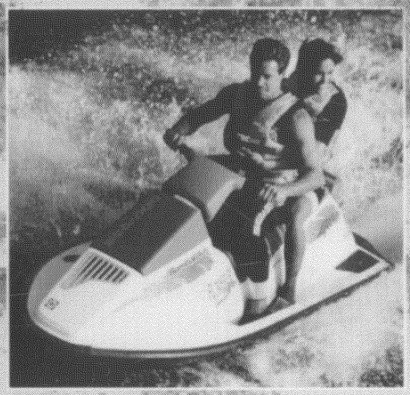
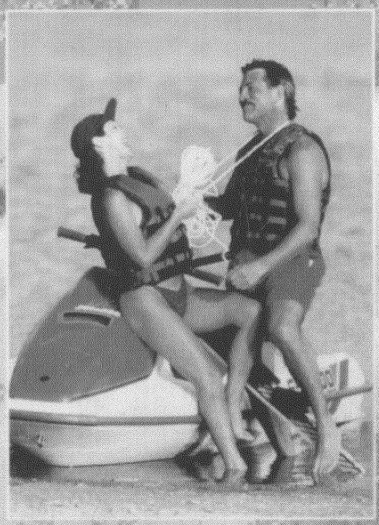
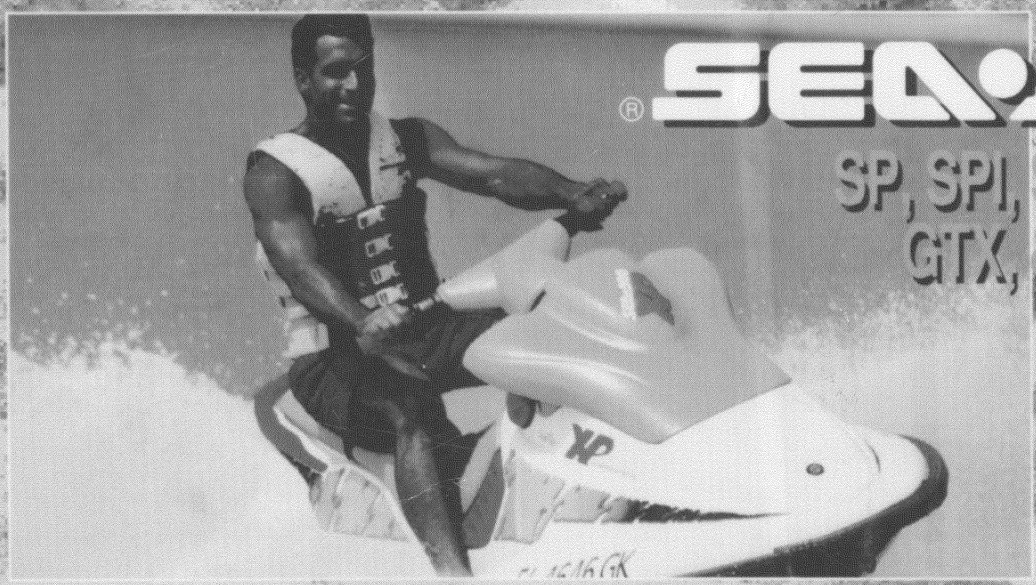
SHOP MANUAL

MODELS
5806
5808
5807
5852
5813
5861
5820







® SEA-DOO

SP, SPI, SPX, XP, GTS, GTX, & EXPLORER

BOMBARDIER

219-100-008

SHOP MANUAL

219 100 008

Legal deposit :

National Library of Quebec

1st trimester 1993

National Library of Canada

Printed in Canada

TABLE OF CONTENTS

SAFETY NOTICE

This manual has been prepared as a guide to service the SEA-DOO, models SP 5806, SPI 5808, SPX 5807, XP 5852, GTS 5813, GTX 5861 and EXPLORER 5820.

This edition was primarily published to be used by watercraft mechanics who are already familiar with all service procedures relating to Bombardier made watercraft.

