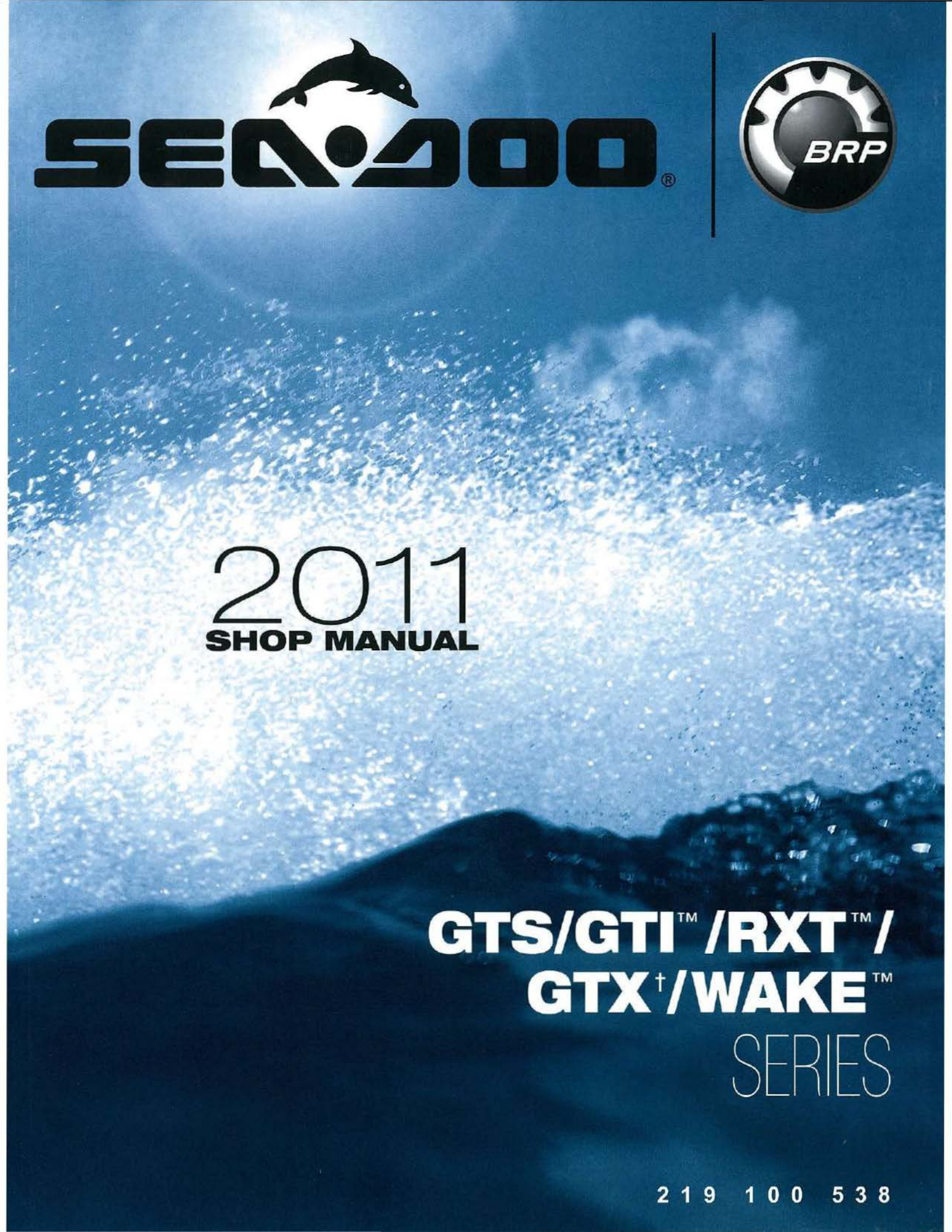

SEA-DOO
BRP
2011
SHOP MANUAL
GTS/GTI™ /RXT™ /
GTX†/WAKE™
SERIES
219 100 538

2011
Shop Manual

GTS/GTI™/RXT™/GTX†/WAKE™ SERIES

SEA-DOO. BRP

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manuals

SAFETY NOTICE

This manual has been prepared as a guide to correctly service and repair 2011 Sea-Doo® watercraft as described in the model list in the *INTRODUCTION*.

This edition was primarily published to be used by technicians who are already familiar with all service procedures relating to BRP products. Mechanical technicians should attend training courses given by BRPTI.

Please note that the instructions will apply only if proper hand tools and special service tools are used.

The contents of this manual depicts parts and procedures applicable to the particular product at the time of writing. Service and Warranty Bulletins may be published to update the content of this manual. Dealer modifications that were carried out after manufacturing of the product, whether or not authorized by BRP, are not included.

In addition, the sole purpose of the illustrations throughout the manual, is to assist identification of the general configuration of the parts. They are not to be interpreted as technical drawings or exact replicas of the parts.

The use of BRP parts is most strongly recommended when considering replacement of any component. Dealer and/or distributor assistance should be sought in case of doubt.

The engines and the corresponding components identified in this document should not be utilized on product(s) other than those mentioned in this document.

It is understood that certain modifications may render use of the watercraft illegal under existing federal, provincial and state regulations.

This manual emphasizes particular information denoted by the following wording and symbols:

⚠ WARNING

Indicates a potential hazard that, if not avoided, could result in serious injury or death.

⚠ CAUTION Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE Indicates an instruction which, if not followed, could result in severe damage to vehicle components or other property.

NOTE: Indicates supplementary information required to fully complete an instruction.

Although the mere reading of such information does not eliminate the hazard, your understanding of the information will promote its correct use. Always use common shop safety practice.

It is understood that this manual may be translated into another language. In the event of any discrepancy, the English version shall prevail.

BRP disclaims liability for all damages and/or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and/or verified by a highly skilled professional mechanic.

INTRODUCTION

This shop manual covers the following BRP made 2011 Sea-Doo watercraft models.

MODEL	MODEL NUMBER
GTI Limited	39BA, 39BB
GTI SE	24BA, 24BB, 24BC, 30BA, 30BB
GTI	23BA, 23BB
GTS	25BA, 43BA, 43BB
GTX Limited iS	18BA, 18BB
GTX iS	33BA
GTX	38BA, 38BB, 42BA, 42BB
RXT iS	34BA, 34BB
RXT-X aS	41BA
RXT-XRS aS	41BB
RXT X	31BA
RXT XRS	31BB
RXT	17BA, 17BB
WAKE	35BA, 35BB
WAKE PRO	26BA, 26BB

The information and component/system descriptions contained in this manual are correct at time of writing. BRP however, maintains a policy of continuous improvement of its products without imposing upon itself any obligation to install them on products previously manufactured.

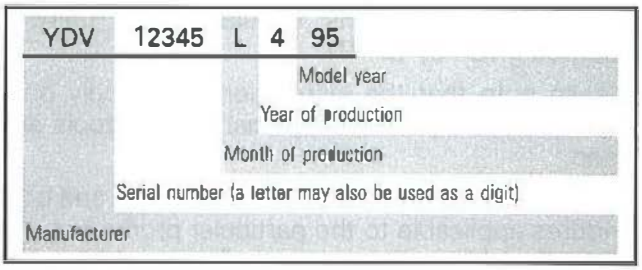
Due to late changes, there may be some differences between the manufactured product and the description and/or specifications in this document.

BRP reserves the right at any time to discontinue or change specifications, designs, features, models or equipment without incurring obligation.

VEHICLE INFORMATION

HULL IDENTIFICATION NUMBER (H.I.N.)

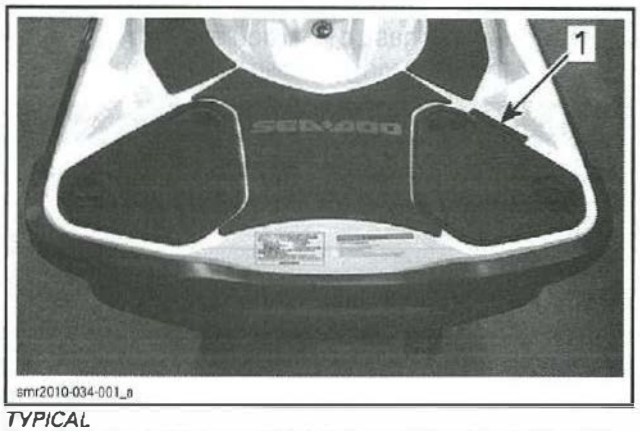
The hull identification number is composed of 12 digits:



It is located on the deck at the rear of watercraft.



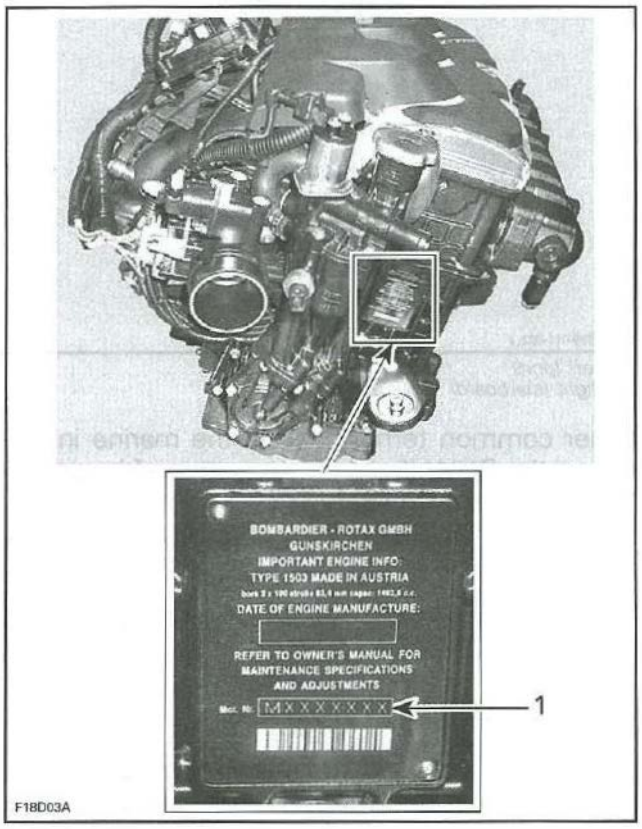
TYPICAL
1. Hull Identification Number (H.I.N.) - aS and iS models



TYPICAL
1. Hull Identification Number (H.I.N.) - models without aS and iS

ENGINE IDENTIFICATION NUMBER (E.I.N.)

The Engine Identification Number is located on front end of the engine.



TYPICAL
1. Engine Identification Number (E.I.N.)

HOISTING A WATERCRAFT

To work on a watercraft, you should mount it securely on a stand.

The LIFTING STRAP (P/N 529 036 171) MUST be used to hoist and mount the watercraft on a stand.

NOTICE **Using any lifting strap kit other than the one recommended may cause damage to the vehicle. Bumpers could be torn off.**



TYPICAL

ENGINE EMISSIONS INFORMATION

Manufacturer's Responsibility

Since production of the 1999 model year engines, PWC manufacturers of marine engines are required to determine the exhaust emission levels for each engine horsepower family and certify these engines with the United States of America *ENVIRONMENTAL PROTECTION AGENCY (EPA)*. An emissions control information label, showing emission levels and engine specifications, must be placed on each vehicle at the time of manufacture.

Dealer Responsibility

When servicing all 1999 and more recent SEA-DOO watercrafts that carry an emissions control information label, adjustments must be kept within published factory specifications.

Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the prescribed certification standards.

Dealers are not to modify the engine in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications.

Exceptions include manufacturers' prescribed changes, such as altitude adjustments.

Owner Responsibility

The owner/operator is required to have engine maintenance performed to maintain emission levels within prescribed certification standards.

The owner/operator is not to, and should not allow anyone else to modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

EPA Emission Regulations

All new 1999 and more recent SEA-DOO watercrafts manufactured by BRP are certified to the EPA standards as conforming to the requirements of the regulations for the control of air pollution emitted from new watercraft engines. This certification is contingent on certain adjustments being set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, whenever practicable, returned to the original intent of the design.

The responsibilities listed above are general and in no way a complete listing of the rules and regulations pertaining to the EPA requirements on exhaust emissions for marine products. For more detailed information on this subject, you may contact:

For All Courier Services:
U.S. Environmental Protection Agency
Office of Transportation and Air Quality
1310 L Street NW
Washington D.C. 20005

Regular US Postal Mail:
U.S. Environmental Protection Agency
Office of Transportation and Air Quality
1200 Pennsylvania Ave. NW
Mail Code 6403J
Washington D.C. 20460

INTERNET WEB SITE: http://www.epa.gov/otaq

E-Mail: otaqpublicweb@epa.gov

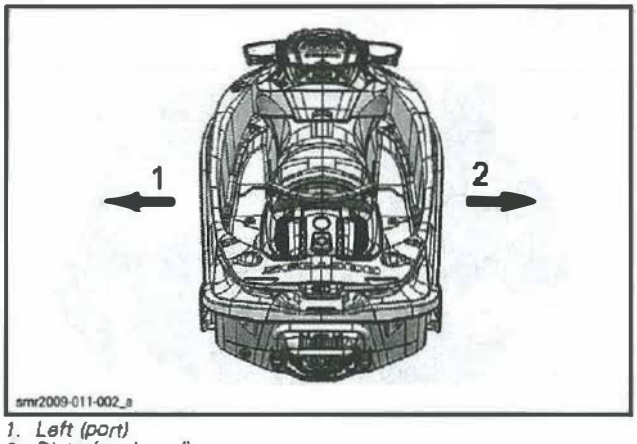
MANUAL INFORMATION

MANUAL PROCEDURES

Many of the procedures in this manual are interrelated. Before undertaking any task, you should read and thoroughly understand the entire section or subsection in which the procedure is contained.

A number of procedures throughout the book require the use of special tools. Before commencing any procedure, be sure that you have on hand all the tools required, or their approved equivalents.

The use of RIGHT (starboard) and LEFT (port) indications in the text are always referenced to the driving position (when sitting on the watercraft).



1. Left (port)
2. Right (starboard)

Other common terms used in the marine industry are the BOW (front of the watercraft), and the STERN (rear of the watercraft).

This manual uses technical terms which may be different from the ones in the *PARTS CATALOGS*.

When ordering parts always refer to the specific model *PARTS CATALOGS*.

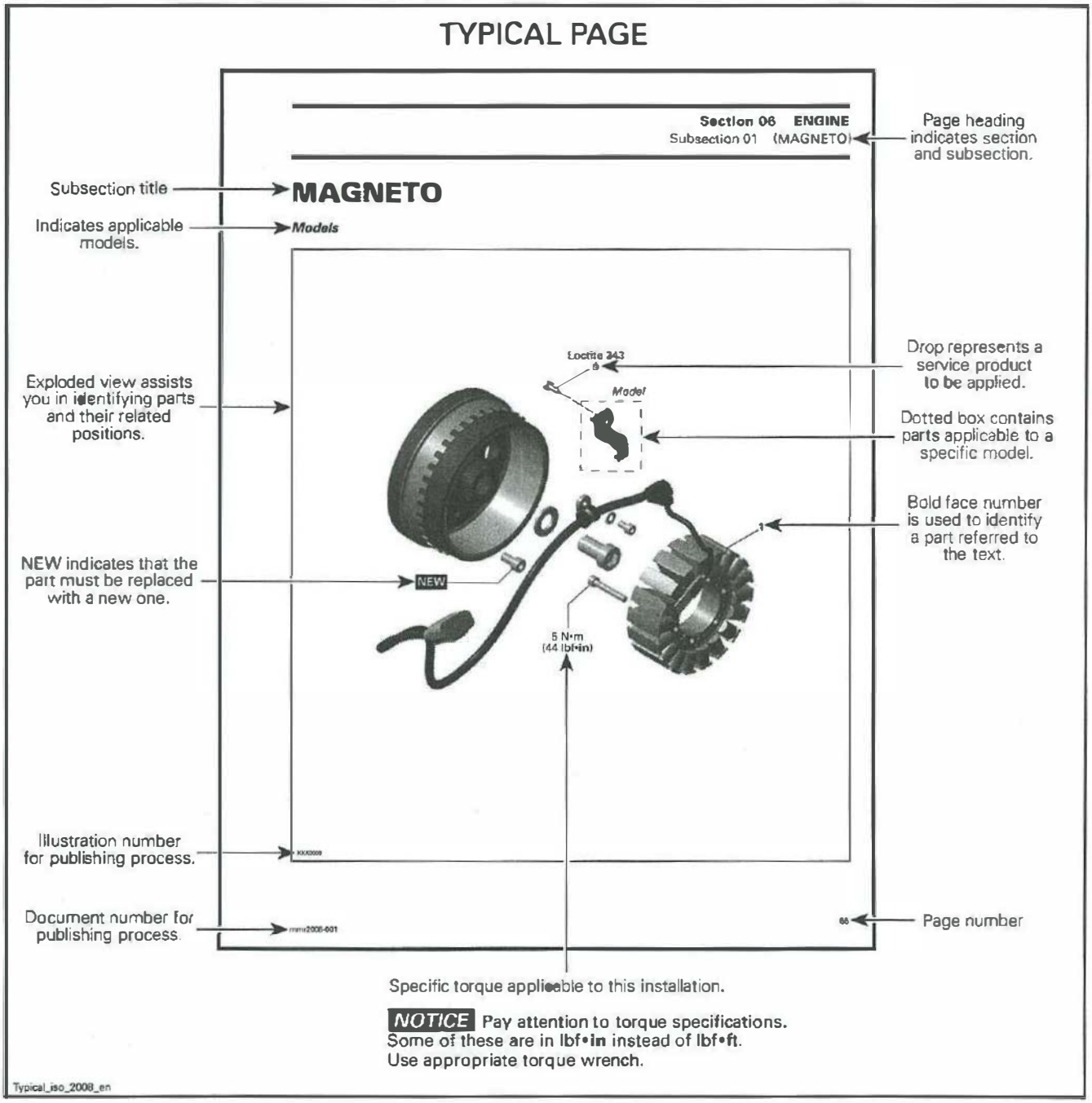
MANUAL LAYOUT

This manual is divided into many major sections as can be seen in the main table of contents at the beginning of the manual.

Each section is divided into various subsections, and again, each subsection has one or more divisions.

Illustrations and photos show the typical construction of various assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts used in a particular model vehicle. However, they represent parts which have the same or a similar function.

TYPICAL PAGE



TYPICAL PAGE

Tittle in bold indicates category of information to be carried out.

GENERAL

NOTE: The following procedures can be done without removing the engine.

During assembly/installation, use the torque values and service products as in the exploded views.

Reference to a specific section or subsection.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* sections at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, etc.) must be replaced with new ones.

PROCEDURES

Indicates component procedures apply to.

MAGNETO FLYWHEEL

Magneto Flywheel Cleaning

Clean all metal components in a non-ferrous metal cleaner.

CAUTION: Clean magneto flywheel using only a clean cloth.

Indicates specific procedure to be carried out.

Magneto Flywheel Removal

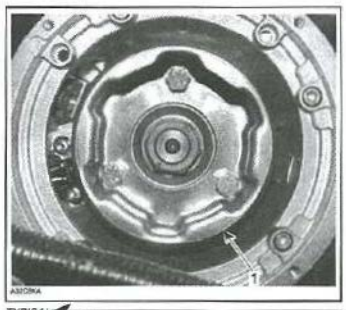
Remove muffler, refer to the *EXHAUST SYSTEM* section.

Remove acoustic panel.

Remove rewind starter.

Remove starting pulley no. 2.

Bold face number following part name refers to exploded view at beginning of subsection.

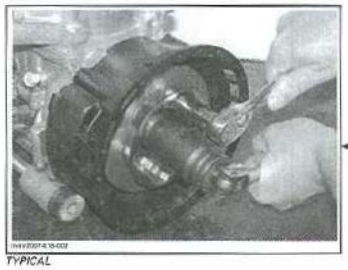


TYPICAL
1. Starting pulley

"TYPICAL" indicates a general view which may not represent exact details.

Call-outs pertaining to above illustration.

NOTE: To remove starting pulley bolts, hold magneto flywheel with a socket as shown.



TYPICAL

Illustration always follows text to which it applies.

Models

Remove the connecting flange retaining the rewind starter to the engine housing.

Italic bold face type-setting indicates a procedure applicable to a specific model(s).

typical_txt_2009_en

TIGHTENING TORQUE

Tighten fasteners to the torque specified in the exploded view(s) and/or in the written procedure. When a torque is not specified, the torque normally recommended for a specific fastener should be used. Refer to the following table.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices must be replaced when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).

In order to avoid a poor assembly, tighten screws, bolts, or nuts in accordance with the following procedure:

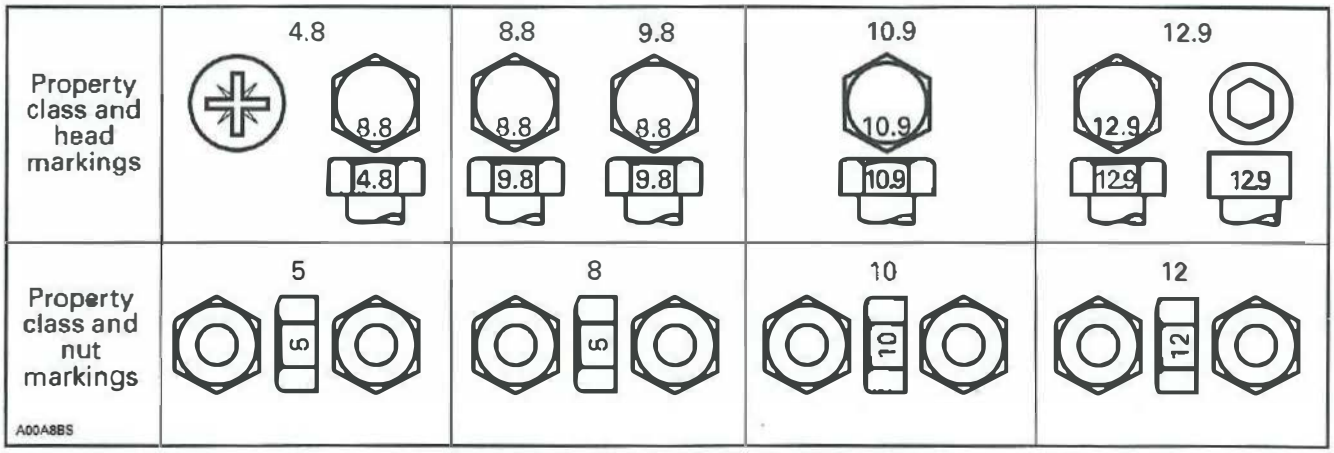
1. Manually screw all screws, bolts and/or nuts.
2. Apply half the recommended torque value.

NOTICE **Be sure to use the recommended tightening torque for the specified fastener used.**

NOTE: Whenever possible, always apply torque on the nut.

3. Tighten fastener to the recommended torque value.

NOTE: Always torque screws, bolts and/or nuts using a crisscross pattern when multiple fasteners are used to secure a part (e.g. a cylinder head). Some parts must be torqued according to a specific sequence and torque pattern as detailed in the installation procedure.

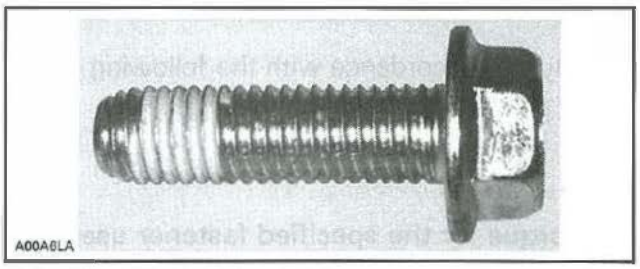


FASTENER SIZE	FASTENER GRADE/TORQUE			
	5.8 Grade	8.8 Grade	10.9 Grade	12.9 Grade
M4	1.5 – 2 N•m (13 – 18 lbf•**in**)	2.5 – 3 N•m (22 – 27 lbf•**in**)	3.5 – 4 N•m (31 – 35 lbf•ft)	4 – 5 N•m (35 – 44 lbf•ft)
M5	3 – 3.5 N•m (27 – 31 lbf•ft)	4.5 – 5.5 N•m (40 – 47 lbf•ft)	7 – 8.5 N•m (62 – 75 lbf•ft)	8 – 10 N•m (71 – 89 lbf•ft)
M6	6.5 – 8.5 N•m (58 – 75 lbf•ft)	8 – 12 N•m (71 – 106 lbf•ft)	10.5 – 15 N•m (93 – 133 lbf•**in**)	16 N•m (142 lbf•**in**)
M8	15 N•m (133 lbf•**in**)	25 N•m (18 lbf•ft)	32 N•m (24 lbf•ft)	40 N•m (30 lbf•ft)
M10	29 N•m (21 lbf•ft)	48 N•m (35 lbf•ft)	61 N•m (45 lbf•ft)	73 N•m (54 lbf•ft)
M12	52 N•m (38 lbf•ft)	85 N•m (63 lbf•ft)	105 N•m (77 lbf•ft)	128 N•m (94 lbf•ft)
M14	85 N•m (63 lbf•ft)	135 N•m (100 lbf•ft)	170 N•m (125 lbf•ft)	200 N•m (148 lbf•ft)

FASTENER INFORMATION

NOTICE Most fasteners are metric. Mismatched or incorrect fasteners could cause damage to the vehicle.

SELF-LOCKING FASTENER PROCEDURE



TYPICAL — SELF-LOCKING FASTENER

The following describes common procedures used when working with self-locking fasteners.

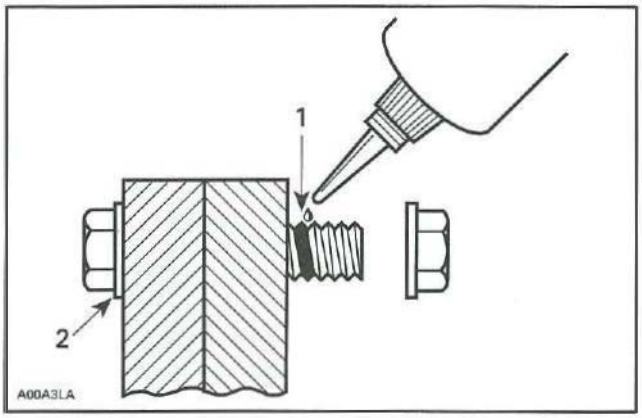
Use a metal brush or a tap to clean the hole properly, then use a solvent. Allow the solvent time to act, approximately 30 minutes, then wipe off. Solvent utilization is to ensure proper adhesion of the product used for locking the fastener.

LOCTITE® APPLICATION PROCEDURE

The following describes common procedures used when working with Loctite products.

NOTE: Always use proper strength Loctite product as recommended in this Shop Manual.

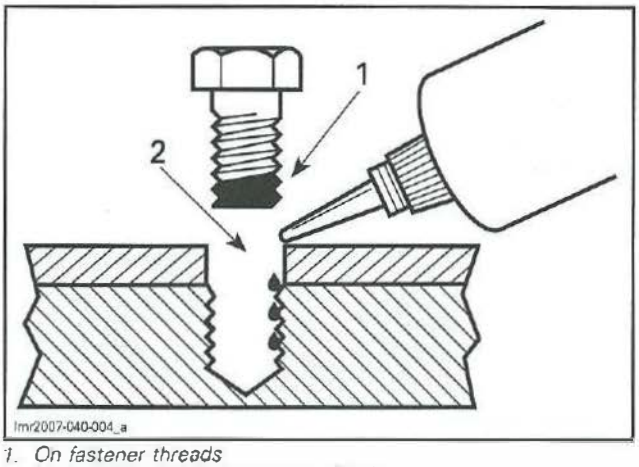
Threadlocker Application for Uncovered Holes (Bolts and Nuts)



1. Apply here
2. Do not apply

1. Clean threads (bolt and nut) with solvent.
2. Apply LOCTITE PRIMER N (P/N 293 800 041) on threads and allow to dry.
3. Choose proper strength Loctite threadlocker.
4. Fit bolt in the hole.
5. Apply a few drops of threadlocker at proposed tightened nut engagement area.
6. Position nut and tighten as required.

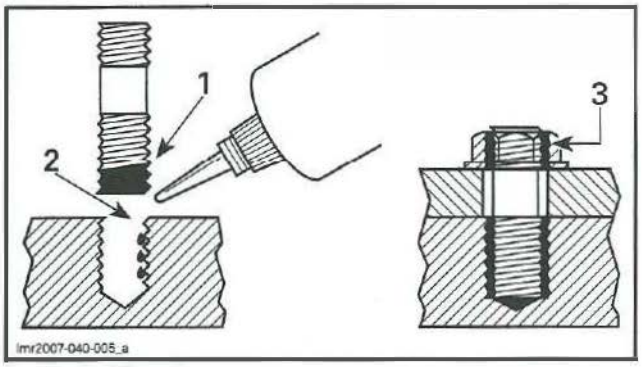
Threadlocker Application for Blind Holes



1. On fastener threads
2. On threads and at the bottom of hole

1. Clean threads (bolt and hole) with solvent.
2. Apply LOCTITE PRIMER N (P/N 293 800 041) on threads (bolt and nut) and allow to dry for 30 seconds.
3. Choose proper strength Loctite threadlocker.
4. Apply several drops along the threaded hole and at the bottom of the hole.
5. Apply several drops on bolt threads.
6. Tighten as required.

Threadlocker Application for Stud Installation in Blind Holes



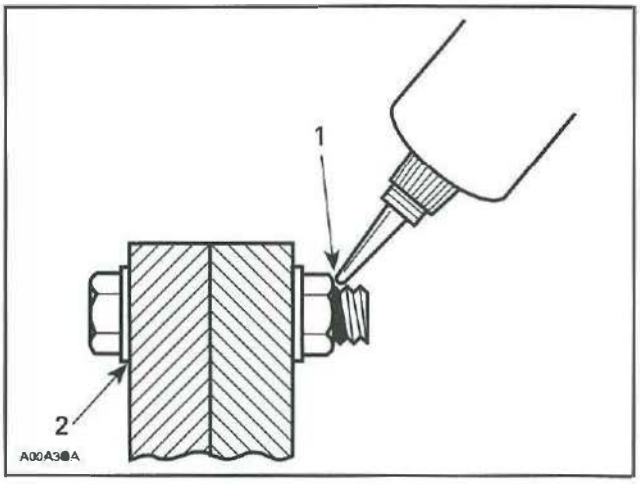
1. On stud threads
2. On threads and in the hole
3. On retaining nut threads

1. Clean threads (stud and hole) with solvent.
2. Apply LOCTITE PRIMER N (P/N 293 800 041) on threads and allow to dry.
3. Put 2 or 3 drops of proper strength Loctite threadlocker on female threads and in hole.

NOTE: To avoid a hydro lock situation, do not apply too much Loctite.

4. Apply several drops of proper strength Loctite on stud threads.
5. Install stud.
6. Install cover, part, etc.
7. Apply a few drops of proper strength Loctite on uncovered stud threads.
8. Install and tighten retaining nut(s) as required.

Threadlocker Application for Pre-Assembled Parts

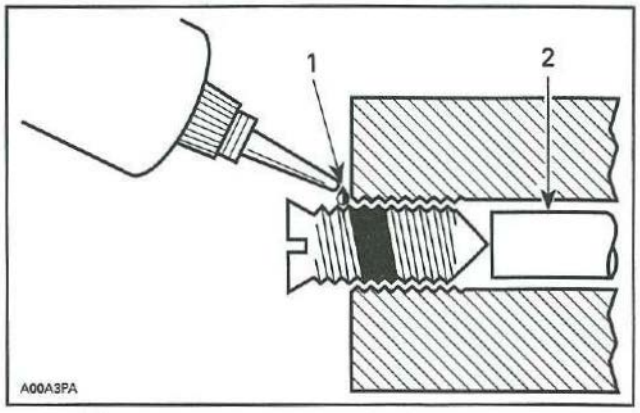


1. Apply here
2. Do not apply

1. Clean bolts and nuts with solvent.
2. Assemble components.
3. Tighten nuts.
4. Apply a few drops of proper strength Loctite on bolt/nut contact surfaces.
5. Avoid touching metal with tip of flask.

NOTE: For preventive maintenance on existing equipment, retighten nuts and apply proper strength Loctite on bolt/nut contact surfaces.

Threadlocker Application for an Adjustment Screw

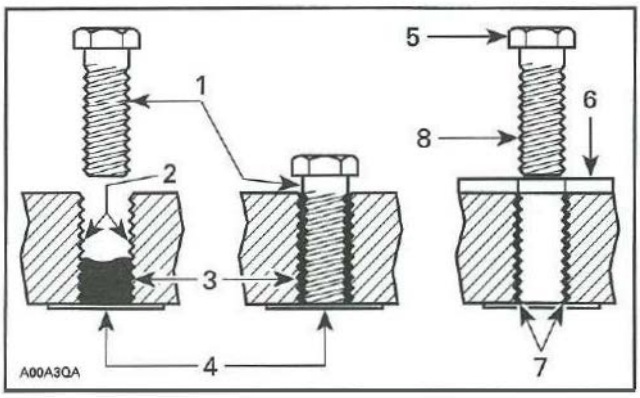


1. Apply here
2. Plunger

1. Adjust screw to proper setting.
2. Apply a few drops of proper strength Loctite threadlocker on screw/body contact surfaces.
3. Avoid touching metal with tip of flask.

NOTE: If it is difficult to readjust, heat screw with a soldering iron (232°C (450°F)).

Application for Stripped Thread Repair



1. *Release agent*
2. *Stripped threads*
3. *Form-A-Thread*
4. *Tape*
5. *Cleaned bolt*
6. *Plate*
7. *New threads*
8. *Threadlocker*

Standard Thread Repair

Follow instructions on Loctite FORM-A-THREAD 81668 package.

If a plate is used to align bolt:

1. Apply release agent on mating surfaces.
2. Put waxed paper or similar film on the surfaces.
3. Twist bolt when inserting it to improve thread conformation.

NOTE: NOT intended for engine stud repairs.

Repair of Small Holes/Fine Threads

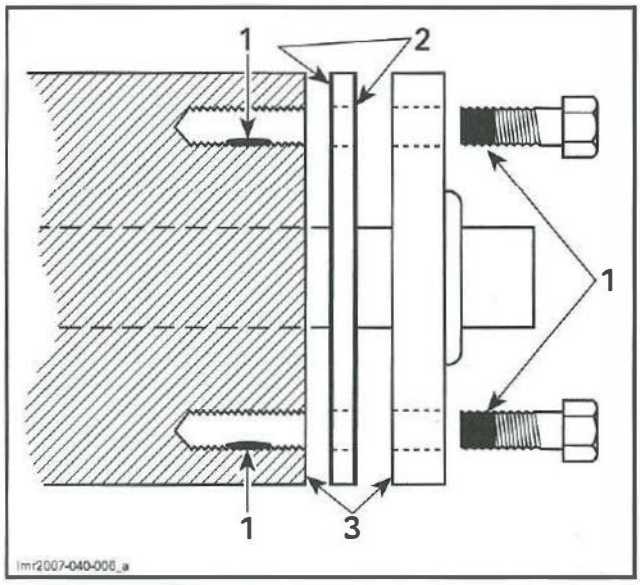
Option 1: Enlarge damaged hole, then follow *STANDARD THREAD REPAIR* procedure.

Option 2: Apply FORM-A-THREAD on the screw and insert in damaged hole.

Permanent Stud Installation (Light Duty)

1. Use a stud of the desired thread length.
2. DO NOT apply release agent on stud.
3. Follow Standard Thread Repair procedure.
4. Allow 30 minutes for Loctite FORM-A-THREAD to cure.
5. Complete part assembly.

Gasket Compound Application



1. *Proper strength Loctite*
2. *Loctite Primer N (P/N 293 800 041) and Gasket Eliminator 518 (P/N 293 800 038) on both sides of gasket*
3. *Loctite Primer N only*

1. Remove old gasket and other contaminants using LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500). Use a mechanical means only if necessary.

NOTE: Avoid grinding.

2. Clean both mating surfaces with solvent.
3. Spray Loctite Primer N on both mating surfaces and on both sides of gasket and allow to dry 1 or 2 minutes.
4. Apply LOCTITE 518 (P/N 293 800 038) on both sides of gasket, using a clean applicator.
5. Place gasket on mating surfaces and assemble parts immediately.

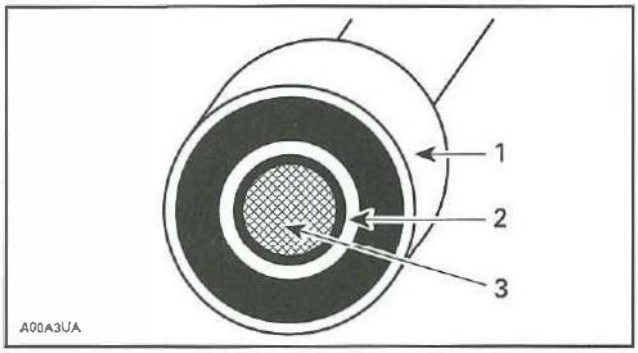
NOTE: If the cover is bolted to blind holes, apply proper strength Loctite in the hole and on threads. Tighten fastener.

If holes are sunken, apply proper strength Loctite on bolt threads.

6. Tighten as usual.

Threadlocker Application for Mounting on a Shaft

Mounting with a Press



1. Bearing
2. Proper strength Loctite
3. Shaft

1. Clean shaft external contact surface.
2. Clean internal contact surface of part to be installed on shaft.
3. Apply a strip of proper strength Loctite on circumference of shaft contact surface at insertion or engagement point.

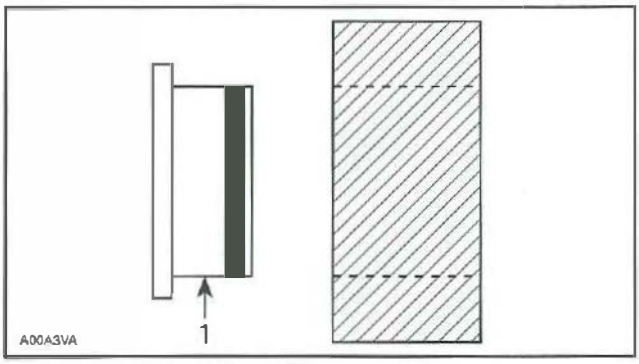
NOTE: Retaining compound is always forced out when applied on shaft.

4. DO NOT use antiseize Loctite or any similar product.
5. No curing period is required.

Mounting in Tandem

1. Apply retaining compound on internal contact surface (bore) of parts to be installed.
2. Continue parts assembly as per previous illustration.

Threadlocker Application for Case-In Components (Metallic Gaskets)



1. Proper strength Loctite

1. Clean inner housing diameter and outer gasket diameter.
2. Spray housing and gasket with LOCTITE PRIMER N (P/N 293 800 ●41).
3. Apply a strip of proper strength Loctite on leading edge of outer metallic gasket diameter.

NOTE: Any Loctite product can be used here. A low strength liquid is recommended as normal strength and gap are required.

4. Install according to standard procedure.
5. Wipe off excess product.
6. Allow 30 minutes for product to cure.

NOTE: Normally used on worn-out housings to prevent leaking or sliding.

It is generally not necessary to remove gasket compound applied on outer gasket diameter.

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3-PIN MAGNETO HARNESS ADAPTER
(P/N 529 036 016)



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4-PIN SOCKET
(P/N 529 035 948)



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ADAPTER HOSE
(P/N 529 035 652)



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ALIGNMENT SHAFT ADAPTER
(P/N 529 035 719)



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ALIGNMENT SHAFT SUPPORT
(P/N 529 035 506)



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ALIGNMENT SHAFT
(P/N 295 000 141)

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BEARING SUPPORT/PUSHER
(P/N 529 035 950)



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BLIND HOLE BEARING PULLER SET
(P/N 529 036 117)



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CAMSHAFT LOCKING TOOL
(P/N 529 035 839)



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CRANKSHAFT LOCKING TOOL
(P/N 529 035 821)



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CRIMPING TOOL (HEAVY GAUGE WIRE)
(P/N 529 035 730)



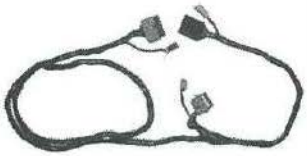
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D.E.S.S. POST REMOVER
(P/N 529 035 943)



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DIAGNOSTIC HARNESS
(P/N 529 036 188)



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DIGITAL INDUCTION TACHOMETER
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DRIVE SHAFT ADAPTER
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DRIVE SHAFT C-CLIP REMOVER
(P/N 529 036 026)



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ECM ADAPTER TOOL
(P/N 529 036 166)



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ECM TERMINAL REMOVER 2.25
(P/N 529 036 175)



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ECM TERMINAL REMOVER 3.36
(P/N 529 036 174)



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ENGINE ALIGNMENT TOOL
(P/N 529 036 197)



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ENGINE LEAK DOWN TEST KIT
(P/N 529 035 661)



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FLOATING RING TOOL (TYPE I)
(P/N 529 035 841)



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FLUKE 115 MULTIMETER
(P/N 529 035 868)



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FLUSHING CONNECTOR ADAPTER
(P/N 295 500 473)



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FUEL HOSE ADAPTER
(P/N 529 036 023)



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FUEL HOSE DISCONNECT TOOL
(P/N 529 036 037)



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FUEL PUMP MODULE SOCKET
(P/N 529 036 125)



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HANDLE
(P/N 420 877 650)



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IMPELLER REMOVER/INSTALLER
(P/N 529 035 820)



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IMPELLER REMOVER/INSTALLER
(P/N 529 035 956)



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IMPELLER SHAFT BEARING TOOL
(P/N 529 036 168)



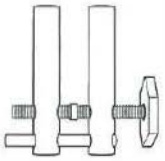
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IMPELLER SHAFT PUSHER
(P/N 529 035 955)



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LARGE HOSE PINCHER
(P/N 529 032 500)



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MAGNETO HARNESS 6 PINS
(P/N 295 000 136)



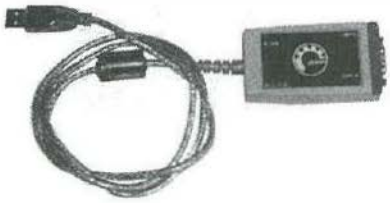
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MPI-2 DIAGNOSTIC CABLE
(P/N 710 000 851)



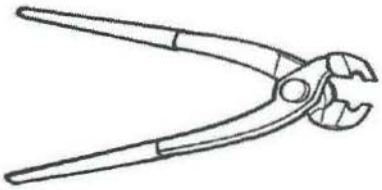
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MPI-2 INTERFACE CARD
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PRESSURE CAP
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PRESSURE GAUGE
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PTO SUPPORT TOOL
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PUMP PLATE
(P/N 529 036 224)



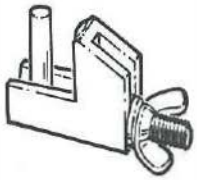
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SEAL/BEARING PUSHER
(P/N 529 035 819)



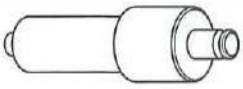
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SMALL HOSE PINCHER
(P/N 295 000 076)



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STARTER DRIVE SEAL PUSHER
(P/N 420 876 502)



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STEERING CABLE TOOL
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SUCTION PUMP
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SUPERCHARGER GEAR HOLDER
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SUPERCHARGER OIL SPRAY NOZZLE TOOL
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SUPERCHARGER RETAINING KEY
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SUPERTANIUM DRILL BIT 3/16"
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SUPPORT PLATE
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TEST CAP
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THRU-HULL ADAPTER
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TORX ADAPTER
(P/N 529 035 938)



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VACUUM/PRESSURE PUMP
(P/N 529 021 800)



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VALVE GUIDE PUSHER (6 MM)
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VALVE GUIDE REMOVER (6 MM)
(P/N 529 036 086)



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VALVE SPRING COMPRESSOR CUP
(P/N 529 036 073)



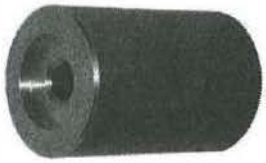
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VALVE SPRING COMPRESSOR
(P/N 529 035 724)



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WATER PUMP SEAL PUSHER
(P/N 529 035 823)



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BREAK-IN INSPECTION

BRP recommends that the maintenance or inspection items listed in the following table be carried out immediately after the first 10 hours of operation (break-in period).

NOTE: Some maintenance or inspection items listed in the following maintenance schedule may not be applicable to every watercraft model (iS, aS, iBR and supercharger components). Follow maintenance schedule as applicable to watercraft model.

BREAK-IN INSPECTION CHART	INSPECT	CLEAN	LUBRICATE	ADJUST	REPLACE
ENGINE					
Engine oil and filter					X
Rubber mounts	X				
Corrosion protection			X		
Supercharger clutch	X				
EXHAUST SYSTEM					
Exhaust system fasteners, hoses and components condition. Also inspect for leaks	X				
COOLING SYSTEM					
Hose and fasteners	X				
Coolant	X				
FUEL SYSTEM					
Fuel cap, filler neck, fuel tank, fuel tank straps, fuel lines and connections	X				
Fuel system leak test	X				
Throttle body	X				
AIR INTAKE SYSTEM					
Air intake silencer	X				
ELECTRONIC MANAGEMENT SYSTEM					
EMS sensors	X				
Fault codes (ECM, iBR, iS, cluster)	X				
ELECTRICAL SYSTEM					
Spark plugs	X				
Electrical connections and fastening (ignition system, starting system, fuel injectors, fuse boxes etc.)	X				
Engine cut-off switch	X				
Monitoring beeper	X				
Battery and fasteners	X				
STEERING SYSTEM					
Steering cable and connections	X				
Steering nozzle bushings	X				
O.T.A.S. (see NOTE 1 after break-in inspection chart)	X				

BREAK-IN INSPECTION CHART	INSPECT	CLEAN	LUBRICATE	ADJUST	REPLACE	
PROPULSION SYSTEM						
Carbon ring and rubber boot (drive shaft)	X					
Impeller boot	X					
Sacrificial anode (if so equipped)	X					
Impeller and impeller wear ring clearance	X					
Pump mounts	X					
iBR SYSTEM (intelligent Brake and Reverse)						
iBR gate backlash	X					
iBR support plates	X					
iBR friction sleeves	X					
iBR connecting arms, sleeves and bushings	X					
iBR U lever, VTS trim ring, iBR gate and bushings	X					
iBR U arm to actuator shaft retaining screw torque (see NOTE 2 after break-in inspection chart)	X					
iBR protective guard	X					
iS SYSTEM (intelligent Suspension)						
iS oil	X					
iS position sensor	X					
aS SYSTEM (adjustable Suspension)						
Nitrogen remote reservoir (adjustment knob, mounts)					X	
HULL/BODY						
Hull	X					
Ride plate and water intake grate	X					

(1) Inspect operation.

(2) Ensure proper torque of screws retaining iBR U arm to iBR actuator shaft. If retaining screws found loose, do not re-torque them. Replace them with new ones.

MAINTENANCE SCHEDULE

The maintenance schedule should be adjusted according to operating conditions and use.

NOTE: The schedule provides an equivalence between number of hours and months/year. Maintenance operations should be carried out following whichever time frame comes due first.

IMPORTANT: Watercraft rental operations or intensive use of watercraft, will require greater frequency of inspection and maintenance.

When maintenance is completed, the maintenance reminders must be cleared using B.U.D.S. Refer to the *(INFORMATION CENTER GAUGE)* subsection.

NOTE: Some maintenance or inspection items listed in the following maintenance schedule may not be applicable to every watercraft model (iS, aS, iBR and supercharger components). Follow maintenance schedule as applicable to watercraft model.

A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE O: OPERATOR D: DEALER	25 HOURS OR 3 MONTHS	50 HOURS OR 6 MONTHS	100 HOURS OR 1 YEAR	200 HOURS OR 2 YEAR	TO BE PERFORMED BY	
PART/TASK						NOTE
ENGINE						
Engine oil and filter			R		D	(1) See NOTE 1 after maintenance schedule.
Rubber mounts			I		D	
Corrosion protection		L			O	
Supercharger clutch	R (1)				D	
EXHAUST SYSTEM						
Exhaust system			I, C (2)		O/D	(2) Daily flushing in salt water or foul water use.
COOLING SYSTEM						
Coolant				R	D	—
FUEL SYSTEM						
iTC lever (3)			I, L		O/D	(3) See NOTE 2 after maintenance schedule.
Fuel cap, filler neck, fuel tank, fuel tank straps, fuel lines and connections			I (4)		D	(4) At storage period or after 100 hours of use whichever comes first.
Fuel system leak test			I		D	
Throttle body			I		D	
AIR INTAKE SYSTEM						
Air intake silencer			I, C		D	—
Blow-by valve hose			I, C		D	
ELECTRONIC MANAGEMENT SYSTEMS						
EMS sensors			I		D	—
Fault codes (ECM, iBR, iS, Cluster)			I		D	

A: ADJUST
C: CLEAN
I: INSPECT
L: LUBRICATE
R: REPLACE

D: OPERATOR
D: DEALER

PART/TASK	25 HOURS OR 3 MONTHS	50 HOURS OR 6 MONTHS	100 HOURS OR 1 YEAR	200 HOURS OR 2 YEAR	TO BE PERFORMED BY	NOTE
ELECTRICAL SYSTEM						
Spark plugs			I	R	D	(5) Inspect once a month. Add electrolyte as required.
Ignition coils			I, L		D	
Electrical connections and fastening (ignition system, starting system, fuel injectors, fuse boxes etc.)			I		D	
Engine cut-off switch			I		D	
Monitoring beeper			I		D	
Battery and fasteners		I (5)			D	
STEERING SYSTEM						
Steering cable and connections			I		D	(6) Inspect operation.
Steering nozzle bushings			I		D	
O.T.A.S. (6)			I		D	
PROPULSION SYSTEM						
Carbon ring and rubber boot (drive shaft)			I		D	(4) At storage period or after 100 hours of use whichever comes first. (7) Inspect each month (more often in salt water use) and change when necessary.
Impeller boot			I		D	
Impeller shaft seal, sleeve and O-ring			I (4)		D	
Drive shaft/impeller splines			I, L		D	
Sacrificial anode (if so equipped)		I (7)			D	
Impeller and impeller wear ring clearance			I		D	
Pump mounts			I		D	
iBR SYSTEM (intelligent Brake and Reverse)						
iBR control lever (3)			I, L		O/D	(3) See NOTE 2 after maintenance chart. (4) At storage period or after 100 hours of use whichever comes first. (8) See NOTE 3 after maintenance schedule.
iBR gate backlash			I		D	
iBR support plates			I		D	
iBR friction sleeves			R		D	
iBR connecting arms, sleeves and bushings			I		D	
iBR U lever, VTS trim ring, iBR gate and bushings			I		D	
iBR U arm to actuator shaft retaining screw torque			I (4) (8)		D	
iBR protective guard			I		D	
iS SYSTEM (intelligent Suspension)						
iS oil (9)			I		D	(9) Check pump reservoir oil level and for system leaks.
iS position sensor			I		D	

A: ADJUST C: CLEAN I: INSPECT L: LUBRICATE R: REPLACE O: OPERATOR D: DEALER	25 HOURS OR 3 MONTHS	50 HOURS OR 6 MONTHS	100 HOURS OR 1 YEAR	200 HOURS OR 2 YEAR	TO BE PERFORMED BY	
PART/TASK						NOTE
aS SYSTEM (adjustable Suspension)						
Nitrogen remote reservoir (adjustment knob, mounts)			I		D	—
HULL AND BODY						
Hull			I		O	—
Ride plate and water intake grate			I		O	

(1) The supercharger clutch requires replacement when the SUPERCHARGER MAINTENANCE REQUIRED message is displayed on the information center every 100 hours of operation or earlier depending on the riding style (speed, engine's RPM, water conditions). This is determined by the engine management system. The supercharger clutch will need to be replaced within 5 hours of the message display. The supercharger maintenance reminder must be reset using B.U.D.S. in order to reset the supercharger maintenance hour counter, even if the maintenance was carried out before the reminder appeared in the information center.

(2) The iTC and iBR levers should be inspected by depressing and releasing the levers to check for freedom of movement. If any friction is felt, the lever must be taken apart, cleaned, inspected for wear and lubricated.

(3) Ensure proper torque of screws retaining iBR U arm to iBR actuator shaft. If retaining screws are found loose, do not re-torque them. Replace them with new ones.

STORAGE PROCEDURE

SERVICE PRODUCTS

Description	Part Number	Page
DOW CORNING 111	413 707 000	14
LOCTITE 767 (ANTISEIZE LUBRICANT)	293 800 070	13
XPS FUEL STABILIZER	413 408 601	11
XPS LUBE	293 600 016	11, 13–14

PROCEDURES

PROPULSION SYSTEM

XPS Lube Cleaning

Clean jet pump by spraying water in its inlet and outlet and then apply a coating of XPS LUBE (P/N 293 600 016) or equivalent.

⚠ WARNING

Always remove tether cord from the engine cut-off switch to prevent unexpected engine starting before cleaning the jet pump area. Engine must not be running for this operation.

Jet Pump Inspection

Remove impeller cover and check if jet pump is water contaminated; if so, refer to *JET PUMP* subsection for the repair procedure.

FUEL SYSTEM

Fuel System Inspection

Verify fuel system. Check fuel hoses for leaks. Replace damaged hoses or clamps if necessary.

Fuel System Protection

XPS FUEL STABILIZER (P/N 413 408 601) (or equivalent) should be added in the fuel tank to prevent fuel deterioration and fuel system gumming. Follow manufacturer's instructions for proper use.

NOTICE Fuel stabilizer should be added prior to engine lubrication to ensure fuel system component protection against varnish deposits.

Fill up fuel tank completely. Ensure there is no water inside fuel tank.

⚠ WARNING

Always stop the engine before refueling. Fuel is inflammable and explosive under certain conditions. Always work in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity. Fuel tank may be pressurized, slowly turn cap when opening. When fueling, keep watercraft level. Do not overfill or top off the fuel tank and leave watercraft in the sun. As temperature increases, fuel expands and might overflow. Always wipe off any fuel spillage from the watercraft. Periodically inspect fuel system.

NOTICE Should any water be trapped inside fuel tank, severe internal damage will occur to the fuel injection system.

ENGINE

Engine Oil and Filter Replacement

Change engine oil and filter. Refer to *LUBRICATION SYSTEM* subsection.

Exhaust System Flushing

Flush the exhaust system. Refer to *EXHAUST SYSTEM* subsection.

Intercooler Draining (260 Engine)

It is important to expel any trapped water that may have accumulated from condensation in the external intercooler.

NOTICE Failure to drain the intercooler may cause severe damage to this component.

Proceed as follows:

iS and aS Models

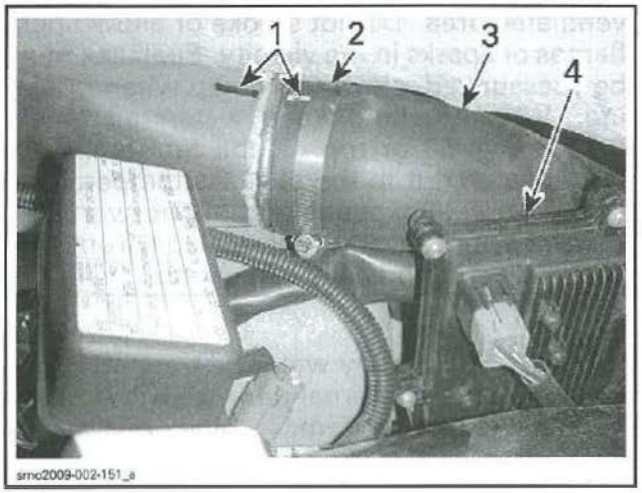
1. Open the boarding platform and remove the RH storage bin.

2. Ensure there is an alignment line drawn on the intercooler outlet hose. This will ensure the hose is not twisted or kinked on reinstallation.
3. Loosen the clamp retaining the intercooler outlet hose.
4. Remove the intercooler outlet hose from the intercooler.

NOTE: This hose feeds the inlet of the throttle body.

iS Models

5. Drape a couple of shop rags over the iS module to protect it from any expelled water from the intercooler.



TYPICAL
1. Hose alignment lines
2. Hose clamp
3. Intercooler outlet hose
4. iS module

All Models

6. Start engine and rev up to 4000 RPM several times. Water will be expelled from the intercooler.

NOTE: Prevent air intake system from aspirating foreign objects which may cause severe engine or damage.

7. Stop engine.
8. Properly align and reinstall hose on intercooler.
9. Torque intercooler hose clamp as specified.

INTERCOOLER HOSE CLAMP TORQUE
4 N•m (35 lbf•**in**)

Models Without iS or aS

1. Open the seat.
2. Ensure there is an alignment line drawn on the throttle body inlet hose. This will ensure the hose is not twisted or kinked on reinstallation.
3. Loosen the clamp retaining the hose to the throttle body.
4. Remove the hose from the throttle body and direct it away from the throttle body and other components.
5. Start engine and rev up to 4000 RPM several times. Water will be expelled from the intercooler.

NOTE: Prevent air intake system from aspirating foreign objects which may cause severe engine or damage.

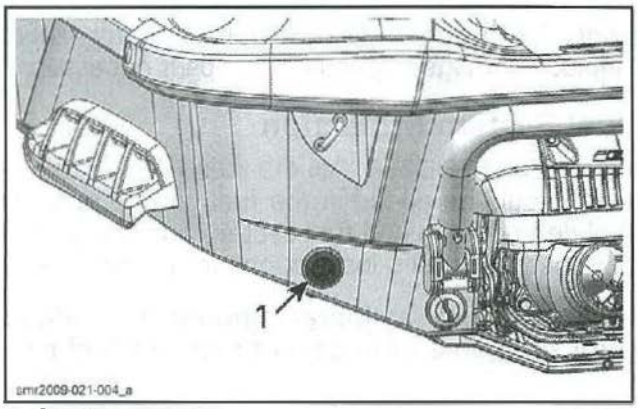
6. Stop engine.
7. Properly align and reinstall hose on throttle body.
8. Torque intercooler hose clamp as specified.

INTERCOOLER HOSE CLAMP TORQUE
4 N•m (35 lbf•**in**)

Exhaust System Protection

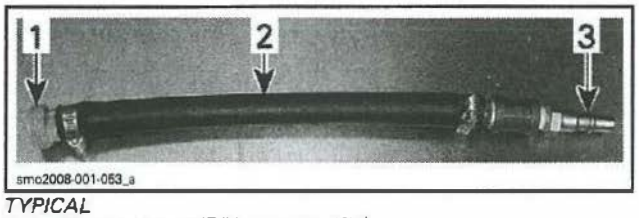
The exhaust system is self draining, but the exhaust manifold and intercooler (215 engine) need to be drained to avoid damages should the watercraft be stored in an area where the temperature attains the freezing point of water.

Using the flushing connector located at the rear of vehicle, inject pressurized air (at 380 kPa (55 PSI)) in the system until there is no more water flowing from jet pump.



1. Flushing connector

The following hose can be fabricated to ease draining procedure.



TYPICAL
1. *Flushing adaptor (P/N 295 500 473)*
2. *Hose 13 mm (1/2 in)*
3. *Air hose male adapter*

NOTICE **Failure to drain the exhaust manifold may cause severe damage to components.**

Engine Coolant Replacement

Antifreeze should be replaced every 200 hours or every two years to prevent antifreeze deterioration.

NOTICE **Failure to replace the antifreeze as recommended may allow its degradation that could result in poor engine cooling.**

If coolant is not replaced, test the coolant density using an antifreeze hydrometer.

Replace coolant if necessary. For the coolant replacement procedure, refer to *COOLING SYSTEM* subsection.

NOTICE **Improper antifreeze density may result in coolant freezing should the vehicle be stored in area where the freezing point is attained. This could seriously damage the engine.**

Engine Internal Lubrication

Engine must be lubricated to prevent corrosion on internal parts.

Lubrication of the engine is recommended at the end of the season and before any extended storage period to provide additional corrosion protection. This will lubricate the engine intake valves, the cylinders and the exhaust valves.

To lubricate the engine, proceed as follows:

1. Open seat.

iS and aS Models

2. Remove the rear ventilation box.

All Models

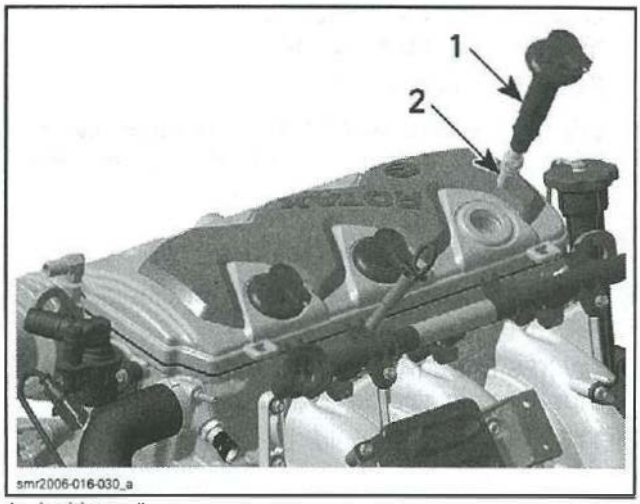
3. Disconnect ignition coil connectors.

⚠ WARNING

When disconnecting coil from spark plug, always disconnect coil from main harness first. Never check for engine ignition spark from an open coil and/or spark plug in the engine compartment as the spark may cause fuel vapors to ignite.

NOTICE **Never cut the locking ties of ignition coil connectors. This would allow mixing of the wires between cylinders.**

4. Clean the area around the ignition coils to avoid dirt falling into a cylinder.
5. Remove ignition coils.
6. Unscrew spark plugs.
7. Using an ignition coil as a puller, remove spark plugs.



1. *Ignition coil*
2. *Spark plug*

8. Spray XPS LUBE (P/N 293 600 016) into each spark plug hole.
9. Crank the engine a few turns to distribute the oil on cylinder wall.

NOTE: To crank engine, use the drowned mode to avoid injecting fuel. Fully depress throttle lever and hold for cranking engine.

10. Apply LOCTITE 767 (ANTISEIZE LUBRICANT) (P/N 293 800 070) on spark plug threads then reinstall them.

NOTE: Refer to *IGNITION SYSTEM* subsection for details on installing the spark plugs and ignition coils.

11. Prior to inserting the ignition coil onto its spark plug, apply some DOW CORNING 111 (P/N 413 707 000) around the seal area that touches the spark plug hole.
12. Reinstall ignition coils.
13. Ensure the seal seats properly with the engine top surface.
14. Reconnect ignition coil connectors.
15. Install all other removed parts.

ELECTRICAL SYSTEM

Battery Removal

For battery removal, cleaning and storage, refer to *CHARGING SYSTEM* subsection.

ENGINE COMPARTMENT

Engine Compartment Cleaning

1. Clean the bilge with hot water and a mild detergent, or using bilge cleaner.
2. Rinse thoroughly.
3. Lift front end of watercraft to completely drain bilge. Refer to appropriate *HULL* subsection for bilge drain plug removal.

Anticorrosion Treatment

Wipe off any residual water in the engine compartment.

Spray XPS LUBE (P/N 293 600 016) over all metallic components in engine compartment.

NOTE: The seat should be left partially open during storage. This will prevent engine compartment condensation and possible corrosion.

BODY AND HULL

Body and Hull Cleaning

Wash the body with a soap and water solution (only use a mild detergent). Rinse thoroughly with fresh water. Remove marine organisms from the hull.

NOTICE Never clean body parts or hull with strong detergent, degreasing agent, paint thinner, acetone, etc.

Replace damaged labels/decals.

Body Repair

If any repair is required, refer to *BODY* subsection.

Hull Repair

If any repair is required, refer to appropriate *HULL* subsection.

Body and Hull Protection

Apply a good quality marine wax on body and hull.

If the watercraft is to be stored outside, cover it with an opaque tarpaulin to prevent sun rays and grime from affecting the plastic components, watercraft finish as well as preventing dust accumulation.

NOTICE The watercraft should never be left in water for storage, stored in direct sunlight or stored in a plastic bag.

SEA-DOO | BRP

WATERCRAFT SERVICE Bulletin

October 29, 2010 Subject: **Storage Procedure** No. **2010-7**

YEAR	MODEL	MODEL NUMBER	SERIAL NUMBER
2010	All	All	All

NOTE: Carry out the following tasks in the same order as detailed in this bulletin.

PROCEDURES

Propulsion System

Jet Pump Cleaning

Clean jet pump by spraying water in its inlet and outlet and then apply a coating of XPS LUBE (P/N 293 600 016) or equivalent.

⚠ WARNING

Always remove safety lanyard cap from post to prevent unexpected engine starting before cleaning the jet pump area. Engine must not be running for this operation.

Jet Pump Inspection

Remove impeller cover and check if jet pump is water contaminated; if so, refer to *JET PUMP* subsection in the appropriate *SHOP MANUAL* for the repair procedure.

Drive Shaft Corrosion Protection

No protection against corrosion is required since the drive shaft is rubber-coated.

Fuel System

Fuel System Inspection

Verify fuel system. Check fuel hoses for leaks. Replace damaged hoses or clamps if necessary.

NOTICE **Salt water use may cause clamps to prematurely corrode. Therefore, they would require a closer look and a more frequent preventive replacement.**

Fuel System Protection

The BRP FUEL STABILIZER (P/N 413 408 600) or equivalent should be added in fuel tank to prevent fuel deterioration and fuel system gumming. Follow manufacturer's instructions for proper use.

NOTICE **Fuel stabilizer should be added prior to engine lubrication to ensure fuel system components protection against varnish deposits.**

Engine

Engine Oil and Filter Replacement

Change engine oil and filter. Refer to *LUBRICATION SYSTEM* subsection in the appropriate *SHOP MANUAL*.

Intercooler Draining

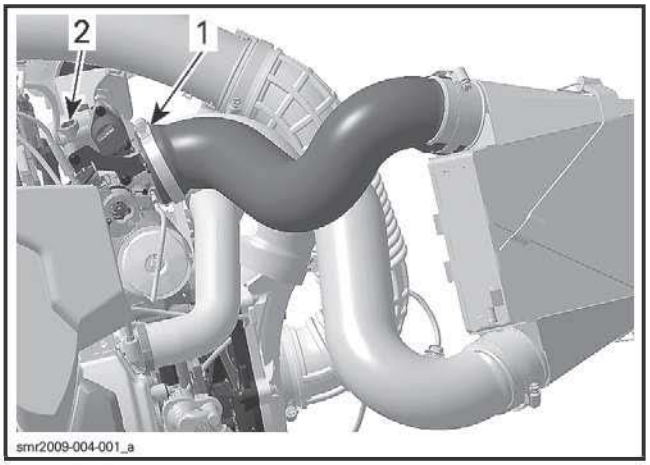
It is important to expel any trapped water that may have accumulated from condensation in the external intercooler.

NOTICE **Failure to drain the intercooler may cause severe damage to this components.**

All 255 Engine Models except iS Series

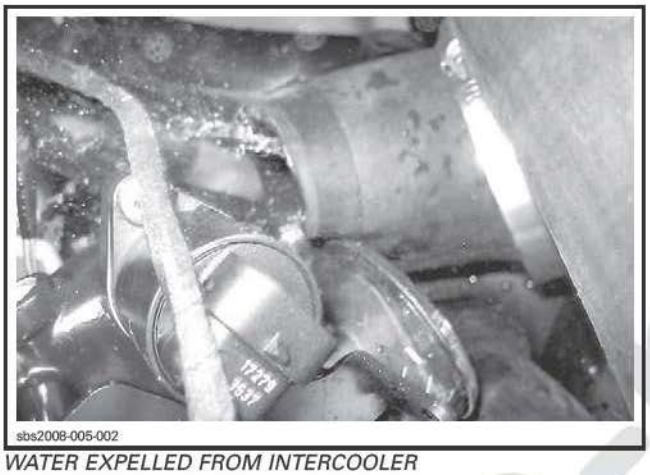
1. Removed the intake hose from throttle body.

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1. *Intake hose*
2. *Throttle body*

2. Start engine and rev up to 4000 RPMs several times. Water will be expelled from intercooler.



WATER EXPELLED FROM INTERCOOLER

3. Stop engine.
4. Liberally lubricate throttle body inside and out.
5. Clean off any lubrication on the throttle body intake hose flange.
6. Install air intake hose to the throttle body.

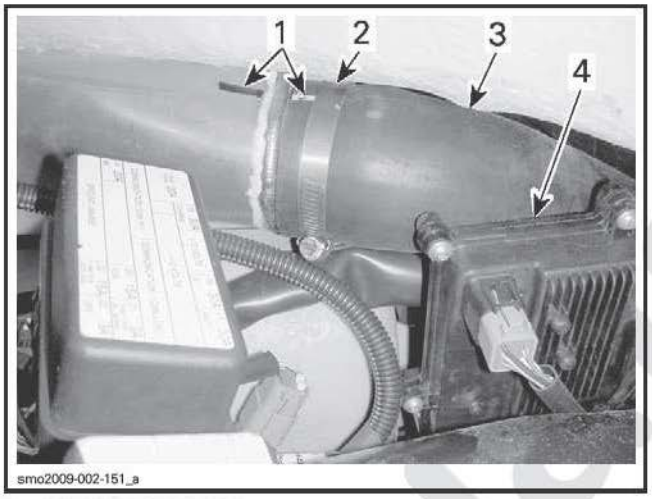
iS Series

Proceed as follows:

1. Loosen the clamp retaining the intercooler outlet hose.
2. Remove the intercooler outlet hose from the intercooler.

NOTE: This hose feeds the inlet of the throttle body.

3. Drape a couple of shop rags over the iS module to protect it from any expelled water from the intercooler.



1. *Hose alignment lines*
2. *Hose clamp*
3. *Intercooler outlet hose*
4. *iS module*

4. Start engine and rev up to 4000 RPMs several times. Water will be expelled from intercooler.

NOTE: Prevent air intake system from aspirating foreign objects which may cause severe engine or damage.

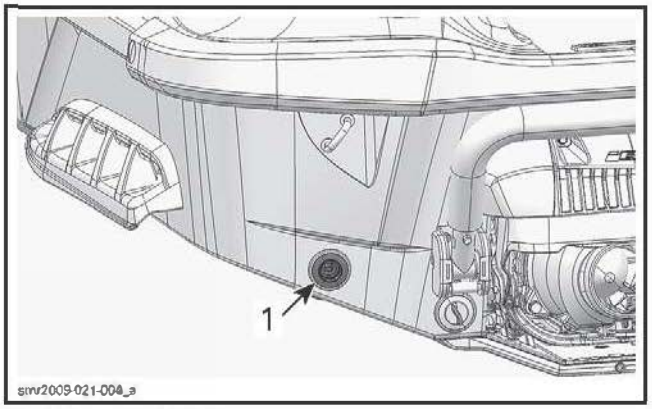
5. Stop engine.
6. Install intercooler outlet hose.

Exhaust System Protection

The exhaust system is self draining, but the exhaust manifold needs to be drained to avoid damages if watercraft is stored in area where freezing weather is present.

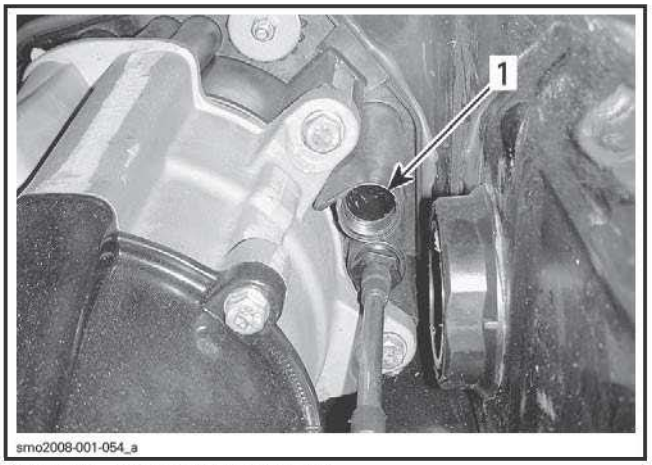
Using the flushing connector located at the rear of vehicle, inject pressurized air into system until there is no more water flowing from jet pump.

MODEL	AIR PRESSURE
iS Series	380 kPa (55 PSI)
All other models	689 kPa (100 PSI)



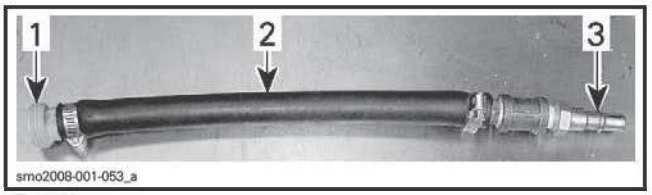
TYPICAL – IS SERIES
1. *Flushing connector*

Jet-Ski Manuals



TYPICAL – ALL OTHER MODELS
1. Flushing connector — location may differ

The following hose can be fabricated to ease draining procedure.



TYPICAL
1. Flushing adaptor (P/N 295 500 473)
2. Hose 13 mm (1/2 in)
3. Air hose male adapter

NOTICE Failure to drain the exhaust manifold may cause severe damage to this components.

Engine Coolant Replacement

Antifreeze should be replaced every 200 hours or every two years to prevent antifreeze deterioration.

NOTICE Failure to replace the antifreeze as recommended may allow its degradation that could result in poor engine cooling.

If coolant is not replaced, test the coolant density using an antifreeze hydrometer.

Replace coolant if necessary. For the coolant replacement procedure, refer to *COOLING SYSTEM* subsection in the appropriate *SHOP MANUAL*.

NOTICE Improper antifreeze density might lead coolant to freeze if vehicle is stored in area where freezing point is reached. This would seriously damage the engine.

Engine Internal Lubrication

Engine must be lubricated to prevent corrosion on internal parts.

Lubrication of the engine is recommended at the end of the season and before any extended storage period to provide additional corrosion protection. This will lubricate the engine intake valves, the cylinders and the exhaust valves.

To lubricate the engine, proceed as follows:

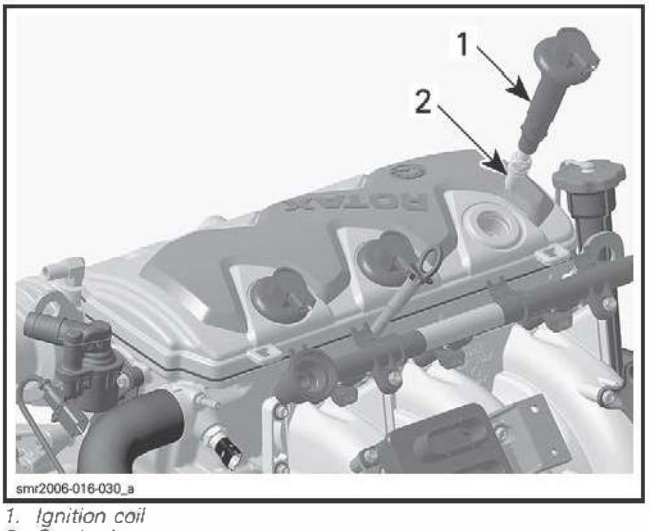
1. Open seat and remove the rear ventilation box.
2. On iS series, remove the rear ventilation box. For all other models, pull engine cover upward and remove it.
3. Disconnect ignition coil connectors.

⚠ WARNING

When disconnecting coil from spark plug, always disconnect coil from main harness first. Never check for engine ignition spark from an open coil and/or spark plug in the engine compartment as spark may cause fuel vapor to ignite.

NOTICE Never cut the locking ties of ignition coil connectors. This would allow mixing the wires between cylinders.

4. Clean ignition coil areas to avoid falling dirt into cylinder.
5. Remove ignition coils.
6. Unscrew spark plugs.
7. Using an ignition coil as a puller, remove spark plugs.



1. Ignition coil
2. Spark plug

8. Spray XPS LUBE (P/N 293 600 016) into each spark plug hole.
9. Crank the engine a few turns to distribute the oil on cylinder wall.

NOTE: To crank engine, use the drowned mode to avoid injecting fuel. Fully depress throttle lever and hold for cranking engine.

10. Apply LOCTITE 767 (ANTISEIZE LUBRICANT) (P/N 293 800 070) on spark plug threads then reinstall them.
11. Prior to inserting the ignition coil to its location, apply some DOW CORNING 111 (P/N 413 707 000) around the seal area that touches the spark plug hole.
12. Reinstall ignition coils.
13. Ensure the seal seats properly with the engine top surface.
14. Reconnect ignition coil connectors.
15. Install all other removed parts.

Electrical System

Battery Removal

For battery removal, cleaning and storage, refer to *CHARGING SYSTEM* subsection in the appropriate *SHOP MANUAL*.

Vehicle

Bilge Cleaning

Clean the bilge with hot water and mild detergent or with bilge cleaner.

Rinse thoroughly.

Lift front end of watercraft to completely drain bilge.

Body and Hull Cleaning

Wash the body with soap and water solution (only use mild detergent). Rinse thoroughly with fresh water. Remove marine organisms from the hull.

NOTICE **Never clean body parts or hull with strong detergent, degreasing agent, paint thinner, acetone, etc.**

Replace damaged labels/decals.

Body Repair

If any repair is needed, refer to *BODY* subsection in the appropriate *SHOP MANUAL*.

Anticorrosion Treatment

Wipe off any residual water in the engine compartment.

Spray XPS LUBE (P/N 293 600 016) over all metallic components in engine compartment.

Vehicle Protection

Apply a good quality marine wax on body and hull.

The seat should be left partially open during storage. This will prevent engine compartment condensation and possible corrosion.

If the watercraft is to be stored outside, cover it with an opaque tarpaulin to prevent sun rays and grime from affecting the plastic components, watercraft finish as well as preventing dust accumulation.

NOTICE **The watercraft should never be left in water for storage, stored in direct sunlight or stored in a plastic bag.**

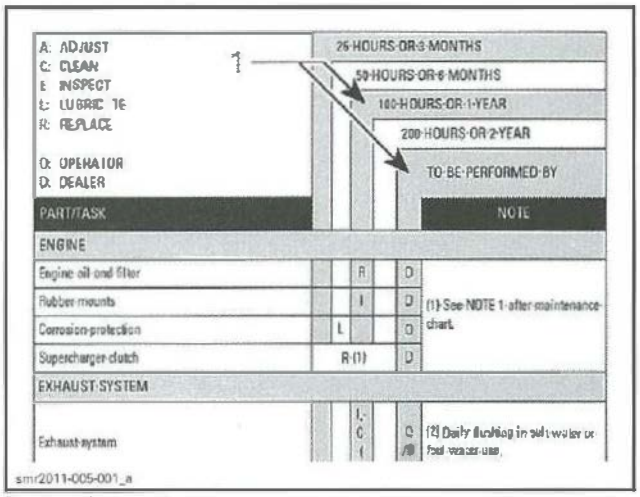
green-manuals

PRESEASON PREPARATION

Proper vehicle preparation is necessary after the winter months or when a watercraft has not been used during 4 months.

Any worn, broken or damaged parts found during the storage procedure should have been replaced. If not, proceed with the replacement.

Referring to the maintenance schedule, carry out the maintenance procedures for every item specified in the columns 100 HOURS OR 1 YEAR, and TO BE PERFORMED BY.



1. *Use these columns*

Furthermore, proceed with the following:

Watercraft Prepared as per Storage Procedure

- Ensure battery is fully charged.
- Reinstall the battery.
- Test ride watercraft to confirm proper operation.

Watercraft Not Prepared as per Storage Procedure

- Ensure battery is fully charged.
- Replace engine oil and filter.
- Drain fuel tank and fill with fresh fuel.
- Reinstall the battery.
- Test ride watercraft to confirm proper operation.

SPECIAL PROCEDURES

SERVICE TOOLS

Description	Part Number	Page
LARGE HOSE PINCHER	529 032 500	19
SUCTION PUMP	529 035 880	18

GENERAL

Refer to the following special procedures according to the specific event. Procedures described may not be applicable to every watercraft model.

PROCEDURES

TOWING THE WATERCRAFT IN WATER

Special precautions should be taken when towing a Sea-Doo watercraft in water.

The maximum recommended towing speed is 24 km/h (15 MPH).

This will prevent the exhaust system from filling with water, which may lead to water being injected into and filling the engine. Without the engine running, there isn't any exhaust pressure to push the water out the exhaust outlet.

NOTICE Failure to follow these instructions may result in damage to the engine. If you must tow a stranded watercraft in water, be sure not to exceed the maximum towing speed of 24 km/h (15 MPH).

SUBMERGED WATERCRAFT

NOTICE Never try to crank or start engine. Water trapped in the intake manifold would flow towards the engine and possible cause severe engine damage.

1. Drain bilge.
2. If the watercraft was submerged in salt water, rinse the bilge and all components thoroughly with fresh water using a garden hose to stop the salt corroding effect.
3. Check for water in the intake system. If water found in the intake system, refer to *WATER-FLOODED ENGINE* in this subsection.

Engine Lubrication

Refer to *WATER-FLOODED ENGINE* in this subsection.

Fuel Inspection

Check fuel tank for water contamination. If necessary, siphon and refill with fresh fuel.

WATER-FLOODED ENGINE

If the engine is flooded with water, it must be serviced within a few hours after the event. Otherwise, the engine will have to be overhauled.

NOTICE

- **Never try to crank or start the engine. Water trapped in the intake manifold would enter the combustion chamber through the intake valves and may cause damage to the engine.**
- **An engine flooded with water must be properly drained, lubricant replaced (oil change), operated (boil out procedure), then lubricant replaced again, otherwise parts will be seriously damaged.**

Exhaust System Draining

If water is suspected to be in the exhaust system, remove the exhaust pipe and the muffler. Drain them or siphon the water out of them. Refer to *EXHAUST SYSTEM* subsection.

Intake System Draining

1. If water is present in the air intake silencer, empty it. Refer to *AIR INTAKE SYSTEM* subsection.
2. Remove the air intake silencer and check for water in the supercharger inlet hose. Remove hose to empty it.
3. Remove the water from blow-by valve hose.
4. If water is suspected in the intake manifold, remove the intake manifold and drain it. Then siphon the water out from the intake valve ports. Refer to *INTAKE MANIFOLD* subsection.

Throttle Body Lubrication

The throttle body should be lubricated to flush out any water infiltration and to prevent corrosion.

Supercharger Servicing

215 and 260 Engines

If there is water in the oil or in the supercharger inlet hose, the supercharger should be taken apart, all the components dried, and the slip clutch needle bearings and shaft ball bearings replaced. Refer to *SUPERCHARGER* subsection.

Engine Oil and Filter Replacement

If the engine oil is contaminated with water (oil will be milky), change the engine oil and filter as per following procedure.

iS and aS Models

Remove the deck extension. Refer to *BODY* subsection.

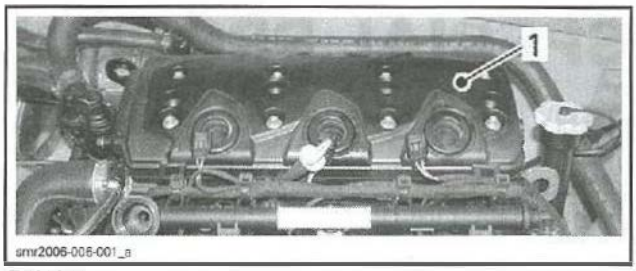
All Models

1. Using the SUCTION PUMP (P/N 529 035 880), siphon the contaminated oil from the engine reservoir through the dipstick hole.



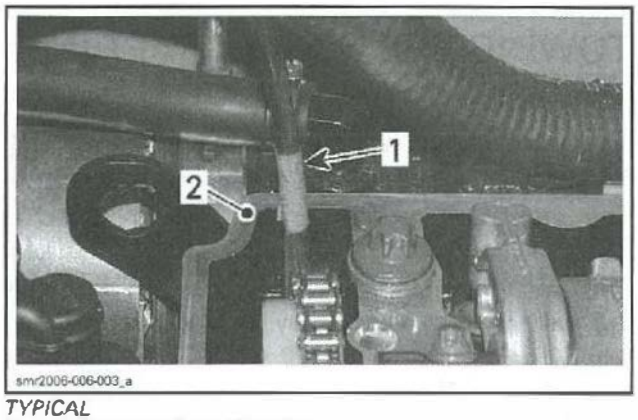
NOTICE Never crank or start engine when siphon tube is in dipstick hole. Never start engine when there is no oil in engine.

2. Remove the suction pump tube from the dipstick hole.
3. Fully depress throttle lever and HOLD it for cranking.
4. Crank the engine for 5 seconds.
5. Remove the oil filter cap and the oil filter. Refer to *LUBRICATION SYSTEM* subsection.
6. Again, siphon the contaminated oil from the oil filter reservoir.
7. Remove valve cover. Refer to *CYLINDER HEAD* subsection.



TYPICAL
1. Valve cover

8. Wrap a piece of tape around the suction pump tube 400 mm (16 in) from the end of the tube.
9. Insert the tube in the PTO area until the tape is even with the cylinder-block edge.
10. Siphon contaminated oil out.



TYPICAL
1. Suction pump tube with tape
2. Edge of cylinder-block

11. Remove the suction pump tube.
12. Reinstall valve cover.
13. Install a NEW oil filter and reinstall the oil filter cap.
14. Replenish the engine with appropriate amount of the recommended engine oil. Refer to *LUBRICATION SYSTEM* subsection.
15. Proceed with the *BOIL OUT PROCEDURE* that follows.

NOTE: The boil out procedure is intended to evaporate a small quantity of water contained in the oil system.

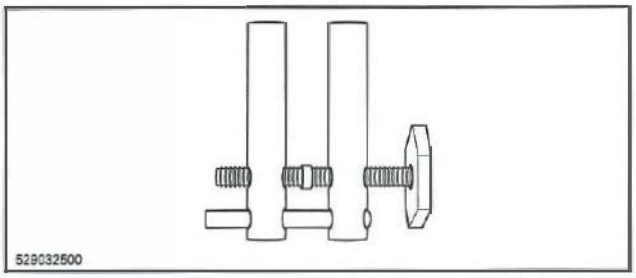
Boil Out Procedure in a Test Tank or Tied to a Trailer with Watercraft in Water

1. Connect the vehicle to latest applicable B.U.D.S. version to monitor the coolant temperature. Coolant temperature must exceed 100°C (212°F) in order for the water to boil out. Once the boiling point is attained, the water will evaporate quickly.
2. Run the engine for 5 minutes at 3500 RPM.

⚠ WARNING

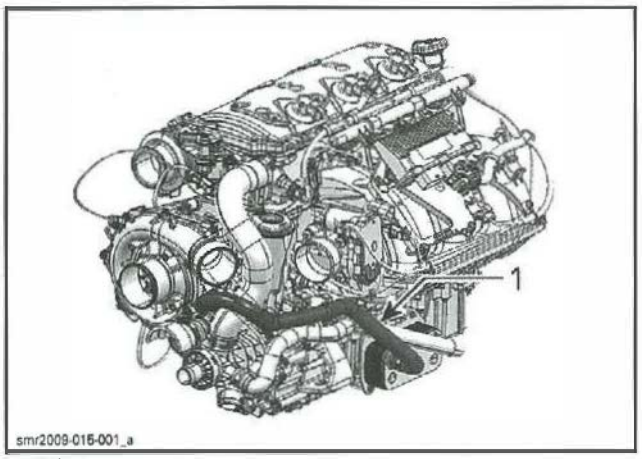
Be sure to safely secure the watercraft.

3. With the engine still running at 3500 RPM, install a LARGE HOSE PINCHER (P/N 529 032 500) on the coolant line going to the oil cooler.



⚠ WARNING

Certain components in the engine compartment may be very hot. Direct contact may result in skin burn. Do not touch any electrical parts or jet pump area when the engine is running.



TYPICAL
1. Oil cooler coolant inlet hose

4. Continue to run the engine at 3500 RPM for 15 more minutes (20 minute total run time).
5. Shut the engine off.
6. Remove the hose pincher from coolant line going to the oil cooler.

NOTICE **Hose pincher must be removed prior to operating the watercraft. Failure to do this will result in damage to the engine.**

7. Change the oil and filter again.
8. Procedure is now complete.

CAPSIZED WATERCRAFT

Capsized for More than 5 Minutes

Refer to *WATER-FLOODED ENGINE* in this subsection.

ENGINE REMOVAL AND INSTALLATION

SERVICE TOOLS

Description	Part Number	Page
ALIGNMENT SHAFT ADAPTER	529 035 719	26–28
ALIGNMENT SHAFT SUPPORT	529 035 506	26
ALIGNMENT SHAFT	295 000 141	26–29
ENGINE ALIGNMENT TOOL	529 036 197	27
PUMP PLATE	529 036 224	26
THRU-HULL ADAPTER	529 036 193	28

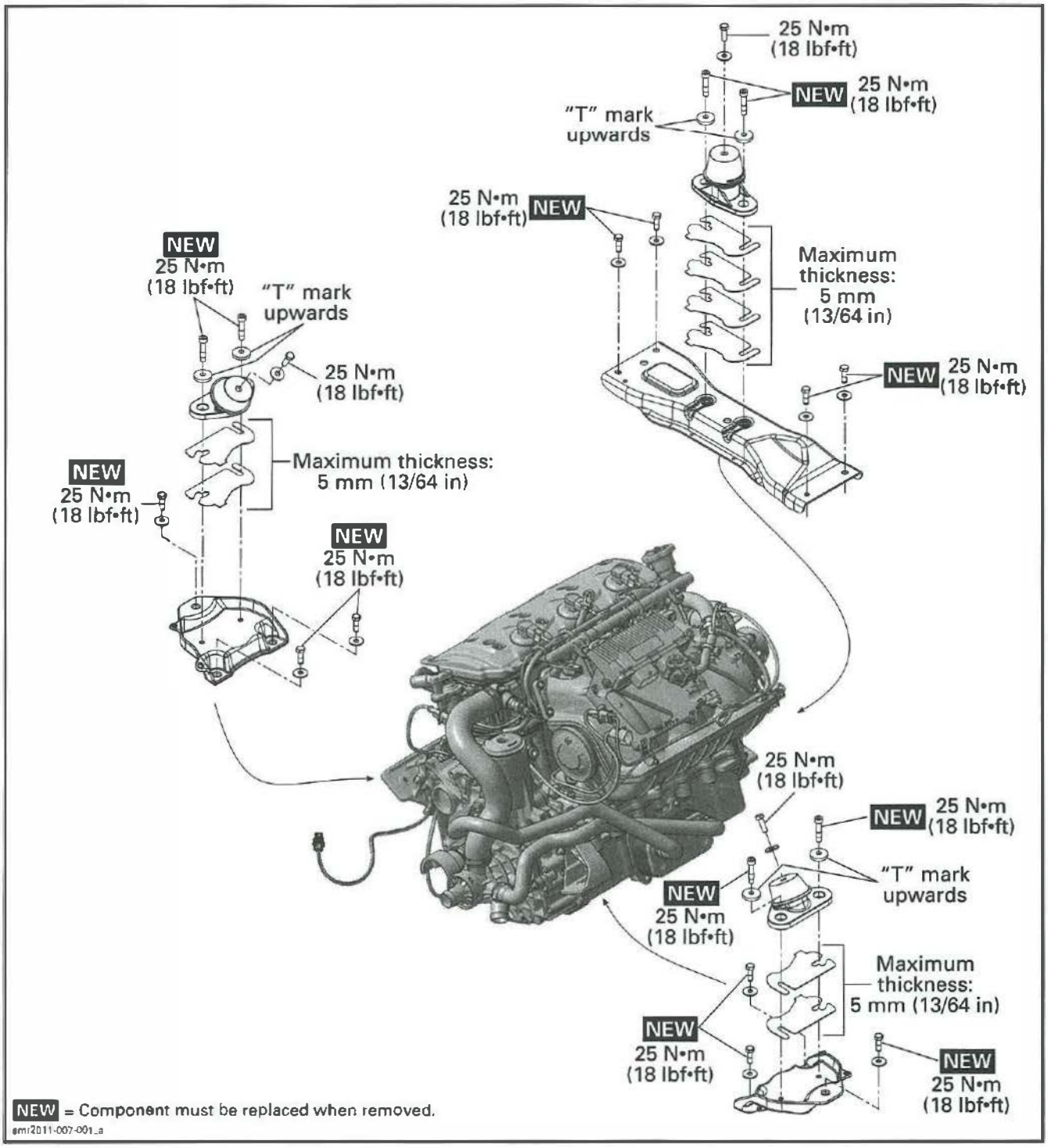
SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	26, 30
PULLEY FLANGE CLEANER	413 711 809	26

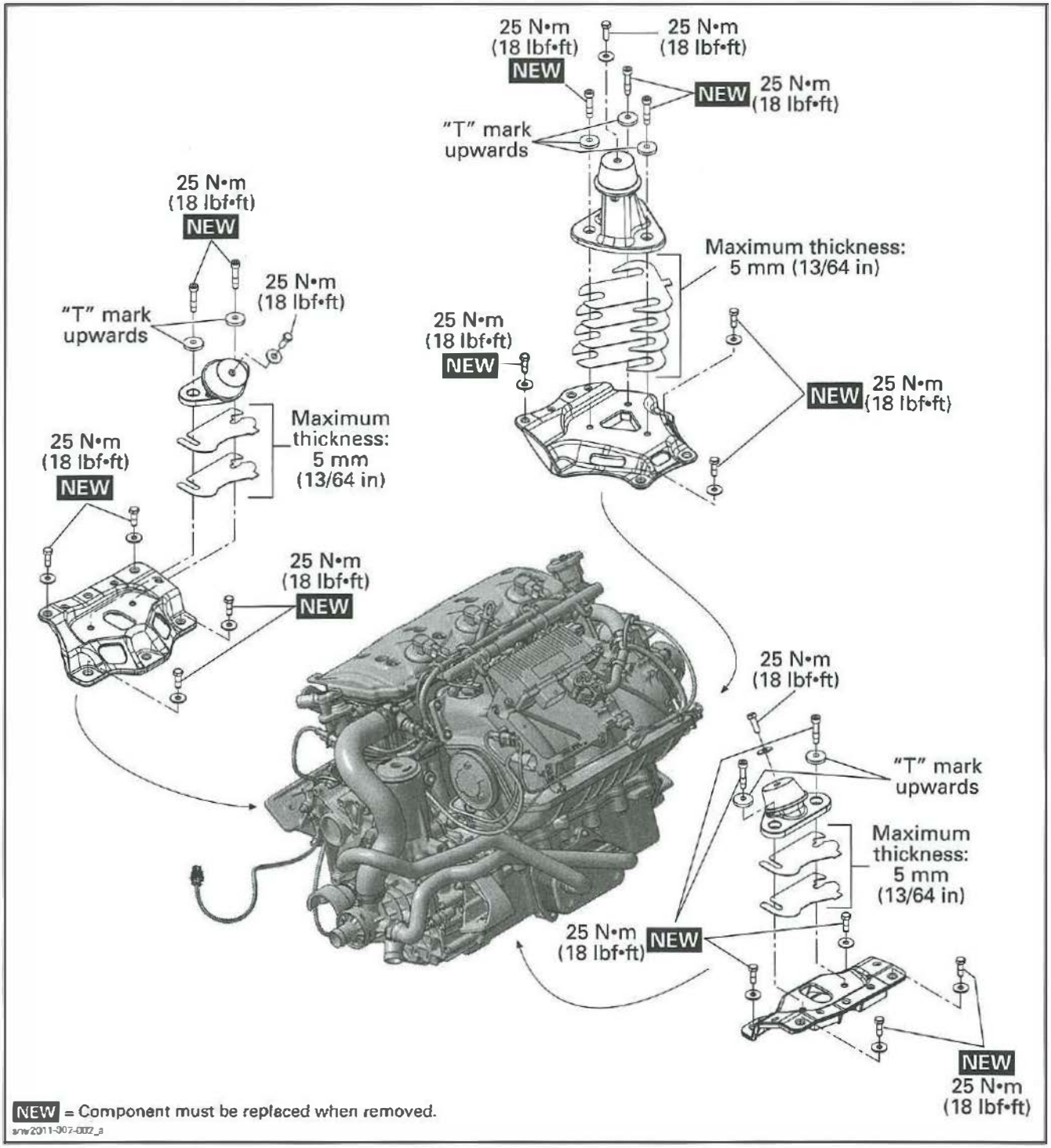
green-manuals

ENGINE SUPPORTS

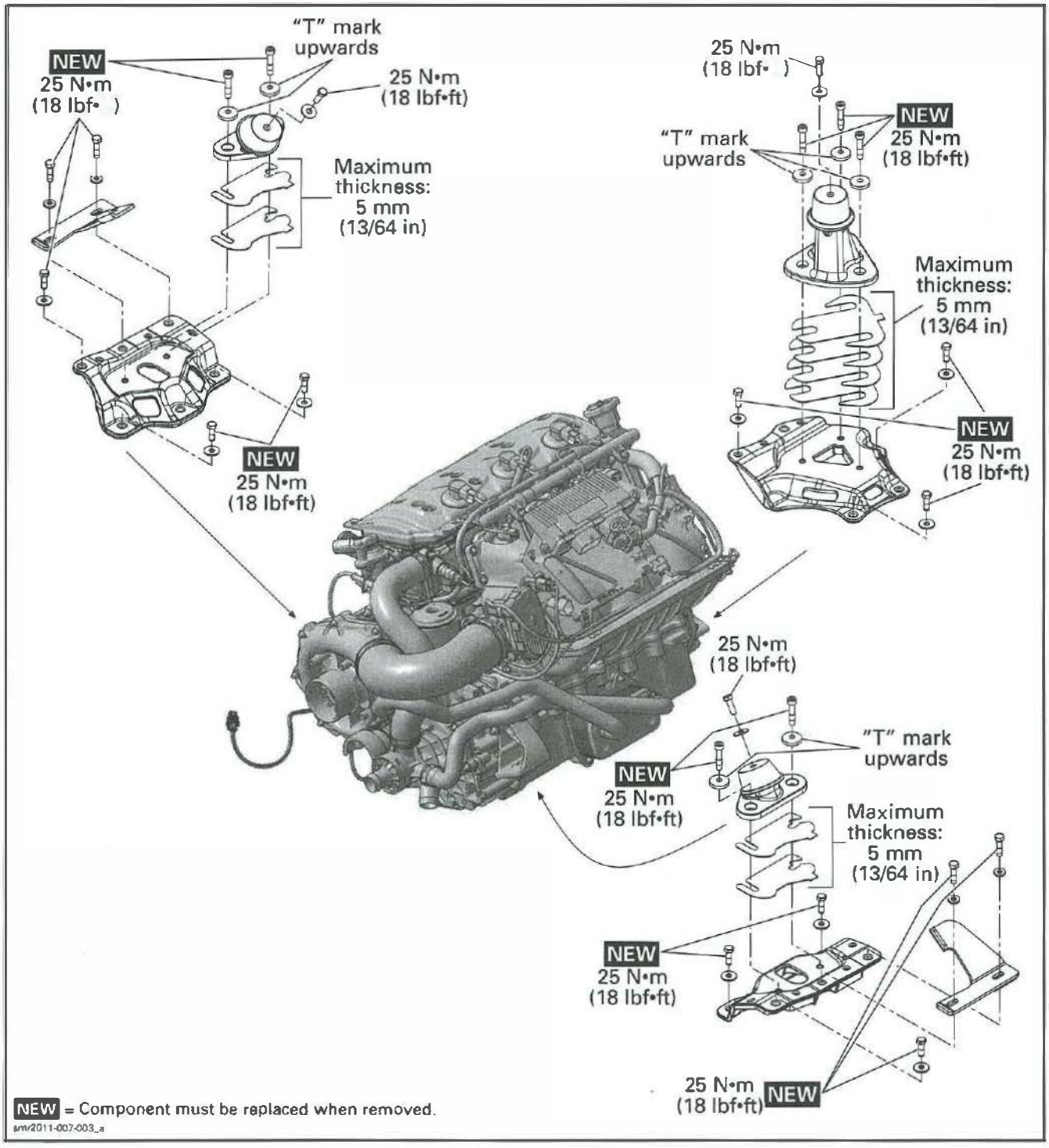
GTS 130, GTI 130, GTI 155 and WAKE 155



GTX 155


25 N•m (18 lbf•ft)
NEW
25 N•m (18 lbf•ft)
NEW
25 N•m (18 lbf•ft)
"T" mark upwards
Maximum thickness: 5 mm (13/64 in)
25 N•m (18 lbf•ft)
NEW
NEW
25 N•m (18 lbf•ft)
25 N•m (18 lbf•ft)
NEW
"T" mark upwards
25 N•m (18 lbf•ft)
NEW
Maximum thickness: 5 mm (13/64 in)
25 N•m (18 lbf•ft)
NEW
25 N•m (18 lbf•ft)
25 N•m (18 lbf•ft)
"T" mark upwards
Maximum thickness: 5 mm (13/64 in)
25 N•m (18 lbf•ft)
NEW
NEW
25 N•m (18 lbf•ft)
NEW = Component must be replaced when removed.
smw2011-007-002_a

RXT Series, GTX Series (except GTX 155) and WAKE PRO 215



GENERAL

During assembly/installation, use torque values and service products from exploded views in the appropriate subsections.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENER* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pin, etc.) must be replaced.

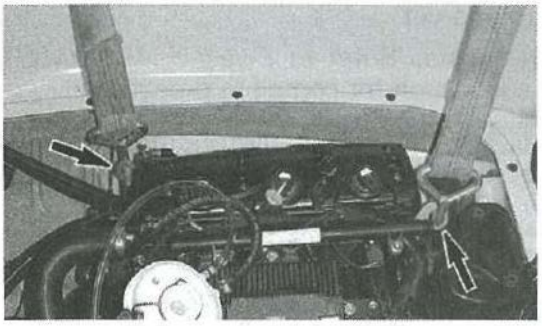
NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

PROCEDURES

ENGINE

Engine Removal Guideline

PROCEDURES ACCORDING TO MODEL
ALL iS AND aS
– Remove moving deck and deck extension. Refer to *BODY*. – Remove the air intake silencer and its support. Refer to *AIR INTAKE SILENCER (iS AND aS models)*.
RXT SERIES AND GTX LTD iS 260
– Unplug air intake hose from the throttle body.
RXT 260, RXT X 260, RXT XRS 260, GTX 215 AND WAKE PRO 215
– Remove the supercharger. Refer to *SUPERCHARGER*.
GTX 215, GTX iS 215 AND WAKE PRO 215
– Unplug both hoses from the supercharger.
ALL EXCEPT iS AND aS
– Disconnect all fuel injector connectors and the following sensors (CTS, CPS, TOPS, CAPS and OPS). – Remove the intake manifold. Refer to *INTAKE MANIFOLD*.

COMMON PROCEDURE FOR ALL MODELS
– Remove the seat. Refer to *BODY*. – Disconnect the battery. Refer to *CHARGING SYSTEM*. – Unplug fuel hose from fuel rail. Refer to *ELECTRONIC FUEL INJECTION (EFI)*. – Drain coolant. Refer to *COOLING SYSTEM*. – Disconnect the "B" connector from the ECM. – Disconnect the engine connector. – Disconnect the knock sensor and magneto connectors (remove connector housings from the ECM support). – Disconnect the EGTS sensor from the muffler. – Disconnect the three ground cables on the front end of engine. – Unplug the front exhaust hose from the muffler. – Unplug the blow-by valve hose. – Unplug the ride plate hoses from water pump housing. – Move muffler backward. Refer to *EXHAUST SYSTEM*. – Remove the drive shaft. Refer to *DRIVE SHAFT*. – Remove the engine mounting screws. – Cut any locking ties from hoses or wiring harness that prevent engine removal. – Slightly lift the engine using a suitable lifting device.  – Unplug water hoses from exhaust manifold. – Disconnect the starter cable from the starter. – Disconnect the engine ground cable located under the exhaust manifold. – Carry on engine lifting to remove it from the body opening.

NOTICE **Be careful not to scratch body or to hit any engine component during engine removal.**

Engine Installation

Installation of engine in watercraft is essentially the reverse of removal procedures. However pay particular attention to the following.

NOTICE Whenever engine is removed from watercraft, engine alignment must be performed at reinstallation.

Wipe off any spillage in bilge. Clean with the PULLEY FLANGE CLEANER (P/N 413 711 809).

Check tightness and condition of engine rubber mounts. Refer to *ENGINE MOUNTS* in this subsection.

Before completely lowering engine, install ground cable, starter cable and water hoses on exhaust manifold. Follow these guide lines.

- Ensure contact surface is perfectly clean then reconnect ground cable to engine.
- Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of ground cable screw or use a new screw with self-locking product.
- Tighten ground cable screw to 23 N•m (17 lbf•ft).
- Torque starter cable nut to 7 N•m (62 lbf•**in**).
- Install protective cap over the starter cable end.
- Connect exhaust manifold water inlet and outlet hoses. Tighten clamps to 1.7 N•m (15 lbf•**in**).

Place engine into vehicle.

Install engine support screws. Do not apply threadlocker to engine support screws and do not torque yet.

Align engine. Refer to *ENGINE ALIGNMENT* in this subsection for complete procedure.

NOTICE The engine alignment must be completed before finalizing the engine installation.

Install and properly align exhaust pipe. Refer to *EXHAUST SYSTEM* subsection.

Reinstall all other removed parts.

Check hose condition and pressure test fuel system, refer to *FUEL SYSTEM*.

⚠ WARNING

Whenever doing any type of repair on watercraft or if any components of the fuel system are disconnected, a pressure test must be done before starting engine.

Verify all electrical connections (ground wires and battery).

Run engine and ensure there is no leakage.

NOTICE If watercraft is out of water, exhaust system must be cooled using the flush kit.

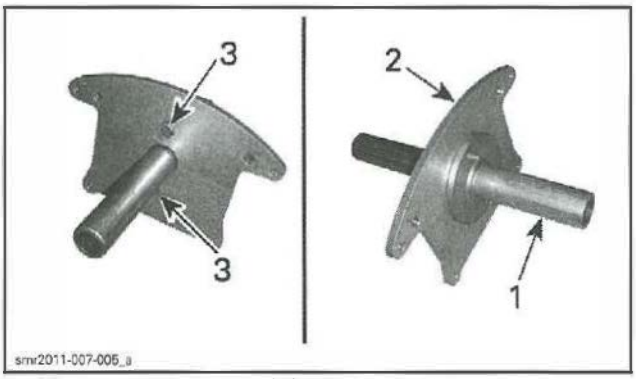
Engine Alignment

GTS, GTI and WAKE 155

REQUIRED TOOLS	
PUMP PLATE (P/N 529 036 224)	
ALIGNMENT SHAFT SUPPORT (P/N 529 035 506)	
ALIGNMENT SHAFT ADAPTER (P/N 529 035 719)	
ALIGNMENT SHAFT (P/N 295 000 141)	

To verify alignment of engine proceed as follows:

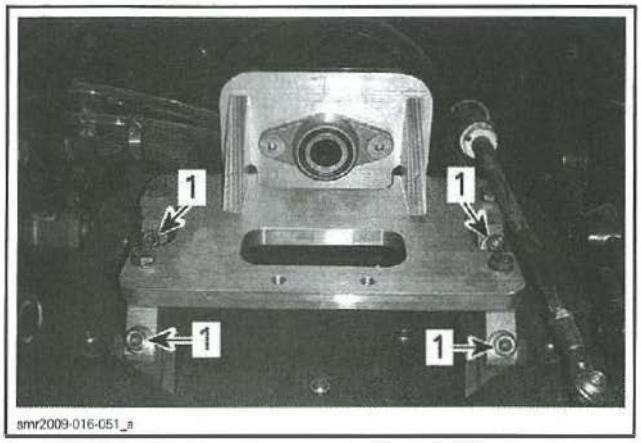
1. Remove jet pump and drive shaft. Refer to *STEERING AND PROPULSION* section.
2. Remove drive shaft boot.
3. Assemble alignment tool.
   - 3.1 Install the alignment shaft support on pump plate.
   - 3.2 Secure using M8 x 25 x 1.25 hexagonal screws.



1. Alignment shaft support (P/N 529 035 506)
2. Support plate (P/N 529 036 224)
3. M8 x 25 x 1.25 hexagonal screws

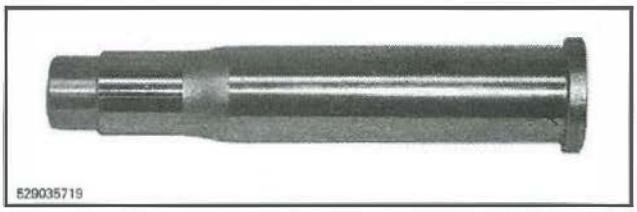
TORQUE	
Alignment tool screws	24 N•m (18 lbf•ft)

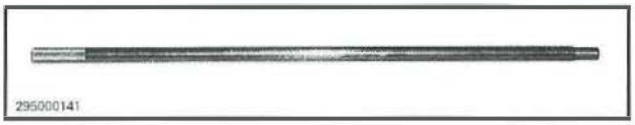
4. Install the alignment tool as follows.
   - 4.1 Position the alignment tool against the pump support.
   - 4.2 Push the alignment tool upward and hold it in this position.



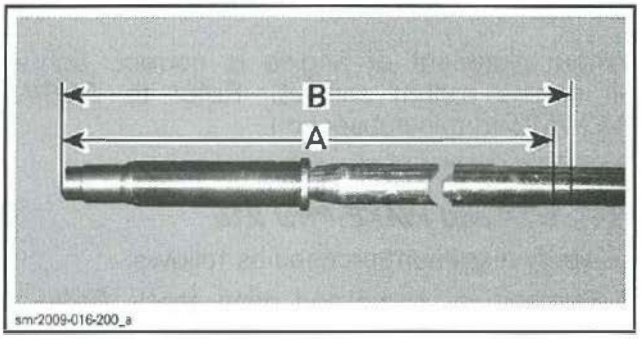
1. Jet pump socket screws

Install the ALIGNMENT SHAFT ADAPTER (P/N 529 035 719) on the end of the ALIGNMENT SHAFT (P/N 295 000 141).





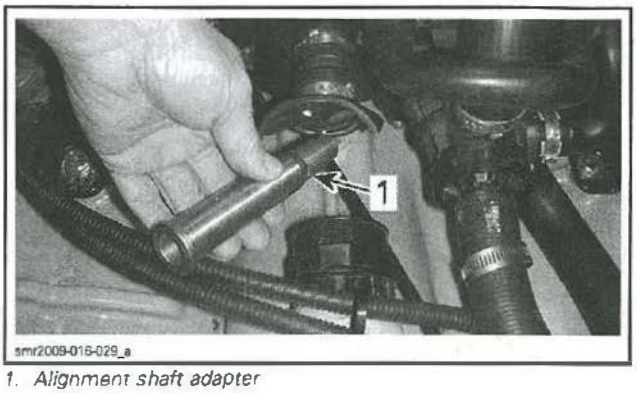
Trace two thin lines on alignment shaft.



LINES	DISTANCE
Line A	at 607.5 mm (23.917 in)
Line B	at 610.5 mm (24.035 in)

4. Remove the ALIGNMENT SHAFT ADAPTER (P/N 529 035 719) from the end of the alignment shaft and install it in engine PTO housing.

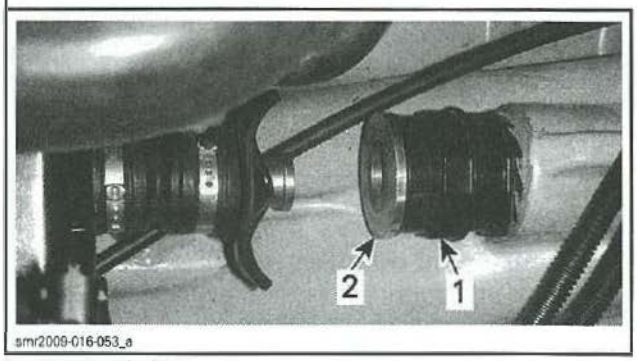
NOTICE Ensure alignment shaft adapter is fully inserted into the engine PTO housing.



1. Alignment shaft adapter

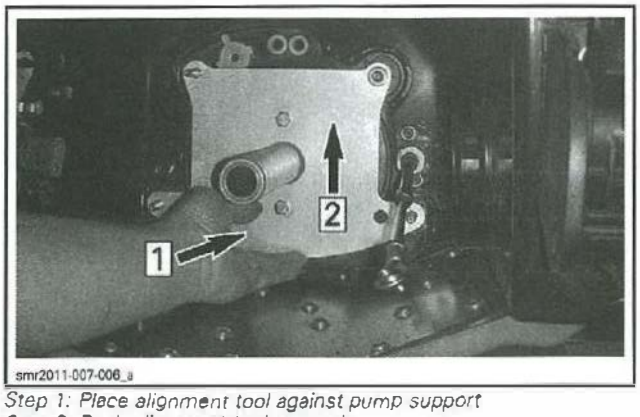
5. Install the THRU-HULL ADAPTER (P/N 529 036 193) into the thru-hull fitting. Ensure the adapter is properly seated against the fitting.





1. Thru-hull fitting
2. Thru-hull adapter

NOTE: On some occasions, the thru-hull adapter must be retained in the fitting using a hose clamp.



Step 1: Place alignment tool against pump support
Step 2: Push alignment tool upward

TORQUE	
Alignment tool nuts	24 N•m (18 lbf•ft)

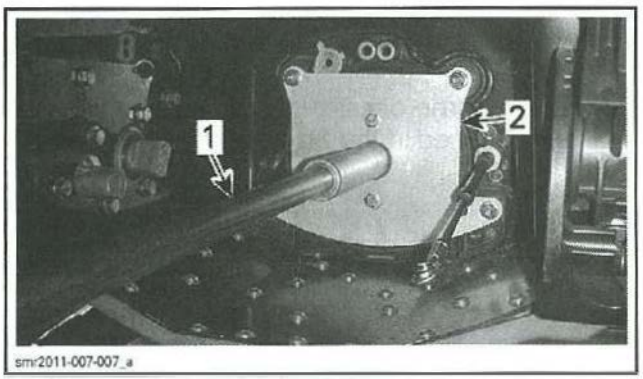
5. Install the ALIGNMENT SHAFT ADAPTER (P/N 529 035 719) in the engine PTO housing.

NOTICE **Ensure alignment shaft adapter is fully inserted into the engine PTO housing.**



TYPICAL
1. Alignment shaft adapter

6. Carefully slide the ALIGNMENT SHAFT (P/N 295 000 141) through the engine alignment tool.



1. Alignment shaft (P/N 295 000 141)
2. Alignment tool

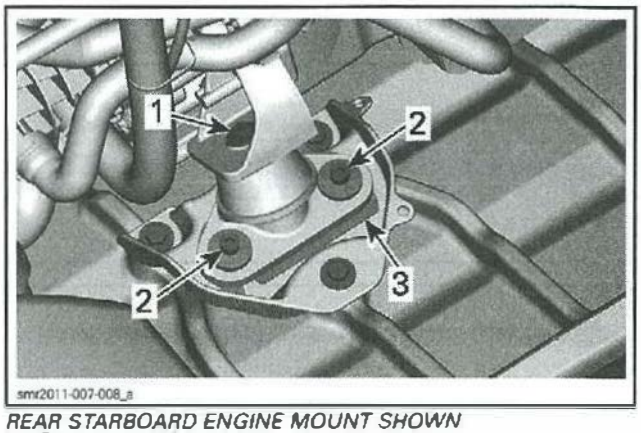
7. Insert alignment shaft end into alignment shaft adapter. If the alignment is correct, the alignment shaft end should slide through the adapter.

NOTE: A small resistance during shaft insertion is normal.

8. If the alignment is incorrect, loosen engine mount retaining screws (Allen socket screws).
9. Add or remove shims as required.

NOTE: Shims location is between engine mount and engine mount plate.

NOTICE **Whenever shims are used to correct alignment, never install more than 5 mm (13/64 in) of shims.**



REAR STARBOARD ENGINE MOUNT SHOWN
1. Engine mounting screw
2. Engine mount retaining screws
3. Shim(s)

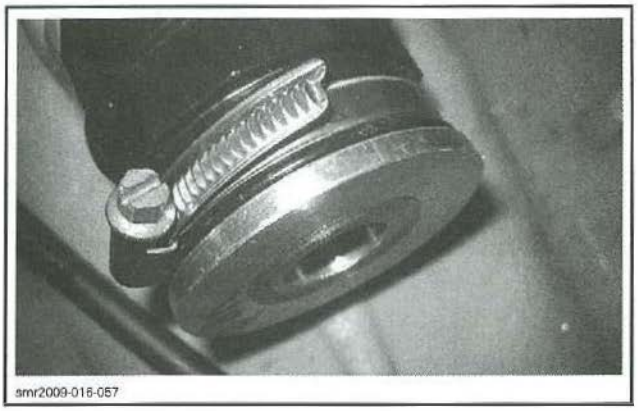
When alignment of engine is correct, tighten all engine mount screws. Refer to *ENGINE MOUNTS* in this subsection.

Recheck engine alignment.

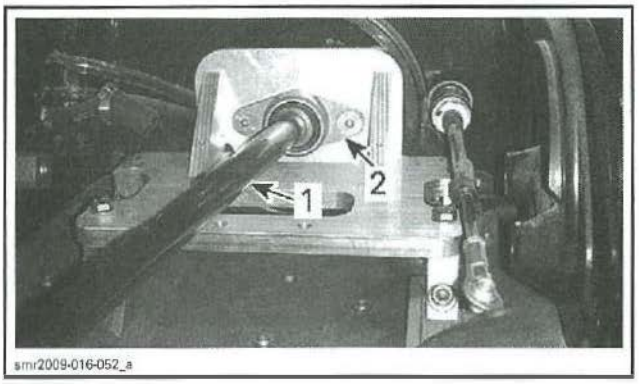
RXT, GTX and WAKE PRO 215

To verify alignment proceed as follows:

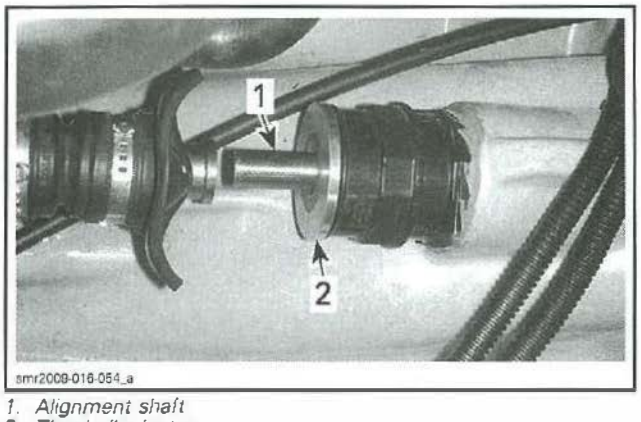
1. Remove jet pump and drive shaft. Refer to *STEERING AND PROPULSION* section.
2. Remove the sealing ring and the drive shaft boot. Refer to *DRIVE SHAFT* subsection.
3. Secure the ENGINE ALIGNMENT TOOL (P/N 529 036 197) on ride plate using jet pump socket screws.



6. Carefully slide the ALIGNMENT SHAFT (P/N 295 000 141) through the engine alignment tool and the thru-hull adapter.

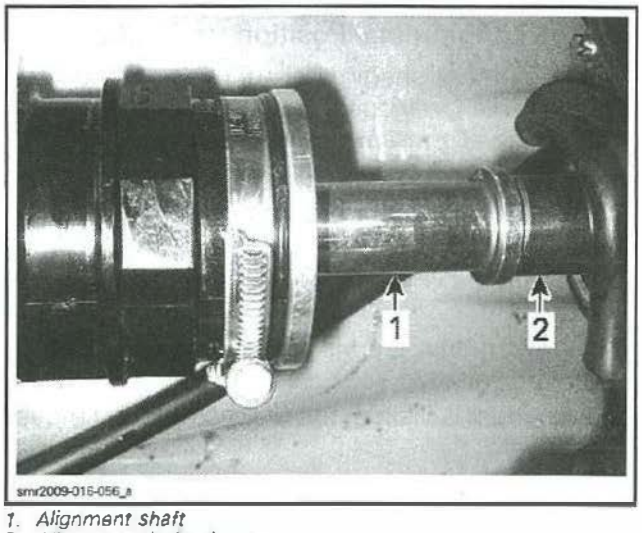


1. Alignment shaft
2. Engine alignment tool



1. Alignment shaft
2. Thru-hull adapter

7. Insert alignment shaft end into alignment shaft adapter. If the alignment is correct, the alignment shaft end should slide through the adapter.



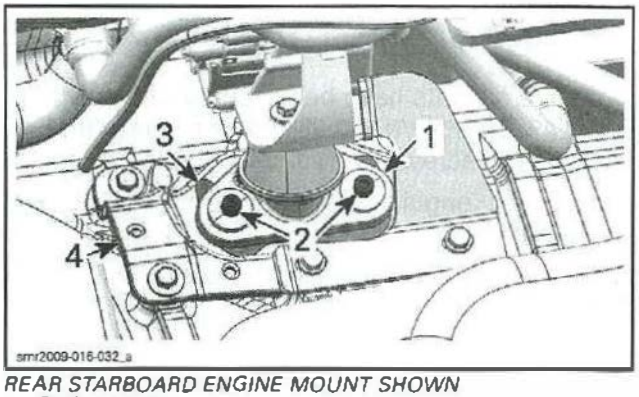
1. Alignment shaft
2. Alignment shaft adapter

NOTE: A small resistance during shaft insertion is normal.

8. If the alignment is correct, check the longitudinal position of engine. See procedure further.
9. If the alignment is incorrect, loosen engine mount screws to align engine.
10. Add or remove shims as required.

NOTE: Use shim(s) (P/N 270 000 770) for the front engine mount and shim(s) (P/N 270 000 762) for the rear engine mounts. Shims location is between engine mount and engine mount plate.

NOTICE Whenever shims are used to correct alignment, never install more than 5 shims.



REAR STARBOARD ENGINE MOUNT SHOWN
1. Engine mount
2. Engine mount screws
3. Shim
4. Engine mount plate

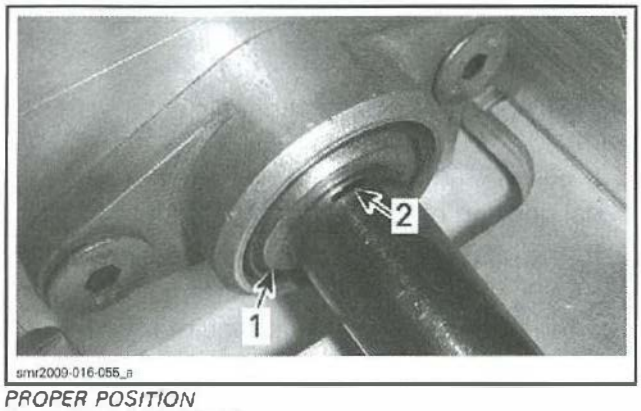
11. When engine alignment is correct, check the longitudinal position of engine.

Engine Longitudinal Position Verification

With alignment shaft installed, check the location of the marks (previously drawn at the beginning of the engine alignment procedure).

Engine is properly positioned longitudinally when the engine alignment tool is between both shaft marks.

- If one mark is visible, the engine is properly positioned.
- If both marks are visible, the engine must be moved forward.
- If no mark is visible, the engine must be moved rearward.



PROPER POSITION
1. *Engine alignment tool*
2. *Mark at 610.5 mm (24.035 in)*

When alignment and longitudinal position of engine are correct, tighten engine mount screws. Refer to *ENGINE MOUNTS* in this subsection.

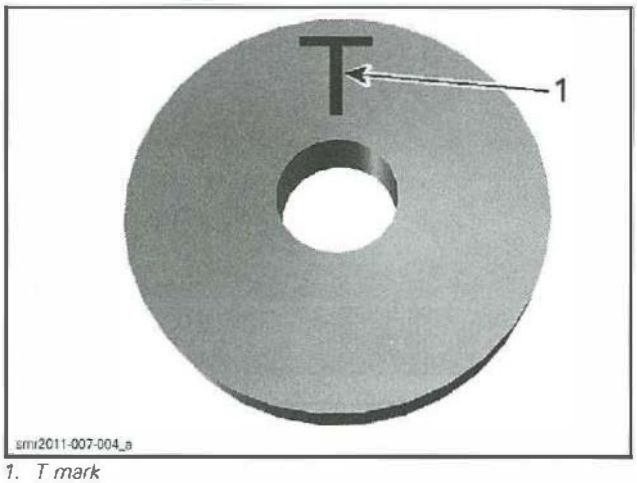
Recheck engine alignment.

ENGINE MOUNTS

If engine mounts have been removed, apply LOCTITE 243 (BLUE) (P/N 293 800 060) on screw threads or use new screws with self-locking product.

Torque all engine mount screws to 25 N•m (18 lbf•ft).

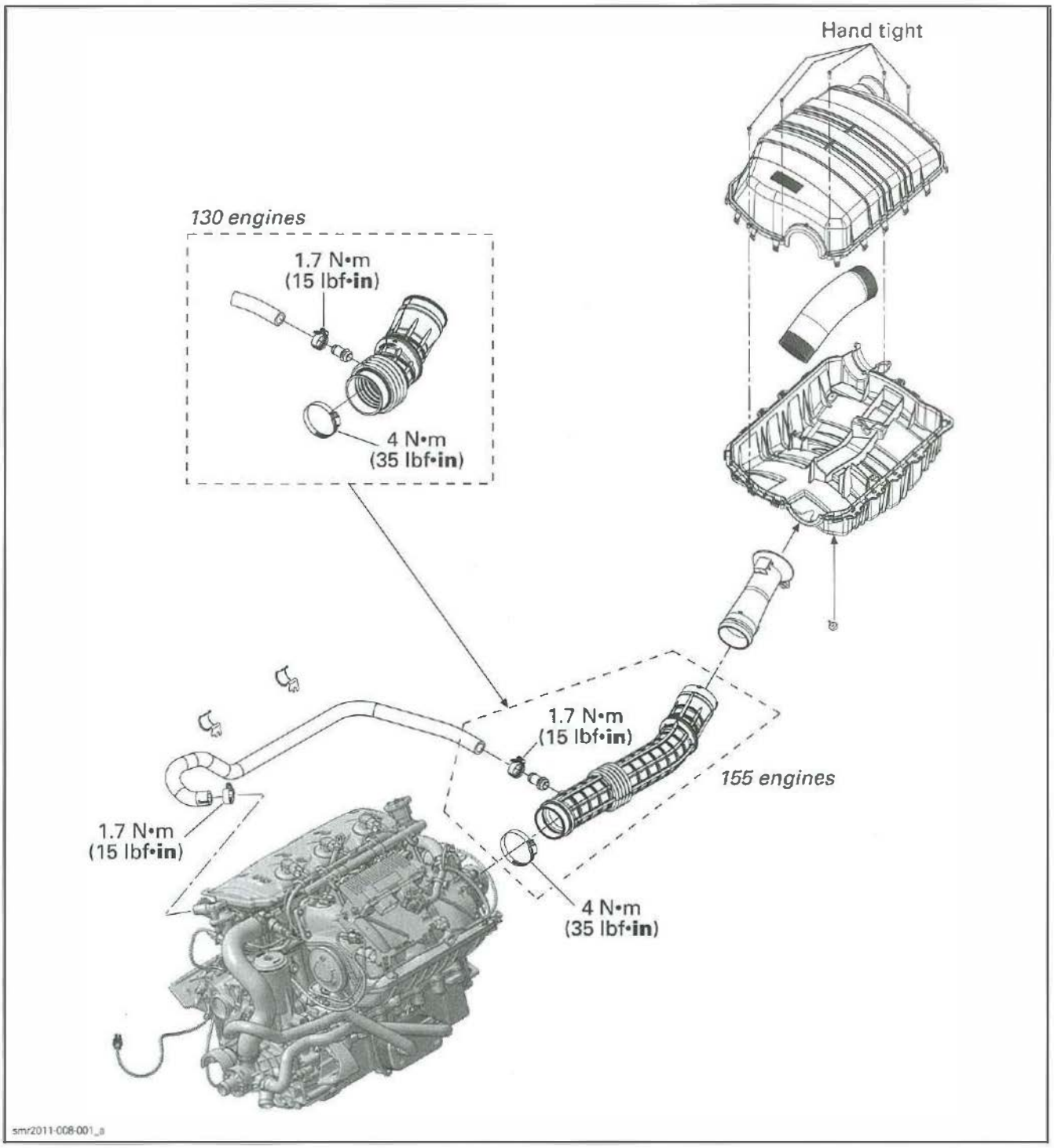
NOTE: Position conical spring washer with the "T" mark upwards.



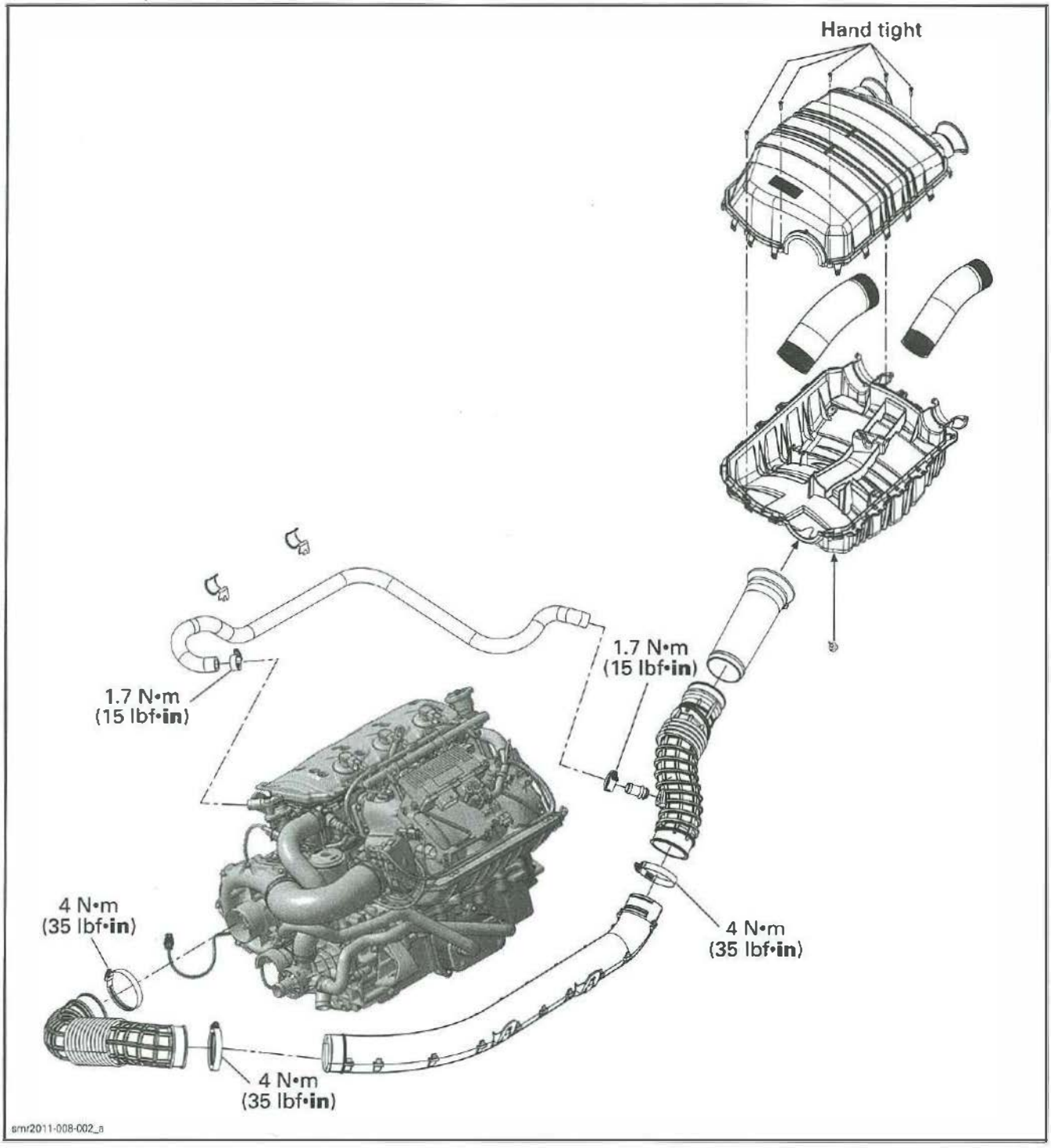
1. *T mark*

AIR INTAKE SYSTEM (EXCEPT iS AND aS MODELS)

130 and 155 engines



215 and 260 Engines



GENERAL

During assembly/installation, use torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

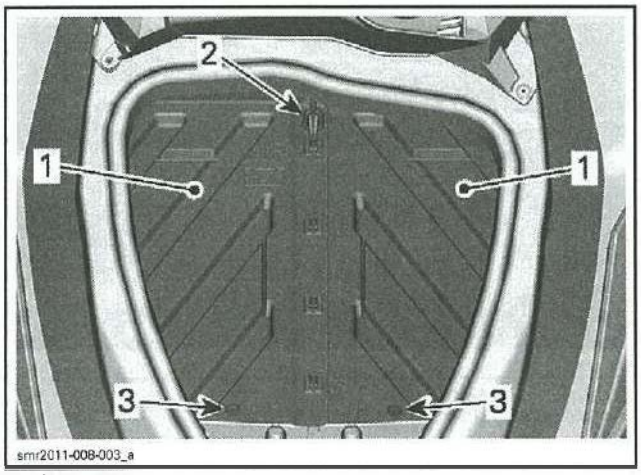
PROCEDURES

AIR INTAKE SILENCER

Air Intake Silencer Access

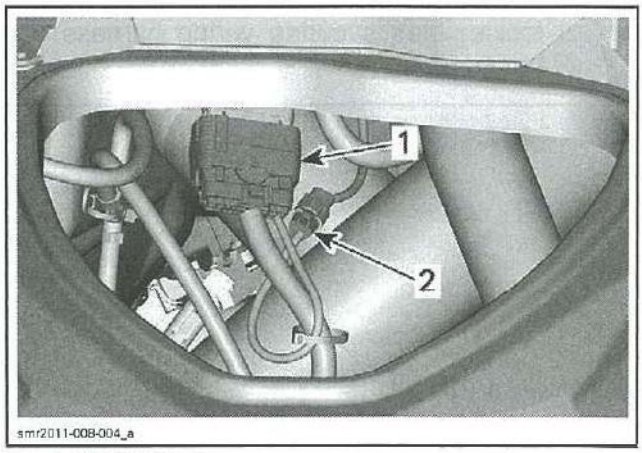
GTS and GTI Models

1. Open the front storage compartment cover.
2. Remove partitions. Refer to *BODY* subsection.



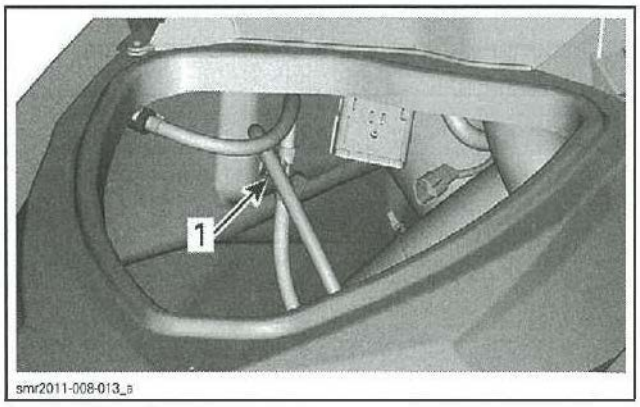
1. *Partitions*
2. *Retaining strap*
3. *Plastic rivets*

3. Disconnect gauge and OTAS connectors.



1. *Gauge connector*
2. *OTAS connector*

4. Cut locking tie retaining fuel hose on body.

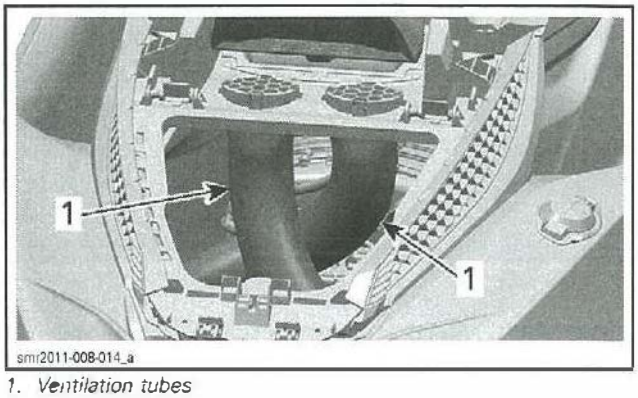


1. *Cut this locking tie*

5. Remove plastic darts securing the top of the ventilation tubes.
6. Unplug ventilations tubes and place them lower in hull.

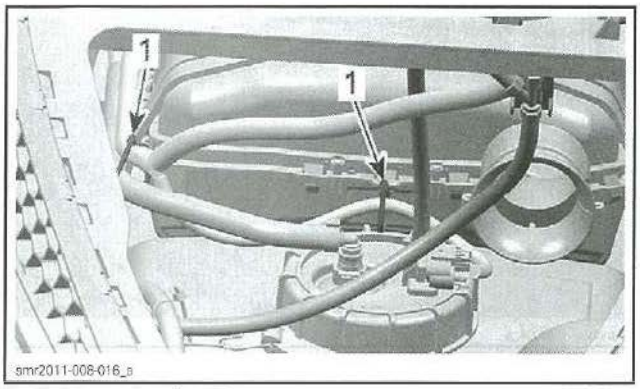
RXT and GTX Models

1. Open the front storage compartment cover.
2. Remove the storage bin.
3. Unplug the top of ventilations tubes and place them lower in hull.



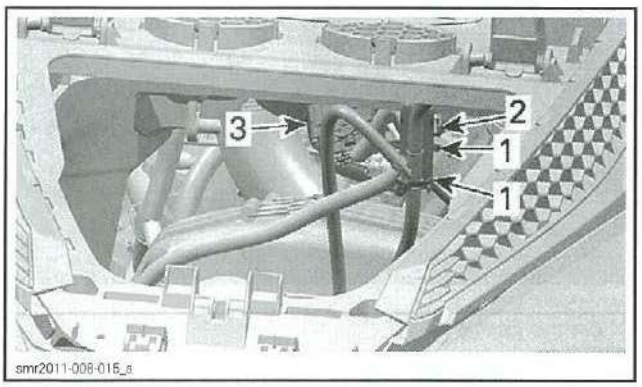
1. *Ventilation tubes*

4. Cut locking ties securing wiring harness and fuel hoses to air intake silencer.



1. Cut these locking ties

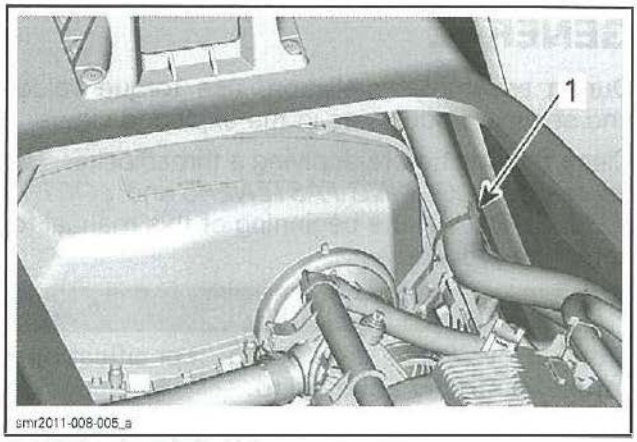
5. Cut locking ties securing fuel hoses and wiring harness to upper bracket
6. Disconnect gauge and OTAS connectors.



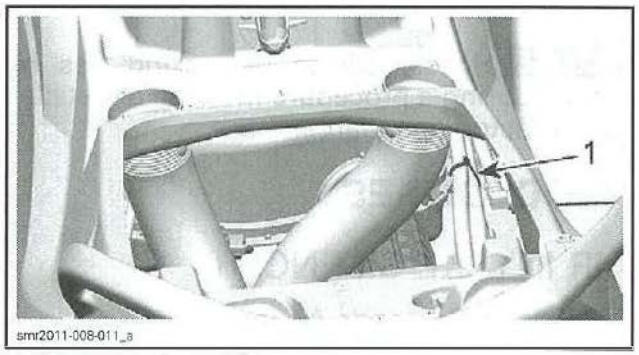
1. Cut these locking ties
2. Disconnect the OTAS connector
3. Disconnect the gauge connector

Air Intake Silencer Removal

1. Open or remove the seat.
2. From seat opening, cut locking tie securing the wiring harness and the fuel supply hose to air intake silencer.

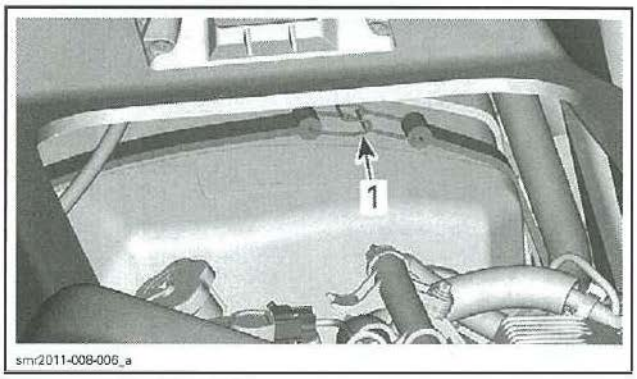


TYPICAL – GTS AND GTI
1. Cut this locking tie

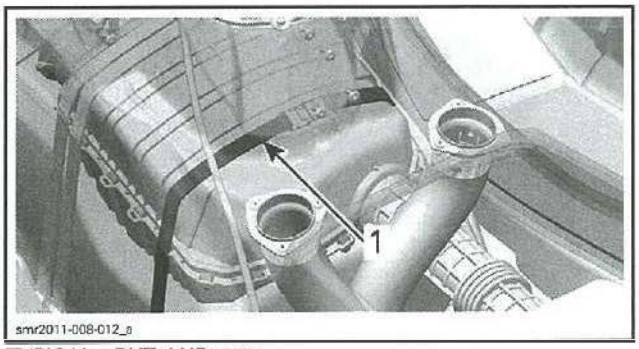


TYPICAL - RXT AND GTX
1. Cut this locking tie

3. Detach rear retaining strap retaining air intake silencer and fuel tank.

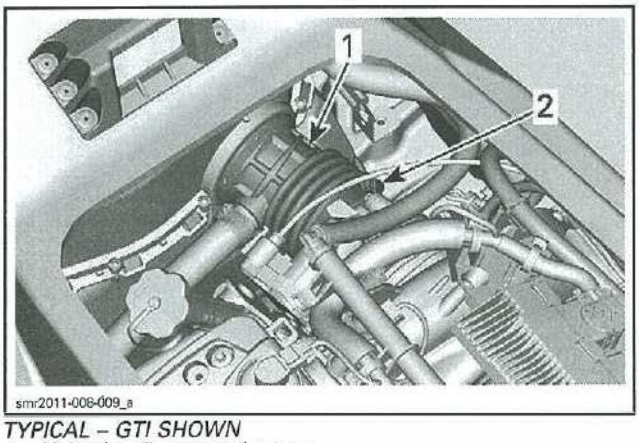


TYPICAL – GTS AND GTI
1. Rear retaining strap



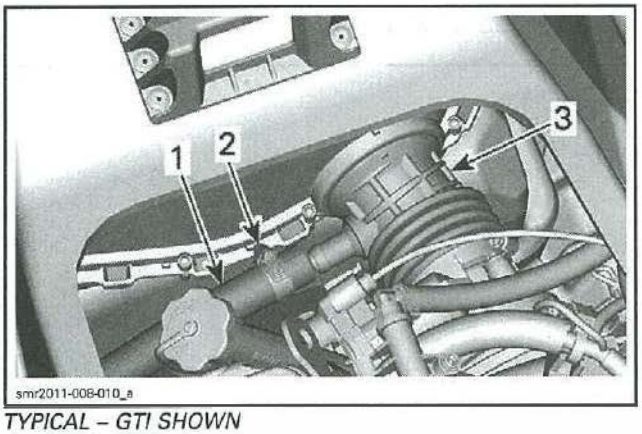
TYPICAL - RXT AND GTX
1. Rear retaining strap – under glove box

4. Loosen clamp securing the air intake silencer outlet hose to throttle body.



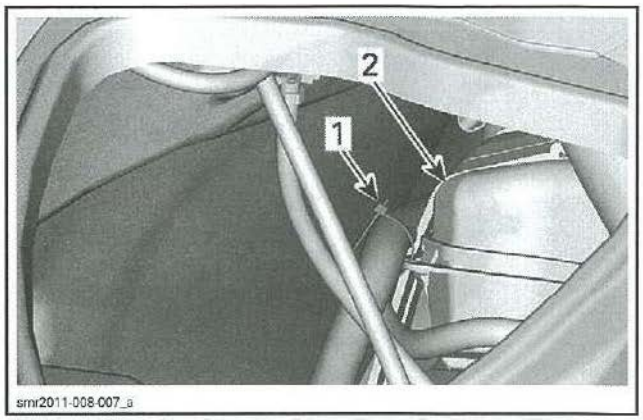
TYPICAL – GTI SHOWN
1. Air intake silencer outlet hose
2. Loosen this clamp

5. Detach the breather hose from the air intake silencer outlet hose.



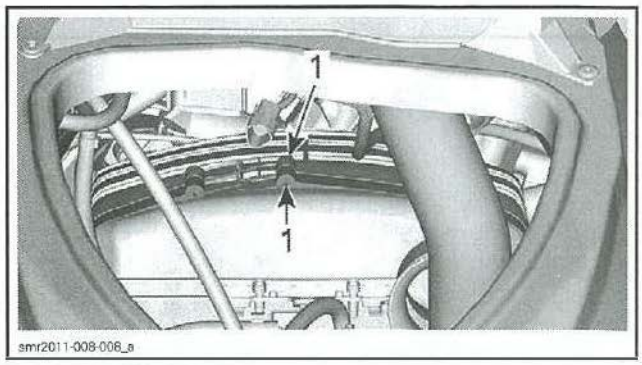
TYPICAL – GTI SHOWN
1. Breather hose
2. Breather hose clamp
3. Air intake silencer outlet hose

6. From the front storage compartment, cut locking tie securing the wiring harness and the fuel hose to air intake silencer.



THROUGH FRONT STORAGE COMPARTMENT OPENING
1. Cut this locking tie
2. Front of air intake silencer

7. Detach the front retaining straps.

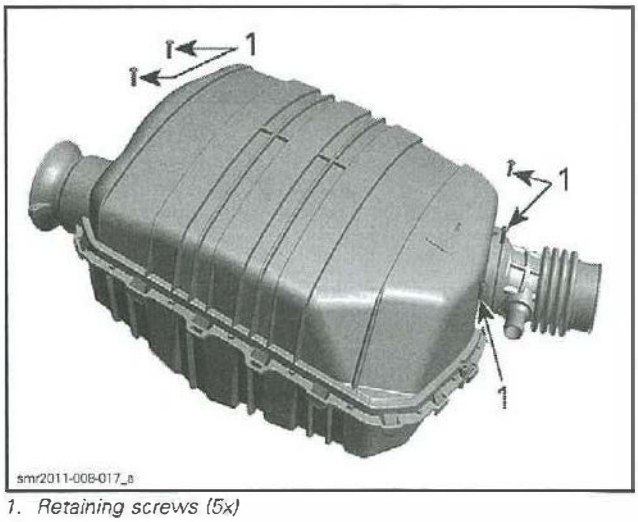


1. Front retaining straps

8. Carefully pull the air intake silencer forward to remove it from the vehicle.

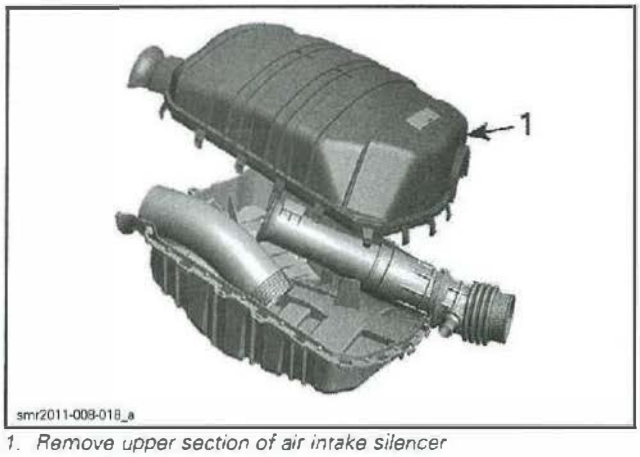
Air Intake Silencer Disassembly

1. Remove screws retaining both parts of air intake silencer together.



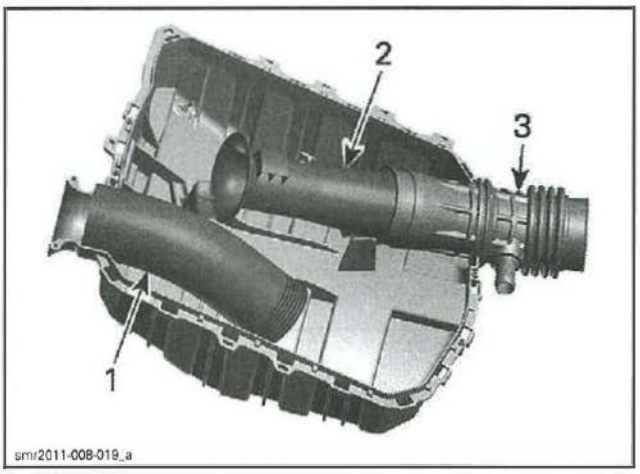
1. Retaining screws (5x)

2. Unlatch air intake silencer and remove the upper section.



1. Remove upper section of air intake silencer

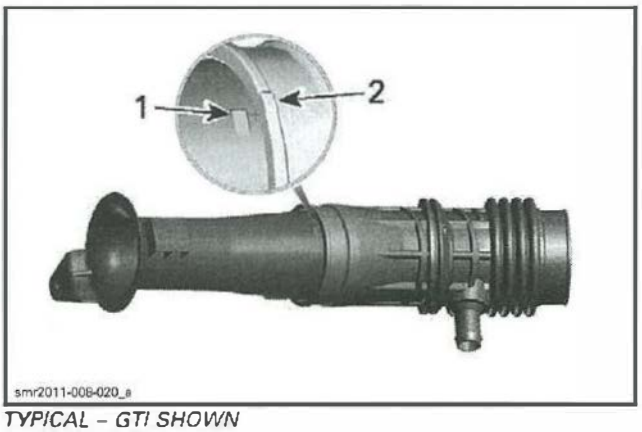
3. Remove the inlet tube (2 inlet tubes on 215 and 260 models), the baffle and the outlet hose from the air intake silencer.



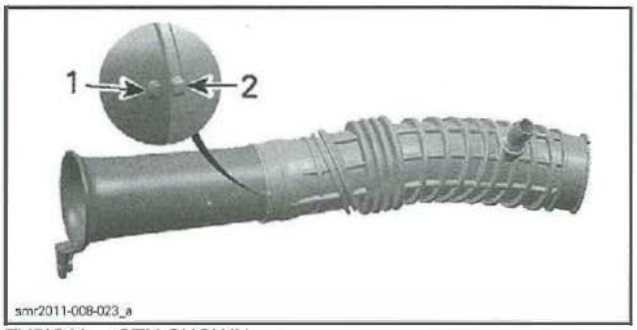
1. Inlet tube
2. Baffle
3. Outlet hose

Air Intake Silencer Assembly

Install the baffle into the outlet hose. Ensure marks are aligned.

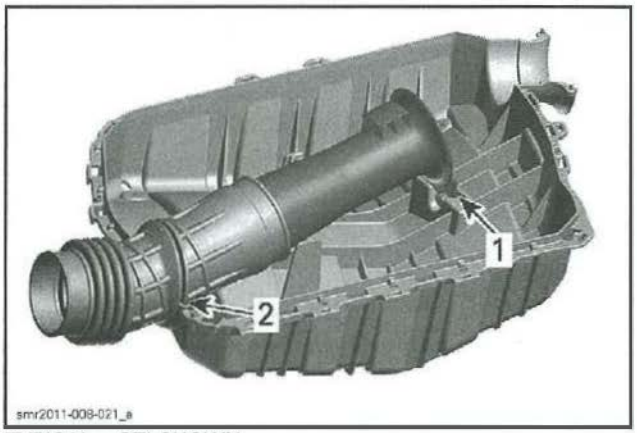


TYPICAL - GTI SHOWN
1. Baffle mark
2. Outlet hose mark



TYPICAL - GTX SHOWN
1. Baffle mark
2. Outlet hose mark

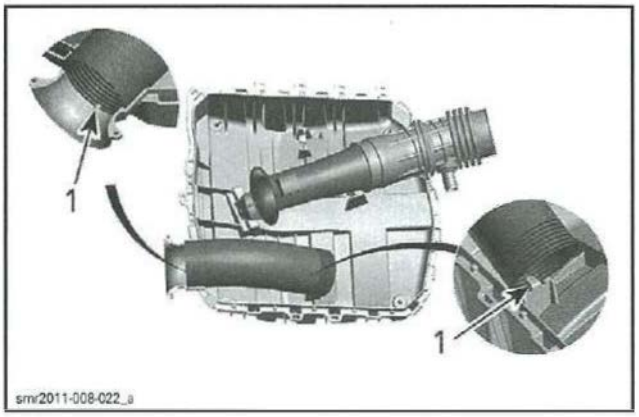
Install the assembly in the air intake silencer.



TYPICAL - GTI SHOWN
1. Baffle tab into air intake silencer slot
2. Air intake silencer rib into the outlet hose groove

Install the inlet tube. Ensure each end is properly attach.

NOTE: On **215 and 260 models**, both inlet tubes are attached as shown.



1. Retaining tabs

Press both halves of the air intake silencer together until all tabs are locked. Do not force, make sure all tubes are properly installed.

TORQUE	
Air intake silencer screws	Hand tight

Air Intake Silencer Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Ensure wiring harness and fuel hoses are properly route.

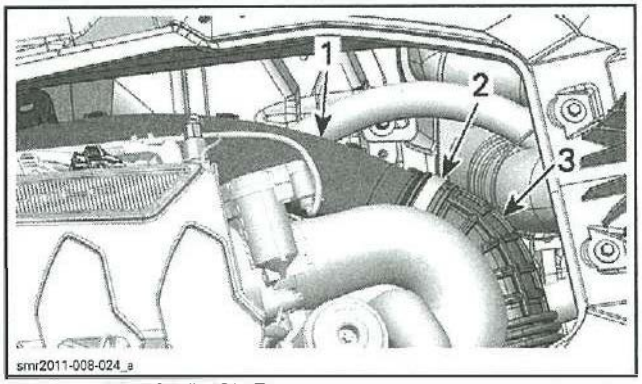
Tighten all gear clamp as specified in exploded views.

AIR INTAKE TUBE

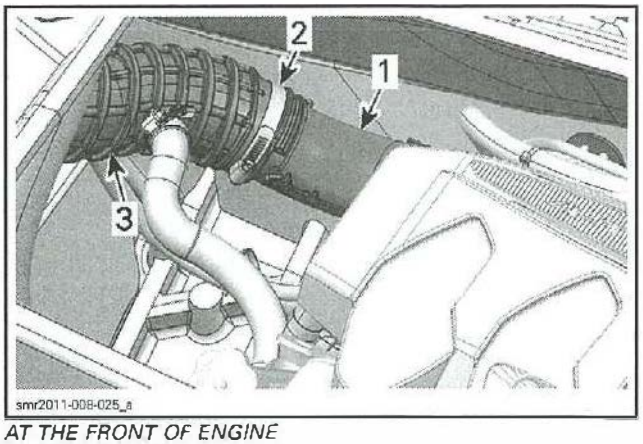
Air Intake Tube Removal

215 and 260 Models

1. Open seat.
2. Detach the seat bridge from the body and move it aside to make room.
3. Loosen clamps retaining the air intake tube to supercharger inlet hose and air intake silencer outlet hose.



AT THE REAR OF ENGINE
1. Air intake tube
2. Retaining clamp
3. Supercharger inlet hose



AT THE FRONT OF ENGINE
1. Air intake tube
2. Retaining clamp
3. Air intake silencer outlet hose

4. Detach the air intake tube from both hoses.
5. Open the front compartment storage cover and remove the storage bin.
6. Slide the air intake tube over the air intake silencer and through the front compartment opening.

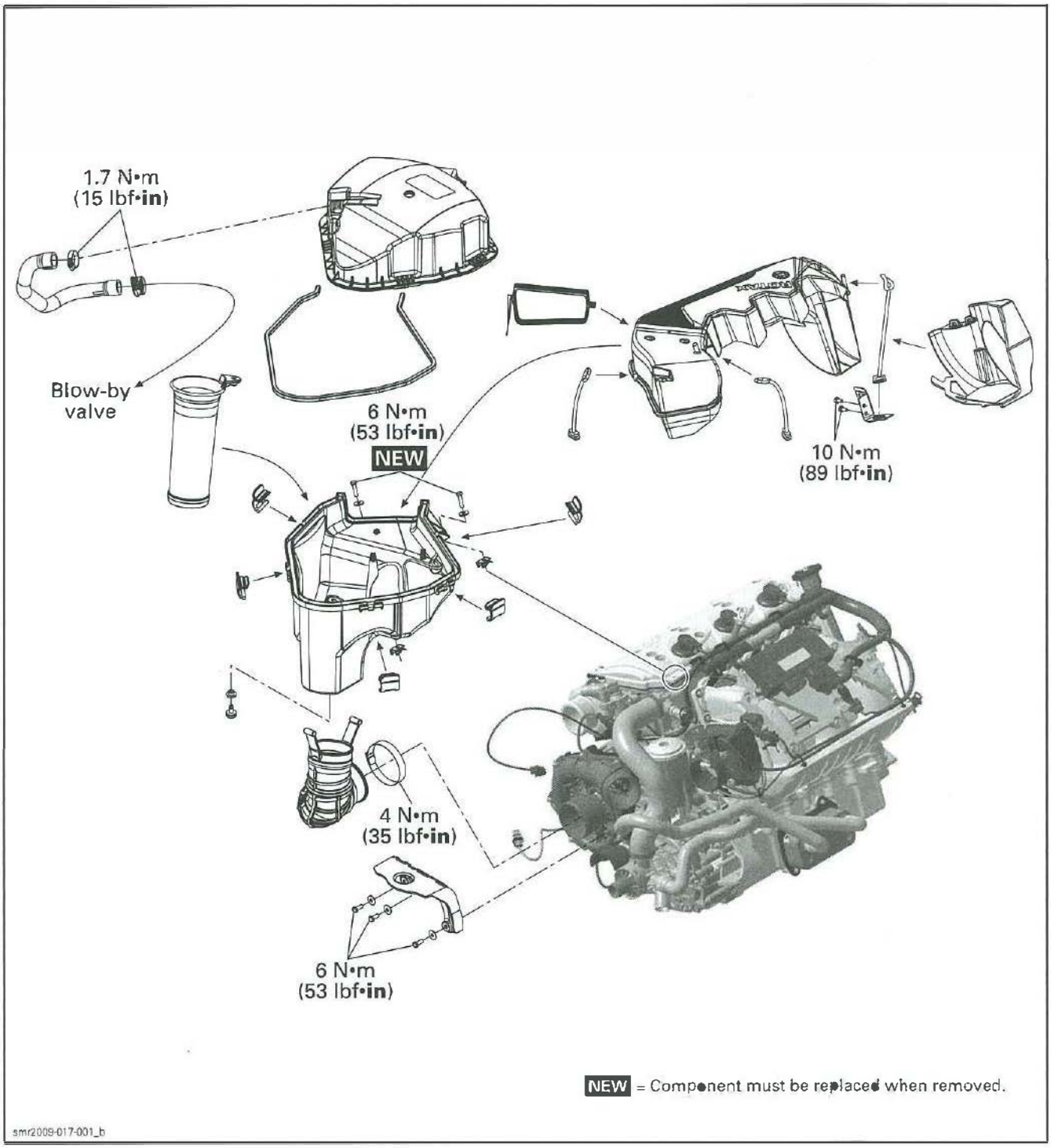
Air Intake Tube Installation

The installation is the reverse of the removal procedure. However pay attention to the following.

Make sure hoses are perfectly inserted into air intake tube before tightening the clamps.

TORQUE	
Retaining clamps	4 N•m (35 lbf•in)

AIR INTAKE SYSTEM (iS AND aS MODELS)



GENERAL

During assembly/installation, use torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new ones.

NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

PROCEDURES

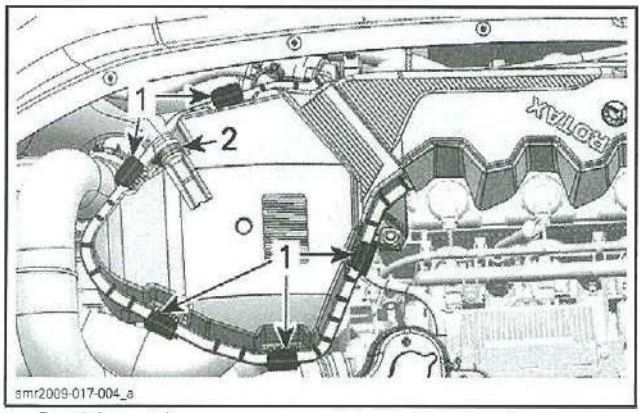
AIR INTAKE SILENCER COVER

Air Intake Silencer Cover Removal

Remove the deck extension. Refer to *BODY* subsection for procedure.

Release retaining latches.

Loosen clamp securing blow-by hose to cover.



1. Retaining latches
2. Loosen this clamp

Remove the cover.

Air Intake Silencer Cover Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Check the condition of the seal cover. Replace seal as required.

Tighten blow-by hose clamp.

TORQUE	
Blow-by hose clamp	1.7 N•m (15 lbf•in)

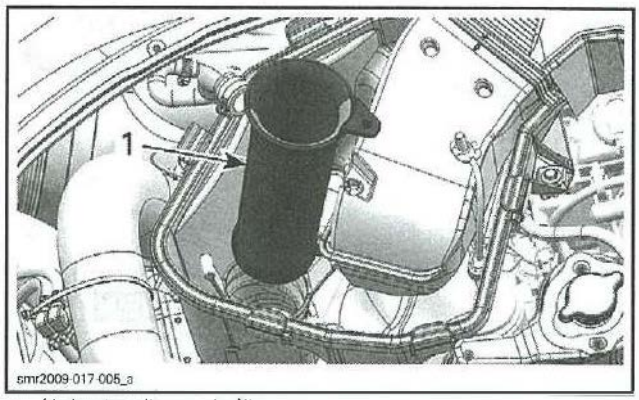
Refer to *BODY* subsection for the proper installation procedure.

AIR INTAKE SILENCER BAFFLE

Air Intake Silencer Baffle Removal

Remove *AIR INTAKE SILENCER COVER*, see procedure in this subsection.

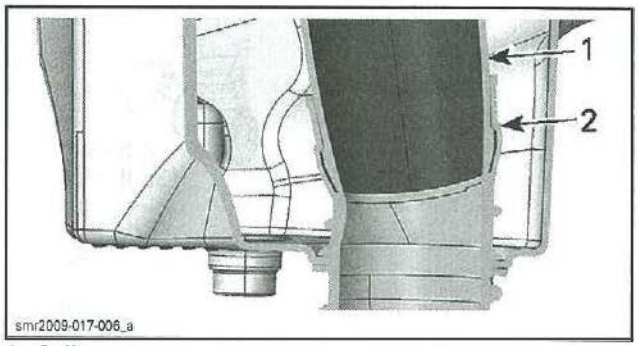
Pull the baffle out of the air intake silencer.



1. Air intake silencer baffle

Air Intake Silencer Baffle Installation

Insert the end of the baffle into supercharger air inlet hose. Using hose ears to retain hose, push the baffle into supercharger air inlet hose.



1. Baffle
2. Air intake hose

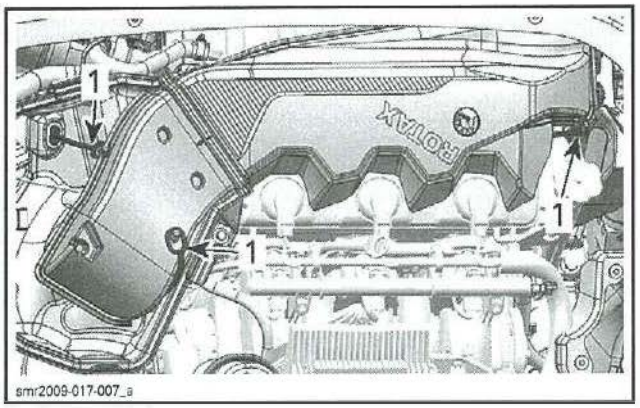
Install air intake silencer cover and all other removed parts.

AIR INTAKE TUBE

Air Intake Tube Removal

Remove the *AIR INTAKE SILENCER COVER* and the *AIR INTAKE SILENCER BAFFLE*, see procedure in this subsection.

Release the three rubber latches securing the air intake tube.



1. Rubber latches

Remove air intake tube from vehicle.

Air Intake Tube Installation

The installation is the reverse of the removal procedure.

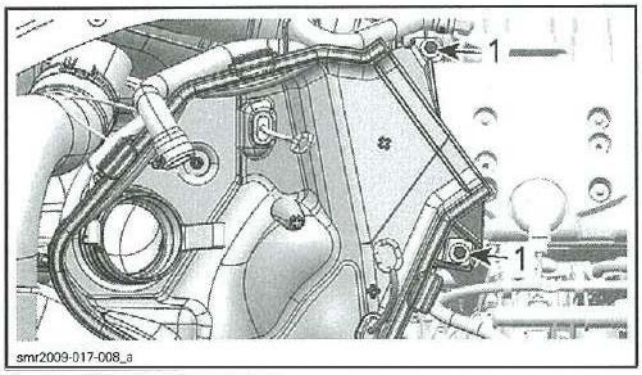
AIR INTAKE SILENCER

Air Intake Silencer Removal

Remove:

- Deck extension, see *BODY* subsection for procedure
- Air intake cover
- Air intake tube.

Remove and discard both screws securing air intake silencer.



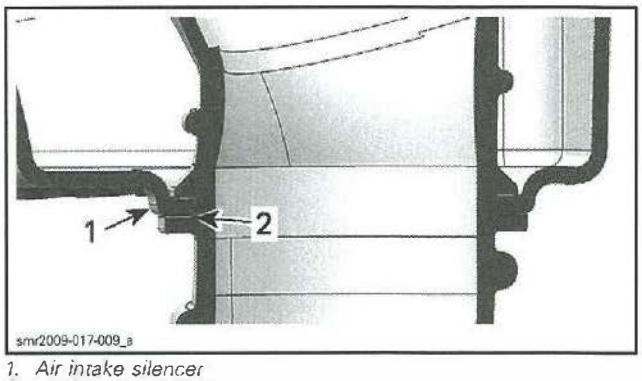
1. Air intake silencer screws

Inside air intake silencer, squeeze the top of its outlet hose and move hose out of air intake silencer.

Air Intake Silencer Installation

Squeeze the top of the air intake silencer outlet hose and move it in the air intake silencer.

Install the air intake silencer into hose groove.



1. Air intake silencer
2. Outlet hose groove

Secure air intake silencer using NEW screws.

TORQUE	
Air intake silencer screw	6 N•m (53 lbf•in)

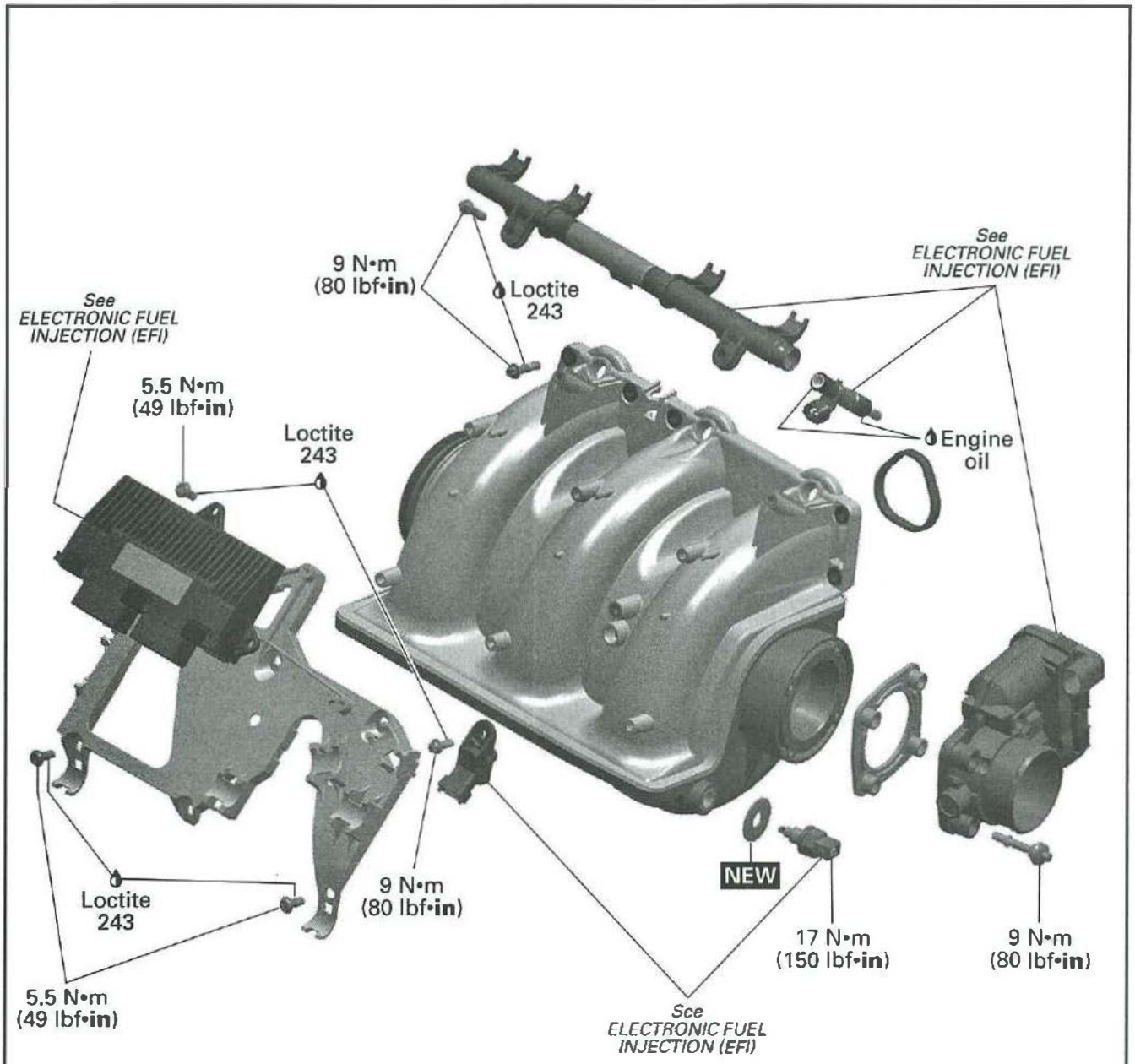
Install all other removed parts.

INTAKE MANIFOLD

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	49

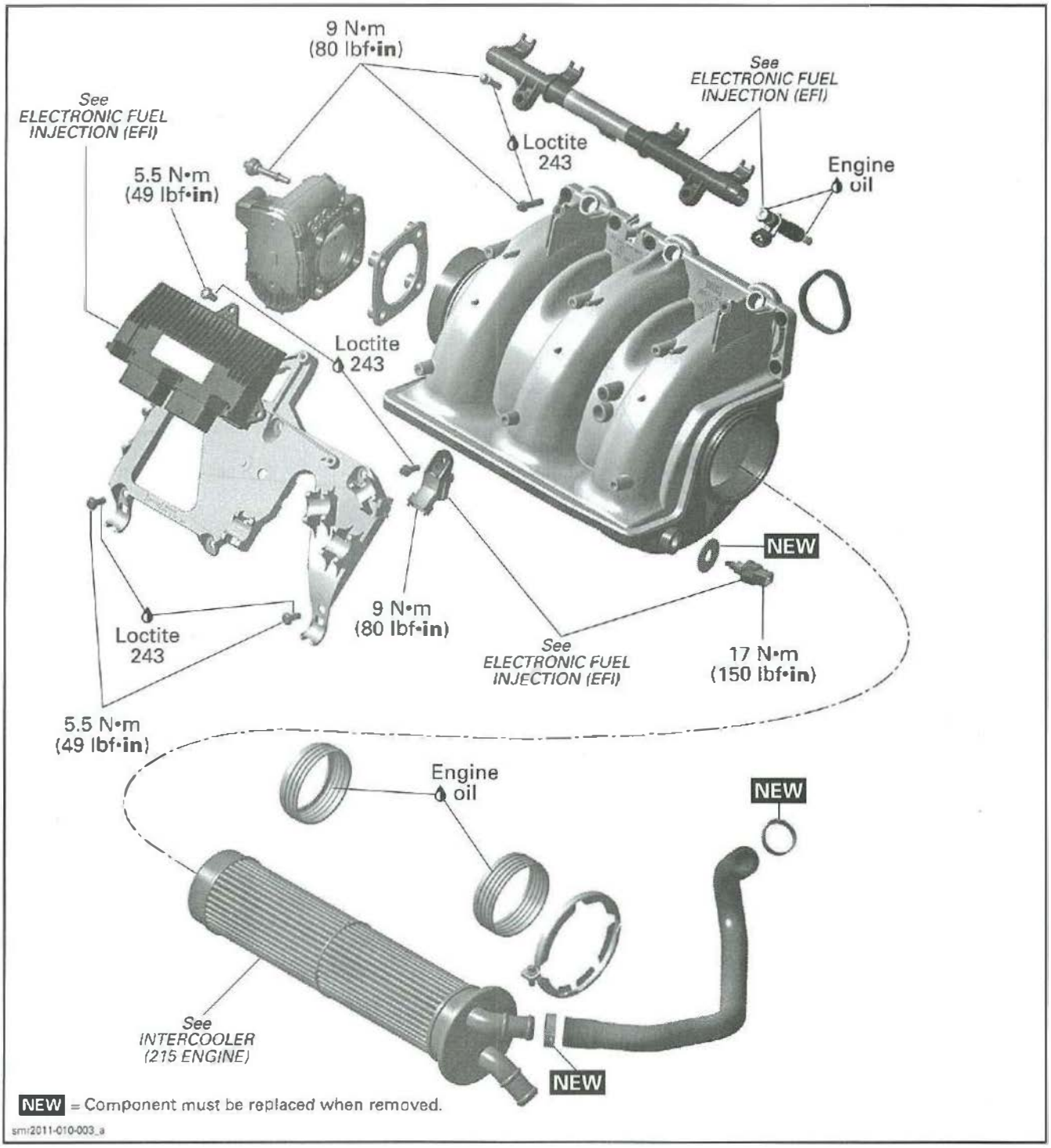
130 and 155 Engines



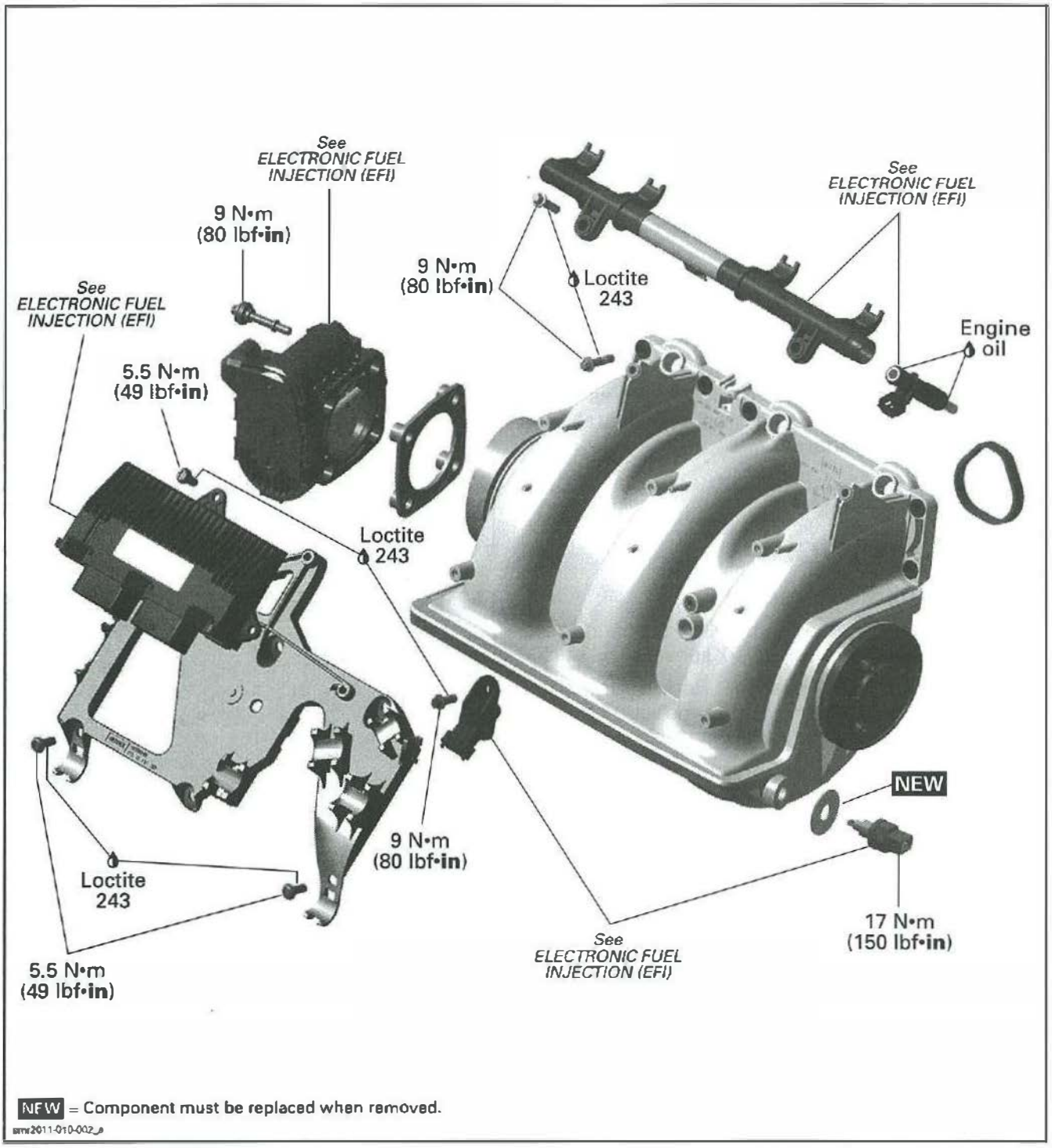
NEW = Component must be replaced when removed.

smr2011-010-001_a

215 Engine


9 N•m
(80 lbf•in)
See
ELECTRONIC FUEL
INJECTION (EFI)
Loctite
243
See
ELECTRONIC FUEL
INJECTION (EFI)
Engine
oil
5.5 N•m
(49 lbf•in)
Loctite
243
NEW
9 N•m
(80 lbf•in)
Loctite
243
See
ELECTRONIC FUEL
INJECTION (EFI)
17 N•m
(150 lbf•in)
5.5 N•m
(49 lbf•in)
Engine
oil
NEW
See
INTERCOOLER
(215 ENGINE)
NEW
NEW = Component must be replaced when removed.
smr2011-010-003_a

260 Engine



NEW = Component must be replaced when removed.

smr2011-010-002_a

GENERAL

During assembly/installation, use torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

PROCEDURES

INTAKE MANIFOLD

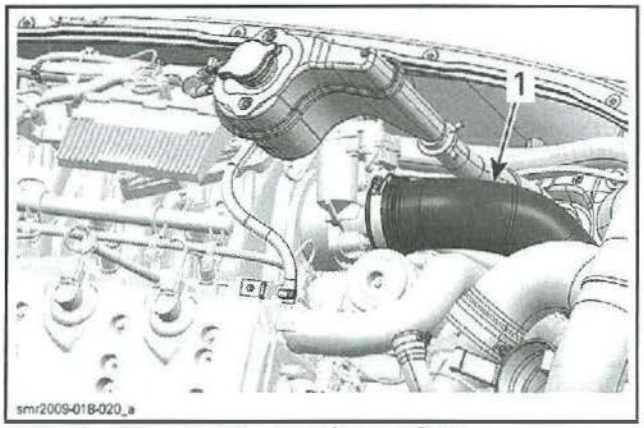
Intake Manifold Removal

On iS models, remove the moving deck and the deck extension. Refer to *BODY* subsection.

Remove the air intake silencer. Refer to the appropriate subsection according to model:

- *AIR INTAKE SYSTEM (EXCEPT iS AND aS MODELS)*
- *AIR INTAKE SYSTEM (iS AND aS MODELS).*

Disconnect the intake hose at intake manifold.



TYPICAL - SUPERCHARGED ENGINE SHOWN
1. Intake hose

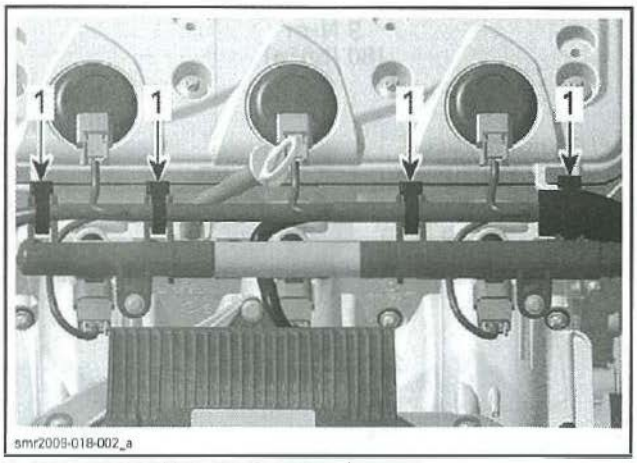
Move the coolant expansion tank aside to make room.

Remove the oil dipstick.

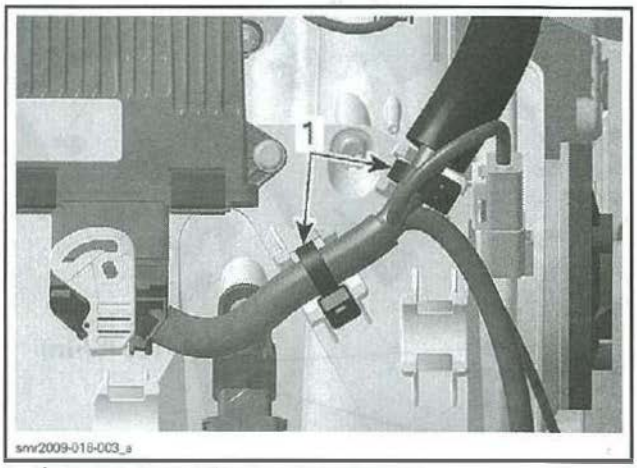
Disconnect fuel hose connector at fuel rail. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Unplug the "B" connector from the ECM by pulling the lock. Refer to *CONNECTOR INFORMATION* subsection for procedure.

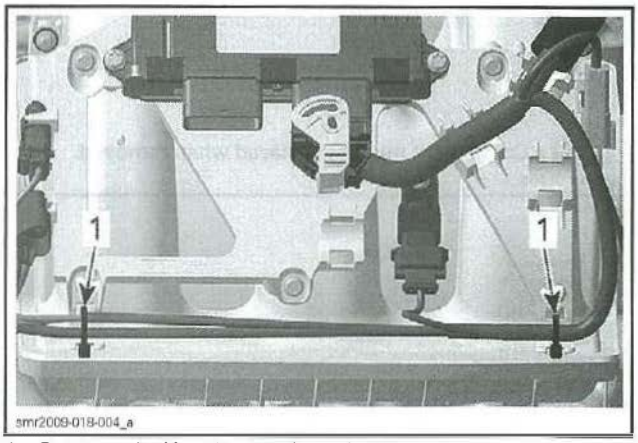
Cut all locking ties securing the wiring harnesses to the intake manifold.



1. Cut these locking ties to release harness

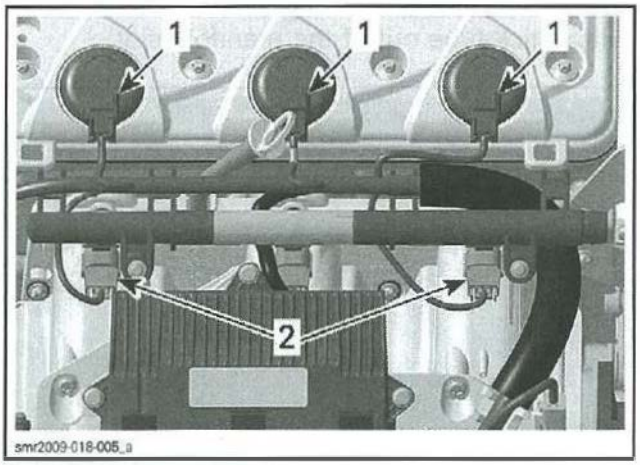


1. Cut these locking ties to release harness



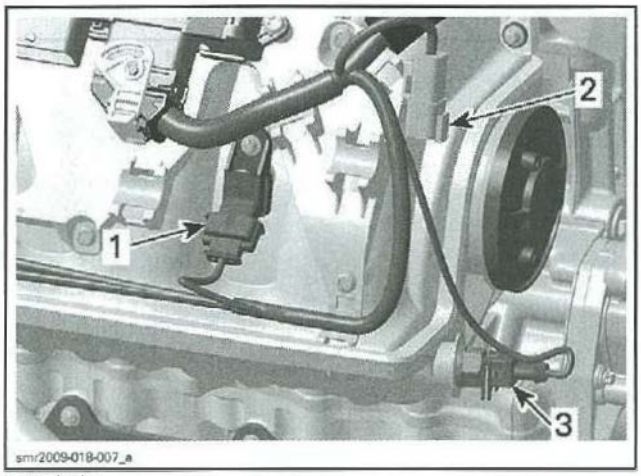
1. Cut these locking ties to release harness

Unplug the ignition coil and fuel injector connectors.



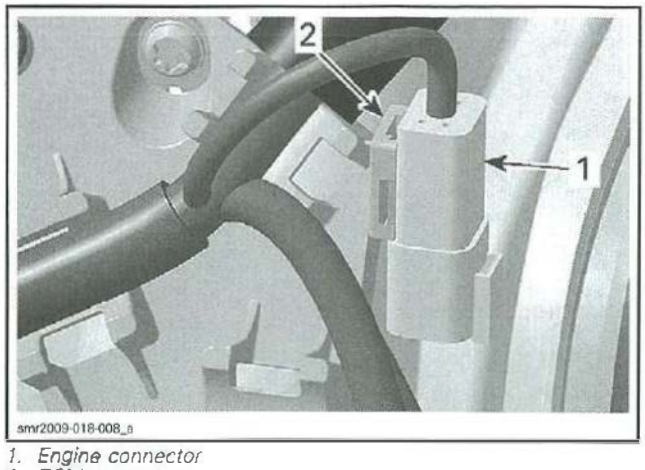
1. *Ignition coil connectors*
2. *Fuel injector connectors*

Unplug the manifold air pressure sensor (MAPS), the engine connector and the manifold air temperature sensor (MATS).



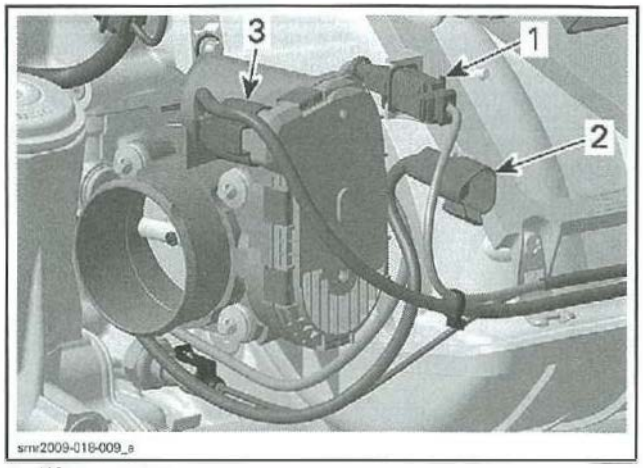
TYPICAL
1. *MAPS connector*
2. *Engine connector location*
3. *MATS connector*

Detach the engine connector housing from the ECM support.



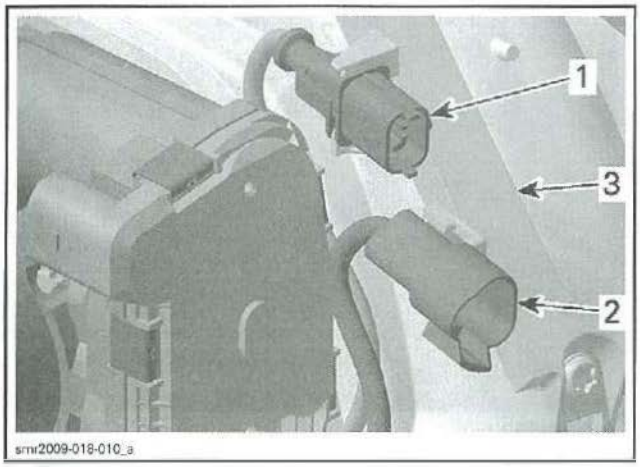
1. *Engine connector*
2. *ECM support*

Unplug the knock sensor (KS), the magneto and the throttle actuator connectors.



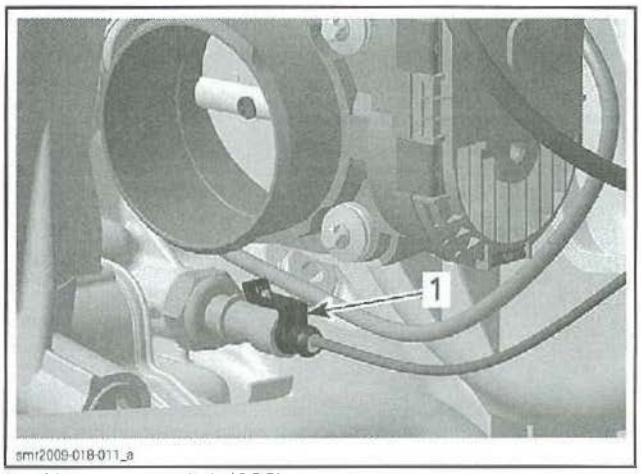
1. *KS connector*
2. *Magneto connector location*
3. *Throttle actuator connector*

Detach the knock sensor (KS) and magneto connector housings from the ECM support. For more details, refer to *CONNECTOR INFORMATION* subsection.



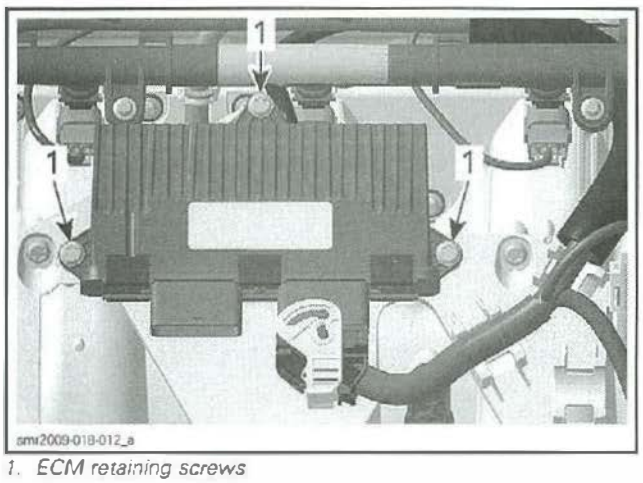
1. *KS connector*
2. *Magneto connector*
3. *ECM support*

Unplug the oil pressure switch (OPS).



1. *Oil pressure switch (OPS)*

Unscrew ECM retaining screws and remove ECM from its support.

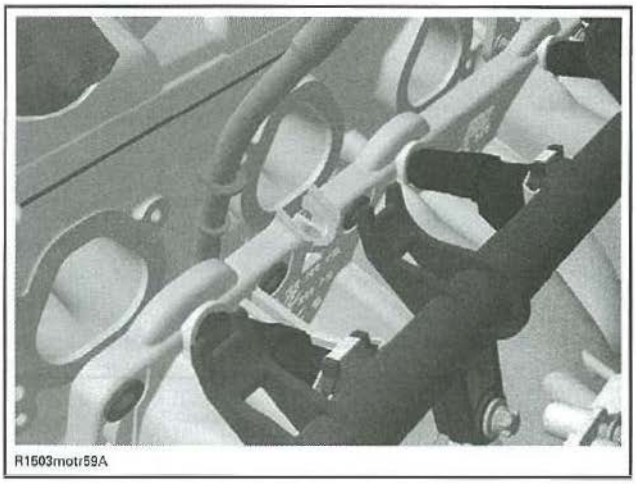


1. *ECM retaining screws*

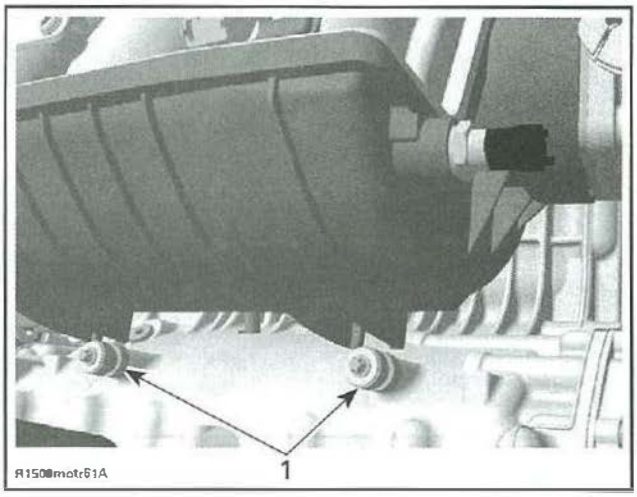
Pull the engine wiring harness with the ECM plugged away from intake manifold.

On 215 engine, disconnect both hoses at the front end of intercooler.

Remove manifold retaining screws and push the oil dipstick tube out of the manifold slot.



Lift intake manifold up to pull it out of the mounting brackets.



1. *Mounting brackets*

Pull intake manifold out.

Intake Manifold Inspection

Check intake manifold for cracks, warping at flanges or any other visible damage.

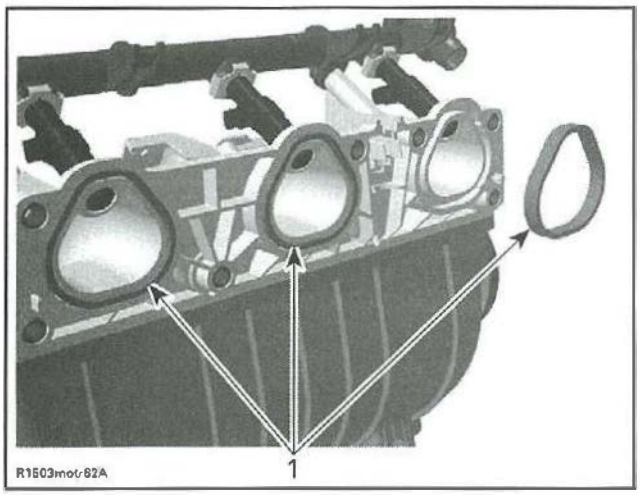
Check if intake manifold gaskets are cracked, brittle or otherwise damaged.

Replace damaged parts as necessary.

Intake Manifold Installation

For installation, reverse the removal procedure. Pay attention to following details.

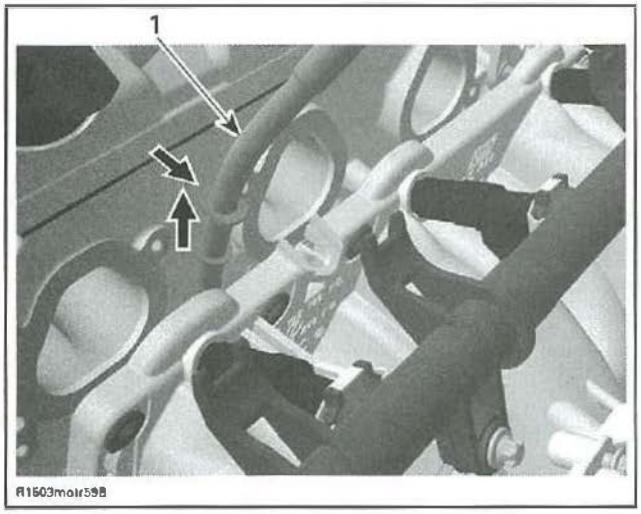
Ensure that all gaskets are properly installed and in good condition.



INTAKE MANIFOLD
1. Gaskets

First, position intake manifold on front mounting bracket then push manifold toward engine to then proceed with rear mounting bracket.

When installing the intake manifold, lift up the oil dipstick tube a little bit to fit in the slot of the manifold.

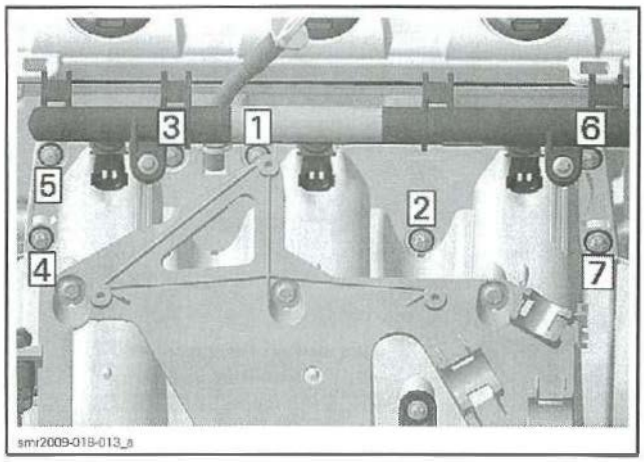


1. Oil dipstick tube

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on the intake manifold screws.

Tighten intake manifold to specification using the following sequence.

TORQUE	
Intake manifold screws	9 N•m (80 lbf•**in**)



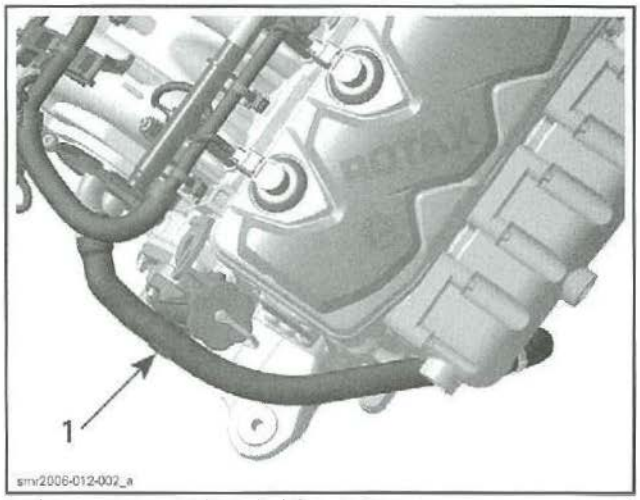
Ensure to properly route and secure wiring harness with locking ties.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on the ECM retaining screws and tighten them to specification.

TORQUE	
ECM retaining screws	9 N•m (80 lbf•**in**)

Install all other removed parts.

NOTE: Make sure the outlet hose of the intercooler is installed in its holding device (located on the oil filler tube) otherwise the hose will scuff on the engine block.

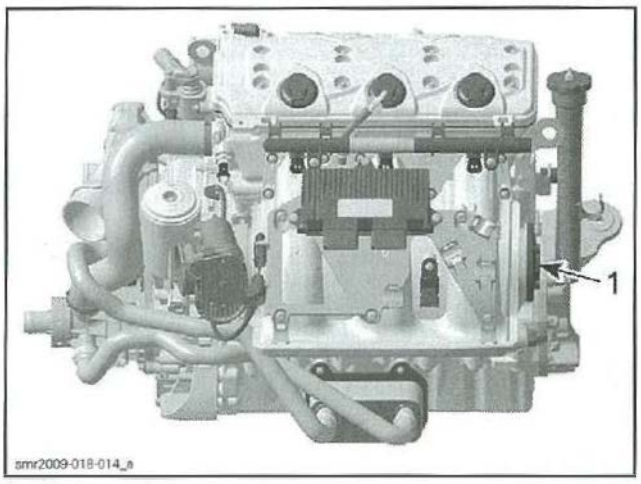


1. Intercooler outlet hose holding device

FLAME ARRESTER

Flame Arrester Location

The flame arrester is integrated in the intake manifold.



1. Flame arrester

Flame Arrester Inspection

The flame arrester in the intake manifold is maintenance free.

Flame Arrester Replacement

NOTE: The flame arrester can not be removed from the intake manifold.

Replace intake manifold if necessary. Refer to *INTAKE MANIFOLD* in this subsection.

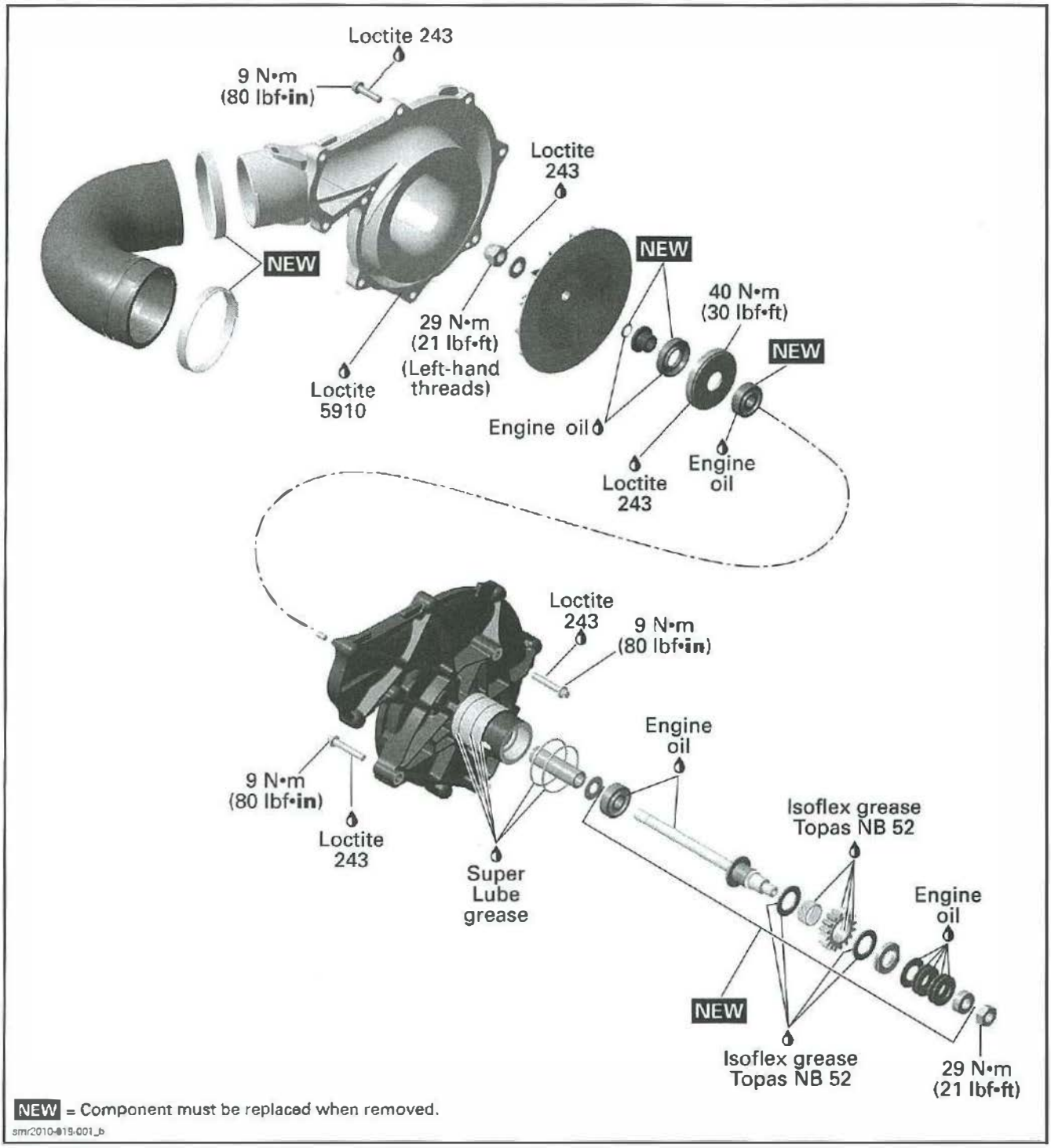
SUPERCHARGER (215 AND 260 ENGINES)

SERVICE TOOLS

Description	Part Number	Page
4-PIN SOCKET	529 035 948	59, 62
BEARING SUPPORT/PUSHER	529 035 950	61–62
CAMSHAFT LOCKING TOOL	529 035 839	54
SUPERCHARGER GEAR HOLDER	529 036 025	55
SUPERCHARGER RETAINING KEY	529 036 027	58–59, 64
SUPPORT PLATE	529 035 947	55, 58, 61–62
TORX ADAPTER	529 035 938	57, 65

SERVICE PRODUCTS

Description	Part Number	Page
ISOFLEX GREASE TOPAS NB 52	293 550 021	63
LOCTITE 243 (BLUE)	293 800 060	62–65
LOCTITE 5910	293 800 081	64
SUPER LUBE GREASE	293 550 030	64



NEW = Component must be replaced when removed.

smr2010-015-001_b

GENERAL

During assembly/installation, use the torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.) must be replaced.

NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

INSPECTION

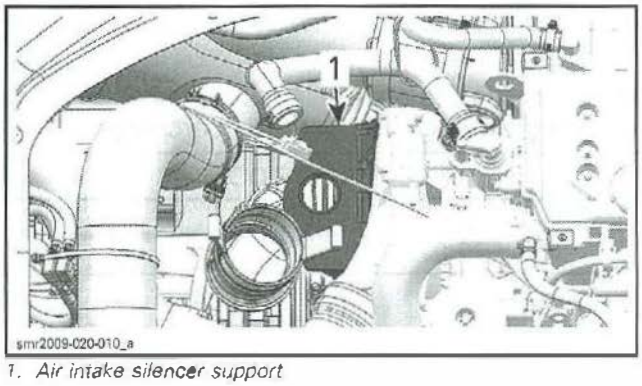
SUPERCHARGER INLET CLEANLINESS

NOTE: A lower than usual maximum RPM at full throttle might be caused by a dirty supercharger inlet.

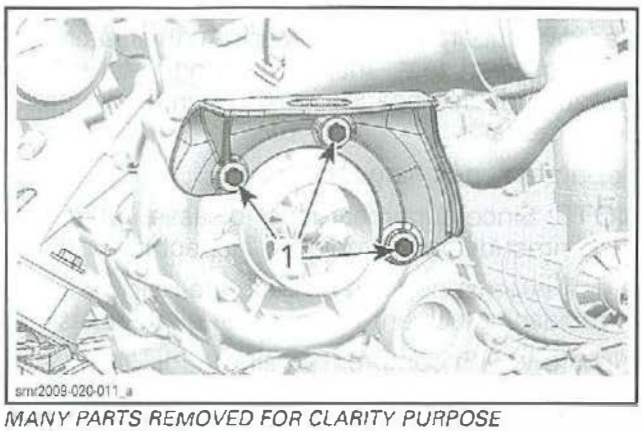
Remove the air intake silencer. Refer to the appropriate subsection according to model:

- *AIR INTAKE SYSTEM (EXCEPT iS AND aS MODELS)*
- *AIR INTAKE SYSTEM (iS AND aS MODELS).*

Remove the air intake silencer support.

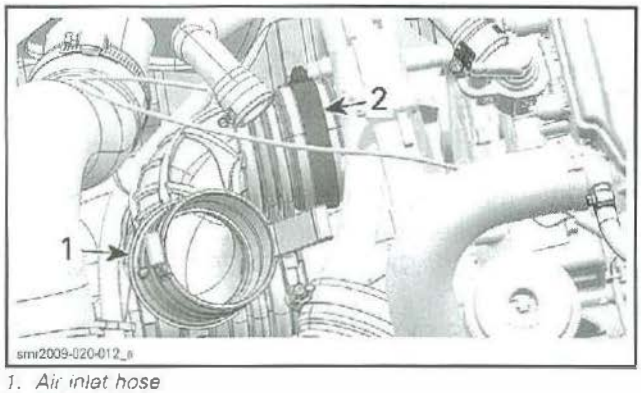


1. Air intake silencer support



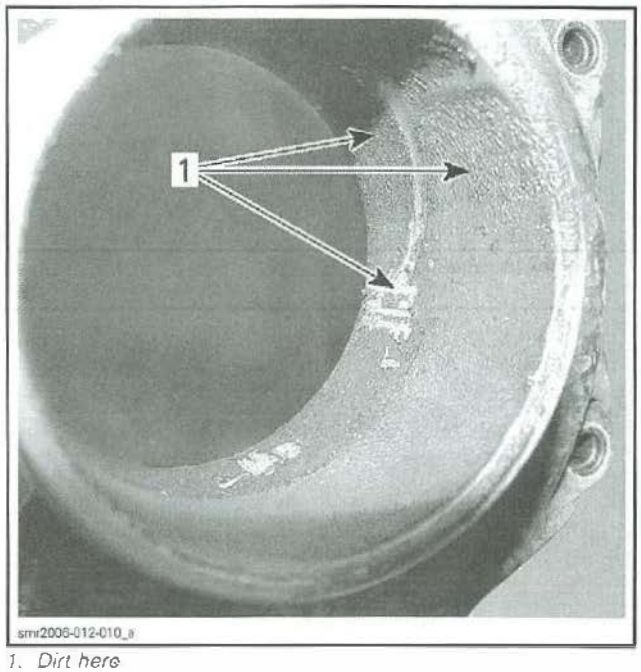
MANY PARTS REMOVED FOR CLARITY PURPOSE
1. Support screws

Remove the air inlet hose from supercharger.



1. Air inlet hose
2. Hose clamp

Visually inspect supercharger inlet side for oil, salt or any other deposits.



1. Dirt here

If dirt is found, proceed as follows.

Remove supercharger and perform the clutch slipping moment test. Inspect bearings and friction clutch. Replace bearings and clutch components as necessary.

Separate supercharger housing.

NOTE: Since supercharger is disassembled, it is recommended to completely inspect it.

Clean internal housing and turbine using a brush and cleaning solvent to get rid of oil deposits.

Blow dry with compressed air.

NOTICE Do not let turbine spin when using compressed air.

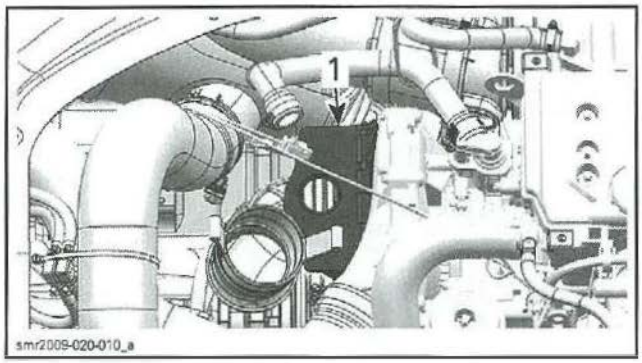
Complete usual assembly procedures as described in this subsection.

SUPERCHARGER CLUTCH SLIPPING MOMENT (ON ENGINE)

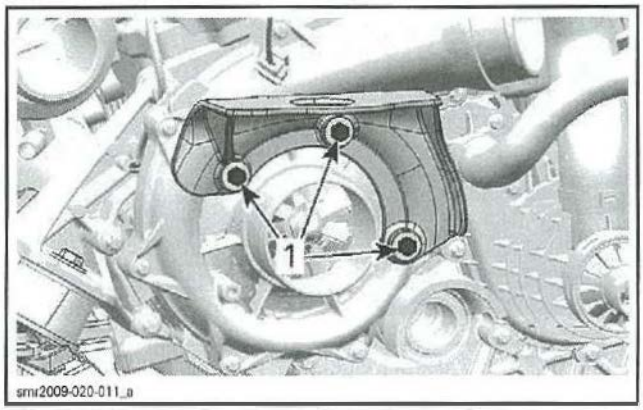
Remove the air intake silencer. Refer to the appropriate subsection according to model:

- *AIR INTAKE SYSTEM (EXCEPT iS AND aS MODELS)*
- *AIR INTAKE SYSTEM (iS AND aS MODELS).*

Remove the air intake silencer support.

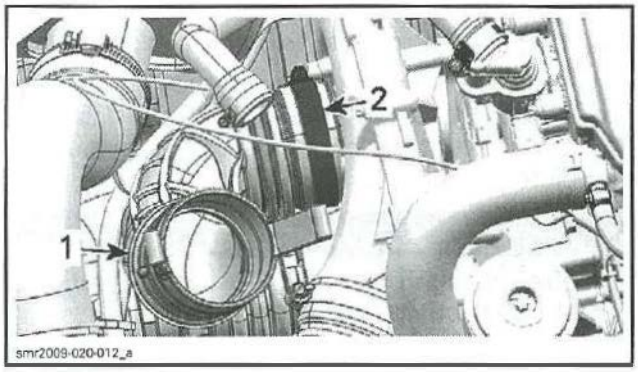


1. Air intake silencer support



MANY PARTS REMOVED FOR CLARITY PURPOSE
1. Support screws

Remove the air inlet hose from supercharger.

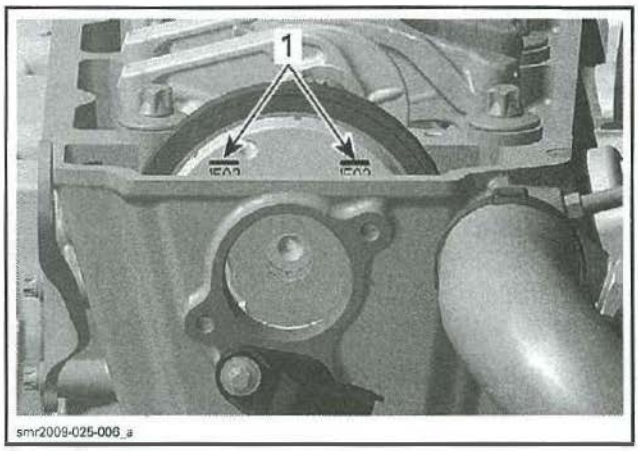


1. Air inlet hose
2. Hose clamp

Remove cylinder head cover, refer to *CYLINDER HEAD* subsection.

Remove spark plugs.

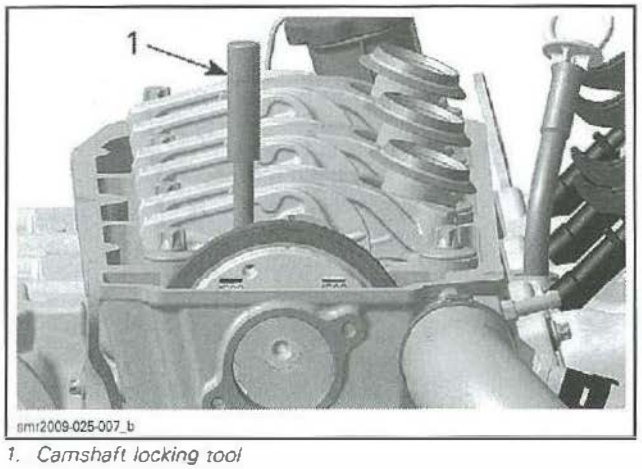
Turn engine by rotating the supercharger nut counterclockwise until the position lines on oil separator cover are lined up as shown in the following illustration.



1. Position lines

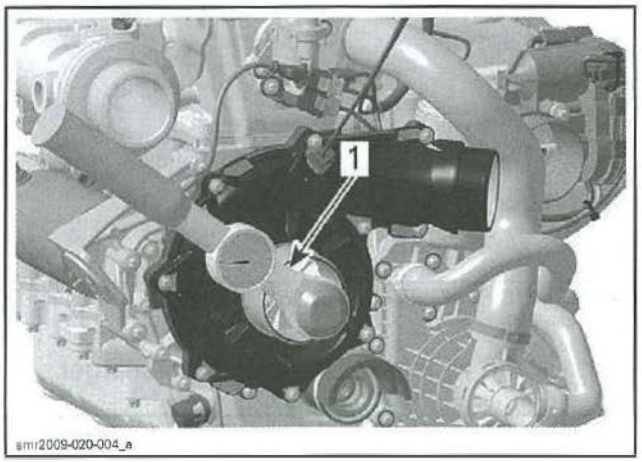
Lock camshaft to prevent camshaft rotation while checking slipping moment of supercharger.

REQUIRED TOOL	
CAMSHAFT LOCKING TOOL (P/N 529 035 839)	



1. Camshaft locking tool

Check slipping moment counterclockwise by using a torque wrench with actual torque viewer. A mirror is useful to see the viewer.



1. Torque wrench

NOTE: Before checking the supercharger slipping moment on a new or rebuilt supercharger, it is recommended to turn the clutch for a minimum of 3 complete revolutions. This will dissipate grease or oil on the friction shims for a precise reading.

Supercharger should start to turn at a torque within the specified values.

SLIPPING MOMENT (NEW SUPERCHARGER)
9 N•m to 14 N•m (80 lbf•**in** to 124 lbf•**in**)

SLIPPING MOMENT (BREAK-IN SUPERCHARGER)
8 N•m to 12 N•m (71 lbf•**in** to 106 lbf•**in**)

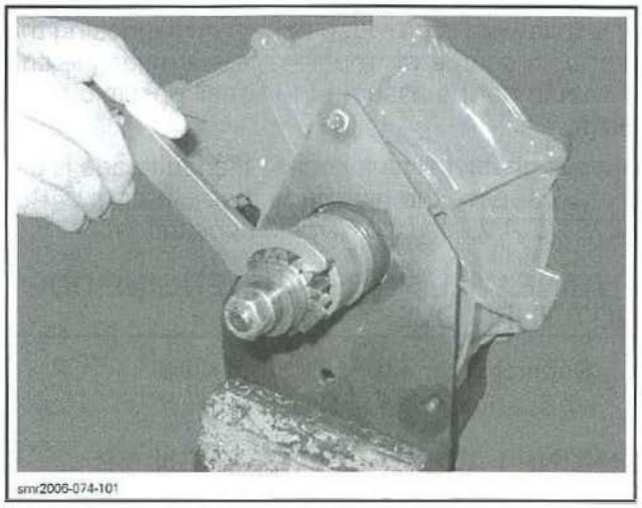
If the torque is not within specifications, repair supercharger clutch. Verify supercharger clutch components as per *SUPERCHARGER INSPECTION* in this subsection.

SUPERCHARGER CLUTCH SLIPPING MOMENT (BENCH TEST)

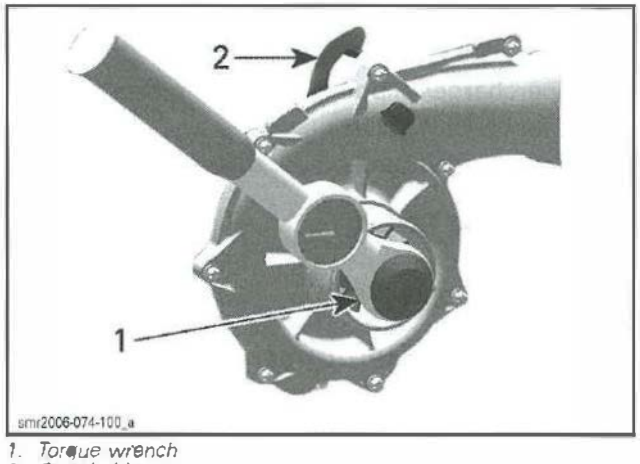
Mount supercharger on support plate.

Hold supercharger gear with supercharger gear holder.

REQUIRED TOOLS	
SUPPORT PLATE (P/N 529 035 947)	
SUPERCHARGER GEAR HOLDER (P/N 529 036 025)	



Check slipping moment counterclockwise by using a torque wrench with a viewer.



1. Torque wrench
2. Gear holder

NOTE: Before checking the supercharger slipping moment on a new or rebuilt supercharger, it is recommended to turn the clutch for a minimum of 3 complete revolutions. This will dissipate grease or oil on the friction shims for a proper reading.

Supercharger should start to turn at a torque within the specified values.

SLIPPING MOMENT (NEW SUPERCHARGER)
9 N•m to 14 N•m (80 lbf•**in** to 124 lbf•**in**)

SLIPPING MOMENT (BREAK-IN SUPERCHARGER)
8 N•m to 12 N•m (71 lbf•**in** to 106 lbf•**in**)

If the torque is not within specification, repair supercharger clutch. Verify supercharger clutch components as per *SUPERCHARGER INSPECTION* in this subsection.

TROUBLESHOOTING

The following is provided to help in diagnosing the probable source of troubles. It is a guideline and it should not be assumed to list all possible problems.

Always check for fault codes. If a fault code is detected, service the fault code first. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

ENGINE WILL NOT START (ENGINE DOES NOT TURN OVER)

1. Supercharger seized or obstructed
   - *Inspect and repair supercharger.*

ENGINE LACKS ACCELERATION OR POWER (DOES NOT REACH MAXIMUM RPM)

1. Supercharger inlet is dirty
   - *Check and clean supercharger inlet.*
   - *Check engine oil. Siphon excess of oil.*
2. Supercharger slipping clutch defective
   - *Check slipping clutch moment.*
   - *Repair supercharger if out of specification.*

PROCEDURES

SUPERCHARGER

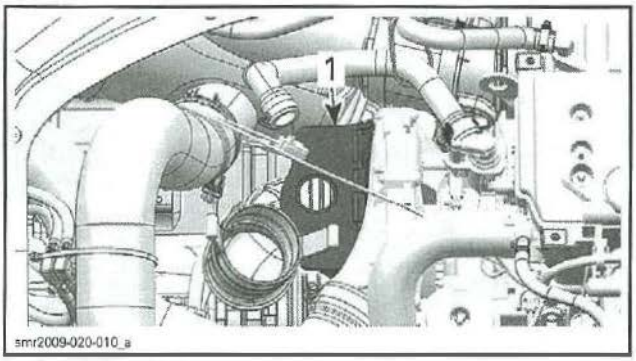
Supercharger Removal

On iS models, remove the moving deck. Refer to *BODY (RXT, GTX AND WAKE PRO)* subsection for proper procedure.

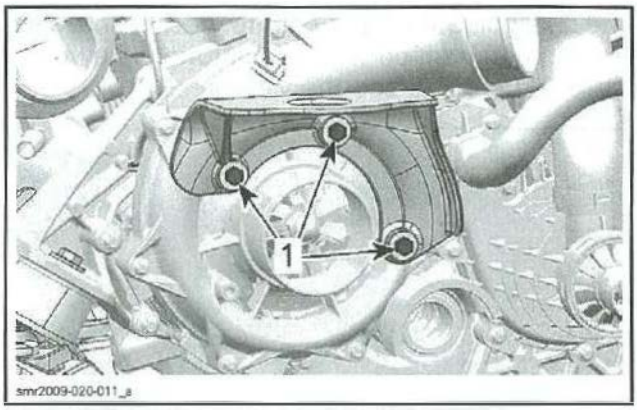
Remove the air intake silencer. Refer to appropriate subsection according to model:

- *AIR INTAKE SYSTEM (EXCEPT iS AND aS MODELS)*
- *AIR INTAKE SYSTEM (iS AND aS MODELS).*

Remove the air intake silencer support.

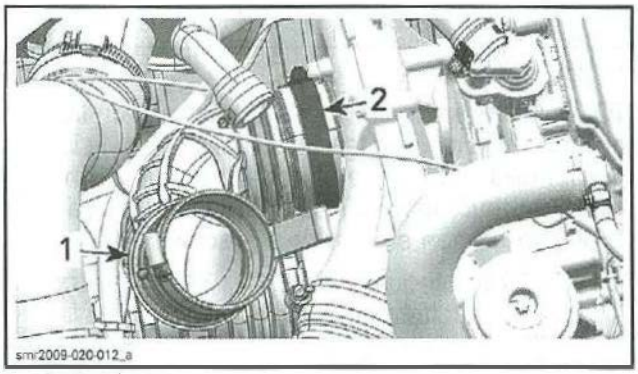


1. Air intake silencer support



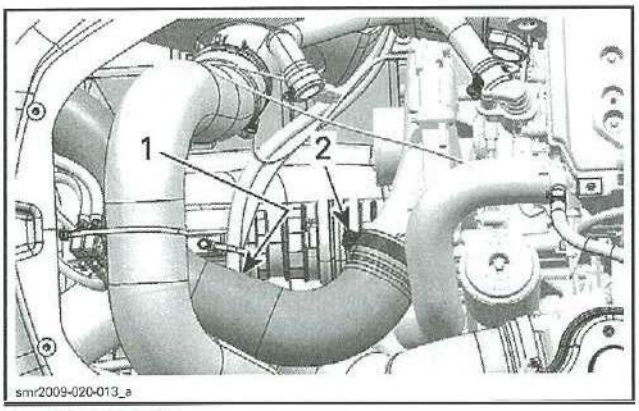
MANY PARTS REMOVED FOR CLARITY PURPOSE
1. Support screws

Remove the air inlet hose from supercharger.



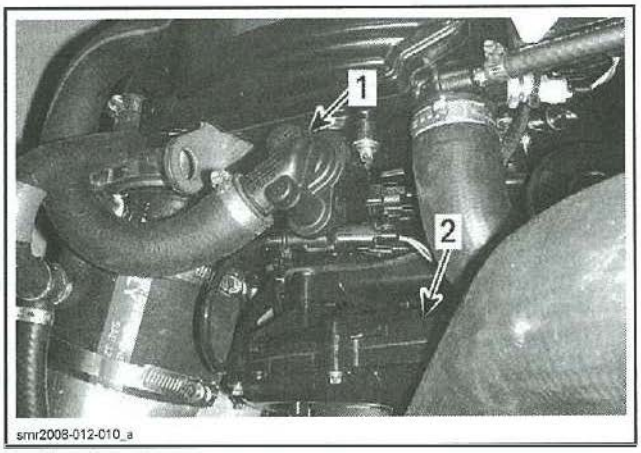
1. Air inlet hose
2. Hose clamp

Remove air outlet hose from supercharger.



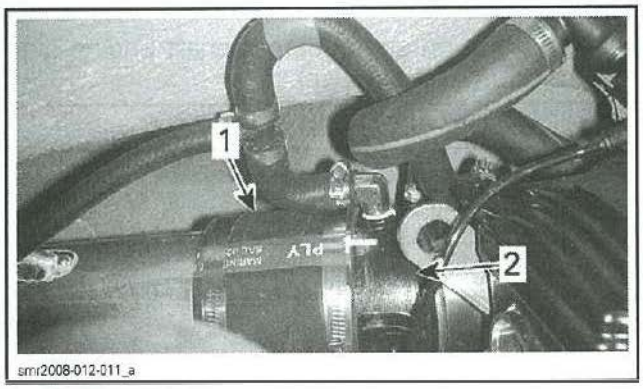
1. *Air outlet hose*
2. *Hose clamp*

Unscrew blow-by valve screws and move it aside to make room.



1. *Blow-by valve*
2. *Supercharger*

Using a marker, trace a mark on rubber adapter and exhaust pipe.



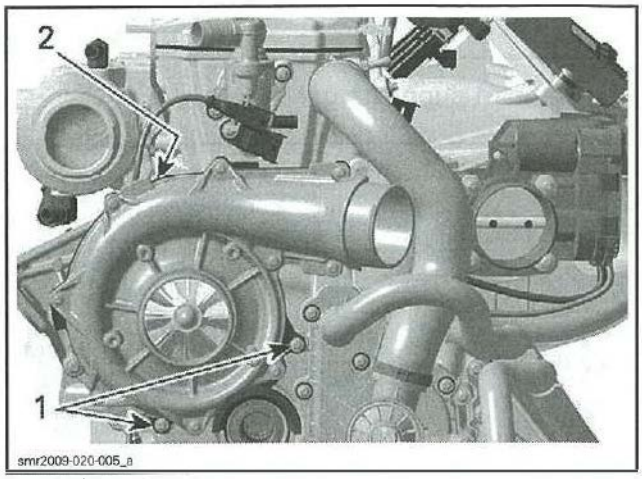
1. *Rubber adapter*
2. *Exhaust pipe*

Loosen clamp securing rubber adapter to exhaust pipe.

Detach muffler strap.

Move muffler back (± 5 cm (2 in)).

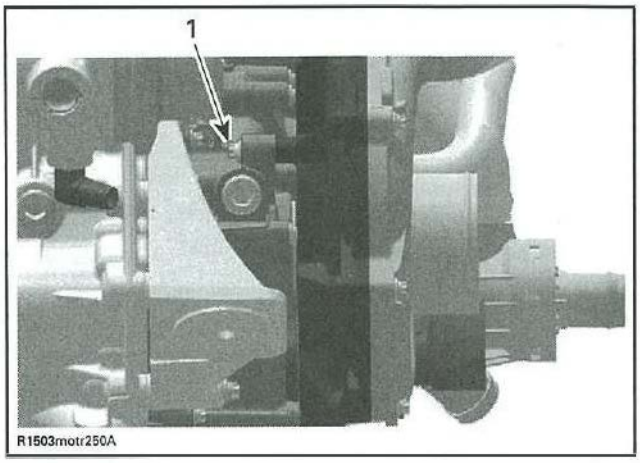
Remove retaining screws and pull out the supercharger.



1. *Retaining screws*
2. *Upper retaining screw (hidden behind the supercharger)*

NOTE: Use the following tool to remove the upper retaining screw.

REQUIRED TOOL	
TORX ADAPTER (P/N 529 035 938)	



1. *Upper retaining screw*

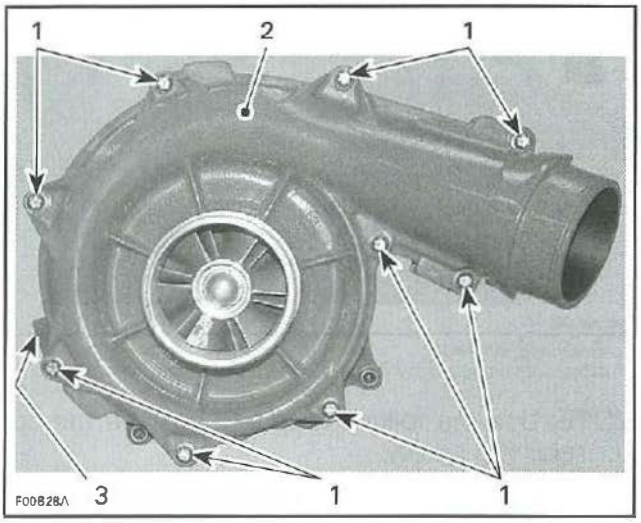
Supercharger Disassembly

NOTICE Be scrupulous when working on supercharger parts. Supercharger rotation reaches 45 000 RPM. Any modification, improper repair, assembly or damage on the parts, may result in damage of the supercharger. Strictly follow the described procedures.

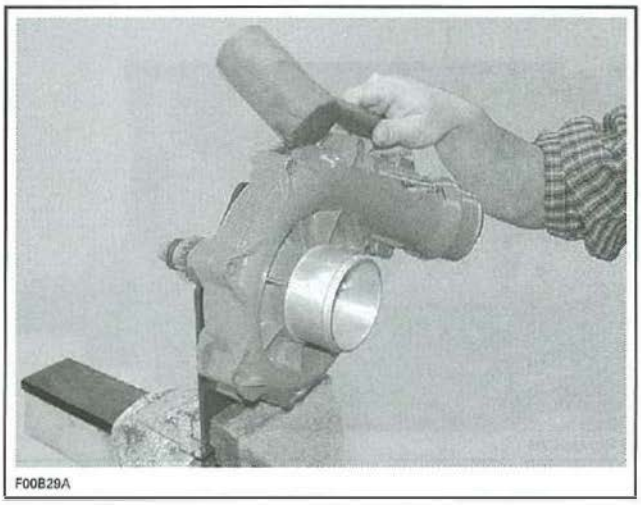
1. Secure the supercharger on its support plate.

REQUIRED TOOL
SUPPORT PLATE (P/N 529 035 947) 

2. Take apart supercharger housing.



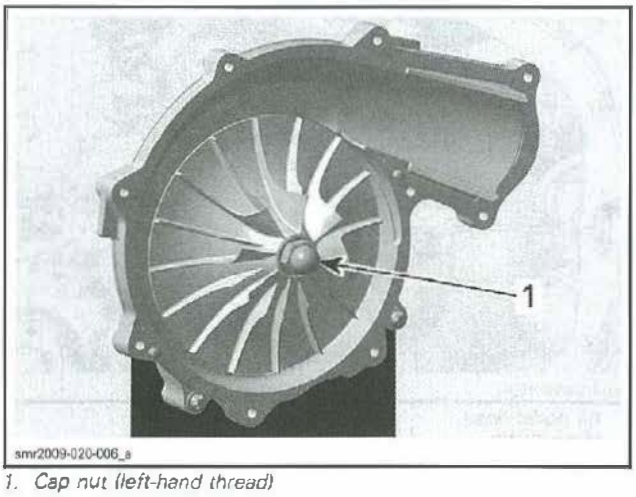
1. *Retaining screws*
2. *Housing half (intake side)*
3. *Housing half (engine side)*



PLASTIC HAMMER

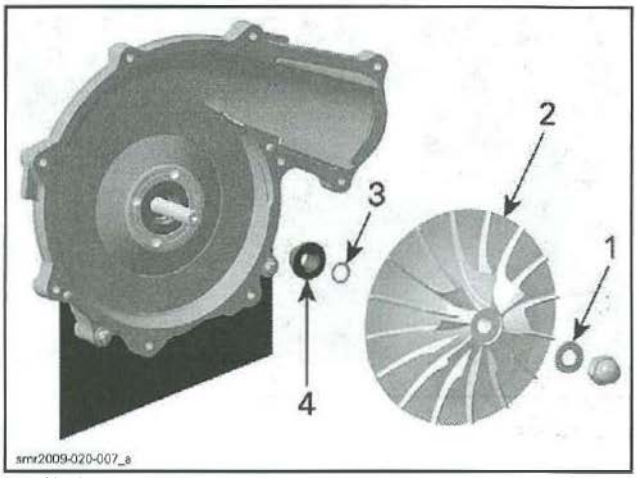
3. Loosen cap nut (turn **clockwise**) on supercharger shaft turbine side.

REQUIRED TOOL
SUPERCHARGER RETAINING KEY (P/N 529 036 027) 



1. *Cap nut (left-hand thread)*

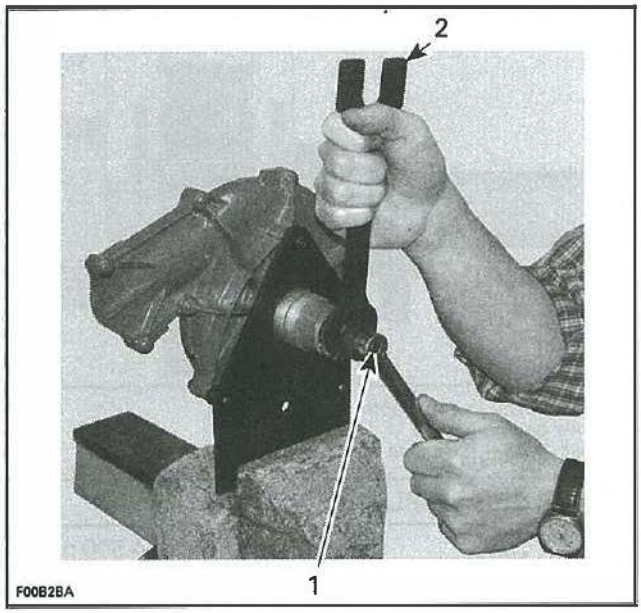
4. Remove washer, turbine, O-ring and step collar from supercharger shaft.



1. *Washer*
2. *Turbine*
3. *O-ring*
4. *Step collar*

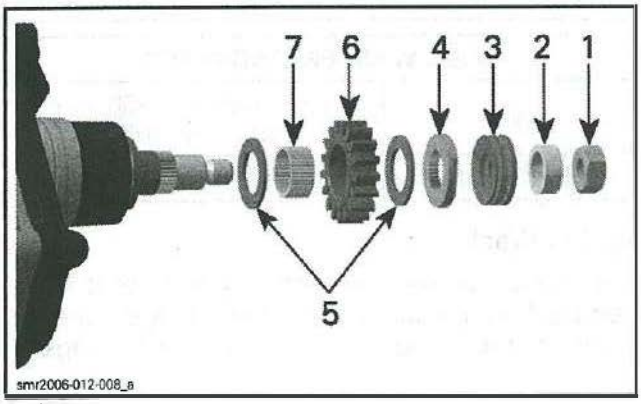
5. Loosen nut on supercharger shaft engine side (turn **counterclockwise**).

REQUIRED TOOL
SUPERCHARGER RETAINING KEY (P/N 529 036 027) 



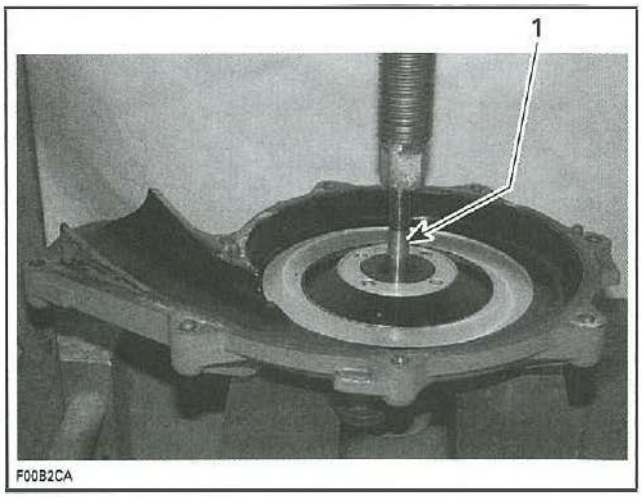
1. *Nut*
2. *Retaining key*

6. Remove L-ring, spring washers, lock washer, drive gear and needle pins by turning the supercharger upside down. Discard all needle pins.



1. *Nut*
2. *L-ring*
3. *Spring washers (5x)*
4. *Lock washer*
5. *Friction shims*
6. *Drive gear*
7. *Needle pins (discard all)*

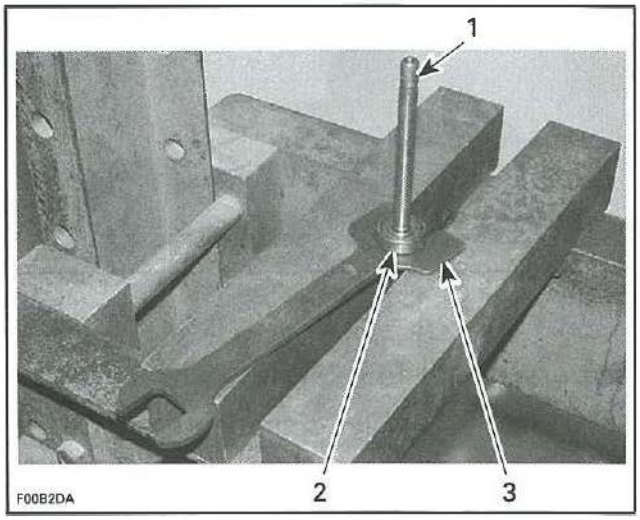
7. Carefully push out supercharger shaft towards engine side by using a press.



1. *Supercharger shaft*

8. Press out ball bearing from supercharger shaft by using a press.

REQUIRED TOOL	
SUPERCHARGER RETAINING KEY (P/N 529 036 027)	

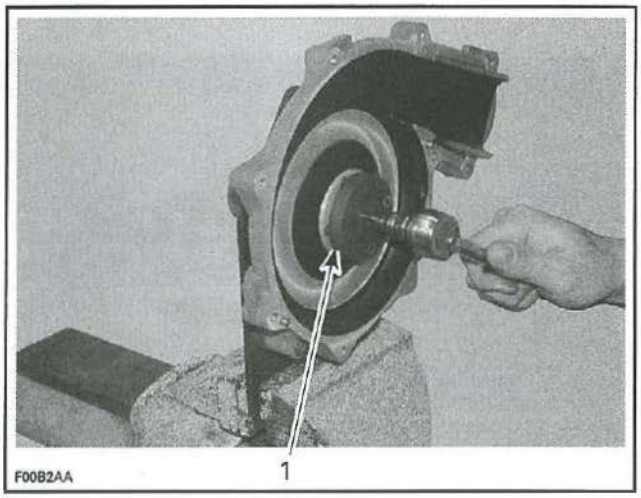


1. *Supercharger shaft*
2. *Ball bearing*
3. *Retaining key*

9. Remove retaining disc with seal from housing half (engine side).

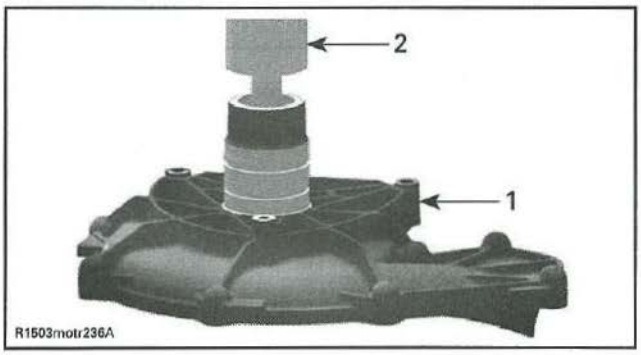
REQUIRED TOOL	
4-PIN SOCKET (P/N 529 035 948)	

NOTE: It may be necessary to heat the housing with a heat gun to release the retaining disc.



1. 4-pin socket

10. Discard the oil seal.
11. Remove and discard ball bearing from supercharger housing half (engine side) by using a press and a suitable bearing pusher.



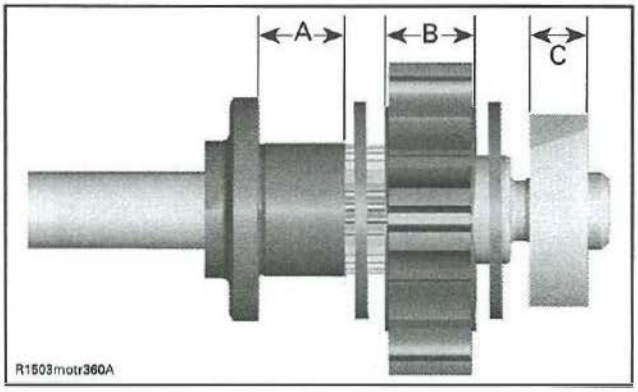
1. Supercharger housing half (engine side)
2. Bearing pusher

Supercharger Inspection

Supercharger Clutch Components and Gear

Check the wear limit on drive gear, lock washer and driven plate on supercharger shaft. Check drive gear for cracks.

NOTE: If parts are worn out or damaged, repair supercharger only by using supercharger repair kit.



A. Driven plate journal depth
B. Drive gear thickness
C. Lock washer thickness

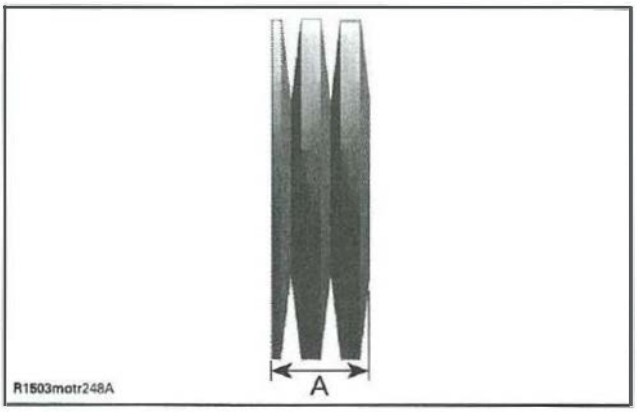
DRIVEN PLATE JOURNAL DEPTH	
NEW	14.460 mm to 14.500 mm (.5693 in to .5709 in)
SERVICE LIMIT	14.600 mm (.5748 in)

DRIVE GEAR THICKNESS	
NEW	11.000 mm to 11.050 mm (.4331 in to .435 in)
SERVICE LIMIT	10.900 mm (.4291 in)

LOCK WASHER THICKNESS	
NEW	4.050 mm to 4.150 mm (.1594 in to .1634 in)
SERVICE LIMIT	3.950 mm (.1555 in)

Spring Washer

Put spring washer package together as it is assembled on the supercharger shaft. Measure the height of the unloaded spring washer package.



A. Spring washer package height

SPRING WASHER PACKAGE HEIGHT	
NEW	10.7 mm to 10.9 mm (.4213 in to .4291 in)
SERVICE LIMIT	10.2 mm (.4016 in)

Supercharger Assembly

NOTICE Every time when supercharger shaft has been removed, both ball bearings have to be replaced.

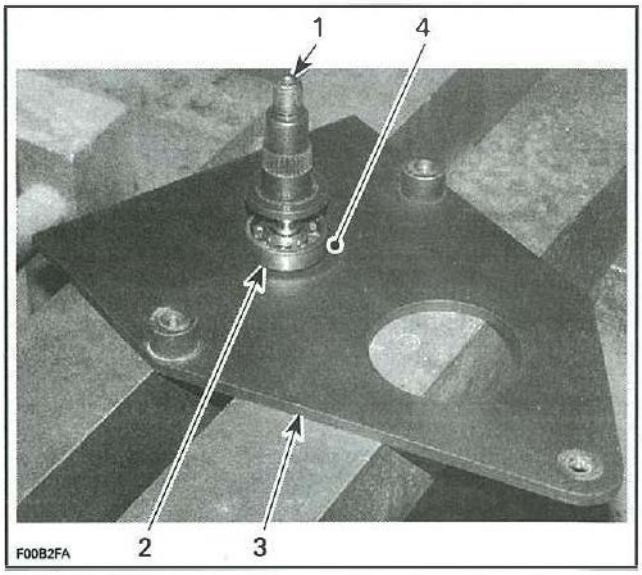
NOTICE Both ball bearings have to be installed with cages facing turbine side.

1. Install ball bearing on supercharger shaft. Hold bearing using the following tool.
   1.1 Apply enough engine oil on NEW ball bearing.
   1.2 Press the bearing. Use the following tool to hold the bearing.

REQUIRED TOOL	
SUPPORT PLATE (P/N 529 035 947)	

NOTICE Ensure to position ball bearing against protrusion of support plate for the installation. This way, the installation pressure will be applied to the inner race and will not be transmitted to the bearing balls which would otherwise shorten the bearing life.

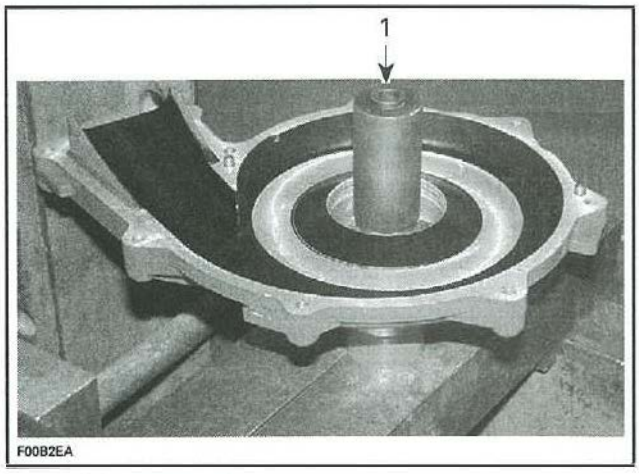
NOTICE To install ball bearings and supercharger shaft always use a press, never use any beating force like a hammer.



1. Supercharger shaft
2. Ball bearing
3. Bearing support plate
4. Protrusion of support plate on this side (underneath inner race)

2. Press in the ball bearing in supercharger housing half (engine side).
   2.1 Apply enough engine oil on NEW ball bearing.
   2.2 Press the bearing using the following tool.

REQUIRED TOOL	
BEARING SUPPORT/PUSHER (P/N 529 035 950)	

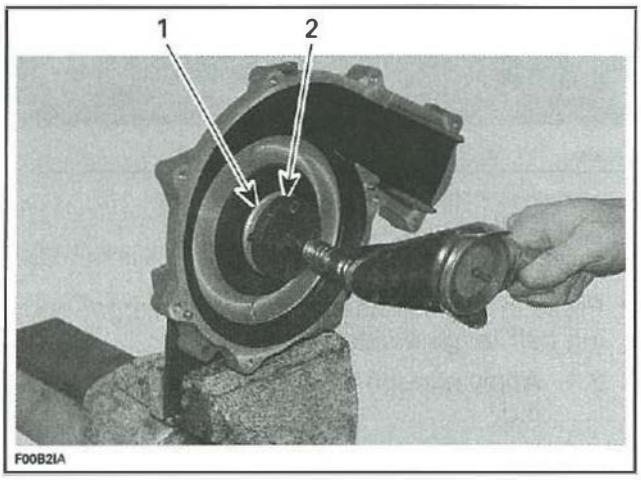


1. Bearing support/pusher

3. Secure the supercharger housing plate (engine side) in a vice.

REQUIRED TOOL	
SUPPORT PLATE (P/N 529 035 947)	

4. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on retaining disc. If a new retaining disc is used, the threads are coated with a self-locking product.
5. Install the retaining disc in supercharger housing half.



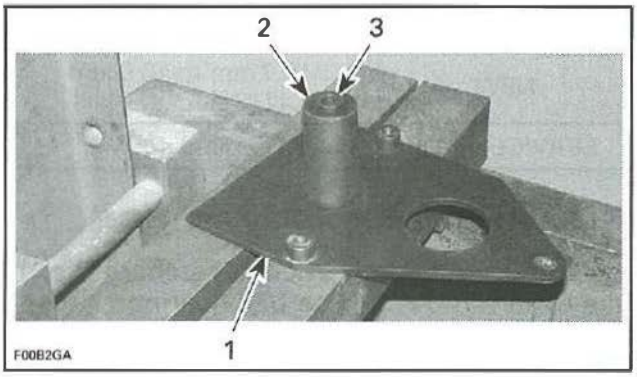
1. Retaining disc
2. 4-pin socket

REQUIRED TOOL	
4-PIN SOCKET (P/N 529 035 948)	

TORQUE	
Retaining disc	40 N•m (30 lbf•ft)

6. Press supercharger shaft in housing half (engine side).
   6.1 Properly support bearing using the following tools under supercharger housing half.

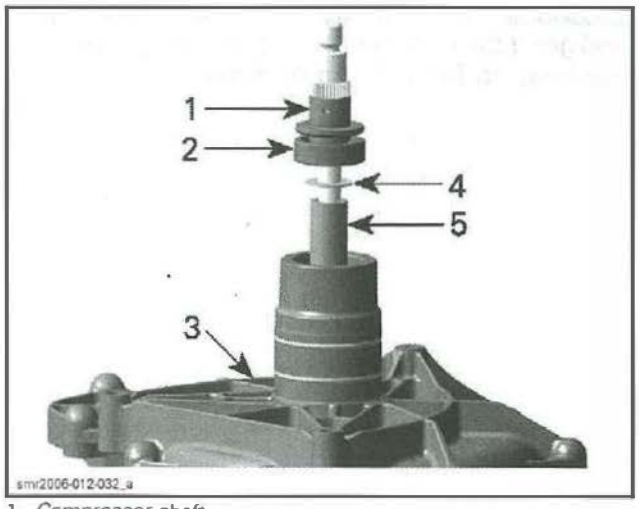
REQUIRED TOOLS	
SUPPORT PLATE (P/N 529 035 947)	
BEARING SUPPORT/PUSHER (P/N 529 035 950)	



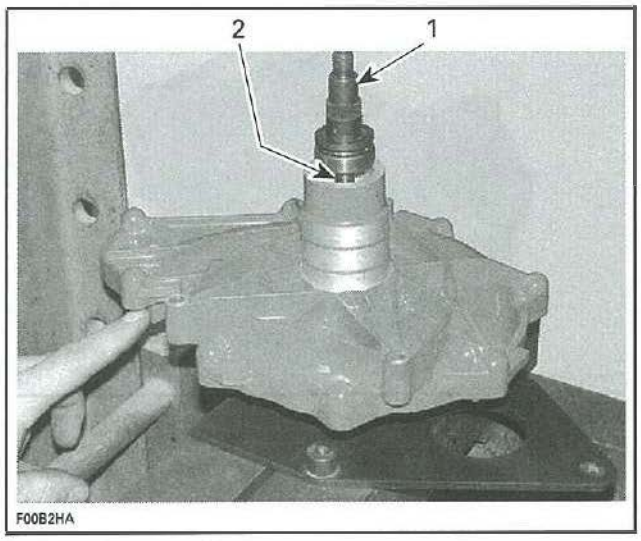
1. Suppo t plate
2. Bearing support/pusher
3. Protrusion here

NOTICE **Before pressing in the supercharger shaft, be sure to properly support the inner race of ball bearing in supercharger housing half with the recommended tool. This way, the installation pressure will be applied to the inner race and will not be transmitted to the bearing balls which would otherwise shorten the bearing life.**

   6.2 Apply heat outside of the housing with a heat gun to expand its diameter prior to inserting the shaft. Ensure there is no O-ring on the housing half prior to heating.
   6.3 Apply engine oil on supercharger shaft. Press shaft with thrust washer and distance sleeve together in supercharger housing half.



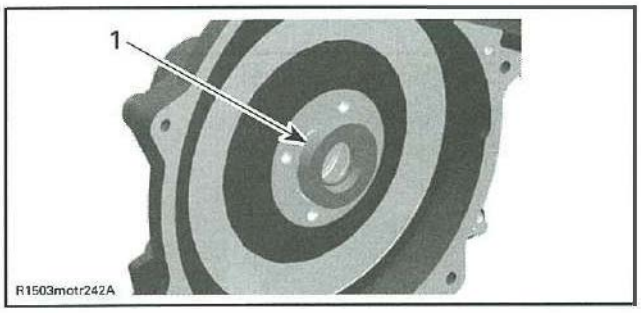
1. Compressor shaft
2. Ball bearing
3. Supercharger housing half
4. Thrust washer
5. Distance sleeve



1. *Supercharger shaft*
2. *Distance sleeve*

7. Apply engine oil on seal and push into retaining disc by hand.

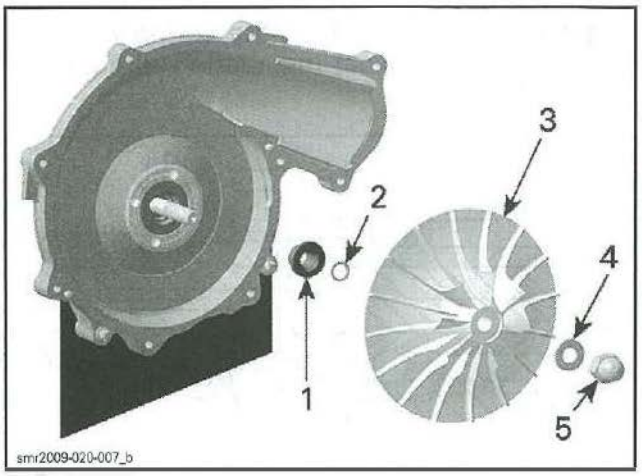
NOTE: Always use a NEW oil seal when assembling the supercharger.



1. *Oil seal*

8. Install step collar, O-ring, turbine and washer on supercharger shaft. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on cap nut and temporary finger tight cap nut.

NOTE: The cap nut on the supercharger shaft has a left-handed thread. The Loctite has to be applied in a small dose into the nut.



1. *Step collar*
2. *O-ring*
3. *Turbine*
4. *Washer*
5. *Cap nut*

Complete installation of supercharger shaft, engine side as follows:

NOTICE **It is of the utmost importance that all parts be absolutely clean. The compressor shaft spins at up to 45 000 RPM and any debris could cause a failure.**

9. Install the first friction shim.

NOTE: The friction shims have the same inner diameter.

NOTICE **Manipulate friction shims with care, those parts are sensitive.**

10. IMPORTANT: Apply ISOFLEX GREASE TOPAS NB 52 (P/N 293 550 021) to the inner diameter of the gear thrust surface on the shaft, friction shims, needle bearing, shaft surface and lock washer.

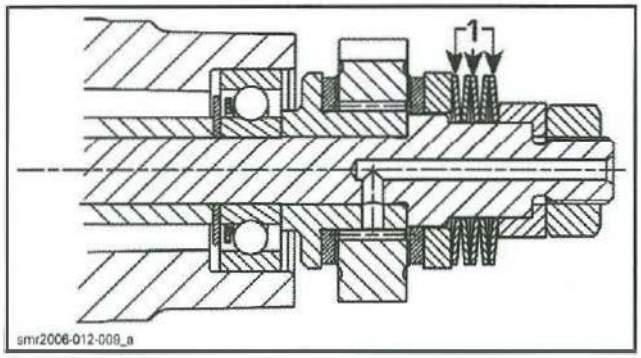
NOTICE **No other grease can be used, otherwise damage to bearings will occur.**

11. Install the NEW needle bearing on the compressor shaft.

NOTE: The new needle bearing contains 40 needle pins trapped in a wax strip with an adhesive backing.

12. Remove the adhesive backing.
13. Install the drive gear over the needle bearing.
14. Install the second friction shim.
15. Install the lock washer.
16. Apply engine oil to the spring washers.
17. Position the spring washers as per illustration.

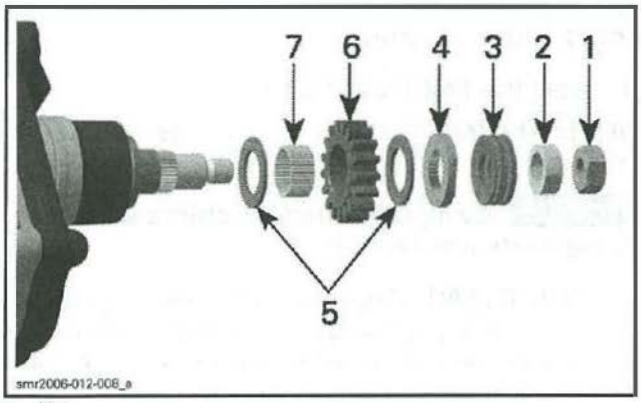
NOTICE When installing the spring washers, take care of the exact installation direction of the washers.



1. Spring washers

18. Install the L-ring on the compressor shaft.
19. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on the hexagonal nut threads.

TORQUE	
Hexagonal nut	29 N•m (21 lbf•ft)



1. Nut
2. L-ring
3. Spring washers
4. Lock washer
5. Friction shims
6. Drive gear
7. Needle bearing

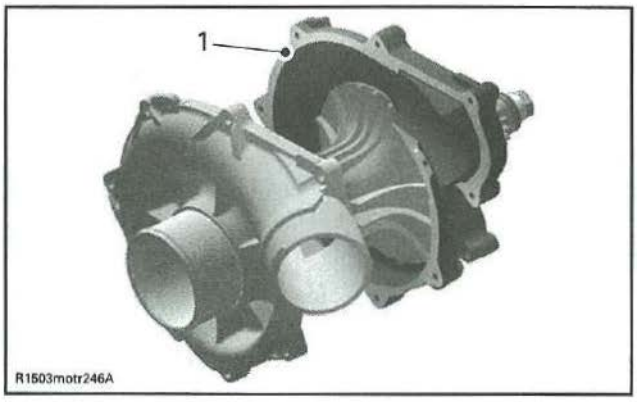
NOTE: The L-ring will preload the spring washers.

20. Hold the lock washer of the supercharger shaft (engine side) and tighten the cap nut.

REQUIRED TOOL
SUPERCHARGER RETAINING KEY (P/N 529 036 027)

TORQUE	
Cap nut	29 N•m (21 lbf•ft)

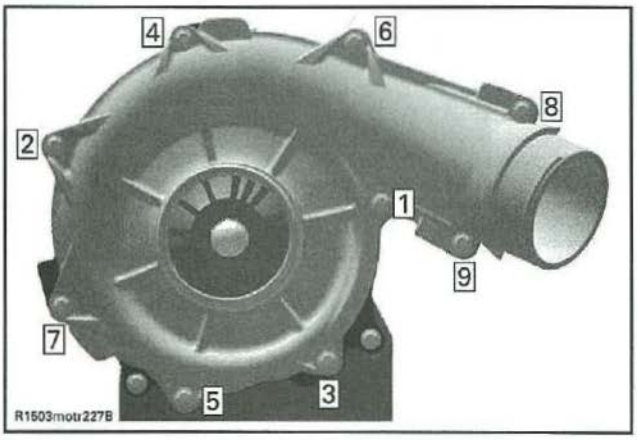
21. Apply LOCTITE 5910 (P/N 293 800 081) on supercharger housing sealing surface.



1. Apply Loctite 5910 on sealing surface

22. Assemble supercharger housing halves.
    22.1 Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on retaining screws.
    22.2 Tighten supercharger housing halves screws according to the following sequence.

TORQUE	
Supercharger housing halves screws	9 N•m (80 lbf•in)



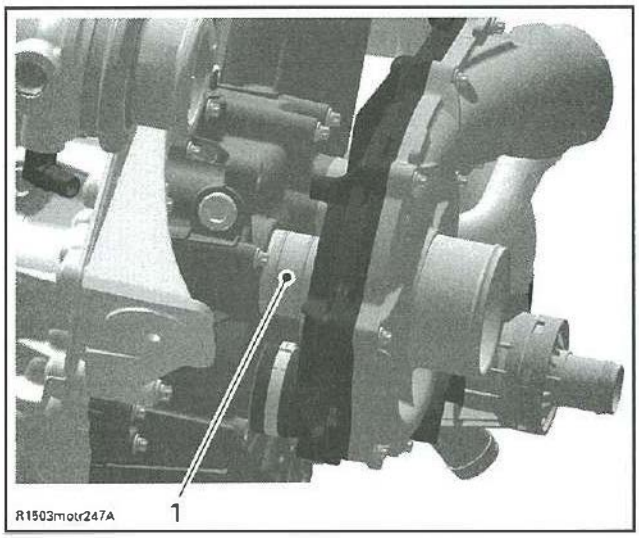
SUPERCHARGER TIGHTENING SEQUENCE

23. Verify the clutch slipping moment. Refer to *SUPERCHARGER CLUTCH SLIPPING MOMENT (BENCH TEST)* in this subsection.

Supercharger Installation

1. Grease sealing surface between supercharger and PTO housing with SUPER LUBE GREASE (P/N 293 550 030).

NOTE: Ensure O-rings are installed.



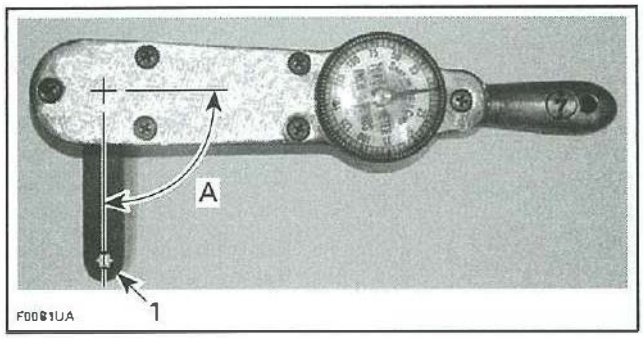
1. Super Lube grease

2. Install supercharger on PTO housing.
3. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on the retaining screws.
4. Tighten supercharger retaining screws to specifications.

TORQUE	
Supercharger retaining screws	9 N•m (80 lbf•in)

NOTE: For the upper retaining screw the following tool must be used mounted 90° to torque wrench.

REQUIRED TOOL	
TORX ADAPTER (P/N 529 035 938)	



1. Torx adapter perpendicular to torque wrench
A. 90°

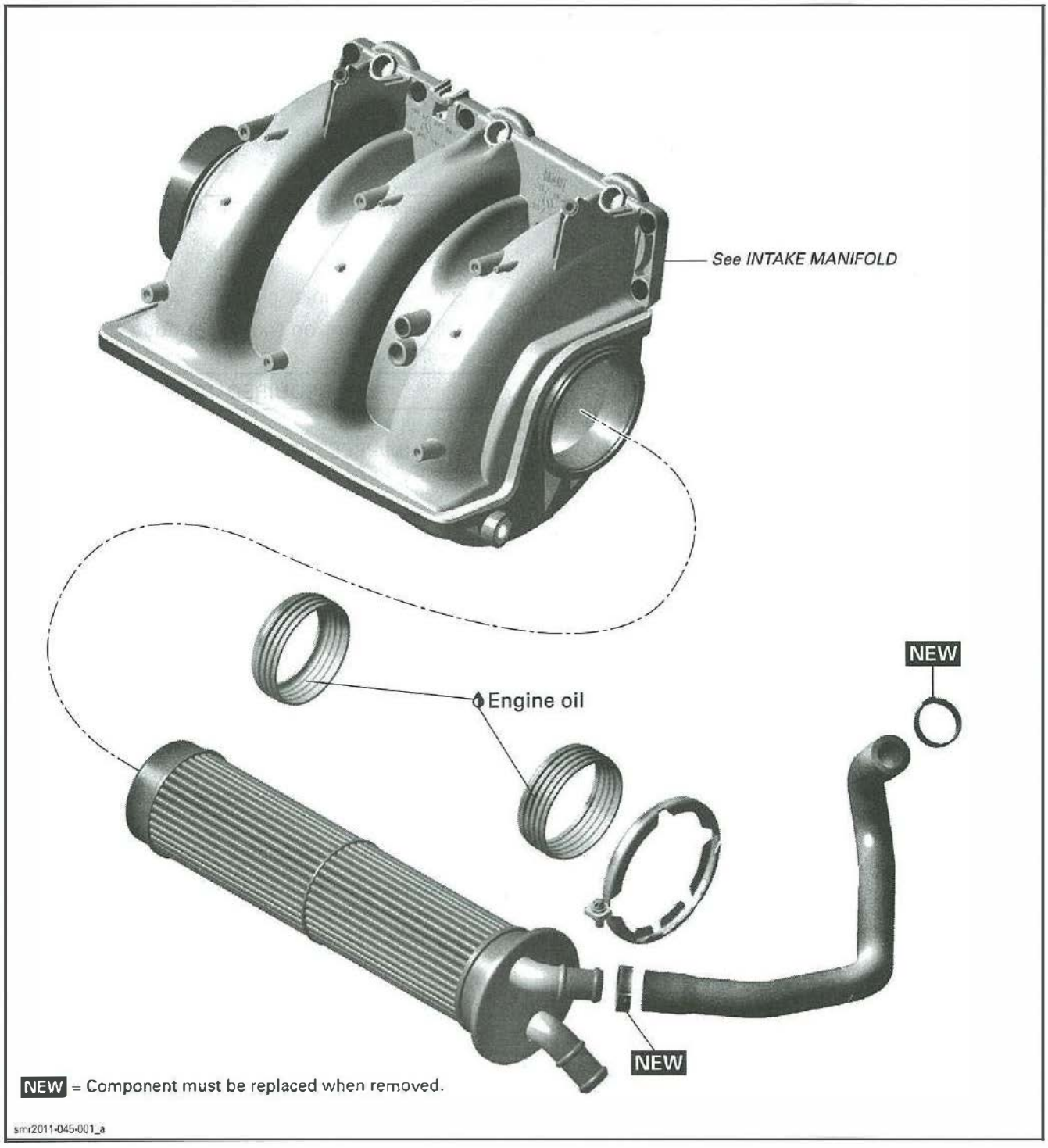
NOTICE **Not installing the tool as shown will change the torque applied to the screw.**

5. After complete installation of the supercharger, the slipping moment has to be rechecked. Refer to *SUPERCHARGER CLUTCH SLIPPING MOMENT (ON ENGINE)* at the beginning of this subsection.

INTERCOOLER (215 ENGINE)

SERVICE TOOLS

Description	Part Number	Page
VACUUM/PRESSURE PUMP	529 021 800	68



GENERAL

During assembly/installation, use torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

NOTICE Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

PROCEDURES

INTERCOOLER

Intercooler Leak Test

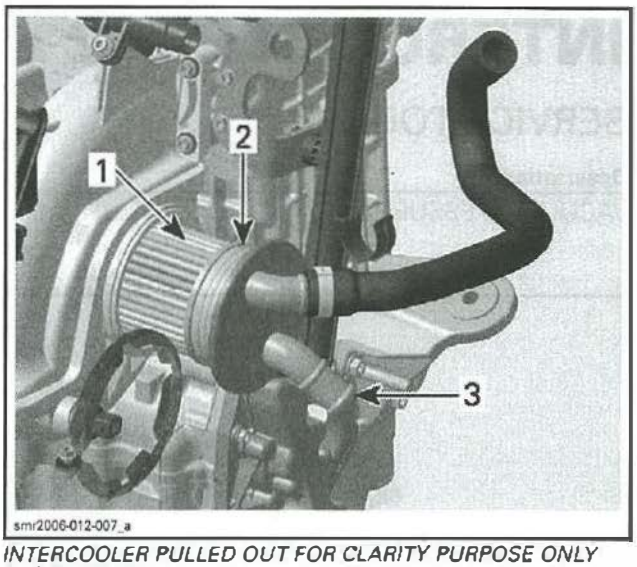
Perform intercooler leak test when engine looses performance, when there is white exhaust smoke or when temperature in exhaust system is to high.

⚠ WARNING

Let engine cool down prior to perform leak test. Direct contact with hot engine may result in skin burn.

NOTE: The inspection can be done while intercooler remains installed in intake manifold.

Remove:
- Outlet hose from exhaust manifold
- Inlet hose from intercooler.



INTERCOOLER PULLED OUT FOR CLARITY PURPOSE ONLY
1. *Intercooler*
2. *Outlet hose*
3. *Inlet nipple*

Plug intercooler inlet nipple.

Install an adapter on the outlet hose to connect a pressure pump.

REQUIRED TOOL	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

Pressurize the intercooler as follows:

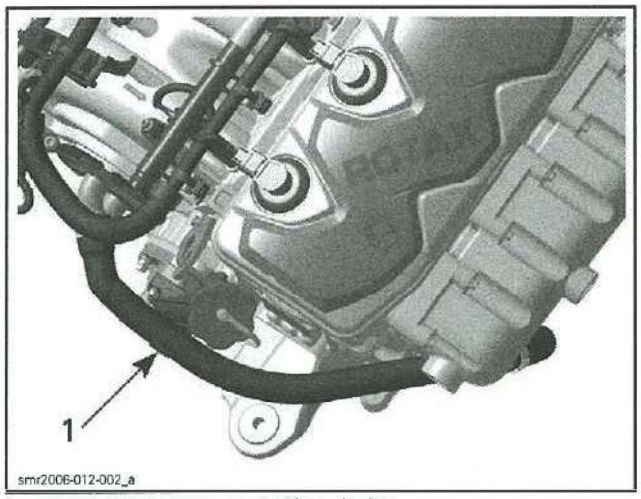
PRESSURE TEST
69 kPa (10 PSI) for 10 minutes minimum

If there is a pressure drop, first spray hoses and adapters with a soapy solution to ensure they are not leaking.

Otherwise, remove intercooler from manifold to spray soapy water on it. If air bubbles are present, replace the intercooler. Refer to procedures further in this subsection.

Properly reinstall removed parts.

Make sure the intercooler outlet hose is installed in the holding device (located on the oil filler tube) otherwise the hose will scuff on the engine block.

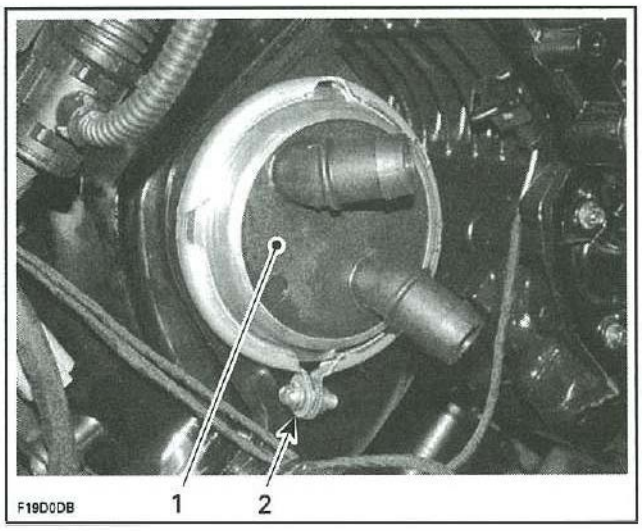


1. Intercooler outlet hose holding device

Intercooler Removal

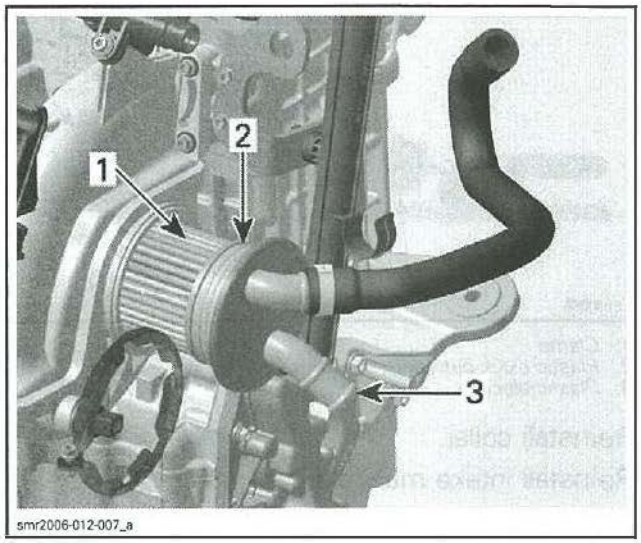
Remove intake manifold. Refer to *INTAKE MANIFOLD* subsection.

Remove collar from intercooler.



TYPICAL
1. Intercooler
2. Collar

Carefully pull intercooler out of intake manifold.



1. Intercooler
2. Profile ring
3. Collar

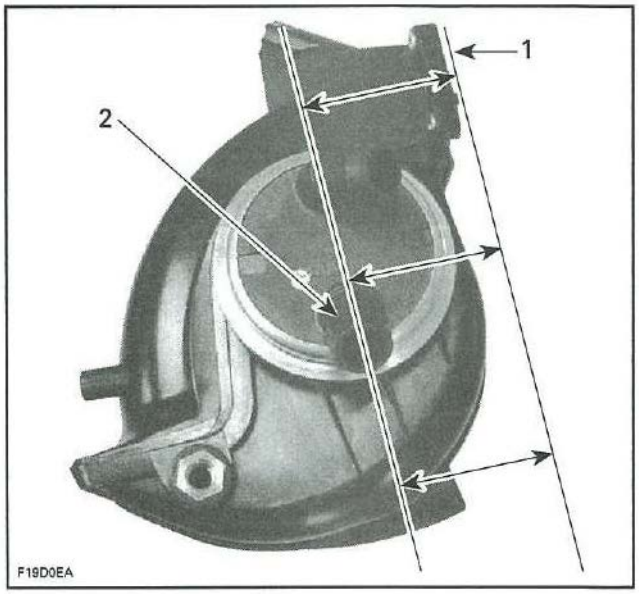
Intercooler Installation

Installation is essentially the reverse of removal procedures. However pay particular attention to the following.

Ensure profile rings are properly installed on intercooler and apply engine oil on them to ease installation.

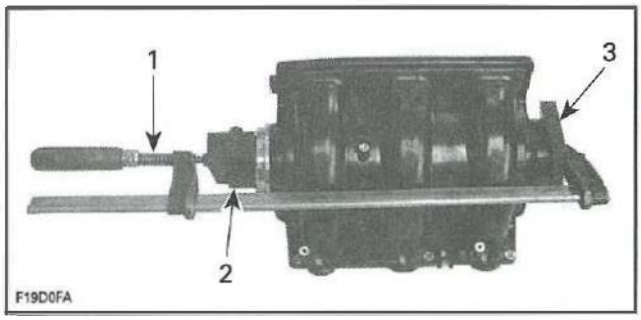
While properly aligning the inner end of intercooler in intake manifold, gently push intercooler until it bottoms.

Rotate intercooler to position nipples as shown.



1. Intake manifold flange
2. Nipple parallel with manifold flange

NOTE: If intercooler is hard to push in, a clamp can be used to press intercooler in.



1. Clamp
2. Plastic block between nipples
3. Plastic block

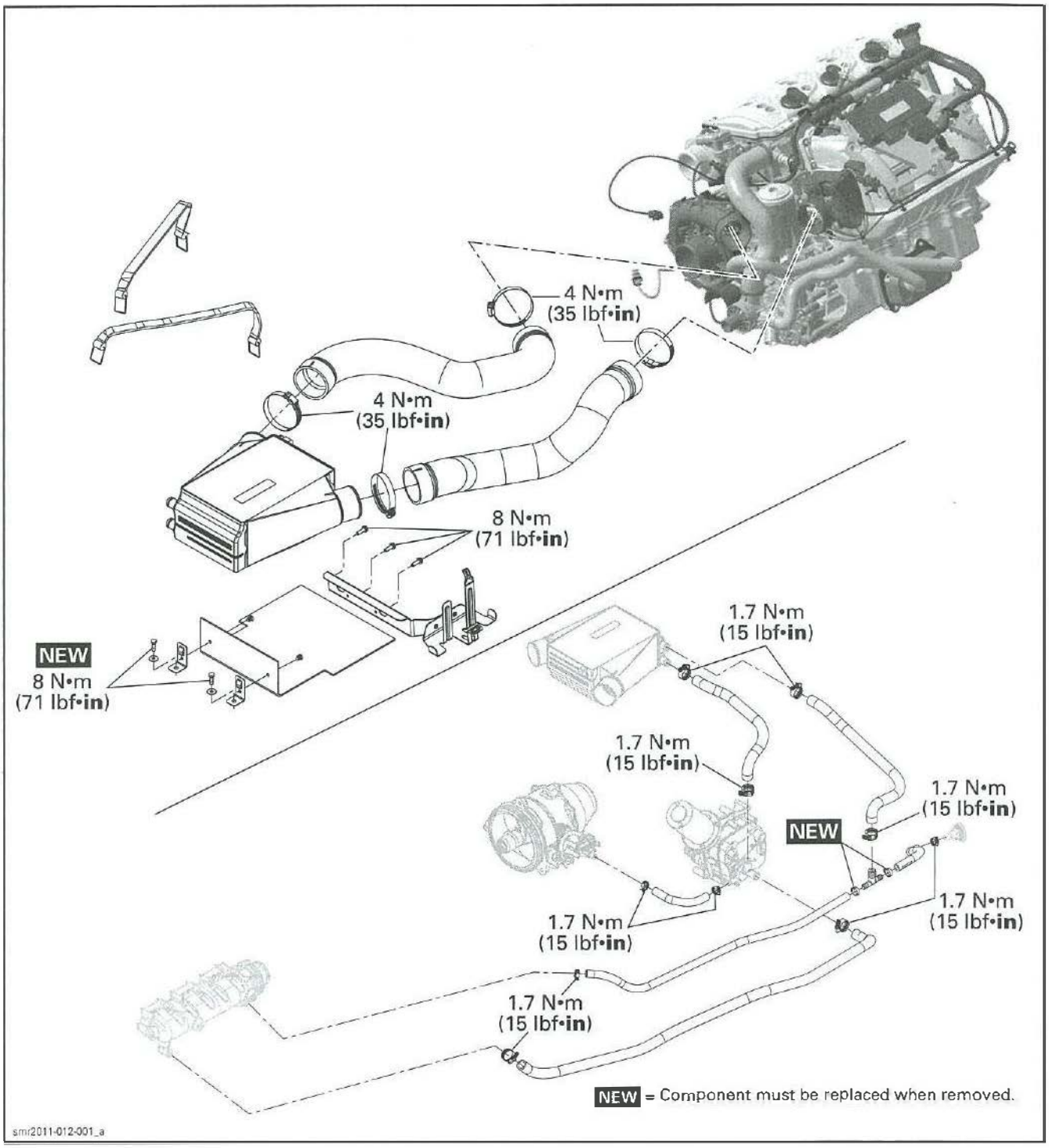
Reinstall collar.

Reinstall intake manifold.

INTERCOOLER (260 ENGINE)

SERVICE TOOLS

Description	Part Number	Page
LARGE HOSE PINCHER	529 032 500	73
VACUUM/PRESSURE PUMP	529 021 800	73



GENERAL

During assembly/installation, use torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.) must be replaced.

NOTICE Hose, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

MAINTENANCE

INTERCOOLER FLUSHING

Flushing the intercooler with fresh water is essential to neutralize corroding effects of salt or other chemical products present in water. It will help to clean up sand, salt, shells or other particles in intercooler.

NOTE: Intercooler is flushed with the exhaust system, as they are on the same circuit.

Exhaust system and intercooler should be flushed each time:

- Watercraft is used in salt water and is not expected to be used further the same day.
- Watercraft is used in foul water.
- Watercraft is stored for any extended time.

Refer to *EXHAUST SYSTEM* subsection for flushing procedure.

NOTICE Failure to flush the system, when necessary, will severely damage engine intercooler and/or exhaust system.

PROCEDURES

INTERCOOLER

⚠ WARNING

Let engine cool down prior to work on or near intercooler.

Intercooler Cleaning

If temperature in intake manifold is too high or if engine is down in performance, intercooler may require to be cleaned.

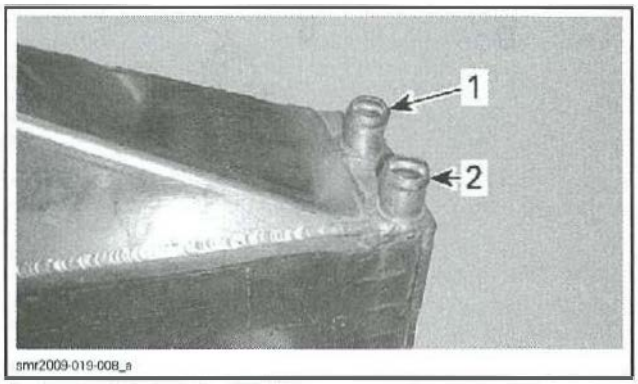
The exhaust system should be flushed first, as it may unclogged the intercooler. If not, then proceed with the intercooler cleaning procedure as detailed here.

NOTE: The exhaust temperature will decrease when the intercooler is clogged because more water is rerouted through the exhaust system.

To clean the intercooler, do the following:

NOTICE Never try to clean the intercooler with chemical products. Only use fresh water. Chemical products will permanently damage the internal parts of intercooler.

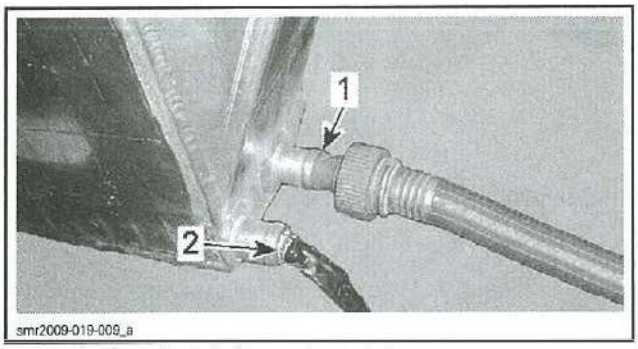
1. Remove the intercooler from the watercraft. See procedure further in this subsection.
2. Pour fresh water into the water outlet fitting.



1. *Intercooler water outlet fitting*
2. *Intercooler water inlet fitting*

3. Let water into intercooler for many hours. Occasionally, shake the intercooler to soak off deposits.
4. Rinse the intercooler using a garden hose installed on water outlet.
5. Let water flows out of intercooler a few minutes to evacuate internal deposits.
6. Check water flow.

WATER FLOW	
LOW OR ERRATIC	1. Repeat cleaning procedure.
	2. Replace the intercooler.
HIGH AND REGULAR	Intercooler is not clogged.



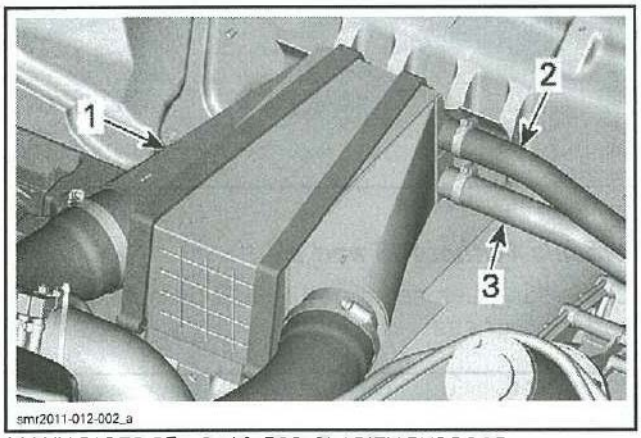
1. *Garden hose installed on water outlet*
2. *High and regular water flow*

7. Perform a leak test before installing the intercooler in the watercraft.

Intercooler Leak Test

Block intercooler water outlet hose.

REQUIRED TOOL	
LARGE HOSE PINCHER (P/N 529 032 500)	



MANY PARTS REMOVED FOR CLARITY PURPOSE
1. *Intercooler*
2. *Intercooler water outlet hose*
3. *Intercooler water inlet hose*

Unplug the intercooler water inlet hose from the intercooler.

Install the VACUUM/PRESSURE PUMP (P/N 529 021 800) on intercooler water inlet fitting.



BLEED HOSE FITTING

Pressurize the intercooler.

PRESSURE TEST
69 kPa (10 PSI) for 10 minutes minimum

If there is a pressure drop, first spray tool, hoses and adapters with a soapy water solution to ensure they are not leaking.

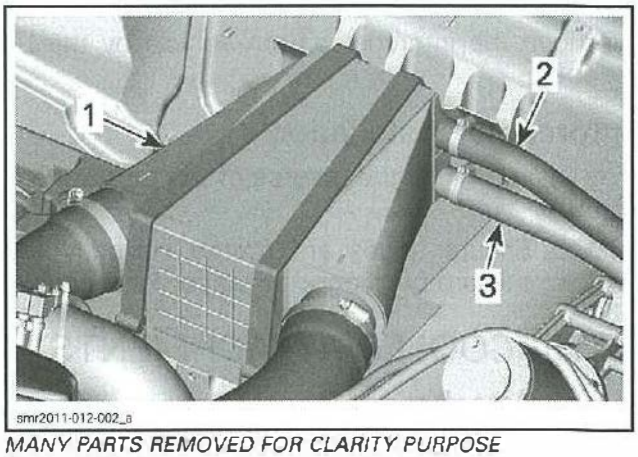
Otherwise, replace the intercooler.

Intercooler Removal

On **iS and aS models**, open the boarding platform and remove both storage baskets.

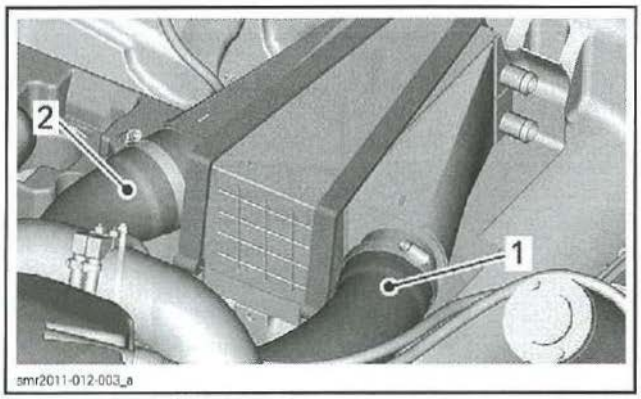
On **models without iS and aS**, open the seat and remove both rear access panels.

From the LH opening, disconnect the intercooler water hoses.



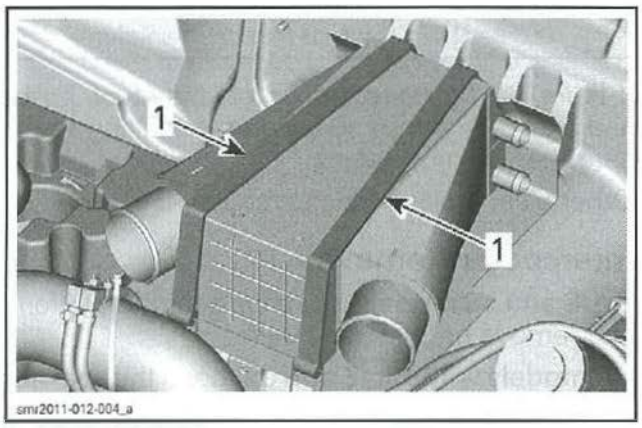
MANY PARTS REMOVED FOR CLARITY PURPOSE
1. *Intercooler*
2. *Intercooler water outlet hose*
3. *Intercooler water inlet hose*

Disconnect both air hoses.



1. Intercooler air inlet hose
2. Intercooler air outlet hose

Detach both intercooler straps.



1. Intercooler straps

Remove the iBR actuator. Refer to *iBR AND VTS* subsection.

Remove the intercooler from vehicle by the LH opening.

Intercooler Installation

The installation is the reverse of the removal procedure.

NOTE: Ensure hoses are routed correctly and locking ties are positioned at proper locations.

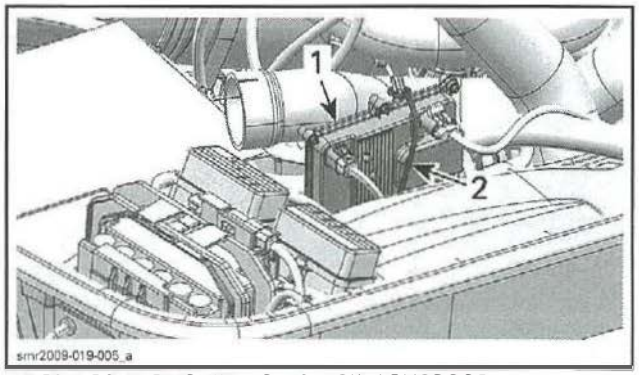
INTERCOOLER ATTACHMENTS

Front Attachment Replacement

Remove the *INTERCOOLER*, see procedure in this subsection.

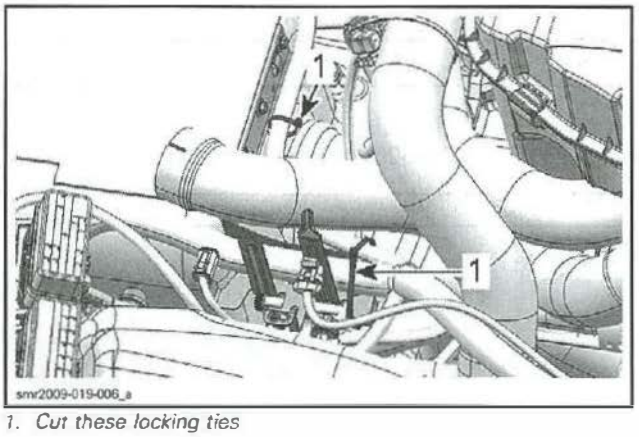
iS Models

Detach iS module from its support and move the module aside to make room.



FIXED DECK REMOVED FOR CLARITY PURPOSE
1. iS module
2. Retaining latch

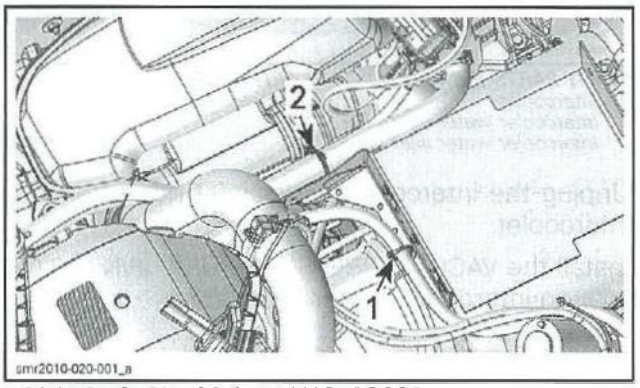
Cut locking ties securing wiring harnesses to iS module support and front attachment.



1. Cut these locking ties

Models Without iS and aS

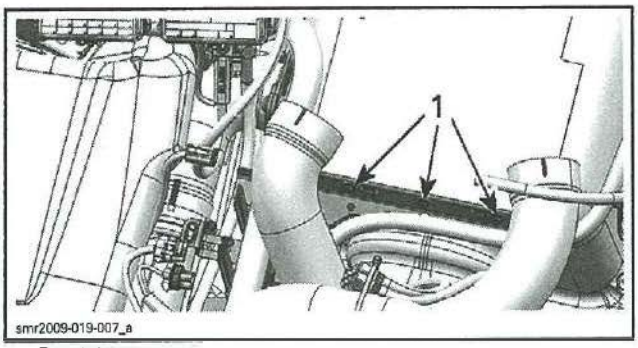
Cut locking ties securing the iBR harness and the battery harness.



DECK REMOVED FOR CLARITY PURPOSE
1. Locking tie retaining the iBR harness
2. Locking tie retaining the battery harness

All Models

Remove screws securing the front attachment to the hull.



1. Retaining screws

Remove the front attachment from vehicle.

NOTE: On **iS models**, the front attachment and the iS module support are attached together with rivets.

When reinstalling, tighten front attachment screws to specification.

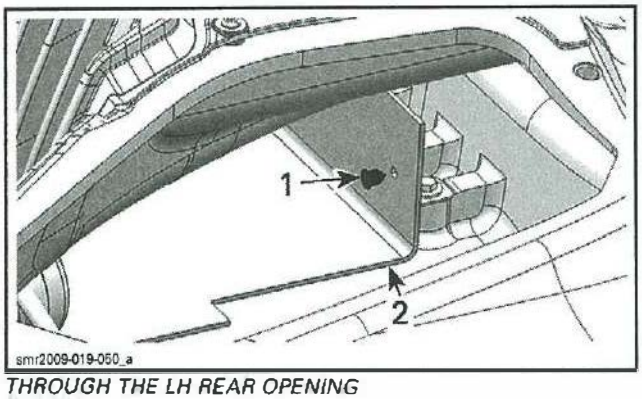
TORQUE	
Front attachment screw	8 N•m (71 lbf•**in**)

Install all other removed parts.

Rear Attachment Replacement

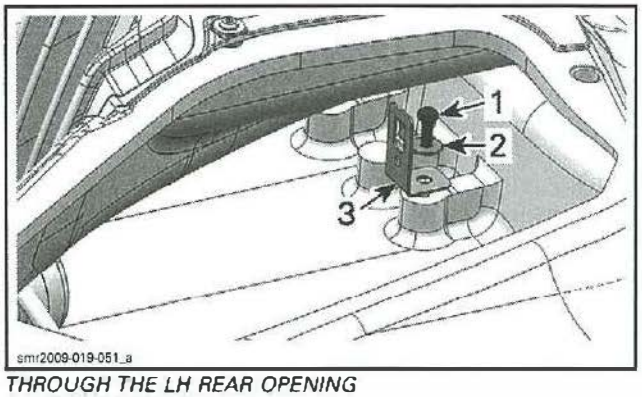
Remove the intercooler, see procedure in this subsection.

Remove darts and rubber pad.



THROUGH THE LH REAR OPENING
1. Dart
2. Rubber pad

Remove and discard screw securing the attachment to the hull.



THROUGH THE LH REAR OPENING
1. Retaining screw
2. Washer
3. LH rear attachment

Install a new attachment using a NEW screw.

Tighten rear attachment screw to specification.

TORQUE	
Rear attachment screw	8 N•m (71 lbf•**in**)

Install all other removed parts.

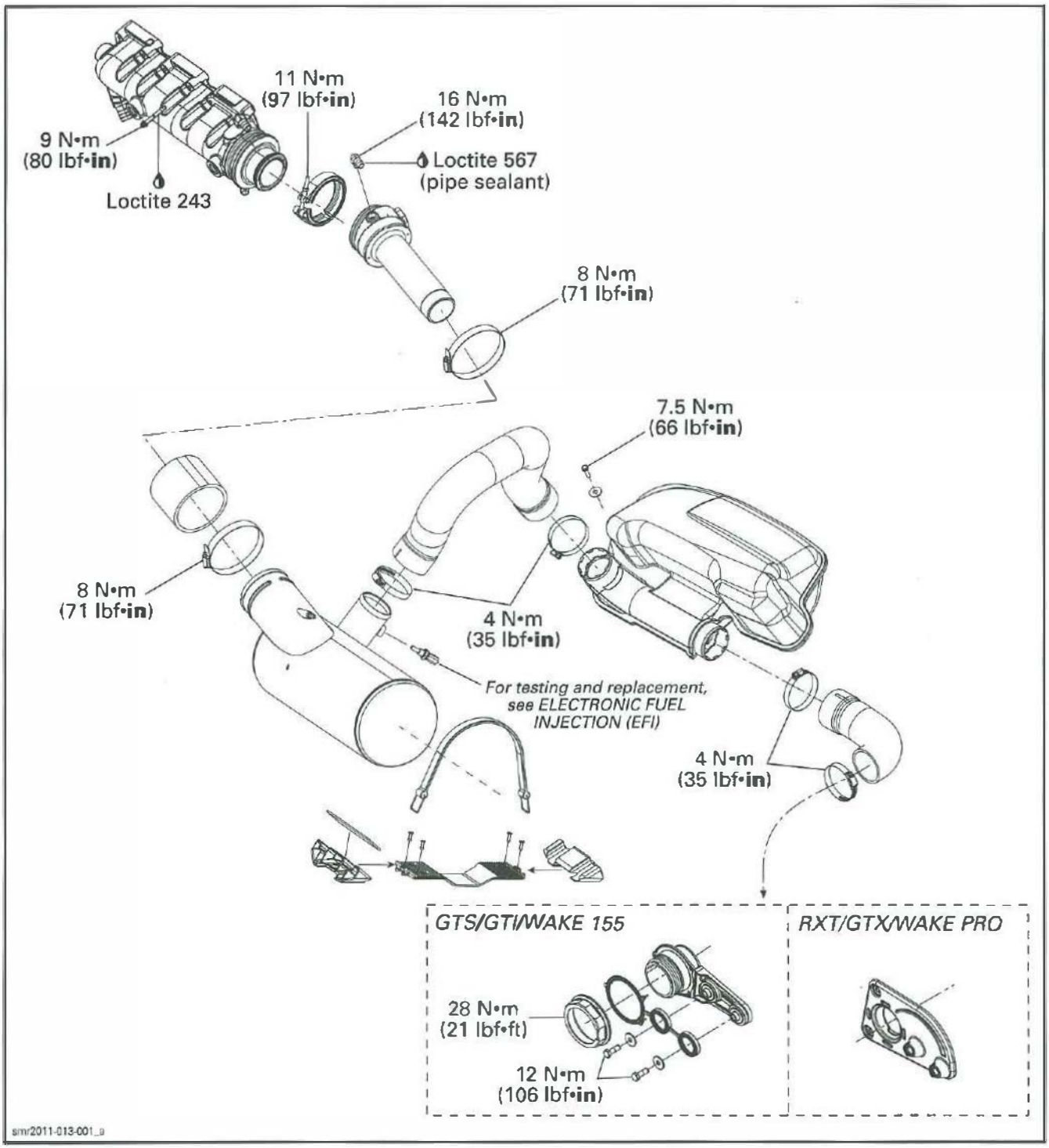
EXHAUST SYSTEM

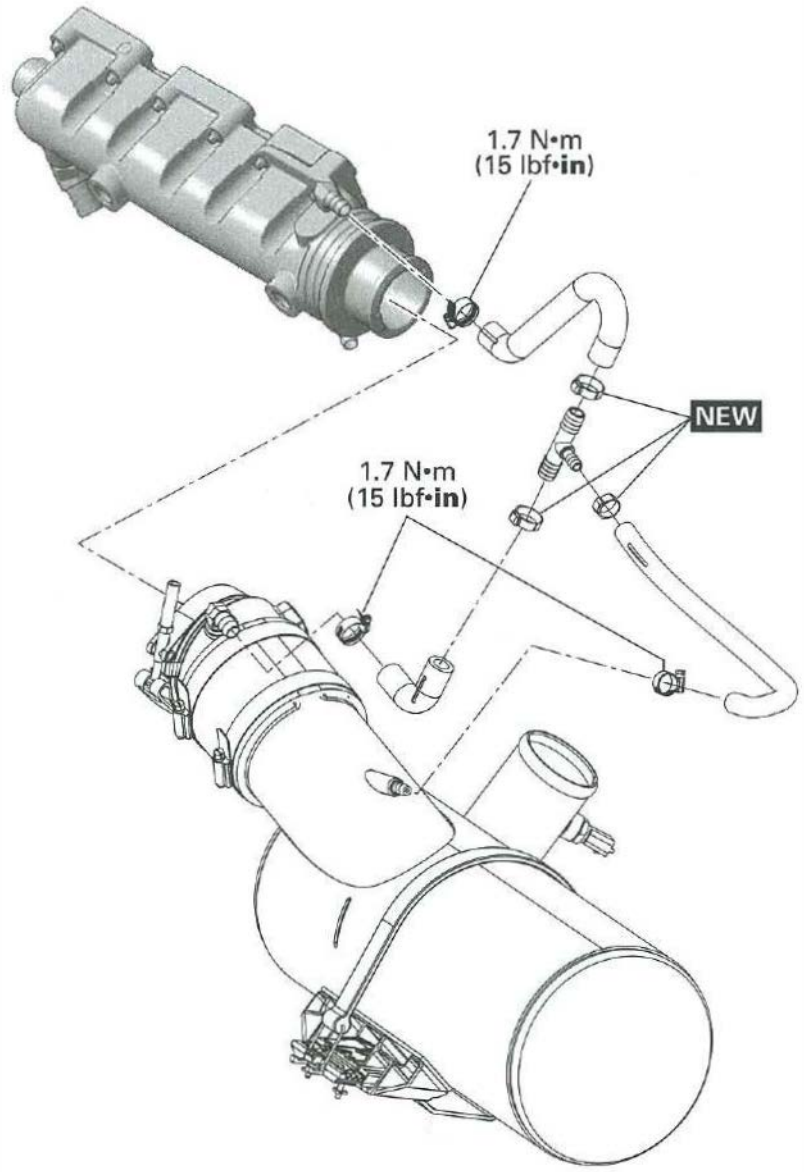
SERVICE TOOLS

Description	Part Number	Page
FLUSHING CONNECTOR ADAPTER	295 500 473	83

SERVICE PRODUCTS

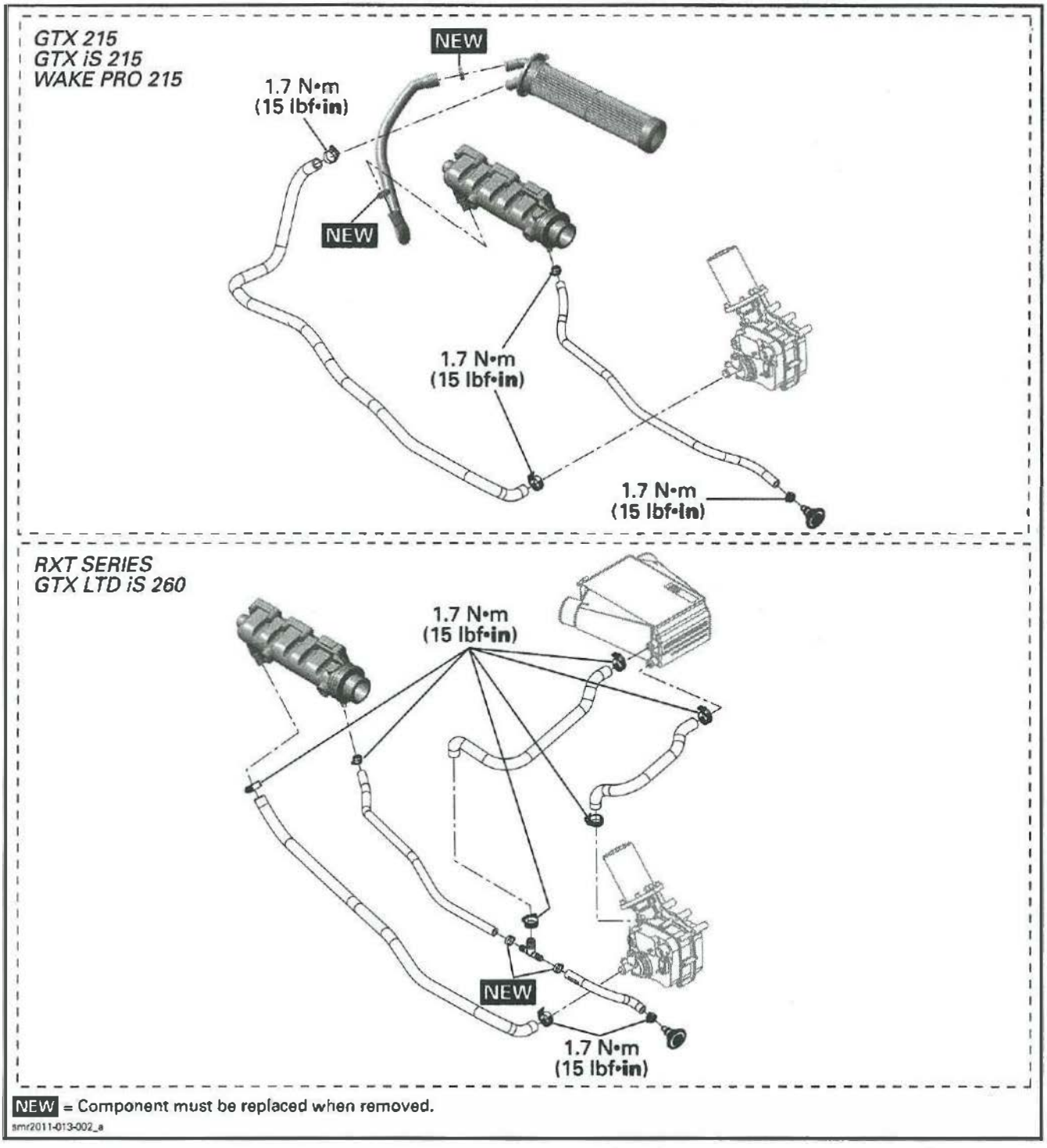
Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	90


11 N•m
(97 lbf•in)
16 N•m
(142 lbf•in)
9 N•m
(80 lbf•in)
Loctite 567
(pipe sealant)
Loctite 243
8 N•m
(71 lbf•in)
7.5 N•m
(66 lbf•in)
8 N•m
(71 lbf•in)
4 N•m
(35 lbf•in)
For testing and replacement, see ELECTRONIC FUEL INJECTION (EFI)
4 N•m
(35 lbf•in)
GTS/GTI/WAKE 155
RXT/GTX/WAKE PRO
28 N•m
(21 lbf•ft)
12 N•m
(106 lbf•in)
smr2011-013-001_a



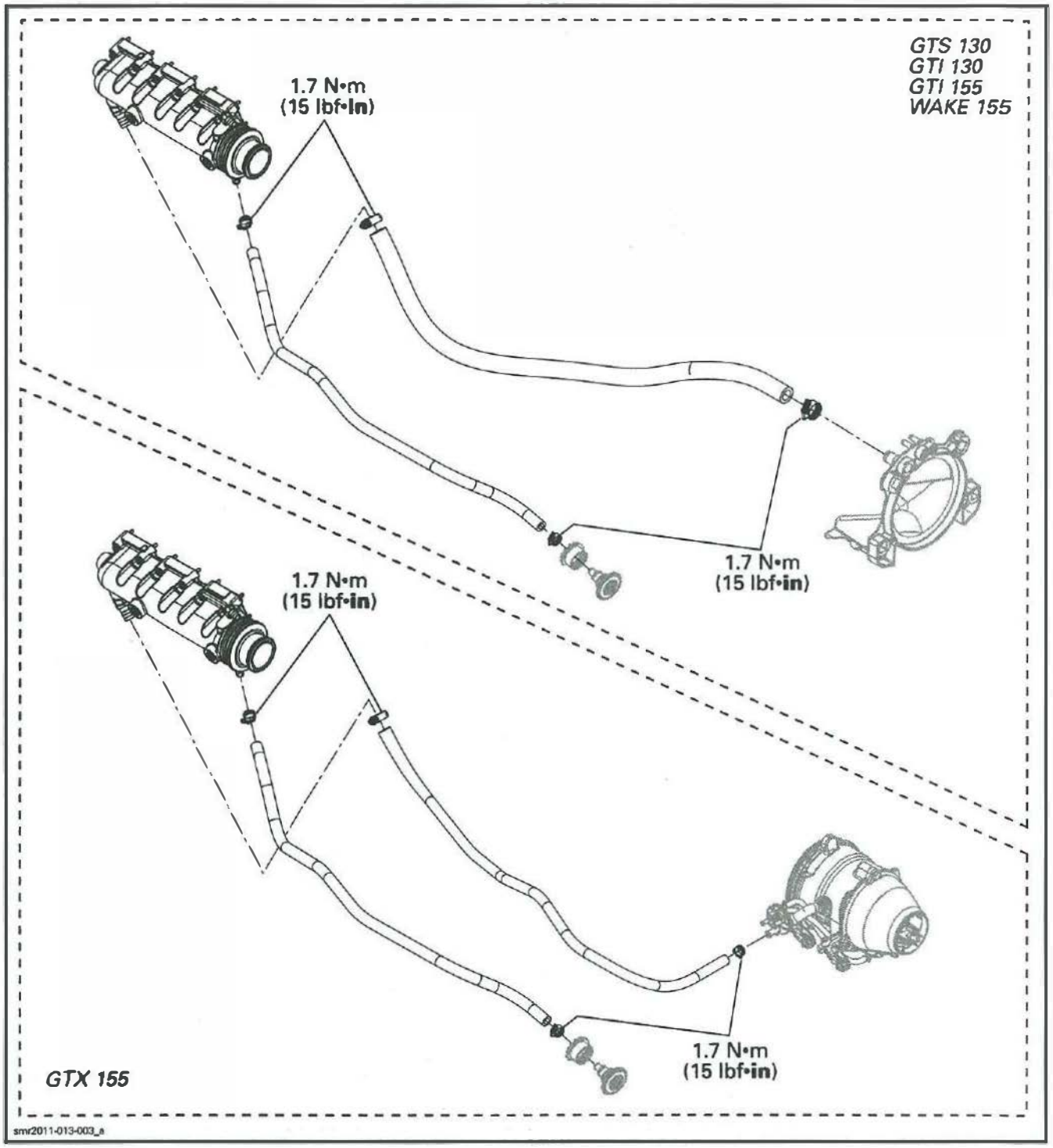
NEW = Component must be replaced when removed.

smr2011-013-100_a



NEW = Component must be replaced when removed.

smr2011-013-002_a


GTS 130
GTI 130
GTI 155
WAKE 155
1.7 N•m
(15 lbf•in)
1.7 N•m
(15 lbf•in)
1.7 N•m
(15 lbf•in)
1.7 N•m
(15 lbf•in)
GTX 155
smr2011-013-003_a

GENERAL

During assembly/installation, use torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

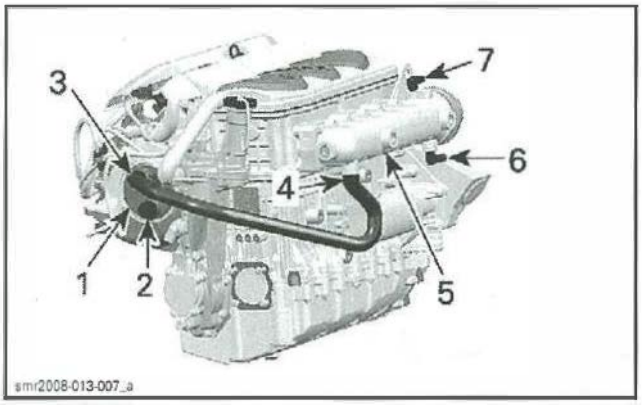
Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, cotter pins, etc.) must be replaced.

NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

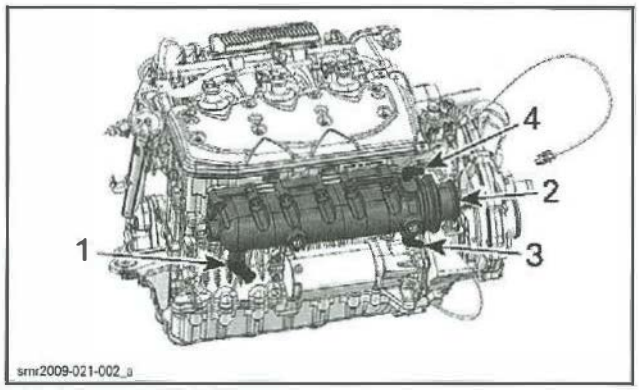
SYSTEM DESCRIPTION

The exhaust system is cooled by water provided by a pressurized area in the jet pump (open loop system).

The same water is also used to cool the intercooler (supercharged engines) and the iBR actuator (models with iBR).

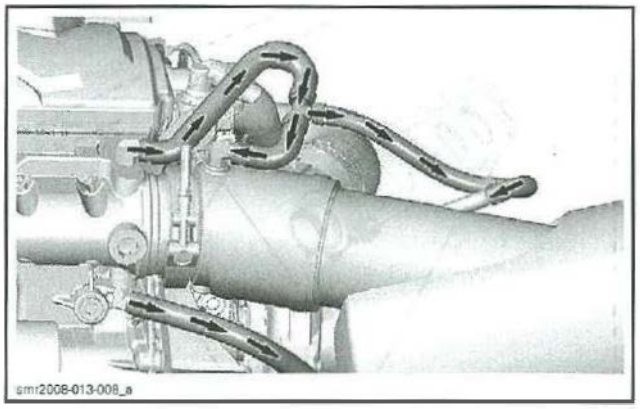


215 ENGINE
1. *Intercooler*
2. *Intercooler water inlet*
3. *Intercooler water outlet*
4. *Exhaust manifold water inlet*
5. *Exhaust manifold*
6. *Exhaust manifold water outlet (to pump support)*
7. *Exhaust manifold water outlet (to exhaust pipe and muffler)*

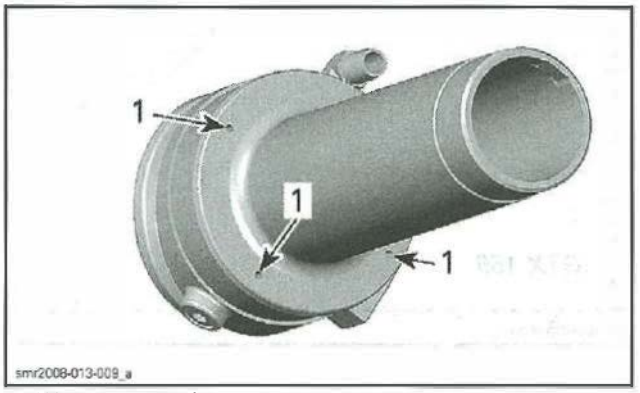


130, 155 AND 260 ENGINES
1. *Exhaust manifold water inlet*
2. *Exhaust manifold*
3. *Exhaust manifold water outlet (to pump support)*
4. *Exhaust manifold water outlet (to exhaust pipe and muffler)*

Water from the exhaust manifold jacket is directed to the exhaust pipe via 2 hoses.



Water exits exhaust pipe water jacket through holes to inject water in muffler and resonator.



1. Water packet holes

Water is evacuated through the exhaust outlet in transom area.

Exhaust System Technical Specifications

TYPE	Total Loss Cooling System (TLCS)
WATER FLOW	Flow from jet pump (no water pump)
TEMPERATURE CONTROL	Calibrated outlet fittings (no thermostat)
SYSTEM BLEEDING	Self-bleed type
SYSTEM DRAINING	Self-drain type

MAINTENANCE

EXHAUST SYSTEM FLUSHING

Flushing the exhaust system with fresh water is essential to neutralize corroding effects of salt or other chemical products present in water. It will help to clean up sand, salt, shells or other particles in water jackets (exhaust system, intercooler (supercharged engines) and hoses).

Exhaust system flushing should be performed when the watercraft is not expected to be used further the same day or when the watercraft is stored for any extended time.

NOTICE **Failure to flush the system, when necessary, will severely damage intercooler (supercharged engines) and exhaust system. Make sure engine operates during entire procedure.**

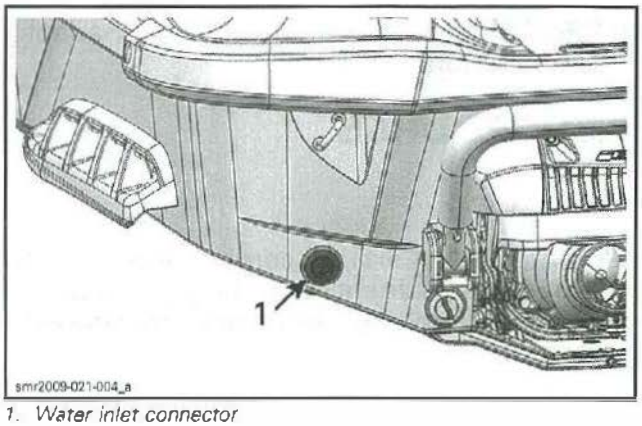
⚠ WARNING

Perform these operations in a well ventilated area. Certain components in the engine compartment may be very hot. Direct contact may result in skin burn. Do not touch any electrical part or jet pump area when engine is running.

⚠ WARNING

When operating the engine while the watercraft is out of the water, the heat exchanger in the ride plate may become very hot. Avoid any contact with ride plate as burns may occur.

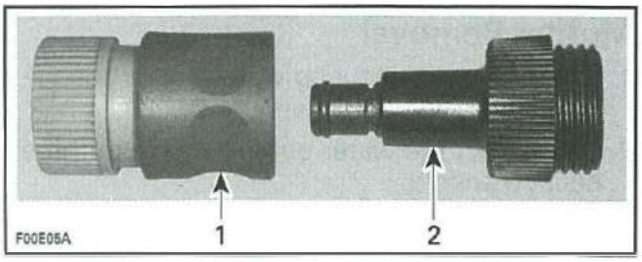
Connect a garden hose to connector located at the rear of watercraft. Do not open water tap yet.



1. Water inlet connector

NOTE: The following tool is recommended when a quick connect adapter is used to ease garden hose installation.

RECOMMENDED TOOL	
FLUSHING CONNECTOR ADAPTER (P/N 295 500 473)	



1. Quick connect adapter
2. Flushing connector adapter

To flush the exhaust system, start the engine then immediately open the water tap.

NOTICE **Always start the engine before opening the water tap. Open water tap immediately after engine is started to prevent overheating. Never run engine without supplying water to the exhaust system when watercraft is out of water.**

Run the engine about 20 seconds at a fast idle between 4000 - 5000 RPM.

NOTICE **Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.**

Ensure water flows out of jet pump while flushing.

Close the water tap, then stop the engine.

NOTICE **Always close the water tap before stopping the engine.**

Disconnect the garden hose.

NOTICE Remove flushing connector adapter after operation (if used).

PROCEDURES

MUFFLER

⚠ CAUTION Certain components in the engine compartment may be very hot. Let exhaust system cool down prior to removing parts.

Muffler Access

iS and aS Models

Open seat.

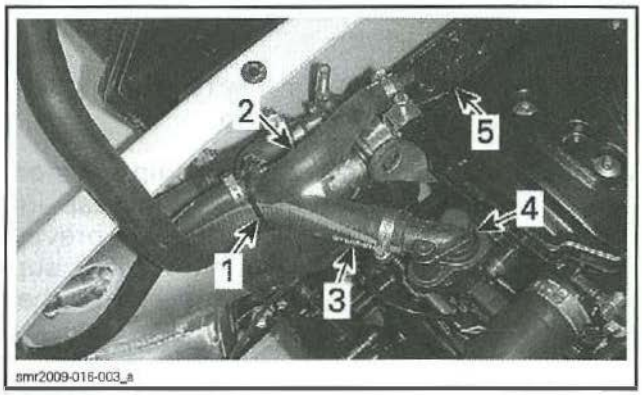
Remove the air intake silencer. Refer to *AIR INTAKE SILENCER (iS AND aS MODELS)* subsection.

All Other Models

Remove seat.

Muffler Removal

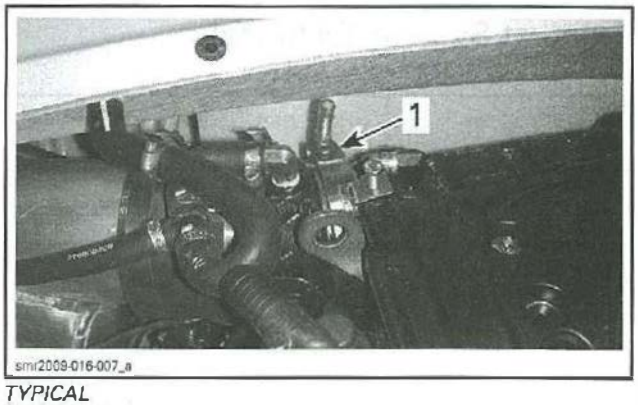
1. Cut locking tie securing water outlet hose (exhaust system) and blow-by hose.
2. Disconnect the water outlet hose from the exhaust manifold.
3. Gently disconnect the hose from blow-by valve.



TYPICAL
1. *Cut this locking tie*
2. *Water outlet hose (exhaust system)*
3. *Blow-by hose*
4. *Blow-by valve*
5. *Exhaust manifold*

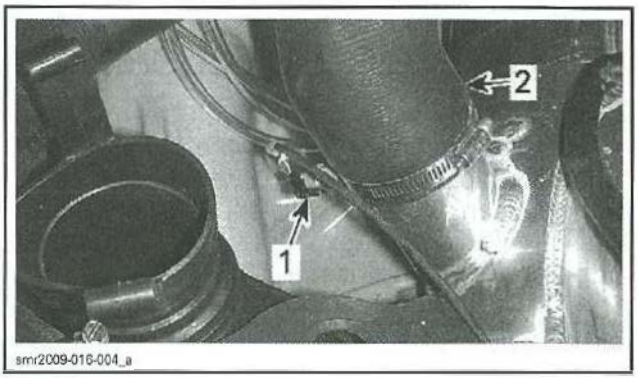
4. Unscrew exhaust clamp.

NOTICE Do not use pneumatic or electrical tools as seizure may occur.



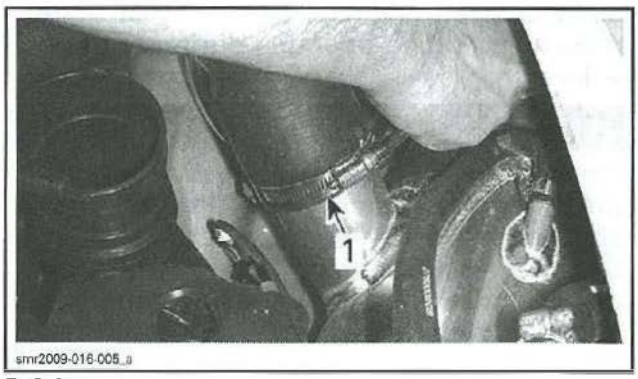
TYPICAL
1. *Exhaust clamp*

5. Unplug the exhaust gas temperature sensor (EGTS).



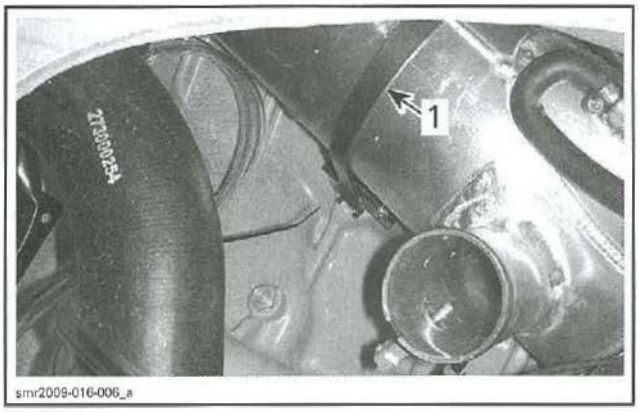
TYPICAL
1. *EGTS sensor*
2. *Exhaust hose*

6. Disconnect the exhaust hose from muffler.



TYPICAL
1. *Exhaust hose clamp*

7. Detach retaining strap.



TYPICAL
1. Muffler retaining strap

8. Remove the muffler.
   - On iS and aS models, remove the LH rear storage basket then move the muffler backwards and slide it through the rear opening.
   - On models without iS and aS, move the muffler back then slide it forward through the deck opening.

Muffler Inspection

Check muffler for:
- Cracks
- Corrosion
- Other damages.

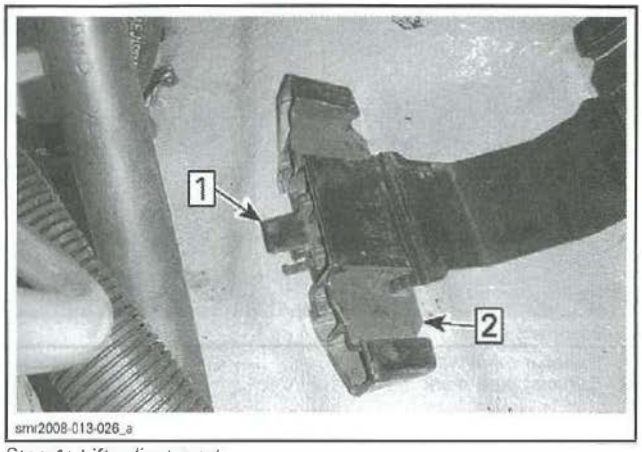
Check if exhaust hose is:
- Brittle
- Hard
- Cracked
- Otherwise damaged.

Replace any defective part.

Muffler Installation

With a new muffler, install the EGTS sensor. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Open muffler adjusters by sliding adjuster blocks.



Step 1: Lift adjuster tab
Step 2: Move adjuster outward

Insert the muffler in hull.

Align the exhaust pipe flange to the exhaust manifold. Rotate and move muffler so that the exhaust pipe flange makes perfect contact with exhaust manifold.

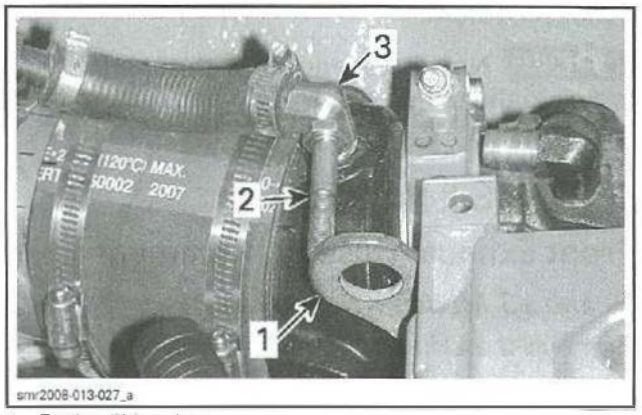
Slide both adjuster blocks against muffler to support it in position.

NOTE: Ensure muffler is in contact with both adjuster blocks. Readjust as required.

Install exhaust clamp with the nut upward.

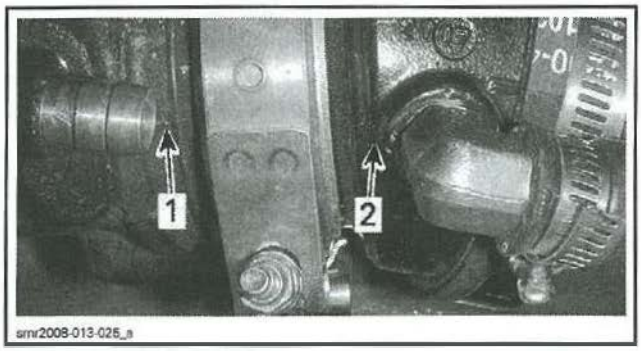
Tighten clamp loosely.

Using a 50 mm (2 in) spacer (in this case a bolt), position the exhaust pipe.



1. Engine lifting ring
2. Spacer
3. Exhaust pipe fitting

Confirm that the exhaust pipe mark is aligned with the mark on the exhaust manifold.



1. *Exhaust manifold mark*
2. *Exhaust pipe mark*

Tighten exhaust clamp.

TORQUE	
Exhaust clamp	11 N•m (97 lbf•in)

NOTICE **Do not use pneumatic or electric tools as seizure may occur.**

Install the muffler strap.

NOTICE **Ensure not to rotate muffler during strap installation. The use of a soapy water solution on inner side of muffler strap is recommended.**

Install all other removed parts.

After installation, ensure there is no water or exhaust gas leak when engine is running.

Test run the engine while supplying water to the exhaust system.

NOTICE **Never run engine without supplying water to the exhaust system when watercraft is out of water.**

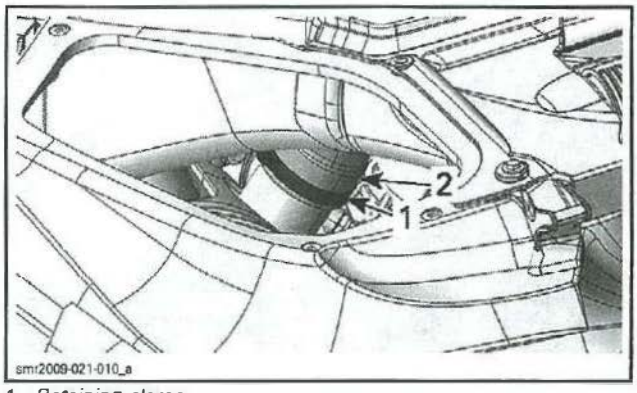
EXHAUST HOSES

Front Exhaust Hose Replacement

iS and aS Models

Remove the LH rear storage basket.

Remove exhaust hose from muffler outlet.



1. *Retaining clamp*
2. *Exhaust hose*

Remove the deck extension. Refer to *BODY* subsection.

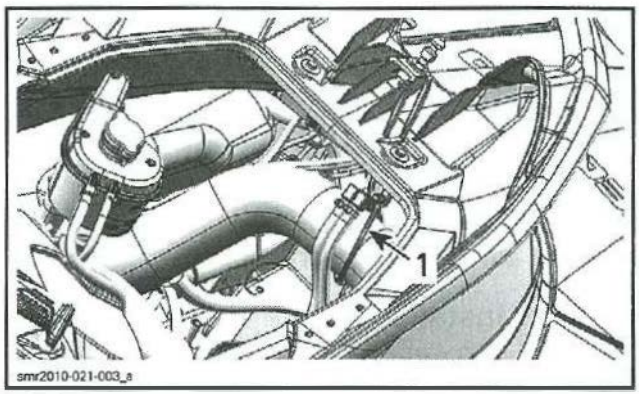
Move the coolant expansion tank aside and cut locking tie retaining the starter cable (RED) to exhaust hose.

Remove exhaust hose from resonator.

Cut locking tie retaining bailer hose elbow fittings to exhaust hose.

Models Without iS and aS

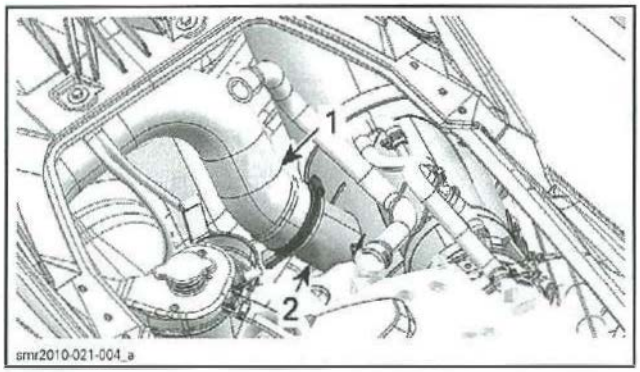
Cut locking tie securing bailers on the top of the front exhaust hose.



TYPICAL
1. *Cut this locking tie*

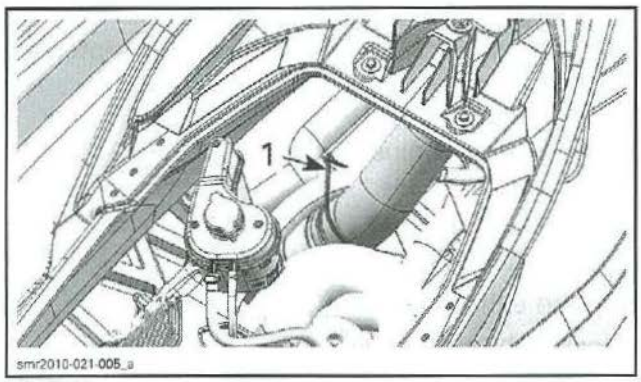
On **GTS and GTI models,** cut locking ties securing wiring harness to exhaust hose.

Remove exhaust hose from the muffler outlet.



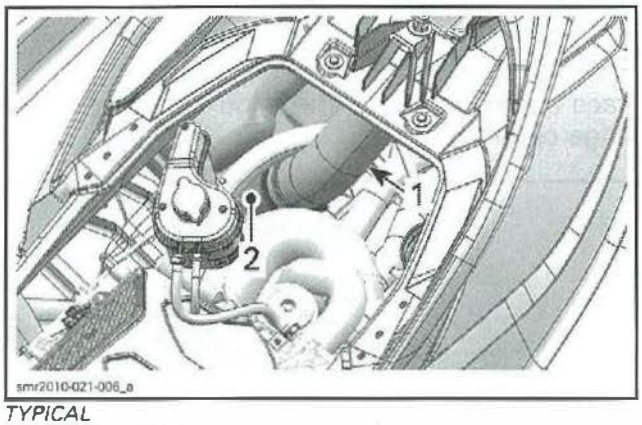
TYPICAL
1. *Front exhaust hose*
2. *Muffler outlet*

Cut the locking tie securing the electrical harness to the front exhaust hose.



TYPICAL
1. *Cut this locking tie*

Detach the end of the hose from the resonator.



TYPICAL
1. *Front exhaust hose*
2. *Resonator*

All Models

Remove front exhaust hose from vehicle.

When reinstalling exhaust hose, make sure to attach elbow fittings at the highest position that you can on the exhaust hose.

Tighten retaining clamps to specification.

TORQUE	
Front exhaust hose clamp	4 N•m (35 lbf•in)

Install all other removed parts.

After installation, ensure there is no water or exhaust gas leak when the engine is running. Test run the engine while supplying water to the exhaust system.

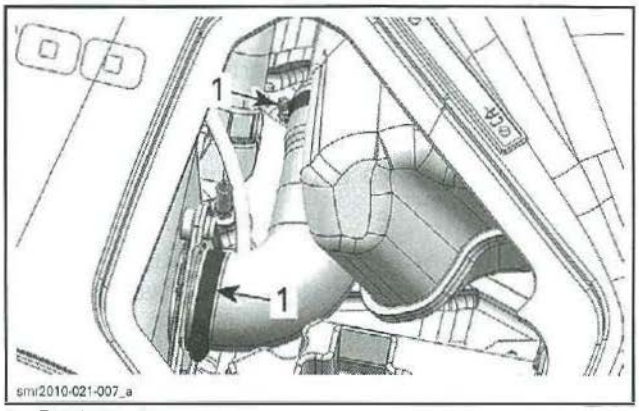
NOTICE **Never run engine without supplying water to the exhaust system when watercraft is out of water.**

Rear Exhaust Hose Replacement

iS and aS Models

Remove battery and battery holder. Refer to *CHARGING SYSTEM* subsection.

Loosen clamps securing rear exhaust hose to resonator and iBR support plate.



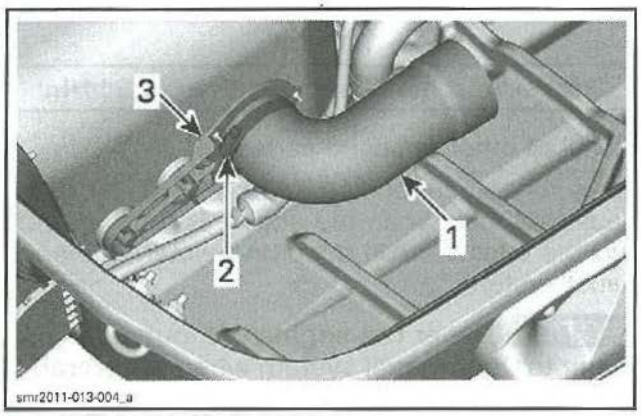
1. *Retaining clamps*

Remove the rear exhaust hose from vehicle.

Models Without iS and aS

Remove the resonator. See procedure in this subsection.

Loosen clamp securing the rear exhaust hose to RH fixing plate.



DECK REMOVED FOR CLARITY
1. *Rear exhaust hose*
2. *Hose clamp*
3. *RH fixing plate*

All Models

When reinstalling rear exhaust hose, tighten clamps to specification.

TORQUE	
Rear exhaust hose clamp	4 N•m (35 lbf•in)

Reinstall all other removed parts.

After installation, ensure there is no water or exhaust gas leak when the engine is running. Test run the engine while supplying water to the exhaust system.

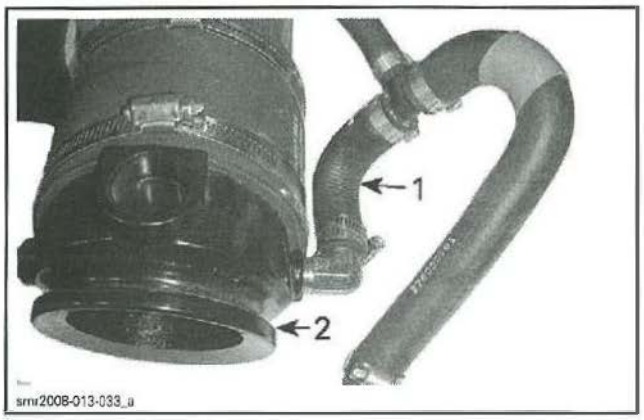
NOTICE **Never run engine without supplying water to the exhaust system when watercraft is out of water.**

EXHAUST PIPE

Exhaust Pipe Removal

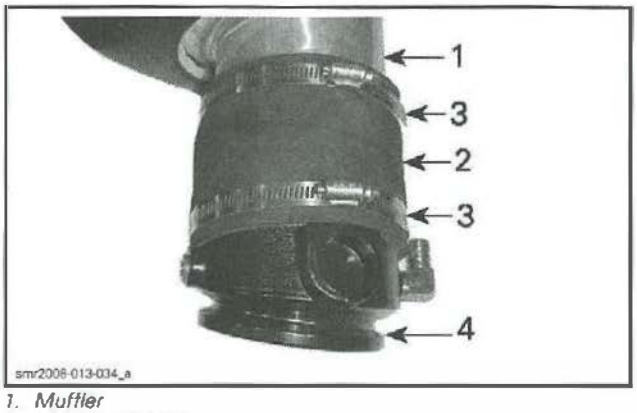
Remove *MUFFLER*, see procedure in this subsection.

Disconnect water inlet hose from exhaust pipe fitting.



1. *Water inlet hose*
2. *Exhaust pipe*

Loosen rubber adapter clamps.



1. *Muffler*
2. *Rubber adapter*
3. *Clamps*
4. *Exhaust pipe*

Remove exhaust pipe and the rubber adapter.

Exhaust Pipe Inspection

Inspect exhaust pipe for:
- Cracks
- Flange damages
- Other damages.

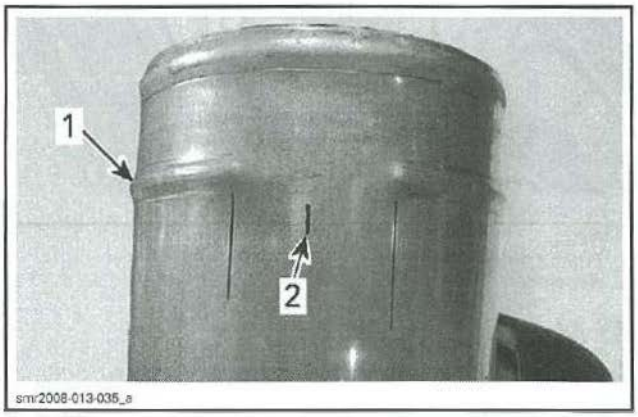
Replace exhaust pipe as required.

Check if the rubber adapter is:
- Brittle
- Hard
- Otherwise damaged.

Replace rubber adapter if necessary.

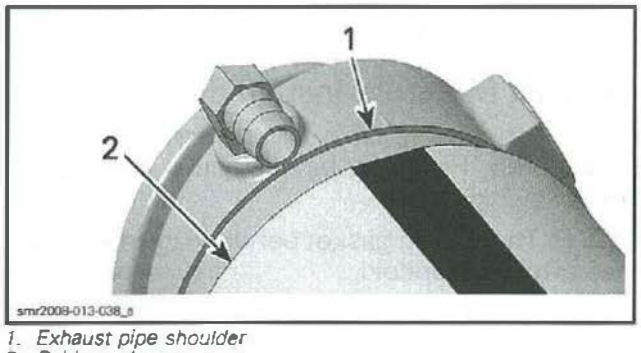
Exhaust Pipe Installation

Trace a mark to locate the middle of the muffler bulge opening.



1. *Bulge*
2. *Middle of the opening*

Install the rubber adapter on exhaust pipe. Ensure rubber adapter is properly seats against exhaust pipe shoulder.

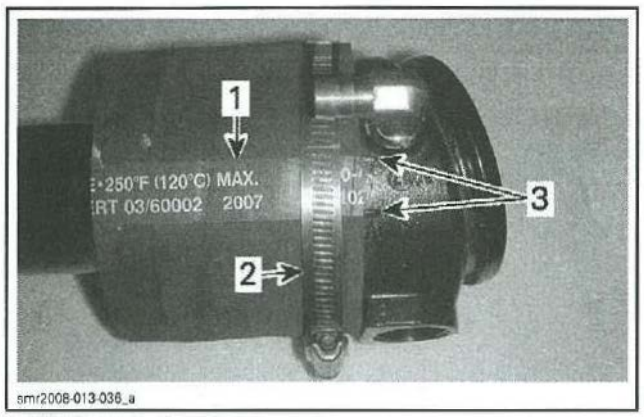


1. *Exhaust pipe shoulder*
2. *Rubber adapter*

Center the rubber adapter strip of the rubber adapter between both exhaust pipe marks.

Tighten retaining clamp.

TORQUE	
Rubber adapter retaining clamp	8 N•m (71 lbf•**in**)

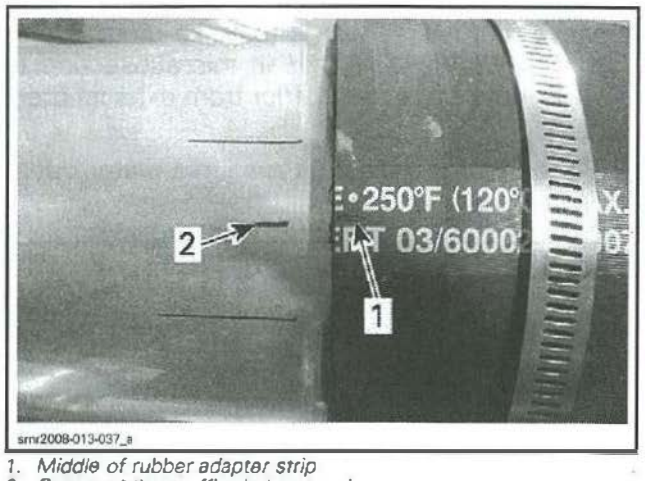


1. *Rubber adapter strip*
2. *Retaining clamp*
3. *Exhaust pipe marks*

Slide the other clamp on the rubber adapter.

Insert the exhaust pipe into the muffler.

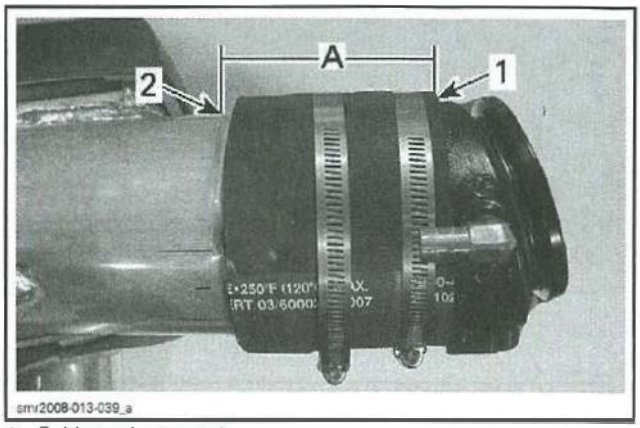
Align the center of the rubber adapter strip with the mark previously traced on muffler.



1. *Middle of rubber adapter strip*
2. *Center of the muffler bulge opening*

Using a caliper, measure the distance between the exhaust pipe shoulder and the outside of the muffler bulge.

Position the muffler to 95 mm ± 2 mm (3.74 in ± .079 in). Check the distance in several places.



1. *Rubber adapter end*
2. *Outside of the muffler bulge*

A. *95 mm ± 2 mm (3.74 in ± .079 in)*

Tighten retaining clamp.

TORQUE	
Rubber adapter retaining clamp	8 N•m (71 lbf•**in**)

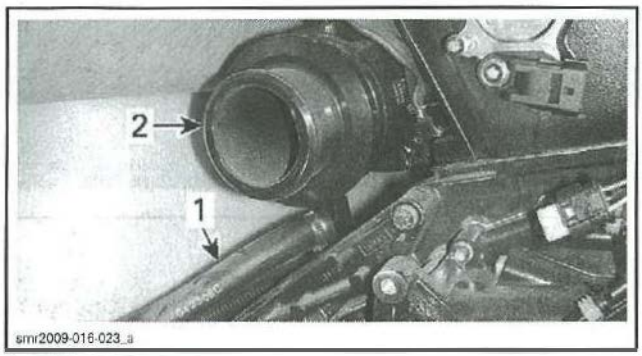
Install muffler in vehicle. Refer to *MUFFLER INSTALLATION* in this subsection for complete procedure.

EXHAUST MANIFOLD

Exhaust Manifold Removal

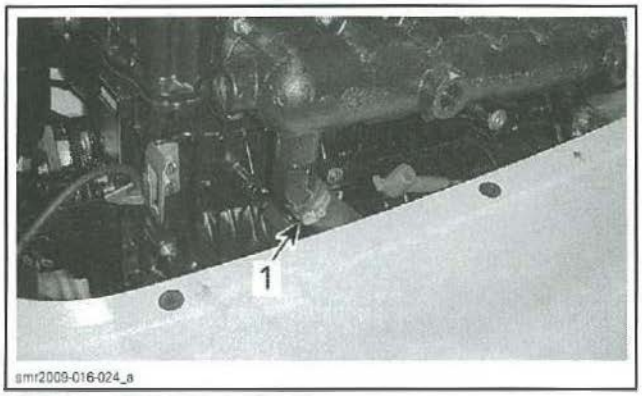
1. On iS and aS models, remove the moving deck and the deck extension. Refer to *BODY* subsection.

2. Move muffler rearwards to make room. Refer to *MUFFLER REMOVAL* in this subsection to know how separate muffler from exhaust manifold.
3. Disconnect the exhaust manifold water outlet hose.



1. *Water outlet hose*
2. *Exhaust manifold*

4. Disconnect exhaust manifold water inlet hose from exhaust manifold.



TYPICAL – iS MODEL SHOWN
1. *Exhaust manifold water inlet hose*

5. Unscrew the exhaust manifold beginning with the bottom screws. This will help holding the manifold while you remove the screws.
6. Remove the exhaust manifold from vehicle.
   - On iS and aS models, move the exhaust manifold rearwards to remove it.
   - On models without iS and aS, lift up the exhaust manifold to remove it.

Exhaust Manifold Inspection

Inspect exhaust manifold condition paying attention for cracks or other damage. Check contact surfaces and hose. Replace any defective part.

Inspect plane surfaces for warpage. Small deformation can be corrected by grinding surface with a fine sand paper. Install sand paper on a surface plate and rub part against oiled sand paper.

Clean all metal components in a solvent.

Exhaust Manifold Installation

Installation is essentially the reverse of removal procedures. However, pay particular attention to the following.

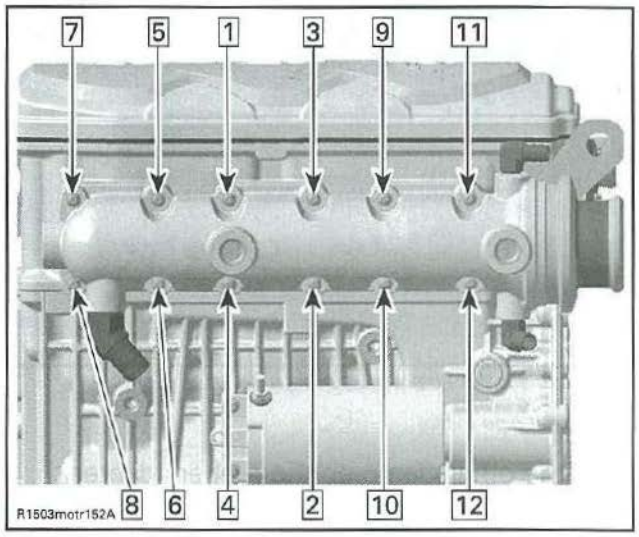
NOTE: There is no gasket between cylinder block and exhaust manifold.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of screws.

To help holding the manifold while installing screws, first insert the exhaust manifold into the exhaust pipe then, install the upper front screw. Continue with the remaining screws.

Torque screws to specification as per following illustrated sequence. Repeat the procedure twice.

TORQUE	
Exhaust manifold screws	9 N•m (80 lbf•in)



After installation, ensure there is no water or exhaust gas leak when the engine is running. Test run the engine while supplying water to the flushing connector.

NOTICE **Never run engine without supplying water to the exhaust system when watercraft is out of water.**

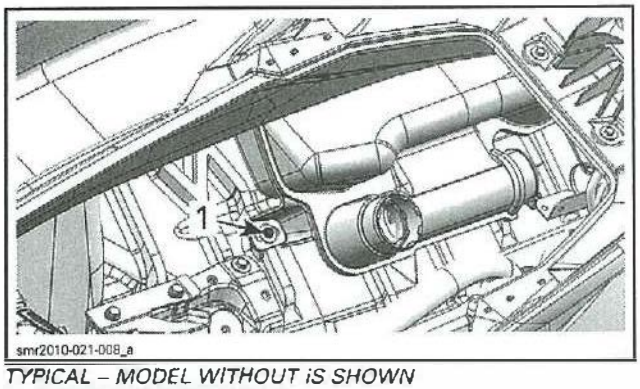
RESONATOR

Resonator Removal

iS and aS Models

1. Remove engine from vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.

2. Remove battery and battery holder. Refer to *CHARGING SYSTEM* subsection.
3. Loosen clamp securing rear exhaust hose to resonator.
4. Remove the screw securing the front of the resonator.

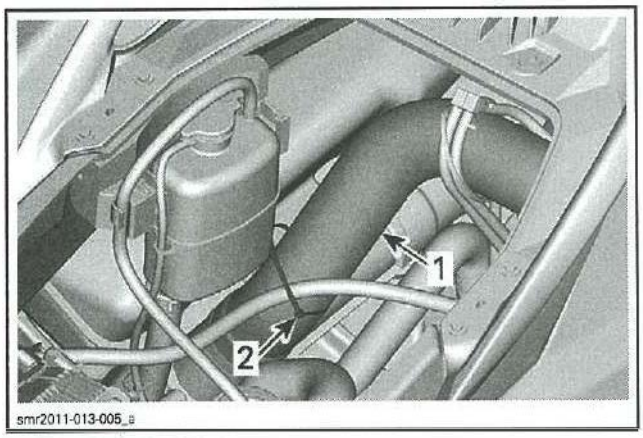


TYPICAL – MODEL WITHOUT iS SHOWN
1. Resonator retaining screw

5. Remove the front exhaust hose from resonator.
6. Remove resonator from vehicle.

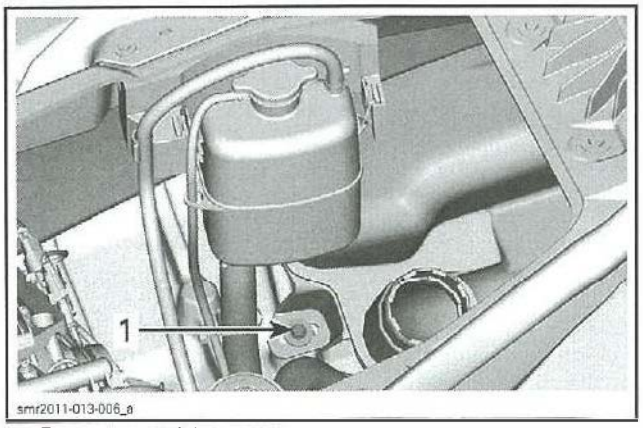
Models Without iS and aS

1. Remove seat.
2. Cut locking tie securing wiring harness to front exhaust hose.



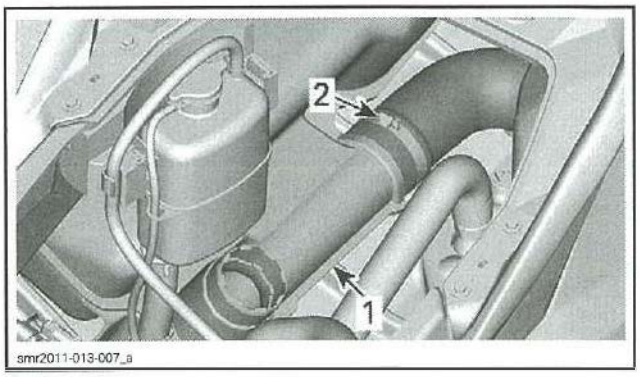
1. Front exhaust hose
2. Cut this locking tie

3. Detach the front exhaust hose from the resonator.
4. Remove screw and washer securing the front of the resonator.



1. Resonator retaining screw

5. Loosen clamp securing the rear exhaust hose to resonator.



1. Resonator
2. Loosen this clamp

6. Slide resonator by the deck opening.

Resonator Inspection

Inspect parts condition paying attention for deformation, cracks or other damage. Check hoses. Replace any defective part.

Resonator Installation

Installation is the reverse of the removal procedures. However, pay attention to the following.

TORQUE	
Resonator retaining screw	7.5 N•m (66 lbf•in)

After installation, ensure there is no water or exhaust gas leak when the engine is running. Test run the engine while supplying water to the exhaust system.

NOTICE Never run engine without supplying water to the exhaust system when watercraft is out of water.

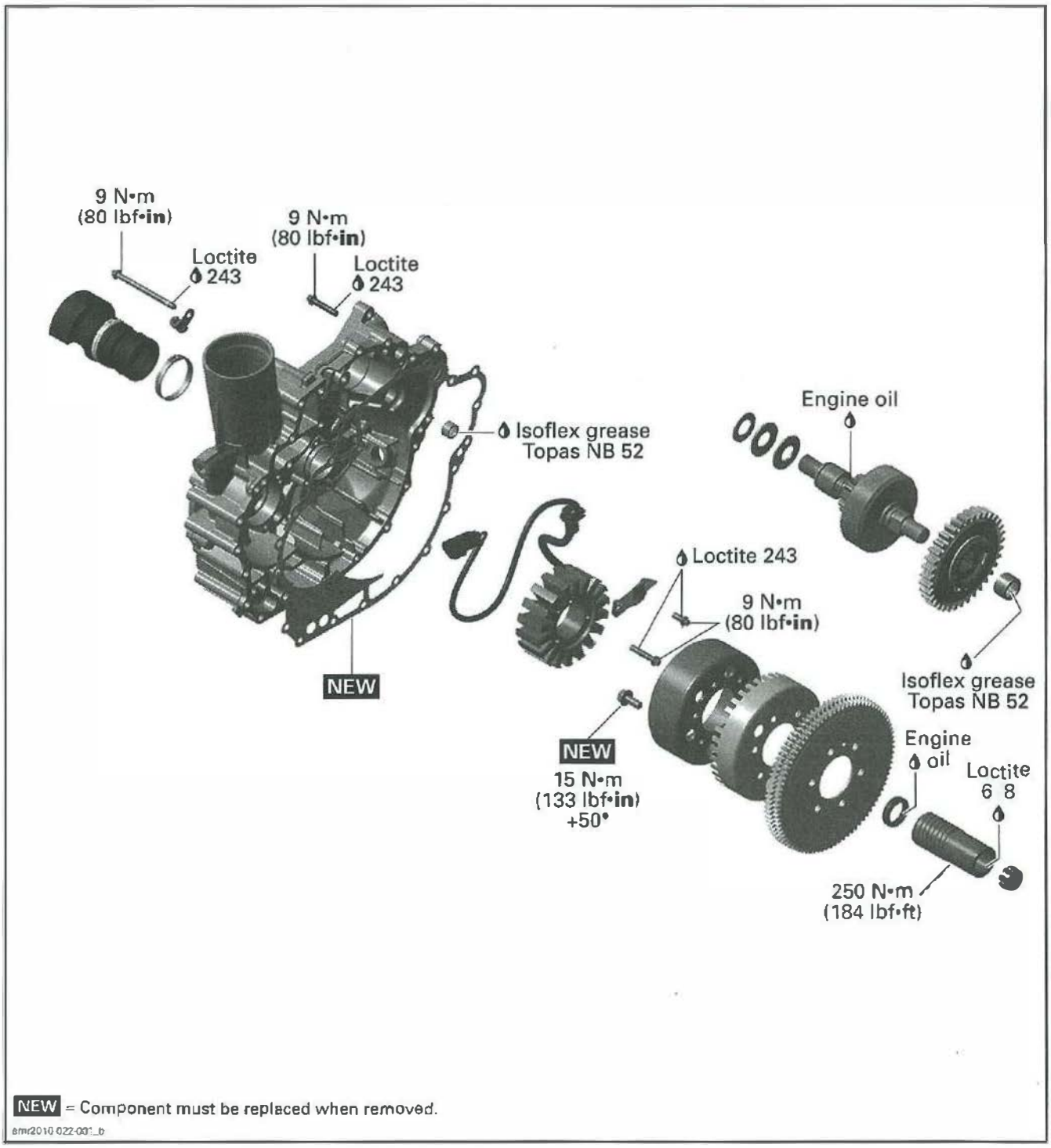
PTO HOUSING AND MAGNETO

SERVICE TOOLS

Description	Part Number	Page
3-PIN MAGNETO HARNESS ADAPTER	529 036 016	101–102
BLIND HOLE BEARING PULLER SET	529 036 117	101
HANDLE	420 877 650	101
IMPELLER REMOVER/INSTALLER	529 035 820	100
OETIKER PLIERS	295 000 070	100
STARTER DRIVE SEAL PUSHER	420 876 502	101
SUCTION PUMP	529 035 880	95

SERVICE PRODUCTS

Description	Part Number	Page
ISOFLEX GREASE TOPAS NB 52	293 550 021	101, 106
LOCTITE 243 (BLUE)	293 800 060	99, 104
LOCTITE 648 (GREEN)	413 711 400	101
PULLEY FLANGE CLEANER	413 711 809	96, 99



NEW = Component must be replaced when removed.

smr2010-022-001_b

GENERAL

NOTE: It is good practice to check for fault codes using the B.U.D.S. software as a first troubleshooting step. Refer to the *DIAGNOSTIC AND FAULT CODES* subsection.

Always carry out electrical tests on components before removing or installing them.

During assembly, use torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

⚠ WARNING

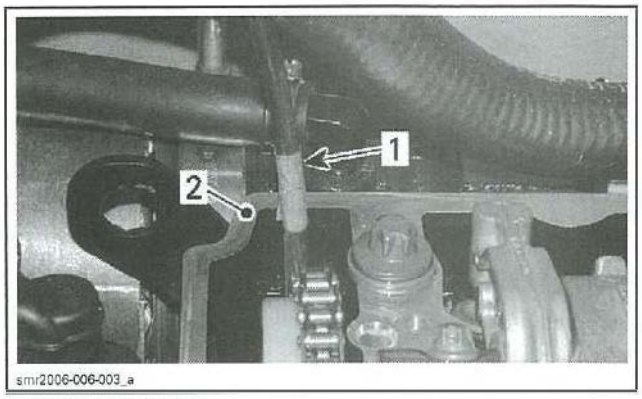
Before carrying out any inspection or maintenance procedure on the vehicle, wait until the engine and exhaust have cooled down to avoid potential burns.

PROCEDURES

PTO HOUSING

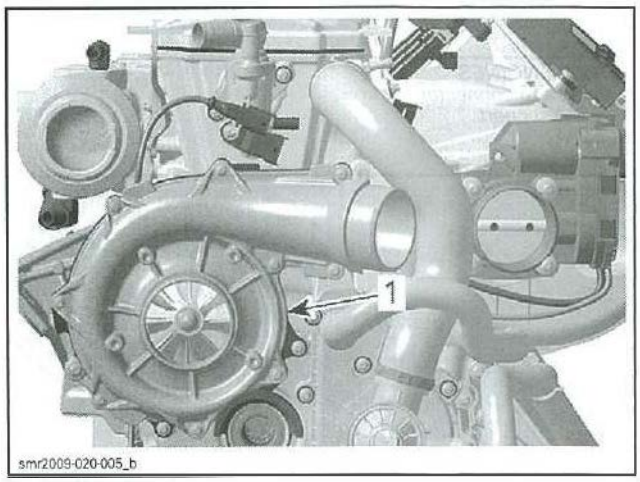
PTO Housing Removal

1. Disconnect the battery. Refer to *STARTING SYSTEM* subsection.
2. On iS models, remove the moving deck and the deck extension. Refer to *BODY* subsection.
3. Drain the engine oil. Refer to *LUBRICATION SYSTEM* subsection.
4. Remove the cylinder head cover. Refer to *CYLINDER HEAD* subsection.
5. Insert the tube of the SUCTION PUMP (P/N 529 035 880) in the lower area of the timing chain.



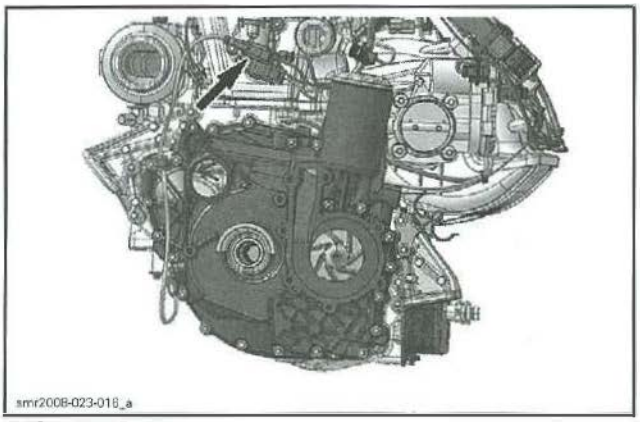
1. Suction pump tube
2. Edge of cylinder block

6. Syphon remaining oil out of the lower timing chain case.
7. Drain engine coolant, refer to the *COOLING SYSTEM* subsection.
8. Remove the air intake silencer. Refer to appropriate *AIR INTAKE SYSTEM* subsection.
9. Disconnect at throttle body the air intake hose.
10. Move muffler rearwards. Refer to *EXHAUST SYSTEM* subsection.
11. On **215 and 260 engines**, remove the supercharger, refer to the *SUPERCHARGER* subsection.



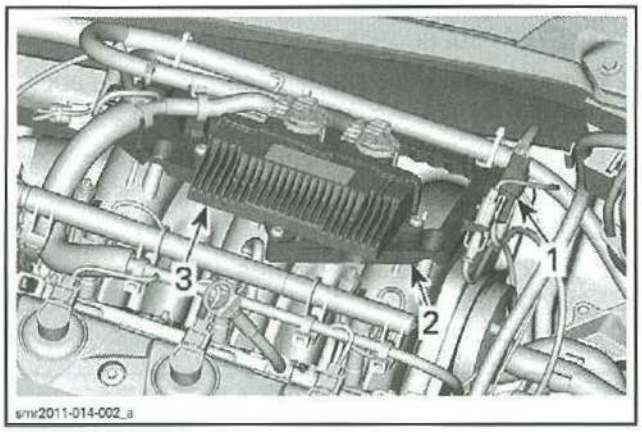
1. Supercharger

12. Refer to *STEERING AND PROPULSION* and remove the following:
    - Jet pump
    - Drive shaft
    - Drive shaft bellows.
13. Disconnect CPS connector from wiring harness.

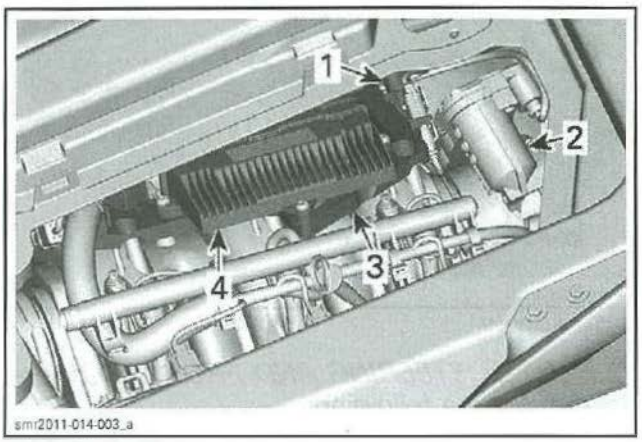


CPS CONNECTOR

14. Disconnect the magneto connector, located beside the ECM.



130/155 ENGINES
1. *Magneto connector*
2. *ECM support*
3. *ECM*

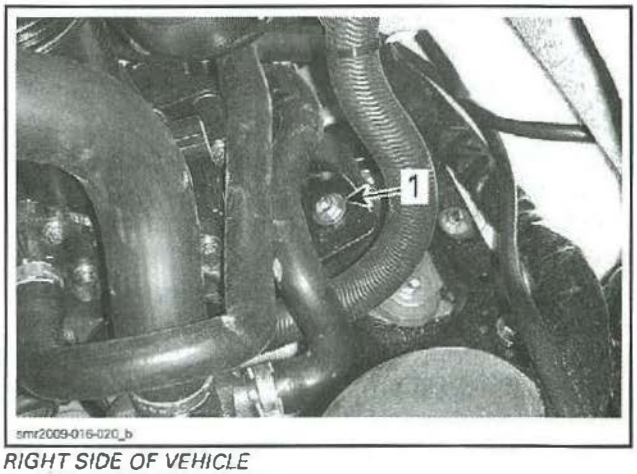


215/260 ENGINES
1. *Magneto connector*
2. *Throttle body*
3. *ECM support*
4. *ECM*

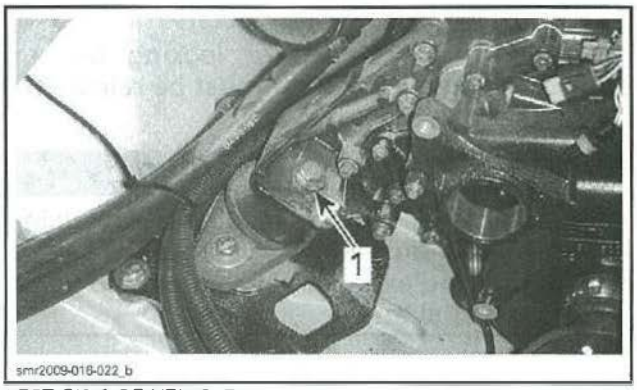
15. Place rags under PTO housing to prevent oil spillage.

NOTE: Up to 250 ml (8 U.S. oz) of oil could flow out when removing PTO housing. If spillage occurs, clean immediately with the PULLEY FLANGE CLEANER (P/N 413 711 809) to prevent oil stains.

16. Remove both rear engine support screws.



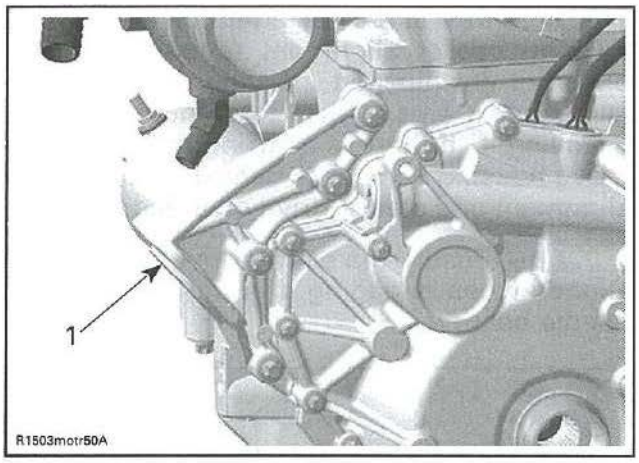
RIGHT SIDE OF VEHICLE
1. *Rear engine support screw*



LEFT SIDE OF VEHICLE
1. *Rear engine support screw*

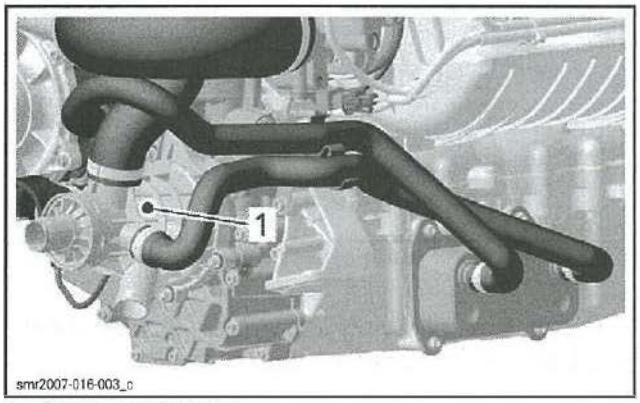
17. Slightly lift aft end of engine and insert a safely block under the engine to secure it in this position.

18. Remove LH rear engine support.



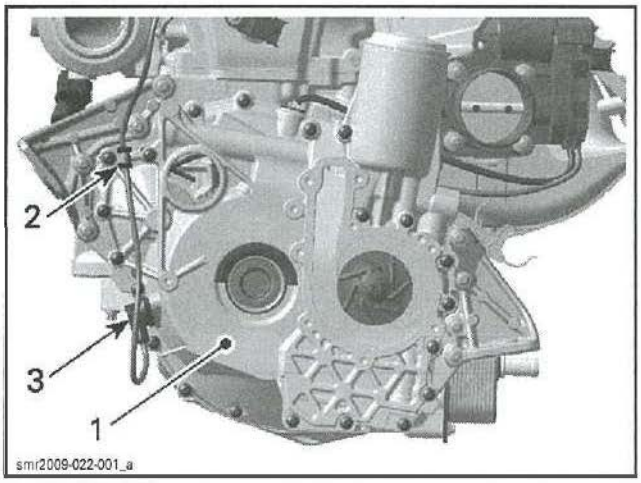
TYPICAL
1. Engine support

19. Remove water pump housing, refer to *COOLING SYSTEM* subsection.



1. Water pump housing

20. Remove PTO housing retaining screws.



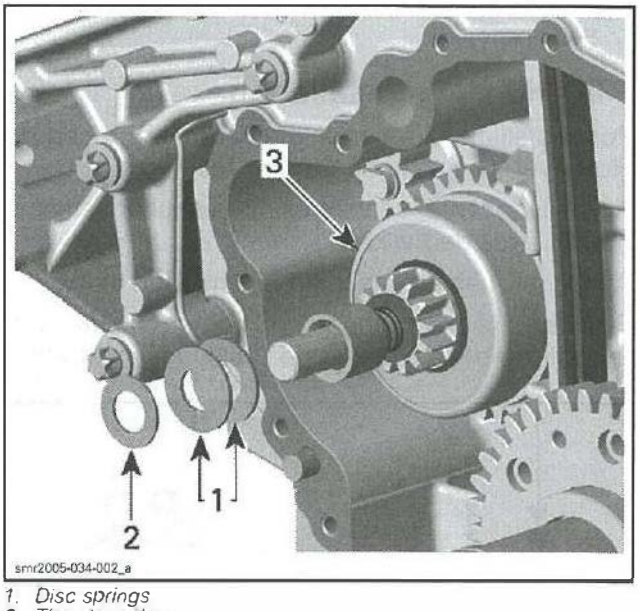
1. PTO housing
2. CPS harness retaining clamp
3. CPS

NOTE: Note position of the CPS harness retaining clamp position as illustrated above for reinstallation.

21. Remove PTO housing from engine.

NOTICE **To prevent damaging contact surfaces, be sure to use prying lugs to separate PTO housing from engine.**

NOTE: Carefully separate PTO housing from engine using two flat screwdrivers prying equally on opposite sides of the housing and at the same time. Proceed slowly to prevent starter drive disc springs and thrust washer from falling down into bilge area.



1. Disc springs
2. Thrust washer
3. Starter drive

22. Remove PTO housing gasket and discard it.

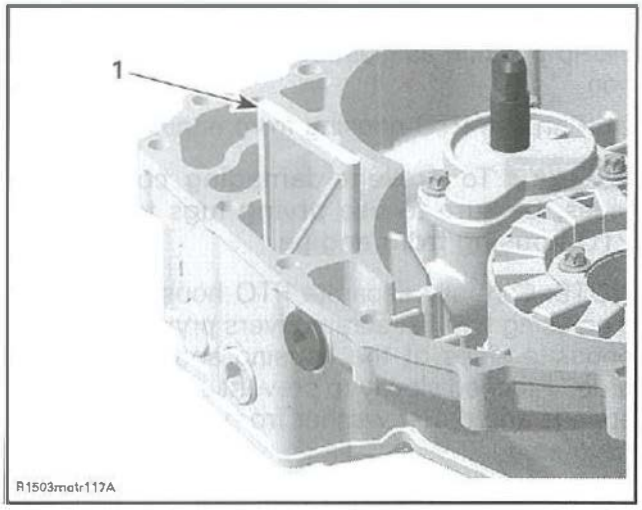
PTO Housing Inspection

Inspect PTO housing for cracks or any other damages. Replace if necessary.

Inspect the needle bearing in the PTO housing used to support the starter drive shaft.

NOTE: Clean all disassembled metal components in a non-ferrous metal cleaner.

Inspect oil strainer for contaminants, debris or other particles. Clean as required.



1. PTO oil strainer

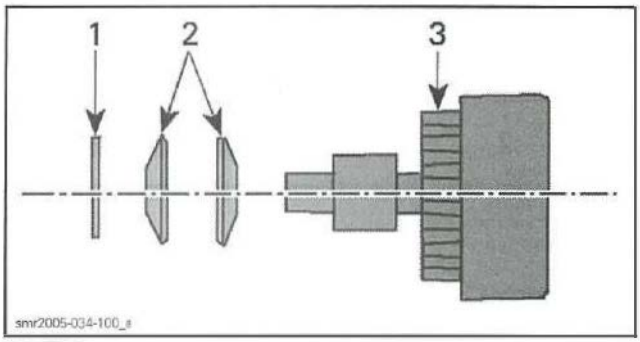
PTO Housing Installation

For installation, reverse the removal procedure. However, pay attention to the following.

Apply lubricants, sealers or threadlocker as specified in exploded view.

Apply torques as specified in exploded view.

Position the disc springs and thrust washer onto the starter drive shaft as per following illustration.



TYPICAL
1. Thrust washer
2. Disc springs
3. Starter drive

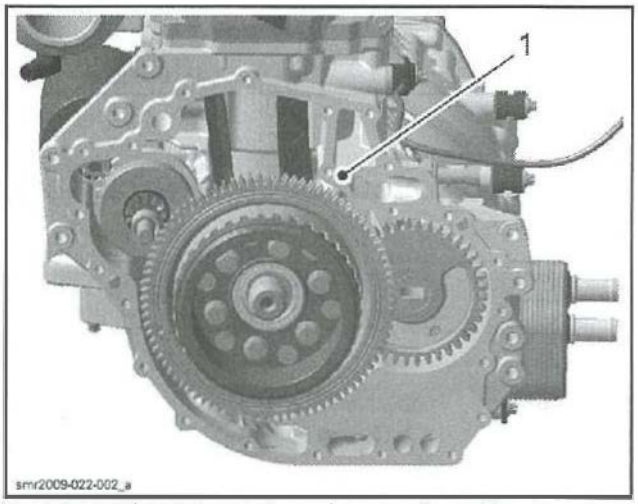
NOTE: When installing a NEW starter drive, oil the shaft and gear splines with engine oil.

Install a NEW PTO housing gasket.

NOTE: When installing the PTO housing, you will need to rotate the oil/water pump shaft slightly to align it with the balance shaft for proper insertion.

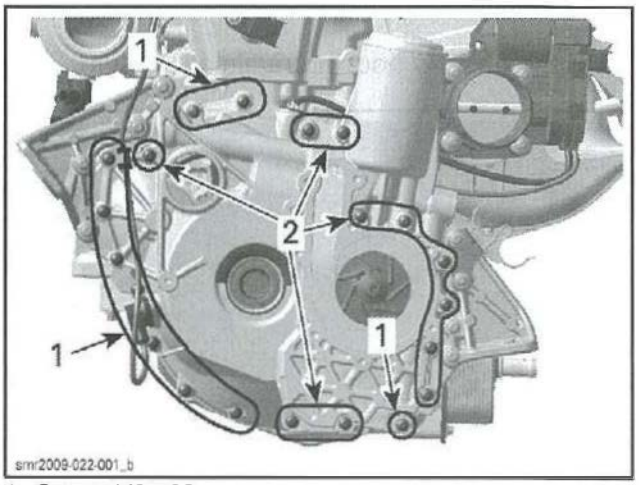
NOTICE Pay particular attention to the PTO housing gasket alignment to ensure that it does not get pinched, or slide out of its surface contact area. Never force housing when installing it. If there is a strong resistance, remove housing and check oil/water pump shaft alignment and starter drive gear alignment.

NOTICE Ensure the starter drive shaft is well aligned when engaging it in the PTO housing needle bearing.



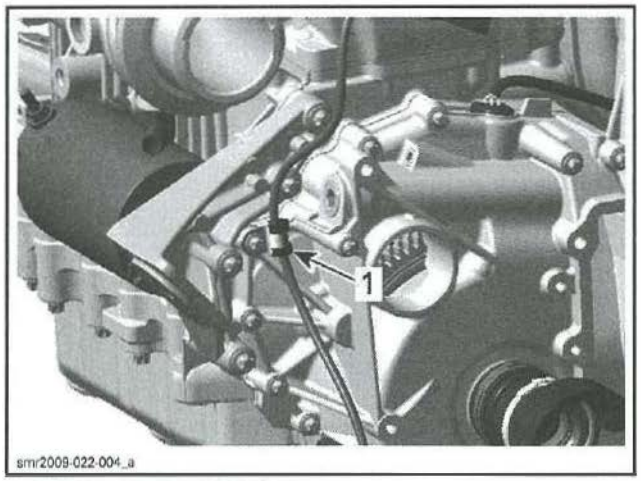
1. Pay attention that gasket remains properly positioned on this surface

Refer to the following illustration to identify the locations of the various housing screws.



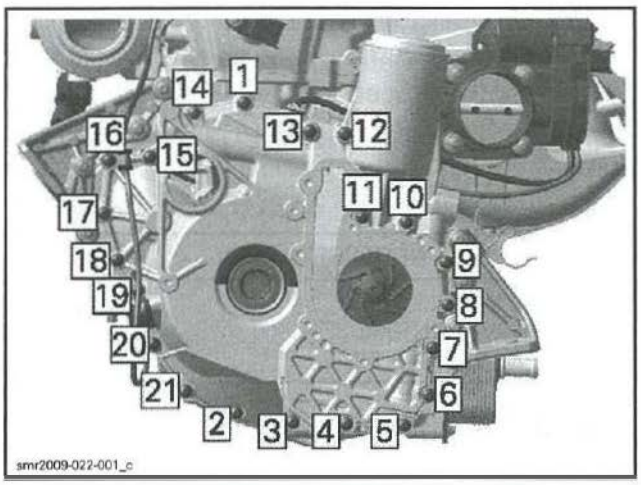
1. Screws M6 x 35
2. Screws M6 x 85

NOTE: Install the CPS harness retaining clamp at the position noted during the PTO housing removal.



1. CPS harness retaining clamp

Install the PTO housing screws finger tight, then torque them to specification as per sequence numbered in the following illustration.



PTO HOUSING SCREWS TORQUE
9 N•m (80 lbf•in)

Reinstall LH engine support.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on engine support screw threads then torque them to specification.

ENGINE SUPPORT SCREWS TORQUE
23 N•m (17 lbf•ft)

Remove block under engine.

Install both rear engine support screws loosely.

Carry out an engine alignment, refer to the *ENGINE REMOVAL AND INSTALLATION* subsection.

NOTICE **An engine alignment procedure must be carried out to ensure proper engine alignment or severe component damage may occur.**

Install all remaining parts, reconnect hoses and electrical connectors. Refer to applicable subsections for procedures and specific details (torques, service products or special instructions).

Refill engine with oil and cooling system with coolant. Refer to *LUBRICATION SYSTEM* and *COOLING SYSTEM* subsections.

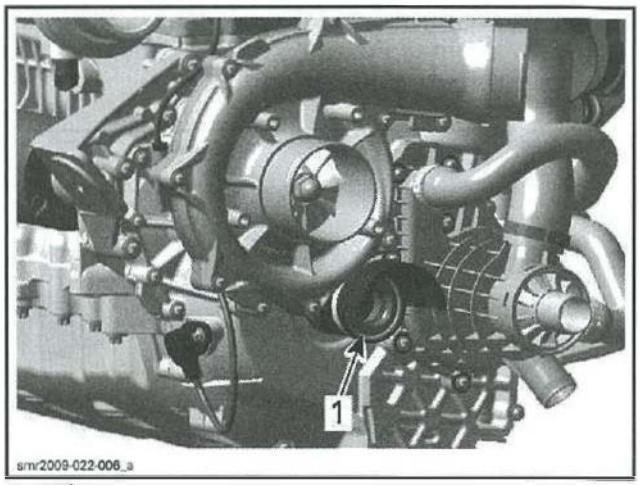
PTO SEAL

PTO Seal Inspection

Inspect the PTO seal on the PTO housing. If brittle, hard or damaged, or if you see a sign of oil leakage, replace it.

Inspect ball bearing within PTO seal for excessive play and smooth operation.

Replace PTO seal if oil seal or ball bearing is damaged.



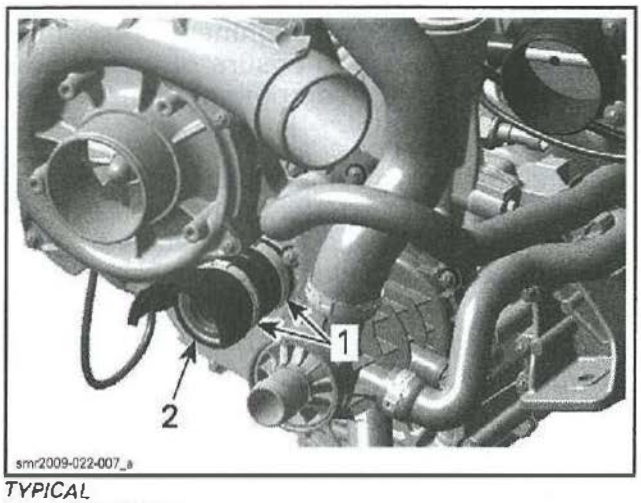
1. PTO seal

PTO Seal Removal

Place rags under PTO housing to prevent spillage. If spillage occurs, clean immediately with PULLEY FLANGE CLEANER (P/N 413 711 809) to prevent oil stains.

NOTE: Note position of seal and orientation of Oetiker clamp for installation.

Remove the Oetiker clamp retaining the seal to the PTO housing.



TYPICAL
1. Oetiker clamps
2. PTO seal

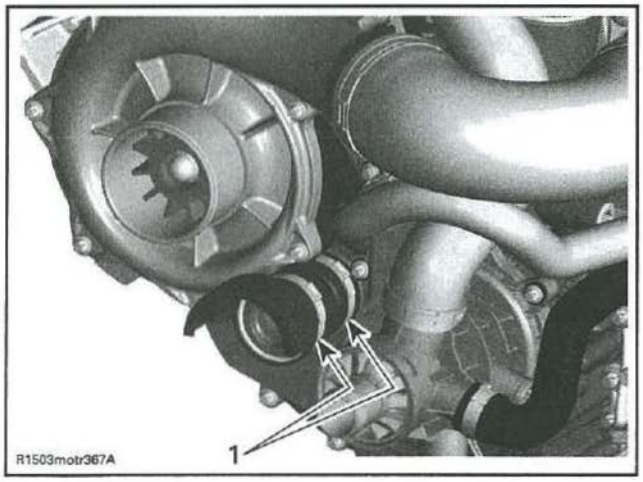
Pull seal from PTO housing.

PTO Seal Installation

Insert a NEW Oetiker clamp over the seal.

Push seal onto PTO housing. Be sure to align seal and clamp as noted at removal.

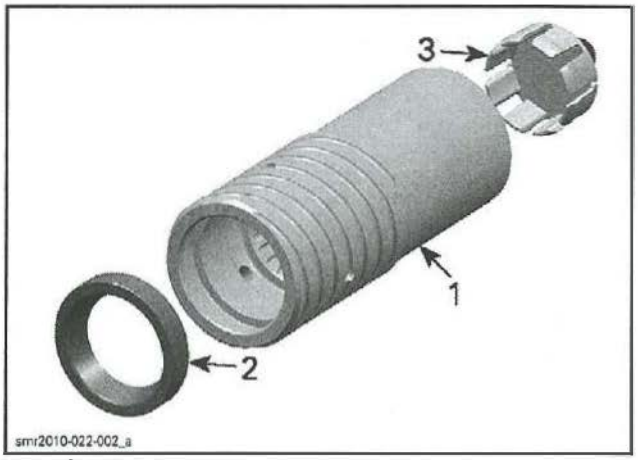
NOTICE **When installing PTO seal on supercharged engines, make sure to position the Oetiker clamps as illustrated.**



1. Oetiker clamps

Crimp Oetiker clamp using OETIKER PLIERS (P/N 295 000 070).

PTO COUPLING



1. PTO coupling
2. Seal
3. Stop sleeve

PTO Coupling Removal

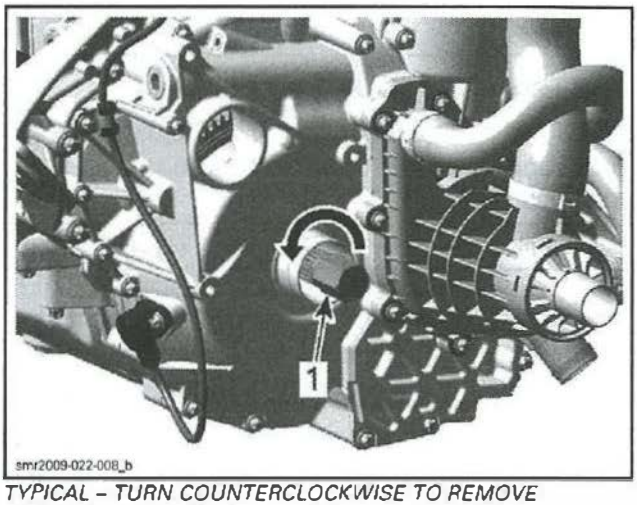
Lock crankshaft. Refer to *CYLINDER BLOCK* subsection for the procedure.

Remove PTO seal as described in previous procedure.

Unscrew coupling from crankshaft.

REQUIRED TOOL	
IMPELLER REMOVER/INSTALLER (P/N 529 035 820)	

NOTICE **Apply engine oil to the removal tool to protect the seal located within the PTO coupling.**



TYPICAL – TURN COUNTERCLOCKWISE TO REMOVE
1. Impeller removal tool

PTO Coupling Inspection

Inspect seal within coupling, if it is brittle, cracked or hard, replace it.

Check coupling for worn or damaged splines. Replace as required.

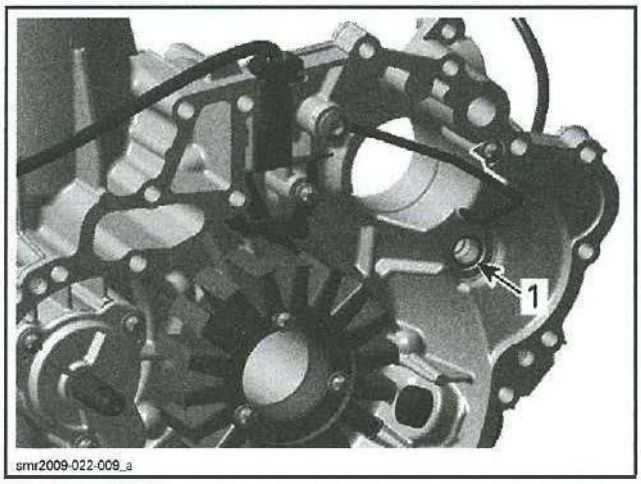
PTO Coupling Installation

For installation, reverse the removal procedure. However, pay attention to the following.

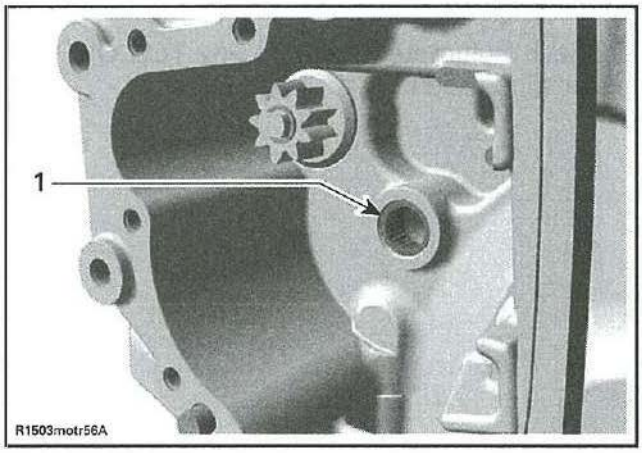
Apply LOCTITE 648 (GREEN) (P/N 413 711 400) on threads and torque PTO coupling to specification.

PTO COUPLING TORQUE
250 N•m (184 lbf•ft)

STARTER DRIVE BEARINGS



PTO HOUSING
1. Starter drive bearing



CYLINDER BLOCK
1. Starter drive bearing

Starter Drive Bearing Removal

Remove PTO housing, see procedure in this subsection.

Remove starter drive bearing from PTO housing or cylinder block.

REQUIRED TOOL	
BLIND HOLE BEARING PULLER SET (P/N 529 036 117)	

Starter Drive Bearing Installation

Prior to assembly grease starter drive bearing with ISOFLEX GREASE TOPAS NB 52 (P/N 293 550 021).

Install starter drive bearing in the PTO housing or in the cylinder block.

REQUIRED TOOLS	
STARTER DRIVE SEAL PUSHER (P/N 420 876 502)	
HANDLE (P/N 420 877 650)	

STATOR

Stator Output Voltage Test

Disconnect the magneto connector, located beside the ECM.

Install this following harness adapter onto the magneto connector.

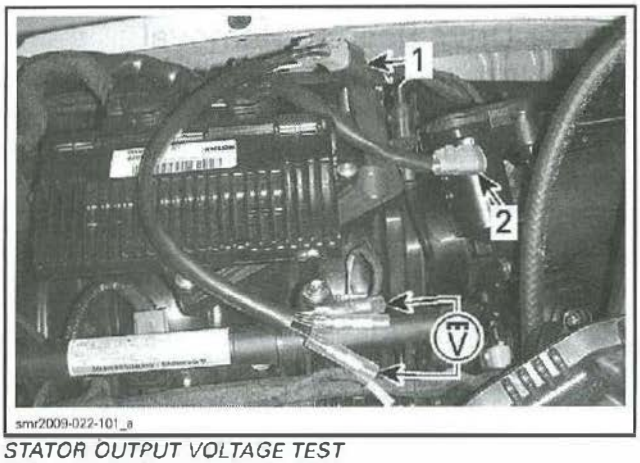
NOTE: Do not connect the magneto harness adapter to the vehicle harness connector.

REQUIRED TOOL	
3-PIN MAGNETO HARNESS ADAPTER (P/N 529 036 016)	

Set multimeter to Vac scale.

Start engine.

Connect multimeter between each pair of YELLOW wires as per following table. Measure voltage between each pair of wires.



STATOR OUTPUT VOLTAGE TEST
1. *Connect adapter to magneto connector*
2. *Leave vehicle harness disconnected*

Read voltage as per following table.

STATOR OUTPUT VOLTAGE TEST		
TEST ENGINE SPEED	TERMINAL	VOLTAGE (AC)
4000 RPM	1 and 2	Approx. 50 Vac
	1 and 3	
	2 and 3	

If voltage is lower than specification, carry out a *STATOR CONTINUITY TEST* and a *STATOR INSULATION TEST*. See procedures in this subsection.

Stator Continuity Test

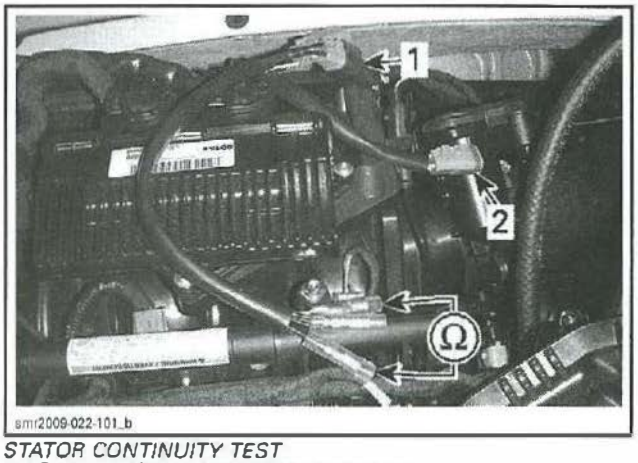
Disconnect the magneto connector, located beside the ECM.

Install the 3-PIN MAGNETO HARNESS ADAPTER (P/N 529 036 016) onto the magneto connector.

NOTE: Do not connect the magneto harness adapter to the vehicle harness connector.

Set multimeter to Ω.

Connect multimeter between each pair of YELLOW wires.



STATOR CONTINUITY TEST
1. *Connect adapter to magneto connector*
2. *Leave vehicle harness disconnected*

Read resistance.

STATOR CONTINUITY TEST	
TERMINAL	RESISTANCE @ 20°C (68°F)
1 and 2	0.1 - 1 Ω
1 and 3	
2 and 3	

If any result is out of specification, replace stator.

Stator Insulation Test

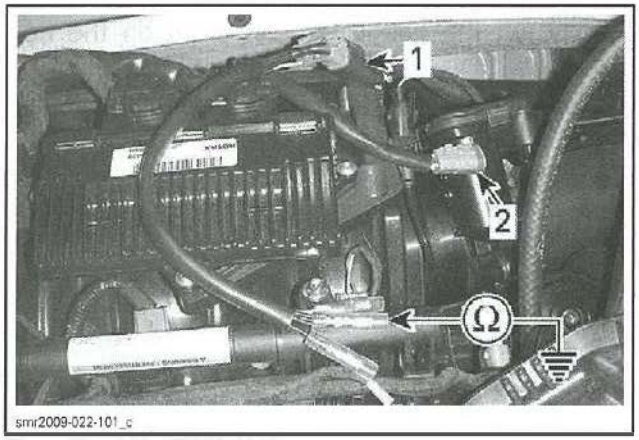
Disconnect the magneto connector, located beside the ECM.

Install the 3-PIN MAGNETO HARNESS ADAPTER (P/N 529 036 016) onto the magneto connector.

NOTE: Do not connect the magneto harness adapter to the vehicle harness connector.

Set multimeter to Ω.

Connect multimeter between any YELLOW wire and engine ground.



STATOR INSULATION TEST
1. *Connect adapter to magneto connector*
2. *Leave vehicle harness disconnected*

Read resistance.

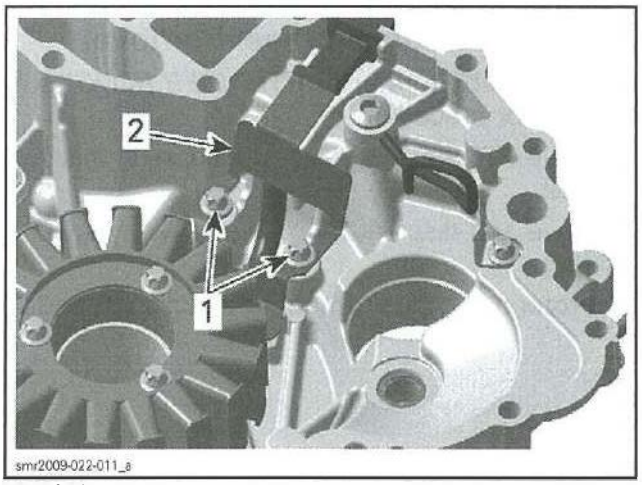
STATOR INSULATION TEST	
TERMINAL	RESISTANCE @ 20°C (68°F)
Any YELLOW wire and engine ground	Infinity (open circuit)

If there is a resistance or continuity to engine ground, the stator coils and/or the wiring is grounded and need to be repaired or replaced.

Stator Removal

Remove PTO housing, see procedure in this subsection.

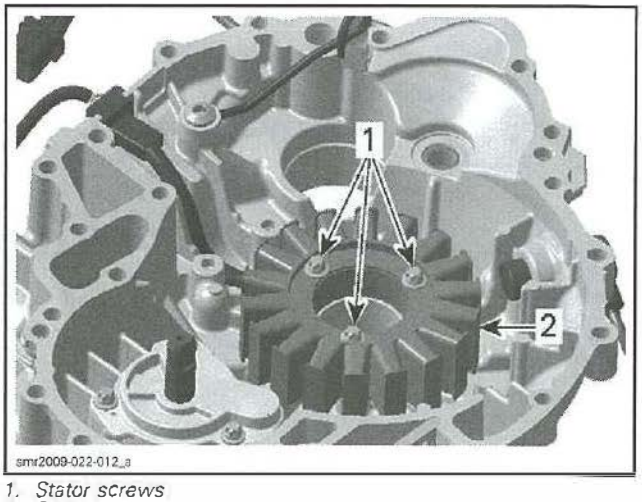
Remove stator cable holding plate from PTO housing.



TYPICAL
1. *Screws*
2. *Holding plate*

Remove stator retaining screws.

Remove stator from PTO housing.

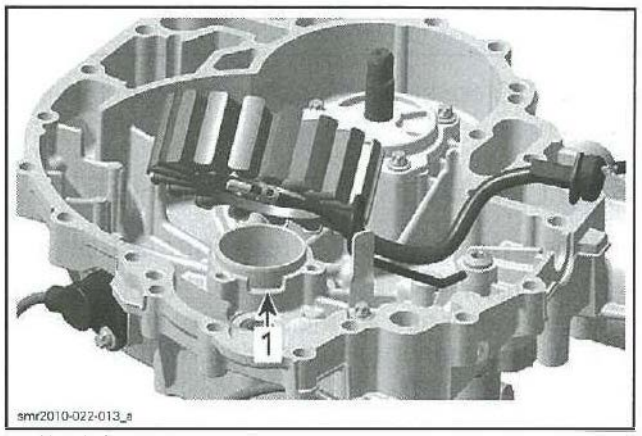


1. *Stator screws*
2. *Stator*

Stator Installation

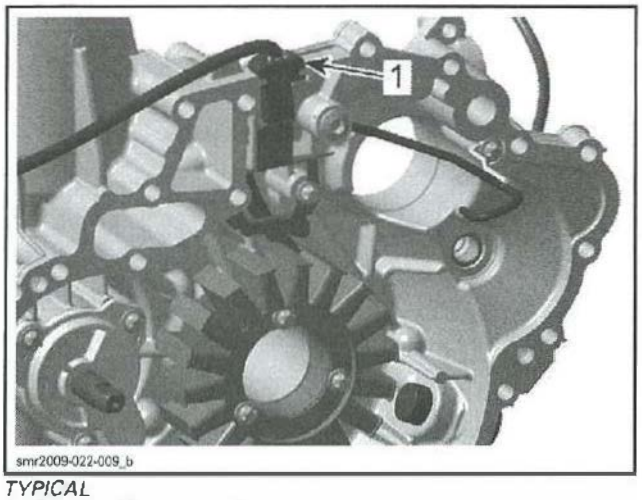
For installation, reverse the removal procedure. However, pay attention to the following.

NOTE: The position of the stator in the PTO housing is determined by a key on the stator and a notch in the magneto housing.



1. *Notch for stator*

Place the stator cable rubber grommet in the notch provided in the PTO housing.



TYPICAL
1. Stator cable grommet

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on the stator screw threads and stator cable holding plate screw threads.

Torque stator and cable holding plate screws to specification.

STATOR AND CABLE HOLDING PLATE SCREWS TORQUE
9 N•m (80 lbf•in)

Install PTO housing as per procedures in this subsection.

ROTOR AND TRIGGER WHEEL

Rotor and Trigger Wheel Inspection

Inspect rotor and trigger wheel condition. Pay particular attention to the inside of the rotor for cracks, rub marks or discoloration. If damaged, replace faulty part.

Check the trigger wheel for bent teeth using the following procedure.

Install a dial indicator on crankcase casting.

Position the gauge on a tooth and set it to zero (0). Be sure to lock the indicator dial to prevent movement of the dial during the remainder of the procedure.

Draw a line on the tooth to indicate it as the first tooth measured (reference tooth).

Gently lift the gauge contact point off the tooth and rotate the rotor to the next tooth.

NOTE: When lifting contact point off the tooth for rotor rotation, be careful not to move gauge position or test readings taken on next tooth will not be accurate with reference to the reference tooth.

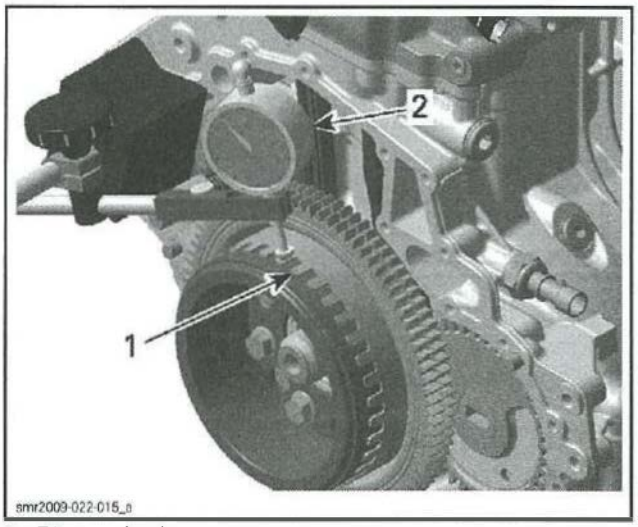
Gently set the gauge contact point on the next tooth and read the dial indicator.

Repeat this procedure taking a reading at each tooth.

Recheck reading on reference tooth to ensure gauge has not changed position (gauge should still read zero).

NOTE: If the reading exceeds the maximum allowable tolerance, straighten the tooth or replace the trigger wheel.

MAXIMUM ALLOWABLE TOLERANCE
0.15 mm (.006 in)



1. Trigger wheel
2. Dial indicator

Properly reinstall PTO housing.

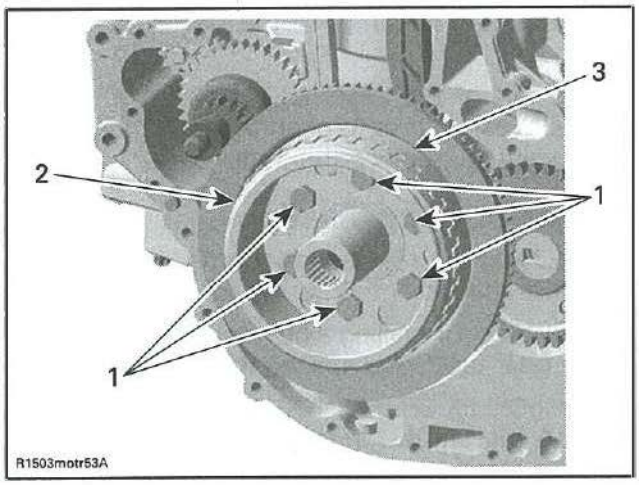
Rotor and Trigger Wheel Removal

Lock crankshaft, refer to *CYLINDER BLOCK* subsection for procedure.

Remove PTO housing, see procedure in this subsection.

Remove and discard the magneto rotor retaining screws.

Pull rotor and trigger wheel off crankshaft end.



TYPICAL
1. *Rotor retaining screws*
2. *Rotor*
3. *Trigger wheel*

Rotor and Trigger Wheel Installation

For installation, reverse the removal procedure. However, pay attention to the following.

Align the trigger wheel to the crankshaft using the location pin on the crankshaft end.

Install **NEW** OEM rotor screws and torque them to specification using a crisscross pattern.

NOTICE **Always install NEW OEM screws with pre-applied threadlocker. These are stretch screws that are one time use only. Not replacing rotor screws may lead to engine damage and failure.**

ROTOR SCREWS TORQUE
15 N•m (133 lbf•**in**) + an additional 50° rotation with a torque angle gauge

RING GEAR

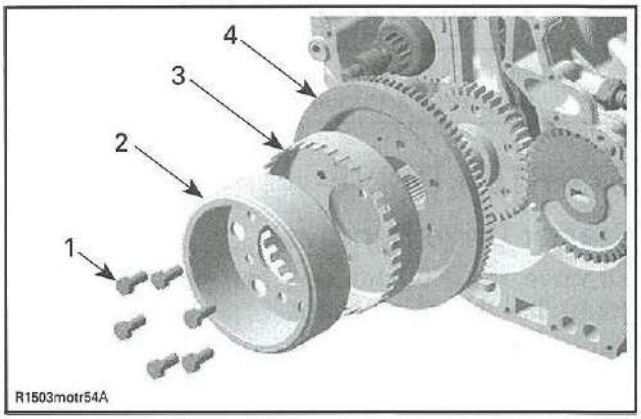
Ring Gear Removal

Lock crankshaft. Refer to *CYLINDER BLOCK* subsection for procedure.

Remove the PTO housing, see procedure in this subsection.

Remove and discard the magneto rotor retaining screws.

Pull rotor, trigger wheel, and ring gear off crankshaft end.



TYPICAL
1. *Magneto rotor retaining screws*
2. *Rotor*
3. *Trigger wheel*
4. *Ring gear*

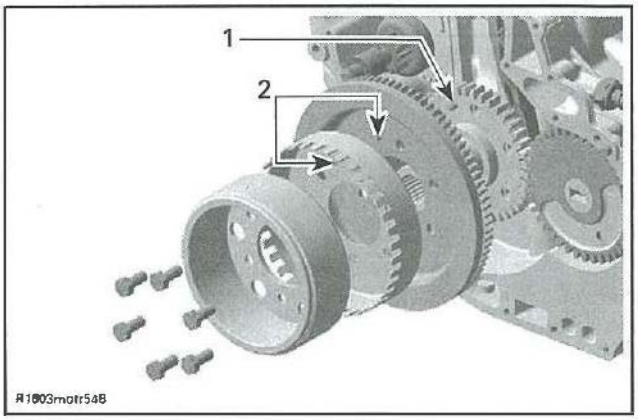
Ring Gear Inspection

Inspect ring gear for damages. Pay particular attention to teeth condition. If badly worn, cracked, or broken teeth are found, replace ring gear.

Ring Gear Installation

For installation, reverse the removal procedure. However, pay attention to the following.

Align the ring gear and trigger wheel to the crankshaft using the location pin on the crankshaft end.



TYPICAL
1. *Location pin*
2. *Location pin holes*

Install **NEW OEM** rotor screws and torque them to specification in a crisscross pattern.

NOTICE **Always install NEW OEM screws with pre-applied threadlocker. These are stretch screws that are one time use only. Not replacing rotor screws may lead to engine damage and failure.**

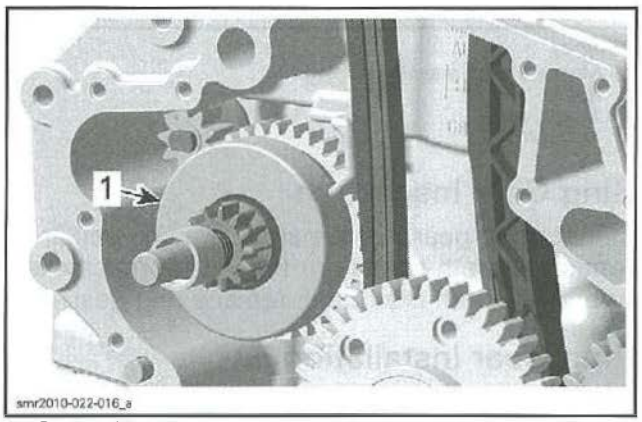
ROTOR SCREWS TORQUE
15 N•m (133 lbf•in) + an additional 50° rotation with a torque angle gauge

STARTER DRIVE

Starter Drive Removal

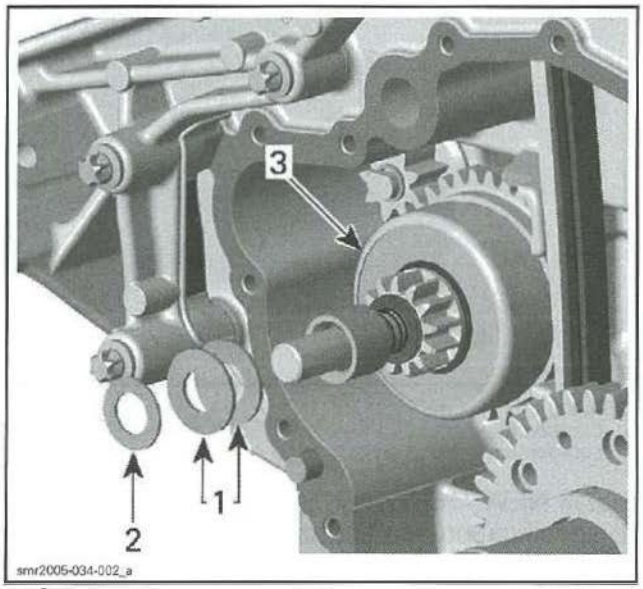
Remove the PTO housing and ring gear as described in this subsection.

Remove starter drive.



1. Starter drive

NOTICE Be careful not to lose the spring discs and thrust washer located on the starter drive shaft.



1. Spring discs
2. Thrust washer
3. Starter drive

Starter Drive Inspection

Inspect all starter drive parts for excessive wear, cracks and other defects. Pay attention to the condition of the drive gear teeth.

Ensure proper operation of the starter drive sprag clutch.

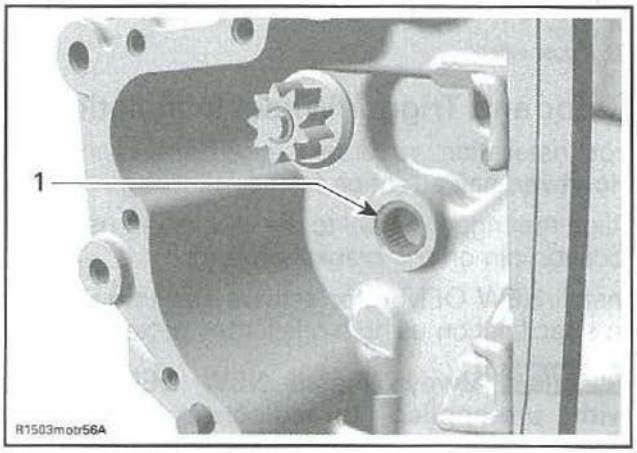
If any part of the assembly shows signs of abnormal wear, cracks, broken teeth or malfunction (sprag clutch), replace the faulty part.

Starter Drive Installation

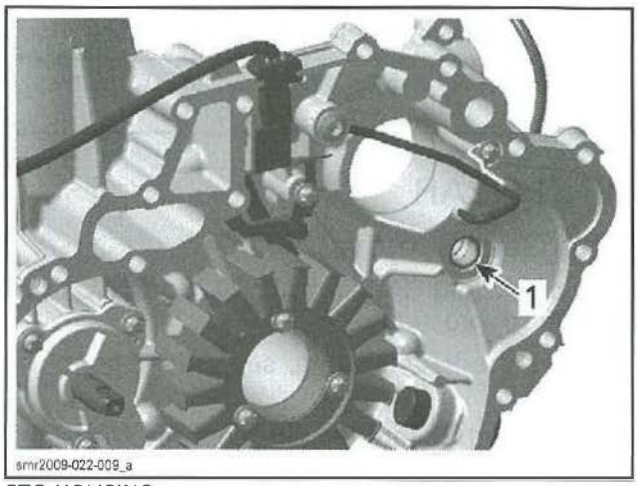
For installation, reverse the removal procedure. However, pay attention to the following.

NOTE: When installing a new starter drive, oil the shaft, gear teeth and splines with engine oil.

Apply ISOFLEX GREASE TOPAS NB 52 (P/N 293 550 021) on the starter drive bearings located in the cylinder block and in the PTO housing.



CYLINDER BLOCK
1. Starter drive bearing



PTO HOUSING
1. Starter drive bearing

NOTICE Be sure not to forget the spring discs and thrust washer on the starter drive shaft when reassembling.

LUBRICATION SYSTEM

SERVICE TOOLS

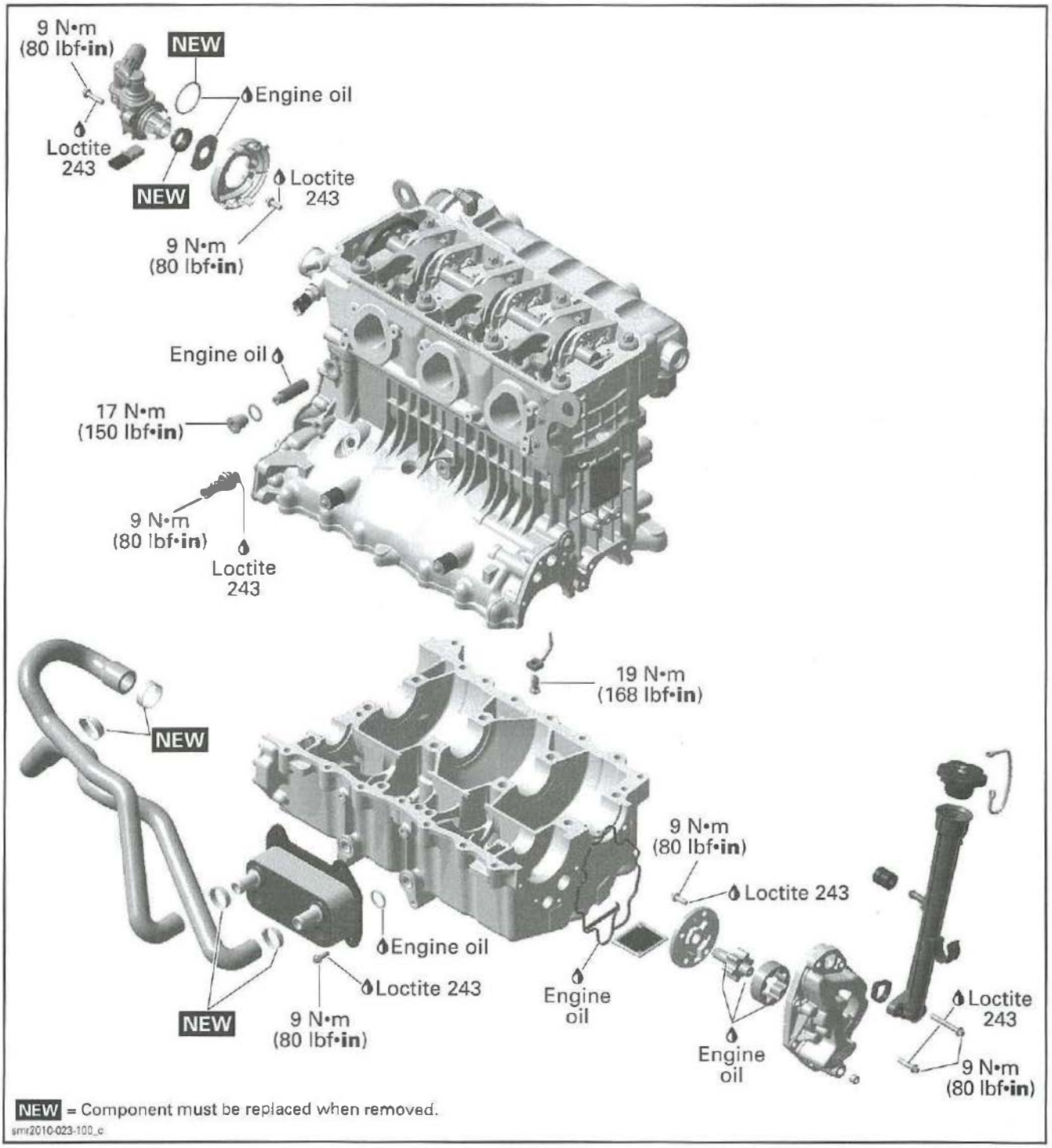
Description	Part Number	Page
ADAPTER HOSE	529 035 652	115
ECM ADAPTER TOOL	529 036 166	117, 134
FLUKE 115 MULTIMETER	529 035 868	117, 134
OIL SEAL GUIDE	529 035 822	123
PRESSURE GAUGE	529 035 709	115
SUCTION PUMP	529 035 880	113
SUPERCHARGER OIL SPRAY NOZZLE TOOL	529 036 134	128
WATER PUMP SEAL PUSHER	529 035 823	123–124

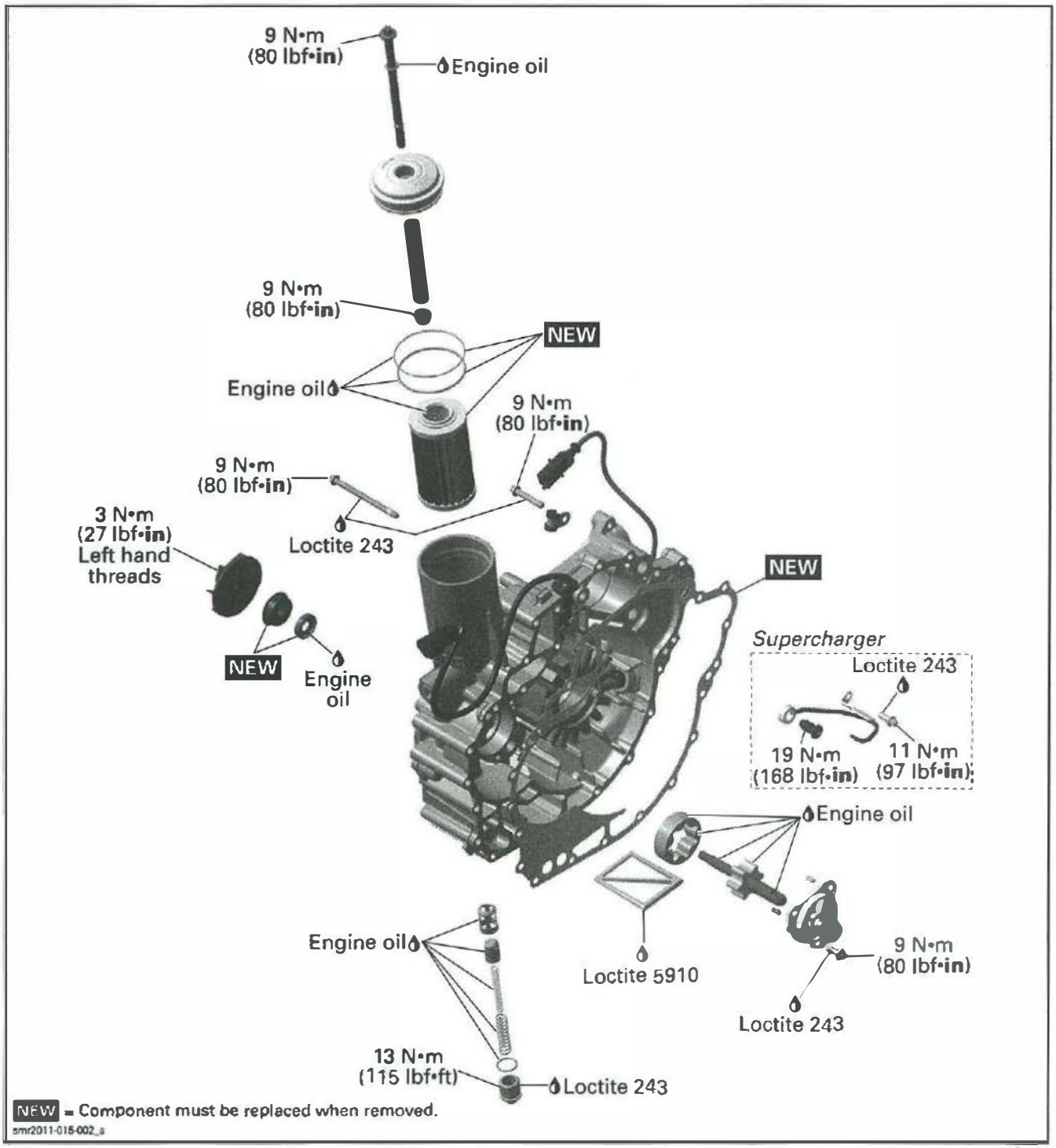
SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
FLUKE RIGID BACK PROBES	tp88	134

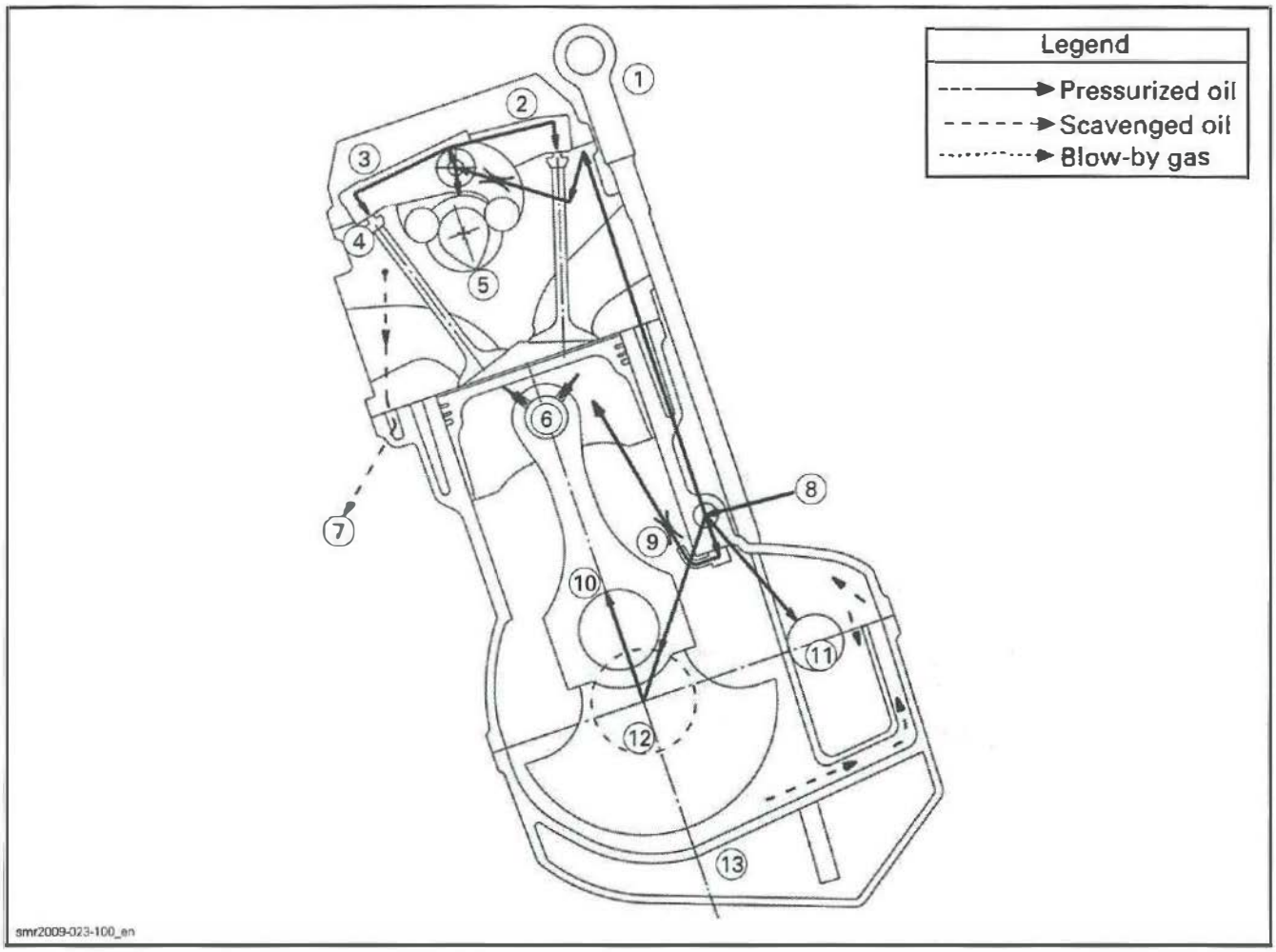
SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	118–119, 121, 123, 127–128, 132, 135
LOCTITE 5910	293 800 081	119
PULLEY FLANGE CLEANER	413 711 809	114, 125
SUPER LUBE GREASE	293 550 030	115
XPS 4-STROKE BLEND OIL (SUMMER GRADE)	293 600 121	112


9 N•m
(80 lbf•in)
NEW
Engine oil
Loctite
243
NEW
Loctite
243
9 N•m
(80 lbf•in)
Engine oil
17 N•m
(150 lbf•in)
9 N•m
(80 lbf•in)
Loctite
243
19 N•m
(168 lbf•in)
NEW
9 N•m
(80 lbf•in)
Loctite 243
Engine oil
Loctite 243
NEW
9 N•m
(80 lbf•in)
Engine
oil
Engine
oil
Loctite
243
9 N•m
(80 lbf•in)
NEW = Component must be replaced when removed.
smr2010-023-100_c

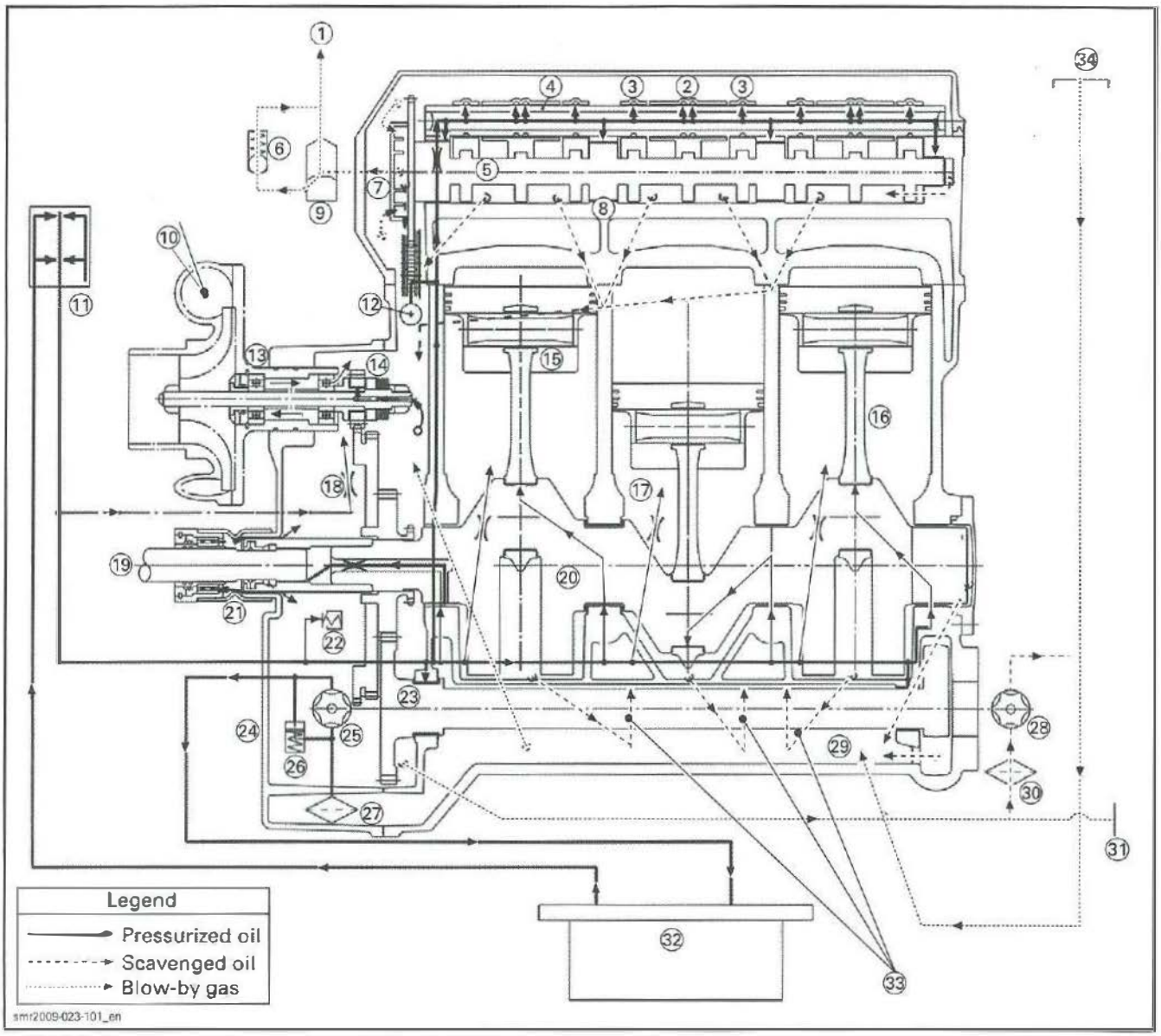

9 N•m
(80 lbf•in)
Engine oil
9 N•m
(80 lbf•in)
NEW
Engine oil
9 N•m
(80 lbf•in)
9 N•m
(80 lbf•in)
Loctite 243
3 N•m
(27 lbf•in)
Left hand
threads
NEW
Engine
oil
NEW
Supercharger
Loctite 243
19 N•m
(168 lbf•in)
11 N•m
(97 lbf•in)
Engine oil
Engine oil
Loctite 5910
9 N•m
(80 lbf•in)
Loctite 243
13 N•m
(115 lbf•ft)
Loctite 243
NEW = Component must be replaced when removed.
smr2011-015-002_a

ENGINE LUBRICATION CIRCUIT



1. *Oil dipstick*
2. *Rocker arm (intake)*
3. *Rocker arm (exhaust)*
4. *Hydraulic valve lifter*
5. *Camshaft*
6. *Piston pin*
7. *Into PTO housing*
8. *From oil filter*
9. *Piston cooling*
10. *Connecting rod*
11. *Balance shaft*
12. *Crankshaft*
13. *Oil tank*

ENGINE LUBRICATION CIRCUIT (CONT'D)



1. To air intake silencer
2. Rocker arm (intake)
3. Rocker arm (exhaust)
4. Rocker arm axle
5. Camshaft
6. Pressure relief valve
7. Oil separator
8. Cylinder head
9. Blow-by valve
10. Supercharger (if so equipped)
11. Oil filter
12. Hydraulic chain tensioner
13. Supercharger bearing (if so equipped)
14. Friction clutch
15. Piston pin
16. Connecting rod
17. Piston cooling
18. Oil spray nozzle
19. Drive shaft
20. Crankshaft
21. PTO seal
22. Oil pressure switch
23. Balance shaft
24. PTO housing
25. Pressure pump
26. Pressure relief valve
27. Oil strainer (pressure pump)
28. Scavenge pump
29. Oil tank
30. Oil strainer (scavenge pump)
31. Oil drainage (PTO housing)
32. Oil cooler
33. Scavenge of oil and blow-by gas
34. Oil filler cap

GENERAL

During assembly/installation, use torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

NOTICE Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

MAINTENANCE

ENGINE OIL

Recommended Oil

Use XPS 4-STROKE BLEND OIL (SUMMER GRADE) (P/N 293 600 121).

Naturally-Aspirated Engines

If the recommended XPS™ engine oil is not available, use a 5W 40 or 10W 40 engine oil meeting the requirements for API service classification SM, SL or SJ. Always check the API service label certification on the oil container, it must contain at least one of the above standards.

Supercharger Engines

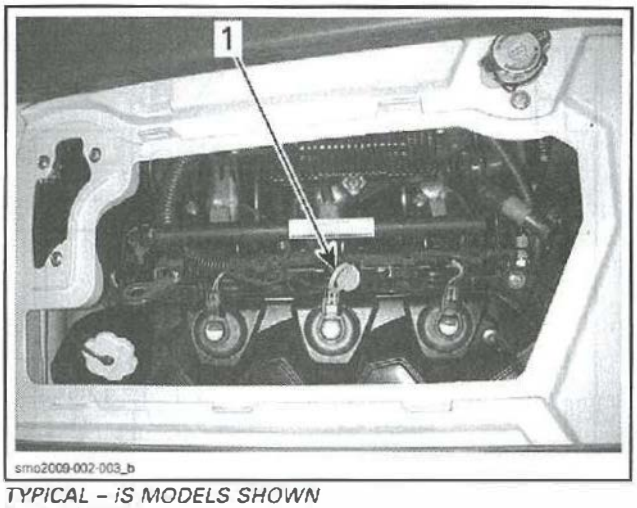
If XPS™ engine oil is not available, use a 10W40 mineral engine oil compatible with wet clutches.

NOTE: The XPS engine oil has been thoroughly tested to be free of any additives that could impair the functionality of the supercharger clutch.

NOTICE NEVER use synthetic oil. This would impair the proper operation of the supercharger clutch. Do not add any additives to the recommended oil. Mineral oils not recommended by BRP may also contain additives (friction modifiers) that may cause inappropriate slippage of the supercharger and eventually lead to premature wear. For this reason, XPS Synthetic Blend oil (Summer Grade) or a BRP approved equivalent are the only recommended oils. Use of any oil not recommended by BRP may void BRP's limited warranty.

Oil Level Verification

NOTICE Check level frequently and refill if necessary. Do not overfill — it would make the engine smoke and reduce its power. Operating the engine with an improper level may severely damage engine. Wipe off any spillage.



TYPICAL – iS MODELS SHOWN
1. Oil dipstick

Check the oil level as follows:

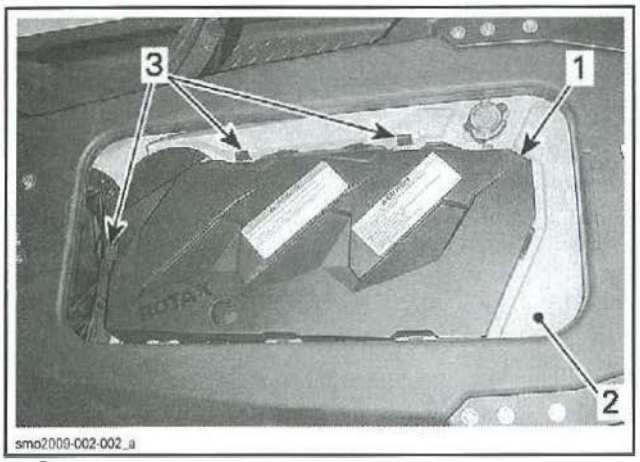
NOTE: It is of the utmost importance to follow this procedure in order to obtain an accurate reading of the engine oil level.

1. Watercraft must be level. Check oil level either with watercraft in water or out of water.
2. If the watercraft is out of water, link a garden hose to the hose adapter. Refer to *EXHAUST SYSTEM FLUSHING* in the *EXHAUST SYSTEM* subsection.

NOTICE When watercraft is out of water:
- **Never run engine without supplying water to the exhaust system.**
- **Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.**

3. Warm-up engine then let idle for 30 seconds before stopping.
4. Stop engine.
5. Open seat.
6. On iS models, remove the ventilation box from the deck extension to gain partial access to engine compartment.

NOTE: To remove the rear ventilation box, simply release the 3 clips retaining it and lift it off the deck extension.

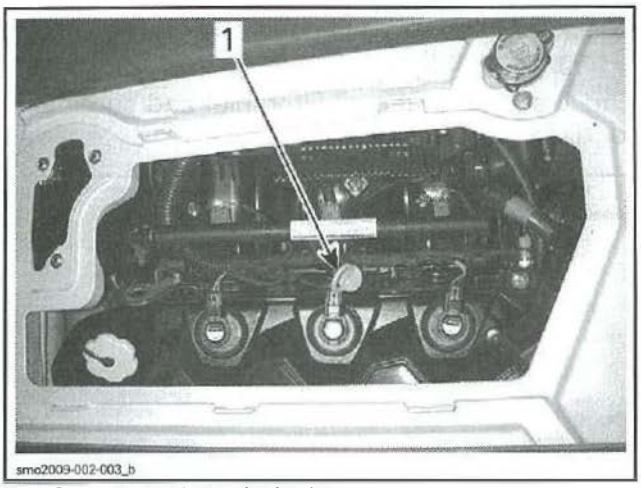


1. *Rear ventilation box*
2. *Deck extension*
3. *Retaining clips*

7. Wait at least 30 seconds for the oil to settle in the engine, then pull dipstick out and wipe clean.

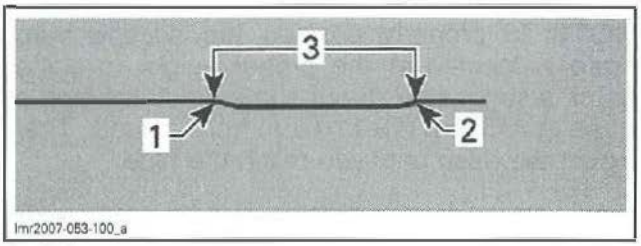
⚠ WARNING

Engine oil may be hot. Certain components in the engine compartment may be very hot. Direct contact may result in skin burn.



TYPICAL - iS MODELS SHOWN
1. *Oil dipstick*

8. Reinstall dipstick, push in completely.
9. Remove dipstick and read oil level. It should be between the FULL and ADD marks.



1. *Full*
2. *Add*
3. *Operating range*

Otherwise, add oil until its level is between marks as required.

To add oil, unscrew oil cap. Place a funnel into the oil filler neck opening and add the recommended oil to the proper level. Do not overfill.

Oil Change

NOTE: Oil and oil filter must be replaced at the same time. Oil change and oil filter replacement should be done with a warm engine.

Bring engine to its normal operating temperature.

NOTICE When watercraft is out of water:
- **Never run engine without supplying water to the exhaust system.**
- **Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.**

Run engine for 10 seconds at 4000 RPM and shut it off at this RPM. This will move oil from PTO housing to oil tank to allow maximum oil draining.

Remove oil filler cap and dipstick.

⚠ WARNING

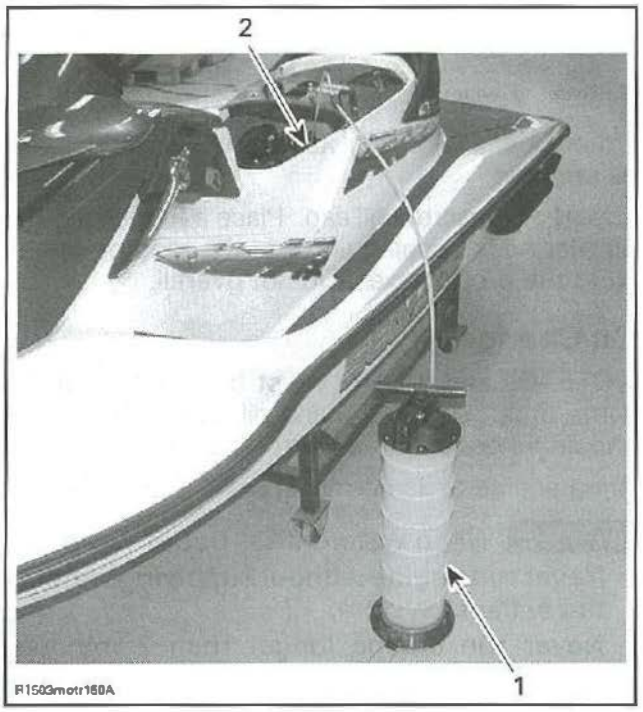
Engine oil may be hot. Certain components in the engine compartment may be very hot. Direct contact may result in skin burn.

Siphon oil through the dipstick tube.

REQUIRED TOOL	
SUCTION PUMP (P/N 529 035 880)	

NOTICE Never crank or start engine when suction pump hose is in the dipstick tube. Never start engine when there is no oil in engine.

NOTE: To properly position the suction pump hose is located at the proper height to siphon oil, it is suggested to put some electrical tape on hose at 475 mm (18-11/16 in) from its end. Then, insert the hose until you reach the tape.



TYPICAL
1. *Suction pump*
2. *Suction pump hose in the dipstick tube*

Pull suction pump hose out of dipstick tube

Fully depress the throttle lever and HOLD it while cranking engine for 10 seconds. Siphon oil again. Repeat the crank-siphon cycle 2 - 3 times.

Refill engine with the recommended oil, see *RECOMMENDED OIL* in this subsection.

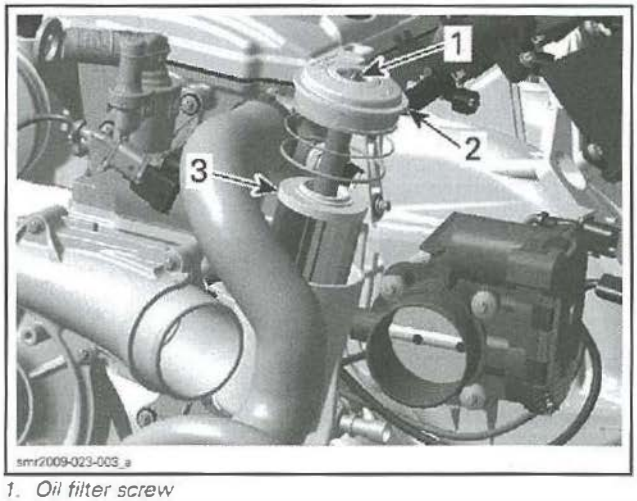
Reinstall oil filler cap and dipstick.

Replace *OIL FILTER*, see procedure in this subsection.

OIL FILTER

Oil Filter Removal

Remove:
- Oil filter screw
- Oil filter cover
- Oil filter.



1. *Oil filter screw*
2. *Oil filter cover*
3. *Oil filter*

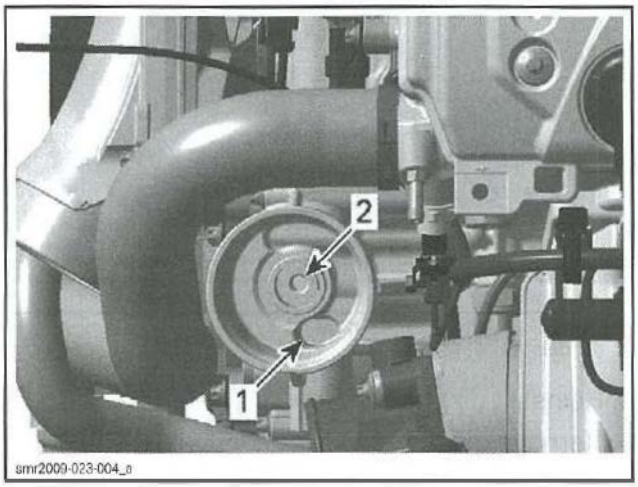
NOTE: No tools are required to remove the oil filter cover, as it will pull off when the oil filter screw is unscrewed.

Place rags in filler area to prevent spillage. If spillage occurs, clean immediately with the PULLEY FLANGE CLEANER (P/N 413 711 809) to prevent stains.

Oil Filter Inspection

Check oil filter cover O-rings and oil filter screw O-ring, change if necessary.

Check and clean the oil filter inlet and outlet area for dirt and other contaminations.



1. *Inlet bore from the oil pump to the oil filter*
2. *Outlet bore to the engine oil providing system*

Oil Filter Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Install a **NEW** oil filter.

Install O-ring on oil filter cover.

Apply engine oil on filter ring, filter cover O-rings and on oil filter screw O-ring.

NOTE: In salt water area, it is recommended to coat mating surface of cover with SUPER LUBE GREASE (P/N 293 550 030).

Torque oil filter screw to specification.

OIL FILTER SCREW TORQUE
9 N•m (80 lbf•in)

INSPECTION

ENGINE OIL PRESSURE

Oil Pressure Test Requirement

Bring engine to its normal operating temperature.

⚠ WARNING

Certain components in the engine compartment may be very hot. Direct contact may result in skin burn.

NOTICE **When watercraft is out of water:**

- **Never run engine without supplying water to the exhaust system.**
- **Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.**

Required Tools for Oil Pressure Test

REQUIRED TOOLS	
PRESSURE GAUGE (P/N 529 035 709)	
ADAPTER HOSE (P/N 529 035 652)	

NOTE: A 1/8 NPT pipe extension may ease the installation.

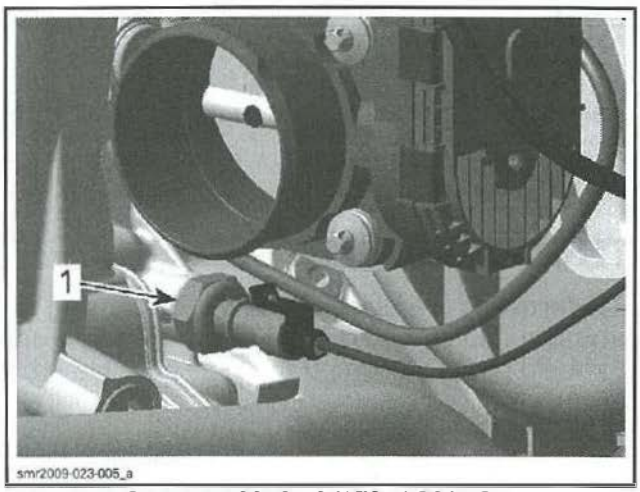
Oil Pressure Specifications

Use the following table to compare the oil pressure at different RPM.

OIL PRESSURE	
Idle (cold)	448 kPa - 648 kPa (65 PSI - 94 PSI) for a very short time
Idle (at 80°C (176°F))	Min. 228 kPa (33 PSI)
4000 - 7500	400 kPa - 496 kPa (58 PSI - 72 PSI)

Test at the Oil Pressure Switch Location

Remove oil pressure switch and install gauge.



INSTALLATION AT PRESSURE SWITCH LOCATION
1. Remove oil pressure switch and install gauge here

To prevent the EMS to go in limp home mode (at 2500 RPM) or to generate a fault code, do the following:

1. Ground OPS to engine.
2. Plug OPS to harness.
3. Start engine.
4. While engine is running, unplug OPS from harness.

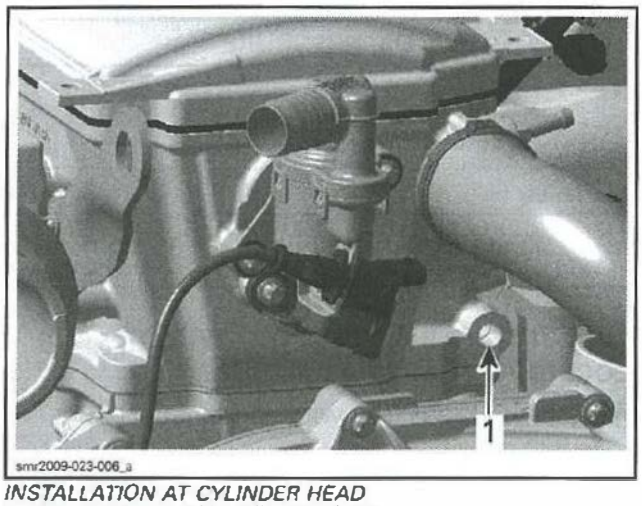
Read oil pressure at different RPM as per table above.

Reinstall oil pressure switch.

Test at the Cylinder Head Location

The oil pressure may be measured from cylinder head if desired.

Remove plug located on cylinder head and install gauge.



INSTALLATION AT CYLINDER HEAD
1. Remove plug and install gauge here

Start engine and read pressure at different RPM as per table above.

Reinstall plug.

TROUBLESHOOTING

The following is provided to help in diagnosing the probable source of troubles. It is a guideline and it should not be assumed to list all possible problems.

Always check for fault codes. If a fault code is detected, service the fault code first. Refer to *ENGINE MANAGEMENT* section.

LOW OR NO ENGINE OIL PRESSURE

1. **Oil level too low.**
   - *Refill engine oil.*
   - *Check for high oil consumption. See below.*
   - *Check for oil leaks (oil leaking out of leak indicator hole, gaskets, oil seal or O-rings). Repair or replace.*
2. **Oil pressure switch defective.**
   - *Check and replace if necessary.*
3. **Oil filter clogged.**
   - *Replace engine oil and oil filter at the same time.*
4. **Oil pressure regulator valve sticks open, or spring load is too small.**
   - *Clean oil regulator piston and its bore. Replace if necessary.*
   - *Measure spring free length. Replace if too small.*
5. **Oil pump(s) worn or damaged.**
   - *Check oil pump rotors and its bore for wear limits. Replace if out of specification.*
6. **Engine oil strainers are clogged.**
   - *Remove and clean engine oil strainers.*
7. **Heavy wear on plain bearings.**
   - *Check radial clearance of plain bearings. Replace if out of specification.*

HIGH OIL CONSUMPTION

1. **Oil in breathing system.**
   - *Check if breather V-ring is brittle, hard or damaged. Replace V-ring.*
2. **Valve stem seals worn or damaged.**
   - *Replace valve stem seals.*
3. **Piston rings worn out (blue colored exhaust smoke).**
   - *Replace piston rings.*

OIL CONTAMINATION (WHITE APPEARANCE)

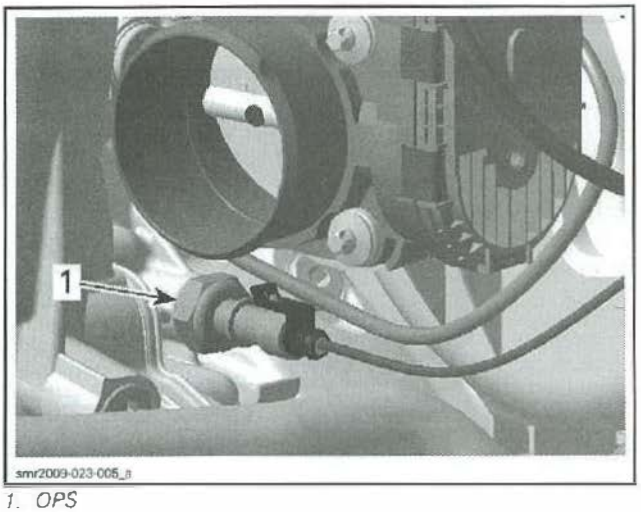
1. **Water ingestion through drive shaft and floating ring**
   - *Check if water is leaking between drive shaft and floating ring. Repair or replace defective parts. Refer to PTO HOUSING AND MAGNETO subsection.*
   - *Change engine oil and filter.*
2. **Oil seal and rotary seal on water pump shaft leaking.**
   - *Replace oil seal and water pump shaft assembly.*
   - *Change engine oil and oil filter.*
3. **Cylinder head gasket leaking.**
   - *Replace cylinder head gasket and tighten cylinder head with recommended torque.*
   - *Change engine oil and oil filter.*
4. **Cylinder head screws not properly tightened.**
   - *Retighten screws with recommended torque.*
   - *Change engine oil.*
5. **Oil cooler O-rings are leaking.**
   - *Replace O-rings.*
   - *Change engine oil and oil filter.*
6. **Cylinder block or cylinder head casting is leaking.**
   - *Check for internal cracks in casting. Replace damaged components.*
   - *Change engine oil and oil filter.*

PROCEDURES

OIL PRESSURE SWITCH (OPS)

Oil Pressure Switch Operation

The switch threshold value to send a signal of low oil pressure may vary from a minimum of 180 kPa (26 PSI) to a maximum of 220 kPa (32 PSI).



1. OPS

Oil Pressure Switch Inspection

First, carefully check the condition of the connector terminals. Clean to remove dirt and corrosion that could affect proper operation of the OPS.

IMPORTANT: Do not apply dielectric grease on terminal.

Before checking the function of the OPS, an oil pressure test has to be performed to be sure the oil pressure is not in fault. Refer to *INSPECTION* in this subsection.

When the engine oil pressure tests good but the OIL message in the information center is present and the beeper sounds:

- Ensure OPS connector is plugged to the switch.
- Check the resistance of the OPS while engine is off and while engine is running.

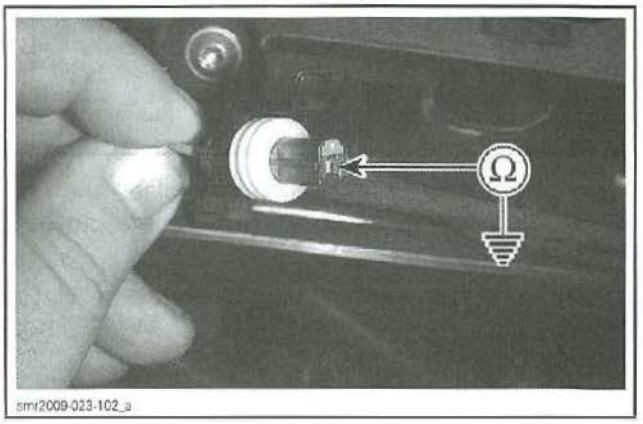
Oil Pressure Switch Resistance Test

Disconnect the connector from the OPS.

Use a multimeter to check the resistance as shown.

ENGINE NOT RUNNING		
TEST PROBES		RESISTANCE (Ω)
OPS connector (pin 1)	Engine ground	Close to 0 (normally closed switch)

ENGINE RUNNING		
TEST PROBES		RESISTANCE (Ω)
OPS connector (pin 1)	Engine ground	Infinitely high (OL) when pressure reaches 180 kPa (26.11 PSI) and 220 kPa (32 PSI)



If resistance values are incorrect, replace OPS.

If the values are correct, check the continuity of the wiring harness.

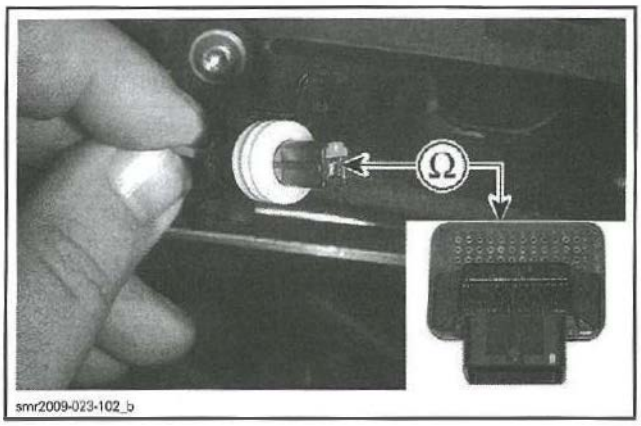
Oil Pressure Switch Circuit Continuity Test

Disconnect the ECM connector "A" from the ECM.

Check continuity of OPS circuit as per following table.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

OPS CONNECTOR	ECM ADAPTER	RESISTANCE
Pin 1	Pin E3	Close to 0 Ω (continuity)



If continuity test failed, repair or replace the connector and wiring between ECM connector and OPS.

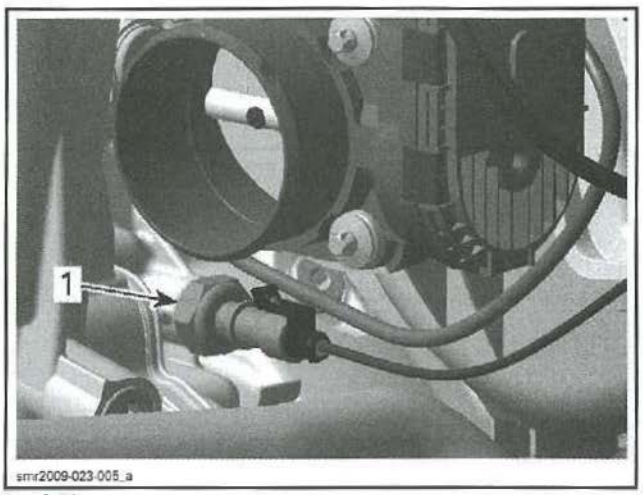
If continuity test succeeded, check the ECM. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Oil Pressure Switch Removal

Remove the throttle body. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Unplug the OPS connector.

Unscrew and remove the oil pressure switch.



1. OPS

Oil Pressure Switch Installation

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of oil pressure switch.

Torque oil pressure switch to specification.

TORQUE	
Oil pressure switch	9 N•m (80 lbf•in)

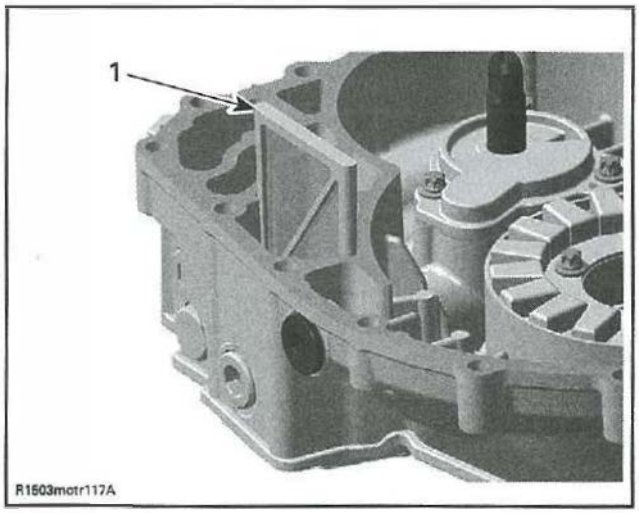
PTO OIL STRAINER

PTO Oil Strainer Removal

Remove engine oil. See procedure in *OIL CHANGE* in this subsection.

Remove the PTO housing. Refer to *PTO HOUSING AND MAGNETO* subsection.

Remove the oil strainer.

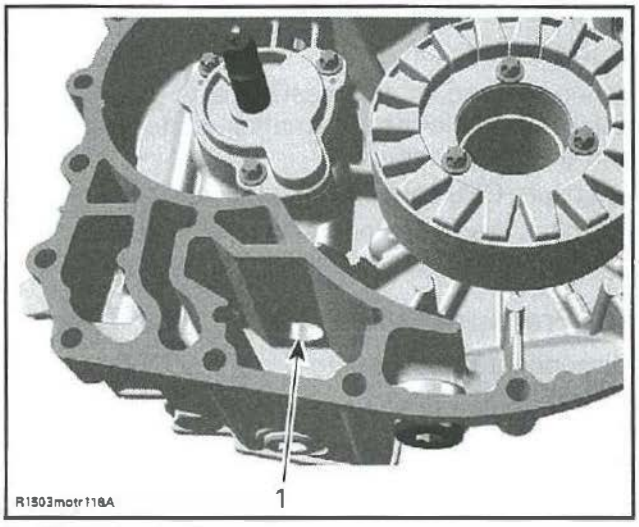


1. PTO oil strainer

PTO Oil Strainer Cleaning and Inspection

Clean oil strainer with a part cleaner then use compressed air to dry it.

Check and clean the oil outlet area for dirt and other contaminations.



1. Oil inlet to the oil pump

PTO Oil Strainer Installation

For installation, reverse the removal procedure. However, pay attention to the following.

Clean cylinder block to remove all remaining silicone residues in oil strainer area.

Apply a thin layer of LOCTITE 5910 (P/N 293 800 081) on oil strainer side.

Install it in the PTO housing.

Install the PTO housing using the procedure described in the *PTO HOUSING AND MAGNETO* subsection.

Refill engine at the proper level with the recommended oil. Refer to *ENGINE OIL* for the procedure.

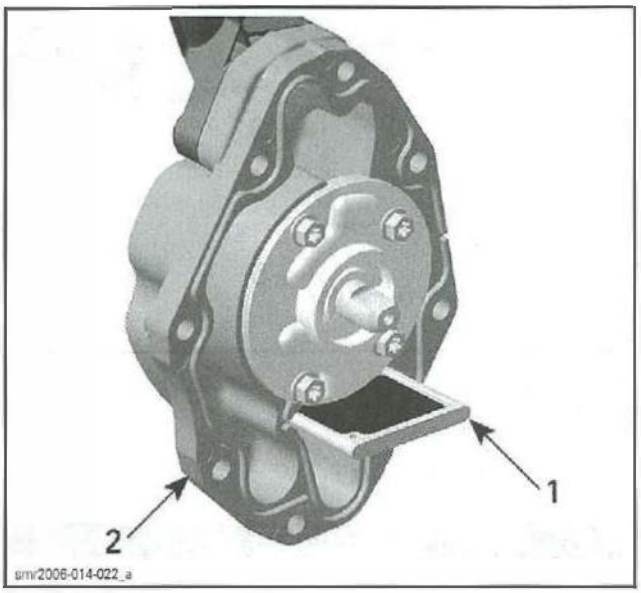
SUCTION PUMP OIL STRAINER

NOTE: The oil strainer does not need to be cleaned at every oil change. Clean it during other inspections, especially when the engine is disassembled.

Suction Pump Oil Strainer Removal

Remove oil filler tube and suction pump cover, refer to *OIL SUCTION PUMP* in this subsection.

Remove oil strainer from the suction pump cover.

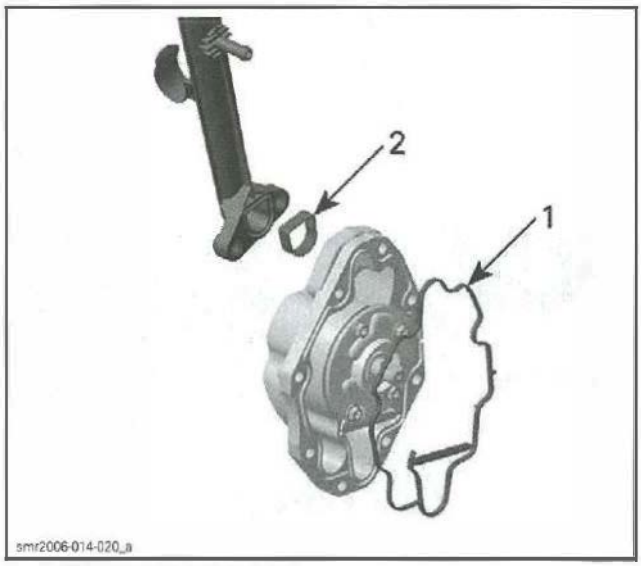


1. *Oil strainer*
2. *Suction pump cover*

Suction Pump Oil Strainer Cleaning and Inspection

Clean oil strainer with a part cleaner then use compressed air to dry it.

Inspect rubber ring gaskets.

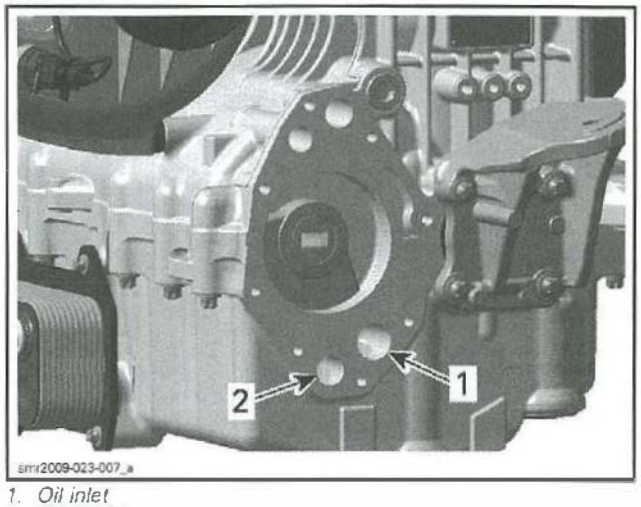


1. *Suction pump cover gasket*
2. *Oil filler tube gasket*

If rubber rings are brittle, cracked or hard, replace them.

Clean both contact surfaces of oil suction pump cover.

Check and clean the oil inlet and outlet area for dirt and other contaminations.



1. *Oil inlet*
2. *Oil outlet*

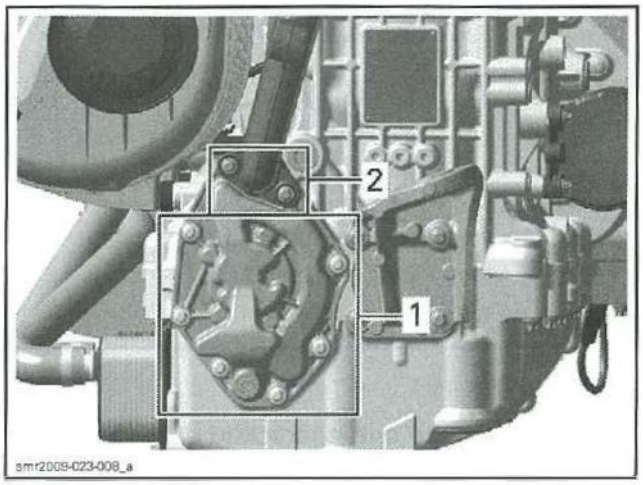
Suction Pump Oil Strainer Installation

For installation, reverse the removal procedure. However, pay attention to the following.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of the suction pump cover screws and tighten them to specification.

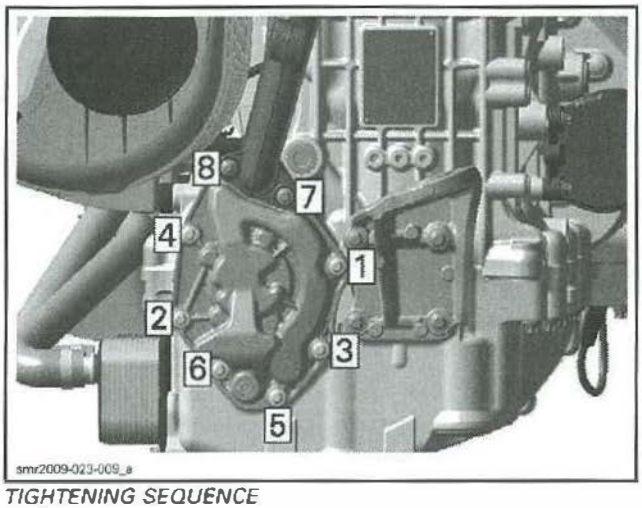
SUCTION PUMP COVER SCREWS TORQUE
9 N•m (80 lbf•in)

Position screws according to their length as shown.



1. Screws M6 x 25
2. Screws stainless steel M6 x 45

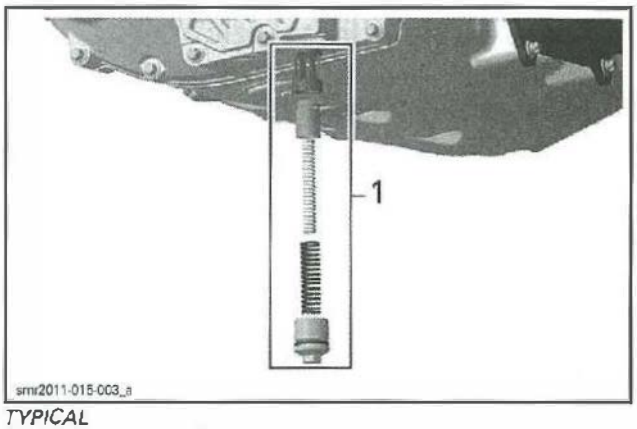
Torque suction pump cover screws as per sequence illustrated below.



TIGHTENING SEQUENCE

ENGINE OIL PRESSURE REGULATOR

The oil pressure regulator is located on the bottom of the PTO housing.



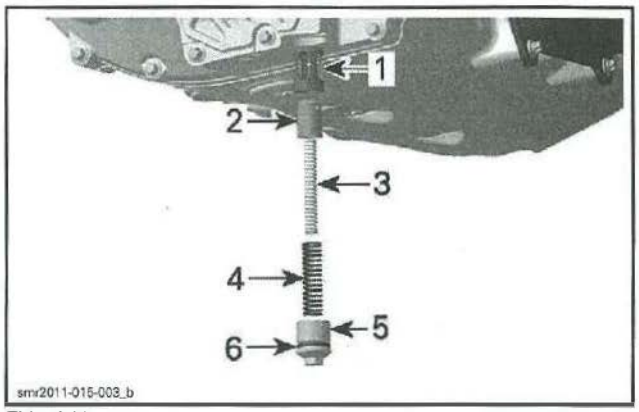
TYPICAL
1. Oil pressure regulator

NOTE: The oil pressure regulator system opens when the oil pressure exceeds 400 kPa (58 PSI).

Oil Pressure Regulator Removal

Remove engine oil. See procedure in *OIL CHANGE* in this subsection.

Remove:
- Oil pressure regulator plug
- Compression springs
- Valve piston
- Valve piston guide.



TYPICAL
1. Valve piston guide
2. Valve piston
3. Inner compression spring
4. Outer compression spring
5. Oil pressure regulator plug
6. O-ring

⚠ WARNING

Oil pressure regulator plug on oil pump housing is spring loaded.

Oil Pressure Regulator Inspection

Inspect valve piston and valve piston guide for scoring or other damages.

Check outer compression spring for free length.

OUTER COMPRESSION SPRING FREE LENGTH	
NEW NOMINAL	60 mm (2.362 in)
SERVICE LIMIT	50.3 mm (1.98 in)

Replace inner and outer compression spring as an assembly.

Replace parts if important wear or damage are present.

Clean bore and threads in the PTO housing from metal shavings and other contaminations.

Oil Pressure Regulator Installation

For installation, reverse the removal procedure. However, pay attention to the following details.

Be careful that the O-ring on plug screw is in place.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of the oil pressure regulator plug.

Torque plug screw to specification.

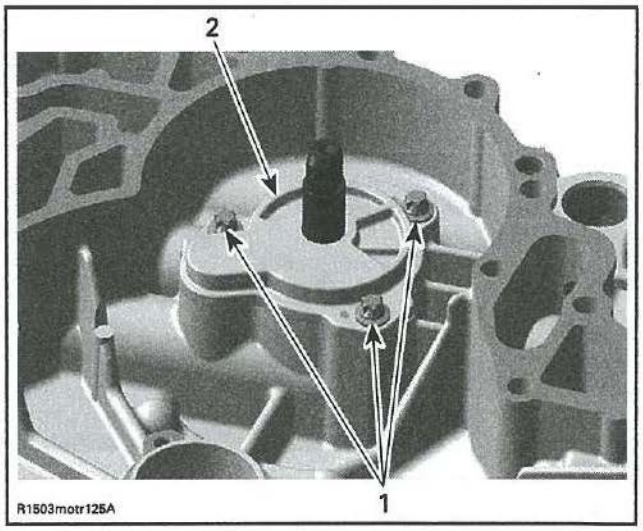
OIL PRESSURE REGULATOR PLUG TORQUE
13 N•m (115 lbf•in)

OIL PRESSURE PUMP

The oil pressure pump is located in the PTO housing and is driven by the balance shaft.

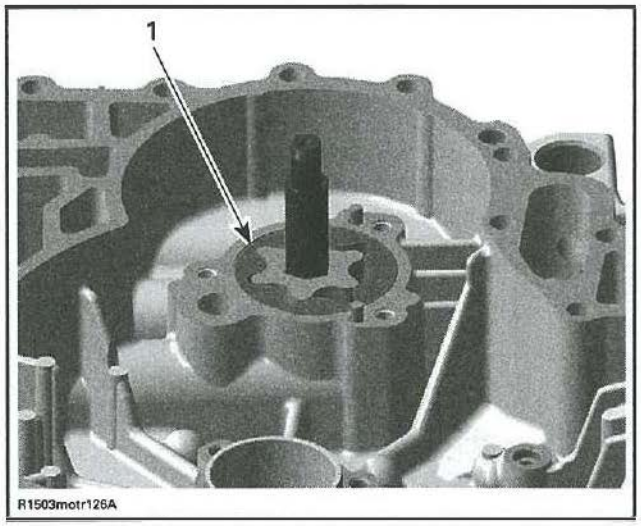
Oil Pressure Pump Removal

1. Remove engine oil. See procedure in *OIL CHANGE* in this subsection.
2. Remove the PTO housing. Refer to *PTO HOUSING AND MAGNETO* subsection.
3. Remove water pump housing and the impeller. Refer to *COOLING SYSTEM* subsection.
4. Remove screws securing the oil pump cover.



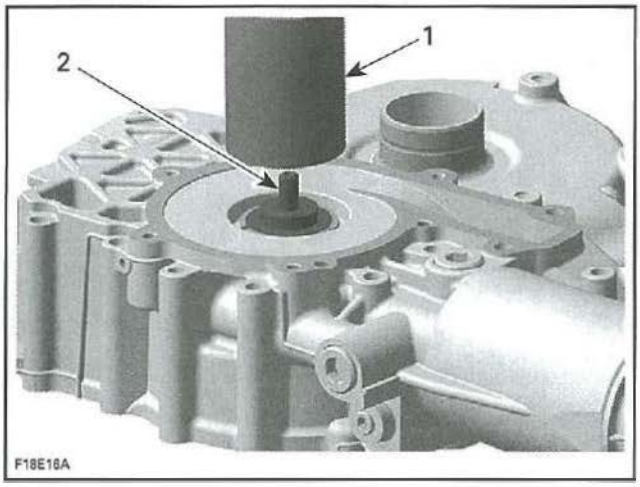
1. Screws
2. Oil pump cover

5. Pull and remove the outer oil pump rotor.



1. Outer oil pump rotor

6. Extract the coolant/oil pump shaft from outside PTO housing cover with a pusher.



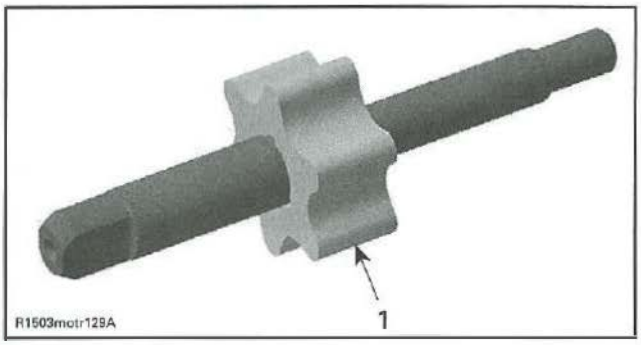
1. Pusher
2. Coolant/oil pump shaft

7. Remove rotary seal and oil seal. Refer to *ROTARY SEAL* further in this subsection.

Oil Pressure Pump Inspection

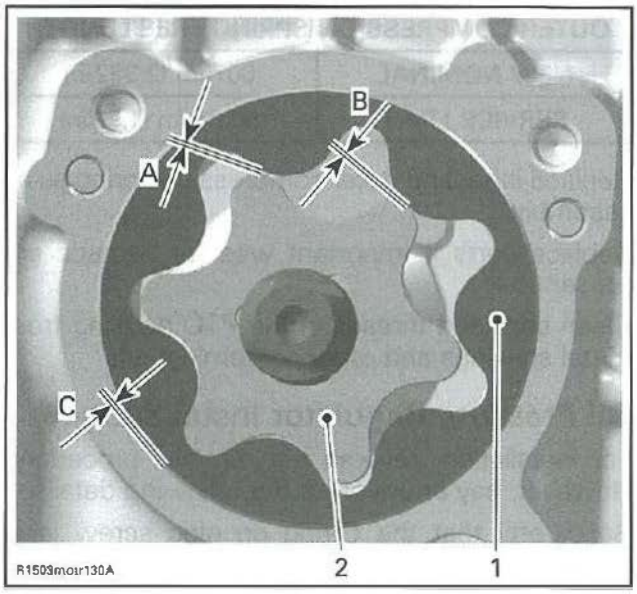
Inspect coolant/oil pump shaft, housing and cover for marks or other damages.

Check inner rotor for corrosion pin-holes or other damages. If so, replace coolant/oil pump shaft. Ensure to also check oil pump housing and cover and replace if damaged.



1. Pittings on the teeth

Using a feeler gauge, measure the clearance between inner and outer rotors.



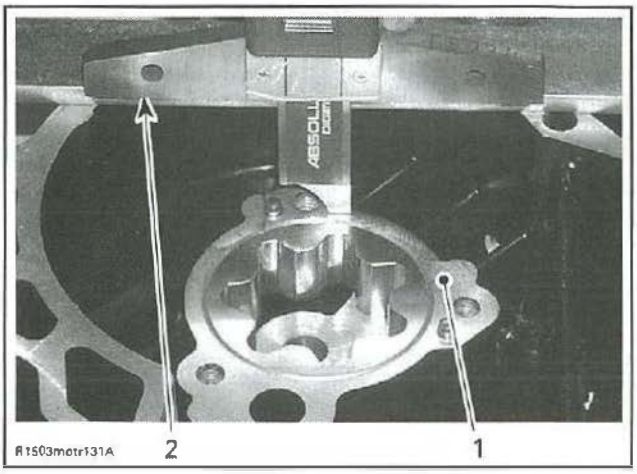
1. Outer rotor
2. Inner rotor

OUTER AND INNER ROTOR CLEARANCE	
SERVICE LIMIT	
A	0.25 mm (.0098 in)
B	
C	

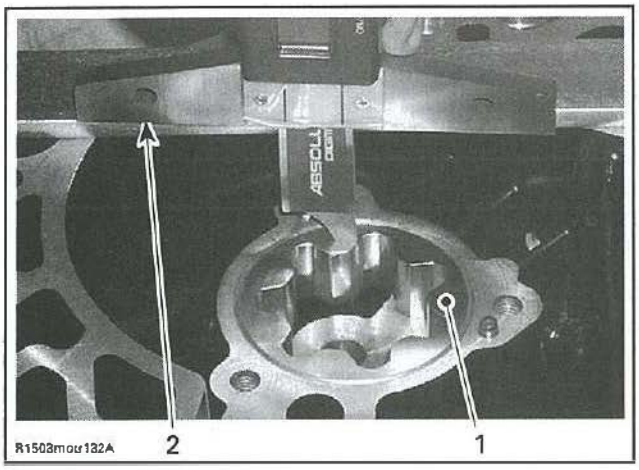
If clearance between inner and outer rotors exceeds the tolerance, replace coolant/oil pump shaft. Ensure to also check oil pump housing and cover and replace if damaged.

If clearance between outer rotor and its bore in oil pump exceeds the tolerance, replace the complete oil pump and the PTO housing.

Using a vernier depth gauge, measure side wear as shown.



1. PTO housing surface
2. Vernier depth gauge



1. *Oil pump outer rotor surface*
2. *Vernier depth gage*

Difference between pump housing and outer rotor should not exceed the following specification. If so, replace the complete oil pump assembly.

DIFFERENCE BETWEEN PUMP HOUSING AND OUTER ROTOR
0.1 mm (.004 in)

NOTE: When the axial clearance of the coolant/oil pump shaft increases, the oil pressure decreases.

Check the inside of oil pump housing and its cover for scoring or other damages and replace if damaged.

Oil Pressure Pump Installation

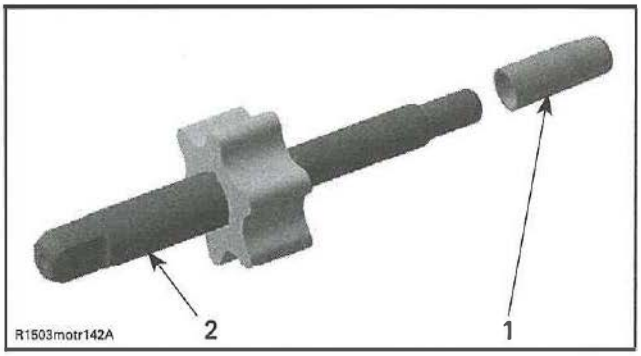
For installation, reverse the removal procedure. Pay attention to the following details.

Install a NEW rotary seal and a NEW oil seal. Refer to *ROTARY SEAL* in this subsection.

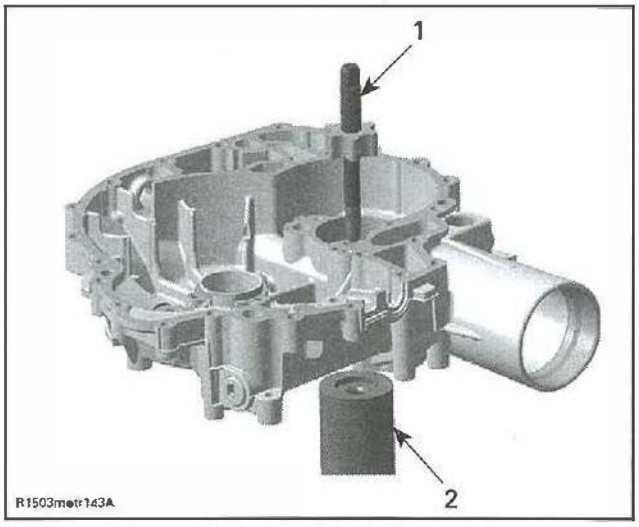
Install the coolant/oil pump shaft.

NOTICE **Never use a hammer for the coolant/oil pump shaft installation. Only use a press to avoid damaging the ceramic component of the rotary seal.**

REQUIRED TOOL	
OIL SEAL GUIDE (P/N 529 035 822)	
WATER PUMP SEAL PUSHER (P/N 529 035 823)	



1. *Oil seal guide*
2. *Coolant/oil pump shaft*



1. *Coolant/oil pump shaft with oil seal guide*
2. *Rotary seal pusher to support PTO housing*

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of oil pump cover screws.

Tighten oil pump cover screws and torque to specification.

OIL PUMP COVER SCREWS TORQUE
9 N•m (80 lbf•**in**)

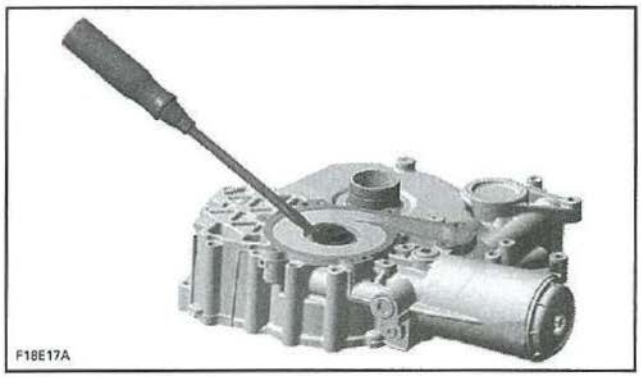
After engine is completely reassembled, start engine and make sure oil pressure is within specifications.

ROTARY SEAL

Rotary Seal Removal

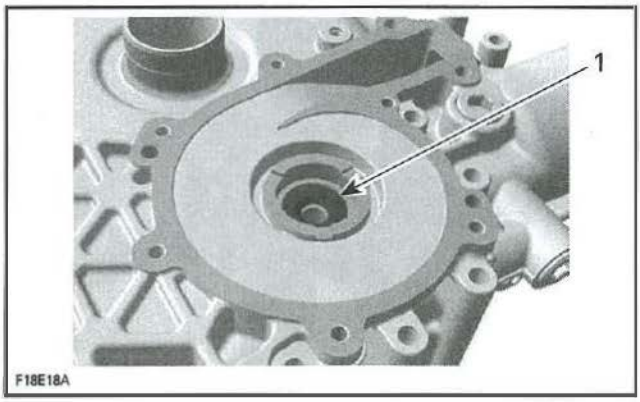
Remove the coolant/oil pump shaft. Refer to *OIL PRESSURE PUMP* in this subsection.

Carefully remove rotary seal with a screwdriver.



NOTICE Be careful not to damage the surface of the rotary seal bore in PTO housing.

Remove also the oil seal behind the rotary seal.



1. Oil seal

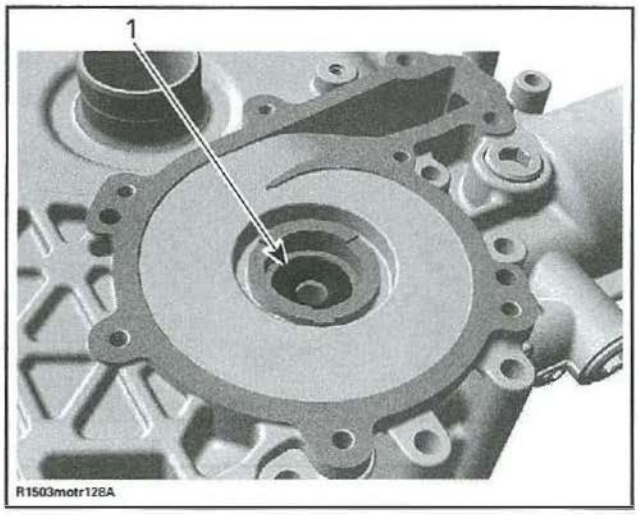
Discard rotary seal and oil seal.

Rotary Seal Installation

The installation is the opposite of the removal procedure. Pay attention to the following details.

NOTE: Never use oil in the press fit area of the oil seal and rotary seal.

Push the NEW oil seal in place by using thumb.

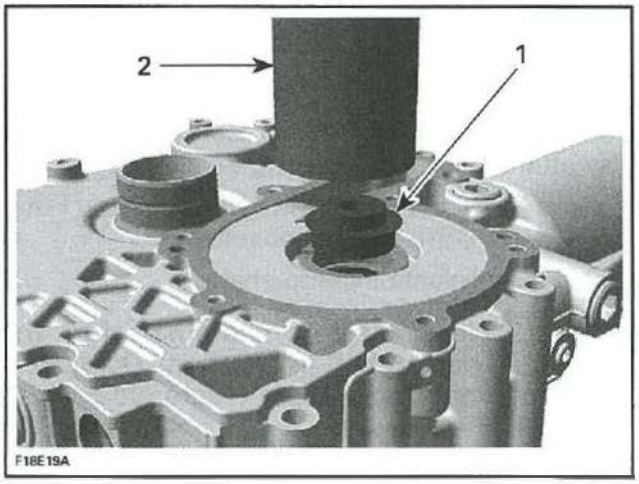


1. Oil seal

Install the **NEW** rotary seal.

REQUIRED TOOL	
WATER PUMP SEAL PUSHER (P/N 529 035 823)	

NOTICE Never use a hammer for the rotary seal installation. Only use a press to avoid damaging the ceramic component.



1. Rotary seal
2. Rotary seal installer

Install the coolant/oil pump shaft. Refer to *OIL PRESSURE PUMP* in this subsection.

OIL SUCTION PUMP

The oil suction pump is located on the front side of the engine inside of the oil suction pump housing at the bottom of the oil filler tube.

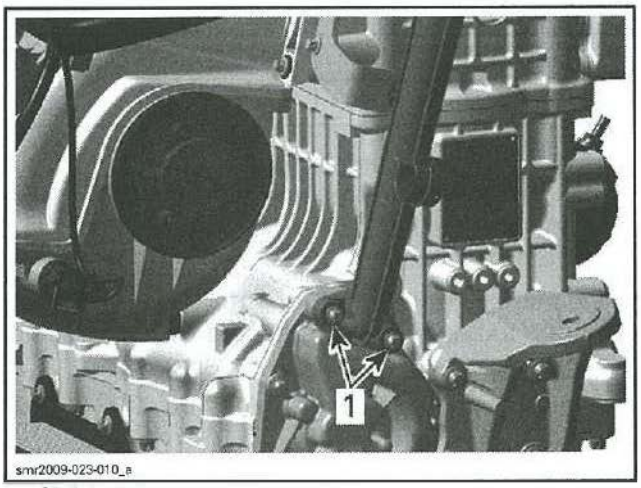
Oil Suction Pump Removal

iS Models

1. Remove jet pump and drive shaft. Refer to *STEERING AND PROPULSION* section.
2. Remove the moving deck. Refer to *BODY (GTX, RXT AND WAKE PRO)* subsection.
3. Remove the air intake silencer. Refer to *AIR INTAKE SYSTEM (iS AND aS MODELS)* subsection.
4. Detach the muffler from the exhaust manifold and move muffler backwards. Refer to *EXHAUST SYSTEM* subsection.
5. Remove engine support mount screws.
6. Move engine backwards, just enough to reach oil suction pump cover screws.

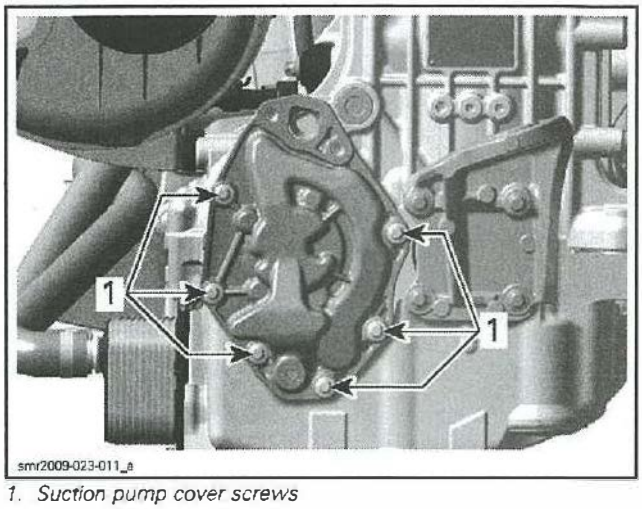
All Models

1. Remove retaining screws from oil filler tube.



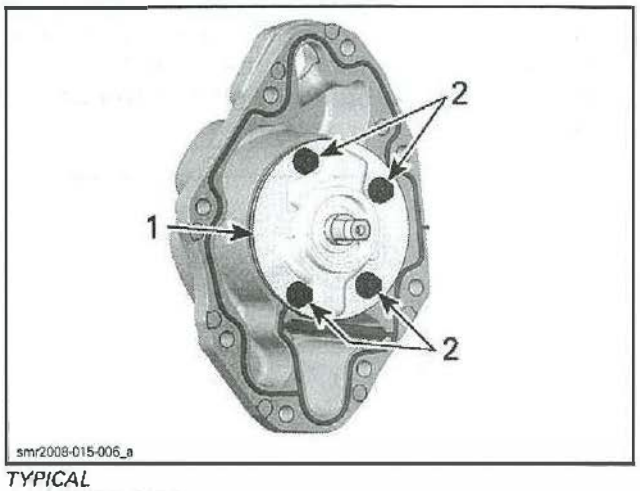
1. Oil filler tube screws

2. Remove oil filler tube.
3. Remove retaining screws.



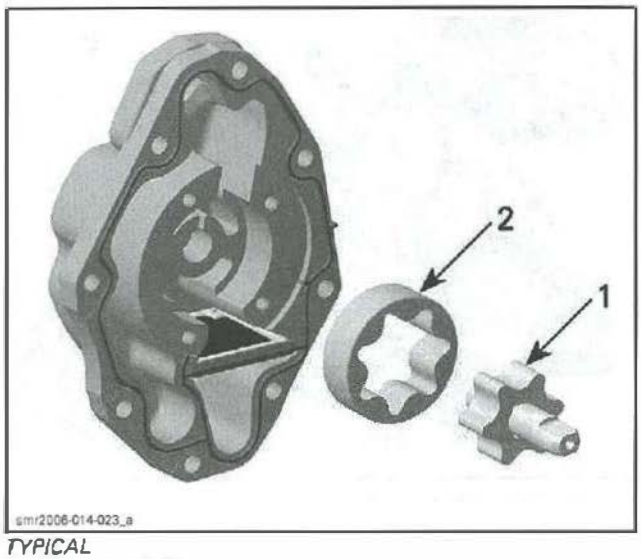
1. Suction pump cover screws

4. Place rags under cover to prevent spillage. If spillage occurs, clean with the PULLEY FLANGE CLEANER (P/N 413 711 809).
5. Remove the oil suction pump housing.
6. Remove oil pump screws and cover.



TYPICAL
1. Oil pump cover
2. Oil pump screws

7. Remove oil pump shaft.
8. Remove outer rotor.

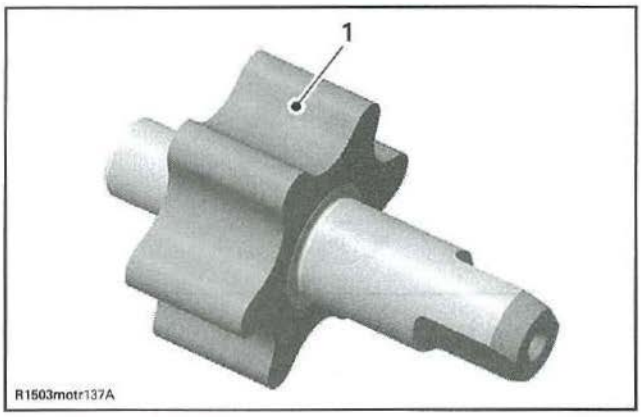


TYPICAL
1. *Oil pump shaft*
2. *Outer rotor*

Oil Suction Pump Inspection

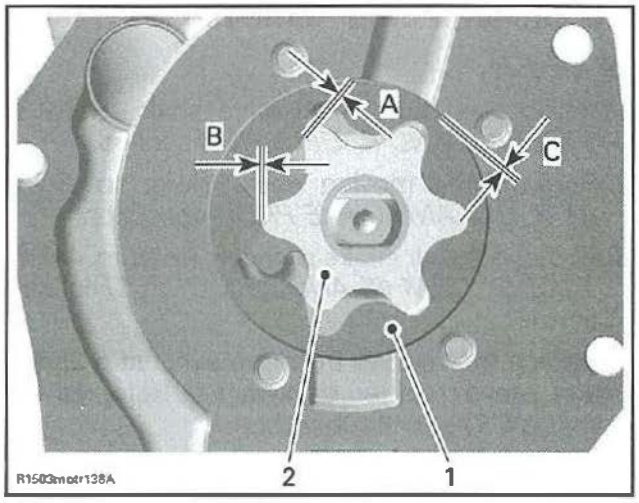
Inspect oil pump shaft, housing and cover for marks or other damages.

Check inner rotor for corrosion, pin-holes or other damages. If so, replace oil pump shaft. Ensure to also check oil pump housing and cover and replace if damaged.



1. *Pittings on the teeth*

Using a feeler gauge, measure the clearance between inner and outer rotors.



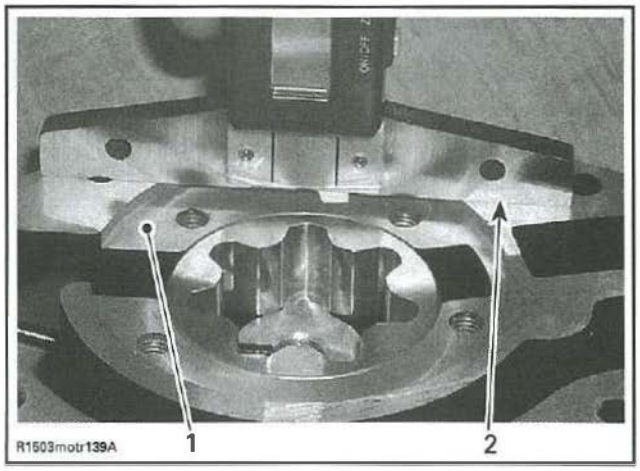
1. *Outer rotor*
2. *Inner rotor*

OUTER AND INNER ROTOR CLEARANCE	
SERVICE LIMIT	
A	0.25 mm (.0098 in)
B	
C	

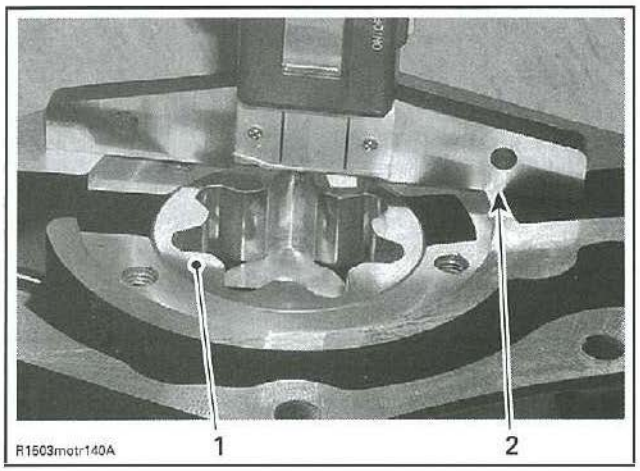
If clearance between inner and outer rotors exceeds the tolerance, replace oil pump shaft. Ensure to also check oil pump housing and cover and replace if damaged.

If clearance between outer rotor and its bore in oil pump exceeds the tolerance, replace the complete oil pump and the PTO housing.

Using a vernier depth gage, measure side wear as shown.



1. *Oil pump housing surface*
2. *Vernier depth gage*



1. *Oil pump outer rotor surface*
2. *Vernier depth gage*

Difference between pump housing and outer rotor should not exceed the following specification. If so, replace the complete oil pump assembly.

DIFFERENCE BETWEEN PUMP HOUSING AND OUTER ROTOR
0.1 mm (.004 in)

NOTE: When the axial clearance of the oil pump shaft assembly increases, the oil pressure decreases.

Check the inside of oil pump housing and its cover for scoring or other damages and replace if damaged.

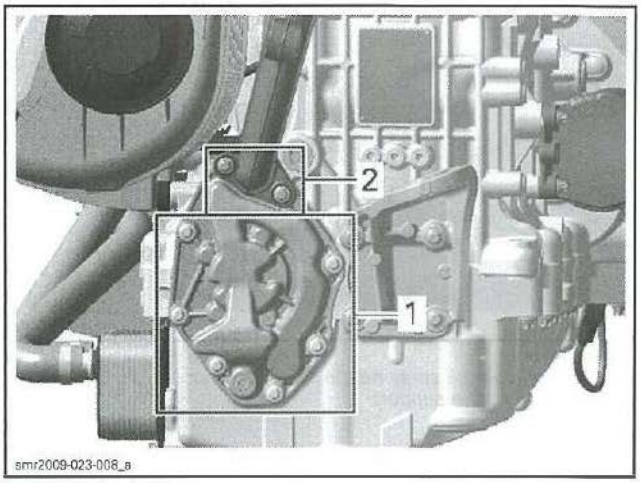
Oil Suction Pump Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of the suction pump cover screws and tighten them to specification.

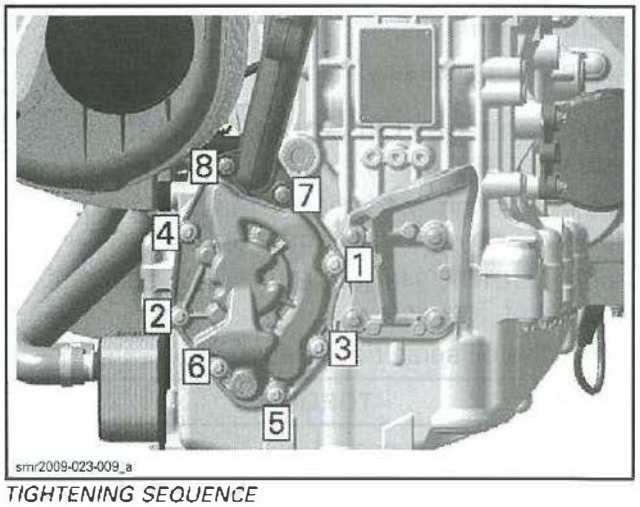
SUCTION PUMP COVER SCREWS TORQUE
9 N•m (80 lbf•**in**)

Position screws according to their length as shown.



1. *Screws M6 x 25*
2. *Screws M6 x 45*

Tighten suction pump cover screws as per following sequence.



TIGHTENING SEQUENCE

Refer to the appropriate procedures and install all other removed parts.

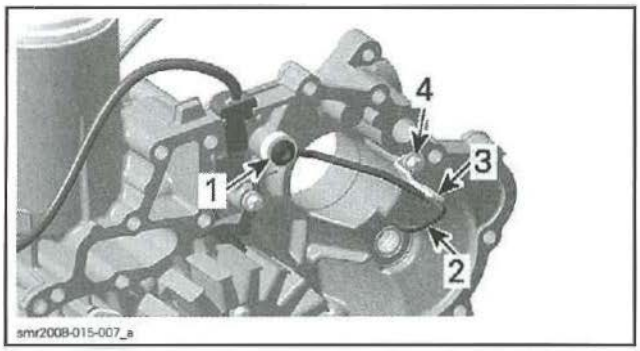
SUPERCHARGER OIL SPRAY NOZZLE

Supercharger Oil Spray Nozzle Removal

Remove the PTO housing. Refer to *PTO HOUSING AND MAGNETO* subsection.

Remove the Torx screw securing the oil spray nozzle support.

Unscrew the Banjo bolt.



1. *Banjo bolt*
2. *Supercharger oil spray nozzle*
3. *Oil spray nozzle support*
4. *Torx screw*

Supercharger Oil Spray Nozzle Inspection

Check oil spray nozzle for:
- Dirt
- Bend
- Other damages.

Replace if necessary.

Supercharger Oil Spray Nozzle Installation

For installation reverse the removal procedure. However, pay attention to the following.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of Torx screw.

Install the oil spray nozzle support.

TORQUE	
Oil spray nozzle support (Torx screw)	11 N•m (97 lbf•in)

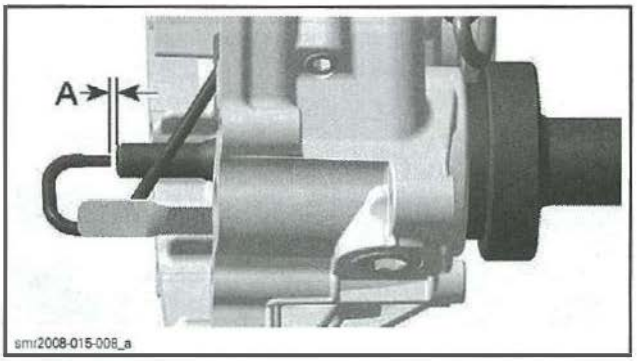
Install oil spray nozzle with Banjo bolt.

TORQUE	
Oil spray nozzle Banjo bolt	19 N•m (168 lbf•in)

Adjust the position of the oil spray nozzle.

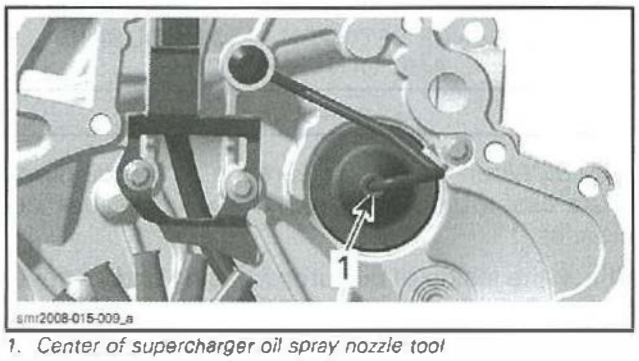
REQUIRED TOOL	
SUPERCHARGER OIL SPRAY NOZZLE TOOL (P/N 529 036 134)	

The distance between the adjustment tool and oil spray nozzle must be within 1 mm (.039 in).



A. 1 mm (.039 in)

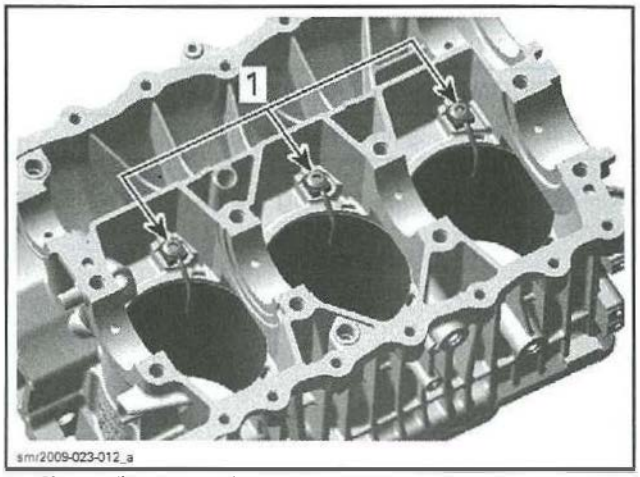
NOTE: Make sure that the oil spray nozzle is facing to the center of the tool. Not following this procedure will lead to an insufficient oiling of the supercharger and a supercharger failure can occurs. Adjust the oil spray nozzle if necessary by slightly bending it, take care not to over bend the oil spray nozzle.



1. Center of supercharger oil spray nozzle tool

PISTON OIL SPRAY NOZZLES

The piston oil spray nozzles are located on the upper half of cylinder block.



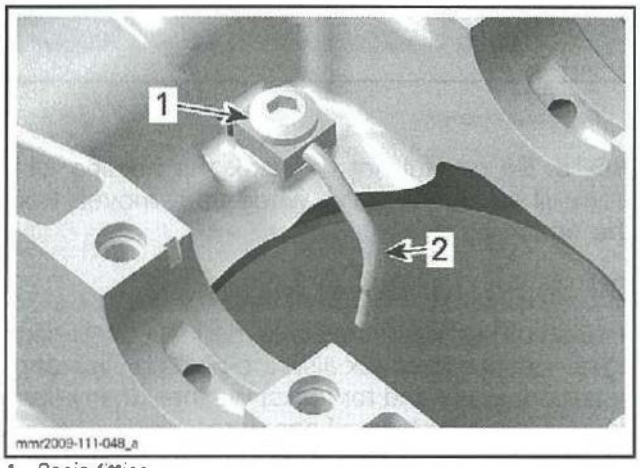
1. Piston oil spray nozzles

NOTE: When the scope of repair work obligates you to split the cylinder block, take this opportunity to clean the oil spray nozzles.

Piston Oil Spray Nozzle Removal

Remove cylinder block lower half. Refer to *CYLINDER BLOCK* subsection.

Remove oil spray nozzle and Banjo fitting from cylinder block upper half.

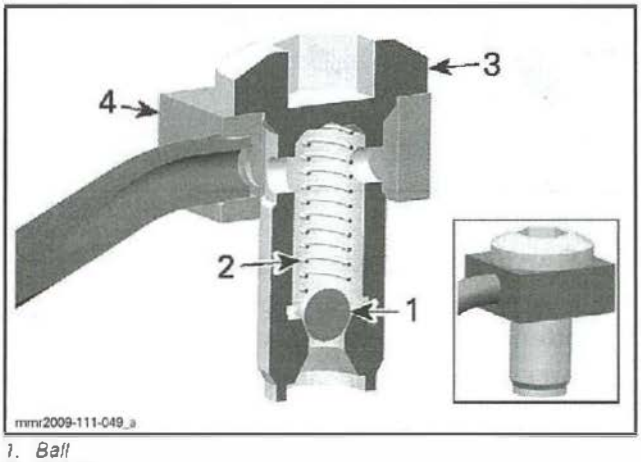


1. *Banjo fitting*
2. *Oil spray nozzle*

Piston Oil Spray Nozzle Cleaning and Inspection

Clean oil spray nozzle and Banjo fitting from dirt and debris. Use a part cleaner, then compressed air and dry the parts.

Check if ball inside Banjo fitting moves freely.

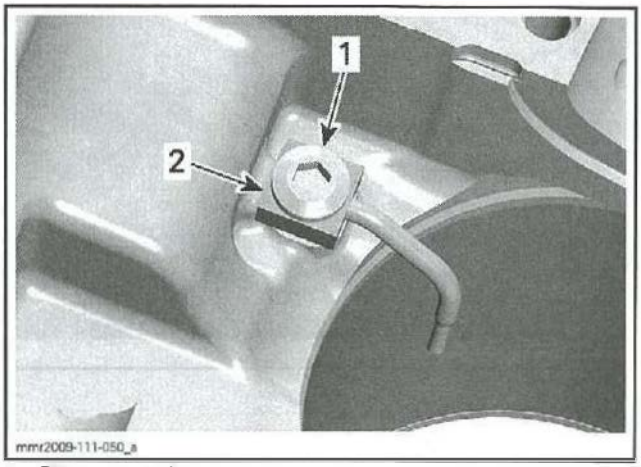


1. *Ball*
2. *Spring*
3. *Banjo fitting*
4. *Oil spray nozzle*

NOTE: If the oil spray nozzle is damaged or bent during work in the cylinder block, it must be replaced immediately.

Piston Oil Spray Nozzle Installation

NOTICE At assembly make sure the contact surface of the oil spray nozzle is well fitted onto the cylinder block. If this is not ensured, the oil spray direction will change, causing potential engine damage.

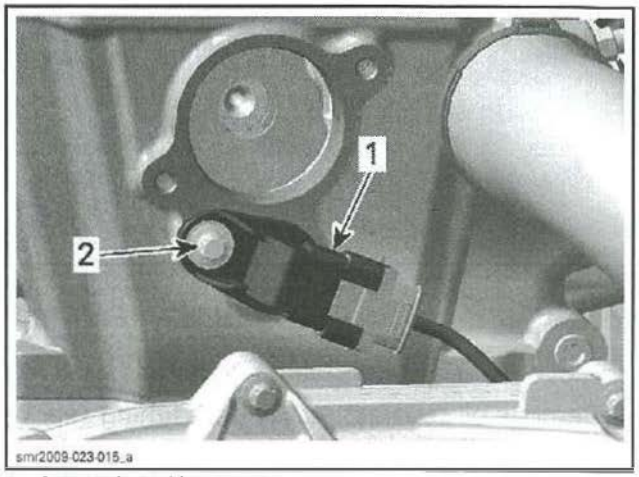


1. *Oil spray nozzle*
2. *Contact surface*

OIL SEPARATOR COVER

Oil Separator Cover Removal

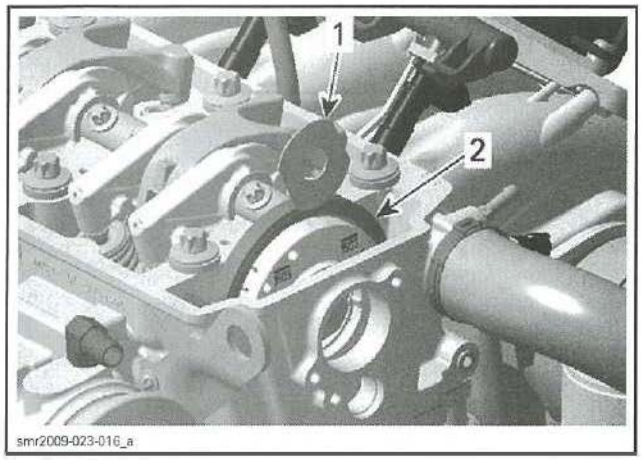
1. Remove the blow-by valve. See procedure in this subsection.
2. Remove camshaft position sensor.



1. *Camshaft position sensor*
2. *Screw*

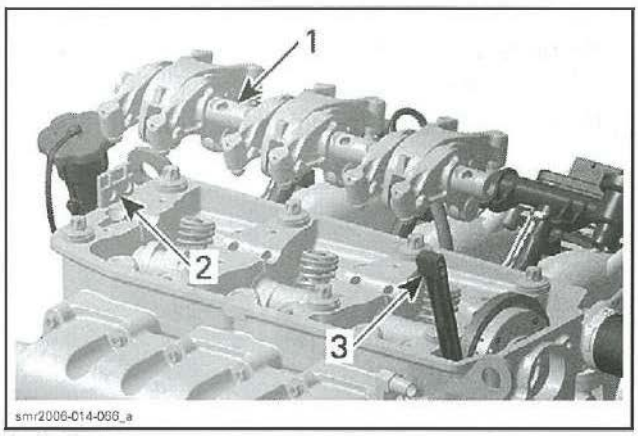
3. Remove cylinder head cover, refer to *CYLINDER HEAD* subsection.
4. Remove thrust washer from oil separator cover.

NOTE: Make sure not to loose thrust washer when removing it from oil separator cover, otherwise thrust washer would fall into the PTO housing.



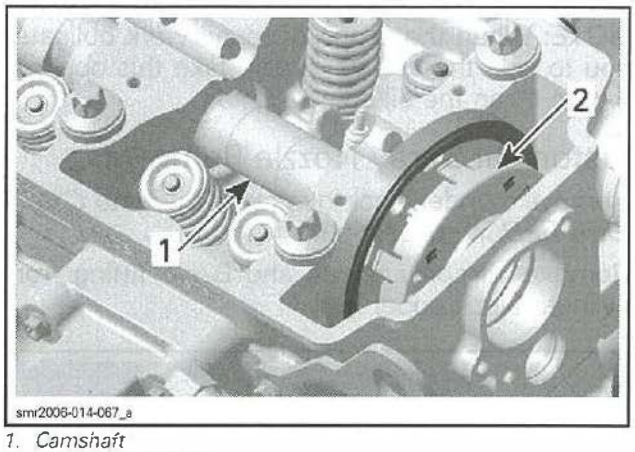
1. *Thrust washer*
2. *Oil separator cover*

5. Remove spark plug tube.
6. Remove rocker arm shaft together with rocker arms, refer to *CYLINDER HEAD* subsection.
7. Remove chain guide and camshaft guide.



1. *Rocker arm*
2. *Camshaft guide*
3. *Chain guide*

8. Move camshaft backwards as far as possible.
9. Remove oil separator cover from timing gear by releasing the holding clips.

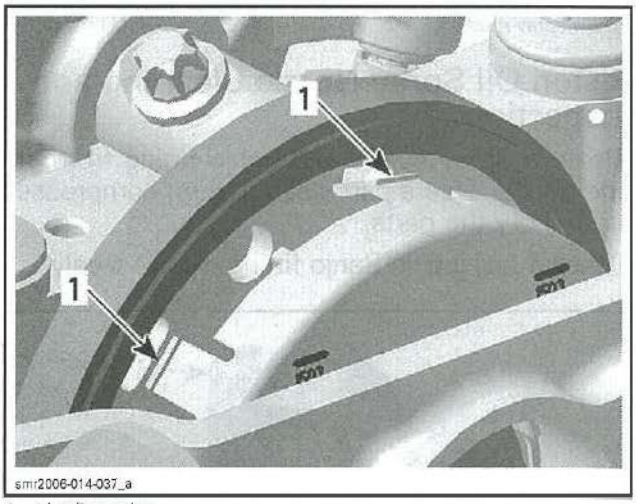


1. *Camshaft*
2. *Oil separator cover*

NOTE: Be careful not to break the holding clips from oil separator cover when its removed from the timing gear.

Oil Separator Cover Inspection

Inspect oil separator cover for marks or other damages. Ensure to check also the holding clips of oil separator cover and for thrust washer. If any damage is visible replace oil separator cover.



1. *Holding clips*

Oil Separator Cover Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Properly install oil separator cover and thrust washer. They need to be in a perfect even position with timing gear.

NOTE: Make sure not to lose thrust washer when installed on oil separator cover.

For installation of rocker arm shaft with rocker arms, follow the procedure as it is described in *CYLINDER HEAD* subsection.

Install all other removed parts.

BLOW-BY VALVE

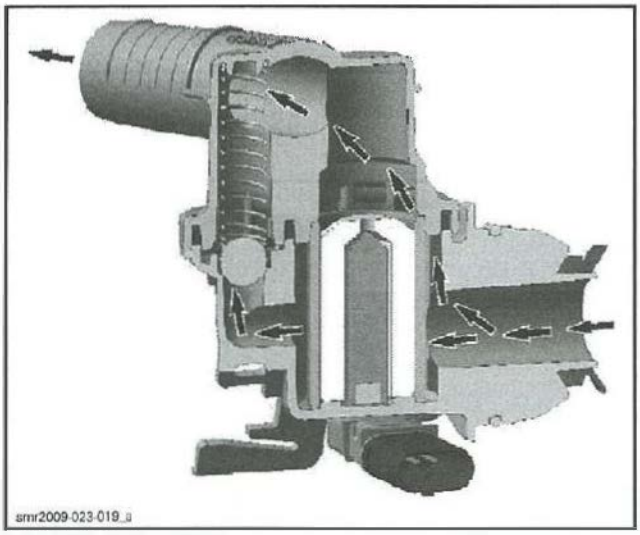
Blow-By Valve Description

The function of the blow-by valve is the circulation of the oil vapors.

Blow-By Valve Operation

Normal Operation

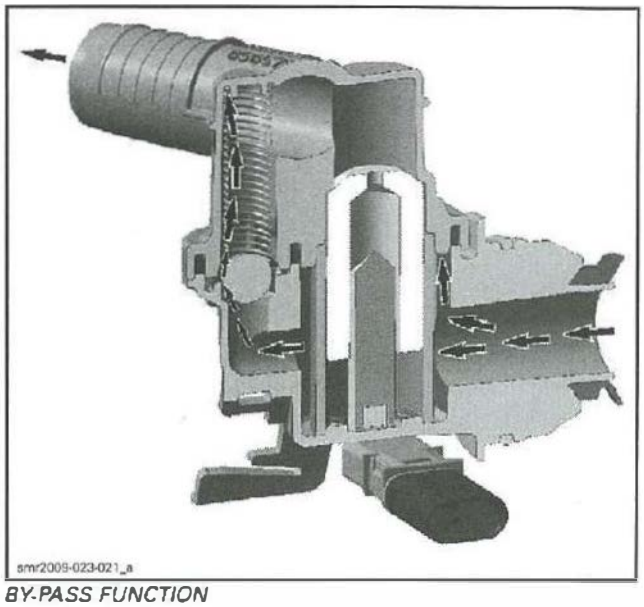
During its normal operation, the blow-by valve allows crankcase vapors to return in the intake system where they are harmlessly burned.



NORMAL OPERATION

By-Pass Function

If, for any reason, the valve piston gets stuck at normal operation and the crankcase pressure exceeds 40 kPa (6 PSI), the pressure unseats a check ball and crankcase vapors can bypass the valve piston.



BY-PASS FUNCTION

Blow-By Valve Removal

iS and aS Models

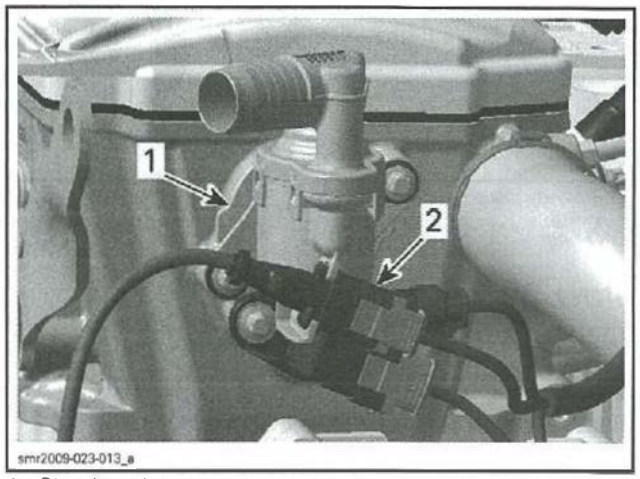
Remove:

- Deck extension, refer to *BODY (GTX, RXT AND WAKE PRO)* subsection
- Air intake silencer, refer to *AIR INTAKE SYSTEM (WITH iS AND aS)* subsection.

All Models

Remove ventilation hose from blow-by valve.

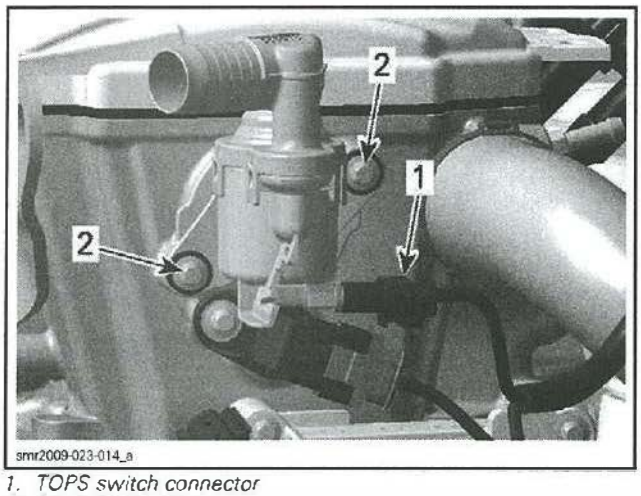
Remove the CPS connector from its support on blow-by valve.



1. *Blow-by valve*
2. *CPS connector*

Disconnect the TOPS switch connector of the blow-by valve.

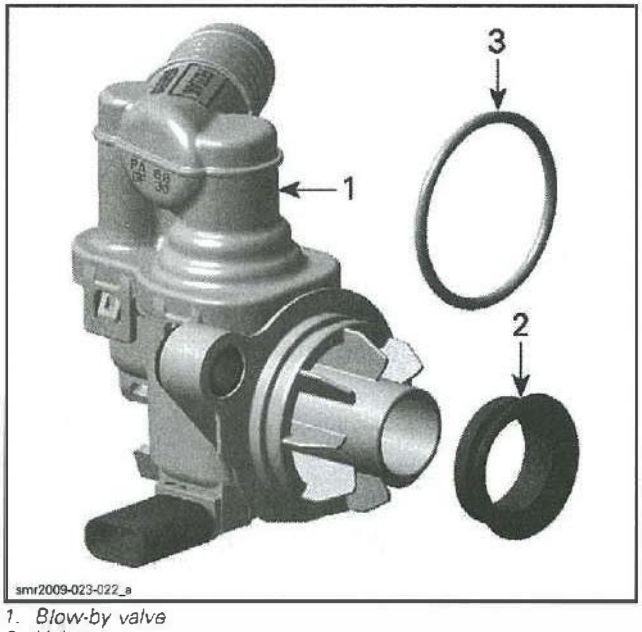
Unscrew and remove the blow-by valve.



1. TOPS switch connector
2. Retaining screws

Remove and discard ●-ring and V-ring.

NOTE: The blow-by valve can not be disassembled.



1. Blow-by valve
2. V-ring
3. O-ring

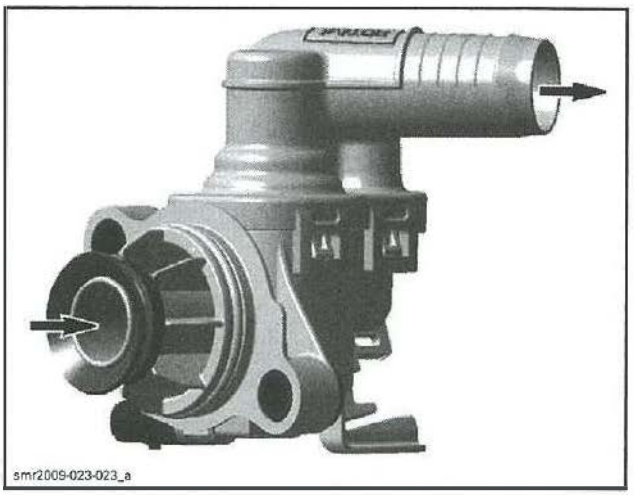
Blow-By Valve Inspection

If blow-by valve is damaged, replace it.

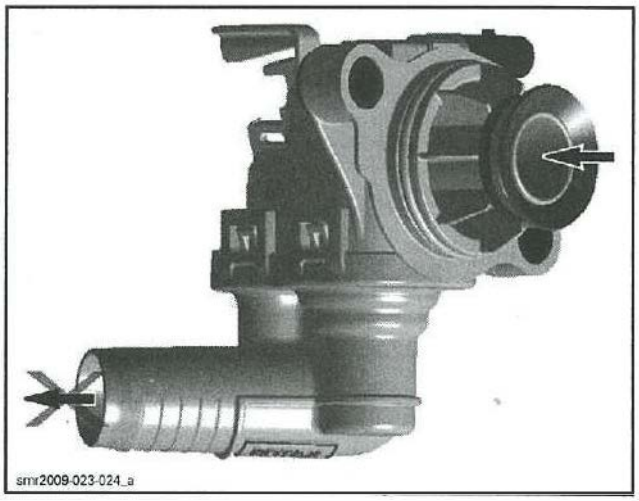
Clean all contact surfaces of blow-by valve.

Place a clean rag on valve inlet.

Blow air through inlet port. Air must flow freely to the outlet port.



Turn valve upside down and blow air again. Air must not flow out.



If test fails, replace blow-by valve.

Blow-By Valve Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Install the blow-by valve with NEW O-ring and V-ring.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of blow-by valve screws.

Tighten blow-by valve screws to specification.

BLOW-BY VALVE SCREWS TORQUE
9 N•m (80 lbf•in)

Reinstall remaining removed parts.

TOPS SWITCH

Tip Over Protection Switch (TOPS Switch) Function

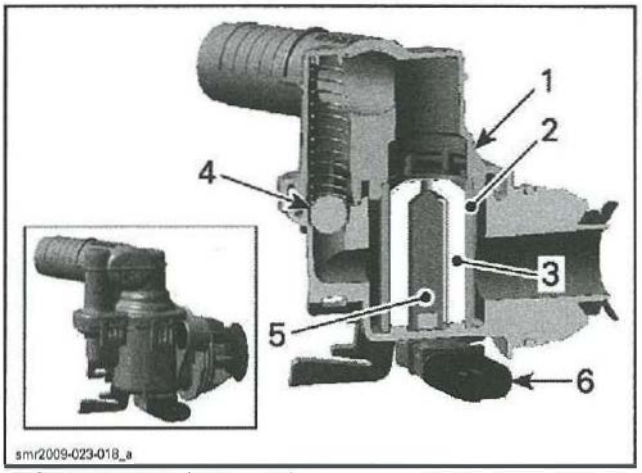
The function of the TOPS switch is the engine protection in the event the watercraft tip over.

During normal operation the TOPS switch state is OFF, no signal to the ECM.

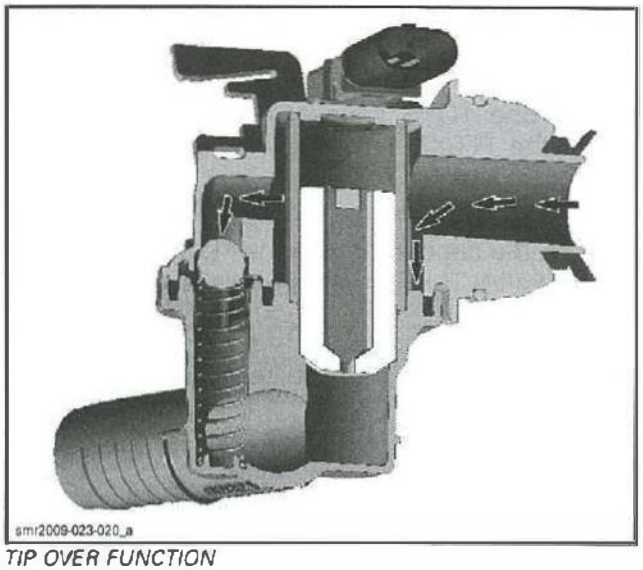
If the watercraft tips over, gravity causes a valve piston to close and no engine oil will leak out of the blow-by valve.

In this event, a pin (with magnet) opens a gap to the TOPS switch (Hall effect sensor) and the TOPS changes its state to ON and sends a signal to the ECM.

The ECM will shut down the engine by cutting the ignition and the fuel injection.



BLOW-BY VALVE CUT-AWAY
1. *Valve housing*
2. *Valve sleeve*
3. *Valve piston*
4. *Check ball*
5. *Valve pin (with magnet)*
6. *TOPS switch of the blow-by valve*



TIP OVER FUNCTION

TOPS Switch Input Voltage Test

Remove:

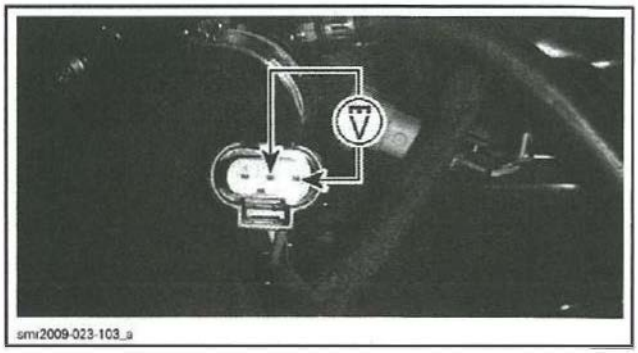
- Deck extension, refer to *BODY (GTX, RXT AND WAKE PRO)* subsection.
- Air intake silencer, refer to appropriate *AIR INTAKE SYSTEM* subsection.

Disconnect the TOPS switch connector of the blow-by valve.

Briefly press the START/STOP button to wake-up the ECM.

Probe terminals as shown to check the voltage output from the ECM.

TOPS SWITCH CONNECTOR	VOLTAGE
Pins 2 and 3	Approximately 5 Vdc



If voltage test is good, check the TOPS switch output voltage.

If voltage test is not good, check the continuity of the blow-by valve TOPS switch circuit.

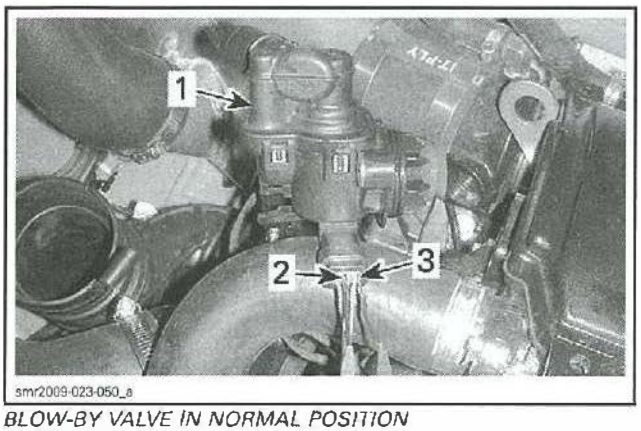
NOTE: After voltage test, clear the fault codes in the ECM using the B.U.D.S. software.

TOPS Switch Output Voltage Test

Remove the blow-by valve.

Back-probe TOPS connector and check voltage using the FLUKE 115 MULTIMETER (P/N 529 035 868).

NOTE: To easily probe wire terminals through the back of the connector, use the FLUKE RIGID BACK PROBES (P/N TP88) or an equivalent.



BLOW-BY VALVE IN NORMAL POSITION
1. *Blow-by valve*
2. *RED probe into pin 2*
3. *BLACK probe into pin 1*

TOPS SWITCH CONNECTOR	BLOW-BY VALVE POSITION	VOLTAGE
Pin 1 and pin 2	Normal position	0.4 ± 0.1 Vdc
Pin 1 and pin 2	Upside down	4.4 ± 0.2 Vdc
Pin 2 and pin 3	Normal position or upside down	Approximately 5 Vdc

Replace TOPS switch if not within specification.

TOPS Switch Circuit Continuity Test

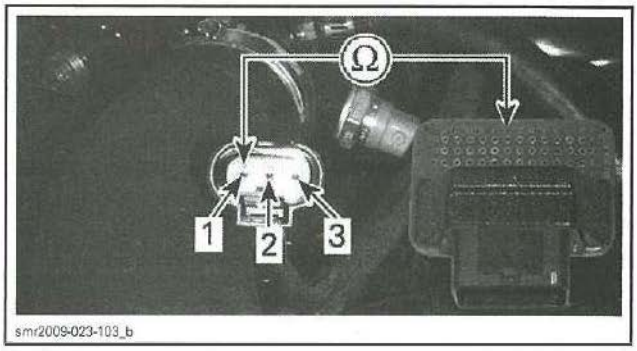
Disconnect the TOPS switch connector of the blow-by valve.

Disconnect the connector "A" from the ECM.

Check continuity of the blow-by valve TOPS switch circuit as per following table.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

TOPS SWITCH CONNECTOR	ECM ADAPTER	RESISTANCE
Pin 1	Pin F4	Close to 0 Ω (continuity)
Pin 2	Pin G1	
Pin 3	Pin C4	



1. *Pin 1*
2. *Pin 2*
3. *Pin 3*

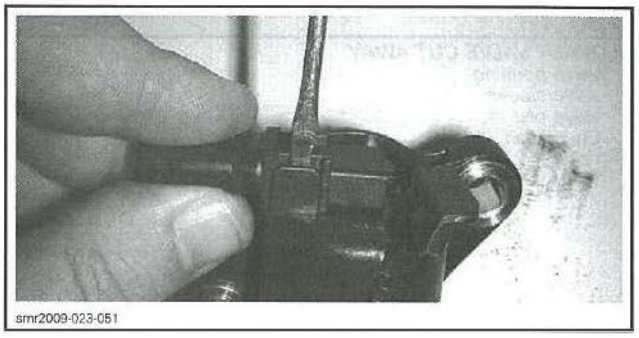
If continuity test is good, check ECM. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

If continuity test is not good, repair or replace defective wires or connectors.

TOPS Switch Replacement

Remove blow-by valve and turn it upside down.

Insert a small screwdriver between TOPS switch and its retaining tab. Twist and hold the TOPS switch then release the other retaining tab.



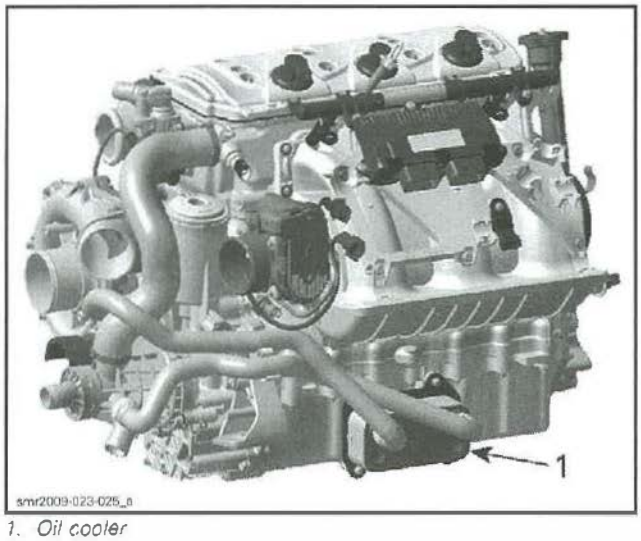
When installing the TOPS switch, make sure printed information is visible.



1. TOPS valve inscriptions

OIL COOLER

The oil cooler is located below the air intake manifold.



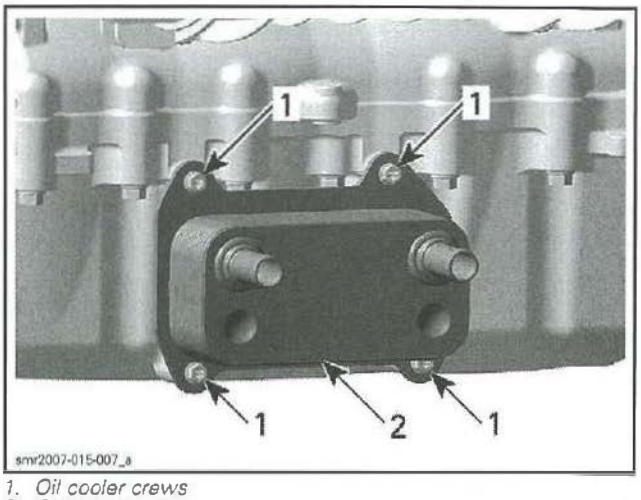
1. Oil cooler

Oil Cooler Removal

Remove engine from vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.

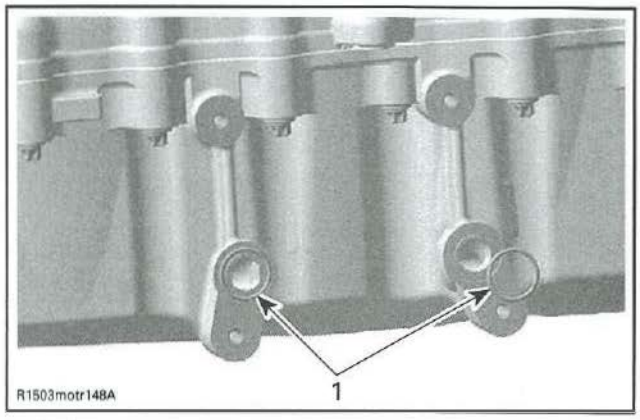
Disconnect cooling hoses from oil cooler.

Remove screws securing oil cooler.



1. Oil cooler crews
2. Oil cooler

Remove oil cooler from engine. Ensure not to lose O-rings located between oil cooler and engine.



1. O-rings

Oil Cooler Inspection

If O-rings are brittle, cracked or hard, replace them.

Clean both contact surfaces of oil cooler.

Check and clean the oil inlet and outlet area for dirt and other contaminations.

Oil Cooler Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Apply engine oil on O-rings.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of oil cooler screws.

Tighten oil cooler screws to specification.

OIL COOLER SCREWS TORQUE
9 N•m (80 lbf•in)

COOLING SYSTEM

SERVICE TOOLS

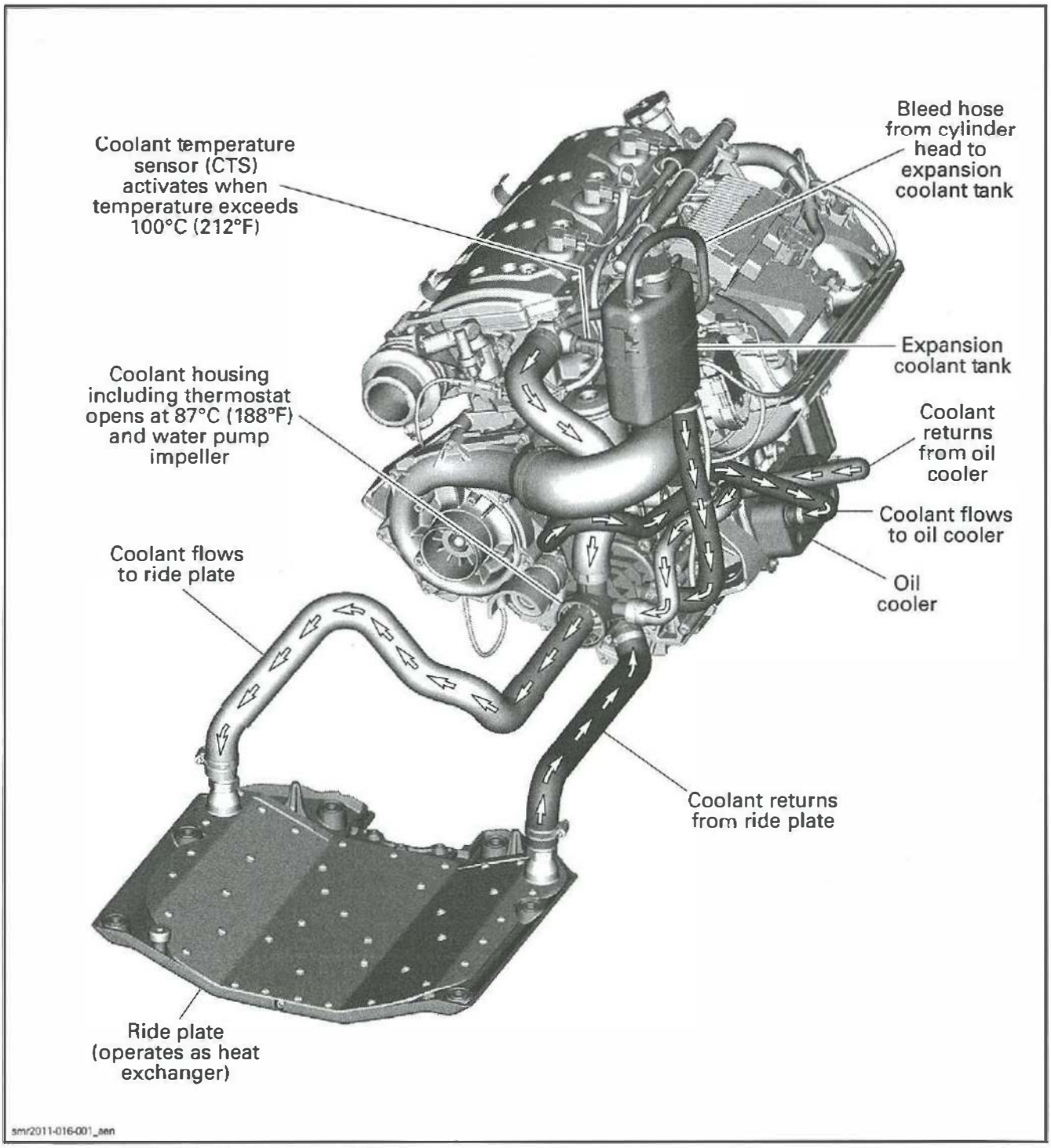
Description	Part Number	Page
OETIKER PLIERS	295 000 070	146
TEST CAP	529 035 991	145
VACUUM/PRESSURE PUMP	529 021 800	146

SERVICE PRODUCTS

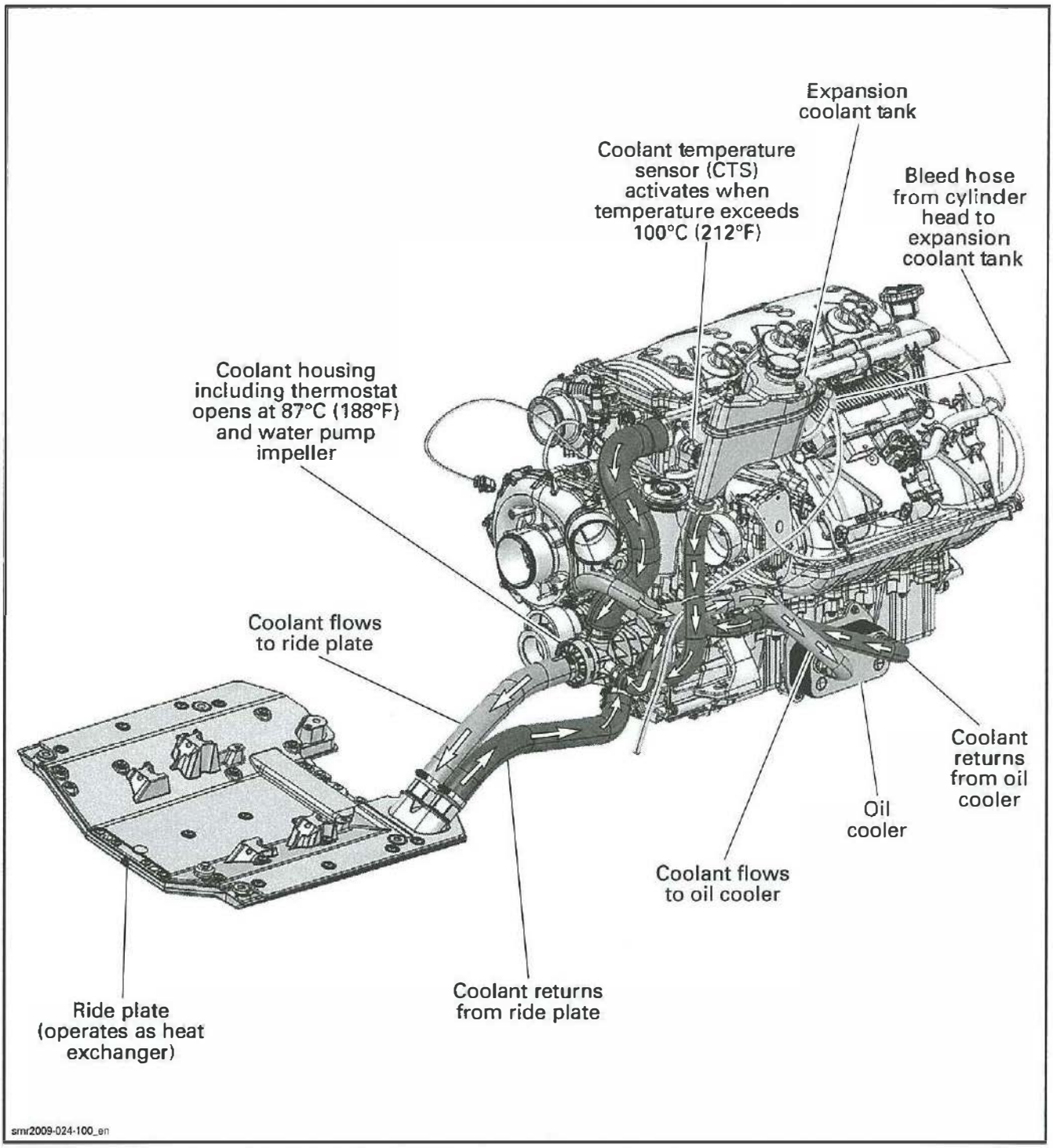
Description	Part Number	Page
BRP PREMIXED COOLANT	219 700 362	143
LOCTITE 243 (BLUE)	293 800 060	149
LOCTITE 567 (PIPE SEALANT)	293 800 013	144

green-manuals

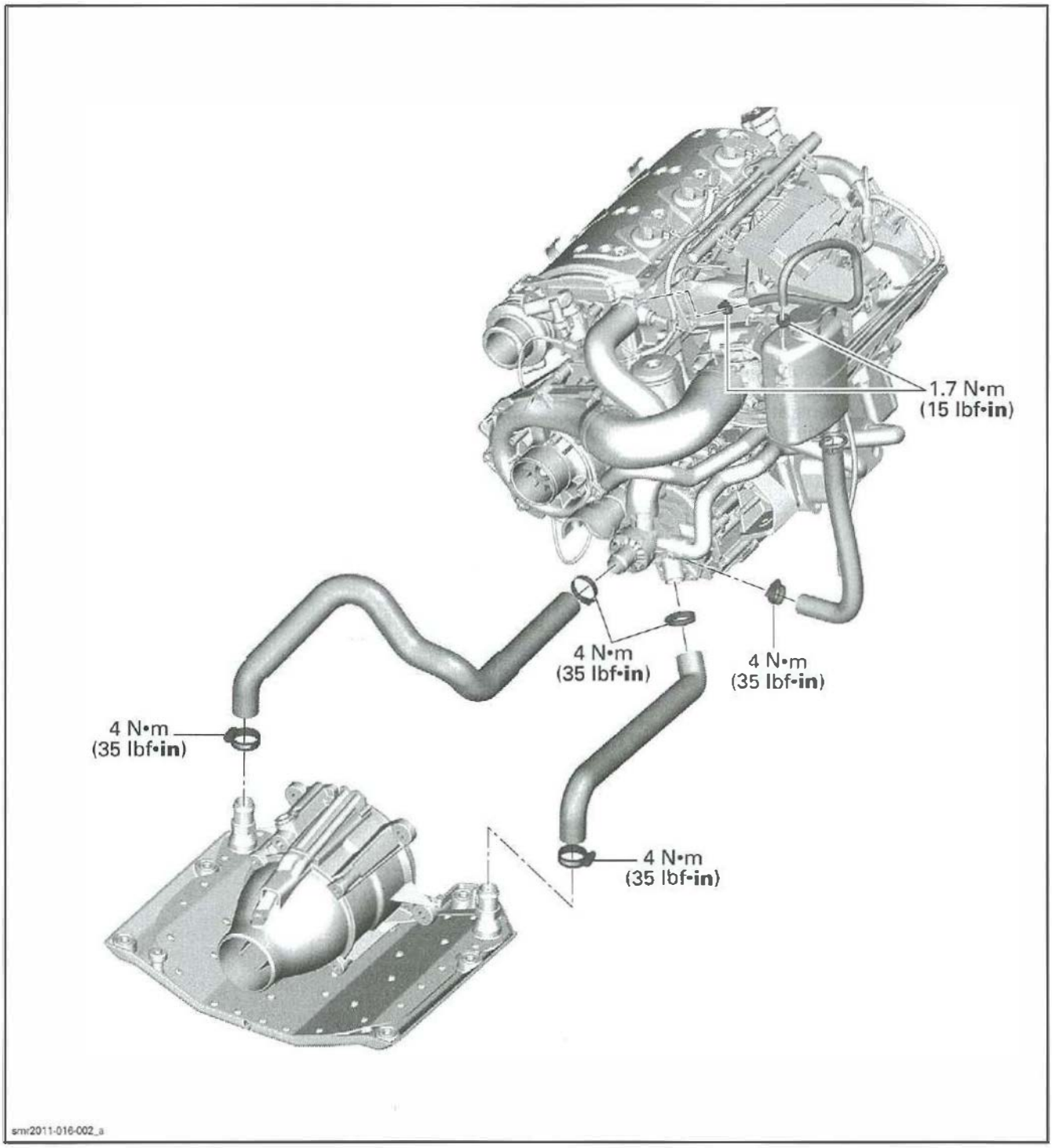
COOLING SYSTEM (CLOSED LOOP) (GTI SERIES, GTS SERIES AND WAKE 155)



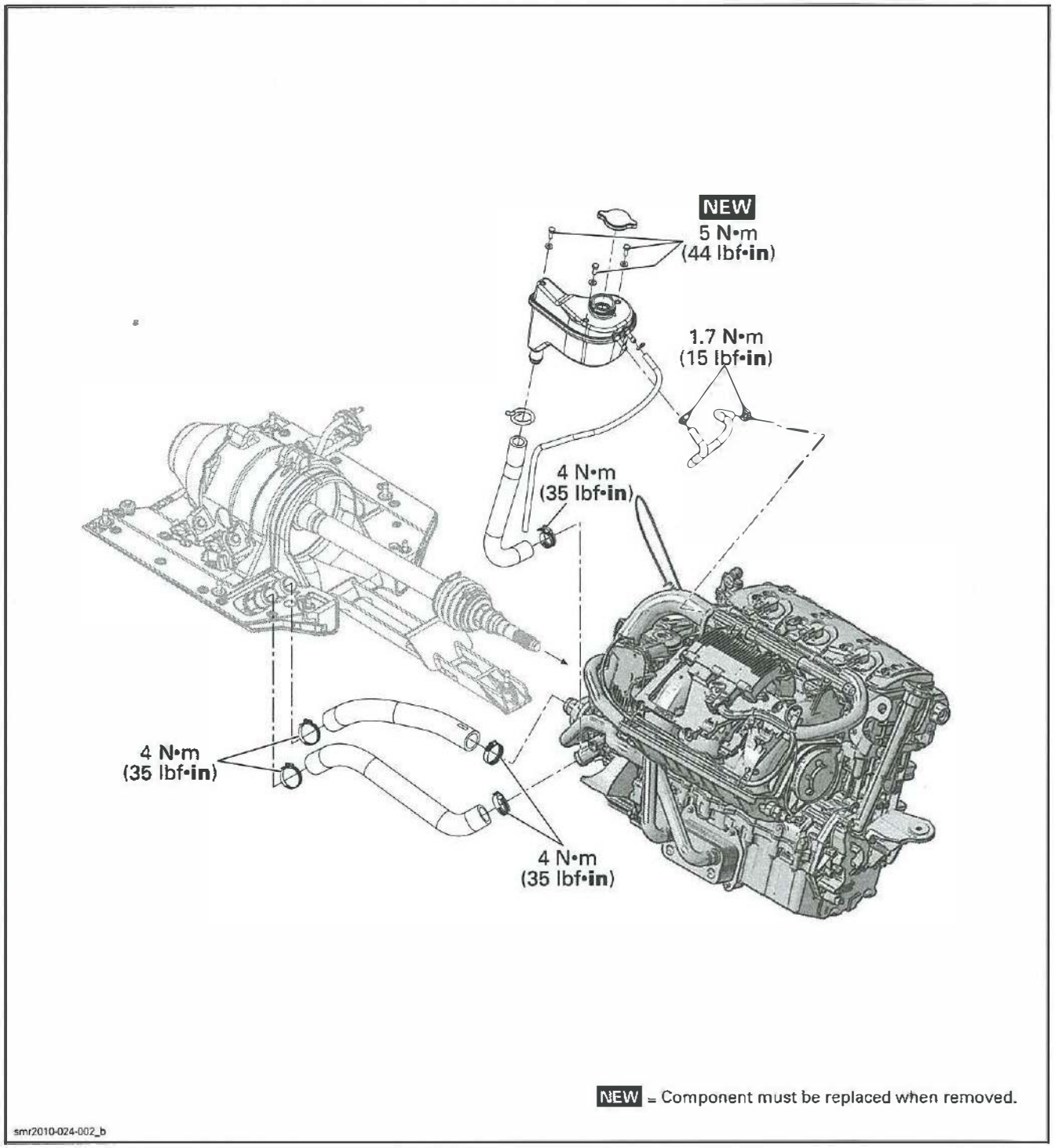
COOLING SYSTEM (CLOSED LOOP) (GTX SERIES, RXT SERIES AND WAKE PRO 215)



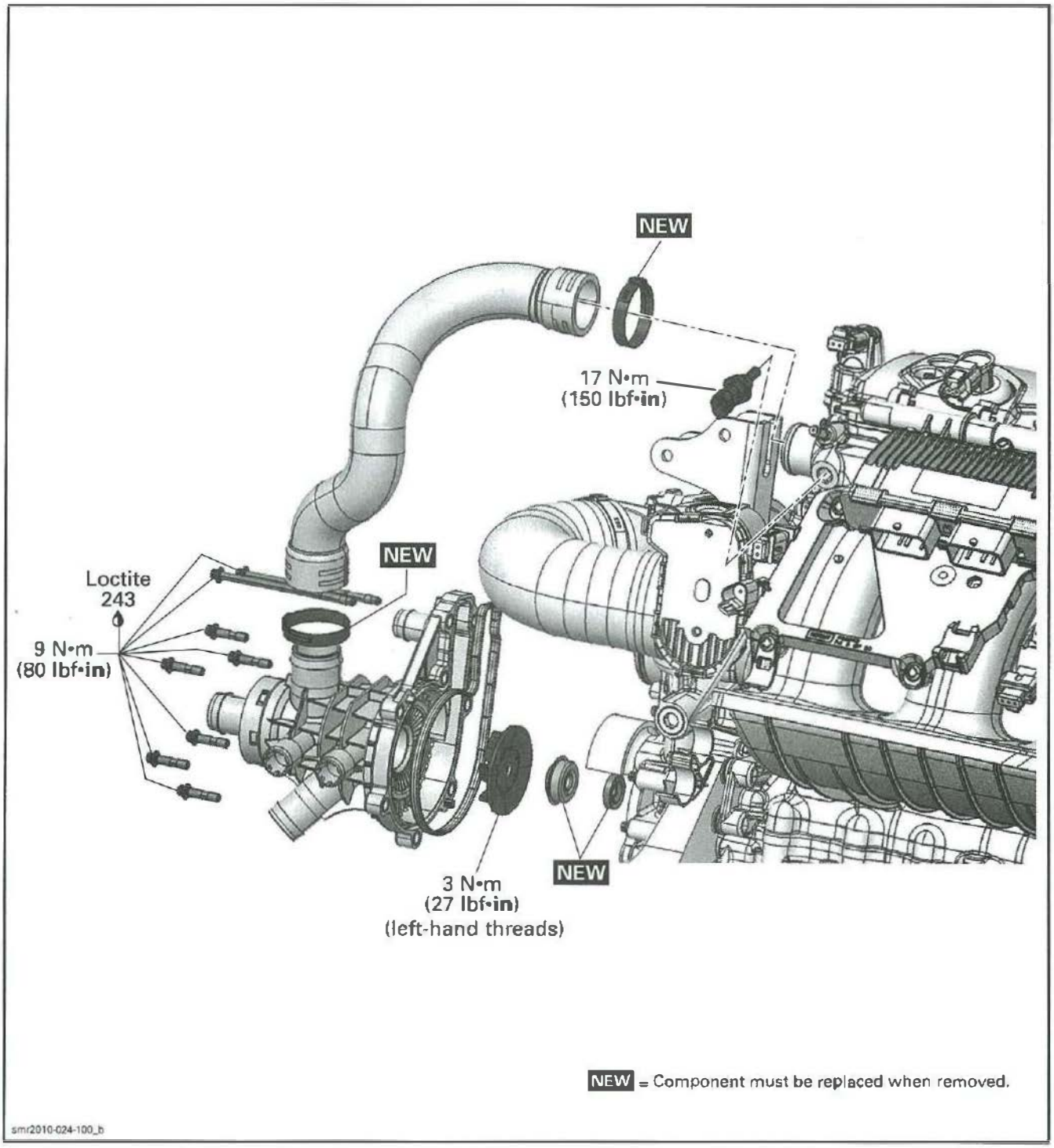
COOLING SYSTEM COMPONENTS (GTI SERIES, GTS SERIES AND WAKE 155)



COOLING SYSTEM COMPONENTS (GTX SERIES, RXT SERIES AND WAKE PRO 215)



COOLING SYSTEM COMPONENTS (ENGINE)



GENERAL

During assembly/installation, use torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

SYSTEM DESCRIPTION

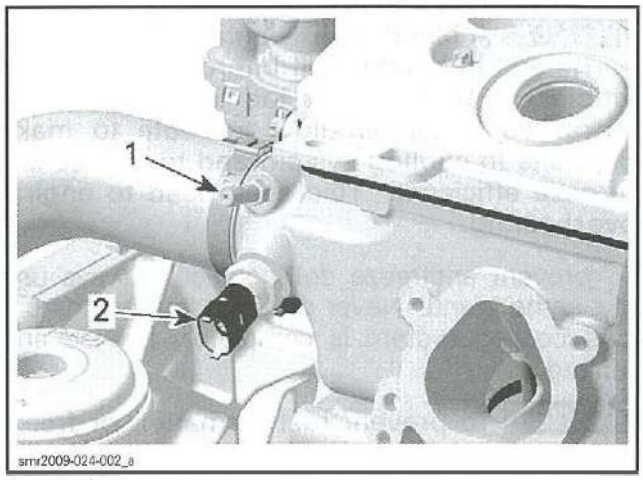
A closed loop cooling system is utilized on the 1503 4-TEC engines, which offers an efficient engine cooling while keeping dirt and salt water out of the cooling system. This system keeps the temperature constant and prevents internal engine corrosion.

A separate coolant tank ensures that enough engine coolant is in the circuit during any operating condition.

The coolant flow comes from the water pump impeller into the cylinder block. It goes around the cylinders and straight up to the cylinder head. A smaller quantity of engine coolant enters the cylinder block on the exhaust side for a better cooling. In the cylinder head the water channels flow around the exhaust and then the intake valves and leave the engine through a large hose. From there the coolant goes back to the water pump housing and depending on the engine temperature, it flows through the thermostat directly back to the water pump impeller, or it takes its way through the heat exchanger.

Engine coolant is also directed towards the oil cooler (coolant type).

Coolant temperature sensor and bleed hose nipple are located on the cylinder head.



1. *Bleed hose nipple*
2. *Coolant temperature sensor (CTS)*

NOTICE **Never modify cooling system arrangement, otherwise serious engine damage could occur.**

Technical Specifications

TYPE	Closed loop cooling system.
COOLANT FLOW	Flow from water pump.
TEMPERATURE CONTROL	Thermostat.
SYSTEM BLEEDING	Self-bleed type through coolant tank (hose at uppermost point of circuit).
MONITORING BEEPER	Turns on at 100°C (212°F) on naturally aspirated engines. Turns on at 110°C (230°F) on supercharged engines.

MAINTENANCE

ENGINE COOLANT

⚠ WARNING

To avoid potential burns, do not remove the coolant tank cap or loosen the ride plate drain plug if the engine is hot.

Recommended Coolant

Use BRP PREMIXED COOLANT (P/N 219 700 362) or a blend of 50% antifreeze with 50% demineralized water.

NOTE: Using a blend of 40% antifreeze with 60% demineralized water will improve the cooling efficiency when watercraft is used in particularly hot weather and/or hot water condition.

NOTICE A blend of 40% antifreeze with 60% demineralized water will improve the cooling efficiency. Using water tap instead of demineralized water, would contribute to make deposits in cooling system and to reduce antifreeze efficiency. This could lead to engine overheating.

To prevent antifreeze deterioration, always use the same brand. Never mix different brands unless cooling system is completely flushed and refilled.

NOTICE To prevent rust formation or freezing condition in cold areas, always replenish the system with 50% antifreeze and 50% demineralized water. Pure antifreeze will freeze at a higher temperature than the optimal water/antifreeze mix. Always use ethylene glycol antifreeze containing corrosion inhibitors specifically recommended for aluminum engines.

Draining the System

⚠ WARNING

Never drain or refill cooling system when engine is hot.

Open seat.

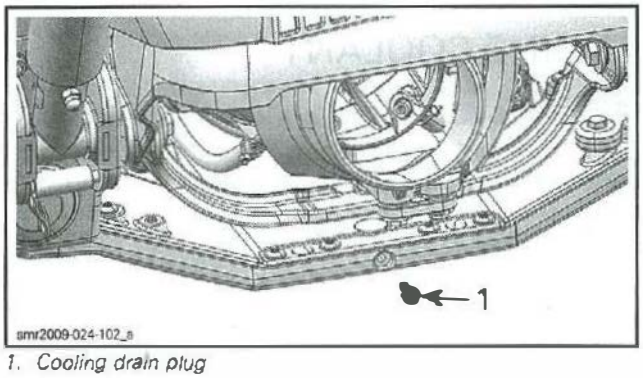
On iS models, remove the rear ventilation box.

Remove the coolant tank cap.

Install a drain pan underneath the ride plate.

Unscrew the drain plug on ride plate.

NOTE: Raising the front of the watercraft will contribute to drain the cooling system.



1. Cooling drain plug

Dispose coolant as per local regulations.

Do not reinstall drain plug at this time.

Cleaning the System

NOTICE Cleaning the cooling system as per the following procedure is required when engine overheats (assuming everything else is operating normally) or each time coolant is replaced.

Drain the cooling system.

Add a cleaning product such as the Zerex® Super Cleaner by Valvoline (or an equivalent) in coolant tank then fill cooling system with demineralized water.

Reinstall cap on coolant tank.

Install watercraft in a test basin or ride on a water plane. Start engine and run for approximately 15 minutes.

IMPORTANT: Ensure thermostat opens so that the cleaning product flows in ride plate properly.

Stop engine and let the cleaning product work for 12 to 16 hours.

Thereafter, engine can be run one last time to soak off deposits.

Drain and thoroughly rinse the cooling system with clean fresh water.

Refill cooling system as described below.

Refilling the System

Watercraft should be level, engine cold and drain plug removed for refilling.

Place a container under drain plug to collect antifreeze.

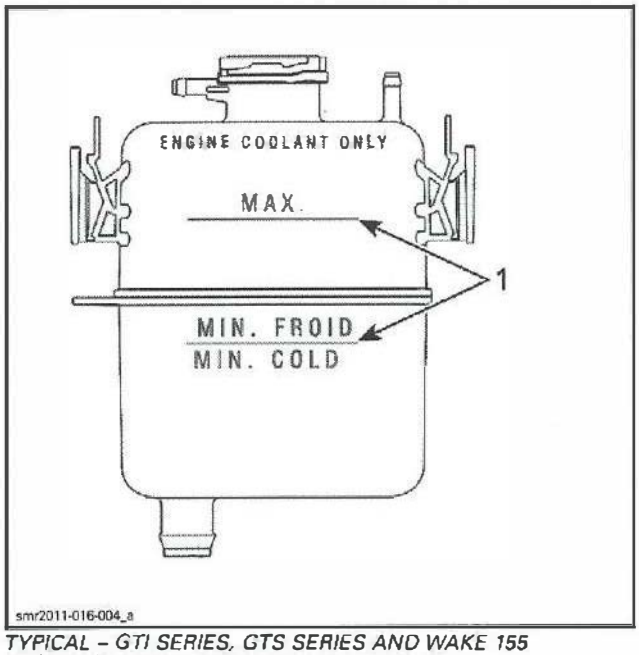
Apply LOCTITE 567 (PIPE SEALANT) (P/N 293 800 013) on drain plug threads.

Ask someone to pour recommended antifreeze in coolant tank.

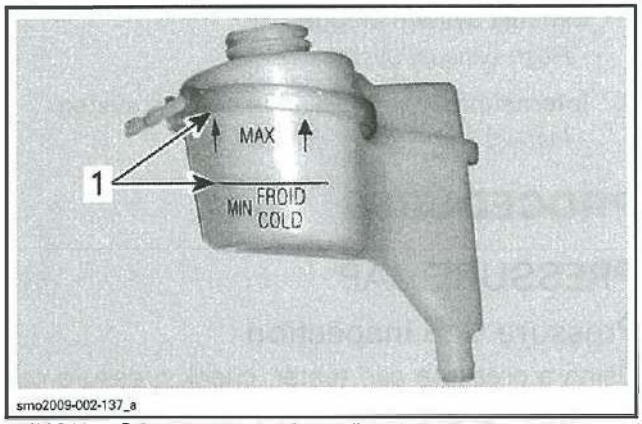
When antifreeze flows out from the ride plate drain hole, reinstall drain plug. Torque drain plug to specification.

DRAIN PLUG TIGHTENING TORQUE
8.5 N•m (75 lbf•in)

Continue to pour and fill coolant tank between marks.



TYPICAL - GTI SERIES, GTS SERIES AND WAKE 155
1. Level between marks when engine is cold



TYPICAL - GTX SERIES, RXT SERIES AND WAKE PRO 215
1. Level between marks when engine is cold

Do not install pressure cap at this time.

Link a garden hose to the hose adapter at the back of the watercraft. Refer to *EXHAUST SYSTEM FLUSHING* in the *EXHAUST SYSTEM* subsection.

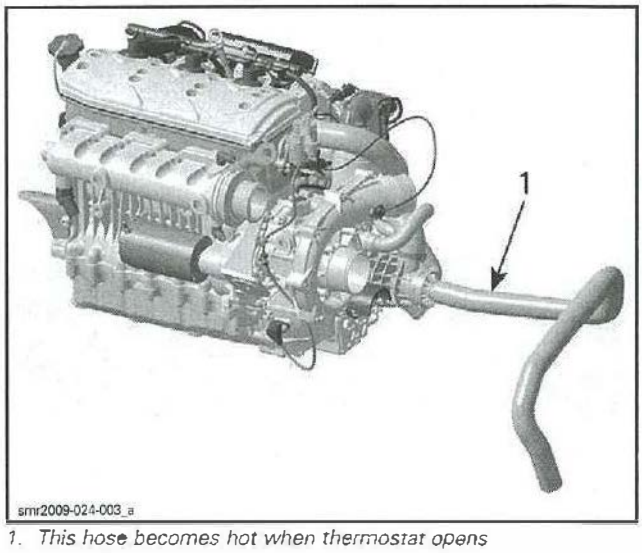
NOTICE **Never run engine without supplying water to the exhaust system.**

Start engine and let run for a maximum of 2 minutes. Stop engine and wait 15 minutes to cool down. Refill tank as necessary.

NOTICE **Never run engine longer than 2 minutes. Drive line seal has no cooling when watercraft is out of water.**

NOTE: Properly cool exhaust system by installing a garden hose. Refer to *EXHAUST SYSTEM* subsection.

Repeat this run-stop cycle 2-3 times until thermostat opens and stop engine.



1. This hose becomes hot when thermostat opens

Last, refill coolant tank and install pressure cap.

When engine has completely cooled down, recheck coolant level coolant tank and top up if necessary.

INSPECTION

COOLING SYSTEM LEAK TEST

⚠ WARNING

To avoid potential burns, do not remove the coolant tank cap or loosen the ride plate drain plug if the engine is hot.

Open seat.

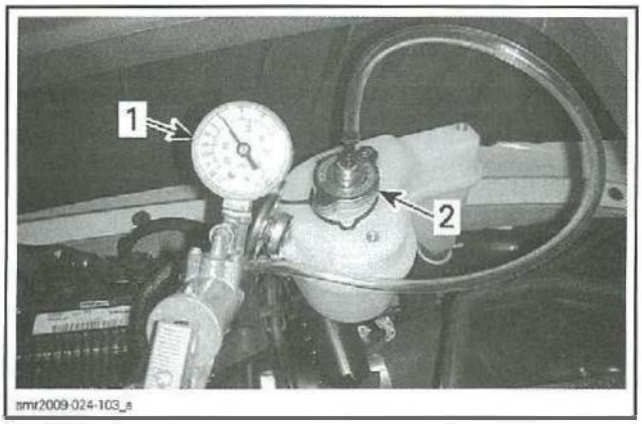
On iS models, remove the deck extension. Refer to *BODY* subsection.

Install the TEST CAP (P/N 529 035 991) on the coolant tank.



NOTE: It is not necessary to install a hose pincher on overflow hose.

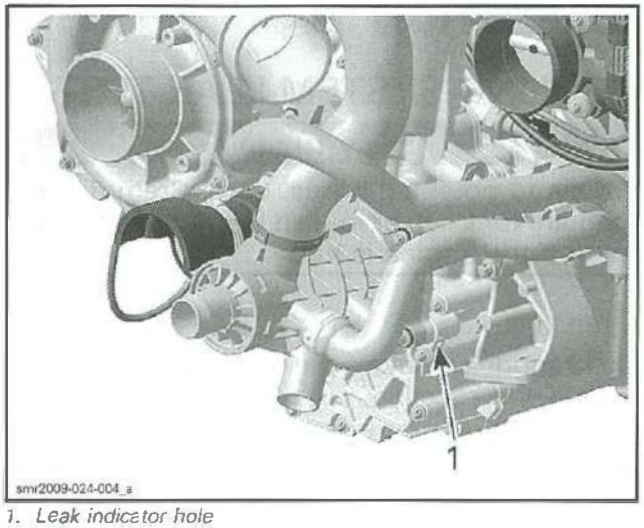
Connect the VACUUM/PRESSURE PUMP (P/N 529 021 800) to test cap and pressurize system through coolant tank to 90 kPa (13 PSI).



1. *Vacuum/pressure pump*
2. *Test cap*

Check all hoses, ride plate, engine and oil cooler for coolant leaks. Spray a soap and water solution and look for air bubbles.

Check the leak indicator hole if there is oil or coolant. If so, replace appropriate water pump shaft seal.



1. *Leak indicator hole*

TROUBLESHOOTING

The following is provided to help in diagnosing the probable source of troubles. It is a guideline and it should not be assumed to list all possible problems.

Always check for fault codes. If a fault code is detected, service the fault code first. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

ENGINE OVERHEATING

1. **Low coolant level.**
   - *Refill and check for leaks (coolant leaking out of engine leak indicator hole, hoses or clamps missing/defective, cylinder head gaskets leaks, ride plate leaking, etc.). Repair or replace.*
2. **Air in cooling system**
   - *Refill and bleed cooling system.*
3. **Thermostat defective (does not open when engine gets hot)**
   - *Replace thermostat housing.*
4. **Water pump failure**
   - *Inspect and replace defective components.*
5. **Water temperature sensor defective**
   - *Check or replace. Refer to ELECTRONIC FUEL INJECTION (EFI).*
6. **Ride plate or hoses damaged**
   - *Check or replace damaged components.*
7. **Exhaust system clogged**
   - *Flush exhaust system.*
8. **Internal passage blocked in cooling system**
   - *Inspect and clean.*

PROCEDURES

PRESSURE CAP

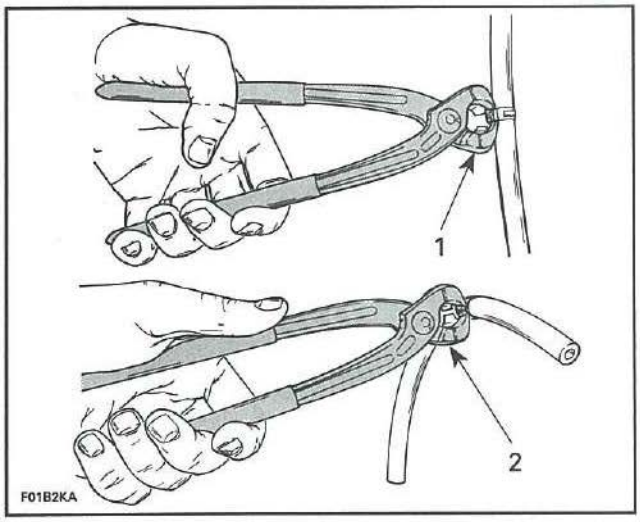
Pressure Cap Inspection

Using a pressure cap tester, check pressure cap efficiency. If the efficiency is feeble, install a new 90 kPa (13 PSI) cap (do not exceed this pressure).

CLAMPS

Clamp Replacement

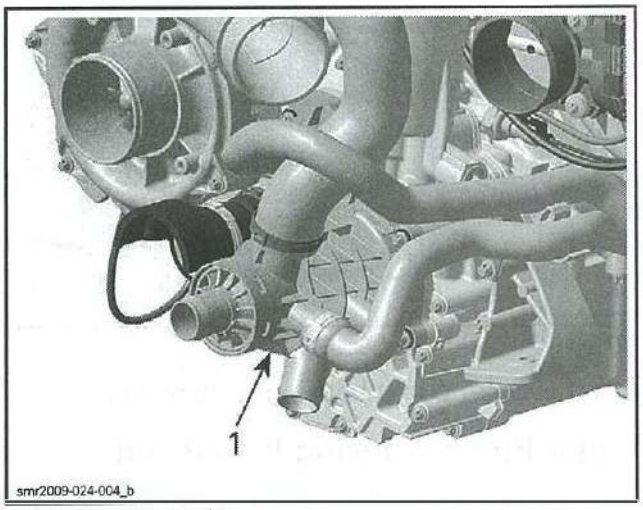
To cut or secure Oetiker clamps of cooling system hoses, use the OETIKER PLIERS (P/N 295 000 070).



1. Cutting clamp
2. Securing clamp

NOTE: Always check general condition of hoses and clamp tightness.

WATER PUMP HOUSING



1. Water pump housing

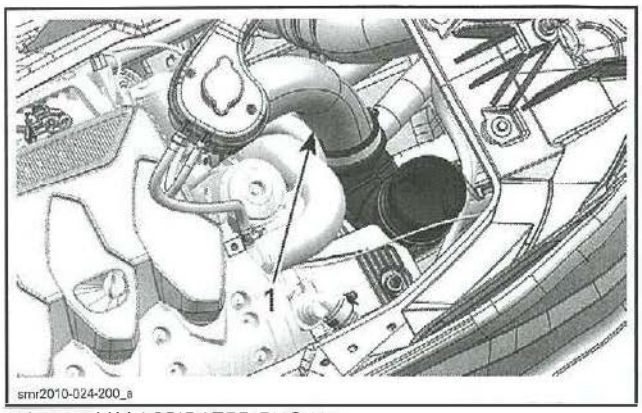
Water Pump Housing Access

GTI Series, GTS Series and WAKE 155

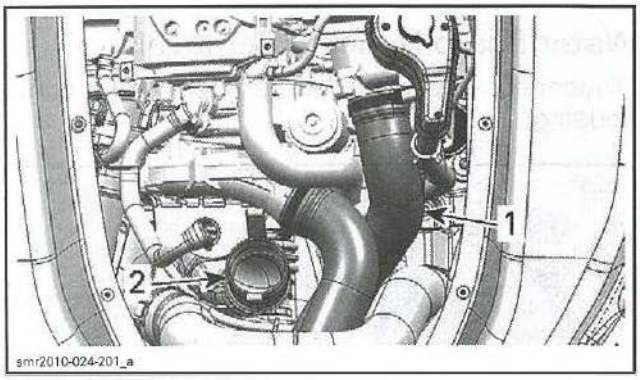
Remove the seat.

GTX Series, RXT Series and WAKE PRO 215

1. On iS models, remove moving deck and deck extension. Refer to *BODY* subsection.
2. Remove the air intake silencer. Refer to the appropriate subsection according to model:
   - *AIR INTAKE SYSTEM (EXCEPT iS AND aS MODELS)*
   - *AIR INTAKE SYSTEM (iS AND aS MODELS).*
3. Detach the air intake hose from the throttle body.

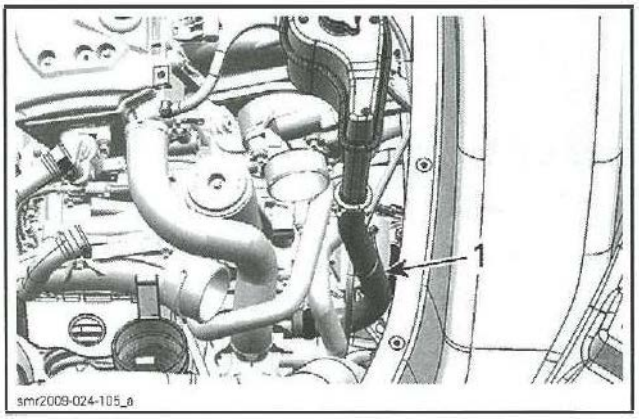


NATURALLY-ASPIRATED ENGINE
1. Detach intake hose at throttle body



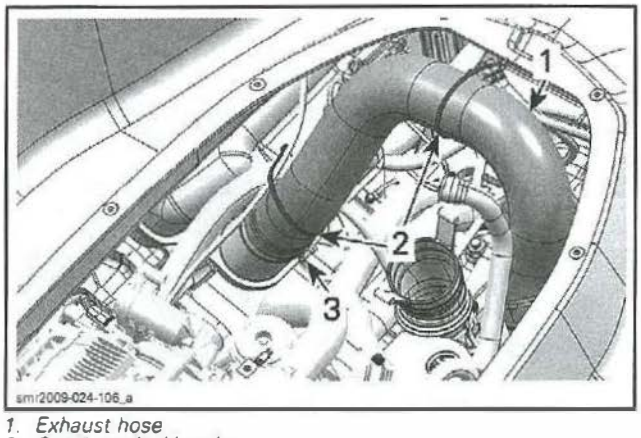
SUPERCHARGED ENGINE
1. Detach intake hose at throttle body
2. Supercharger hose

4. On supercharged engines, remove also the hose from the supercharger.
5. Drain cooling system and engine oil.
6. Disconnect the coolant tank hose from water pump housing and move coolant tank aside to make room.



1. Coolant tank hose

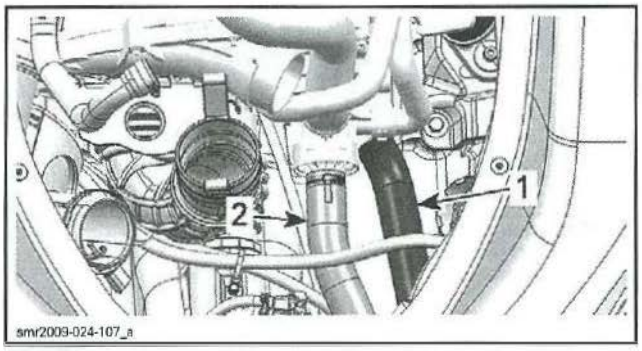
7. Disconnect exhaust hose from the resonator. Place hose over muffler.



1. Exhaust hose
2. Cut these locking ties
3. Retaining clamp

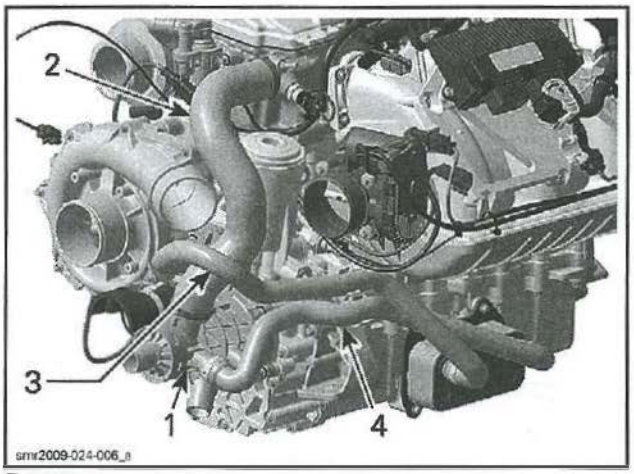
Water Pump Housing Removal

Disconnect ride plate hoses from water pump housing.



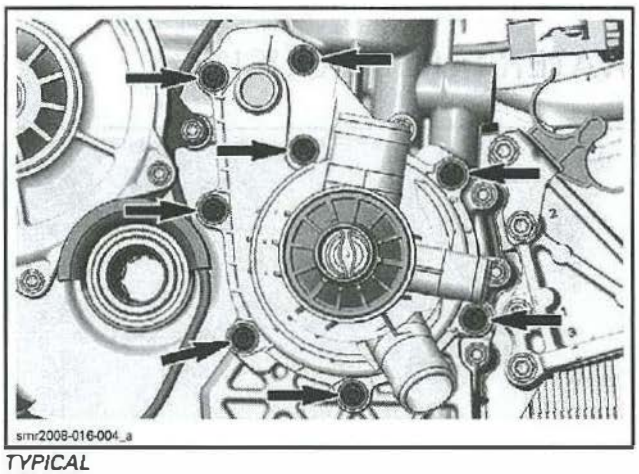
TYPICAL
1. Ride plate outlet hose
2. Ride plate inlet hose

Disconnect the cylinder head outlet hose and oil cooler hoses.



TYPICAL
1. Water pump housing
2. Cylinder head hose
3. Oil cooler inlet hose
4. Oil cooler outlet hose

Remove water pump housing screws.

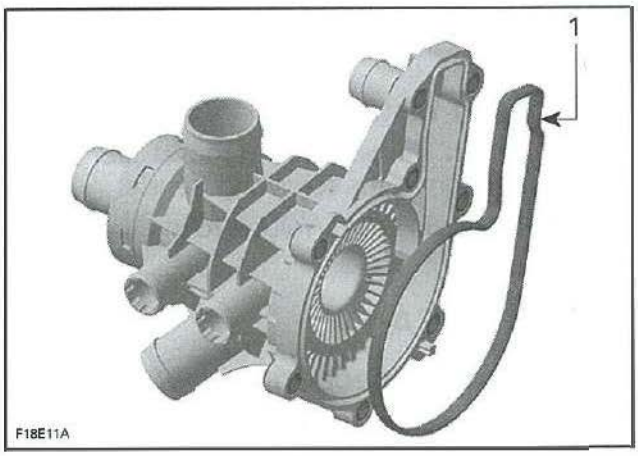


TYPICAL

Pull the water pump housing to remove it.

Water Pump Housing Inspection

Check if gasket is brittle, hard or damaged and replace as necessary.

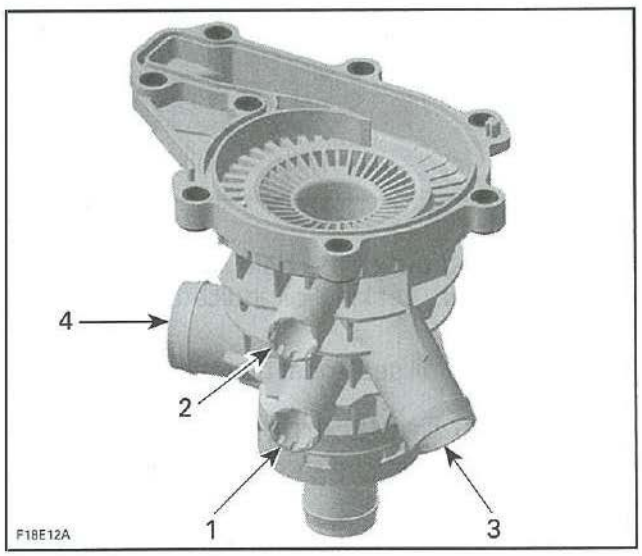


1. Water pump housing gasket

Check if thermostat is in good condition. Refer to *THERMOSTAT* in this subsection.

Water Pump Housing Leak Test

Plug the connections of the oil cooler return hose, coolant tank hose, ride plate return hose and cylinder head return hose with a rag.



1. Oil cooler return connection
2. Coolant tank hose connection
3. Ride plate return hose connection
4. Cylinder head return hose connection

Fill the water pump housing with water.

If a bigger quantity of coolant leaks out at the ride plate outlet connection, replace the water pump housing.

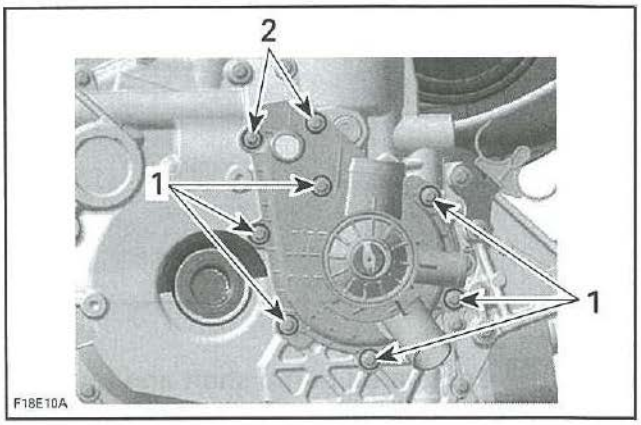
If there is no leak, check the operation of the thermostat.

Water Pump Housing Installation

The installation is the opposite of the removal procedure. However, pay attention to the following.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of water pump housing screws.

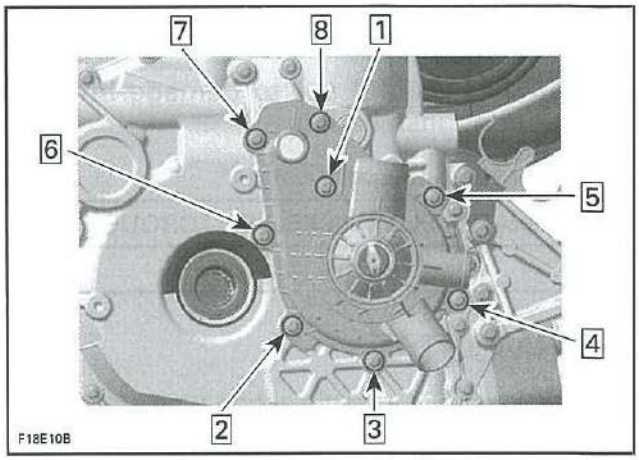
Install screws as per the following illustration.



1. Screws M6 x 25
2. Screws M6 x 105

NOTICE **To prevent leaking, take care that the gaskets are exactly in groove when you reinstall the water pump housing.**

Tighten screws to specification using the following sequence.



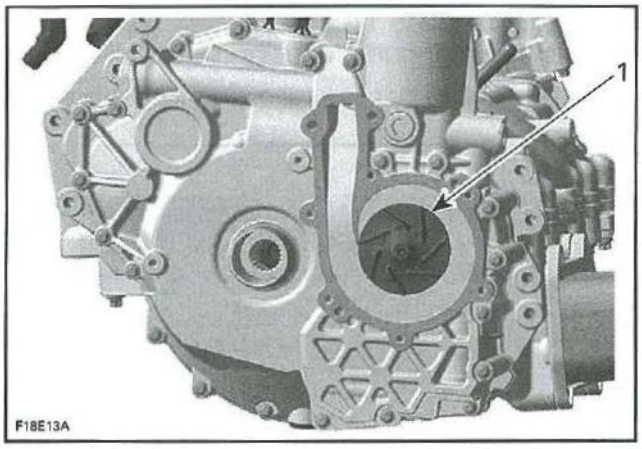
WATER PUMP HOUSING SCREWS TORQUE
9 N•m (80 lbf•in)

WATER PUMP IMPELLER

Water Pump Impeller Removal

Remove the *WATER PUMP HOUSING*, see procedure in this subsection.

Unscrew the impeller clockwise.



1. Impeller

NOTICE Coolant/oil pump shaft and impeller have left-hand threads. Remove by turning clockwise and install by turning counterclockwise.

Water Pump Impeller Inspection

Check impeller for cracks or other damage. Replace impeller if damaged.

Water Pump Impeller Installation

The installation is the opposite of the removal procedure. Pay attention to the following details.

NOTICE Be careful not to damage impeller wings during installation.

Torque impeller to specification.

WATER PUMP IMPELLER TORQUE
3 N•m (27 lbf•in)

THERMOSTAT

The thermostat is a single action type.

Thermostat Removal

Remove the *WATER PUMP HOUSING*, see procedure in this subsection.

NOTE: The thermostat is located inside the water pump housing.

Thermostat Test

To check the operation of the thermostat, put it in water and heat water.

Look inside the cylinder head return hose connection to see the movement of the thermostat. Thermostat should open when water temperature reaches 87°C (189°F).

If there is no operation, replace the water pump housing.

Thermostat Installation

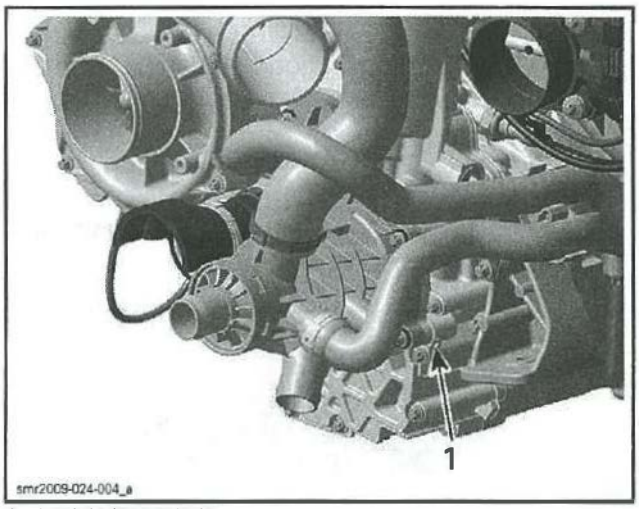
For installation, reverse the removal procedure, paying attention to the following details.

Refer to *WATER PUMP HOUSING* in this subsection.

ROTARY SEAL

Rotary Seal Inspection

Check leak indicator hole for oil or coolant leak.



1. Leak indicator hole

Coolant leaking out of the hole indicates a defective rotary seal. Leaking oil indicates a faulty oil seal.

Rotary seal and oil seal must be replaced together.

Rotary Seal Replacement

Refer to *LUBRICATION SYSTEM* subsection.

CYLINDER HEAD

SERVICE TOOLS

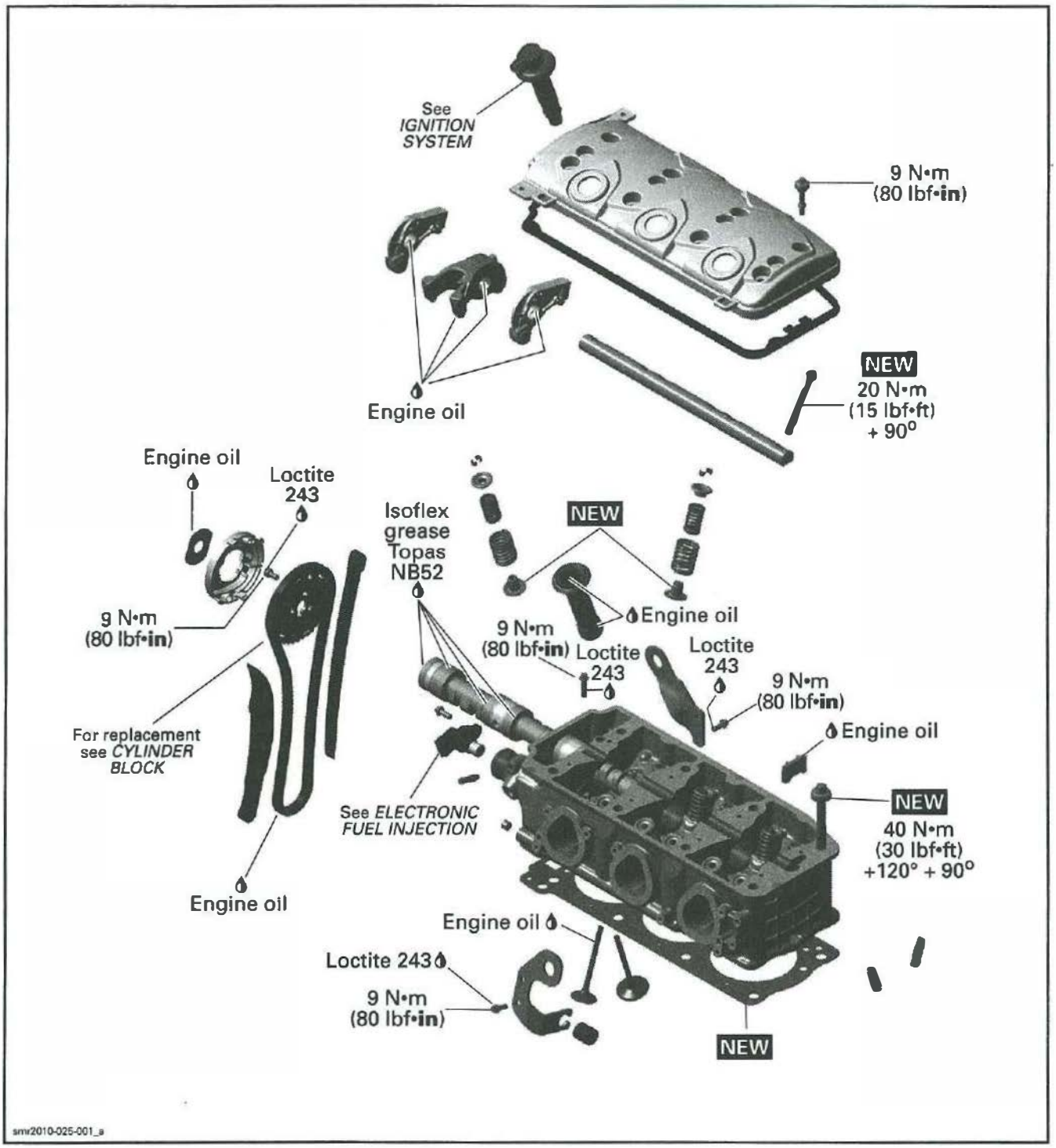
Description	Part Number	Page
CAMSHAFT LOCKING TOOL	529 035 839	161
DRIVE SHAFT ADAPTER	529 035 985	154
ENGINE LEAK DOWN TEST KIT	529 035 661	154
VALVE GUIDE PUSHER (6 MM)	529 036 087	170
VALVE GUIDE REMOVER (6 MM)	529 036 086	170
VALVE SPRING COMPRESSOR CUP	529 036 073	165
VALVE SPRING COMPRESSOR	529 035 724	165

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
SNAP-ON VALVE STEM SEAL PLIERS	YA8230	166

SERVICE PRODUCTS

Description	Part Number	Page
ISOFLEX GREASE TOPAS NB 52	293 550 021	162
LOCTITE 243 (BLUE)	293 800 060	161, 164
MOLYKOTE G-N	420 297 433	170


See IGNITION SYSTEM
9 N•m (80 lbf•in)
NEW
20 N•m (15 lbf•ft) + 90°
Engine oil
Engine oil
Loctite 243
9 N•m (80 lbf•in)
For replacement see CYLINDER BLOCK
Engine oil
Isoflex grease Topas NB52
NEW
Engine oil
9 N•m (80 lbf•in)
Loctite 243
Loctite 243
9 N•m (80 lbf•in)
Engine oil
See ELECTRONIC FUEL INJECTION
NEW
40 N•m (30 lbf•ft) +120° + 90°
Engine oil
Loctite 243
9 N•m (80 lbf•in)
NEW
sm2010-025-001_a

GENERAL

NOTE: When diagnosing an engine problem, always perform an engine leak test. This will help pin-point a problem. Refer to *ENGINE LEAK TEST* in this subsection for procedures.

Always place the vehicle on level surface.

Always disconnect the negative wire from the battery before working on the engine.

Even if the removal of many parts is not necessary to reach another part, it is recommended to remove these parts in order to check them.

When disassembling parts that are duplicated in the engine, (e.g.: valves, bushings), it is strongly recommended to note their position (cylinder 1, 2 or 3) and to keep them as a "group". If you find a defective component, it would be much easier to find the cause of the failure within the group of parts (e.g.: you found a worn valve guide. A bent spring could be the cause and it would be easy to know which one among the springs is the cause to replace it if you grouped them at disassembly). Besides, since used parts have matched together during the engine operation, they will keep their matched fit when you reassemble them together within their "group".

During assembly/installation, use torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

Hoses, cable or locking ties removed during the removal must be reinstalled as per factory standards.

INSPECTION

ENGINE LEAK TEST

The procedure has to be done when engine operating temperature of approximately 70°C (158°F) is reached.

⚠ WARNING

Be careful to burns when working on a hot engine.

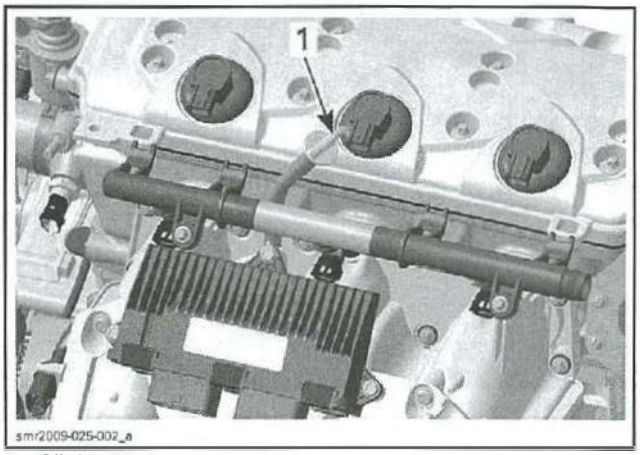
Preparation

1. Remove any required parts to give access to engine.
2. Remove the tether cord.
3. Remove jet pump (refer to *JET PUMP* subsection).
4. Remove coolant pressure cap.

⚠ WARNING

To avoid potential burns, only remove the coolant pressure cap by wearing the appropriate safety equipment.

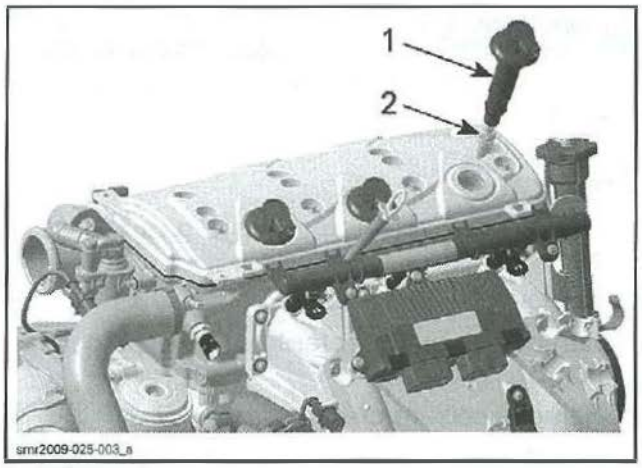
5. Remove oil dipstick.



1. Oil dipstick

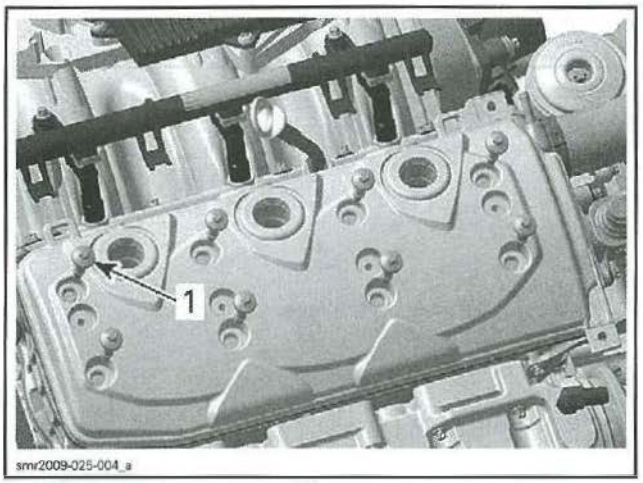
6. Unplug and remove ignition coils.
7. Remove spark plugs.

NOTE: Ignition coil may be used as an extractor.



1. Ignition coil
2. Spark plug

8. Remove cylinder head cover cowl.
9. Unscrew and remove cylinder head cover.



1. Cylinder head cover screw (8)

10. Install the DRIVE SHAFT ADAPTER (P/N 529 035 985) on drive shaft end.

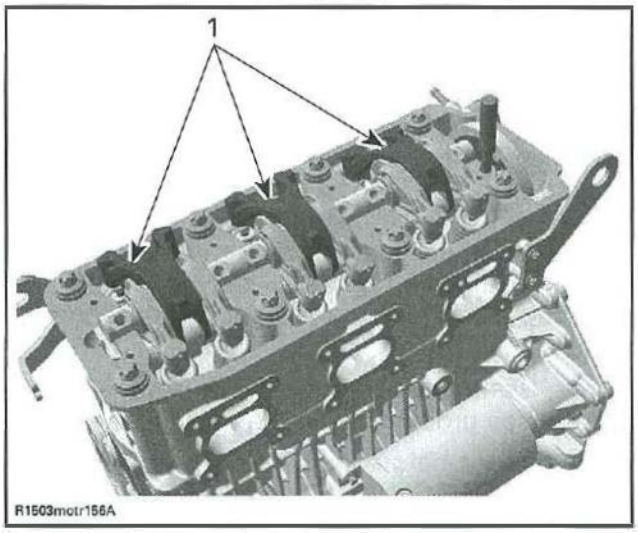


11. To rotate engine crankshaft, use an appropriate wrench lever with drive shaft adapter.

Leak Test Procedure

NOTE: Cylinder numbers are molded on cylinder head cover.

1. Rotate engine crankshaft counterclockwise until the cylinder 1 is at Top Dead Center (TDC) compression stroke.
   1.1 As the engine crankshaft is turned over, observe the movement of intake rocker arm of the cylinder to be checked.
   1.2 After piston completes its cycle and the intake valve closes, observe the piston.
   1.3 When it reaches its uppermost position this is **TDC compression stroke.**

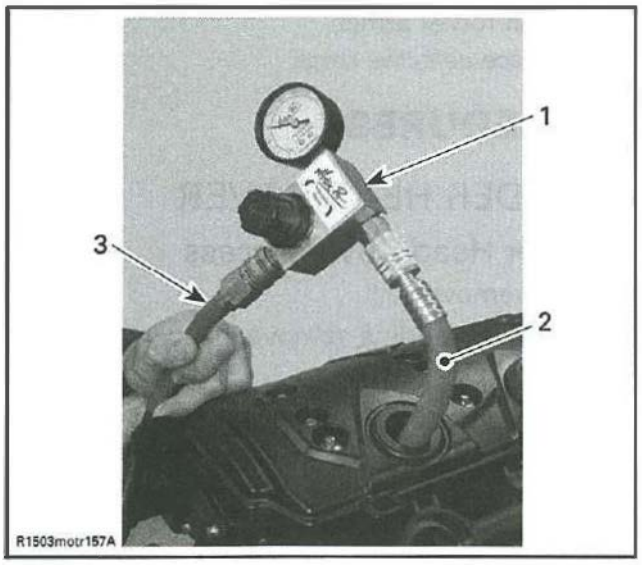


1. Intake rocker arms

2. Secure the drive shaft adapter with a wrench lever against hull to prevent further crankshaft rotation.
3. Install gauge adapter from the ENGINE LEAK DOWN TEST KIT (P/N 529 035 661) into spark plug hole.
4. Connect to adequate air supply.

NOTE: Each tester will have specific instruction on the gauge operation and required pressure. Refer to manufacturer's instructions.

5. Set needle of measuring gauge to zero.
6. Supply combustion chamber with air.



TYPICAL
1. Leak down tester gauge
2. Gauge adapter
3. Air supply hose

7. Note the amount of leaking or percentage (depending on tester).

LEAKAGE PERCENTAGE	ENGINE CONDITION
Up to 15%	Excellent condition
16% to 25%	Good condition
26% to 40%	Fair condition; engine will run and performance might be down in some cases
41% and higher	Poor condition, diagnose and repair engine

8. Proceed the same way with remaining cylinders.

Diagnostic

Pressurize area to be tested, spray soap/water solution at the indicated location and look and/or listen for air bubbles.

OBSERVATION	CAUSE
Air escaping on intake port	Leaking intake valve(s)
Air escaping on exhaust port	Leaking exhaust valve(s)
Air escaping into crankcase	Excessively worn and/or broken piston rings
Air bubbles out of coolant tank	Leaking cylinder head gasket
Air/water escaping from cylinder-block/head	Damaged gasket and/or loosened screws
Coolant escaping from water pump housing	Damaged gasket and/or loosened screws (refer to *COOLING SYSTEM*)
Coolant escaping from leak indicator hole	Damaged rotary seal on water pump shaft (refer to *COOLING SYSTEM*)
Oily contamination on leak indicator hole	Damaged oil seal on water pump shaft

Reassembly

For reassembly, reverse the preparation procedure. Use torque values and service products from the exploded views (refer to proper *ENGINE* subsections).

Properly install ignition coils. Refer to *IGNITION SYSTEM* subsection.

TROUBLESHOOTING

The following is provided to help in diagnosing the probable source of problems. It is a guideline and it should not be assumed to list all possible problems.

Always check for fault codes. If a fault code is detected, service the fault code first. Refer to *ENGINE MANAGEMENT* section.

UNUSUAL ENGINE NOISE OR VIBRATIONS

1. Incorrect camshaft timing adjustment
   - *Replace damaged components and readjust camshaft timing.*
2. Camshaft timing gear screws got loose
   - *Retighten screws with the recommended torque.*
3. Rocker arm(s) hydraulic element is broken or worn out (improper valve adjustment).
   - *Replace faulty rocker arm(s).*

4. Rocker arm screw not properly tightened
   - *Retighten screws with recommended torquing procedure.*
5. Faulty chain tensioner
   - *Replace chain tensioner.*
6. Chain guide is worn out
   - *Replace chain guide.*
7. Stretched timing chain or worn out sprocket
   - *Replace timing chain and sprocket.*
8. Camshaft is worn out
   - *Check if camshaft radial clearance is out of specification.*

OIL LEAKAGE FROM CYLINDER HEAD

1. Cylinder head cover gasket is leaking
   - *Replace cylinder head cover gasket and retighten screws with recommended torque.*
   - *Check cylinder head cover for cracks or other damage. Replace if necessary.*
2. Cylinder head cover screws are leaking
   - *Replace cylinder head cover screws.*
3. Spark plug tube gasket is leaking
   - *Remove cylinder head cover and replace spark plug tube gasket.*
   - *Clean spark plug area from oil spillage.*
4. Blow by valve is leaking
   - *Replace blow by valve O-ring.*
5. Camshaft sensor O-ring is leaking
   - *Replace camshaft sensor O-ring.*
6. Cylinder head gasket is leaking
   - *Remove cylinder head and check for damage.*
   - *Replace cylinder head gasket and retighten screws with recommended torquing procedure.*

ENGINE LACKS ACCELERATION OR POWER

1. Incorrect camshaft timing adjustment
   - *Replace damaged components and readjust camshaft timing.*
2. Intake or exhaust valves are leaking
   - *Perform ENGINE LEAK TEST.*
   - *Check if valve seats properly in valve seat.*
   - *Repair or replace damaged components.*
3. Broken valve spring(s)
   - *Replace defective parts.*
4. Broken rocker arm(s)
   - *Replace defective parts.*

PROCEDURES

CYLINDER HEAD COVER

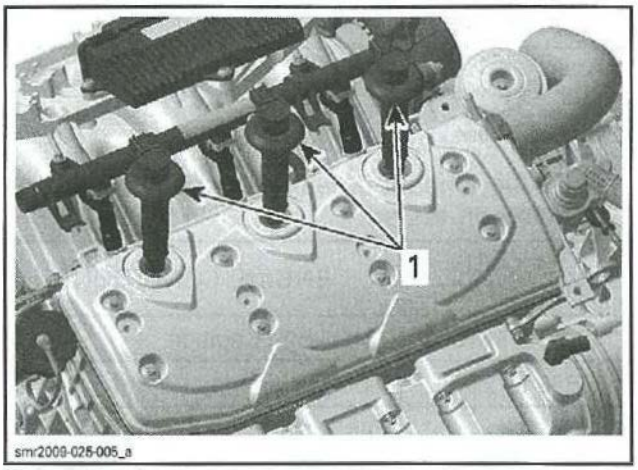
Cylinder Head Cover Access

Open or remove seat.

On iS and aS models, remove the rear ventilation cover.

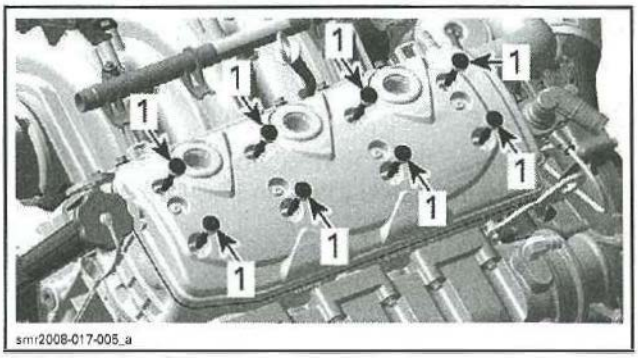
Cylinder Head Cover Removal

1. Unplug and remove ignition coils.



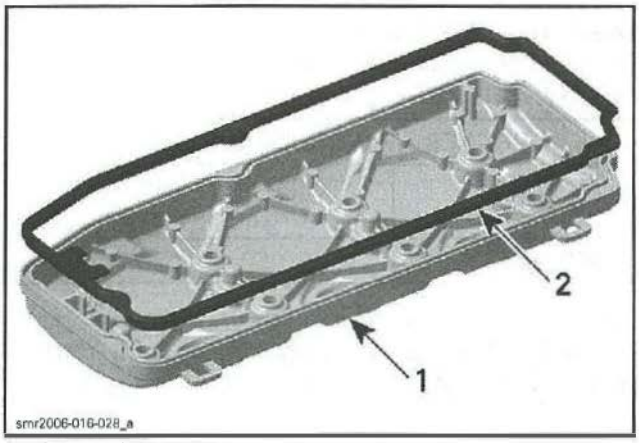
1. Ignition coils

2. Remove screws securing the cylinder head cover.



1. Cylinder head cover screws

3. Remove the cylinder head cover and its gasket.



1. *Cylinder head cover*
2. *Gasket*

Cylinder Head Cover Inspection

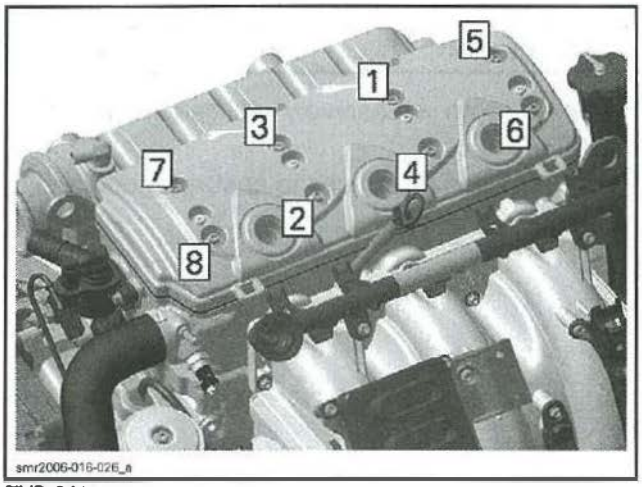
Check if the gasket on the cylinder head cover and the rubber bushing on the cylinder head cover screws are brittle, cracked or hard. If so, replace the gasket or the cylinder head cover screw accordingly.

Cylinder Head Cover Installation

For installation, reverse the removal procedure. However, pay attention to the following.

Properly seat the gasket in the cover groove.

Install the cylinder head cover screws according to following sequence.



TYPICAL

Torque screws to 9 N•m (80 lbf•**in**).

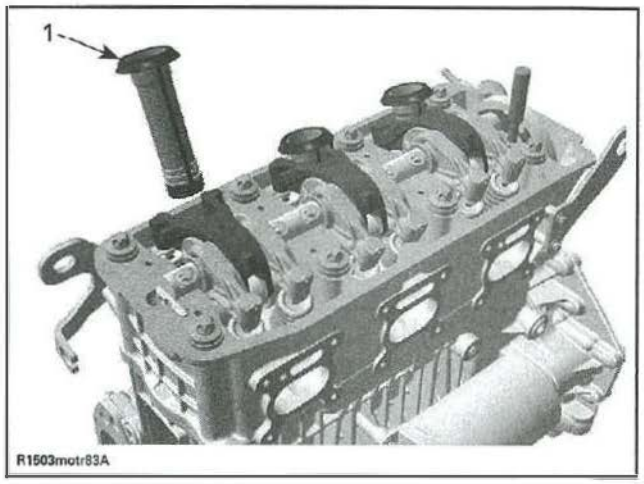
Install all other removed parts. Refer to proper subsection for procedure.

SPARK PLUG TUBES

Spark Plug Tube Removal

Remove the *CYLINDER HEAD COVER*, see procedure in this subsection.

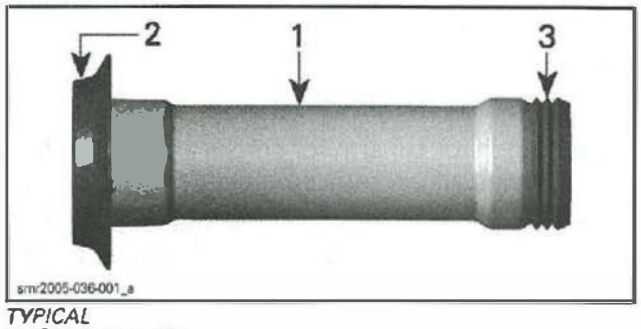
Pull spark plug tubes to remove them.



1. *Spark plug tube*

Spark Plug Tube Inspection

Check seals on spark plug tube. If seals are brittle, cracked or hard, replace spark plug tube.



TYPICAL
1. *Spark plug tube*
2. *Seal to the cylinder head cover*
3. *Seal to the cylinder head*

Spark Plug Tube Installation

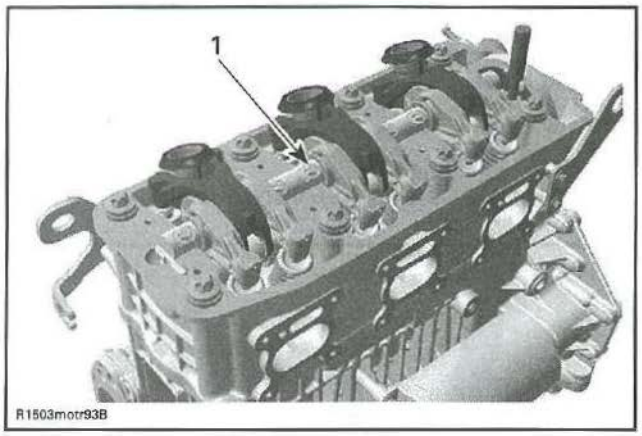
For installation, reverse the removal procedure. Pay attention to the following detail.

Apply engine oil on seals.

ROCKER ARMS

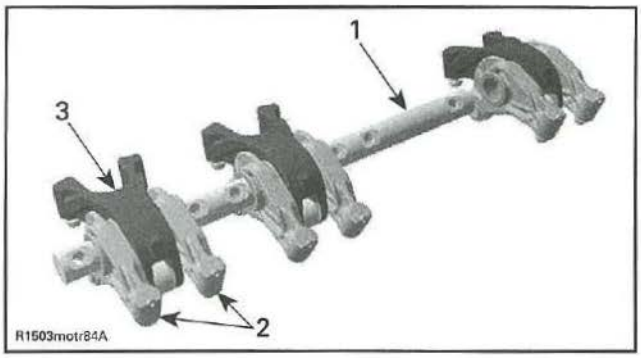
Rocker Arm Removal

1. Remove the *CYLINDER HEAD COVER*, see procedure in this subsection.
2. Remove spark plug tubes.
3. Remove and discard rocker arm shaft screws.



1. Rocker arm shaft screw

4. Remove rocker arm shaft with rocker arms.

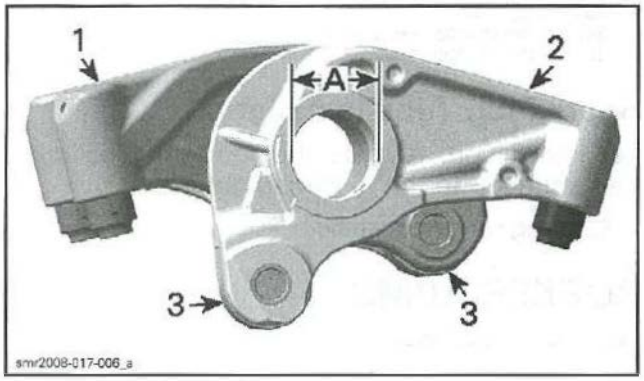


1. Rocker arm shaft
2. Rocker arms (exhaust side)
3. Rocker arm (intake side)

Rocker Arm Inspection

Inspect each rocker arm for cracks and scored friction surfaces. If so, replace rocker arm assembly.

Check the rocker arm rollers for free movement, wear and excessive radial play. Replace rocker arm assembly as necessary.



1. Rocker arm (intake side)
2. Rocker arm (exhaust side)
3. Rollers
A. Rocker arm inside diameter

Measure rocker arm inside diameter. If diameter is out of specification, change the rocker arm assembly.

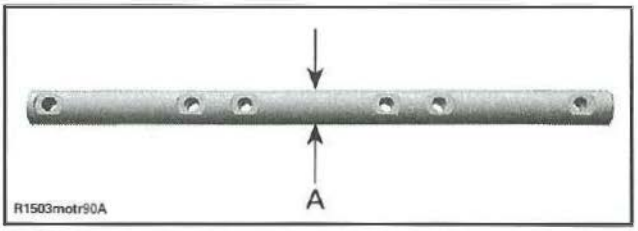
ROCKER ARM INSIDE DIAMETER	
NEW	20.007 mm - 20.020 mm (.7877 in - .7882 in)
SERVICE LIMIT	20.050 mm (.7894 in)

Press the hydraulic lifter with your thumb. If the hydraulic lifter can be fully pressed in, replace rocker arm. Lifter must turn freely in rocker arm bore. Otherwise, replace.

Rocker Arm Shaft

Check for scored friction surfaces, if so, replace parts.

Measure rocker arm shaft diameter.

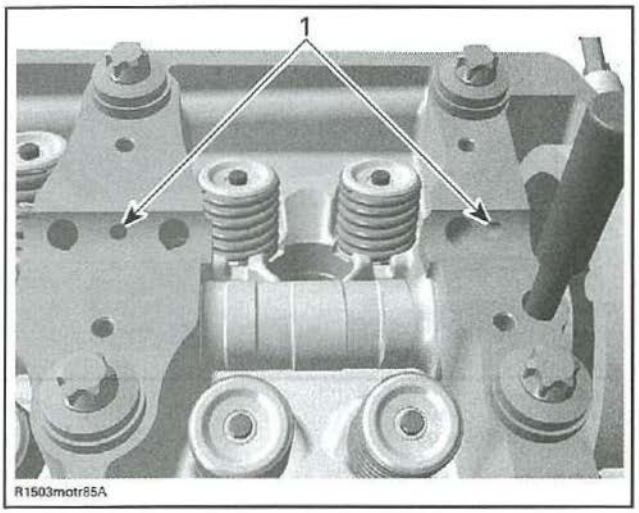


A. Measure rocker arm shaft diameter here

ROCKER ARM SHAFT DIAMETER	
NEW	19.980 mm - 19.993 mm (.7866 in - .7871 in)
SERVICE LIMIT	19.970 mm (.7862 in)

Any area worn excessively will require parts replacement.

Verify and clean oil orifices to ensure a good rocker arm shaft lubrication.



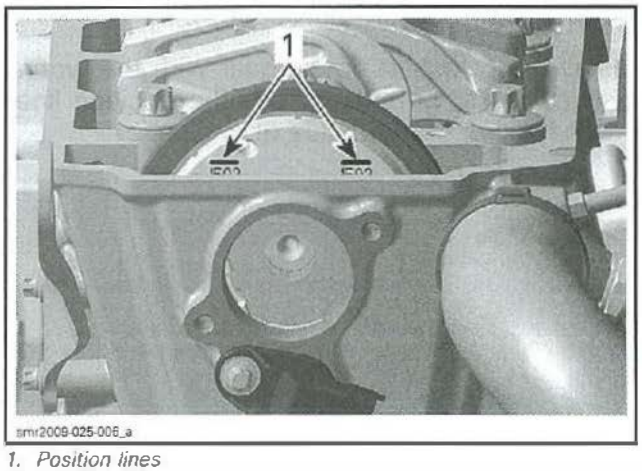
1. Oil orifices from the camshaft to the rocker arm shaft, then to the rocker arms and finally to the valve adjustment

Rocker Arm Installation

For installation, reverse the removal procedure. Pay attention to the following details.

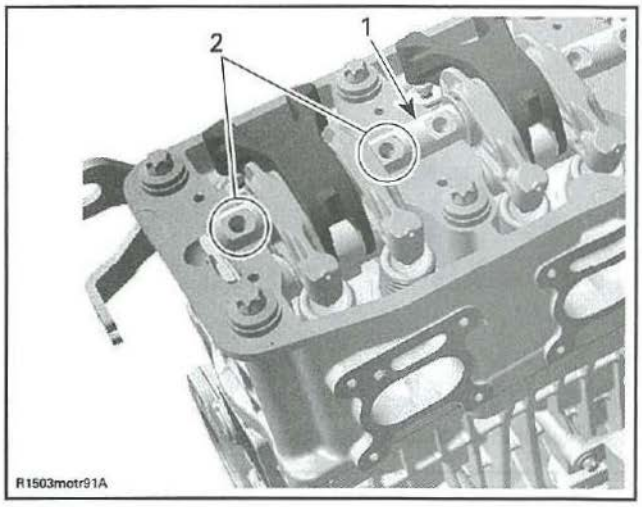
NOTE: The rocker arm shaft can only be installed in one specific position. Therefore the camshaft has to be positioned with its locking pin when the piston of cylinder 3 is on ignition TDC.

1. Lock camshaft. Refer to *CAMSHAFT* in this subsection.
2. Make sure the position lines on oil separator cover are lined up as shown in the following illustration.



1. Position lines

3. Apply engine oil on rocker arm shaft.
4. Position the rocker arm shaft with the notches on top.

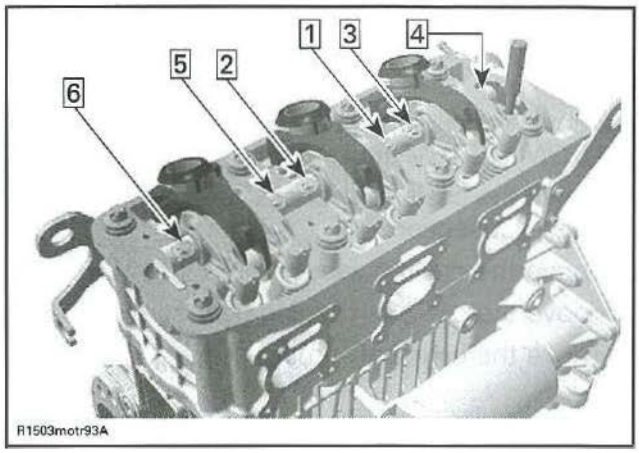


1. Rocker arm shaft
2. Rocker arm shaft notches

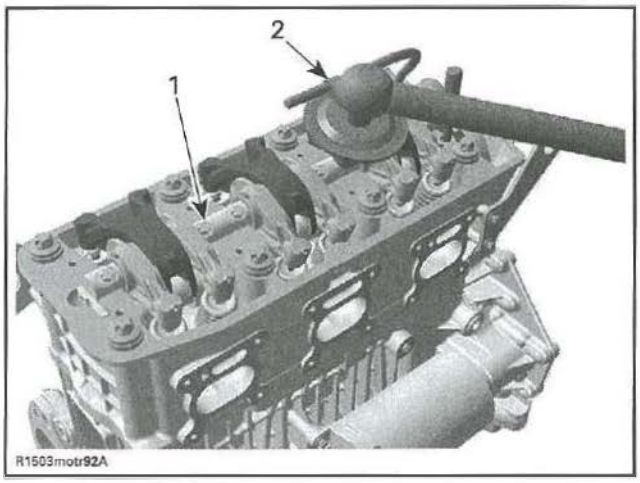
5. Install NEW rocker arm shaft screws.

NOTICE **This assembly uses stretch screws. As the screws have been stretched from the previous installation, it is very important to use new screws at assembly. Failure to replace screws and to strictly follow the torque procedure may cause screws to loosen and lead to engine damage.**

6. Torque screws at first to 10 N•m (89 lbf•**in**) according to following sequence.



7. Retorque screws to 20 N•m (15 lbf•ft).
8. Finish tightening screws turning an additional 90° rotation with a torque angle gauge.



1. *Rocker arm shaft screw*
2. *Torque angle gauge*

CAMSHAFT TIMING GEAR

NOTE: Although it is not necessary to position crankshaft to TDC for disassembly, it is a good practice to do it, as a troubleshooting step, to know before disassembly if valve timing was appropriate.

Camshaft Timing Gear Removal

Lock crankshaft, refer to *CYLINDER BLOCK* subsection.

Remove *CYLINDER HEAD COVER*, see procedure above in this subsection.

Lock camshaft. Refer to *CAMSHAFT* in this subsection.

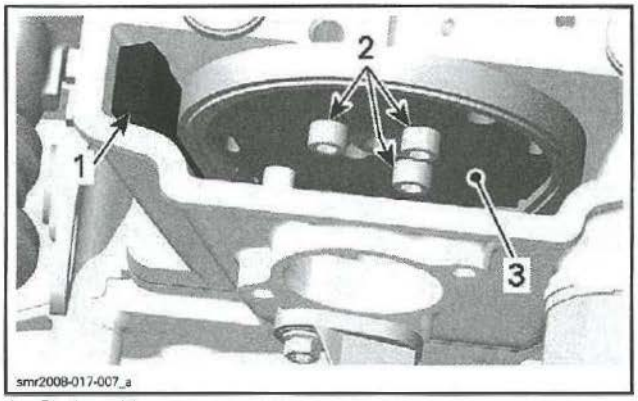
Remove the oil separator cover. Refer to *LUBRICATION SYSTEM* subsection.

Remove the chain tensioner. Refer to *CYLINDER BLOCK* subsection.

Remove the chain guide.

Remove the camshaft timing gear screws.

Remove the camshaft timing gear.



1. *Chain guide*
2. *Timing gear screws*
3. *Camshaft timing gear*

NOTE: Secure timing chain with a retaining wire.

Camshaft Timing Gear Inspection

Check camshaft timing gear for wear or deterioration.

If gear is worn or damaged, replace it as a set (camshaft timing gear and timing chain).

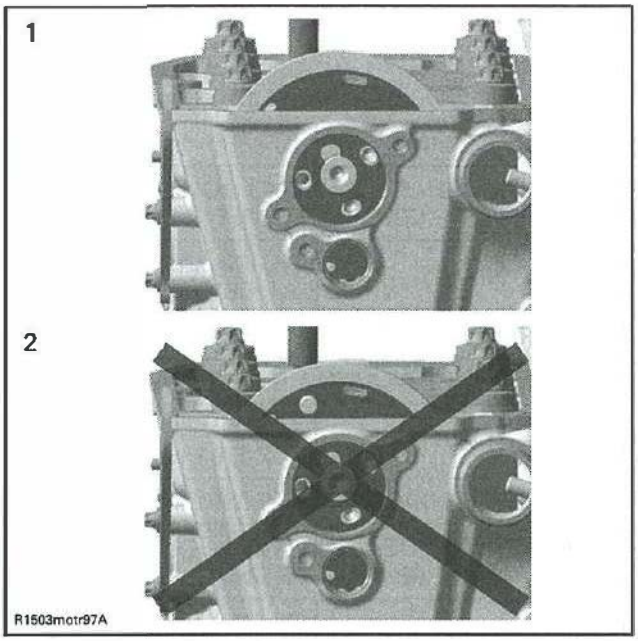
For crankshaft timing gear replacement, refer to *CYLINDER BLOCK* subsection.

Camshaft Timing Gear Installation

For installation, reverse the removal procedure. Pay attention to the following details.

NOTICE **Improper camshaft timing will damage engine components. Make sure camshaft and crankshaft are still locked. If not, lock them before beginning this procedure.**

Install the camshaft timing gear with the writing visible, i.e. to be able to see the position lines when looking from outside of engine.



1. *Good (with 1503 aligned)*
2. *Never*

Install timing chain. Refer to *CYLINDER BLOCK* subsection.

Ensure chain guides are properly installed.

Loosely install gear chain screws.

Install chain tensioner.

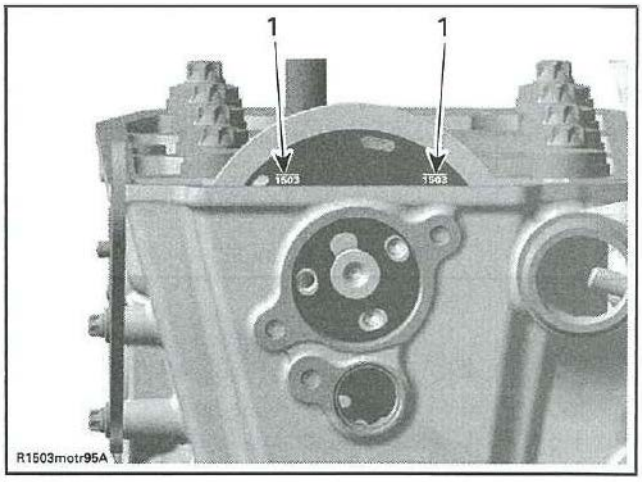
NOTE: There can be 2 different positions to install the timing gear on the camshaft. Basically both positions are working well, since the camshaft and crankshaft are locked in their proper position. Due to some tolerances, there could be one position which fits better than the other one. To check this, perform the following test.

Check if timing gear screws are still loose. If screws are squeezed by the timing gear, remove the chain tensioner again and rotate timing gear by one tooth clockwise. Then install the chain tensioner again.

One at a time, remove timing gear screws and apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads.

Tighten timing gear screws to 9 N•m (80 lbf•**in**).

NOTICE **Crankshaft and camshaft must be locked on TDC position to place camshaft timing gear and timing chain in the proper position. To double check, take a look at the timing gear lines. They must be parallel to the cylinder head surface.**



1. *Position lines*

NOTICE **Ensure to remove locking tools when finished.**

Install all other removed parts.

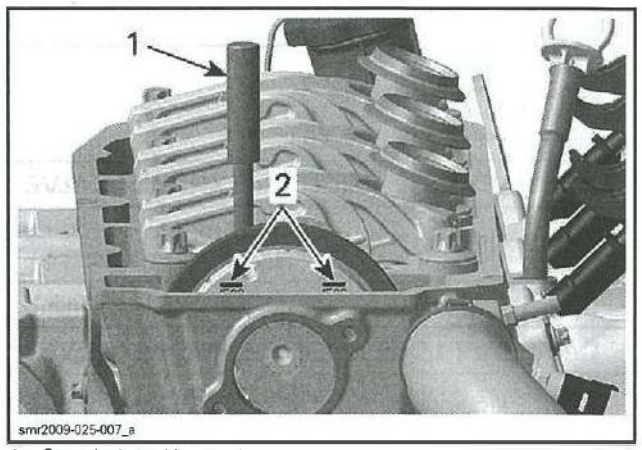
CAMSHAFT

Camshaft Locking Procedure

1. Remove *CYLINDER HEAD COVER*, see procedure in this subsection.
2. Lock crankshaft, refer to procedure in *CYLINDER BLOCK* subsection.
3. Lock camshaft using the CAMSHAFT LOCKING TOOL (P/N 529 035 839).



4. Make sure the position lines on oil separator cover are lined up as shown in the following illustration.



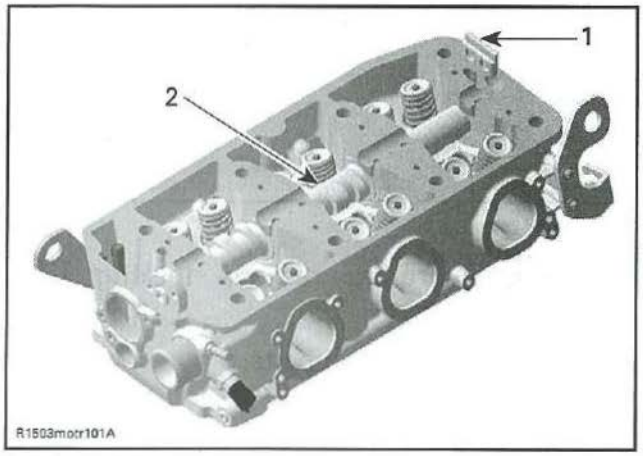
1. *Camshaft locking tool*
2. *Position lines*

Camshaft Removal

Remove the *CAMSHAFT TIMING GEAR*, see procedure in this subsection.

Remove the *ROCKER ARM*, see procedure in this subsection.

Remove the camshaft lock to remove the camshaft.



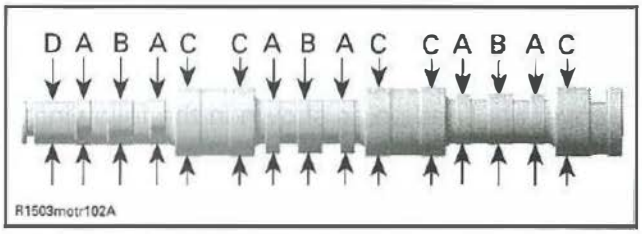
1. Camshaft lock
2. Camshaft

Camshaft Inspection

Check each lobe and bearing journal of camshaft for scoring, scuffing, cracks or other signs of wear.

Measure camshaft bearing journal and lobe height using a micrometer.

Measure clearance between both ends of camshaft and cylinder head.



A. Camshaft lobe (exhaust valves)
B. Camshaft lobe (intake valves)
C. Camshaft bearing journal
D. Camshaft bearing journal — engine front

CAMSHAFT LOBE HEIGHT — EXHAUST VALVE	
NEW	31.430 mm to 31.630 mm (1.2374 in to 1.2453 in)
SERVICE LIMIT	31.380 mm (1.2354 in)
CAMSHAFT LOBE HEIGHT — INTAKE VALVE	
NEW	31.540 mm - 31.740 mm (1.2417 in - 1.2496 in)
SERVICE LIMIT	31.50 mm (1.2402 in)

CAMSHAFT BEARING JOURNAL	
NEW	39.892 mm - 39.905 mm (1.5706 in - 1.5711 in)
SERVICE LIMIT	39.880 mm (1.5701 in)
CAMSHAFT BEARING JOURNAL (ENGINE FRONT)	
NEW	24.939 mm - 24.960 mm (.9819 in - .9827 in)
SERVICE LIMIT	24.910 mm (.9807 in)
CAMSHAFT BEARING INNER DIAMETER	
NEW	40.000 mm - 40.020 mm (1.5748 in - 1.5756 in)
SERVICE LIMIT	40.050 mm (1.5768 in)
CAMSHAFT BEARING INNER DIAMETER (ENGINE FRONT)	
NEW	25.000 mm - 25.013 mm (.9843 in - .9848 in)
SERVICE LIMIT	25.050 mm (.9862 in)

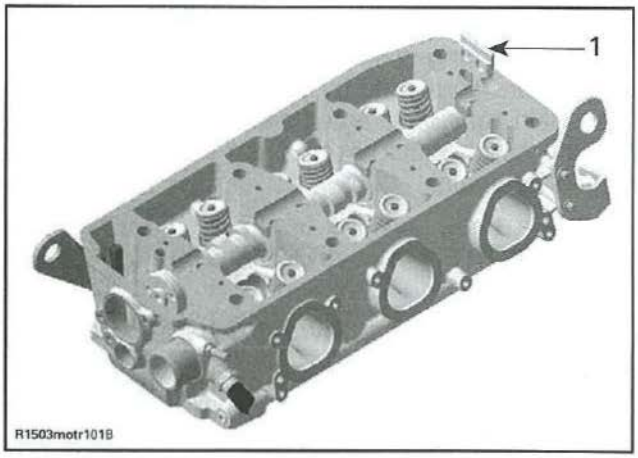
Replace parts that are not within specifications.

Camshaft Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Grease the camshaft bearing journals well by using the ISOFLEX GREASE TOPAS NB 52 (P/N 293 550 021) or a similar product.

Install camshaft then place the camshaft lock in its slot.



1. Camshaft lock

For other parts, refer to the proper installation procedures in this subsection.

CYLINDER HEAD

Cylinder Head Removal

Lock crankshaft, refer to *CYLINDER BLOCK* subsection.

Drain coolant, refer to *COOLING SYSTEM* subsection.

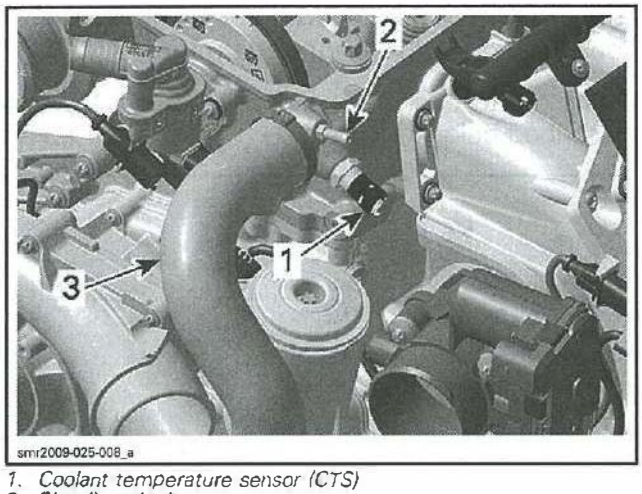
Remove blow-by valve from cylinder head. Refer to *LUBRICATION SYSTEM* subsection.

Unplug the camshaft position sensors (CAPS).

Unplug the coolant temperature sensor (CTS).

Disconnect bleeding hose.

Disconnect the cylinder head outlet hose.

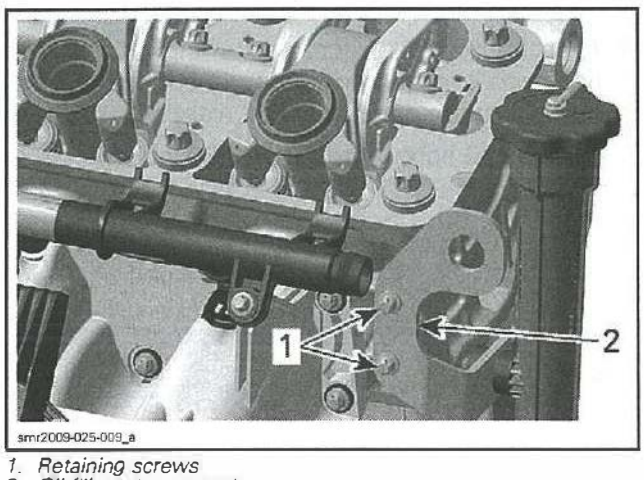


1. *Coolant temperature sensor (CTS)*
2. *Bleeding nipple*
3. *Cylinder head outlet hose*

Remove the intake manifold. Refer to *INTAKE MANIFOLD* subsection.

Remove the exhaust manifold. Refer to *EXHAUST SYSTEM* subsection.

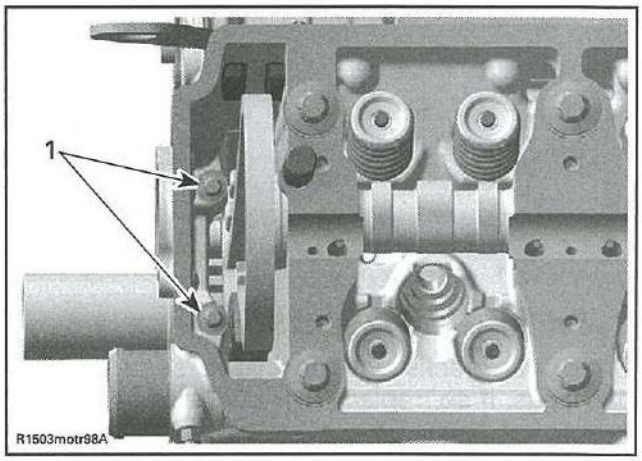
Unscrew the oil filler tube support from cylinder head.



1. *Retaining screws*
2. *Oil filler tube support*

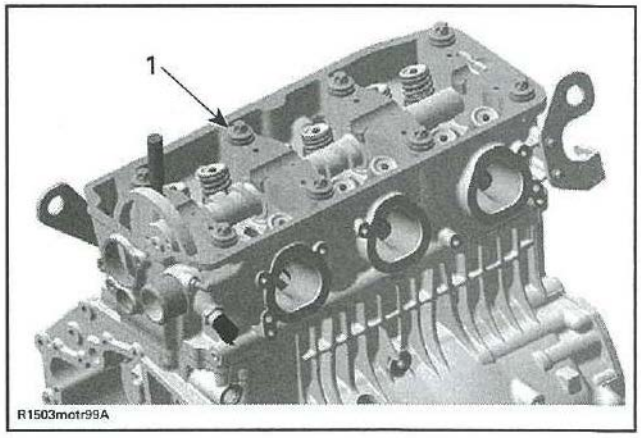
Remove the *CAMSHAFT TIMING GEAR*, see procedure in this subsection.

Remove the M6 cylinder head screws.



1. *M6 cylinder head screws*

Remove and discard the M11 cylinder head screws securing cylinder head to cylinder block.



1. *M11 cylinder head screws*

Pull up cylinder head.

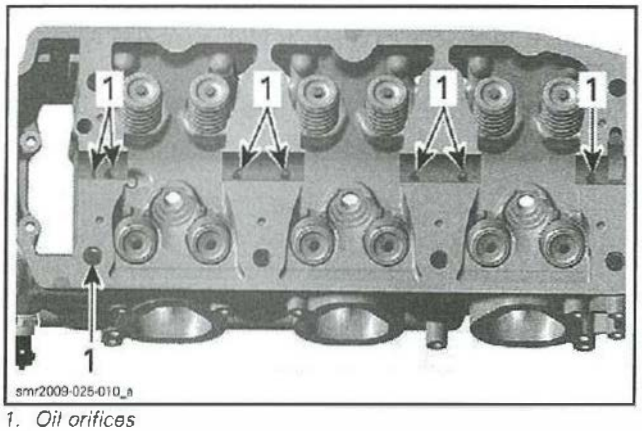
Remove gasket.

Cylinder Head Cleaning

Remove carbon deposits from combustion chamber, exhaust port and piston top.

Clean cylinder head, especially cylinder head screw surface from oil spillage.

Blow out the oil orifices and check if they are not clogged.

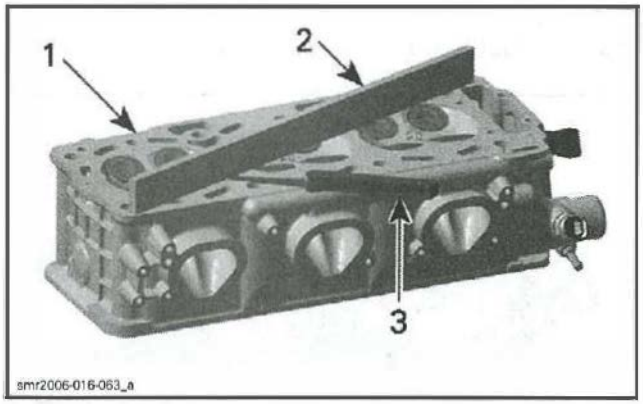


1. Oil orifices

Cylinder Head Inspection

Check for cracks between valve seats or other damages, if so, replace cylinder head.

Check cylinder head mating surface for flatness, using a straight edge.



1. Cylinder head
2. Flat bar
3. Feeler gauge

Check cylinder head warpage.

CYLINDER HEAD WARPAGE	
Maximum	0.15 mm (.006 in)

If warpage exceeds specification, resurface the cylinder head as follows.

Use a 400 - 600 grit wet sandpaper on a surface plate and gently grind off the mating surface.

NOTE: To ensure an even surface, rotate cylinder head several times during resurfacing.

Replace cylinder head, if resurfacing fails.

Cylinder Head Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Ensure dowel pins are in place.

Install NEW cylinder head gasket.

NOTICE Each installation of the cylinder head requires a new cylinder head gasket. Using a gasket twice will cause engine damage, even if the engine had not run.

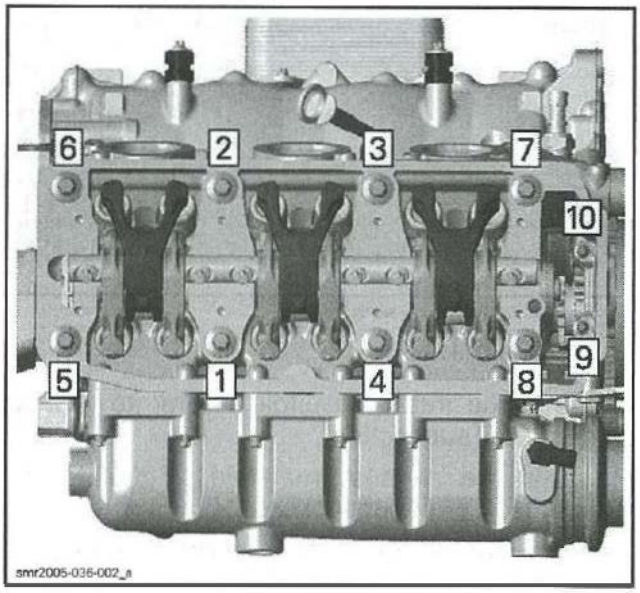
Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of M6 screws.

Install M6 screws and manually tighten them.

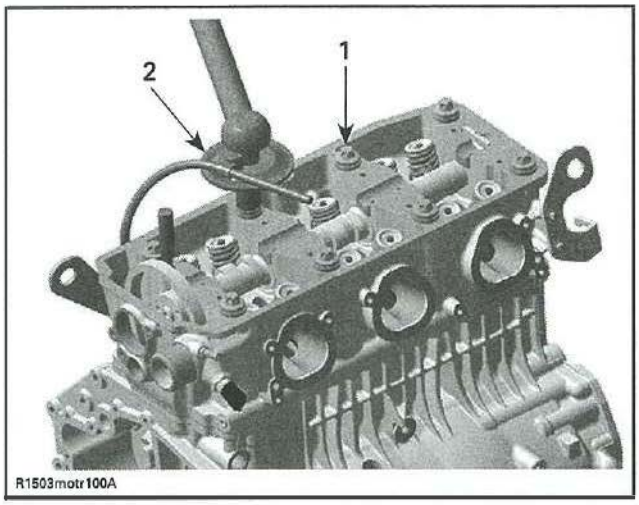
Install NEW M11 screws and tighten them manually.

NOTICE This assembly uses stretch screws. As the M11 screws have been stretched from the previous installation, it is very important to replace the old screws by new ones at assembly. Failure to replace screws and to strictly follow the torque procedure may cause screws to loosen and lead to engine damage.

Using the following sequence, tighten screws as described below.



1. First torque M11 screws to 40 N•m (30 lbf•ft).
2. Then tighten M11 screws turning a 120° rotation with a torque angle gauge and finish tightening with an additional 90° rotation.
3. Torque M6 screws to 9 N•m (80 lbf•**in**).



1. *M11 cylinder screws*
2. *Angle torque wrench*

Remove all locking tools.

Install all removed parts.

VALVE SPRINGS

Valve Spring Removal

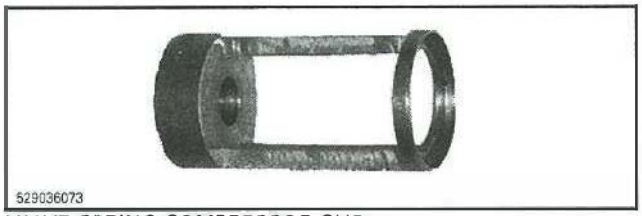
Remove rocker arm shaft. Refer to *ROCKER ARM* procedure in this subsection.

Remove *CYLINDER HEAD*, see procedure in this subsection.

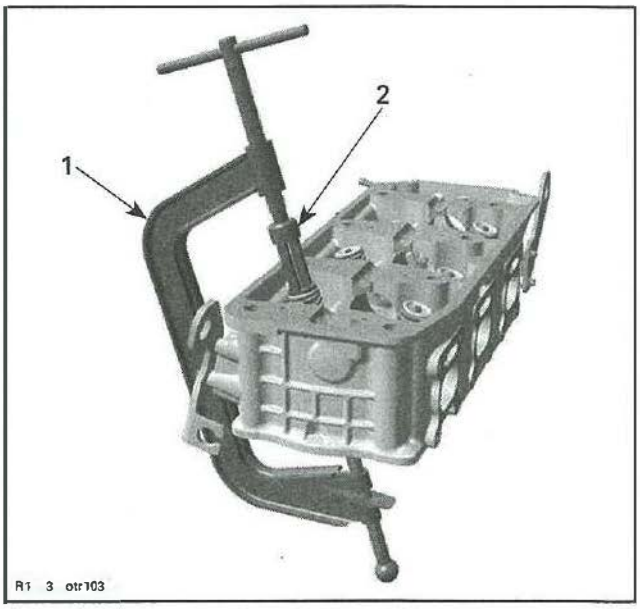
Compress valve springs, using the VALVE SPRING COMPRESSOR (P/N 529 035 724) and the VALVE SPRING COMPRESSOR CUP (P/N 529 036 073).



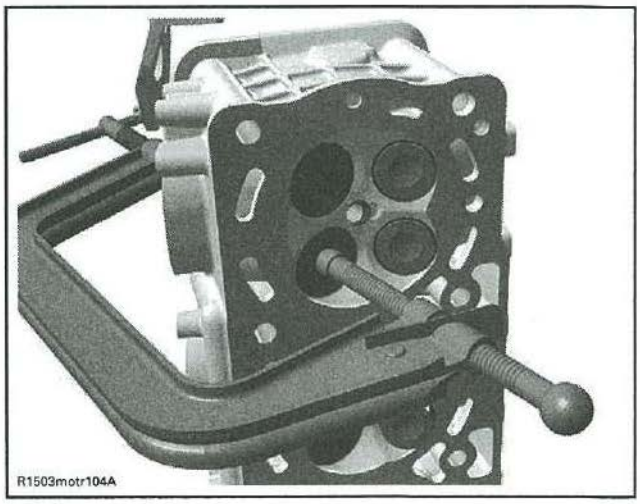
VALVE SPRING COMPRESSOR



VALVE SPRING COMPRESSOR CUP



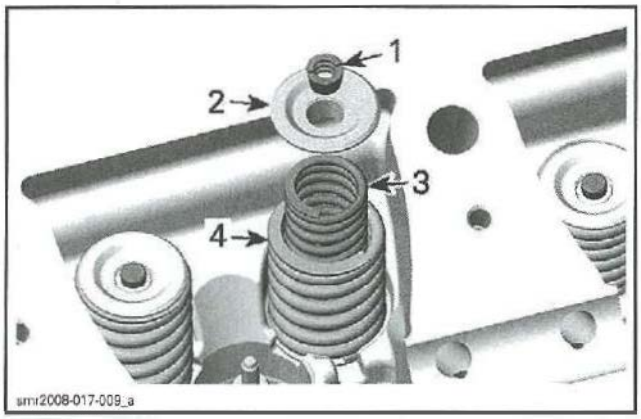
1. *Valve spring compressor clamp*
2. *Valve spring compressor cup*



LOCATE VALVE SPRING COMPRESSOR CLAMP IN CENTER OF THE VALVE

Remove valve cotters.

Withdraw valve spring compressor, valve spring retainer and valve springs.



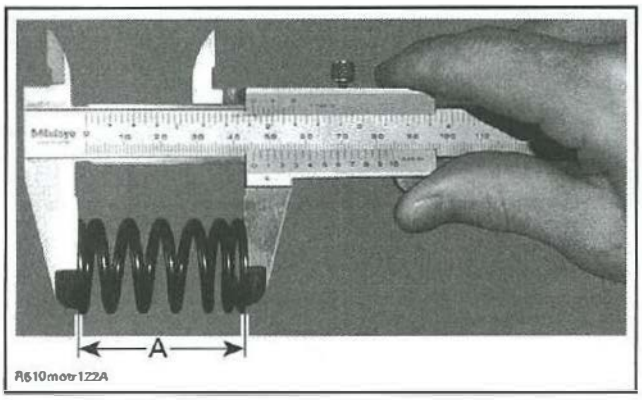
1. *Valve cotters*
2. *Valve spring retainer*
3. *Inner valve spring*
4. *Outer valve spring*

Valve Spring Inspection

Check valve springs for rust, corrosion or other visible damages. If so, replace faulty valve springs.

Check valve springs for free length and straightness.

Replace valve springs if not within specifications.



A. Valve spring length

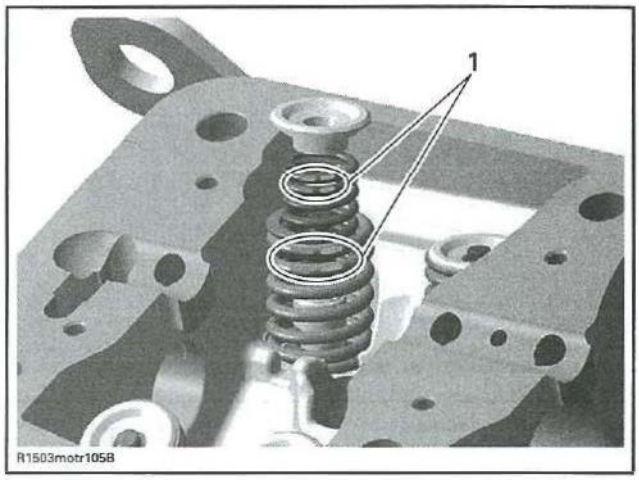
OUTER VALVE SPRING FREE LENGTH	
NEW NOMINAL	45.45 mm (1.789 in)
SERVICE LIMIT	43.00 mm (1.693 in)
INNER VALVE SPRING FREE LENGTH	
NEW NOMINAL	41.02 mm (1.615 in)
SERVICE LIMIT	38.8 mm (1.528 in)

Valve Spring Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Colored area of the valve spring must be placed on top.

NOTE: Valve cotters must be properly engaged in valve stem grooves.



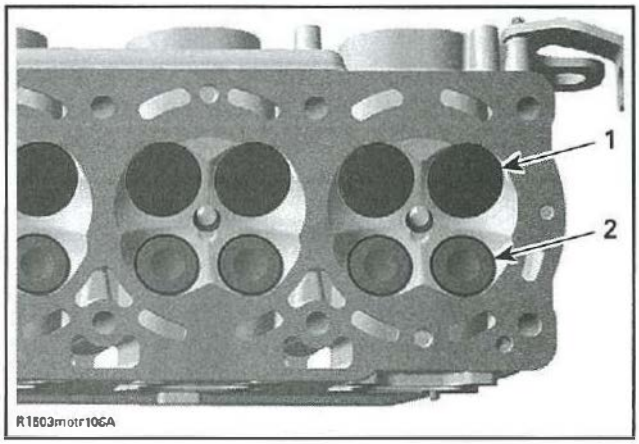
1. *Position of the valve spring*

VALVES

Valve Removal

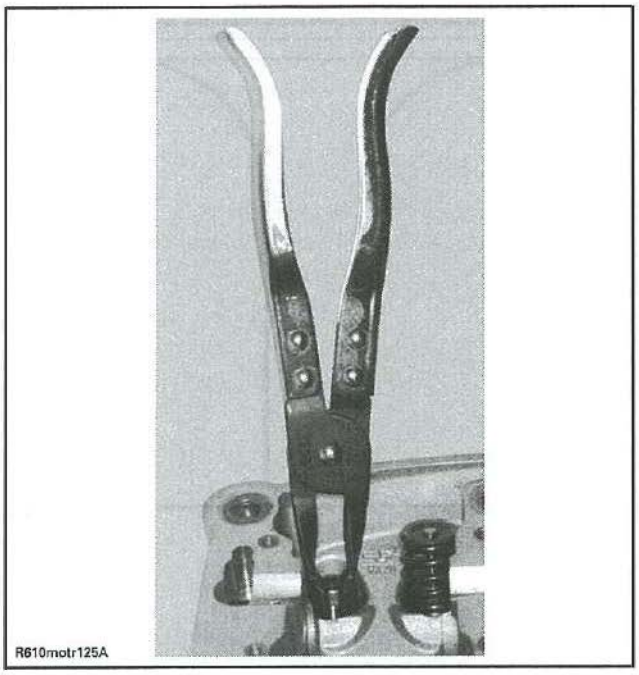
Remove valve spring.

Push valve stem then pull valves out of valve guides.



1. *Intake valve 38 mm*
2. *Exhaust valve 31 mm*

Remove valve stem seal with a valve stem seal pliers such as the SNAP-ON VALVE STEM SEAL PLIERS (P/N YA8230).


R610motr125A

Valve Inspection

Valve Stem Seal

Inspection of valve stem seals is not needed because NEW seals should always be installed whenever cylinder head is removed.

Valve

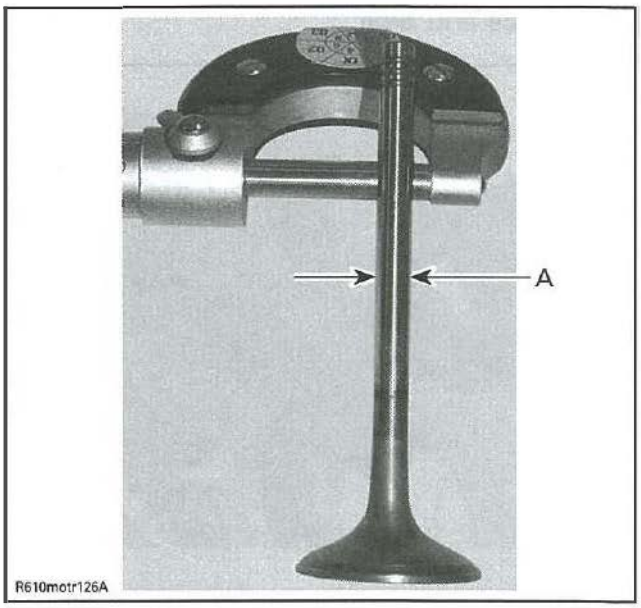
Inspect valve surface, check for abnormal stem wear and bending. If so, replace by a new one.

Valve Stem and Valve Guide Clearance

Measure valve stem and valve guide in three places, using a micrometer and a small bore gauge.

NOTE: Clean valve guide to remove carbon deposits before measuring.

Change valve if valve stem is out of specification or has other damages such as wear or friction surface.



R610motr126A

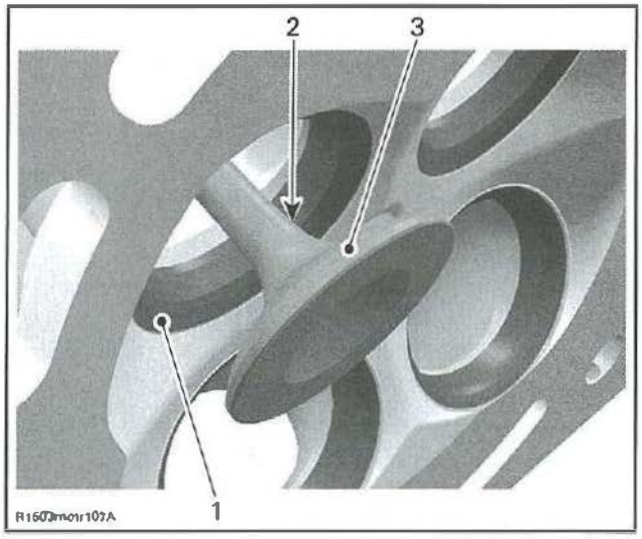
A. Valve stem diameter

VALVE STEM DIAMETER	
NEW	
EXHAUST	5.946 mm - 5.960 mm (.2341 in - .2346 in)
INTAKE	5.961 mm - 5.975 mm (.2347 in - .2352 in)
SERVICE LIMIT	
EXHAUST	5.93 mm (.233 in)
INTAKE	

Replace valve guide if it is out of specification or has other damages such as wear or friction surface. Refer to valve guide replacement below.

VALVE GUIDE INNER DIAMETER	
NEW	
EXHAUST	5.994 mm - 6.018 mm (.236 in - .2369 in)
INTAKE	
SERVICE LIMIT	
EXHAUST	6.060 mm (.2386 in)
INTAKE	

Valve Face and Seat



1. Valve seat
2. Exhaust valve contaminated area
3. Valve face (contact surface to valve seat)

Check valve face and seat for burning or pittings and replace valve or cylinder head if there are signs of damage.

Ensure to seat valves properly. Apply some lapping compound on valve face and work valve on its seat with a lapping tool.

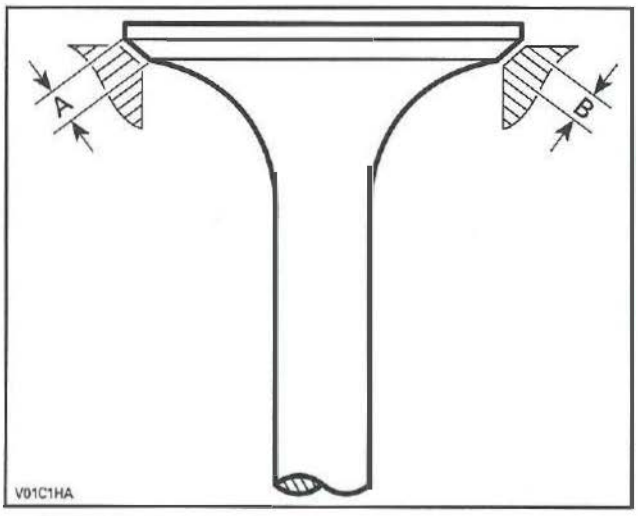
Measure valve face contact width.

NOTE: The location of contact area should be in center of valve seat.

Measure valve seat width, using a caliper.

VALVE SEAT CONTACT WIDTH	
NEW	
EXHAUST	1.25 mm - 1.55 mm (.049 in - .061 in)
INTAKE	1.10 mm - 1.30 mm (.043 in - .051 in)
SERVICE LIMIT	
EXHAUST	1.8 mm (.071 in)
INTAKE	1.6 mm (.063 in)

If valve seat contact width is too wide or has dark spots, replace the cylinder head.

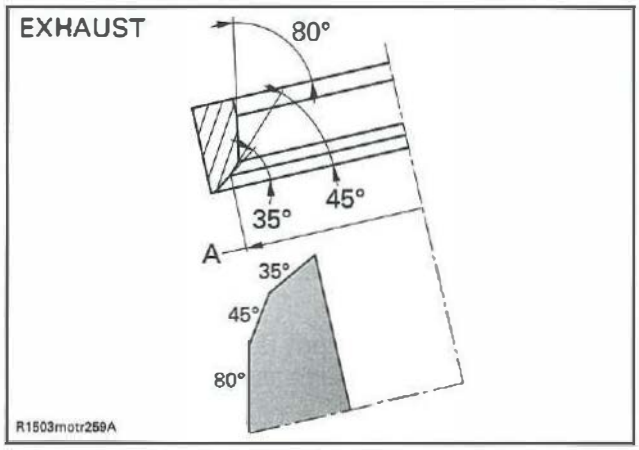


A. Valve face contact width
B. Valve seat contact width

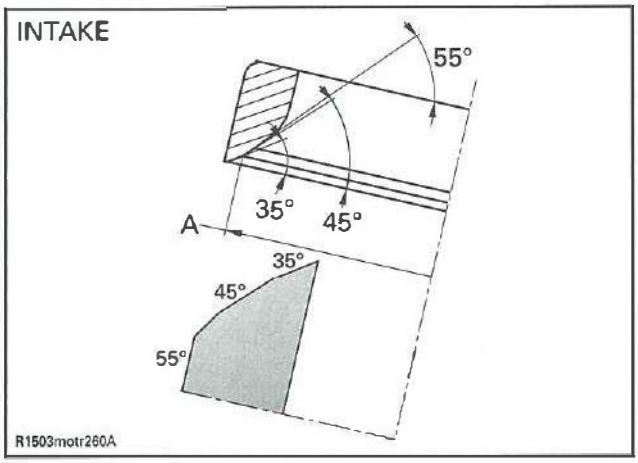
Valve Seat Grinding

NOTE: The valve seats may be reground with a valve seat grinder which centers on the valve guide.

1. Grind the valve seat at 45°. Remove no more material than absolutely necessary to clean the seat up.
2. Using a 35° stone, narrow the valve seat until the appropriate outer diameter is obtained.



A. Valve seat outer diameter EXHAUST



A. Valve seat outer diameter INTAKE

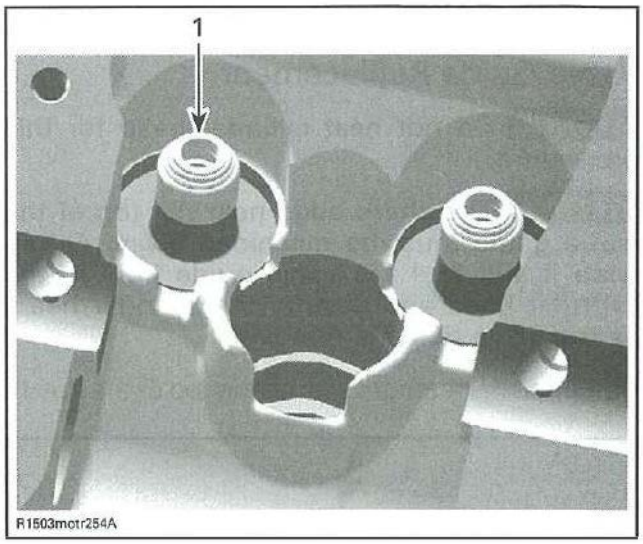
VALVE SEAT OUTER DIAMETER	
INTAKE	37.35 mm (1.4705 in)
EXHAUST	30.3 mm (1.1929 in)

3. Using a 55° stone for the intake and an 80° stone for the exhaust valve, reduce the valve seat contact width to the appropriate value mentioned above.
4. Finally, coat the valve seating surface with a fine paste of valve grinding compound using a manual valve grinding mandrel. Lightly grind the valves until a smooth, even, uniform sealing surface of the appropriate inside and outside diameter is obtained on both the valve and the seat. Use only a hand held valve grinding mandrel with a suction cup, rotating the valve back and forth through about 45°, and then advancing the valve 45° before repeating this operation.

Valve Installation

For installation, reverse the removal procedure. Pay attention to the following details.

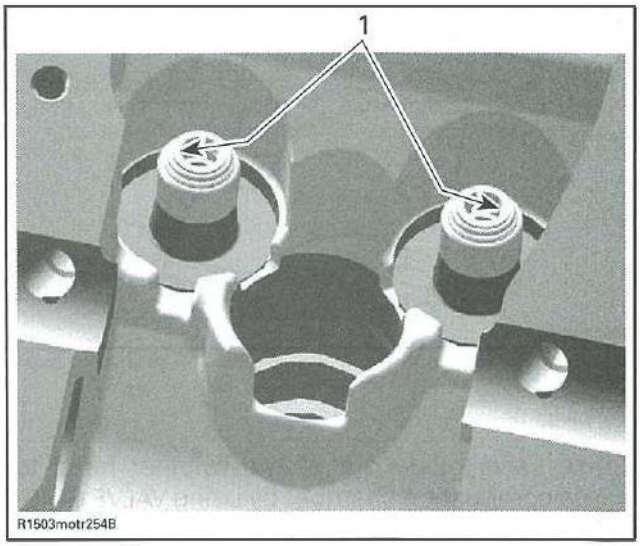
Install **NEW** valve stem seal.



1. Valve stem seal

Apply engine oil on valve stem and install valve.

NOTICE Be careful when valve stem is passed through sealing lips of valve stem seal.



1. Sealing lips of valve stem seal

To ease installation of cotters, apply oil or grease on them so that they remain in place while releasing the spring.

After springs are installed, ensure valve springs and valve spring retainer are properly locked by tapping on valve stem end with a soft hammer so that valve opens and closes a few times.

NOTICE An improperly locked valve spring will cause engine damage.

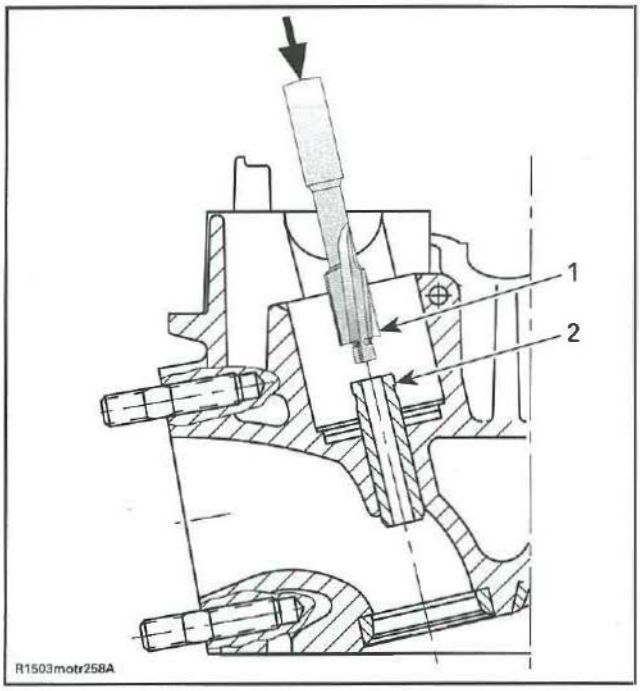
VALVE GUIDE

Valve Guide Replacement

NOTICE Do not heat cylinder head for this procedure.

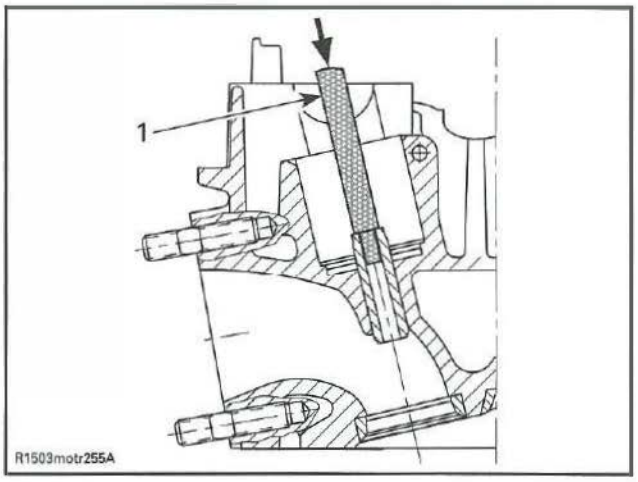
NOTICE The sharp edge near the top of the valve guide must be machined away. Otherwise it will foul the valve guide hole in the cylinder head and destroy the cylinder head, as the valve guide is removed.

Use a special reamer as far as the top of the notch.



TYPICAL
1. *Special reamer*
2. *Notch*

Chase valve guide out of the cylinder head towards combustion chamber by using VALVE GUIDE REMOVER (6 MM) (P/N 529 036 086).

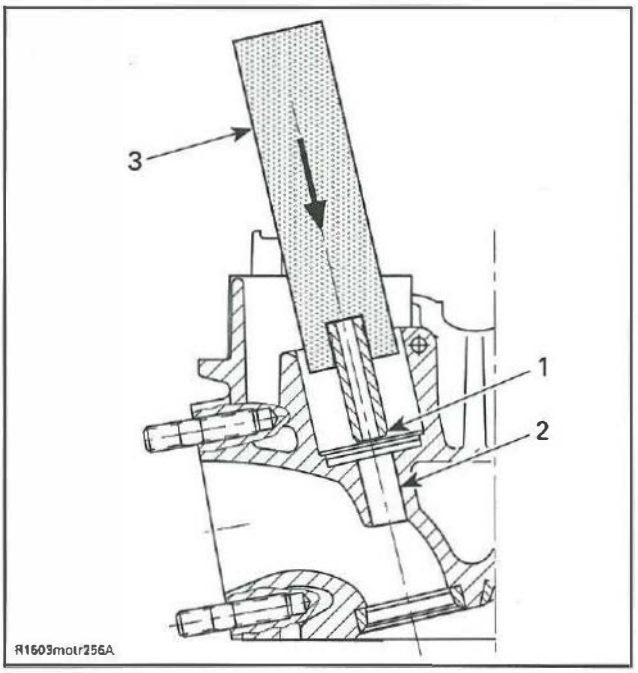


TYPICAL
1. *Punch*

Check valve guide bore for abreased material. The inlet and exhaust valve guides have the same length and are interchangeable.

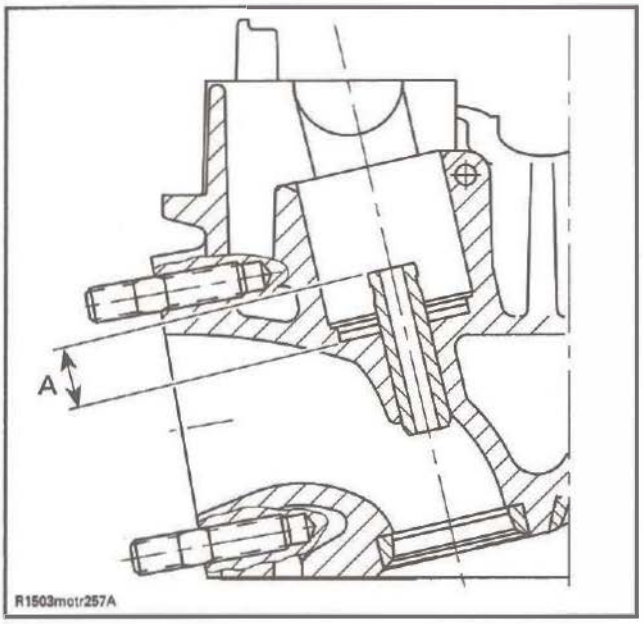
NOTE: If valve guide has caused scoring during extraction, replace the cylinder head.

Grease the bore in cylinder head and the leading end of valve guide with MOLYKOTE G-N (P/N 420 297 433).



TYPICAL
1. *Valve guide leading end*
2. *Cylinder head bore*
3. *Jig*

With the VALVE GUIDE PUSHER (6 MM) (P/N 529 036 087), press the valve guide into the COLD cylinder head as shown.



TYPICAL
A. Protrusion

VALVE GUIDE PROTRUSION	
MINIMUM	12.4 mm (.4882 in)
MAXIMUM	12.8 mm (.5039 in)

NOTE: After installing new guides, they must be reamed with a standard 6 mm reamer tool. These are available from various tool suppliers.

Clean cylinder head carefully. Check that the valve seat is concentric with the new guide axis (check contact surface with engineer's blue).

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CYLINDER BLOCK

SERVICE TOOLS

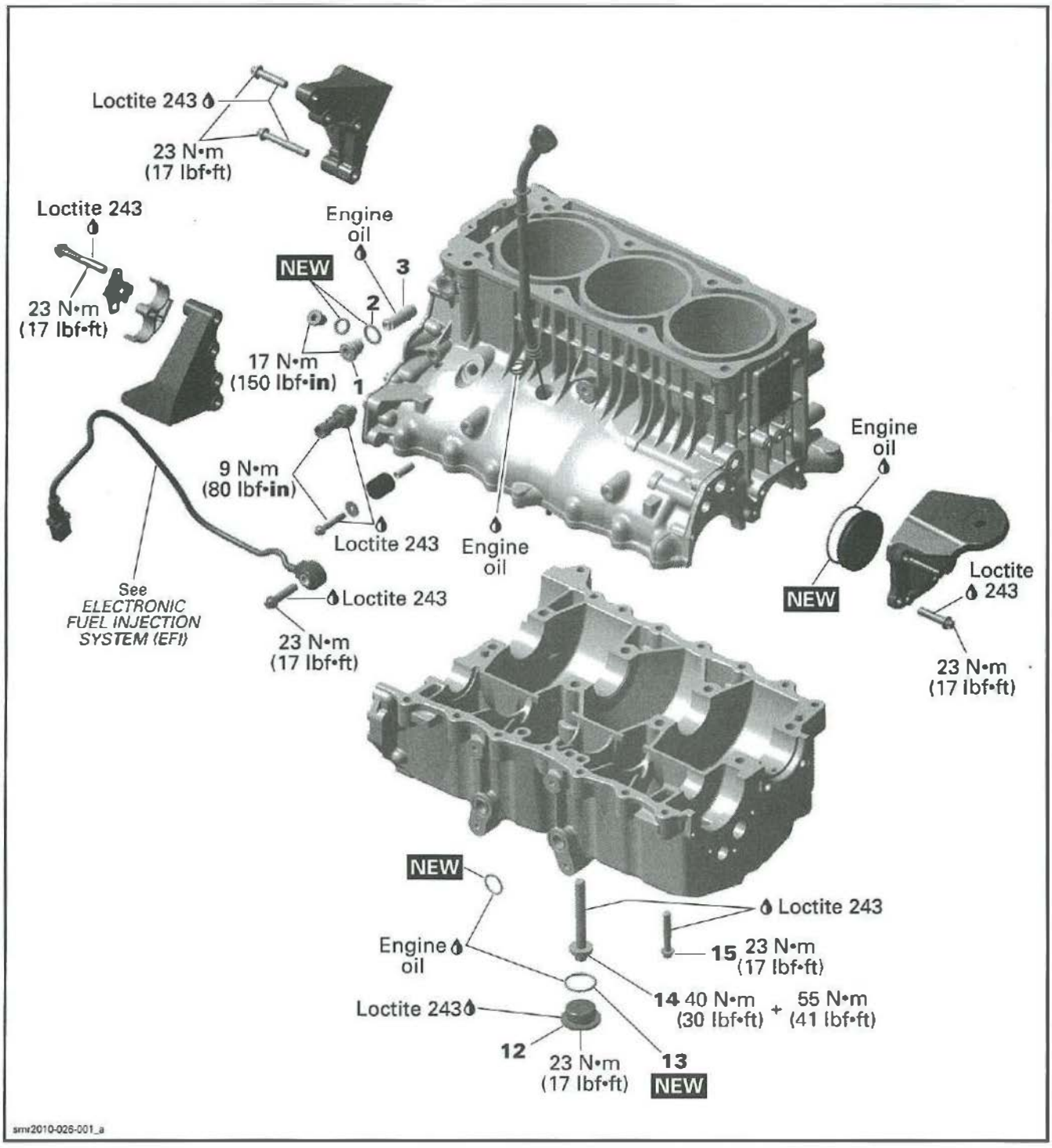
Description	Part Number	Page
CRANKSHAFT LOCKING TOOL	529 035 821	184, 188, 190, 195
HANDLE	420 877 650	193
PISTON CIRCLIP INSTALLER	529 035 765	181
STARTER DRIVE SEAL PUSHER	420 876 502	193

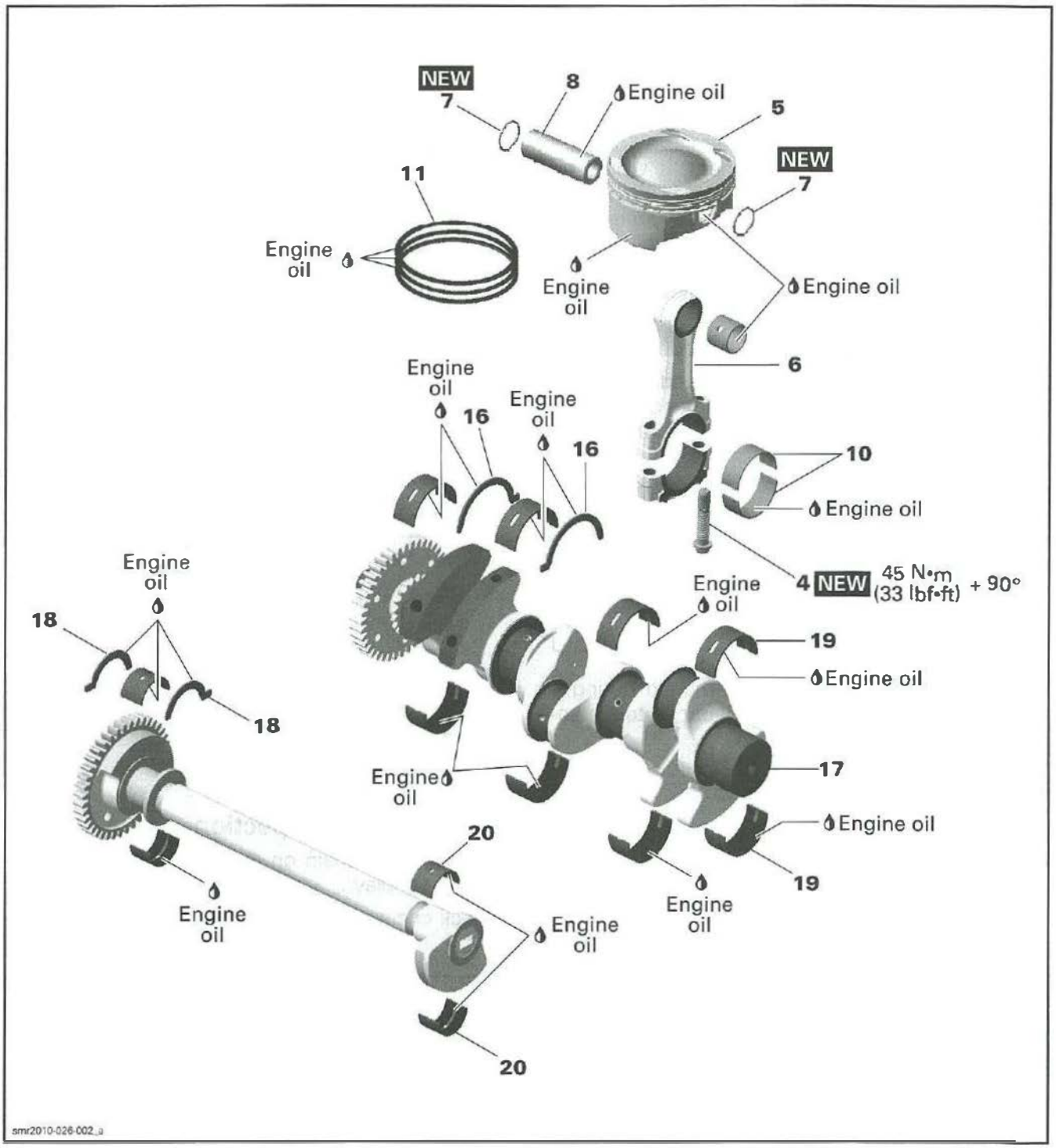
SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
SNAP-ON PISTON RING COMPRESSOR PLIERS	RC980	181

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	194
LOCTITE 5910	293 800 081	193
LOCTITE CHISEL (GASKET REMOVER)	413 708 500	193


Loctite 243
23 N•m
(17 lbf•ft)
Loctite 243
23 N•m
(17 lbf•ft)
Engine
oil
NEW
3
2
17 N•m
(150 lbf•in)
1
9 N•m
(80 lbf•in)
Loctite 243
Engine
oil
See
ELECTRONIC
FUEL INJECTION
SYSTEM (EFI)
Loctite 243
23 N•m
(17 lbf•ft)
Engine
oil
NEW
Loctite
243
23 N•m
(17 lbf•ft)
NEW
Loctite 243
Engine
oil
15 23 N•m
(17 lbf•ft)
14 40 N•m
(30 lbf•ft) + 55 N•m
(41 lbf•ft)
Loctite 243
12
23 N•m
(17 lbf•ft)
13
NEW
smr2010-026-001_a


NEW
7
8
Engine oil
5
NEW
7
11
Engine oil
Engine oil
Engine oil
6
Engine oil
16
Engine oil
16
10
Engine oil
Engine oil
4 NEW 45 N•m (33 lbf•ft) + 90°
18
Engine oil
Engine oil
19
Engine oil
18
Engine oil
17
Engine oil
20
Engine oil
Engine oil
19
Engine oil
20
smr2010-026-002_a

GENERAL

When disassembling parts that are duplicated in the engine, (e.g.: pistons, connecting rods etc.), it is strongly recommended to note their position (cylinder 1, 2 or 3) and to keep them as a "group". If you find a defective component, it would be much easier to find the cause of the failure within the group of parts. Besides, since used parts have matched together during the engine operation, they will keep their matched fit when you reassemble them together within their "group".

During assembly/installation, use torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

TROUBLESHOOTING

The following is provided to help in diagnosing the probable source of troubles. It is a guideline and it should not be assumed to list all possible problems.

UNUSUAL ENGINE NOISE OR VIBRATIONS

1. **Heavy wear on plain bearings**
   - *Check radial play of plain bearings.*
   - *Replace plain bearings if out of specification.*
2. **Crankshaft and balancer shaft are not properly aligned**
   - *Disassemble cylinder block and check if marks are properly aligned.*
3. **Crankshaft or balancer shaft axial play out of specification**
   - *Measure crankshaft and balancer shaft axial play.*
   - *If axial play is out of specification, replace thrust washers.*
4. **Connecting rod axial play out of specification**
   - *Measure connecting rod axial play on crankshaft.*
   - *Replace connecting rod or crankshaft if out of specification.*
5. **Connecting rod screws got loose**
   - *Replace damaged components and retighten screws with the recommended torque.*

BLUE SMOKE IN THE EXHAUST

1. **Oil scrapper rings worn out**
   - *Replace piston rings.*

ENGINE SUDDENLY TURNS OFF (POOR IDLING)

1. **Piston rings worn out**
   - *Replace piston rings.*
2. **Piston/cylinder wall clearance out of specification**
   - *Check piston/cylinder wall clearance.*
   - *Replace if out of specification.*
3. **Melted or broken piston**
   - *Check if oil spray nozzle is not clogged. Refer to LUBRICATION SYSTEM subsection.*
   - *Replace piston and cylinder block if necessary.*

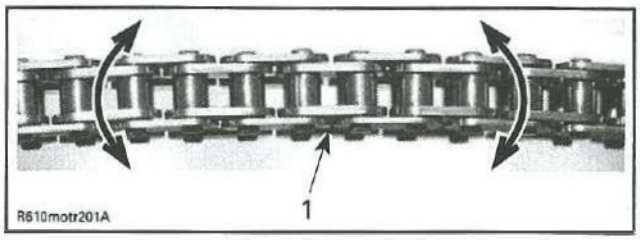
PROCEDURES

TIMING CHAIN

Timing Chain Inspection

Check timing chain on camshaft gear for excessive radial play.

Check chain condition for wear and rollers condition.



1. Timing chain

If chain is excessively worn or damaged, replace it as a set (camshaft timing gear and timing chain).

Timing Chain Removal

Remove:

– Engine oil (refer *LUBRICATION SYSTEM* subsection)

- Engine from vehicle (refer to *ENGINE REMOVAL AND INSTALLATION* subsection)
- Cylinder head (refer to *CYLINDER HEAD* subsection)
- PTO housing (refer to *PTO HOUSING AND MAGNETO* subsection)
- Crankshaft (refer to *CRANKSHAFT* in this subsection)
- Timing chain.

Timing Chain Installation

The installation is essentially the reverse of the removal procedure. However, pay attention to the following details.

Ensure to perform proper valve timing.

NOTICE Improper valve timing will damage engine components.

Lock crankshaft and camshaft at TDC (refer to *CYLINDER HEAD* subsection for the camshaft locking procedure).

Install chain, then install chain tensioner.

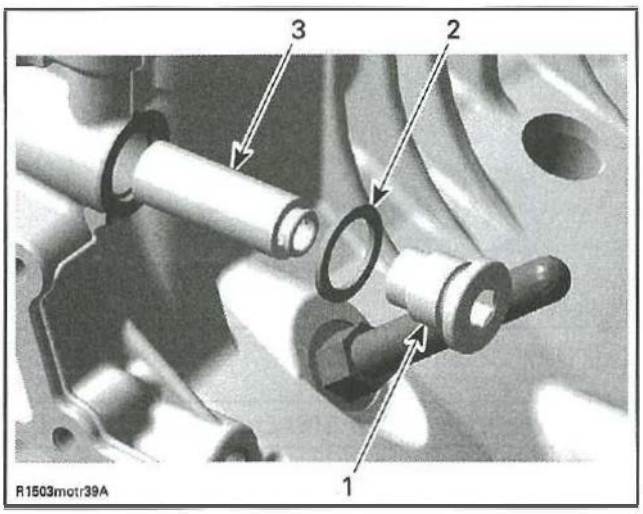
CHAIN TENSIONER

Chain Tensioner Removal

NOTE: Removal of the intake manifold allows easier access to the chain tensioner, but is not necessary. Refer to *INTAKE MANIFOLD* subsection.

Remove:

- Chain tensioner plug screw no. 1
- Gasket ring no. 2 (discard it)
- Chain tensioner no. 3.



1. *Plug screw*
2. *Gasket ring*
3. *Chain tensioner*

Chain Tensioner Inspection

Check chain tensioner for excessive wear or cracks. Also check free movement of the chain tensioner piston.

Chain Tensioner Installation

The installation is essentially the reverse of the removal procedure but, pay attention to the following details.

Use a NEW gasket ring when installing the chain tensioner plug screw.

Torque chain tensioner plug screw to 17 N•m (150 lbf•in).

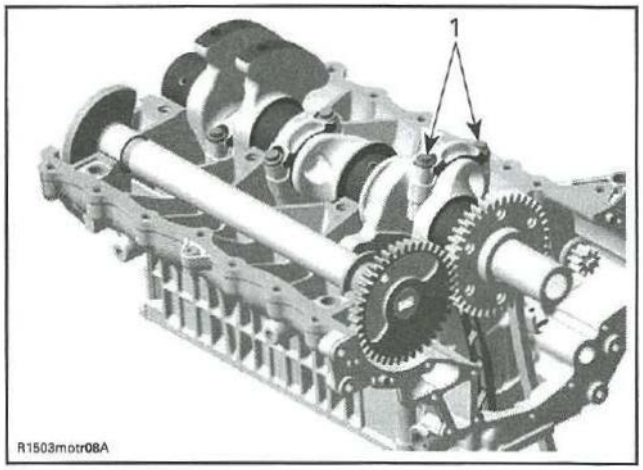
PISTONS AND CONNECTING RODS

Piston and Connecting Rod Removal

1. Disassemble *CYLINDER BLOCK* as per procedure in this subsection.

NOTE: It is recommended to measure connecting rod big end axial play prior to remove connecting rod. Refer to *INSPECTION* below.

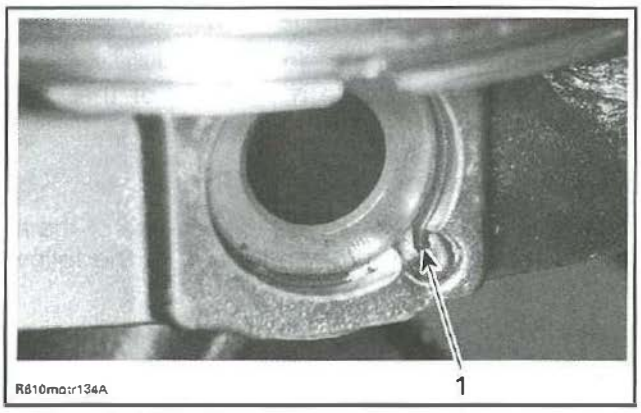
2. Remove connecting rod cap screws no. 4.



1. *Connecting rod screws*

NOTE: Before removing the connecting rod caps, mark them to remember the right position when reassembling.

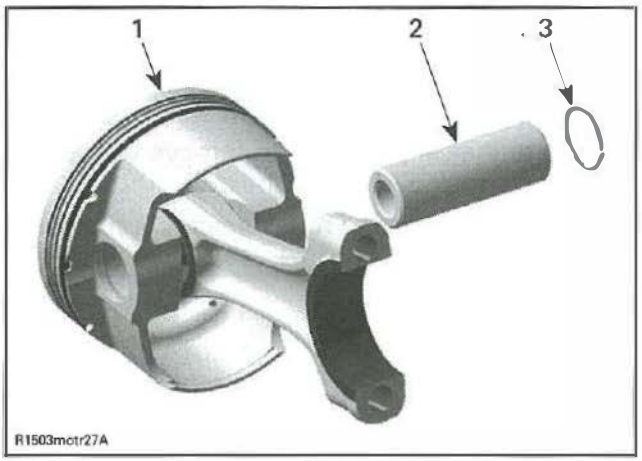
3. Pull piston no. 5 with connecting rod no. 6 out of the cylinders.
4. Remove one piston circlip no. 7 and discard it.



1. Piston circlip

NOTE: The removal of both piston circlips is not necessary to remove piston pin.

5. Push piston pin no. 8 out of piston.



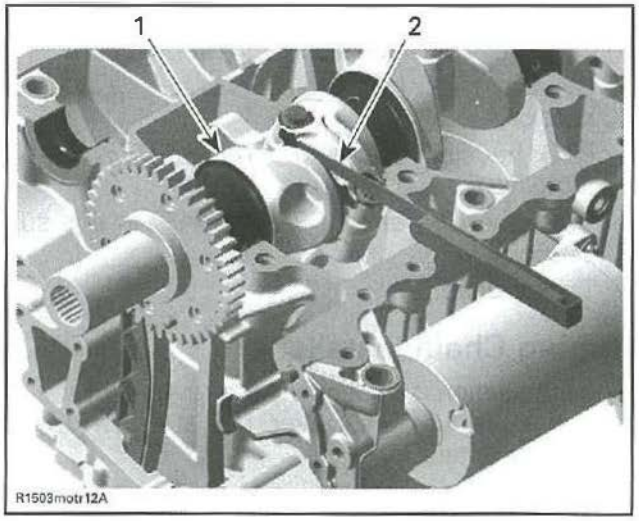
1. Piston
2. Piston pin
3. Circlip

6. Detach piston from connecting rod.

Connecting Rod Inspection

Connecting Rod Big End Axial Play

Using a feeler gauge, measure distance between butting face of connecting rod and crankshaft counterweight. If the distance exceeds specified tolerance, replace the worn part.

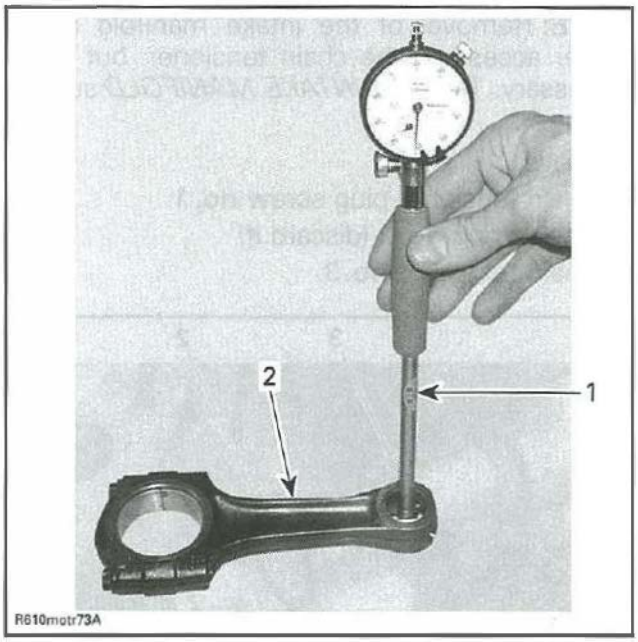


1. Crankshaft
2. Feeler gauge

CONNECTING ROD BIG END AXIAL PLAY	
NEW	0.100 mm - 0.352 mm (.004 in - .014 in)
SERVICE LIMIT	0.500 mm (.02 in)

Connecting Rod Small End Radial Play

Measure connecting rod small end.



1. Bore gauge
2. Connecting rod

CONNECTING ROD SMALL END DIAMETER	
NEW	23.01 mm - 23.02 mm (.9059 in - .9063 in)
SERVICE LIMIT	23.07 mm (.908 in)

If the connecting rod small end diameter is out of specification, replace small end bearing sleeve **no. 9**.

NOTE: For small end bearing sleeve replacement contact a machine shop. After installing a NEW small end bearing sleeve on the connecting rod, the inner diameter and the oil holes need to be machined to specification.

Measure piston pins (refer to *PISTON PIN INSPECTION* in this subsection). Compare to inside diameter of connecting rod to obtain connecting rod small end radial play.

CONNECTING ROD SMALL END RADIAL PLAY	
SERVICE LIMIT	0.080 mm (.003 in)

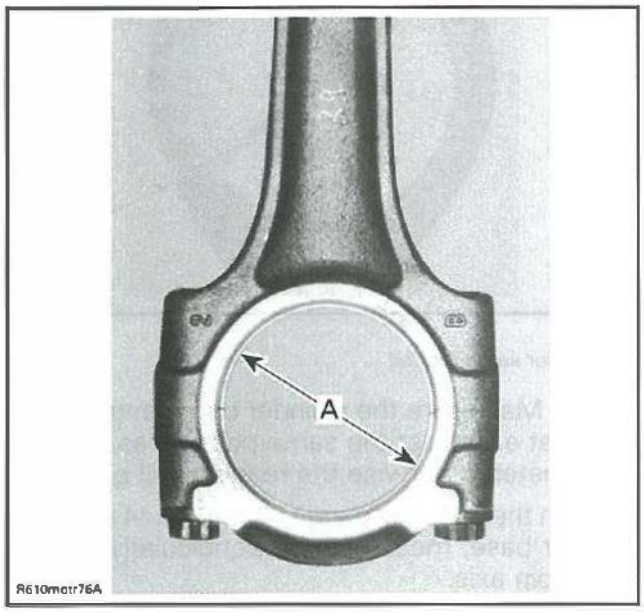
Connecting Rod Big End Radial Play

Measure inside diameter of connecting rod big end. Compare to crankshaft pin.

To measure the connecting rod big end diameter, use the OLD screws **no. 4**.

Install the OLD bearings **no. 10** as they were mounted initially.

Do the torque procedure as described below.



A. Connecting rod big end bearing

CONNECTING ROD BIG END DIAMETER	
SERVICE LIMIT	45.080 mm (1.775 in)

CONNECTING ROD BIG END RADIAL PLAY	
SERVICE LIMIT	0.09 mm (.0035 in)

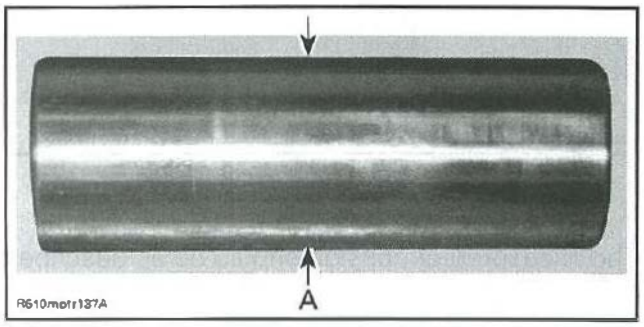
Use NEW bearings, when connecting rod big end diameter is out of specification.

Piston Pin Inspection

Using synthetic abrasive woven, clean piston pin from deposits.

Inspect piston pin for scoring, cracking or other damages.

Measure piston pin. See the following illustration for the proper measurement position.



A. Piston pin diameter in the area of the bushing

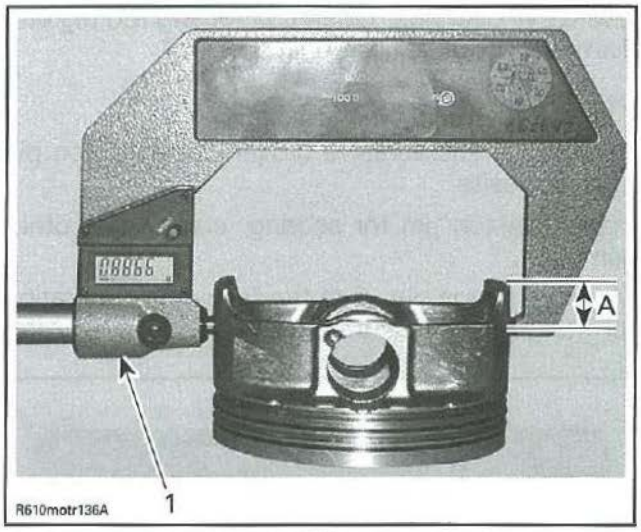
PISTON PIN DIAMETER	
NEW	22.996 mm - 23.000 mm (.905 in - .906 in)
SERVICE LIMIT	22.990 mm (.905 in)

Measure connecting rod small end diameter (refer to *CONNECTING RODS INSPECTION* above) to check connecting rod small end radial play.

Piston Inspection

Inspect piston for scoring, cracking or other damages. Replace piston and piston rings if necessary.

Using a micrometer, measure piston at 18 mm (.709 in) perpendicularly (90°) to piston pin axis.



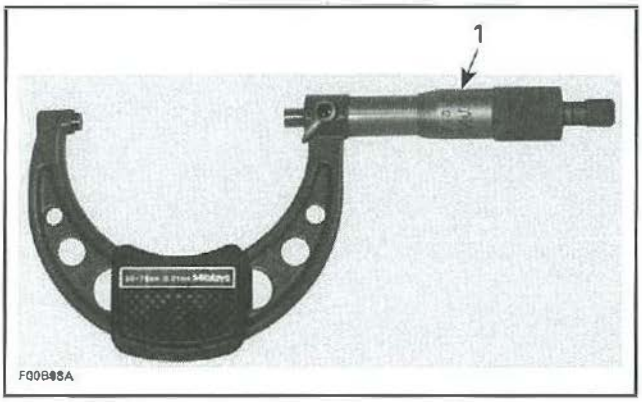
1. Measuring perpendicularly (90°) to piston pin axis
A. 18 mm (.709 in)

The measured dimension should be as described in the subsequent table. If not, replace piston.

PISTON MEASUREMENT	
130 AND 155 ENGINES	
NEW NOMINAL	99.951 mm - 99.969 mm (3.935 in - 3.936 in)
SERVICE LIMIT	99.90 mm (3.933 in)
215 AND 260 ENGINES	
NEW NOMINAL	99.931 mm - 99.949 mm (3.934 in - 3.935 in)
SERVICE LIMIT	99.90 mm (3.933 in)

Piston/Cylinder Wall Clearance

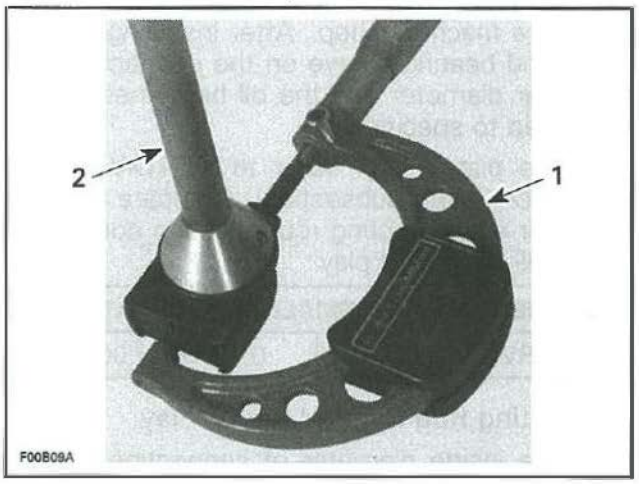
Adjust and lock a micrometer to the piston dimension.



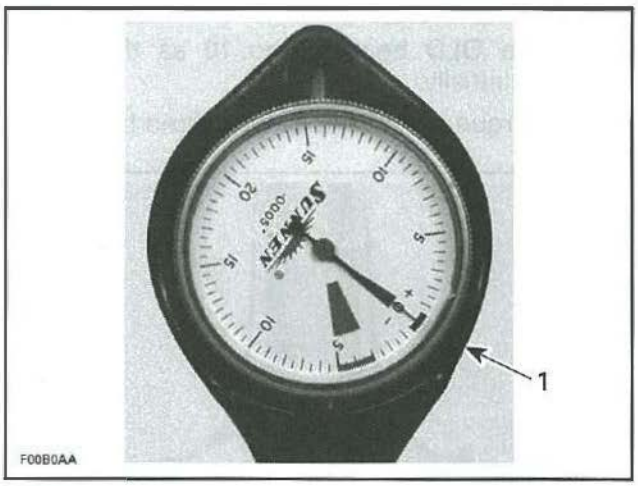
1. Micrometer set to the piston dimension

NOTE: Make sure used piston is not worn.

With the micrometer set to the dimension, adjust a cylinder bore gauge to the micrometer dimension and set the indicator to 0 (zero).



1. Use the micrometer to set the cylinder bore gauge
2. Dial bore gauge



TYPICAL
1. Indicator set to 0 (zero)

NOTE: Make sure the cylinder bore gauge indicator is set exactly at the same position as with the micrometer, otherwise the reading will be false.

Position the dial bore gauge 62 mm (2.44 in) above cylinder base, measuring perpendicularly (90°) to piston pin axis.

Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance.

PISTON/CYLINDER CLEARANCE	
130 AND 155 ENGINES	
NEW NOMINAL	0.024 mm - 0.056 mm (.001 in - .002 in)
SERVICE LIMIT	0.100 mm (.004 in)
215 AND 260 ENGINES	
NEW NOMINAL	0.044 mm - 0.076 mm (.0017 in - .003 in)
SERVICE LIMIT	0.100 mm (.004 in)

If clearance exceeds specified tolerance, re-hone cylinder sleeve and replace piston by an oversize one.

NOTE: It is not necessary to have all pistons replaced with an oversize if they are not all out of specification. Mixed standard size and oversize piston are allowed.

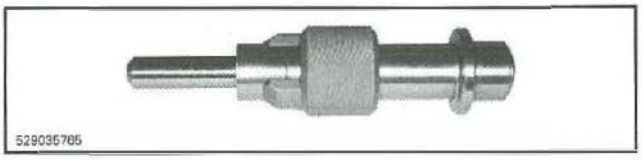
Piston and Connecting Rod Assembly

For installation, reverse the removal procedure. Pay attention to the following details.

Apply engine oil on the piston pin.

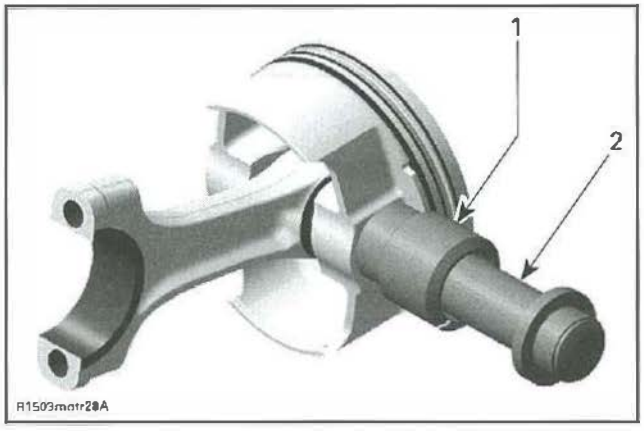
Insert piston pin into piston and connecting rod.

Use the PISTON CIRCLIP INSTALLER (P/N 529 035 765) to assemble the piston circlip.

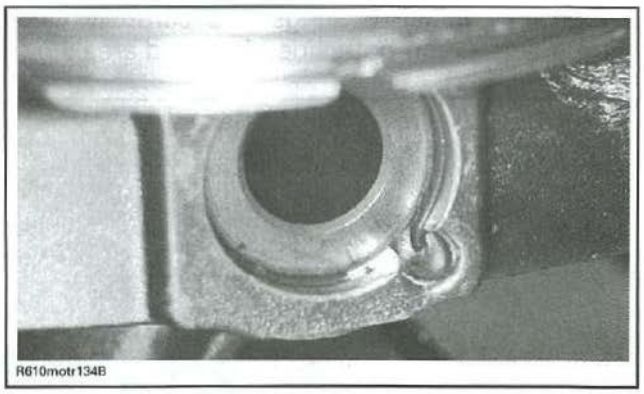


NOTICE Secure piston pin with new piston circlips.

NOTE: Take care that the hook of the piston circlip is positioned properly.



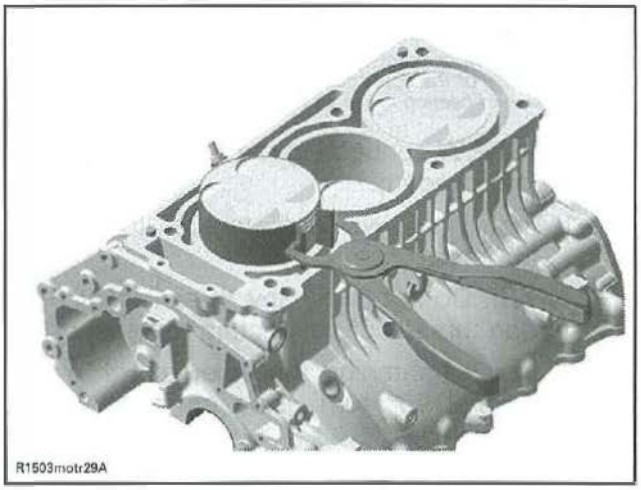
1. Sleeve with piston circlip inside
2. Assembly jig from piston clip installer



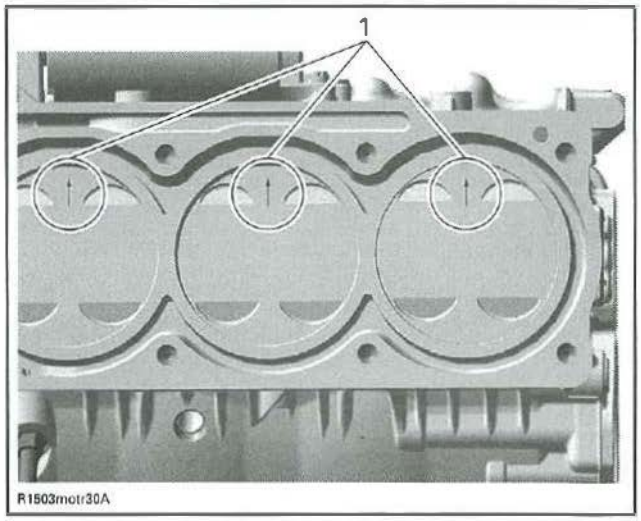
CORRECT POSITION OF THE PISTON CIRCLIP

Piston and Connecting Rod Installation

1. Using a piston ring compressor such as the SNAP-ON PISTON RING COMPRESSOR PLIERS (P/N RC980), slide piston into cylinder.

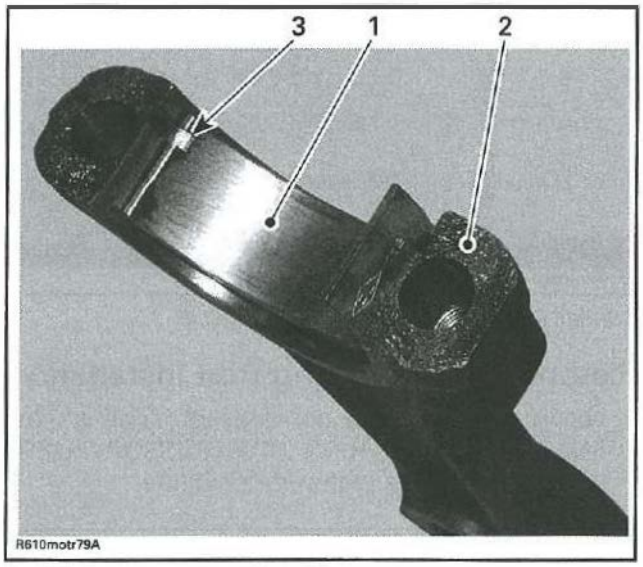


NOTICE Install piston with punched arrow toward exhaust side.



1. Arrows toward exhaust side

2. Correctly install bearings and carefully clean split surface on both sides (cracked area).



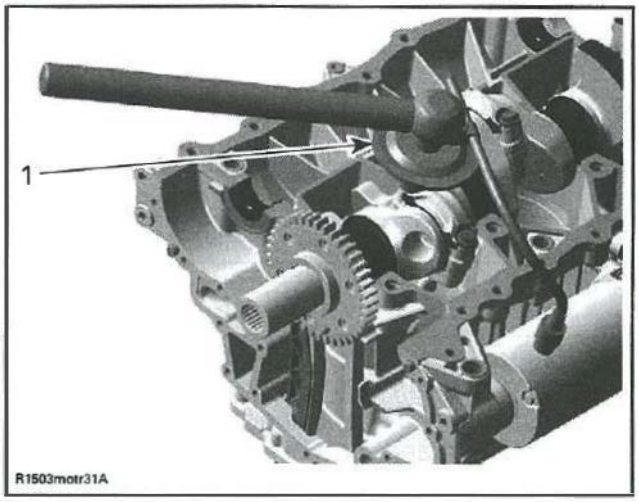
1. Half bearing of connecting rod big end
2. Split surface of the connecting rod
3. Protrusion of bearing in line with connecting rod groove

3. Torque **NEW** connecting rod screws as per following procedure:
   3.1 Install screws and torque to 45 N•m (33 lbf•ft).

   NOTE: Do not apply any threadlocker product on threads of connecting rod screws.

   3.2 Finish tightening the screws with an additional 90° turn using an angle torque wrench.

NOTICE **Failure to strictly follow this procedure may cause screw to loosen and lead to engine damage. Knowing that the screws have been stretched from the previous installation, it is very important to use new screws at assembly.**



1. Angle torque wrench

PISTON RINGS

Piston Ring Removal

Remove piston as described above.

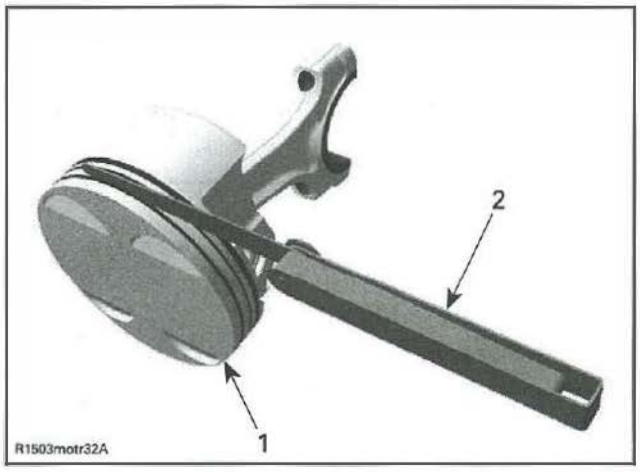
Remove rings no. 11.

Piston Ring Inspection

Ring/Piston Groove Clearance

Using a feeler gauge measure each ring/piston groove clearance. If the clearance is too large, the piston and the piston rings should be replaced.

RING/PISTON GROOVE CLEARANCE	
NEW	
RECTANGULAR	0.025 mm - 0.070 mm (.001 in - .0028 in)
TAPER-FACE	0.015 mm - 0.060 mm (.0006 in - .0024 in)
OIL SCRAPER RING	0.020 mm - 0.055 mm (.0008 in - .0022 in)
SERVICE LIMIT	
ALL	0.15 mm (.006 in)



1. *Piston*
2. *Feeler gauge*

Ring End Gap

RING END GAP	
NEW	
RECTANGULAR	0.30 mm - 0.50 mm (.012 in - .02 in)
TAPER-FACE	0.35 mm - 0.55 mm (.014 in - .022 in)
OIL SCRAPER RING	0.35 mm - 0.50 mm (.014 in - .02 in)
SERVICE LIMIT	
ALL	1.50 mm (.0591 in)

Measure position for ring end gap in the area of 8 mm to 16 mm (.315 in to .63 in) from top of cylinder.

NOTE: In order to correctly position the ring in the cylinder, use piston as a pusher.

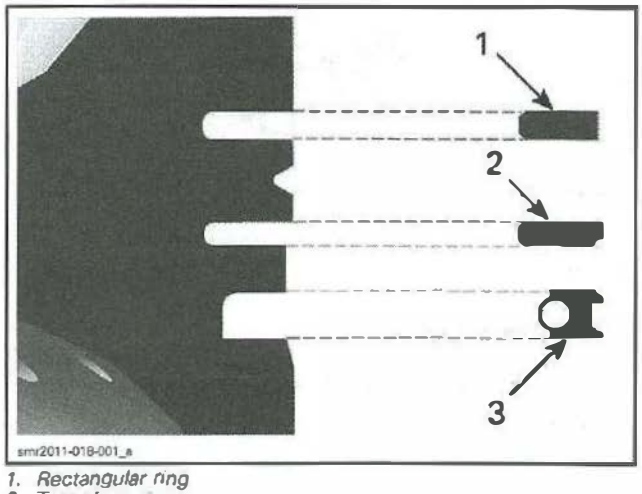
Using a feeler gauge, check ring end gap. Replace ring if gap exceeds above described specified tolerance.

Piston Ring Installation

For installation, reverse the removal procedure. Pay attention to the following details.

Install rings in the following order and layout:

PISTON RING INSTALLATION		
ORDER	RING	POSITION
FIRST STEP	Oil scraper ring	Stamped dot facing UP
SECOND STEP	Taper-face ring	Stamped "E" and "TOP" facing UP
THIRD STEP	Rectangular ring	Stamped "E" and "TOP" facing UP



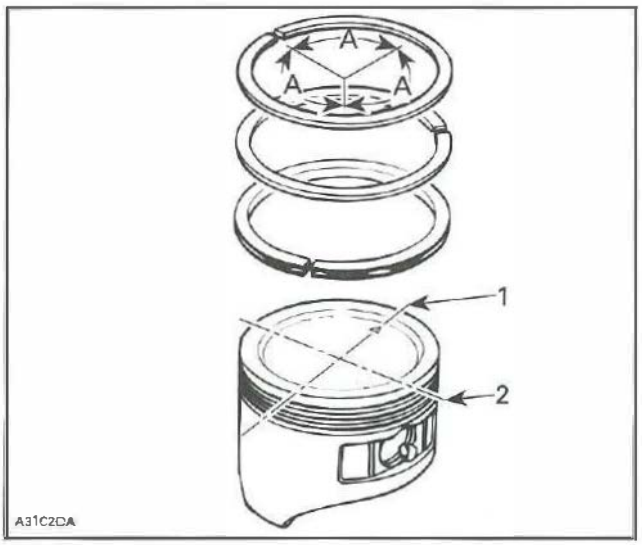
1. *Rectangular ring*
2. *Taper-face ring*
3. *Oil scraper ring*

NOTICE Ensure that top and second rings are not interchanged.

NOTE: Use a ring expander to prevent breakage during installation. The oil ring must be installed by hand.

Check that rings rotate smoothly after installation.

Space the piston ring end gaps 120° apart and do not align the gaps with the piston pin bore or the thrust side axis.



1. *DO NOT align ring gap with piston trust side axis*
2. *DO NOT align ring gap with piston pin bore axis*

A. 120°

CRANKSHAFT

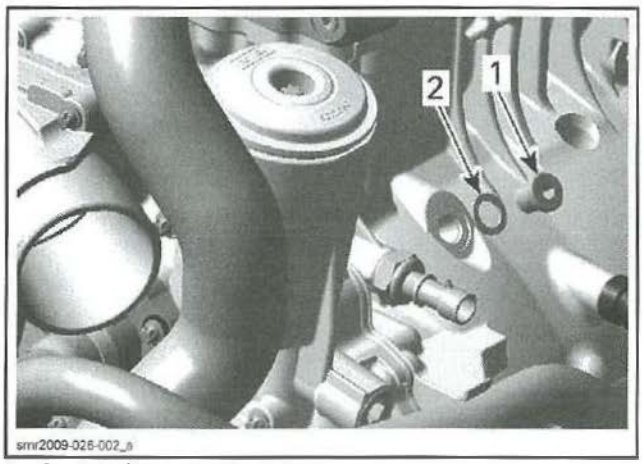
Crankshaft Locking Procedure

NOTICE The crankshaft must be locked at TDC for removal and installation of crankshaft, balancer shaft and camshaft.

NOTE: When the crankshaft is locked, the piston of cylinder 3 is at ignition TDC.

Remove:

- Intake manifold (refer to *INTAKE MANIFOLD* subsection)
- Spark plugs
- Cylinder head cover (refer to *CYLINDER HEAD* subsection
- Crankshaft access plug screw.

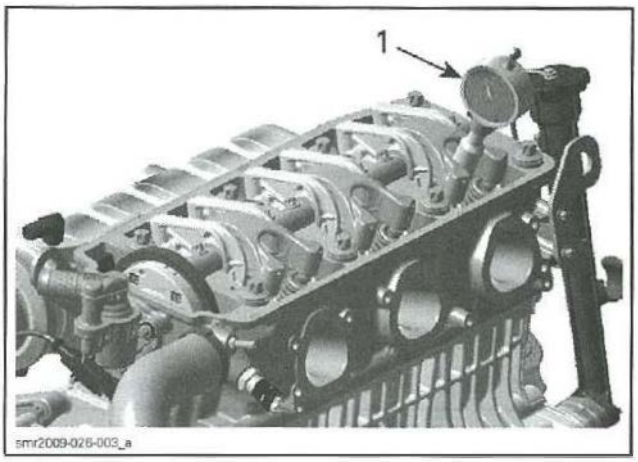


1. *Crankshaft access plug screw*
2. *Gasket ring*

Turn engine counterclockwise.

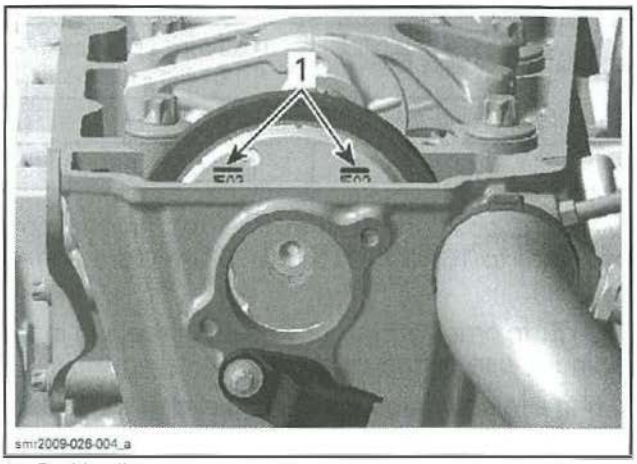
Bring piston of cylinder 3 to ignition TDC, using a dial gauge or another similarly suitable tool.

NOTICE Do not scratch or damage piston and cylinder surface.



1. *Dial gauge*

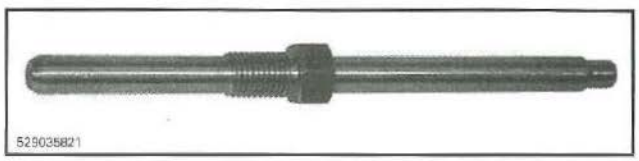
NOTE: When the piston of cylinder 3 is at ignition TDC, the position lines on oil separator cover must be lined up as shown in the following illustration.



1. *Position lines*

Use a small screwdriver to check if the groove in the crankshaft is aligned with the hole.

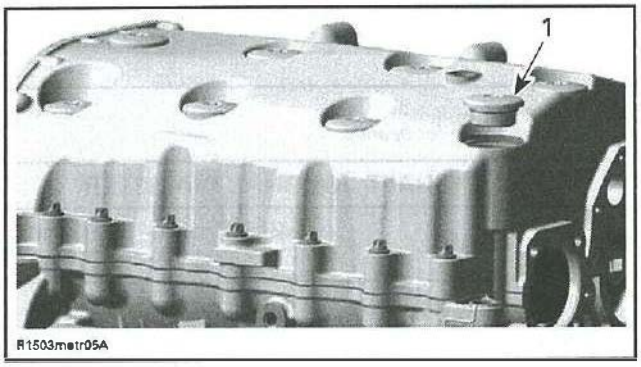
In this position, lock the crankshaft using the CRANKSHAFT LOCKING TOOL (P/N 529 035 821).



Crankshaft Removal

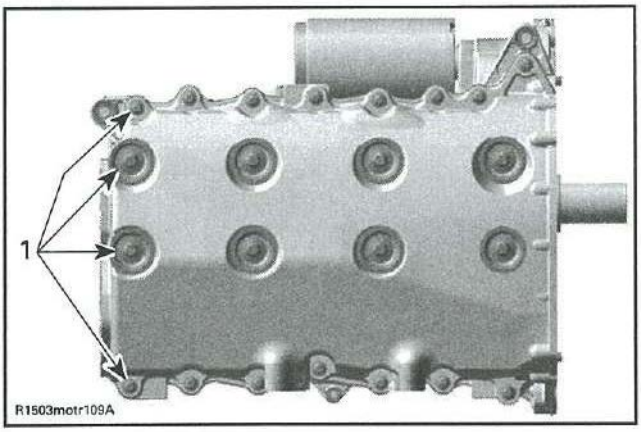
1. Drain engine oil (refer to *LUBRICATION SYSTEM* subsection).

2. Remove engine from vehicle (refer to *ENGINE REMOVAL AND INSTALLATION* subsection).
3. Remove cylinder head (refer to *CYLINDER HEAD* subsection).
4. Remove PTO housing (refer to *PTO HOUSING AND MAGNETO* subsection).
5. Remove starter gear (refer to *PTO HOUSING AND MAGNETO* subsection).
6. Remove starter drive.
7. Remove oil suction pump (refer to *LUBRICATION SYSTEM* subsection).
8. Remove engine mounting brackets.
9. Remove oil reservoir plug screws **no. 12** with O-ring **no. 13**.



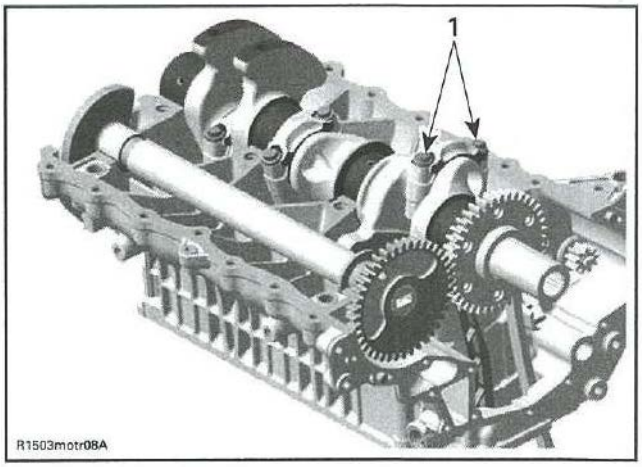
ENGINE UPSIDE DOWN
1. Oil reservoir plug screw with O-ring

10. Remove cylinder block screws **no. 14** and **no. 15**.



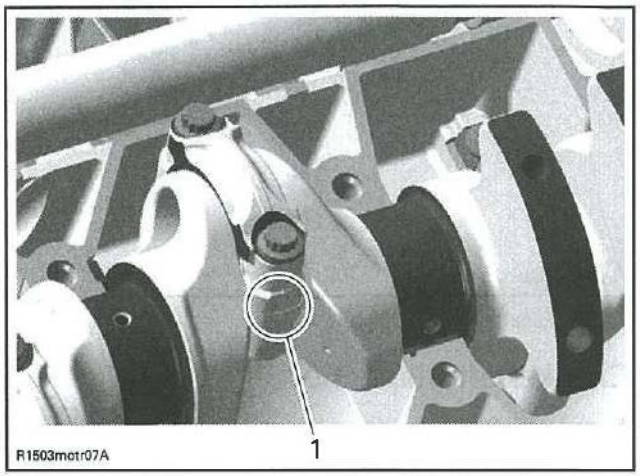
BOTTOM VIEW OF ENGINE
1. Screws

11. Remove cylinder block lower half.
12. Remove connecting rod screws.



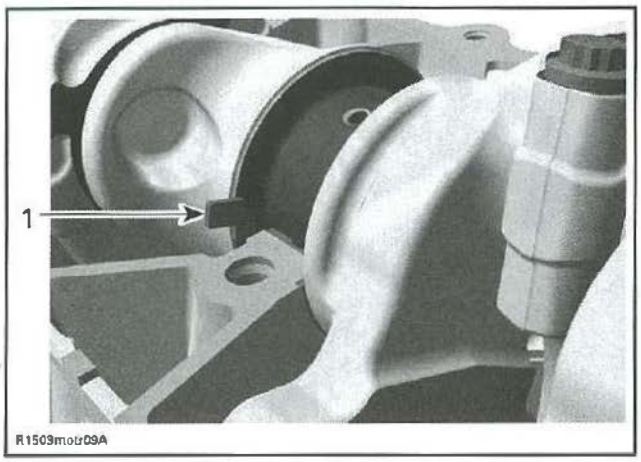
1. Connecting rod screws

NOTE: Before removing the connecting rod caps, mark them to remember the right position when reassembling. It is recommended to measure connecting rod big end axial play prior to remove connecting rod. Refer to *PISTONS AND CONNECTING RODS* in this subsection for the procedure.



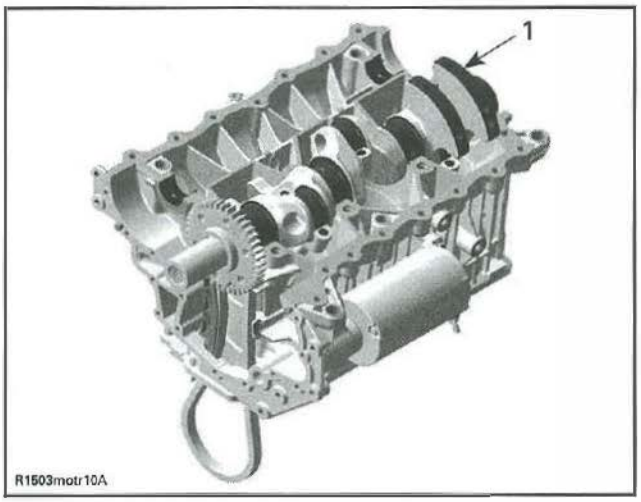
1. Mark on connecting rod

13. Remove thrust washers **no. 16**.



1. Thrust washer

14. Remove crankshaft no. 17.

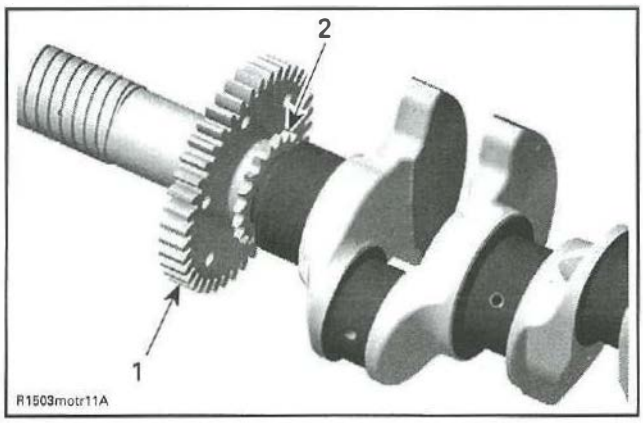


1. Crankshaft

Crankshaft Inspection

Crankshaft Gear Inspection

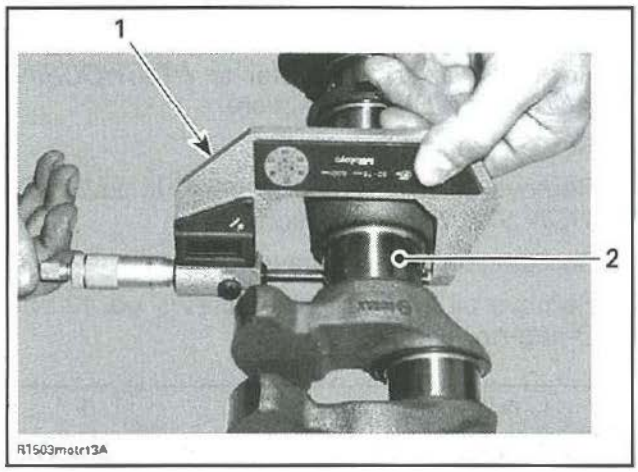
Replace crankshaft if the gears are worn or otherwise damaged.



1. Balancer gear
2. Crankshaft timing gear

Crankshaft Radial Play

Measure all crankshaft journals. Compare to inside diameter of crankshaft bearings (elsewhere in this subsection).



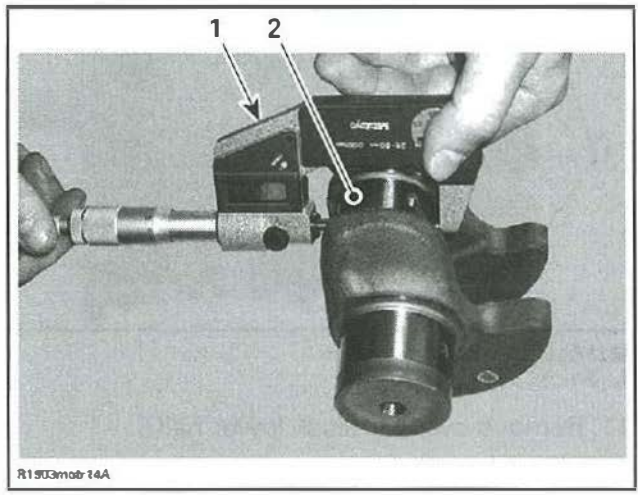
1. Micrometer
2. Crankshaft area for bearing

CRANKSHAFT JOURNAL DIAMETER	
NEW	49.991 mm - 50.01 mm (1.9681 in - 1.9689 in)
SERVICE LIMIT	49.95 mm (1.9665 in)

CRANKSHAFT JOURNAL RADIAL CLEARANCE	
SERVICE LIMIT	0.07 mm (.0028 in)

Crankshaft Pin

Measure all crankshaft pin diameters. Compare to inside diameter of connecting rod bearings (elsewhere in this subsection).



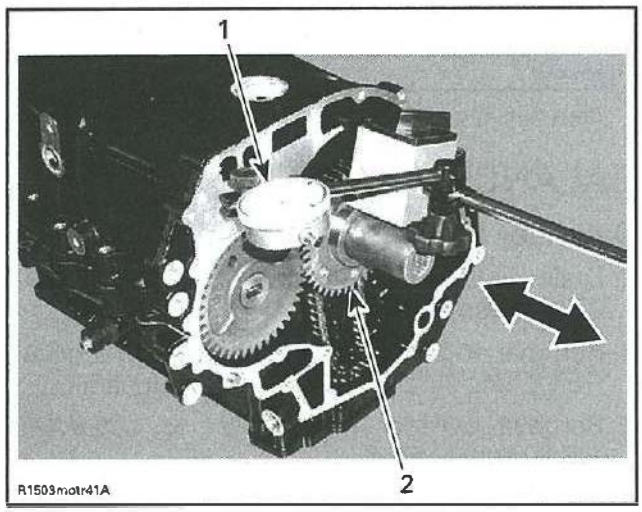
1. Micrometer
2. Crankshaft pin area for bearing

CRANKSHAFT PIN DIAMETER	
NEW	45.032 mm - 45.048 mm (1.7729 in - 1.7735 in)
SERVICE LIMIT	45.029 mm (1.7728 in)

CRANKSHAFT PIN RADIAL CLEARANCE	
SERVICE LIMIT	0.09 mm (.0035 in)

Crankshaft Axial Clearance

When assembling the cylinder-block, measure the crankshaft axial clearance.



1. *Dial gauge*
2. *Crankshaft*

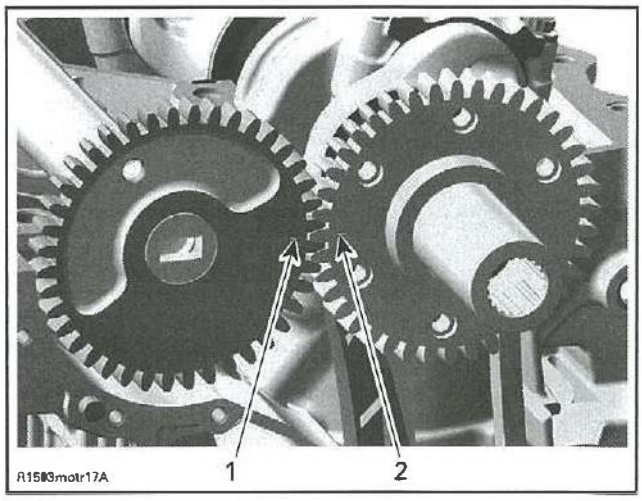
CRANKSHAFT AXIAL CLEARANCE	
NEW	0.08 mm - 0.22 mm (.003 in - .009 in)
SERVICE LIMIT	0.35 mm (.014 in)

Crankshaft Installation

For installation, reverse the removal procedure. Pay attention to following details.

NOTE: Before installing the crankshaft, make sure that the timing chain is on the crankshaft and the chain guide has been installed first. Those parts cannot be installed when the crankshaft is in place.

NOTICE Crankshaft and balancer shaft marks have to be aligned.



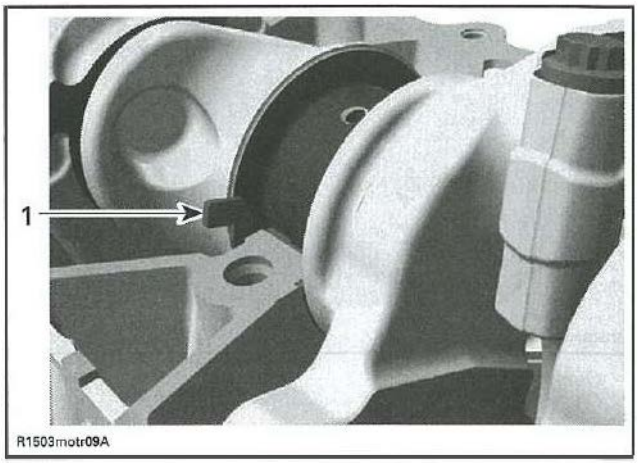
1. *Mark on balancer shaft*
2. *Mark on crankshaft*

For correct installation of the connecting rods, refer to *PISTONS AND CONNECTING RODS* in this subsection.

NOTICE It is absolutely necessary to follow this procedure. Otherwise severe engine damage can occur.

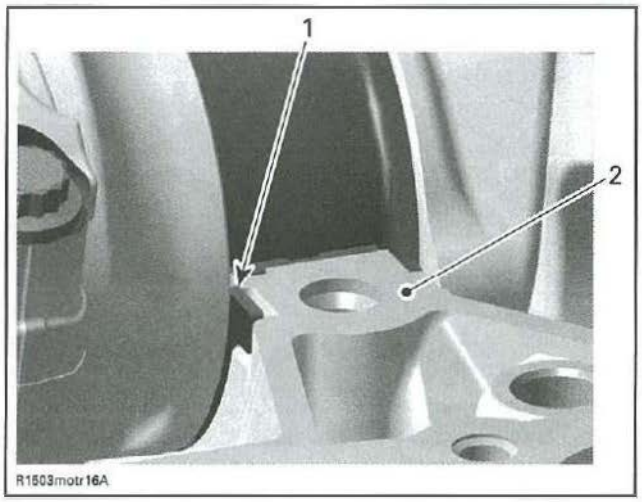
Insert thrust washers no. 16 as soon as crankshaft is in place as per following illustration.

NOTICE Never forget thrust washers on center of crankshaft to control axial adjustment.



THRUST WASHER INSERT DIRECTION
1. *Thrust washer*

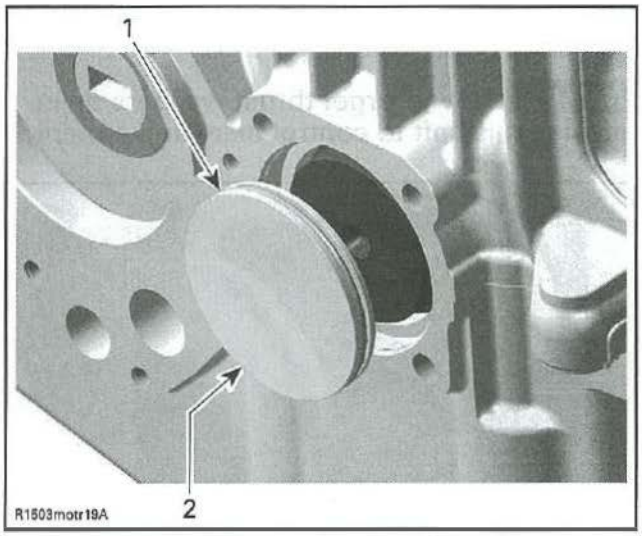
NOTICE Thrust washers have to be flush with the cylinder block sealing surface.



1. Thrust washer
2. Sealing surface

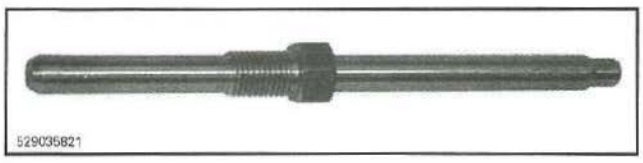
Install cylinder block lower half. Refer to *CYLINDER BLOCK* in this subsection.

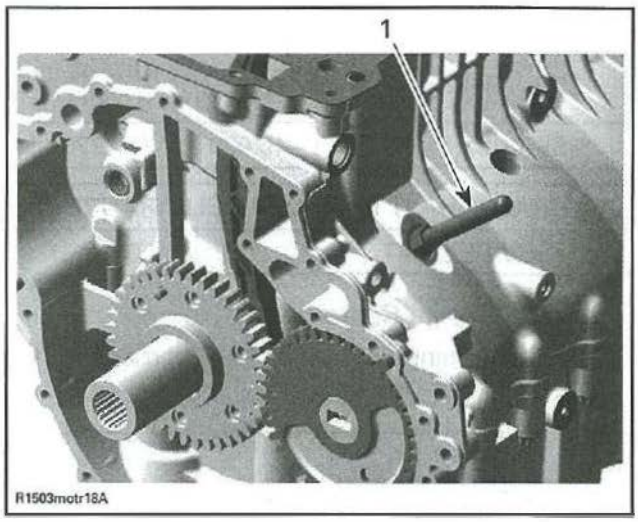
Install the crankshaft cover before mounting the engine bracket. Apply engine oil on O-ring and press cover in. Crankshaft cover has to be flush with cylinder block surface.



1. O-ring
2. Crankshaft cover

Install the CRANKSHAFT LOCKING TOOL (P/N 529 035 821) right away to position crankshaft at TDC before installing the camshaft and the rocker arms (refer to *CYLINDER HEAD* subsection).



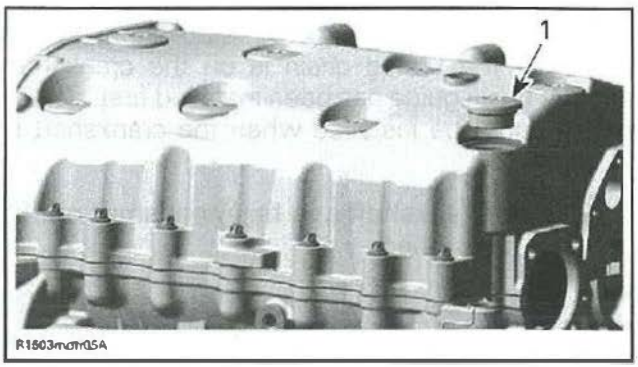


1. Crankshaft locking tool

BALANCER SHAFT

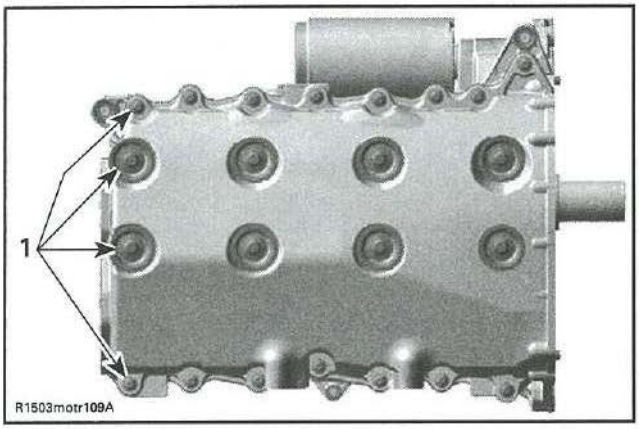
Balancer Shaft Removal

1. Drain engine oil (refer to *LUBRICATION SYSTEM* subsection).
2. Remove engine from vehicle (refer to *ENGINE REMOVAL AND INSTALLATION* subsection).
3. Remove cylinder head (refer to *CYLINDER HEAD* subsection).
4. Remove PTO housing (refer to *PTO HOUSING AND MAGNETO* subsection).
5. Remove starter gear (refer to *PTO HOUSING AND MAGNETO* subsection).
6. Remove starter drive.
7. Remove oil suction pump (refer to *LUBRICATION SYSTEM* subsection).
8. Remove engine mounting brackets.
9. Remove oil reservoir plug screws no. 12 with O-ring no. 13.



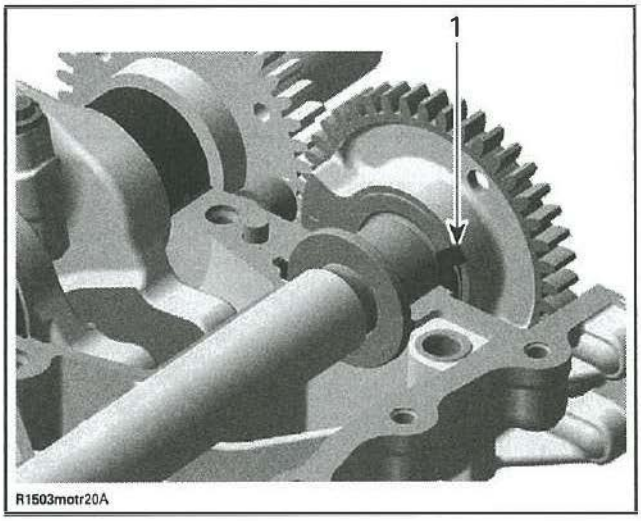
ENGINE UPSIDE DOWN
1. Oil reservoir plug screw with O-ring

10. Remove cylinder block screws no. 14 and no. 15.



1. Screws

11. Remove cylinder block lower half.
12. Remove thrust washers no. 18.



1. Thrust washer

13. Remove balancer shaft.

Balancer Shaft Inspection

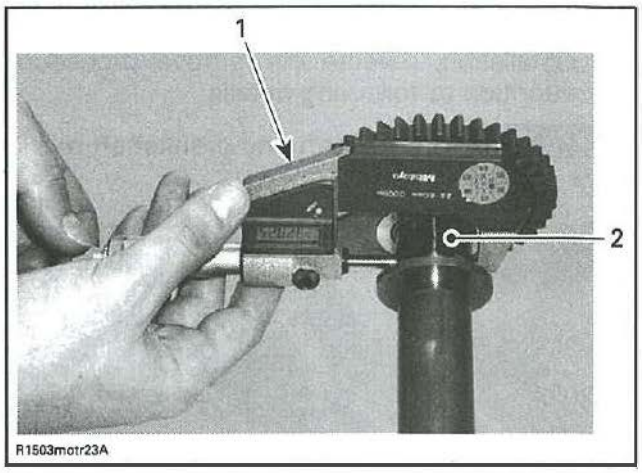
Check balancer shaft and replace if damaged.

If the gear on the balancer shaft is damaged, replace balancer shaft.

Check gear on the crankshaft at the same time and replace crankshaft if necessary (refer to *CRANKSHAFT* above).

Balancer Shaft Bearing Seat Play

Measure all balancer shaft bearing seats. Compare to inside diameter of balancer shaft bearings (see *CYLINDER BLOCK INSPECTION* in this subsection).



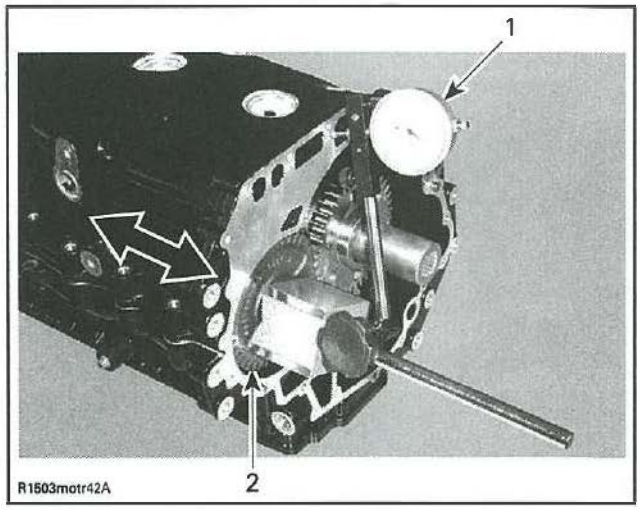
1. Micrometer
2. Balancer shaft area for bearing

BALANCER SHAFT SEAT DIAMETER	
NEW	31.984 mm - 32.000 mm (1.2592 in - 1.2598 in)
SERVICE LIMIT	31.950 mm (1.2579 in)

BALANCER SHAFT SEAT RADIAL CLEARANCE	
SERVICE LIMIT	0.07 mm (.0028 in)

Balancer Shaft Axial Clearance

When assembling the cylinder-block, measure the balance shaft axial play.



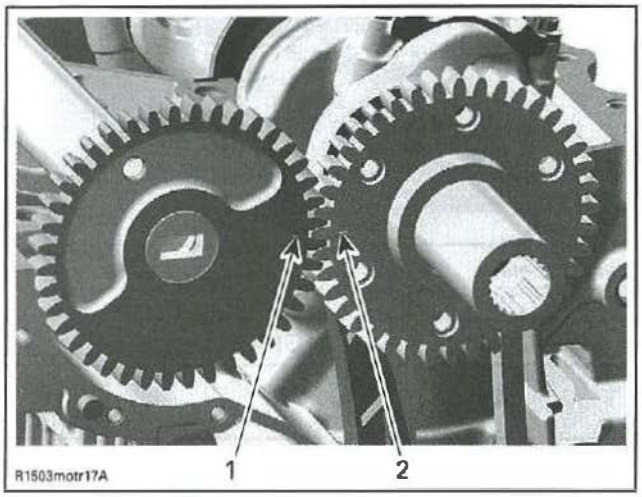
1. Dial gauge
2. Balancer shaft

BALANCER SHAFT AXIAL CLEARANCE	
NEW	0.02 mm - 0.25 mm (.001 in - .01 in)
SERVICE LIMIT	0.35 mm (.014 in)

Balancer Shaft Installation

For installation, reverse the removal procedure. Pay attention to following details.

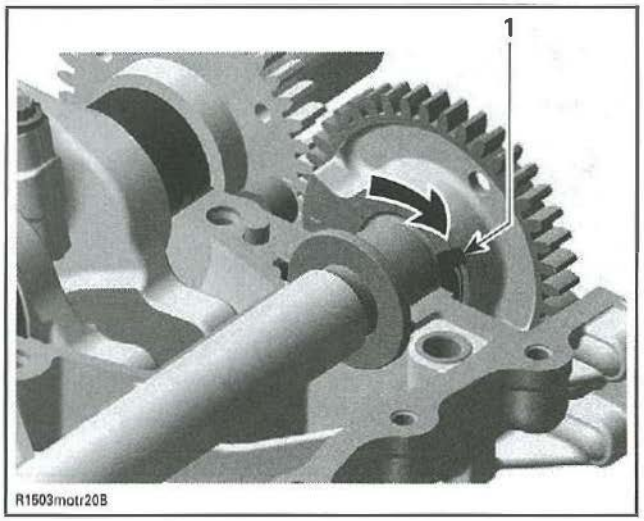
NOTICE **Balancer shaft and crankshaft marks have to be aligned.**



1. Mark on balancer shaft
2. Mark on crankshaft

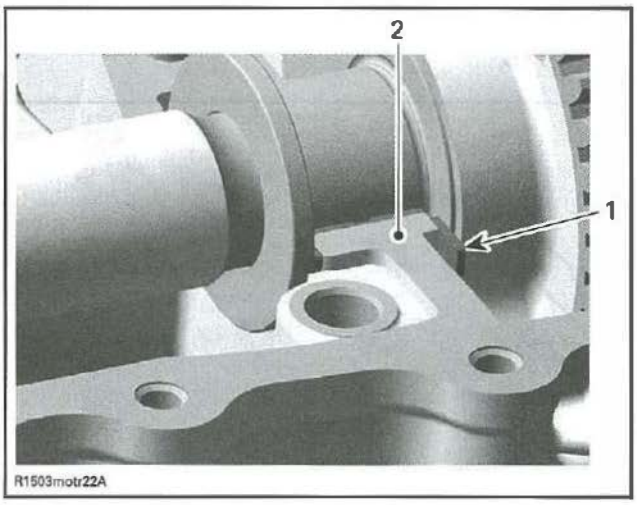
NOTICE **Never forget thrust washers no. 18 on PTO side to control axial adjustment on balancer.**

Insert thrust washers as soon as balancer shaft is in place as per following illustration.



THRUST WASHER INSERT DIRECTION
1. Thrust washer

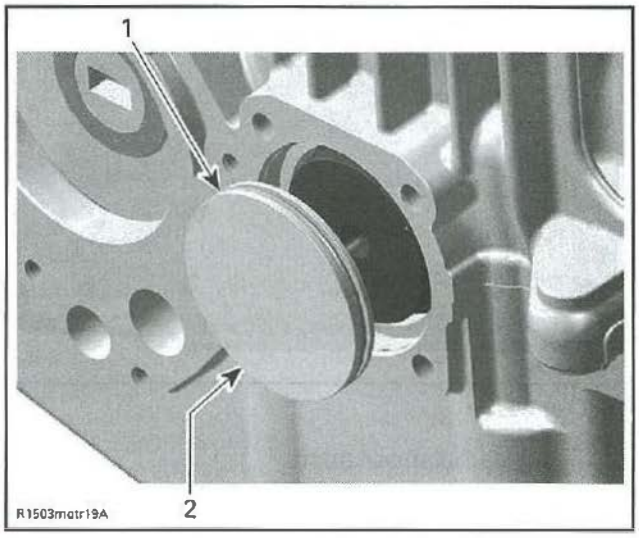
NOTICE **Thrust washers have to be flush with the cylinder block sealing surface.**



1. Thrust washer
2. Sealing surface

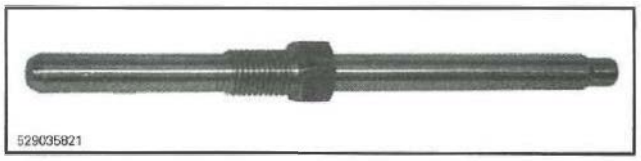
Install cylinder block lower half. Refer to *CYLINDER BLOCK* in this subsection.

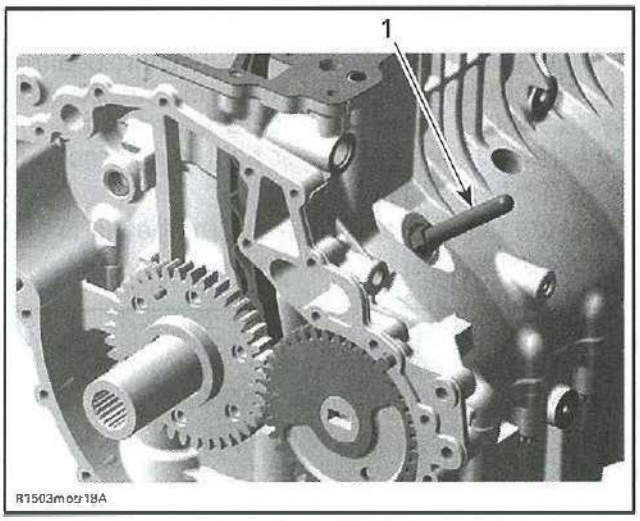
Install the crankshaft cover before mounting the engine bracket. Apply engine oil on O-ring and press cover in. Crankshaft cover has to be flush with cylinder block surface.



1. O-ring
2. Crankshaft cover

Install the CRANKSHAFT LOCKING TOOL (P/N 529 035 821) right away to position crankshaft at TDC before installing the camshaft and the rocker arms (refer to *CYLINDER HEAD* subsection).





1. Crankshaft locking tool

CYLINDER BLOCK

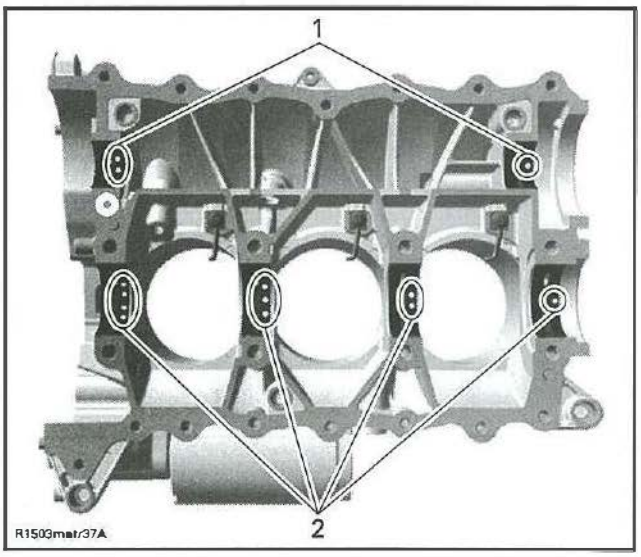
Cylinder Block Disassembly

Remove:

- Engine oil (refer to *LUBRICATION SYSTEM* subsection)
- Engine from vehicle (refer to *ENGINE REMOVAL AND INSTALLATION* subsection)
- Cylinder head (refer to *CYLINDER HEAD* subsection)
- PTO housing (refer to *PTO HOUSING AND MAGNETO* subsection)
- Starter gear and starter drive (refer to *PTO HOUSING AND MAGNETO* subsection)
- Oil suction pump (refer to *LUBRICATION SYSTEM* subsection)
- Balancer shaft (refer to *BALANCER SHAFT* elsewhere in this subsection)
- Crankshaft (refer to *CRANKSHAFT* elsewhere in this subsection)
- Piston with connecting rod (refer to *PISTONS AND CONNECTING RODS* elsewhere in this subsection).

Bearings

When bearings **no. 19** and **no. 20** need to be removed from the cylinder block, mark them to identify the correct position at installation. See the following illustration for an example:



1. Marks on balancer shaft bearings
2. Marks on crankshaft bearings

Cylinder Block Inspection

Cylinder

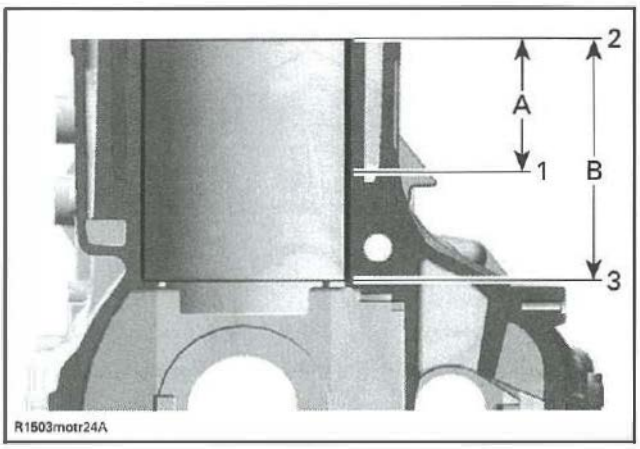
Check cylinder for cracks, scoring and wear ridges on the top and bottom of the cylinder. If so, replace cylinder.

Cylinder Taper

Measure cylinder bore and if it is out of specifications, re-hone cylinder sleeve and replace piston with first oversize.

NOTE: It is not necessary to have all cylinders re-honed if they are not all out of specification. Mixed standard size and oversize cylinders are allowed.

Measure cylinder bore at 3 recommended positions. See the following illustration.



1. First measuring diameter
2. Second measuring diameter
3. Third measuring diameter
A. 60 mm (2.362 in)
B. 110 mm (4.331 in)

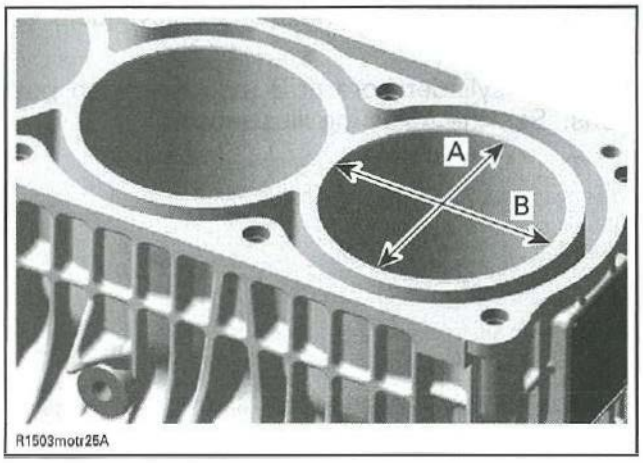
CYLINDER TAPER IN DIAMETER	
NEW MAXIMUM	0.038 mm (.001 in)
SERVICE LIMIT	0.100 mm (.004 in)

Distance between measurements should not exceed the service limit mentioned above.

Cylinder Out of Round

Measure cylinder diameter in piston axis direction from top of cylinder. Take an other measurement 90° from first one and compare.

NOTE: Take the same measuring points as described in *CYLINDER TAPER* above.



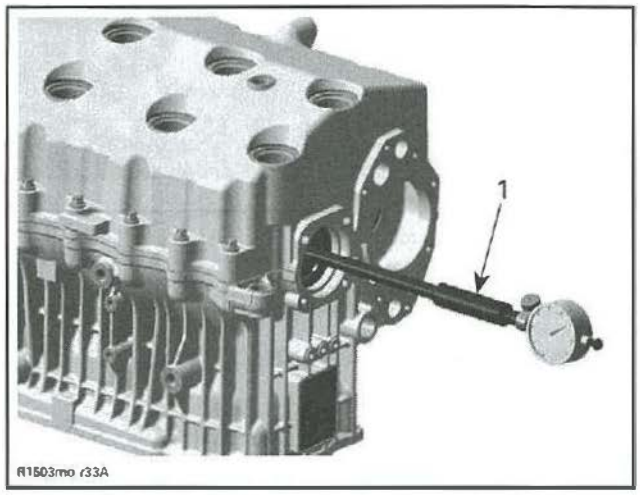
A. Perpendicular to crankshaft axis
B. Parallel to crankshaft axis

CYLINDER OUT OF ROUND	
NEW MAXIMUM	0.008 mm (.0003 in)
SERVICE LIMIT	0.015 mm (.0006 in)

Bearings

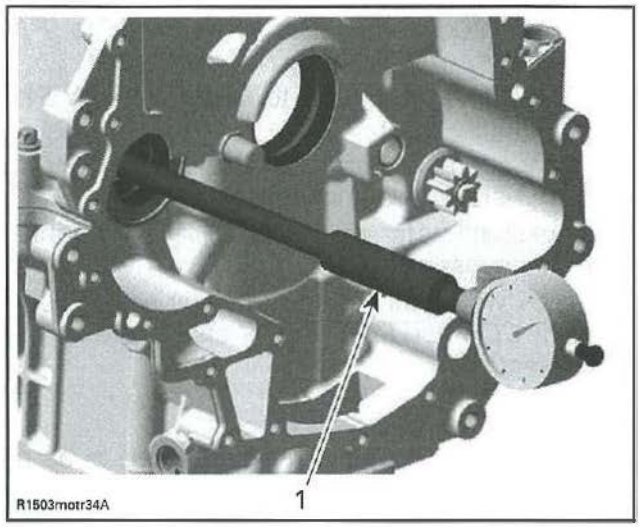
To measure the wear of the crankshaft bearings no. 19 and balancer shaft bearings no. 20, both cylinder block halves with OLD bearings have to be screwed together as per tightening procedure described below.

Measure the inside diameter of the bearings with a bore gauge.



ENGINE UPSIDE DOWN
1. Bore gauge

CRANKSHAFT BEARING INSIDE DIAMETER	
SERVICE LIMIT	50.1 mm (1.9724 in)



ENGINE UPSIDE DOWN
1. Bore gauge

BALANCER SHAFT BEARING INSIDE DIAMETER	
SERVICE LIMIT	32.11 mm (1.2642 in)

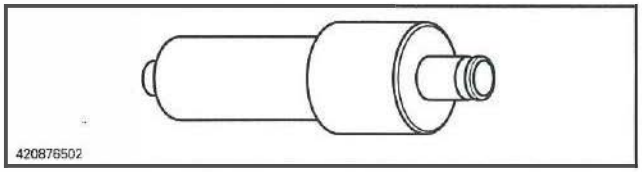
Replace bearings if they are out of specifications.

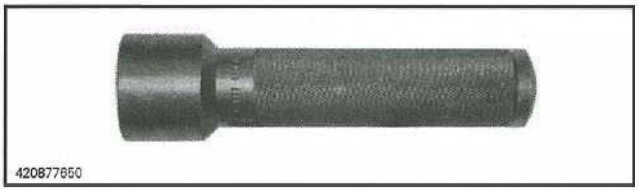
Cylinder Block Assembly

For assembly, reverse the disassembly procedure. Pay attention to the following details.

Torque Banjo screw to 19 N•m (168 lbf•**in**).

To install starter drive bearing no. 21 of starter drive assembly, use the STARTER DRIVE SEAL PUSHER (P/N 420 876 502) and the HANDLE (P/N 420 877 650).

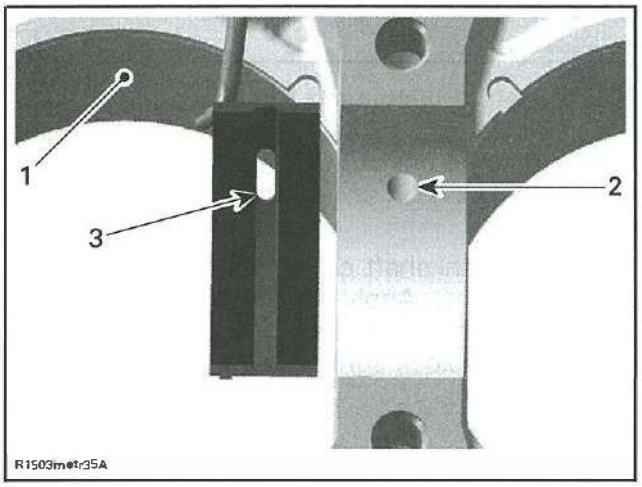




Use **NEW** bearings when diameters are out of specification.

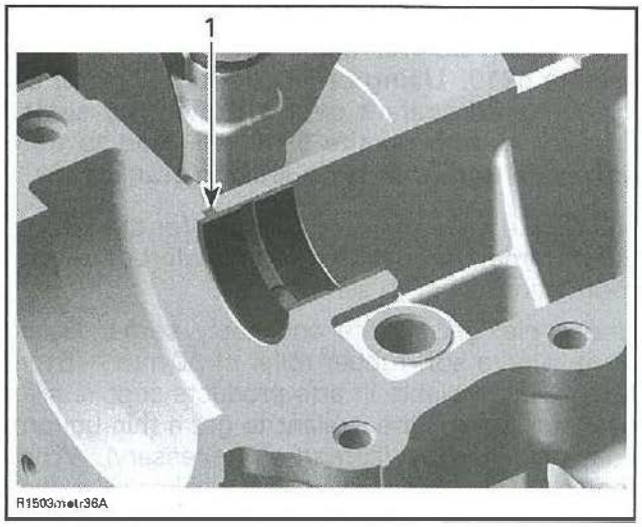
If **OLD** bearings can be used again, make sure they are at the same position as they were before.

Correctly install bearings. Top crankshaft bearing halves have a bore which has to be placed in the upper cylinder block.



1. Cylinder block upper half
2. Oil bore in cylinder block
3. Oil bore in bearing

Bearings have to be flush with the cylinder block split surface and their protrusions have to fit in the notched areas in the cylinder block seat.



1. Bearing protrusion in cylinder block notch

Apply engine oil on all bearings, in the bottom area of the cylinder bore and also on the band of the piston ring compressor tool.

For proper installation of pistons, refer to *PISTONS AND CONNECTING RODS* in this subsection.

NOTE: Before installing the crankshaft, make sure that the timing chain is on the crankshaft and the chain guide has been installed first. Those parts cannot be installed after as the crankshaft is in place.

Clean oil passages and make sure they are not clogged.

Clean all metal components in a solvent.

Cylinder block mating surfaces are best cleaned using a combination of the LOCTITE CHISEL (GASKET REMOVER) (P/N 413 708 500) and a brass brush. Brush a first pass in one direction then make the final brushing perpendicularly (90°) to the first pass (cross hatch).

NOTICE **Do not wipe with rags. Use a new clean hand towel only.**

IMPORTANT: When beginning the application of the crankcase sealant, the assembly and the first torquing should be done within 10 minutes. It is suggested to have all you need on hand to save time.

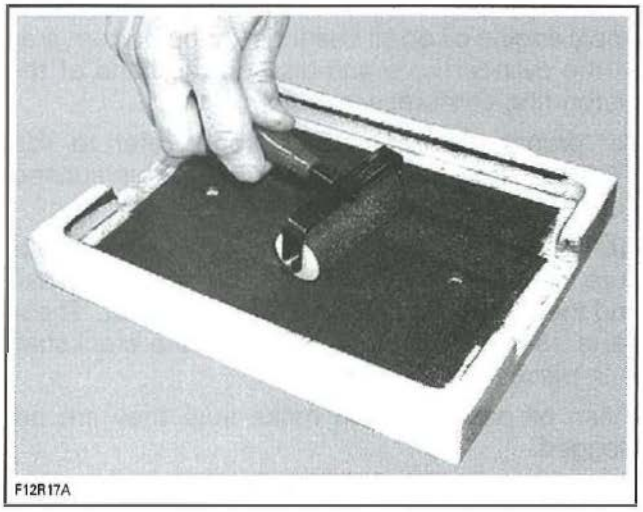
NOTE: It is recommended to apply this specific sealant as described here to get an uniform application without lumps. If you do not use the roller method, you may use your finger to uniformly distribute this sealant.

Apply LOCTITE 5910 (P/N 293 800 081) on mating surfaces.

NOTICE Do not use other products to seal crankcase. Do not use an activator with the Loctite 5910. Using other products or non silicone-based sealant over a previously sealed crankcase with Loctite 5910 will lead to poor adhesion and possibly a leaking crankcase.

NOTE: Refer to the product label for the sealant curing time. Respect the manufacturer's recommendations prior to start engine.

Use a plexiglass plate and apply some sealant on it. Use a soft rubber roller of 50 mm - 75 mm (2 in - 3 in) available in arts products suppliers for printmaking, roll the sealant to get a thin uniform coat on the plate (spread as necessary). When ready, apply the sealant on crankcase mating surfaces.

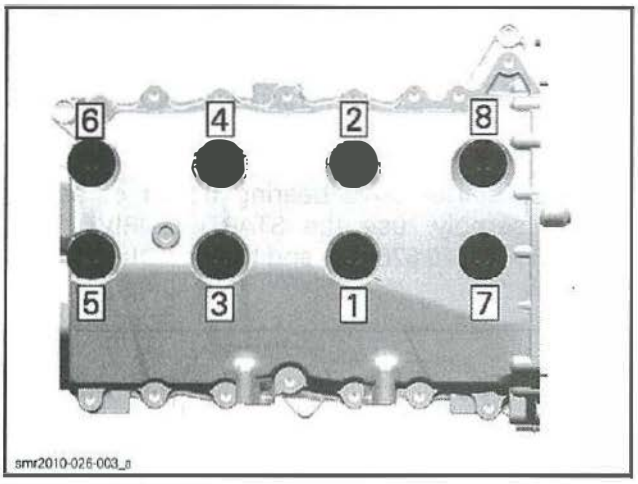

F12R17A

Do not apply in excess as it will spread out inside crankcase.

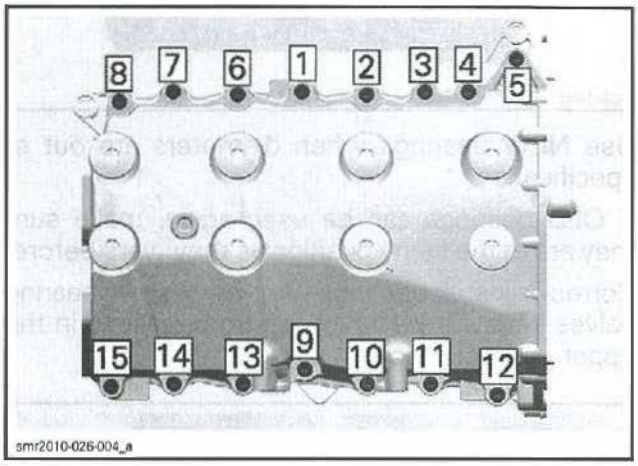
Tighten cylinder block screws as per following procedure:

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on screw threads.

Torque cylinder block screws no. 14 to 40 N•m (30 lbf•ft) using the following sequence and then repeat the sequence to 55 N•m (41 lbf•ft).

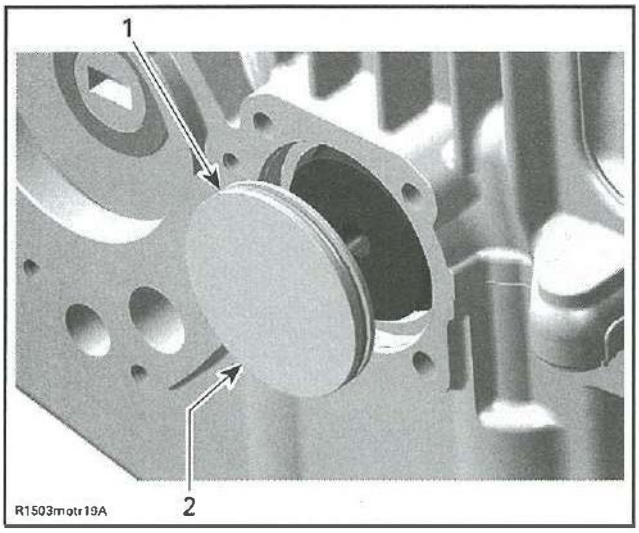


Torque cylinder block screws no. 15 to 23 N•m (17 lbf•ft) using the following sequence.



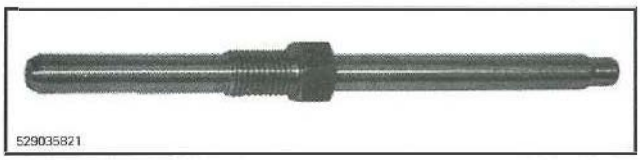
NOTE: Before continuing the assembly process, the axial clearance of balancer shaft and crankshaft has to be checked. Refer to *CRANKSHAFT* and *BALANCER SHAFT* in this subsection for the procedure.

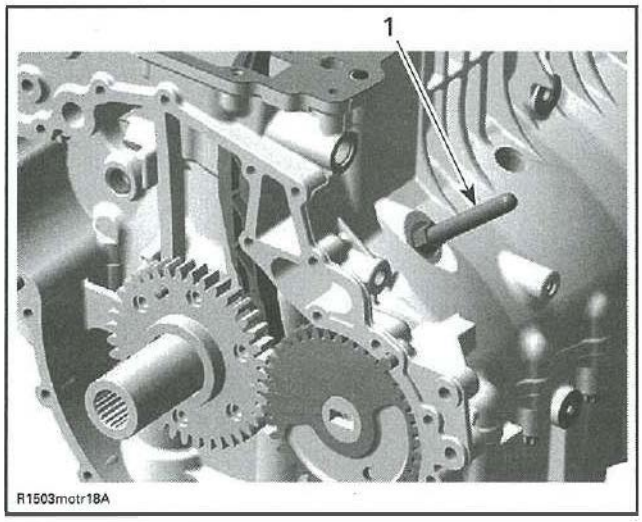
Install the crankshaft cover before mounting the engine bracket. Apply engine oil on O-ring and press cover in. Crankshaft cover has to be flush with cylinder block surface.



1. O-ring
2. Crankshaft cover

Install the CRANKSHAFT LOCKING TOOL (P/N 529 035 821) right away to position crankshaft at TDC before installing the camshaft and the rocker arms (refer to *CYLINDER HEAD* subsection).

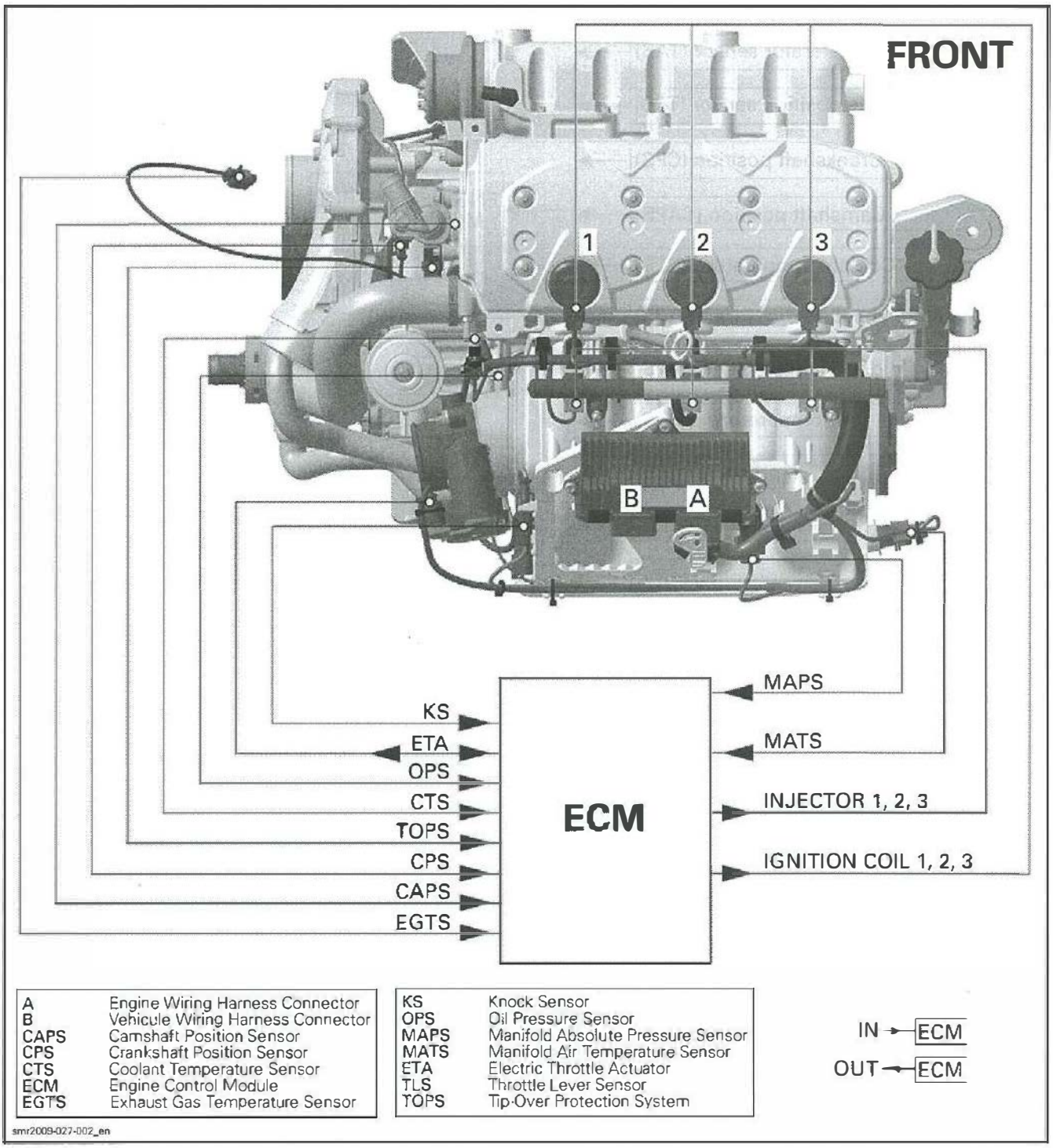


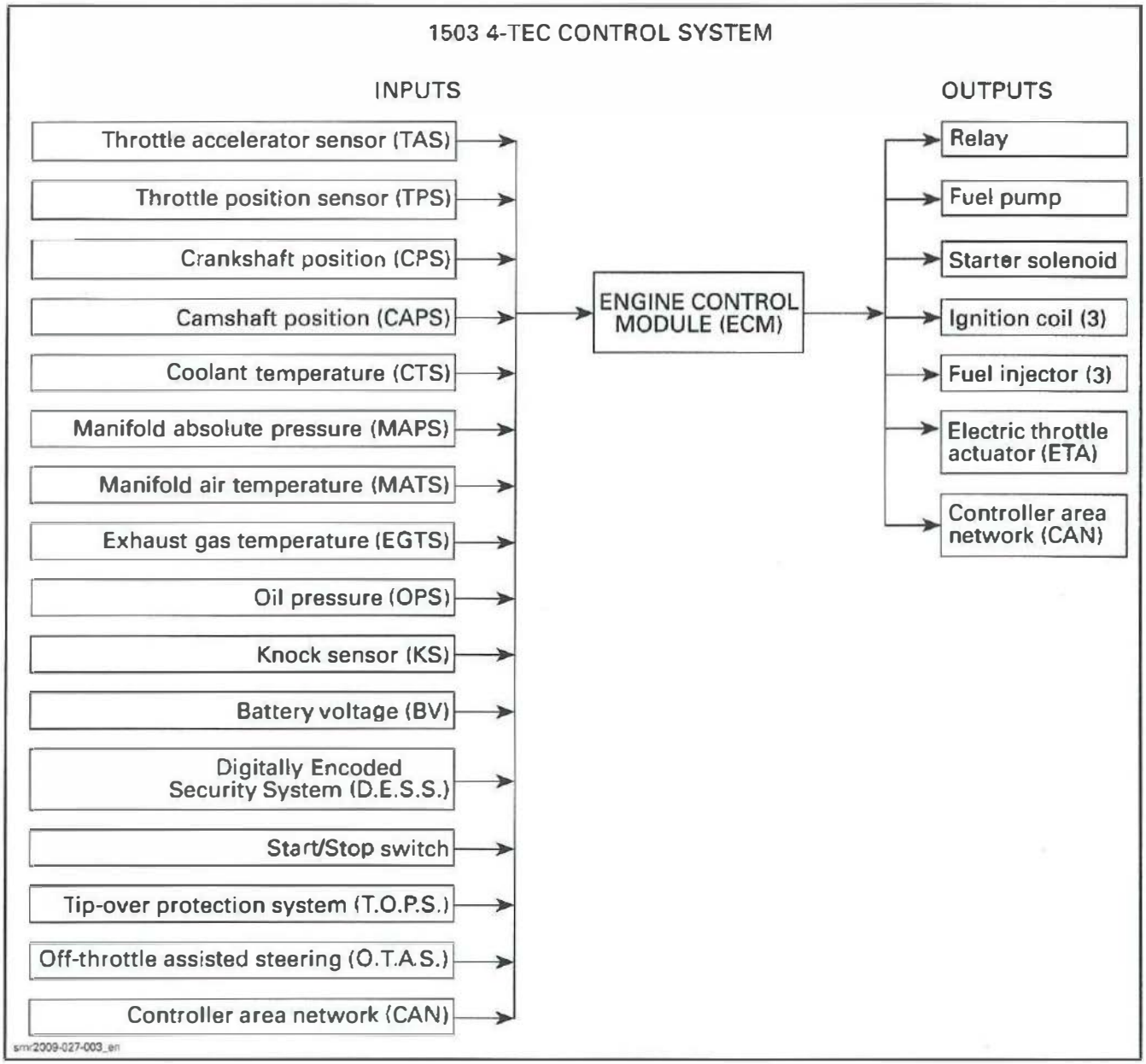


1. Crankshaft locking tool

Install cylinder head, PTO housing and the other parts in accordance with the proper assembly procedures.

ENGINE MANAGEMENT SYSTEM




1503 4-TEC CONTROL SYSTEM
INPUTS
OUTPUTS
Throttle accelerator sensor (TAS)
Throttle position sensor (TPS)
Crankshaft position (CPS)
Camshaft position (CAPS)
Coolant temperature (CTS)
Manifold absolute pressure (MAPS)
Manifold air temperature (MATS)
Exhaust gas temperature (EGTS)
Oil pressure (OPS)
Knock sensor (KS)
Battery voltage (BV)
Digitally Encoded Security System (D.E.S.S.)
Start/Stop switch
Tip-over protection system (T.O.P.S.)
Off-throttle assisted steering (O.T.A.S.)
Controller area network (CAN)
ENGINE CONTROL MODULE (ECM)
Relay
Fuel pump
Starter solenoid
Ignition coil (3)
Fuel injector (3)
Electric throttle actuator (ETA)
Controller area network (CAN)
smr2009-027-003_en

GENERAL

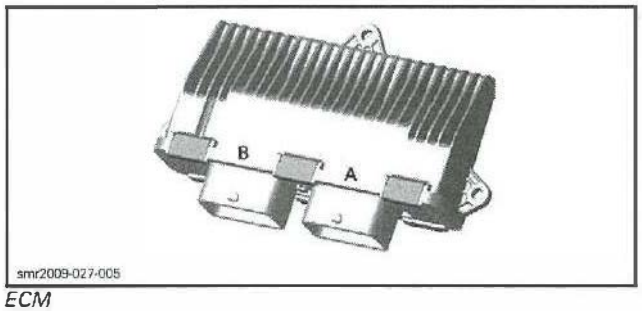
SYSTEM DESCRIPTION

A highly advanced engine management system (EMS) is used to ensure a high power output with cleaner combustion.

There are 7 main systems that interact with the engine management system:

1. Electronic fuel injection
2. D.E.S.S. System
3. Ignition System
4. Starting System
5. O.T.A.S.
   (Off-Throttle Assisted Steering)
6. T.O.P.S.
   (Tip-Over Protection System)
7. iControl System

Engine Control Module (ECM)

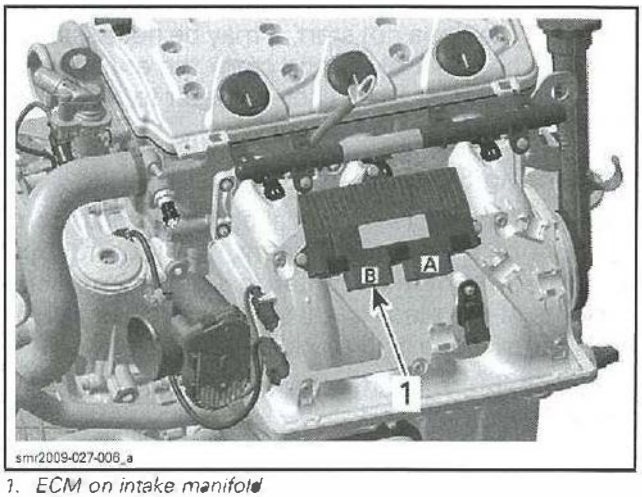


ECM

The ECM is the main component of the engine management system. It controls the electrical system and the engine management functions by processing the information obtained from various switches, controls and sensors that it compares to predetermined parameters stored in the ECM.

It also interacts with the other electronic systems through the CAN bus (information center and iControl System) for various functions that affect engine management.

The ECM is mounted on the intake manifold.



1. ECM on intake manifold

It features a permanent memory that will store fault codes, customer information and other engine information, even when the battery is removed from the vehicle.

The ECM controls the following engine management functions:

Engine RPM Limiter

The ECM limits maximum engine speed. It monitors engine RPM through the CPS and varies fuel injection, ignition and throttle plate opening as necessary.

Engine Speed Control

The ECM controls the engine idle RPM. In addition, it can vary the engine speed by commanding the electric throttle actuator (ETA) to open or close based on throttle position and various other inputs. The ETA also allows for other functions of the iControl system.

Drowned Mode

If the engine is flooded and does not start, this special mode can be activated to prevent fuel injection and ignition while cranking in order to ventilate the engine to dry the cylinder walls.

NOTE: This mode can also be used if the engine is water-flooded.

To activate DROWNED MODE, proceed as per following steps.

1. Install the tether cord cap on the engine cut out switch.
2. While the engine is stopped, fully pull and HOLD the throttle lever.
3. Press the START/STOP button. DROWNED MODE is now on.

Releasing the throttle lever will allow the ECM to revert back to normal mode.

If the engine does not start, it may be necessary to remove the spark plugs and crank the engine with rags over the spark plug holes. Refer to *IGNITION SYSTEM* subsection.

Monitoring System

The ECM monitors electrical and electronic components of the engine system, the iControl system, the information center (gauge), some components of the electrical system as well as signals from other electronic modules.

For more information, refer to *DIAGNOSTIC AND FAULT CODES*.

Limp Home Mode

The ECM may automatically set the engine in LIMP HOME MODE using default parameters when certain major faults are detected. For more information, refer to *DIAGNOSTIC AND FAULT CODES*.

Diagnostic Mode

The ECM features a self-diagnostic mode that is initiated on system power up for certain systems and components (when pressing the START button), and when the engine is running for others. Refer to *DIAGNOSTIC AND FAULT CODES* subsection for more information.

green-manuals

iCONTROL SYSTEM

GENERAL

The iControl (intelligent Control) system may consist of the following systems depending on the PWC model:

- Intelligent Throttle Control (iTC)
- Intelligent Brake and Reverse (iBR)
- Intelligent Suspension (iS).

The information center (gauge) and handlebar switches are used to navigate through and select several functions, modes of operation and change certain settings and system parameters using the appropriate handlebar controls.

Each control is electronic and provides a command signal to an electronic module whose function is to assure proper operation of its system within set parameters.

For a comprehensive and complete description of the information center, refer to *INFORMATION CENTER (GAUGE)* subsection.

iTC (INTELLIGENT THROTTLE CONTROL)

The iTC is an electronic throttle control system (ETC) that includes a cable-less throttle control (TAS) located on the RH side of handlebar and an electric throttle actuator (ETA) located on the throttle body.

The iTC allows functions such as touring/sport mode, cruise control, slow speed mode, ski mode and O.T.A.S.™ as well as a more precise control of the engine power.

For a comprehensive and complete description of this system, refer to *INTELLIGENT THROTTLE CONTROL (ITC)* subsection.

iBR (INTELLIGENT BRAKE AND REVERSE)

The iBR is a brake and reverse system used to avoid obstacles, gradually slow down or stop the watercraft, or drive backwards by lowering the iBR gate that redirects the water flow at the outlet of the jet pump nozzle.

For a comprehensive and complete description of this system, refer to *IBR AND VTS* subsection.

iS (INTELLIGENT SUSPENSION)

The intelligent suspension is an electronically controlled hydro/mechanical system consisting of a hydraulic pump, an actuator, suspension arms, springs and one shock absorber. They are installed in the hull and connected to the moving deck. The suspension system is used to isolate the riders from the rough water.

For a comprehensive and complete description of this system, refer to *SUSPENSION (iS)* subsection.

CONTROLLER AREA NETWORK (CAN)

SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	205
FLUKE 115 MULTIMETER	529 035 868	205

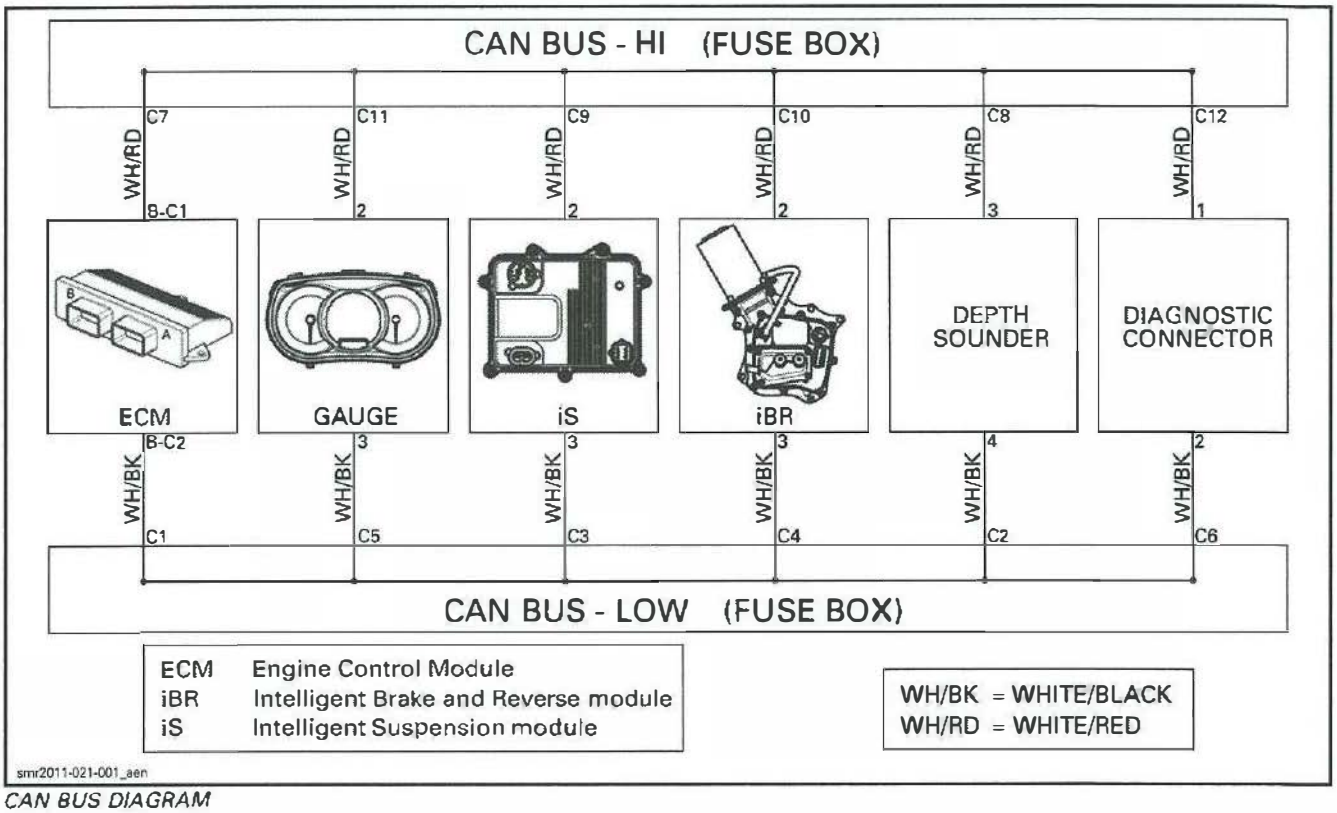
GENERAL

SYSTEM DESCRIPTION

The CAN (Controller Area Network) protocol is an ISO standard for serial data communication.

The CAN bus is the nervous system of the iControl system and the engine management system (EMS). It links the electronic modules (ECUs) together so that they communicate to interact as required.

Two wires connect each component and they are in constant communication with each other at a rate of about every 10 or 20 milliseconds depending on the component. CAN lines consist of a pair of twisted wires (WHITE/BLACK and WHITE/RED).



CAN BUS DIAGRAM

TROUBLESHOOTING

DIAGNOSTIC TIPS

Check the fault codes using B.U.D.S. as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

Make sure the modules are powered before testing CAN.

CAN Communication Problems

The following chart gives some symptoms and behaviors relative to the CAN component in cause. The list is not exhaustive, only the most significant items are given to help in troubleshooting.

CAN FAULTY WIRES (no communication)	VEHICLE BEHAVIOR OR OBSERVATION IN INFORMATION CENTER	OBSERVATION IN B.U.D.S.
Short circuit in CAN wires	Engine is set to limp home mode. iBR gate will not move. "Locked" in neutral. iBR light is ON. Check engine light is ON.	B.U.D.S. will not be able to communicate with any electronic module. "No vehicle detected" message will be displayed in B.U.D.S.
Information center (cluster)	Check engine light is ON. iBR light is ON. Some functions not displayed such as: Engine hours, iS, VTS and RPM.	3 modules instead of 4 will be active. "Cluster" tab and its data will not be available in B.U.D.S. ECM, iBR and iS will report a cluster CAN problem.
ECM (Engine Control Module)	Engine is set to limp home mode. Check engine light is ON. iBR light is ON. iBR gate "locked" in neutral. Some functions not displayed such as: Engine hours and RPM.	3 modules instead of 4 will be active. ECM tab and its data will not be available in B.U.D.S. iBR and iS will report an ECM CAN problem.
iBR (intelligent Brake and Reverse)	Engine is set to limp home mode. iBR gate will not move. "Locked" in neutral. iBR light is ON. Check engine light is ON. Some functions not displayed such as: Lake water temperature, no VTS, no F, N and R indication.	3 modules instead of 4 will be active. iBR tab and its data will not be available in B.U.D.S. ECM and iS will report an iBR CAN problem.
iS (intelligent Suspension)	iS handlebar controls have no effect. No DOCK mode. Suspension will remain to its last position before the CAN problem. iS position is not displayed.	3 modules instead of 4 will be active. iS tab and its data will not be available in B.U.D.S.
Depth sounder	The menu Depth Sounder. Indicator will not be visible. The Depth menu will not be available.	Nothing will be observable.
Diagnostic connector	Nothing will be observable.	B.U.D.S. will not be able to communicate with any electronic module. "No vehicle detected" message will be displayed in B.U.D.S.

NOTE: If the gauge cannot communicate with an optional module (iS module or depth sounder) during the initial power up, the gauge will interpret this as if the vehicle is not equipped with it. No further test of the system occurs and no indication or fault message will be visible. If communication is interrupted after the gauge has already detected them, then the gauge will indicate that there is a communication fault.

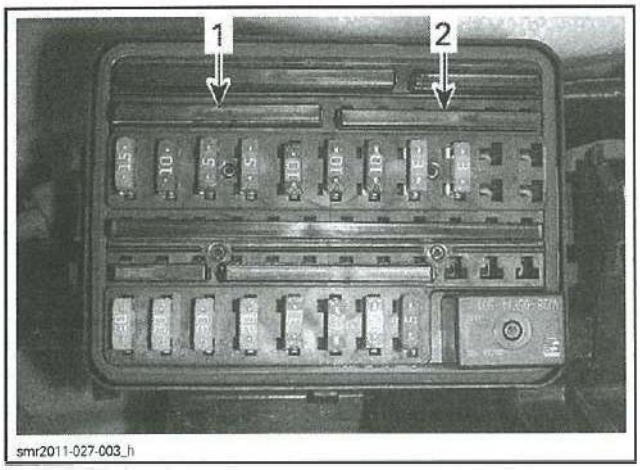
CAN Continuity Tests

If a communication problem is present, perform the appropriate continuity test relating to the component reported by, or not available in B.U.D.S.

Test wire continuity between the corresponding terminal of the CAN bus bar in the fuse box and the suspected component as follows.

For fuse box access, refer to *POWER DISTRIBUTION AND GROUNDS* subsection.

Remove both CAN bus bars.



1. *CAN LO bus bar*
2. *CAN HI bus bar*

Inspect bus bar condition.

Disconnect the connector from the component to be tested. Refer to its appropriate subsection.

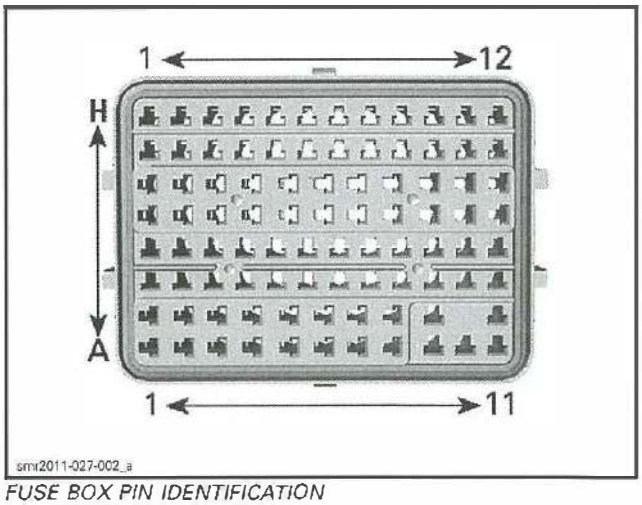
Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.

Refer to the *CAN BUS DIAGRAM* above and read wire resistance between the each bus bar terminal and the applicable component terminal. Check the continuity of the WHITE/RED wire and the continuity of the WHITE/BLACK wire.

The following gives an example between the CAN LO wire and the ECM.

NOTE: When working with the ECM, install the ECM ADAPTER TOOL (P/N 529 036 166) on ECM "B" connector. For connector identification, refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

CONTINUITY TEST EXAMPLE: ECM TO FUSE BOX		
ECM CONNECTOR	FUSE BOX TERMINAL	RESISTANCE
B-C2	G1	Close to 0 Ω (continuity)



FUSE BOX PIN IDENTIFICATION

If continuity is good, CAN wires are in good condition.

If continuity is not good, check wiring, connectors and terminals condition.

NOTE: It may be necessary to check the continuity to more than one component.

Reconnect connectors and reinstall removed parts.

COMMUNICATION TOOLS AND B.U.D.S.

SERVICE TOOLS

Description	Part Number	Page
MPI-2 DIAGNOSTIC CABLE	710 000 851	209
MPI-2 INTERFACE CARD	529 036 018	210

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
MALE-FEMALE EXTENSION SERIAL CABLE	DB9	210

GENERAL

Refer to *PROCEDURES* for instructions on the communication tools.

If communication problems occur, refer to *TROUBLESHOOTING* in this subsection.

TROUBLESHOOTING

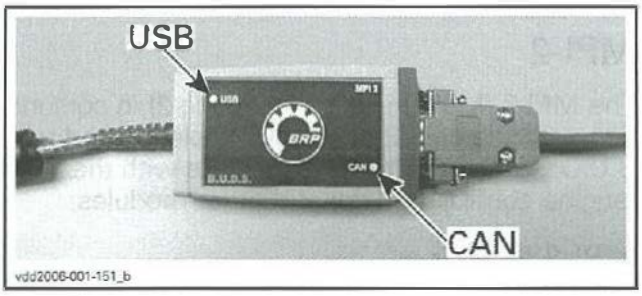
DIAGNOSTIC TIPS

IMPORTANT: Make sure all connections are made and vehicle is powered up before starting B.U.D.S. to allow proper communication between the vehicle and B.U.D.S. software.

MPI-2 Connection Troubleshooting

MPI-2 Status Lights

The MPI-2 includes 2 status lights that indicate the connection condition: USB and CAN. Both lights must be GREEN for the MPI-2 to function properly. Otherwise, refer to the following charts.



Prerequisite for USB communication:
- PC Computer turned on
- MPI-2 connected to PC computer.

USB LIGHT	
STATUS	WHAT TO DO
Light is OFF	– Check USB connection between MPI-2 and PC computer. – Check USB operation on PC computer (hardware or Windows drivers).
Light is GREEN	– Connections are GOOD. Communication can take place on USB side.

Prerequisite for CAN communication:
- MPI-2 connected to diagnostic connector on vehicle.
- ECM turned on (press the START button).
- tether cord installed on the vehicle engine cut-off switch.
- B.U.D.S. started and logged on.

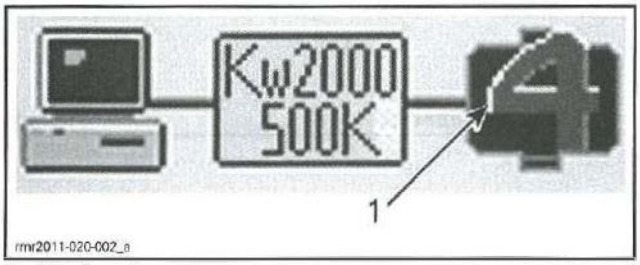
CAN LIGHT	
STATUS	WHAT TO DO
Light is OFF	Check connection between MPI-2 and diagnostic connector on vehicle.
Light is RED	Check CAN wires/connectors on vehicle.
Light is GREEN	Connections are GOOD. Communication can take place on CAN side.

Communication Problems when Using B.U.D.S.

Missing Module

Ensure the appropriate number of modules is shown at the bottom RH side of B.U.D.S. screen.

MODEL	NUMBER OF MODULES	MODULES
GTS	2	ECM and cluster
Models with iS	4	ECM, cluster, iBR and iS
Models without iS	3	ECM, cluster and iBR

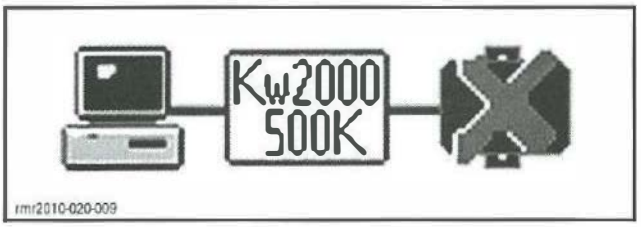


1. Number of modules

If one or more ECU is not communicating with the MPI, refer to *DIAGNOSTIC AND FAULT CODES.*

No Vehicle Detected

If an "X" is shown in the status bar and the protocol tool is blinking between Kw2000 500K and Kw2000, it means that no ECU is communicating with the MPI.

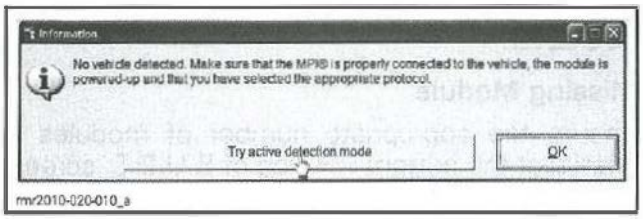


1. Check connections between the PC computer and the vehicle.
2. Ensure the electrical system is powered up.

NOTE: The tether cord must be installed.