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

This *Shop Manual* uses technical terms which may be slightly different from the ones used in *Parts Catalogs.*

The content depicts parts and / or procedures applicable to the particular product at its time of manufacture. It does not include dealer modifications, whether authorized or not by Bombardier, after manufacturing the product.

In addition, the sole purpose of the illustrations / photographs 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 Bombardier parts is most strongly recommended when considering replacement of any component. Dealer and / or distributor assistance should be sought in case of doubt.

Torque wrench tightening specifications must be strictly adhered to. Locking devices (ex. : locking disk, elastic stop nut) must be installed or replaced with new ones, where specified. If the efficiency of a locking device is impaired, it must be renewed.

This manual emphasizes particular information denoted by the wording and symbols ;

◆ WARNING : Identifies an instruction which, if not followed, could cause serious personal injury including possibility of death.

▼ CAUTION : Denotes an instruction which, if not followed, could severely damage vehicle components.

○ NOTE : Indicates supplementary information needed 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.

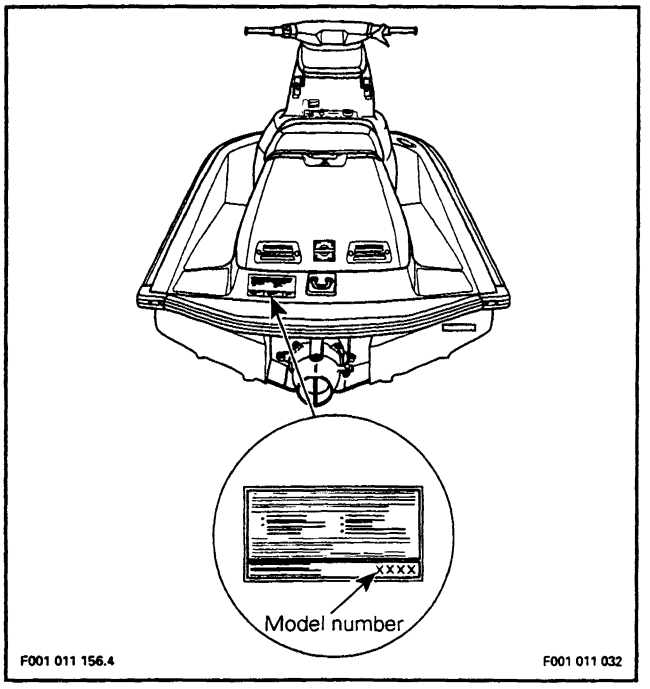
This information relates to the preparation and use of Bombardier watercraft and has been utilized safely and effectively by Bombardier Inc.. However, Bombardier Inc. disclaims liability for all damages and / or injuries resulting from the improper use of the contents. We strongly recommend that any services be carried out and / or verified by a highly skilled professional mechanic. It is understood that certain modifications may render use of the watercraft illegal under existing federal, provincial and state regulations.

INTRODUCTION

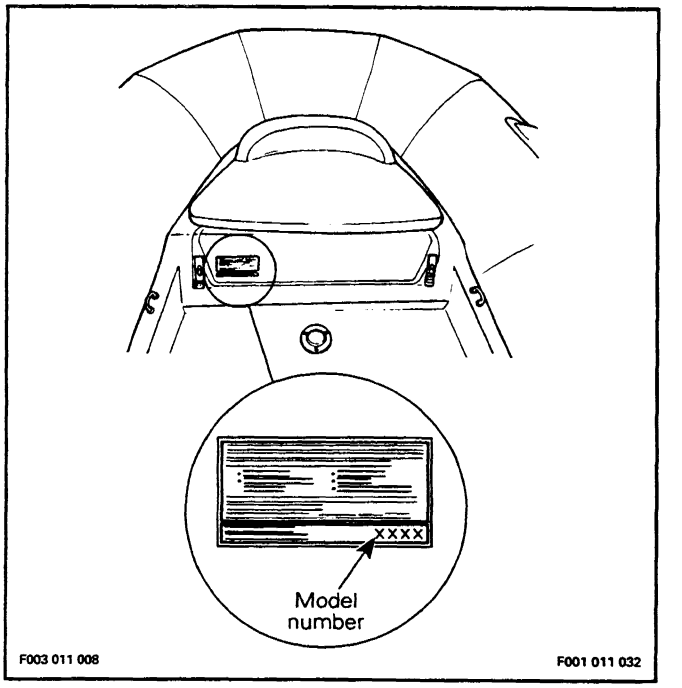
This *Shop Manual* covers BOMBARDIER made SEA-DOO® watercraft models SP 5806, SPI 5808, SPX 5807, XP 5852, GTS 5813, GTX 5861 and EXPLORER 5820.