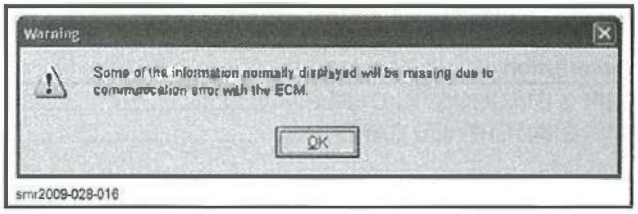
3. Ensure both USB and CAN lights on the MPI-2 are GREEN. Refer to *MPI-2 CONNECTION TROUBLESHOOTING* subsection.

If B.U.D.S. does not automatically exit the following message box, click the **Try active detection mode** button. This will manually establish the communication with the ECUs.



Message Box: "Some of the Information Normally Displayed..."

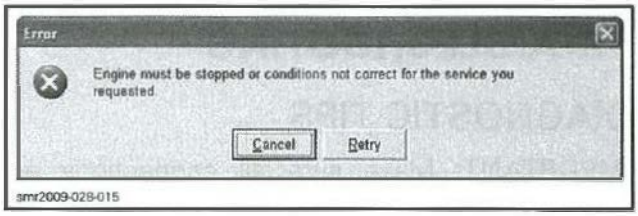
If the following message box is displayed in B.U.D.S.:



1. Click on the **OK** button in the box.
2. Ensure the tether cord is properly installed.
3. Briefly press the vehicle START button to activate the ECM. Do not hold **START** button to avoid engine starting.
4. Click on the **Read Data** button in B.U.D.S.

Message Box: "Engine must be Stopped..."

If the following message box is displayed in B.U.D.S.:



1. Click on the **Cancel** button in B.U.D.S.
2. Ensure the tether cord is properly installed.
3. Briefly press the vehicle START button to activate the ECM. Do not hold **START** button to avoid engine starting.
4. Continue with the procedure undertaken prior to the appearance of the message box.

PROCEDURES

MPI-2

The MPI-2 (Multi-Purpose Interface-2) in conjunction with the MPI-2 diagnostic cable is used with B.U.D.S. software to communicate with the ECM (engine control module) and other modules.

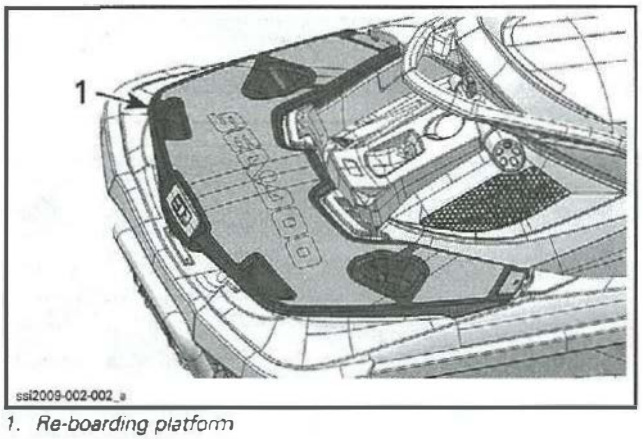
MPI-2 Power

The MPI-2 interface card uses the power from the PC computer USB port.

Connecting the PC to the Vehicle

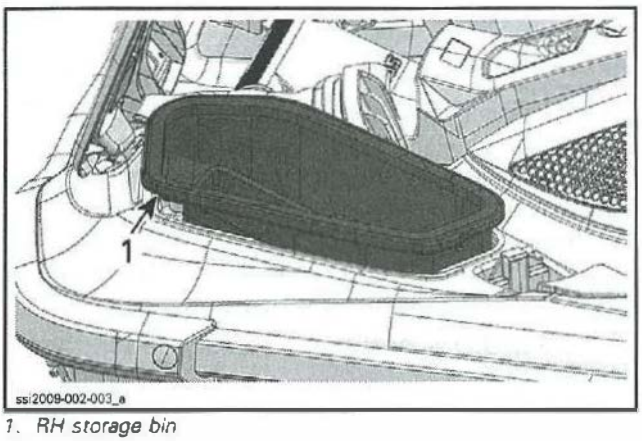
iS Models

1. Open the boarding platform.



1. Re-boarding platform

2. Remove the RH storage bin.



1. RH storage bin

Models Without iS

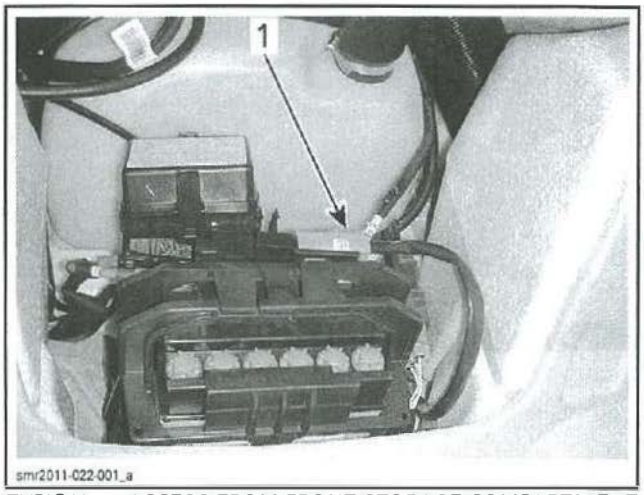
3. Remove the RH access panel on the boarding platform.

GTI/GTS Series and Wake Models

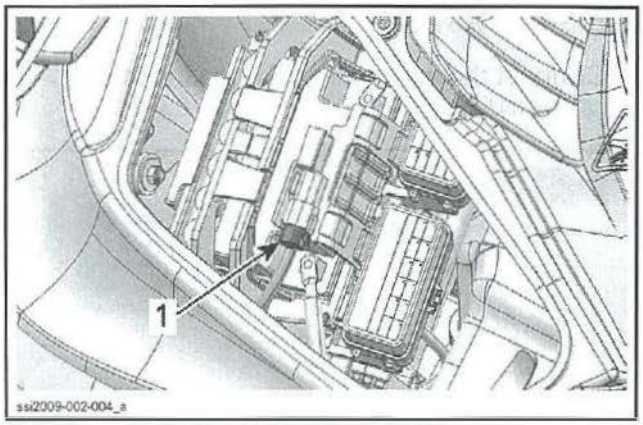
4. Open front storage compartment.
5. Remove storage basket.

All Models

6. Disconnect the 6-pin diagnostic connector from its holder (protective cap).

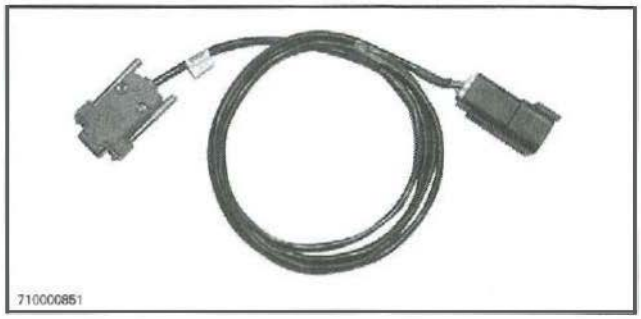


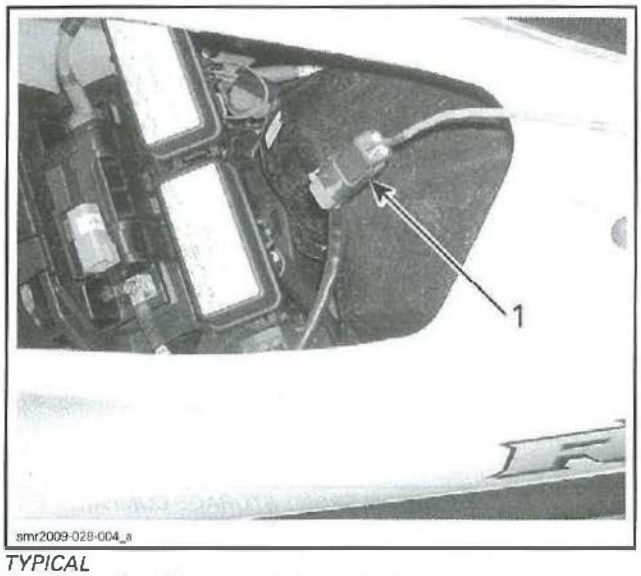
TYPICAL — ACCESS FROM FRONT STORAGE COMPARTMENT
1. Diagnostic connector



TYPICAL — ACCESS FROM REAR RH PANEL
1. Diagnostic connector

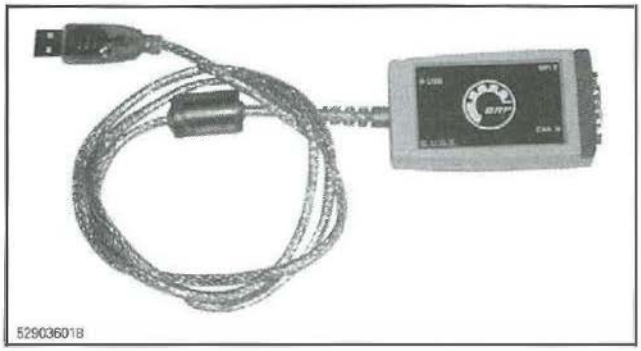
7. Connect one end of the MPI-2 DIAGNOSTIC CABLE (P/N 710 000 851) to vehicle connector.



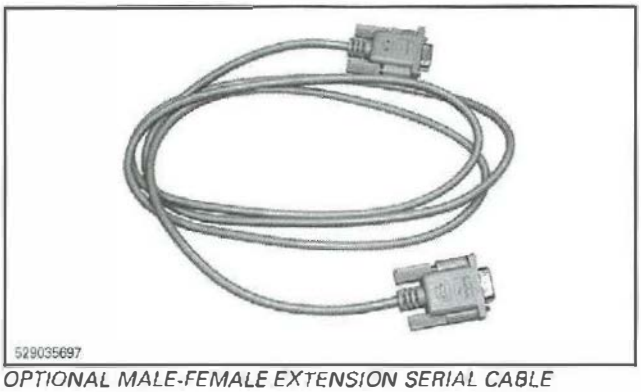


TYPICAL
1. Diagnostic cable connected to vehicle

8. Connect the other end of diagnostic cable to the MPI-2 INTERFACE CARD (P/N 529 036 018).

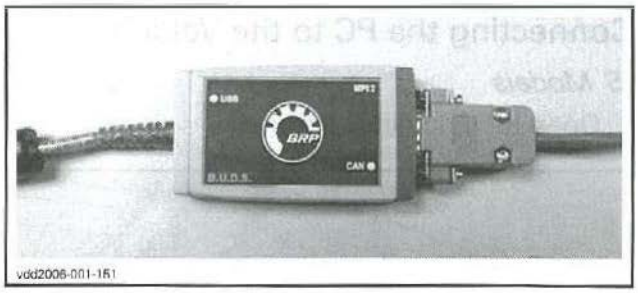


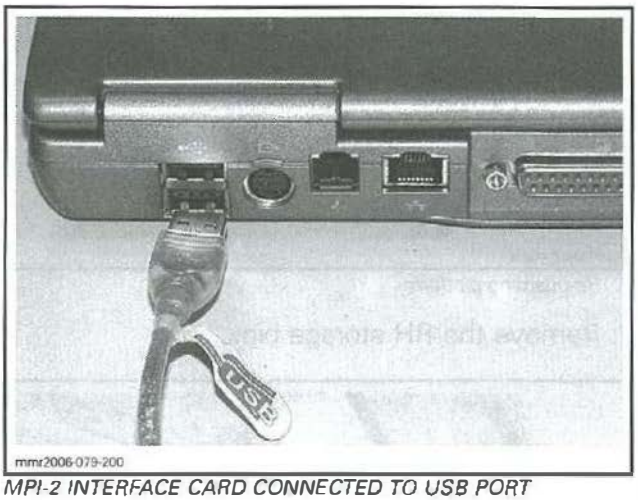
NOTE: An optional MALE-FEMALE EXTENSION SERIAL CABLE (P/N DB9) available at electronic retail outlets can be used between diagnostic cable and MPI-2 interface. Do not exceed 7.6 m (25 ft).



OPTIONAL MALE-FEMALE EXTENSION SERIAL CABLE

9. Connect the MPI-2 INTERFACE CARD (P/N 529 036 018) to the USB port of a PC (personal computer).





MPI-2 INTERFACE CARD CONNECTED TO USB PORT

⚠ CAUTION If the computer you are using is connected to a power outlet, there is a potential risk of electric shock when working in contact with water. Be careful not to touch water while working with the computer.

10. Use B.U.D.S. software as described further in *B.U.D.S. SOFTWARE*.

B.U.D.S. SOFTWARE

B.U.D.S. (Bombardier Utility and Diagnostic Software) is designed to allow programming key(s) to the vehicle, allow electrical and electronic component monitoring, activation of certain components for diagnostic purposes, and to carry out settings changes.

For more information pertaining to the use of the B.U.D.S. software, use its help which contains detailed information on its functions.

Always use the latest applicable B.U.D.S. version available on BOSSWeb.

How to Read the Electronic Control Units Using B.U.D.S. Software

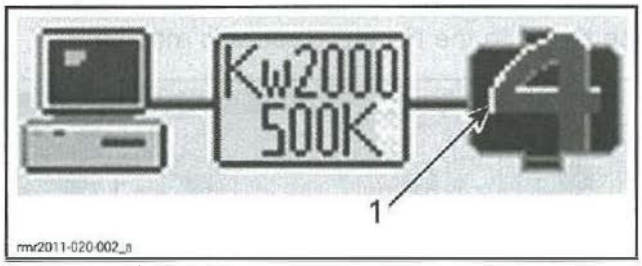
IMPORTANT: Ensure all connections have been made before starting B.U.D.S. to allow proper operation. Refer to *MPI-2* in this subsection.

1. Press the START button to wake up the electrical system.
2. Install the tether cord on the engine cut-off switch.
3. Start B.U.D.S. and logon.

NOTE: B.U.D.S. will automatically choose the appropriate MPI 2 protocol.

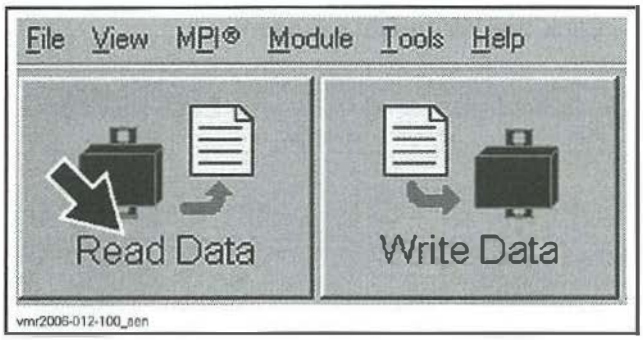
4. Ensure the appropriate number of modules is shown in the status bar.

MODEL	NUMBER OF MODULES	MODULES
GTS	2	ECM and cluster
Models with iS	4	ECM, cluster, iBR and iS
Models without iS	3	ECM, cluster and iBR



1. *Number of modules*

5. Read ECUs by clicking the Read Data button.



B.U.D.S. is now ready to use.

GTX/RXT Series and Wake Pro

IMPORTANT

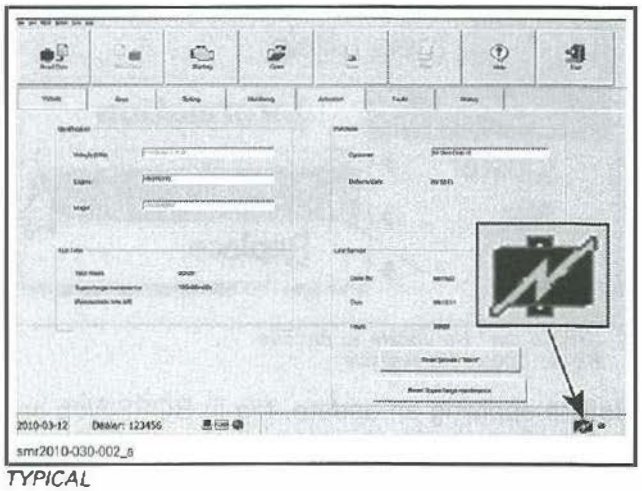
When the engine is not started, approximately 3 minutes after pressing the START button, the ECM will stop communicating with B.U.D.S. Therefore, operations with B.U.D.S. will be interrupted.

To reestablish communication, briefly press the START button. Do not hold START button to avoid engine starting if engine starting is not desired.

Electronic Modules ECU Update

NOTICE Failure to strictly follow a procedure to update a module may permanently damage the module.

Whenever B.U.D.S. is started, check for an update icon in the B.U.D.S. status bar.

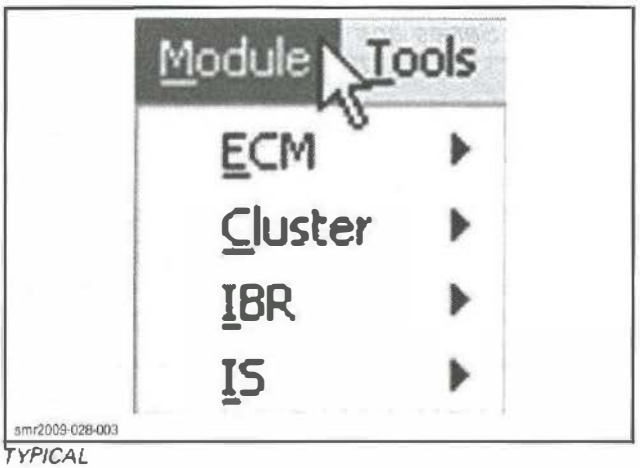


TYPICAL

If the icon is visible, it indicates that a file is available in B.U.D.S. to update at least one of the electronic modules:

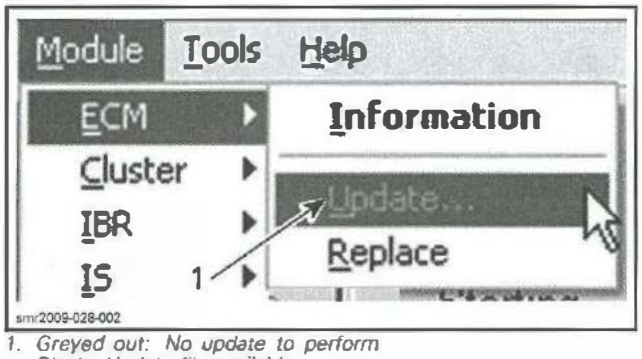
NOTE: If an update file is available on BOSSWeb but the B.U.D.S. software being used is not up to date, the update icon will not appear. Refer to the service bulletins to see if there is an update available.

Use the Module submenu and check all modules one at a time to see which module(s) can be updated.



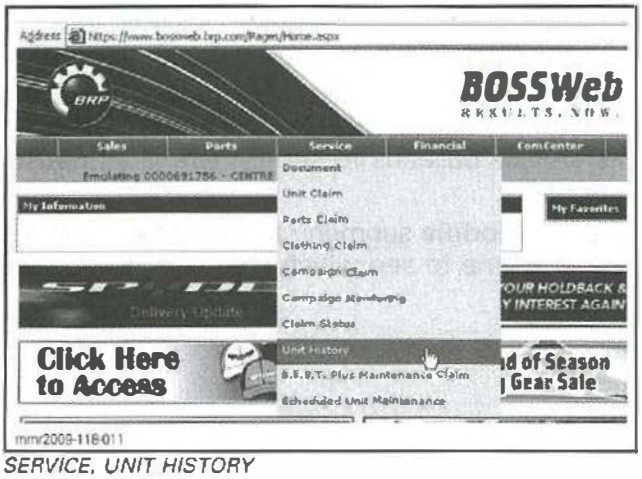
TYPICAL

1. If the Update option is greyed out, no update file is available for this module.
2. If the Update option is black, an update file is available for this module.



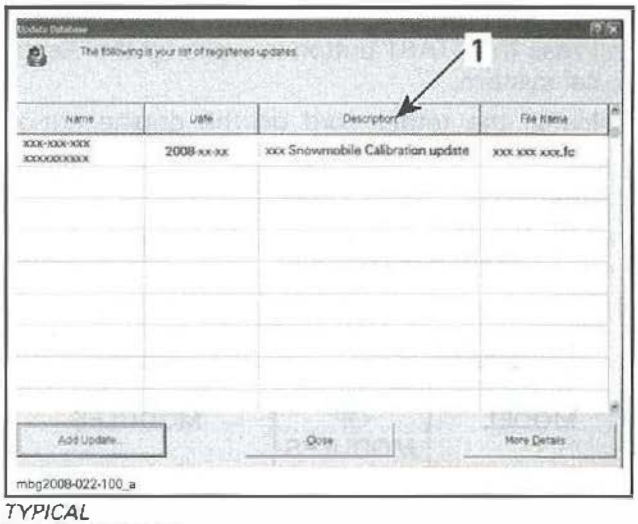
1. Greyed out: No update to perform
Black: Update file available

Before applying an update, log in BOSSWeb and look in Service for the Unit history to find out if any information or publication related to the vehicle is available. If so, carefully follow the given instructions.



SERVICE, UNIT HISTORY

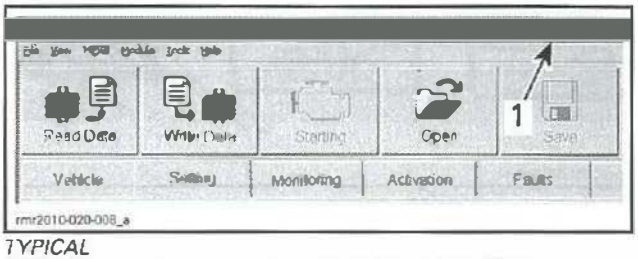
NOTE: When selecting the update menu in B.U.D.S., a dialog box will appear and the update file description may give some clue to finding the vehicle-related information in BOSSWeb.



TYPICAL
1. File description

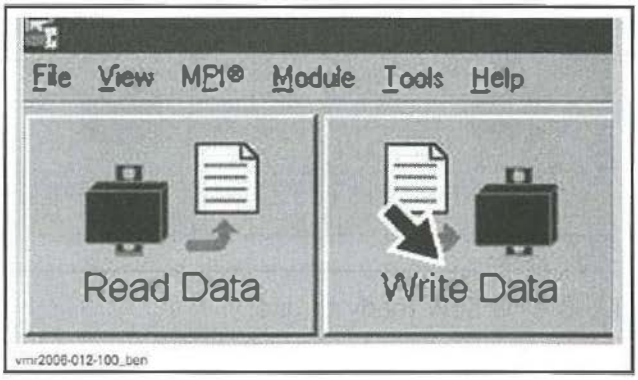
Writing Changes in an ECU

If the word **Modified** appears at the end of the vehicle file name at the top of the B.U.D.S. page, then a change has been made that requires it to be saved to the related electronic module.



TYPICAL
1. Indicate setting or data modified; Write Data to save

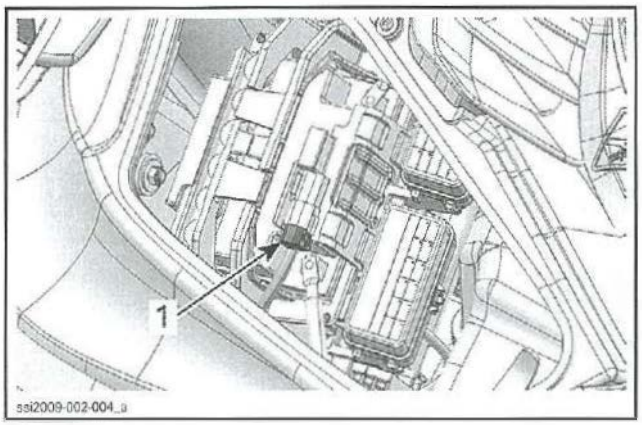
1. Click the **Write Data** button.



NOTE: A message box will confirm a successful operation.

2. Remove tether cord from the engine cut-off switch.

Disconnect MPI connections and store the vehicle diagnostic connector in its protective cap.



TYPICAL
1. Diagnostic connector in its cap

NOTICE **Failure to secure the diagnostic connector in its protective cap may result in corrosion or other damage to the terminals.**

NOTE: There is a 120 Ω resistor in protective cap to minimize the possibility of communication error.

3. Reinstall al removed parts, refer to appropriate subsections.

DIAGNOSTIC AND FAULT CODES

GENERAL

MONITORING SYSTEM

This system monitors the electronic components of the EMS (engine management system), iBR, information center, iS and other components of the electrical system to detect if they are faulty or defective. The monitoring system becomes active when the START button is pressed.

NOTE: Some components need the engine to be running for them to be monitored (fuel injectors for example).

The following components or functions are monitored.

EMS MONITORING
Battery voltage
EMS sensors (TAS, TPS, CPS, CAPS, MAPS, MATS, CTS, OPS, EGTS, TOPS, knock sensor). Throttle actuator, ignition coils and fuel injectors
ECM
Engine RPM
CAN
D.E.S.S. system
START switch and starter solenoid
Fuel pump
O.T.A.S.
Information center
iBR module

iBR MONITORING
iBR module and motor
BRLS
Engine RPM
Vehicle speed
iBR gate position
CAN
Lake temperature sensor
Information center
ECM

INFORMATION CENTER MONITORING
Information center
VTS and iS switch
MODE and SET switch
Cruise switch
CAN
GPS
Fuel level sensor
Depth sounder
ECM
iBR module
iS module

iS MONITORING
iS module and motor
Vehicle speed
Suspension position
CAN
TOPS
Information center
iBR module

When a malfunction is currently detected, the related electronic module:

- Sets an active fault code.
- Adapts the proper protection strategy according to the failure.
- Sends out warning signals to the information center/beeper codes to inform the rider of a particular condition.

When a minor or transient fault occurs, the fault message and beeper will cease automatically if the condition that caused the fault does not exist anymore.

If a minor fault is active, the engine will operate without a noticeable loss of performance.

Releasing the throttle and letting the engine return to idle speed may allow normal operation to resume. If this does not work, try the following:

- Remove tether cord from the engine cut-off switch.
- Wait 3 minutes to allow the ECM to shut down.
- Start engine.
- Check if the fault code is still active.

The electronic system will react differently depending on the fault type. If a severe failure occurs, the engine may not be allowed to be started. In other cases, the engine may operate in limp home mode (reduced speed) or not be affected at all.

These strategies are used to protect the engine system from damage and to maintain safe operation of the vehicle.

Limp Home Mode

When a major component of the EMS or the iBR is not operating properly, limp home mode will be set. Engine speed will be limited and therefore vehicle speed.

This mode allows the rider to return home which would otherwise not be possible without this advanced system.

When this mode is active, LIMP HOME MODE will be displayed in the information center.

Major Fault and Vehicle Reaction

The following EMS conditions will trigger a limp home mode.

ENGINE PROBLEM	MAX ALLOWED RPM
High engine temperature (from 110°C (230°F))	3000
High exhaust temperature (from 110°C (230°F))	3000
Low oil pressure (below 180 - 220 kPa (26 - 32 PSI))	2500

The following conditions will trigger limp home mode.

iBR PROBLEM	SYSTEM BEHAVIOR
Any active fault code related to the iBR that prevents its proper operation	iBR gate will be moved and locked in forward position (if possible)
	Engine will be set in limp home mode (reduced speed)

The following conditions will stop the suspension.

iS PROBLEM	SYSTEM BEHAVIOR
Any active fault code related to the iS that prevents its proper operation	Suspension operation will be disabled
	It will remain at the position it was at when the fault code was set

Indicator Lights and Message Display Information

The fault indicators and messages displayed in the information center will inform you of a particular condition or if an anomaly occurs.

GTI/GTS Series and Wake

FAULT INDICATOR (ON)	MESSAGE DISPLAY	DESCRIPTION
	HIGH TEMPERATURE	Engine or exhaust system overheating
	CHECK ENGINE or LIMP HOME MODE	Check engine (minor fault req. maint.) or iBR system fault or LIMP HOME MODE (major eng. fault)
	LOW or HIGH BATTERY VOLTAGE	Low/high battery voltage
	LOW OIL PRESSURE	Low engine oil pressure detected
	iBR MODULE ERROR	iBR system fault

RXT/GTX Series and Wake Pro

PILOT LAMPS (ON)	MESSAGE DISPLAY	DESCRIPTION
	LOW or HIGH BATTERY VOLTAGE	Low/high battery voltage
	HIGH TEMPERATURE	Engine or exhaust system overheating
	CHECK ENGINE or LIMP HOME MODE	Check engine (minor fault req. maint.) or LIMP HOME MODE (major eng. fault)
	LOW OIL PRESSURE	Low oil pressure
	–	iBR system fault
	–	OTAS system fault

FAULT MESSAGES	
RIGHT KEYPAD ERROR	Gauge control button malfunction
LOW OIL PRESSURE	Engine low oil pressure detected
HIGH EXHAUST TEMPERATURE	High exhaust temperature detected
HIGH TEMPERATURE	High engine temperature detected
CHECK ENGINE	Engine management system malfunction or maintenance required
HIGH BATTERY VOLTAGE	High battery voltage detected
LOW BATTERY VOLTAGE	Low battery voltage detected
LIMP HOME MODE	Major fault detected, engine power limited
FUEL SENSOR DEFECTIVE	Fuel level sensor fault
WATER TEMP SENSOR DEFECTIVE	Problem in iBR, not sending water temperature info
CALIBRATION CHECKSUM ERROR	Information center programming corrupted
MAINTENANCE REQUIRED	Watercraft maintenance required
SUPERCHARGER MAINTENANCE REQUIRED	Maintenance on supercharger required
DEPTH SOUNDER MODULE COMMUNICATION PROBLEM	Error message if depth sounder is disconnected while riding
IS MODULE COMMUNICATION PROBLEM	Error message if communication with the suspension module is lost while riding
iBR MODULE ERROR	Error message if communication with the iBR module is lost while riding
FUNCTION CANNOT BE ACTIVATED	Message when a function is not or cannot be properly activated

Beeper Signals

When one of the below conditions occurs, the monitoring system emits the following beep signals.

BEEPER CODES	DESCRIPTION
1 long beep (while installing D.E.S.S. key on engine cut-off switch if ECM is on)	**Bad D.E.S.S. system connection.** Reinstall tether cord correctly over engine cut-off switch.
	Wrong D.E.S.S. key. Use a tether cord with a D.E.S.S. key that has been programmed for the watercraft.
	Defective D.E.S.S. key. Use another programmed D.E.S.S. key.
	Dried salt water in D.E.S.S. key. Clean D.E.S.S. key with fresh water to remove salt water.
	Defective engine cut-off switch. Check. Refer to *DIGITALLY ENCODED SECURITY SYSTEM* subsection.
	Improper operation of ECM or defective wiring harness. Check. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.
A 2 second beep every 15 minute interval	**Watercraft is upside down.** Turn watercraft upright. TOPS switch is disconnected or defective. Refer to *LUBRICATION* subsection.
	Engine management system fault. Read the fault code.
A 2 second beep every 5 minute interval	**Low fuel level.** Refill fuel tank. If problem persists, check sensor and circuit. Refer to *FUEL TANK AND FUEL PUMP* subsection.
	Fuel tank level sensor or circuit malfunction. Check sensor and circuit. Refer to *FUEL TANK AND FUEL PUMP* subsection.
Continuously beeps	**High engine temperature.** Refer to *COOLING SYSTEM* subsection.
	High exhaust temperature. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.
	Low oil pressure. Turn off engine as soon as possible. Check oil level and refill. Refer to *LUBRICATION* subsection.

FAULT CODES

A fault code is an indication that a malfunction is detected by the monitoring system of the vehicle.

Fault Code Categories

A fault code consists of an alphanumeric designator followed by a hexadecimal number of 3 digits. The alphanumeric designator defines the category of the fault code while the hexadecimal number refers to a unique fault.

FAULT CODE CATEGORIES		
ALPHANUMERIC DESIGNATOR	MODULE/ SYSTEM	EXAMPLE OF FAULT CODE
From B0 to B3	Body (include information center and switch faults)	B2200
From C0 to C3	iBR and iS	C007B
From P0 to P3	Power train and related system faults (includes ECM)	P062F
From U0 to U3	Communication between modules and sensors	U0073

RELATED MODULE AND FAULTS	
MODULE	FAULT CODE CATEGORY
ECM (engine control module)	Stores mainly "P" codes and some "U" codes
iBR (intelligent brake and reverse)	Stores mainly "C" codes and a few "U" codes
iS (intelligent suspension)	Stores mainly "C" codes and a few "U" codes
Cluster	Stores mainly "C" codes and a few "U" codes

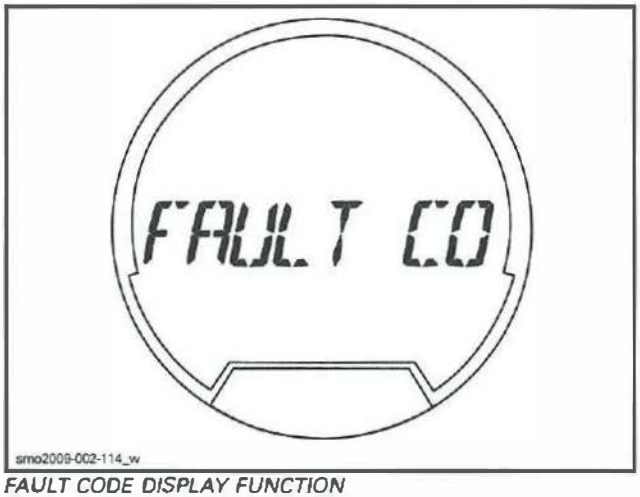
Reading Fault Codes Using the Information Center

NOTE: A fault code must have the "Active" state to be displayed in the multifunction gauge.

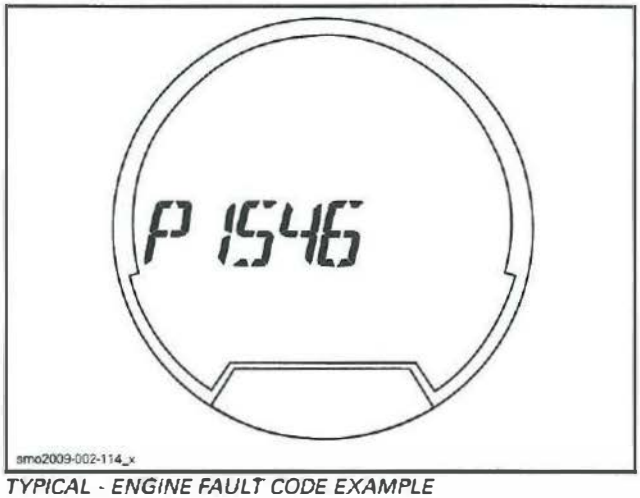
1. Press the MODE button repeatedly until the FAULT CODE function is visible in the multifunction display.
2. Press the SET button or the UP or DOWN arrow button to enter the function and display the first fault code.
3. Press the UP or DOWN arrow button repeatedly to display each subsequent code.

NOTE: When the last fault code has been displayed and the button is pressed again, the system loops back to the first fault code displayed, and all fault codes can again be displayed. If there was one active fault code when entering FAULT CODE mode, and it becomes occurred (no longer active), a NO ACTIVE FAULT CODE message will scroll in the display.

4. To exit the FAULT CODE display function, the MODE or SET button must be pressed once. There is no time out on this function.



FAULT CODE DISPLAY FUNCTION



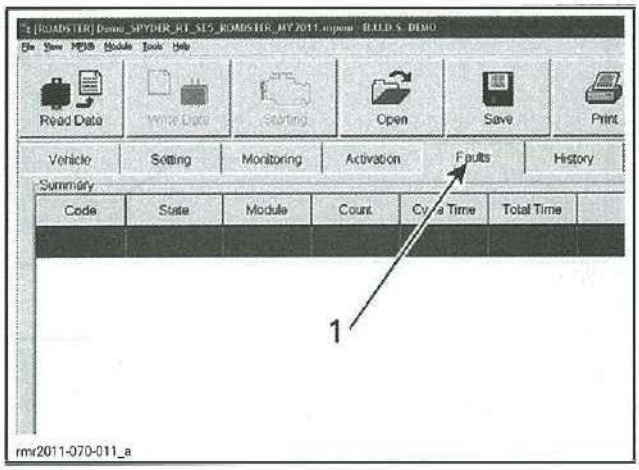
TYPICAL - ENGINE FAULT CODE EXAMPLE

Reading Fault Codes Using B.U.D.S. Software

NOTE: All fault code types can be read with B.U.D.S.

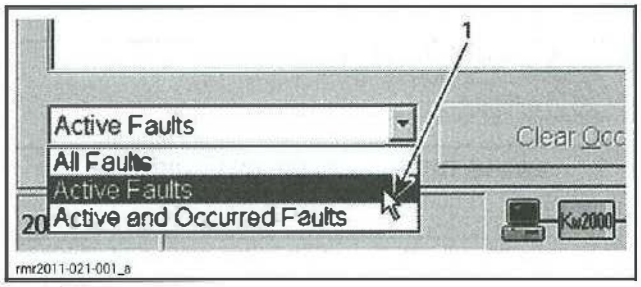
1. Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

2. Click on the **Read Data** button.
3. Click on the **Faults** tab.



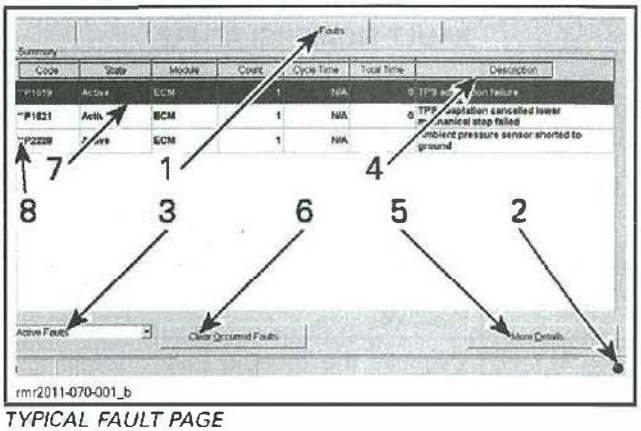
TYPICAL
1. Fault tab

4. Click on the drop-down list on the LH lower corner.
5. Choose the fault state to display.



TYPICAL
1. Drop down list

FAULT STATE	INFORMATION
All faults	Display all possible faults regardless of state
Active faults	Display only faults matching this state. Empty area if there is no active fault
Active and occurred faults	Display only faults that have either state. Empty area if there is neither active nor occurred fault



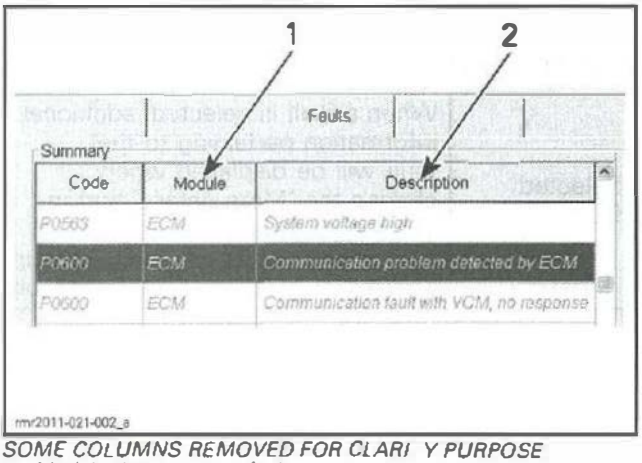
TYPICAL FAULT PAGE
1. Fault tab
2. Fault indicator light
3. Fault code state drop box
4. Fault nomenclature
5. More details button
6. Clear occurred faults button
7. Selected fault
8. More information indicator

FAULT PAGE DESCRIPTION	
ITEM	INFORMATION
Fault tab	Click tab to display the fault page
Fault indicator light	When flashing, it indicates there is active fault(s)
Fault code state drop box	Click drop box to select the type of faults to display
Fault nomenclature	Display specific information and statistics related to the fault (see fault nomenclature table)
More details button	To display possible causes and service actions related to the selected fault
Clear occurred faults button	To clear all occurred faults in related ECU(s)
Selected fault	When a fault is selected, additional information pertaining to that fault will be displayed when clicking the "More details" button. To select a fault, click on the fault with the mouse or use the cursor up or down to scroll to the desired fault

FAULT NOMENCLATURE	
COLUMN	INFORMATION
Code	Fault code number. When 2 stars (**) precedes the code, detailed conditions when the fault occurred, can be displayed by clicking the 'More details' button
State	Display the fault state (active, occurred, inactive)
Module	Displays the module that reports the fault code. This is the module that detects or has received a message of an anomaly and reports it. List of modules: Multifunction gaugeECM (engine control module) iBR (intelligent brake and reverse) iS (intelligent suspension)
Count	Number of times this fault occurred within the driving cycle Value: From 0 to 255
Cycle time	Not to be used Value: From 0 to 255 minutes
Total time	Not to be used Value: From 0 to 64 255 minutes
Description	Provides a short description of the fault

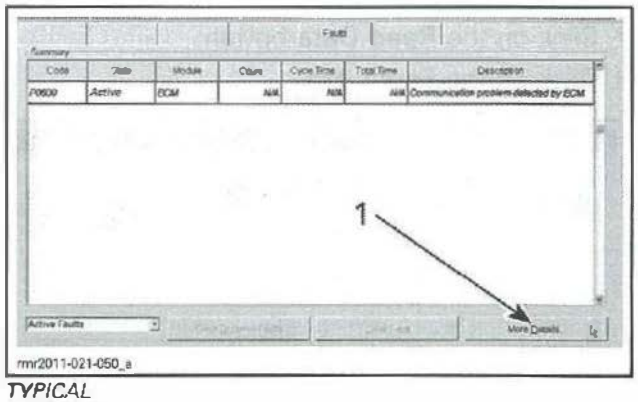
When reading a fault code in B.U.D.S., pay particular attention to which module reports a fault. It is indicated in the Module column.

The Description column gives a short description of the fault.

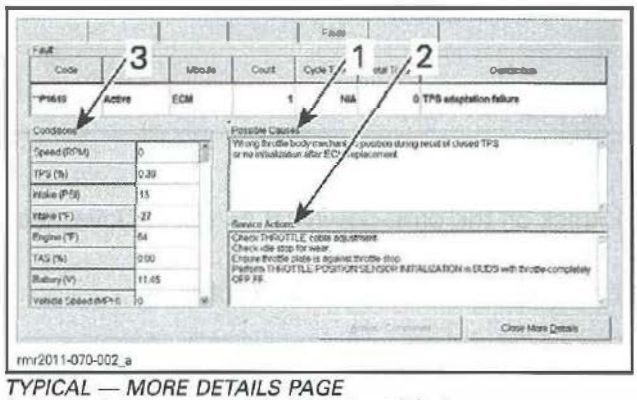


SOME COLUMNS REMOVED FOR CLARI Y PURPOSE
1. *Module that reports a fault*
2. *Fault description*

Click on the More Details button, on the RH lower corner, to display the "Possible Causes" and the "Service Actions" to step further in the diagnosis.



TYPICAL
1. *Click here*



TYPICAL — MORE DETAILS PAGE
1. *Possible causes related to the selected fault*
2. *Service actions*
3. *Operating conditions when fault occurred*

MORE DETAILS PAGE DESCRIPTION	
ITEM	INFORMATION
Possible causes	List the possible causes that triggered the fault
Service actions	List the possible actions to perform to solve the fault
Conditions when fault occurred	List the operating conditions of the engine and/or vehicle when the fault was triggered

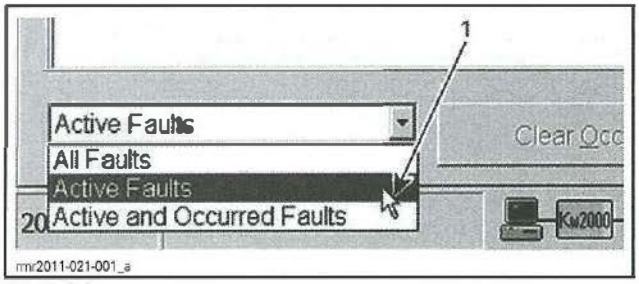
Fault Code States

The various electronic control units (ECUs) used in the vehicle can generate a variety of fault codes depending on the level of monitoring they are capable of. Fault codes have 3 possible states:

- Active
- Occurred
- Inactive.

Click the Fault tab then click on the drop-down list on the LH lower corner.

Choose the fault code state you want to display.



TYPICAL
1. Drop down list

FAULT STATE	INFORMATION
All faults	Display all possible faults regardless of state
Active faults	Display only faults matching this state. Empty area if there is no active fault
Active and occurred faults	Display only faults that have either state. Empty area if there is neither active nor occurred fault

Active Fault Codes

An active fault code is an indication of a fault that is currently triggered.

The active fault may or may not compromise normal operation of the related system(s). Service action in B.U.D.S. should be used to correct the problem that caused the fault code.

Once the fault condition(s) of the active fault is no longer present, its state will change to "occurred".

Occurred Fault Codes

An occurred fault code indicates a fault that was active, but no longer is.

The occurred fault does not presently affect system or component operation but is retained as a history of the faults that were detected.

Inactive Fault Codes

An inactive fault code represents a fault code that is neither active, nor occurred. It is simply part of a list of all possible faults which may be monitored by the various ECUs, which may become active or occurred if the monitoring system detects an applicable fault.

How to Clear Fault Codes Using B.U.D.S.

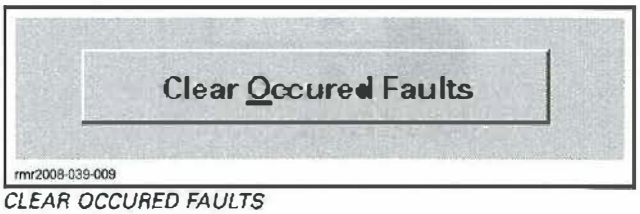
Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

Click on the Read Data button.

Click on the **Faults** tab.

NOTE: Only the **Occurred** state faults can be cleared.

Click the "Clear Occurred Faults" button.



CLEAR OCCURED FAULTS

This will reset the appropriate counter(s) and will also record that the problem has been fixed in the related module memory.

Observe the "Occurred" fault(s). They should all disappear. Otherwise, follow this procedure.

- Remove tether cord cap from engine cut-off switch.
- Wait 3 minutes.
- Repeat procedure to clear faults again.

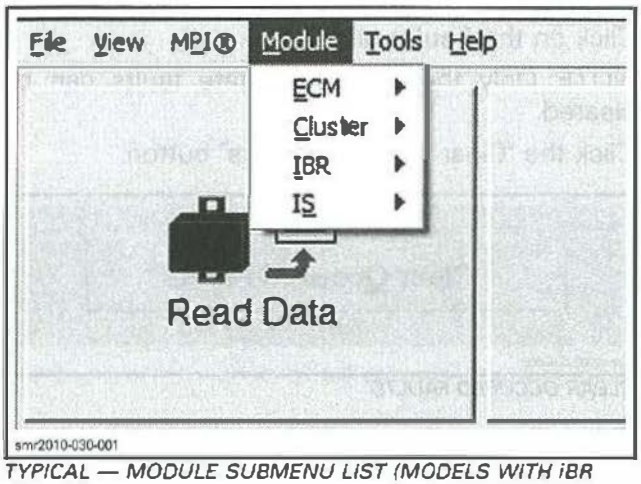
FAULT CODE DIAGNOSTIC

Missing Module

If a module is missing, several fault codes will appear.

To quickly find which module is missing, perform the following:

1. Connect vehicle to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Click on the **Read Data** button.
3. Click **Module** in the menu bar.
4. Look at the list of modules.
5. If a module is not visible, then it is not communicating through the CAN bus (controller area network).



TYPICAL — MODULE SUBMENU LIST (MODELS WITH iBR AND iS)

6. Refer to the following table to find the appropriate subsection in this manual to diagnose the missing module.

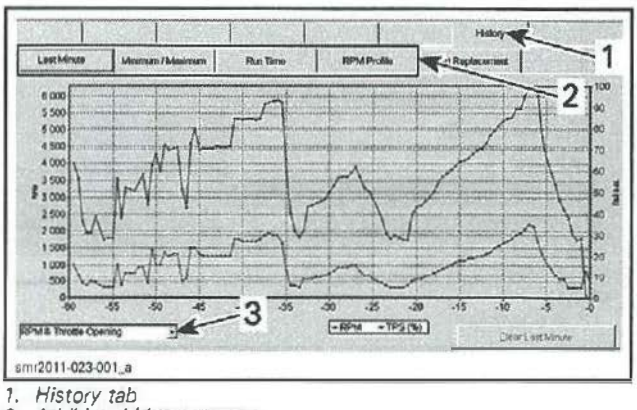
MISSING MODULE	SECTION TO REFER TO
ECM	*ELECTRONIC FUEL INJECTION (EFI)*
Cluster	*GAUGE*
iBR	*iBR AND VTS*
iS	*SUSPENSION (iS)*

Diagnostic Tips Using B.U.D.S.

History Page

HISTORY PAGE DESCRIPTION	
ITEM	INFORMATION
Last minute	Displays several parameters recorded in the last minute of engine operation
Minimum/ Maximum	Display the minimum and maximum values encountered. Click "Clear Min/Max" to reset the values
Run time	Display the time proportion in what mode the engine was running in
RPM profile	Display the RPM range proportion in which the engine was running in

To see the last minute of operating conditions, click on the History tab in B.U.D.S.

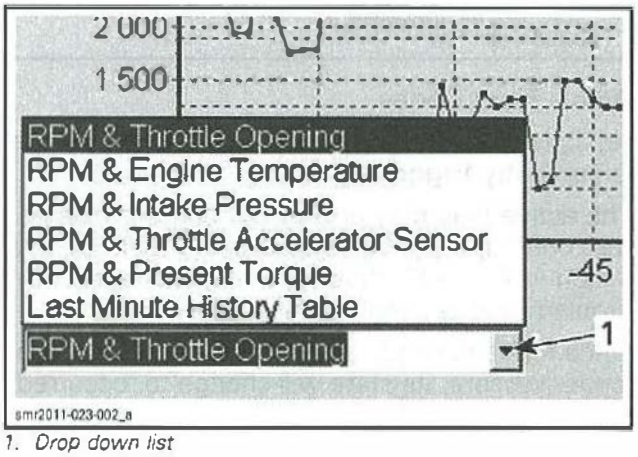


1. *History tab*
2. *Additional history pages*
3. *Drop-down list in Last Minute page*

Last Minute Drop-Down List:

From the **Last Minute** page, click on the drop-down list on the LH lower corner.

Choose the values to display.



1. *Drop down list*

Guidelines to Solve Fault Codes

CONDITION	ACTION
Troubleshooting vehicle	Use B.U.D.S. to: Read fault codes. Display "Active" faults to see components currently not operating normally. Display "Occurred" faults to troubleshoot intermittent problems. Monitor system(s), sensor(s), switches and actual conditions. Activate component(s) for troubleshooting. Set components etc. Know the last minute of operating conditions by using the "History" page. Know the operating conditions, if available, when a fault code occurred by using the "More details" button in the fault page.
New fault(s) appear after a vehicle maintenance or repair	Check sensor connections or mixed up connections. Before vehicle maintenance: Read the electronic modules with B.U.D.S. Save and print the B.U.D.S. file (keep faults option only). After vehicle maintenance: Read the electronic modules with B.U.D.S. Compare the fault code(s) before and after the maintenance using the printed copy and the current B.U.D.S. reading. Investigate only the newly fault codes. Clear all occurred faults in B.U.D.S.
Communication faults displayed as "Occurred" after module flashing	Normal behavior when flashing a module. Clear all occurred faults and check again.
Sensor "Active" fault	Read the fault description in B.U.D.S. Click on the "More Details" button. Look at the "Conditions" when available. Read the "Possible Causes". Apply the "Service Actions".
Several fault codes active at the same time	Likely to be caused by burnt fuse(s) or bad bus bar connection(s).
Low system voltage on one module Power problem on sensor(s)	Check related fuse(s) and relay. Check related power and ground wires. Check for common power supply to several sensors/modules (refer to *POWER DISTRIBUTION AND GROUNDS*). **NOTE:** Some sensors are supplied by the battery while others are supplied by a module.
Low system voltage on several modules (several communication faults will also appear)	Check battery condition and connections. Check related fuse(s) and relay. Check voltage regulator/rectifier.
High system voltage on several modules	A battery charger has likely been used to substitute the vehicle battery. Clear all occurred faults and check again. Check voltage regulator/rectifier.
When all modules report that a module is missing	Check the module that is reported as missing. Check related fuse(s) and relay. Check related power and ground wires.
When several modules are in fault	Search for a common problem such as a faulty sensor.

CONDITION	ACTION
CAN bus failure, CAN buss OFF	When several modules and sensors report that a module is missing. The missing module may report CAN bus failure, CAN bus off. Check related CAN wires (continuity, short to ground, short between CAN low and high). Check module pins and wiring terminals. Then, the other modules should stop reporting that module is missing.
Occurred fault(s)	May have been generated due to a system or component that was momentarily operating outside normal parameters.
	May be generated when disconnecting and reconnecting a component, replacing a burnt fuse, or may be due to a momentary high or low voltage.
	Before being "Occurred", a fault has always been "Active" for a certain time, indicating that an unexpected condition or problem has been present during the driving cycle. A frequent momentarily fault or an intermittent fault may never be seen as "Active" in B.U.D.S. while there is still a pending problem. This type of malfunctions can be discovered by looking at the "Occurred" faults and then by evaluating the fault count. As long as a fault is present, it is displayed as "Active".
Fault count (0 - 255)	**Low value:** Suggests handling problems (connections, terminal contact/shape etc.). **High value:** Suggests a frequent and unsolved problem. The problem should be investigated.
Fault conditions (More details button)	Look for abnormal, excessive values.
Hard to find problems	When the basic troubleshooting has been done and the fault code(s) persists, often the problem is related to the wiring harness, connections or electromechanical components. Short to ground, to battery or between wires. Wire splices, chafing, terminal problems (pulled out, bent, out of shape, corroded etc.). Bad contacts in switch or relay.

GUIDELINES TO SOLVE SPECIFIC FAULT CODES

Several Fault Codes Are Active Simultaneously

If this occurs, check the following:

- Check the 30 A fuses in fuse box.
- Check the bus bar condition and connections in the fuse box(es).
- Check the diagnostic connector for the presence of water or corrosion.
- Check the CAN wires.

Fault Code C2121, C2221

iBR or iS application parameters corrupted (backup no. 1 or no. 2). This fault may occasionally appear as occurred. It happens when power to the module is shut off before the module has time to complete its shutdown. Normal operation is not affected. If it occurs often, check supply voltage to module.

Fault Code C2122, C2222

iBR or iS last session interrupted. This fault may occasionally appear as occurred. It occurs when power to the module is shut off before the module has time to complete its shutdown. Normal operation is not affected. If it occurs often, check supply voltage to module.

Fault Code C2150, C2233, C2250

iBR or iS motor or system current software breaker. Motor or module current too high. This fault may occasionally appear as occurred. Normal operation is not affected. If it the count is high, check the moving mechanism of the system if it is stiffer than normal to operate.

Fault Code C2232

Motor open. If suspension operates when using the iS Up/Down switches, the suspension will operate normally when riding even if this fault is active. In this case, the fault can be ignored. The fault will be set to "occurred" when the iS module will be shut down. If the suspension does not operate when using the iS Up/Down switches, refer to *SUSPENSION (iS)* subsection.

Fault Code P0562

Battery voltage too low. It occurs when both battery voltage and engine RPM conditions are met. See following chart. Refer to *CHARGING SYSTEM* subsection.

BATTERY VOLTAGE	ENGINE SPEED
Lower than 6.5 Vdc	Lower than 1280 RPM
Lower than 11.8 Vdc	Greater than 1280 RPM

Fault Code P0563

Battery voltage too high. It occurs when battery voltage is above 16 Vdc when engine is running. Refer to *CHARGING SYSTEM*.

Fault Code U016A

Loss of vehicle speed. This fault may occasionally appear as occurred. Normal operation is not affected. If the count is high, check the related components.

Fault Code U0129

CAN communication error between iS and iBR modules or iBR CAN message time-out or validity. This fault may occasionally appear as occurred. Normal operation is not affected. If the count is high, check the related components. Ensure connector is plugged.

Fault Code U0300

Incorrect ECM or information center for the engine. Installed part is not appropriate for the vehicle. Using BUDS, check if the security coding of the cluster is matched with the ECM security coding. Engine will crank but will not start. Refer to *PARTS CATALOGS* for proper part according to vehicle.

Fault Code U16A1, U16A2, U16A3, U16A4, U16A5

Cluster or iBR CAN time-out error-missing CAN ID xxxh. This fault may occasionally appear as occurred. Normal operation is not affected. If the count is high, check the related components.

Fault Code U0401, U0457

ECM or cluster CAN message time-out or validity. This fault may occasionally appear as occurred. Normal operation is not affected. If it the count is high, check the related components.

FAULT CODE TABLE

NOTE: Always refer to the fault code list available in the latest applicable version of B.U.D.S. software.

When using the service action suggested in the Fault section of B.U.D.S., the system circuits are referred as A-M4 for instance. It means ECM connector "A" and the circuit wire M4 as found in the *WIRING DIAGRAM*.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
B2210	CLUSTER	Left keypad fault (Switch kept activated more than 60 seconds)	Problem with left keypad.	The switch may be defective, verify the functionnality of the switch or the wires. Refer to the shop manual for switch diagnosis/testing procedure.
B2211	CLUSTER	Suspension UP/DOWN switches shorted to ground fault	Problem with left keypad.	Look for pin B if shorted to ground or pin C.
B2212	CLUSTER	Suspension UP/DOWN switches disconnected fault	Problem with left keypad.	Look for pin B if disconnected to pin 14 on the cluster. Look for pin C if disconnected to pin 15 on the cluster.
B2213	CLUSTER	VTS UP/DOWN switches shorted to ground fault	Problem with left keypad.	Look for pin A if shorted to ground or pin C.
B2214	CLUSTER	VTS UP/DOWN switches disconnected fault	Problem with left keypad.	Look for pin A if disconnected to pin 13 on the cluster. Look for pin C if disconnected to pin 15 on the cluster.
B2220	CLUSTER	Right keypad fault (Switch kept activated more than 60 seconds)	Problem with right keypad.	The switch may be defective, verify the functionnality of the switch or the wires. Refer to the shop manual for switch diagnosis/testing procedure.
B2221	CLUSTER	MODE/SET switches shorted to ground fault	Problem with right keypad.	Look for pin B if shorted to ground or pin C.
B2222	CLUSTER	MODE/SET switches disconnected fault	Problem with right keypad.	Look for pin B if disconnected to pin 17 on the cluster. Look for pin C if disconnected to pin 18 on the cluster.
B2223	CLUSTER	UP/DOWN switches shorted to ground fault	Problem with right keypad.	Look for pin A if shorted to ground or pin C.
B2224	CLUSTER	UP/DOWN switches disconnected fault	Problem with right keypad.	Look for pin A if disconnected to pin 16 on the cluster. Look for pin C if disconnected to pin 18 on the cluster.
C0042	iBR	Brake Lever Sensor (BRLS) signals A open/shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0.5 to 3 V on pin F and 0.25 to 1.5 on pin C.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
C0043	iBR	Brake Lever Sensor (BRLS) signals B open/shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0.5 to 3 V on pin F and 0.25 to 1.5 on pin C.
C0073	iBR	Torque request failure	ECM software failure. CPS wires shorted.	Perform ECM software update if available or replace ECM. Verify CPS connection.
C2100	iBR	Sensors caliBRation is corrupted	Incompatible firmware or memory failure.	Replace iBR unit. Refer to the Service Manual for more details.
C2100	iBR	Actuator movement	The reverse gate cannot move to the desired position.	Clean and check for damage in the reverse gate and nozzle area. Refer to the Service Manual for more details.
C2101	iBR	Actuator movement warning	The reverse gate cannot move to the desired position within expected time.	Clean and check for damage in the reverse gate and nozzle area. Refer to the Service Manual for more details.
C2110	iBR	Reverse gate position sensor error	iBR malfunction.	Replace iBR unit. Refer to the Service Manual for more details.
C2110	iBR	Angle position sensor warning	iBR malfunction.	Replace iBR unit. Refer to the Service Manual for more details.
C2110	iBR	iBR overheat	iBR cooling system failure. iBR unit failure.	Check iBR cooling circuit. Replace iBR unit. Refer to the Service Manual for more details.
C2110	iBR	Monitoring CPU message timeout or validity	iBR malfunction.	Perform an iBR software update if available. Replace the iBR unit. Refer to the Service Manual for more details.
C2110	iBR	Monitoring CPU limp force	iBR malfunction.	Perform an iBR software update if available. Replace the iBR unit. Refer to the Service Manual for more details.
C2111	iBR	ECM erratic RPM signal	RPM signal received from engine ECM not plausible.	Check CPS sensor connection
C2120	iBR	Application calibration is corrupted	Incompatible firmware or memory failure.	Perform an iBR software update if available. Replace the iBR unit. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
C2121	iBR	Application parameters corrupted (backup #1 or #2)	Battery power lost or memory failure.	Perform an electrical system shut downlaod to clear fault. Verify starting and charging system circuits. Refer to the Service Manual for more details.
C2122	iBR	Last session interrupted	Unexpected battery power lost.	Perform an electrical system shut down and clear fault. Verify starting and charging system circuits. Refer to the Service Manual for more details.
C2130	iBR	Motor current software breaker	Motor current too high.	Clean and check for damage in the reverse gate and nozzle area. Refer to the Service Manual for more details.
C2130	iBR	Internal motor drive failure	Motor voltage feedback not fitting with the command.	
C2131	iBR	iBR DC motor shorted to ground or 12 V	iBR motor failure. iBR motor wires dammaged.	Check iBR circuit A and B. Refer to the Service Manual for more details.
C2132	iBR	Motor Open	No current while activated.	
C2142	iBR	Brake Lever Sensor (BRLS) signals A shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0.5 to 3 V on pin F and 0.25 to 1.5 on pin C.
C2143	iBR	Brake Lever Sensor (BRLS) signals B shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0.5 to 3 V on pin F and 0.25 to 1.5 on pin C.
C2144	iBR	Brake Lever Sensor (BRLS) power shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 4.5 to 5 volts on sensor connector pin A & D. Refer to the Service Manual for more details.
C2145	iBR	Brake Lever Sensor (BRLS) power shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 4.5 to 5 volts on sensor connector pin A & D. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
C2146	iBR	Brake Lever Sensor (BRLS) signals A/B reading difference	Damaged sensor, damaged circuit wires, damaged connector or damaged iBR pins. Fault detected when the engine is running or stopped.	Check for 0.5 to 3 V on pin F and 0.25 to 1.5 on pin C.
C2150	iBR	System current software breaker	iBR input current too high.	Clean and check for damage in the reverse gate and nozzle area. Refer to the Service Manual for more details.
C2151	iBR	System disabled and need activation	System is locked. Need activation.	Use B.U.D.S. iBR unlock function. Refer to the Service Manual for more details.
C2155	iBR	Water temperature sensor overheat	iBR cooling system failure. iBR unit failure.	Check iBR cooling circuit. Replace iBR unit. Refer to the Service Manual for more details.
C2161	iBR	Low voltage detected	Battery failure, rectifier failure, damaged circuit wires, battery terminal connection, damaged AC generator or damaged connectors.	Check fuses #6 (refer to WIRING DIAGRAM). Check ground continuity to the engine block. Refer to the Service Manual for more details.
C2200	iS	Sensors calibration is corrupted	Incompatible firmware or memory failure (Internal memory failure, return to supplier).	Defective iS module, replace module and return to supplier.
C2210	iS	Bridge/CPU temperature sensor overheat	Hardware failure or external heat source.	Check for over utilization/heat.
C2220	iS	Application calibration is corrupted	Incompatible firmware or memory failure (B.U.D.S. should repair that).	Program calibration with B.U.D.S.
C2221	iS	Application parameters corrupted (backup #1 or #2)	Battery power lost or memory failure (Reset after power-down-up, clear fault. If happens often, verify supply voltage).	Check power wiring and fuse.
C2222	iS	Last session interrupted	Unexpected battery power lost.	Check power wiring and fuse.
C2230	iS	Internal motor drive failure	Motor voltage feedback not fitting with the command.	Defective iS module, replace module and return to supplier.
C2231	iS	Motor shorted to ground/battery	Current leak detected when the bridge is off.	Check suspension actuator pump wiring.
C2232	iS	Motor open	No current while activated.	Check suspension actuator pump and/or wiring.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
C2233	iS	Motor current software breaker	Motor current too high.	Check suspension actuator pump.
C2240	iS	Seat position sensor error Open, Shorted to Gnd	Sensor not connected.	Check system circuit at iS module. (refer to WIRING DIAGRAM).
C2250	iS	System current software breaker	Battery input current too high.	Check suspension actuator pump.
C2251	iS	System disabled and need activation	System is locked for safety. Need activation.	Activate iS using B.U.D.S. activation function.
C2252	iS	TOPS active	Warning only: TOPS detected by the system, the suspension is disable while the TOPS is "ON".	Refer to the Service Manual for more details.
C2260	iS	System under voltage	System under voltage warning.	Check battery and charging system.
P0008	ECM	Engine phase detection fault		
P0030	ECM	Heater Power Stage fault for lambda sensor upstreams of catalyst		
P0031	ECM	Heater Power Stage fault for lambda sensor upstreams of catalyst - short circuit to GND		
P0032	ECM	Heater Power Stage fault for lambda sensor upstreams of catalyst - short circuit to V+		
P0036	ECM	Heater Power Stage fault for lambda sensor downstreams of catalyst		
P0037	ECM	Heater Power Stage fault for lambda sensor downstreams of catalyst - short circuit to GND		
P0038	ECM	Heater Power Stage fault for lambda sensor downstreams of catalyst - short circuit to V+		

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0106	ECM	Intake pressure sensor out of range	Sensing port dirty or blocked. Sensor failure or unexpected reading at idle. Sensor fallen out of housing or leaking inlet.	Check system circuits A-B4, A-G4, A-H2. Make sure that the sensor housing is correctly inserted into the manifold. Check sensor connector for: a) 5 volts on pin 1. b) 0 volt on pin 2. c) 0 volt on pin 3. Refer to the Service Manual for more details.
P0107	ECM	Manifold absolute pressure sensor shorted to ground or not connected.	Sensing port dirty or blocked. Sensor failure or unexpected reading at idle. Sensor fallen out of housing or leaking inlet. Connector disconnected.	Check system circuits A-B4, A-G4, A-H2. Make sure that the sensor housing is correctly inserted into the manifold. Check sensor connector for: a) 5 volts on pin 1. b) 0 volt on pin 2. c) 0 volt on pin 3. Refer to the Service Manual for more details.
P0108	ECM	Manifold absolute pressure sensor open circuit or shorted to battery	Sensing port dirty or blocked. Sensor failure or unexpected reading at idle. Sensor fallen out of housing or leaking inlet.	Check system circuits A-B4, A-G4, A-H2. Make sure that the sensor housing is correctly inserted into the manifold. Check sensor connector for: a) 5 volts on pin 1. b) 0 volt on pin 2. c) 0 volt on pin 3. Refer to the Service Manual for more details.
P0112	ECM	Intake manifold temperature sensor shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-H3 and A-J3. Refer to the Service Manual for more details.
P0113	ECM	Intake manifold temperature sensor open circuit or shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-H3 and A-J3. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0116	ECM	Engine coolant temperature signal not plausible	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check for debris or blockage in cooling system. Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-A1 and A-J2. Refer to the Service Manual for more details.
P0117	ECM	Engine coolant temperature sensor fault - Short circuit to GND	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check for debris or blockage in cooling system. Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-A1 and A-J2. Refer to the Service Manual for more details.
P0118	ECM	Engine coolant temperature sensor fault - Short circuit to V+ or connector disconnected.	Engine overheated or damaged sensor. Connector disconnected.	Check for debris or blockage in cooling system. Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-A1 and A-J2. Refer to the Service Manual for more details.
P0122	ECM	TAS (Throttle Accelerator sensor) 1 fault (short circuit to GND)	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check system circuits B-E1, B-K1, B-K3. Check for 0 volt on sensor connector pin E. Check for 5 volts on sensor connector pin D. Check for 0.5 to 3 volts on sensor connector pin F. Refer to the Service Manual for more details.
P0123	ECM	TAS (Throttle Accelerator sensor) 1 fault (short circuit to battery)	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check system circuits B-E1, B-K1, B-K3. Check for 0 volt on sensor connector pin E. Check for 5 volts on sensor connector pin D. Check for 0.5 to 3 volts on sensor connector pin F. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0127	ECM	Intercooler system fault	High air intake temperature detected. Fault detected when the engine is running and stopped. Blocked intercooler water circuit.	Clean intercooler water circuit system. Refer to the Service Manual for more details.
P0130	ECM	Lambda Sensor fault upstreams of catalyst - signal not plausible		
P0131	ECM	Lambda Sensor fault upstreams of catalyst - short circuit to GND		
P0132	ECM	Lambda Sensor fault upstreams of catalyst - short circuit to V+		
P0133	ECM	Oxygen sensor upstreams of catalyst reacts too slow –> contaminated		
P0134	ECM	Oxygen sensor upstreams of catalyst reacts too slow –> defective		
P0135	ECM	Lambda Sensor heating fault upstreams of catalyst		
P0136	ECM	Lambda Sensor fault downstream of catalyst - signal not plausible		
P0137	ECM	Lambda Sensor fault downstream of catalyst - short circuit to GND		
P0138	ECM	Lambda Sensor fault downstreams of catalyst - short circuit to V+		
P0141	ECM	Lambda Sensor heating fault downstreams of catalyst		
P0171	ECM	Multiplicative mixture adaptation exeeds upper limit–> mixture too lean		
P0172	ECM	Multiplicative mixture adaptation below lower limit–> mixture too rich		

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0201	ECM	Injection Power Stage fault - open line/Cylinder 1	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 2 and ECM connector pin A-B3. Check for 12 volts on pin 2 of injector connector. Check fuse #13 (refer to WIRING DIAGRAM). Check for damaged circuit wires. Refer to the Service Manual for more details.
P0202	ECM	Injection Power Stage fault - open line/Cylinder 2	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 2 and ECM connector pin A-K1. Check for 12 volts on pin 2 of injector connector. Check fuse #14 (refer to WIRING DIAGRAM). Check for damaged circuit wires Refer to the Service Manual for more details.
P0203	ECM	Injection Power Stage fault - open line/Cylinder 3	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 3 and ECM connector pin A-J1. Check for 12 volts on pin 2 of injector connector. Check fuse #15 (refer to WIRING DIAGRAM). Check for damaged circuit wires. Refer to the Service Manual for more details.
P0217	ECM	High engine coolant temperature detected	High engine coolant temperature detected.	Check for debris or blockage in cooling system. Check the sensor for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F). Check for approximately 2280 to 2736 ohms at 19 to 21°C (66 to 70°F) between ECM connector pins A-A1 and A-J2. Refer to the Service Manual for more details.
P0222	ECM	TAS (Throttle Accelerator sensor) 2 fault (short circuit to GND)	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check system circuits B-A3, B-B3, B-J3. Check for 0 volt on sensor connector pin B. Check for 5 volts on sensor connector pin A. Check for 0.25 to 1.5 volts on sensor connector pin C. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0223	ECM	TAS (Throttle Accelerator sensor) 2 fault (short circuit to battery)	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check system circuits B-A3, B-B3, B-J3. Check for 0 volt on sensor connector pin B. Check for 5 volts on sensor connector pin A. Check for 0.25 to 1.5 volts on sensor connector pin C. Refer to the Service Manual for more details.
P0231	ECM	Fuel pump open circuit or short to ground	Damaged pump, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 1 ohm between pins A and B of the fuel pump connector. Check fuse #18 (refer to WIRING DIAGRAM). Check for damaged circuit wires. Check for damaged connector, damaged ECM output pins or ECM failure. Refer to the Service Manual for more details.
P0232	ECM	Fuel pump short circuit to battery	Damaged pump, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 1 ohm between pins A and B of the fuel pump connector. Check fuse #18 (refer to WIRING DIAGRAM). Check for damaged circuit wires. Check for damaged connector, damaged ECM output pins or ECM failure. Refer to the Service Manual for more details.
P0261	ECM	Injector 1 open circuit or shorted to ground	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 1 and ECM connector pin A-B3. Check for 12 volts on pin 2 of injector connector. Check fuse #13 (refer to WIRING DIAGRAM). Check for damaged circuit wires. Refer to the Service Manual for more details.
P0262	ECM	Injector 1 shorted to battery	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 1 and ECM connector pin A-B3. Check for 12 volts on pin 2 of injector connector. Check fuse #13 (refer to WIRING DIAGRAM). Check for damaged circuit wires. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0264	ECM	Injector 2 open circuit or shorted to ground	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 2 and ECM connector pin A-K1. Check for 12 volts on pin 2 of injector connector. Check fuse #14 (refer to WIRING DIAGRAM). Check for damaged circuit wires. Refer to the Service Manual for more details.
P0265	ECM	Injector 2 shorted to battery	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 2 and ECM connector pin A-K1. Check for 12 volts on pin 2 of injector connector. Check fuse #14 (refer to WIRING DIAGRAM). Check for damaged circuit wires. Refer to the Service Manual for more details.
P0267	ECM	Injector 3 open circuit or shorted to ground	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 3 and ECM connector pin A-J1. Check for 12 volts on pin 2 of injector connector. Check fuse #15 (refer to WIRING DIAGRAM). Check for damaged circuit wires. Refer to the Service Manual for more details.
P0268	ECM	Injector 3 shorted to battery	Damaged injector, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 11.4 to 12.6 ohms between engine connector pin 3 and ECM connector pin A-J1. Check for 12 volts on pin 2 of injector connector. Check fuse #15 (refer to WIRING DIAGRAM). Check for damaged circuit wires. Refer to the Service Manual for more details.
P0300	ECM	Multiple misfire detected		
P0301	ECM	Misfire cylinder 2 (physical cylinder 1)		
P0302	ECM	Misfire cylinder 0 (physical cylinder 2)		
P0303	ECM	Misfire cylinder 1 (physical cylinder 3)		

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0325	ECM	Knock sensor 1 fault	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins. Open circuit.	Bring engine to 5000 RPM. If fault code appears then check for approximately 5 Mohms between system circuits A-C3 and A-G2. Refer to the Service Manual for more details.
P0330	ECM	Knock sensor 2 fault		
P0335	ECM	Crankshaft signal error	Damaged sensor, damaged circuit wires, damaged connector, damaged ECM pins or damaged tooth wheel. Connector disconnected.	For the CPS, check for 700 to 900 ohms between terminals A-H1 and A-K2 of ECM connector. Refer to the Service Manual for more details.
P0340	ECM	Camshaft 1 signal error	Damaged sensor, damaged circuit wires, damaged connector, damaged ECM pins or damaged tooth wheel. Connector disconnected.	For the CAPS, check for 12 volts on sensor connector pin 3. Check continuity for circuits A-D4, A-E2 and terminal 4 on engine connector. Check fuse #12 (refer to WIRING DIAGRAM). Engine must run to erase the corrected fault. Refer to the Service Manual for more details.
P0351	ECM	Ignition coil 1 open circuit or shorted to ground or to battery	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M4. Check for 12 volts on pin 2 of coil connector. Check fuse #13 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.
P0352	ECM	Ignition coil 2 open circuit or shorted to ground or to battery	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M2. Check for 12 volts on pin 2 of coil connector. Check fuse #14 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.
P0353	ECM	Ignition coil 3 open circuit or shorted to ground or to battery	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 3 and ECM connector pin A-M1. Check for 12 volts on pin 2 of coil connector. Check fuse #15 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0354	ECM	Ignition Power Stage fault - short circuit to GND/Cylinder 1	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M4. Check for 12 volts on pin 2 of coil connector. Check fuse #13 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.
P0355	ECM	Ignition Power Stage fault - short circuit to GND/Cylinder 2	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M2. Check for 12 volts on pin 2 of coil connector. Check fuse #14 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.
P0356	ECM	Ignition Power Stage fault - short circuit to GND/Cylinder 3	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 3 and ECM connector pin A-M1. Check for 12 volts on pin 2 of coil connector. Check fuse #15 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.
P0357	ECM	Ignition Power Stage fault - short circuit to V+/Cylinder 1	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M4. Check for 12 volts on pin 2 of coil connector. Check fuse #13 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.
P0358	ECM	Ignition Power Stage fault - short circuit to V+/Cylinder 2	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M2. Check for 12 volts on pin 2 of coil connector. Check fuse #14 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.
P0359	ECM	Ignition Power Stage fault - short circuit to V+/Cylinder 3	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 0.85 to 1.15 ohms between engine connector pin 3 and ECM connector pin A-M1. Check for 12 volts on pin 2 of coil connector. Check fuse #15 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0360	ECM	Ignition Power stage max error & false detection of low battery voltage/Cylinder 1	Signal not plausible, verify battery voltage too low during ignition.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M4. Check for 12 volts on pin 2 of coil connector. Check fuse #13 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.
P0361	ECM	Ignition Power stage max error & false detection of low battery voltage/Cylinder 2	Signal not plausible, verify battery voltage too low during ignition.	Check for 0.85 to 1.15 ohms between engine connector pin 1 and ECM connector pin A-M2. Check for 12 volts on pin 2 of coil connector. Check fuse #14 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.
P0362	ECM	Ignition Power stage max error & false detection of low battery voltage/Cylinder 3	Signal not plausible, verify battery voltage too low during ignition.	Check for 0.85 to 1.15 ohms between engine connector pin 3 and ECM connector pin A-M1. Check for 12 volts on pin 2 of coil connector. Check fuse #15 (refer to WIRING DIAGRAM). Refer to the Service Manual for more details.
P0365	ECM	Camshaft 2 signal error		
P0420	ECM	Catalyst conversion insufficient		
P0500	ECM	Vehicle speed signal fault	Cluster fault detected by ECM C.A.N. circuit failure, Instrument cluster or ECM failure	Check C.A.N. circuits wires. Replace instrument Cluster. Verify outside of the building if the GPS LED becomes active after 1 minute and stays steady Refer to the Service Manual for more details.
P0501	ECM	Vehicle speed not plausible	Cluster or iBR fault detected by ECM. C.A.N. circuit failure, Instrument cluster, iBR or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Verify outside of the building if the GPS LED becomes active after 1 minute and stays steady Refer to the Service Manual for more details.
P0504	ECM	Brake signal not plausible	iBR fault detected by ECM. C.A.N. circuit failure, ECM software failure.	Check C.A.N. circuits wires. Replace iBR. Refer to the Service Manual for more details.
P0512	ECM	Starter power stage detects high current	Damaged solenoid, damaged circuit wires, damaged connector or damaged ECM.	Verify fuse #16 (5AMP). Check for 12 volts on pin 2 of the starter relay. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0513	ECM	Invalid D.E.S.S. Key detected	Key not programmed in ECU.	Program a good key.
P0520	ECM	Oil pressure switch functional problem	Engine leak, oil pump failure, damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check resistance at 0 RPM and above 3500 RPM. Switch is normally closed, ECM connector pin A-E3 When blow-by pressure exceeds 40 kPa (6 PSI), the resistance is infinitely high. Refer to the Service Manual for more details.
P0523	ECM	Oil pressure sensor fault	Engine leak, oil pump failure, damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins. Fault detected when the engine is running or stopped.	Check resistance at 0 RPM and above 3500 RPM. When blow-by pressure exceeds 40 kPa (6 PSI), the resistance is infinitely high. Refer to the Service Manual for more details.
P0524	ECM	Low oil pressure condition	Low oil level, engine leak, oil pump fault.	Check oil level. Check impedance of sensor. Refer to the Service Manual for more details.
P0544	ECM	Exhaust gas temperature sensor functional problem	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 2280 to 2736 ohms at temperature of 19 to 21°C (66 to 70°F) between system circuits A-H4 and A-J4. Refer to the Service Manual for more details.
P0545	ECM	Exhaust gas temperature sensor shorted to ground	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 2280 to 2736 ohms at temperature of 19 to 21°C (66 to 70°F) between system circuits A-H4 and A-J4. Refer to the Service Manual for more details.
P0546	ECM	Exhaust gas temperature sensor open circuit or shorted to battery	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 2280 to 2736 ohms at temperature of 19 to 21°C (66 to 70°F) between system circuits A-H4 and A-J4. Refer to the Service Manual for more details.
P0560	ECM	Battery voltage not plausible	Battery failure, rectifier failure, damaged circuit wires, battery terminal connection, damaged AC generator or damaged connectors.	Check fuses #6 (refer to WIRING DIAGRAM). Check ground continuity to the engine block. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P0562	ECM	Battery voltage too low	Battery failure, rectifier failure, damaged circuit wires, battery terminal connection, damaged AC generator or damaged connectors.	Check fuses #6 (refer to WIRING DIAGRAM). Check ground continuity to the engine block. Refer to the Service Manual for more details.
P0563	ECM	Battery voltage too high	Battery failure, rectifier failure or battery terminal connection.	Check for regulator-rectifier failure. Refer to the Service Manual for more details.
P0564	CLUSTER	Cruise switch fault	The cruise switch is shorted or activated more than 60 seconds.	Verify the cruise switch if it is normally open and close when activated.
P0606	ECM	ECM ADC fault	Damaged ECM.	Replace ECM
P060D	ECM	TAS (Throttle Accelerator sensor) synchronization error	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM pins.	Check system circuits B-E1, B-K1, B-K3, B-A3, B-B3, B-J3 Check for 0 volt on sensor connector pin B and E. Check for 5 volts on sensor connector pin A and D. Check for 0.5 to 3 volts on sensor connector pin Fand 0.25 to 1.5 on C Refer to the Service Manual for more details.
P060E	ECM	Throttle Actuator - Controller Fault- digital position control exceeds limit		
P0610	ECM	Variant coding fault		
P0629	CLUSTER	Fuel sensor disconnected fault	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for 2.6 ohms (full tank) to 93.6 ohms (empty tank) between pin C and pin D at the fuel pump connector. Check system circuit at the gauge Pin 19 and 20. (refer to WIRING DIAGRAM).
P062C	ECM	Cluster CAN error - Loss of vehicule speed information from cluster	Cluster fault detected by ECM. C.A.N. circuit failure, Instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Verify outside of the building if the GPS LED becomes active after 1 minute and stays steady Refer to the Service Manual for more details.
P062F	ECM	ECM EEPROM fault - exchange ECM	Damaged ECM.	Replace ECM.
P06B6	ECM	ECM Fast ADC fault (knock detection line)		

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P1030	ECM	Heater Power Stage fault for lambda sensor upstreams of catalyst - open line		
P1036	ECM	Heater Power Stage fault for lambda sensor downstreams of catalyst - open line		
P1106	ECM	Altitude correction factor (fho) not plausible - out of range		
P1120	ECM	Throttle positions calculated from TPS 1 and TPS 2 not corresponding	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1130	ECM	Lambda Sensor fault upstreams of catalyst - open line		
P1136	ECM	Lambda Sensor fault downstream of catalyst - open line		
P1171	ECM	Additive mixture adaptation exceeds upper limit –> mixture too lean		
P1172	ECM	Additive mixture adaptation below lower limit –> mixture too rich		
P1264	ECM	Ignition Power stage overload	Damaged coil, damaged circuit wires, damaged connector or damaged ECM output pins. Fault detected when the engine is running.	
P1502	ECM	T.O.P.S. functional problem	Boat or sensor upside down, damaged circuit wires, damaged connector or damaged ECM output pins.	Check continuity for circuits A-C4, A-G1, A-F4. Refer to the Service Manual for more details.
P1503	ECM	T.O.P.S. switch short circuit to 12 V	Boat or sensor upside down, damaged circuit wires, damaged connector or damaged ECM output pins.	Check continuity for circuits A-C4, A-G1, A-F4. Refer to the Service Manual for more details.
P1504	ECM	T.O.P.S. switch short circuit ground	Boat or sensor upside down, damaged circuit wires, damaged connector or damaged ECM output pins.	Check continuity for circuits A-C4, A-G1, A-F4. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P1505	ECM	T.O.P.S. switch fault non plausible state	Boat or sensor upside down, damaged circuit wires, damaged connector or damaged ECM output pins. Open circuit.	Check continuity for circuits A-C4, A-G1, A-F4. Refer to the Service Manual for more details.
P1506	ECM	T.O.P.S. switch open circuit	Boat or sensor upside down, damaged circuit wires, damaged connector or damaged ECM output pins. Open circuit.	Check continuity for circuits A-C4, A-G1, A-F4. Refer to the Service Manual for more details.
P1509	ECM	Lake Water Temperature sensor fault		
P1550	ECM	Otas sensor voltage not plausible	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM. Open circuit.	Check continuity for circuits B-H3, B-H1 and fuse #12. Refer to the Service Manual for more details.
P1590	ECM	VTS position sensor circuit out of range		
P1591	ECM	VTS position sensor circuit voltage low		
P1592	ECM	VTS position sensor circuit voltage high		
P1593	ECM	VTS malfunction		
P1606	ECM	ECM ADC fault - exchange ECM	Damaged ECM.	No service action available for fault P1606.
P160E	ECM	Throttle Actuator - Controller Fault - digital position control below limit	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1610	ECM	Throttle Actuator - Power Stage fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1611	ECM	Throttle Actuator - Power Stage fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1612	ECM	Throttle Actuator - Power Stage fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P1613	ECM	Throttle Actuator - Power Stage fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1614	ECM	Throttle Actuator - Return-Spring check not passed/Spring does not close	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1615	ECM	Throttle Actuator - Position monitoring fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1616	ECM	Throttle Actuator - Default position check or learning fault	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1619	ECM	Throttle Actuator - Adaptation of upper mechanical limit failed	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1620	ECM	Throttle Actuator - Adaptation of lower mechanical limit failed	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1621	ECM	Throttle Actuator - Abortion of adaptation	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1622	ECM	Throttle Actuator - Repeated abortion of adaptation	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P1654	ECM	Voltage of D.E.S.S. key switch out of range	Damaged D.E.S.S. key switch, damaged circuit wires, damaged connector or damaged ECM output pins.	Remove D.E.S.S. key and check system circuit B-B2. Refer to the Service Manual for more details.
P1657	ECM	Electrical fault of D.E.S.S. key communication line	Damaged D.E.S.S. key switch, damaged circuit wires, damaged connector or damaged ECM output pins.	Remove D.E.S.S. key and check system circuit B-B2. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P1658	ECM	Faulty D.E.S.S. key communication	Damaged D.E.S.S. key switch, damaged circuit wires, damaged connector or damaged ECM output pins.	Remove D.E.S.S. key and check system circuit B-B2. Refer to the Service Manual for more details.
P1661	ECM	iBR malfunction	iBR fault detected by ECM.	Remove D.E.S.S. key Perform an electrical system shut down. Clear fault.
P1662	ECM	iBR torque request is not plausible	iBR fault detected by ECM.	Perform iBR software update if available or replace iBR.
P1679	ECM	Main Relay Stinking	Permanent 12 V is present on ECM Pin B-M4.	ECU pin B-M4 is permanently supplied thru 15 amp fuse and it should be accessory 12 Vdc.
P1690	ECM	VTS control up circuit open circuit or shorted to ground		
P1691	ECM	VTS control up circuit shorted to battery		
P1692	ECM	VTS control down circuit open circuit or shorted to ground		
P1693	ECM	VTS control down circuit shorted to battery		
P1694	ECM	VTS Power stage fault		
P1695	ECM	VTS Power stage fault		
P16B6	ECM	ECU Fast ADC fault (knock detection line)		
P16B7	ECM	ECU Fast ADC fault (knock detection line)		
P16B8	ECM	ECU Fast ADC fault (knock detection line)		
P16C0	ECM	Fault of ECM ADC		
P16C1	ECM	Fault of ECM ADC		
P16C2	ECM	Fault of ECM monitoring module		
P16C3	ECM	Monitoring fault due to Accelerator Sensor check		
P16C4	ECM	Monitoring fault due to engine speed check		
P16C5	ECM	Safety fuel cut off activ - Monitoring level 1		
P16C6	ECM	Safety fuel cut off activ - Monitoring level 2		

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P16C7	ECM	Monitoring fault due to throttle valve plausibility check	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P16C8	ECM	Monitoring fault due to exceeding permitted throttle valve position	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P16C9	ECM	Monitoring detected non plausible D.E.S.S. key state	Damaged D.E.S.S. key switch, damaged circuit wires, damaged connector or damaged ECM output pins.	Remove D.E.S.S. key and check system circuit B-B2. Refer to the Service Manual for more details.
P16CA	ECM	ECU detected faulty watch dog line ECU defect	Damaged ECM.	Replace ECM.
P16CB	ECM	ECU switch off through watch dog line (hardware fault) ECU defect	Damaged ECM.	Replace ECM.
P2080	ECM	Exhaust temperature not plausible	Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 2280 to 2736 ohms at temperature of 19 to 21°C (66 to 70°F) between system circuits A-H4 and A-J4. Refer to the Service Manual for more details.
P2081	ECM	Exhaust temperature sensor fault	Intremittent connection. Damaged sensor, damaged circuit wires, damaged connector or damaged ECM output pins.	Check for approximately 2280 to 2736 ohms at temperature of 19 to 21°C (66 to 70°F) between system circuits A-H4 and A-J4. Refer to the Service Manual for more details.
P212C	ECM	Electrical lower-range violation TPS 2	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, replace ECM
P212D	ECM	Electrical upper-range violation TPS 2	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, replace ECM
P2159	ECM	TAS (Throttle Accelerator sensor) signal not plausible		
P2245	ECM	Lambda Sensor aging fault downstreams of catalyst Sensor Voltage too low		

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
P2246	ECM	Lambda Sensor aging fault downstreams of catalyst Sensor Voltage too high		
P2279	ECM	Air intake manifold leak downstream of throttle		
P2428	ECM	High exhaust temperature detected	Exhaust overheat, damaged sensor or damaged circuit wires.	Check cooling system for blockage. Check if the exhaust injection valve is properly calibrated. Refer to the Service Manual for more details.
P2620	ECM	TPS value not plausible	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P2621	ECM	Electrical lower-range violation TPS 1	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
P2622	ECM	Electrical upper-range violation TPS 1	Damaged throttle actuator, damaged circuit wires, damaged connector or damaged ECM.	Check system circuit, perform closed throttle with B.U.D.S. Replace throttle actuator, repalce ECM.
U0129	ECM	CAN communication error between ECM and iBR module	iBR fault detected by ECM. C.A.N. circuit failure, iBR or ECM failure. Disconnected connector.	Check C.A.N. circuits wires. Replace iBR. Refer to the Service Manual for more details.
U0129	iS	IBR CAN messages timeout or validity	Warning only: the iS module lost communication with the iBR.	If fault ACTIVE, verify CAN connection between iBR and iS.
U016A	ECM	Loss of vehicle speed	Instrument cluster fault detected by ECM. C.A.N. circuit failure, instrument Cluster or ECM failure.	Check C.A.N. circuits wires, replace instrument Cluster. Refer to the Service Manual for more details.
U0300	ECM	Exchange security - Wrong ECM	Incorrect ECM or cluster for engine.	Install proper recommended ECM or cluster for vehicle.
U0401	iBR	ECM CAN messages timeout or validity	C.A.N. circuit failure, ECM software failure.	Check C.A.N. circuits wires. Replace ECM. Refer to the Service Manual for more details.
U0401	iS	ECM CAN messages timeout or validity	Warning only: the iS module lost communication with the engine ECU.	If fault ACTIVE, verify CAN connection between ECM and iS.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
U0457	iBR	Cluster CAN messages timeout or validity	C.A.N. circuit failure, Cluster software failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the Service Manual for more details.
U0457	iS	Cluster CAN messages timeout or validity	Warning only: the iS module lost communication with the Cluster.	If fault ACTIVE, verify CAN connection between Cluster and iS.
U16A1	ECM	Cluster CAN Timeout error-Missing CAN ID 514h	Cluster fault detected by ECM. C.A.N. circuit failure, Instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the Service Manual for more details.
U16A2	ECM	Cluster CAN Timeout error-Missing CAN ID 230h	Cluster fault detected by ECM. C.A.N. circuit failure, Instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the Service Manual for more details.
U16A3	ECM	Cluster CAN Timeout error-Missing CAN ID 408h	Cluster fault detected by ECM. C.A.N. circuit failure, Instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the Service Manual for more details.
U16A4	ECM	iBR CAN Timeout error-Missing CAN ID 010h	iBR fault detected by ECM. C.A.N. circuit failure, iBR or ECM failure. Disconnected connector.	Check C.A.N. circuits wires. Replace iBR. Refer to the Service Manual for more details.
U16A5	ECM	iBR CAN Timeout error-Missing CAN ID 012h	iBR fault detected by ECM. C.A.N. circuit failure, iBR or ECM failure. Disconnected connector.	Check C.A.N. circuits wires. Replace instrument iBR. Refer to the Service Manual for more details.
U16A6	ECM	Cluster check sum error - CAN ID230h	Cluster fault detected by ECM. C.A.N. circuit failure, Instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the Service Manual for more details.

FAULT CODE	REPORTING MODULE	DESCRIPTION	POSSIBLE CAUSE	SERVICE ACTION
U16A7	ECM	Cluster check sum error - CAN ID408h	Cluster fault detected by ECM. C.A.N. circuit failure, instrument cluster or ECM failure.	Check C.A.N. circuits wires. Replace instrument Cluster. Refer to the Service Manual for more details.
U16A8	ECM	iBR check sum error - CAN ID010h	iBR fault detected by ECM. C.A.N. circuit failure, ECM software failure.	Check C.A.N. circuits wires. Replace iBR. Refer to the Service Manual for more details.
U16A9	ECM	iBR check sum error - CAN ID012h	iBR fault detected by ECM. C.A.N. circuit failure, ECM software failure.	Check C.A.N. circuits wires. Replace iBR. Refer to the Service Manual for more details.

INTELLIGENT THROTTLE CONTROL (iTC)

SERVICE TOOLS

Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 188	280
FLUKE 115 MULTIMETER	529 035 868	280, 285

SERVICE PRODUCTS

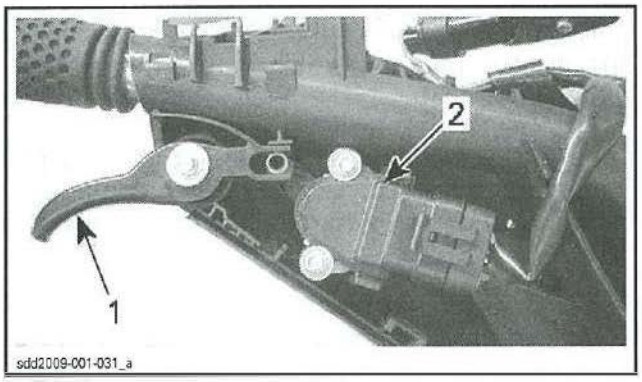
Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	285

GENERAL

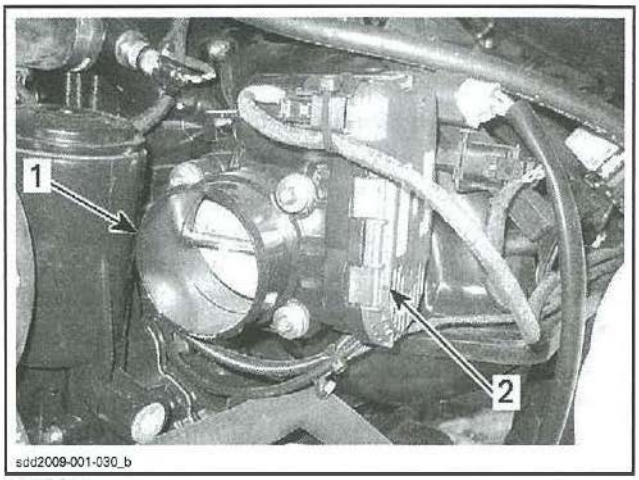
SYSTEM DESCRIPTION

NOTE: Some functions or features described in this section may not apply to every PWC model, or may be available as an option.

The iTC is an electronic throttle control system that includes a cableless throttle control located on the RH side of handlebar, an electric throttle actuator (ETA) located on the throttle body and the engine control module (ECM). The iTC is often referred to as a "throttle by wire" system.



TYPICAL
1. *Throttle lever*
2. *Throttle accelerator sensor (TAS)*



TYPICAL
1. *Throttle body*
2. *Throttle actuator*

The throttle lever operates the throttle accelerator sensor (TAS). It is a double output hall effect sensor. The redundancy is used for security purposes.

The throttle actuator (ETA) is a DC motor on the throttle body that regulates the throttle plate via a drive gear. Pulse width modulation (PWM) is used to control the motor. In the throttle body, there is a double throttle position sensor (TPS). The redundancy is used for security purposes. The TPS is a potentiometer that supplies the ECM the actual angle position of the throttle plate.

According to the torque demand from the TAS, the ECM powers the ETA motor to rotate towards open or close the throttle plate. When the ECM detects through the TPS that the throttle plate has reached the targeted opening, the ECM stops the throttle actuator.

The iTC allows the throttle actuator to be moved irrespective of the accelerator sensor position since it is not directly linked by a throttle cable.

While the throttle lever might be fully pulled in and held, the ECM could close the throttle plate instead of opening it if the iBR lever were pulled in. Then, the ECM could open the throttle plate to accelerate the engine to increase the braking effect. These different throttle plate movements could be achieved while the throttle lever was still fully pulled in. This is one of the great flexibility of the iTC.

The use of the iTC allows the following additional engine modes of operation.

Touring/Sport Mode

Touring/Sport mode allows the operator to choose between sport mode for instant throttle response, or touring mode for progressive throttle response at certain engine speed.

In sport mode, maximum engine power is available throughout the engine operational range.

In touring mode, available engine power and acceleration is reduced when accelerating from a complete stop and when operating in the low engine power range under certain conditions.

When throttle is applied in touring mode, the engine will progressively accelerate to an operating range whereby full power eventually becomes available as if operating in sport mode. If the engine is throttled down sufficiently and for a long enough period of time, engine power and acceleration will again be reduced.

ECO Mode

When ECO mode is selected (fuel economy mode), engine RPM is limited whereby an optimal cruising speed is maintained in order to reduce fuel consumption.

Cruise Control

Cruise mode is a function of iTC (intelligent Throttle Control) system that allows the operator to set the desired maximum watercraft speed.

This is useful when cruising for long distances, operating in limited speed zones, or towing a tuber, skier or wake boarder.

Cruise mode only limits forward speed, the operator must keep the throttle depressed to maintain forward speed.

Once the maximum cruise speed is set, the operator can vary the watercraft speed from idle speed up to the set cruise speed using the throttle lever. The set cruise speed will not be exceeded even if the throttle lever is fully depressed.

As you proceed under a constant cruising speed setting, keep your attention level up to maintain good situational awareness.

Slowing down is a matter of releasing the throttle lever further than the set point, or by pulling the iBR lever in or decrease speed with the DOWN button.

If the iBR lever is pulled in for braking, CRUISE mode is overridden but not deactivated.

Once the iBR lever is released and the throttle is pulled in to engage forward position, the cruise function will reengage to limit the watercraft speed as it was set before iBR lever activation.

Slow Speed Mode

The Intelligent Throttle Control also allows for a Slow Speed Mode where the driver can adjust and set idle speed. This is useful when operating in slow speed zones where the driver must be especially attentive to possible obstacle avoidance.

The throttle plate will open and close as necessary to maintain the set speed.

Ski Mode

Ski mode allows for repeated and precisely controlled launches and a set towing speed, designed specifically for towing a skier or wake boarder.

RAMP Function

The RAMP function available in ski mode is a preprogrammed function used for launching and accelerating the PWC when towing a skier or wakeboarder.

TARGET SPEED Function

The TARGET SPEED function limits the maximum towing speed.

Learning and Rental Keys

Learning and Rental keys limit the watercraft maximum speed. The full stroke of the throttle lever is used while only a partial stroke of the throttle plate is achieved. Therefore, greater throttle lever movement is used while a smaller engine speed and torque variation is applied through the throttle actuator. This permits a more accurate and easier throttle operation to control the engine within a specified torque curve and maximum speed setting for a learner.

O.T.A.S. ™ System (Off-Throttle Assisted Steering)

The O.T.A.S. (Off-Throttle Assisted Steering) system provides additional maneuverability in off-throttle situations. The O.T.A.S. system is electronically activated and slightly increases engine speed under a pre-defined RPM when the driver initiates a full turn. When the handlebar is brought back to its center position, the throttle reverts to idle.

The throttle plate will open and close as necessary to assist the steering.

Limitations

The O.T.A.S. system cannot help maintaining control or prevent collisions in all situations.

green-manuals

OPERATING MODES (GTS, GTI AND WAKE SERIES)

	GTS	GTI	GTI SE	GTI LIMITED	WAKE
Touring mode	X	X	X	X	X
Sport mode	X	X	X	X	X
ECO mode	N.A.	N.A.	X	X	X
Cruise mode	N.A.	Opt	Opt	X	X
Slow speed mode	N.A.	Opt	Opt	X	X
Ski mode	N.A.	Opt	Opt	Opt	X
Learning and rental key modes	X	X	X	X	X

X = Indicates a standard feature
Opt = Indicates a feature available as an option
N.A. = Indicates a function that is not applicable

Touring Mode

By default, the watercraft is in TOURING mode of operation when first started.

A TOURING mode indicator is ON in the multifunction gauge to confirm the active mode of operation.



TOURING MODE INDICATOR

Sport Mode

A SPORT mode indicator is ON in the multifunction gauge to confirm the active mode of operation.



SPORT MODE INDICATOR

Once activated, SPORT MODE will remain active until it is deactivated by the operator, or the engine is shut down whereby it defaults back to TOURING MODE.

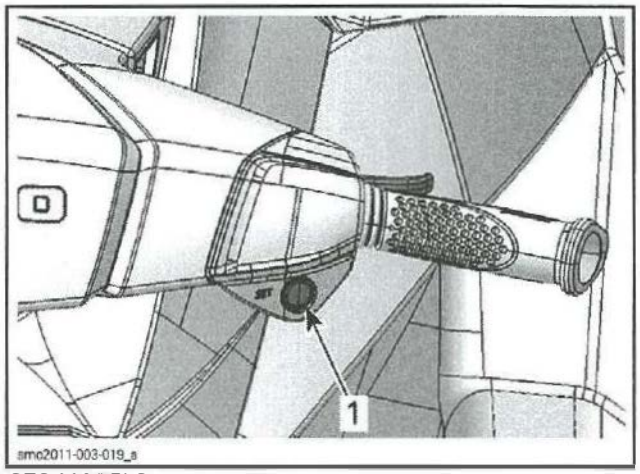
Activating Sport Mode (Quick Method)

To quickly activate sport mode while riding at speed, carry out the following:

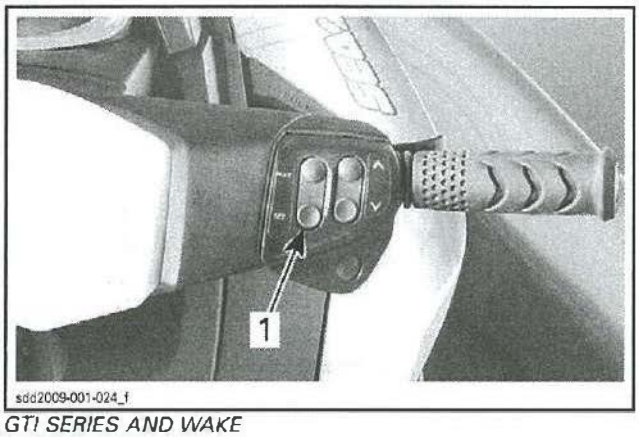
⚠ WARNING

When activating sport mode, be sure to maintain situational awareness of other watercraft, obstacles, or persons in the water.

1. Depress and hold the SET button for at least 3 seconds.

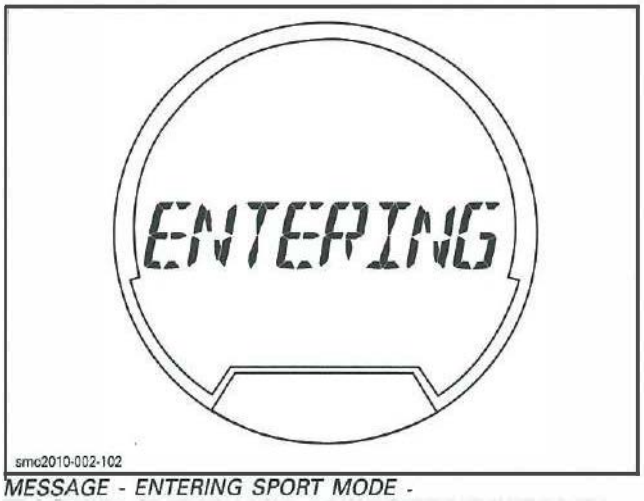


GTS MODELS
1. SET button



GTI SERIES AND WAKE
1. SET button

NOTE: The following **important** message will scroll across the multifunction display:
ENTERING SPORT MODE - INCREASED ACCELERATION - INSTRUCT PASSENGERS TO HOLD - PRESS_SET_BUTTON.



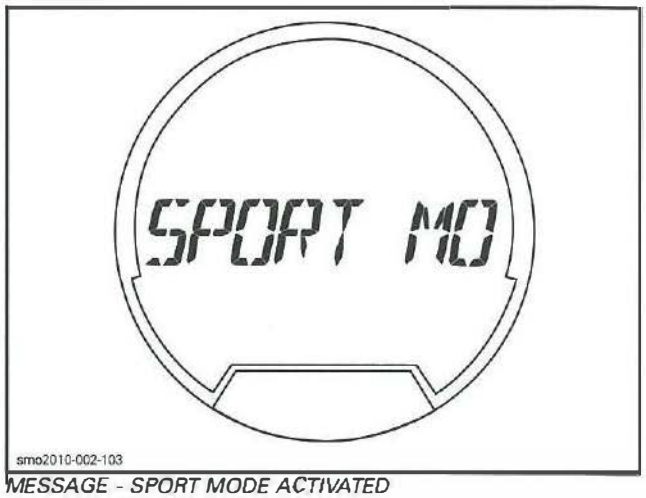
MESSAGE - ENTERING SPORT MODE - INCREASED ACCELERATION - INSTRUCT PASSENGERS TO HOLD - PRESS_SET_BUTTON

⚠ WARNING

Ensure passengers are advised that sport mode provides for increased accelerations and to hold on tightly.

2. Press the SET button again to activate sport mode.

A scrolling SPORT MODE ACTIVATED message will momentarily confirm that sport mode has been activated.



MESSAGE - SPORT MODE ACTIVATED

NOTE: After a few seconds, the gauge will revert to its normal display.

3. Ensure the SPORT mode indicator is turned on.



SPORT MODE INDICATOR

NOTE: The SPORT mode indicator will come on and stay on as long as sport mode is active.

Deactivating Sport Mode (Quick Method)

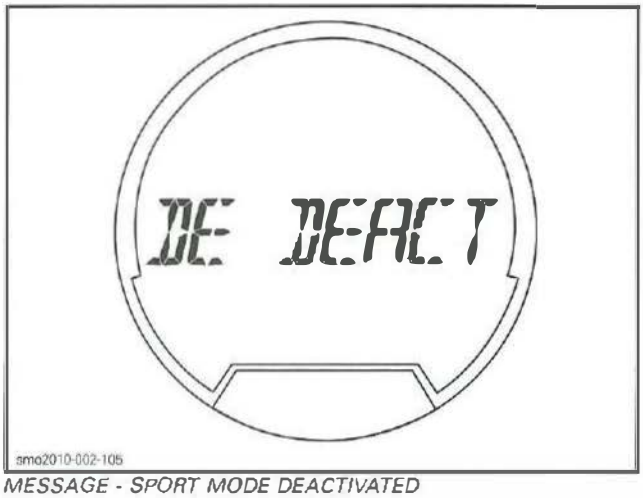
To quickly deactivate sport mode while riding at speed, carry out the following:

⚠ WARNING

When activating sport mode, be sure to maintain situational awareness of other watercraft, obstacles, or persons in the water.

1. Depress and hold the SET button for at least 3 seconds.

NOTE: The following message will scroll in the multifunction display: SPORT MODE DEACTIVATED.



MESSAGE - SPORT MODE DEACTIVATED

NOTE: After a few seconds, the gauge will revert to its normal display.

2. Ensure the TOURING mode indicator is on.



TOURING MODE INDICATOR

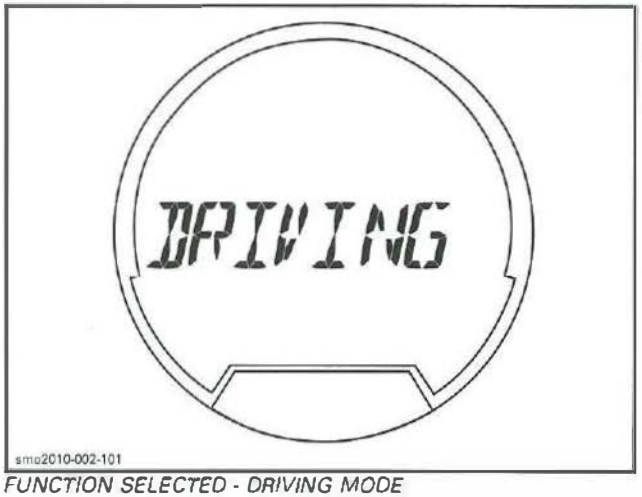
Activating Sport Mode (Through Information Center)

To activate sport mode through the gauge functions, carry out the following:

⚠ WARNING

Activating sport mode through the information center should only be carried out with the watercraft stopped and the engine running at idle. The operator must ensure to maintain situational awareness of other watercraft, obstacles, or persons in the water.

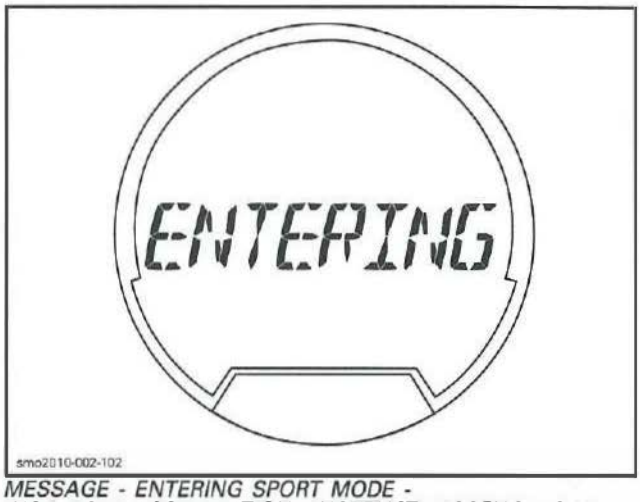
1. With the engine running at idle, press the MODE button repeatedly until DRIVING MODE scrolls across the multifunction display.



FUNCTION SELECTED - DRIVING MODE

2. Press the SET button to enter the driving mode function.

NOTE: The following important message will scroll across the multifunction display ENTERING SPORT MODE - INCREASED ACCELERATION - INSTRUCT PASSENGERS TO HOLD - PRESS_SET_BUTTON.



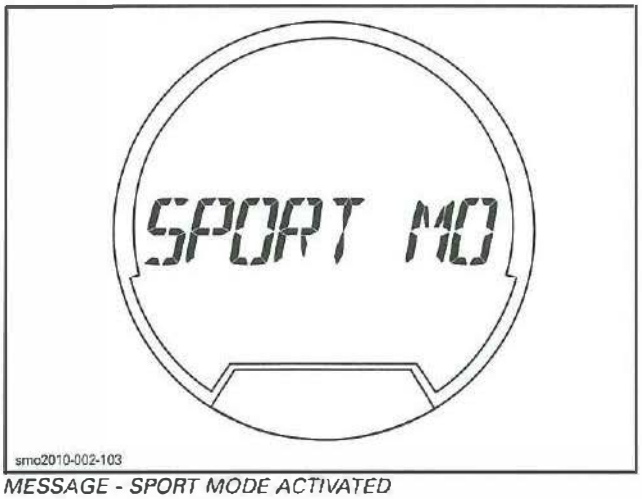
MESSAGE - ENTERING SPORT MODE - INCREASED ACCELERATION - INSTRUCT PASSENGERS TO HOLD - PRESS_SET_BUTTON

⚠ WARNING

Ensure passengers are advised that sport mode provides for increased accelerations and to hold on tightly.

3. Press the SET button again to activate sport mode.

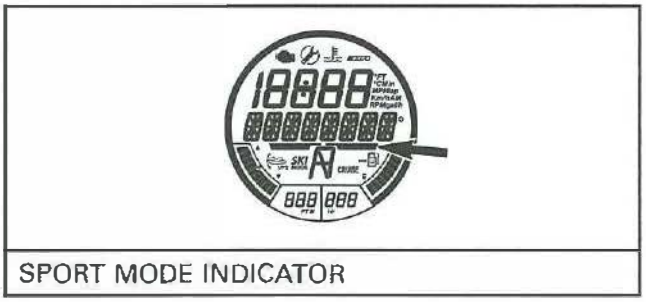
A scrolling SPORT MODE ACTIVATED message will confirm momentarily that sport mode has been activated.



MESSAGE - SPORT MODE ACTIVATED

NOTE: After a few seconds, the gauge will exit the function and return to its normal display.

4. Ensure the SPORT mode indicator is turned on.



SPORT MODE INDICATOR

NOTE: The SPORT mode indicator will come on and stay on as long as sport mode is active. If the engine is not at idle and sport mode cannot be activated, the following message will appear: SPORT MODE - RETURN TO IDLE TO ACTIVATE.

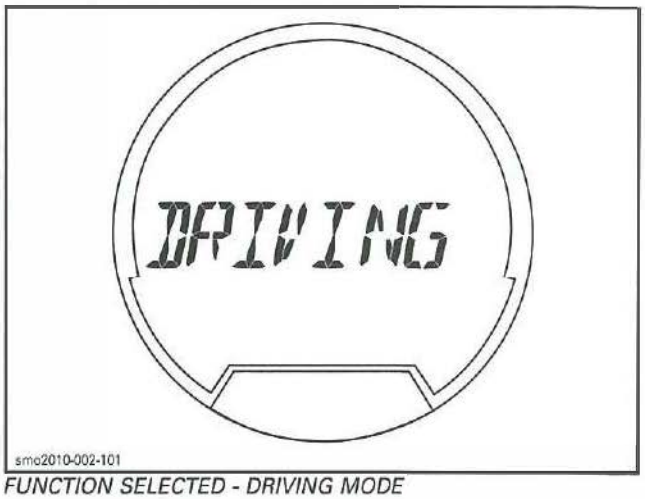
Deactivating Sport Mode (Through Information Center)

To deactivate sport mode, carry out the following:

⚠ WARNING

Deactivating sport mode through the information center must only be carried out with the watercraft stopped and the engine running at idle.

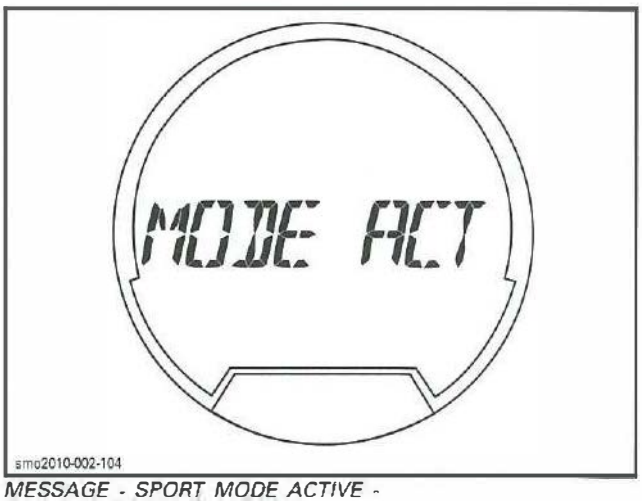
1. With the engine running at idle, press the MODE button repeatedly until DRIVING MODE scrolls across the multifunction display.



FUNCTION SELECTED - DRIVING MODE

2. Press the SET button to enter driving mode function.

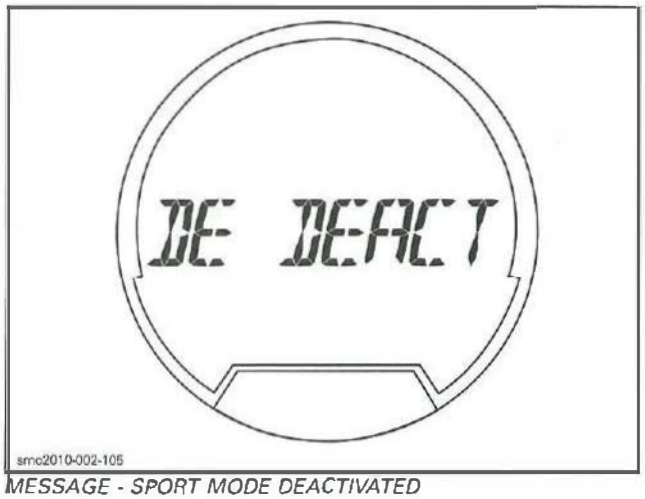
NOTE: The following message will scroll in the multifunction display SPORT MODE ACTIVE - PRESS_SET_TO_DISENGAGE.



MESSAGE - SPORT MODE ACTIVE - PRESS_SET_TO_DISENGAGE

3. Press the SET button again to disengage sport mode.

NOTE: The following message will scroll in the multifunction display SPORT MODE DEACTIVATED.



MESSAGE - SPORT MODE DEACTIVATED

NOTE: After a few seconds, the gauge will exit the function and return to its normal display.

4. Ensure the TOURING mode indicator is on.

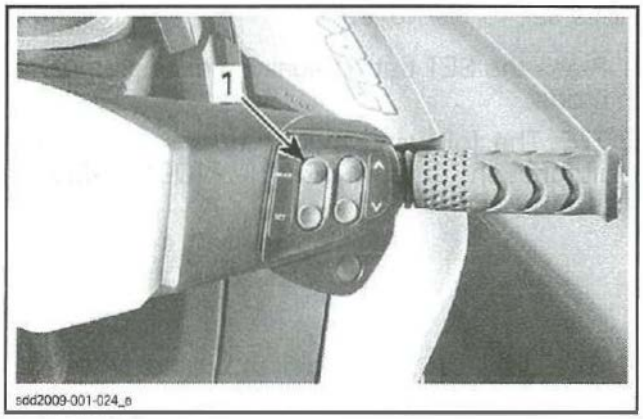


TOURING MODE INDICATOR

Eco Mode (Fuel Economy Mode)

How to Activate Fuel Economy Mode

1. Press the MODE button repeatedly until the following function appears in the multifunction display.

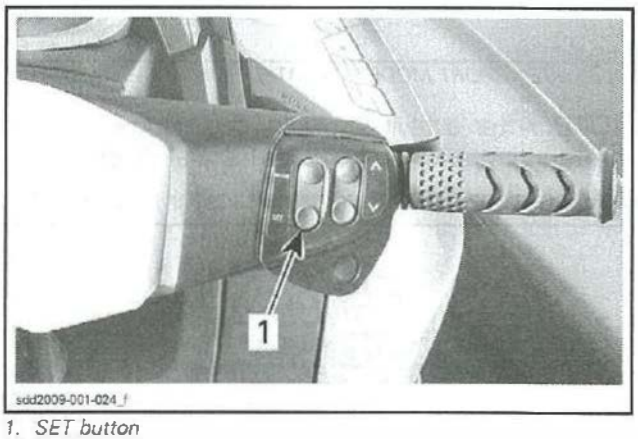


1. MODE button



FUEL ECONOMY MODE

2. Press SET button to enter the function; the following message will appear.



1. SET button

FUEL ECONOMY MODE - HOLD SET TO ACTIVATE OR MODE TO EXIT

3. Press and hold SET button to activate fuel economy mode as instructed.

Fuel economy mode activation will be indicated in the following manner:

- A flashing ECO indicator will appear next to the fuel tank symbol.
- A flashing smile will appear in the fuel tank symbol.
- The multifunction display will revert back to its previous indication.



ECO MODE INDICATORS
(Fuel Economy Mode)

How to Deactivate Fuel Economy Mode

1. Press the MODE button repeatedly until the following function appears in the multifunction display.

MULTIFUNCTION DISPLAY MESSAGE
FUEL ECONOMY MODE

2. Press SET button to enter the function; the following message will appear.

MULTIFUNCTION DISPLAY MESSAGE
FUEL ECONOMY MODE - HOLD SET TO DEACTIVATE OR MODE TO EXIT

3. Press and hold SET button to deactivate fuel economy mode as instructed.

When activated, the following will occur:
- The flashing ECO indicator will disappear.
- The flashing smile will disappear.
- The multifunction display will revert back to its previous indication.

Cruise Mode

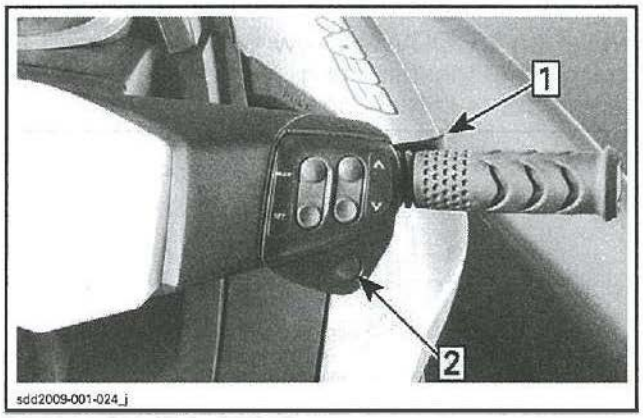
NOTE: Cruise mode is **not** available if slow speed mode, ski mode or ECO mode is engaged.

Cruise Mode Activation at Idle Speed

NOTE: This function is available up to approximately 10 km/h (6 MPH).

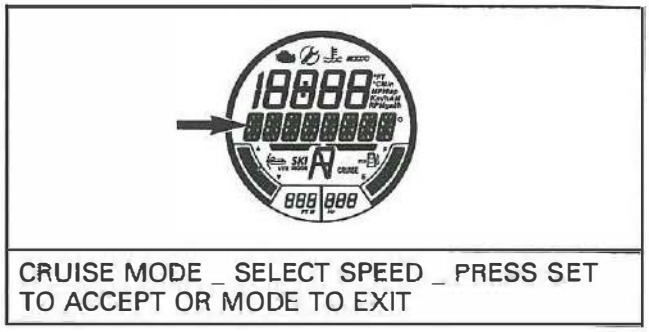
To activate and preset CRUISE MODE at idle speed, carry out the following:

1. Tap the throttle lever to move the iBR to the forward position.
2. Press and hold the cruise button.



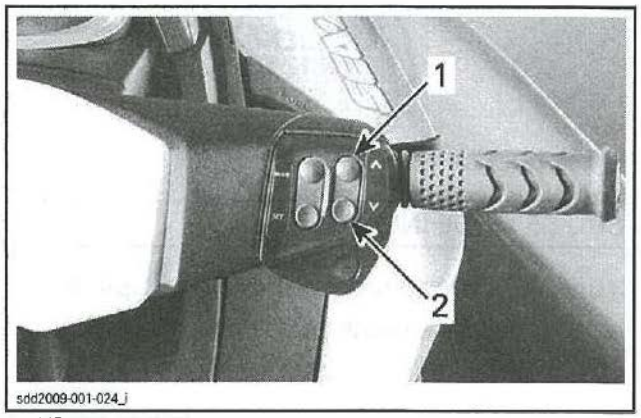
ENGAGING CRUISE AT IDLE
Step 1: Tap throttle to engage FORWARD
Step 2: Press cruise button

The following message will appear in the multifunction display.



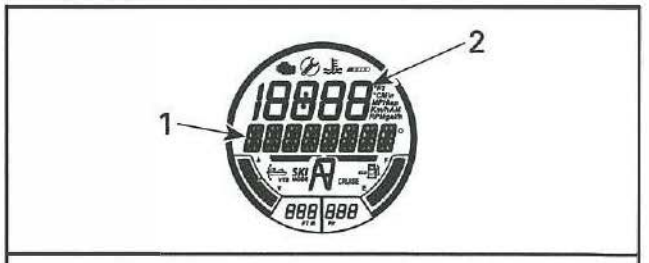
CRUISE MODE _ SELECT SPEED _ PRESS SET TO ACCEPT OR MODE TO EXIT

3. Press the UP arrow button until the desired cruise speed is indicated in the numerical display.



1. UP arrow button
2. DOWN arrow button

The following will be displayed in the multifunction gauge.



1. CRUISE MODE _ SPEED ADJUSTING 2. CRUISE SPEED SET POINT INDICATION

4. Press the SET button to save the cruise speed selected and engage cruise mode. The following scrolling message will appear in the multifunction display.



CRUISE MODE ACTIVE

A beep indicating that you are now in cruise mode will sound, and a CRUISE indicator will come on in the multifunction gauge.

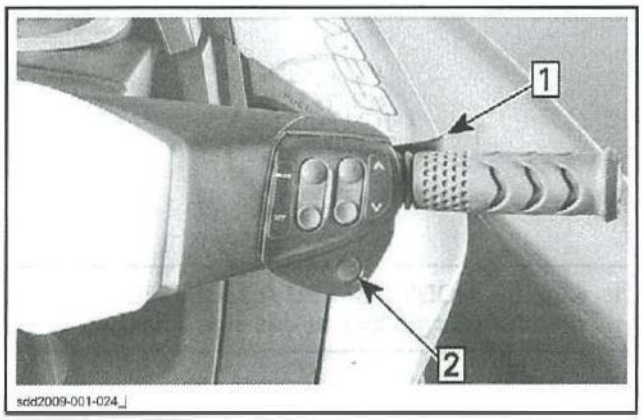


CRUISE MODE INDICATOR

Cruise Mode Activation Above Idle Speed

To activate cruise mode above idle speed (10 km/h (6 MPH)):

1. Accelerate to the desired watercraft speed and hold throttle lever steady.
2. Press and hold the cruise button for approximately 1 second.



ENGAGING CRUISE AT SPEED
Step 1: Accelerate to desired speed and hold throttle steady
Step 2: Press cruise button

A beep indicating that you are now in cruise mode will sound, and a CRUISE indicator will come on in the multifunction gauge.

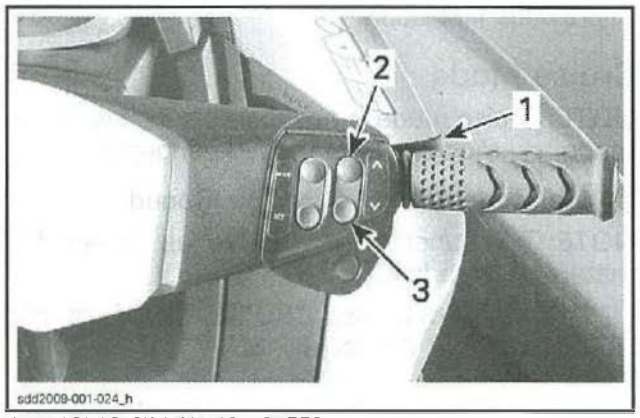


CRUISE MODE INDICATOR

Changing Set Cruise Speed

To increase or decrease the set cruise speed:

1. Hold the throttle lever all the way in to the handlebar.
2. On the RH handlebar, press UP/DOWN arrow button.



CHANGING SET CRUISE SPEED
1. Throttle lever
2. UP arrow button
3. DOWN arrow button

While the UP/DOWN arrow is being pressed to change the speed setting, the following will appear in the multifunction gauge.



1. Scrolling CRUISE MODE _ SPEED ADJUSTING message
2. Cruise speed setting indication

NOTE: Pressing the UP/DOWN arrow button repeatedly will change the cruise speed setting in single increments. Pressing and holding the button will increase or decrease the speed until the button is released.

Deactivating Cruise Mode

To deactivate cruise mode:

1. Release the throttle lever.
2. Press the cruise button.

Deactivation of cruise mode is indicated by:

- The CRUISE indicator in the multifunction display will go off.
- A BEEP will be heard.

NOTE: If the throttle lever is not fully released when the cruise button is pressed to deactivate cruise mode, the BEEP will not be heard and the cruise light will remain on. The speed limiting function of cruise mode will stay active until the throttle is fully released, then the BEEP will be heard and the cruise light will go out.

Slow Speed Mode

The operator can select an idle speed set point (slow speed) between 1 and 5 (1.6 km/h to 11 km/h (1 MPH to 7 MPH)).

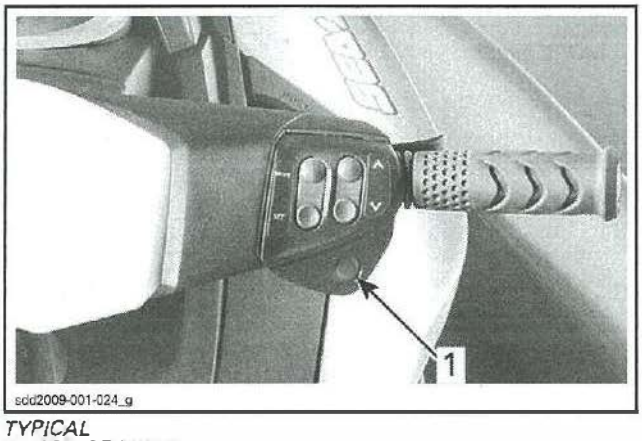
If you accelerate above approximately 14 km/h (9 MPH), Slow Speed Mode will be deactivated and the engine will return to its normal idle RPM when the throttle is released.

Should a situation arise where the operator must stop or accelerate quickly away from a hazardous situation, pull in the iBR lever, or pull in on the throttle lever to deactivate slow speed mode and regain normal control of the watercraft.

Activating Slow Speed Mode

To activate slow speed mode of operation:

1. Release the throttle lever to idle RPM.
2. Pull in and release the iBR lever to engage neutral.
3. Press and hold the CRUIDE button for approximately 1 second.



TYPICAL
1. CRUISE button

The CRUISE indicator will come on in the multifunction gauge to indicate cruise activation.



CRUISE MODE INDICATOR

A scrolling message will appear in the multifunction display to specify that slow speed mode. The default slow speed set point of 1 will also come on for a few seconds in the numerical display.



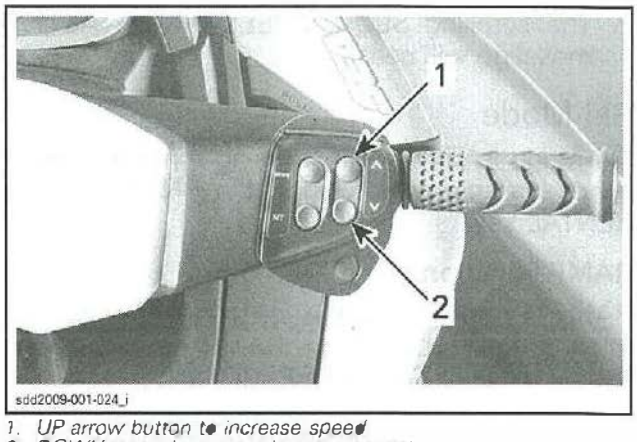
1. Scrolling SLOW SPEED MODE message
2. Slow speed set point of "1" indication

NOTE: As a reminder, the scrolling SLOW SPEED MODE message repeats itself as long as slow speed mode is active. The numerical display reverts back to the previous indication after a few seconds.

Changing Set Slow Speed

There are 5 slow speed set points available (1 through 5), 1 being the slowest.

To increase or decrease the slow speed set point, press the UP/DOWN arrow button on the RH handlebar once, or repeatedly.



1. UP arrow button to increase speed
2. DOWN arrow button to decrease speed

While the UP/DOWN arrow is being pressed to change the slow speed set point, the following will appear in the multifunction gauge.



1. SLOW SPEED MODE - SPEED ADJUSTING
2. Slow speed set point indication

The displays will revert back to their previous indication a few seconds after the last activation of the UP/DOWN arrow button.

NOTE: As a reminder, the following message will scroll across the multifunction display periodically.

MULTIFUNCTION DISPLAY MESSAGE
SLOW SPEED MODE ACTIVE

Deactivating Slow Speed Mode

Slow speed mode can be deactivated using any of the following methods:

- Pressing the cruise button
- Depressing the iBR lever
- Accelerating above the highest slow speed that can be set (approximately 14 km/h (9 MPH)).

When deactivating SLOW SPEED MODE:

- By pressing the cruise button, the iBR system maintains forward position.
- By pressing the iBR lever, the iBR system will shift to neutral position.

SLOW SPEED MODE deactivation will be indicated in the following manner:

1. The CRUISE indicator will go out
2. The scrolling SLOW SPEED MODE ACTIVE message will cease.

Ski Mode

Ski mode is only available using a normal key, it is not available when using a LEARNING key or a RENTAL key.

RAMP Function

RAMP 1 provides for the smoothest launch and most gradual acceleration. RAMP 1 also provides for the slowest TARGET SPEED range.

RAMP 5 provides for the quickest launch and most rapid acceleration. RAMP 5 also provides the highest TARGET SPEED range.

The RAMP setting that is selected by default when entering ski mode may be changed to a different setting.

TARGET SPEED Function

Once the RAMP has been selected, an average PWC target speed for that RAMP will be visible in the numerical display.

The average speed displayed and the speed range available is dependent on the RAMP selected. The higher the RAMP number, the higher the speed range.

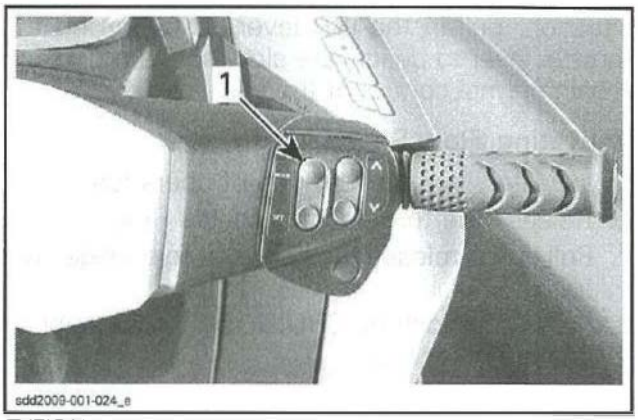
The operator may increase or decrease the target speed to any value within the selected RAMP speed range.

If the desired target speed cannot be set in the selected RAMP, you must exit and reengage SKI MODE, then select a different RAMP.

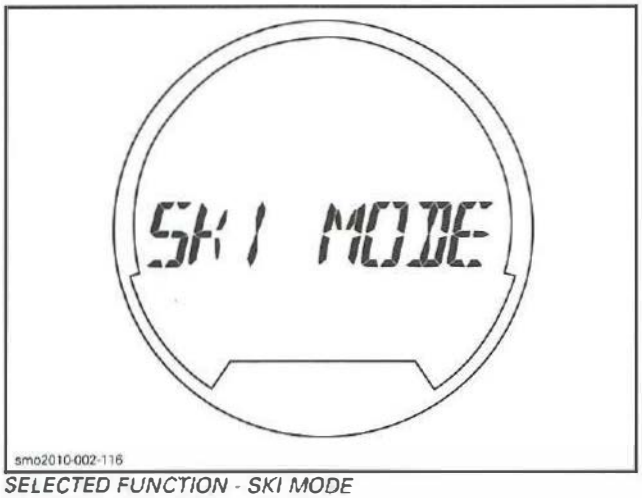
Engaging and Using Ski Mode

To engage ski mode, carry out the following steps:

1. Press the MODE button repeatedly until SKI MODE is visible in the multifunction display.

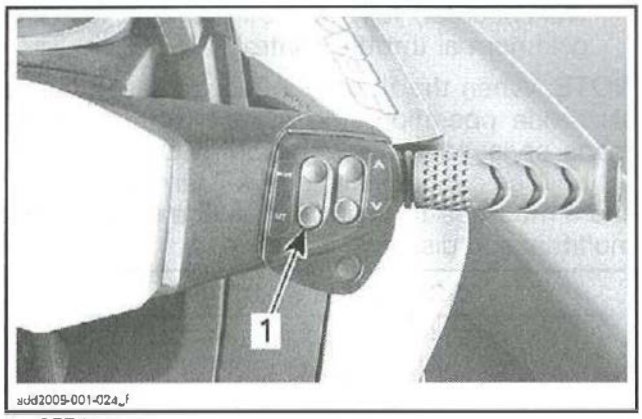


TYPICAL
1. MODE button

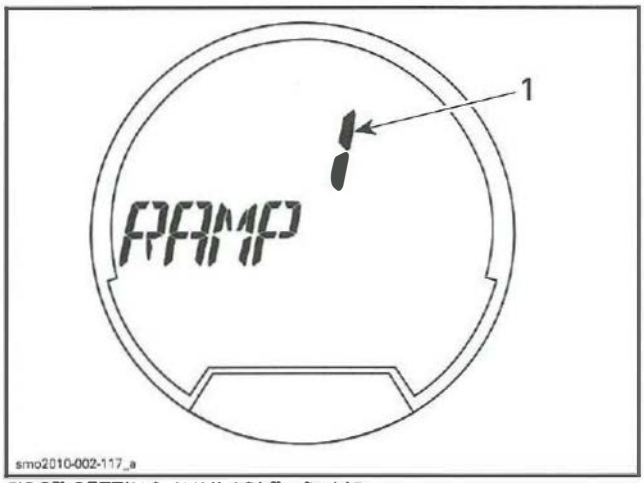


SELECTED FUNCTION - SKI MODE

2. Press SET to enter the function. The multifunction gauge message will change to RAMP. The RAMP setting number will be visible in the numerical display.



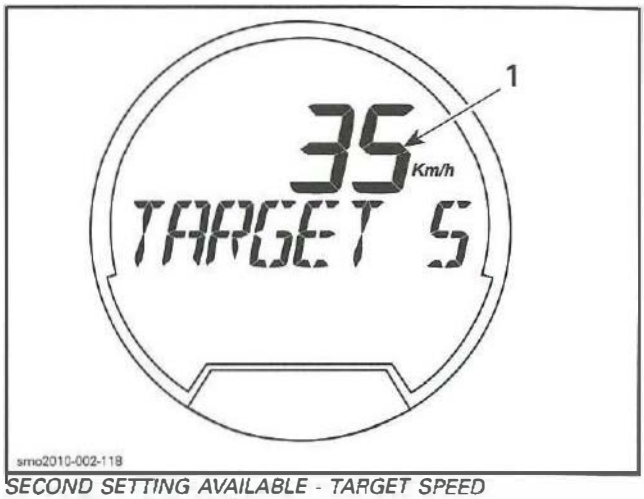
1. SET button



FIRST SETTING AVAILABLE - RAMP
1. RAMP setting

3. To change the RAMP setting, press the UP/DOWN arrow button until the desired ramp number is visible in the numerical display.

4. Press SET to lock in the ramp setting; the multifunction display will change to the TARGET SPEED setting function.



SECOND SETTING AVAILABLE - TARGET SPEED
1. TARGET SPEED setting

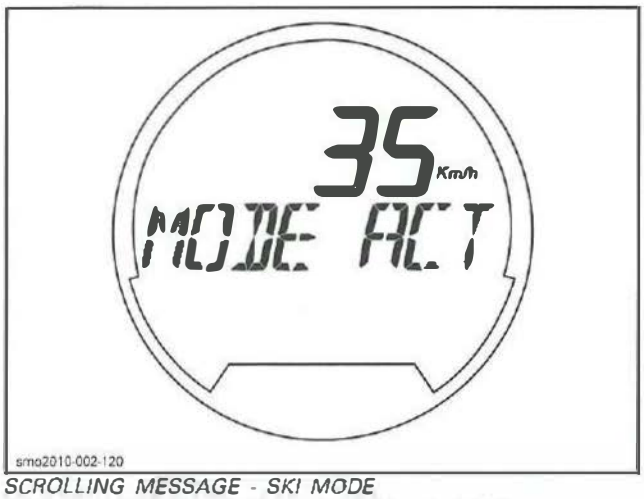
5. Press the UP/DOWN arrow button to increase or decrease the target speed.
6. Press SET to lock in the target speed; the display will switch to the following scrolling message.



SCROLLING MESSAGE - SKI MODE_PRESS_SET_TO START OR MODE TO EXIT

NOTE: A BEEP will be heard every 5 seconds as a SKI MODE engaged reminder.

7. Press SET again; the following confirmation message will appear.



SCROLLING MESSAGE - SKI MODE ACTIVE_PRESS_MODE_AND RETURN TO IDLE TO CANCEL

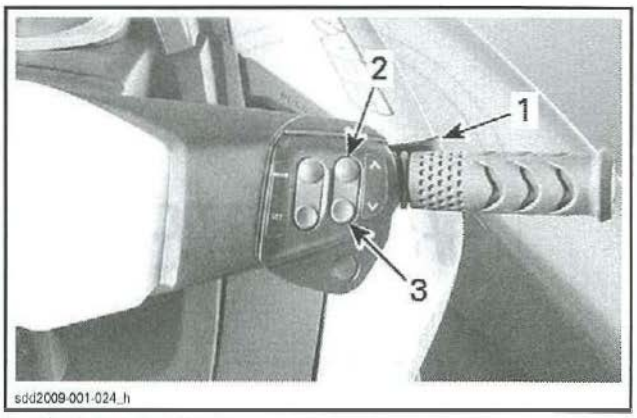
NOTE: The SKI MODE indicator will also come ON and blink when ski mode becomes active. It will be ON steady when the operator pulls and holds the throttle lever all the way in to the handlebar.



SKI MODE INDICATOR

NOTE: Ski mode cannot be engaged if the throttle is not fully released, and if CRUISE or SLOW SPEED mode is engaged. A message will appear in the multifunction display advising you of the situation. Follow the instruction in the display.

8. To launch the PWC in ski mode, pull in and hold the throttle lever all the way to the handlebar grip. The PWC will accelerate to the set TARGET SPEED and the SKI MODE indicator will be on steady.
9. To increase or decrease the TARGET SPEED during a ski run, press the UP/DOWN arrow button, do not release the throttle lever.



1. *Hold throttle lever in*
2. *Press UP arrow button to increase speed*
3. *Press DOWN arrow button to increase speed*

NOTE: If the throttle is partly released during a ski run, the SKI MODE indicator light will start to blink and the speed adjust function using the UP/DOWN arrow button will be deactivated.

10. To end a ski run or to pick up a fallen skier or wakeboarder, fully release the throttle to regain normal throttle control.

NOTE: When the throttle is fully released during ski mode operation, the system returns to ski mode engaged status. The SKI MODE indicator light will go out but, ski mode will remain engaged and a message to that effect will reappear in the multifunction display.

SCROLLING MESSAGE
SKI MODE - PRESS SET TO START OR MODE TO EXIT

11. Press SET to reactivate ski mode and fully pull in the throttle lever to start another ski run.

Deactivating Ski Mode

To exit ski mode at any given point during the ski mode setting process, press the MODE button.

To end a ski run and completely deactivate ski mode, release the throttle to idle, then press the MODE button.

Learning Key and Rental Key Modes

There are 5 speed settings available for the rental key mode, and 5 for the learning key mode. By default, the key modes are preset to the highest speed setting (5).

NOTE: Changing key settings is only available when the engine is not running.

Changing Learning or Rental Key Speed Settings

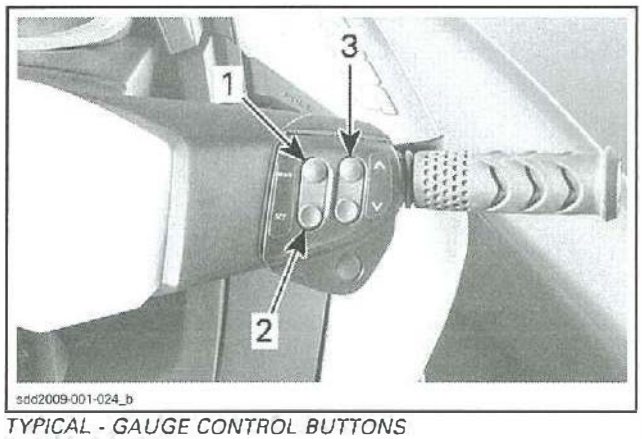
GTS Models

NOTE: The default learning or rental key setting of 5 cannot be changed on these models.

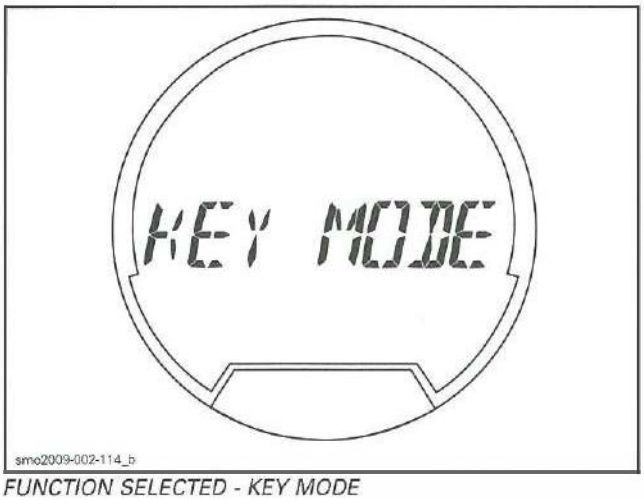
All Models Except GTS

To change learning or rental key settings, carry out the following:

1. Press the START/STOP to wake up the electrical system and install the NORMAL key on the engine cut-off switch.
2. Wait for the information center to complete its self-test and display the key recognition message.
3. Press the MODE button repeatedly until KEY MODE is visible in the digital screen of the information center.

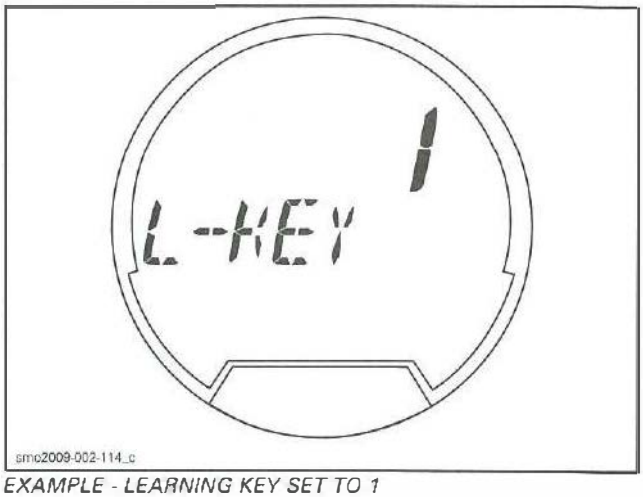


TYPICAL - GAUGE CONTROL BUTTONS
1. *MODE button*
2. *SET button*
3. *UP/DOWN arrow button*



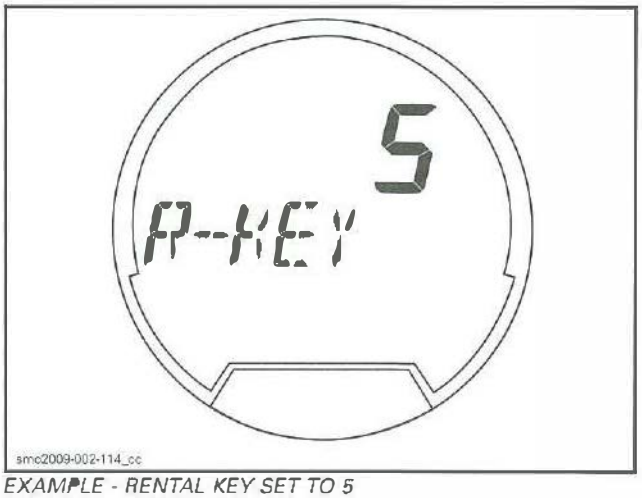
FUNCTION SELECTED - KEY MODE

4. Press the SET button once to enable learning key mode setting function. The display will change to L-Key.



EXAMPLE - LEARNING KEY SET TO 1

NOTE: Pressing the SET button twice will enable the Rental key setting function. The display will change to R-Key.



EXAMPLE - RENTAL KEY SET TO 5

5. Press the UP/DOWN arrow button to toggle the key setting between 1 and 5. See table for speed limitations according to setting.
6. Press the SET button once to save the setting, twice to exit the function, or simply wait for the function to time-out. The change in key setting will automatically be saved.

NOTE: The key speed setting is applicable to any key of the same type used on a specific watercraft. The same key type used on a different watercraft may therefore have a different key speed setting.

D.E.S.S. KEY TYPE	KEY SPEED SETTING	APPROX. MAX. SPEED
LEARNING KEY	5	58 km/h (36 MPH)
	4	55 km/h (34 MPH)
	3	50 km/h (31 MPH)
	2	47 km/h (29 MPH)
	1	42 km/h (26 MPH)
RENTAL KEY	5	74 km/h (46 MPH)
	4	69 km/h (43 MPH)
	3	63 km/h (39 MPH)
	2	58 km/h (36 MPH)
	1	51 km/h (32 MPH)

green-manuals

OPERATING MODES (RXT, GTX AND WAKE PRO SERIES)

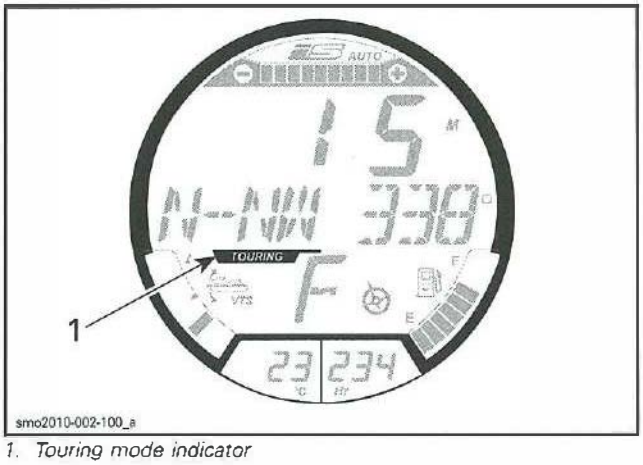
OPERATING MODE AVAILABLE	GTX LTD iS	GTX iS, RXT iS	RXT-X aS, RXT-X	WAKE PRO	GTX 215	RXT	GTX 155
Touring mode	X	X	X	X	X	X	X
Sport mode	X	X	X	X	X	X	X
ECO mode	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	X
Cruise mode	X	X	Opt	X	X	X	X
Slow speed mode	X	X	Opt	X	X	X	X
Ski mode	Opt	Opt	Opt	X	Opt	Opt	Opt
Learning and rental key modes	X	X	X	X	X	X	X

X = Indicates a standard feature
Opt = Indicates a feature available as an option
N.A. = Not Available

Touring Mode

By default, the watercraft is set to TOURING mode of operation when started.

A TOURING mode indicator is ON in the multifunction gauge to confirm the active mode of operation.

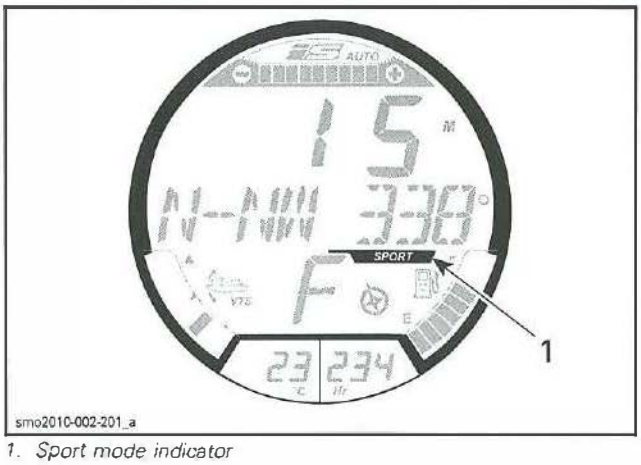


1. Touring mode indicator

Sport Mode

NOTE: If using a LEARNING or RENTAL key, sport mode of operation is not available.

A SPORT mode indicator is on in the multifunction gauge to confirm the active mode of operation.



1. Sport mode indicator

Once activated, SPORT MODE will remain active until it is deactivated by the operator, or the engine is shut down whereby it defaults back to TOURING MODE.

Activating Sport Mode (Quick Method)

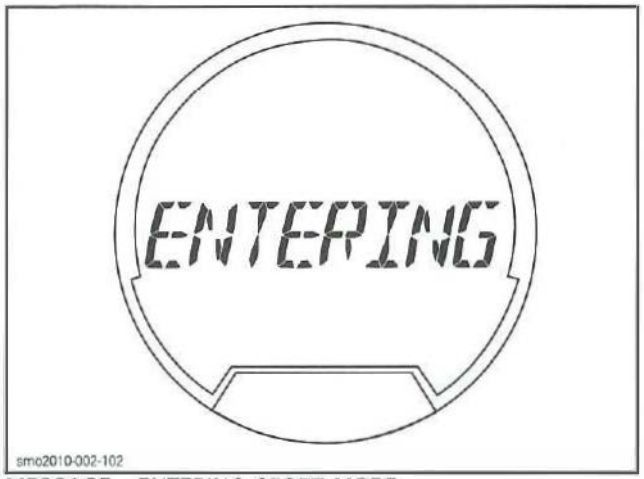
To quickly activate sport mode while riding at speed, carry out the following:

⚠ WARNING

When activating sport mode, be sure to maintain situational awareness of other watercrafts, obstacles, or persons in the water.

1. Depress and hold the SET button for at least 3 seconds.

NOTE: The following **important** message will scroll across the multifunction display: ENTERING SPORT MODE - INCREASED ACCELERATION - INSTRUCT PASSENGERS TO HOLD - PRESS_SET_BUTTON.



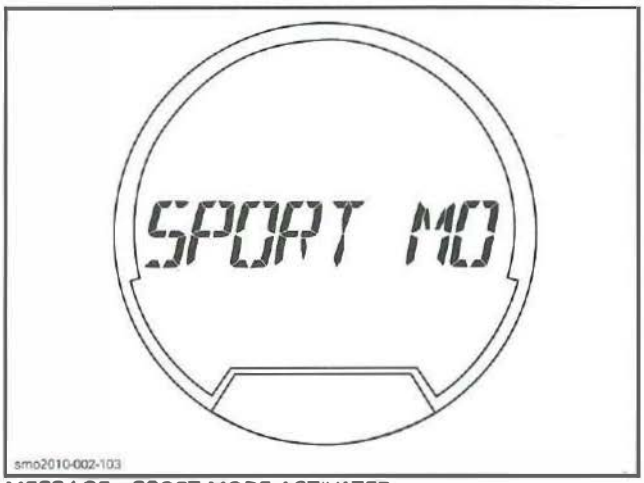
MESSAGE - ENTERING SPORT MODE - INCREASED ACCELERATION - INSTRUCT PASSENGERS TO HOLD - PRESS_SET_BUTTON

⚠ WARNING

Ensure passengers are advised that sport mode provides for increased accelerations and to hold on tightly.

2. Press the SET button again to activate sport mode.

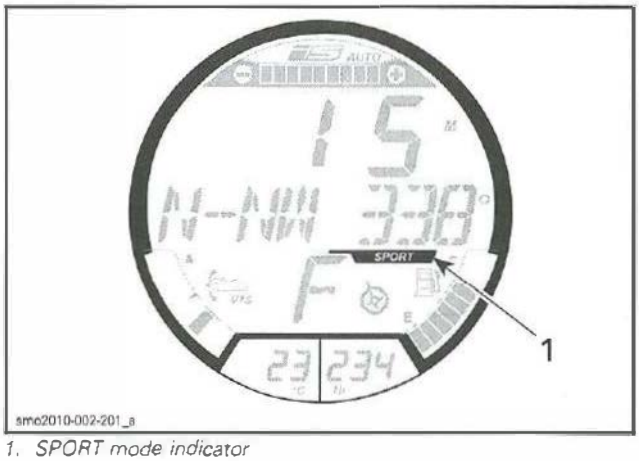
A scrolling SPORT MODE ACTIVATED message will momentarily confirm that sport mode has been activated.



MESSAGE - SPORT MODE ACTIVATED

NOTE: After a few seconds, the gauge will revert to its normal display.

3. Ensure the SPORT mode indicator is turned on.



1. SPORT mode indicator

NOTE: The SPORT mode indicator will come on and stay on as long as sport mode is active.

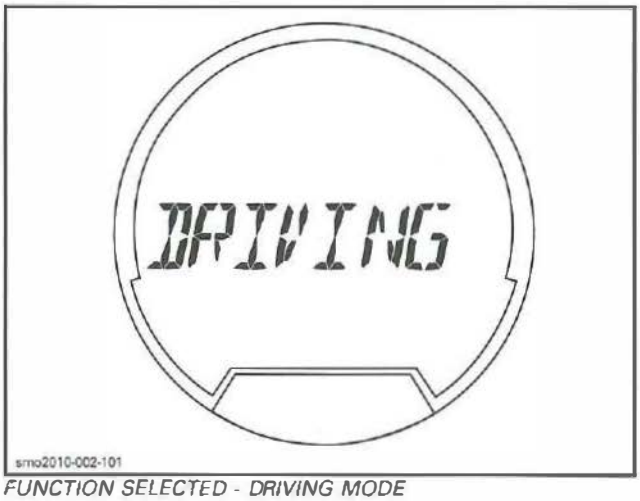
Activating Sport Mode (Through Information Center)

To activate sport mode through the gauge functions, carry out the following:

⚠ WARNING

Activating sport mode through the information center should only be carried out with the watercraft stopped and the engine running at idle. The operator must ensure to maintain situational awareness of other watercrafts, obstacles, or persons in the water.

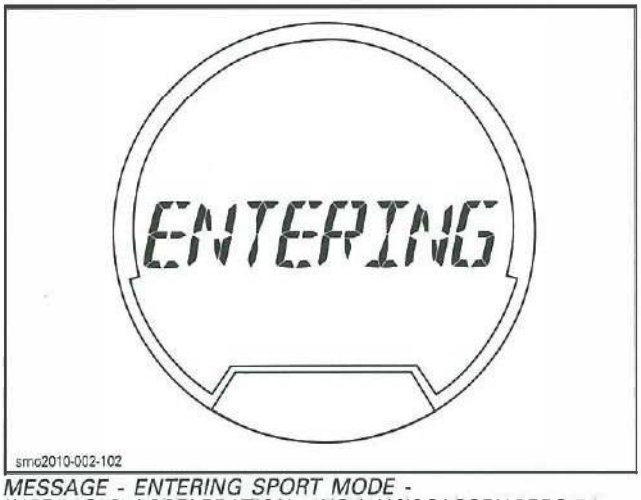
1. With the engine running at **idle**, press the MODE button repeatedly until DRIVING MODE scrolls across the multifunction display.



FUNCTION SELECTED - DRIVING MODE

2. Press the SET button to enter the driving mode function.

NOTE: The following important message will scroll across the multifunction display ENTERING SPORT MODE - INCREASED ACCELERATION - INSTRUCT PASSENGERS TO HOLD - PRESS_SET_BUTTON.



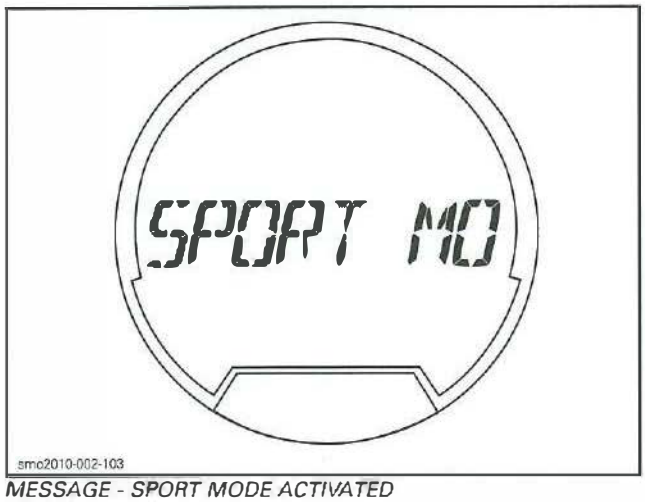
MESSAGE - ENTERING SPORT MODE - INCREASED ACCELERATION - INSTRUCT PASSENGERS TO HOLD - PRESS_SET_BUTTON

⚠ WARNING

Ensure passengers are advised that sport mode provides for increased accelerations and to hold on tightly.

3. Press the SET button again to activate sport mode.

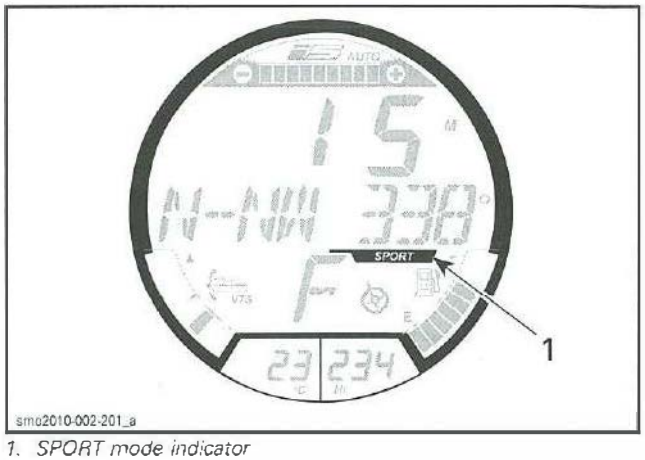
A scrolling SPORT MODE ACTIVATED message will confirm momentarily that sport mode has been activated.



MESSAGE - SPORT MODE ACTIVATED

NOTE: After a few seconds, the gauge will exit the function and return to its normal display.

4. Ensure the SPORT mode indicator is turned on.



1. SPORT mode indicator

NOTE: The SPORT mode indicator will come on and stay on as long as sport mode is active. If the engine is not at idle and sport mode cannot be activated, the following message will appear: SPORT MODE - RETURN TO IDLE TO ACTIVATE.

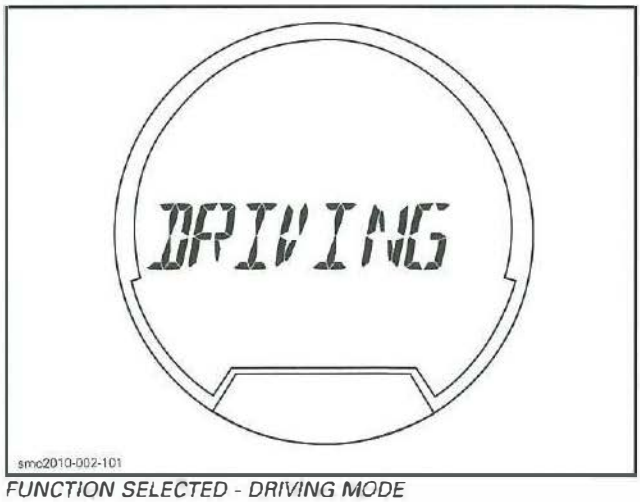
Deactivating Sport Mode (Through Information Center)

To deactivate sport mode, carry out the following:

⚠ WARNING

Deactivating sport mode through the information center must only be carried out with the watercraft stopped and the engine running at idle.

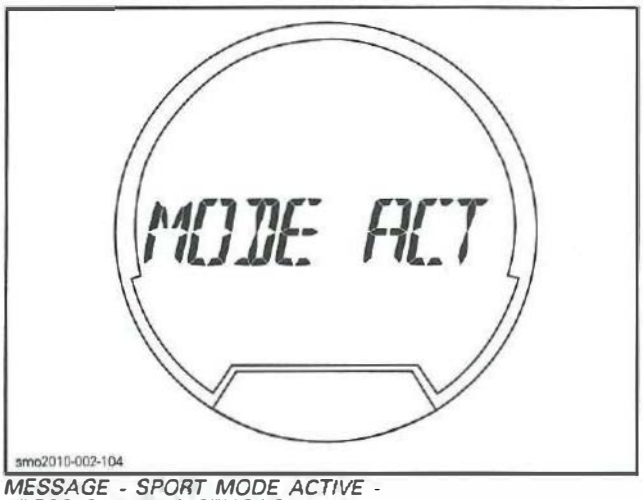
1. With the engine running at idle, press the MODE button repeatedly until DRIVING MODE scrolls across the multifunction display.



FUNCTION SELECTED - DRIVING MODE

2. Press the SET button to enter driving mode function.

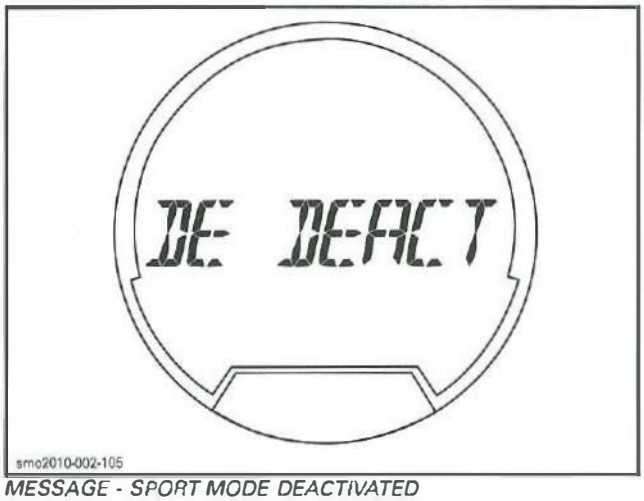
NOTE: The following message will scroll in the multifunction display SPORT MODE ACTIVE - PRESS_SET_TO_DISENGAGE.



MESSAGE - SPORT MODE ACTIVE - PRESS_SET_TO_DISENGAGE

3. Press the SET button again to disengage sport mode.

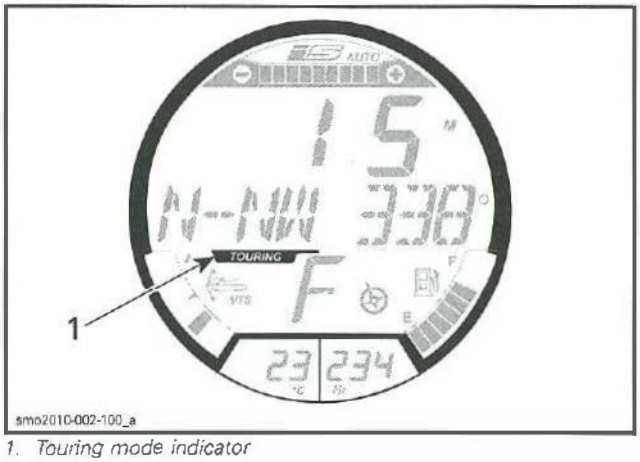
NOTE: The following message will scroll in the multifunction display SPORT MODE DEACTIVATED.



MESSAGE - SPORT MODE DEACTIVATED

NOTE: After a few seconds, the gauge will exit the function and return to its normal display.

4. Ensure the TOURING mode indicator is on.



1. Touring mode indicator

ECO Mode (Fuel Economy Mode)

How to Activate Fuel Economy Mode

1. Press the MODE button repeatedly until the following function appears in the multifunction display.

MULTIFUNCTION DISPLAY
FUEL ECONOMY MODE

2. Press SET button to enter the function, the following message will appear.

MULTIFUNCTION DISPLAY MESSAGE
FUEL ECONOMY MODE - HOLD SET TO ACTIVATE OR MODE TO EXIT

3. Press and hold SET button to activate fuel economy mode as instructed.

When activated, the following will occur:

- The multifunction display reverts back to previous indication.
- A flashing ECO indicator will appear next to the fuel tank symbol.
- A flashing smile will appear in the fuel tank symbol.

How to Deactivate Fuel Economy Mode

1. Press the MODE button repeatedly until the following function appears in the multifunction display.

MULTIFUNCTION DISPLAY MESSAGE
FUEL ECONOMY MODE

2. Press SET button to enter the function, the following message will appear.

MULTIFUNCTION DISPLAY MESSAGE
FUEL ECONOMY MODE - HOLD SET TO DEACTIVATE OR MODE TO EXIT

3. Press and hold SET button to deactivate fuel economy mode as instructed.

When activated, the following will occur:
- The multifunction display reverts back to previous indication.
- The flashing ECO indicator will disappear.
- The flashing smile will disappear.

Cruise Mode

Prerequisite for Cruise Mode Activation

GTX 155 Model

CRUISE MODE can be activated:
- At idle in forward thrust up to approximately 10 km/h (6 MPH)
- Whenever at constant speed above 10 km/h (6 MPH).

All Models except GTX 155

CRUISE MODE can be activated at a constant speed above approximately 3800 RPM.

Cruise Mode Activation at Idle Speed

GTX 155 Only

NOTE: This function is available up to approximately 10 km/h (6 MPH).

To activate and preset CRUISE MODE at idle speed in forward thrust:

1. Press and hold the cruise button until the following message appears in the multifunction display.

MULTIFUNCTION DISPLAY MESSAGE
CRUISE MODE _ SELECT SPEED _ PRESS SET TO ACCEPT OR MODE TO EXIT

2. Press the UP arrow button until the desired cruise speed is indicated in the numerical display. The following message will scroll in the multifunction display.

MULTIFUNCTION DISPLAY MESSAGE
CRUISE MODE _ SPEED ADJUSTING

3. Press the SET button to save the cruise speed selected and engage cruise speed function. The following message will scroll in the multifunction display.

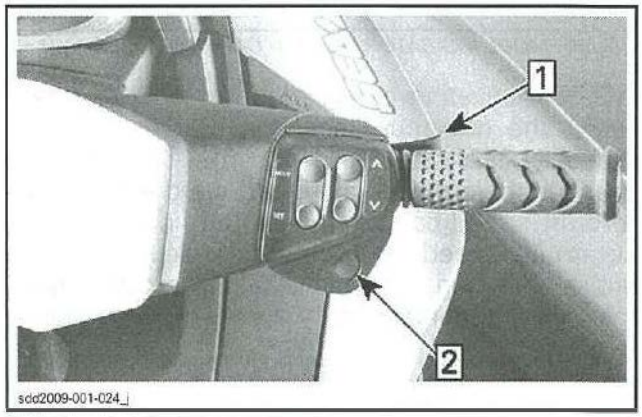
MULTIFUNCTION DISPLAY MESSAGE
CRUISE MODE ACTIVE

Cruise Mode

Cruise Mode Activation at Constant Speed

All Models

1. Accelerate to the desired watercraft speed and hold throttle steady.
2. Press and hold the cruise button for approximately 1 second.

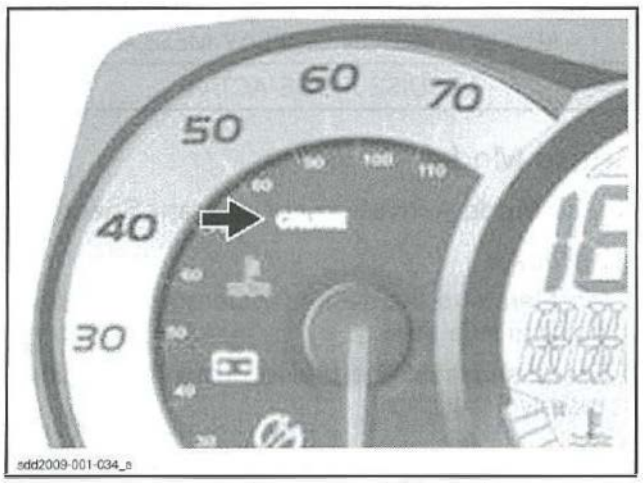


ENGAGING CRUISE AT SPEED
Step 1: Accelerate to desired speed and hold throttle steady
Step 2: Press CRUISE button

You will hear a beep indicating that you are now in cruise mode, and a green CRUISE indicator light will be lit.



CRUISE MODE INDICATOR — GTX 155



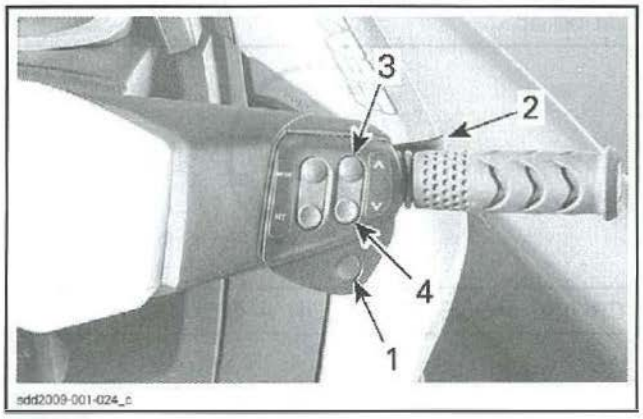
CRUISE MODE INDICATOR LIGHT — OTHER MODELS

NOTE: Activating cruise mode of operation only limits the maximum speed available when depressing the throttle lever. The throttle lever must be held in to maintain forward speed. Watercraft speed can be varied from idle up to the set cruise speed using the throttle lever once the cruise function is activated. Watercraft speed may vary depending on water conditions during use.

Changing Set Cruise Speed

To increase or decrease the set cruise speed:

1. Keep throttle lever fully depressed.
2. Press the UP/DOWN arrow button.



TYPICAL
1. *CRUISE button*
2. *Throttle lever*
3. *UP arrow button*
4. *DOWN arrow button*

MULTIFUNCTION DISPLAY MESSAGE
CRUISE MODE _ SPEED ADJUSTING

3. Press the UP/DOWN arrow button to adjust speed accordingly.

Deactivating Cruise Mode

To deactivate cruise mode:

1. Release the throttle lever.
2. Press the cruise button.

Deactivation of cruise mode is indicated by:

- The CRUISE indicator light in the speedometer display will go off.
- A BEEP will be heard.

NOTE: If the throttle lever is not fully released when the cruise button is pressed to deactivate cruise mode, the BEEP will not be heard and the cruise light will remain on. The speed limiting function of cruise mode will stay active until the throttle is fully released, then the BEEP will be heard and the cruise light will go out.

Slow Speed Mode

The operator can set idle speed between 1.6 km/h to 11 km/h (1 MPH to 7 MPH).

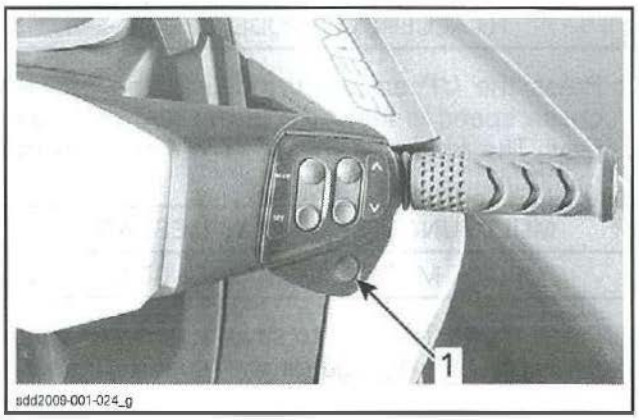
If you accelerate above approximately 14 km/h (9 MPH) , Slow Speed Mode will be deactivated and the engine will return to idle RPM when the throttle is released.

Should a situation arise where the operator must stop or accelerate quickly away from a hazardous situation, pulling in the iBR lever, or pulling in on the throttle lever will deactivate slow speed mode and normal control of the watercraft will be returned to the operator.

Activating Slow Speed Mode

To activate slow speed mode of operation:

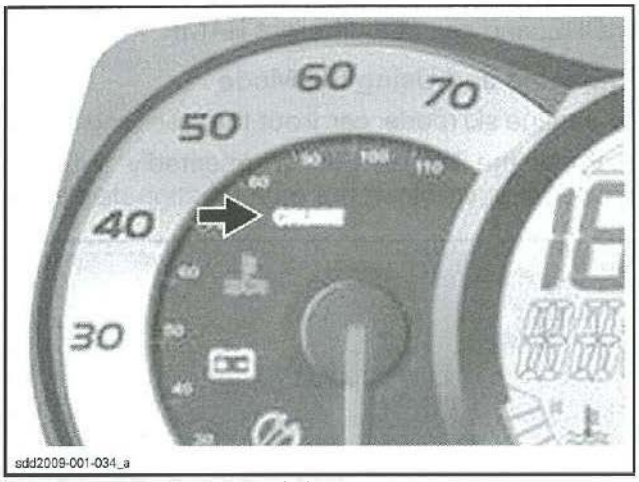
1. Release the throttle lever to idle RPM.
2. Pull in and release the iBR lever to engage neutral.
3. Press and hold the cruise button for approximately 1 second.



TYPICAL
1. *CRUISE button*

All Models Except GTX 155

The green CRUISE indicator light will come on in the speedometer or multifunction display to indicate cruise activation.



CRUISE MODE INDICATOR LIGHT

A message will scroll in the multifunction display to specify that you are now in slow speed mode.

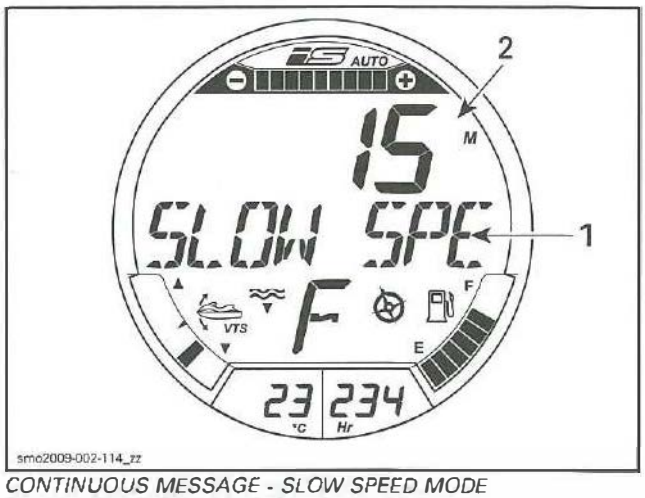
MULTIFUNCTION DISPLAY MESSAGE
SLOW SPEED MODE _ SPEED ADJUSTING

The default slow speed setting of 1 will also come on for a few seconds in the numerical display.



SLOW SPEED MODE INDICATION
1. *Scrolling SLOW SPEED MODE ACTIVATED message*
2. *The slow speed setting appears for a few seconds*

NOTE: The scrolling SLOW SPEED MODE message repeats itself as long as slow speed mode is activated. The numerical display reverts back to the previous indication after a few seconds.



CONTINUOUS MESSAGE - SLOW SPEED MODE
1. *Scrolling SLOW SPEED MODE message*
2. *Numerical display reverts to previous indication*

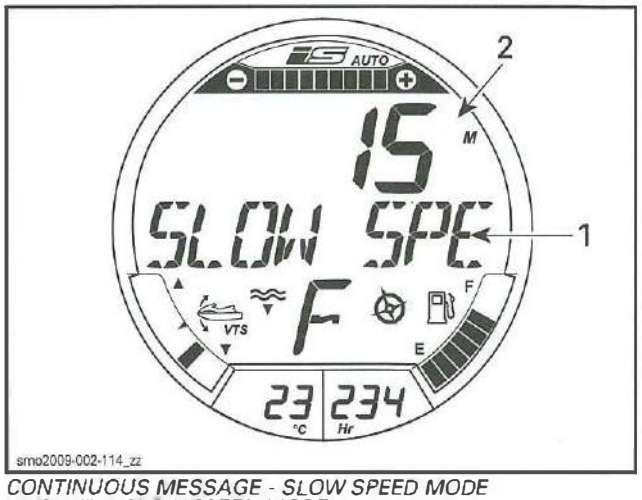
Changing Set Slow Speed

NOTE: There are 5 slow speed settings available (1 through 5). Adjust slow speed mode to desired speed.

To **increase** or **decrease** the set slow speed, press the UP/DOWN arrow button on the RH handlebar once, or repeatedly.

MULTIFUNCTION DISPLAY MESSAGE
SLOW SPEED MODE _ SPEED ADJUSTING

The setting point indication in the digital screen will come back on to indicate the slow speed setting change.



CONTINUOUS MESSAGE - SLOW SPEED MODE
1. *Scrolling SLOW SPEED MODE message*
2. *Numerical display reverts to previous indication*

The displays will revert back to their previous indication a few seconds after the last activation of the UP or DOWN arrow button.

NOTE: As a reminder, the following message will scroll across the multifunction display periodically as a reminder.

MULTIFUNCTION DISPLAY MESSAGE
SLOW SPEED MODE ACTIVE

The displays will revert back to their previous indication a few seconds after the last activation of the UP or DOWN arrow button.

Deactivating Slow Speed Mode

The slow speed mode can be deactivated using any of the following methods:

- Pressing the cruise button
- Depressing the iBR lever
- Accelerating past the set slow speed.

When deactivating SLOW SPEED MODE by pressing the cruise button, or accelerating using the throttle lever, the iBR gate stays in the forward position.

When using the iBR lever, the iBR gate will move towards the reverse position, then neutral when the lever is released.

SLOW SPEED MODE deactivation will be indicated in the following manner:

- The CRUISE indicator will go out
- The scrolling SLOW SPEED MODE ACTIVE message will cease.

Ski Mode

RAMP Function

RAMP 1 provides for the smoothest launch and most gradual acceleration. RAMP 1 also provides for the slowest TARGET SPEED range.

RAMP 5 provides for the quickest launch and most rapid acceleration. RAMP 5 also provides the highest TARGET SPEED range.

The RAMP setting that is selected by default when entering ski mode may be changed to a different setting.

TARGET SPEED Function

Once the RAMP has been selected, an average PWC target speed for that RAMP will be visible in the numerical display.

The average speed displayed and the speed range available is dependent on the RAMP selected. The higher the RAMP number, the higher the speed range.

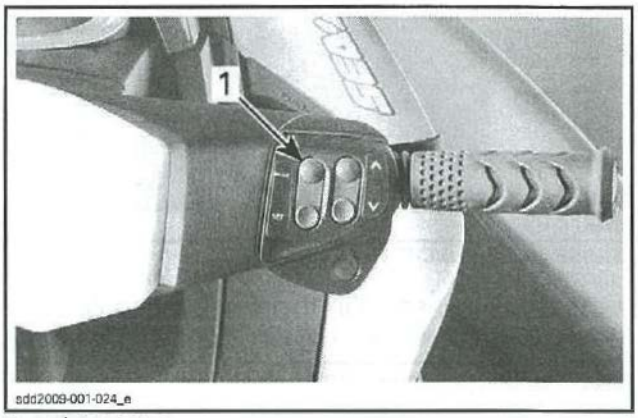
The operator may increase or decrease the target speed to any value within the selected RAMP speed range.

If the desired target speed cannot be set in the selected RAMP, you must exit then reengage SKI MODE, and select a different RAMP.

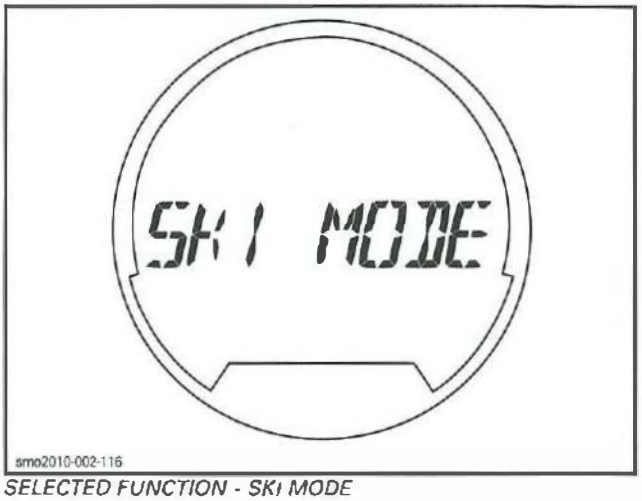
Engaging and Using Ski Mode

To engage ski mode, carry out the following steps:

1. Press the MODE button repeatedly until SKI MODE is visible in the multifunction display.

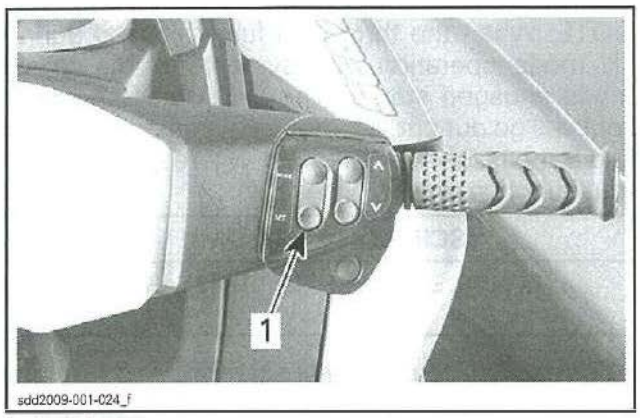


1. MODE button

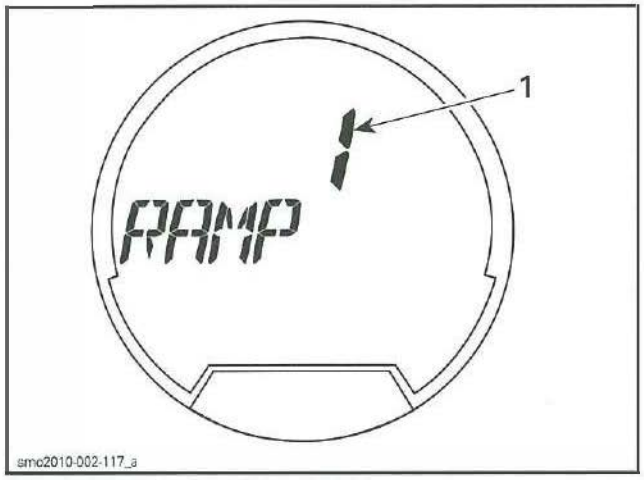


SELECTED FUNCTION - SKI MODE

2. Press SET to enter the function. The multifunction gauge message will change to RAMP. The RAMP setting number will be visible in the numerical display.

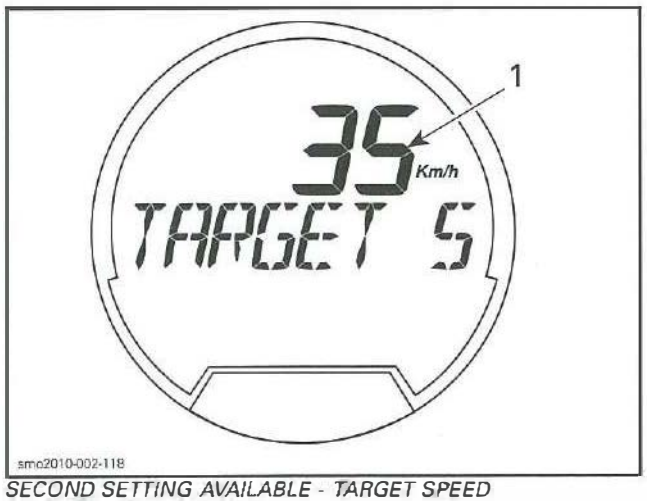


1. SET button



FIRST SETTING AVAILABLE - RAMP
1. RAMP setting

3. To change the RAMP setting, press the UP or DOWN arrow button until the desired ramp mode number is visible in the numerical display.
4. Press SET to lock in the ramp setting, the multifunction display will change to the TARGET SPEED setting function.



SECOND SETTING AVAILABLE - TARGET SPEED
1. TARGET SPEED setting

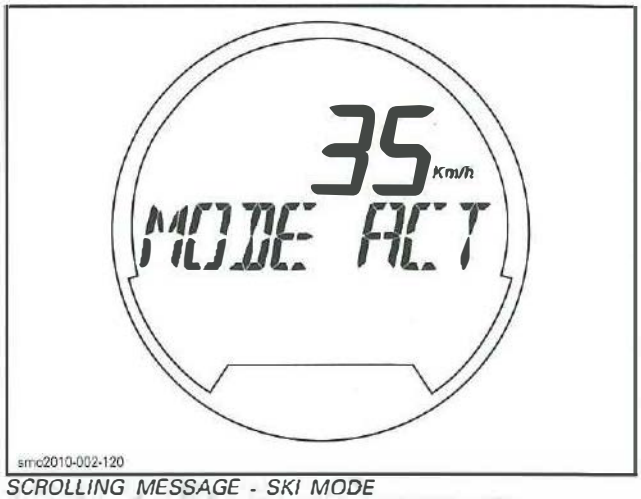
5. Press the UP or DOWN arrow button to increase or decrease the target speed.
6. Press SET to lock in the target speed, the display will switch to the following scrolling message SKI MODE - PRESS_SET_TO START OR MODE TO EXIT.



SCROLLING MESSAGE - SKI MODE_PRESS_SET_TO START OR MODE TO EXIT

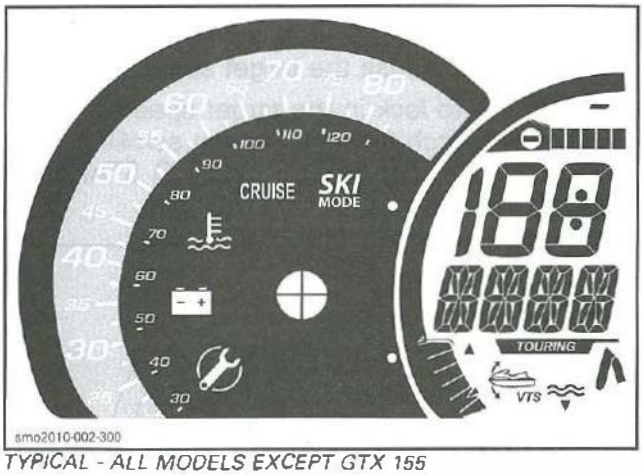
NOTE: A BEEP will be heard every 5 seconds as a SKI MODE engaged reminder.

7. Press SET again, the following confirmation message will appear SKI MODE ACTIVE - RETURN TO IDLE TO CANCEL.



SCROLLING MESSAGE - SKI MODE ACTIVE_PRESS_MODE_AND RETURN TO IDLE TO CANCEL

NOTE: The SKI MODE indicator light will also blink on the speedometer or multifunction display when ski mode becomes active.

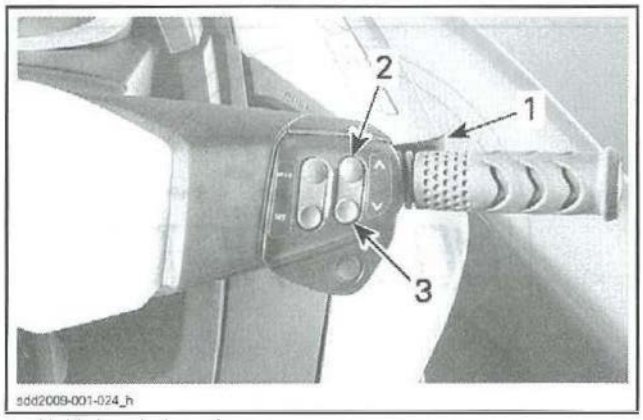


smo2010-002-300

TYPICAL - ALL MODELS EXCEPT GTX 155

NOTE: Ski mode cannot be engaged if the throttle is not fully released, and if CRUISE or SLOW SPEED mode is engaged. A message will appear in the multifunction display advising you of the situation. Follow the instruction in the display.

8. To launch the PWC in ski mode, pull in and hold the throttle lever all the way to the handlebar grip. The PWC will accelerate to the set TARGET SPEED and the SKI MODE indicator will be on steady.
9. To increase or decrease the TARGET SPEED during a ski run, press the UP or DOWN arrow button, do not release the throttle lever.



sdd2009-001-024_h

1. Hold throttle lever in
2. Press UP arrow button to increase speed
3. Press DOWN arrow button to increase speed

MULTIFUNCTION DISPLAY MESSAGE
SKI MODE - SPEED ADJUSTING

NOTE: If the throttle is partly released during a ski run, the SKI MODE indicator light will start to blink and the speed adjust function using the UP or DOWN arrow button will be deactivated.

10. To end a ski run or to pick up a fallen skier or wakeboarder, fully release the throttle to regain normal throttle control.

NOTE: When the throttle is fully released during ski mode operation, the system returns to ski mode engaged status. The SKI MODE indicator light will go out but, ski mode will remain engaged and a message to that effect will reappear in the multifunction display.

SCROLLING MESSAGE
SKI MODE - PRESS SET TO START OR MODE TO EXIT

11. Press SET to reactivate ski mode and fully pull in the throttle lever to start another ski run.

Deactivating Ski Mode

To exit ski mode at any given point during the ski mode setting process, press the MODE button.

To end a ski run and completely deactivate ski mode, release the throttle to idle, then press the MODE button.

Learning Key and Rental Key Modes

There are 5 speed settings available for each learning and rental modes.

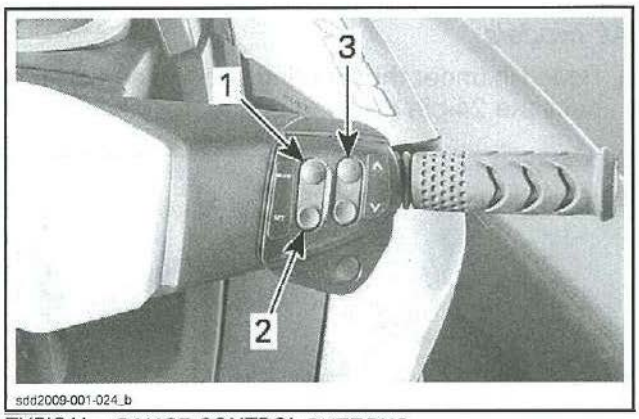
By default, the speed setting is 5 (highest).

Changing Learning or Rental Key Speed Settings

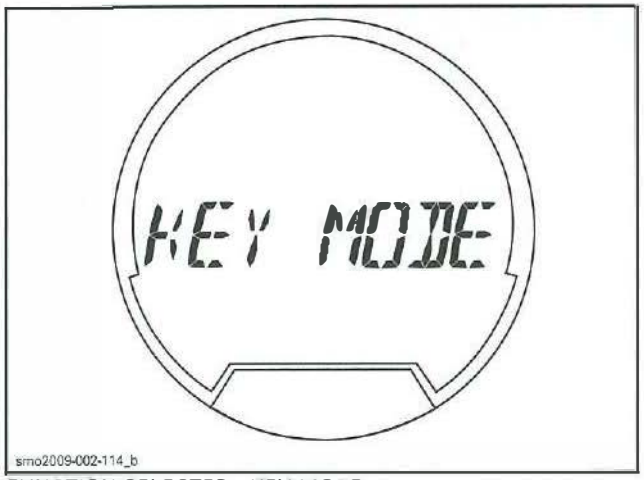
NOTE: Changing key settings is only available when the engine is not running.

To change learning or rental key settings, carry out the following:

1. Press the START/STOP to wake up the electrical system and install the NORMAL key on the engine cut-off switch.
2. Wait for the information center to complete its self-test and display the key recognition message.
3. Press the MODE button repeatedly until KEY MODE is visible in the digital screen of the information center.

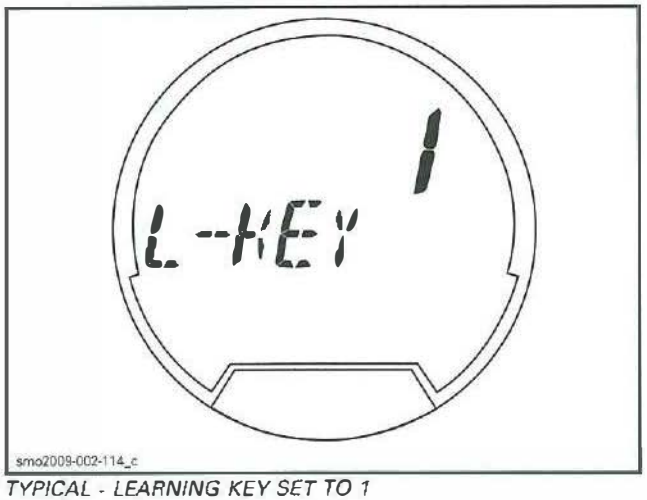


TYPICAL - GAUGE CONTROL BUTTONS
1. *MODE button*
2. *SET button*
3. *UP/DOWN arrow button*



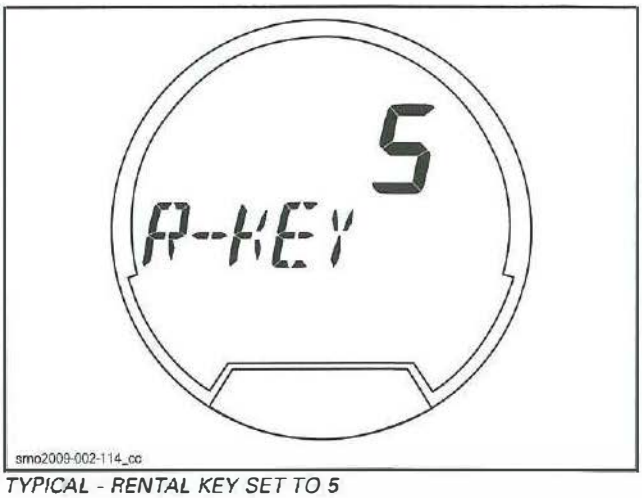
FUNCTION SELECTED - KEY MODE

4. Press the SET button once to enable learning key mode setting function. The display will change to L-Key.



TYPICAL - LEARNING KEY SET TO 1

NOTE: Pressing the SET button twice will enable the Rental key setting function. The display will change to R-Key.



TYPICAL - RENTAL KEY SET TO 5

5. Press the UP or DOWN arrow button to toggle the key setting between 1 and 5. See table for speed limitations according to setting.
6. Press the SET button once to save the setting, twice to exit the function, or simply wait for the function to time-out. The change in key setting will automatically be saved.

NOTE: The key speed setting is applicable to any key of the same type used on a specific watercraft. The same key type used on a different watercraft may therefore have a different key speed setting.

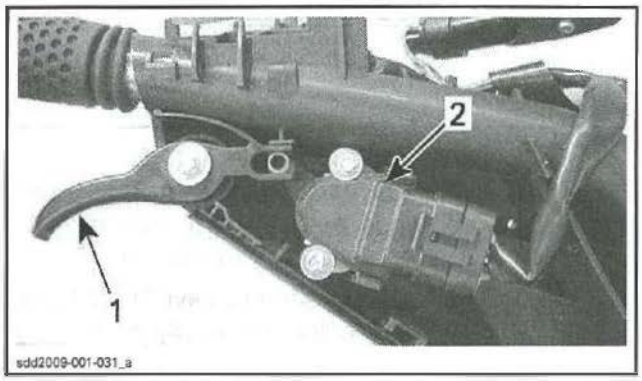
D.E.S.S. KEY TYPE	KEY SPEED SETTING	APPROX. MAX. SPEED
LEARNING KEY	5	58 km/h (36 MPH)
	4	55 km/h (34 MPH)
	3	50 km/h (31 MPH)
	2	47 km/h (29 MPH)
	1	42 km/h (26 MPH)
RENTAL KEY	5	74 km/h (46 MPH)
	4	69 km/h (43 MPH)
	3	63 km/h (39 MPH)
	2	58 km/h (36 MPH)
	1	51 km/h (32 MPH)

PROCEDURES

THROTTLE ACCELERATOR SENSOR (TAS)

General

The throttle accelerator sensor (TAS) is a double hall effect sensor that sends a signal to the ECM which is proportional to the throttle lever angle.



1. *Throttle lever*
2. *Throttle accelerator sensor (TAS)*

First ensure the throttle lever functions adequately. Pull the throttle lever fully in towards the handlebar, then release it. It must reach the wide open position and return to the idle position freely when released. Otherwise, refer to *STEERING SYSTEM* for an inspection.

TAS Voltage Test

Check the voltage of the throttle accelerator sensor as follows.

1. Open the front storage cover and remove the storage bin.

iS Models

2. Lift suspension using the iS UP button to gain access.

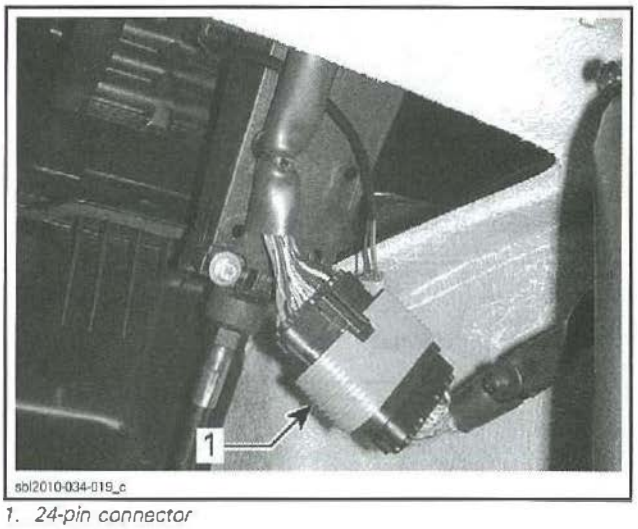
NOTE: If more height is required or if the iS cannot be used, manually lift suspension by the anchor points close to handlebar and safely lock in this position. Do not lift the watercraft from the anchor points.

Models Without iS

3. As applicable, disconnect the top of the 2 front air ventilation hoses for ease of access to steering connector. Refer to *BODY* subsection.
4. As applicable, remove vertical panel in front storage compartment.

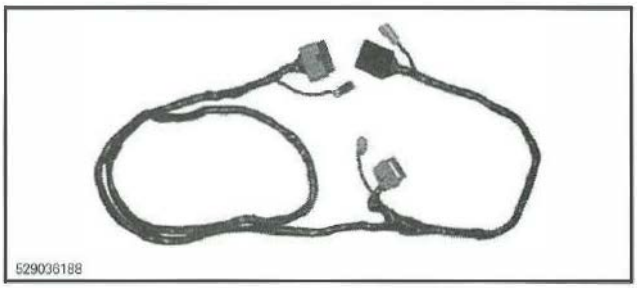
All Models

5. Reach in under the steering support and disconnect the 24-pin steering connector.



1. *24-pin connector*

6. Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) to make an in-line connection between the disconnected connectors.



NOTE: Use only the 24 pin connectors.

7. Install the tether cord on the engine cut-off switch.
8. Briefly press the START button to wake up the ECM.
9. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Vdc.
10. Measure the voltage readings on the installed diagnostic harness connector as follows. Refer to wiring diagram for details.

24-PIN CONNECTOR		IDLE POSITION	WIDE OPEN POSITION
PIN		VOLTAGE (Vdc)	
9 (VI/BU)	3 (BK)	4.9 - 5.1	
3 (BK)	6 (YL/BU)	0.15 - 0.35	1.4 - 1.6
10 (VI/GN)	4 (BK)	4.9 - 5.1	
4 (BK)	7 (YL/GN)	0.4 - 0.6	2.9 - 3.1

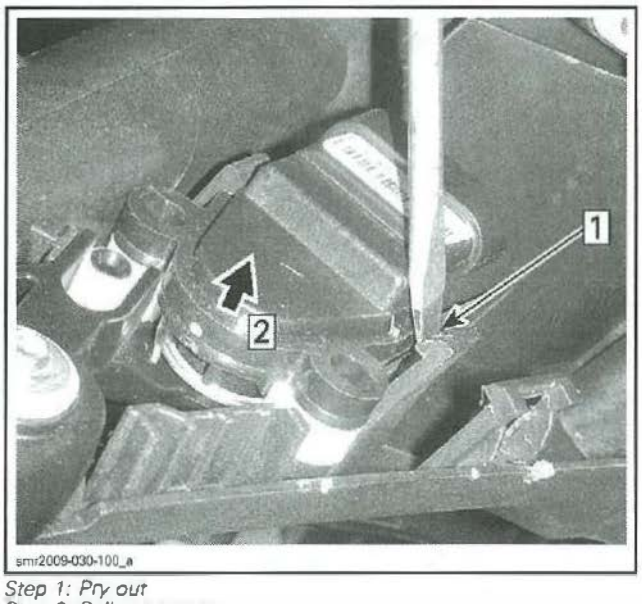
If voltage is as per specification, the TAS sensor is functional.

If voltage is out of specification, check continuity of wires between the ECM and the sensor. If continuity is good, replace sensor.

11. Reinstall removed components.

TAS Replacement (Except X Package)

1. Remove steering cover. Refer to *STEERING SYSTEM*.
2. Pry out sensor locking tabs and pull out sensor.



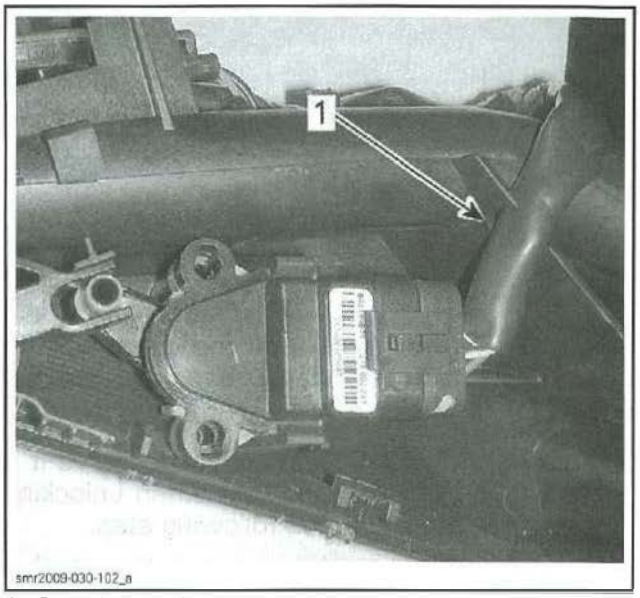
Step 1: Pry out
Step 2: Pull out sensor

3. Pull up on the connector end of the TAS and gently pull it out of the throttle handle.
4. Remove connector from TAS sensor.
5. For installation, reverse the removal procedure. Pay attention to the following.
6. Align sensor pins in their holes.



1. Align pin into hole

7. Press sensor into position until locking tabs engage. Ensure it is properly locked in place.
8. Route harness through the notched bracket.



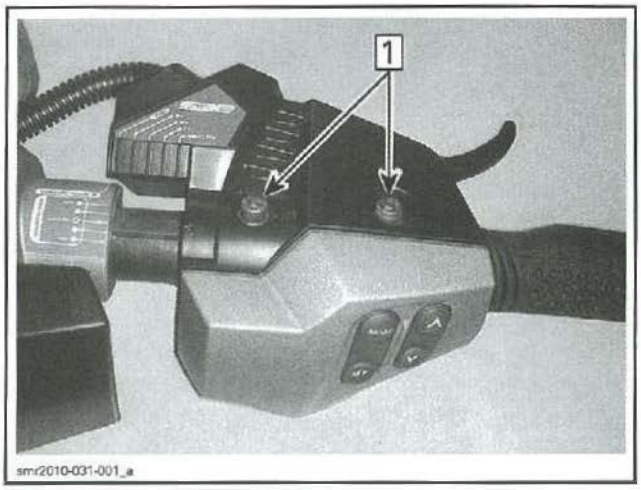
1. Route harness here

9. When installation is complete, ensure throttle lever functions properly.

TAS Replacement (X Package Only)

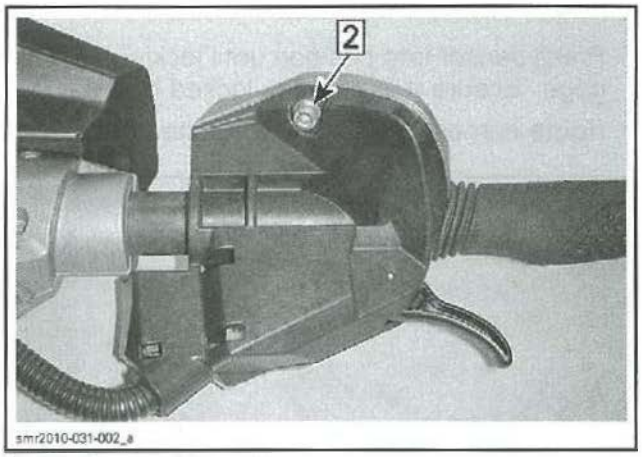
TAS Removal

1. Remove the 2 screws in the front of the upper handlebar housing.



Step 1: Remove these two screws

2. Remove the screw at back of the handlebar.

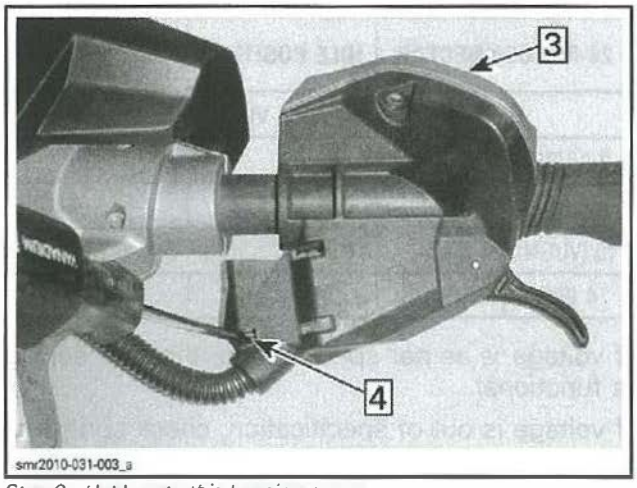


Step 2: Remove this screw

NOTICE **Do not try to pull the cover off the housing at this time or damage to the cover will occur.**

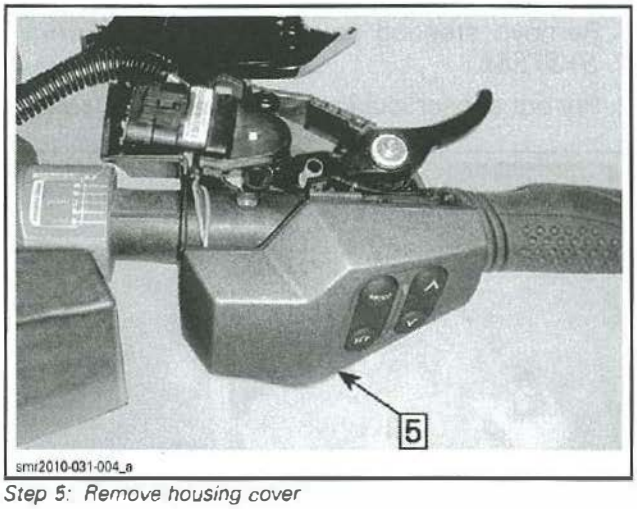
3. Grab hold of the housing cover to prevent it from falling off the handlebar when unlocking the upper housing in the following step.
4. Using a small screwdriver, unlock the tab that retains the upper housing and pull the upper housing off.

NOTICE **As you remove the upper housing, hold on to the housing cover to prevent it from falling off the handlebar.**



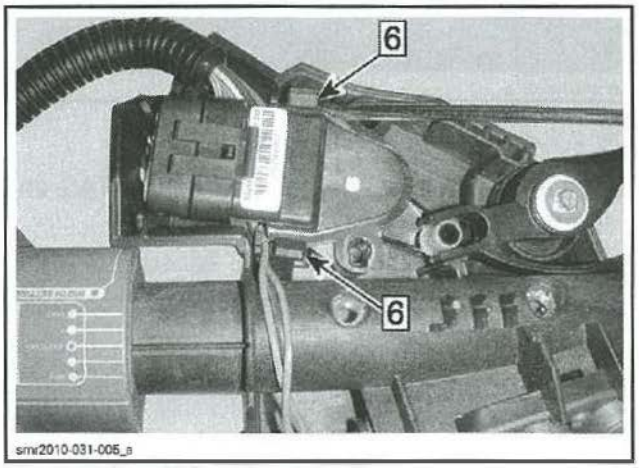
Step 3: Hold on to this housing cover
Step 4: Unlock this tab

5. Remove the housing cover from the handlebar.



Step 5: Remove housing cover

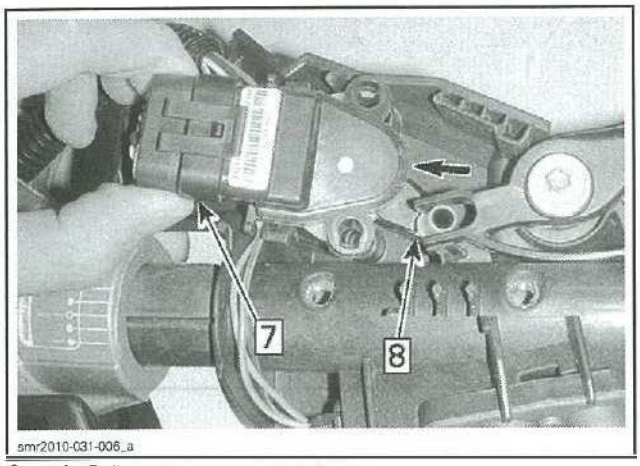
6. Release the two tabs that retain the TAS in the handlebar housing.



Step 6: Release TAS retaining tabs (2)

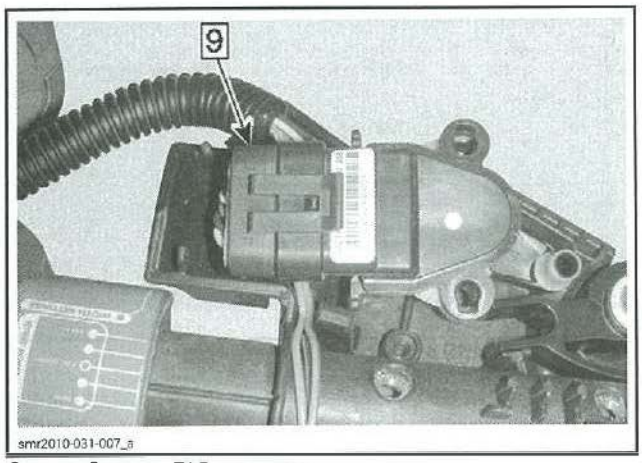
7. Pull up on the connector end of the TAS.

8. Gently pull TAS out of the throttle handle.



Step 7: Pull up at connector end
Step 8: Pull TAS out of throttle lever here

9. Remove the connector from the TAS.

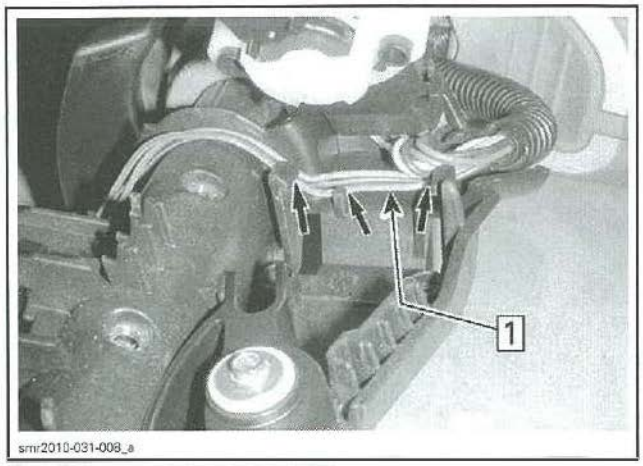


Step 9: Remove TAS connector

TAS Installation

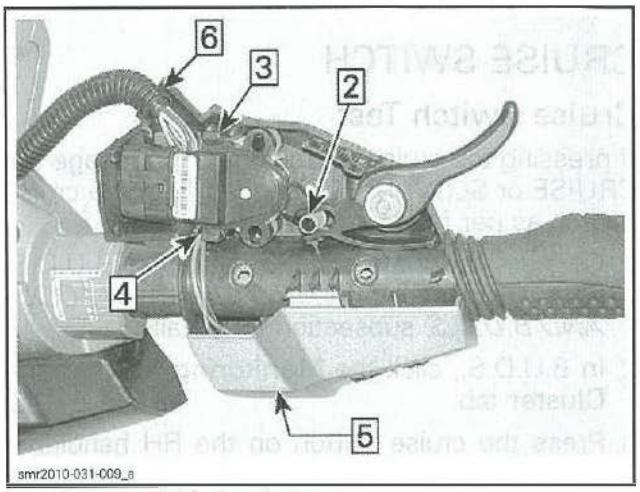
Installation is the reverse of the removal procedure however, pay attention to the following.

1. Install connector on TAS and ensure wiring is properly positioned in handlebar housing.



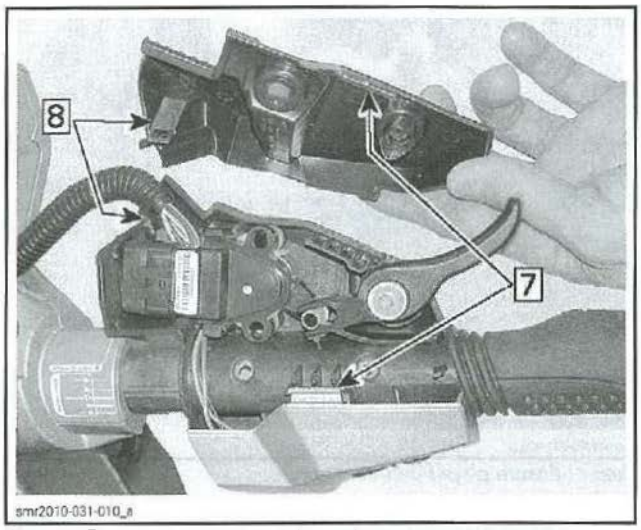
Step 1: Ensure proper wire routing

2. Insert the TAS in the throttle lever.
3. Align the TAS in the housing, then press it into the housing until both locking tabs engage. Ensure it is properly locked in place.
4. Ensure wiring is not pinched.
5. Position the housing cover onto the handlebar housing.
6. Ensure positioning of corrugated conduit.



Step 2: Insert TAS in throttle lever
Step 3: Ensure locking tab engagement
Step 4: Ensure wiring is not pinched
Step 5: Install housing cover
Step 6: Ensure proper corrugated conduit positioning

7. Position the upper housing on the handlebar housing.
8. Ensure proper engagement of the upper housing and cover tabs.



Step 7: Ensure engagement of housing cover retaining tabs
Step 8: Ensure engagement of upper housing locking tabs

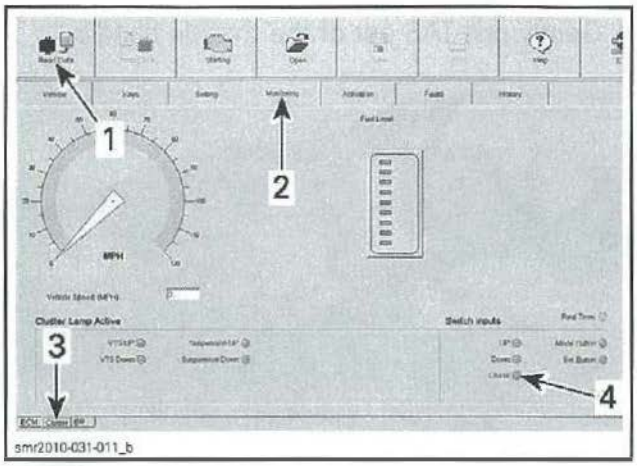
9. Install the three retaining screws for the upper housing and torque them to 2 N•m (18 lbf•**in**).
10. Ensure there are no fault codes. Connect watercraft to the latest B.U.D.S. software, refer to *DIAGNOSTIC AND FAULT CODES*.
11. Ensure proper operation of throttle lever and TAS with engine running.

CRUISE SWITCH

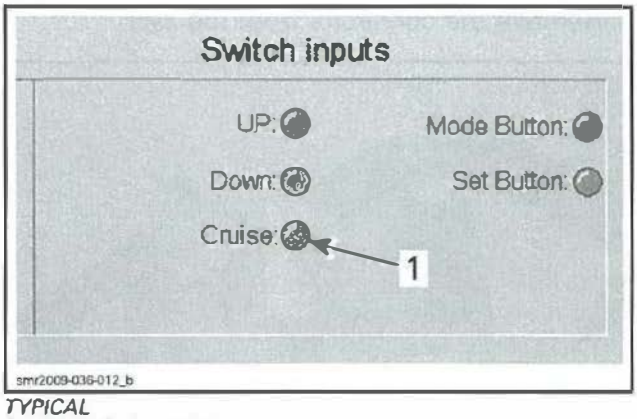
Cruise Switch Test

If pressing the cruise switch does not engage the CRUISE or SLOW SPEED modes, test the cruise switch as per following procedure.

1. Connect the watercraft to the latest B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection for details.
2. In B.U.D.S., click the **Monitoring** tab then the **Cluster** tab.
3. Press the cruise button on the RH handlebar and look for the **Cruise** indicator light to come on in the **Switch inputs** area.



TYPICAL
1. Read Data
2. Monitoring tab
3. Cluster tab
4. Cruise indicator light



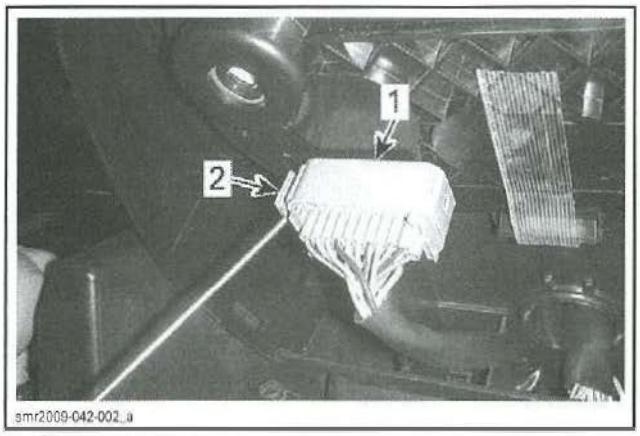
TYPICAL
1. Cruise indicator light

If the test succeeded, the switch and wiring are good and the problem may be related to the information center or ECM. Check for related fault codes. Refer to *DIAGNOSTIC AND FAULT CODES*.

If the test failed, test the switch and wiring as described in the following steps.

4. Remove the gauge support cover. Refer to *GAUGE* subsection.
5. Disconnect the gauge connector.

NOTICE Pull connector lock out sideways. Do not twist the screwdriver.



1. *Gauge connector*
2. *Pull out to unlock connector*

6. Use the FLUKE 115 MULTIMETER (P/N 529 035 868).
7. Select the Ω (ohm) function.
8. Test the cruise button switch as per following table.

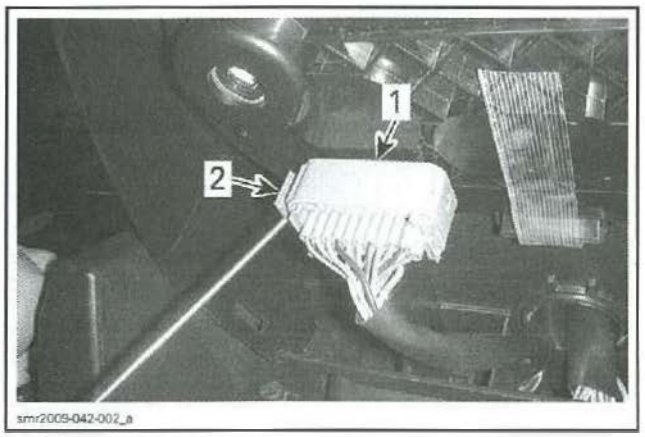
CRUISE SWITCH TEST			
GAUGE CONNECTOR		SWITCH POSITION	RESISTANCE
Pin 7	Pin 10	Switch released	OL
		Switch depressed	Close to 0 Ω

If the test failed, replace the cruise switch.

If the test succeeded, the problem may be internal to the information center. Try a new one.

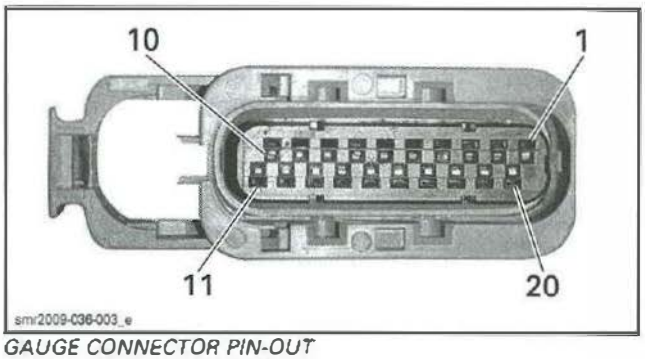
Cruise Switch Replacement

1. Disconnect information center connector.



1. *Gauge connector*
2. *Pull out to unlock connector*

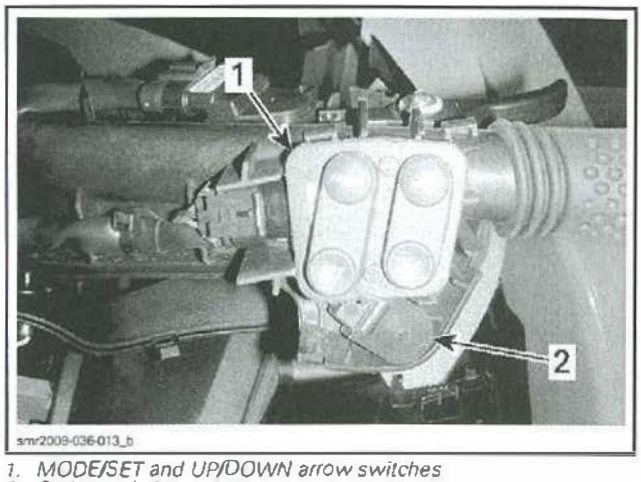
2. Remove terminal 7 (GRAY wire) and 10 (BLACK wire) from the gauge connector.



GAUGE CONNECTOR PIN-OUT

3. Attach a string approximately 1.2 m (4 ft) to the end of the wires which will be used for drawing the new switch wires through the harness protective sheath.
4. Remove steering cover. Refer to *STEERING AND O.T.A.S.* subsection.
5. Remove the MODE/SET and UP/DOWN arrow switches from its support.

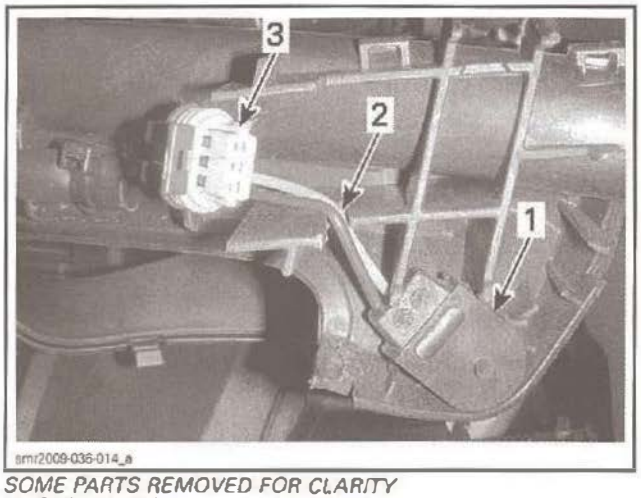
NOTE: It is not necessary to disconnect switches.



1. *MODE/SET and UP/DOWN arrow switches*
2. *Cruise switch*

6. Remove the cruise switch by lifting it off its support.
7. Cut the locking ties from the harness sheath as necessary.
8. Carefully pull the wires out of the harness. Ensure the string draws through the harness sheath.
9. Tie the string to the new cruise switch wire ends and pull the new wires through the harness.
10. Install new switch terminals in the gauge connector.
11. Apply a small amount of DIELECTRIC GREASE (P/N 293 550 004) on switch terminals.

12. Reconnect gauge connector.
13. Properly insert cruise switch wiring in slot in switch support before installing MODE/SET and UP/DOWN arrow switches.



SOME PARTS REMOVED FOR CLARITY
1. *Cruise switch*
2. *Wiring in slot*
3. *MODE/SET and UP/DOWN arrow switch connector*

14. Complete installation in reverse order of removal.

green-manuals

ELECTRONIC FUEL INJECTION (EFI)

SERVICE TOOLS

Description	Part Number	Page
DIGITAL INDUCTION TACHOMETER	529 014 500	288
ECM ADAPTER TOOL	529 036 166	292, 302, 310, 314, 316, 318, 320
FLUKE 115 MULTIMETER	529 035 868	292, 301–303, 308, 310, 312, 314, 317–318
FUEL HOSE DISCONNECT TOOL	529 036 037	297

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
FLUKE RIGID BACK PROBE	TP88	312

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	294, 298, 311, 321
LOCTITE 518	293 800 038	319

GENERAL

⚠ WARNING

Always disconnect battery prior to working on the fuel system. Always disconnect battery exactly in the specified order, BLACK (-) cable first. Electrical connections should be disconnected prior to disconnecting fuel lines.

⚠ WARNING

Fuel vapors are flammable and explosive under certain conditions. Ensure work area is well ventilated. Do not smoke or allow open flames or sparks in the vicinity.

Use B.U.D.S. software to release the fuel pressure in the system prior to disconnecting a fuel line. Refer to *FUEL TANK AND FUEL PUMP* subsection

Cover the fuel line connection with an absorbent shop rag before disconnecting them. Slowly disconnect the fuel hose to minimize spilling.

⚠ WARNING

Fuel lines remain under pressure at all times. Always proceed with care and use appropriate safety equipment when working on a pressurized fuel system. Wear safety glasses. Do not allow fuel to spill on hot engine parts and/or on electrical connectors. Proceed with care when removing or installing high pressure test equipment, or disconnecting fuel line connections. Wipe off any fuel spillage in the bilge. Never use a hose pincher on high pressure hoses.

When the repair is completed, ensure the hose from the fuel rail to the fuel pump is properly connected and secured in its support. Perform the *FUEL SYSTEM HIGH PRESSURE LEAK TEST* as described in *FUEL TANK AND FUEL PUMP* subsection.

⚠ WARNING

Always perform the fuel system high pressure leak test if any component has been removed or disconnected.

⚠ WARNING

If a gasoline leak and/or odor is present, do not start the engine. Repair the leak.

SYSTEM DESCRIPTION

The electronic fuel injection system (EFI) on this engine is based on the open-loop Bosch ME-Motronic system. It is comprised of various sensors used for detecting ongoing operating conditions of the engine and watercraft, and includes all the actuators that perform the required adjustment to the engine.

This system also introduces torque management functions.

Electrical System

ECM (Electronic Control Module)

From input signals (e.g. throttle lever, iBR lever), the ECM acknowledges driver demands and converts them to an engine torque requirement through calculation of several variables. Then, the ECM controls the iTC (intelligent Throttle Control), the injection system and the ignition system to meet the torque requirement.

The ECM manages the engine torque requirements and controls engine operation to ensure it is delivering optimum performance, fuel economy and meeting emission regulations. The ECM also controls idle speed and limits maximum engine speed.

Since the ECM manages several torque requirements at the same time including contradictory demands (such as the throttle lever and the iBR lever being fully pulled in at the same time), it must prioritize the most important requirement according to predefined conditions and apply the proper action.

EFI Sensors

The ECM reads the inputs from the sensors which it compares to predetermined parameters stored in the ECM, makes computations, and activates the outputs accordingly (injectors, ignition coils etc.).

Signals from sensors are used by the ECM to determine the injection and ignition parameters (referenced to fuel and ignition maps) as required to maintain the optimum air-fuel ratio.

Air Induction

Throttle Body

A 62 mm throttle body is mounted on the intake manifold.

Air for combustion is drawn in by the engine or by a mechanically-driven supercharger. The air flows through the throttle body and is controlled by a throttle plate.

Fitted on the throttle body, an electric throttle actuator (ETA) allows the ECM to electronically control the throttle plate opening which regulates the amount of air that enters the engine, and therefore engine speed.

There is no idle air control valve (IACV).

Fuel System

Fuel Rail

A single fuel rail is mounted on the intake manifold. The fuel rail ensures that enough fuel can be delivered to the fuel injectors throughout the engine operating range.

The fuel rail is fed by the fuel pump. The fuel pressure applied to the fuel rail is regulated by the fuel pressure regulator located in the fuel pump module.

Fuel Injectors

Three fuel injectors are used to inject fuel into the intake ports of the cylinder head. One injector is used per cylinder.

Fuel Pump

An electric fuel pump with an integrated pressure regulator is used. For more details on the fuel pump unit, refer to *FUEL TANK AND FUEL PUMP* subsection.

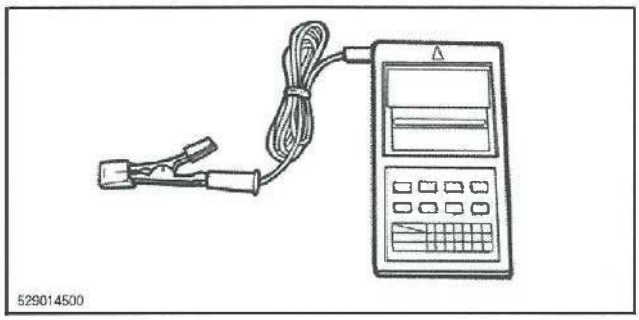
ADJUSTMENT

IDLE SPEED

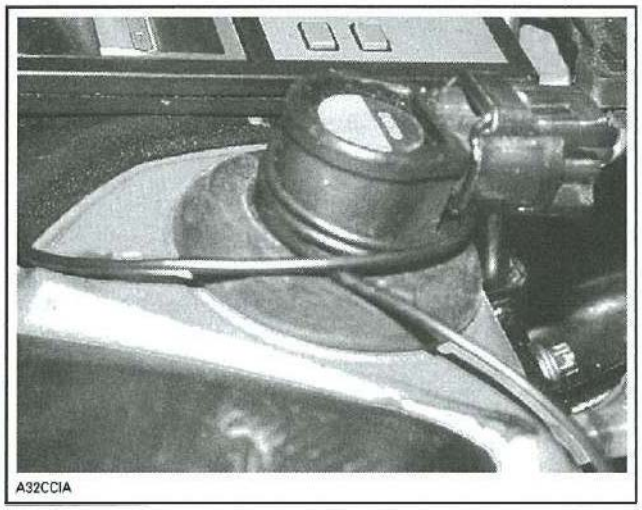
Idle speed is not adjustable. The ECM controls the idle speed of the engine through the iTC system by controlling throttle plate opening using the ETA (electric throttle actuator).

If desired, the engine RPM can be measured following this procedure:

1. Use a DIGITAL INDUCTION TACHOMETER (P/N 529 014 500).



2. Wrap the tachometer's wire a few times around the protruding part of the ignition coil.



TYPICAL

3. Start engine, read the engine RPM on the induction tachometer.

NOTE: If idle speed is not within specifications, check if there is any occurred or active fault code(s). If not, proceed with the *CLOSED THROTTLE RESET PROCEDURE*. If idle speed is still not adequate, there is probably a mechanical problem.

CLOSED THROTTLE RESET

General Information

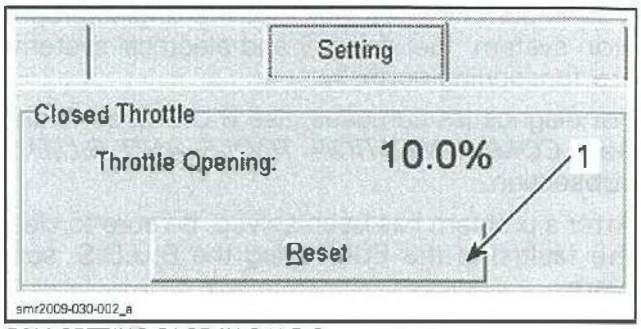
This operation performs a reset of the TPS values of the throttle body in the ECM.

Closed throttle reset must be carried out only when:

- Replacing the throttle body.
- Replacing the ECM.

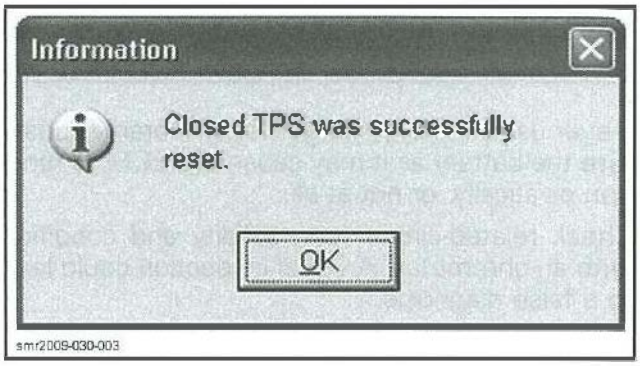
Closed Throttle Reset Procedure

1. Use the B.U.D.S. software to perform this setting. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Press the START button to wake up the ECM.
3. Install the tether cord on the engine cut-off switch.
4. In B.U.D.S., click the ECM **Setting** tab, then click on the **Reset** button.



ECM SETTING PAGE IN B.U.D.S.
1. Click Reset button

The following message will confirm the operation.



Reset is completed.

NOTE: It is not necessary to click on the Write button in B.U.D.S.

Exit B.U.D.S.

NOTE: If the throttle valve was not within the allowed range when the **Closed Throttle** reset was carried out, no error message would be displayed. However, a fault code would be set when the engine is started.

5. Start engine and make sure it operates normally through its full engine RPM range.
6. Check for fault codes using B.U.D.S. If a fault code related to the throttle actuator appears, clear it, then carry out another **Closed Throttle** reset procedure. To clear faults, refer to *DIAGNOSTIC AND FAULT CODES* subsection.

TROUBLESHOOTING

DIAGNOSTIC TIPS

Engine problems are not necessarily related to the fuel injection system.

It is important to ensure that the engine/propulsion system, fuel delivery and electrical systems are functioning normally.

For diagnostics purposes, use B.U.D.S. software. See *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

After a problem has been solved, be sure to clear the fault(s) in the ECM using the B.U.D.S. software.

⚠ WARNING

All electrical actuators and electronic modules are powered as soon as the START button is pressed. Always disconnect the battery prior to disconnecting any electrical or electronic parts.

Never use a battery charger to temporarily substitute the battery as it may cause the ECM to function erratically, or not at all.

Check related-circuit fuse solidity and condition with an ohmmeter. A visual inspection could lead to a false diagnosis.

Electrical Related Problems

It is important to check the following in the electrical system:
- Battery voltage
- Fuses
- Bus bar condition in fuse box
- Ground connections
- Wiring and connectors.

Ensure that all electronic components are genuine OEM. Any modification to the wiring harness may lead to poor system operation or generate fault codes.

Electrical Connections

Pay particular attention to ensure that terminals and pins are not out of their connectors, corroded, or out of shape.

When probing terminals, pay attention not to deform the terminals as this could cause a loose or intermittent connection that would be difficult to troubleshoot.

PROCEDURES

ENGINE CONTROL MODULE (ECM)

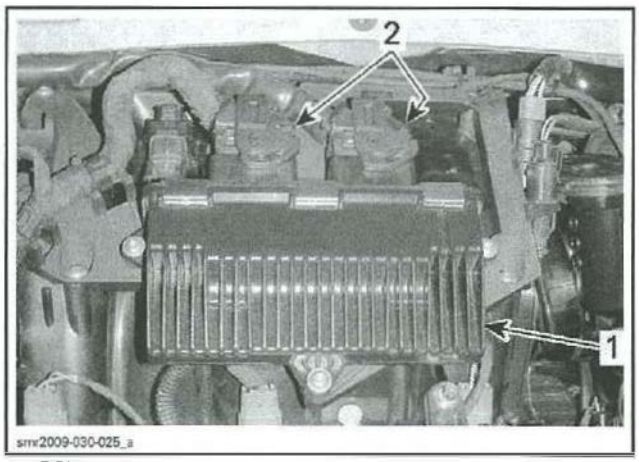
ECM Access

Open/remove seat.

iS/aS Models

1. Remove the rear ventilation box located over the engine. Refer to *AIR INTAKE SYSTEM*.
2. Remove deck extension. Refer to *BODY*.

All Models



1. ECM
2. ECM connectors

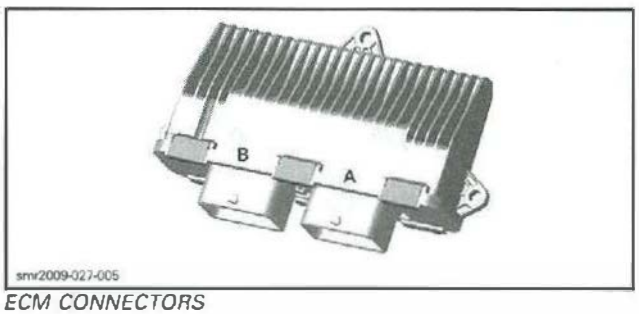
ECM Connector Identification

There are 2 connectors connected to the ECM.

The engine harness female connector is connected to the ECM module male connector "A".

The vehicle system control harness female connector is connected to the ECM module male connector "B".

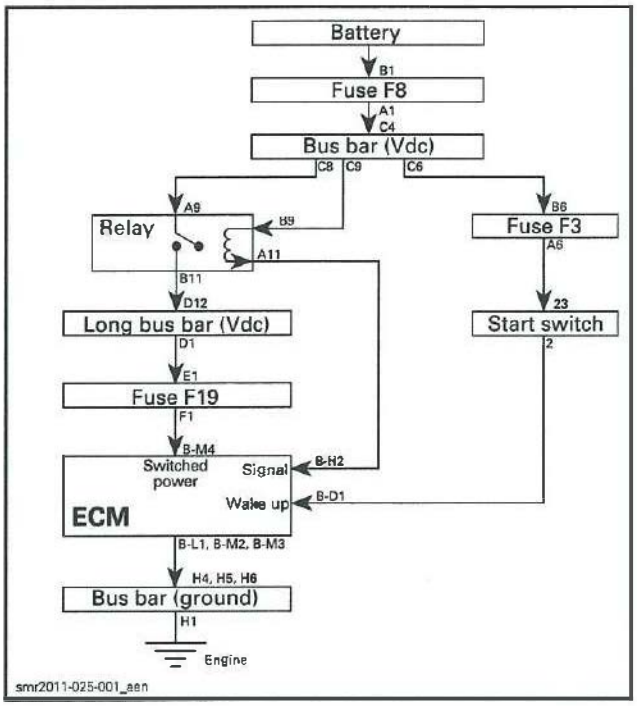
The ECM connectors have 48 pins.



ECM CONNECTORS

NOTE: For connector information, cleaning and probing, refer to *WIRING DIAGRAM* subsection.

ECM Power Supply Diagram



ECM Wake Up Validation

Press the START button.

NOTE: Do not install the tether cord.

QUICK INDICATION THAT ECM IS POWERED (assuming the observed component is working)
Information center turns on.
Fuel pump turns on for approximately 5 seconds.

NOTE: Since the tether cord is not installed, the information center will turn off a few seconds after the self-test, but the ECM and electrical system will stay powered for approximately 3 minutes longer.

If the ECM does not turn on, check the following:

- Fuses F8, F19 and F3 in fuse box
- Battery voltage. Refer to *CHARGING SYSTEM*
- The 12 Vdc power bus bars in fuse box
- The ground bus bar in fuse box
- Relay and wiring. Refer to *POWER DISTRIBUTION*
- ECM power supply wires and ground wires. See following procedure.

ECM Wake Up Logic

With Tether Cord Installed

When the START button is pressed to start engine:

- ECM pin B-D1 receives current from battery via the START switch. ECM is woken up.
- ECM pin B-H2 provides a ground to the relay coil in fuse box.
- The relay contacts close and provides main 12 Vdc power to the ECM at pin B-M4.
- The relay also powers the other components in the electrical system.
- ECM pin B-E4 monitors for a tether cord installed on the engine cut-off switch.
- When a tether cord is installed, the magnet in the tether cord cap closes the reed switches in the engine cut-off switch and the ECM pin B-F2 provides a ground. This tells the ECM the tether cord is installed.
- ECM pin B-B2 reads the D.E.S.S. key in the tether cap and determines if it is valid. If so, the engine can be started.

Without a Tether Cord Installed

When the START button is pressed:

- The information center turns on, goes through the self-test function, displays applicable messages and turns off a few seconds later.
- The engine cannot be cranked.
- The ECM stays powered up until it removes the ground to the relay coil after 3 minutes (pin B-H2).
- Relay contacts open and power to the ECM is removed.
- Power is also removed on all other electrical systems except the GPS supply to the information center.

ECM Shut Down Logic

When the engine is stopped by using the STOP button or by removing the tether cord from the engine cut-off switch, the following occurs:

- ECM stops the engine.
- After 5 seconds, the information center turns off.
- After 10 seconds (130 and 155 engines) or 60 seconds (215 and 260 engines), ECM (pin B-H2) removes the ground to the relay coil.

- Relay contacts open and power to the ECM is removed.
- Power is also removed on all other electrical systems except the GPS supply to the information center.

ECM Power Supply Test

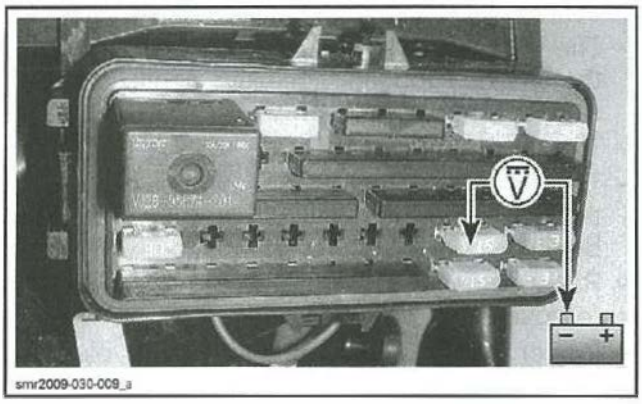
1. Remove cover from fuse box. Refer to *POWER DISTRIBUTION* subsection.
2. Press the START button to wake up the ECM.

NOTE: Do not install the tether cord.

3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Vdc.
4. Probe fuse F190 as illustrated.

NOTE: This will validate the fuse at the same time.

FUSE BOX	BATTERY POST	VOLTAGE
Fuse F190 terminal at F1	Ground	Battery voltage
Fuse F190 terminal at E1		



If battery voltage is measured at E1 but not at F1, replace the fuse.

If voltage is not measured at E1, check the wiring and connections between the relay output and F19 output. Refer to *WIRING DIAGRAM*.

If voltage is as per specification, carry out the *CONTINUITY TEST OF ECM POWER CIRCUIT*.

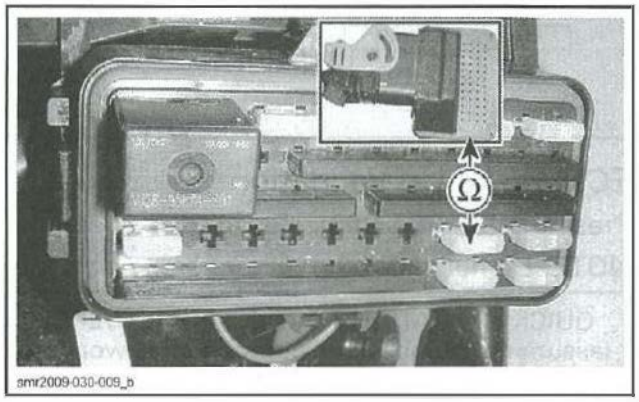
Continuity Test of ECM Power Circuit

1. Wait for electrical power to go off (approximately 3 minutes).
2. Disconnect "B" connector from ECM.
3. Install ECM ADAPTER TOOL (P/N 529 036 166) on ECM connector.



4. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
5. Probe terminals as per following table.

FUSE BOX	ECM ADAPTER	RESISTANCE
Terminal F1	Pin B-M4	Close to 0 Ω



If an open circuit is measured, repair or replace wiring and connectors.

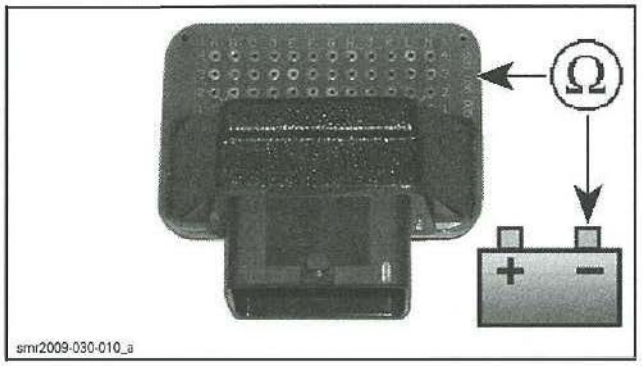
If the ECM power circuit tests good, the problem may be one of the following:

- Start switch circuit open to ECM, refer to *STARTING SYSTEM* subsection.
- ECM not providing a ground to relay in fuse box, refer to *POWER DISTRIBUTION* subsection.
- ECM ground wire open circuit, refer to *CONTINUITY TEST OF ECM GROUND CIRCUITS* in this subsection.
- ECM internal problem.

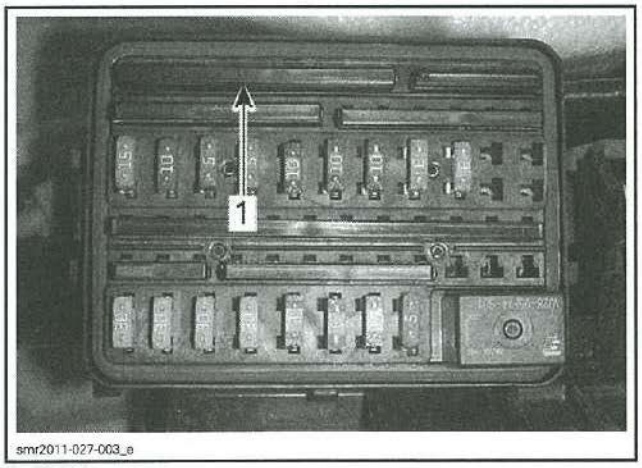
Continuity Test of ECM Ground Circuits

1. Disconnect "B" connector from ECM.
2. Install ECM ADAPTER TOOL (P/N 529 036 166) on ECM connector.
3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
4. Probe adapter terminals as per following table.

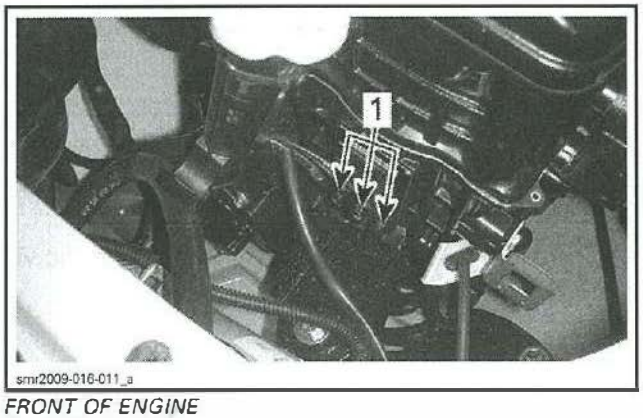
ECM ADAPTER	BATTERY POST	RESISTANCE
Pins B-L1, B-M2 and B-M3	Ground	Close to ● Ω (continuity)



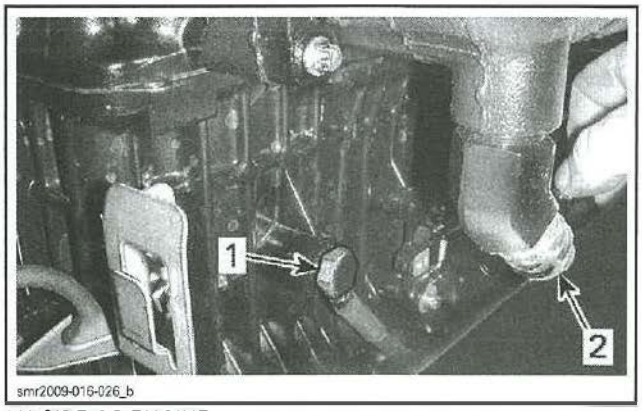
If measurement is out of specification, check ground bus bar in fuse box and continuity of its wires and connections with the engine grounds. Also check battery ground and engine grounds.



TYPICAL
1. Ground bus bar in fuse box



FRONT OF ENGINE
1. Engine grounds



LH SIDE OF ENGINE
1. Battery ground cable
2. Exhaust manifold water inlet fitting

If everything tests good and ECM does not power up, try a new ECM. Refer to *ECM REPLACEMENT*.

ECM Removal

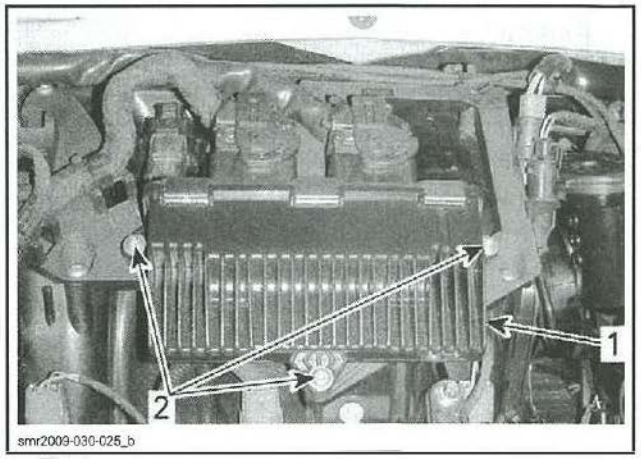
NOTE: If a new ECM is to be installed, first read the procedures in *ECM REPLACEMENT* in this subsection.

1. Disconnect battery cables.

⚠ WARNING

Always disconnect the BLACK negative (−) battery cable first, then disconnect RED positive (+) cable.

2. Disconnect both ECM connectors from ECM.
3. Unscrew all retaining screws and remove the engine ECM from its support on the intake manifold.



1. ECM
2. Retaining screws

ECM Installation

Reverse removal procedure however, pay attention to the following.

1. Install ECM. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) to mounting screws and torque to 5.5 N•m (49 lbf•**in**).

NOTICE **Always replace ECM by the same part number or by a BRP approved equivalent.**

2. Reconnect ECM connectors.
3. Reconnect battery cables.

⚠ WARNING

Always reconnect the RED positive (+) battery cable first, then reconnect BLACK negative (–) cable.

4. If a new ECM is installed, refer to *ECM REPLACEMENT* in this subsection.

ECM Replacement

Prior to replacing a suspected ECM, ensure that all the recommendations in the general introduction of this section have been followed.

When installing a new ECM, data must be entered and a reset is required.

ECM Manual Data Entry

There are 2 possible methods to collect the required information. The 1st being the easiest:

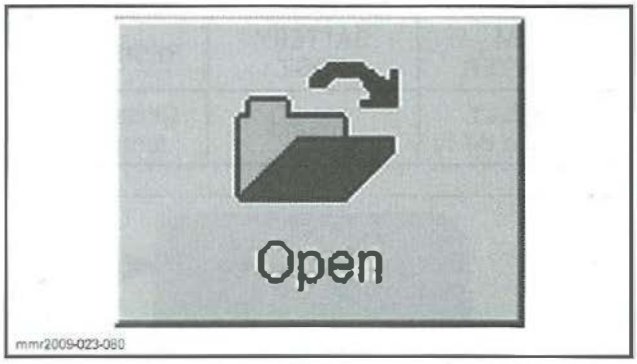
1. Use B.U.D.S. software and obtain the data from a saved **.mpem** file on your PC computer.
2. Collect the information from the vehicle and BOSSWeb.

1st Collecting Method: Obtaining the Data from a Saved .mpem File

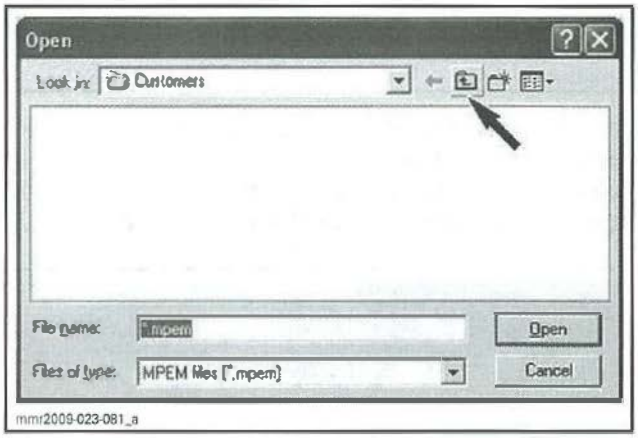
1. Use the B.U.D.S. software.

NOTE: It is not necessary to perform any connection. The PC computer can be used alone.

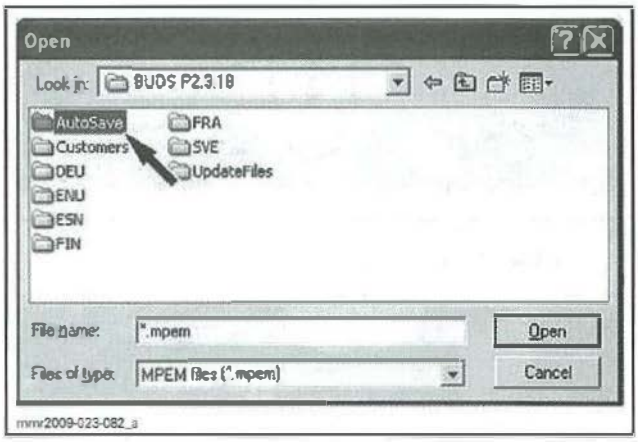
2. In B.U.D.S., click on the Open button.



3. Click once on the **Folder Up** button in the Open box.

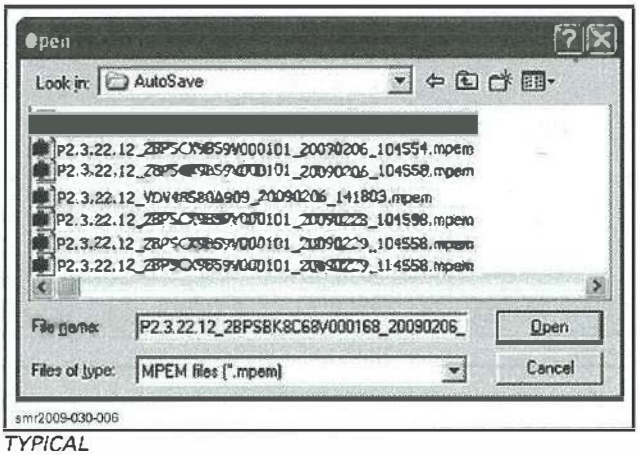


Double click on the **AutoSave** folder.



NOTE: You may have to go to another **AutoSave** folder from a previous version of B.U.D.S.

4. Choose the latest file saved for this specific vehicle.

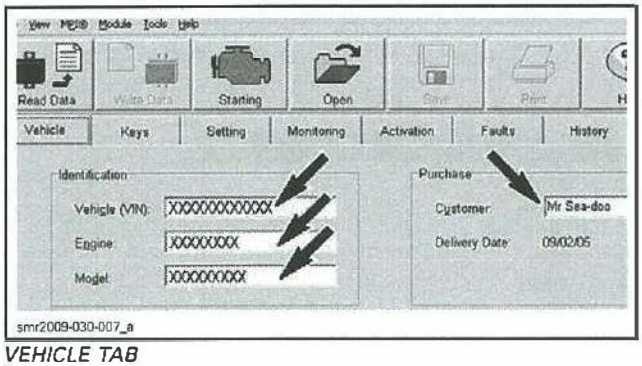


TYPICAL

IMPORTANT: Be sure to use the file that specifically matches the vehicle you are servicing.

NOTE: The file name structure is as follows:
BUDS version_VIN_date read (yyyymmdd)_hour read (hhmmss).mpem
Example: P2.3.22.12_2BPSBK8C68V000168_20090206_111640.mpem Hence: B.U.D.S. version: P2.3.22.12 VIN: 2BPSBK8C68V000168 Date: 2009 02 06 Hour: 11h 16m 40s

5. Go in the **Vehicle** tab and record the following information.
   1. Vehicle serial number
   2. Engine serial number (without the leading "M")
   3. Vehicle model number
   4. Customer name.

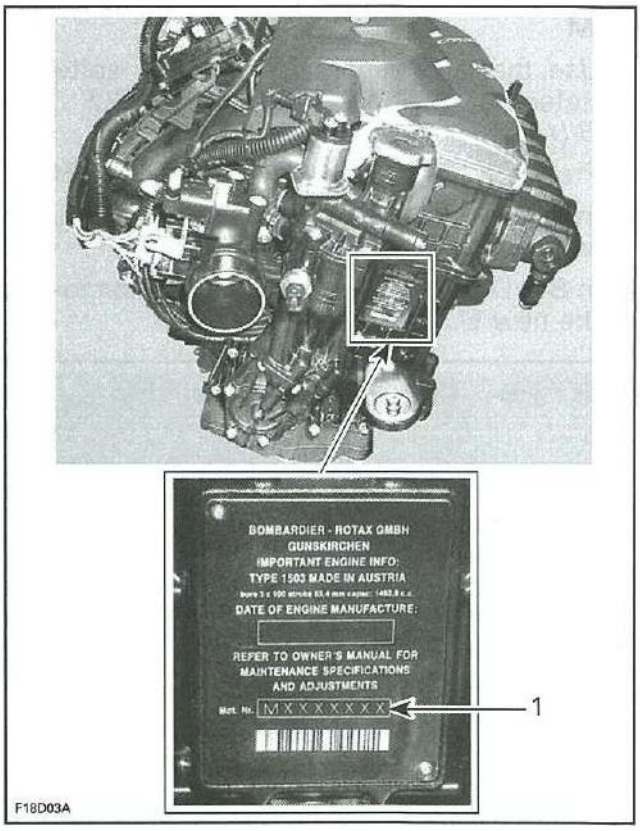


VEHICLE TAB

6. Enter recorded data in ECM as detailed in *ENTERING THE COLLECTED INFORMATION INTO THE ECM.*

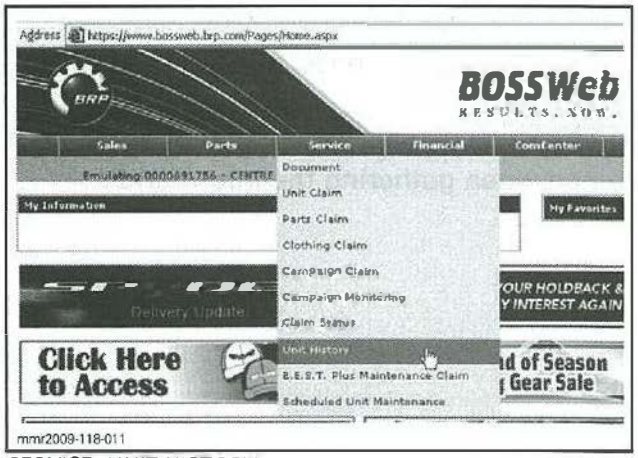
2nd Collecting Method: Collect the Information from the Vehicle and BOSSWeb

1. Record engine serial number.



1. Engine serial number

2. Record the following numbers using BOSSWeb. Look in **Service** menu and choose **Unit history**.
   1. Vehicle serial number
   2. Vehicle model number
   3. Customer name.

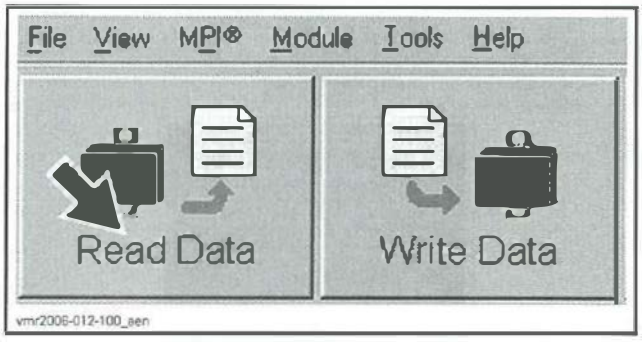


SERVICE, UNIT HISTORY

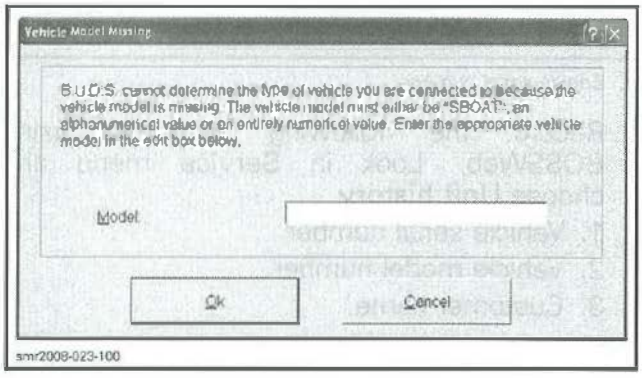
3. Enter the recorded data in the new ECM as detailed in *ENTERING THE COLLECTED INFORMATION INTO THE ECM.*

Entering the Collected Information into the ECM

1. Use the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Press the START button to wake up the ECM.
3. Install the tether cord on the engine cut-off switch.
4. In B.U.D.S., click the **Read Data** button to read the new ECM.

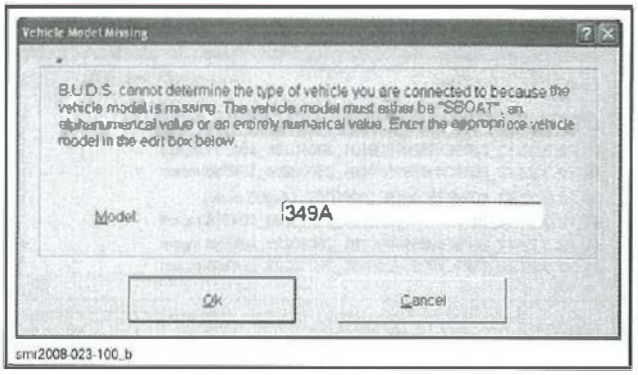


The following window will pop up.

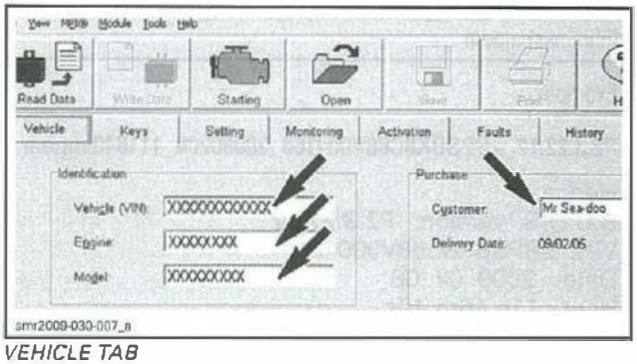


5. Enter the vehicle model number.

NOTICE **Do not enter SBOAT for a PWC. Enter only the appropriate model number as obtained when gathering the information.**

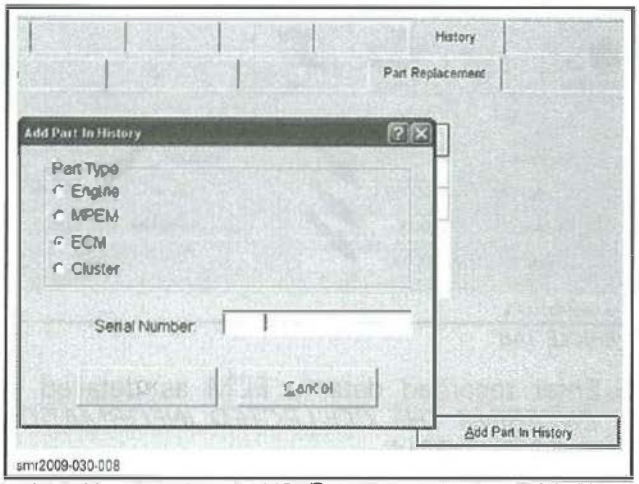


6. Click the **Vehicle** tab and enter the information you recorded previously.
   1. Vehicle serial number
   2. Engine number (**do not** enter the "M" at the beginning of the engine number)
   3. Customer name.



VEHICLE TAB

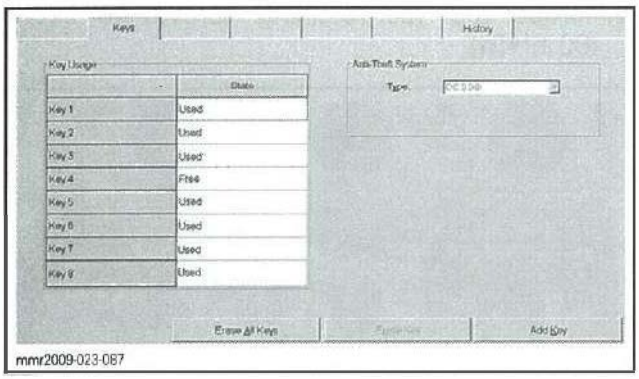
7. Click on the following tabs:
   - **History**
   - **Part Replacement**
   - **Add Part in History.**
8. Enter the old ECM serial number in the **Add Part In History** window.



HISTORY, PART REPLACEMENT, ADDING PART IN HISTORY TABS

NOTE: The ECM serial number can be found on the ECM sticker that also identifies the part number.

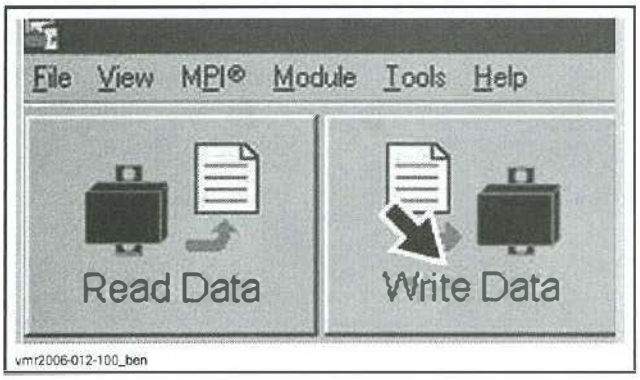
9. Click the **Keys** tab and click on the **Erase All Keys** button.



10. Program the desired D.E.S.S. key(s) to the watercraft. Refer to *D.E.S.S. SYSTEM* subsection.

NOTE: If you do not program at least one D.E.S.S. key to the watercraft, you will not be able to write the data to the new ECM, and will be prompted to do so.

11. Briefly press the vehicle START button to wake up the ECM. **Engine must not crank.**
12. Click on the **Write Data** button.



13. Perform the **Closed throttle reset**. Refer to **Closed Throttle Reset (TPS)** in *ADJUSTMENTS* in this subsection.
14. Reinstall remaining removed parts.

FUEL RAIL

Fuel Rail Removal

1. Open/remove seat.

iS/aS Models

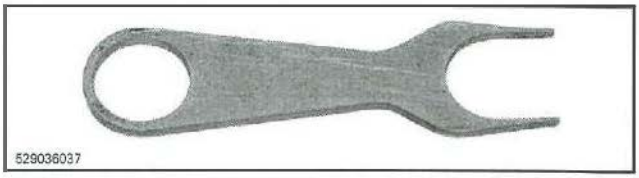
2. Remove rear ventilation box. Refer to *BODY*.
3. Remove deck extension. Refer to *BODY*.

All Models

4. Pull out relay in fuse box to prevent fuel pump to turn on unexpectedly. Refer to *POWER DISTRIBUTION*.

Fuel Rail Hose Disconnection

1. Release fuel pressure. Refer to *FUEL PUMP* in *FUEL TANK AND FUEL PUMP* subsection.
2. Place an absorbent shop rag under the fuel supply hose fitting at the fuel rail to catch any fuel leakage.
3. Disconnect fuel hose from fuel rail using the FUEL HOSE DISCONNECT TOOL (P/N 529 036 037).

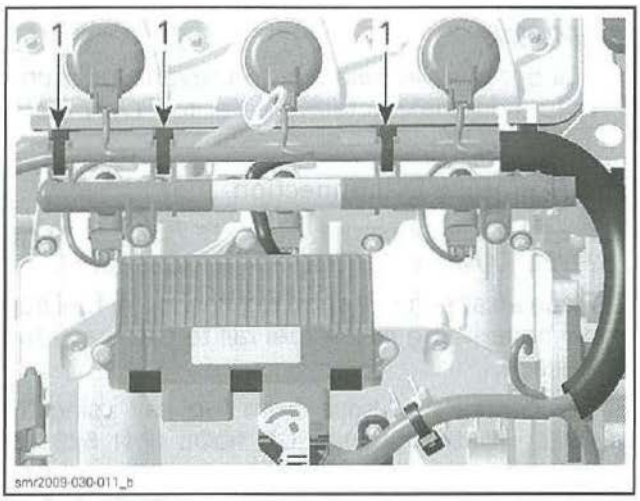




NOTE: It may be necessary to rotate fuel hose fitting to align the tool ends with the openings of the locking mechanism.

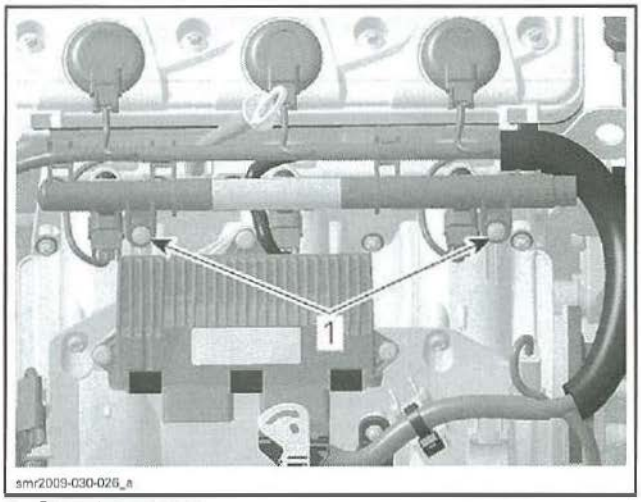
Fuel Rail Removal

1. Cut locking ties retaining engine harness to fuel rail.



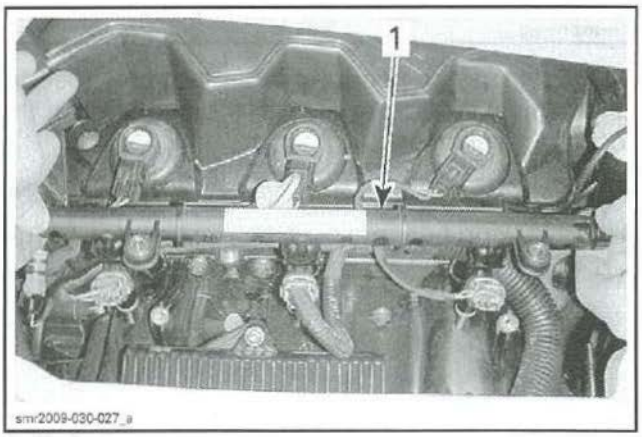
1. Cut locking ties

2. Remove screws retaining the fuel rail.



1. Retaining screws

3. Gently pull fuel rail side to side (wiggle).



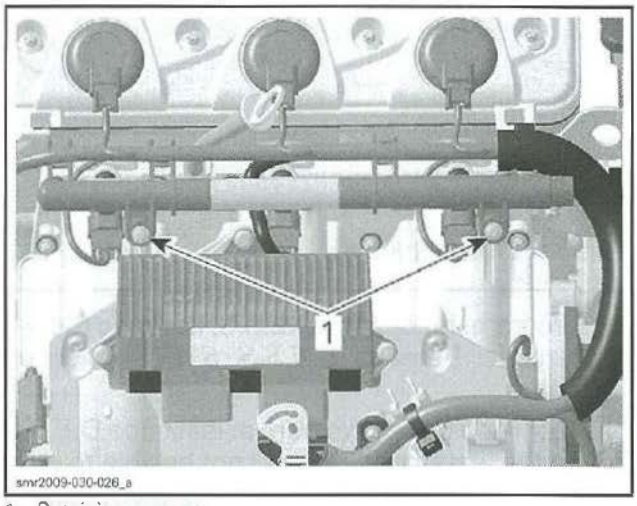
1. Fuel rail

4. Disconnect all injector connectors.
5. Pull fuel rail out with fuel injectors.

Fuel Rail Installation

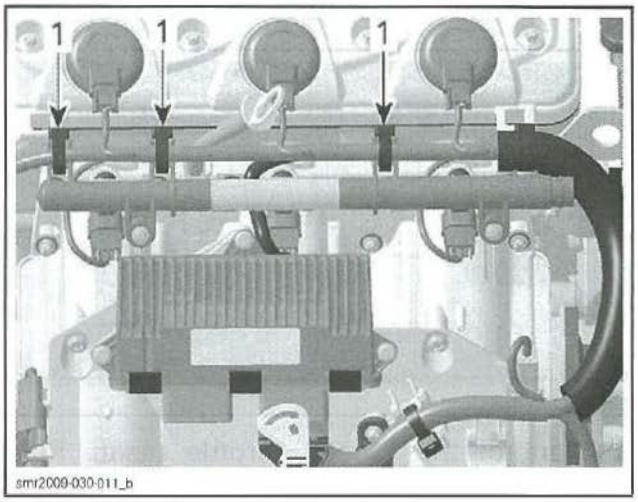
Reverse the removal procedure. However, pay attention to the following.

1. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on fuel rail retaining screws.
2. Torque fuel rail retaining screws to 9 N•m (80 lbf•**in**).



1. Retaining screws

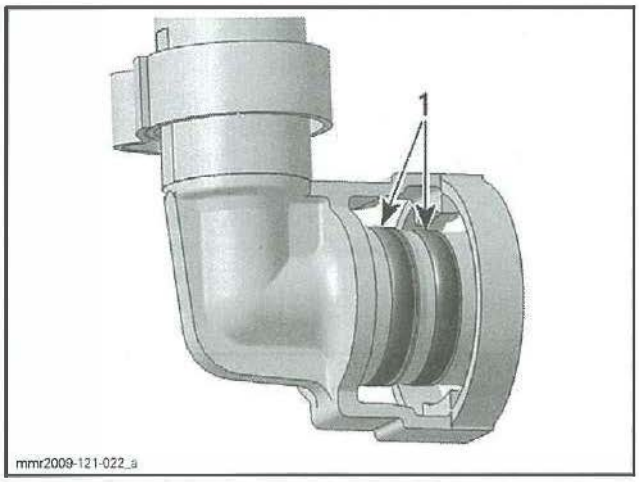
3. Properly install new locking ties to secure engine harness to fuel rail.



1. New locking ties

Fuel Rail Hose Connection

1. Apply engine oil on O-rings of fitting.



1. Apply oil on O-rings

2. Connect fuel hose to fuel rail.

IMPORTANT: Push fuel hose fitting on fuel rail until you hear a "click". Try pulling fuel hose off fuel rail to ensure fitting is properly locked.

3. Pressurize the fuel system and check for a fuel leak. Refer to *FUEL SYSTEM HIGH PRESSURE LEAK TEST* in *FUEL TANK AND FUEL PUMP* subsection.

⚠ WARNING

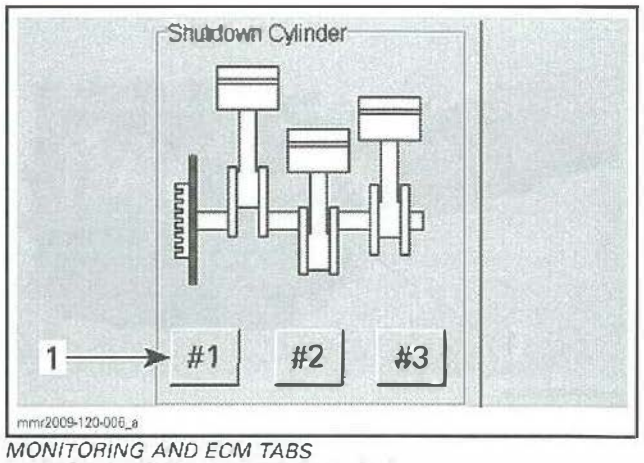
Failure to pressurize the fuel system may result in severe injury or a life threatening situation should a leak occur.

4. Reinstall all remaining removed parts.

FUEL INJECTOR

Fuel Injector Operation Test with B.U.D.S. (Dynamic)

1. Connect watercraft to B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. Start engine.
3. In B.U.D.S., click the following:
   - **Read Data** button
   - **Monitoring** tab.
4. Using the B.U.D.S. software, shut down each engine cylinder one at a time by clicking on the button under the applicable cylinder.



MONITORING AND ECM TABS
1. Click on cylinder number to be tested

If the engine RPM drops when clicking on a cylinder, the injector and the ignition of this cylinder are functioning normally.

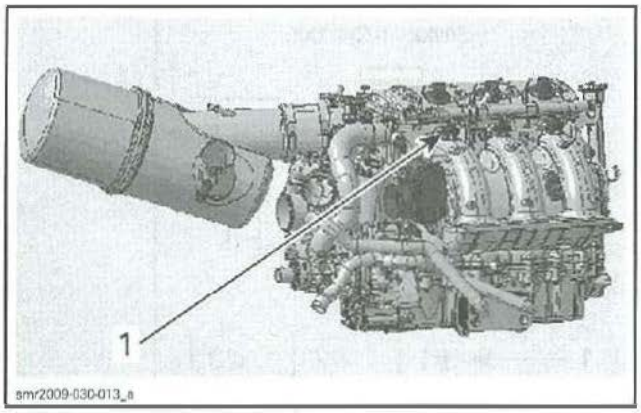
If the engine RPM does not drop when clicking on a cylinder, this cylinder is not functioning properly. Check the following:

- Fuel injector operation. Refer to *FUEL INJECTOR OPERATION TEST*.
- Spark plug and ignition coil. Refer to *IGNITION SYSTEM*.
- Engine condition.

Fuel Injector Operation Test with B.U.D.S. (Static)

NOTICE **After fuel injector activation using B.U.D.S., always crank engine in drowned mode to ventilate engine and prevent a potential backfire due to fuel accumulation in the engine.**

1. Connect watercraft to B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. Press the START button to wake up the ECM.
3. Install the tether cord on the engine cut-off switch.
4. In B.U.D.S., click the following:
   - **Read Data** button
   - **Activation** tab.
5. On the ECM Activation page, energize the fuel injector to be tested by clicking on it in B.U.D.S.



ACTIVATION AND ECM TABS
1. Injector of cylinder no. 1 shown

6. Listen to the injector.

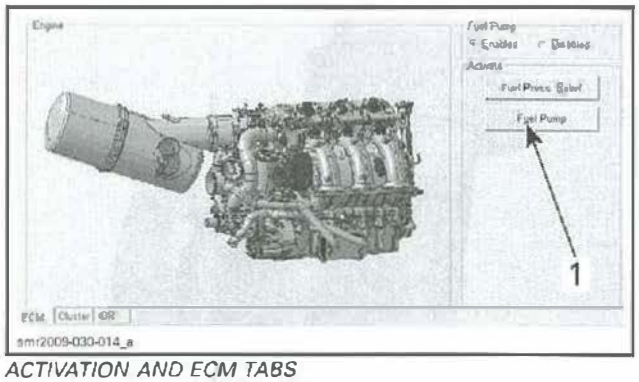
If you can hear the injector, it validates its operation. Carry out the *FUEL INJECTOR BALANCE TEST*.

If you do not hear the injector, carry out the *INJECTOR INPUT VOLTAGE TEST*.

Fuel Injector Balance Test with B.U.D.S.

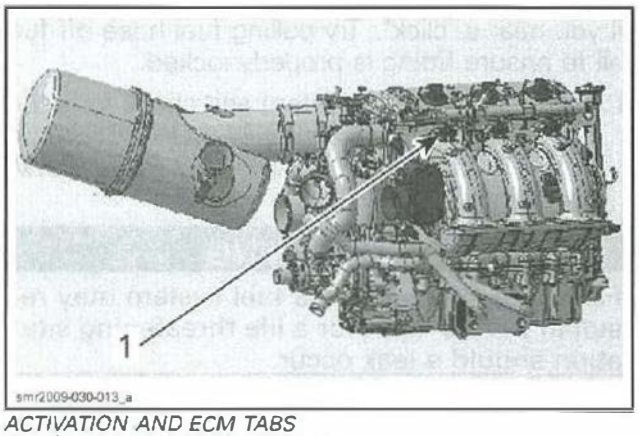
NOTICE **After fuel injector activation using B.U.D.S., always crank engine in drowned mode to ventilate engine and prevent a potential backfire due to fuel accumulation in engine.**

1. Install a fuel pressure gauge as described in *FUEL PUMP PRESSURE TEST* of *FUEL TANK AND FUEL PUMP* subsection.
2. Connect watercraft to B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
3. Press the START button to wake up the ECM.
4. Install tether cord on engine cut-off switch.
5. In B.U.D.S., click the following:
   - **Read Data** button
   - Activation tab.
6. In B.U.D.S., click the **Fuel Pump** button to activate fuel pump.



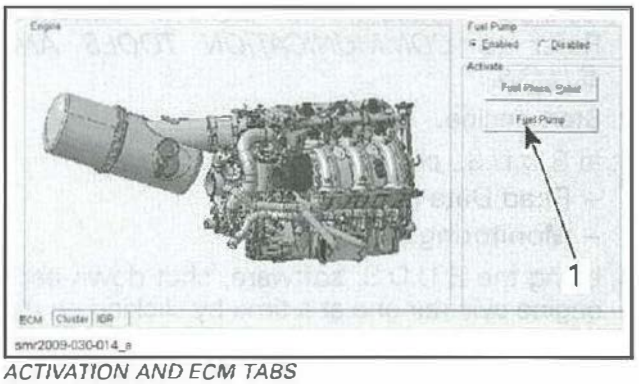
ACTIVATION AND ECM TABS
1. Fuel Pump activation button

7. Fuel pressure must be within specification. Refer to *FUEL TANK AND FUEL PUMP* subsection. Re-activate fuel pump as necessary.
8. In B.U.D.S., energize fuel injector **no. 1**.



ACTIVATION AND ECM TABS
1. Injector of cylinder no. 1 shown

9. Record the fuel pressure drop for injector **no. 1**.
10. In B.U.D.S., click the **Fuel Pump** button to activate fuel pump.



ACTIVATION AND ECM TABS
1. Fuel pump

11. Repeat the procedure for fuel injectors **no. 2** and **no. 3** and record the pressure drop for each injector.

12. The maximum fuel pressure drop between injectors should not exceed the following specification:

MAXIMUM FUEL PRESSURE DROP ALLOWED BETWEEN FUEL INJECTORS
10 kPa (1.5 PSI)

If pressure drop of any fuel injector is greater than the specification, replace that injector then repeat the test.

13. Using the valve on the fuel pressure gauge, release the pressure in the system (if so equipped).
14. Remove fuel pressure gauge and reinstall removed parts.

Fuel Injector Input Voltage Test

1. Open/remove seat.

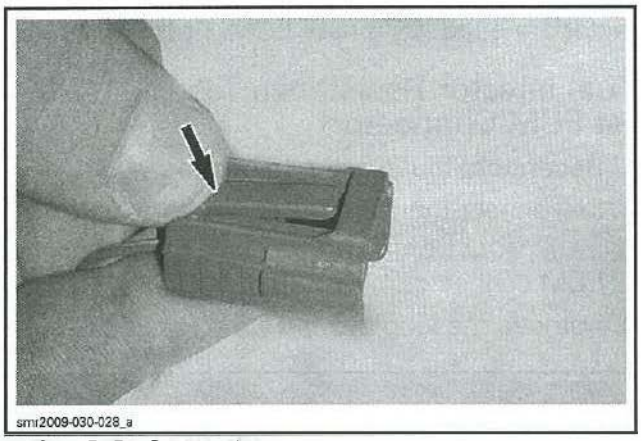
iS/aS Models

2. Remove rear ventilation box. Refer to *BODY*.

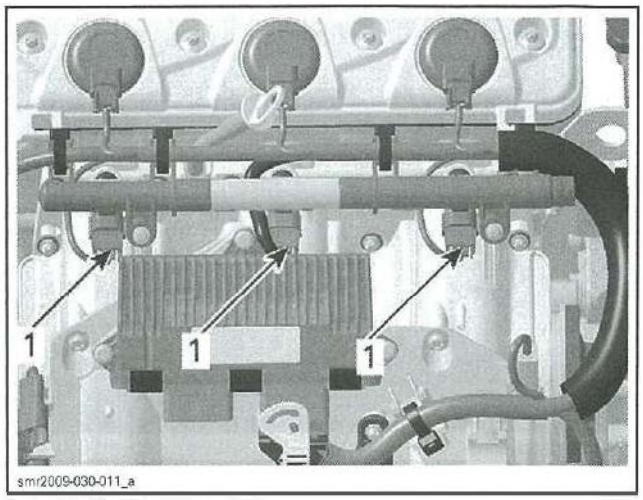
All Models

3. Disconnect fuel injector connectors.

NOTE: Push against tab underneath connector as illustrated to unlock it.



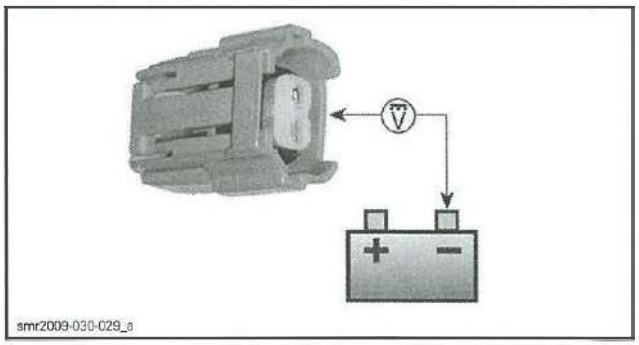
PUSH HERE TO UNLOCK



1. Fuel injector connectors

4. Press the START button to wake up the ECM.
5. Install tether cord on engine cut-off switch.
6. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Vdc.
7. Read input voltage to the applicable injector as per following table.

PROBE INJECTOR CONNECTOR	MEASUREMENT
VIOLET wire with a tracer to battery ground	Battery voltage

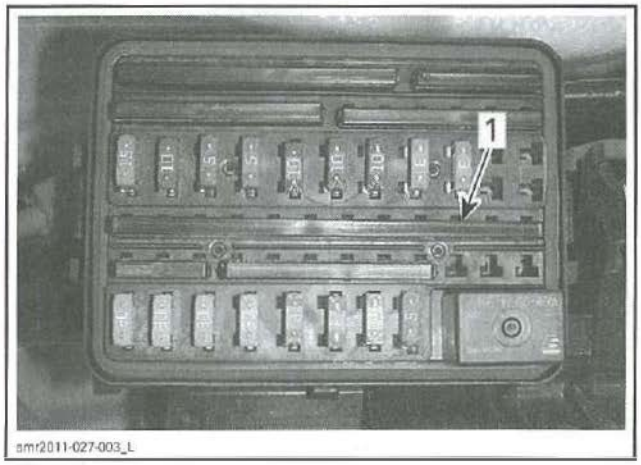


If battery voltage is measured, carry out the *INJECTOR CONTROL CIRCUIT TEST*.

If battery voltage is not measured, check continuity between fuse box and injector as follows.

Continuity Test of Injector Power Circuit

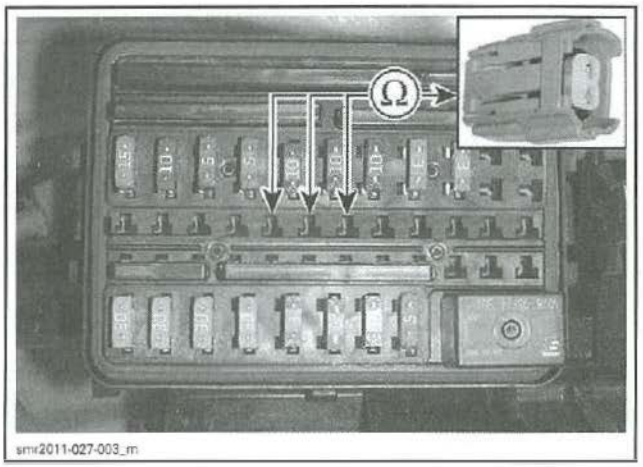
1. Remove cover of fuse box. Refer to *POWER DISTRIBUTION* subsection.
2. Remove the long bus bar.



TYPICAL
1. Long bus bar

3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
4. Read resistance of the applicable injector circuit as per following table.

INJECTOR	INJECTOR CONNECTOR	FUSE BOX	MEASUREMENT
1 (rear)	VIOLET wire with a tracer	Terminal D7	Close to 0 Ω
2		Terminal D6	
3		Terminal D5	



If continuity is good, the fuse, wiring and connectors are functional.

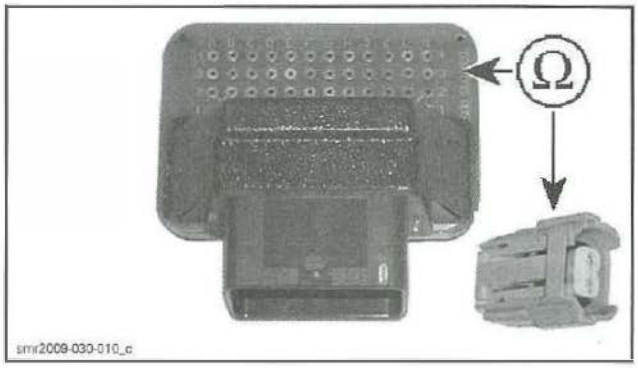
If continuity is not obtained, first check the fuse and replace as required.

5. If fuse is good, repair/replace wiring and connectors from fuse box to injector. Refer to *WIRING DIAGRAM* subsection.
6. Reinstall bus bar and cover.

Fuel Injector Control Circuit Test

1. Disconnect ECM "A" connector.
2. Install ECM ADAPTER TOOL (P/N 529 036 166) on ECM connector.
3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
4. Probe terminals as per following table.

INJECTOR	ECM ADAPTER	INJECTOR	MEASUREMENT
1 (rear)	Pin A-B3	BROWN wire with a tracer	Close to 0 Ω
2	Pin A-K1		
3	Pin A-J1		

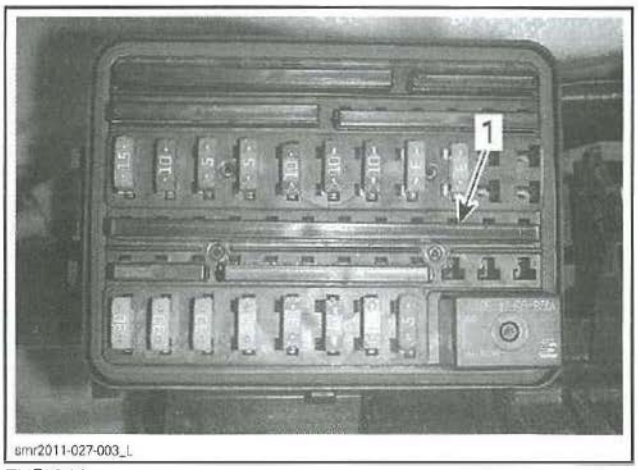


If control circuit is at fault, repair or replace wiring and connectors.

If control circuit and all tests applicable to the injector are good, try a new ECM. Refer to *ECM*.

Fuel Injector Resistance Test (at ECM Connector)

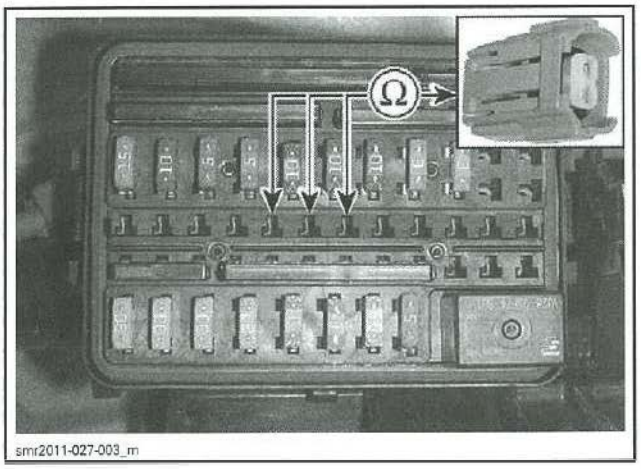
1. Reconnect the injector connector.
2. Disconnect the ECM "A" connector.
3. Install ECM ADAPTER TOOL (P/N 529 036 166) on ECM connector.
4. Remove the long bus bar from fuse box.



TYPICAL
1. Long bus bar

5. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
6. Measure resistance value between terminals as follows.

INJECTOR	FUSE BOX TERMINAL	ECM ADAPTER PIN	RESISTANCE @ 20°C (68°F)
1	D7	A-B3	11.4 - 12.6 Ω
2	D6	A-K1	
3	D5	A-J1	



If resistance values are as specified, injector coil is in good condition.

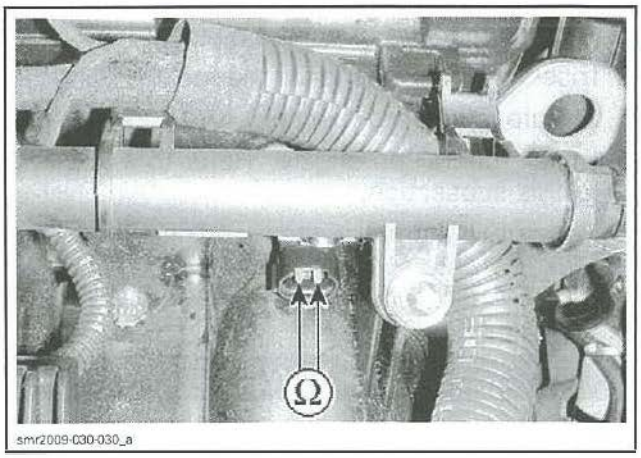
If resistance value are not as specified, repeat test at injector connector.

7. Reinstall bus bar and fuse box cover.

Fuel Injector Resistance Test (at Component)

1. Remove injector connector.
2. Check resistance value between injector pins as per followings table.

INJECTOR PIN		RESISTANCE @ 20°C (68°F)
1	2	11.4 - 12.6 Ω

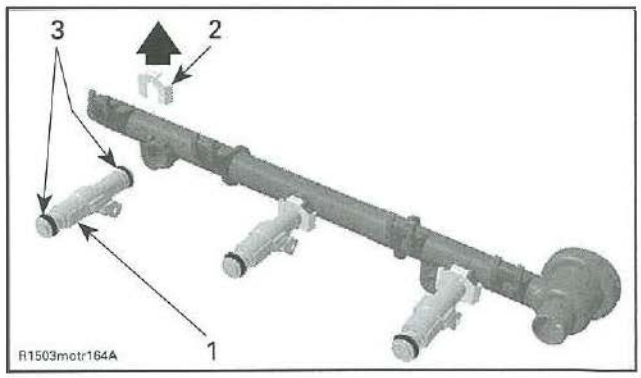


If readings are not as specified, replace injector.

If readings are as specified, repair or replace wiring and connectors from ECM to injector.

Fuel Injector Removal

1. Remove fuel rail. Refer to *FUEL RAIL* in this subsection.
2. Remove the injector clip.



FUEL RAIL ASSEMBLY
1. *Fuel injector*
2. *Injector clip*
3. *O-ring*

3. Pull the fuel injector out of the fuel rail.

Fuel Injector Installation

Installation is the reverse of the removal procedure. However, pay attention to the following details.

FUEL INJECTOR IDENTIFICATION	
ENGINE	INJECTOR COLOR CODE
130	Red
155/215/260	Blue

1. If you reinstall a used injector, carefully inspect O-ring condition before reinstallation. Replace O-ring with a new one if damaged.

2. Apply a thin film of engine oil to O-rings.
3. Insert the fuel injector in the fuel rail.
4. Secure injector to fuel rail with a retaining clip.
5. Install fuel rail on engine. Refer to *FUEL RAIL* in this subsection.
6. Pressurize the fuel system and check for a fuel leak. Refer to *FUEL SYSTEM HIGH PRESSURE LEAK TEST* in *FUEL TANK AND FUEL PUMP* subsection.

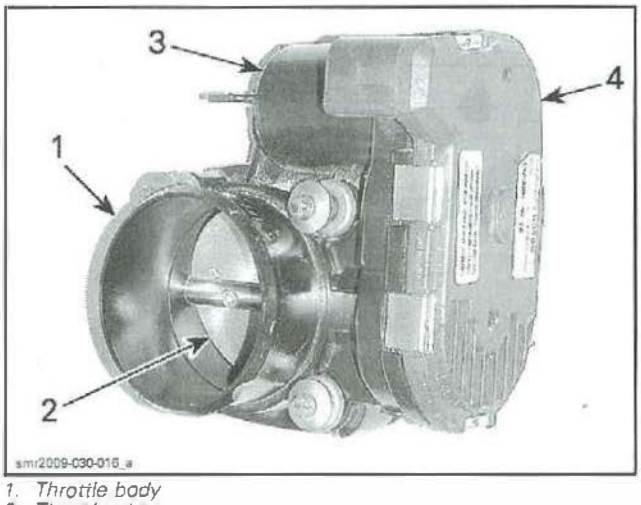
⚠ WARNING

Always carry out a fuel system high pressure leak test after working on the fuel system.

7. Reinstall all remaining removed parts, refer to applicable subsections.

THROTTLE BODY

Throttle Body Description



1. *Throttle body*
2. *Throttle plate*
3. *Throttle actuator (electric motor inside)*
4. *Throttle position sensor (TPS) (inside)*

Throttle Plate Operating Positions

Two torsional springs are connected to the throttle plate. A main spring and another one in a plunger mechanism.

When there is no power to the throttle actuator (ETA), the plunger mechanism maintains the throttle plate at a rest position. This also serves as the limp home position.

When the throttle plate is opened by the ETA as commanded by the ECM, it acts against the main spring. If the ETA failed, the return spring would bring the throttle plate back to the limp home position.

ECM	ENGINE	THROTTLE BODY
OFF	Stopped	Throttle actuator: Off. Throttle plate: Rest position, maintained opened at approximately 8° (1). This is also the limp home position.
ON	Not started	Throttle actuator: On. Throttle plate: Moves from the rest position to apprnximately 14°. It then moves back to the rest position. This is the diagnostic mode where the rest position, actuator opening force to overcome the return springs and the motor return rate are monitored. If any of these parameters are out of range, a fault code is initiated.
ON	Started. Normal operation at idle	Throttle actuator: On. Throttle plate: Moves from the rest position to idle position (approximately 1-3°) according to ECM injection and ignition maps. Throttle plate is opened and closed as necessary to control the idle speed.
ON	Started. Normal operation at various RPM	Throttle actuator: On. Throttle plate: Opens and closes according to ECM torque management priorities.

(1) Degree values are given from the fully closed position.

Throttle-Body Faults and Effects

NOTE: Among other things, a weak or broken spring and a sticky throttle plate (carbon build-up, dried salt water etc) are validated by the throttle body diagnostic mode.

FAULT	EFFECT
Partial failure of TAS sensor (one internal sensor only)	Limp home mode. Engine speed limited to idle. ECM will use the remaining TAS sensor. Fault code set and beeper activated to emit warning signals. Check engine light is turned ON. Driveability could be reset by releasing and reapplying the throttle.
Complete failure of TAS sensor (both internal sensors)	Limp home mode. Engine speed limited to 2500 RPM. Fault code set and beeper activated to emit warning signals. Check engine light is turned ON.
Any throttle body failure	Limp home mode. Engine speed limited to 2500 RPM. Engine speed can still be increased up to 3200 RPM using the throttle lever. Fault code set and beeper activated to emit warning signals. Check engine light is turned ON.

NOTE: When one of these faults is active, O.T.A.S. and iBR will continue to monitor their input signals. However, since the engine speed is limited, the O.T.A.S. will not be activated. Also, since the ECM cannot control the throttle body, the iBR may produce a fault since the ECM does not react to its specific torque requests. It all depends on the circumstances when the iBR is applied. (vehicle and engine speed will be a factor).

Throttle Body Lubrication

No lubrication is required.

Throttle Body Cleaning

1. Remove the parts required to access the throttle body, refer to *THROTTLE BODY REMOVAL*.
2. Check throttle body cleanliness using a flashlight. Fully open throttle plate and verify:
- Throttle body bore
- Throttle plate edge.

Look for:
- Dirt
- Oily surfaces
- Carbon and salt deposits on throttle plate and the surrounding bore.

3. Clean as necessary.
4. Use a throttle body cleaner such as GUNK INTAKE MEDIC or an equivalent.

NOTICE **Only use an appropriate throttle body cleaner that will not damage O-rings and EFI sensors.**

⚠ WARNING

Use the product in well ventilated area. Refer to product manufacturer's warnings. Wipe off any product leakage in bilge.

5. To avoid getting dirt into engine, spray cleaner on a clean rag (outside the bilge) then rub rag against throttle plate and bore. A toothbrush works well too.

⚠ WARNING

First ensure ECM is off. Otherwise, if ECM should suddenly turn off, it would quickly close the throttle plate which could cause serious finger injury.

6. Manually open throttle and hold fully open to reach all surfaces.

⚠ WARNING

Ensure nobody presses the START button. The ECM would turn on and the throttle actuator (ETA) would cycle. This could cause serious finger injury as the throttle plate moves quickly.

7. To remove residual dirt, spray cleaner on throttle plate and on bore.
8. Reinstall removed parts.

Throttle Body Inspection

Always check for corroded terminals or damaged wiring when diagnosing throttle body problems.

Throttle Body Dynamic Tests

1. Remove the parts required to access the throttle body, refer to *THROTTLE BODY REMOVAL*.
2. Remove the air inlet hose from the throttle body.
3. Observe the throttle plate with the engine stopped.

NOTE: The throttle plate should be in the rest position (slightly opened).

⚠ WARNING

Keep your fingers out of the throttle plate area while the ECM turns on. The throttle actuator will cycle. This could cause serious finger injuries as throttle plate quickly moves.

4. As you observe the throttle plate, have someone press the START button to wake up the ECM.

NOTE: The throttle plate should cycle quickly from the rest position to a partially open position (approximately 14°), then back to the rest position.

5. Install the tether cord on the engine cut-off switch.

NOTE: The throttle plate should cycle again.

6. As you observe the throttle plate, have someone gradually and evenly pull in the throttle lever, then release it in the same way.

NOTE: The throttle plate should open then close according to throttle lever position.

If any test failed, proceed with the *STATIC TESTS*.

Throttle Body Static Tests

⚠ WARNING

First ensure the ECM is off. Otherwise, if ECM should turn off, it would quickly close the throttle plate which could cause serious finger injury.

⚠ WARNING

During the test, ensure nobody presses the START button. The ECM would turn on and cycle the throttle actuator. This could cause serious finger injuries as the throttle plate moves quickly.

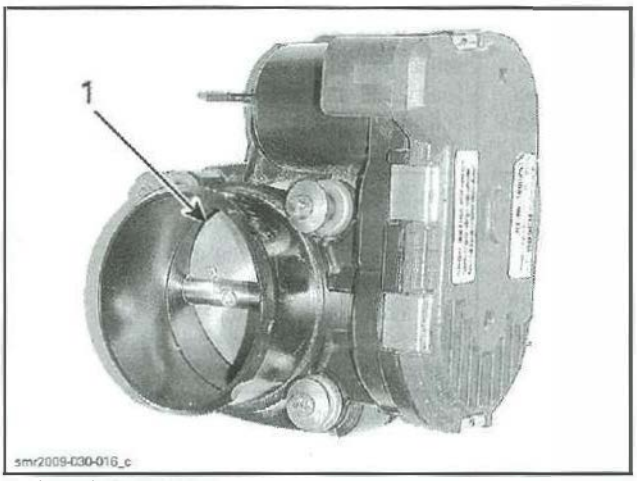
1. Using your fingers, push in on the throttle plate and ensure it opens smoothly within the throttle body.



1. Push here to open

NOTE: The throttle plate must open fully and return freely to the rest position (slightly opened) when released.

2. Push throttle plate closed as indicated in following illustration. It must close completely and return freely to the rest position (slightly opened) when released.



1. Push here to close

If the throttle plate does not move smoothly or does not return freely to the rest position, the problem is mechanical. Check for salt accumulation on throttle plate shaft. It may also be an actuator or gear problem. Replace throttle body as necessary.

If throttle plate operates normally, the problem is electrical. Check throttle actuator (ETA) wiring continuity, throttle position sensor (TPS) and throttle accelerator sensor (TAS).

⚠ WARNING

Replace throttle body when throttle plate does not return properly.

Throttle Body Replacement

Throttle Body Removal

1. Open/remove seat.

iS/aS Models

2. Remove rear ventilation box. Refer to *BODY*.
3. Remove deck extension. Refer to *BODY*.

iS Models

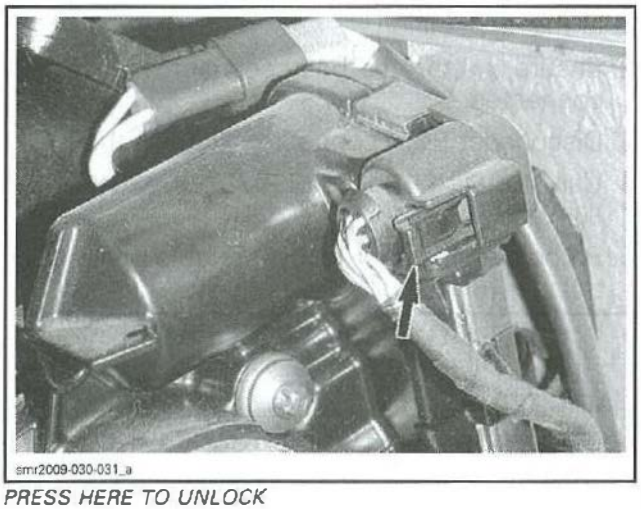
4. Lift suspension using the iS up button to gain access.

NOTE: If more height is required or if the iS cannot be used, manually lift suspension by the anchor points close to handlebar and safely block in this position. Do not lift the watercraft from the anchor points.

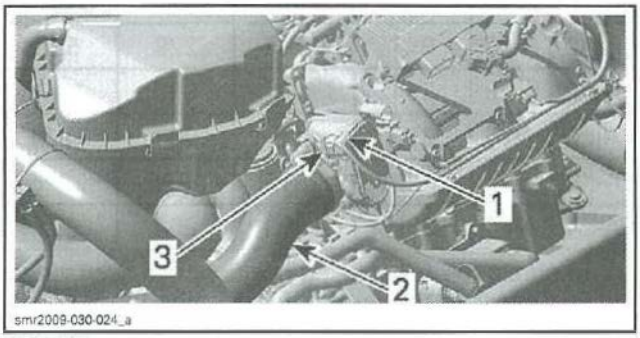
All Models

5. Disconnect inlet hose from throttle body.
6. Disconnect throttle body connector.

To remove connector from throttle body, press connector locking tab illustrated.

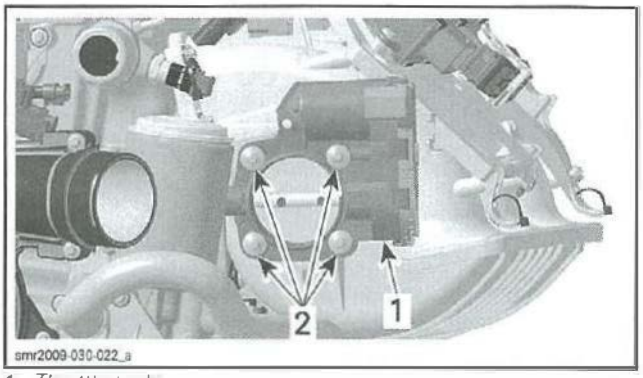


PRESS HERE TO UNLOCK



TYPICAL
1. *Throttle body*
2. *Inlet hose*
3. *Connector*

7. Remove retaining screws from throttle body.



1. *Throttle body*
2. *Screws*

8. Pull throttle body off intake manifold.

Installation

Installation of the new throttle body is the reverse of the removal procedure. However, pay attention to the following.

1. Torque retaining screws in a criss-cross sequence to 9 N•m (80 lbf•**in**).
2. Perform the Closed Throttle reset. See procedure in *ADJUSTMENTS*.

TPS (THROTTLE POSITION SENSOR)

General

NOTE: The TPS is part of the throttle body.

The throttle position sensor (TPS) is a double potentiometer that sends a signal to the ECM that is proportional to the throttle plate angle. The TPS is located inside the throttle body.

TPS Wear Test

1. With the engine turned off, slowly pull in throttle lever and pay attention for smooth operation without physical stops.
2. Press the START button to wake up the ECM.
3. Install the tether cord on the engine cut-off switch.
4. Connect watercraft to B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
5. In B.U.D.S., click the following:
   - **Monitoring** tab
   - ECM tab.
6. Slowly and regularly depress the throttle lever.
7. Observe the Throttle Opening needle movement in B.U.D.S.



MONITORING AND ECM TABS

NOTE: The needle should move gradually and regularly as you move the throttle lever. If the needle "sticks", bounces or suddenly drops, it may indicate a worn TPS that needs to be replaced. An initial slight delay after the throttle lever is pulled and before the needle starts to move is normal.

If the needle behavior is not as expected, proceed with the following steps.

8. Manually move the throttle plate in throttle body using a blunt tool (without sharp tip).

⚠ WARNING

Do not move throttle plate with your fingers. Otherwise, if ECM should turn off, it would quickly close the throttle plate which could cause serious finger injury.



1. Push here

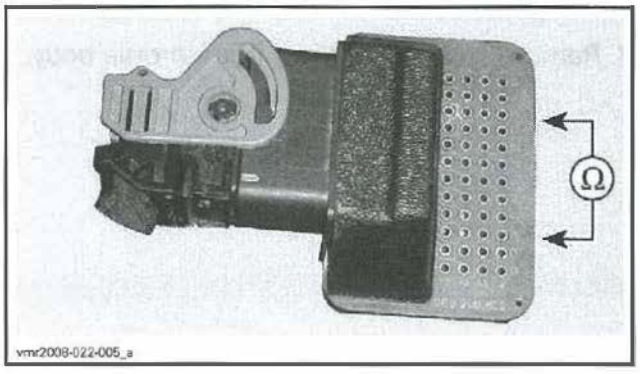
9. Check needle movement again.
- If needle moves as expected, check the throttle accelerator sensor (TAS). Refer to *THROTTLE ACCELERATOR SENSOR (TAS)* in this subsection.
- If needle does not move as expected, perform the *TPS VOLTAGE TEST* and the *TPS RESISTANCE TEST* in this subsection.

TPS Resistance Test

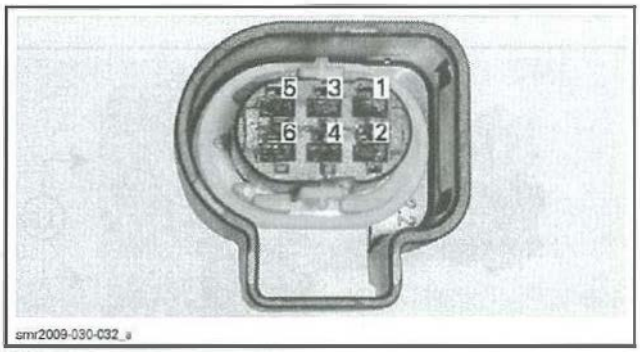
1. Remove the parts required to access the throttle body, refer to *THROTTLE BODY REMOVAL* in this subsection.
2. Ensure the throttle body connector is properly connected.
3. Disconnect ECM connector "A" from the ECM.
4. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
5. Probe circuit as per following table while using a finger to manually move throttle plate.

ECM ADAPTER		FULLY CLOSED THROTTLE PLATE (1)		FULLY OPEN THROTTLE PLATE	
		RESISTANCE (Ω)			
PIN		MIN.	MAX.	MIN.	MAX.
A-A2	A-K4	875	1625	875	1625
A-A2	A-K3	954	1934	228	585
A-A2	A-F3	254	634	980	1983
A-K3	A-K4	228	585	954	1934
A-K3	A-F3	1385	2315	1385	2315
A-K4	A-F3	980	1983	254	634

(1) To obtain the fully closed position, it is necessary to push against the throttle plate in the throttle body with a finger and hold it in this position for the measurement.



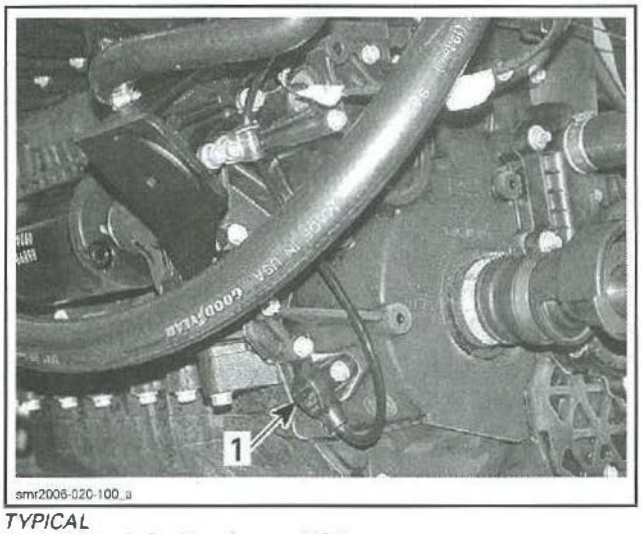
If any resistance value is incorrect, check wire continuity between ECM and throttle body before assuming the TPS is at fault. Refer to *WIRING DIAGRAM* subsection.



TPS CONNECTOR PIN-OUT

If the TPS resistance values are correct, try a new ECM. Refer to *ENGINE CONTROL MODULE (ECM)* in this subsection.

CRANKSHAFT POSITION SENSOR (CPS)

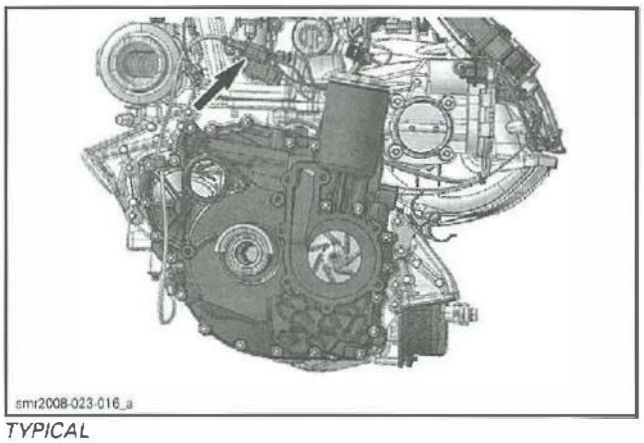


TYPICAL
1. Crankshaft Position Sensor (CPS)

NOTE: Take into account that a CPS fault can be triggered by a bent or missing trigger wheel tooth. First check for fault codes, then test the CPS as per following procedure. If it tests good, check trigger wheel teeth condition. Refer to *PTO HOUSING AND MAGNETO* in the *ENGINE* section.

CPS Voltage Test

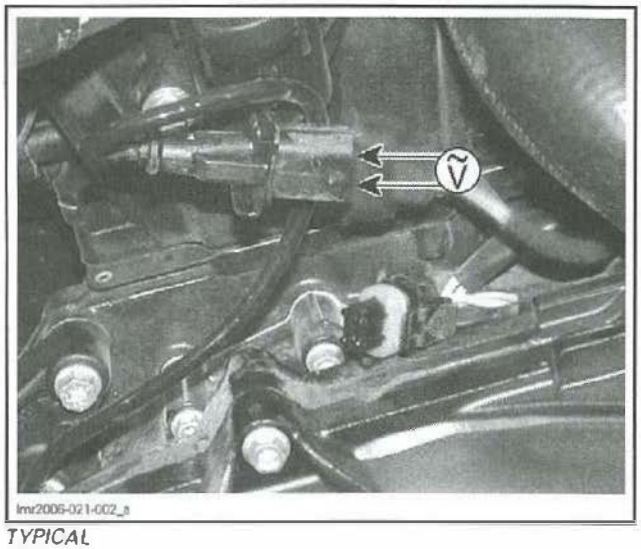
1. Remove the required parts to access the CPS, refer to *CPS REPLACEMENT.*
2. Disconnect CPS connector.



TYPICAL

3. Press the START button to wake up the ECM.
4. Install the tether cord on the engine cut-off switch.
5. Pull the throttle lever completely in to the handlebar and hold (drowned mode).
6. While cranking the engine, probe CPS terminals.

CPS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
1	2	Approximately 2.3 Vac



TYPICAL

If voltage is not as specified, carry out a *CPS RESISTANCE TEST.*

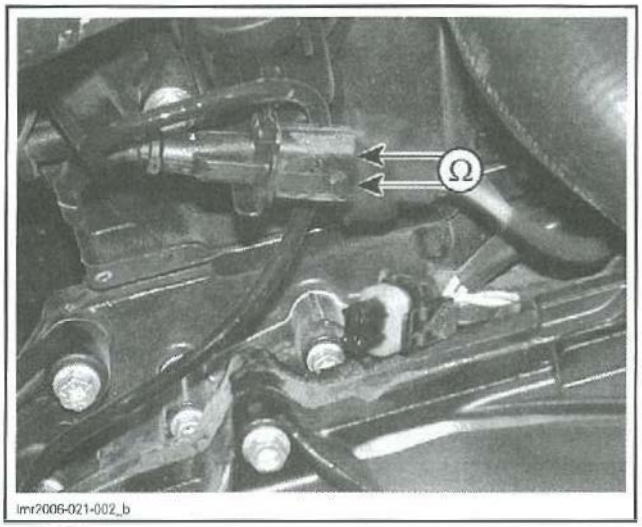
If voltage is as specified, check continuity of wiring between CPS connector and ECM connector. Refer to *WIRING DIAGRAM.*

CPS Resistance Test

1. Disconnect CPS connector.

2. Using a FLUKE 115 MULTIMETER (P/N 529 035 868) set to Ω, probe CPS terminals as per following table.

CPS CONNECTOR		MEASUREMENT
PIN		RESISTANCE Ω @ 20°C (68°F)
1	2	700 - 900 Ω



TYPICAL

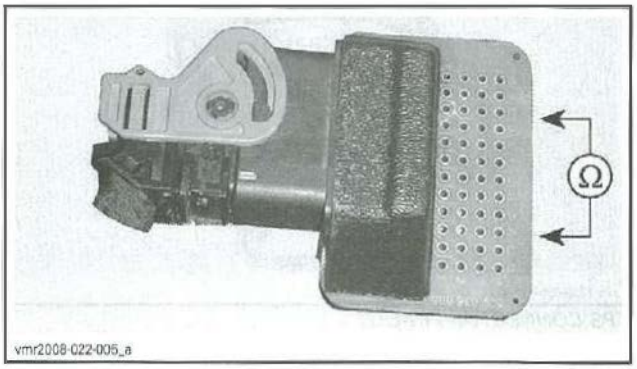
If resistance is not within specifications, replace the CPS.

If resistance tests good, proceed with the following steps.

3. Reconnect the CPS and disconnect ECM connector "A" from the ECM.
4. Install the ECM ADAPTER TOOL (P/N 529 036 166) on ECM connector "A".
5. Test circuit resistance through CPS as per following table.



ECM ADAPTER		MEASUREMENT
PIN		RESISTANCE Ω @ 20°C (68°F)
A-H1	A-K2	700 - 900 Ω



If resistance measured is as specified, check ECM. Refer to *ENGINE CONTROL MODULE (ECM)* in this subsection.

If resistance measured is not as specified, repair or replace wiring and connectors between ECM and the CPS.

CPS Replacement

1. Open/remove seat.

iS/aS Models

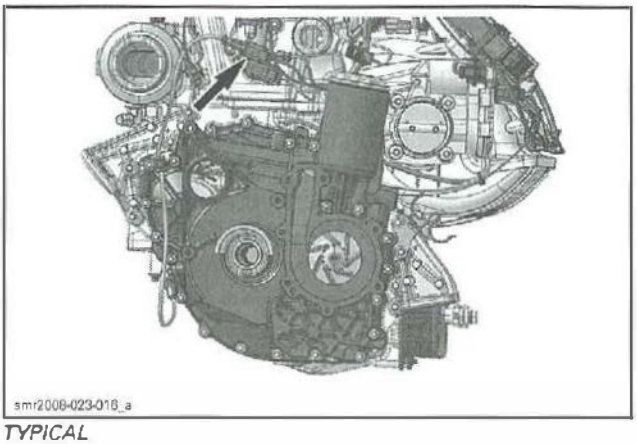
2. Remove rear ventilation box. Refer to *BODY*.
3. Remove deck extension. Refer to *BODY*.

All Models

4. Remove air intake silencer. Refer to *AIR INTAKE SYSTEM*.
5. Drain oil from PTO housing. Refer to *PTO HOUSING AND MAGNETO*.

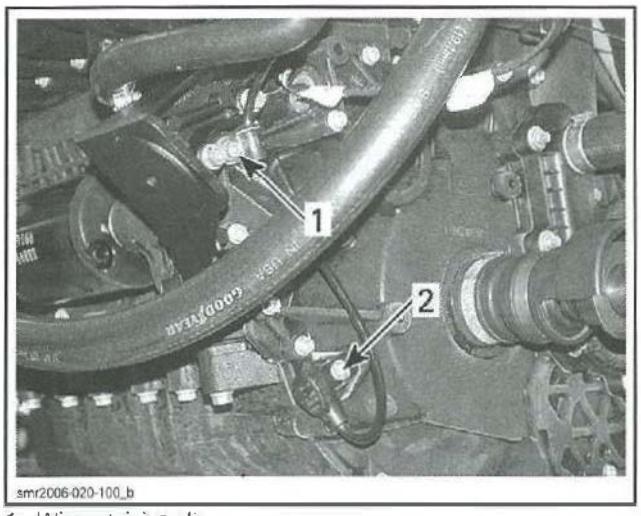
NOTE: It is not necessary to drain oil from engine.

6. Disconnect CPS connector.



TYPICAL

7. Remove wire retaining clip (as applicable).
8. Remove CPS retaining screw.



1. *Wire retaining clip*
2. *CPS retaining screw*

9. Pull out CPS.

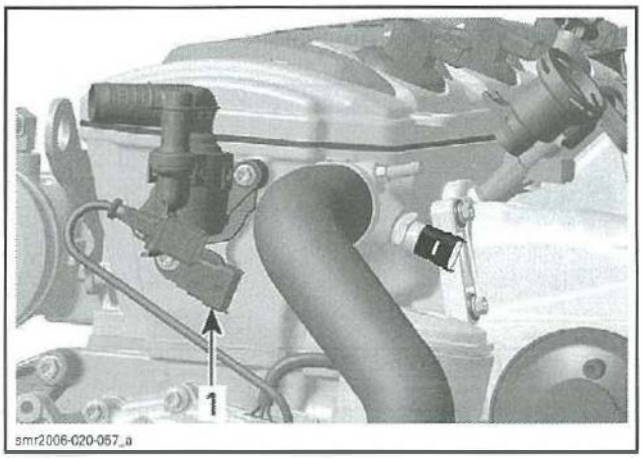
Installation is the reverse removal procedure. However, pay attention to the following.

10. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on CPS retaining screw threads, then torque to 9 N•m (80 lbf•**in**).
11. Refill engine oil and check oil level, refer to *LUBRICATION SYSTEM* subsection.

Trigger Wheel Inspection

Refer to *PTO HOUSING AND MAGNETO* in the *ENGINE* section.

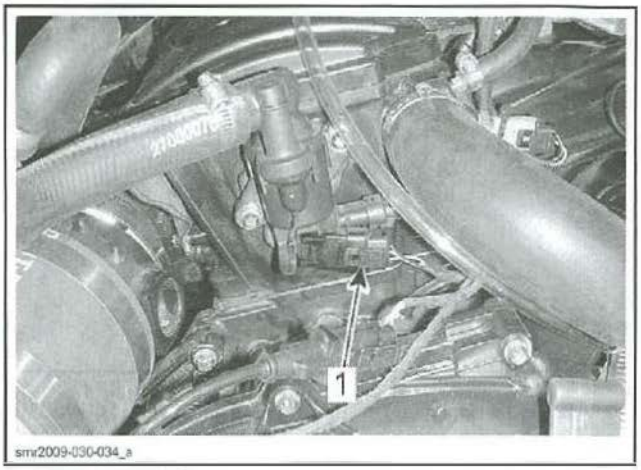
CAMSHAFT POSITION SENSOR (CAPS)



TYPICAL
1. *CAPS*

CAPS Voltage Test (Harness Side)

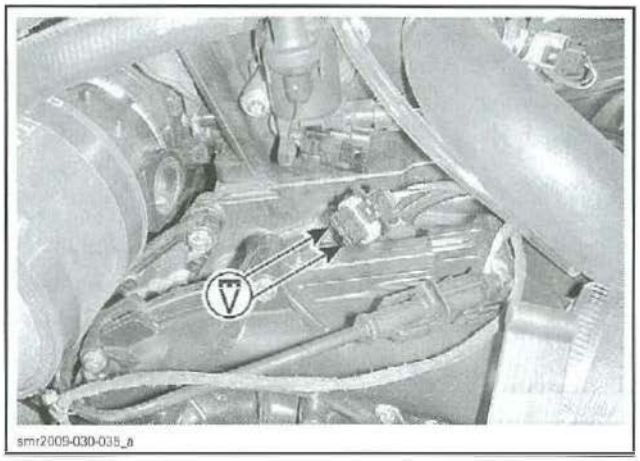
1. First check fuse F12 in fuse box. Replace as required.
2. Remove the parts required to access the CAPS, refer to *CAPS REPLACEMENT*.
3. Disconnect CAPS connector.



1. *CAPS connector*

4. Press the START button to wake up the ECM.
5. Install tether cord on engine cut-off switch.
6. Probe harness connector terminals as per following table.

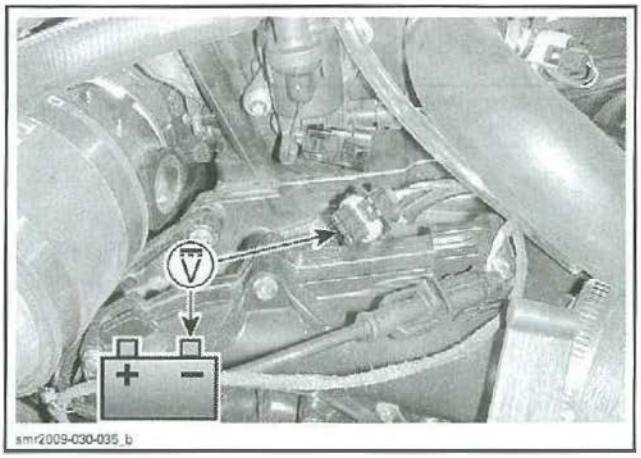
CAPS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
3	1	Battery voltage



If battery voltage is read, proceed with *CAPS DYNAMIC TEST* further in this subsection.

If battery voltage is not read, probe circuit as per following table.

CAPS CONNECTOR		MEASUREMENT
PIN		VOLTAGE
3	Battery ground	Battery voltage



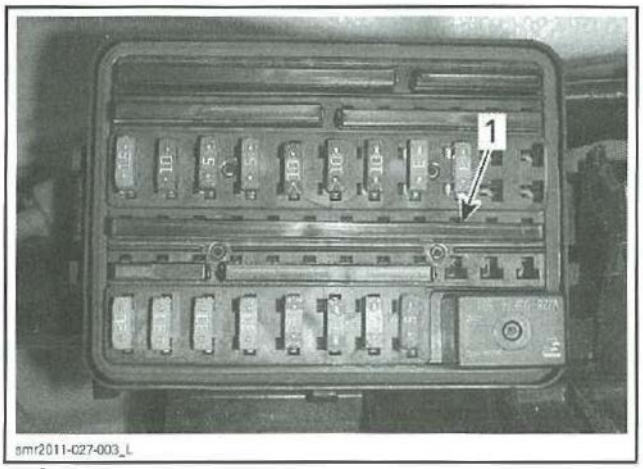
smr2009-030-035_b

If voltage is read to battery ground, check continuity of ground circuit between CAPS pin 1 and ECM connector "A" pin D4. Repair or replace wiring and connectors.

If voltage is not read to battery ground, carry out a *CONTINUITY TEST OF CAPS POWER CIRCUIT*.

Continuity Test of CAPS Power Circuit

1. Remove cover from fuse box. Refer to *POWER DISTRIBUTION*.
2. Remove the long bus bar.

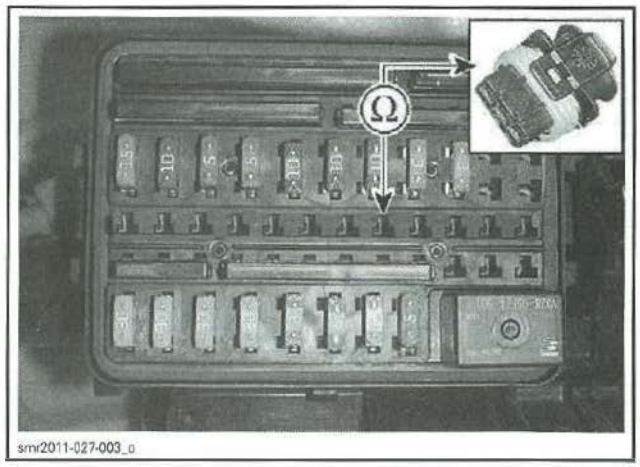


smr2011-027-003_L

1. Pull out

3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
4. Read resistance of the CAPS circuit as per following table.

FUSE BOX	CAPS CONNECTOR	RESISTANCE
TERMINAL	PIN	Ω
D8	3	Close to 0 Ω (continuity)



smr2011-027-003_a

If continuity is good, wiring and connectors are functional.

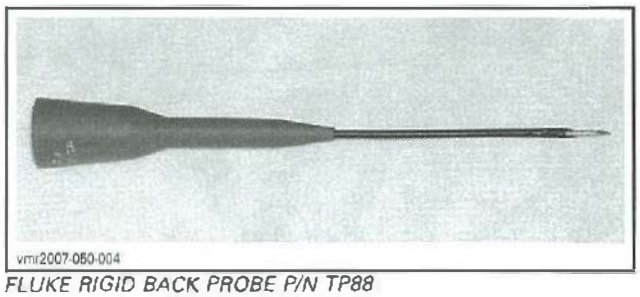
If a high resistance or an open circuit is measured, check the short bus bar in fuse box, repair or replace wiring and connectors from fuse box terminal to CAPS connector.

5. Reinstall bus bar and cover.

CAPS Dynamic Test

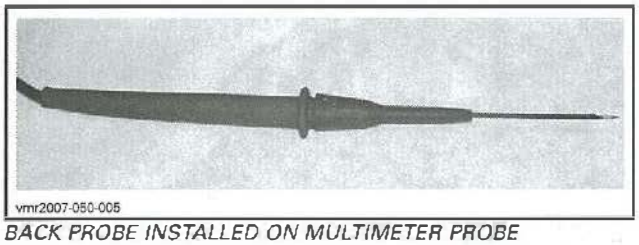
1. Remove the parts required to access the CAPS, refer to *CAPS REPLACEMENT*.
2. Remove CAPS sensor from engine.
3. Back-probe connector and read voltage as follows.

NOTE: To easily probe wire terminals through the back of the connector, use FLUKE RIGID BACK PROBE (P/N TP88) or equivalent.


vmr2007-050-004

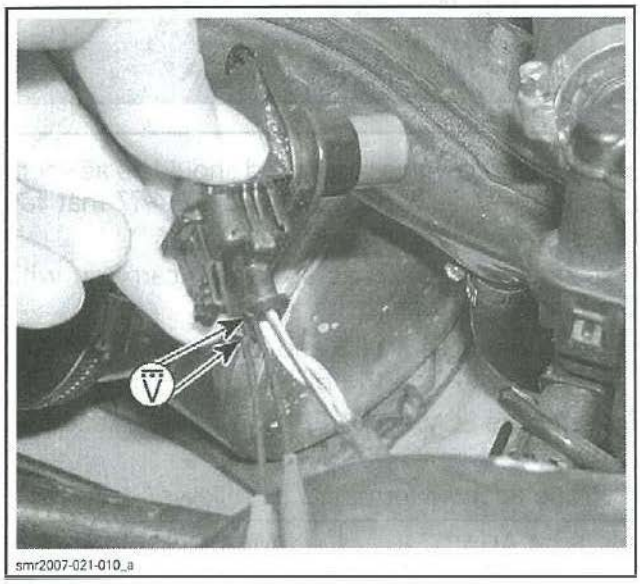
FLUKE RIGID BACK PROBE P/N TP88

They can be inserted at the end of the standard probes of the FLUKE 115 MULTIMETER (P/N 529 035 868).

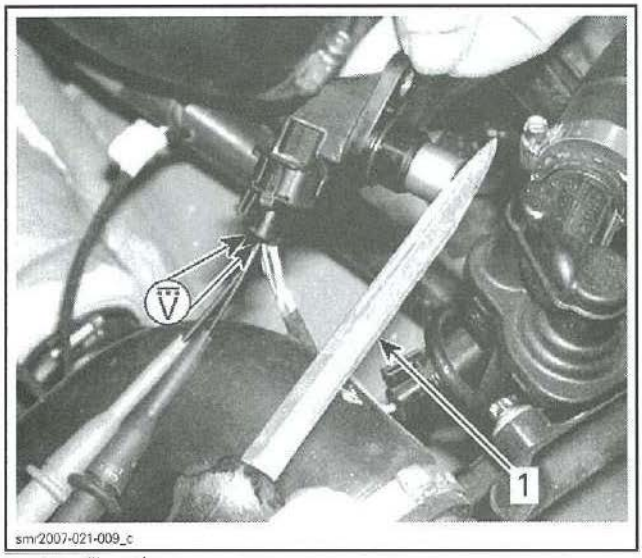

vmr2007-050-005

BACK PROBE INSTALLED ON MULTIMETER PROBE

CAPS CONDITION	CAPS CONNECTOR		VOLTAGE
Free	3	2	Close to 0 Vdc


smr2007-021-010_a

CAPS CONDITION	CAPS CONNECTOR		VOLTAGE
Metallic object on sensor	3	2	Battery voltage



smr2007-021-009_c

1. Metallic object

If voltage is as specified, repair or replace wiring and connectors between sensor and ECM.

If wiring is good, check ECM. Refer to *ENGINE CONTROL MODULE (ECM)*.

If battery voltage is not measured as specified, try a new CAPS.

CAPS Replacement

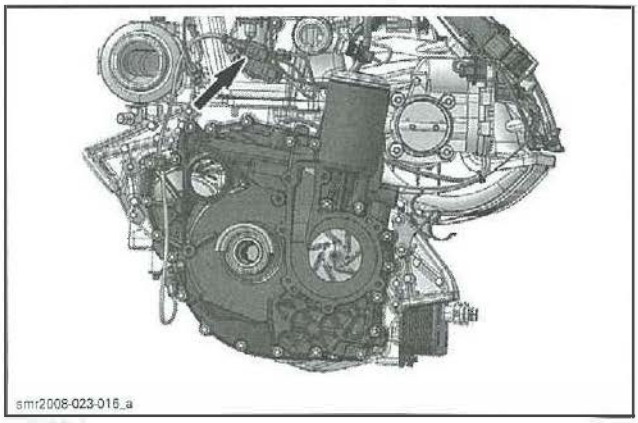
1. Open/remove seat.

iS/aS Models

2. Remove rear ventilation box. Refer to *BODY*.
3. Remove deck extension. Refer to *BODY*.

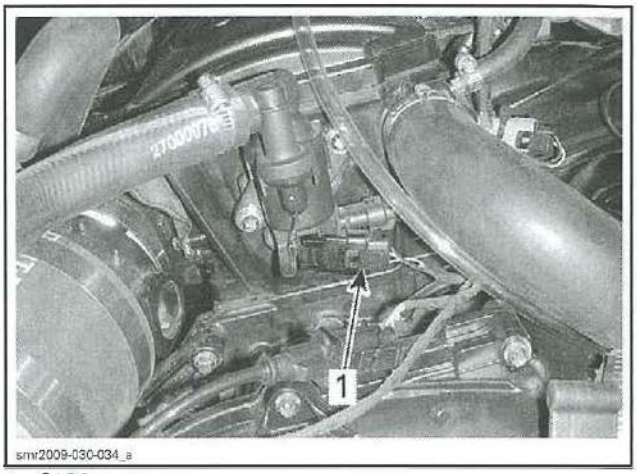
All Models

4. Remove air intake silencer. Refer to *AIR INTAKE SYSTEM*.
5. Detach CPS connector from its holder.


smr2008-023-016_a

TYPICAL

6. Disconnect CAPS connector.



smr2009-030-034_a

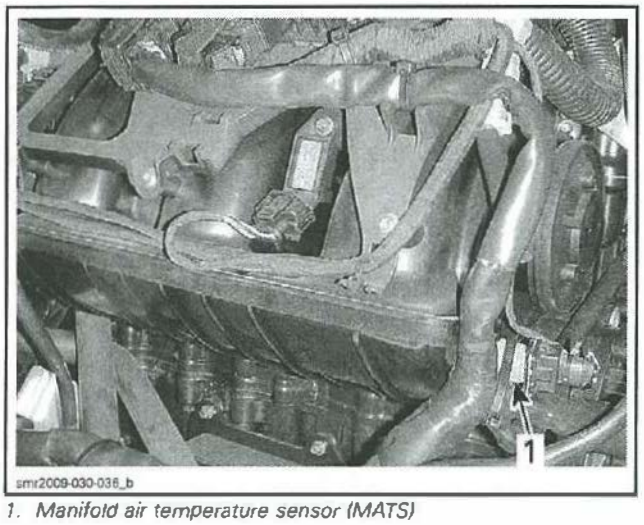
1. CAPS connector

7. Unscrew the CAPS retaining screw.
8. Pull CAPS from engine.
9. Install the new CAPS.

NOTICE Be sure to install new O-ring on the new CAPS.

10. Apply Loctite 243 (blue) on the CAPS retaining screw threads.
11. Torque the CAPS retaining screw to 9 N•m (80 lbf•in).

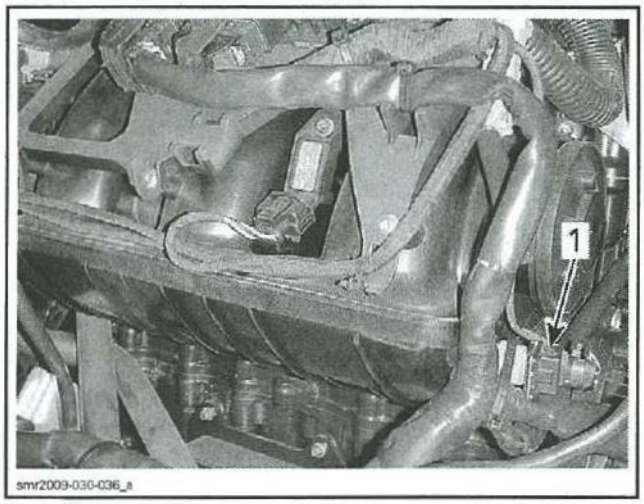
MANIFOLD AIR TEMPERATURE SENSOR (MATS)



1. Manifold air temperature sensor (MATS)

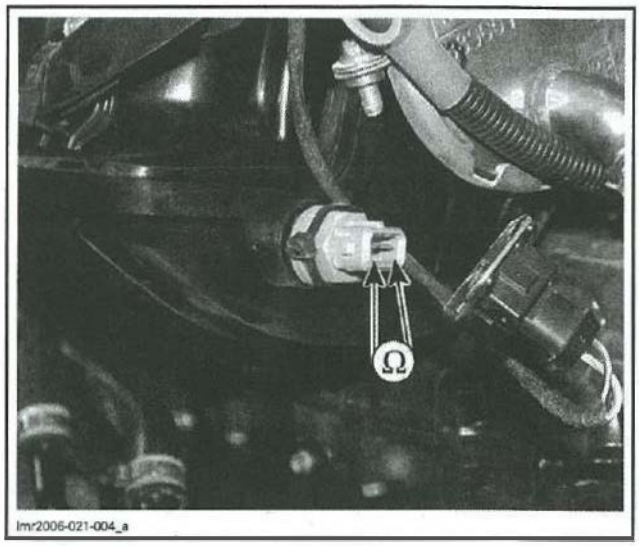
MATS Resistance Test

1. Remove the parts required to access the MATS, refer to *MATS REPLACEMENT.*
2. Disconnect the MATS connector.



1. MATS connector

3. Using the FLUKE 115 MULTIMETER (P/N 529 035 868) set to Ω, probe the MAPS sensor terminals.



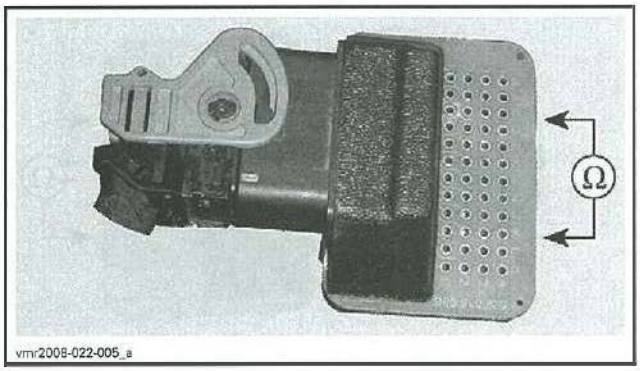
The resistance value measured should be as specified in the *MATS RESISTANCE CHART* that follows. Otherwise, replace the MATS.

If resistance value is as specified, carry on with the following steps.

4. Reconnect the MATS and disconnect the ECM connector "A" on the ECM.
5. Install the ECM ADAPTER TOOL (P/N 529 036 166) on ECM connector "A".
6. Probe adapter terminals as follows.

ECM ADAPTER		MEASUREMENT
PIN		RESISTANCE Ω
A-J3	A-H3	See *MATS RESISTANCE CHART*

MATS RESISTANCE CHART				
TEMPERATURE		RESISTANCE (OHMS)		
°C	°F	NOMINAL	LOW	HIGH
- 30	- 22	12600	11800	13400
- 20	- 4	11400	11000	11800
- 10	14	9500	8000	11,000
0	32	5900	4900	6900
10	50	3800	3100	4500
20	68	2500	2200	2800
30	86	1700	1500	1900
40	104	1200	1080	1320
50	122	840	750	930
60	140	630	510	750
70	158	440	370	510
80	176	325	280	370
90	194	245	210	280
100	212	195	160	210
110	230	145	125	160
120	248	115	100	125



If resistance value is as specified, check ECM. Refer to *ENGINE CONTROL MODULE (ECM)* in this section.

If resistance value is not as specified, repair or replace wiring and connectors between the ECM and the MATS.

MATS Replacement

1. Open/remove seat.

iS/aS Models

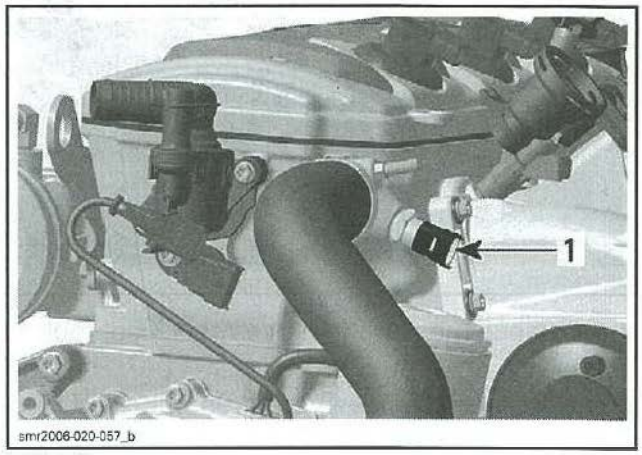
2. Remove rear ventilation box. Refer to *BODY*.

All Models

3. Disconnect the MATS connector.
4. Unscrew the MATS from the engine.
5. Install a new MATS and torque to 17 N•m (150 lbf•**in**).

NOTE: Be sure to install a new thrust washer on the MATS before installing it on the intake manifold.

COOLANT TEMPERATURE SENSOR (CTS)



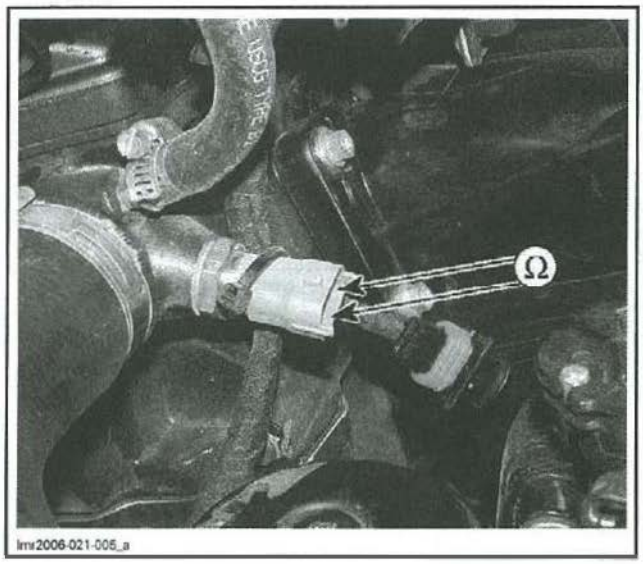
TYPICAL
1. Coolant temperature sensor (CTS)

NOTE: An overheat indication will come on in the information center when the coolant temperature reaches:

ENGINE	OVERHEAT TEMPERATURE
All 1503	110°C (230°F)

CTS Resistance Test

1. Remove the parts required to access the CTS, refer to *CTS REPLACEMENT*.
2. Disconnect the connector from the CTS and test the resistance of the sensor. Refer to the *CTS RESISTANCE CHART* further in this topic.



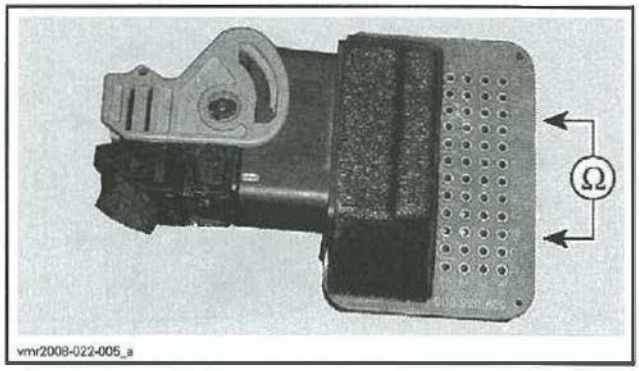
If resistance measured is not as specified, replace the CTS.

If the resistance measured is as specified, proceed with the following steps.

3. Reconnect the CTS connector and disconnect ECM connector "A" from the ECM.
4. Using a multimeter and the ECM ADAPTER TOOL (P/N 529 036 166), check the CTS circuit resistance as per table.

CTS RESISTANCE TEST		
ECM ADAPTER PIN		RESISTANCE Ω
A-A1	A-J2	See *CTS RESISTANCE CHART*

CTS RESISTANCE CHART				
TEMPERATURE		RESISTANCE (OHMS)		
°C	°F	NOMINAL	LOW	HIGH
- 30	- 22	12600	11800	13400
- 20	- 4	11400	11000	11800
- 10	14	9500	8000	11,000
0	32	5900	4900	6900
10	50	3800	3100	4500
20	68	2500	2200	2800
30	86	1700	1500	1900
40	104	1200	1080	1320
50	122	840	750	930
60	140	630	510	750
70	158	440	370	510
80	176	325	280	370
90	194	245	210	280
100	212	195	160	210
110	230	145	125	160
120	248	115	100	125



If the resistance value measured is as specified, check ECM. Refer to *ECM* further in this section.

If the resistance value is not within specification, repair or replace wiring and connectors between ECM connector and the CTS.

CTS Replacement

1. Open/remove seat.

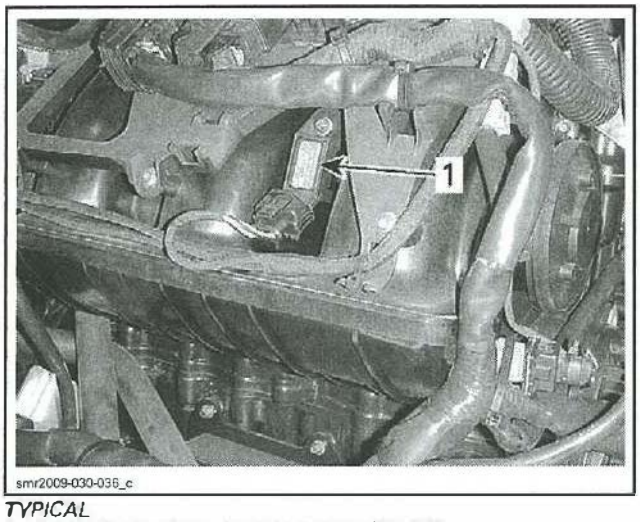
iS/aS Models

2. Remove rear ventilation box. Refer to *BODY*.
3. Remove deck extension. Refer to *BODY*.

All Models

4. Disconnect CTS connector and remove CTS.
5. Install the new CTS and torque to 18 N•m (159 lbf•**in**).
6. Reinstall remaining removed parts.

MANIFOLD ABSOLUTE PRESSURE SENSOR (MAPS)



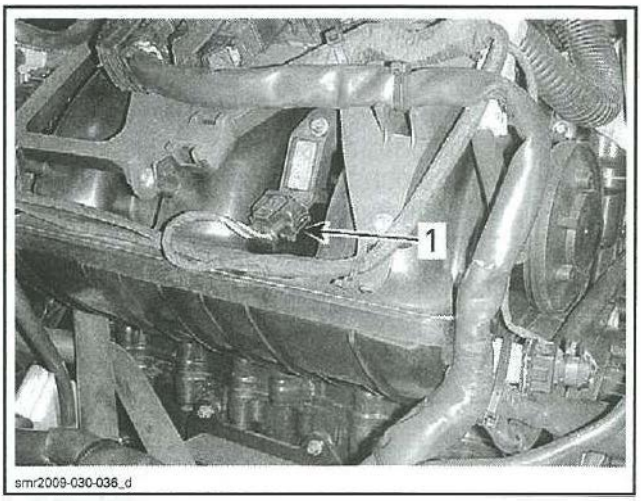
TYPICAL
1. Manifold absolute pressure sensor (MAPS)

NOTE: This sensor is a dual function device. When the engine is started and runs at idle speed, the sensor measures atmospheric pressure and stores it in the ECM. Thereafter, it measures manifold absolute pressure at operating RPMs.

Ensure sensor is correctly installed on intake manifold. Otherwise, the MAPS could generate a fault code for an unexpected sensor range at idle when it reads atmospheric pressure. Remove sensor and check for oil or dirt on its end and if problem persists, check throttle plate condition/position and the wiring harness. Perform the following tests.

MAPS Voltage Test

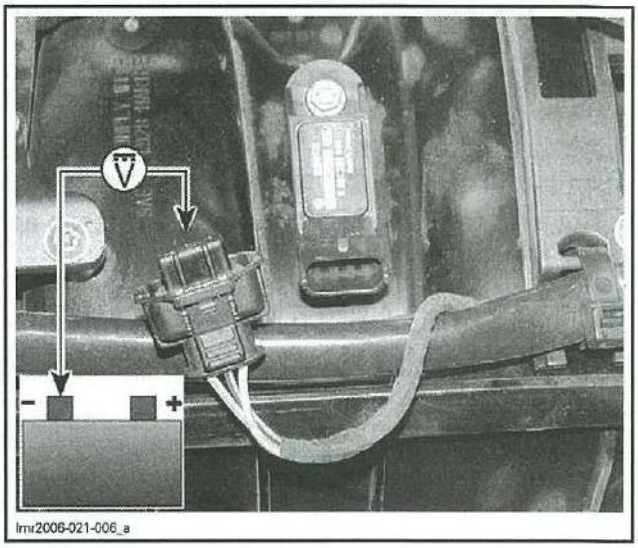
1. Remove the parts required to access the MAPS, refer to *CTS REPLACEMENT* in this subsection.
2. Disconnect connector from MAPS.



1. Disconnect

3. Press the START button to wake up the ECM.
4. Install the tether cord on the engine cut-off switch.
5. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Vdc.
6. Read voltage as per following table.

MAPS CONNECTOR	VOLTAGE
Terminal 1 to battery ground	Approx. 5 V
Terminal 2 to battery ground	Approx. 0 V
Terminal 3 to battery ground	Approx. 0 V



If voltage measured is as specified, replace the MAPS.

If voltage measured is not as specified, refer to *CONTINUITY TEST OF MAPS WIRING HARNESS*.

Continuity Test of MAPS Wiring Harness

1. Disconnect ECM connector "A" from the ECM.
2. Using a multimeter and the ECM ADAPTER TOOL (P/N 529 036 166), test for circuit continuity as per following table.

MAPS CONNECTOR	ECM CONNECTOR	RESISTANCE
Pin 1	A-B4	Close to 0 Ω continuity
Pin 2	A-G4	
Pin 3	A-H2	

3. If wiring harness is good, check ECM. Refer to *ENGINE CONTROL MODULE (ECM)* in this subsection.
4. If a high resistance or an open circuit is measured, repair or replace wiring and connectors between the ECM and the MAPS.

MAPS Replacement

1. Open/remove seat.

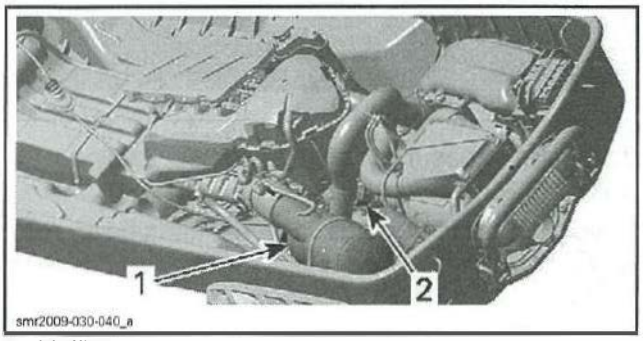
iS/aS Models

2. Remove rear ventilation box. Refer to *BODY*.
3. Remove deck extension. Refer to *BODY*.

All Models

4. Disconnect MAPS connector and remove the MAPS.
5. Install the new MAPS paying attention to index its tab into the adaptor notch.
6. Apply Loctite 243 (blue) on retaining screw and torque to 10 N•m (89 lbf•**in**).
7. Reinstall remaining parts removed, refer to applicable subsections.

EXHAUST GAS TEMPERATURE SENSOR (EGTS)



1. Muffler
2. Exhaust gas temperature sensor (EGTS)

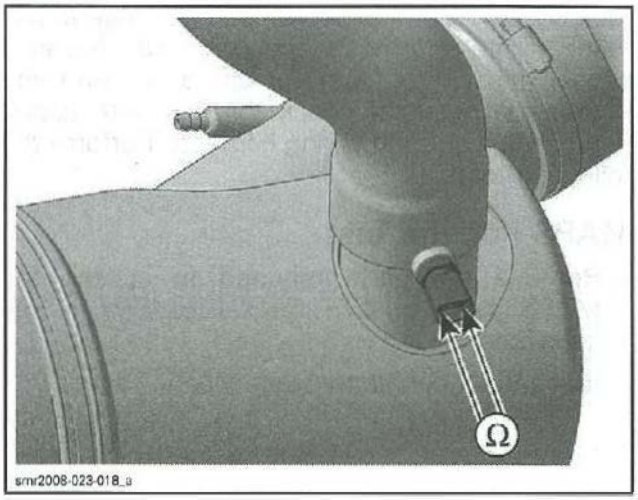
NOTE: An overheat signal will come on in the information center when the exhaust temperature reaches.

ENGINE	OVERHEAT TEMPERATURE
All 1503	110°C (230°F)

EGTS Resistance Test

1. Remove the parts required to access the EGTS, refer to *EGTS REPLACEMENT* in this subsection.
2. Disconnect the connector from the EGTS.
3. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω selection and measure the resistance of the sensor.





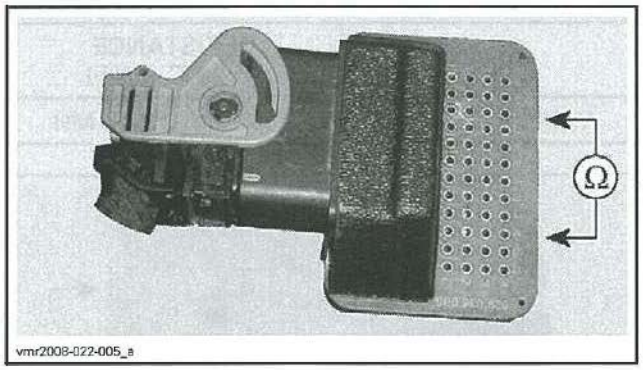
The resistance should be as per the *EGTS RESISTANCE CHART* that follows. Otherwise, replace the EGTS.

If the EGTS resistance is within specifications, proceed with the following steps.

4. Reconnect the EGTS and disconnect ECM connector "A" from the ECM.
5. Using a multimeter and the ECM ADAPTER TOOL (P/N 529 036 166), check the circuit resistance as per following table.

ECM ADAPTER		MEASUREMENT
PIN		RESISTANCE Ω
A-J4	A-H4	See *EGTS RESISTANCE CHART*

EGTS RESISTANCE CHART				
TEMPERATURE		RESISTANCE (OHMS)		
°C	°F	NOMINAL	LOW	HIGH
- 30	- 22	12600	11800	13400
- 20	- 4	11400	11000	11800
- 10	14	9500	8000	11,000
0	32	5900	4900	6900
10	50	3800	3100	4500
20	68	2500	2200	2800
30	86	1700	1500	1900
40	104	1200	1080	1320
50	122	840	750	930
60	140	630	510	750
70	158	440	370	510
80	176	325	280	370
90	194	245	210	280
100	212	195	160	210
110	230	145	125	160
120	248	115	100	125



If resistance value is as specified, check ECM. Refer to *ENGINE CONTROL MODULE (ECM)* in this subsection.

If resistance value is not within specifications, repair or replace wiring and connectors between the ECM and the EGTS.

EGTS Replacement

iS/aS Models

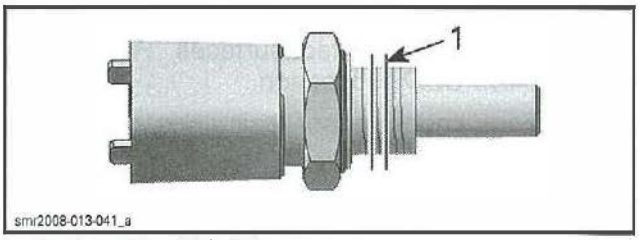
1. Open the boarding platform and remove the LH storage basket.

GTX/RXT/Wake Pro Models

2. Remove the LH access panel on the boarding platform.
3. Disconnect the exhaust hose from the muffler.

All Models

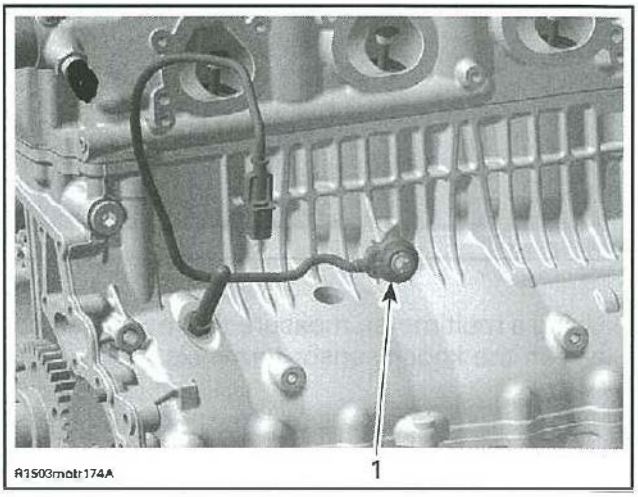
4. Disconnect the EGTS connector.
5. Unscrew EGTS from muffler.
6. Apply LOCTITE 518 (P/N 293 800 038) on the middle threads of the new EGTS.



1. Apply Loctite 518 in this area

7. Install the EGTS.
8. Torque the sensor to 16 N•m (142 lbf•**in**).
9. Install the EGTS connector.
10. Install all other removed parts, refer to applicable subsections.

KNOCK SENSOR (KS)



1. Knock sensor (KS)

KS Dynamic Test

1. Connect watercraft to B.U.D.S. software, refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In B.U.D.S., click the Faults tab and look for a **Knock sensor fault**.

3. Start the engine and bring engine RPM above 5000 RPM.
4. Using the B.U.D.S. software, monitor the knock sensor for a fault code.

If no fault occurs, the knock sensor is good.

If a fault occurs, carry out the following steps.

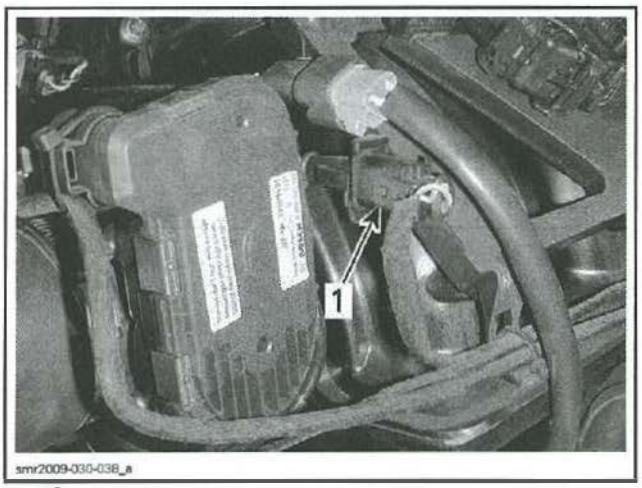
5. Ensure sensor and cylinder head contact surfaces are clean.
6. Ensure the correct mounting bolt and washer are used and are properly torqued.

NOTE: It is necessary to remove the intake manifold to inspect the contact surfaces. Refer to *INTAKE MANIFOLD* subsection.

7. Check the knock sensor resistance, refer to *KS RESISTANCE TEST.*

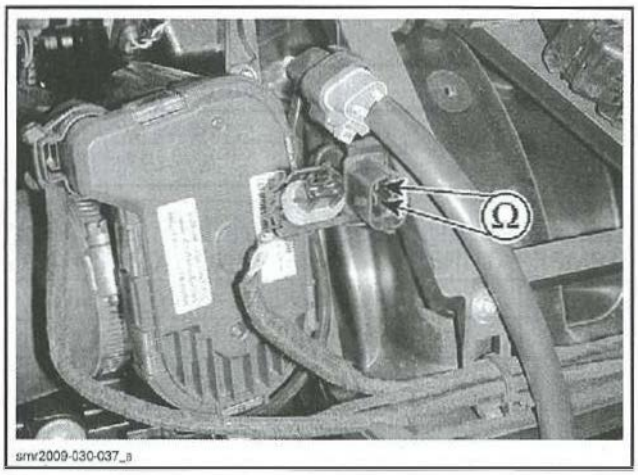
KS Resistance Test

1. Remove the parts required to access the knock sensor, refer to *KS REPLACEMENT.*
2. Disconnect the knock sensor connector.



1. KS connector

3. Using a multimeter, measure the resistance between the knock sensor terminals.



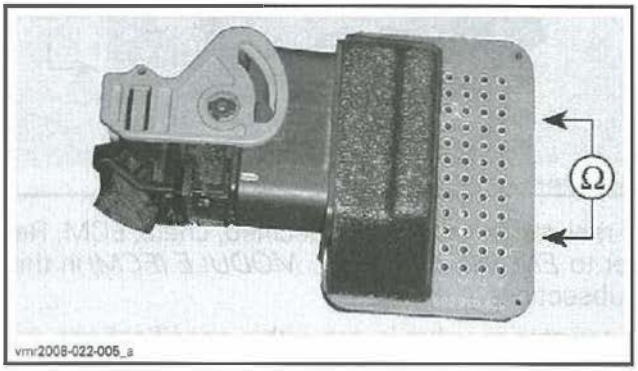
KNOCK SENSOR RESISTANCE @ 20°C (68°F)
Approximately 5 MΩ

If resistance is not as specified, replace knock sensor.

If resistance is as specified, carry on with the following steps.

4. Reconnect the knock sensor connector.
5. Disconnect connector "A" from the ECM.
6. Using a multimeter and the ECM ADAPTER TOOL (P/N 529 036 166), check circuit resistance through the knock sensor as per following table.

ECM ADAPTER		MEASUREMENT
PIN		RESISTANCE @ 20°C (68°F)
A-C3	A-G2	Approximately 5 MΩ



If wiring harness is good, check ECM. Refer to *ENGINE CONTROL MODULE (ECM)* in this section.

If an open circuit is measured, repair or replace wiring and connectors between ECM and knock sensor.

KS Replacement

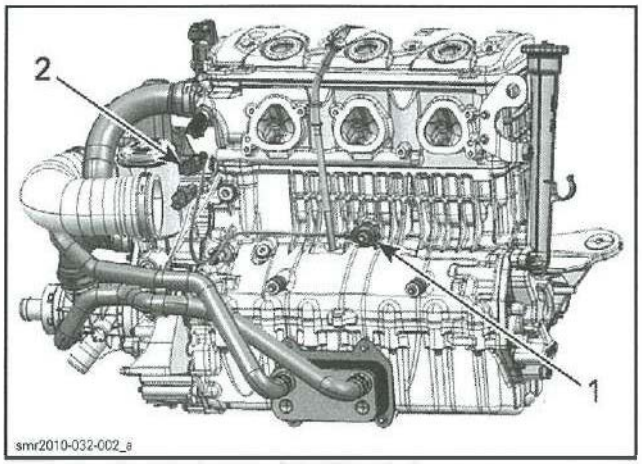
1. Open/remove seat.

iS/aS Models

2. Remove rear ventilation box. Refer to *BODY*.
3. Remove deck extension. Refer to *BODY*.

All Models

4. Remove air intake silencer. Refer to *AIR INTAKE SYSTEM*.
5. Remove the intake manifold. Refer to *INTAKE MANIFOLD* subsection.
6. Disconnect KS sensor connector.



TYPICAL - INTAKE MANIFOLD REMOVED
1. *Knock sensor*
2. *Knock sensor connector*

7. Unscrew and remove knock sensor from engine.
8. Clean contact surfaces.
9. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) in threaded hole then install the new knock sensor.
10. Torque sensor retaining screw to 23 N•m (17 lbf•ft).

NOTICE **Improper torque might prevent sensor to work properly and lead engine to severe damage of internal components.**

11. Reconnect knock sensor connector.
12. Reinstall remaining removed parts, refer to applicable subsections.

FUEL TANK AND FUEL PUMP

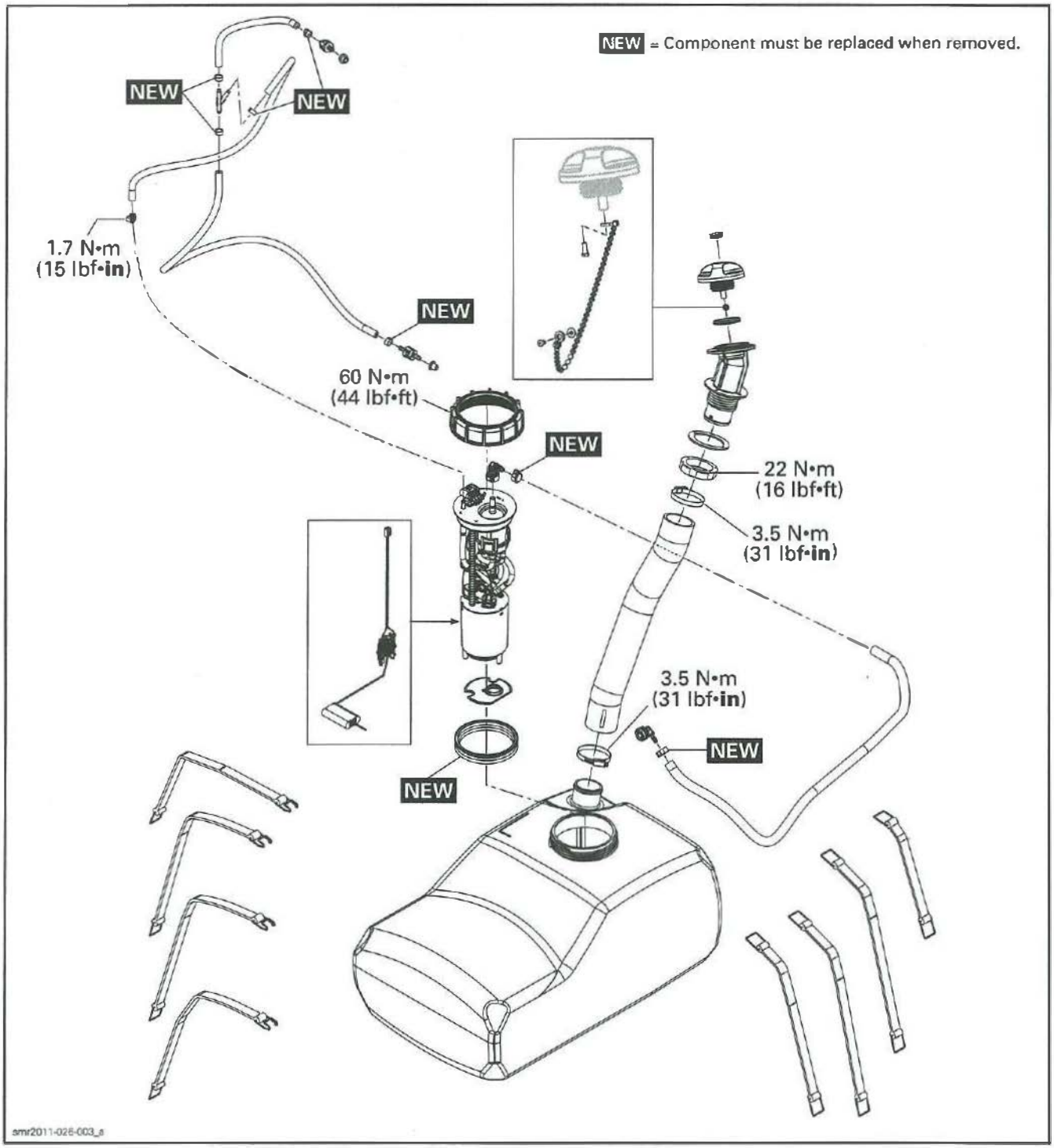
SERVICE TOOLS

Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 188	342
ECM ADAPTER TOOL	529 036 166	338
FLUKE 115 MULTIMETER	529 035 868	337, 342–343
FUEL HOSE ADAPTER	529 036 023	335
FUEL PUMP MODULE SOCKET	529 036 125	339
OETIKER PLIERS	295 000 070	336
PRESSURE GAUGE	529 035 709	335
SMALL HOSE PINCHER	295 000 076	332–333
VACUUM/PRESSURE PUMP	529 021 800	331

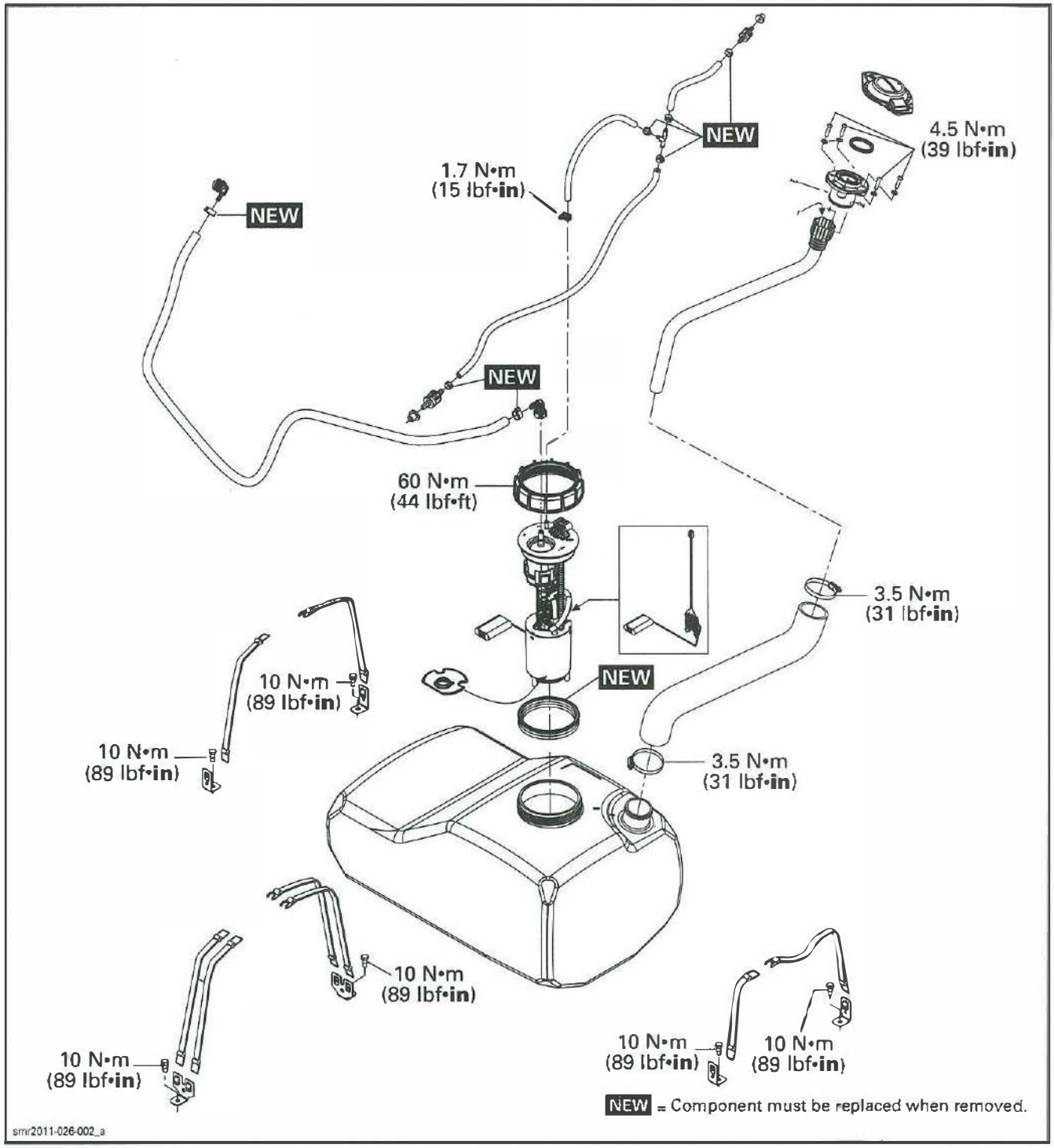
green-manuals

FUEL TANK AND FUEL PUMP

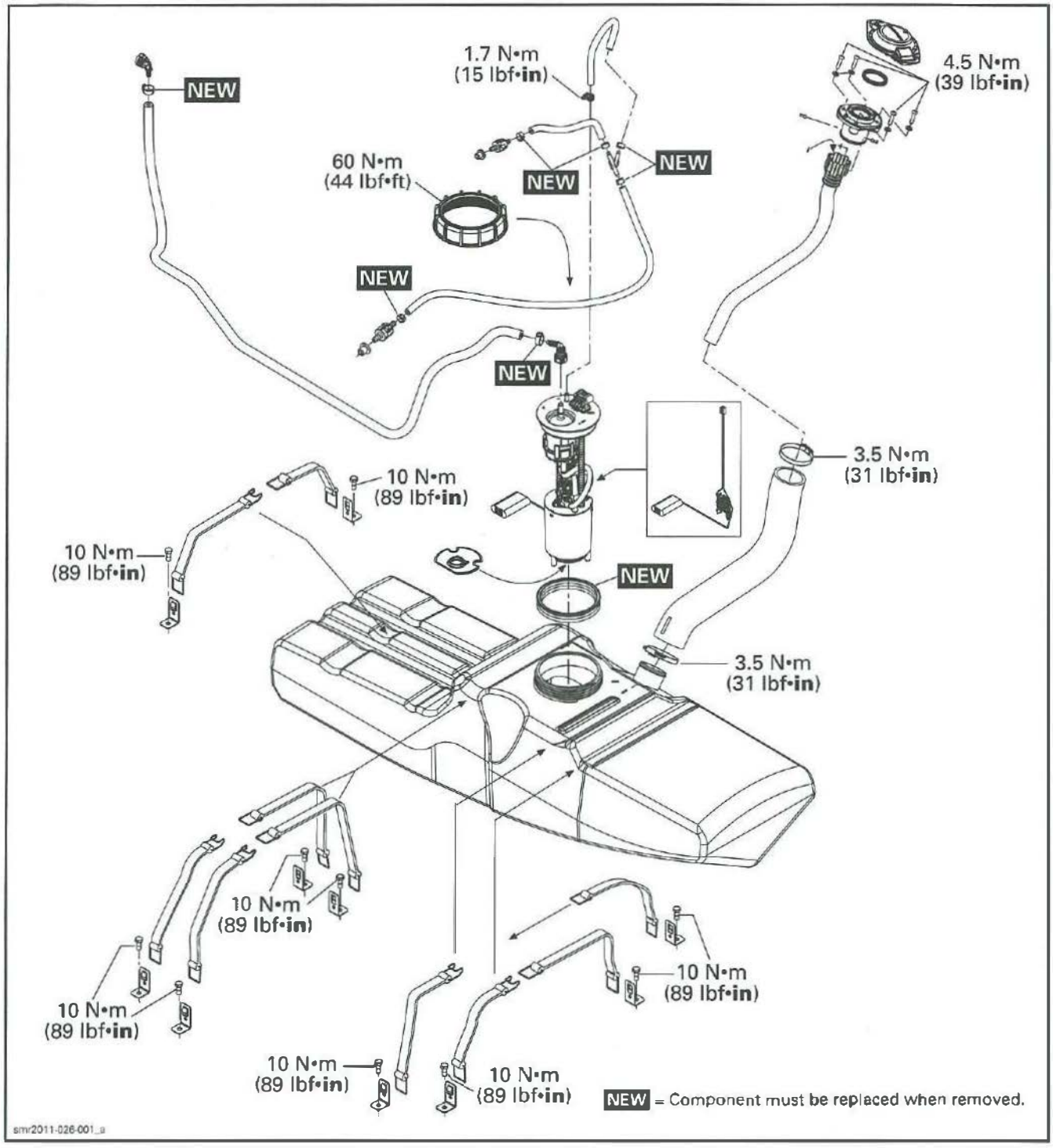
GTS and GTI Series



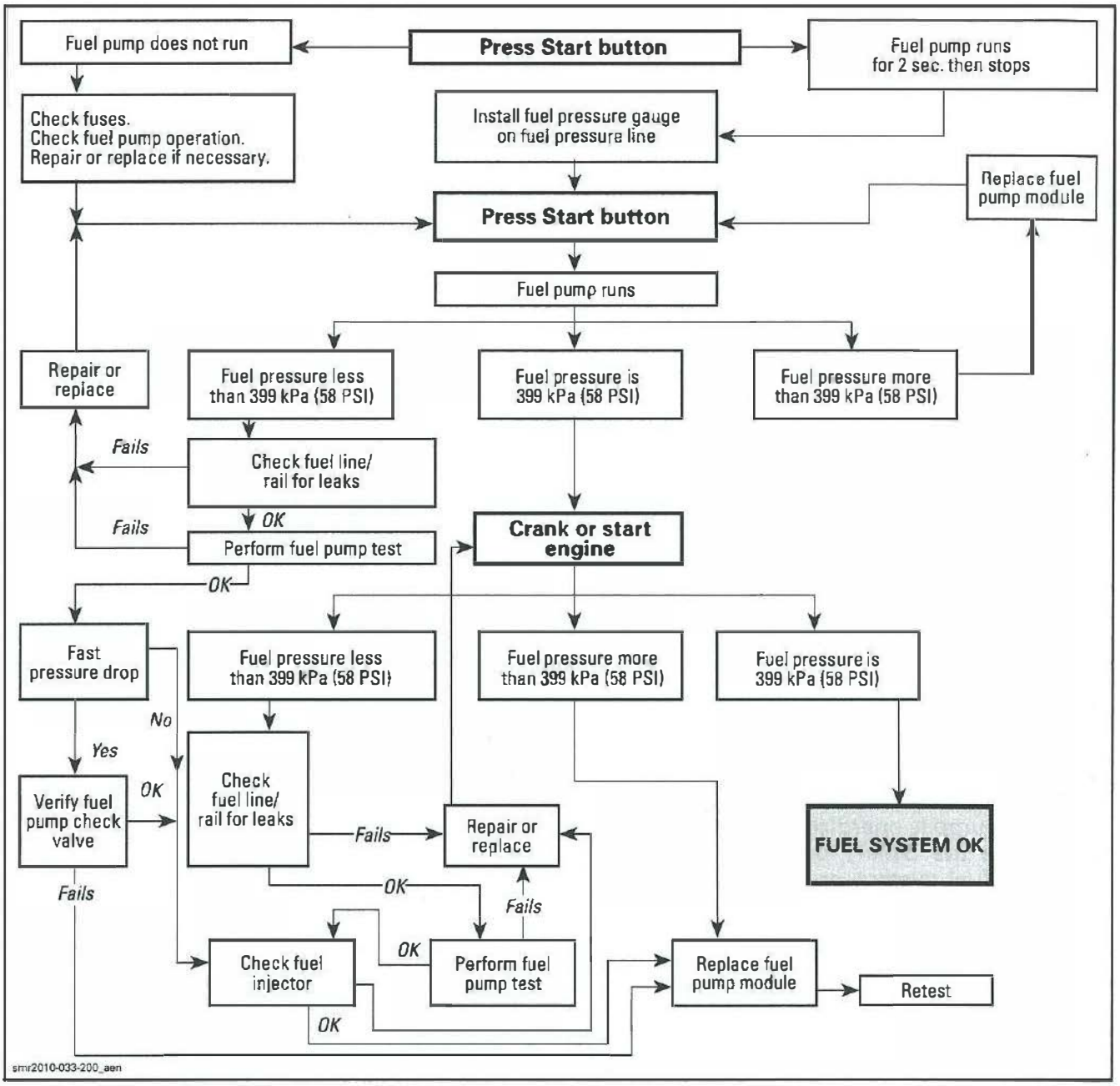
RXT 260, RXT X 260, RXT XRS 260, GTX 155, GTX 215 and WAKE PRO 215



RXT iS 260, RXT aS X 260, RXT aS XRS 260, GTX iS 215 and GTX LTD iS 260



FUEL SYSTEM DIAGNOSTIC FLOW CHART



GENERAL

⚠ WARNING

Fuel lines remain under pressure at all times. Always proceed with care and use appropriate safety equipment when working on a pressurized fuel system. Wear safety glasses.

⚠ WARNING

Always disconnect battery prior to working on the fuel system. Fuel vapors are flammable and explosive under certain conditions. Always work in a well ventilated area. Do not allow fuel to spill on hot engine parts and/or on electrical connectors. Proceed with care when removing/installing high pressure test equipment or disconnecting fuel line connections. Cover the fuel line connection with an absorbent shop rag. Wipe off any fuel spillage in the bilge.

⚠ WARNING

When the repair is completed, ensure that hoses and connections from fuel rail to the fuel pump are properly secured. Then, pressurize the fuel system. After carrying out a fuel pump pressure test, use the valve on the fuel pressure gauge to release the pressure (if so equipped).

⚠ WARNING

The fuel pump is energized for a few seconds each time the START button is depressed. It builds fuel system pressure very quickly. Prior to pressing the START button, ensure there are no disconnected or damaged fuel lines that may leak fuel. A high pressure leak test must be carried out whenever a fuel system component has been disconnected.

⚠ WARNING

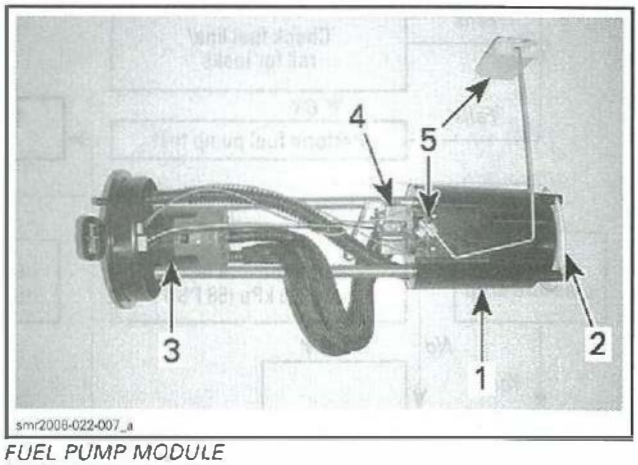
Ensure wires and hoses are routed and secured away from any vibrating, rotating, moving or hot components or sharp edges. Use appropriate shields and fastening devices as per factory standards.

NOTICE Whenever repairing the fuel system, always check for water infiltration in the fuel tank. Replace any damaged, leaking or deteriorated fuel line.

SYSTEM DESCRIPTION

The fuel system is comprised of:
- A fuel tank
- A non-vented fuel tank cap
- A fuel pump module mounted inside the fuel tank
- A fuel vent system, and
- A variety of hoses.

The fuel pump module is basically comprised of:
- An electric fuel pump mounted inside a canister type pump reservoir
- A lower inlet filter
- An upper outlet filter
- A pressure regulator
- A float type fuel level sensor.



FUEL PUMP MODULE
1. *Fuel pump reservoir*
2. *Lower inlet filter*
3. *Upper outlet filter*
4. *Fuel pressure regulator*
5. *Float type fuel level sensor*

Fuel Pump Operation

When the pump is in operation, it draws fuel into the canister through a lower inlet filter and a disk type valve.

The pressurized fuel is pushed through an upper outlet filter to the fuel rail.

Excess fuel pressure generated by the pump is routed from the upper filter back to the pump canister reservoir by a pressure regulator mounted on the pump reservoir cover.

When the START button is pressed, the electrical system is powered. The fuel pump will come on for approximately 2 seconds to pressurize the fuel rail in preparation for the engine start.

The ECM supplies the ground signal to turn on the fuel pump motor.

The pressure regulator will ensure appropriate fuel pressure is supplied to the injectors.

When the ECM receives a signal to shut down the engine (START/STOP switch, engine cut-off switch, or T.O.P.S. switch) it removes the fuel pump ground signal.

Fuel Level Indication

An electric float type fuel level sensor is mounted on the side of the fuel pump reservoir. As the float moves with changing fuel levels, it varies a resistance that changes the voltage signal coming from the information center (multifunction gauge). This signal is representative of the fuel level.

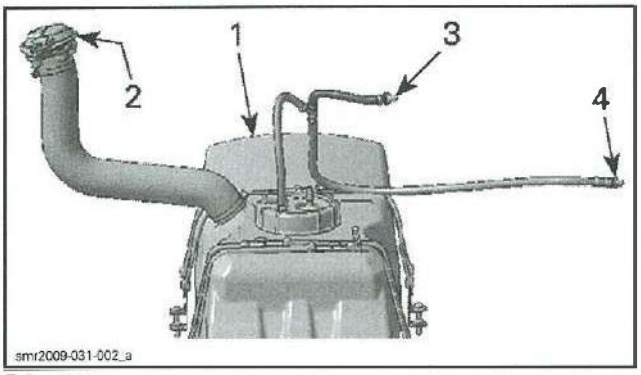
The information center interprets the fuel level voltage signal that comes back from the fuel level sensor. It then displays the proper fuel level in the information center and a low fuel warning message when required.

The information center will also trigger the beeper which produces the appropriate beep signal to warn the driver of a low fuel condition.

The fuel level sensor resistance is at its lowest value when the fuel tank is full, and at its highest value when the tank is empty.

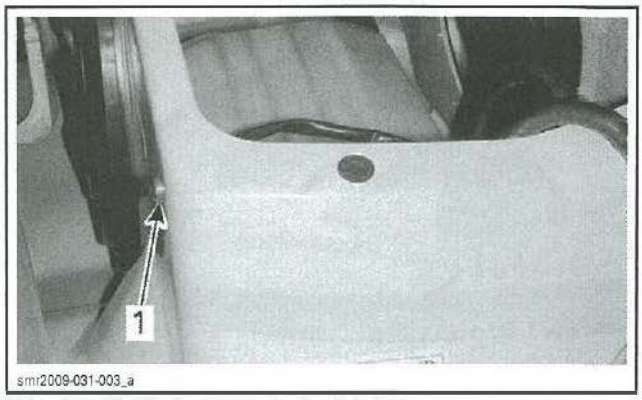
Refer to the *FUEL LEVEL SENSOR* in this subsection for fuel level sensor testing procedures.

Fuel Tank Vent System Operation



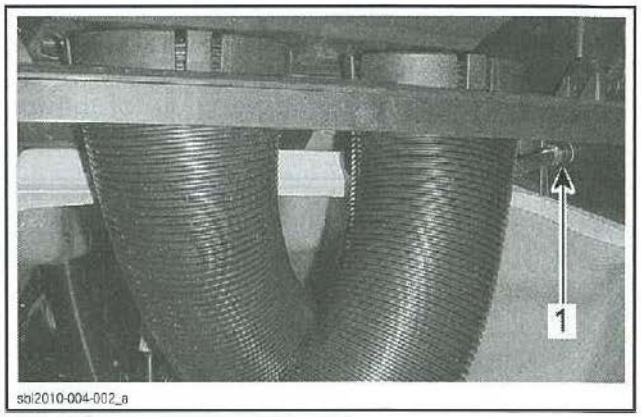
TYPICAL
1. *Fuel tank*
2. *Fuel tank cap*
3. *Inlet valve (check valve)*
4. *Outlet valve (fuel pressure relief valve)*

RXT iS, RXT aS and GTX iS Series



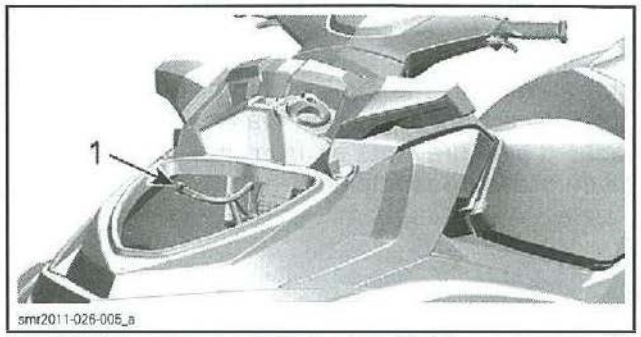
RH SIDE OF FRONT VENTILATION BOX
1. *Inlet valve*

RXT 260, RXT X 260, RXT XRS 260, GTX 155, GTX 215 and WAKE PRO 215



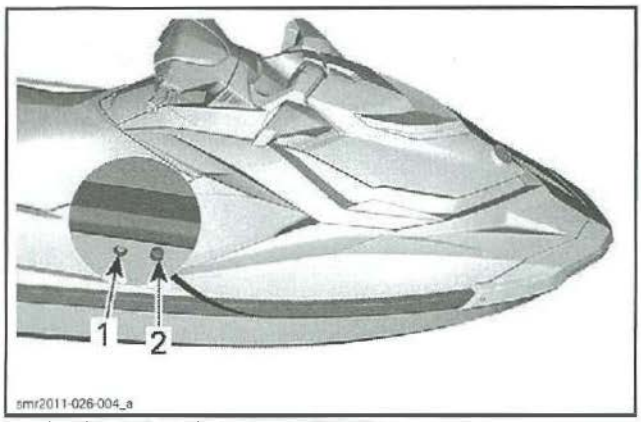
LH SIDE OF FRONT BODY MODULE
1. *Inlet valve*

GTS 130, GTI 130, GTI 155 and WAKE 155



ON RH SIDE - BEHIND LATERAL TRIM PANEL
1. *Inlet valve*

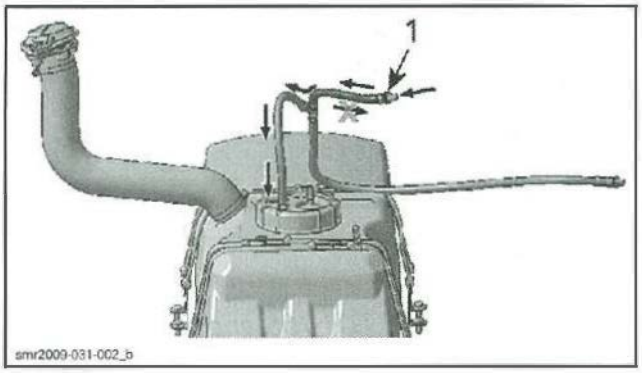
All Models



RH SIDE OF HULL (BELOW BUMPER)
1. Outlet valve
2. Battery vent hose (GTS and GTI only)

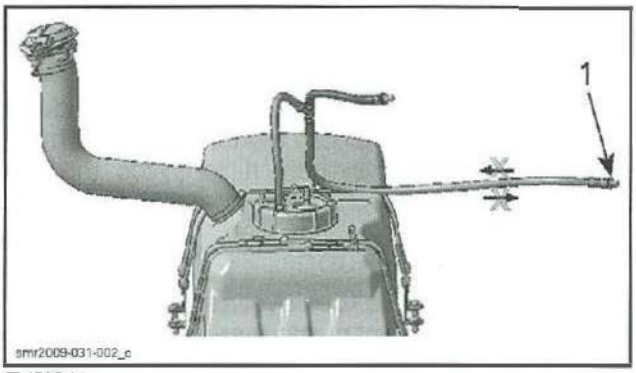
The inlet valve is located high in the watercraft to prevent water entry in fuel tank.

The inlet valve is a check valve that allows air to enter the fuel tank and prevents fuel starvation. It also prevents fuel from flowing out of the fuel tank.



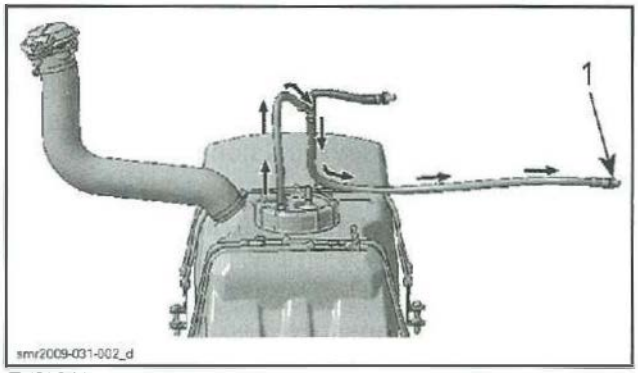
TYPICAL
1. Inlet valve

The outlet valve is a pressure relief valve that is normally closed to prevent water entry in the fuel tank. It also prevents air from flowing out until a given pressure is attained.



TYPICAL
1. Outlet valve

If pressure in the fuel tank builds up and exceeds 2.8 kPa - 7.6 kPa (.4 PSI - 1.1 PSI), the outlet valve opens to let the excess pressure out of the fuel tank.



TYPICAL
1. Outlet valve

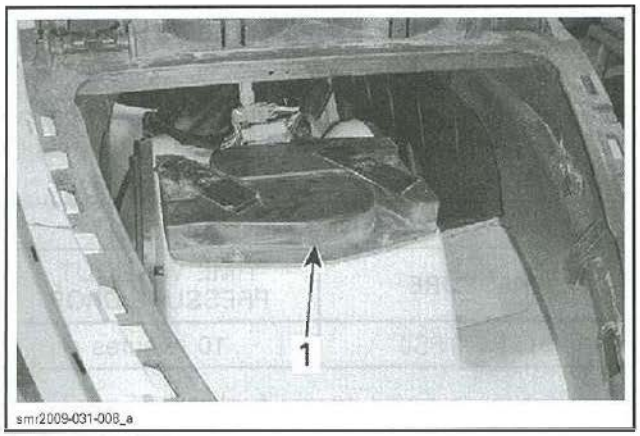
INSPECTION

FUEL TANK LEAK TEST

1. Fill up fuel tank.
2. Close fuel tank cap.
3. Open front storage compartment cover.
4. Remove storage bin or partitions. Refer to *BODY* subsection.

iS and aS Models

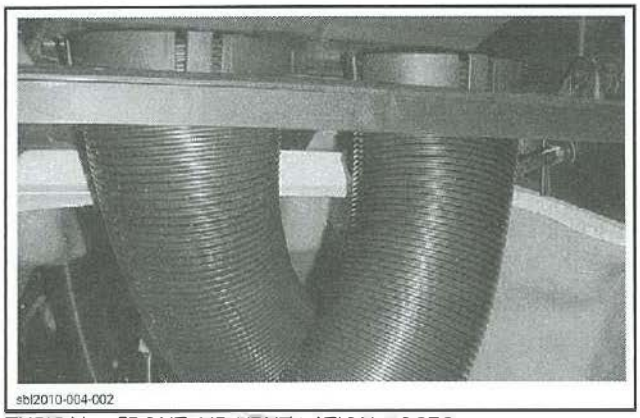
5. Remove front ventilation box.



1. *Ventilation box*

Models Without iS and aS

6. Disconnect the top of the two front air ventilation hoses, refer to *BODY* subsection.



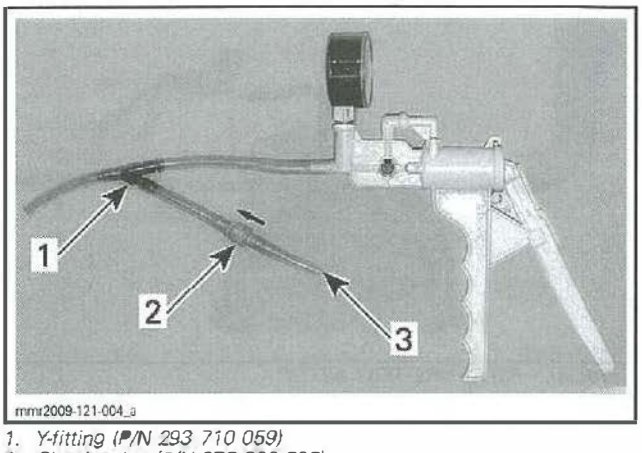
TYPICAL - FRONT AIR VENTILATION HOSES

All Models

7. Visually inspect condition of hoses and clamps.
8. Pull inlet valve out of its grommet. Refer to *FUEL TANK VENT SYSTEM OPERATION* for inlet valve location.
9. Pressurize fuel tank.

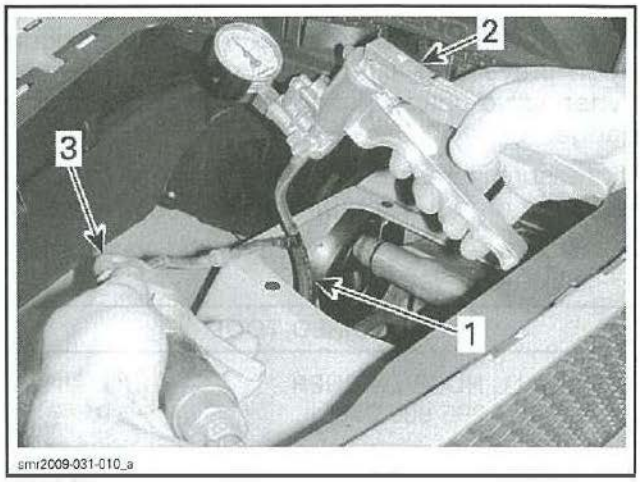
REQUIRED TOOL	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	

NOTE: A Y-fitting and a check valve can be installed to use compressed air for quick pressure build-up when the fuel tank is not full.



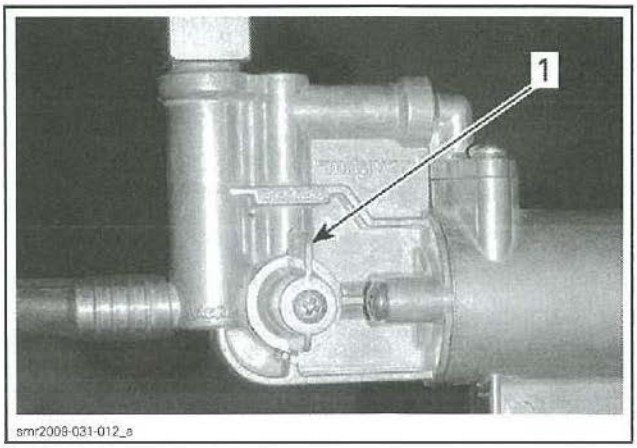
1. *Y-fitting (P/N 293 710 059)*
2. *Check valve (P/N 275 500 505)*
3. *Apply compressed air here*

10. Install the vacuum/pressure pump on the inlet valve end.

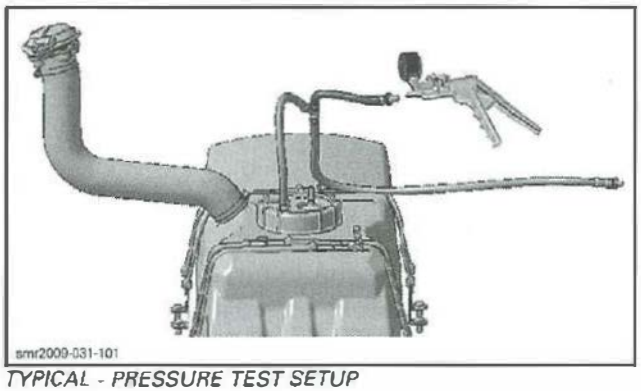


TYPICAL
1. *Inlet valve end*
2. *Vacuum/pressure pump*
3. *Compressed air supply*

11. Set vacuum/pressure pump to pressure.



1. *Pressure selected*



TYPICAL - PRESSURE TEST SETUP

12. Slowly apply air pressure.

NOTE: If pressure rises quickly within a few strokes of the pump, the inlet valve is likely clogged. Refer to *INLET CHECK VALVE TEST* in this subsection.

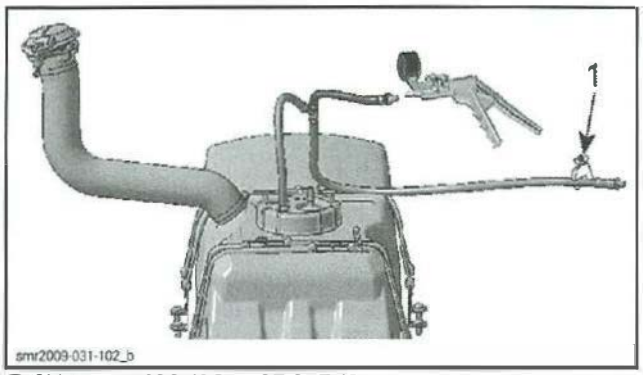
When pressure has reached 2.8 kPa - 7.6 kPa (.4 PSI - 1.1 PSI) the pressure relief valve should open preventing a further increase in pressure. When valve opens, pressure must drop at pump gauge.

If pressure increases above specification or gauge does not drop to zero (0), replace outlet valve.

13. Block the vent hose near outlet valve (pressure relief valve).

REQUIRED TOOL	
SMALL HOSE PINCHER (P/N 295 000 076)	

NOTE: To validate outlet hose, connection and valve altogether, a test cap (P/N 293 000 105) or an equivalent hand made plug (such as a capped vent hose) can be installed on the outlet nipple of the valve.



TYPICAL - PRESSURE TEST SETUP
1. Hose pincher

14. Slowly apply pressure until it nearly attains the pressure specification.

NOTICE Do not exceed the specification when pressurizing the fuel tank.

15. Bring the test pressure to the specification by manually pumping the vacuum/pressure pump.

FUEL TANK LEAK TEST	
PRESSURE	TIME WITHOUT PRESSURE DROP
21 kPa (3 PSI)	10 minutes

If the pressure drops, locate fuel leak(s), repair/replace leaking component(s) and carry out a new fuel system leak check to validate repair and ensure there are no other leaks.

Possible leak areas are:
- Inlet valve
- Fuel tank
- Fuel tank neck
- Fuel tank cap
- Fuel pump gasket
- Vent hoses
- Connections and valves
- Filler hose and connections
- Fuel hose and connections
- Fuel rail and injector(s).

To locate a leak, check for a fuel smell or leaking fuel.

If a fuel smell is detected but a leak is not visible, spray a soapy water solution on components to ease locating the leak(s); bubbles will indicate the leak location(s).

NOTE: If the pressure drops and no leak has been found, it is likely a leaking fuel injector. Refer to *ELECTRONIC FUEL INJECTION (EFI)*.

NOTICE When the fuel system leak test is completed, thoroughly rinse all components of the soapy water solution with clear water. A soapy water residue may cause premature deterioration and must be rinsed away.

⚠ WARNING

If a leak is found, do not start the engine. Wipe off any fuel that leaked and ventilate the hull thoroughly to remove any accumulated fuel vapors. Do not use electric powered tools on watercraft unless system has passed the leak test.

16. Open fuel tank cap to release pressure in fuel tank.

Check Valve and Pressure Relief Valve Test

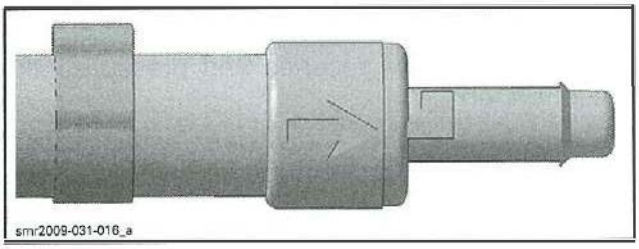
Pressure Relief Valve Function Test

The pressure relief valve is checked when performing the *FUEL TANK LEAK TEST*.

⚠ WARNING

If the pressure relief valve is stuck, the pressure in the fuel system will build up and possibly cause fuel leakage in the engine compartment.

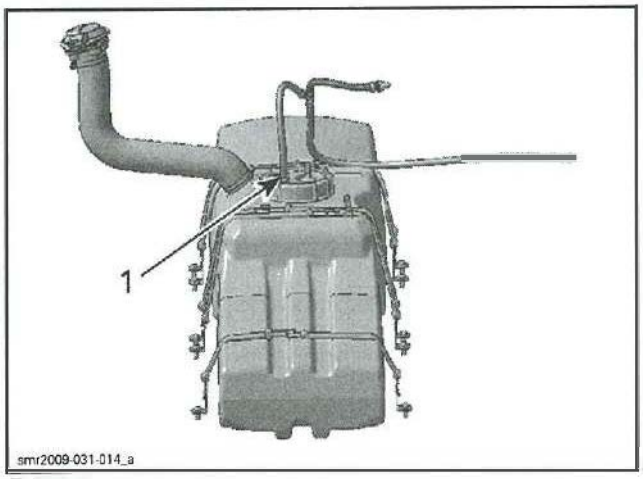
When replacing the pressure relief valve, always install it with the arrow pointing away from the vent hose.



Install the valve end the arrow is pointing to through the grommet in the hull, towards outside ambient air pressure.

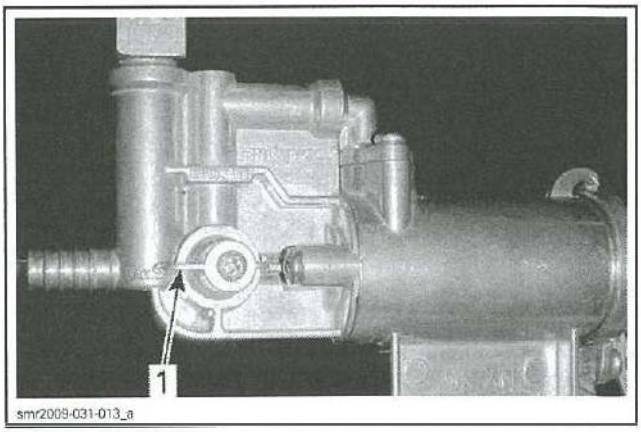
Inlet Check Valve Test

1. Disconnect vent hose from fuel pump.



TYPICAL
1. Disconnect here

2. Set the vacuum/pressure pump to vacuum.

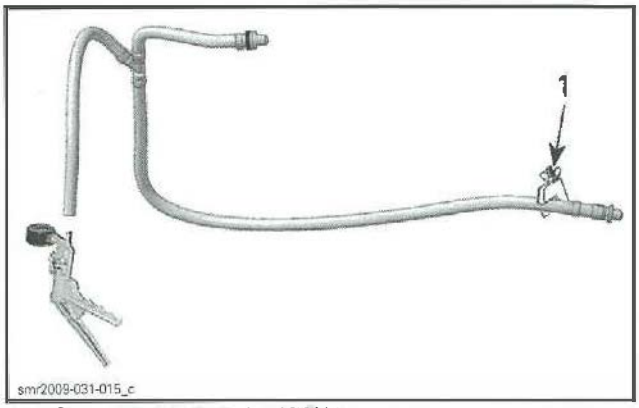


1. Vacuum selected

3. Block the vent hose near outlet valve (pressure relief valve).

REQUIRED TOOL	
SMALL HOSE PINCHER (P/N 295 000 076)	

4. Connect vacuum/pressure pump to the vent hose.

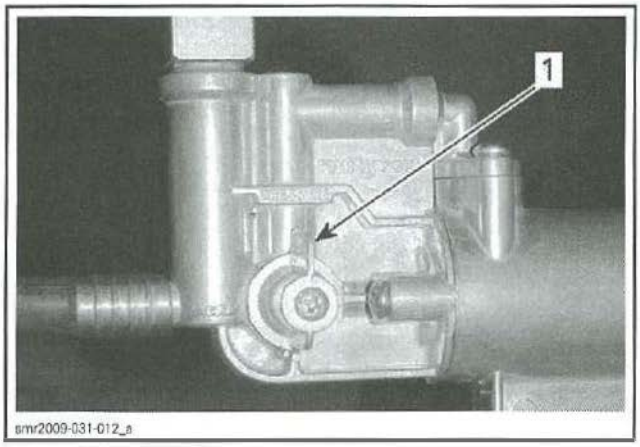


TYPICAL - VACUUM TEST SETUP
1. Hose pincher

5. Squeeze the vacuum/pressure pump handle several times to draw air in through the inlet valve.

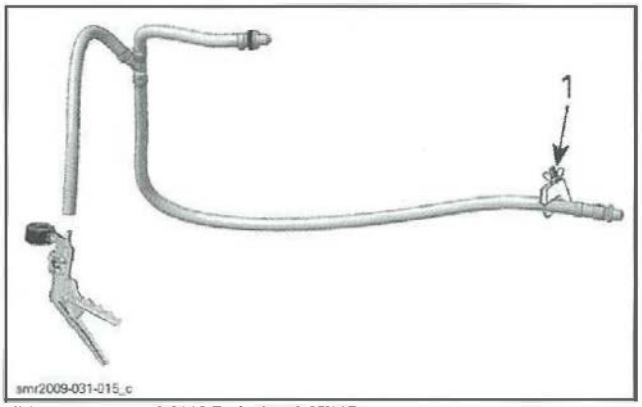
Air should be drawn in freely and the vacuum indication on the pump gauge should remain at zero (0). If the indication does not remain at zero (0), replace the inlet check valve.

6. Set vacuum/pressure pump to pressure.



1. Pressure selected

7. Squeeze the vacuum/pressure pump handle several times to apply air pressure to the inlet valve.



TYPICAL - PRESSURE TEST SETUP
1. Hose pincher

The valve should hold 34.5 kPa (5 PSI) without leakage. Otherwise, replace inlet check valve.

When replacing the valve, always reinstall it with the black side towards the hose.



8. Reinstall valve in its grommet.
9. Reinstall remaining removed components.

FUEL SYSTEM HIGH PRESSURE LEAK TEST

⚠ WARNING

A high pressure leak test must be carried out before starting the engine anytime a fuel system component has been disconnected for maintenance or replacement.

1. Visually inspect fuel system to ensure all fuel system connections are properly made.
2. Lightly pull on hoses at each connection to ensure they are properly locked at the quick connect fittings.
3. Remove tether cord from the engine cut-off switch to prevent engine starting.
4. Press the START button to turn on the fuel pump for a few seconds and pressurize the fuel system.
5. Check for fuel odor and visually inspect hoses, fittings and components for leaking fuel.
6. If a leak is detected, repair or replace the leaking component and repeat leak test after the repair.
7. If no leak is found, engine can be started.

FUEL PUMP PRESSURE TEST

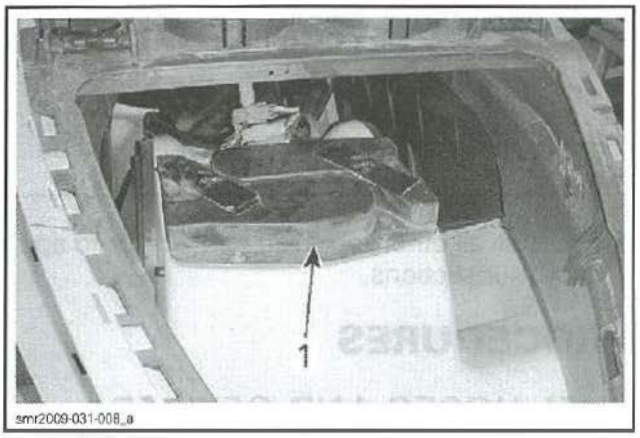
Preparation

The pressure test will show the available pressure at the fuel pump outlet. It validates the pressure regulator, the fuel pump and tests for leaks in the system.

1. Ensure the battery is fully charged, refer to *CHARGING SYSTEM*.
2. Open front storage compartment cover.
3. Remove the storage bin or partitions. Refer to *BODY* subsection.

iS and aS Models

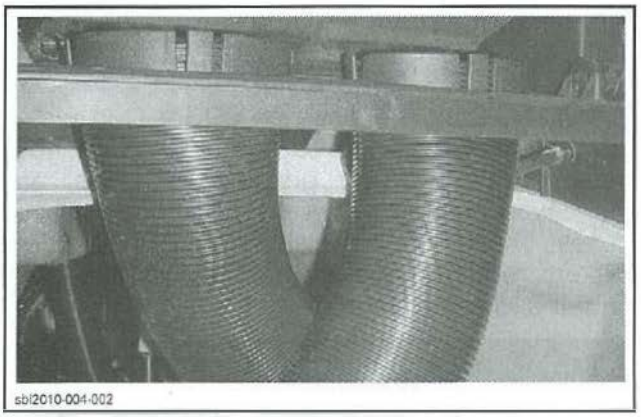
4. Remove front ventilation box.



1. Ventilation box

Models Without iS and aS

5. Disconnect the top of the two front air ventilation hoses, refer to *BODY* subsection.



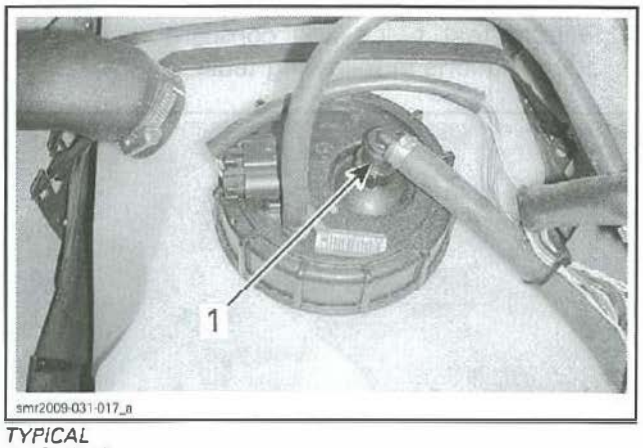
TYPICAL – FRONT AIR VENTILATION HOSES

All Models

6. Ensure hoses and fittings are not leaking. Repair any leak.
7. Ensure there is enough gas in the fuel tank.
8. Disconnect the pressure outlet hose from the fuel pump.

⚠ WARNING

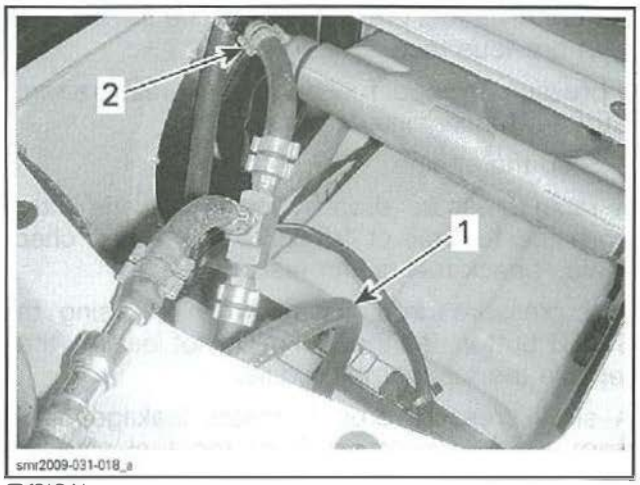
Cover the fuel line connection with an absorbent shop rag. Wipe off any fuel spillage inside the bilge.



TYPICAL
1. Outlet hose

9. Install pressure test tools between disconnected hose and fuel pump fitting (in line installation).

REQUIRED TOOLS	
PRESSURE GAUGE (P/N 529 035 709)	
FUEL HOSE ADAPTER (P/N 529 036 023)	

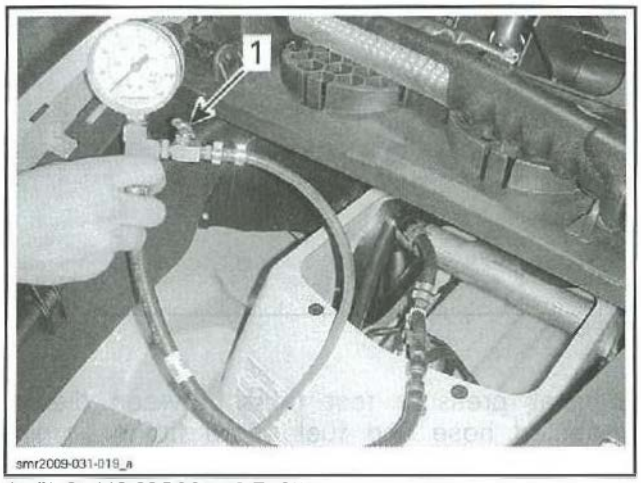


TYPICAL
1. Connect to fuel pump
2. Connect to outlet hose

Test when Engine Is Stopped

1. Remove tether cord from the engine cut-off switch to prevent engine starting.
2. Press the START button and observe fuel pressure.
3. Release pressure in system using the valve on the pressure gauge between each test so that the reading returns to zero (0).

4. Repeat test twice and compare readings to specifications in following table.



FUEL PUMP PRESSURE TEST
1. Valve on gauge

MODELS	FUEL PRESSURE (WHEN PRESSING THE START BUTTON)
All	386 kPa - 414 kPa (56 PSI - 60 PSI)

Test when Cranking or Starting Engine

1. Crank or start engine and observe fuel pressure. The fuel pressure should be the same as in previous test.

If pressure is good, fuel pump and pressure regulator are functioning correctly.

2. Stop the engine.

A rapid pressure drop indicates leakage either from the fuel rail or from the fuel pump check valve. Check fuel rail for leaks.

If a pressure drop occurs when pressing the START button and the fuel rail is not leaking, then replace the fuel pump module.

A slow pressure drop indicates leakage either from a fuel injector or from the fuel pressure regulator in the fuel pump module. To check fuel injectors for leaks, refer to the *ELECTRONIC FUEL INJECTION (EFI)* subsection. If injectors are not leaking, then replace fuel pump.

3. Release fuel pressure in system using the valve on the pressure gauge.
4. Remove pressure gauge and reinstall fuel hose on fuel pump module.

⚠ WARNING

Wipe off any fuel spillage in the bilge. Fuel is flammable and explosive under certain conditions. Always work in a well ventilated area.

5. Reinstall all other removed parts, refer to applicable subsections.

PROCEDURES

FUEL HOSES AND OETIKER CLAMPS

Fuel Hose Inspection

1. Inspect all fuel hoses for wear, kinks, cracks or any other types of damages.
2. Inspect all clamps for tightness.

Fuel Hose Replacement

When replacing fuel lines on all Sea-Doo watercraft models, be sure to use "A1" type hose approved by BRP for pressurized hoses, and "B1" type hose approved by BRP for ventilation hoses. These hoses available from BRP meet our system requirements and will ensure continued proper and safe operation.

⚠ WARNING

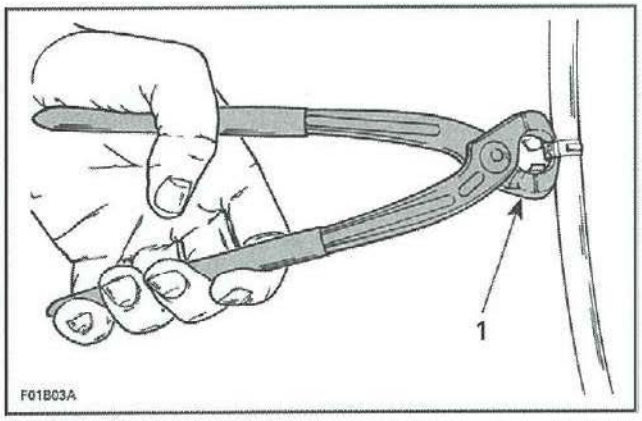
Use of fuel lines other than those recommended by BRP may compromise fuel system integrity.

⚠ WARNING

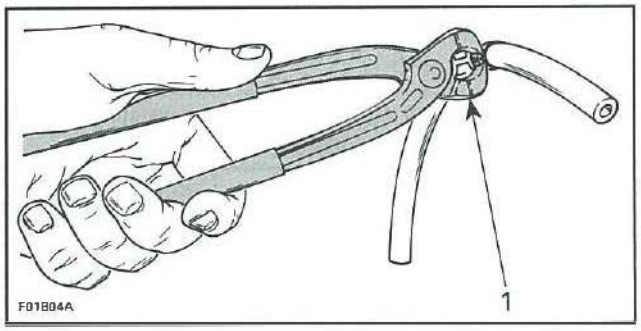
Whenever removing a hose in the fuel system, always use new Oetiker clamps at assembly. Then validate fuel tightness of system by performing a fuel tank leak test or a high pressure leak test as applicable.

Oetiker Clamp Replacement

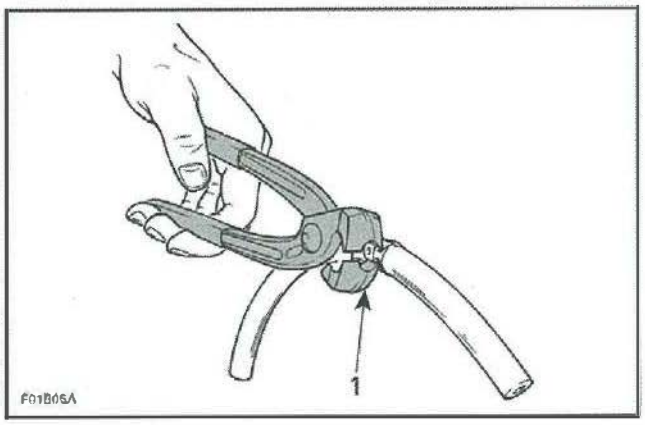
To secure or cut Oetiker clamps on fuel lines, use OETIKER PLIERS (P/N 295 000 070).



1. Cutting clamp



1. Securing clamp



1. Securing clamp in limited access

FUEL PUMP

Fuel Pump Operation Test

1. Remove tether cord from the engine cut-off switch to prevent engine starting.
2. Press START button.
3. The fuel pump should run for 2 seconds to build up fuel system pressure.
4. If fuel pump runs, carry out the *FUEL PUMP PRESSURE TEST* as described in *INSPECTION* in this subsection.
5. If the fuel pump does not run:
   - Ensure ECM is powered. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.
   - Check fuse F18. If fuse is faulty, replace it and repeat test. If fuse is good, carry out the *FUEL PUMP INPUT VOLTAGE TEST* in this subsection.

Reconnect throttle body connector.

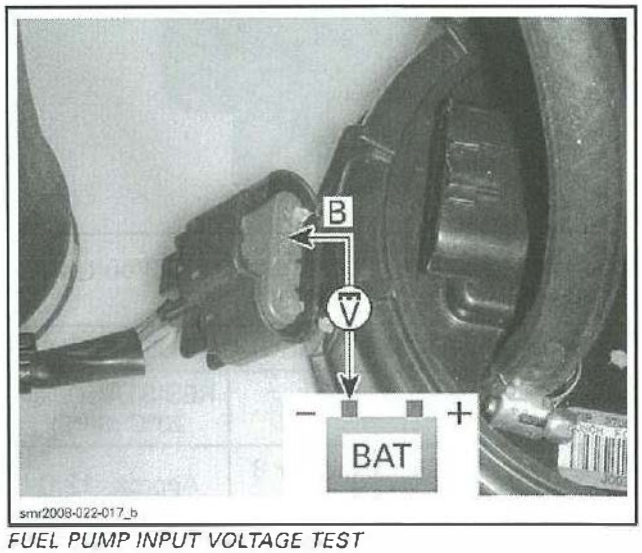
Fuel Pump Pressure Test

Refer to *INSPECTION* in this subsection.

Fuel Pump Input Voltage Test

1. Ensure the fuel pump fuse (F18) is in good condition.
2. Disconnect fuel pump harness connector. Refer to *FUEL PUMP REMOVAL*.
3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868).
4. Select Vdc.
5. Press the START button.
6. Read voltage at fuel pump harness connector as per following table.

INPUT VOLTAGE TEST		
TEST PROBES		VOLTAGE
Pin B (+ probe)	Battery ground (- probe)	Battery voltage



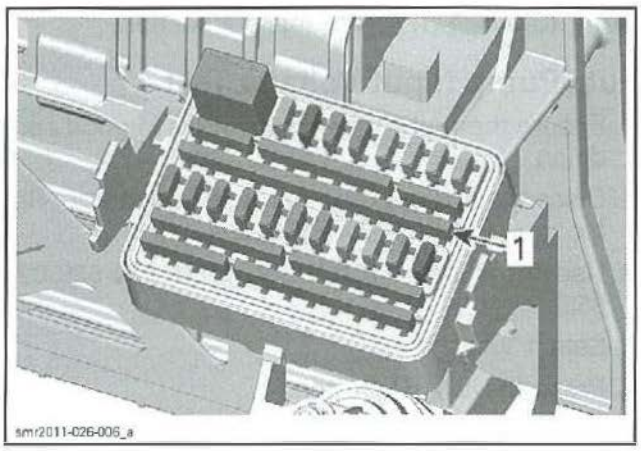
FUEL PUMP INPUT VOLTAGE TEST

If battery voltage is read, power circuit is good. Test the fuel pump circuit. Refer to *FUEL PUMP CIRCUIT TEST*.

If battery voltage is not read, power circuit is faulty. Test continuity of power circuit wiring between fuse box and fuel pump. Refer to *FUEL PUMP CIRCUIT TEST* in this subsection.

Fuel Pump Circuit Test

1. Reconnect the fuel pump harness connector.
2. Remove cover of fuse box.
3. Remove the long bus bar.



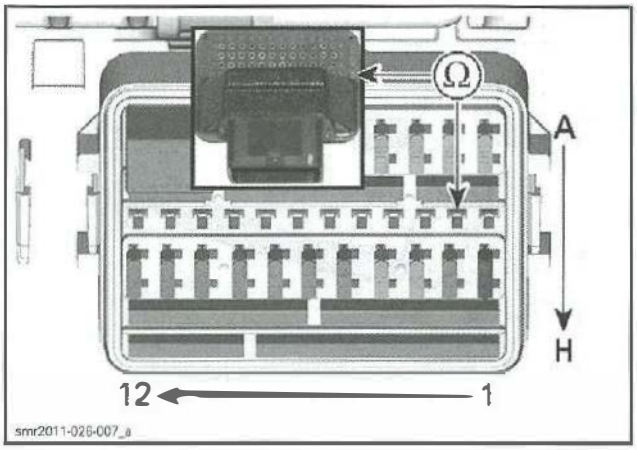
1. Long bus bar

4. Remove ECM connector "B" and install it on the ECM ADAPTER TOOL (P/N 529 036 166).



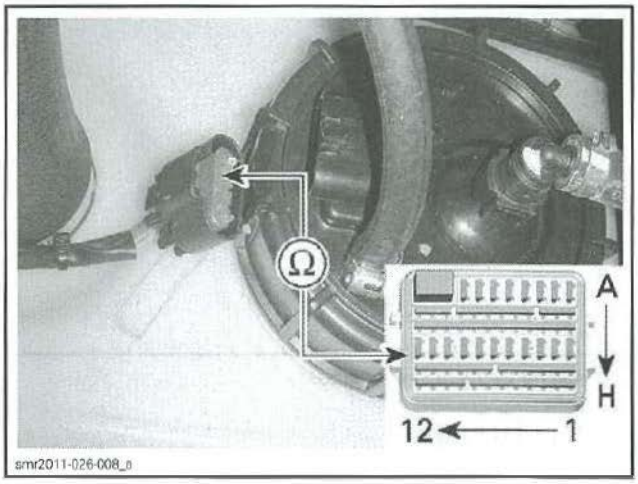
5. Set multimeter to Ω and test pump circuit as per following table.

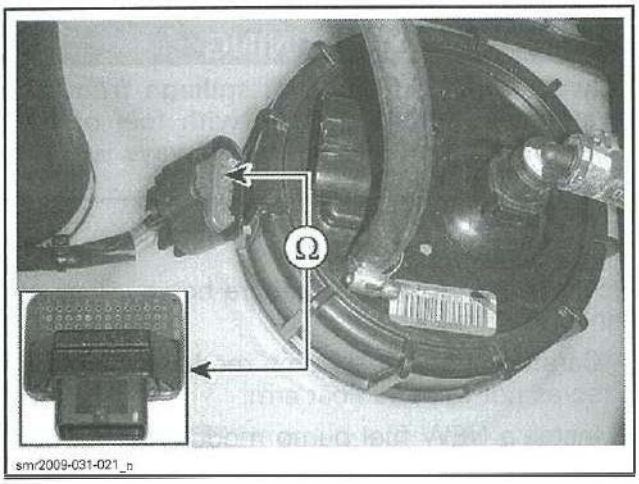
PUMP CIRCUIT TEST THROUGH FUEL PUMP		
TEST PROBES		RESISTANCE @ 20°C (68°F)
Fuse box terminal D2	ECM connector B pin B-M1	Approx. 12 Ω



6. If test succeeded, the fuel pump, its fuse and its wiring harness are good.
7. If test failed, test wiring continuity as per table.

FUEL PUMP HARNESS CONTINUITY TEST (WIRING ONLY)		
TEST PROBES		RESISTANCE @ 20°C (68°F)
Pump harness connector pin B	Fuse box terminal F2	Close to 0 Ω (continuity)
Pump harness connector pin A	ECM connector B pin B-M1	





If there is an open circuit to FB-F2, repair wiring/connector between fuel pump and fuse box.

If there is good continuity to FB-F2 and fuel pump fuse (F18) is good, check continuity of the wire jumper between D2 and E2. Repair or replace wiring as required.

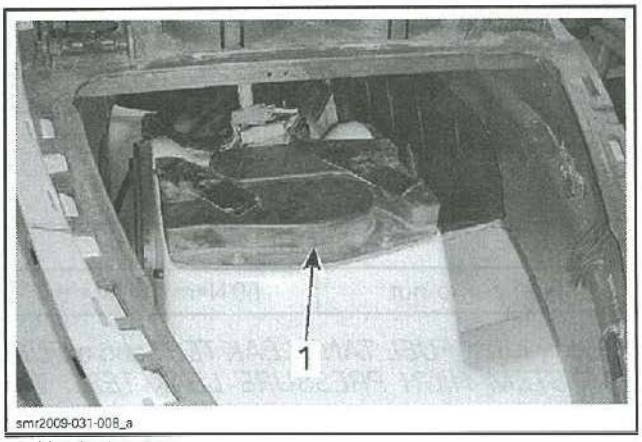
If every test succeeded and fuel pump still does not work, try a new ECM. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

Fuel Pump Removal

1. Open front storage compartment cover.
2. Remove storage bin or partitions. Refer to *BODY* subsection.

iS and aS Models

3. Remove front ventilation box.



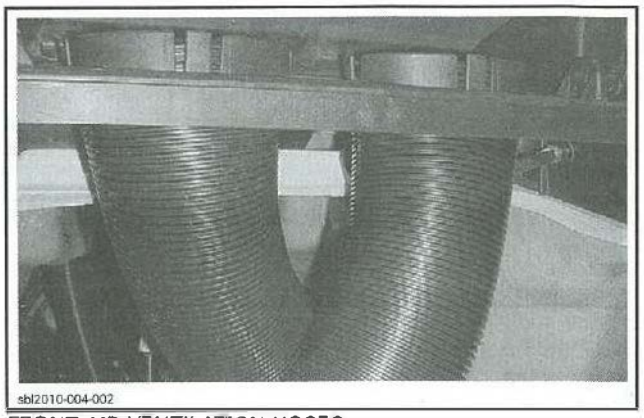
1. Ventilation box

4. Lift suspension to gain access.

NOTE: If more height is required or if the suspension cannot be used, manually lift suspension by the anchor points close to handlebar and safely lock in this position. Do not lift the watercraft from the anchor points.

Models Without iS and aS

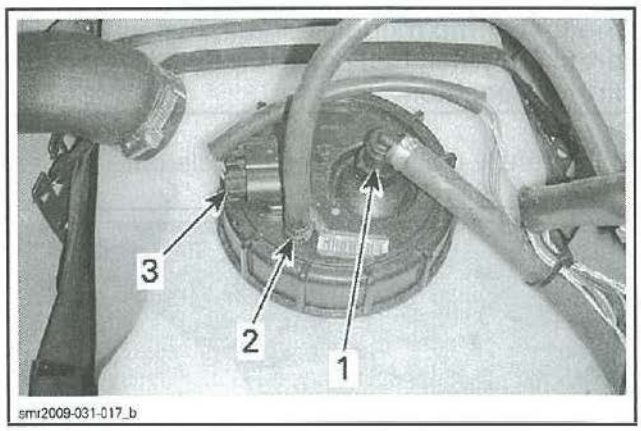
5. Disconnect the top of the two front air ventilation hoses, refer to *BODY* subsection.



FRONT AIR VENTILATION HOSES

All Models

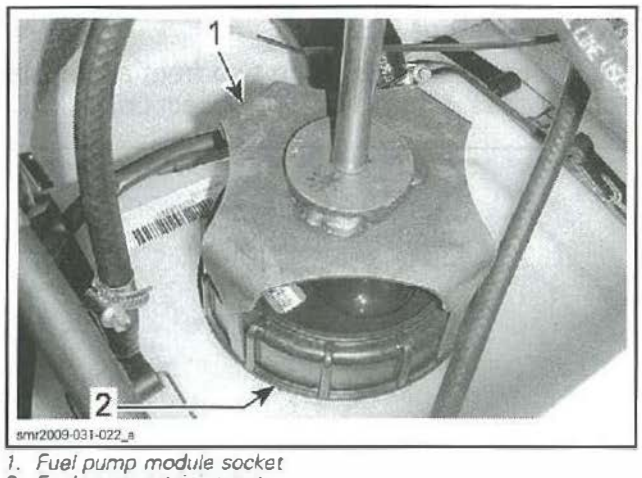
6. Disconnect the negative battery terminal, refer to *CHARGING SYSTEM* subsection.
7. Disconnect fuel pump electrical connector.
8. Disconnect the vent tube from the fuel pump.
9. Wrap shop rags around the high pressure fuel hose fitting, then press on the release button of the quick connect fitting and disconnect the hose.



TYPICAL
1. Quick connect fitting (high pressure fuel hose)
2. Vent hose
3. Harness connector

10. Unscrew the fuel pump retaining nut.

REQUIRED TOOL	
FUEL PUMP MODULE SOCKET (P/N 529 036 125)	



1. Fuel pump module socket
2. Fuel pump retaining nut

NOTICE While pulling out the fuel pump module, pay attention to the corrugated tubes and fuel sensor float arm. Float arm can get caught up and bend which will reduce fuel sensor accuracy. If fuel pump module is dropped or damaged, it must be replaced.

11. Slowly pull fuel pump module up through opening until corrugated tubes contact sides of opening. Tilt the fuel pump module as you slowly pull the pump upwards.

⚠ WARNING

The upper filter and fuel pump reservoir on the fuel pump module contain fuel which will drain out when fuel pump module is not in an upright position.

12. Carefully pull fuel pump module out.



iS MODEL SHOWN
1. Pull out fuel pump module

⚠ WARNING

Always wipe off any fuel spillage from the watercraft. When working with fuel or fuel system and its components, always work in a well ventilated area.

Fuel Pump Installation

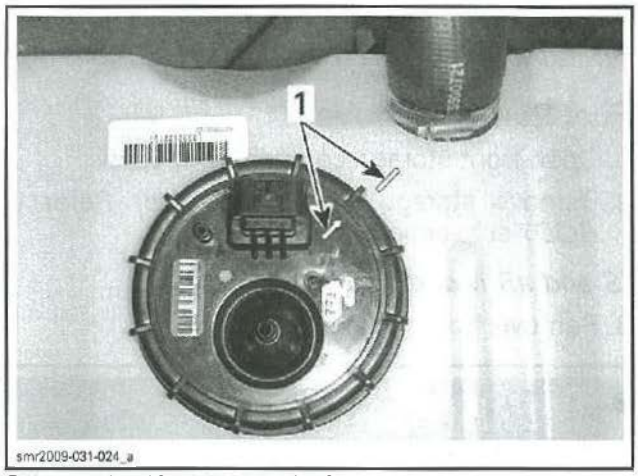
Reverse the removal procedure however, pay attention to the following.

1. Carefully insert fuel pump module in fuel tank so as not to bend float arm.
2. Install a NEW fuel pump module gasket each time the module is reinstalled.

NOTE: Wipe off parts to prevent fuel pump from turning while torquing fuel pump nut.

3. Align arrow on top of fuel pump module with index mark on top of fuel tank or fuel sensor accuracy will be affected.

NOTE: Index mark and arrow locations are highlighted for clarity in following illustration.



FUEL PUMP MODULE INDEXING
1. Align marks

4. Tighten fuel pump nut.

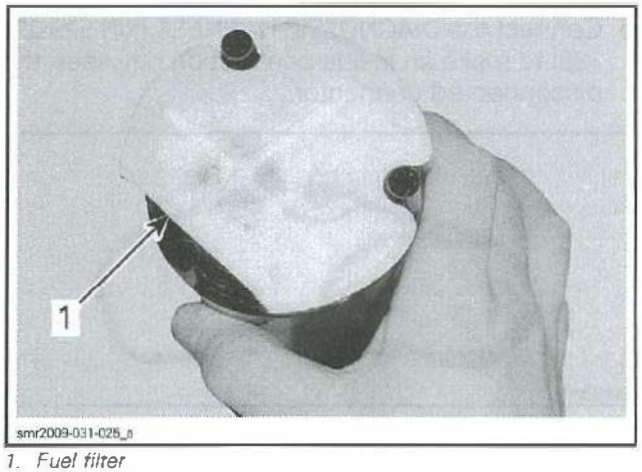
TORQUE	
Fuel pump nut	60 N•m (44 lbf•ft)

5. Carry out a *FUEL TANK LEAK TEST* and a *FUEL SYSTEM HIGH PRESSURE LEAK TEST*. See procedures in this subsection.

FUEL FILTER

Fuel Filter Inspection

Inspect fuel filter. If dirty, partially clogged or damaged, replace it.



1. Fuel filter

Fuel Filter Removal

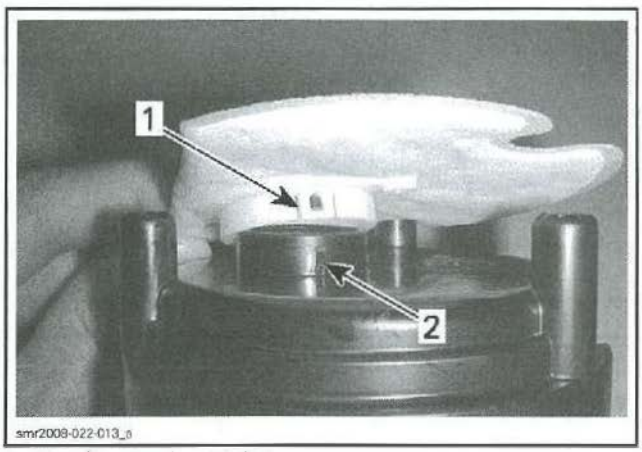
NOTE: The lower fuel filter on the fuel pump module does not require replacement under normal operating conditions. Replace only if permanently clogged or damaged.

1. Remove fuel pump. Refer to *FUEL PUMP* in this subsection.

⚠ WARNING

The upper filter and fuel pump reservoir on the fuel pump module contain fuel which will drain out when fuel pump module is not in an upright position.

2. Turn fuel pump upside down.
3. Using a small flat screwdriver, pry up the filter locking tabs.



1. Fuel filter locking tab (x2)
2. Filter locking pin (x2)

4. Pull filter off fuel pump reservoir housing.

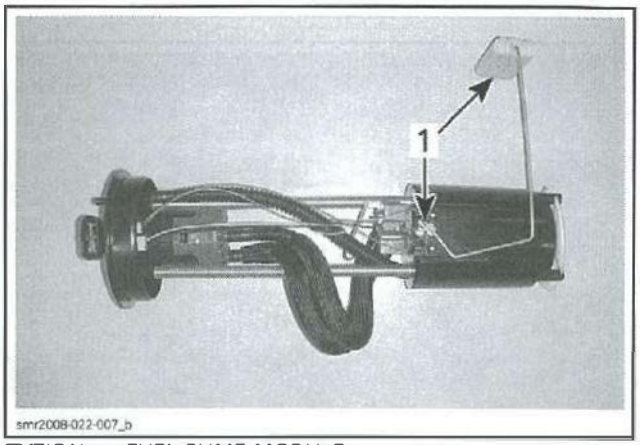
Fuel Filter Installation

1. Align new filter with pump reservoir housing.
2. Press new filter on by hand. Ensure it is fully seated and locked onto the pump reservoir housing.
3. Reinstall fuel pump as per procedure in this subsection.
4. Carry out a *FUEL SYSTEM HIGH PRESSURE LEAK TEST* as described in this subsection.
5. Install or other removed parts, refer to applicable subsection.

FUEL LEVEL SENSOR

Fuel Level System Overview

A float type fuel level sensor mounted on the fuel pump module sends a signal to the information center.



TYPICAL — FUEL PUMP MODULE
1. Fuel level sensor

The information center interprets this signal and turns on the appropriate number of segments of a bar type fuel level indication in the lower RH side of the digital screen in the information center.

Fuel Level Troubleshooting

FUEL LEVEL TROUBLESHOOTING	
SYMPTOM	POSSIBLE CAUSE
Fuel gauge always display EMPTY	– Wiring/connectors – Fuel level sensor – Float stuck in low position
Fuel gauge always display FULL	– Water in fuel pump connector – Float stuck in full position
Fuel level sensor fault code	– Wiring/connectors – Fuel level sensor
Fuel gauge displays wrong level	– Low battery voltage – Fuel level sensor fault

Use B.U.D.S. to check for a fault code. Refer to *DIAGNOSTIC AND FAULT CODES*.

Fuel Level Sensor Voltage Test

1. First ensure battery is fully charged.

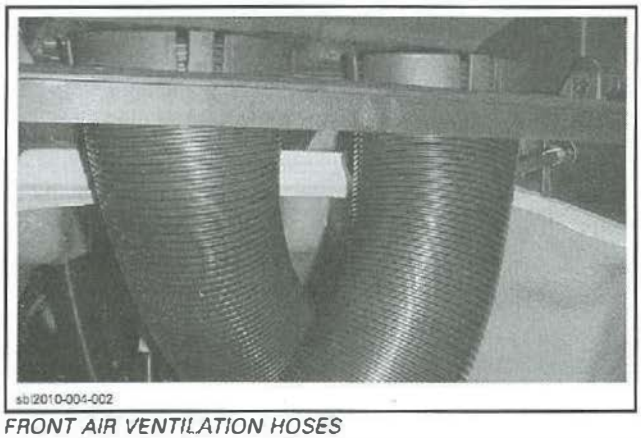
iS Models

2. Lift suspension using the iS up button to gain access.

NOTE: On RXT aS 260 model, if more height is required , manually lift suspension by the anchor points close to handlebar and safely lock in this position. Do not lift the watercraft from the anchor points.

Models Without iS and aS

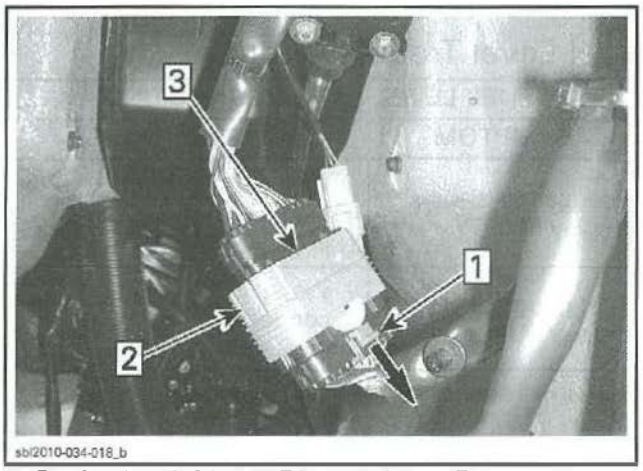
3. Disconnect the top of the two front air ventilation hoses, refer to *BODY* subsection.



FRONT AIR VENTILATION HOSES

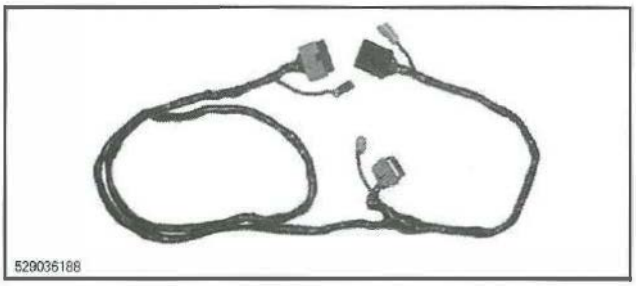
All Models

4. From under the steering support area, disconnect the 24-pin connector.



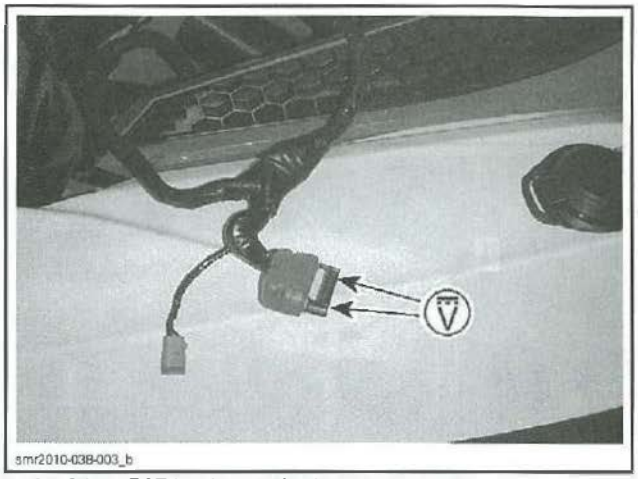
24-PIN STEERING CONNECTOR DISCONNECT
Step 1: Pull out safety lock
Step 2: Press in on release tab
Step 3: Pull locking collar down

5. Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) to make an in-line connection between the disconnected connector.



6. Briefly press the START button to wake up the ECM.
7. Install the tether cord on the engine cut-off switch.
8. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Vdc.
9. Measure the voltage at the test connector of the diagnostic harness as follows.

FUEL TANK LEVEL	TEST CONNECTOR OF DIAGNOSTIC HARNESS	VOLTAGE
Full	Pins 5 and 17	0.14 Vdc
Empty		2.7 Vdc



TEST CONNECTOR OF DIAGNOSTIC HARNESS

NOTE: Voltage could be slightly different depending on battery voltage but should remain relatively close to this range. If fuel tank is not full or empty, the voltage value will be proportional to the fuel level (somewhere in-between).

If voltage is as per specifications the fuel level circuit and sensor are good. If fuel level does not work in information center, try a new one.

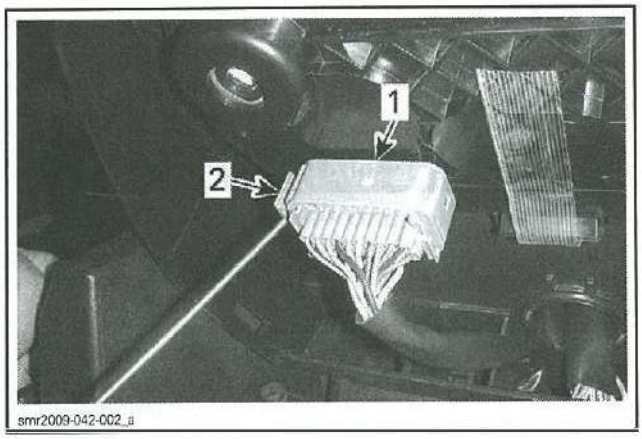
If voltage is out of specifications, perform the *FUEL LEVEL SENSOR RESISTANCE TEST AT INFORMATION CENTER* as described in this subsection.

Remove diagnostic harness and reconnect connector.

Fuel Level Sensor Resistance Test at Information Center

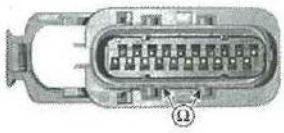
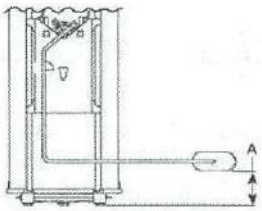
1. Disconnect information center (multifunction gauge) connector. Refer to *GAUGE* subsection.

NOTICE **Pull connector lock out. Do not twist the screwdriver.**



1. *Gauge connector*
2. *Pull out to unlock connector*

2. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
3. Alternately drain then fill fuel tank and measure the sensor resistance between pins 19 and 20 as follows.

RESISTANCE (Ω)	FLOAT HEIGHT (MM)
4.8 ± 2.2	268.9 ± 3.0 (FULL)
17.8 ± 2.2	240.6 ± 3.0
27.8 ± 2.2	219.1 ± 3.0
37.8 ± 2.2	193.8 ± 3.0
47.8 ± 2.2	161.9 ± 3.0 (HALF)
57.8 ± 2.2	128.3 ± 3.0
67.8 ± 2.2	94.1 ± 3.0
77.8 ± 2.2	60.6 ± 3.0
89.8 ± 2.2	28.8 ± 3.0 (EMPTY)
	 A. Float height

NOTE: If fuel tank is not full or empty, the resistance value will be proportional to the fuel level (somewhere in-between).

If readings are as per specifications, the fuel level circuit and sensor are good. If fuel level does not work in information center, try a new one.

If readings are out of specifications, perform the *FUEL LEVEL SENSOR RESISTANCE TEST AT FUEL PUMP.*

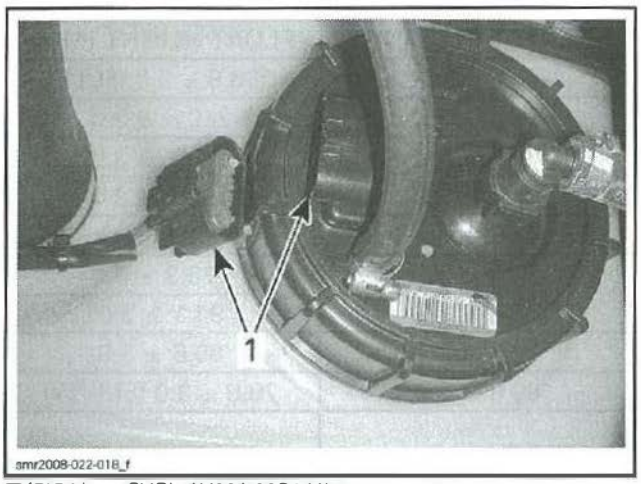
If an open circuit is measured, carry out a continuity test of the wiring from the information center to the 24-pin steering connector, and from the 24-pin steering connector to the fuel pump module connector. Refer to *WIRING DIAGRAM.*

If the wiring is good, carry out a *FUEL LEVEL SENSOR RESISTANCE TEST AT FUEL PUMP.*

4. Reconnect information center (multifunction gauge) connector.

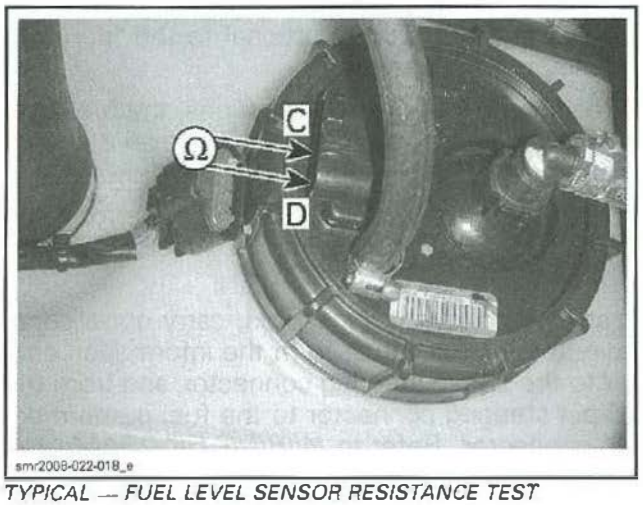
Fuel Level Sensor Resistance Test at Fuel Pump

1. Disconnect fuel pump module connector.



TYPICAL — FUEL PUMP MODULE
1. Fuel pump module connector

2. Alternately drain then fill fuel tank and measure the sensor resistance between pins "C" and "D" of the fuel pump connector. See table in *FUEL LEVEL SENSOR RESISTANCE TEST AT INFORMATION CENTER.*

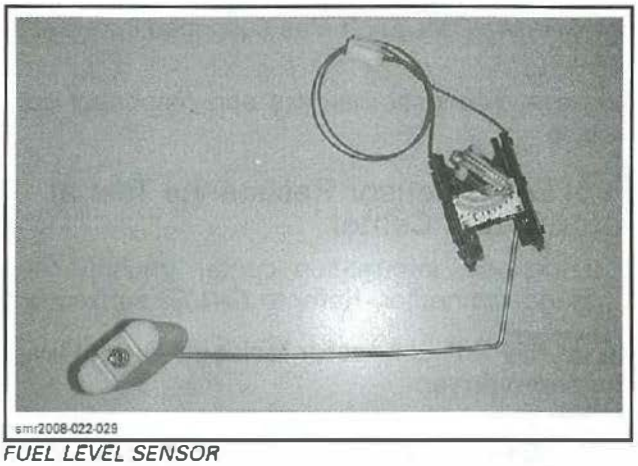


TYPICAL — FUEL LEVEL SENSOR RESISTANCE TEST

If readings are out of specifications, replace sensor.

When everything else has been tested and fuel level is still not working, try a new information center.

Fuel Level Sensor Removal



FUEL LEVEL SENSOR

1. Remove fuel pump module from fuel tank, see *FUEL PUMP REMOVAL* in this subsection.

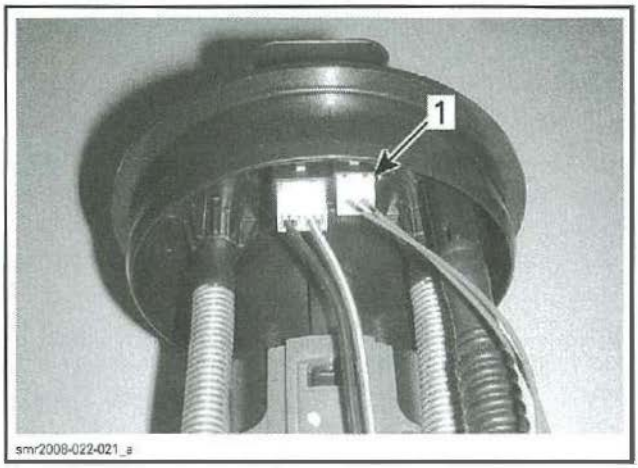
⚠ WARNING

The upper filter and fuel pump reservoir on the fuel pump module contain fuel which will drain out when fuel pump module is not in an upright position.

2. Drain all fuel from the upper fuel filter and fuel pump reservoir in an appropriate container.

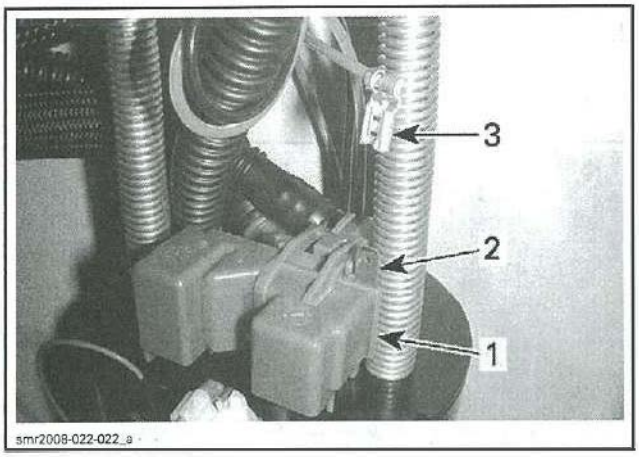
NOTE: Note routing of fuel level sensor wires prior to disconnecting the sensor from the fuel pump module flange.

3. Disconnect the fuel level sensor connector from the fuel pump module upper flange.



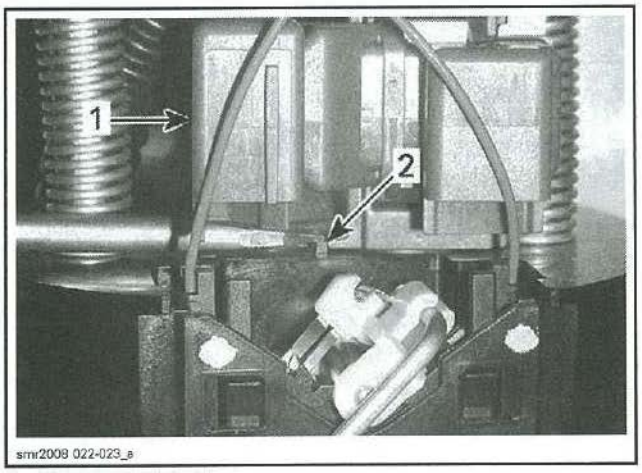
1. Fuel level sensor connector

4. Disconnect the ground wire from the pressure regulator. Be careful not to bend the ground contact on the pressure regulator.

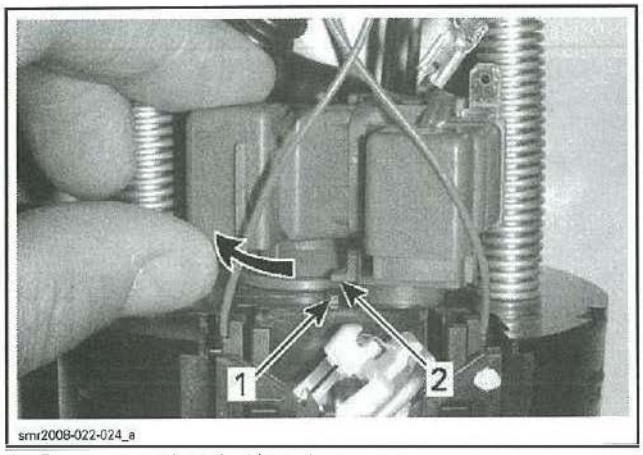


1. *Pressure regulator*
2. *Ground wire contact on pressure regulator*
3. *Ground wire disconnected*

5. Using a flat screwdriver, press down on the locking tab just below the pressure regulator to release it from the pump reservoir cover, and rotate it clockwise simultaneously so that it slips over the locking tab.

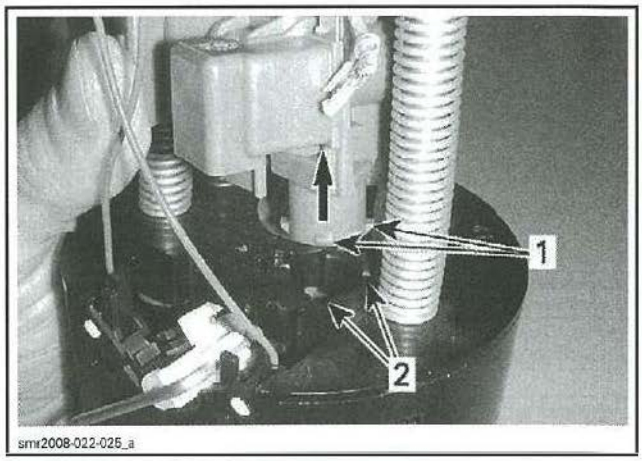


1. *Pressure regulator*
2. *Pressure regulator locking tab*



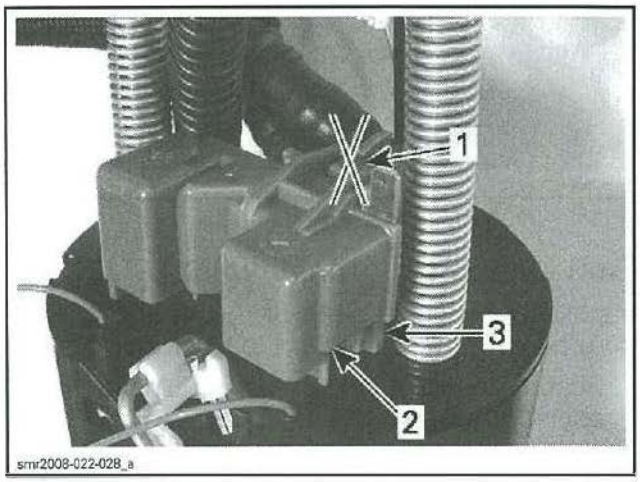
1. *Pressure regulator locking tab*
2. *Pressure regulator rotated clockwise over locking tab*

6. Once the pressure regulator is rotate over the locking tab, pull up on it to remove it from the pump reservoir cover.



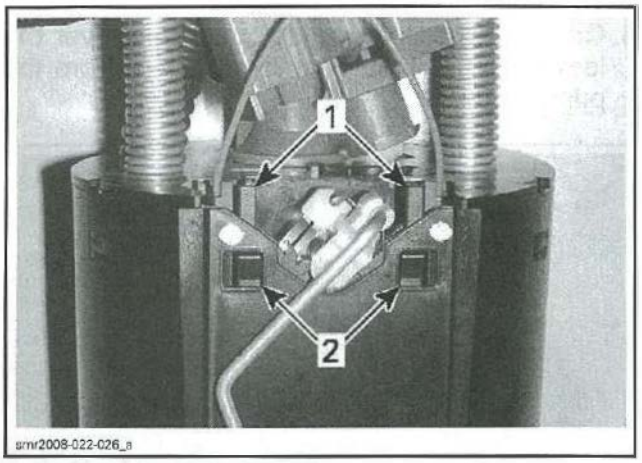
1. *Pressure regulator alignment tabs*
2. *Fuel pump reservoir alignment tabs*

NOTE: The pressure regulator cover must not be removed from the pressure regulator housing assembly.

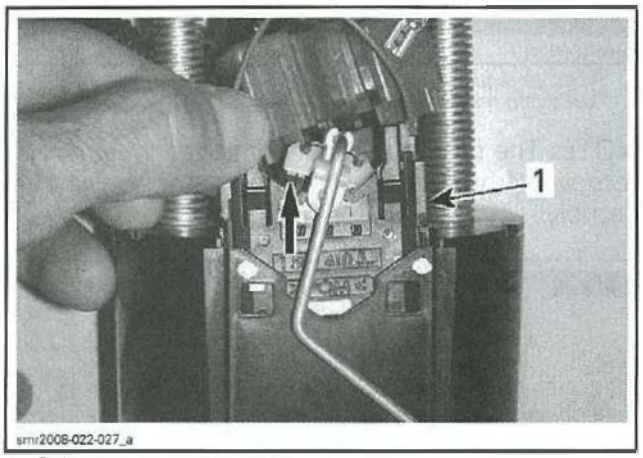


1. *Do not remove pressure regulator cover at locking tabs*
2. *Pressure regulator cover*
3. *Pressure regulator housing*

7. Push in on the release tabs at the top of the fuel level sensor to unlock it from the fuel pump reservoir housing, and simultaneously pull up on the fuel level sensor to remove it.



1. Fuel level sensor release tabs
2. Locking pins

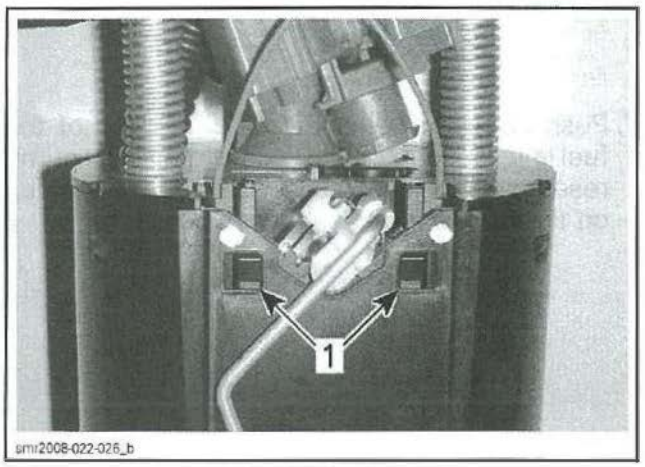


1. Pull up on fuel level sensor

Fuel Level Sensor Installation

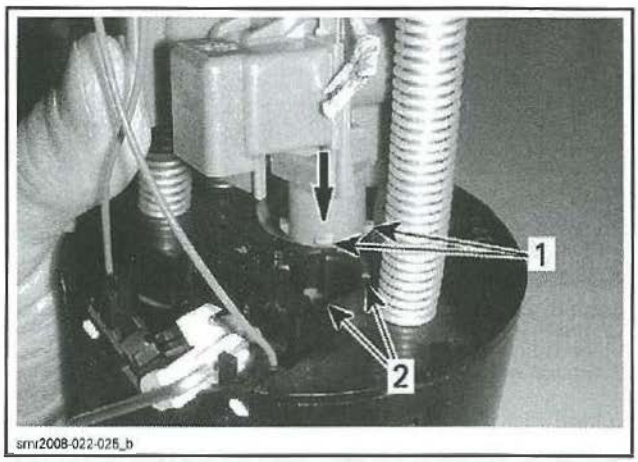
Installation is the reverse of the removal procedure however, pay attention to the following.

1. Ensure fuel level sensor locking pins are properly engaged into the fuel pump reservoir.

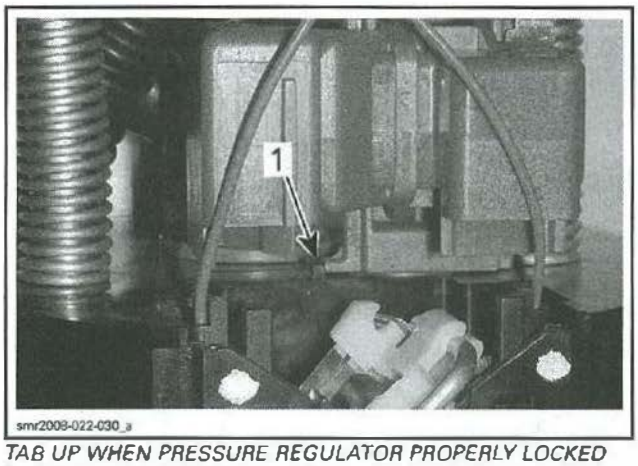


1. Ensure engagement of sensor locking pins

2. Align the fuel pressure regulator tabs into the pump reservoir cover and turn it counterclockwise until it locks properly.

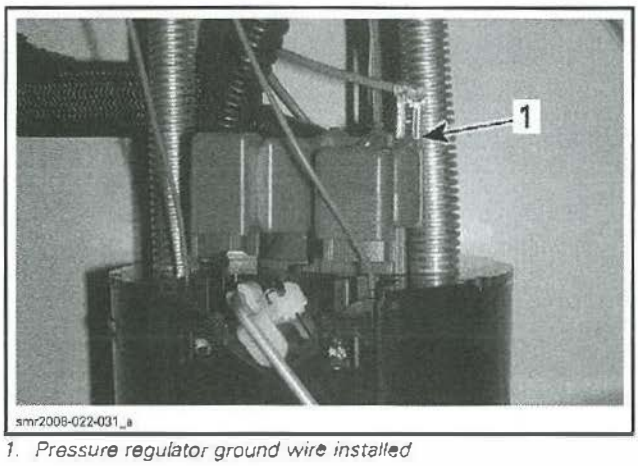


PRESSURE REGULATOR INSERTION INTO PUMP RESERVOIR COVER
1. Pressure regulator alignment tabs
2. Fuel pump reservoir alignment tabs



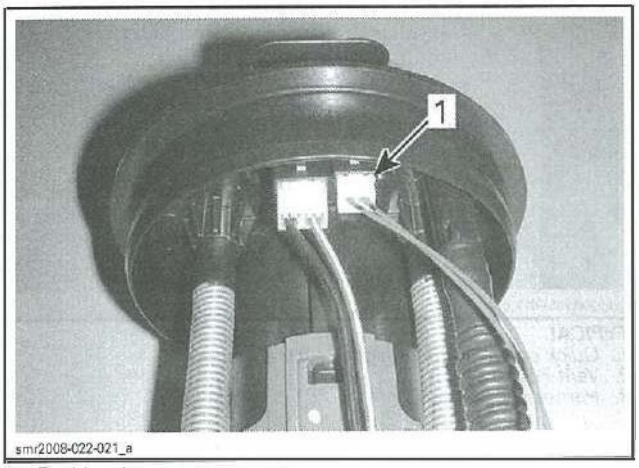
TAB UP WHEN PRESSURE REGULATOR PROPERLY LOCKED
1. Pressure regulator locking tab

3. Reconnect the ground wire onto the pressure regulator.



1. Pressure regulator ground wire installed

4. Ensure fuel level sensor connector is locked into the module flange connector.



1. Fuel level sensor connector

5. Carry out a *FUEL LEVEL SENSOR RESISTANCE TEST* as described in this subsection.
6. Reinstall the fuel pump module. Refer to *FUEL PUMP INSTALLATION* in this subsection.

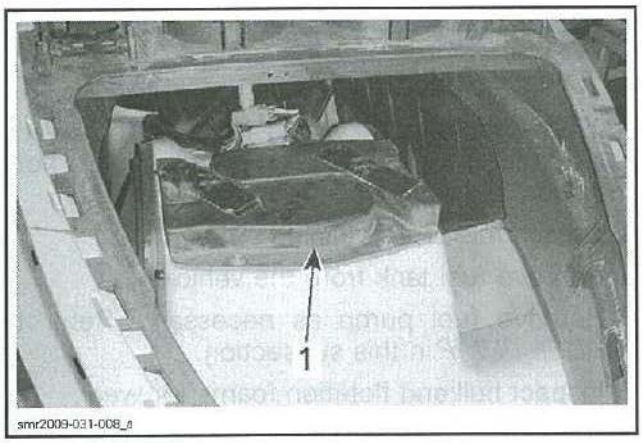
FUEL TANK

Fuel Tank Inspection

1. Open front storage compartment cover.
2. Remove storage bin or partitions. Refer to *BODY* subsection.

iS and aS Models

3. Remove front ventilation box.



1. Ventilation box

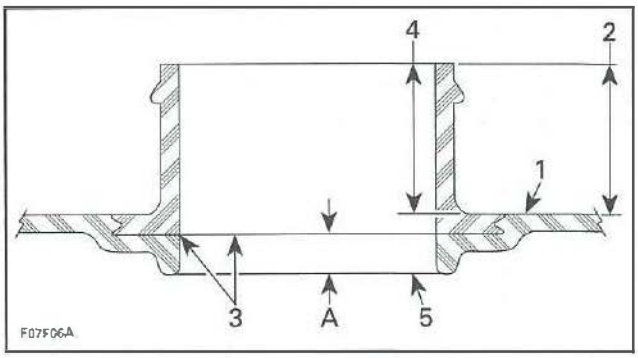
Models Without iS and aS

4. Open or remove seat for access to aft end of fuel tank.

All Models

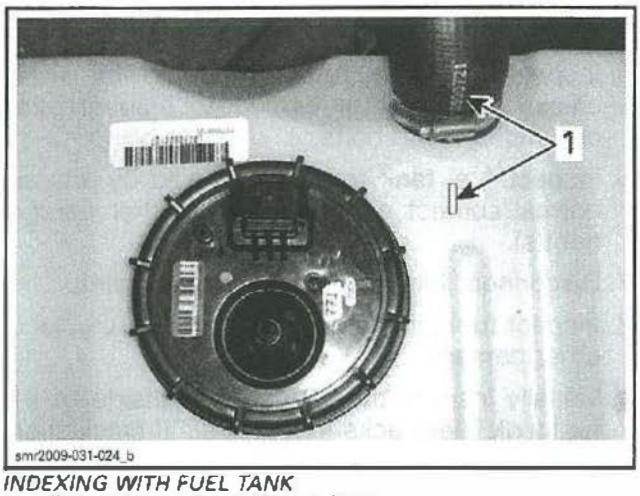
5. Inspect fuel tank retaining straps for wear, cracks or any other damages. Inspect strap clip anchors and bolts.
6. Inspect fuel tank for wear caused by any abnormal contact or rubbing with other component(s).
7. Disconnect fuel filler hose from fuel tank.
8. Inspect fuel tank filler hose for wear, cracks or other damages.
9. Visually inspect the inside and outside of the fuel tank filler necks for crack(s). If crack(s) are found, replace fuel tank.
10. With your fingers, feel the inside and outside surfaces of fuel tank, especially near the filler neck.
11. Flex fuel tank neck to ensure there are no hidden cracks.

NOTE: A fuel tank is comprised of 2 components: the tank and the filler neck. The filler neck is injection molded and the tank is then blow molded over the neck. During the molding process, a small molding seam may appear on the inner side of the neck at approximately 4 mm (5/32 in) from the base of the neck. It is normal to have a molding seam and it should not be confused with a crack.



1. Tank upper surface area
2. Inspect outer upper surface at filler neck
3. Normal molding seam
4. Inspect upper surface area inside filler neck
5. Base of filler neck
A. Approx. 4 mm (5/32 in)

12. Install filler hose and torque retaining clamps.



INDEXING WITH FUEL TANK
1. Align mark with the writing on hose

TORQUE	
Filler hose retaining clamps	3.5 N•m (31 lbf•in)

13. Reinstall all other removed parts. Refer to appropriate subsection.

Fuel Tank Removal

GTS, GTI and WAKE 155

1. Remove engine. Refer to *ENGINE REMOVAL AND INSTALLATION*.
2. Remove the air intake silencer. Refer to *AIR INTAKE SYSTEM (EXCEPT iS AND aS MODELS)* subsection.

RXT 260, RXT X 260, RXT XRS 260, GTX 155, GTX 215 and WAKE PRO 215

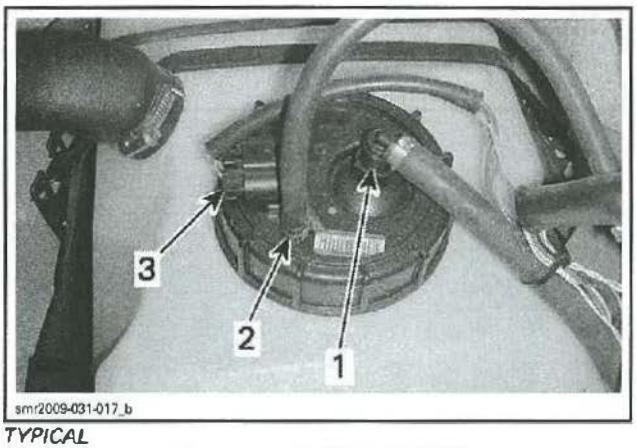
1. Remove the front body module. Refer to *BODY* subsection.
2. Remove the air intake silencer. Refer to *AIR INTAKE SYSTEM (EXCEPT iS AND aS MODELS)* subsection.

RXT iS 260, RXT aS X 260, RXT aS XRS 260, GTX iS 215 and GTX LTD iS 260

1. Remove moving deck. Refer to *BODY* subsection.
2. Remove engine. Refer to *ENGINE REMOVAL AND INSTALLATION*.
3. Remove suspension base. Refer to *SUSPENSION*.

All Models

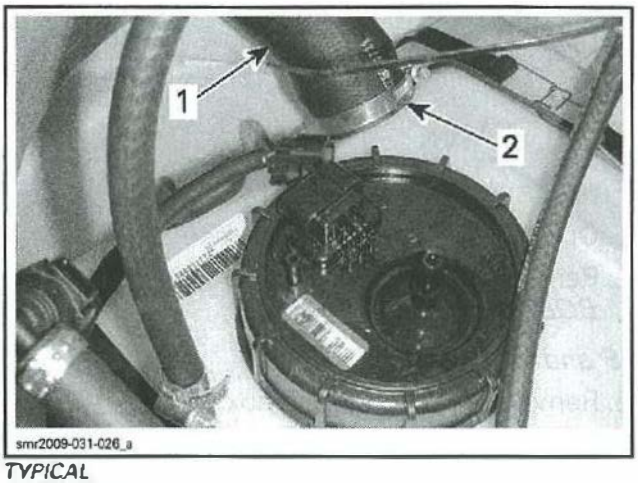
1. Siphon fuel tank.
2. Disconnect fuel pump connections.



TYPICAL
1. Quick connect fitting (high pressure fuel hose)
2. Vent hose
3. Harness connector

3. Disconnect filler hose from fuel tank.

NOTE: Removing retaining screws of the filler neck may help to disconnect hose from fuel tank.



TYPICAL
1. Filler hose
2. Retaining clamp

NOTE: Take note of wiring harness, hose and cable routing for proper reinstallation. Also note method used for securing with locking ties.

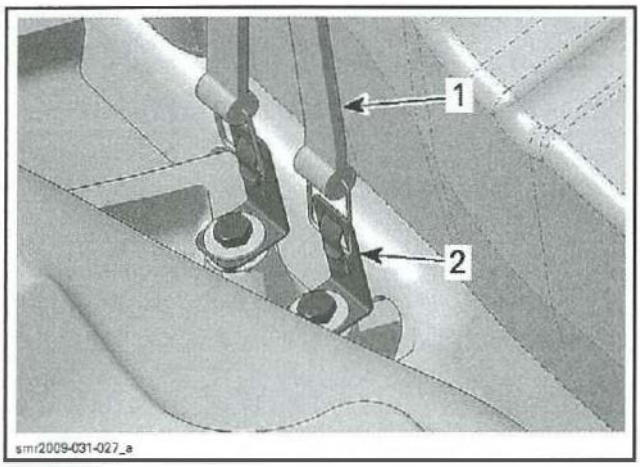
4. Detach fuel tank retaining straps.
5. Remove fuel tank from the vehicle.
6. Remove fuel pump as necessary. Refer to *FUEL PUMP* in this subsection.
7. Inspect hull and flotation foams for wear.

Fuel Tank Installation

NOTE: Apply torque values as specified in the exploded view.

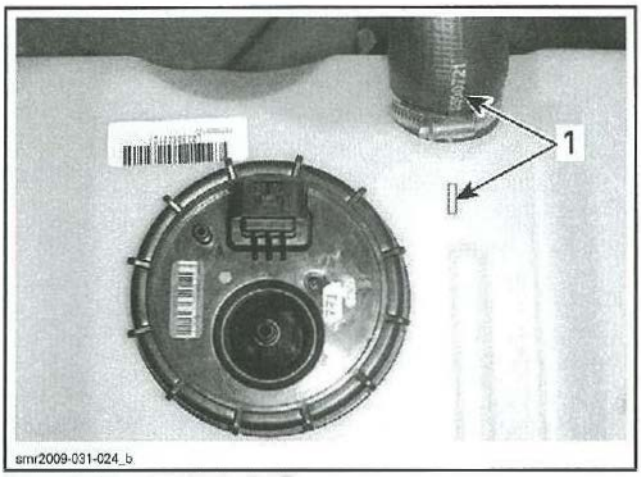
1. Reinstall fuel pump if it was removed. Refer to *FUEL PUMP* in this subsection.
2. Ensure flotation foams are properly positioned under fuel tank.

3. Insert fuel tank in hull.
4. Place fuel tank retaining strap ends in anchoring clips. Temporarily use tape to hold straps on the top of fuel tank.



TYPICAL
1. *Fuel tank retaining strap*
2. *Clip anchor securing strap to hull*

5. Secure retaining strap ends on top of fuel tank.
6. Properly secure wire harness, cables and hose as prior to removal using appropriate locking ties.
7. Install fuel tank filler hose as illustrated.



INDEXING WITH FUEL TANK
1. *Align mark with the writing on hose*

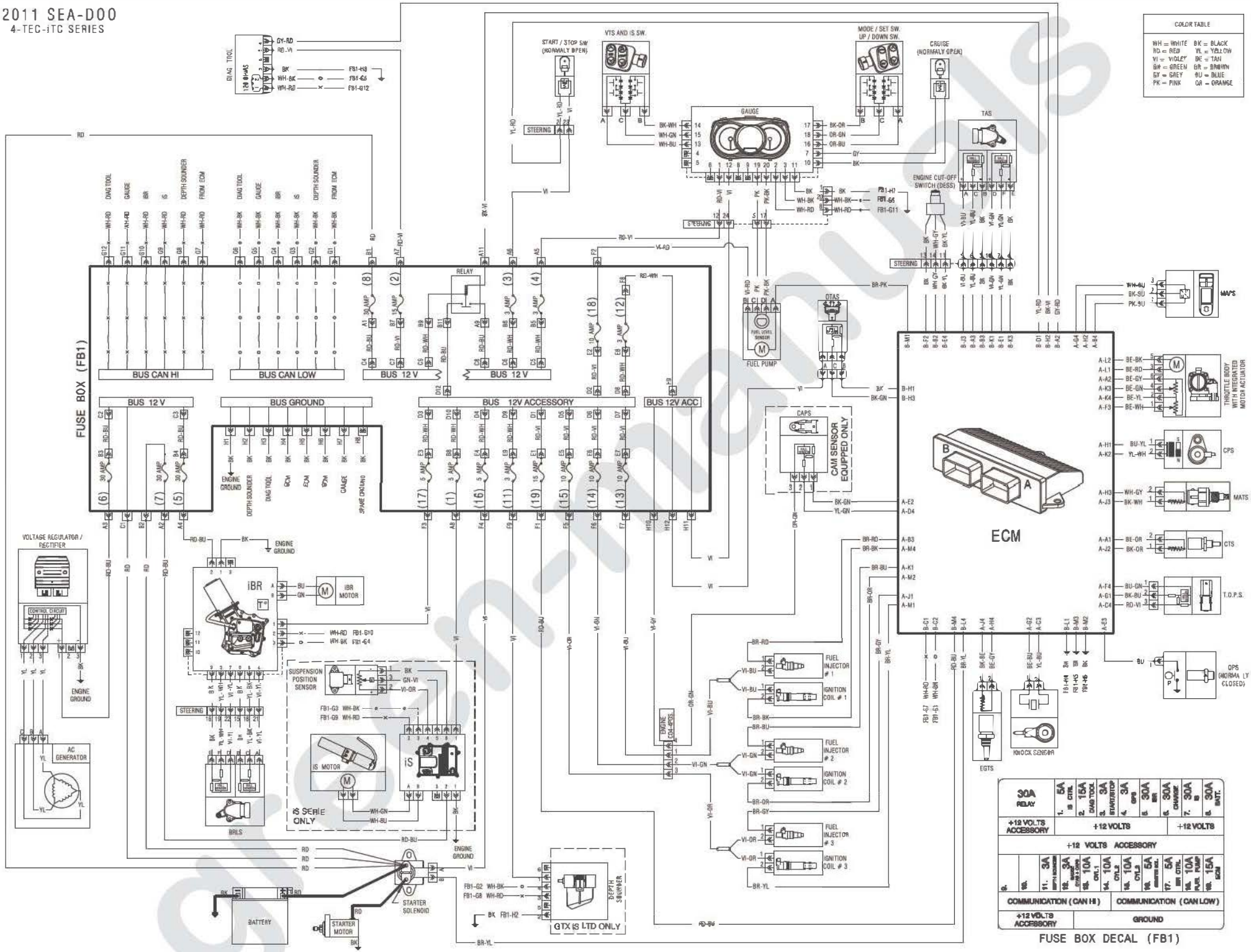
TORQUE	
Filler hose retaining clamps	3.5 N•m (31 lbf•in)

8. Tighten clamp retaining vent hose to pump module.

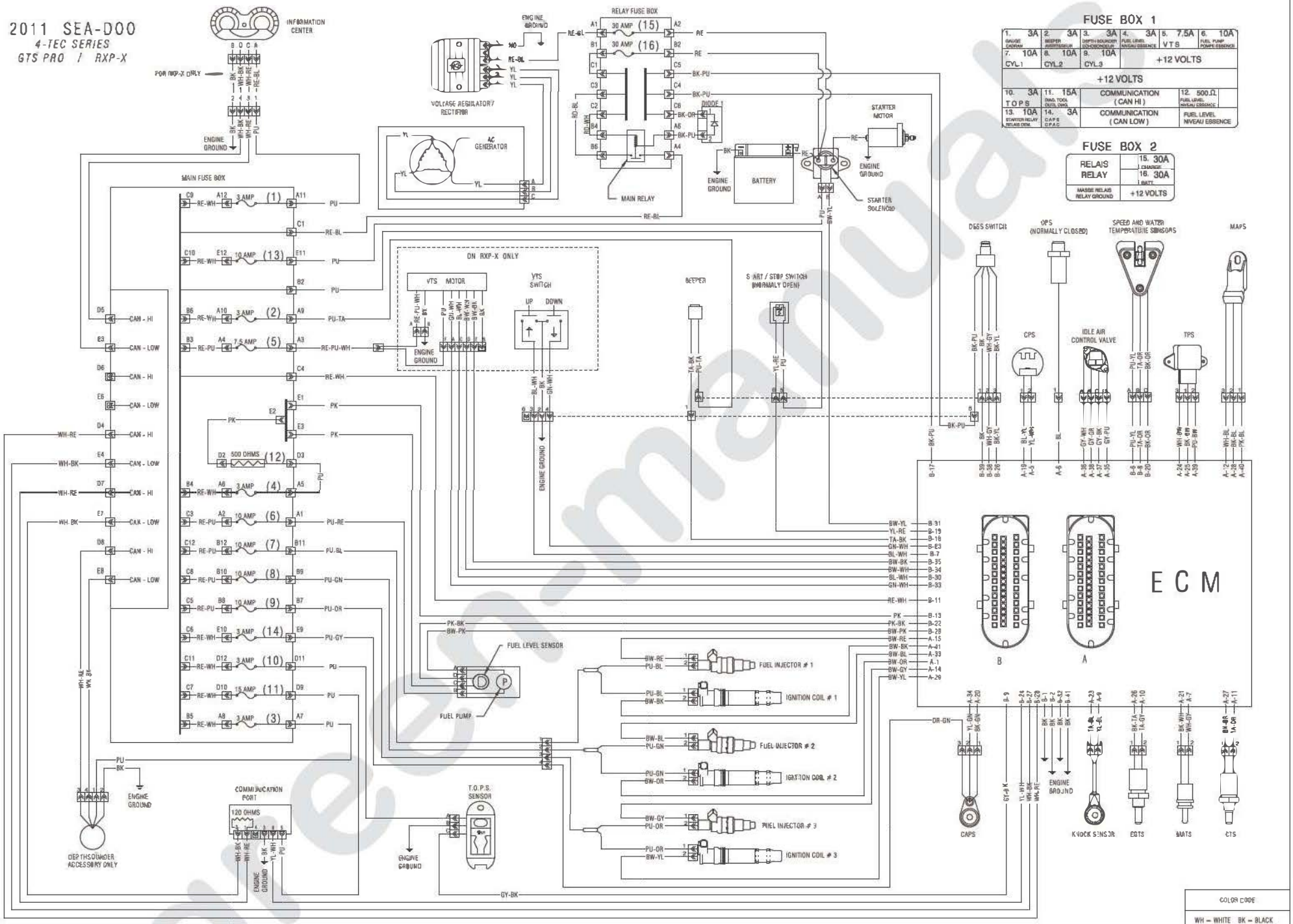
TORQUE	
Vent hose clamp	1.7 N•m (15 lbf•in)

9. Reinstall all other removed parts. Refer to their subsections.
10. When vehicle reassembly is complete, carry out a *FUEL TANK LEAK TEST* and a *FUEL SYSTEM HIGH PRESSURE LEAK TEST* as described in this subsection.

2011 SEA-DOO
4-TEC-iTC SERIES



2011 SEA-DOO
4-TEC SERIES
GTS PRO / RXP-X



FUSE BOX 1

1. 3A GAUGE CADRAN	2. 3A BEEPER AVERTISSEUR	3. 3A SPEED SENSOR DÉTECTEUR	4. 3A FUEL LEVEL NIVEAU ESSENCE	5. 7.5A VTS	6. 10A FUEL PUMP POMPE ESSENCE
7. 10A CYL.1	8. 10A CYL.2	9. 10A CYL.3	+12 VOLTS		
+12 VOLTS					
10. 3A TOPS	11. 15A DIAG. TOOL OUTIL DIAG.	COMMUNICATION (CAN HI)		12. 500 Ω FUEL LEVEL NIVEAU ESSENCE	
13. 10A STARTER RELAY RELAIS DEM.	14. 3A CAPS CPAC	COMMUNICATION (CAN LOW)		FUEL LEVEL NIVEAU ESSENCE	

FUSE BOX 2

RELAIS RELAY	15. 30A CHARGE 16. 30A BATT.
MASSE RELAIS RELAY GROUND	+12 VOLTS

COLOR CODE

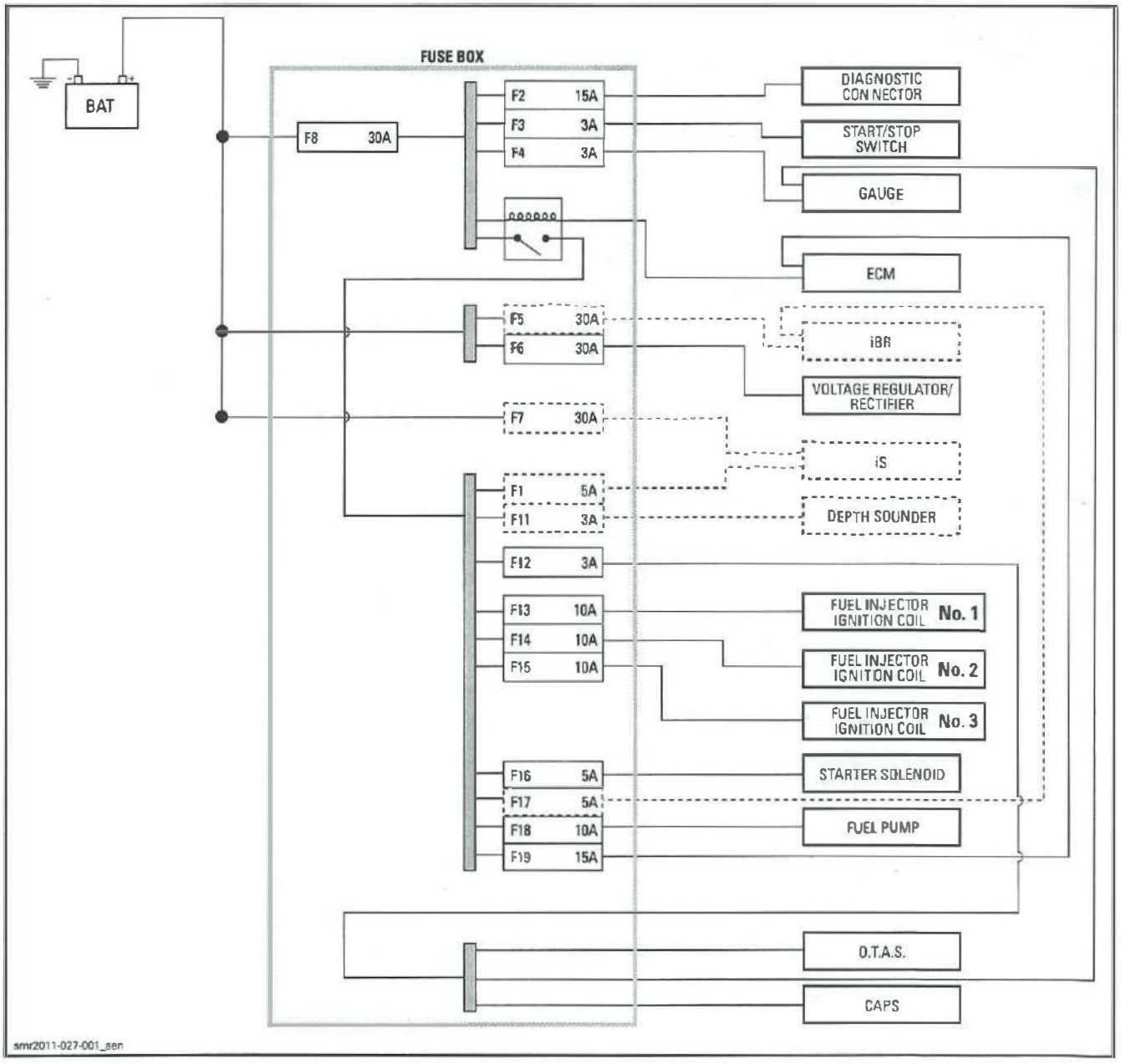
WH = WHITE	BK = BLACK
RE = RED	YL = YELLOW
PU = PURPLE	TA = TAN
GN = GREEN	BW = BROWN
GY = GREY	BL = BLUE
PK = PINK	OR = ORANGE

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POWER DISTRIBUTION AND GROUNDS

GENERAL

POWER DISTRIBUTION DIAGRAM



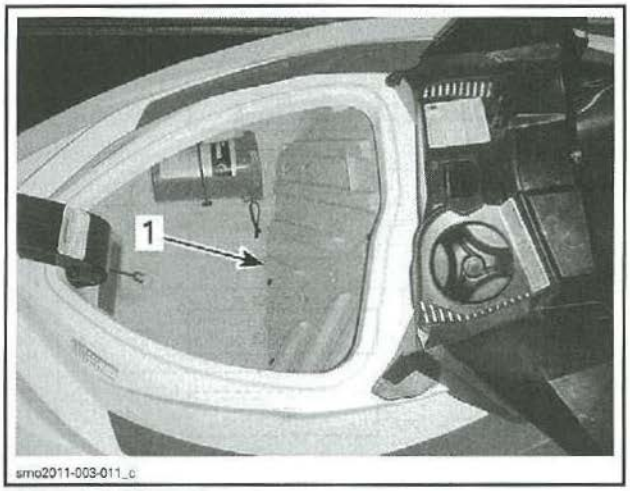
NOTE: Component shown in doted lines are not offered on all models.

ACRONYM DESCRIPTION	
CAPS: Camshaft position sensor	iS: Intelligent suspension
ECM: Engine control module	O.T.A.S.: Off throttle assisted steering
iBR: Intelligent brake and reverse	

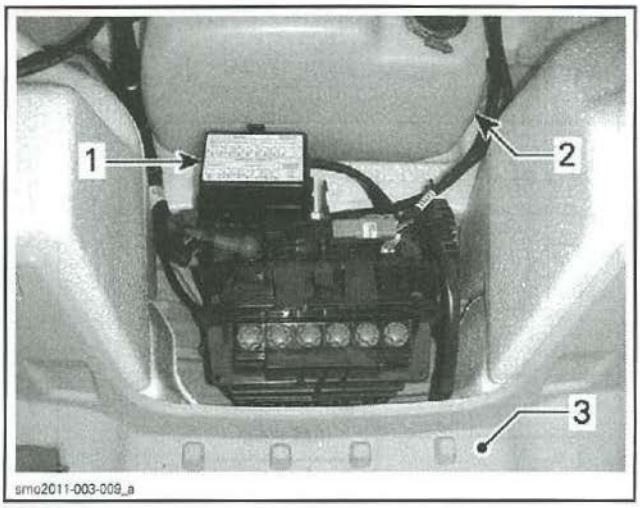
FUSE BOX

Fuse Box Location (GTS and GTI Series)

To access the fuse box, open the front storage cover an remove the access panel.



FUSE BOX ACCESS
1. Access panel

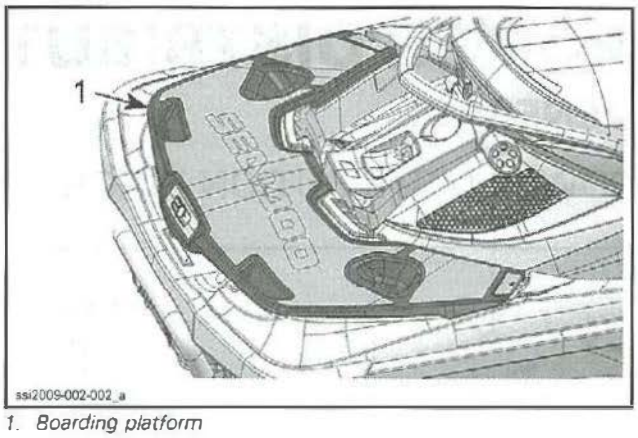


TYPICAL
1. Fuse box
2. Fuel tank
3. Front storage compartment (access panel removed)

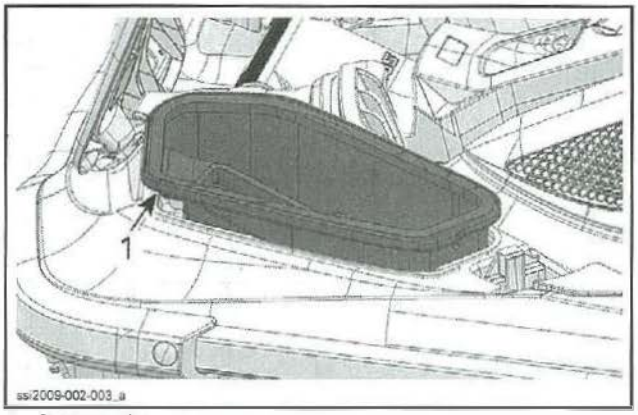
Fuse Box Location (RXT, GTX and Wake Pro Series)

iS and aS Models

To access the fuse box, open the boarding platform and remove the RH storage bin.



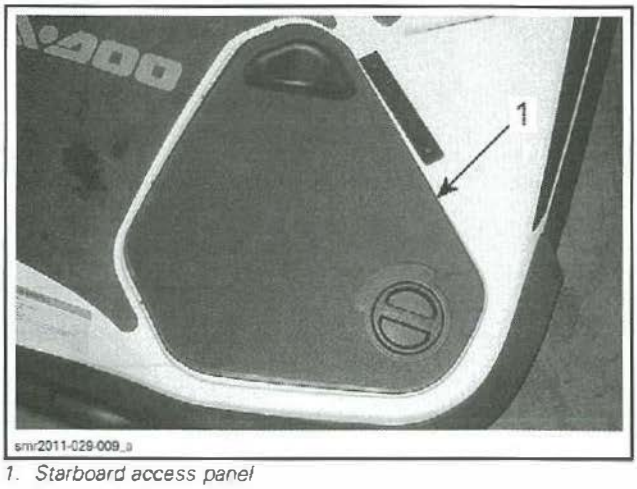
1. Boarding platform



1. Storage bin

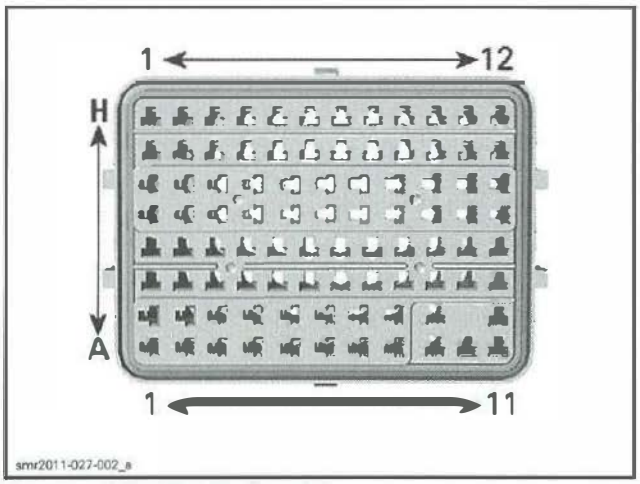
Models Without iS or aS

To access the fuse box, open the starboard access panel on the rear deck.



1. Starboard access panel

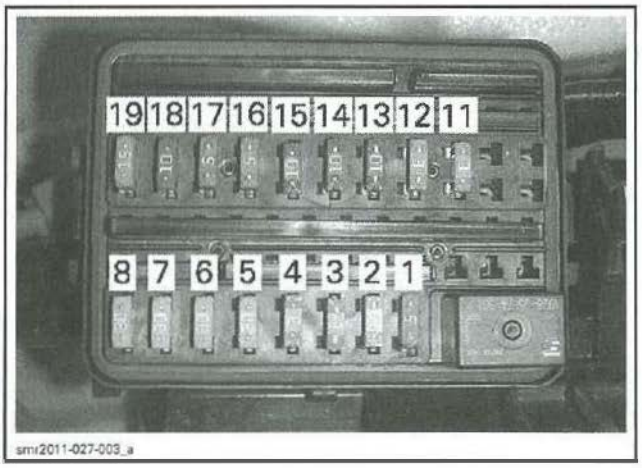
Fuse Identification



FUSE BOX PIN IDENTIFICATION

NOTE: This fuse box has rows of 11 or 12 cavities. See table below for details.

NUMBER OF CAVITIES BY ROW	
ROW	NUMBER OF CAVITIES
A-B	11
C-D	12
E-F	11
G-H	12



NO.	DESCRIPTION	
F1	Through relay: – iBR control	5 A
F2	Direct power (through F8): – Diagnostic connector	15 A
F3	Direct power (through F8): – START/STOP	3 A
F4	Direct power (through F8): – Gauge constant power	3 A
F5	Direct power: – iBR power	30 A
F6	Direct power: – Voltage rectifier/regulator	30 A
F7	Direct power: – iS power	30 A
F8	– F2 – F3 – F4 – Relay	30 A
F11	Through relay: – Depth sounder	3 A
F12	Through relay: – O.T.A.S. – Gauge start up – CAPS	3 A
F13	Through relay: – Fuel injector cyl. 1 – Ignition coil cyl. 1	10 A
F14	Through relay: – Fuel injector cyl. 2 – Ignition coil cyl. 2	10 A
F15	Through relay: – Fuel injector cyl. 3 – Ignition coil cyl. 3	10 A
F16	Through relay: – Starter solenoid	5 A
F17	Through relay: – iBR control	5 A
F18	Through relay: – Fuel pump	10 A
F19	Through relay: – ECM power	15 A

RELAY

Relay Pin Identification

The relay is on the fuse box. Refer to *FUSE BOX LOCATION*.

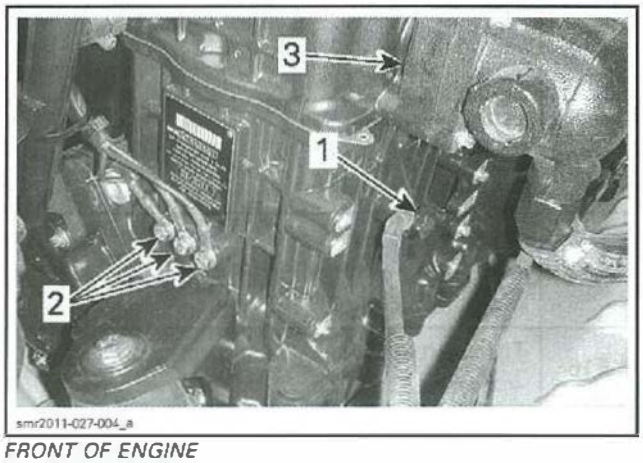
RELAY PIN IDENTIFICATION		
FUNCTION	FUSE BOX PIN	CONDITION
12-volt input at winding	B9	Direct battery power from fuse F8
Control	A11	Grounded by ECM B pin H2 once START/STOP is depressed
12-volt input at contacts	A9	Direct battery power from fuse F8
12-volt output	B11	-

GROUNDS

Ground Location

All the ground terminals are located on the front of engine.

There is no splice in the ground wiring, the interconnections are made through a bus bar in the fuse box.



FRONT OF ENGINE
1. *Battery ground*
2. *Electrical components grounds*
3. *Exhaust manifold*

IGNITION SYSTEM

SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	358
FLUKE 115 MULTIMETER	529 035 868	357–358

SERVICE PRODUCTS

Description	Part Number	Page
DOW CORNING 111	413 707 000	360

GENERAL

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

⚠ WARNING

Never check for engine ignition spark from an open coil and/or spark plug as spark may cause potential fuel vapors to ignite. Always use an approved spark tester.

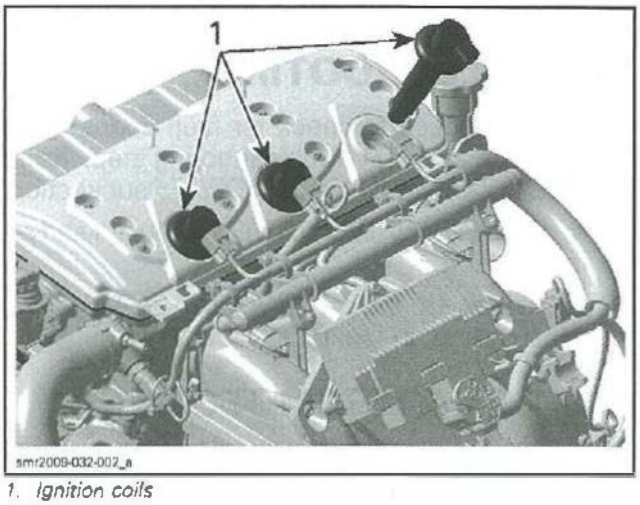
SYSTEM DESCRIPTION

The ignition system is a digital inductive type system.

Ignition system parameters such as ignition timing, spark duration, and firing order, as well as many other engine related functions are controlled by the engine management system (EMS) in order to meet engine operational requirements. The EMS can detect many abnormalities including a short circuit in the primary winding of the ignition coils as well as its associated circuits.

Three separate ignition coils receive power from three separate fuses.

When a ground signal is provided by the ECM to an ignition coil primary winding, a high voltage is induced in the coil secondary winding that is used to produce a spark at the spark plug electrode.



1. Ignition coils

Ignition Timing

Ignition timing is not adjustable.

The ECM is programmed with data (ignition mappings) that it uses to establish optimum ignition timing under all engine operating conditions.

It receives signals from a variety of sensors that it compares with the ignition mappings and uses it to control the ignition spark timing, duration and firing order.

The firing of each spark plug is independent of the others.

Engine RPM Limiter

The ECM will limit the maximum engine speed by cutting off ignition spark and fuel at a predetermined engine RPM.

ENGINE	RPM LIMITER
130 and 155 HP	7750 RPM
215 and 260 HP	8300 RPM

Knock Sensor

A knock sensor is mounted on the cylinder block behind the intake manifold. It detects specific vibrations that would typically be generated by engine detonation.

If detonation occurs, the knock sensor detects it and the ECM goes into a specific operating mode whereby it temporarily retards the ignition advance until detonation stops.

The ECM is able to identify in which cylinder the knocking occurs and modifies the ignition advance on that cylinder only.

Refer to the *ELECTRONIC FUEL INJECTION (EFI)* section for testing and replacement procedures.

TROUBLESHOOTING

It is good practice to check for fault codes using the B.U.D.S. as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

Refer to *POWER DISTRIBUTION* for fuses and relay information.

Always refer to the *WIRING DIAGRAM* when troubleshooting an electrical circuit.

IGNITION SYSTEM TESTING

1. Ensure fuses F13, F14 and F15 are powered and in good condition.
2. If a fuse is burnt, test for a short circuit or faulty component on that fuse circuit before replacing the fuse.

⚠ WARNING

Due to the possibility of flammable vapors accumulating in the bilge, you should always test for a short circuit which may produce a spark and ignite the vapors before replacing a burnt fuse.

3. If there is no active fault code, start diagnostic by carrying out *IGNITION COIL TEST USING B.U.D.S.*
4. If a primary winding of an ignition coil or a circuit is at fault, a fault code will be set. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

DIAGNOSTIC GUIDELINES

The following is provided to help in diagnosing the probable cause of a problem. It is a guideline and should not be assumed to list all possible causes.

ENGINE WILL NOT START (ENGINE TURNS OVER)

1. Fouled or defective spark plug
   - *Check spark plug condition. Replace if necessary.*
2. Defective CPS
   - *Test CPS, refer to ELECTRONIC FUEL INJECTION (EFI) subsection.*
3. Defective trigger wheel
   - *Check. Refer to PTO HOUSING/MAGNETO subsection.*
4. Defective ignition circuit
   - *Check fuses, ignition coils, wiring and connectors.*

ENGINE HARD TO START

1. Faulty, fouled or worn out spark plug
   - *Check spark plug condition. Replace if necessary.*

ENGINE MISFIRES, RUNS IRREGULARLY

1. Fouled, defective, worn spark plugs
   - *Check spark plug condition. Replace if necessary.*
2. Defective T.O.P.S. sensor
   - *Test T.O.P.S. Refer to LUBRICATION subsection.*
3. Damaged trigger wheel/loose CPS
   - *Check. Refer to PTO HOUSING/MAGNETO subsection.*
4. Defective ignition circuit
   - *Check fuses, ignition coils, wiring and connectors.*
5. Poor engine grounds
   - *Check ground condition, refer to POWER DISTRIBUTION AND GROUNDS subsection.*

ENGINE CONTINUALLY BACKFIRES

1. Fouled, defective spark plugs
   - *Check spark plug condition. Replace if necessary.*
2. Damaged trigger wheel/defective or loose CPS
   - *Check, refer to PTO HOUSING/MAGNETO and ELECTRONIC FUEL INJECTION (EFI) subsections.*

ENGINE DETONATION OR PINGING

1. Faulty or disconnected knock sensor
   - *Check, refer to ELECTRONIC FUEL INJECTION (EFI) subsection.*

ENGINE LACKS ACCELERATION OR POWER

1. **Weak spark**
   - *Check spark plugs, coils, wiring and connections.*

PROCEDURES

IGNITION COILS

⚠ WARNING

Never check for engine ignition spark from an open coil and/or spark plug in the engine compartment as a spark may cause fuel vapors which may have accumulated in the bilge to ignite.

Ignition Coil Access

1. Open or remove seat.

iS and aS Models

2. Remove the rear ventilation cover.

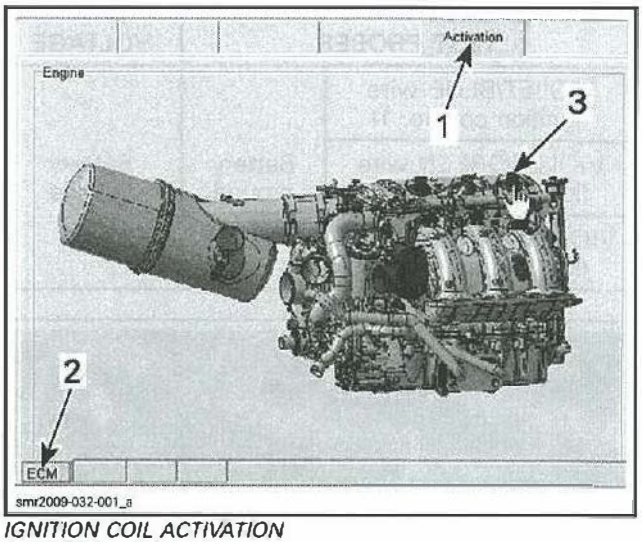
All Models

Ignition coils are located on top of the valve cover.

NOTE: Some models have an engine cover that has to be removed to access the ignition coils.

Ignition Coil Test Using B.U.D.S.

1. Connect to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* section.
2. Select the Activation and **ECM** tabs.
3. Energize the ignition coil to be tested by clicking on the corresponding illustration.



IGNITION COIL ACTIVATION
1. Activation tab
2. ECM tab
3. Click on the desired ignition coil

You should hear the spark occurring. If in doubt, use a sealed vapor proof spark tester or an inductive spark tester as available from tool suppliers, to prevent a spark from occurring in the bilge.

If there is no ignition at one or more coils, carry out a *IGNITION COIL INPUT VOLTAGE TEST*.

If spark is weak, try a new spark plug. If spark is still weak, try a new ignition coil.

NOTE: The voltage required to produce a spark in the combustion chamber is higher when the engine is running.

Ignition Coil Input Voltage Test

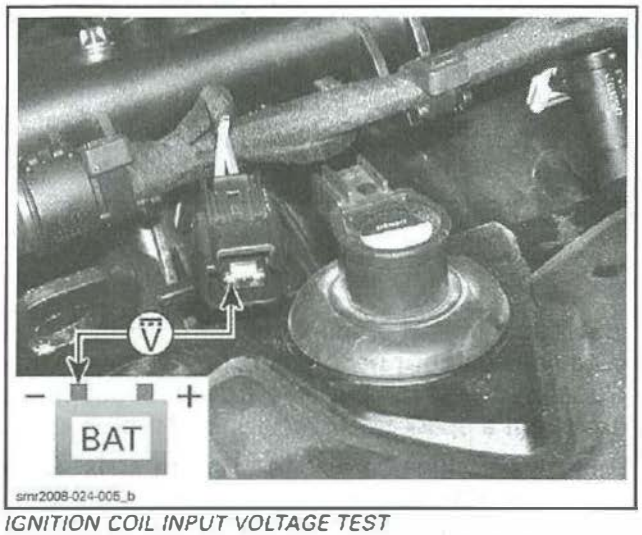
Make sure fuses F13, F14 and F15 are good before testing.

1. Disconnect the applicable ignition coil connector.
2. Remove tether cord from the engine cut-off switch.
3. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc.
4. Press the START button to activate the ECM.

NOTE: Pressing the start button without the tether cord installed on the engine cut-off switch will turn on electrical power without starting the engine; the information center will cycle through a self-test function and shut off its display after a few seconds. However, the electrical system will stay powered up for approximately three minutes after the START button was pressed.

5. Measure voltage as per following table.

TEST PROBES		VOLTAGE
VIOLET/BLUE wire (ignition coil no. 1)	Battery ground	Battery voltage
VIOLET/GREEN wire (ignition coil no. 2)		
VIOLET/ORANGE wire (ignition coil no. 3)		



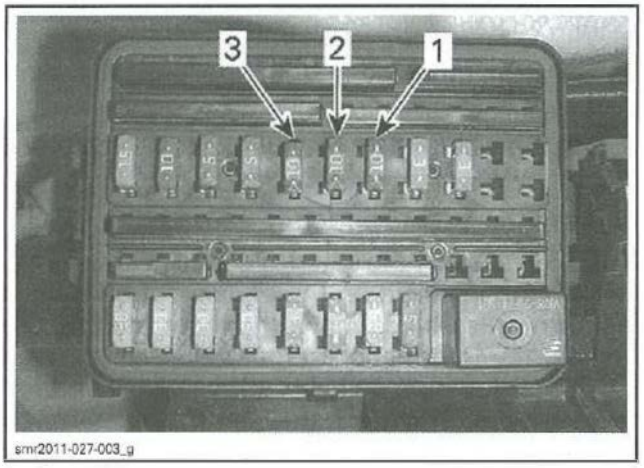
IGNITION COIL INPUT VOLTAGE TEST

If test succeeds, carry out an *IGNITION COIL RESISTANCE TEST.*

If test fails, carry out an *IGNITION COIL POWER CIRCUIT CONTINUITY TEST.*

Ignition Coil Power Circuit Continuity Test

1. Remove fuses F13, F14 and F15.

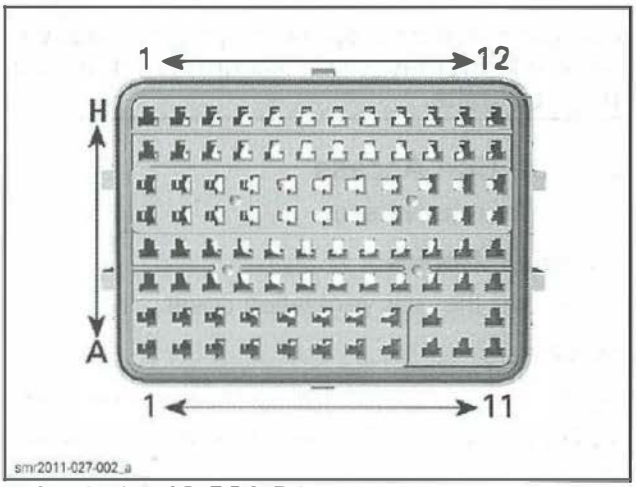


1. *Fuse F13*
2. *Fuse F14*
3. *Fuse F15*

2. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.

3. Read resistance of the desired ignition coil circuit.

IGNITION COIL	IGNITION COIL WIRE	FUSE BOX	MEASUREMENT
1 (rear)	VI/BU	Terminal F7	Close to 0 Ω
2	VI/GR	Terminal E6	
3	VI/OR	Terminal F5	



FUSE BOX PIN IDENTIFICATION

If test fails at any ignition coil, test the following items separately and repair/replace wiring or terminals from fuse box to the applicable ignition coil.

- Wiring from fuse box to engine C04-4POS connector
- Wiring from C04-4POS connector to ignition coil.

Refer to *WIRING DIAGRAM* for details.

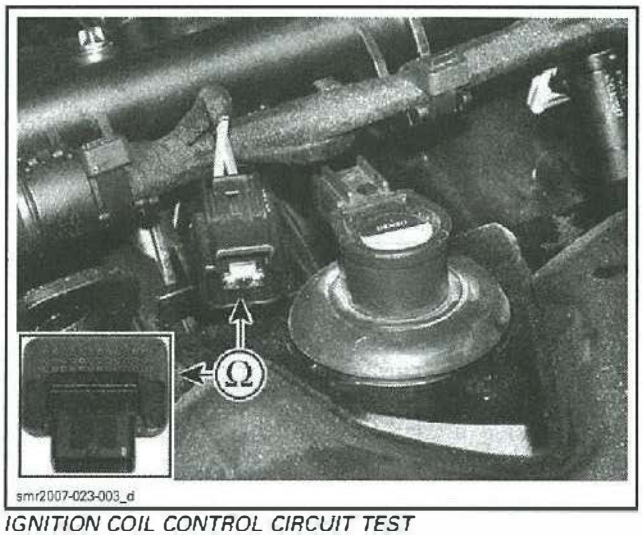
Ignition Coil Control Circuit Continuity Test

1. Disconnect ECM connector "A". For connector identification, refer to *WIRING HARNESS AND CONNECTOR* subsection.
2. Connect ECM connector to the ECM ADAPTER TOOL (P/N 529 036 166).



3. Disconnect ignition coil connector.
4. Test for continuity of circuit as per following table.

COIL	IGNITION COIL WIRE	ECM ADAPTER	RESISTANCE
Cylinder 1 (rear)	BR/BK	A-M4	Close to 0 Ω (continuity)
Cylinder 2	BR/OR	A-M2	
Cylinder 3	BR/YL	A-M1	



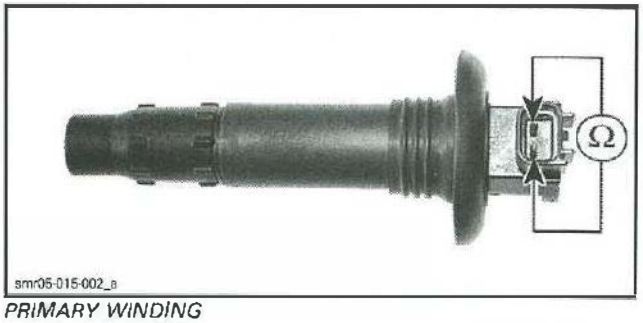
IGNITION COIL CONTROL CIRCUIT TEST

If test fails, repair the connector or replace the engine wiring harness.

Ignition Coil Resistance Test

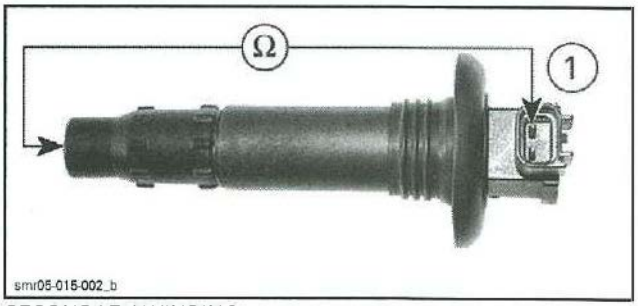
An ignition coil with a good resistance measurement can still be faulty. Current leakage can occur at high voltage levels which is not detectable with an ohmmeter. Replacing the ignition coil may be necessary as a test.

1. Remove ignition coil. Refer to *IGNITION COIL REMOVAL* in this subsection.
2. Perform a visual inspection of the ignition coils. Check for corrosion, bent pins, loose or burnt contacts, and cracked or torn insulator.
3. Using a multimeter, test the resistance in both primary and secondary windings.



PRIMARY WINDING

CIRCUIT	TERMINAL	RESISTANCE @ 20°C (68°F)
Primary winding	1 and 2	0.85 - 1.15 Ω



SECONDARY WINDING

CIRCUIT	TERMINAL	RESISTANCE @ 20°C (68°F)
Secondary winding	1 and spark plug terminal	9.5 - 13.5 kΩ

If any test fails, replace ignition coil.

If test succeeds, carry out an *IGNITION COIL CONTROL CIRCUIT CONTINUITY TEST.*

Ignition Coil Removal

1. Disconnect ignition coil connector.

NOTICE **Do not remove the ignition coil before disconnecting the input connector or the wires may be damaged. Do not pry up ignition coil with a screwdriver to avoid damage.**

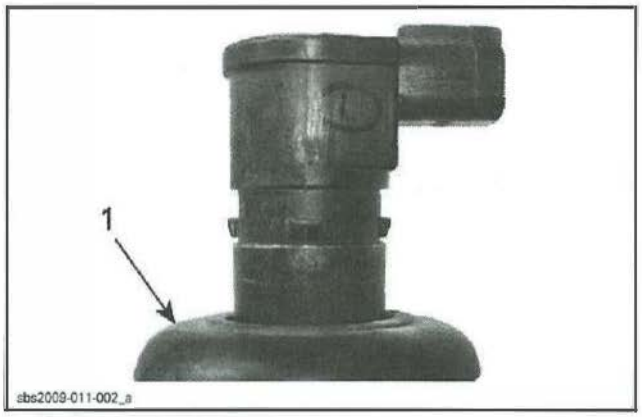
NOTE: Twist ignition coil in both directions as you pull it up to ease removal.

2. Remove ignition coil from spark plug.

Ignition Coil Installation

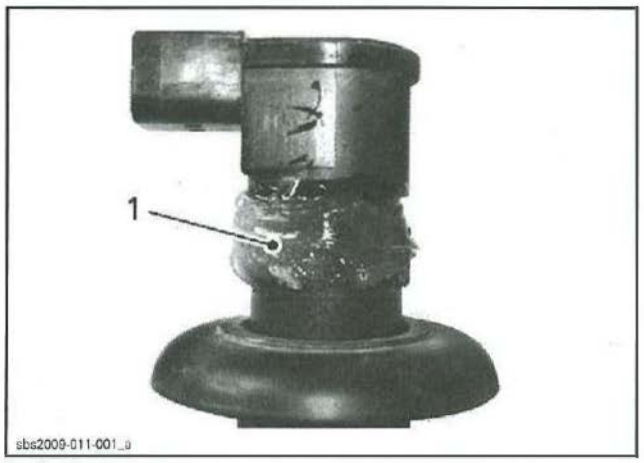
Prior to inserting the ignition coil on its spark plug, apply sealant as described in following procedure:

1. Pull rubber seal down.



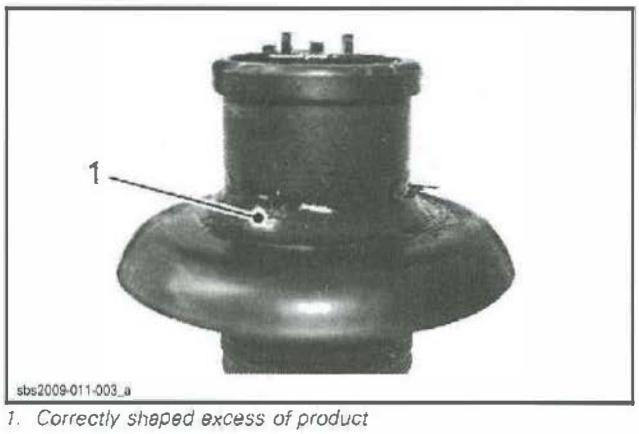
1. Rubber seal pulled down

2. Apply DOW CORNING 111 (P/N 413 707 000) to rubber seal seat as shown.



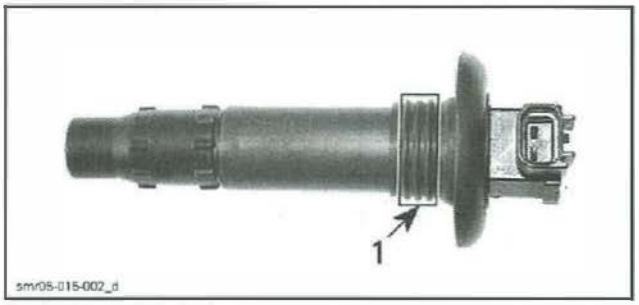
1. Apply product here

3. Pull rubber seal back on its seat making sure the tabs on the ignition coil and the slots in the seal properly match together.
4. Leave a ring of grease on top of the seal as shown to act as a water barrier. Wipe off the excess.



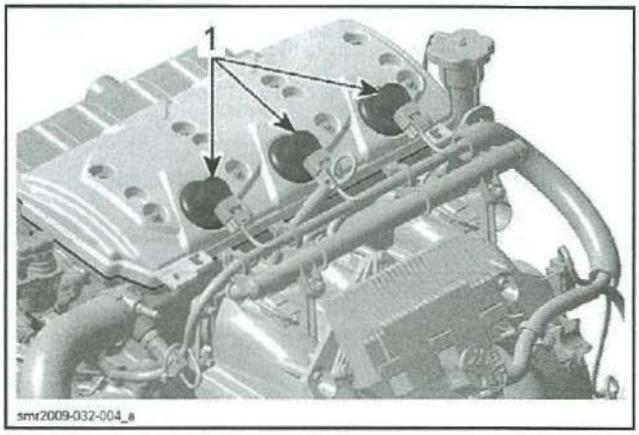
1. Correctly shaped excess of product

5. Apply DOW CORNING 111 (P/N 413 707 000) on rubber seal contact area.



1. Apply product here

6. Install coil in cylinder head hole.
7. Push the ignition coil down to securely install it on the spark plug tip.
8. Ensure the seal seats properly with top surface of engine valve cover.



1. Seal properly seated

SPARK PLUGS

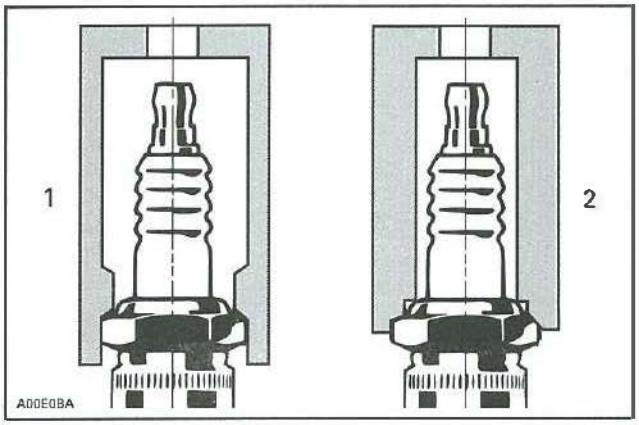
Spark Plug Removal

1. Remove ignition coil. Refer to *IGNITION COIL REMOVAL* in this subsection.

⚠ WARNING

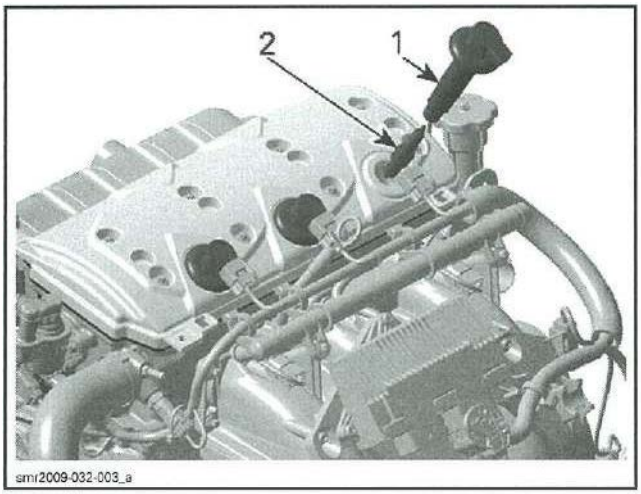
Never remove an ignition coil from a spark plug without disconnecting it from the wiring harness. Flammable vapors may be present in the bilge. Should the tether cord be installed on the engine cut-off switch, a spark could be generated at the spark plug end of the coil possibly resulting in an explosion.

2. Using a spark plug socket, release the torque applied to the spark plug.



1. Approved socket
2. Improper socket

3. Clean the spark plug and cylinder head with pressurized air.
4. Unscrew spark plug then use the ignition coil to take spark plug out of spark plug hole.



1. Ignition coil
2. Spark plug

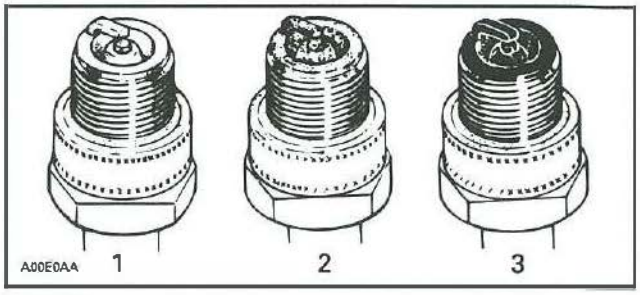
Troubleshooting a Fouled Spark Plug

Fouling of the spark plug is indicated by irregular running or misfiring of the engine, decreased engine speed due to misfiring, reduced performance, and increased fuel consumption.

Other possible causes are: use of an incorrect or bad fuel, defective ignition system, incorrect spark plug gap, loss of compression, or lubricating oil entering the combustion chamber.

The plug face of a fouled spark plug has either a wet or dry black carbon deposit. Such coatings form a conductive connection between the center electrode and the ground electrode.

Spark Plug Analysis



TYPICAL
1. Overheated (light gray, white)
2. Normal (light brown, brown)
3. Fouled (black, wet or dry, dark deposits, gray, melted coating)

The plug face reveals the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at prescribed intervals, examining the plug face (i.e. the part of the plug projecting into the combustion chamber).

Spark Plug Installation

Prior to installation, ensure the contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, set electrode gap as specified in the following chart.

ENGINE	SPARK PLUG	TORQUE	GAP mm (in)
1503	NGK DCPR8E	Hand tighten + 1/4 turn with a socket	0.75 (.030)

2. Apply anti-seize lubricant over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head. Then, tighten the spark plug clockwise an additional 1/4 turn with an approved spark plug socket.

4. Install ignition coil. Refer to *IGNITION COIL INSTALLATION* in this subsection.
5. Complete the installation in the reverse order of the removal.

green-manuals

CHARGING SYSTEM

SERVICE TOOLS

Description	Part Number	Page
VACUUM/PRESSURE PUMP	529 021 800	378

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
ELECTRO SPECIALTIES BATTERY LOAD TESTER	710	372
EXTECH INDUCTIVE AMMETER	380941	364

GENERAL

NOTICE **When performing a test on iS models with the engine running above approximately 4500 RPM for 3 seconds, be aware that the suspension will move to its predefined up position and then stop in that position. Wait until suspension is stopped before working on the watercraft. Keep away from moving parts.**

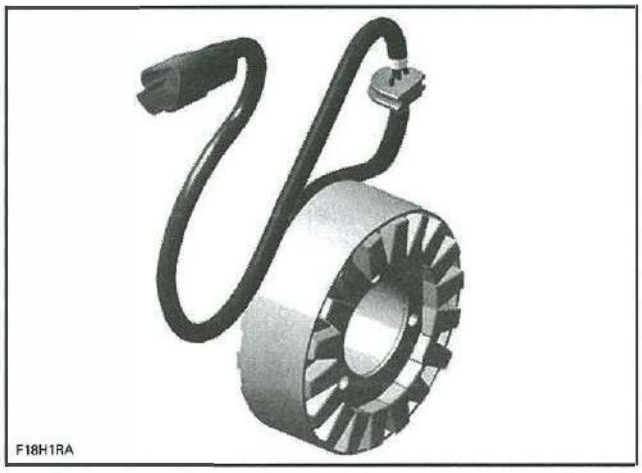
SYSTEM DESCRIPTION

The purpose of the charging system is to maintain the battery at a full state of charge and to provide the electrical system with the required electrical power for normal vehicle operation.

Magneto

The magneto is the primary source of electrical energy. It transforms a magnetic field into an electric current (AC).

The magneto has a 3 phase, delta wound, 18 pole stator that is rated at 380 watts.

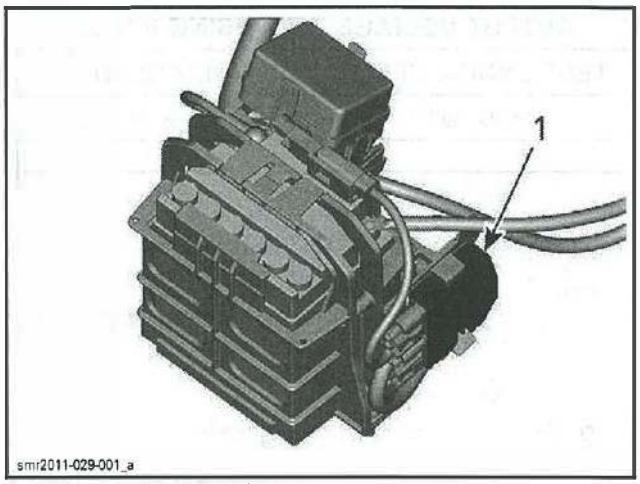


TYPICAL

Voltage Regulator/Rectifier

The rectifier receives AC current from the magneto and transforms it into direct current (DC).

The voltage regulator, included in the same unit, limits voltage to a maximum level to prevent any damage to electrical components.



1. Voltage regulator/rectifier

Battery

The battery supplies DC power to the electric starter for cranking the engine. During engine starting, it also supplies DC power to every electrical and electronic system in the vehicle as well as all accessories.

At low engine RPM operation and high current load conditions, it supplements the magneto output and helps to maintain a steady system voltage.

INSPECTION

CHARGING SYSTEM OUTPUT

First ensure that battery is in good condition prior to performing the following tests.

NOTE: It is good practice to check for fault codes using the B.U.D.S. as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

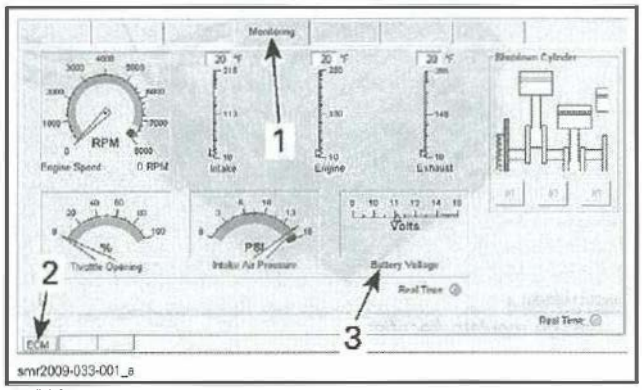
Output Voltage Test Using B.U.D.S.

1. Connect to the latest applicable B.U.D.S. software. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Select the **Monitoring** and **ECM** tabs.
3. Start engine.

NOTE: Connect a garden hose to cool exhaust system. Refer to *EXHAUST SYSTEM* subsection.

4. Increase engine RPM as specified in the following table and read voltage in B.U.D.S.

OUTPUT VOLTAGE TEST USING B.U.D.S.	
TEST ENGINE SPEED	VOLTAGE (DC)
5500 RPM	14.5 ± .5 Vdc



TYPICAL
1. *Monitoring tab*
2. *ECM tab*
3. *Battery voltage*

If voltage is above specification, replace voltage regulator/rectifier.

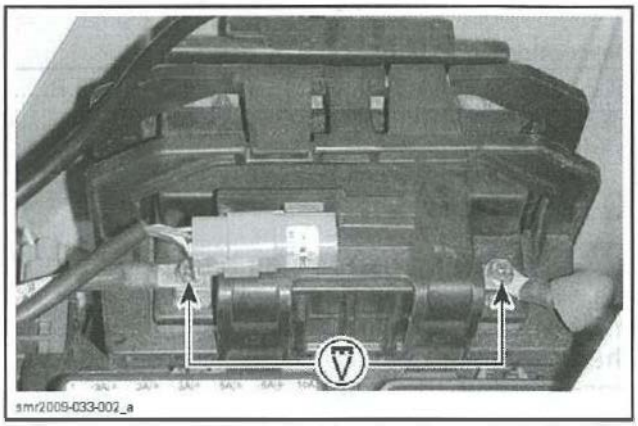
If voltage is below specification, check stator output and wiring harness prior to concluding that voltage regulator/rectifier is defective. Refer to *PTO HOUSING AND MAGNETO* subsection.

Output Voltage Test Using a Multimeter

GTS and GTI Models

For battery access, refer to *BATTERY ACCESS* in this subsection.

1. Set multimeter to Vdc.
2. Connect multimeter to battery posts.



TYPICAL - CHARGING SYSTEM VOLTAGE TEST AT BATTERY POSTS

3. Start engine.

NOTE: Connect a garden hose to cool exhaust system. Refer to *EXHAUST SYSTEM* subsection.

4. Increase engine RPM as specified in the following table and read voltage with the multimeter.

OUTPUT VOLTAGE TEST USING A MULTIMETER	
TEST ENGINE SPEED	VOLTAGE (DC)
5500 RPM	14.5 ± .5 Vdc

If voltage is above specification, replace voltage regulator/rectifier.

If voltage is below specification, check stator output and wiring harness prior to concluding that voltage regulator/rectifier is defective. Refer to *PTO HOUSING AND MAGNETO* subsection.

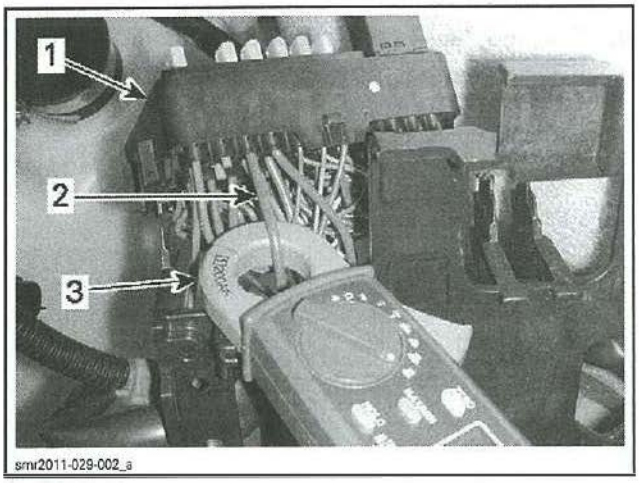
Output Current Test with an Inductive Ammeter

For fuse box access, refer to the appropriate *BATTERY ACCESS* in this subsection.

1. Detach fuse box from its support.

Use an inductive ammeter such as the EXTECH INDUCTIVE AMMETER (P/N 380941) or equivalent.

2. Turn on the ammeter and select 40 Adc.
3. From underneath the fuse box, clamp the ammeter around the DC output (RED/BLUE) wire.



1. *Fuse box*
2. *DC output (RED/BLUE) wire*
3. *Ammeter clamp*

NOTE: Zero set the ammeter before use or reading may be erroneous.

4. Start engine.

NOTE: Connect a garden hose to cool exhaust system. Refer to *EXHAUST SYSTEM* subsection.

5. Increase engine RPM as specified in the following table and read current with the ammeter.

TEST ENGINE SPEED	CURRENT
5500 RPM	Approx. 10 A (while suspension does not move)

NOTE: Initial current reading will be higher than specified due to the battery drain from the engine start. This is an indication that the charging system is operating normally. Current load will come down as the battery recovers its charge.

If current reading is far below specification, test stator output and wiring harness prior to concluding the voltage regulator/rectifier is faulty.

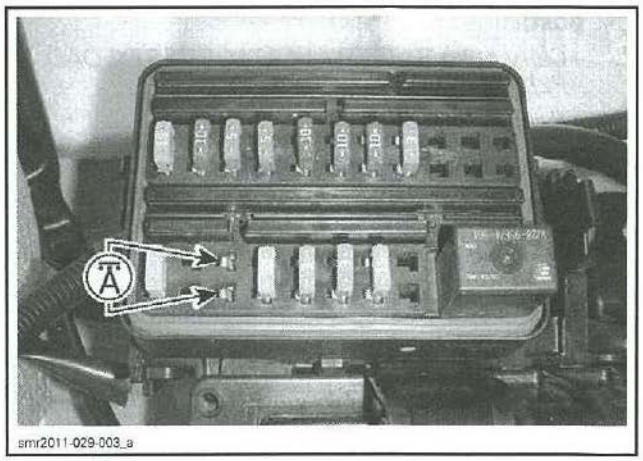
NOTE: If the battery is in poor condition or is not at a full state of charge, current reading will be above specification. Refer to *BATTERY* in this subsection for battery testing.

Output Current Test with a Multimeter

NOTICE **Charging current may rise over multimeter current reading capacity (usually 10 A) possibly causing test equipment damage. It is preferable to use an inductive ammeter to test the charging system current.**

For fuse box access, refer to *BATTERY ACCESS* in this subsection.

1. Remove charging system fuse.
2. Set multimeter to Adc.
3. Connect probes to fuse holder terminals.



4. Start engine.

NOTE: Connect a garden hose to cool exhaust system. Refer to *EXHAUST SYSTEM* subsection.

5. Increase engine RPM as specified in the following table and read current with the multimeter.

OUTPUT CURRENT TEST	
TEST ENGINE SPEED	CURRENT (DC)
5500 RPM	Approx. 10 A (while suspension does not move)

NOTE: Initial current reading will be higher than specified due to the battery drain from the engine start. This proves the charging system works. Current load will come down as the battery recovers its charge.

If current is below specification, carry out a *STATOR OUTPUT VOLTAGE TEST* prior to concluding the voltage regulator/rectifier is faulty.

TROUBLESHOOTING

DISCHARGED OR WEAK BATTERY

1. **Battery posts and/or cable terminal oxidized.**
   - *Clean battery terminals, posts, and coat with dielectric grease.*
2. **Loose or bad connections.**
   - *Check for wiring and connector tightness, frayed or broken wires. Repair or replace cables or connectors.*

3. Worn or faulty battery (sulfated, fretting, shorted plates or cell, damaged casing, loose post).
   - *Carry out a BATTERY VOLTAGE TEST (LOAD APPLIED).*
   - *Replace battery.*
4. Burnt fuse(s) or faulty rectifier.
   - *First check fuse(s). If in good condition, check voltage regulator/rectifier.*
5. Faulty stator.
   - *Test stator and replace as required.*
6. Parasitic or "Key Off" current loads.
   - *Isolate, reduce or eliminate such loads.*
   - *Recharge battery as recommended if vehicle is not used for extended periods of time.*

   NOTE: "Key Off" or parasitic loads may be loads due to installed accessories. Parasitic loads may also be due to water infiltration in connectors, or partial short circuits that slowly drain a battery without causing a fuse to burn.

LOW OR NO CHARGING SYSTEM VOLTAGE

1. Blown F6 fuse.
   - *Check F6 fuse.*
2. Defective stator.
   - *Test stator. Refer to PTO HOUSING AND MAGNETO subsection.*
3. Defective charging system wiring or connections.
   - *Check for damaged wiring.*
   - *Check for damaged or loose connections.*

REPETITIVE BLOWN F6 FUSE

1. Voltage regulator/rectifier internal circuit shorted to ground.
   - *Refer to VOLTAGE REGULATOR/RECTIFIER TEST FOR BLOWN F6 FUSE in this subsection.*

FREQUENT LOW ELECTROLYTE LEVEL REQUIRING ADDITION OF DISTILLED WATER

1. High charging system voltage.
   - *Carry out a CHARGING SYSTEM VOLTAGE TEST.*
2. Old battery with reduced current storage capacity.
   - *Carry out a BATTERY VOLTAGE TEST (LOAD APPLIED).*
   - *Replace battery.*
3. Cracked, leaking or improperly sealed battery.
   - *Ensure battery cell caps are properly installed and not leaking.*
   - *If battery is cracked or leaking electrolyte, replace battery and clean surrounding area as recommended in BATTERY further in this subsection.*

PROCEDURES

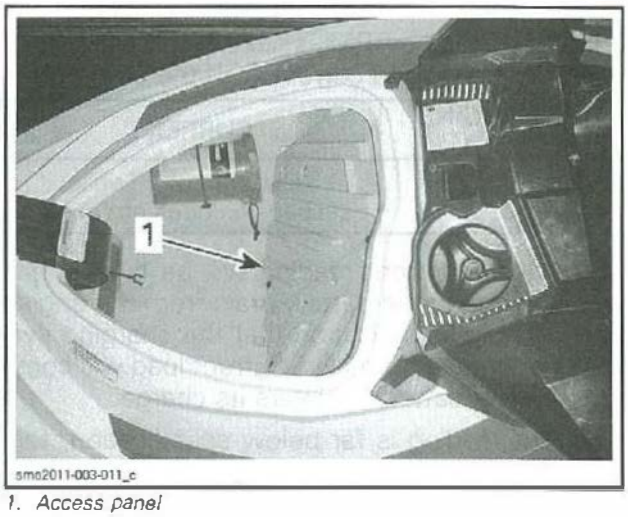
VOLTAGE REGULATOR/RECTIFIER

Voltage Regulator Continuity Test

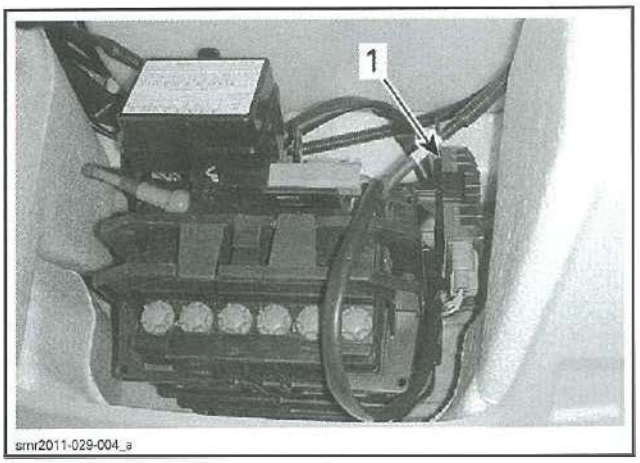
Due to internal circuitry, there is no static test available to check continuity.

Voltage Regulator/Rectifier Access (GTS and GTI Series)

Open the front storage cover an remove the access panel.



1. Access panel

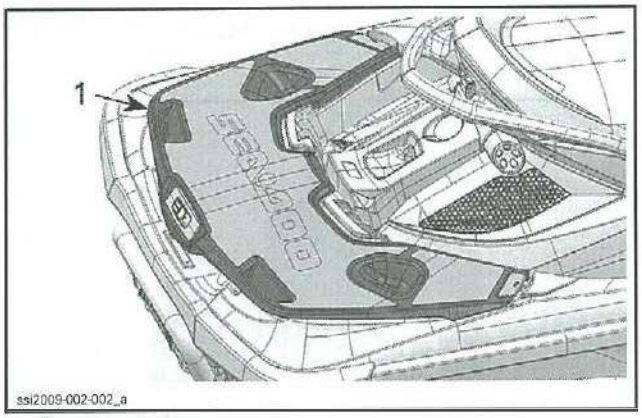


1. Regulator/rectifier

Voltage Regulator/Rectifier Access (RXT, GTX and Wake Pro Series)

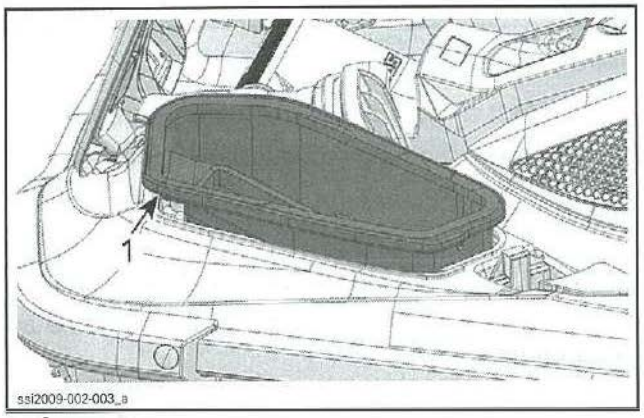
iS and aS Models

1. Open the boarding platform.

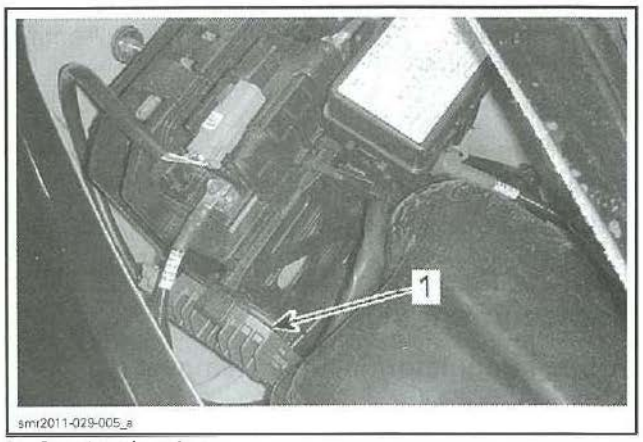


1. Boarding platform

2. Remove the starboard storage bin.



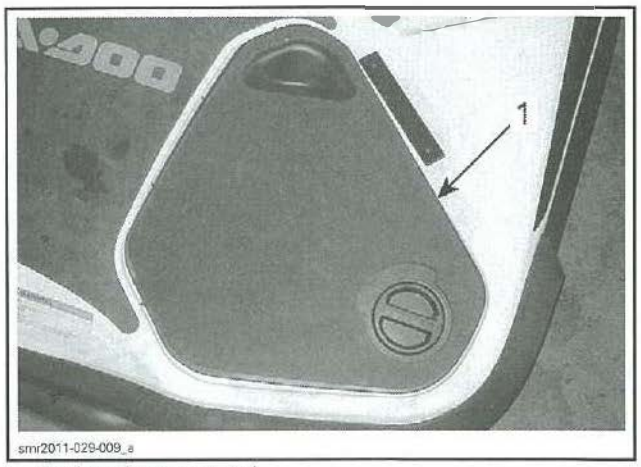
1. Storage bin



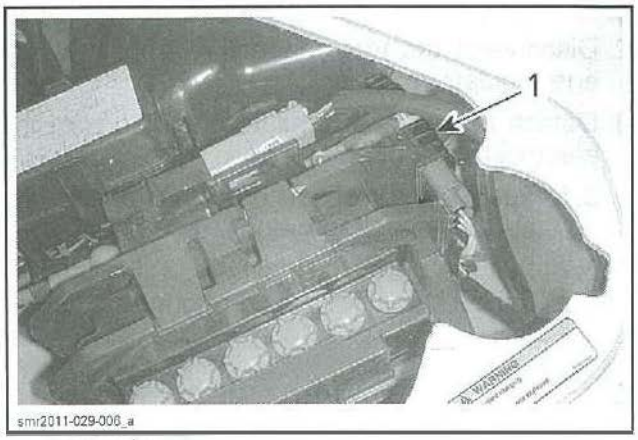
1. Regulator/rectifier

Models Without iS or aS

Remove the starboard access panel on the rear deck.



1. Starboard access panel



1. Regulator/rectifier

Voltage Regulator/Rectifier Test for Blown F6 Fuse

1. Detach the voltage regulator/rectifier from the electrical component support.

2. Disconnect the voltage regulator/rectifier 2-wire connector.
3. Install a new fuse.

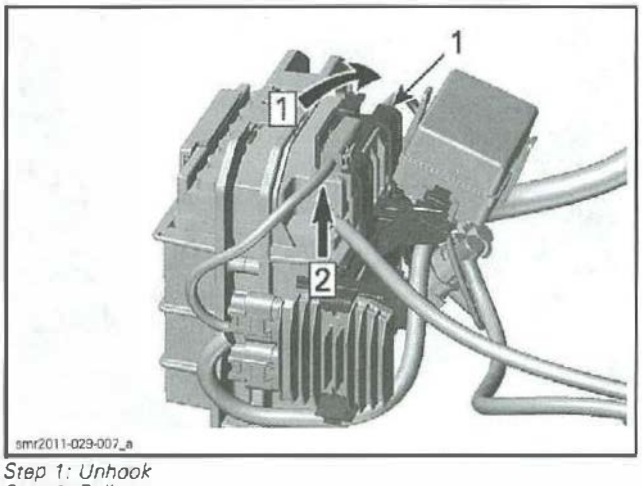
If the fuse still burns, check for a shorted wire or connector pin.

If fuse does not burn, replace regulator/rectifier.

Voltage Regulator/Rectifier Replacement

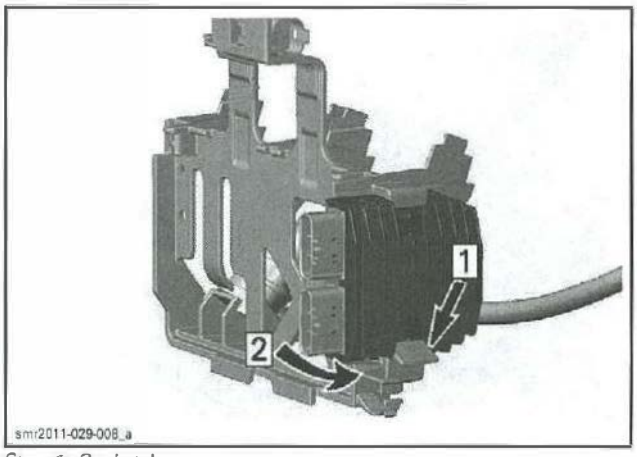
Voltage Regulator/Rectifier Removal

1. Detach the electrical component support from the battery holder:
   1.1 Unhook the top of electrical component support.
   1.2 Pull electrical component support up.



Step 1: Unhook
Step 2: Pull up
1. Electrical component support

2. Disconnect the two connectors from the voltage regulator/rectifier.
3. Detach the voltage regulator/rectifier from the electrical component support:
   3.1 Push the lower tab down to release the bottom of voltage regulator/rectifier.
   3.2 Pull the bottom of voltage regulator/rectifier off the electrical component support.

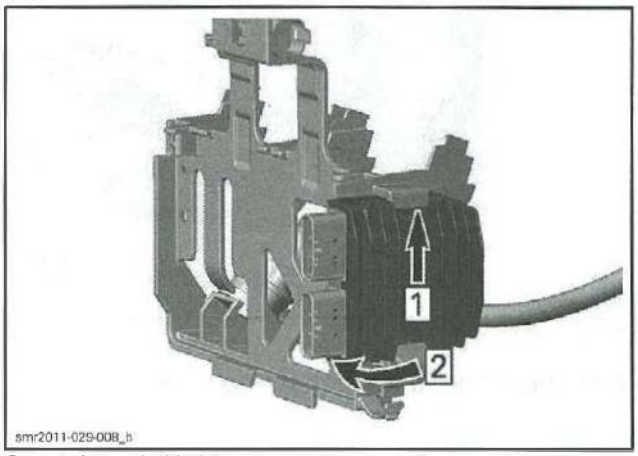


Step 1: Push tab
Step 2: Pull off

Voltage Regulator/Rectifier Installation

Installation is the reverse of the removal procedure. However, pay attention to the following.

1. Insert the top of voltage regulator/rectifier behind the component support upper tab.
2. Push the bottom of voltage regulator/rectifier to lock it.



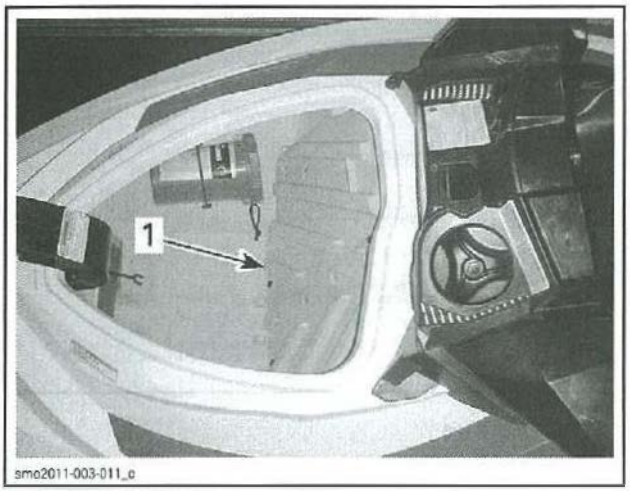
Step 1: Insert behind the tab
Step 2: Push to lock

3. Wiggle it to make sure it is safely locked.
4. Reinstall remaining removed components.

BATTERY

Battery Access (GTS and GTI Series)

Open the front storage cover an remove the access panel.

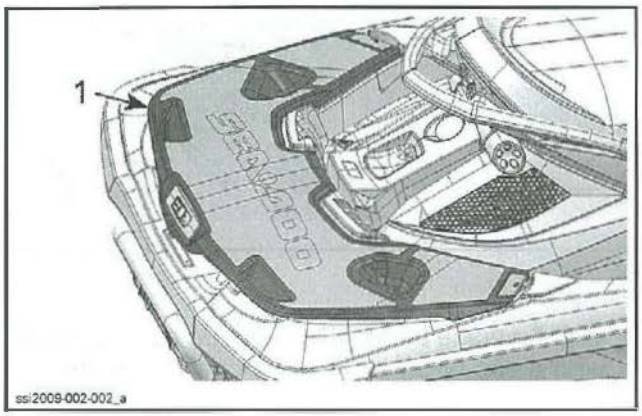


FUSE BOX ACCESS
1. Access panel

Battery Access (RXT, GTX and Wake Pro Series)

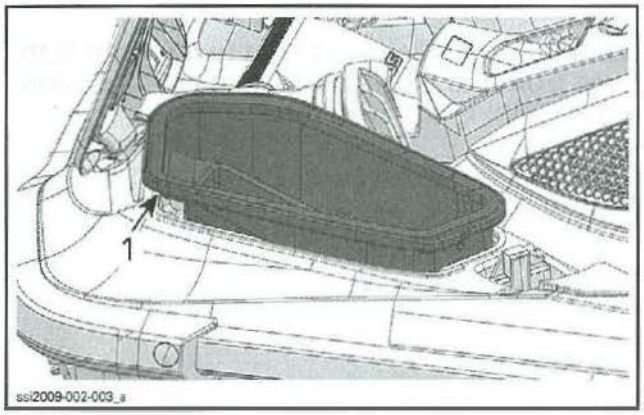
iS and aS Models

1. Open the boarding platform.



1. Boarding platform

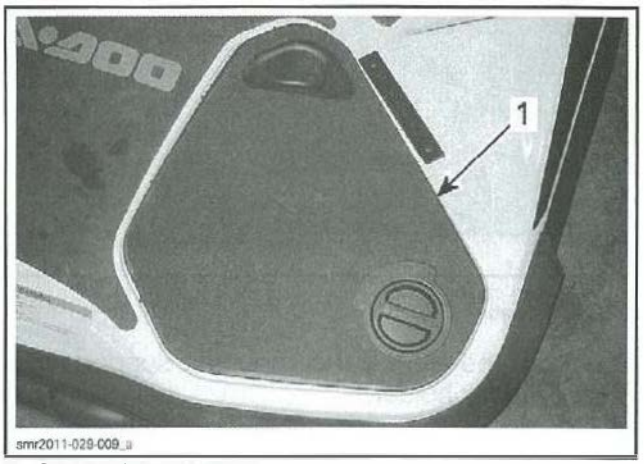
2. Remove the starboard storage bin.



1. Storage bin

Models Without iS or aS

3. Remove the starboard access panel on the rear deck.



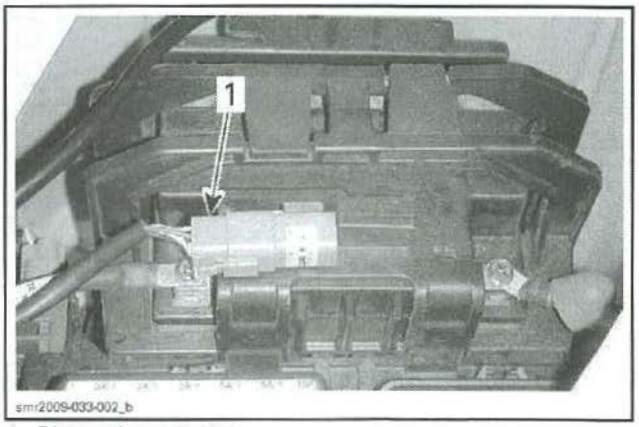
1. Starboard access panel

Battery Removal

⚠ WARNING

The BLACK negative battery cable must always be disconnected first and reconnected last. Never charge or boost battery while installed in watercraft.

1. Remove the diagnostic connector from its holder.



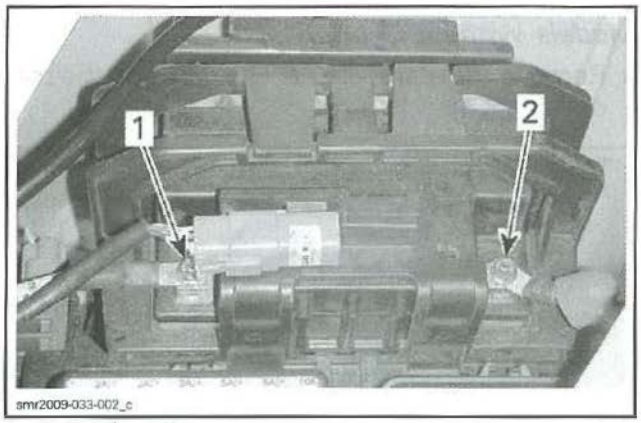
1. Diagnostic connector

2. Disconnect the BLACK (-) battery cable.

⚠ WARNING

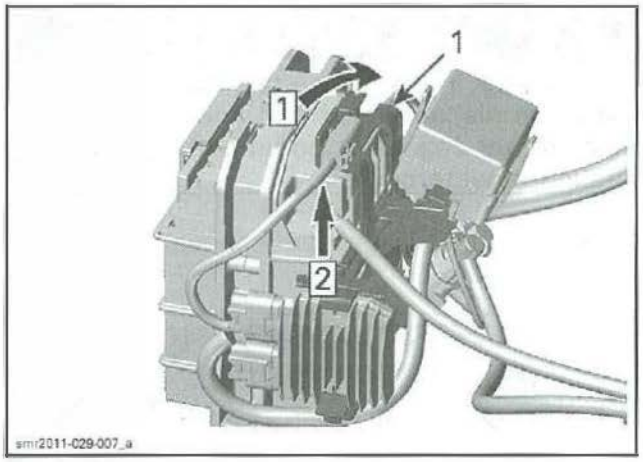
Always disconnect battery cables exactly in the specified order, BLACK (-) battery cable first then the RED (+) cable last.

3. Disconnect the RED (+) cable.



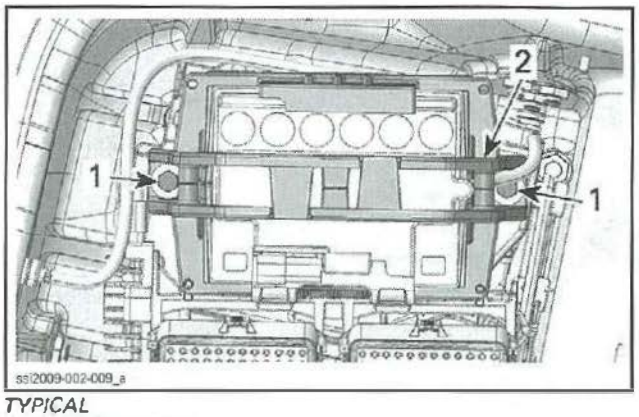
1. BLACK (-) cable
2. RED (+) cable

4. Detach the electrical component support from the battery holder:
   4.1 Unhook the top of electrical component support.
   4.2 Pull electrical component support up.



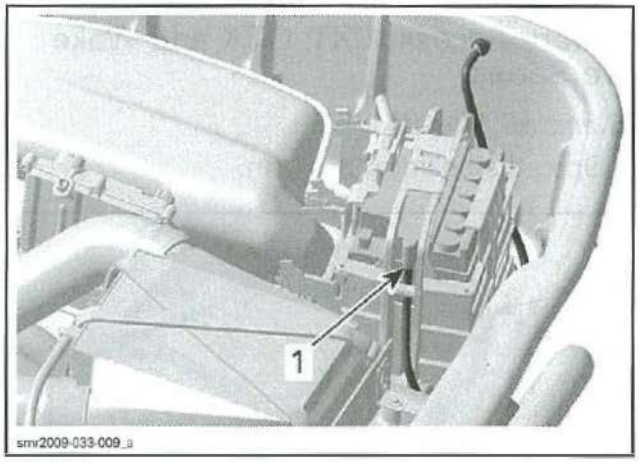
Step 1: Unhook
Step 2: Pull up
1. Electrical component support

5. Remove and discard both screws securing battery holder to battery holder base.



TYPICAL
1. Retaining screws
2. Battery holder

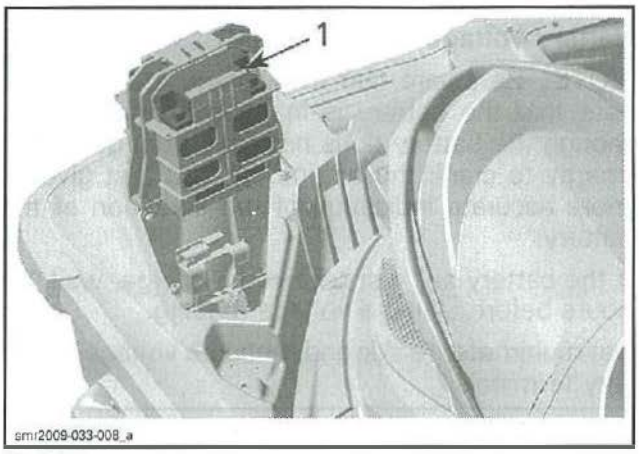
6. Disconnect vent hose from the battery.



TYPICAL
1. Disconnect here

7. Install a piece of hose (same type as vent hose), with a cap or small hose pincher, onto the battery vent to prevent electrolyte spillage when removing the battery.
8. Remove battery with battery holder from vehicle.

⚠ CAUTION **Be careful not to disconnect the hose from the battery vent and cause an electrolyte spill in the watercraft.**



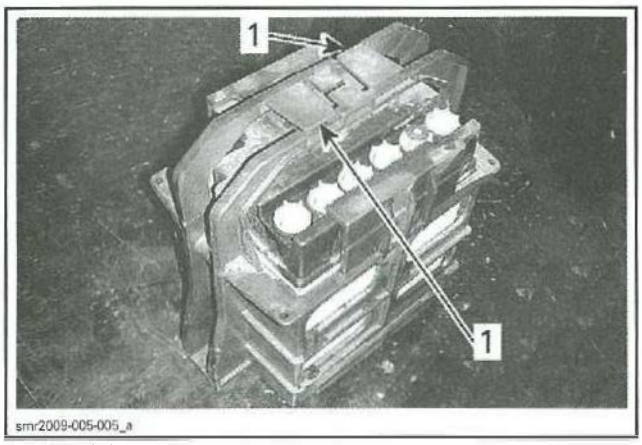
TYPICAL.
1. Vent plugged for removal

⚠ WARNING

Electrolyte is poisonous and corrosive. Avoid contact with eyes, skin and clothing. Wear a suitable pair of non-absorbent gloves when removing the battery by hand. Rinse any affected area with clear running water for at least 15 minutes, then seek professional medical attention.

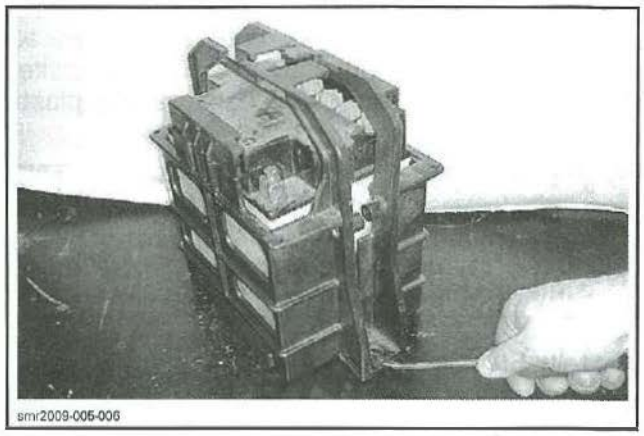
NOTICE **Should any electrolyte spillage occur, immediately wash off area with a solution of baking soda and water, then rinse thoroughly.**

9. Unlock the upper tabs then slightly open battery holder.

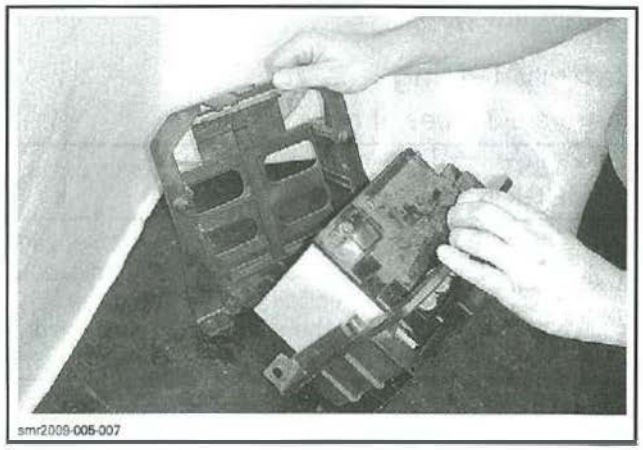


1. Unlock here

10. Separate lower tabs to unlock them.



11. Remove battery holder from battery.



Battery Cleaning

Clean the battery casing, caps, cables and battery posts using a solution of baking soda and water.

NOTICE **Do not allow cleaning solution to enter battery.**

Remove corrosion from battery cable terminals and battery posts using a firm wire brush. Rinse with clear water then dry well.

Battery Inspection

Visually inspect battery casing for cracks or other possible damages. If casing is damaged or shows signs of acid leaking, replace battery and thoroughly clean battery holder, holder base and surrounding area with a solution of water and baking soda.

Inspect battery posts for corrosion and security of mounting.

Inspect for cracked or damaged battery caps, replace defective caps.

NOTE: Hand tighten caps then tighten an additional 1/4 turn using a 20 mm (3/4 in) socket. Using any other tool could damage the plastic battery caps.

⚠ WARNING

Battery electrolyte is caustic. To prevent spillage, ensure battery cell caps are sufficiently tight to properly seal each cell.

Battery Electrolyte Level

Check electrolyte level in each cell, add distilled water up to the upper fill level line.

NOTICE **Add only distilled water in an activated battery.**

Battery Testing

There are 3 types of battery tests.

TEST METHOD	COMMENT
Voltage test (load applied)	A dynamic voltage test with a load applied gives an accurate indication of the condition of the battery. **This is the most recommended method.**
Voltage test (no load)	A static voltage test is carried out without discharging current. It is the simplest and most commonly used but the most likely to give false results.
Battery electrolyte reading	Gives an accurate indication of the charge condition of each cell.

Battery Voltage Test (Load Applied)

Use a load testing device such as the ELECTRO SPECIALTIES BATTERY LOAD TESTER (P/N 710). It has a 500 A carbon pile adjustable load.

Follow battery load tester instructions.

Apply a load of 3 times the ampere-hour rating of the battery for 14 seconds, then check battery voltage.

BATTERY VOLTAGE TEST (LOAD APPLIED)	
TIME TO MEASURE INTO TEST	VOLTAGE (with load applied)
14 seconds	10.5 Vdc min.

If battery voltage has dropped below specification, the battery storage capacity has decreased appreciably and the battery should be replaced.

Battery Voltage Test (No Load)

NOTE: Be aware that the voltage test can indicate that the battery is in good condition even though the battery does not have enough stored energy to crank the engine. A load test gives a more accurate indication of the condition of the battery.

If the battery has just received a charge, wait 1-2 hours before taking a voltage reading.

Set multimeter to Vdc and measure voltage at battery terminals.

FULLY CHARGED BATTERY VOLTAGE (NO LOAD)
12.6 Vdc minimum

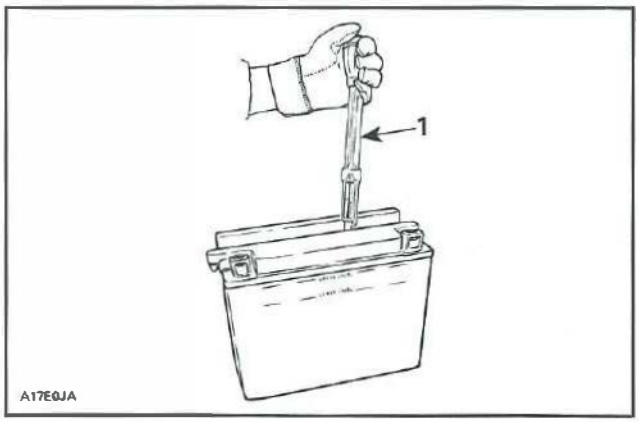
Battery Electrolyte Reading

NOTE: Do not top up cell electrolyte level with distilled water prior to taking an electrolyte reading.

Check charge condition of each cell using a hydrometer.

NOTE: A hydrometer measures the charge of a battery in terms of specific gravity of the electrolyte.

BATTERY ELECTROLYTE SPECIFICATION	
BATTERY CONDITION	SPECIFIC GRAVITY
Fully charged	1.265 - 1.280



1. Hydrometer

Most hydrometers give a true reading at 21°C (70°F).

In order to obtain the correct value, adjust the initial reading by adding or subtracting the number indicated in the following table.

ELECTROLYTE TEMPERATURE		OPERATION TO PERFORM	
°C	°F		
38	100	Add to the reading:	.012
32	90		.008
27	80		.004
21	70	CORRECT READING	
16	60	Subtract from the reading:	.004
10	50		.008
4	40		.012
- 1	30		.016

EXAMPLE NO. 1

TEMPERATURE BELOW 21°C (70°F):

Hydrometer reading: 1.250
Electrolyte temperature: -1°C (30°F)
Subtract: .016
Corrected: 1.234

EXAMPLE NO. 2

TEMPERATURE ABOVE 21°C (70°F):

Hydrometer reading: 1.235
Electrolyte temperature: 38°C (100°F)
Add: .012
Corrected: 1.247

STATE OF CHARGE AS PER HYDROMETER READING (CORRECTED)		
STATE OF CHARGE	SPECIFIC GRAVITY	
	@ 27°C (80°F)	@ 4°C (40°F)
100%	1.26 - 1.27	1.27 - 1.28
75%	1.21 - 1.22	1.22 - 1.23
50%	1.16 - 1.17	1.17 - 1.18
25%	1.12 - 1.13	1.13 - 1.14
0%	1.10 or less	1.11 or less

Battery Storage

Disconnect and remove battery from watercraft as explained in *BATTERY REMOVAL*.

NOTICE Battery storage is critical for battery life. Regularly charging the battery during storage will prevent cell sulfation. Keeping the battery in vehicle for storage may lead to contacts degradation/corrosion and case damage if freezing occurs. A discharged battery will freeze and crack in areas where freezing conditions are experienced. Electrolyte leakage will damage surrounding parts. Always remove battery from vehicle for storage and regularly recharge it to keep an optimal condition.

Check electrolyte level in each cell.

Add distilled water up to upper level line as necessary.

NOTICE Do not overfill.

The battery must always be stored fully charged. If required, recharge until the recommended specific gravity is obtained prior to storage.

NOTICE Battery electrolyte temperature must not exceed 50°C (122°F) during charging. The battery casing should not feel hot to the touch.

Clean battery terminals and cable connections using a wire brush.

Apply a light coat of dielectric grease on terminals.

Clean battery casing and caps using a solution of baking soda and water.

NOTICE Do not allow cleaning solution to enter battery.

Rinse battery with clear water and dry well using a clean cloth.

Store battery in a cool dry place. Such conditions reduce self-discharging and keep fluid evaporation to a minimum. Keep battery away from dew, high moisture and direct sunlight.

During the storage period, recheck electrolyte level and specific gravity readings at least every month. If necessary, top up the electrolyte level with distilled water, then recharge (trickle charge). Recharge frequency depends on battery condition and storage temperature. Maintain battery as per following table.

AMBIENT TEMPERATURE	CHARGING FREQUENCY
Below 16°C (60°F)	Every month
Above 16°C (60°F)	Every 2 weeks

⚠ WARNING

Batteries must always be stored out of reach of children.

Activation of a New Battery

⚠ WARNING

Never charge or boost battery while installed in watercraft.

Perform the following operations whenever a new battery is to be installed.

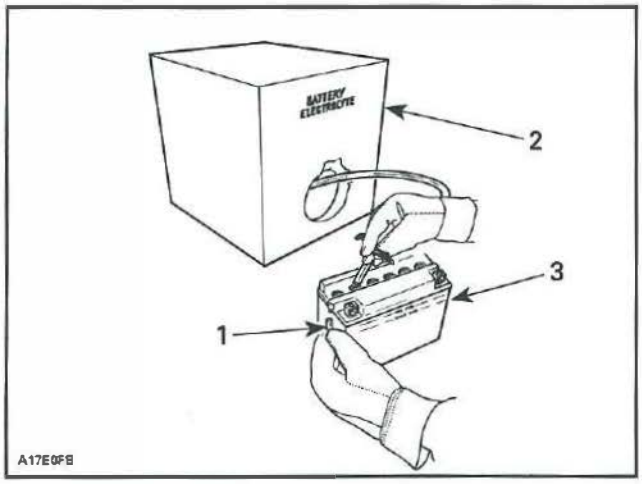
– Remove the sealing tube from the vent fitting.

⚠ WARNING

Failure to remove the sealing tube could result in an explosion.

1. Remove caps and fill battery to UPPER LEVEL line with electrolyte (specific gravity: 1.265 at 21°C (70°F)).

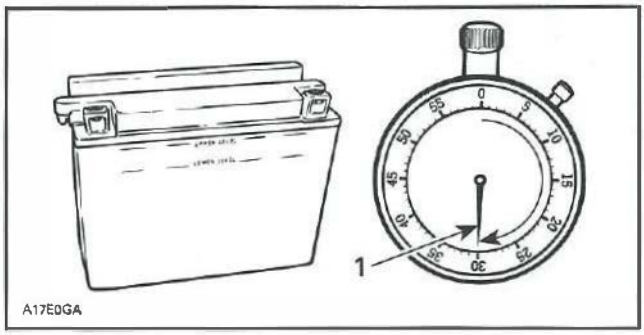
NOTE: This battery may fill slower than others due to the anti-spill check ball design.



1. Sealing tube removed
2. Battery electrolyte
3. Upper level line

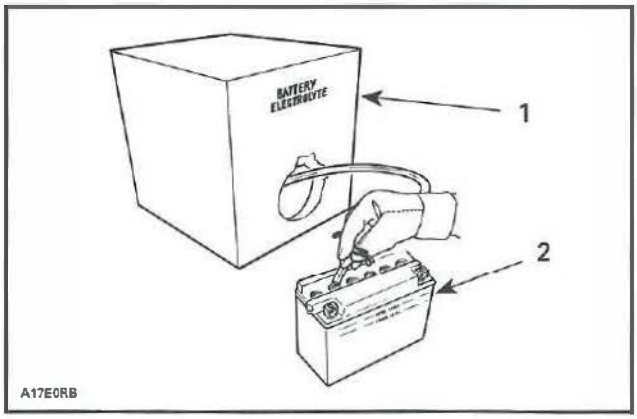
NOTE: Place the cell caps over the cell openings engaging only the first thread to prevent cell contamination and acid splatter during charging. Do not screw caps on tightly.

2. Allow the battery to stand for 30 minutes MINIMUM to allow the electrolyte time to soak through the battery cells plates.



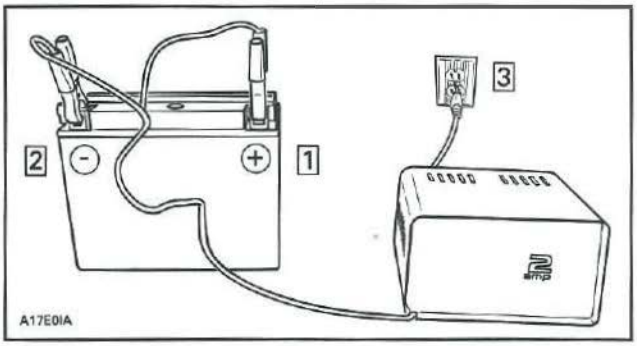
1. 30 minutes

3. Readjust the electrolyte level to the UPPER LEVEL line.



1. Battery electrolyte
2. Upper level line

4. Connect a 2 A battery charger for 3 to 5 hours.



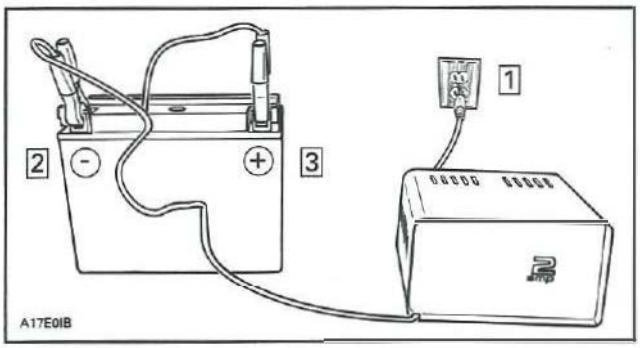
Step 1: Connect + lead to battery + post
Step 2: Connect - lead to battery - post
Step 3: Connect battery charger to AC outlet

⚠ WARNING

Gases given off by a battery being charged are highly explosive. Always charge in a well ventilated area. Keep battery away from cigarettes, open flames, welding operations and any other types of ignition. Always turn battery charger off prior to disconnecting cables. Otherwise, a spark will occur possibly causing the battery to explode.

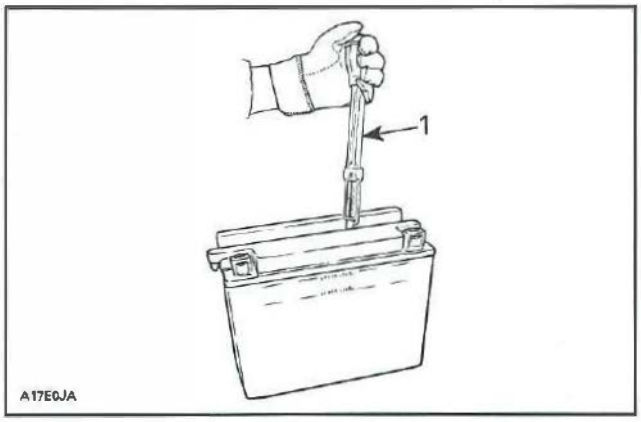
NOTICE **If charging rate increases above 2.4 A reduce it immediately. If cell temperature rises above 50°C (122°F) or if the casing feels hot, discontinue charging temporarily or reduce the charging rate.**

5. Disconnect battery charger.



Step 1: Disconnect battery charger from AC outlet
Step 2: Disconnect - lead
Step 3: Disconnect + lead

6. Test battery state of charge. Use a hydrometer.



1. Hydrometer

7. If electrolyte level has dropped after charging, fill with distilled water to UPPER LEVEL line. After water is added, continue charging for 1 to 2 hours to mix water with electrolyte.
8. Reinstall caps and clean any electrolyte spillage using a solution of baking soda and water.

NOTE: Hand tighten caps then tighten an additional 1/4 turn using a 20 mm (3/4 in) socket. Using an other tool could damage the plastic battery caps.

⚠ WARNING

Battery electrolyte is caustic. To prevent spillage, battery cell cap should be sufficiently tight to properly seal.

Charging a Used Battery

⚠ WARNING

Never charge battery while installed in watercraft.

For best results, battery should be charged when it is at room temperature. A battery that is cold may not accept current for several hours after charging has begun.

Do not charge a frozen battery. If the battery charge is very low, the battery may freeze. If you suspect the battery to be frozen, move it to a heated area for about 2 hours (or more if required) to let it thaw out before charging.

⚠ WARNING

Always charge a battery in a well ventilated area.

The time required to charge a battery will vary depending on several factors, such as:

- Battery temperature: The charging time is increased for a cold battery as charging current accepted by a cold battery will be lower than for a warm battery. As the battery warms up, it will accept a higher rate of charge.
- State of charge: As a battery discharges, it gives up its stored energy. The greater the discharge, the longer it will take to fully recharge it.
- Type of charger: Battery chargers vary in the amount of voltage and current that they can supply.

Charging a Very Flat or Completely Discharged Battery

The battery charger used should have an adjustable charging rate. A unit which can be adjusted in small increments is acceptable.

The battery charger must be equipped with an ammeter capable of accurately measuring current of less than 1 ampere.

Unless this procedure is properly followed, a good battery may be needlessly replaced.

1. Measure the voltage at the battery posts with an accurate voltmeter. If it is below 10 volts, the battery will accept current at very low rate. It could be some time before the charging rate increases. Such low current flow may not be detectable on some charger ammeters and the battery will not seem to accept the charge.
2. Exceptionally for this particular case, set the charger to a high rate.

NOTE: Some chargers have a polarity protection feature which prevents charging unless the charger leads are connected to the correct battery terminals. A completely discharged battery may not have enough voltage to activate this circuitry, even though the leads are connected properly. This will make it appear that the battery will not accept a charge. Follow the charger manufacturer's instruction on how to bypass or override this circuitry so that the charger will turn on and charge a low-voltage battery.

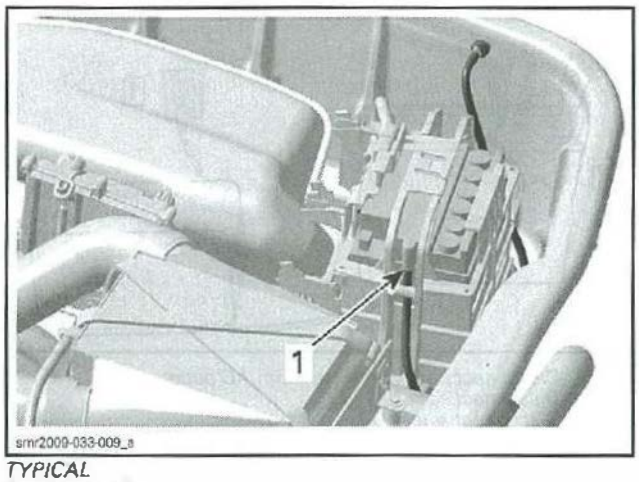
3. Since battery chargers vary in the amount of voltage and current they provide, the time required for the battery to accept a measurable charger current may be up to 10 hours or more.
4. If the charging current is not up to a measurable amount after 10 hours, the battery should be replaced.
5. If the charging current is measurable before the end of the 10 hour period, the battery is good and charging should be completed at a lower rate as specified in *ACTIVATION OF A NEW BATTERY*.
6. It is recommended that any battery recharged using this procedure be tested under load prior to returning it to service.

Battery Installation

1. Install battery in its holder and lock holder.
2. Install the battery in the watercraft using new screws.
3. Tighten battery holder screws to 14 N•m (124 lbf•**in**).
4. Remove the temporary hose used to plug the battery vent.
5. Reconnect the watercraft vent hose to the battery vent outlet. Make sure vent hose is not pinched or bent.

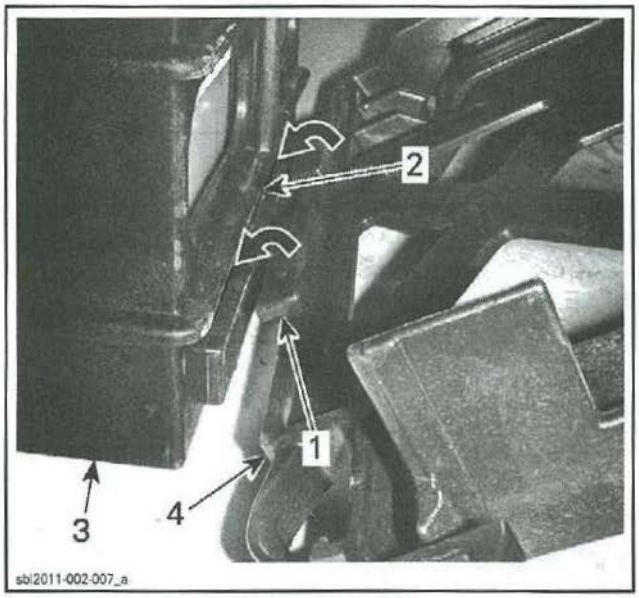
⚠ WARNING

Vent hose must be free and open. Avoid skin contact with electrolyte.

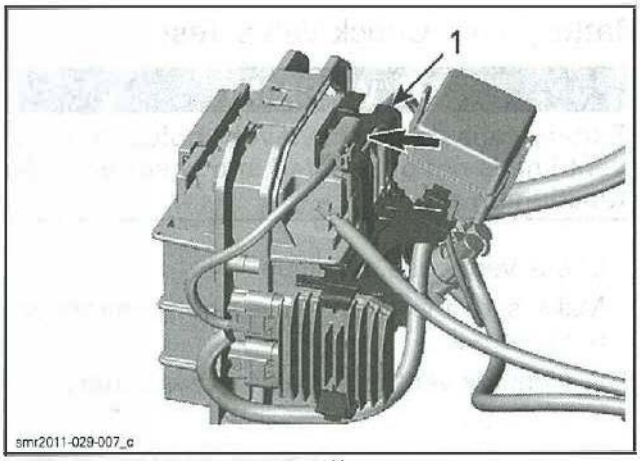


TYPICAL
1. Connect here

6. Attach the electrical component support to the battery holder:
   6.1 Engage the electrical component support lower tabs in the battery holder openings.
   6.2 Push the top of electrical component support towards the battery holder until it clips.



1. Electrical component support lower tabs
2. Battery holder openings
3. Battery holder
4. Electrical components support



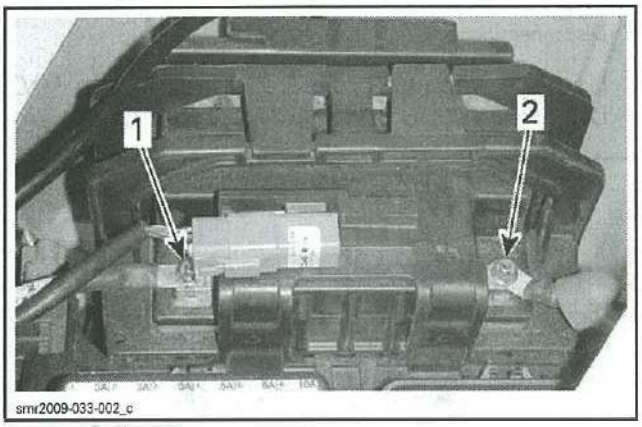
PUSH TOWARDS BATTERY RACK
1. Electrical component support

7. Wiggle the assembly to make sure it is properly secured.

⚠ WARNING

Always connect battery cables in the specified order, RED positive cable first, BLACK negative cable last.

8. Connect RED (+) cable.
9. Connect BLACK (-) cable last.



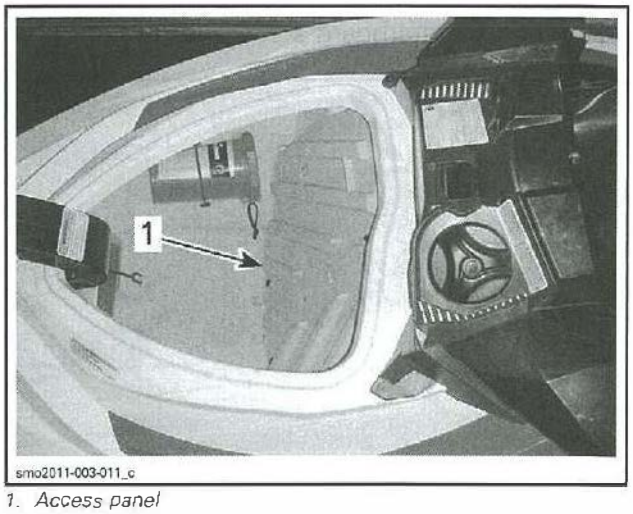
1. BLACK (-) cable
2. RED (+) cable

10. Apply dielectric grease on battery posts.
11. Verify cable routing and attachments.
12. Insert diagnostic connector in its holder.
13. Install remaining removed components.

BATTERY VENT CHECK VALVE

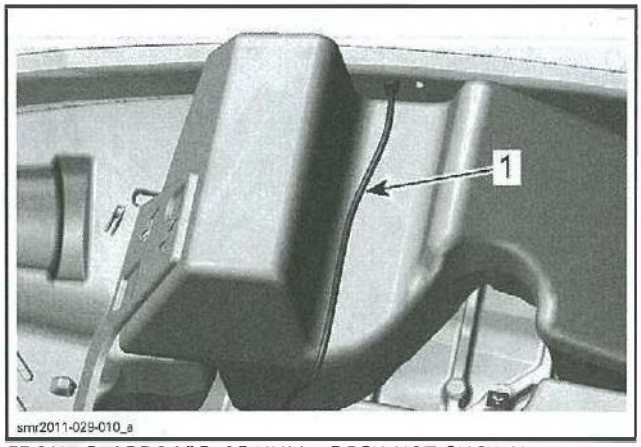
Battery Vent Hose and Check Valve Access (GTS and GTI Series)

Open the front storage cover an remove the access panel.



1. Access panel

Reach the check valve on starboard side of the hull just in front of the fuel tank vent.

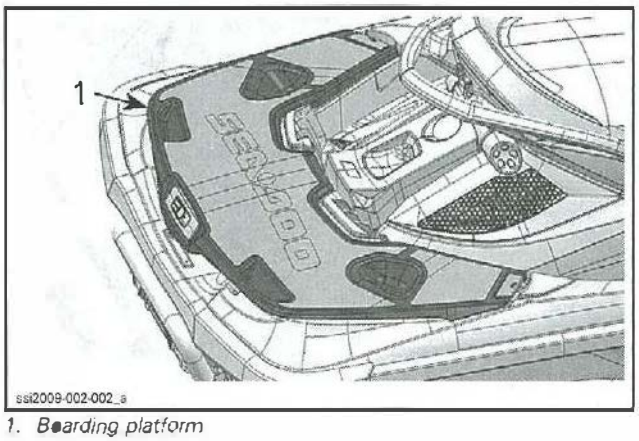


FRONT STARBOARD OF HULL - DECK NOT SHOWN
1. Vent hose

Battery Vent Hose and Check Valve Access (RXT, GTX and Wake Pro Series)

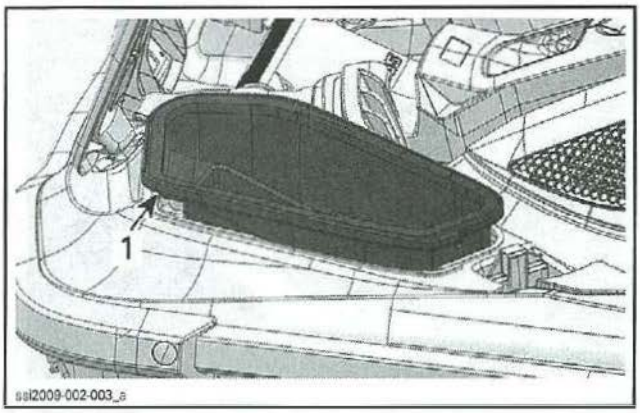
iS and aS Models

1. Open the boarding platform.



1. Boarding platform

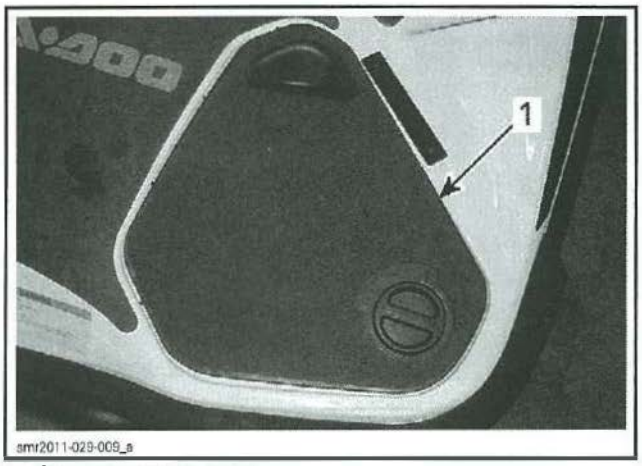
2. Remove the starboard storage bin.



1. Storage bin

Models Without iS or aS

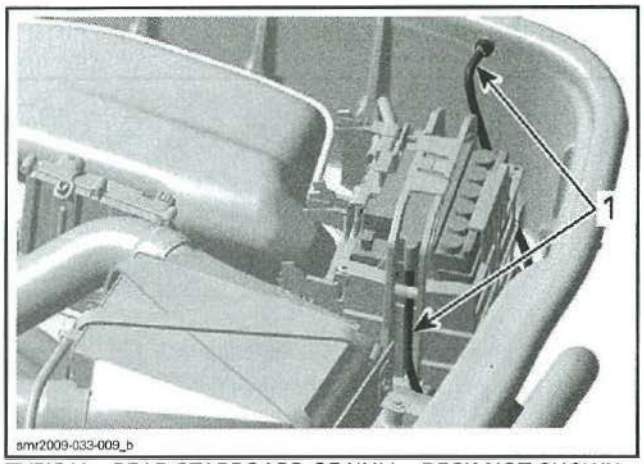
Remove the starboard access panel on the rear deck.



1. Starboard access panel

All models

Reach the check valve on starboard side of the hull.



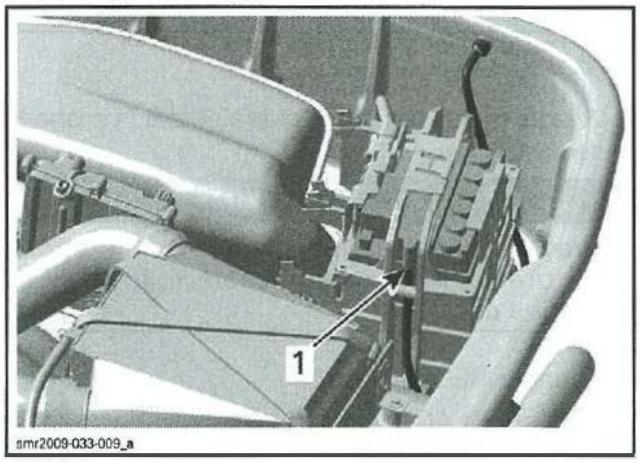
TYPICAL - REAR STARBOARD OF HULL - DECK NOT SHOWN
1. Vent hose

Battery Vent Check Valve Test

⚠ WARNING

Battery caps do not have vent holes. Ensure vent line is not obstructed and check valve is functioning properly.

1. Check vent hose condition.
2. Make sure the check valve and grommet are not plugged.
3. Disconnect vent on LH side of the battery.

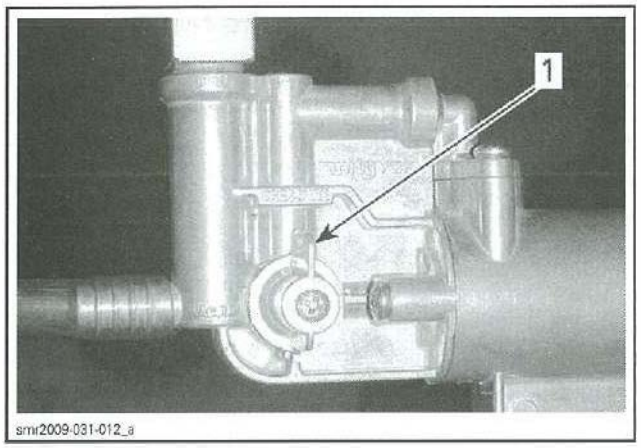


TYPICAL
1. Disconnect here

4. Use the vacuum/pressure pump in the VACUUM/PRESSURE PUMP (P/N 529 021 800).



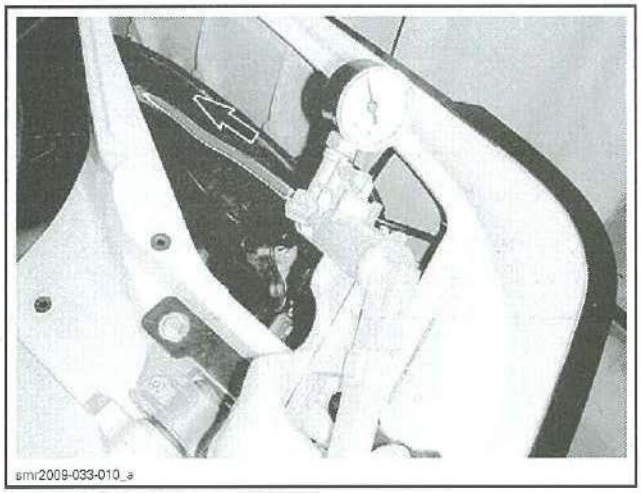
5. Set vacuum/pressure pump to PRESSURE.



1. Pressure selected

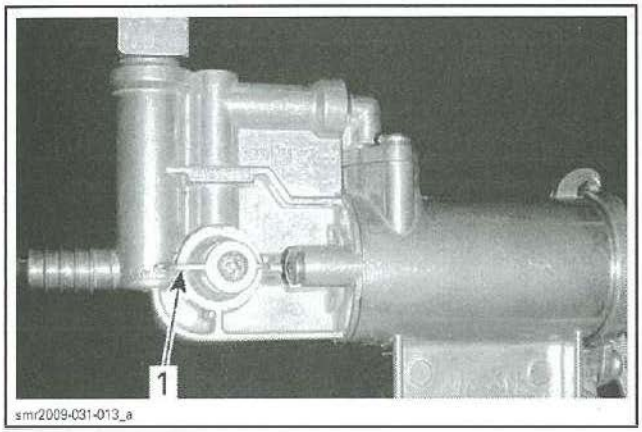
6. Connect vacuum/pressure pump to the vent hose end.
7. Squeeze the vacuum/pressure pump handle several times to push air out through the check valve.

NOTE: The check valve must let air flow out.



AIR MUST FLOW OUT FREELY

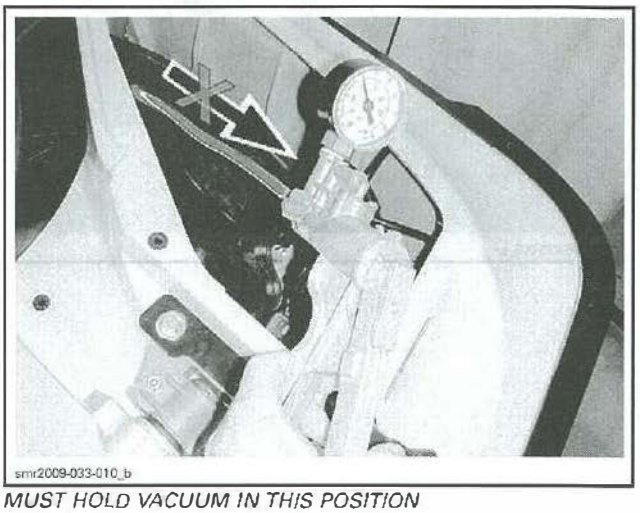
8. Set vacuum/pressure pump to VACUUM.



1. Vacuum selected

9. Squeeze the vacuum/pressure pump handle several times to draw air in through the check valve.

NOTE: The check valve must not let air in, and must be able to hold 10 in Hg (-34 kPa) of vacuum without leaking.



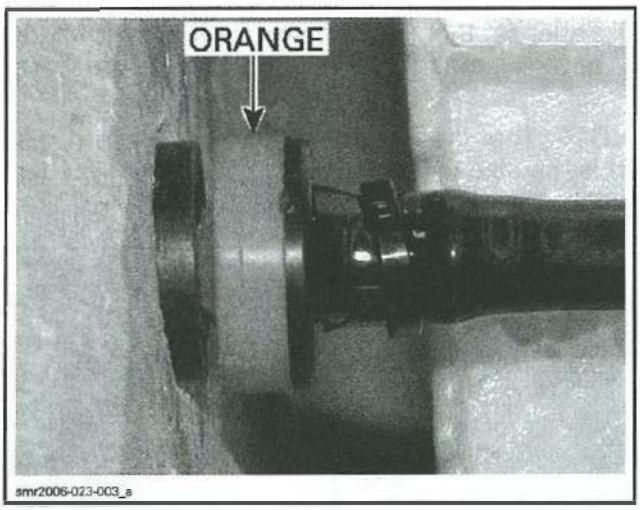
MUST HOLD VACUUM IN THIS POSITION

If any test failed, check the vent hose. If the vent hose is good, replace check valve.

Battery Vent Check Valve Replacement

1. Pull vent check valve out of grommet in hull.
2. Cut locking tie retaining vent hose to check valve.
3. Remove hose from valve.
4. Install a new check valve on vent hose with black end towards vent hose, and secure with a locking tie.
5. Push check valve through grommet in hull.

NOTICE **At installation, be sure to position the check valve with the black side connected to the vent line, and ORANGE side inserted through the grommet protruding outside of the hull.**


ORANGE
smr2006-023-003_a

STARTING SYSTEM

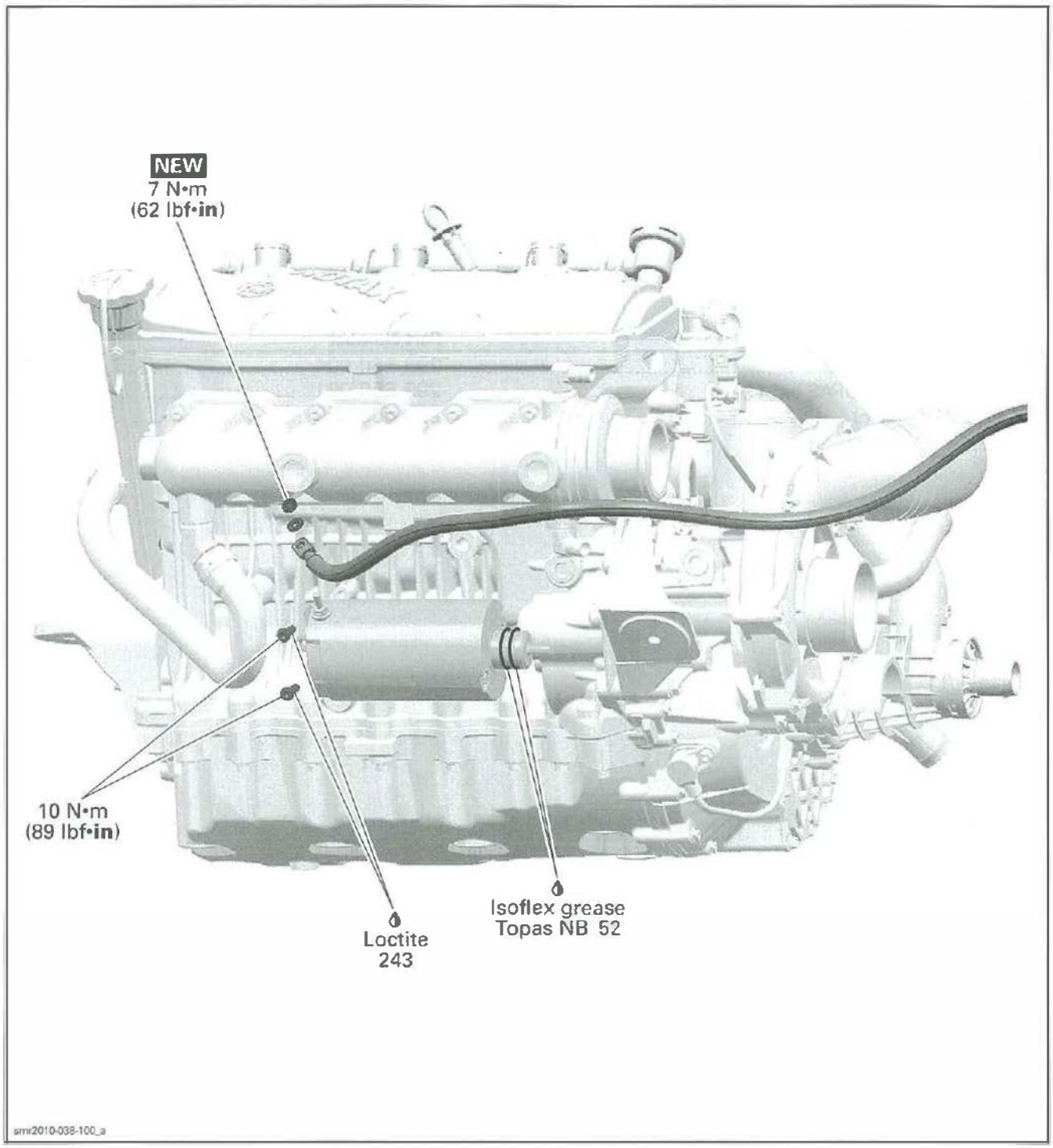
SERVICE TOOLS

Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 188	385
ECM ADAPTER TOOL	529 036 166	384, 388
FLUKE 115 MULTIMETER	529 035 868	384–385, 387–388

SERVICE PRODUCTS

Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	393
ISOFLEX GREASE TOPAS NB 52	293 550 021	392
LOCTITE 243 (BLUE)	293 800 060	393

green-manuals


NEW
7 N•m
(62 lbf•in)
10 N•m
(89 lbf•in)
Loctite
243
Isoflex grease
Topas NB 52
smr2010-038-100_a

GENERAL

BASIC STARTING SYSTEM OPERATION

Engine Cranking Conditions

The following conditions must be met to allow engine cranking:

1. START/STOP button pressed and released to activate the ECM.
2. The tether cord securely installed on the engine cut-off switch and the D.E.S.S. key recognized by the ECM as valid (2 short beeps)
3. START/STOP button pressed and held.

Starting System Logic

If the ECM recognizes a valid D.E.S.S. key, it allows engine cranking by providing the ground to the starter solenoid when the START/STOP button is pressed and held.

If the START/STOP button is activated while the throttle lever is depressed more than 60%, the engine will crank but will not start (engine drowned mode).

If the START/STOP button is held after engine has started, the ECM automatically stops the starter if engine speed reaches at least 1400 RPM.

If the START/STOP button is pressed when the engine is running, the engine will shut down.

TROUBLESHOOTING

DIAGNOSTIC TIPS

NOTE: It is a good practice to check for fault codes using B.U.D.S. as a first troubleshooting step. Refer to *DIAGNOSTIC AND FAULT CODES* subsection.

Starting system failures are not necessarily related to the starter but may be due to one the following:

- Starter solenoid fuse F16
- Battery, refer to *CHARGING SYSTEM*
- START/STOP switch
- Starter solenoid
- Engine cut-off switch
- ECM
- Wiring/connections.

Check these components before removing the starter.

NOTE: This subsection assumes the problem is related to an electrical component of the starting system. If the starting system tests good, ensure engine and jet pump integrity. Refer to applicable subsection.

DIAGNOSTIC GUIDELINES

NOTHING HAPPENS WHEN START/STOP BUTTON PRESSED

1. Battery not connected
   - *Connect battery*
2. Burnt fuse
   - *F3 fuse: (START/STOP button circuit).*
   - *F8 fuse: (main DC power fuses).*
   - *F19 fuse (ECM power fuse).*
3. Defective relay or related circuits
   - *Test relay and circuits.*
4. Defective START/STOP switch
   - *Test START/STOP switch, wiring and connections.*

ENGINE DOES NOT CRANK

1. D.E.S.S. not functional or wrong D.E.S.S. key
   - *If 2 short beeps are not heard when pressing the START/STOP button, refer to DIGITALLY ENCODED SECURITY SYSTEM subsection.*
2. Burnt fuse
   - *F16 fuse: (starter solenoid power) Carry out a SOLENOID INPUT VOLTAGE TEST (Solenoid Coil).*
3. Discharged battery
   - *Recharge and test. Refer to CHARGING SYSTEM subsection.*
4. Battery connections
   - *Check/clean/tighten.*
5. Poor/bad or corroded ground contacts (engine, battery ground cable, starter etc.)
   - *Check/clean/repair, refer to POWER DISTRIBUTION AND GROUNDS subsection.*
6. Starter solenoid
   - *Test solenoid, wiring and connections.*
7. Damaged starter or ground cables
   - *Carry out SOLENOID DYNAMIC TEST*
8. Obstructed starter drive gear assembly
   - *Check/repair, refer to PTO HOUSING AND MAGNETO.*
9. No ground provided by ECM to starter solenoid
   - *Refer to CONTINUITY TEST OF START/STOP SWITCH CONTROL CIRCUIT in this subsection.*

10. Engine cannot be rotated (possibly seized)
    - *Refer to ENGINE subsection.*

ENGINE CRANKS SLOWLY

1. Loose, corroded or dirty battery cable connections
   - *Check/clean/tighten.*
2. Discharged/weak battery
   - *Recharge and test. Refer to CHARGING SYSTEM subsection.*
3. Low voltage from starter solenoid
   - *Carry out a SOLENOID DYNAMIC TEST.*
4. Damaged starter or ground cables
   - *Carry out SOLENOID DYNAMIC TEST*
5. Worn starter
   - *Check.*

STARTER TURNS, BUT STARTER DRIVE DOES NOT MESH WITH RING GEAR

1. Worn starter drive gear/starter gear/ring gear
   - *Replace worn parts. Refer to STARTER GEAR in this subsection and PTO HOUSING AND MAGNETO subsection.*
2. Defective drive
   - *Replace starter drive. Refer to PTO HOUSING AND MAGNETO subsection.*

STARTER KEEPS RUNNING

1. Shorted solenoid winding
   - *Replace solenoid.*
2. Melted solenoid contacts
   - *Replace solenoid.*
3. Sticking or defective starter drive
   - *Lubricate or replace. Refer to PTO HOUSING AND MAGNETO.*

PROCEDURES

⚠ WARNING

When carrying out any kind of maintenance on the starting system, always disconnect the battery ground cable. This will eliminate the possibility of shorting out a power cable, and generating a spark which could result in a fire or and explosion. Do not place any tool on the battery.

ENGINE START/STOP SWITCH

START/STOP Circuit Continuity Test

1. Remove START/STOP button fuse (F3).

For fuse box access, refer to *POWER DISTRIBUTION AND GROUNDS* subsection.

Disconnect connector "B" from the ECM, refer to *WIRING HARNESS AND CONNECTOR* subsection.

Install ECM ADAPTER TOOL (P/N 529 036 166) on ECM harness connector "B".



Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω.

Press and hold the START/STOP switch and test for continuity of the switch circuit as per following table.

CONTINUITY TEST OF START/STOP SWITCH CIRCUIT (BUTTON PRESSED AND HELD)		
FUSE BOX	ECM CONNECTOR B	RESISTANCE
Pin A6	B-D1	Close to 0 Ω (continuity)

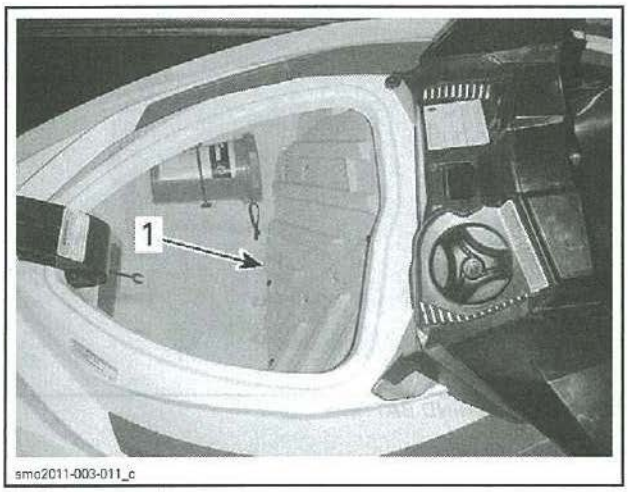
2. If the reading is as specified, the START/STOP switch and its wiring are good.
3. If a high resistance or an open circuit is measured, carry out s *START/STOP SWITCH CONTINUITY TEST.*

START/STOP Continuity Test

1. Remove START/STOP button fuse (F3).
2. Disconnect the 24-pin steering connector:

GTS, GTI and Wake 155 Models

Open the front storage cover an remove the access panel.



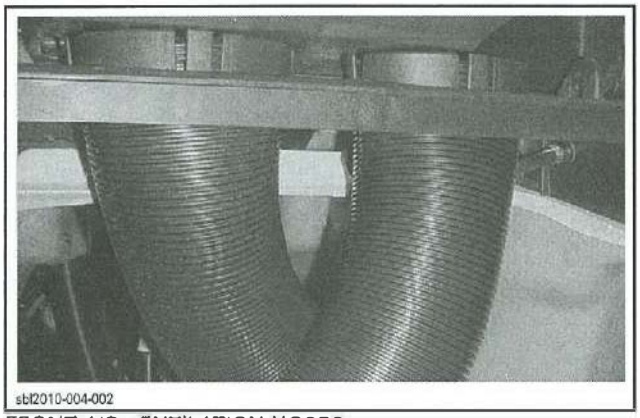
1. Access panel

RXT, GTX and Wake Pro Models Without iS or aS

Open front storage compartment cover.

Remove front storage bin.

Disconnect the top air ventilation hoses.



FRONT AIR VENTILATION HOSES

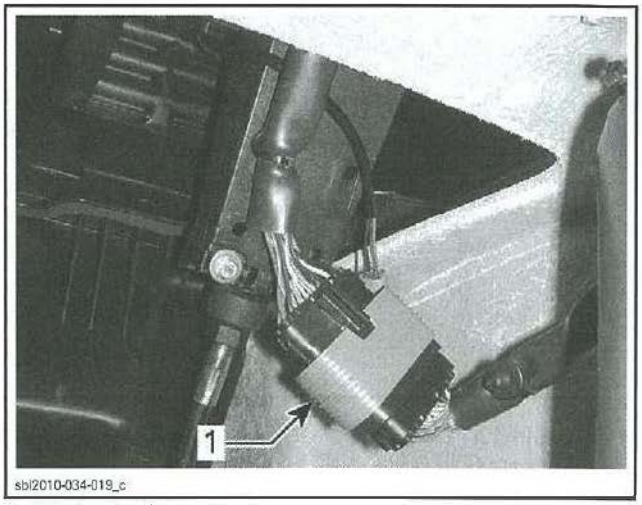
RXT, GTX and Wake Pro iS Models

Open front storage compartment cover.

Remove front storage bin.

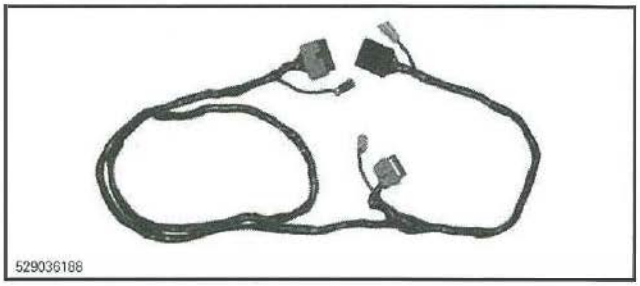
For easier access, rise the moving deck using the iS "UP" button.

All Models



1. 24-pin steering connector

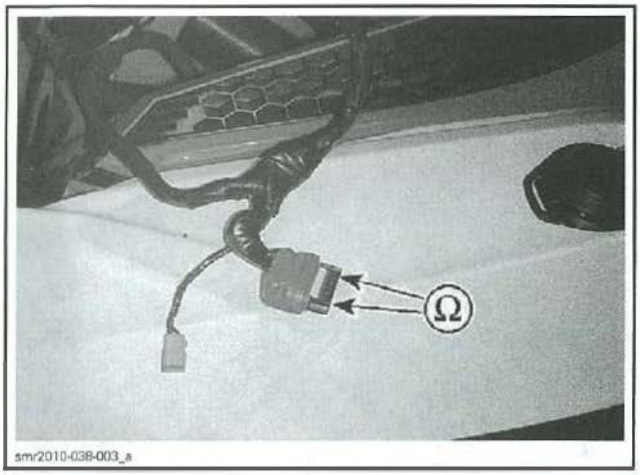
3. Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) to make an in-line connection between the disconnected connector.



NOTE: Use the 24 pin connectors only.

4. Use the FLUKE 115 MULTIMETER (P/N 529 035 868) and select Ω.
5. Measure resistance through switch as per following table.

CONTINUITY TEST OF START/STOP SWITCH CIRCUIT		
SWITCH POSITION	DIAGNOSTIC HARNESS CONNECTOR	RESISTANCE
Released	Pins 2 and 23	Infinite (OL)
Pressed and held		Close to 0 Ω



If the switch does not test as specified, replace the engine START/STOP switch.

If the switch tests as specified, check for an open circuit:

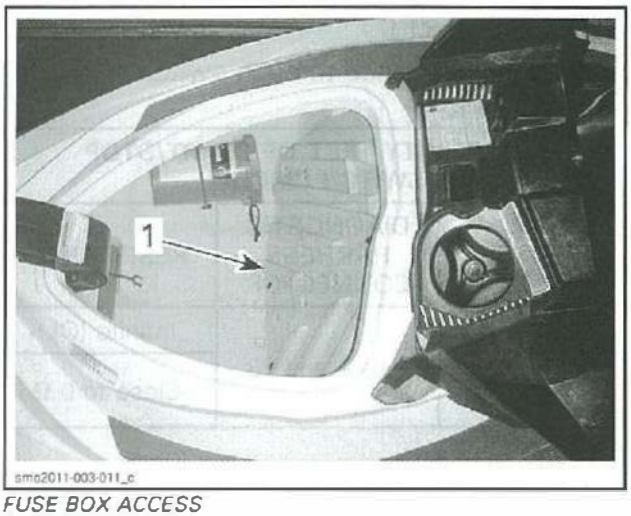
- Between fuse box pin A6 and steering connector pin 23.
- Between steering connector pin 2 and ECM connector B, pin D1.

STARTER SOLENOID

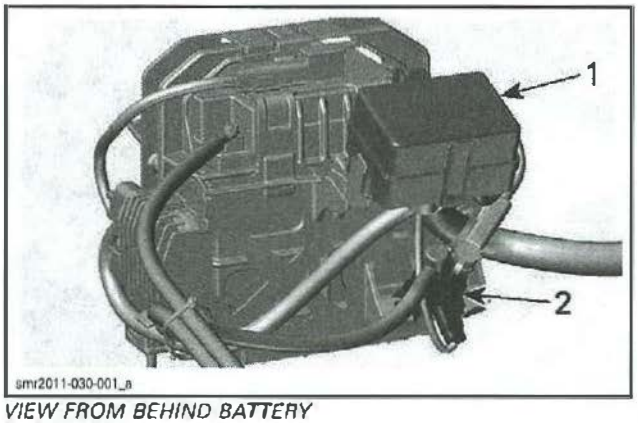
Starter Solenoid Access (GTS and GTI Series)

The starter solenoid is located underneath the fuse box.

Open the front storage cover an remove the access panel.



FUSE BOX ACCESS
1. Access panel



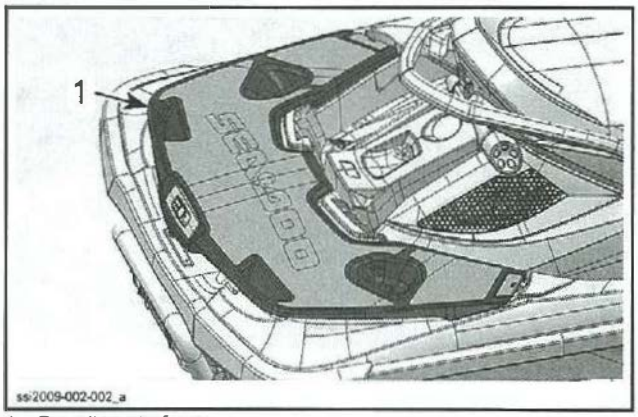
VIEW FROM BEHIND BATTERY
1. Fuse box
2. Starter solenoid

Starter Solenoid Access (RXT, GTX and Wake Pro Series)

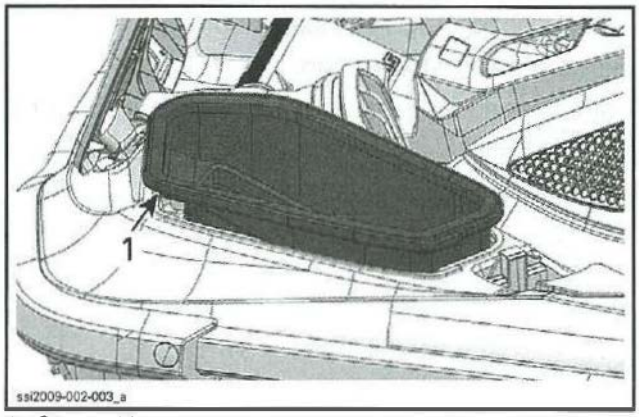
The starter solenoid is located underneath the fuse box.

iS and aS Models

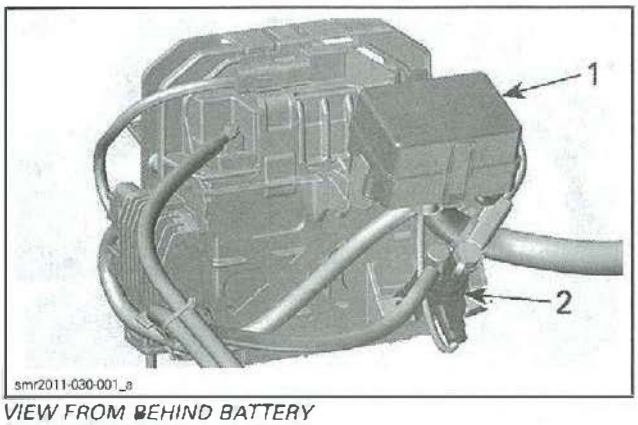
Open the boarding platform and remove the RH storage bin.



1. Boarding platform



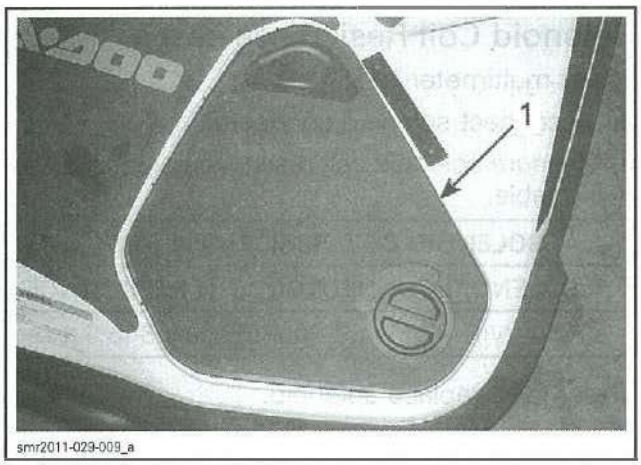
1. Storage bin



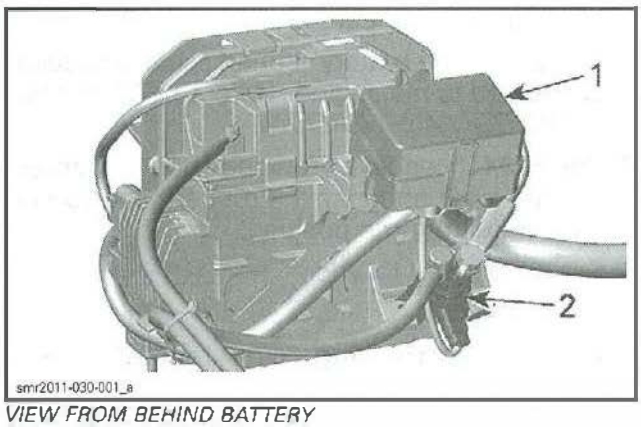
VIEW FROM BEHIND BATTERY
1. *Fuse box*
2. *Starter solenoid*

Models Without iS or aS

Open the starboard access panel on the rear deck.



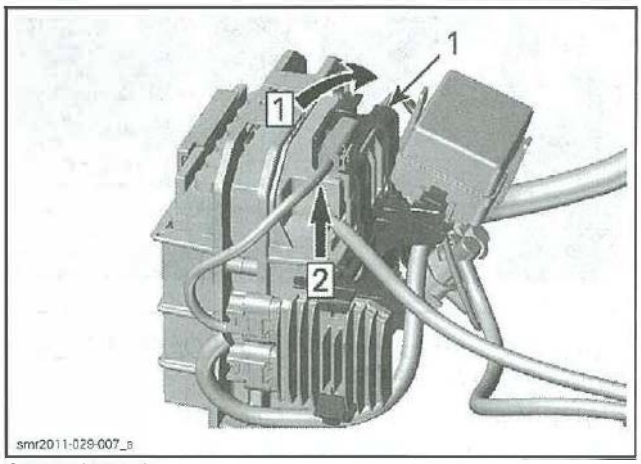
1. *Starboard access panel*



VIEW FROM BEHIND BATTERY
1. *Fuse box*
2. *Starter solenoid*

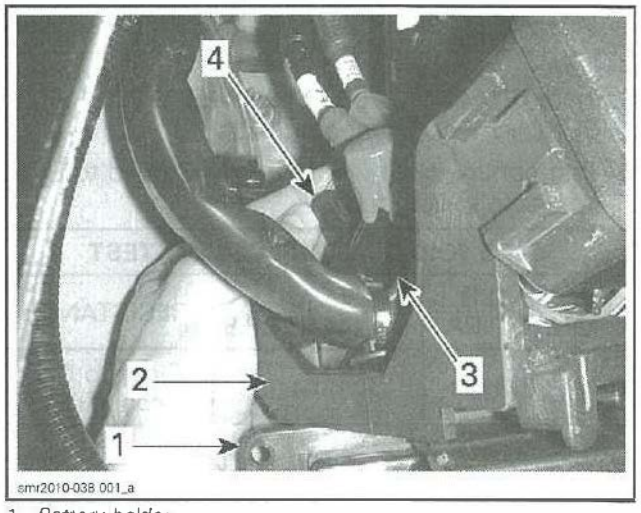
Solenoid Input Voltage Test (Solenoid Coil)

1. Make sure F16 fuse is powered and in good condition before testing.
2. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc.
3. Install tether cord on the engine cut-off switch.
4. Press the START/STOP button to activate ECM.
5. Detach the electrical component support from the battery holder:
   - 5.1 Unhook the top of electrical component support.
   - 5.2 Pull electrical component support up.



Step 1: Unhook
Step 2: Pull up
1. *Electrical component support*

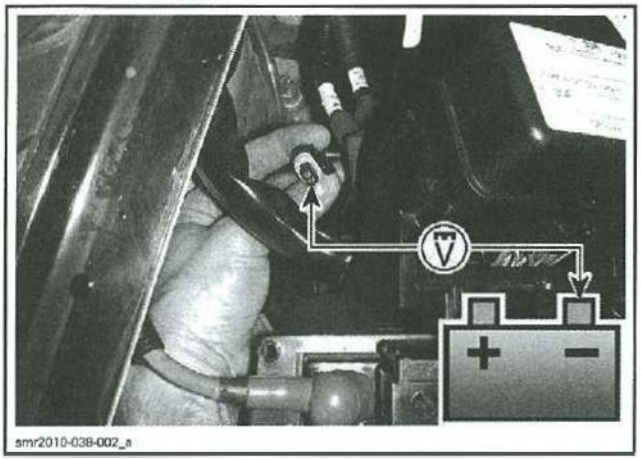
6. Disconnect solenoid connector, refer to *STARTER SOLENOID ACCESS* in this subsection.



1. *Battery holder*
2. *Electrical components support*
3. *Starter solenoid*
4. *Solenoid connector*

7. Measure voltage as per following table.

SOLENOID INPUT VOLTAGE TEST (SOLENOID COIL)		
TEST PROBES		VOLTAGE READING
Pin A (VIOLET)	Battery ground	Battery voltage



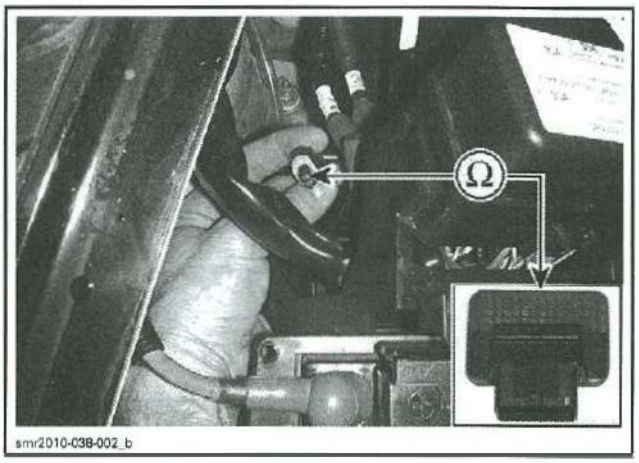
If test succeeded, carry out a *SOLENOID CONTROL CIRCUIT TEST.*

If test failed, carry out a *START/STOP SWITCH CIRCUIT CONTINUITY TEST.*

Solenoid Control Circuit Continuity Test

1. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω.
2. Disconnect connector "B" from ECM, refer to *WIRING HARNESS AND CONNECTOR* subsection.
3. Install ECM ADAPTER TOOL (P/N 529 036 166) on ECM harness connector.
4. Test continuity of wiring from solenoid to ECM as per following table.

SOLENOID CONTROL CIRCUIT TEST		
SOLENOID CONNECTOR	ECM CONNECTOR B	RESISTANCE
Pin B (BR/YL)	B-L4	Close to 0 Ω (continuity)



If test failed, repair or replace wiring/connectors.

If test succeeded, carry out a *SOLENOID COIL RESISTANCE TEST.*

Solenoid Coil Resistance Test

1. Set multimeter to Ω.
2. Disconnect solenoid connector.
3. Measure solenoid coil resistance as per following table.

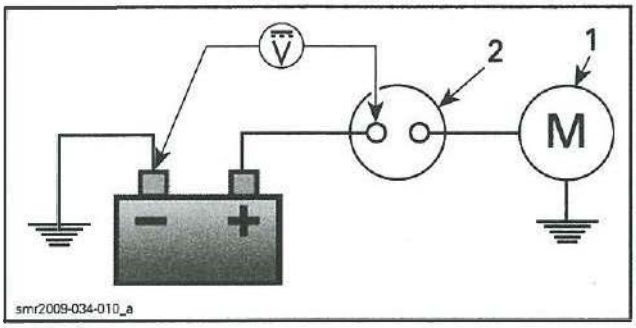
SOLENOID COIL RESISTANCE TEST		
SOLENOID CONNECTOR		RESISTANCE
Pin A (VI)	Pin B (BK/YL)	4.5 to 5.5 Ω

If test fails, replace solenoid.

Solenoid Dynamic Test

1. Ensure fuse F16, battery, and starter solenoid are properly connected.
2. Make sure the battery ground cable is securely connected to the engine. Refer to *POWER DISTRIBUTION AND GROUNDS.*
3. Set ECM in engine drowned mode: Depress throttle lever and install a rubber band to hold lever in full throttle position.
4. Set multimeter to Vdc.
5. Crank engine.
6. As engine is cranking, measure the voltage as per following tables.

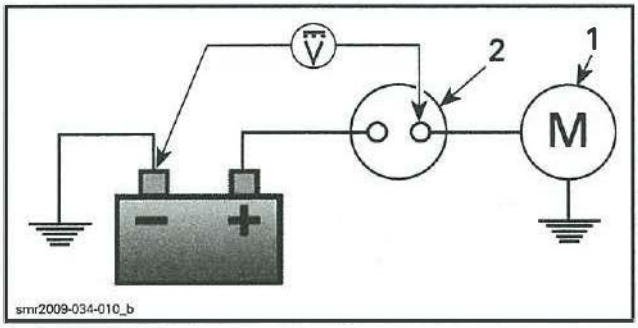
SOLENOID DYNAMIC TEST (ENGINE CRANKING)		
TEST PROBES		VOLTAGE (DC)
Solenoid battery post	Battery ground	Battery voltage



1. Starter motor
2. Starter solenoid

7. If test failed, check battery positive cable (from battery to solenoid).
8. If test succeeded, continue with next step.

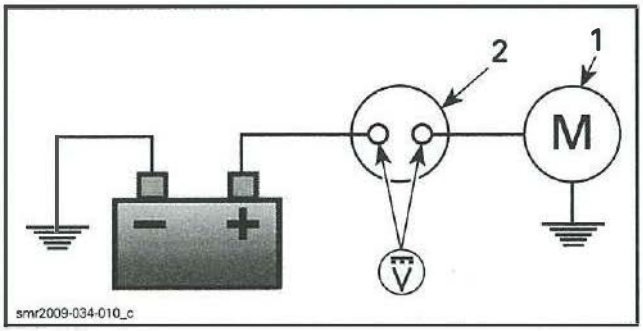
SOLENOID DYNAMIC TEST (ENGINE CRANKING)		
TEST PROBES		VOLTAGE (DC)
Solenoid battery post	Battery ground	Battery voltage



1. Starter motor
2. Starter solenoid

9. If test failed, carry out a *SOLENOID INPUT VOLTAGE TEST (SOLENOID COIL).*
10. If test succeeded, continue with next step.

SOLENOID DYNAMIC TEST (ENGINE CRANKING)		
TEST PROBES		VOLTAGE (DC)
Solenoid battery post	Solenoid starter post	0.2 Vdc max.



1. Starter motor
2. Starter solenoid

If test failed, replace solenoid.

If all solenoid dynamic tests are as specified, replace starter.

11. Remove rubber band from throttle lever.
12. Reinstall removed parts.

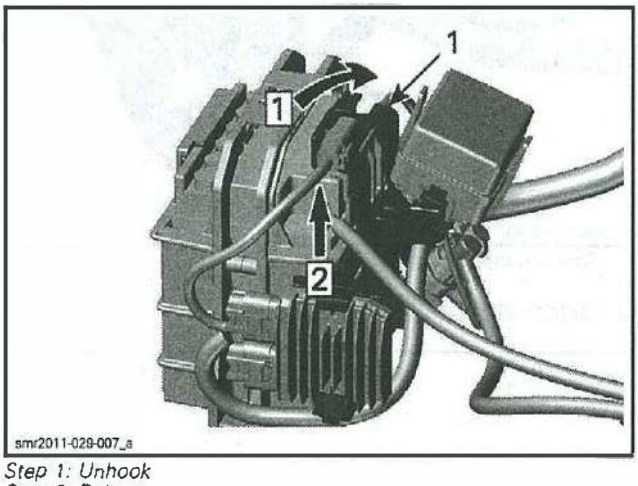
Solenoid Removal

1. Disconnect battery. Refer to *CHARGING SYSTEM* subsection.

⚠ WARNING

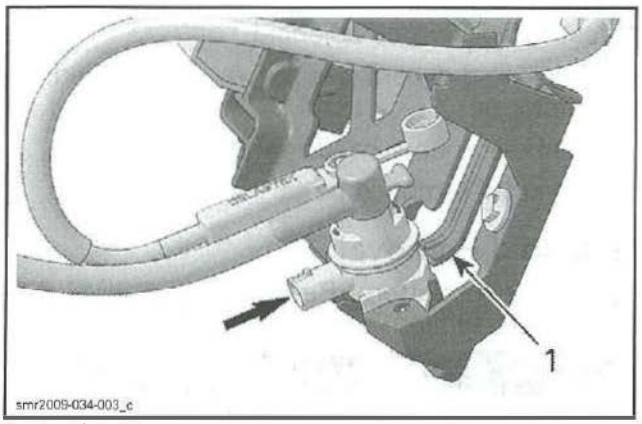
Always disconnect the BLACK (-) battery cable first and reconnect last.

2. Remove diagnostic connector from battery holder.
3. Detach the electrical component support from the battery holder:
   - 3.1 Unhook the top of electrical component support.
   - 3.2 Pull electrical component support up.



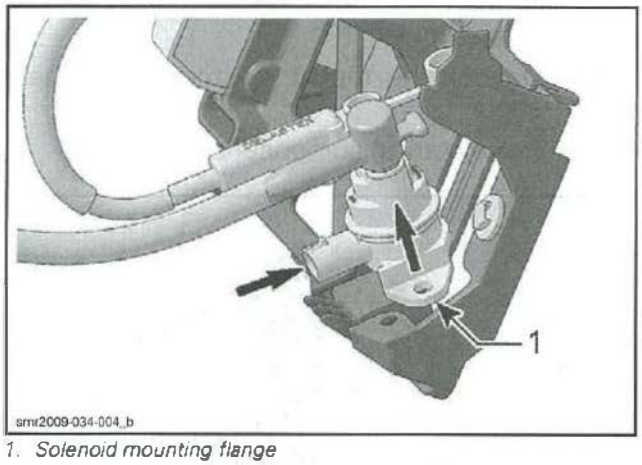
Step 1: Unhook
Step 2: Pull up
1. Electrical component support

4. Disconnect voltage regulator/rectifier connectors.
5. Disconnect starter solenoid connector.
6. Push starter solenoid back against locking tab.



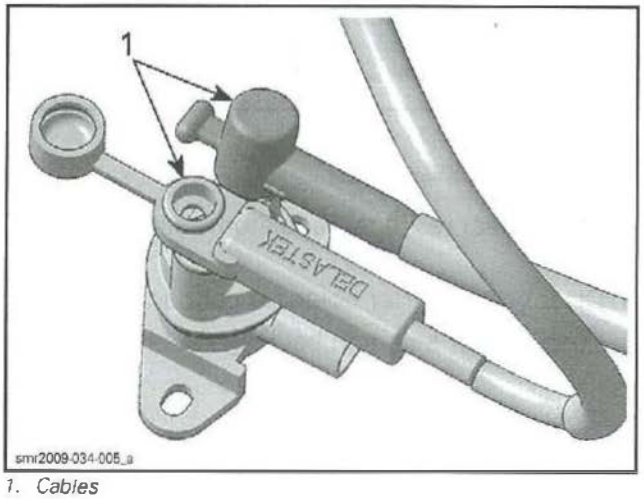
1. Locking tab

7. When the solenoid mounting flanges are clear of the electrical components support, slide solenoid up and out of the support.



1. Solenoid mounting flange

8. Disconnect solenoid cables.

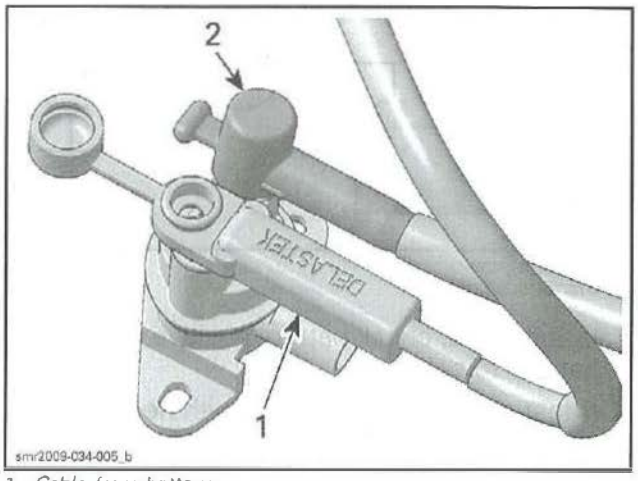


1. Cables

Solenoid Installation

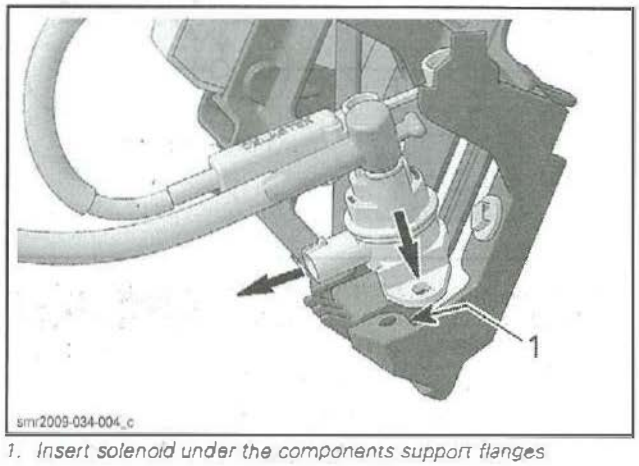
1. Reverse the removal procedure and pay attention to the following.

2. Connect cables to solenoid as shown.



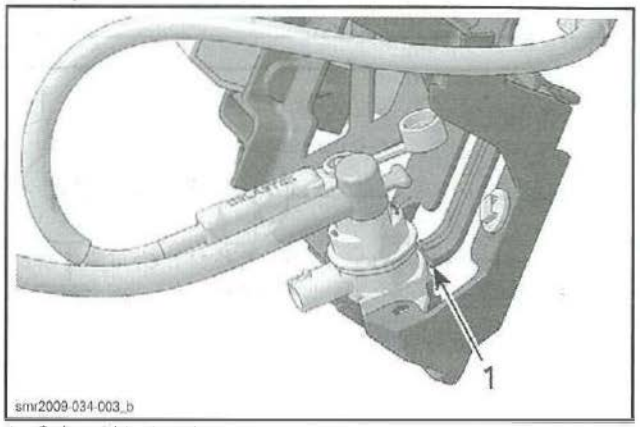
1. Cable from battery
2. Cable to starter motor

3. Insert solenoid in components support by pushing in against the locking tab, then down so the solenoid mounting flanges insert under the flanges on the electrical components support.



1. Insert solenoid under the components support flanges

4. Push the solenoid into the support until a "click" is heard (locking tab engagement).



1. Solenoid locked here

NOTE: It may be necessary to pull retaining tab to ensure proper locking.

5. Wiggle solenoid to ensure it is securely locked.
6. Reinstall remaining components.
7. Reconnect battery and test starter solenoid operation.

STARTER

Starter Quick Test

To easily bypass the starter solenoid and the start control circuits, proceed as follows.

- Use a fully charged 12 V battery with a capacity of at least 30 A-h.
- Use a set of booster cables to power the starter.

This procedure tests the following:

- Electric starter
- Starter power cable
- Battery to engine ground cable.

⚠ WARNING

Fuel, oil, or electrolyte vapors are flammable and may become explosive if certain conditions are met. These vapors may collect near the bottom of the hull when present. All types of ignition including electrical sparks are to be avoided when maintaining or testing vehicle.

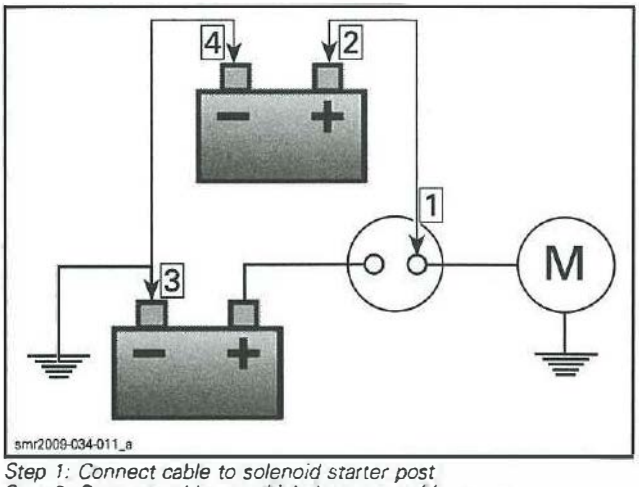
⚠ WARNING

Always wear safety glasses when working with or around batteries. Be sure to leave the booster battery out of the watercraft.

1. Connect booster cables in this strict order:
2. **RED booster cable:**
3. Connect one clip to the starter post on the starter solenoid.
4. Connect the other clip to the positive (+) terminal on the external battery.
5. **BLACK booster cable:**
6. Connect one clip to the negative (-) battery terminal in the **vehicle**.
7. Momentarily apply the second clip to the negative (-) terminal of the **external** battery.

⚠ WARNING

Always use an external battery for this test to prevent any electrical sparks from occurring within the hull. Always make the final connection to the external battery negative (-) terminal using the BLACK booster cable clip. Do not short starter solenoid contacts across the main power connections on the relay with a tool that would cause electrical sparks. Failure to follow this procedure may result in an explosion.



Step 1: Connect cable to solenoid starter post
Step 2: Connect cable to vehicle battery positive post
Step 3: Connect cable to external battery negative post
Step 4: Make a momentary contact

If engine does not crank (or cranks slowly), check the following:

- Booster cable connections
- Vehicle battery ground cable connections to engine
- Starter power cable/connections from solenoid to starter
- Carry out a *SOLENOID DYNAMIC TEST*.

If the above items all test good, replace the starter.

Starter Removal

1. Open or remove seat.

iS and aS Models

2. Remove rear ventilation cover. Refer to *BODY*.
3. Remove deck extension. Refer to *BODY*.
4. Lower moving deck.

All Models

5. Remove air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection.

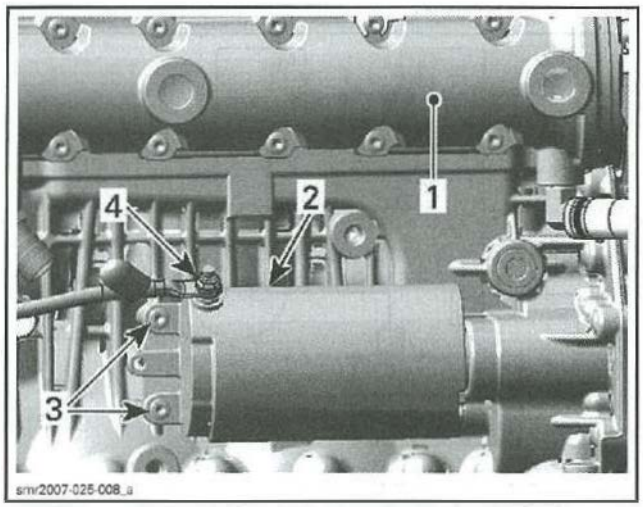
6. Disconnect battery. Refer to *CHARGING SYSTEM* subsection.

⚠ WARNING

Always disconnect the BLACK (-) battery cable first and reconnect last.

NOTE: For better access to the starter, work from starboard (RH side) and lay across the watercraft.

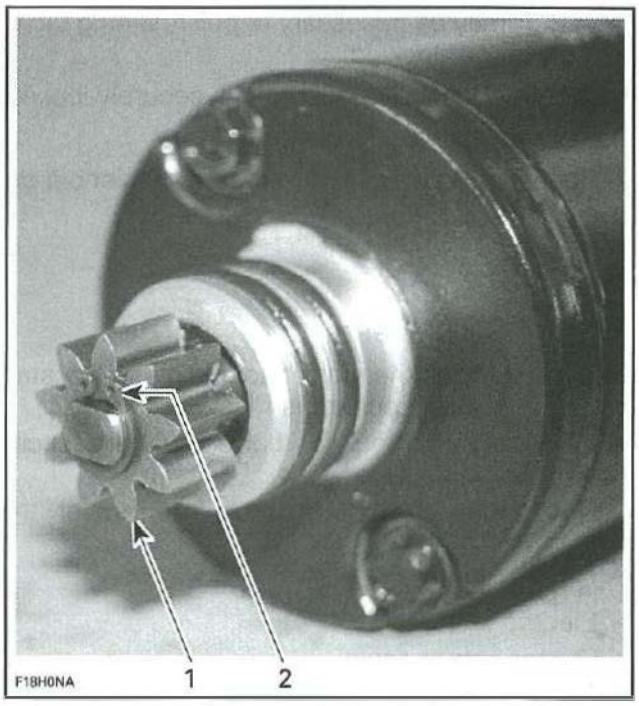
7. Disconnect starter power cable.
8. Remove starter retaining screws.



TYPICAL — REAR OF WATERCRAFT IN ON RH SIDE OF ILLUSTRATION
1. *Exhaust manifold*
2. *Starter*
3. *Starter retaining screws*
4. *Starter power cable retaining nut*

Starter Gear Removal

1. Remove starter.
2. Remove gear retaining circlip and pull out starter gear.



1. *Retaining circlip*
2. *Starter gear*

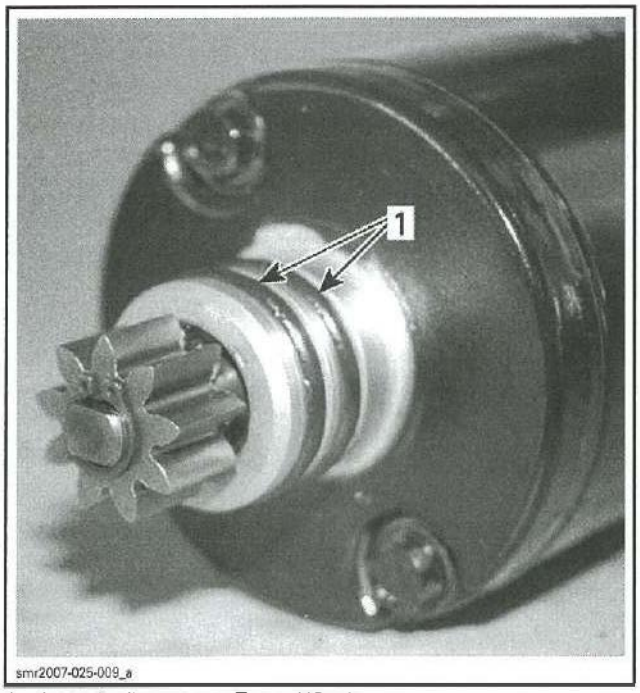
Starter Gear Installation

Installation is the reverse of removal procedure. However, pay particular attention to the following.

Use a new circlip.

Starter Installation

1. Installation is the reverse of the removal procedure. However, pay particular attention to the following.
2. Ensure starter and engine mating surfaces are free of debris. Serious problems may arise if starter is not properly aligned.
3. Apply ISOFLEX GREASE TOPAS NB 52 (P/N 293 550 021) on starter O-rings.



1. Apply Isoflex grease Topas NB 52

Install starter.

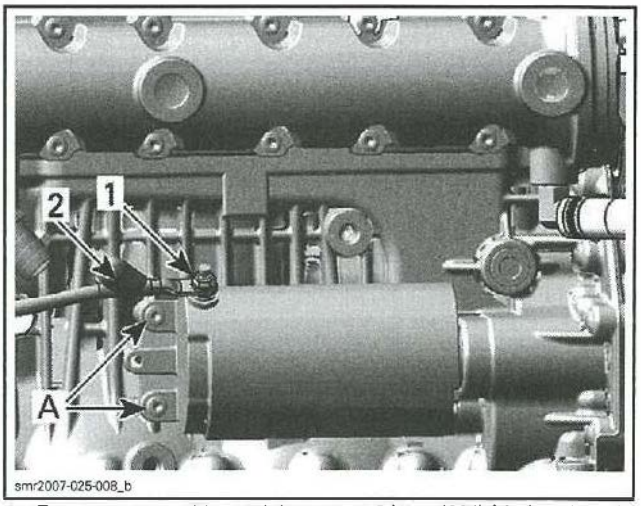
NOTE: If starter does not mesh properly with the intermediate gear: Pull starter out, slightly rotate the starter gear then reinstall the starter. Temporarily removing both O-rings makes it easier to align both gears. Once gears are aligned, remove starter to install O-rings being careful not to rotate starter gear out of position, then reinstall the starter.

4. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on retaining screws and torque to 10 N•m (89 lbf•**in**).
5. Connect the RED positive cable to the starter and torque retaining nut to 7 N•m (62 lbf•**in**).

⚠ WARNING

To prevent electric shock whenever connecting the RED power cable to the starter motor, ensure the BLACK (-) battery cable is disconnected.

6. Apply DIELECTRIC GREASE (P/N 293 550 004) on terminal and nut.
7. Install rubber protector over starter power cable retaining nut.



*1. Torque power cable retaining nut to 7 N•m (62 lbf•**in**) and apply dielectric grease*
2. Install rubber protector
*A. 10 N•m (89 lbf•**in**)*

8. Reinstall all remaining removed parts.

DIGITALLY ENCODED SECURITY SYSTEM (D.E.S.S.)

SERVICE TOOLS

Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 188	399–400
ECM ADAPTER TOOL	529 036 166	400
FLUKE 115 MULTIMETER	529 035 868	399–400

GENERAL

SYSTEM DESCRIPTION

The D.E.S.S. system allows the engine to start only if a tether cord cap is installed on the engine cut-off switch and the D.E.S.S. key is recognized as valid by the ECM.

NOTE: If desired, the tether cord can be used on other watercraft. It only needs to be programmed for the other watercraft.

The following components are specially designed for this system: ECM, D.E.S.S. key and engine cut-off switch.

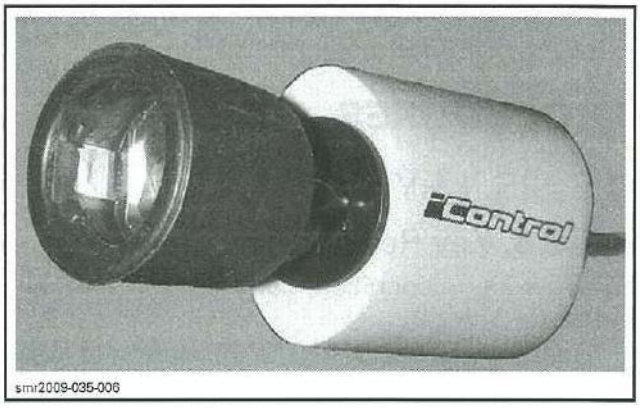
The tether cord cap contains a magnet and a ROM chip.

- The magnet closes the reed switche inside the engine cut-off switch, which is the equivalent of a mechanical ON/OFF switch.
- The chip has a unique digital code, which is the equivalent of the tooth-pattern on a conventional key.

The D.E.S.S. system is quite flexible. It allows several different keys to be programmed into the memory of the ECM. They can also be erased individually.

The memory of the ECM is programmed to recognize the digital code of each D.E.S.S. key.

D.E.S.S. Key Types



In addition to the normal D.E.S.S. key, other special keys can be programmed so that the vehicle can only be operated at a limited speed. Such a feature is ideal for first time riders or renters.

The tether cord floats are color-coded to differentiate the type of D.E.S.S. keys.

D.E.S.S. KEY TYPE	FLOAT COLOR
Normal key	YELLOW or BLACK
Learning key	GREEN
Rental key	ORANGE

The Learning and Rental keys can be set through 5 settings to control the maximum watercraft speed. Refer to *LEARNING KEY AND RENTAL KEY MODES* in *INTELLIGENT THROTTLE CONTROL (iTC)* subsection.

iS Models

NOTE: When a Learning or a Rental key is used, the DOCK MODE is always active. Refer to *SUSPENSION (iS)* subsection for more information about DOCK MODE.

D.E.S.S. Key Beeper Codes

When a D.E.S.S. key is present on the vehicle engine cut-off switch once the START/STOP button was pressed, the key is identified by the ECM and coded beeper signals are emitted according to the key recognition. See table:

BEEPER	SIGNIFICATION
2 short beeps	Indicates the D.E.S.S. recognizes the key.
1 long beep	Indicates the D.E.S.S. does not recognize the key.

Other beeps can be heard. The ECM features a self-diagnostic mode. Refer to *DIAGNOSTIC AND FAULT CODES* for more information.

PROCEDURES

D.E.S.S. KEY

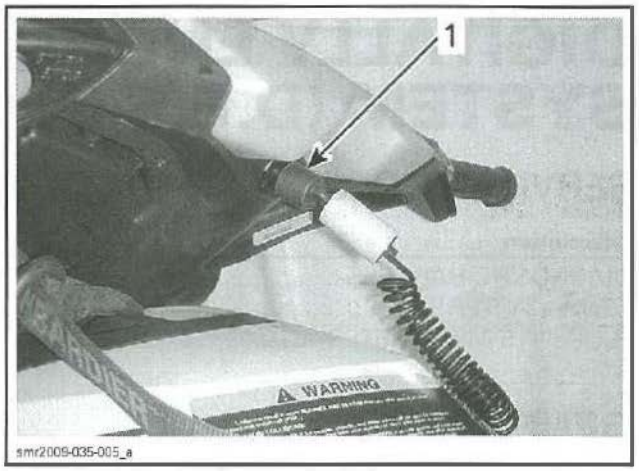
D.E.S.S. Key Recognition

To allow key recognition, carry out the following steps:

1. Briefly press the START/STOP button to wake up the ECM.
2. Securely install the tether cord on watercraft engine cut-off switch.
3. Press and hold the START/STOP button to start engine.

D.E.S.S. Key Programming

1. Connect the watercraft to latest applicable B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. **IMPORTANT: Ensure all connections have been made before starting B.U.D.S. to allow proper operation.**
3. Briefly press START/STOP button to power the ECM.
4. Install a tether cord on the engine cut-off switch to program a D.E.S.S. key.



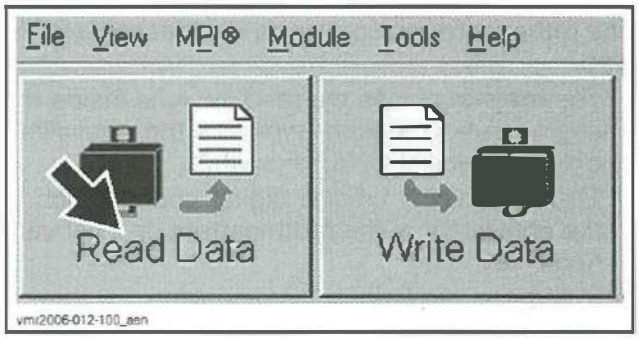
1. Tether cord on engine cut-off switch

IMPORTANT

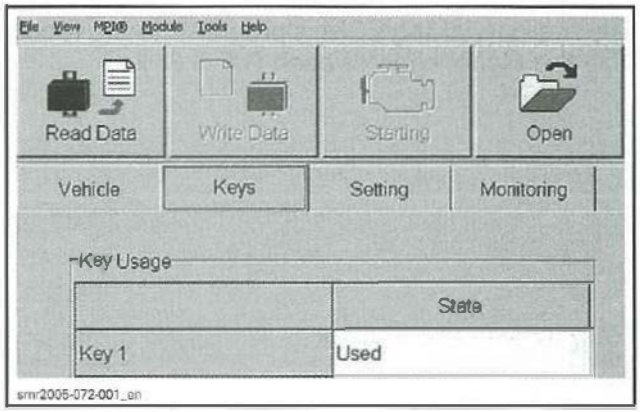
215 and 260 models: Approximately 3 minutes after pressing the START/STOP button, the ECM will stop communicating with B.U.D.S. Therefore, operations with B.U.D.S. will be interrupted.

To reinstate communication, **briefly** press the START/STOP button. **Do not hold START/STOP button to avoid engine cranking.**

5. Read ECM using Read Data button.



6. Click on Keys tab.

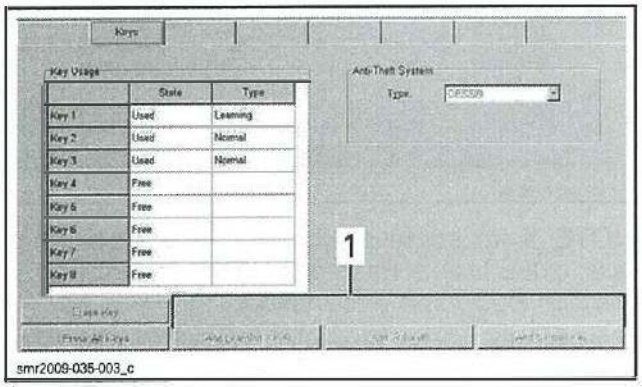


Adding a Key

1. Click on the **Add Key** button at the bottom of the screen according to the key type you want to program.

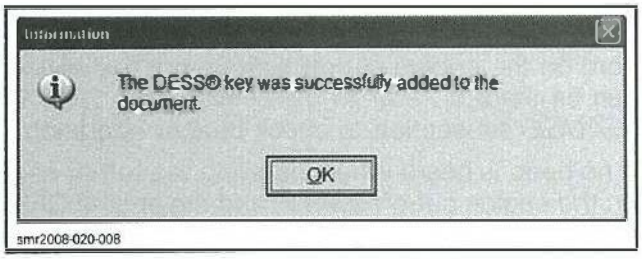
⚠ WARNING

If programming a Learning or Rental key, be sure to use the proper key type (color) to avoid possible confusion.



1. Add Key buttons

2. After approximately 10 seconds, the following window will pop up confirming the new key has been saved **in the PC computer**.



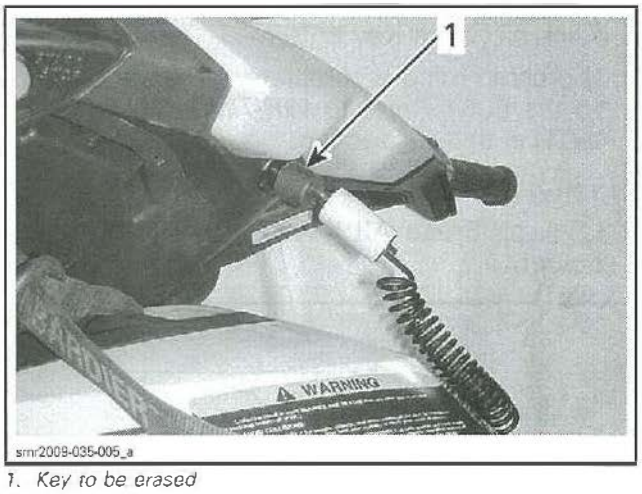
3. If programming is complete, write the changes to the ECM. Refer to *WRITING CHANGES TO ECM* in this subsection.

Adding Another Key

1. Remove the tether cord from the engine cut-off switch.
2. Install the next tether cord on the engine cut-off switch.
3. Click on the **Add Key** button.
4. If programming is complete, write the changes to the ECM. Refer to *WRITING CHANGES TO ECM* in this subsection.

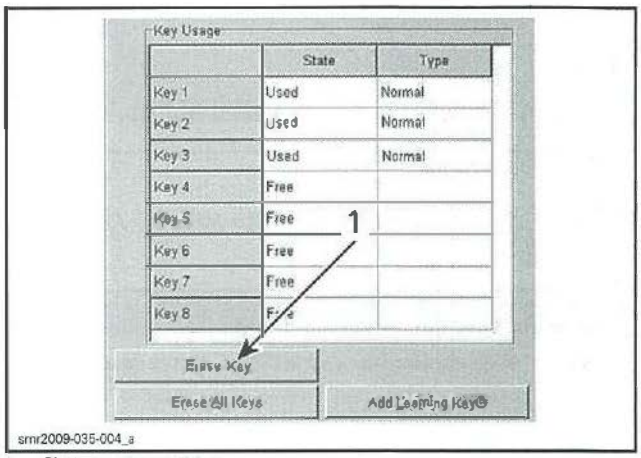
Erasing a Key

1. Install the tether cord on the engine cut-off switch.



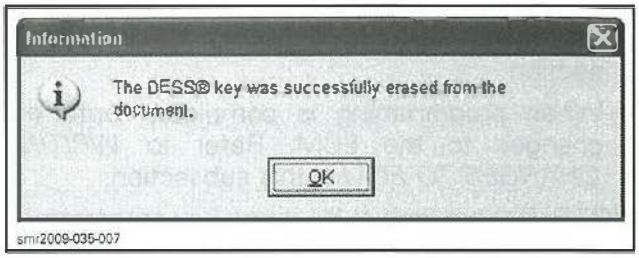
1. Key to be erased

2. Click on **Erase Key** button at bottom of B.U.D.S. screen.



1. Click on this button

After approximately 10 seconds the following message will appear.



The key is now erased in the **PC computer**.

3. If programming is complete, write the changes to the ECM. Refer to *WRITING CHANGES TO ECM* in this subsection.

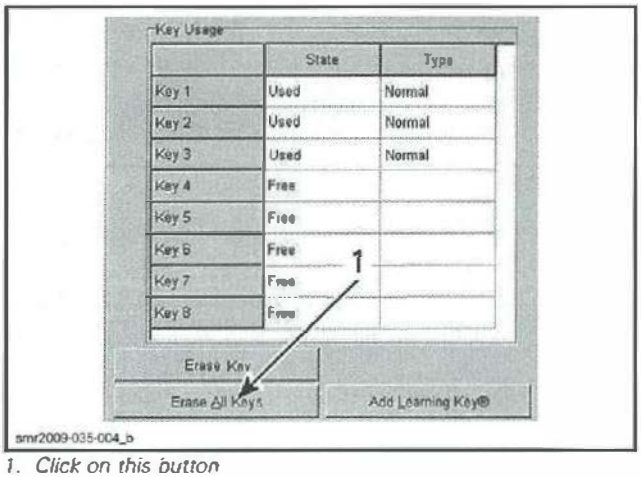
Erasing Another Key

1. Remove the tether cord from the engine cut-off switch.
2. Install the next tether cord to be erased on the engine cut-off switch.

3. Click on Erase Key button.
4. If programming is complete, write the changes to the ECM. Refer to *WRITING CHANGES TO ECM* in this subsection.

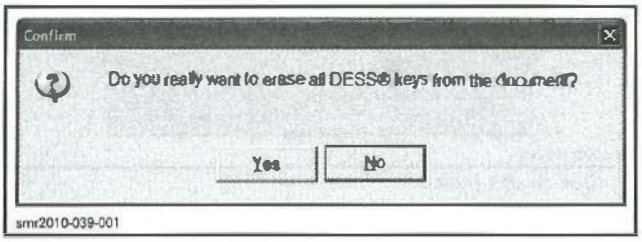
Erasing All Keys

1. Click on Erase All Keys button at bottom of screen.



1. Click on this button

NOTE: The following message will be displayed in B.U.D.S.



2. Click Yes to proceed with erasing all keys.
3. When done, program at least one new key to the vehicle. Refer to *ADDING A KEY* in this subsection.
4. When programming is complete, write the changes to the ECM. Refer to *WRITING CHANGES TO ECM* in this subsection.

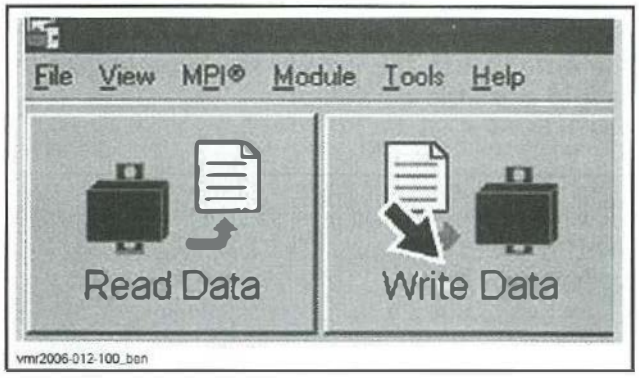
NOTE: If there isn't at least one key programmed to the watercraft, B.U.D.S. will not allow you to write the changes to the ECM and will prompt you to add a key.

Writing Changes to ECM

Save the changes made in B.U.D.S. into the ECM as follows.

NOTE: On 215 and 260 models, Briefly press the START/STOP button to prevent ECM communication interruption. Do not hold START/STOP button to avoid engine cranking.

1. Click the Write Data button.



NOTE: If for some reason the writing operation fails, exit B.U.D.S. Restart B.U.D.S. and reenter all the previously lost information.

2. After the write operation, remove key from D.E.S.S. post.
3. Try the key(s) on the watercraft.

BEEPER

Beeper Troubleshooting

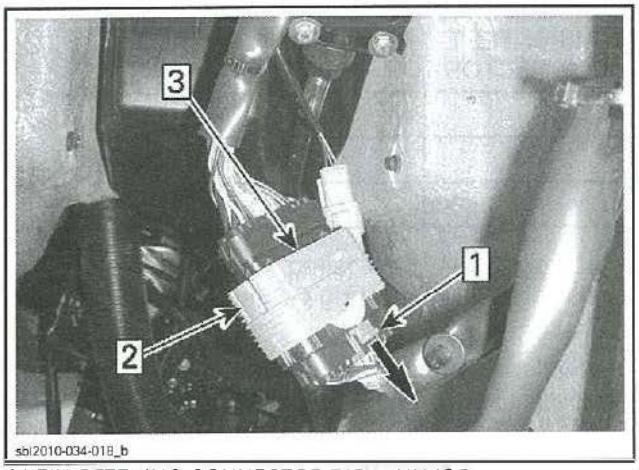
If no beep is heard when installing the tether cord on the engine cut-off switch, but the engine can be started, refer to *INFORMATION CENTER (GAUGE)* subsection to check beeper operation.

If no beep is heard when installing the tether cord on the engine cut-off switch, and the engine CANNOT be started, refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

ENGINE CUT-OFF SWITCH

Continuity Test of Engine Cut-Off Switch

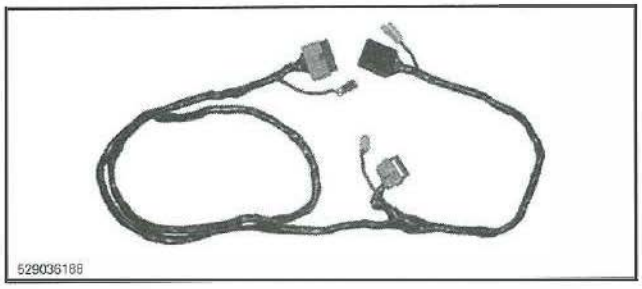
1. Disconnect the 24-pin steering connector from the vehicle harness. Refer to *START/STOP SWITCH* in the *STARTING SYSTEM* subsection for details.



24-PIN STEERING CONNECTOR DISCONNECT
Step 1: Pull out safety lock
Step 2: Press in on release tab
Step 3: Pull locking collar down

2. IMPORTANT: Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) to the 24-pin steering connector only, **NOT** to the vehicle harness connector.

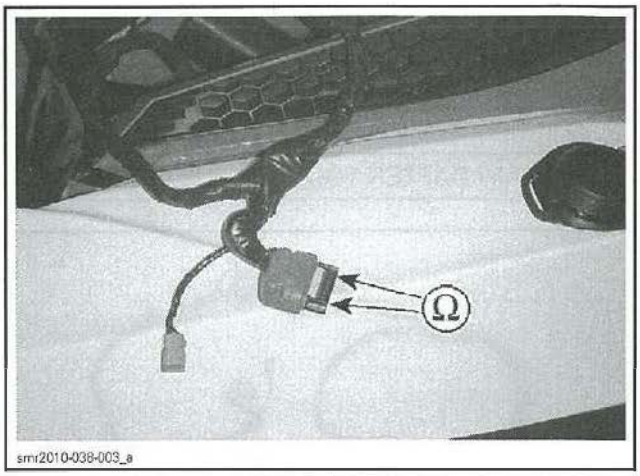
REQUIRED TOOLS
DIAGNOSTIC HARNESS (P/N 529 036 188)
FLUKE 115 MULTIMETER (P/N 529 035 868)



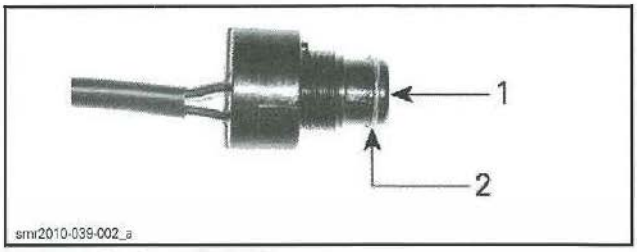


NOTICE Do not attempt to probe the 24-pin connector on the watercraft. Use the test connector on the diagnostic harness.

3. Set multimeter to Ω.
4. Probe test connector on diagnostic harness to check continuity as follows.



D.E.S.S. KEY	24-PIN TEST CONNECTOR		ENGINE CUT-OFF SWITCH	READING @ 20°C (68°F)
Removed	Pin 13	Pin 11	–	Open circuit
	Pin 14	–	Center contact	Close to 0 Ω
	Pin 13	–	Ring contact	
Installed	Pin 13	Pin 11	–	



ENGINE CUT-OFF SWITCH
1. Center contact
2. Ring contact

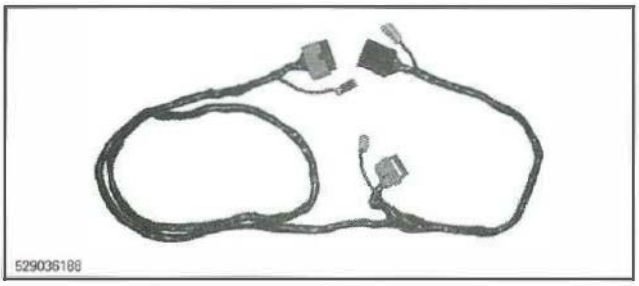
If any continuity test fails, replace engine cut-off switch.

If all readings were as specified, carry out the *CONTINUITY TEST OF VEHICLE HARNESS TO ENGINE CUT-OFF SWITCH.*

Continuity Test of Vehicle Harness to Engine Cut-Off Switch

1. Disconnect the 24-pin steering connector. Refer to *START/STOP SWITCH* in the *STARTING SYSTEM* subsection for details.

REQUIRED TOOLS
DIAGNOSTIC HARNESS (P/N 529 036 188)
FLUKE 115 MULTIMETER (P/N 529 035 868)
ECM ADAPTER TOOL (P/N 529 036 166)







2. Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) to the 24-pin vehicle harness connector only, **NOT** to the steering harness connector.
3. Disconnect connector "B" from ECM. Refer to *WIRING HARNESS AND CONNECTOR* subsection.
4. Install the ECM ADAPTER TOOL (P/N 529 036 166) on ECM connector "B".
5. Probe test connector as follows.

24-PIN TEST CONNECTOR	ECM ADAPTER TOOL	READING
11	B-E4	Close to 0 Ω
14	B-B2	
13	B-F2	

If any continuity test failed, check wiring harness between 24-pin steering connector and ECM connector.

If problem persists and all tests have been performed, try a new ECM. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

6. Reconnect 24-pin steering harness connector.
7. Reinstall removed components.

INFORMATION CENTER (GAUGE)

SERVICE TOOLS

Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 188	433, 436–437
FLUKE 115 MULTIMETER	529 035 868	432, 434, 436, 438, 443

SERVICE PRODUCTS

Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	427, 440, 445

green-manuals

GENERAL

INFORMATION CENTER (GTS MODELS)

⚠ WARNING

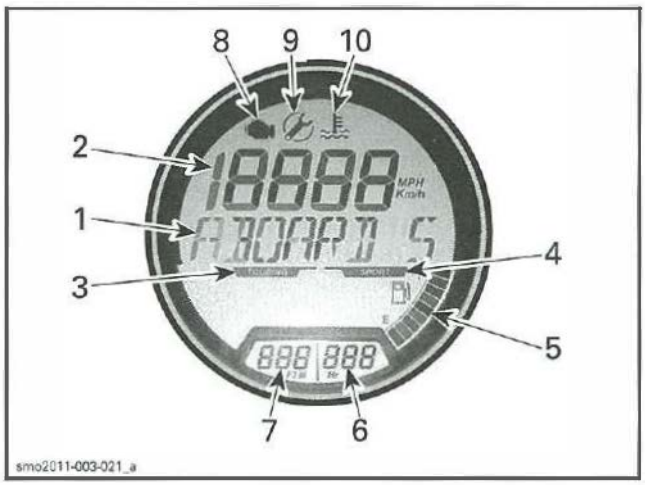
Do not adjust the display while riding, you could lose control.



smr2011-032-100_a

TYPICAL - INFORMATION CENTER
1. Multifunction gauge

Multifunction Gauge Description



smo2011-003-021_a

1) Multifunction Display

The multifunction display is used to:
- Display the WELCOME message on power up
- Display the KEY recognition message
- Display the engine RPM
- Display fault messages.

NOTE: RPM is the default indication when the engine is running.

2) Numerical Display

The numerical display provides an indication of estimated watercraft speed. Watercraft speed is based on various engine parameters received from the ECM.

3) Touring Mode Indicator

When the TOURING mode indicator is ON, the default TOURING mode is active.

Refer to *INTELLIGENT THROTTLE CONTROL (iTC)* subsection for details.

4) Sport Mode Indicator

When the SPORT mode indicator is ON, sport mode has been selected and is active.

NOTE: Sport mode is not the default riding mode. To be active, it must be selected on after each engine start.

5) Fuel Level Indication

A bar gauge located in the bottom RH side of the multifunction display continuously indicates the amount of fuel in the fuel tank while riding.

When the fuel tank is full, 8 segments (bars) of the indicator are turned on. The top segment is not used.

Low Fuel Warning

When there is only 2 segments of fuel indicated (approximately 25% fuel tank capacity or 14 L (3.7 U.S. gal.), the following indications will come ON to advise you that a low fuel condition exists.

LOW FUEL LEVEL INDICATIONS	
Last 2 fuel gauge segments	Flashing
Fuel tank symbol	
Audible advisory (one long beep)	Periodically
Scrolling LOW FUEL advisory message	

6) Hour Meter Display

Continuously displays the accumulated engine hours as transmitted by the ECM.

Engine hours are calculated and stored by the ECM.

7) Water Depth Display

The water depth display provides an indication of the lake water depth.

The system is capable of indicating water depth under the hull in single increments up to 50 m (164 ft).

NOTE: Under certain conditions, the display may stop indicating. The display's ability to provide an indication of the waters's depth depends on the conditions of use.

NOTE: The water depth indication is only available when a depth sounder is installed and detected.

⚠ WARNING

Never use the depth sounder as a warning device to ride in shallow water.

8) Check Engine Light

The check engine light comes ON when a fault is detected by the engine management system.

The check engine light may be accompanied by the applicable scrolling fault message in the multifunction display.

The signal to turn on the check engine light and scrolling fault message comes from the ECM.

9) Maintenance Reminder Indicator

The maintenance reminder indicator comes ON when required maintenance is due.

The signal to turn on the maintenance reminder and scrolling maintenance message comes from the ECM.

10) High Temperature Indicator

The high temperature indicator comes ON when a high engine temperature or a high exhaust system temperature is detected.

The signal to turn on the high temperature indicator and scrolling HIGH TEMPERATURE or HIGH EXHAUST TEMPERATURE message comes from the ECM.

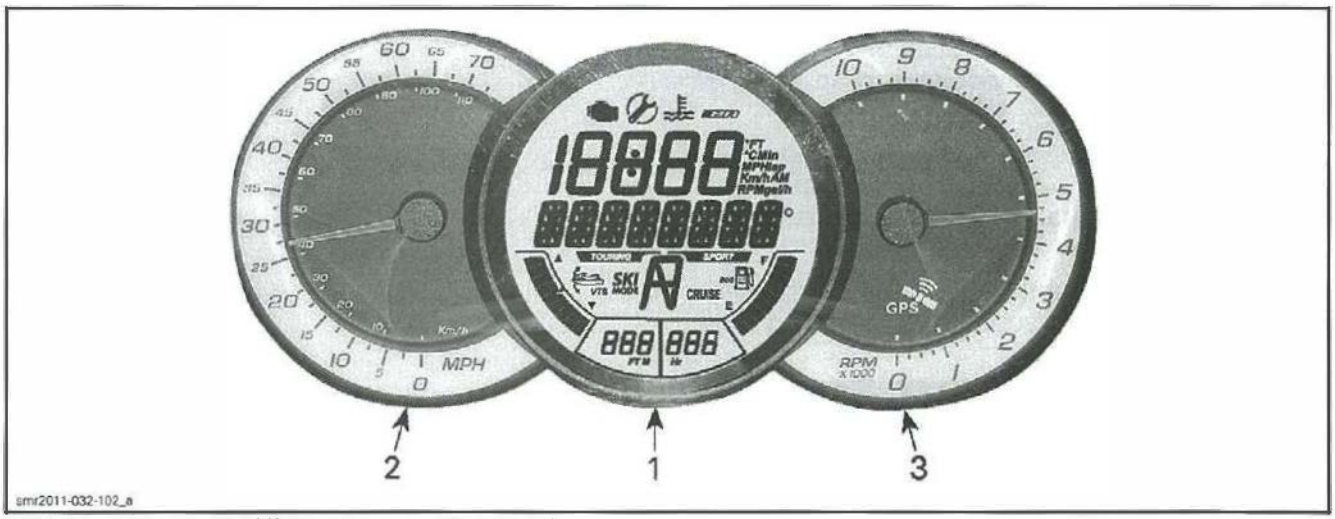
INFORMATION CENTER (GTX 155, GTI SERIES AND WAKE MODELS)

⚠ WARNING

Do not adjust the display while riding, you could lose control.



TYPICAL - GTI AND GTI SE MODELS
1. Multifunction gauge



TYPICAL - GTX 155, GTI LIMITED AND WAKE MODELS
1. Multifunction gauge
2. Analog speedometer
3. Analog tachometer

Analog Speedometer Description

The speedometer, located in the LH side of the information center, provides an analog indication of the speed of the watercraft in miles per hour (MPH) and kilometers per hour (km/h).

The speed indication is based on a GPS (Global Positioning System) incorporated within the information center.

If for some reason the GPS signal is lost, a default mode is used whereby, the speed is calculated using information received from other systems to provide an estimated watercraft speed.

Analog Tachometer Description

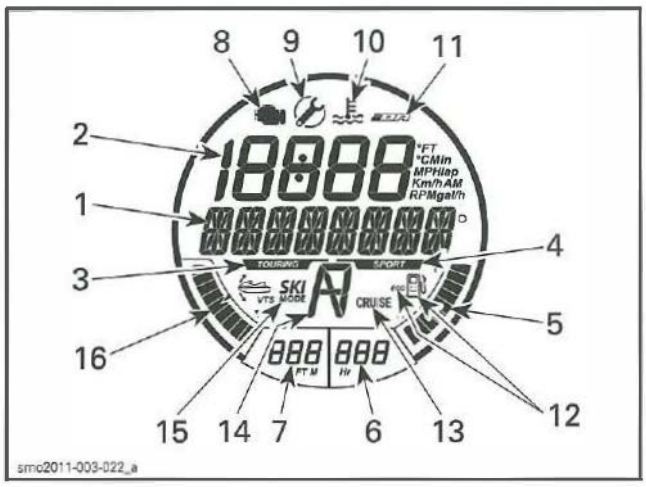
The tachometer provides an analog indication of the revolutions per minute (RPM) of the engine. Multiply the indicated number by 1000 to obtain the actual engine RPM.

Multifunction Gauge Features

	GTI	GTI SE	GTI LIMITED	WAKE	GTX 155
1) Multifunction display	X	X	X	X	X
2) Numerical display	X	X	X	X	X
3) Touring mode indicator	X	X	X	X	X
4) Sport mode indicator	X	X	X	X	X
5) Fuel level indication	X	X	X	X	X
6) Hour meter display	X	X	X	X	X
7) Water depth indication	Opt	Opt	Opt	Opt	Opt
8) CHECK ENGINE light	X	X	X	X	X
9) MAINTENANCE REQUIRED indicator	X	X	X	X	X
11) iBR fault indicator	X	X	X	X	X
12) ECO mode indicator	Opt	X	X	X	X
13) CRUISE mode indicator	Opt	Opt	X	X	X
14) iBR position indicator	X	X	X	X	X
15) SKI mode indicator	Opt	Opt	Opt	X	Opt
16) VTS position indication	Opt	X	X	X	X

X = Indicates a standard feature
Opt = Indicates a feature available as an option

Multifunction Gauge Description



1) Multifunction Display

The multifunction display is used to:

- Display the WELCOME message on power up
- Display the KEY recognition message
- Provide various indications as selected by the operator
- Activating or changing various functions or modes of operation
- Display scrolling messages of function activation or system faults
- Display fault codes.



MULTIFUNCTION DISPLAY

NOTE: The default indication in the multifunction display is the compass direction.

2) Numerical Display

The numerical display is used to provide a variety of indications as selected by the operator using the DISPLAY function in the multifunction display.



NUMERICAL DISPLAY

1. Numerical display indication
2. Unit of measurement of indication

AVAILABLE INDICATIONS IN NUMERICAL DISPLAY

	GTI	GTI SE	GTI LIMITED	WAKE	GTX 155
Watercraft speed	Indication by default				
Engine RPM	X	X	X	X	X
Engine temperature	Opt	Opt	Opt	Opt	Opt
Clock	N.A.	X	X	X	X
Learning and rental key settings	X	X	X	X	X
CRUISE SPEED setting (from idle RPM)	Opt	Opt	X	X	X
SLOW SPEED MODE setting	Opt	Opt	X	X	X
Full VTS (with LH VTS switch)	Opt	Opt	X	Opt	Opt
VTS preset	Opt	Opt	X	Opt	Opt
VTS settings (through gauge, no switch)	Opt	X	N.A.	X	X
SKI MODE settings	Opt	Opt	Opt	X	Opt
Fuel consumption (instant and average)	Opt	X	X	X	X
Fuel autonomy (distance and time to empty)	Opt	Opt	X	Opt	Opt
Lap timer	Opt	Opt	Opt	Opt	Opt
Top speed/RPM, average speed/RPM	Opt	Opt	Opt	Opt	Opt
Altitude	N.A.	N.A.	X	N.A.	N.A.

X = An X indicates a standard feature
Opt = Feature available as an option
N.A. = Not Available

When the information center is first powered up, the numerical display defaults to the last selected indication.

3) Touring Mode Indicator

When the TOURING mode indicator is ON, the default TOURING mode of operation is active.



TOURING MODE INDICATOR

4) Sport Mode Indicator

When the SPORT mode indicator is ON, sport mode has been selected and is active.



SPORT MODE INDICATOR

NOTE: Sport mode is not the default riding mode. To be active, it must be selected ON after each engine start.

5) Fuel Level Indication

A bar gauge located in the bottom RH side of the multifunction display continuously indicates the amount of fuel in the fuel tank while riding.



FUEL LEVEL INDICATION

When the fuel tank is full, 8 segments (bars) of the indicator are turned on. The top segment is not used.

Low Fuel Level Warning

When there is only 2 segments of fuel indicated (approximately 25% fuel tank capacity or 14 L (3.7 U.S. gal.), the following warnings will be ON.

LOW FUEL LEVEL WARNING	
Last 2 fuel gauge segments	Flashing
Fuel tank symbol	
Audible warning (one long beep)	Periodically
Scrolling LOW FUEL WARNING message	

6) Hour Meter Display (HR)

Continuously displays the accumulated engine hours as transmitted by the ECM.



HOUR METER DISPLAY

NOTE: Engine hours are calculated and stored in the ECM.

7) Water Depth Display

The water depth display provides an indication of the lake water depth.

The system is capable of indicating water depth under the hull in single increments up to 50 m (164 ft).

NOTE: Under certain conditions, the display may stop indicating. The display's ability to provide and indication of the water's depth depends on the conditions of use.



WATER DEPTH DISPLAY

NOTE: The water depth indication is only available when a depth sounder is installed and detected.

⚠ WARNING

Never use the depth sounder as a warning device to ride in shallow water.

8) Check Engine Light

The check engine light comes ON when a fault is detected by the engine management system.



CHECK ENGINE LIGHT

The signal to turn on the check engine light and scrolling fault message comes from the ECM.

9) Maintenance Reminder Indicator

The maintenance reminder indicator comes ON when required maintenance is due.



MAINTENANCE REMINDER INDICATOR

NOTE: The signal to turn on the maintenance reminder and to display the MAINTENANCE DUE message in the multifunction display comes from the ECM.

10) High Temperature Indicator

The high temperature indicator comes ON when a high engine temperature or a high exhaust system temperature is detected.



HIGH TEMPERATURE INDICATOR

NOTE: The signal to turn on the high temperature indicator and the scrolling HIGH TEMPERATURE or HIGH EXHAUST TEMPERATURE message in the multifunction display comes from the ECM.

11) iBR Fault Indicator

The iBR fault indicator comes ON when a fault in the iBR system has been detected.



iBR FAULT INDICATOR

The signal to turn on the iBR fault indicator and scrolling fault message comes from the ECM or iBR.

12) ECO Indicator

The ECO indicator and a smile in the fuel tank symbol comes ON when **FUEL ECONOMY MODE** is activated.



ECO MODE INDICATOR
(Fuel Economy Mode)

13) CRUISE Mode Indicator

The cruise mode indicator comes ON when:
- CRUISE MODE has been activated.
- SLOW SPEED MODE has been activated.



CRUISE MODE INDICATOR

14) iBR Position Indicator

Provides an indication of the iBR gate position.
- N (neutral)
- F (forward)
- R (reverse).



iBR POSITION INDICATOR

15) SKI MODE Indicator

The ski mode indicator is ON when SKI MODE is active.



SKI MODE INDICATOR

16) VTS Position Indication

The VTS position indication provides an indication of the of the pump nozzle position.

A single segment of a bar gauge type indicator is turned on to indicate the relative position of the watercraft bow.



VTS POSITION INDICATION

Navigating the Multifunction Display

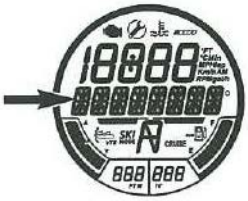
⚠ WARNING

Do not adjust display while riding, you could lose control.

Selecting Functions

When operating at speed, the multifunction display provides an indication of the compass direction and azimuth of the watercraft is traveling by default.

1. To select the various functions available through the multifunction display, press the MODE button repeatedly until the desired function is visible:



FUNCTION SUBMENU DISPLAYED IN SEQUENCE WHEN MODE BUTTON PRESSED REPEATEDLY

2. Then press the SET button to enter that function.

NOTE: The available functions and the order in which they appear depends on the watercraft model. The fault code function is only available when there is an active fault. The settings function is only available when the engine is shut off.

FUNCTIONS AVAILABLE THROUGH MULTIFUNCTION DISPLAY	
COMPASS (default function)	DRIVING MODE
LAP TIMER	DISPLAY
SKI MODE	FAULT CODES
FUEL ECONOMY MODE	KEY MODE
FUEL CONSUMPTION	SETTINGS
VTS MODE	-

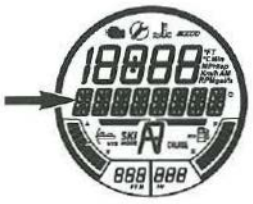
Description of Functions Available Through Multifunction Display

Compass

A GPS incorporated in the information center provides the indication in the multifunction display.

The cardinal points, intermediate cardinal points, as well as the azimuth the watercraft is travelling are displayed by default in the multifunction display when the watercraft is moving.

For a compass indication to be displayed, the GPS must have a good uplink with at least three navigation satellites.



COMPASS DIRECTION DISPLAYED HERE

NOTE: The compass indication is only available above 5 km/h (3 MPH).

⚠ WARNING

Use the compass as a guide only. Not to be used for precision navigation purposes.

Lap Timer

The lap timer can be used to record up to 50 individual lap times.

Ski Mode

Ski mode is used for repeated controlled launches when towing a skier or wakeboarder.

Fuel Economy Mode

Fuel economy mode is a function by which engine fuel consumption is reduced.

Fuel Consumption

The FUEL CONSUMPTION function is used to display the watercraft fuel consumption four different ways:

- Instant fuel flow per hour (gal/h or L/h)
- Average fuel flow per hour (gal/h or L/h)
- Distance to empty (Mi or Km)
- Time to empty (h or min).

VTS Mode

The VTS MODE function is used to manually set the VTS or change VTS PRESET settings.

Driving Mode

The DRIVING MODE function can be used for activating or deactivating SPORT mode.

Display

The DISPLAY function is used to change the indication in the numerical display.

Fault Codes

The FAULT CODES function can only be used to display active fault codes.

Key Mode

The KEY MODE function is used for changing LEARNING or RENTAL key settings.

Settings

The SETTINGS function is used for:

- Changing the clock setting
- Activating the iBR override function.

Activating Functions Through the Multifunction Display

To activate the following operating modes, refer to *INTELLIGENT THROTTLE CONTROL (ITC)* subsection:

- SPORT mode
- TOURING mode
- SKI mode
- FUEL ECONOMY mode
- KEY mode.

For VTS mode, refer to *iBR AND VTS* subsection.

For DISPLAY modes, refer to *CHANGING NUMERICAL DISPLAY INDICATION* in this subsection.

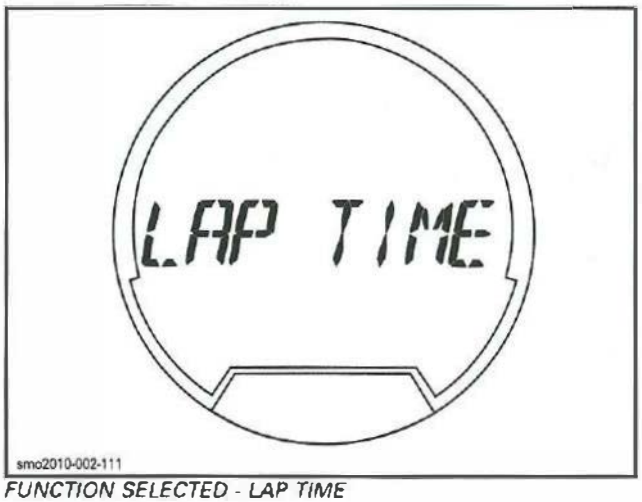
For FAULT CODES display function, refer to *DIAGNOSTIC AND FAULT CODES* subsection.

For the SETTINGS function:

- To change clock setting, refer to *MULTIFUNCTION GAUGE SETUP* in this subsection.
- For the iBR override function, refer to *iBR AND VTS* subsection.

Lap Timer

1. Press the MODE button repeatedly until LAP TIME is visible in the multifunction display.



FUNCTION SELECTED - LAP TIME

2. Press the SET button to enter the function, the lap timer will be activated and visible in the display.



LAP TIMER FUNCTION

1. 00'00'00 lap time displayed here
2. Lap number "0" displayed here

3. To start the timer, press the SET button.

NOTE: The timer starts immediately when pressing the SET button.

4. To record each lap time, press the SET button at the start of each lap.

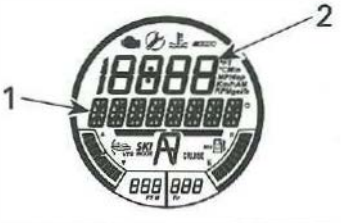
NOTE: The lap time will be recorded, the lap counter in the numerical display will count the number of laps recorded, and the timer will continue to run.



LAP TIMER FUNCTION EXAMPLE

1. 01'02'34 lap time displayed here
2. Lap number "1" displayed here

5. To save the last lap and stop the timer, press the MODE button.



LAP TIMER FUNCTION EXAMPLE

1. 01'21'03 lap time displayed here
2. Lap number "2" displayed here

To view each lap time, use the UP/DOWN arrow button. The lap counter will indicate which lap is indicated.

To view the cumulative lap time of all laps recorded, use the UP/DOWN arrow button until ALL is visible in the lap counter.



LAP TIMER FUNCTION EXAMPLE

1. Total lap times 02'23'37 displayed here
2. Lap count "ALL" displayed here

To reset the lap timer and lap counter, press and hold the SET button until the timer and counter are reset to 0 (zero).

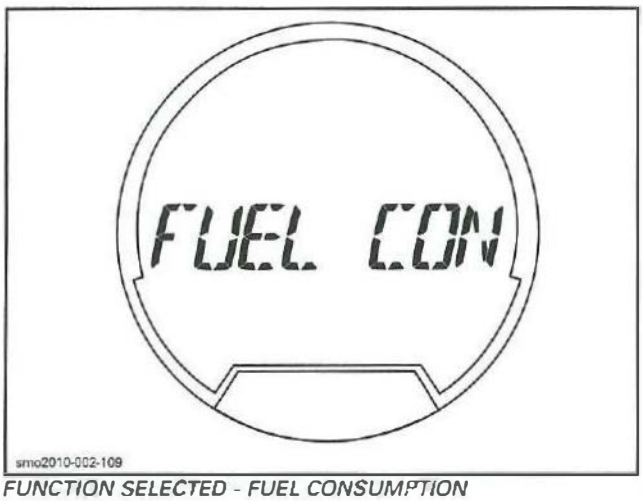
Fuel Consumption Display

NOTE: The fuel consumption functions are not continuously active and therefore do not record in the background. The desired fuel consumption function becomes active only when selected as the indication in the numerical display.

When the LOW FUEL indications come on in the multifunction gauge, the "TIME TO EMPTY" and "DISTANCE TO EMPTY" functions will indicate "0" (zero) if they are the selected indication.

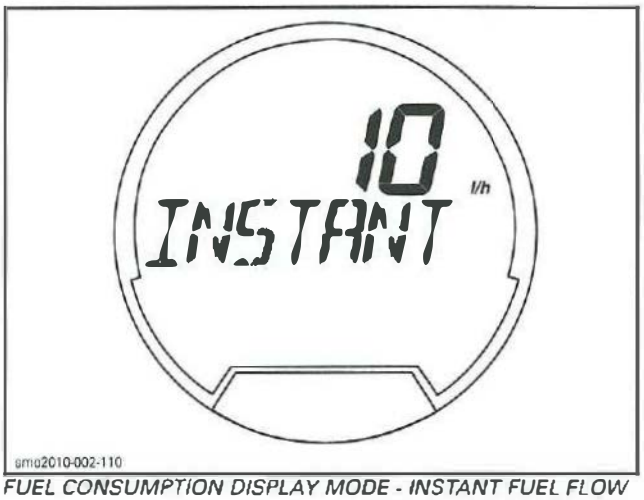
To display the watercraft fuel consumption, carry out the following:

1. Press the MODE button repeatedly until FUEL CONSUMPTION is visible in the multifunction display.



FUNCTION SELECTED - FUEL CONSUMPTION

2. Press the UP/DOWN arrow button to toggle to the desired fuel consumption display mode.



FUEL CONSUMPTION DISPLAY MODE - INSTANT FUEL FLOW

3. Press the SET button to save the setting and return to the main display.

NOTE: The fuel consumption value selected will be displayed in the numerical display. Double click the SET button to reset the average fuel consumption indication. The display will momentarily indicate zero (0).

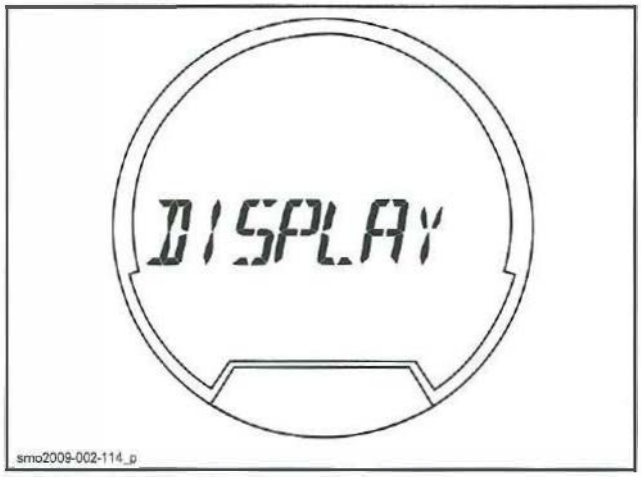
Multifunction Display Messages

For a list of usual messages that may be displayed in the multifunction display, refer to *MULTIFUNCTION DISPLAY MESSAGES* in *INFORMATION CENTER (RXT,GTX (EXCEPT 155) AND WAKE PRO SERIES)*.

Changing Numerical Display Indication

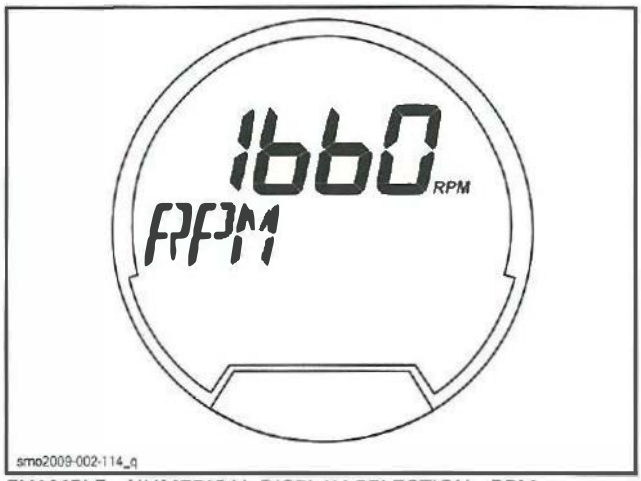
To change the indication in the numerical display, carry out the following:

1. Press the MODE button on the RH handlebar repeatedly until DISPLAY is visible in the multifunction display.



FUNCTION SELECTED - DISPLAY

2. Press the SET button to enter the DISPLAY function.
3. Press the UP/DOWN arrow button until the preferred indication is visible in the multifunction display.
   - RPM
   - SPEED
   - CLOCK
   - ENGINE TEMP
   - ALTITUDE.
   - TOP SPEED (RXT-X)
   - AVG SPEED (RXT-X)
   - TOP RPM (RXT-X)
   - AVG RPM (RXT-X).



EXAMPLE - NUMERICAL DISPLAY SELECTION - RPM

4. Press the SET button to select and save the preferred indication, or wait for the display function to time out. The last indication visible will be automatically saved.

Resetting Numerical Display Indication

The following numerical display indications can be reset when selected:

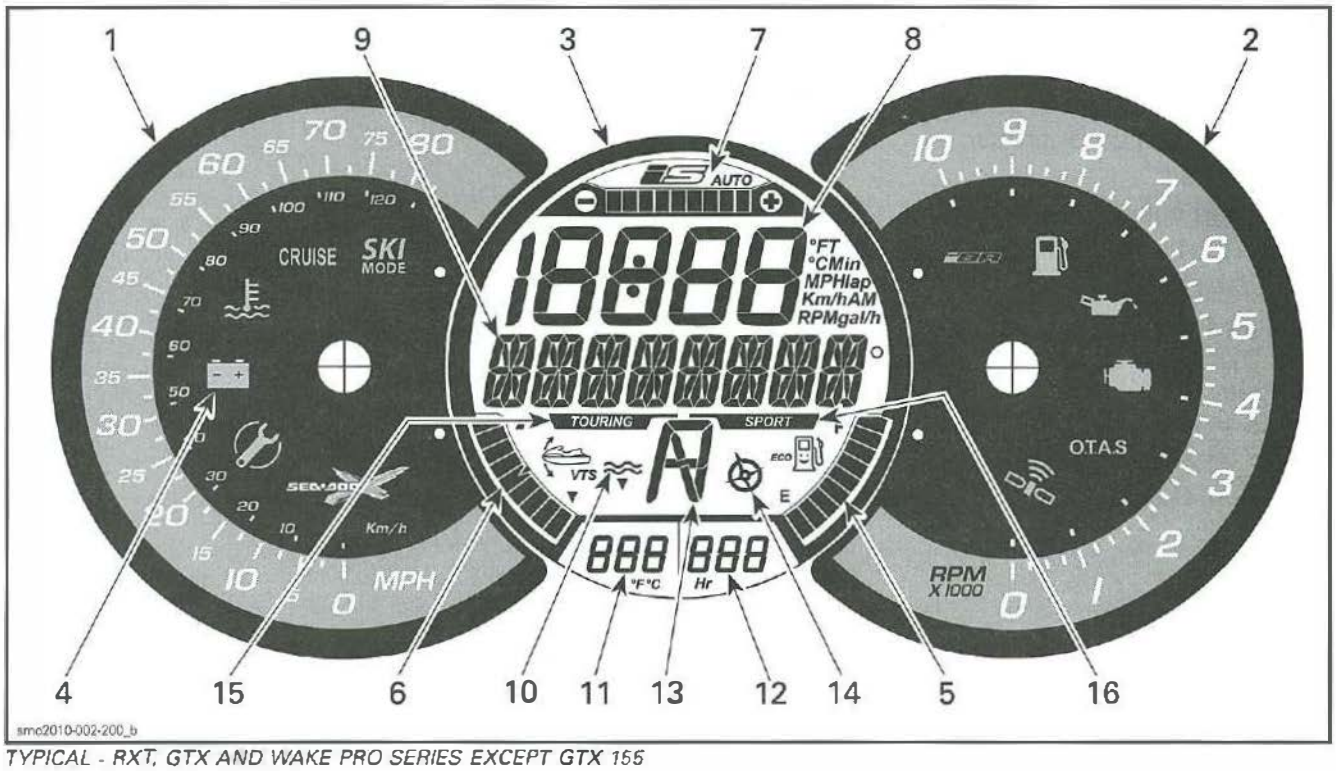
- Average fuel consumption
- Top speed
- Average speed
- Top RPM
- Average RPM.

To reset the indication. double click the SET button. The numerical display will momentarily indicate zero (0).

NOTE: Each of these functions become active **ONLY** when selected as the numerical display indication, they do not record in the background.

INFORMATION CENTER (RXT,GTX (EXCEPT 155) AND WAKE PRO SERIES)

Information Center Description



TYPICAL - RXT, GTX AND WAKE PRO SERIES EXCEPT GTX 155

1) Speedometer

The speedometer, located in the LH side of the information center, provides an analog indication of the speed of the watercraft in miles per hour (MPH) and kilometers per hour (km/h).

The speed indication is based on a GPS (Global Positioning System) incorporated within the information center.

An indicator light seen in the tachometer lights up when the GPS has a good uplink with at least three satellites.



GPS INDICATOR LIGHT

If for some reason the GPS signal is lost, a default mode is used whereby, the speed is calculated using information received from other systems to provide an estimated watercraft speed.

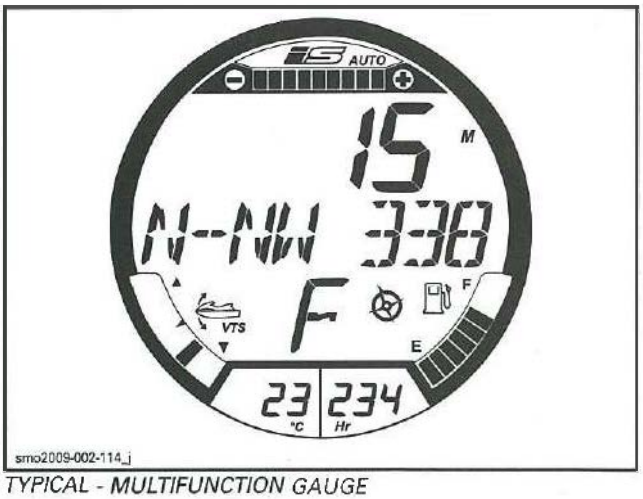
2) Tachometer

The tachometer provides an analog indication of the revolutions per minute (RPM) of the engine. Multiply the indicated number by 1000 to obtain the actual engine RPM.

3) Multifunction Gauge

The multifunction gauge, located in the center of the information center, is capable of providing many indications simultaneously.

The numerical and multifunction displays in the multifunction gauge can be used to display various indications, or for selecting modes of operation and changing settings as explained in their respective subsections.



TYPICAL - MULTIFUNCTION GAUGE

MULTIFUNCTION GAUGE FEATURES	GTX LTD iS	GTX iS, RXT iS	RXT-X aS, RXT-X	WAKE PRO	GTX 215	RXT
Multifunction display	X	X	X	X	X	X
Numerical display	X	X	X	X	X	X
TOURING mode indicator	X	X	X	X	X	X
SPORT mode indicator	X	X	X	X	X	X
Fuel level indication	X	X	X	X	X	X
Hour meter display	X	X	X	X	X	X
Water depth indication	X	Opt	Opt	Opt	Opt	Opt
CHECK ENGINE indicator	X	X	X	X	X	X
MAINTENANCE REQUIRED indicator	X	X	X	X	X	X
iBR fault indicator	X	X	X	X	X	X
CRUISE mode indicator	X	X	Opt	X	X	X
iBR position indicator	X	X	X	X	X	X
SKI mode indicator	Opt	Opt	Opt	X	Opt	Opt
VTS position indication	X	X	X	X	X	X

X = An X indicates a standard feature
Opt = Feature available as an option

4) Indicator Lights

Indicator lights (pilot lamps), located in the speedometer and tachometer indicator, inform you of a selected function, or a system anomaly.

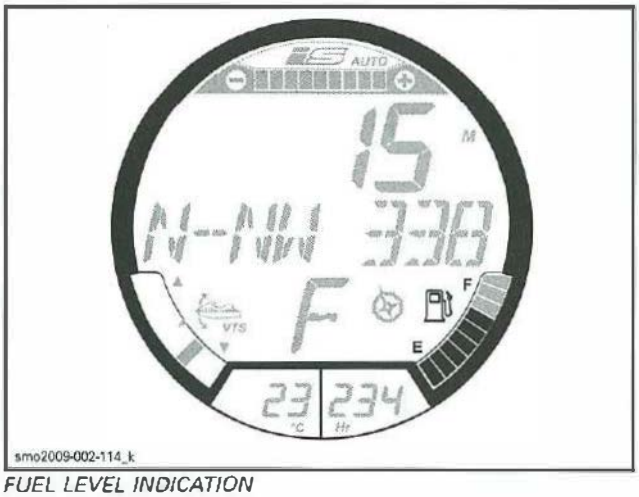
An indicator light may be accompanied by a scrolling message in the multifunction display.

See the following table for information on the usual pilot lamps. Refer to *DIAGNOSTIC AND FAULT CODES* subsection for details on malfunction pilot lamps.

PILOT LAMPS (ON)	MESSAGE DISPLAY	DESCRIPTION
	MAINTENANCE REMINDER	Maintenance required
	LOW or HIGH BATTERY VOLTAGE	Low/high battery voltage
	LOW-FUEL	Low fuel level, approx. 25% tank capacity, 14 L (3.7 U.S. gal.) or fuel level sensor disconnected
	HIGH TEMPERATURE	Engine or exhaust system overheating
	CHECK ENGINE or LIMP HOME MODE	Check engine (minor fault req. maint.) or LIMP HOME MODE (major eng. fault)
	LOW OIL PRESSURE	Low oil pressure
CRUISE	Scrolling SLOW SPEED MODE message	CRUISE mode or SLOW SPEED mode engaged
	–	iBR system fault
O.T.A.S.	–	O.T.A.S. system fault
	–	Good GPS uplink
SKI MODE	Scrolling SKI MODE messages	SKI mode activated

5) Fuel Level Indication

A bar gauge located in the bottom RH side of the multifunction display continuously indicates the amount of fuel in the fuel tank while riding.



FUEL LEVEL INDICATION

When the fuel tank is full, 8 segments (bars) of the indicator are turned on. The top segment is not used.

Low Fuel Warning

When there is only 2 segments of fuel indicated (approximately 25% fuel tank capacity or 14 L (3.7 U.S. gal.), the following warnings will be ON.

LOW FUEL LEVEL WARNING	
Last 2 fuel gauge segments	ON
Fuel tank symbol (LED)	
Audible warning (one long beep)	Periodically
Scrolling LOW FUEL WARNING message	

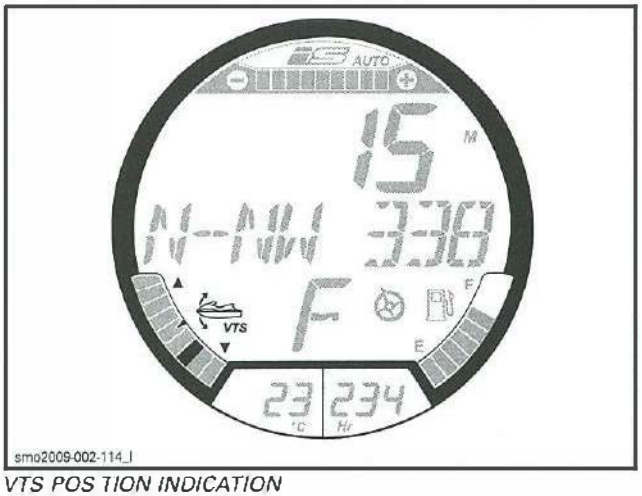
The audible warning (one long beep) will be heard periodically as long as the low fuel condition exists.

NOTE: The watercraft fuel consumption may be displayed in the numerical display. Refer to *NUMERICAL DISPLAY* in this subsection.

6) VTS Position Indication

The VTS position indication located in the bottom LH side of the multifunction display indicates the riding attitude of the watercraft.

A single segment of a bar gauge type indicator is turned on to indicate the relative position of the watercraft bow.

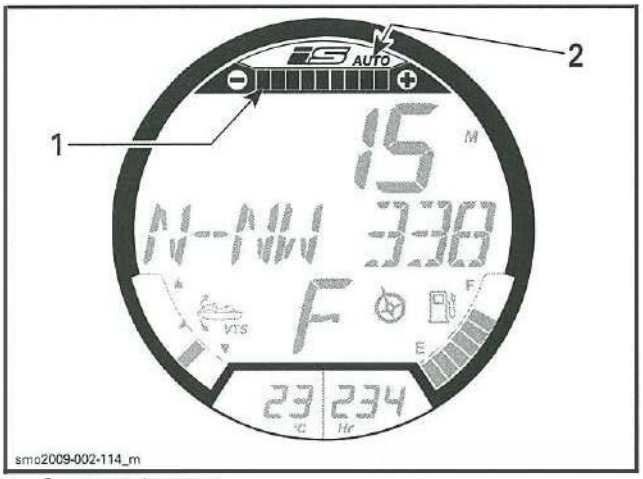


VTS POSITION INDICATION

7) iS Position Indication

The iS position display (intelligent Suspension) provides a visual indication of the relative height of the suspension.

It also indicates if the suspension is in AUTO mode of operation.



1. iS position indicator
2. iS AUTO mode indicator

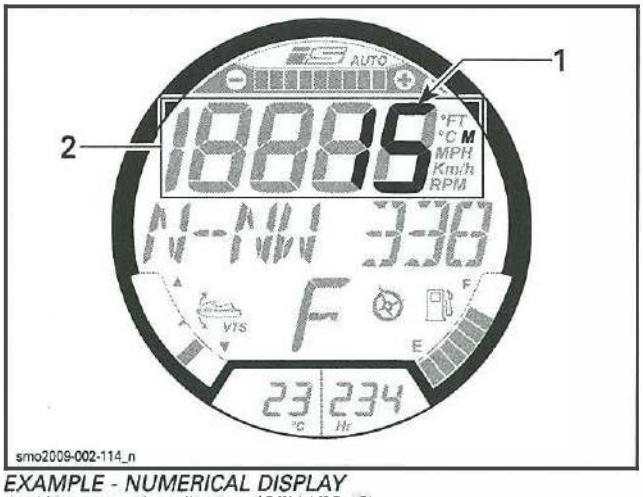
When the suspension system is operating in AUTO mode, the AUTO indicator and all bar segments of the position indicator will be on.

When the suspension height is adjusted using the iS button, the system switches to MANUAL mode of operation. The AUTO indication disappears and only one segment of the bar gauge is turned on to indicate the position of the suspension.

Refer to *SUSPENSION (iS)* subsection for details.

8) Numerical Display

The numerical display is used to provide a variety of indications as selected by the operator using the DISPLAY function in the multifunction display.



EXAMPLE - NUMERICAL DISPLAY
1. Water depth indication (GTX LTD iS)
2. Numerical display

AVAILABLE INDICATIONS IN NUMERICAL DISPLAY	GTX LTD iS	GTX iS, RXT iS	RXT-X aS, RXT-X	WAKE PRO	GTX 215	RXT
1) Watercraft speed	Indication by default					
2) Engine RPM	X	X	X	X	X	X
3) Engine temperature	Opt	Opt	X	Opt	Opt	Opt
4) Lake water temperature	X	X	X	X	X	X
5) Clock	X	X	X	X	X	X
6) Learning and rental key settings	X	X	X	X	X	X
7) CRUISE button (on handlebar)	X	X	Opt	X	X	X
8) CRUISE SPEED setting	X	X	Opt	X	X	X
9) SLOW SPEED MODE setting	X	X	Opt	X	X	X
10) Full VTS (with LH VTS switch)	X	X	X	X	Opt	X
11) VTS preset	X	X	X	X	Opt	X
12) VTS settings (through gauge)	N.A.	N.A.	N.A.	N.A.	X	N.A.
13) SKI MODE settings	Opt	Opt	Opt	X	Opt	Opt
14) Fuel consumption (instant and average)	X	X	X	X	X	X
15) Fuel autonomy (distance and time to empty)	X	Opt	X	Opt	Opt	Opt
16) Lap timer	Opt	Opt	X	Opt	Opt	Opt
17) Top speed/RPM, average speed/RPM	Opt	Opt	X	Opt	Opt	Opt
18) Altitude	X	N.A.	N.A.	N.A.	N.A.	N.A.

X = An X indicates a standard feature
Opt = Feature available as an option
N.A. - Not Available

When the information center is first powered up, the numerical display defaults to the last selected indication.

9) Multifunction Display

The multifunction display is used to:

- Display the WELCOME message on power up.
- Display the KEY recognition message.
- Provide various indications as selected by the operator.
- Activating and setting various functions and modes of operation.
- Display scrolling messages of function activation or system faults.
- Display fault codes.

NOTE: The default indication in the multifunction display is the compass direction.

10) Water Depth Display

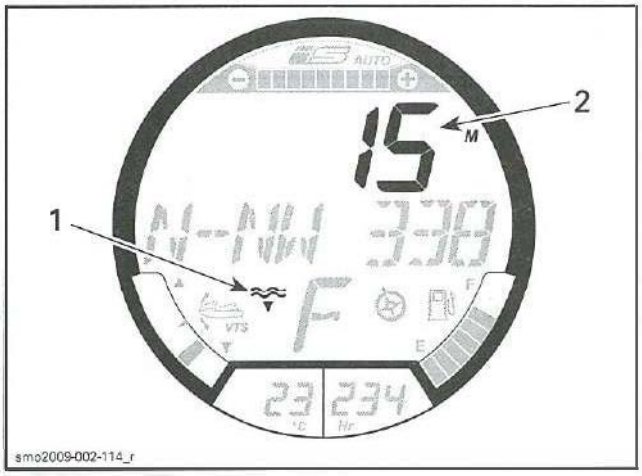
GTX Limited iS Model

The *NUMERICAL DISPLAY* can be selected to provide an indication of the lake water depth.

The system is capable of indicating water depth under the hull in single increments up to 50 m (164 ft).

NOTE: Under certain conditions, the digital screen may stop displaying. The digital screen's ability to display the depth depends on the conditions of use.

To activate the water depth indication, refer to *CHANGING NUMERICAL DISPLAY INDICATION* in this subsection.



GTX LIMITED IS
1. *Depth sounder indicator*
2. *Water depth indication*

NOTE: The water depth indication is only available when a depth sounder is installed and detected.

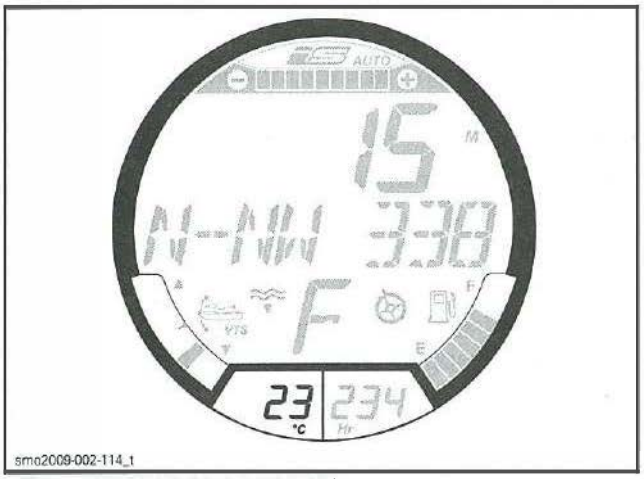
⚠ WARNING

Never use the depth gauge as a warning device to ride in shallow water.

11) Water Temperature Display

All Models Except GTX 155

Continuously displays surface water temperature in degrees Celsius (°C) or Fahrenheit (°F).



WATER TEMPERATURE DISPLAY

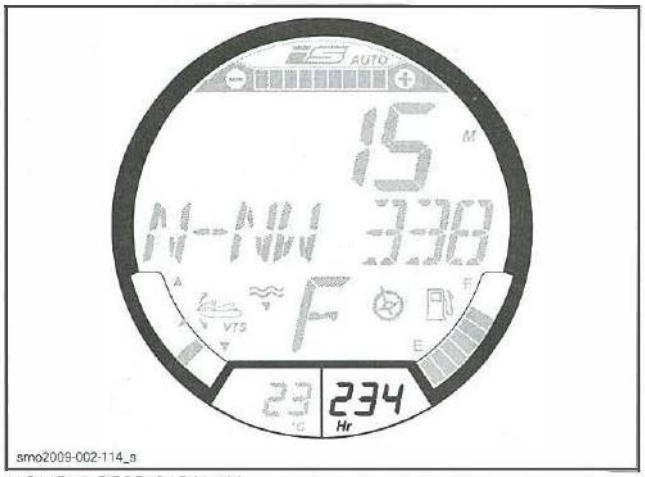
The signal used to display water temperature comes from the iBR module.

The numerical display may also be selected to display water temp. See *CHANGING NUMERICAL DISPLAY INDICATION* in this subsection.

To change the unit of measurement (°C or °F), refer to *MULTIFUNCTION GAUGE SETUP* in this subsection.

12) Hour Meter Display (HR)

Continuously displays the accumulated engine hours as transmitted by the ECM.

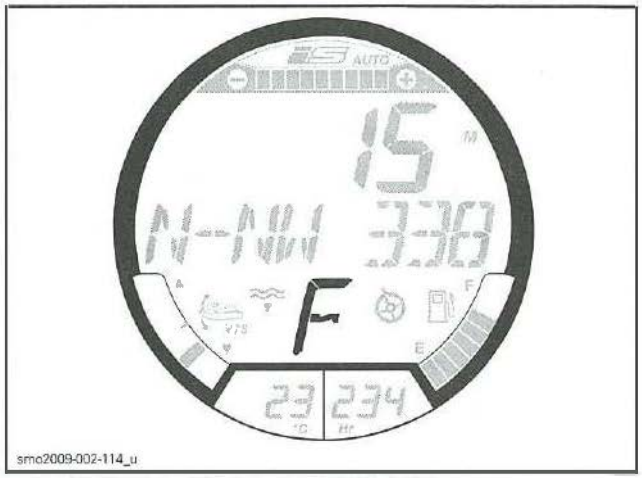


HOUR METER DISPLAY

The engine hours are calculated and stored in the ECM.

13) iBR Position

Provides an indication of the iBR gate position.
- N (neutral)
- F (forward)
- R (reverse).



IBR POSITION - FORWARD ILLUSTRATED (F)

14) Compass

A GPS incorporated in the information center provides the indication in the multifunction display.

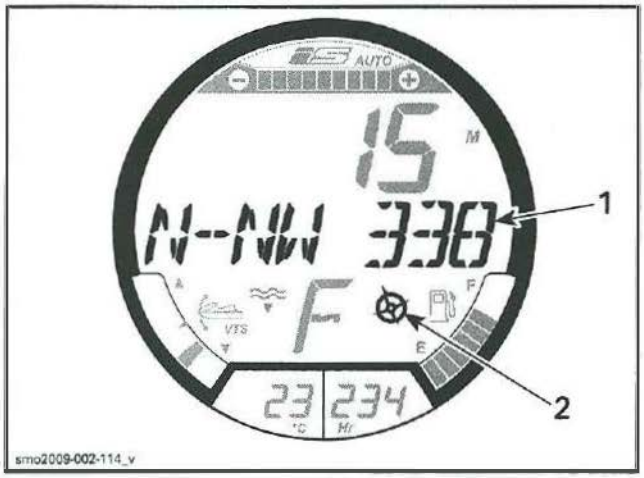
The cardinal points, intermediate cardinal points, as well as the azimuth the watercraft is travelling are displayed in the multifunction display by default when the watercraft is moving.

For a compass indication to be displayed, the GPS must first have a good uplink with at least three navigation satellites.

NOTE: The compass indication is only available above 5 km/h (3 MPH).

⚠ WARNING

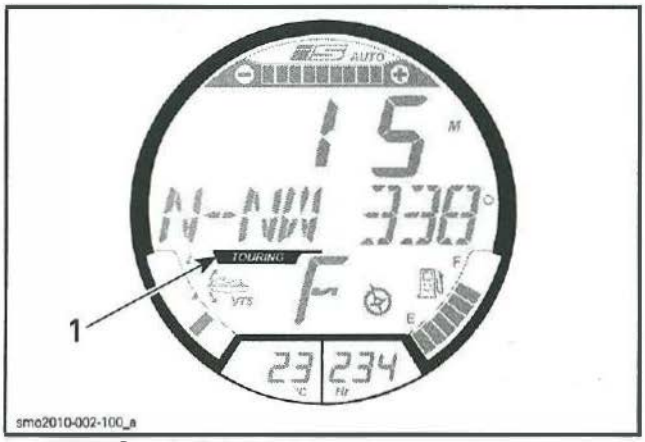
Use the compass as a guide only. Not to be used for precision navigation purposes.



TYPICAL
1. *Compass indication*
2. *Compass active indicator*

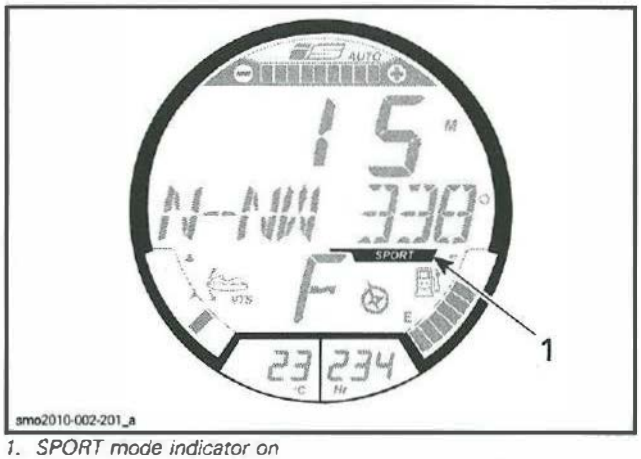
15) Touring Mode Indicator

When the TOURING mode indicator is on, the default TOURING mode is active.



1. *TOURING mode indicator on*

16) Sport Mode Indicator



1. *SPORT mode indicator on*

When the SPORT mode indicator is ON, sport mode has been selected and is active.

NOTE: Sport mode is not the default riding mode. To be active, it must be selected ON after each engine start.

Navigating the Multifunction Display

⚠ WARNING

Do not adjust display while riding, you could lose control.

Selecting Functions

When operating at speed, the multifunction display normally provides an indication of the compass direction and azimuth the watercraft is traveling.

1. To select the various functions available through the multifunction display, press the MODE button repeatedly until the desired function is visible:
2. Press the SET button to enter that function.

NOTE: The available functions and the order in which they appear depends on the watercraft model. The fault code function is only available when there is an active fault. The settings function is only available when the engine is shut off.

FUNCTIONS AVAILABLE THROUGH MULTIFUNCTION DISPLAY	
COMPASS (default function)	DRIVING
LAP TIMER	DISPLAY
SKI MODE	FAULT CODES

FUNCTIONS AVAILABLE THROUGH MULTIFUNCTION DISPLAY	
FUEL ECONOMY MODE	KEY MODE
FUEL CONSUMPTION	SETTINGS
VTS MODE	-

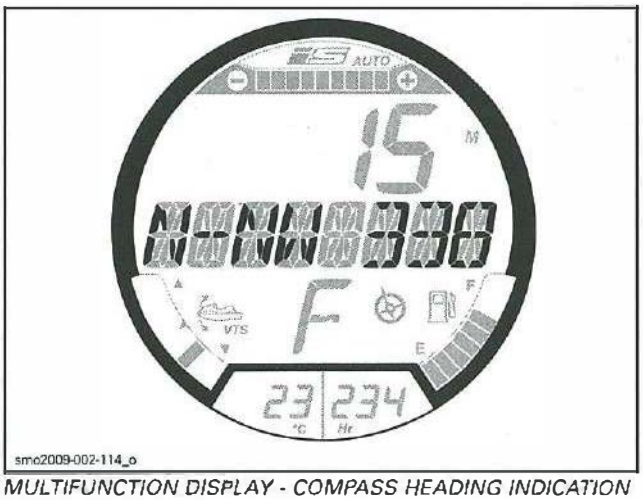
Description of Functions Available Through Multifunction Display

Compass

A GPS incorporated in the information center provides the indication in the multifunction display.

The cardinal points, intermediate cardinal points, as well as the azimuth the watercraft is travelling are displayed in the multifunction display by default when the watercraft is moving.

For a compass indication to be displayed, the GPS must have a good uplink with at least three navigation satellites.



MULTIFUNCTION DISPLAY - COMPASS HEADING INDICATION

NOTE: The compass indication is only available above 5 km/h (3 MPH).

⚠ WARNING

Use the compass as a guide only. Not to be used for precision navigation purposes.

Lap Timer

The lap timer can be used to record up to 50 individual lap times and total lap times.

SKI Mode

SKI mode is used for repeated controlled launches and accurately maintained maximum speed when towing a skier or wakeboarder.

VTS Mode

The VTS mode function is used to change VTS PRESET settings.

DRIVING Mode

The DRIVING mode function is used for activating or deactivating SPORT mode of throttle control.

Display

The DISPLAY function is used to change the indication in the numerical display of the information center.

Fault Codes

The FAULT CODES function can only be used to display active fault codes.

KEY Mode

The KEY mode function is used for changing LEARNING or RENTAL key settings.

Settings

The SETTINGS function is used for:

- Changing clock setting
- DOCK mode function setting
- Activating the iBR override function.

NOTE: The settings function is only available when the engine is shut off.

Fuel Consumption

The approximate watercraft fuel consumption may be displayed in the numerical display 4 different ways:

- Instant fuel flow per hour (gal/h or l/h)
- Average fuel flow per hour (gal/h or l/h)
- Distance to empty (Mi or Km)
- Time to empty (h or min).

Activating Functions Through the Multifunction Display

To activate the following operating modes, refer to *INTELLIGENT THROTTLE CONTROL (ITC)* subsection:

- SPORT mode
- TOURING mode
- SKI mode
- FUEL ECONOMY mode
- KEY mode.

For VTS mode, refer to *iBR AND VTS* subsection.

For DISPLAY modes, refer to *CHANGING NUMERICAL DISPLAY INDICATION* in this subsection.

For FAULT CODES display function, refer to *DIAGNOSTIC AND FAULT CODES* subsection.

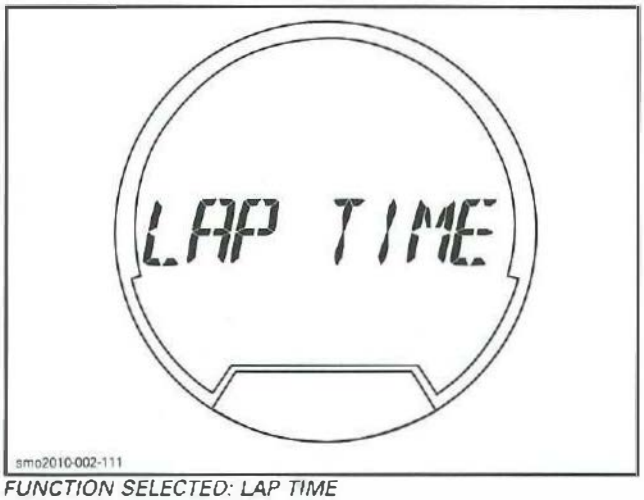
For the SETTINGS function:

- To change clock setting, refer to *MULTIFUNCTION GAUGE SETUP* in this subsection.
- To access the iBR override function, refer to *iBR AND VTS* subsection.
- To access the DOCK mode function setting, refer to *SUSPENSION (iS)*.

Lap Timer

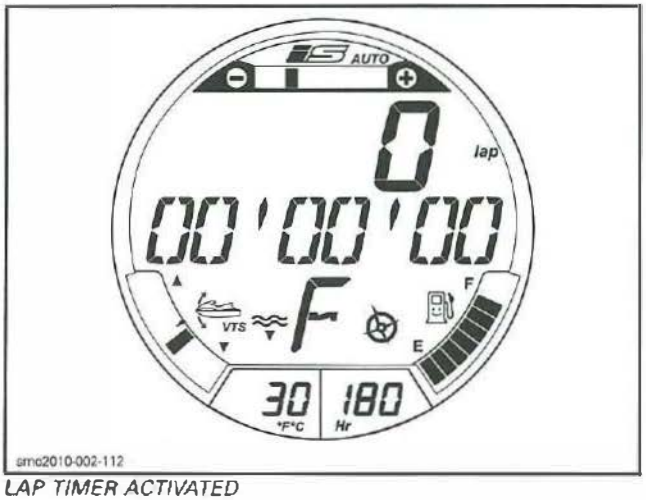
To activate and use the lap timer, carry out the following:

1. Press the MODE button repeatedly until LAP TIME is visible in the multifunction display.



FUNCTION SELECTED: LAP TIME

2. Press the SET button to enter the function, the lap timer will be activated and visible in the display.



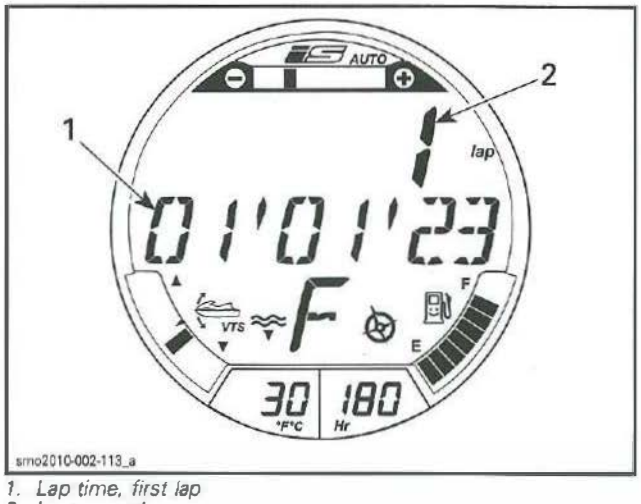
LAP TIMER ACTIVATED

3. To start the timer, press the SET button.

NOTE: The timer starts immediately when pressing the SET button.

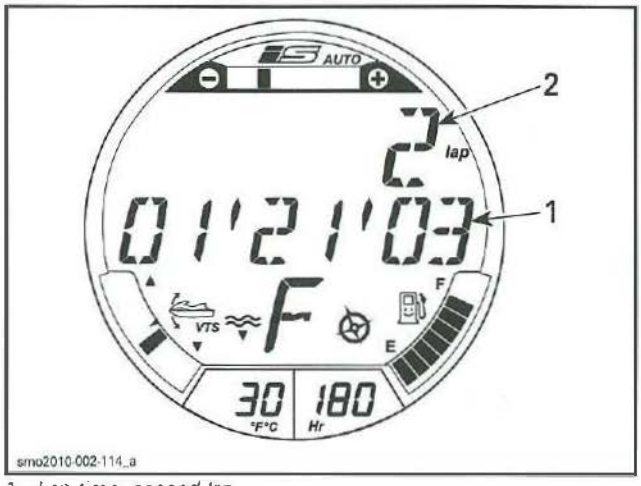
4. To record each lap time, press the SET button at the start of each lap.

NOTE: The lap time will be recorded, the lap counter in the numerical display will count the number of laps recorded, and the timer will continue to run.



1. Lap time, first lap
2. Lap count 1

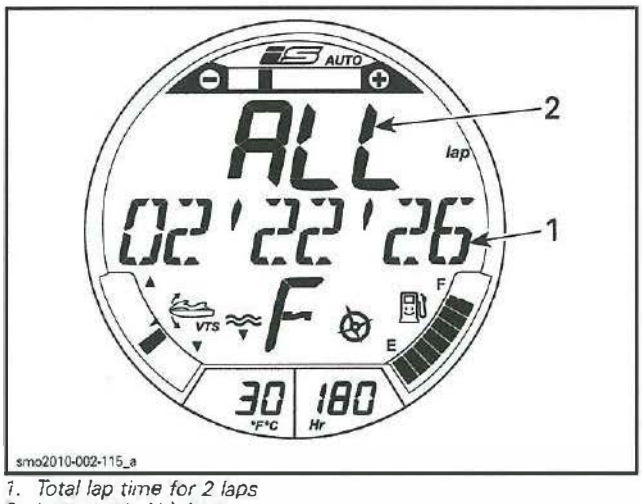
5. To save the last lap and stop the timer, press the MODE button.



1. Lap time, second lap
2. Lap count 2

To view each lap time, use the UP or DOWN arrow button. The lap counter will indicate which lap is indicated.

To view the cumulative lap time of all laps recorded, use the UP or DOWN arrow button until ALL is visible in the lap counter.



1. *Total lap time for 2 laps*
2. *Lap count, ALL laps*

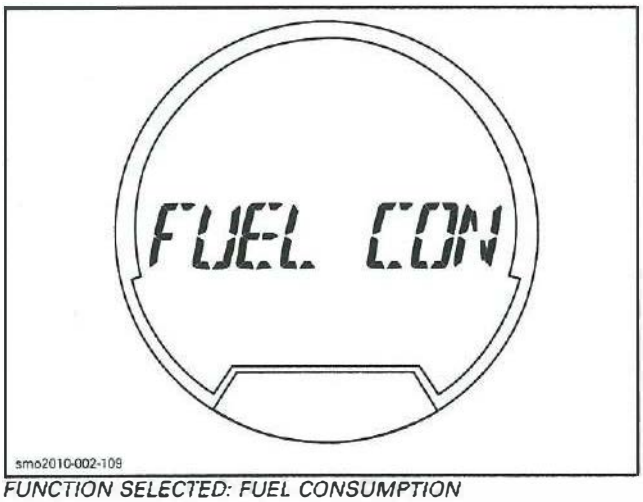
To reset the lap timer and lap counter, press and hold the SET button until the timer and counter are reset to 0 (zero).

Fuel Consumption Display

NOTE: The fuel consumption functions **are not** continuously active. They **do not** record in the background. The desired fuel consumption function becomes active **only** when selected as the indication in the numerical display.

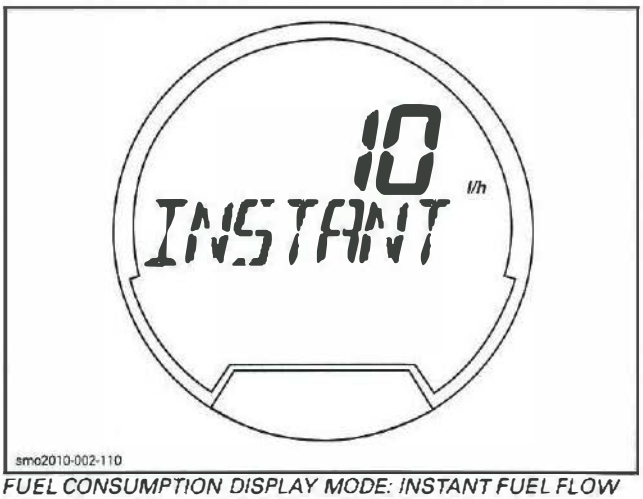
To view the watercraft fuel consumption, carry out the following:

1. Press the MODE button repeatedly until the FUEL CONSUMPTION is visible in the multifunction display.



FUNCTION SELECTED: FUEL CONSUMPTION

2. Press the UP or DOWN arrow button to select the desired fuel consumption display mode.



FUEL CONSUMPTION DISPLAY MODE: INSTANT FUEL FLOW

3. Press the SET button to save the setting and return to the main display.

NOTE: The fuel consumption value will be displayed in the numerical display. Double click the SET button to reset the average fuel consumption indication. The display will momentarily indicate zero (0).

Multifunction Display Messages

The following is a list of usual messages that may be displayed in the multifunction display. Displayed messages are subject to the functions as applicable to watercraft model.

USUAL MESSAGES	
WELCOME ABOARD SEA-DOO	Power up display
NORMAL KEY	Normal key detected
LEARNING KEY	Learning key detected
RENTAL KEY	Rental key detected
DISPLAY	Display menu for numerical display indication
DEPTH	Water depth indication selection
RPM	RPM indication selection
SPEED	Watercraft speed indication selection
ENGINE TEMP	Engine temp selection
LAKE TEMPERATURE	Lake temperature indication selection
ALTITUDE	Altitude selection (from GPS)
TOP SPEED	Top speed selection

USUAL MESSAGES	
AVG SPEED	Average speed selection
TOP RPM	Maximum RPM selection
AVG RPM	Average RPM selection
FUNCTION CANNOT BE ENGAGED	Message when system cannot enter a specific function
CLOCK	Clock function
CHANGE CLOCK OFFSET	Clock setting function
FUEL CONSUMPTION	Menu for selecting fuel consumption display
INSTANT FUEL FLOW	Used to display instantaneous fuel consumption
AVERAGE FUEL FLOW	Used to display average fuel consumption since last reset
DISTANCE TO EMPTY	Display distance available based on fuel remaining in tank and instant fuel consumption
TIME TO EMPTY	Display time to empty based on fuel remaining in tank and instant fuel consumption
VTS MODE	VTS preset menu
PRESET 1	For changing PRESET 1
PRESET 2	For changing PRESET 2
FAULT CODE	Fault code menu for viewing codes
KEY MODE	KEY mode menu
L-KEY	For changing learning key setting
R-KEY	For changing rental key setting
SETTINGS	For accessing DOCK mode, iBR-OVR, and CLOCK settings
DOCK MODE	DOCK mode function menu
DOCK MODE OFF	DOCK mode disable
DOCK MODE AUTO	DOCK mode enable
DOCK MODE ON	Suspension moving to DOCK position
iBR-OVR	iBR mode function menu

USUAL MESSAGES	
OVR OFF	iBR-OVR function disable
OVR ON	iBR-OVR function enable
SLOW SPEED MODE ACTIVE	Slow speed mode acknowledgement
AUTOMATIC SUSPENSION	Automatic suspension acknowledgement
MANUAL SUSPENSION	Manual suspension acknowledgement
DRIVING MODE	Menu for selecting between TOURING mode and SPORT mode
ENTERING SPORT MODE - INCREASED ACCELERATION - INSTRUCT PASSENGERS TO HOLD ON - PRESS SET BUTTON	Message when SPORT mode is selected
SPORT MODE ACTIVATED	Message when SPORT mode is activated
SPORT MODE - RETURN TO IDLE TO ACTIVATE	Message when SPORT mode cannot be activated, engine not at idle
SPORT MODE ACTIVE - PRESS SET TO DISENGAGE	Message when driver requests returning to TOURING mode
SPORT MODE ACTIVE - RETURN TO IDLE TO CANCEL	Message when SPORT mode is in use
SPORT MODE DEACTIVATED	Message when user first returns to TOURING mode
SKI MODE	WAKE and SKI function
PLEASE EXIT SKI MODE FIRST	Message when a rider attempts to enter CRUISE mode when already in SKI mode
PLEASE EXIT SLOW SPEED MODE FIRST	Message when a rider attempts to enter SKI mode when already in SLOW SPEED mode
RAMP	Ramp curve or level of acceleration from 1 to 5
TARGET SPEED	Speed requested for SKI mode
SKI MODE - PRESS SET TO START OR MODE TO EXIT	SKI mode is unarmed but ready, the PWC is at idle

USUAL MESSAGES	
SKI MODE ARMED - RETURN TO IDLE OR PRESS MODE TO CANCEL	SKI mode is ready but the PWC is not at idle, the system is at standby
SKI MODE ACTIVE - PRESS MODE AND RETURN TO IDLE TO CANCEL	Message scrolling when SKI mode is active
SKI MODE - SPEED ADJUSTING	Message scrolling when adjusting SKI mode speed setting
SKI MODE ACTIVE - RETURN TO IDLE TO CANCEL	Message scrolling when the user pressed MODE to disengage but didn't return to idle
LAP TIME	Lap timer function
FUEL ECONOMY MODE	Menu option for selecting FUEL ECONOMY MODE
FUEL ECONOMY MODE - HOLD SET TO ACTIVATE OR MODE TO EXIT	FUEL ECONOMY MODE is selected, scrolling instruction for activation
FUEL ECONOMY MODE - HOLD SET TO DEACTIVATE OR MODE TO EXIT	FUEL ECONOMY MODE is active, scrolling instruction for deactivation
SLOW SPEED MODE ACTIVE	Message when SLOW SPEED mode is in operation
SLOW SPEED MODE ACTIVATED	Message when SLOW SPEED mode is selected
SLOW SPEED MODE - SPEED ADJUSTING	Message scrolling when adjusting slow speed TARGET speed setting
PLEASE EXIT SLOW SPEED MODE FIRST	Message scrolling if SLOW SPEED mode is still active when trying to engage CRUISE mode
CRUISE MODE ACTIVE	Message when CRUISE mode is in operation
CRUISE MODE ACTIVATED	Message when CRUISE mode is selected

USUAL MESSAGES	
CRUISE - SPEED ADJUSTING	Message scrolling when adjusting cruise TARGET speed setting
PLEASE EXIT CRUISE MODE FIRST	Message scrolling if CRUISE mode still active when trying to engage SLOW SPEED mode
LOW FUEL	Message when approximately 25% fuel remaining

The following is a list of messages related to a malfunction that may be displayed in the multi-function gauge. Displayed messages are subject to functions as applicable to watercraft model.

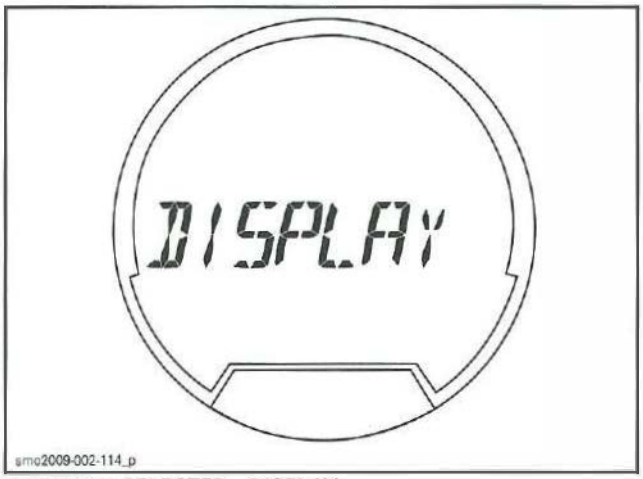
FAULT MESSAGES	
RIGHT KEYPAD ERROR	MODE/SET, UP/DOWN arrow button malfunction
LOW OIL PRESSURE	Engine low oil pressure detected
HIGH EXHAUST TEMPERATURE	High exhaust temperature detected
HIGH TEMPERATURE	High engine temperature detected
CHECK ENGINE	Engine system malfunction or maintenance required
HIGH BATTERY VOLTAGE	High battery voltage detected
LOW BATTERY VOLTAGE	Low battery voltage detected
LIMP HOME MODE	Major fault detected, engine power limited
FUEL SENSOR DEFECTIVE	Fuel level sensor fault
WATER TEMP SENSOR DEFECTIVE	Problem in iBR, not sending water temperature info.
CALIBRATION CHECKSUM ERROR	Cluster programming corrupted, need to be re-flashed using B.U.D.S.
MAINTENANCE REQUIRED	Watercraft maintenance required
SUPERCHARGER MAINTENANCE REQUIRED	Maintenance on supercharger required

FAULT MESSAGES	
DEPTH SOUNDER MODULE COMMUNICATION PROBLEM	Error message if depth sounder is disconnected while riding
iS MODULE COMMUNICATION PROBLEM	Error message if communication with the suspension module is lost while riding
iBR MODULE ERROR	Error message if communication with the iBR module is lost while riding
FUNCTION CANNOT BE ACTIVATED	Message when a function is not or cannot be properly activated

Changing Numerical Display Indication

To change the indication in the numerical display, carry out the following:

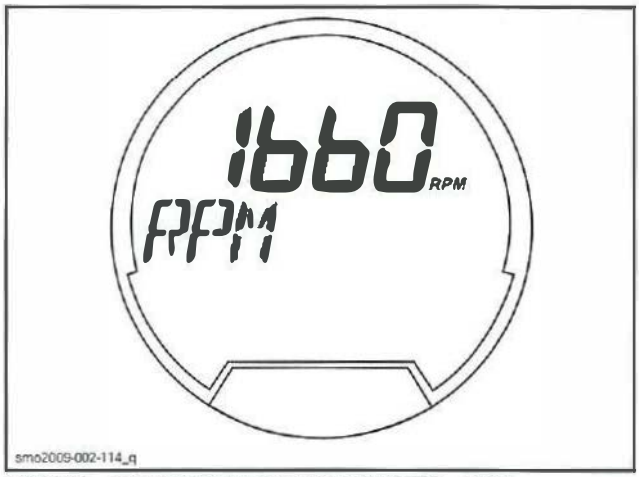
1. Press the MODE button on the RH handlebar repeatedly until DISPLAY is visible in the multi-function display.



FUNCTION SELECTED - DISPLAY

2. Press the SET button to enter the DISPLAY function.
3. Press the UP or DOWN arrow button until the preferred indication appears.
   - RPM
   - SPEED
   - LAKE TEMPERATURE
   - DEPTH
   - ENGINE TEMP (RXT-X)
   - ALTITUDE (GTX LTD iS)
   - TOP SPEED (RXT-X)
   - AVG SPEED (RXT-X)
   - TOP RPM (RXT-X)
   - AVG RPM (RXT-X)
   - CLOCK.

NOTE: The DEPTH selection is only available if a depth sounder is installed.



TYPICAL - NUMERICAL DISPLAY SELECTED - RPM

4. Press the SET button to select and save the preferred indication, or wait for the display function to time out. The last indication visible will be automatically saved.

The following abbreviations are used in the numerical display:

- FT or M
- RPM
- MPH or Km/h
- °F or °C
- AM or PM
- Gal/h or l/h.

Resetting Numerical Display Indication

The following numerical display indications can be reset:

- Average fuel consumption
- Top speed
- Average speed
- Top RPM
- Average RPM.

To reset indications, double click the SET button. The numerical display will momentarily indicate zero (0).

NOTE: Each of these functions become active ONLY when selected as the numerical display indication. They do not record in the background.

TROUBLESHOOTING

DIAGNOSTIC TIPS

NOTE: It is a good practice to check for fault codes using B.U.D.S. software as a first troubleshooting step. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

IMPORTANT: When troubleshooting an electrical system fault, check battery condition, cables and connections first.

Electrical System Activation

1. Press the START/STOP button.

NOTE: Pressing the START/STOP button without the tether cord (D.E.S.S. key) installed on the engine cut-off switch will turn on electrical power without starting the engine; the information center will cycle through a self-test function and shut off its display after a few seconds. However, the electrical system will stay powered up for approximately three minutes after the START button was pressed.

2. Install the tether cord on the engine cut-off switch to activate ECM and Information Center when testing procedures require a component or system to be supplied with electrical power.

IMPORTANT: When B.U.D.S. is being used, the ECM will stop communicating with B.U.D.S. approximately 3 minutes after the START button is pressed. Therefore, operations with B.U.D.S. will be interrupted. To reestablish communication, briefly press the START button. Do not hold the START button to avoid engine starting.

Circuit Testing

Check the related-circuit fuse condition with a fuse tester or ohmmeter (a visual inspection could lead to a wrong conclusion).

Electrical Connection Inspection

When replacing an electric or electronic component, always check electrical connections. Make sure they are tight, make good contact, and are corrosion-free. Dirty, loose or corroded contacts are poor conductors and are often the source of a system or component malfunction.

Pay particular attention to ensure that pins are not bent or pushed out of their connectors.

Ensure all wire terminals are properly crimped on wires, and connector housings are properly fastened.

Check for signs of moisture, corrosion or dullness. Clean pins properly and coat them with DIELECTRIC GREASE (P/N 293 550 004) or other appropriate lubricant when reassembling them, except if otherwise specified such as for the ECM connectors.

Pay attention to ground wires.

TROUBLESHOOTING GUIDELINES

Press the START/STOP button and install the tether cord on the engine cut-off switch.

NOTE: Information center should come on, cycle through its self test function, and stay on for approximately 3 minutes after which all electrical power will turn off.

Briefly press the START/STOP button every 3 minutes to reenergize the electrical system. Do not hold the START/STOP button to avoid engine starting.

NOTE: When troubleshooting using the following guidelines, it is important to remember that some indications, functions and features described may not apply to every PWC model, or may be available as an option.

Information Center "Does Not Turn ON"

If the information center does not turn ON when the START/STOP button is pressed, the power circuit or ground circuit to the information center is probably open.

iS Models

Double click the iS button to move the suspension to the up position. If the suspension does not move to the up position, the problem is related to the electrical power system. Refer to *POWER DISTRIBUTION AND GROUNDS* subsection.

If the suspension moves to the up position, the electrical power system is functioning normally.

All Models

Test the 3 A GAUGE/OTAS/CAPS fuse (fuse 12) in fuse box 1 (FB1).

If the fuse tests good, carry out an *INFORMATION CENTER INPUT VOLTAGE TEST.*

If the information center input voltage test is good, test for continuity of the gauge ground circuit (gauge connector pin 11 (BLACK wire) to the ground bus-bar (pin H7) in FB1.

Refer to *WIRING DIAGRAM* for circuit details.

Information Center Turns ON with Some Indications Missing

1. Connect to the latest applicable B.U.D.S. version, refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Read the fault codes, refer to *DIAGNOSTIC AND FAULT CODES* subsection.

If a fault code is related to a communication problem, carry out a continuity test of the CAN bus wires between the applicable module and the CAN bus-bars in FB1. Refer to *WIRING DIAGRAM* and *CONTROLLER AREA NETWORK (CAN)* subsections.

NOTE: The information center, ECM, iS module, iBR module, and the diagnostic connector are linked together through CAN bus-bars in fuse box 1. If one wire of the two wire CAN bus system is open, communication will be slower than normal. Multiple fault codes may be generated and the ECM will put the watercraft in LIMP HOME mode.

If one module cannot be seen in B.U.D.S., the fault may be the wires that link the module to the CAN bus bars, or a problem internal to that module. Test the CAN bus wires from the faulty module to the CAN bus-bars in FB1 for continuity before assuming the problem is the module.

Information Center Goes Blank except for:

- GPS indicator ON
- Compass ON (if watercraft moving)
- Fuel level ON
- iBR fault indicator light ON
- Indicated speed
- No other indications visible.

NOTE: GPS, compass and iBR indications are not applicable to GTS models.

There is no communication between the information center and all other modules (ECM, iS, iBR).

Carry out a continuity check of the CAN bus wires from the CAN bus-bars in FB1 to the information center (pins 2 and 3). Refer to the *WIRING DIAGRAM* and *CONTROLLER AREA NETWORK (CAN)* subsections for details.

If an open circuit is detected, carry out same test from the pin steering connector (pins 8 and 20).

All Indications ON Except for:

All Models Except GTS
- LAKE WATER TEMP indication
- VTS indication
- iBR position indication
- CHECK ENGINE light is on.

NOTE: The lake water temperature indication is not available for the GTI Series and WAKE models.

The iBR CAN bus circuit is open or the iBR module is at fault.

NOTE: The ECM will generate several fault codes and engage LIMP HOME mode.

Carry out a continuity check of the CAN bus wires from the CAN bus-bars in FB1 to the iBR module (pins 2 and 3). Refer to the *WIRING DIAGRAM* and *CONTROLLER AREA NETWORK (CAN)* subsections for details.

NO RPM Indication and NO Engine Hour Display

If there is NO RPM indication and NO engine hour display, and the watercraft is in LIMP HOME mode, the CAN bus to the ECM is open.

Carry out a continuity check of the CAN bus wires from the CAN bus-bars in FB1 to the ECM module, connector "B" pins C1 and C2 (B-C1 and B-C2). Refer to the *WIRING DIAGRAM* and *CONTROLLER AREA NETWORK (CAN)* subsections for details.

NO iS Position Display

If there is no iS position display (suspension position), the iS module is at fault, or its CAN bus circuit is open.

Carry out a continuity check of the CAN bus wires from the CAN bus-bars in FB1 to the iS module (pins 2 and 3). Refer to the *WIRING DIAGRAM* for details.

NOTE: If communication with the iS module cannot be established when electrical power is first applied, the monitoring system assumes this is a normal situation (PWC not equipped with iS) and will not display an error message.

NO Fuel Level Indication

If there is no fuel level indication, test the fuel level sensor and its wiring circuit to the information center. Refer to *FUEL TANK AND FUEL PUMP* subsection.

NO Depth Gauge Indication

If there is no depth gauge indication available and the depth sounder active indicator is not on, refer to *DEPTH GAUGE* in this subsection.

NOTE: If communication with the depth sounder cannot be established when electrical power is first applied, the monitoring system assumes this is a normal situation (PWC not equipped with depth finder) and will not display an error message.

NO Speed or Compass Indication

All Models Except GTS

To obtain a speed or compass reading and to turn on the GPS indicator, the GPS requires a good uplink to at least three navigation satellites.

If there is no speed or compass indication, look for the GPS indicator icon. If the GPS indicator is off, either the GPS cannot uplink with the satellites, or the GPS system in the information center is at fault.

If another watercraft nearby displays a good GPS uplink (GPS indicator light on in cluster), the information center may need to be replaced.

NOTE: If the GPS uplink is lost while navigating at speed, the speedometer will provide an estimated speed indication based on other parameters. The compass indication will not be available until a good satellite uplink is reestablished.

Speed and Compass Indication Slow to Come ON

All Models Except GTS

When initially powering up the watercraft and driving away, the speed and compass indications may be slow to come on. This is normal as the GPS requires time to establish an uplink with the navigation satellites (cold start).

If the watercraft was run long enough to display the compass and speed indications, shut down for a short period of time and then restarted (hot start), the speed and compass indications should not take more than 30 seconds to come on.

If the speed and compass indications take more than 30 seconds to come on, test for the following:

- GPS fuse 4 in FB1
- Battery voltage at pin 1 of the information center
- Continuity of wire between information center (pin 1) and contact A5 of FB1.

NOTE: This circuit provides 12 Vdc to the GPS in the information center so that it memorizes the satellites it was linked to for a period of two hours. This allows the indications to be available within a few seconds of restarting the watercraft (hot start). After a two hour period, the GPS will have to reestablish new satellite links.

Beeper Does Not Function

The beeper is incorporated within the information center.

If no beep code is heard when installing the tether cord, first ensure ECM is powered. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

In B.U.D.S., carry out the following:

- Cluster Buzzer Test on the cluster activation page
- Check for fault codes. Carry out service actions as applicable.

If the Cluster Buzzer Test failed, the ECM is powered, and the ECM and information center are communicating properly through the CAN bus, replace the information center.

PROCEDURES

INFORMATION CENTER

Information Center Self Test Function

When the START/STOP button is pressed momentarily and the vehicle powers up, all LCD segments and indicator lights in the information center will turn ON for 3 seconds (self test function). This self test function allows the driver time to ensure that all indications are functioning properly.

It also validates the information centers internal circuits, however, this does not validate proper operation of the individual external circuits and sensors that provide inputs to the information center.

If a system fault is detected by the ECM, the applicable message and/or indicator light will be displayed, and a beep code may be heard.

If the tether cord is not installed, the indications in the information center will shut off a few seconds after the self test function, but the electrical system power stays on for approximately 3 minutes. Installing the tether cord on the engine cut-off switch will turn the indications back on.

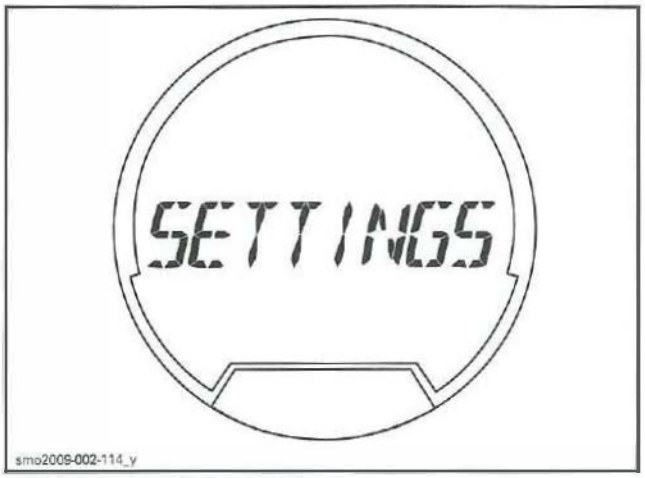
NOTE: If the START/STOP button is pressed and held without the tether cord installed, the information center will stay on as long as the START button is held.

Multifunction Gauge Setup

Clock Setting

All Models Except GTS

1. Press the MODE button repeatedly until SETTINGS is visible in the multifunction display.



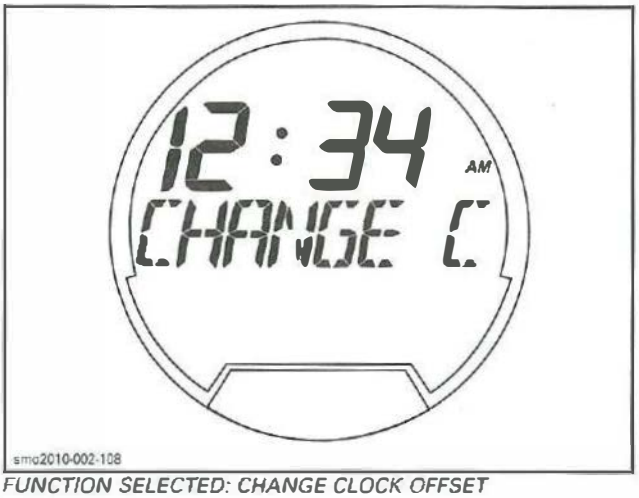
FUNCTION SELECTED: SETTINGS

2. Press the UP or DOWN arrow button repeatedly until CLOCK is visible.



FUNCTION SELECTED: CLOCK

3. Press the SET button to enter the function. CHANGE CLOCK OFFSET message will be displayed.



FUNCTION SELECTED: CHANGE CLOCK OFFSET

4. Press the UP or DOWN arrow button to adjust the clock to the correct local time.
5. Press the SET button to save the setting and return to the main display.

NOTE: The clock uses the GPS signal to maintain the appropriate time referenced to Greenwich Mean Time (GMT). When setting the clock, only the hour digits may be changed. For the clock to function, the GPS requires a good satellite uplink.

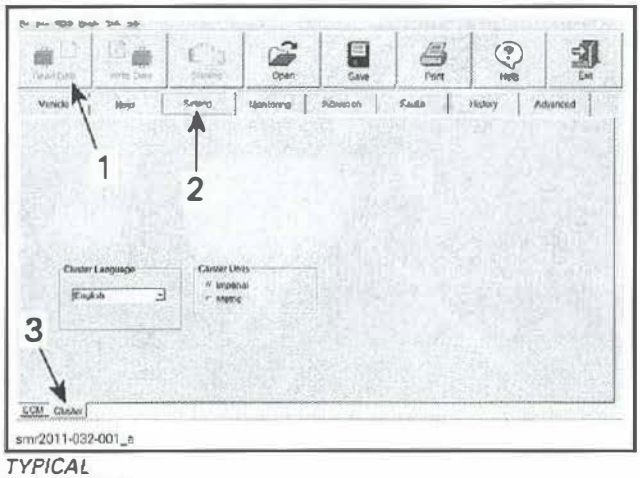
Units of Measurement and Language Setting

1. Connect vehicle to the latest applicable B.U.D.S. version, refer to the *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Press the START/STOP button to energize the electrical system.

NOTE: You will need to press the START button every three minutes or the electrical system will shut off.

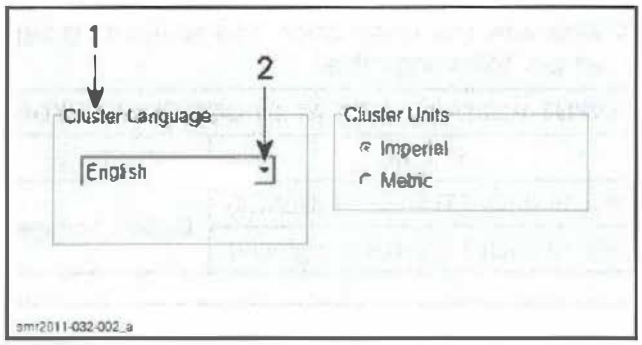
3. Select the Read Data button.
4. Choose the **Setting** tab at the top of the page.

At the bottom LH side of the setting page, select the **Cluster** tab.



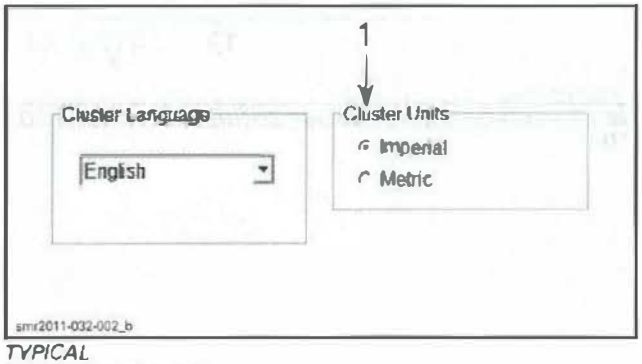
TYPICAL
1. Read Data
2. Setting tab
3. Cluster tab

In the Cluster Language field, choose the desired unit of language.



TYPICAL
1. Cluster Language field
2. Click on this arrow to expand list of available languages

In the Cluster Units field, choose the desired unit of measurement, Imperial or Metric.



TYPICAL
1. Cluster Units field

Clearing the Maintenance Reminder Indicators

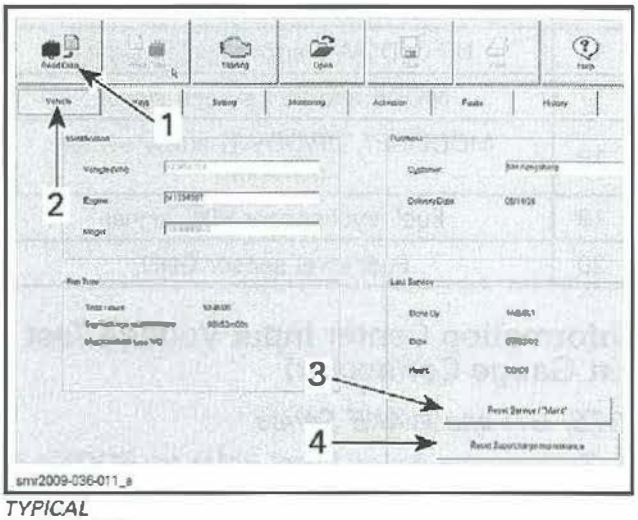
When the watercraft, engine or supercharger are due for maintenance, the maintenance reminder indicator will come on, and a scrolling MAINTENANCE REQUIRED or SUPERCHARGER MAINTENANCE REQUIRED message will scroll in the digital screen. These maintenance reminders must be cleared using B.U.D.S.

1. Connect vehicle to the latest applicable B.U.D.S. version, refer to the *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Press the START/STOP button to energize the electrical system.

NOTE: You will need to press the START button every three minutes or the electrical system will shut off.

3. Select the Read Data button.
4. Choose the Vehicle tab at the top of the page.
5. At the bottom RH side of the vehicle page in the Last Service field, choose Reset Service/"Maint" or Reset Supercharger Maintenance button as applicable.

NOTE: If the supercharger maintenance was carried out before the reminder appeared in the information center, the supercharger maintenance reminder must be reset in order to reset the supercharger maintenance hour counter and prevent the reminder from appearing prematurely.



TYPICAL
1. Read Data
2. Vehicle tab
3. Reset Service/"Maint" button
4. Reset Supercharger Maintenance button

Information Center Pin-Out

NOTE: Depending on watercraft model and installed accessories, some multifunction gauge connector pins may not be used.

INFORMATION CENTER PIN-OUT	
PIN NO.	FUNCTION
1	GPS back-up power
2	CAN HI
3	CAN LOW
4	Spare (buzzer external GND)
5	Spare (buzzer external GND)
6	Not used
7	Cruise switch signal Vdc (SET switch for GTS models)
8	Spare (digital input)
9	Not used
10	Cruise switch ground (SET switch for GTS models)
11	Gauge GND
12	Gauge input Vdc power
13	VTS switch signal (UP or DOWN)
14	iS switch signal (UP or DOWN)
15	VTS and iS switch common
16	UP or DOWN arrow switch signal
17	MODE and SET switch signal
18	MODE/SET, UP/DOWN arrow switch common
19	Fuel level sensor VDC signal
20	Fuel level sensor GND

Information Center Input Voltage Test (at Gauge Connector)

GTS, GTI and WAKE Series

1. Remove the gauge bezel, refer to *BODY* subsection.

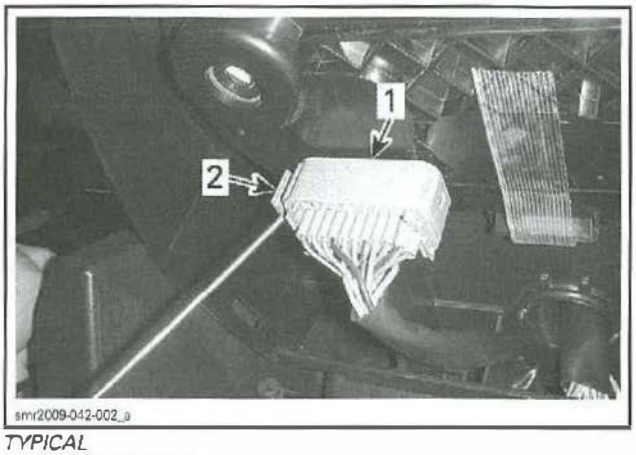
RXT, GTX and WAKE Pro Series

2. Remove the gauge support cover, refer to *INFORMATION CENTER REMOVAL* in this subsection.

All Models

3. Disconnect the gauge connector.

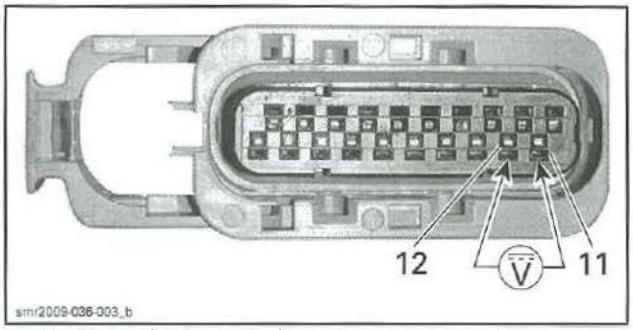
NOTICE **Pull on connector with your hand as you pull the connector lock out with the screwdriver. Do not twist the screwdriver.**



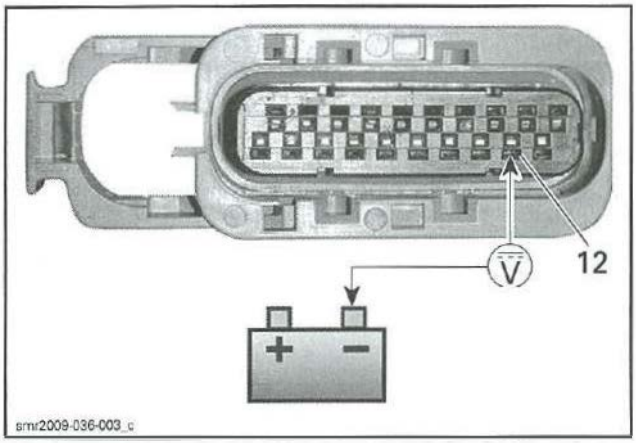
TYPICAL
1. *Gauge connector*
2. *Pull out to unlock connector*

4. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc.
5. Press the START button and install the tether cord on the engine cut-off switch.
6. Measure the information center input voltage as per following table.

INPUT VOLTAGE TEST AT GAUGE CONNECTOR		
PROBE		VOLTAGE
Pin 12 (VIOLET)	Pin 11 (BLACK)	Battery voltage
Pin 12 (VIOLET)	Battery ground	



INPUT VOLTAGE TEST AT GAUGE CONNECTOR (PINS 12 TO 11)



INPUT VOLTAGE TEST AT GAUGE CONNECTOR (PIN 12 TO BATTERY GROUND)

If battery voltage is measured as specified, replace the information center.

If battery voltage is measured to battery ground but not to pin 11, carry out a *CONTINUITY TEST OF GAUGE GROUND WIRE* circuit from the gauge connector to the ground bus-bar contact in FB1 as described further in this subsection.

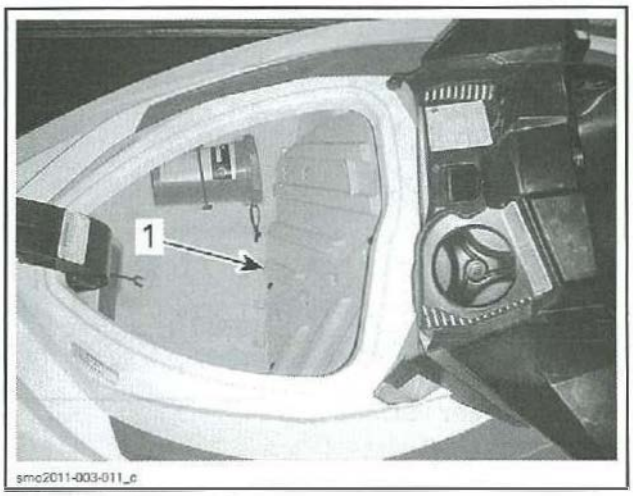
7. If battery voltage is not measured at the gauge connector, carry out a *INFORMATION CENTER INPUT VOLTAGE TEST (AT STEERING CONNECTOR).*

Information Center Input Voltage Test (at Steering Connector)

1. Open front storage compartment cover.

GTS, GTI Series and Wake

2. Remove battery access panels.



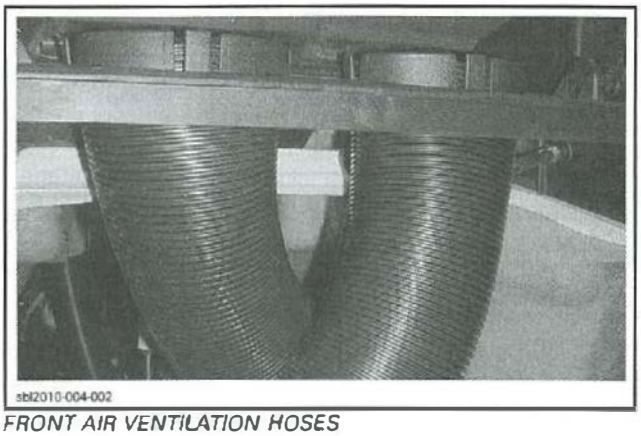
1. Battery access panels

RXT, GTX and WAKE Pro Series

3. Remove front storage bin.

RXT and GTX Models Without iS or aS

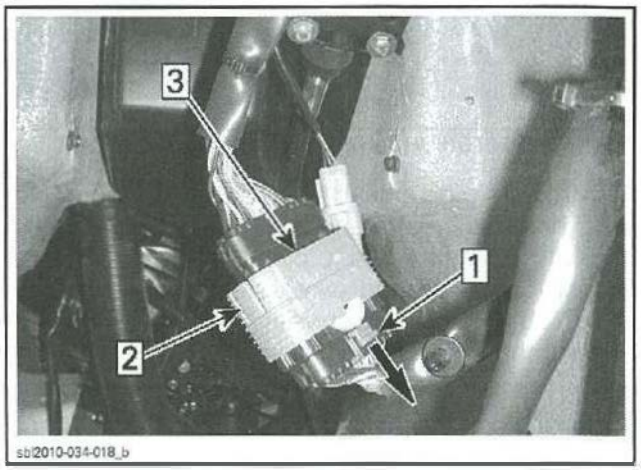
4. Reach into the front storage compartment and remove the front air ventilation hoses.



FRONT AIR VENTILATION HOSES

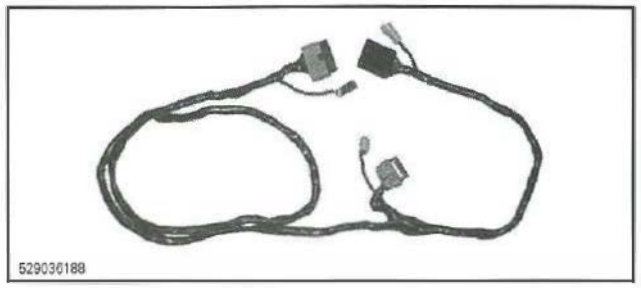
All Models

5. From under the steering support area, disconnect the 24-pin steering connector.



TYPICAL - DISCONNECT 24-PIN STEERING CONNECTOR
Step 1: Pull out safety lock
Step 2: Press in on release tab
Step 3: Pull locking collar down

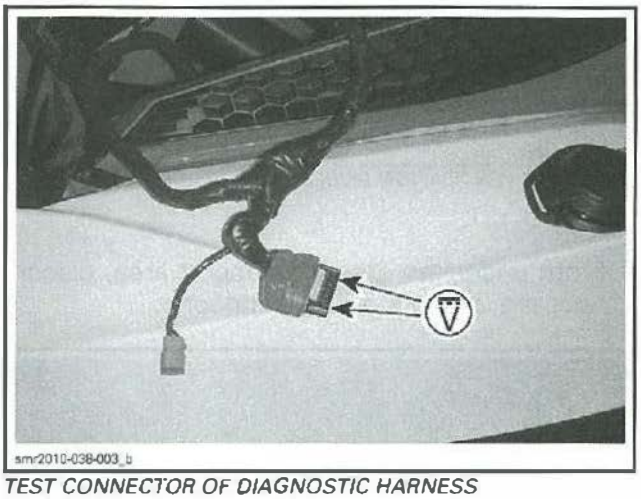
6. Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) to make an in-line connection between the disconnected connectors.



7. Press the START/STOP switch and install the tether cord on the engine cut-off switch.

8. Carry out an input voltage test at the steering connector (vehicle harness side) as per following table.

INFORMATION CENTER INPUT VOLTAGE TEST (STEERING CONNECTOR)		
TEST CONNECTOR ON DIAGNOSTIC HARNESS		VOLTAGE
Pin 24 (VIOLET)	Pin 1 (BLACK)	Battery voltage
Pin 24 (VIOLET)	Battery ground	



TEST CONNECTOR OF DIAGNOSTIC HARNESS

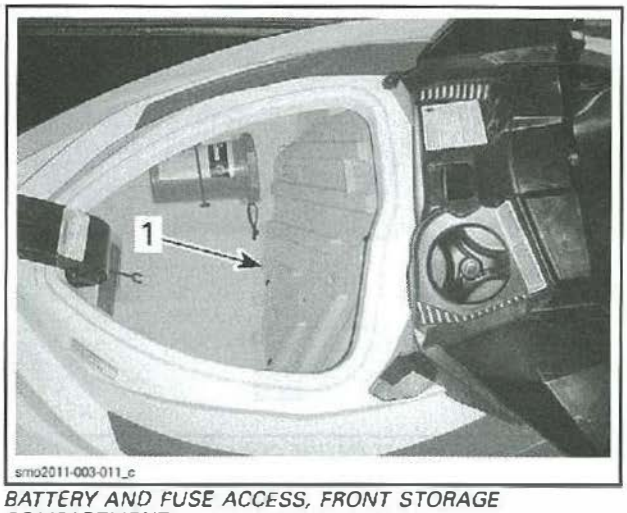
If battery voltage is read at steering connector (vehicle harness side) as specified in previous table, but was not measured to pin 11 at the gauge connector (gauge ground wire), repair or replace the BLACK ground wire between the gauge connector and the steering connector.

If battery voltage is measured to battery ground but not to pin 1, carry out a *CONTINUITY TEST OF GAUGE GROUND WIRE* described further in this subsection.

If no voltage is measured, carry out the following steps.

GTS, GTI and WAKE Models

9. Remove the battery access panel at the back of the storage compartment.



BATTERY AND FUSE ACCESS, FRONT STORAGE COMPARTMENT
1. Battery access panel

iS and aS Models

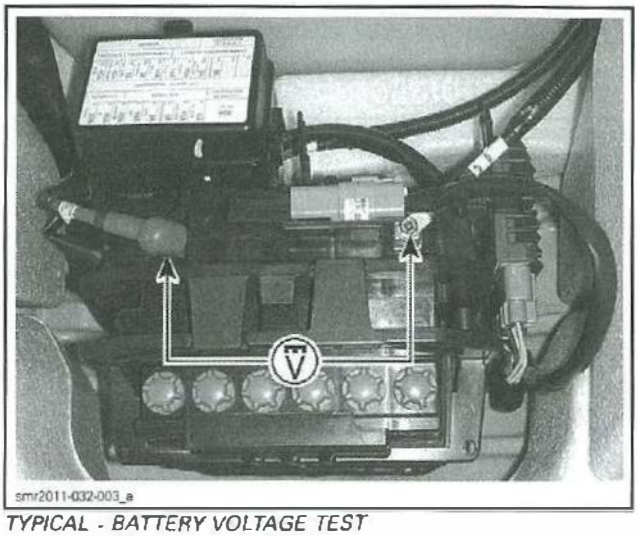
10. Open the boarding platform and remove the RH storage bin.

RXT, GTX and Wake Pro Models Without iS or aS

11. Remove the RH access panel on the boarding platform.

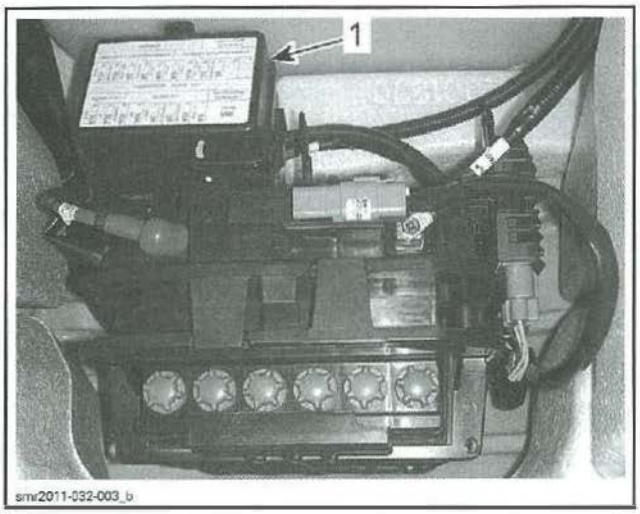
All Models

12. Using the FLUKE 115 MULTIMETER (P/N 529 035 868) set to Vdc, measure battery voltage at the battery terminals.



TYPICAL - BATTERY VOLTAGE TEST

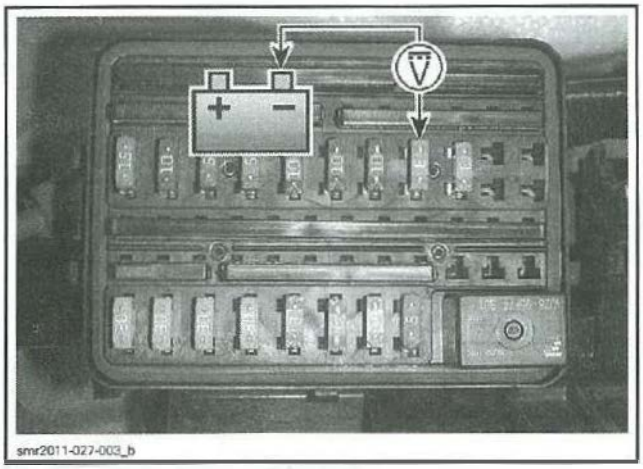
13. Remove fuse box cover.



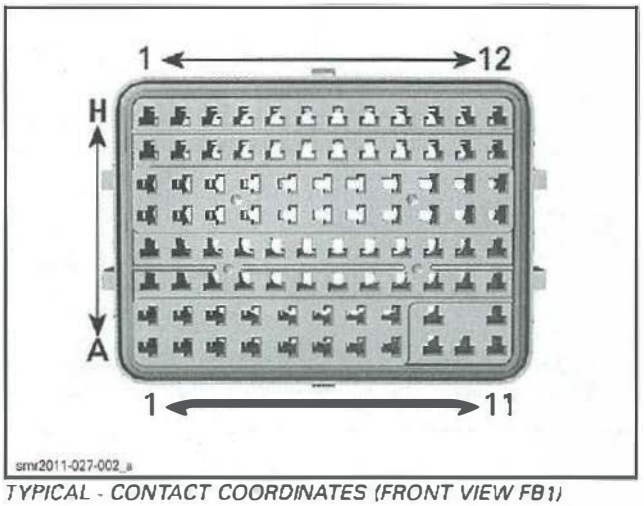
1. Fuse box cover

14. Press the START/STOP button to energize electrical system and install the tether cord.
15. Test for battery voltage between each of the terminals atop the GAUGE/OTAS/CAPS fuse (12) and battery ground as per following table.

VOLTAGE TEST AT FB1			
GAUGE FUSE	TEST PROBES		READING
Fuse pin numbers	E8	Battery (-) post	Battery Vdc
	F8		



VOLTAGE TEST AT FUSE CONTACTS



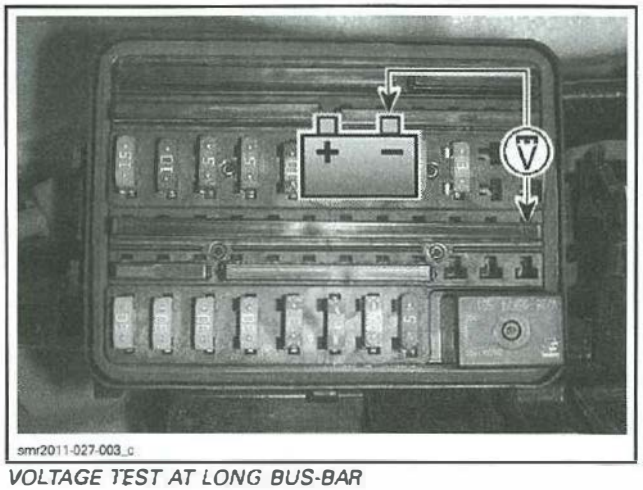
TYPICAL - CONTACT COORDINATES (FRONT VIEW FB1)

If battery voltage is measured at E8 but not at F8 (with fuse installed), replace the fuse.

If battery voltage is measured at fuse contact E8, refer to *CONTINUITY TEST OF GAUGE POWER WIRE* in this subsection.

If no voltage is measured at fuse contact E8, slightly lift one corner of the long bus-bar (12 contacts long).

16. Measure for battery Vdc between the bus-bar and battery ground.



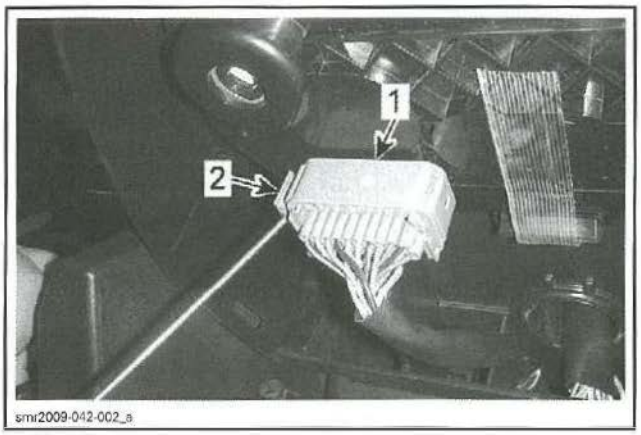
VOLTAGE TEST AT LONG BUS-BAR

If battery voltage is measured at the long bus-bar, repair or replace the wire jumper D8 to E8 (behind fuse box).

Continuity Test of Gauge Power Wire

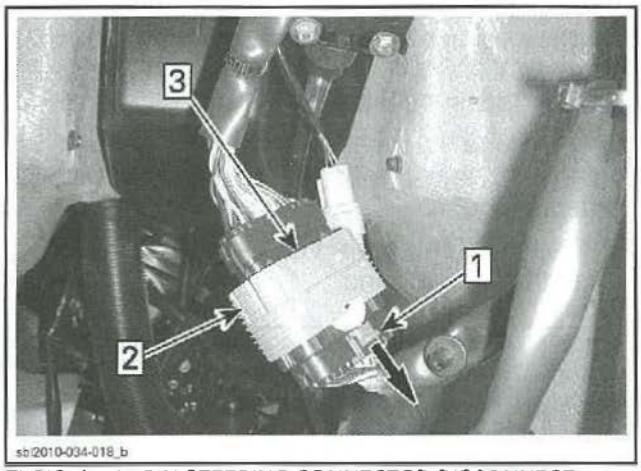
1. Remove tether cord from engine cut-off switch.
2. Disconnect gauge connector.

NOTICE Pull connector lock out sideways. Do not twist the screwdriver.



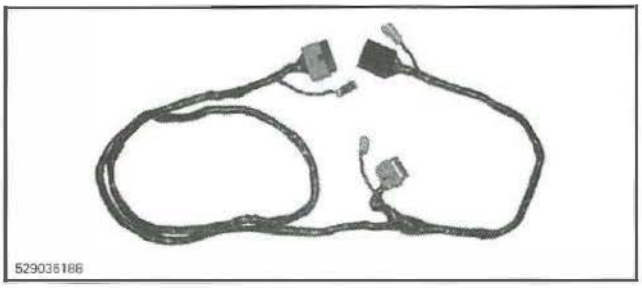
TYPICAL
1. *Gauge connector*
2. *Pull out to unlock connector*

3. Disconnect 24-pin steering connector.

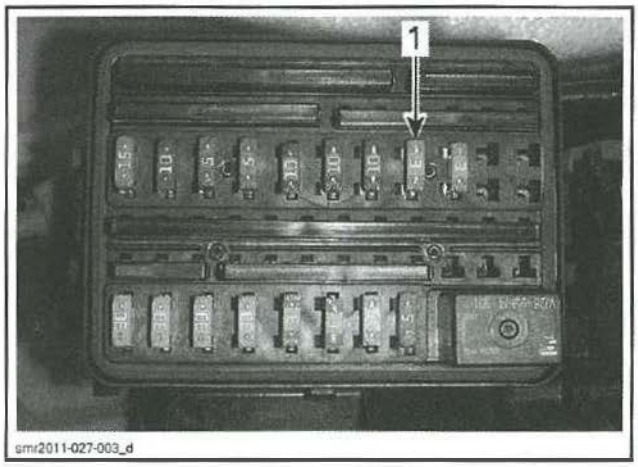


TYPICAL - 24-PIN STEERING CONNECTOR DISCONNECT
Step 1: Pull out safety lock
Step 2: Press in on release tab
Step 3: Pull locking collar down

4. Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) to make an in-line connection between the disconnected connectors.

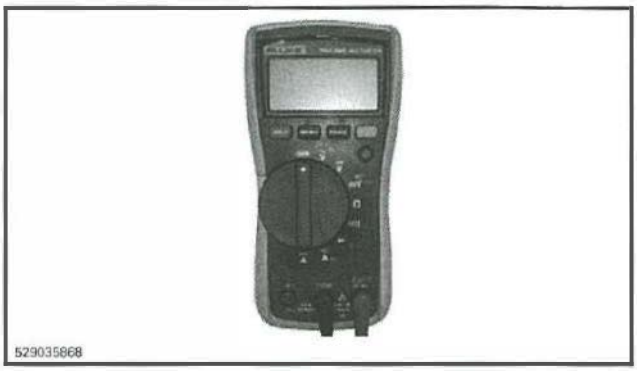


5. Remove the gauge fuse in FB1.



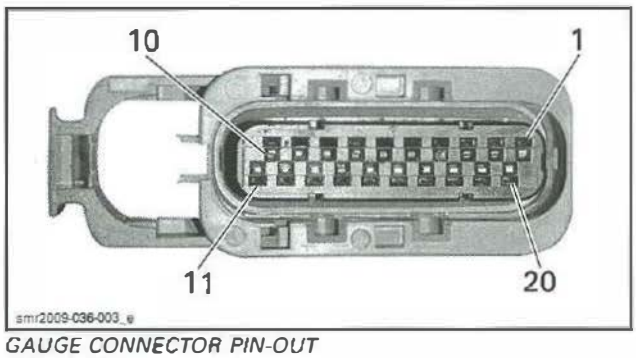
FB1
1. *Remove gauge fuse (F1)*

6. Set FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω setting.

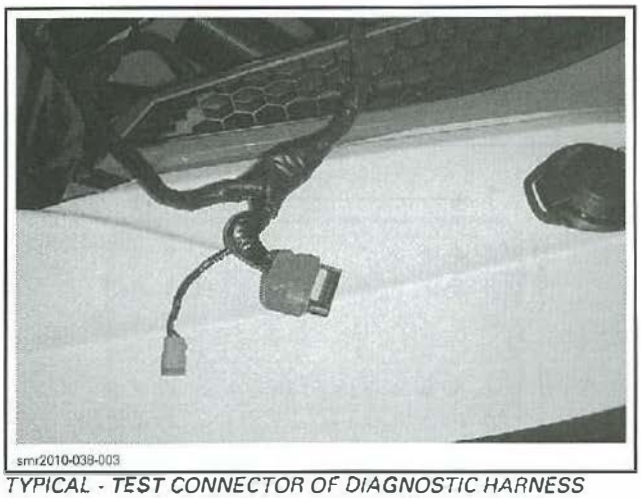


7. Test the information center power wire continuity as per following table.

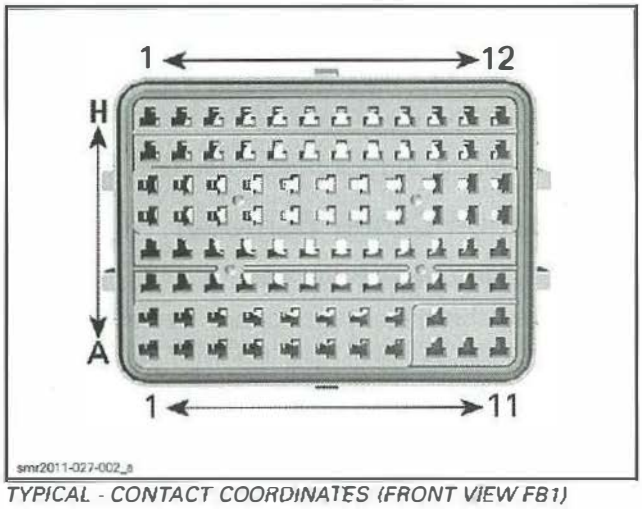
CONTINUITY TEST OF GAUGE POWER WIRE			
GAUGE CONNECTOR	TEST CONNECTOR ON DIAGNOSTIC HARNESS	FUSE BOX 1	READING
Pin 12 (VIOLET)	Pin 24 (VIOLET)	–	Close to 0 Ω
Pin 12 (VIOLET)	–	F8	
–	Pin 24 (VIOLET)	F8	



GAUGE CONNECTOR PIN-OUT



TYPICAL - TEST CONNECTOR OF DIAGNOSTIC HARNESS



TYPICAL - CONTACT COORDINATES (FRONT VIEW FB1)

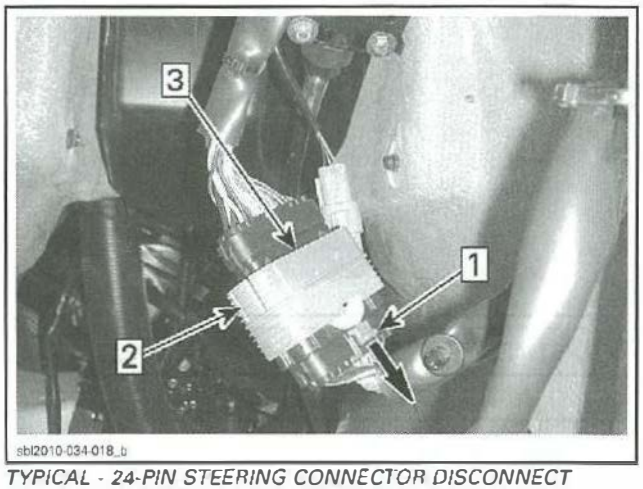
8. If an open circuit is measured, test the following:

CONTINUITY TEST OF GAUGE POWER WIRE		
FUSE BOX 1	TEST CONNECTOR ON DIAGNOSTIC HARNESS	READING
F8 to H9	–	Close to 0 Ω
H9 to H11	–	
H11	Pin 24 (VIOLET)	

9. Repair or replace wiring/connectors as required.

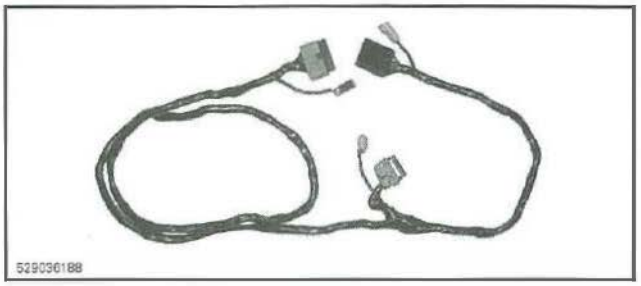
Continuity Test of Gauge Ground Wire

1. Disconnect the 24-pin steering connector.

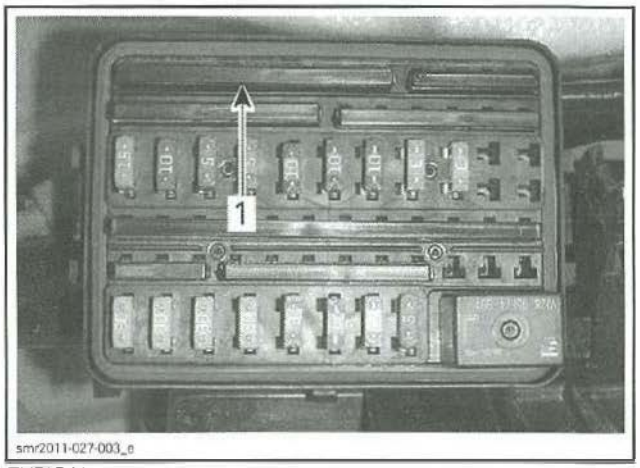


TYPICAL - 24-PIN STEERING CONNECTOR DISCONNECT
Step 1: Pull out safety lock
Step 2: Press in on release tab
Step 3: Pull locking collar down

2. Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) to make an in-line connection between the disconnected connectors.