WATERCRAFT MODEL NUMBER

Can be found on U.S. Coast Guard approved label located on left hand side of stern (rear) eyelet.

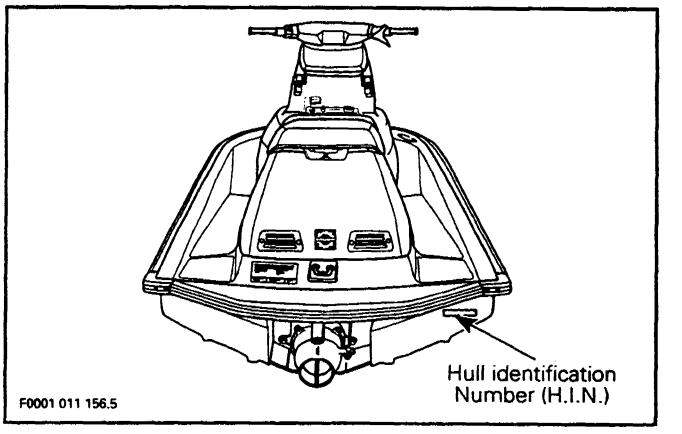


For the EXPLORER model it can be found on left hand side of front storage compartment cover.



HULL IDENTIFICATION NUMBER (H.I.N.)

Can be found at right hand rear side of hull, and inside it.



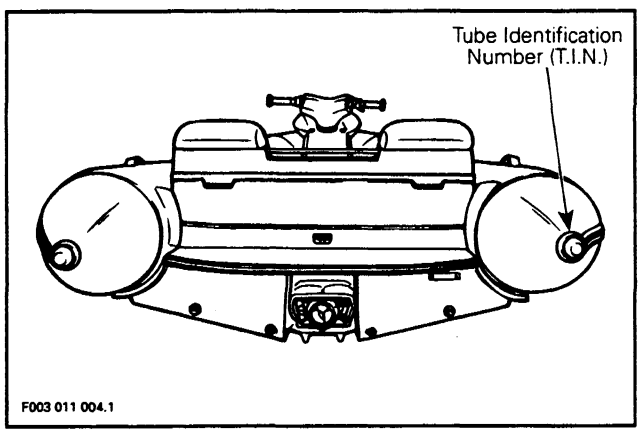
The five digits after ZZN are the watercraft serial number.

ZZN 1 2 3 4 5 X X X X

Serial number

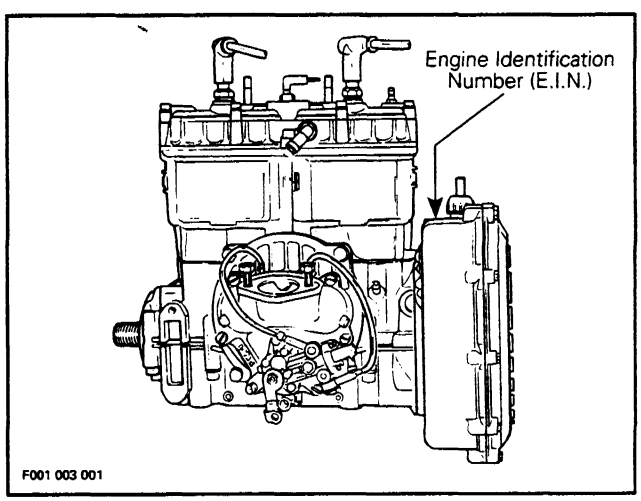
TUBE IDENTIFICATION NUMBER (T.I.N.)