3. Remove the ground bus-bar in the fuse box.

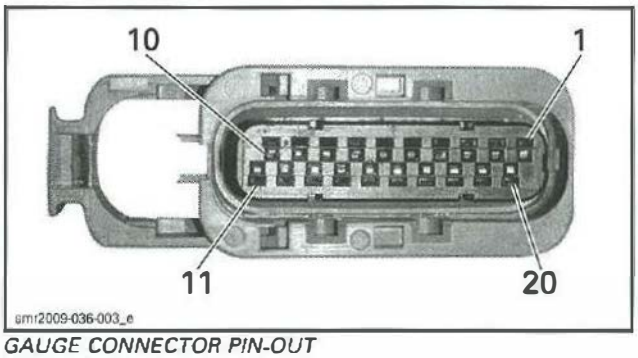


TYPICAL
1. Ground bus bar

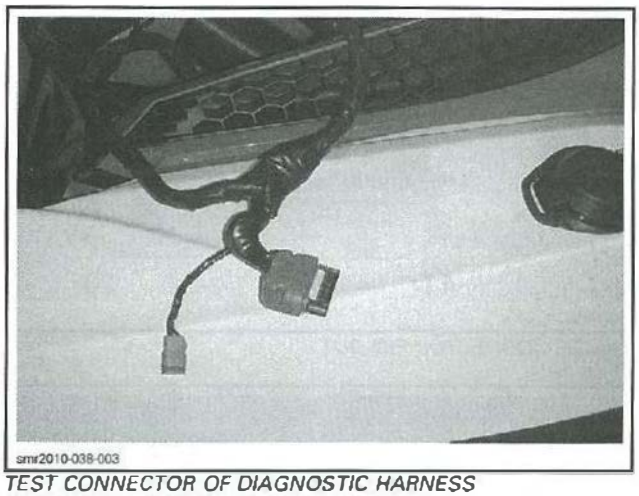
4. Set FLUKE 115 MULTIMETER (P/N 529 035 868) to Ω selection and carry out a continuity test as per following table. Refer to the *WIRING DIAGRAM* for circuit details.



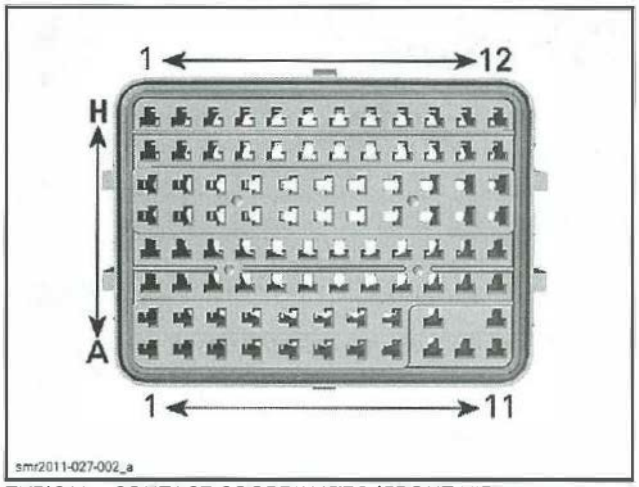
CONTINUITY TEST OF GAUGE GROUND WIRE			
MULTIMETER PROBES			READING
GAUGE CONNECTOR	TEST CONNECTOR ON DIAGNOSTIC HARNESS	FUSE BOX	
Pin 11 (BLACK)	–	H7	Close to 0 Ω
Pin 11 (BLACK)	Pin 1 (BLACK)	–	
–	Pin 1 (BLACK)	H7	



GAUGE CONNECTOR PIN-OUT



TEST CONNECTOR OF DIAGNOSTIC HARNESS



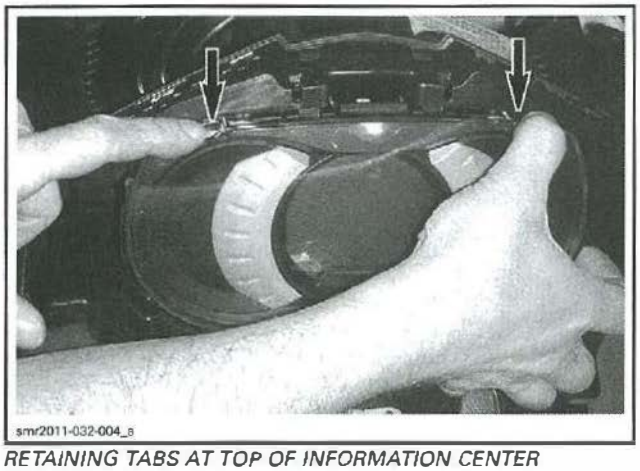
TYPICAL - CONTACT COORDINATES (FRONT VIEW FB1)

5. Repair wiring and connectors as required.

Information Center Removal

GTS, GTI and WAKE Series

1. Remove the bezel that covers the information center and mirrors, refer to *BODY* subsection.
2. Press in on the two retaining tabs at the top of the information center.

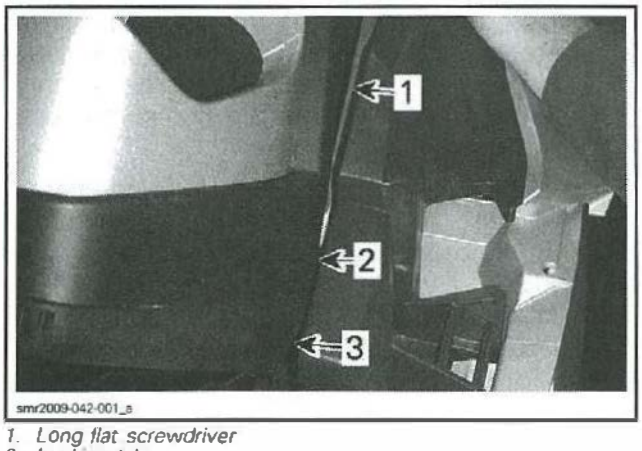


RETAINING TABS AT TOP OF INFORMATION CENTER

3. Pull information center out of console.

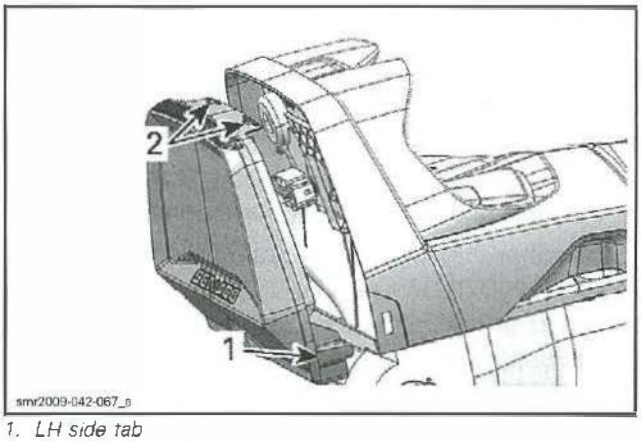
GTX, RTX and Wake Pro Series

1. Open the front storage compartment cover.
2. Move the steering to its highest position, refer to *BODY* subsection.
3. Using a long flat screwdriver, insert the blade between the lower locking tabs (one each side) of the gauge support cover, and carefully pry the tabs outwards to release them from the gauge support.



1. *Long flat screwdriver*
2. *Locking tab*
3. *Gauge support cover*

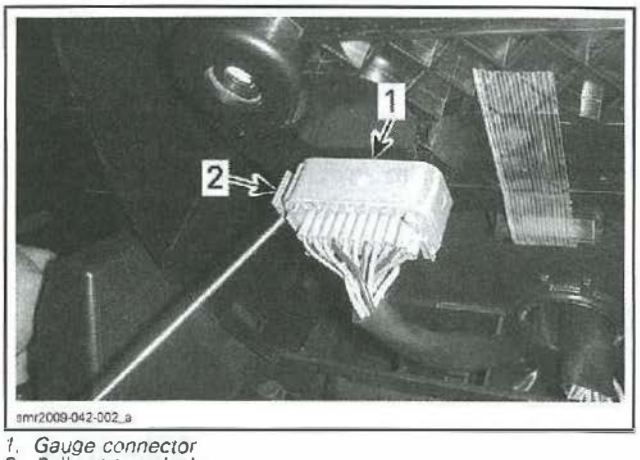
4. Pull the bottom of the panel outwards to remove it from the gauge support.



1. *LH side tab*
2. *Upper retaining tabs*

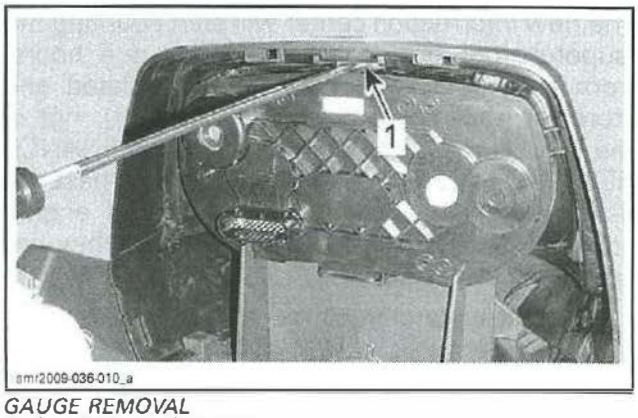
5. Disconnect the gauge connector.

NOTICE Pull connector lock out sideways. Do not twist the screwdriver.



1. *Gauge connector*
2. *Pull out to unlock*

6. Insert a flat screwdriver between the upper gauge locking tab and gauge support.



GAUGE REMOVAL
1. *Insert screwdriver here*

7. Hold back of the gauge with one hand and carefully compress the retaining tab to release the information center from the gauge support.

Information Center Installation

Installation of the information center is the reverse of the removal procedure. However, pay attention to the following.

1. Apply a small amount of DIELECTRIC GREASE (P/N 293 550 004) to the gauge connector pins.
2. Reconnect gauge connector and ensure proper operation of gauge.
3. Insert and align the bottom of the gauge into the support first, then push the top into the support and ensure it properly locks into the retaining tab.

GTX, RTX and Wake Pro Series

4. When reinstalling the gauge support cover, first insert the top of the cover into the support. Then align the bottom of the cover with the locking tabs on the outside of the gauge support and push it in until it snaps back in place.

All Models

NOTE: If you are installing a replacement information center, refer to *INFORMATION CENTER REPLACEMENT* in this subsection.

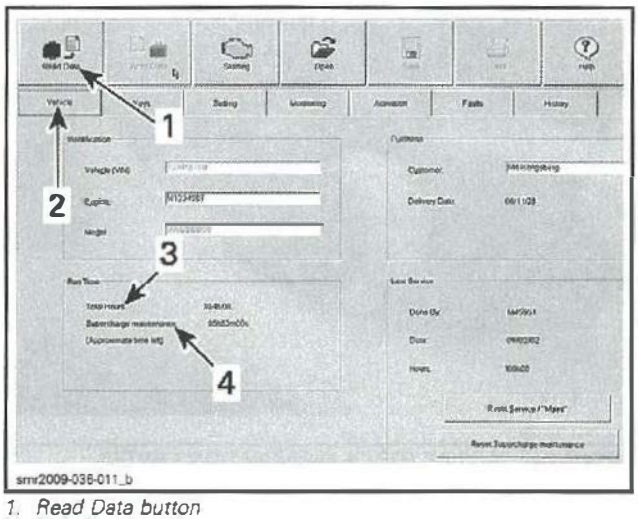
Information Center Replacement

Models With a Supercharger

NOTICE **Before replacing the information center, it is very important to retrieve the "approximate time left to Supercharger maintenance" in B.U.D.S. (on the Vehicle page), and to advise the customer when the watercraft needs to be brought in for supercharger maintenance.**

The new information center will start counting the "supercharger time to maintenance due hours" from zero (0) as the hours are calculated and stored in the gauge cluster (old cluster), not in the ECM. The SUPERCHARGER MAINTENANCE REQUIRED indicators will then come on past the real maintenance due hours. Indicated engine hours in new gauge will be correct as they are calculated in the ECM.

1. Connect watercraft to the latest B.U.D.S. software, refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Select the Read Data button.
3. In the **Run Time** field of the vehicle page, note the accumulated Total Hours and the **Supercharger maintenance** (Approximate time left) hours.



1. Read Data button
2. Vehicle page tab
3. Total Hours
4. Supercharger maintenance hours (approximate time left)

4. Add the approximate time left to supercharger maintenance hours to the total hours to calculate the hours at which the next supercharger maintenance is due.

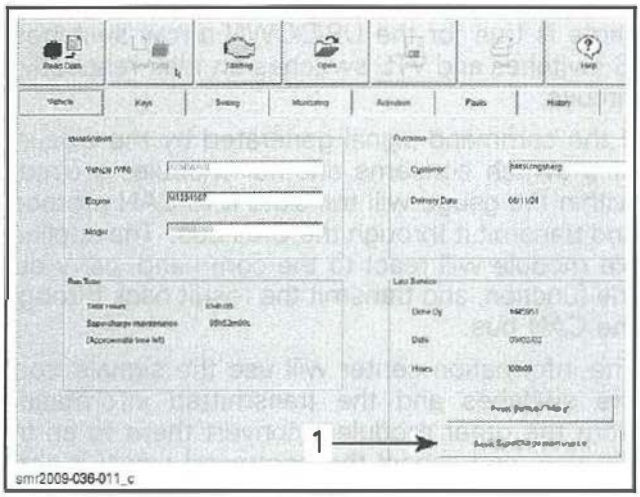
Example: 104.08 + 95.52 = 200

The next supercharger maintenance will be due at 200 hours (Total Hours in B.U.D.S. or hours indicated in the information center hour meter).

5. Advise customer to bring the watercraft in for supercharger maintenance at the calculated "Total Hours" even if the supercharger maintenance advisory message did not come on in the information center.

If the "approximate time left to Supercharger maintenance" hours cannot be retrieved in B.U.D.S. (because old cluster cannot be read by B.U.D.S.), and the engine hours (Total Hours) at which the last supercharger maintenance was carried out are known, then add 100 to the last known Total Hours at which the last supercharger maintenance was carried out.

Once the supercharger maintenance has been carried out, the time left to supercharger maintenance must be reset using the **Reset Supercharger Maintenance** function in B.U.D.S. This ensures the following supercharger maintenance advisory message comes on as per normal intervals. Refer to *CLEARING MAINTENANCE REMINDER INDICATORS* in this subsection.



1. Reset Supercharger maintenance button

All Models

NOTE: Replacement information centers are delivered already programmed.

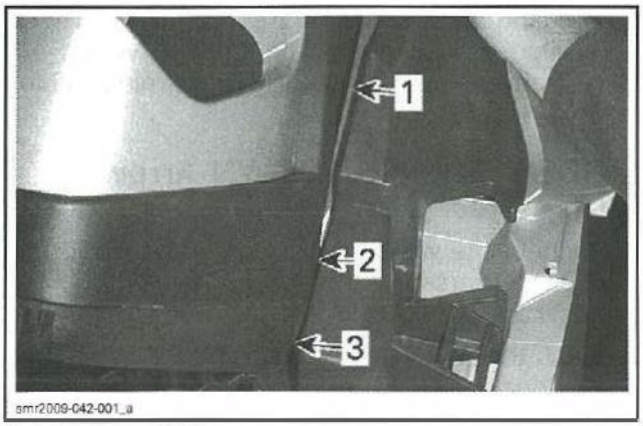
After the information center has been replaced, connect the watercraft to the latest applicable B.U.D.S. version and carry out any updates (if required). Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

Once the information center has been updated (if required), select the applicable settings as described in *SETTING LANGUAGE AND UNITS OF MEASUREMENT* in this subsection.

GAUGE SUPPORT (RXT, GTX AND WAKE PRO SERIES)

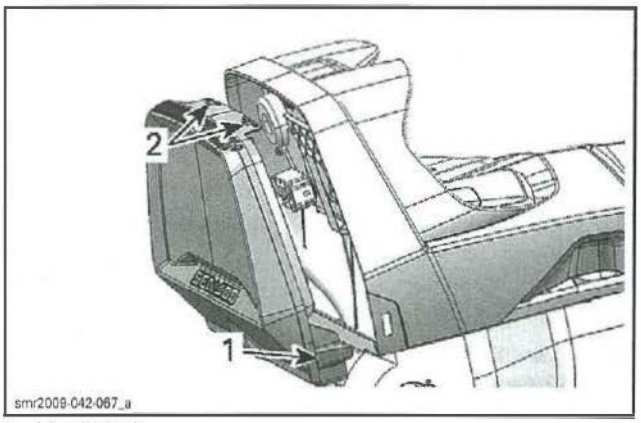
Gauge Support Removal

1. Move steering to its upper most position.
2. Using a long flat screwdriver, unlatch both sides of gauge support cover.



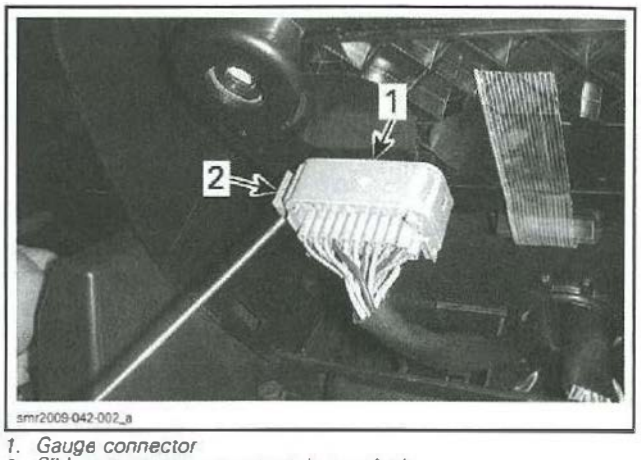
1. Long screwdriver
2. Locking tab
3. Gauge support cover

3. Remove the cover.



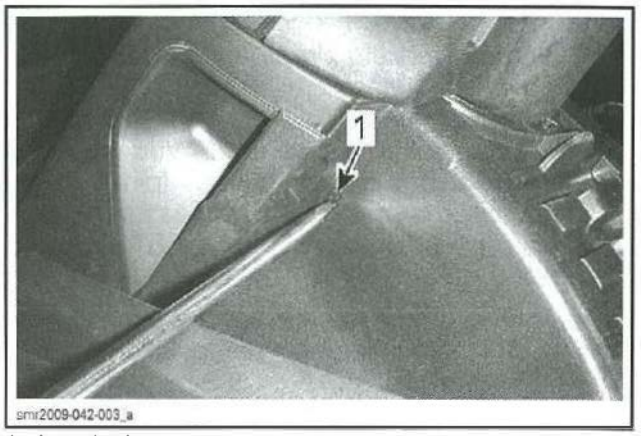
1. LH side tab
2. Upper retaining latches

4. Disconnect the gauge connector.



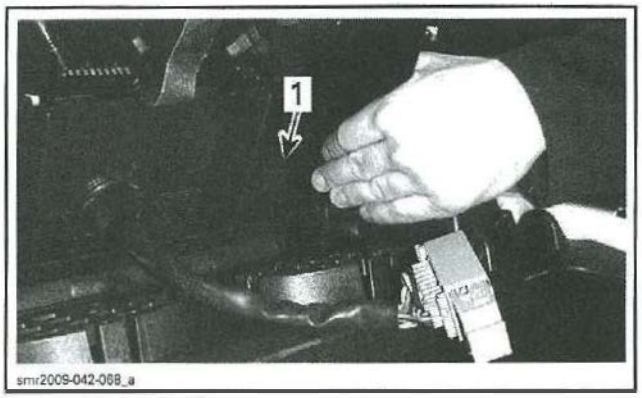
1. Gauge connector
2. Slide out gauge connector tab to unlock

5. Using a small screwdriver, unlock back end of gauge support by pushing on tabs on each side of the steering column.



1. Inner latches

6. Remove gauge support by pulling out its forward tabs (one on each side), then pulling up on the support.



1. Pull out locking tab

Gauge Support Installation

1. Reverse the removal procedure.
2. Ensure proper operation of gauge once reconnected.

MODE/SET AND UP/DOWN ARROW BUTTONS

Overview

The MODE/SET and UP/DOWN arrow buttons assembly contains a series of 4 diodes for the MODE and SET switches, and another 4 diodes for the UP/DOWN arrow switches. Refer to *WIRING DIAGRAM* for simplified diagram of switches.

The center wire to the switches (pin C), is common to both sides of the switch assembly (somewhat like a ground wire). The other two wires (pins A and B), act as signal wires to the information center for each set of switches. They actually each form one branch of an electronic circuit within the information center.

Each diode (in circuit) drops a nominal 0.6 Vdc when conducting electricity. If the circuit current passes through all four diodes (say MODE and SET switches open), a drop of 2.4 Vdc would be measured across the 4 the diodes (pin B to pin C). This voltage drop of 2.4 Vdc measured at pin B tells the gauge the MODE and SET switches are open.

If the MODE switch is pressed, 2 diodes are bypassed. The remaining two diodes in the circuit drop 1.2 Vdc (at pin B).

If the SET switch is pressed, 1 diode is bypassed. The remaining three diodes in the circuit drop 1.8 Vdc (at pin B).

The gauge senses these voltages through pin 17 of the gauge connector, and interprets them as signals that tell it which switch is activated. The same is true for the UP/DOWN arrow switches, iS switches and VTS switches on their respective circuits.

If the command signal generated by the closure of a switch concerns another module, a circuit within the gauge will translate it to CAN protocol and transmit it through the CAN bus. The applicable module will react to the command, carry out the function, and transmit the result back through the CAN bus.

The information center will use the signals from the switches and the transmitted information from the other modules, convert them to an indication, and cancel the command signal it sent out once the function has been carried out.

Command signals from the MODE and SET switches are used by the information center only.

VTS and iS switch commands are translate and sent to the modules.

The UP/DOWN arrow switch commands are used by the gauge for certain functions and settings. They will also be translated and sent out through the CAN bus to be used by the ECM for the CRUISE, SKI mode and SLOW SPEED functions for increasing or decreasing speed when the functions are active, and by the iBR for iBR gate positioning in SLOW SPEED mode of operation.

The UP/DOWN switches are also used for VTS trim on RXT 215, GTX 155, GTI SE 130 and 155, and WAKE models.

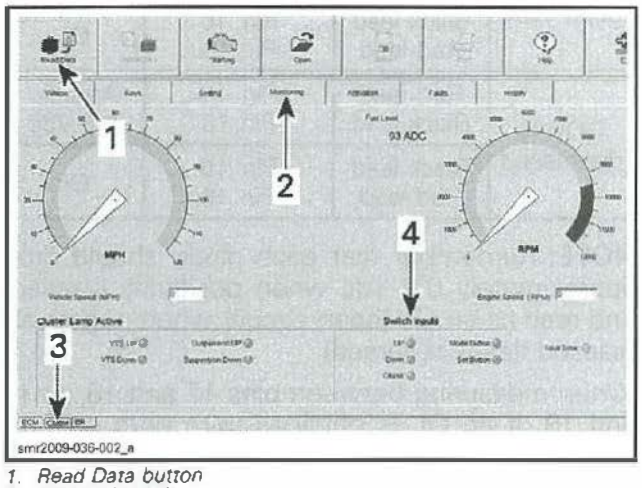
NOTE: The voltages stated previously vary slightly depending on the actual voltage applied to the circuit and the current flow through the diodes. When using a Fluke 115 multimeter for testing in diode test mode, the voltage and current applied by the multimeter are lower than in circuit. The quality of probe contact, the actual probes and leads, and the precision of the meter calibration will all affect the results, which will most likely be slightly lower than nominal values stated.

MODE/SET and UP/DOWN Arrow Buttons Test Using B.U.D.S.

1. Connect the watercraft to the latest applicable B.U.D.S. version. Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. Press the START/STOP button to energize the electrical system.

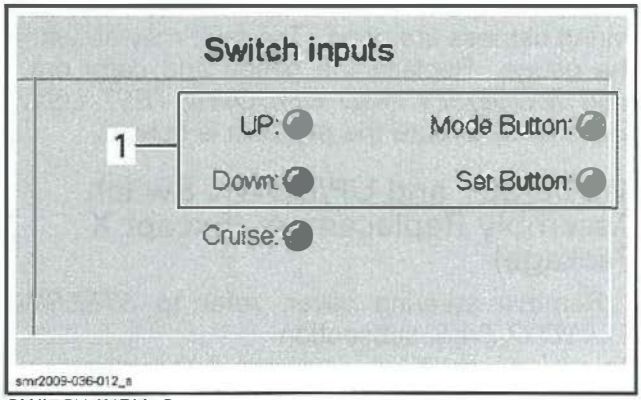
NOTE: You will need to press the START button every three minutes or the electrical system will shut off.

3. Select the Read Data button.
4. Choose the **Monitoring** tab at the top of the page.
5. At the bottom LH side of the monitoring page, select the **Cluster** tab.



1. *Read Data button*
2. *Monitoring tab*
3. *Cluster tab*
4. *Switch inputs field*

6. Press each of the MODE/SET and UP/DOWN arrow buttons and look for the applicable indicator light to come on in the **Switch inputs** field on lower RH side of the cluster page (Mode, Set, Up or Down).



SWITCH INPUTS
1. *MODE/SET and UP/DOWN arrow button indicator lights*

If each of the gauge button indicator lights come on when the applicable switch is pressed, the problem may be related to the information center.

If one or all of the indicator lights does not come on, refer to *MODE/SET AND UP/DOWN ARROW SWITCH TEST USING A MULTIMETER.*

MODE/SET and UP/DOWN Switch Test Using a Multimeter

GTI and WAKE Series

1. Remove the information center from the console, refer to *INFORMATION CENTER REMOVAL (GTI AND WAKE SERIES)* in this subsection.

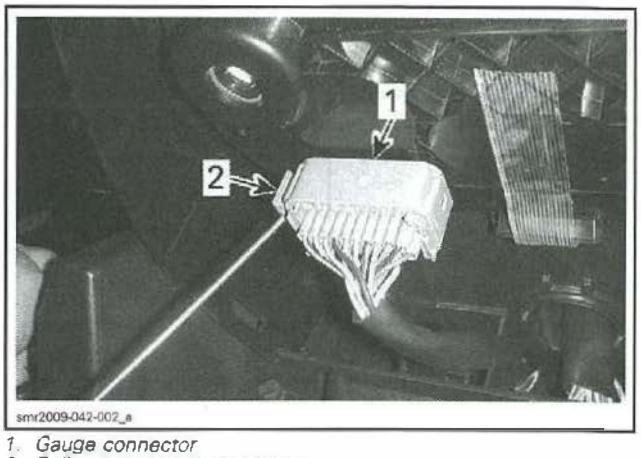
RXT, GTX and WAKE PRO Series

2. Remove the gauge support cover, refer to *INFORMATION CENTER REMOVAL (RXT, GTX AND WAKE PRO SERIES)* in this subsection.

All Models

3. Disconnect the gauge connector.

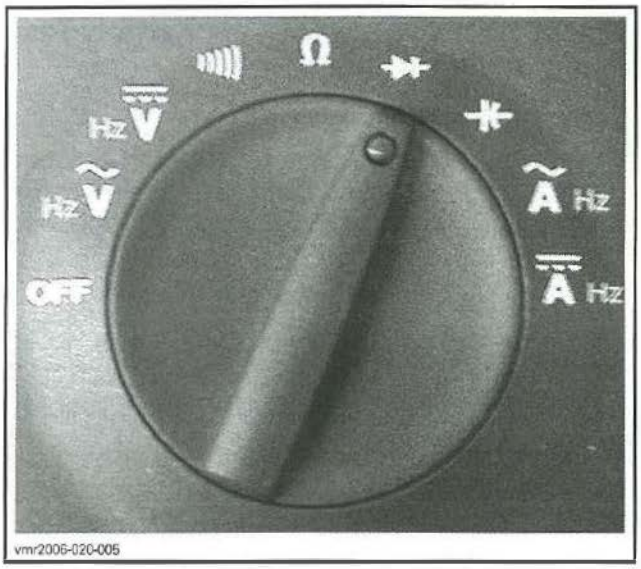
NOTICE Pull connector lock out. Do not twist the screwdriver.



1. *Gauge connector*
2. *Pull out to unlock connector*

4. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to the diode test function.

NOTE: It is important to set the multimeter to the diode check function when testing the MODE/SET and UP/DOWN arrow switches as it contain diodes.



5. Test the MODE/SET and UP/DOWN arrow switches as per following tables.

MODE/SET SWITCH TEST			
SWITCH POSITION	FLUKE 115	GAUGE CONNECTOR	VOLTAGE
Switch released	Red lead Black lead	Pin 17 Pin 18	Approx. 2 Vdc
	Black lead Red lead	Pin 17 Pin 18	OL
MODE depressed	Red lead Black lead	Pin 17 Pin 18	Approx. 1.1 Vdc
	Black lead Red lead	Pin 17 Pin 18	OL
SET depressed	Black lead Red lead	Pin 17 Pin 18	Approx. 1.6 Vdc
	Black lead Red lead	Pin 17 Pin 18	OL

UP/DOWN ARROW SWITCH TEST			
SWITCH POSITION	FLUKE 115	GAUGE CONNECTOR	VOLTAGE
Switch released	Red lead Black lead	Pin 16 Pin 18	Approx. 2 Vdc
	Black lead Red lead	Pin 16 Pin 18	OL

UP/DOWN ARROW SWITCH TEST			
SWITCH POSITION	FLUKE 115	GAUGE CONNECTOR	VOLTAGE
UP depressed	Red lead Black lead	Pin 16 Pin 18	Approx. 1.1 Vdc
	Black lead Red lead	Pin 16 Pin 18	OL
DOWN depressed	Red lead Black lead	Pin 16 Pin 18	Approx. 1.6 Vdc
	Black lead Red lead	Pin 16 Pin 18	OL

NOTE: Remember that each diode should drop approximately 0.6 Vdc when positively biassed, and read as an OL (open circuit) when negatively biassed (leads reversed).

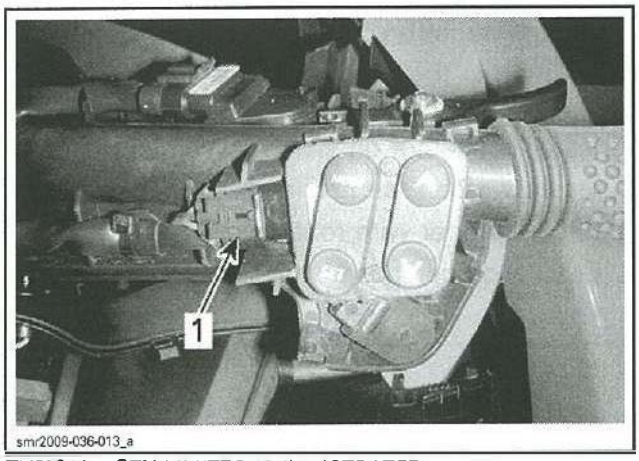
When measuring between pins 17 and 18, or 16 and 18, if an OL is obtained with both positive and negative diode biassing, test the continuity of each wire between the gauge and switch assembly. If continuity is good, replace the switch assembly.

If any reading is significantly different than specified, carry out the same test at the switch connector, refer to the wiring diagram. If you obtain the same results, replace the switch assembly.

If voltages measured on every switch are as specified (or very close to it), the switches and the wiring harness are good. The fault may be within the gauge. Replace the gauge and carry out a new *MODE/SET AND UP/DOWN TEST USING B.U.D.S.* to ensure the problem is solved.

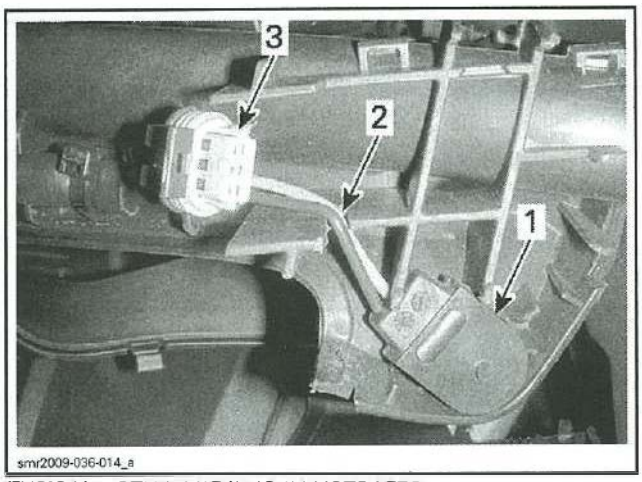
MODE/SET and UP/DOWN Switch Assembly Replacement (Except X Package)

1. Remove steering cover, refer to *STEERING AND O.T.A.S.* subsection.
2. Disconnect connector from switch assembly.



TYPICAL - GTX LIMITED iS ILLUSTRATED
1. MODE/SET and UP/DOWN switch connector

3. Remove switch assembly from support by lifting it off the support.
4. As applicable, ensure wiring from cruise switch is properly inserted in slot provided before installing MODE/SET and UP/DOWN arrow switch assembly.



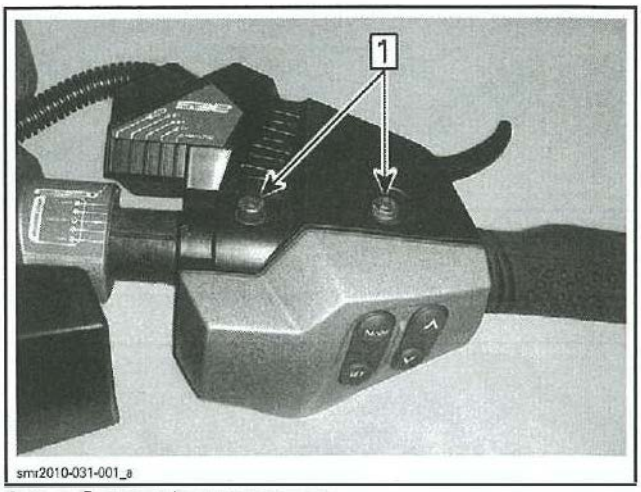
TYPICAL - GTX LIMITED iS ILLUSTRATED
1. Cruise switch
2. Wiring in slot provided in support
3. MODE/SET and UP/DOWN arrow switch connector

5. Apply a small amount of DIELECTRIC GREASE (P/N 293 550 004) on switch contact pins.
6. Install connector on new switch assembly.
7. Insert switch assembly in switch support.
8. Install steering cover, refer to *STEERING AND O.T.A.S.*

MODE/SET and UP/DOWN Switch Assembly Replacement (X Package only)

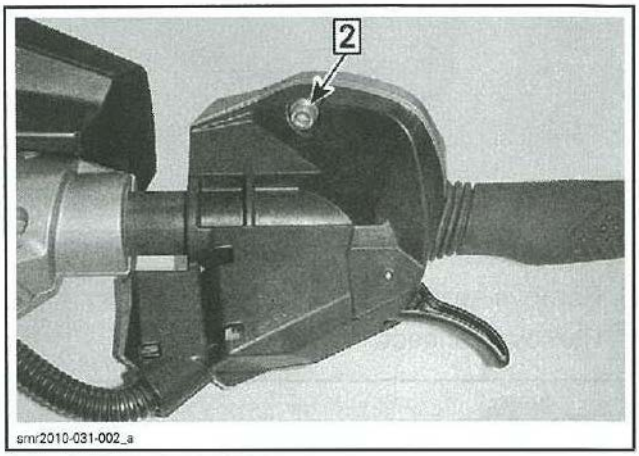
Switch Removal

1. Remove the 2 screws in the front of the upper handlebar housing.



Step 1: Remove these two screws

2. Remove the screw at back of the handlebar.

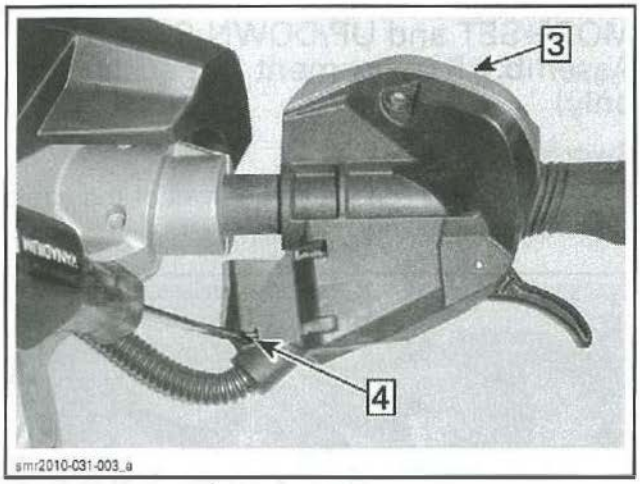


Step 2: Remove this screw

NOTICE **Do not try to pull the cover off the housing at this time or damage to the cover will occur.**

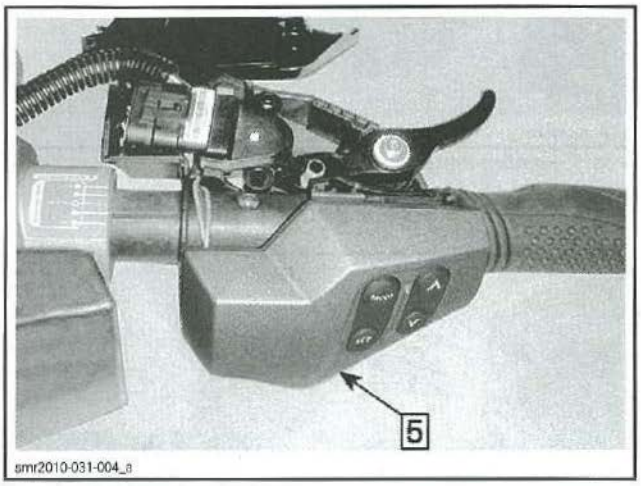
3. Take hold of the housing cover to prevent it from falling off the handlebar when unlocking the upper housing in the following step.
4. Using a small screwdriver, unlock the tab that retains the upper housing and pull the upper housing off.

NOTICE **As you remove the upper housing, hold on to the housing cover to prevent it from falling off the handlebar.**



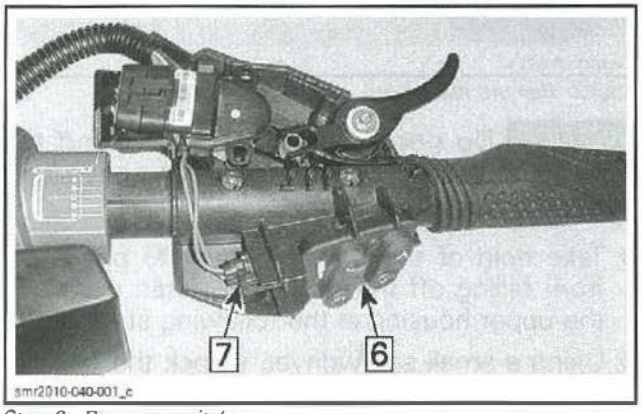
Step 3: Hold on to this housing cover
Step 4: Unlock this tab

5. Remove the housing cover from the handlebar.



Step 5: Remove housing cover

6. Remove switch from handlebar housing.
7. Remove connector from switch.

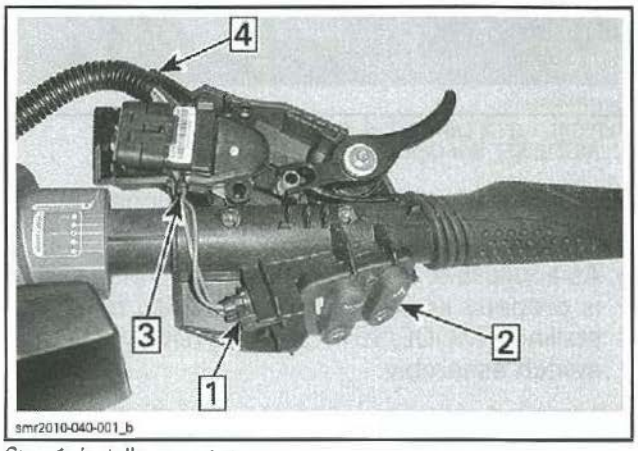


Step 6: Remove switch
Step 7: Remove connector

Switch Installation

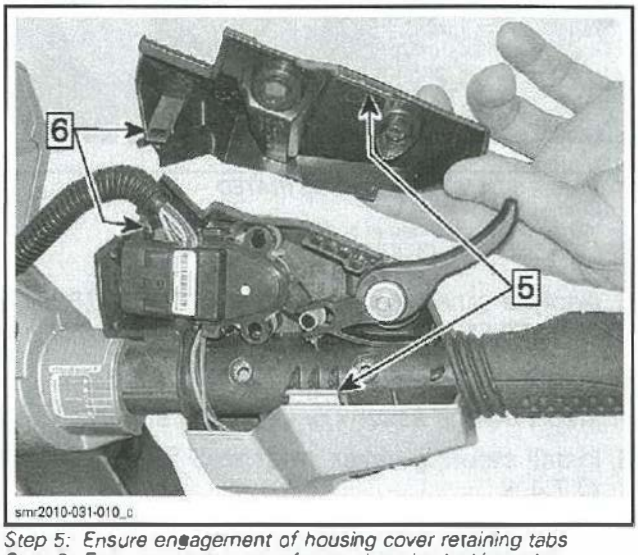
Installation is the reverse of the removal procedure however, pay attention to the following.

1. Install connector on switch assembly.
2. Insert switch assembly in handlebar housing.
3. Ensure proper wire routing.
4. Ensure proper positioning of corrugated conduit.



Step 1: Install connector
Step 2: Insert switch in handlebar housing
Step 3: Ensure proper wire routing
Step 4: Ensure proper positioning of corrugated conduit

5. Ensure engagement of housing cover retaining tabs.
6. Ensure engagement of upper housing locking tabs.



Step 5: Ensure engagement of housing cover retaining tabs
Step 6: Ensure engagement of upper housing locking tabs

7. Position the upper housing on the handlebar housing.
8. Ensure proper engagement of the upper housing and cover tabs.

9. Install the three retaining screws for the upper housing and tighten them as specified.

UPPER SWITCH HOUSING SCREW TORQUE
2 N•m (18 lbf•in)

10. Connect watercraft to the latest applicable B.U.D.S. version, refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
11. Ensure there are no fault codes, refer to *DIAGNOSTIC AND FAULT CODES* subsection.
12. Ensure proper operation of throttle lever and switch assembly.

WATER TEMPERATURE SENSOR

The water temperature sensor is located within the iBR module that is part of the iBR actuator. It cannot be tested or replaced separately.

Water from the jet pump passes through the iBR actuator where the sensor measures its temperature, generating a signal that is interpreted by the iBR module. The iBR module then sends the information through the can-bus to the information center that translates it into a temperature indication.

If the temperature sensor is defective, the temperature indication will not be displayed and a WATER TEMP SENSOR DEFECTIVE message will scroll in the multifunction display.

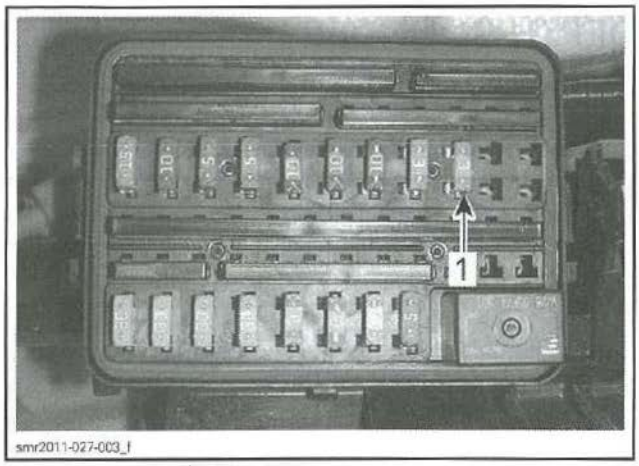
A lake water temperature sensor fault code should be generated if the sensor is defective. Refer to *DIAGNOSTIC AND FAULT CODES*.

If the lake water temp sensor is defective, replace the iBR actuator.

DEPTH SOUNDER

Depth Sounder Troubleshooting

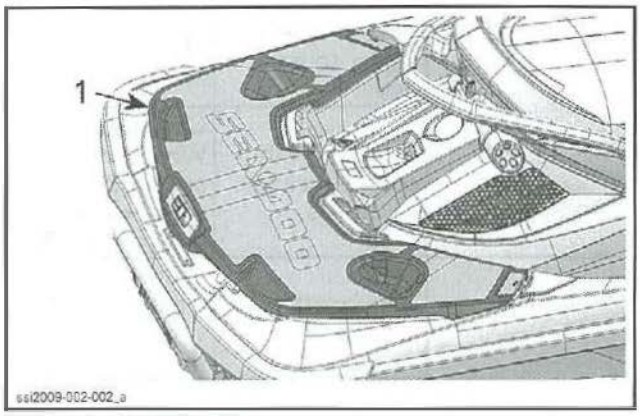
DEPTH SOUNDER TROUBLESHOOTING		
SYMPTOM	POSSIBLE CAUSE	REMEDY
Nothing is displayed in the information center	Depth sounder not connected.	Properly connect depth sounder.
	Depth sounder not properly installed.	Make sure depth sounder is properly installed in battery holder base. There must be no air gap between hull and silicone pad(s).
	12 Vdc wire or ground wire to depth sounder open.	Check fuse 3 in FB1 and wiring harnesses.
	Problem with communication link wires.	Check WHITE/BLACK and WHITE/RED wires to CAN bus-bars in FB1.
- - - - (ft or m) is displayed	Watercraft is not in water.	Launch watercraft in water and recheck.
	There is air between silicone pad and depth sounder or between depth sounder and battery holder base.	Remove depth sounder. Replace silicone pad.
	Depth sounder is defective.	Try a new depth sounder.



1. Depth sounder 3A fuse (FB1)

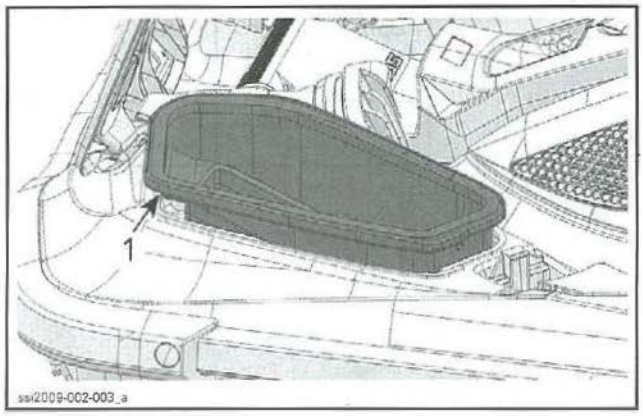
Depth Sounder Removal

1. Open the boarding platform.



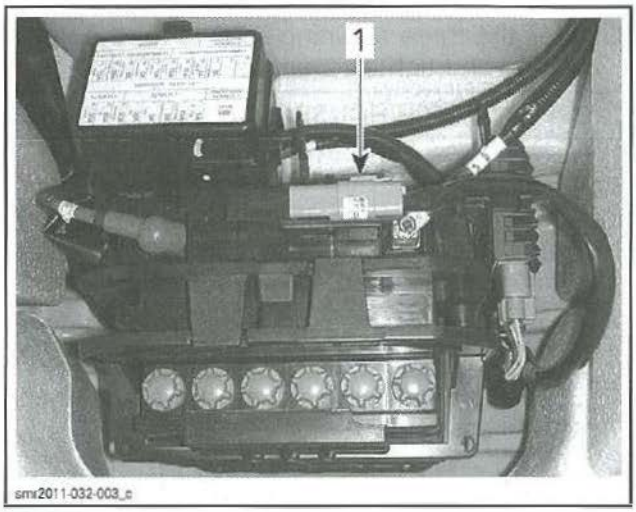
1. Re-boarding platform

2. Remove the starboard (RH) storage bin.



1. Starboard storage bin

3. Disconnect the diagnostic connector from its holder.



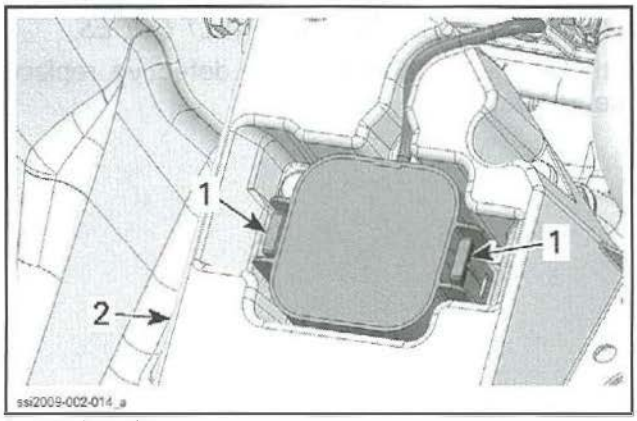
TYPICAL
1. Diagnostic connector

4. Remove the electrical component support from the battery holder, refer to *CHARGING SYSTEM*.
5. Remove the battery (with holder) from the watercraft, refer to *CHARGING SYSTEM*.

⚠ WARNING

Always disconnect the battery cables exactly in the specified order, BLACK (-) battery cable first then the RED (+) cable last.

6. Unlock the depth sounder clocking tabs from the battery holder base and pull the depth sounder out from the base.



1. Locking tabs
2. Battery holder base

7. Disconnect the depth sounder connector from the wiring harness.

Depth Sounder Inspection

Ensure the silicone pad is in good condition.

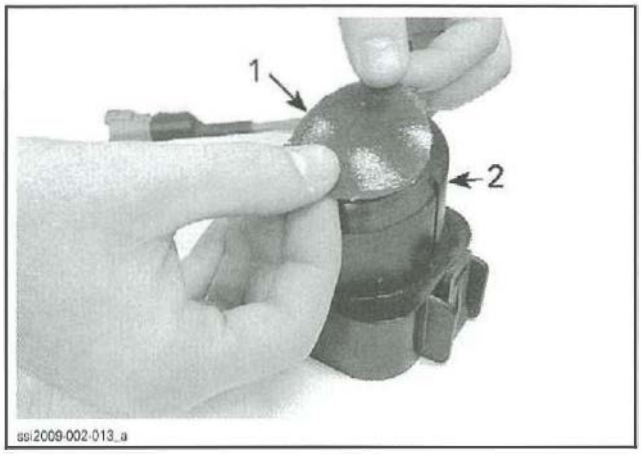
NOTE: There must not be any air trapped between the bottom of the depth sounder and the bilge. Otherwise, the sounder will not function correctly.

If the silicone pad is damaged, replace it.

Depth Sounder Silicone Pad Replacement

1. Place the flat side of the depth sounder on a level surface.
2. Remove the old silicone pad from the bottom of the depth sounder.
3. Clean the concave surface of depth sounder.
4. Remove both protectors from the silicone pad.
5. Apply silicone pad on depth sounder.

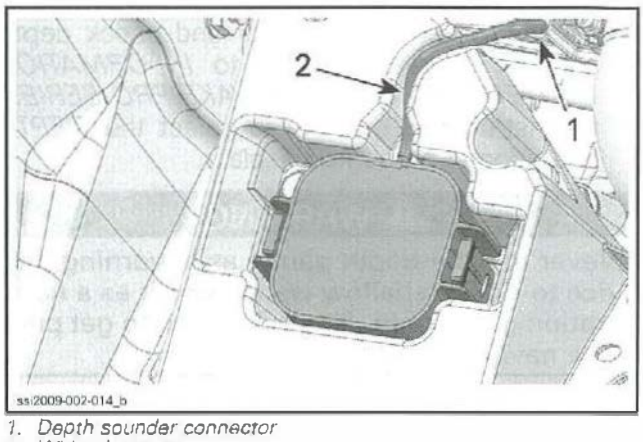
NOTICE **Make sure do not trap air between silicone pad and depth sounder. Otherwise, the device will not work.**



1. *Silicone pad*
2. *Depth sounder*

Depth Sounder Installation

1. Insert the depth sounder in the battery holder base while paying attention to the position of the wiring on the sounder with the groove in the battery holder base.
2. Press firmly on the depth sounder until both locking tabs are locked into the base.
3. Connect the sounder connector to the wiring harness and route the wiring in the groove provided in the battery holder base.



1. *Depth sounder connector*
2. *Wiring harness*

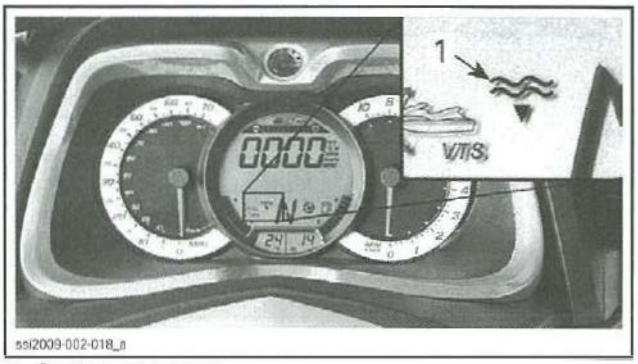
4. After installation:
   - 4.1 Try pulling the sounder out to ensure it is properly locked in the battery support base.
   - 4.2 Try pushing on depth sounder. You must feel a resistance (no air gap).

NOTE: An air gap can be eliminated by adding an additional silicone pad.

5. Install the battery and electrical component support in the reverse order of removal, refer to *CHARGING SYSTEM*.
6. Install the diagnostic connector in its holder.
7. Carry out the following procedure: *TESTING DEPTH SOUNDER OPERATION*.

Testing Depth Sounder Operation

1. Press START/STOP button.
2. Install the tether cord on the engine cut-off switch.
3. Check information center to confirm depth sounder operation. The depth sounder icon is visible in the information center when the depth sounder is detected.



1. *Depth sounder icon*

4. Reinstall all other removed parts.

5. Launch watercraft in water and check depth sounder operation. Refer to *INFORMATION CENTER (RXT, GTX AND WAKE PRO SERIES)* for instructions on how to select the *DEPTH* indication in numerical display.

⚠ WARNING

Never use the depth gauge as a warning device to ride in shallow water. Use it as a navigation guide only. Not to be used to get precise navigation data.

STEERING AND O.T.A.S.

SERVICE TOOLS

Description	Part Number	Page
D.E.S.S. POST REMOVER	529 035 943	461
DIAGNOSTIC HARNESS	529 036 188	470
FLUKE 115 MULTIMETER	529 035 868	470
STEERING CABLE TOOL	295 000 145	465

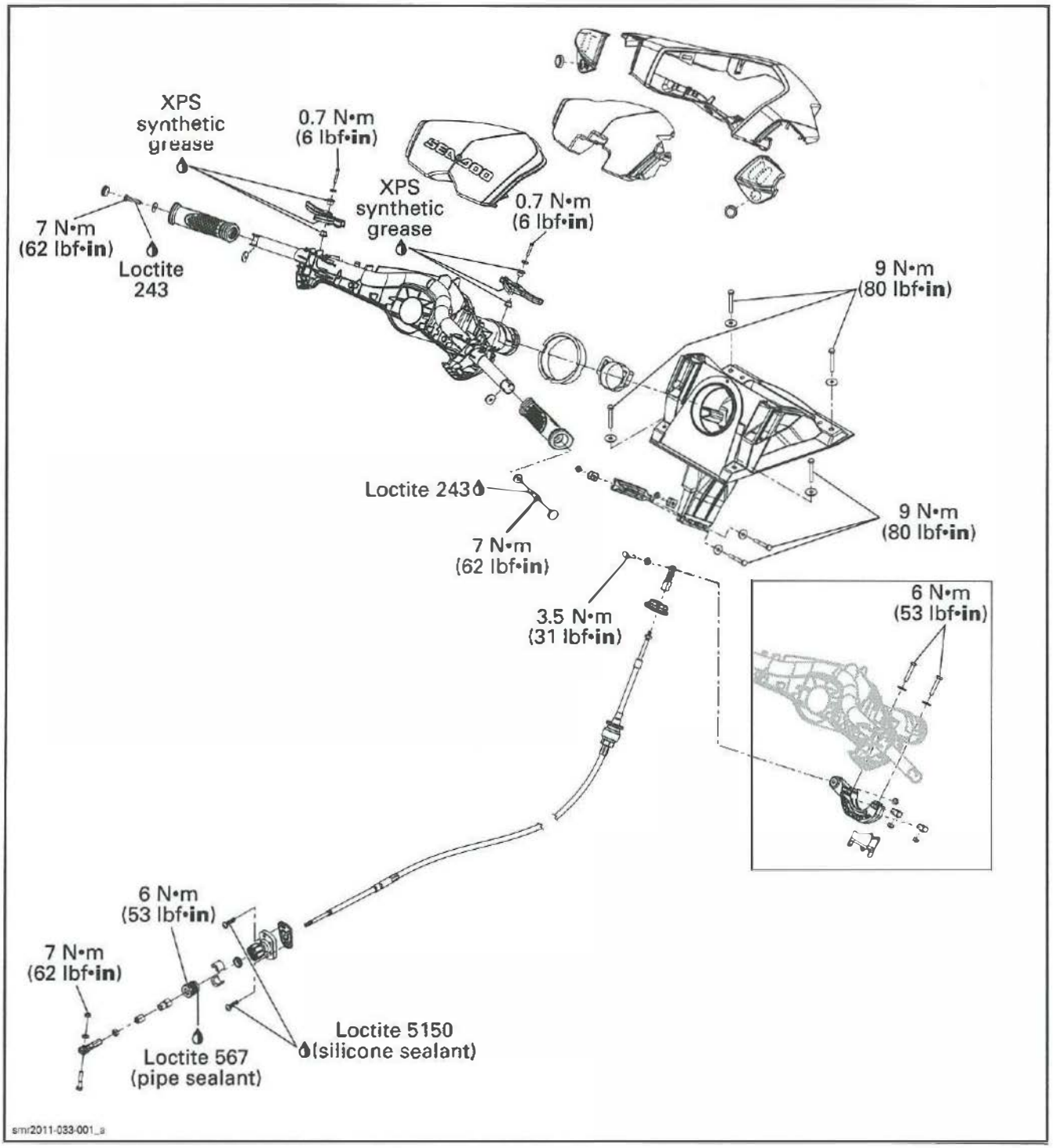
SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	459
LOCTITE 567 (PIPE SEALANT)	293 800 013	465
XPS SYNTHETIC GREASE	293 550 010	463

green-manuals

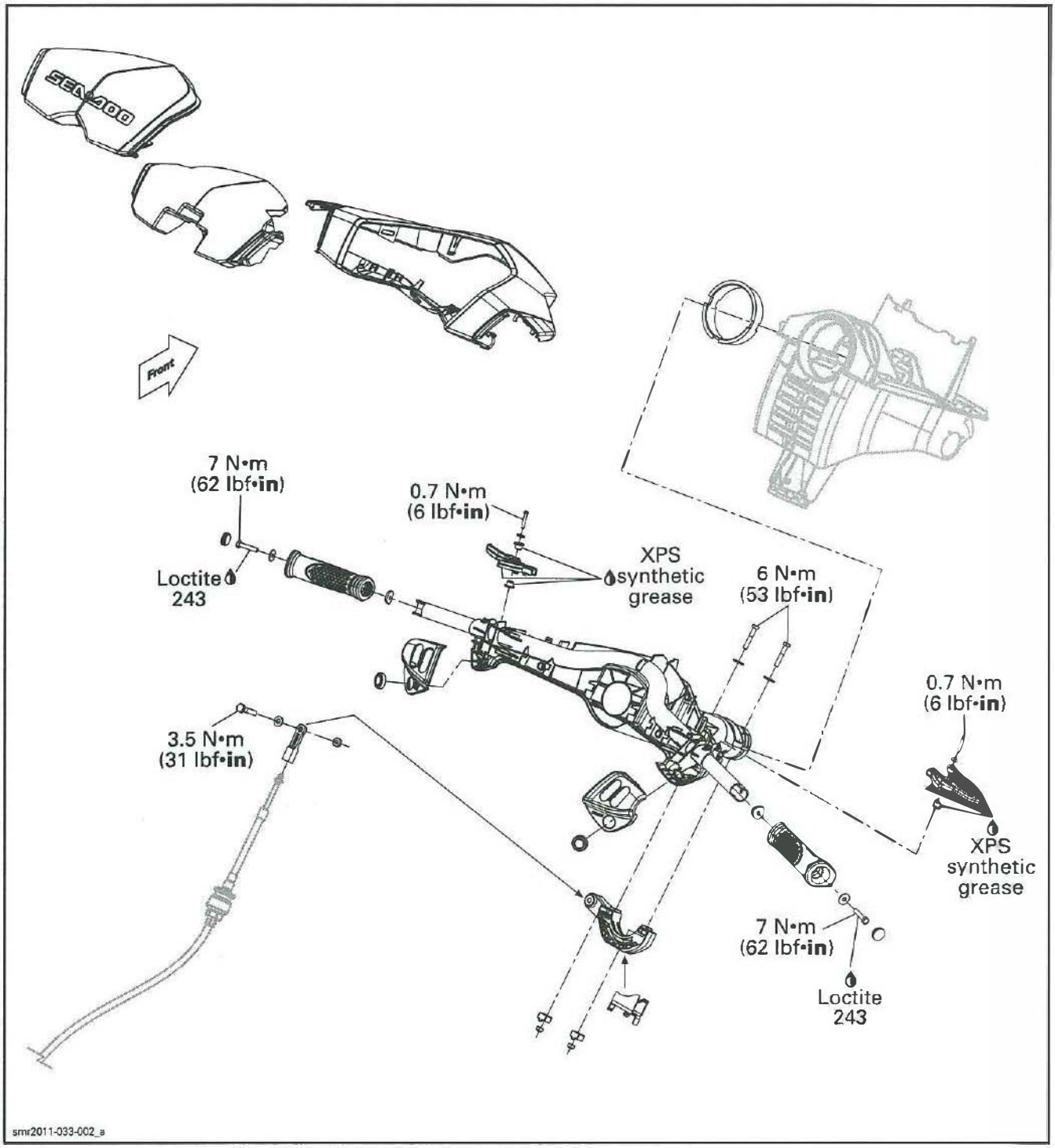
STEERING COLUMN AND CABLE

GTS, GTI and WAKE 155



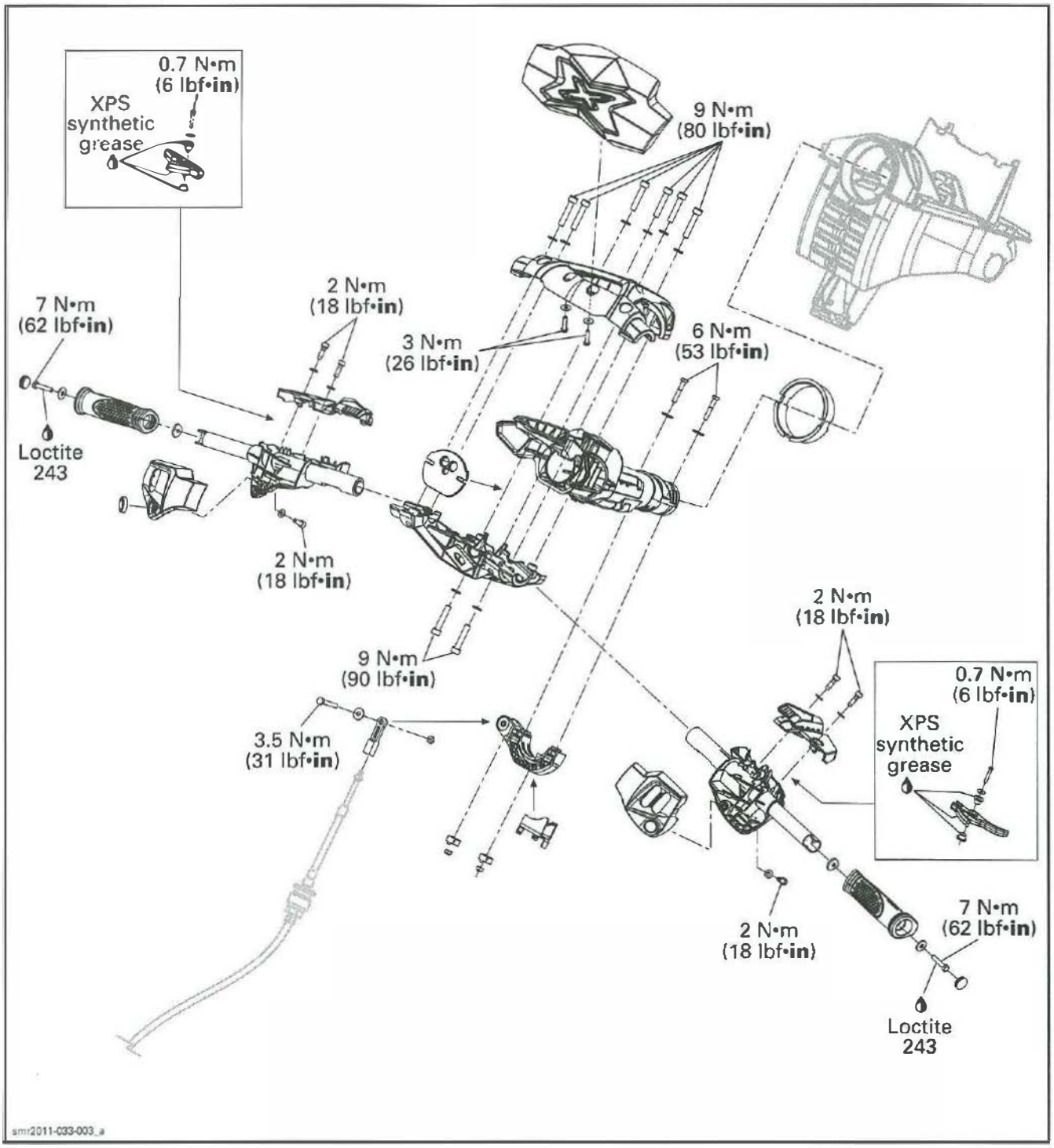
STEERING COLUMN

GTX, GTX iS RXT, RXT iS and Wake Pro



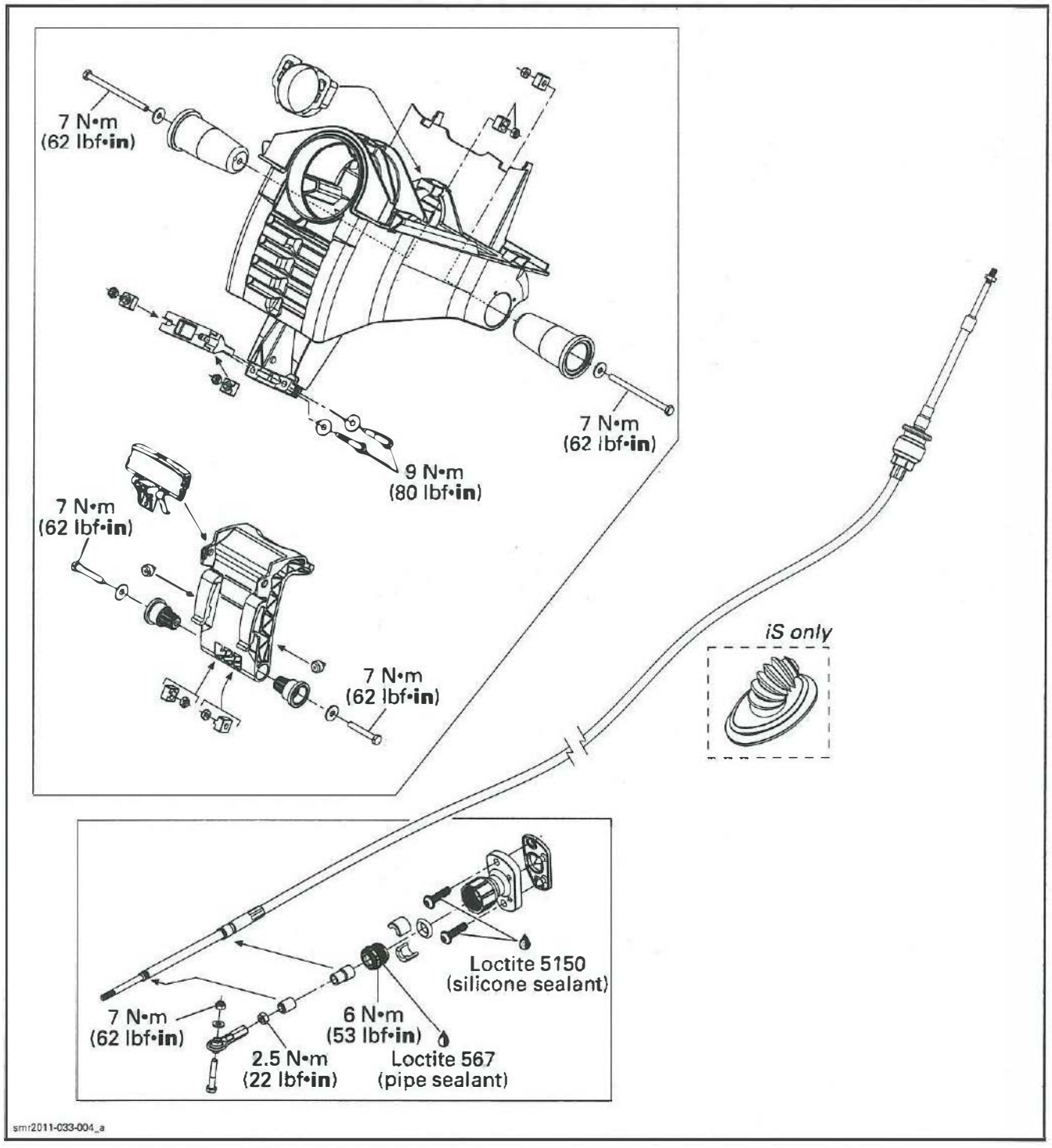
STEERING COLUMN

RXT-X, RXT-X aS



STEERING COLUMN SUPPORT AND CABLE

GTX, RXT and Wake Pro Series



GENERAL

During assembly/installation, use torque values and service products as in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new ones.

Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

SYSTEM DESCRIPTION (O.T.A.S.)

The O.T.A.S. (Off-Throttle Assisted Steering) provides additional maneuverability in off-throttle situations.

The system uses a pair of magnets attached to the steering column and a Hall effect switch attached to the steering column support.

When activated by a magnet, the O.T.A.S. switch sends a signal to the ECM.

The ECM activates a pre-programmed RPM setting when the driver initiates a full turn after releasing throttle lever. The engine RPM is controlled by the Intelligent Throttle Control (iTC).

The O.T.A.S. system is activated in the following conditions:

- The engine speed must be above 4000 RPM for at least 1.5 second (approximately).
- The throttle lever must be released completely.
- The steering must be fully turned within approximately 4 seconds after throttle release.

The O.T.A.S. will stay activated for a random period of time as long as the O.T.A.S. switch is closed.

O.T.A.S. will be deactivated if:

- The throttle is reapplied, or
- The steering is turned sufficiently to open the O.T.A.S. switch for more than one second.

ADJUSTMENT

STEERING ALIGNMENT

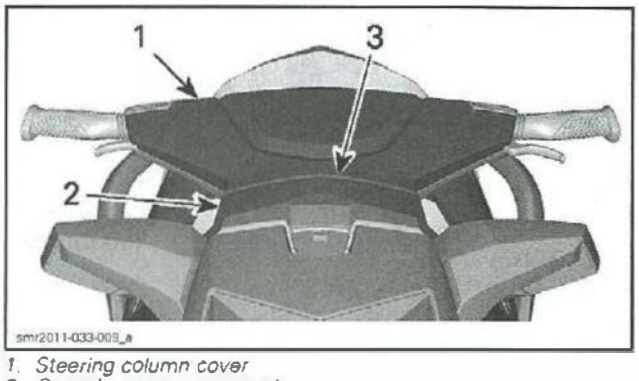
Install two bungee cords to maintain handlebar in position during the procedure.

Models with iBR

Raise the iBR gate by activating the iBR override function. Refer to *iBR AND VTS* subsection.

All Models Except RXT-X

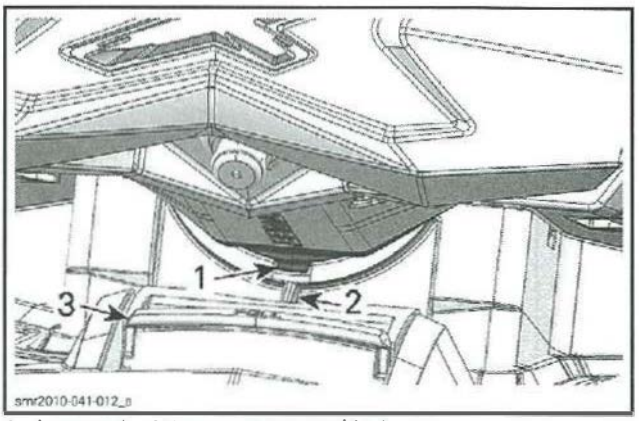
Position steering so that the edge of the steering column cover and the edge of the gauge support (or console) are flush.



1. *Steering column cover*
2. *Console or gauge support*
3. *Flush edges*

RXT-X Models

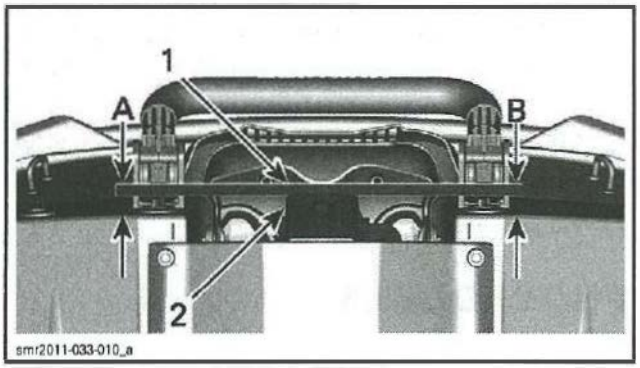
Align the center of the rear extension block lower tab with the center of the rib located in front of the steering tilt release handle.



1. *Lower tab of the rear extension block*
2. *Rib*
3. *Steering tilt release handle*

All Models

Check jet pump nozzle alignment by placing a straight edge on the nozzle outer end. Measure the distance on each side of the straight edge.



VIEW FROM UNDERNEATH THE HULL
1. *Straight edge*
2. *Nozzle*

A. Port measure
B. Starboard measure

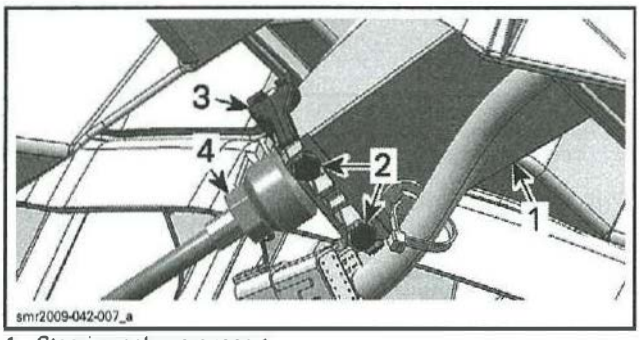
When properly aligned, measures A and B are equal.

If necessary, adjust cable at steering column as follows:

Open storage compartment cover and remove basket or access cover as applicable.

Loosen steering cable clamp bolts.

Turn adjusting nut as required.



1. *Steering column support*
2. *Steering cable clamp bolts*
3. *Steering cable clamp*
4. *Steering cable adjusting nut*

Tighten steering cable clamp bolts to 9 N•m (80 lbf•in).

NOTICE Verify when the handlebar is turned completely to the left or right side, that there is no interference with jet pump or reverse parts.

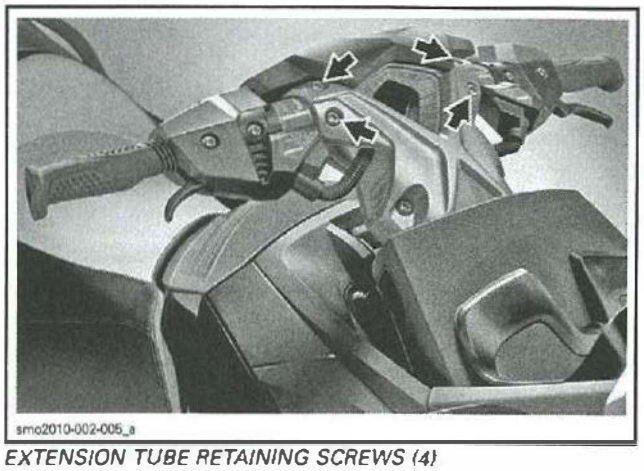
ERGONOMIC ADJUSTMENTS

RXT-X Models

The handlebar width and angular position of the controls may be adjusted to driver preference by extending and rotating the handlebar extension tubes.

To adjust, carry out the following steps:

1. Loosen the screws (2 each side) that secure the handlebar extension tubes.



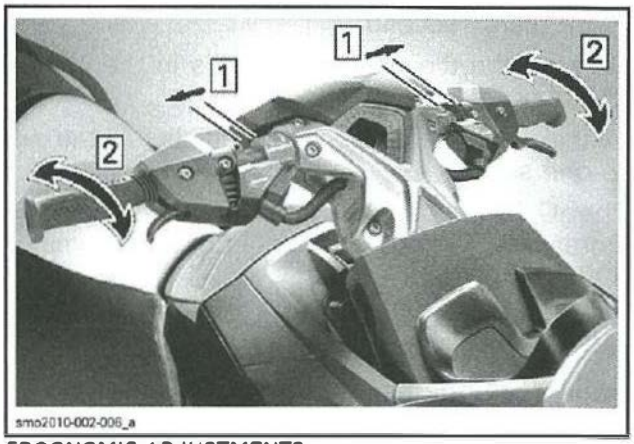
EXTENSION TUBE RETAINING SCREWS (4)

2. Pull out on the handlebar grips to adjust handlebar width.

NOTE: The handlebar width factory set position is fully closed. The handlebar width may be increased by 2.5 cm (1 in) each side.

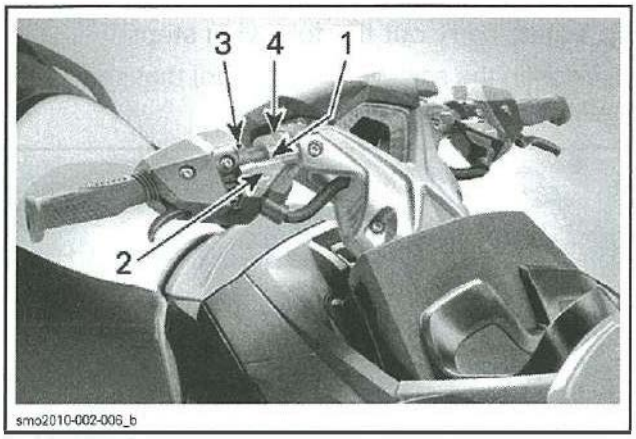
3. Rotate the handlebar grips to the desired position of the controls.

NOTE: Rotating the handlebar grips rotates the handlebar extension tubes and controls. The extension tubes may be rotated plus or minus 18° from the factory set position.



ERGONOMIC ADJUSTMENTS
Step 1: Adjust handlebar width
Step 2: Adjust angular position of controls

4. Using the index marks and scales on each side of the handlebar, ensure identical width and angular position of both handlebar extension tubes.



1. Width index
2. Width scale
3. Angular position index
4. Angular position scale

5. Torque handlebar retaining screws to 9 N•m (80 lbf•in).

INSPECTION

O.T.A.S. OPERATION

This test is to be performed with the watercraft in the water (test tank or on a trailer).

NOTICE If the test is performed on a trailer, ensure no debris or rocks can damage the jet pump.

Start engine.

Raise engine speed higher than 4000 RPM for more than 1 second.

Release throttle while steering is in the straight ahead position.

Within 1 to 3 seconds, turn handlebar all the way to one side.

The O.T.A.S. should come on by keeping or increasing engine speed to approximately 3000 RPM.

Then, engine speed will gradually decrease to idle speed within approximately 5 seconds.

Repeat test for the other side.

If the engine does not behave as described, carry out the *O.T.A.S. SWITCH TEST WITH B.U.D.S.*

TROUBLESHOOTING

DIAGNOSTIC TIPS

Check fault codes as a first troubleshooting step.

If O.T.A.S. works when handlebar is turned on one side only, check magnets condition, if magnets and switch are securely installed.

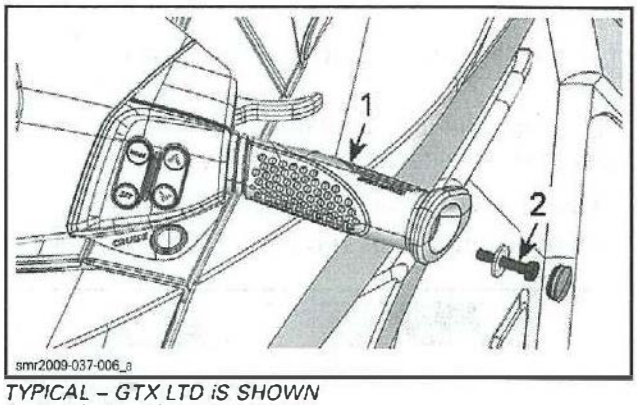
To confirm is O.T.A.S. is functional, carry out *O.T.A.S. OPERATION* in this subsection. If it is not possible, carry out *O.T.A.S. SWITCH TEST WITH B.U.D.S.*

PROCEDURES

HANDLEBAR GRIP

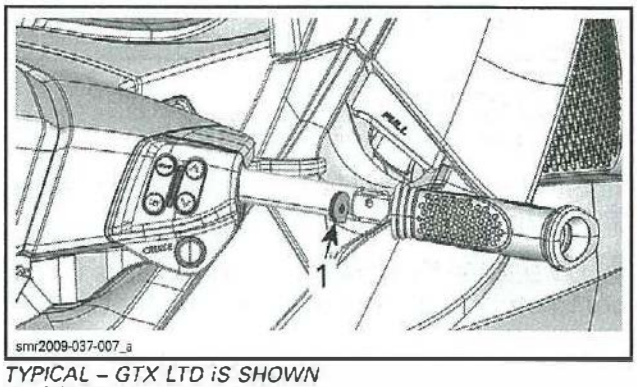
Handlebar Grip Removal

To remove handlebar grip, remove the cap, then the retaining screw.



TYPICAL – GTX LTD iS SHOWN
1. Handlebar grip
2. Handlebar grip screw

Pull out handlebar grip and remove grip insert from handlebar.

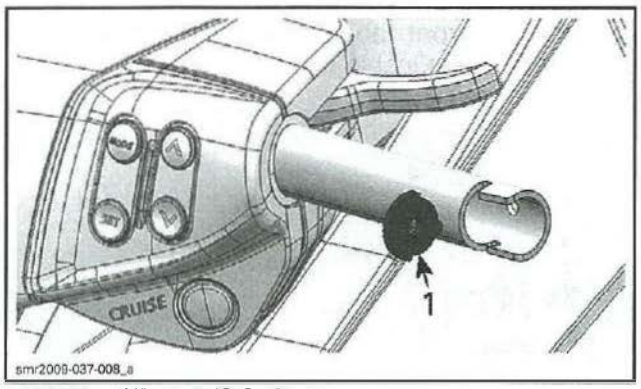


TYPICAL – GTX LTD iS SHOWN
1. Grip insert

NOTE: Verify grip insert for damage.

Handlebar Grip Installation

When installing the grip insert in the handlebar, ensure that it is properly inserted in the slot at the end of the handlebar tubing.



TYPICAL – GTX LTD iS SHOWN
1. Grip insert

Install handlebar grip on handlebar matching it to the notch in the handlebar.

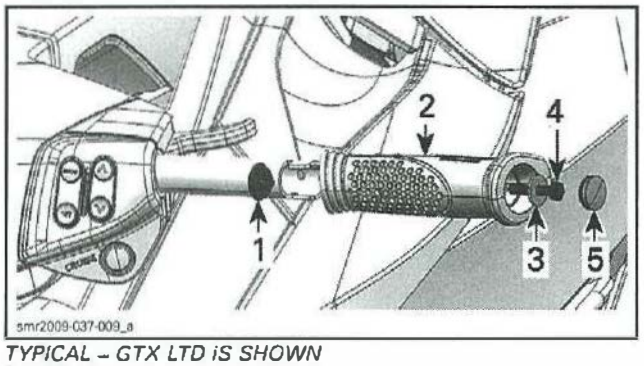
Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on screw threads (or use new self-locking screws).

Install flat washer and handlebar grip screw.

NOTICE **Ensure to install flat washer otherwise screw will damage the grip end.**

Torque handlebar grip screw to 7 N•m (62 lbf•**in**).

Install cap.



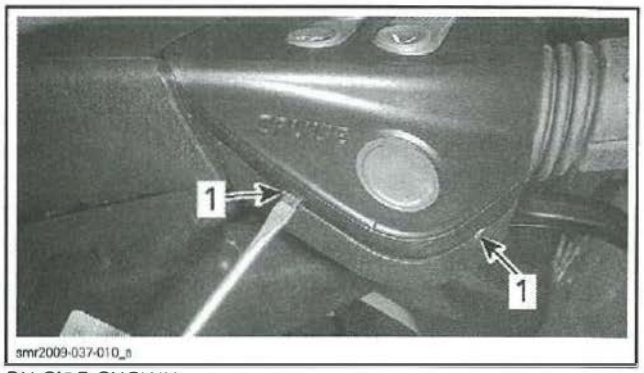
TYPICAL – GTX LTD iS SHOWN
1. Grip insert
2. Grip
3. Flat washer
4. Screw
5. Cap

HANDLEBAR SWITCH COVER (LH OR RH)

Handlebar Switch Cover Removal (LH or RH)

All Models Except RXT-X

1. Insert the end of a small screwdriver in one of cover slots.

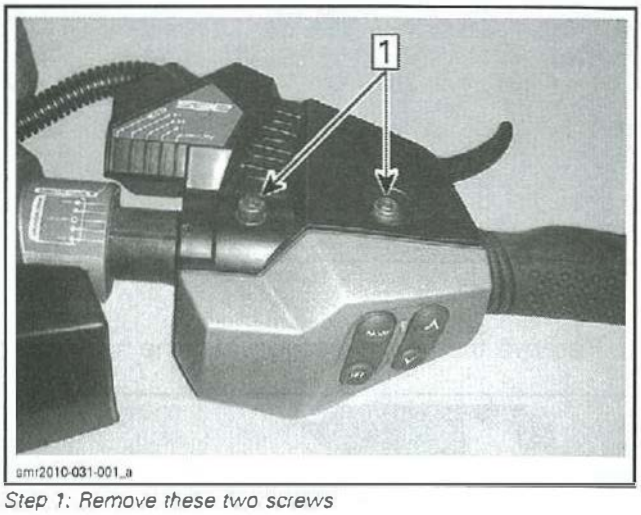


RH SIDE SHOWN
1. Cover slots

2. Twist screwdriver to open cover.
3. Remove the switch cover.

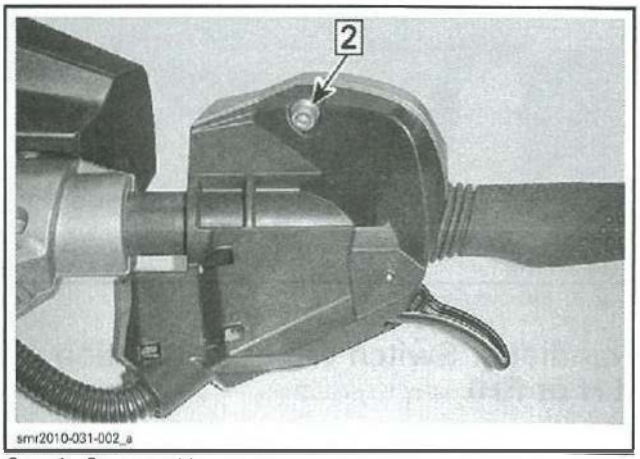
RXT-X Models

1. Remove the 2 screws at front of the upper handlebar housing.



Step 1: Remove these two screws

2. Remove the screw at rear of the handlebar.

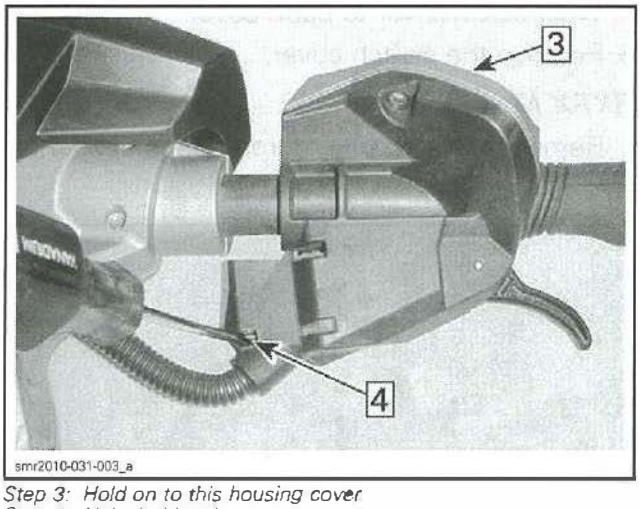


Step 2: Remove this screw

NOTICE **Do not try to pull the cover off the housing at this time.**

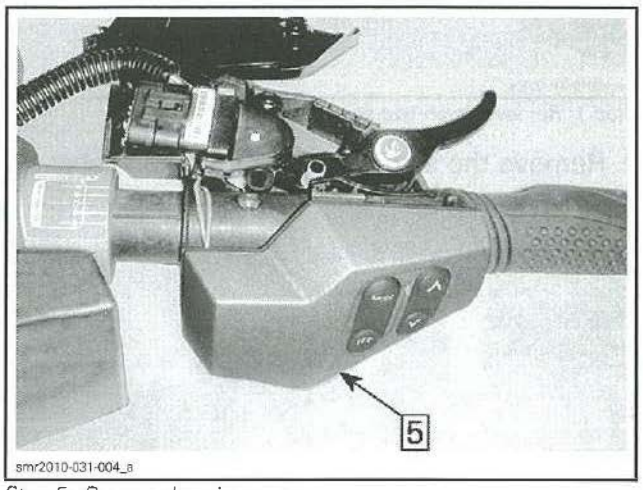
3. Hold the housing cover to prevent it from falling off the handlebar when unlocking the upper housing in the following step.
4. Using a small screwdriver, unlock the tab retaining the upper housing and pull the upper housing off.

NOTICE **As you remove the upper housing, hold the housing cover to prevent it from falling off the handlebar.**



Step 3: Hold on to this housing cover
Step 4: Unlock this tab

5. Remove the housing cover from the handlebar.

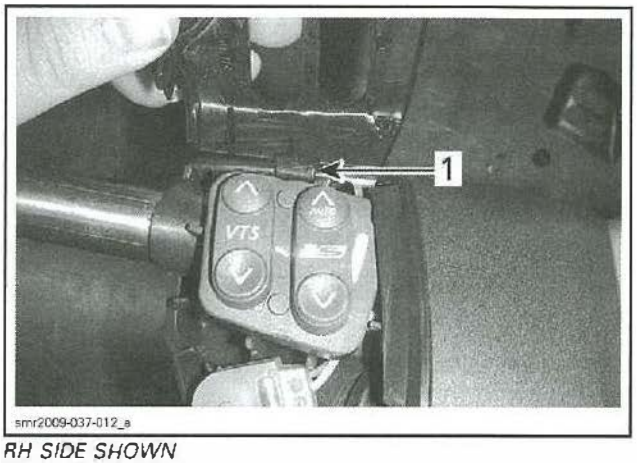


Step 5: Remove housing cover

Handlebar Switch Cover Installation (LH or RH)

All Models Except RXT-X

1. Install the round rubber button in the cover.
2. Insert the front tab and tilt the cover over the switches (applicable models).



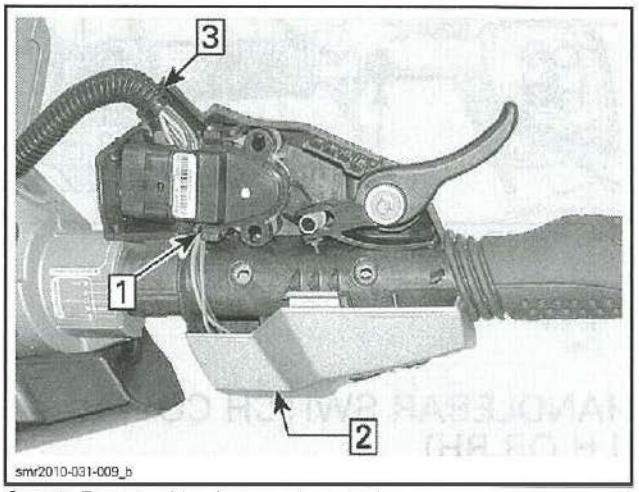
RH SIDE SHOWN
1. Front tab

3. Press on the cover to lock it.

RXT-X Models

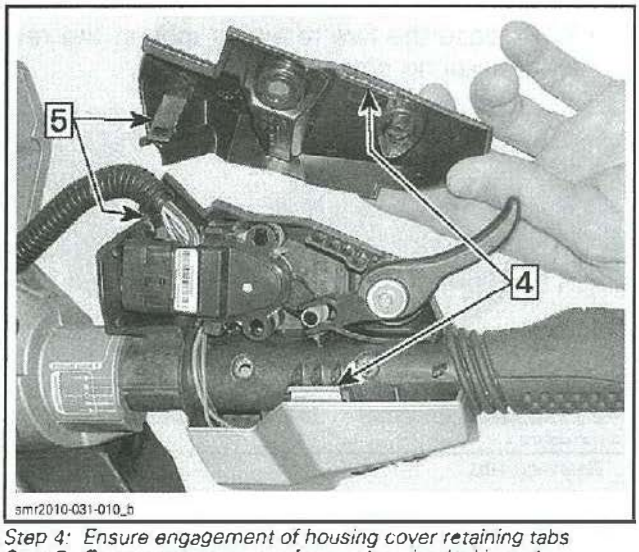
Installation is the reverse of the removal procedure however, pay attention to the following.

1. Route wires to avoid pinching them.
2. Position the housing cover onto the handlebar housing.
3. Ensure positioning of corrugated conduit



Step 1: Ensure wiring is properly routed
Step 2: Install housing cover
Step 3: Ensure proper corrugated conduit positioning

4. Position the upper housing on the handlebar housing.
5. Ensure proper engagement of the upper housing and cover tabs.



Step 4: Ensure engagement of housing cover retaining tabs
Step 5: Ensure engagement of upper housing locking tabs

6. Install the three retaining screws for the upper housing and torque them to 2 N•m (18 lbf•**in**).
7. Ensure proper operation of throttle lever.

EXTENSION BLOCKS (RXT-X MODELS)

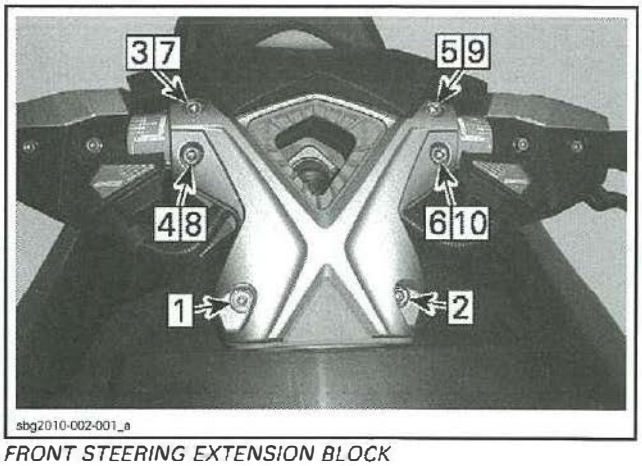
Extension Block Removal

1. Remove all socket screws (8x) that retain the front and the rear extension blocks.
2. Separate both extension blocks.
3. Using the D.E.S.S. POST REMOVER (P/N 529 035 943), remove the engine cut-off switch (D.E.S.S. post) retaining nut.

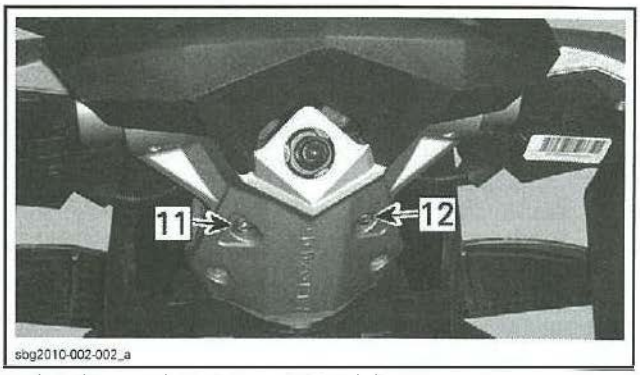


Extension Block Installation

Tighten screws to 9 N•m (80 lbf•**in**) using the following sequence.



FRONT STEERING EXTENSION BLOCK



REAR STEERING EXTENSION BLOCK

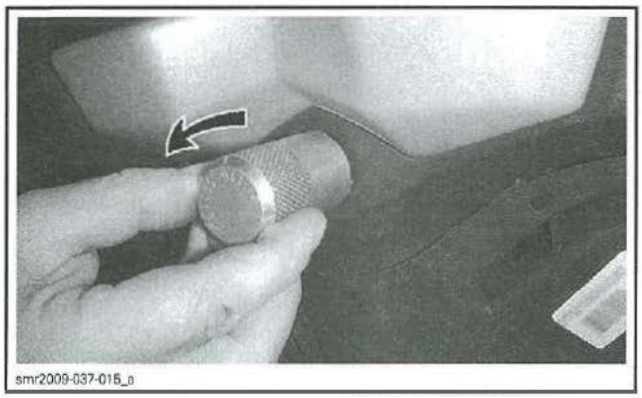
STEERING COVER

Steering Cover Removal

All Models Except RXT-X

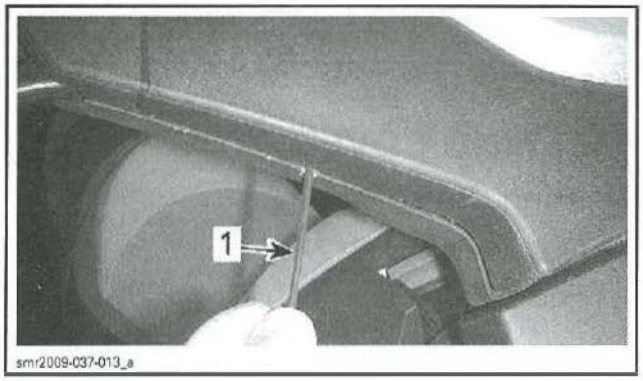
1. Using the D.E.S.S. POST REMOVER (P/N 529 035 943), remove the engine cut-off switch (D.E.S.S. post) retaining nut.





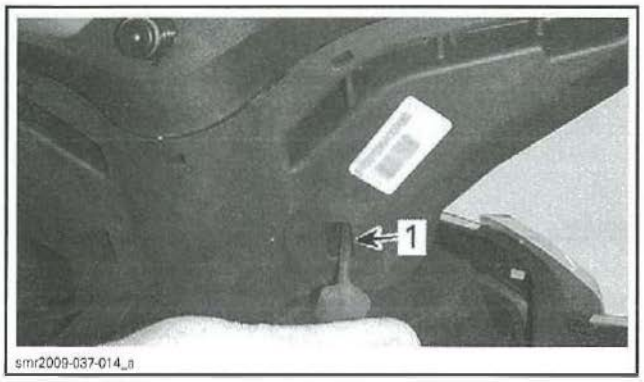
2. Remove both handlebar switch covers. See procedure in this subsection.
3. Unlock steering cover from steering.
   3.1 Insert a small tool, such as an Allen key, into a steering cover hole. Press the tool against the retaining tab to unlock it. Repeat for the other side.

   NOTICE **The tool must be inserted perfectly straight to avoid breaking the tab holder.**



1. Allen key

   3.2 In both cavities at the back of steering cover, release both inner retaining tabs using a long screwdriver.



1. Rear cavity

   3.3 Release the five retaining tabs at the rear of steering cover.



1. Retaining tabs

   3.4 Remove the foam inside the steering cover.
   3.5 Remove the engine cut-off switch from the steering cover.

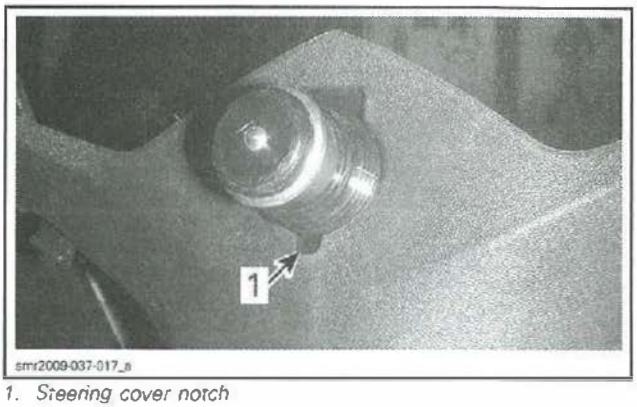
RXT-X Models

1. Separate the extension blocks. See procedure in this subsection.
2. Remove screws securing the steering cover to the front extension block.

Steering Cover Installation

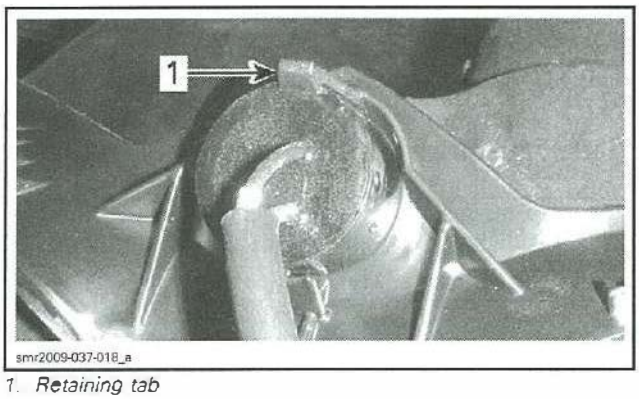
All Models Except RXT-X

1. Install the engine cut-off switch.
   1.1 Index the alignment pin of the engine cut-off switch with the notch of steering cover.



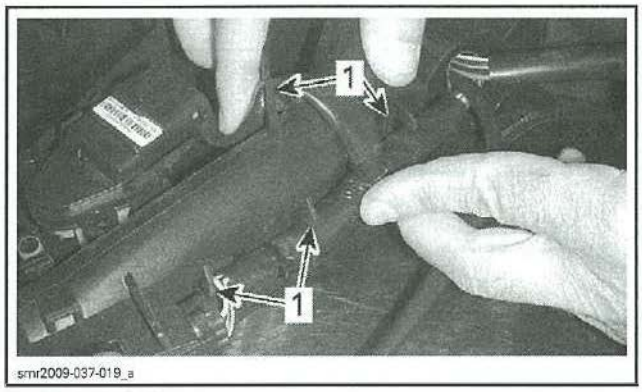
1. Steering cover notch

   1.2 Press the engine cut-off switch until retaining tab is positioned correctly.



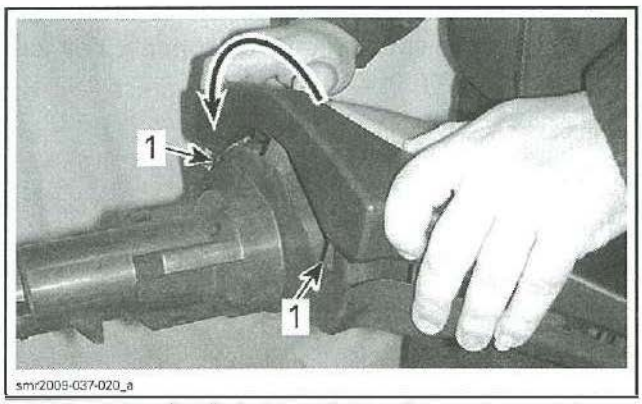
1. Retaining tab

2. Install the engine cut-off switch nut and tighten it to 2 N•m (18 lbf•**in**).
3. Install the foam.
4. Place the engine cut-off switch harness in foam slot.
5. Install the steering cover.
   5.1 Check if all harnesses are route properly. All harness must be inserted in its slot.



1. Harness slots

   5.2 Clip the top of the cover.
   5.3 Stretch the bottom of the steering cover until the cover edge passes over the inner ribs.



STEERING REMOVED FOR CLARITY PURPOSE
1. Inner ribs

   5.4 Push both side of the cover to lock it with the steering column.
   5.5 Install switch covers.

RXT-X Models

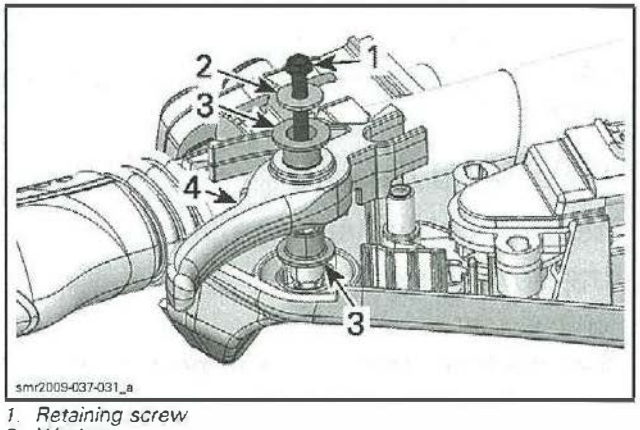
The installation is the reverse of the removal procedure.

THROTTLE AND iBR LEVERS

NOTE: The following procedure demonstrates the replacement of the throttle lever but the same procedure will be used for the iBR lever.

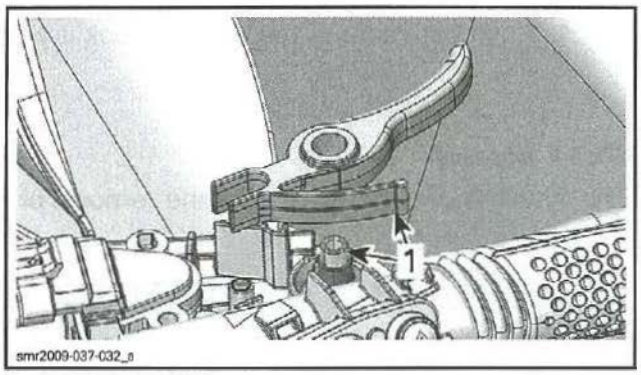
Lever Replacement

1. Remove *HANDLEBAR SWITCH COVER*, see procedure in this subsection.
2. Remove the screw and washer securing throttle lever.
3. Remove throttle lever and its bushings.



1. Retaining screw
2. Washer
3. Bushings
4. Throttle lever

4. Clean throttle lever area from dust or any deposits.
5. Apply XPS SYNTHETIC GREASE (P/N 293 550 010) on bushings and on the outer surface of the return tab.



1. Apply grease here

6. Install the lever.
   6.1 Install both bushings in lever hole.
   6.2 Insert sensor lever end into throttle lever fork.
   6.3 Position the return tab against the handlebar.
   6.4 Secure the lever with washer and screw.
   6.5 Tighten the lever screw to 0.7 N•m (6 lbf•**in**).
7. Reinstall all removed parts using appropriate procedures.

STEERING CABLE

Steering Cable Replacement

GTS, GTI and Wake 155

Remove seat.

Open the front storage compartment cover.

Remove access cover.

Remove the gauge trim. Refer to *BODY* subsection.

RXT GTX and Wake Pro

Open the seat and the front storage compartment cover.

Remove the storage basket.

Remove the gauge support. Refer to *GAUGE* subsection.

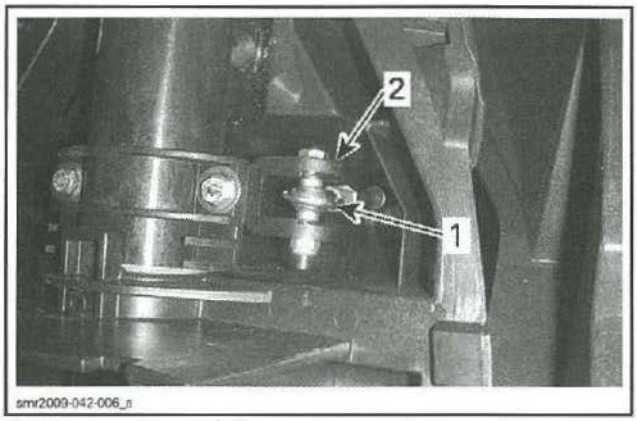
RXT aS, RXT iS and GTX iS

Remove the moving deck. Refer to *BODY* subsection.

Remove the adjusting nut from steering cable end.

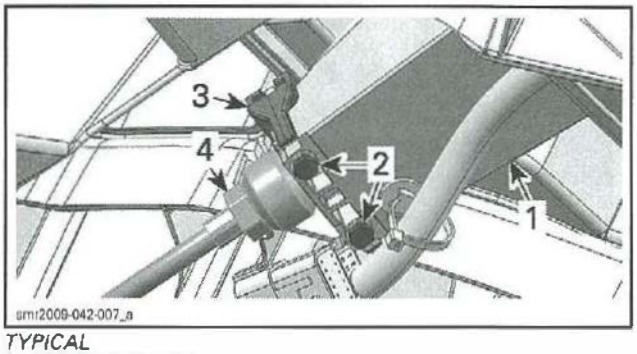
All Models

1. Detach steering cable from steering column.
   1.1 Remove the bolt securing the ball joint to the steering column arm.



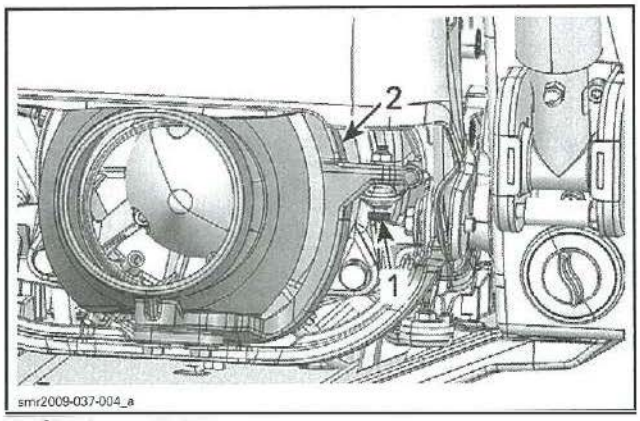
1. Steering cable ball joint
2. Steering column arm

   1.2 Remove the steering cable clamp bolts.
   1.3 Unhook steering cable clamp.



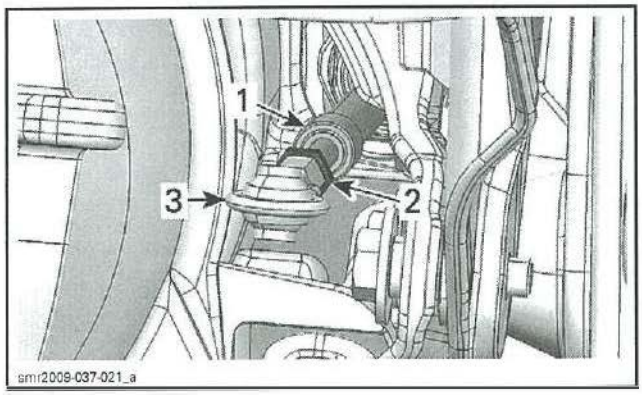
TYPICAL
1. Steering column
2. Steering column clamp bolts
3. Steering column clamp
4. Steering cable adjusting nut

   1.4 Place steering in its lower position (models with tilt steering).
   1.5 Free steering cable from the clamp.
1. At rear of the watercraft, disconnect ball joint from jet pump nozzle arm.



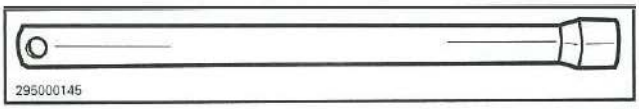
1. *Steering cable bolt*
2. *Nozzle arm*

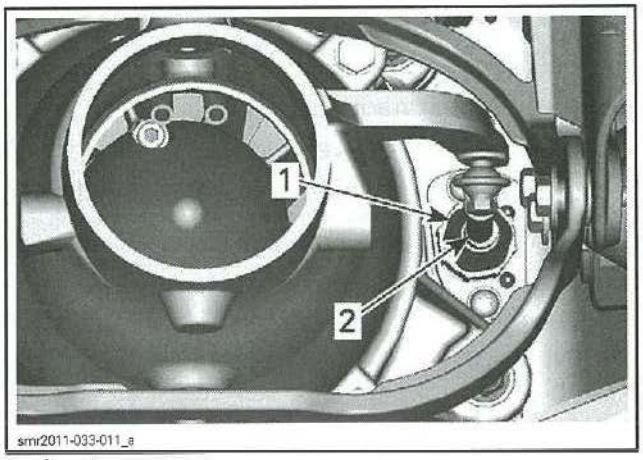
2. Remove ball joint and jam nut from cable.



1. *Steering cable*
2. *Jam nut*
3. *Ball joint*

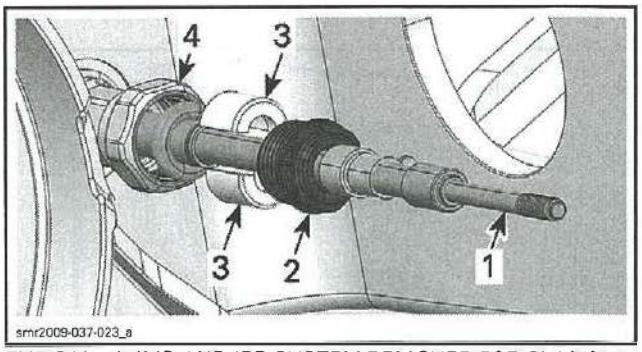
3. Using the STEERING CABLE TOOL (P/N 295 000 145), loosen steering cable nut.





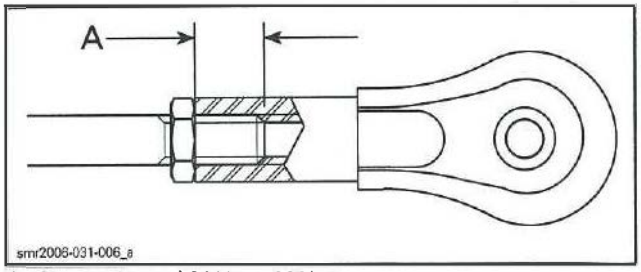
1. *Steering cable nut*
2. *Steering cable*

4. Remove steering cable nut, half rings and O-ring.



TYPICAL - PUMP AND iBR SYSTEM REMOVED FOR CLARITY PURPOSE ONLY
1. *Steering cable*
2. *Steering cable nut*
3. *Half rings*
4. *O-ring*

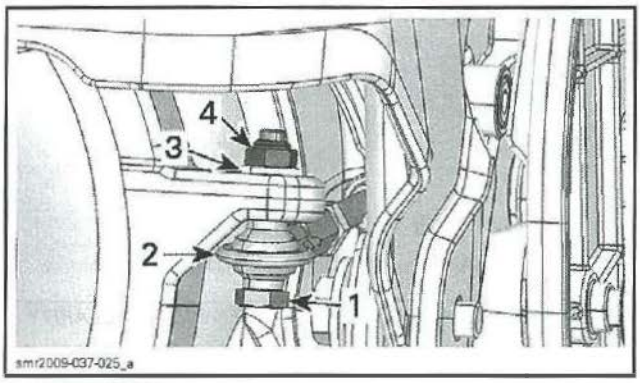
5. Remove the adjusting nut from the new steering cable.
6. From inside the hull, pull the aft end of the cable through the hull fitting.
7. Using a piece of hose, attach one end of the new cable to the opposite end old cable together.
8. Route the new cable in the hull by slowly pulling the old one, then separate cable ends.
9. From inside of the hull, pass the aft end of the cable through the hull fitting.
10. Secure the steering cable to the hull fitting.
    - 10.1 Install O-ring and half rings.
    - 10.2 Apply LOCTITE 567 (PIPE SEALANT) (P/N 293 800 013) on nut threads.
    - 10.3 Secure steering cable with the steering cable nut.
    - 10.4 Tighten nut to 6 N•m (53 lbf•**in**).
11. Install the ball joint on the end of the steering cable.
    - 11.1 The threaded portion of steering cable inserts into ball joint should have between 9 mm ± 1 mm (.354 in ± .039 in).



A. 9 mm ± 1 mm (.354 in ± .039 in)

11.2 Tighten jam nut to 2.5 N•m (22 lbf•**in**).

11.3 Position the steering cable ball joint to the nozzle as per following illustration.

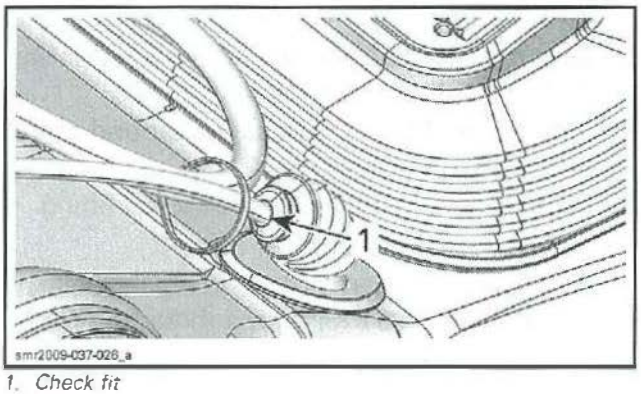


1. *Ball joint bolt*
2. *Ball joint under nozzle arm*
3. *Washer*
4. *Nut*

11.4 Tighten ball joint nut to 7 N•m (62 lbf•**in**).

RXT iS and GTX iS

1. Check if the cable bellows is properly positioned all around steering cable.

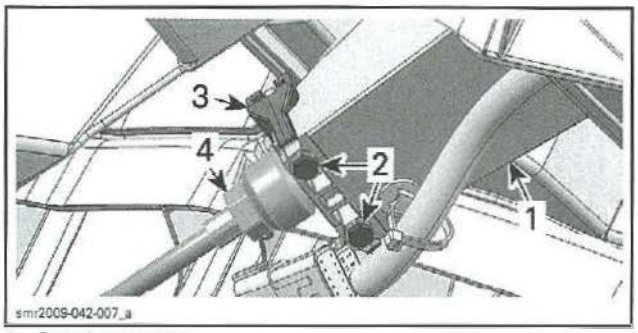


1. *Check fit*

2. Reinstall the moving deck. Refer to *BODY* subsection for complete procedure.

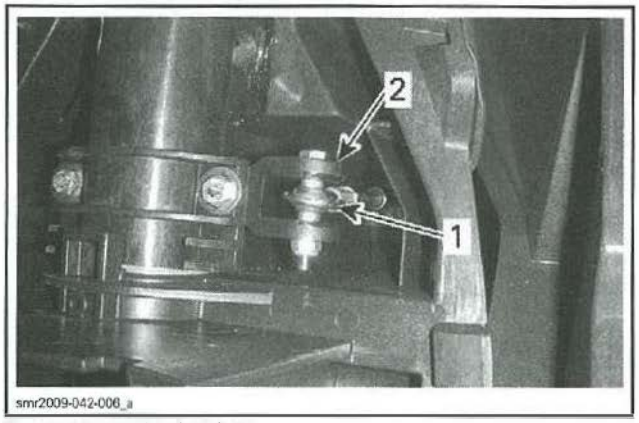
All Models

1. Insert the steering cable through the bottom end of the steering column.
2. Install steering cable clamp and its bolts. Do not tighten bolts yet.



1. *Steering column*
2. *Steering column clamp bolts*
3. *Steering column clamp*
4. *Steering cable adjusting nut*

3. Attach steering cable to steering column arm.



1. *Steering cable ball joint*
2. *Steering column arm*

4. Tighten retaining bolt to 5 N•m (44 lbf•**in**).
5. Carry out *STEERING ALIGNMENT*. See procedure in this subsection.
6. Install other removed parts.

STEERING COLUMN

Steering Column Removal

GTS, GTI and Wake 155

Open the front storage cover.

Remove the access cover.

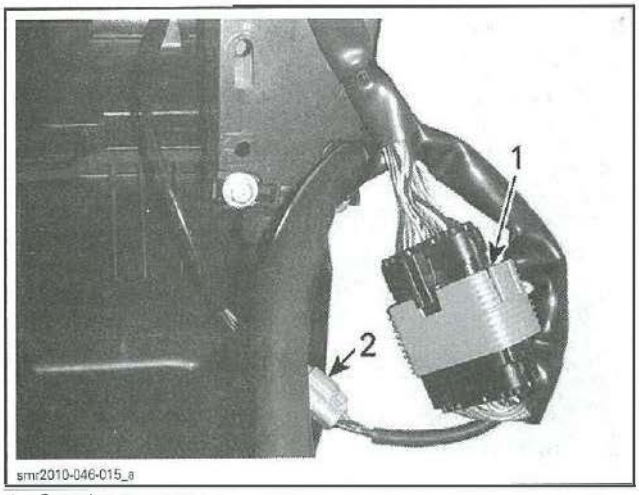
Remove gauge trim, refer to *BODY* subsection.

GTX, RXT and Wake Pro

Open the front storage cover and remove the storage basket.

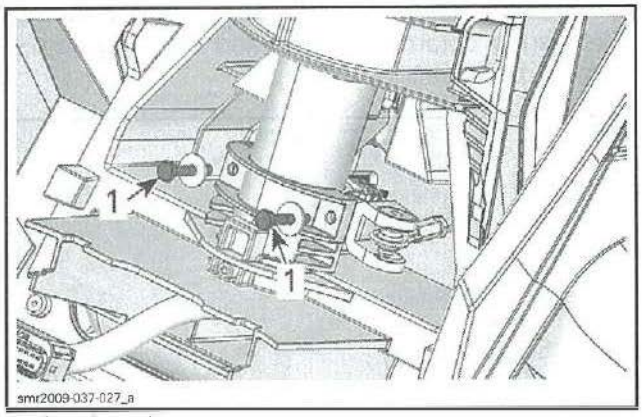
Remove the gauge support. Refer to *GAUGE* subsection.

1. Disconnect both connectors under the steering column.



1. *Steering connector*
2. *O.T.A.S. connector*

2. Remove both screws securing the steering column.



1. *Steering column screws*

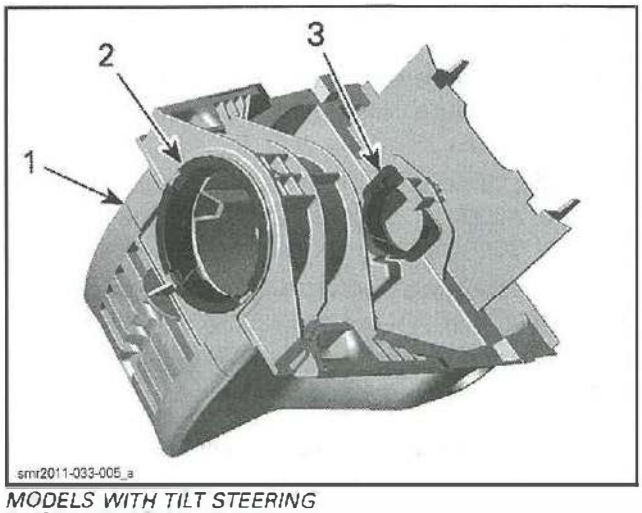
3. Pull steering column out of its support. Ensure to not damage wiring harness connectors and O.T.A.S. magnets.

Steering Column Inspection

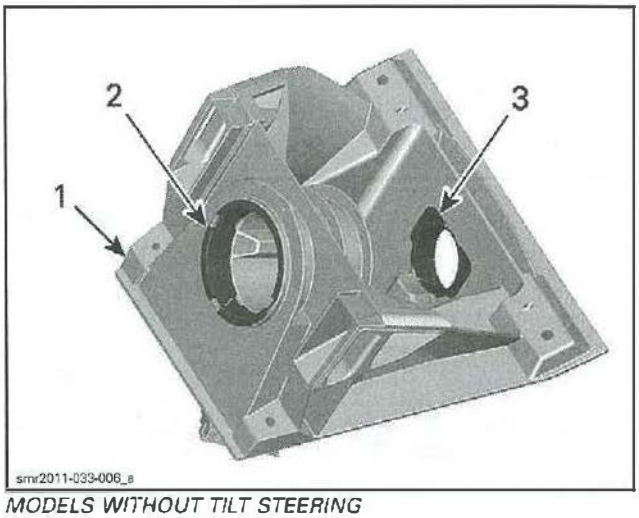
Check steering column for:

- Cracks
- Stress marks
- Sings of wear.

Check steering column support bushings.

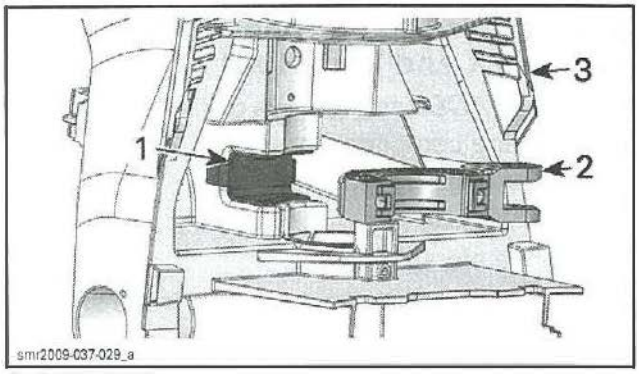


MODELS WITH TILT STEERING
1. *Steering column support*
2. *Upper bushing*
3. *Lower bushing*



MODELS WITHOUT TILT STEERING
1. *Steering column support*
2. *Upper bushing*
3. *Lower bushing*

Check wear sleeve behind the steering column arm.



1. *Wear sleeve*
2. *Steering column arm*
3. *Steering column support*

Replace any damaged or worn parts.

Steering Column Installation

The installation is essentially the reverse of the removal procedure. However, pay attention to the following.

Carefully, drive steering column through steering column support. Ensure not to hit the O.T.A.S. magnet during steering column installation.

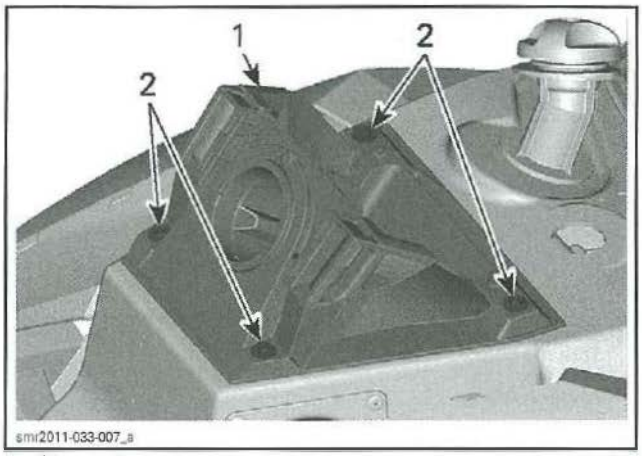
Tighten steering column screws to 6 N•m (53 lbf•in).

Reinstall all removed parts using appropriate procedure.

STEERING COLUMN SUPPORT

Steering Column Support Removal (GTS, GTI and Wake 155)

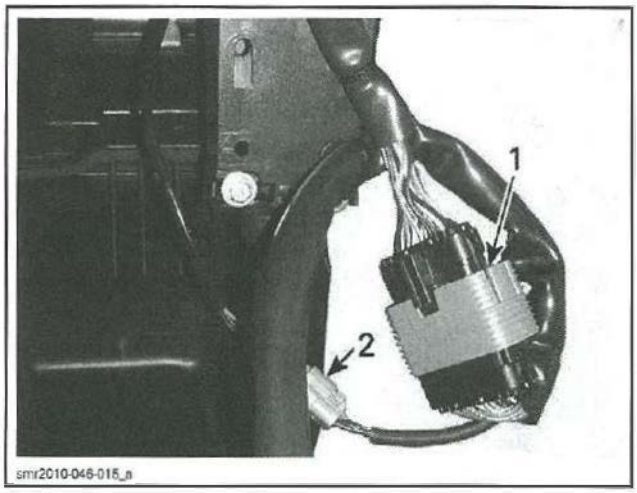
1. Remove steering column, see procedure in this subsection.
2. Remove console, refer to *BODY* subsection.
3. Remove steering column support retaining screws.



1. *Steering column support*
2. *Retaining screws*

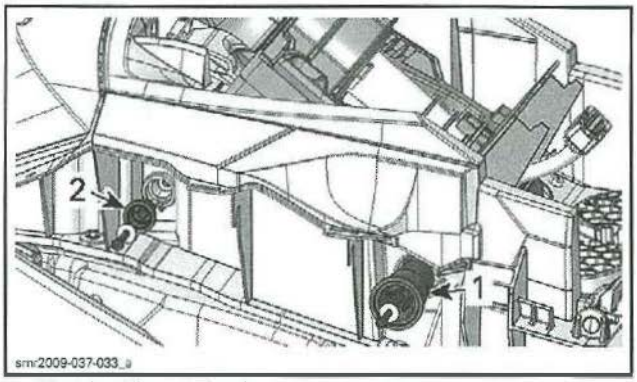
Steering Column Support Removal (RXT, GTX and Wake Pro)

1. Refer to *BODY* and remove the following parts:
   - Storage compartment cover
   - Front grille (iS models)
   - Body covers.
2. Remove storage basket.
3. Disconnect both connectors under the steering column.



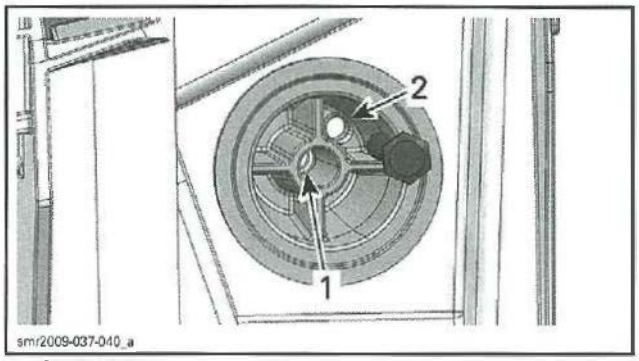
1. *Steering connector*
2. *O.T.A.S. connector*

4. Remove the gauge support. Refer to *GAUGE* subsection.
5. On both sides, remove both pivot bushings (steering column support and steering adjustment handle).



1. *Pivot bushing of steering column support*
2. *Pivot bushing of steering adjustment handle*

NOTE: If pivot bushings retaining steering column are hard to remove, remove the retaining screw from the center hole and tighten it into the offset hole. Tighten screw until the pivot bushing comes out of steering column support.



1. *Center hole*
2. *Offset hole*

6. Remove steering column support and steering adjustment handle from vehicle.
7. Remove *STEERING COLUMN* from its support. See the procedure in this subsection.

Steering Column Support Installation

Installation is the reverse of the removal procedure.

STEERING TILT RELEASE HANDLE

Steering Tilt Release Handle Replacement

Use the same procedure as for *STEERING COLUMN SUPPORT*.

O.T.A.S. SWITCH

O.T.A.S. Switch Test with B.U.D.S.

Connect watercraft to B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

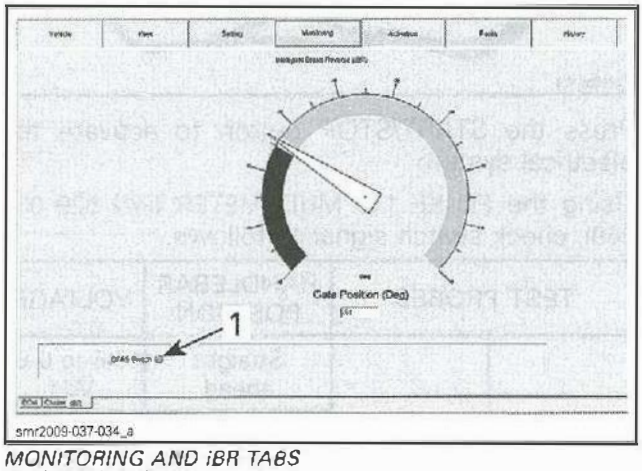
Select the **Monitoring** and **iBR** tabs.

Briefly press the START/STOP button to wake up the ECM.

Install the tether cord on the engine cut-off switch.

While monitoring the O.T.A.S. indicator in B.U.D.S., completely turn steering in one direction and keep it in this position.

The O.T.A.S. indicator should turn on when handlebar reaches the stopper.



MONITORING AND iBR TABS
1. O.T.A.S. indicator

Repeat test for the other side.

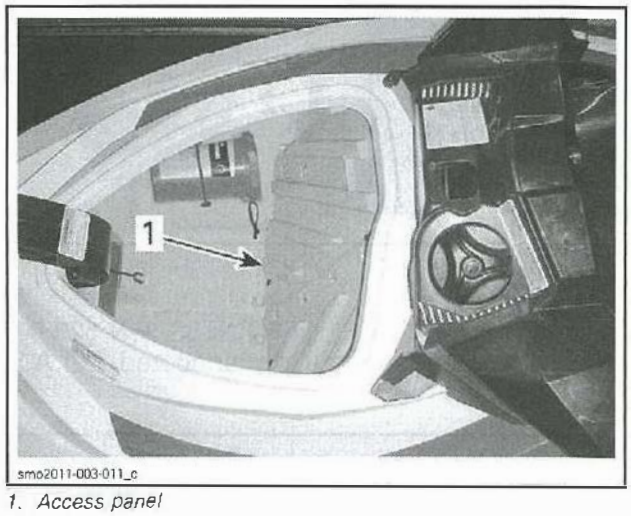
If O.T.A.S. indicator does not turn on, carry out the *O.T.A.S. SWITCH INPUT VOLTAGE TEST*.

O.T.A.S. Switch Input Voltage Test

Access the O.T.A.S. connector as follows:

GTI, GTS and Wake 155

Open the front storage cover an remove the access panel.



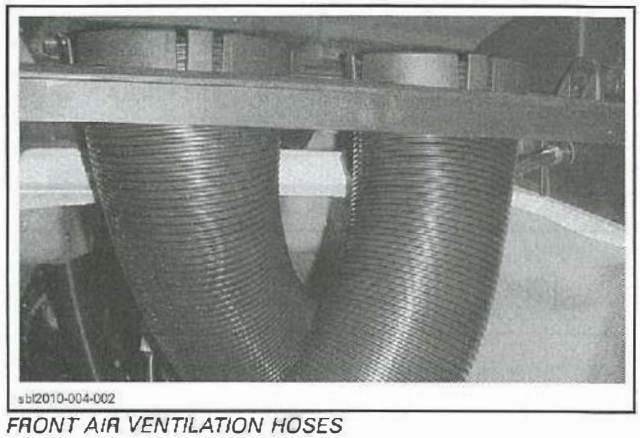
1. Access panel

RXT, GTX and Wake Pro

Open front storage compartment cover.

Remove front storage bin.

Disconnect the top air ventilation hoses.



FRONT AIR VENTILATION HOSES

RXT iS, RXT aS and GTX iS

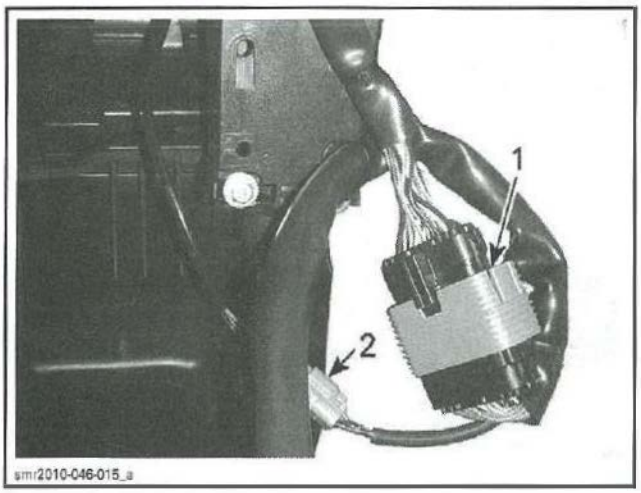
Open front storage compartment cover.

Remove front storage bin.

For easier access, rise the moving deck using the iS "up" button.

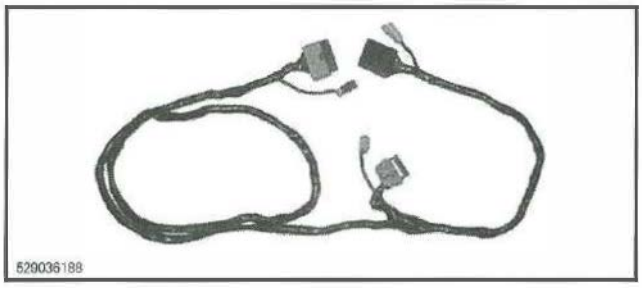
All Models

Disconnect the O.T.A.S. connector (keep the 24-pin steering harness connected.



1. *Steering connector*
2. *O.T.A.S. connector*

Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) in-line between the disconnected O.T.A.S. connectors.



Press the START/STOP button to activate the electrical system.

Using the FLUKE 115 MULTIMETER (P/N 529 035 868), measure voltage as follows.

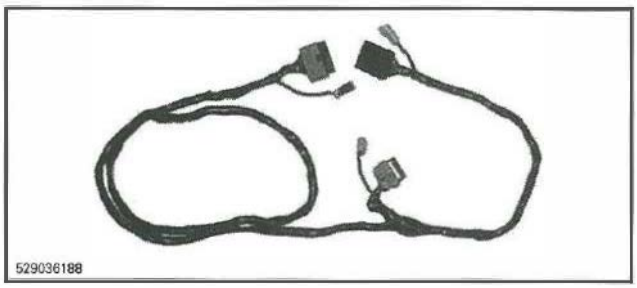
TEST PROBES		VOLTAGE (VDC)
PIN A (3-pin connector)	Battery negative post	Battery voltage

If voltage is not as specified, check wiring and connectors.

If voltage is as specified, carry out the *O.T.A.S. SWITCH GROUND TEST.*

O.T.A.S. Switch Ground Test

Install the DIAGNOSTIC HARNESS (P/N 529 036 188) as described in the *O.T.A.S. SWITCH INPUT VOLTAGE TEST.*



Press the START/STOP button to activate the electrical system.

Using the FLUKE 115 MULTIMETER (P/N 529 035 868), check ground circuit as follows.

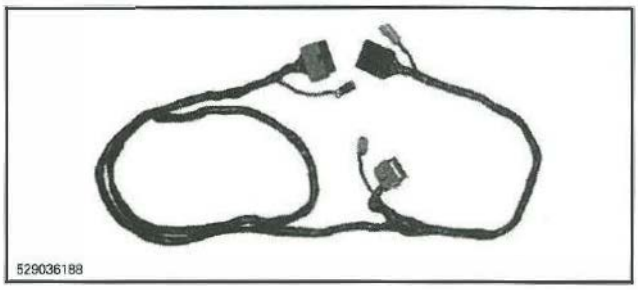
TEST PROBES		VOLTAGE (VDC)
PIN A (3-pin connector)	PIN B (3-pin connector)	Battery voltage

If voltage is not as specified, check wiring and connectors.

If voltage is as specified, carry out the *O.T.A.S. SWITCH SIGNAL TEST.*

O.T.A.S. Switch Signal Test

Install the DIAGNOSTIC HARNESS (P/N 529 036 188) as described in the *O.T.A.S. SWITCH INPUT VOLTAGE TEST.*



Press the START/STOP button to activate the electrical system.

Using the FLUKE 115 MULTIMETER (P/N 529 035 868), check switch signal as follows.

TEST PROBES		HANDLEBAR POSITION	VOLTAGE
PIN C (3-pin connector)	PIN B (3-pin connector)	Straight ahead	0.6 to 0.8 Vdc
		Turned completely to the right	2.0 to 2.5 Vdc
		Turned completely to the left	

If voltage is not as specified, replace the switch.

NOTE: To avoid useless switch replacement, make sure magnets are in good condition. Also, make sure magnets and switch are securely clipped.

O.T.A.S. Switch Replacement

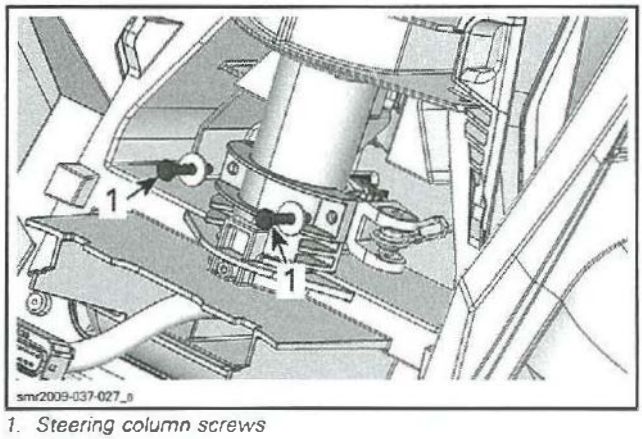
Models Without Tilt Steering

Remove steering column, see procedure in this subsection.

Models with Tilt Steering

Remove *STEERING COLUMN SUPPORT*, see procedure in this subsection.

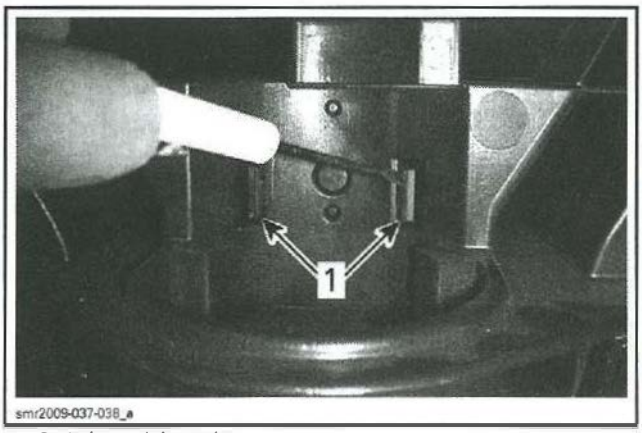
Remove steering column from its support by removing both retaining screws.



1. Steering column screws

All Models

1. Using a small screwdriver, unhook the switch from steering support.



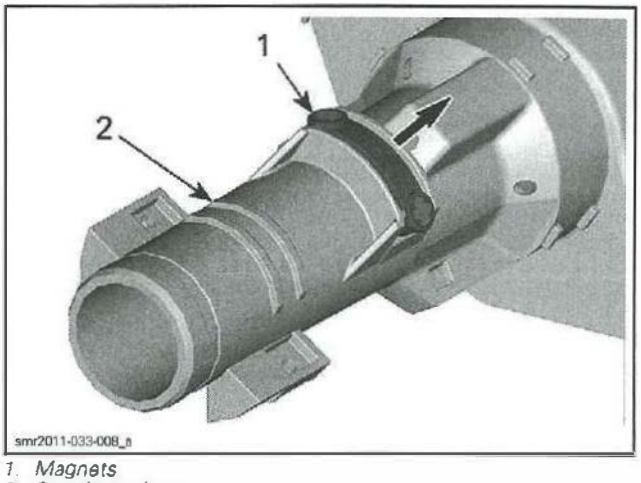
1. Switch retaining tabs

Reverse removal procedure to reinstall the O.T.A.S. switch.

O.T.A.S. MAGNETS

Magnets Replacement

1. Remove *STEERING COLUMN*, see procedure in this subsection.
2. Pull magnets off the steering column.



1. Magnets
2. Steering column

Reverse removal procedure to reinstall the magnets.

iBR AND VTS

SERVICE TOOLS

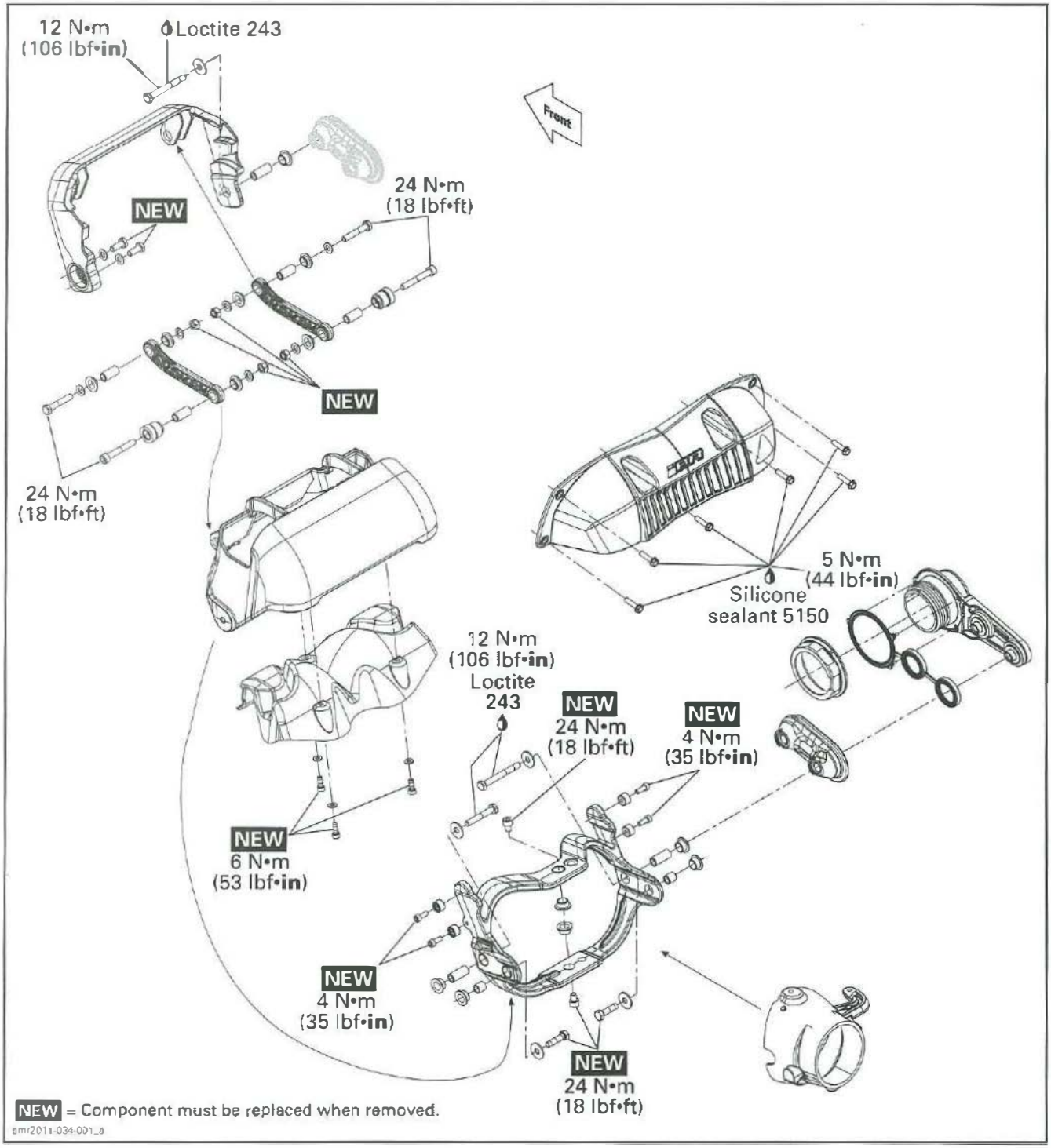
Description	Part Number	Page
DIAGNOSTIC HARNESS	529 036 188	489–491
FLUKE 115 MULTIMETER	529 035 868	489, 494–495, 513

SERVICE PRODUCTS

Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	500, 514
LOCTITE 243 (BLUE)	293 800 060	499–500

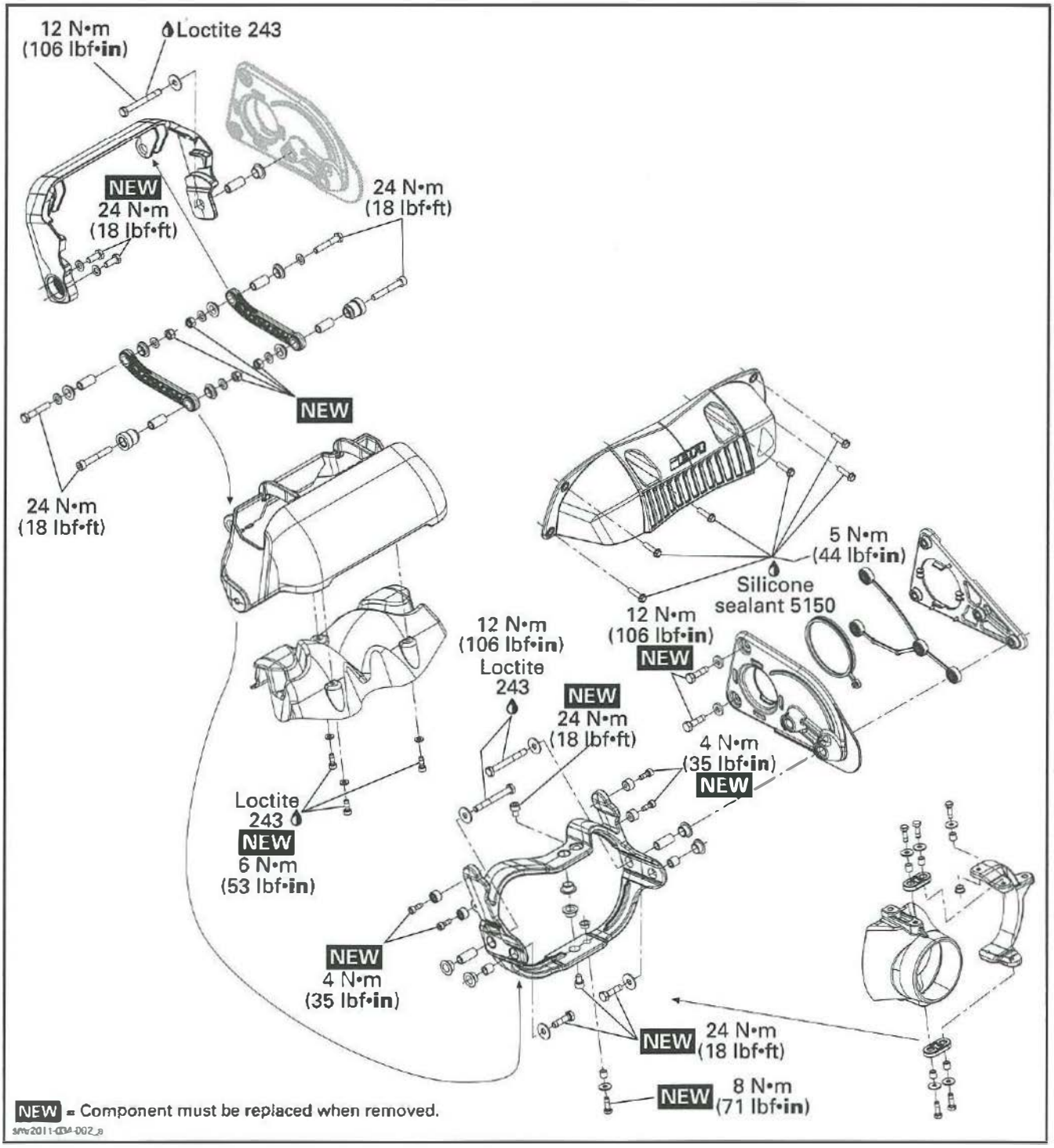
iBR GATE COMPONENTS

GTI and Wake Models



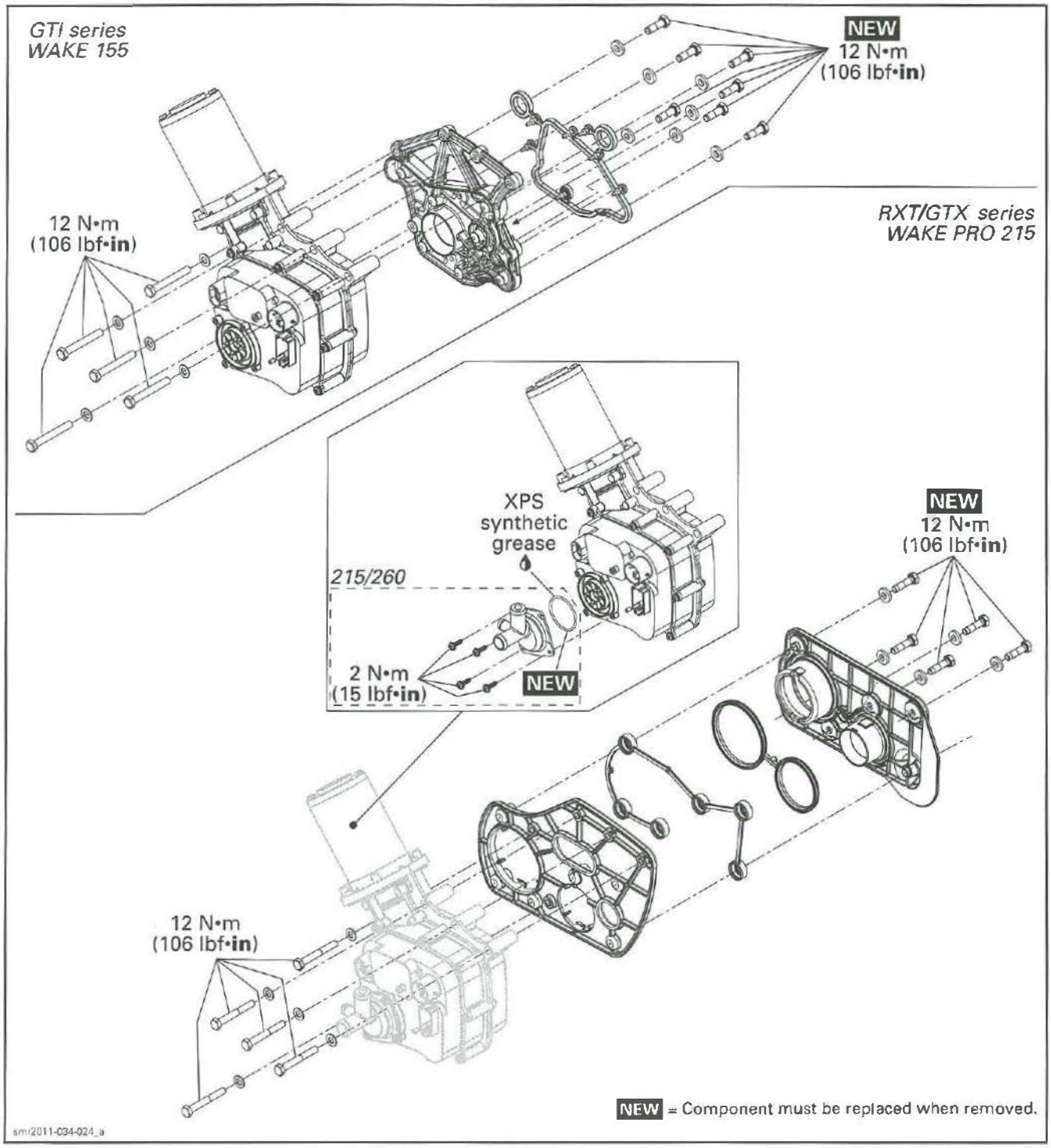
iBR GATE COMPONENTS

GTX, RXT and Wake Pro Models



iBR ACTUATOR

All Models



GENERAL

During assembly/installation, use torque values and service products as indicated in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new ones.

Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

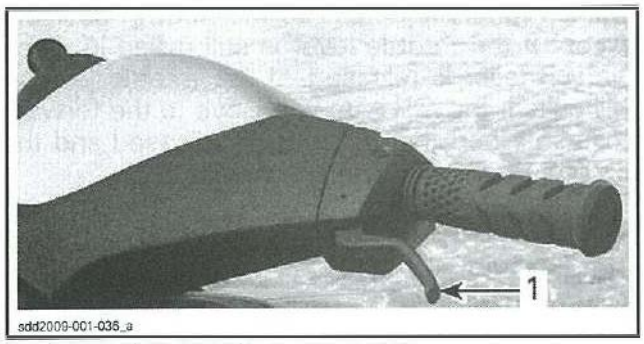
SYSTEM DESCRIPTION (iBR)

The iBR (intelligent Brake and Reverse) is an electronically controlled braking and reverse system.

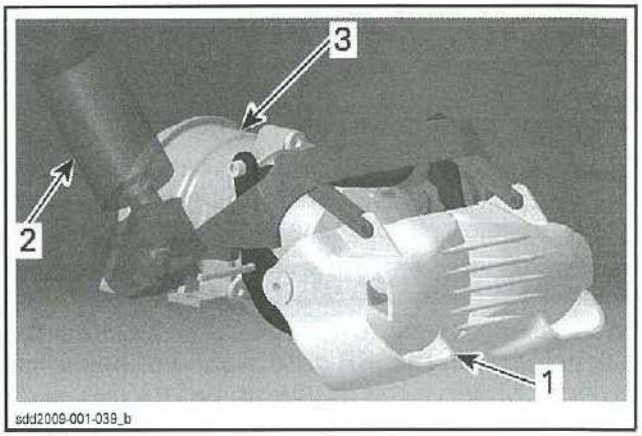
The iBR module controls the position of the iBR gate to provide forward thrust, reverse thrust, braking thrust, and neutral.

The operator commands the position of the iBR gate using either the throttle lever for forward thrust, or the iBR lever for neutral, reverse, and for the braking function.

The iBR lever is located on the LH side of the handlebar.

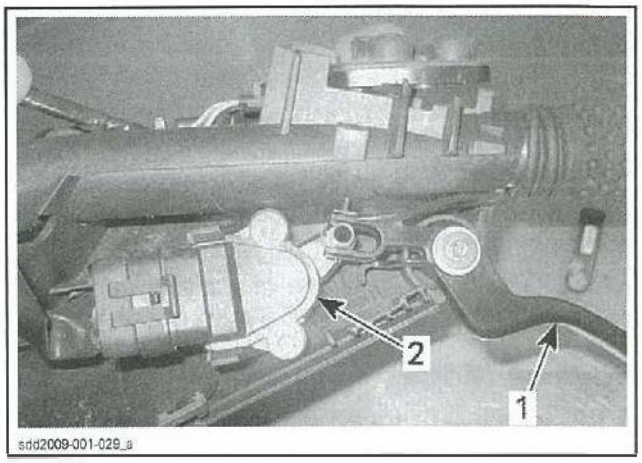


1. iBR lever (intelligent Brake and Reverse)



1. iBR gate
2. iBR module and motor
3. Jet pump

When the iBR lever is pulled in, it operates the brake and reverse lever sensor (BRLS). It is a double output hall effect sensor. The redundancy is used for security purposes.



1. iBR lever
2. BRLS sensor

The BRLS sends the signals to the iBR module. The iBR module controls an electric motor that in turn raises or lowers the iBR gate through a mechanical drive unit.

NOTE: The iBR gate will move when commanded by the iBR lever only if the engine is running. For maintenance purposes, the iBR OVERRIDE function available through the gauge can be used to electrically move the gate to the desired position.

The iBR module is programmed with various parameters that it compares to the input signals and information it obtains through the CAN bus from the other electronic modules.

Depending on vehicle speed and how far the iBR lever is pulled in, the iBR module will automatically adjust the iBR gate movement speed and stroke.

NOTE: The iBR lever must be pulled in at least 25% of its travel (approximately) before the iBR gate starts to move. The first 25% of iBR lever travel has no effect on the iBR gate.

Every time the iBR gate moves when commanded by the iBR lever, engine RPM is momentarily reduced to idle speed as the gate moves.

⚠ WARNING

If it is necessary to remove any foreign object caught in the iBR gate, nozzle or linkages, strictly observe the following before proceeding:
- **Remove tether cord from engine cut-off switch.**
- **Wait at least 5 minutes or remove iBR fuses.**
- **Do not press on START/STOP button. If START/STOP button is pressed, wait another 5 minutes.**

Forward Mode

To engage forward:
- Start engine
- Pull in the throttle lever.

The iBR gate will automatically move to the forward position (full up).

NOTE: The full up position of the iBR gate is dependent on the selected VTS trim position.

Reverse Mode

If the watercraft speed is below 8 km/h (5 MPH) when the iBR lever is pulled in, reverse mode is engaged.

When the iBR lever is pulled in to engage reverse, the following occurs:
- Engine RPM is reduced to idle.
- The iBR gate moves to the reverse position.
- Engine RPM ramps up to the engine power commanded by the throttle lever.

When operating in reverse mode, the iBR lever controls the iBR gate position and the engine RPM is controlled by the throttle lever.

The iBR gate position can be modulated anywhere between the neutral and full reverse positions depending on the position of the iBR lever. If the iBR lever position is varied during reverse operation, engine RPM is reduced to idle every time the iBR gate moves. It is therefore recommended to maintain the iBR lever completely pulled in.

Maximum engine RPM in reverse is 5000 RPM.

Braking Mode

If the watercraft speed is 8 km/h (5 MPH) per hour and above when the iBR lever is pulled in, braking mode is engaged.

When the iBR lever is pulled in to engage braking, the following occurs:
- Engine RPM is reduced to idle.
- The iBR gate moves to the maximum down position.
- Engine RPM ramps up to the engine power commanded by the iBR lever.

When operating in braking mode, the iBR gate always moves to the maximum down position. The throttle lever signal is overridden and engine RPM is now dependent on watercraft speed and how far the iBR lever is pulled in.

If watercraft speed is high when braking is applied, engine power will be initially low and then ramp up to the power commanded by the iBR lever position. The engine RPM may be increased, as necessary, to apply a stronger braking effect with the jet pump thrust when the conditions dictate.

As the watercraft slows to less than 8 km/h (5 MPH), the following occurs:
- Braking mode ceases.
- Reverse mode takes over if the iBR lever is not released.
- Throttle control reverts back to the throttle lever.

Neutral Mode

Every time the iBR lever is pulled in and released, the iBR gate will default to the neutral position, except if the throttle lever is still pulled in when the iBR lever is released. If the throttle lever is still pulled, the iBR gate will move to the forward position when the iBR lever is released and the watercraft will accelerate forward.

iBR Override Function

To permit easy access to the jet pump, nozzle, iBR gate, and various linkages for inspection, maintenance, cleaning or removal of debris, the iBR system provides for an iBR override function that is accessible through the information center.

When iBR override is activated, it allows the user to electrically move the iBR gate and nozzle through its full range of motion.

NOTICE An object or tool caught in the iBR gate, nozzle or linkages when using the iBR override function may cause damage to these components. Remove any foreign object that may obstruct the iBR gate travel.

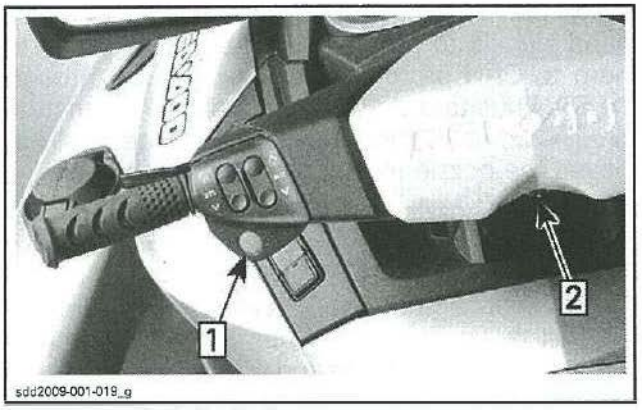
Activating iBR Override Function

⚠ WARNING

When using the iBR override function, ensure nobody stands near the rear of the watercraft. Movement of the iBR gate may squeeze fingers.

To use the iBR override function, carry out the following step.

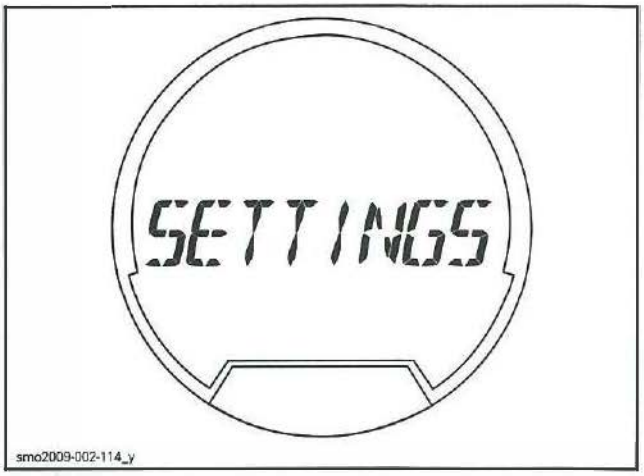
1. Press the START/STOP button.
2. Install the tether cord.



Step 1: Press START/STOP button
Step 2: Install tether cord

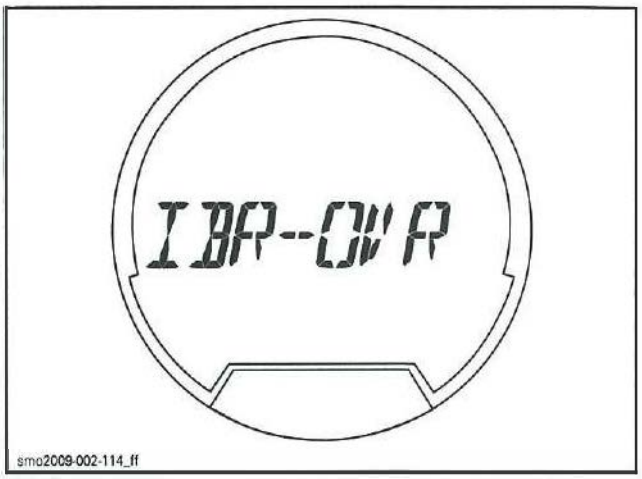
NOTE: Do not start the engine. The tether cord must be installed to ensure the information center will not shut off all indications after its self test function. Briefly press the START/STOP button to reactivate the electrical system when required.

3. Press the **Mode** button on the RH handlebar repeatedly until SETTINGS is visible in the digital display of the information center.



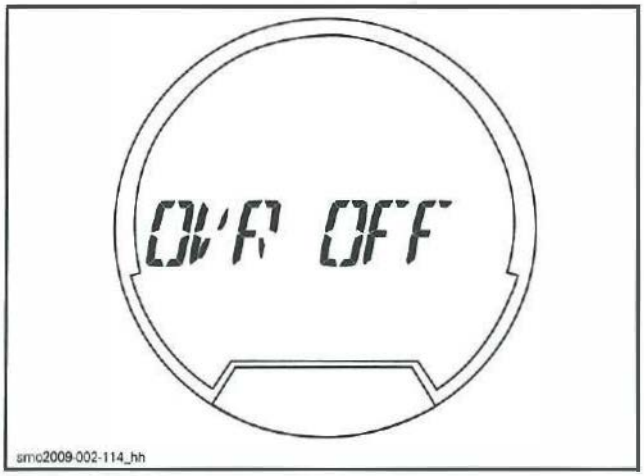
SETTINGS

4. Press the SET button (RH handlebar) to enter the **Settings** function.
5. If iBR OVR is not the following function displayed, press the UP/DOWN arrow button until iBR OVR is displayed.



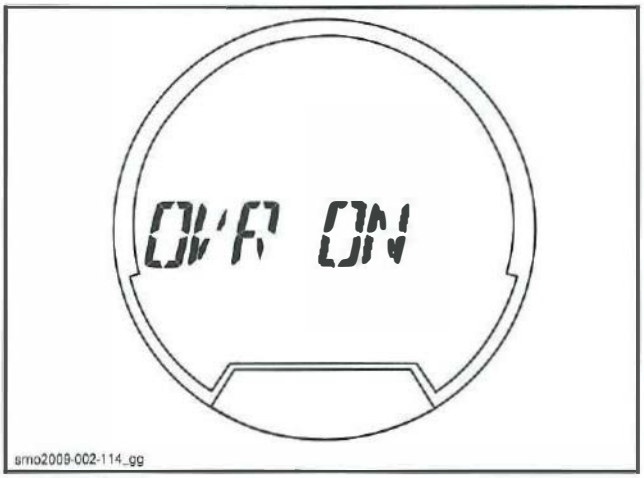
iBR OVERRIDE

6. Press the SET button to enter iBR OVR function and display OVR OFF.



OVERRIDE OFF

7. Press the UP/DOWN arrow button (RH handlebar) to display OVR ON.



OVERRIDE ON

8. Press the SET button to select the OVR ON function. The gauge will return to its normal display.

Models with a VTS Switch

9. Press the VTS UP or DOWN button (LH handlebar) to move the iBR gate.

Models Without a VTS Switch

10. Press the UP/DOWN arrow button (RH handlebar) to move the iBR gate.

Deactivating iBR Override Function

To deactivate the iBR override function, carry out one of the following:

1. Repeat previous steps and press the SET button when OVR OFF is visible.
2. Remove tether cord and wait for the electrical power to shut off (approximately 3 minutes).
3. Start the engine.

NOTE: When the engine is started, the iBR OVR function is deactivated and the iBR gate will move to the neutral position.

⚠ WARNING

When moving the iBR gate using the iBR override function, ensure nobody stands near the rear of the watercraft. Movement of the gate may squeeze fingers.

SYSTEM DESCRIPTION (VTS)

The VTS system is actually part of the iBR system.

It provides watercraft pitch trim adjustments by adjusting the horizontal position of the jet nozzle.

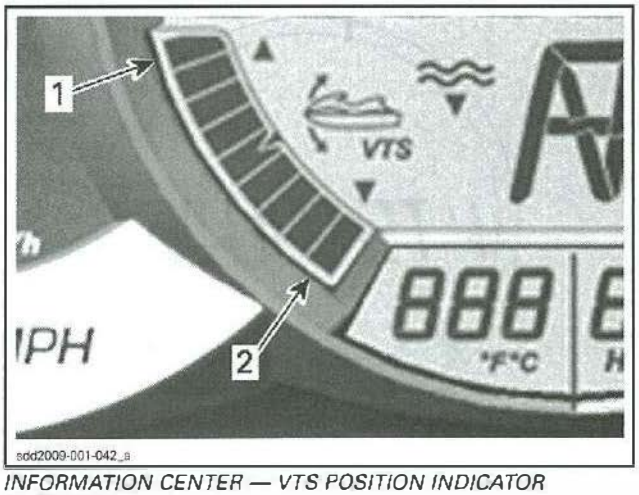
The VTS can be electrically trimmed to the desired attitude within the VTS range, or to one of 2 preset trim positions.

The VTS switch (or Up/Down switch) sends command signals to the gauge. The gauge converts them to CAN protocol and sends them through the CAN bus to the iBR module on the iBR actuator. The actuator then moves the iBR gate which moves the nozzle to the desired trim position.

NOTE: The nozzle and iBR gate move together in the VTS trim range up to the maximum nozzle down position. If NEUTRAL, BRAKING or REVERSE is engaged, the iBR gate moves past the VTS full down position. When FORWARD thrust is reengaged, the nozzle and iBR gate move up to the last selected VTS trim position.

The nozzle trim position can be seen on the VTS position indicator in the information center.

NOTE: Changing the VTS trim position without the engine running in forward thrust mode only changes the indication. The nozzle will move to the selected VTS trim position when forward thrust is engaged.



INFORMATION CENTER — VTS POSITION INDICATOR
1. *Bow up*
2. *Bow down*

NOTE: Only the segment indicating the relative position of the VTS will be on. The illustration shows all segments on as can be seen during the self test function.

The VTS system provides the following features according to models

- Nozzle trimming
- Selection of 2 preset trim positions
- Recording of 2 preset trim positions.

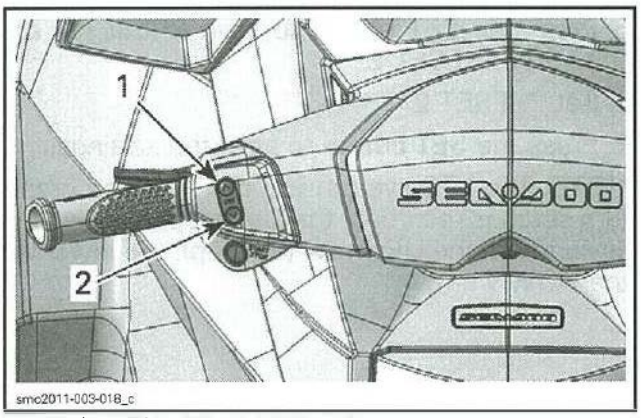
Nozzle Trimming

Watercraft must be operating in forward position.

Depending on the model, 5 or 9 trim positions are available.

Using the VTS Button (LH side of Handlebar)

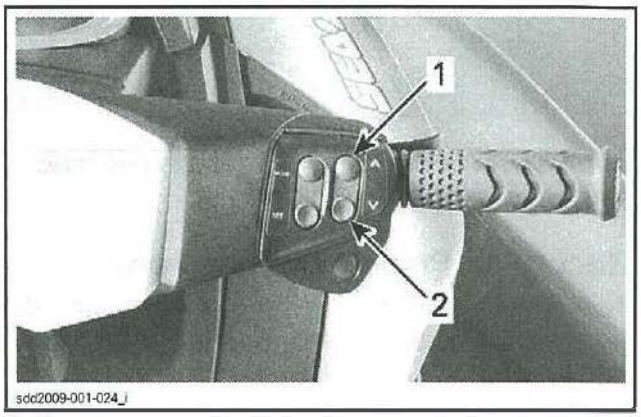
Press the UP or DOWN arrow button to change the VTS setting.



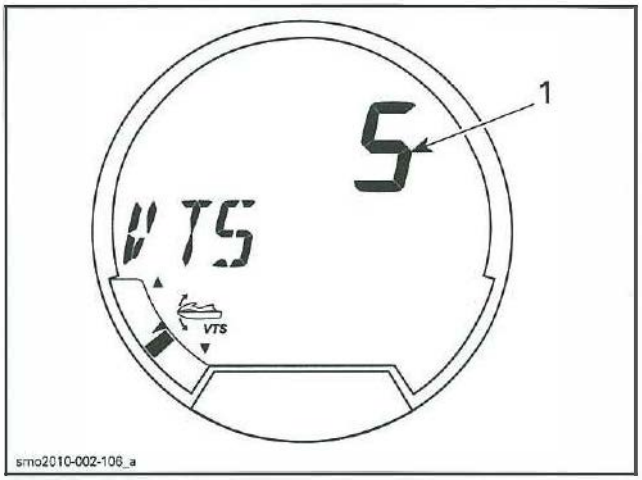
TYPICAL - VTS CONTROL BUTTON
1. *Bow up*
2. *Bow down*

Using the Up/Down Button (RH side of Handlebar)

1. Press the MODE button to display the VTS function in the gauge.
2. Press the UP or DOWN arrow button to change the VTS setting.



1. *Bow up*
2. *Bow down*



FUNCTION SELECTED - VTS
1. *VTS setting*

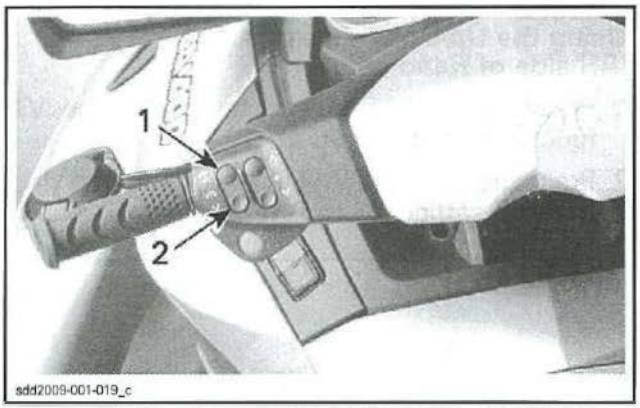
3. Press the SET button to save the desired setting.

Using Preset Trim Positions

Two preset trim positions can be selected.

To select the **highest** trim position recorded, double-click on the VTS UP arrow button (bow up).

To select the **lowest** trim position recorded, double-click on the VTS DOWN arrow button (bow down).



DOUBLE-CLICK UP OR DOWN TO USE PRESET POSITIONS
1. *Highest preset position on UP arrow*
2. *Lowest preset position on DOWN arrow*

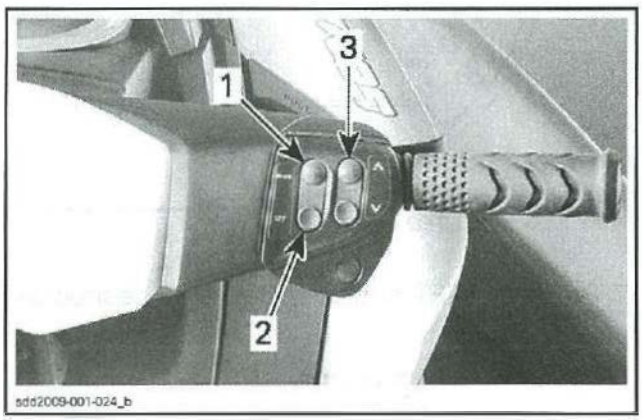
Recording Preset Trim Positions

Two different VTS trim positions may be recorded for quickly selecting the preferred watercraft trim attitude.

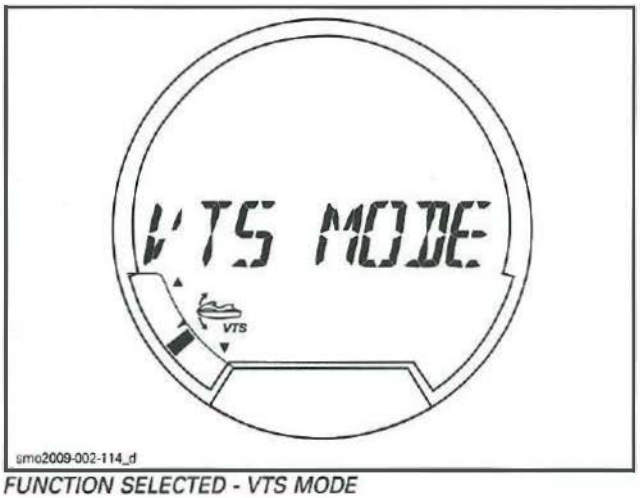
When the VTS PRESET trim positions are changed, the new settings will remain recorded in memory.

To record VTS preset trim positions:

1. Press the START/STOP button.
2. Install the tether cord on the engine cut-off switch.
3. Press the MODE button repeatedly until VTS MODE is displayed.

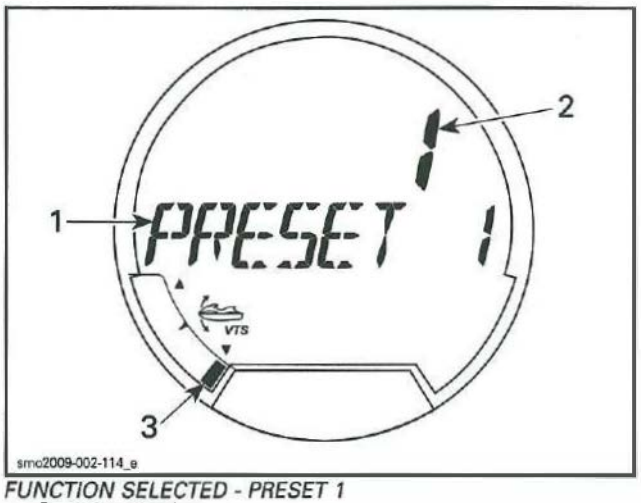


1. *MODE button*
2. *SET button*
3. *UP/DOWN arrow button*



FUNCTION SELECTED - VTS MODE

4. Press the SET button to display PRESET 1.
5. Press the VTS UP/DOWN button to change the PRESET 1 VTS position.



FUNCTION SELECTED - PRESET 1
1. *Preset 1 function*
2. *VTS setting selected to 1*
3. *VTS position indicator at setting 1 (bow down)*

6. Press the SET button to save PRESET 1 and display PRESET 2.
7. Set PRESET 2
8. Press the SET button to save the settings.

NOTE: The VTS system will compare the preset trim settings recorded, the highest position will be assigned to the UP arrow (bow up), the lowest to the DOWN arrow.

ADJUSTMENT

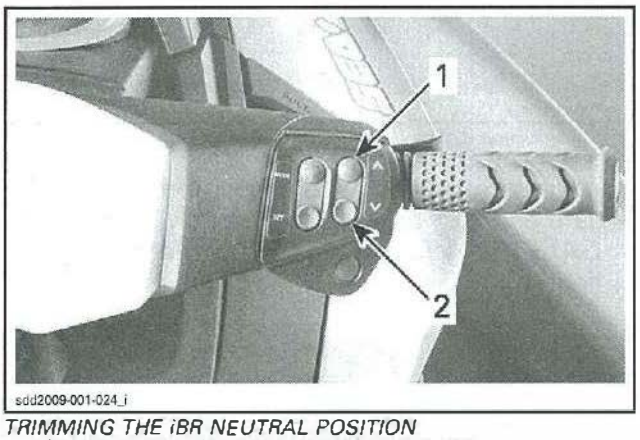
iBR NEUTRAL ADJUSTMENT

GTI 130/155, GTX 155 AND WAKE 155

When in NEUTRAL, if the watercraft creeps forward or backward, the iBR system may be trimmed.

If the watercraft is moving forwards, momentarily press the DOWN arrow button on RH side of handlebar.

If the watercraft is moving backwards, momentarily press the UP arrow button on RH side of handlebar.



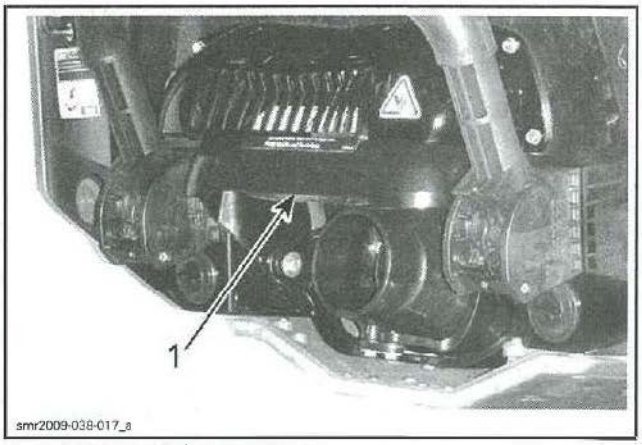
TRIMMING THE iBR NEUTRAL POSITION
1. *UP arrow button (to stop rearward movement)*
2. *DOWN arrow button (to stop forward movement)*

NOTE: Press the UP/DOWN arrow button repeatedly until proper adjustment of the neutral position is attained and the watercraft stops moving.

MAINTENANCE

iBR GATE BACKLASH CHECK

1. Using the iBR override function, move the iBR gate to the up position. Refer to *SYSTEM DESCRIPTION (iBR)* in this subsection.



1. iBR gate moved to up position

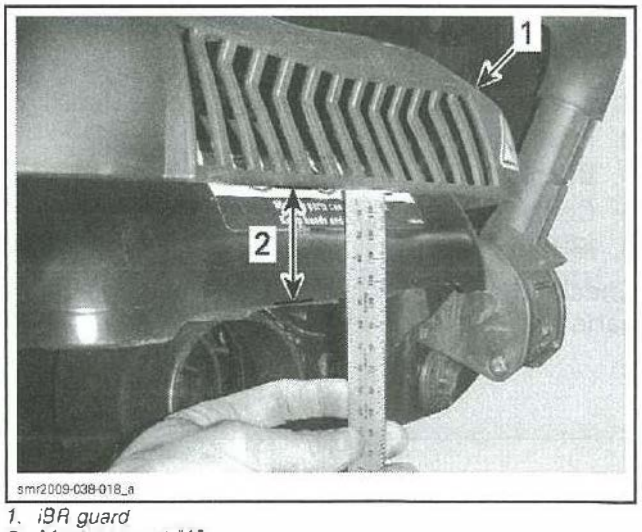
2. Take hold of the lower edge of the iBR gate and pull down on it slightly, then release it.



PULL DOWN SLIGHTLY ON iBR GATE

Distance "A" Measurement

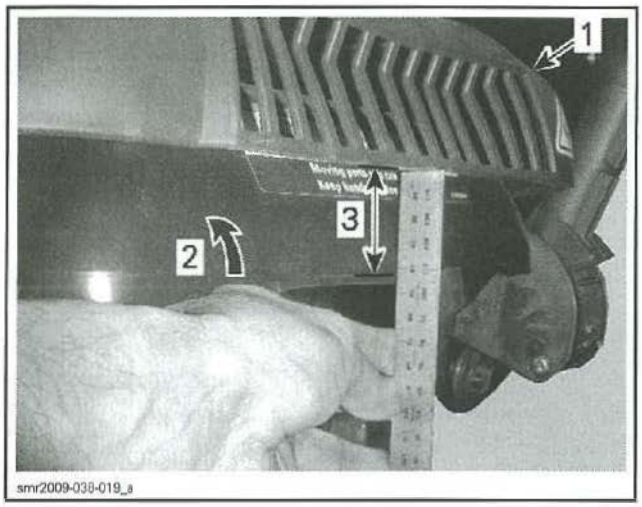
Using a machinists ruler, measure the distance between the bottom of the guard and the trailing edge of the iBR gate. Note as measurement "A".



1. iBR guard
2. Measurement "A"

Distance "B" Measurement

Without using excessive force, push up on the trailing edge of the iBR gate to pick up the backlash in the gate mechanism. As you hold the gate up, measure the distance between the trailing edge of the guard and the trailing edge of the iBR gate again. Note as measurement "B".



1. *iBR guard*
2. *Lift up on iBR gate*
3. *Measurement "B"*

iBR Gate Backlash Calculation

Subtract measurement "B" from "A" to obtain the iBR gate backlash.

iBR GATE BACKLASH (A - B)	
MAXIMUM	25 mm (.98 in)

Backlash Measurement Result

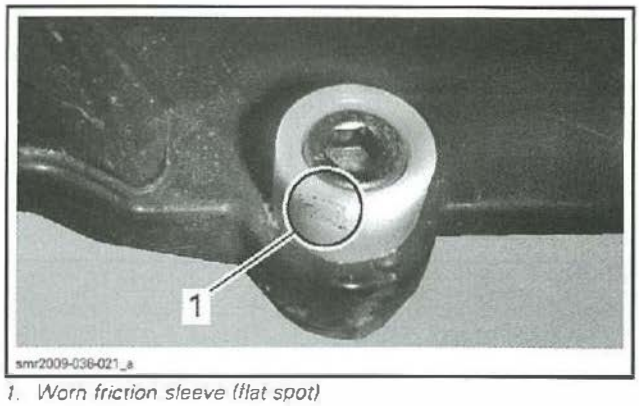
If backlash is excessive, inspect and replace iBR gate parts as required in the following order:

1. Tightening of screws retaining the U-arm to the actuator shaft
2. Splines on actuator shaft end and in U-arm
3. Friction sleeves
4. Bushings
5. Contact points (VTS trim ring, U-arm, iBR gate)
6. iBR actuator.

Check iBR gate backlash and gate operation after parts replacement and reassembly.

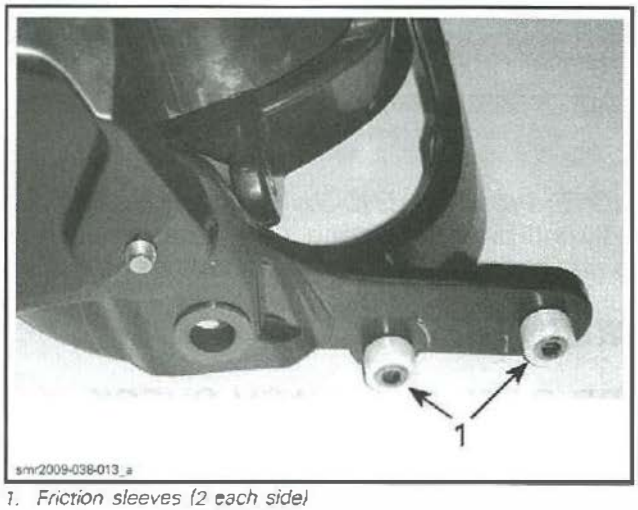
FRICTION SLEEVE REPLACEMENT

The 4 friction sleeves on the VTS trim ring should be replaced if they show signs of advanced wear (flat spots), or every 100 hours as per the maintenance schedule.



1. *Worn friction sleeve (flat spot)*

1. To replace the friction sleeves, remove the iBR gate and VTS ring as an assembly, refer to *iBR GATE AND VTS RING REMOVAL* in this subsection.



1. *Friction sleeves (2 each side)*

2. Remove the worn friction sleeves from the VTS ring and install new ones.
3. Apply service products, torques, and install new screws with threadlocker as specified in the exploded view.

INSPECTION

iBR SYSTEM FUNCTIONAL TEST

Test on Dry Land

NOTE: This test requires two persons. One person to start engine and operate controls, and one person to observe iBR gate movement.

1. Provide adequate ventilation of exhaust gases or move watercraft outside.

NOTICE Do not install an exhaust ventilation hose in the iBR gate area or damage may occur when the iBR gate moves downward during operation.

2. Connect a water hose to the watercraft to provide exhaust system cooling when operating engine. Refer to *EXHAUST SYSTEM* subsection for procedure.

NOTICE

- Ensure there are no tools or other object that may interfere with the iBR gate movement.
- Do not run engine for more than 2 minutes out of water or damage may occur to drive shaft seal carrier.

⚠ WARNING

The person observing the iBR gate movement must stand to the side of the stern well clear of the iBR gate and pump nozzle in full view of the operator.

3. Start engine and let idle.

NOTE: If iBR gate was not in the neutral position, it will move to the neutral position on engine start up.

4. Depress the throttle lever slightly and visually confirm the iBR gate moves to the forward position (up to the VTS trim position), then release throttle. The iBR gate must remain in the forward position.
5. Depress the iBR lever fully and confirm the iBR gate moves to the full down position.
6. Release the iBR lever completely and confirm the iBR gate moves to the neutral position.
7. Disconnect water hose then shut engine off.

Test with Watercraft on a Waterway

1. Start engine and let idle.

NOTE: If iBR gate is not in the neutral position before the engine start, it will move to the neutral position on engine start up.

2. Depress the throttle lever slightly, then release it. Forward movement of the watercraft confirms the iBR gate has moved to the forward position.
3. Depress the iBR lever fully. Rearward movement of the watercraft confirms the iBR gate has moved to the reverse position.
4. Release the iBR lever completely. Reverse thrust should cease and the watercraft should continue to drift rearward on momentum.
5. Apply a small amount of forward thrust to stop rearward velocity, then tap the iBR lever to return the iBR gate to neutral.
6. Shut engine off.

VTS FUNCTIONAL TEST

NOTE: This test requires two persons. One person to start engine and operate controls, and one person to observe nozzle and iBR gate movement.

1. Provide adequate ventilation of exhaust gases or move watercraft outside.

NOTICE Do not install an exhaust ventilation hose in the iBR gate area or damage may occur when the iBR gate moves downward during operation.

2. Connect a water hose to the watercraft to provide exhaust system cooling when operating engine. Refer to *EXHAUST SYSTEM* subsection for procedure.

NOTICE

- Ensure there are no tools or other object that may interfere with the iBR gate movement.
- Do not run watercraft for more than 2 minutes out of water or damage may occur.

⚠ WARNING

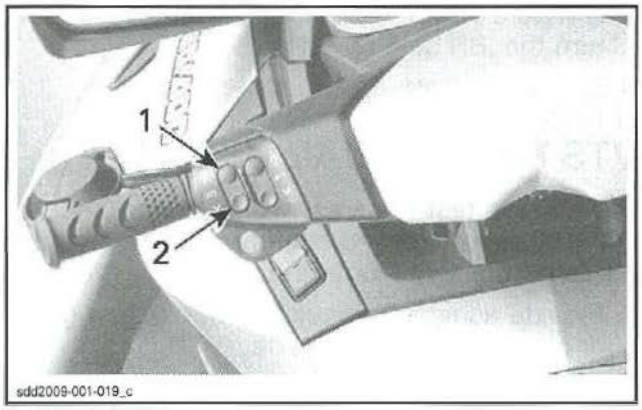
The person observing the iBR gate movement must stand to the side of the stern well clear of the iBR gate and pump nozzle in full view of the operator.

NOTE: The VTS system cannot be tested without the engine operating in forward thrust. If the engine is not running in forward thrust, only the VTS indication will change when the VTS control button is pressed; the nozzle will not change position until forward thrust is engaged by pulling the throttle lever.

3. Start engine.
4. Pull in and release the throttle lever to engage forward thrust, allow engine to run at idle RPM.

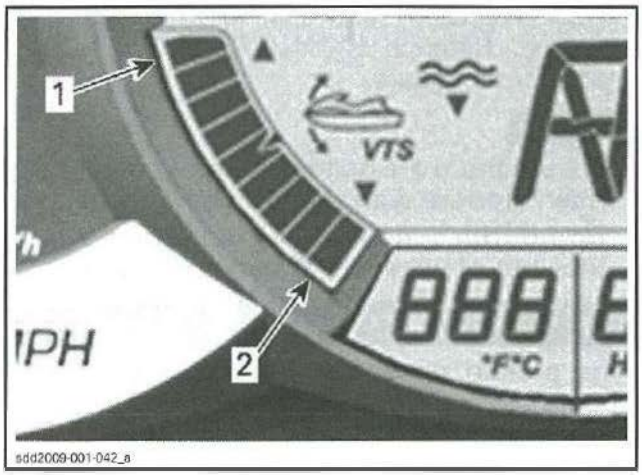
Models with a VTS Switch

5. Push the VTS UP and DOWN button alternately to check VTS operation.



1. VTS up button
2. VTS down button

6. Confirm nozzle movement and VTS position indication change in the information center.



1. Bow up
2. Bow down

NOTE: Only the segment indicating the relative position of the VTS will be on. The illustration shows all segments on as visible during the gauge self test function.

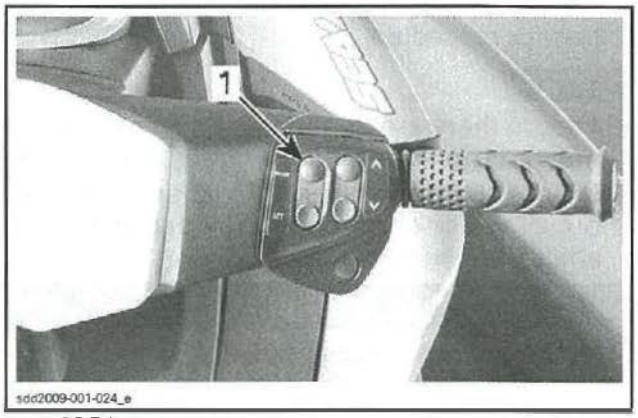
7. Double click the VTS UP and DOWN button alternately to test the VTS preset trim positions.

If double clicking the VTS UP or DOWN button does not cause the nozzle position or indication to change, navigate to the VTS MODE function in the gauge and check for recorded PRESET 1 and PRESET 2 settings. If no presets are recorded, record PRESET 1 bow up and PRESET 2 bow down, exit the function and carry out a new test.

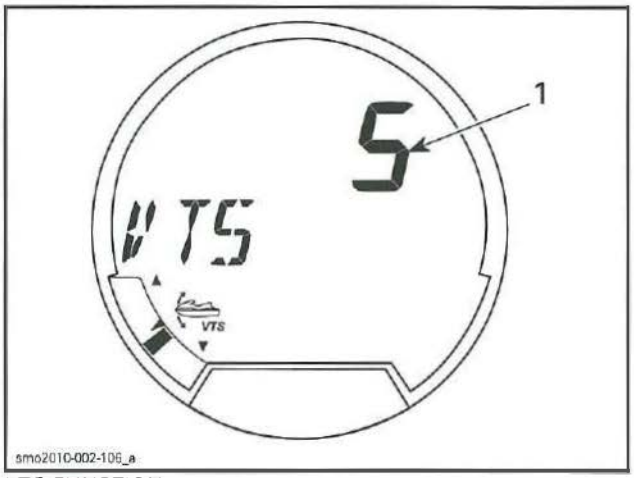
If both PRESET 1 and PRESET 2 have the same setting, note the operator's setting and change one PRESET, exit the function and carry out a new test. Return the PRESET to the operator's preference after testing is complete.

Models Without a VTS Switch

8. Press the MODE button to display VTS.

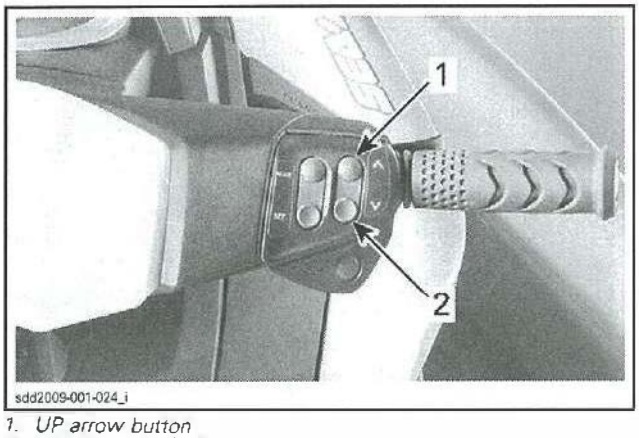


1. MODE button



VTS FUNCTION
1. VTS setting

9. Press the UP/DOWN arrow button (RH handlebar) to change the VTS angle.



1. *UP arrow button*
2. *DOWN arrow button*

10. Ensure the VTS setting in the gauge moves with the VTS.

TROUBLESHOOTING

The iBR system is self monitoring. If a fault occurs in the iBR system, it will raise a fault code and communicate it to the information center through the CAN bus. The information center will turn on the iBR indicator light to advise the operator of the iBR system fault. If the fault remains active, it may be displayed in the gauge. If it is no longer active, B.U.D.S. must be used to read the fault.

TESTING SEQUENCE

To troubleshoot the iBR system, carry out the following in this order:

- Ensure the iBR gate movement is not obstructed in any way.
- Ensure the iBR gate mechanisms (gate, VTS ring, U-arm and linkages) are all in good condition and do not show signs of excessive wear or friction.
- Cycle the iBR gate up and down using the *iBR OVERRIDE* function as described in this subsection.
- Check the iBR power fuse (F5) and the iBR control fuse (F17) in fuse box if the gate did not move using the iBR OVERRIDE function.
- Connect the watercraft to B.U.D.S. to check for iBR system or CAN bus related fault codes. Carry out service actions as indicated in B.U.D.S.
- If a CAN bus communication fault with the iBR module is indicated, or the iBR module is not visible in B.U.D.S., carry out a continuity test of the CAN bus wires between the iBR module and the CAN bus-bars in fuse box. Refer to *CONTROLLER AREA NETWORK (CAN)* subsection.
- Try moving the iBR using the iBR UP and iBR DOWN buttons on the iBR activation page in B.U.D.S.
- Carry out an *iBR SYSTEM FUNCTIONAL TEST* to check for proper gate and actuator movement.
- Visually inspect system connectors for moisture ingress, corrosion, and proper contact.
- Check for excessive backlash in the gate mechanism.
- Remove the screws retaining the U-arm to the actuator shaft. Move the gate up and down by hand to check for freedom of movement.

PROCEDURES

iBR LEVER SENSOR (BRLS)

BRLS Test Using B.U.D.S.

NOTE: The BRLS is composed of a twin hall effect sensor. A resistance test of the sensor cannot be carried out.

1. Connect watercraft to the latest B.U.D.S. software, refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. Check for an applicable fault code, refer to *DIAGNOSTIC AND FAULT CODES*.
3. If a fault is indicated, follow service actions as indicated in B.U.D.S.

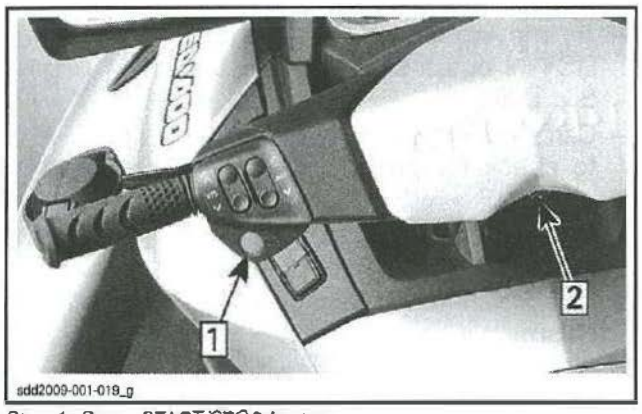
BRLS Voltage Test

Test for BRLS input voltage as well as BRLS signal voltages as per following steps.

iS Models

1. Press the START/STOP button.
2. Install the tether cord on the engine cut-off switch to energize the electrical system.

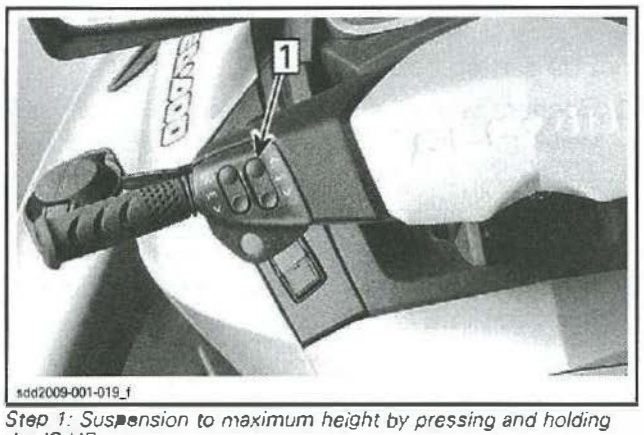
NOTE: DO NOT start the engine.



Step 1: Press START/STOP button
Step 2: Install tether cord

NOTE: Briefly press the START/STOP button to reactivate the electrical system when required.

3. Set the suspension to its maximum height by double clicking the iS UP button. This will provide better access to the steering connectors.



Step 1: Suspension to maximum height by pressing and holding the iS UP

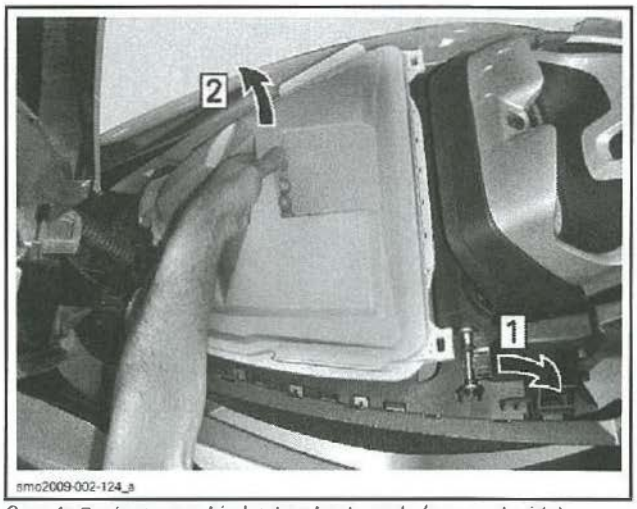
NOTE: If more height is required or if the iS system cannot be used, manually lift the suspension using a hoist and the anchor points close to handlebars. Then safety lock it in the up position.

NOTICE Do not lift the watercraft using the anchor points.

4. Remove the tether cord and wait approximately 3 minutes for the electrical system power to shut off.

All Models

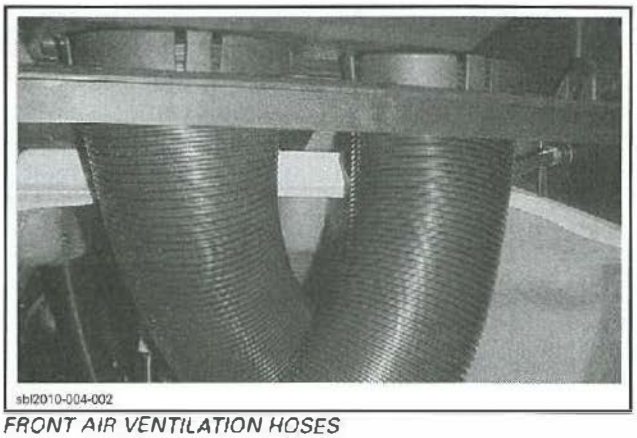
5. Open the front storage compartment cover and remove the storage bin.



Step 1: Push storage bin latches backwards (one each side)
Step 2: Lift and tilt forward to remove storage bin

Models Without iS

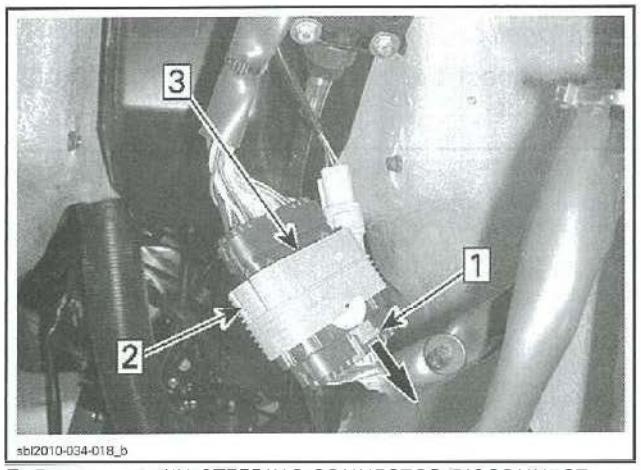
6. Disconnect the top of the two front air ventilation hoses, refer to *BODY* subsection.



FRONT AIR VENTILATION HOSES

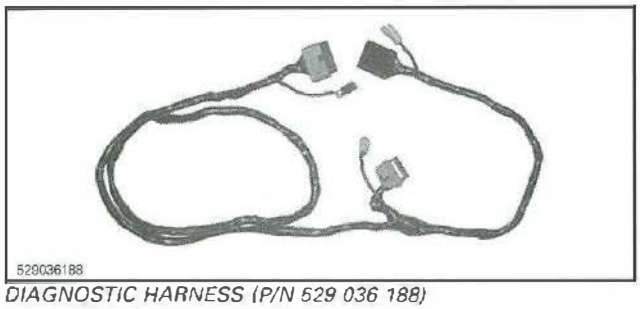
All Models

7. Reach in through the storage bin opening under the steering area and disconnect the 24-pin steering connector.



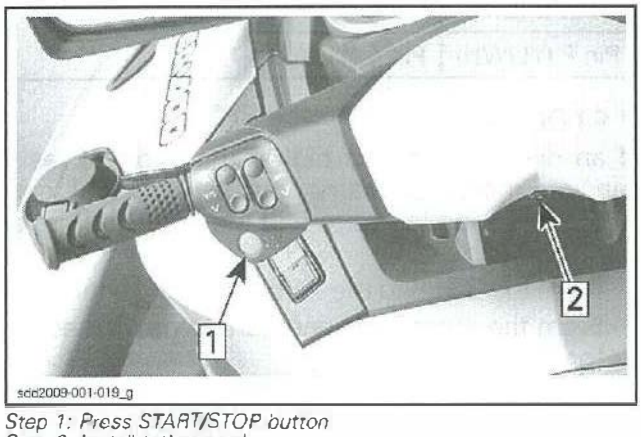
TYPICAL — 24-PIN STEERING CONNECTOR DISCONNECT
Step 1: Pull out safety lock
Step 2: Press in on release tab
Step 3: Pull locking collar down

8. Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) in series between the disconnected steering connectors.



DIAGNOSTIC HARNESS (P/N 529 036 188)

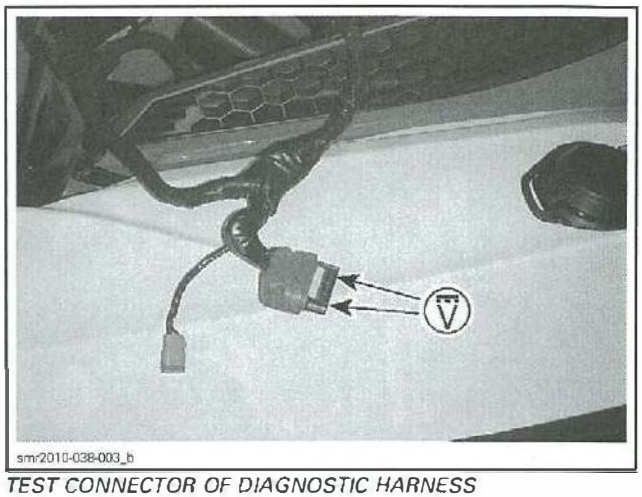
9. Press the START/STOP button to wake up the electrical system.
10. Install the tether cord on the engine cut-off switch.



Step 1: Press START/STOP button
Step 2: Install tether cord

NOTE: Briefly press the START/STOP button to reactivate the electrical system when required.

11. Using a FLUKE 115 MULTIMETER (P/N 529 035 868) set to Vdc, measure the BRLS voltages from the test connector of the diagnostic harness as per following tables.



TEST CONNECTOR OF DIAGNOSTIC HARNESS

TEST CONNECTOR OF DIAGNOSTIC HARNESS		iBR LEVER RELEASED	iBR LEVER PULLED IN
PINS		VOLTAGE (Vdc)	
21	15	4.9 - 5.1	
22	16		
15	18	0.15 - 0.35	1.4 - 1.6
19	16	0.4 - 0.6	2.9 - 3.1

12. If voltage measured is as specified, the BRLS sensor is functioning properly.

NOTE: When moving iBR lever, BRLS voltage change should increase or decrease in a steady linear fashion.

13. If voltage is out of specification, carry out a continuity test of the wiring between the iBR module and the BRLS sensor, refer to *CONTINUITY TEST OF BRLS WIRING HARNESS.*

Continuity Test of BRLS Wiring Harness

1. Ensure the 24-pin steering connector pins are clean, make good contact, and properly connected.

Models Without the X Package

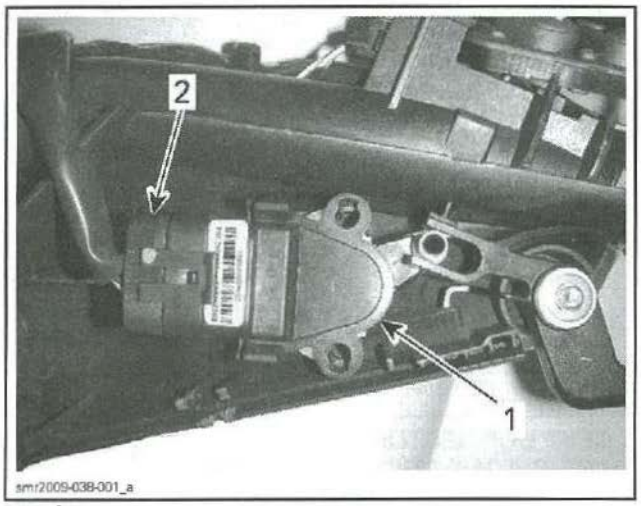
2. Remove the steering cover, refer to *STEERING AND O.T.A.S.* subsection.

Models with the X Package

3. Remove the upper housing and housing cover from the LH handlebar housing, refer to *STEERING AND O.T.A.S.* subsection.

All Models

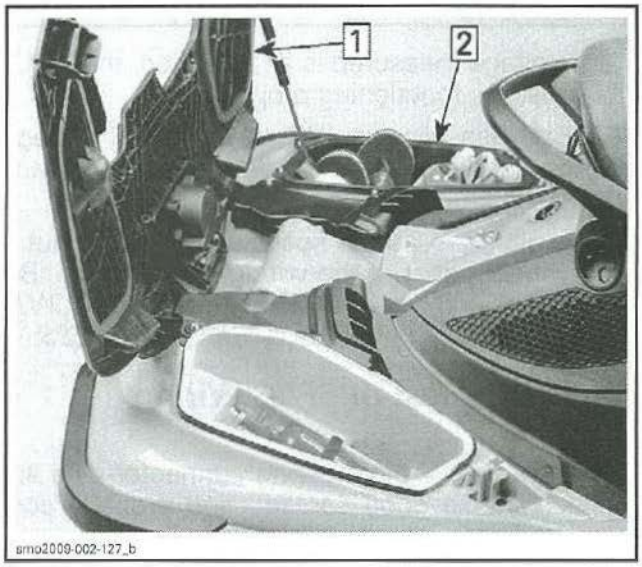
4. Disconnect the BRLS connector.



TYPICAL
1. BRLS
2. BRLS connector

iS Models

5. Open the boarding platform and remove the LH storage bin.



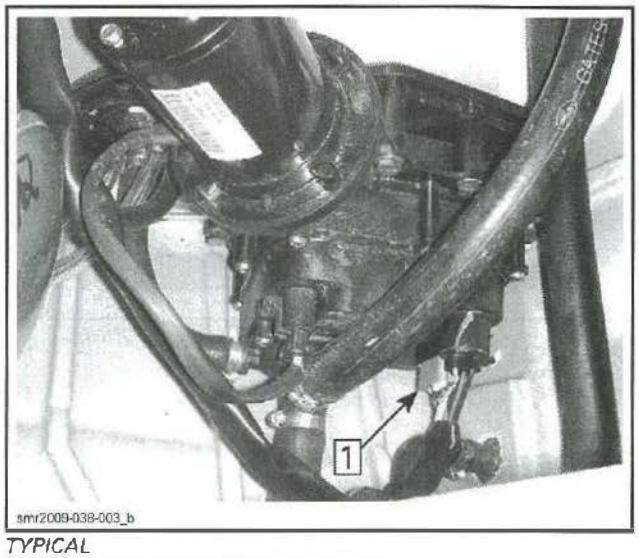
Step 1: Open the boarding platform
Step 2: Remove the LH storage bin

Models Without iS

6. Remove the LH access panel on the boarding platform or remove seat.

All Models

7. Disconnect the 12-pin connector from the iBR actuator.



TYPICAL
Step 1: Disconnect the 12-pin connector

8. Measure for continuity from the BRLS connector to the 12-pin iBR actuator connector as per following table.

CONTINUITY TEST OF BRLS WIRING HARNESS		
BRLS CONNECTOR	12 PIN iBR CONNECTOR	RESISTANCE
Pin A (VI/YL)	Pin 4 (VI/YL)	Close to 0 Ω (continuity)
Pin B (BK)	Pin 6 (BK)	
Pin C (YL/BK)	Pin 8 (YL/BK)	
Pin D (VI/YL)	Pin 7 (VI/YL)	
Pin E (BK)	Pin 9 (BK)	
Pin F (YL/WH)	Pin 5 (YL/WH)	

If continuity is good, replace BRLS.

If an open circuit or a higher than normal resistance is measured, carry out the continuity tests in the following tables to find the problem wire or connection:

- From the BRLS to the 24-pin steering connector
- From the steering connectors to the iBR actuator 12 pin connector.

9. Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) to the steering connector (steering side only).

NOTE: Resistance readings may be slightly higher than normal (maximum .5 Ω) when measuring from the test connector on the diagnostic harness.

CONTINUITY TEST BRLS TO 24-PIN STEERING CONNECTOR		
BRLS	TEST CONNECTOR	RESISTANCE
Pin A (VI/YL)	Pin 21 (VI/YL)	Close to 0 Ω (continuity)
Pin B (BK)	Pin 15 (BK)	
Pin C (YL/BK)	Pin 18 (YL/BK)	
Pin D (VI/YL)	Pin 22 (VI/YL)	
Pin E (BK)	Pin 16 (BK)	
Pin F (YL/WH)	Pin 19 (YL/WH)	

10. Connect the DIAGNOSTIC HARNESS (P/N 529 036 188) to the steering connector (vehicle side only).

CONTINUITY TEST STEERING CONNECTORS TO iBR CONNECTOR		
TEST CONNECTOR	12 PIN iBR	RESISTANCE
Pin 22 (VI/YL)	Pin 7 (VI/YL)	Close to 0 Ω (continuity)
Pin 16 (BK)	Pin 9 (BK)	
Pin 19 (YL/WH)	Pin 5 (YL/WH)	
Pin 21 (VI/YL)	Pin 4 (VI/YL)	
Pin 15 (BK)	Pin 6 (BK)	
Pin 18 (YL/BK)	Pin 8 (YL/BK)	

11. Repair or replace wiring/connector as required.

BRLS Removal

Models Without the X Package

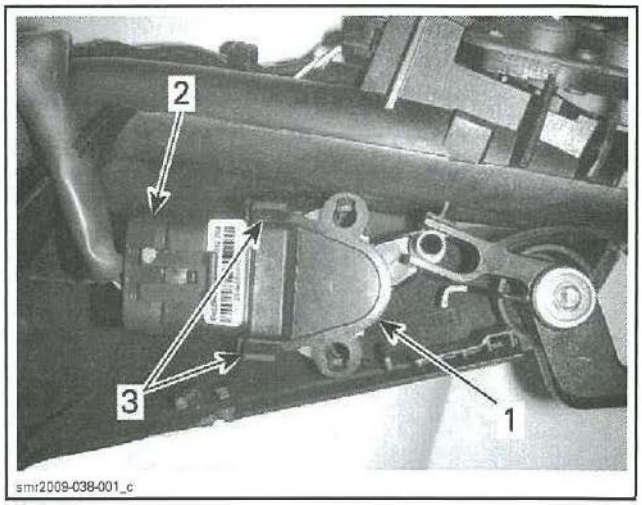
1. Remove steering cover, refer to *STEERING AND O.T.A.S.* subsection.

Models with the X Package

2. Remove the upper housing and housing cover from the LH handlebar housing, refer to *STEERING AND O.T.A.S.* subsection.

All Models

3. Open the sensor retaining tabs.
4. Pull up on the connector end of the BRLS.
5. Gently pull the sensor from its support and the iBR lever. Depress the lever as required to ease sensor removal.



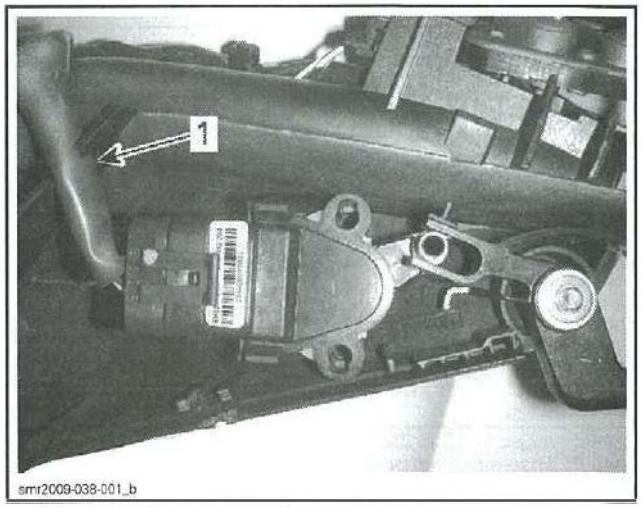
TYPICAL
1. BRLS
2. BRLS connector
3. Sensor retaining tabs

6. Remove connector from the BRLS.

BRLS Installation

Models Without the X Package

1. Install BRLS sensor in the reverse order of removal.
2. Ensure wiring harness is properly routed through slot provided in sensor support before installing steering cover.



1. Wire harness routed in slot

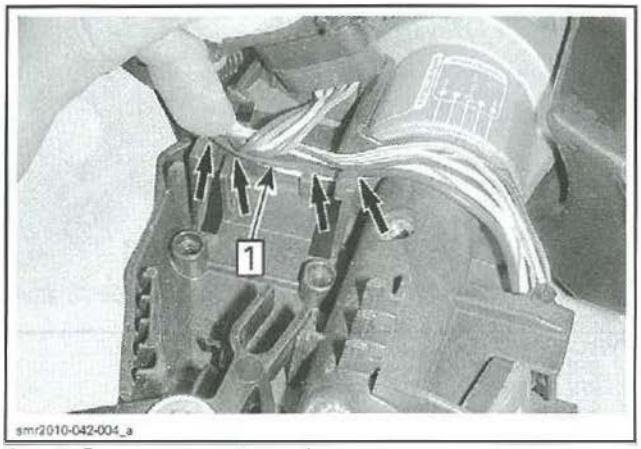
3. Ensure there are no fault codes. Connect watercraft to the latest B.U.D.S. software, refer to *DIAGNOSTIC AND FAULT CODES.*

4. Carry out an *iBR SYSTEM FUNCTIONAL TEST* using the iBR lever (engine must be running).

Models with the X Package

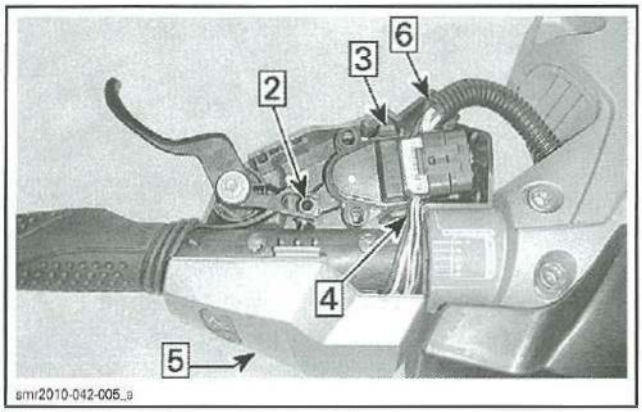
Install BRLS sensor in the reverse order of removal. However, pay attention to the following:

1. Install connector on BRLS and ensure wiring is properly positioned in handlebar housing.



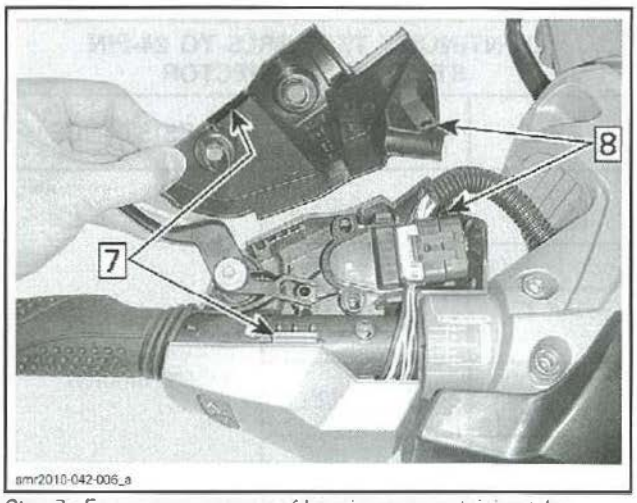
Step 1: Ensure proper wire routing

2. Insert the BRLS in the iBR lever.
3. Align the BRLS in the housing, then press it into the housing until both locking tabs engage. Ensure it is properly locked in place.
4. Ensure wiring is not pinched.
5. Position the housing cover onto the handlebar housing.
6. Ensure positioning of corrugated conduit



Step 2: Insert BRLS in iBR lever
Step 3: Ensure locking tab engagement
Step 4: Ensure wiring is not pinched
Step 5: Install housing cover
Step 6: Ensure proper corrugated conduit positioning

7. Position the upper housing onto the handlebar.
8. Ensure proper engagement of the housing and cover tabs.



Step 7: Ensure engagement of housing cover retaining tabs
Step 8: Ensure engagement of upper housing locking tabs

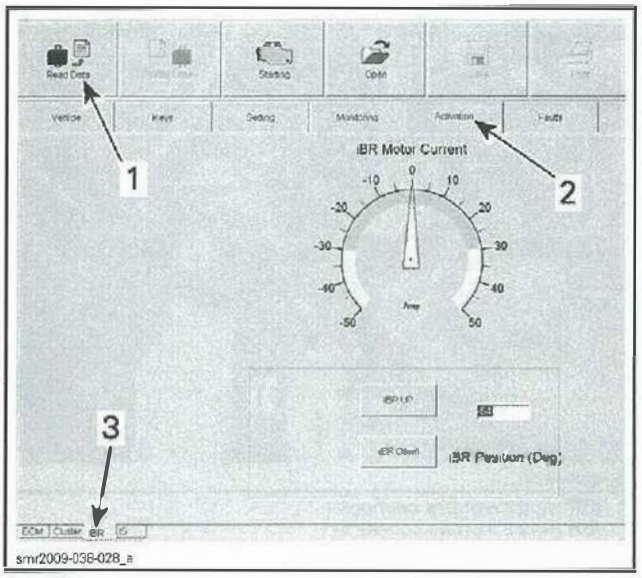
9. Install the three retaining screws for the upper housing and torque them to 2 N•m (18 lbf•**in**).
10. Ensure there are no fault codes. Connect watercraft to the latest B.U.D.S. software, refer to *DIAGNOSTIC AND FAULT CODES*.
11. Carry out an *iBR SYSTEM FUNCTIONAL TEST* using the iBR lever (engine must be running).

iBR ACTUATOR

NOTICE **The iBR actuator motor must never be tested by applying 12 Vdc directly to it's connector. Doing so may cause a lock-up and damage internal actuator components, necessitating replacement of the iBR actuator assembly.**

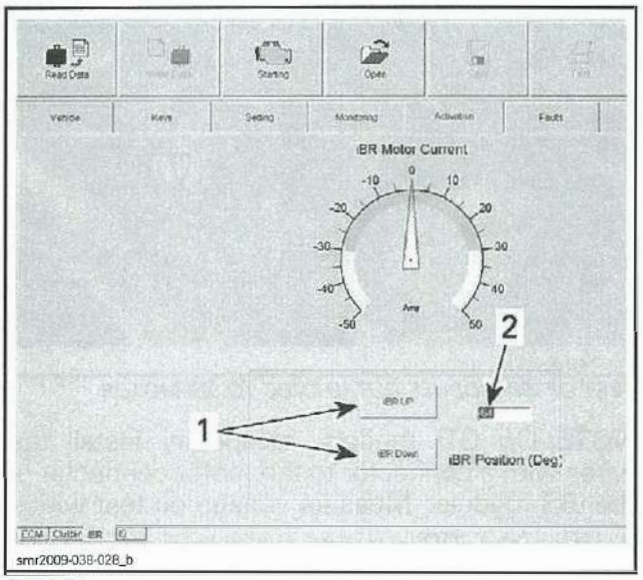
iBR Actuator Operation Test Using B.U.D.S.

1. Connect watercraft to the latest B.U.D.S. software, refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. Click the **Read Data** button.
3. Check for applicable fault codes on the **Faults** page.
4. Click the **Activation** tab.
5. In the lower LH corner, click the iBR tab.



TYPICAL
1. *Read Data*
2. *Activation tab*
3. *iBR tab*

6. In B.U.D.S., click **iBR UP** and **iBR DOWN** buttons alternately and look for a change in **iBR Position (Deg)**.



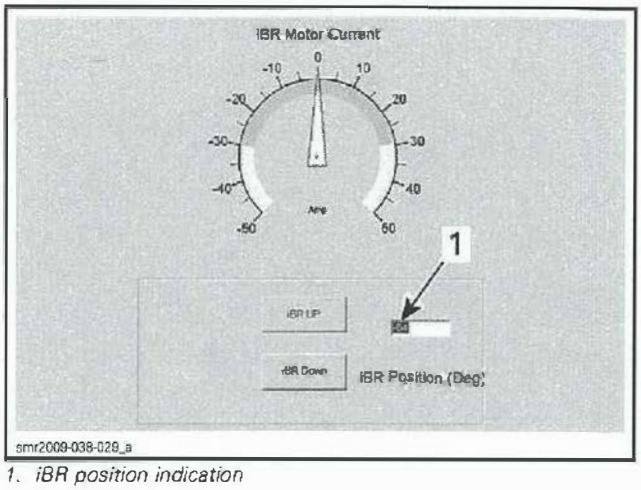
TYPICAL
1. *iBR UP/DOWN buttons*
2. *iBR position indication*

If the iBR moves using these buttons but does not move using the iBR lever, refer to *BRLS VOLTAGE TEST* in this subsection.

If the iBR does not move, check the iBR fuses (F5 and F17) in fuse box. If fuse are good, refer to *iBR ACTUATOR INPUT VOLTAGE TEST* in this subsection.

iBR Actuator Motor Current Test Using B.U.D.S.

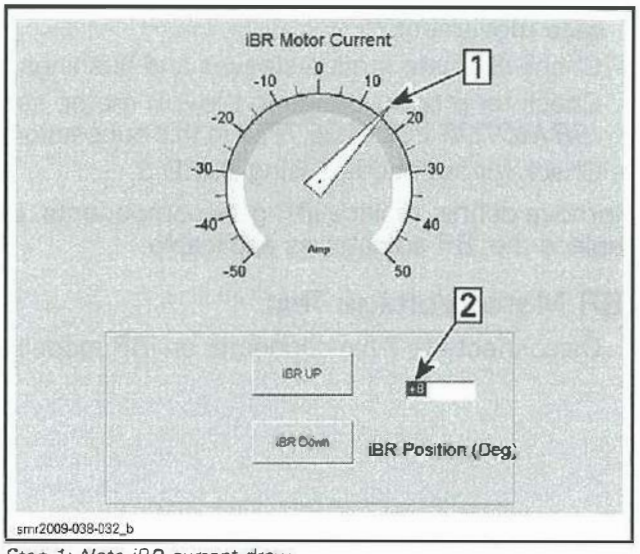
1. On the iBR activation page in B.U.D.S., note the **iBR Position (Deg)** indication.



1. *iBR position indication*

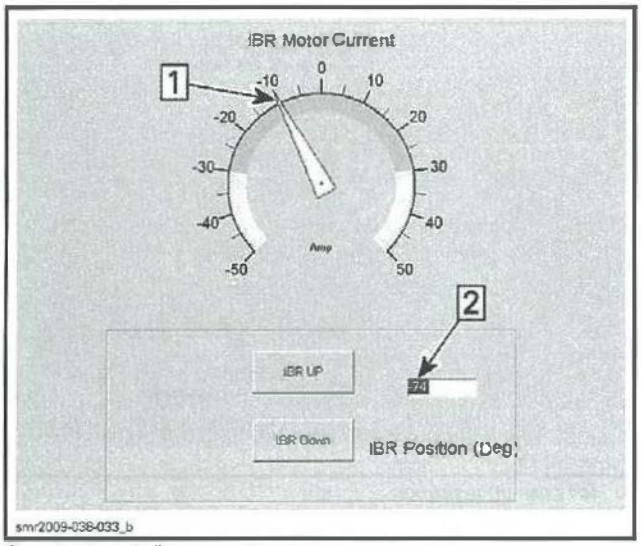
2. Activate the iBR override function, refer to *iBR OVERRIDE FUNCTION* in the beginning of this subsection.
3. Press and hold the VTS UP button on the LH handlebar to position the iBR to the full up position and look for the **iBR Motor Current** indication in B.U.D.S. Also look for a change of **iBR Position (Deg)** indication.

NOTE: Current draw indication will not be stable. High and low peaks will be observed. Look for the maximum average current draw.



Step 1: Note iBR current draw
Step 2: Note iBR position indication change

4. Press and hold the VTS DOWN button and look for the iBR Motor Current draw indication. Also look for a change of iBR Position (Deg) indication.



Step 1: Note iBR current draw
Step 2: Note iBR position indication change

iBR ACTUATOR CURRENT DRAW	
DOWN SELECTION	-5 to -15 A
UP SELECTION	+10 to +20 A

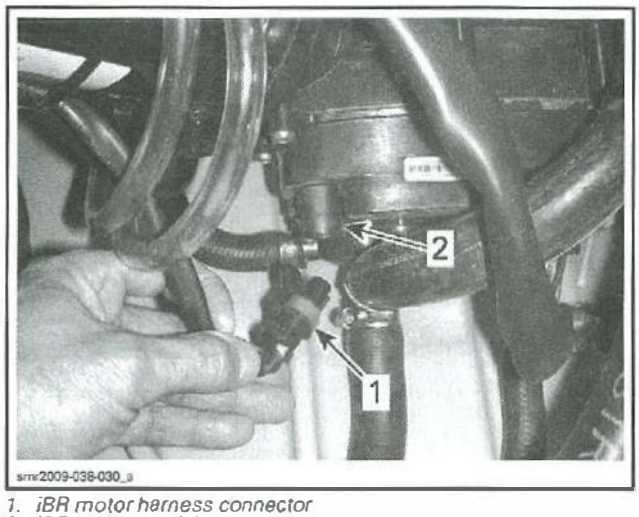
If current draw is abnormally high (between 20 and 30 A), check the following:

- Ensure iBR gate is free of debris.
- Remove the screws retaining the U-arm to the actuator shaft. Check for excessive friction in gate movement.
- Check iBR gate friction sleeves and bushings.
- Check for proper voltage to the iBR motor, see *iBR MOTOR VOLTAGE TEST* in this subsection.
- Check for fault codes using B.U.D.S.

Remove debris, replace iBR gate components, or replace the iBR actuator as applicable.

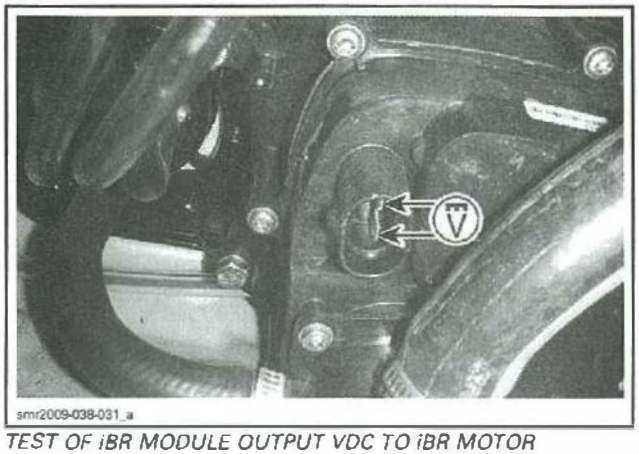
iBR Motor Voltage Test

1. Disconnect the 2-pin connector on iBR module.



1. iBR motor harness connector
2. iBR motor module connector

2. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc selection.
3. Install insulated clips on the multimeter leads and clip leads to pins in the motor connector on the iBR module.

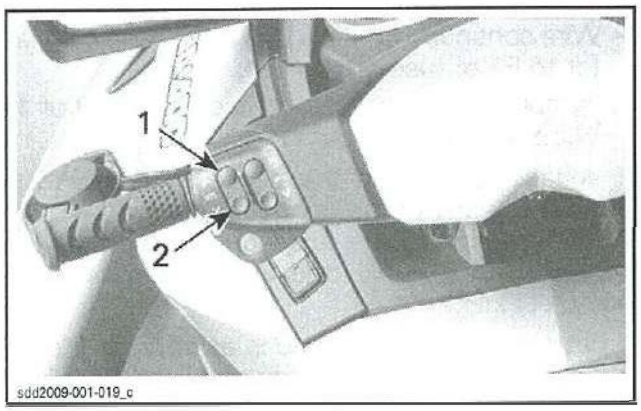


TEST OF iBR MODULE OUTPUT VDC TO iBR MOTOR

NOTE: On GTI models, temporary install test wires with a connector to the motor connector on the iBR module. Measure voltage on test wires.

4. Using the iBR override function (see *SYSTEM DESCRIPTION (iBR* in this subsection), press the VTS UP button and read the iBR module motor output voltage.

NOTE: The iBR UP button on the iBR Activation page in B.U.D.S. may be used instead of the iBR override function.



1. *VTS UP*
2. *VTS DOWN*

NOTE: Briefly press the START/STOP button to reactivate the electrical system when required.

5. Press the VTS DOWN button and read the iBR module motor output voltage.

NOTE: The iBR DOWN button on the iBR Activation page in B.U.D.S. may be used instead of the iBR override function.

iBR MOTOR VOLTAGE TEST
Battery voltage (over 12 Vdc)

NOTE: Voltage measured should be battery voltage in both UP or DOWN directions. Voltage polarity should reverse as UP or DOWN button is pressed alternately.

- If battery voltage **is not measured**, refer to *iBR ACTUATOR INPUT VOLTAGE TEST* in this subsection.
- If battery voltage **is measured** in both directions, refer to *iBR POWER TEST USING A TEST LIGHT* in this subsection.
- If battery voltage **is measured** and the test light is **bright** for both iBR UP or DOWN selections, the iBR motor is at fault and the iBR actuator must be replaced.
- If battery voltage **is low** or test light is **dim in** both directions, refer to *iBR ACTUATOR INPUT VOLTAGE TEST* in this subsection.
- If battery voltage **is measured** and test light **is dim in one** direction, replace the iBR actuator.

iBR Power Test Using a Test Light

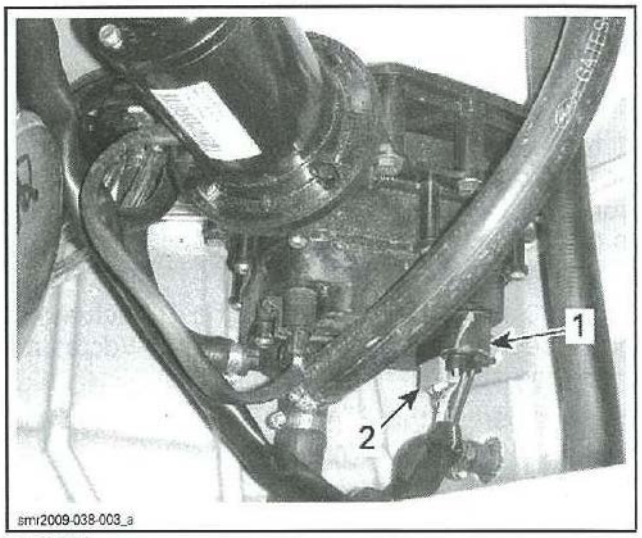
1. Connect the clip of a 12 Vdc test light to the battery ground (or engine ground).
2. Touch the test light probe to each pin of the motor output connector on the iBR module as you select the iBR UP and DOWN alternately.

The test light should come on bright for one pin only in each direction.

NOTE: The 12 Vdc and ground will alternate between pins with a change of iBR direction.

iBR Actuator Input Voltage Test

1. Disconnect the 3-pin and 12-pin connectors from the iBR module.



TYPICAL
1. *3-pin connector*
2. *12-pin connector*

NOTE: The 3-pin connector provides battery power directly to the iBR module for the actuator motor through the fuse F5. The 12 pin connector provides BRLS signals, CAN bus, and a switched 12 Vdc power to the iBR module through the fuse F17. Refer to *WIRING DIAGRAM*.

2. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc selection.
3. Measure for the battery input voltage (through fuse F5) to the iBR actuator as per following table.

iBR ACTUATOR INPUT VOLTAGE TEST (30 AMP BATTERY POWER)			
3 PIN CONNECTOR		**BATTERY**	**READING**
Pin 2	Pin 1	–	Battery voltage
Pin 2	–	Neg. (-) post	

If battery voltage is not measured, check the following:

- iBR fuse F5 in fuse box
- Battery voltage at fuse contact B4 of fuse box
- Wire continuity from pin 2 of iBR 3-pin connector to A4 of fuse box
- Jumper continuity fuse contact B4 to C3 of 12 Vdc bus-bar in fuse box.

If voltage is good to the negative battery post but not to pin 1 of the connector (ground wire to engine), check for an open or bad ground wire (loose, corroded, or pitted terminals, wire continuity, etc.)

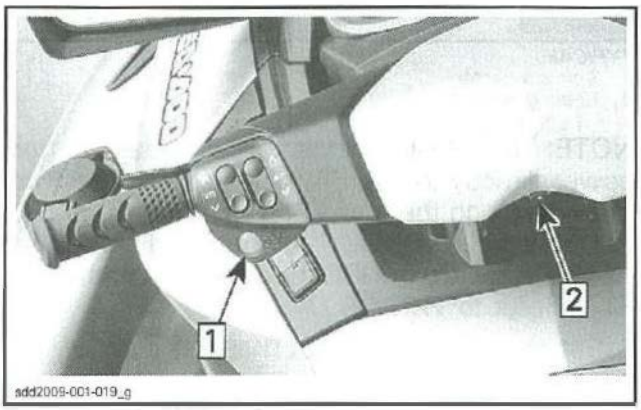
If battery voltage measured is as specified, carry out same test using a 12 Vdc test light. Test light should be bright.

If test light is not bright to pin 1 only, look for a bad contact on the ground circuit (loose, corroded, pitted, etc.).

If test light is not bright to the negative battery post, first check voltage at battery terminals to ensure battery is not discharged. If battery voltage is good, look for a bad contact in the 30 amp 12 V iBR power circuit (loose, corroded, pitted, etc.).

If the 30 amp 12 Vdc power to the iBR actuator is good, test for the switched 5 amp 12 Vdc as per following steps.

4. Briefly press the START/STOP button to wake the electrical system.



Step 1: Press START/STOP button
Step 2: Install D.E.S.S. key

5. Measure for the switched input voltage to the iBR actuator as per following table.

iBR ACTUATOR INPUT VOLTAGE TEST (5 AMP SWITCHED)			
iBR CONNECTORS		BATTERY	READING
12 PIN	3 PIN		
Pin 1	Pin 1	-	Battery voltage
Pin 1	-	Neg. (-) post	

NOTE: The 5 A switched power to the iBR actuator is for the iBR electronic module and BRLS.

If battery voltage is not measured at all, check the following:

- iBR control (CRTL) fuse F17 in fuse box
- Battery voltage at fuse contact E3 of fuse box
- Wire continuity from pin 1 of iBR 12-pin connector to F3 of fuse box
- Jumper continuity fuse contact E3 to D3 of 12 Vdc accessory bus-bar in fuse box.

If voltage is good to the negative battery post but not to pin 1 of the connector (ground wire to engine), check for an open or bad ground wire (loose, corroded, or pitted terminals, wire continuity, etc.).

If battery voltage measured is as specified, carry out same test using a 12 Vdc test light. Test light should be bright.

If test light is not bright to pin 1 of the 3 pin connector, look for a bad contact on the ground circuit (loose, corroded, pitted, etc.).

If test light is not bright to battery negative terminal, first check voltage at battery terminals to ensure battery is not discharged. If battery voltage is good, look for a bad contact in the 12 V iBR switched power circuit (loose, corroded, pitted, etc.).

If the iBR actuator input voltages and ground circuit are good, and there is no CAN bus or BRLS fault, replace the iBR actuator.

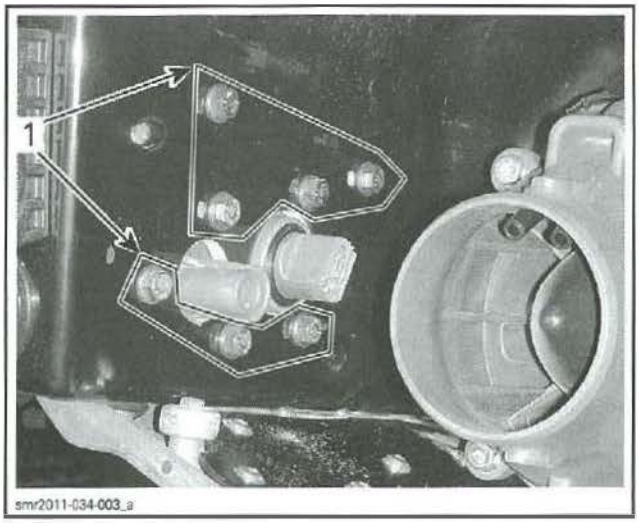
iBR Actuator Removal

GTI and Wake Models

⚠ CAUTION Remove iBR fuse before working in the iBR gate area. Refer to *POWER DISTRIBUTION*.

NOTICE Do not try to move the iBR gate when all components are installed.

1. Remove iBR Gate ass'y. Refer to *IBR GATE* in this subsection.
2. Remove iBR actuator retaining screws.

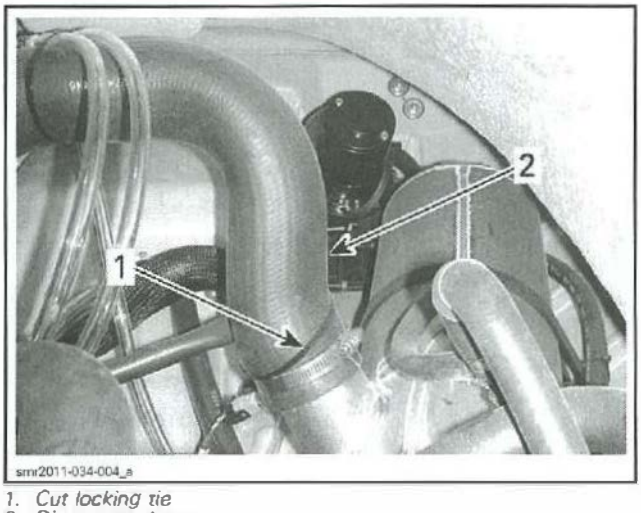


1. Remove screws

3. Remove seat.

From Inside Bilge

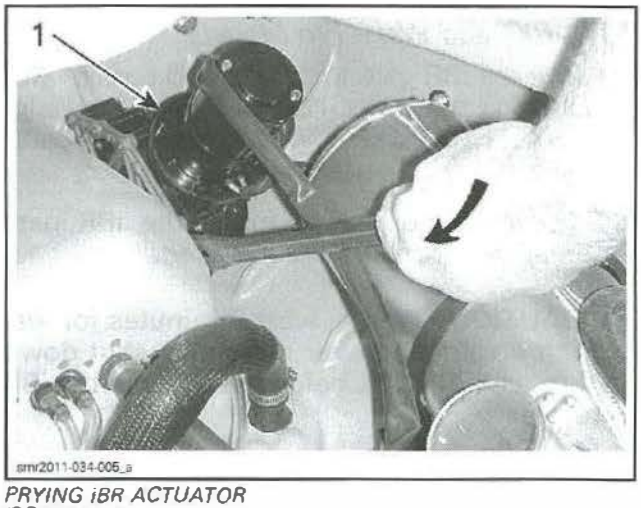
4. Cut locking tie.
5. Disconnect hose from muffler.
6. Move hose end away.



1. Cut locking tie
2. Disconnect hose

7. Pull out iBR actuator.

NOTE: It may be necessary to pry out iBR actuator.

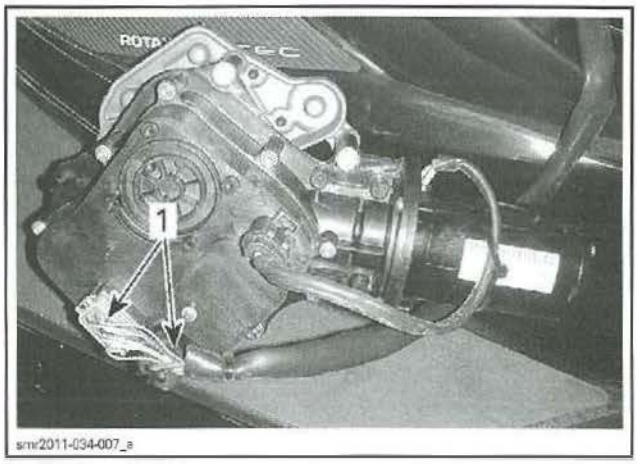


PRYING iBR ACTUATOR
iBR actuator



1. Pull out

8. Cut locking tie.
9. Disconnect the indicated connectors.



1. Unplug connectors

GTX, RXT and Wake Pro Models

1. Move the iBR gate to the forward position (full up) using the *iBR OVERRIDE* function. Refer to *SYSTEM DESCRIPTION (iBR)* in this subsection.

NOTICE Do not try to move the iBR gate when all components are installed.

⚠ CAUTION Wait at least 5 minutes for watercraft electrical power system to shut down or remove iBR fuses before working in the iBR gate area.

iS Models

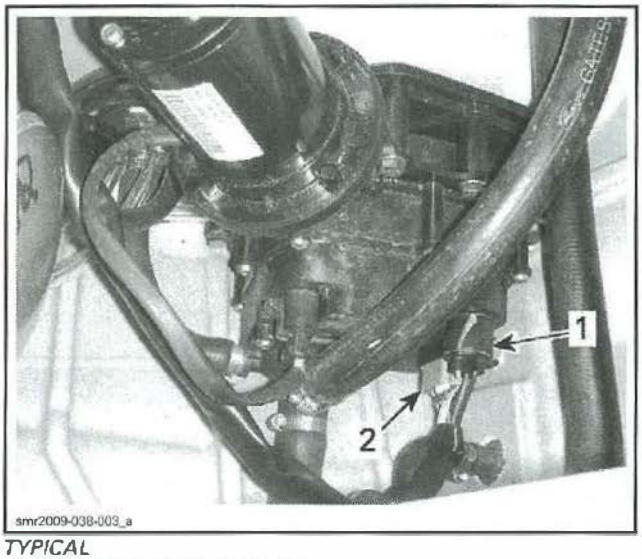
2. Open the boarding platform and remove the LH storage bin.

Models Without iS

3. Remove the LH access panel on the boarding platform.

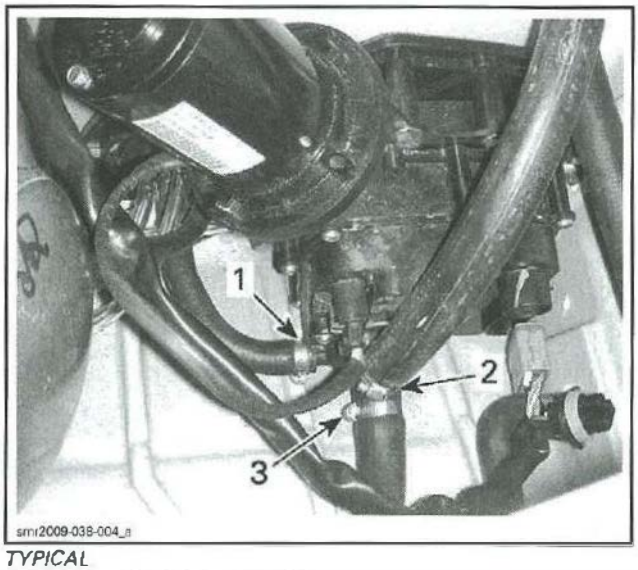
All Models

4. Disconnect the two aft electrical connectors from the iBR actuator. The forward electrical connector (iBR motor power) does not need to be removed.



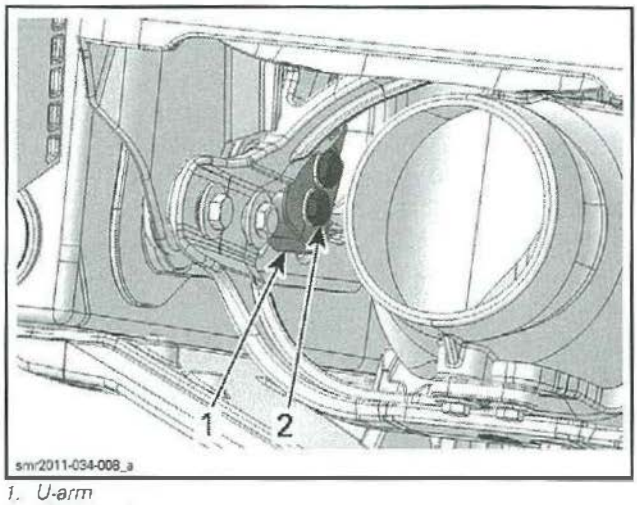
TYPICAL
1. *iBR actuator 3 pin connector*
2. *iBR actuator 12 pin connector*

5. Disconnect the three water pressure hoses indicated in the following illustration from the iBR actuator.



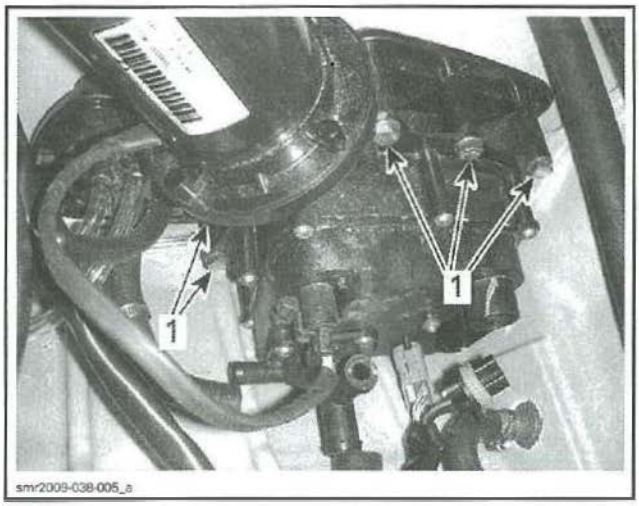
TYPICAL
1. *Pressure hose from jet pump*
2. *Pressure hose to intercooler (260 hp models)*
3. *Pressure hose to exhaust manifold*

6. From jet pump area, remove and discard the two hexagonal screws securing the U-arm to the iBR actuator shaft.



1. *U-arm*
2. *Hexagonal screws*

7. From bilge, remove the five hexagonal screws securing the iBR actuator to the LH support plate.



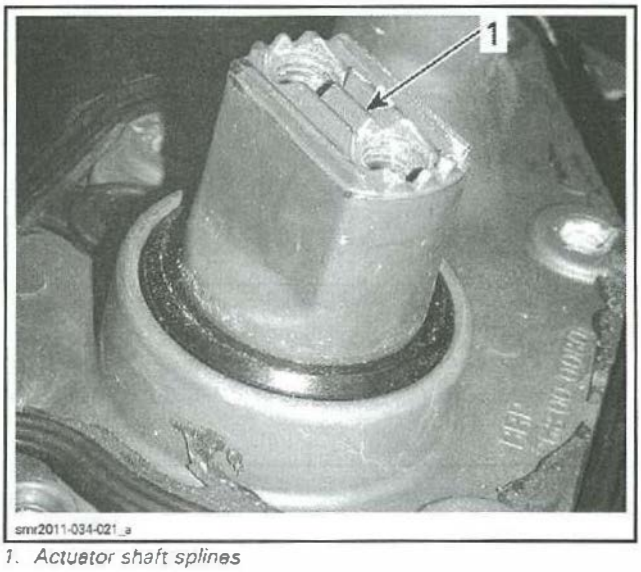
TYPICAL
1. Hexagonal screws to remove (1 screw not visible)

8. Pull the iBR actuator from the support plate.

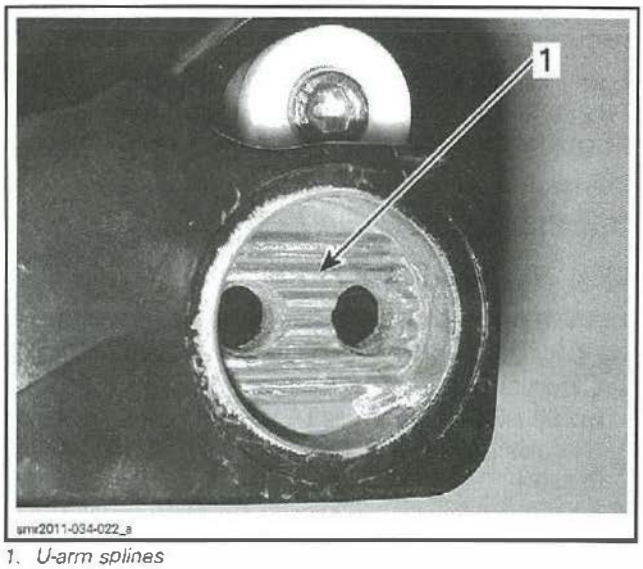
iBR Actuator Inspection

Check condition of iBR actuator gasket.

Check condition of splines on actuator shaft end and in U-arm.



1. Actuator shaft splines



1. U-arm splines

Replace parts as necessary.

iBR Actuator Installation

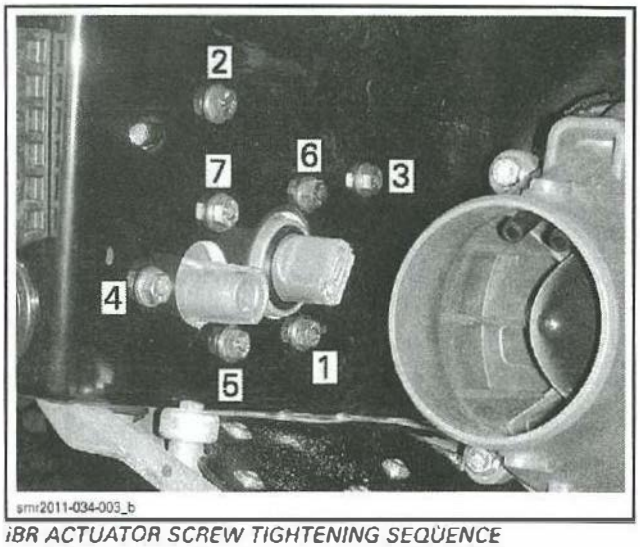
GTI and Wake Models

Installation is the reverse of the removal procedure however, pay attention to the following.

Clean actuator mounting screw threads and apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads (or install new screws with threadlocker).

Tighten actuator mounting screw to specification as per following sequence.

TIGHTENING TORQUE
12 N•m (106 lbf•in)



iBR ACTUATOR SCREW TIGHTENING SEQUENCE

Clean iBR shaft screw threads and apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads (or install new screws with threadlocker).

Secure U-arm to iBR shaft.

Apply a small amount of DIELECTRIC GREASE (P/N 293 550 004) to the connector pins before plugging the connectors to the iBR actuator.

Reinstall iBR fuse.

Check watercraft in water for water tightness.

GTX, RXT and Wake Pro Models

Installation is the reverse of the removal procedure however, pay attention to the following:

- Clean all actuator mounting screw threads and apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads (or install new screws with threadlocker).
- Install the U-arm on iBR shaft using new hexagonal screw with threadlocker.
- Torque hexagonal screws securing iBR actuator
- Torque gear clamps securing water pressure hoses to 2 N•m (18 lbf•**in**).
- Apply a small amount of DIELECTRIC GREASE (P/N 293 550 004) to the connector pins before installing the connectors on the iBR actuator.
- Check watercraft in water for water tightness.

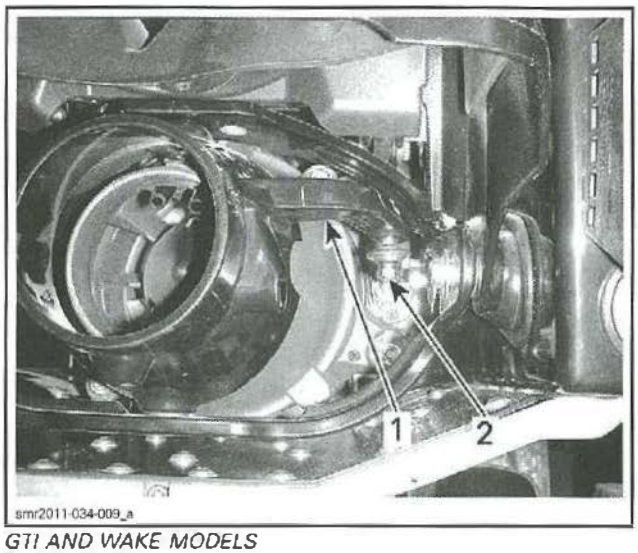
iBR GATE

iBR Gate Removal (with VTS Trim Ring and Steering Nozzle)

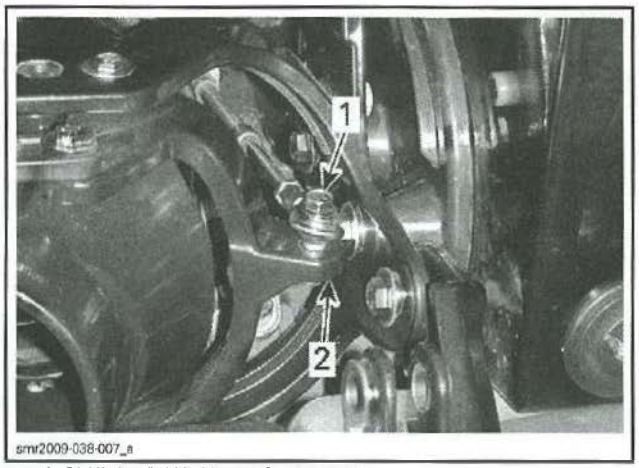
⚠ CAUTION **Remove iBR fuse before working in the iBR gate area. Refer to *POWER DISTRIBUTION*.**

NOTICE **Do not try to move the iBR gate when all components are installed.**

1. Disconnect the steering cable from the steering nozzle arm.

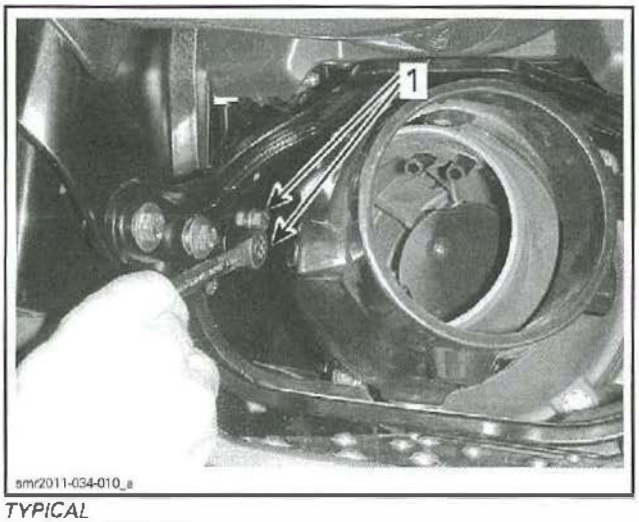


GTI AND WAKE MODELS
1. *Nozzle arm*
2. *Remove screw*



GTX, RXT AND WAKE PRO MODELS
1. *Remove screw*
2. *Nozzle lever*

2. Remove screws retaining U-arm to iBR actuator shaft.

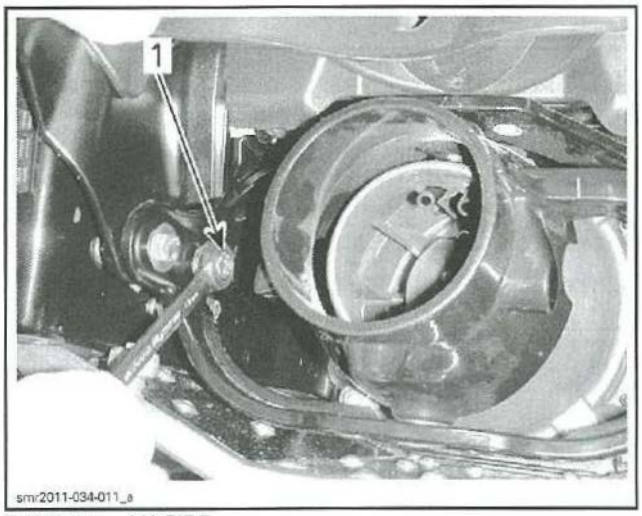


TYPICAL
1. *Remove screws*

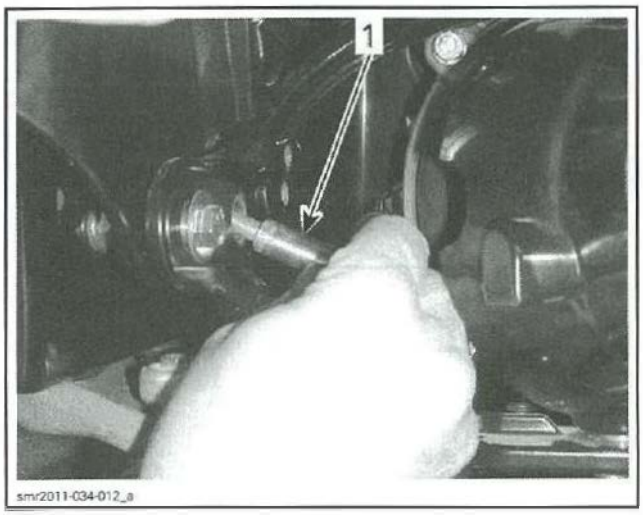
⚠ CAUTION From now on, retain iBR gate to prevent it to fall. Pay attention not to caught your fingers.

3. Raise iBR gate to its upper position. Hold in position.
4. Remove screw from iBR gate LH pivot point.

NOTE: Pull out bushing along with the screw.



TYPICAL — LH SIDE
1. Remove screw and bushing

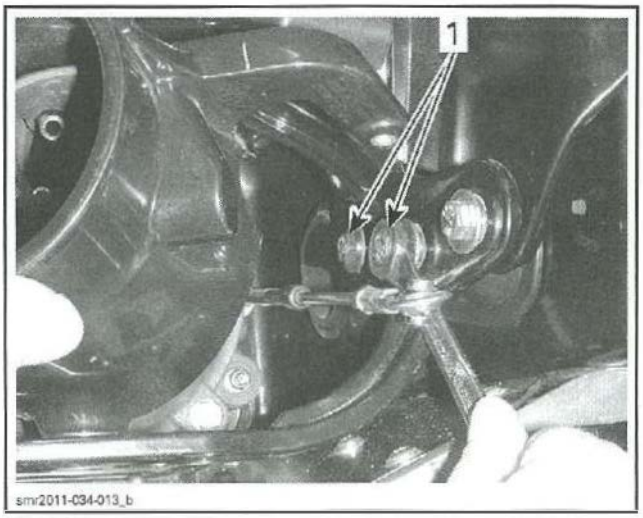


PICAL
1. Bushing

5. Remove screw from iBR gate RH pivot point.

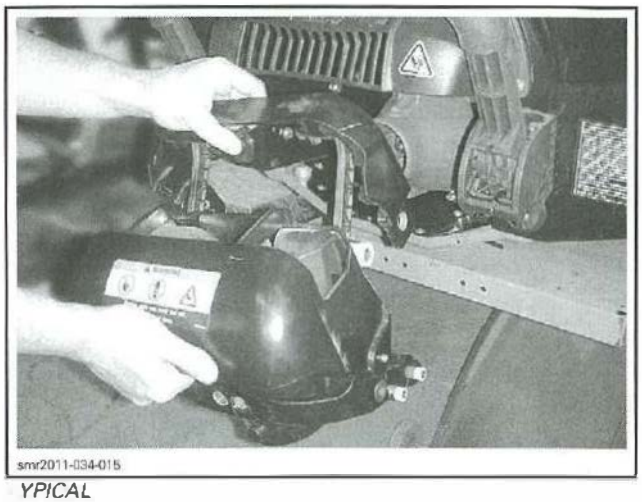
NOTE: Pull out bushing along with the screw.

6. Remove screw from U-arm pivot point



TYPICAL — RH SIDE
1. Remove screws

Pull out iBR gate ass'y with U-arm.

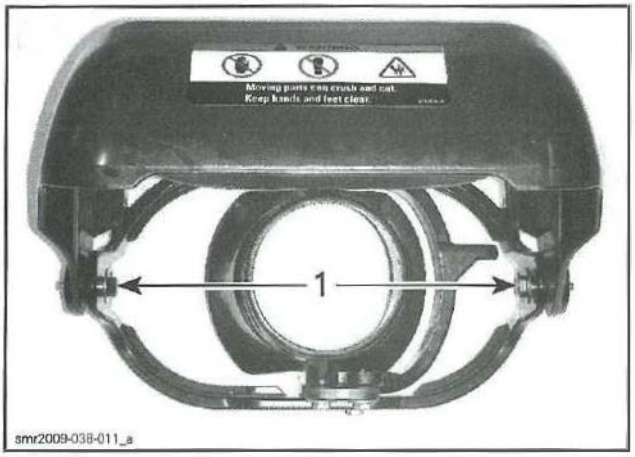


YPICAL

iBR Gate and VTS Trim Ring Disassembly

VTS Trim Ring Removal

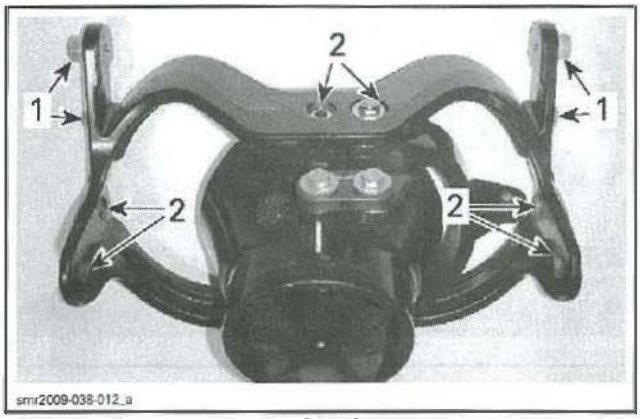
Remove the two hexagonal screws securing the iBR gate to the VTS trim ring.



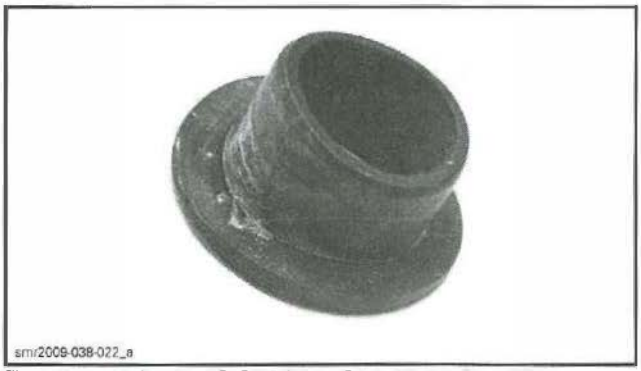
TYPICAL
1. iBR gate retaining hexagonal screws to remove

Trim Ring Inspection

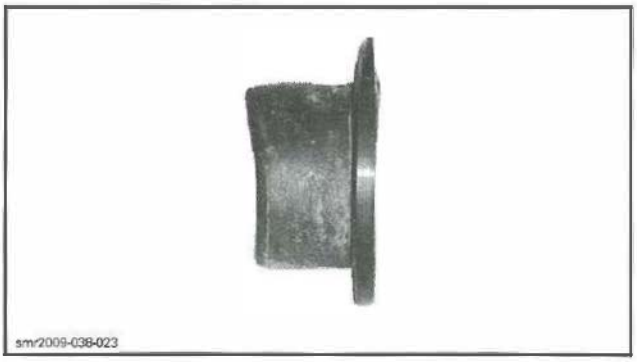
1. Inspect trim ring and metal spacers for cracks, oblong holes, evidence of wear and deformation.
2. Inspect plastic bushings and friction sleeves for cracks, deformation and signs of wear.



TYPICAL VTS TRIM RING (WITH NOZZLE AND STEERING ARM)
1. Friction sleeves (2 each side)
2. Plastic bushings (x8)

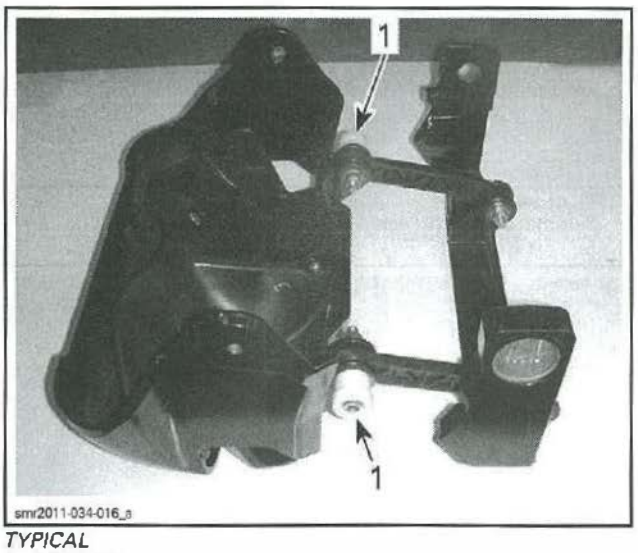


TYPICAL - WORN AND DEFORMED PLASTIC BUSHING



NOTE: Friction sleeves should be replaced as specified in maintenance chart or if they show signs of wear (flat surfaces). Plastic bushings are press fit and should be replaced if they show signs of wear, deformation, or if the iBR gate backlash is beyond service limit.

3. Inspect gate stoppers for signs of wear.



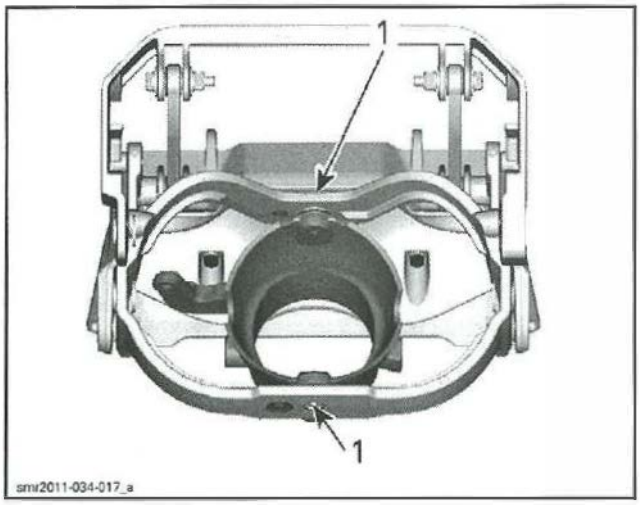
TYPICAL
1. Stoppers

4. Replace parts as required.

Steering Nozzle Removal

GTI and Wake Models

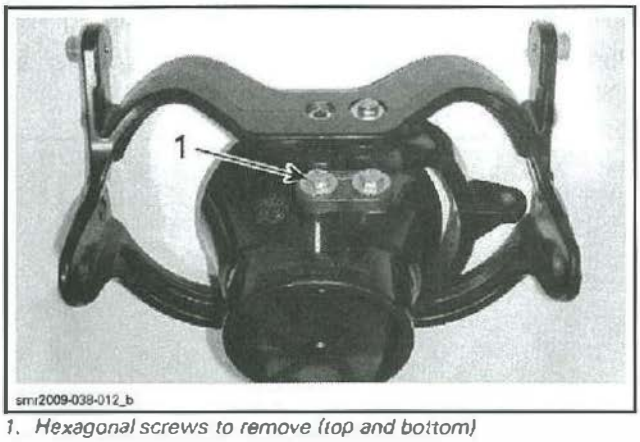
1. Remove screws securing nozzle to VTS ring.



1. Remove screws

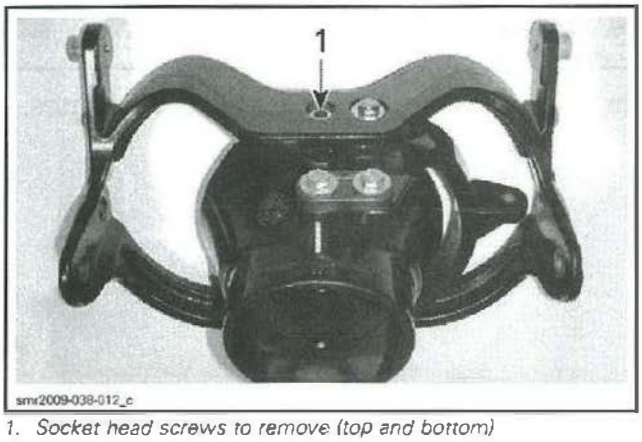
GTX, RXT and Wake Pro Models

1. Remove the 2 hexagonal screws securing the steering arms (links) to the steering nozzle (top and bottom).



1. Hexagonal screws to remove (top and bottom)

2. Remove the 2 socket head screws securing the nozzle to the VTS trim ring (1 top and 1 bottom).

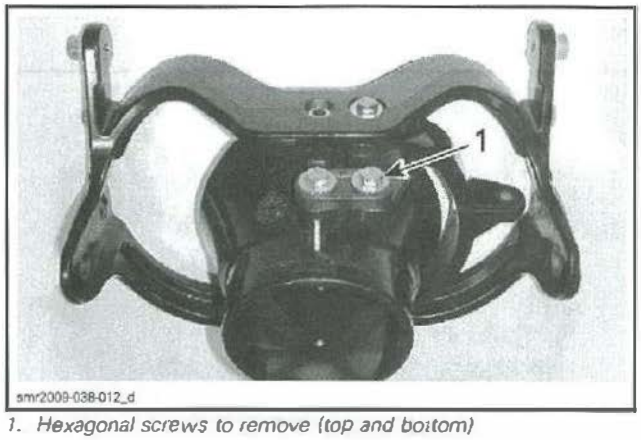


1. Socket head screws to remove (top and bottom)

Steering Nozzle Lever Removal

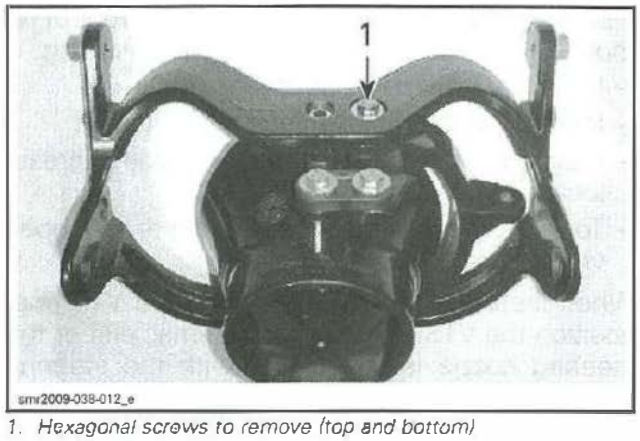
GTX, RXT and Wake Pro Models

1. Remove the hexagonal screws securing the steering arms (links) to the steering nozzle lever, top and bottom.



1. Hexagonal screws to remove (top and bottom)

2. Remove the hexagonal screws securing the steering nozzle lever to the VTS trim ring, top and bottom.



1. Hexagonal screws to remove (top and bottom)

Steering Nozzle Inspection

1. Inspect steering nozzle for cracks, wear, deformation, and other damages.

Inspect bushings for wear or other damage.

2. Replace parts as required.

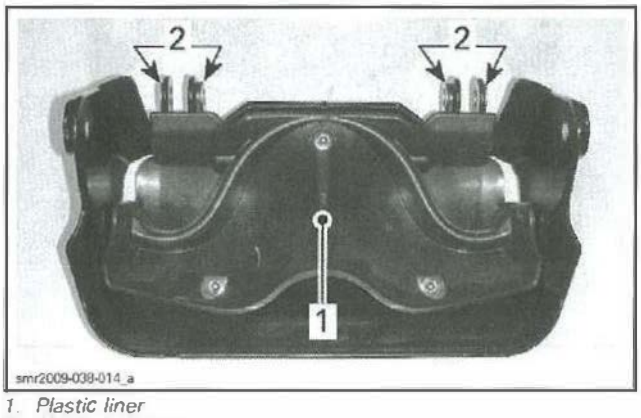
Steering Nozzle Lever Inspection

GTX, RXT and Wake Pro Models

1. Inspect steering nozzle lever, steering arms, and spacers for cracks, elongated holes, evidence of wear, deformation and other damages.
2. Replace as required.

iBR Gate Inspection

1. Inspect the iBR gate and its plastic liner for cracks, out of round holes, evidence of wear, deformation and other damages.
2. Inspect plastic bushings (x4) for cracks, wear, and deformation.
3. Replace as required.



1. Plastic liner
2. Plastic bushings

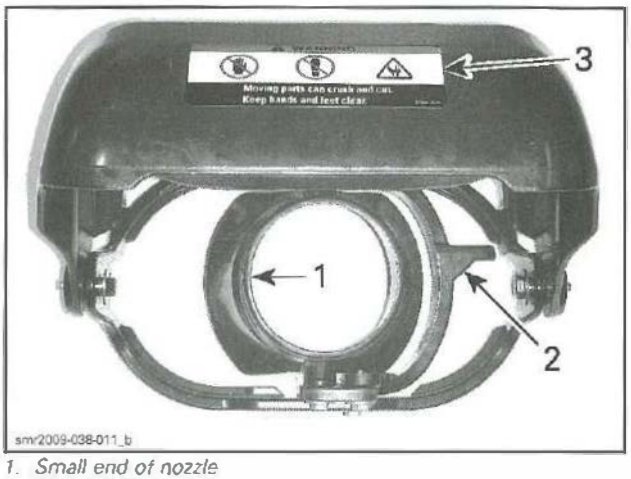
iBR Gate and VTS Ring Reassembly

Install all parts removed in the reverse order of removal, however pay attention to the following:

- Install new friction sleeves (as required).
- Install new plastic bushings (as required).
- Install new hexagonal screws with threadlocker.
- Torque all retaining screws as per exploded view.

When installing the iBR gate onto the VTS ring, position the VTS ring so that the small end of the steering nozzle is facing you with the steering lever towards the RH side.

Position the iBR gate over the ring so that the warning label is facing you (right side up) and install the mounting hardware as seen in the exploded view. The attachment points for the linkage arms will be facing away from you (not visible in following illustration of iBR gate and VTS ring assembly).



1. Small end of nozzle
2. Steering lever
3. Warning label

iBR Gate Installation (with VTS Trim Ring and Steering Nozzle)

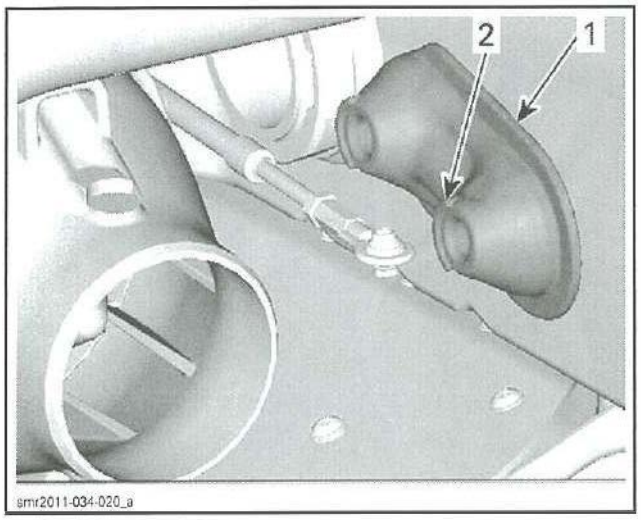
GTI and Wake Models

Installation is the reverse of the removal procedure however, pay attention to the following.

Position iBR gate down and components as shown to install into position.



Insert iBR gate ass'y between mounting plates.



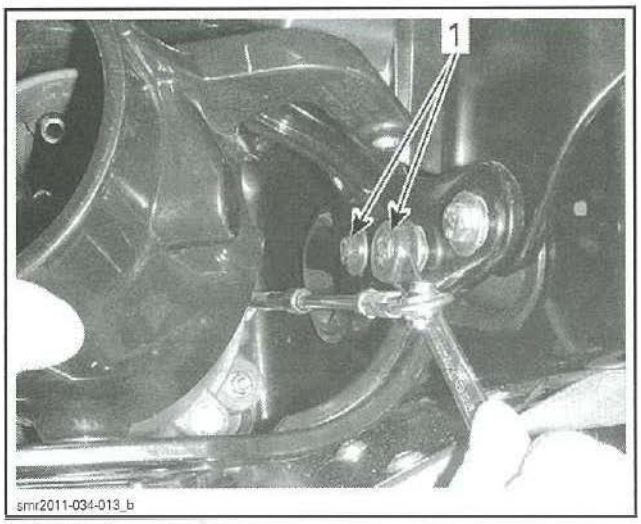
1. RH mounting plate
2. Rib here

NOTE: Ensure RH mounting plate is in place before inserting iBR gate ass'y. Also position its ribs as illustrated.

Raise iBR gate to its upper position. Hold in position.

Use new screws with threadlocker for installation.

Loosely install M8 x 70 mm screws on RH side.



1. M8 x 70 screws here

Install screw on LH side of VTS ring pivot point then iBR shaft screws.

Torque all retaining screws as specified in exploded view.

NOTICE Over torquing will damage inserts.

GTX, RXT and Wake Pro Models

Installation is the reverse of the removal procedure however, pay attention to the following:

- Install new plastic bushings (as required).
- Install all new hexagonal screws with threadlocker.
- Lift the 2 linkage arms on the U-arm as you insert the iBR gate and VTS ring between the mounting plates.
- Secure the VTS ring to the mounting plates, then secure the linkage arms to the iBR gate.
- Torque all retaining screws as specified in exploded view.

NOTICE Overtorquing will damage inserts.

U-ARM

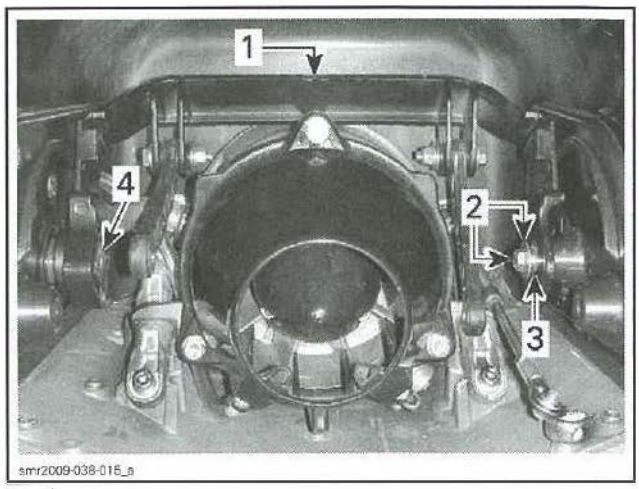
U-Arm Removal

GTI and Wake

Remove U-arm as an assembly with iBR gate. Refer to *iBR GATE* in this subsection.

RXT, GTX and Wake Pro

1. Carry out the *iBR GATE REMOVAL (WITH VTS TRIM RING)* procedure as detailed in this subsection.
2. Remove the RH U-arm retaining hexagonal screw and washer.
3. Secure the U-arm with one hand and remove the RH spacer sleeve.
4. Remove U-arm from actuator shaft.

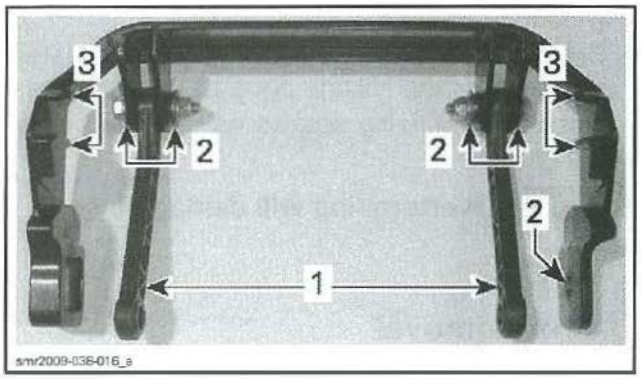


1. U-arm
2. Hexagonal screw and washer
3. Spacer sleeve
4. Actuator shaft

U-Arm Inspection

1. Inspect U-arm and linkage arms (x2) for cracks, wear, and signs of twisting and bending.
2. Ensure the VTS cams on the U-arm are not worn, cracked or broken.

3. Inspect the plastic bushings (x5) for cracks, wear and deformation.
4. Replace parts as required.



1. Linkage arms
2. Plastic bushings (x5)
3. VTS cams

U-Arm Installation

Installation is the reverse of the removal procedure however, pay attention to the following:

- Install new plastic bushings (as required).
- Install all new hexagonal screws with threadlocker.
- Torque all retaining screws as per exploded view.

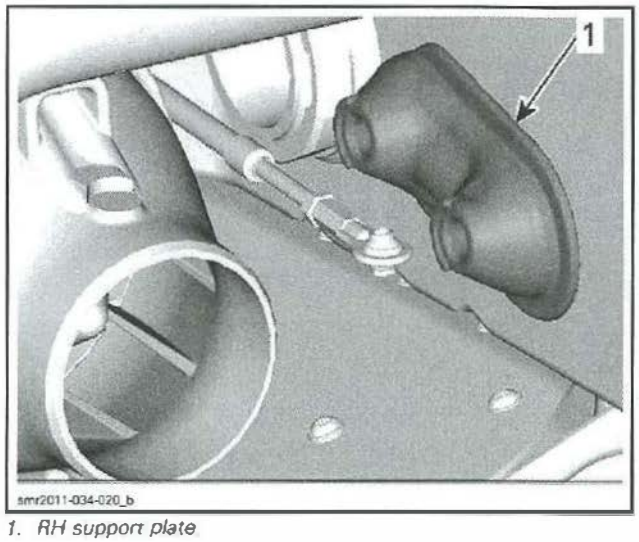
iBR GATE SUPPORT PLATES

iBR Gate Support Plate Removal

GTI and Wake Models

RH Support Plate Removal

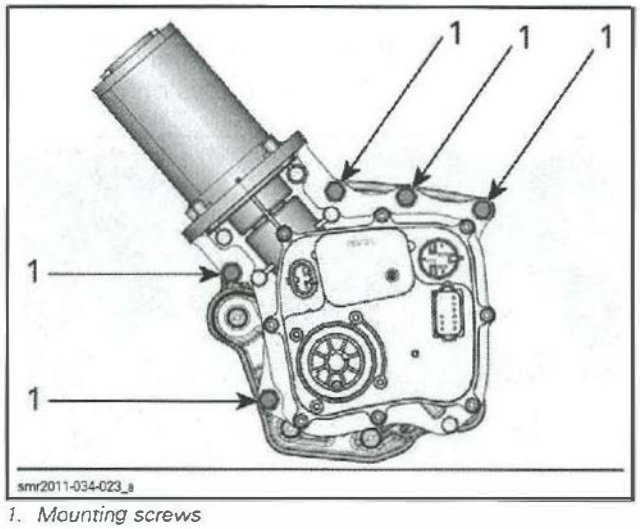
1. Remove iBR gate ass'y. Refer to procedure in this subsection.
2. Remove support plate.



1. RH support plate

LH Support Plate Removal

1. Remove iBR actuator. Refer to procedure in this subsection.
2. Remove support plate mounting screws.



1. Mounting screws

3. Pull out support plate.

GTX, RXT and Wake Pro Models

Preparation

NOTE: The following steps must be carried out when removing the LH or RH support plates.

iS Models

1. Open the boarding platform. Refer to *BODY* subsection.

All Models

2. Remove the following items, see procedures in this subsection:
   - iBR gate, VTS trim ring and the steering nozzle as an assembly
   - iBR U-arm.

RH Support Plate Removal

iS Models

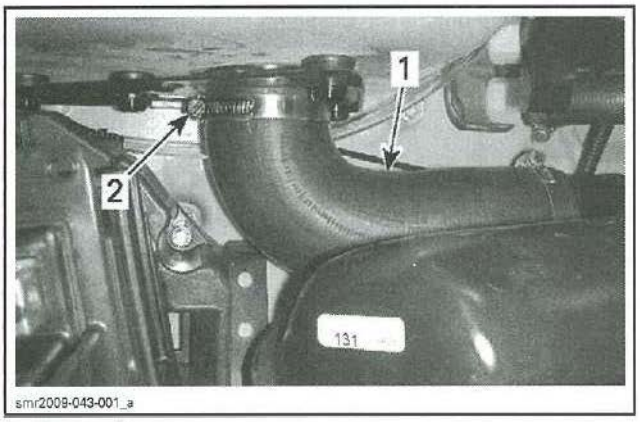
1. Remove the RH storage bin, refer to the *BODY* subsection.

Models Without iS

2. Remove RH access panel from the boarding platform.

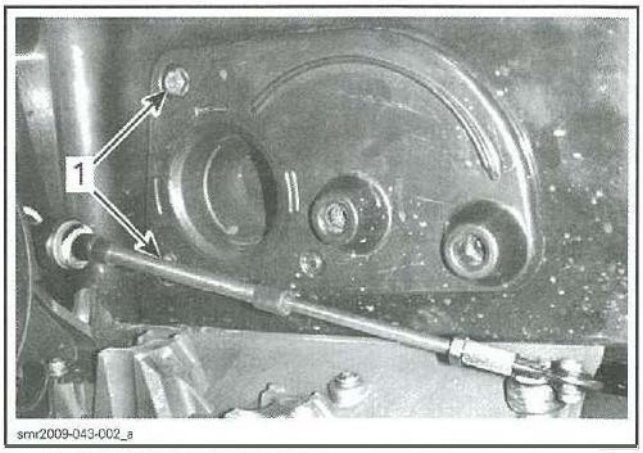
All Models

3. Remove the battery, refer to *CHARGING SYSTEM* subsection.
4. Disconnect the exhaust hose from the RH inner support plate.



1. *Exhaust hose*
2. *Clamp to loosen*

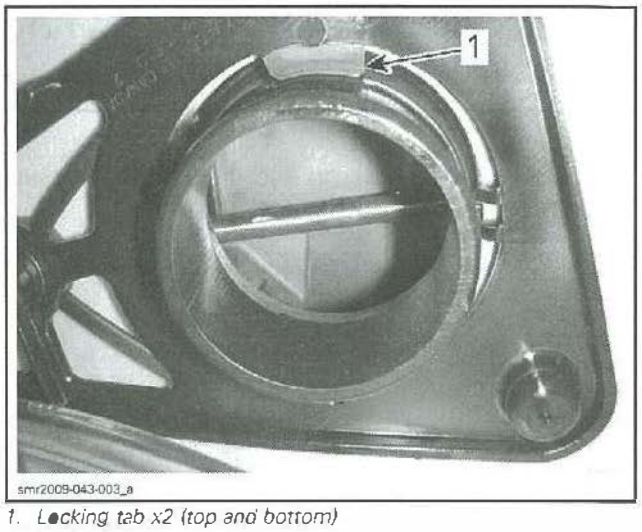
5. Remove and discard the 2 hexagonal screws securing the outer support plate to the inner support plate.



1. *Support plate retaining screws*

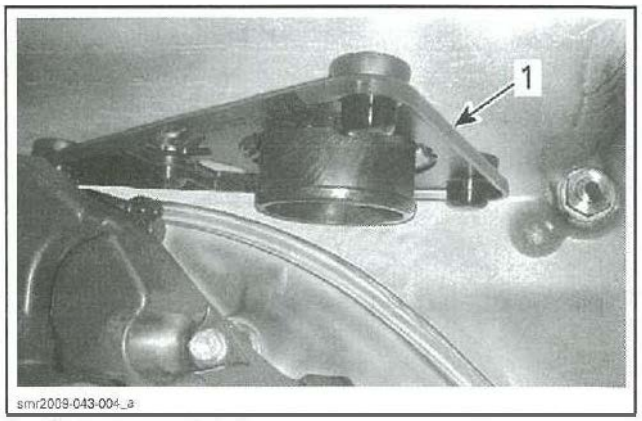
NOTE: Two locking tabs on the inner plate locks it to the outer plate exhaust nozzle.

6. Using a small screwdriver or a scriber, lift the upper locking tab slightly to help release the plates and avoid breaking the tabs.



1. *Locking tab x2 (top and bottom)*

7. Carefully pull the RH inner support plate off the outer plate.

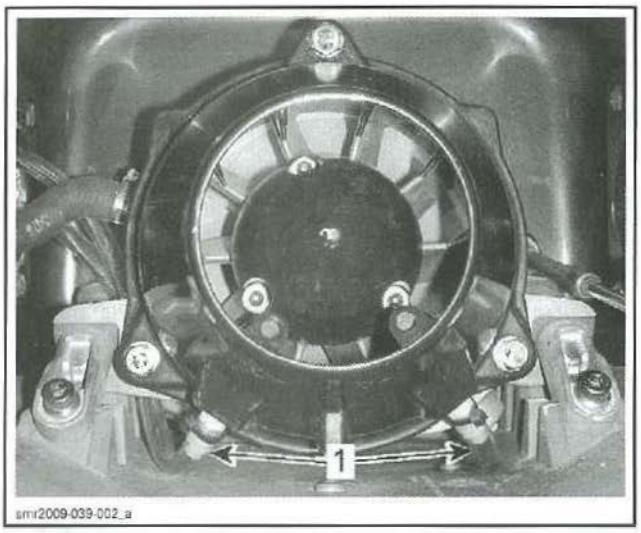


1. *RH inner support plate*

8. Pull the outer plate off the hull.

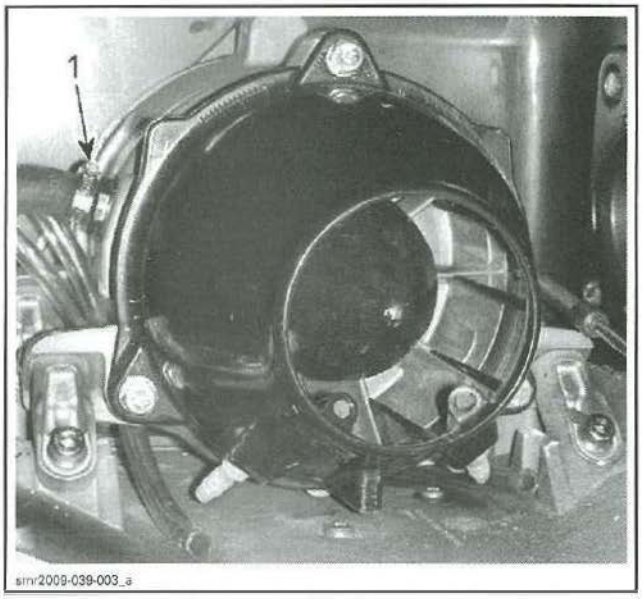
LH Support Plate Removal

1. Remove the iBR actuator, refer to procedure in this subsection.
2. Cut the locking ties and disconnect the 2 bailer hoses from the jet pump venturi.



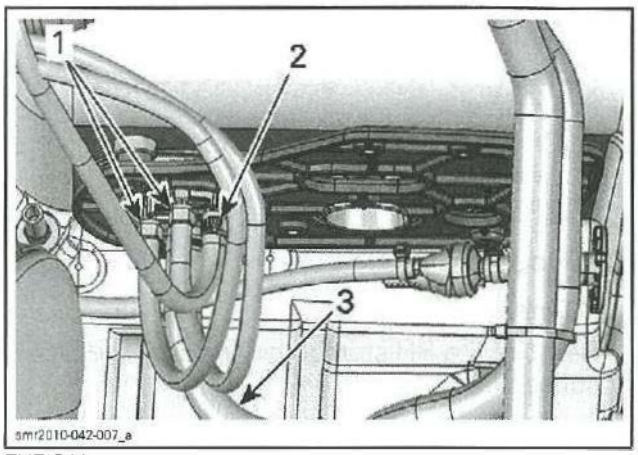
1. Bailer hoses

3. Loosen the gear clamp and disconnect the water pressure hose from the jet pump.



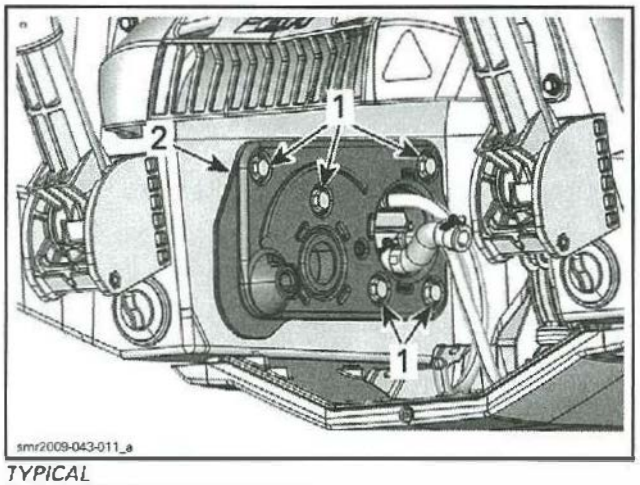
1. Water pressure hose

4. Disconnect the hoses connected to the fitting plate mounted in the iBR support plate.



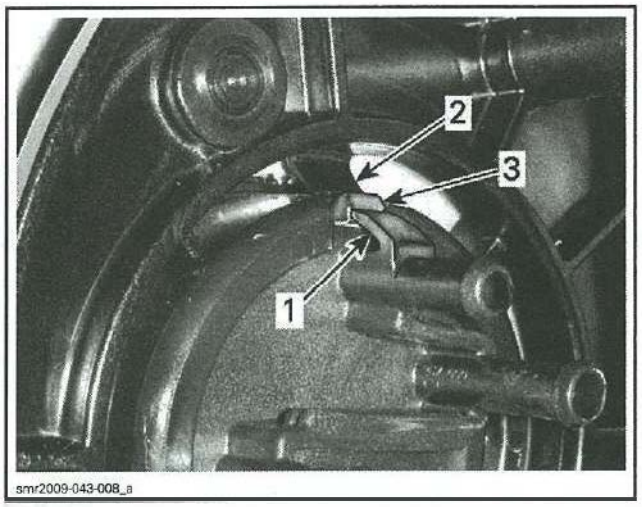
TYPICAL
1. Bailer hoses (x2)
2. Intercooler bleed hose (models with external intercooler)
3. Pump water pressure hose

5. Remove and discard the 5 hexagonal screws securing the outer support plate to the inner support plate.



TYPICAL
1. Hexagonal screws to remove
2. Outer support plate

6. From the iBR actuator side, carefully compress the outer support plate tab retaining the two support plates together using a common screwdriver.



TYPICAL
1. *Fitting plate tab*
2. *Inner plate tab*
3. *Outer plate tab to compress*

7. Pull the inner support plate off the outer support plate.
8. Pull the outer support plate from the hull.

iBR Support Plate Installation

GTI and Wake Models

RH Support Plate Installation

Installation is the reverse of the removal procedure.

LH Support Plate Installation

Installation is the reverse of the removal procedure however, pay attention to the following:

1. Install screws to secure support plate to iBR actuator and torque as per exploded view.
2. Ensure formed seal is in good condition and properly install on support plate.

GTX, RXT and Wake Pro Models

RH Support Plate Installation

1. Ensure formed seals are in good condition and properly installed on each support plate.
2. Position the RH inner support plate in front of its mounting position in the hull.
3. As you hold the inner support plate, insert exhaust fitting on the outer support plate through the hull. Push the outer plate in until it snaps onto the inner plate.
4. Install 2 new hexagonal screws to secure iBR support plates and torque to 12 N•m (106 lbf•**in**).
5. Install the exhaust hose on the support plate fitting and torque the gear clamp to 4 N•m (35 lbf•**in**).
6. Install the battery, refer to *CHARGING SYSTEM* subsection.
7. Install remaining parts in the reverse order of removal. Refer to applicable procedures for details, torque values and service products.

NOTICE **Overtorquing will damage inserts.**

LH Support Plate Installation

1. Ensure formed seals are in good condition and properly installed on each support plate.
2. Position the LH inner support plate in front of its mounting position in the hull.
3. As you hold the inner support plate, insert the round extension on the outer support plate through the hull. Push the outer plate in until it snaps onto the inner plate.
4. Install 5 new hexagonal screws to secure iBR support plates and torque as per exploded view.
5. Install the fitting plate, refer to *FITTING PLATE* in this subsection.
6. Install remaining parts in reverse order of removal. Refer to appropriate procedures for details, service products and torque values.

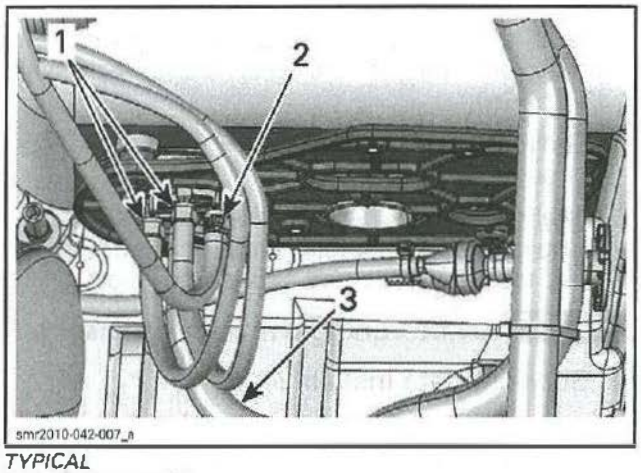
FITTING PLATE

The fitting plate connects the bailer and pressure hoses inside the hull to the hoses that are connected to the jet pump. It also provides the drain fitting for the intercooler drain hose (260 hp engine only).

Fitting Plate Removal

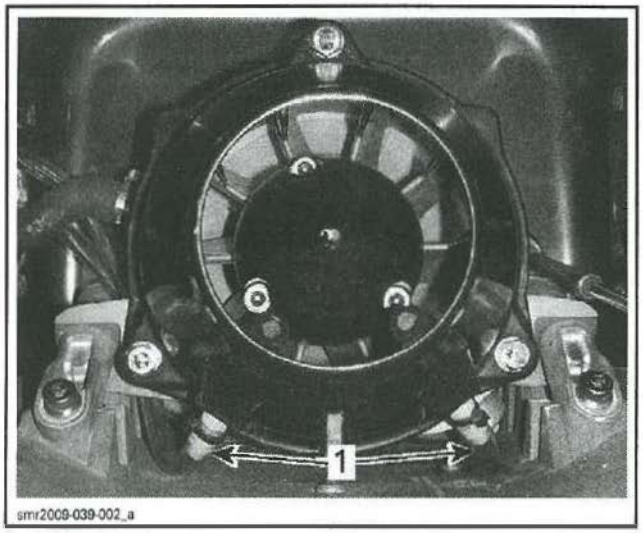
GTX, RXT and Wake Pro Models (215/260 Engines)

1. Remove the iBR actuator for access to the fitting plate, refer to *iBR ACTUATOR* in this section.
2. Disconnect the hoses connected to the fitting plate (inside hull).



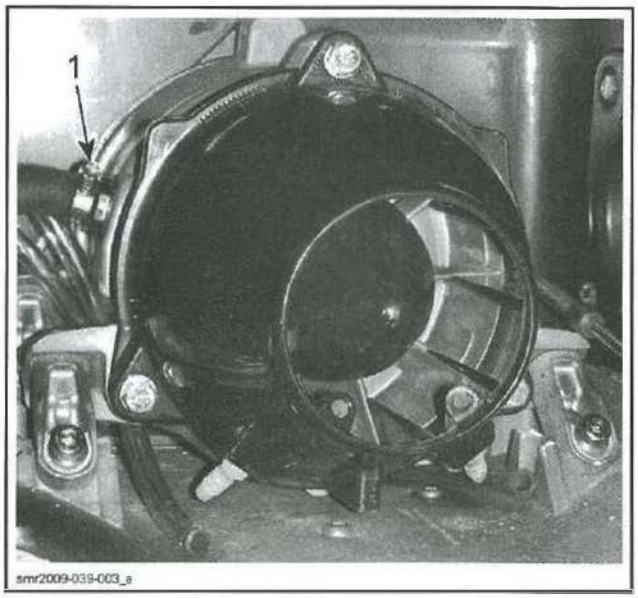
TYPICAL
1. *Bailer hoses (x2)*
2. *Intercooler bleed hose (models with an external intercooler*
3. *Water pressure hose from jet pump*

3. Cut the locking ties and disconnect the 2 bailer hoses from the jet pump venturi.



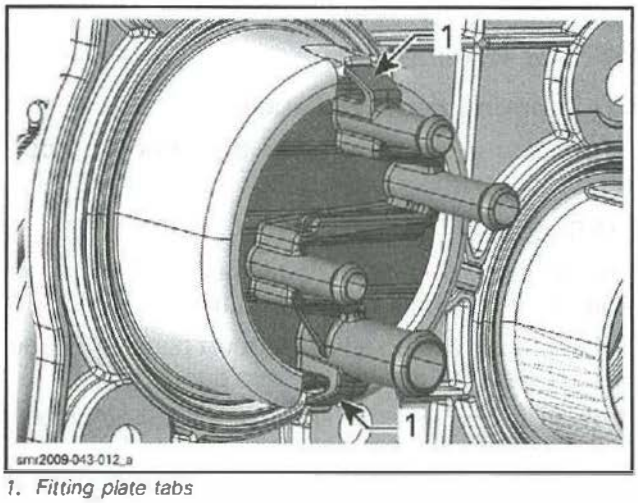
1. Bailer hoses

4. Loosen the gear clamp and disconnect the water pressure hose from the jet pump.



1. Water pressure hose

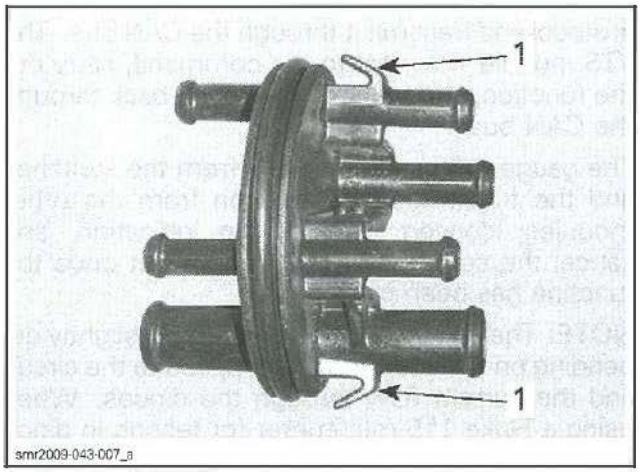
5. Compress the fitting plate retaining tab and push the fitting plate out of the outer support plate.



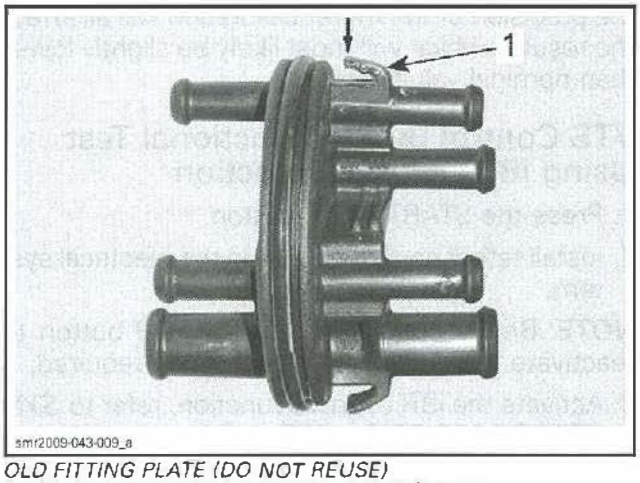
1. Fitting plate tabs

6. Discard the fitting plate.

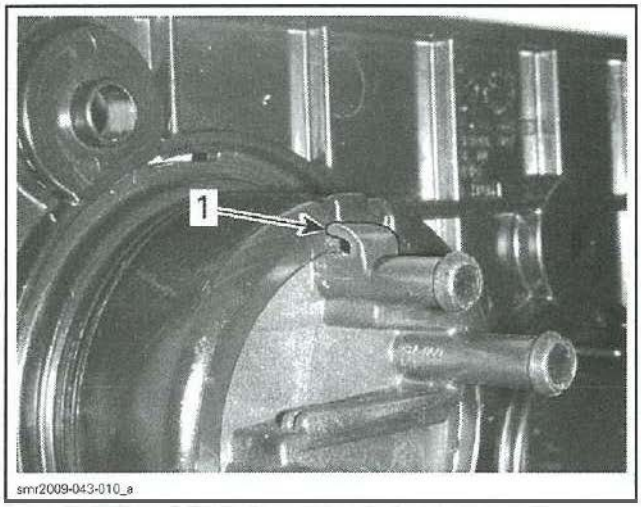
NOTICE When the fitting plate retaining tabs are compressed for removal, the tabs become deformed and weakened. Do not reinstall a used fitting plate. Always install a new fitting plate. Failure to comply with this notice can result in water seeping into the bilge.



NEW FITTING PLATE
1. Good retaining tabs



OLD FITTING PLATE (DO NOT REUSE)
1. BAD retaining tabs (compressed and deformed)



OLD FITTING PLATE (BAD RETAINING TAB CONTACT)
1. Retaining tab

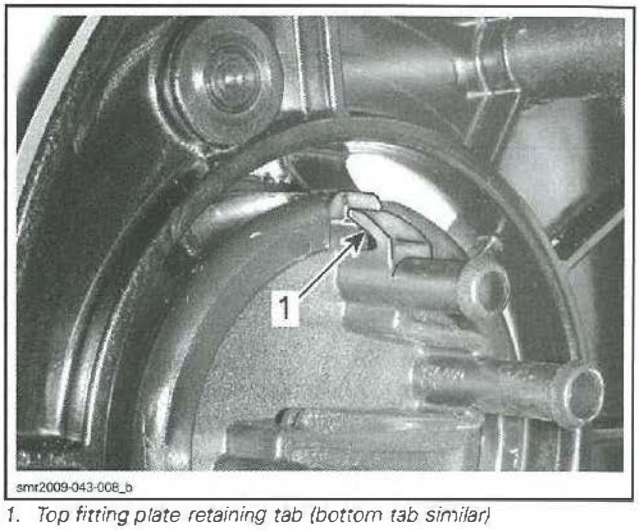
Fitting Plate Installation

1. Ensure the O-ring seal is properly installed on the fitting plate and in good condition.
2. Insert the fitting plate through the outer iBR support plate.

NOTICE The fitting plate used on models with an external intercooler is slightly different than, and not interchangeable with, the fitting plate used on all other models. Be sure to use the correct fitting plate.

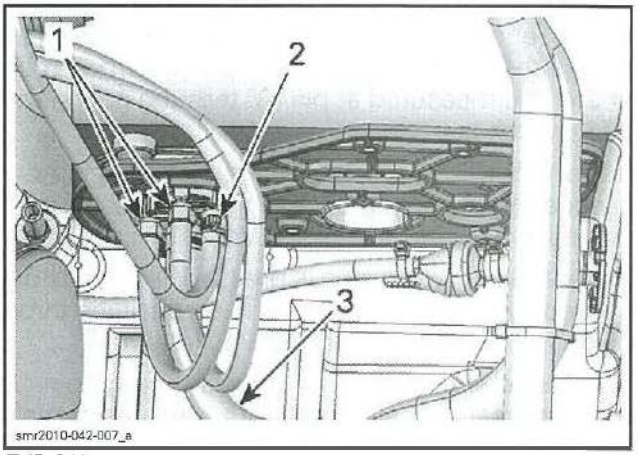
3. Push the fitting plate in until it bottoms out and the retaining tabs (x2) snap securely into position.

NOTICE Ensure both tabs are properly locked to secure fitting plate to the support plate. If fitting plate is not properly locked in position, water may seep into the bilge.



1. Top fitting plate retaining tab (bottom tab similar)

4. Install the hoses on the inner fitting plate.
5. Torque gear clamps to 1.7 N•m (15 lbf•**in**).

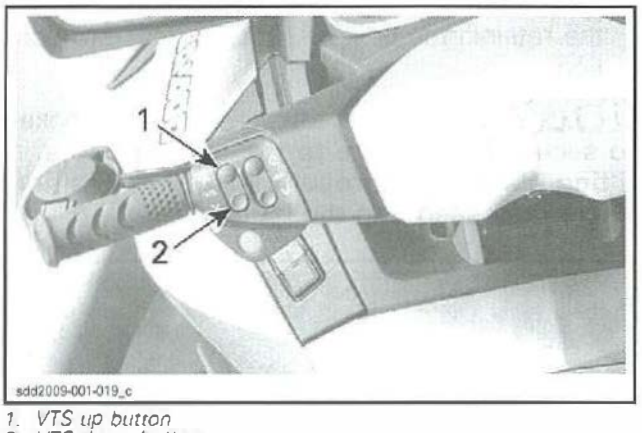


TYPICAL
1. Bailer hoses (x2)
2. Intercooler bleed hose (models with an external intercooler)
3. Water pressure hose from jet pump

6. Install the three hoses on the jet pump.

7. Torque the gear clamp securing pressure hose to the jet pump to 1.7 N•m (15 lbf•**in**).
8. Install remaining parts in the reverse order of removal, refer to appropriate procedure in this subsection.

VTS CONTROL BUTTON



1. *VTS up button*
2. *VTS down button*

VTS Button Overview

The VTS button contain a series of 4 diodes for the UP and DOWN arrow switches. Refer to *WIRING DIAGRAM*.

The center wire to the switches (pin "C"), is common for iS button and VTS button (somewhat like a ground wire). The other two wires (pins "A" and "B"), act as signal wires to the gauge for each set of switches. They actually each form one branch of an electronic circuit within the gauge.

Each diode (in circuit) drops a nominal 0.6 Vdc when conducting electricity. If the circuit current passes through all four diodes (say VTS switch open), a drop of 2.4 Vdc would be measured across the 4 diodes (pin "A" to pin "C"). This drop of 2.4 Vdc measured at pin "A" tells the gauge the VTS switch is open.

If the VTS UP button is pressed, 2 diodes are bypassed by the closed switch. The remaining two diodes in the circuit drop 1.2 Vdc (at pin "A").

If the VTS DOWN button is pressed, 1 diode is bypassed by the closed switch. The remaining three diodes in the circuit drop 1.8 Vdc (at pin "A").

The gauge senses these voltages through pin 13 of its connector, and interprets them as signals that tell it which switch is activated (VTS UP or VTS DOWN).

Since the command signal generated by the closure of a VTS switch concerns the VTS module, a circuit within the gauge will translate it to CAN protocol and transmit it through the CAN bus. The VTS module will react to the command, carry out the function, and transmit the result back through the CAN bus.

The gauge will use the signals from the switches and the transmitted information from the other modules, convert them to an indication, and cancel the command signal it sent out once the function has been carried out.

NOTE: The voltages stated above vary slightly depending on the actual voltage applied to the circuit and the current flow through the diodes. When using a Fluke 115 multimeter for testing in diode test mode, the voltage and current applied by the multimeter are lower than in circuit. The quality of probe contact, the actual probes and leads, and the precision of the meter calibration will all affect the results, which will most likely be slightly lower than nominal values stated.

VTS Control Button Functional Test Using iBR Override Function

1. Press the START/STOP button.
2. Install tether cord to power up the electrical system.

NOTE: Briefly press the START/STOP button to reactivate the electrical system when required.

3. Activate the iBR override function, refer to *SYSTEM DESCRIPTION (iBR)* in this subsection.
4. Press and hold the VTS DOWN arrow button. The iBR gate and steering nozzle will move downwards together until they reach the full VTS down position. The iBR gate will then continue moving to the full reverse/braking position alone.
5. Depress and hold the VTS UP arrow button and ensure the iBR gate moves up to the forward position.

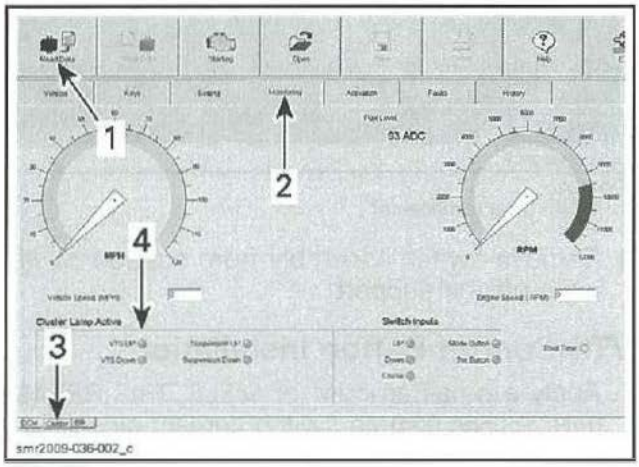
NOTE: If the VTS button is released before full travel of the iBR gate, movement of the iBR gate will cease.

If the iBR does not respond to VTS button commands (UP or DOWN), carry out the following *VTS SWITCH TEST USING B.U.D.S.*

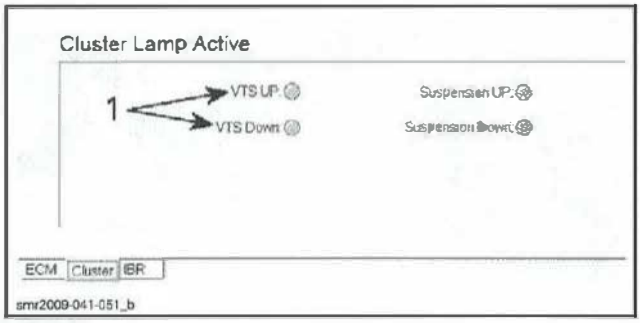
VTS Control Button Test Using B.U.D.S.

1. Connect watercraft to the latest B.U.D.S. software, refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. Click the Read Data button.

3. Check for an applicable fault code on the *FAULTS* page.
4. Click the **Monitoring** tab.
5. In the lower LH corner, click the **Cluster** tab.
6. On the LH handlebar, press the VTS UP and DOWN button alternately and look for the VTS UP and VTS Down indicator lights to come on in the **Cluster Lamp Active** area in B.U.D.S.



TYPICAL
1. *Read Data button*
2. *Monitoring tab*
3. *Cluster tab*
4. *Cluster Lamp Active area*



TYPICAL
1. *VTS UP and VTS Down indicator lights*

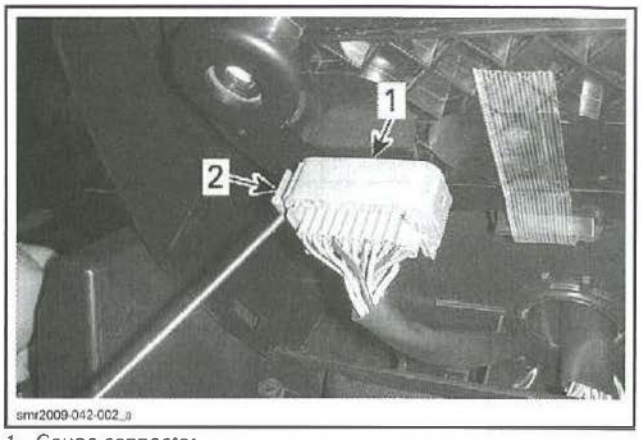
If each of the gauge button indicator lights come on when the applicable switch is pressed, the VTS control button switches and wiring are good. The problem may be related to the information center or iBR module.

If one or all of the indicator lights do not come on, refer to *VTS CONTROL BUTTON TEST USING A MULTIMETER*.

VTS Control Button Test Using a Multimeter

1. Remove the gauge support cover, refer to *GAUGE* subsection.
2. Disconnect the gauge connector.

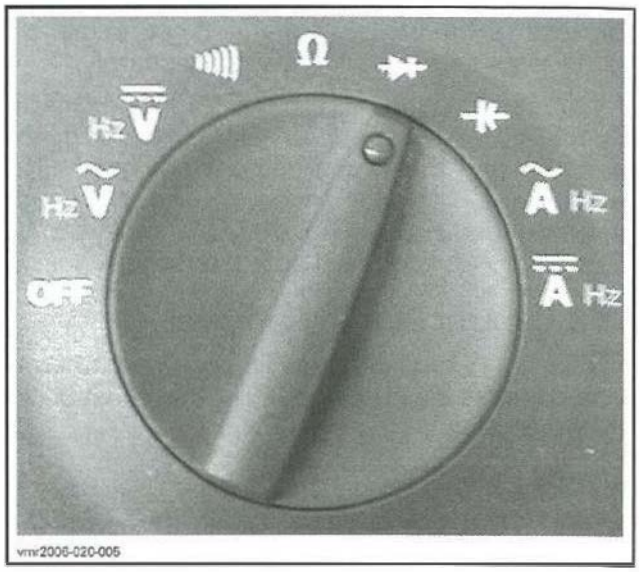
NOTICE Pull connector lock out. Do not twist the screwdriver.



1. *Gauge connector*
2. *Pull out to unlock connector*

3. Use a FLUKE 115 MULTIMETER (P/N 529 035 868) set to the diode test function. Test the VTS button switches as per following tables.

NOTE: It is important to set the multimeter to the diode check function when testing the VTS control switches.



NOTE: Pay attention to multimeter lead position for diode biasing during test. Remember that each diode should drop approximately 0.6 Vdc when positively biassed, and read as an OL (open circuit) when negatively biassed (leads reversed).

VTS CONTROL TEST			
SWITCH POSITION	MULTIMETER LEAD	GAUGE CONNECTOR	VOLTAGE
Switch released	RED lead BLACK lead	Pin 13 Pin 15	Approx. 2 Vdc
	BLACK lead RED lead	Pin 13 Pin 15	OL
UP depressed	RED lead BLACK lead	Pin 13 Pin 15	Approx. 1.1 Vdc
	BLACK lead RED lead	Pin 13 Pin 15	OL
DOWN depressed	RED lead BLACK lead	Pin 13 Pin 15	Approx. 1.6 Vdc
	BLACK lead RED lead	Pin 13 Pin 15	OL

When measuring between pins 13 and 15, if an OL is obtained with both positive and negative diode biassing, test the continuity of each wire between the gauge and switch assembly. If continuity is good, replace the switch assembly.

If any reading is significantly different than specified, carry out the same test at the switch connector, refer to the wiring diagram. If you obtain the same results, replace the switch assembly.

If voltages measured on the VTS UP and DOWN switch are as specified (or very close to it), the switches and the wiring harness are good. The fault may be within the gauge. Replace the gauge and carry out a new *VTS BUTTON TEST USING B.U.D.S.* to ensure the problem is solved.

VTS Control Button Removal

NOTE: On iS models, the VTS and iS control buttons come as a switch assembly that must be replaced as a unit.

Models with a VTS Switch

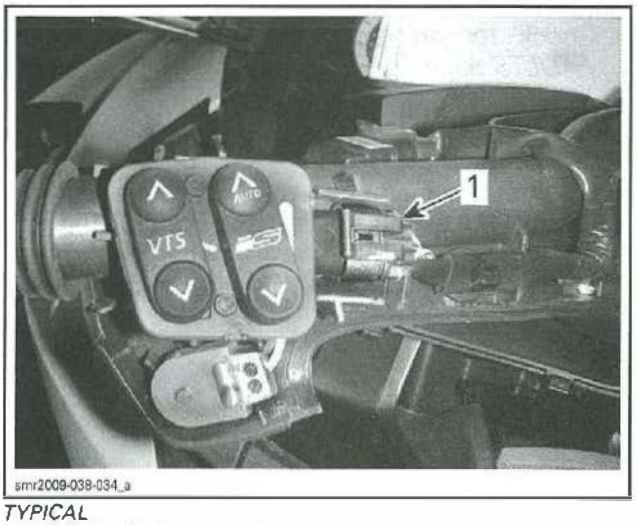
1. Remove steering cover, refer to *STEERING AND O.T.A.S.*

Models Without a VTS Switch

2. Remove the upper housing and housing cover from the LH handlebar housing.

All Models

3. Remove connector from switch assembly.



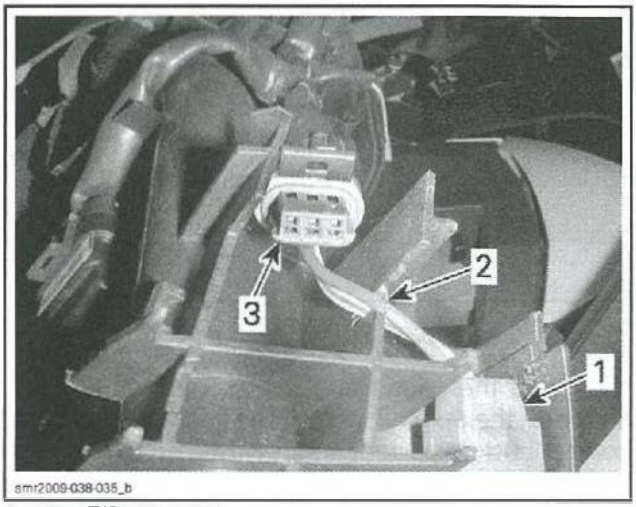
smr2009-038-034_a

TYPICAL
1. VTS/iS switch connector

4. Remove switch assembly from support by lifting it off the support.

VTS Control Button Installation

1. Apply a small amount of DIELECTRIC GREASE (P/N 293 550 004) on switch contact pins.
2. Install connector on new switch assembly.
3. Ensure wiring from START switch is properly inserted in slot provided before installing VTS and iS control button assembly.



smr2009-038-035_b

1. START/STOP switch
2. Wiring routed in slot provided in support
3. VTS/iS switch connector

4. Insert switch assembly in switch support.
5. Install remaining removed parts, refer to *STEERING AND O.T.A.S.*
6. Carry out an operational test of the VTS and iS systems to ensure proper operation of new switch assembly.

JET PUMP

SERVICE TOOLS

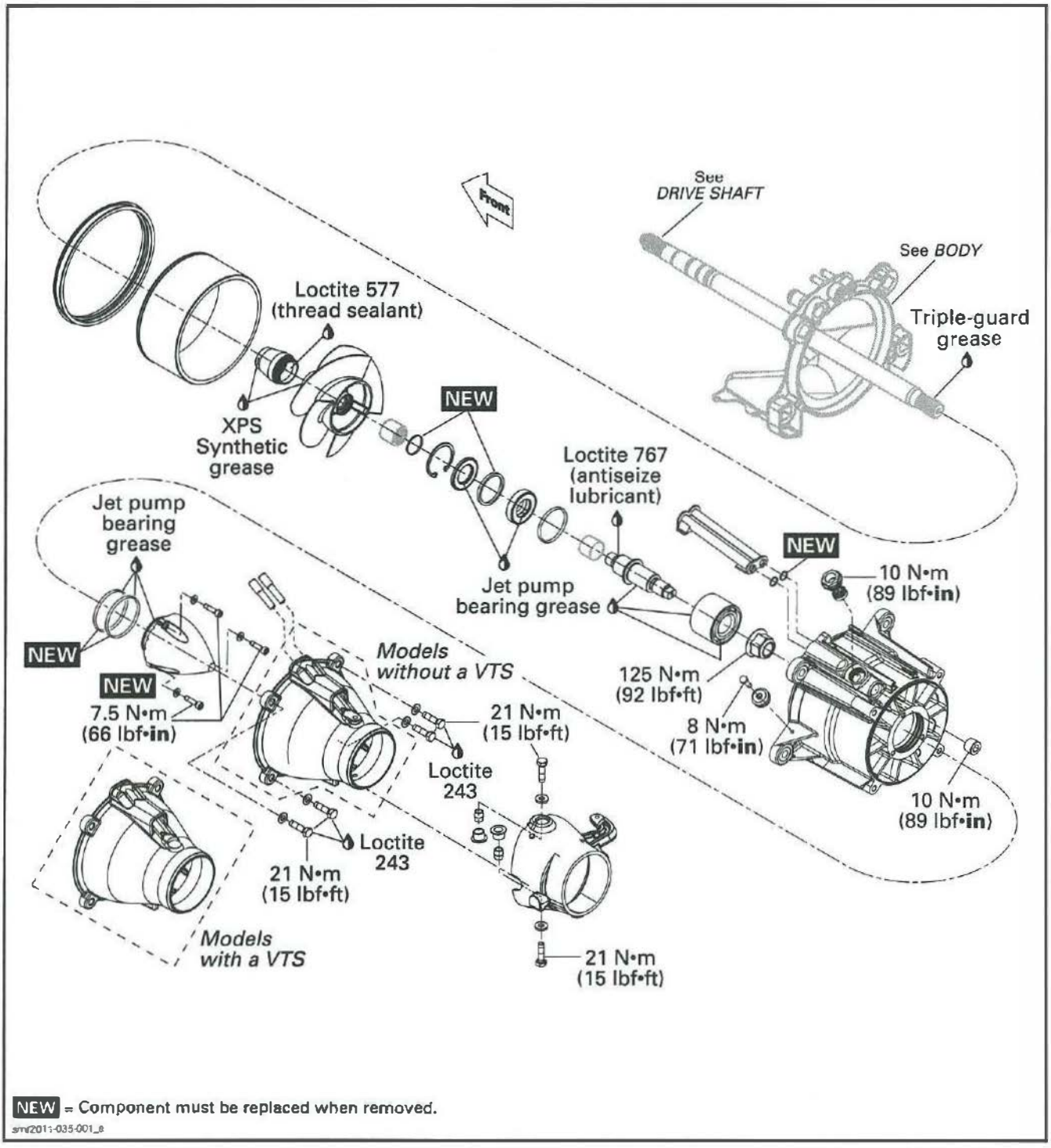
Description	Part Number	Page
IMPELLER REMOVER/INSTALLER	529 035 820	529–531, 533, 536
IMPELLER REMOVER/INSTALLER	529 035 956	529–531, 533, 536
IMPELLER SHAFT BEARING TOOL	529 036 168	533–534
IMPELLER SHAFT PUSHER	529 035 955	533–534
PRESSURE CAP	529 036 172	519
PUMP PLATE	529 036 224	521–522
SEAL/BEARING PUSHER	529 035 819	535
VACUUM/PRESSURE PUMP	529 021 800	519

SERVICE PRODUCTS

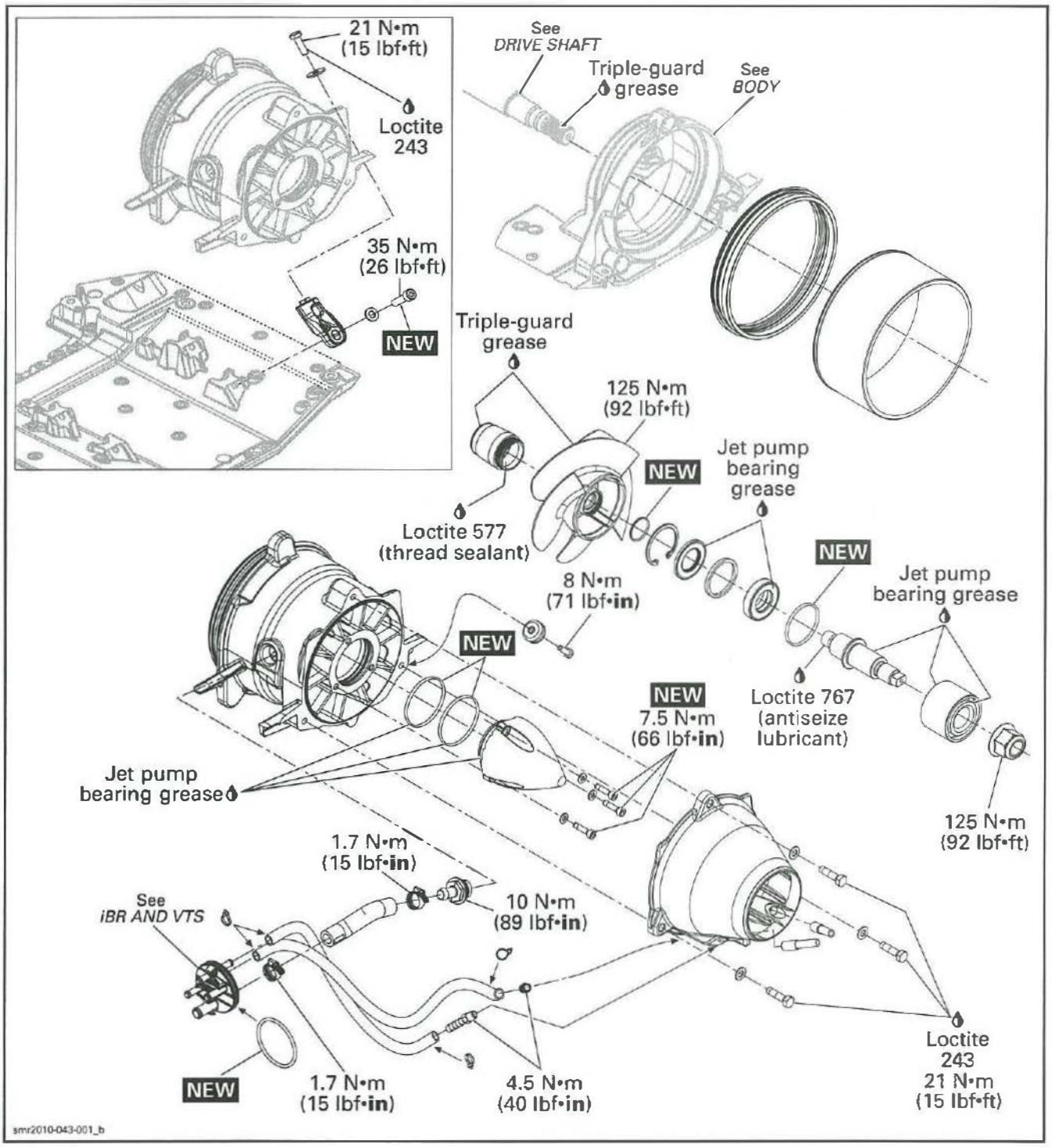
Description	Part Number	Page
JET PUMP BEARING GREASE	293 550 032	528, 535, 537
LOCTITE 243 (BLUE)	293 800 060	526, 537
LOCTITE 577 (THREAD SEALANT)	293 800 050	530
LOCTITE 767 (ANTISEIZE LUBRICANT)	293 800 070	529
PULLEY FLANGE CLEANER	413 711 809	524
TRIPLE-GUARD GREASE	296 000 329	524–525, 530
XPS LUBE	293 600 016	525, 529

green-manuals

Models with Jet Pump Bolted to Pump Support



Models with Jet Pump Bolted to Ride Plate



GENERAL

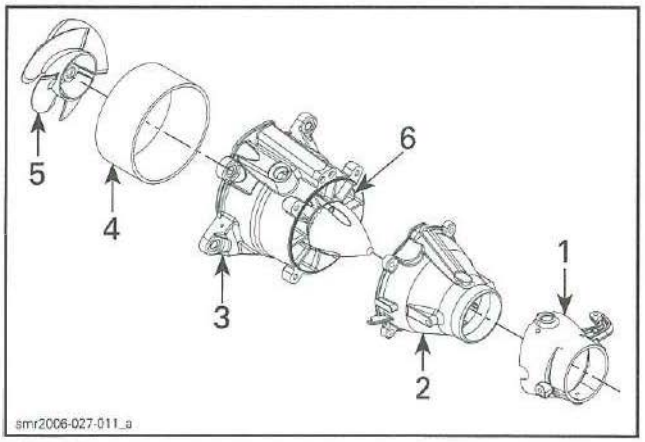
During assembly/installation, use torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENER* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced.

JET PUMP MAIN COMPONENTS

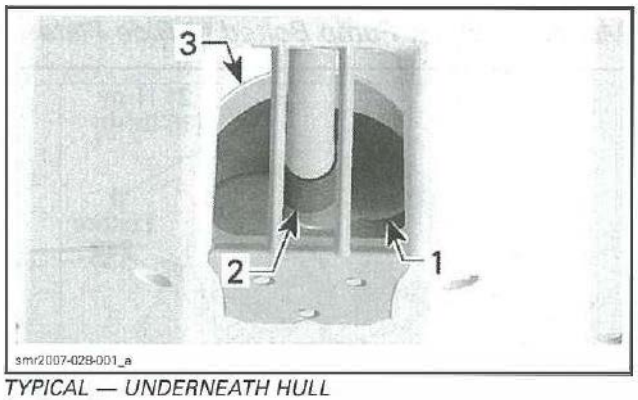


TYPICAL
1. *Nozzle*
2. *Venturi*
3. *Jet pump housing*
4. *Wear ring*
5. *Impeller*
6. *Stator*

INSPECTION

IMPELLER CONDITION

Condition of impeller, impeller boot and wear ring can be quickly checked from underneath the watercraft. With the vehicle on the trailer, use a flashlight to visually inspect them through the inlet grate.



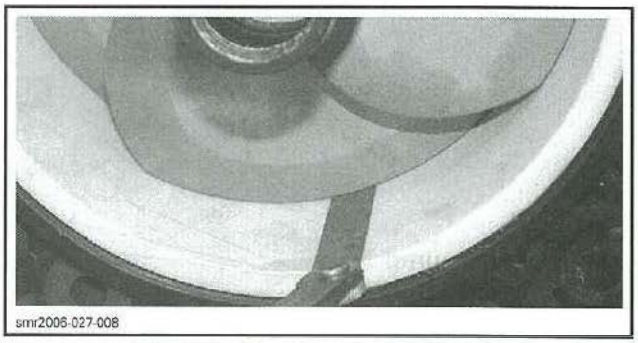
TYPICAL — UNDERNEATH HULL
1. *Impeller*
2. *Impeller boot*
3. *Wear ring*

IMPELLER/WEAR RING CLEARANCE

This clearance is critical for jet pump performance.

To check clearance, remove jet pump.

Using a feeler gauge, measure clearance between impeller blade tip and wear ring. Measure each blade at its center.



MODEL	MAXIMUM WEAR CLEARANCE
All models	0.35 mm (.014 in)

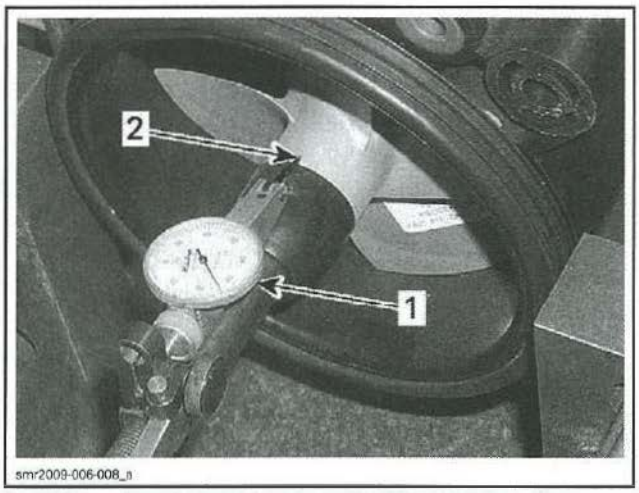
IMPELLER SHAFT RADIAL PLAY

Radial play is critical for jet pump life span.

To check radial play, remove jet pump.

Make sure impeller shaft turns freely and smoothly.

1. Retain housing in a soft jaw vise making sure not to damage housing lug.
2. Set a dial gauge and position its tip onto metal end, close to the end of the impeller hub.
3. Move shaft end up and down. Difference between highest and lowest dial gauge reading is radial play.



TYPICAL — MEASURING IMPELLER SHAFT RADIAL PLAY
1. *Dial gauge*
2. *Measure close to impeller hub end*

RADIAL PLAY
0 mm (0 in)

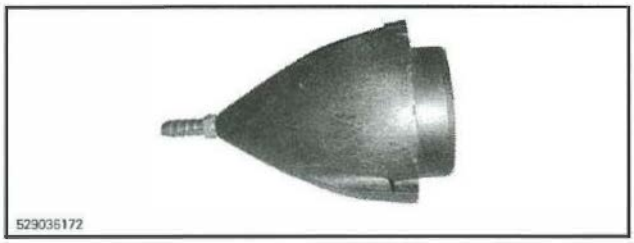
Excessive play can come either from worn bearing or damaged jet pump housing bearing surface.

LEAK TEST

Whenever performing any type of repair on the jet pump, a leak test should be carry out.

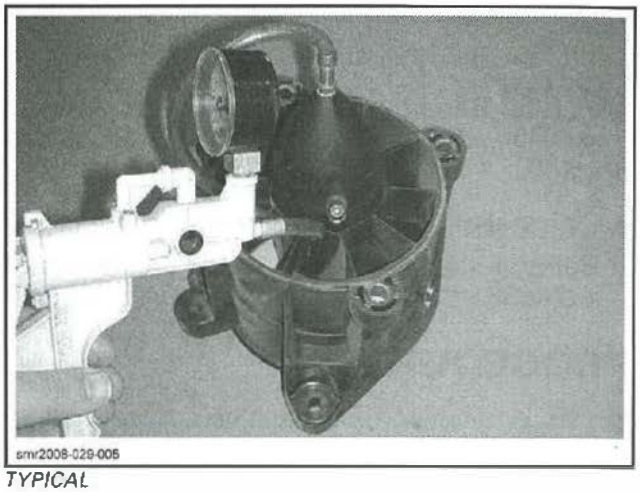
Proceed as follows:

1. Remove impeller cover. Refer to *IMPELLER COVER* in this subsection.
2. Install the PRESSURE CAP (P/N 529 036 172) on pump housing.



3. Connect the VACUUM/PRESSURE PUMP (P/N 529 021 800) to the pressure cap fitting.





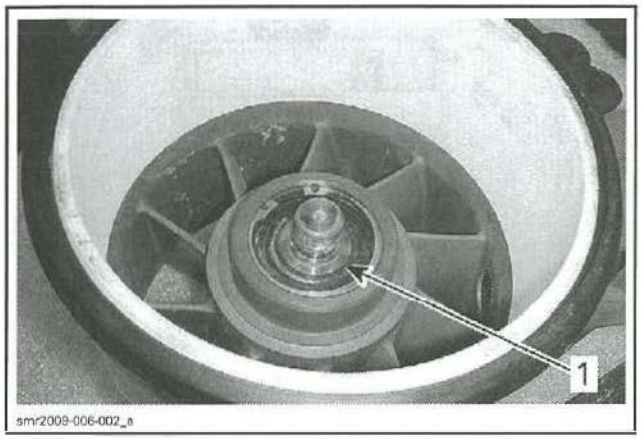
TYPICAL

4. Pressurize pump.

LEAK TEST PRESSURE
Maximum 70 kPa (10 PSI)

5. Pump must maintain this pressure for at least 5 minutes.
   - If there is a pressure drop, spray soapy water around cover. If there are no bubbles, impeller shaft, impeller shaft seal must be replaced. Jet pump unit has to be disassembled.

NOTE: If there is 2 or 3 bubbles coming out from the seal on the impeller side is acceptable. Leaks from other areas must be repaired.



TYPICAL
1. Small leak here is acceptable

NOTICE **Repair any leak. Failure to correct a leak will lead to premature wear of pump components.**

6. Disconnect pump and remove pressure cap.
7. Reinstall impeller cover. Refer to *IMPELLER COVER* in this subsection.

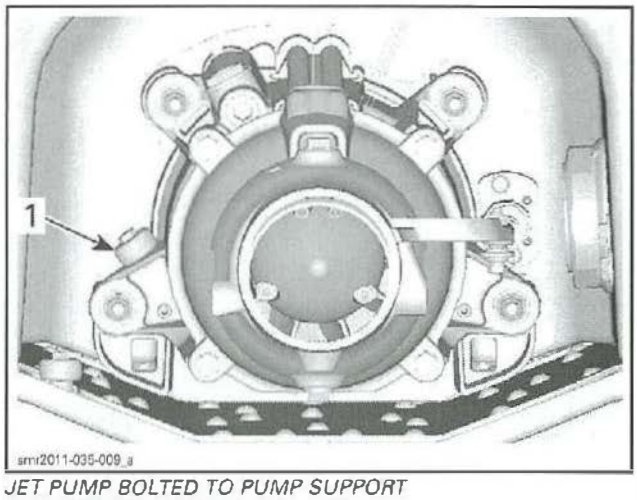
PROCEDURES

NOTE: Whenever removing a part, visually check for damage such as: corrosion, cracks, split, break, porosity, cavitation, deformation, distortion, heating discoloration, wear pattern, defective plating, missing or broken balls in ball bearing, water damage diagnosed by black-colored spots on metal parts, etc. Replace any damaged parts. As a quick check, manually feel clearance and end play, where applicable, to detect excessive wear.

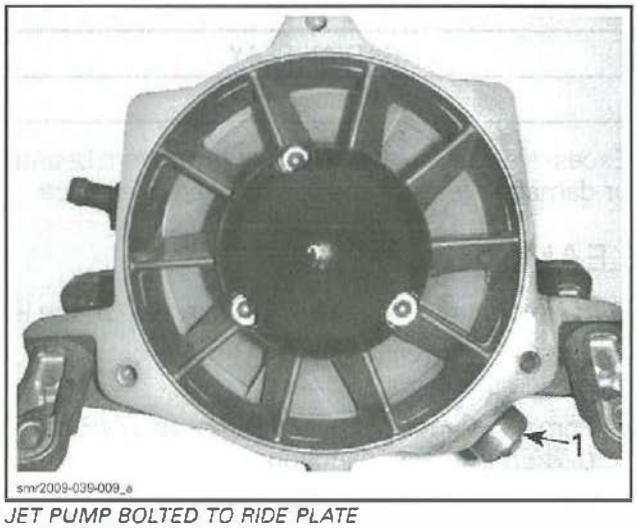
SACRIFICIAL ANODE

Sacrificial Anode Inspection

Check for wear. If worn more than half, replace anode.



JET PUMP BOLTED TO PUMP SUPPORT
1. Sacrificial anode location



JET PUMP BOLTED TO RIDE PLATE
1. Sacrificial anode location

Sacrificial Anode Removal

Unscrew sacrificial anode hexagonal screw and remove anode.



Sacrificial Anode Installation

Installation is the reverse of the removal procedure.

Torque anode retaining screw as specified in exploded view.

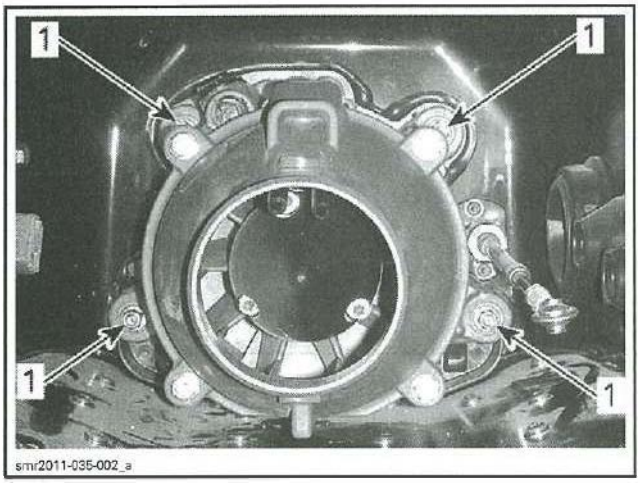
JET PUMP HOUSING

NOTE: The jet pump housing can be removed as an assembly with the venturi. This is the preferred procedure when either the drive shaft or engine removal is required.

Jet Pump Housing Removal (Jet Pump Bolted to Pump Support)

Do the following as applicable.

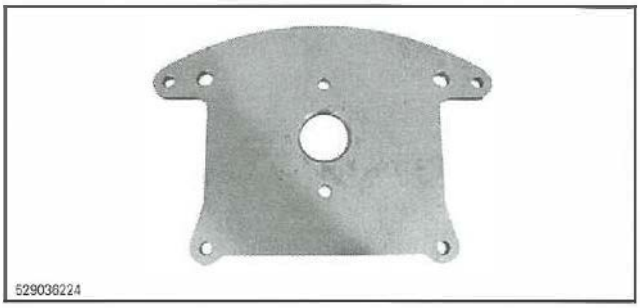
1. Remove the iBR gate and VTS trim ring. Refer to *iBR AND VTS* subsection.
2. Detach steering cable from nozzle.
3. Remove the nuts that retain the jet pump to the pump support.



1. Nuts to remove

4. Pull back jet pump housing to remove it from the pump support. It may be necessary to wiggle it slightly as you pull back on the pump.

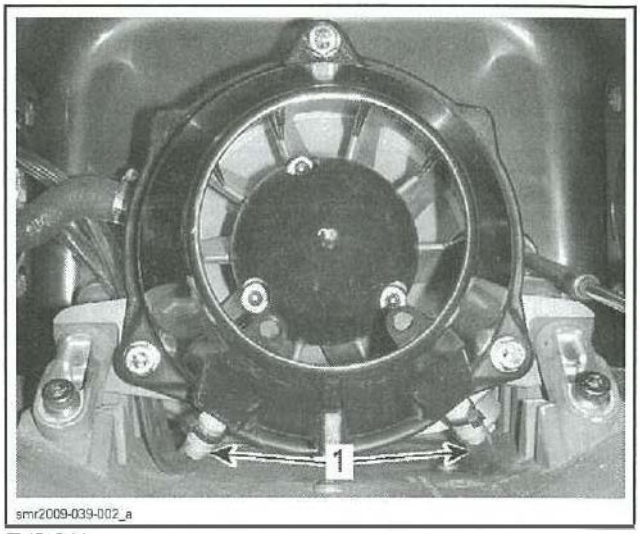
Temporarily fasten the PUMP PLATE (P/N 529 036 224) to pump support to support drive shaft and avoid PTO oil seal damage.



Jet Pump Housing Removal (Jet Pump Bolted to Ride Plate)

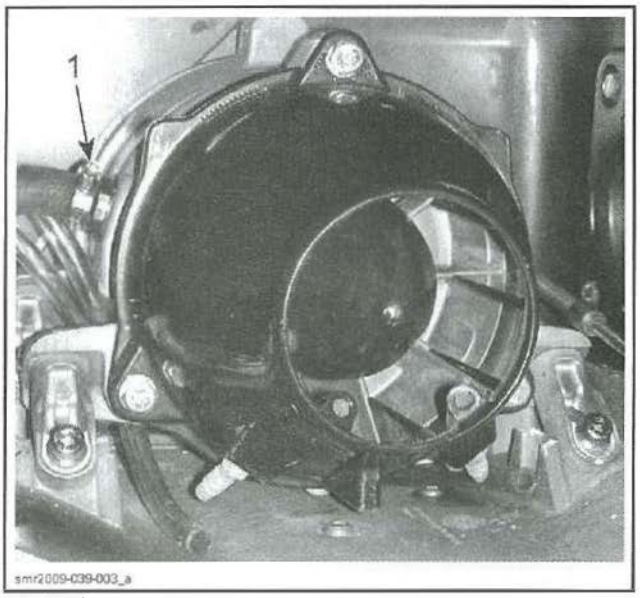
Remove the following parts as applicable.

1. Remove iBR gate and VTS trim ring. Refer to *iBR AND VTS* subsection.
2. Cut locking ties and disconnect both bailer hoses from the venturi.



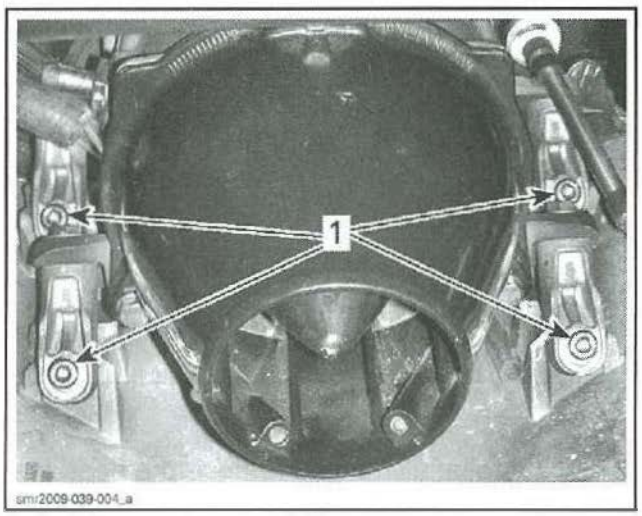
TYPICAL
1. Bailer hoses

3. Loosen gear clamp and remove the hose from the water pressure outlet fitting on the jet pump housing.



TYPICAL
1. Water pressure hose

4. Remove the socket screws that retain the jet pump to the ride plate.

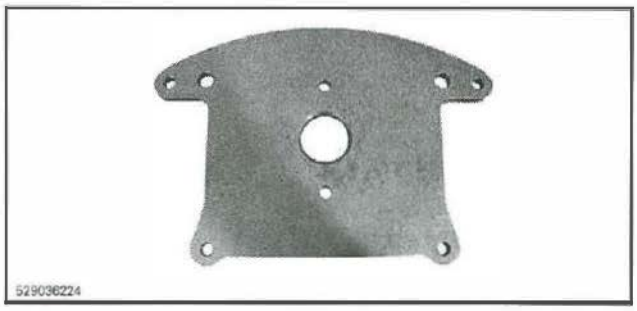


1. Socket screws to remove (x4)

5. Pull back jet pump housing to remove it from the pump support. It may be necessary to wiggle it slightly as you pull back on the pump.

NOTE: The jet pump housing is held tightly in the pump support due to the neoprene seal at the forward end of the pump. There are no fasteners securing the jet pump housing to the pump support.

Temporarily fasten the PUMP PLATE (P/N 529 036 224) to pump support to support drive shaft and avoid PTO oil seal damage.

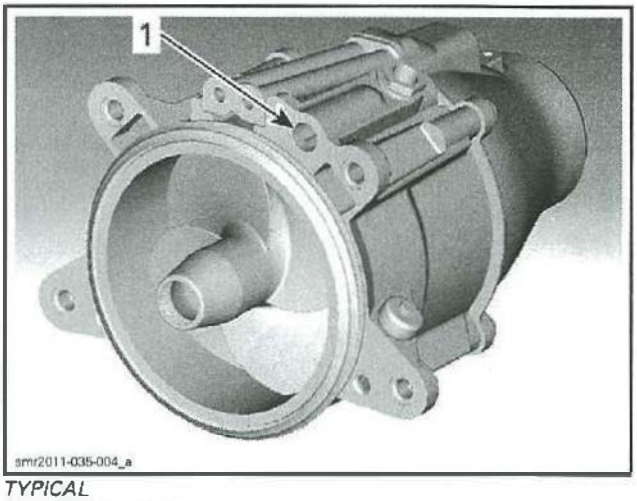


Jet Pump Housing Inspection and Cleaning

1. Visually inspect jet pump housing. Pay attention to the stator. Ensure the assembly is clean and free of any debris and defects.

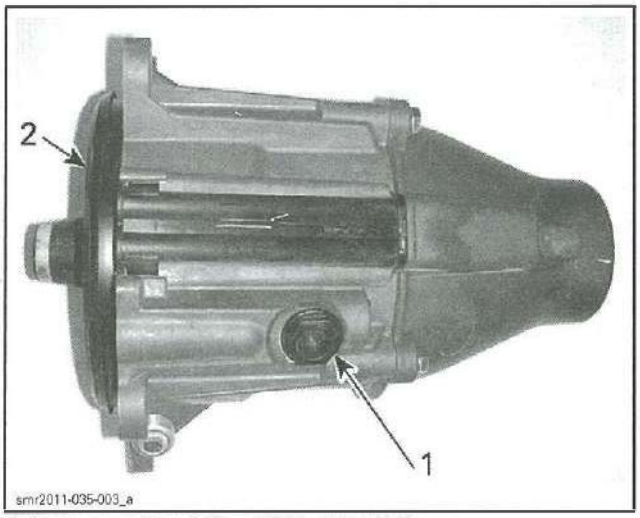
Do the following as applicable.

2. Blow low pressure compressed air through the pressure outlet fitting and make sure it is clear.

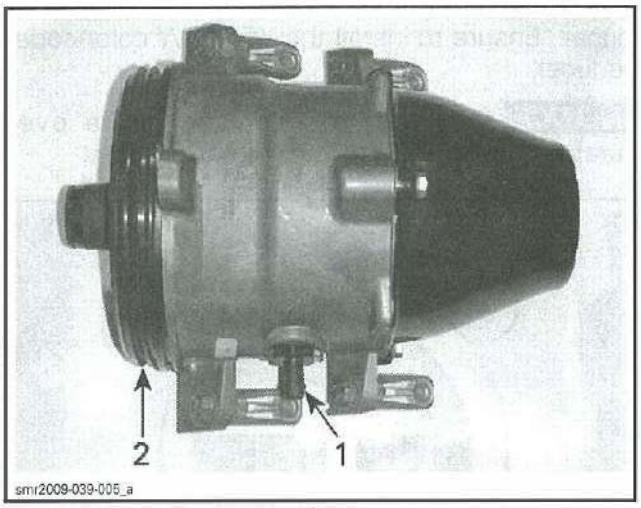


TYPICAL
1. Pressure outlet

3. Ensure cap screw is tight.
4. Ensure the neoprene seal is in good condition. Replace as required.

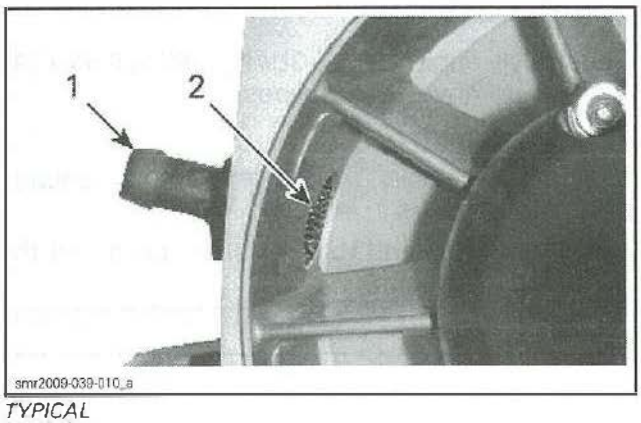


JET PUMP BOLTED TO PUMP SUPPORT
1. *Cap screw*
2. *Neoprene seal*



JET PUMP BOLTED TO RIDE PLATE
1. *Pressure hose fitting*
2. *Neoprene seal*

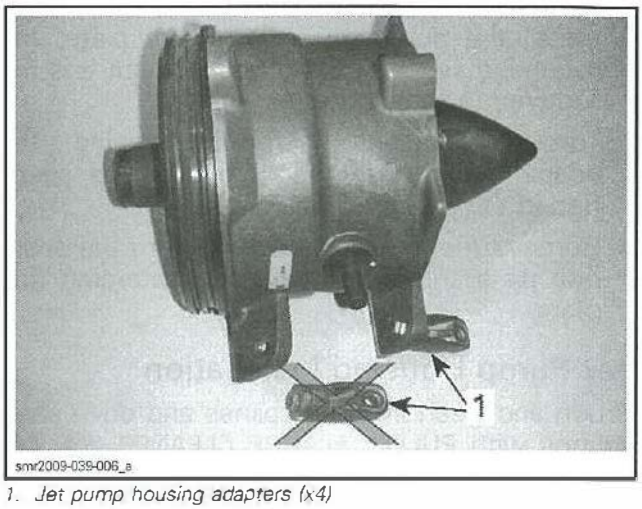
NOTE: Ensure holes of pressure inlet remain clear to ensure an adequate water supply for the intercooler and exhaust system.



TYPICAL
1. *Fitting*
2. *Holes in pump housing*

5. Check the 4 pump adapters (jet pump bolted to ride plate). Ensure they are free of any cracks.

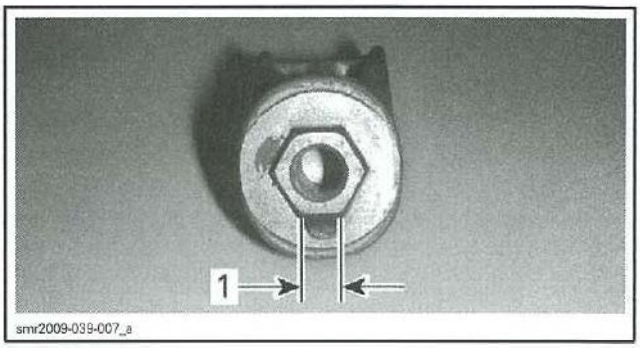
NOTE: Do not remove the jet pump housing adapters from the pump unless it is necessary to do so.



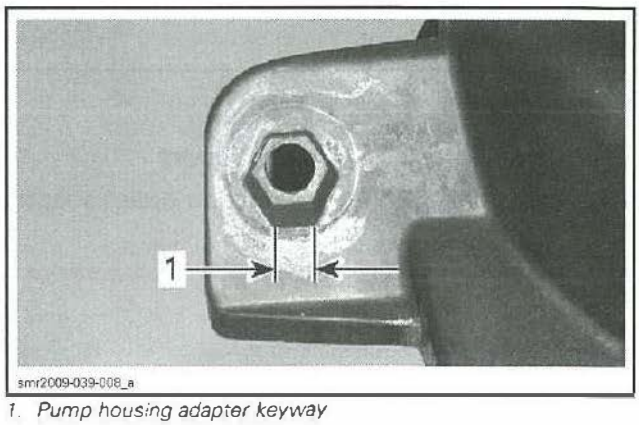
1. *Jet pump housing adapters (x4)*

Jet Pump Housing Adapter Replacement (Jet Pump Bolted to Ride Plate)

Adapters incorporate a keyway at the pump housing end of the adapter that provide for a small amount of play for mounting the jet pump.



1. *Adapter key*



1. *Pump housing adapter keyway*

If adapters are removed or replaced, or a new pump housing is installed, adapters may be aligned to the pump housing using a spare ride plate as a jig. Carry out the following steps.

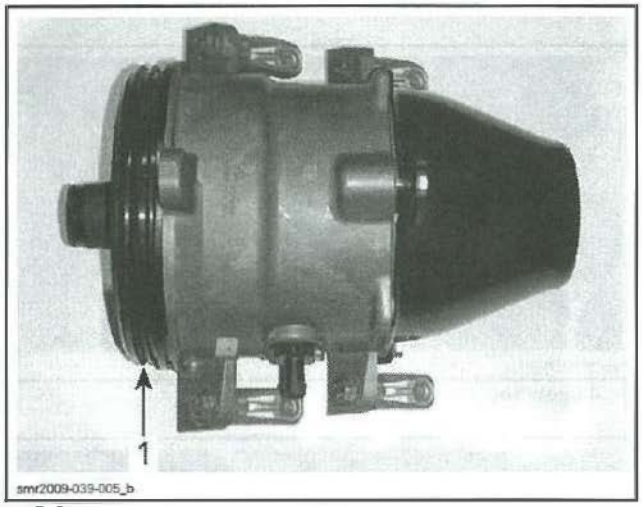
1. Install the four adapters on the jet pump housing leaving the hexagonal screws slightly loose.
2. Install the pump on a spare ride plate, the mounting screws should be tight, but it is not required to torque them.
3. Torque hexagonal screws retaining the adapters to the jet pump housing as specified in the exploded view.
4. Remove the jet pump housing from the spare ride plate and install it on the watercraft ride plate.

Jet Pump Housing Installation

Brush and clean impeller splines and drive shaft splines with PULLEY FLANGE CLEANER (P/N 413 711 809) or equivalent. Splines must be free of any residue.

Lubricate drive shaft splines, impeller splines and the inside of the impeller boot with TRIPLE-GUARD GREASE (P/N 296 000 329).

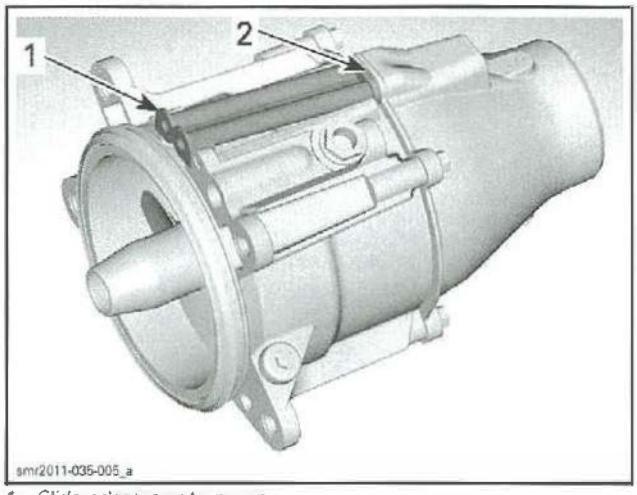
Ensure the neoprene seal is properly installed on the jet pump.



TYPICAL
1. Neoprene seal

Jet Pump Bolted to Pump Support

Install new O-rings then slide water outlet adapter onto pump.

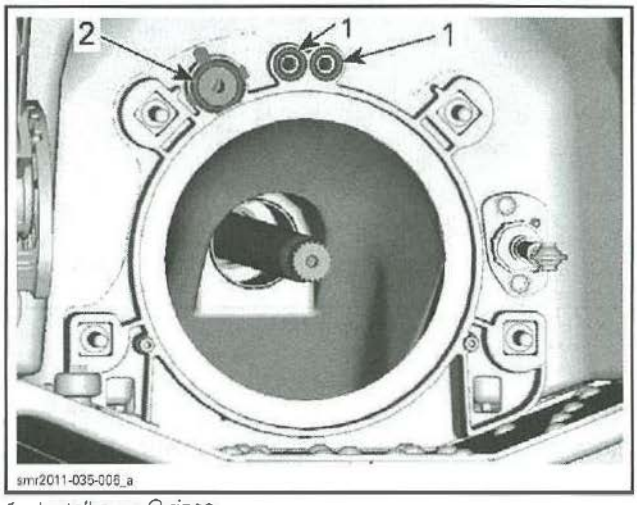


1. Slide adapter onto pump
2. New O-rings here

Install new O-rings on pump support.

The water flow is controlled by a calibrated reducer. Ensure to install the YELLOW color-coded reducer.

NOTICE **Improper reducer can cause overheating and damage to exhaust system.**



1. Install new O-rings
2. Calibrated reducer

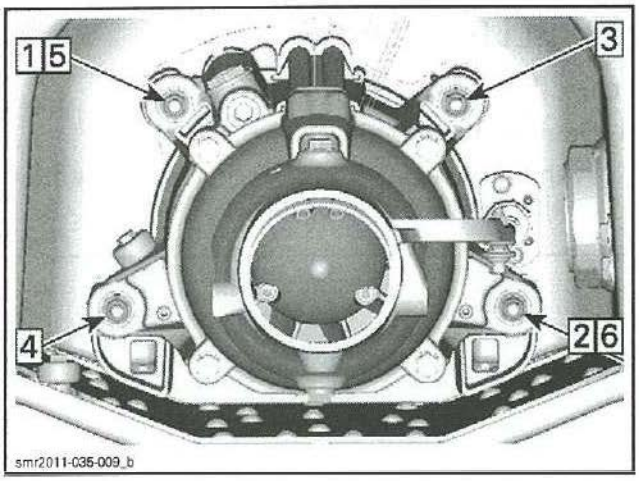
Generously apply TRIPLE-GUARD GREASE (P/N 296 000 329) on drive shaft splines.

Install jet pump.

NOTE: If necessary, wiggle jet pump to engage drive shaft splines in impeller.

Install new nuts and torque as per table and the illustrated sequence.

TORQUE
22 N•m (16 lbf•ft)



NOTE: Slightly lubricate wear ring with XPS LUBE (P/N 293 600 016) to minimize friction during initial impeller start.

Jet Pump Bolted to Ride Plate

Generously apply TRIPLE-GUARD GREASE (P/N 296 000 329) on drive shaft splines.

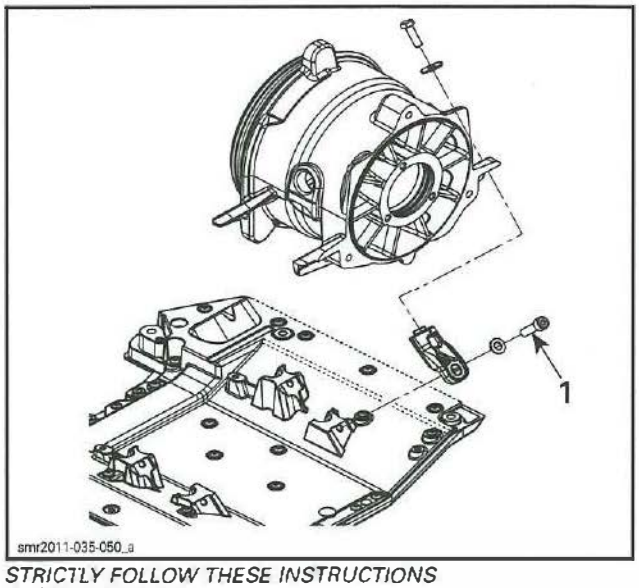
While holding the pump housing with the pump adapters downwards, align the pump with the drive shaft and carefully push the pump into the pump support.

Use NEW screws to retain pump adapters to ride plate.

Torque each screw to 35 N•m (26 lbf•ft) then torque each screw a second time.

NOTICE Failure to properly follow the above procedure might lead to screw loosening.

Wait one day before using the watercraft to let time for the thread locker to settle.



STRICTLY FOLLOW THESE INSTRUCTIONS
1. Use new screw
Torque to 35 N•m (26 lbf•ft) twice
Allow one day to settle without using watercraft

NOTE: Slightly lubricate wear ring with XPS LUBE (P/N 293 600 016) to minimize friction during initial impeller start.

VENTURI

Venturi Removal

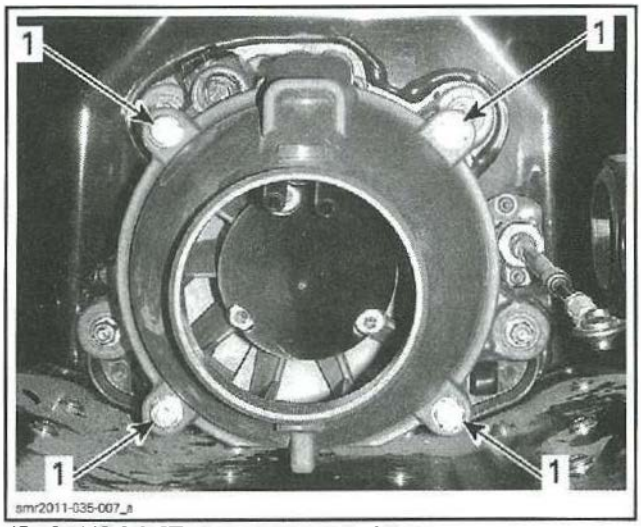
Jet Pump Housing installed

As applicable, do the following.

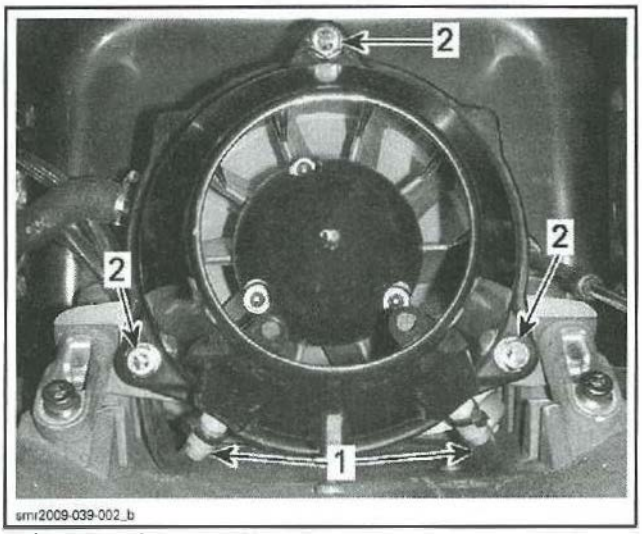
1. Remove the iBR gate and VTS trim ring as an assembly. Refer to *iBR AND VTS* subsection.
2. Remove nozzle.
3. Cut locking ties and remove the 2 bailer hoses from the venturi.
4. Refer to *JET PUMP HOUSING REMOVED* to continue procedure.

Jet Pump Housing Removed

1. Remove the screws retaining the venturi to the jet pump housing.



JET PUMP BOLTED TO PUMP SUPPORT
1. Venturi retaining screws



JET PUMP BOLTED TO RIDE PLATE
1. Bailer hoses
2. Venturi retaining screws

Venturi Installation

The installation is the reverse of the removal procedure. Pay attention to the following.

As applicable, align venturi bailer holes with those in pump support.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of venturi screws (or install new self-locking screws).

Install venturi screws and flat washers.

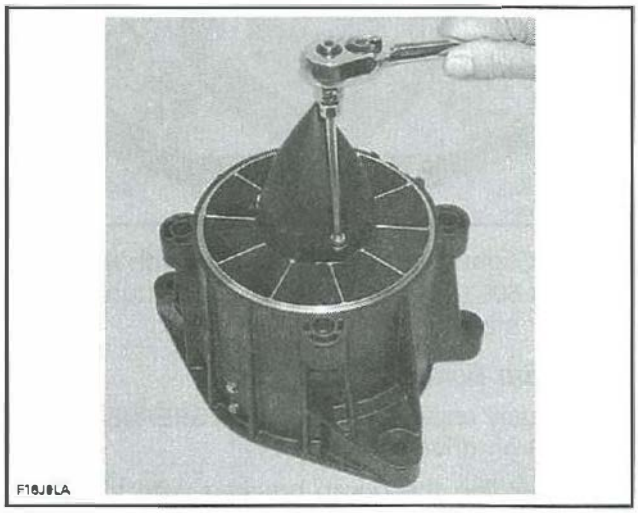
Torque venturi screws to 21 N•m (15 lbf•ft).

As applicable, ensure bailer hoses and fittings are in good condition.

IMPELLER COVER

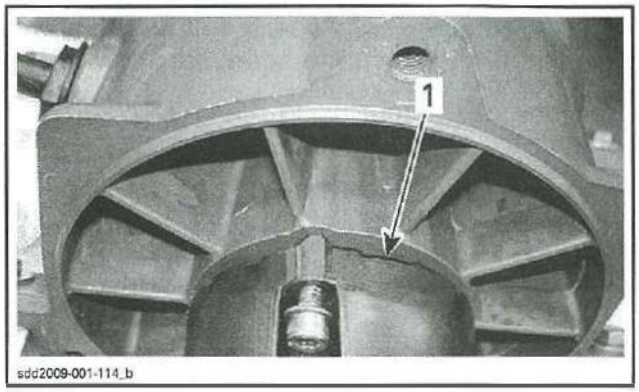
Impeller Cover Removal

1. Remove the venturi.
2. With pump housing in vertical position, remove and discard the 3 retaining screws.

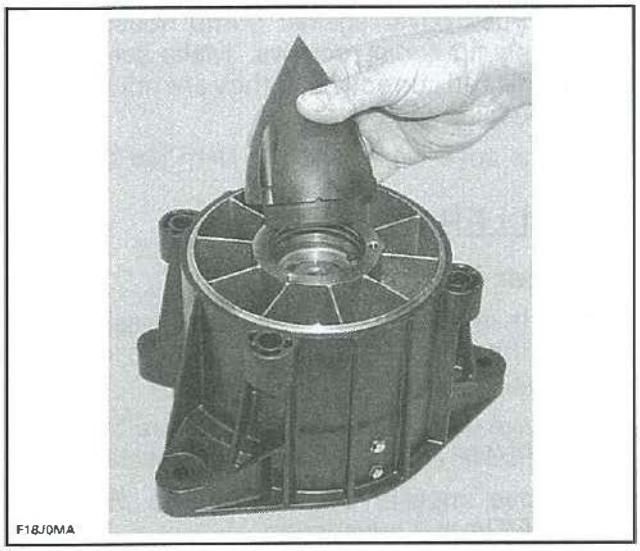


TYPICAL

3. Using a fiber hammer, gently tap impeller cover to help release it from the jet pump housing.
4. Use a flat screwdriver in the slots provided as pry points to remove it from the jet pump housing.

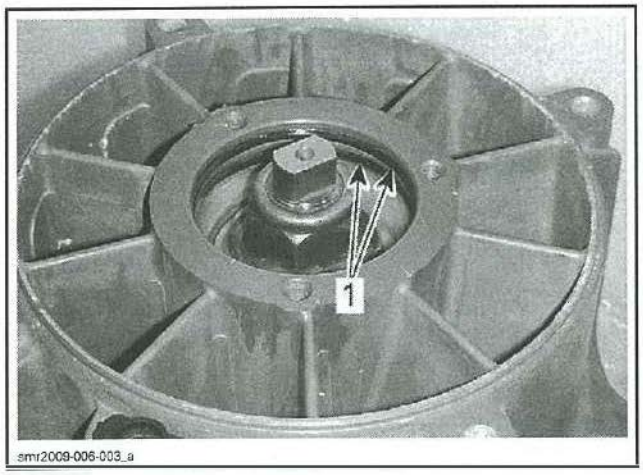


1. Slot



TYPICAL

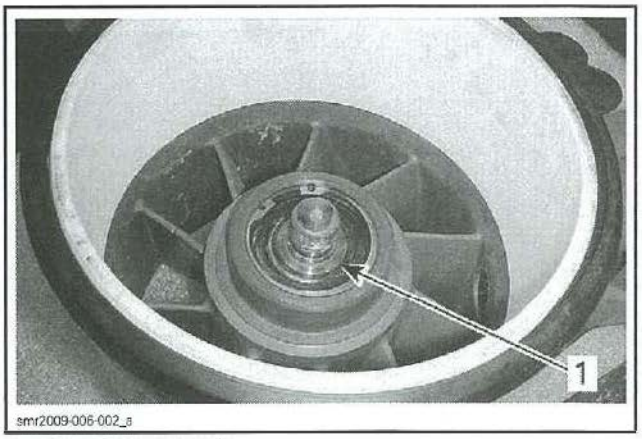
5. Remove both O-rings.



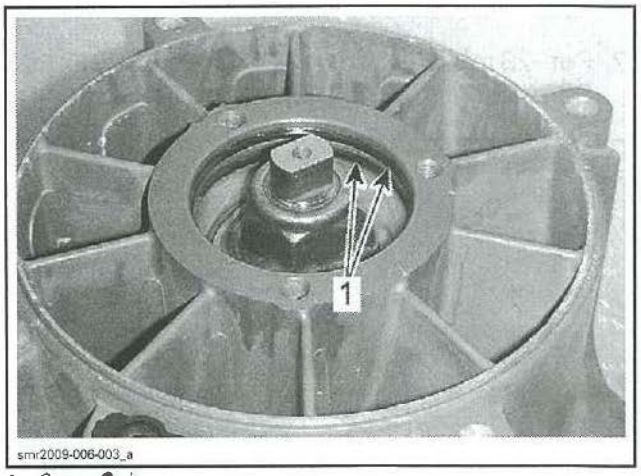
TYPICAL
1. O-rings

Impeller Cover Inspection

Check for presence of water in cover and bearing area. If water is found, replace seals on impeller side. Also replace O-rings and/or impeller cover.

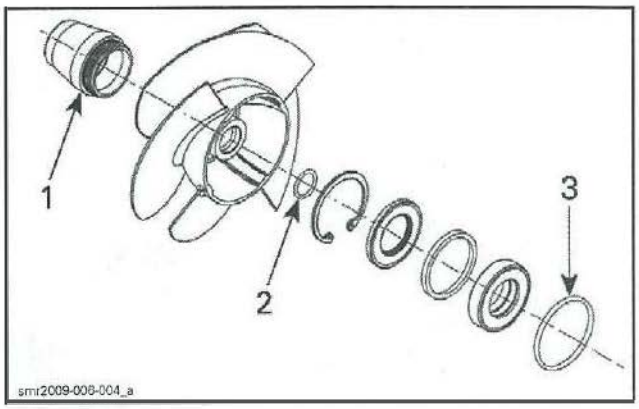


1. Seal on impeller side



1. Cover O-rings

Check impeller boot and O-rings condition on impeller. Replace as required.

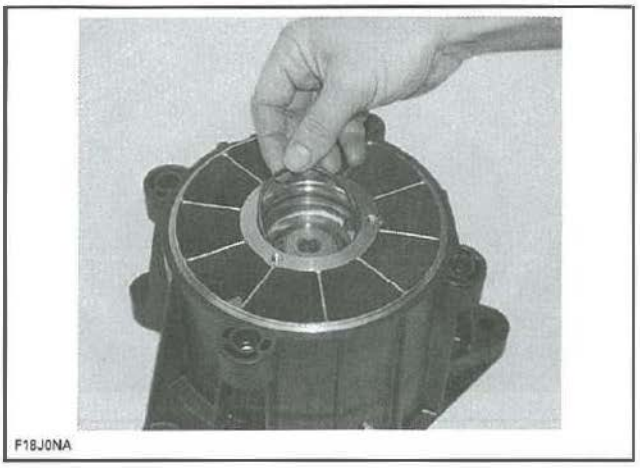


1. Impeller boot
2. Impeller O-ring
3. Pump housing O-ring

Perform a leak test. Refer to *LEAK TEST* in this subsection.

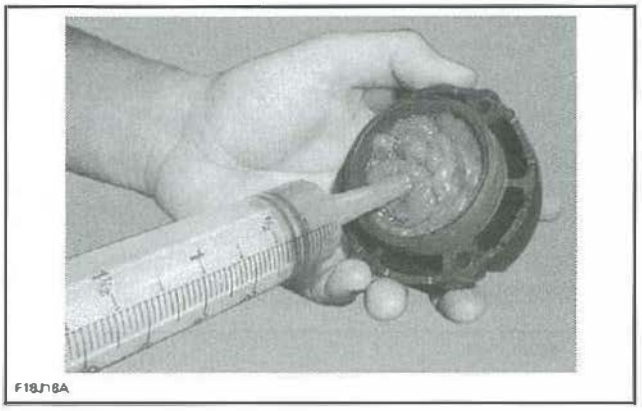
Impeller Cover Installation

1. Install O-rings in their respective groove.



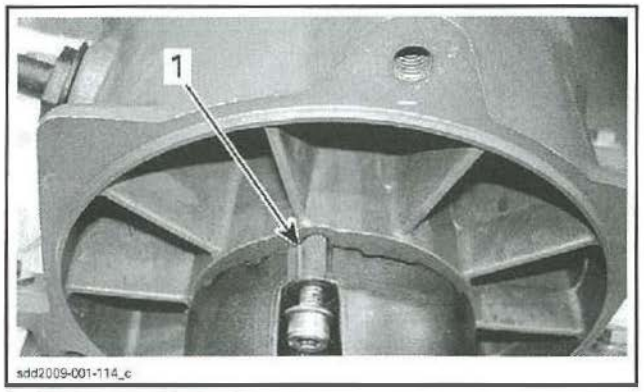
TYPICAL

2. Put 23 ml (.8 U.S. oz) of JET PUMP BEARING GREASE (P/N 293 550 032) in the cover.



TYPICAL

3. Install impeller cover by aligning the cover index mark with the pump top fin as shown.



1. Align mark with top fin

NOTE: Cover can only be installed in one position as screw holes are not located symmetrically.

4. Secure cover with NEW self-locking screws.

NOTE: Push cover against pump housing while alternately tightening screws. Make sure O-rings are positioned correctly and they are not damaged when pushing the cover.

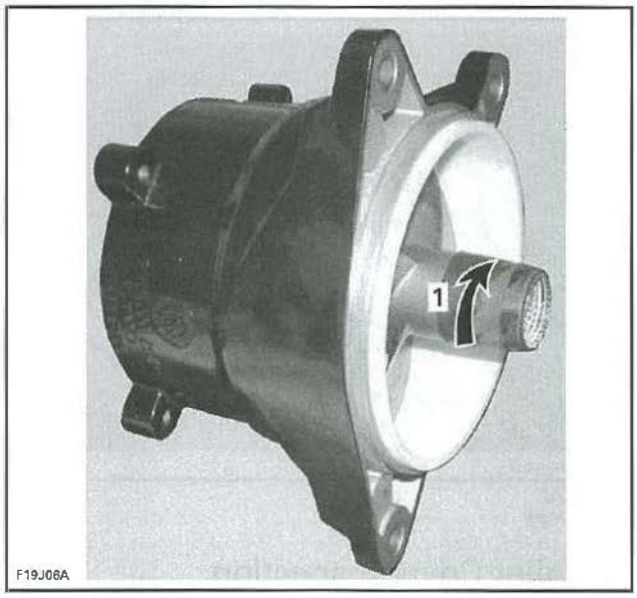
5. Torque cover screws to 7.5 N•m (66 lbf•in).

IMPELLER

Impeller Removal

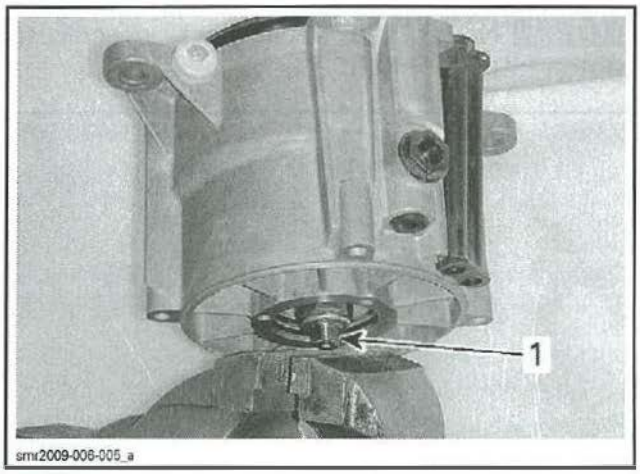
NOTE: If impeller shaft is to be disassembled, loosen the impeller shaft nut prior to removing the impeller.

1. Remove jet pump from the watercraft. Refer to *JET PUMP HOUSING* in this subsection.
2. Remove impeller cover. Refer to *IMPELLER COVER* in this subsection.
3. Remove impeller boot by turning it clockwise (LH threads).



TYPICAL
1. Unscrew clockwise

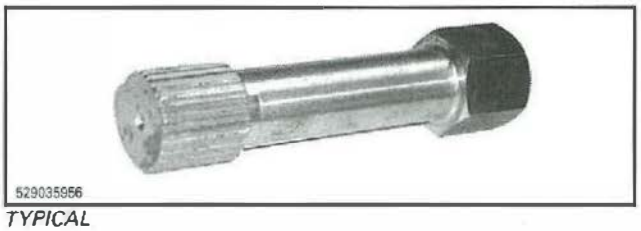
4. Mount the flat sides of impeller shaft in a vise.



TYPICAL
1. Flat side

5. Unscrew the impeller counterclockwise using the required tool.

ENGINE	REQUIRED TOOL
130, 155	IMPELLER REMOVER/INSTALLER (P/N 529 035 820)
215, 260	IMPELLER REMOVER/INSTALLER (P/N 529 035 956)



TYPICAL

NOTE: It may be necessary to heat the impeller to ease removal.

NOTICE Never use an impact wrench to loosen impeller.

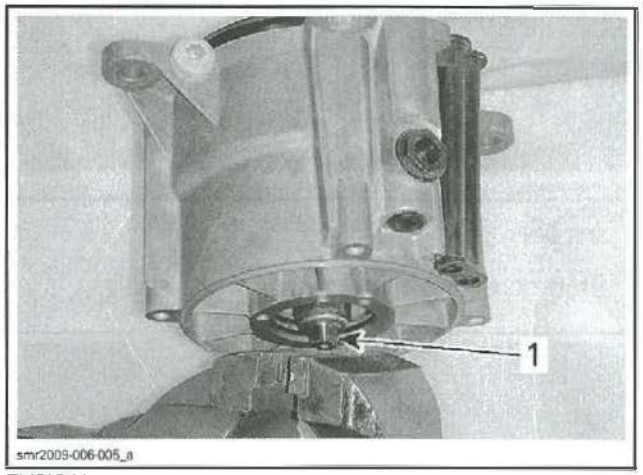


TYPICAL

6. To pull impeller out of the pump, apply a rotating movement as you pull on the impeller.

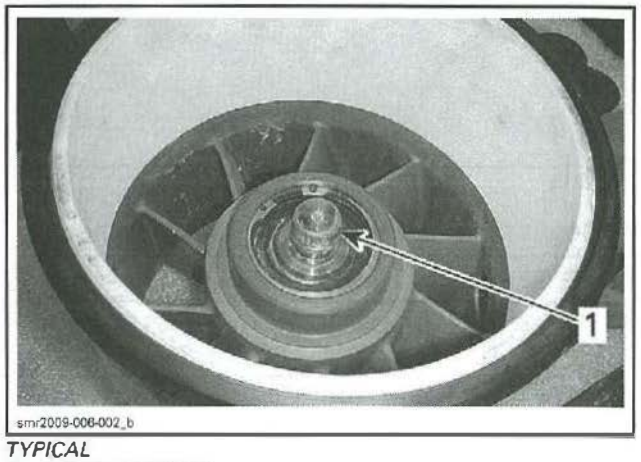
Impeller Installation

1. Mount the flat sides of the impeller shaft in a vise.



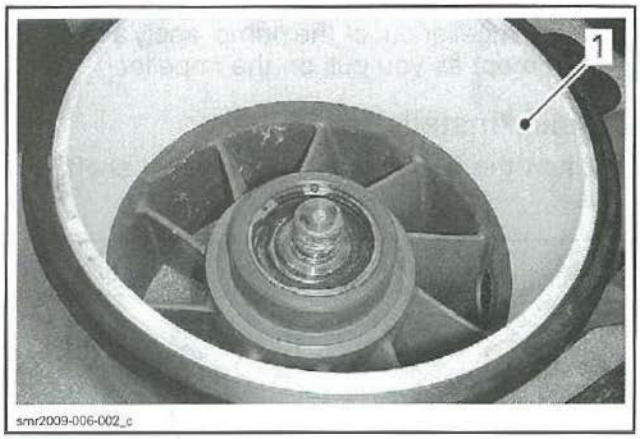
TYPICAL
1. Flat side

2. Apply LOCTITE 767 (ANTISEIZE LUBRICANT) (P/N 293 800 070) on threads of impeller shaft.



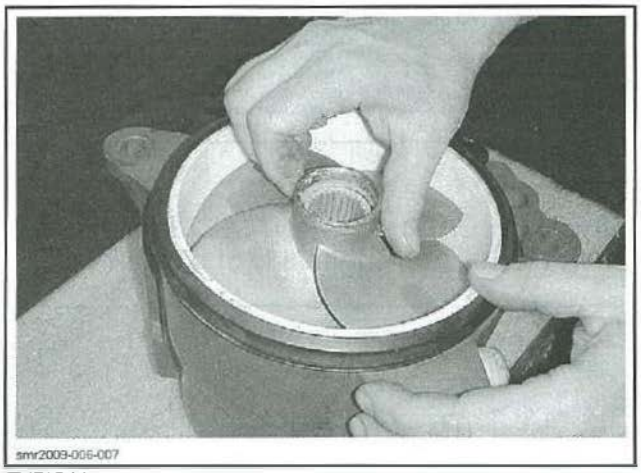
TYPICAL
1. Antiseize lubricant

3. Apply XPS LUBE (P/N 293 600 016) on the wear ring surface.



TYPICAL
1. XPS lube

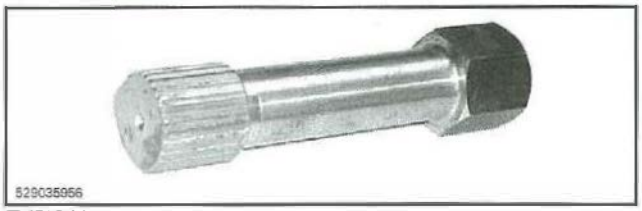
4. Start screwing the impeller on its shaft.



TYPICAL

5. Mount the required tool in impeller splines.

ENGINE	REQUIRED TOOL
130, 155	IMPELLER REMOVER/INSTALLER (P/N 529 035 820)
215, 260	IMPELLER REMOVER/INSTALLER (P/N 529 035 956)



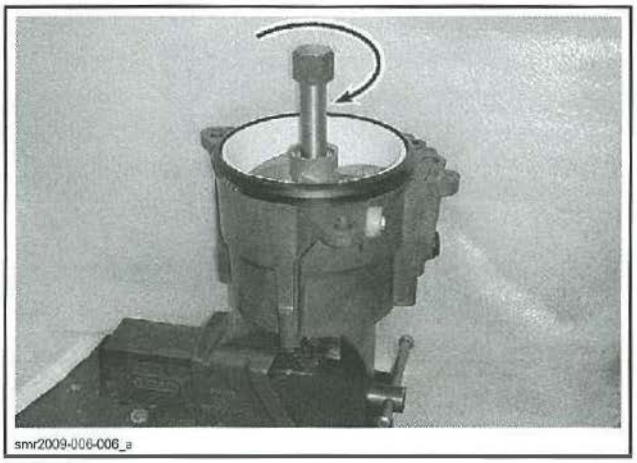
TYPICAL

6. Torque impeller as per table.

TORQUE
125 N•m (92 lbf•ft)

Remove tool.

NOTICE Never use an impact wrench to tighten impeller shaft.



TYPICAL

7. Apply LOCTITE 577 (THREAD SEALANT) (P/N 293 800 050) on impeller boot threads.
8. Apply TRIPLE-GUARD GREASE (P/N 296 000 329) inside impeller boot.
9. Install impeller boot on impeller and tighten counterclockwise.

WEAR RING

Wear Ring Inspection

Check wear ring for:
- Deep scratches
- Irregular surface
- Any apparent damage.

Check *IMPELLER/WEAR RING CLEARANCE*, see procedure at the beginning of this subsection.

Wear Ring Removal

1. Remove the iBR gate, VTS trim ring and the steering nozzle as an assembly. See procedure in *IBR AND VTS* subsection.
2. Remove jet pump from watercraft. Refer to *JET PUMP HOUSING* in this subsection.
3. Remove impeller from jet pump housing, refer to *IMPELLER* in this subsection.
4. Place jet pump housing in a vise with soft jaws. It is best to clamp housing using a lower ear.
5. Cut wear ring at two places.

NOTICE When cutting ring, be careful not to damage jet pump housing.

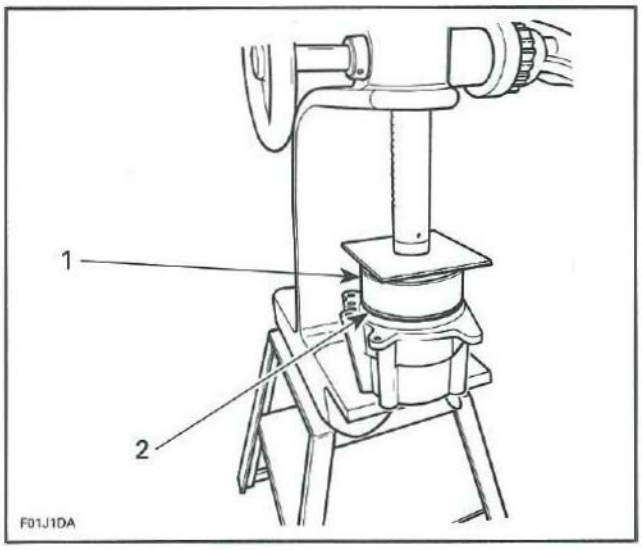
NOTE: Wear ring can be cut using a jigsaw, a small grinder or a low clearance hacksaw.

6. After cutting ring, insert a screwdriver blade between jet pump housing and ring outside diameter.
7. Push ring so that it can collapse internally.
8. Pull ring out.

Wear Ring Installation

To install wear ring in housing, use a square steel plate of approximately 180 x 180 mm x 6 mm thick (7 x 7 in x 1/4 in) and a press.

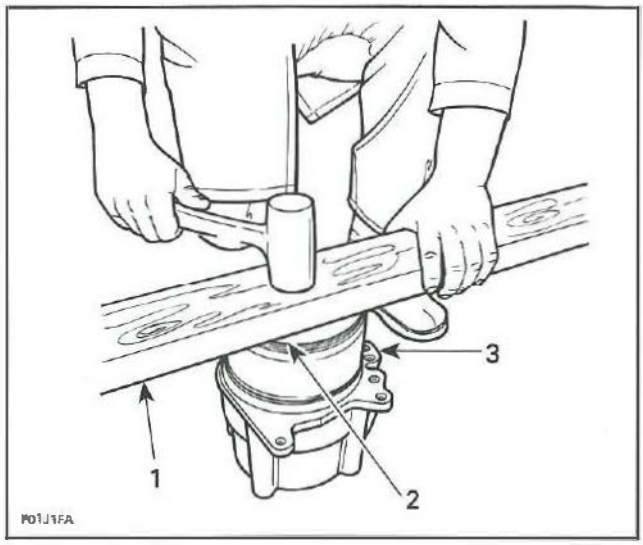
Manually engage ring in housing making sure it is equally inserted all around. Press ring until it seats into bottom of housing.



1. Rounded edge
2. Press wear ring

If a press is not readily available, a piece of wood such as a 2 x 4 in x 12 in long, can be used.

Manually engage ring in housing making sure it is equally inserted all around. Place wood piece over ring. Using a hammer, strike on wood to push ring. Strike one side then rotate wood piece about 90° and strike again. Frequently rotate wood piece so that ring slides in evenly until it seats into bottom of housing.

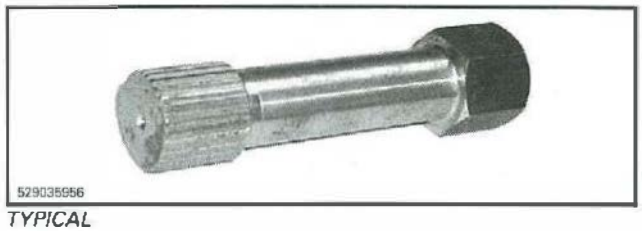


1. Piece of wood
2. Rounded edge
3. Wear ring

IMPELLER SHAFT AND BEARING

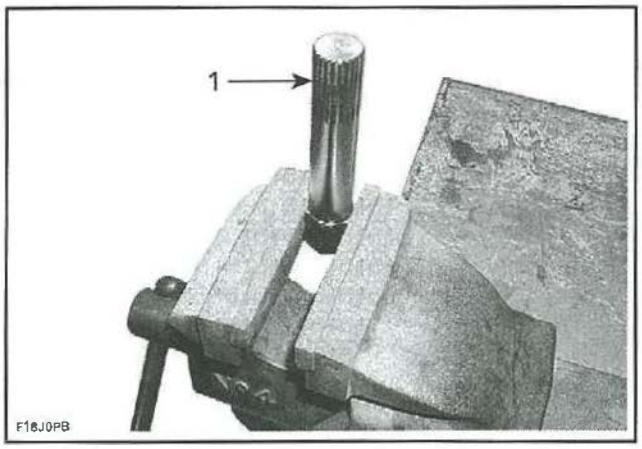
Impeller Shaft and Bearing Removal

1. Remove impeller cover. Refer to *IMPELLER COVER* in this subsection.
2. Mount in a vise the proper impeller remover/installer as per table.



TYPICAL

ENGINE	REQUIRED TOOL
130, 155	IMPELLER REMOVER/INSTALLER (P/N 529 035 820)
215, 260	IMPELLER REMOVER/INSTALLER (P/N 529 035 956)



TYPICAL
1. Impeller remover/installer tool

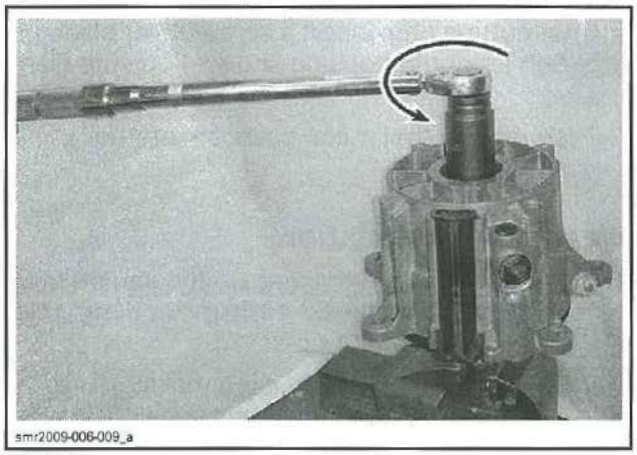
3. Install jet pump housing over impeller remover/installer tool.



TYPICAL

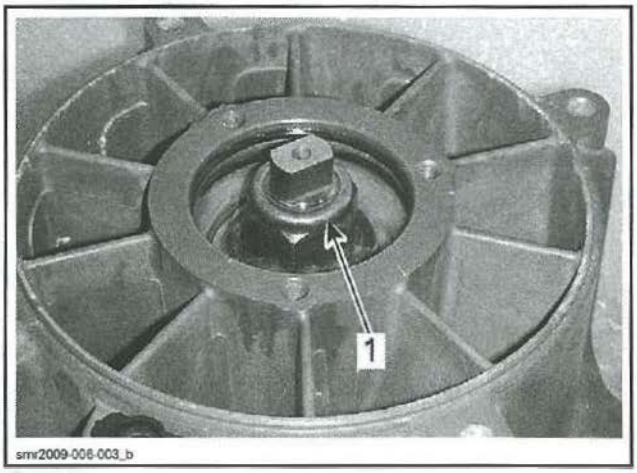
4. Using a 30 mm socket, unscrew the impeller shaft nut counterclockwise.

NOTE: If impeller loosens instead of shaft nut, refer to *IMPELLER SHAFT NUT REMOVAL IF IMPELLER HAS LOOSENED* further in this procedure.



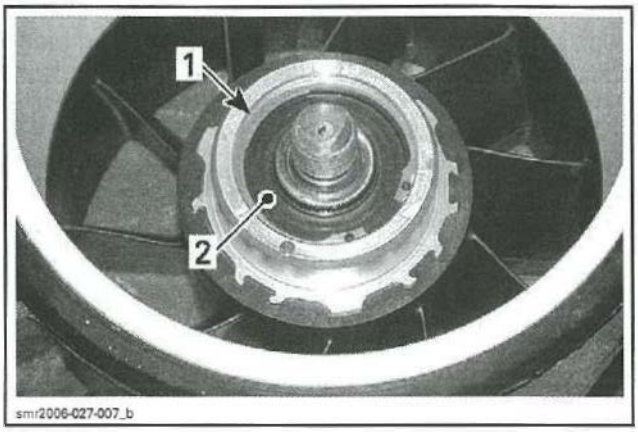
TYPICAL

5. Remove impeller shaft nut.



TYPICAL
1. Nut

6. Remove impeller as described in this subsection.
7. From the impeller side, remove circlip, seals, spacer and O-ring.

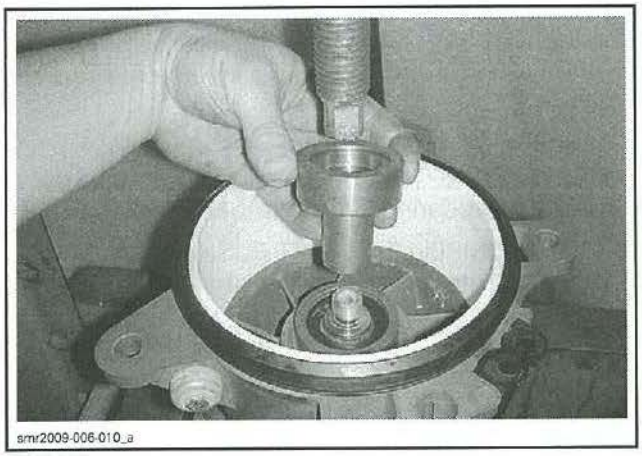


TYPICAL
1. Circlip
2. Seal

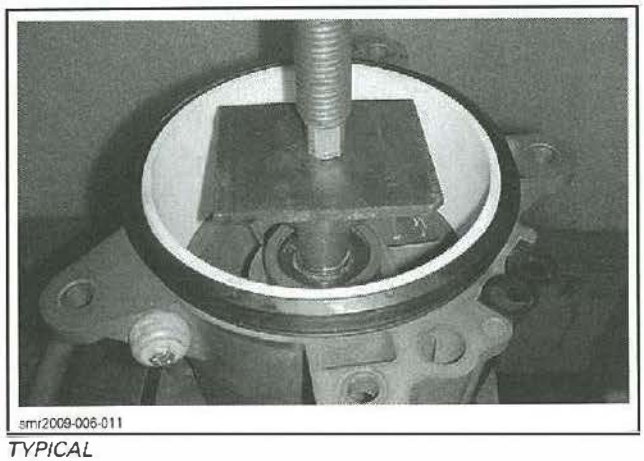
8. Use the IMPELLER SHAFT PUSHER (P/N 529 035 955) to press impeller shaft out of pump housing.

NOTE: Bearing will come out with the impeller shaft.



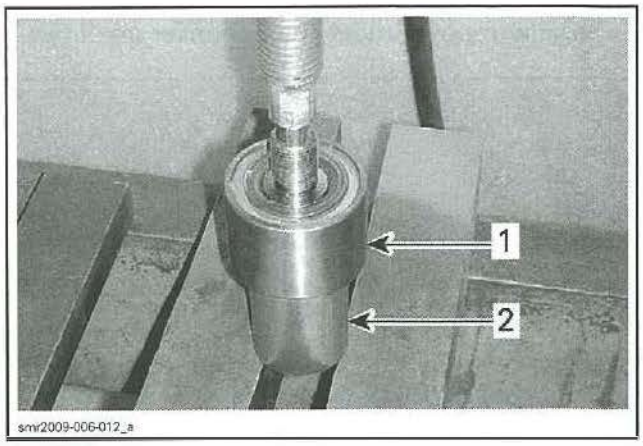


TYPICAL



TYPICAL

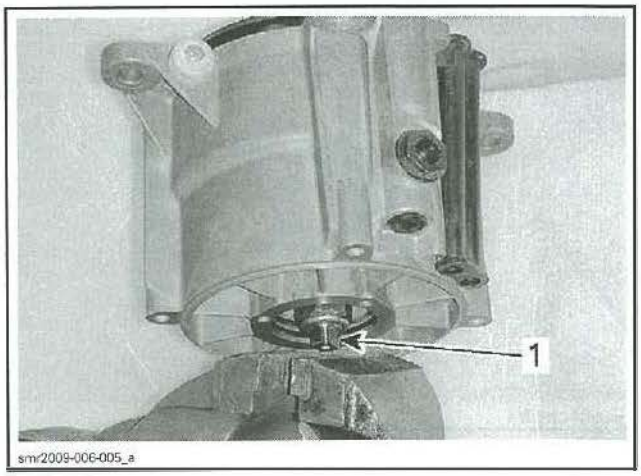
9. Use the IMPELLER SHAFT BEARING TOOL (P/N 529 036 168) to press bearing off impeller shaft.



TYPICAL
1. Impeller shaft and bearing
2. Bearing tool on INNER race

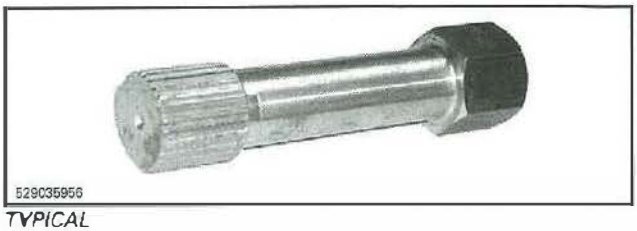
Impeller Shaft Nut Removal if Impeller Has Loosened

1. Turn pump upside down and mount the flat sides of impeller shaft in a vise.



TYPICAL
1. Flat side

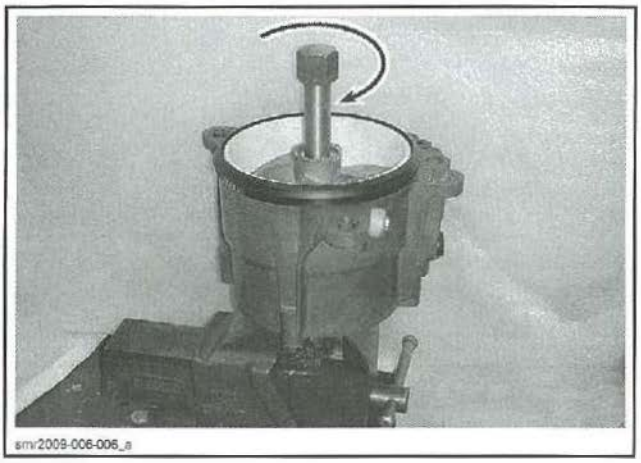
2. Mount in the impeller splines the proper impeller remover/installer as per table.



TYPICAL

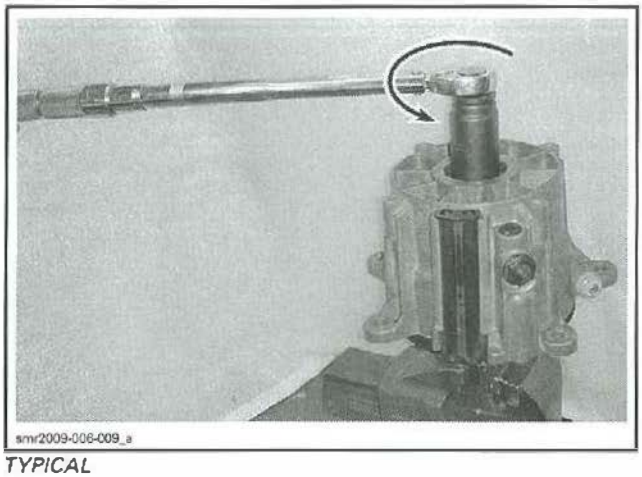
ENGINE	REQUIRED TOOL
130, 155	IMPELLER REMOVER/INSTALLER (P/N 529 035 820)
215, 260	IMPELLER REMOVER/INSTALLER (P/N 529 035 956)

3. Torque impeller more than impeller shaft nut.



TYPICAL

4. Turn pump upside down and retry unscrewing impeller shaft nut.



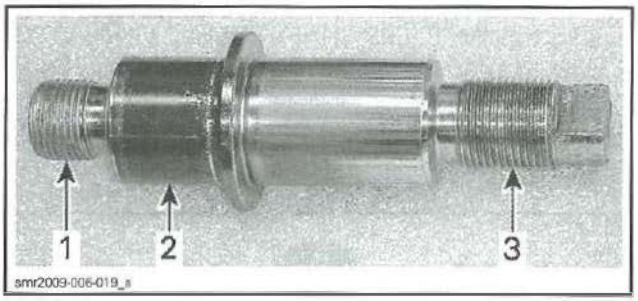
TYPICAL

5. If impeller still loosens instead of nut, retighten impeller more and retry. Repeat until nut loosens.
6. Remove impeller as described in this subsection.
7. Return to step 5 in the *IMPELLER SHAFT AND BEARING REMOVAL* main procedure.

Impeller Shaft and Bearing Inspection

With your finger nail, feel seal lip contact surface on shaft. If any irregular surface is found, replace shaft and seals.

Check condition of shaft threads.



TYPICAL
1. *Threads*
2. *Seal lip contact surface*
3. *Threads*

Inspect ball bearing for corrosion.

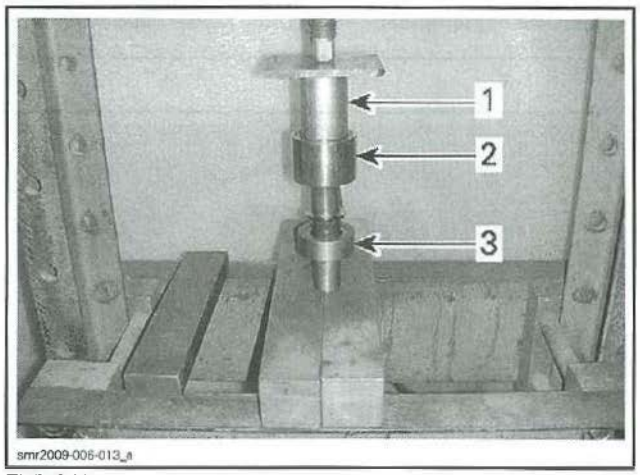
Impeller Shaft and Bearing Installation

Bearing Installation

The installation is essentially the reverse of the removal procedure. However, pay attention to the following.

1. Using the IMPELLER SHAFT BEARING TOOL (P/N 529 036 168) on the bearing inner race, press the bearing on the impeller shaft.
2. Use the IMPELLER SHAFT PUSHER (P/N 529 035 955) to protect the impeller shaft threads.

NOTE: The bearing can be installed in either direction.



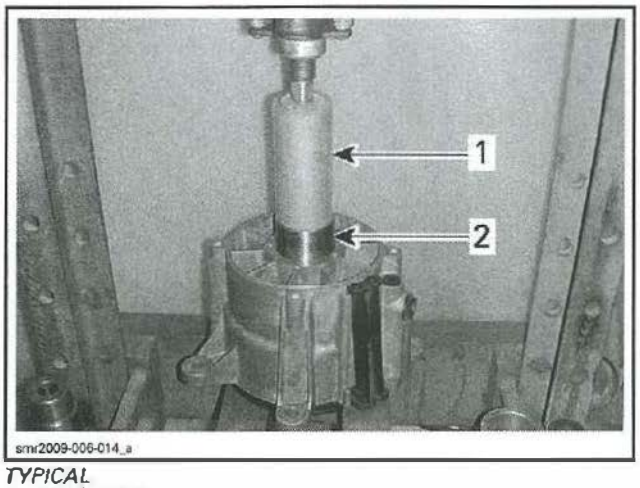
TYPICAL
1. *Impeller shaft bearing tool on INNER race*
2. *Impeller shaft and bearing*
3. *Impeller shaft installer/pusher tool*

3. Press bearing until it bottoms.

Impeller Shaft Installation

NOTE: Ensure there is no O-ring in pump housing on the cover side.

1. From the outlet side of pump, press impeller shaft assembly into housing using the IMPELLER SHAFT BEARING TOOL (P/N 529 036 168).

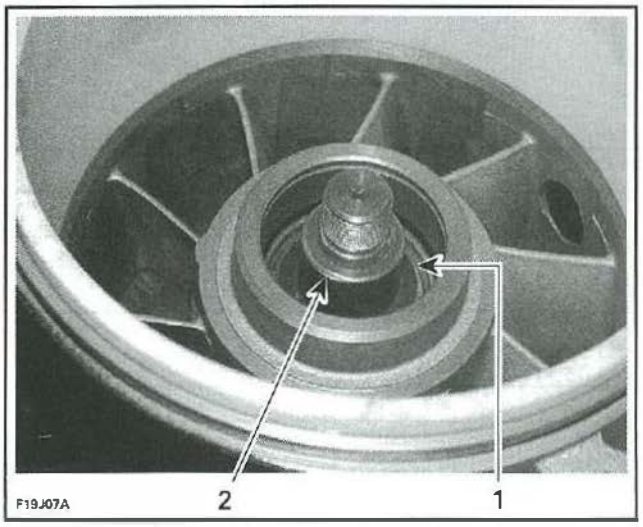


TYPICAL
1. *Bearing tool*
2. *Impeller shaft and bearing*

2. Press bearing until it bottoms.

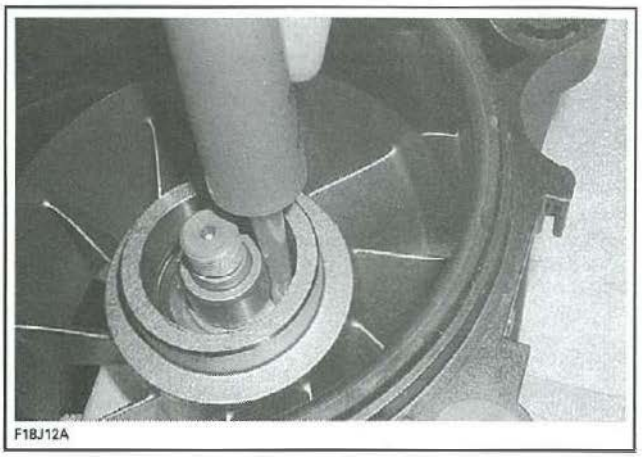
NOTE: Ensure impeller shaft turns freely and smoothly.

3. Turn pump upside down.
4. Coat shaft surface with JET PUMP BEARING GREASE (P/N 293 550 032).
5. Install O-ring at bottom.



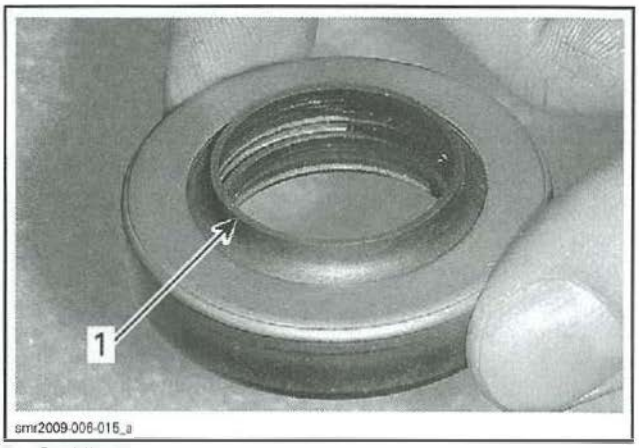
TYPICAL
1. *O-ring at bottom*
2. *Coat surface*

6. Apply 4 ml (.1 U.S. oz) of JET PUMP BEARING GREASE (P/N 293 550 032) on bearing.

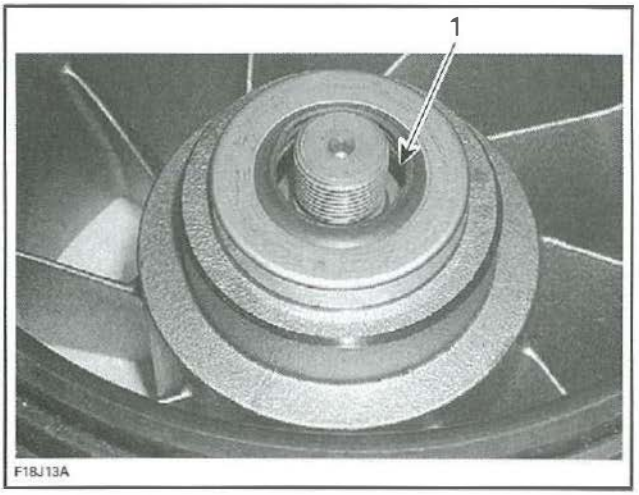


TYPICAL

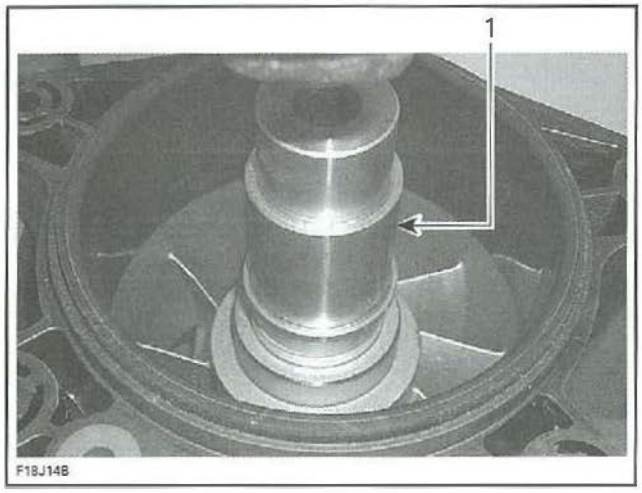
7. Press a NEW double lip seal using the SEAL/BEARING PUSHER (P/N 529 035 819) until seal bottoms. Make sure seal lip are facing upwards.



1. *Seal lip up*

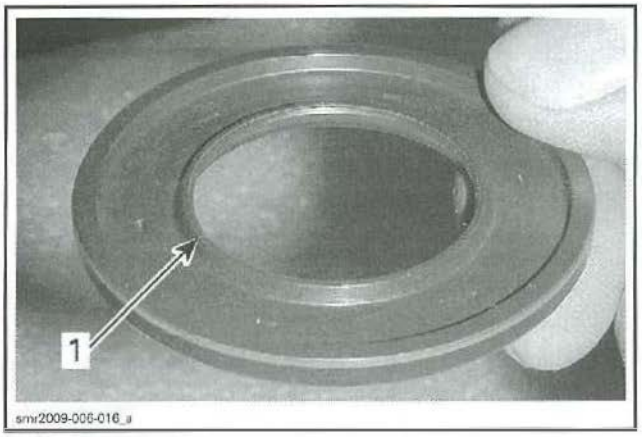


1. *Seal lip facing up*



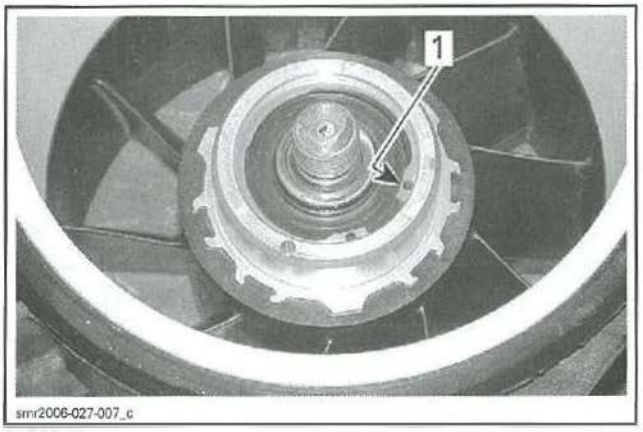
TYPICAL
1. Seal/bearing pusher

8. Install spacer and then the other seal (thin). Ensure seal lip is facing up.



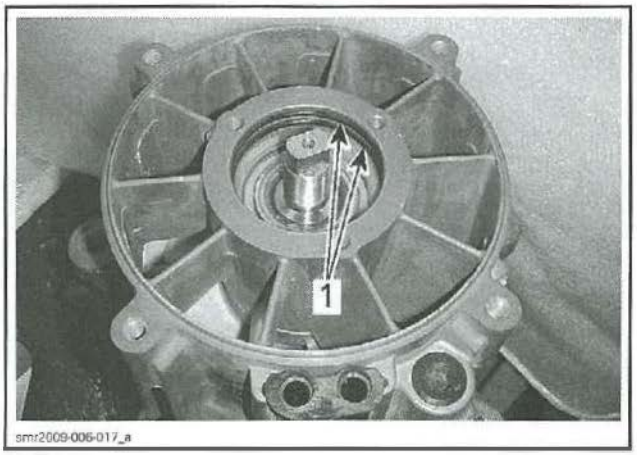
1. Seal lip facing up

9. Install circlip.



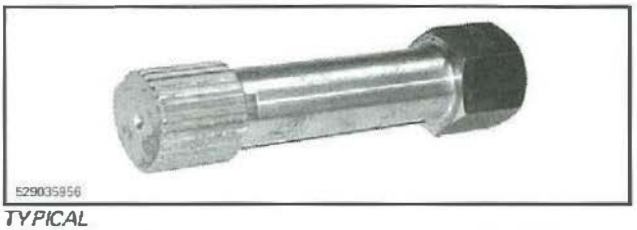
TYPICAL
1. Circlip

10. Turn pump upside down.
11. Install the two O-rings in pump housing.



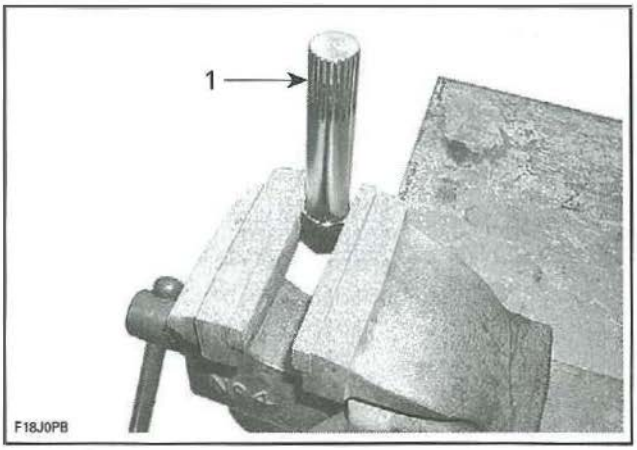
TYPICAL
1. O-rings

12. Before installing any other parts, pressurize jet pump to insure proper seal installation. Refer to *LEAK TEST* in this subsection.
13. Install impeller. Refer to *IMPELLER* in this subsection.
14. Mount in a vise the proper impeller remover/installer as per table.



TYPICAL

ENGINE	TOOL P/N
130, 155	IMPELLER REMOVER/INSTALLER (P/N 529 035 820)
215, 260	IMPELLER REMOVER/INSTALLER (P/N 529 035 956)



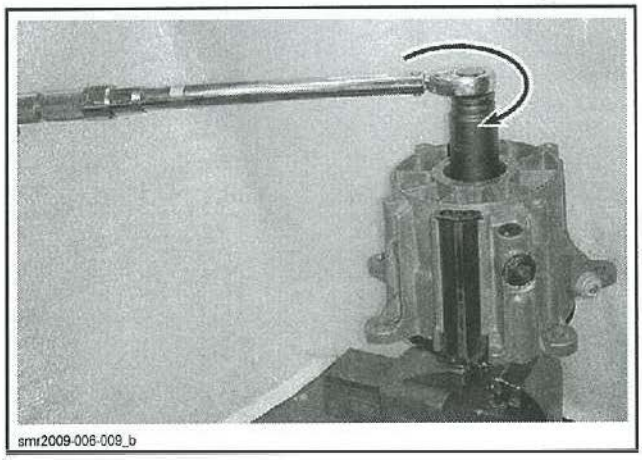
1. Impeller remover/installer tool

15. Install jet pump housing over this tool.

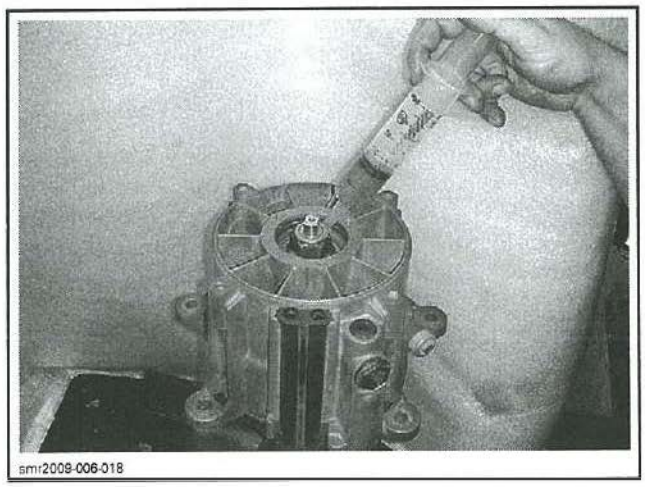


TYPICAL

16. Using a 30 mm socket, screw the impeller shaft nut on clockwise.
17. Torque nut as specified in exploded view.



18. Apply 24 ml (.8 U.S. oz) of JET PUMP BEARING GREASE (P/N 293 550 032) on the bearing (nut side).



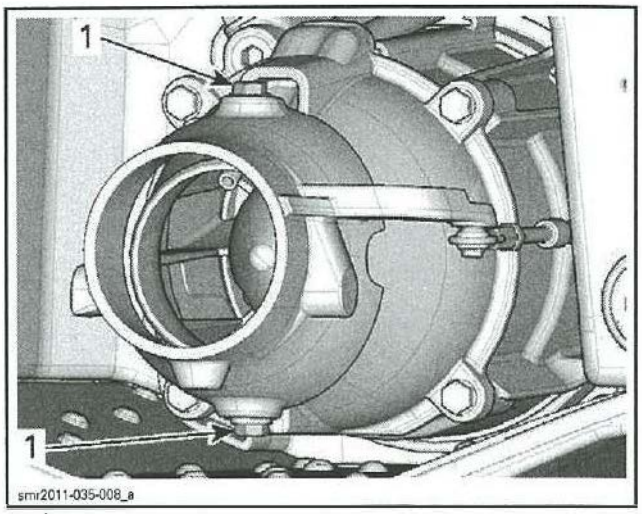
19. Install the impeller cover. Refer to *IMPELLER COVER* in this subsection.

NOZZLE (GTS MODELS)

Nozzle Removal

Disconnect steering cable from nozzle arm. Refer to *STEERING AND O.T.A.S.*

Remove screws retaining nozzle to venturi.



1. Screws

Remove nozzle.

Steering Nozzle Inspection

Inspect steering nozzle for cracks, wear, deformation, and other damages.

Inspect bushings for wear or other damage.

Replace parts as required.

Nozzle Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on screw threads (or use new self-locking screws).

Torque screws as per table..

TORQUE
21 N•m (15 lbf•ft)

Secure steering cable to nozzle arm. Refer to Refer to *STEERING AND O.T.A.S.*

Perform the *STEERING ALIGNMENT*. Refer to *STEERING AND O.T.A.S.*

DRIVE SHAFT

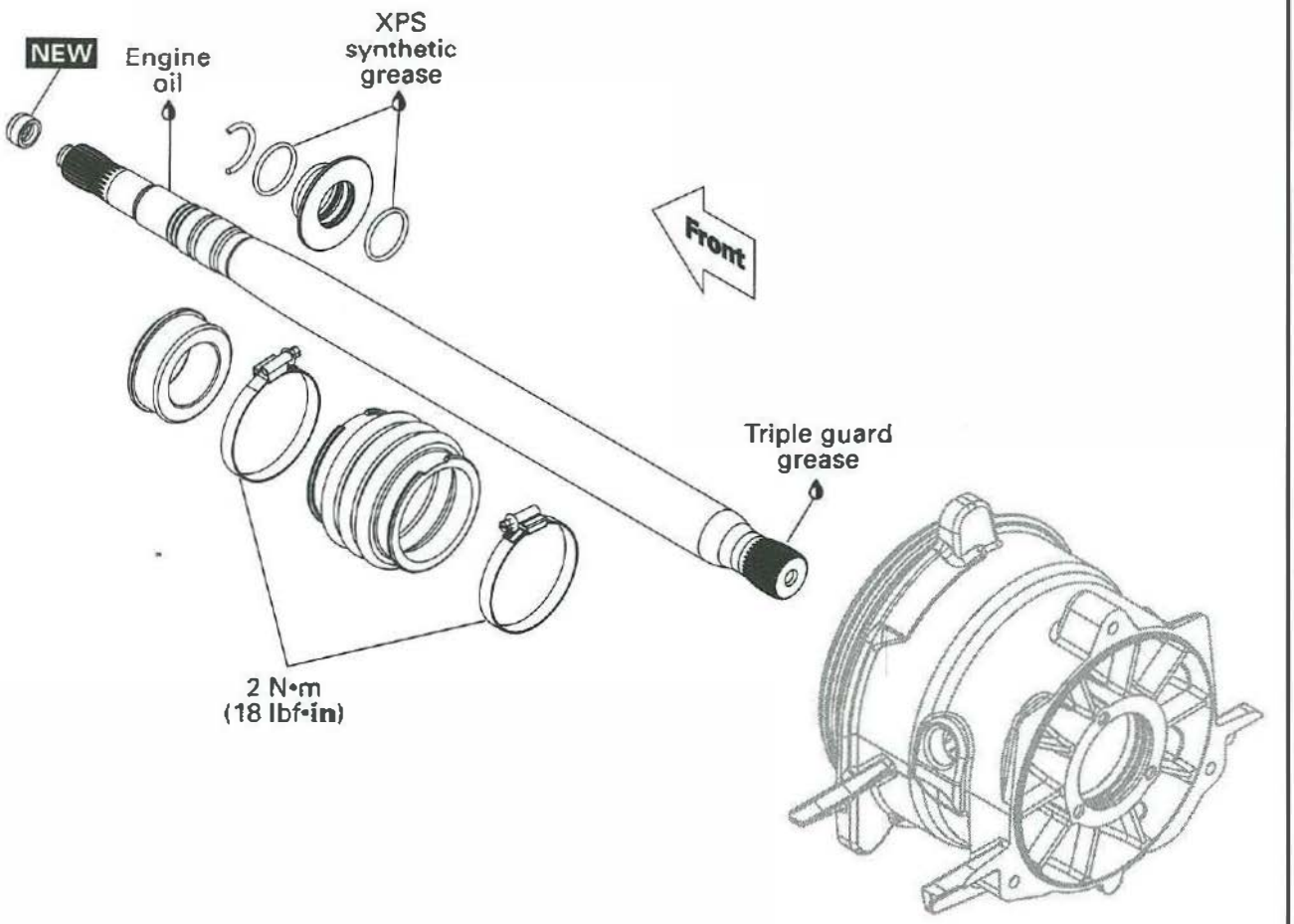
SERVICE TOOLS

Description	Part Number	Page
DRIVE SHAFT C-CLIP REMOVER	529 036 026	542
FLOATING RING TOOL (TYPE I)	529 035 841	542, 547
PTO SUPPORT TOOL	529 035 842	543, 546

SERVICE PRODUCTS

Description	Part Number	Page
PULLEY FLANGE CLEANER	413 711 809	544
XPS LUBE	293 600 016	543
XPS SYNTHETIC GREASE	293 550 010	546

green-manuals



NEW = Component must be replaced when removed.

smr2011-036-081_b

GENERAL

Jet pump must be removed to replace any components of the drive system. Refer to *JET PUMP* for removal procedure.

During assembly/installation, use torque values and service products as in the exploded view.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices must be replaced with new ones (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).

Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

PROCEDURES

DRIVE SHAFT

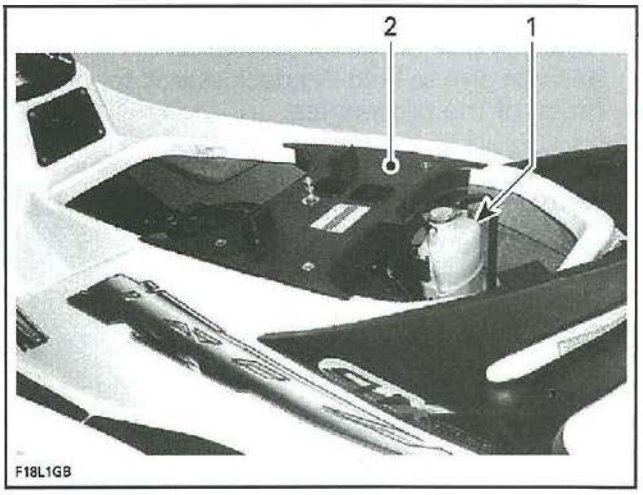
Drive Shaft Access (GTS/GTI/Wake)

Remove seat.

Drive Shaft Access (RXT/GTX/Wake Pro)

GTX 155/215

1. Remove seat.
2. Detach coolant expansion reservoir from vent tube support then move away.



TYPICAL
1. *Detach expansion reservoir*
2. *Remove vent tube support*

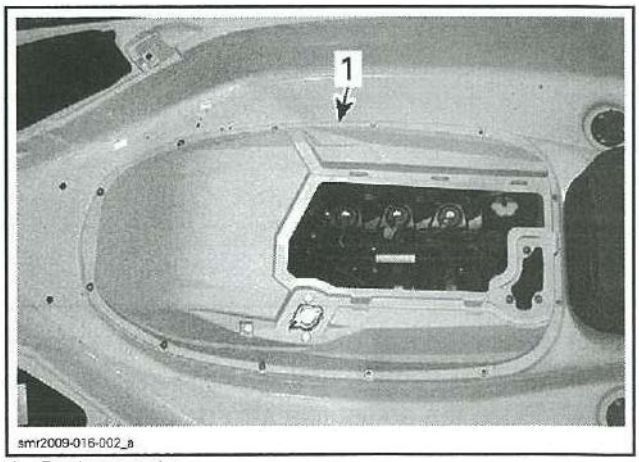
3. Detach vent tube.
4. Remove vent tube support.
5. On GTX 215, remove supercharger air inlet hose.

RXT 260/RXT-X 260

6. Remove seat.
7. Detach coolant expansion reservoir from vent tube support then move away.
8. Remove muffler hose.
9. Remove intercooler inlet and outlet air hoses.
10. Remove supercharger air inlet hose.

RXT-X aS 260, GTX iS 215 and GTX Ltd iS 260

1. Open seat.
2. Remove the deck extension. Refer to *BODY (RXT/GTX/WAKE PRO)* subsection.



1. *Deck extension*

3. Lower the moving deck onto the fixed deck and install a few hexagonal screws on the rear suspension arm to hold the deck steady for the duration of the procedures.

GTX iS 215

4. Remove air intake silencer.
5. Remove supercharger air inlet hose.

RXT-X aS 260 and GTX Ltd iS 260

6. Remove air intake silencer.
7. Remove muffler hose.
8. Remove intercooler inlet and outlet air hoses.
9. Remove supercharger air inlet hose.

Drive Shaft Removal

Preparation

Refer to *DRIVE SHAFT ACCESS* to remove required parts according to model.

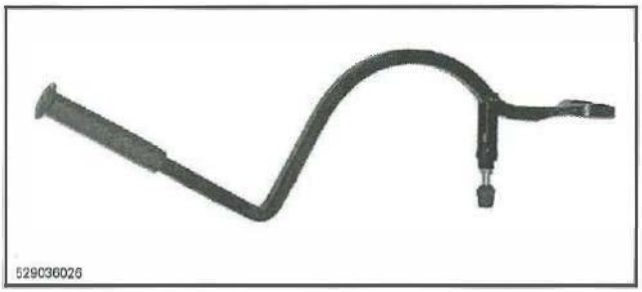
To minimize oil spillage, syphon oil in engine PTO area. Refer to *PTO HOUSING REMOVAL* in *PTO HOUSING AND MAGNETO* subsection.

Procedures

NOTE: Ensure jet pump is installed before beginning this procedure.

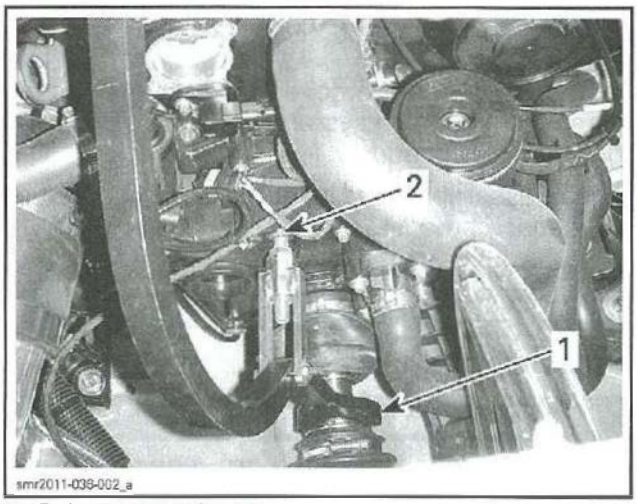
1. Disconnect EGTS sensor as necessary.
2. Lift rubber protector to expose PTO seal assembly.
3. Confirm the floating ring is not stuck on drive shaft as follows:

REQUIRED TOOL
DRIVE SHAFT C-CLIP REMOVER (P/N 529 036 026)



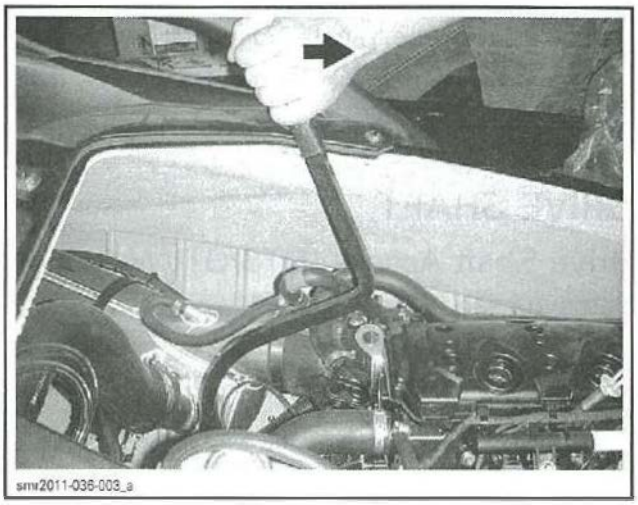
3.1 Place the fork of drive shaft circlip remover against floating ring.

3.2 Place the adjustable arm on engine.



1. Fork against floating ring
2. Adjustable arm

3.3 Move the tool handle toward the front of vehicle to push floating ring rearward.

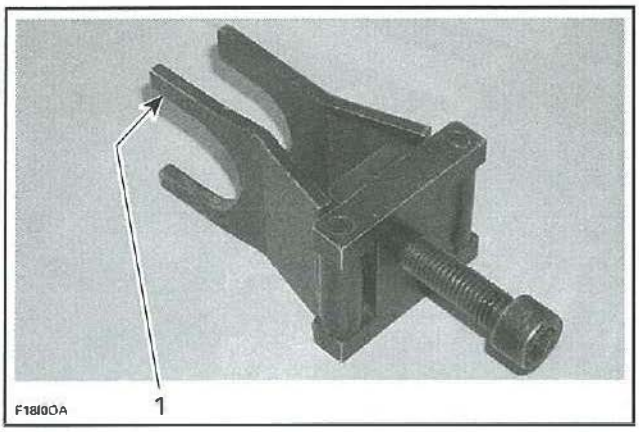


NOTE: Do not remove circlip at this time.

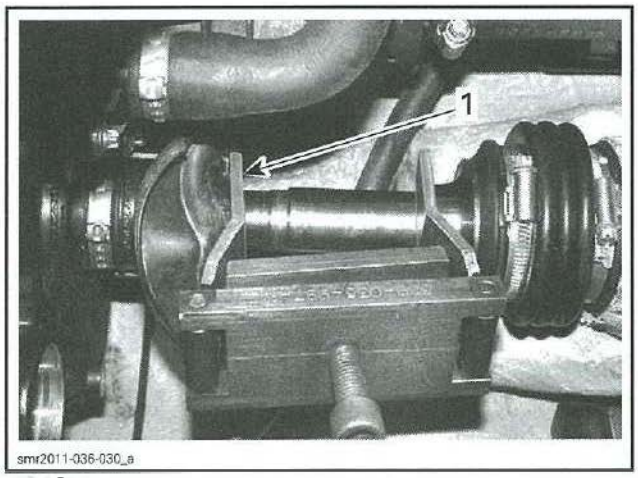
3.4 Remove the drive shaft C-clip remover.

4. Install the following tool on drive shaft with its largest opening on PTO side.

REQUIRED TOOL
FLOATING RING TOOL (TYPE I) (P/N 529 035 841)



TYPICAL
1. Largest opening on PTO seal side



TYPICAL
1. Largest opening here

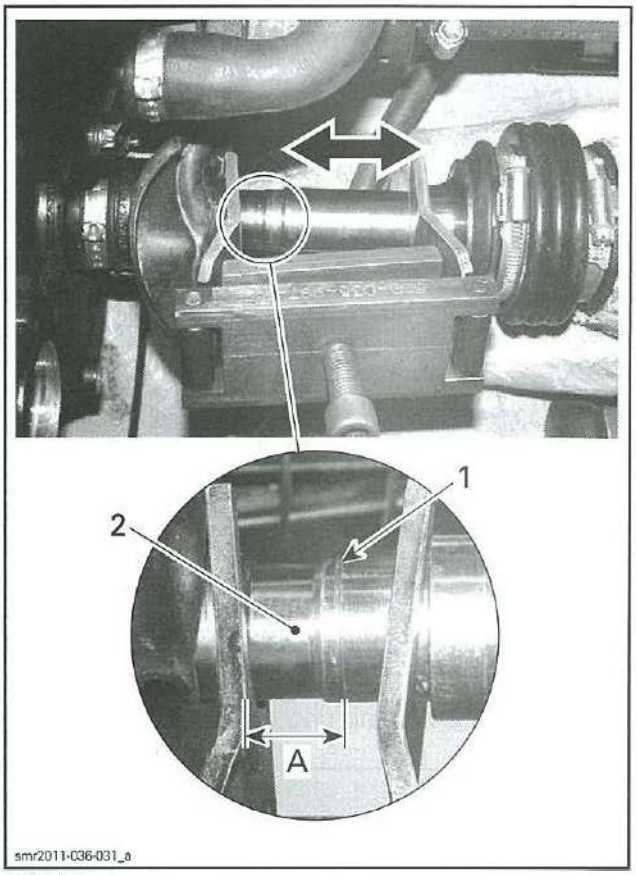
5. Turn tool screw CLOCKWISE until the following gap is obtained.

GAP BETWEEN TELLTALE GROOVE AND TOOL EDGE
18 mm (.71 in)

NOTE: This will expose the O-ring contact area.

6. Lubricate O-ring contact area with XPS LUBE (P/N 293 600 016).

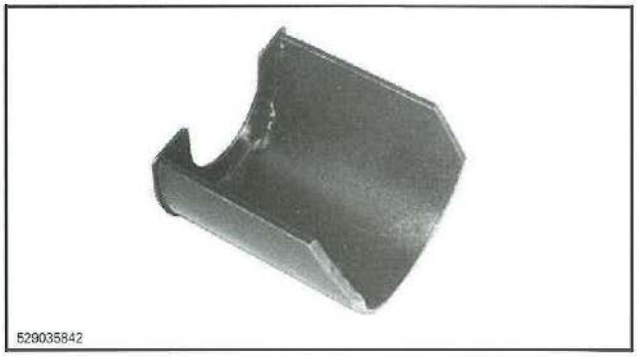
NOTE: This is necessary to ease drive shaft removal later in this procedure.

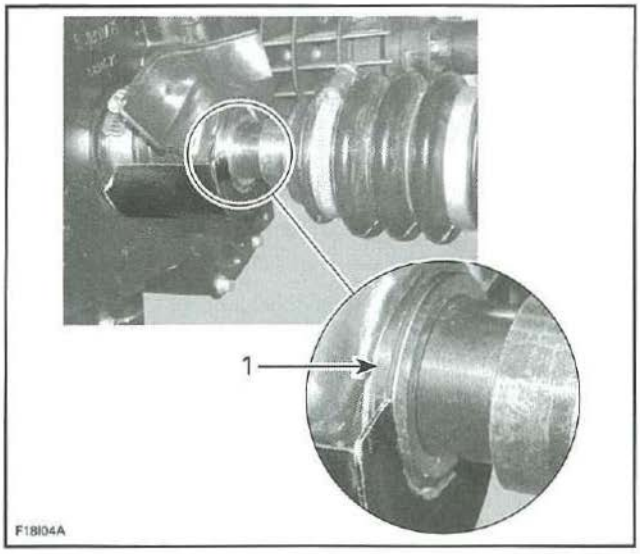


TYPICAL
1. Telltale groove
2. Lubricate this area
A. 18 mm (.71 in)

7. Remove the floating ring tool.
8. Install the following tool to PTO seal assembly.

REQUIRED TOOL
PTO SUPPORT TOOL (P/N 529 035 842)

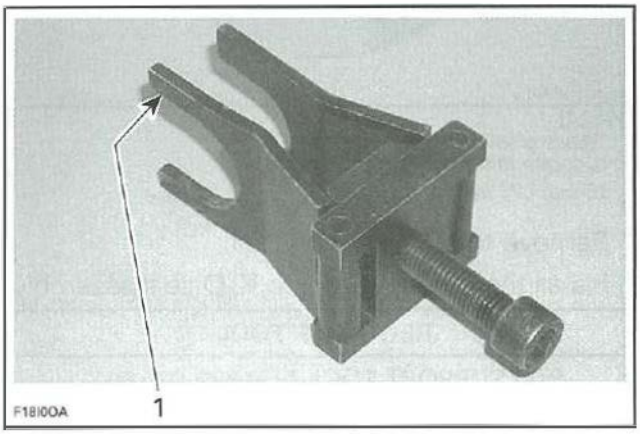




1. Insert in groove of PTO seal assembly

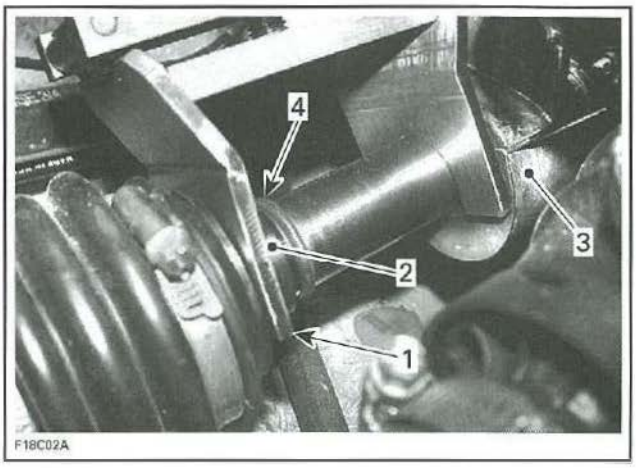
NOTICE Strictly follow this procedure otherwise damage to component might occur.

9. Reinstall the floating ring tool as shown.



TYPICAL
1. Largest opening on PTO seal side

10. Turn screw of tool clockwise to push floating ring rearward to expose circlip.
11. Remove and discard circlip.



TYPICAL
1. Largest opening here
2. Floating ring
3. PTO seal support tool
4. Remove circlip

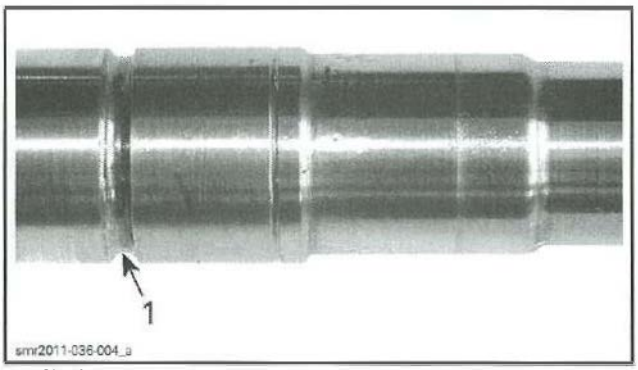
12. Remove the floating ring tool.
13. Place rags under PTO housing to prevent spillage. If spillage occurs, clean immediately with the PULLEY FLANGE CLEANER (P/N 413 711 809) to prevent oil stains.
14. Remove jet pump. Refer to *JET PUMP* section.
15. Remove drive shaft.

NOTE: A slight jerk to the rear may be required to remove the drive shaft from the PTO seal assembly.

Drive Shaft Inspection

Drive Shaft

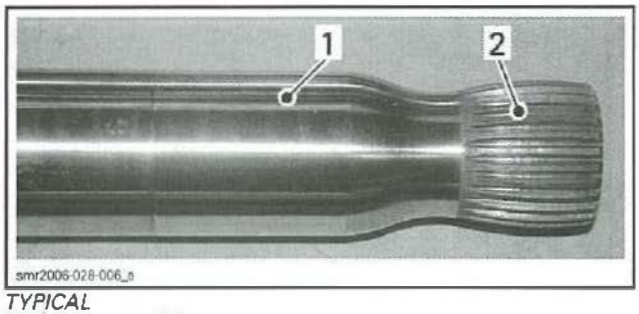
Inspect condition of circlip groove. If there is any damage or severe wear, replace drive shaft.



1. Circlip groove

Inspect condition of drive shaft splines. If splines are damaged, replace drive shaft.

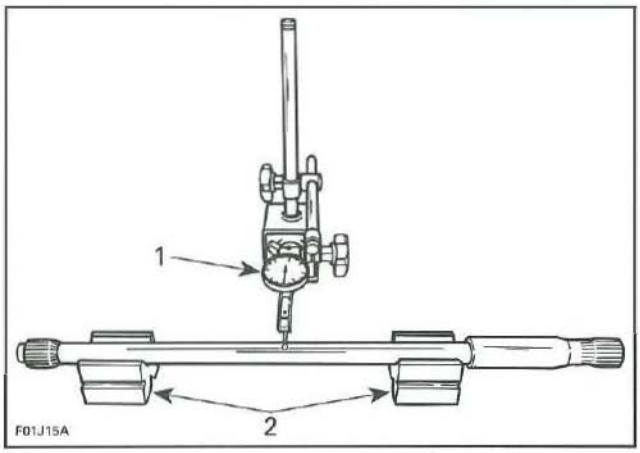
With your finger nail, feel machined surface of drive shaft. If any irregular surface is found, renew drive shaft.



TYPICAL
1. *Surface condition*
2. *Splines condition*

Excessive deflection could cause vibration and damage to drive shaft splines, impeller or floating ring.

Place drive shaft on V-blocks and set-up a dial gauge in center of shaft. Slowly rotate shaft; difference between highest and lowest dial gauge reading is deflection. Refer to the following illustration.



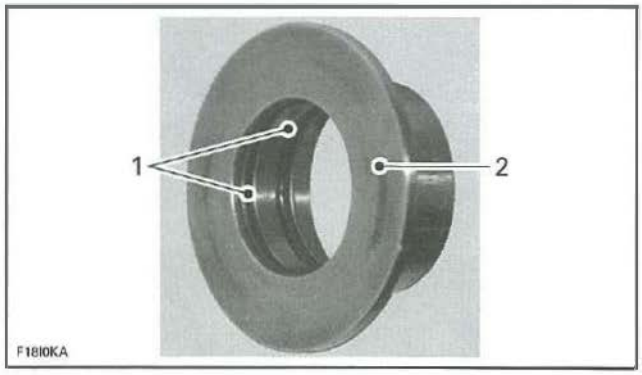
MEASURING DRIVE SHAFT DEFLECTION
1. *Dial gauge*
2. *V-blocks*

Maximum permissible deflection is 0.5 mm (.020 in).

Floating Ring

Inspect condition of O-rings and contact surface of floating ring.

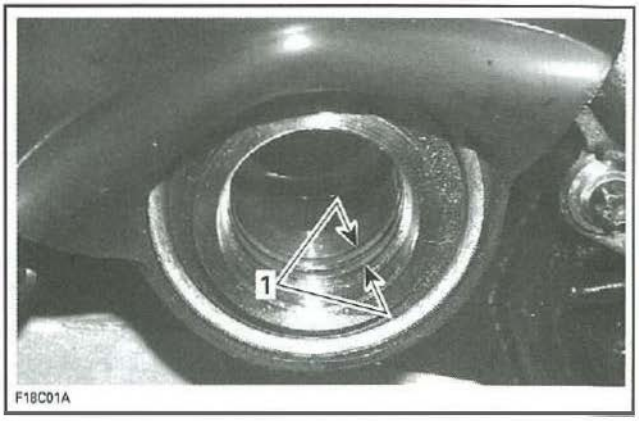
Replace as required.



1. *O-rings*
2. *Contact surface*

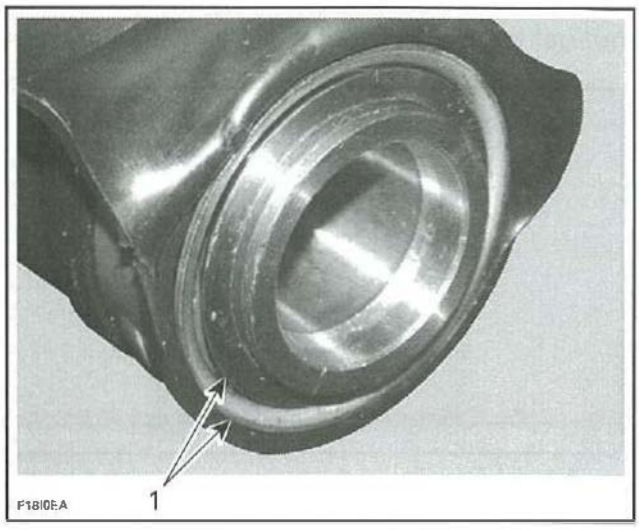
Drive Shaft Installation

Before installing drive shaft, discard both O-rings inside PTO seal and install NEW ones.

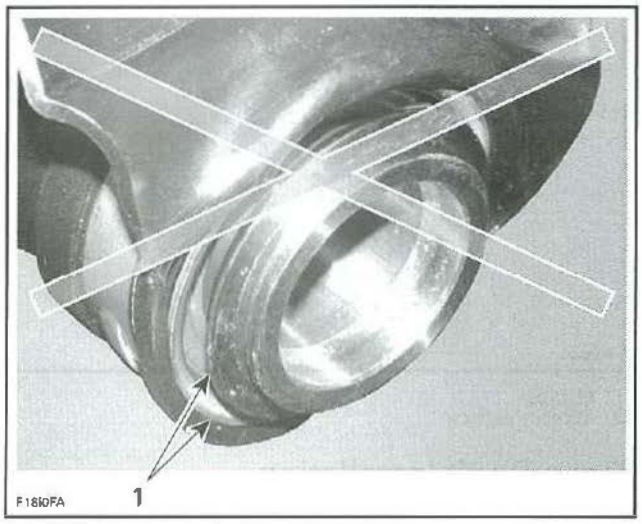


1. *O-rings*

Inspect PTO seal assembly. The inner sleeve must be flush with outer circumference of the assembly. Otherwise, gently push or tap on inner sleeve until flush.

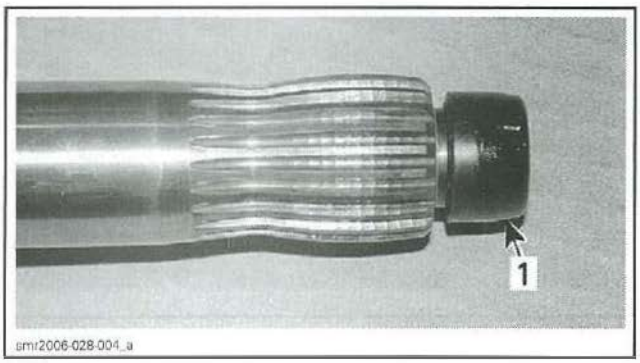


CORRECT POSITION
1. *Inner sleeve flush with outer circumference*



INCORRECT POSITION
1. Inner sleeve not flush with outer circumference

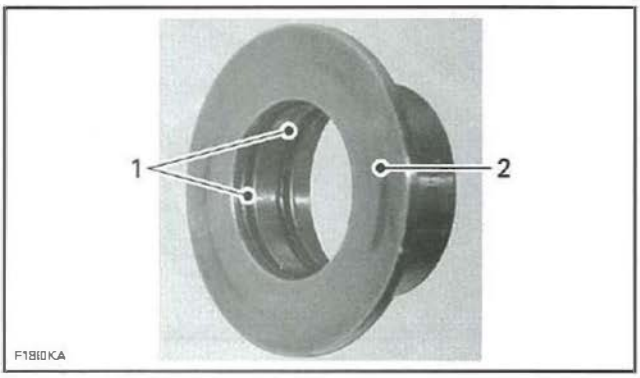
Remove the damper at the end of drive shaft and replace it with a NEW one.



1. Damper

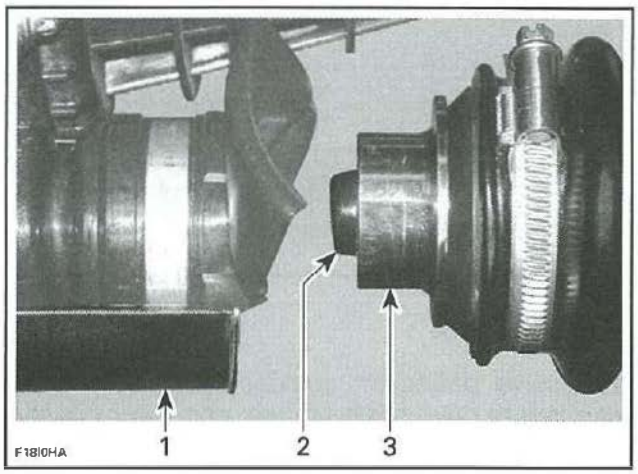
Install the PTO SUPPORT TOOL (P/N 529 035 842) on PTO seal assembly.

Apply a thin coat of XPS SYNTHETIC GREASE (P/N 293 550 010) on the floating ring O-rings. Do not get grease on floating ring contact surface.



1. XP-S synthetic grease on O-rings
2. No lubrication on contact surface

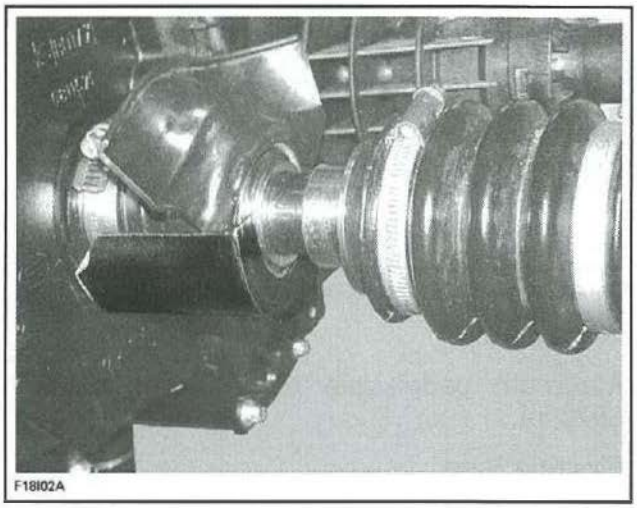
Slide drive shaft far enough to install floating ring.



1. PTO seal support
2. Drive shaft end
3. Insert floating ring on shaft end

Continue pushing drive shaft towards engine carefully guiding it in the PTO seal then in crankshaft splines. It may be necessary to move PTO seal assembly up and down to position it in the same axis as the drive shaft.

NOTE: If drive shaft does not enter into the PTO seal, check engine alignment.

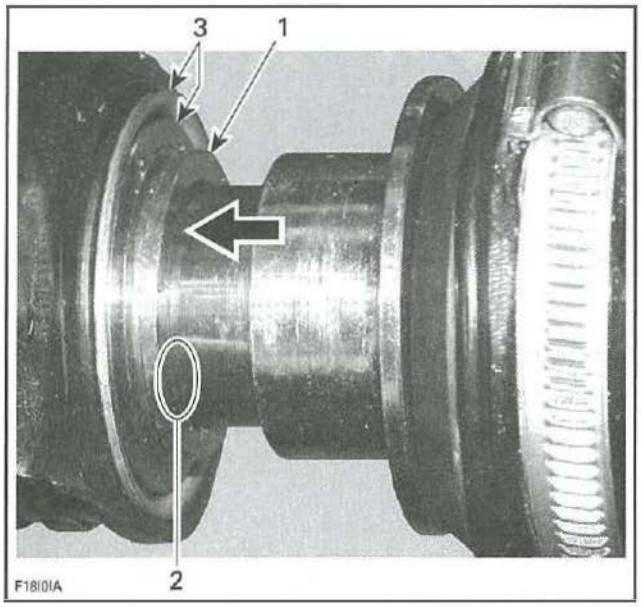


TYPICAL

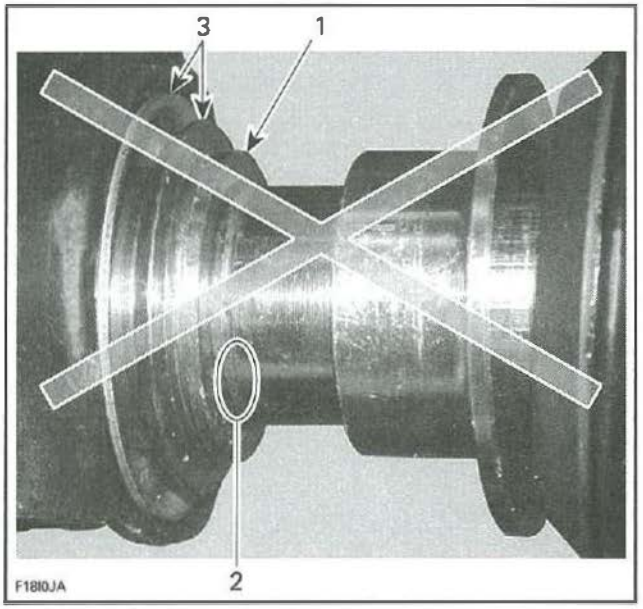
Maintain PTO seal assembly in the proper position and tap shaft end until it bottoms against engine.

At this time, the telltale groove MUST NOT be visible. This validates the correct position.

NOTICE **If the telltale groove is exposed, the installation is wrong and PTO seal assembly will be pressed into crankshaft splines which could rub a hole in seal thus creating an oil leak.**



CORRECT INSTALLATION
1. *PTO seal assembly*
2. *Shaft pushed in, hiding telltale groove*
3. *Inner sleeve flush with outer circumference*

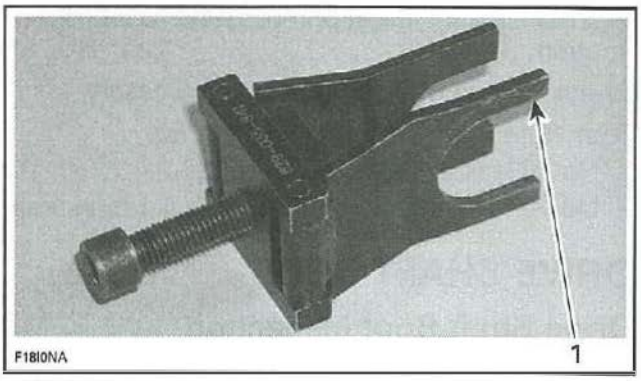


IMPROPER INSTALLATION
1. *PTO seal assembly*
2. *Telltale groove visible*
3. *Inner sleeve NOT flush with outer circumference*

Temporarily install the jet pump.

Install a new circlip using the following procedure and tools.

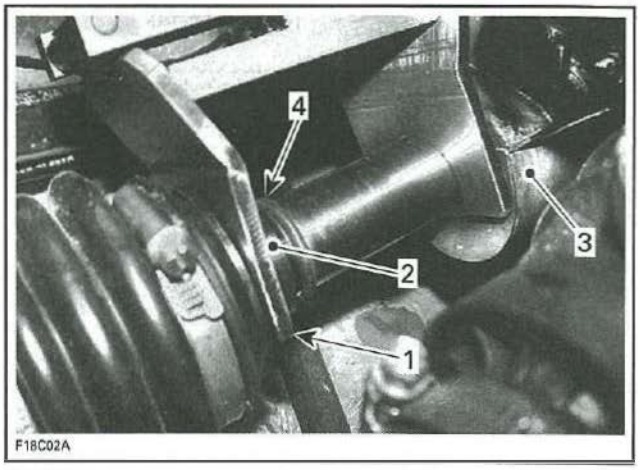
REQUIRED TOOL
FLOATING RING TOOL (TYPE I) (P/N 529 035 841)



TYPICAL
1. *Largest opening on through-hull fitting side*

NOTE: Ensure PTO seal support is still in place.

Push floating ring rearwards and install a NEW circlip.



TYPICAL
1. *Largest opening*
2. *Floating ring*
3. *PTO seal support tool*
4. *Install circlip*

Remove floating ring tool and PTO seal support.

NOTE: Pulling drive shaft boot rearward will ease removal of PTO support tool.

Ensure everything is properly positioned:
- Telltale groove is not visible
- Inner sleeve is flush with outer circumference of PTO seal assembly
- Circlip is not exposed.

If telltale groove is visible, pull PTO seal assembly rearwards to fully extend it.

If inner sleeve is not flush, gently tap it until it is flush.

Reposition rubber protector.

Reconnect EGTS sensor if applicable.

Permanently install jet pump. Refer to *JET PUMP* section.

Check engine oil level. Refill as necessary.

Test watercraft then ensure there is:
- No oil leak in PTO seal area
- No water intrusion by the thru-hull fitting area.

DRIVE SHAFT BOOT

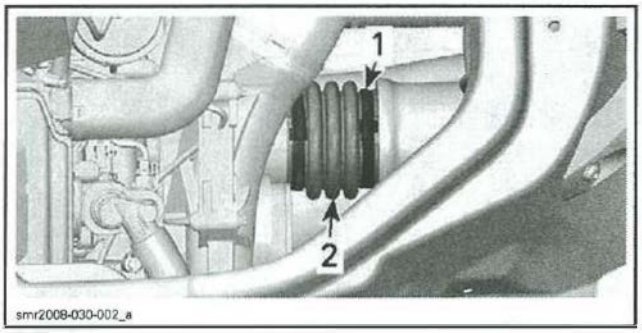
Drive Shaft Boot Inspection

Inspect the condition of boot. If there is any damage or evidence of wear, replace it.

Drive Shaft Boot Removal

Remove drive shaft. Refer to *DRIVE SHAFT* in this subsection.

Loosen gear clamp holding boot, then carefully pull boot and carbon ring from hull insert.



TYPICAL
1. *Loosen this clamp*
2. *Drive shaft boot*

Drive Shaft Boot Installation

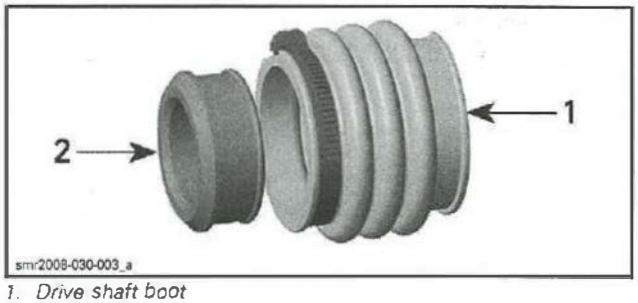
The installation is the reverse of the removal procedure.

CARBON RING

Carbon Ring Removal

Remove *DRIVE SHAFT BOOT*. See procedure in this section.

Loosen gear clamp then pull carbon ring from drive shaft boot.



1. *Drive shaft boot*
2. *Carbon ring*

Carbon Ring Installation

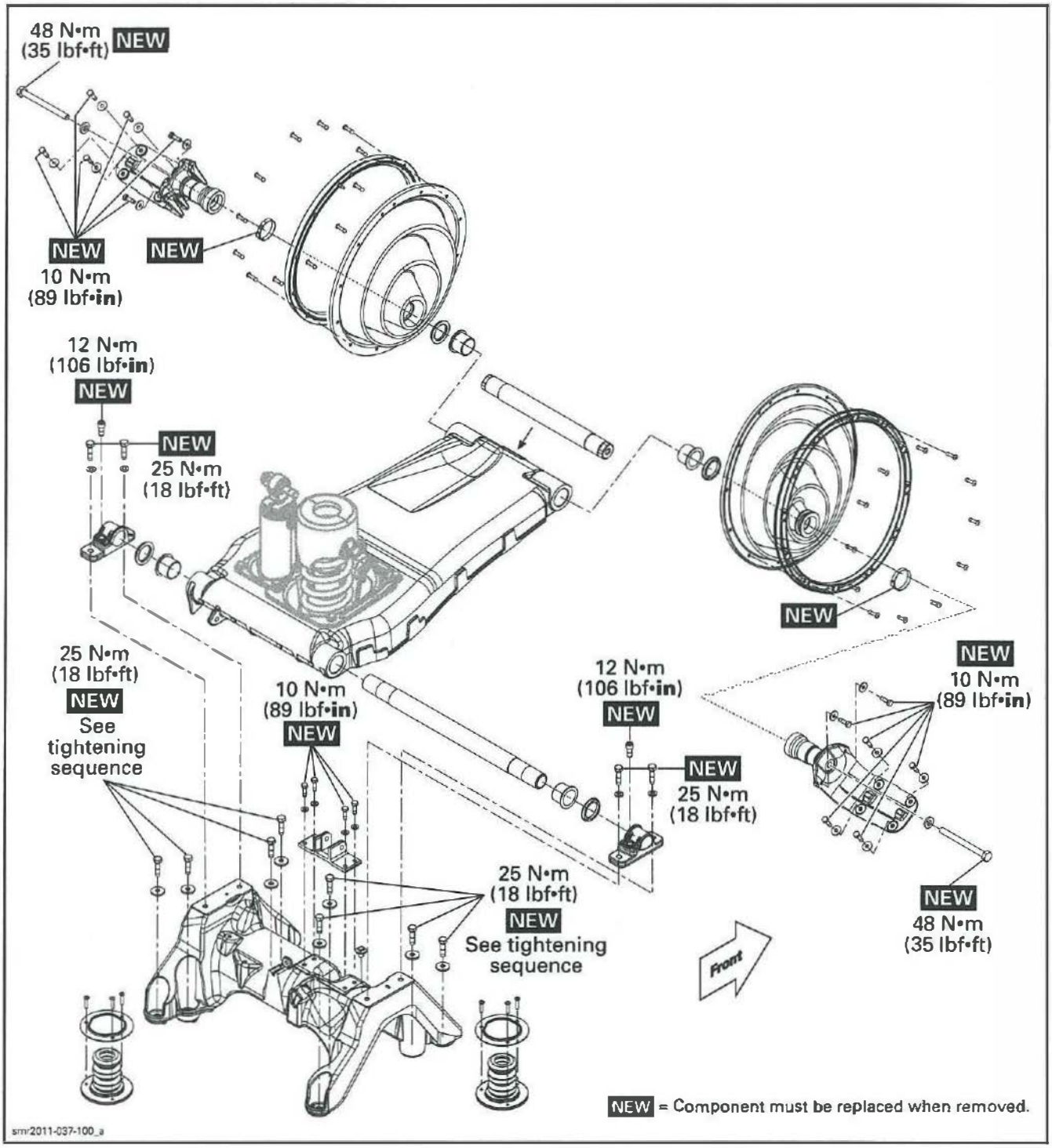
The installation is the reverse of the removal procedure.

SUSPENSION (aS)

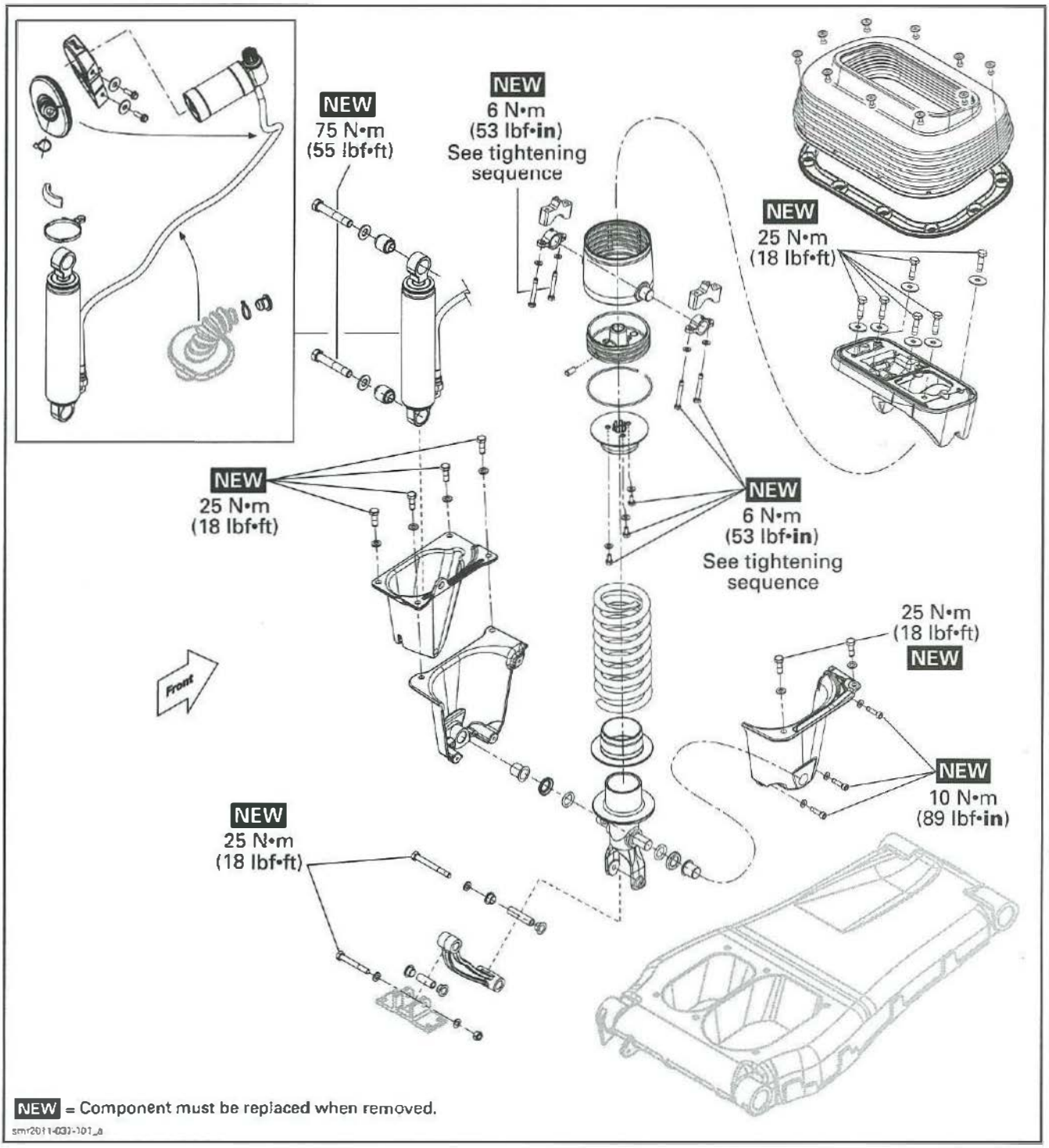
SERVICE TOOLS

Description	Part Number	Page
SUPERTANIUM DRILL BIT 3/16"	529 031 800	560

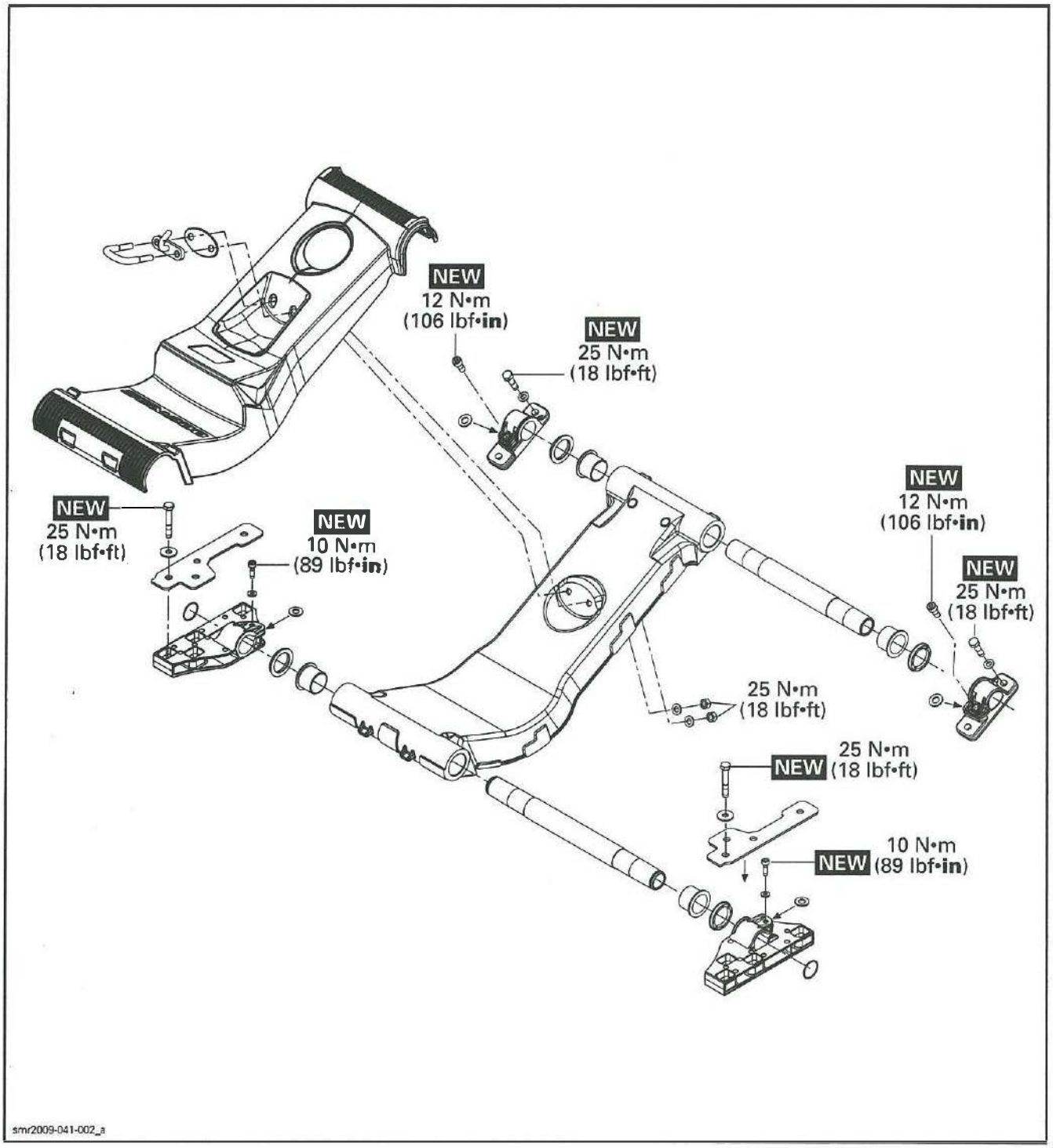
FRONT SUSPENSION ARM



SHOCK ABSORBER



REAR SUSPENSION ARM



GENERAL

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

NOTICE **When applying threadlocker products (anaerobic products), pay attention so that it does not come in contact with ABS plastic parts (painted parts). It could lead to plastic cracks or other damage.**

⚠ WARNING

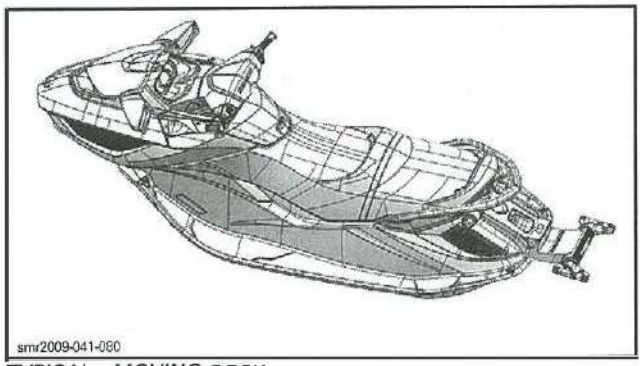
Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new one.

NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

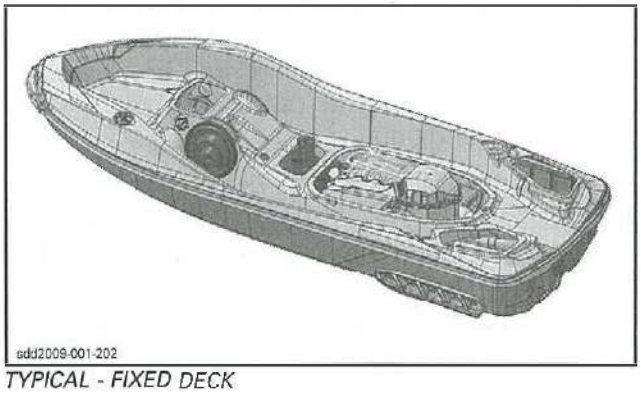
SYSTEM DESCRIPTION

The adjustable Suspension (aS) allows the moving deck to move independently from the fixed deck, isolating rider and passenger from the impact of rough water.

With the aS feature, the moving deck may be adjusted mechanically to absorb (dampen) water shocks according to the driver riding style and water conditions.



TYPICAL - MOVING DECK

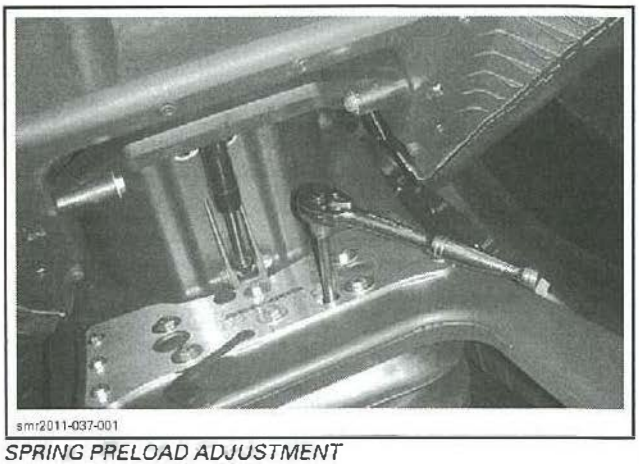


TYPICAL - FIXED DECK

Spring Preload Adjustment

The spring preload can be easily adjusted using a 1/2" drive ratchet wrench with an extension.

The spring preload adjuster is located under the seat.



SPRING PRELOAD ADJUSTMENT

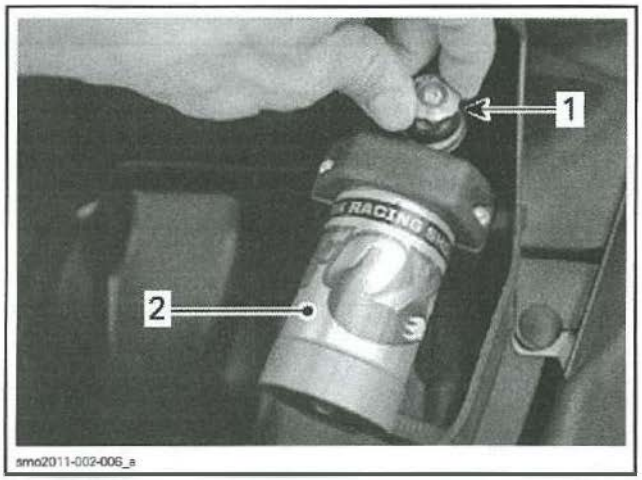
RIDERS TOTAL WEIGHT (KG/LB)	NBR OF CLICKS ON SPRING ADJUSTER (CLOCKWISE*)
57 kgf (125 lbf)	0
73 kgf (160 lbf)	2
89 kgf (195 lbf)	4
105 kgf (230 lbf)	6
120 kgf (265 lbf)	8
136 kgf (300 lbf)	10
152 kgf (335 lbf)	12
168 kgf (370 lbf)	14
184 kgf (405 lbf)	16
200 kgf (440 lbf)	18
* 0 is set at fully unscrewed position (counterclockwise).	

Damping Adjustment

The aS Suspension damping may be personally adjustable according to the driving preferences and water conditions.

Damping adjustment is carried out via the remote nitrogen reservoir in the glove box.

A blue knob located in glove box allows damper adjustment for this purpose.



1. *Blue knob*
2. *Nitrogen gas damper*

TYPICAL CONDITIONS	NBR OF CLICKS ON DAMPER ADJUSTER (CLOCKWISE*)
Calm water	0
	5
Rough water	10
	15
Offshore	20
* 0 is set at fully unscrewed position (counterclockwise).	

NOTE: These adjustments are provided as guidelines to ensure optimum suspension performance. Personal preference may dictate different settings than those recommended.

TROUBLESHOOTING

DIAGNOSTIC GUIDELINES

The following is provided to help in diagnosing the probable source of troubles. It is a guideline and it should not be assumed to list all possible problems.

SUSPENSION MOVES ERRATICALLY

1. **Defective shock absorber.**
   - *Replace the shock absorber.*
2. **Broken spring.**
   - *Replace spring.*

SUSPENSION NOISE (DURING A TURN)

1. **Front or rear suspension arm shaft supports position.**
   - *Supports must be flushed against both ends of shaft. Reposition shaft in its supports.*
2. **Worn arm shaft bushings.**
   - *Check front and rear arm shaft bushings condition and replace as required.*
3. **Snap rings on both sides of the rear lower arm shaft are not properly positioned.**
   - *Reposition shaft in its supports. Refer to SUSPENSION ARM SHAFTS.*

SUSPENSION NOISE (FRONT OF SEAT)

1. **Holder retaining screws are loose.**
   - *Tighten shock absorber holder screws to recommended torque.*
2. **Shock absorber screws are loose.**
   - *Tighten shock absorber screws to recommended torque.*

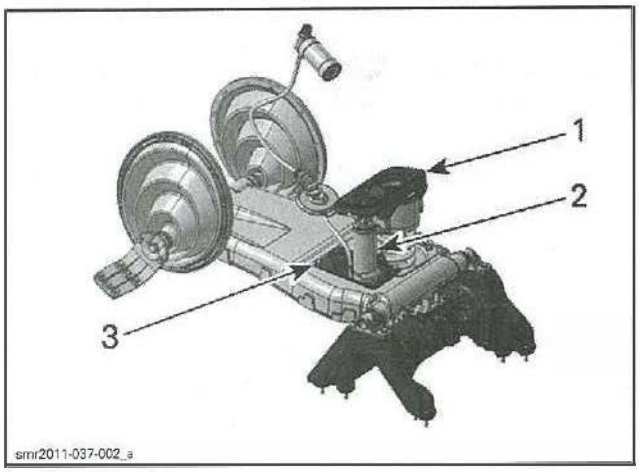
SUSPENSION BOTTOMS HARD

1. **Spring out of specification or broken.**
   - *Replace spring.*
2. **Shock absorber is damaged.**
   - *Check shock absorber resistance. Replace shock absorber.*
3. **Bump stops damaged or worn.**
   - *Replace both bump stops.*

PROCEDURES

SHOCK ABSORBER

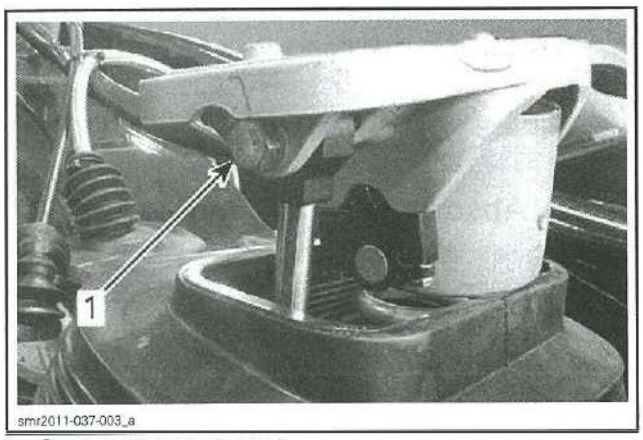
Shock Absorber Location



1. *Mounting plate*
2. *Shock absorber*
3. *Shock holder*

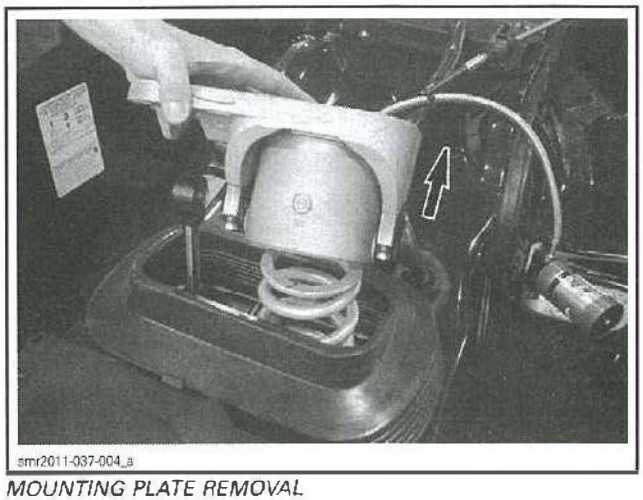
Shock Absorber Removal

1. Remove moving deck. Refer to *BODY* subsection.
2. Remove shock absorber upper bolt.



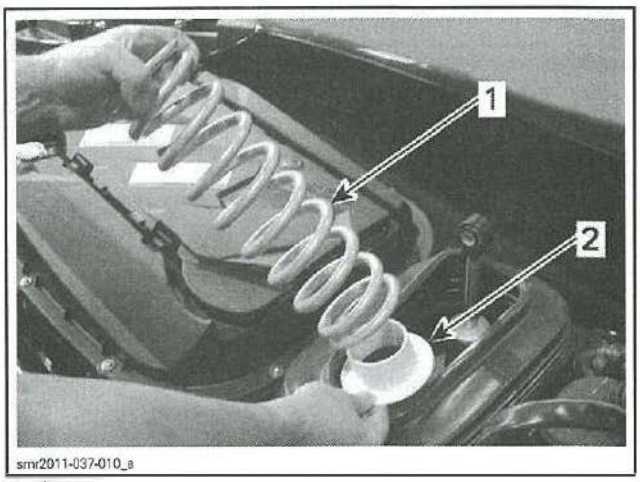
1. *Shock absorber upper bolt*

3. Remove mounting plate by pulling it upwards.



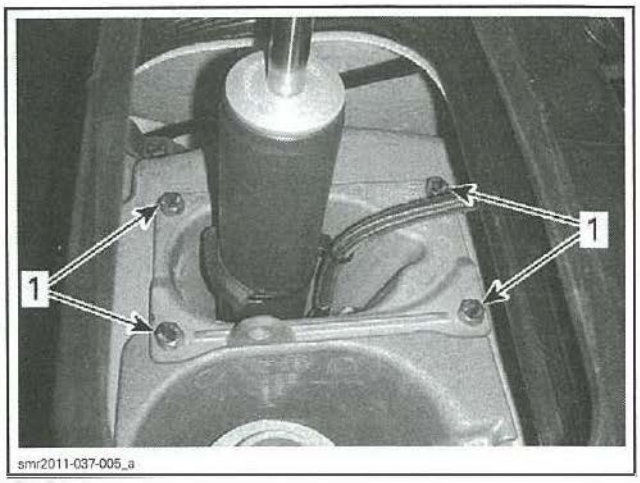
MOUNTING PLATE REMOVAL

4. Remove spring and lower spring bushing.



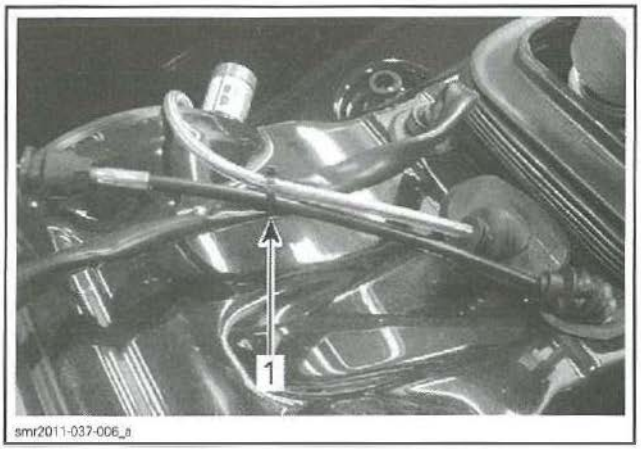
1. *Spring*
2. *Lower spring bushing*

5. Remove shock holder retaining screws.



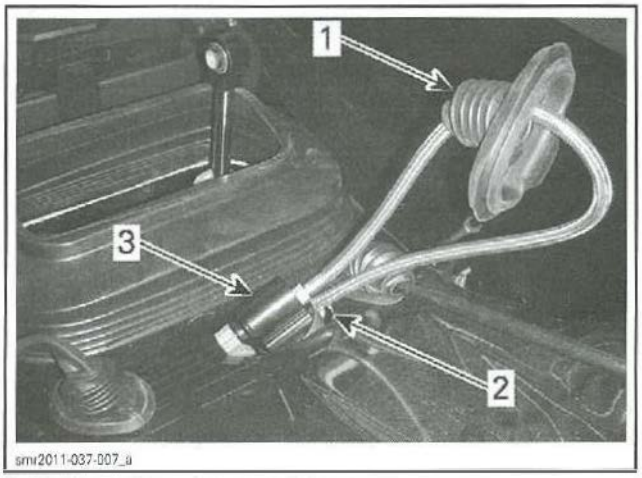
TYPICAL
1. *Shock holder retaining screws*

6. Remove locking tie securing remote reservoir hose.



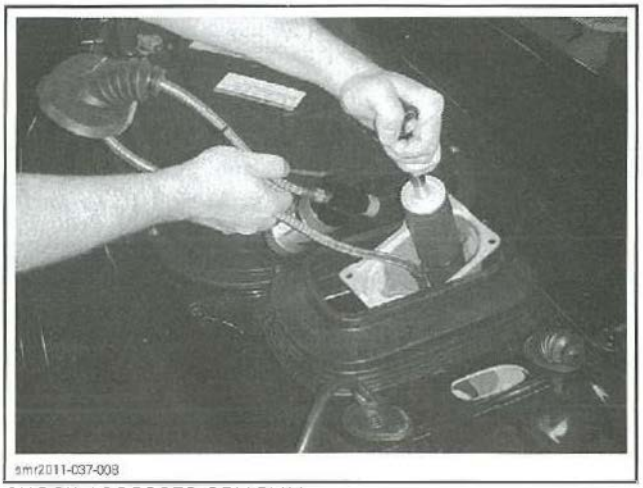
1. Locking tie securing remote reservoir hose

7. Remove bellows of remote reservoir hose from deck.
8. Insert remote reservoir into deck hole.



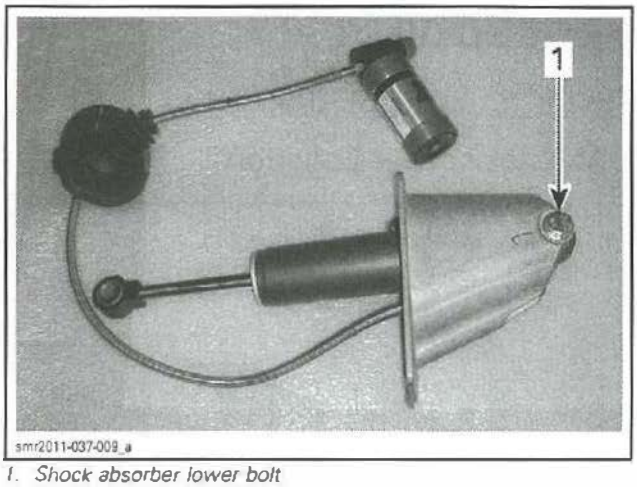
1. Bellows of remote reservoir hose
2. Deck hole
3. Remote reservoir

9. Remove shock absorber and remote reservoir.



SHOCK ABSORBER REMOVAL

10. Remove shock holder from shock absorber.



1. Shock absorber lower bolt

Shock Absorber Inspection

NOTE: Because of gas pressure, strong resistance is felt when compressing shock.

To inspect shock operation, or if suspecting an internal leak between oil chamber and gas chamber, check shock as follows:

1. Grab the shock absorber body firmly and press the rod end against a firm surface.
   - 1.1 Verify the compression stroke when the rod is fully extended.
   - 1.2 Make sure that shock absorber rod can be completely inserted in the shock body.
2. The shock should extend unassisted. Rod must come out at a steady speed.

If any problem is detected, replace the shock absorber.

Shock Absorber Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Secure shock absorber using NEW bolts.

Tighten shock absorber bolts to specification.

TORQUE	
Shock absorber bolt	75 N•m (55 lbf•ft)

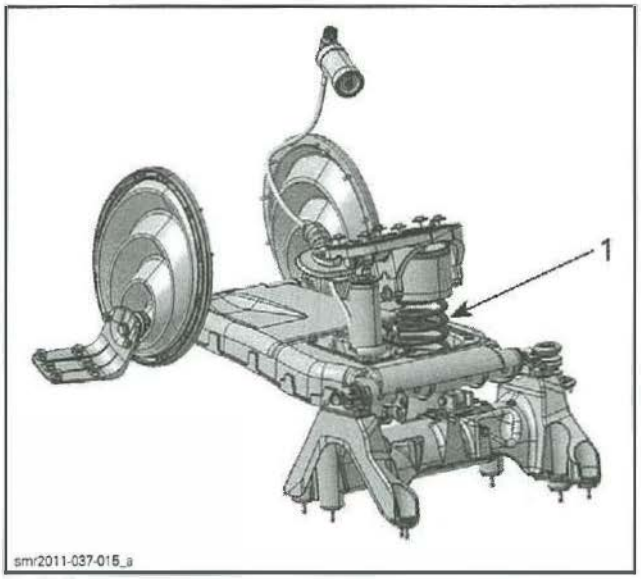
Install NEW shock holder screws.

Tighten shock holder screws to specification.

TORQUE	
Shock holder screw	25 N•m (18 lbf•ft)

SPRING

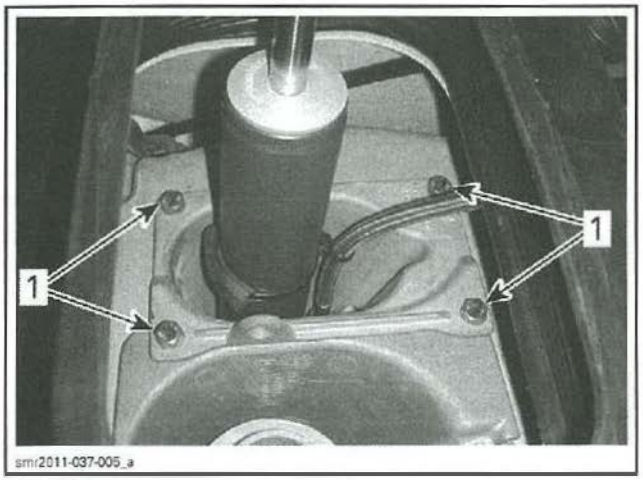
Spring Location



1. Spring

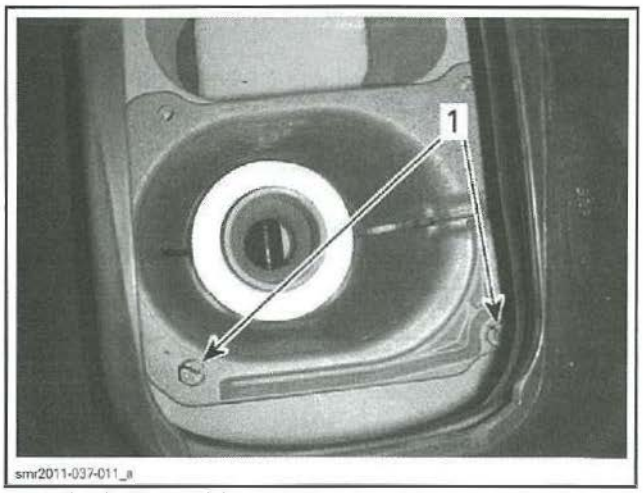
Spring Removal

1. Remove moving deck. Refer to *BODY* subsection.
2. Remove shock holder from its location. Refer to *SHOCK ABSORBER* in this subsection.



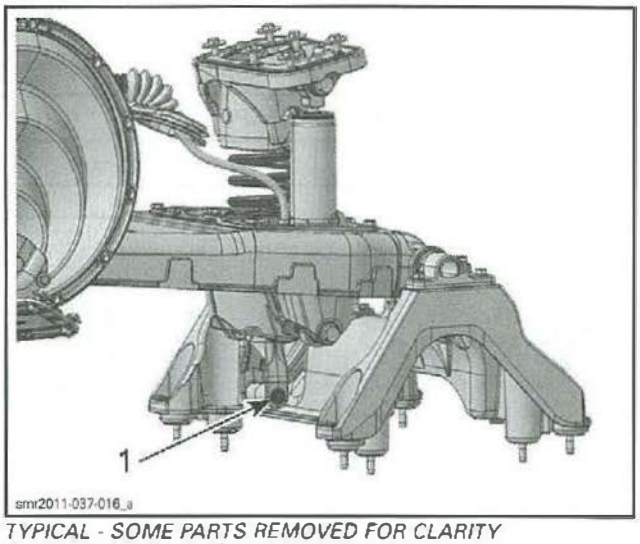
TYPICAL
1. Shock holder retaining screws

3. Move shock holder aside.
4. Remove spring holder retaining screws.



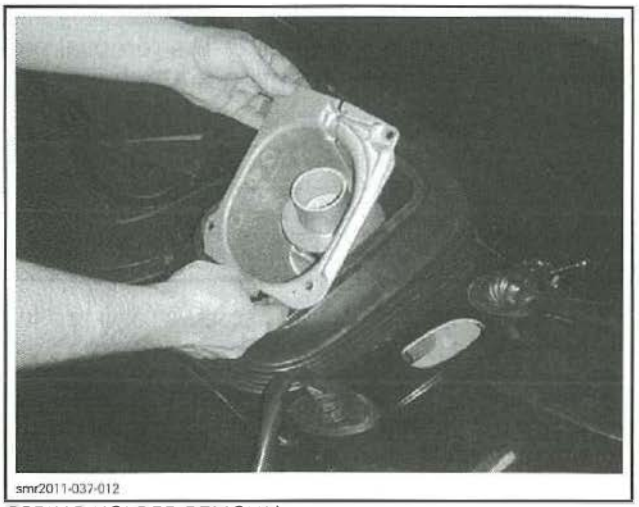
1. Spring holder retaining screws

5. Remove screw securing spring holder to link arm.



TYPICAL - SOME PARTS REMOVED FOR CLARITY
1. Screw securing spring holder to link arm

6. Remove spring holder.



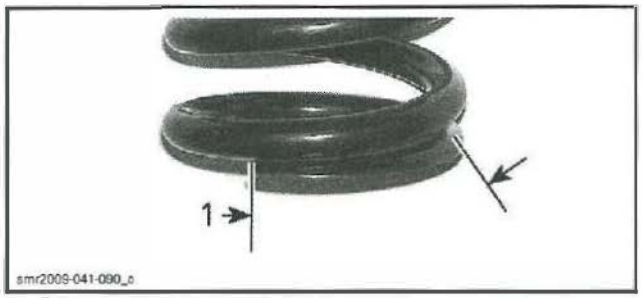
SPRING HOLDER REMOVAL

Spring Inspection

Inspect spring and replace if one of the following damage is detected:

- Crack in the paint
- Rust
- Other visible damages.

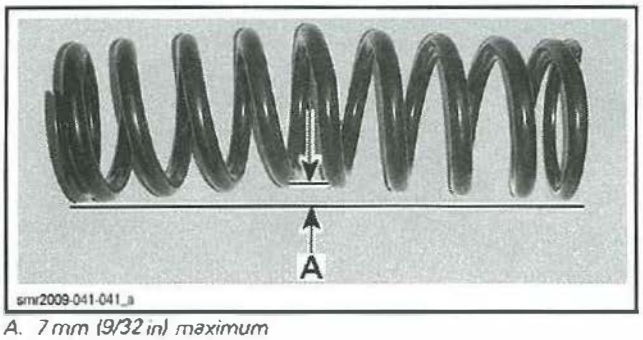
NOTE: If rust is limited to a 1/4 of the first coil, the spring should not be replaced.



1. Zone where presence of rust is normal

Check the curve line of spring.

SPRING SHAPE	
Maximum	7 mm (9/32 in)



A. 7 mm (9/32 in) maximum

Replace spring if out of specification.

Spring Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Secure shock absorber using **NEW** bolts.

Tighten shock absorber bolts to specification.

TORQUE	
Shock absorber bolt	75 N•m (55 lbf•ft)

Install **NEW** shock holder screws and spring holder screws.

Tighten shock and spring holder screws to specification.

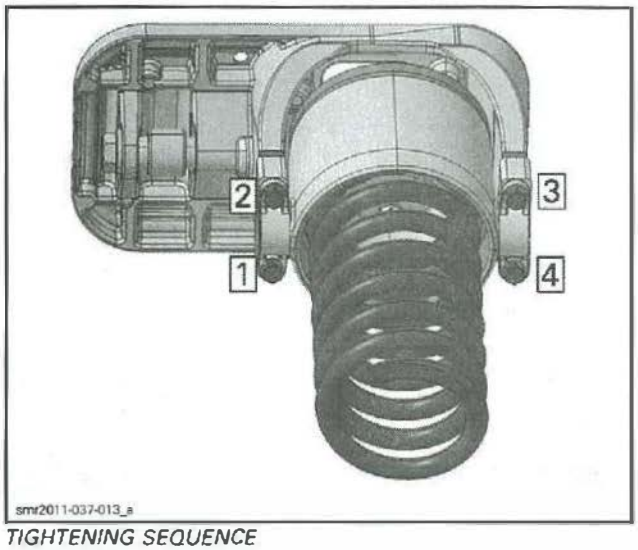
TORQUE	
Shock holder screw	25 N•m (18 lbf•ft)
Spring holder screw	25 N•m (18 lbf•ft)

If spring supports were disassembled, pay attention to the following.

Install **NEW** upper spring support screws.

Tighten upper spring support screws to specification as per the following sequence.

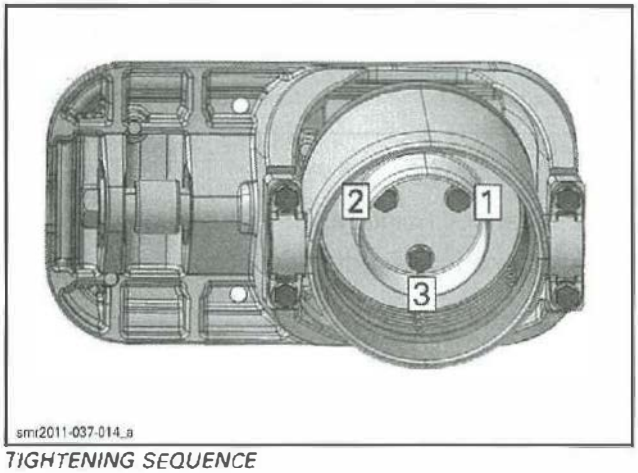
TORQUE	
Upper spring support screw	6 N•m (53 lbf•**in**)



TIGHTENING SEQUENCE

Tighten upper wear ring retaining screws to specification as per the following sequence.

TORQUE	
Upper wear ring retaining screw	6 N•m (53 lbf•**in**)



TIGHTENING SEQUENCE

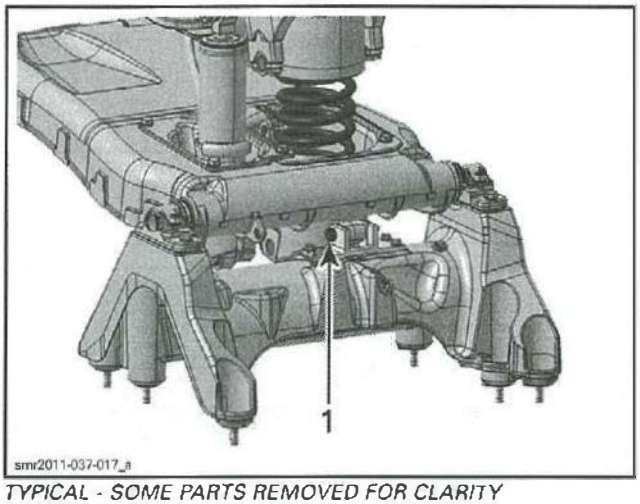
LINK ARM

Link Arm Access

Refer to *BODY* subsection and remove:
- Moving deck
- Deck extension.

Link Arm Removal

1. Remove spring holder. Refer to *SPRING REMOVAL* in this subsection.
2. Remove link arm lower retaining bolt.



TYPICAL - SOME PARTS REMOVED FOR CLARITY
1. Link arm lower retaining bolt

Link Arm Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Secure link arm using NEW bolts.

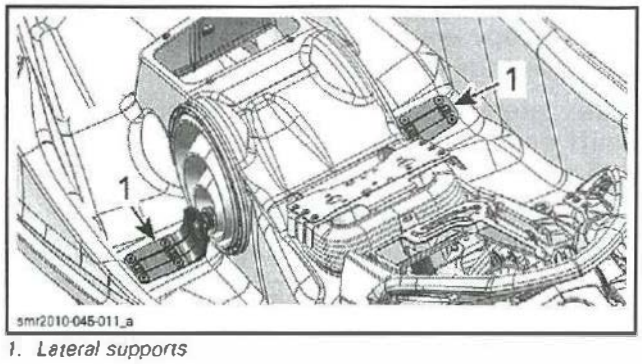
Tighten link arm bolts to specification.

TORQUE	
Link arm bolt	25 N•m (18 lbf•ft)

LATERAL SUPPORT

Lateral Support Location

The lateral supports are located on both side of the fixed deck to support the moving deck.

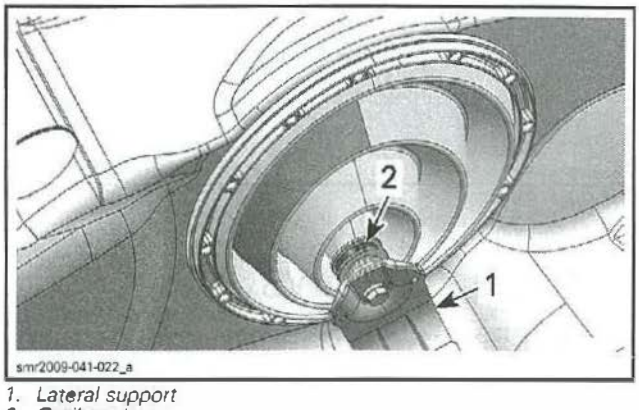


1. Lateral supports

Lateral Support Removal

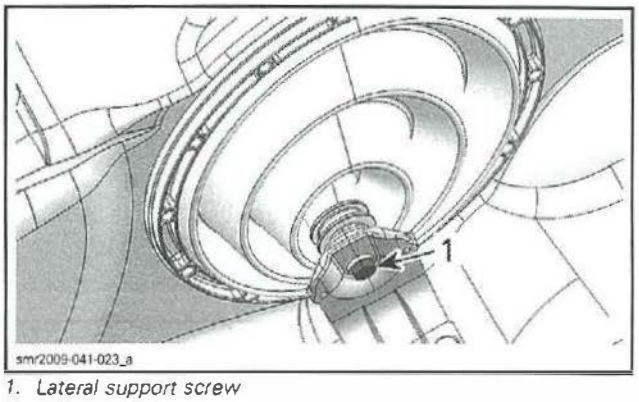
NOTE: The following instruction can be used for RH or LH support.

1. Remove the moving deck. Refer to *BODY* subsection.
2. Cut the Oetiker clamp retaining lateral bellows to lateral support.



1. Lateral support
2. Oetiker clamp

3. Remove the lateral support screw.



1. Lateral support screw

4. Remove lateral support from lateral bellows.

Lateral Support Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Apply soapy water solution on bellows opening and insert the lateral support.

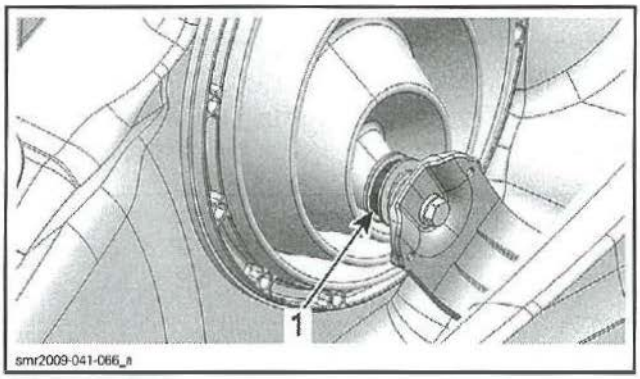
Index lateral supports with the front suspension shaft ends. Lateral supports can be inserted in one position only.

Install new lateral support screw.

Tighten lateral support screw to specification.

TORQUE	
Lateral support screw	48 N•m (35 lbf•ft)

Install a new Oetiker clamp. Position the ear of clamp rearwards.

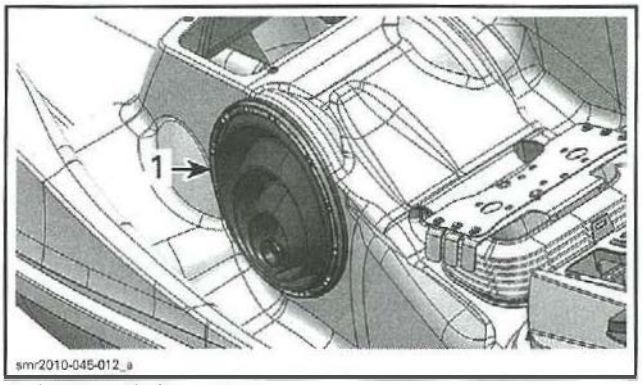


RH SIDE SHOWN
1. Ear of clamp rearwards

LATERAL BELLOWS

Lateral Bellows Location

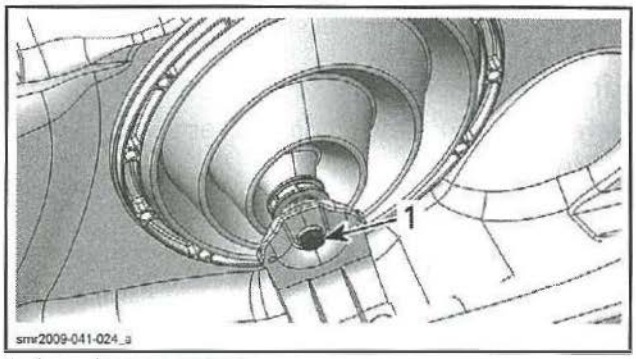
The lateral bellows are located on each side of the fixed deck.



1. LH lateral bellows shown

Lateral Bellows Removal

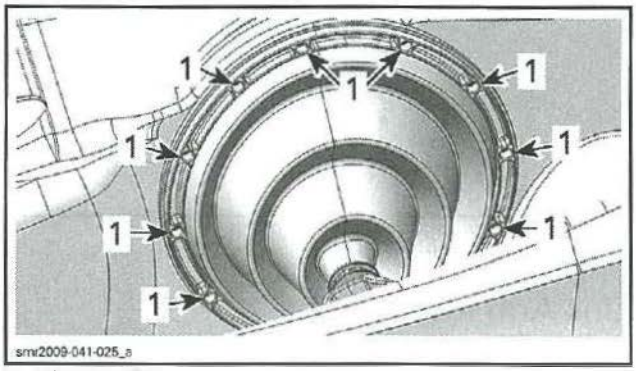
1. Remove lateral support screw.



1. Lateral support screw

2. Detach lateral support from suspension shaft.
3. Using the SUPERTANIUM DRILL BIT 3/16" (P/N 529 031 800), remove all rivets (12) securing the lateral bellows ring to body.





1. Rivet location

4. Remove lateral ring.
5. Cut Oetiker clamp securing bellows to lateral support.
6. Separate lateral support from bellows.

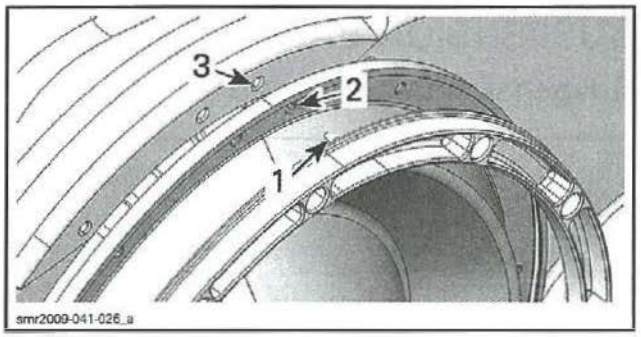
Lateral Bellows Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Apply soapy water solution on bellows opening and insert the lateral support.

Index suspension shaft with the lateral support. The lateral support can be inserted in one position only.

Install the retaining ring. Align the ring pin with holes in bellows and body.



1. Ring pin
2. Bellows alignment hole
3. Body hole

Install new rivets. If the head of rivet tool cannot be inserted in ring opening, use the sleeve (P/N 707 000 181) to offset the rivet tool and well lean the rivet head against ring.

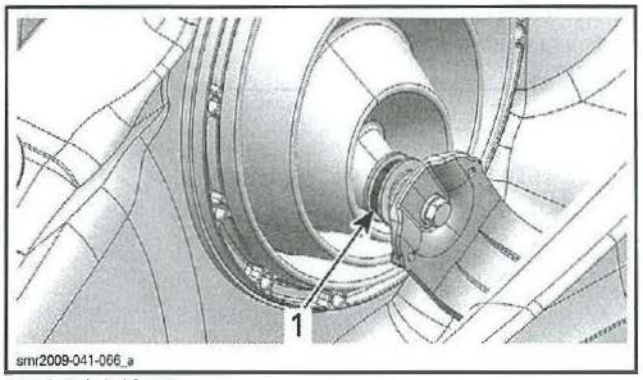
Index lateral supports with the front suspension shaft ends. Lateral supports can be inserted in one position only.

Install new lateral support screw.

Tighten lateral support screw to specification.

TORQUE	
Lateral support screw	48 N•m (35 lbf•ft)

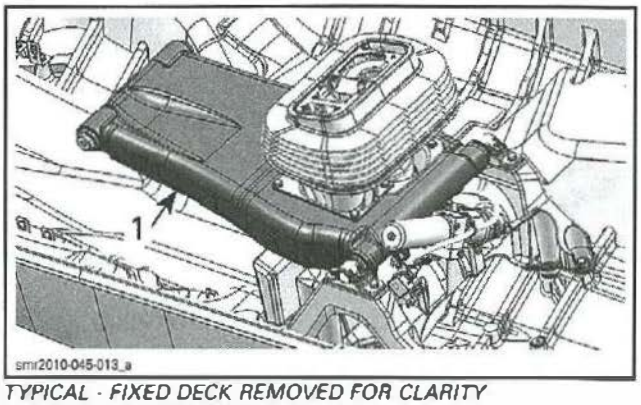
Install a new Oetiker clamp. Position the ear of clamp rearwards.



RH SIDE SHOWN
1. Ear of clamp rearwards

FRONT SUSPENSION ARM

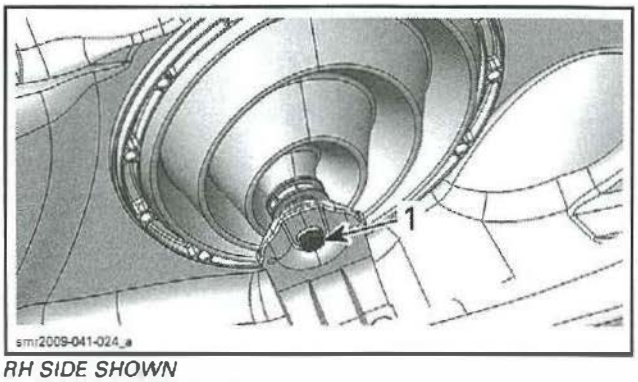
Front Suspension Arm Location



TYPICAL - FIXED DECK REMOVED FOR CLARITY
1. Front suspension arm

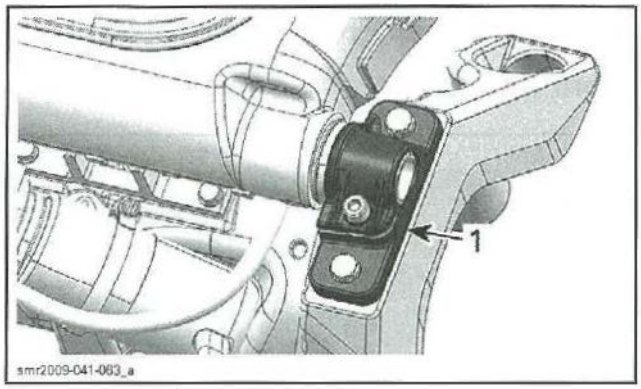
Front Suspension Arm Removal

1. Remove the moving deck. Refer to *BODY* subsection.
2. Remove the engine. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
3. Remove both lateral support screws.



RH SIDE SHOWN
1. Lateral support screw

4. Detach lateral supports from suspension arm shaft.
5. Remove screws securing both shaft supports to suspension base.



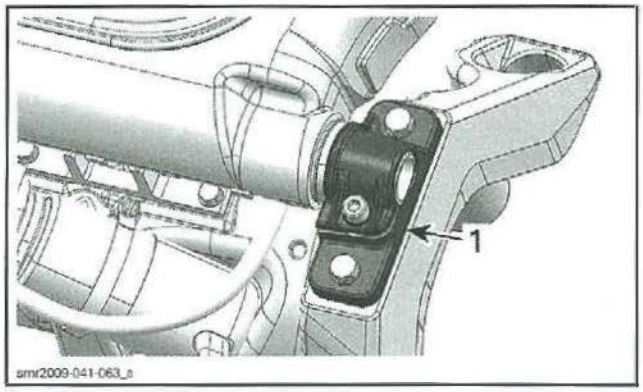
1. Shaft support (one on each side)

6. Move front suspension arm rearward to remove it.

Front Suspension Arm Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

If a shaft support has been loosened from the suspension arm shaft, see *SUSPENSION ARM SHAFTS* for proper installation procedure.



1. Shaft support (one on each side)

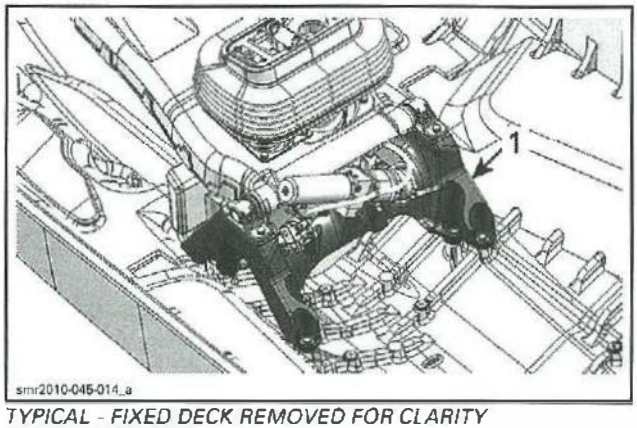
Install **NEW** shaft support screws.

Tighten shaft support screws to specification.

TORQUE	
Shaft support screws	25 N•m (18 lbf•ft)

SUSPENSION BASE

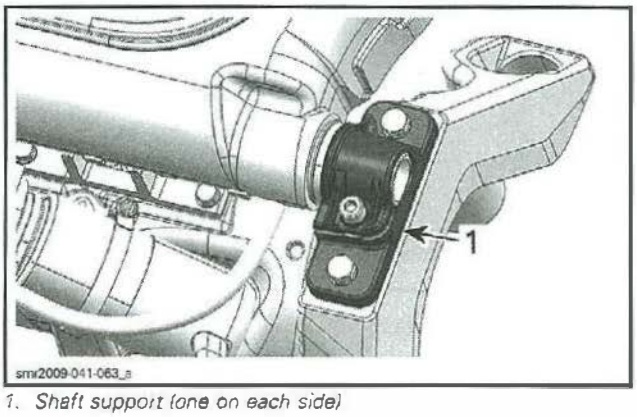
Suspension Base Location



TYPICAL - FIXED DECK REMOVED FOR CLARITY
1. Suspension base

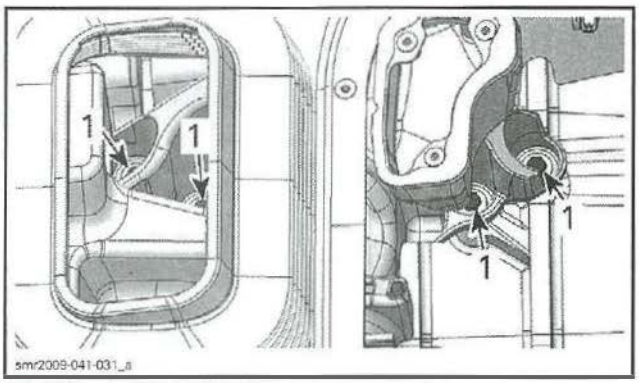
Suspension Base Removal

1. Refer to the appropriate procedures and remove the following parts:
   - Moving deck
   - Engine
   - Shock absorber and spring.
2. Using a marker, trace the shape of suspension base at the bottom of the hull to reposition it at the same place.
3. Remove screws securing both shaft supports to suspension base.

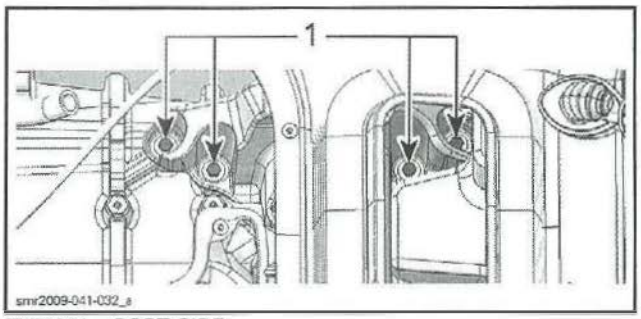


1. Shaft support (one on each side)

4. Remove and discard suspension base screws.

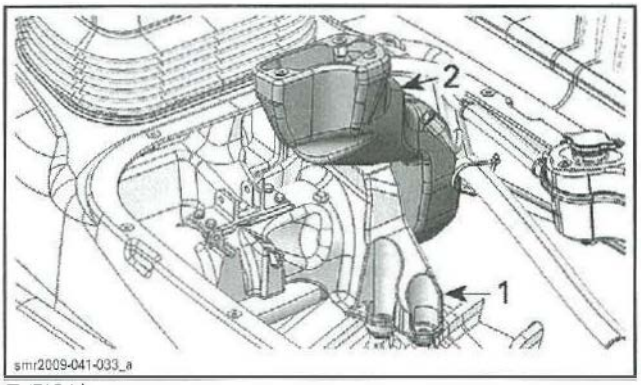


TYPICAL - STARBOARD SIDE
1. Suspension base screws



TYPICAL - PORT SIDE
1. Suspension base screws

5. Remove suspension base with the rear vent duct.



TYPICAL
1. Suspension base
2. Rear vent duct

Suspension Base Installation

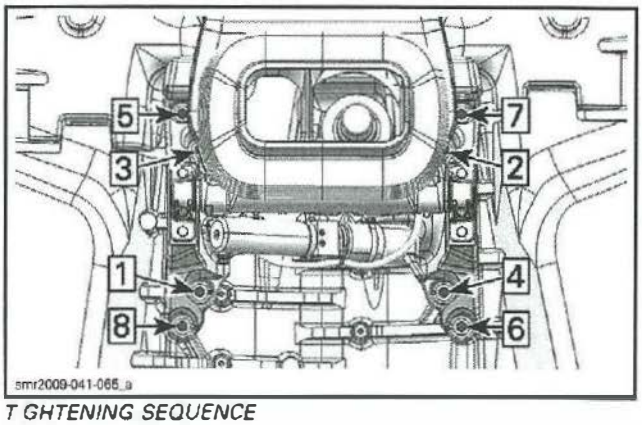
The installation is the reverse of the removal procedure. However, pay attention to the following.

1. Install the suspension base.
   1.1 Position the base in accordance with the reference marks previously drawn at the bottom of the hull.

   NOTE: If no marks are available, see *SUSPENSION BASE INSTALLATION WITHOUT REFERENCE MARKS*.

   1.2 Install NEW suspension base screws.
   1.3 Tighten suspension base screws to specification as per the following sequence.

TORQUE	
Suspension base screws	25 N•m (18 lbf•ft)



T GHTENING SEQUENCE

2. Install NEW shaft support screws to secure front suspension arm.
3. Tighten shaft support screws to specification.

TORQUE	
Shaft support screws	25 N•m (18 lbf•ft)

4. Refer to the appropriate procedures and install all other removed parts.
   - Shock absorber and spring
   - Engine
   - Moving deck.

Suspension Base Installation without Reference Marks

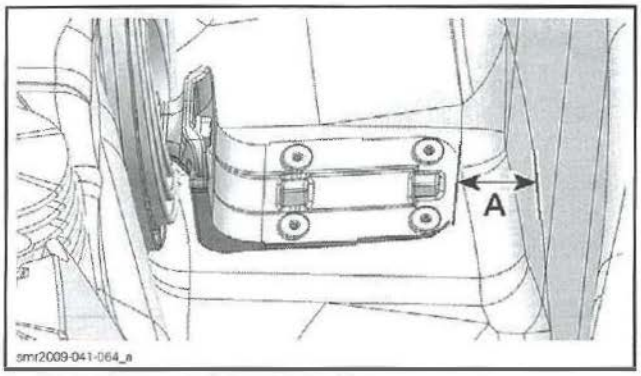
1. Install the suspension base on watercraft using NEW screws. Do not tighten them yet.
2. Install NEW shaft support screws to secure front suspension arm.
3. Tighten shaft support screws to specification.

TORQUE	
Shaft support screws	25 N•m (18 lbf•ft)

4. Install lateral supports.
   4.1 Index lateral supports with the front suspension shaft ends. Lateral supports can be inserted in one position only.
   4.2 Tighten lateral support screws to specification.

TORQUE	
Lateral support screws	48 N•m (35 lbf•ft)

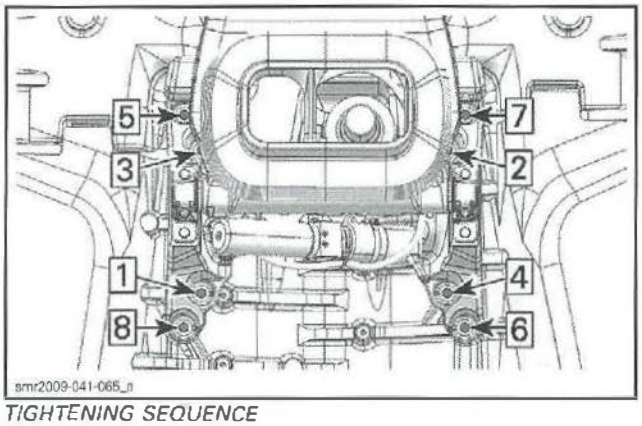
5. Align suspension base on watercraft.
   5.1 On both sides, measure the distance between the end of lateral support and fixed deck.



A. Same distance on LH and RH sides

   5.2 If required, move suspension base until both distances are equal.
   5.3 Tighten suspension base screws to specification as per the following sequence.

TORQUE	
Suspension base screws	25 N•m (18 lbf•ft)

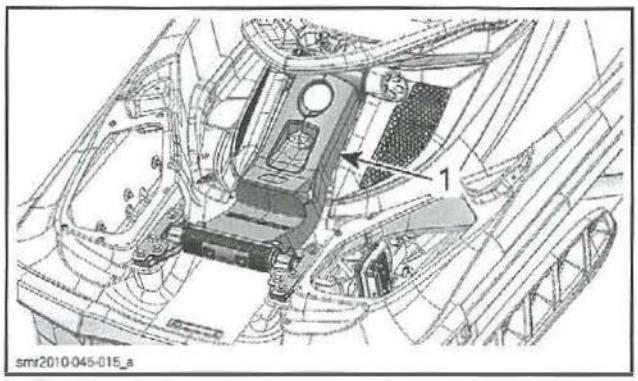


TIGHTENING SEQUENCE

6. Refer to the appropriate procedures and install all other removed parts.
   - Shock absorber and spring
   - Engine
   - Moving deck.

REAR SUSPENSION ARM

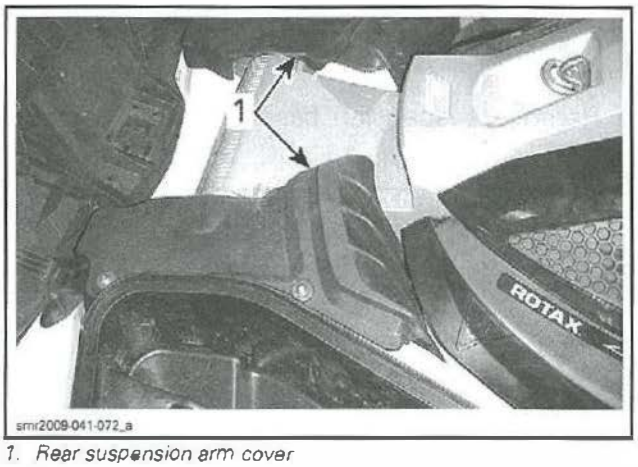
Rear Suspension Arm Location



1. Rear suspension arm

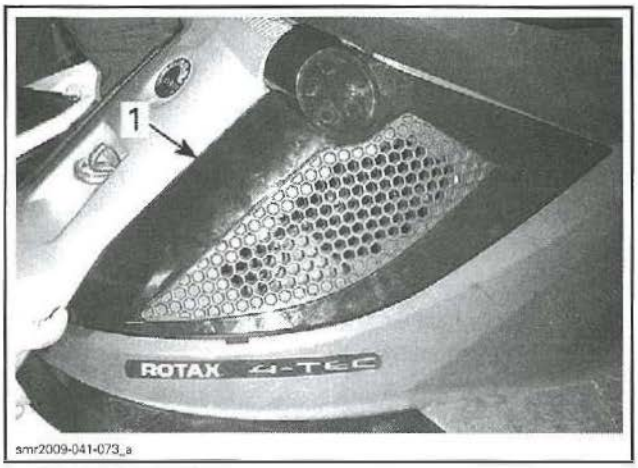
Rear Suspension Arm Removal

1. Open the boarding platform.
2. Remove bolts securing both rear suspension arm covers.



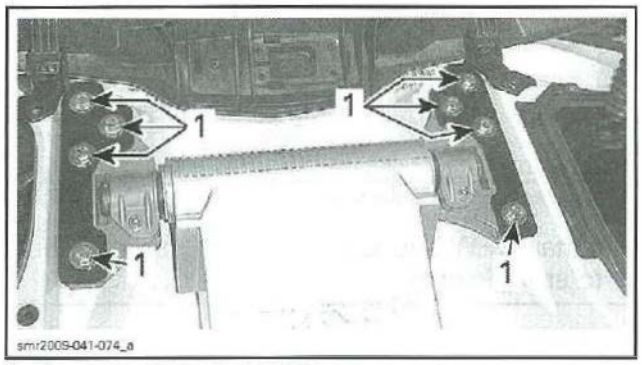
1. Rear suspension arm cover

3. Unclip and remove both lateral rear panels.



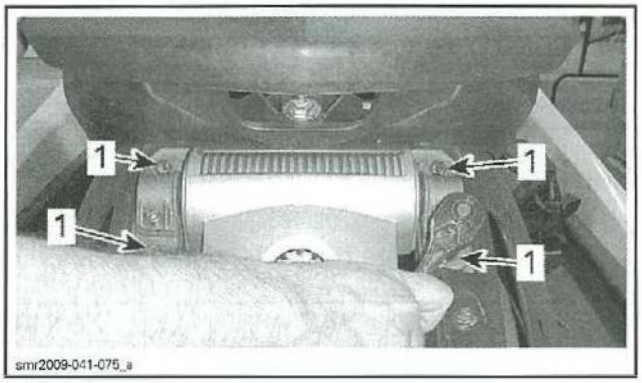
1. RH lateral rear panel

4. Mark position of rear suspension arm brackets for proper reinstallation.
5. Remove and discard screws securing rear suspension arm to fixed deck.



1. Rear suspension arm screws

6. Remove and discard screws securing the top of rear suspension arm.



1. Retaining screws

7. Remove the rear suspension arm from watercraft.

Rear Suspension Arm Installation

1. Using **NEW** screws, install the top of rear suspension arm.

NOTE: If the upper arm shaft or one of its arm shaft support has been removed or loosened, refer to *SUSPENSION ARM SHAFTS* for proper installation procedure.

2. Tighten upper arm support screws to specification.

TORQUE	
Upper arm support screws	25 N•m (18 lbf•ft)

3. Carefully lower and secure the rear suspension arm to the fixed deck.
   3.1 Position the rear suspension arm brackets in accordance with the reference marks previously draw on fixed deck.

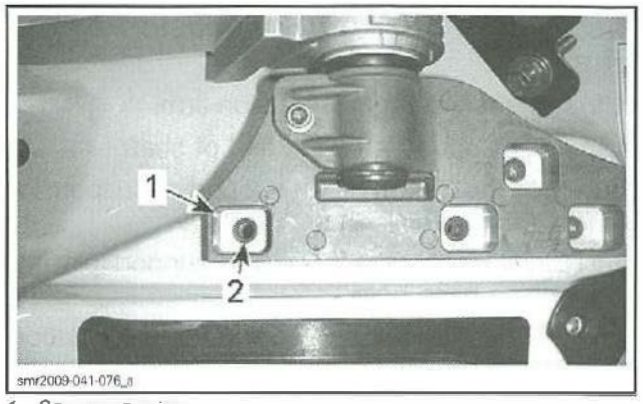
   NOTICE If no mark was traced, refer to *REAR SUSPENSION ARM INSTALLATION WITHOUT REFERENCE MARKS* for proper procedure to install and align the rear suspension arm.

   3.2 Install **NEW** screws to secure rear suspension arm brackets.
   3.3 Tighten rear suspension arm screws to specification.

TORQUE	
Rear suspension arm screws	25 N•m (18 lbf•ft)

Rear Suspension Arm Installation Without Reference Marks

1. Lower the rear suspension arm on fixed deck.
2. Position the square openings of rear suspension arm brackets so that the threaded inserts in fixed deck are centered.



1. Square opening
2. Threaded insert

3. On each bracket, install the retaining plate and one screw.
4. Install a weight of 90 kg (200 lb) on vehicle to lower the moving deck.
5. Check moving deck position in comparison to fixed deck.
   5.1 Check the gap between moving deck wipers and fixed deck. It should be the same on both sides.
   5.2 Check front and rear gaps. Moving deck should be able to move without having contact with the fixed deck.

5.3 Reposition rear suspension arm brackets on fixed deck until positioning of moving deck is satisfactory.

6. Secure the rear suspension arm to the fixed deck.
   6.1 Install NEW screws to secure rear suspension arm brackets.
   6.2 Remove and replace screws installed during alignment.
   6.3 Tighten rear suspension arm screws to specification.

TORQUE	
Rear suspension arm screws	25 N•m (18 lbf•ft)

SUSPENSION ARM SHAFTS

Removal of Front Suspension Arm Shaft

1. Remove the *FRONT SUSPENSION ARM*, see procedure in this subsection.
2. Remove and discard socket screws securing supports to shaft.
3. Separate arm shaft supports from arm shaft.

Installation of Front Suspension Arm Shaft

1. Insert shaft in the suspension arm.
2. Install a support on each end of shaft.
3. Secure the LH arm shaft support to suspension base using NEW support screws.

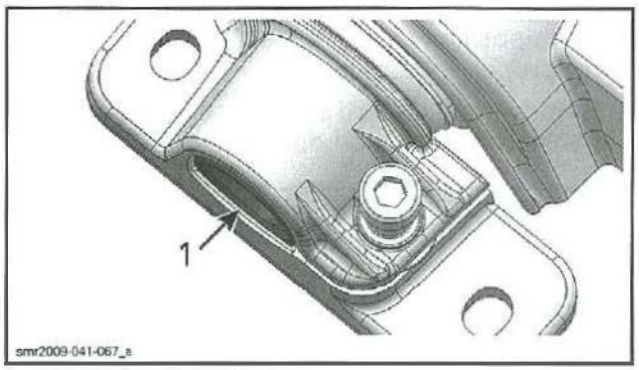
NOTE: Make sure to insert the support pin into suspension base hole.

4. Tighten the LH support screws to specification.

TORQUE	
Shaft support screws	25 N•m (18 lbf•ft)

5. Apply a force on the RH support to move it on the left side.

NOTICE Make sure arm shaft is fully inserted, it must lean against the arm shaft support.



1. Arm shaft against its support

6. Install NEW support screws and tighten them to specification.

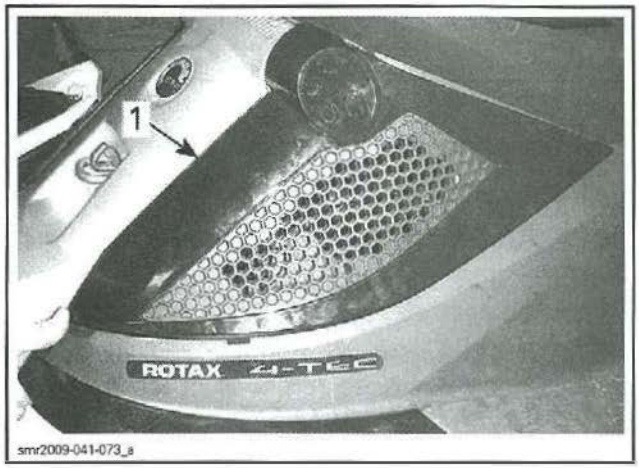
TORQUE	
Shaft support screws	25 N•m (18 lbf•ft)

7. Secure both supports to shaft using NEW socket screws.
8. Tighten shaft screws to specification.

TORQUE	
Shaft screws	12 N•m (106 lbf•in)

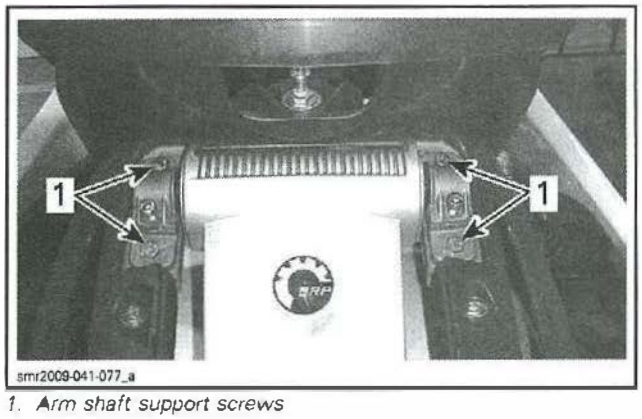
Removal of Rear Suspension Arm Upper Shaft

1. Unclip and remove both lateral rear panels.



1. RH lateral rear panel

2. Remove arm shaft support screws.



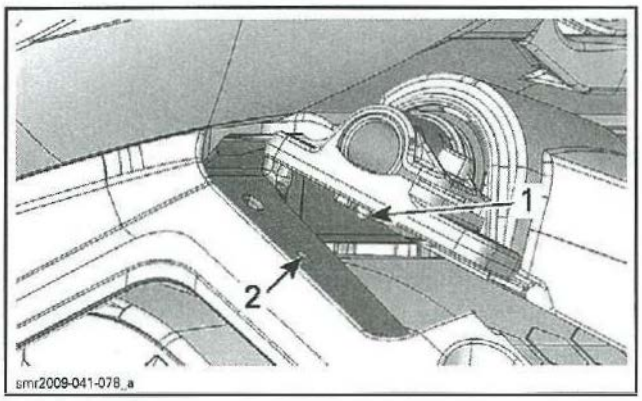
1. Arm shaft support screws

3. Remove and discard socket screws securing supports to arm shaft.
4. Separate arm shaft support from arm shaft.

Installation of Rear Suspension Arm Upper Shaft

1. Insert shaft in the rear arm.
2. Install a support on each end of shaft.
3. Secure the LH support to rear arm holder using NEW support screws.

NOTE: Make sure to insert the support pin into holder hole.



1. Support pin
2. Holder hole

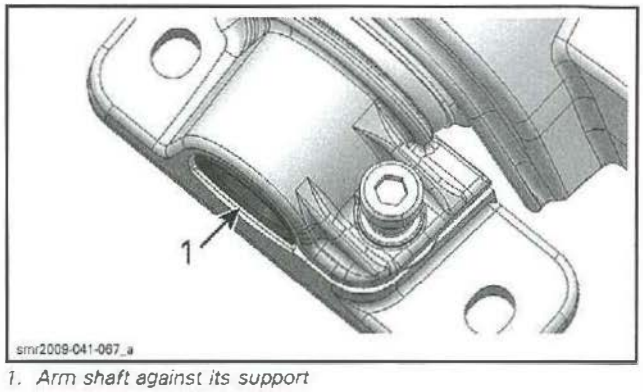
4. Tighten the LH support screws to specification.

TORQUE	
Upper arm support screws	25 N•m (18 lbf•ft)

5. Apply a force on the RH support to move it to the left side.

NOTE: A bar clamp can be used to compress both supports together.

NOTICE Make sure arm shaft is fully inserted, it must flush against the arm shaft support.



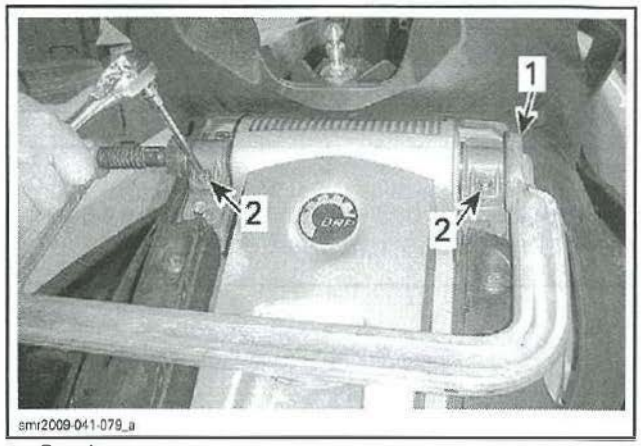
1. Arm shaft against its support

6. Install NEW support screws and tighten them to specification.

TORQUE	
Upper arm support screws	25 N•m (18 lbf•ft)

7. Secure both supports to shaft using NEW socket screws.
8. Tighten upper shaft screws to specification.

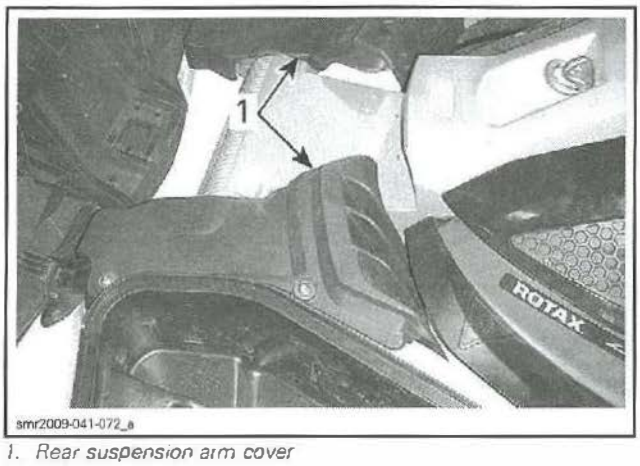
TORQUE	
Upper shaft screws	12 N•m (106 lbf•in)



1. Bar clamp
2. New socket screws

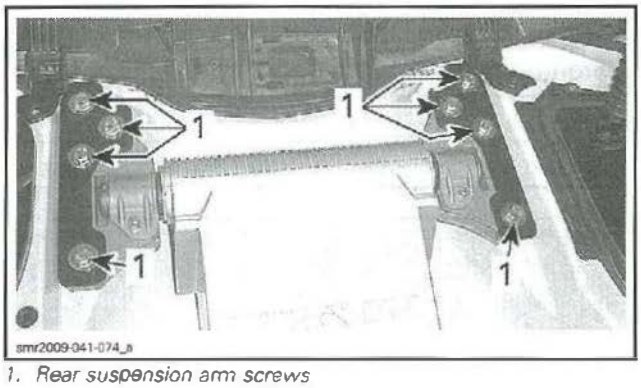
Removal of Rear Suspension Arm Lower Shaft

1. Open the boarding platform.
2. Remove bolts securing both rear suspension arm covers.



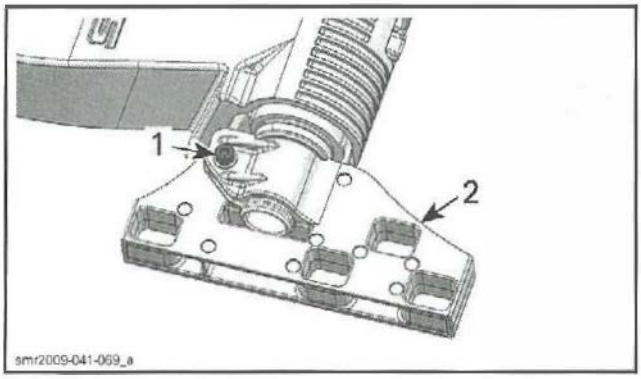
1. Rear suspension arm cover

3. Mark position of rear suspension arm brackets for proper reinstallation.
4. Remove and discard screws securing rear suspension arm to fixed deck.



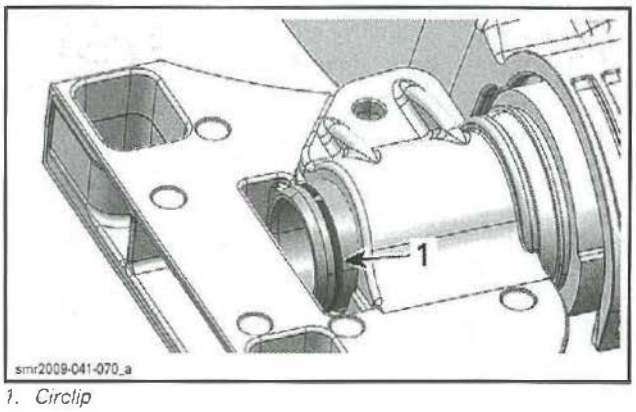
1. Rear suspension arm screws

5. Remove and discard socket screws securing rear brackets to arm shaft ends.



1. Socket screw
2. LH rear bracket

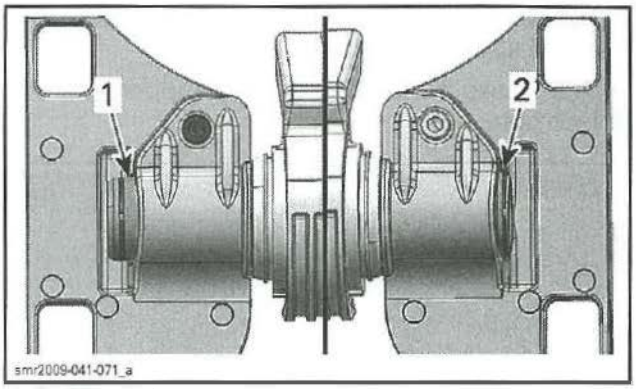
6. Press one rear bracket against the suspension arm bushing and remove the circlip. Repeat for the other side.



1. Circlip

Installation of Rear Suspension Arm Lower Shaft

1. When reassembly the rear bracket on shaft end, press bracket on bushing to install the circlip.
2. When both brackets are installed on shaft, pull brackets outside to position circlips against brackets.



1. Bad installation
2. Good installation

3. Lower the rear suspension arm on fixed deck.
4. Tighten NEW socket screws to specification.

TORQUE	
Lower shaft screws	10 N•m (89 lbf•in)

5. Refer to *REAR ARM* for reinstallation.

SUSPENSION (iS)

SERVICE TOOLS

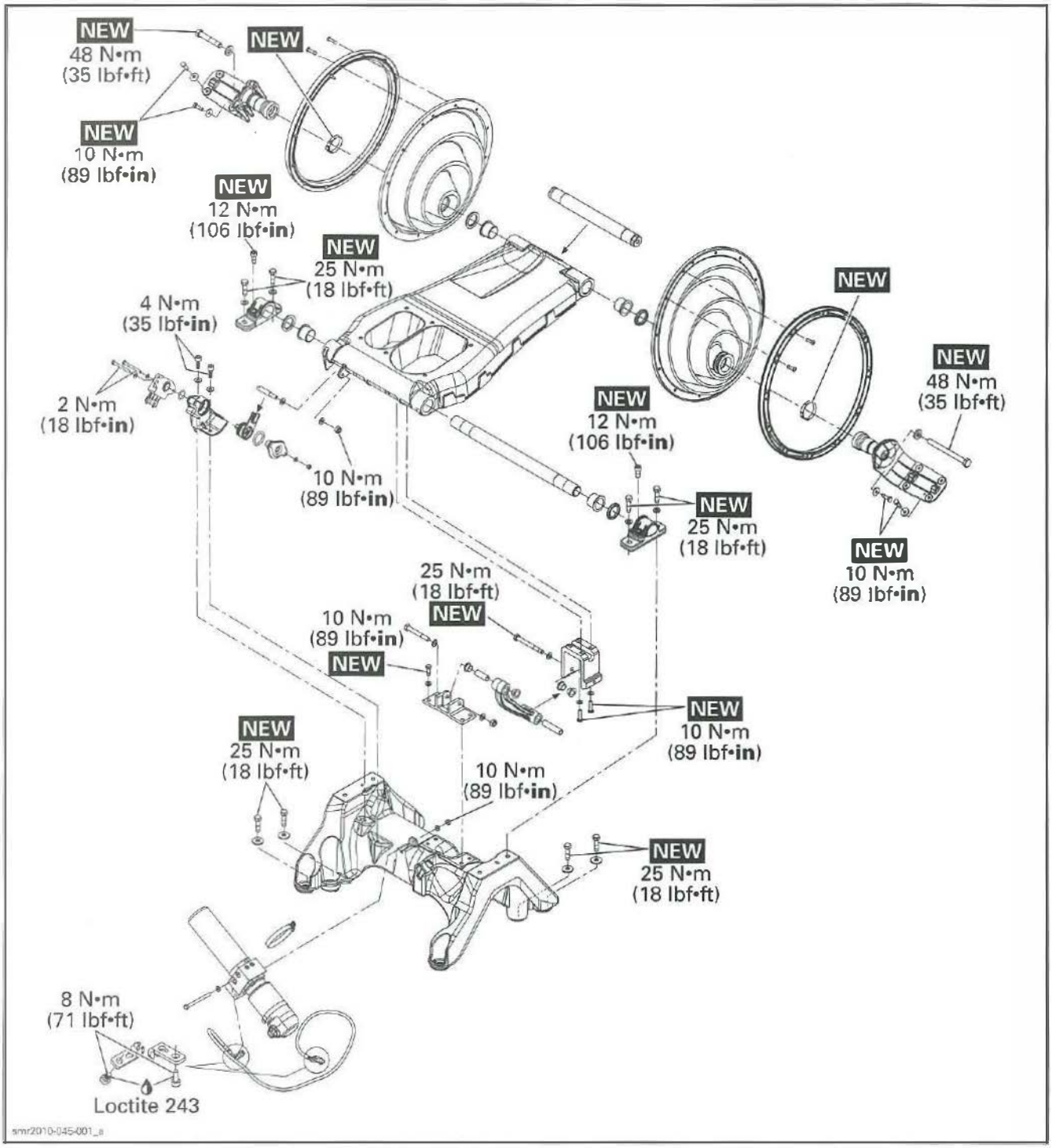
Description	Part Number	Page
FLUKE 115 MULTIMETER	529 035 868	582–585, 587
MAGNETO HARNESS 6 PINS	295 000 136	582
SUPERTANIUM DRILL BIT 3/16"	529 031 800	594

SERVICE PRODUCTS

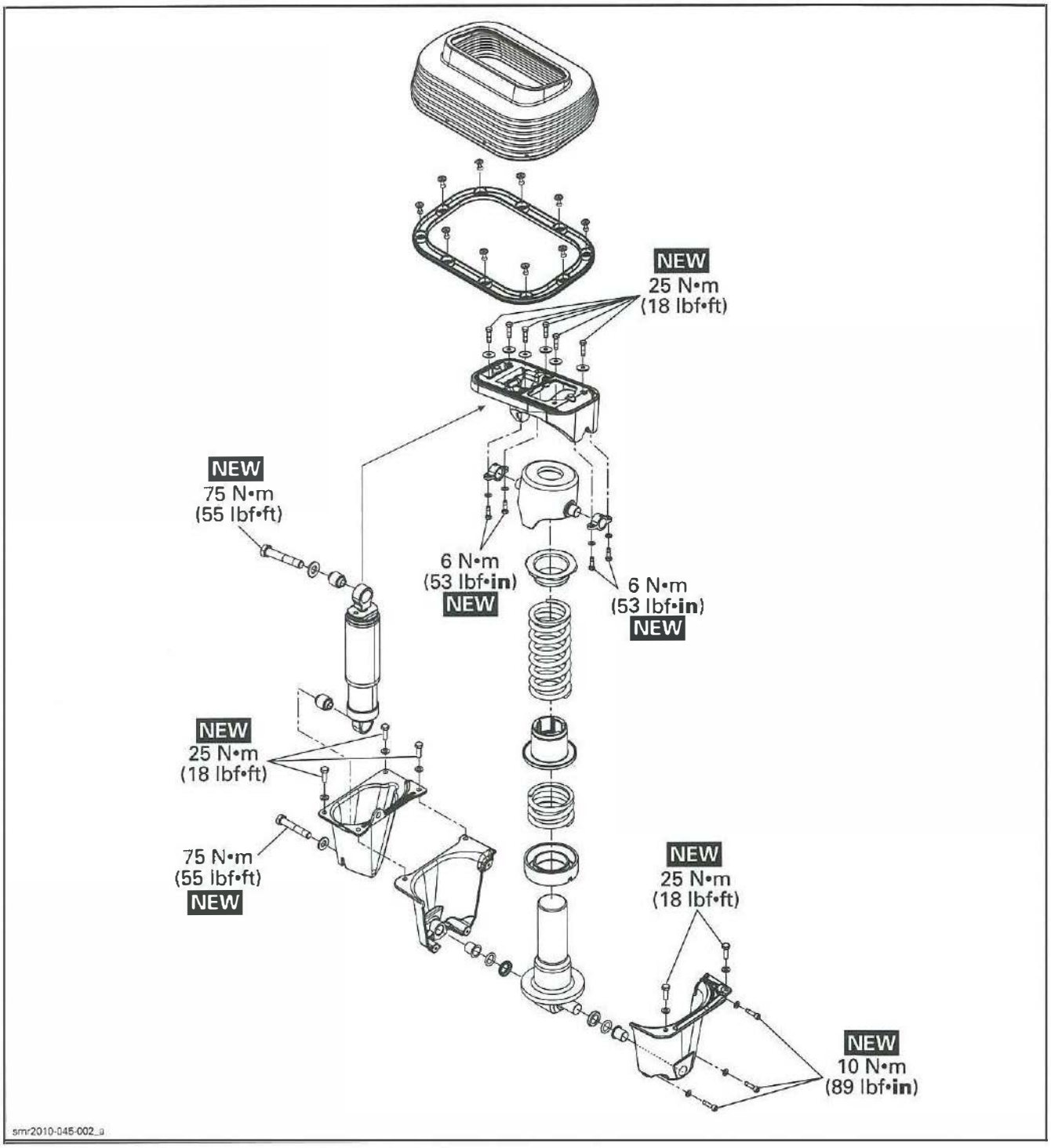
Description	Part Number	Page
DIELECTRIC GREASE	293 550 004	576
LOCTITE 243 (BLUE)	293 800 060	591, 593

green-manuals

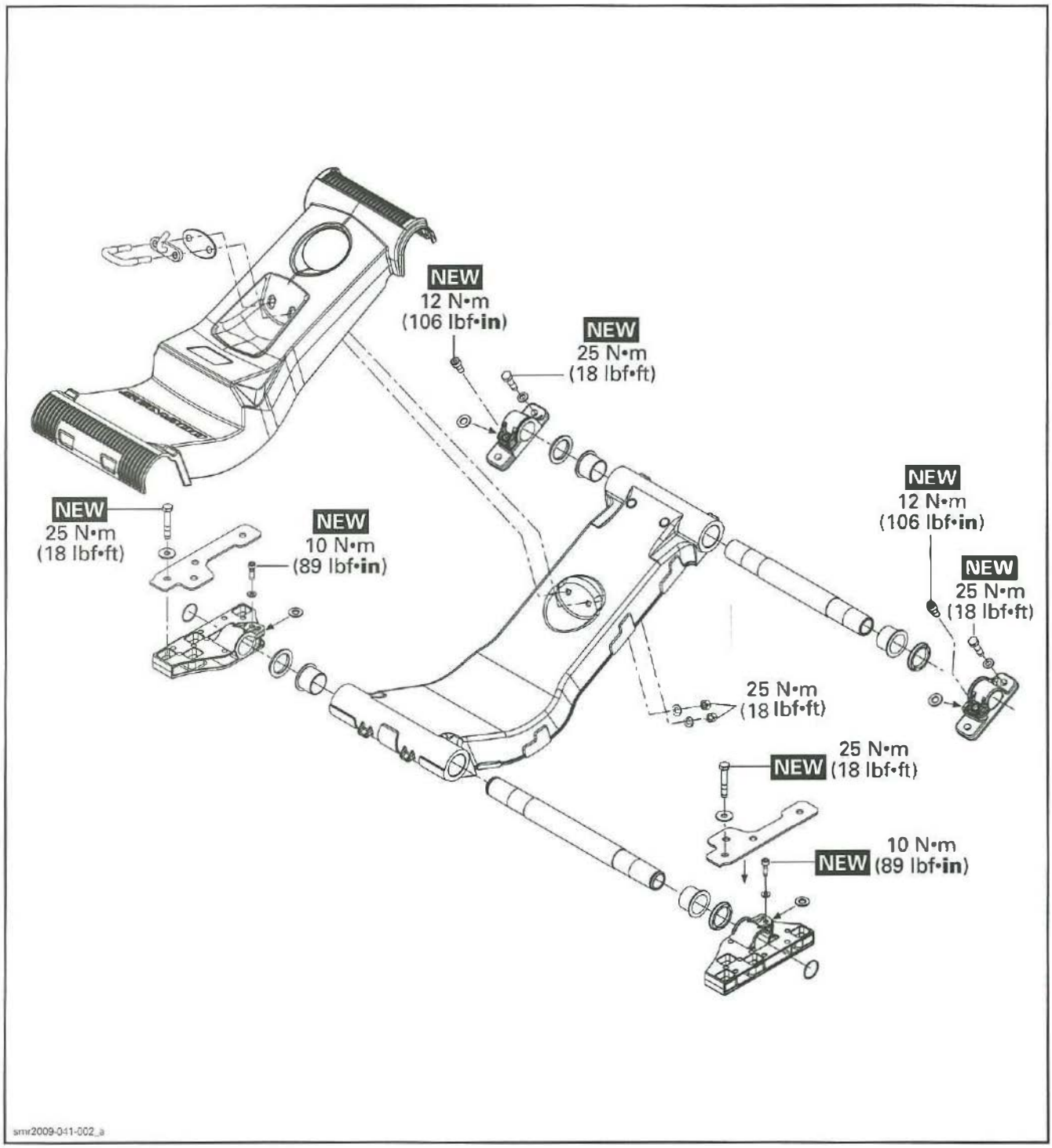
FRONT SUSPENSION ARM AND HYDRAULIC PUMP



ACTUATOR AND SHOCK ABSORBER



REAR SUSPENSION ARM



GENERAL

NOTE: For a complete overview of the electrical system, refer to *POWER DISTRIBUTION AND GROUNDS* subsection.

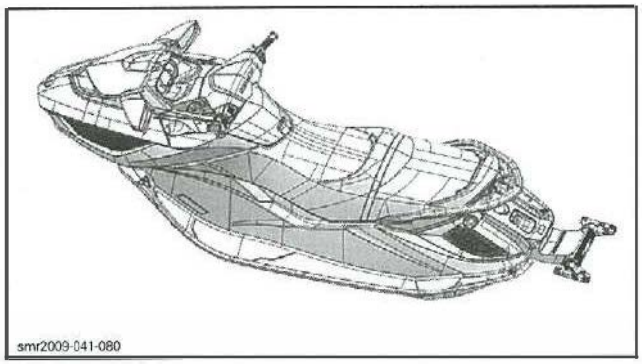
It is highly recommended to disconnect the battery when replacing any electric or electronic component.

⚠ WARNING

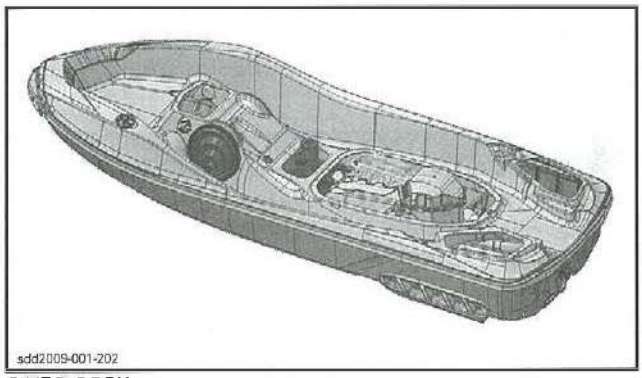
Always disconnect battery exactly in the specified order, BLACK (-) cable first, RED (+) cable last. Always reconnect BLACK (-) cable last. Do not place tools on battery.

SYSTEM DESCRIPTION (COMPONENTS)

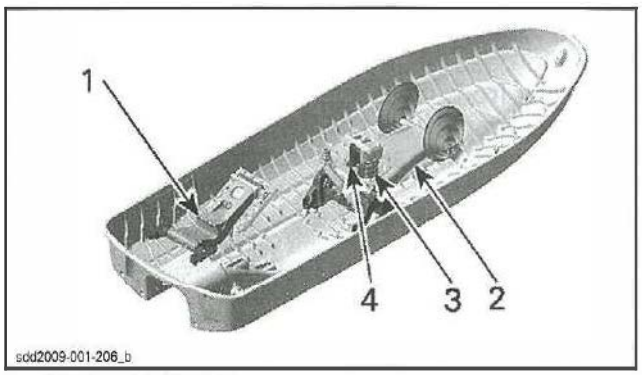
The intelligent suspension is a mechanical system composed of two springs and one shock absorber installed in the fixed deck which connects to the moving deck to isolate the riders from the rough water.



MOVING DECK

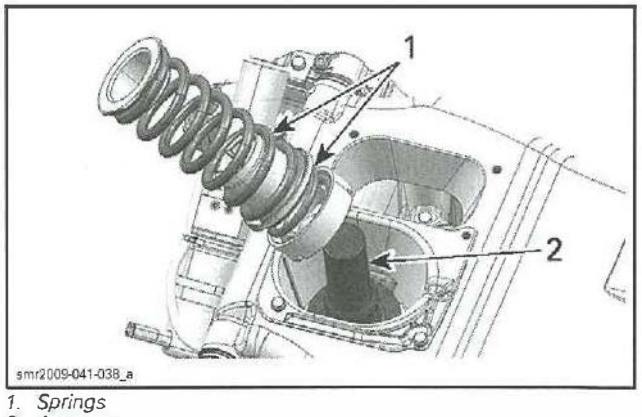


FIXED DECK



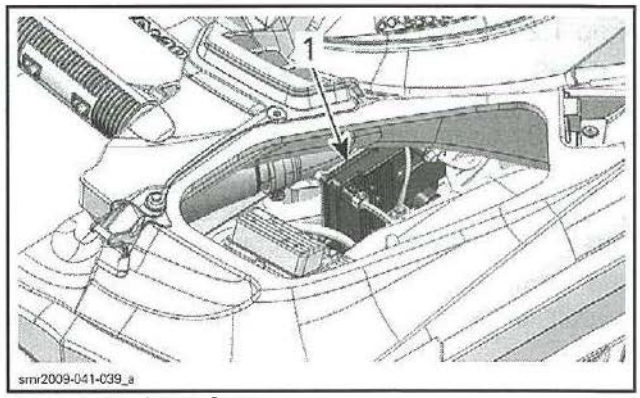
1. *Rear suspension arm*
2. *Front suspension arm*
3. *Springs*
4. *Shock absorber*

An actuator is mounted underneath the springs to control the spring preload and therefore the suspension height.



1. *Springs*
2. *Actuator*

The iS module controls the electric motor of the hydraulic pump to adjust the actuator height. It also sets the suspension height according to the active mode of operation and input signals.



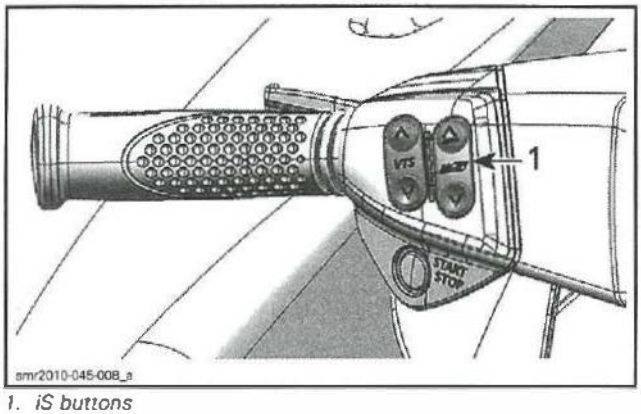
REAR STARBOARD SIDE
1. *iS module*

iS Module

The iS module communicates via CAN protocol with the multifunction gauge.

The iS module receives information from the multifunction gauge and a comparison is made with the input from the suspension position sensor. If the suspension is not in the proper position, the iS module will send an output signal to the hydraulic pump to either raise or lower the suspension to pre-programmed positions.

iS Button



1. iS buttons

The iS button contain a series of 4 diodes for the UP and DOWN arrow switches.

The center wire to the switches (pin C), is common for iS button and VTS button. The other two wires (pins A and B), act as signal wires for each set of switches to the gauge.

Each diode (in circuit) drops a nominal 0.6 Vdc when conducting electricity. If the circuit current passes through all four diodes (if the iS switch is open), a drop of 2.4 Vdc would be measured across the 4 diodes (pin B to pin C). This 2.4 Vdc at pin B tells the gauge the iS switch is open.

If the iS UP switch is pressed, 2 diodes are bypassed. The remaining two diodes in the circuit drop 1.2 Vdc (at pin B).

If the iS DOWN switch is pressed, 1 diode is bypassed. The remaining three diodes in the circuit drop 1.8 Vdc (at pin B).

The gauge senses these voltages through pin 14 of its connector, and interprets them as signals that tell it which switch is activated.

The command generated by the closure of a switch is transmitted to the iS module through CAN .

Suspension Position Sensor

The suspension position sensor is a potentiometer that sends a signal to the iS module which is proportional to the front suspension arm angle.

SYSTEM OPERATION

The occupants sit on what is known as the moving deck. When the suspension system is active, the moving deck is usually in an "up" position. This means the moving deck is raised above the fixed deck sufficiently for the suspension system to absorb the up and down movement of the watercraft as it travels through the water.

The iS module is programmed with various parameters that it compares to the input signals and information it obtains through the CAN bus from the other electronic modules.

The suspension can be set to the AUTO or MANUAL mode.

In AUTO mode, suspension height is factory preset and the iS module constantly monitors the stroke of the suspension and it automatically readjusts suspension height for changing water conditions and passenger load.

In MANUAL mode, the driver may choose to set the suspension higher or lower by using the UP and DOWN s on the handlebar.

The iS system incorporates a function known as DOCK MODE. When activated manually or automatically, DOCK MODE moves the suspension down to lower the center of gravity of the watercraft. This function is useful when transporting the watercraft, operating at slow speed or when O.T.A.S. is activated as it reduces the possibility of capsizing.

Suspension Adjustment

The suspension height (up position) is factory calibrated to a preset height for most riding conditions while cruising in AUTO SUSPENSION MODE. The factory calibrated height is the same regardless of the number of passengers or weight on the moving deck.

⚠ WARNING

Do not overload the watercraft or take on more passengers than designated. Refer to *SPECIFICATIONS* for details.

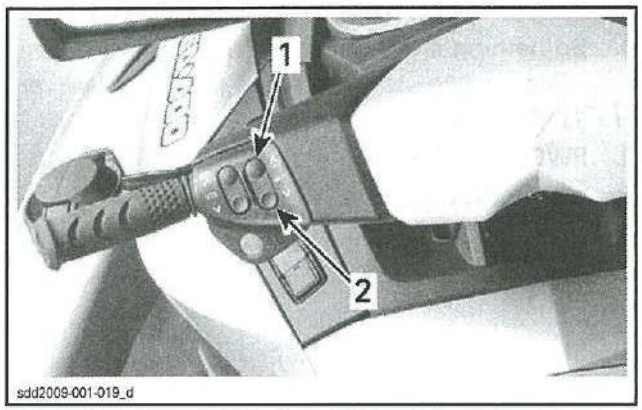
The iS button is primarily used to manually fine-tune the suspension height to operator preference.

Using the iS button to change the suspension height overrides the AUTO SUSPENSION MODE function. The iS system switches to MANUAL SUSPENSION MODE and the operator can select a different suspension height as preferred in accordance with riding style and riding conditions.

Suspension height and mode of operation is indicated in the information center (gauge) digital screen.

Manually Adjusting Ride Height

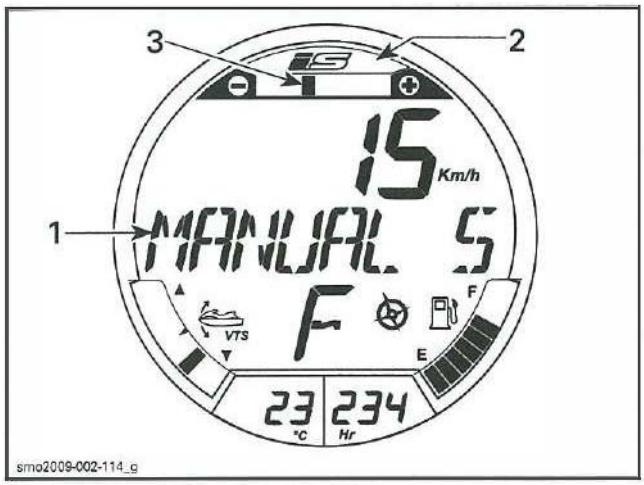
Press the iS UP or DOWN arrow button once to move the suspension to the next height increment, or press and hold the button until the desired ride height is obtained.



TYPICAL
1. *iS UP arrow button*
2. *iS DOWN arrow button*

The following indications of manual suspension mode can be observed in the digital screen of the information center:

- A scrolling message in the digital screen that states MANUAL SUSPENSION.
- The AUTO indication in the iS display will disappear.
- The suspension position indicator will indicate the relative suspension height (only one segment of the indicator will be on).



1. *MANUAL SUSPENSION message*
2. *AUTO mode indicator OFF*
3. *Relative suspension position indication*

Selecting Auto Suspension Mode

To revert back to AUTO selection mode, double click the iS UP arrow button.

The following indications of automatic suspension mode can be observed in the digital screen of the information center:

- A scrolling message in the digital screen stating AUTOMATIC SUSPENSION.
- The AUTO indication in the iS display will appear.
- All segments of the suspension position indicator will be on.



1. *AUTOMATIC SUSPENSION message*
2. *AUTO mode indicator ON*
3. *All segments of suspension position indicator ON*

TROUBLESHOOTING

DIAGNOSTIC TIPS

It is important to determine first if the problem is electrical or mechanical related. If you hear the hydraulic motor running when pressing the UP or DOWN suspension button, check for related mechanical problem.

NOTE: It is a good practice to check for fault codes using B.U.D.S. software as a first troubleshooting step. If a problem occurs with the suspension, several fault codes pertaining to the suspension position sensor may be generated.

IMPORTANT: When troubleshooting an electrical system fault, check battery condition, cables and connections first.

Electrical System Activation

1. Press the START/STOP button.

NOTE: Pressing the START/STOP button without the D.E.S.S. key installed on its post will turn on electrical power without starting the engine; the information center will cycle through a self-test function and shut off its display after a few seconds. However, the electrical system will stay powered up for approximately three minutes after the START/STOP button was depressed.

2. Install D.E.S.S. key to activate ECM and the information center when testing procedures require the device or system to be supplied with electrical power.

NOTE: When using B.U.D.S., briefly press the START/STOP button to initiate back the communication after the electrical system has shut off.

Circuit Testing

Check the related-circuit fuse condition with a fuse tester or test light (relying solely on a visual inspection could lead to an incorrect conclusion).

Electrical Connection Inspection

When replacing an electric or electronic component, always check electrical connections. Make sure they are tight, make good contact, and are corrosion-free. Dirty, loose or corroded contacts are poor conductors and are often the source of a system or component malfunction.

Pay particular attention to ensure that pins are not bent or pushed out of their connectors.

Ensure all wire terminals are properly crimped on wires, and connector housings are properly fastened.

Check for signs of moisture, corrosion or dullness. Clean pins properly and coat them with DIELECTRIC GREASE (P/N 293 550 004) or other appropriate lubricant (except if otherwise specified) when reassembling them.

Pay attention to the ground wire connections. Make sure they are clean, tight and free of corrosion.

DIAGNOSTIC GUIDELINES

The following is provided to help in diagnosing the probable source of troubles. It is a guideline and it should not be assumed to list all possible problems.

SUSPENSION DOES NOT MOVE

1. **Check gauge display for iS informations.**
   - *No information, refer to the diagnostic flow chart (electrical) in this subsection.*
   - *iS information appears, refer to the diagnostic flow chart (hydraulic/mechanical) in this subsection.*

SUSPENSION DOES NOT LOWER IN DOCK MODE POSITION

1. **Something stuck under moving deck.**
   - *Remove object(s) between moving deck and fixed deck.*
2. **PWC is not level.**
   - *Place PWC level*
3. **Hydraulic fluid level too low.**
   - *Refill hydraulic pump reservoir and check for leaks.*
4. **Shock absorber is damaged.**
   - *Replace shock absorber.*
5. **Leak in hydraulic circuit.**
   - *Repair or replace defective part(s).*
6. **Faulty suspension position sensor.**
   - *Test sensor and replace as required.*
7. **Actuator is damaged.**
   - *Replace the actuator.*
8. **Hydraulic pump cannot build enough pressure.**
   - *Replace hydraulic pump.*

SUSPENSION MOVES ERRATICALLY

1. **Defective shock absorber.**
   - *Replace the shock absorber.*
2. **Broken spring(s).**
   - *Replace spring(s).*

SUSPENSION NOISE (DURING A TURN)

1. **Front or rear suspension arm shaft supports position.**
   - *Supports must be flushe against both ends of shaft. Reposition shaft in its supports.*
2. **Worn arm shaft bushings.**
   - *Check front and rear arm shaft bushings condition and replace as required.*
3. **Snap rings on both sides of the rear lower arm shaft are not properly positioned.**
   - *Reposition shaft in its supports.*

SUSPENSION NOISE (FRONT OF SEAT)

1. Holder retaining screws are loose.
   - *Tighten shock absorber and actuator holder screws to recommended torque.*
2. Shock absorber screws are loose.
   - *Tighten shock absorber screws to recommended torque.*
3. Link under actuator holder loosened or not installed.
   - *Install link properly.*
   - *Tighten bolts to recommended torque.*

SUSPENSION IS LOWER THAN THE DOCK MODE POSITION

1. Spring (s) out of specification or broken.
   - *Replace the defective spring(s).*
2. Bump stops damaged or worn.
   - *Replace both bump stops.*

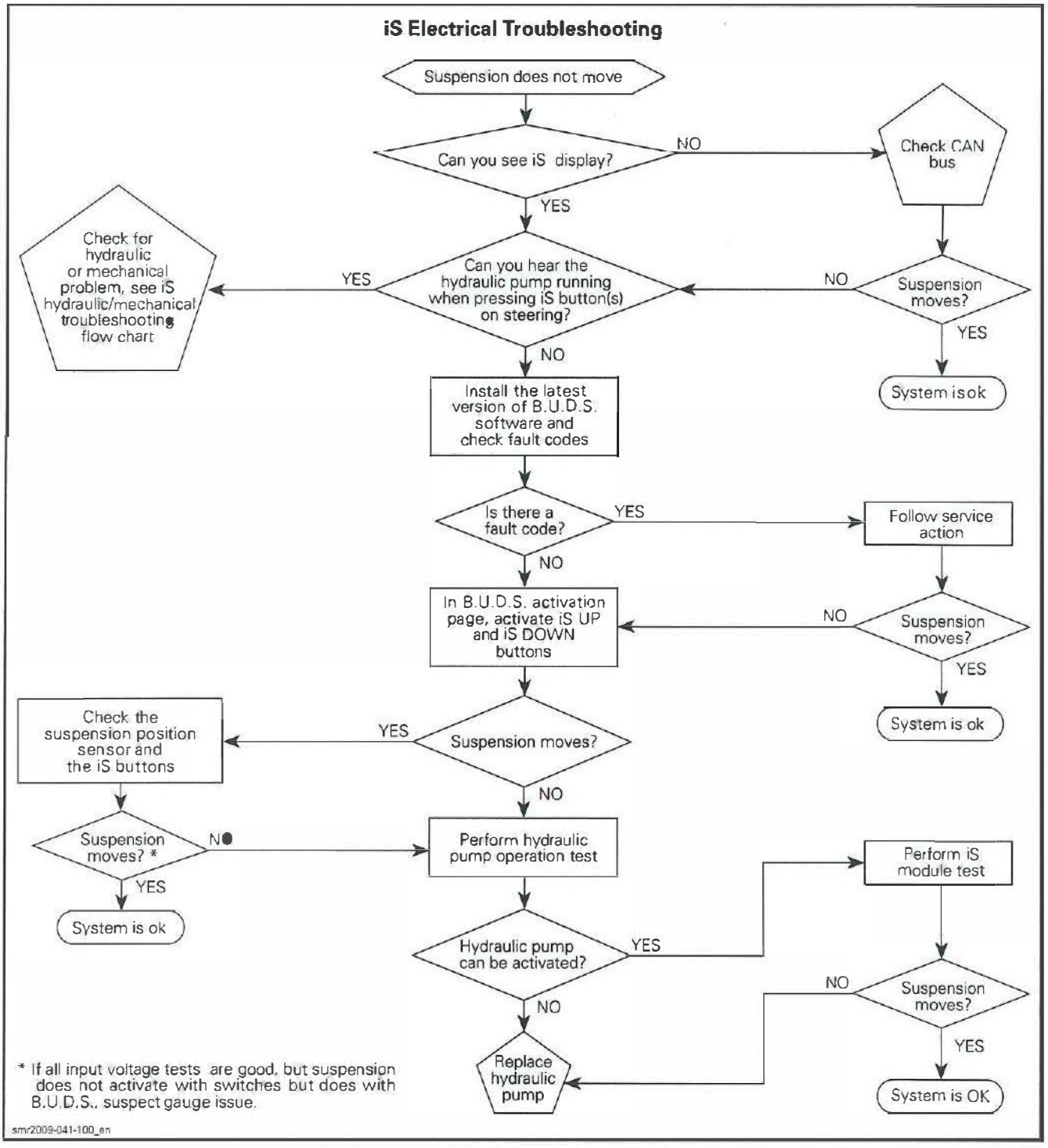
SUSPENSION BOTTOMS HARD

1. Spring(s) out of specification or broken.
   - *Replace the defective spring(s).*
2. Shock absorber is damaged.
   - *Check shock absorber resistance. Replace shock absorber.*
3. Bump stops damaged or worn.
   - *Replace both bump stops.*

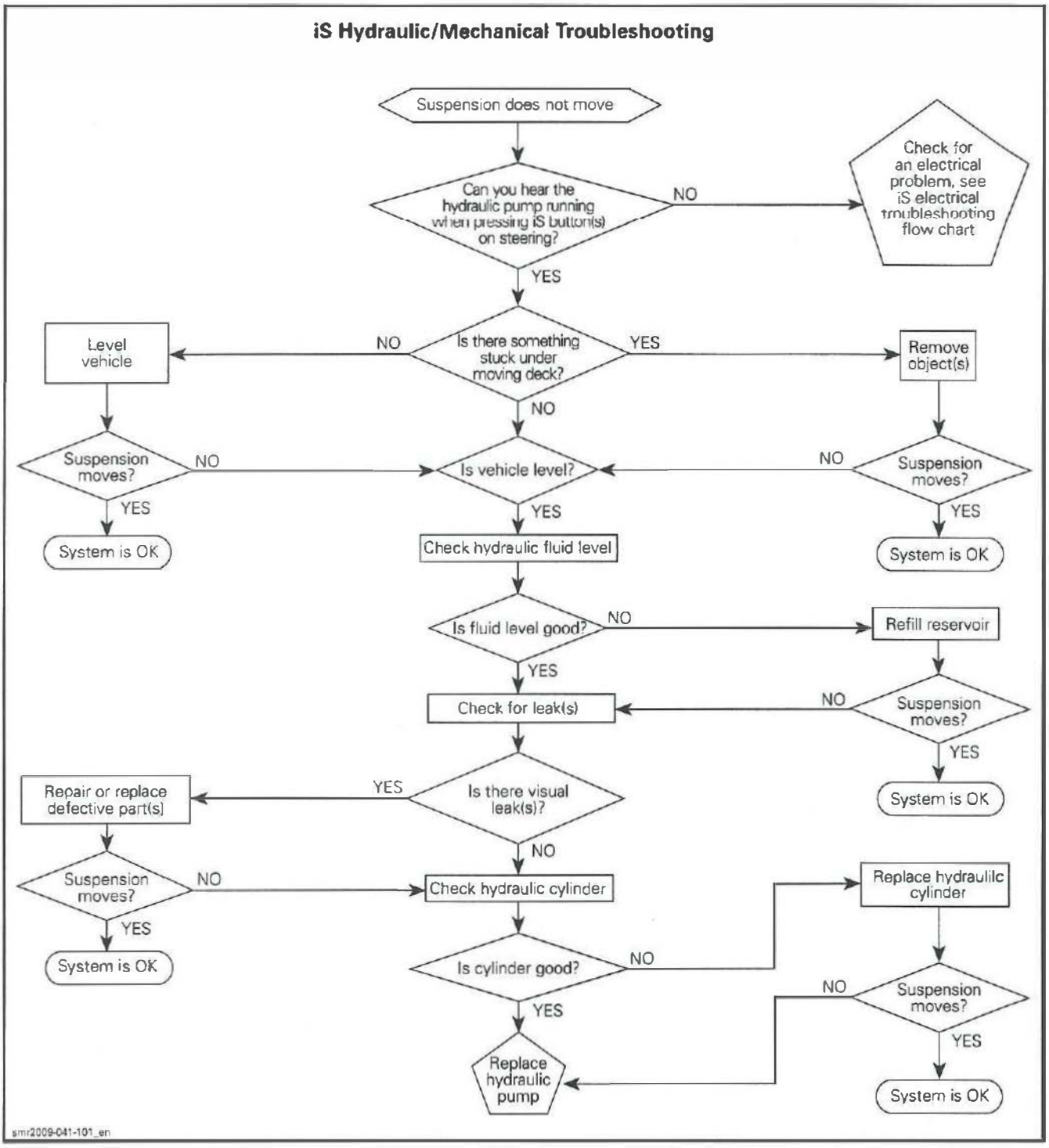
SUSPENSION QUIT WORKING BUT MAY OPERATE MOMENTARILY AFTER RESTARTING THE ENGINE

1. Hydraulic pump current draw is too high.
   - *Check hydraulic pump.*
2. Internal problem within iS module.
   - *Replace iS module.*

DIAGNOSTIC FLOW CHARTS



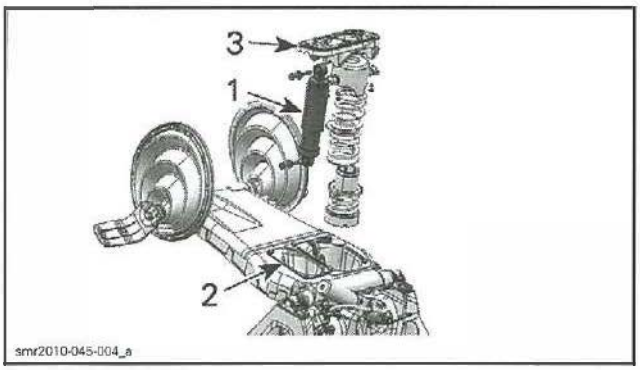
iS Hydraulic/Mechanical Troubleshooting



PROCEDURES

SHOCK ABSORBER

Shock Absorber Location

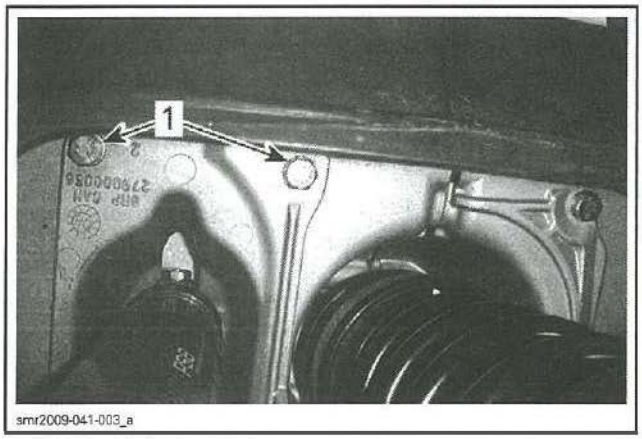


1. *Shock absorber*
2. *Shock holder*
3. *Mounting plate*

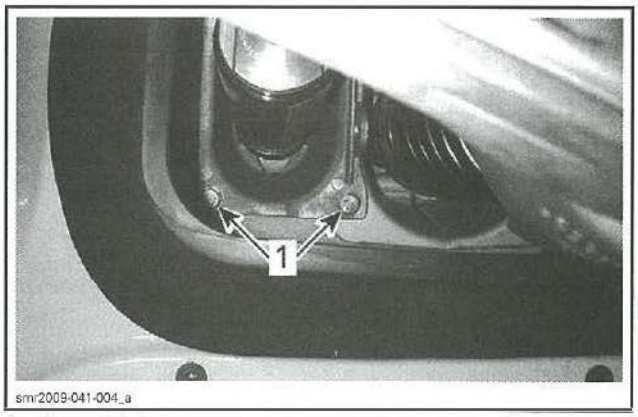
Shock Absorber Removal

1. Remove the moving deck. Refer to *BODY* subsection.
2. Remove tapes securing central bellows to mounting plate.
3. Move down central bellows to reach shock holder screws.
4. Remove and discard the four screws securing the shock holder.

NOTE: Using lateral supports, raise front arm to reach front screws.



1. *Front retaining screws*

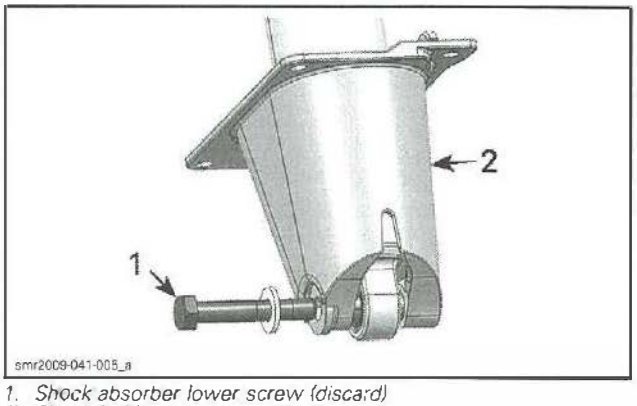


1. *Rear retaining screws*

5. Remove shock absorber with mounting plate and shock holder.

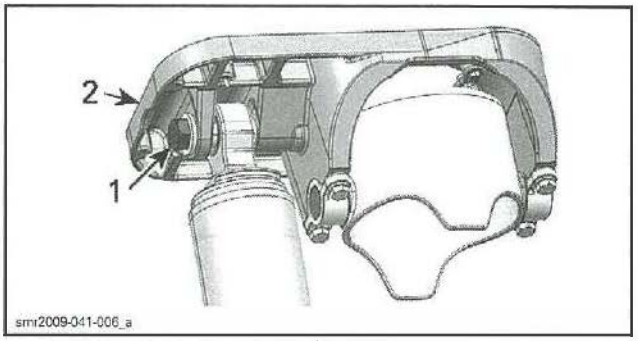
NOTE: Take care not to let the spring protector fall into the hull.

6. Remove and discard the screw securing shock absorber to shock holder.



1. *Shock absorber lower screw (discard)*
2. *Shock holder*

7. Detach the top of shock absorber from mounting plate. Discard screw.



1. *Shock absorber upper screw (discard)*
2. *Mounting plate*

Shock Absorber Inspection

NOTE: Because of gas pressure, strong resistance is felt when compressing shock.

To inspect shock operation, or if suspecting an internal leak between oil chamber and gas chamber, check shock as follows:

1. Grab the shock absorber body firmly and press the rod end against a firm surface.
   1.1 Verify the compression stroke when the rod is fully extended.
   1.2 Make sure that shock absorber rod can be completely inserted in the shock body.
2. The shock should extend unassisted. Rod must come out at a steady speed.

If any problem is detected, replace the shock absorber.

Shock Absorber Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

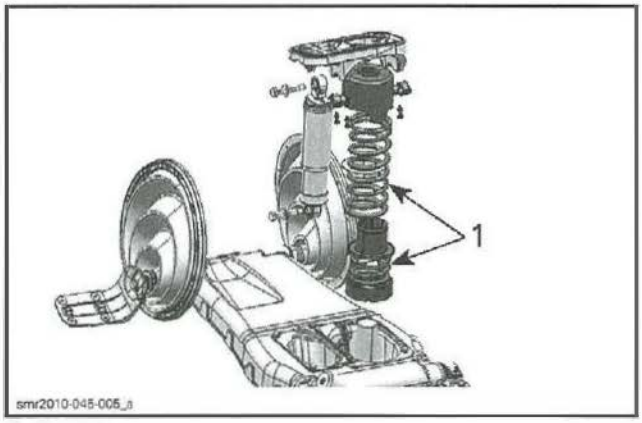
Secure the shock absorber using **NEW** screws.

Tighten screws to 75 N•m (55 lbf•ft).

Install **NEW** shock holder screws and tighten them to 25 N•m (18 lbf•ft).

SPRINGS

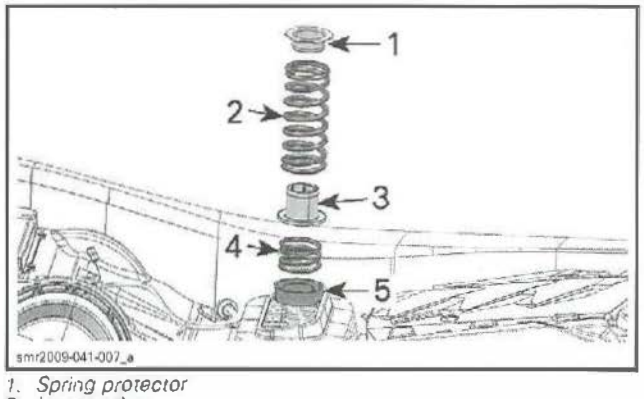
Spring Location



1. Springs

Spring Removal

1. Remove *SHOCK ABSORBER*, see procedure in this subsection.
2. Remove the spring protector, the long spring, the spacer, the short spring and the spring holder.



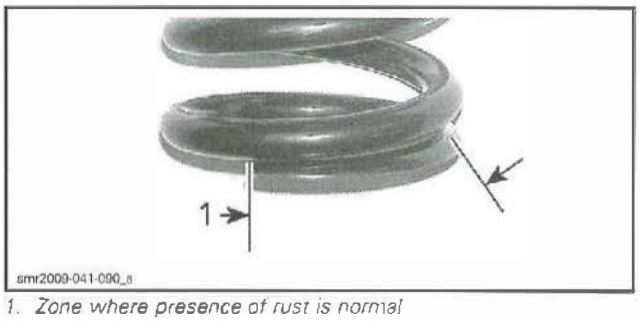
1. Spring protector
2. Long spring
3. Spacer
4. Short spring
5. Spring holder

Spring Inspection

Inspect both springs and replace if one of the following damage is detected:

- Crack in the paint
- Rust
- Other visible damage.

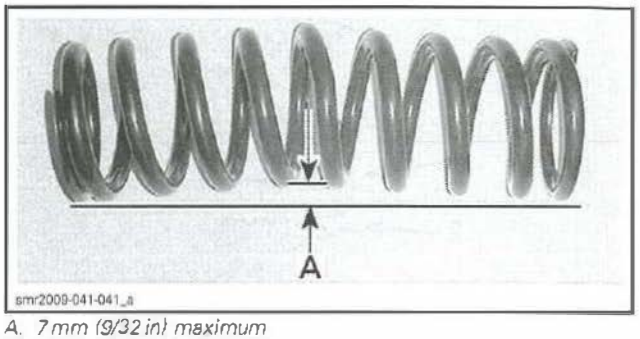
NOTE: If rust is limited to a 1/4 of the first coil, the spring should not be replaced.



1. Zone where presence of rust is normal

Check the curve line of the long spring.

LONG SPRING SHAPE	
Maximum	7 mm (9/32 in)



A. 7 mm (9/32 in) maximum

Replace spring if out of specification.

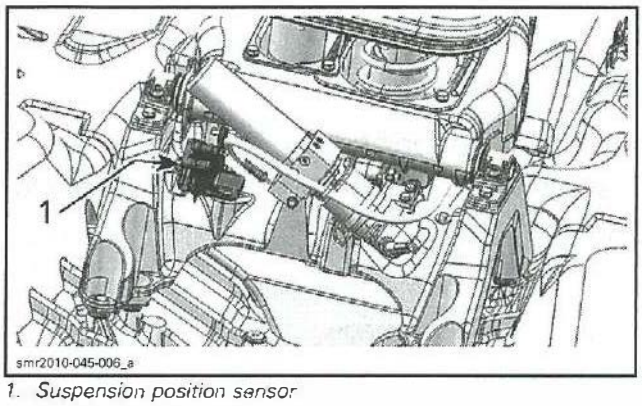
Spring Installation

The installation is the reverse of the removal procedure.

SUSPENSION POSITION SENSOR

Suspension Position Sensor Location

The suspension position sensor is located on suspension base, under the hydraulic pump reservoir.



1. Suspension position sensor

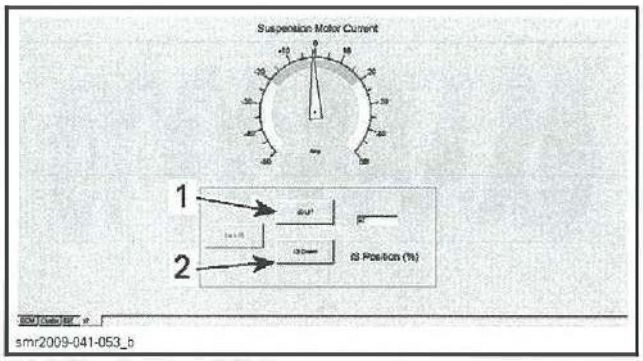
Suspension Position Sensor Input Voltage Test

At Sensor Connector

SUSPENSION POSITION SENSOR CONNECTOR		VOLTAGE
Pin 1	Pin 2	5 Vdc

Using the 6-pin Magneto Harness Tool

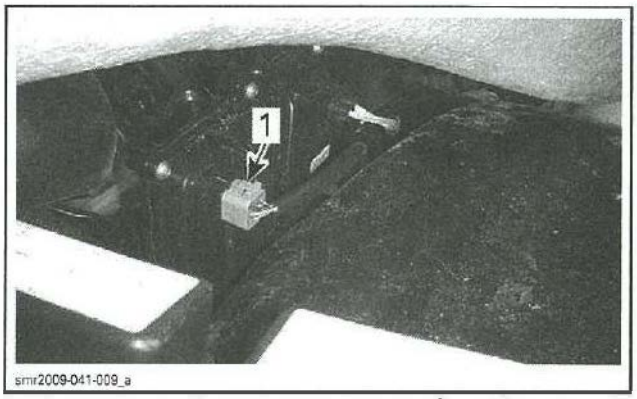
1. Connect B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Using B.U.D.S., raise suspension to the fully up position.



ACTIVATION AND iS TABS
1. iS UP
2. iS down

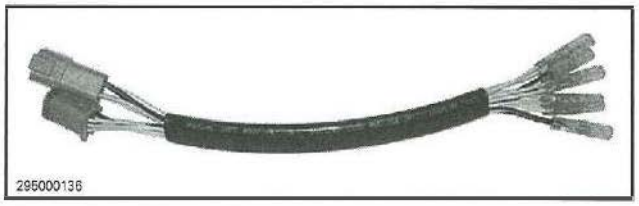
NOTE: If the seat is moving up and the number does not increase in B.U.D.S. but it is between 10 and 100%, check the suspension position sensor fork.

3. Unplug the 6-pins connector from the iS module. The module is located in front of the battery in the same compartment.



1. Suspension position sensor connector on iS module

4. Connect the MAGNETO HARNESS 6 PINS (P/N 295 000 136) to iS module for voltage checks.



5. Using the FLUKE 115 MULTIMETER (P/N 529 035 868), check voltage as per the following table.



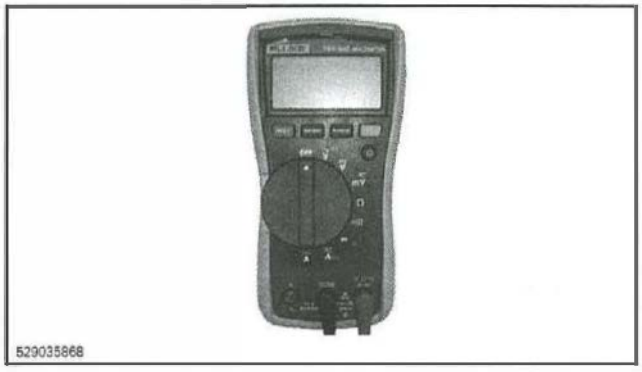
SUSPENSION POSITION (% in B.U.D.S.)	MAGNETO HARNESS (wire lead color)		VOLTAGE (Vdc)
All positions	BK	BK/YL	4.99
100%	WH	BK/YL	3.23
100%	BK	WH	1.75
88%	WH	BK/YL	3.09
88%	BK	WH	1.89
75%	WH	BK/YL	2.99
75%	BK	WH	1.98
53%	WH	BK/YL	2.81
53%	BK	WH	2.16
35%	WH	BK/YL	2.68
35%	BK	WH	2.30

6. Remove the 6-pin magneto harness tool.

Suspension Position Sensor Resistance Test

At iS Module Connector

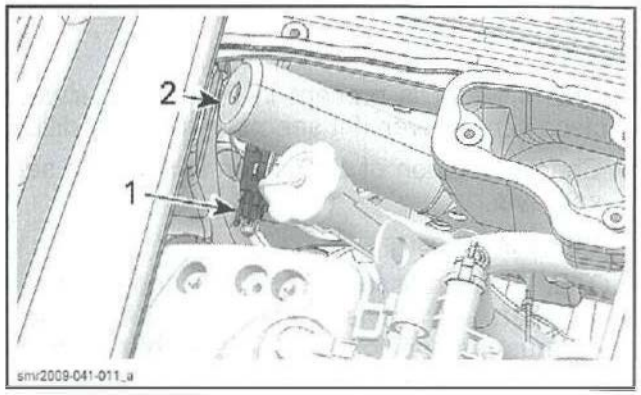
1. Using the FLUKE 115 MULTIMETER (P/N 529 035 868), check resistance values on iS connector as per the following table.



SUSPENSION POSITION (% in B.U.D.S.)	iS MODULE (6-pin connector)		RESISTANCE Ω
All positions	4	6	1803 - 2203
100%	5	6	1957 - 2391
100%	4	5	1361 - 1663
88%	5	6	1904 - 2327
88%	4	5	1410 - 1724
75%	5	6	1871 - 2287
75%	4	5	1448 - 1770
53%	5	6	1799 - 2199
53%	4	5	1516 - 1852
35%	5	6	1752 - 2142
35%	4	5	1565 - 1913

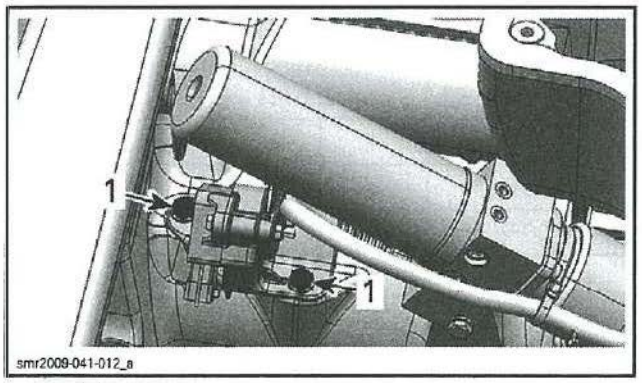
Suspension Position Sensor Replacement

1. Remove the deck extension. Refer to *BODY* subsection.
2. Remove the air intake tube. Refer to *AIR INTAKE SYSTEM* subsection.
3. Unplug the suspension position sensor connector.



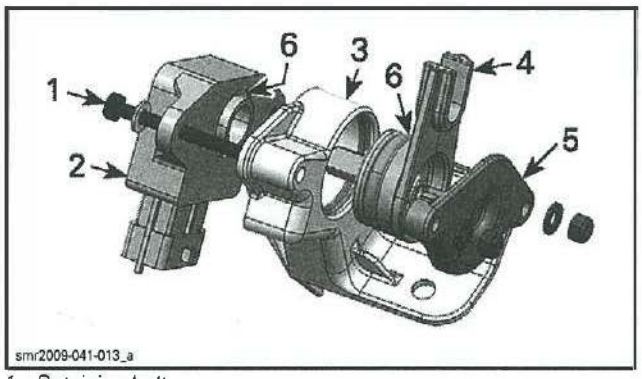
1. *Sensor connector*
2. *Hydraulic pump reservoir*

4. Remove screws securing the suspension position sensor.



1. Retaining screws

5. Remove bolts securing the sensor and its cover to the sensor support and the sensor lever.



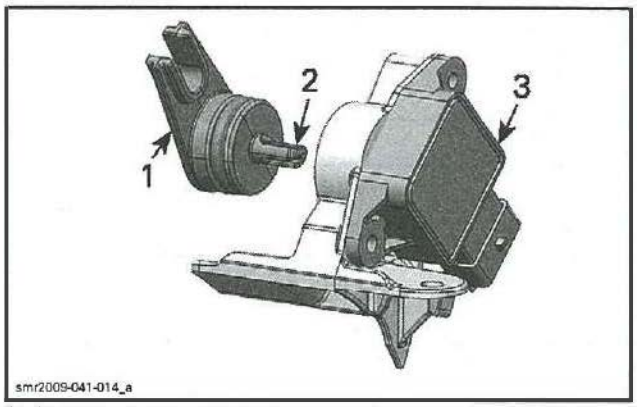
1. Retaining bolt
2. Sensor
3. Support
4. Lever
5. Cover
6. O-rings

NOTE: If water is present in the sensor always replace sensor even if it seems in good condition.

6. Check condition of O-rings on sensor and sensor lever.

7. Reinstall all parts.

NOTE: When reassembling parts, index sensor lever shaft with sensor inner slot. The sensor lever must be positioned to 180° with the sensor electrical connector.



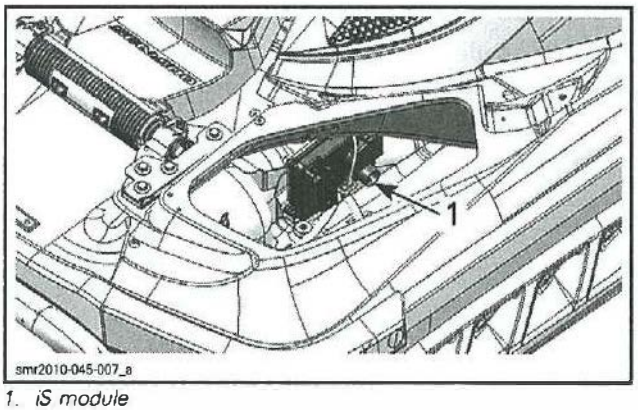
1. Lever
2. Lever shaft
3. Sensor

8. Reinstall and connect the sensor in PWC.

iS MODULE

iS Module Location

The iS module is located inside hull, in front of the battery.



1. iS module

iS Module Input Voltage Test (Switched Power)

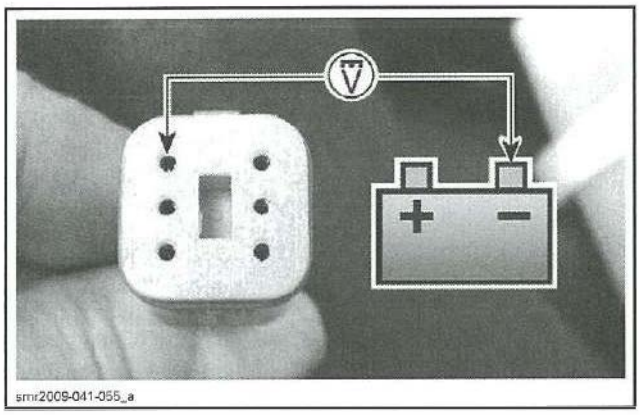
Make sure fuse F1 is powered and in good condition.

Press the START/STOP button to activate the electrical system.

Install the D.E.S.S. key.

Using the FLUKE 115 MULTIMETER (P/N 529 035 868), perform the following test.

MULTIMETER LEAD POSITION		VOLTAGE (VDC)
Pin 1 of iS module 6-pin connector	Negative battery post	Battery voltage



Repeat the test using a test light.

TEST LIGHT POSITION		RESULT
Pin 1 of iS module 6-pin connector	Negative battery post	Bright light

If tests succeed, carry out the *iS MODULE INPUT VOLTAGE TEST (BATTERY POWER).*

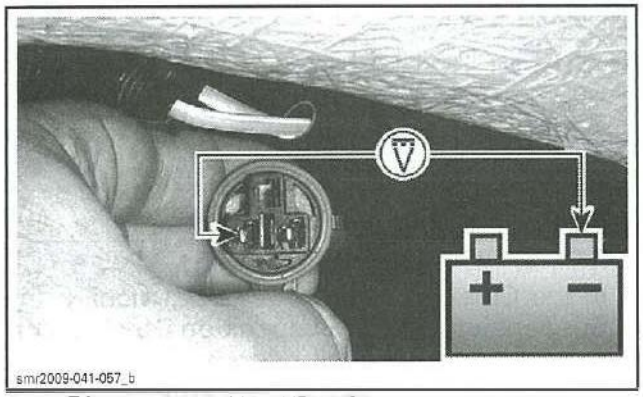
If tests fail, check wiring and connectors between fuse box pin A8 and module 6-pin connector pin 1.

iS Module Input Voltage Test (Battery Power)

Make sure fuse F7 is powered and in good condition.

Using the FLUKE 115 MULTIMETER (P/N 529 035 868), perform the following test.

iS MODULE 3-PIN CONNECTOR	BATTERY	VOLTAGE (VDC)
Pin 2	Negative post	Battery voltage



PIN 2 TO BATTERY NEGATIVE POST

Repeat the test using a test light.

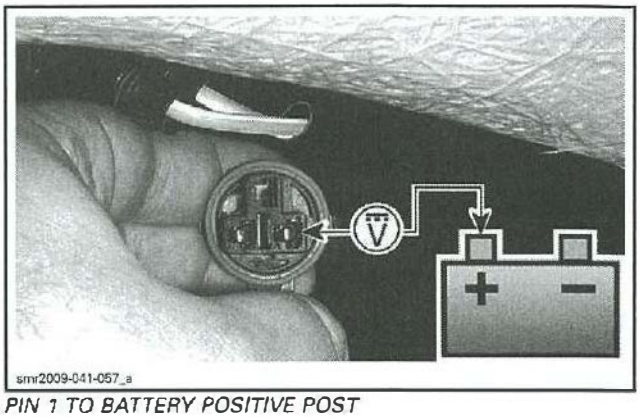
iS MODULE 3-PIN CONNECTOR	BATTERY	RESULT
Pin 2	Negative post	Bright light

If tests succeed, carry out *iS MODULE GROUND TEST.*

If tests fails, check wiring and connectors between fuse box pin A2 and module 3-pin connector pin 2.

iS Module Ground Test

Using the FLUKE 115 MULTIMETER (P/N 529 035 868), perform the following test.



PIN 1 TO BATTERY POSITIVE POST

iS MODULE 3-PIN CONNECTOR	BATTERY	RESULT
Pin 1	Positive post	Battery voltage

Repeat the test using a test light.

iS MODULE 3-PIN CONNECTOR	BATTERY	RESULT
Pin 1	Positive post	Bright light

If tests succeed, carry out *iS BUTTON TEST USING B.U.D.S.*

If tests fails, check wiring and connectors module 3-pin connector pin 1 and engine ground.

iS Module Output Voltage Test

At the hydraulic pump motor connector, connect multimeter leads.

Activate the iS either UP and DOWN with B.U.D.S. or with iS button on steering.

There will be either a positive 12 Vdc or a negative 12 Vdc reading.

Activate the opposite UP or DOWN and the reading should reverse polarity.

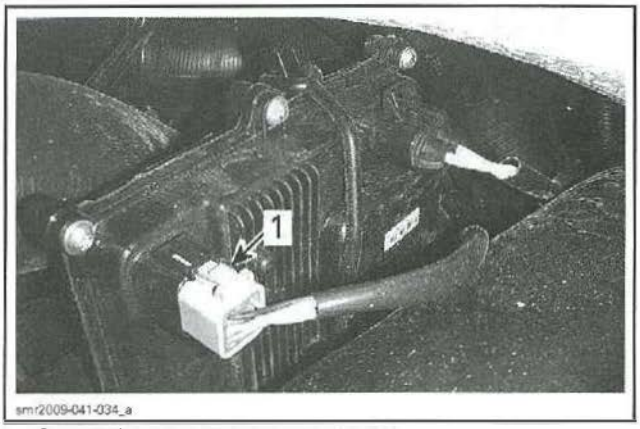
If the voltage is as specified, carry out the same test using a 12 V test light to ensure the circuit can supply enough current to operate the hydraulic pump.

The light should be bright in both the UP or DOWN positions.

If tests fail, carry out the *iS MODULE INPUT VOLTAGE TEST (SWITCHED POWER)*.

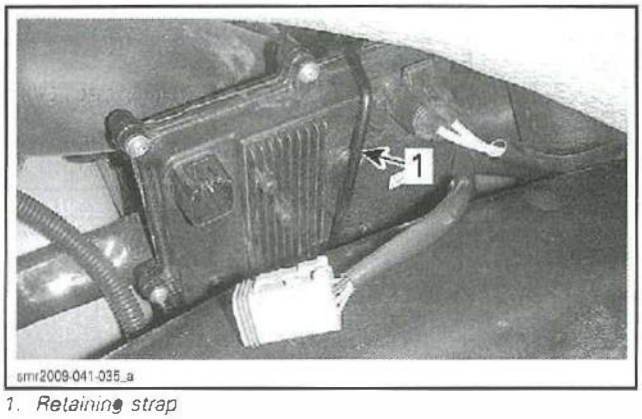
iS Module Removal

1. Open boarding platform and remove the starboard storage bin.
2. Disconnect the suspension position sensor connector from the iS module.



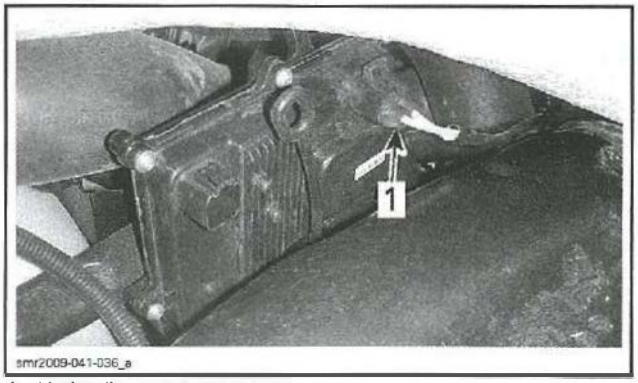
1. Suspension position sensor connector

3. Detach the retaining strap.



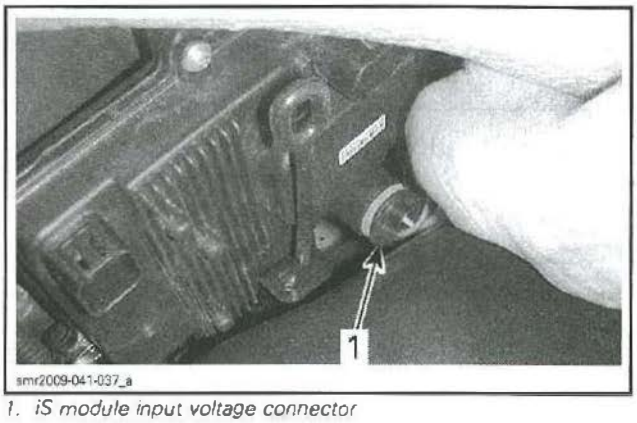
1. Retaining strap

4. Disconnect the hydraulic motor connector.



1. Hydraulic motor connector

5. Disconnect the iS module input voltage connector.



1. iS module input voltage connector

NOTE: The locking tab of input voltage connector is located underneath.

6. Remove the iS module from PWC.

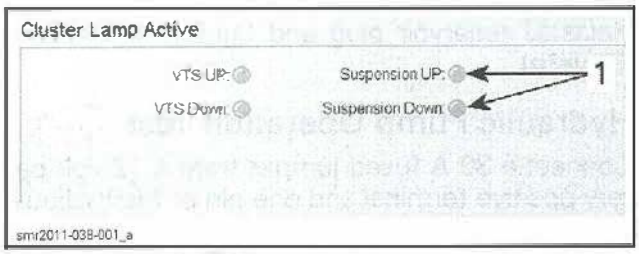
iS Module Installation

The installation is the reverse of the removal procedure.

iS BUTTON

iS Button Test Using B.U.D.S.

1. Connect PWC to B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. Select **Monitoring** and **Cluster** tabs.
3. Press START/STOP button to activate the electrical system.
4. In the **Cluster Lamp Active** box, monitor the **Suspension UP** and **Suspension Down** indicators while pressing the buttons.

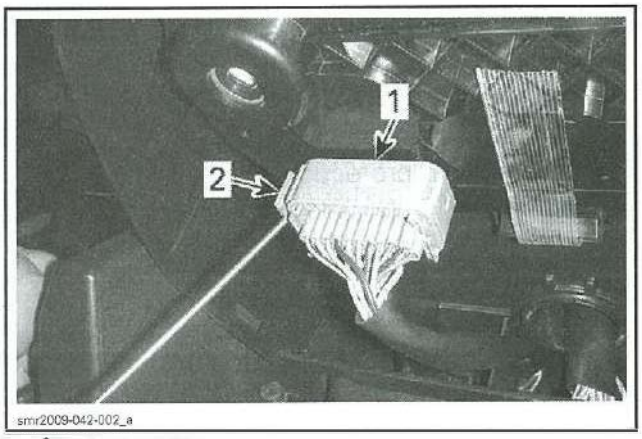


CLUSTER LAMP ACTIVE
1. UP and Down button indicators

If test fails, carry out the *iS BUTTON TEST USING A MULTIMETER*.

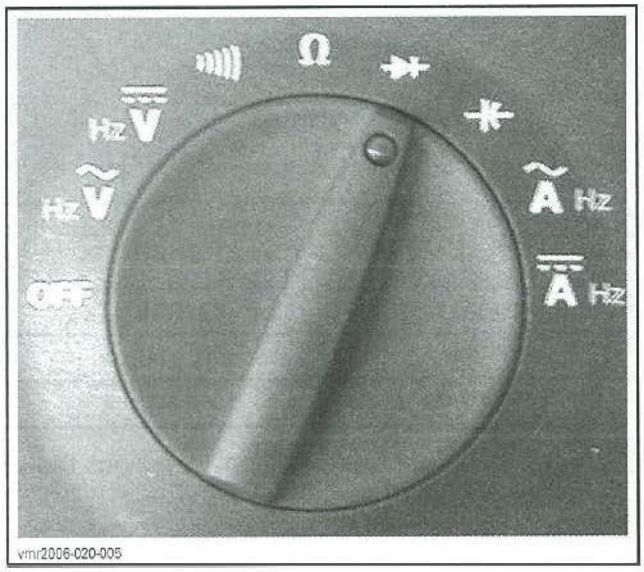
iS Button Test Using a Multimeter

1. Press START/STOP button to activate the electrical system.
2. Remove the gauge support cover.
3. Disconnect the gauge connector.



1. Gauge connector
2. Slide out gauge connector tab to unlock

4. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to diode test function.



5. Test as follows.

iS SWITCH TEST		
SWITCH POSITION	MULTIMETER LEAD/GAUGE CONNECTOR	VOLTAGE
Switch released	RED lead/Pin 14 BLACK lead/Pin 15	Approx. 2 Vdc
	BLACK lead/Pin 14 RED lead/Pin 15	OL
UP depressed	RED lead/Pin 14 BLACK lead/Pin 15	Approx. 1.1 Vdc
	BLACK lead/Pin 14 RED lead/Pin 15	OL
DOWN depressed	RED lead/Pin 14 BLACK lead/Pin 15	Approx. 1.6 Vdc
	BLACK lead/Pin 14 RED lead/Pin 15	OL

If any reading is significantly out of specification, carry out the same test at the switch connector.

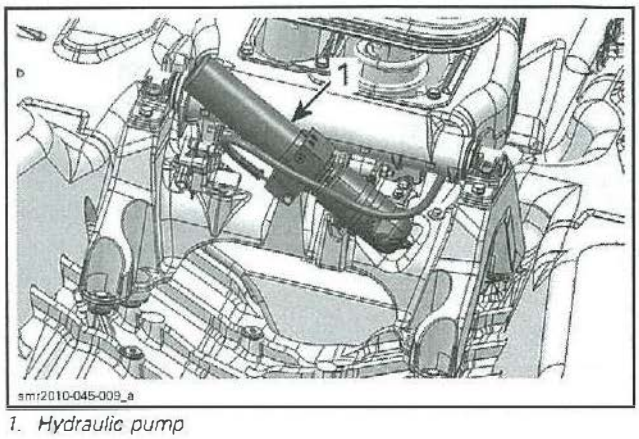
If the same results are obtained at the switch connector, replace the switch assembly.

If results are as per specification at the switch connector, check wiring and connectors.

HYDRAULIC PUMP

Hydraulic Pump Location

The hydraulic pump is located at the rear of the suspension base.



1. Hydraulic pump

Hydraulic Pump Recommended Fluid

Always use automatic transmission fluid (ATF) Dexron III.

NOTICE Use ATF Dexron III only. Do not use fluids other than the recommended one, nor mix different types of fluids.

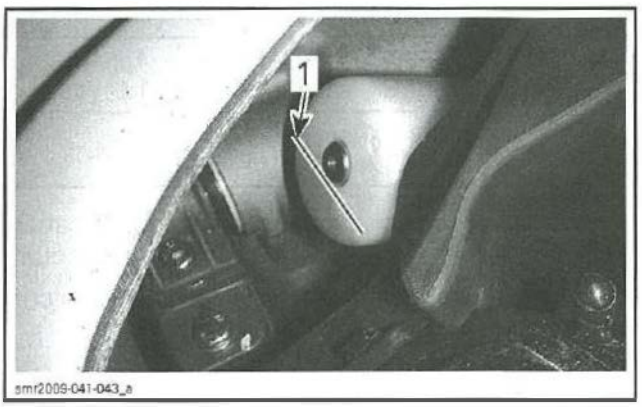
Hydraulic Pump Fluid Level Verification

NOTE: The fluid level will drop slightly during break-in period because the actuator uses a small amount of fluid to lubricate its moving parts. If a large amount of fluid is required, check components for leaks.

Reservoir in Vehicle

Place the PWC level (longitudinally and transversely). Make sure suspension is in DOCK MODE position.

The fluid should be near reservoir plug.

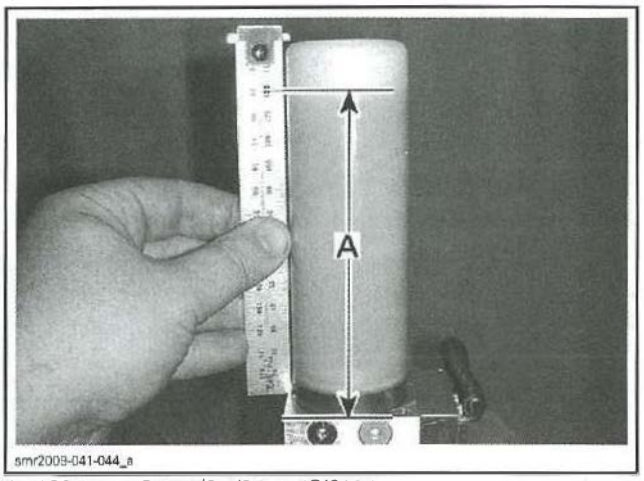


1. Fluid level

Reservoir Out of Vehicle

Place the reservoir vertically.

Using a ruler, measure the fluid level. The reservoir is full when fluid level reaches 130 mm ± 5 mm (5-1/8 in ± 13/64 in).



A. 130 mm ± 5 mm (5-1/8 in ± 13/64 in)

To Add Fluid

Remove the plug on the end of reservoir.

Using a syringe, fill up the reservoir to the recommended level.

Reinstall reservoir plug and tighten it to 1 N•m (9 lbf•**in**).

Hydraulic Pump Operation Test

Connect a 30 A fused jumper from a 12-volt battery positive terminal and one pin of the hydraulic pump 2-pin connector .

Connect a jumper from battery negative terminal and the other pin of the hydraulic pump 2-pin connector .

The hydraulic pump should activate and suspension should go up or down.

Reverse the jumpers position at the pump connector. The suspension should reverse direction.

If the hydraulic pump does not run, replace hydraulic pump.

If hydraulic pump turns, carry out the *HYDRAULIC PUMP CURRENT DRAW* test to confirm pump operation.

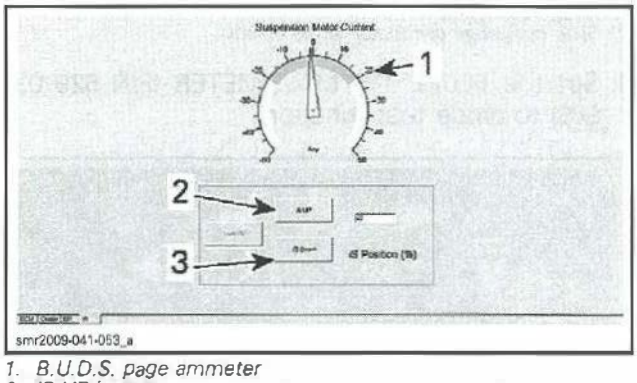
Hydraulic Pump Current Draw

If the current draw is to high, the iS module activates an internal protection.

Connect PWC to B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

Select ACTIVATION and **iS** tabs.

Activate the suspension by pressing iS UP and iS DOWN and check monitor the ammeter in the B.U.D.S. page.



1. B.U.D.S. page ammeter
2. iS UP button
3. iS DOWN button

SWITCH POSITION	CURRENT
iS UP	16 - 20 A
iS DOWN	15 - 18 A

If current is as per specification, carry out the *iS MODULE OUTPUT VOLTAGE TEST.*

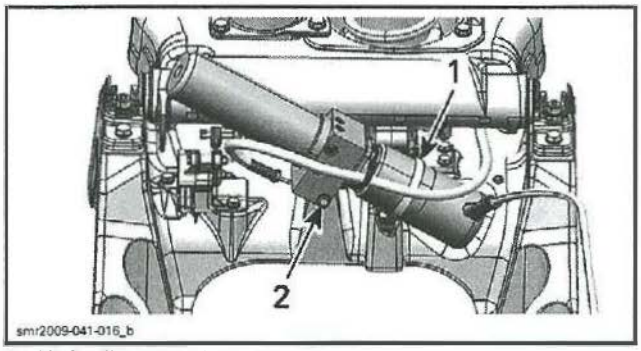
If current draw is low, check connections and wires.

If the current draw is excessive, replace the hydraulic pump.

Hydraulic Pump Removal (as a Unit with Actuator)

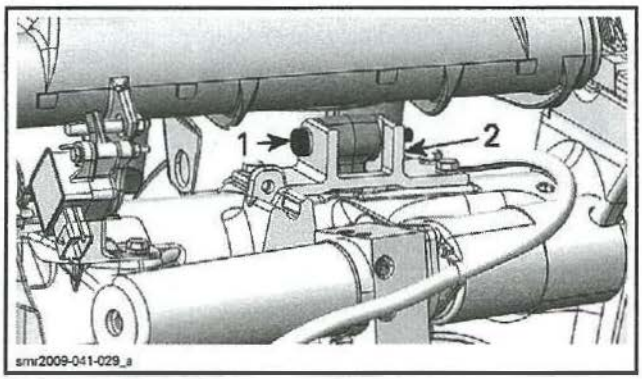
To work on many parts of suspension system, the removal of the hydraulic pump and actuator as an unit is necessary.

1. Remove *SHOCK ABSORBER* and *SPRINGS*. See procedures in this subsection.
2. Unplug the hydraulic pump connector from the iS module.
3. Cut any locking ties securing the pump harness to PWC harness.
4. Remove clamp and bolt securing the hydraulic pump from suspension base.



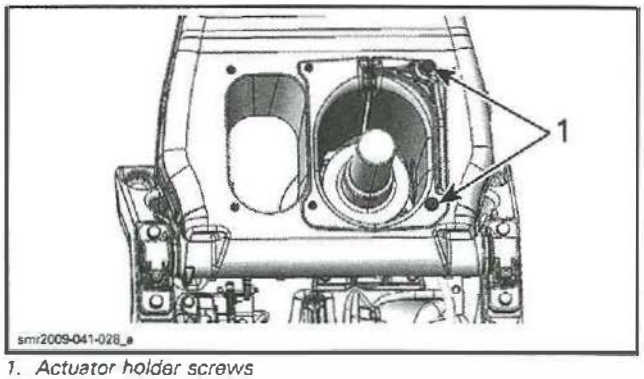
1. Hydraulic pump clamp
2. Retaining bolt

5. Remove actuator link bolt.



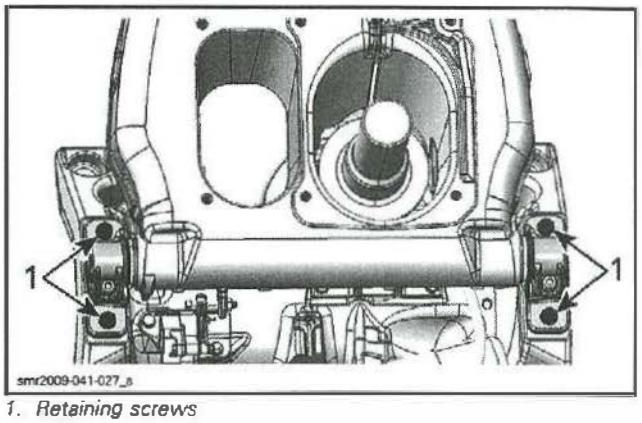
1. Actuator link bolt
2. Link support on the top of suspension base

6. Remove screws retaining the actuator holder.



1. Actuator holder screws

7. Remove the suspension position sensor to avoid damaging it.
8. Remove screws securing both rear ends of front suspension arm to suspension base.



1. Retaining screws

9. Lift the rear of the front suspension arm to make room for hydraulic pump.
10. Remove hydraulic pump with actuator by lifting them through the suspension bellows opening.

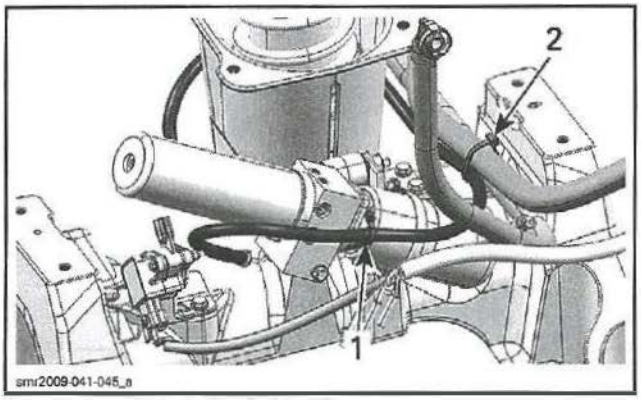
Hydraulic Pump Installation (as a Unit with Actuator)

The installation is essentially the reverse of the removal procedure. However, pay attention to the following.

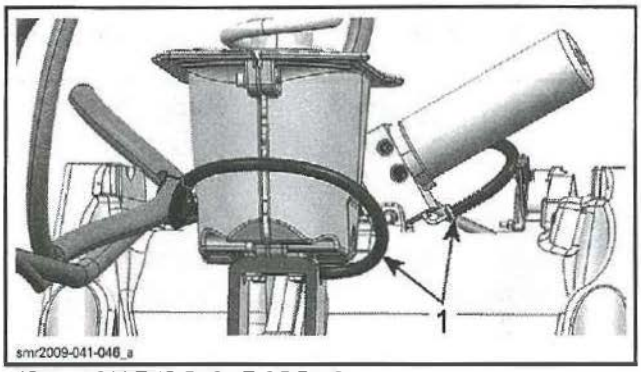
Make sure to secure the actuator link to suspension base. Tighten actuator link bolt to 25 N•m (18 lbf•ft).

NOTICE **Failure to do so might result in spring failure.**

Hydraulic hose routing is very critical to avoid problems with hydraulic unit. Use the following illustration to route and attach the hydraulic hose properly.



VIEW FROM THE REAR OF PWC
1. *Secure hydraulic hose to hydraulic pump*
2. *Secure hydraulic hose, fuel hose and PWC wiring harness*

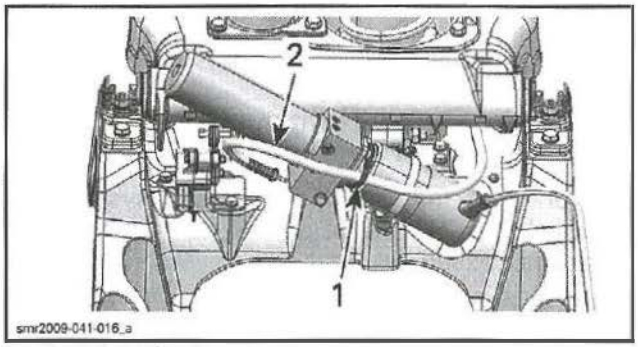


VIEW FROM THE FRONT OF PWC
1. *Position both ends of hydraulic hose on same side*

Install the *FRONT SUSPENSION ARM*. See procedure in this subsection.

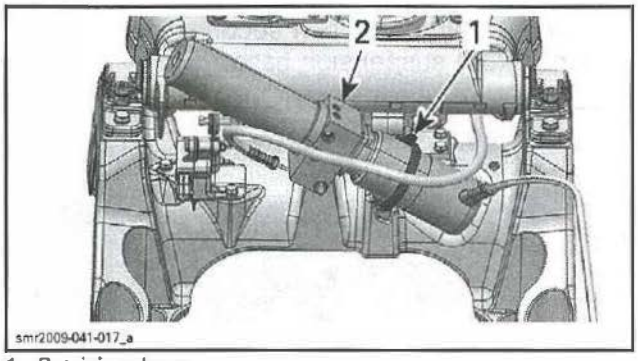
Hydraulic Pump Removal (Without Actuator)

1. Remove the deck extension. Refer to *BODY* subsection.
2. Remove the air intake tube. Refer to *AIR INTAKE SYSTEM* subsection.
3. Unplug the hydraulic pump connector from the iS module.
4. Cut any locking ties securing the pump harness to PWC harness.
5. Cut locking tie securing the hydraulic hose to pump.



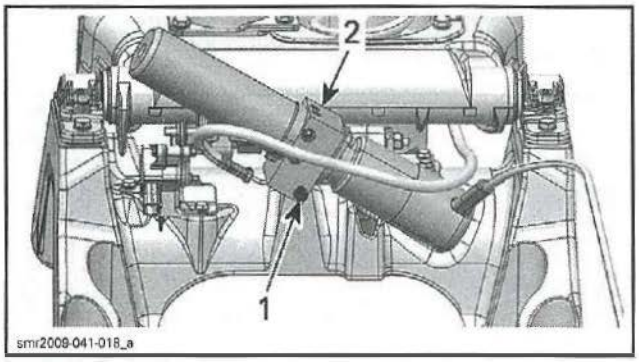
1. *Cut this locking tie*
2. *Hydraulic hose*

6. Unscrew the retaining clamp completely and remove it.



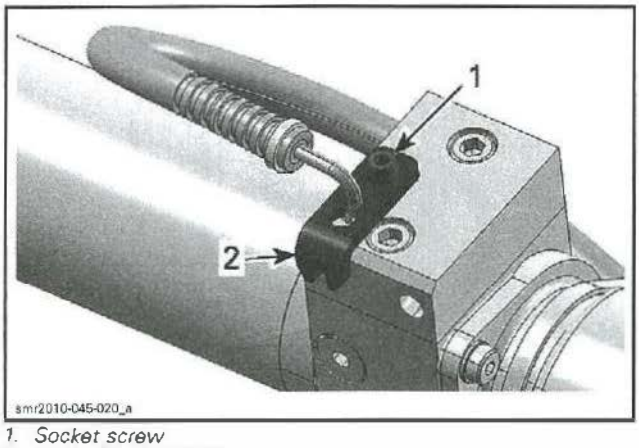
1. *Retaining clamp*
2. *Hydraulic pump*

7. Remove hydraulic pump retaining bolt.



1. *Retaining bolt*
2. *Hydraulic pump*

8. At the bottom of pump housing, remove socket screw securing hydraulic hose lock.



1. *Socket screw*
2. *Hydraulic hose lock*

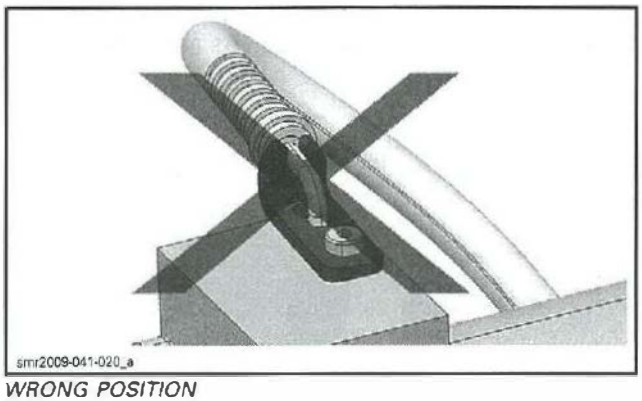
9. Remove hose from pump and plug hose to avoid oil spillage.
10. Place your finger on pump opening and remove pump from PWC.

NOTE: Wipe any oil spillage.

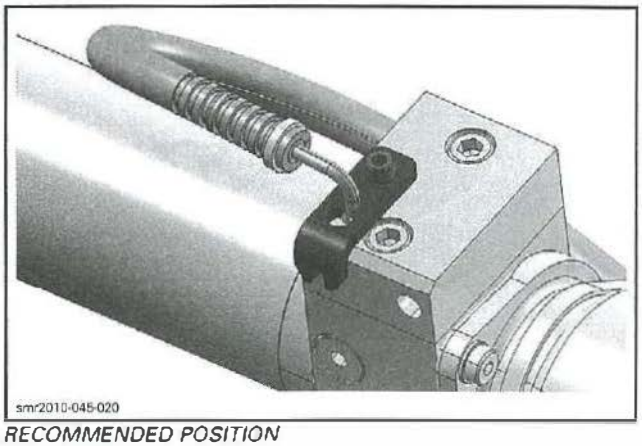
Hydraulic Pump Installation (Without Actuator)

1. Install hydraulic hose on pump and secure hose using the hydraulic hose lock.

NOTE: The hose must turn freely. Do not insert hose into lock hook.



WRONG POSITION



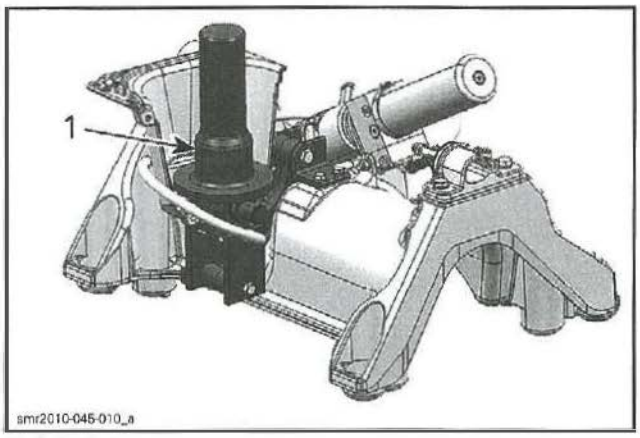
RECOMMENDED POSITION

2. Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of lock screw.
3. Tighten screw to 8 N•m (71 lbf•**in**).
4. Secure hydraulic pump to suspension base.
   - 4.1 Install pump retaining screw and tighten it to 10 N•m (89 lbf•**in**).
   - 4.2 Install retaining clamp and tighten it to 2 N•m (18 lbf•**in**).
5. Secure hose to reservoir with a new locking tie.
6. Route pump harness and secure it with new locking ties.
7. Connect the hydraulic pump connector to iS module.
8. Install a weight of 90 kg (200 lb) on moving deck and using suspension controls on steering, cycle the suspension fully up and fully down 3 times. This action will remove air bubbles trapped into hose and pump during installation.
9. Check for leaks.
10. Install all other removed parts.

ACTUATOR

Actuator Location

The actuator is located at the front of the suspension base under suspension springs.



1. Actuator

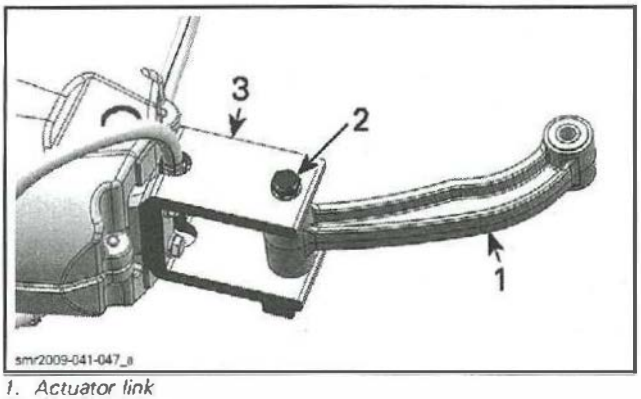
Actuator Inspection

Check actuator for leaks at hose opening and around inner piston.

Replace actuator if any leak is detected.

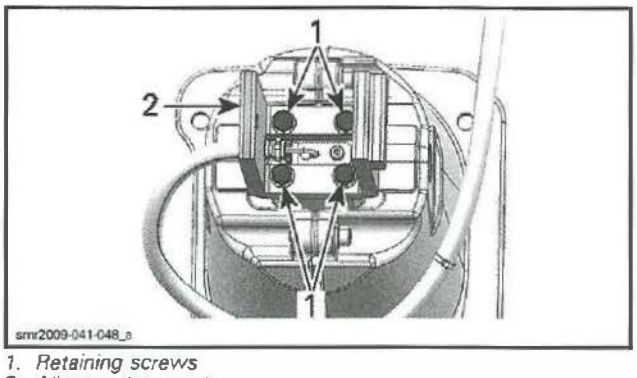
Actuator Removal

1. Refer to *HYDRAULIC PUMP REMOVAL (AS A UNIT WITH ACTUATOR)* and remove the pump from the PWC.
2. Remove and discard the screw securing actuator link to alignment support.



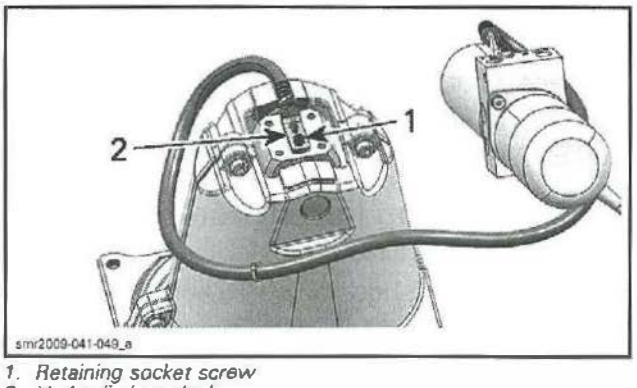
1. Actuator link
2. Retaining screw
3. Alignment support

3. Remove the alignment support from actuator holder. Discard screws.



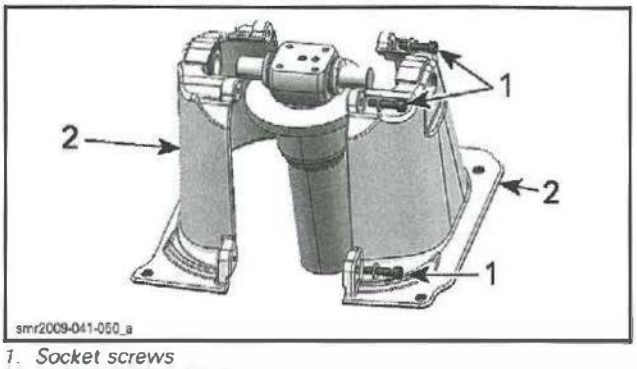
1. Retaining screws
2. Alignment support

4. Turn actuator up side down and remove hydraulic hose.



1. Retaining socket screw
2. Hydraulic hose lock

5. Remove and discard the three socket screws securing actuator holder halves and split the actuator holder.

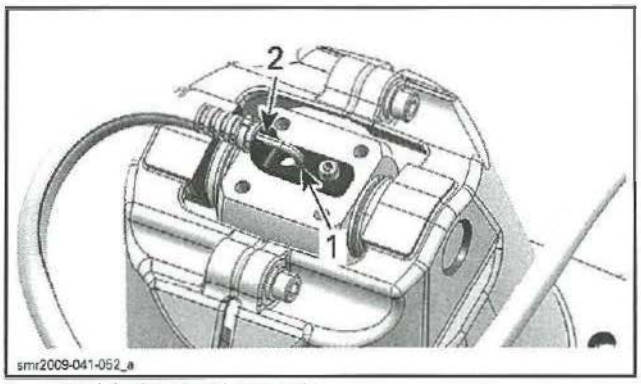


1. Socket screws
2. Actuator holder halves

Actuator Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Install hydraulic hose in accordance with the following illustration.



1. *Hose fully inserted in lock slot*
2. *Position hydraulic hose in lock hook*

Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of lock screw.

Tighten screw to 8 N•m (71 lbf•in).

Install the hydraulic pump in PWC. Make sure to route the hydraulic hose properly. See *HYDRAULIC PUMP INSTALLATION (AS A UNIT WITH ACTUATOR)* in this subsection.

Install a weight of 90 kg (200 lb) on moving deck and using suspension controls on steering, cycle the suspension fully up and fully down 3 times. This action will remove air bubbles trapped into hose and pump during installation.

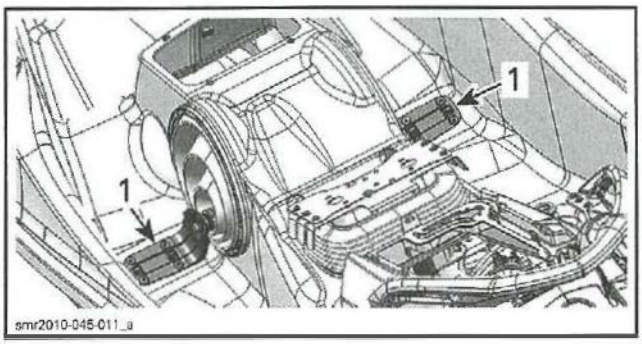
Check for leaks.

Install all other removed parts.

LATERAL SUPPORT

Lateral Support Location

The lateral supports are located on both side of the fixed deck to support the moving deck.

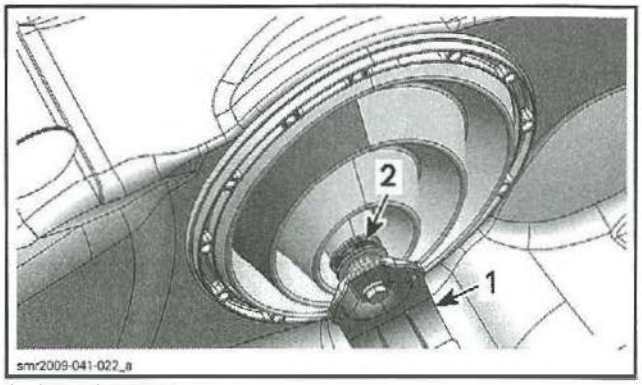


1. *Lateral supports*

Lateral Support Removal

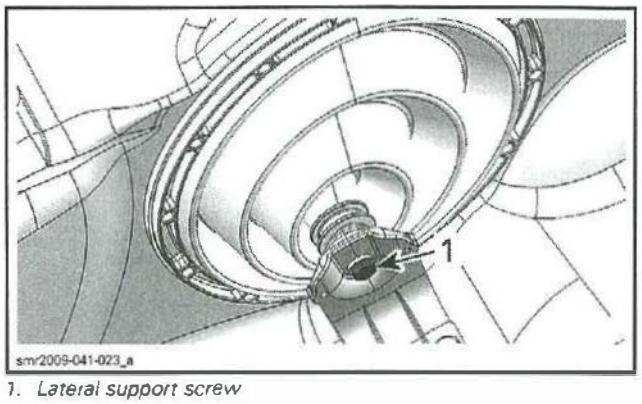
NOTE: The following instruction can be used for RH or LH support.

1. Remove the moving deck. Refer to *BODY* subsection.
2. Cut the Oetiker clamp retaining lateral bellows to lateral support.



1. *Lateral support*
2. *Oetiker clamp*

3. Remove the lateral support screw.



1. *Lateral support screw*

4. Remove lateral support from lateral bellows.

Lateral Support Installation

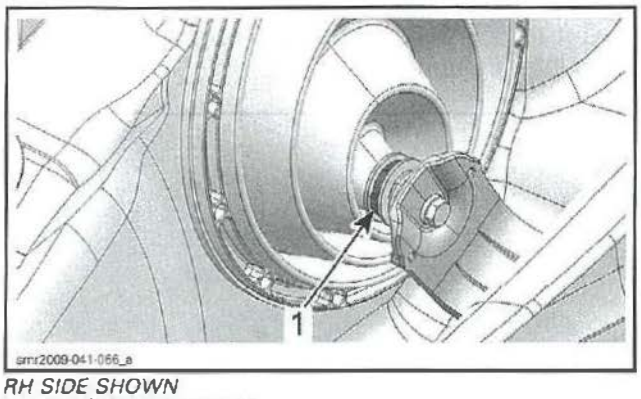
The installation is the reverse of the removal procedure. However, pay attention to the following.

Apply soapy water solution on bellows opening and insert the lateral support.

Index lateral supports with the front suspension shaft ends. Lateral supports can be inserted in one position only.

Tighten lateral support screw to 48 N•m (35 lbf•ft).

Install a new Oetiker clamp. Position the ear of clamp rearwards.

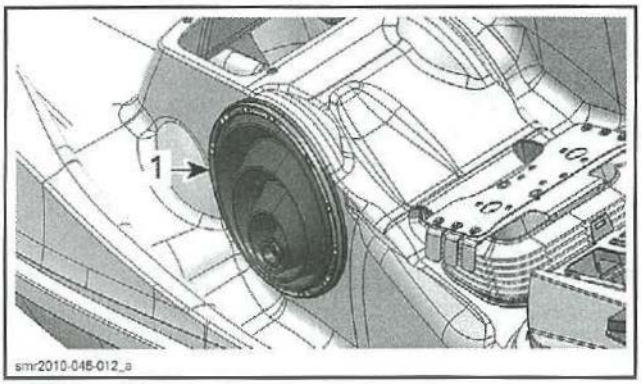


RH SIDE SHOWN
1. Ear of clamp rearwards

LATERAL BELLOWS

Lateral Bellows Location

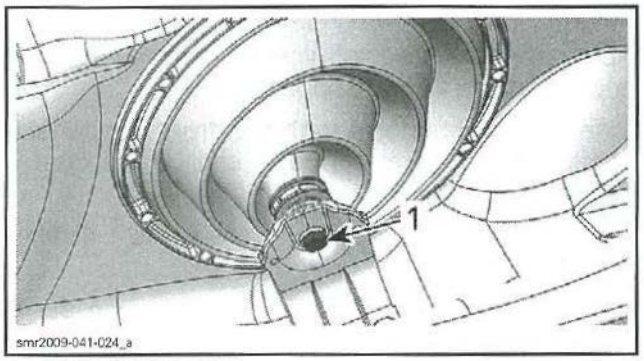
The lateral bellows are located on each side of the fixed deck.



1. LH lateral bellows shown

Lateral Bellows Removal

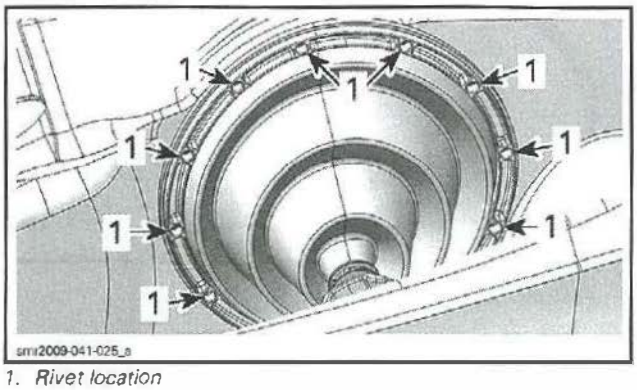
1. Remove lateral support screw.



1. Lateral support screw

2. Disconnect lateral support from suspension shaft.
3. Using the SUPERTANIUM DRILL BIT 3/16" (P/N 529 031 800), remove all rivets (12) securing the lateral bellows ring to body.





1. Rivet location

4. Remove lateral ring.
5. Cut Oetiker clamp securing bellows to lateral support.
6. Separate lateral support from bellows.

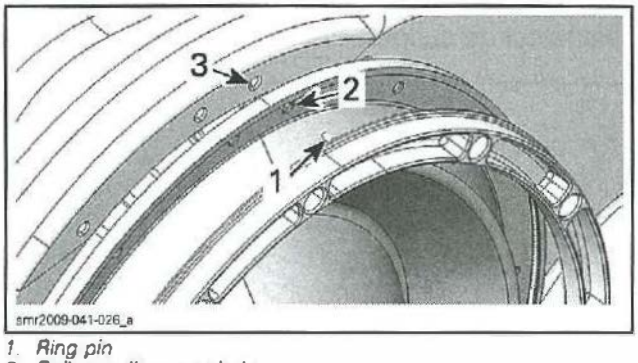
Lateral Bellows Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Apply soapy water solution on bellows opening and insert the lateral support.

Index suspension shaft with the lateral support. The lateral support can be inserted in one position only.

Install the retaining ring. Align the ring pin with holes in bellows and body.



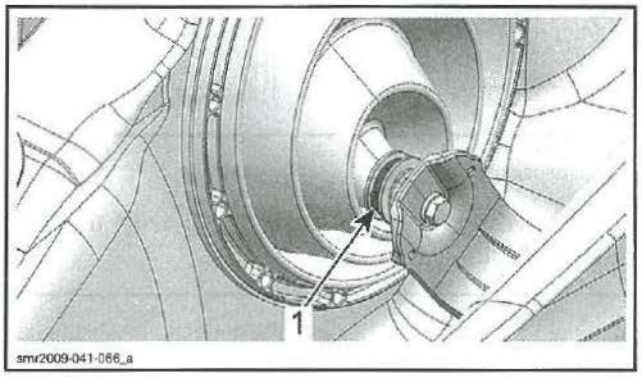
1. Ring pin
2. Bellows alignment hole
3. Body hole

Install new rivets. If the head of rivet tool cannot be inserted in ring opening, use the sleeve (P/N 707 000 181) to offset the rivet tool and well lean the rivet head against ring.

Index lateral supports with the front suspension shaft ends. Lateral supports can be inserted in one position only.

Tighten lateral support screw to 48 N•m (35 lbf•ft).

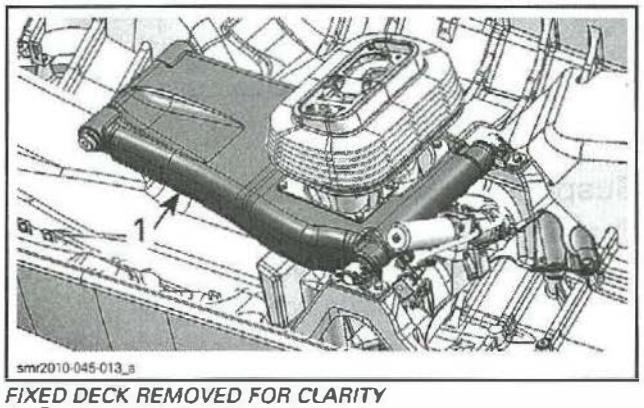
Install a new Oetiker clamp. Position the ear of clamp rearwards.



RH SIDE SHOWN
1. Ear of clamp rearwards

FRONT SUSPENSION ARM

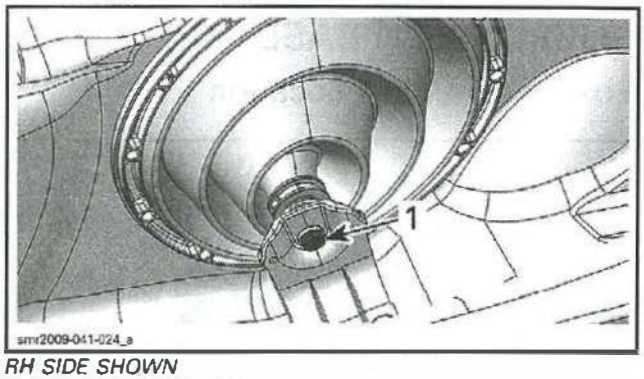
Front Suspension Arm Location



FIXED DECK REMOVED FOR CLARITY
1. Front suspension arm

Front Suspension Arm Removal

1. Remove the moving deck. Refer to *BODY* subsection.
2. Remove the engine. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
3. Remove both lateral support screws.



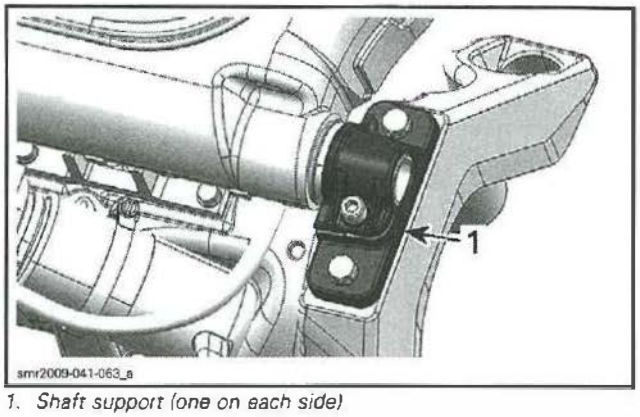
RH SIDE SHOWN
1. Lateral support screw

4. Disconnect lateral supports from suspension arm shaft.
5. Refer to *HYDRAULIC PUMP REMOVAL (AS A UNIT WITH ACTUATOR)* and remove the pump from the PWC.
6. Remove screws securing both shaft supports to suspension base.
7. Move front suspension arm rearward to remove it from the PWC.

Front Suspension Arm Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

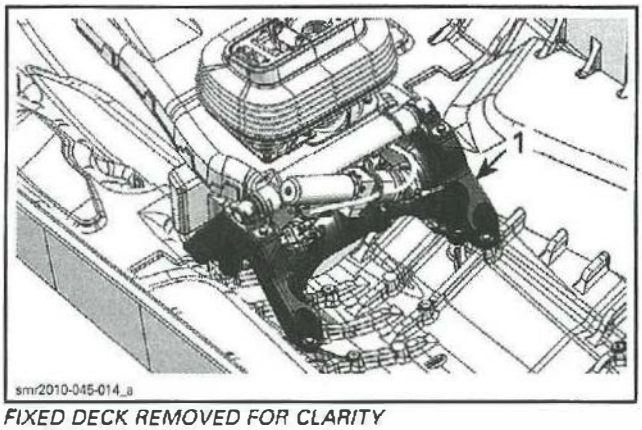
If a shaft support has been loosened from the suspension arm shaft, see *SUSPENSION ARM SHAFTS* for proper installation procedure.



1. Shaft support (one on each side)

SUSPENSION BASE

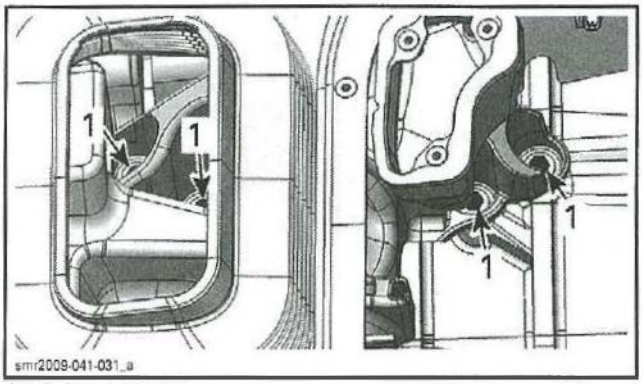
Suspension Base Location



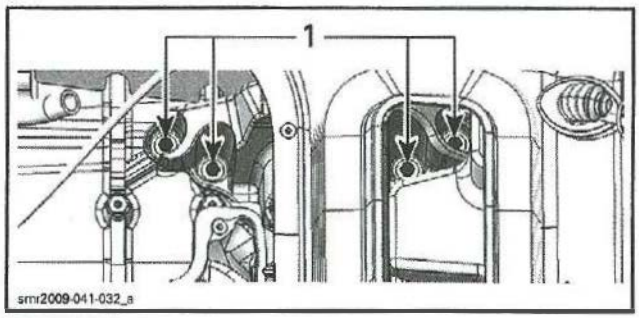
FIXED DECK REMOVED FOR CLARITY
1. Suspension base

Suspension Base Removal

1. Refer to the appropriate procedures and remove the following parts:
   - Moving deck
   - Engine
   - Shock absorber and springs
   - Hydraulic pump (with actuator)
   - Suspension position sensor.
2. Using a marker, trace the shape of suspension base at the bottom of the hull to reposition it at the same place.
3. Remove and discard suspension base screws.

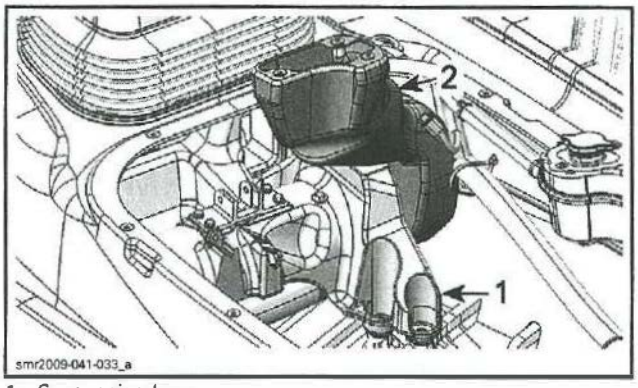


STARBOARD SIDE
1. Suspension base screws



PORT SIDE
1. Suspension base screws

4. Remove suspension base along with the rear vent duct.



1. Suspension base
2. Rear vent duct

Suspension Base Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

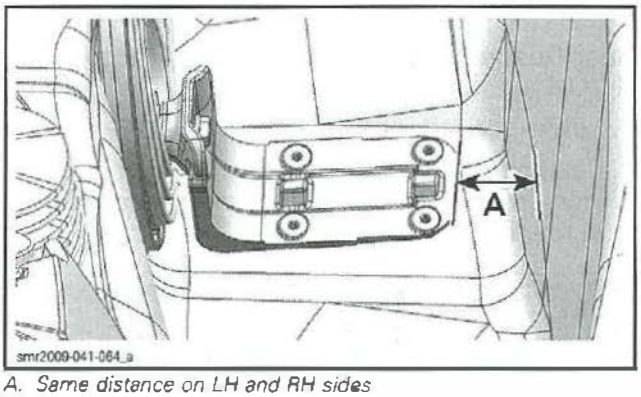
1. Install the suspension base.
   1.1 Position the base in accordance with the reference marks previously drawn at the bottom of the hull.

   NOTE: If there is no mark, see *SUSPENSION BASE INSTALLATION WITHOUT REFERENCE MARKS*.

   1.2 Install NEW suspension base screws.
   1.3 Tighten suspension base screws to 25 N•m (18 lbf•ft).
2. Refer to the appropriate procedures and install all other removed parts.
   - Actuator and hydraulic pump
   - Front suspension arm
   - Shock absorber and springs
   - Engine
   - Moving deck.

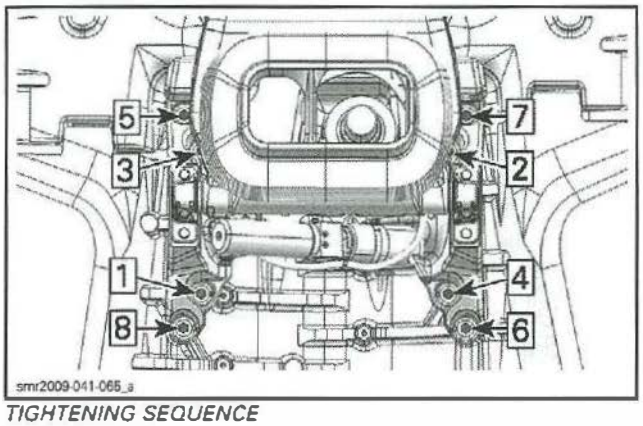
Suspension Base Installation without Reference Marks

1. Install the suspension base in PWC using NEW screws. Do not tighten them yet.
2. Install the front arm on suspension base and tighten screws to 25 N•m (18 lbf•ft), use the OLD screws.
3. Install lateral supports.
   3.1 Index lateral supports with the front suspension shaft ends. Lateral supports can be inserted in one position only.
   3.2 Tighten lateral support screws to 48 N•m (35 lbf•ft).
4. Align suspension base in PWC.
   4.1 On both sides, measure the distance between the end of lateral support and fixed deck.



A. Same distance on LH and RH sides

   4.2 If required, move suspension base until both distances are equal.
   4.3 Tighten suspension base rear screws to 25 N•m (18 lbf•ft).

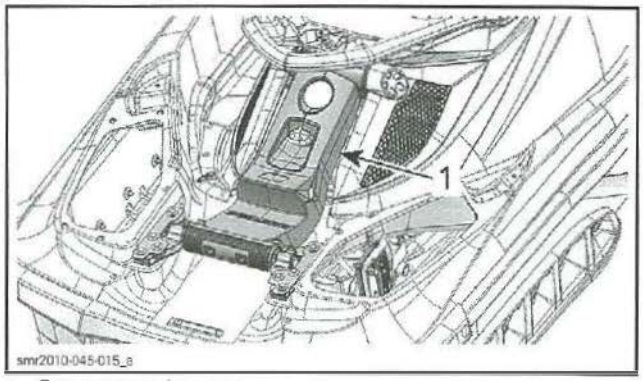


TIGHTENING SEQUENCE

5. Refer to the appropriate procedures and install all other removed parts.
   - Actuator and hydraulic pump
   - Shock absorber and springs
   - Engine
   - Moving deck.

REAR SUSPENSION ARM

Rear Suspension Arm Location



1. Rear suspension arm

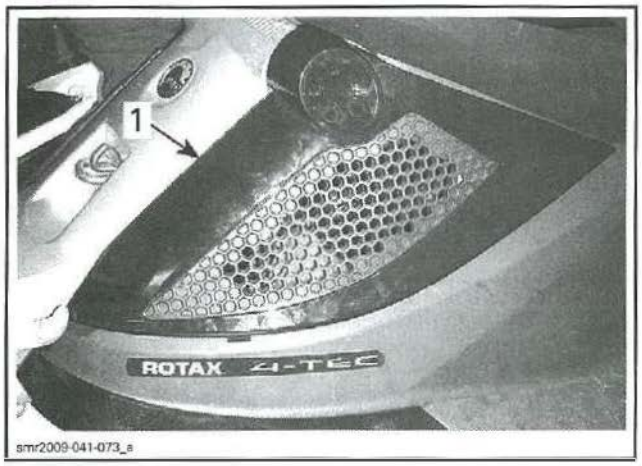
Rear Suspension Arm Removal

1. Open the boarding platform.
2. Remove bolts securing both rear suspension arm covers.



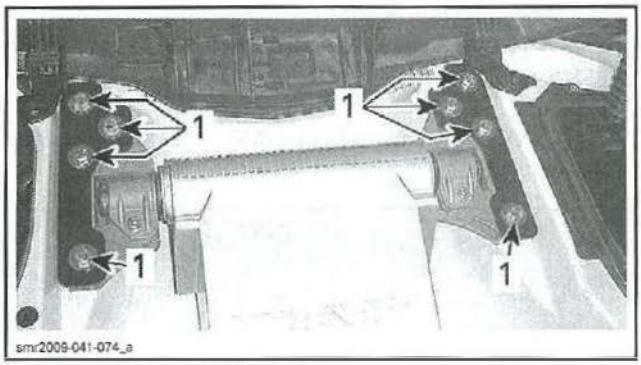
1. Rear suspension arm cover

3. Unclip and remove both lateral rear panels.



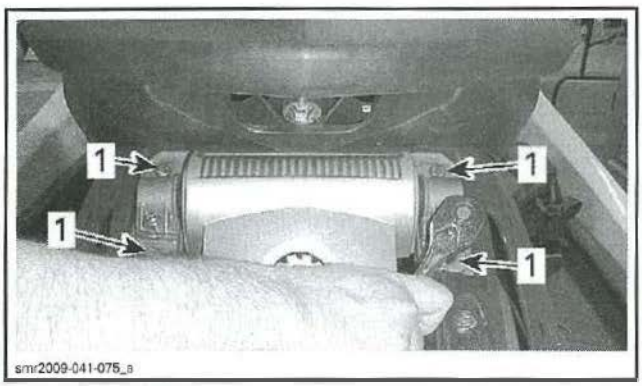
1. RH lateral rear panel

4. Mark position of rear suspension arm brackets for proper reinstallation.
5. Remove and discard screws securing rear suspension arm to fixed deck.



1. Rear suspension arm screws

6. Remove and discard screws securing the top of rear suspension arm.



1. Retaining screws

7. Remove the rear suspension arm from PWC.

Rear Suspension Arm Installation

1. Using NEW screws, install the top of rear suspension arm.

NOTE: If the upper arm shaft or one of its arm shaft support has been removed or loosened, refer to *SUSPENSION ARM SHAFTS* for proper installation procedure.

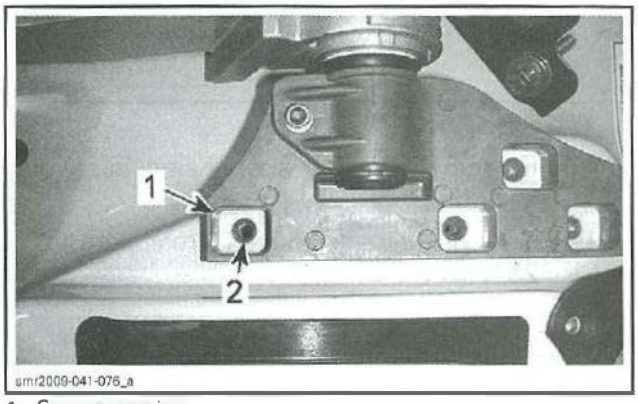
2. Tighten screws to 25 N•m (18 lbf•ft).
3. Carefully lower and secure the rear suspension arm to the fixed deck.
   3.1 Position the rear suspension arm brackets in accordance with the reference marks previously draw on fixed deck.

   NOTICE If no mark was traced, refer to *REAR SUSPENSION ARM INSTALLATION WITHOUT REFERENCE MARKS* for proper procedure to install and align the rear suspension arm.

   3.2 Install NEW screws to secure rear suspension arm brackets.
   3.3 Tighten screws to 25 N•m (18 lbf•ft).

Rear Suspension Arm Installation Without Reference Marks

1. Lower the rear suspension arm on fixed deck.
2. Position the square openings of rear suspension arm brackets so that the threaded inserts in fixed deck are centered.



1. Square opening
2. Threaded insert

3. On each bracket, install the retaining plate and one screw.
4. Install a weight of 90 kg (200 lb) on PWC to lower the moving deck.
5. Check moving deck position in comparison to fixed deck.
   5.1 Check the gap between moving deck wipers and fixed deck. It should be the same on both sides.
   5.2 Check front and rear gaps. Moving deck should be able to move without having contact with the fixed deck.

5.3 Reposition rear suspension arm brackets on fixed deck until positioning of moving deck is satisfactory.

6. Secure the rear suspension arm to the fixed deck.
   6.1 Install NEW screws to secure rear suspension arm brackets.
   6.2 Remove and replace screws installed during alignment.
   6.3 Tighten screws to 25 N•m (18 lbf•ft).

SUSPENSION ARM SHAFTS

Removal of Front Suspension Arm Shaft

1. Remove the *FRONT SUSPENSION ARM*, see procedure in this subsection.
2. Remove and discard socket screws securing supports to shaft.
3. Separate arm shaft supports from arm shaft.

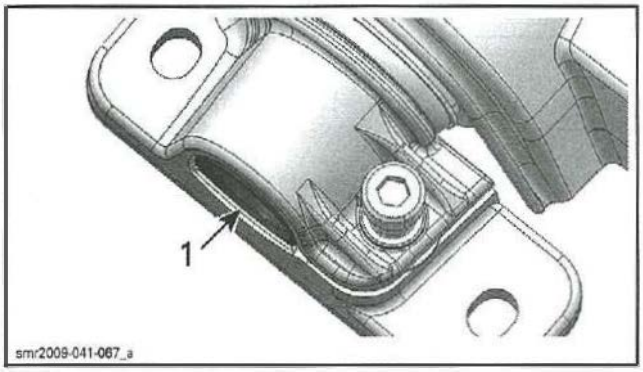
Installation of Front Suspension Arm Shaft

1. To reinstall the shaft, insert it in the suspension arm.
2. Install a support on each end of theshaft.
3. Secure the LH arm shaft support to suspension base using NEW support screws.

NOTE: Make sure to insert the support pin into suspension base hole.

4. Tighten the LH support screws to 25 N•m (18 lbf•ft).
5. Apply a force on the RH support to move it on the left side.

NOTICE **Make sure arm shaft is fully inserted, it must lean against the arm shaft support.**

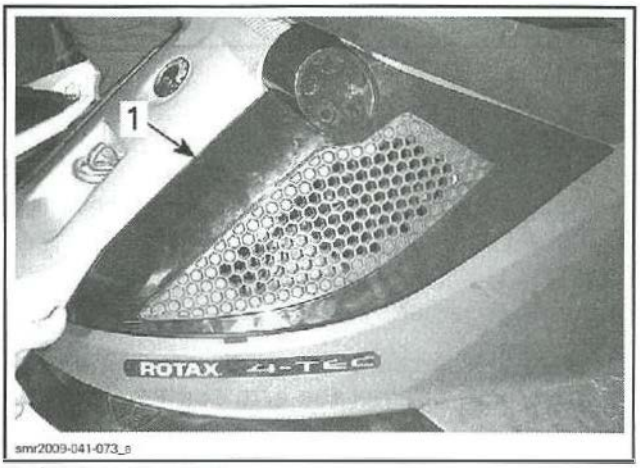


1. Arm shaft against its support

6. Install NEW support screws and tighten them to 25 N•m (18 lbf•ft).
7. Secure both supports to shaft using NEW socket screws. Tighten them to 12 N•m (106 lbf•**in**).

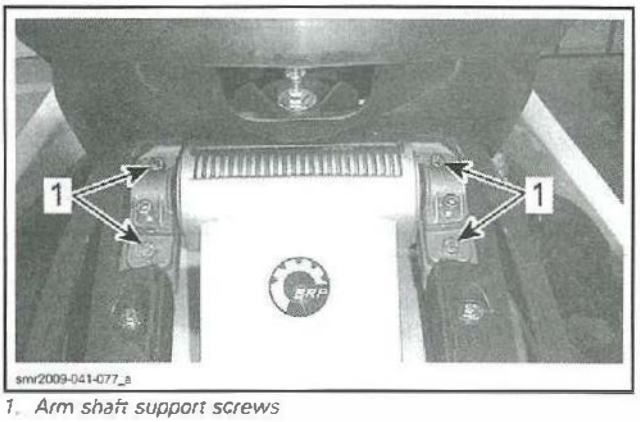
Removal of Rear Suspension Arm Upper Shaft

1. Unclip and remove both lateral rear panels.



1. RH lateral rear panel

2. Remove arm shaft support screws.



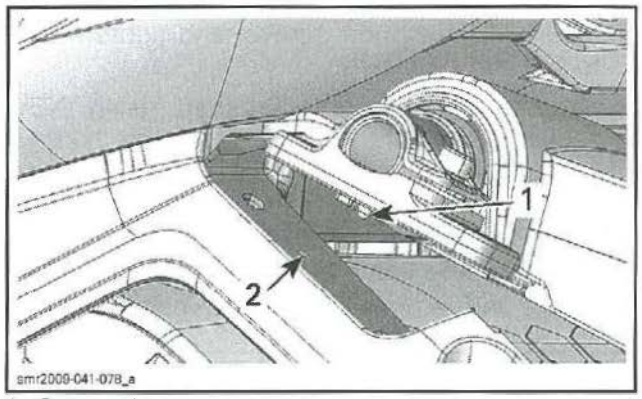
1. Arm shaft support screws

3. Remove and discard socket screws securing supports to arm shaft.
4. Separate arm shaft support from arm shaft.

Installation of Rear Suspension Arm Upper Shaft

1. To reinstall the shaft, insert it in the rear arm.
2. Install a support on each end of shaft.
3. Secure the LH support to rear arm holder using NEW support screws.

NOTE: Make sure to insert the support pin into holder hole.

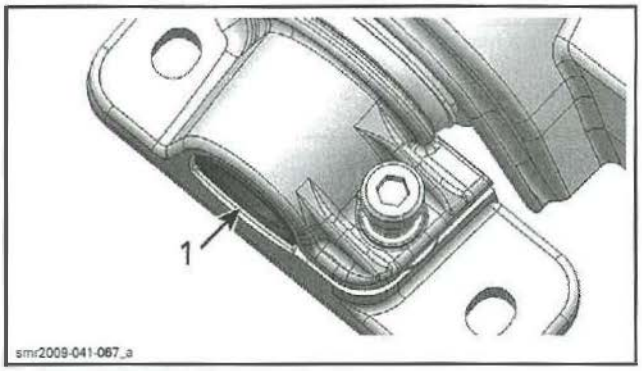


1. *Support pin*
2. *Holder hole*

4. Tighten the LH support screws to 25 N•m (18 lbf•ft).
5. Apply a force on the RH support to move it to the left side.

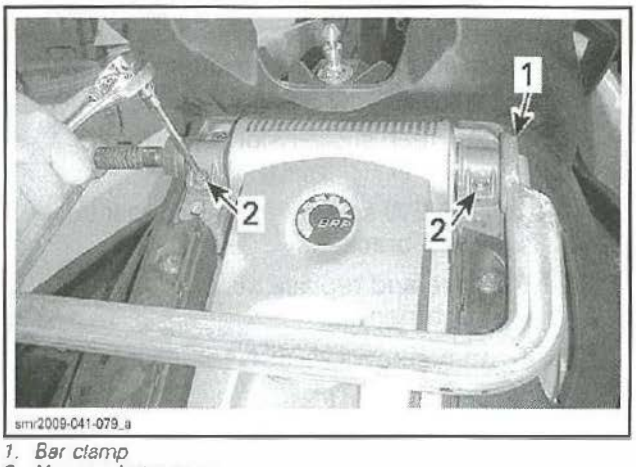
NOTE: A bar clamp can be used to compress both supports together.

NOTICE **Make sure arm shaft is fully inserted, it must flush against the arm shaft support.**



1. *Arm shaft against its support*

6. Install **NEW** support screws and tighten them to 25 N•m (18 lbf•ft).
7. Secure both supports to shaft using **NEW** socket screws. Tighten them to 12 N•m (106 lbf•**in**).



1. *Bar clamp*
2. *New socket screws*

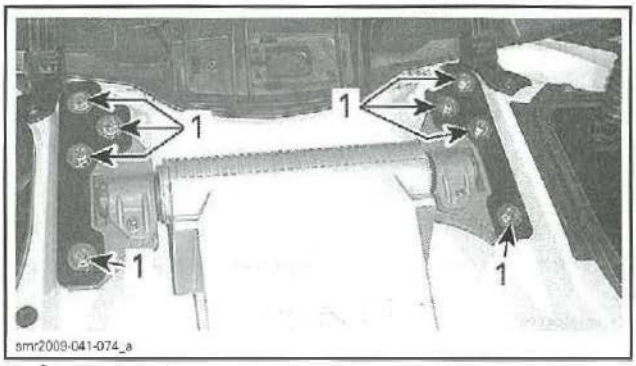
Removal of Rear Suspension Arm Lower Shaft

1. Open the boarding platform.
2. Remove bolts securing both rear suspension arm covers.



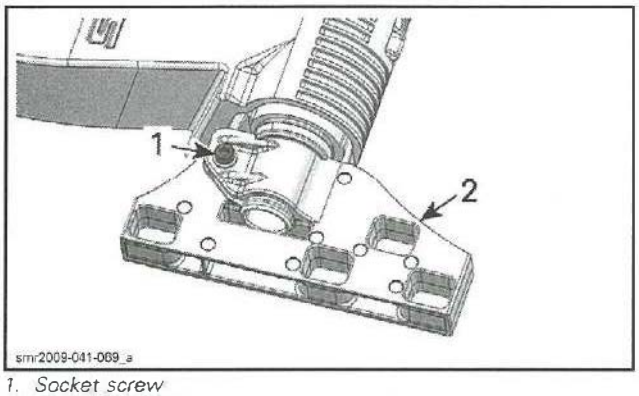
1. *Rear suspension arm cover*

3. **Mark position of rear suspension arm brackets for proper reinstallation.**
4. Remove and discard screws securing rear suspension arm to fixed deck.



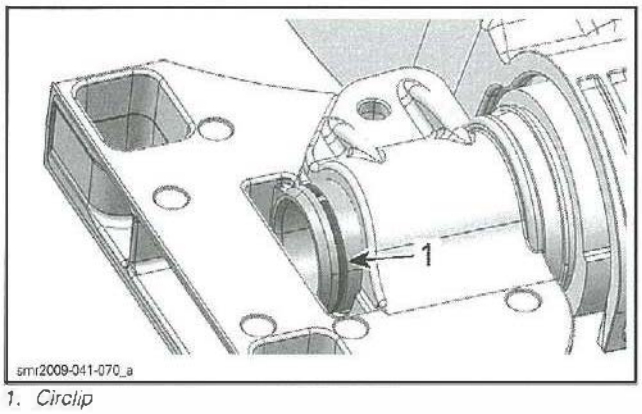
1. *Rear suspension arm screws*

5. Remove and discard socket screws securing rear brackets to arm shaft ends.



1. *Socket screw*
2. *LH rear bracket*

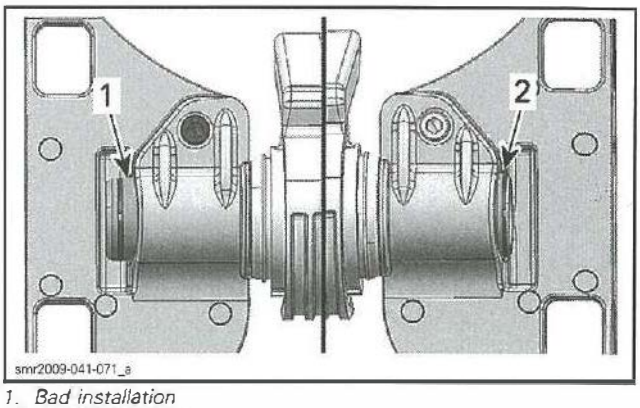
6. Press one rear bracket against the suspension arm bushing and remove the circlip. Repeat for the other side.



1. *Circlip*

Installation of Rear Suspension Arm Lower Shaft

1. When reassembly the rear bracket on shaft end, press bracket on bushing to install the circlip.
2. When both brackets are installed on shaft, pull brackets outside to position circlips against brackets.



1. *Bad installation*
2. *Good installation*

3. Lower the rear suspension arm on fixed deck.
4. Tighten **NEW** socket screws to 10 N•m (89 lbf•**in**).
5. Refer to *REAR ARM* for reinstallation.

BODY (GTS/GTI/WAKE)

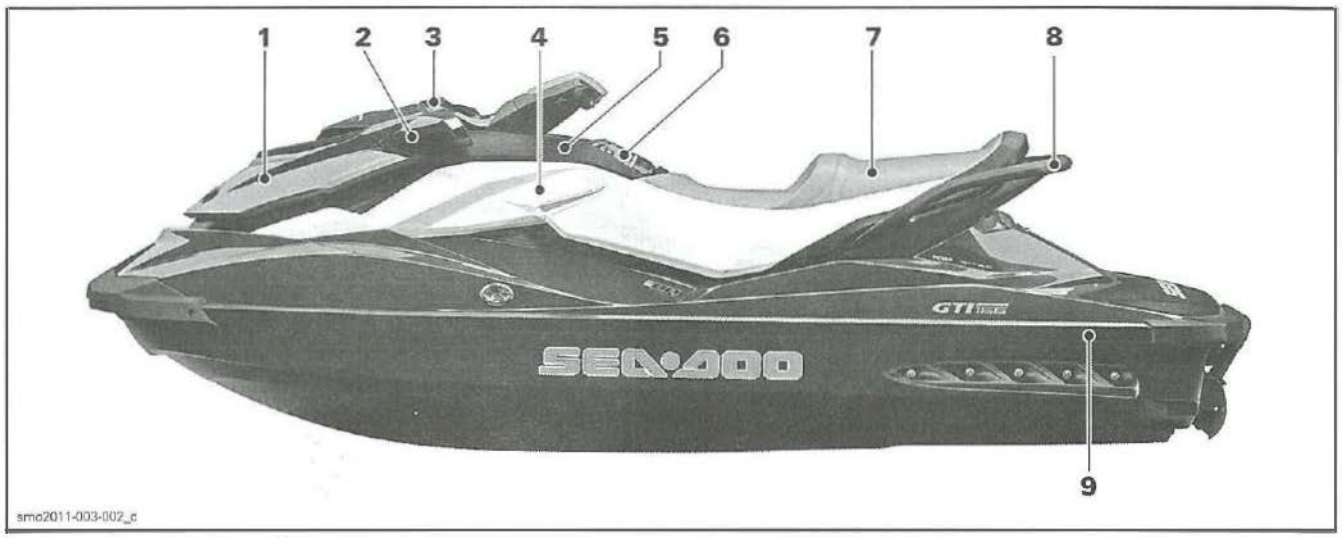
SERVICE TOOLS

Description	Part Number	Page
SUPERTANIUM DRILL BIT 3/16"	529 031 800	615–616, 619

SERVICE PRODUCTS

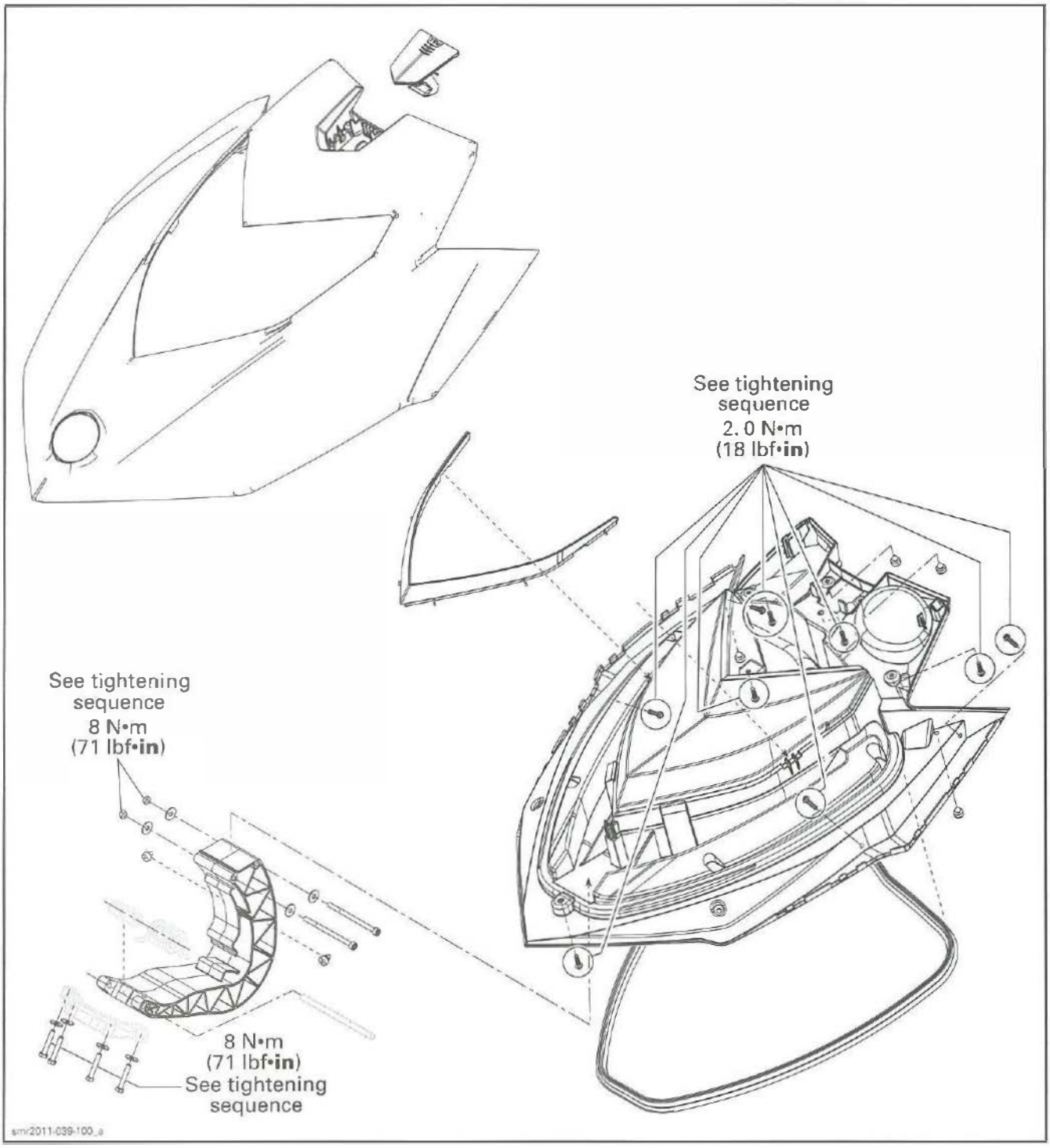
Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	618
XPS MULTI-PURPOSE CLEANER	219 701 709	617
XPS SYNTHETIC GREASE	293 550 010	621–622

BODY PARTS NOMENCLATURE

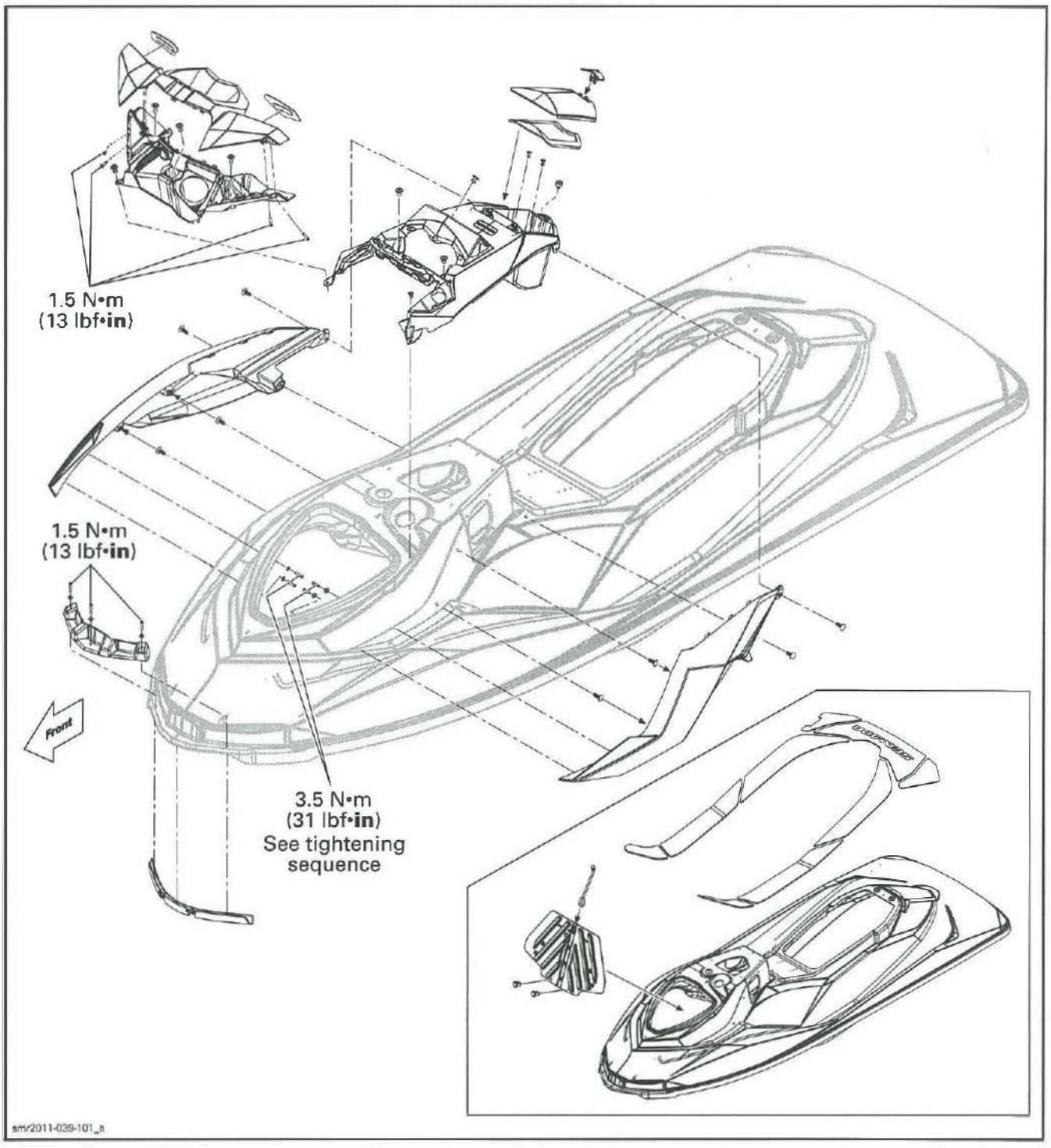


1. *Storage compartment cover*
2. *Mirror support*
3. *Gauge trim*
4. *Lateral trim panel*
5. *Console*
6. *Glove box cover*
7. *Seat*
8. *Rear handle*
9. *Bumper*

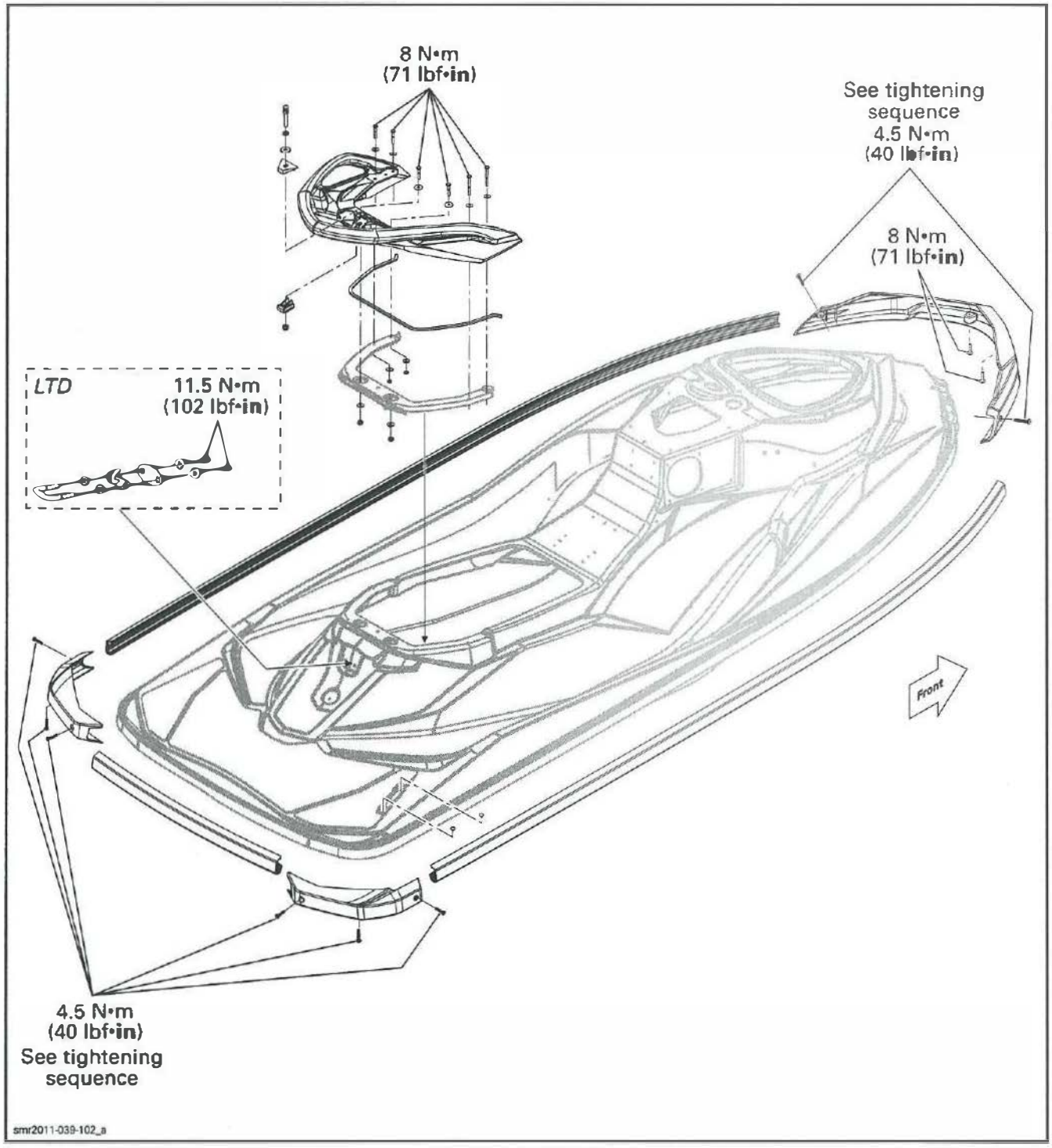
STORAGE COMPARTMENT COVER



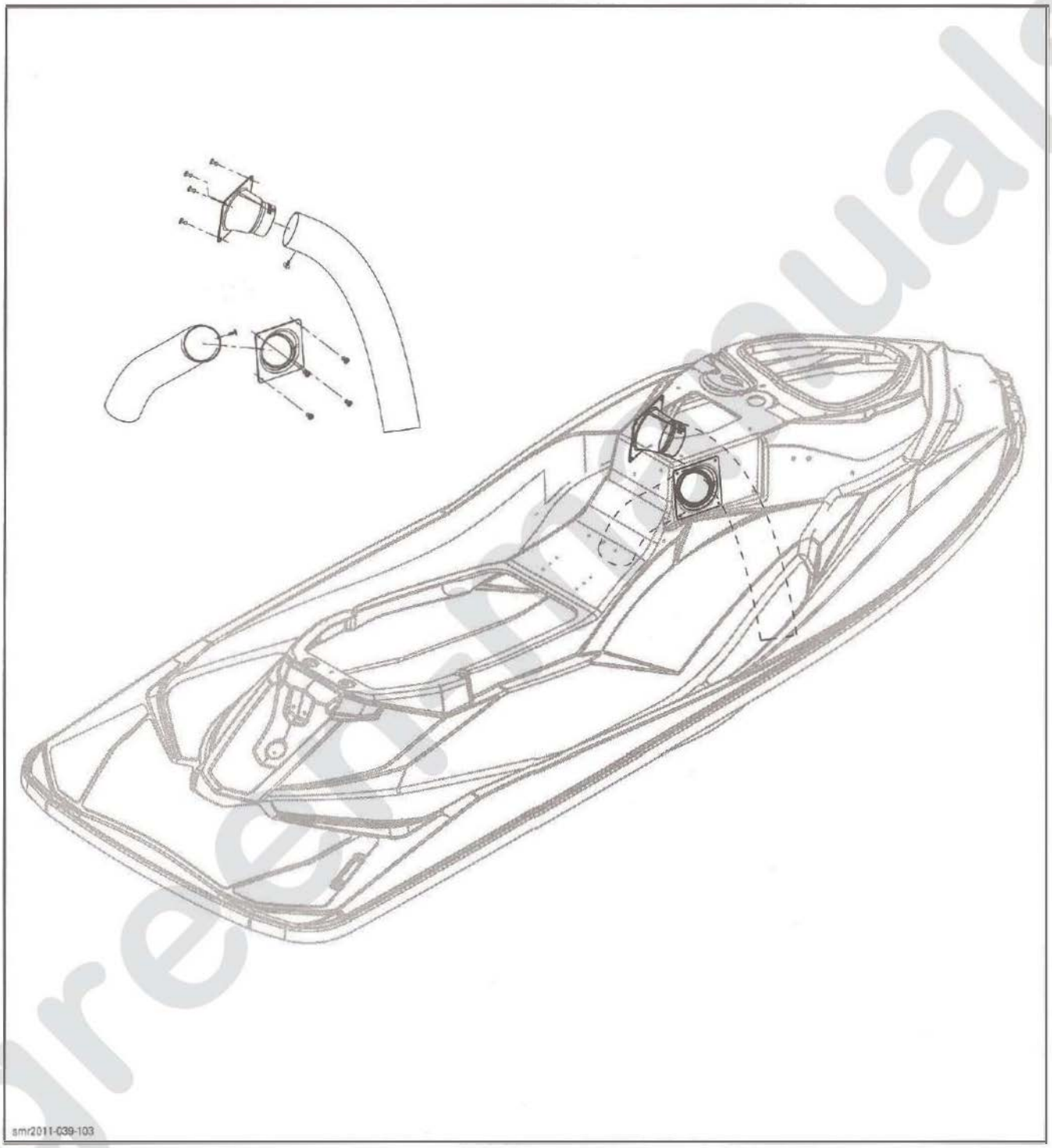
BODY PARTS


1.5 N•m
(13 lbf•in)
1.5 N•m
(13 lbf•in)
Front
3.5 N•m
(31 lbf•in)
See tightening
sequence
smr2011-039-101_a

BODY PARTS

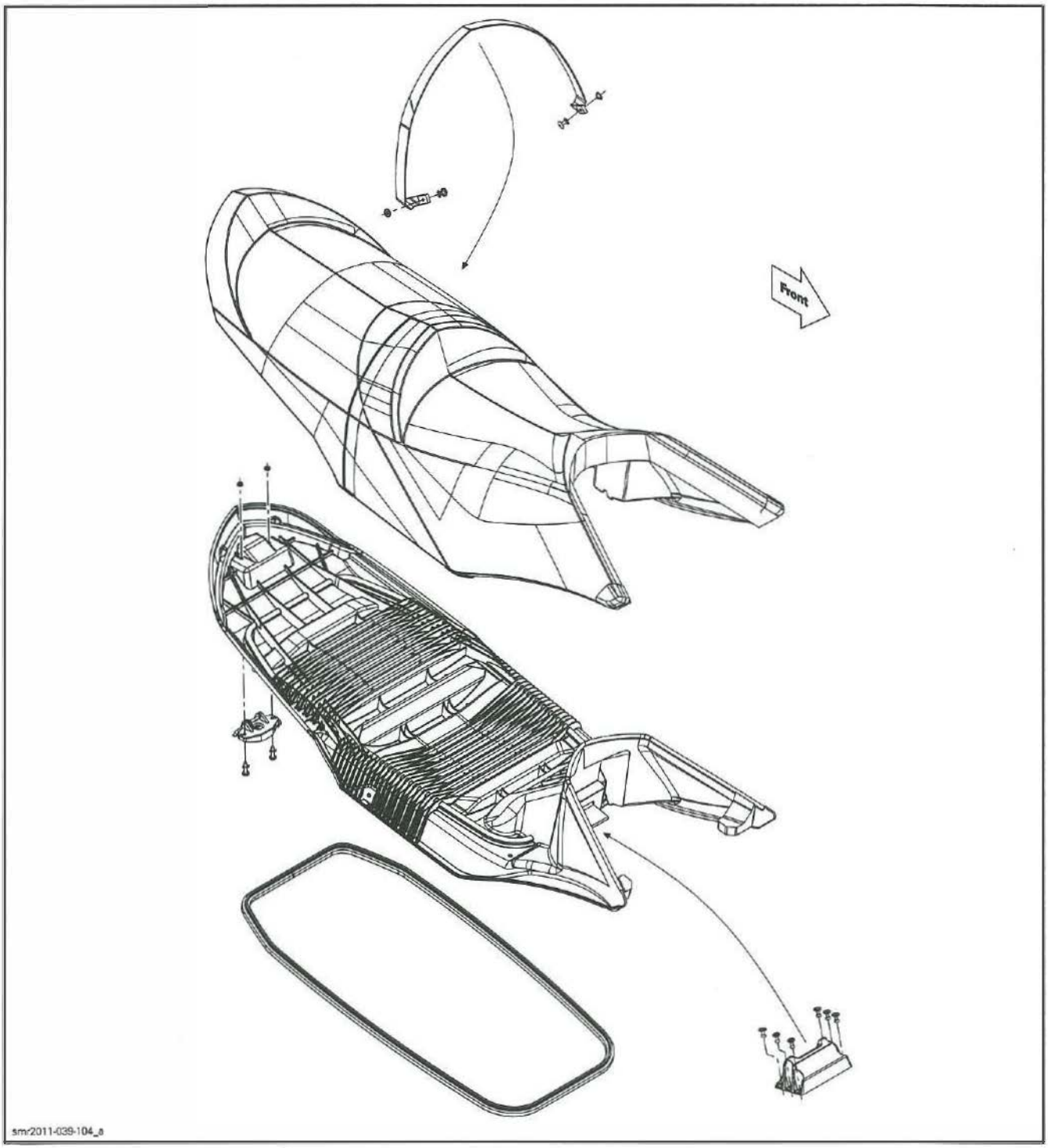

8 N•m
(71 lbf•in)
See tightening
sequence
4.5 N•m
(40 lbf•in)
8 N•m
(71 lbf•in)
LTD
11.5 N•m
(102 lbf•in)
Front
4.5 N•m
(40 lbf•in)
See tightening
sequence
smr2011-039-102_a

VENTILATION



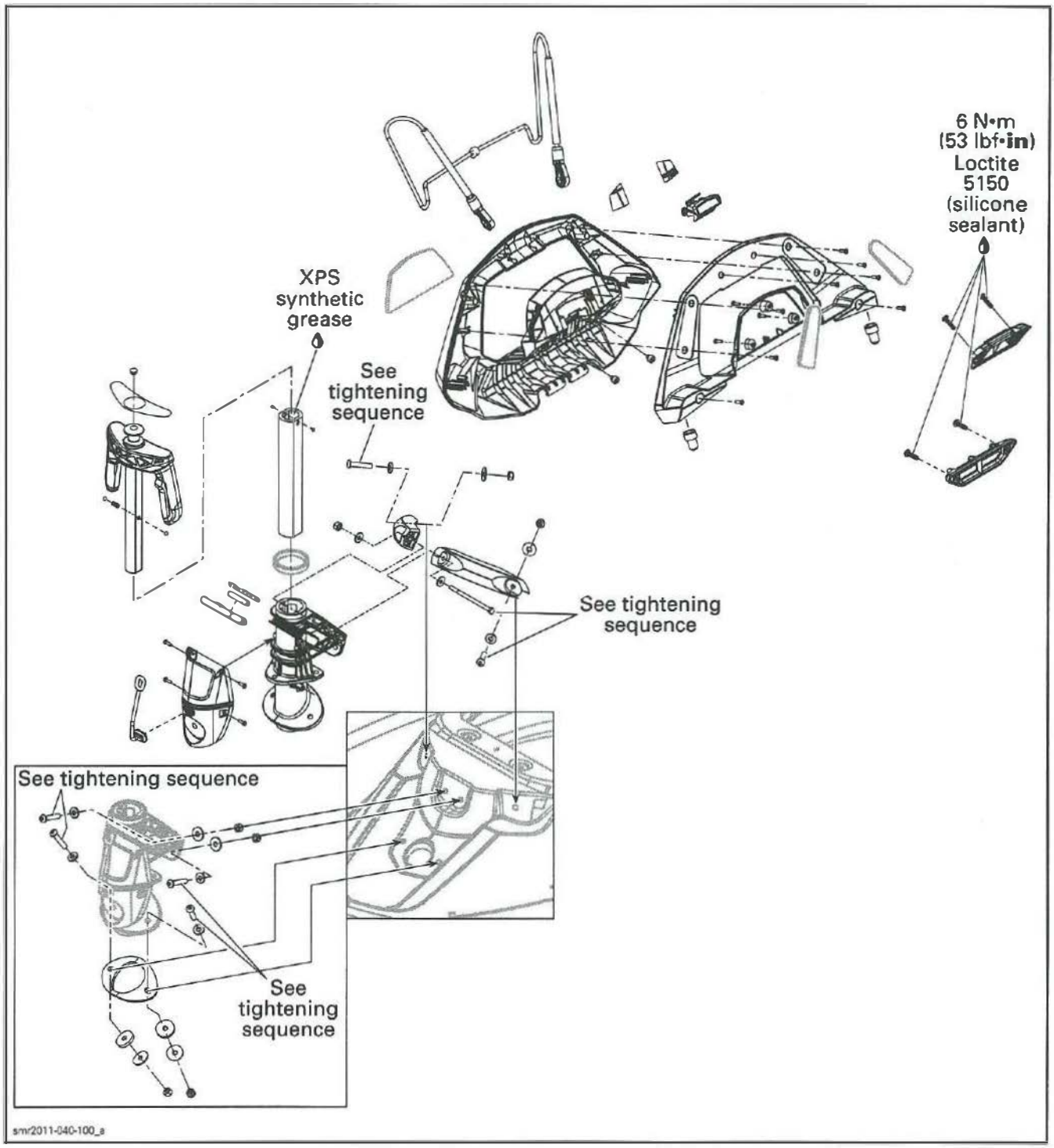
greenmanuals

SEAT



WAKEBOARD RACK AND WAKE PYLON

Wake 155



GENERAL

Verify hinges condition and latching mechanisms condition and operation. Replace any damaged components.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

NOTICE **When applying threadlocker products (anaerobic products), pay attention so that it does not come in contact with ABS plastic parts (painted parts). It could lead to plastic cracks or other damage.**

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new one.

NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

PROCEDURES

GELCOAT

For information and repair, refer to *BODY (RXT/GTX/WAKE PRO)* subsection.

DECALS

For information and repair, refer to *BODY (RXT/GTX/WAKE PRO)* subsection.

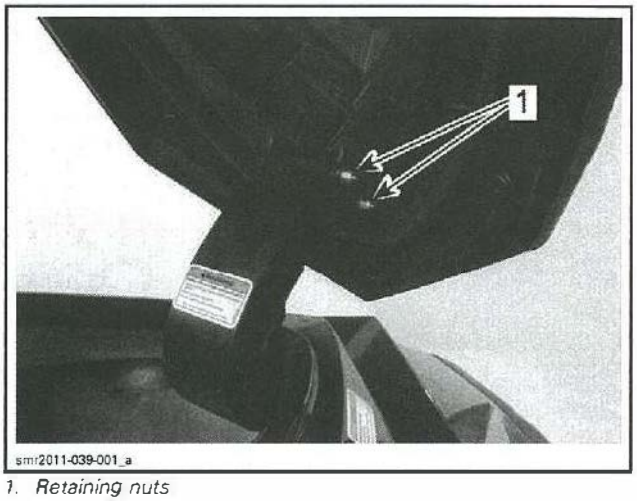
CARPETS

For information and repair, refer to *BODY (RXT/GTX/WAKE PRO)* subsection.

STORAGE COMPARTMENT COVER

Storage Compartment Cover Removal

1. Open storage compartment cover.
2. Remove nuts and bolts securing storage compartment cover to hinge.



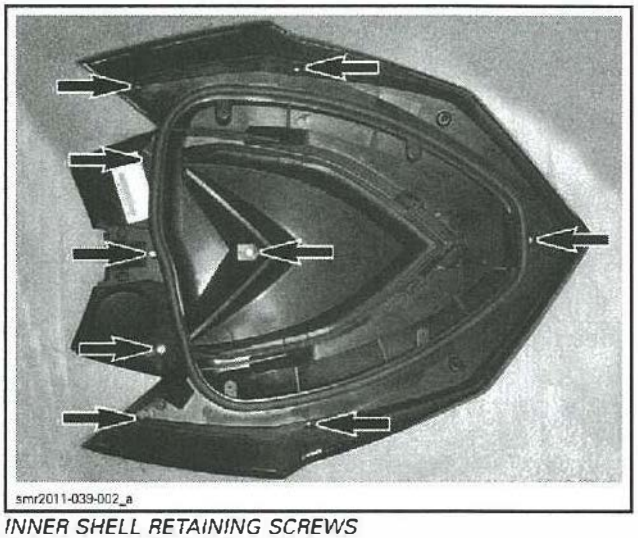
1. Retaining nuts

3. Remove storage compartment cover.

Storage Compartment Cover Disassembly

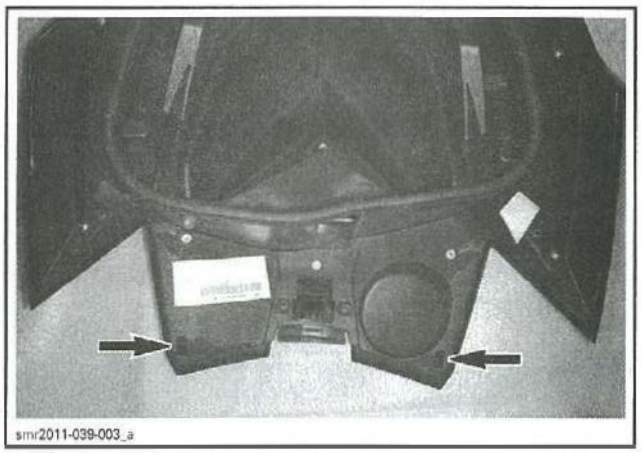
Storage Compartment Cover Inner Shell

1. Remove inner shell retaining screws.



INNER SHELL RETAINING SCREWS

2. Unlatch both retaining tabs at the rear using a screwdriver.



RETAINING TABS

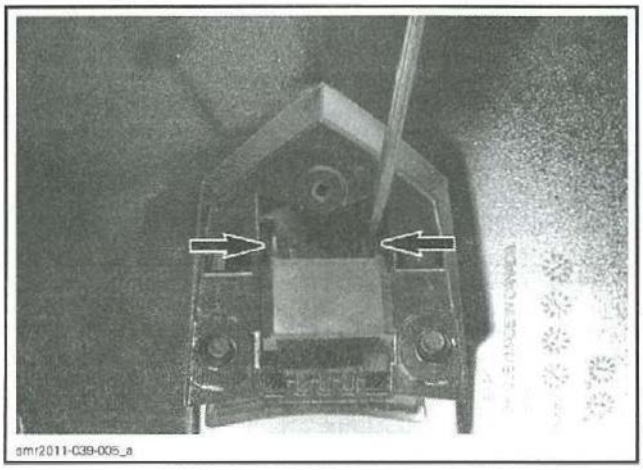
3. Unlatch retaining tabs on both sides using a screwdriver.



4. Disassemble inner shell from storage compartment cover.

Storage Compartment Cover Latch

1. Ensure that inner shell is removed.
2. Remove latch by slightly pushing both retaining holes toward the inside.

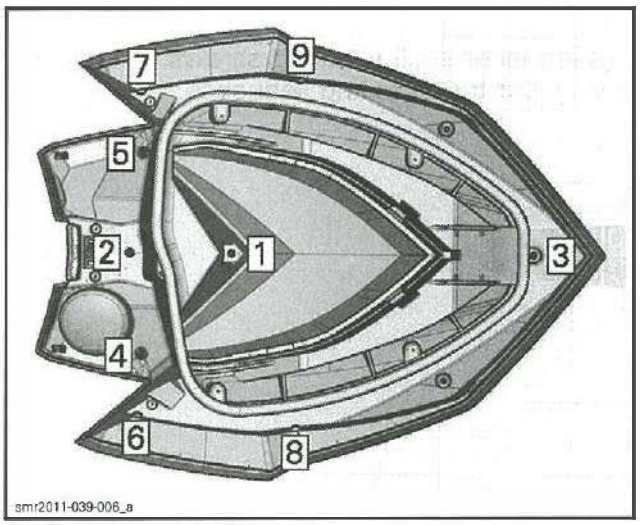


Storage Compartment Cover Assembly

The assembly is the reverse of the disassembly procedure. However, pay attention to the following.

Tighten inner shell retaining screws to specification as per the following sequence.

TORQUE	
Inner shell retaining screws	2.0 N•m (18 lbf•in)



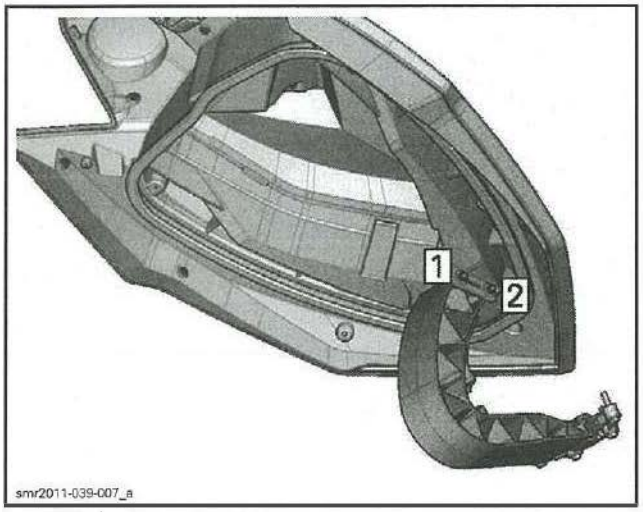
TIGHTENING SEQUENCE

Storage Compartment Cover Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Tighten storage compartment cover retaining nuts to specification as per the following sequence.

TORQUE	
Storage compartment cover retaining nuts	8.0 N•m (71 lbf•in)

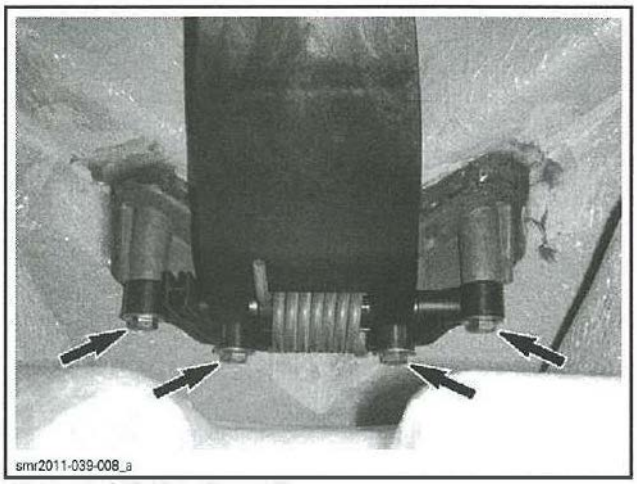


TIGHTENING SEQUENCE

STORAGE COMPARTMENT COVER HINGE

Storage Compartment Cover Hinge Removal

1. Proceed with *STORAGE COMPARTMENT COVER REMOVAL.*
2. Remove screws securing storage compartment cover hinge to deck.

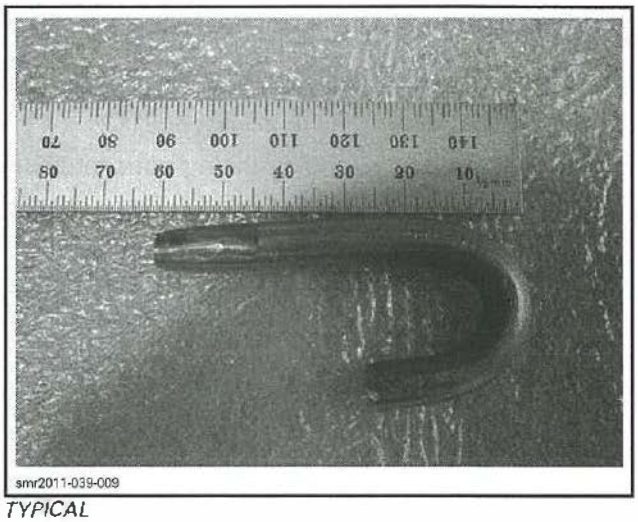


HINGE RETAINING SCREWS

Storage Compartment Cover Hinge Installation

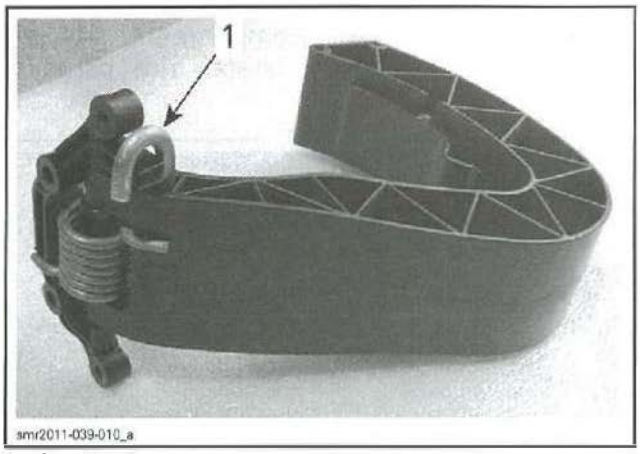
The installation is the reverse of the removal procedure. However, pay attention to the following.

Use a ø 6.5 mm (1/4 in) steel rod to make a hook in order to lock the hinge.



TYPICAL

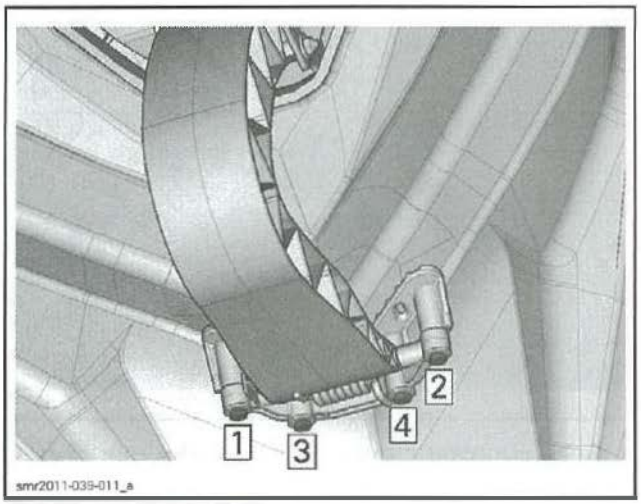
Insert the steel hook on the lateral tab of hinge in order to slightly load the spring.



1. Steel hook

Tighten hinge retaining screws to specification as per the following sequence.

TORQUE	
Storage compartment cover hinge screws	8.0 N•m (71 lbf•in)

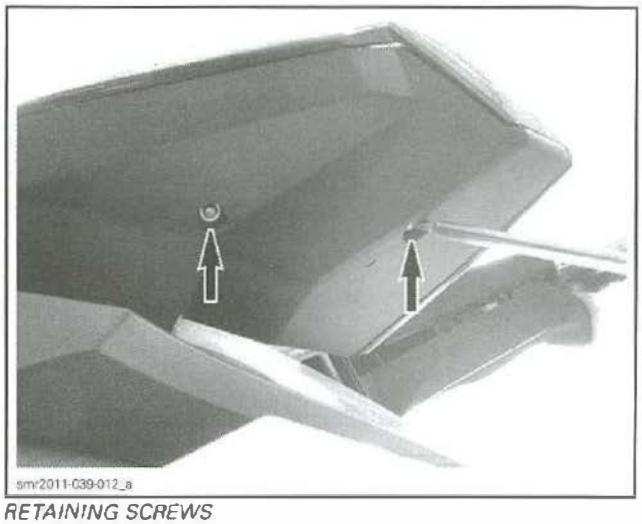


TIGHTENING SEQUENCE

GAUGE TRIM

Gauge Trim Removal

1. Open storage compartment cover.
2. From underneath mirror, remove retaining screws on both sides.



RETAINING SCREWS

3. Hit with a sharp blow the front part of mirror toward the rear to unlock it.

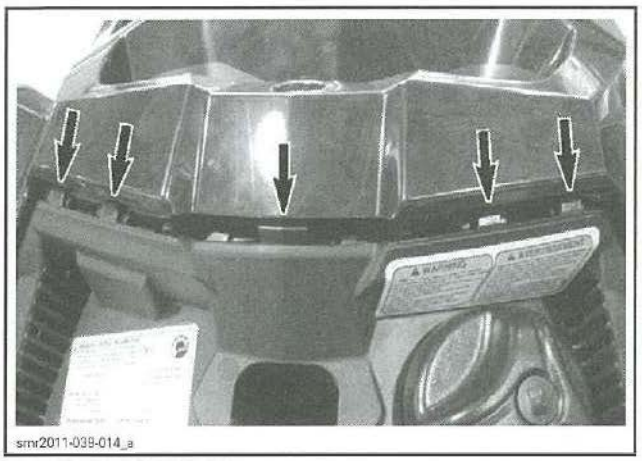


4. Remove gauge trim from mirror support.

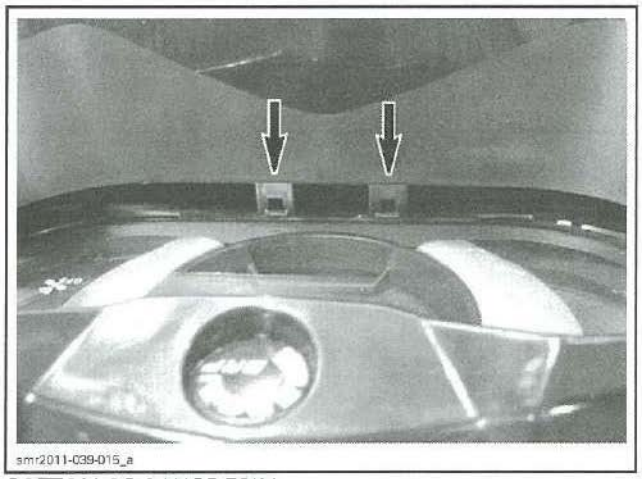
Gauge Trim Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Prior to inserting gauge trim into mirror support, ensure that all tabs are properly aligned.


smr2011-039-014_a

TOP OF GAUGE TRIM

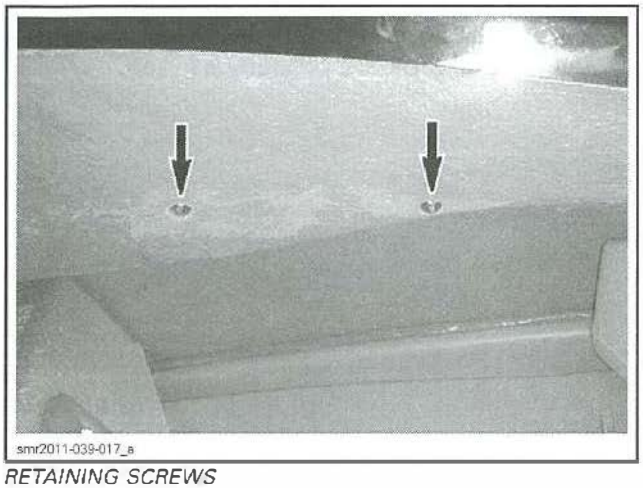

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BOTTOM OF GAUGE TRIM

LATERAL TRIM PANEL

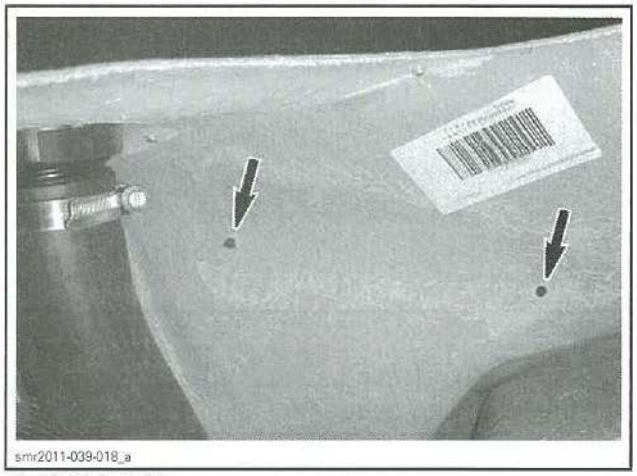
Lateral Trim Panel Removal

1. Remove seat.
2. From inside storage compartment, remove screws securing lateral trim panel to deck.

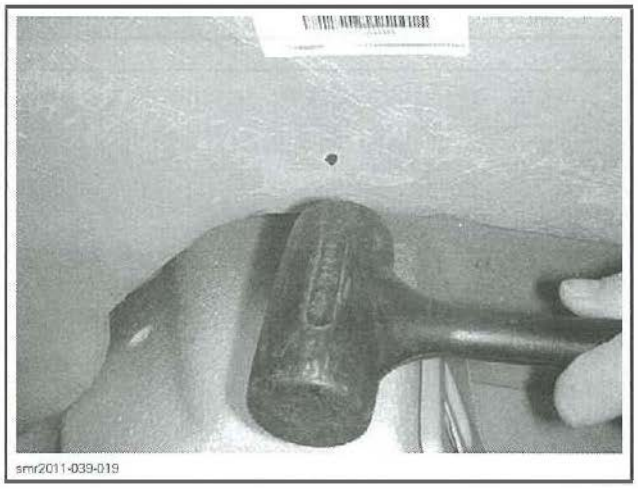

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RETAINING SCREWS

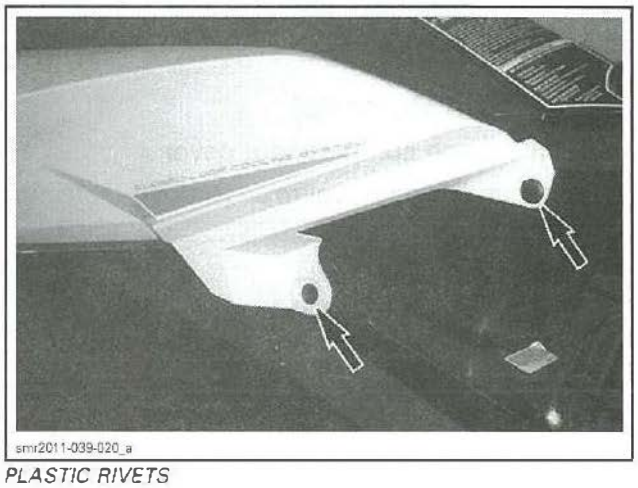
3. From inside storage compartment, remove plastic rivets securing lateral trim panel to deck.


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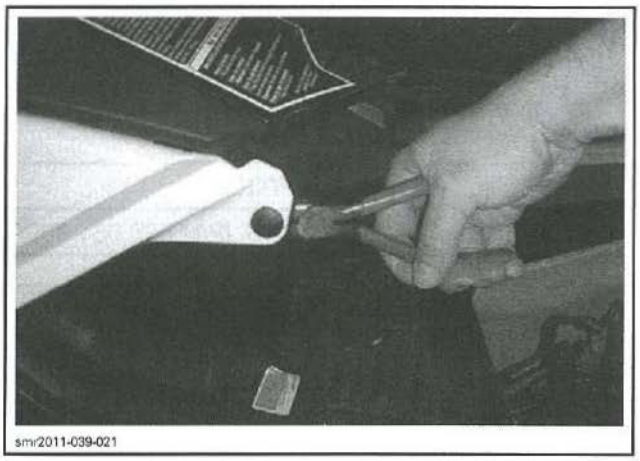
PLASTIC RIVETS


smr2011-039-019

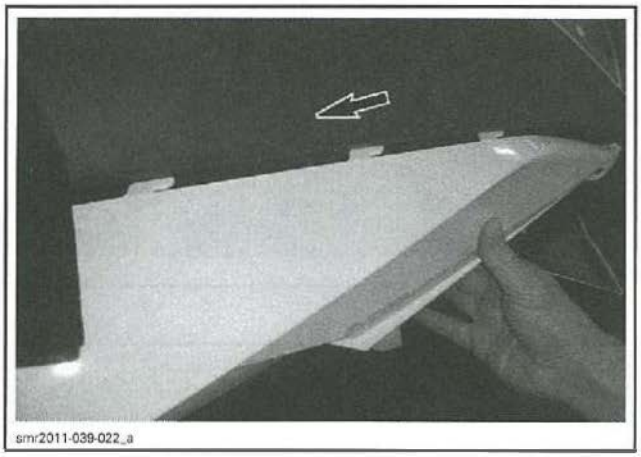
4. Remove plastic rivets securing the rear portion of lateral trim panel.


smr2011-039-020_a

PLASTIC RIVETS



5. Slide panel toward the front to unlock retaining tabs.



Lateral Trim Panel Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

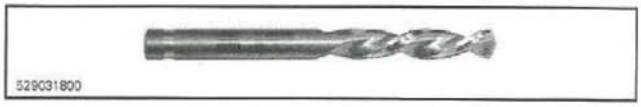
Install NEW plastic rivets.

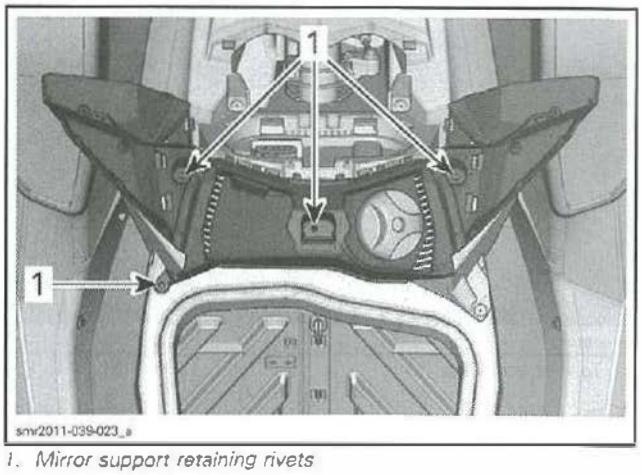
MIRROR SUPPORT

Mirror Support Removal

1. Proceed with *LATERAL TRIM PANEL REMOVAL*. See procedure in this subsection.
2. Proceed with *INFORMATION CENTER REMOVAL*. Refer to *INFORMATION CENTER (GAUGE)* subsection.
3. Remove steering column, refer to *STEERING AND O.T.A.S.* subsection.
4. Remove the following rivets securing mirror support to deck.

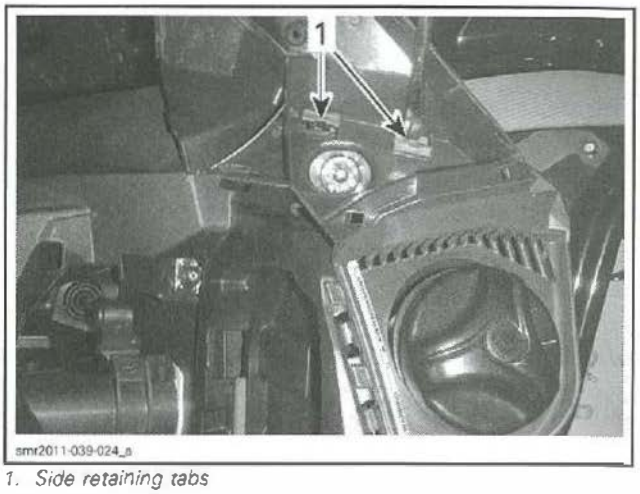
REQUIRED TOOL
SUPERTANIUM DRILL BIT 3/16" (P/N 529 031 800)





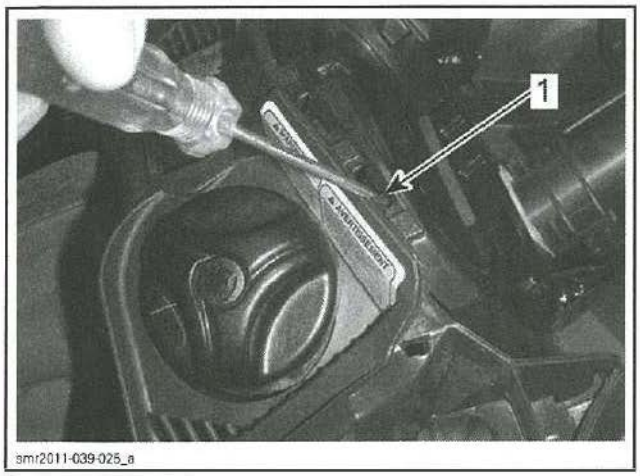
1. Mirror support retaining rivets

5. Remove fuel tank cap.
6. Place a clean cloth rag onto fuel tank tube.
7. Unlatch retaining tabs on both sides using a screwdriver.



1. Side retaining tabs

8. Unlatch retaining tabs on the top using a screwdriver.



1. Top retaining tab

9. Remove mirror support by pulling it upwards.
10. Remove cloth rag and reinstall fuel tank cap.

⚠ WARNING

Fuel vapors are flammable and explosive under certain conditions. Unless otherwise noted, the fuel tank cap must always be installed on watercraft.

Mirror Support Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Prior to inserting mirror support into console, ensure that all tabs are properly aligned.

Install rivets upside down with washers on mirror support top surface.

MIRRORS

Mirror Replacement

1. Proceed with *GAUGE TRIM REMOVAL*, see procedure in this subsection.
2. From inside gauge trim, slightly heat mirror.
3. Push at the back of mirror to remove it.
4. Properly clean gauge trim surface of any glue residue.
5. Install mirror using adhesive tape at the back of mirror.
6. Reinstall gauge trim as the reverse of removal.

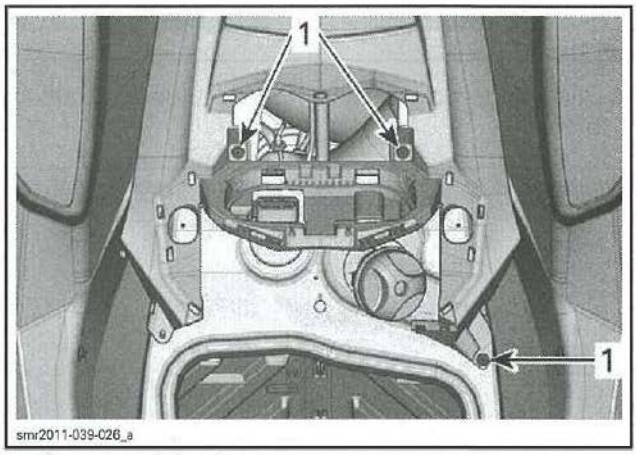
CONSOLE

Console Removal

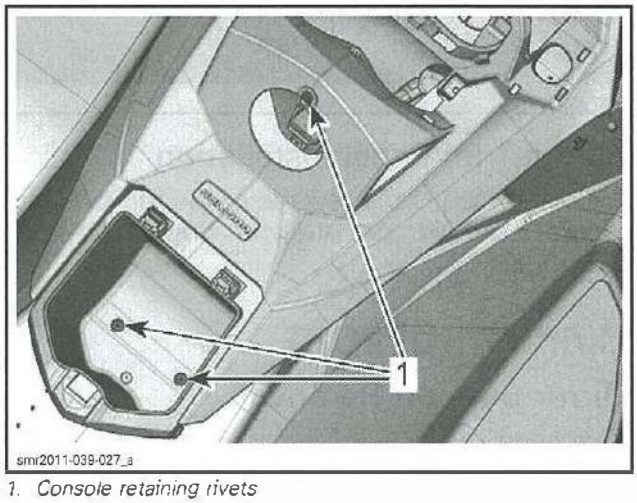
1. Proceed with *MIRROR SUPPORT REMOVAL*. See procedure in this subsection.
2. Remove *GLOVE BOX COVER*, see procedure in this subsection.
3. Remove the following rivets securing console to deck.

REQUIRED TOOL
SUPERTANIUM DRILL BIT 3/16" (P/N 529 031 800)





1. Console retaining rivets



1. Console retaining rivets

4. Remove console by pulling it upwards.

Console Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

To ease installation of rivets located in glove box, proceed as follows:

- Remove air intake silencer, refer to *AIR INTAKE SYSTEM (EXCEPT iS AND aS MODELS)* subsection.
- Install rivets upside down with washers on console top surface.

GLOVE BOX COVER

Glove Box Cover Replacement

1. Open glove box cover.
2. Pull glove box cover upwards to release it from console hinge.



3. Reinstall glove box cover as the reverse of removal.

SEAT

Seat Cleaning

For general purpose cleaning, use XPS MULTI-PURPOSE CLEANER (P/N 219 701 709), Vinyl Finish Vinyl Cleaner, Fantastik or warm water with a mild dish soap such as Dawn or Ivory. Gently scrub with a small soft bristle brush.

For dirt build-up, use XPS MULTI-PURPOSE CLEANER (P/N 219 701 709), Vinyl Finish Vinyl Cleaner or an equivalent. Let soak for approximately 10 minutes, then gently scrub with a soft bristle brush. For specific stain removal, refer to your cleaning and care card.

Do not use any silicone-based protectants. They will extract the plasticizers, leaving the vinyl hard and brittle, and eventually cracking will occur.

RECOMMENDED PRODUCTS
1. XPS MULTI-PURPOSE CLEANER (P/N 219 701 709)
2. Dish Soap (Dawn or Ivory)
3. Fantastik
4. 3M Citrus Cleaner
5. 303 Protectant

Vinyl Cleaning Recommendations for Special Stains

TYPE OF STAIN	STEP 1	STEP 2	STEP 3	ACTION
Ballpoint ink *	E	B	A	A. Medium-soft brush, warm soapy water, rinse/dry.
Chewing gum	D	A	—	
Coffee, tea, chocolate	B	—	—	
Pen	D	B	—	B. Vinyl Finish Cleaner, rinse/dry.
Grease	D	B	—	
Household soil	A	B	—	
Ketchup	A	B	—	C. One (1) tablespoon of ammonia, one-fourth (1/4) cup of hydrogen peroxide, three-fourth (3/4) cup of water, rinse/dry.
Latex paint	A	B	—	
Lipstick	A	B	—	
Mildew or wet leaves *	C	B	A	
Motor oil	B	—	—	
Oil-based paint	D	B	—	D. Wipe or scrape off excess (chill gum with ice before hand).
Permanent marker *	E	B	C	
Spray paint	B	B	—	
Suntan lotion	A	B	—	E. Denatured alcohol, rinse/dry.
Tar/asphalt	D	B	—	
Yellow mustard	A	B	C	

* Suntan lotion, tree pollen, wet leaves and some other products can contain dyes that stain permanently.

All cleaning methods must be followed by a thorough rinse with warm water.

Certain household cleaners, powdered abrasives, steel wool and industrial cleaners can cause damage and discoloration and are not recommended. Dry cleaning fluids and lacquer solvents should not be used as they will remove printed pattern and gloss. Waxes should be used with caution as many contain dyes or solvents that can permanently damage the protective coating.

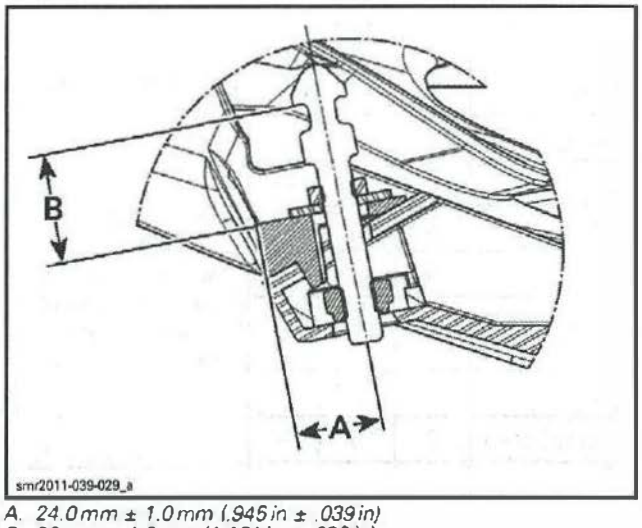
SEAT LATCH

Seat Latch Adjustment

NOTE: Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of lock pin when the adjustment is required or when the lock pin is removed. If a new lock pin is used, it is already coat with a threadlocker.

1. Loosen adjustment nut.
2. Adjust lock pin height. Do not torque yet.
3. Position the lock pin longitudinally into the rear handle slot.

LOCK PIN POSITIONING	
MEASURE A	MEASURE B
24.0 mm ± 1.0 mm (.945 in ± .039 in)	30 mm ± 1.0 mm (1.181 in ± .039 in)



A. 24.0 mm ± 1.0 mm (.945 in ± .039 in)
B. 30 mm ± 1.0 mm (1.181 in ± .039 in)

4. Hold the lock pin in this position and tighten as per the following sequence.

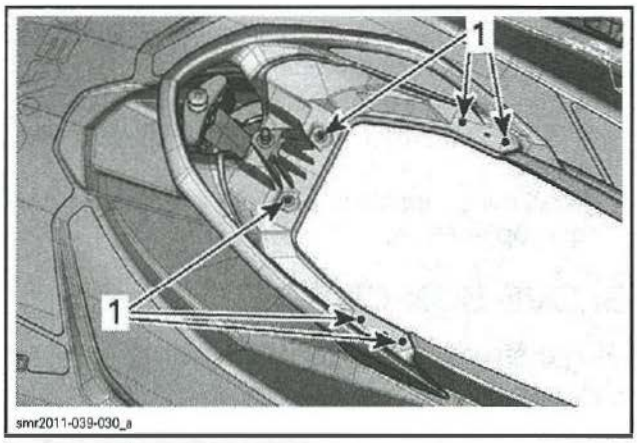
SEAT LATCH TIGHTENING SEQUENCE		
STEP 1	Lock pin	9.5 N•m (84 lbf•in)
STEP 2	Adjustment nut	8.0 N•m (71 lbf•in)

5. Close the seat and readjust if required.

REAR HANDLE

Rear Handle Replacement

1. Remove seat.
2. Remove screws securing rear handle to deck.



1. Rear handle retaining screws

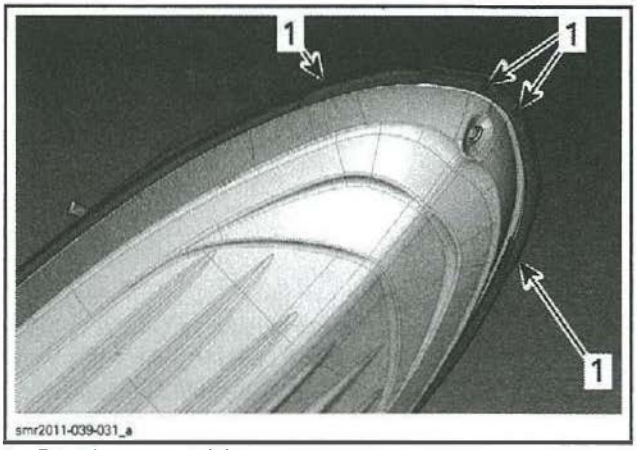
3. Replace rear handle.
4. Tighten rear handle screws to specification.

TORQUE	
Rear handle screws	8.0 N•m (71 lbf•in)

BUMPER

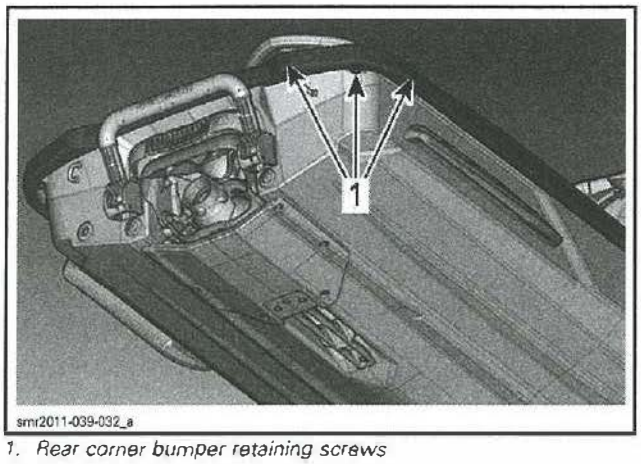
Bumper Replacement

1. Remove screws securing front bumper.
2. Remove front bumper from deck.



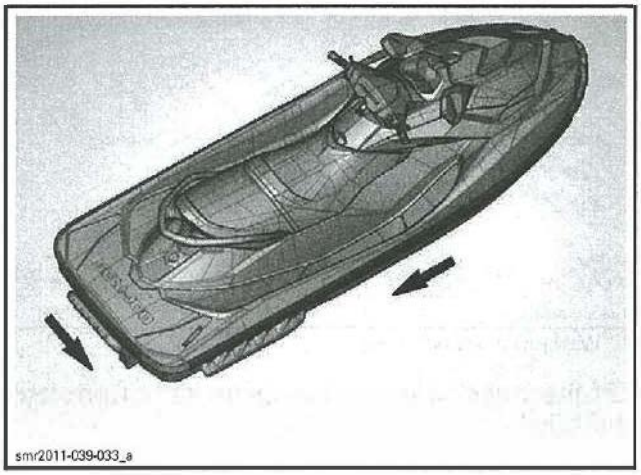
1. Front bumper retaining screws

3. Remove screws securing both rear corner bumpers.
4. Remove rear corner bumpers from deck.



1. Rear corner bumper retaining screws

5. Slide side bumpers toward the rear to remove them from deck.
6. Slide rear bumper toward the side to remove it from deck.



7. Install **new** bumpers as the reverse of removal.

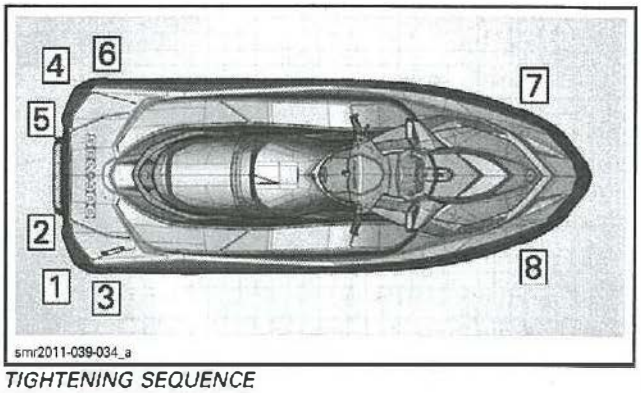
NOTE: Use soapy water to ease bumper installation.

8. Tighten front bumper lower retaining screws to specification.

TORQUE	
Front bumper lower screws	8.0 N•m (71 lbf•**in**)

9. Tighten bumper retaining screws to specification as per the following sequence.

TORQUE	
Bumper retaining screws	4.5 N•m (40 lbf•**in**)

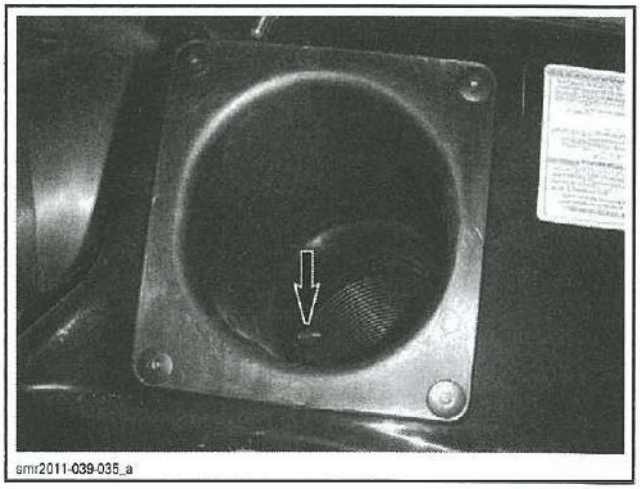


TIGHTENING SEQUENCE

VENTILATION DUCT

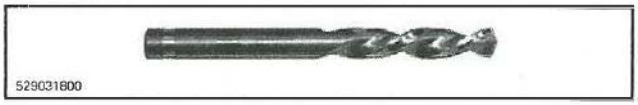
Ventilation Duct Replacement

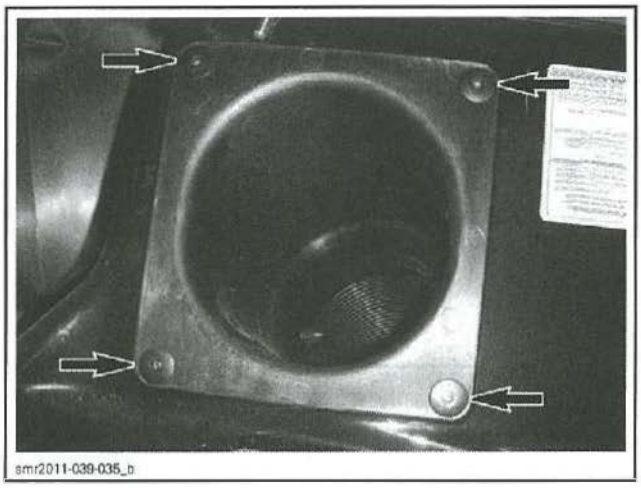
1. Proceed with *LATERAL TRIM PANEL REMOVAL*. See procedure in this subsection.
2. Remove plastic rivet securing ventilation duct to housing.



3. Remove the following rivets securing ventilation duct housing to deck.

REQUIRED TOOL
SUPERTANIUM DRILL BIT 3/16" (P/N 529 031 800)





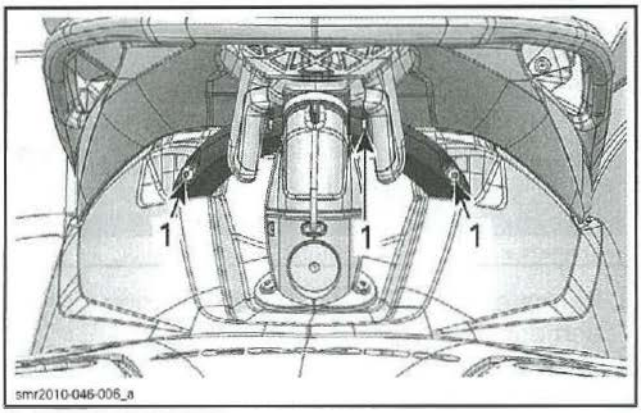
4. If applicable, remove locking tie securing wiring harness to ventilation duct.
5. Remove ventilation duct and its housing from watercraft.
6. Reinstall parts as the reverse of removal.

WAKE PYLON (WAKE)

Wake Pylon Removal

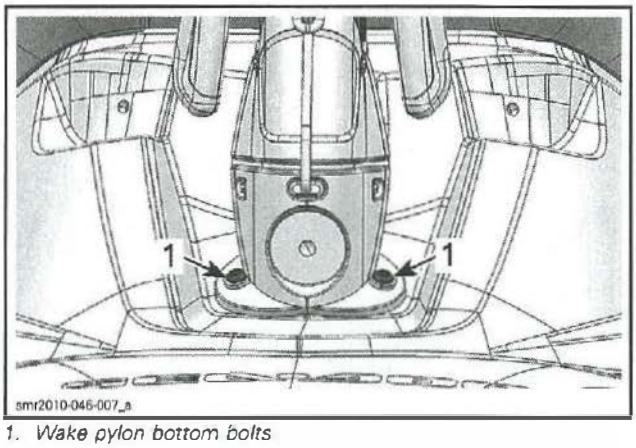
Open the seat.

Remove both lateral arms.



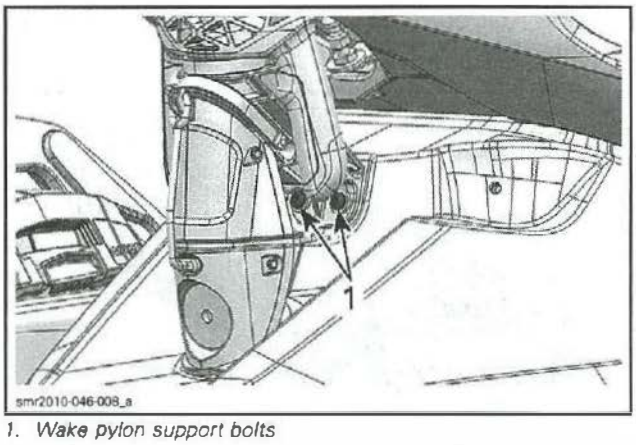
1. Lateral arms screws

Remove bolts at the bottom of wake pylon.



1. Wake pylon bottom bolts

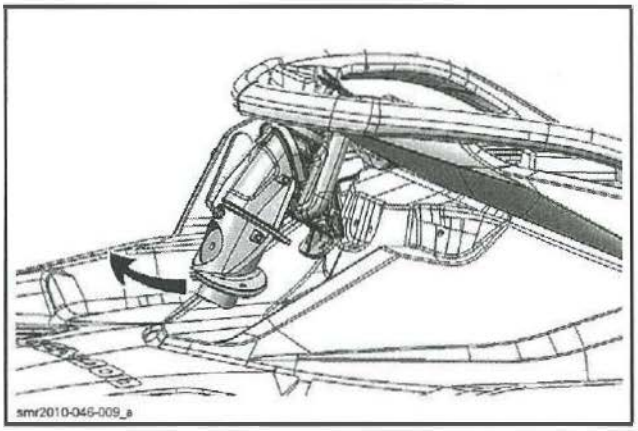
Remove bolts securing the wake pylon support to body.



1. Wake pylon support bolts

Lift the wake pylon to disengage its bottom from the body.

Slide the bottom of the wake pylon rearward to remove the wake pylon from vehicle.

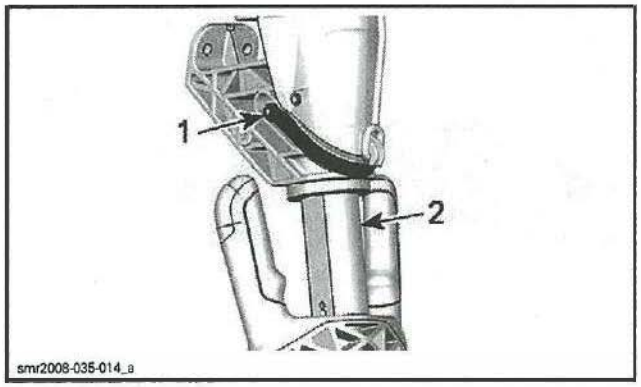


Wake Pylon Disassembly

Extend the handle completely.

Turn the wake pylon upside down.

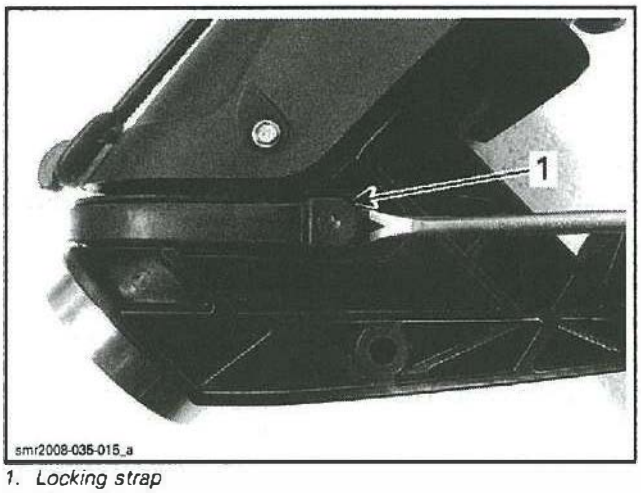
Move both ends of locking strap to disengage the inner lock and free the handle.



1. Locking strap end
2. Handle stem

Locking Strap

Using a screwdriver or any other suitable tool, detach a side of the locking strap from retaining pin.

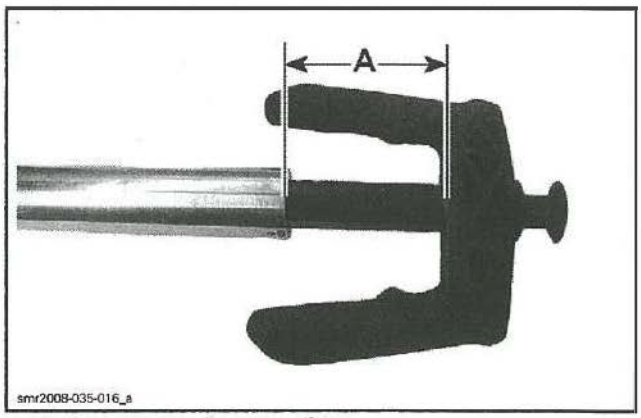


1. Locking strap

Remove locking strap and the inner lock.

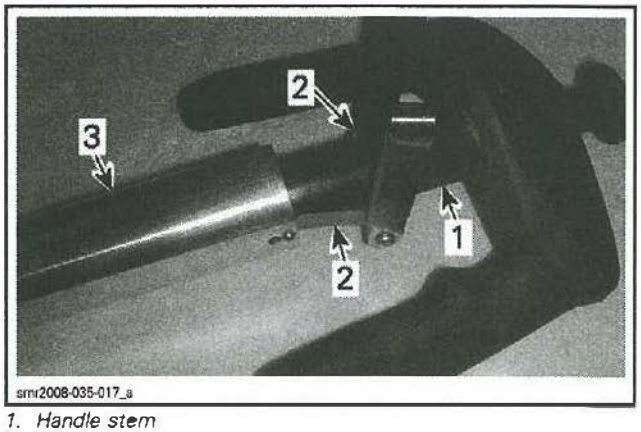
Handle

Extend handle approximately 75 mm to 90 mm (3 in to 3-1/2 in).



A. 75 mm to 90 mm (3 in to 3-1/2 in)

Insert two thin feeler gauges between handle stem and extension tube.



1. Handle stem
2. Feeler gauges
3. Extension tube

Place a rag around the joint to catch balls and spring.

Hold feeler gauges and pull the handle.

Wake Pylon Assembly

Handle

Install a loose locking tie on handle stem.

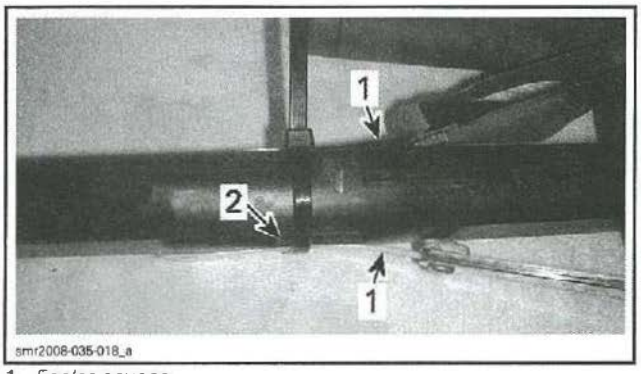
Apply XPS SYNTHETIC GREASE (P/N 293 550 010) on each ends of spring.

Insert the spring in the handle stem hole.

Position a ball on each ends of spring.

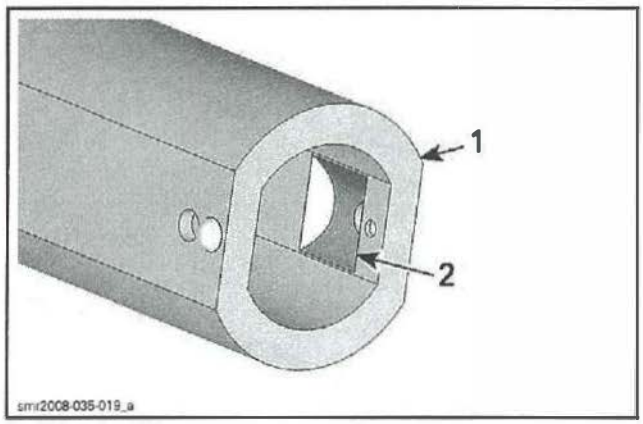
Install a feeler gauge over each balls.

Tighten the locking tie in order to retain feeler gauges and balls.



1. Feeler gauges
2. Ball

Apply XPS SYNTHETIC GREASE (P/N 293 550 010) in both recesses of the extension tube.



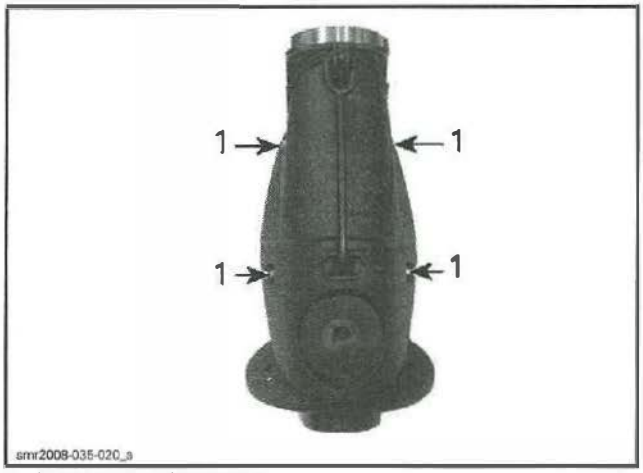
1. Extension tube
2. Recesses

Slide the handle stem into the extension tube.

Remove feeler gauges and locking tie.

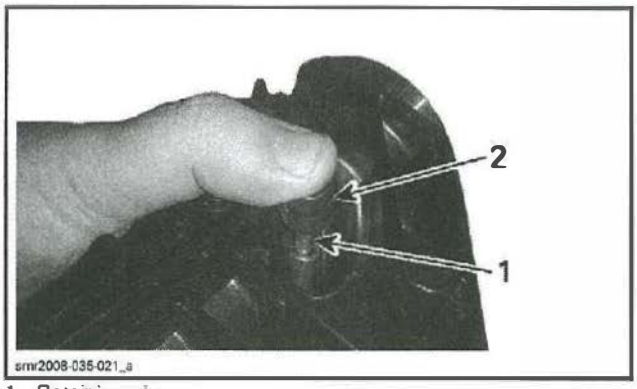
Locking Strap

Remove the wake pylon trim.



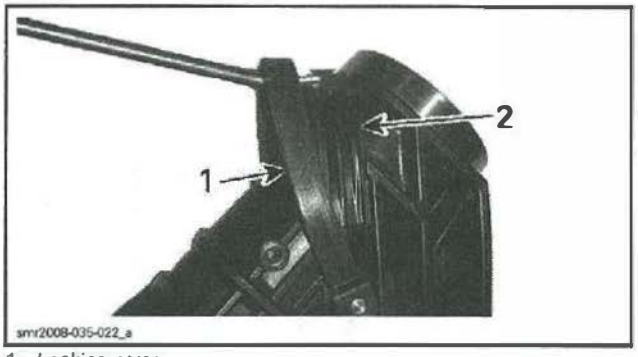
1. Wake pylon trim screws

Install lock and insert the end of the locking strap over the retaining pin.



1. Retaining pin
2. Locking strap

Using a suitable tool, position the locking strap in its groove.



1. Locking strap
2. Locking strap groove

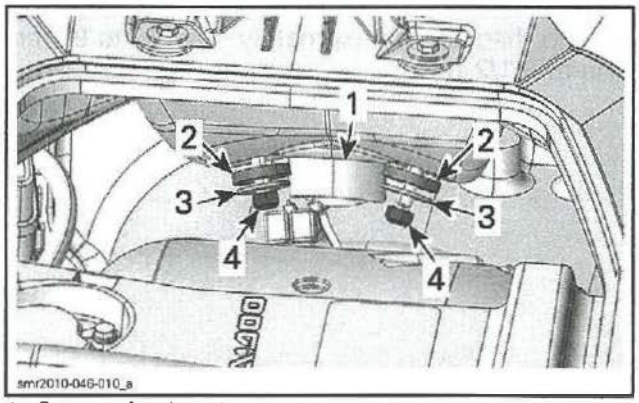
Reinstall the wake pylon trim.

Do not install the handle into wake pylon yet.

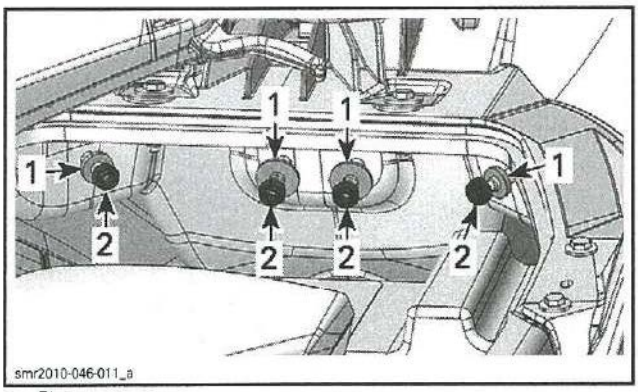
Wake Pylon Installation

Position the wake pylon on deck.

Install and secure wake pylon and lateral arms using previously removed fasteners and new elastic stop nuts.



1. Bottom of wake pylon
2. Rubber washers
3. Flat washers
4. New elastic stop nuts

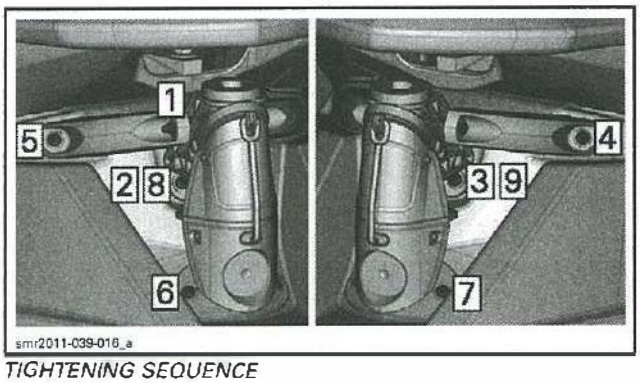


1. *Flat washers*
2. *New elastic stop nuts*

Tighten all bolts by hand.

Ensure base of wake pylon is well leaned against body.

Tighten all bolts as per the following sequence.



TIGHTENING SEQUENCE

Insert the handle into the wake pylon.

Move both ends of the locking strap forward to fully insert handle.

BODY (RXT/GTX/WAKE PRO)

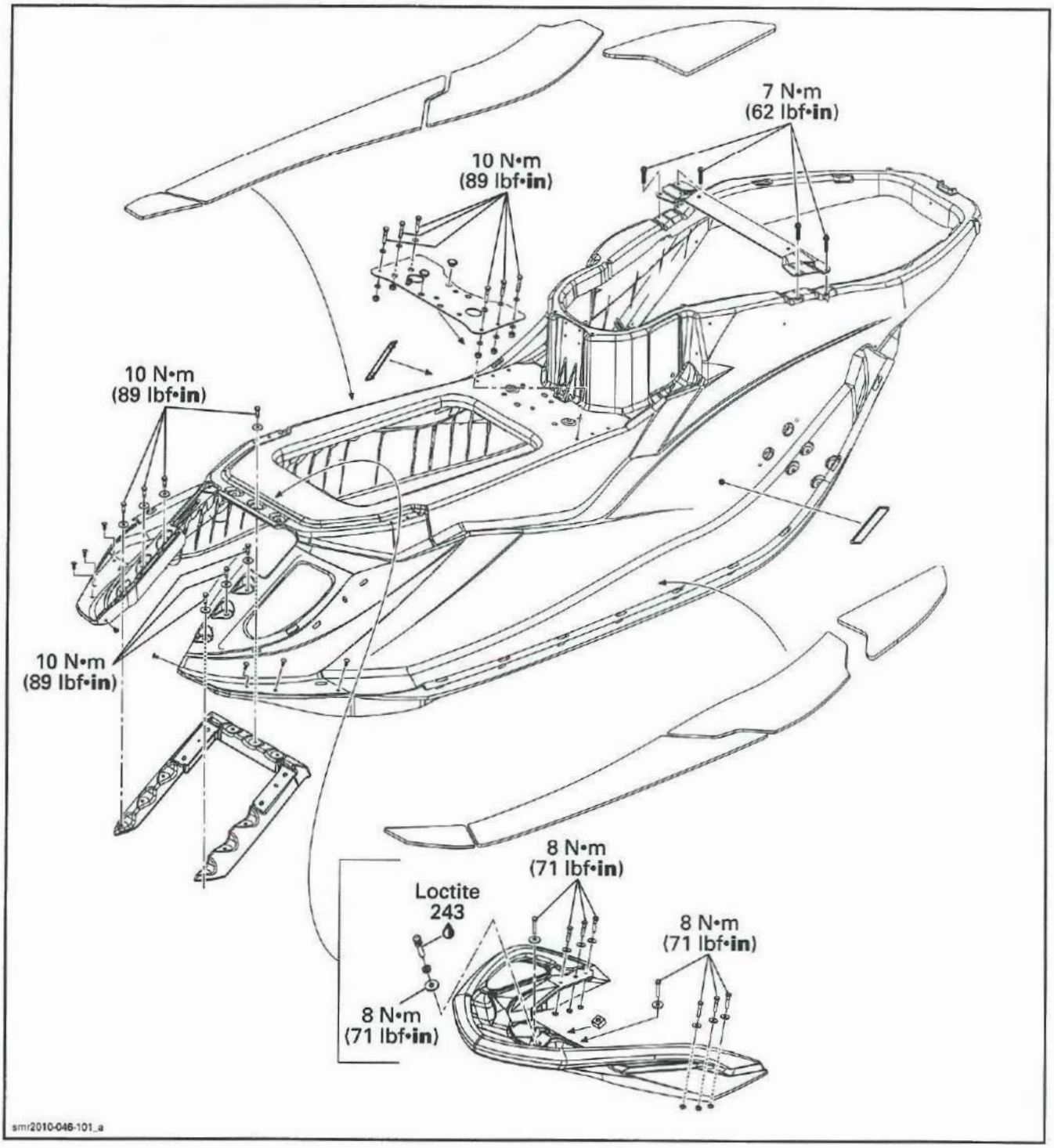
SERVICE TOOLS

Description	Part Number	Page
SUPERTANIUM DRILL BIT 3/16"	529 031 800	650

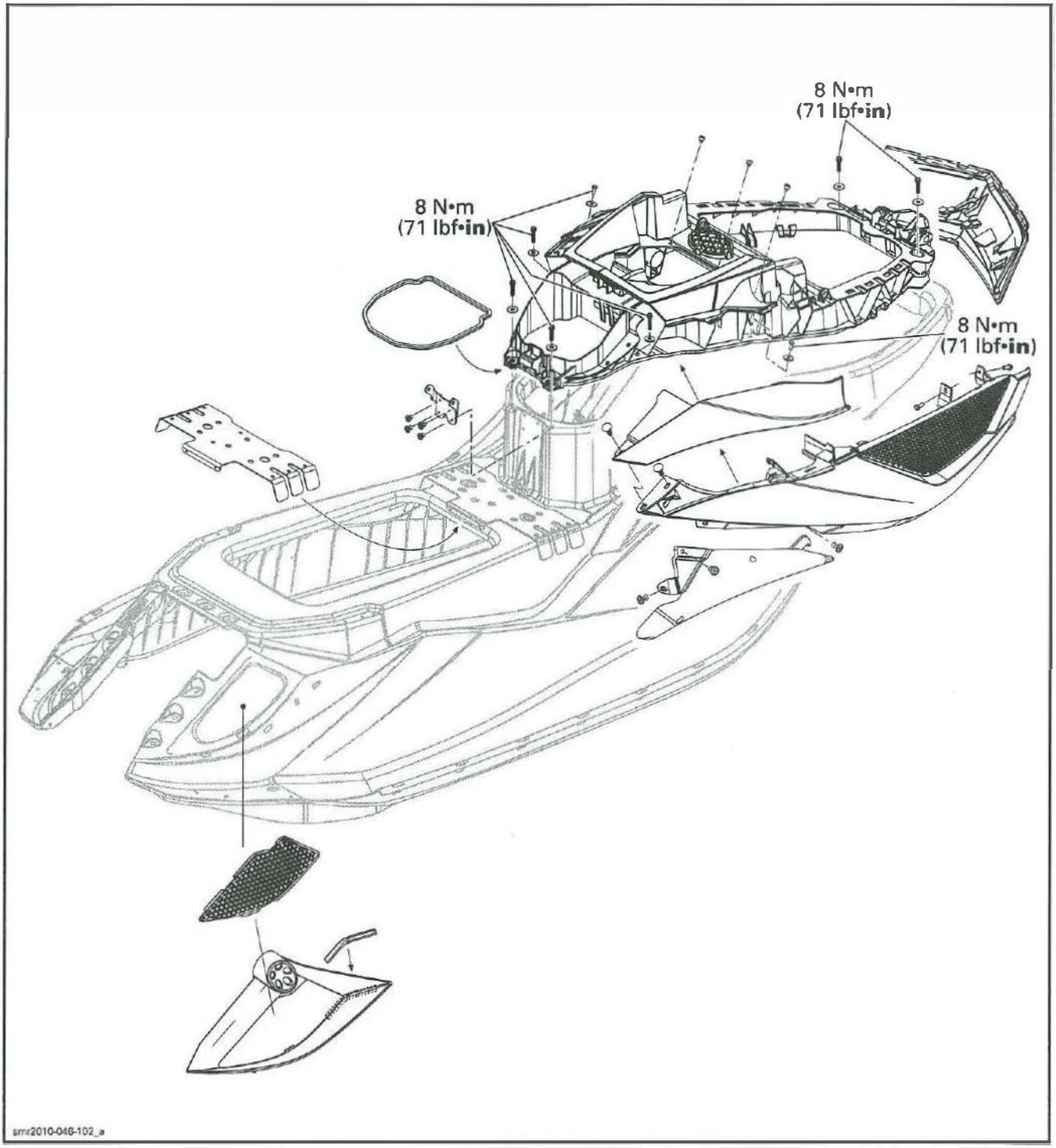
SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE)	293 800 060	644
LOCTITE 414	413 705 800	642, 660
LOCTITE 5150 (SILICONE SEALANT)	296 000 309	655–656
XPS MULTI-PURPOSE CLEANER	219 701 709	644
XPS SYNTHETIC GREASE	293 550 010	673

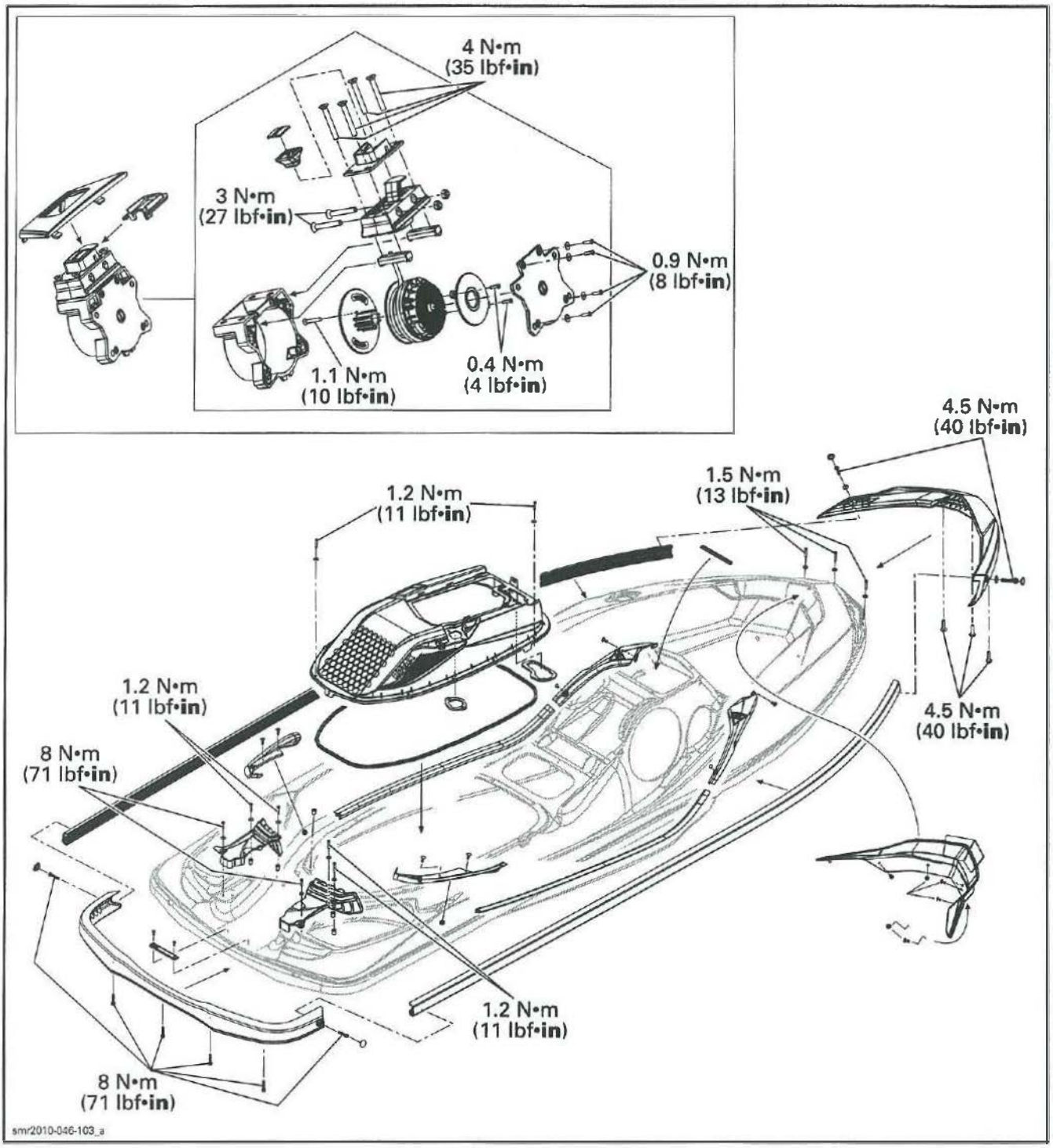
BODY (iS AND aS MODELS)



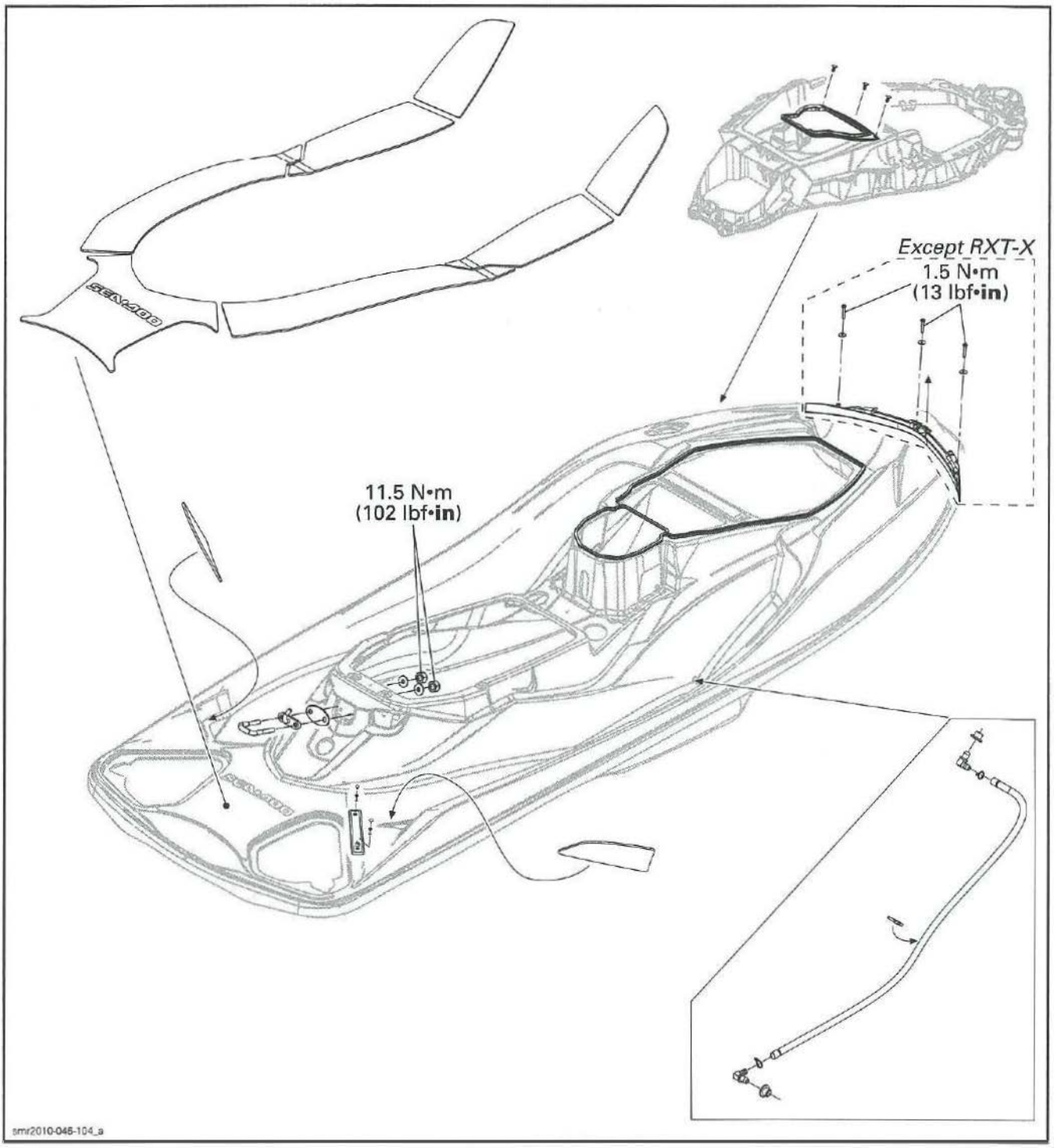
BODY (iS AND aS MODELS)



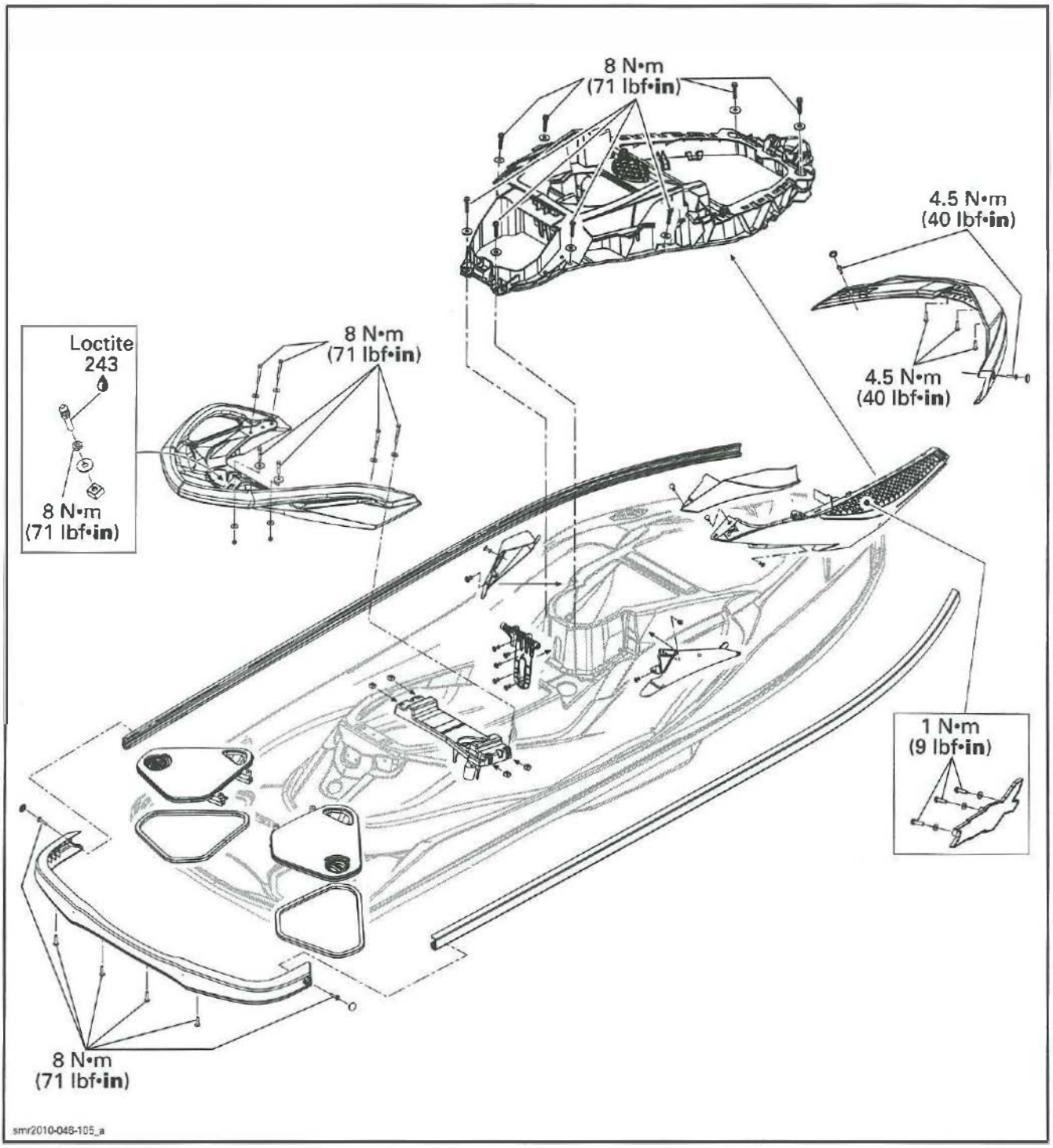
BODY (iS AND aS MODELS)



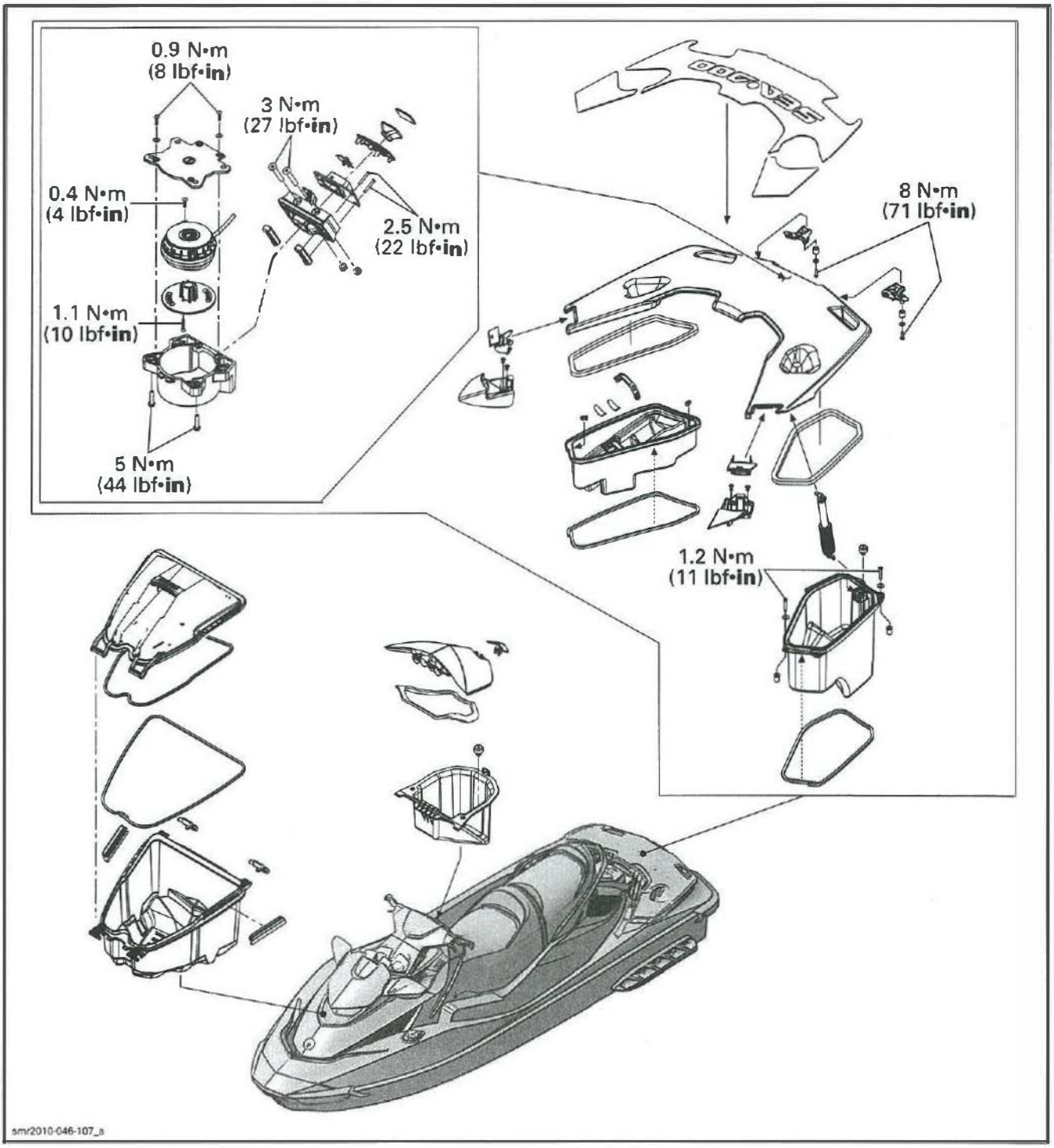
BODY (MODELS WITHOUT iS OR aS)



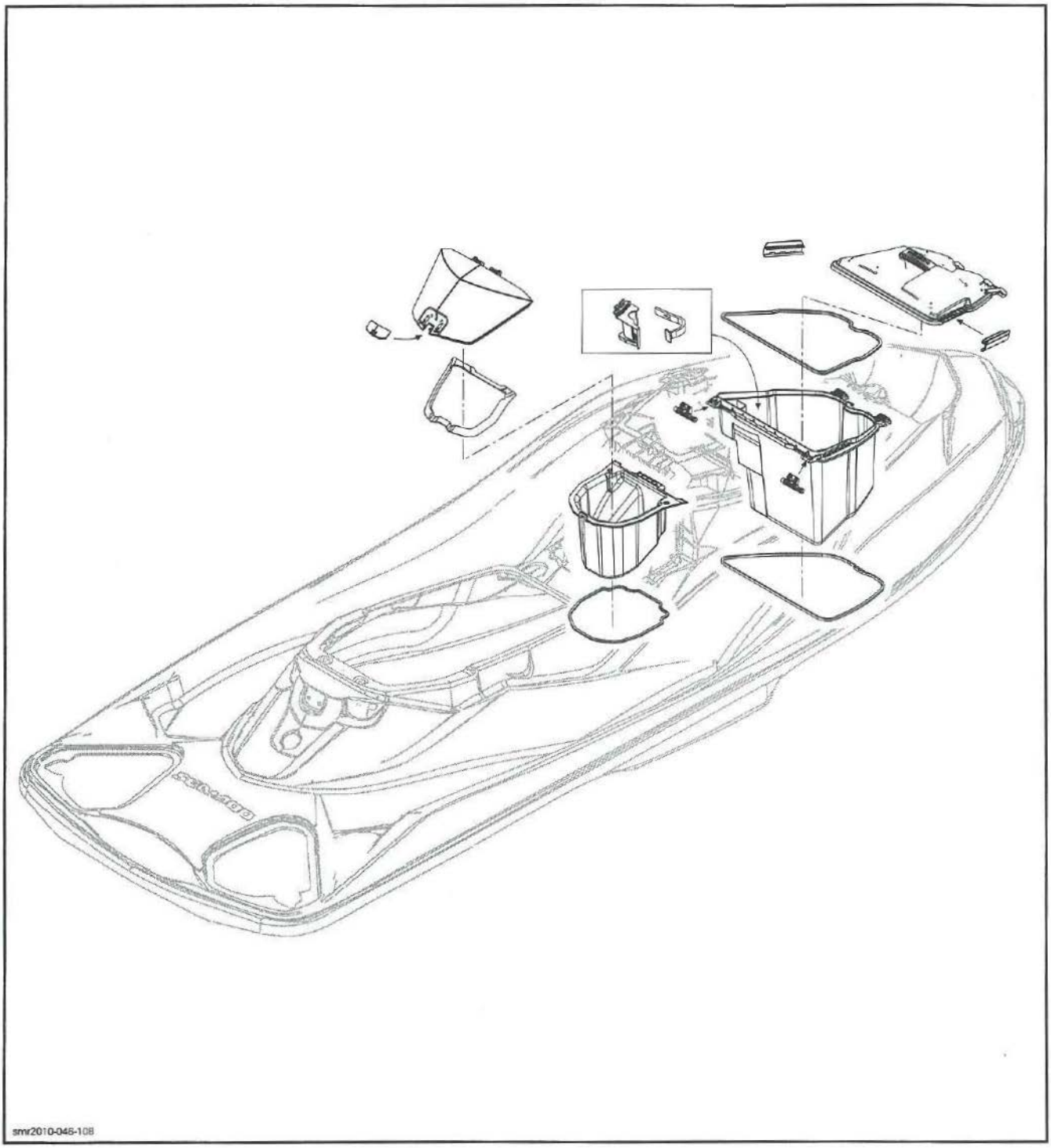
BODY (MODELS WITHOUT iS OR aS)



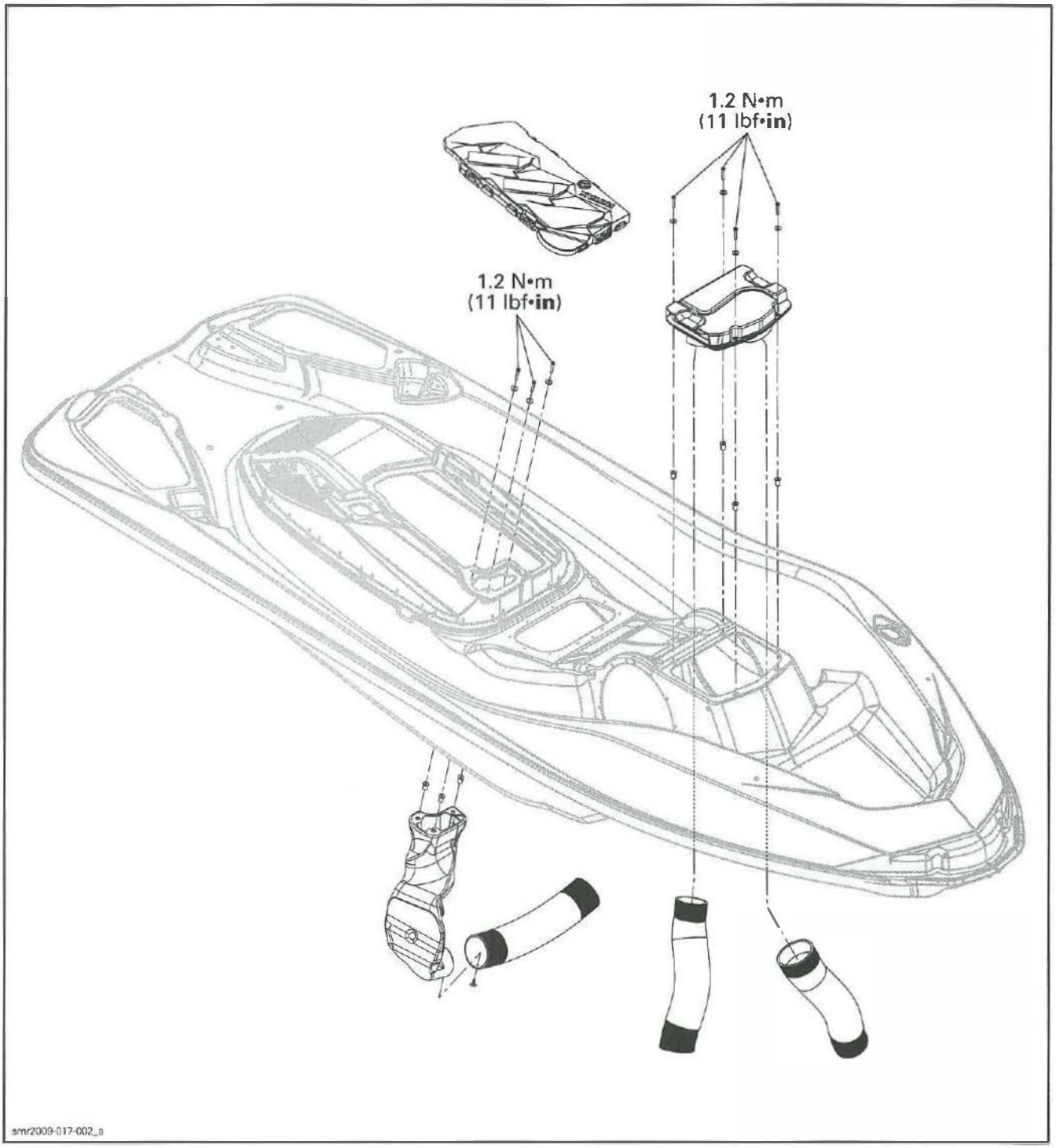
STORAGE COMPARTMENT (iS AND aS MODELS)



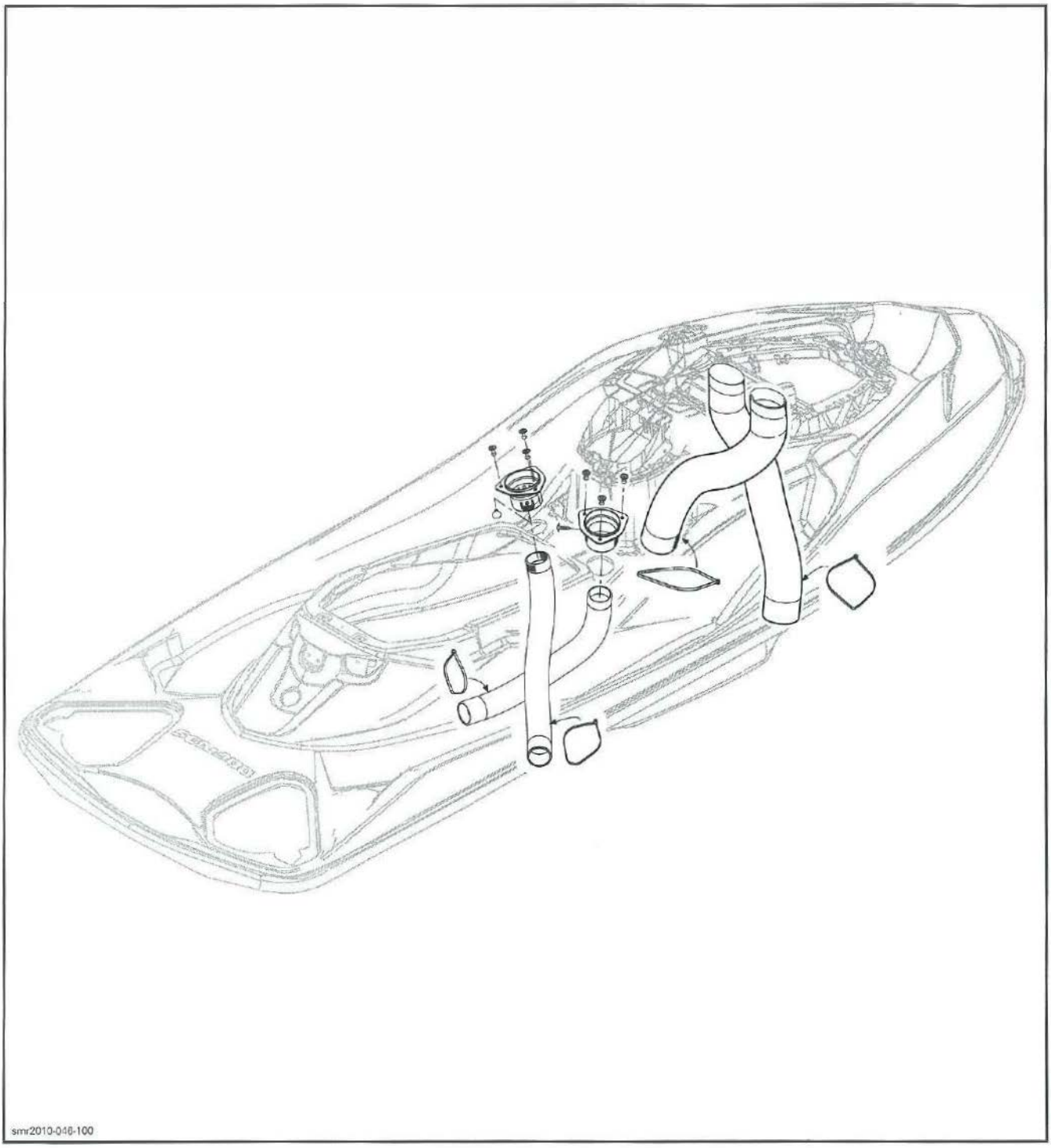
STORAGE COMPARTMENT (MODELS WITHOUT iS OR aS)



VENTILATION (iS AND aS MODELS)

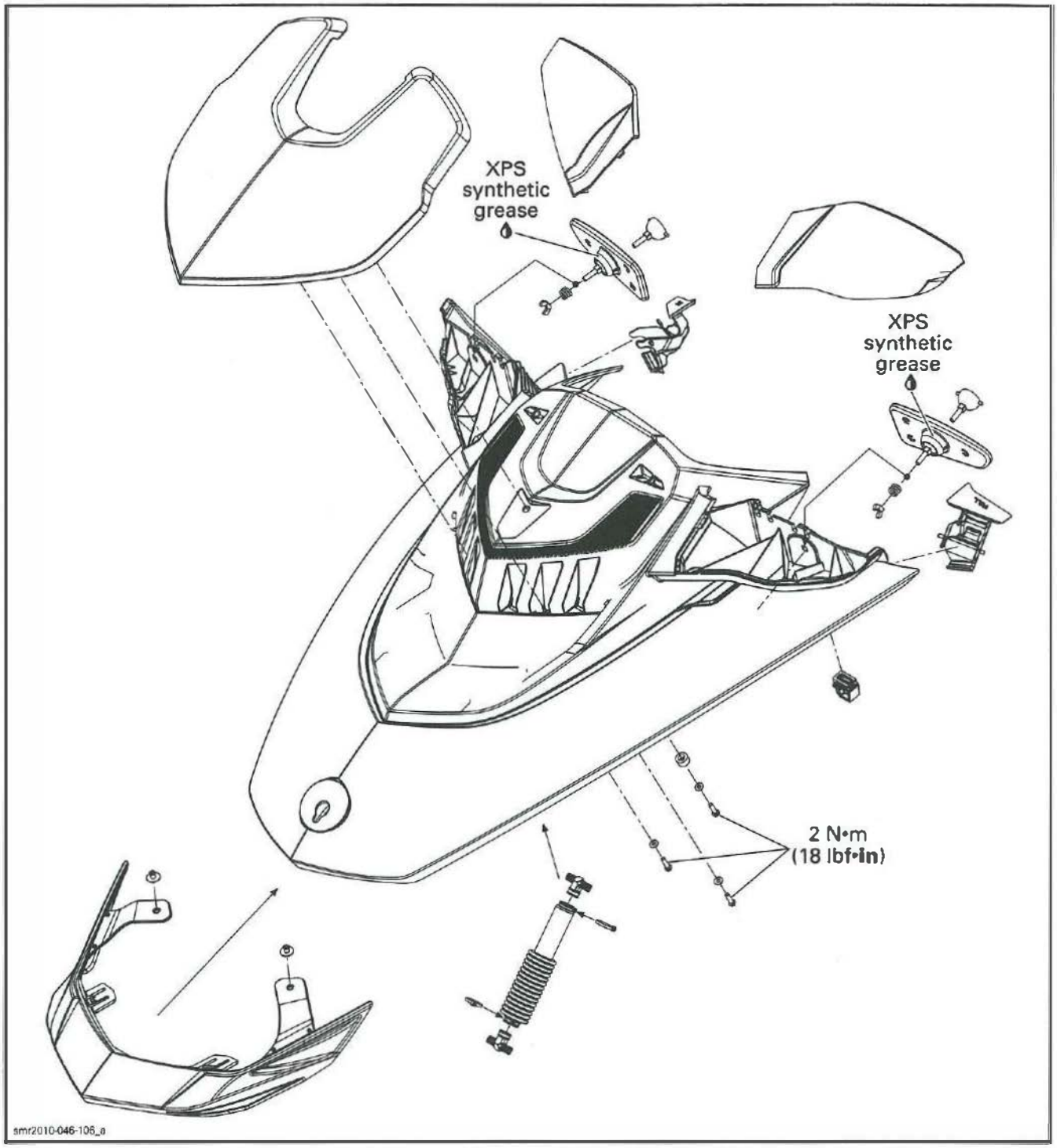


VENTILATION (MODELS WITHOUT iS OR aS)

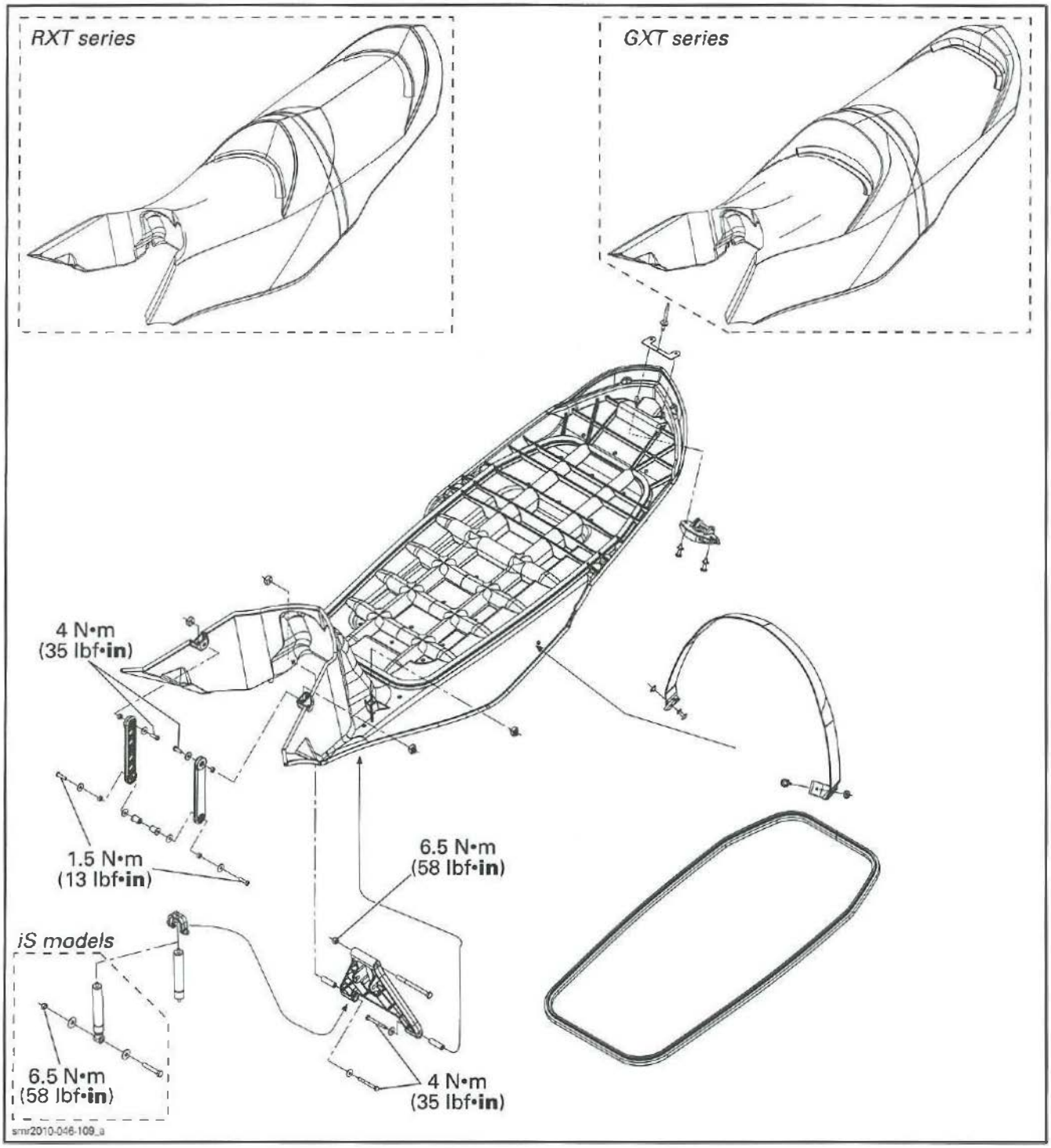


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FRONT COVER

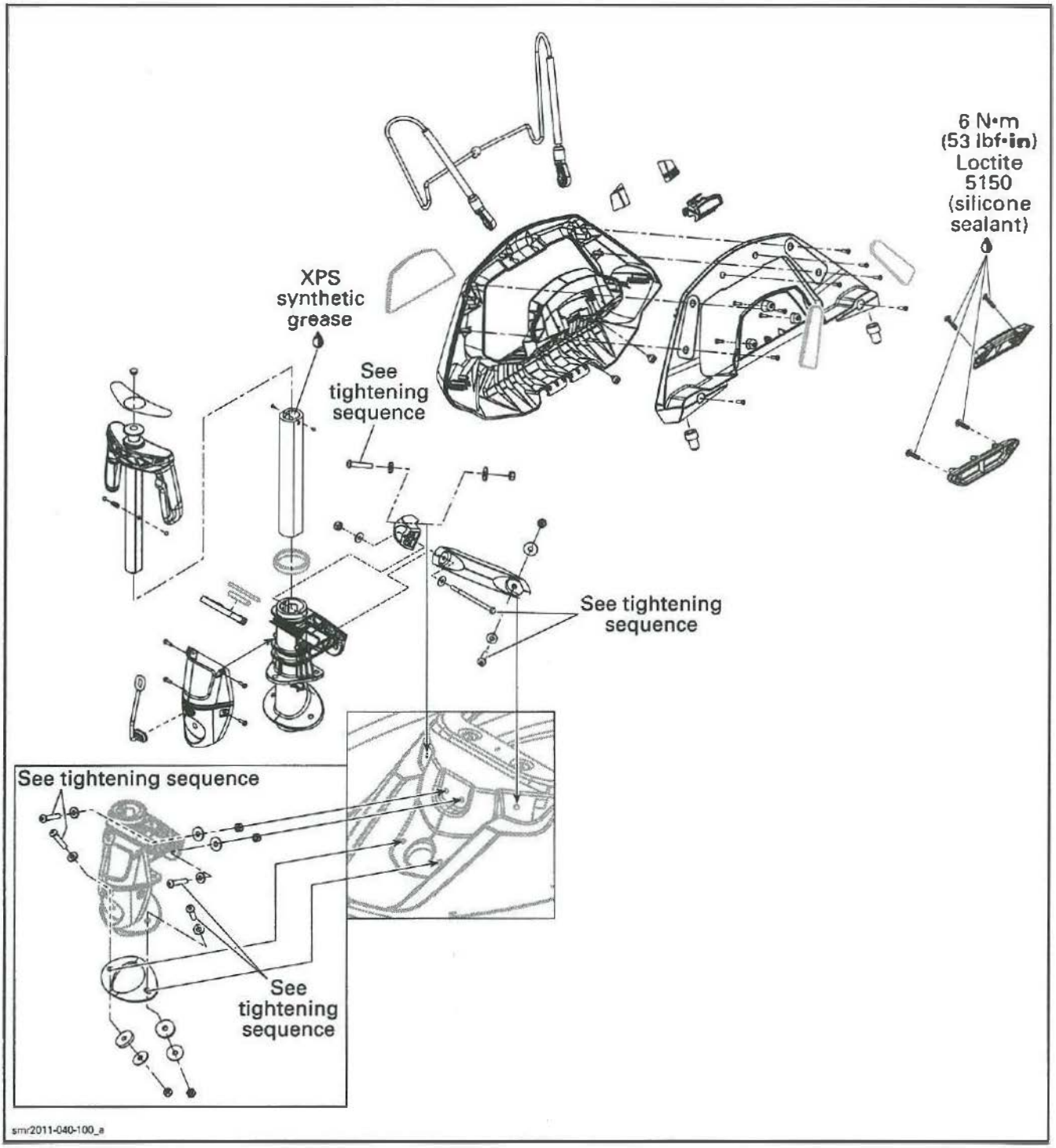

XPS synthetic grease
XPS synthetic grease
2 N•m (18 lbf•in)
smr2010-046-106_a

SEAT


RXT series
GXT series
4 N•m
(35 lbf•in)
1.5 N•m
(13 lbf•in)
6.5 N•m
(58 lbf•in)
iS models
6.5 N•m
(58 lbf•in)
4 N•m
(35 lbf•in)
smr2010-046-109_a

WAKEBOARD RACK AND WAKE PYLON

Wake Pro



GENERAL

Verify hinges condition and latching mechanisms condition and operation. Replace any damaged components.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

NOTICE **When applying threadlocker products (anaerobic products), pay attention so that it does not come in contact with ABS plastic parts (painted parts). It could lead to plastic cracks or other damage.**

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new one.