Can be found on right hand side plastic cone.



ENGINE IDENTIFICATION NUMBER (E.I.N.)

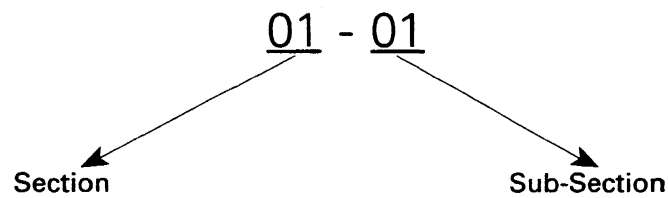
It is located on the upper side of the magneto housing.



DEFINITION OF NUMBERING SYSTEM OF THIS MANUAL

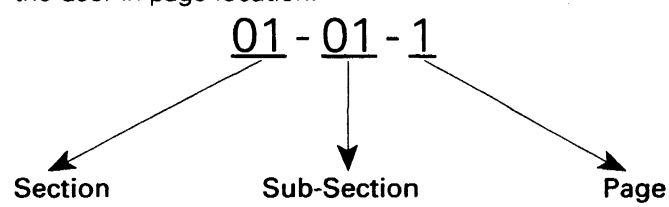
Sections and Sub-Sections System

The manual makes uses of a 2- part digital numbering system (e.g. : 01- 01), in which the first two-digits represents the section, the second two-digits the sub-section.



Pages System

The numerotation at the bottom of each page assists the user in page location.



ARRANGEMENT OF THIS MANUAL

The manual is divided into 13 major sections :

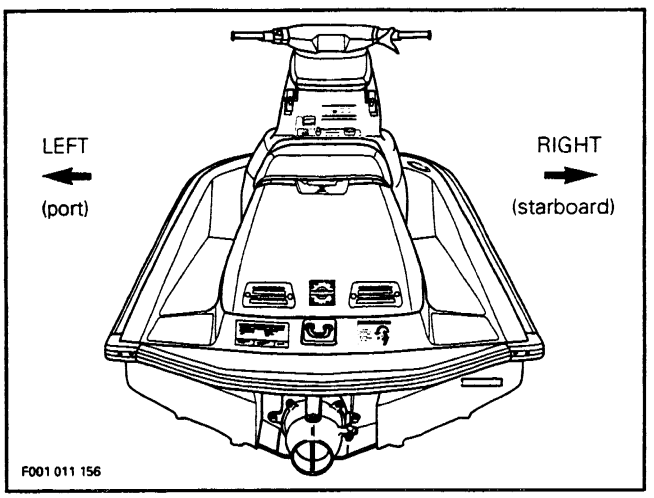
01 Service Tools and Products
02 Periodic Inspection Chart
03 Engine
04 Cooling System
05 Fuel System
06 Oil System
07 Electrical
08 Propulsion and Drive Systems
09 Steering System
10 Hull / Body
11 Storage
12 Technical Data
13 Troubleshooting

Each section is divided in various sub-sections, and again, each sub-section has one or more division.

EX. : 03 ENGINE

01 Water-Flooded Engine Care
02 Removal and Installation
03 Top End
04 Flywheel and Magneto
05 Bottom End
06 Rotary Valve and Reservoir
07 Exhaust System

The use of RIGHT and LEFT indications in the text, always refers to driving position (when sitting on vehicle).



GENERAL

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

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

ILLUSTRATIONS AND PROCEDURES

An exploded view is conveniently located at the beginning of each section and is meant to assist the user in identifying parts and components.

This *Shop Manual* uses technical terms which may be different from the ones of the *parts catalogs*.