NOTICE **Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.**

PROCEDURES

GELCOAT

The deck is constructed of chopped fiberglass, saturated with resin. It is sprayed on the layer of gelcoat along with pieces of fiberglass mat, cloth and woven roving which are added at required areas.

For the hull, a different material is used and a standard polyester based fiberglass repair kit will not work. Refer to *HULL* subsection for proper material and procedures.

Gelcoat Repair Information

All liquid gelcoat and repair kits can be purchased directly from Gelcote International Ltd. BRP does not distribute these products.

NOTE: Fiberglass repair kit is also available through automotive or marine suppliers.

Gelcote International Ltd web site has all the Sea-Doo personal watercraft and sport boat gelcoat colors.

You can order on the web site and get confirmation of your order within hours. Quick, reliable service is what is offered to all BRP dealers around the world.

There are many services on this web site to make your ordering quick and informative. Or you can call Gelcote International directly with any question pertaining to gelcoat. Service, value and knowledge is what you can expect when you call Gelcote International.

Gelcote International Ltd
174 Colonnade Road Suite 29
Ottawa, Ontario
Canada, K2E 7J5

Phone: (613) 225-2177
Phone: (877) 435-2683 (Toll Free)
Fax: (613) 225-5297

Web Site: www.gelcoat.ca
E-mail: info@gelcote.com

⚠ WARNING

Protect skin, wear gloves when in contact with resin, hardeners and gelcoat. A barrier skin cream may also be used. Do not expose area to open flame or lit cigarette. Some of the materials are flammable. Protect eyes, wear safety glasses when grinding, sanding or spraying. Use a dust mask when sanding or grinding. When spraying wear a respirator or paint mask. Always read warning labels on products.

TOOLS	
Air mask	Power sander
Buffing pda	Putty knife
Cover sheets	Safety glasses
Heavy-duty polisher	Sanding block
Paint bruhs	Scissors
Plastic container (mixing)	Spray gun
Plastic film	Stirring stick
Plastic squeegee	White cloths

MATERIALS	
Acetone	Epoxy filler
Cabosil	Masking tape
Cardboard	Liquid gelcoat
Fine compound (white)	Medium compound (white)
Fiberglass cloth	Polyester resin
Fiberglass mat	24-grit sanding disks
Gelcoat putty	Wax
Sandpaper (100-grit, 220-grit, 320-grit, 400-grit, 600-grit, 1000-grit)	

Air Bubbles Repair

Possible cause:

- Air pocket trapped between layers of laminate and gelcoat.

Preparation of Surface

Remove all of the damaged gelcoat surrounding the air bubble with a putty knife or preferably a carbide grinding tip. Make sure all loose and weak areas are completely removed. Sand a small area of the gelcoat surface with 220-grit sandpaper. If needed, sand the cavity itself. These areas must have a rough surface to allow the gelcoat putty to bond properly.

Filling the Cavity

The prepared surface must be cleaned with acetone on a cloth. Use a gelcoat repair kit. Follow the mixing instructions in the kit when preparing the gelcoat putty.

Carefully mix the required amount while making sure there are no air bubbles in the mixture. With a putty knife, fill the repair area and cover with plastic film. Curing time may depend on temperature, amount of putty and percentage of catalyst. After 2 hours, press lightly on the surface with fingers to test the hardness. When the area becomes hard, remove the plastic film.

Sanding

Begin block sanding the patch with 320-grit sandpaper until you come close to the original surface. Remove dust with a water soaked cloth and continue sanding with a 400-grit wet paper. Finish wet sanding with a 600-grit to remove deeper scratches. If needed you can wet sand with finer grit paper such as 1000-grit.

Buffing and Waxing

Buff the surface using a heavy duty polisher with a buffing pad. Make sure the pad is free of dirt or you may damage the gelcoat. Carefully begin buffing with a white medium compound. Finish off using a fine compound. While buffing, pay close attention to avoid overheating the surface.

Blisters Repair

Possible causes:

- Insert catalyst
- Improper catalyst/gelcoat ratio.

A blister is a visible bump on the watercraft surface that may not necessarily come right through the gelcoat layer. In the case of only a few blisters, follow the same repair procedure as for air bubbles. If they are numerous and in close concentration, spray liquid gelcoat to achieve proper repair. This procedure is covered in *MINOR GELCOAT FRACTURES*.

Minor Gelcoat Fractures Repair

Possible causes:

- Flexing of fiberglass laminate
- Gelcoat thickness
- Direct result of impact.

In case of fractures which have not penetrated past the gelcoat layer, the repair concerns the gelcoat only. If flex cracking or impact are evident, then additional reinforcement may be necessary. This subject will be covered in *COMPOUND FRACTURES*.

Preparing the Surface

Small Fractures: Open the cracks up with a sharp triangular can opener or preferably a carbide tipped die grinder. The V groove will provide a good bonding area for the gelcoat. With 220-grit sandpaper, sand the sides of the notched out areas.

Numerous Fractures: Using a grinder with a 24-grit disk, remove the gelcoat. Sand the area edge with 220-grit sandpaper.

Filling the Repair Area

Small Fractures: Refer to the same procedure as in the *AIR BUBBLES*.

Numerous Fractures Over Large Surface: Prepare the area for spray application of liquid gelcoat. Wipe down the surface with acetone. Mask the area off to protect the watercraft from overspray.

Mix the needed quantity of gelcoat and catalyst according to suppliers recommendations. The gelcoat can be thinned with acetone up to 10%. If it needs more consistency you can add cabosil.

Make sure that the air supply is free of oil, dirt and water.

Test spray the gelcoat mixture on paper to verify its consistency and pattern. You may have to apply 5 or 6 coats to cover the area properly. Overlap each coat further than the last, leaving at least 30 seconds between passes. Avoid trying to coat the surface with only a few heavy coats, this will not allow the gelcoat to dry properly.

Apply a coat of polyvinyl alcohol (PVA) to seal off the air and protect the gelcoat surface from dust. PVA speeds up the curing process because gelcoat will not cure properly when exposed to air.

Sanding

Wash the polyvinyl alcohol off with water. Depending on the size of the area repaired, you can either block sand as per previous procedure or you may use an air sander. Sand the surface down with progressively finer grits of sandpaper until the desired finish is achieved.

Buffing and Waxing

Buff the surface using a heavy duty polisher with a buffing pad. Make sure the pad is free of dirt or you may damage the gelcoat. Carefully begin buffing with a white medium compound. Finish off using a fine compound. While buffing, pay close attention to avoid overheating the surface.

Compound Fractures Repair

Possible causes:

- Thickness of fiberglass laminate
- Direct result of impact.

Compound fractures are those that have gone past the gelcoated surface and in through the layers of fiberglass laminate. Two types of repairs have to be performed. The first is to restore the structural integrity of the damaged area. Fracture types can vary from a simple crack to a large hole. Usually, fiberglass reinforcement becomes necessary, especially if the fracture can be attributed to weakness. The final part of the repair is the gelcoating, which cannot be done until the interior and exterior laminate surfaces have been repaired.

Outside: Remove the damaged gelcoat and fiberglass with a 24-grit disk using a power sander. Grind outward at least 2 inches from the fracture to allow the patch to bond to strong material. Cut enough pieces of fiberglass mat necessary to build up the area. The pieces should be cut so they overlap each other by at least a half inch. For a smoother finish, the last layer should be fiberglass cloth. If the fracture is small enough all you may have to do is fill the area with an epoxy filler.

Inside: For the interior repair, you can grind more. This will allow for more fiberglass material which will strengthen the area. If the fracture opening is too large after surface preparation, you may need a backing support to cover the opening. Cut alternating pieces of fiberglass mat and cloth in overlapping sizes.

Patching the Repair Area

Outside: The outside should be done first. Wipe clean the area with acetone on a cloth, then mask off area. For a small crack use an epoxy filler in the same way you would use gelcoat repair putty. When laying up a larger area you will use mat, cloth and fiberglass resin and catalyst. Use a clean container to mix the resin, mix only what you will need. Follow the recommended catalyst ratio.

Using a clean paintbrush, brush the mixed resin on the surface. Place the smallest piece of mat over the fracture and then wet out the mat. Follow with the remaining pieces of mat and final layer of cloth. While wetting the pieces make sure you work the air bubbles out and saturate all the pieces evenly. Try to work quickly, you may only have 15 or 20 minutes. You may clean the brush with acetone.

Wait until the repair has hardened before moving on to the interior repair. If the size of the opening is too large for the pieces to maintain the proper shape, you will have to use a backing support. It is a shaped piece of cardboard that fits flush to the interior surface and has a plastic layer on the repair side. It is held in place by tape or a support.

Inside: Wipe down the area with acetone on a cloth. Apply the same procedure as for outside repair when laminating the alternating pieces of fiberglass material. If a backing support was used, remove it before starting the repair. After the area has hardened, remove sharp edges of material from surface. If required paint the surface.

Sanding

Outside: This surface will have to be prepared for application of gelcoat. The size of the area will determine the gelcoating procedure to be used. Refer to the *MINOR GELCOAT FRACTURES REPAIR*.

Buffing and Waxing

Refer to the *BUFFING AND WAXING* in *MINOR GELCOAT FRACTURES REPAIR*.

DECALS

Decal Removal

Using a heat gun warm up one end of decal for a few seconds until decal can roll off when rubbing with your finger.

NOTE: When heating near light surfaces, duct tape should be applied to protect the surface. Otherwise the light color could become a yellowish color.

Pull decal slowly and when necessary apply more heat to ease removal on the area that has to be peeled off.

If decal tears while pulling off, it has to be heated for a few seconds longer. If decal tends to stretch while pulling off, stop heating and wait a few seconds to let it cool, then peel it off.

Decal Installation (with a Protective Film on Back Side)

These decals usually contain written information (e.g.: warning) and are used on gelcoat or metal.

Using isopropyl alcohol, clean the surface and dry thoroughly.

Using a pencil and the decal as a template, mark the area where decal will be located.

Remove half of the decal back protective film and align decal with marks. Start sticking it from center and remove the other half of the film to stick it completely. Carefully squeegee decal beginning at center and working outward using, firm, short, overlapping strokes.

Decal Installation (with a Protective Film on Both Sides)

These decals usually contain graphics and are used on gelcoat or plastic.

Installation on Gelcoat

Using isopropyl alcohol, clean the surface and dry thoroughly.

Using a pencil and the decal as a template mark the area where decal will be located.

For better adhesion a dry application is recommended, however, to ease decal installation a mild solution of soapy water can be sprayed over surface where decal will be installed.

Remove back protective film from decal and align decal with marks. When well aligned squeegee decal beginning at center and working outward using firm, short, overlapping strokes.

Remove front protective film once decal has adhered to hull.

Installation on Plastic Surface (Storage Cover)

Clean surface with isopropyl alcohol and dry thoroughly.

Using a pencil and the decal as a template, mark the area where decal will be located.

NOTICE **Do not use soapy water to locate decal on plastic parts.**

Remove back protective film from decal and carefully align decal with marks. When well aligned squeegee decal beginning at center and working outward using firm, short, overlapping strokes.

Remove front protective film once decal has adhered.

CARPETS

Carpet Cleaning

To clean the carpets, use 3M™ Citrus Base Cleaner or the equivalent. See the manufacturer's instructions.

Carpet Removal

Unstick a carpet corner.

Pull carpet vigorously to remove the carpet and its glue from body.

To remove the remaining glue from body, use a plastic or rubber spatula. Scrape remaining glue with spatula.

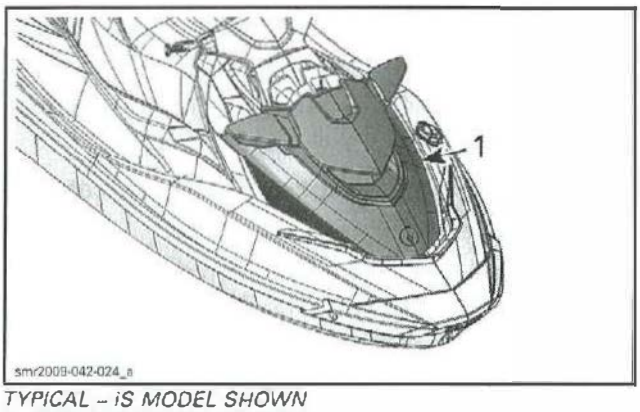
NOTE: Do not use any products (alcohol, acetone, thinner, etc.) or heat the remaining carpet glue. Chemical reactions make glue very hard to remove.

Carpet Installation

Clean body surface with isopropyl alcohol and dry thoroughly.

Install new carpet.

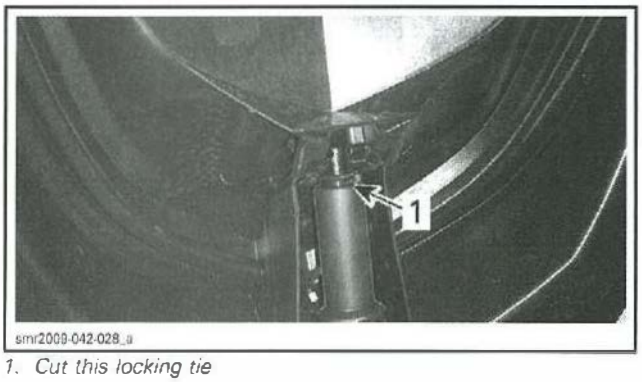
STORAGE COMPARTMENT COVER



TYPICAL – iS MODEL SHOWN
1. Storage compartment cover

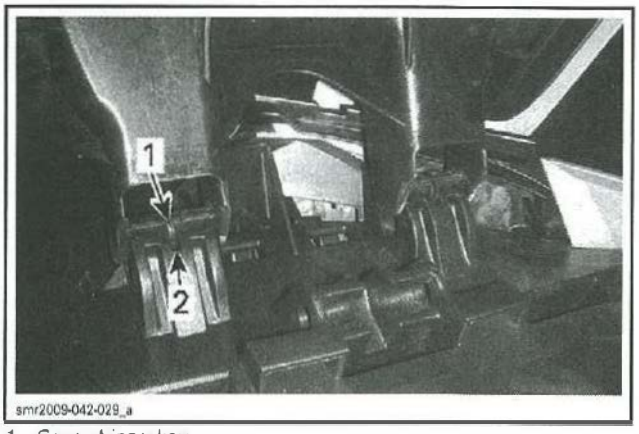
Storage Compartment Cover Removal

1. Open cover.
2. Cut locking tie retaining the bellows of gas shock.



1. Cut this locking tie

3. Move bellows downward.
4. Unscrew gas shock from its upper attachment.
5. Remove gas shock from vehicle.
6. Open cover completely.
7. Align cover hinge keys with front body module slots.
8. Pull up cover to remove it.



1. Cover hinge key
2. Front body module slot

Storage Compartment Cover Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Remove gas shock attachment from cover.

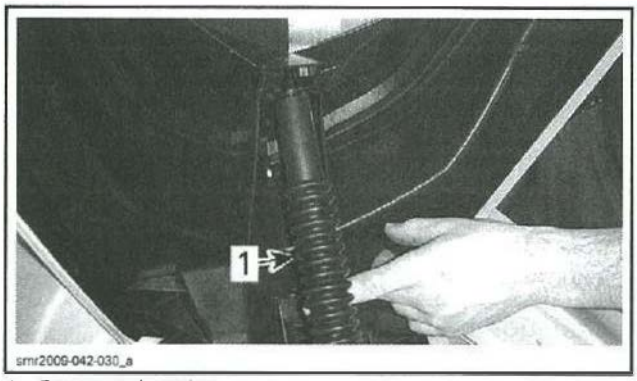
Apply LOCTITE 414 (P/N 413 705 800) on threads of shock absorber body.

Tighten manually the attachment on gas shock.

Install the bellows and secure it using a locking tie.

Install the gas shock on cover.

NOTE: The corrugated section of bellows must point downward.



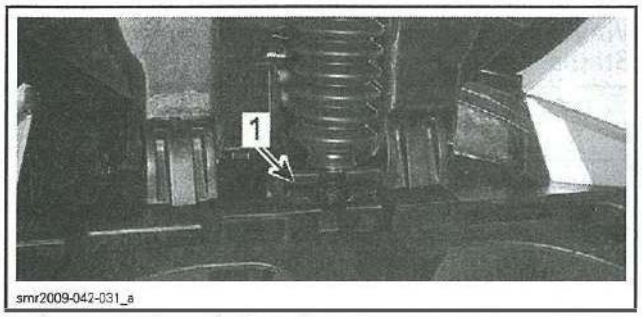
1. Corrugated section

Install cover on vehicle.

NOTICE Make sure to insert cover hinges completely. A click must be heard to indicate complete insertion.

Position the gas shock lower attachment on cavity opening.

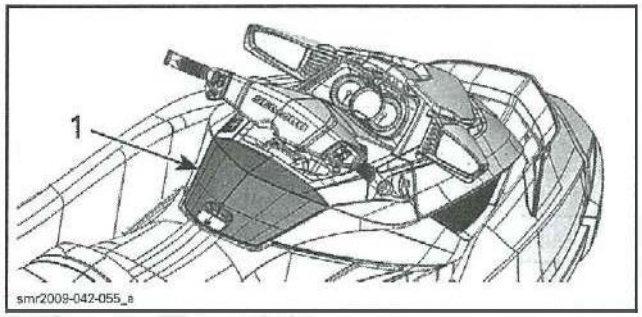
NOTICE To avoid breaking the attachment, do not force to insert it in cavity.



1. Lower attachment in its cavity

Close cover to lock the bottom of the gas shock.

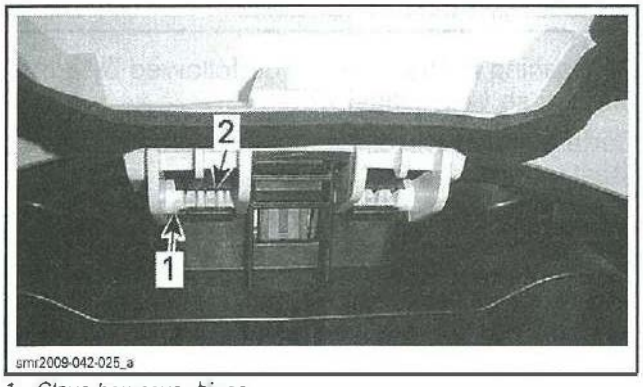
GLOVE BOX COVER



TYPICAL - iS MODEL SHOWN
1. Glove box cover

Glove Box Cover Removal

1. Move steering in its upper position.
2. Open glove box cover until cover hinges are aligned with front body module openings.



1. Glove box cover hinge
2. Front body module opening

3. Pull the bottom of cover gently to release hinges.

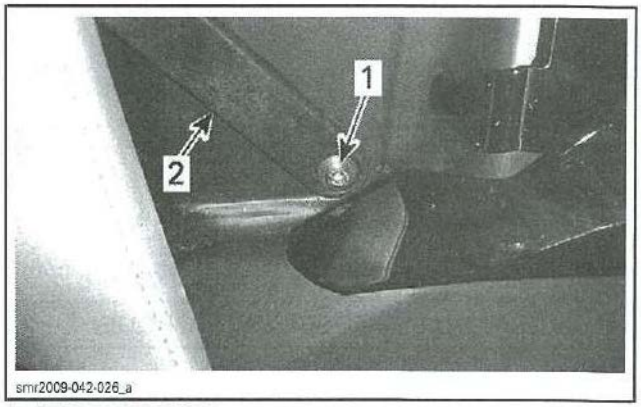
Glove Box Cover Installation

Reverse the removal procedure.

SEAT

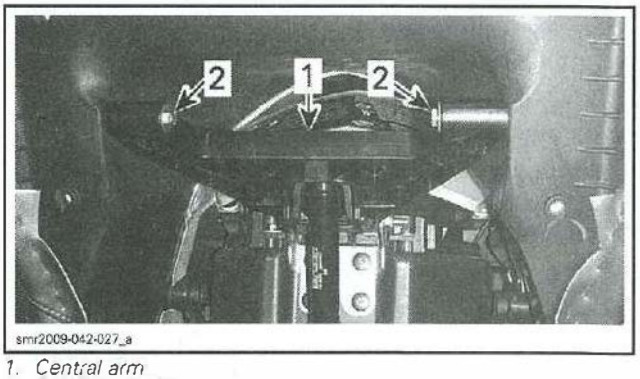
Seat Removal

1. Open seat.
2. Attach the seat to support it during removal.
3. Remove Allen socket screw retaining the lateral arm to moving deck (one each side).



1. Allen socket screw
2. RH lateral arm

4. Remove bolts securing the central arm to seat.



1. Central arm
2. Retaining bolts

5. Remove seat from vehicle.

Seat Installation

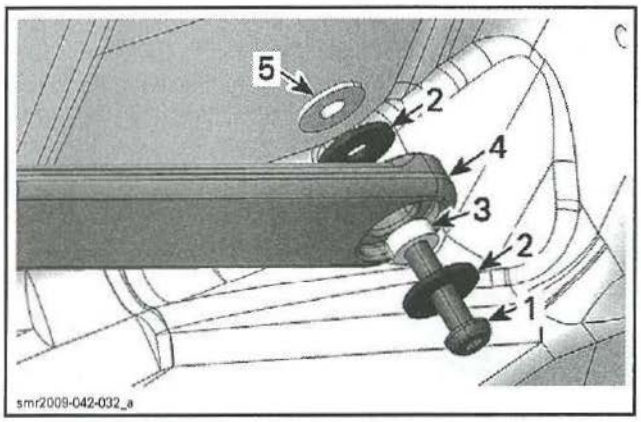
The installation is the reverse of the removal procedure. However, pay attention to the following.

Install seat to central arm.

Tighten seat retaining bolts to specification.

SEAT RETAINING BOLTS TORQUE
4 N•m (35 lbf•in)

Secure lateral arms to moving deck. Install parts as shown.



1. *Allen socket screw*
2. *Stainless steel flat washers*
3. *Sleeve*
4. *RH lateral arm*
5. *Rubber grommet in moving deck*

Tighten lateral arm screws to specification.

LATERAL ARM SCREWS TORQUE
1.5 N•m (13 lbf•in)

NOTICE Do not tighten screws over this recommended torque. Otherwise, the rubber grommet could turns and screw will be hard to remove.

Seat Cleaning

For general purpose cleaning, use XPS MULTI-PURPOSE CLEANER (P/N 219 701 709), Vinyl Finish Vinyl Cleaner, Fantastik or warm water with a mild dish soap such as Dawn or Ivory. Gently scrub with a small soft bristle brush.

For dirt build-up, use XPS MULTI-PURPOSE CLEANER (P/N 219 701 709), Vinyl Finish Vinyl Cleaner or an equivalent. Let soak for approximately 10 minutes, then gently scrub with a soft bristle brush. For specific stain removal, refer to your cleaning and care card.

Do not use any silicone-based protectants. They will extract the plasticizers, leaving the vinyl hard and brittle, and eventually cracking will occur.

RECOMMENDED PRODUCTS
1. XPS MULTI-PURPOSE CLEANER (P/N 219 701 709)
2. Dish Soap (Dawn or Ivory)
3. Fantastik
4. 3M Citrus Cleaner
5. 303 Protectant

Vinyl Cleaning Recommendations for Special Stains

TYPE OF STAIN	STEP 1	STEP 2	STEP 3	ACTION
Ballpoint ink*	E	B	A	A. Medium-soft brush, warm soapy water, rinse/dry.
Chewing gum	D	A	—	
Coffee, tea, chocolate	B	—	—	
Pen	D	B	—	B. Vinyl Finish Cleaner, rinse/dry.
Grease	D	B	—	
Household soil	A	B	—	
Ketchup	A	B	—	
Latex paint	A	B	—	C. One (1) tablespoon of ammonia, one-fourth (1/4) cup of hydrogen peroxide, three-fourth (3/4) cup of water, rinse/dry.
Lipstick	A	B	—	
Mildew or wet leaves*	C	B	A	
Motor oil	B	—	—	
Oil-based paint	D	B	—	
Permanent marker*	E	B	C	D. Wipe or scrape off excess (chill gum with ice before hand).
Spray paint	B	B	—	
Suntan lotion	A	B	—	
Tar/asphalt	D	B	—	E. Denatured alcohol, rinse/dry.
Yellow mustard	A	B	C	

*Suntan lotion, tree pollen, wet leaves and some other products can contain dyes that stain permanently.

All cleaning methods must be followed by a thorough rinse with warm water.

Certain household cleaners, powdered abrasives, steel wool and industrial cleaners can cause damage and discoloration and are not recommended. Dry cleaning fluids and lacquer solvents should not be used as they will remove printed pattern and gloss. Waxes should be used with caution as many contain dyes or solvents that can permanently damage the protective coating.

SEAT LATCH

Seat Latch Adjustment

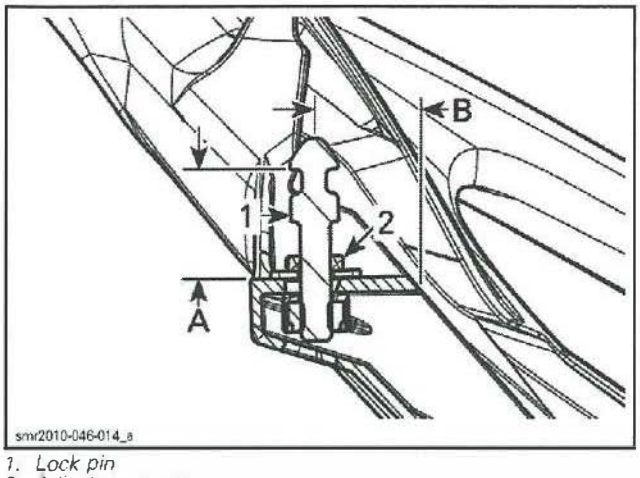
NOTE: Apply LOCTITE 243 (BLUE) (P/N 293 800 060) on threads of lock pin when the adjustment is required or when the lock pin is removed. If a new lock pin is used, it is already coat with a threadlocker.

1. Loosen adjustment nut.

2. Adjust lock pin height. Do not torque yet.
3. Position the lock pin longitudinally into the rear handle slot.
4. Hold the lock pin in this position and tighten adjustment nut to specification.

SEAT LATCH ADJUSTMENT NUT TORQUE
8 N•m (71 lbf•in)

5. Close the seat and readjust as required.



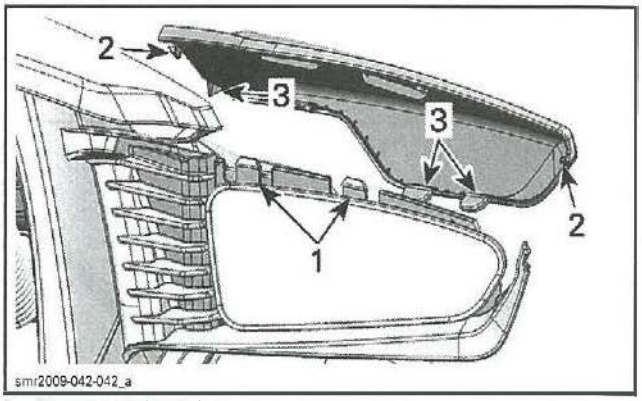
1. Lock pin
2. Adjustment nut

MODEL	MEASURE A	MEASURE B
iS and aS Models	32.4 mm ± 1.0 mm (1.276 in ± .039 in)	34.4 mm ± 1.0 mm (1.354 in ± .039 in)
Models without iS or aS	36.4 mm ± 1.0 mm (1.433 in ± .039 in)	

MIRRORS

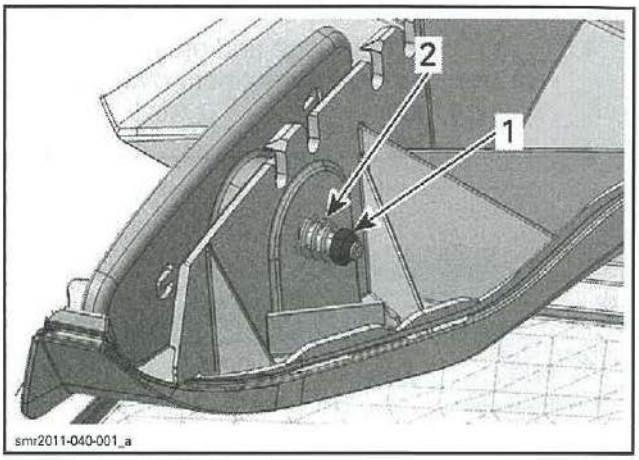
Mirror Replacement

1. Remove mirror trim as follows.
   1.1 Using a small screwdriver, unlock both front tabs securing the front of mirror trim.
   1.2 Tilt the trim forward and remove it.



1. Front retaining tabs
2. Side retaining tabs
3. Locating tabs

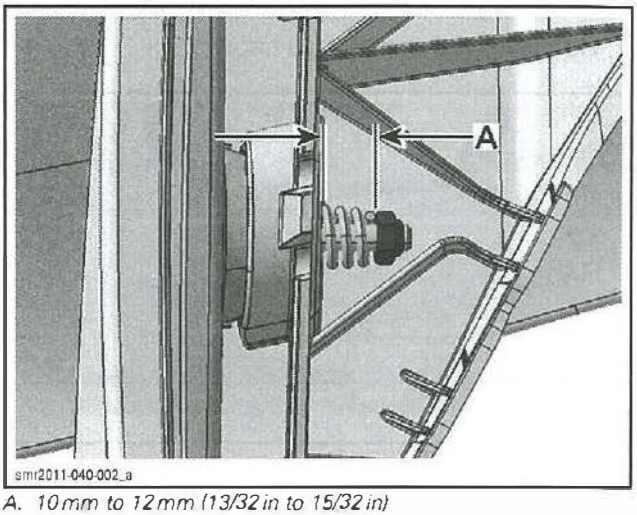
2. Remove nut and spring securing mirror.



1. Nut
2. Spring

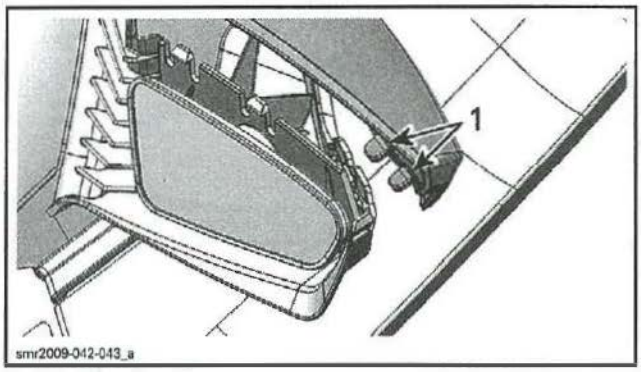
3. Install the new mirror and tighten nut to specification.

MIRROR SPRING LENGTH SPECIFICATION
10 mm to 12 mm (13/32 in to 15/32 in)



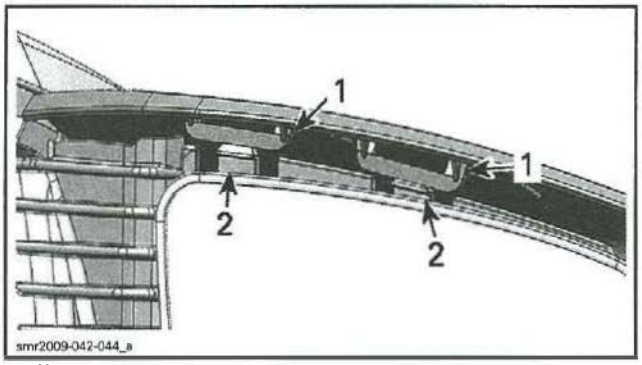
A. 10 mm to 12 mm (13/32 in to 15/32 in)

4. Install mirror trim as follows.
   4.1 Install the front locating tabs.



1. Front locating tabs

   4.2 Lower rear part of trim.
   4.3 Lift up the rear edge and press the center of trim to position retainers over front retaining tabs.



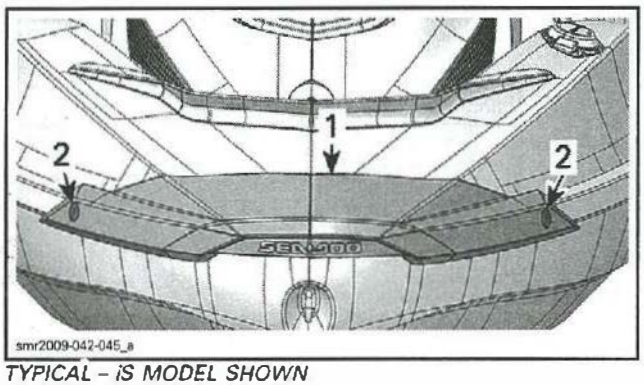
1. Trim retainers
2. Retaining tabs

BUMPERS

Bumper Removal

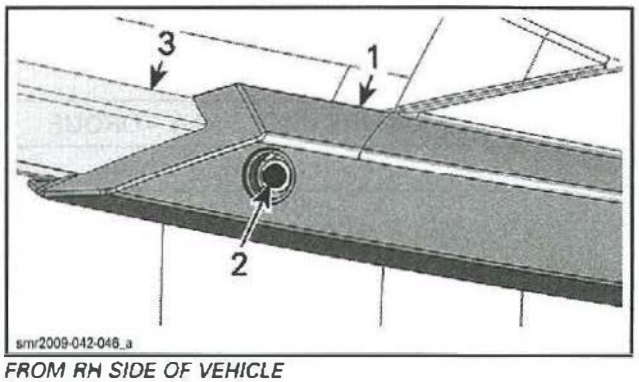
Front Bumper

1. Remove both protective caps.



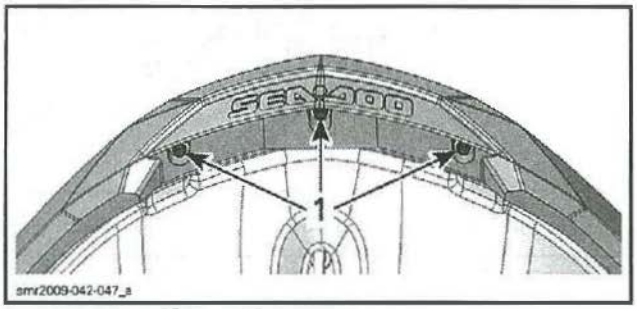
TYPICAL - iS MODEL SHOWN
1. Front bumper
2. Protective caps

2. Remove side screws securing front bumper to body.



FROM RH SIDE OF VEHICLE
1. Front bumper
2. Retaining screw
3. Side bumper

3. Remove screws located under front bumper.

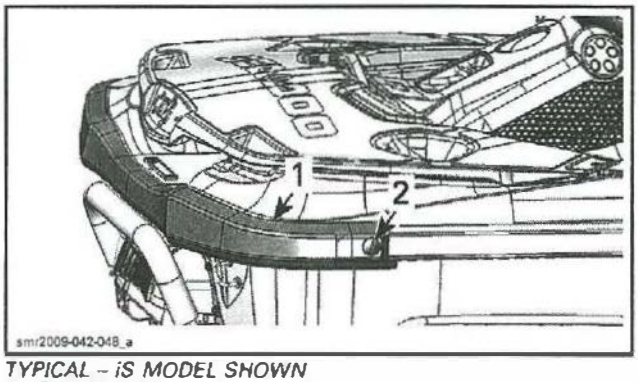


UNDERNEATH FRONT OF VEHICLE
1. Retaining screws

4. Remove front bumper from vehicle.

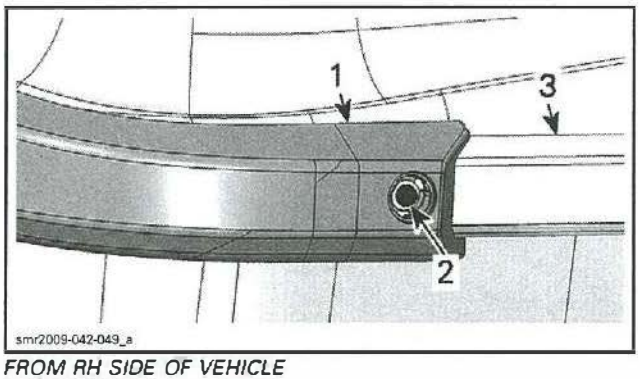
Rear Bumper

1. Remove both protective caps (one on each side).



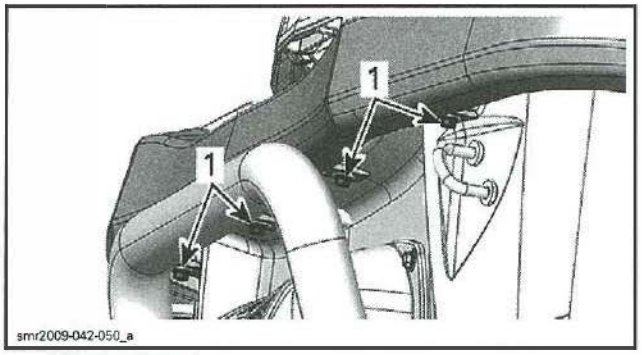
TYPICAL - iS MODEL SHOWN
1. Rear bumper
2. Protective cap

2. Remove side screws securing rear bumper to body.



FROM RH SIDE OF VEHICLE
1. *Rear bumper*
2. *Retaining screw*
3. *Side bumper*

3. Remove screws located under rear bumper.



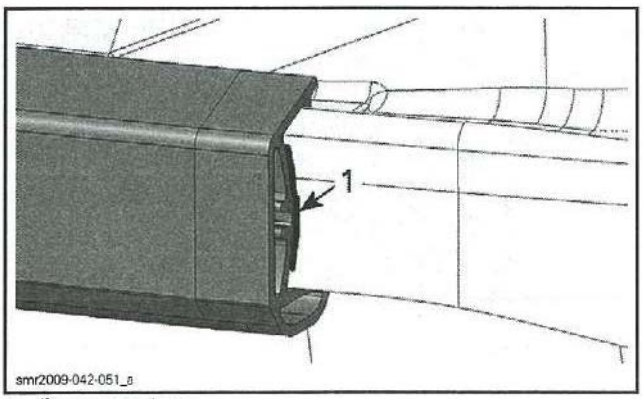
1. *Retaining screws*

4. Remove rear bumper from vehicle.

Side Bumpers

1. Remove front and rear bumpers.
2. Using a marker, trace a line at bumper end.

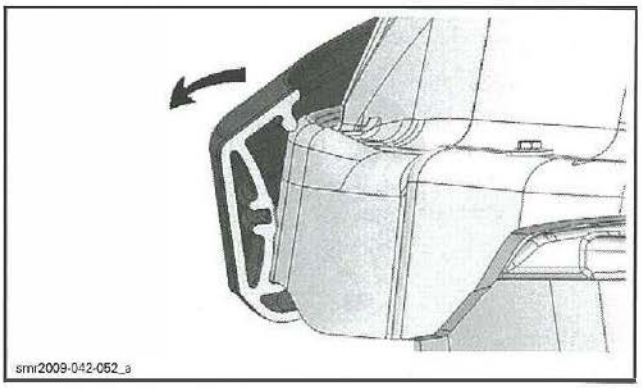
NOTE: These marks will be used during installation.



1. *Trace a line here*

3. Pull the top of bumper to unclip it from body.

NOTE: A heat gun can be used to soften side bumper.



Bumper Installation

Front and Rear Bumper

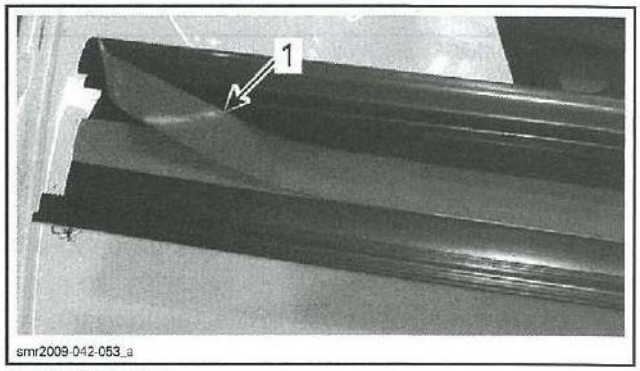
The installation is the reverse of the removal procedure.

Tighten bumper screws to specification.

BUMPER SCREWS TORQUE
5 N•m (44 lbf•**in**)

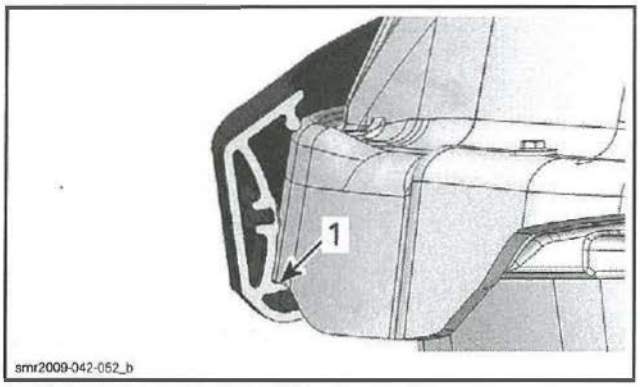
Side Bumpers

1. Remove all remaining residues of the mounting tape.
2. Clean bumper area using isopropyl alcohol.
3. Remove the protective skin on mounting tape.



1. *Protective skin*

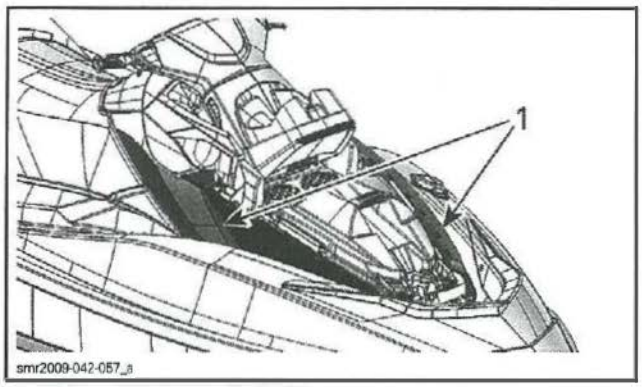
4. Insert bumper over body lip.
   4.1 Insert lower section first.
   4.2 Insert upper section last.



1. Make sure bumper is positioned correctly

NOTE: A heat gun can be used to soften side bumper.

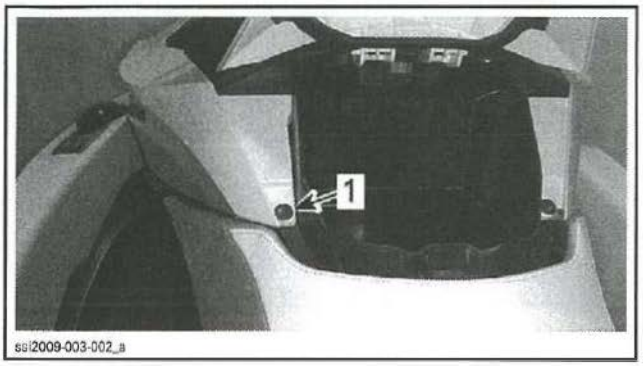
BODY COVER



TYPICAL – IS MODEL SHOWN
1. Body covers

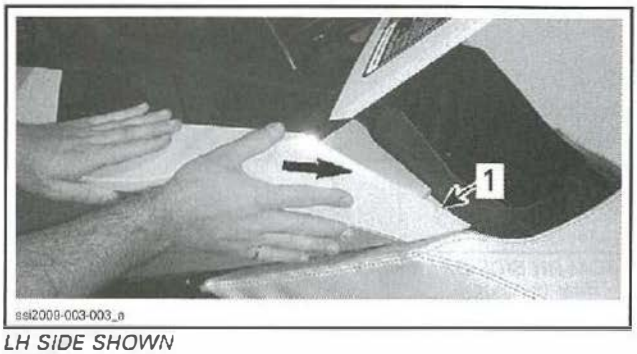
Body Cover Removal

1. Remove the *STORAGE COMPARTMENT COVER*, see procedure in this subsection.
2. Remove the *FRONT GRILLE*, see procedure in this subsection.
3. Remove the plastic push-in clip securing the upper trim.



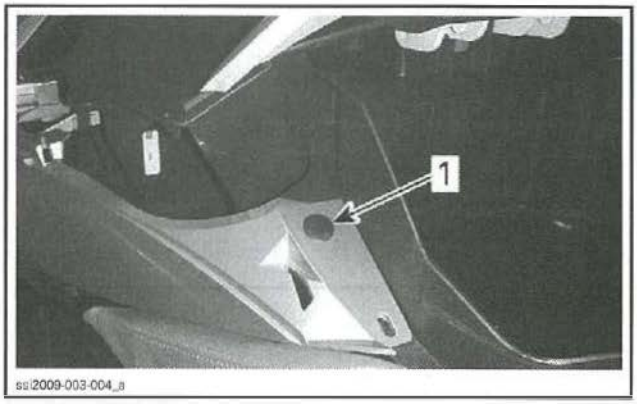
LH SIDE SHOWN
1. Remove this plastic push-in clip

4. Move both upper trims rearward and remove them.



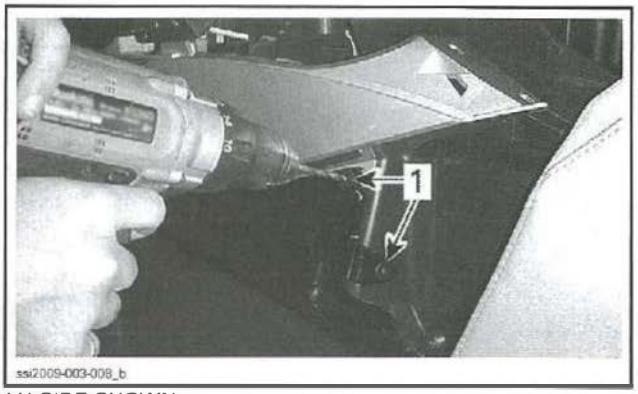
LH SIDE SHOWN
1. LH upper trim

5. Remove the plastic push-in clips retaining the LH and RH trims.



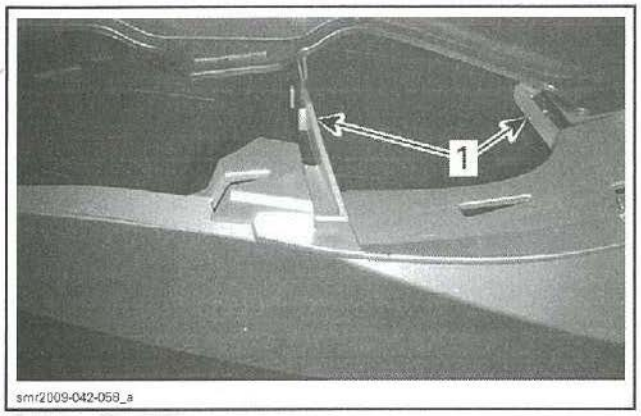
LH SIDE SHOWN
1. Remove this plastic push-in clip

6. Open seat and using a 3/16" drill bit, drill the rivets securing the seat trims.

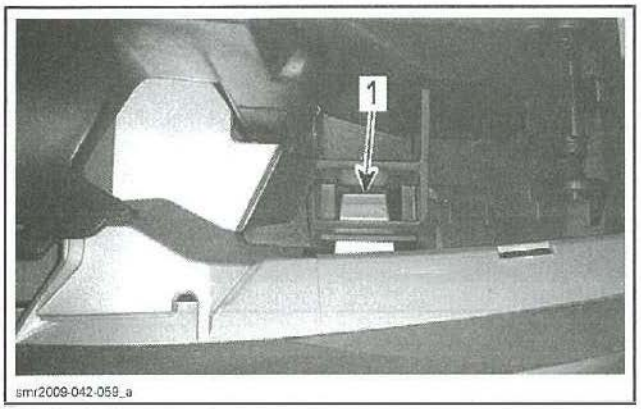


LH SIDE SHOWN
1. Remove these rivets

7. Remove seat trim and drill the front rivet securing the body cover.
8. At the front of front body module, remove screws or rivets retaining both body cover.
9. Unlock rear and center retaining tabs.

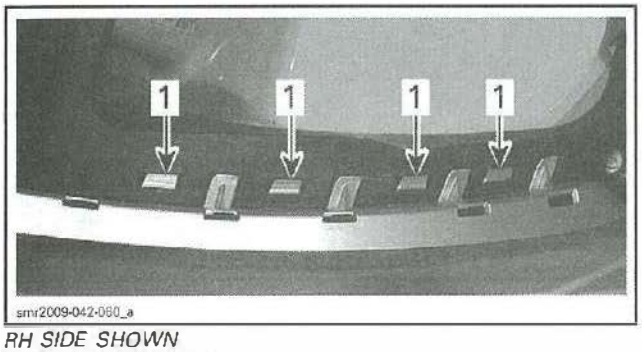


RH SIDE SHOWN
1. Rear retaining tabs



RH SIDE SHOWN
1. Center retaining tab

10. Unlock the four retaining tabs securing the front of body cover.



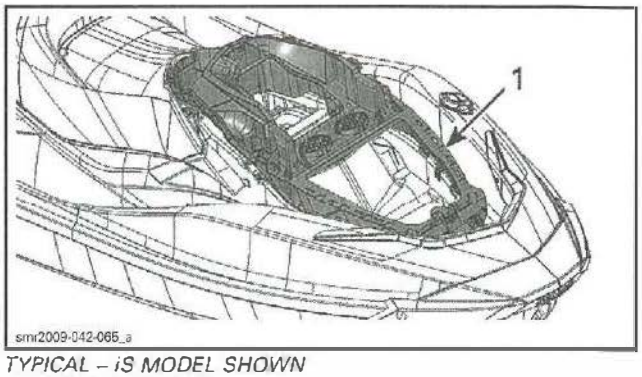
RH SIDE SHOWN
1. Front retaining tab

11. Remove body covers.

Body Cover Installation

The installation is the reverse of the removal procedure.

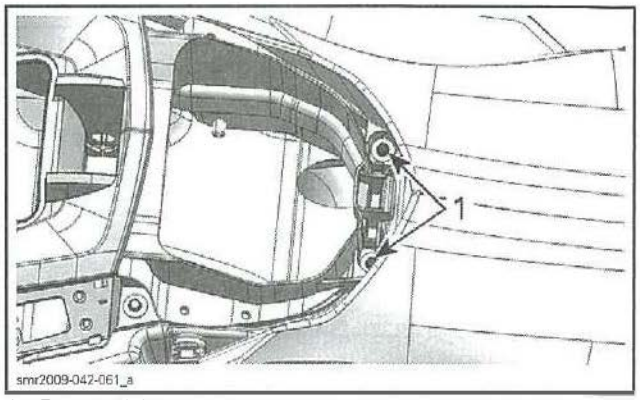
FRONT BODY MODULE



TYPICAL – iS MODEL SHOWN
1. Front body module

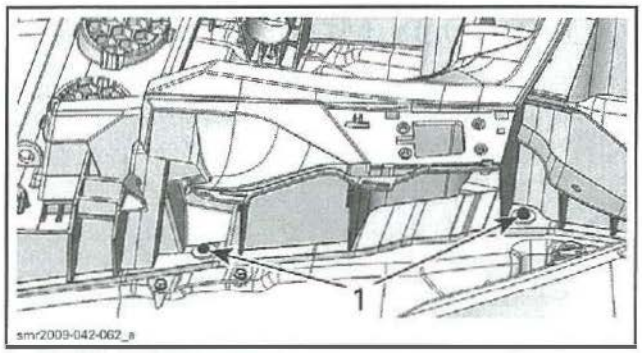
Front Body Module Removal

1. Refer to appropriate procedures and remove the following parts:
   - Storage compartment cover
   - Storage bin
   - Glove box cover
   - Body covers and front grille
   - Steering and steering lock
   - Speed-Tie unit (if equipped).
2. Remove both screws and washers located between seat and glove box.



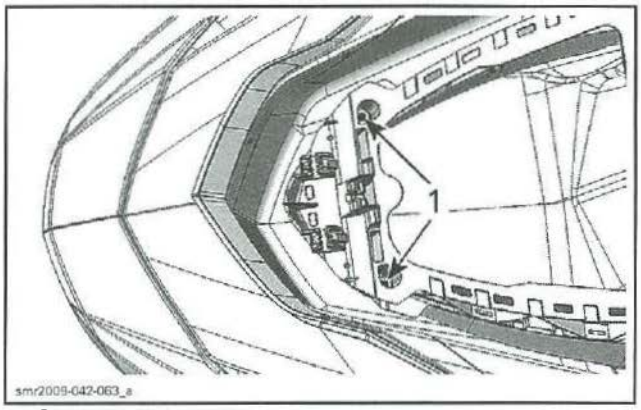
1. Rear retaining screws

3. On each side of front body module, remove both retaining screws.



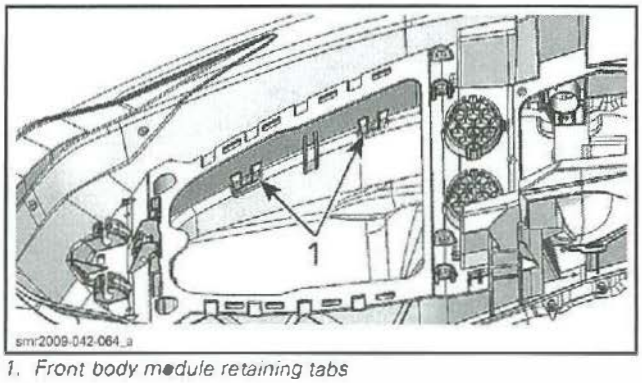
1. LH side retaining screws

4. At the front of body module, remove screws.



1. Front retaining screws

5. Unlock retaining tabs.



1. Front body module retaining tabs

6. Remove front body module.

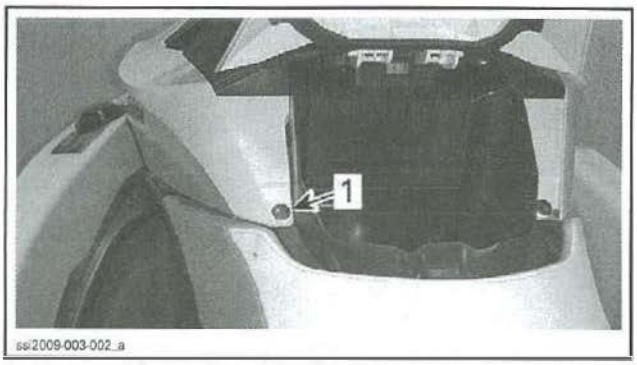
Front Body Module Installation

The installation is the reverse of the removal procedure.

SPEED-TIE UNIT

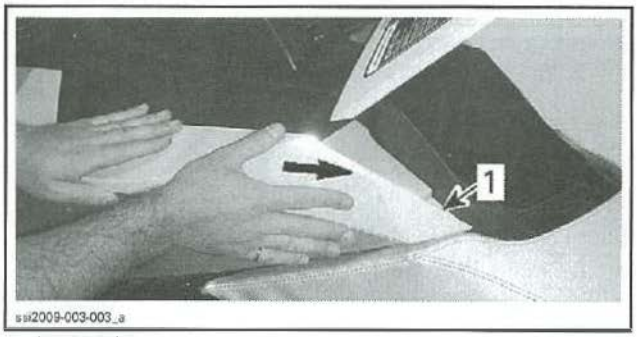
Front Speed-Tie Unit Removal

1. Open the glove box.
2. Remove the plastic push-in clip securing the LH upper trim.



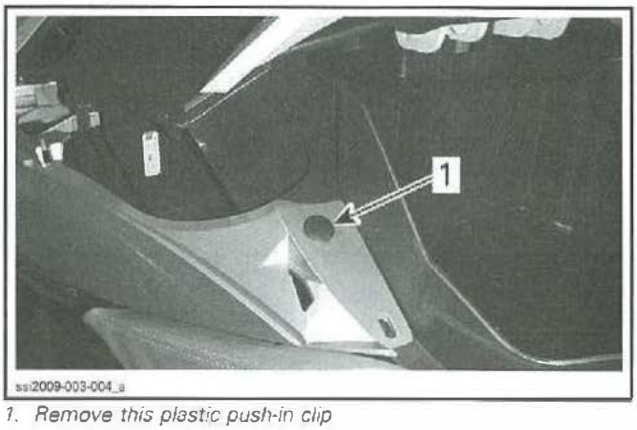
1. Remove this plastic push-in clip

3. Move upper trim rearward and remove it.



1. Upper trim

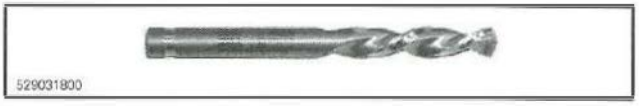
4. Remove the plastic push-in clip retaining the LH trim.

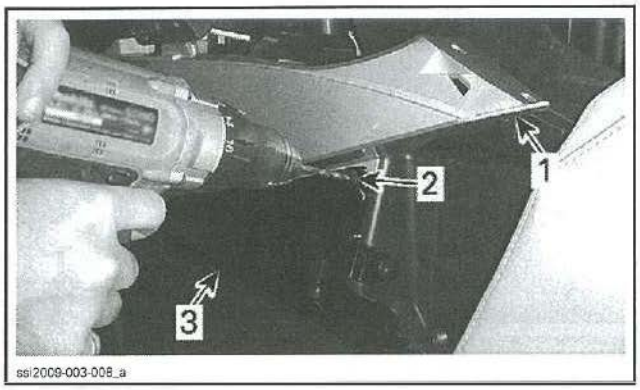


1. Remove this plastic push-in clip

5. Open seat.
6. Drill rivet securing the LH body cover and the seat trim.

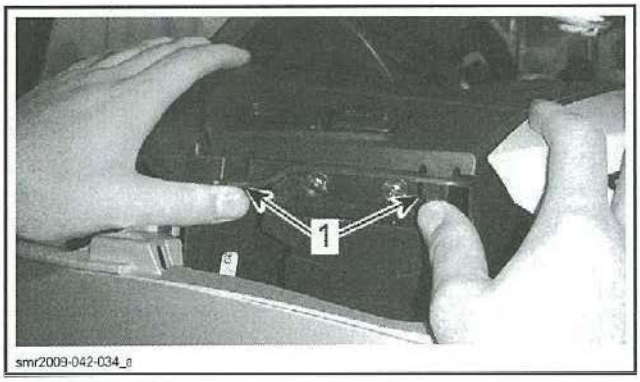
REQUIRED TOOL
SUPERTANIUM DRILL BIT 3/16" (P/N 529 031 800)





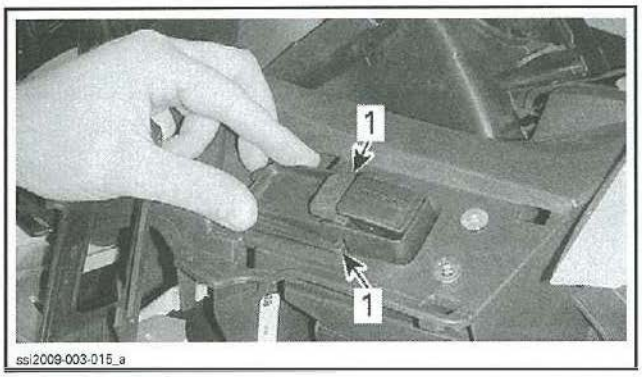
1. LH body cover
2. Remove this rivet
3. Seat trim

7. Remove front trim by releasing both retaining tabs.



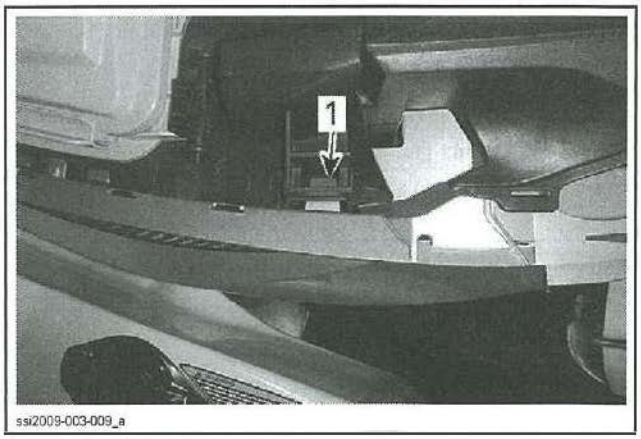
1. Retaining tabs

8. Using a small screwdriver, release both retaining hooks securing the cam trim on locking mechanism.



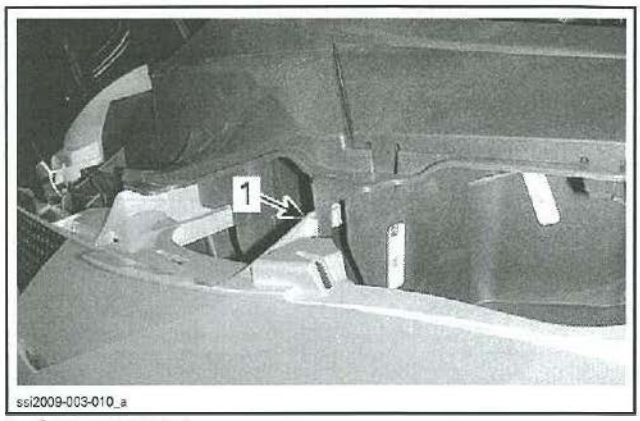
1. Retaining hooks

9. Remove screws retaining the Speed-Tie unit.
10. Position the reel of Speed-Tie unit to the bottom of its cavity.
11. Remove the locking mechanism from vehicle.
12. Open storage cover and unlock the front tab securing the LH trim.



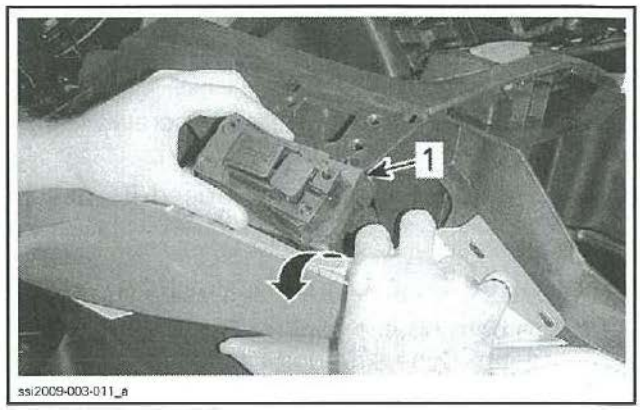
1. Front locking tab

13. Unlatch the rear tab.



1. Rear locking tab

14. Slightly pull the top of LH trim and remove the reel of the Speed-Tie unit from its location as shown.



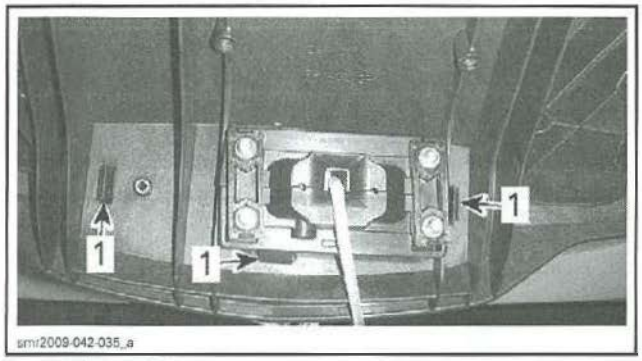
1. Speed-Tie unit reel

NOTICE During Speed-Tie unit removal, be careful not to damage the LH trim.

Rear Speed-Tie Unit Removal

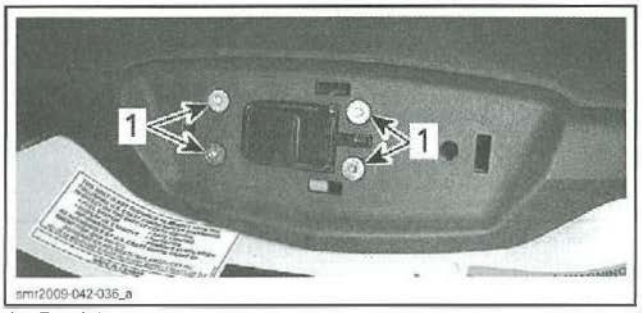
iS and aS Models

1. Remove screws securing the Speed-Tie unit to the boarding platform.
2. Remove rear trim by releasing retaining tabs.



1. Retaining tabs

3. Remove screws securing the locking mechanism to the boarding platform.



1. Retaining screws

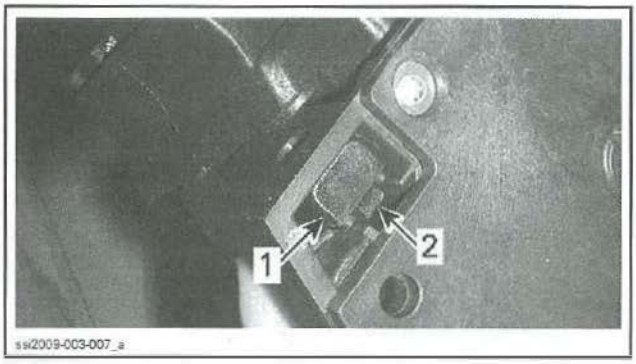
4. Remove the Speed-Tie unit from vehicle.

Models Without iS or aS

1. Remove both access covers.
2. From underneath deck, remove screws retaining the Speed-Tie cover.
3. Remove bolts securing the Speed-Tie unit to deck.

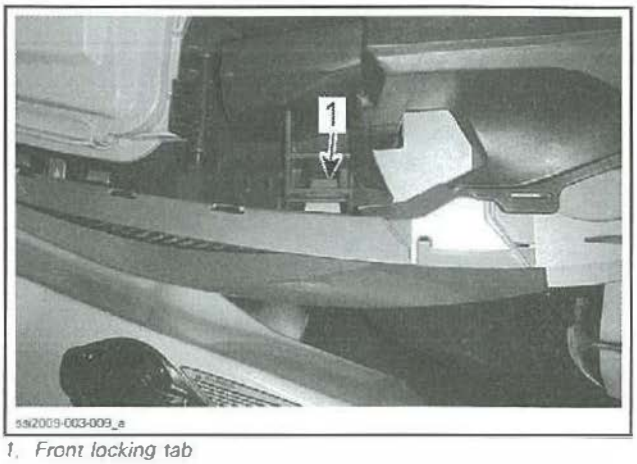
Front Speed-Tie Unit Installation

1. Ensure both double cage nuts are correctly inserted into Speed-Tie unit cavities.



1. Double cage nut
2. Positioning tab

2. Insert the Speed-Tie unit in vehicle.
   2.1 Unlock the front tab securing the LH trim.



1. Front locking tab

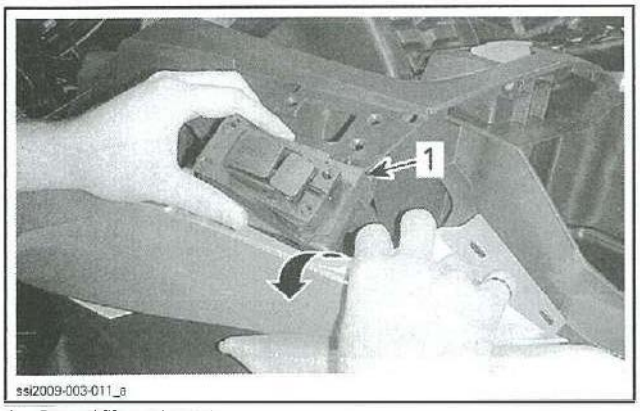
   2.2 Unlatch the rear tab.



1. Rear locking tab

   2.3 Slightly pull the top of LH trim and insert the reel of the Speed-Tie unit in its location as shown.

   NOTE: Insert the unit with the marking outside.

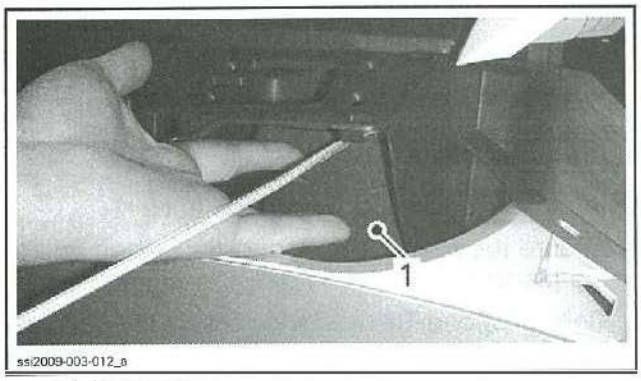


1. Speed-Tie unit reel

NOTICE During Speed-Tie unit insertion, be careful not to damage the LH trim.

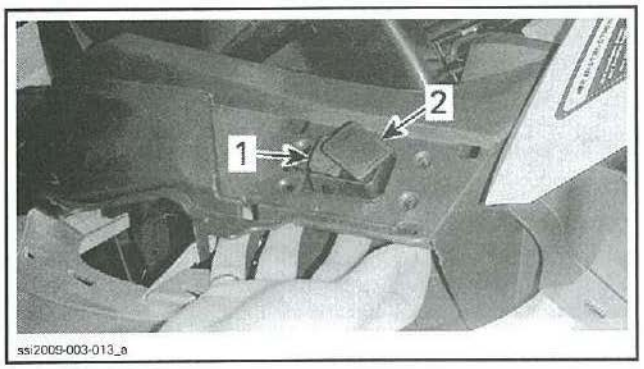
NOTE: To facilitate the locking mechanism insertion, temporarily pull approximately 200 mm (8 in) of rope between reel and locking mechanism.

3. Position the reel to the bottom of its cavity.



1. Push in the reel

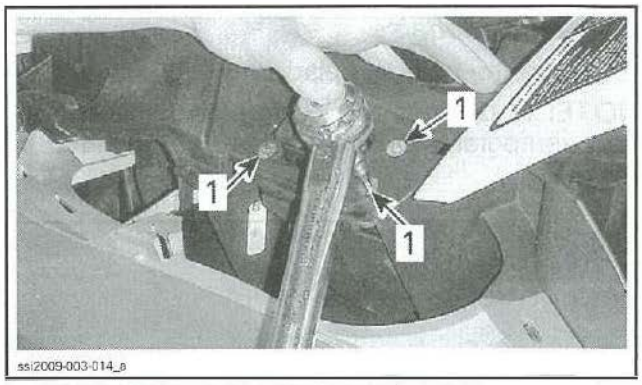
4. Lift the lever and insert the locking mechanism so that the lever is pointing toward the front of vehicle.



1. Locking lever
2. Rope

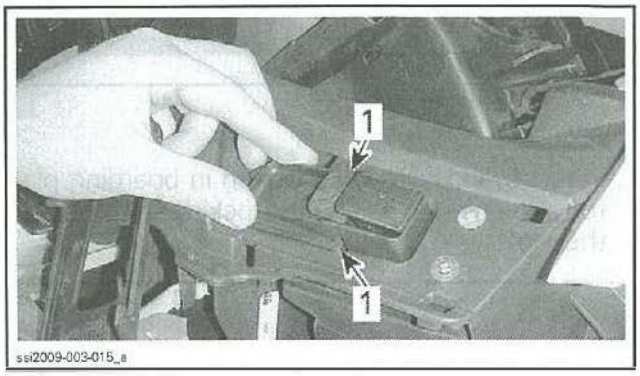
5. Align the reel with the locking mechanism.
6. Tighten locking mechanism retaining screws to specification.

LOCKING MECHANISM RETAINING SCREWS TORQUE
4 N•m (35 lbf•in)



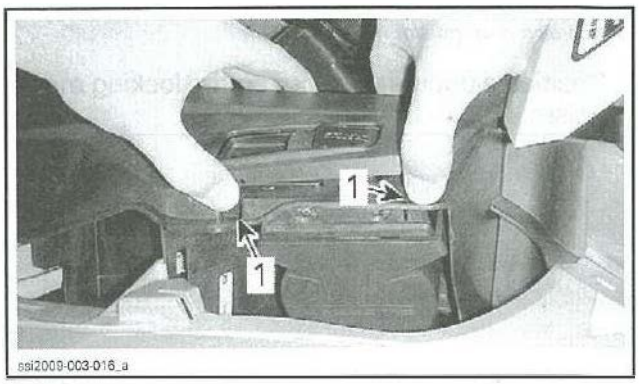
1. Locking mechanism retaining screws (M6 x 45)

7. Install the cam trim.
   7.1 Insert both cam trim retaining hooks into locking mechanism openings.



1. Retaining hooks

   7.2 Press down the cam trim until it snaps into place.
8. Install the front trim.
   8.1 Insert top tabs and align lower tabs with openings.



1. Tabs

   8.2 Press trim in place.

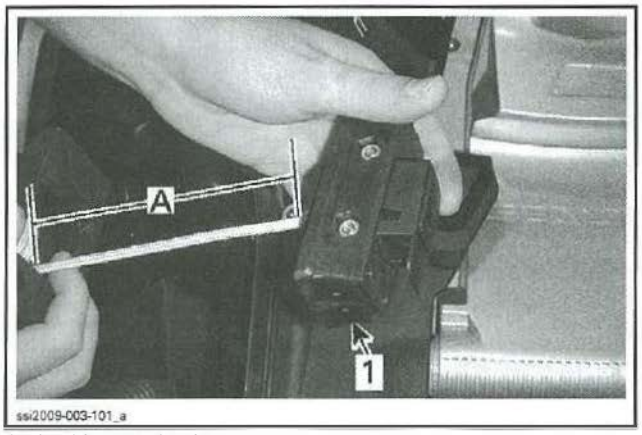
9. Test Speed-Tie operation.
10. Reinstall all removed parts.

Rear Speed-Tie Unit Installation

iS and aS Models

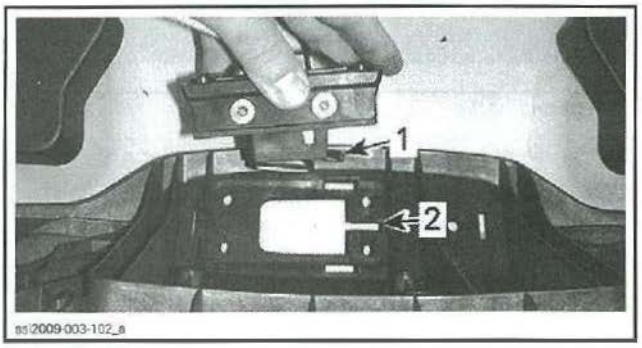
1. Lift up the boarding platform.

NOTE: To facilitate the locking mechanism insertion, temporarily pull approximately 200 mm (8 in) of rope.



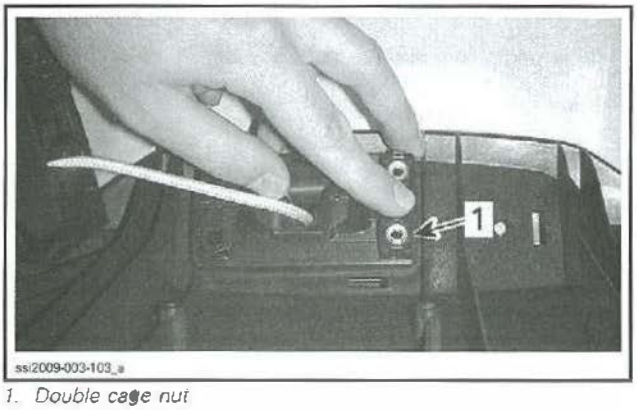
1. Locking mechanism
A. 200 mm (8 in)

2. Insert the locking mechanism in boarding platform opening. Position the locking lever toward the slot.



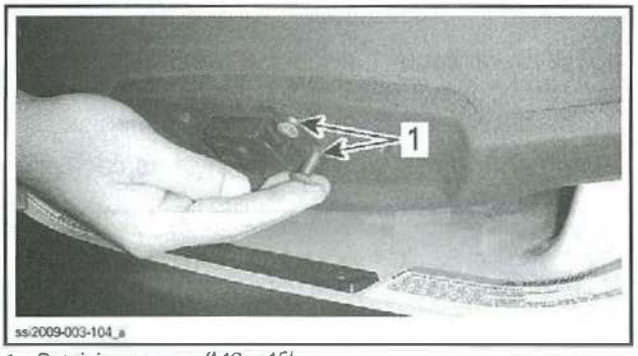
1. Locking lever
2. Boarding platform slot

3. Position a double cage nut on the locking mechanism.



1. Double cage nut

4. Secure it using retaining screws.



1. Retaining screws (M6 x 45)

5. Install the second double cage nut.
6. Secure the reel of the Speed-Tie unit on boarding platform.
7. Tighten Speed-Tie retaining screws to specification.

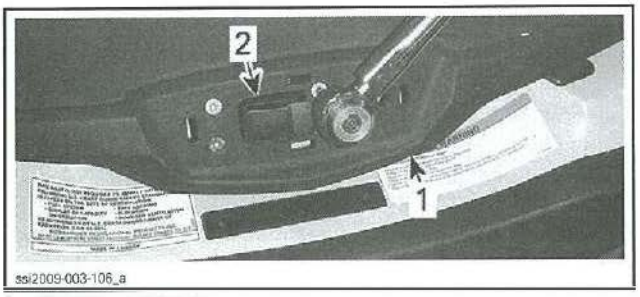
SPEED-TIE RETAINING SCREWS TORQUE
5 N•m (44 lbf•in)



1. Speed-Tie unit

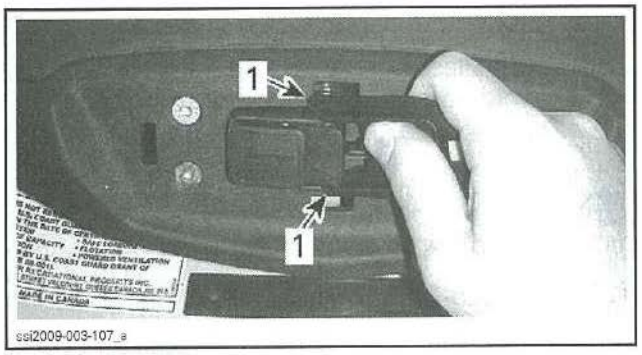
8. Close boarding platform.
9. Tighten locking mechanism retaining screws to specification.

LOCKING MECHANISM SCREWS TORQUE
2.5 N•m (22 lbf•in)



1. *Boarding platform*
2. *Locking mechanism*

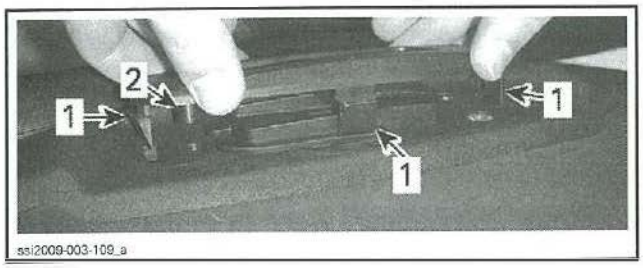
10. Install the cam trim.
    10.1 Insert both cam trim retaining hooks into locking mechanism openings.



1. *Retaining hooks*

    10.2 Press down the cam trim against boarding platform.

11. Install the rear trim.
    11.1 Align tabs and alignment pin with corresponding openings.



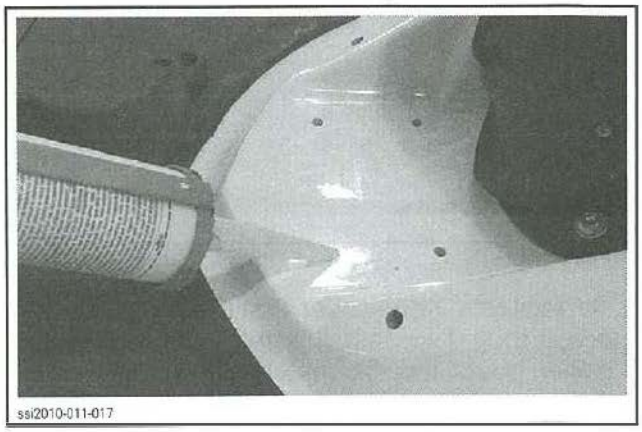
1. *Tabs*
2. *Alignment pin*

    11.2 Press trim in place.

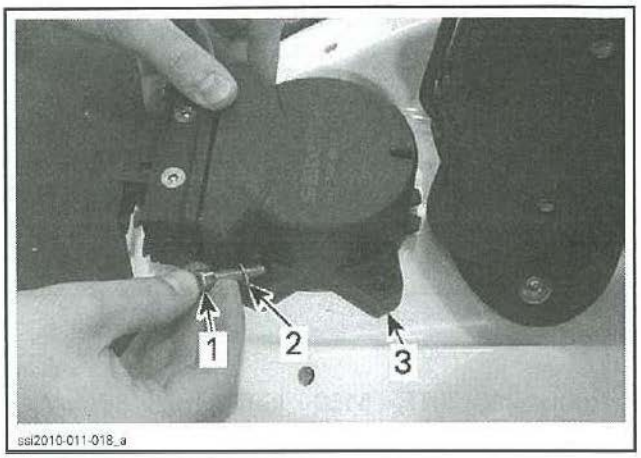
12. Test Speed-Tie operation.

Models Without iS or aS

1. Clean all residues of silicone from deck and Speed-Tie cover.
2. Apply LOCTITE 5150 (SILICONE SEALANT) (P/N 296 000 309) in the Speed-Tie unit holes.



3. Align Speed-Tie unit holes with body holes.
4. Secure the Speed-Tie unit.

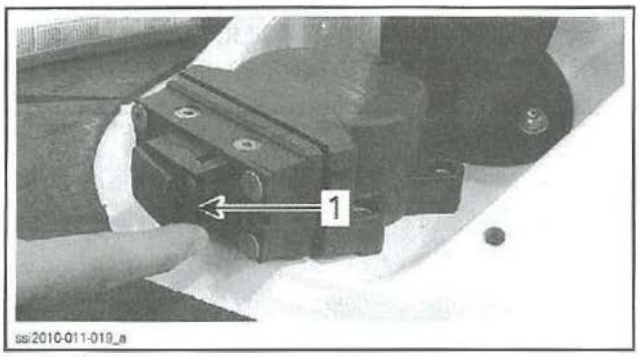


1. *M6 x 30 Allen socket screw*
2. *M6 flat washers*
3. *Speed-Tie unit*

5. Tighten Speed-Tie unit retaining screws to specification.

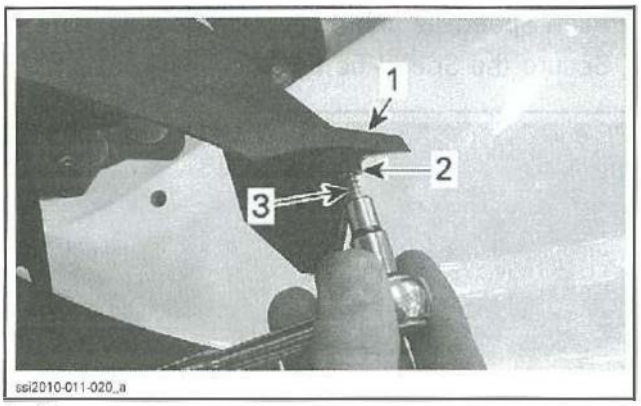
SPEED-TIE UNIT RETAINING SCREWS TORQUE
8 N•m (71 lbf•in)

6. Pull the locking lever to allow cover installation.



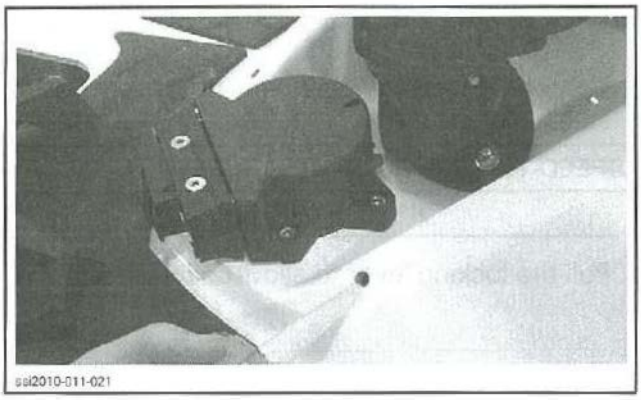
1. Locking lever

7. To facilitate new cover installation and avoid cross threading, install both Plastite screws in cover posts (approximately 3-4 turns). Then, remove screws.



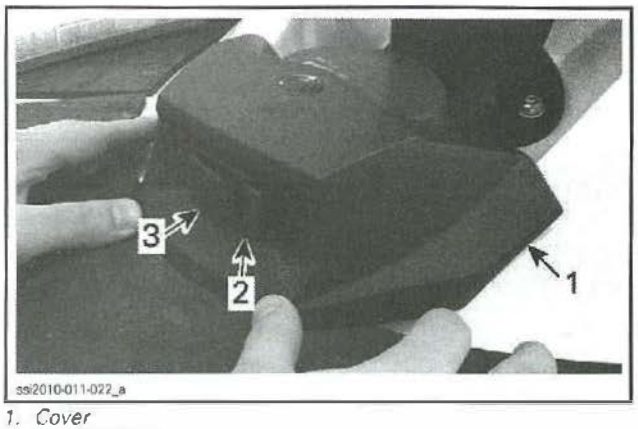
1. Cover
2. Cover posts
3. Plastite screws K40 x 13

8. Apply LOCTITE 5150 (SILICONE SEALANT) (P/N 296 000 309) all around both cover holes.



9. Install the cover.

9.1 Insert cover opening over the mooring rope stopper and the locking lever.



1. Cover
2. Locking lever
3. Mooring rope stopper

9.2 Insert cover posts into cover holes.

NOTE: Due to the drilling precision, it may be necessary to pry slightly the cover to insert cover posts into cover holes.

9.3 From underneath deck, secure the cover with Plastite screws and flat washers. To avoid damaging the cover, stop tightening as soon as the washers are against the deck.

NOTICE **Do not tighten screws more than necessary to avoid damaging the cover.**

10. Test Speed-Tie operation.

11. Reinstall access covers.

Speed-Tie Unit Cleaning

A minimum of maintenance is required to keep the Speed-Tie unit and the rope in serviceable condition.

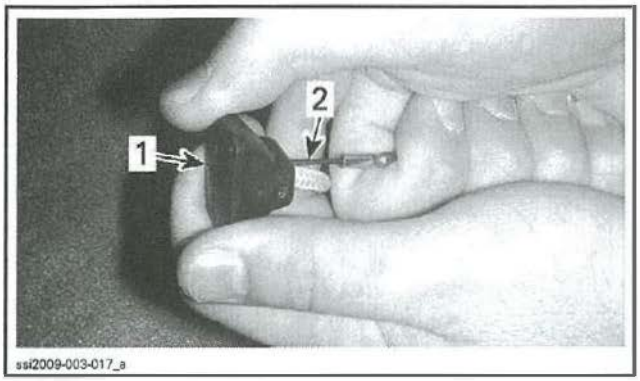
Clean the locking mechanism and rope with fresh water to remove salt, sand or other deposits.

NOTICE **Do not use a high pressure washer to clean the Speed-Tie unit.**

Let dry.

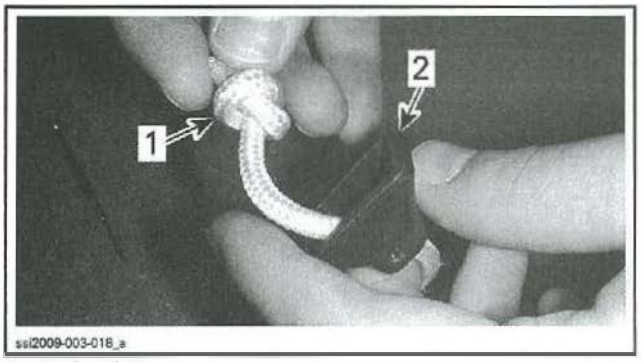
Speed-Tie Rope Replacement

1. Remove the Speed-Tie unit from the vehicle.
2. Using a small tool, remove the rope cap.



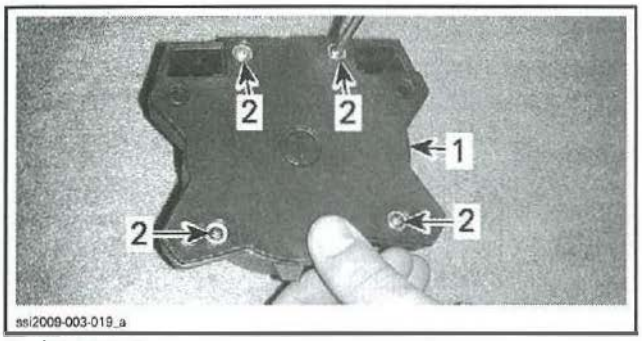
1. *Cap*
2. *Small screwdriver*

3. Untie the knot and remove the button.



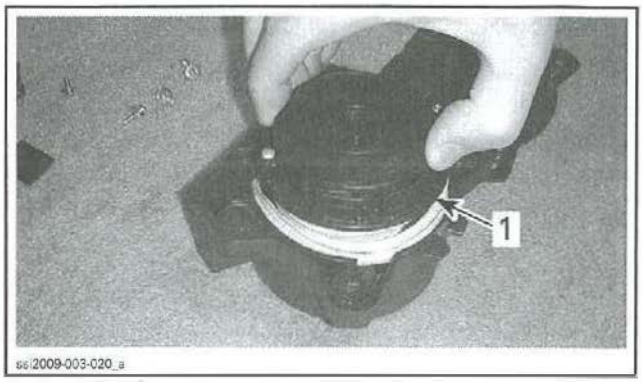
1. *Untie this knot*
2. *Button*

4. Remove the locking mechanism and let the rope retracts into housing.
5. Remove the back cover.



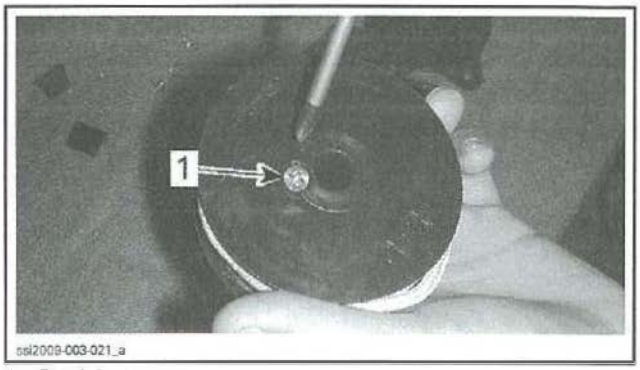
1. *Back cover*
2. *Retaining screws*

6. Remove the rewind unit.



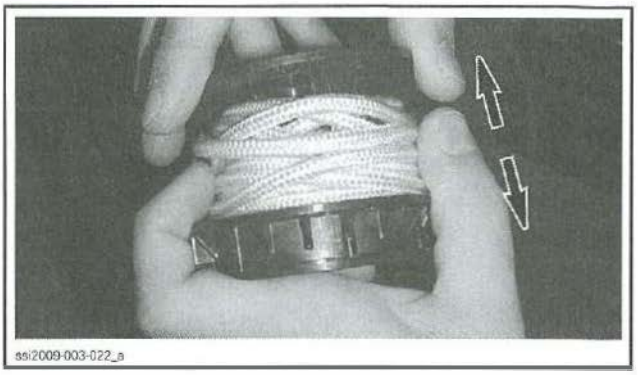
1. *Rewind unit*

7. Turn the unit upside down and remove the retaining screw.

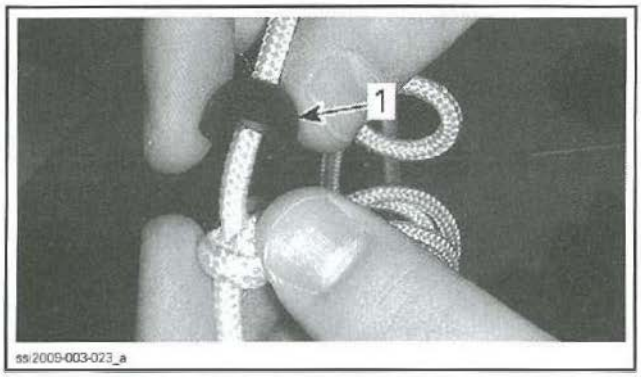


1. *Retaining screw*

8. Split the rewind unit and remove damaged rope.

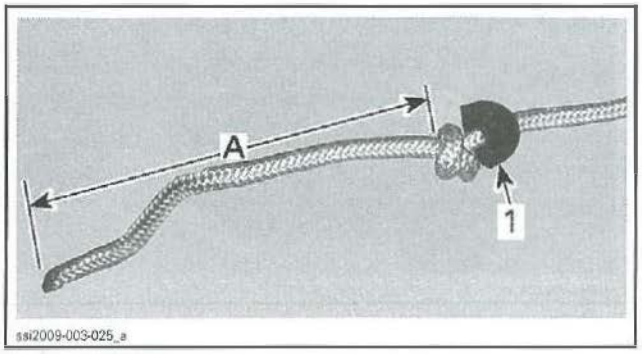


9. Before discarding rope, remove and keep the inner stopper.



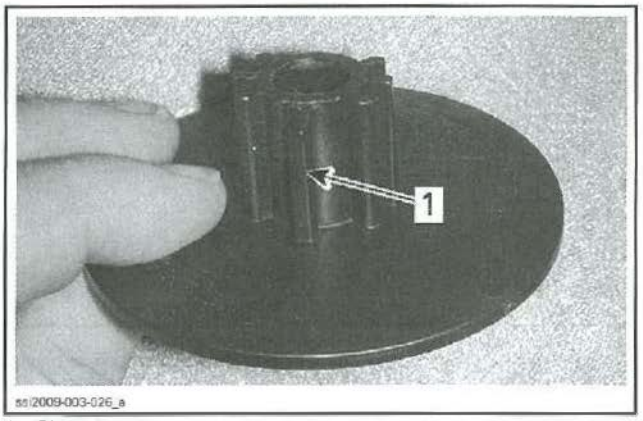
1. Inner stopper

10. Insert the inner stopper on new rope and tie a knot near the end of the line. Position the inner stopper in order to its flat side leans against the knot.



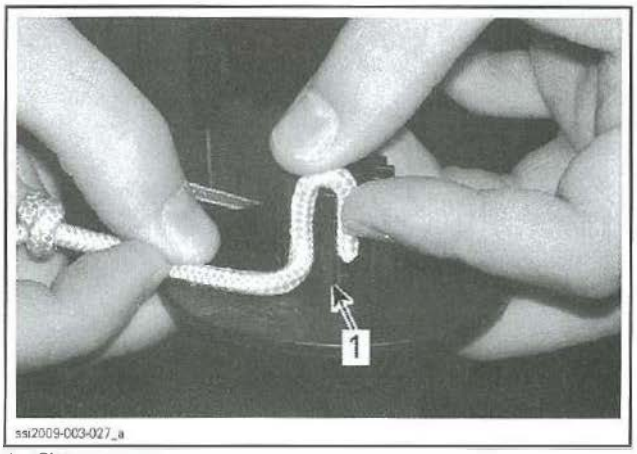
1. Inner stopper
A. 106 mm ± 6 mm (4-1/8 in ± 15/64 in)

11. On rewind unit base, identify the short tongue.



1. Short tongue

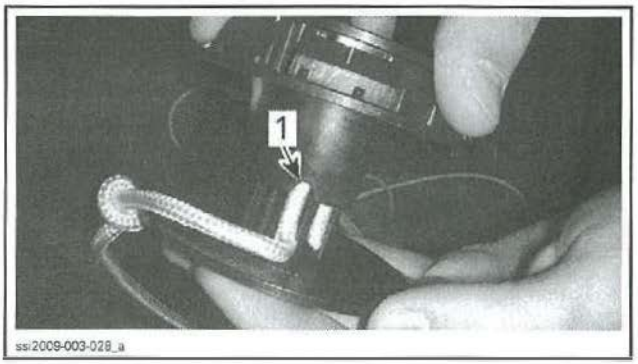
12. Install the rope end (with the knot) over the short tongue as shown.



1. Short tongue

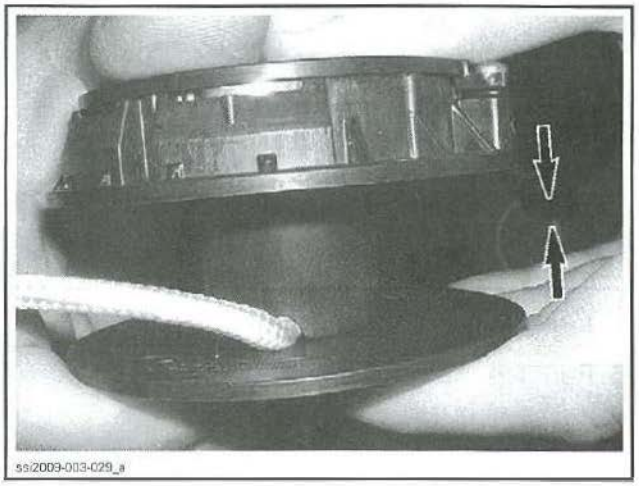
13. Install the rewind unit cover.

13.1 Align the cover notch and the rope.



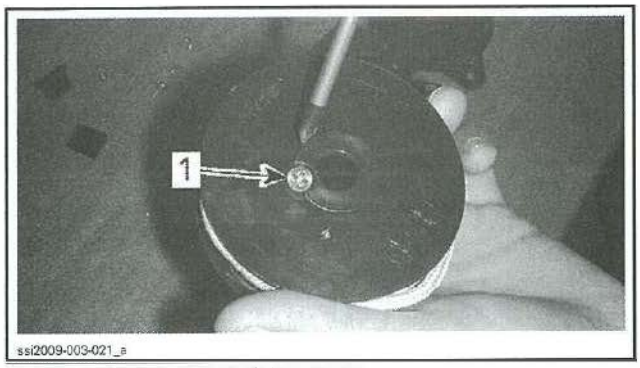
1. Cover notch

13.2 Press in the cover until both parts are completely pressed together.



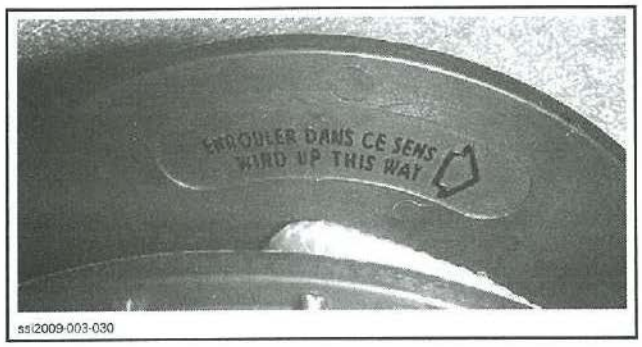
13.3 Install and tighten retaining screw to specification.

REWIND UNIT COVER RETAINING SCREW TORQUE
1 N•m (9 lbf•in)

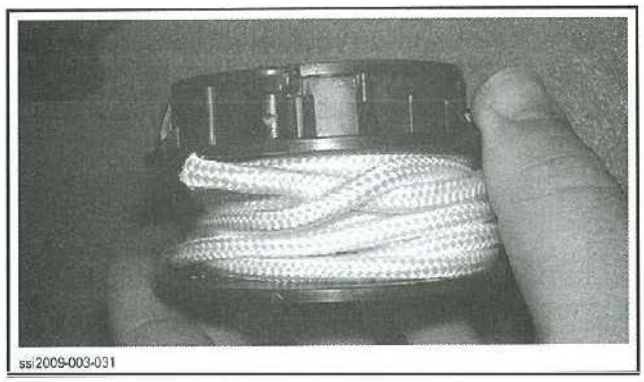


1. Rewind unit cover retaining screw

14. Turn rope clockwise. Check indications on inner side of rewind unit.



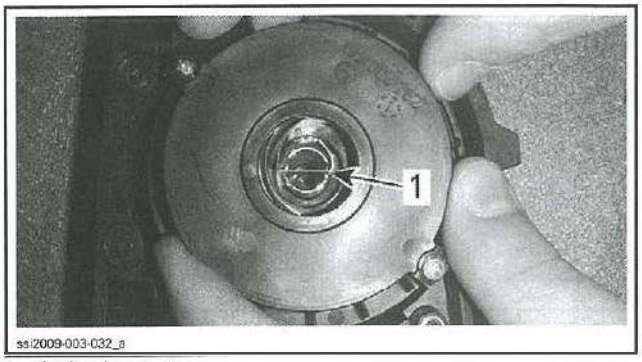
15. Lock the end of rope as shown.



16. Install rewind unit into housing.

    16.1 Install the rewind unit with the retaining screw downward. The end of rope must be placed in front of the housing opening.

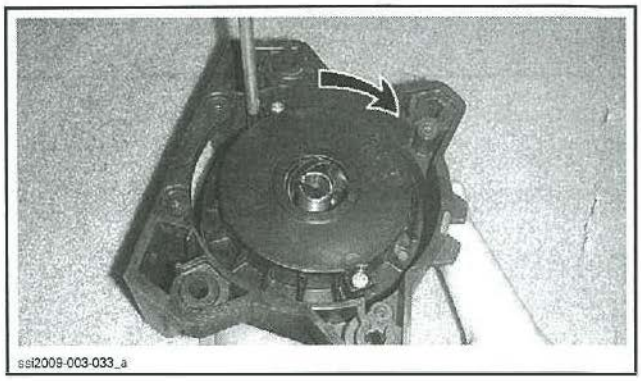
    16.2 Insert spring in shaft notch.



1. Spring in notch

NOTE: Ensure spring is properly inserted in notch.

17. Using a screwdriver, crank rewind spring exactly 7 turns (clockwise).



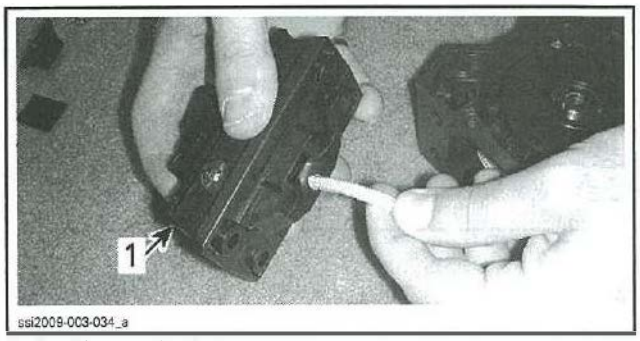
18. Unlock the end of the rope and pull it out by the housing opening.

NOTE: Be careful not to release the rope and the spring. Otherwise you will need to remove drum and repeat the cranking operation.

19. Install locking mechanism and rope.

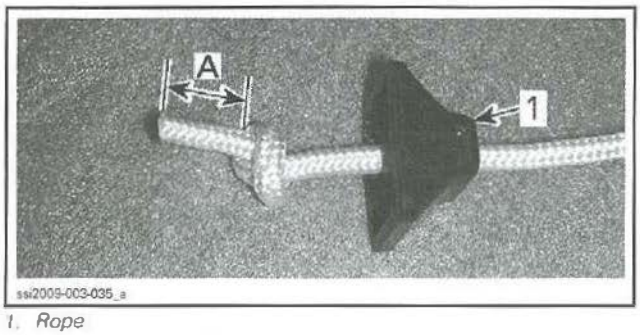
    19.1 Pull out rope end.

    19.2 Insert end of rope through locking mechanism.



1. Locking mechanism

    19.3 Pass rope end through the rope button and tie a knot on the rope end, see picture.



1. *Rope*

A. 18 mm ± 6 mm (23/32 in ± 15/64 in)

19.4 Pull knot in the button and install the button cap. Make sure cap is properly snapped.

20. Install and tighten Speed-Tie cover retaining screws to specification.

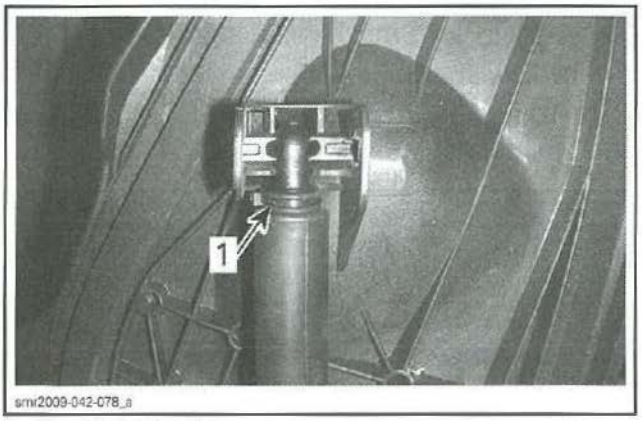
SPEED-TIE COVER RETAINING SCREWS TORQUE
1 N•m (9 lbf•in)

21. Check Speed-Tie operation.
22. Reinstall the Speed-Tie unit on vehicle.

BOARDING PLATFORM (iS AND aS MODELS)

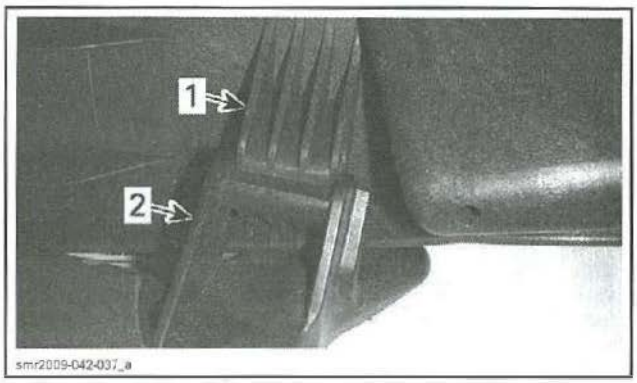
Boarding Platform Removal

1. Unlatch the boarding platform.
2. Open boarding platform completely.
3. Cut locking tie retaining the bellows of gas shock.



1. *Cut this locking tie*

4. Move bellows downward.
5. Unscrew gas shock from its upper attachment.
6. Remove gas shock from vehicle.
7. Align boarding platform hinge openings with flat sides of fixed hinges.



1. *Boarding platform hinge*
2. *Fixed hinge*

8. Remove boarding platform.

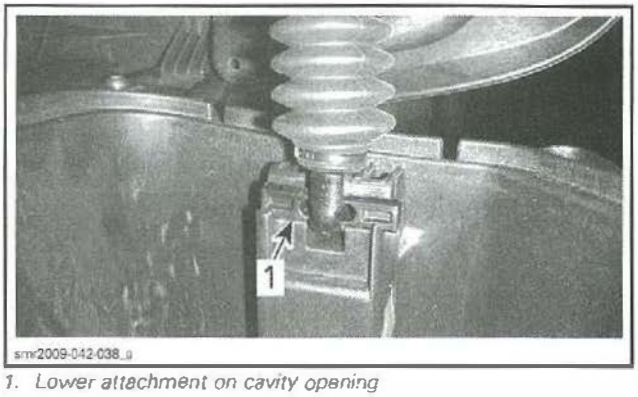
Boarding Platform Installation

1. Remove gas shock attachment from boarding platform.
2. Apply LOCTITE 414 (P/N 413 705 800) on threads of shock absorber body.
3. Manually tighten the attachment on gas shock.
4. Install the bellows and secure it using a locking tie.
5. Install the gas shock on cover.

NOTE: The corrugated section of bellows must point downward.

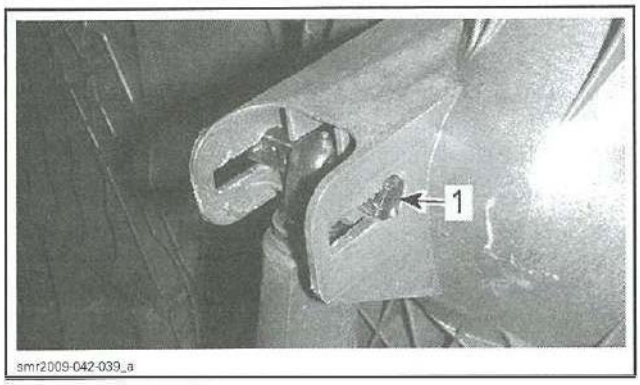
6. Align boarding platform hinge openings with flat sides of fixed hinges.
7. Push in the boarding platform to assemble hinges.
8. Position the bottom of the gas shock on cavity opening.

NOTICE **To avoid breaking the attachment, do not force to insert it in cavity.**



1. *Lower attachment on cavity opening*

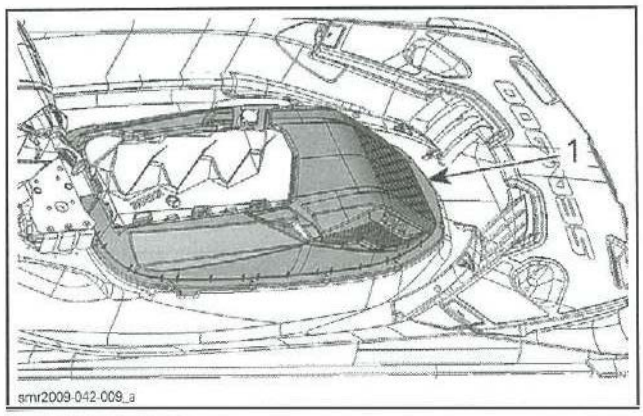
NOTE: Make sure upper attachment is properly inserted in its slots.



1. *Upper attachment*

9. Close boarding platform to lock the bottom of the gas shock.
10. Lock boarding platform.

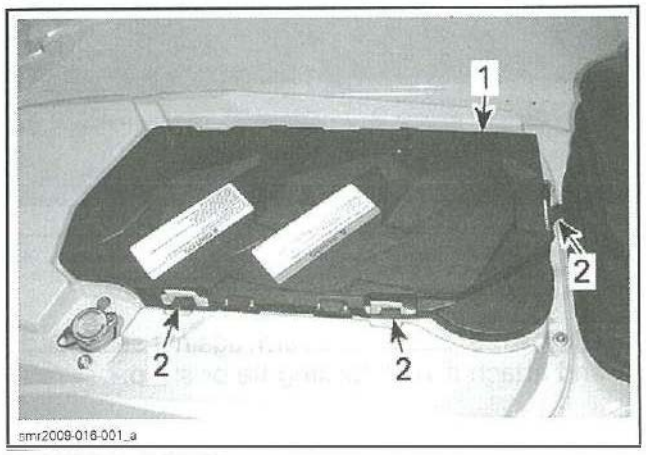
DECK EXTENSION (iS AND aS MODELS)



1. *Deck extension*

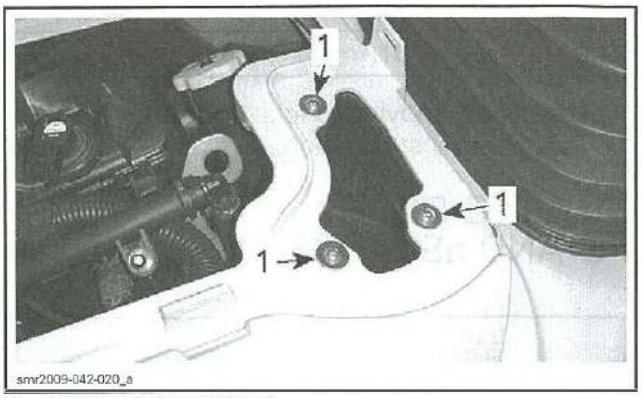
Deck Extension Removal

1. Open seat.
2. Remove the rear ventilation box.



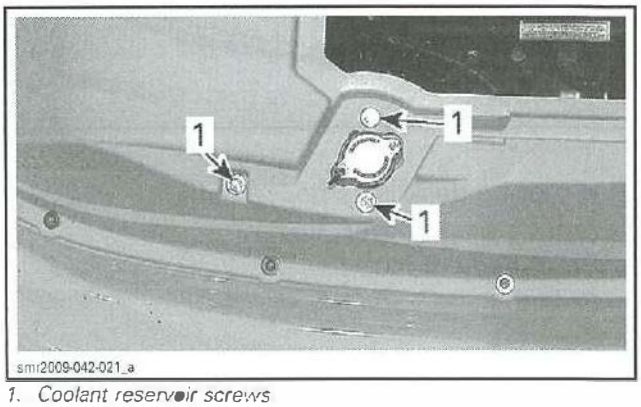
1. *Rear ventilation box*
2. *Retaining latches*

3. Remove screws securing air inlet to deck extension.



1. *Air inlet retaining screws*

4. Remove coolant reservoir screws.



1. *Coolant reservoir screws*

5. Remove all screws retaining deck extension to fixed deck.
6. Close seat.
7. Tilt the *MOVING DECK*, see procedure in this subsection.
8. Remove the deck extension.

Deck Extension Installation

1. Position the deck extension.
2. Install screws retaining deck extension and air inlet.
3. Tighten deck extension retaining screws to specification.

DECK EXTENSION RETAINING SCREWS TORQUE
1.2 N•m (11 lbf•in)

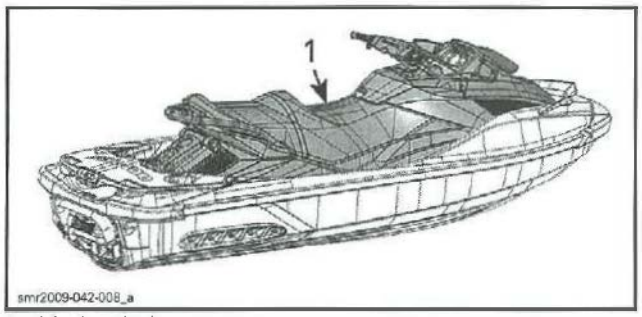
NOTICE Do not tighten screws over this recommended torque. Otherwise, the rubber grommet could turns and screw will be hard to remove.

4. Install and tighten coolant reservoir screws to specification.

COOLANT RESERVOIR SCREWS TORQUE
5 N•m (44 lbf•in)

5. Reposition moving deck. Refer to *MOVING DECK* in this subsection.

MOVING DECK (iS AND aS MODELS)



1. Moving deck

The moving deck is comprised of:
- Front storage cover
- Front body module
- Steering
- Seat
- Foot wells.

The moving deck is attached to the intelligent suspension and moves as a single unit.

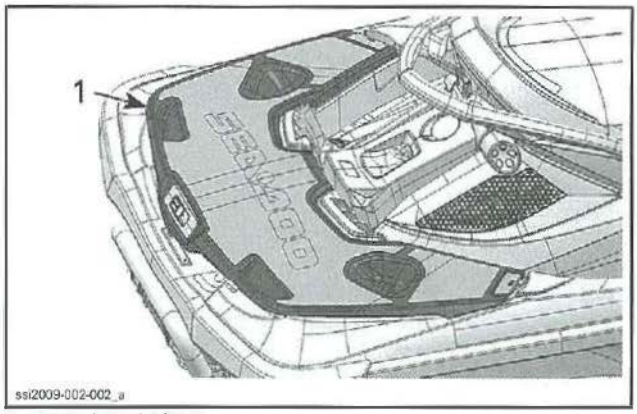
The moving deck does not comprise the boarding platform and the rear storage bins.

It is possible to tilt the moving deck for servicing the watercraft, such as:
- Deck extension removal
- Working on air intake system
- Suspension position sensor replacement
- Suspension hydraulic pump replacement.

The moving deck removal is also required for major repairs, such as:
- Engine removal
- Suspension component removal (except suspension position sensor)
- Fuel tank removal.

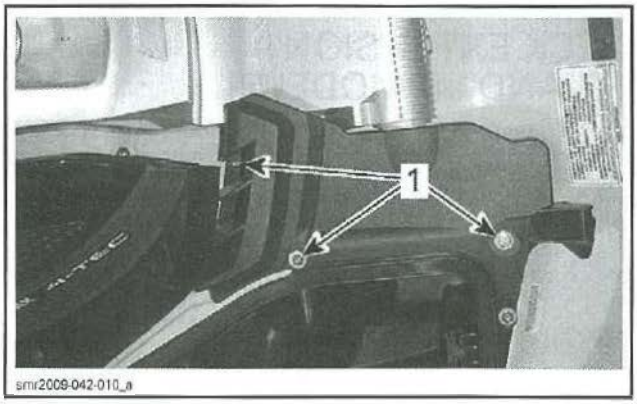
Tilting Moving Deck for Servicing Watercraft

1. Remove the *BOARDING PLATFORM*, see procedure in this subsection.



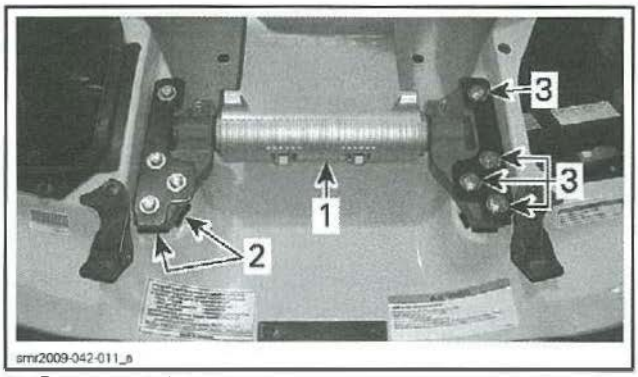
1. Boarding platform

2. Remove bolts securing both rear suspension arm covers.



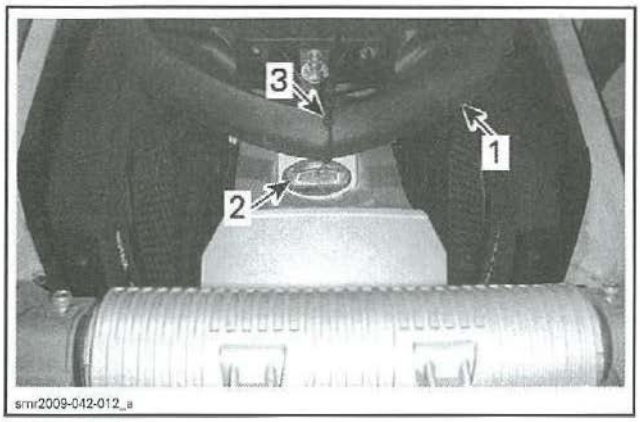
1. Cover screws

3. Mark position of rear suspension arm brackets for proper reinstallation.
4. Remove and discard screws securing rear suspension arm to fixed deck.



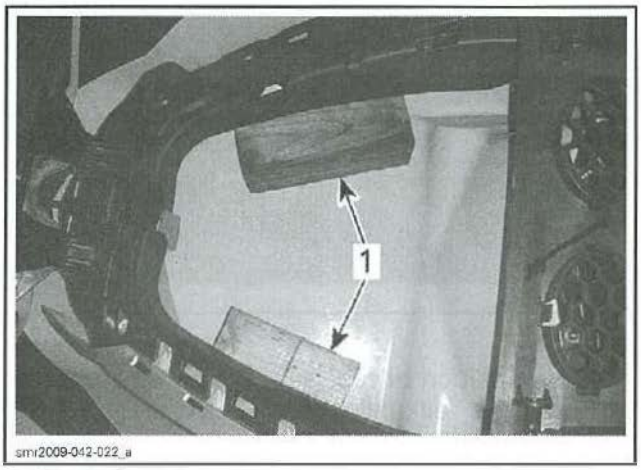
1. Rear suspension arm
2. Reinstallation marks
3. Screws (discard)

5. Lift the rear suspension arm against seat handle and attach it with locking tie or strap.



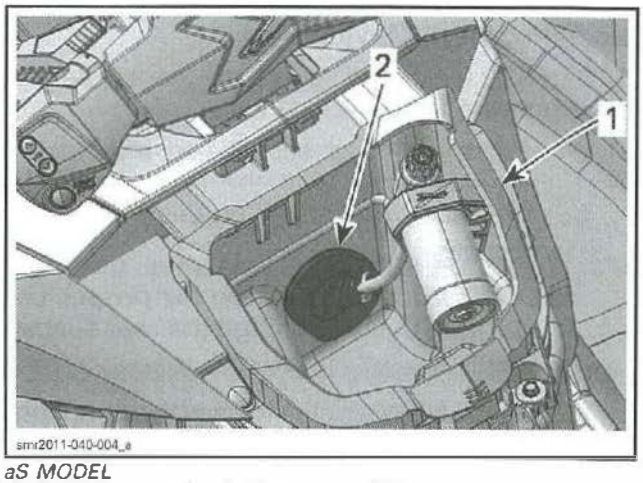
1. Seat handle
2. Ski/wakeboard attachment
3. Locking tie

6. Install two pieces of wood (4 x 4) under moving deck front area as shown to avoid potential damage when lifting the moving deck.



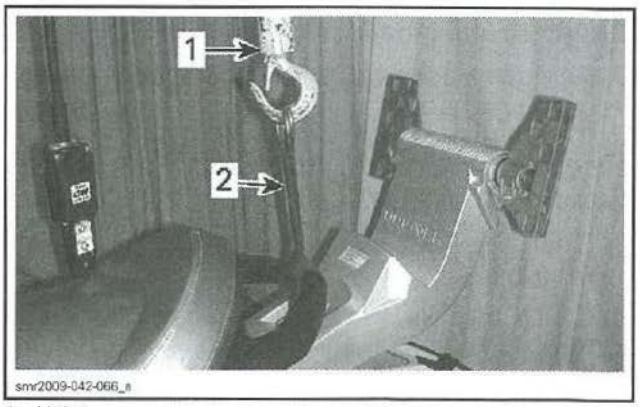
1. Pieces of wood

7. Place steering in its lower position.
8. On aS models, ensure that remote reservoir hose has enough free length before tilting the moving deck.
   - If hose is too tight, remove remote reservoir retaining screws then move hose inside deck.

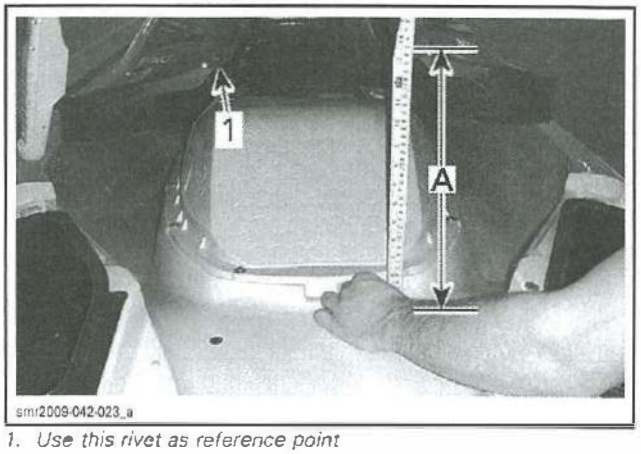


aS MODEL
1. Remote reservoir retaining screws (2x)
2. Hose bellows

9. Using suitable lifting devices, raise the rear of moving deck to 340 mm (13-1/2 in).



1. Hoist
2. Lifting strap



1. Use this rivet as reference point

A. 340 mm (13-1/2 in)

NOTICE Lifting the rear of moving deck more than the recommended height can damage the steering cable and the remote reservoir hose.

Lowering Back Moving Deck

1. Carefully lower and secure the rear suspension arm to the fixed deck.
   1.1 Position the rear suspension arm brackets in accordance with the reference marks previously drew on fixed deck.

   NOTICE If no mark was trace, refer to *IS SUSPENSION* subsection for proper procedure to install and align the rear suspension arm.

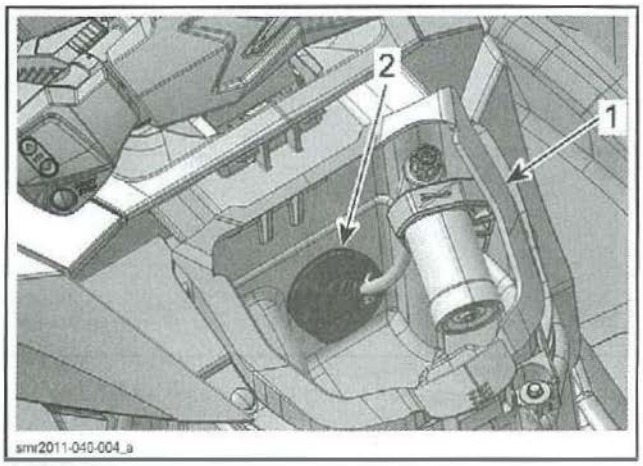
   1.2 Install NEW screws to secure rear suspension arm brackets.
   1.3 Tighten screws to specification.

REAR SUSPENSION ARM RETAINING SCREWS TORQUE
25 N•m (18 lbf•ft)

2. Detach lifting device.
3. Remove pieces of wood located under the front of moving deck.

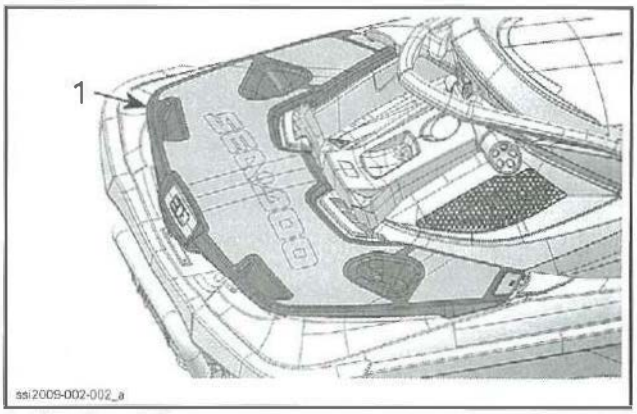
Removing the Moving Deck for Servicing Watercraft

1. Open the front storage cover and remove the front basket.
2. On aS models, remove remote reservoir from moving deck as follows:
   2.1 Remove both retaining screws.
   2.2 Detach hose bellows from moving deck.
   2.3 Insert remote reservoir into moving deck hole.



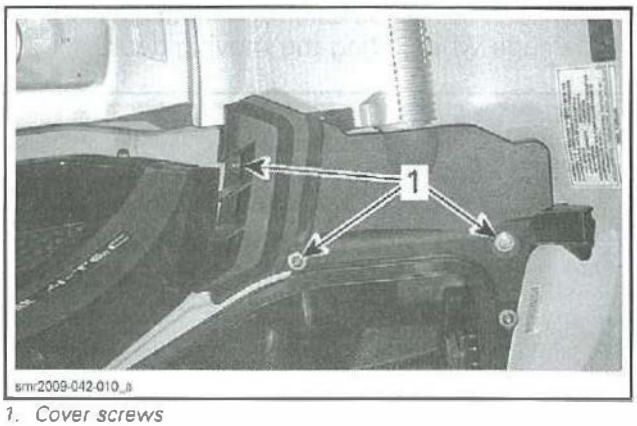
aS MODEL
1. *Remote reservoir retaining screws (2x)*
2. *Hose bellows*

3. Remove the *BOARDING PLATFORM*, see procedure in this subsection.



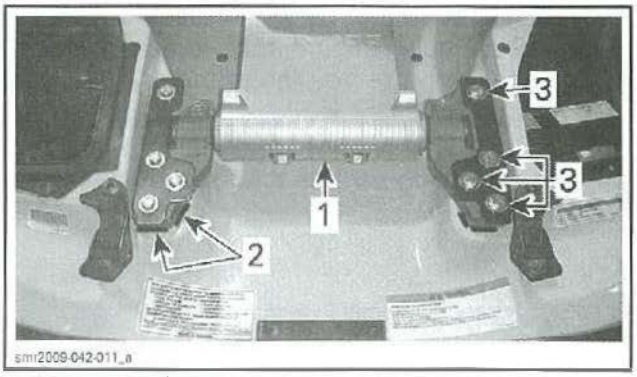
1. *Boarding platform*

4. Remove bolts securing both rear suspension arm covers.



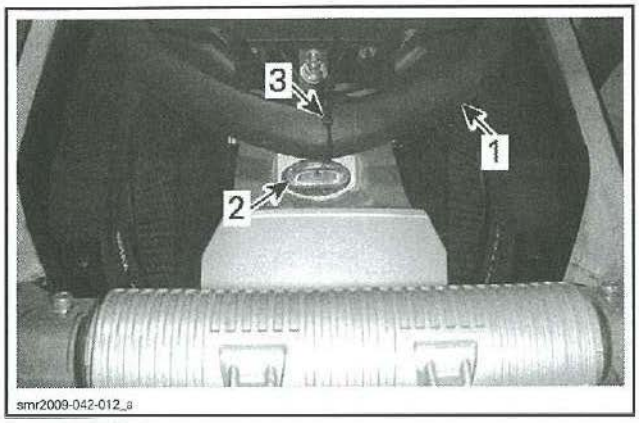
1. *Cover screws*

5. Mark position of rear suspension arm brackets for proper reinstallation.
6. Remove and discard screws securing rear suspension arm to fixed deck.



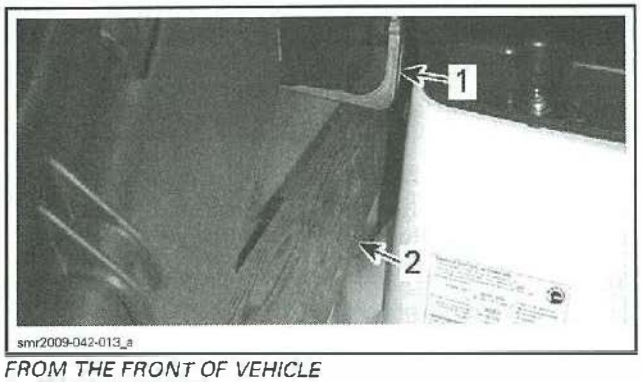
1. *Rear suspension arm*
2. *Reinstallation marks*
3. *Screws (discard)*

7. Lift and attach the rear suspension arm against seat handle.



1. *Seat handle*
2. *Ski/wakeboard attachment*
3. *Locking tie*

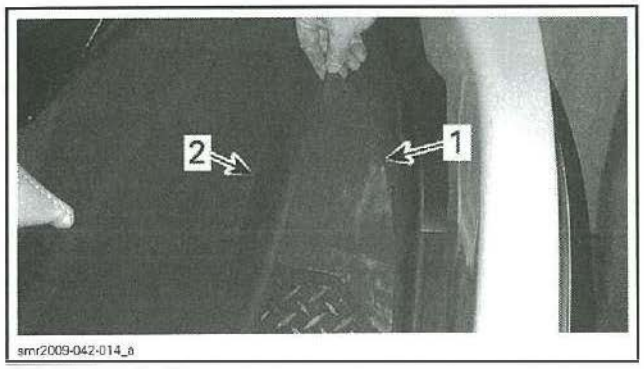
8. Manually tip up the front of moving deck and install a piece of wood (2 x 4) between fixed deck and each lateral supports.



FROM THE FRONT OF VEHICLE
1. *RH lateral support*
2. *Piece of wood*

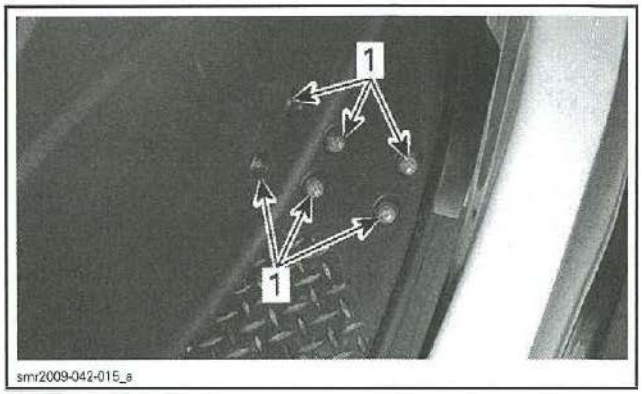
9. Detach moving deck from lateral supports.

9.1 Remove front carpet of foot wells and protective caps on both sides of the moving deck. Discard the front carpets.



RH SIDE SHOWN
1. *Front carpet (discard)*
2. *Protective cap*

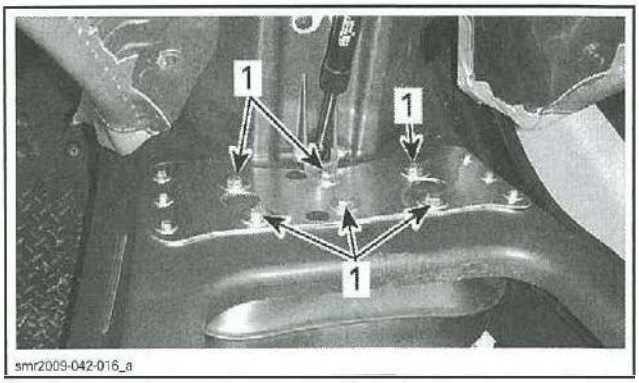
9.2 Remove and discard screws securing moving deck to lateral supports.



RH SIDE SHOWN
1. *Retaining screws (discard)*

10. Open seat.

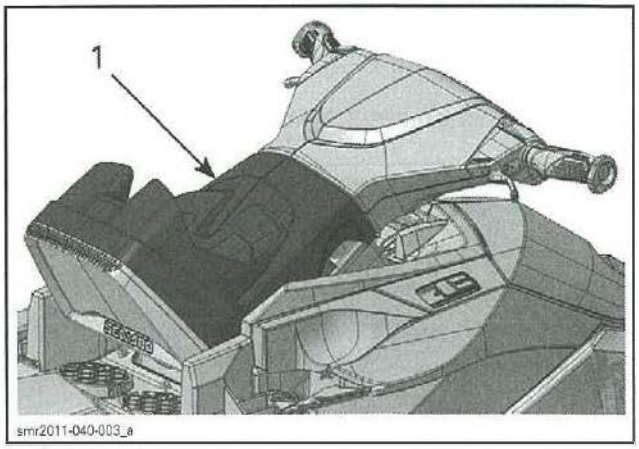
11. Remove and discard M8 screws securing the suspension mounting plate and moving deck.



1. *Moving deck central screws (to discard)*

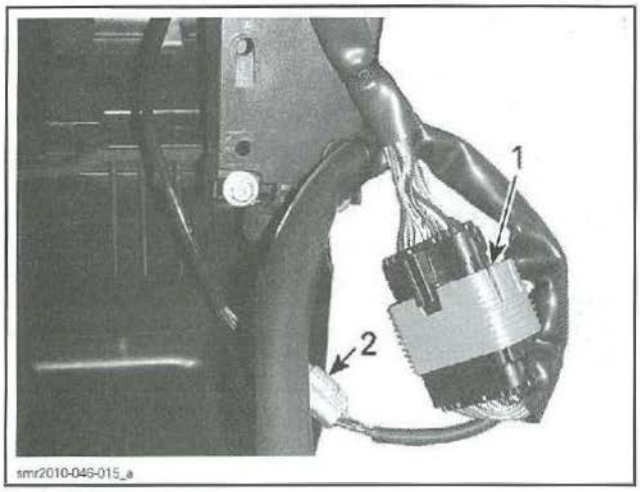
12. Close seat.

13. Remove the gauge support. Refer to *INFORMATION CENTER (GAUGE)* subsection.



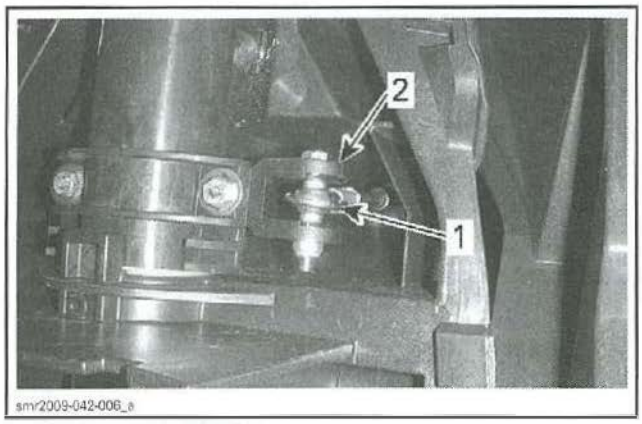
1. *Gauge support*

14. Disconnect both connectors under moving deck.



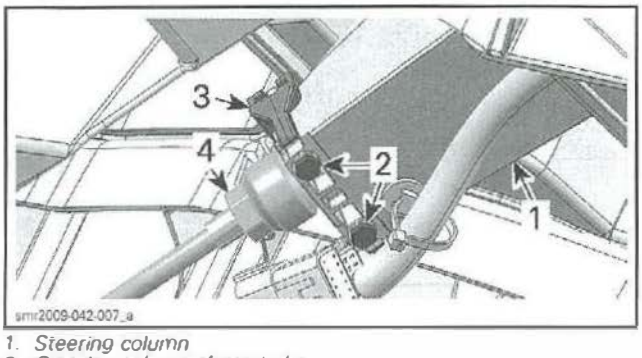
1. Steering connector
2. O.T.A.S. connector

15. Detach steering cable from steering column.
    15.1 Remove bolt securing ball joint to steering column.



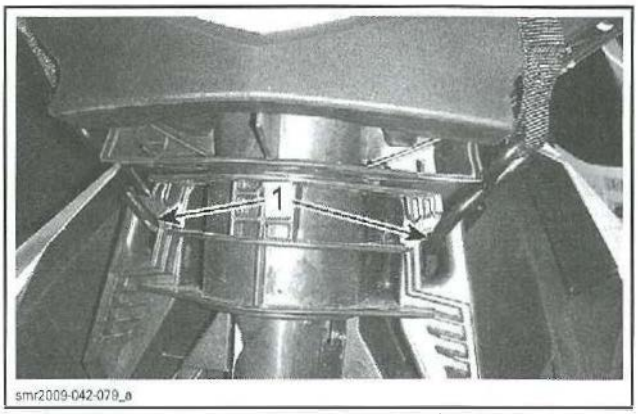
1. Steering cable ball joint
2. Steering column

    15.2 Remove bolts retaining steering cable clamp.
    15.3 Unlatch steering cable clamp.



1. Steering column
2. Steering column clamp bolts
3. Steering column clamp
4. Steering cable adjusting nut

    15.4 Place steering in its lower position.
    15.5 Free steering cable from fixed clamp.
16. Install lifting straps.
    16.1 Using both mooring cleats under steering, install two lifting straps.



1. Front lifting strap hooks into steering mooring cleats

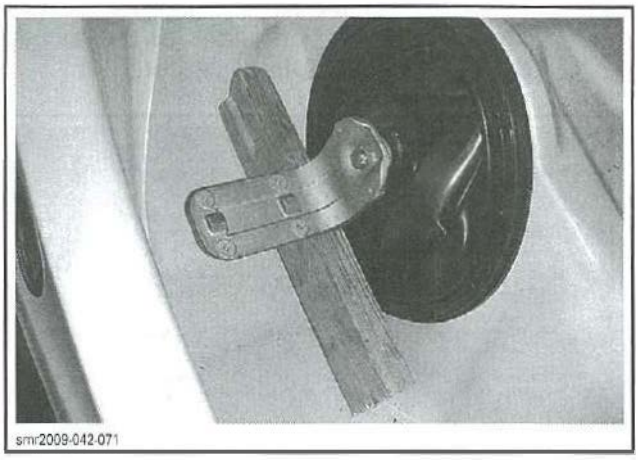
    16.2 Install another lifting strap on seat handle.
17. Attach all lifting straps to an lifting device to lift the moving deck.

⚠ CAUTION Make sure lifting device is located at the center of the vehicle to rise moving deck horizontally.

18. Raise moving deck slowly and drive steering cable out of steering column.
19. Place the moving deck on a level surface.

Moving Deck Installation

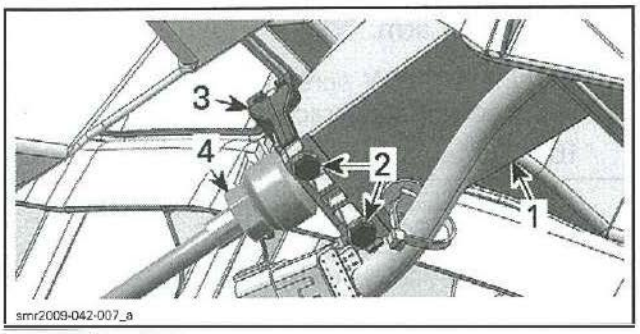
1. Install 2 pieces of wood under lateral supports.



2. Slowly, lower the moving deck just enough to be able to insert the end of steering cable in steering column.

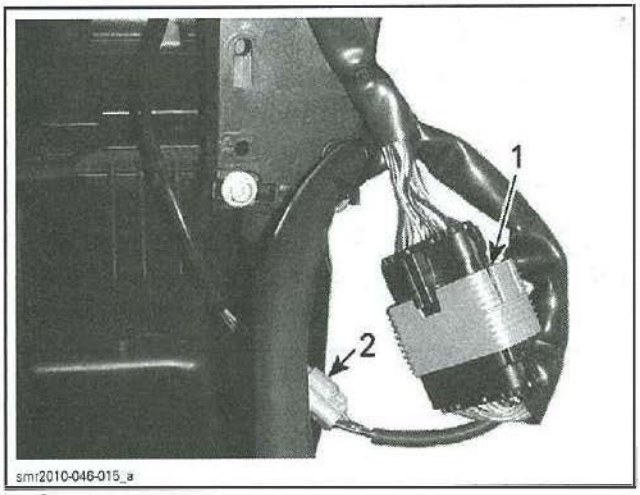
NOTICE Make sure not to pinch electrical harness while lowering the moving deck.

3. Install steering cable clamp and its bolts. Do not tighten bolts yet.



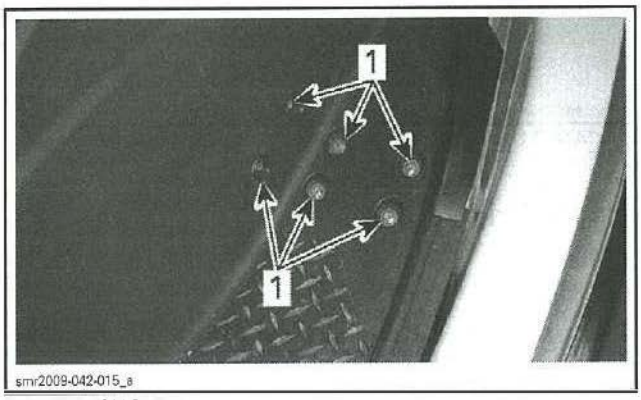
1. *Steering column*
2. *Steering column clamp bolts*
3. *Steering column clamp*
4. *Steering cable adjusting nut*

4. Connect both electrical connectors under moving deck.



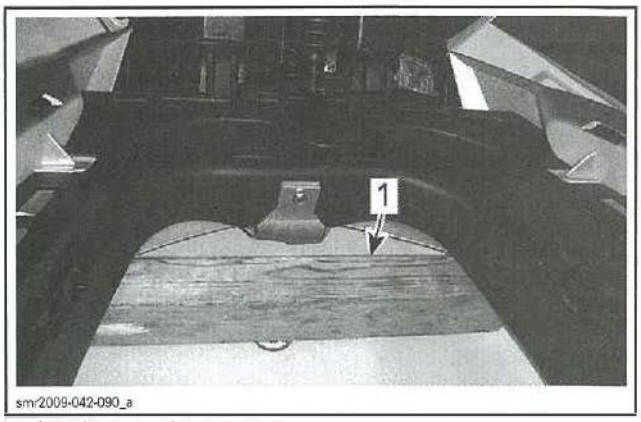
1. *Steering connector*
2. *O.T.A.S. connector*

5. Lower the front of moving deck and secure it on both lateral supports using **NEW** screws.



RH SIDE SHOWN
1. *Retaining screws (new)*

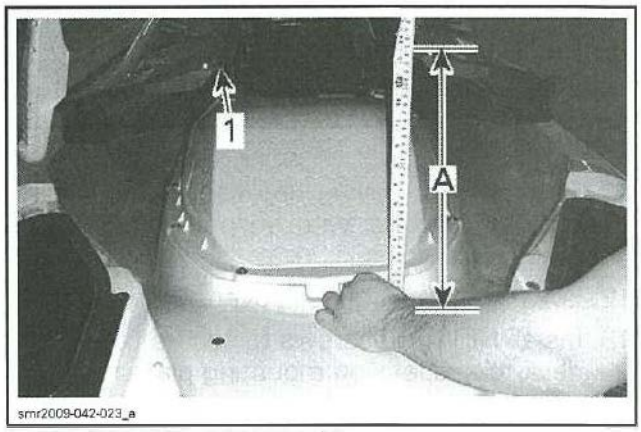
6. Remove pieces of wood located under lateral supports and reposition one under moving deck front area.



1. *Install piece of wood here*

7. Remove the front lifting straps.
8. Open seat.
9. Raise rear of moving deck until suspension is clear of moving deck.

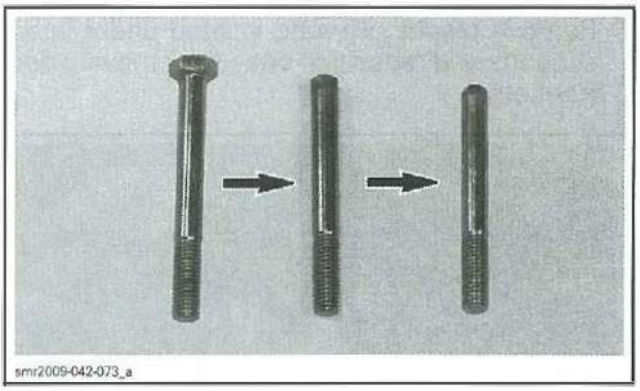
NOTICE Do not raise the rear of moving deck more than 340 mm (13-1/2 in).



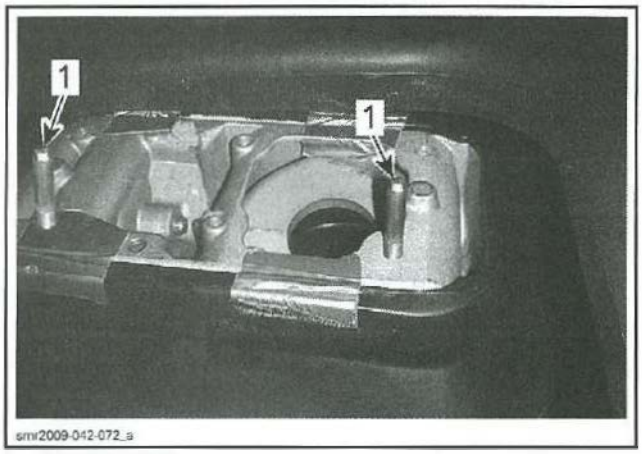
1. *Use this rivet as reference point*

A. 340 mm (13-1/2 in)

10. Install two homemade alignment pins on suspension mounting plate.
    10.1 Take two M8 x 50 bolts and cut their heads.
    10.2 Grind down the cut ends to make a rounded shape.



10.3 Install alignment pins into the 2 rear outside positions of suspension mounting plate.



1. Alignment pins

11. Position the moving deck so that alignment pins are aligned with suspension reinforcement plate holes.
12. Lower the moving deck over alignment pins.
13. Install NEW M8 screws to secure the moving deck to suspension mounting plate.

NOTE: Remove the alignment pins only when 2 screws are engaged in mounting plate.

14. Tighten screws to specification.

MOVING DECK RETAINING SCREWS TORQUE (M8)
25 N•m (18 lbf•ft)

15. Close seat.
16. Carefully lower and secure the rear suspension arm to the fixed deck.

16.1 Position the rear suspension arm brackets in accordance with the reference marks previously drew on fixed deck.

NOTICE If no mark was trace, refer to *iS SUSPENSION* subsection for proper procedure to install and align the rear suspension arm.

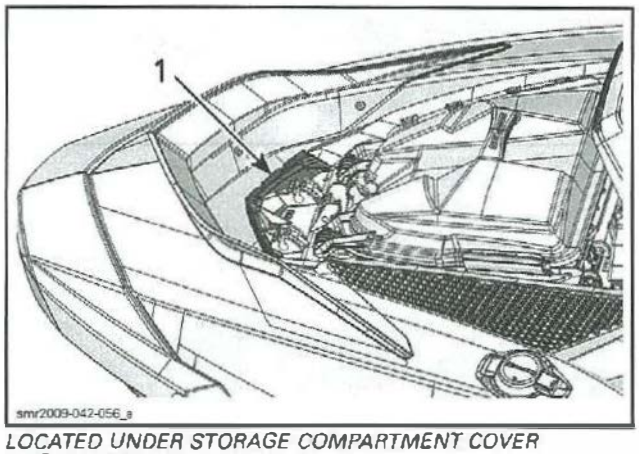
16.2 Install NEW screws to secure rear suspension arm brackets.

16.3 Tighten screws to specification.

REAR SUSPENSION ARM RETAINING SCREWS TORQUE
25 N•m (18 lbf•ft)

17. Remove rear lifting strap.
18. Attach steering cable to steering column.
19. Install gauge support. Refer to *INFORMATION CENTER (GAUGE)* subsection.
20. On aS models, install remote reservoir on moving deck.
21. Install NEW front carpets on foot wells and protective caps on moving deck.
22. Check steering alignment then tighten steering clamp bolts. Refer to *STEERING* subsection.

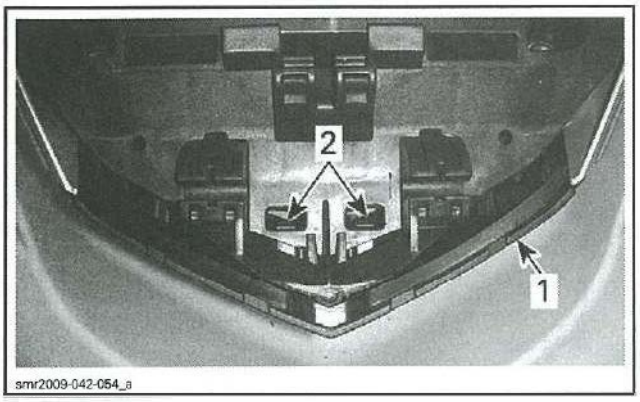
FRONT GRILLE (iS AND aS MODELS)



LOCATED UNDER STORAGE COMPARTMENT COVER
1. Front grille

Front Grille Removal

1. Remove the *STORAGE COMPARTMENT COVER*, see procedure in this subsection.
2. Press on both tabs securing front grille to front body module.



1. *Front grille*
2. *Retaining tabs*

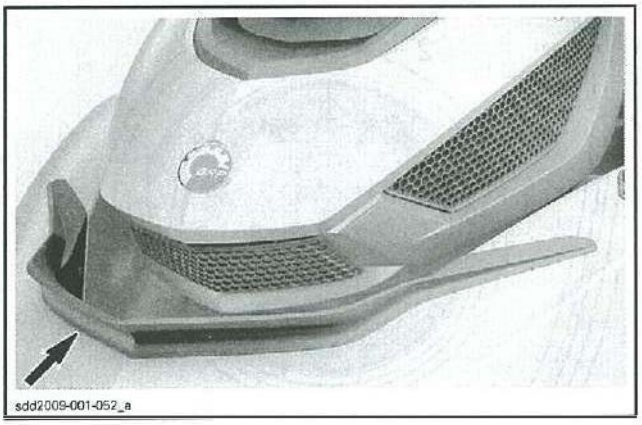
3. Remove grille.

Front Grille Installation

The installation is the reverse of the removal procedure.

SPLASH DEFLECTOR (iS AND aS MODELS)

Splash Deflector Removal



1. To remove the splash deflector, drill out the 4 rivets securing the splash deflector to the fixed deck.
2. Pull the deflector from the fixed deck.

NOTICE **A molded location pin at each end of the deflector are each inserted into the fixed deck. Be careful not to break them when removing the deflector.**

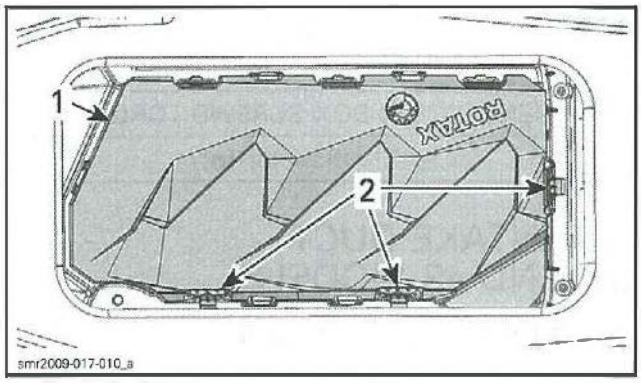
Splash Deflector Installation

1. Position the splash deflector over the forward end of the fixed deck and press the guide pins into the holes provided in the deck.
2. Install four new rivets to secure the deflector to the deck.

REAR VENTILATION BOX (iS AND aS MODELS)

Rear Ventilation Box Removal

1. Open seat.
2. Release all retaining latches.



1. *Ventilation box*
2. *Retaining latches*

3. Remove the ventilation box.

Rear Ventilation Box Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

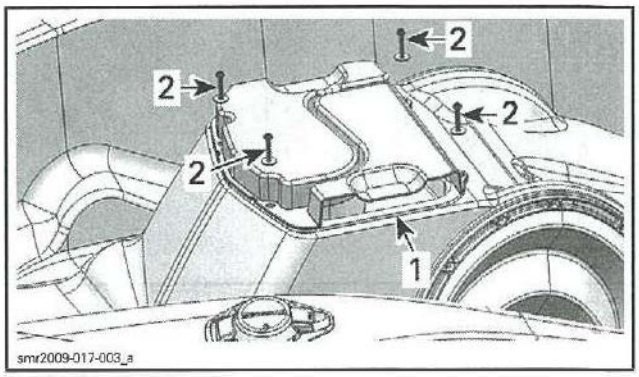
Before installing the ventilation box, check the condition of its seal.

If the seal is damaged, replace the ventilation box as an assembly.

FRONT VENTILATION BOX (iS AND aS MODELS)

Front Ventilation Box Removal

1. Open the front storage cover and remove the storage basket.
2. Remove screws securing the ventilation box to fixed deck.



1. *Front ventilation box*
2. *Retaining screws*

3. Remove the ventilation box.

Front Ventilation Box Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

Before installing the ventilation box, check the condition of its seal.

If the seal is damaged, replace the ventilation box.

Tighten ventilation box screws to specification.

VENTILATION BOX SCREWS TORQUE
1.2 N•m (11 lbf•in)

AIR INTAKE DUCT (iS AND aS MODELS)

Air Intake Duct Removal

Remove engine. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.

Remove the suspension base. Refer to *iS SUSPENSION* subsection.

Remove air intake duck from vehicle.

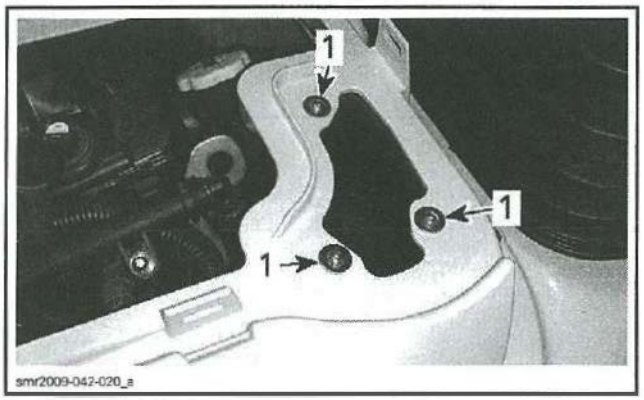
Air Intake Duct Installation

Install suspension base. Refer to *iS SUSPENSION* for complete procedure.

Install engine. Refer to *ENGINE REMOVAL AND INSTALLATION*.

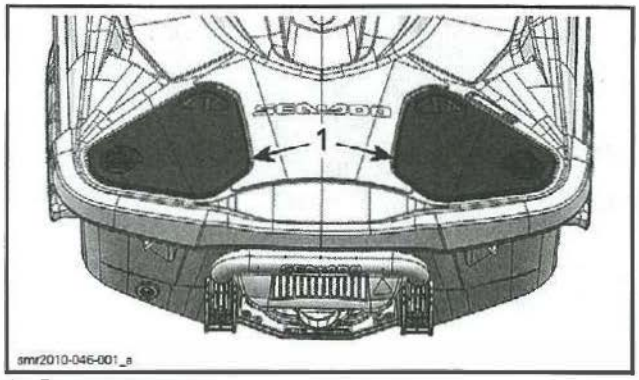
After deck extension installation, tighten screws retaining the air intake duct to deck extension to specification.

AIR INTAKE DUCT RETAINING SCREWS TORQUE
1.2 N•m (11 lbf•in)



1. Air inlet retaining screws

REAR ACCESS PANELS (MODELS WITHOUT iS OR aS)

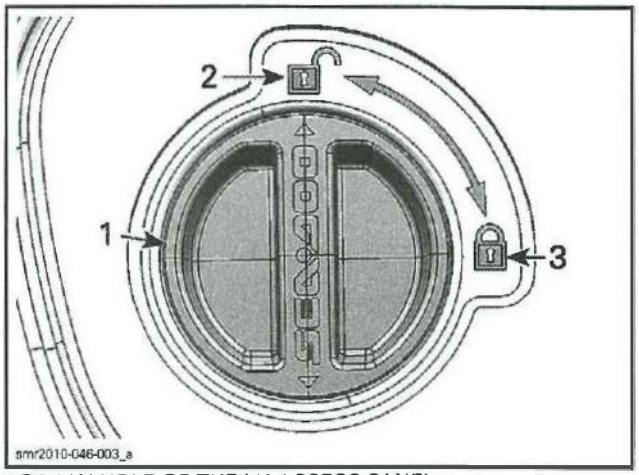


1. Rear access panels

Rear Access Panel Removal

Turn the lock handle to select the UNLOCK position.

- LH access panel: turn lock handle counterclockwise.
- RH access panel: turn lock handle clockwise.



LOCK HANDLE OF THE LH ACCESS PANEL
1. Lock handle
2. UNLOCK position
3. LOCK position

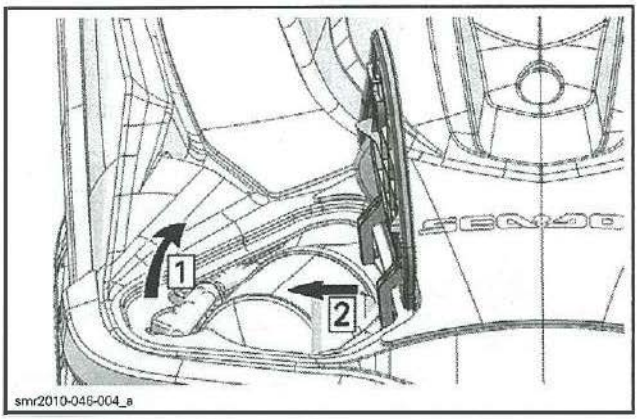
RXT X

Open and remove the panel.

GTX 155, RXT 215 and WAKE Pro 215

Open the panel completely.

Move the bottom of the panel outwards to remove it.



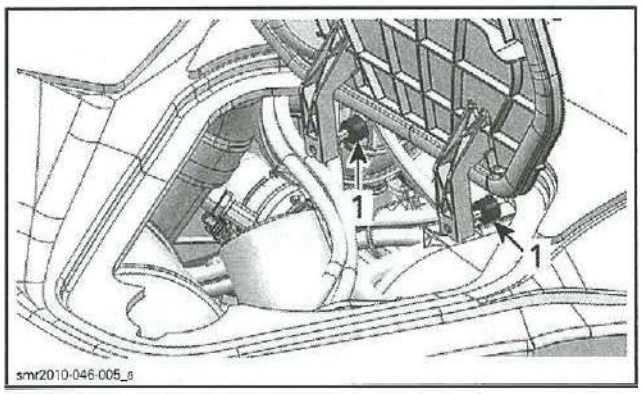
Step 1: Open the panel
Step 2: Move the panel outside

Rear Access Panel Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.

GTX 155, RXT 215 and WAKE Pro 215

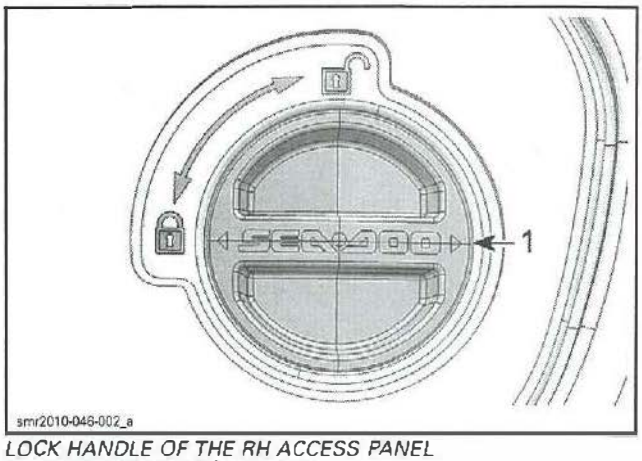
Insert rubber stoppers under the deck.



1. Rubber stoppers

Close the panel partially and center it into the deck cavity.

Press the corner, near the lock handle, against the deck and turn the lock handle in the LOCK position.



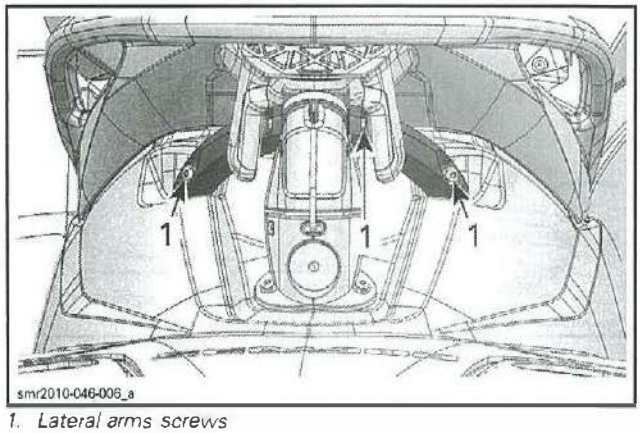
LOCK HANDLE OF THE RH ACCESS PANEL
1. Lock handle in LOCK position

WAKE PYLON (WAKE PRO 215)

Wake Pylon Removal

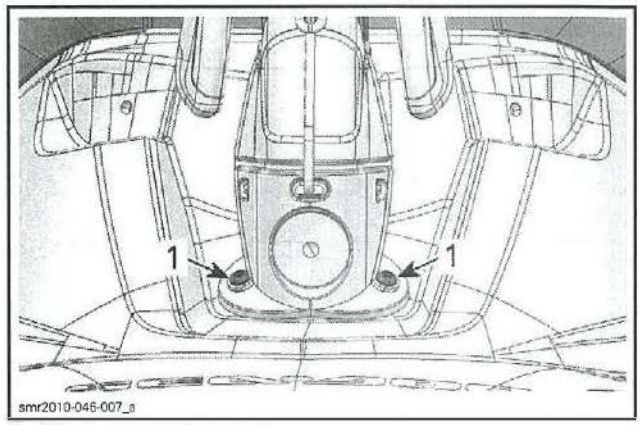
Open the seat.

Remove both lateral arms.



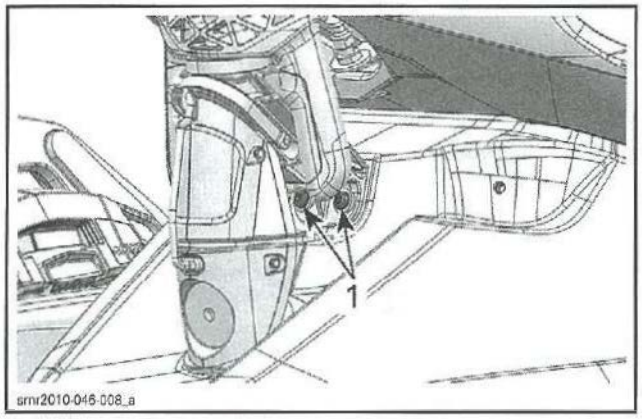
1. Lateral arms screws

Remove bolts at the bottom of wake pylon.



1. Wake pylon bottom bolts

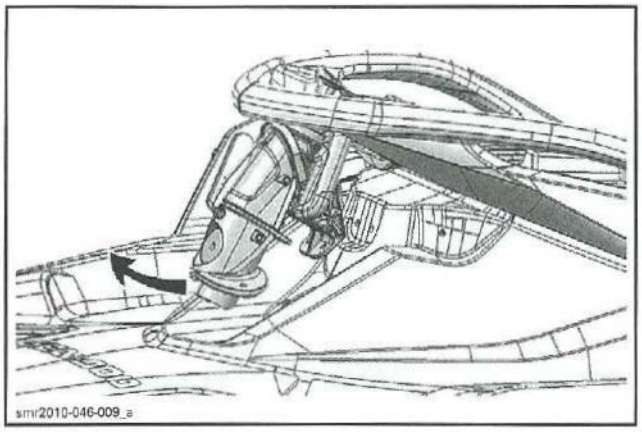
Remove bolts securing the wake pylon support to body.



1. Wake pylon support bolts

Lift the wake pylon to disengage its bottom from the body.

Slide the bottom of the wake pylon rearward to remove the wake pylon from vehicle.

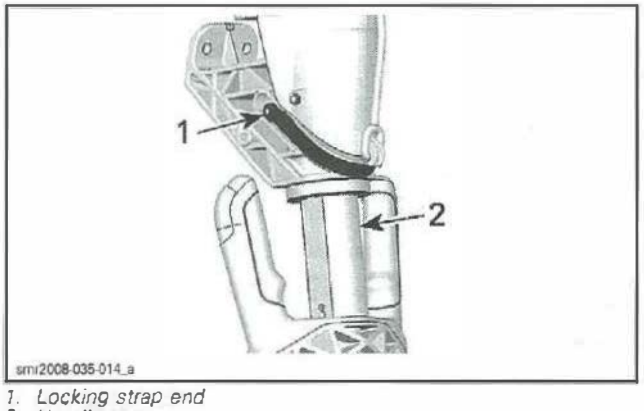


Wake Pylon Disassembly

Extend the handle completely.

Turn the wake pylon upside down.

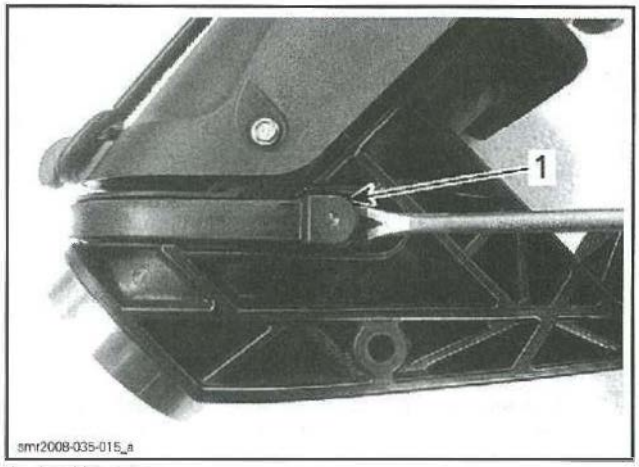
Move both ends of locking strap to disengage the inner lock and free the handle.



1. Locking strap end
2. Handle stem

Locking Strap

Using a screwdriver or any other suitable tool, detach a side of the locking strap from retaining pin.

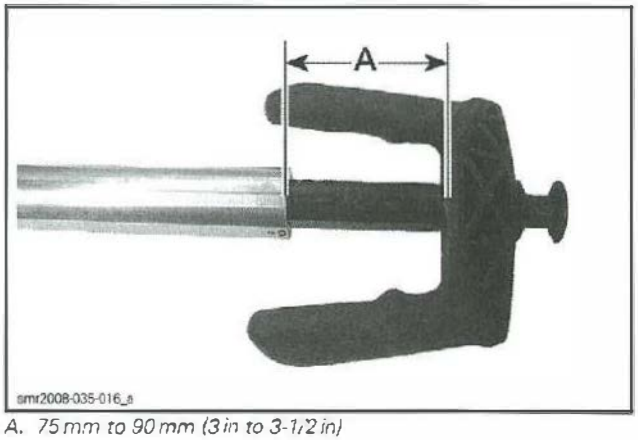


1. Locking strap

Remove locking strap and the inner lock.

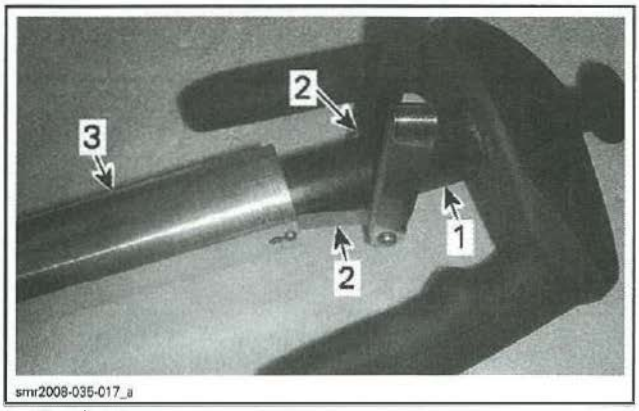
Handle

Extend handle approximately 75 mm to 90 mm (3 in to 3-1/2 in).



A. 75 mm to 90 mm (3 in to 3-1/2 in)

Insert two thin feeler gauges between handle stem and extension tube.



1. *Handle stem*
2. *Feeler gauges*
3. *Extension tube*

Place a rag around the joint to catch balls and spring.

Hold feeler gauges and pull the handle.

Wake Pylon Assembly

Handle

Install a loose locking tie on handle stem.

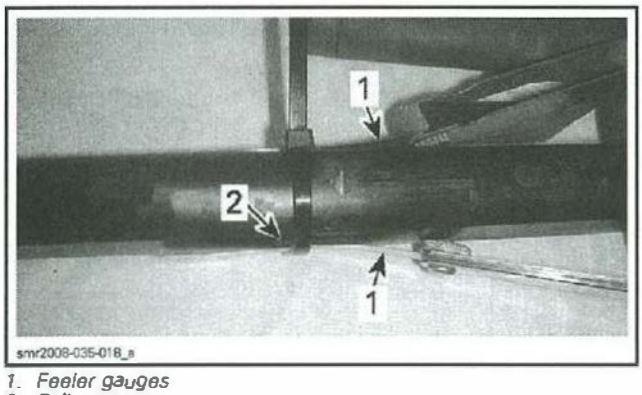
Apply XPS SYNTHETIC GREASE (P/N 293 550 010) on each ends of spring.

Insert the spring in the handle stem hole.

Position a ball on each ends of spring.

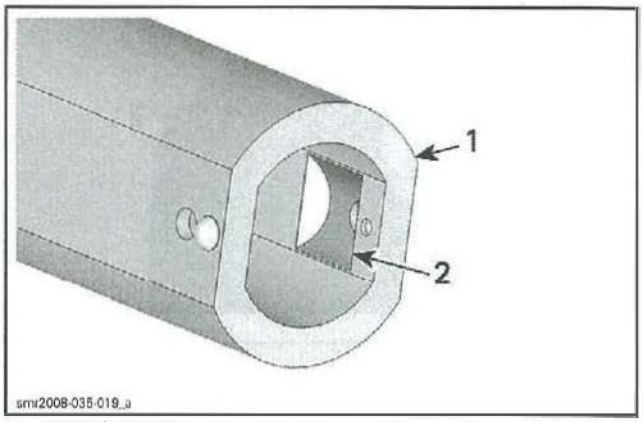
Install a feeler gauge over each balls.

Tighten the locking tie in order to retain feeler gauges and balls.



1. *Feeler gauges*
2. *Ball*

Apply XPS SYNTHETIC GREASE (P/N 293 550 010) in both recesses of the extension tube.



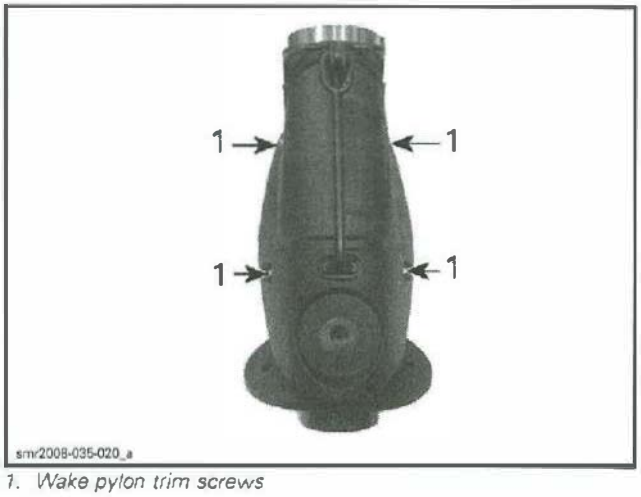
1. *Extension tube*
2. *Recesses*

Slide the handle stem into the extension tube.

Remove feeler gauges and locking tie.

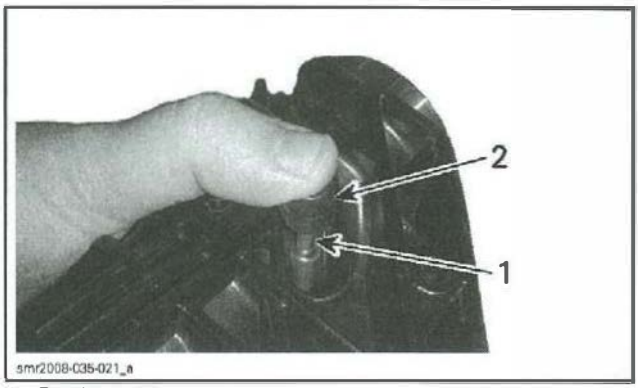
Locking Strap

Remove the wake pylon trim.



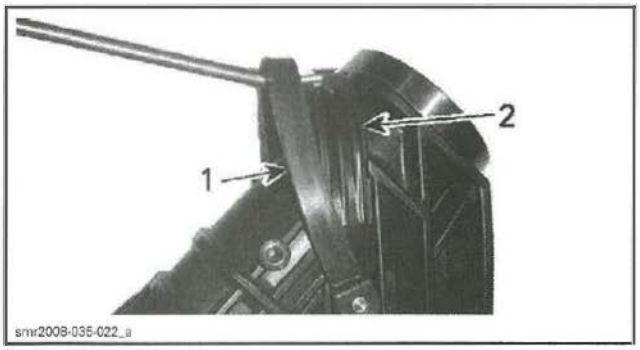
1. *Wake pylon trim screws*

Install lock and insert the end of the locking strap over the retaining pin.



1. *Retaining pin*
2. *Locking strap*

Using a suitable tool, position the locking strap in its groove.



1. *Locking strap*
2. *Locking strap groove*

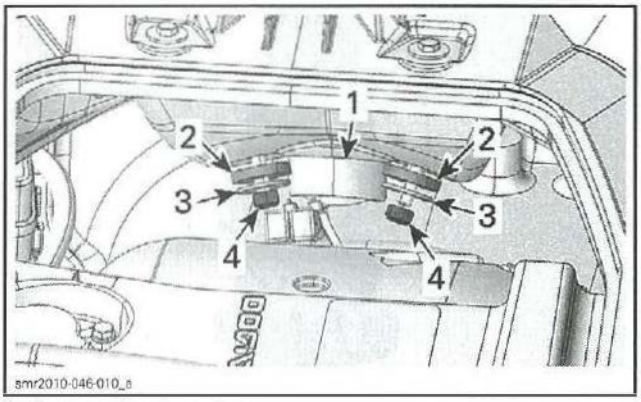
Reinstall the wake pylon trim.

Do not install the handle into wake pylon yet.

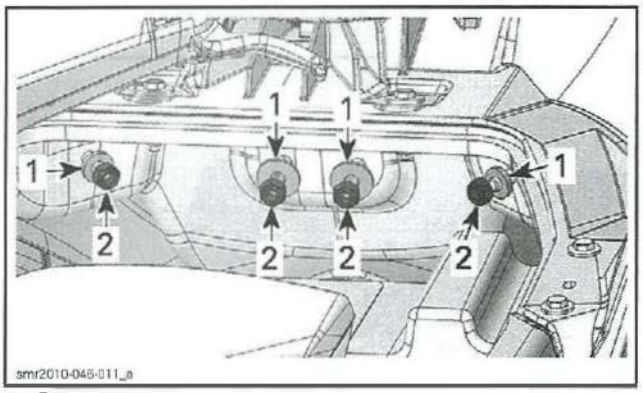
Wake Pylon Installation

Position the wake pylon on vehicle.

Install and secure wake pylon and lateral arms using previously removed fasteners and new elastic stop nuts.



1. *Bottom of wake pylon*
2. *Rubber washers*
3. *Flat washers*
4. *New elastic stop nuts*

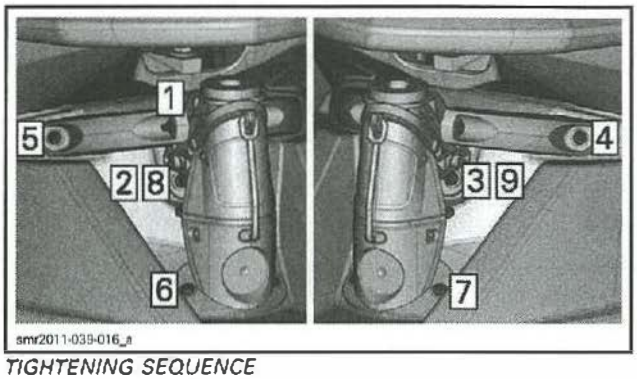


1. *Flat washers*
2. *New elastic stop nuts*

Tighten all bolts by hand.

Ensure base of wake pylon is well leaned against body.

Tighten all bolts as per the following sequence.



TIGHTENING SEQUENCE

Insert the handle into the wake pylon.

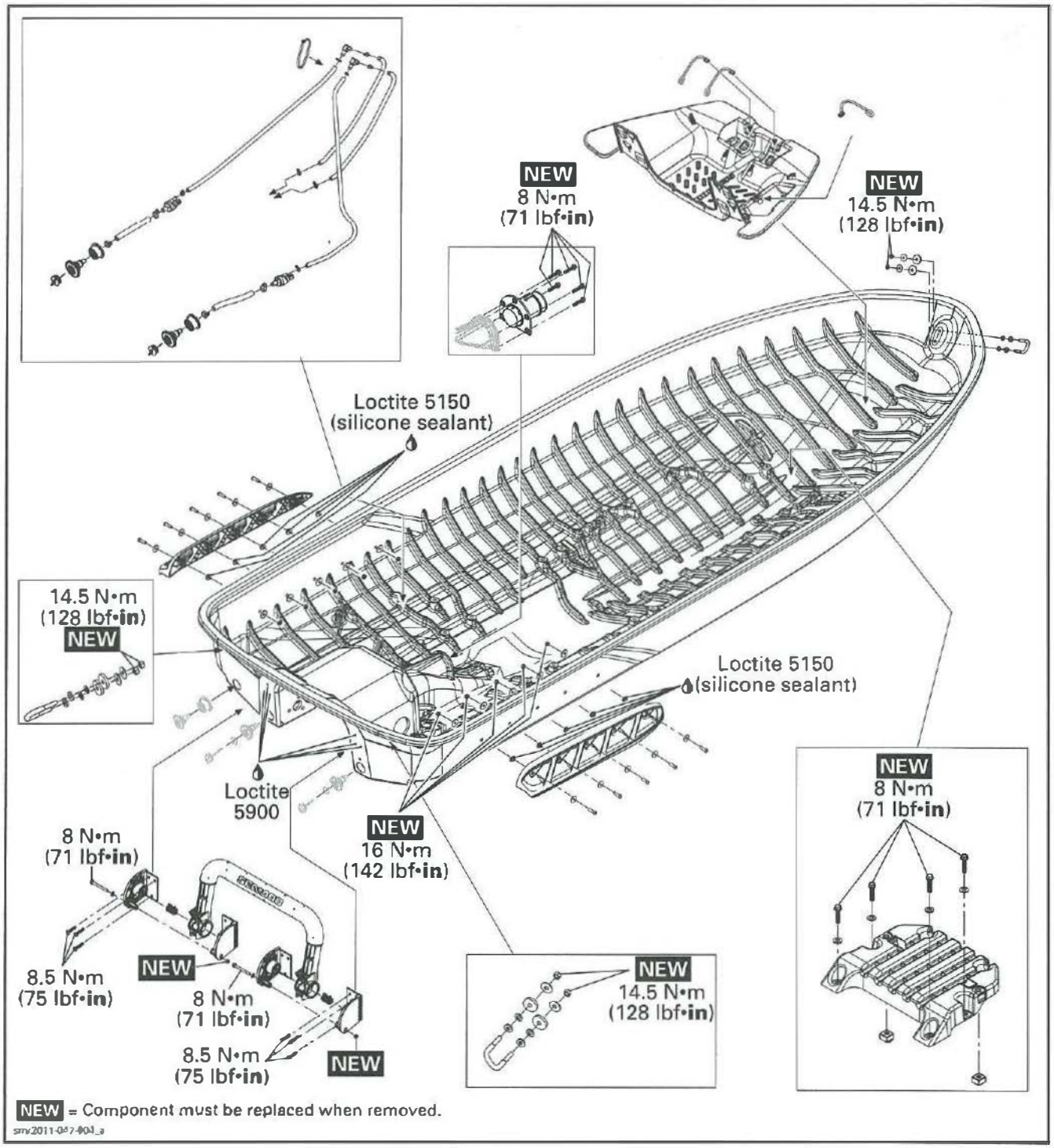
Move both ends of the locking strap forward to fully insert the handle.

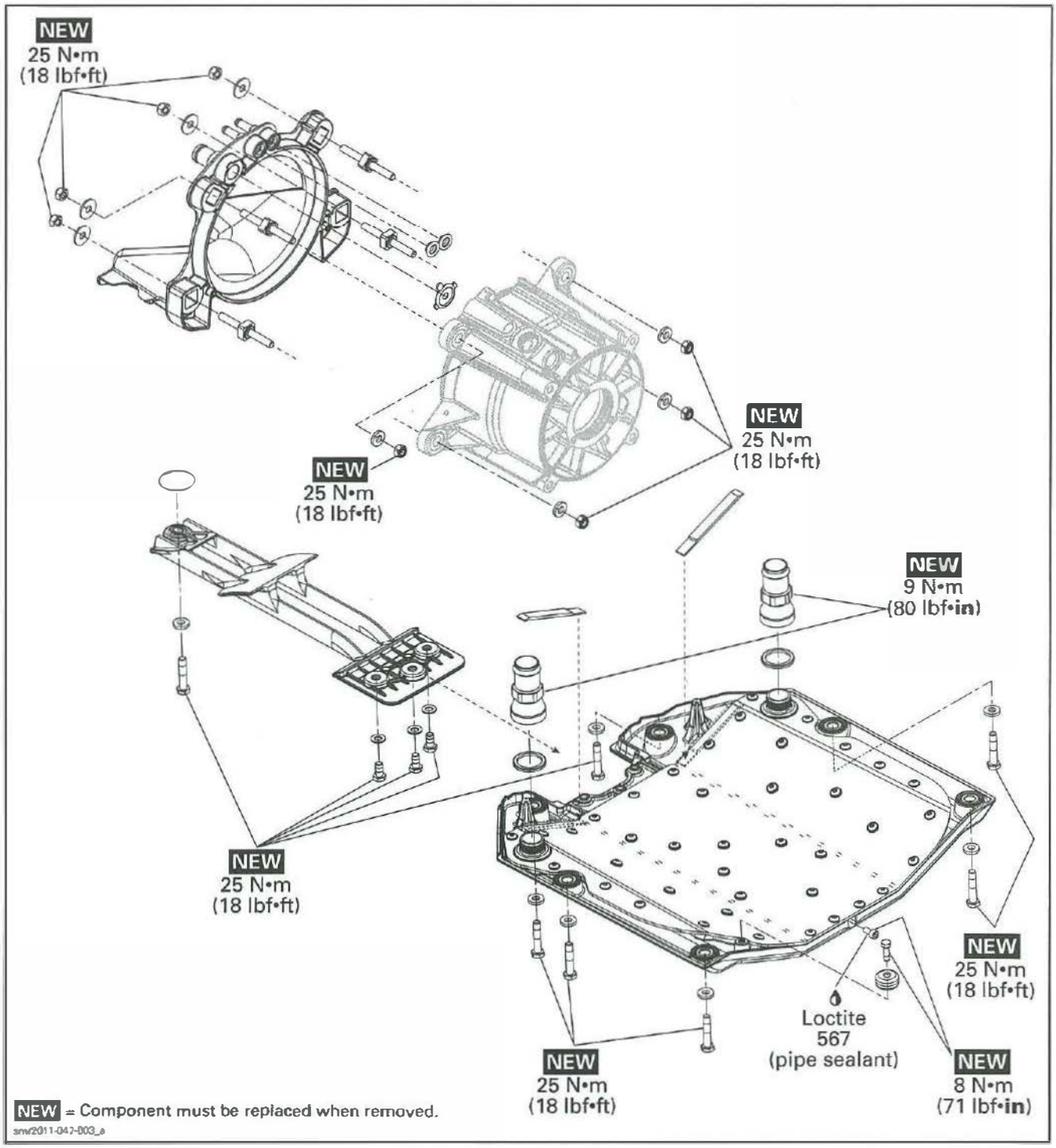
HULL (GTS/GTI/WAKE)

SERVICE PRODUCTS

Description	Part Number	Page
BRP HEAVY DUTY CLEANER	293 110 001	680–682
LOCTITE 5150 (SILICONE SEALANT)	296 000 309	683, 685
LOCTITE 5900	293 800 066	680–682

green-manuals


NEW
8 N•m
(71 lbf•in)
NEW
14.5 N•m
(128 lbf•in)
Loctite 5150
(silicone sealant)
14.5 N•m
(128 lbf•in)
NEW
Loctite 5150
(silicone sealant)
Loctite
5900
NEW
16 N•m
(142 lbf•in)
NEW
8 N•m
(71 lbf•in)
8 N•m
(71 lbf•in)
8.5 N•m
(75 lbf•in)
NEW
8 N•m
(71 lbf•in)
8.5 N•m
(75 lbf•in)
NEW
NEW
14.5 N•m
(128 lbf•in)
NEW = Component must be replaced when removed.
smr2011-047-003_a


NEW
25 N•m
(18 lbf•ft)
NEW
25 N•m
(18 lbf•ft)
NEW
25 N•m
(18 lbf•ft)
NEW
9 N•m
(80 lbf•in)
NEW
25 N•m
(18 lbf•ft)
NEW
25 N•m
(18 lbf•ft)
Loctite
567
(pipe sealant)
NEW
25 N•m
(18 lbf•ft)
NEW
8 N•m
(71 lbf•in)
NEW = Component must be replaced when removed.
smr2011-047-003_a

GENERAL

Verify condition and operation of hinges and latching mechanisms. Replace any damaged components.

During assembly/installation, use torque values and service products as specified in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

NOTICE When applying threadlocker products (anaerobic products), pay attention to prevent the product from coming into contact with ABS plastic parts (painted parts).

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new ones.

Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

PROCEDURES

HULL

Hull Repair

The repair procedures of the S³ hull is not the same as a fiberglass composite hull and deck. The standard polyester based fiberglass repair kits will not work with this type of hull. The polyester will not adhere to the S³ hull material. Only two-part epoxy repair material should be used.

To repair a S³ hull, the use of an Epoxy repair system, such as the WEST SYSTEM® or equivalent epoxy, is mandatory.

However, the finish on the S³ hull is a polyester based gelcoat with a bonding layer between the hull and the gelcoat. Standard gelcoat refinishing can be performed if the damage is limited to the color surface. If damage requires the removal or the repair to structure material, the epoxy may also be used as a barrier coat before refinishing with gelcoat. Epoxy adheres to S³ hull material, and gelcoat adheres to epoxy.

An epoxy repair kit can be purchased directly from WEST SYSTEM.

Go to **http://www.westsystem.com.**

On this site you will find complete repair instructions, click on HOW TO USE.

Also training videos, tools and several products are available on the web site.

Consumer Assistance

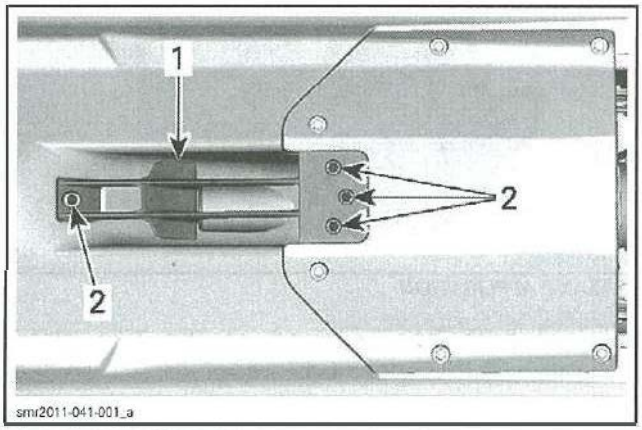
North and South America
WEST SYSTEM 102 Patterson Ave. P.O. Box 665 Bay City, MI 48707-0665 Phone: 989 684-7286 Toll free: 866 937-8797 Fax: 989 684-1374
Europe, Middle East, Africa and Asia
WESSEX RESINS AND ADHESIVES LIMITED Cupernham House, Cupernham Lane, Romsey England SO51 7LF Phone: 44-1-794-521-111 Fax: 44-1-794-517-779 E-mail: info@wessex-resins.com
Australia, South Pacific and Asia
ATL COMPOSITES P.O. Box 2349/Southport 4215 Queensland, Australia Tel.: +61 7-5563-1222, Fax: +61 7-5563-1585 E-mail: info@atlcomposites.com
New Zealand, South Pacific and Asia
ADHESIVE TECHNOLOGIES LTD. 17 Corbans Ave./Box 21-169, Henderson Auckland, New Zealand Phone: 64-9-838-6961 Fax: 64-9-836-4849 E-mail: enquiries@adhesivetechnologies.co.nz

WEST SYSTEM is a registered trademark of Gougeon Brother, Inc

INLET GRATE

Inlet Grate Removal

1. Remove inlet grate retaining screws using an impact tool.

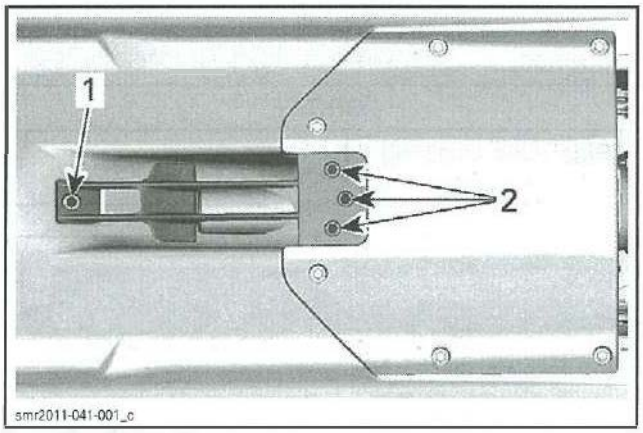


GTS, GTI AND WAKE 155
1. *Inlet grate*
2. *Inlet grate screws*

2. Remove inlet grate.

Inlet Grate Installation

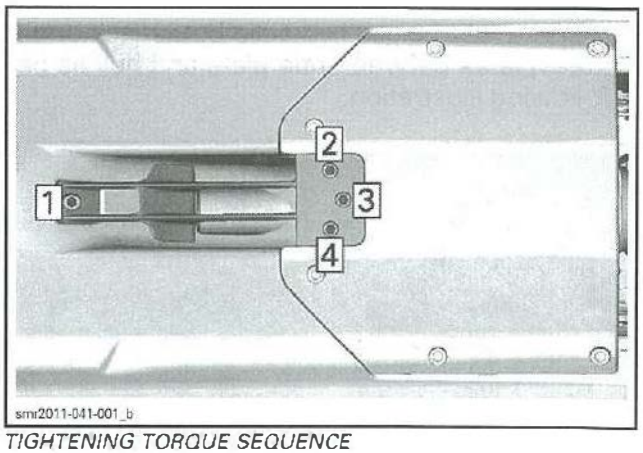
1. Install NEW at the proper location.



SCREW LOCATION
1. *M8 x 40 screw*
2. *M8 x 16 screws*

2. Tighten screws to the specified torque and sequence.

TORQUE		
INLET GRATE SCREWS	First step	Hand tighten
	Second step	25 N•m (18 lbf•ft)
	Final step	Recheck tightening torque of screw 1



TIGHTENING TORQUE SEQUENCE

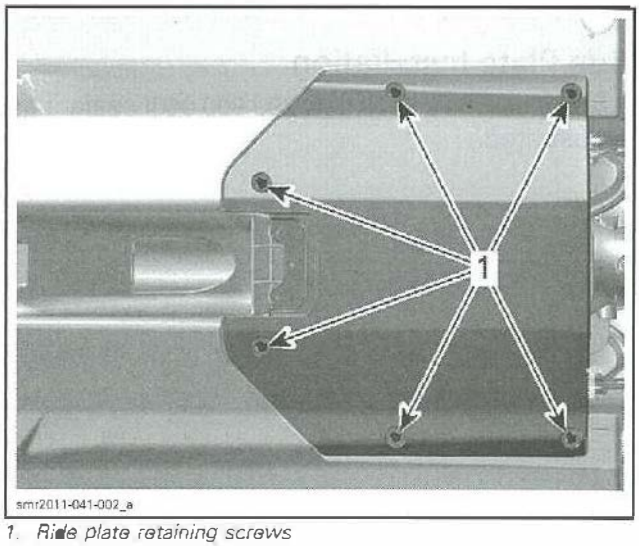
RIDE PLATE

Ride Plate Removal

1. Remove inlet grate, see procedure in this subsection.
2. Remove jet pump. Refer to *JET PUMP*.
3. Drain cooling system. Refer to *COOLING SYSTEM*.
4. From inside the hull, disconnect coolant hoses from the ride plate.
5. Remove coolant hose fittings from the ride plate.

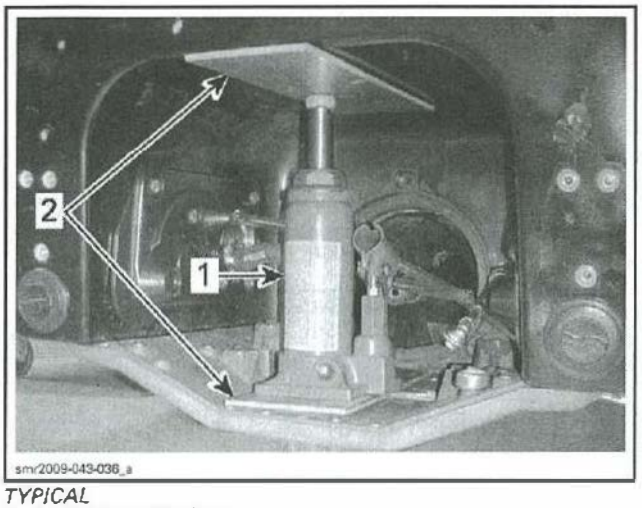
NOTICE **If possible, remove the hose fittings from the ride plate before removing the ride plate. If fittings cannot be removed, proceed with care when removing the ride plate.**

6. Heat retaining screws using a heat gun.
7. Remove ride plate retaining screws using an impact tool.



1. *Ride plate retaining screws*

8. Install a low height hydraulic bottle jack and 2 steel plates between ride plate and hull as per following illustration.



TYPICAL
1. *Hydraulic bottle jack*
2. *Steel plates*

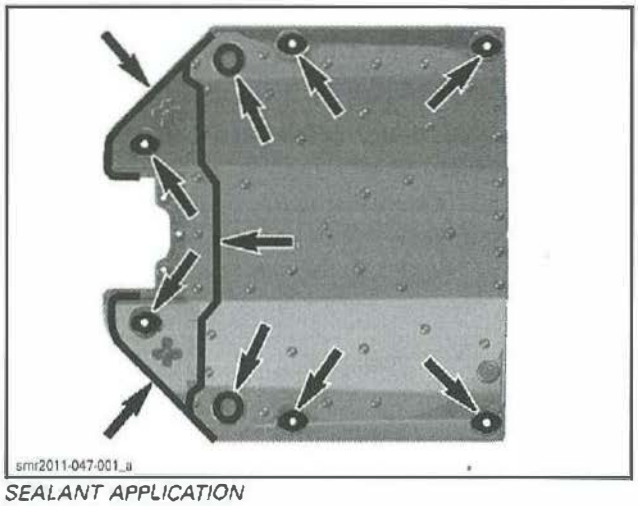
9. Heat the edge of the ride plate with a heat gun to soften the sealant before prying the ride plate and pump support off the watercraft.
10. Start pumping the hydraulic jack slowly.
11. Using a sharp knife, carefully cut the sealant around the ride plate edges.
12. Pump the hydraulic jack slowly to pry the ride plate from the hull.

Ride Plate Cleaning

1. Carefully scrape off all excess sealant from ride plate and hull.
2. Clean hull surface with BRP HEAVY DUTY CLEANER (P/N 293 110 001) to eliminate grease, dust and sealant residue. Clean fitting threads.

Ride Plate Installation

1. Apply LOCTITE 5900 (P/N 293 800 066) sealant as illustrated.



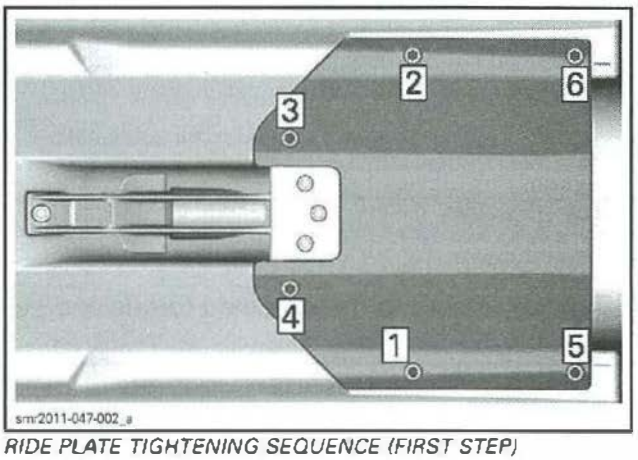
SEALANT APPLICATION

2. Install both hose fittings on the ride plate. Tighten to the specified torque.

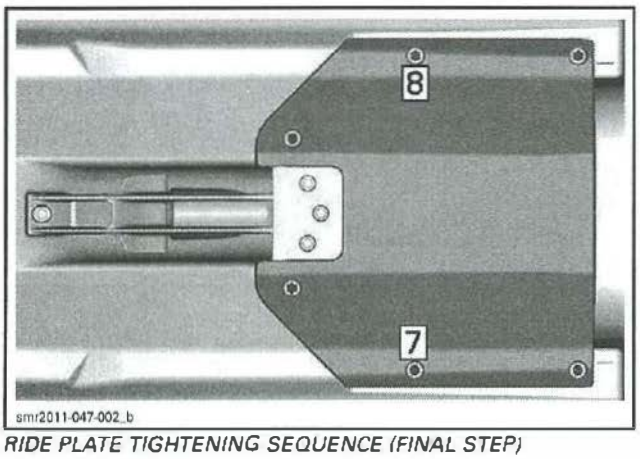
TORQUE	
Hose fittings	9 N•m (80 lbf•in)

3. Position ride plate on hull and thread NEW screws 5 turns by hand.
4. Position inlet grate and thread NEW screws 5 turns by hand. Refer to *INLET GRATE* in this subsection.
5. Tighten screws to the specified torque and sequence.

TORQUE	
Ride plate retaining screws	25 N•m (18 lbf•ft)



RIDE PLATE TIGHTENING SEQUENCE (FIRST STEP)



RIDE PLATE TIGHTENING SEQUENCE (FINAL STEP)

6. Tighten inlet grate screws to the specified torque and sequence, refer to *INLET GRATE INSTALLATION* in this subsection.
7. Reinstall coolant hoses on ride plate fittings.

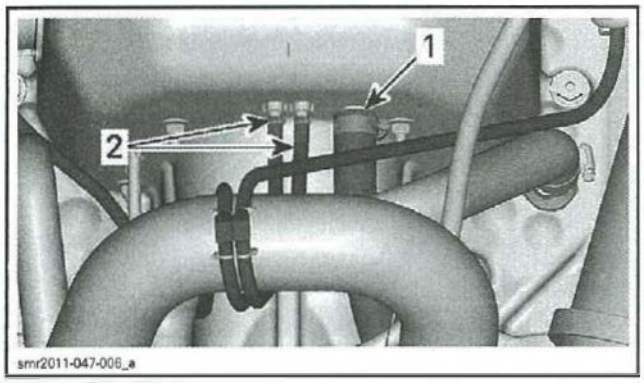
NOTICE **Make sure the coolant hose clamp screws do not rub on any component.**

8. Fill and bleed cooling system and carry out a leak test. Refer to *COOLING SYSTEM* subsection.
9. Install all remaining parts. Refer to the applicable procedures.

JET PUMP SUPPORT

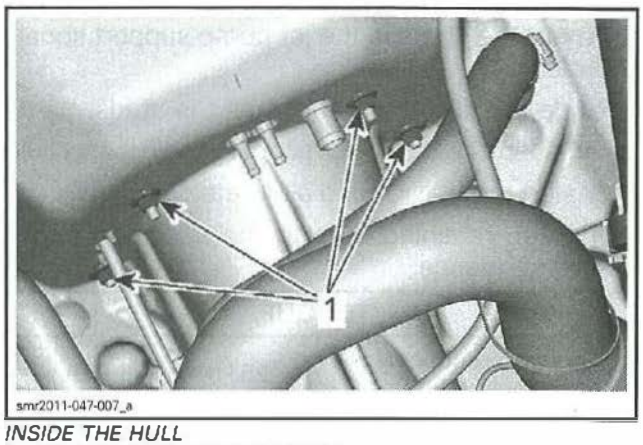
Jet Pump Support Removal

1. Remove drive shaft (and jet pump). Refer to *DRIVE SHAFT* subsection.
2. Disconnect exhaust water supply hose and bailer hoses from jet pump support.



INSIDE THE HULL
1. Exhaust water supply hose
2. Bailer hoses

3. Remove jet pump support retaining nuts and washers.



INSIDE THE HULL
1. Jet pump support retaining nuts

4. Heat the jet pump support using a heat gun in order to soften the sealant.
5. Pull jet pump support off the hull.
6. Note the alignment shims location.

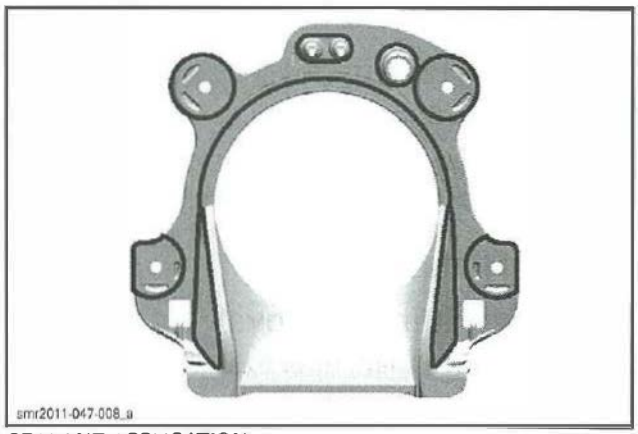
NOTICE **Alignment shims have to be reinstalled at the same location.**

Jet Pump Support Cleaning

1. Scrape off all excess sealant from jet pump support, ride plate, and hull.
2. Inspect pump support for cracks or other damage.
3. Clean jet pump support and hull surface with BRP HEAVY DUTY CLEANER (P/N 293 110 001) to eliminate grease, dust, and sealant residue.

Jet Pump Support Installation

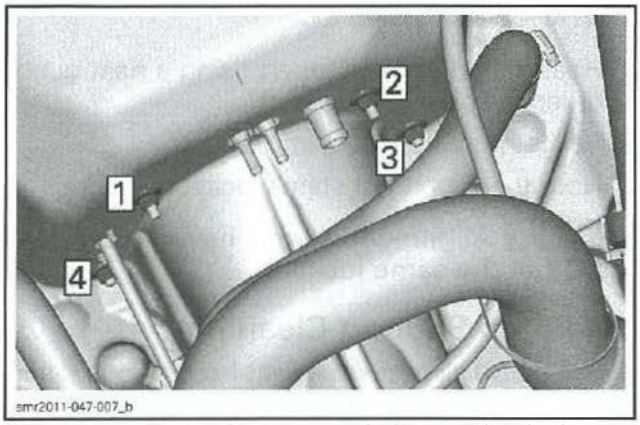
1. Make sure sealant contact areas are clean and dry.
2. Apply LOCTITE 5900 (P/N 293 800 066) on the jet pump support as shown (thick black line).



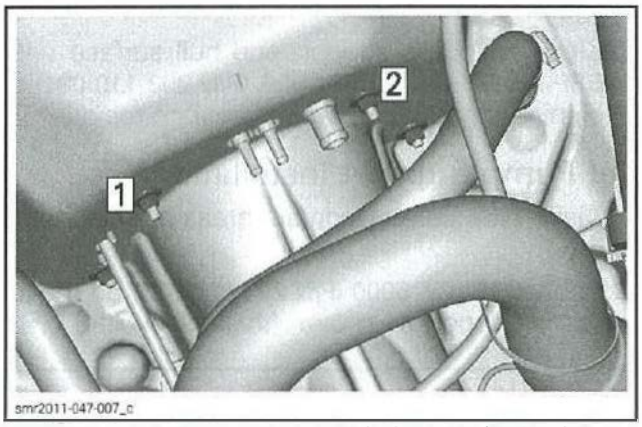
SEALANT APPLICATION

3. Insert the studs in the jet pump support square holes.
4. Slide the alignment shims on the studs.
5. Position the jet pump support against the hull.
6. Inside the hull, thread all 4 retaining nuts.
7. Tighten retaining nuts to the specified torque and sequence.

TORQUE	
Jet pump support retaining nuts	25 N•m (18 lbf•ft)



JET PUMP SUPPORT TIGHTENING SEQUENCE (FIRST STEP)



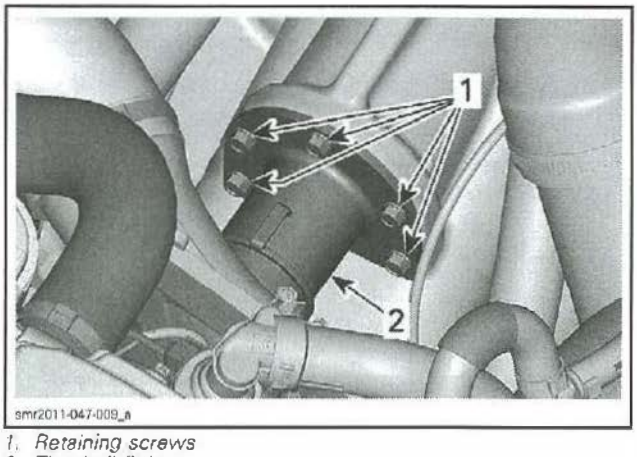
JET PUMP SUPPORT TIGHTENING SEQUENCE (FINAL STEP)

8. Remove excess sealant.
9. Reinstall other removed parts. Refer to appropriate subsections for procedures.

THRU-HULL FITTING

Thru-Hull Fitting Removal

1. Remove drive shaft, refer to *DRIVE SHAFT* subsection.
2. Remove the thru-hull fitting retaining screws.



1. Retaining screws
2. Thru-hull fitting

3. Heat the thru-hull fitting with a heat gun to soften the sealer.
4. Pull thru-hull fitting off the hull.

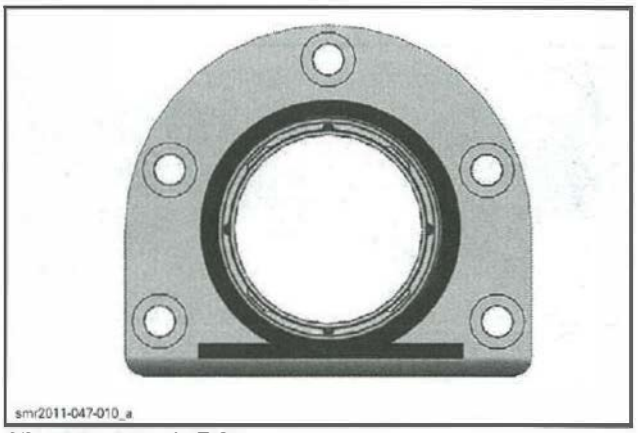
Thru-Hull Fitting Area Cleaning

1. Scrape off all excess sealant from the hull.
2. Clean hull surface with BRP HEAVY DUTY CLEANER (P/N 293 110 001) to eliminate grease, dust, and sealant residue.

NOTE: Use only a clean, dry, oil free filtered air supply for dusting and drying parts or hull.

Thru-Hull Fitting Installation

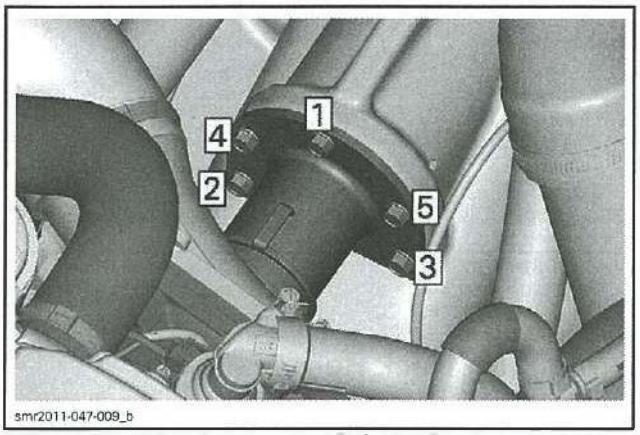
1. Make sure thru-hull fitting sealing surface is free of sealant residue, clean and dry before installation.
2. Apply LOCTITE 5900 (P/N 293 800 066) sealant as illustrated.



SEALANT APPLICATION

3. Tighten screws to the specified torque and sequence.

TORQUE	
Thru-hull fitting retaining screws	8 N•m (71 lbf•in)



THRU-HULL FITTING TIGHTENING SEQUENCE

4. Install other removed parts, refer to the appropriate subsections.

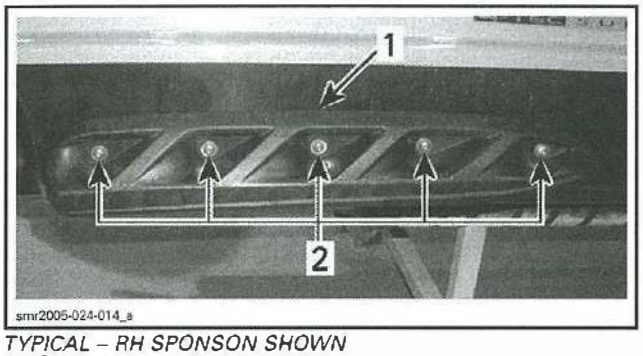
SPONSONS

NOTE: Removal and installation procedure for RH and LH sponson is similar.

Sponson Removal

On starboard (RH) side, remove the resonator. Refer to the *EXHAUST SYSTEM* subsection.

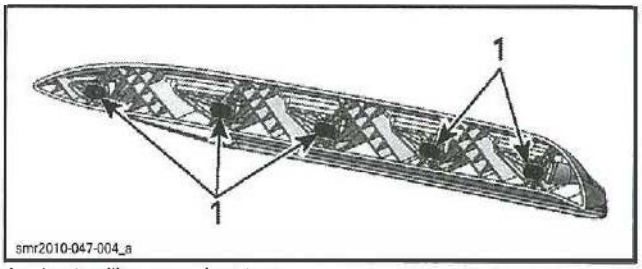
From inside hull, hold sponson nuts while removing sponson retaining bolts and washers.



TYPICAL – RH SPONSON SHOWN
1. *Sponson*
2. *Retaining bolts*

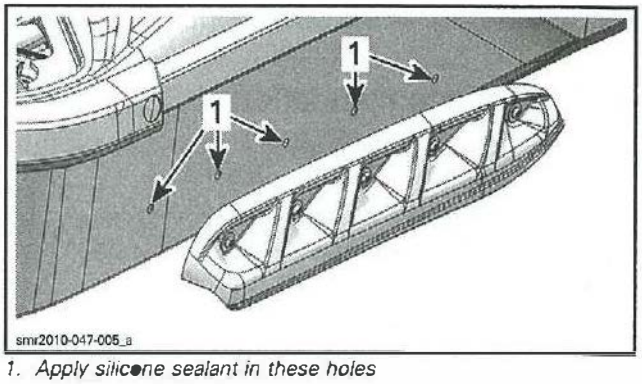
Sponson Installation

1. Clean any residues of silicone sealant on hull and sponsons.
2. Apply LOCTITE 5150 (SILICONE SEALANT) (P/N 296 000 309) on back side of sponson spacers.



1. *Apply silicone sealant here*

3. Apply a small amount of LOCTITE 5150 (SILICONE SEALANT) (P/N 296 000 309) into each hull hole.



1. *Apply silicone sealant in these holes*

4. Insert a bolt with washer through each hole and install the sponson against the hull.
5. From inside hull, secure each bolt with a washer and a NEW elastic stop nut.
6. Tighten nuts as specified in the exploded view.
7. Reinstall resonator. Refer to *EXHAUST SYSTEM* for the procedure.

BAILERS

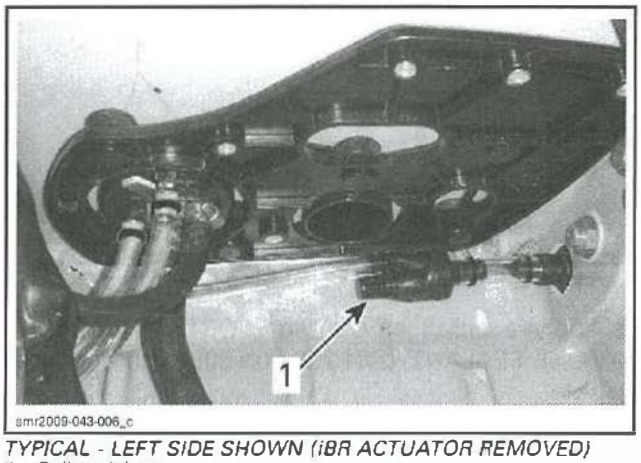
Two bailer pick ups (one each side), draw water from the bilge when watercraft is in operation.

The bailer pick ups are connected to syphon tubes mounted in the jet pump venturi that use the jet pump thrust to create a vacuum. The bailers are also connected to the bilge drain plugs in the stern.

Bailer Pick-Up Location

Port side (LH): underneath the iBR actuator (if equipped).

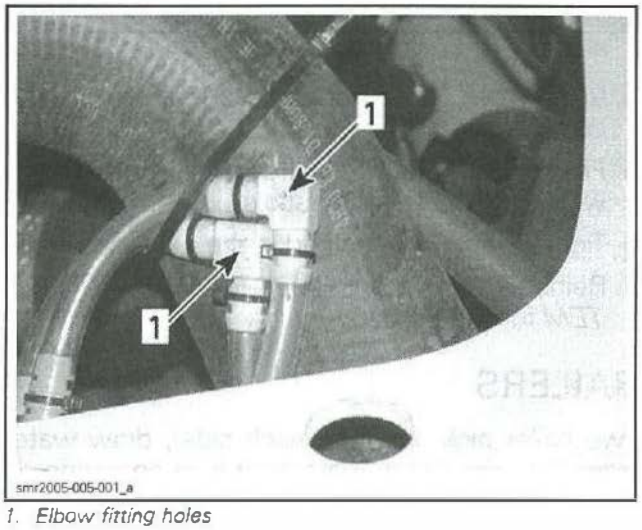
Starboard side (RH): underneath the rear exhaust hose.



TYPICAL - LEFT SIDE SHOWN (iBR ACTUATOR REMOVED)
1. Bailer pick-up

Bailer Pick-Up Inspection

1. Check holes in the bailer pick-ups to see if they are obstructed. Clean if necessary.
2. Check if the hole on each bailer hose elbow fitting is obstructed. Clean elbow fittings if necessary.



1. Elbow fitting holes

NOTE: When repositioning the bailer hose elbows, attach them at the highest available point on the exhaust hose.

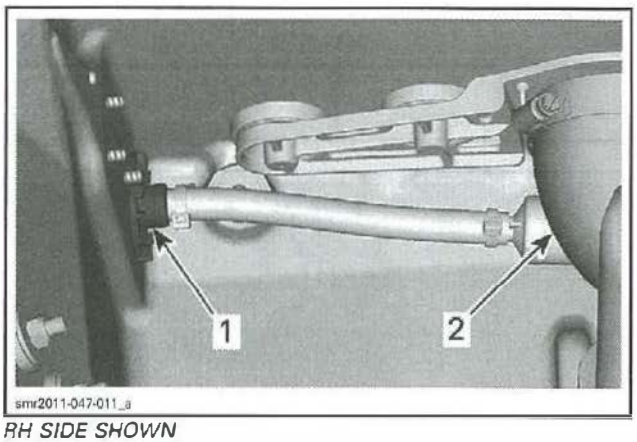
DRAIN PLUGS

NOTE: Each drain plug on the stern are each connected to a bailer. When watercraft is off the water, the drain plugs can be removed to manually drain the bilge.

Drain Plug Neck Location

Port side (LH): behind the iBR actuator (if equipped).

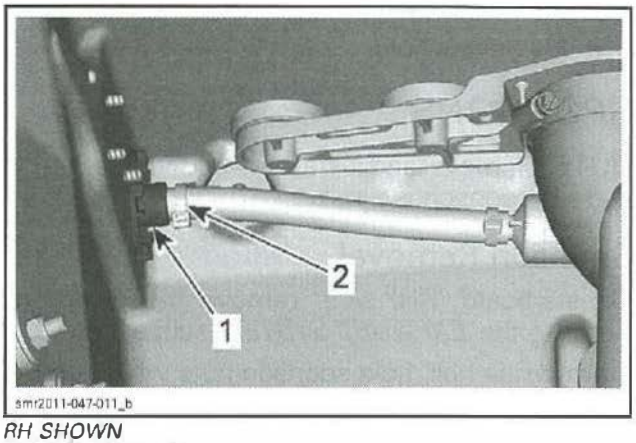
Starboard side (RH): behind the rear exhaust hose.



RH SIDE SHOWN
1. Drain plug neck
2. Rear exhaust hose

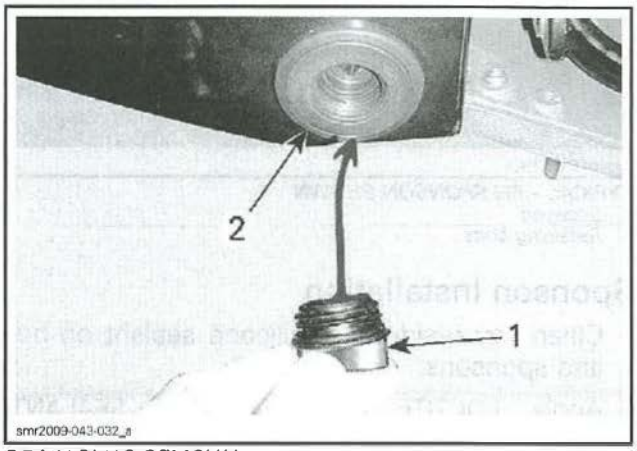
Drain Plug Neck Removal

1. Cut locking tie securing bailer hose to the drain plug assembly.



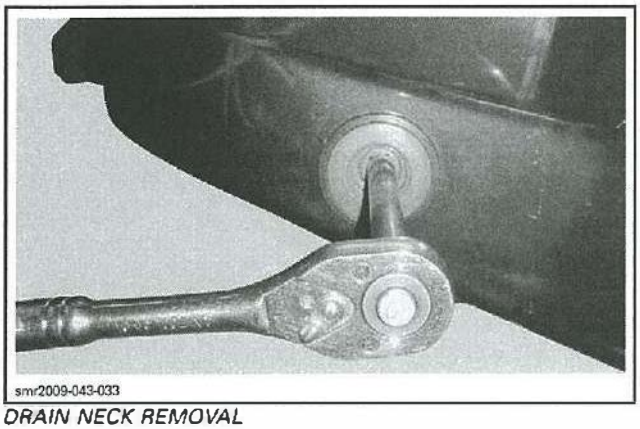
RH SHOWN
1. Drain plug neck
2. Locking tie

2. Unscrew the drain plug from the drain neck and pull the drain plug out of the neck.



DRAIN PLUG REMOVAL
1. Drain plug
2. Drain neck

3. Inside the hull, hold drain neck nut using adjustable pliers.
4. Insert a ratchet extension in the square hole, then unscrew the drain neck from the hull.



DRAIN NECK REMOVAL

Drain Plug Neck Installation

1. Install drain neck and torque to 9 N•m (80 lbf•**in**).
2. Secure bailer hose to drain neck using a NEW locking tie.
3. Reinstall all removed parts in the reverse order of removal.

BOW AND STERN EYELETS

Bow Eyelet Access

Open the front storage cover.

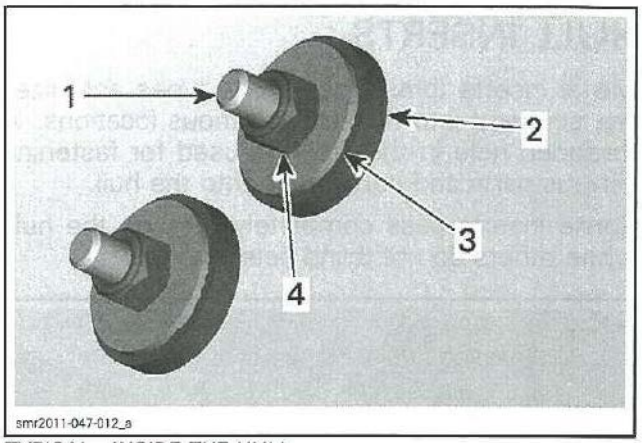
Stern Eyelet Access

Remove seat.

Eyelet Removal

1. Unscrew and discard both bow eyelet retaining nuts.

NOTE: Keep all washers for installation. Bow and stern eyelets have the same hardware layout.



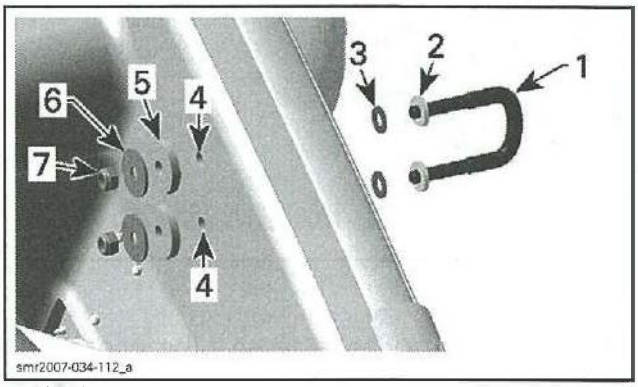
TYPICAL - INSIDE THE HULL
1. *Threaded portion of the eyelet*
2. *Rubber washer*
3. *Large stainless steel washer*
4. *Elastic stop nut*

2. Pull eyelet off the hull.
3. Clean any silicone sealant residue.

Eyelet Installation

1. Inside the hull, apply LOCTITE 5150 (SILICONE SEALANT) (P/N 296 000 309) around eyelet mounting holes.
2. Position eyelet and hardware as illustrated. Use **NEW** elastic stop nuts.

NOTE: Bow and stern eyelets have the same hardware layout.



TYPICAL
1. *Eyelet*
2. *Small stainless steel washer*
3. *Nylon washer*
4. *Loctite 5150 (silicone sealant) here*
5. *Rubber washer*
6. *Large stainless steel washer*
7. *Elastic stop nut*

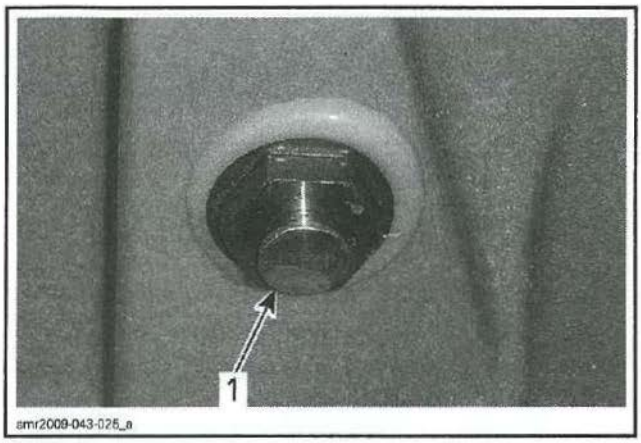
3. Tighten nuts to the specified torque.

TORQUE	
Eyelet retaining nuts	14.5 N•m (128 lbf•**in**)

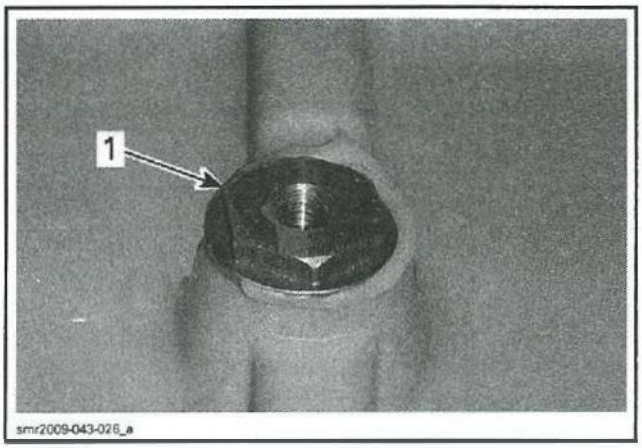
HULL INSERTS

Metal inserts (brass) of various types and sizes are screwed into the hull at various locations. A threaded hole in the insert is used for fastening various parts and equipment onto the hull.

Some inserts pass completely through the hull, while others do not (blind hole inserts).



TYPICAL
1. Pass through insert



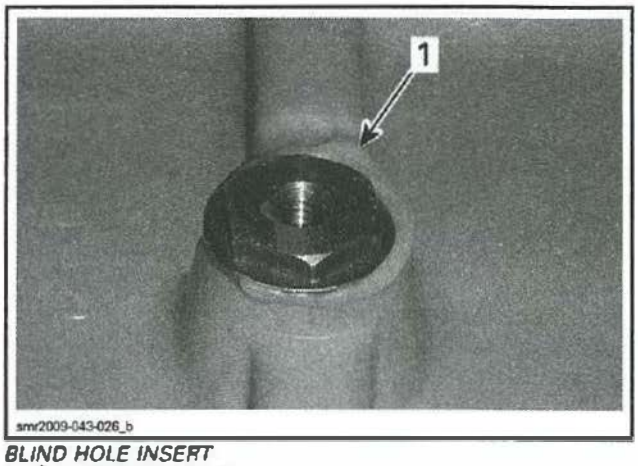
TYPICAL
1. Blind hole insert

All type inserts may be replaced if the inner screw threads are damaged.

NOTE: Inserts should only be replaced as a last resort. First try passing a tap, cleaning the hole, and using a NEW self-locking screw. If fastener can be tightened to the specified torque, do not change insert. If torque cannot be applied, drill and tap insert one size larger before trying to change an insert.

Insert Removal

1. Heat the insert using a heat gun to soften the glue securing the insert into the hull.
2. Remove any excess glue from around the head of the insert that would prevent proper insertion of the socket used to remove the insert.



BLIND HOLE INSERT
1. Excess glue on head

3. Use a six-point socket of appropriate size and a ratchet wrench to unscrew the insert from the hull.

NOTE: An impact tool may be used to facilitate removal of the insert.

Insert Installation

1. Clean the insert hole in the hull to remove any dirt or loose glue using clean, dry, oil free filtered air.

NOTICE **Do not use a metal tool to clean or remove the glue inside the hull insert hole to prevent damaging the threads in the hull material. The glue that is properly bonded to the hull does not need to be removed.**

2. If the insert passes completely through the hull, screw a stud of appropriate size into the insert (M6 or M8) to prevent any glue from seeping into the fastener threads in the insert. Apply the SIX10 glue from West System (see *HULL REPAIR* at the beginning of this subsection for more information) or an equivalent to the outer threads of the insert.

NOTE: Apply a sufficient amount of glue through the full length of the insert threads to ensure excess glue will come out of the hole as the insert is screwed into the hull.

3. If the insert screws into a blind hole, apply the SIX10 glue or an equivalent to the threads in the hull.

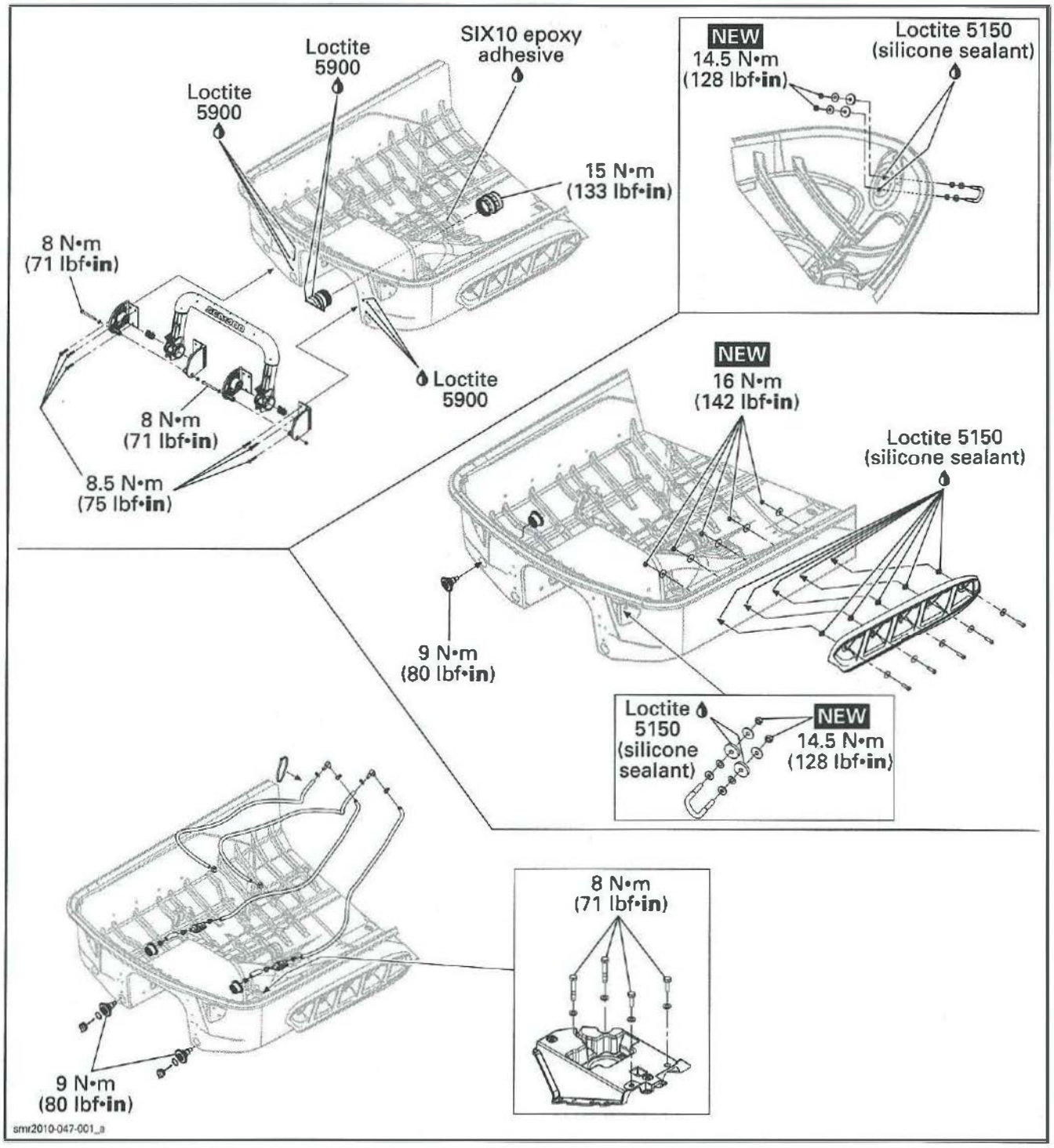
4. Screw the insert in the hull boss and torque to 25 N•m (18 lbf•ft). Ensure the flanged portion of the insert makes contact with the boss it is being screwed into.

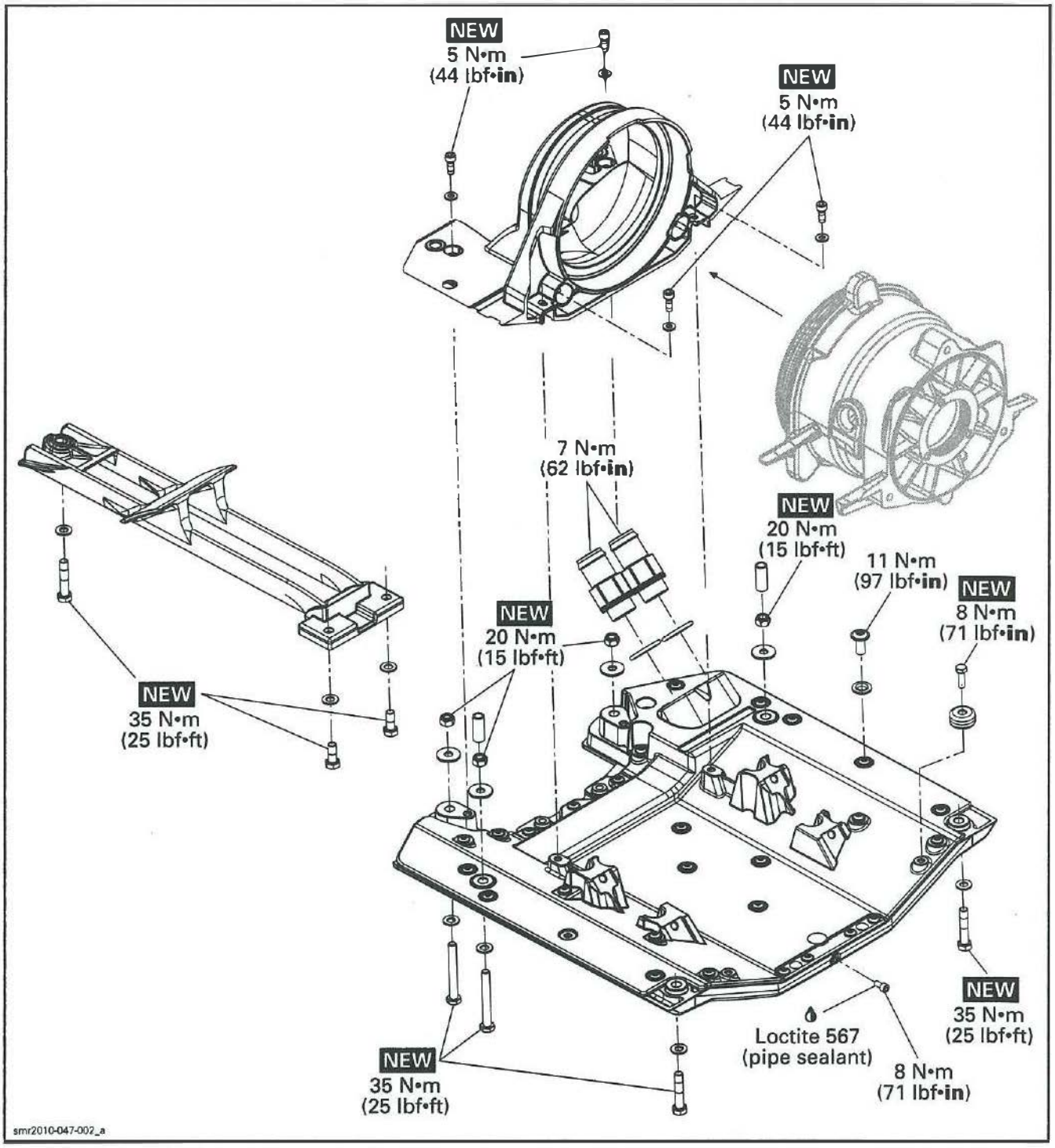
HULL (GTX/RXT/WAKE PRO)

SERVICE PRODUCTS

Description	Part Number	Page
BRP HEAVY DUTY CLEANER	293 110 001	694, 696, 698
LOCTITE 5150 (SILICONE SEALANT)	296 000 309	699, 702–703
LOCTITE 5900	293 800 066	695-696, 698

green-manuals


Loctite 5900
SIX10 epoxy adhesive
Loctite 5900
15 N•m (133 lbf•in)
8 N•m (71 lbf•in)
Loctite 5900
8 N•m (71 lbf•in)
8.5 N•m (75 lbf•in)
NEW
14.5 N•m (128 lbf•in)
Loctite 5150 (silicone sealant)
NEW
16 N•m (142 lbf•in)
Loctite 5150 (silicone sealant)
9 N•m (80 lbf•in)
Loctite 5150 (silicone sealant)
NEW
14.5 N•m (128 lbf•in)
8 N•m (71 lbf•in)
9 N•m (80 lbf•in)
smr2010-047-001_a


NEW
5 N•m
(44 lbf•in)
NEW
5 N•m
(44 lbf•in)
7 N•m
(62 lbf•in)
NEW
20 N•m
(15 lbf•ft)
11 N•m
(97 lbf•in)
NEW
8 N•m
(71 lbf•in)
NEW
20 N•m
(15 lbf•ft)
NEW
35 N•m
(25 lbf•ft)
NEW
35 N•m
(25 lbf•ft)
Loctite 567
(pipe sealant)
8 N•m
(71 lbf•in)
NEW
35 N•m
(25 lbf•ft)
smr2010-047-002_a

GENERAL

Verify condition and operation of hinges and latching mechanisms. Replace any damaged components.

During assembly/installation, use torque values and service products as specified in the exploded views.

Clean threads before applying a threadlocker. Refer to *SELF-LOCKING FASTENERS* and *LOCTITE APPLICATION* at the beginning of this manual for complete procedure.

NOTICE **When applying threadlocker products (anaerobic products), pay attention to prevent the product from coming into contact with ABS plastic parts (painted parts). Plastic parts may develop cracks or other damages, and finished or painted surfaces may become damaged.**

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to.
Locking devices (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.) must be replaced with new ones.

Hoses, cables or locking ties removed during a procedure must be reinstalled as per factory standards.

PROCEDURES

HULL

Hull Repair

The repair procedures of the S³ hull is not the same as a fiberglass composite hull and deck. The standard polyester based fiberglass repair kits will not work with this type of hull. The polyester will not adhere to the S³ hull material. Only two-part epoxy repair material should be used.

To repair a S³ hull, the use of an Epoxy repair system, such as the WEST SYSTEM® or an other equivalent epoxy system, is mandatory.

However, the finish on the S³ hull is a polyester based gelcoat with s a bonding layer between the hull and the gelcoat. Standard gelcoat refinishing can be performed if the damage is limited to the color surface. If damage requires the removal or the repair to structure material, the epoxy may also be used as a barrier coat before refinishing with gelcoat. Epoxy adheres to S³ hull material, and gelcoat adheres to epoxy.

An epoxy repair kit can be purchased directly from WEST SYSTEM.

Go to **http://www.westsystem.com**.

On this site you will find complete repair instructions, click on HOW TO USE.

Also training videos, tools and several products are available on the web site.

Consumer Assistance

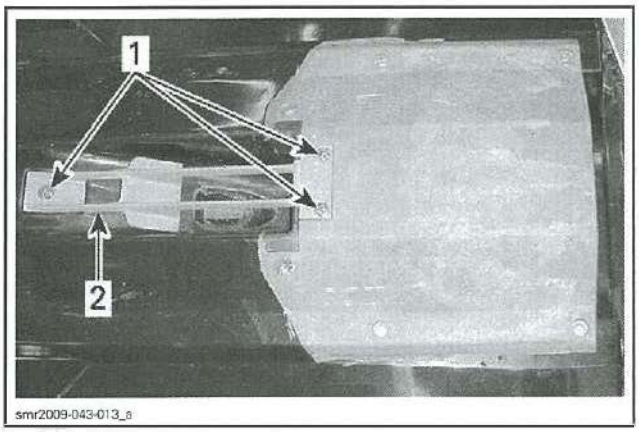
North and South America
WEST SYSTEM 102 Patterson Ave. P.O. Box 665 Bay City, MI 48707-0665 Phone: 989 684-7286 Toll free: 866 937-8797 Fax: 989 684-1374
Europe, Middle East, Africa and Asia
Wessex Resins and Adhesives Limited, Cupernham House, Cupernham Lane, Romsey, England SO51 7LF Phone: 44-1-794-521-111 Fax: 44-1-794-517-779 E-mail: info@wessex-resins.com
Australia, South Pacific and Asia
ATL Composites, P.O. Box 2349/Southport 4215, Queensland, Australia, Tel.: +61 7-5563-1222, Fax: +61 7-5563-1585 E-mail: info@atlcomposites.com
New Zealand, South Pacific and Asia
Adhesive Technologies Ltd., 17 Corbans Ave./Box 21-169, Henderson, Auckland, New Zealand, Phone: 64-9-838-6961, Fax: 64-9-836-4849 E-mail: enquiries@adhesivetechnologies.co.nz

INLET GRATE

Inlet Grate Removal

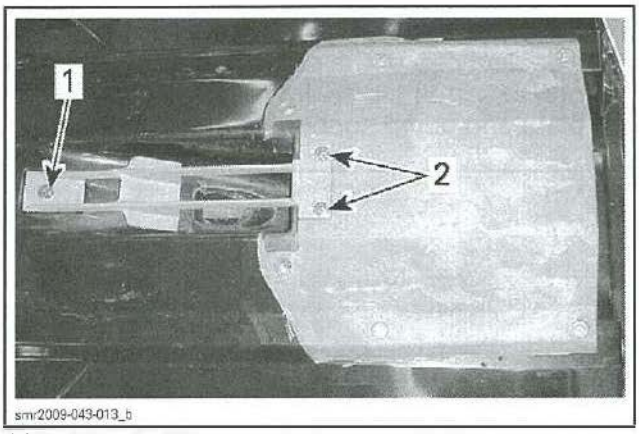
1. Remove inlet grate retaining screws using an impact tool and remove inlet grate. Discard the retaining screws.

WEST SYSTEM is a registered trademark of Gougeon Brother, Inc



1. Inlet grate screws
2. Inlet grate

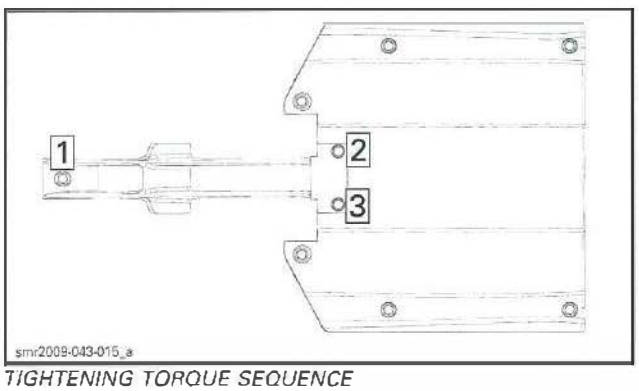
Inlet Grate Installation



SCREW LOCATION
1. M8 x 40 screw
2. M8 x 20 screws

1. Hand tighten NEW screws.
2. Tighten screws to the specified torque and sequence.

INLET GRATE SCREWS TIGHTENING TORQUE	
First step	35 N•m (26 lbf•ft)
Second step	Recheck tightening torque of screw 1



TIGHTENING TORQUE SEQUENCE

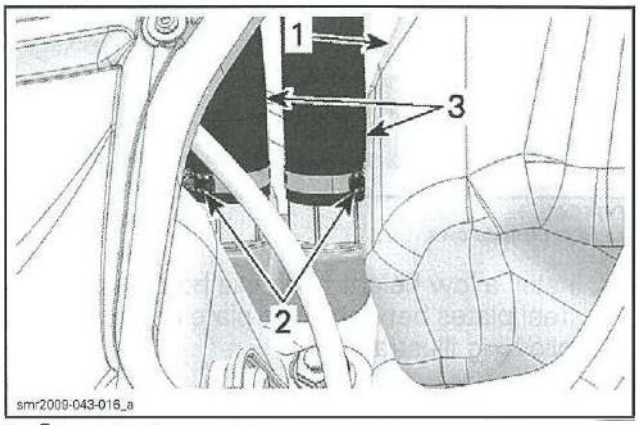
RIDE PLATE

Ride Plate Removal

NOTE: The jet pump support and ride plate must be removed as an assembly. The pump support is fastened to the ride plate and the forward pump support mounting screws cannot be accessed when the ride plate is installed.

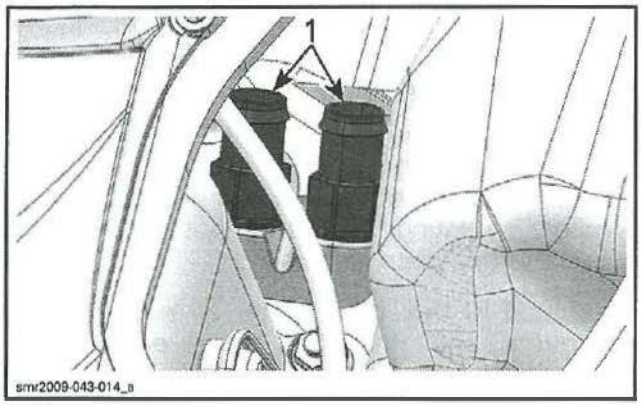
NOTICE **If the ride plate is replaced, or removed and installed, the engine/drive shaft/pump alignment must be checked. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.**

1. Remove iBR gate and VTS trim ring, refer to *iBR AND VTS* subsection.
2. Remove jet pump and nozzle, refer to *JET PUMP* subsection.
3. Drain cooling system, refer to *COOLING SYSTEM* subsection.
4. Remove the battery from the watercraft, refer to *CHARGING SYSTEM* subsection.
5. On **iS models**, move the electrical accessories support and electrical harness above and to the right of the resonator for improved access to the ride plate coolant hoses and fittings.
6. Reach in between the exhaust system resonator and hull to loosen the gear clamps and disconnect both coolant hoses from the ride plate.



1. Exhaust system resonator
2. Gear clamps
3. Coolant hoses

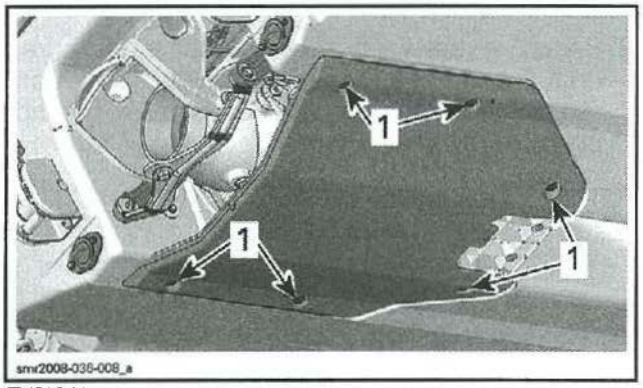
7. Remove excess sealant from around the coolant hose fittings.
8. Unscrew both hose fittings from the ride plate.



1. Hose fittings

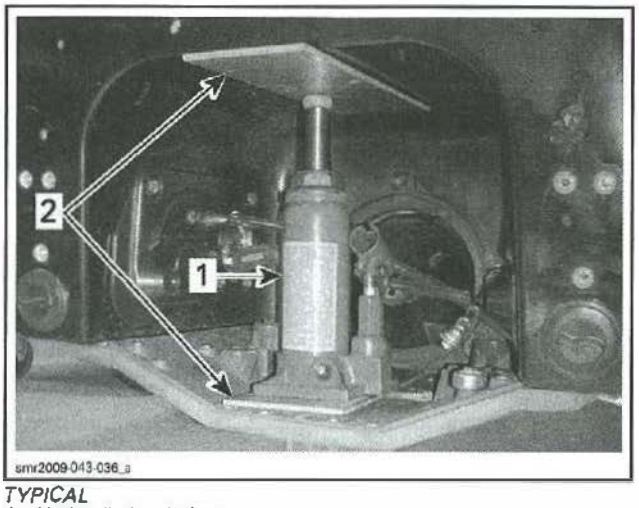
NOTICE **If possible, remove the hose fittings from the ride plate before removing the ride plate. If fittings cannot be removed, proceed with care when removing the ride plate.**

9. Remove *INLET GRATE*, see procedure in this subsection.
10. Inside hull, remove nuts securing the 4 front screws of the ride plate.
11. Heat retaining screws using a heat gun.
12. Using an impact tool, remove and discard ride plate retaining screws.



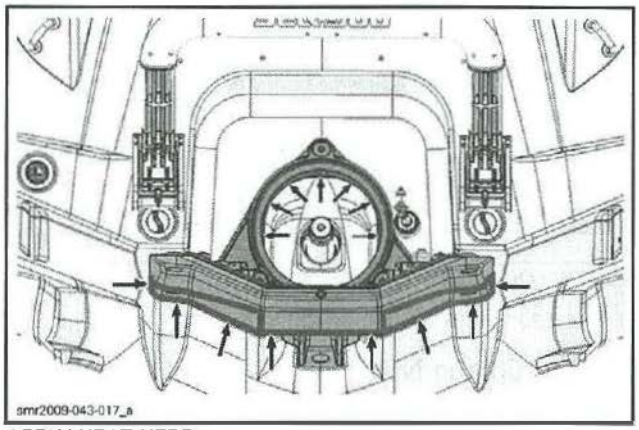
TYPICAL
1. Ride plate screws

13. Install a low height hydraulic bottle jack and 2 steel plates between ride plate and hull as per following illustration.



TYPICAL
1. Hydraulic bottle jack
2. Steel plates

14. Heat the edge of the ride plate and the inside diameter of the pump support with a heat gun to soften the sealer before prying the ride plate and pump support off the watercraft.



APPLY HEAT HERE

15. Start pumping the hydraulic jack slowly.
16. Using a sharp knife, carefully cut the sealant around the ride plate edges.
17. Pump the hydraulic jack slowly to pry the ride plate from the hull.

Ride Plate Cleaning

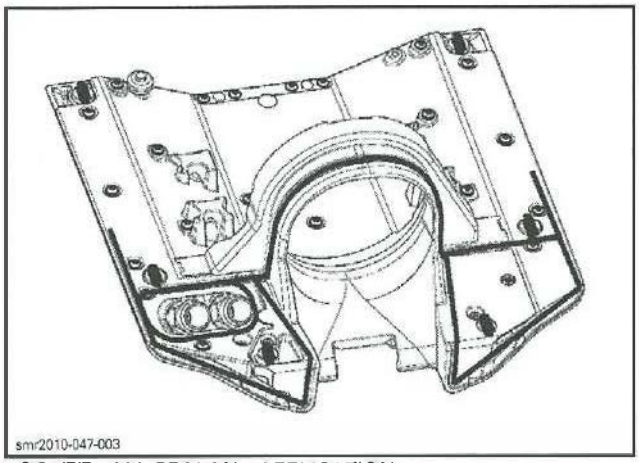
1. Carefully scrape off all excess sealant from ride plate and hull.
2. Clean hull surface with BRP HEAVY DUTY CLEANER (P/N 293 110 001) to eliminate grease, dust and sealant residue. Clean fitting threads.

Ride Plate Installation

1. Install the jet pump support on the ride plate, see procedure in this subsection.

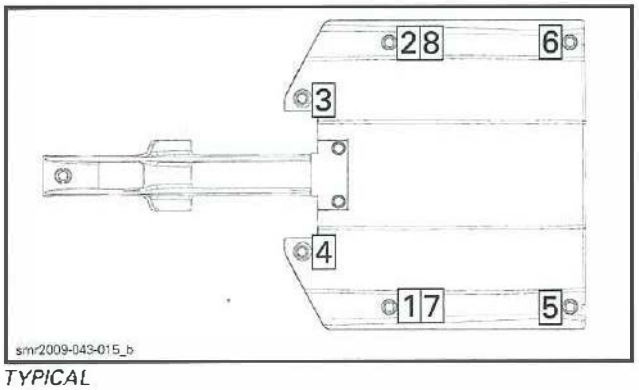
NOTE: The jet pump support must be installed on the ride plate before installation of the ride plate on the watercraft.

2. Reinstall hose fittings on ride plate and torque to 7 N•m (62 lbf•in).
3. Apply LOCTITE 5900 (P/N 293 800 066) on ride plate and jet pump support circumference as seen in the following illustration.



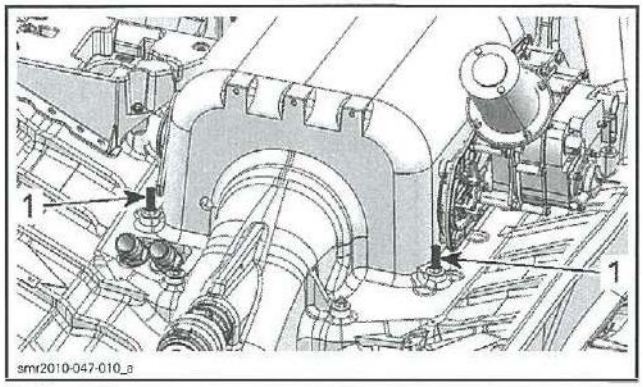
LOCTITE 5900 SEALANT APPLICATION

4. Position ride plate on hull and engage NEW M8 self-locking screws 5 turns by hand.
5. Position inlet grate and engage NEW retaining screws 5 turns by hand. Refer to *INLET GRATE* in this subsection.
6. Push ride plate completely forward and torque ride plate screws to 35 N•m (26 lbf•ft) as per following torque sequence.



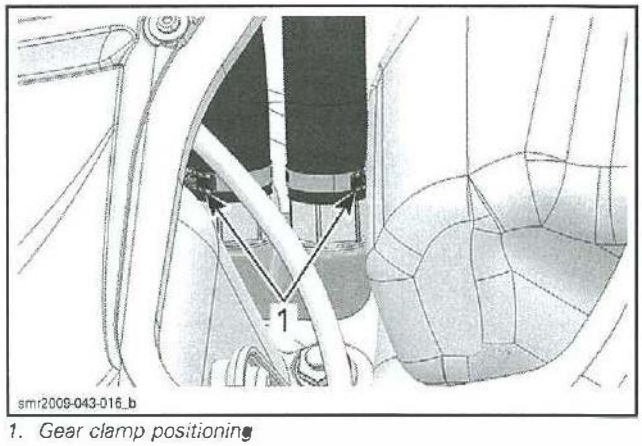
TYPICAL

7. Torque inlet grate screws. See *INLET GRATE INSTALLATION* in this subsection.
8. Inside hull, install nuts on the 4 front screws and tighten them to 20 N•m (15 lbf•ft).
9. Install a piece of hose over the threaded end of the front ride plate screws.



1. Hoses

10. Reinstall coolant hoses on ride plate fittings, pay attention to gear clamp positioning. See following illustration.



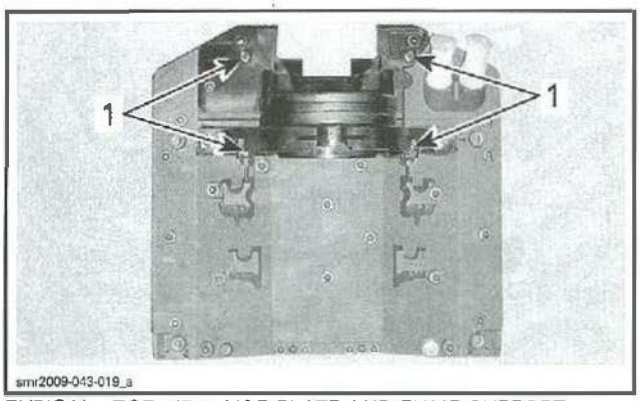
1. Gear clamp positioning

11. Install jet pump, refer to the *JET PUMP* subsection.
12. Install iBR gate and VTS trim ring, refer to the *iBR AND VTS* subsection.
13. Install battery and electrical accessories support, refer to *CHARGING SYSTEM* subsection.
14. Refill cooling system and carry out a leak test. Refer to *COOLING SYSTEM* subsection.
15. Install all remaining parts in the reverse order of removal.

JET PUMP SUPPORT

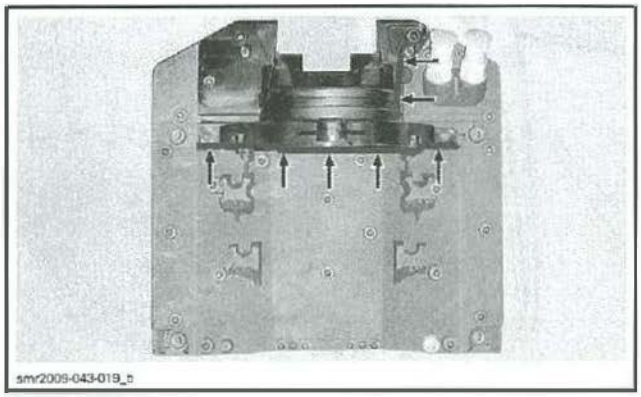
Jet Pump Support Removal

1. Remove the inlet grate and ride plate, see procedures in this subsection.
2. Remove the four screws retaining the pump support to the ride plate.



TYPICAL - TOP VIEW RIDE PLATE AND PUMP SUPPORT
1. Pump support retaining screws

3. Using a heat gun, heat the base of the pump support to soften the sealant and carefully pry the pump support off the ride plate.



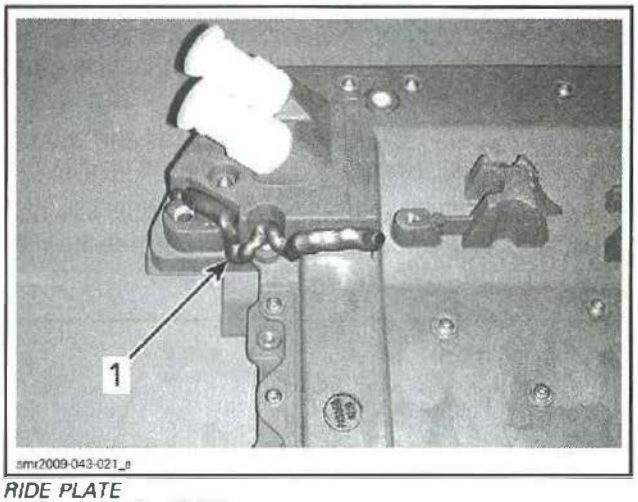
APPLY HEAT HERE

Jet Pump Support Cleaning

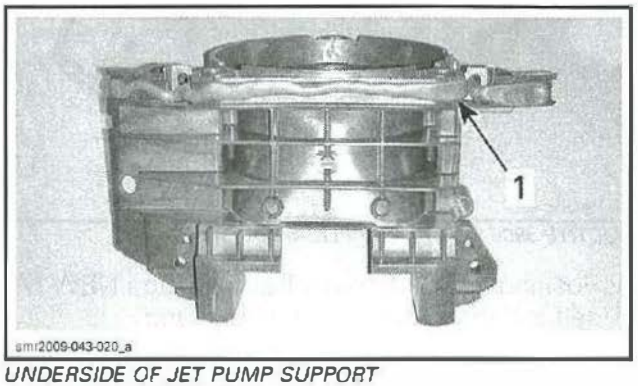
1. Scrape off all excess sealant from jet pump support, ride plate, and hull.
2. Inspect pump support for cracks and other damages. Replace as necessary.
3. Clean jet pump support and hull surface with BRP HEAVY DUTY CLEANER (P/N 293 110 001) to eliminate grease, dust, and sealant residue.

Jet Pump Support Installation

1. Ensure sealant contact areas are clean and dry.
2. Apply LOCTITE 5900 (P/N 293 800 066) on the ride plate and pump support as seen in the following illustrations.

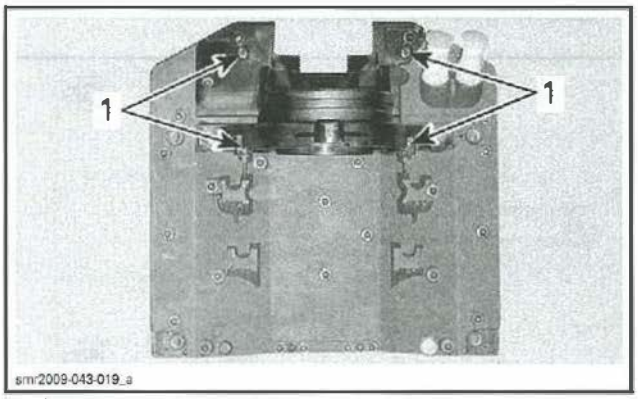


RIDE PLATE
1. Apply Loctite 5900 here



UNDERSIDE OF JET PUMP SUPPORT
1. Apply Loctite 5900 here

3. Torque jet pump support screws as specified in exploded view.

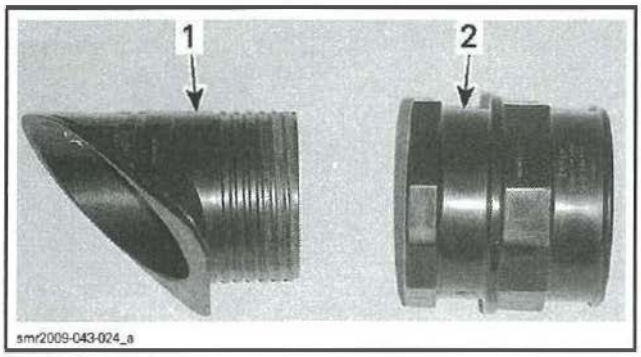


1. Jet pump support screws

4. Remove any excess sealant from the right hand forward ride plate mounting hole.
5. Reinstall all removed parts in the reverse order of removal. Refer to appropriate subsections for procedures.

THRU-HULL FITTING

The thru-hull fitting is composed of 2 pieces, an outer fitting, and an inner fitting that screws onto the outer fitting after the outer fitting is inserted in the hull.

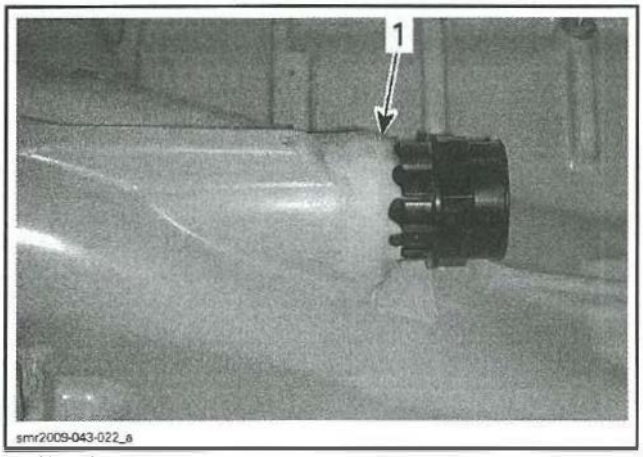


1. *Outer fitting*
2. *Inner fitting*

Thru-Hull Fitting Removal

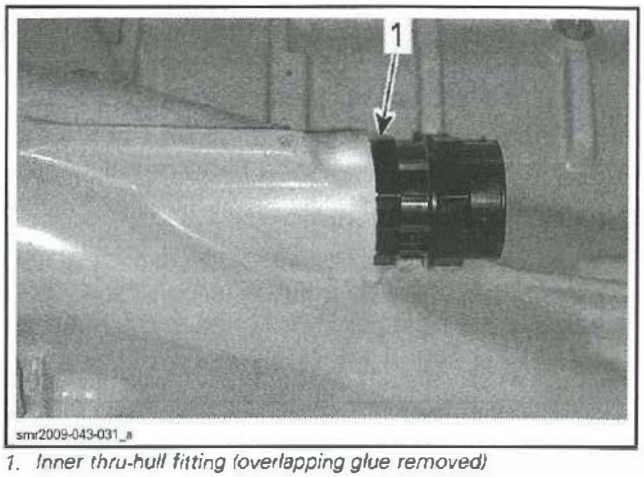
Inner Fitting Removal

1. Remove drive shaft, refer to *DRIVE SHAFT* subsection.
2. Using a heat gun, heat the glue at the joint between the hull and the inner thru-hull fitting to soften the glue applied.



1. *Heat here*

3. Carefully remove overlapping glue from around the inner fitting.

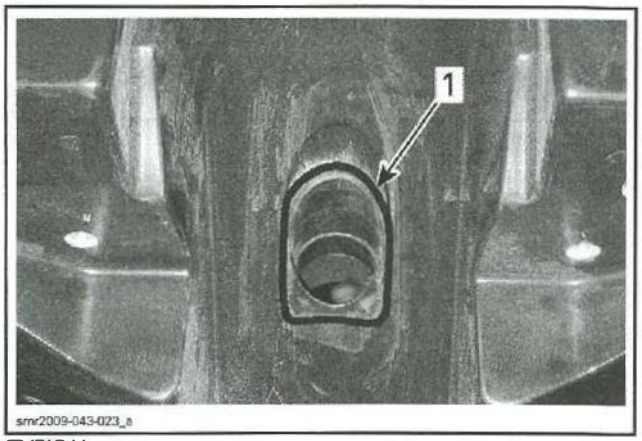


1. *Inner thru-hull fitting (overlapping glue removed)*

4. Unscrew the inner fitting from the outer fitting using a 65 mm (2.56 in) socket.

Outer Fitting Removal

1. Carefully cut sealant around the edge of the outer fitting (jet pump side).



TYPICAL
1. *Cut sealant around outer fitting here*

2. Heat the inside of the outer fitting to soften the sealant and help break the bond between the hull and fitting.
3. Using a rubber mallet (or a hammer and a wooden block), hammer the outer fitting from the inside of the hull towards the outside, until it is flush with the hull.
4. Reach in through the pump support and pull the fitting out of the hull.

Hull Cleaning for Thru-Hull Fitting Installation

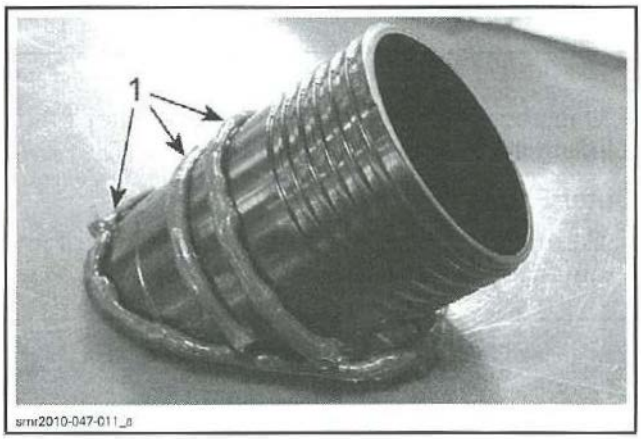
1. Scrape off all excess sealant from the hull on the outer fitting side.
2. Remove excess glue from the hull on the inner fitting side.

3. Clean hull surface with BRP HEAVY DUTY CLEANER (P/N 293 110 001) to eliminate grease, dust, and sealant residue.

NOTE: Use only a clean, dry, oil free filtered air supply for dusting and drying parts or hull.

Outer Fitting Installation

1. Apply a wide bead of LOCTITE 5900 (P/N 293 800 066) sealant completely around the outer edge of the fitting (pointed end), and two beads across the top of the fitting.

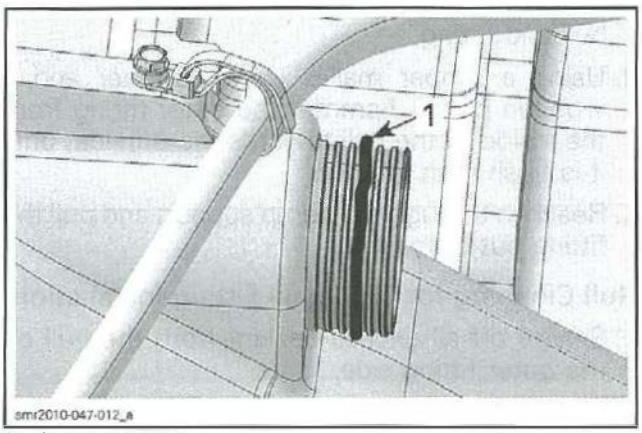


1. Apply Loctite 5900 here

2. Insert the outer fitting into the hull from the jet pump side of the hull towards the inside. Ensure fitting is pushed in against the hull.
3. Continue with *INNER FITTING INSTALLATION* procedure.

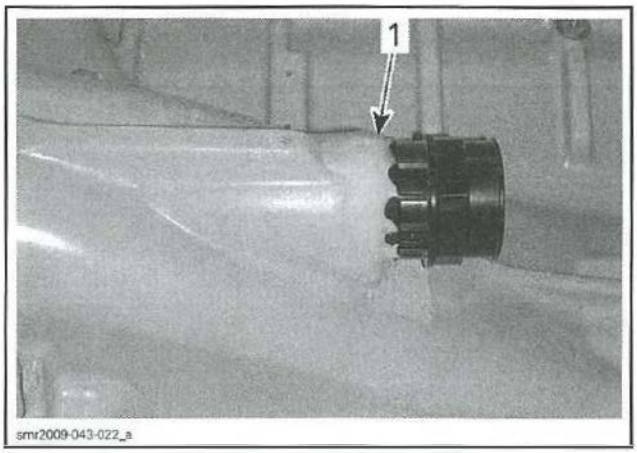
Inner Fitting Installation

1. Apply the SIX10 glue from West System (see *HULL REPAIR* at the beginning of this subsection for more information) or an equivalent completely around the third thread of the fitting.



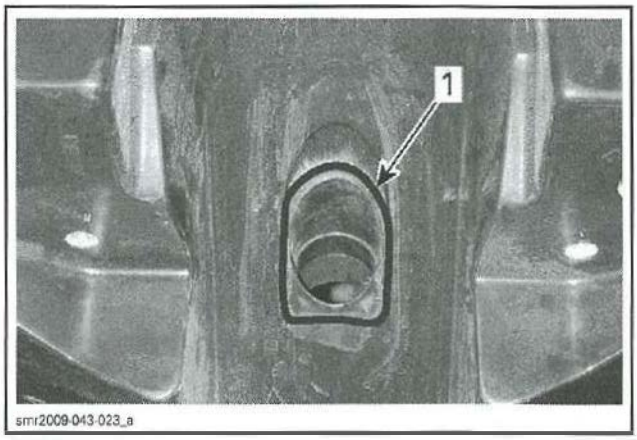
1. Apply glue here

2. Screw the inner fitting onto the outer fitting and torque as specified in the exploded view.
3. Using a stirring stick (or a tongue depressor), smooth out glue over the hull and inner fitting joint.



1. Smooth out glue here over edge of inner fitting

4. If the outer fitting was replaced, ensure it is properly seated against the hull in the jet pump area. Remove excess sealant at the joint between the outer fitting and hull.
5. Apply a bead of LOCTITE 5900 (P/N 293 800 066) sealant completely around the outer edge of the outer fitting to complete the sealing procedure.



TYPICAL
1. Bead of Loctite 5900 all around the outer fitting

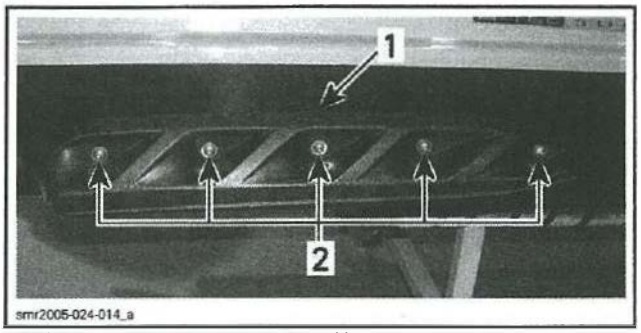
SPONSONS

NOTE: Removal and installation procedure for RH and LH sponson is the same.

Sponson Removal

Remove the muffler or the resonator. Refer to the *EXHAUST SYSTEM* subsection.

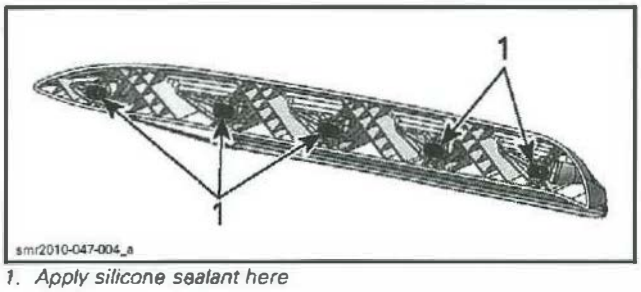
From inside hull, hold sponson nuts while removing sponson retaining bolts and washers.



TYPICAL – RH SPONSON SHOWN
1. *Sponson*
2. *Retaining bolts*

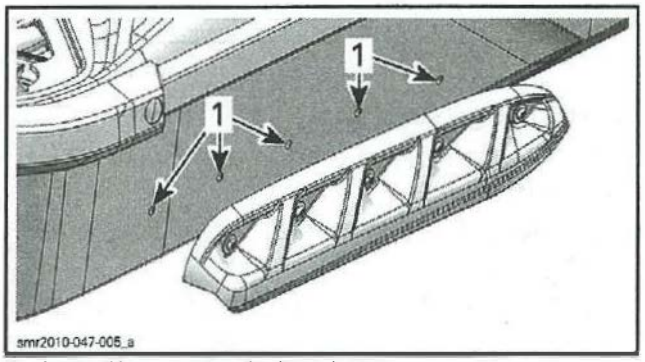
Sponson Installation

1. Clean any residues of silicone sealant on hull and sponsons.
2. Apply LOCTITE 5150 (SILICONE SEALANT) (P/N 296 000 309) on back side of sponson spacers.



1. *Apply silicone sealant here*

3. Apply a small amount of LOCTITE 5150 (SILICONE SEALANT) (P/N 296 000 309) into each hull hole.



1. *Apply silicone sealant in these holes*

4. Insert a bolt with washer through each hole and install the sponson against the hull.
5. From inside hull, secure each bolt with a washer and a NEW elastic stop nut.
6. Tighten nuts as specified in the exploded view.
7. Reinstall muffler or resonator. Refer to *EXHAUST SYSTEM* for the procedure.

BAILERS

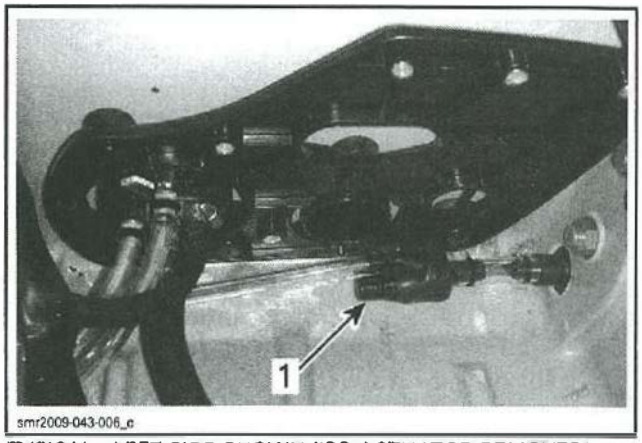
Two bailer pick ups (one each side), serve to drain the bilge of the watercraft when it is in operation.

The bailer pick ups are connected through a hose system to two syphon tubes mounted in the jet pump venturi that draw the water out of the bilge through the bailer pick ups. The bailers are also connected to the bilge drain plugs in the stern.

Bailer Pick-Up Inspection

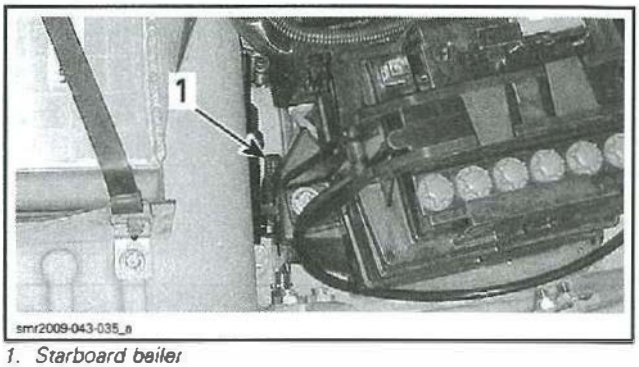
1. On iS models, open boarding platform and remove the storage bins. On models without iS, remove the rear access panels.
2. Inside hull, check holes in the bailer pick-ups to see if they are obstructed. Clean if necessary.

NOTE: On the port side (LH), the bailer is located below the iBR actuator.



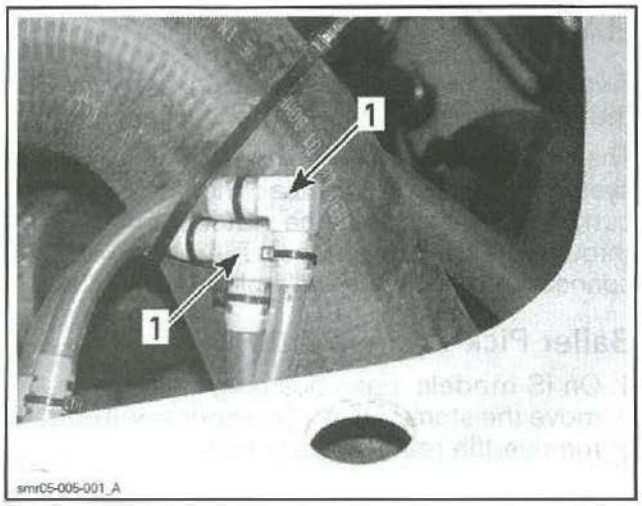
TYPICAL - LEFT SIDE SHOWN (iBR ACTUATOR REMOVED)
1. *Bailer assembly*

NOTE: On the starboard side (RH), the bailer is located between the battery support base and the hull (jet pump tunnel).



1. *Starboard bailer*

3. Check if the hole on each bailer hose elbow fitting is obstructed. Clean both elbow fittings if necessary.



1. Elbow fitting holes

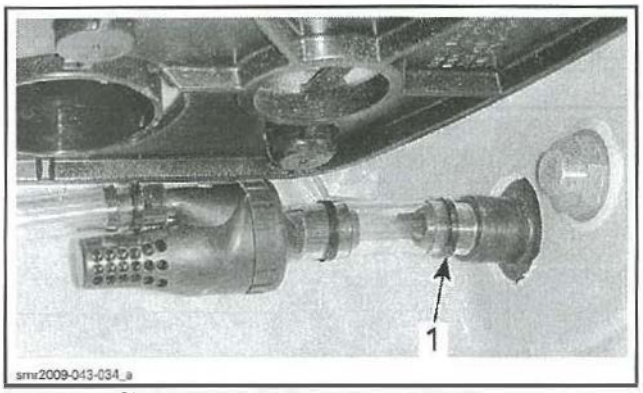
NOTE: When repositioning the bailer hose elbows, attach them at the highest position that you can on the exhaust hose.

DRAIN PLUGS

NOTE: The two drain plugs on the stern are each connected to a bailer. When watercraft is on dry land, the drain plugs can be removed to manually drain the bilge.

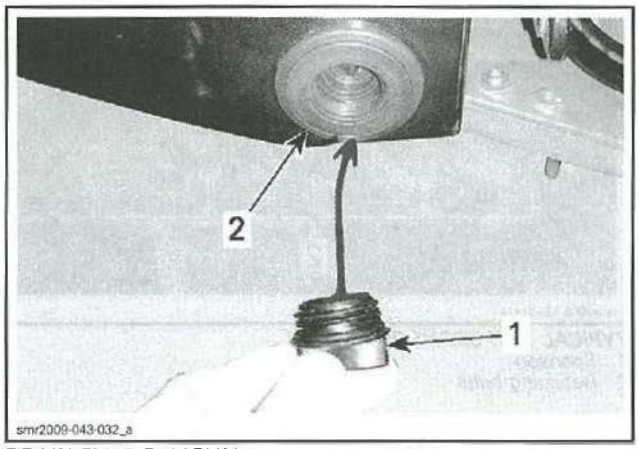
Drain Plug Neck Removal

1. On iS models, open the boarding platform and remove the rear storage bins (one each side). On models without iS, remove the appropriate access panel.
2. Cut locking tie securing bailer hose to the drain plug assembly.



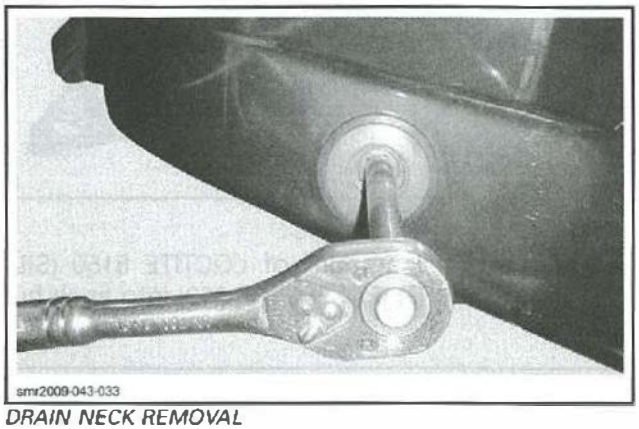
LEFT SIDE SHOWN (iBR ACTUATOR REMOVED)
1. Cut this locking tie

3. Unscrew the drain plug from the drain neck and pull the drain plug out of the neck.



DRAIN PLUG REMOVAL
1. Drain plug
2. Drain neck

4. Inside hull, hold the drain neck nut using adjustable pliers.
5. Using a ratchet handle and extension of appropriate size, unscrew the drain neck from the hull.



DRAIN NECK REMOVAL

Drain Plug Neck Installation

1. Install drain neck and torque to 9 N•m (80 lbf•in).
2. Secure bailer hose to drain neck using a NEW locking tie.
3. Reinstall all removed parts in the reverse order of removal.

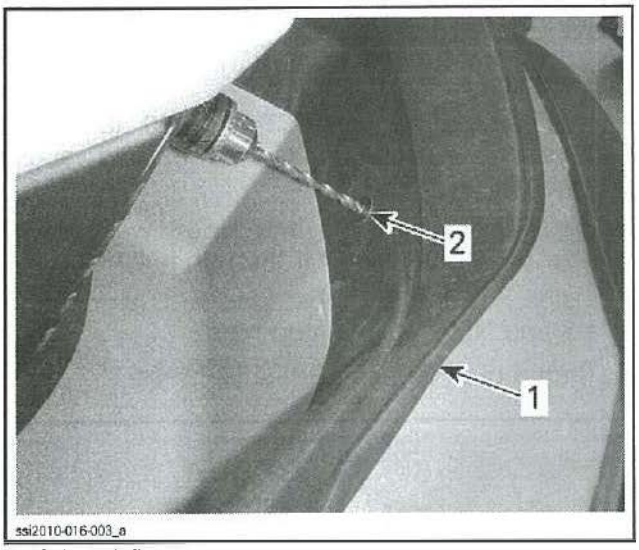
BOW EYELET

Bow Eyelet Removal

iS Models

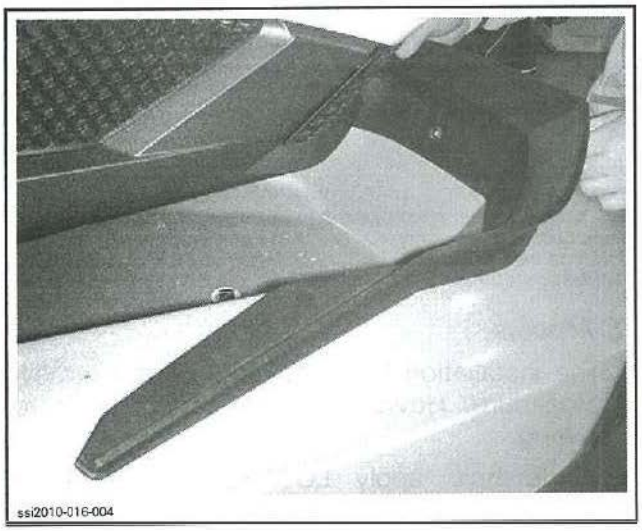
To remove the retaining nuts on the bow mooring eyelet, an access hole must be cut in the neoprene sealing pad. Carry out the following steps.

1. Remove splash deflector.
   1.1 Drill all rivets holding the splash deflector.



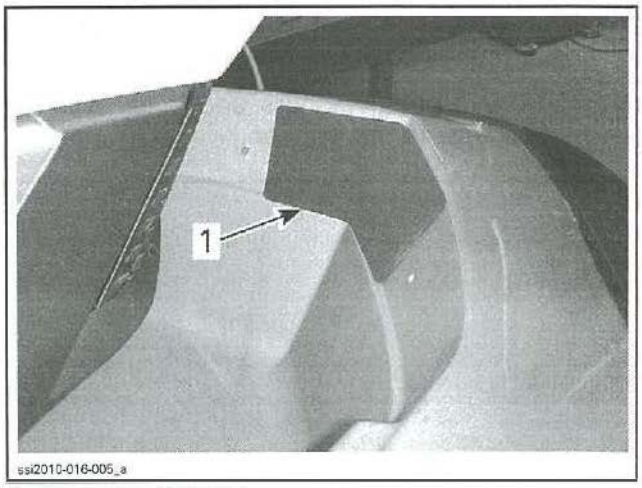
1. *Splash deflector*
2. *Rivet*

1.2 Remove splash deflector from vehicle.



1.3 Clean aluminum residues.

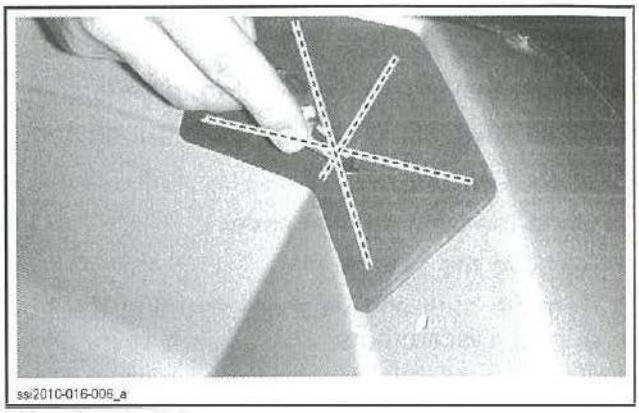
2. Using a cutting knife, make opening in the neoprene sealing pad.



1. *Neoprene sealing pad*

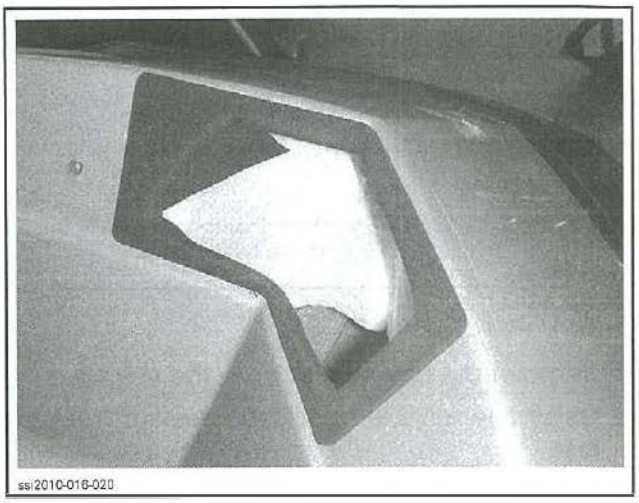
3. Make 3 cuts according to the following picture.

NOTICE **Do not cut neoprene sealing pad too close to its edges to prevent tearing it off when folding and ensure proper sealing.**



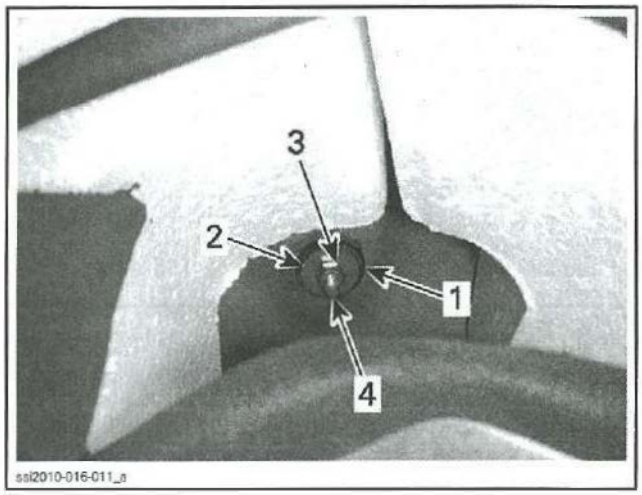
CUTTING PATTERN

4. Gently fold all flaps of the neoprene sealing pad towards the inside of the hull.



5. Unscrew and discard both elastic stop nuts holding the bow eyelet in place.

NOTE: The rubber washers and large washers should be kept for installation.

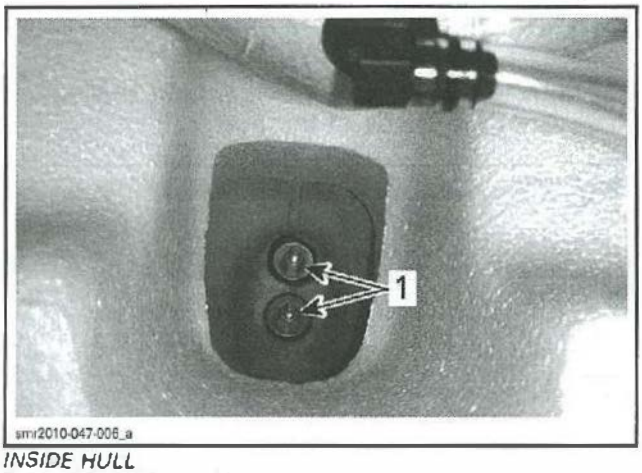


1. Rubber washer
2. Large washer
3. Elastic nut
4. Screw

6. Pull bow eyelet to remove it from watercraft.
7. Clean any residue of silicone sealant on hull.

Models Without iS

1. Open the front storage cover.
2. Remove the storage bin.
3. Remove nuts and washers securing the bow eyelet. Discard nuts.



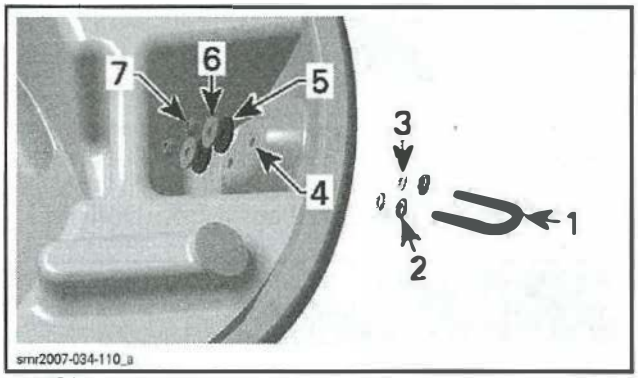
INSIDE HULL
1. Eyelet retaining nuts

4. Remove the bow eyelet from the vehicle.
5. Clean any residue of silicone sealant from the hull.

Bow Eyelet Installation

All Models

1. Inside hull, apply LOCTITE 5150 (SILICONE SEALANT) (P/N 296 000 309) around eyelet mounting holes.
2. Install small washers and nylon washers on bow eyelet and insert it through hull holes.
3. Inside hull, install rubber washers, large washers and NEW elastic stop nuts.
4. Torque nuts to 14.5 N•m (128 lbf•**in**).



TYPICAL
1. Bow eyelet
2. Small washer
3. Nylon washer
4. Loctite 5150 (silicone sealant) here
5. Rubber washer
6. Large washer
7. Elastic stop nut

iS Models

1. The installation is the reverse of the removal procedure. However, pay attention to the following.
2. Inside hull, apply LOCTITE 5150 (SILICONE SEALANT) (P/N 296 000 309) around eyelet mounting holes.
3. Install rubber washers, large washers and NEW elastic stop nuts.
4. Torque elastic nuts to 14.5 N•m (128 lbf•**in**).
5. Reinstall the splash deflector on the fixed deck using 6 rivets.

NOTICE **Ensure neoprene gasket edges have not been damaged during the installation procedure before reinstalling the splash deflector. If gasket is damaged, replace by a new one.**

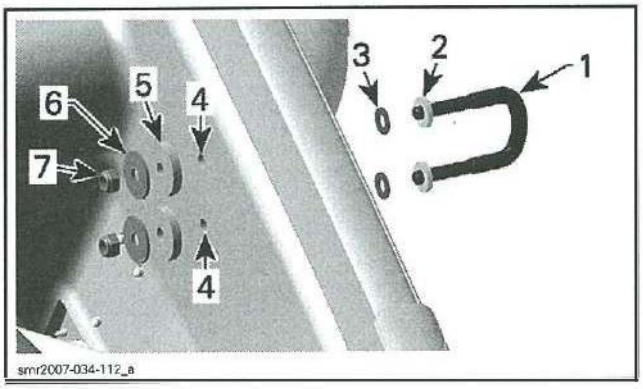
STERN EYELETS

Stern Eyelet Removal

1. On iS models, open the boarding platform and remove the applicable storage tray. On models without iS, remove the applicable access cover.
2. Inside hull, unscrew and discard elastic stop nuts securing the stern eyelet to hull.
3. Pull stern eyelet to remove it from watercraft.
4. Clean any residue of silicone sealant from the hull.

Stern Eyelet Installation

1. Install small washers and nylon washers to stern eyelet and insert it through the hull.
2. Inside hull, apply LOCTITE 5150 (SILICONE SEALANT) (P/N 296 000 309) all around holes.
3. Install eyelet and other parts using NEW elastic stop nuts as per following illustration.



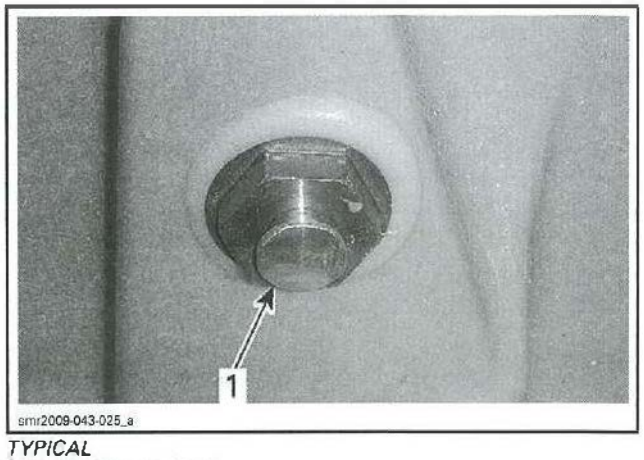
TYPICAL
1. Stern eyelet
2. Small washer
3. Nylon washer
4. Loctite 5150 (silicone sealant) here
5. Rubber washer
6. Large washer
7. Elastic stop nut

4. Torque retaining nuts to 14.5 N•m (128 lbf•in).

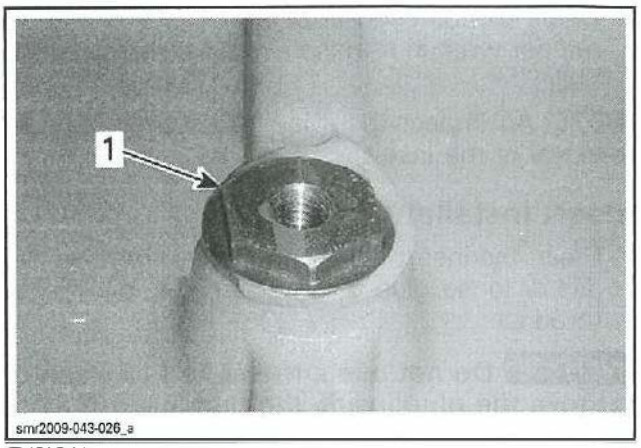
HULL INSERTS

Metal inserts (brass) of various types and sizes are screwed into the hull at various locations. A threaded hole in the insert is used for fastening various parts and equipment onto the hull.

Some inserts pass completely through the hull, while others do not (blind hole inserts).



TYPICAL
1. Pass through insert



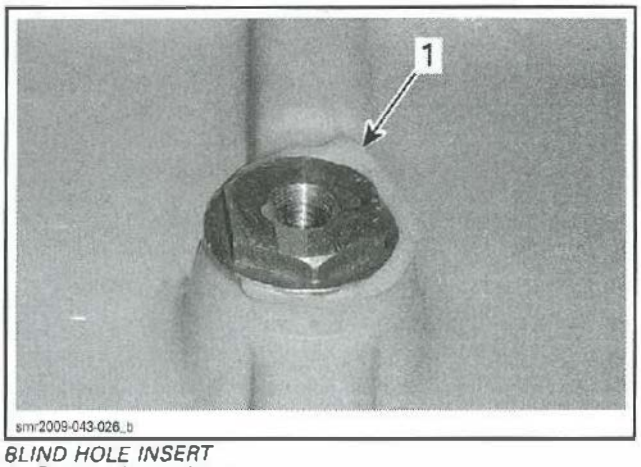
TYPICAL
1. Blind hole insert

All type inserts may be replaced if the inner screw threads are damaged beyond use.

NOTE: Inserts should only be replaced as a last resort. First try passing a tap, cleaning the hole, and using a NEW self-locking screw. If fastener can be tightened to the specified torque, do not change insert. If torque cannot be applied, drill and tap insert one size larger before trying to change an insert.

Insert Removal

1. Heat the insert using a heat gun to soften the glue securing the insert into the hull.
2. Remove any excess glue from around the head of the insert that would prevent proper insertion of the socket used to remove the insert.



BLIND HOLE INSERT
1. Excess glue on head

3. Use a six-point socket of appropriate size and a ratchet wrench to unscrew the insert from the hull.

NOTE: An impact tool may be used to facilitate removal of the insert.

Insert Installation

1. Clean the insert hole in the hull to remove any dirt or loose glue using clean, dry, oil free filtered air.

NOTICE **Do not use a metal tool to clean or remove the glue inside the hull insert hole to prevent damaging the threads in the hull material. The glue that is properly bonded to the hull does not need to be removed.**

2. If the insert passes completely through the hull, screw a stud of appropriate size into the insert (M6 or M8) to prevent any glue from seeping into the fastener threads in the insert. Apply the SIX10 glue from West System (see *HULL REPAIR* at the beginning of this subsection for more information) or an equivalent to the outer threads of the insert.

NOTE: Apply a sufficient amount of glue thru the full length of the insert threads to ensure excess glue will come out of the hole as the insert is screwed into the hull.

3. If the insert screws into a blind hole, apply the SIX10 glue or an equivalent to the threads in the hull.
4. Screw the insert in the hull boss and torque to 25 N•m (18 lbf•ft). Ensure the flanged portion of the insert makes contact with the boss it is being screwed into.

GTS 130 AND GTI 130

MODEL			GTS 130	GTI 130
ENGINE				
Engine type			ROTAX® 1503 4-TEC™, 4-stroke, Single Over Head Camshaft (SOHC)	
Induction			Naturally-aspirated	
Number of cylinders			3	
Number of valves			12 valves with hydraulic lifters (no adjustment)	
Bore		Standard	100 mm (3.9 in)	
		1st Oversize	100.25 mm (3.95 in)	
Stroke			63.4 mm (2.5 in)	
Displacement			1 493.8 cm³ (91 in³)	
Compression ratio			10.6:1	
Maximum RPM			7300 RPM	
Lubrication		Type	Dry sump (2 oil pumps). Replaceable oil filter. Water-cooled oil cooler	
		Oil type	XPS synthetic blend oil (summer grade) (P/N 293 600 121). Refer to *LUBRICATION SYSTEM* subsection	
		Capacity	3 L (3.2 qt (U.S. liq.)) oil change w/filter 4.5 L (4.8 qt (U.S. liq.)) total	
Intake valve opening			10° ATDC	
Intake valve closing			50° ABDC	
Exhaust valve opening			50° BBDC	
Exhaust valve closing			10° BTDC	
Valve stem diameter	Intake	New	5.961 mm to 5.975 mm (.2347 in to .2352 in)	
		Wear limit	5.930 mm (.233 in)	
	Exhaust	New	5.946 mm to 5.960 mm (.2341 in to .2346 in)	
		Wear limit	5.930 mm (.233 in)	
Valve guide diameter		New	5.994 mm to 6.018 mm (.236 in to .2369 in)	
		Wear limit	6.060 mm (.2386 in)	
Valve spring free length	Inner	New	41.02 mm (1.615 in)	
		Wear limit	38.80 mm (1.528 in)	
	Outer	New	45.45 mm (1.789 in)	
		Wear limit	43.00 mm (1.693 in)	
Valve seat contact width	Intake	New	1.10 mm to 1.30 mm (.043 in to .051 in)	
		Wear limit	1.60 mm (.063 in)	
	Exhaust	New	1.25 mm to 1.55 mm (.049 in to .061 in)	
		Wear limit	1.80 mm (.071 in)	
Rocker arm inner diameter		New	20.007 mm to 20.020 mm (.7877 in to .7882 in)	
		Wear limit	20.050 mm (.7894 in)	
Rocker arm shaft diameter		New	19.980 mm to 19.993 mm (.7866 in to .7871 in)	
		Wear limit	19.970 mm (.7862 in)	
Cylinder head maximum warpage		Service limit	0.15 mm (.006 in)	

MODEL			GTS 130	GTI 130
ENGINE (cont'd)				
Piston ring type		1st	Upper compression ring, rectangular	
		2nd	Lower compression ring, tapered face	
		3rd	Oil scraper ring	
Ring end gap	Rectangular	New	0.30 mm to 0.50 mm (.012 in to .02 in)	
	Taper-face	New	0.35 mm to 0.55 mm (.014 in to .022 in)	
	Oil scraper ring	New	0.35 mm to 0.50 mm (.014 in to .02 in)	
	All	Wear limit	1.50 mm (.059 in)	
Ring/piston groove clearance	Rectangular	New	0.025 mm to 0.070 mm (.001 in to .003 in)	
	Taper-face	New	0.015 mm to 0.06 mm (.0006 in to .0024 in)	
	Oil scraper ring	New	0.020 mm to 0.055 mm (.001 in to .002 in)	
	All	Wear limit	0.15 mm (.006 in)	
Piston/cylinder wall clearance		New	0.024 mm to 0.056 mm (.0009 in to .0022 in)	
		Wear limit	0.100 mm (.0039 in)	
Cylinder taper		Wear limit	0.100 mm (.0039 in)	
Cylinder out of round (maximum)			0.015 mm (.0006 in)	
Camshaft bearing journal diameter	Front	New	24.939 mm to 24.960 mm (.9819 in to .9827 in)	
		Wear limit	24.910 mm (.9807 in)	
	PTO and center	New	39.892 mm to 39.905 mm (1.5706 in to 1.5711 in)	
		Wear limit	39.880 mm (1.5701 in)	
Camshaft bearing inner diameter	Front	New	25.000 mm to 25.013 mm (.9843 in to .9848 in)	
		Wear limit	25.050 mm (.9862 in)	
	PTO and center	New	40.000 mm to 40.020 mm (1.5748 in to 1.5756 in)	
		Wear limit	40.050 mm (1.5768 in)	
Cam lobe height	Intake	New	31.540 mm to 31.740 mm (1.2417 in to 1.2496 in)	
		Wear limit	31.50 mm (1.2402 in)	
	Exhaust	New	31.430 mm to 31.630 mm (1.2374 in to 1.2453 in)	
		Wear limit	31.380 mm (1.2354 in)	
Crankshaft deflection		Maximum	0.05 mm (.002 in)	
Crankshaft axial clearance		New	0.080 mm to 0.220 mm (.0031 in to .0087 in)	
		Wear limit	0.35 mm (.014 in)	
Crankshaft bearing journal diameter		New	49.991 mm to 50.000 mm (1.9681 in to 1.9685 in)	
		Wear limit	49.950 mm (1.9665 in)	
Crankshaft radial clearance		Wear limit	0.07 mm (.0028 in)	
Connecting rod big end diameter		Service limit	45.080 mm (1.7748 in)	
Connecting rod big end radial play		Service limit	0.090 mm (.0035 in)	
Connecting rod big end axial play		New	0.100 mm to 0.352 mm (.004 in to .014 in)	
		Wear limit	0.500 mm (.0197 in)	
Connecting rod small end diameter		New	23.010 mm to 23.020 mm (.9059 in to .9063 in)	
		Wear limit	23.070 mm (.9083 in)	
Connecting rod small end radial play		Wear limit	0.080 mm (.0031 in)	

MODEL			GTS 130	GTI 130
ENGINE (cont'd)				
Piston pin diameter		New	22.996 mm to 23.000 mm (.9054 in to .9055 in)	
		Wear limit	22.990 mm (.9051 in)	
Balance shaft journal diameter		New	31.984 mm to 32.000 mm (1.2592 in to 1.2598 in)	
		Wear limit	31.950 mm (1.2579 in)	
Balance shaft radial clearance		Wear limit	0.070 mm (.0028 in)	
Balance shaft axial clearance		New	0.020 mm to 0.250 mm (.0008 in to .0098 in)	
Supercharger shaft driven plate journal depth		New	N.A.	
		Wear limit	N.A.	
Supercharger drive gear thickness		New	N.A.	
		Wear limit	N.A.	
Supercharger lock washer thickness		New	N.A.	
		Wear limit	N.A.	
Supercharger spring washer package height (not compressed)		New	N.A.	
		Wear limit	N.A.	
AIR INTAKE SYSTEM				
Intake spark arrester			Tubular, wire screen	
COOLING SYSTEM				
Type			Closed loop cooling system	
Coolant			Ethylene-glycol and distilled water (50%/50%). Use premix coolant from BRP or a coolant specially formulated for aluminum engines	
Cooling system capacity			5.5 L (5.8 qt (U.S. liq.)) total	
Thermostat			87°C (189°F)	
Monitoring beeper setting			100°C (212°F)	
EXHAUST SYSTEM				
Type			D-Sea-Bel sound reduction system. Water cooled/water injected (open loop). Direct flow from jet pump	
Water injection in muffler			3 x 3.5 mm (.138 in) on exhaust pipe and 1 x 3.5 mm (.138in) on muffler	
FUEL SYSTEM				
Fuel injection type			Multipoint fuel injection with iTC (intelligent Throttle Control). Single throttle body (62 mm) with an actuator	
Fuel pressure			386 kPa to 414 kPa (56 PSI to 60 PSI)	
Fuel injector		Quantity	3	
Fuel type	Inside North America ((RON + MON)/2)		87 or higher	
	Outside North America (RON)		92 or higher	
Fuel tank (including reserve)			60 L (15.9 U.S. gal.)	
Fuel tank reserve (from low level signal)			approx. 12 L (3.2 U.S. gal.)	
Idle speed			1750 ± 50 RPM (not adjustable)	

Section 08 TECHNICAL SPECIFICATIONS
Subsection 01 (GTS 130 AND GTI 130)

MODEL			GTS 130	GTI 130
ELECTRICAL SYSTEM				
Magneto generator output			360 W @ 6000 RPM	
Stator			0.1 to 1.0 Ω	
Battery			12 V, 30 A•h	
Anti-start system			D.E.S.S. (Digitally Encoded Security System) with selectable maximum vehicle speed settings for RK (rental key) and LK (learning key)	
Ignition system type			IDI (Inductive Discharge Ignition)	
Ignition timing			Variable (electronically controlled)	
Spark plug		Make and type	NGK DCPR8E	
		Gap	0.7 mm to 0.8 mm (.028 in to .031 in)	
Ignition coil		Primary	0.85 to 1.15 Ω	
		Secondary	9.5 to 13.5 KΩ	
Engine speed limiter setting			7650 RPM	
Fuse box	#1: iBR control		5 A	
	#2: Diagnostic connector		15 A	
	#3: START/STOP		3 A	
	#4: Gauge constant power		3 A	
	#5: power		30 A	
	#6: Voltage rectifier/regulator		30 A	
	#8: Relay, fuses 2, 3 and 4		30 A	
	#12: O.T.A.S., gauge start up and CAPS		3 A	
	#13: Inj/Ign cyl 1		10 A	
	#14: Inj/Ign cyl 2		10 A	
	#15: Inj/Ign cyl 3		10 A	
	#16: Starter solenoid		5 A	
	#18: Fuel pump		10 A	
	#19: ECM power		15 A	
STEERING AND PROPULSION				
Steering			Fixed column	
Steering nozzle pivoting angle			20°	
O.T.A.S. (Off-Throttle Assisted Steering)			Electronically-controlled	
Jet pump		Type	Axial flow single stage	
		Grease type	Jet pump bearing grease (P/N 293 550 032)	
Impeller		Rotation (seen from rear)	Counterclockwise	
		Pitch	11°/18°	
		Outside diameter	155.5 mm ± 0.06 mm (6.122 in ± .002 in)	
Impeller/wear ring clearance		New	0 mm to 0.23 mm (0 in to .009 in)	
		Wear limit	0.35 mm (.0138 in)	
Impeller shaft		End play (new)	0	
		Side play	0	
Drive shaft		Coupling type	Crowned splines, direct drive	
		Deflection (max.)	0.5 mm (.02 in)	
Minimum required water level for propulsion system			90 cm (3 ft) underneath the lowest rear portion of hull	

MODEL		GTS 130	GTI 130
iBR and VTS			
Description		N.A.	Intelligent Brake and Reverse activated by a LH lever. Electronically-controlled iBR gate to provide brake, reverse, neutral and forward position
Gate angle (from horizontal line of watercraft)	Forward	N.A.	Approx. from +8° to -4°
	Neutral		Approx. -52°
	Braking		Approx. -70°
	Reverse		Approx. from -52° to -70°
VTS system		N.A.	
VTS range angle		N.A.	
Actuator		N.A.	
WEIGHT AND LOADING CAPACITY			
Dry weight		333 kg (734 lb)	338 kg (745 lb)
Number of passenger (driver incl.)		3	
Load limit (passenger and 10 kg (22 lb) luggage)		273 kg (602 lb)	
DIMENSIONS			
Overall length		336.8 cm (132.6 in)	
Overall width		123.1 cm (48.5 in)	
Overall height		111.8 cm (44 in)	
MATERIALS			
Hull		Composite fiberglass	
Inlet grate		Aluminum	
Steering cover		Thermoplastic	
Impeller material		Stainless steel	
Impeller housing/stator		Aluminum/aluminum	
Venturi		Aluminum	
Nozzle		Aluminum	
Fuel tank		Polyethylene	
Seat		Polyurethane/foam	

N.A.: Not Available

GTI 155 AND WAKE 155

MODEL			GTI 155	WAKE 155
ENGINE				
Engine type			ROTAX® 1503 4-TEC™, 4-stroke, Single Over Head Camshaft (SOHC)	
Induction			Naturally-aspirated	
Number of cylinders			3	
Number of valves			12 valves with hydraulic lifters (no adjustment)	
Bore		Standard	100 mm (3.9 in)	
		1st Oversize	100.25 mm (3.95 in)	
Stroke			63.4 mm (2.5 in)	
Displacement			1 493.8 cm³ (91 in³)	
Compression ratio			10.6:1	
Maximum RPM			7300 RPM	
Lubrication		Type	Dry sump (2 oil pumps). Replaceable oil filter. Water-cooled oil cooler	
		Oil type	XPS synthetic blend oil (summer grade) (P/N 293 600 121). Refer to *LUBRICATION SYSTEM* subsection	
		Capacity	3 L (3.2 qt (U.S. liq.)) oil change w/filter 4.5 L (4.8 qt (U.S. liq.)) total	
Intake valve opening			0° BTDC	
Intake valve closing			50° ABDC	
Exhaust valve opening			50° BBDC	
Exhaust valve closing			0° ATDC	
Valve stem diameter	Intake	New	5.961 mm to 5.975 mm (.2347 in to .2352 in)	
		Wear limit	5.930 mm (.233 in)	
	Exhaust	New	5.946 mm to 5.960 mm (.2341 in to .2346 in)	
		Wear limit	5.930 mm (.233 in)	
Valve guide diameter		New	5.994 mm to 6.018 mm (.236 in to .2369 in)	
		Wear limit	6.060 mm (.2386 in)	
Valve spring free length	Inner	New	41.02 mm (1.615 in)	
		Wear limit	38.80 mm (1.528 in)	
	Outer	New	45.45 mm (1.789 in)	
		Wear limit	43.00 mm (1.693 in)	
Valve seat contact width	Intake	New	1.10 mm to 1.30 mm (.043 in to .051 in)	
		Wear limit	1.60 mm (.063 in)	
	Exhaust	New	1.25 mm to 1.55 mm (.049 in to .061 in)	
		Wear limit	1.80 mm (.071 in)	
Rocker arm inner diameter		New	20.007 mm to 20.020 mm (.7877 in to .7882 in)	
		Wear limit	20.050 mm (.7894 in)	
Rocker arm shaft diameter		New	19.980 mm to 19.993 mm (.7866 in to .7871 in)	
		Wear limit	19.970 mm (.7862 in)	
Cylinder head maximum warpage		Service limit	0.15 mm (.006 in)	

MODEL			GTI 155	WAKE 155
ENGINE (cont'd)				
Piston ring type		1st	Upper compression ring, rectangular	
		2nd	Lower compression ring, tapered face	
		3rd	Oil scraper ring	
Ring end gap	Rectangular	New	0.30 mm to 0.50 mm (.012 in to .02 in)	
	Taper-face	New	0.35 mm to 0.55 mm (.014 in to .022 in)	
	Oil scraper ring	New	0.35 mm to 0.50 mm (.014 in to .02 in)	
	All	Wear limit	1.50 mm (.059 in)	
Ring/piston groove clearance	Rectangular	New	0.025 mm to 0.070 mm (.001 in to .003 in)	
	Taper-face	New	0.015 mm to 0.06 mm (.0006 in to .0024 in)	
	Oil scraper ring	New	0.020 mm to 0.055 mm (.001 in to .002 in)	
	All	Wear limit	0.15 mm (.006 in)	
Piston/cylinder wall clearance		New	0.024 mm to 0.056 mm (.0009 in to .0022 in)	
		Wear limit	0.100 mm (.0039 in)	
Cylinder taper		Wear limit	0.100 mm (.0039 in)	
Cylinder out of round (maximum)			0.015 mm (.0006 in)	
Camshaft bearing journal diameter	Front	New	24.939 mm to 24.960 mm (.9819 in to .9827 in)	
		Wear limit	24.910 mm (.9807 in)	
	PTO and center	New	39.892 mm to 39.905 mm (1.5706 in to 1.5711 in)	
		Wear limit	39.880 mm (1.5701 in)	
Camshaft bearing inner diameter	Front	New	25.000 mm to 25.013 mm (.9843 in to .9848 in)	
		Wear limit	25.050 mm (.9862 in)	
	PTO and center	New	40.000 mm to 40.020 mm (1.5748 in to 1.5756 in)	
		Wear limit	40.050 mm (1.5768 in)	
Cam lobe height	Intake	New	31.540 mm to 31.740 mm (1.2417 in to 1.2496 in)	
		Wear limit	31.50 mm (1.2402 in)	
	Exhaust	New	31.430 mm to 31.630 mm (1.2374 in to 1.2453 in)	
		Wear limit	31.380 mm (1.2354 in)	
Crankshaft deflection		Maximum	0.05 mm (.002 in)	
Crankshaft axial clearance		New	0.080 mm to 0.220 mm (.0031 in to .0087 in)	
		Wear limit	0.35 mm (.014 in)	
Crankshaft bearing journal diameter		New	49.991 mm to 50.000 mm (1.9681 in to 1.9685 in)	
		Wear limit	49.950 mm (1.9665 in)	
Crankshaft radial clearance		Wear limit	0.07 mm (.0028 in)	
Connecting rod big end diameter		Service limit	45.080 mm (1.7748 in)	
Connecting rod big end radial play		Service limit	0.090 mm (.0035 in)	
Connecting rod big end axial play		New	0.100 mm to 0.352 mm (.004 in to .014 in)	
		Wear limit	0.500 mm (.0197 in)	
Connecting rod small end diameter		New	23.010 mm to 23.020 mm (.9059 in to .9063 in)	
		Wear limit	23.070 mm (.9083 in)	
Connecting rod small end radial play		Wear limit	0.080 mm (.0031 in)	

MODEL			GTI 155	WAKE 155
ENGINE (cont'd)				
Piston pin diameter		New	22.996 mm to 23.000 mm (.9054 in to .9055 in)	
		Wear limit	22.990 mm (.9051 in)	
Balance shaft journal diameter		New	31.984 mm to 32.000 mm (1.2592 in to 1.2598 in)	
		Wear limit	31.950 mm (1.2579 in)	
Balance shaft radial clearance		Wear limit	0.070 mm (.0028 in)	
Balance shaft axial clearance		New	0.020 mm to 0.250 mm (.0008 in to .0098 in)	
Supercharger shaft driven plate journal depth		New	N.A.	
		Wear limit	N.A.	
Supercharger drive gear thickness		New	N.A.	
		Wear limit	N.A.	
Supercharger lock washer thickness		New	N.A.	
		Wear limit	N.A.	
Supercharger spring washer package height (not compressed)		New	N.A.	
		Wear limit	N.A.	
AIR INTAKE SYSTEM				
Intake spark arrester			Tubular, wire screen	
COOLING SYSTEM				
Type			Closed loop cooling system	
Coolant			Ethylene-glycol and distilled water (50%/50%). Use premix coolant from BRP or a coolant specially formulated for aluminum engines	
Cooling system capacity			5.5 L (5.8 qt (U.S. liq.)) total	
Thermostat			87°C (189°F)	
Monitoring beeper setting			100°C (212°F)	
EXHAUST SYSTEM				
Type			D-Sea-Bel sound reduction system. Water cooled/water injected (open loop). Direct flow from jet pump	
Water injection in muffler			3 x 3.5 mm (.138 in) on exhaust pipe and 1 x 3.5 mm (.138 in) on muffler	
FUEL SYSTEM				
Fuel injection type			Multipoint fuel injection with iTC (intelligent Throttle Control). Single throttle body (62 mm) with an actuator	
Fuel pressure			386 kPa to 414 kPa (56 PSI to 60 PSI)	
Fuel injector		Quantity	3	
Fuel type	Inside North America ((RON + MON)/2)		87 or higher	
	Outside North America (RON)		92 or higher	
Fuel tank (including reserve)			60 L (15.9 U.S. gal.)	
Fuel tank reserve (from low level signal)			approx. 12 L (3.2 U.S. gal.)	
Idle speed			1800 ± 50 RPM (not adjustable)	

MODEL			GTI 155	WAKE 155
ELECTRICAL SYSTEM				
Magneto generator output			360 W @ 6000 RPM	
Stator			0.1 to 1.0 Ω	
Battery			12 V, 30 A•h	
Anti-start system			D.E.S.S. (Digitally Encoded Security System) with selectable maximum vehicle speed settings for RK (rental key) and LK (learning key)	
Ignition system type			IDI (Inductive Discharge Ignition)	
Ignition timing			Variable (electronically controlled)	
Spark plug		Make and type	NGK DCPR8E	
		Gap	0.7 mm to 0.8 mm (.028 in to .031 in)	
Ignition coil		Primary	0.85 to 1.15 Ω	
		Secondary	9.5 to 13.5 KΩ	
Engine speed limiter setting			7750 RPM	
Fuse box	#1: iBR control		5 A	
	#2: Diagnostic connector		15 A	
	#3: START/STOP		3 A	
	#4: Gauge constant power		3 A	
	#5: power		30 A	
	#6: Voltage rectifier/regulator		30 A	
	#8: Relay, fuses 2, 3 and 4		30 A	
	#12: O.T.A.S., gauge start up and CAPS		3 A	
	#13: Inj/Ign cyl 1		10 A	
	#14: Inj/Ign cyl 2		10 A	
	#15: Inj/Ign cyl 3		10 A	
	#16: Starter solenoid		5 A	
	#18: Fuel pump		10 A	
	#19: ECM power		15 A	
STEERING AND PROPULSION				
Steering			Fixed column	
Steering nozzle pivoting angle			20°	
O.T.A.S. (Off-Throttle Assisted Steering)			Electronically-controlled	
Jet pump		Type	Axial flow single stage	
		Grease type	Jet pump bearing grease (P/N 293 550 032)	
Impeller		Rotation (seen from rear)	Counterclockwise	
		Pitch	11°/18°	
		Outside diameter	155.5 mm ± 0.06 mm (6.122 in ± .002 in)	
Impeller/wear ring clearance		New	0 mm to 0.23 mm (0 in to .009 in)	
		Wear limit	0.35 mm (.0138 in)	
Impeller shaft		End play (new)	0	
		Side play	0	
Drive shaft		Coupling type	Crowned splines, direct drive	
		Deflection (max.)	0.5 mm (.02 in)	
Minimum required water level for propulsion system			90 cm (3 ft) underneath the lowest rear portion of hull	

MODEL		GTI 155	WAKE 155
iBR and VTS			
Description		Intelligent Brake and Reverse activated by a LH lever. Electronically-controlled iBR gate to provide brake, reverse, neutral and forward position	
Gate angle (from horizontal line of watercraft)	Forward	Approx. from +8° to -4°	
	Neutral	Approx. -52°	
	Braking	Approx. -70°	
	Reverse	Approx. from -52° to -70°	
VTS system		Yes	
VTS range angle		Approx. from +8° to -4°	
Actuator		12 V, 80 A max. capacity. Reversible PWM (pulse-width modulation) motor	
WEIGHT AND LOADING CAPACITY			
Dry weight		338 kg (745 lb)	339 kg (747 lb)
Number of passenger (driver incl.)		3	
Load limit (passenger and 10 kg (22 lb) luggage)		273 kg (602 lb)	
DIMENSIONS			
Overall length		336.8 cm (132.6 in)	
Overall width		123.1 cm (48.5 in)	
Overall height		111.8 cm (44 in)	
MATERIALS			
Hull		Composite fiberglass	
Inlet grate		Aluminum	
Steering cover		Thermoplastic	
Impeller material		Stainless steel	
Impeller housing/stator		Aluminum/aluminum	
Venturi		Aluminum	
Nozzle		Aluminum	
Fuel tank		Polyethylene	
Seat		Polyurethane/foam	
N.A.: Not Available			

GTX 155/215/260

MODEL			GTX 155	GTX 215	GTX iS 215	GTX LTD iS 260
ENGINE						
Engine type			ROTAX® 1503 4-TEC™, 4-stroke, Single Over Head Camshaft (SOHC)			
Induction			Naturally-aspirated	Supercharged intercooled		
Number of cylinders			3			
Number of valves			12 valves with hydraulic lifters (no adjustment)			
Bore		Standard	100 mm (3.9 in)			
		1st Oversize	100.25 mm (3.95 in)			
Stroke			63.4 mm (2.5 in)			
Displacement			1 493.8 cm³ (91 in³)			
Compression ratio			10.6:1	8.4:1		
Maximum RPM			7300 RPM	8000 RPM		
Lubrication		Type	Dry sump (2 oil pumps). Replaceable oil filter. Water-cooled oil cooler			
		Oil type	XPS synthetic blend oil (summer grade) (P/N 293 600 121). Refer to *LUBRICATION SYSTEM* subsection			
		Capacity	3 L (3.2 qt (U.S. liq.)) oil change w/filter 4.5 L (4.8 qt (U.S. liq.)) total			
Intake valve opening			0° BTDC			
Intake valve closing			50° ABDC			
Exhaust valve opening			50° BBDC			
Exhaust valve closing			0° ATDC			
Valve stem diameter	Intake	New	5.961 mm to 5.975 mm (.2347 in to .2352 in)			
		Wear limit	5.930 mm (.233 in)			
	Exhaust	New	5.946 mm to 5.960 mm (.2341 in to .2346 in)			
		Wear limit	5.930 mm (.233 in)			
Valve guide diameter		New	5.994 mm to 6.018 mm (.236 in to .2369 in)			
		Wear limit	6.060 mm (.2386 in)			
Valve spring free length	Inner	New	41.02 mm (1.615 in)			
		Wear limit	38.80 mm (1.528 in)			
	Outer	New	45.45 mm (1.789 in)			
		Wear limit	43.00 mm (1.693 in)			
Valve seat contact width	Intake	New	1.10 mm to 1.30 mm (.043 in to .051 in)			
		Wear limit	1.60 mm (.063 in)			
	Exhaust	New	1.25 mm to 1.55 mm (.049 in to .061 in)			
		Wear limit	1.80 mm (.071 in)			
Rocker arm inner diameter		New	20.007 mm to 20.020 mm (.7877 in to .7882 in)			
		Wear limit	20.050 mm (.7894 in)			
Rocker arm shaft diameter		New	19.980 mm to 19.993 mm (.7866 in to .7871 in)			
		Wear limit	19.970 mm (.7862 in)			
Cylinder head maximum warpage		Service limit	0.15 mm (.006 in)			

MODEL			GTX 155	GTX 215	GTX iS 215	GTX LTD iS 260
ENGINE (cont'd)						
Piston ring type		1st	Upper compression ring, rectangular			
		2nd	Lower compression ring, tapered face			
		3rd	Oil scraper ring			
Ring end gap	Rectangular	New	0.30 mm to 0.50 mm (.012 in to .02 in)			
	Taper face	New	0.35 mm to 0.55 mm (.014 in to .022 in)			
	Oil scraper ring	New	0.35 mm to 0.50 mm (.014 in to .02 in)			
	All	Wear limit	1.50 mm (.059 in)			
Ring/piston groove clearance	Rectangular	New	0.025 mm to 0.070 mm (.001 in to .003 in)			
	Taper-face	New	0.015 mm to 0.06 mm (.0006 in to .0024 in)			
	Oil scraper ring	New	0.020 mm to 0.055 mm (.001 in to .002 in)			
	All	Wear limit	0.15 mm (.006 in)			
Piston/cylinder wall clearance		New	0.024 mm to 0.056 mm (.0009 in to .0022 in)	0.04 mm to 0.08 mm (.0016 in to .0031 in)		
		Wear limit	0.100 mm (.0039 in)			
Cylinder taper		Wear limit	0.100 mm (.0039 in)			
Cylinder out of round (maximum)			0.015 mm (.0006 in)			
Camshaft bearing journal diameter	Front	New	24.939 mm to 24.960 mm (.9819 in to .9827 in)			
		Wear limit	24.910 mm (.9807 in)			
	PTO and center	New	39.892 mm to 39.905 mm (1.5706 in to 1.5711 in)			
		Wear limit	39.880 mm (1.5701 in)			
Camshaft bearing inner diameter	Front	New	25.000 mm to 25.013 mm (.9843 in to .9848 in)			
		Wear limit	25.050 mm (.9862 in)			
	PTO and center	New	40.000 mm to 40.020 mm (1.5748 in to 1.5756 in)			
		Wear limit	40.050 mm (1.5768 in)			
Cam lobe height	Intake	New	31.540 mm to 31.740 mm (1.2417 in to 1.2496 in)			
		Wear limit	31.50 mm (1.2402 in)			
	Exhaust	New	31.430 mm to 31.630 mm (1.2374 in to 1.2453 in)			
		Wear limit	31.380 mm (1.2354 in)			
Crankshaft deflection		Maximum	0.05 mm (.002 in)			
Crankshaft axial clearance		New	0.080 mm to 0.220 mm (.0031 in to .0087 in)			
		Wear limit	0.35 mm (.014 in)			
Crankshaft bearing journal diameter		New	49.991 mm to 50.000 mm (1.9681 in to 1.9685 in)			
		Wear limit	49.950 mm (1.9665 in)			
Crankshaft radial clearance		Wear limit	0.07 mm (.0028 in)			
Connecting rod big end diameter		Service limit	45.080 mm (1.7748 in)			
Connecting rod big end radial play		Service limit	0.090 mm (.0035 in)			

MODEL		GTX 155	GTX 215	GTX iS 215	GTX LTD iS 260
ENGINE (cont'd)					
Connecting rod big end axial play	New	0.100 mm to 0.352 mm (.004 in to .014 in)			
	Wear limit	0.500 mm (.0197 in)			
Connecting rod small end diameter	New	23.010 mm to 23.020 mm (.9059 in to .9063 in)			
	Wear limit	23.070 mm (.9083 in)			
Connecting rod small end radial play	Wear limit	0.080 mm (.0031 in)			
Piston pin diameter	New	22.996 mm to 23.000 mm (.9054 in to .9055 in)			
	Wear limit	22.990 mm (.9051 in)			
Balance shaft journal diameter	New	31.984 mm to 32.000 mm (1.2592 in to 1.2598 in)			
	Wear limit	31.950 mm (1.2579 in)			
Balance shaft radial clearance	Wear limit	0.070 mm (.0028 in)			
Balance shaft axial clearance	New	0.020 mm to 0.250 mm (.0008 in to .0098 in)			
Supercharger shaft driven plate journal depth	New	N.A.	14.460 mm to 14.500 mm (.5693 in to .5709 in)		
	Wear limit	N.A.	14.600 mm (.5748 in)		
Supercharger drive gear thickness	New	N.A.	11.000 mm to 11.050 mm (.4331 in to .435 in)		
	Wear limit	N.A.	10.900 mm (.4291 in)		
Supercharger lock washer thickness	New	N.A.	4.050 mm to 4.150 mm (.1594 in to .1634 in)		
	Wear limit	N.A.	3.950 mm (.1555 in)		
Supercharger spring washer package height (not compressed)	New	N.A.	10.900 mm to 10.700 mm (.4291 in to .4213 in)		
	Wear limit	N.A.	10.200 mm (.4016 in)		
AIR INTAKE SYSTEM					
Intake spark arrester		Tubular, wire screen			
COOLING SYSTEM					
Type		Closed loop cooling system			
Coolant		Ethylene-glycol and distilled water (50%/50%). Use premix coolant from BRP or a coolant specially formulated for aluminum engines			
Cooling system capacity		5.5 L (5.8 qt (U.S. liq.)) total			
Thermostat		87°C (189°F)			
Monitoring beeper setting		100°C (212°F)			
EXHAUST SYSTEM					
Type		D-Sea-Bel sound reduction system. Water cooled/water injected (open loop). Direct flow from jet pump			
Water injection in muffler		3 x 3.5 mm (.138 in) on exhaust pipe and 1 x 3.5 mm (.138 in) on muffler			

MODEL			GTX 155	GTX 215	GTX iS 215	GTX LTD iS 260
FUEL SYSTEM						
Fuel injection type			Multipoint fuel injection with iTC (intelligent Throttle Control). Single throttle body (62 mm) with an actuator			
Fuel pressure			386 kPa to 414 kPa (56 PSI to 60 PSI)			
Fuel injector		Quantity	3			
Fuel type	Inside North America ((RON + MON)/2)		87 or higher	91 or higher		
	Outside North America (RON)		92 or higher	95 or higher		
Fuel tank (including reserve)			60 L (16 U.S. gal.)		70 L (18 U.S. gal.)	
Fuel tank reserve (from low level signal)			approx. 12 L (3.2 U.S. gal.)		approx. 14 L (3.7 U.S. gal.)	
Idle speed			1800 ± 50 RPM (not adjustable)			
ELECTRICAL SYSTEM						
Magneto generator output			360 W @ 6000 RPM			
Stator			0.1 to 1.0 Ω			
Battery			12 V, 30 A•h			
Anti-start system			D.E.S.S. (Digitally Encoded Security System) with selectable maximum vehicle speed settings for RK (rental key) and LK (learning key)			
Ignition system type			IDI (Inductive Discharge Ignition)			
Ignition timing			Variable (electronically controlled)			
Spark plug		Make and type	NGK DCPR8E			
		Gap	0.7 mm to 0.8 mm (.028 in to .031 in)			
Ignition coil		Primary	0.85 to 1.15 Ω			
		Secondary	9.5 to 13.5 KΩ			
Engine speed limiter setting			7750 RPM	8300 RPM		
Fuse box	#1: iBR control		5 A			
	#2: Diagnostic connector		15 A			
	#3: START/STOP		3 A			
	#4: Gauge constant power		3 A			
	#5: iBR power		30 A			
	#6: Voltage rectifier/regulator		30 A			
	#7: iS power		30 A			
	#8: IFuses 2, 3, 4 and relay		30 A			
	#11: Depth sounder		3 A			
	#12 O.T.A.S., Gauge start up, CAPS		3 A			
	#13: Inj/Ign cyl 1		10 A			
	#14: Inj/Ign cyl 2		10 A			
	#15: Inj/Ign cyl 3		10 A			
	#16: Starter solenoid		5 A			

MODEL		GTX 155	GTX 215	GTX iS 215	GTX LTD iS 260
ELECTRICAL SYSTEM (cont'd)					
Fuse box (cont'd)	#17: iBR control	5 A			
	#18: Fuel pump	10 A			
	#19: ECM power	15 A			
STEERING AND PROPULSION					
Steering		Adjustable 4 positions			
Steering nozzle pivoting angle		26°			
O.T.A.S. (Off-Throttle Assisted Steering)		Electronically-controlled			
Jet pump	Type	Axial flow single stage			
	Grease type	Jet pump bearing grease (P/N 293 550 032)			
Impeller	Rotation (seen from rear)	Counterclockwise			
	Pitch	10°/21°			14°/25°
	Outside diameter	159 mm ± 0.06 mm (6.26 in ± .002 in)			
Impeller/wear ring clearance	New	0 mm to 0.23 mm (0 in to .009 in)			
	Wear limit	0.35 mm (.0138 in)			
Impeller shaft	End play (new)	0			
	Side play	0			
Drive shaft	Coupling type	Crowned splines, direct drive			
	Deflection (max.)	0.5 mm (.02 in)			
Minimum required water level for propulsion system		90 cm (3 ft) underneath the lowest rear portion of hull			
iBR and VTS					
Description		Intelligent Brake and Reverse activated by a LH lever. Electronically-controlled iBR gate to provide brake, reverse, neutral and forward position			
Gate angle (from horizontal line of watercraft)	Forward	Approx. from +8° to -4°			
	Neutral	Approx. -52°			
	Braking	Approx. -70°			
	Reverse	Approx. from -52° to -70°			
VTS system		Yes			
VTS range angle		8° up, -4° down			
Actuator		12 V, 80 A max. capacity. Reversible PWM (pulse-width modulation) motor			
WEIGHT AND LOADING CAPACITY					
Dry weight		374 kg (825 lb)	388 kg (855 lb)	435 kg (960 lb)	446 kg (980 lb)
Number of passenger (driver incl.)		3			
Load limit (passenger and 10 kg (22 lb) luggage)		272 kg (600 lb)		226 kg (500 lb)	
DIMENSIONS					
Overall length		354 cm (139 in)			
Overall width		122 cm (48 in)			
Overall height		116.6 cm (45.91 in)		111.4 cm (43.9 in)	
Overall height with keel horizontal, suspension extended		N.A.		128 cm (50 in)	
Overall height with keel horizontal, suspension collapsed		N.A.		115.8 cm (45.6 in)	

MODEL	GTX 155	GTX 215	GTX iS 215	GTX LTD iS 260
MATERIALS				
Hull	Composite fiberglass			
Inlet grate	Aluminum			
Steering cover	Thermoplastic			
Impeller material	Stainless steel			
Impeller housing/stator	Aluminum/aluminum			
Venturi	Aluminum			
Nozzle	Aluminum			
Fuel tank	Polyethylene			
Seat	Polyurethane/foam			
N.A.: Not Available				

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RXT 260

MODEL			RXT 260	RXT-X 260	RXT-X 260 aS/ RXT iS 260
ENGINE					
Engine type			ROTAX® 1503 4-TEC™, 4-stroke, Single Over Head Camshaft (SOHC)		
Induction			Supercharged intercooled		
Number of cylinders			3		
Number of valves			12 valves with hydraulic lifters (no adjustment)		
Bore		Standard	100 mm (3.9 in)		
		1st Oversize	100.25 mm (3.95 in)		
Stroke			63.4 mm (2.5 in)		
Displacement			1 493.8 cm³ (91 in³)		
Compression ratio			8.4:1		
Maximum RPM			8000 RPM		
Lubrication		Type	Dry sump (2 oil pumps). Replaceable oil filter. Water-cooled oil cooler		
		Oil type	XPS synthetic blend oil (summer grade) (P/N 293 600 121) Refer to *LUBRICATION SYSTEM* subsection		
		Capacity	3 L (3.2 qt (U.S. liq.)) oil change w/filter 4.5 L (4.8 qt (U.S. liq.)) total		
Intake valve opening			0° BTDC		
Intake valve closing			50° ABDC		
Exhaust valve opening			50° BBDC		
Exhaust valve closing			0° ATDC		
Valve stem diameter	Intake	New	5.961 mm to 5.975 mm (.2347 in to .2352 in)		
		Wear limit	5.930 mm (.233 in)		
	Exhaust	New	5.946 mm to 5.960 mm (.2341 in to .2346 in)		
		Wear limit	5.930 mm (.233 in)		
Valve guide diameter		New	5.994 mm to 6.018 mm (.236 in to .2369 in)		
		Wear limit	6.060 mm (.2386 in)		
Valve spring free length	Inner	New	41.02 mm (1.615 in)		
		Wear limit	38.80 mm (1.528 in)		
	Outer	New	45.45 mm (1.789 in)		
		Wear limit	43.00 mm (1.693 in)		
Valve seat contact width	Intake	New	1.10 mm to 1.30 mm (.043 in to .051 in)		
		Wear limit	1.60 mm (.063 in)		
	Exhaust	New	1.25 mm to 1.55 mm (.049 in to .061 in)		
		Wear limit	1.80 mm (.071 in)		
Rocker arm inner diameter		New	20.007 mm to 20.020 mm (.7877 in to .7882 in)		
		Wear limit	20.050 mm (.7894 in)		
Rocker arm shaft diameter		New	19.980 mm to 19.993 mm (.7866 in to .7871 in)		
		Wear limit	19.970 mm (.7862 in)		
Cylinder head maximum warpage		Service limit	0.15 mm (.006 in)		

MODEL			RXT 260	RXT-X 260	RXT-X 260 aS/ RXT iS 260
ENGINE (cont'd)					
Piston ring type		1st	Upper compression ring, rectangular		
		2nd	Lower compression ring, tapered face		
		3rd	Oil scraper ring		
Ring end gap	Rectangular	New	0.30 mm to 0.50 mm (.012 in to .02 in)		
	Taper-face	New	0.35 mm to 0.55 mm (.014 in to .02 in)		
	Oil scraper ring	New	0.35 mm to 0.50 mm (.014 in to .02 in)		
	All	Wear limit	1.50 mm (.059 in)		
Ring/piston groove clearance	Rectangular	New	0.025 mm to 0.070 mm (.001 in to .003 in)		
	Taper-face	New	0.015 mm to 0.06 mm (.0006 in to .0024 in)		
	Oil scraper ring	New	0.020 mm to 0.055 mm (.001 in to .002 in)		
	All	Wear limit	0.15 mm (.006 in)		
Piston/cylinder wall clearance		New	0.04 mm to 0.08 mm (.0016 in to .0031 in)		
		Wear limit	0.100 mm (.0039 in)		
Cylinder taper		Wear limit	0.100 mm (.0039 in)		
Cylinder out of round (maximum)			0.015 mm (.0006 in)		
Camshaft bearing journal diameter	Front	New	24.939 mm to 24.960 mm (.9819 in to .9827 in)		
		Wear limit	24.910 mm (.9807 in)		
	PTO and center	New	39.892 mm to 39.905 mm (1.5706 in to 1.5711 in)		
		Wear limit	39.880 mm (1.5701 in)		
Camshaft bearing inner diameter	Front	New	25.000 mm to 25.013 mm (.9843 in to .9848 in)		
		Wear limit	25.050 mm (.9862 in)		
	PTO and center	New	40.000 mm to 40.020 mm (1.5748 in to 1.5756 in)		
		Wear limit	40.050 mm (1.5768 in)		
Cam lobe height	Intake	New	31.540 mm to 31.740 mm (1.2417 in to 1.2496 in)		
		Wear limit	31.50 mm (1.2402 in)		
	Exhaust	New	31.430 mm to 31.630 mm (1.2374 in to 1.2453 in)		
		Wear limit	31.380 mm (1.2354 in)		
Crankshaft deflection		Maximum	0.05 mm (.002 in)		
Crankshaft axial clearance		New	0.080 mm to 0.220 mm (.0031 in to .0087 in)		
		Wear limit	0.35 mm (.014 in)		
Crankshaft bearing journal diameter		New	49.991 mm to 50.000 mm (1.9681 in to 1.9685 in)		
		Wear limit	49.950 mm (1.9665 in)		
Crankshaft radial clearance		Wear limit	0.07 mm (.0028 in)		
Connecting rod big end diameter		Service limit	45.080 mm (1.7748 in)		
Connecting rod big end radial play		Service limit	0.090 mm (.0035 in)		
Connecting rod big end axial play		New	0.100 mm to 0.352 mm (.004 in to .014 in)		
		Wear limit	0.500 mm (.0197 in)		

MODEL		RXT 260	RXT-X 260	RXT-X 260 aS/ RXT iS 260
ENGINE (cont'd)				
Connecting rod small end diameter	New	23.010 mm to 23.020 mm (.9059 in to .9063 in)		
	Wear limit	23.070 mm (.9083 in)		
Connecting rod small end radial play	Wear limit	0.080 mm (.0031 in)		
Piston pin diameter	New	22.996 mm to 23.000 mm (.9054 in to .9055 in)		
	Wear limit	22.990 mm (.9051 in)		
Balance shaft journal diameter	New	31.984 mm to 32.000 mm (1.2592 in to 1.2598 in)		
	Wear limit	31.950 mm (1.2579 in)		
Balance shaft radial clearance	Wear limit	0.070 mm (.0028 in)		
Balance shaft axial clearance	New	0.020 mm to 0.250 mm (.0008 in to .0098 in)		
Supercharger shaft driven plate journal depth	New	14.460 mm to 14.500 mm (.5693 in to .5709 in)		
	Wear limit	14.600 mm (.5748 in)		
Supercharger drive gear thickness	New	11.000 mm to 11.050 mm (.4331 in to .435 in)		
	Wear limit	10.900 mm (.4291 in)		
Supercharger lock washer thickness	New	4.050 mm to 4.150 mm (.1594 in to .1634 in)		
	Wear limit	3.950 mm (.1555 in)		
Supercharger spring washer package height (not compressed)	New	10.900 mm to 10.700 mm (.4291 in to .4213 in)		
	Wear limit	10.200 mm (.4016 in)		
AIR INTAKE SYSTEM				
Intake spark arrester		Tubular, wire screen		
COOLING SYSTEM				
Type		Closed loop cooling system		
Coolant		Ethylene-glycol and distilled water (50%/50%). Use premix coolant from BRP or a coolant specially formulated for aluminum engines		
Cooling system capacity		5.5 L (5.8 qt (U.S. liq.)) total		
Thermostat		87°C (189°F)		
Monitoring beeper setting		100°C (212°F)		
EXHAUST SYSTEM				
Type		D-Sea-Bel sound reduction system. Water cooled/water injected (open loop). Direct flow from jet pump		
Water injection in muffler		3 x 3.5 mm (.138 in) on exhaust pipe and 1 x 3.5 mm (.138 in) on muffler		
FUEL SYSTEM				
Fuel injection type		Multipoint fuel injection with iTC (intelligent Throttle Control). Single throttle body (62 mm) with an actuator		
Fuel pressure		386 kPa to 414 kPa (56 PSI to 60 PSI)		
Fuel injector	Quantity	3		
Fuel type	Inside North America ((RON + MON)/2)	91 or higher		
	Outside North America (RON)	95 or higher		
Fuel tank (including reserve)		60 L (16 U.S. gal.)		70 L (18 U.S. gal.)
Fuel tank reserve (from low level signal)		approx. 12 L (3.2 U.S. gal.)		approx. 14 L (3.7 U.S. gal.)
Idle speed		1800 ± 50 RPM (not adjustable)		

MODEL		RXT 260	RXT-X 260	RXT-X 260 aS/ RXT iS 260
ELECTRICAL SYSTEM				
Magneto generator output		360 W @ 6000 RPM		
Stator		0.1 to 1.0 Ω		
Battery		12 V, 30 A•h		
Anti-start system		D.E.S.S. (Digitally Encoded Security System) with selectable maximum vehicle speed settings for RK (rental key) and LK (learning key)		
Ignition system type		IDI (Inductive Discharge Ignition)		
Ignition timing		Variable (electronically controlled)		
Spark plug	Make and type	NGK DCPR8E		
	Gap	0.7 mm to 0.8 mm (.028 in to .031 in)		
Ignition coil	Primary	0.85 to 1.15 Ω		
	Secondary	9.5 to 13.5 KΩ		
Engine speed limiter setting		8300 RPM		
ELECTRICAL SYSTEM				
Fuse box	#1: iBR control	5 A		
	#2: Diagnostic connector	15 A		
	#3: START/STOP	3 A		
	#4: Gauge constant power	3 A		
	#5: iBR power	30 A		
	#6: Voltage rectifier/regulator	30 A		
	#7: iS power	30 A		
	#8: Fuses 2, 3, 4 and relay	30 A		
	#11: Depth sounder	3 A		
	#12 O.T.A.S., Gauge start up, CAPS	3 A		
	#13: Inj/Ign cyl 1	10 A		
	#14: Inj/Ign cyl 2	10 A		
	#15: Inj/Ign cyl 3	10 A		
	#16: Starter solenoid	5 A		
	#17: iBR control	5 A		
	#18: Fuel pump	10 A		
	#19: ECM power	15 A		

MODEL		RXT 260	RXT-X 260	RXT-X 260 aS/ RXT iS 260
STEERING AND PROPULSION				
Steering		Adjustable 4 positions	Steering: Adjustable 4 positions Handlebar: -0.0 mm to +25 mm	aS: Steering: Adjustable 4 positions. Handlebar: -0.0 mm to +25 mm. iS: Adjustable 4 positions
Steering nozzle pivoting angle		26°		
O.T.A.S. (Off-Throttle Assisted Steering)		Electronically-controlled. Achieved with the iBR gate and engine speed		
Jet pump	Type	Axial flow single stage		
	Grease type	Jet pump bearing grease (P/N 293 550 032)		
Impeller	Rotation (seen from rear)	Counterclockwise		
	Pitch	RXT: 10°/21°	14°/25°	
	Outside diameter	159 mm ± 0.06 mm (6.26 in ± .002 in)		
Impeller/wear ring clearance	New	0 mm to 0.23 mm (0 in to .009 in)		
	Wear limit	0.35 mm (.0138 in)		
Impeller shaft	End play (new)	0		
	Side play	0		
Drive shaft	Coupling type	Crowned splines, direct drive		
	Deflection (max.)	0.5 mm (.02 in)		
Minimum required water level for propulsion system		90 cm (3 ft) underneath the lowest rear portion of hull		
iBR and VTS				
Description		Intelligent Brake and Reverse activated by a LH lever. Electronically-controlled iBR gate to provide brake, reverse, neutral and forward position		
Gate angle (from horizontal line of watercraft)	Forward	Approx. from +8° to -4°		
	Neutral	Approx. -52°		
	Braking	Approx. -70°		
	Reverse	Approx. from -52° to -70°		
VTS system		Electronically-controlled through the VTS control button with 2 preset positions		
VTS range angle		8° up, -4° down		
Actuator		12 V, 80 A max. capacity. Reversible PWM (pulse-width modulation) motor		
WEIGHT AND LOADING CAPACITY				
Dry weight		383 kg (845 lb)	RXT-X: 388 kg (855 lb)	aS: 436 kg (961 lb) iS: 441 kg (970 lb)
Number of passenger (driver incl.)		3		
Load limit (passenger and 10 kg (22 lb) luggage)		272 kg (600 lb)		226 kg (500 lb)
DIMENSIONS				
Overall length		354 cm (139 in)		
Overall width		122 cm (48 in)		
Overall height		116.6 cm (45.91 in)	118 cm (46.5 in)	111.4 cm (43.9 in)
Overall height with keel horizontal, suspension extended		N.A.		128 cm (50 in)
Overall height with keel horizontal, suspension collapsed		N.A.		115.8 cm (45.6 in)

MODEL	RXT 260	RXT-X 260	RXT-X 260 aS/ RXT iS 260
MATERIALS			
Hull	Composite fiberglass		
Inlet grate	Aluminum		
Steering cover	Thermoplastic		
Impeller material	Stainless steel		
Impeller housing/stator	Aluminum/aluminum		
Venturi	Aluminum		
Nozzle	Aluminum		
Fuel tank	Polyethylene		
Seat	Polyurethane/foam		
N.A.: Not Available			

WAKE PRO 215

MODEL			WAKE PRO 215
ENGINE			
Engine type			ROTAX® 1503 4-TEC™, 4-stroke, Single Over Head Camshaft (SOHC)
Induction			Supercharged intercooled
Number of cylinders			3
Number of valves			12 valves with hydraulic lifters (no adjustment)
Bore		Standard	100 mm (3.9 in)
		1st Oversize	100.25 mm (3.95 in)
Stroke			63.4 mm (2.5 in)
Displacement			1 493.8 cm³ (91 in³)
Compression ratio			8.4:1
Maximum RPM			8000 RPM
Lubrication		Type	Dry sump (2 oil pumps). Replaceable oil filter. Water-cooled oil cooler
		Oil type	XPS synthetic blend oil (summer grade) (P/N 293 600 121). Refer to *LUBRICATION SYSTEM* subsection
		Capacity	3 L (3.2 qt (U.S. liq.)) oil change w/filter 4.5 L (4.8 qt (U.S. liq.)) total
Intake valve opening			0° BTDC
Intake valve closing			50° ABDC
Exhaust valve opening			50° BBDC
Exhaust valve closing			0° ATDC
Valve stem diameter	Intake	New	5.961 mm to 5.975 mm (.2347 in to .2352 in)
		Wear limit	5.930 mm (.233 in)
	Exhaust	New	5.946 mm to 5.960 mm (.2341 in to .2346 in)
		Wear limit	5.930 mm (.233 in)
Valve guide diameter		New	5.994 mm to 6.018 mm (.236 in to .2369 in)
		Wear limit	6.060 mm (.2386 in)
Valve spring free length	Inner	New	41.02 mm (1.615 in)
		Wear limit	38.80 mm (1.528 in)
	Outer	New	45.45 mm (1.789 in)
		Wear limit	43.00 mm (1.693 in)
Valve seat contact width	Intake	New	1.10 mm to 1.30 mm (.043 in to .051 in)
		Wear limit	1.60 mm (.063 in)
	Exhaust	New	1.25 mm to 1.55 mm (.049 in to .061 in)
		Wear limit	1.80 mm (.071 in)
Rocker arm inner diameter		New	20.007 mm to 20.020 mm (.7877 in to .7882 in)
		Wear limit	20.050 mm (.7894 in)
Rocker arm shaft diameter		New	19.980 mm to 19.993 mm (.7866 in to .7871 in)
		Wear limit	19.970 mm (.7862 in)
Cylinder head maximum warpage		Service limit	0.15 mm (.006 in)

MODEL			WAKE PRO 215
ENGINE (cont'd)			
Piston ring type		1st	Upper compression ring, rectangular
		2nd	Lower compression ring, tapered face
		3rd	Oil scraper ring
Ring end gap	Rectangular	New	0.30 mm to 0.50 mm (.012 in to .02 in)
	Taper-face	New	0.35 mm to 0.55 mm (.014 in to .022 in)
	Oil scraper ring	New	0.35 mm to 0.50 mm (.014 in to .02 in)
	All	Wear limit	1.50 mm (.059 in)
Ring/piston groove clearance	Rectangular	New	0.025 mm to 0.070 mm (.001 in to .003 in)
	Taper-face	New	0.015 mm to 0.06 mm (.0006 in to .0024 in)
	Oil scraper ring	New	0.020 mm to 0.055 mm (.001 in to .002 in)
	All	Wear limit	0.15 mm (.006 in)
Piston/cylinder wall clearance		New	0.04 mm to 0.08 mm (.0016 in to .0031 in)
		Wear limit	0.100 mm (.0039 in)
Cylinder taper		Wear limit	0.100 mm (.0039 in)
Cylinder out of round (maximum)			0.015 mm (.0006 in)
Camshaft bearing journal diameter	Front	New	24.939 mm to 24.960 mm (.9819 in to .9827 in)
		Wear limit	24.910 mm (.9807 in)
	PTO and center	New	39.892 mm to 39.905 mm (1.5706 in to 1.5711 in)
		Wear limit	39.880 mm (1.5701 in)
Camshaft bearing inner diameter	Front	New	25.000 mm to 25.013 mm (.9843 in to .9848 in)
		Wear limit	25.050 mm (.9862 in)
	PTO and center	New	40.000 mm to 40.020 mm (1.5748 in to 1.5756 in)
		Wear limit	40.050 mm (1.5768 in)
Cam lobe height	Intake	New	31.540 mm to 31.740 mm (1.2417 in to 1.2496 in)
		Wear limit	31.50 mm (1.2402 in)
	Exhaust	New	31.430 mm to 31.630 mm (1.2374 in to 1.2453 in)
		Wear limit	31.380 mm (1.2354 in)
Crankshaft deflection		Maximum	0.05 mm (.002 in)
Crankshaft axial clearance		New	0.080 mm to 0.220 mm (.0031 in to .0087 in)
		Wear limit	0.35 mm (.014 in)
Crankshaft bearing journal diameter		New	49.991 mm to 50.000 mm (1.9681 in to 1.9685 in)
		Wear limit	49.950 mm (1.9665 in)
Crankshaft radial clearance		Wear limit	0.07 mm (.0028 in)
Connecting rod big end diameter		Service limit	45.080 mm (1.7748 in)
Connecting rod big end radial play		Service limit	0.090 mm (.0035 in)
Connecting rod big end axial play		New	0.100 mm - 0.352 mm (.004 in - .014 in)
		Wear limit	0.500 mm (.0197 in)
Connecting rod small end diameter		New	23.010 mm to 23.020 mm (.9059 in to .9063 in)
		Wear limit	23.070 mm (.9083 in)

MODEL			WAKE PRO 215
ENGINE (cont'd)			
Connecting rod small end radial play		Wear limit	0.080 mm (.0031 in)
Piston pin diameter		New	22.996 mm to 23.000 mm (.9054 in to .9055 in)
		Wear limit	22.990 mm (.9051 in)
Balance shaft journal diameter		New	31.984 mm to 32.000 mm (1.2592 in to 1.2598 in)
		Wear limit	31.950 mm (1.2579 in)
Balance shaft radial clearance		Wear limit	0.070 mm (.0028 in)
Balance shaft axial clearance		New	0.020 mm to 0.250 mm (.0008 in to .0098 in)
Supercharger shaft driven plate journal depth		New	14.460 mm to 14.500 mm (.5693 in to .5709 in)
		Wear limit	14.600 mm (.5748 in)
Supercharger drive gear thickness		New	11.000 mm to 11.050 mm (.4331 in to .435 in)
		Wear limit	10.900 mm (.4291 in)
Supercharger lock washer thickness		New	4.050 mm to 4.150 mm (.1594 in to .1634 in)
		Wear limit	3.950 mm (.1555 in)
Supercharger spring washer package height (not compressed)		New	10.900 mm to 10.700 mm (.4291 in to .4213 in)
		Wear limit	10.200 mm (.4016 in)
AIR INTAKE SYSTEM			
Intake spark arrester			Tubular, wire screen
COOLING SYSTEM			
Type			Closed loop cooling system
Coolant			Ethylene-glycol and distilled water (50%/50%). Use premix coolant from BRP or a coolant specially formulated for aluminum engines
Cooling system capacity			5.5 L (5.8 qt (U.S. liq.)) total
Thermostat			87°C (189°F)
Monitoring beeper setting			100°C (212°F)
EXHAUST SYSTEM			
Type			D-Sea-Bel sound reduction system. Water cooled/water injected (open loop). Direct flow from jet pump
Water injection in muffler			3 x 3.5 mm (.138 in) on exhaust pipe and 1 x 3.5 mm (.138 in) on muffler
FUEL SYSTEM			
Fuel injection type			Multipoint fuel injection with iTC (intelligent Throttle Control). Single throttle body (62 mm) with an actuator
Fuel pressure			386 kPa to 414 kPa (56 PSI to 60 PSI)
Fuel injector		Quantity	3
Fuel type	Inside North America ((RON + MON)/2)		91 or higher
	Outside North America (RON)		95 or higher
Fuel tank (including reserve)			70 L (18 U.S. gal.)
Fuel tank reserve (from low level signal)			approx. 14 L (3.7 U.S. gal.)
Idle speed			1800 ± 50 RPM (not adjustable)

MODEL			WAKE PRO 215
ELECTRICAL SYSTEM			
Magneto generator output			360 W @ 6000 RPM
Stator			0.1 to 1.0 Ω
Battery			12 V, 30 A•h
Anti-start system			D.E.S.S. (Digitally Encoded Security System) with selectable maximum vehicle speed settings for RK (rental key) and LK (learning key)
Ignition system type			IDI (Inductive Discharge Ignition)
Ignition timing			Variable (electronically controlled)
Spark plug		Make and type	NGK DCPR8E
		Gap	0.7 mm to 0.8 mm (.028 in to .031 in)
Ignition coil		Primary	0.85 to 1.15 Ω
		Secondary	9.5 to 13.5 KΩ
Engine speed limiter setting			8300 RPM
Fuse box #1	#1: Gauge		3 A
	#2: CAPS		3 A
	#3: Depth sounder		3 A
	#4: Starter solenoid		5 A
	#5: iBR control		5 A
	#6: Fuel pump		10 A
	#7: Inj/Ign cyl 1		10 A
	#8: Inj/Ign cyl 2		10 A
	#9: Inj/Ign cyl 3		10 A
	#10: O.T.A.S. switch		3 A
	#11: iS control		Empty
Fuse box #2	Relay		30 A
	#15: Charging system		30 A
	#16: iS power		Empty
	#17: Batt power		30 A
	#18: iBR power		30 A
	#20: ECM		15 A
	#21: START/STOP switch		3 A
	#22: Diag connector		15 A
	#23: GPS		3 A
STEERING AND PROPULSION			
Steering			Adjustable 4 positions
Steering nozzle pivoting angle			26°
O.T.A.S. (Off-Throttle Assisted Steering)			Electronically-controlled. Achieved with the iBR gate and engine speed
Jet pump		Type	Axial flow single stage
		Grease type	Jet pump bearing grease (P/N 293 550 032)
Impeller		Rotation (seen from rear)	Counterclockwise
		Pitch	10°/21°
		Outside diameter	159 mm ± 0.06 mm (6.26 in ± .002 in)

MODEL		WAKE PRO 215
STEERING AND PROPULSION (cont'd)		
Impeller/wear ring clearance	New	0 mm to 0.23 mm (0 in to .009 in)
	Wear limit	0.35 mm (.0138 in)
Impeller shaft	End play (new)	0
	Side play	0
Drive shaft	Coupling type	Crowned splines, direct drive
	Deflection (max.)	0.5 mm (.02 in)
Minimum required water level for propulsion system		90 cm (3 ft) underneath the lowest rear portion of hull
iBR and VTS		
Description		Intelligent Brake and Reverse activated by a LH lever. Electronically-controlled iBR gate to provide brake, reverse, neutral and forward position
Gate angle (from horizontal line of watercraft)	Forward	Approx. from +8° to -4°
	Neutral	Approx. -52°
	Braking	Approx. -70°
	Reverse	Approx. from -52° to -70°
VTS system		Electronically-controlled through the VTS control button
VTS range angle		8° up, -4° down
Actuator		12 V, 80 A max. capacity. Reversible PWM (pulse-width modulation) motor
WEIGHT AND LOADING CAPACITY		
Dry weight		388 kg (855 lb)
Number of passenger (driver incl.)		3
Load limit (passenger and 10 kg (22 lb) luggage)		272 kg (600 lb)
DIMENSIONS		
Overall length		354 cm (139 in)
Overall width		122 cm (48 in)
Overall height		116.6 cm (45.91 in)
MATERIALS		
Hull		Composite fiberglass
Inlet grate		Aluminum
Steering cover		Thermoplastic
Impeller material		Stainless steel
Impeller housing/stator		Aluminum/aluminum
Venturi		Aluminum
Nozzle		Aluminum
Fuel tank		Polyethylene
Seat		Polyurethane/foam

WIRING DIAGRAM INFORMATION

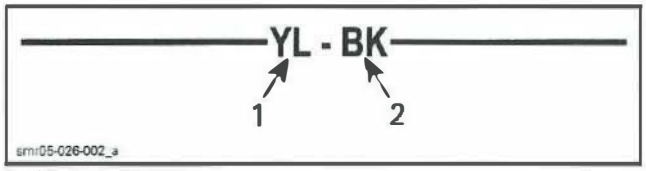
GENERAL

WIRING DIAGRAM LOCATION

The wiring diagrams are in the back cover pocket.

WIRING DIAGRAM CODES

Wire Color Codes



1. *Wire main color*
2. *Tracer (thin colored line)*

General Wire Color Use

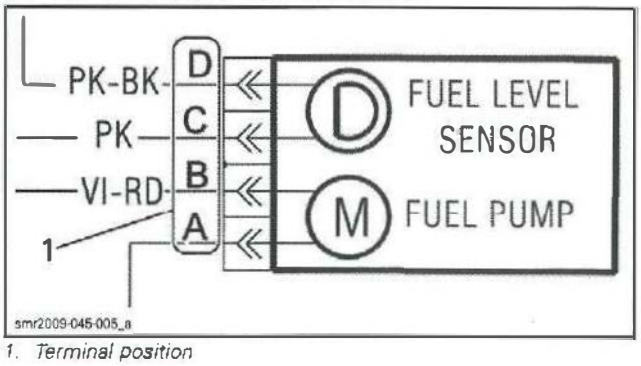
COLOR	USE
RED	Battery power (12 Vdc directly connected to battery)
RED + tracer	Fused 12 Vdc power or switched power from relay
VIOLET or VIOLET + tracer	Fused 12 Vdc power from fuse box
YELLOW	Alternating current (AC) from magneto
BLACK	Ground
BLACK + tracer	Switched ground (by ECM)
WHITE/RED WHITE/BLACK	CAN HI wires CAN LO wires

Color Codes

COLOR CODES			
CODE	COLOR	CODE	COLOR
BE	TAN	OR	ORANGE
BR	BROWN	PK	PINK
BU	BLUE	RD	RED
BK	BLACK	VI	VIOLET
GN	GREEN	WH	WHITE
GY	GRAY	YL	YELLOW

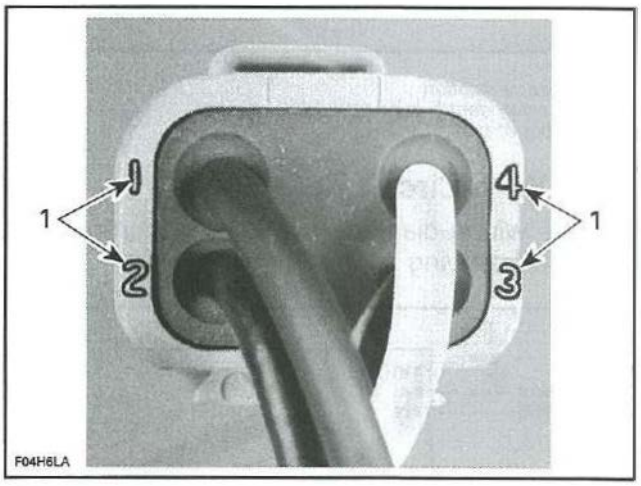
Terminal Identification on Connector

On the wiring diagram, a letter or a digit is used to identify the terminal position in a connector.



1. *Terminal position*

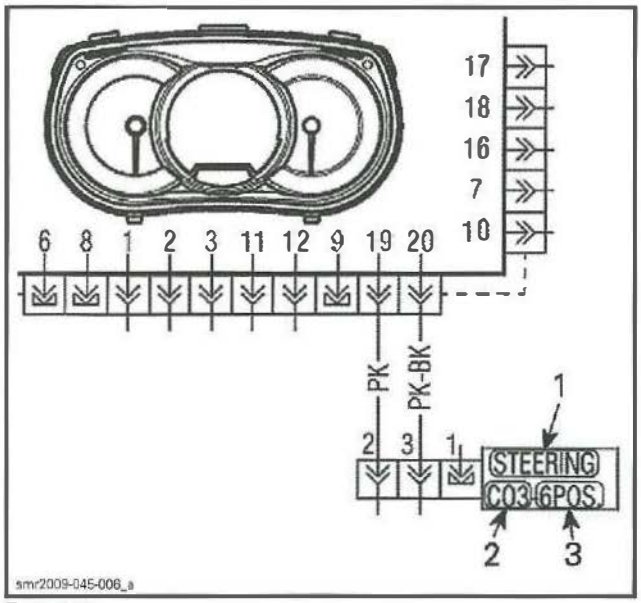
On a connector, a letter or a digit is usually molded on the connector to identify the terminal position.



TYPICAL
1. *Wire identification numbers*

Terminal Identification on a Wiring Diagram

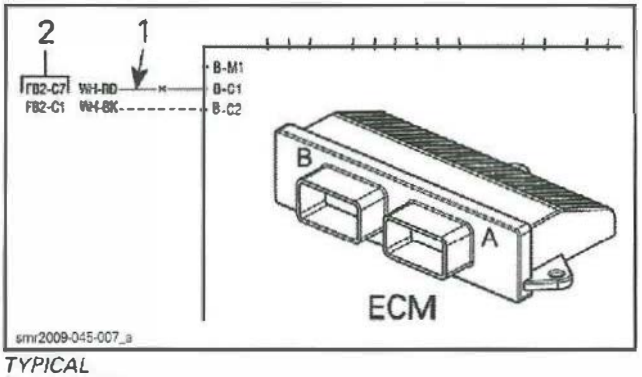
In-line connectors of wiring harnesses are identified on the wiring diagram with their approximate location and the following information.



TYPICAL
1. *Connector location*
2. *Connector identification (reference number)*
3. *Number of pins*

CAN Wire Circuit References

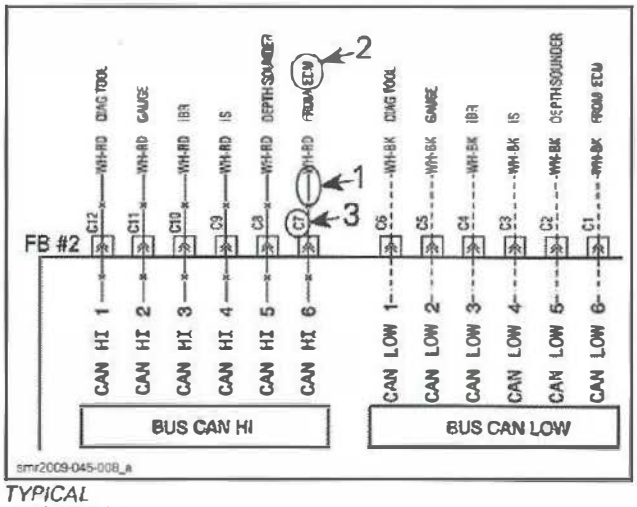
On the wiring diagram, CAN linked components use the following coding.



TYPICAL
1. *CAN wire*
2. *Wire destination*

FB2: Fuse box no. 2
C7: Terminal C7 in fuse box no. 2

On the wiring diagram, corresponding CAN links are identified at fuse box no. 2 using the following coding.



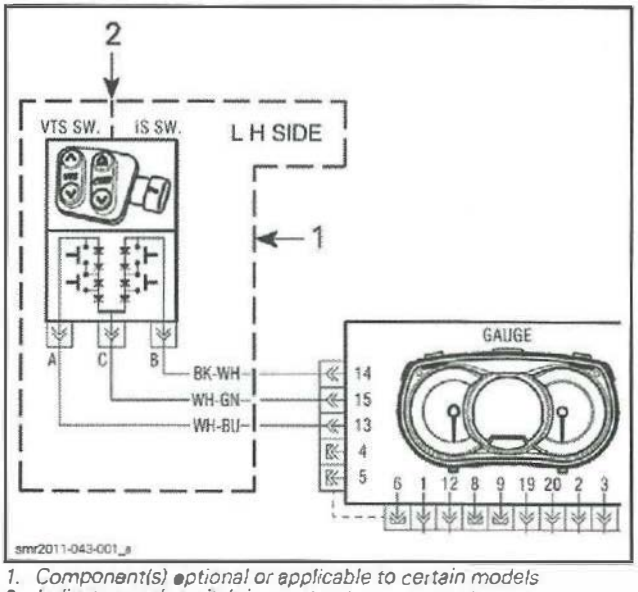
TYPICAL
1. *CAN wire*
2. *Wire origin*
3. *Destination terminal (as referenced at ECM)*

Fuse Box Terminal Reference

Refer to *POWER DISTRIBUTION AND GROUNDS* subsection.

Component Application

If a component in the wiring diagram is not applicable to every vehicle model, or can be installed as an option or accessory on certain models, the component shall be enclosed in a dash line.



1. *Component(s) optional or applicable to certain models*
2. *Indicates each switch is a separate component*

CONNECTOR INFORMATION

SERVICE TOOLS

Description	Part Number	Page
CRIMPING TOOL (HEAVY GAUGE WIRE)	529 035 730	751
DIAGNOSTIC HARNESS	529 036 188	746
ECM ADAPTER TOOL	529 036 166	741
ECM TERMINAL REMOVER 2.25	529 036 175	741
ECM TERMINAL REMOVER 3.36	529 036 174	741

SERVICE TOOLS – OTHER SUPPLIER

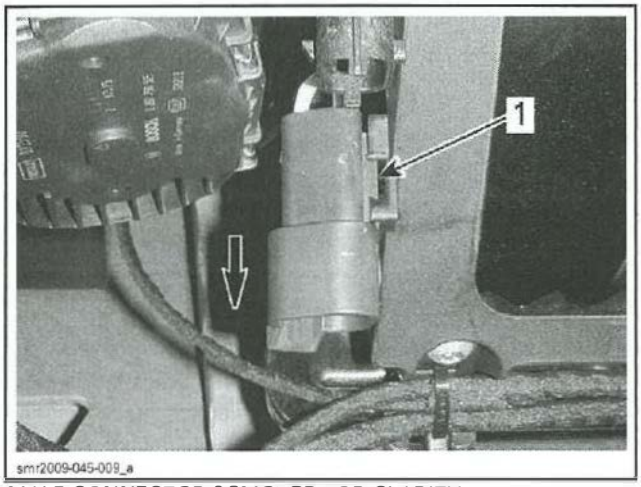
Description	Part Number	Page
AMP TERMINAL EXTRACTOR	726503-1	743
DELPHI TERMINAL EXTRACTOR	12094429	742, 745–748
FCI TERMINAL EXTRACTOR TOOL	54241678	746, 748
GM TERMINAL EXTRACTOR	12094430	743, 750

PROCEDURES

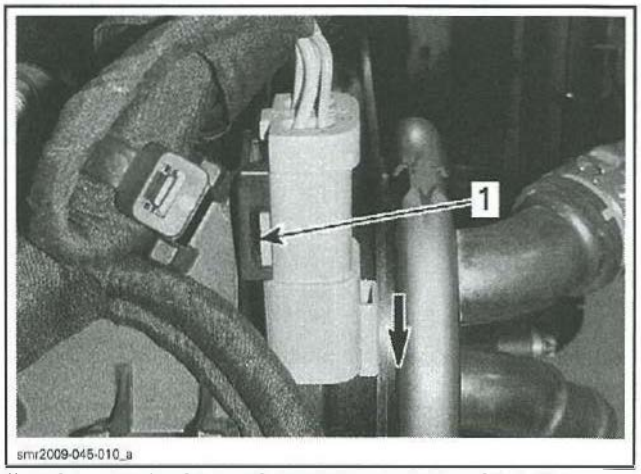
MAGNETO AND ENGINE CONNECTOR (DEUTSCH)

Connector Removal from its Support

1. Insert a small flat screwdriver between the support and the Deutsch connector.
2. Pry the connector away from the support slightly while sliding it out in the direction shown.



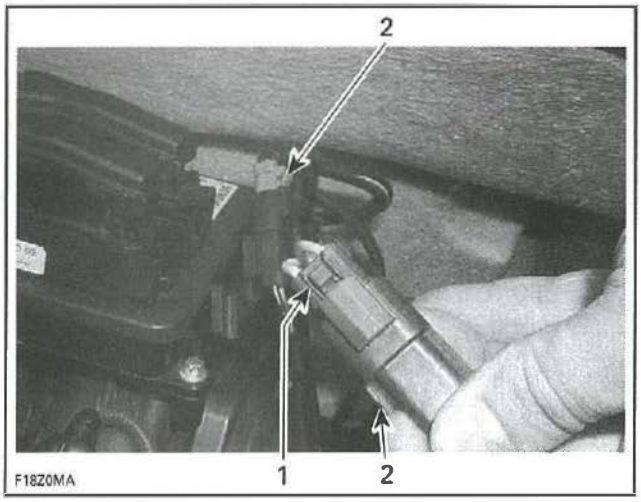
MALE CONNECTOR REMOVED FOR CLARITY
1. Insert screwdriver here



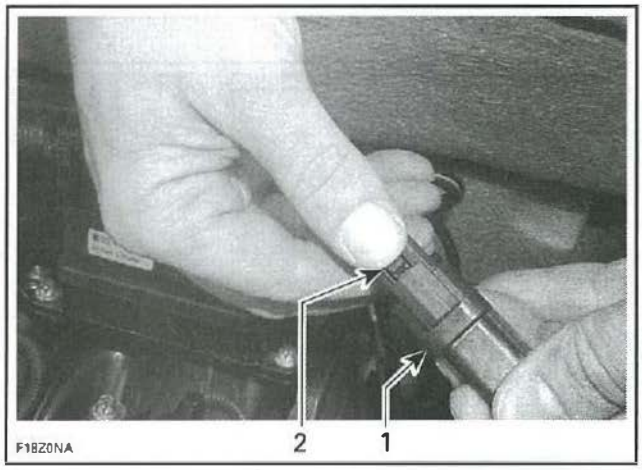
TYPICAL - MALE CONNECTOR REMOVED FOR CLARITY
1. Insert screwdriver here

Connector Disconnect

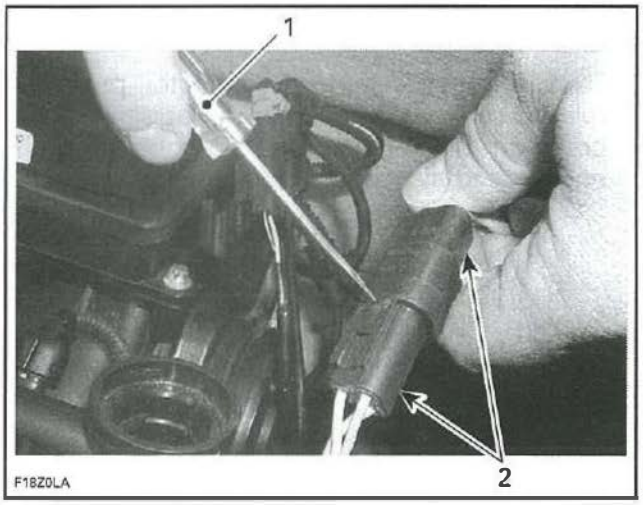
1. To disconnect a Deutsch connector, press the release tab and twist a small flat screwdriver between the male and female housing to disengage and disconnect them.



TYPICAL
1. *Release tab*
2. *Deutsch connector*

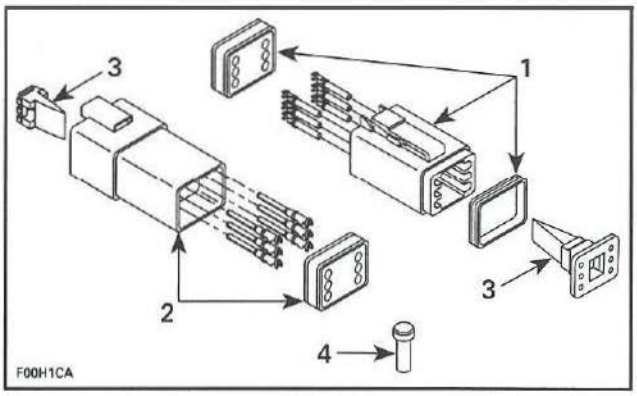


TYPICAL
1. *Deutsch connector*
2. *Press release button*



TYPICAL
1. *Flat screwdriver*
2. *Deutsch connector*

Connector Disassembly and Reassembly

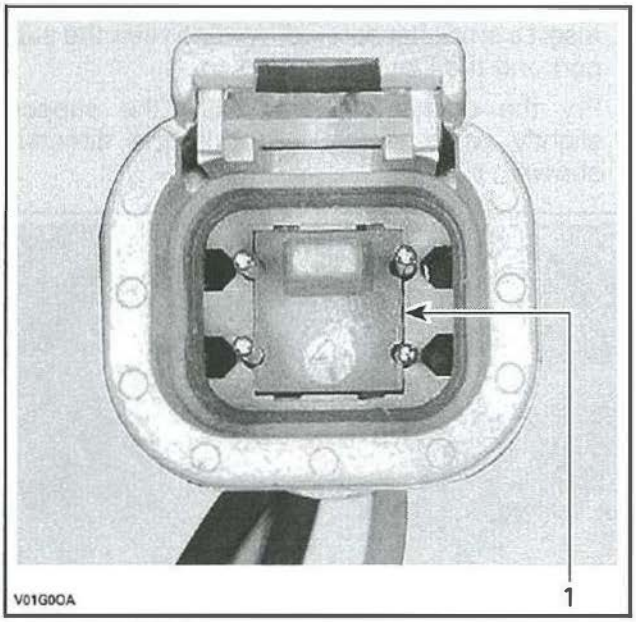


TYPICAL - DEUTSCH CONNECTOR
1. *Male connector*
2. *Female connector*
3. *Secondary lock*
4. *Sealing cap*

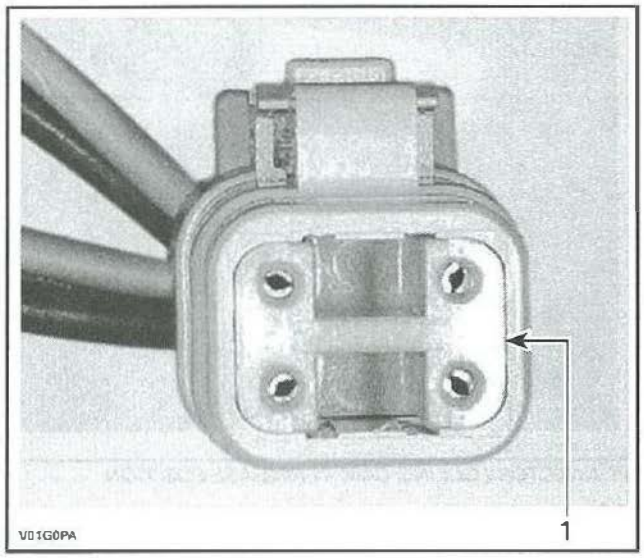
NOTICE **Do not apply dielectric grease on terminal inside connector.**

To remove terminals from connector, proceed as follows:

1. Using long nose pliers, pull out the plastic lock from between the terminals.



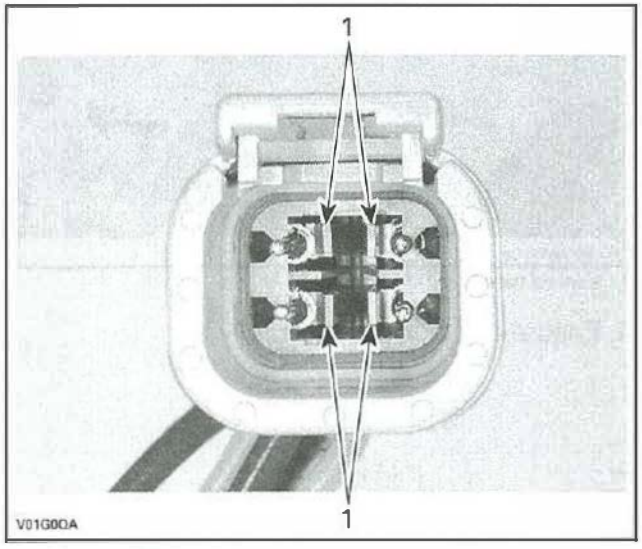
FEMALE CONNECTOR
1. *Female lock*



MALE CONNECTOR
1. Male lock

NOTE: Before pin extraction, push wire forward to relieve pressure on retaining tab.

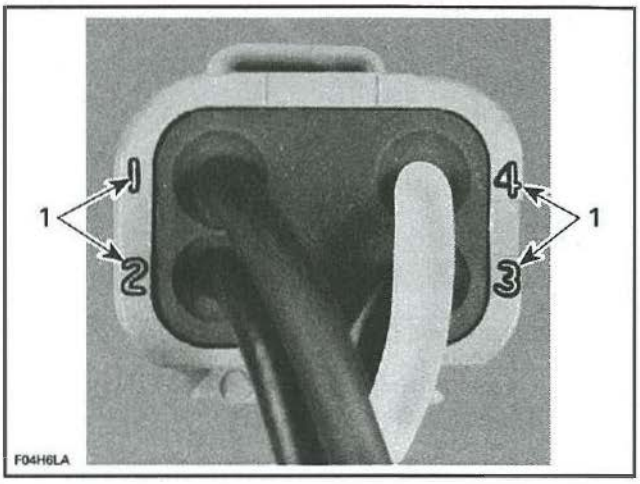
2. Insert a 4.8 mm (.189 in) wide screwdriver blade inside the front of the terminal cavity.
3. Pry the retaining tab away from the terminal while gently pulling the wire and terminal out of the back of the connector.



FEMALE CONNECTOR
1. Retaining tabs

To install:

1. For insertion of a terminal, ensure the plastic lock is removed.
2. Insert terminal through the back of the connector in the appropriate position, and push it in as far as it will go. You should feel or hear the terminal lock engage.
3. Pull back on the terminal wire to be sure the retention fingers are holding the terminal.
4. After all required terminals have been inserted, the lock must be installed.



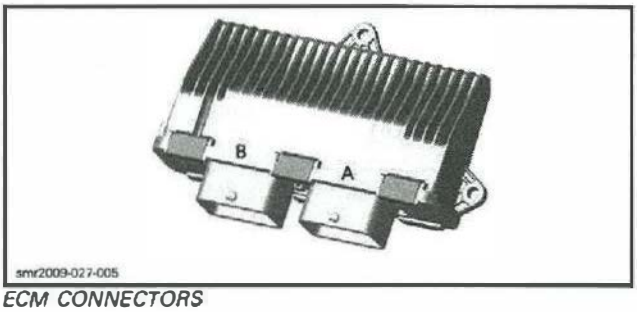
CONNECTOR PIN-OUT
1. Terminal position identification numbers

ECM CONNECTOR (MOLEX)

There are 2 connectors on the ECM.

The engine wiring harness connector is connected to ECM connector "A". The vehicle wiring harness connector is connected to ECM connector "B".

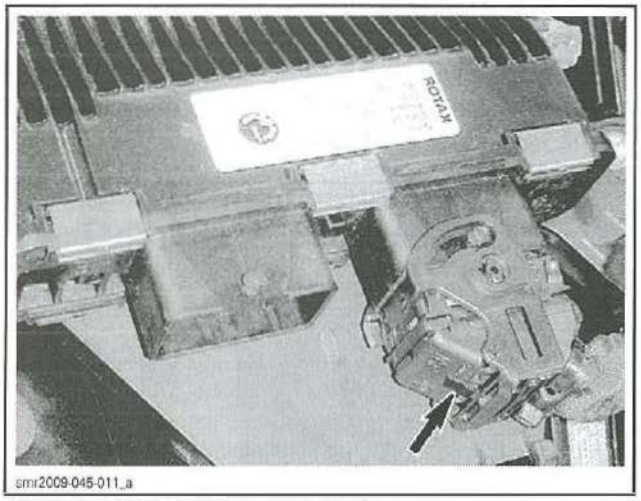
Each ECM connector has 48 pins.



ECM CONNECTORS

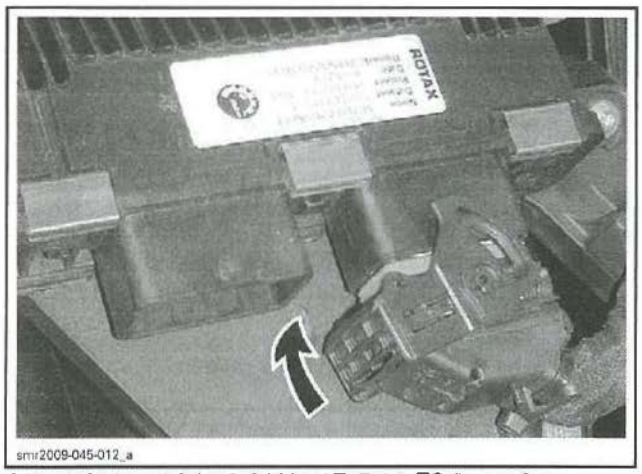
Connector Removal

1. To access the ECM, refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.
2. Press and hold the locking tab on the connector to be disconnected.



LOCKING TAB TO PRESS AND HOLD

3. As you hold the locking tab, rotate the connector locking cam until it stops.



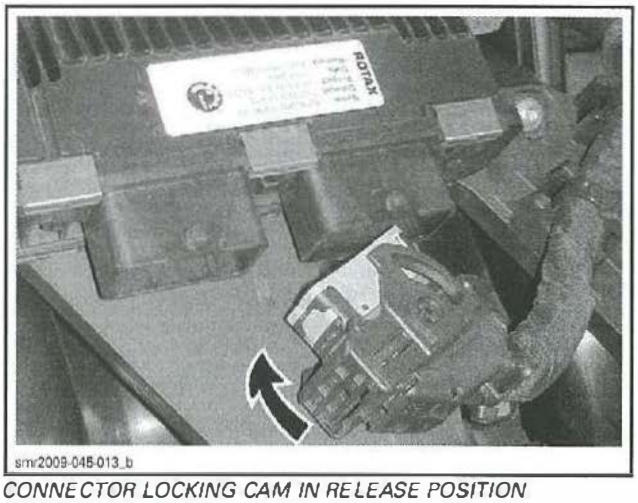
CONNECTOR LOCKING CAM ROTATION TO RELEASE

4. Pull connector off ECM.



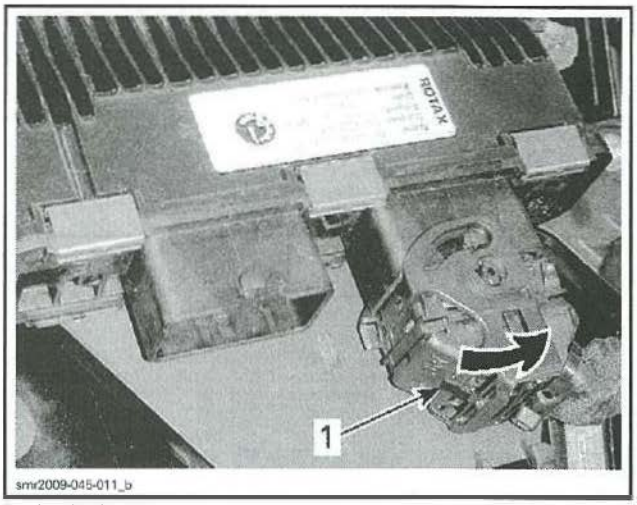
Connector Installation

1. Fully open connector locking cam.



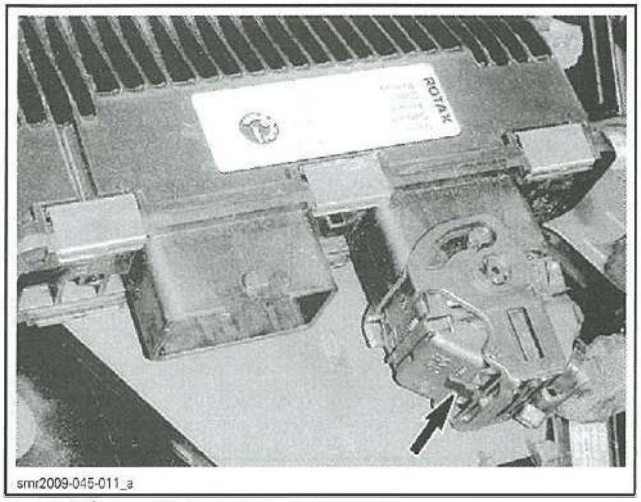
CONNECTOR LOCKING CAM IN RELEASE POSITION

2. Insert connector on ECM.
3. As you push the connector onto the ECM, rotate the connector locking cam until it snaps locked.



1. Locked here

4. Ensure the locking tab is fully out.



LOCKING TAB FULLY OUT

Connector Inspection

Before replacing an ECM, always check electrical connections.

1. Ensure connector locking mechanism is functioning properly.
2. Ensure all wire terminals (pins) are properly locked in the connector.
3. Ensure they are very tight, make good contact with the pins in the ECM.
4. Ensure the pins in the harness connector and the ECM connector are clean, shiny and corrosion-free.
5. Check wiring harness for signs of scoring.

NOTE: A "defective ECM module" could possibly be repaired simply by disconnecting and reconnecting it.

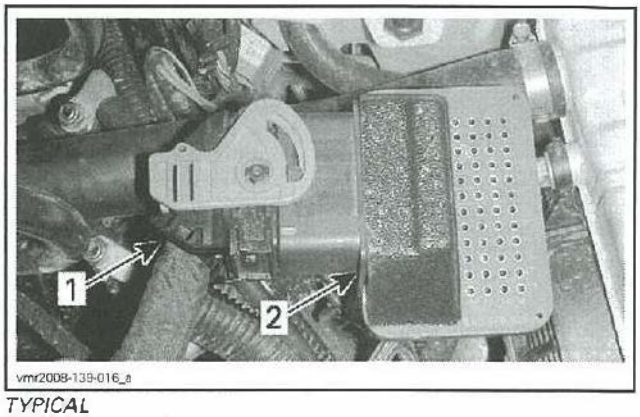
NOTICE **Do not apply any lubricant product to the pins of the ECM connector.**

Connector Probing

The most recommended and safest method to probe the MOLEX (ECM) connector terminals is to use the ECM ADAPTER TOOL (P/N 529 036 166). This tool will prevent deforming or enlarging of the terminals, which would lead to bad ECM terminal contact creating intermittent or permanent problems.



1. Disconnect the ECM connector to be probed, and reconnect it on the ECM adapter.
2. Probe wire terminals of the circuit to be tested directly in the adapter holes.



TYPICAL
1. ECM connector
2. ECM adapter

NOTICE **Never probe directly on the ECM harness connector. This could change the shape or enlarge the terminals and create intermittent or permanent contact problems.**

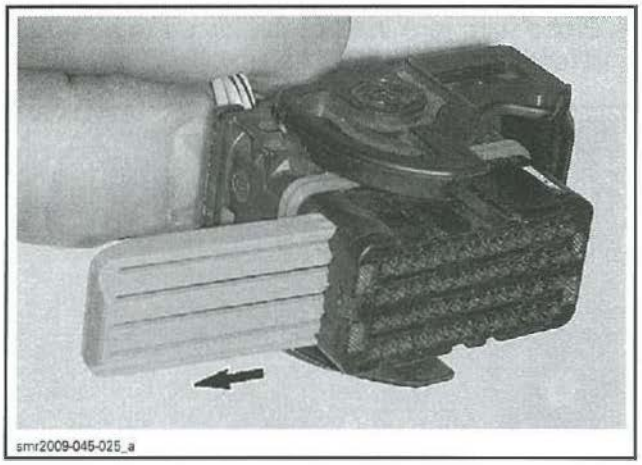
Connector Terminal Removal (Harness Connector)

To remove a signal terminal from the ECM harness connector, use the ECM TERMINAL REMOVER 2.25 (P/N 529 036 175).

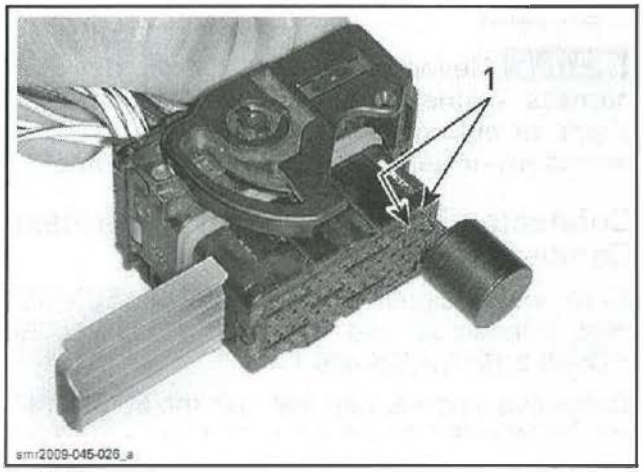
To remove a power terminal, use the ECM TERMINAL REMOVER 3.36 (P/N 529 036 174).



1. Remove rear protector from connector.
2. Pull out the connector lock.

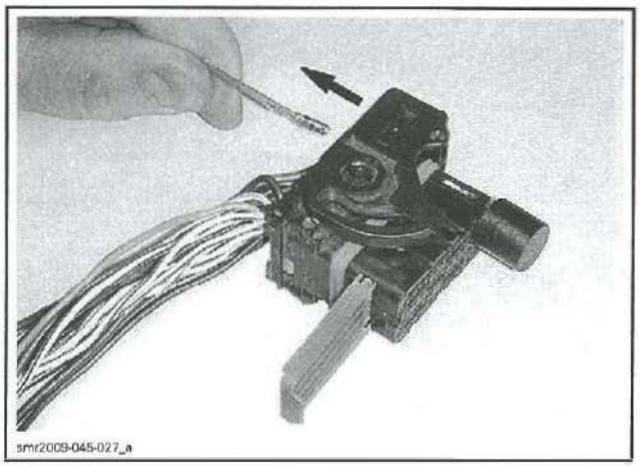


3. Insert tool to unlock terminal.



1. Unlock here

4. Gently pull on the wire to extract the terminal out the back of the connector.



NOTICE **Before installing wire terminals in the connector, ensure all terminals are properly crimped on wires. After installation of wire terminals in the connectors, ensure they are properly locked by gently pulling on them as if to extract them.**

BRLS, TAS AND STARTER SOLENOID CONNECTORS (DELPHI)

Connector Terminal Removal

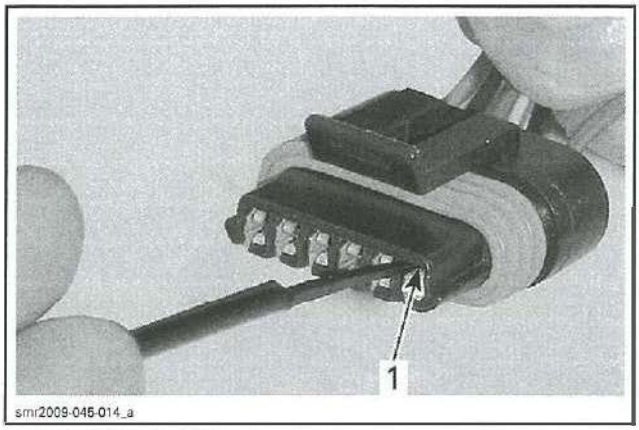
To remove a terminal (pin) from the connector, use a special tool such as the DELPHI TERMINAL EXTRACTOR (P/N 12094429).



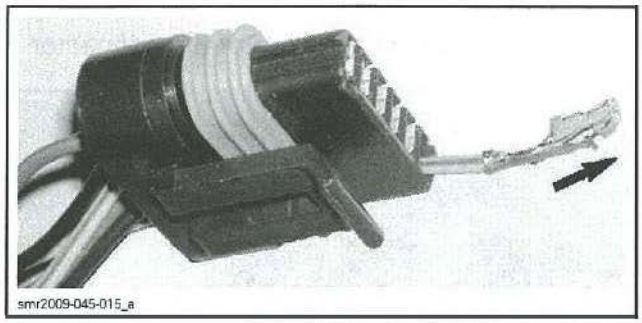
DELPHI TERMINAL EXTRACTOR (P/N 12094429)

NOTE: Grinding the tool end to a taper is required.

1. Carefully insert the tool in the space provided to release the pin lock.
2. Push the pin out the front of the connector by pushing on the wire.



1. Unlock terminal here



NOTICE Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pushing on them as if to extract them.

iBR AND iS POWER CONNECTORS (DELPHI)

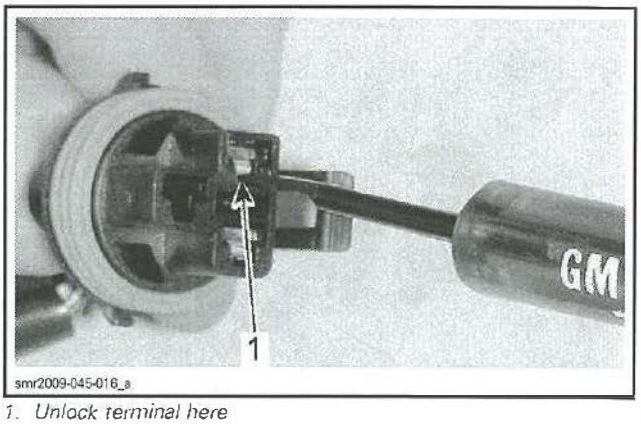
Connector Terminal Removal

To remove a terminal (pin) from the connector, use a special tool such as the GM TERMINAL EXTRACTOR (P/N 12094430).



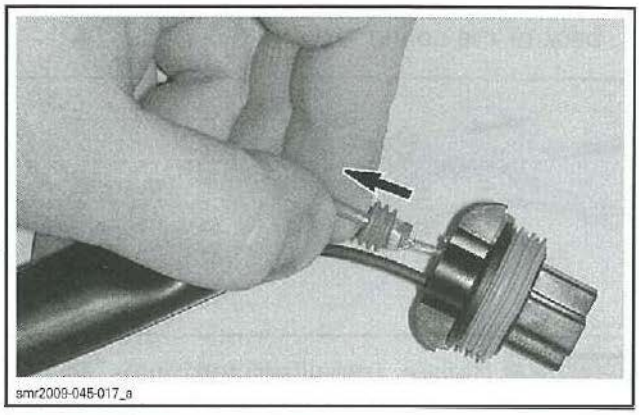
GM TERMINAL EXTRACTOR (P/N 12094430)

1. Carefully insert the tool in the space provided to release the pin lock.



1. Unlock terminal here

2. Gently pull on the wire to extract the pin out the back of the connector.



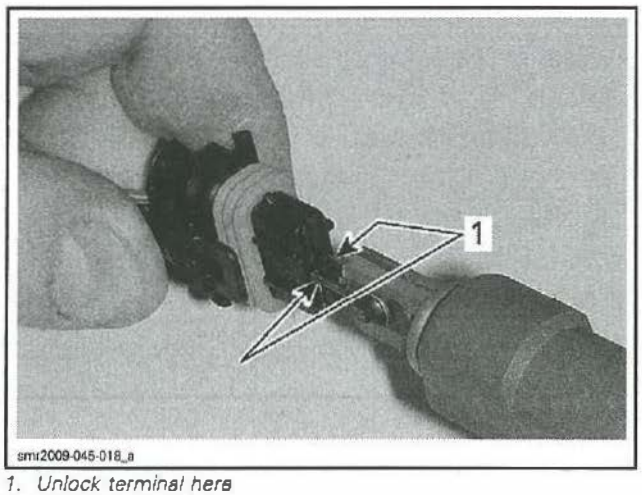
NOTICE Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pushing on them as if to extract them.

SPS CONNECTORS (BOSCH)

Connector Terminal Removal

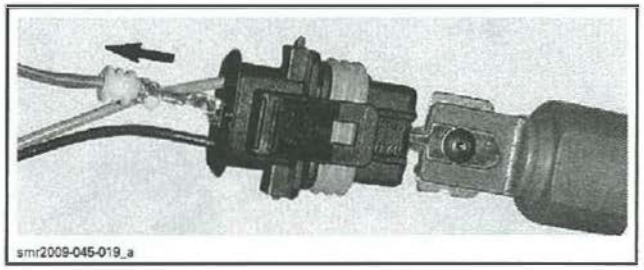
To remove a terminal (pin) from the connector, use a special tool such as the AMP TERMINAL EXTRACTOR (P/N 72650●3-1).

1. Carefully insert the tool in the space provided to release the pin lock.



1. Unlock terminal here

2. Gently pull on the wire to extract the pin out the back of the connector.

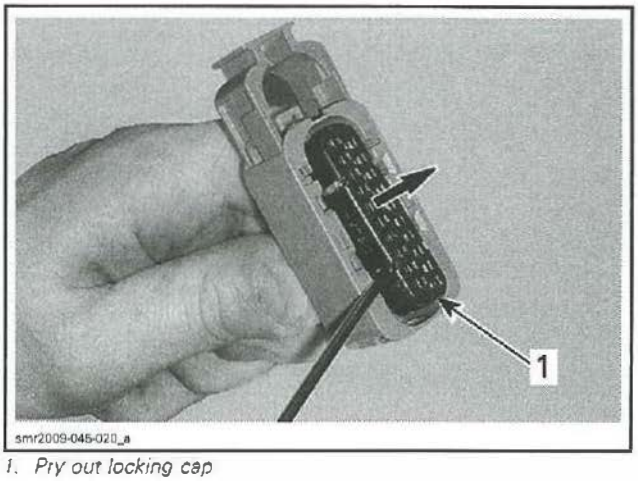


NOTICE Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pulling on them as if to extract them.

INFORMATION CENTER CONNECTOR (DELPHI)

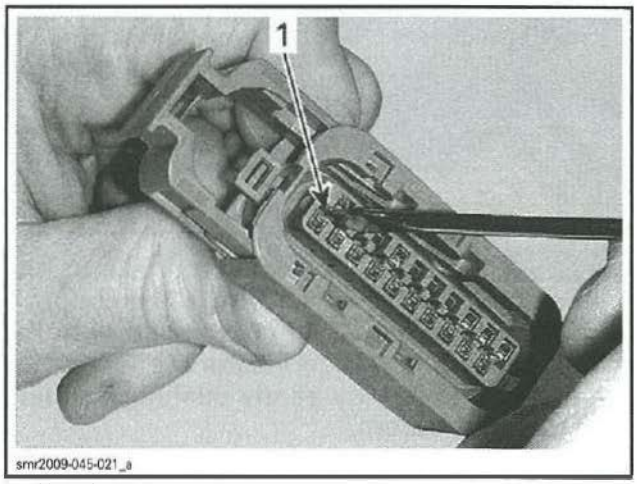
Connector Terminal Removal

1. To remove a terminal from the connector, first remove the locking cap in the front of the connector.



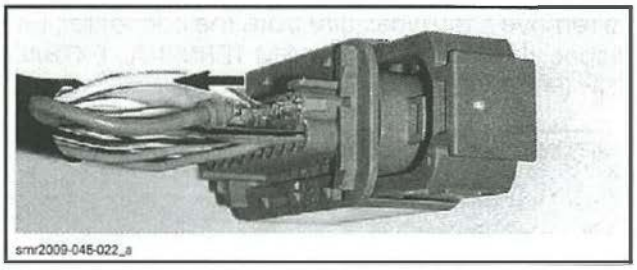
1. Pry out locking cap

2. Release the pin in the front of the connector.



1. Unlock here

3. Gently pull on the wire to extract the pin out the back of the connector.

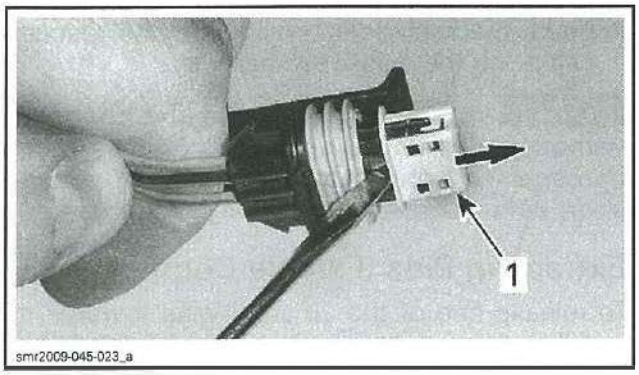


NOTICE Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pushing on them as if to extract them.

VTS, iS, MODE/SET AND UP/DOWN SWITCH CONNECTORS (DELPHI)

Terminal Removal

1. To remove a terminal from connector, first remove the locking cap.

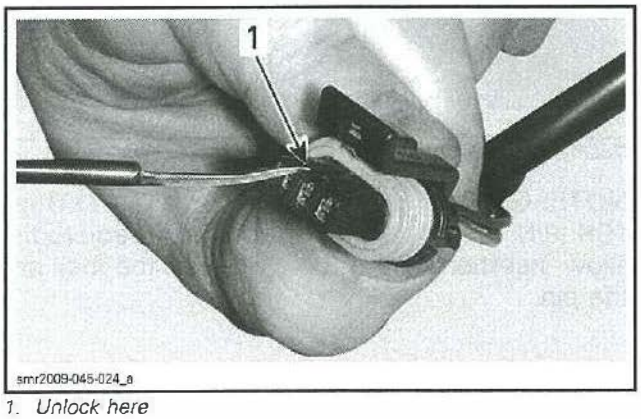


1. Pry out locking cap

2. Carefully insert the DELPHI TERMINAL EXTRACTOR (P/N 12094429) in the space provided to release the pin lock.

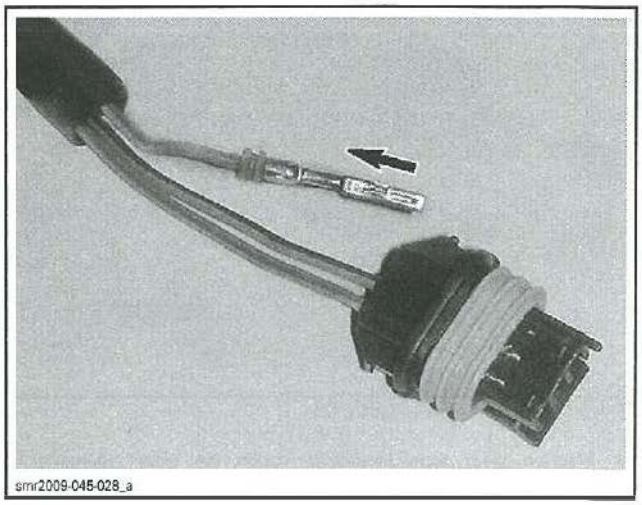


DELPHI TERMINAL EXTRACTOR (P/N 12094429)



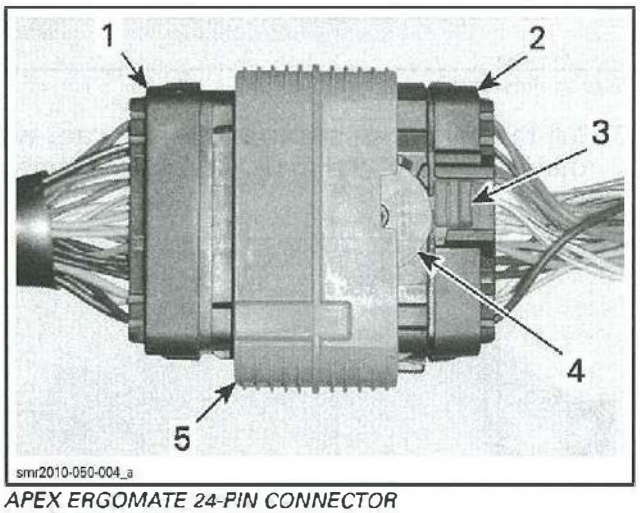
1. Unlock here

3. Gently pull on the wire to extract the pin out the back of the connector.



NOTICE Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pushing on them as if to extract them.

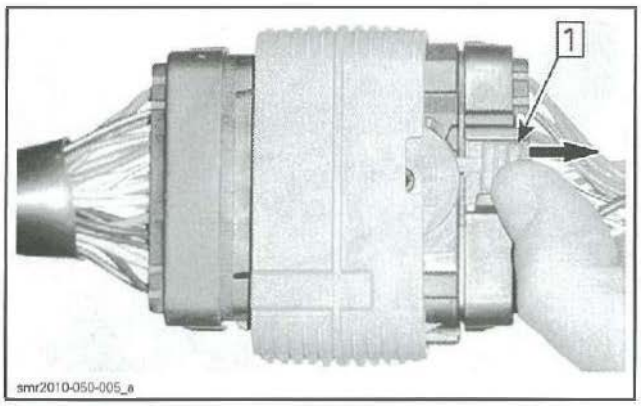
24 PIN STEERING CONNECTOR (APEX ERGOMATE)



APEX ERGOMATE 24-PIN CONNECTOR
1. Male connector
2. Female connector
3. Safety lock
4. Locking cam
5. Connector sleeve

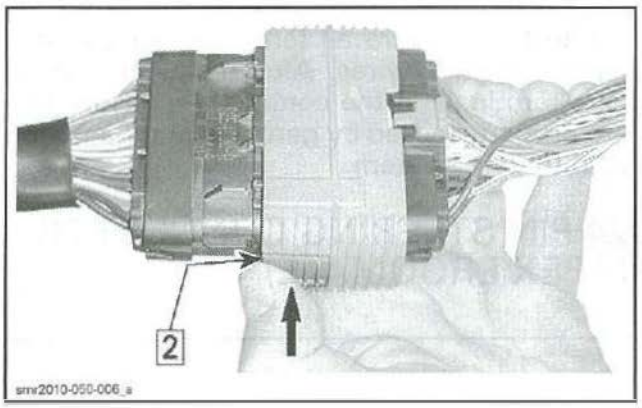
Connector Disconnect

1. Pull the red safety lock out of the locking cam.



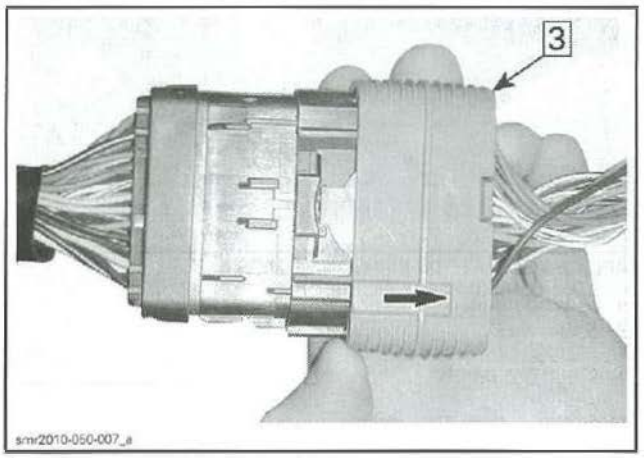
Step 1: Pull RED safety lock back

2. Press the tab on the side of the connector sleeve.



Step 2: Press tab

3. Pull the connector sleeve back. The cam will rotate and unlock the male and female connectors.

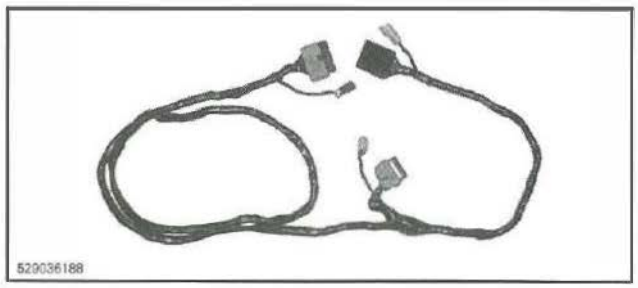


Step 3: Pull connector sleeve back

4. Pull the connectors apart.

Connector Probing

1. Disconnect the APEX ERGOMATE connector in the vehicle and connect it to the DIAGNOSTIC HARNESS (P/N 529 036 188).

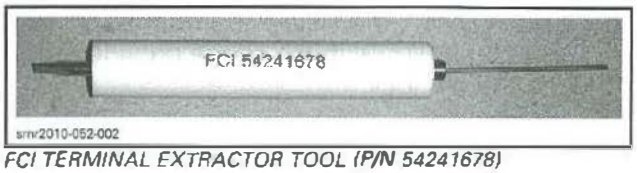


2. Probe the applicable circuit using the test connector on the diagnostic harness.

NOTICE **Attempting to probe the connector without using the diagnostic connector may damage the connector pins, or even cause a short circuit if testing an energized circuit.**

Extracting Pins (Female Connector)

To release one of the 16 small pins towards the middle part of the connector, use the FCI TERMINAL EXTRACTOR TOOL (P/N 54241678).



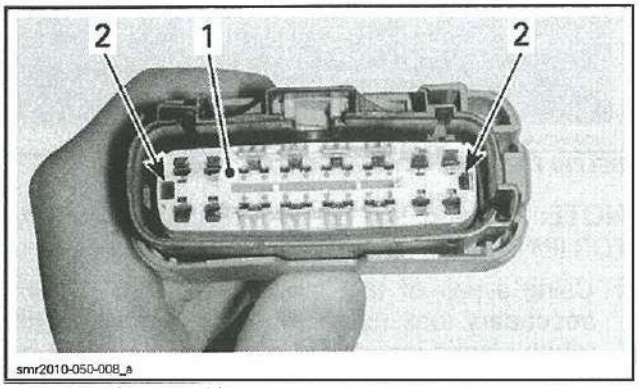
FCI TERMINAL EXTRACTOR TOOL (P/N 54241678)

To release one of the 8 larger pins towards the outer part of the connector, use the DELPHI TERMINAL EXTRACTOR (P/N 12094429).



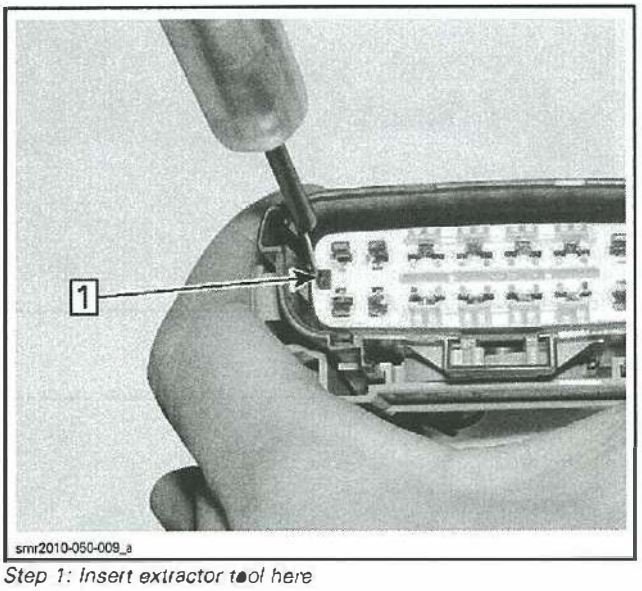
DELPHI TERMINAL EXTRACTOR TOOL(P/N 12094429)

NOTE: Grinding the DELPHI TERMINAL EXTRACTOR (P/N 12094429) end to a taper is required to allow insertion of the tool between the lock and the pin.



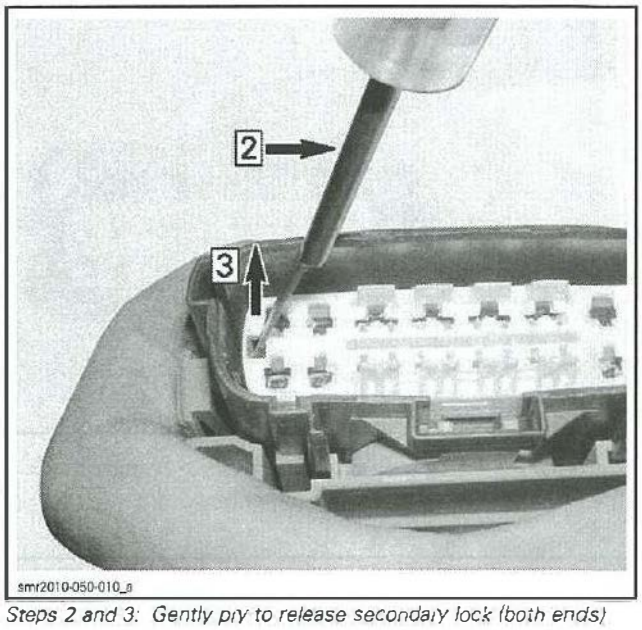
FEMALE CONNECTOR
1. Secondary pin lock
2. Retaining tabs

1. Insert the DELPHI TERMINAL EXTRACTOR (P/N 12094429) in one of the holes at the end of the secondary lock (the white plastic insert in the connector).



Step 1: Insert extractor tool here

2. Gently pry the tool towards the center of the connector to release one end of the secondary lock, then pull it up slightly.



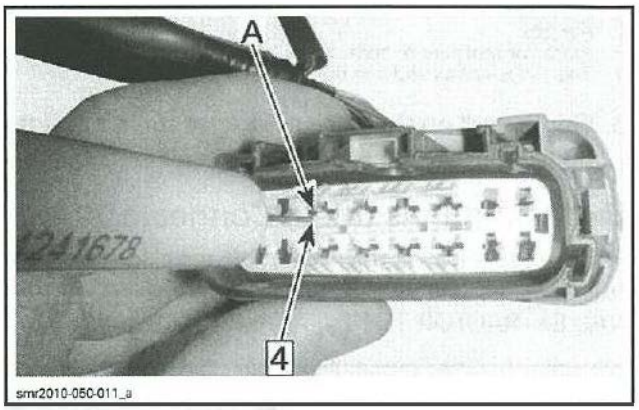
Steps 2 and 3: Gently pry to release secondary lock (both ends)

3. Repeat the previous step at the other end of the secondary lock and pull it up to the detent position. This will allow unlocking of the pins.

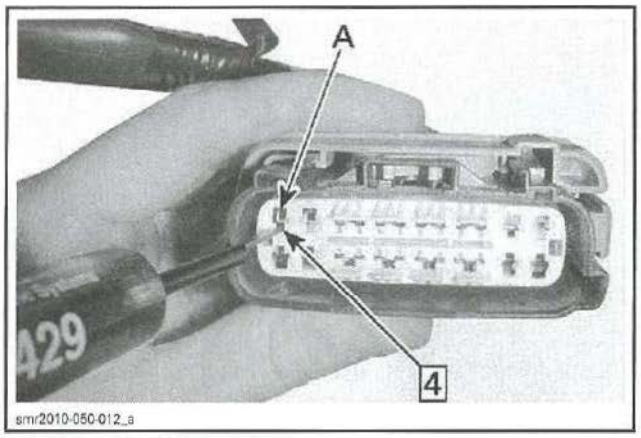
NOTE: It is not necessary to remove the secondary lock.

4. Insert the extractor tool in the small hole adjacent to the pin.

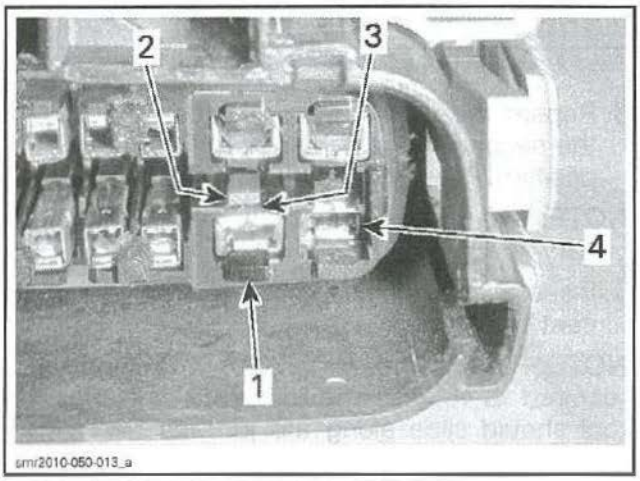
NOTE: Push the extractor tool in only as far as required to release the lock from the pin. The tool should slide along the pin and be inserted between the pin and the lock.



EXTRACTING A SMALL PIN
Step 4: Insert FCI terminal extractor tool (P/N 54241678) in round hole
A. Pin hole



EXTRACTING A LARGER PIN
Step 4: Insert the DELPHI terminal extractor (P/N 12094429) in square hole
A. Pin hole

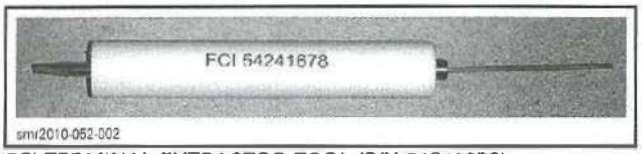


SECONDARY LOCK REMOVED FOR CLARITY
1. *Pin stop*
2. *Pin lock*
3. *Extractor tool inserts here*
4. *This pin is not locked and pushed back*

5. Gently pull on the wire to extract the pin out the back of the connector.

Extracting Pins (Male Connector)

To release one of the 16 small pins towards the middle part of the connector, use the FCI TERMINAL EXTRACTOR TOOL (P/N 54241678).



FCI TERMINAL EXTRACTOR TOOL (P/N 54241678)

To release one of the 8 larger pins towards the outer part of the connector, use the DELPHI TERMINAL EXTRACTOR (P/N 12094429).

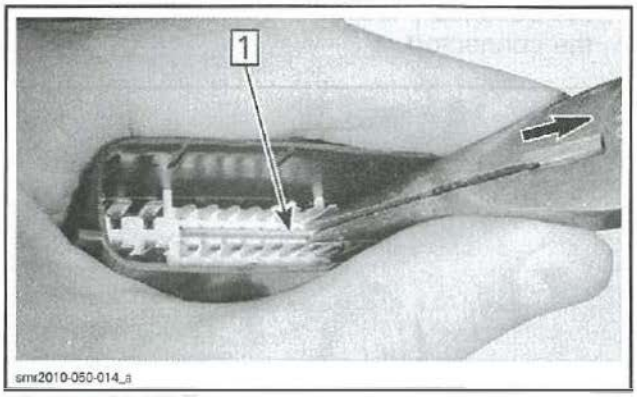


DELPHI TERMINAL EXTRACTOR TOOL (P/N 12094429)

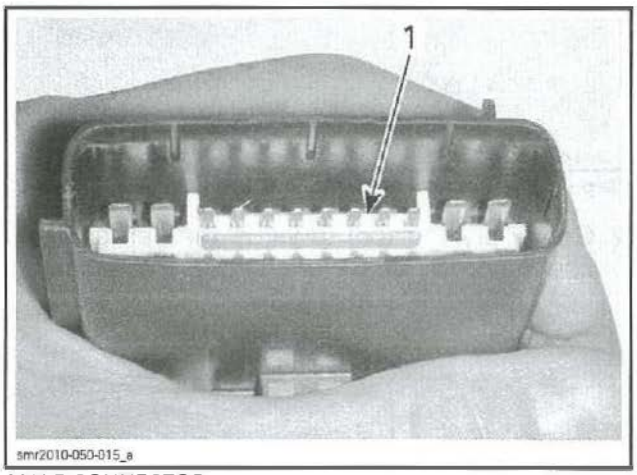
NOTE: Grinding the DELPHI TERMINAL EXTRACTOR (P/N 12094429) end to a taper is required.

1. Using a pair of thin long nose pliers, pull the secondary lock up to the detent position (the white plastic insert in the connector). This will allow unlocking of the pins.

NOTICE Do not attempt to remove the secondary lock or damage will occur. Be careful not to bend the pins when using the pliers.



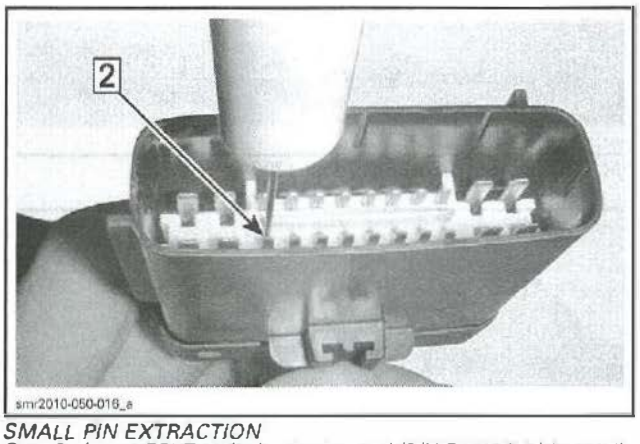
MALE CONNECTOR
Step 1: Pull on secondary lock here



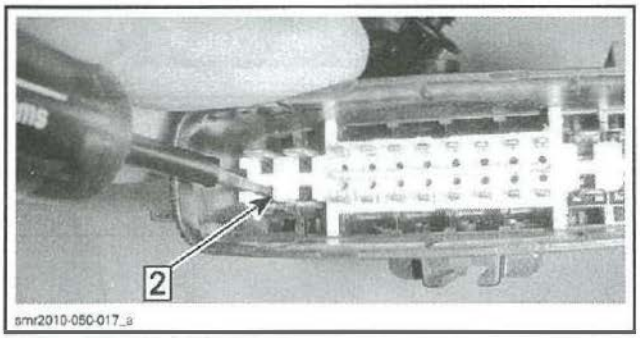
MALE CONNECTOR
1. *Secondary lock in detente position*

2. Insert the extractor tool in the small hole adjacent to the pin.

NOTE: Push the extractor tool in only as far as required to release the lock from the pin. The tool should slide along the pin and be inserted between the pin and the lock.



SMALL PIN EXTRACTION
Step 2: Insert FCI Terminal extractor tool (P/N 54241678) in small round hole



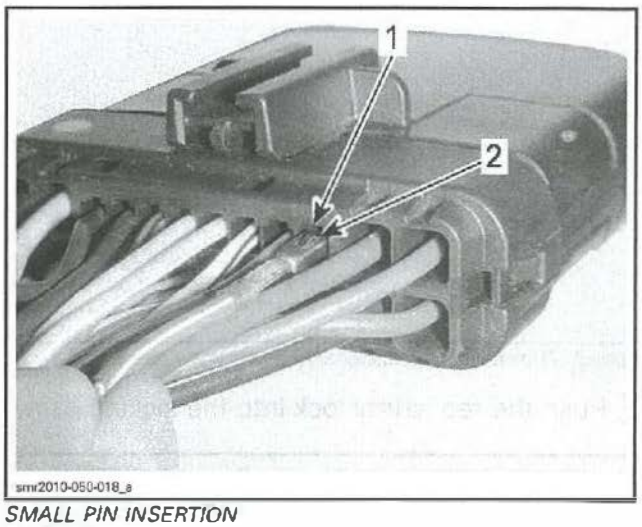
LARGE PIN EXTRACTION
Step 2: Insert DELPHI terminal extractor (P/N 12094429) in square hole

3. Gently pull on the wire to extract the pin out the back of the connector.

Inserting Pins

1. Ensure the terminal (pin) is properly crimped onto the wire.
2. Ensure the secondary lock (the white plastic insert in the connector) is up in the detent position.
3. Insert the pin in through the back of the connector.

NOTE: When inserting a small pin, insert the stepped portion facing the notch in the connector pin hole. The large pin does not have a specific orientation.

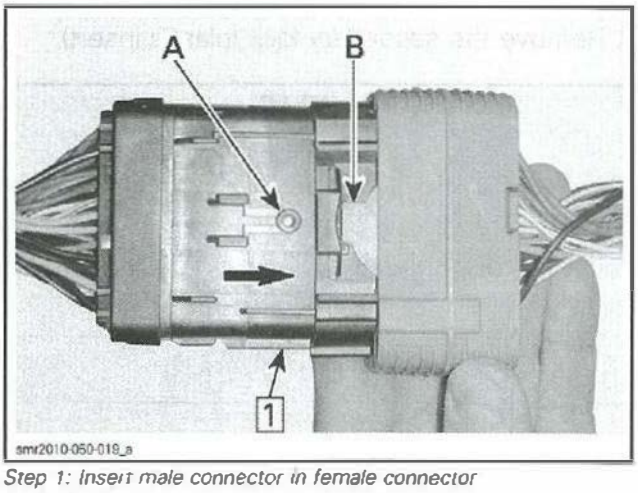


SMALL PIN INSERTION
1. Notch
2. Stepped portion towards notch

4. Push the pin in until the pin lock engages the pin.
5. Gently pull on the pin to ensure it is properly locked.
6. Repeat previous steps for each pin to be inserted.
7. Push the secondary lock into the connector to the locked position.

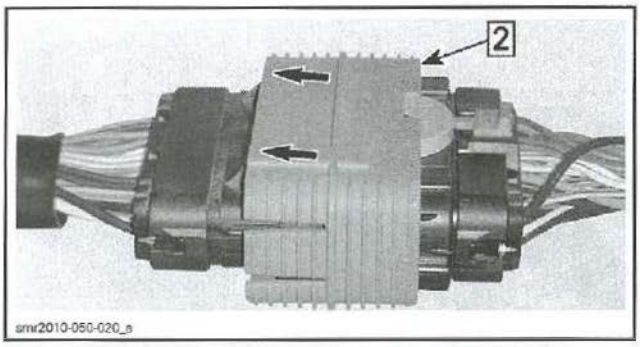
Reconnecting the APEX ERGOMATE Connector

1. Insert the male connector into the female connector so the lock pin inserts into the lock cam.



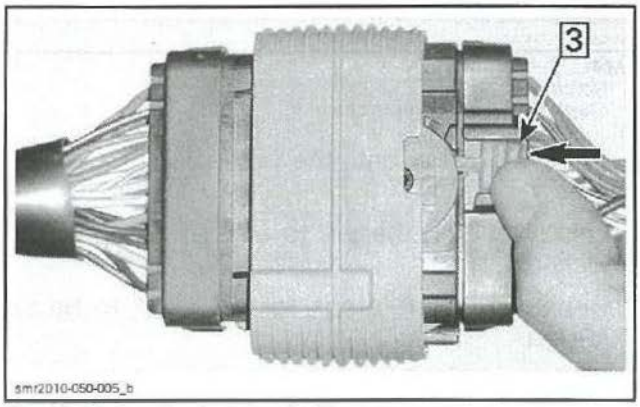
Step 1: Insert male connector in female connector
A. Lock pin
B. Lock cam

2. Push the female connector sleeve over the male connector to rotate and fully engage the locking cam.



Step 2: Push female connector sleeve over male connector

3. Push the red safety lock into the locking cam.

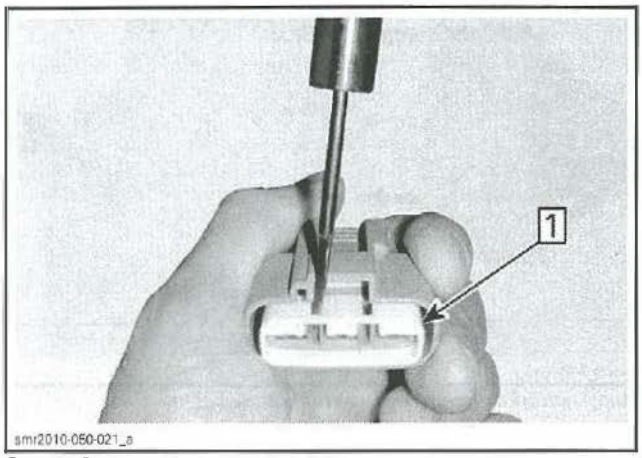


Step 3: Push safety lock into locking cam

VOLTAGE REGULATOR/RECTIFIER CONNECTOR (FURUKAWA)

Terminal Removal

1. Remove the secondary lock (plastic insert).

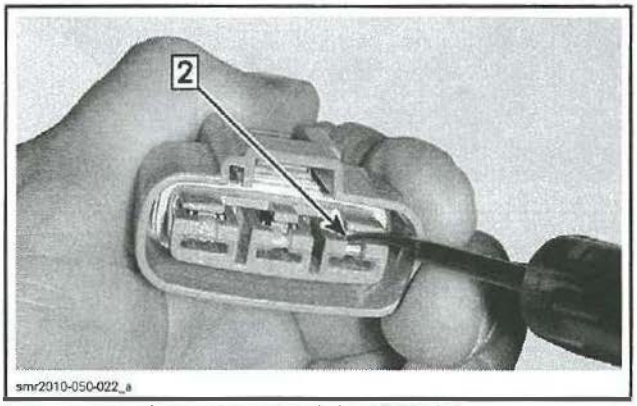


Step 1: Remove the secondary lock

2. Carefully insert the GM TERMINAL EXTRACTOR (P/N 12094430) between the lock and the pin to release the pin.

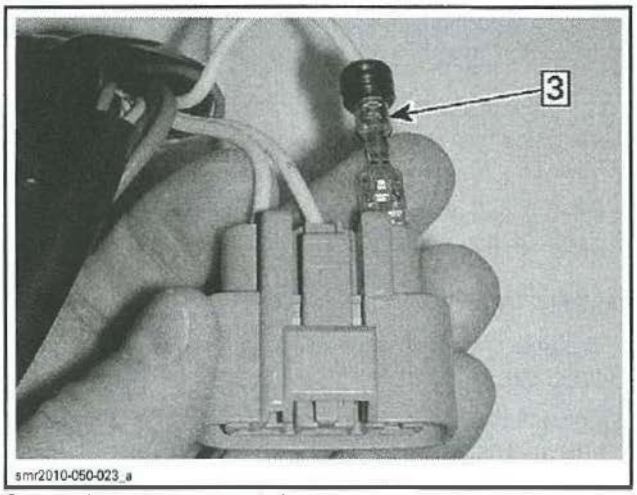


GM TERMINAL EXTRACTOR (P/N 12094430)



Step 2: Insert GM extractor tool (P/N 12094430)

3. Gently pull on the wire to extract the pin out the back of the connector.



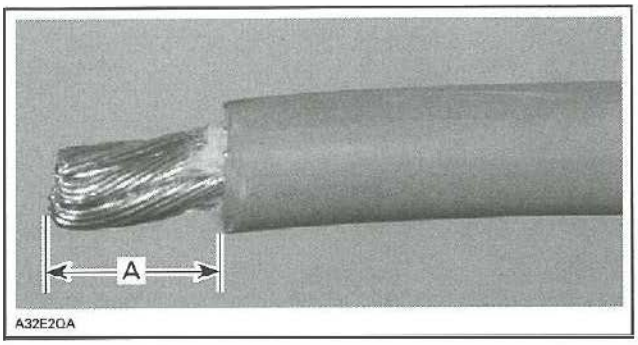
Step 3: Pull wire to extract pin

NOTICE **Before installing terminals in the connectors, ensure all terminals are properly crimped on the wires. After installation of the wire terminals in the connectors, ensure they are properly locked by gently pushing on them as if to extract them.**

BATTERY CABLES

Battery Cable Crimping

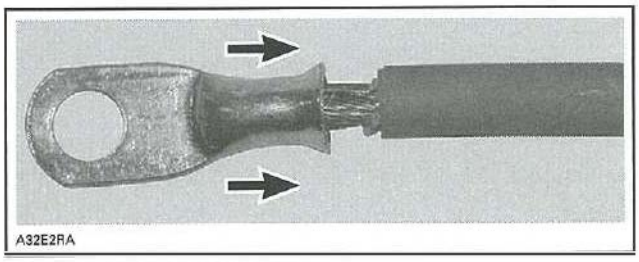
Carefully strip the wire approximately to 10 mm (3/8 in) in length, using a wire stripping tool or sharp blade/knife.



A. 10 mm (3/8 in)

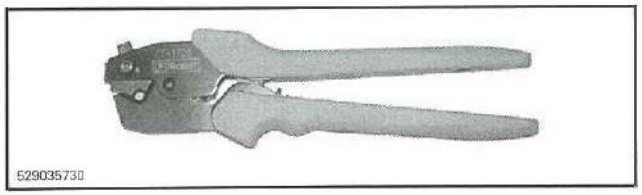
NOTE: Make sure not to cut wire strands while stripping the wire.

Install the appropriate terminal on the wire according to the requirement. Refer to appropriate *PARTS CATALOG.*

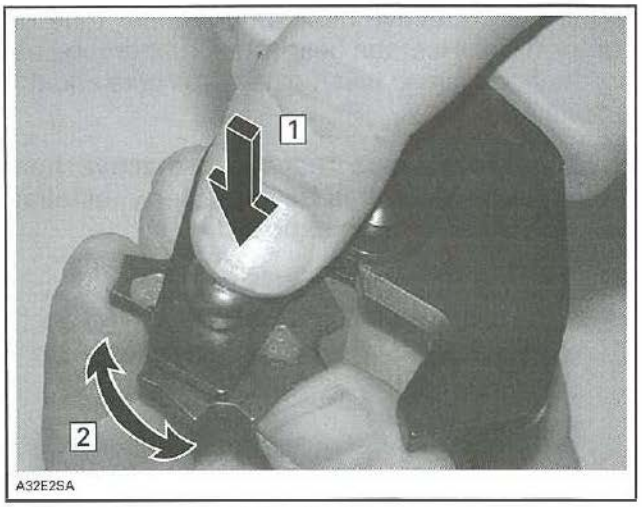


INSTALLATION OF TERMINAL

Follow the instructions provided with the CRIMPING TOOL (HEAVY GAUGE WIRE) (P/N 529 035 730) to select the proper position of the tool.

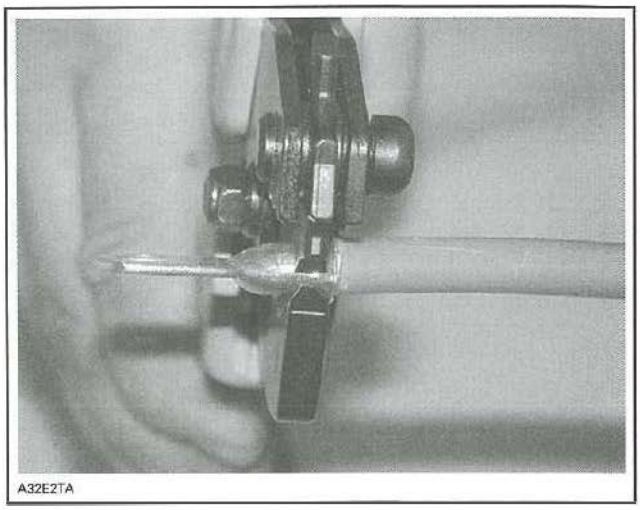


NOTE: Different wires require different crimping pliers settings, so make sure to follow the instruction supplied with the tool.

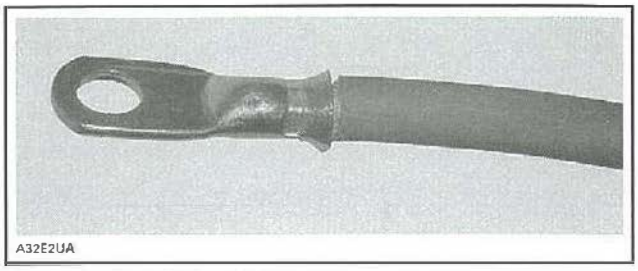


POSITIONING THE CRIMPING PLIERS
Step 1: Press
Step 2: Rotate

After positioning the crimping pliers, crimp the terminal already installed on wire.



CRIMPING OF WIRE



PROPERLY CRIMPED WIRE

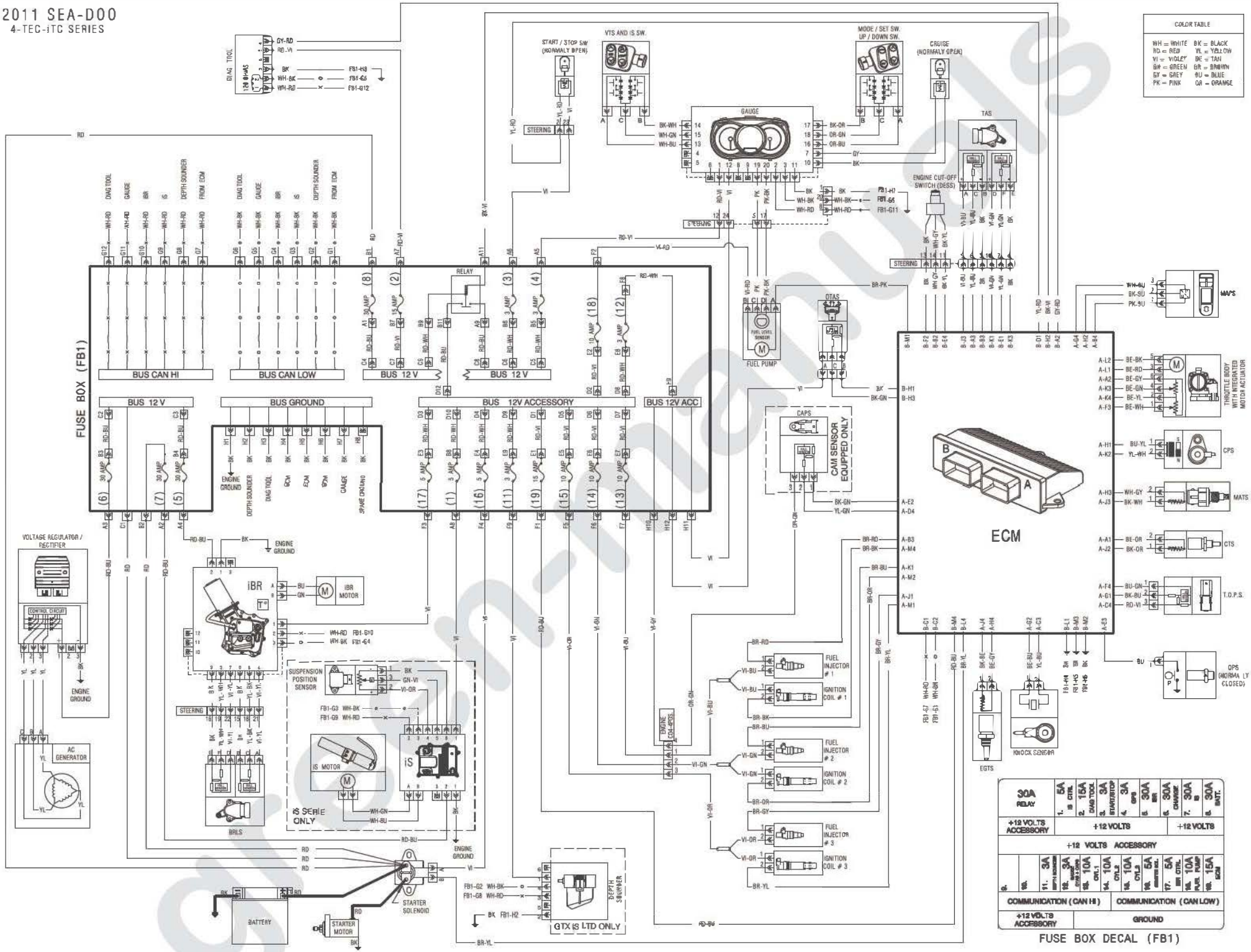
To verify, if the wire is properly crimped, apply some pulling force on wire and the terminal at the same time from both directions.

NOTICE Never weld the wire to the terminal. Welding can change the property of the wire and it can become brittle and break.

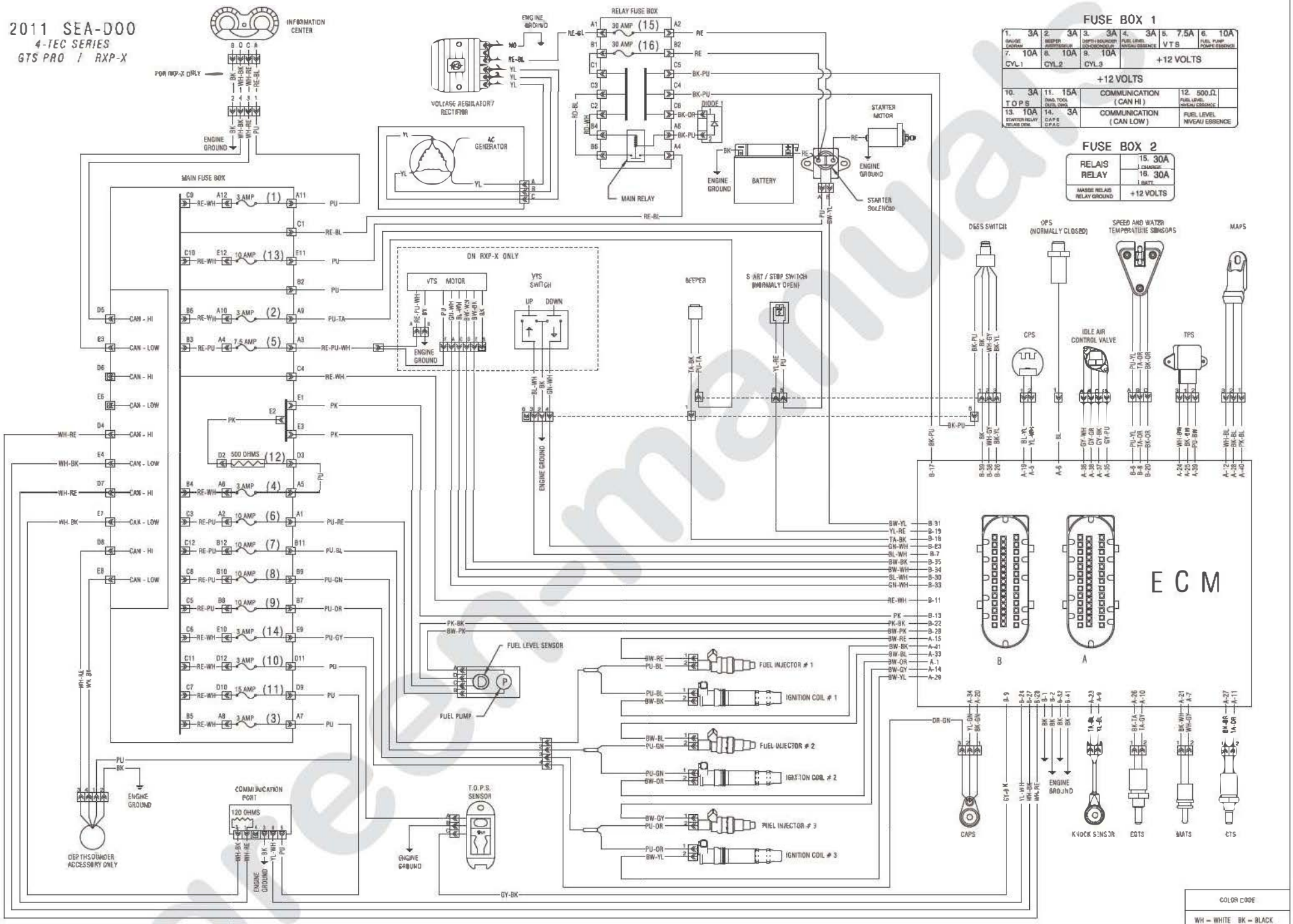
Install the protective heat shrink rubber tube on the terminal. Heat the heat shrink rubber tube using the heat gun so that it grasps the wire and the terminal.

NOTICE **Make sure that the protective heat shrink rubber tube has been properly installed and no part of wire is exposed.**

2011 SEA-DOO
4-TEC-iTC SERIES



2011 SEA-DOO
4-TEC SERIES
GTS PRO / RXP-X



FUSE BOX 1

1. 3A GAUGE CADRAN	2. 3A BEEPER AVERTISSEUR	3. 3A SPEED SENSOR DÉTECTEUR	4. 3A FUEL LEVEL NIVEAU ESSENCE	5. 7.5A VTS	6. 10A FUEL PUMP POMPE ESSENCE
7. 10A CYL.1	8. 10A CYL.2	9. 10A CYL.3	+12 VOLTS		
+12 VOLTS					
10. 3A TOPS	11. 15A DIAG. TOOL OUTIL DIAG.	COMMUNICATION (CAN HI)		12. 500 Ω FUEL LEVEL NIVEAU ESSENCE	
13. 10A STARTER RELAY RELAIS DEM.	14. 3A CAPS CPAC	COMMUNICATION (CAN LOW)		FUEL LEVEL NIVEAU ESSENCE	

FUSE BOX 2

RELAIS RELAY	15. 30A CHARGE 16. 30A BATT.
MASSE RELAIS RELAY GROUND	+12 VOLTS

COLOR CODE

WH = WHITE	BK = BLACK
RE = RED	YL = YELLOW
PU = PURPLE	TA = TAN
GN = GREEN	BW = BROWN
GY = GREY	BL = BLUE
PK = PINK	OR = ORANGE

greenmanuals

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SEA-DOO | BRP

WATERCRAFT SERVICE *Bulletin*

November 2, 2010 Subject: **Sea Level and High Altitude Impeller Charts** No. **2011-2**

YEAR	MODEL	MODEL NUMBER	SERIAL NUMBER
2011	All	All	All

HIGH ALTITUDE PARTS EXCHANGE/ LABOR CREDIT PROGRAM

This program allows dealers/distributors to return new and resalable impellers and covers the labor time to change out the impeller.

NOTICE The technical recommendations contained herein apply only to the current model year watercraft operating between 900 m (3,000 ft) and 2 400 m (8,000 ft) above sea level.

File a claim on BOSSWeb or fill out a warranty claim form (P/N 484 070 600) with the following information:

JOB CODE	05 70
Claim Type	03 Predelivery
Flat Rate Time	0.8 hour

NOTE: Claim comments should read: "High Altitude Parts Return" and the original impeller part number should be listed on the claim, not the high altitude one. Filing a claim other then the way herein described will cause the claim to be rejected.

Purchase from Bombardier Recreational Products Inc. (BRP) the necessary parts for high altitude application. Anything other than a BRP part will not be accepted.

PARTS RETURN

Return the original UNUSED impellers. Attach proof that replacement parts were purchased from BRP (invoice or a packing slip).

Please return impellers using the same boxes that your high altitude impellers were shipped in.

The impellers must be returned within 30 days from the date the modification is performed. The parts must be new and in resalable condition. Parts will be inspected when received, and if damaged, will be returned to the dealer without credit.

PROGRAM ONLY APPLIES TO WATERCRAFT MODIFIED BY THE DEALER!

HIGH ALTITUDE PARTS RETURN ADDRESSES
Canadian Dealers
Bombardier Recreational Products Inc., Centre de pièces de garantie, Warranty Parts Center, 565, de la Montagne, Valcourt, QC J0E 2L0
U.S. Dealers
Bombardier Recreational Products Inc., 7575 Bombardier Court, Wausau, WI 54401
International
All parts must be returned to your distributor or BRP regional office. Please contact them for complete address and shipping information.

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SEA LEVEL SPECIFICATIONS

WATERCRAFT			IMPELLER		
Model	Model Number	Engine	Pitch Angle (°)	Impeller / Venturi Diameter (mm)	Part Number
GTI™ Series					
GTI	23BA	130	11-18	155/84	267 000 532
GTI intl	23BB				
GTI SE	24BA, 24BC	130	11-18	155/84	267 000 532
GTI SE intl	24BB				
GTI Limited	39BA	155	11-18	155/84	267 000 532
GTI Limited intl	39BB				
GTI SE	30BA	155	11-18	155/84	267 000 532
GTI SE intl	30BB				
GTS™ Series					
GTS	43BA	130	11-18	155/84	267 000 532
GTS intl	43BB				
GTS intl (Rental)	25BA				
GTS PRO	44BA	130	11-18	155/84	267 000 431
GTX† Series					
GTX	38BA	155	11-18	155/83	267 000 577
GTX intl	38BB				
GTX	42BA	215	10-21	159/83	267 000 575
GTX intl	42BB				
GTX iS	33BA	215	10-21	159/83	267 000 575
GTX LTD iS	18BA	260	14/23	159/83	267 000 567
GTX LTD iS intl	18BB				
RXP™ Series					
RXP-X	32BA	255	14-24	159/87	267 000 444
RXP-X RS intl	32BB		14-25	159/87	267 000 481
RXT™ Series					
RXT	17BA	260	14-23	159/83	267 000 567
RXT intl	17BB				
RXT iS	34BA	260	14-23	159/83	267 000 567
RXT iS intl	34BB				

† GTX is a registered trademark of Castrol Ltd, used under license.

WATERCRAFT			IMPELLER		
Model	Model Number	Engine	Pitch Angle (°)	Impeller / Venturi Diameter (mm)	Part Number
RXT™ Series (cont'd)					
RXT-X	31BA	260	14-23	159/83	267 000 567
RXT-X RS intl	31BB				
RXT-X aS	41BA	260	14-23	159/83	267 000 567
RXT-X RS aS intl	41BB				
WAKE™ Series					
WAKE	35BA	155	11-18	155/84	267 000 532
WAKE intl	35BB				
WAKE PRO	26BA	215	10-21	155/83	267 000 575
WAKE PRO intl	26BB				

HIGH ALTITUDE SPECIFICATIONS

Models equipped with variable trim system (VTS) must have nozzle set to 0° for optimum skiing facility.

NOTE: Test altitude: 1 676 m (5,500 ft).

WATERCRAFT			IMPELLER		
Model	Model Number	Engine	Pitch Angle (°)	Impeller / Venturi Diameter (mm)	Part Number
GTI™ Series					
GTI	23BA	130	11-17	155/84	267 000 600
GTI intl	23BB				
GTI SE	24BA, 24BC	130	11-17	155/84	267 000 600
GTI SE intl	24BB				
GTI Limited	39BA	155	11-17	155/84	267 000 602
GTI Limited intl	39BB				
GTI SE	30BA	155	11-17	155/84	267 000 602
GTI SE intl	30BB				
GTS™ Series					
GTS	43BA	130	11-17	155/84	267 000 600
GTS intl	43BB				
GTS intl (Rental)	25BA				
GTS PRO	44BA	130	11-15	155/84	267 000 447
GTX† Series					
GTX	38BA	155	11-16	155/83	267 000 594
GTX intl	38BB				
GTX	42BA	215	10-19	159/83	267 000 596
GTX intl	42BB				
GTX iS	33BA	215	10-19	159/83	267 000 596
GTX LTD iS	18BA	260	14-22	159/83	267 000 598
GTX LTD iS intl	18BB				
RXP™ Series					
RXP-X	32BA	255	14-23	159/87	267 000 456
RXP-X RS intl	32BB				
RXT™ Series					
RXT	17BA	260 HP	14-22	159/83	267 000 598
RXT intl	17BB				
RXT iS	34BA	260	14-22	159/83	267 000 598
RXT iS intl	34BB				

† GTX is a registered trademark of Castrol Ltd, used under license.

WATERCRAFT			IMPELLER		
Model	Model Number	Engine	Pitch Angle (°)	Impeller / Venturi Diameter (mm)	Part Number
RXT Series (cont'd)					
RXT-X	31BA	260	14-22	159/83	267 000 598
RXT-X RS intl	31BB				
RXT-X aS	41BA	260	14-22	159/83	267 000 598
RXT-X RS aS intl	41BB				
WAKE™ Series					
WAKE	35BA	155	11-17	155/84	267 000 602
WAKE intl	35BB				
WAKE PRO	26BA	215	10-19	155/83	267 000 596
WAKE PRO intl	26BB				

WATERCRAFT
SERVICE
Bulletin

February 10th, 2011 Subject: **SEA-DOO® Paint Codes & Gelcoat** No. **2011-5**

YEAR	MODEL	MODEL NUMBER	SERIAL NUMBER
2011	All	All	All

PAINT CODES

These paints should be used for minor touch-ups only.

Actual finish on hulls is gelcoat, not paint. See further in this bulletin for gelcoat information.

CORRESPONDING PAINT CODES			
BRP COLORS		B.A.S.F., R-M	PPG
5801-88-01	White	88643	DCC 98192
B-160	Deep Black	85366, RM 85366	DCC 95066 / DBC 9554
B-176	Viper Red	94820	DCC 74790
B-212	Scarlet Red	98088	N/A
B-286	Swift Silver	796948	BC-DCC 00005
B-310	Cuban Orange	881951	N/A
B-311	Dragon Red	862181	FBCH SOL 926050
B-313	Vegas White	862276	FBCH MET/MICA926051
B-320	Casino Gold	870212	N/A
B-325	Marina Blue	865718	N/A
B-329	Alpine White	881950	N/A
J-805	Pewter Metallic	625331	N/A
M-506	Bright Yellow	88245, RM88152	N/A
N/A: Information not available at time of printing.			

NOTE: Unless otherwise specified, gloss level for all colors is **High**.

GELCOAT

This is a reminder that all liquid gelcoat and repair kits can be purchased directly from Gelcote‡ International Ltd. BRP does not distribute these products.

Gelcote International Ltd web site has all the Sea-Doo personal watercraft and sport boat gelcoat colors.

‡ Gelcote is a trademark of Gelcote International Ltd

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You can order on the web site and get confirmation of your order within hours. Quick, reliable service is what is offered to all BRP dealers around the world.

There are many services on this web site to make your ordering quick and informative. Or you can call Gelcote International directly with any question pertaining to gelcoat. Service, value and knowledge is what you can expect when you call Gelcote International.

Gelcote International Ltd
174 Colonnade Road Suite 29
Ottawa, Ontario
Canada, K2E 7J5

Phone: (613) 225-2177
Phone: (877) 435-2683 (Toll Free)
Fax: (613) 225-5297

Web Site: www.gelcoat.ca
E-mail: info@gelcote.com

WATERCRAFT COLOR CODES

GTI MODELS



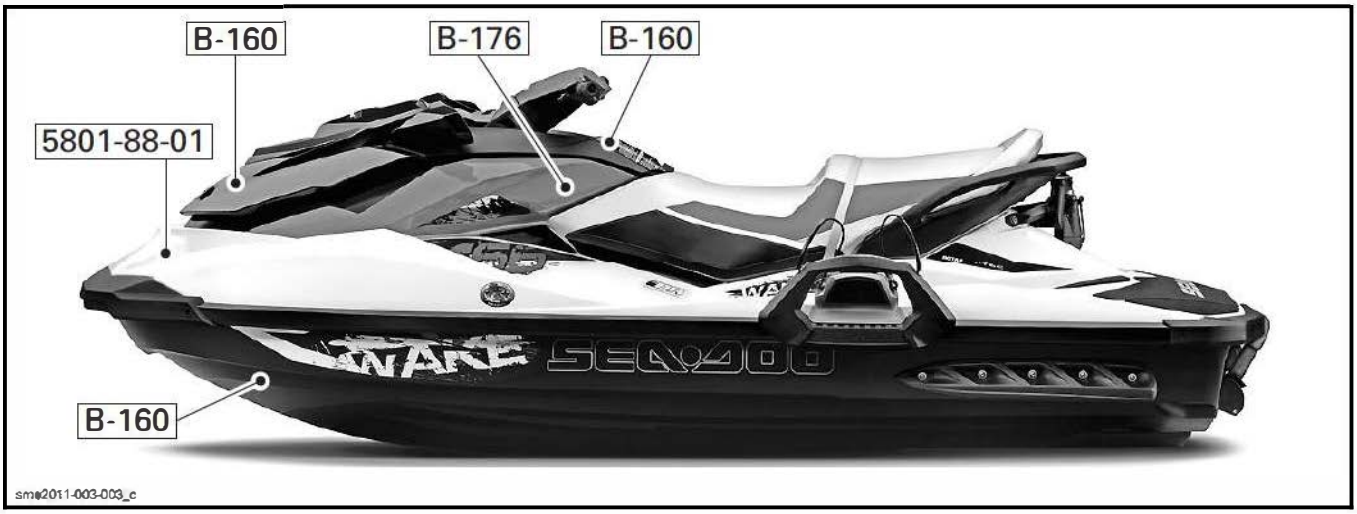
GTI, GTI SE AND GTI LIMITED

GTS MODELS



GTS RENTAL (INT'L) AND GTS

WAKE MODEL



GTX MODELS



GTX



GTX LIMITED iS AND GTX iS

RXT MODELS



RXT iS



RXT



RXT-X



RXT-X aS

WAKE PRO MODEL



GTS PRO MODEL



RXP-X MODEL





SEA-DOO ADVANCED TEC PWC TRAILERS...

...clearly distinguishing themselves over the competition

ADVANCED TEC™ iCATCH™ I



Shown with optional accessories

SPECIFICATIONS	
Overall length	13' 6"
Overall width	5' 10"
Width between walk pad[1]	4' 3"
Overall height (walk pad)[2]	32"
Overall height (iCatch)[3]	3' 3"
Coupler	2.0"
Approx. weight	360 lbs
Carrying capacity	1,200 lbs





iCatch and release system eliminates traditional winch and tackle process, simplifies launching and loading. Works in conjunction with walk pad guidance system.

Patent pending



Walk pad guidance system allows you to conveniently walk around to access your PWC. Doubles as a guidance system for a trouble free mooring process. Launch and load in seconds.



Premium **roller bunk system** allowing for smooth and resistance free PWC manipulation when launching and loading.

With never-seen-before industry firsts like an iCatch and release system, a walk pad and roller bunk, Sea-Doo Advanced TEC iCatch Trailer is so over and above the competition, it clearly pays to have the best.

ADVANCED TEC I



SPECIFICATIONS	
Overall length	13' 6"
Overall width	5' 10"
Width between fenders[1]	4' 7"
Overall height (fender)[2]	23"
Overall height (winch)[3]	31"
Coupler	2.0"
Approx. weight	260 lbs
Carrying capacity	1,300 lbs

USA / [1] Maximum PWC width [2] Coupler on ground [3] Coupler on hitch at 16" above the ground

OPTIONAL ACCESSORIES



Marine Jack and Stand - 295 100 399



Alloy Mag Wheel Kit - 295 100 401
(sold in pairs with center cap & nuts)



Spare Tire Support - 295 100 400



Spare Wheel Assembly - 271 001 676



Walk Pad Diamond Plate Carpet Kit
295 100 398



KEY FEATURES INCLUDED	ADVANCED TEC iCATCH I	ADVANCED TEC I
Rugged and durable hot-dipped galvanized finish	•	•
8 adjustable rollers (4" left to right, 8-degree angle)	•	
Adjustable iCatch system	•	
Non-marking rollers	•	
Blow molded walk pad	•	
2 adjustable wooden bunks with carpet (4" left to right, 8-degree angle)		•
Adjustable winch strap		•
Multi adjustable axle	•	•
Torsion rubber suspension	•	•
Tire size: 4.80 x 12	•	•
Bolt pattern: 5 bolts on 4 ½" diameter	•	•
Ground wired	•	•
Fully enclosed wiring harness	•	•
Submersible lights	•	•
Coupler stand	•	•
Suspended plastic fender for better splash protection	•	•
Safety cable	•	•
No-maintenance sealed bearing	•	•
RETAIL PRICE	**$1,399.99**	**$799.99**
WARRANTY	**1/5 year***	**1/5 year***

REQUIRED OPTION	RETAIL PRICE		
iCatch bow cup (295 100 403)	$39.99	•	
OPTIONAL ACCESSORIES	**RETAIL PRICE**		
Marine jack and stand	$69.99	•	•
Alloy mag wheel kit	$399.99	•	•
Spare tire support	$64.99	•	•
Spare wheel assembly	$89.99	•	•
Walk pad carpet kit	$119.99	•	

*One year complete warranty and 5 years on frame and axle.

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NMMA

SEA-DOO
THE GOOD LIFE JUST GOT BETTER™

BRP

I have removed certain pages from this technical update book that contained dealer only contact information.

The contact information required a valid dealer number and is useless to the general public.

If you bought this manual from any other seller, they are reselling my work.

Please leave them negative feedback & email me at sales@green-manuals.com .

Our goal is to be one of the BEST sellers on eBay and the internet by providing you with the BEST customer service and the BEST manuals on the market.

Thank you for choosing us.

Green-Manuals

Paperless Manuals
For a Better Tomorrow



sales@midwestmanuals.com
www.midwestmanuals.com

2011 Technical Update Book

TECHNICAL UPDATE BOOK and the DEALER CERTIFICATION PROGRAM (for North American dealer only):

This Technical Update Book and it's associated exam are critical components of your Dealership Certification Level and your Technicians Training Status.

To maintain or achieve Gold or Platinum status two technicians must complete the training provided by this book by passing the exam with 75% or higher scores. Technicians must complete this training to achieve or maintain their Technician or Certified Level training status. Master Technicians must complete this training and pass the exam on the first attempt with a 90% or better score. Training must be completed prior to the deadline.

Enjoy the Update Book and good luck on the exam. See page 36 for details on Technical training.

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ROTAX ®

STEP BY STEP INSTRUCTIONS ON HOW TO DO THE EXAMS ON BRPTI :

(for North American dealer only)

If you are new to BOSSWeb and BRPTI OR you have a BRPTI login but not set up as a user in BOSSWeb:

- Ask your dealership's BOSSWeb administrator to create your profile in BOSSWeb by making sure that all the personal information fields are completed and the Training, BRPTI role BRP Dealer Employee BRPTI responsibility is checked off in your profile.
- **If you have a BRPTI login**, your BOSSWeb administrator must make sure your first name, last name, date of birth and gender are the same in BOSSWeb as they are in BRPTI.

If you already have a personal login to BOSSWeb and have BRPTI access:

1. Access BRPTI via BOSSWeb/Training/BRPTI.
2. In the "Resources" box, click on "Courses".
3. Check "English", click on "Start search — GO".
4. Find **2011 Sea-Doo Technical Update** in the list of courses.
5. Click on the Info/Enroll icon at the right of the course name.
6. Click on "Enroll" at the bottom right of the screen.
7. Click on "OK" in the pop-up box to enroll to this course.
8. Click on "updated learning plan" in the confirmation paragraph or click on "Home" in the "Resources" box. This will take you back to your home page where you will see the course (exam) is now in your "Training Activities TO COMPLETE" section.
9. In the "Training Activities TO COMPLETE" section, click on the **2011 Sea-Doo Technical Update** course title to start your exam.

- To pass the Technical Update Exam, a technician must pass with a **75% or greater** score.
- To achieve or maintain Technician Level status, a technician must have completed all applicable Technician Level Exams after viewing the DVD series, and pass all Update exams for the appropriate products carried by the dealership.
- To qualify for the Certified Technician Level course, a technician must first achieve and maintain Technician Level Status.
- To maintain Certified Technician Status, a technician must stay current by passing all subsequent Technical Update Exams for the product lines completed at the Certified Technician hands-on school.
- To qualify for Master Level Status, a technician must meet the criteria below.

Master Technician Level criteria:

- Minimum of 5 years as a Powersports Industry mechanic.
- Minimum of 2 years at your current BRP dealership.
- Maintain Certified Technician Level for at least one year.
- 90% or higher, on 1st completed score, on Technical Update exam(s).

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General Information

The objective of Section 1 is to make contacts between dealers and BRP as easy as possible.

In this section you will find the most important phone numbers, key contact names and the latest update procedures to help you being more efficient.

IT'S EASY TO REACH US

NORTH AMERICAN SERVICE TOLL-FREE NUMBER

NOTE: These references are only for North American dealers. If you are calling from a country outside of Canada or the United States please refer to the *DEALER TECHNICAL SUPPORT* section in this book.

BEFORE YOU CALL THE SERVICE DEPARTMENT

Be prepared

The BRP Service Department values your call. In fact, **you are the reason that we are here!** Your input and information are vital to our department, and accuracy is critical. In an effort to provide the best service to you, we ask that you observe the following guidelines:

Review the service material that you already have

Check your service library for any publications that may assist you with your problem. Often the answer is already in your hands in the form of manuals, bulletins, spec books, technical update books, What's New letters, etc.

Check BOSSWeb

All bulletins and campaigns can be found on BOSSWeb. Verify the unit history on each vehicle to see if there are any pending campaigns.

Have vital information close at hand

Many times you will be asked for your **dealer number,** the vehicle model, **serial number** and the **vehicle mileage/hours.** You will also be asked if there is already a **call identification number** logged on the vehicle or customer in question. Not having this information readily available is very common and slows the system down for everybody.

Verify the customer's complaint

If you are contacting your Service Representative for assistance, you should be able to describe the problem accurately, with factual information. Make sure the vehicle does what the customer says it does; when he says it does it. If you cannot verify a problem, do not work on the vehicle. Do not attempt needless repairs.

Verify the warranty status

Is the unit in warranty, out of warranty, or covered by a BEST contract (if applicable)? If it is covered by BEST, have the contract number available as well as the maintenance history if available.

Take names and Call ID

Every BRP representative will identify themselves when answering your call. Do not complete the call without noting who you spoke with. Your call may be logged in the computer system. Ask for the call I.D. number and put it on the repair order.

WARRANTY

TIPS

NOTE: **Please, do not forget:**

- You have 21 days from the repair date to submit a claim.
- You have 45 days from the credit date to ask for a claim resubmission.
- North American dealers have 21 days to return your parts (please keep tracking number) and documents to BRP from the date your claim is accepted.

NOTE: For North America, If you feel you will not be able to complete the repair before the end of Warranty, but the vehicle before the end of warranty, please complete the Repairs Completed While Vehicle's Warranty Expired form available in the ComCenter section of BOSSWeb under Warranty Guide and Forms. Fax this form before the end of the Warranty to the number at the bottom of the Form.

NOTE: For other countries dealers, please contact your local distributor or BRP Regional Office.

- You must keep the parts that are not requested to be returned to BRP 90 days after the credit date.
- You must register all vehicles within 10 calendar days from the date of delivery to the customer.

NOTE: **You must keep on file all the following information about a vehicle.**

- Signed PDI checklist (keep for 10 years).
- Signed rider form (ATV only).
- Warranty registration form.
- Work/repair order (keep for 3 years from the credit date).
- Warranty claims (keep for 3 years from the credit date).
- Sublet work/repair receipts (keep for 3 years from the credit date).
- Notes on customer call.

NOTE: **Your work orders must be able to provide key elements which describe and justify the warranty claim:**

The 3 C's

- Condition or Complaint: Description of customer complaint(s).
- Cause: The determination of which component(s) failed.
- Cure: The corrective action taken to fix the problem (repair and/or replace).

And

- Vehicle serial number.
- Reported date of failure/date of repairs completed.
- Mileage or hours on the vehicle.
- If applicable, authorization number issued by a service representative.
- Punched timecards of mechanics.
- Customer's signed authorization to perform the work (signature).

PARTS RETURN

CANADIAN DEALERS	USA DEALERS	INTERNATIONAL DEALERS
Use label (P/N 484 500 001)	Use label (P/N 480 901 601)	All requested Warranty Parts must be returned to your distributor or BRP Regional office. Contact them for complete address and shipping information.
BRP C/O Warranty Parts Center 565 De La Montagne Valcourt Qc J0E 2L0	BRP C/O Warranty Department 7575 Bombardier Court Wausau WI 54401	

Ensure the part returned is properly tagged and the correct copy of the BOSSWeb claim is included in the packaging, otherwise this may cause a delay in processing your claim.

Dealers dealing with North West Co. Inc. must forward the parts, warranty claim and documents to their respective distributor's office.

NOTE: For complete details concerning returning warranty parts, please refer to the Warranty Service Guide on BOSSWeb.

FIBERGLASS WARRANTY AND REPAIR

There is a 60 month hull structural warranty on all 15' and longer Sea-Doo Boats only.

To claim use system 12.

You will need to get an authorization from a Service Representative if the cost of the repair exceeds $250.

Use these part numbers on your Warranty Claims:

- Hull (P/N 999 999 000)
- Deck (P/N 999 999 001)
- Ass'y (P/N 999 999 002).

B.E.S.T. (BRP EXTENDED SERVICE TERMS)

NOTE: for details concerning this program refer to the *BEST GUIDE* in the *COMCENTER SECTION OF BOSSWEB*.



SUPPLIER INFORMATION

RADIO, CD PLAYER, REMOTE CONTROL, AND SPEAKERS

Effortless Returns!

ASAelectronics
THE MOBILE ELECTRONICS COMPANY SINCE 1977

Program Details

If you should run across a JENSEN®, Voyager®, or Audiovox® product issue, have your repair technician call ASA's experienced troubleshooting team while the product is still installed and we'll help you sort out the problem.

- If the unit is determined to be a possible manufacturing defect, you will have to provide the ASA rep with the following information:
  - Dealer address, contact name & phone number
  - Model number
  - Serial number
  - Date of sale & Date of failure
  - Vehicle identification number
  - Posted labor rate
  - Preferred method of payment for labor reimbursement
  - Description of suspected defect and environment the defect occured (INOP not applicable)
- We will immediately ship a replacement unit and a return call tag back to you within 24 hours of receiving the phone call. (An invoice will not be generated for the part.)
- Upon receipt of the replacement unit, dealers can then reuse the box to pack up the defective unit, write the RA# on the outside of the box, apply the enclosed call tag, and ship the defective unit back to ASA for thorough testing. The unit must be returned within 30 days in order to receive labor reimbursement.
- Once the unit is fully tested, ASA will determine what type of failure occurred and compute the BRP Dealer labor credit per the attached flat rate schedule.
- ASA will mail the applicable labor credit check within 10 business days.
- Labor reimbursement will not be provided if:
  - the unit is physically damaged
  - the defective unit is not returned
  - the unit is not returned within the 30 days

BRP

AUDIOVOX Voyager JENSEN

sdd2008-002-120_en_1

BOSSWEB ACCESS FOR SERVICE DEPARTMENT PERSONNEL

It has been brought to our attention that in many instances BRP service department personnel do not have complete BOSSWeb accesses to view information in specific roles (functions) they need to properly service vehicles and maintain dealership records. Many times this is due to the fact that the dealerships BOSSWeb system administrator does not know what accesses to grant these personnel.

These accesses can only be granted by the dealerships BOSSWeb system administrator.

The following is a list for the minimum recommended specific roles for service department personnel.

Service Technician

E-Tec Injector Coefficient (Ski-Doo Only)	Messages
Online Parts Catalogs	Shop Manual
Document	Rebuild Program
BRPTI (BRP Training Institute)	Technical Publications
BOSSWeb e-Z learning	Warranty Flat Rate
Diagnostic software	What's News
Instruction sheets	

Service Manager

Parts Availability & Prices	Customer Satisfaction Index
Claim Status	Document
Clothing Claim	BRPTI (BRP Training Institute)
Parts Claim	BOSSWeb e-Z learning
Unit History	B.E.S.T. Guide
Unit Claim	Diagnostic Software
Campaign Monitoring	Instruction Sheets
Campaign Claim	Messages
Scheduled Unit Maintenance	PAC Price List
B.E.S.T plus Maintenance Claim	Rebuild Program
PartSmart CD Password	Shop Manual
Dealer Certification	Technical Publications
E-Tec Injector Coefficient (Ski-Doo)	Warranty Flat Rate
Online Parts Catalogs	Warranty Guide & Forms
B.U.D.S. Access Codes	What's News

Parts Manager

Dealer to Dealer Parts/Clothing Search	PartSmart CD Password
Request	Online Parts Catalog
Return Status	Licensed Products
Parts History	Document
Regular Order Entry	BRPTI (BRP Training Institute)
Parts Availability and Prices	BOSSWeb e-Z learning
Back Order List	B.E.S.T. Guide
Return Entry	Instruction Sheets
Shopatron Orders	Messages
Shopatron Enrollment	PAC Price List
View All Dealer Parts/Clothing Request	Promotions
PAC order status	Rebuild Program
Claim Status	Shop Manual
Clothing Claim	Technical Publications
Parts Claim	Warranty Guide & Forms
Invoice Display	What's News

BOSSWEB SYSTEM ADMINISTRATOR TIPS

The following is a step by step procedure for the dealership BOSSWeb system administrator on how to add or remove BOSSWeb Web Roles and Authorized Document Types for the Service Manager, Technician, Sales, and Parts profiles. The suggested roles will help make your department staff more informed and knowledgeable with BRP products and procedures.

To give access to the sub users, please go to the administration tab, select "users".



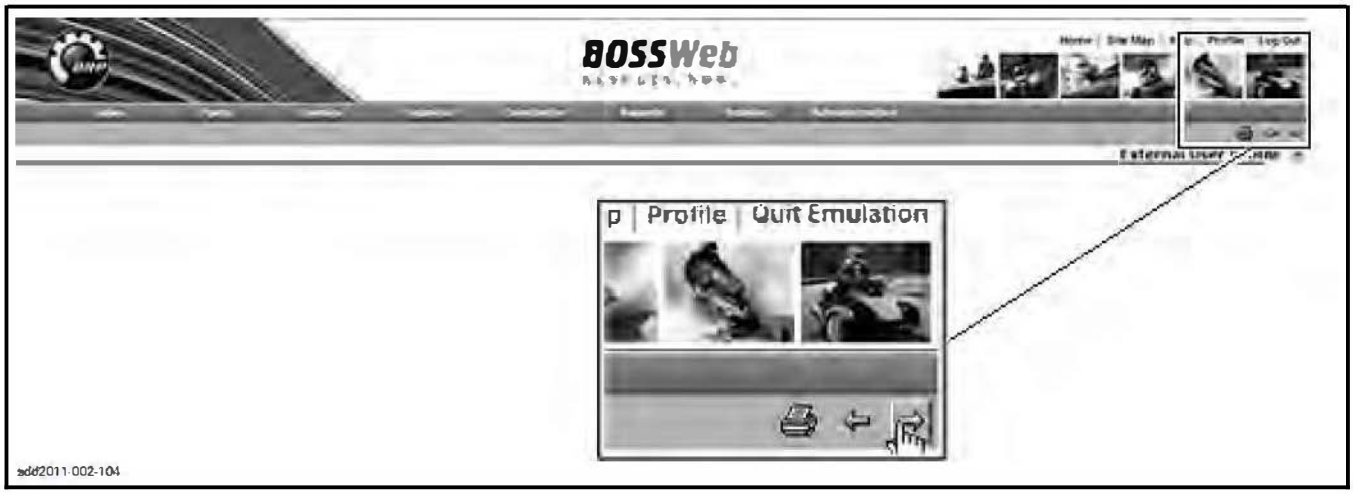
Choose the user you want to give the accesses.



Select the accesses you wish to give that user.



Click on the blue arrow forward to save changes



B.U.D.S. ACCESS CODES ARE NOW AVAILABLE ON BOSSWEB

A new Feature in BOSSWeb has been added to allow you to automatically get your access codes for MPI-2 without having to contact BRP Service Representatives. This section for the BOSSWeb administrator and Sub-Users who were given the "get B.U.D.S. access codes" role.

NOTE: This access is only for B.U.D.S. version 3.xx or newer.

NOTE: Please remember that these access code needs to be entered in B.U.D.S. on the same day you get them from BOSSWeb. The access code will be invalid after 24 hours.

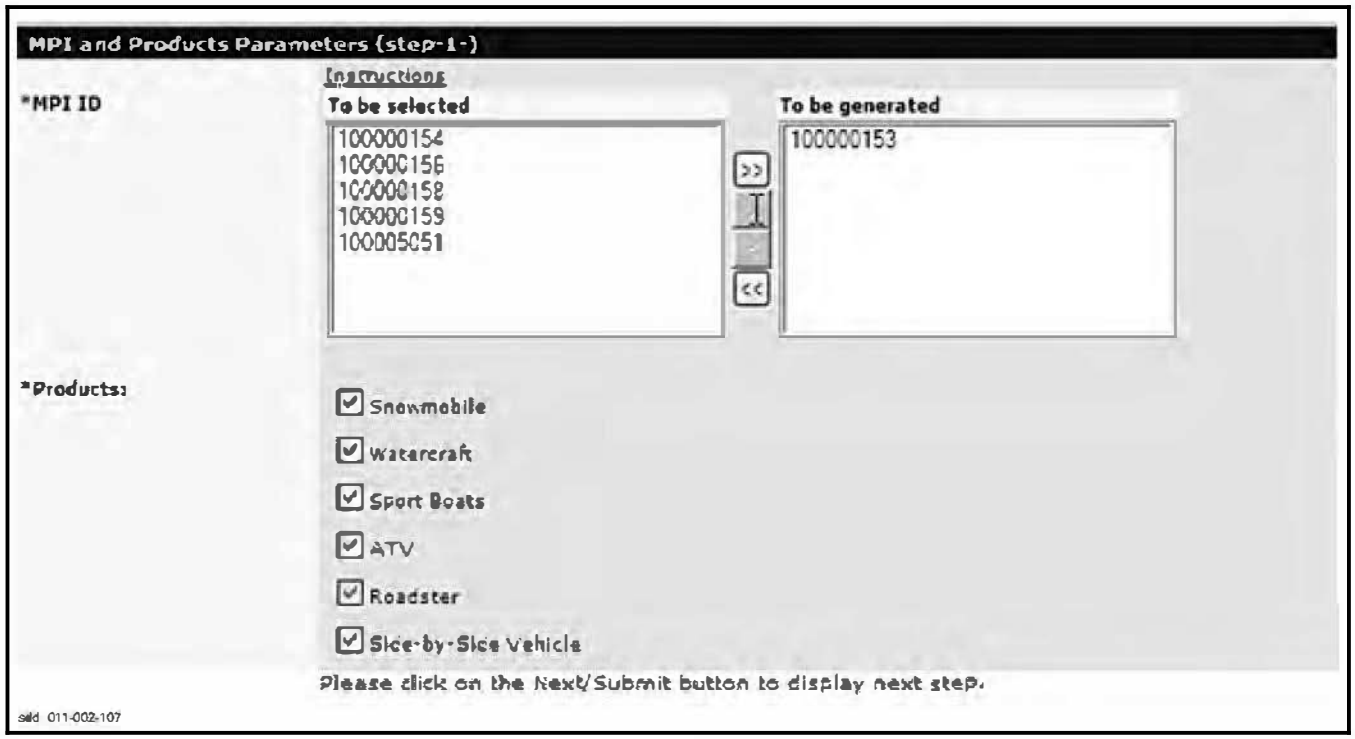
Under the ComCenter Tab, choose the "Get B.U.D.S. Access Codes" menu.



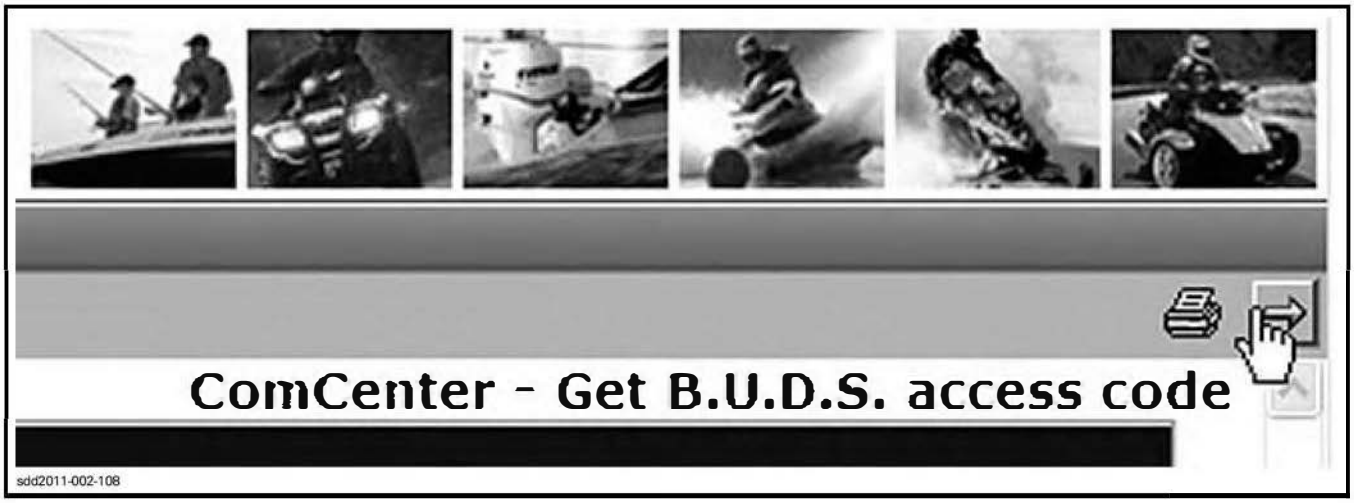
The following screen shows the registered MPI serial numbers recorded previously from manual entries done at the Call Center, that were purchased by your dealership.



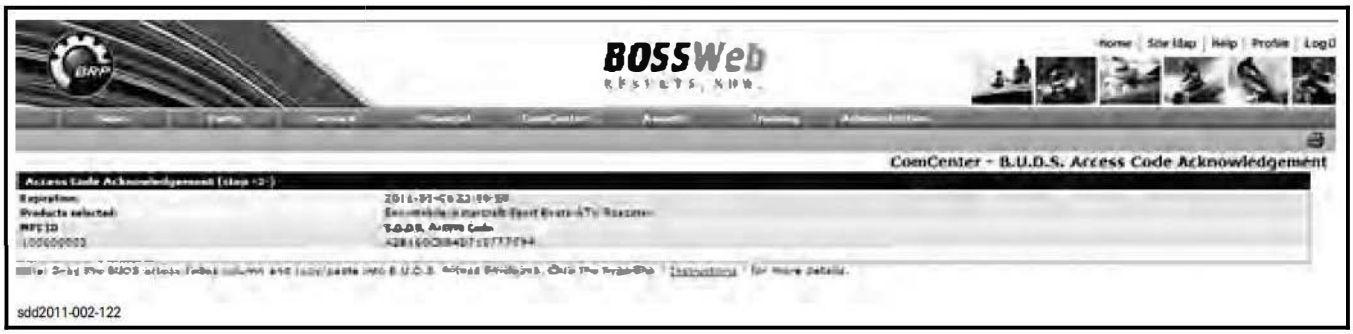
Select the specific MPI serial number you want the access code for by highlighting the serial number. Then push the single arrow to the right for that serial number to be moved to the "to be generated" section.



Then push the blue submit arrow on menu bar to get your code.



Copy the code and type it or paste it in B.U.D.S. Access screen.





NOTE: : If the MPI 2 serial number is not listed in BOSSWeb, you will need to contact your service representative, as you did in the past to have him add the serial number to our master database for future access in BOSSWeb. The service representative will be able to generate a temporary code for you, so you can start using B.U.D.S. immediately.

NOTE: If you no longer have the MPI-2 as listed, contact a Service rep so that it may be removed from your list. This will cause the missing MPI-2 to eventually be deactivated permanently preventing unauthorized use.

"WHAT'S NEWS" LETTER

HOT TIPS AND TRICKS FROM YOUR AFTER SALES GROUP, POSTED WEEKLY

Once a week, the "What's News" letter is published on BOSSWeb. It provides the latest news from the After Sales Department.

3 ways to access the "What's News" letters.

Go to *BOSSWeb* (www.bossweb.brp.com).

On the home page, select the **"What's News" banner [1]** which provides rapid access to the newly published letters for 3 days.

After 3 days, the recently published letters can be accessed through the BOSSWeb home page for an additional 4 days. To access them, choose **What's News** in the *DOCUMENT TYPE* drop down menu **[2]** on the right side of the page.

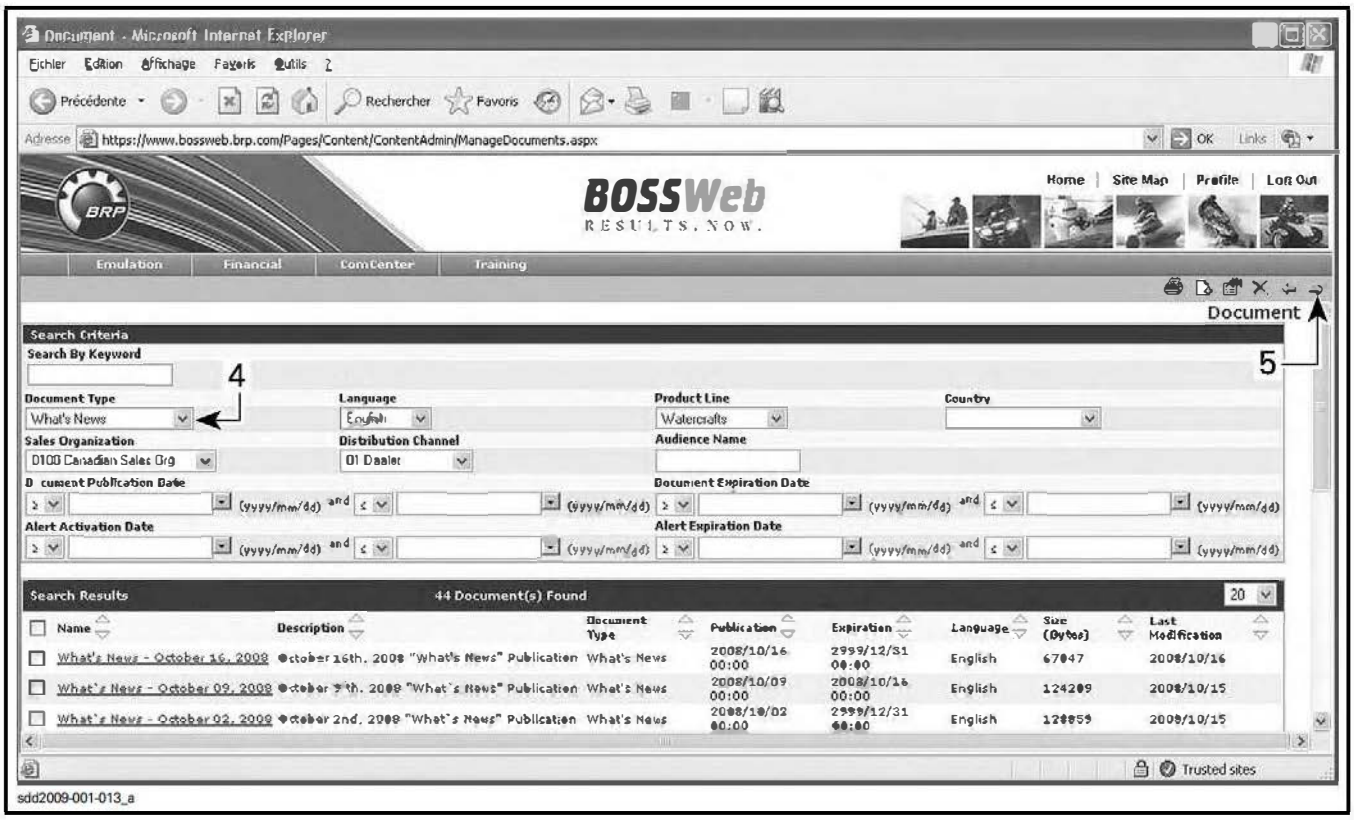
All What's News publications are archived from the first day of publication and available though the *COMCENTER* **[3]** section of BOSSWeb.



They can be accessed by first selecting **Document** in the *COMCENTER* drop down menu **[3]**.

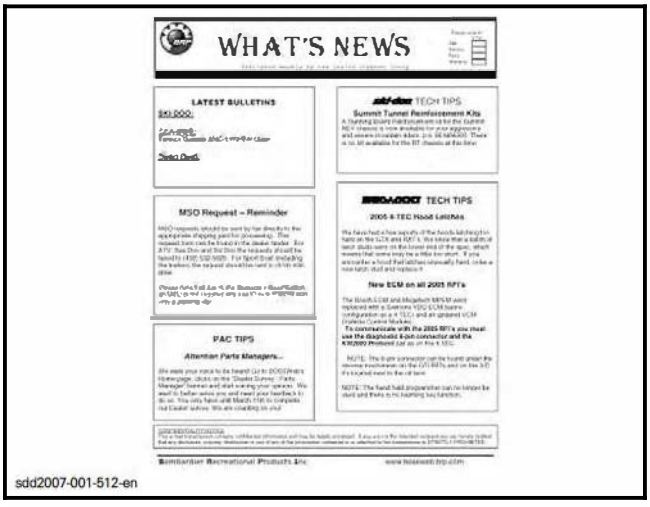
In the *SEARCH CRITERIA FIELD*, choose "What's News" in the **Document Type** drop down box **[4]**, select the appropriate information in the other applicable drop down boxes, and click on the **Submit** arrow **[5]**.

The archived publications shall be listed in the **Search Results** field at the bottom of the page. Double click on the publication name to view it.



NOTE: BOSSWeb is the only place you will find this letter.

This is an example of a What's News letter.



WHAT'S NEWS ARCHIVES

SEARCHING WHAT'S NEWS FOR A PREVIOUS ARTICLE – FIND FUNCTION

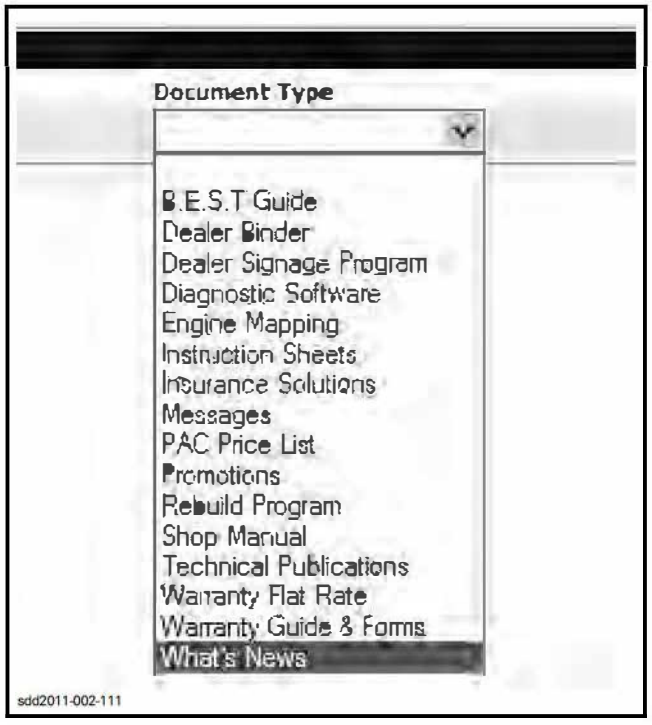
What's News the weekly publication from the BRP after sales service department is not only posted weekly on BOSSWeb, it is put into an archive file and stored on BOSSWeb after the week is over. The What's News files are archived all the way back to the year 2004. Valuable information can be found by simply searching the files as described below.

NOTE: News are also archived on the B.R.P.T.I. website.

To access the What's News archive files, begin by clicking on "document" under the ComCenter pull-down menu.



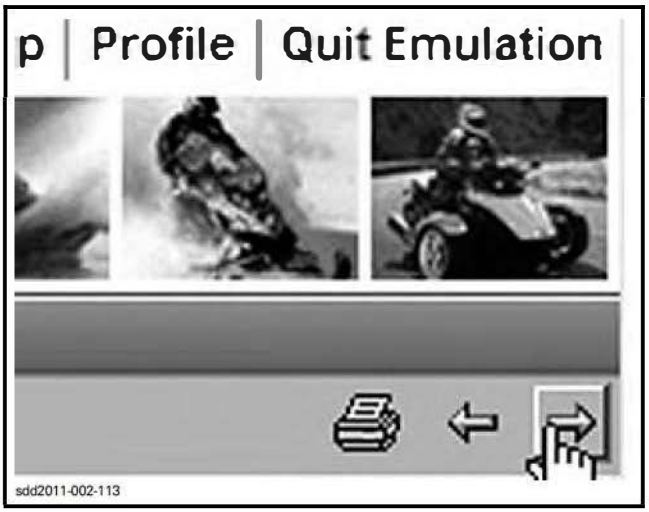
Select "What's News" under "document type".



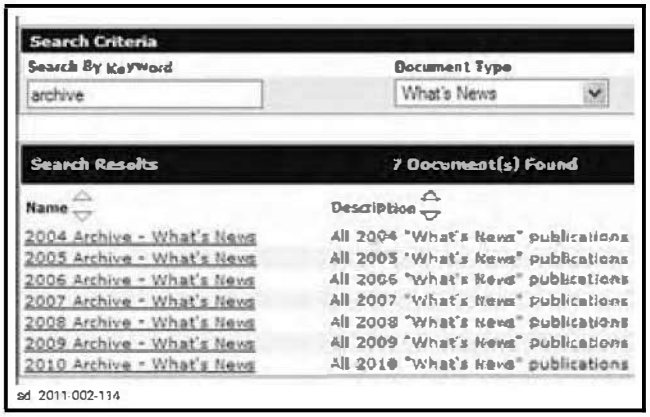
Enter in "archive" in the "search by keyword" window.



Then push the blue submit arrow on menu bar to access the archives.



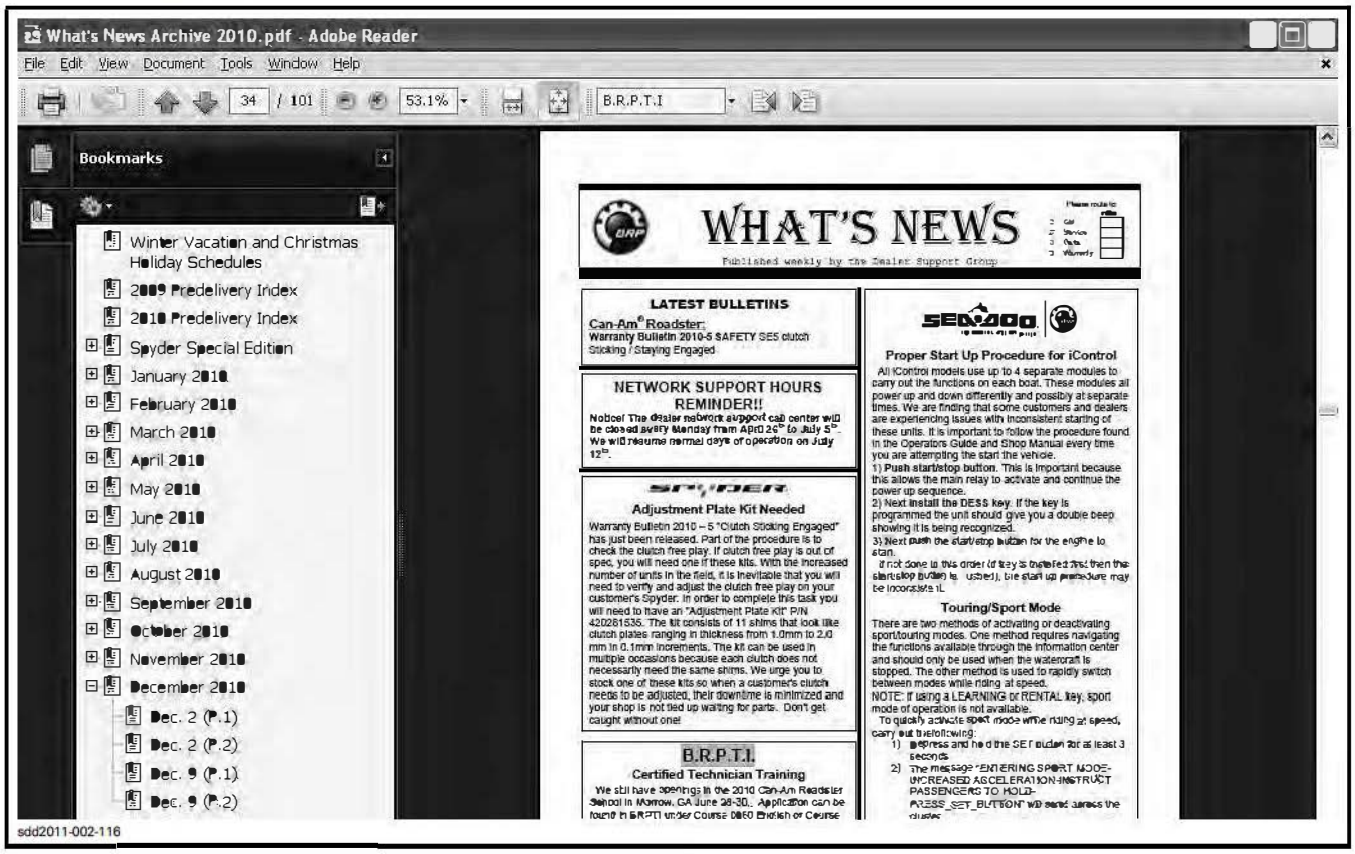
Double click on the years archive you would like to view.



Either open the file from BOSSWeb or save the file to your computer.



If the date of a particular What's News is known simply click on the appropriate bookmark to bring you directly to that page.



To search by a key word click on "find" under the "edit" menu.

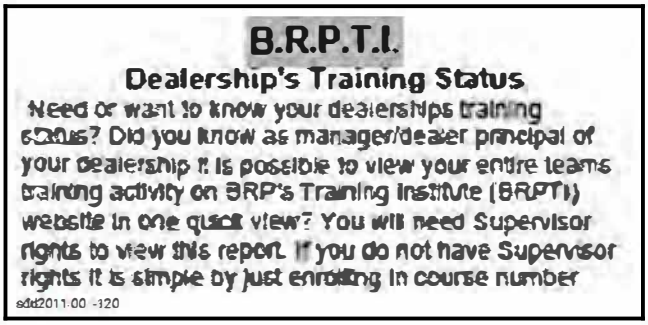


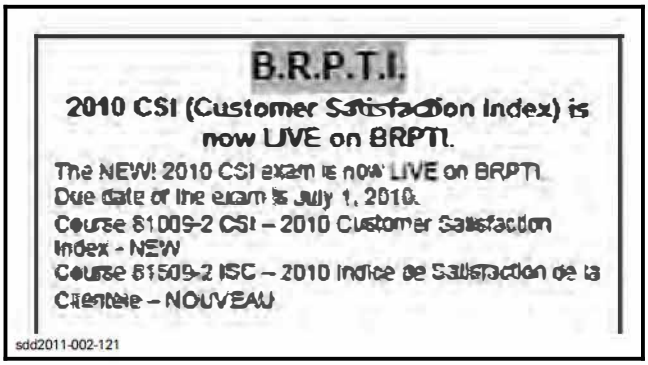
Enter in a key word in the find window. (In this case " B.R.P.T.I." was entered).



Finally hit "enter" on the key board. This will bring you to the next time it is mentioned in the document. Each time "enter" is pushed you will be brought to the next topic with that keyword in the article.







REPORTS ON PERFORMANCE AND QUALITY

RPQ

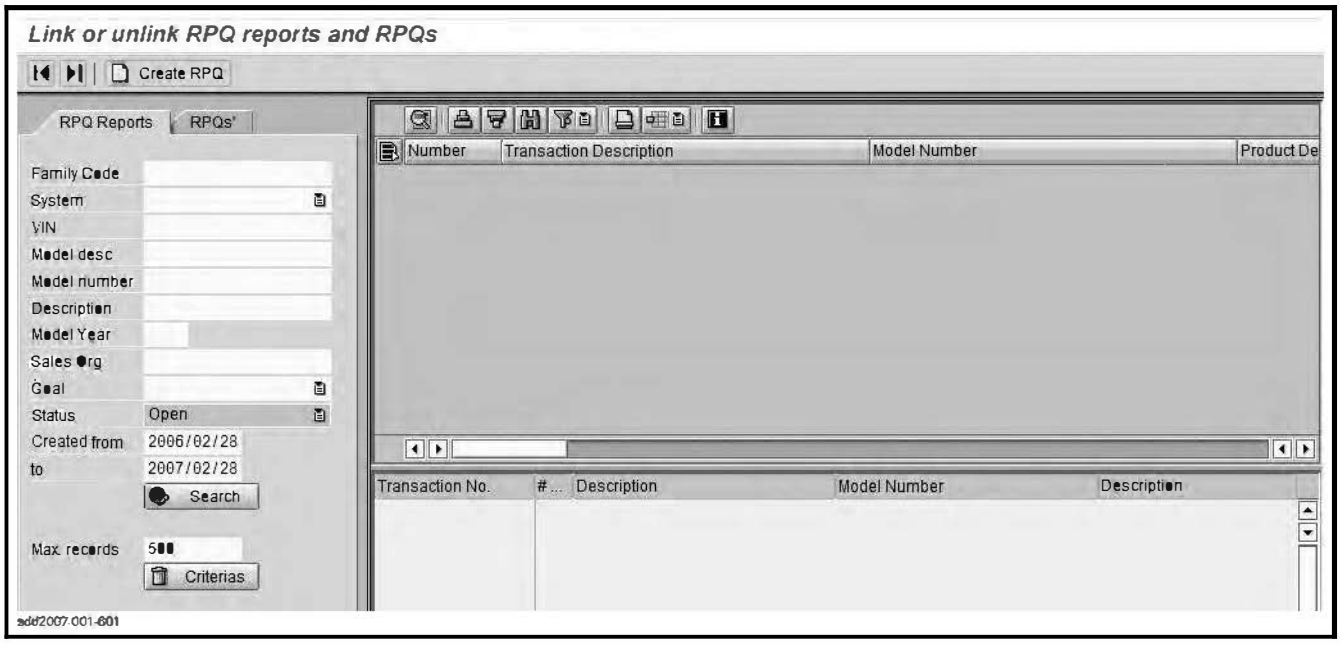
RPQ is the method BRP uses to find out what is happening in the network.

By calling or faxing the **R**eports on **P**erformance and **Q**uality you are helping speed up the investigation process.

Quantity Counts

The quantity of RPQs we receive on issues helps determining priorities; an issue that is occurring on many units will most likely be put in priority. Do not hesitate to report the same issue on different vehicles, especially on the current model year.

This is an example of the information the Service Representative will enter in the data base:



You will be asked:

- Dealer number
- Vehicle model/year
- Serial number
- Mileage/hours
- Possible digital pictures
- B.U.D.S. report
- Riding conditions when the failure occurred.

You will also be asked if there is already a call identification number logged in the system and a detailed description of the issue.

A form is also available in the Annexes Section; it can be filled out and faxed to a Service Representative.

It is important that you tell us about your concerns: Report on Performance and Quality.

IMPORTANCE OF PDI

WAS THE PDI CHECK LIST PROPERLY FILLED AND FILED?

Sell Value for the Money

Give the customer assurance that a proper pre-delivery inspection has been performed on the vehicle. As well as the ability to show all the steps required to justify the expense of "set-up charges".

Professionalism

In today's market place, customers have come to expect nothing but the best from a well trained service department. With the PDI sheet completed and signatures from each person involved you can show your commitment to excellence. When a customer leaves your dealership he should be aware of and have:

- All operators and safety guides.
- His sales information.
- The PDI sheet.
- Proof of registration.

NOTE: The checklist has been modified to include an "OWNER'S SECTION" on the second page that is to be read and signed by the customer.

Was the PDI checklist reviewed with the customer? Was the "OWNER'S SECTION" of the PDI Check list read and signed by the customer?

Legal Protection

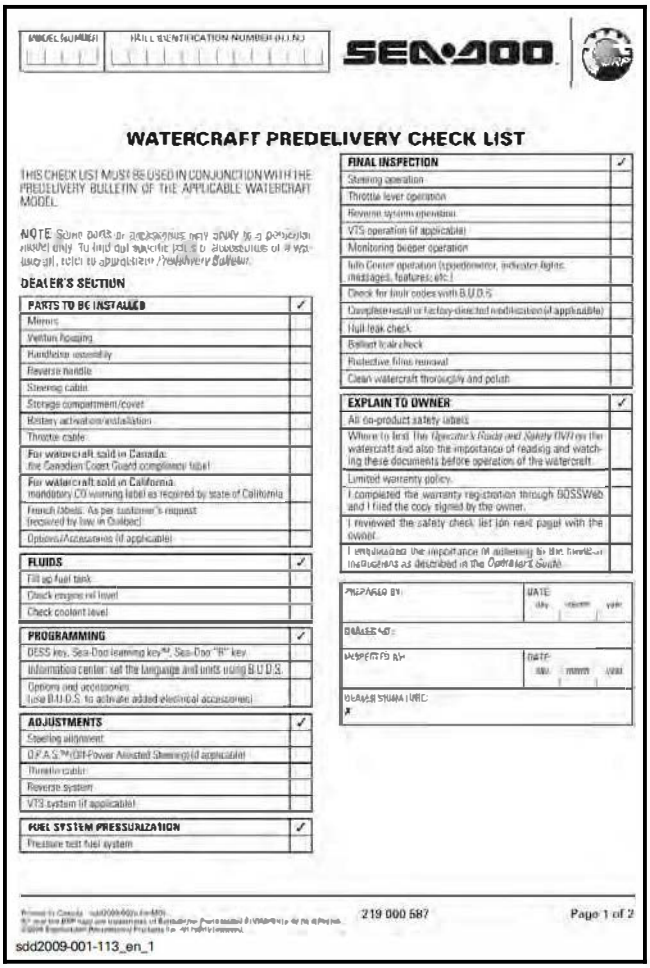
Documented proof that you have reviewed with the customer the operation and maintenance procedures for the vehicle.

Where Do I Find these Documents?

They are shipped with every BRP recreational vehicle or can be found in **BOSSWeb** (www.bossweb.brp.com), **ComCenter** tab, **Document Type** (Technical Publications), **Category** (Checklist).

How Do I Learn More About It!

An easy way to learn more about the delivery process is to view the DVD: Introduction to Dealer Development Training DVD Volume 1; (P/N 219 700 256) from the BRPTI (Bombardier Recreational Products Training Institute) DVD series.



MODEL NUMBER | HULL IDENTIFICATION NUMBER (H.I.N.)

SEA-DOO

WATERCRAFT PREDELIVERY CHECK LIST

THIS CHECK LIST MUST BE USED IN CONJUNCTION WITH THE PREDELIVERY BULLETIN OF THE APPLICABLE WATERCRAFT MODEL.

NOTE: Some parts or accessories may apply to a particular model only. To find out specific parts to assemble or if you have any, refer to applicable Predelivery Bulletin.

DEALER'S SECTION

PARTS TO BE INSTALLED	✓
Mirrors	
Vertun flooring	
Handlebar assembly	
Reverse handle	
Steering cable	
Storage compartment/cover	
Battery activation/installation	
Throttle cable	
For watercraft sold in Canada: the Canadian Coast Guard compliancy label	
For watercraft sold in California: mandatory CO warning label as required by state of California	
French (Multi): As per customer's request (required by law in Québec)	
Options/Accessories (if applicable)	

FLUIDS	✓
Fill up fuel tank	
Check engine oil level	
Check coolant level	

PROGRAMMING	✓
DESS key, Sea-Doo learning key™, Sea-Doo "R" key	
Information center: set the language and units using B.U.D.S.	
Options and accessories (use B.U.D.S. to activate added electrical accessories)	

ADJUSTMENTS	✓
Steering alignment	
D.F.A.S.™ (Off-Power Assisted Steering) (if applicable)	
Throttle cable	
Reverse system	
VTS system (if applicable)	

FUEL SYSTEM PRESSURIZATION	✓
Pressure test fuel system	

FINAL INSPECTION	✓
Steering operation	
Throttle lever operation	
Reverse system operation	
VTS operation (if applicable)	
Monitoring buzzer operation	
Info Center operation (speedometer, indicator lights, messages, features, etc.)	
Check for fault codes with B.U.D.S.	
Completion recall or factory-directed modification (if applicable)	
Hull leak check	
Ballast tank check	
Protective films removal	
Clean watercraft thoroughly and polish	

EXPLAIN TO OWNER	✓
All co-product safety labels	
Where to find The *Operator's Guide and Safety DVD* on the watercraft and also the importance of reading and watching these documents before operation of the watercraft.	
Limited warranty policy.	
I completed the warranty registration through BOSSWeb and I filed the copy signed by the owner.	
I reviewed the safety check list on next page with the owner.	
I emphasized the importance of adhering to the break-in instructions as described in the *Operator's Guide*.	

PREPARED BY: DATE: day / month / year

DEALER NO.:

INSPECTED BY: DATE: day / month / year

DEALER STAMP / ORIG.

X

219 000 587 Page 1 of 2

sdd2009-001-113_en_1

BRP ELECTRONIC PARTS CATALOG

PARTSMART VERSION 8.9.28

By the end of May you will receive the new electronic *PARTS CATALOG PART SMART* version 8.9.28!

If you need detailed instructions (including pictures of example screens) or for network install instructions, access a file called instructions pdf on the *PART SMART CD*.

License Keys

A license key is required for new installations of PartSmart 8.9.28, or if a new license key has been issued for some other reason.

Installation

Server-only Installations. When 8.9.28 is installed from the Server, the software on the client work stations will be updated to the newest version without any additional action required. All Client work stations must exit PartSmart before running the update from the server.

NOTE: If you are using the PartSmart Updater feature, when installation of PartSmart 8.9.28 is complete, you will need to reset the schedule you have in place. To update, click on Start ALL Programs ARI PartSmartUpdate, choose the tab to review and or set up your preferred schedule.

Overall Install

You will be prompted to enter your license key after you launch PartSmart, and to select a catalog which, requires an updated key.

Catalog Install

The catalog data installation has been designed to ensure that catalog updates do not "hang" during the installation and successfully complete regardless of size.

The license key can be found on BOSSWeb.

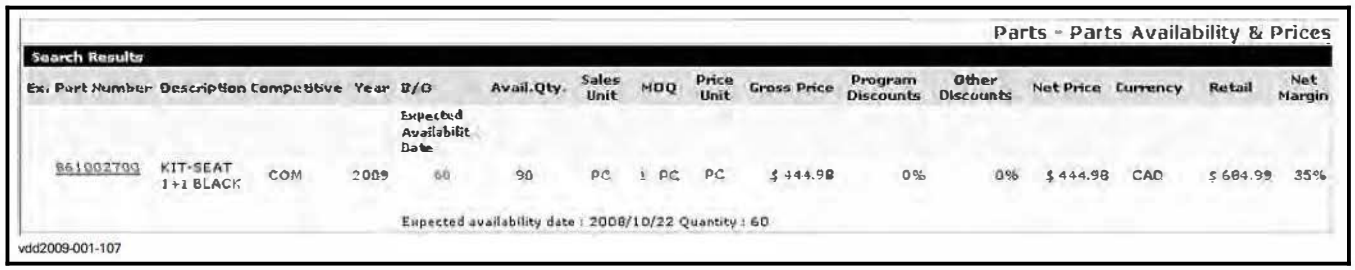
For assistance in obtaining a license key, please communicate with our technology support group.

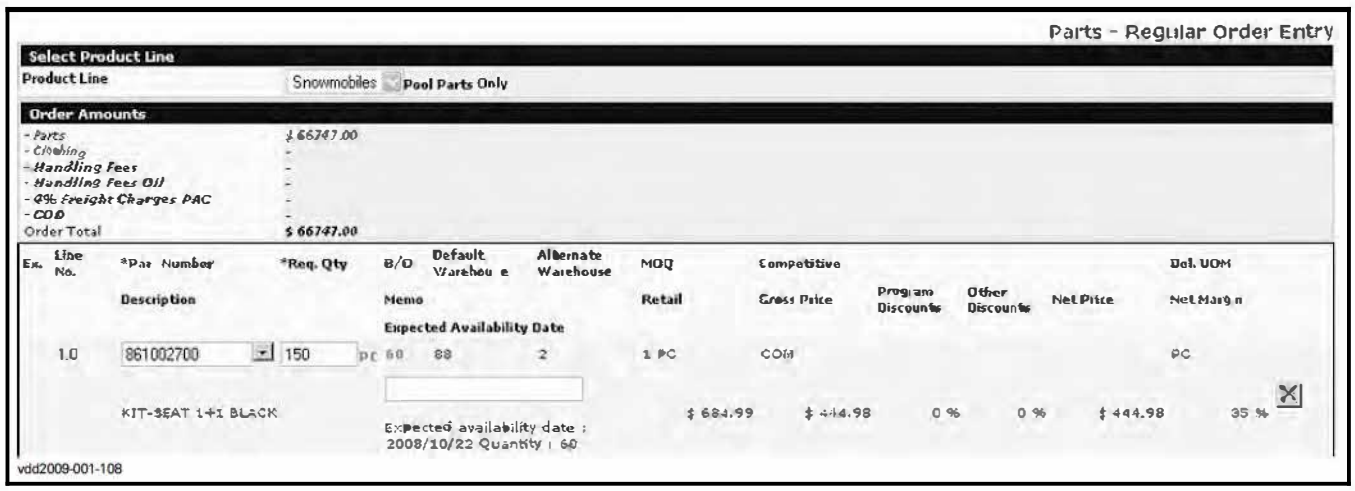
BRP Electronic Parts Catalogs (PartSmart and Empart) are included in the monthly fee, so there is **NO extra billing**.

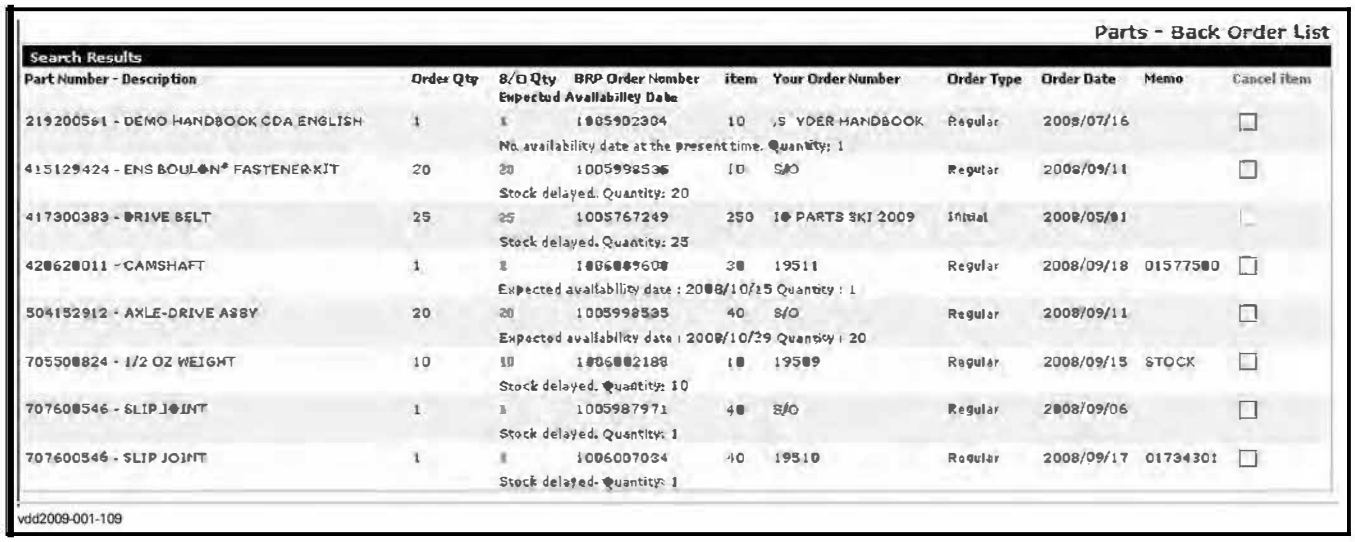
BOSSWEB TIPS AND TRICKS: E.T.A.

PARTS AVAILABILITY SCREEN

You can now see on various BOSSWeb screens, Estimated Time of Arrival (E.T.A.'s) for some our your critical back ordered items:







BOMBARDIER RECREATIONAL PRODUCTS TRAINING INSTITUTE



THE FOUR STEPS TO TECHNICIAN TRAINING

1. Getting Started

How to become a better BRP service technician

GO to BRPTI via BOSSWeb, review your dealership copy of the *BOMBARDIER RECREATIONAL PRODUCTS GUIDE TO SERVICE FUNDAMENTALS BOOKS* (English (P/N 484 800 168) or French (P/N 484 800 167) which was automatically shipped to every dealership. Then complete the Entrance (Qualifier) Exam on the web site. A passing score of 75% allows you to proceed to the Technician level.

2. Technician Level Training

Watch the series (all product lines are DVDs Vol. 1-2-3-4-5, DVD Vol. 6 Sea-Doo Supercharger, DVD Vol. 7 Roadster Technical Overview, and USB Vol. 8 Sea-Doo iControl Advanced Training). Complete all the exams in the Technician Level of your choice on BRPTI. Passing scores of 75% qualifies you for the BRP Technician Level.



vdd2009-001-105

3. Certified Technician Level

After the Technician Level and current Technical Update exams are completed with a passing score, you can register to attend the Certified Level, hands-on training at one of three locations:

- Sherbrooke, QC
- Wausau, WI
- Atlanta, GA


vdd2008-001-053

These courses are 100% hands-on and very challenging. Students receive credits toward their Certified Technician Level for each task completed. Enroll on BRPTI to Course no. 0060 to see the latest information.


vdd2008-001-054

4. Master Technician Level

After being at the Certified Technician Level for one year, if you have 5 years Powersports Industry experience
as a technician, have worked at your current dealership for 2 years, and pass all subsequent applicable Technical Update exams with 90% or higher on the first completion, you may qualify as a Master Technician. Enroll on BRPTI to Course no. 0070 to see the latest information.

BOOK AND DVD QUICK PN REFERENCE

TRAINING PUBLICATIONS

	ENGLISH	FRENCH
Technical Update Books		
2011 Sea-Doo Watercraft and Boats Technical Update Book	219 600 051	219 600 052
2010 Sea-Doo Watercraft and Boats Technical Update Book	219 600 044	219 600 045
2009 Sea-Doo Watercraft and Boats Technical Update Book	219 600 035	219 600 034
2008 Sea-Doo Watercraft and Boats Technical Update Book	219 600 023	219 600 024
2007 Sea-Doo Watercraft and Boats Technical Update Book	219 600 017	219 600 018
2006 Sea-Doo Watercraft and Boats Technical Update Book	219 700 607	219 700 608
2005 Sea-Doo Watercraft and Boats Technical Update Book	219 700 365	219 700 431
Technical Book		
BRP Guide to Service Fundamentals and Principles	484 800 168	484 800 167
Competitive Edge DVDs		
2011 Sea-Doo Watercraft and Boats Competitive Edge	Only available on BRPTI	
2010 Sea-Doo Watercraft and Boats Competitive Edge DVD	297 001 534	297 001 536
2009 Sea-Doo Watercraft and Boats Competitive Edge DVD	297 001 339	297 001 396
2008 Sea-Doo Watercraft and Boats Competitive Edge DVD	297 001 185	297 001 195
Technical Training Materials		
Intro to BRPTI DVD	219 700 196	
Vol 1 Engines	219 700 197	
Vol 2 Electrical Systems	219 700 198	
Vol 3 Fuel Systems	219 700 199	
Vol 4 Suspensions/Chassis/Steering	219 700 200	
Vol 5 Transmissions/Drive Lines	219 700 201	
Vol 6 Supercharger (Sea-Doo)	219 700 273	
Vol 7 Can-Am Roadster Technical Overview	219 701 329	
Vol 7 Can-Am Roadster Technical Overview Workbook	219 600 032	219 600 033
Vol 8 Sea-Doo iControl Advanced Technical Training	219 701 672	219 701 673
Dealer Development Training DVDs		
Vol 1 Introduction to Dealer Development Training	219 700 256	
Vol 2 Dealer Development Training CSI	219 700 325	
Vol 3 Dealer Development Training Service Department Operation	219 700 329	
Vol 4 Dealer Development Training Parts Accessories Management	219 700 403	
Vol 5 Dealer Development Training Selling Skills	219 700 518	
Vol 6 Dealer Development Training Merchandising	219 700 519	

What's New

Engine



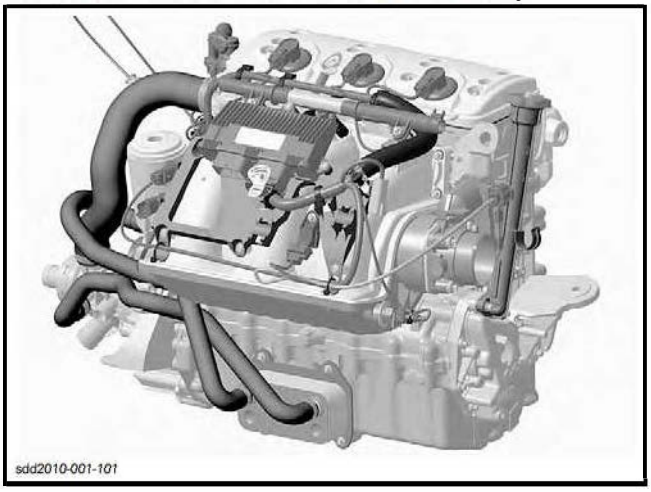
ROTAX 1503 DT ETC (130 HP)

What's New:

New Engine Type

Main differences between DT and DT ETC include

- Bosch ECM
- Electrically controlled throttle body
- PTO cover
- Oil Filter cover


sdd2010-001-101

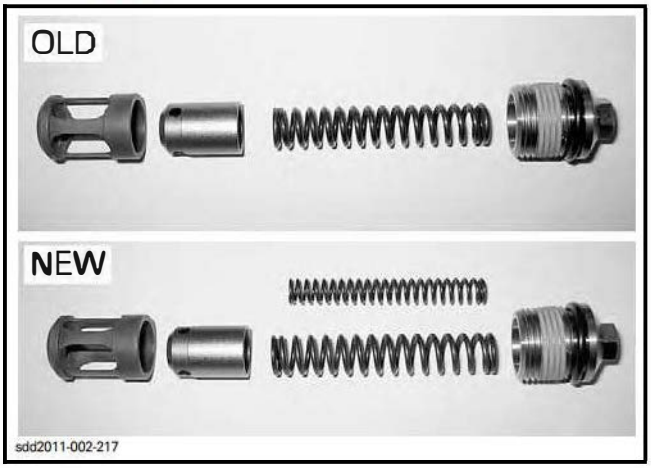
Why:

1503 DT now gets Bosch engine management system and Electric Throttle Control to meet the requirements of the intelligent Throttle Control system (iTC) now used on more models.

ALL 1503

What's New:

Oil Pressure Regulator



sdd2011-002-217

Why:

All engines use double spring oil pressure regulating system for more stable oil pressure. Running Production change. Will retro fit.

1503 DT, 1503 NA ETC, 1503 HO, 1503 HO ETC, 1503 SC IS ETC

What's New:

Ball bearing with bellows assembly


sdd2011-002-219

Why:

Bellows assembly includes ball bearing and stainless steel inner sleeve on ALL engine executions. This is for standardization and use with the stainless drive shafts.

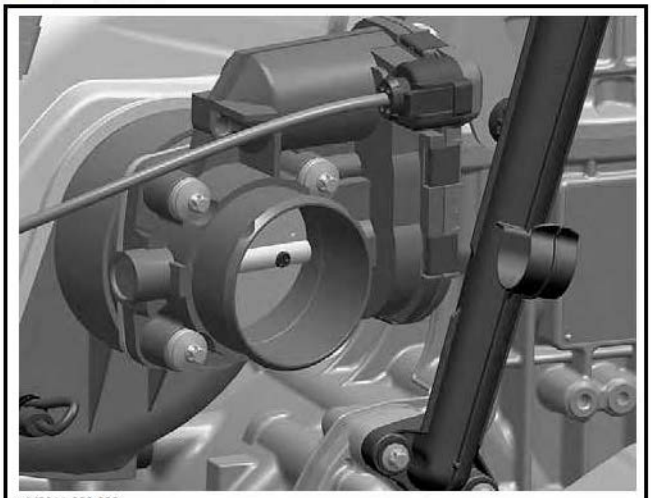
ALL 1503

What's New:

Oil filler tube

Why:

A slight modification to the rib on the side of the tube allow more room to accept the throttle body on the new platform. This new tube is used in all engine executions.


sdd2011-002-220

1503 HO AND 1503SC IS ETC

What's New:

Supercharger friction washer

Why:

Molybdenum coated friction washer for improved durability. To be included in all rebuild kits.


sdd2011-002-221

Watercraft

ALL iCONTROL MODELS


sdd2011-002-222

What's New:

iBR Actuator Module
– 2 different part number actuator modules:
- HO Models
- BVIC and NA Models

Why:

End of iBR shaft is now keyed. Locking sleeve no longer used. Different software calibrations between HO and BVIC/NA models.

ALL iCONTROL MODELS


sdd2011-002-223

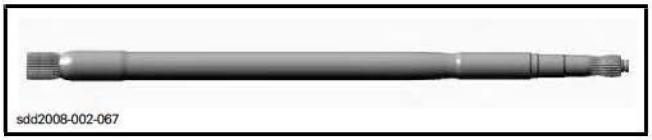
What's New:

"U" Arm

Why:

Now keyed to except the new iBR.

ALL


sdd2008-002-067

What's New:

Drive shaft

Why:

Stainless steel drive replaces carbon steel over molded with rubber coating shafts on all models.

ALL

What's New:

Venturi

Why:

Diameter has changed from 87mm to 83 mm to help improve performance consistency from unit to unit.


sdd2011-002-224

ALL

What's New:

Muffler hose barb

Why:

Diameter of the barb has been increased allowing more consistent and improved cooling hose retention.


sdd2011-002-225

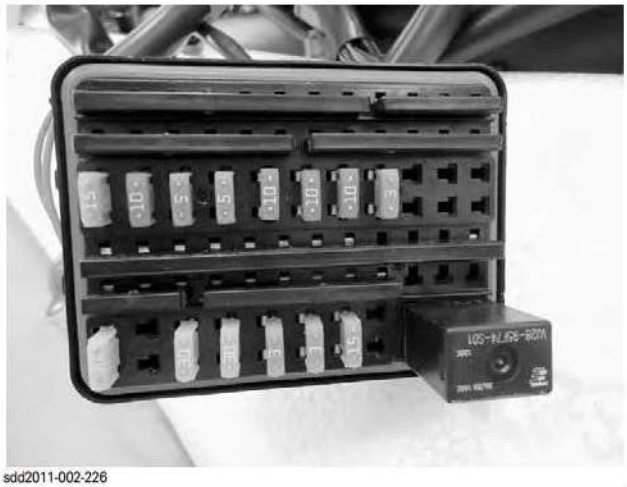
ALL

What's New:

Fuse box

Why:

New fuse box. Will use one single fuse box instead of two separate as found on previous years.


sdd2011-002-226

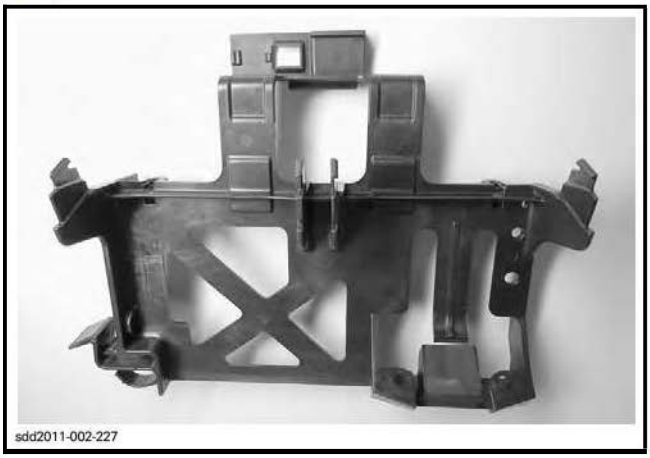
ALL

What's New:

Battery support plate

Why:

Redesigned to attach new single fuse box.



sdd2011-002-227

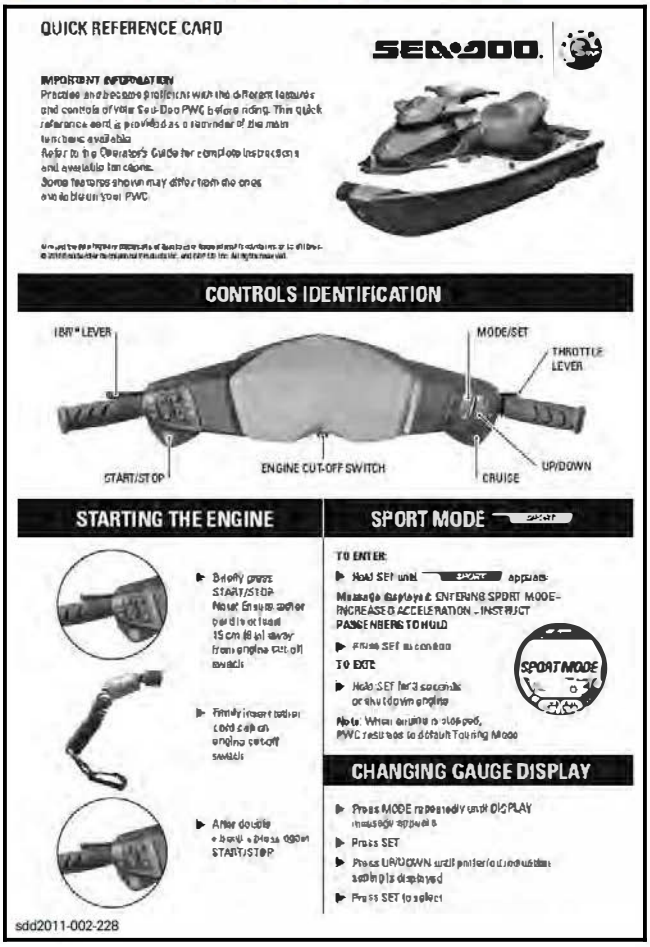
ALL ETC EQUIPPED MODELS

What's New:

Quick Reference Card

Why:

This reference card will be included with all units to be used as a quick guide for customers regarding most commonly used features. (See full card in the ANNEXES section).



sdd2011-002-228

ALL

What's New:

Part Number stamped on all Impellers

Why:

Easier to indentify.



sdd2011-002-229

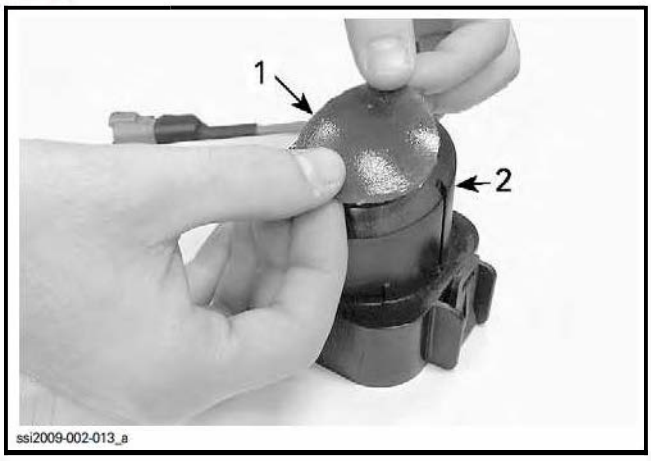
ALL

What's New:

Depth finder gelpad removed

Why:

Will no longer use gelpads between hull and transducer. Silicone will now be utilized to help eliminate manufacturing tolerances between hull and tranducer.



ssi2009-002-013_a

1. Gel pad
2. Depth finder

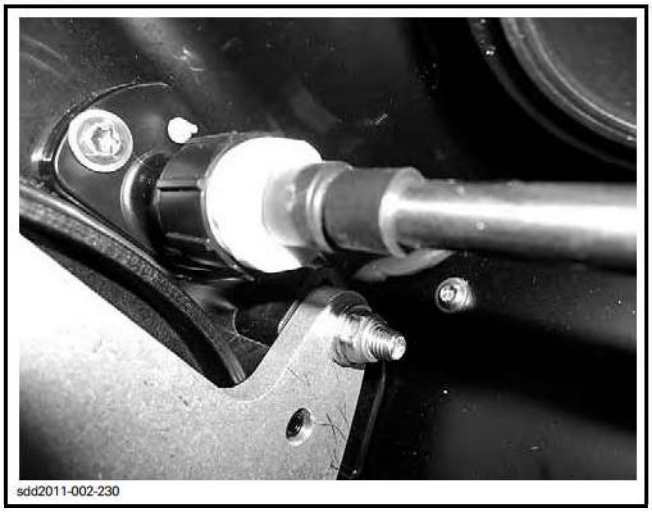
ALL

What's New:

Steering cable thru hull attachment

Why:

Ease installation. Standardization.


sdd2011-002-230

What's New:

Manually Adjustable Suspension

Why:

Race-inspired RXT-X aS 260 is now offered with a new, manually adjustable suspension.

RXT-X aS 260



sdd2011-002-231

What's New:

Complete new shock and coil spring
- 25% stiffer spring rate vs RXT iS Suspension calibration

Why:

Allows for an easily tune able suspension for more aggressive riding.

RXT-X aS 260



sdd2011-002- 2

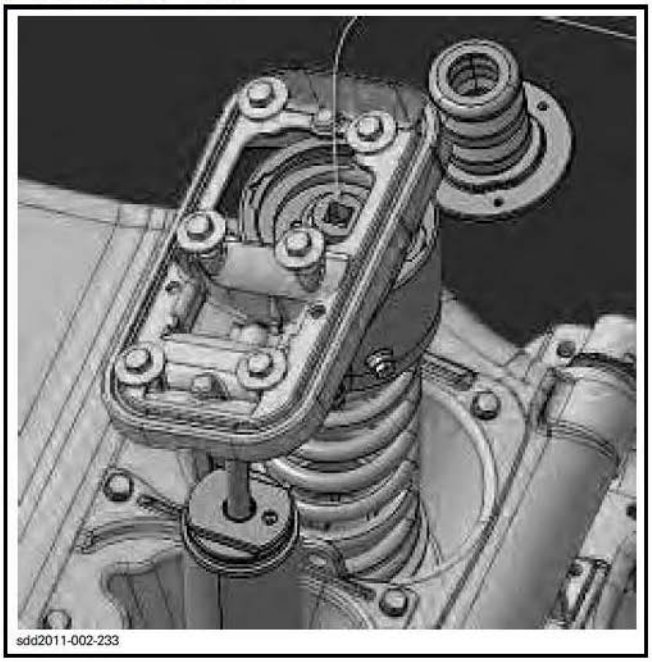
What's New:

Adjustable spring under seat

Why:

Adjustable with tool for additional passenger or heavier rider.

RXT-X aS 260


sdd2011-002-233

RXT-X aS 260

What's New:

Adjustable compression damping

Why:

Easily adjustable clicker allows for 65% to 115% compression damping vs RXT iS via Nittrogen-charged remote oil reservoir located in glovebox.


sdd2011-002-234

ALL iTC

What's New:

Handlebar Switch

Why:

Individual switches improved to give a more positive feel when selecting.



sdd2011-002-235

ALL s3 HULL

What's New:

Fixing Plates

Why:

Nut inserts improved. Insert has improved knurling for better fixation.


sdd2011-002-236

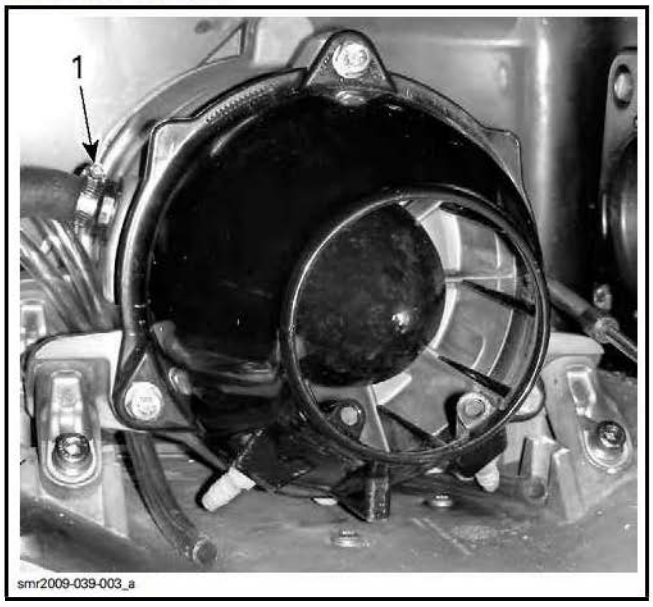
ALL s3 HULL

What's New:

Hose from pump to adapter

Why:

Reinforced over molded mesh design for increased durability.



1. Water pressure hose

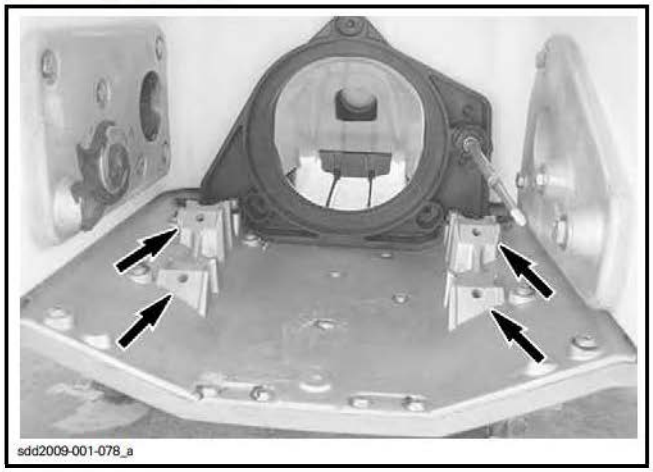
ALL s3 HULL

What's New:

Ride Plate top cover

Why:

Deeper hole and threads for pump retention block bolts for more consistent pump bolt torque.



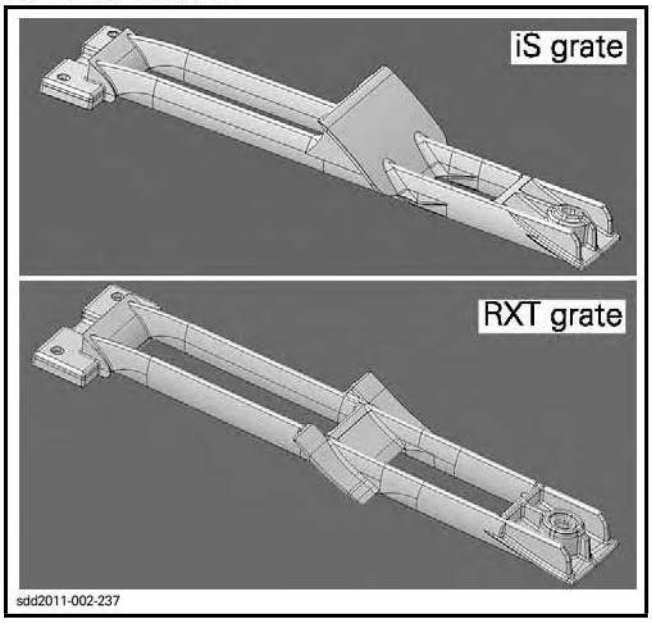
ALL s3 HULL

What's New:

Intake grate

Why:

All s3 hull vehicles get the RXT-X intake grate that was introduced last year. Grate scoop is designed to curve the water flow more upward into the inlet as opposed to more parallel water flow design.



sdd2011-002-237

ALL s3 HULL

What's New:

Seat corner protectors

Why:

Standardization of parts within BRP Will retro fit to earlier years and models.


sdd2011-002-239

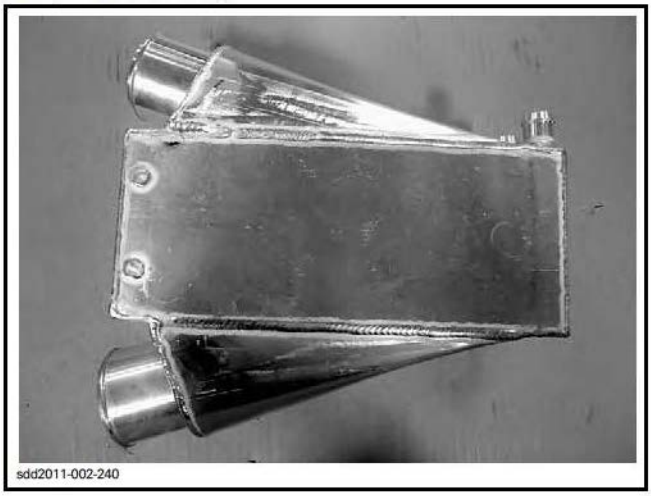
ALL 1503 HO

What's New:

Intercooler

Why:

To match H.O. calibration and ETC. Standardization for all models. Can retro.


sdd2011-002-240

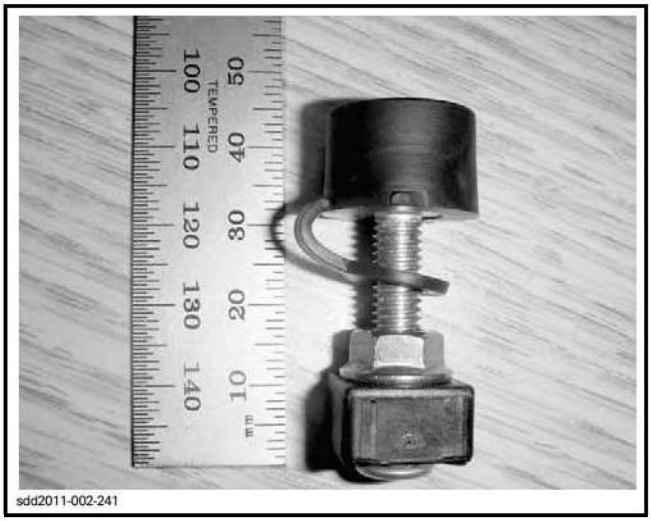
ALL S3 FIXED DECK

What's New:

Rear access panel rubber bumper

Why:

Added tab to the bumper for better retention.



sdd2011-002-241

Sea-Doo Boats

ALL MODELS

What's New:

Challenger Models:
- 180 Challenger/SE
- 210 Challenger/SE
- 230 Challenger/SE

Sport Models
- 210 WAKE
- 210 SP
- 230 WAKE
- 230 SP

Speedster Models
- 150 Speedster
- 200 Speedster



sdd2011-002-201

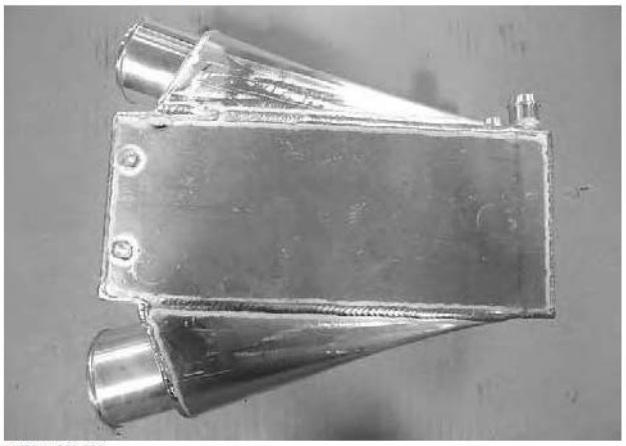
ALL H.O. MODELS

What's New:

Intercooler

Why:

To match H.O. calibration and ETC. Standardization for all models.


sdd2011-002-202

ALL MODELS

What's New:

New capacity label

Why:

To meet ISO standards.



sdd2011-002-203

200 SPEEDSTER, ALL 230

What's New:

New shifter assembly with dual throttles

Why:

New neutral detent shifter and styling to keep the boat from shifting into forward or reverse.


sdd2011-002-204

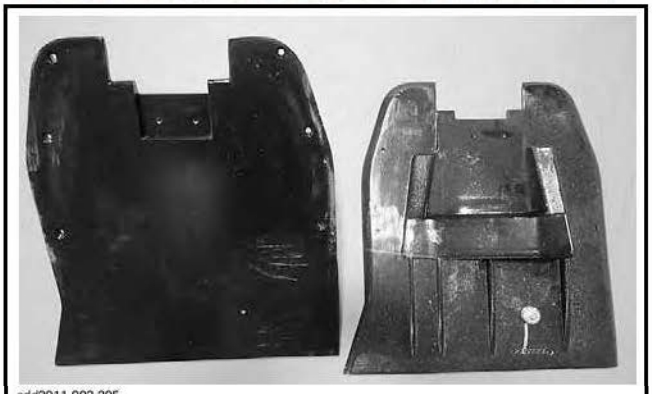
200 SPEEDSTER, ALL 210 AND 230

What's New:

Ride shoe

Why:

Ride plate extensions now integrated with ride shoe. Previous year model had ride plate extensions screwed on with two rows of screws. Allow for more consistent handling characteristics between boats.


sdd2011-002-205

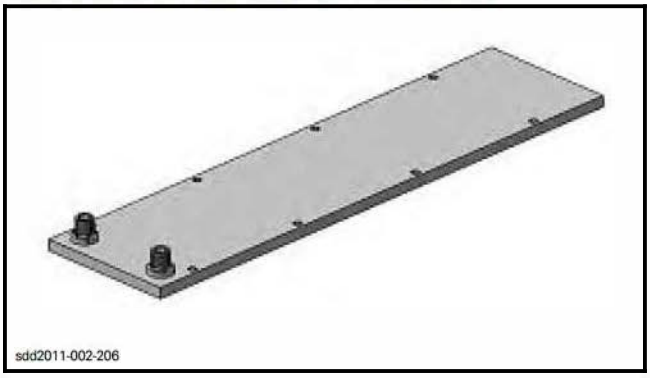
210 AND 230 CHALLENGER

What's New:

Heat exchanger

Why:

Standardization of parts used on 210 and 230 models.


sdd2011-002-206

210 AND 230 CHALLENGER

What's New:

Walk through door and latch assembly

Why:

Fold n' stow door now discontinued on 230 models. Simplification of parts and standardization for 210 and 230 models. New latch assembly used for model year 2011.


sdd2011-002-207

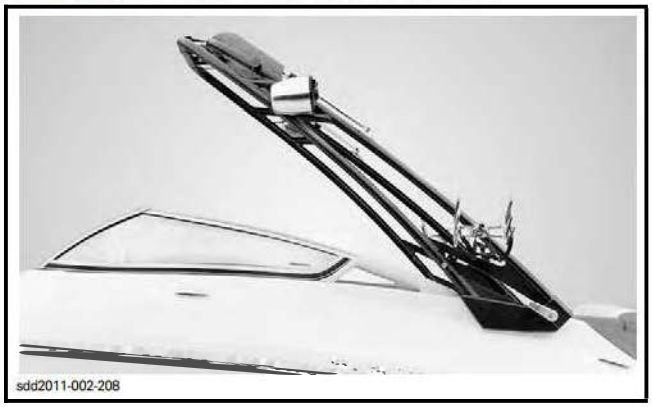
210 AND 230 CHALLENGER

What's New:

New tower and bimini top

Why:

New easy to fold, forward swept tower with modern design. New bimini top to fit with new tower design. Integrated levers release cam latch mechanism on port and starboard sides to lower the tower. Please see Service Bulletin 2011-4 for tower functionality details.


sdd2011-002-208

210 AND 230 CHALLENGER

What's New:

New tower speakers and wakeboard racks (Wake models)

Why:

Comparable sound and less intrusive. More reliable and possibility to add two additional speakers.


sdd2011-002-209

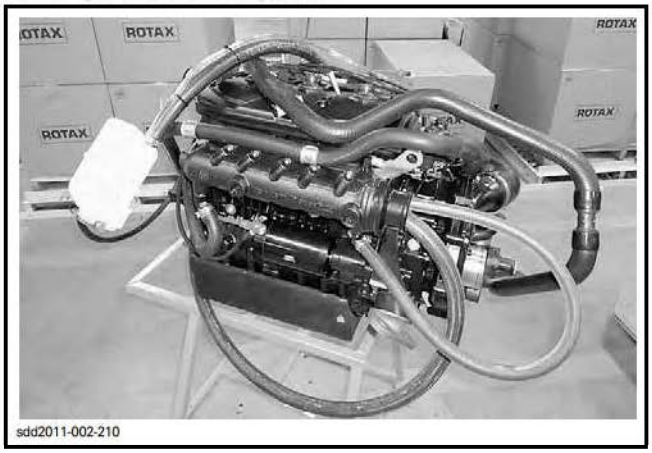
230 CHALLENGER

What's New:

iTC engines

Why:

230 models now feature the same electronically controlled throttle technology found on the 210 Challenger.

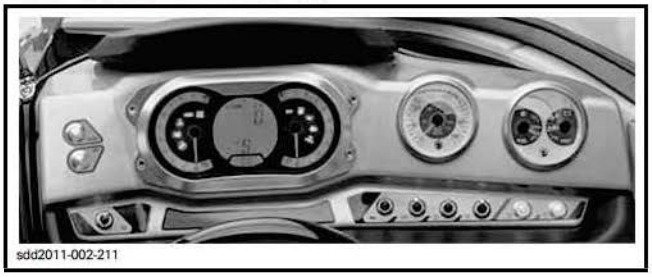


sdd2011-002-210

230 CHALLENGER

What's New:

Helm console and gauge cluster with iTC functions


sdd2011-002-211

Why:

The 230 Challenger will now use the same gauges and cluster found in the 210 models. This allows for several new features such as ECO mode.

210 CHALLENGER

What's New:

Rear swim platform storage area drainage


sdd2011-002-212

Why:

Hose routing and length has been changed to aid in draining. New fittings are also used.

180 CHALLENGER

What's New:

New dash and console


sdd2011-002-213

Why:

New gauge fascia and black console. Clock and depth finder now separate gauges. New rocker switches now standard for all Challenger models. Gauges are backlit with red color.

180 CHALLENGER

What's New:

New black port console and glove box tub

Why:

One radio door and one glove box door. Glued in storage tub.


sdd2011-002-214

180 CHALLENGER

What's New:

New tower and bimini top

Why:

New easy to fold, forward swept tower with modern design. New bimini top on SE models to fit with new tower design. The 180 has a single removable lever that can be used on port and starboard sides to release a cam latch mechanism to lower the tower (an 8 mm Allen wrench will also work). Please see Service Bulletin 2011-4 for tower functionality details.


sdd2011-002-215

150 SPEEDSTER

What's New:

Rub rail mounting and deck to hull bonding

Why:

Rub rail screwed on and hull laminated with Trivera core around shearline (Same as all other models in 2010). Trivera core offers better grip to screw. Bead hull/deck joint with urethane all the way around the shear, no longer Sikaflex. Standardization with all other 2011 models.



sdd2011-002-216

Troubleshooting and Tech Tips

In this section you will find the most current tips and solutions concerning situations that occurred during last season, as well as the latest updated procedures information concerning the latest technologies used by BRP. All the troubleshooting procedure should be used in conjunction with the *SHOP MANUAL* and other BRP service publications.

TROUBLESHOOTING AND TECH TIPS INDEX FROM TECH UPDATE BOOKS - 2002 THROUGH 2010

ENGINE	SUBJECT	YEAR BOOK	DISCUSSED
RFI	Idle	2005	RFI single cylinder idle explained
	3-D steering bushing	2005	New bushings offered
	OTAS	2005	3-D OTAS facts
	3-D TPS	2006	TPS performance issue
	3-D OTAS switch	2006	Discussion on new OTAS switch
	Cylinders	2008	Identifying RFI cylinders differences 2004 and 2003
	TPS settings	2010	When you may want to check TPS settings and how to set
947 DI	Connectors	2002	Connectors that can be plugged in to the wrong component
	Oil consumption	2002	Oil consumption facts
	Injector carbon dam	2002	Installation tips on the carbon dam and O-rings
	Fuel pumps	2002	Issues with the fuel pump
	Fuel pumps	2002	Unseating the check valve on a fuel pump
	15 amp injector fuse	2002	Direct injector shorting out causing the 15 amp injector fuse to blow
	Fuel filter	2002	Fuel filter direction
	CPS faults	2002	Reasons why CPS fault P0335 becomes active
	Air pump	2002	Reasons why air pressure could be low
	Oil tank venting	2002	Oil tank venting
	TPS faults	2002	Detailed info on the 2 types of TPS faults
	Reed valves	2002	Comments on reed valves
	Spark plugs	2002	Spark plug tips
	Rave valve solenoid	2002	Detailed explanation of the rave valve solenoid
	Cylinders and injectors	2004	Component differences between a DI and DI LE
	Loss of ground	2005	Running problem caused by a bad ground
	Engine review	2008	A review of the differences between the DI STD and DI LE engines and parts interchangeability
	MPEM replacement	2010	Detailed procedure on how to replace an MPEM
947 carb	RX-X	2002	Similarities of the RX-X engine and 947 carby
B.U.D.S. on 947's	B.U.D.S.	2002	Fault screen info; terms and meanings on 947 DI's
B.U.D.S. on 4 TEC's	B.U.D.S.	2003	Total review on the installation and functions of B.U.D.S.
			Detailed info on B.U.D.S. functions and cluster displays
			Fault screen info; terms and meanings on 4-TEC's
	MPI-2 hardware	2009	*SERVICE BULLETIN 2006-9.* What is needed for the MPI-2

ENGINE	SUBJECT	YEAR BOOK	DISCUSSED
4-TEC	Valve cover gasket	2003	Model year 2002 valve cover gasket tab removal
	D.E.S.S. (digital encoded security system) recognition	2003	An involved explanation on D.E.S.S. recognition on 2002 models
	4-TEC all	2003	What to do if there is water in engine
	Ring installation	2003	Extra info on piston ring installation
	Oil level check	2003	Defining the proper procedure to check engine oil
	Oil in PTO cover	2003	Reasons why oil collects in the PTO cover, what are the consequences, and what to do about it. See also *2004 TECHNICAL UPDATE BOOK*
	Fault code P1202	2003	Crankcase venting theory, why P1202 becomes active, and what to do about it
	Dipstick blowing out of crankcase	2003	Reasons why what to test
	Cam timing	2003	Step by step cam timing procedure
	Head torque	2003	Head torque and sequence explained
	Flywheel balance holes	2003	Assembly procedure of the encoder wheel and flywheel
	Powering up the MPEM and ECM	2003	The sequence of how these components are powered up
	ECM fuse	2003	Special procedure on checking the 5 amp ECM fuse
	General info	2003	Details about various sensors and fault codes
	OPS and OTPS	2004	Detailed info and troubleshooting procedures on the OPS and OTPS
	Oil in PTO cover	2004	More theory of why oil collects in the PTO cover and what to do about it
	New oil filter cap	2004	Aluminum cap replaces the plastic cap
	Rebuilding a 4 TEC	2004	Helpful facts and tips on rebuilding the 4-TEC engine
	Electrical power loss	2004	A fuse that could cause a power loss
	ECM Kostal connectors	2004	Detailed information on the ECM connectors and troubleshooting tips
	Dept finder message	2004	Why 'Sensor' is displayed on the cluster
	Supercharger slip clutch	2004	Checking a supercharger clutch for slippage, and what to do if it does
	Ventilation	2005	Reason why a carbon seal can cause ventilation
	Intermittent bogs	2005	Troubleshooting running problems
	Engine mount oil leak	2005	Rare oil leak on the front engine mount and procedures to repair it
	Overheating	2005	Different reasons the high temperature is displayed
	Lanyards	2006	Lanyard will programmed ECM will not recognized it
	Bent encoder tooth	2006	Discussion on the encoder wheel
	Flywheel bolts	2006	Non reusable flywheel bolts
	Air silencer restriction	2007	Internal defector that may cause a restiction
	Recorded hours	2007	What hours are recorded
	Long blocks	2007	Introduction of long blocks
	Long block interchangeability	2007	What to do to fit the new longblocks on previous models
	Head interchangeability	2007	Head interchangeability on different year model engines

ENGINE	SUBJECT	YEAR BOOK	DISCUSSED
4-TEC (cont'd)	Valve guides	2007	Finished guides now available
	Cylinder head screws	2007	Cylinder head screws are no longer reusable
	CPS	2007	Test spec's 2006-2007 CPS's
	Fuel pump filter	2007	Discussion on lower fuel pump filter
	Stick coils	2007	Misfires and type of grease to use
	Counter balancers	2007	Differences of counter balancers
	Crankcase breathing	2007	Crankcase venting theory on 2006 and up engines
	OPS wire diagram	2008	Error on wire diagram
	Depth finder	2008	New depth finder
	Fuel pressure gauge	2008	Superseded RFI gauge
	ECM	2008	Polarity protection discussion
	Oil pressure	2008	Oil pressure taken at the head
	Exhaust overheat	2008	Plugged gooseneck injection holes
	Cluster	2008	Ability to flash new cluster *SERVICE BULLETIN 2008-3*
	Over molded drive shafts	2009	Installation procedures
	ECM replacement	2009	ECM replacement with B.U.D.S.
	ECM	2009	Replacement ECM speed issue
	Diode cap	2009	Diode allows the main relay to energize
	Tops switch	2009	Review of TOPS switch function and identification of different types
	1503 crankshaft differences	2009	Changes starting in year 2006
	Oil spray nozzles	2009	Oil spray nozzle identification
	Hose clamps	2009	Inspection of clamps
	Venturi bailer tubes	2010	Bailer system operation
	T-code on cluster	2010	Cluster displays T-Codes when replaced
	s3 hull	2010	s3 Hull repair system
	Drive shaft turning tools	2010	Details on which tools are used for different models
	Over molded Battery cable corrosion	2010	Hidden corrosion causing various electrical issues
	iS fault codes	2010	Detailed review of various iS fault codes
	iS battery box retaining nut issue	2010	Retaining bolts hard to remove or stripped
	1503 oil pressure regulator	2010	OIL light comes on LCD display
	Overheating facts	2010	Explanation of H-TEMP on LCD and possible cause
	iS analog inoperative	2010	Analog needles inoperable
	iS fault code strategy update	2010	*WARRANTY BULLETIN 2009-3* P0232 & C2232
	Collapsed oil filter	2010	What causes oil filters to collapse
	1503 long blocks	2010	Descrption of assembles and associated part numbers
	Bent rods	2010	Pictures and causes of bent rods

ENGINE	SUBJECT	YEAR BOOK	DISCUSSED
4-TEC GTI rental	Battery	2008	Installing a 2008 GTI rental battery on previous GTI
4-TEC SCIC	RXP recalibration	2005	Facts about the 2004 RXP recalibration
	ECM's and wire harness	2005	Explanation of the knock sensor adapter, wire harness and ECM facts
	Wire harness on BVIC	2006	Wire harness updates
	Intercoolers	2006	Testing intercoolers
	Superchargers	2006	Kit P/N's and rebuild facts
	Dirty superchargers	2007	What a dirty supercharger can do to performance
	Supercharger repair kits	2008	Kit part numbers and repair procedures
	External intercooler condensation	2009	Engine may stumble, until water is processed
	Fault code P0106	2010	Intake pressure sensor out of range/ Booster
Miscesllaneous	Spark plug and piston failure analysis	2002	Detailed failure modes on spark plugs and pistons
	Vinyl cleaners	2006	Recommended vinyl cleaners
	Wire diagram book	2007	Part number of the book
	Fiberglass and Gelcote warranty claims	2010	Reminder on what is needed when contacting Technical Service for warranty claiming
	Electrical current draw	2010	Electrical draw specifications
RFI, DI & 4 TEC	Maintenance light flashing	2010	Review on how to reset maintenace light
Sea-Doo Boat	Perfect pass	2008	User's guide
	Wakeboard tower sound system	2008	Infinity instruction and installation guide
	Sea-Doo Boat reverse gate bushing seizing	2010	Reverse gate difficult to move. *SERVICE BULLETIN 2009-6*
	08-09 Challenger 230 sliding door end cap failure	2010	New thicker cap part numbers listed
OPAS equipped models	OPAS	2003	OPAS info and facts
All injected engines	Fuel filter	2004	Mesh filters now available on the bottom of the fuel pumps
2004 2-stroke	D.E.S.S. switch and cut-off relay	2004	Detailed info and schematic diagrams of these 2 components
2004 2-stroke	Mag wire chaffing	2005	Prevention of mag wire chaffing

D.E.S.S. KEY RECOGNITION

Intermittent D.E.S.S. Key Recognition

We have written about D.E.S.S. key recognition and the proper procedures to follow in order to get the iControl units to recognize the key and then start but have continued to receive reports of issues with this.

Remember the D.E.S.S. lanyard has two functions. One is the magnet inside the lanyard draws up and closes the switch inside the D.E.S.S. post when attached, waking the ECM. The ECM then "Searches" for the computer chip inside the lanyard and determines if it is a code that has been programmed to the ECM. The logic in the ECM was originally programmed as follows. After the switch has been closed by the lanyard, the ECM has one second to find and accept the code in the lanyard. Thus, if the lanyard is held close to the post the magnet is strong enough to close the switch and start the timer. If the lanyard is not attached fully within 1 second the ECM does not recognize the key and the single beep will be heard.

Since then a Warranty Bulletin was produced and the procedure raises the time limit from the original 1 second to a longer time of 5 seconds. This update greatly reduces the chance of a false start up of the unit.

If there are any customer complaints of inconsistent tether operation please reference and perform Warranty Bulletin 2010-9. All unsold units should have Warranty Bulletin 2010-10 performed before delivery to the customer

Following the procedure found in the Operator's Guide and Shop Manual every time you are attempting to start the vehicle will allow proper D.E.S.S. recognition and ease the staring procedure.

1. **D.E.S.S. key should be at least 6 inches from D.E.S.S. post.**
2. **Push START/STOP button.** This is important because this allows the main relay to activate and continue the power up sequence.
3. Next firmly and with purpose **install the D.E.S.S. key**. If the key is programmed the unit should give you a double beep showing it is being recognized.
4. Next push the START/STOP button for the engine to start. If not done in this order (if key is installed first then the start/stop button is pushed), the start up procedure may be inconsistent.

NEW ENGINE ALIGNMENT PROCEDURE FOR ICONTROL UNITS

The 2010 Technical Update Book discusses the change in alignment specifications to the alignment shaft. Then Service Bulletin 2010-6 was created to list the changes in the alignment tools to modify the original alignment tools produced, for the 2009 and 2010 model year units. To simplify all this, the 2010 Shop Manual has a complete updated procedure utilizing the new alignment tools. This procedure can be found starting on page 24 in the *2010 RXT/GTX/WAKE PRO SERIES SHOP MANUAL*.

All 2009 and 2010 iControl units should be aligned with this updated procedure.

P0127 FAULT CODE ON 1503 NA

When ever a customer with a 2010 Sea-Doo, produced with a NA (normally aspirated) engine, is experiencing a Check Engine light, warning buzzer and the unit has a rev limit of 6700, check the unit with B.U.D.S. for an active or occurred P0127 code. This normally will occur during hot engine re-starts in very warm ambient climates. A likely scenario would be while skiing or tubing on a hot day and restarting the engine shortly after stopping it.

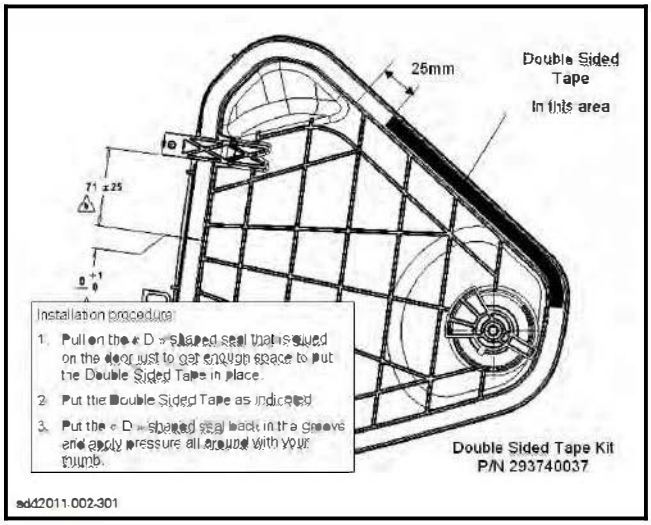
This is caused by a fault code that was intended to detect inoperable intercoolers on intercooled models only. The air temperature sensor (ATS) is located in the engine air intake plenum and will sense very warm air accumulating in the plenum on a hot engine when it is stopped. Upon restart the ECM software is setting a fault because it is sensing air over 120 degrees and therefore reports that the Intercooler is not working, even though the NA does not have one.

This situation has been remedied by performing Warranty Bulletin 2010-10 (unsold units) or Warranty Bulletin 2010-9 (sold units).

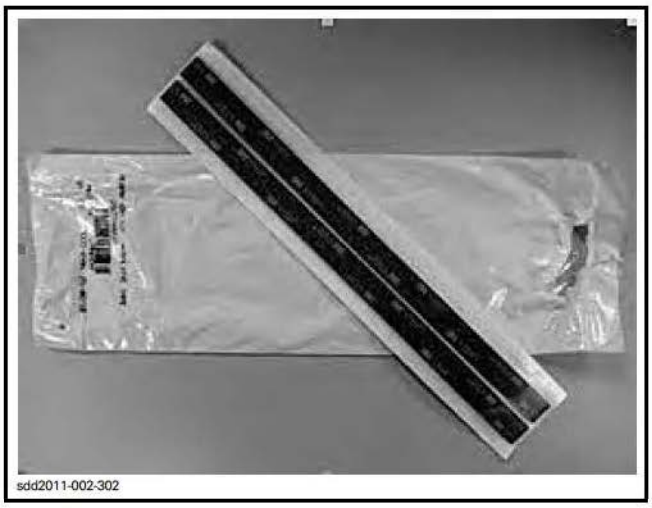
Please locate and read these bulletins as related to the effected units.

2010 FIXED DECK GTX, RXT AND WAKE MODELS

Some iControl fixed deck models may have a gap between the access panel and the hull when fully closed. In certain extreme riding conditions or uncovered mooring situations during very heavy rains, some customers may experience what they feel is unacceptable leakage from the rear access panel seals. A Double Sided Tape Kit (P/N 293 740 037) has been developed to address the issue, however it must be understood that these panels are not designed to be water tight in submersed conditions. Always keep unattended watercraft covered.



Double sided tape kit P/N 293 740 037.



Remove access panels.

Pull up "D" shaped seal that is glued on the door just to get enough space to put the new "double Sided" tape in place.



Install Double Sided Tape starting 25 mm or 1 inch from recess edge as shown.


sdd2011-002-304

Reinstall the "D" shaped seal back in the groove and apply pressure all around with your thumb.


sdd2011-002-305

WATERCRAFT BULLETIN OVERVIEW

When prepping any new model year 2009 or 2010 watercrafts it is important to perform all the outstanding Service and Warranty Bulletins. This will eliminate the need for the customer to bring the unit back to your dealership for updates, after the unit is originally delivered.

Listed here is a quick reference guide to bulletins that may need to be finalized before the unit is delivered to the customer at the time of sale.

2009 iS:

Warranty Bulletin 2009-2 – Supercharger outlet hose inspection, front splash deflector rivets, seat inspection and adjustment and iBR software Update

Warranty Bulletin 2009-3 – iS Fault Code Strategy Update

Warranty Bulletin 2009-4 – D.E.S.S. Key replacement at PDI for iS models.

Warranty Bulletin 2009-5 -- Replace the cluster

2010 Various Models:

Warranty Bulletin 2010-1 Rear view mirror broken

Warranty Bulletin 2010-6 Supercharger hose inspection

Warranty Bulletin 2010-7 iBR Inspection at PDI

BOARDING PLATFORM AND STORAGE COVER SHOCK ENDS REPLACEMENT

When removing these shocks you must first cut the tie wrap holding the protective bellows. Then unscrew the gas shock from the shock nut. The complete procedure can be found in the 2009 and 2010 Shop Manuals or the 2009 Interactive Shop Manual which was sent to your dealership 2 years ago. If your customer accidently breaks the shock nut, it is available separately, without having to order the entire shock. Simply order P/N 269 501 717 and replace it. Warranty does not pay claims for the entire shock assembly if the shock is not defective.

FRONT PANEL MELTING AND DEFORMING

A very important step in the PDI process is getting the unit out of the crate. We have found a potential issue that may arise if the following steps are not followed.

It is critical when uncrating a Sea-Doo Watercraft, to take the unit out of the shipping bag or protective wrap as soon as the top of the crate is removed. We have found that if the unit is left inside the enclosed bag with exposure to the sun, temperatures can rise to significantly high levels. This increase in temperature may be hot enough to start to melt and distort the plastic hood. Please make sure your PDI team is aware of this communication.



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GPS OPERATION



The GPS found on the new iS Watercrafts has many functions. This GPS is located in the craft's dash cluster. There is a GPS INDICATOR LIGHT located on the cluster to show if the satellites have been located. The GPS needs at least 3 locked satellites to have the LED ON and use GPS speed.

One function of the GPS is to monitor the speed of the vehicle, which was obtained on prior models thru the use of a paddle wheel on the stern of the craft. With the new system the vehicle speed will still be displayed even if the GPS signal is **temporarily** lost, by using a default mode that is calculated in the iBR. Because the GPS is located in the cluster of the vehicle, it is always powered up, even after the main relay is powered down. After the ECM is shut down, if the watercraft is used within 2 hours, the GPS will be ready within 3 seconds because the GPS uses the satellites almanac data in its memory. If the watercraft is used after the 2 hour shut down, the GPS will need to find the satellites. It can take up to 30 seconds after the satellites are found, for the speed reading to show on the cluster.

Because the clock, altimeter and compass functions on iControl craft's are set thru the GPS, the craft must have a satellite signal for these to operate. The clock time in hours can be set if needed, as stated in the owner's manual, but the minutes can not be altered.

Care must be taken when troubleshooting a cluster related issue, and keep in mind that the issue could be caused by a failed satellite signal to the GPS. Most of the time troubleshooting is performed inside a shop environment and it is likely the GPS **WILL NOT** get a signal indoors.

ICATCH TRAILER UPDATES

Several updates have been written since the iCatch trailer was 1st introduced last season. The PDI bulletin was updated reflecting the Extremely important changes in trailer set up, utilizing the optimum location of the "fit", since the iCatch system is adjusted specifically to the PWC hull type. The iCatch system must be used along with the iCatch bow cup for proper mounting at the front of the craft. It is also mandated to be sure the craft is properly strapped at the rear as stated in the owner's manual. A thorough understanding of the trailer operation, discussed with the customer at the time of delivery, will help to eliminate all the trailering concerns of the customer.

When performing a PDI on an iCatch trailer please reference this quick overview of the appropriate Warranty and Service Bulletins.

2010 Models

Predelivery Bulletin 2010-5, Rev 3

Warranty Bulletin 2010-5 iCatch alignment and Safety Cable Installation

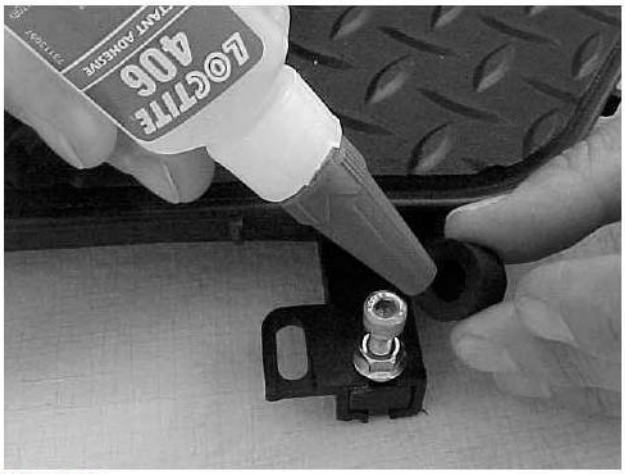
Warranty Bulletin 2010-8 iCatch Handle Cable Breakage

2011 Models

Predelivery Bulletin 2011-1 Rev 1

REAR ACCESS COVER RUBBER BUMPER

TIP: To keep the rubber bumpers that cover the Allen bolts on the access panels from falling off, a possible preventive procedure is to apply a drop of adhesive to the rubber bumper (P/N 291 003 038) before installing it onto the bolt. Loctite 414 (P/N 413 705 800) should be used. Loctite 406 (P/N 293 800 100) can be substituted if needed.



sdd2011-002-308


sdd2011-002-309

B.U.D.S.

BRP Utility and Diagnostic Software

Bulletin

December 15, 2010 Subject: **New Version of B.U.D.S. (3.0.3.5) for Watercraft and Boat** No. **N/A**

YEAR	MODEL	MODEL NUMBER	SERIAL NUMBER
All	All Sea-Doo™ Watercraft and Boat	All	All

GUIDELINES

This B.U.D.S. version is for Sea-Doo watercrafts and boats only.

NOTE: You will not able to read any other product line. Other product lines should be using the following versions available on BOSSWeb.

B.U.D.S. VERSION	PRODUCT LINE
3.0.5.4	Can-Am™ Roadster
P2.3.31	Can-Am ATV
3.0.1.2	Can-Am Side-by-Side
3.1.2.0	Ski-Doo® and Lynx®

REMINDER: All MY2006 and older products must still use the version P2.3.14 as per the *B.U.D.S. REVISED BULLETIN P2.3.26* dated September of 2009.

The new B.U.D.S. version is now available on BOSSWeb, go to:

- www.bossweb.brp.com
- ComCenter = Document
- Document Type = Diagnostic Software
- Select the following version

B.U.D.S. 3.0.3.5

IMPORTANT: Like previous version of B.U.D.S., this new version 3 requires an access code. Starting with version 3.0, the access code is now available on BOSSWeb, there is no need to call your service representative. Go to:

- www.bossweb.brp.com
- ComCenter = Document
- Document Type = Diagnostic Software
- Select the following document

Get B.U.D.S. 3.0 Access codes on BOSSWeb ComCenter

Refer to the following table for detail of the new version.

NEW FEATURES

- Support all MY2011 SeaDoo/Boat models
- Integration of all published FC files for Watercraft / Boat:
  - 296000339.FC / 296000340.FC : ECM update for Watercraft MY2010 (fix for intermittent tether cord recognition and P0127 issue, per warranty bulletins 2010-9 and 2010-10
  - 296000341.FC: Cluster update for Boat MY2010 (fix U1301 issue, per warranty bulletin 2010-8)
  - 296000343.FC: ECM update for Boat (Sync mode functionality improvement)
  - 296000344.FC: Cluster update for GTX®/RXT™ 215/260 Premium, RXT™-X™ and RXT™-X™ aS™ (fix distance to empty, "speed not plausible" ECM error and cluster buzzing in severe water conditions)

IMPROVEMENTS

- Disappearance of hidden dialog boxes. Hidden boxes caused B.U.D.S. to appear frozen.
- D.E.S.S. POST INTERFACE (P/N 529 036 019) is now detected on all models. No more need to go in MPI menu to select informations
- Fault information reported when clicking on the "more details" button
- Validation of model number
- Automatic procedure for ECM replacement

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B.U.D.S. SOFTWARE INSTALLATION

Proceed with the regular installation procedure.

If you are not familiar with B.U.D.S. or how to install it please go to:

- www.bossweb.brp.com
- ComCenter = Document
- Document Type = Diagnostic Software
- Category = B.U.D.S.
- Select the following document

B.U.D.S. PROGRAM INSTALLATION INSTRUCTIONS

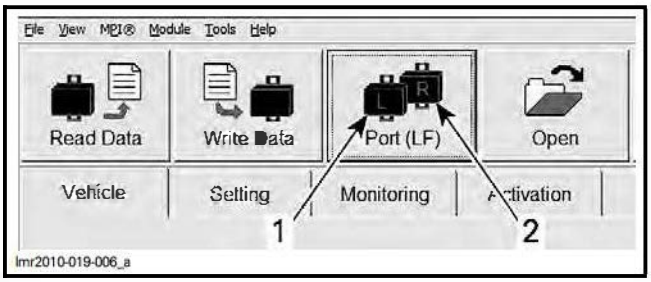
† GTX is a registered trademark of Castrol Ltd, used under license.

NEUTRAL SWITCH FAILURE ON 210 CHALLENGER MODELS

In 2010, a number of Challenger 210 models were built with a new style shifter that uses a typical marine grade neutral safety switch. Some of these switches have the potential to fail, thus rendering the starting system inoperable. This issue was identified and a Warranty Bulletin issued. The bulletin number is 2010-5; it is a campaign that should be performed at PDI if possible. **To Recap**: the symptom is both starter motors being disabled, leading to a no-start condition.

210 AND 230 CHALLENGER B.U.D.S. TIP

210 and 230 Challenger Sea-Doo Boats have iTC (intelligent throttle control) along with two engines and two ECMs that can communicate with each other through the CAN network. The wiring harnesses are identical so there are two diagnostic connectors but it makes no difference which one is used when connected to B.U.D.S. However, when connected you must choose what engine/ECM you want to communicate with. This can be done by choosing the R or L icon as shown below.



1. Port (L) ECM selected
2. Starboard (R) ECM available

Another good tip is to ensure that BOTH engines have had the "maint." reminder reset properly during a service (this is the small wrench icon in the gauge cluster). In the event that only one motor has been successfully reset, the boat may leave the dealership only to have the other engine soon begin to warn that the service interval is due, causing unnecessary frustration and wasted time for both the dealer and customer. This is why it is critical to ensure both engines have been reset, and data written to both ECMs.

O.T.A.S Fault Codes

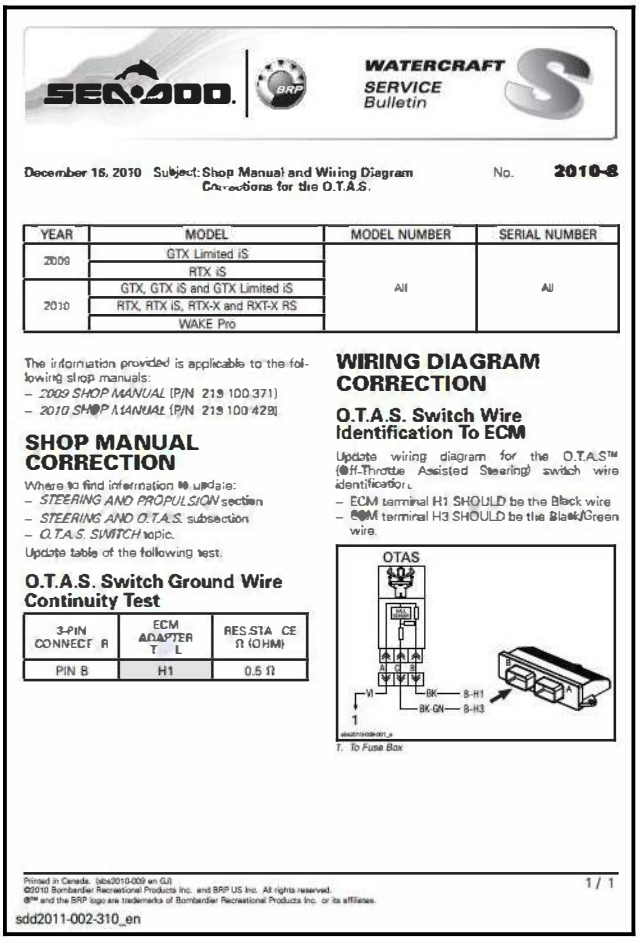
Last season we received several reports of OTAS fault codes being stored with no problems being found. Many times the technicians report that after troubleshooting the system, the faults did not reoccur. We have had many of these sensors returned for evaluation, and have found that 100% of them have had no problem found.

After investigating we believe the faults may be caused by an excessive amount of dielectric grease in the three pin Deutsch connector. It appears that the grease may be opening the female terminals (hydro-lock) causing an intermittent connection.

When troubleshooting this system you should check that all the terminals are fully seated in the connector housing and that there is not an excessive amount of grease inside the connector.

NOTE: Improper use of dielectric grease may cause electrical connection issues.

There has also been some confusion in testing this circuit, caused by an error in the 2009 and 2010 *SHOP MANUAL* and *WIRING DIAGRAM*. The ECM terminal H1 should be the Black wire and the ECM terminal H3 should be the Black/Green wire. Please make sure to make the corrections to your Shop Manuals. This information can be referenced in the Service Bulletin 2010-8.



SEA-DOO BRP WATERCRAFT SERVICE Bulletin

December 16, 2010 Subject: Shop Manual and Wiring Diagram Corrections for the O.T.A.S. No. 2010-8

YEAR	MODEL	MODEL NUMBER	SERIAL NUMBER
2009	GTX Limited iS	All	All
	RTX iS		
2010	GTX, GTX iS and GTX Limited iS		
	RTX, RTX iS, RTX-X and RXT-X RS		
	WAKE Pro		

The information provided is applicable to the following shop manuals:
- *2009 SHOP MANUAL* (P/N 219 100 371)
- *2010 SHOP MANUAL* (P/N 219 100 428)

SHOP MANUAL CORRECTION

Where to find information to update:
- *STEERING AND PROPULSION* section
- *STEERING AND O.T.A.S.* subsection
- *O.T.A.S. SWITCH* topic.

Update table of the following test.

O.T.A.S. Switch Ground Wire Continuity Test

3-PIN CONNECTOR B	ECM ADAPTER T_L	RESISTANCE Ω (OHM)
PIN B	H1	0.5 Ω

WIRING DIAGRAM CORRECTION

O.T.A.S. Switch Wire Identification To ECM

Update wiring diagram for the O.T.A.S™ (Off-Throttle Assisted Steering) switch wire identification.
- ECM terminal H1 SHOULD be the Black wire
- ECM terminal H3 SHOULD be the Black/Green wire.

1. To Fuse Box

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NEW! IBR ACTUATOR PART NUMBER AND SUBSTITUTIONS

All 2009 and 2010 iBR Actuators will substitute to the 2011 iBR Actuator along with the needed parts to install this new execution.

The iBR Actuator unit that was previously installed on 2009 and 2010 models has been updated to standardize and ease the installation of replacement iBR units. This is a direct bolt on application that will not need a calibration update. Only the correct vehicle model number and serial number will need to be matched to the cluster, with B.U.D.S. as with past replacements. The iBR job code has been adjusted to reflect the additional parts needed for installation. Simply order the part number in the *PARTS CATALOG* and you will receive all the correct parts.

Units: model year2009 and 2010 GTX, RXT and WAKE Models Equipped with iBR

P/N 278002321 (2009) and P/N 278002476 (2010HO)

Substitutes to 278002321a or 278002476a which will substitute to and includes:

1 - 278002606 iBR assembly

1 - 268000087 U-Arm Bracket

2 - 207382060 M8 x 20 Bolt

2 - 234081600 M8 Washer

1 - 293900007 Bushing

1 - 268000067 LH Support Plate

P/N 278002418 (2010BVIC)

Substitutes to 278002418a which will substitute to and includes:

1 - 278002605 iBR assembly

1 - 268000087 U-Arm Bracket

2 - 207382060 M8 x 20 Bolt

2 - 234081600 M8 Washer

1 - 293900007 Bushing

1 - 268000067 LH Support Plate

Attn: PAC Manager
PARTS
ACCESSORIES
RIDING GEAR

ZIP

( ) SKI-DOO®
(✓) SEA-DOO®
( ) EVINRUDE®
( ) CAN-AM® ATV
( ) CAN-AM® SSV
( ) CAN-AM® Roadster

DECEMBER 2010

SEA-DOO ADVANCED TEC TRAILERS: IMPORTANT UNLOADING INFORMATION



The Sea-Doo Advanced TEC™ and Advanced TEC™ iCatch™ trailers will be shipped out starting this month. This year, the trailers are shipped fully assembled and crate-free, which affects how you will unload them. Please see enclosed information on how to unload each of these trailer models, without injury to your personnel or damage to the trailers.



The trailers are shipped in packages of two. The photo on the left shows a shipment of six trailers, two per protective cover.

REQUIRED EQUIPEMENT:

- Forklift with unloading forks of at least 72 inches (183 cm) in length.

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Advanced TEC iCatch Trailers



1 Unfasten the cover ties.



2 Lift the cover to reveal the wheels and frame.

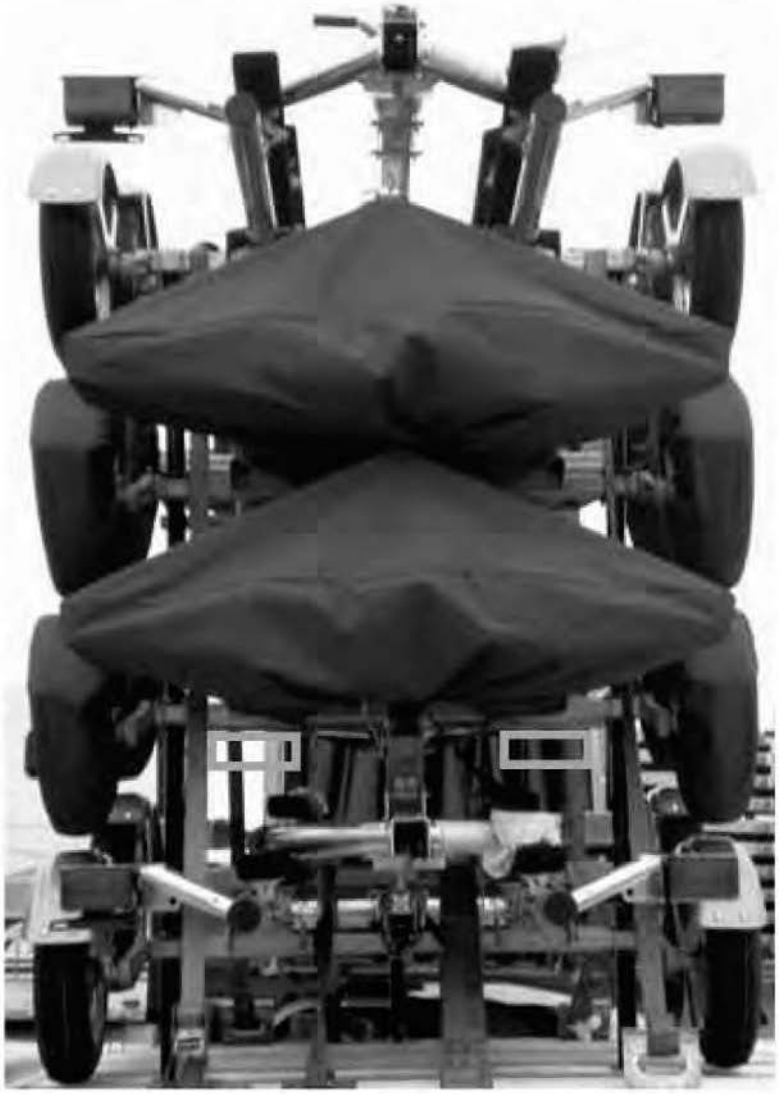


3 Insert the forks under the two-trailer package, as shown. Make sure the forks reach the frame pipe on the other side of the trailer.

4 Unload a single two-trailer package at a time. The upper support tubes will slide upwards and out of the support tubes of the two-trailer package directly underneath.

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Advanced TEC Trailers



1 Insert the forks under the two-trailer package, as shown.

2 Unload a single two-trailer package at a time. The upper support tubes will slide upwards and out of the support tubes of the two-trailer package directly underneath.

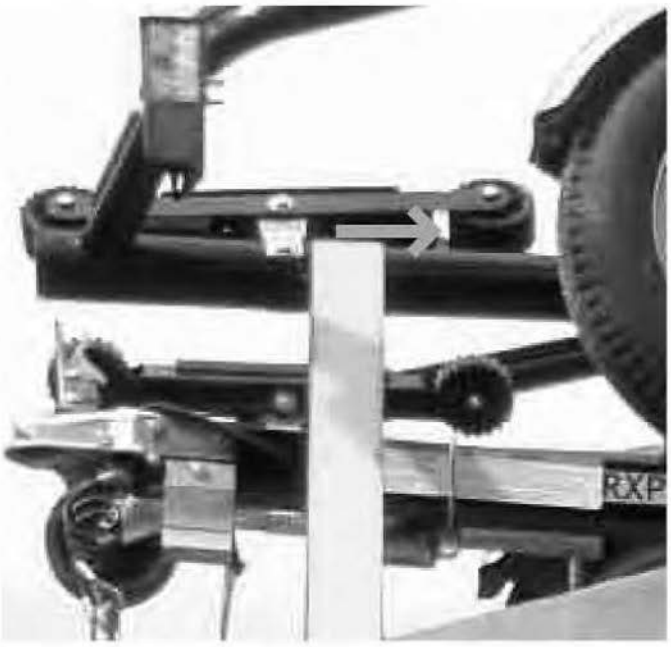
sdd2011-002-307_en_3

ADDITIONAL INFORMATION

WHERE TO POSITION TIE-DOWN STRAPS FOR SECURE TRANSPORT

Advanced TEC iCatch Trailers

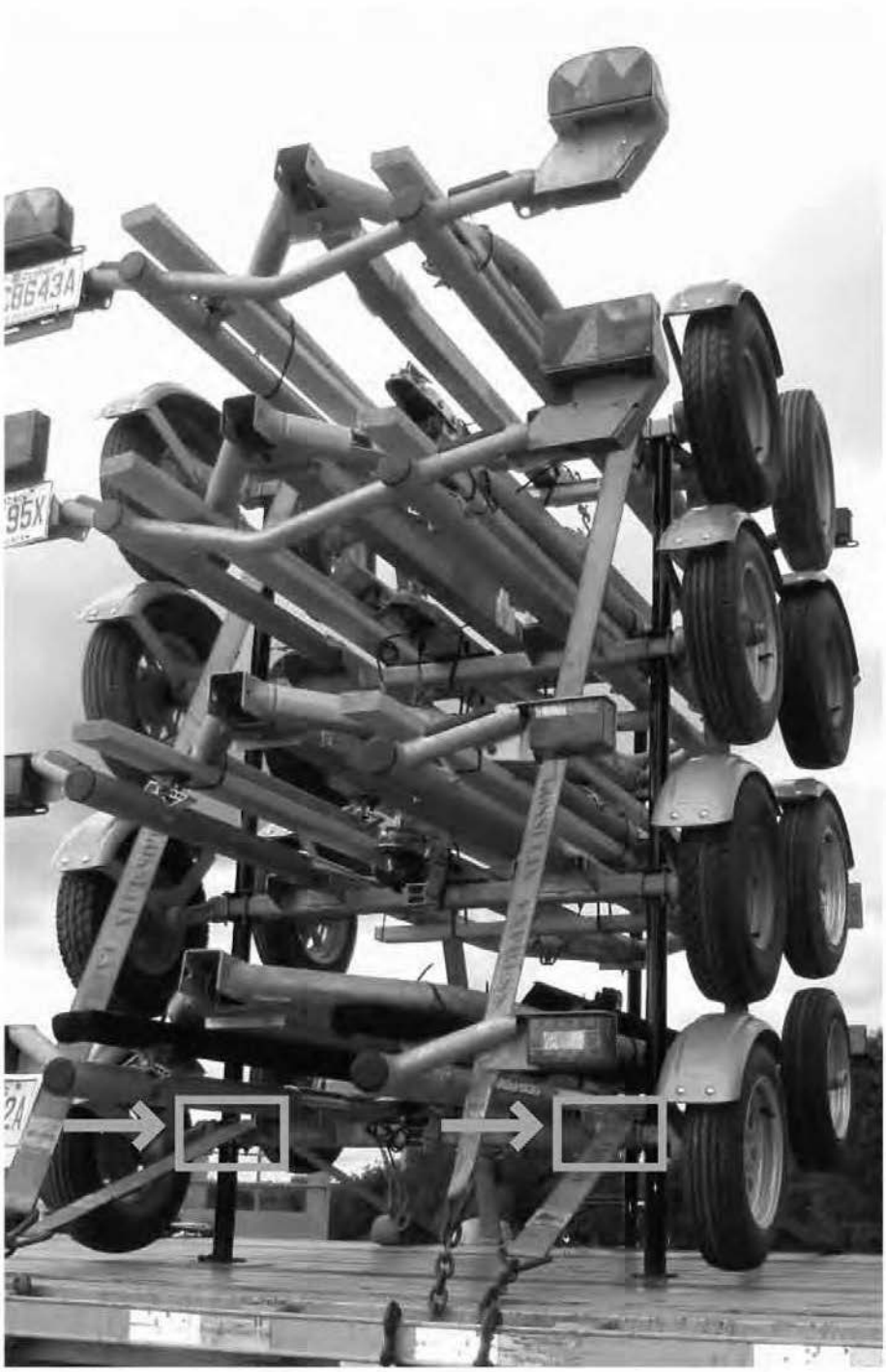




Always position the tie-down strap to the frame on the inside of the roller-bunk system. Be careful not to over tighten the straps.

sdd2011-002-307_en_4

Advanced TEC Trailers



Position the tie-down strap on the axle between the support tubes and the frame.

sdd2011-002-307_en_5

sbd2011-002-702

2006 INDEX

PREDELIVERY	SUBJECT	MODEL
2006-1 rev.3	Predelivery	All 4-TEC
2006-2	Predelivery	3D

SERVICE	SUBJECT	MODEL
2006-1	Impeller Chart	ALL
2006-2	Carbon Monoxide Warning Label (California Only)	ALL
2006-3	Importance of PDI	All
2006-4	New Version of B.U.D.S. 2.3.8	All
2006-5	High Altitude	All
2006-6 rev.1	Paint Codes and Gelcoat	All
2006-7	Transport Canada-Safety and Security- Compliance Labels	
2006-8	Premium Gauge Compass Feature	All
2006-9	MPI-2 Hardware for B.U.D.S.	All
2006-10	New Version of B.U.D.S. : 2.3.8	All
2006-11	New Optional Service Tools	All
2006-12	MY 2006 1503 4-TEC Run-ability Issue	
2006-13	Service Tools	All
2006-14	GTI Wind Deflector	GTI 130 SE,GTI 130 STD,GTI 130 STD-R
2006-15	Storage Procedure for 4-TEC™	All
2006-16	Storage Procedure	3D 947DI PREMIUM
2006-17	Pre-Season/Annual Safety Inspection	All (except 3D DI)
2006-18	Pre-Season/Annual Safety Inspection	3D 947DI PREMIUM

WARRANTY	SUBJECT	MODEL
2006-1 rev.1	Fuel System Check Valvee Cracking	RXP-RXT-GTI SE-GTI
2006-2	Storage Bin Hinge. Storage Cover Seperation	GTISE

ADMINISRATIVE	Inspection	MODEL
2006-1	Operator's Guide Availibility	ALL
2006-2	PartSmart New Version Notification	ALL

sdd2011-002-703

2007 INDEX

PREDELIVERY	SUBJECT	MODEL
2007-1	Predelivery	3D
2007-2	Predelivery	4-Tec North America/International

SERVICE	SUBJECT	MODEL
2007-1	Impeller Chart Sea Level High Altitude	All
2007-2	Importance Of POI	All
2007-3	Transport Canada Compliance Labels	All Canadian Models
2007-4	Carbon Monoxide Label Installation	California Models Only
2007-5	Safety Lanyards	All
2007-6	Service Tools	All
2007-7	Paint Codes and gelcoat	All
2007-8	4 TEC's Aluminum Jet Pump Wear Ring	All
2007-9	Long Block Service Parts	All
2007-10	Electric Probe Tool	All
2007-11	B.U.D.S. 2.3.13	All
2007-12	Model Year 2007 4-TEC Single ECM	All
2007-13	Storage Procedure for 4 TEC Equipped Vehicles	All 4 TEC's
2007-14	Storage Procedure for 4 TEC Equipped Vehicles	3 D
2007-15	New Valve Guide Tools	All 4 TEC's
2007-16	Pre Season Inspection	All 4 TEC's
2007-17	Fuel Pump Activation Procedure	All 4 TEC's

WARRANTY	SUBJECT	MODEL
2007-1	Steering Cable Stem Arm Bolt	4-TEC's
2007-2	Fuel System Pressure Relief Valve	4-TEC's

ADMINISRATIVE	SUBJECT	MODEL
2007-1	Operators Guide Availability on the Web	All

edoc2011-002-704

2008 INDEX

PREDELIVERY	SUBJECT	MODEL
2008-1	Predelivery	All
2008-2	Install the Correct Software in gauge Cluster	All

SERVICE	SUBJECT	MODEL
2008-1	CO warning label installation (CA only)	All
2008-2	Transport Canada compliance labels	All
2008-3	Ability to flash new cluster (Rev 1)	All except GTI series
2008-4	Importance of PDI	All
2008-5	Sea Level and High Altitude Impeller Chart	All
2008-6	Paint Codes & Gelcoat	All
2008-7	Fuel Tank Venting System	All
2008-8	Service tools	All
2008-9	Battery care reminder	All
2008-10	Storage procedure	All
2008-11	RXP / RXT Storage Cover Shock Bracket Location	RXP, RXP-X, RXT, RXT-X
2008-12	2003 to 2009 - Supercharger Service Part Update	All supercharged models
2008-13	Pre-Season / Annual Safety Inspection	All

WARRANTY	SUBJECT	MODEL
2008-1	RXT Storage Cover Replacement	RXT, RXT int.
2008-2	Exhaust and Supercharger hoses coming off	RXP-X, RXT-X
2008-3	SAFETY RECALL - Fuel Vent Hose Chafing	RXP-X

ADMINISRATIVE	SUBJECT	MODEL
2008-1	Operators guide availability on the web	All

sdd2011-002-705

2009 INDEX

PREDELIVERY	SUBJECT	MODEL
2009-1	Predelivery	All Except GTX LTD and RXT iS (North America)
2009-2 rev 1	Predelivery	All Except GTX LTD and RXT iS (International)
2009-3 rev 3	Predelivery	GTX LTD iS 255 and RXT iS 255 (All Countries)

SERVICE	SUBJECT	MODEL
2009-1	Service Tools	All
2009-2	Carbon Monoxide Warning label Installation	All (California Only)
2009-3	Transport Canada-Safety and Security- Compliance Labels	All
2009-4	Sea-Doo Battery Activation, Charging and Maintenance	All
2009-5	Sending and Saving B.U.D.S. files	
2009-6	Replacing and Updating the ECM's calibration parameter table	All
2009-7	Ignition Coil Long Term Reliability	All
2009-8	GTX 255 LTD / RXT 255 iS New Special Tools	GTX Limited iS 255, RXT iS 255
2009-9	Sea Level and High Altitude Impeller Chart	All
2009-10	Paint Codes and Gelcoat	All
2009-11	Storage Procedure	All

WARRANTY	SUBJECT	MODEL
2009-1	Update for Early Release Boat Show Watercraft	GTX Limited iS 255, RXT iS 255
2009-2 rev 1	Supercharger Hose & Seat Inspection,Splash Deflector, iBR Software Update	GTX Limited iS 255, RXT iS 255
2009-3	iS Fault Code Strategy Update	GTX Limited iS 255, RXT iS 255
2009-4	DESS Key Replacement on iS Models - Unregistered Vehicles Only	GTX Limited iS 255, RXT iS 255
2009-5 rev 1	Cluster Not Working on iS models - Unregistered Vehicles Only	GTX Limited iS 255, RXT iS 255
2009-6 rev 1	Cluster Not Working in iS models - Registered Vehicles Only	GTX Limited iS 255, RXT iS 255

ADMINISTRATIVE	SUBJECT	MODEL

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2010 INDEX

PREDELIVERY	SUBJECT	MODEL
2010-1	Predelivery	RXT,GTX and WAKE PRO (North America)
2010-2 rev 1	Predelivery	RXT, GTX and WAKE PRO (International)
2010-3	Predelivery	RXP, GTI and Wake (North America)
2010-4	Predelivery	RXP, GTI and Wake (International)
2010-5 rev 1	Predelivery	ADVANCED TEC™ and ADVANCED TEC iCatch trailer
2010-6	Predelivery	ADVANCED TEC™ iCatch trailer (International)

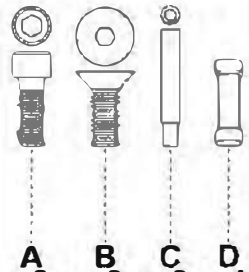
SERVICE	SUBJECT	MODEL
2010-1	Compliance Labels	All (Canadian models only)
2010-2	Carbon Monoxide warning label installation	All (California models only)
2010-3	Sea Level and High Altitude Impeller Charts	All
2010-4	Batteries Activation, Charging and Maintenance	All
2010-5 rev 1	Paint Codes & Gelcoat	All
2010-6	Alignment tool and diagnostic harness	All iControl

WARRANTY	SUBJECT	MODEL
2010-1 rev 1	Rear view mirror broken	GTX(STD, LTD, iS) and RXT (iS, X)
2010-2	Steering Extension Block Bolts Tightening	RXT-X and RXT-X RS
2010-3	Sponson Bolts without Thread Locker	GTI and WAKE
2010-4	Parts Missing in the PDI Kit	GTI (International)
2010-5 SAFETY	iCatch trailer system / Securing the PWC	ADVANCED TEC™ iCatch trailer
2010-6	Supercharger Outlet Hose Inspection	GTX LTD iS, RXT iS, RXP-X, RXT-X (unregistered only)
2010-7	iBR inspection at PDI	GTX LTD iS and RXT iS (unregistered only)
2010-8	iCatch handle cable breakage	ADVANCED TEC™ iCatch trailer
2010-9	Tether Cord Recognition, Fault Code P0127	All iControl (Previously Registered)
2010-10	Tether Cord Recognition, Fault Code P0127	All iControl (Non Registered)

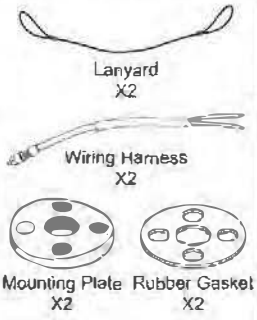
ADMINISTRATIVE	SUBJECT	MODEL
2010-1 rev 1	Registration of ADVANCED TEC™ trailer	ADVANCED TEC™ & ADVANCED TEC™ iCatch trailer
2010-2	U.S. EPA Regulations and BRP warranty changes	All (U.S. only)

SEA-DOO Tower Speaker Assembly Instructions

HARDWARE

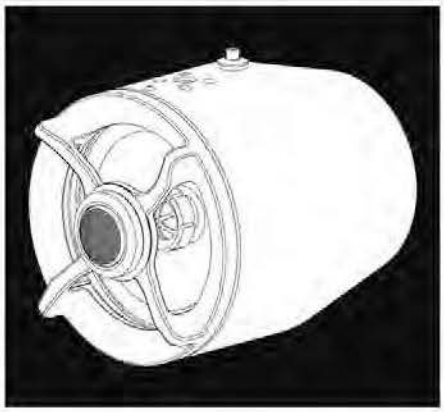


PARTS



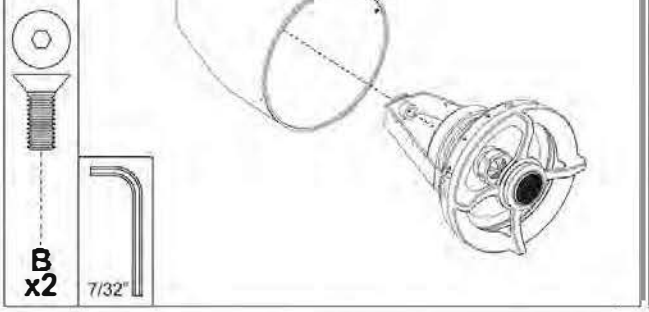
Tools Required





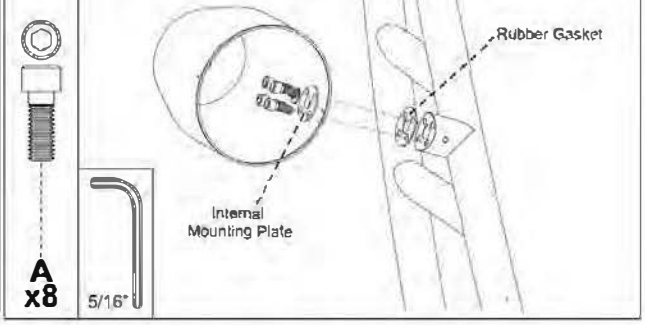
A

Remove speaker from the speaker housing by removing bolt 'B'. Repeat each step for both speakers.



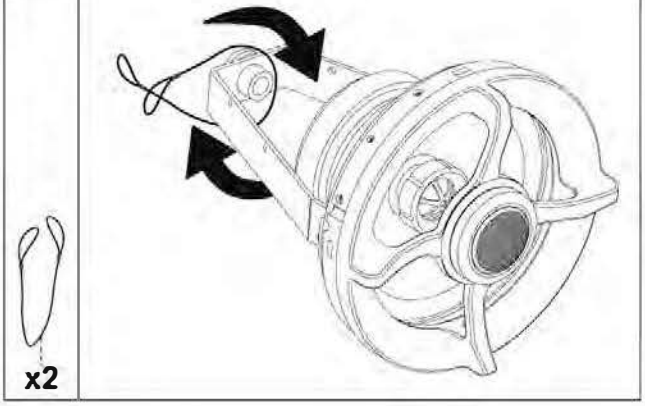
B

Place the rubber gasket between the speaker housing and tower nub, place the internal mounting plate inside the speaker housing and line up the holes. Insert the 4 assembly bolts with pre-applied Loctite, and attach the speaker housing to the tower nub.



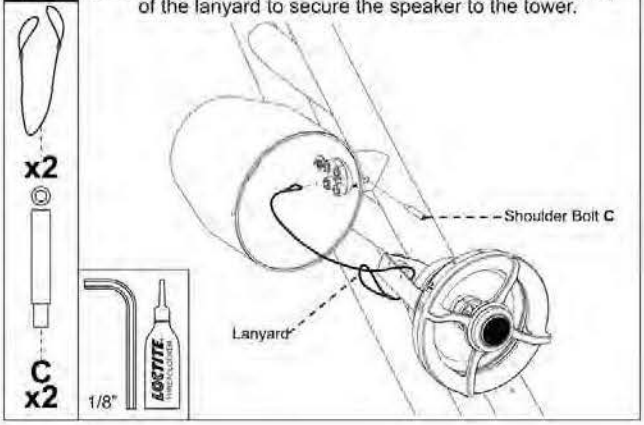
C

Pass the small end of the lanyard around the speaker spine and through the large end of the lanyard. Gently pull until taught.



D

Insert the small end of the lanyard through the speaker housing and into the speaker nub on the tower. Apply Blue Loctite to the shoulder bolt '**C**' and insert it through the loop of the lanyard to secure the speaker to the tower.



sdd2011-002-311_1

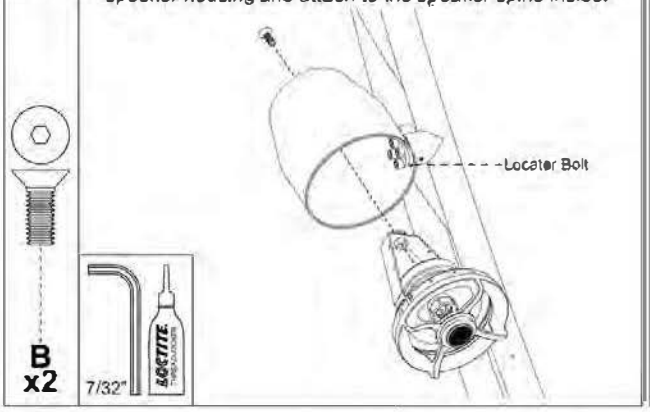
Rev. 02-November-10 Pg. 1/2

SEA-DOO

Tower Speaker Assembly Instructions

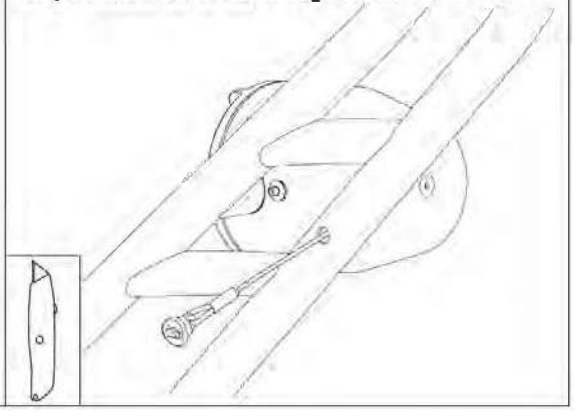
E

Lining up locator bolt with the slot on the speaker, insert the speaker and spine into the speaker housing. Apply Blue Loctite to a flat head bolt, insert at the back of the speaker housing and attach to the speaker spine inside.



F

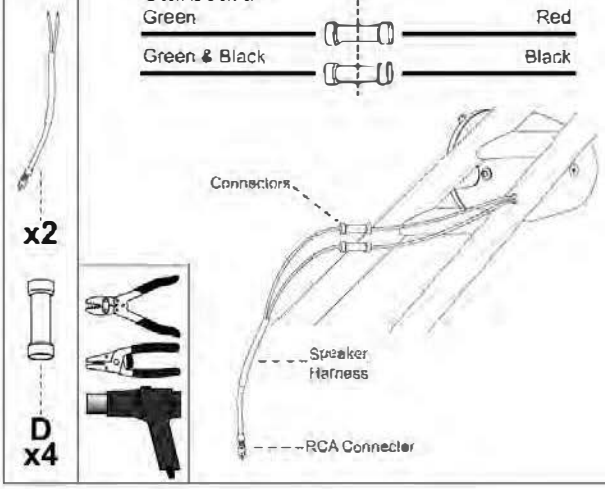
On the tower, gently pull the black rubber plug to access the wires. Carefully cut the shrink wrap with a utility knife to expose the speaker wires within and remove the plug. Be **very cautious not to cut through the wire's insualtion.**



G

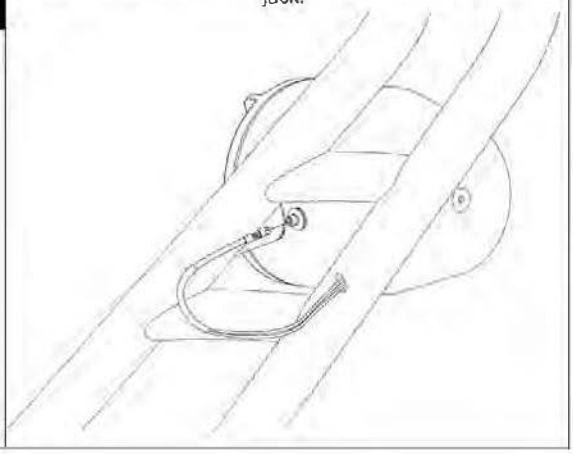
1) Use wire stippers to expose 1/4" of wire on all wires. 2) Slide matching wires (as illustrated) into opposing ends of the connectors and crimp. 3) Heat shrink the connectors. 4) Carefully push the wires back into the tower tubing.

Tower		Speaker Harness
Port	**Crimp**	
Purple		Red
Purple & Black		Black
Starboard		
Green		Red
Green & Black		Black



H

Plug the red RCA connector to its corresponding speaker jack.



WWW.ROSWELLWAKEAIR.COM
If you have any questions please call : 1-780-962-0868

Rev. 02-November-10 Pg. 2/2

sdd2011-002-311_2

New Technologies

In this section you will find the most current information concerning the latest technologies used by BRP.

Sea-Doo

Introducing the All New GTI Series

GTI LTD



sdd2011-002-401

GTI SE

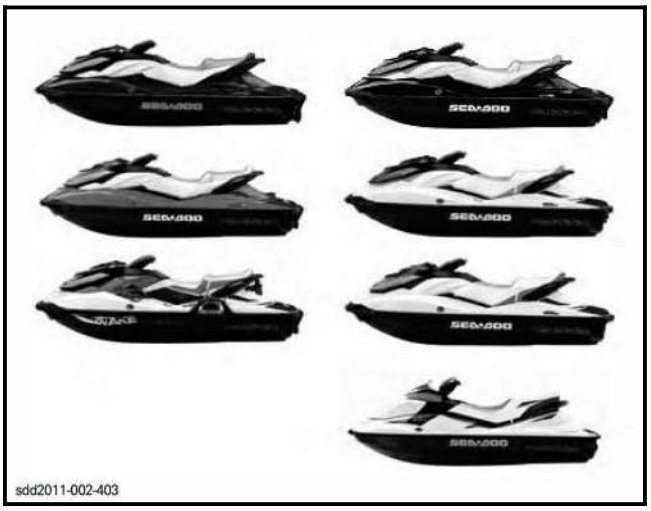


sdd2011-002-402

GTI Platform

Quick overview of new GTi platform:

- GTi LTD 155, GTi SE 155/130, GTi 130 Models, WAKE 155, GTS Pro.
- New entry level GTS 130 Model.
- Improved hull.
- All models include iTC, iBR, OTAS.
- All models include mirrors.
- Larger bow storage area (116 liter/31 gal total storage).
- New Deck increased platform length, 3 inches longer. Same width.
- Finger Throttle operation.
- Hull Ventilation provided using corrugated tubes.
- New ergonomics for increased stability and more comfort.
- Optional functions on some models: VTS, Cruise control, ski mode, ECO Mode etc.


sdd2011-002-403

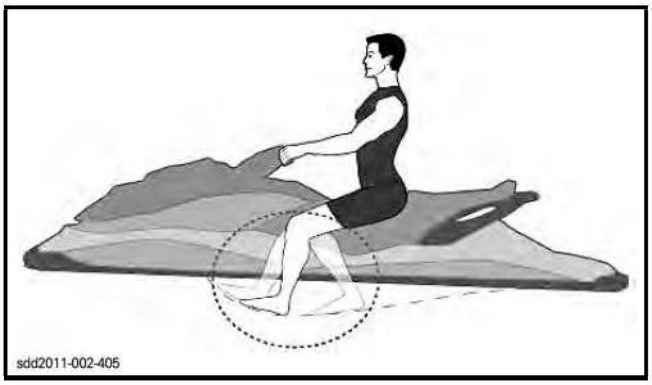
New Improved GTI Hull

New 2011 GTI maintains the same handling characteristics of the 2010 GTI, with several refinements:

- LFI (long fiber injection) construction (same process as s3 hull). 20 lb.(9 kg) weight reduction.
- Unique Ribbed construction makes it more durable.
- Improved water inlet - more stable RPM and reduced potential for cavitation on acceleration.
- More efficient manufacturing.
- Environmentally Friendly.
- Improved splash deflector for dryer ride.
- Better wave penetration in rough water.
- Longer hull (same width) – 3 inches (7.6 cm) longer.

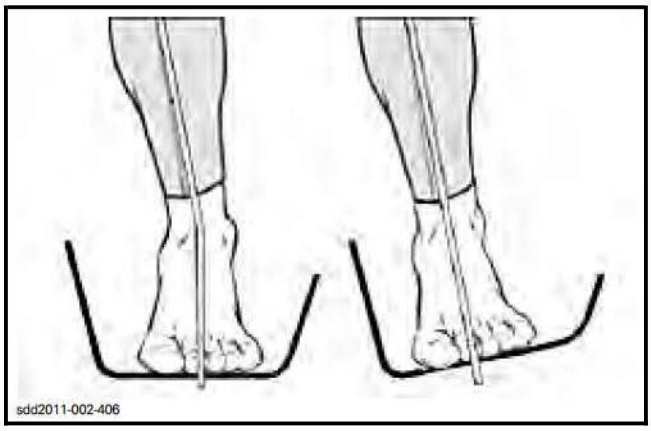

sdd2011-002-404

All New GTI Deck


sdd2011-002-405

New deck design incorporates several ergonomic improvements:

- Multi position footwell allows rider to move foot position around without loosing grip.
- New footwell profile reduces ankle fatigue and enhances overall comfort.
- Lower center of gravity increases stability over the previous GT models.


sdd2011-002-406

Narrow Seat Design

- The new narrow seat provides the best comfort while optimizing a more aggressive riding style.
- In stand-up position the new seat also provides the narrowest distance between the rider's knees.


sdd2011-002-412

ECO Mode

Fuel economy mode now offered for new GTI platform on some models. The iTC (intelligent Throttle Control) system allows the PWC to maintain a steady speed and constant RPM to reduce fuel consumption. When ECO mode is selected, the operator simply keeps the throttle fully applied, and the ECM uses a predetermined mapping program to fine tune the RPM and speed for maximum fuel efficiency.



sdd2011-002-413

VTS now Available on Some GTI Models

VTS accessed differently on LTD vs. SE models:

- "High Performance VTS" on LTD model – utilizes rocker switches on handlebars.
- VTS is adjusted before riding via the gauge menu on SE models.
- Base models and GTS do not have VTS.



sdd2011-002-414

New GTS Model

New model provides an economical, value minded entry level PWC offering - the standard for value:

- Basic model still retains many of the GTI platform highlights.
- New updated hull and deck, with many of the same ergonomics.
- iTC including sport and touring mode.
- More power then other brands competitive models (130 hp on GTS).
- No reverse or iBR on this model.
- Speedometer is not GPS linked.



sdd2011-002-415

Thru Hull Fitting

Thru-hull fitting now bolted on to the hull.


sdd2011-002-407

iBR Bolted from Outside of Hull

The iBR is now through bolted from the outside of the watercraft easing removal.


sdd2011-002-408

New Fixing Plates

New redesigned fixing plates.


sdd2011-002-409

New Pump Support

New pump support with two molded alignment tabs.

NOTE: Pump is mounted to back of hull instead of ride plate like found on the s3 hull.


sdd2011-002-410

Integrated Stops Molded in Venturi



Special Tools

In this section you will find the most current special tools to service efficiently BRP vehicles. All mandatory tools will be shipped automatically.

SEA-DOO | BRP

WATERCRAFT SERVICE Bulletin

Date : **December 9 2008** Subject : **Service Tools** No **2009-1**

Year	Model
All	All

BRP is proud to introduce its latest Service Tools Bulletin. These special tools were designed to help you efficiently service BRP vehicles.
Please always make sure to use special tools along with the appropriate Shop Manual(s) and respect all safety measures.



Mandatory Tools: These tools are absolutely needed to perform certain service procedures. They will be automatically shipped to dealerships. They do not need to be ordered separately.

Recommended Tools: These tools will facilitate the Technicians work. They will not be automatically shipped to dealerships. They need to be ordered separately.

Table of contents

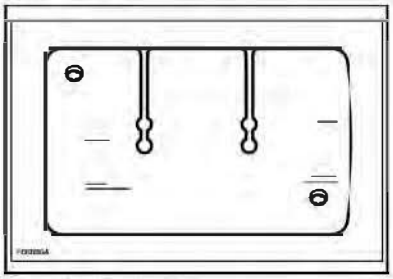
Tools by System:

Engine ..... P 2
Fuel ..... P 10
Cooling ..... P 11
Electrical ..... P 12
Lubrication ..... P 15
Transmission / Propulsion ..... P 15
Steering ..... P 18
Suspension ..... P 18
Various ..... P 19

Index of tools by Part Number: ..... P 21

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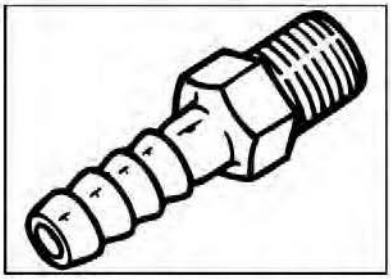
Engine



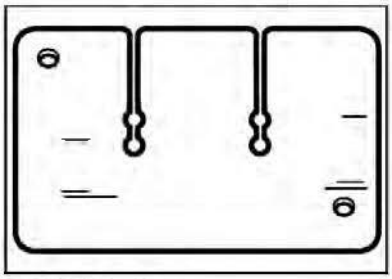
Protective Rubber Pad
P/N 290 877 032 Recommended
947 DI engines



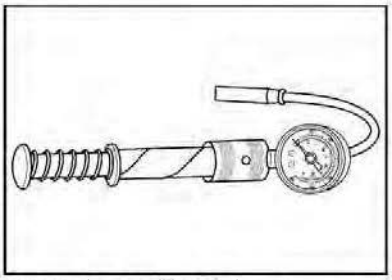
Gear / Bearing Puller
P/N 290 877 665 Recommended
787 engines
No longer sold; a standard puller can be used.



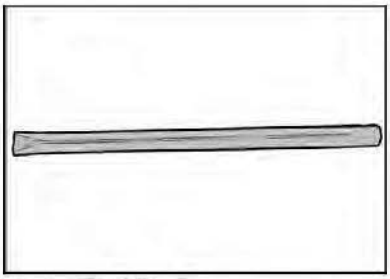
Male Fitting
P/N 295 000 086 Recommended
4-TEC 1503
To test jet pump tightness on 2-stroke.



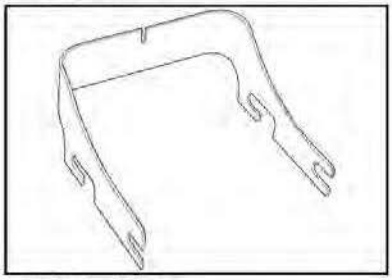
Protective Carpet
P/N 295 000 101 Recommended
717 / 787 RFI engines
So piston bearing does not fall in base during replacement.



Leakage Tool MIKUNI BN Pump
P/N 295 000 114 Recommended
All carbureted engines
To leak test carburetor pop-off pressure.



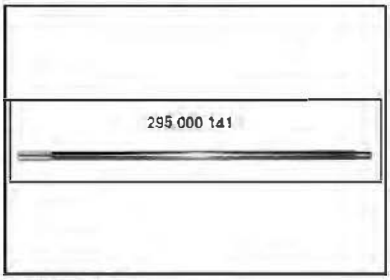
FLYWHEEL HOLDER
P/N 295 000 125 Recommended
587/657/717 engines
Use with 420 876 080.



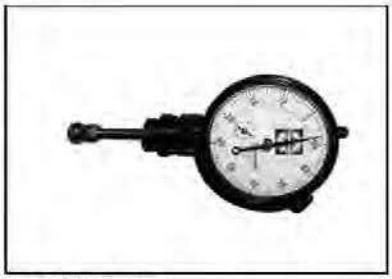
Timing Gauge 717
P/N 295 000 130 Recommended
717 engines



Timing Gauge
P/N 295 000 135 Recommended
787, 787 RFI, 947, 947 DI engines



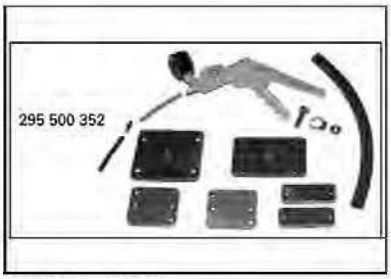
alignment shaft
P/N 295 000 141 **Mandatory**
All models



TDC Dial Indicator
P/N 295 000 143 Recommended
2-stroke engines except DI, 1203

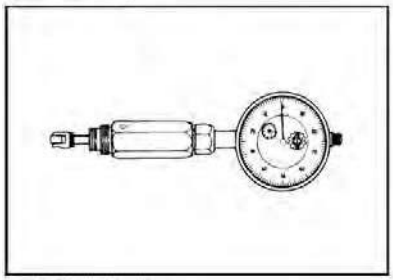


Flywheel Puller
P/N 295 000 156 Recommended
787 RFI



engine leak test Kit
P/N 295 500 352 Recommended
All 2-stroke engines
Kit includes vacuum pump 529 021 800.

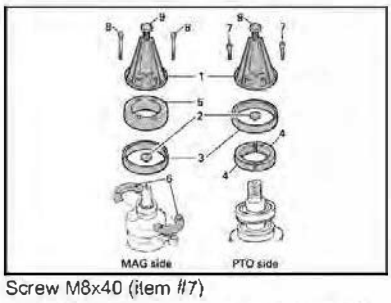
Engine



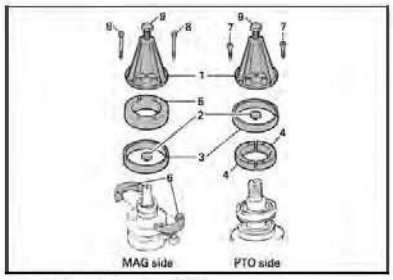
TDC dial indicator
P/N 414 104 700 Recommended
For ignition timing static measurement



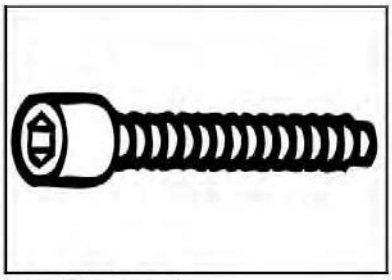
HALF RING PULLER MAG
P/N 420 276 025 Recommended
717 engine
To remove crankshaft bearings.



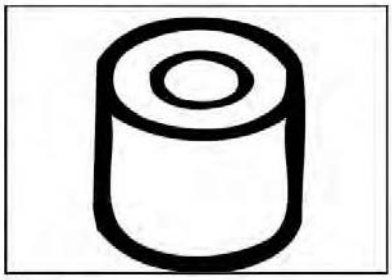
Screw M8x40 (item #7)
P/N 420 840 681 Recommended
All 2-stroke engines



Screw M8x70 (item #8)
P/N 420 841 201 Recommended
All 2-stroke engines
To be used with P/N 420 877 635.



Screw M8x35 (qty 3)
P/N 420 841 591 Recommended
717 engines
To be used with 529 035 533.



Sleeve
P/N 420 847 220 Recommended
717 engines
Use with 420 876 080.



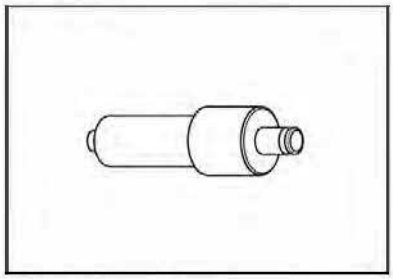
Half ring puller
P/N 420 876 330 Recommended
947 & 947 DI engines
To remove 52 mm O.D. bearings from the crankshaft.



Rotary Valve Shaft Puller
P/N 420 876 488 Recommended
717, 787 & 787 RFI engines
Kit includes 420 240 860 / 232 400 414.



Rotary Valve Bearing Pusher
P/N 420 876 501 Recommended
717, 787 & 787 RFI engines



Starter Drive Seal Pusher
P/N 420 876 502 Recommended
947 & 947 DI engines
For starter drive



Crankshaft Protector
P/N 420 876 552 Recommended
All 2 stroke, 1203
Use with 420877635

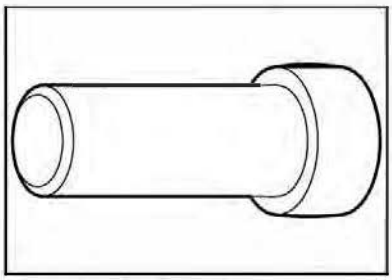


Crankshaft Protector
P/N 420 876 557 Recommended
717 / 787 RFI / 800R / 800 HO

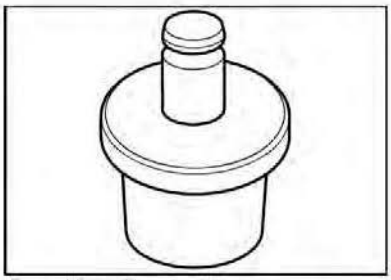
Engine



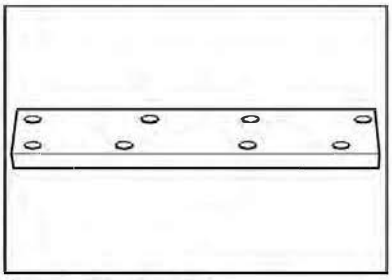
Crankshaft Distance Ring (MAG)
P/N 420 876 569 Recommended
All 2-stroke engines



Rotary Valve Shaft Installer
P/N 420 876 605 Recommended
717 engines & older than 1990



Rotary Valve Shaft Installer
P/N 420 876 609 Recommended
787 & 787 RFI engines
Use with 420 877 650



Cylinder Alignment Tool
P/N 420 876 904 Recommended
717 engines



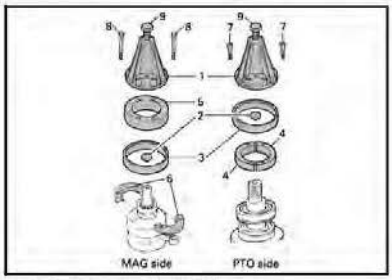
PISTON RING COMPRESSOR 88mm
P/N 420 876 965 Recommended
947 & 947 DI engines



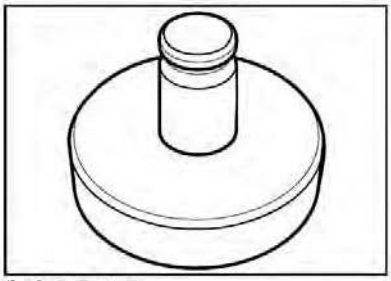
PISTON RING COMPRESSOR 82mm
P/N 420 876 979 Recommended
717, 787 & 787 RFI engines



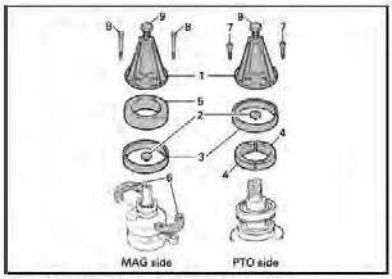
Crankshaft Protector
P/N 420 877 414 Recommended
947 DI engines



crankshaft bearing puller
P/N 420 877 635 Recommended
All 2-stroke engines



Oil Seal Pusher
P/N 420 877 740 Recommended
787 RFI engines
Used with 420 877 650



Replacement Puller Bolt (item #9)
P/N 420 940 755 Recommended
All 2-stroke engines
To use with puller P/N 420 877 635.



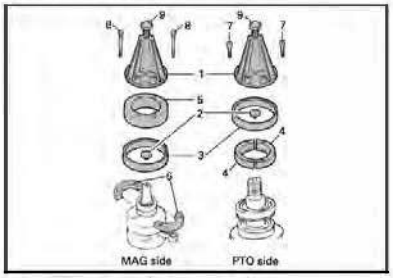
Flywheel puller
P/N 420 976 235 Recommended
247, 787, 787 RFI, 947 & 947 DI engines
Replacement bolt P/N 529 035 549.



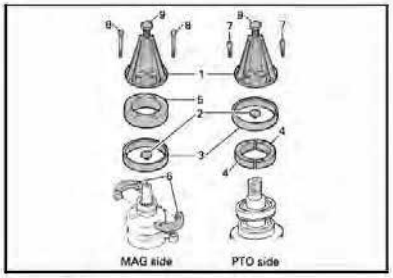
half rings
P/N 420 977 475 Recommended
717 / 787 RFI engines

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Engine



HOLDER RING (item #3)
P/N 420 977 480 Recommended
947DI engines



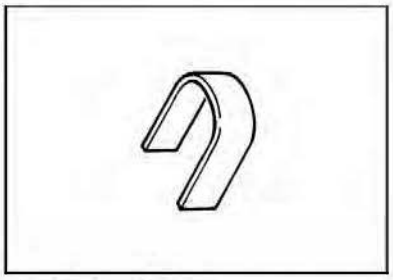
puller ring
P/N 420 977 490 Recommended
717/787RFI engines



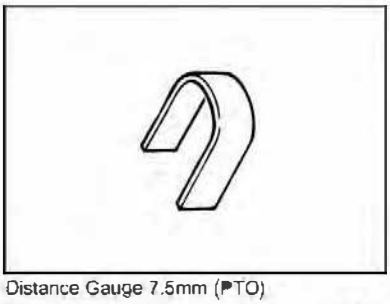
Vacuum pressure pump
P/N 529 021 800 Recommended
All models



Distance Gauge 14 mm
P/N 529 034 800 Recommended
717 engines



Distance Gauge 15.4mm
P/N 529 034 900 Recommended
787 RFI engines



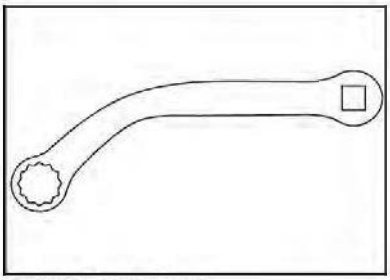
Distance Gauge 7.5mm (PTO)
P/N 529 035 000 Recommended
947 DI Engine

No picture available

Distance gauge11.5mm (MAG)
P/N 529 035 100 Recommended
947 DI engines



Piston pin puller
P/N 529 035 503 Recommended
All 2-stroke engines



Exhaust Wrench 15mm
P/N 529 035 505 Recommended
947 DI engines



Replacement Protector Sleeve
P/N 529 035 513 Recommended
To be used with P/N 529 035 503.

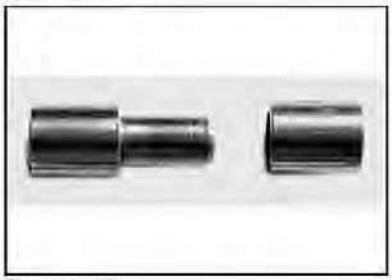


Flywheel Tool
P/N 529 035 533 Recommended
All 947 and 947 DI
Use in conjunction with 529 035 547 puller and 295 000 125 holder.

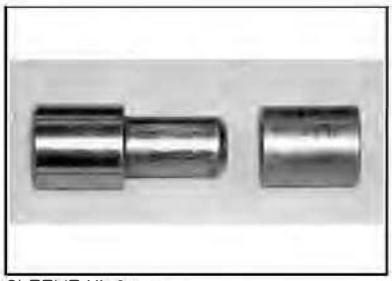


Sleeve kit 18 mm
P/N 529 035 541 Recommended
Ski-Doo 277, Sea-Doo 587
To install cageless bearings. Used with 529035503

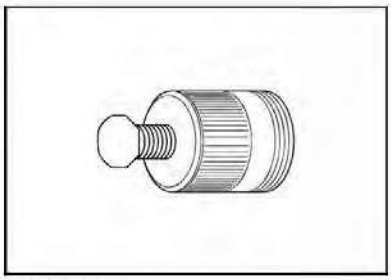
Engine



Sleeve kit 20 mm
P/N 529 035 542 Recommended
717, 787 RFI, 600, 800HO
Used with 529035503



SLEEVE Kit 21mm
P/N 529 035 543 Recommended
947, 947 DI, 800 R Engines
To install cageless bearings. Used with 529035503



magneto puller
P/N 529 035 547 Recommended
Replacement bolt 529035549. Use 20876081/295000125/420841591/290847220



Bolt M16 x 1,5 x 65mm
P/N 529 035 549 Recommended
DS 450
Goes with 529 035 547 & 420 976 235



Spring installer remover
P/N 529 035 559 Recommended
Replaced by 529035983 or 529035989



piston circlip installer 18 mm
P/N 529 035 561 Recommended
Sea-Doo 587, Ski-Doo 277 engines



Circlip insertion Tool 20 mm
P/N 529 035 562 Recommended
593, 670, 693, 717, 787 & 787 RFI engine
Sleeve without groove P/N 529 035 567 also available.



Circlip Insertion Tool 21 mm
P/N 529 035 563 Recommended
947 & 947 DI engines
Sleeve without groove. P/N 529 035 569 also available.



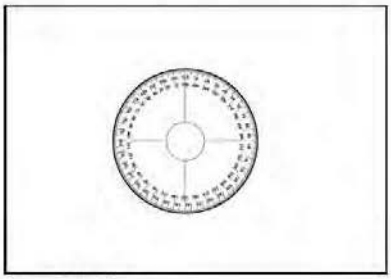
20 mm Sleeve
P/N 529 035 567 Recommended
Use with 529 035 562



21 mm Sleeve
P/N 529 035 569 Recommended
Use with P/N 529 035 563.



Insert Alignment Tool
P/N 529 035 590 Recommended
XP & XP DI models



Degree Wheel
P/N 529 035 607 Recommended
All rotary valve engines

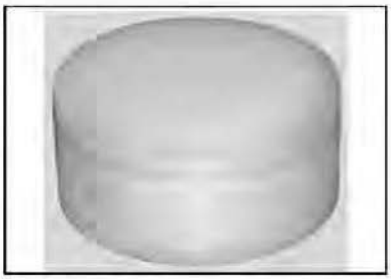
Engine



Engine leak down test kit
P/N 529 035 661 Recommended
All 4-stroke engines
To perform a leak down test on engine.



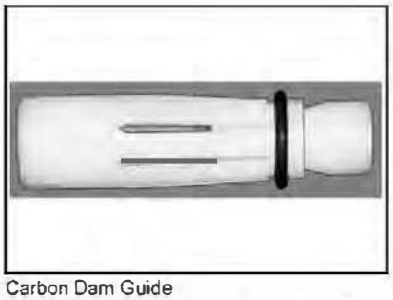
Valve stem seal installer
P/N 529 035 687 Recommended
1503 engine



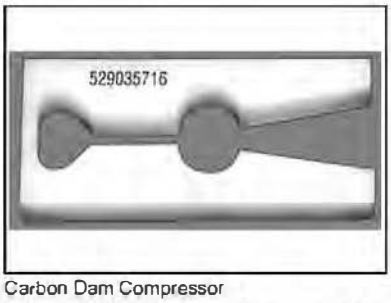
Intake Plug
P/N 529 035 708 Recommended
947DI engines



COMPRESSOR RING
P/N 529 035 713 Recommended
947DI engines



Carbon Dam Guide
P/N 529 035 715 Recommended
947 DI engines



Carbon Dam Compressor
P/N 529 035 716 Recommended
947 DI engines



shaft alignment adaptor
P/N 529 035 719 **Mandatory**
4-TEC engines



Valve spring compressor
P/N 529 035 724 Recommended
4-TEC engines
To be used with valve spring compressor cup 529 035 764 and 529 036 073



Piston circlip installer
P/N 529 035 765 **Mandatory**
610/500/1503/V-1000 engines



CRANKSHAFT LOCKING TOOL
P/N 529 035 821 **Mandatory**
4-TEC 1503 engines

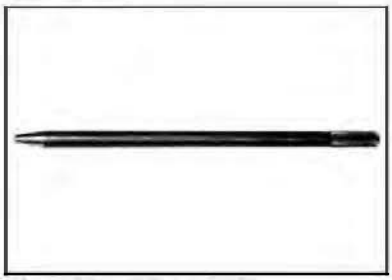


OIL SEAL GUIDE
P/N 529 035 822 **Mandatory**
4-TEC 1503 engines



Engine lifting ring
P/N 529 035 830 Recommended
2-stroke engines with 14 mm spark plugs

Engine



CAMSHAFT LOCKING TOOL
P/N 529 035 839 **Mandatory**
V1000, V1300 &1503 engines



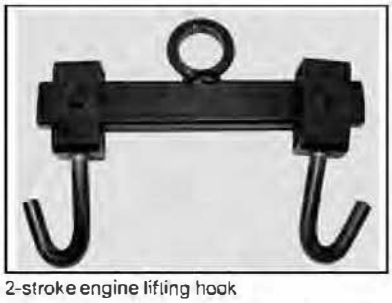
RING GEAR BLOCKING TOOL
P/N 529 035 846 Recommended
787 & 787 RFI engines



Suction pump
P/N 529 035 880 Recommended



TORX ADAPTOR
P/N 529 035 938 **Mandatory**
4-TEC 1503 SC engines



2-stroke engine lifting hook
P/N 529 035 940 Recommended
All 2-stroke engines



RING GEAR BLOCKING TOOL
P/N 529 035 946 Recommended
947 & 947 DI engines



SUPPORT PLATE
P/N 529 035 947
4-TEC 1503 SC
To hold the supercharger assembly in a vise for disassembly and assembly.



4-pin socket
P/N 529 035 948 **Mandatory**
1503 supercharged



BEARING SUPPORT/PUSHER
P/N 529 035 950 **Mandatory**
4-TEC 1503 SC engines
To install bearing of the supercharger ground plate.



Crank shaft bearing puller
P/N 529 036 004 Recommended
2 strokes Engine



Supercharger Gear Holder
P/N 529 036 025 **Mandatory**
4-TEC 1503 SC



Supercharger Retaining Key
P/N 529 036 027 **Mandatory**
4-TEC 1503 SC

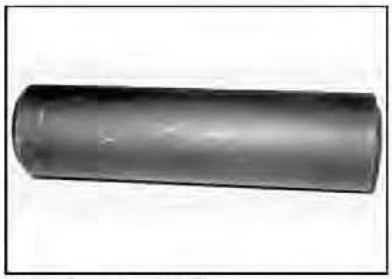
Engine



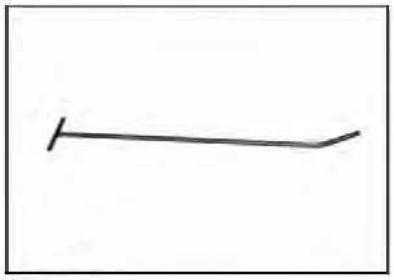
Valve spring compressor cup
P/N 529 036 073 Recommended
449, 991, 1503, 610/500, Traxter 500
To be used with 529 035 724



Valve Guide Remover 6 mm
P/N 529 036 086 Recommended
1503



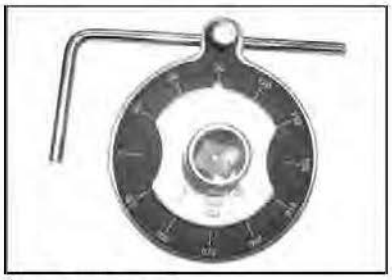
Valve Guide Installer 6 mm
P/N 529 036 087 Recommended
1503.Traxter 500, Quest 610/500



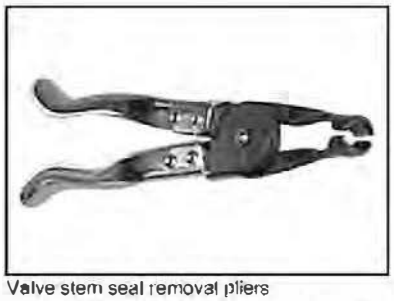
Strap Tool
P/N 529 036 126 Recommended
1503 H●



Piston ring compressor
P/N Snap-on RC 980 Recommended
4-TEC
Not sold by BRP



Torque angle gauge
P/N Snap-on TA362 Recommended
Used on most 4-stroke engines.
Not sold by BRP



Valve stem seal removal pliers
P/N Snap-on YA 8230 Recommended
1503, 991 engines, DS650
Not sold by BRP

Fuel



Fuel pressure gauge
P/N 529 035 591 Recommended
787 RFI, 793 SDI & 4-TEC engines
Replaced by 529 035 709. Spare plastic clip P/N 275500429



Pressure gauge
P/N 529 035 709 **Mandatory**
Injection type engines
Use with 529035652, 529035714 & 529036023



Fuel Gauge T Adaptor
P/N 529 035 710 **Mandatory**
947 DI engines
Use with gauge P/N 529035709 and P/N 529 035 714.



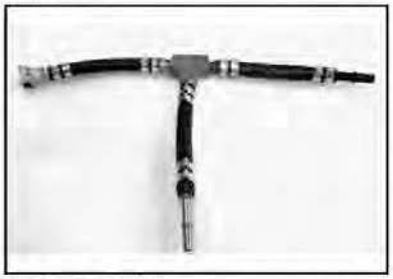
Pressure Relief Valve Adaptor
P/N 529 035 711 **Mandatory**
947 DI engines
Use with gauge P/N 529035709 and P/N 529 035 714.



Air Compressor Adaptor
P/N 529 035 712 **Mandatory**
947 DI engines
Use with gauge P/N 529035709 and P/N 529 035 714.



disconnect tool
P/N 529 035 714 **Mandatory**
Injection models
Used also with gauge P/N 529 035 709, 529 035 652 & 529 036 023



Fuel hose adapter
P/N 529 036 023 **Mandatory**
Injection type vehicles
To be used with 529 035 709. Replacement clip 513 033 135



Fuel hose disconnect tool
P/N 529 036 037 **Mandatory**
1503, 1203
Disconnect fuel hose



fuel pump module socket
P/N 529 036 125 **Mandatory**
1503 2008



Vented cap test adapter
P/N 529 036 141 **Mandatory**
Vented cap model

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Cooling



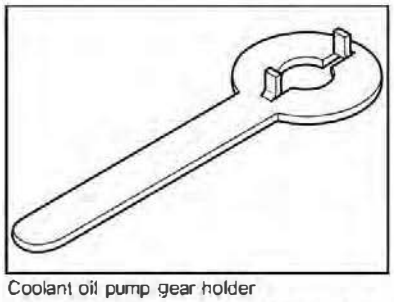
Flush Kit
P/N 295 500 068 Recommended
97-98 GTS



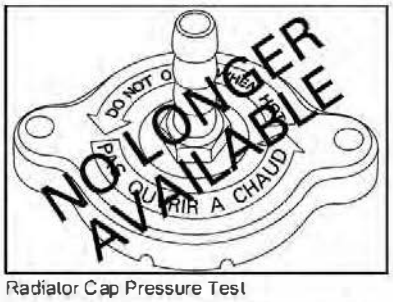
Flushing Kit Hose
P/N 295 500 258 Recommended
All models (except GTS)



Flushing connector adaptor
P/N 295 500 473 Recommended
All models



Coolant oil pump gear holder
P/N 420 277 905 Recommended
717, 583, 670, 599, 699, 779, 809 engine



Radiator Cap Pressure Test
P/N 529 021 400 Recommended
4-TEC models
Replacement part for item also included in kit 861749100



water pump seal pusher
P/N 529 035 823 Recommended
4-TEC 1503



Test cap
P/N 529 035 991 Recommended
All models
To be used with Vacuum/Pressure Pump 529 021 800.

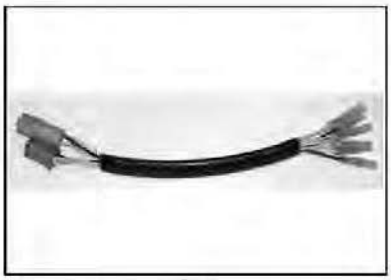
Electrical



MPI communication cables only
P/N 278 001 052 Recommended
MPI not included



D.E.S.S. Adaptor
P/N 278 001 978 Recommended
MY 2003-05 787 RFI models
To be used with the MPI or MPI-2.



Magneto Harness 4 Pins
P/N 295 000 131 Recommended
717 engines
To test the magneto.



Magneto Harness 6 Pins
P/N 295 000 136 Recommended
787, 787 RFI 947 & 947 DI engines
Replaced by 259 035 604



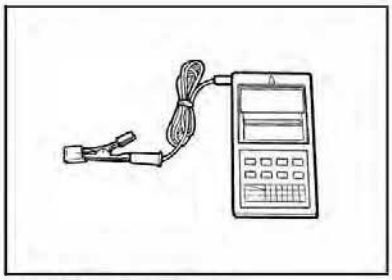
Suction Cup
P/N 295 000 163 Recommended
To remove gauges.



ECM adapter tool
P/N 420 277 010 [redacted]
All models
All injected 2-TEC & 4-TEC with VDO ECM



MPEM programmer guide
P/N 484 300 139 Recommended
Guide: how to use hand held programmer
Has been replaced by B.U.D.S., the MPI and recently by the MPI-2.



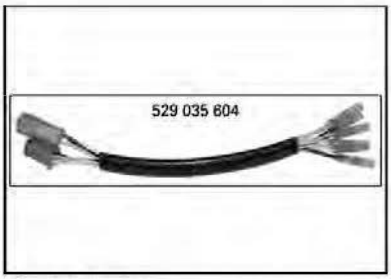
Digital Induction tachometer
P/N 529 014 500 Recommended
All models



Stroboscopic Timing Light
P/N 529 031 900 Recommended
All 2-stroke



Choke Nut Removal Tool
P/N 529 034 600 Recommended
Replaced by 529035943



Magneto harness
P/N 529 035 604 Recommended
787, 787 RFI, 947 & 947 DI engines
To test magneto.



Diagnostic adaptor for VCK
P/N 529 035 679 Recommended
To be used with the MPI, connects to 529 035 807.

Service 2009-1 12/21
sdd2011-302-500_en_12

Electrical



9 Pins to 25 Pins Adaptor
P/N 529 035 681 Recommended
To connect communication cable P/N 529 035 697 of MPI to older PC.



D.E.S.S 4 Pin Adaptor
P/N 529 035 685 Recommended
1998-2002 787 RFI engines
Disconnect the D.E.S.S. post and connect in series, then to MPI.



MPI-2 Communication Cable Extension
P/N 529 035 697 Recommended
Male/female DB9 extension can be purchased at any PC store; max. 25 ft lg.



Crimping tool (heavy gauge wire)
P/N 529 035 730 Recommended
All models
Ex.: To crimp battery cable terminals.



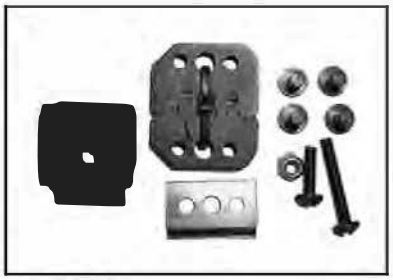
Fluke 115 multimeter
P/N 529 035 868 Recommended
All models



MPEM programmer kit
P/N 529 035 878 Recommended
All 2-stroke models
No longer sold, replaced by MPI-2, P/N 529 036 018.



D.E.S.S. Adaptor
P/N 529 035 904 **Mandatory**
Connects to the diagnostic cable of the MPI or MPI-2.



KOSTAL Die
P/N 529 035 906 Recommended
All models with KOSTAL ECM connectors
To use with crimping tool 529 035 909 to crimp ECU connectors



AMP die
P/N 529 035 908 Recommended
All models with AMP connectors
To use with crimping tool 529 035 909 to crimp Deutsch connectors.



Crimping tool (Kostal)
P/N 529 035 909 Recommended
To use with compatible die to crimp different connectors



D.E.S.S. Post Remover
P/N 529 035 943 Recommended
All DESS equipped models

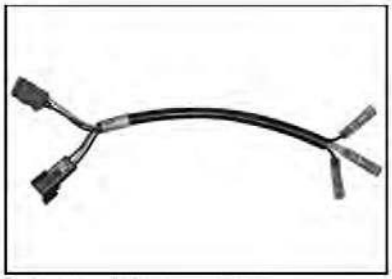


MPI communication kit
P/N 529 035 981 Recommended
Spare cables are still available. See MPI-2

Electrical



Handheld MEM Programme Cable
P/N 529 035 993 Recommended
6 pin connector



3-pin magneto harness adapter
P/N 529 036 016 Recommended
1503, 449
To test the magneto.



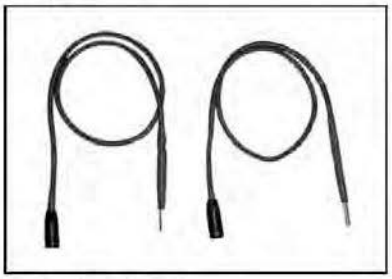
787 RFI Timing Tool
P/N 529 036 017 Recommended
MY 2005, 787 RFI
To replace temperature sensor during timing procedure.



MPI-2 interface card
P/N 529 036 018 Mandatory
Replaces the MPI.



D.E.S.S. Post Interface
P/N 529 036 019 Mandatory
To programm D.E.S.S. keys with the MPI-2.



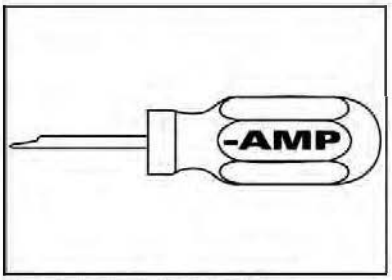
Back probe test wires
P/N 529 036 063 Recommended
All models
To back probe various connectors.



ECM adapter tool
P/N 529 036 166 Mandatory
RXT iS and GTX iS



MPI-2 diagnostic cable
P/N 710 000 851 Mandatory
All DESS-equipped vehicles

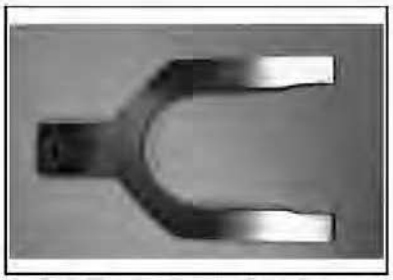


Multilock terminal extraction tool
P/N AMP 755430-2 Recommended
Not sold by BRP

Lubrication



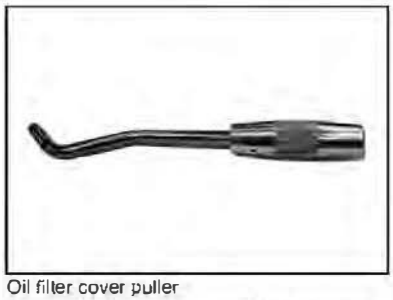
Adapter Hose
P/N 529 035 652 **Mandatory**
4 strokes engines
Used with 529 035 709.



OIL FILTER COVER EXTRACTOR
P/N 529 036 038 Recommended
4-TEC 1503



Oil Filter Cover Puller
P/N 529 036 057 Recommended
4-TEC 1503
Replaced by 529 036 108

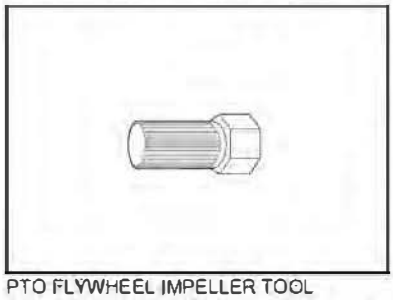


Oil filter cover puller
P/N 529 036 108 Recommended
1503
Used with 529 036 038.

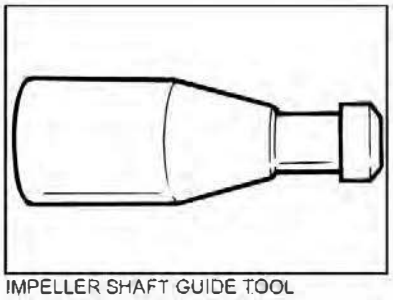


Supercharger Oil Spray jet tool
P/N 529 036 134 **Mandatory**
1503 Supercharged (2008 and newer)

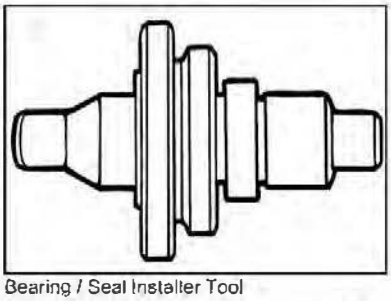
Transmission / Propulsion



PTO FLYWHEEL IMPELLER TOOL
P/N 295 000 001 Recommended
All 2-stroke

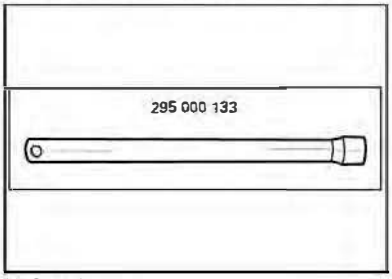


IMPELLER SHAFT GUIDE TOOL
P/N 295 000 002 Recommended
All 2-stroke models

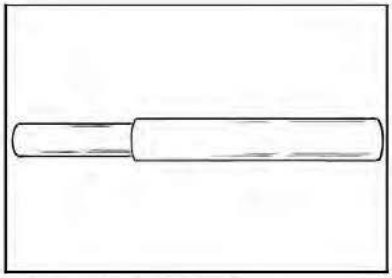


Bearing / Seal Installer Tool
P/N 295 000 107 Recommended
All 2-stroke engines

Transmission / Propulsion



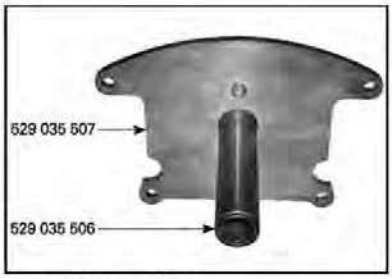
VTS socket tool
P/N 295 000 133 Recommended
All VTS equipped



Jet Pump Bearing Remover
P/N 295 000 144 Recommended
All 2-stroke models



Alignment Adapter
P/N 295 000 157 Recommended
HX & XP models until 1998



Engine alignment Tool
P/N 529 035 506 **Mandatory**
All 155.6mm and 139.5mm jet pump

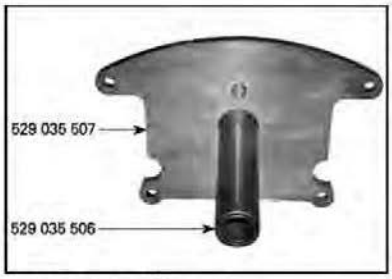


Plate for engine Alignment
P/N 529 035 507 **Mandatory**
155.6 mm jet pump



Pump Plate
P/N 529 035 508 Recommended
139.5 mm jet pump
Used with 529 035 506



Inner Seal Installer
P/N 529 035 609 **Mandatory**
All 155.6mm jet pump models



Pump Bearing Pusher
P/N 529 035 818 **Mandatory**
4-TEC 1503 models



SEAL/BEARING PUSHER
P/N 529 035 819 **Mandatory**
4-TEC 1503 models



impeller remover/installer
P/N 529 035 820 **Mandatory**
4-TEC 1503 NA and BV
Also used to turn the engine.



Floating ring tool I
P/N 529 035 841 **Mandatory**
1503 engine without super charger

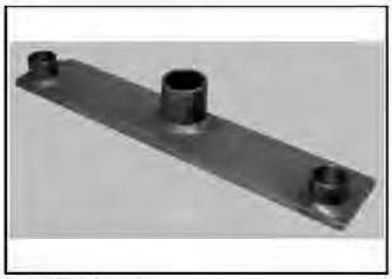


PTO support tool
P/N 529 035 842 **Mandatory**
4-TEC 1503 models

Transmission / Propulsion



Pressure Cap
P/N 529 035 843 **Mandatory**
4-TEC 1503 models



Drive Shaft Holder
P/N 529 035 871 **Mandatory**
4-TEC models, except RXP
Replaced by 529 035 986 (RXP) tool that fits all 4-TEC.



Drive Shaft Adapter
P/N 529 035 892 **Mandatory**
4-TEC 1503 engines (except BV IC)
Install on drive shaft to turn engine as required.



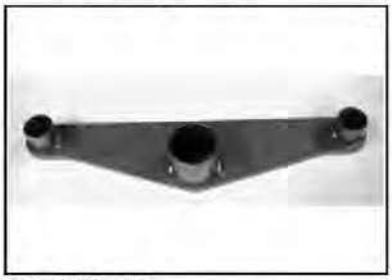
Impeler shaft installer/ Pusher
P/N 529 035 955 **Mandatory**
4-TEC Plastic & Aluminum Jet Pump
Tool used to push out impeller shaft and install back bearing in pump.



impeller remover/installer
P/N 529 035 956 **Mandatory**
SC IC Models
Tool used to remove and install impeller



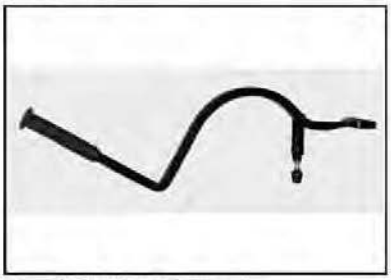
Drive Shaft Adapter
P/N 529 035 985 **Mandatory**
RXP (BV IC)
To install on driveshaft for turning engine as required.



Drive Shaft Holder
P/N 529 035 986
All 4-TEC 1503
To hold driveshaft in place when using the floating ring tool.



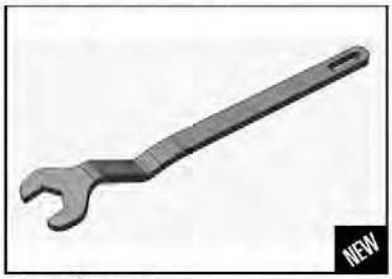
Floating ring tool
P/N 529 035 987 **Mandatory**
RXP SCIC
Tool used to push the floating ring to epxose C-clip on drive shaft



Drive Shaft C-Clip Remover
P/N 529 036 026 Recommended
4-TEC 1503



Floating ring tool II
P/N 529 036 116 **Mandatory**
GTX SC/SCIC, RXT SCIC



driveshaft wrench
P/N 529 036 167 **Mandatory**
RXT iS and GTX iS



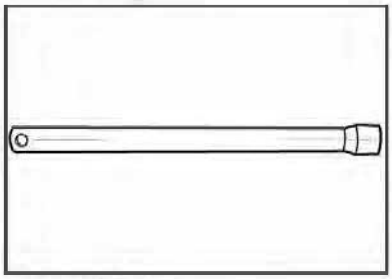
Impeller shaft bearing removal tool
P/N 529 036 168 Recommended
Starting from 2009

Transmission / Propulsion



Engine alignment tool
P/N 529 036 170 **Mandatory**
RXT iS and GTX iS

Steering



steering cable tool
P/N 295 000 145 Recommended
All

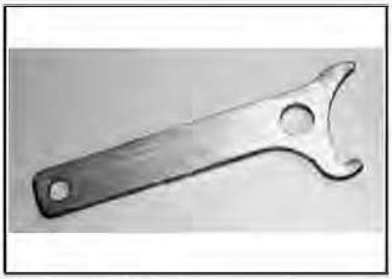


O.P.A.S. CYLINDER NUT WRENCH
P/N 529 035 840 **Mandatory**
All ●.P.A.S. models

Suspension

No picture available

gas fill tool kit
P/N 503 190 102 Recommended
T/A shocks
To be used with P/N 529035570. Spare needle P/N 529035930.



Shock preload adjustment wrench
P/N 529 032 900 Recommended

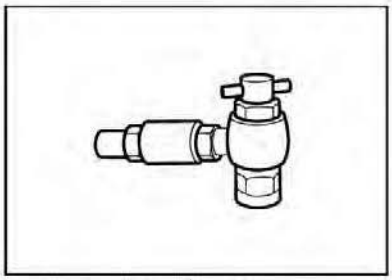


Spring compressor
P/N 529 035 504 Recommended
No longer sold, replaced by P/N 529 036 007.

Suspension



529 035 504 Remplacement Component
P/N 529 035 551 Recommended
HX & XP
To easily remove HX & XP suspension

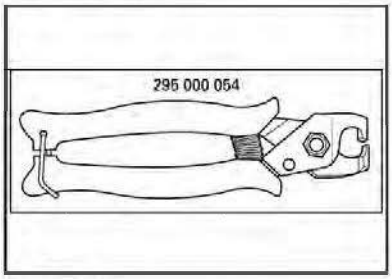


gas shock valve tool (tire valve type)
P/N 529 035 570 Recommended
T/A shocks

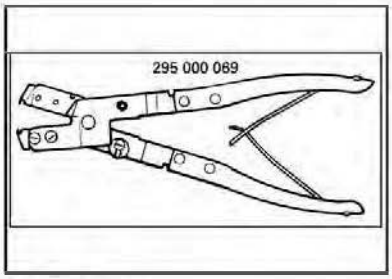


Spring Remover
P/N 529 036 007 Recommended
All models
To remove coil spring from shock.

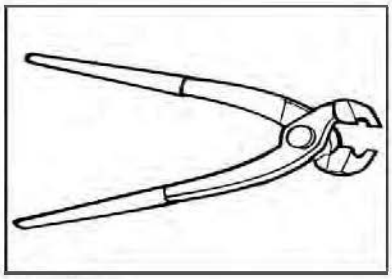
Various



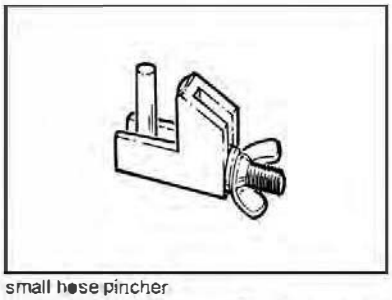
Caillau pliers
P/N 295 000 054 Recommended
All models



Oetiker Pliers
P/N 295 000 069 Recommended
All models



Oetiker pliers
P/N 295 000 070 Recommended
All models



small hose pincher
P/N 295 000 076 Recommended
All models



LIFT KIT
P/N 295 100 204 Recommended
LRV DI



LIFT KIT
P/N 295 100 205 Recommended
4-TEC

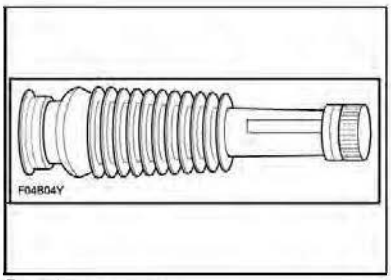
Various



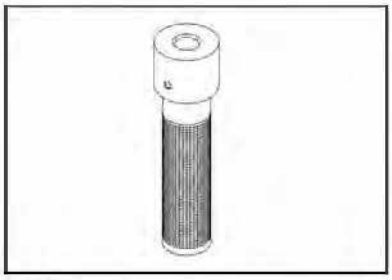
LIFT KIT
P/N 295 100 206 Recommended
All 2-stroke models, except LRV



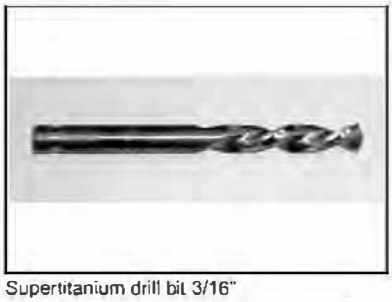
LEAK SUPPLEMENT KIT
P/N 295 500 780 Recommended
787 RFI / 947 DI
Kit includes 296 000 024/ 296 000 025/ 296 000 026/ 296 000 027



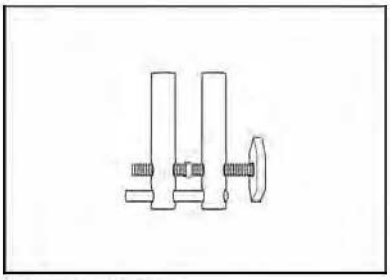
Flexible spout for oil
P/N 414 837 300 Recommended
All models



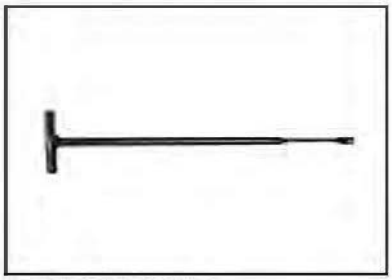
Handle
P/N 420 877 650 Recommended
All models
To be used with many pushers.



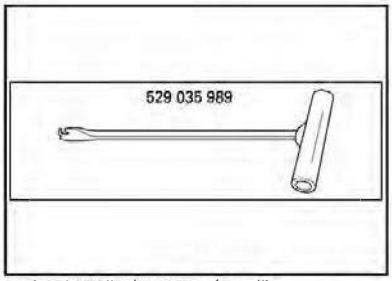
Supertitanium drill bit 3/16"
P/N 529 031 800 Recommended
To drill/remove many kinds of rivet.



Large hose pincher
P/N 529 032 500 Recommended
All models



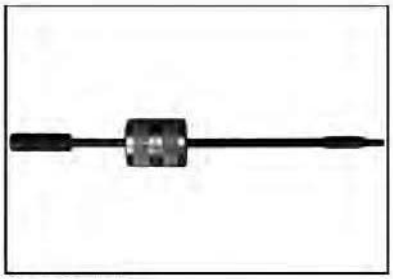
spring installer/remover
P/N 529 035 983 Recommended
All models



spring installer/remover (small)
P/N 529 035 989 Recommended



Blind hole bearing puller set
P/N 529 036 117 Recommended
All models
Replaced by 529036056



Slide hammer
P/N Snap-on CJ125-6 Recommended
All
No sold by BRP

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Tool Part Numbers ... Page

These tools are mandatory

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420876569 4
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420976235 4
420977475 4
420977480 5
420977490 5
484300139 12
503190102 18
529014500 12
529021400 11
529021800 5
529031800 20
529031900 12
529032500 20
529032900 18
529034600 12
529034800 5
529034900 5
529035000 5
529035100 5
529035503 5
529035504 18
529035505 5
529035506 16
529035507 16
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529035513 5
529035533 5
529035541 5
529035542 6
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529035551 19
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529035569 6
529035570 19
529035590 6
529035591 10
529035604 12
529035607 6
529035609 16
529035652 15
529035661 7
529035679 12
529035681 13
529035685 13
529035687 7
529035697 13
529035708 7
529035709 10
529035710 10
529035711 10
529035712 10
529035713 7
529035714 10
529035715 7
529035716 7
529035719 7
529035724 7
529035730 13
529035765 7
529035818 16
529035819 16
529035820 16
529035821 7
529035822 7
529035823 11
529035830 7
529035839 8
529035840 18
529035841 16
529035842 16
529035843 17
529035846 8
529035868 13
529035871 17
529035878 13
529035880 8
529035892 17
529035904 13
529035906 13
529035908 13
529035909 13
529035938 8
529035940 8
529035943 13
529035946 8
529035947 8
529035948 8
529035950 8
529035955 17
529035956 17
529035981 13
529035983 20
529035985 17
529035986 17
529035987 17
529035989 20
529035991 11
529035993 14
529036004 8
529036007 19
529036016 14
529036017 14
529036018 14
529036019 14
529036023 10
529036025 8
529036026 17
529036027 8
529036037 10
529036038 15
529036057 15
529036063 14
529036073 9
529036086 9
529036087 9
529036108 15
529036116 17
529036117 20
529036125 10
529036126 9
529036134 15
529036141 10
529036166 14
529036167 17
529036168 17
529036170 18
710000851 14
AMP 755430-2 14
Snap-on CJ125-6 20
Snap-on RC 980 9
Snap-on TA362 9
Snap-on YA 8230 9

Specifications

Objective in this section you will find the most important specifications concerning this year line up.

2011 SEA-DOO BOAT IMPELLER CHART/ TABLEAU DES HÉLICES POUR BATEAUX SEA-DOO 2011

MODEL/ MODÈLE	ENGINE/ MOTEUR	PITCH ANGLE @ IMPELLER O.D. (deg)/ PAS DE L'HÉLICE AU DIAM. EXT. DE L'HÉLICE (DEGRÉ)	P/N IMPELLER ASSEMBLY/ N/P DE HÉLICE COMPLET
150 SPEEDSTER	1503 NA	10-21	204 160 350
150 SPEEDSTER	1503 HO	14-24	204 160 353
200 SPEEDSTER	2 X 1503 HO	14-24	204 160 353
		14-23	267 000 569
180 CHALLENGER	1503 SCIC	10-20	204 160 355
180 CHALLENGER SE	1503 SCIC	10-20	204 160 355
180 CHALLENGER SE	1503 HO	14-23	267 000 569
210 CHALLENGER	2 X 1503 NA	10-20	267 000 434
		11-17	267 000 527
210 CHALLENGER SE	2 X 1503 NA	10-20	267 000 434
		11-17	267 000 527
210 CHALLENGER SP	2 X 1503 NA	10-20	267 000 434
		11-17	267 000 527
210 CHALLENGER SE	2 X 1503 SCIC	10-22	204 160 358
		10-21	204 160 355
230 CHALLENGER	1503 NA	10-20	267 000 434
		11-18	267 000 431
230 CHALLENGER SE	2 X 1503 NA	10-20	267 000 434
		11-18	267 000 431
230CHALLENGER SE	2 X 1503 SCIC	10-21	204 160 358
		10-20	204 160 355
230 CHALLENGER SP	2 X 1503 SCIC	10-21	204 160 358
		10-20	204 160 355
230 CHALLENGER SE	2 X 1503 HO	14-25	267 000 442
		14-23	267 000 569
210 WAKE	2 X 1503 NA	10-20	267 000 434
		11-17	267 000 527
210 WAKE	2 X 1503 SCIC	10-22	204 160 358
		10-21	204 160 355
230 WAKE	2 X 1503 SCIC	10-21	204 160 358
		10-20	204 160 355
230 WAKE	2 X 1503 HO	14-25	267 000 442
		14-23	267 000 569

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2011 SEA-DOO BOAT HIGH ALTITUDE IMPELLER CHART/ TABLEAU DES HÉLICES POUR BATEAUX SEA-DOO 2011 (HAUTE ALTITUDE)

MODEL/ MODÈLE	ENGINE/ MOTEUR	PITCH ANGLE @ IMPELLER O.D. (deg)/ PAS DE L'HÉLICE AU DIAM. EXT. DE L'HÉLICE (DEGRÉ)	P/N IMPELLER ASSEMBLY/ N/P DE HÉLICE COMPLET
150 SPEEDSTER	1503 NA	11-16	267 000 449
150 SPEEDSTER	1503 HO	14-23	267 000 456
200 SPEEDSTER	2 X 1503 HO	14-23	267 000 456
		14-23	267 000 456
180 CHALLENGER	1503 SCIC	10-21	267 000 452
180 CHALLENGER SE	1503 SCIC	10-21	267 000 452
180 CHALLENGER SE	1503 HO	14-23	267 000 456
210 CHALLENGER	2 X 1503 NA	11-16	267 000 449
		11-15	267 000 447
210 CHALLENGER SE	2 X 1503 NA	11-16	267 000 449
		11-15	267 000 447
210 CHALLENGER SP	2 X 1503 NA	11-16	267 000 449
		11-15	267 000 447
210 CHALLENGER SE	2 X 1503 SCIC	10-21	267 000 452
		10-21	267 000 452
230 CHALLENGER	1503 NA	11-16	267 000 449
		11-15	267 000 447
230 CHALLENGER SE	2 X 1503 NA	11-16	267 000 449
		11-15	267 000 447
230CHALLENGER SE	2 X 1503 SCIC	10-21	267 000 452
		10-21	267 000 452
230 CHALLENGER SP	2 X 1503 SCIC	10-21	267 0004 52
		10-21	267 000 452
230 CHALLENGER SE	2 X 1503 HO	14-23	267 000 456
		14-23	267 000 456
210 WAKE	2 X 1503 NA	11-16	267 000 449
		11-15	267 000 447
210 WAKE	2 X 1503 SCIC	10-21	267 000 452
		10-21	267 000 452
230 WAKE	2 X 1503 SCIC	10-21	267 000 452
		10-21	267 000 452
230 WAKE	2 X 1503 HO	14-23	267 000 456
		14-23	267 000 456

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2011 SEA-DOO WATERCRAFT IMPELLER CHART/ TABLEAU DES HÉLICES POUR MOTOMARINES SEA-DOO 2011

MODEL/ MODÉLE	ENGINE/ MOTEUR	MODEL NUMBER/ NUMÉRO DE MODÉLE	PITCH ANGLE @ IMPELLER O.D. (deg)/ PAS DE L'HÉLICE AU DIAM. EXT. DE L'HÉLICE (DEGRÉ)	P/N IMPELLER ASSEMBLY/ N/P DE L'HÉLICE COMPLET
GTI	1503 DT	23BA	11-18	267 000 532
GTI intl		23BB		
GTI SE	1503 DT	24BA,24BC	11-18	267 000 532
GTI SE intl		24BB		
GTI Limited	1503 NA	39BA	11-18	267 000 532
GTI Limited intl		39BB		
GTI SE	1503 NA	30BA	11-18	267 000 532
GTI SE intl		30BB		
GTS	1503 DT	43BA	11-18	267 000 532
GTS intl		43BB		
GTS intl (RENTAL)		25BA		
GTS PRO	1503 DT	44BA	11-18	267 000 431
GTX	1503 NA	38BA	11-18	267 000 577
GTX intl		38BB		
GTX	1503 SCIC	42BA	10-21	267 000 575
GTX intl		42BB		
GTX iS	1503 SCIC	33BA	10-21	267 000 575
GTX LTD iS	1503 HO	18BA	14-23	267 000 567
GTX LTD iS intl		18BB		
RXP-X	1503 HO	32BA	14-24	267 000 444
RXP-X RS intl		32BB	14-25	267 000 481
RXT	1503 HO	17BA	14-23	267 000 567
RXT intl		17BB		
RXT iS	1503 HO	34BA	14-23	267 000 567
RXT iS intl		34BB		
RXT-X	1503 HO	31BA	14-23	267 000 567
RXT-X RS intl		31BB		
RXT-X aS	1503 HO	41BA	14-23	267000567
RXT-X RS aS intl		41BB		
WAKE	1503 NA	35BA	11-18	267 000 532
WAKE intl		35BB		
WAKE PRO	1503 SCIC	26BA	10-21	267 000 575
WAKE PRO intl		26BB		

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2011 SEA-DOO WATERCRAFT HIGH ALTITUDE IMPELLER CHART/ TABLEAU DES HÉLICES POUR MOTOMARINES SEA-DOO 2011 (HAUTE ALTITUDE)

MODEL/ MODÉLE	ENGINE/ MOTEUR	MODEL NUMBER/ NUMÉRO DE MODÉLE	PITCH ANGLE @ IMPELLER O.D. (deg)/ PAS DE L'HÉLICE AU DIAM. EXT. DE L'HÉLICE (DEGRÉ)	P/N IMPELLER ASSEMBLY/ N/P DE L'HÉLICE COMPLET
GTI	1503 DT	23BA	11-17	267 000 600
GTI intl		23BB		
GTI SE	1503 DT	24BA,24BC	11-17	267 000 600
GTI SE intl		24BB		
GTI Limited	1503 NA	39BA	11-17	267 000 602
GTI Limited intl		39BB		
GTI SE	1503 NA	30BA	11-17	267 000 602
GTI SE intl		30BB		
GTS	1503 DT	43BA	11-17	267 000 600
GTS intl		43BB		
GTS intl (RENTAL)		25BA		
GTS PRO	1503 DT	44BA	11-15	267 000 447
GTX	1503 NA	38BA	11-16	267 000 594
GTX intl		38BB		
GTX	1503 IC	42BA	10-19	267 000 596
GTX intl		42BB		
GTX iS	1503 IC	33BA	10-19	267 000 596
GTX LTD iS	1503 HO	18BA	14-22	267 000 598
GTX LTD iS intl		18BB		
RXP-X	1503 HO	32BA	14-23	267 000 456
RXP-X RS intl		32BB		
RXT	1503 HO	17BA	14-22	267 000 598
RXT intl		17BB		
RXT iS	1503 HO	34BA	14-22	267 000 598
RXT iS intl		34BB		
RXT-X	1503 HO	31BA	14-22	267 000 598
RXT-X RS intl		31BB		
RXT-X aS	1503 HO	41BA	14-22	267 000 598
RXT-X RS aS intl		41BB		
WAKE	1503 NA	35BA	11-17	267 000 602
WAKE intl		35BB		
WAKE PRO	1503 IC	26BA	10-19	267 000 596
WAKE PRO intl		26BB		

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ALL-NEW MODEL FOR 2011

iBR iTC CLCS





iBR (Intelligent Brake & Reverse)



iTC™ including touring / Sport mode



Wide-angle mirrors



Closed-loop cooling system (CLCS)



Digital information centre



iControl™ programmable Learning Key™

Specifications

DIMENSIONS	
Length	132.6" / 336.8 cm
Width	48.5" / 123.1 cm
Height	44" / 111.8 cm
Weight (dry)	745 lb. / 338 kg
Rider capacity	3
Fuel capacity	15.9 US gal / 60 l
Storage capacity	30.8 US gal / 116.6 l
ENGINE	
Type	1503 Rotax® 4-TEC® engine
Intake system	Naturally aspirated with 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	10.6:1
Cooling	Closed-loop cooling system
Fuel type	87 octane
DRIVE UNIT	
Propulsion system	Sea-Doo® Direct Drive
Jet pump	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	iBR™
Impeller	Stainless steel
ELECTRICAL	
Ignition	Digital induction
Starter	Electric
Battery	12 V
HULL AND COMPONENTS	
Type	LFI, composite
Colour	Black and White

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Standard Features

GTI 130 RECREATION | 2011



HULL AND COMPONENTS

Touring / Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
3-up seat	Comfortable room for three – permits rear-facing spotter for watersports.
Elevated fuel filler	Easy access and prevents water intrusion while refueling.
Multifunction Digital Information Centre	Reports 19 key operating functions: Fuel level, Tachometer, Speedometer, Touring / Sport mode, Hour meter, Compass, F-N-R Indicator, Low fuel level, Lowoil pressure, Low voltage, Overheat, HI voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.

Sponsons
Bumpers
Footwell carpets
Ski tow hook
Reboarding platform
Wide-angle mirrors
Rear grab handle
Dual drain plugs
External exhaust cooling flush attachment
Double density comfort hand grips
Emergency floating lanyard
Cut & sew seat with three colours
Seat strap
Operator's guide, instructional video and booklet

OPTIONS

Fold-down reboarding step	Top/average speed/RPM
3-position retractable ski pylon	Lap timer
Removable wakeboard rack	Engine temperature
Depth finder	High-performance VTS™
Cruise control	Removable dry bag for front storage
Ski mode	Ski tow eye
Slow mode	Speed Tie™
Clock	Safety kit
Fuel consumption meter	Sandbag anchor
New ECO mode	Protective cover
Time/distance to empty	Fire extinguisher

WARRANTY

BRP limited warranty covers the watercraft for one year.*

ENGINE

1,494 cc four-stroke, Rotax with four valves per cylinder	1503 Rotax 4-TEC engine provides reliable performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
ITC (Intelligent Throttle Control) system	Operating electronically, this advanced throttle system starts you in neutral for easier dockside starts. It also features an activity-specific cruise control, Touring / Sport mode and Variable Trim System that can all be set to accommodate your riding style. The result is a more responsive, more intuitive ride.
iControl Learning Key	The programmable Learning Key allows you to limit the performance of the PWC based on rider skill-level. Each of the two settings can be fine-tuned using the mode/ set buttons.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Closed-loop cooling system	Uses coolant to keep the engine running at the ideal temperature, much like a car's radiator. Also keeps out corrosive saltwater and debris.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
iBR (Intelligent Brake & Reverse) system	The world's only on-water braking system, iBR lets you stop up to 100 feet sooner than any other watercraft[1]. All with the squeeze of a lever. And with its electronic reverse, it gives you a level of manoeuvrability that makes docking easier.
Aluminium stator vanes	Handles the high-performance engine without erosion.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Replaceable UHMW* wear ring	Provides long impeller life, less maintenance and maximum thrust.
Stainless steel Impeller	Delivers improved acceleration, higher top speed and less cavitation.

*In some markets, the duration of the warranty coverage may differ.

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ALL-NEW MODEL FOR 2011

iBR iTC CLCS ECO

Specifications

DIMENSIONS

Length	132.6" / 336.8 cm
Width	48.5" / 123.1 cm
Height	44" / 111.8 cm
Weight (dry)	745 lb. / 338 kg
Rider capacity	3
Fuel capacity	15.9 US gal / 60 l
Storage capacity	30.8 US gal / 116.6 l

ENGINE

Type	1503 NA Rotax® 4-TEC® engine
Intake system	Naturally aspirated with 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	10.6:1
Cooling	Closed-loop cooling system (CLCS)
Fuel type	87 octane

DRIVE UNIT

Propulsion system	Sea-Doo® Direct Drive
Jet pump	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	iBR
Impeller	Stainless steel

ELECTRICAL

Ignition	Digital Induction
Starter	Electric
Battery	12 V

HULL AND COMPONENTS

Type	LFI, composite
Colour	Marina Blue


Touring seat



High-performance VTS™


Cruise control & ECO mode


Wide-angle mirrors


Multi-function digital infocentre


iBR™ (Intelligent Brake & Reverse)

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Standard Features

GTI LIMITED 155

HULL AND COMPONENTS

Touring / Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
ECO mode	The newest iTC™ function that automatically determines the most economical power delivery and sets the optimal speed for greatest fuel economy.
Elevated fuel filler	Easy access and prevents water intrusion while refueling.
Touring seat	Ergonomically designed for comfort and great looks providing ultra-plush seating for three.
Multifunction Digital Information Centre	Reports 29 key operating functions: Fuel level, Tachometer, Speedometer, Touring / Sport mode, Cruise control, Slow mode, New ECO mode, Altitude, Hour meter, Compass, Clock, Fuel consumption meter, Time/Distance to empty, VTS, VTS preset, F-N-R indicator, Low fuel level, Low oil pressure, Low voltage, Overheat, Hi voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.
Fold-down reboarding step	Makes reboarding from the water easier and quicker.

Sponsons
Bumpers
Platform carpets double colouration
Reboarding platform
Wide-angle mirrors
Rear grab handle
Dual drain plugs
External exhaust cooling flush attachment
Double density comfort hand grips
Emergency floating lanyard
Cut & sew seat with three colours
Seat strap
Operator's guide, instructional video and booklet

OPTIONS

3-position retractable ski pylon	Lap timer
Removable wakeboard rack	Engine temperature
Depth finder	Speed Tie™
Ski mode	Protective cover
Top/average speed/RPM	Fire extinguisher

WARRANTY

BRP limited warranty covers the watercraft for one year.*

ENGINE

1,494 cc four-stroke Rotax with four valves per cylinder	1503 NA Rotax 4-TEC engine provides reliable performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
iTC (Intelligent Throttle Control) system	Operating electronically, this advanced throttle system starts you in neutral for easier dockside starts. It also features an activity-specific cruise control, Touring/Sport mode, ECO mode and Variable Trim System that can all be set to accommodate your riding style. The result is a more responsive, more intuitive ride.
iControl Learning Key™	The programmable Learning Key allows you to limit the performance of the PWC based on rider skill level. Each of the two settings can be fine-tuned using the mode/set buttons.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
Closed-loop cooling system	Ensures the proper operating temperature at all speeds and improves corrosion durability.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
iBR (Intelligent Brake & Reverse) system	The world's only on-water braking system, iBR lets you stop up to 100 feet sooner than any other watercraft[1]. All with the squeeze of a lever. And with its electronic reverse, it gives you a level of manoeuvrability that makes docking easier.
Aluminium stator vanes	Handles the high-performance engine without erosion.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Replaceable UHMW** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

LIMITED PACKAGE

Additional gauge functions	Cruise control, Time/Distance to empty, Altitude.
Chrome parts	For extra style and premium looks.
Removable dry bag	Keeps contents dry and converts to backpack when removed.
Sandbag anchor	Easy way to hold your boat in one position.
Safety kit	Contains all the essential safety equipment.
Custom boat cover	Protect your PWC.
High-performance electric VTS (Variable Trim System)	Provides pre-set positions for quick settings when adjusting boat trim, maximises acceleration and high-speed stability.
Ski Tow Eye	For easy and secure attachment of ski rope.

*In some markets, the duration of the warranty coverage may differ.

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SEA-DOO

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ALL-NEW MODEL FOR 2011

iBR iTC CLCS ECO





Touring seat



iBR™ (Intelligent Brake & Reverse)



Fold-down roboarding step



ECO mode & VTS™ (Variable Trim System)



Ski tow hook



iControl™ Programmable Learning Key™

Specifications

DIMENSIONS

Length	132.6" / 336.8 cm
Width	48.5" / 123.1 cm
Height	44" / 111.8 cm
Weight (dry)	745 lb. / 338 kg
Rider capacity	3
Fuel capacity	15.9 US gal / 60 l
Storage capacity	30.8 US gal / 116.6 l

ENGINE

Type	1503 NA Rotax® 4-TEC® engine
Intake system	Naturally aspirated with 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	10.6:1
Cooling	Closed-loop cooling system (CLCS)
Fuel type	87 octane

DRIVE UNIT

Propulsion system	Sea-Doo® Direct Drive
Jet pump	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	iBR
Impeller	Stainless steel

ELECTRICAL

Ignition	Digital induction
Starter	Electric
Battery	12 V

HULL AND COMPONENTS

Type	LFI, composite
Colour	Black and Sunshine

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Standard Features

HULL AND COMPONENTS

Touring / Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
ECO mode	The newest iTC™ function that automatically determines the most economical power delivery and sets the optimal speed for greatest fuel economy.
Elevated fuel filler	Easy access and prevents water intrusion while refueling.
Touring seat	Ergonomically designed for comfort and great looks providing ultra-plush seating for three.
Multifunction Digital Information Centre	Reports 23 key operating functions: Fuel level, Tachometer, Speedometer, Touring / Sport mode, New ECO mode, Hour meter, Compass, Clock, Fuel consumption meter, VTS™, F-N-R indicator, Low fuel level, Low oil pressure, Low voltage, Overheat, Hi voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.

Sponsons
Bumpers
Platform carpets double colouration
Ski tow hook
Reboarding platform
Wide-angle mirrors
Rear grab handle
Dual drain plugs
External exhaust cooling flush attachment
Double density comfort hand grips
Emergency floating lanyard
Cut & sew seat with three colours
Seat strap
Operator's guide, instructional video and booklet

SE PACKAGE

Fold-down reboarding step	Makes reboarding from the water easier and quicker.
Chrome parts	For extra style and premium looks.
Additional gauge functions	VTS, fuel consumption meter, clock.

OPTIONS

3-position retractable ski pylon	Engine temperature
Removable wakeboard rack	High-performance VTS
Depth finder	Removable dry bag for front storage
Cruise control	Ski tow eye
Ski mode	Speed Tie™
Slow mode	Safety kit
Time/distance to empty	Sandbag anchor
Top/average speed/RPM	Protective cover
Lap timer	Fire extinguisher

WARRANTY

BRP limited warranty covers the watercraft for one year.*

ENGINE

1,494 cc four-stroke Rotax with four valves per cylinder	1503 NA Rotax 4-TEC engine provides reliable performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
iTC™ (Intelligent Throttle Control) system	Operating electronically, this advanced throttle system starts you in neutral for easier dockside starts. It also features an activity-specific cruise control, Touring / Sport mode, ECO mode and Variable Trim System that can all be set to accommodate your riding style. The result is a more responsive, more intuitive ride.
iControl Learning Key	The programmable learning Key allows you to limit the performance of the PWC based on rider skill-level. Each of the two settings can be fine-tuned using the mode/set buttons.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
Closed-loop cooling system	Ensures the proper operating temperature at all speeds and improves corrosion durability.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
iBR (Intelligent Brake & Reverse) system	The world's only on-water braking system, iBR lets you stop up to 100 feet sooner than any other watercraft[1]. All with the squeeze of a lever. And with its electronic reverse, it gives you a level of manoeuvrability that makes docking easier.
Aluminium stator vanes	Handles the high-performance engine without erosion.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Replaceable UHMW** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

*In some markets, the duration of the warranty covered may differ.

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ALL-NEW MODEL FOR 2011

iTC **CLCS**





iTC™ including Touring / Sport mode



Large swim platform



Wide-angle mirrors



Closed-loop cooling system (CLCS)



Digital information centre with speedometer



iControl™ programmable Learning Key™

Specifications

DIMENSIONS	
Length	132.6" / 336.8 cm
Width	48.5" / 123.1 cm
Height	44" / 111.8 cm
Weight (dry)	735 lb. / 333 kg
Rider capacity	3
Fuel capacity	15.9 US gal / 60 l
Storage capacity	30.8 US gal / 116.6 l

ENGINE	
Type	1503 Rotax® 4-TEC® engine
Intake system	Naturally aspirated with 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	10.6:1
Cooling	Closed-loop cooling system (CLCS)
Fuel type	87 octane

DRIVE UNIT	
Propulsion system	Sea-Doo® Direct Drive
Jet pump	Aluminium, axial flow, single stage, large hub with 10-vane stator
Impeller	Stainless steel

ELECTRICAL	
Ignition	Digital induction
Starter	Electric
Battery	12 V

HULL AND COMPONENTS	
Type	LFI, composite
Colour	Viper Red and White

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GTS 130

RECREATION | 2011



Standard Features

HULL AND COMPONENTS

Touring / Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
3-up seat	Comfortable room for three – permits rear-facing spotter for watersports.
Elevated fuel filler	Easy access and prevents water intrusion while refueling.
Multifunction Digital Information Centre	Reports 17 key operating functions: Fuel level, Tachometer, Speedometer, Touring / Sport mode, Hour meter, Low fuel level, Low oil pressure, Low voltage, Overheat, Hi voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.

Sponsons
Bumpers
Footwell carpets
Ski tow hook
Reboarding platform
Wide-angle mirrors
Rear grab handle
Dual drain plugs
External exhaust cooling flush attachment
Double density comfort hand grips
Emergency floating lanyard
Cut & sew seat with three colours
Seat strap
Operator's guide, instructional video and booklet

OPTIONS

Fold-down reboarding step	Speed Tie™
3-position retractable ski pylon	Safety kit
Removable wakeboard rack	Sandbag anchor
Depth finder	Protective cover
Removable dry bag for front storage	Fire extinguisher
Ski tow eye	

WARRANTY

BRP limited warranty covers the watercraft for one year.*

ENGINE

1,494 cc four-stroke Rotax with four valves per cylinder	1503 Rotax 4-TEC engine provides reliable performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
iTC (Intelligent Throttle Control) system	The most advanced throttle control on a PWC. For improved engine response.
iControl Learning Key	The programmable Learning Key allows you to limit the performance of the PWC based on rider skill-level. Each of the two settings can be fine-tuned using the mode/set buttons.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Closed-loop cooling system	Uses coolant to keep the engine running at the ideal temperature, much like a car's radiator. Also keeps out corrosive saltwater and debris.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

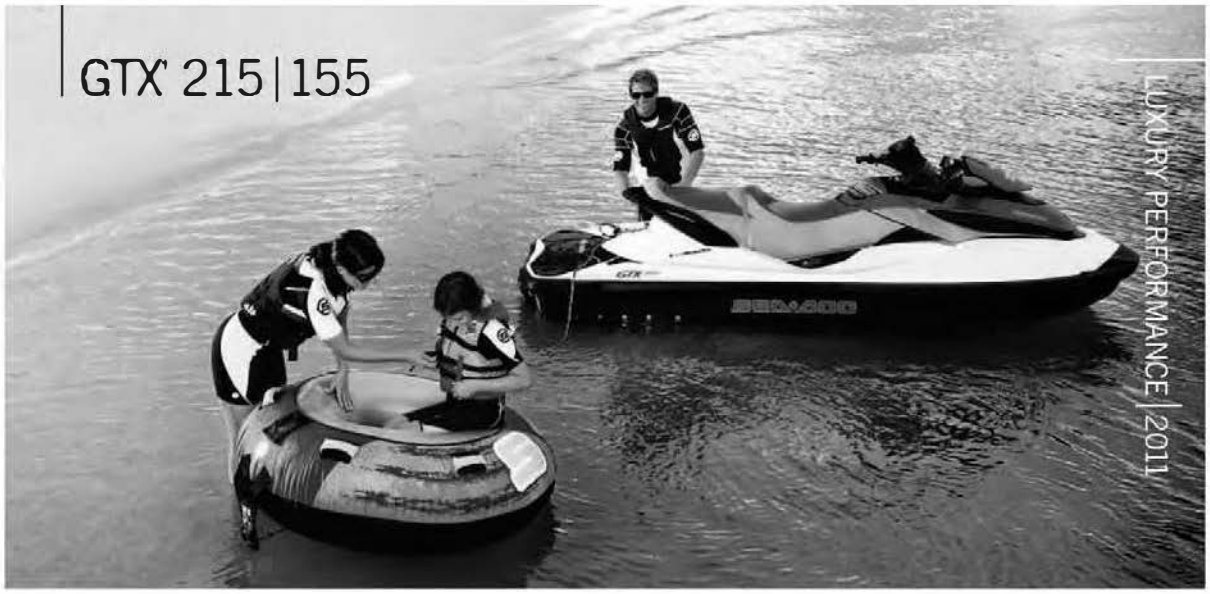
Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Aluminium stator vanes	Handles the high-performance engine without erosion.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Replaceable UHMW** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

*In some markets, this duration of the warranty coverage may differ.

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SEA-DOO

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iBR iTC S³ CLCS




Information centre


Touring seat


Large reboarding platform


Large glove box


Tilt steering


Flowing edge design

Specifications

DIMENSIONS	
Length	139" / 354 cm
Width	48" / 122 cm
Height	45.9" / 116.6 cm
Weight (dry)	GTX 215 : 855 lb. / 388 kg GTX 155 : 825 lb. / 374 kg
Rider capacity	3
Fuel capacity	15.9 US gal / 60 l
Storage capacity	13.7 US gal / 52 l
ENGINE	
Type	GTX 215: 1503 SC Rotax® 4-TEC® engine* GTX 155: 1503 NA Rotax 4-TEC engine
Intake system	GTX 215: Supercharged with Intercooler, 60 mm throttle body GTX 155: Naturally aspirated, 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	GTX 215: 8.4:1 GTX 155: 10.6:1
Cooling	Closed-Loop Cooling System (CLCS)
Fuel type	GTX 215: 87 octane – minimum 91 octane – recommended GTX 155: 87 octane – recommended
DRIVE UNIT	
Propulsion system	Sea-Doo® Direct Drive
Jet pump	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	iBR™
Impeller	Stainless steel
ELECTRICAL	
Ignition	Digital induction
Starter	Electric
Battery	12 V
HULL AND COMPONENTS	
Type	S³ Hull™
Colour	Autumn Red

*New for 2011

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GTX 215|155

LUXURY PERFORMANCE | 2011



Standard Features

HULL AND COMPONENTS

iControl™	The "Brain" that integrates and controls all systems to create the best possible ride.
S³ Hull	Stepped, stable & strong. Lightweight material, ribbed and stepped. Creates a low-pressure zone to reduce drag for nimble handling and rail-tight cornering.
Touring/Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
Electric Variable Trim System (VTS™)	Provides boat trim adjustments, maximises acceleration and high-speed stability.
Bow and stern eyes	Designed for towing or securing the craft to a trailer or dock.
Watertight, removable storage bin	Provides dry storage for luggage and necessities with easy access.
Tilt steering	Adjusts the steering and information centre angle for maximum ease and comfort.
Touring seat	Ergonomically designed for comfort and great looks providing ultra-plush seating for three.
Carpeted footwells and deck pads	Offer extra comfort, non-skid surface and great looks.
Ski tow eye	For easy and secure attachment of ski rope.
Fold-down reboarding step	Makes reboarding from the water easier and quicker.
Multifunction Digital Information Centre	Reports 26 key operating functions: Fuel level, Tachometer, Speedometer, Hour meter, Compass, Clock, Fuel consumption meter, Water temperature (GTX 215), New ECO mode (GTX 155), Touring / Sport mode, Cruise control, Slow mode, VTS, F-N-R indicator, Low fuel level, Low oil level, Low oil pressure, Low voltage, Overheat, Hi voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.

Quick latch fuel filler design
Sponsons
Bumpers
Adjustable mirrors
Reboarding platform
Reboarding handles on rear platform
Rear grab handle
Front splash deflector
Dual drain plugs
External exhaust cooling flush attachment
Special comfort hand grips
Emergency floating lanyard
Cut & sew seat with 2 colours
Seat strap
Operator's guide, instructional video and booklet

OPTIONS

3-position retractable ski pylon
Removable wakeboard rack
Depth finder
Ski mode
Time/distance to empty
Attitude
Top/average speed/RPM
Lap timer
Engine temperature
Removable dry bag for front storage
Safety kit
Sandbag anchor
Speed tie**
Glovebox organiser
Protective cover
Advanced TEC trailer
Fire extinguisher

WARRANTY

BRP limited warranty covers the watercraft for one year.**

ENGINE

1,494 cc four-stroke Rotax with four valves per cylinder	Supercharged, intercooled 1503 SC Rotax 4-TEC engine (GTX 215) or 1503 NA Rotax 4-TEC engine (GTX 155) provides reliable performance in fresh or saltwater, increased torque at RPM, optimised power at all RPM levels and throttle positions.
iTC™ (Intelligent Throttle Control) system	Operating electronically, this advanced throttle system starts you in neutral for easier dockside starts. It also features an activity-specific cruise control, Touring / Sport mode and Variable Trim System that can all be set to accommodate your riding style. The result is a more responsive, more intuitive ride.
iControl Learning Key™	The programmable Learning Key allows you to limit the performance of the PWC based on rider skill-level. Each of the two settings can be fine-tuned using the mode/set buttons.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Closed-loop cooling system	Uses coolant to keep the engine running at the ideal temperature, much like a car's radiator. Also keeps out corrosive saltwater and debris.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

iBR (Intelligent Brake & Reverse) system	The world's only on-water braking system, iBR lets you stop up to 100 feet sooner than any other watercraft¹. All with the squeeze of a lever. And with its electronic reverse, it gives you a level of manoeuvrability that makes docking easier.
Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Aluminium stator vanes	Handles the high-performance engine without erosion.
Replaceable UHMW*** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

**In some markets, the duration of the warranty coverage may differ.

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GTX† LIMITED iS™ 260



LUXURY PERFORMANCE | 2011

iBR iTC iS S³ CLCS





Tilt steering with information centre



Reboarding platform with storage



Touring seat



iBR™ (Intelligent Brake & Reverse) brake lever



Speed Tie™



Glove box organiser

Specifications

DIMENSIONS

Length	139" / 354 cm
Width	48" / 122 cm
Height	43.9" / 111.4 cm
Weight (dry)	980 lb. / 446 kg
Rider capacity	3
Fuel capacity	18.6 US gal / 70 l
Storage capacity	16.4 US gal / 62 l

ENGINE

Type	1503 XHO Rotax® 4-TEC® engine
Intake system	Supercharged with external intercooler, 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	8.4:1
Cooling	Closed-loop cooling system (CLCS)
Fuel type	87 octane – minimum 91 octane – recommended

DRIVE UNIT

Propulsion system	Sea-Doo® Direct Drive
Jet pump	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	iBR
Impeller	Stainless steel

ELECTRICAL

Ignition	Digital Induction
Starter	Electric
Battery	12 V

HULL AND COMPONENTS

Type	S³ Hull™
Colour	Pearl White*

*New for 2011

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GTX LIMITED iS 260

Standard Features

HULL AND COMPONENTS

iControl™	The "Brain" that integrates and controls all systems to create the best possible ride.
iS™	Allows the hull to move independently of the upper deck, isolating rider and passenger from the impact of rough water. Electronic adjustment, manual or automatic mode. Auto docking position, Touring calibration.
S³ Hull	Stepped, stable & strong. Lightweight material, ribbed and stepped. Creates a low-pressure zone to reduce drag for nimble handling and rail-tight cornering.
Touring / Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
Hinged seal	Easy-open seat with convenient stay-open support struts. Provides easy access to the engine compartment while remaining attached to the watercraft.
Touring seat	Ergonomically designed for comfort and great looks providing ultra-plush seating for three.
High-performance electric VTS™ (Variable Trim System)	Provides pre-set positions for quick settings when adjusting boat trim, maximises acceleration and high-speed stability.
Bow and stern eyes	Designed for towing or securing the craft to a trailer or dock.
Carpeted footwells and deck pads	Offer extra comfort, non-skid surface and great looks.
Reboarding platform with rear storage	Easy access to battery, fuses and storage.
Fold-down reboarding step	Makes reboarding from the water easier and quicker.
Ski tow eye	For easy and secure attachment of ski rope.
Watertight, removable storage bin	Provides dry storage for luggage and necessities with easy access.
Tilt steering	4 adjustable steering and information centre angles for maximum ease and comfort.
Interactive Multifunction Digital Information Centre	Reports 34 key operating functions: Fuel level, Tachometer, Speedometer, Hour meter, Compass, Clock, Fuel consumption meter, Time / Distance to empty, Altitude, Water temperature, Depth finder, Touring / Sport mode, Cruise control, Stow mode, VTS, VTS preset, Suspension settings: auto and manual mode, Suspension dock mode ON_OFF, F-N-R indicator, Low fuel level, Low oil level, Low oil pressure, Low voltage, Overheat, Hi voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.

- Quick latch fuel filler design
- Sponsons
- Bumpers
- Adjustable mirrors
- Reboarding handles on rear platform
- Rear grab handle
- Front splash deflector
- Dual drain plugs
- Engine access cover (removable)
- External exhaust cooling flush attachment
- Special comfort hand grips
- Wide handlebars
- Emergency floating lanyard (permanent)
- Cut & sew seat with 2 colours
- Seat strap
- Operator's guide, instructional video and booklet

OPTIONS

- Removable wakeboard rack
- Ski mode
- Top/average speed/RPM
- Lap timer
- Engine temperature
- Fire extinguisher

WARRANTY

BRP limited warranty covers the watercraft for one year.*

ENGINE

Supercharged, intercooled 1,494 cc four-stroke, Rotax with four valves per cylinder	Supercharged, intercooled 1503 XHO Rotax 4-TEC engine provides reliable ultra-high performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
iTC™ (Intelligent Throttle Control) system	Operating electronically, this advanced throttle system starts you in neutral for easier dockside starts. It also features an activity-specific cruise control, Touring / Sport mode and Variable Trim System that can all be set to accommodate your riding style. The result is a more responsive, more intuitive ride.
iControl Learning Key™	The programmable Learning Key allows you to limit the performance of the PWC based on rider skill level. Each of the two settings can be fine-tuned using the mode/set buttons.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Closed-loop cooling system	Uses coolant to keep the engine running at the ideal temperature, much like a car's radiator. Also keeps out corrosive saltwater and debris.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

iBR (Intelligent Brake & Reverse) system	The world's only on-water braking system, iBR lets you stop up to 100 feet sooner than any other watercraft[1]. All with the squeeze of a lever. And with its electronic reverse, it gives you a level of manoeuvrability that makes docking easier.
Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Replaceable UHMW** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Stainless steel impeller	Delivers improved acceleration, higher top impeller speed and less cavitation.
Aluminium stator vanes	Handles the high-performance engine without erosion.

LIMITED PACKAGE

Additional gauge functions	Depth finder, time/Distance to empty, Altitude.
Speed Tie™	Automatic retractable mooring lines eliminate the hassles of traditional docking lines.
Removable dry bag	Keeps contents dry and converts to backpack when removed.
Sandbag anchor	Easy way to hold your boat in one position.
Safety kit	Contains all the essential safety equipment.
Glove box organiser	Ideal to keep gear or cell phone dry; removable and watertight.
Custom boat cover	Protect your PWC.

*In some markets, the duration of the warranty coverage may differ.

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CLCS



Specifications

DIMENSIONS	
Length	121" / 307 cm
Width	48" / 122 cm
Height	45.8" / 116 cm
Weight (dry)	774 lb. / 351 kg
Rider capacity	2
Fuel capacity	15.9 US gal / 60 l
Storage capacity	10.7 US gal / 40.3 l

ENGINE	
Type	1503 HO Rotax 4-TEC engine
Intake system	Supercharged with external intercooler, 52 mm throttle b dy
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	8.4:1
Cooling	Closed-loop cooling system (CLCS)
Fuel type	87 l ane – minimum 91 octane – recommended

DRIVE UNIT	
Propulsion system	Sea-Doo® Direct Drive
Racing pump with high-performance intake grate	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	Direct drive, forward/neutral/reverse and high-performance electric VTS (Variable Trim System)
Impeller	Stainless steel

ELECTRICAL	
Ignition	Digital induction
Starter	Electric
Battery	12 V

HULL AND COMPONENTS	
Type	FRP, composite
Colour	Black and Dragon Red


X-Handlebars


High-performance VTS™


X-Racing seat



X-Tra traction carpet


Racing design



1503 HO Rotax® 4-TEC® engine

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Standard Features

HULL AND COMPONENTS

FRP, composite	Strong, light and easy to maintain. Designed to enable your craft to cut through the water with razor precision and corner more aggressively than the competition.
Elevated fuel filler	Easy access and prevents water intrusion while refueling.
Bow and stern eyes	Designed for towing or securing the craft to a trailer or dock.
Carpeted footwells and deck pads	Offer extra comfort, non-skid surface and an aggressive diamond-plate pattern for additional traction.
Removable engine hatch	Easily removed to allow expanded access during routine engine maintenance.
Multifunction Digital Information Centre	Reports 20 key operating functions: Fuel level, Tachometer, Speedometer, Hour meter, Maintenance info, Compass, Water temperature, VTS, VTS preset, Low fuel level, Low oil pressure, Low voltage, Overheat, HI voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key, Error codes.
High-performance electric Variable Trim System (VTS)	Provides pre-set positions for quick settings when adjusting boat trim, maximises acceleration and high-speed stability.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Power Assisted Steering (O.P.A.S.™)	Assists steering during off-power, as well as off-throttle situations.

X-Tra traction carpet with diamond plate pattern
Removable storage bin
Sponsons
Bumpers
Reboarding platform
Ski tow hook
Rear grab handle
Dual drain plugs
Knee pad
External exhaust cooling flush attachment
Double density comfort hand grips
Aluminium finger throttle with braided steel cable
Emergency floating lanyard
Seat strap
Operator's guide, instructional video and booklet

X-PACKAGE

X-Handlebars	Keep you in complete control in tough water conditions.
X-Racing seat	Low-profile seat allows rider to adjust body position for maximum leverage.
X-Tra traction carpet	With diamond plate pattern

OPTIONS

Fold-down reboarding step
Removable dry bag for front storage
Safety kit
Mooring rope
Sandbag anchor
Protective cover
Advanced TEC trailer
Fire extinguisher

WARRANTY

BRP limited warranty covers the watercraft for one year.*

RXP-X 255 RS

PERFORMANCE | 2011



ENGINE

Supercharged, intercooled, 1,494 cc four-stroke, Rotax with four valves per cylinder	Supercharged, intercooled 1503 HO Rotax 4-TEC engine provides reliable ultra-high performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
Sea-Doo Learning Key™	LK1 – Limits engine RPM and top speed to about 35 mph (56 km/h). LK2 – Limits engine RPM and top speed to about 45 mph (72 km/h). Options are programmable by dealer.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Water-cooled exhaust pipe	Regulates exhaust temperature.
Closed-loop cooling system	Uses coolant to keep the engine running at the ideal temperature, much like a car's radiator. Also keeps out corrosive saltwater and debris.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Racing pump with high-performance intake grate	Ensures that the inlet stays hooked up and fills the pump for maximum thrust even in the roughest conditions.
Forward/neutral/reverse	Located on the left side for maximum convenience and manoeuvrability especially around docks and trailer ramps.
Aluminium stator vanes	Handles the high-performance engine without erosion.
Replaceable UHMW** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

*In some markets, the duration of the warranty coverage may differ.

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iBR iTC S³ CLCS




Tilt steering & information centre


Reboarding platform


Flowing edge design


Hinged seat


Ski tow hook


Quick latch fuel filler design

Specifications

DIMENSIONS

Length	139" / 354 cm
Width	48" / 122 cm
Height	45.9" / 116.6 cm
Weight (dry)	845 lb. / 383 kg
Rider capacity	3
Fuel capacity	15.9 US gal / 60 l
Storage capacity	13.7 US gal / 52 l

ENGINE

Type	1503 XHO Rotax® 4-TEC® engine*
Intake system	Supercharged with intercooler, 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	8.4:1
Cooling	Closed-loop cooling system (CLCS)
Fuel type	87 octane – minimum 91 octane – recommended

DRIVE UNIT

Propulsion system	Sea-Doo® Direct Drive
Jet pump	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	iBR™
Impeller	Stainless steel

ELECTRICAL

Ignition	Digital induction
Starter	Electric
Battery	12 V

HULL AND COMPONENTS

Type	S³ Hull™
Colour	Bright Yellow

*New for 2011

sdd2011-002-601_en_15

Standard Features

HULL AND COMPONENTS

iControl™	The "Brain" that integrates and controls all systems to create the best possible ride.
S³ Hull	Stepped, stable & strong. Lightweight material, ribbed and stepped. Creates a low-pressure zone to reduce drag for nimble handling and rail-tight cornering.
Touring / Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
Hinged seat	Easy-open seat with convenient stay-open support struts. Provides easy access to the engine compartment while remaining attached to the watercraft.
Watertight, removable storage bin	Provides dry storage for luggage and necessities with easy access.
Tilt steering	4 adjustable steering and information centre angles for maximum ease and comfort.
Fold-down reboarding step	Makes reboarding from the water easier and quicker.
Bow and stern eyes	Designed for towing or securing the craft to a trailer or dock.
Carpeted footwells and deck pads	Offer extra comfort, non-skid surface and great looks.
Ski tow eye	For easy and secure attachment of ski rope.
Multifunction Digital Information Centre	Reports 25 key operating functions: Fuel level, Tachometer, Speedometer, Hour meter, Compass, Clock, Fuel consumption meter, Water temperature, Touring / Sport mode, Cruise control, Slow mode, VTS™, F-N-R indicator, Low fuel level, Low oil level, Low oil pressure, Low voltage, Overheat, Hi voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Electric Variable Trim System (VTS)	Provides boat trim adjustments, maximises acceleration and high-speed stability.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.

Quick latch fuel filler design	Dual drain plugs
Sponsons	External exhaust cooling flush attachment
Bumpers	Special comfort hand grips
Adjustable mirrors	Emergency floating lanyard
Reboarding platform	Cut & sew seat with multi colours
Reboarding handles on rear platform	Seat strap
Rear grab handle	Operator's guide, instructional video and booklet
Front splash deflector	

OPTIONS

3-position retractable ski pylon	Removable dry bag for front storage
Removable wakeboard rack	Glove box organiser
Depth finder	Safety kit
Ski mode	Sandbag anchor
Time/distance to empty	Speed Tie™
Altitude	Protective cover
Top/average speed/RPM	Advanced TEC trailer
Lap timer	Fire extinguisher
Engine temperature	

WARRANTY

BRP limited warranty covers the watercraft for one year.*

*In some markets, the duration of this warranty coverage may differ.

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RXT 260 RS

PERFORMANCE | 2011



ENGINE

Supercharged, intercooled 1,494 cc four-stroke, Rotax with four valves per cylinder	Supercharged, intercooled 1503 XHO Rotax 4-TEC engine provides reliable ultra-high performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
iTC™ (Intelligent Throttle Control) system	Operating electronically, this advanced throttle system starts you in neutral for easier dockside starts. It also features an activity-specific cruise control, Touring / Sport mode and Variable Trim System that can all be set to accommodate your riding style. The result is a more responsive, more intuitive ride.
iControl Learning Key™	The programmable Learning Key allows you to limit the performance of the PWC based on rider skill-level. Each of the two settings can be fine-tuned using the mode/set buttons.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Water-cooled exhaust pipe	Regulates exhaust temperature.
Closed-loop cooling system	Uses coolant to keep the engine running at the ideal temperature, much like a car's radiator. Also keeps out corrosive saltwater and debris.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

iBR (Intelligent Brake & Reverse) system	The world's only on-water braking system. iBR lets you stop up to 100 feet sooner than any other watercraft†. All with the squeeze of a lever. And with its electronic reverse, it gives you a level of maneuverability that makes docking easier.
Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Aluminium stator vanes	Handles the high-performance engine without erosion.
Replaceable UHMW** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

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X-Steering with A.E.S.™



X-Information centre



Special X-logo



Racing design



X-Colouration seat



Hinged seat

iBR iTC S³ CLCS

Specifications

DIMENSIONS	
Length	139" / 354 cm
Width	48" / 122 cm
Height	46.5" / 118.1 cm
Weight (dry)	855 lb. / 388 kg
Rider capacity	3
Fuel capacity	15.9 US gal / 60 l
Storage capacity	13.7 US gal / 52 l

ENGINE	
Type	1503 XHO Rotax® 4-TEC® engine
Intake system	Supercharged with external intercooler, 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	8.4:1
Cooling	Closed-loop cooling system (CLCS)
Fuel type	87 octane – minimum 91 octane – recommended

DRIVE UNIT	
Propulsion system	Sea-Doo® Direct Drive
Racing pump with high-performance intake grate	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	iBR™
Impeller	Stainless steel

ELECTRICAL	
Ignition	Digital induction
Starter	Electric
Battery	12 V

HULL AND COMPONENTS	
Type	S³ Hull™
Colour	Black and Dragon Red

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RXT-X 260 RS

PERFORMANCE | 2011



Standard Features

HULL AND COMPONENTS

High-performance electric VTS™ (Variable Trim System)	Provides pre-set positions for quick settings when adjusting boat trim, maximises acceleration and high-speed stability.
iControl™	The "Brain" that integrates and controls all systems to create the best possible ride.
S³ Hull	Stepped, stable & strong. Lightweight material, ribbed and stepped. Creates a low-pressure zone to reduce drag for nimble handling and rail-tight cornering.
Touring / Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
Hinged seat	Easy open seat with convenient stay-open support struts. Provides easy access to the engine compartment while remaining attached to the watercraft.
Watertight, removable storage bin	Provides dry storage for luggage and necessities with easy access.
Tilt steering	4 adjustable steering and information centre angles for maximum ease and comfort.
Bow and stern eyes	Designed for towing or securing the craft to a trailer or dock.
Carpeted footwells and reboarding deck pads	Offer extra comfort, non-skid surface and an aggressive diamond-plate pattern for additional traction.
Interactive Multifunction Digital Information Centre	Reports 30 key operating functions: Fuel level, Tachometer, Speedometer, Hour meter, Compass, Clock, Fuel consumption meter, Time / Distance to empty, Top/average speed/RPM, Lap timer, Engine temperature, Water temperature, Touring / Sport mode, VTS, VTS preset, F-N-R indicator, Low fuel level, Low oil level, Low oil pressure, Low voltage, Overheat, Hi volt age, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.
Ski tow eye	For easy and secure attachment of ski rope.

Sponsons	Dual drain plugs
Bumpers	External exhaust cooling flush attachment
Adjustable mirrors	Special comfort hand grips
Reboarding platform	Emergency floating lanyard (permanent)
Reboarding handles on rear platform	Seat strap
Rear grab handle	Operator's guide, instructional video and booklet
Front splash deflector	

X-PACKAGE

X-Steering with A.E.S. (Adjustable Ergonomic Steering)	The only fully adjustable handlebar in the industry. With A.E.S. the rider can adjust the handlebar width and grip for a fully customised ride.
X-Colouration seat	Race-inspired designed for comfort and great looks providing seating for three.
X-Tra traction carpet	With diamond plate pattern

OPTIONS

3-position retractable ski pylon	Glove box organiser
Removable wakeboard rack	Safety kit
Depth finder	Sandbag anchor
Cruise control	Speed Tie™
Ski mode	Fold-down reboarding step
Slow mode	Protective cover
Altitude	Advanced TEC trailer
Removable dry bag for front storage	Fire extinguisher

WARRANTY

BRP limited warranty covers the watercraft for one year.*

ENGINE

Supercharged, intercooled, 1,494 cc four-stroke, Rotax with four valves per cylinder	Supercharged, intercooled 1503 XHO Rotax 4-TEC engine provides reliable ultra-high performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
ITC™ (Intelligent Throttle Control) system	Operating electronically, this advanced throttle system starts you in neutral for easier dockside starts. It also features an activity-specific Touring / Sport mode and Variable Trim System that can be set to accommodate your riding style. The result is a more responsive, more intuitive ride.
iControl Learning Key™	The programmable Learning Key allows you to limit the performance of the PWC based on rider skill level. Each of the two settings can be fine-tuned using the mode/set buttons.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Water-cooled exhaust pipe	Regulates exhaust temperature.
Closed-loop cooling system	Uses coolant to keep the engine running at the ideal temperature, much like a car's radiator. Also keeps out corrosive saltwater and debris.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

iBR (Intelligent Brake & Reverse) system	The world's only on-water braking system, iBR lets you stop up to 100 feet sooner than any other watercraft[1]. All with the squeeze of a lever. And with its electronic reverse, it gives you a level of manoeuvrability that makes docking easier.
Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Aluminium stator vanes	Handles the high-performance engine without erosion.
Replaceable UHMW** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

*In some markets, the duration of the warranty coverage may differ.

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ALL-NEW MODEL FOR 2011

iBR iTC S³ CLCS

Specifications

DIMENSIONS

Length	139" / 354 cm
Width	48" / 122 cm
Height	46.5" / 118 cm
Weight (dry)	960 lb. / 436 kg
Rider capacity	3
Fuel capacity	18.6 US gal / 70 l
Storage capacity	13.7 US gal / 52 l

ENGINE

Type	1503 XHO Rotax® 4-TEC® engine
Intake system	Supercharged with external intercooler, 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	8.4:1
Cooling	Closed-loop cooling system (CLCS)
Fuel type	87 octane – minimum 91 octane – recommended

DRIVE UNIT

Propulsion system	Sea-Doo® Direct Drive
Jet pump	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	iBR
Impeller	Stainless steel

ELECTRICAL

Ignition	Digital induction
Starter	Electric
Battery	12 V

HULL AND COMPONENTS

Type	S³ Hull™
Colour	Black and Dragon Red



X-Handlebars with A.E.S.™



Reboarding platform with storage



NEW aS suspension



iBR™ (Intelligent Brake & Reverse) brake lever



X-Colouration seat



X-Information centre

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Standard Features

RXT-X aS 260 RS

HULL AND COMPONENTS

iControl™	The "Brain" that integrates and controls all systems to create the best possible ride.
aS (Adjustable Suspension)	Allows the hull to move independently of the upper deck, isolating rider and passenger from the impact of rough water. Manual compression damping adjustment via the nitrogen remote reservoir into the glove box. Suspension spring can also be easily adjusted with tools under the seat.
S³ Hull	Stepped, stable & strong. Lightweight material, ribbed and stepped. Creates a low-pressure zone to reduce drag for nimble handling and rail-tight cornering.
Touring / Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
Hinged seat	Easy-open seat with convenient stay-open support struts. Provides easy access to the engine compartment while remaining attached to the watercraft.
High-performance electric Variable Trim System (VTS™)	Provides pre-set positions for quick settings when adjusting boat trim, maximises acceleration and high-speed stability.
Bow and stern eyes	Designed for towing or securing the craft to a trailer or dock.
Carpeted footwells and deck pads	Offer extra comfort, non-skid surface and great looks.
Reboarding platform with rear storage	Easy access to battery, fuses and storage.
Watertight, removable storage bin	Provides dry storage for luggage and necessities with easy access.
Tilt steering	4 adjustable steering and information centre angles for maximum ease and comfort.
Interactive Multifunction Digital Information Centre	Reports 30 key operating functions: Fuel level, Tachometer, Speedometer, Hour meter, Compass, Clock, Fuel consumption meter, Time/Distance to empty, Top/average speed/RPM, Lap timer, Engine temperature, Water temperature, Touring / Sport mode, VTS, VTS preset, F-N-R indicator, Low fuel level, Low oil level, Low oil pressure, Low voltage, Overheat, HI voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.

Quick latch fuel filler design
Sponsons
Bumpers
Adjustable mirrors
Ski tow eye
Reboarding handles on rear platform
Rear grab handle
Front splash deflector
Dual drain plugs
Engine access cover (removable)
External exhaust cooling flush attachment
Special comfort hand grips
Wide handlebars
Emergency floating lanyard (permanent contact)
Seat strap
Operator's guide, Instructional video and booklet

X-PACKAGE

X-Steering with A.E.S. (Adjustable Ergonomic Steering)	The only fully adjustable handlebar in the industry. With A.E.S. the rider can adjust the handlebar width and grip for a fully customised ride.
X-Colouration seat	Race inspired designed for comfort and great looks providing seating for three.
X-Tra traction carpet	With diamond plate pattern

WARRANTY

BRP limited warranty covers the watercraft for one year.*

ENGINE

Supercharged, intercooled 1,494 cc four-stroke, Rotax with four valves per cylinder	Supercharged, intercooled 1503 XHO Rotax 4-TEC engine provides reliable ultra-high performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
ITC™ (Intelligent Throttle Control) system	Operating electronically, this advanced throttle system starts you in neutral for easier dockside starts. It also features an activity-specific Touring /Sport mode and Variable Trim System that can be set to accommodate your riding style. The result is a more responsive, more intuitive ride.
iControl Learning Key™	The programmable Learning Key allows you to limit the performance of the PWC based on rider skill level. Each of the two settings can be fine-tuned using the mode/set buttons.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Water-cooled exhaust pipe	Regulates exhaust temperature.
Closed-loop cooling system	Uses coolant to keep the engine running at the ideal temperature, much like a car's radiator. Also keeps out corrosive saltwater and debris.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

iBR (Intelligent Brake & Reverse) system	The world's only on-water braking system, iBR lets you stop up to 100 feet sooner than any other watercraft[1]. All with the squeeze of a lever. And with its electronic reverse, it gives you a level of manoeuvrability that makes docking easier.
Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Replaceable UHMW** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Stainless steel impeller	Delivers improved acceleration, higher top impeller speed and less cavitation.
Aluminium stator vanes	Handles the high-performance engine without erosion.

OPTIONS

Fold-down reboarding step
Removable wakeboard rack
Depth finder
Cruise control
Ski mode
Slow mode
Altitude
Removable dry bag for front storage
Glove box organiser
Safety kit
Sandbag anchor
Speed Tie™
Protective cover
Fire extinguisher

*In some markets, the duration of the warranty coverage may differ.

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ALL-NEW MODEL FOR 2011

iBR iTC CLCS ECO





3-position retractable ski pylon



Fold-down reboarding step



Removable board rack



iBR™ (Intelligent Brake & Reverse) brake lever



Wide-angle mirrors



Digital information centre with SKI mode

Specifications

DIMENSIONS

Length	132.6" / 336.8 cm
Width	48.5" / 123.1 cm
Height	44" / 111.8 cm
Weight (dry)	748 lb. / 339 kg
Rider capacity	3
Fuel capacity	15.9 US gal / 60 l
Storage capacity	30.8 US gal / 116.6 l

ENGINE

Type	1503 NA Rotax® 4-TEC® engine
Intake system	Naturally aspirated with 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	10.6:1
Cooling	Closed-loop cooling system (CLCS)
Fuel type	87 octane

DRIVE UNIT

Propulsion system	Sea-Doo® Direct Drive
Jet pump	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	iBR
Impeller	Stainless steel

ELECTRICAL

Ignition	Digital inductive
Starter	Electric
Battery	12 V

HULL AND COMPONENTS

Type	LFI, composite
Colour	Wake Red

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WAKE 155 SPORT | 2011



Standard Features

HULL AND COMPONENTS

Touring / Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
ECO mode	ECO mode is the newest iTC™ function that automatically determines the most economical power delivery and sets the optimal speed for greatest fuel economy.
Bow and stern eyes	Designed for towing or securing the craft to a trailer or dock.
Carpeted footwells and deck pads	Offer extra comfort, non-skid surface and great looks.
3-up seat	Comfortable room for three – permits rear-facing spotter for watersports.
Elevated fuel filler	Easy access and prevents water intrusion while refueling.
Fold-down rebearding step	Makes rebearding from the water easier and quicker.
Multifunction Digital Information Centre	Reports 26 key operating functions: Fuel level, Tachometer, Speedometer, Hour meter, Compass, Clock, Cruise control, Ski mode, Slow mode, Fuel consumption meter, New ECO mode, Touring / Sport mode, VTS™, F-N-R indicator, Low fuel level, Low oil pressure, Low voltage, Overheat, Hi voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.

Spoosons	Double density comfort hand grips
Bumpers	Emergency floating lanyard
Rebearding platform	Cut & sew seat with three colours
Wide-angle mirrors	Seat strap
Rear grab handle	Operator's guide, instructional
External exhaust cooling flush attachment	video and booklet

WAKE PACKAGE

Ski mode	This advanced iControl™ feature allows the driver to adjust the intensity of the launch for different rider skill levels and tow sports while maintaining a constant speed. You get highly repeatable runs for the best possible tow sports experience.
3-position retractable ski pylon	Retractable, so it's there when you're pulling someone and out of the way when you're not. Also features spotter hand grips and rope storage
Removable wakeboard rack	Provides easy transport of a wakeboard to the ride site.

OPTIONS

Depth finder	Speed Tie™
Time/distance to empty	Safety kit
Top/average speed/RPM	Additional wakeboard rack
Lap timer	Sandbag anchor
Engine temperature	Protective cover
High Performance VTS	Fire extinguisher
Removable dry bag for front storage	

WARRANTY

BRP limited warranty covers the watercraft for one year.*

ENGINE

1,494 cc four-stroke, Rotax with four valves per cylinder	1503 NA Rotax 4-TEC engine provides reliable performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
iTC™ (Intelligent Throttle Control) system	Operating electronically, this advanced throttle system starts you in neutral for easier dockside starts. It also features an activity-specific cruise control, Touring / Sport mode, ECO mode and Variable Trim System that can all be set to accommodate your riding style. The result is a more responsive, more intuitive ride.
iControl Learning Key™	The programmable Learning Key allows you to limit the performance of the PWC based on rider skill-level. Each of the two settings can be fine-tuned using the mode/set buttons.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
Closed-loop cooling system	Uses coolant to keep the engine running at the ideal temperature, much like a car's radiator. Also keeps out corrosive saltwater and debris.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
iBR (Intelligent Brake & Reverse) system	The world's only on-water braking system, iBR lets you stop up to 100 feet sooner than any other watercraft†. All with the squeeze of a lever. And with its electronic reverse, it gives you a level of manoeuvrability that makes docking easier.
Aluminium stator vanes	Handles the high-performance engine without erosion.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Replaceable UHMW** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

*In some markets, the duration of the warranty coverage may differ.

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SEA-DOO

sdd2011-002-601_en_22



iBR iTC S³ CLCS




Ski mode


3-position retractable ski pylon


Fold-down reboarding step


Removable board rack


Flowing edge design


Watertight, removable storage bin

Specifications

DIMENSIONS	
Length	139" / 354 cm
Width	48" / 122 cm
Height	45.9" / 116.6 cm
Weight (dry)	855 lb. / 388 kg
Rider capacity	3
Fuel capacity	15.9 US gal / 60 l
Storage capacity	13.7 US gal / 52 l

ENGINE	
Type	1503 SC Rotax® 4-TEC® engine
Intake system	Supercharged with intercooler, 60 mm throttle body
Bore x stroke	100 mm x 63.4 mm
Displacement	1,494 cc
Compression ratio	8.4:1
Cooling	Closed-loop cooling system (CLCS)
Fuel type	87 octane – minimum 91 octane – recommended

DRIVE UNIT	
Propulsion system	Sea-Doo® Direct Drive
Jet pump	Aluminium, axial flow, single stage, large hub with 10-vane stator
Transmission	iBR™
Impeller	Stainless steel

ELECTRICAL	
Ignition	Digital induction
Starter	Electric
Battery	12 V

HULL AND COMPONENTS	
Type	S³ Hull™
Colour	Wake Red

sdd2011-002-601_en_23

WAKE PRO 215

SPORT | 2011



Standard Features

HULL AND COMPONENTS

iControl™	The "Brain" that integrates and controls all systems to create the best possible ride.
S³ Hull	Stepped, stable & strong. Lightweight material, ribbed and stepped. Creates a low-pressure zone to reduce drag for nimble handling and rail-tight cornering.
Touring / Sport mode	Offers a choice between two throttle responses for different riding styles. Touring mode is the default setting offering a more progressive acceleration curve for a more confident ride – ideal for cruising and 2-up riding. Sport mode can be easily activated using the Set button. It provides all acceleration performance for a more aggressive throttle response.
Bow and stem eyes	Designed for towing or securing the craft to a trailer or dock.
Carpeted footwells and deck pads	Offer extra comfort, non-skid surface and great looks.
3-up seat	Comfortable room for three – permits spotter for watersports.
Hinged seat	Easy-open seat with convenient stay-open support struts. Provides easy access to the engine compartment while remaining attached to the watercraft.
Fold-down reboarding step	Makes reboarding from the water easier and quicker.
Watertight, removable storage bin	Provides dry storage for luggage and necessities with easy access.
Tilt steering	Adjusts the steering and information centreangle for maximum ease and comfort.
Multifunction Digital Information Centre	Reports 28 key operating functions: Fuel level, Tachometer, Speedometer, Hour meter, Compass, Clock, Cruise control, Ski mode, Slow mode, Fuel consumption meter, Water temperature, Touring / Sport mode, VTS™, VTS preset, F-N-R indicator, Low fuel level, Low oil level, Low oil pressure, Low voltage, Overheat, Hi voltage, Check engine, Sensor check, Battery protection, Key (wrong key), L-Key / R-Key, Maintenance info, Error codes.
Digitally Encoded Security System (D.E.S.S.™)	Industry's first digitally encoded theft-deterrent system.
Foam flotation	Ride with security and peace of mind. Meets or exceeds USCG standards.
Off-Throttle Assisted Steering (O.T.A.S.™)	Provides the operator with additional steering effect in off-throttle situations for greater manoeuvrability.

- Quick latch fuel filler design
- Sponsons
- Bumpers
- Adjustable mirrors
- Reboarding platform
- Reboarding handles on rear platform
- Rear grab handle
- Front splash deflector
- Dual drain plugs
- External exhaust cooling flush attachment
- Special comfort hand grips
- Emergency floating lanyard
- Cut & sew seat with multi colours
- Seat strap
- Operator's guide, instructional video and booklet

WAKE PRO PACKAGE

Ski mode	This advanced iControl feature allows the driver to adjust the intensity of the launch for different rider skill levels and tow sports while maintaining a constant speed. You get highly repeatable runs for the best possible tow sports experience.
High-performance electric VTS (Variable Trim System)	Provides pre-set positions for quick settings when adjusting boat trim, maximises acceleration and high-speed stability.
3-position retractable ski pylon	Retractable, so it's there when you're pulling someone and out of the way when you're not. Also features spotter hand grips and rope storage.
Removable wakeboard rack	Provides easy transport of a wakeboard to the ride site.
Wide-angle convex mirrors	Increase field of view by 32% over standard mirrors.

WARRANTY

BRP limited warranty covers the watercraft for one year.*

ENGINE

Supercharged, intercooled, 1,494 cc four-stroke, Rotax with four valves per cylinder	Supercharged, intercooled 1503 SC Rotax 4-TEC engine provides reliable ultra-high performance in fresh or saltwater, increased torque at low RPM, optimised power at all RPM levels and throttle positions.
iTC™ (Intelligent Throttle Control) system	Operating electronically, this advanced throttle system starts you in neutral for easier dockside starts. It also features an activity-specific cruise control. Touring / Sport mode and Variable Trim System that can all be set to accommodate your riding style. The result is a more responsive, more intuitive ride.
iControl Learning Key™	The programmable Learning Key allows you to limit the performance of the PWC based on rider skill-level. Each of the two settings can be fine-tuned using the mode/set buttons.
D-Sea-Bel™ system	Combines a series of resonators and vibration-absorbing components to make Sea-Doo watercraft some of the quietest on the water.
Multi-port fuel injection	Better control of exhaust emission and power at all RPM ranges to reduce emissions and reduce fuel consumption.
Closed-loop cooling system	Uses coolant to keep the engine running at the ideal temperature, much like a car's radiator. Also keeps out corrosive saltwater and debris.
Water/air separator	Provides maximum airflow to engine and reduces water intrusion.
Watertight digital ignition	Provides optimal energy for a consistent spark, ensuring maximum performance.
RPM limiter	Protects engine from over-revving.
Warning device	Warns operator of engine and exhaust overheating, engine management and system failure.
Handlebar-mounted start/stop button	Engine starts and stops with single, user-friendly control button.
Tip Over Protection System (T.O.P.S.™)	Protects engine in case of turn over.

PROPULSION SYSTEM

iBR (Intelligent Brake & Reverse) system	The world's only on-water braking system, iBR lets you stop up to 100 feet sooner than any other watercraft[1]. All with the squeeze of a lever. And with its electronic reverse, it gives you a level of manoeuvrability that makes docking easier.
Sea-Doo Direct Drive propulsion system	Delivers optimum performance with the Rotax engine.
Aluminium stator vanes	Handles the high-performance engine without erosion.
Dual automatic vacuum siphon pumps	Continuously removes water entering the engine compartment.
Large diameter drive shaft with crowned spline design	Maintains engine and pump alignment at all operating speeds.
Replaceable UHMW** wear ring	Provides long impeller life, less maintenance and maximum thrust.
Stainless steel impeller	Delivers improved acceleration, higher top speed and less cavitation.

OPTIONS

- Depth finder
- Time/distance to empty
- Altitude
- Top/average speed/RPM
- Lap timer
- Engine temperature
- Removable dry bag for front storage
- Glove box organiser
- Safety kit
- Sandbag anchor
- Speed Tie™
- Protective cover
- Fire extinguisher

*In some markets, the duration of the warranty coverage may differ.

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SEA-DOO

sdd2011-002-601_en_24



CLCS


Yellow



Specifications

DIMENSIONS	
Length	15' 4" / 4.67 m
Beam	7' 1" / 2.16 m
Draft	12" / 30.5 cm
Dry weight	1,454 lb. / 659 kg
Seating capacity	4
Fuel capacity	21 US gal / 79.4 l

ENGINE	
Model	1503 Rotax® 4-TEC™
Type	1.5 l high output

Highlights

- 1.5 l high output Rotax 4-TEC engine
- Digital Information Centre with 18 functions including depth finder, compass, water temperature, hour meter
- Satellite-ready** stereo with MP3 port and 2 speakers
- Chrome cleats (4)
- Non-slip grab handles (8)
- Driver console
- Front and stern lockable storage
- Ski pylon – pull-up
- Swim platform with ladder


Digital information centre


Sporty seats


Satellite-ready** stereo with MP3 port


Lockable stern storage

sdd2011-002-602_en_1

150 Speedster

PERFORMANCE | 2011



Overall Specifications

DIMENSIONS

Length	15' 4" / 4.67 m
Beam	7' 1" / 2.16 m
Draft	12" / 30.5 cm
Dry weight	1,454 lb. / 659 kg
Storage capacity	14.5 cu. ft. / .44 cu m
Seating capacity	4
Weight capacity	715 lb. / 324 kg
Fuel capacity	21 US gal / 79.4 l

DIMENSIONS (ON TRAILER)

Length	18' 5" / 5.6 m
Width	7' 1" / 2.16 m
Height: No tower	4' 11" / 1.50 m
Tower down	6' 10" / 2.08 m
Tower up	8' 6" / 2.59 m
Gross weight	2,100 lb. / 952 kg

ENGINE

Model	Fuel injected, 1503 Rotax 4-TEC
Displacement	1,494 cc
Type:	1.5 l high output
Cylinders	3
Max RPM	8,000
Octane: Recommended	91
Emission level	CARB 3-Star
Cooling system	Closed-Loop Cooling System

ELECTRICAL

Generator	30 amp / 380 W
Battery	12 V

HULL & DECK

Material	Composite FRP
Vinylester barrier layer	Std
Full fiberglass stringer	Std
Graphics	Std
Deadrise	20°
Colours	Yellow
	Red

PROPULSION

Jet pump type:	
Axial flow	Single stage
Pump diameter:	6 1/4" / 15.63 cm
Impeller:	
Material	Stainless steel
Outside diameter (mm)	159 ± .07
Reverse system	Std

Equipment

HULL & DECK

- Cleats – chrome (4)
- Cup holders (4)
- Rub rail – Black
- Grab handles (8)
- Non-skid decking
- Navigation lights
- Ski pylon – pull-up
- Tow hooks – stainless steel bow & stern
- Walk-through – bow
- Reboarding ladder – stern (1-step)
- Engine access – sunpad
- Engine blower
- Auto bilge pump

STORAGE

- In-floor, lockable
- Sunpad, lockable
- Console, lockable – starboard

CONTROL STATION

HELM

- Steering – standard
- Separated shift & throttle lever
- Neutral lock*
- Battery switch
- Fuse box
- Security system D.E.S.S.™ magnetic lanyard key

CONTROL STATION (Cont'd)

INSTRUMENTATION

- Fuel level
- Tachometer
- Speedometer
- Hour meter
- Maintenance info
- Compass
- Water temperature
- Depth finder
- Low fuel level
- Low oil level
- Low oil pressure
- Low voltage
- Overheat
- HI voltage
- Check engine
- Sensor check
- Battery protection
- Key (Wrong Key)

COCKPIT

- Dashboard finish – Black
- Outlet – 12 volt accessory (1)
- Cooler – integrated

STEREO & SOUND

- Stereo system – satellite-ready**
- Speakers – cockpit (2)
- MP3 port

CANVAS & MISCELLANEOUS

- Sunpad

CERTIFICATIONS

- NMMA
- CMMA

TRAILER

- Single axle
- Galvanised trailer
- EC versions available

Options

- Wakeboard tower & racks (red model only)
- Carpet – snap-in
- Mirror – with tower only (red model)
- Mooring cover
- Bimini top (incl. tower; red model only)
- Fire extinguisher
- Anchor



*New for 2011 **If available in your area.

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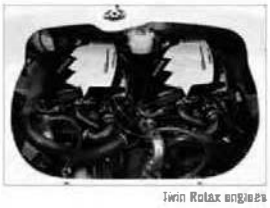
SEA-DOO

sdd2011-002-602_en_2




Bright White




Twin Rotax engines


Large cockpit area


Full instrumentation dashboard


Stern storage access

CLCS

Specifications

DIMENSIONS

Length	19' 9" / 6.02 m
Beam	8' / 2.44 m
Draft	12" / 30.5 cm
Dry weight: No tower	2,770 lb. / 1,256 kg
With tower*	2,830 lb. / 1,284 kg
Seating capacity	7
Fuel capacity	44 US gal / 166.5 l

ENGINE

Model	1503 Rotax® 4-TEC® (x 2)
Type	Twin 1.5 l high output

Highlights

- Twin 1.5 l high output Rotax 4-TEC engine
- Swim platform with 2-step ladder
- Dual stern storage compartment
- Sundeck pad
- Pop-up ski pylon
- Cockpit courtesy lights
- Ski storage
- Satellite-ready** AM/FM/CD stereo with MP3 port and 4 speakers
- Depth finder
- 12 volt jack
- Windscreen with pop-up wind deflector and helm storage
- Built-in cooler
- Multi-function aluminium black rails
- Grab handles
- On-board storage

sdd2011-002-602_en_3

200 Speedster

PERFORMANCE | 2011



Bright White

Overall Specifications

DIMENSIONS

Length	19' 9" / 6.02 m
Beam	8' / 2.44 m
Draft	12" / 30.5 cm
Dry weight: No tower	2,770 lb. / 1,256 kg
With tower +	2,830 lb. / 1,284 kg
Storage capacity	46 cu. ft. / 1.3 cu m
Seating capacity	7
Weight capacity	1,365 lb. / 619 kg
Fuel capacity	44 US gal / 166.5 l

DIMENSIONS (ON TRAILER)

Length (tongue folded)	22' 7" / 6.88 m (20' 6" / 6.25 m)
Width	8' 6" / 2.59 m
Height: No tower	6' 6" / 1.98 m
Tower down +	7' 1" / 2.16 m
Tower up +	9' 11" / 3.02 m
Gross weight: No tower	4,095 lb. / 1,857 kg
With tower +	4,115 lb. / 1,885 kg

ENGINE

Model	Fuel injected, 1503 Rotax 4-TEC (2)
Displacement	1,494 cc
Type	Twin 1.5 L high output
Cylinders (/engine)	3
Max RPM (/engine)	8,000
Octane: Minimum	87
Recommended	91
Emission level	CARB 3-Star
Cooling system	Closed-Loop Cooling System

ELECTRICAL

Generator	30 amp / 380 W
Battery	12 V

HULL & DECK

Material	Composite FRP
Vinylester barrier layer	Std
Full fiberglass stringer	Std
Graphics	Std
Deadrise	21°
Colour	Bright White

PROPULSION

Jet pump type:	
Axial flow	Single stage
Pump diameter	6 1/4" / 15.63 cm
Impeller:	
Material	Stainless steel
Outside diameter (mm)	159 ± .07
Reverse system	Std

Equipment

HULL & DECK

- Cleats – chrome (6)
- Cup holders (6)
- Rub rail – Black
- Grab handles (8)
- Non-skid decking
- Navigation lights – bow side
- Courtesy lights (3)
- Ski pylon – pull-up
- Tow hooks – stainless steel bow & stern
- Reboarding ladder – stern (2-step)
- Engine access
- Engine blower (2)
- Auto bilge pump

STORAGE

- Anchor
- In-floor, lockable
- Under seat
- Sunpad, lockable
- Glove box, lockable

CONTROL STATION

HELM

- Steering – custom
- Steering – rack & pinion
- Horn
- Separated shift & dual throttle levers
- Battery switch
- Neutral lock*
- Fuse box
- Security system D.E.S.S.™ magnetic lanyard key

INSTRUMENTATION

- Gauges – backlight & anti-fog
- Fuel level
- Tachometer
- Speedometer
- Depth finder
- Overheat

COCKPIT

- Dashboard finish – Pearlstone
- Outlet – 12 volt accessory (1)
- Cooler – integrated

SEATING

Driver Seat

- Track & swivel

Passenger Seat

- Track & swivel

STEREO & SOUND

- Stereo system – satellite-ready**
- Speakers – cockpit (4)
- MP3 port

CANVAS & MISCELLANEOUS

- Sunpad
- Wind deflector

CERTIFICATIONS

- NMMA
- CMMA

TRAILER

- Single axle
- Swing-away tongue
- EC version available

Options

- Wakeboard tower & racks
- Carpet – snap-in
- Mirror – with tower only
- Mooring cover
- Bimini top
- Fire extinguisher
- Anchor



*New for 2011 **If available in your area. + The tower is optionally available through PAC.

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SEA-DOO

sdd2011-002-602_en_4



iTC CLCS ECO

Specifications

DIMENSIONS	
Length	20' 6" / 6.25 m
Beam	8' 6" / 2.59 m
Draft	12" / 30.5 cm
Dry weight	3,100 lb. / 1,406 kg
Seating capacity	10
Fuel capacity	44 US gal / 166.5 l

ENGINE	
Model	1503 Rotax® 4-TEC®
Type	Twin 1.5 l supercharged


Black




Transat seats


Premium helm


Stereo remote & table mount on sundeck


Bow ladder

Highlights

- Twin 1.5 l supercharged Rotax 4-TEC engine
- iTC™ (Intelligent Throttle Control) – Drive by wire
- Swim platform storage accessible from inside and outside the boat
- Satellite-ready*** stereo AM/FM with USB Direct Control (MP3), 4 speakers, LCD remote on sundeck
- Complete premium instrumentation dashboard
- Innovative Transat seats on sundeck
- Reboarding ladders – bow & stern
- Stainless steel rub rail
- Stainless steel cup holders
- Depth finder
- Cruise control
- Bimini top
- Ski mode
- ECO mode

sdd2011-002-602_en_5

210 Challenger SE

RECREATION | 2011



Overall Specifications

DIMENSIONS

Length	20' 6" / 6.25 m
Beam	8' 6" / 2.59 m
Draft	12" / 30.5 cm
Dry weight	3,100 lb. / 1,406 kg
Storage capacity	56.65 cu. ft. / 1.6 cu m
Seating capacity	10
Weight capacity	1,525 lb. / 692 kg
Fuel capacity	44 US gal / 166.5 l

DIMENSIONS (ON TRAILER)

Length (tongue folded)	23' 6" / 7.16 m (20' 1" / 6.43 m)
Width	8' 6" / 2.59 m
Height	7' 3" / 2.20 m
Gross weight	4,070 lb. / 1,846 kg

ENGINE

Model	Fuel injected, 1503 Rotax 4-TEC (2)
Displacement	1,494 cc
Type	Twin 1.5 l supercharged
Cylinders (/engine)	3
Max RPM (/engine)	8,000
Octane: Recommended	91
Emission level	CARB 3-Star
Cooling system	Closed-Loop Cooling System

ELECTRICAL

Generator	30 amp / 380 W
Battery	12 V

HULL & DECK

Material	Composite FRP
Vinylester barrier layer	Std
Full fiberglass stringer	Std
Deadrise	21°
Colour	Black

PROPULSION

Jet pump type:	
Axial flow	Single stage
Pump diameter	6 1/4" / 15.63 cm
iTC – electronic throttle control	Std
Impeller:	
Material	Stainless steel
Outside diameter (mm)	159 ± .07
Reverse system	Std

Equipment

HULL & DECK

- Cleats – stainless steel, pull-up (6)
- Cup holders – stainless steel (10)
- Rub rail – stainless steel
- Grab handles (7 total) – stainless steel (5)
- Non-skid decking
- Navigation lights
- Courtesy lights (4)
- Tow hooks – stainless steel bow & stern
- Ski pylon – pull-up
- Ski eye – stern
- Walk-through – stern
- Walk-through – bow
- Reboarding ladder – bow (3-step)
- Reboarding ladder – stern (2-step)
- Engine access
- Engine blower (2)
- Auto bilge pump
- Swim platform mat

STORAGE

- Anchor locker
- In-floor, lockable
- Under seat
- Glove box
- Console – port & starboard bow backrest
- Cargo net
- Swim platform, lockable

CONTROL STATION

HELM

- Steering – standard
- Steering – rack & pinion
- Steering – tilt
- Horn
- Shift & throttle lever – chrome

CONTROL STATION (Cont'd)

- Electronic throttle control
- Battery switch
- Circuit breakers
- Engine synchronisation
- Neutral lock**

INSTRUMENTATION

- Gauges – backlight & anti fog
- Cruise control
- Fuel level
- Fuel consumption
- ECO mode**
- Tachometer
- Speedometer
- Hour meter
- Compass
- Water temperature
- Depth finder
- Docking mode
- Ski mode
- Low fuel level
- Low oil level
- Low oil pressure
- Low voltage
- Overheat
- Hi voltage
- Check engine
- Sensor check
- Battery protection
- Maintenance info

COCKPIT

- Outlet – 12 volt accessory (2)
- Cooler – removable
- Snap-in carpet
- Table
- Table mount – bow, cockpit and sundeck

COCKPIT (Cont'd)

SEATING

Driver Seat

- Track & swivel
- Bolster

Passenger Seat

- Track & swivel
- Bolster

Sundeck

- Transat seats

STEREO & SOUND

- Stereo system – satellite-ready***
- Speakers – bow (2)
- Speakers – cockpit (2)
- MP3 – USB direct control
- Stereo remote with LCD display – sundeck

CANVAS & MISCELLANEOUS

- Bimini top
- ow cover
- Cockpit cover
- Door – see-through
- Windshield – fixed

CERTIFICATIONS

- NMMA
- CMMA

TRAILER

- Tandem axles
- Single disc brakes
- Swing-away tongue
- EC version available

Options

- Fire extinguisher
- Anchor



**New for 2011 ***Not available in your area.

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SEA-DOO

sdd2011-002-602_en_6




Riviera Blue




Flip-up helmet cockpit seats


NEW premium dashboard with ECO mode


Bow & cockpit covers


Stainless steel cup holders

iTC CLCS ECO

Specifications

DIMENSIONS

Length	23' 6" / 7.16 m
Beam	8' 9" / 2.67 m
Draft	12" / 30.5 cm
Dry weight	3,435 lb. / 1,558 kg
Seating capacity	12
Fuel capacity	53 US gal / 200.6 l

ENGINE

Model	Rotax® 1503 4-TEC® (x 2)
Type	twin 1.5 l high output

Highlights

- Twin 1.5 l high output Rotax 4-TEC engines
- Largest Sea-Doo® ever with 12 passenger capacity
- Huge cockpit and bow area
- iTC™ (Intelligent Throttle Control) – Drive by wire
- ECO mode
- Snap-in carpet
- Stainless steel rub-rail
- Stainless steel cup holders
- Stainless steel pull-up cleats
- Cockpit & bow covers
- Table mount – bow & cockpit
- Stereo remote with LCD display at transom
- 6 stereo speakers
- Backlit depth finder
- Bimini top

sdd2011-002-602_en_7

230 Challenger SE

RECREATION | 2011



Overall Specifications

DIMENSIONS

Length	23' 6" / 7.16 m
Beam	8' 9" / 2.67 m
Draft	12" / 30.5 cm
Dry weight	3,435 lb. / 1,558 kg
Storage capacity	60 cu. ft. / 1.69 cu m
S ating capacity	12
Weight capacity	2,383 lb. / 1,081 kg
Fuel capacity	53 US gal / 200.6 l

DIMENSIONS (ON TRAILER)

Length (tongue folded)	25' 10" / 7.87 m (24' 7" / 7.49 m)
Width	8' 9" / 2.67 m
Height	7' 4" / 3.15 m
Gross weight	5,168 lb. / 2,344 kg

ENGINE

Model	Fuel injected, 1503 Rotax 4-TEC (2)
Displacement	1,494 cc
Type	Twin 1.5 l high output
Cylinders (/engine)	3
Max RPM (/engine)	8,000
Octane: Minimum	87
Recommended	91
Emission level	CARB 3-Star
Cooling system	Closed-Loop Cooling System

ELECTRICAL

Generator	30 amp / 380 W
Battery	12 V

HULL & DECK

Material	Composite FRP
Vinylester barrier layer	Std
Full fiberglass stringer	Std
Graphics	Std
Deadrise	21°
Colour	Riviera Blue

PROPULSION

Jet pump type:	
Axial flow	Single stage
Pump diameter	6 1/4" / 15.63 cm
iTC™ – electronic throttle control**	Dual
Impeller:	
Material	Stainless steel
Outside diameter (mm)	159 ± .07
Reverse system	Std

Equipment

HULL & DECK

- Cleats – stainless steel, pull-up (6)
- Cup holders – stainless steel (10)
- Rub rail – stainless steel
- Bow rails – stainless steel
- Grab handles (10 total) – stainless steel (6)
- Coaming box (5)
- Non-skid decking
- Navigation lights
- Courtesy lights (7)
- Towhooks – stainless steel bow & stern
- Ski eye – stern
- Walk-through – stern
- Walk-through – bow
- Reboarding ladder – stern (2-step)
- Engine access
- Engine blower (2)
- Auto bilge pump

STORAGE

- Anchor
- In-floor, lockable
- Under seat
- Side compartment
- Sunpad
- Glove box (2)
- Cargo nets (3)

CONTROL STATION

HELM

- Steering – custom
- Steering – tilt
- Steering – rack & pinion
- Horn
- Neutral lock**

CONTROL STATION (Cont'd)

HELM

- Separated shift & throttle lever – chrome
- Electronic throttle control**
- Battery switch
- Circuit breakers**
- Engine synchronisation**

INSTRUMENTATION

- Gauges – backlight & anti-fog
- Clock**
- Fuel level
- Fuel consumption**
- ECO mode**
- Tachometer
- Speedometer
- Hour meter
- Maintenance information
- Compass
- Water temperature
- Depth finder
- Cruise control**
- Docking mode**
- Ski mode**
- Low fuel level
- Low oil level
- Low oil pressure
- Low voltage
- Overheat
- High voltage
- Check engine
- Sensor check
- Battery protection

COCKPIT

- Carpet – snap-in
- Dashboard finish
- Dashboard mat
- Outlet – 12 volt accessory (2)
- Cooler – removable
- Table
- Table mount – bow
- Table mount – cockpit

SEATING

Driver Seat

- Track & swivel
- Flip-up bolster
- Height adjustable

Passenger Seat

- Track & swivel
- Flip-up bolster

STEREO & SOUND

- Stereo system – satellite-ready***
- Speakers – bow (2)
- Speakers – cockpit (4)
- MP3 port
- USB direct control**
- Stereo remote with LCD display – swim platform**

CANVAS & MISCELLANEOUS

- Cockpit cover
- Bow cover
- Bimini top
- Door – see-through**
- Sunpad
- Windshield – fixed

CERTIFICATIONS

- NMMA
- CMMA

TRAILER*

- Tandem axles
- Single disc brakes
- Swing-away tongue**
- Galvanised trailer
- EC version available

Options

- Mooring cover
- Fire extinguisher
- Anchor



**New for 2011 ***Not available in your area.

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SEA-DOO

sdd2011-002-602_en_8




White & Black with Red accent




NEW Premium dashboard with Ski mode


NEW tower speakers


Heater outlet


Board racks

iTC CLCS ECO

Specifications

DIMENSIONS

Length	23' 6" / 7.16 m
Beam	8' 9" / 2.67 m
Draft	12" / 30.5 cm
Dry weight	3,842 lb. / 1,742 kg
Seating capacity	12
Fuel capacity	53 US gal / 200.6 l

ENGINE

Model	1503 Rotax® 4-TEC® (x 2)
Type	Twin 1.5 l high output

Highlights

- Twin 1.5 l high output Rotax 4-TEC engines
- Satellite-ready** stereo with USB Direct control, MP3 port, with 125 watts/channel amp., 6 speakers, 2 lower speakers and LCD remote
- Walk-through – stern & bow
- Wakeboard tower
- Wakeboard racks (2)
- Cockpit-controlled WakeBoost (1,000 lb. / 454 kg) system
- Heater
- Walk-through door – transparent
- Bimini top
- Snap-in carpet
- Cockpit & bow covers
- Stainless steel cup holders
- Stainless steel rub rail
- Depth finder
- Cruise control
- Docking mode
- Ski mode
- ECO mode

sdd2011-002-602_en_9

Overall Specifications

230 WAKE SPORT | 2011



White & Black with Red accent

DIMENSIONS

Length	23' 6" / 7.16 m
Beam	8' 9" / 2.67 m
Draft	12" / 30.5 cm
Dry weight	3,842 lb. / 1,742 kg
Storage capacity	67 cu. ft. / 1.90 cu m
Seating capacity	12
Weight capacity	2,260 lb. / 1,025 kg
Fuel capacity	53 US gal / 200.6 l

DIMENSIONS (ON TRAILER)

Length (tongue folded)	25' 10" / 7.87 m (24' 7" / 7.49 m)
Width	8' 9" / 2.67 m
Height: Tower down	7' 6" / 2.29 m
Tower up	10' 10" / 3.30 m
Gross weight	5,575 lb. / 2,529 kg

ENGINE

Model	Fuel injected, 1503 Rotax 4-TEC (2)
Displacement	1,494 cc
Type	Twin 1.5 l high output
Cylinders (/engine)	3
Max RPM (/engine)	8,000
Octane: Minimum	87
Recommended	91
Emission level	CARB 3-Star
Cooling system	Closed-Loop Cooling System

ELECTRICAL

Generator	30 amp / 380 W
Battery	12 V

HULL & DECK

Material	Composite FRP
Vinylester barrier layer	Std
Full fiberglass stringer	Std
Graphics	WAKE graphics
Deadrise	21°
Colour	White & Black with Red accent

PROPULSION

Jet pump type:	
Axial flow	Single stage
Pump diameter	6 1/4" / 15.63 cm
ITC™ – electronic throttle control*	Dual
Impeller:	
Material	Stainless steel
Outside diameter (mm)	159 ± .07
Reverse system	Std

Equipment

HULL & DECK

- Cleats – stainless steel, pull-up (6)
- Cup holders – stainless steel (10)
- Rub rail – stainless steel
- Bow rail – stainless steel
- Grab handles (9 total) – stainless steel (4)
- Coaming box (4)
- Non-skid decking
- Navigation lights
- Courtesy lights (6)
- Wakeboard tower & racks*
- WakeBoost system (twin 1,000 lb total)
- Tow hooks – stainless steel bow & stern
- Ski eye – stern
- Walk-through – stern
- Walk-through – bow
- Reboarding ladder – stern (2-step)
- Swim platform mat*
- Engine access
- Engine blower (2)
- Auto bilge pump

STORAGE

- Anchor locker
- In-floor, lockable
- Under seat
- Sunpad
- Console – port side
- Glove box
- Cargo nets (3)

HELM

- Steering – custom (Silver)
- Steering – tilt

CONTROL STATION

HELM

- Steering – rack & pinion
- Horn
- Separated shift & throttle lever – chrome
- Neutral lock*
- Electronic throttle control*
- Battery switch
- Circuit breakers*
- Engine synchronisation*

INSTRUMENTATION

- Gauges – backlight & anti-fog
- Clock*
- Fuel level
- Fuel consumption*
- ECO mode*
- Tachometer
- Speedometer
- Hour meter
- Maintenance information
- Compass
- Water temperature
- Depth finder
- Cruise control*
- Docking mode*
- Ski mode*
- Low fuel level
- Low oil level
- Low oil pressure
- Low voltage
- Overheat
- High voltage
- Check engine
- Sensor check
- Battery protection

COCKPIT

- Carpet – snap-in
- Dashboard finish – Silver / chrome
- Dashboard mat
- Mirror
- Outlet – 12 volt accessory (2)
- Heater
- Cooler – removable

SEATING

Driver Seat

- Track & swivel
- Flip-up bolster

Passenger Seat

- Rear-facing bench

STEREO & SOUND

- Stereo system – satellite-ready**
- Speakers – bow (2)
- Speakers – cockpit (4)
- Tower speakers (2)*
- USB direct control (MP3)*
- Stereo remote with LCD display – swim platform*
- MP3 port
- Amplifier

CANVAS & MISCELLANEOUS

- Cockpit cover
- Bow cover
- Bimini top
- Door – see-through*
- Sunpad
- Windshield – fixed

CERTIFICATIONS

- NMMA
- CMMA

TRAILER*

- Tandem axles
- Single disc brakes
- Swing-away tongue*
- Galvanised trailer
- EC version available

Options

- Mooring cover
- Fire extinguisher
- Anchor



*Nouveau pour 2011

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SEA-DOO

sdd2011-002-602_en_10

Annexes


BRP Rebuild Center:
Le centre de réusinage BRP:
BUILT ON TRADITION. DRIVEN BY EXCELLENCE.
ISSU D'UNE TRADITION AXÉ SUR L'EXCELLENCE.
When it comes to rebuilding peace of mind, we've been doing our part for over 25 years.
Depuis plus de 25 ans, nous avons fait nos preuves et vous pouvez compter sur nous pour perpétuer cette tradition.
rebuilt-components



There's a lot of experience and know-how that goes into every rebuilt part we handle. BRP's commitment to quality is legendary and we really hate to break with tradition. We guarantee that each and every rebuilt part leaves our center matching or altogether eclipsing Rotax's most demanding standards. I guess you could say we're making history every day.

Also, unlike aftermarket suppliers, we do not compete with our dealer network by selling directly to consumers. On the contrary, we take pride in helping you generate more business. And that's the best part.

A day in the life of a part at our state-of-the-art center The BRP remanufacturing crew in Sherbrooke, Quebec, works in a multi-million dollar facility tooled and staffed for one purpose only: making sure that Rotax's trademark durability and performance are alive and kicking in every BRP-rebuilt short block, crankshaft and cylinder. Just how do they accomplish this? Read on and take the tour.

There are 4 rebuilding steps: Disassembly/Inspection & Cleaning, Remanufacturing, Reassembly, Testing & Warranty.

01 Disassembly / Inspection & Cleaning

Short block components that can be remanufactured to original specifications are saved. The rest are discarded.

Reusable parts are cleaned to remove oil and castings are sandblasted.

After further inspection, reusable parts are repainted.

02 Remanufacturing

Nicacil cylinders are replated by Rotax and piston fit is matched.

For steel sleeved cylinders, sleeves are replaced with new Rotax parts and line-bored. Then piston fit is matched.

Crankshaft webs are the only component of the crank even considered for reuse as a rebuilt part.

Whenever a reusable component is not available for replacement, a new Rotax part is used. Only the components that meet our strict standards ever make it past this point.

03 Reassembly

Crankshaft wheels are pressed together with all new Rotax bearings, seals and rod assemblies. They are balanced and blueprinted to within .001".

Crankshafts are set, crankcases are sealed and torqued to OEM specifications.

All short block assemblies are completed with new Rotax standard size pistons, rings, bearings and gaskets.

04 Testing & Warranty

After reassembly, all short blocks are run through a battery of tests, including pressure testing.

Our quality-tested and – controlled products are backed by a comprehensive **one-year limited warranty that covers parts and labor**.

Replacement rebuilt crankshafts and cylinders are also warranted **for one year parts only**.





blue_rebuilt_3

Putting a reasonable price on premium quality is something only BRP can do

The math is simple: **1.** We've lowered our Sea-Doo® rebuilt short block prices; **2.** Dealers who placed a qualified pre-season order **are also** entitled to their repeat order discount on every new rebuilt parts order. **3. We are shipping to our dealers freight free – Saving up to $150.** See how quickly value adds up?

To learn just how much you can save, simply consult your Sales Program for the available discount percentages.



Simply return to the core, and you'll be the center of easy money

Cores are a critical part of the rebuilding process. So we made some changes to the amounts we credit your parts account for approved returned cores. Here how it works:

PARTS	THEN	NOW
Cylinders	$50.00	$75.00
Crankshafts	$200.00	$200.00
Short blocks	$300.00	$700.00

New Sea-Doo® Core Return & Credit Policy*: Hassle-free + Free money

Chances are you have short block, crankshaft and cylinder cores lying around in your service shop. You don't know what to do with them and don't have the right rebuilt core(s) return forms.

No problem, your BRP Rebuild Center now takes them off your hands hassle-free and hands you some free cash in return.

PARTS	THEN	NOW
Cylinders	$0.00	$50.00
Crankshafts	$0.00	$100.00
Short blocks	$0.00	$300.00

Program is not applicable to SK300 and Supercross RFI types.

Credit amounts may be reduced or altogether refused if any returned core casting are:

Broken, cracked or damaged – Modified in any way (welding of crankshaft, porting of cylinder or crankcase, etc.) – With broken bolts inside the threads – Showing wear around the mounting bolts to the frame – Damaged during transportation due to poor packing – Disassembled or incomplete

The better shape your cores are in, the more we pay out

Condition	Cylinder deduction	Crankshaft deduction	Short block deduction
Broken or cracked casting	$75/50*	NA	$200
Welding	NA	$200/100*	NA
Porting of cylinder & crankcase	$75/50*	NA	$200
Broken bolts inside threads	$75/50*	NA	Up to $200 – depending on location & quantity of broken bolts
Incomplete core	NA	NA	Value of missing parts
Wear around the mounting bolts to the frame	NA	NA	$200
Damaged during transportation due to poor packing	$75/50*	$200/100*	Value of damaged parts Damaged parts

*$75 represents value with Return Core Form, and $50 represents value without Return Core Form.

blue_rebuilt_5

Whether placing an order or returning a core, it's a simple procedure

To do	What to do
Place an order	Simply use BOSSWeb™.
Return a core without a "Rebuilt Credit Form"	• Identify each core as much as possible. Tag them and indicate the engine type as reference. • Fill out and enclose a copy of the enclosed 'Universal' BRP Rebuild Center Core Credit Request Form with the cores in your shipping box (for additional forms go on BOSSWeb™.)
Return a core with a "Rebuild Credit Form"	• Return the white copy of the "Rebuild Credit Form", included with every rebuilt part shipped by the Rebuild Center, along with the core. • Cores received with the yellow copy or with a photocopy will be considered as core returns without the Rebuilt Credit Form. The white copy is, therefore, required in order to receive the proper credit amount.

Shipping core returns: Must be freight prepaid

Who / What	Where
US Dealers	BRP 7575 Bombardier Court Wausau WI, 54401 (Please use Rebuild / Warranty Return Label # 480901601)
Canadian Dealers	BRP 75 J.A. Bombardier Street Sherbrooke, QC J1L 1W3 (Please use Rebuild / Warranty Return Label # 480901500)
For defective parts replaced with rebuilt parts and in connection with a warranty claim (Canadian dealers only)	BRP Warranty Part inspection Center 565 de la Montagne Valcourt, QC CANADA, J0E 2L0 (Please use Rebuild / Warranty Return Label # 484500001, and include copy of claim and core credit form)

IMPORTANT

If only the short block has been changed, the old engine plate must be applied to the new short block. Do not ship the plate.

Who needs to know	Who knows
US Dealers	PAC Analyst: 1 800 366-6992
Canadian Dealers	PAC Analyst: 1 800 361-9980

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blue_rebuilt_7

REBUILT PRICE LIST

PRODUCT	REBUILT PART	PART	ENGINE TYPE	COOLING SYSTEM F/C - L/C	AMOUNT CYL	Y AR	DESCRIPTION	ORIGINAL PA T #
SKI-DOO	421000835	REP	G ARB◆X REPAIR REQUE T			N/A	Dealer completes form from best web	N/A
	421000031	CRANKSHAFT	277	F/C	1	1993 to 2005		420995301
	421000639		277	F/C	1	2006 to 2009		420995307
	421000154		377 - 443	F/C	2	1997 to 2006		420889630
	421000151		494	L/C	2	1996 to 2000		420886933
	421000567		493	L/C	2	2000 to 2002		420888462
	421000599		493	L/C	2	2003		420888465
	421000011		503	F/C	2	1990 to 1996	Keyway at 3 o'clock	420996445
	421000155		503	F/C	2	1997 to 2003		420888390 / 420888391
	421000601		552	F/C	2	2003 to 2009		420 889 062
	421000673		552	F/C	2	2010		420 889 067
	421000553		593	L/C	2	1999		420888250
	421000563		593	L/C	2	2000 to 2002		420888252 / 420888751
	421000611		593	L/C	2	2003 to 2010		420888757
	421000064		593SDI	L/C	2	2004 to 2010		420889098 / 420890950 / 890951
			593 ETEC	L/C	2			420890956 / 420890955 / 890954
	421000574		693	L/C	2	2000 to 2002	DIECAST ENGINE ONLY	420888286
	421000699		693 593HO	L/C	2	2003 to 2007	693 AND 593 HO ONLY	420889091
	421000152		599	L/C	3	1996 & 1997		420887970
	421000310		99 - 699 CK3	L/C	3	1998 to 2000	New modified part for 19 2000	420888030 / 420888034
	421000153		699	L/C	3	1997		420887605
	421000573		793	L/C	2	2000 to 2002		420888402
	421000608		793	L/C	2	2003	2003 ONLY	420889101
	421000607		793HO	L/C	2	2003 to 2007	HO ONLY	420889671
	421000606		793SDI	L/C	2	2003 & 2004	SDI ONLY	420889106
	421000665		797	L/C	2	2006 to 2008	2006 & 2007 REV / 2008 REV-XP	420892562
	421000668		797	L/C	2	2009 & 2010	REV-XP	420892567
	421000156		809	L/C	3	1997 to 2003	New modified p/n for 19 9-2002	420887667 / 420887668 420887662
	421000634		995SDI	L/C	2	2005 & 2006		420889217
	421000200	CYLINDER	277	F/C	1	1993 to 2009		420913218 / 420913219 / 623180
	421000559		377	F/C	2	1999 to 2004	Pto	420923403
	421000560		377	F/C	2	1999 to 2004	Mag	420923408
	421000568		493	L/C	2	2001 to 2003		420923855 / 420613605
	421000500		503	F/C	2	1983 to 2003		420923417
	421000680		552	F/C	2	2003 to 2006		4 23975 / 4209239 8
						2007 to 2009	Model MXZ, Summit et GTX/GSX	
	4210 1		552	F/C	2	2007	FREESTYLE et Expedition	42 23141 / 420823142
						2008 & 2009	Except MXZ, Summit and GTX/GSX	Lov Perf. page 2H-8 2007 Tech Update Book
						2010	All models	
	421000578		593	L/C	2	1999 to 2010	All models	420613620 / 420613625 / 613627
	421000605	NIC. CYL.	593HO	L/C	2	2003 to 2006	H.O. ONLY	420613711
	421000624		593SDI	L/C	2	2004 to 2008	593 SDI ONLY	420613940 / 420613944
	421000687		593 ETEC	L/C	2	2008 to 2010		420623260 / 420623262
	421000064		699	L/C	3	1997 to 2000		420923420
	421000579		793	L/C	2	2000 to 2004	WITH OUT DEKO SLOTS	420923811 / 420923817
	421000604		793HO	L/C	2	2003 to 2006	H.O. ONLY	420613852
	421000666		797	L/C	2	2007 to 2009		420623240 / 420623241
	421000675		797	L/C	2	2010		420623242
	421000668		809	L/C	3	1997 to 2003		420613852
	421000636		995SDI	L/C	2	2005 & 2006	CYLINDER BLOCK	420613746
	421000625	SHORTBLOCK	377	F/C	2	2004 to 2006	New 377 with oil check valves	
	421000617		493	L/C	2	2003		
	421000410		503	F/C	2	1994 to 1999		N/A
	421000 38		552	F/C	2	2003 to 2007	Except REV, RF, Exped.	420055201 / 420055204
			552	F/C	2	2005 & 2006	Model REV & Expedition	420055206
						2007 to 2009	Model MXZ, Summit et GTX/GSX	
	421000863		5 2	F/C	2	2007	FREESTYLE et Expedition	420055207
						2008 & 2009	Except MXZ, Summit and GTX/GSX	
	421000674		552	F/C	2	2010		420055208
	421000616		593	L/C	2	2001 to 2007		
	421000660		593XP	L/C	2	2008 to 2010	XP500SS	420059310/420059312
	421000615		593HO	L/C	2	2003 to 2007	H.O. ONLY	
	421000623		593SDI	L/C	2	2004 to 2007	593 SDI ONLY	
	421000659		593SDI-XP	L/C	3	2008 to 2010	593SDI-XP models	420059373
	421000662		593 ETEC	L/C	2	2008 to 2010	593 SDI E-TEC	420059350 / 59351 / 59352
	421000613		793	L/C	2	2001 to 2003		
	421000612		793HO	L/C	2	2003 to 2007	H.O. ONLY	
	421000645		797	L/C	2	2006 & 2007	NOT FOR XP MODEL	420079703 / 420079704
	421000650		797	L/C	2	2008	REV-XP	42079705/42079707
	421000661		797	L/C	2	2009	REV-XP	420079706
	421000676		797	L/C	2	2010	REV-XP	420079708
	421000637		995SDI	L/C	2	2005 & 2006		420099502
	421000678	longblock	1203cc	L/C	3	2009 & 2010		420120302

sdd2011-002-701_1

PRODUCT	REBUILT PART	PART	ENGINE TYPE	COOLING SYSTEM F/C - L/C	AMOUNT CYL.	YEAR	DESCRIPTION	ORIGINAL PART #
CAN-AM	421000626	CRANKSHAFT	175	L/C	1	2003 to 2005	RALLY-175	420296420
	421000157		511	L/C	1	all	Traxter	420295893
	421000577		654	L/C	1	all	DS650	711295192
	421000672	longblock	v800	L/C	2	2006 TO 2008	OUTLANDER 800 / RENEGADE 800	420081030
SEA-DOO	421000074	Crankshaft	717	L/C	2	1995 to 2003		290887867
	421000076		787	L/C	2	1996 to 1998	Carb.	290888103
	421000712		787RFI	L/C	2	199 to 2 05	RFI	290887890 / 420887891
	421000574		947DI	L/C	2	all	D.I.	290887767
	421000711		947	L/C	2	1998 to 2003	Except D.I.	290887762
	421000670		1503	L/C	3	2002 to 2005		420819077
	421000671		1503	L/C	3	2006 to 2009		420819346
	421000056	CYLINDER	717	L/C	2	1995 to 2003		290923805
	421000059		787	L/C	2	1996 to 1999	Carb.	290923503
	421000813		787RFI	L/C	2	1998 to 2003	RFI	290923846
	421000626		787RFI	L/C	2	2004 to 2005	RFI	420923086
	421000561		947	L/C	2	1998 to 2002	Except D.I.	290813561
	421000570		947DI	L/C	2	2001	D.I.	290923718
	421000205		947DI	L/C	2	2002 & 2003	D.I.	420613576
	421000097	Shortblock	717	L/C	2	1995 to 2005		290071703
	421000098		787	L/C	2	1995	USE 421 000 100 + 290 958 057	290881527 / 290881528
	421000100		787	L/C	2	1996 to 1999	Carb.	290078704
	421000913		787RFI	L/C	2	1998 to 2003	RFI	290078703
	421000627		787RFI	L/C	2	2004 & 2005	RFI	420078707
	421000562		947	L/C	2	1998 to 2002	Except D.I.	290094703
	421000572		947DI	L/C	2	2001	D.I.	2900 4705
	421000416		947DI	L/C	2	2002 to 2005	D.I.	420094706
	421000647	longblock 4 tec	1503 N/A	L/C	3	2002 to 2005	1st Oversize Long Block	270000645
	421000648		1503 B/V	L/C	3	2 03 to 2005	1st Oversize Long Block	270000644
	421000649		1503 I/C	L/C	3	2004 & 2005	1st Oversize Long Block	270000843
	421000640		1503 DT	L/C	3	2006 to 2009	1st Oversize Long Block	420150345
	421000641		1503 N/A	L/C	3	2006 to 2009	1st Oversize Long Block	420150315
	421000642		1503 I/C	L/C	3	2006 to 2009	1st Oversize Long Block	420150335
	421000658		1503 HO	L/C	3	2008 & 2009	1st Oversize Long Block	420150355
	421000652	Basic longblock	1503 N/A	L/C	3	2005 & prior	Basic Long Block	270000845
	421000653		1503 B/V	L/C	3	2005 & prior	Basic Long Block	270000644
	421000654		1503 I/C	L/C	3	2004 & 2005	Basic Long Block	270000843
	421000655		1503 DT	L/C	3	2006 to 2009	Basic Long Block	420150345/420150347
	421000656		1503 NA	L/C	3	2006 to 2009	Basic Long Block	420150335/420150337
	421000657		I/C & HO & ETC	L/C	3	2006 to 2009	Basic Long Block	420150337/420150355/420150365
	421000644	Head	1503	L/C	3	2002 to 2009	Head with valves installed	420613976/420613978

Note: Old core will be completely refunded only if :

- Core is returned within 30 days with the filled-out rebuilt cor formation form
- Core is same model as the one shipped
- Core casting is not broken
- Core is complete and fully assembled
- Core is shipped prepaid to BRP
- Core is returned in original packaging to avoid freight damages

Not respecting those requirements could result in a refused or reduced core credit

LEGEND	
CR	CRANKSHAFT
CY	CYLINDER
CY N	CYLINDER (NICASIL)
REP	REPAIR ONLY
SB	SHORT BLOCK

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QUICK REFERENCE CARD

SEA-DOO

IMPORTANT INFORMATION

Practice and become proficient with the different features and controls of your Sea-Doo PWC before riding. This quick reference card is provided as a reminder of the main functions available.

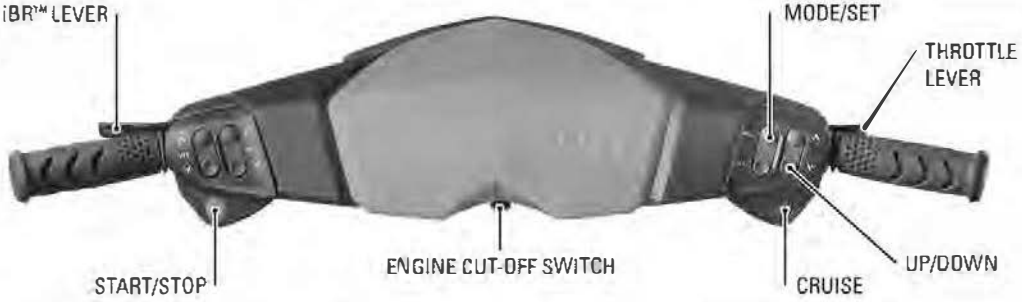
Refer to the Operator's Guide for complete instructions and available functions.

Some features shown may differ from the ones available on your PWC.



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CONTROLS IDENTIFICATION



STARTING THE ENGINE



▶ Briefly press START/STOP
Note: Ensure tether cord is at least 15 cm (6 in) away from engine cut-off switch



▶ Firmly insert tether cord cap on engine cut-off switch



▶ After double « beep » press again START/STOP

SPORT MODE SPORT

TO ENTER:

▶ Hold SET until SPORT appears

Message displayed: ENTERING SPORT MODE - INCREASED ACCELERATION - INSTRUCT PASSENGERS TO HOLD

▶ Press SET to confirm



TO EXIT:

▶ Hold SET for 3 seconds or shut down engine

Note: When engine is stopped, PWC resumes to default Touring Mode

CHANGING GAUGE DISPLAY

▶ Press MODE repeatedly until DISPLAY message appears

▶ Press SET

▶ Press UP/DOWN until preferred indication setting is displayed

▶ Press SET to select

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QUICK REFERENCE CARD (CONTINUED)

SEA-DOO



SKI MODE

TO ENTER:

- Press MODE repeatedly up to SKI MODE
- Press SET
- Press UP/DOWN to choose ramp
- Press SET
- Press UP/DOWN to set target speed
- Press SET (SKI MODE) (blinking)
- Press SET again
- Fully apply throttle lever when ready







TO CANCEL: Press MODE

TO RESUME: Press SET

TO EXIT: Press MODE twice

ECO MODE

TO ENTER:

- Press MODE repeatedly up to FUEL ECONOMY MODE
- Press SET
- Press and hold SET until ECO appears



TO EXIT:

- Press MODE repeatedly until ECO MODE appears
- Press SET
- Press SET to disengage ECO MODE

CRUISE MODE

TO ENTER:

- Maintain a constant speed
- Hold CRUISE until (CRUISE) appears
- Fully apply throttle lever
- Press UP/DOWN to adjust maximum speed



TO EXIT:

- Press CRUISE

SLOW SPEED MODE

TO ENTER:

- Engage NEUTRAL
- Hold CRUISE until (CRUISE) appears
- Press UP/DOWN to adjust speed



TO EXIT:

- Press CRUISE, iBR lever or throttle lever

THE WORLD IS OUR PLAYGROUND.
From snow and water to on- and off-road fun, BRP's passion for adventure fuels the innovations that deliver the ultimate experience in powersports. Because your free time should always be your best time.

SKI-DOO® LYNX™ SEA-DOO® EVINRUDE® JOHNSON® ROTAX® CAN-AM™

219 903 492

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BRP Oils and Lubricants / Huiles et lubrifiants BRP

Part #	Product Description	Size	Ski-Doo	Sea-Doo	ATV	
293 600 011	Synthetic jet pump oil 75W90 Huile synthétique 75W90 pour turbine	177 ml (6 oz).	-	X	-	
293 600 043	Synthetic gear oil 75W90 Huile synthétique 75W90 pour engrenage	946 ml (32 oz)	-	-	X	Same as 293 600 011 but 946 ml (32 oz)
413 801 900	XP-S chaincase oil Huile XP-S pour carter de chaîne	250 ml (8.4 oz)	X	-	X	
413 803 300	XP-S synthetic chaincase oil Huile synthétique XP-S pour carter de chaîne	355 ml (12 oz)	X	-	X	
413 711 600	XP-S storage oil / Huile de remisage XP-S	spray 473 ml (16 oz)	X	X	X	
293 600 016	XP-S lubricant / Lubrifiant XP-S	Spray 473 ml (16 oz)	X	X	X	General use Usage générale
293 550 010	XP-S synthetic grease Graisse synthétique XP-S	400 g tube (14 oz)	-	X	-	High rev marine application Utilisation marine, revolution élevée
293 550 033	XP-S synthetic grease Graisse synthétique XP-S	400 g tube (14 oz)	X	-	X	For suspension Pour suspension
413 408 600	Fuel stabilizer / Stabilisateur de carburant	236 ml (8 oz)	X	X	X	
413 803 100	XP-S premix oil / Huile prémélangée XP-S	500 ml (17 oz)	X	X	X	For carbureted 2-stroke Pour moteur deux-temps à carburateur.
413 802 900	XP-S 2-stroke mineral injection oil Huile minéral XP-S pour moteur deux-temps	1 U.S. Quart / 946 ml	X	X	X	For carbureted 2-stroke and ATV: Mini DS 2-stroke only
413 803 000	XP-S 2-stroke mineral injection oil Huile minéral XP-S pour moteur deux-temps	1 U.S. Gallon / 3.785 L	X	X	X	Pour moteur deux-temps DI, SDI et à carburateur.
413 803 200	XP-S 2-stroke mineral injection oil Huile minéral XP-S pour moteur deux-temps	Drum 205 L / 54 US gallons	X	X	X	VTT: Mini DS à moteur deux-temps seulement VTT: Mini DS à moteur deux-temps seulement
293 600 071	XP-S Semi-Synthetic 2-stroke oil Huile Semi-Synthétique XP-S pour moteur deux-temps	1 U.S. Quart / 946 ml	X	X	X	For DI, SDI and Carbureted 2-stroke. ATV: Mini DS 2-stroke only
293 600 072	XP-S Semi-Synthetic 2-stroke oil Huile Semi-Synthétique XP-S pour moteur deux-temps	1 U.S. Gallon / 3.785 L	X	X	X	Pour moteur deux-temps DI, SDI et à carburateur.
293 600 073	XP-S Semi-Synthetic 2-stroke oil Huile Semi-Synthétique XP-S pour moteur deux-temps	Drum 205 L / 54 US gallons	X	X	X	VTT: Mini DS à moteur deux-temps seulement
293 600 045	XP-S Synthetic 2-stroke oil Huile Synthétique XP-S pour moteur deux-temps	1 U.S. Quart / 946 ml	X	X	X	For DI, SDI and Carbureted 2-stroke. ATV: Mini DS 2-stroke only
293 600 046	XP-S Synthetic 2-stroke oil Huile Synthétique XP-S pour moteur deux-temps	1 U.S. Gallon / 3.785 L	X	X	X	Pour moteur deux-temps DI, SDI et à carburateur.
293 600 047	XP-S Synthetic 2-stroke oil Huile Synthétique XP-S pour moteur deux-temps	Drum 205 L / 54 US gallons	X	X	X	VTT: Mini DS à moteur deux-temps seulement
293 600 054	XP-S 4-stroke Synthetic oil 0W40 Huile XP-S Synthétique 0W40 pour moteur quatre-temps	1 U.S. Quart / 946 ml	X	-	-	Recommended for V-1000 Recommandé pour V-1000
293 600 039	XP-S 4-stroke Synthetic oil 5W40 Huile XP-S Synthétique 5W40 pour moteur quatre-temps	1 U.S. Quart / 946 ml	-	X	X	Not recommended for the supercharged engines. Non recommandé pour moteur à surcompresseur.
219 700 359	XP-S 4-stroke Synthetic oil 5W40 Huile XP-S Synthétique 5W40 pour moteur quatre-temps	Drum 205 L / 54 US gallons	-	X	X	
219 700 706	XP-S 4-stroke Mineral oil 5W30 Huile minéral XP-S 5W30 pour moteur quatre-temps	1 U.S. Quart / 946 ml			X	New
219 700 702	XP-S 4-stroke Mineral oil 5W30 Huile minéral XP-S 5W30 pour moteur quatre-temps	Drum 205 L / 54 US gallons			X	New
219 700 346	XP-S 4-stroke Mineral oil 10W40 Huile minéral XP-S 10W40 pour moteur quatre-temps	1 U.S. Quart / 946 ml	-	X	-	See Oil Application Chart in Operator's Guide for ATV's / Recommended for the supercharged engines, Sea-Doo Pour VTT, se référer à la charte d'utilisation des huiles du Guide de l'opérateur. / Recommandé pour moteur à surcompresseur, Sea-Doo
219 700 433	XP-S 4-stroke oil 10W40 Huile minéral XP-S 10W40 pour moteur quatre-temps	Drum 205 L / 54 US gallons	-	X	-	

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