When ordering parts always refer to the specific model, *parts catalogs*.

The illustrations show the typical construction of the different assemblies and, in all cases, may not reproduce the full detail or exact shape of the parts shown, however, they represent parts which have the same or a similar function.

When something special applies (such as adjustment, inspection, etc.), boldface numbers in exploded views are used for specific parts and referred to in the text.

▼CAUTION : Pay attention to torque specifications. Some of these are in lbf•in instead of lbf•ft. Use appropriate torque wrench.

▼CAUTION : Components of this watercraft are built with parts dimensioned in the metric system. Fasteners are metric and must not be replaced by customary SAE fasteners or vice versa. Mismatched or incorrect fasteners could cause damage to the watercraft or possible personal injury.

As many of the procedures in this manual are interrelated, we suggest, that before undertaking any task, you read and thoroughly understand the entire section or sub-section in which the procedure is contained.

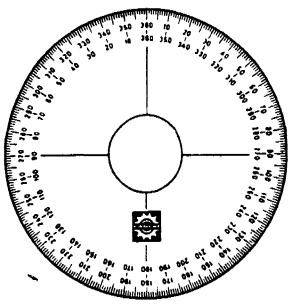
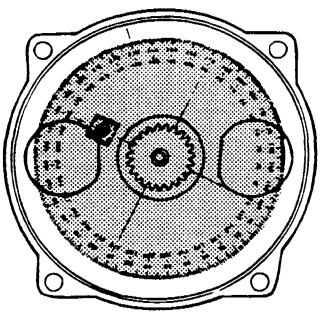
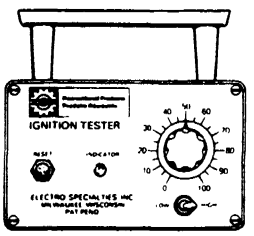
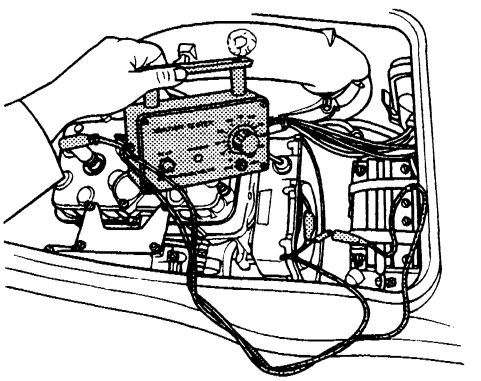
A number of procedures throughout the book require the use of special tools. Where a special tool is indicated, refer to section 01. Before commencing any procedure, be sure that you have on hand all the tools required, or approved equivalents.

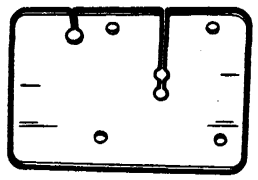
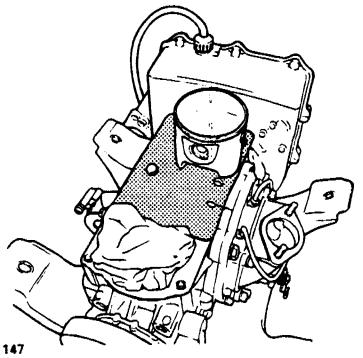
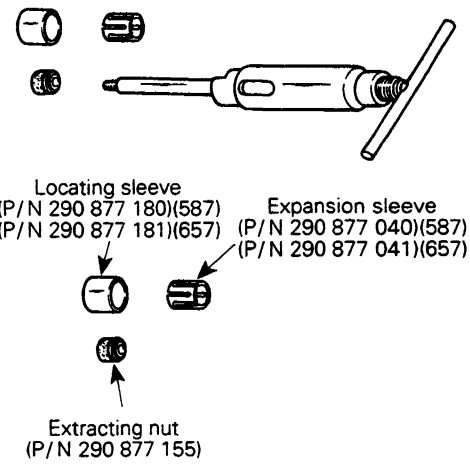
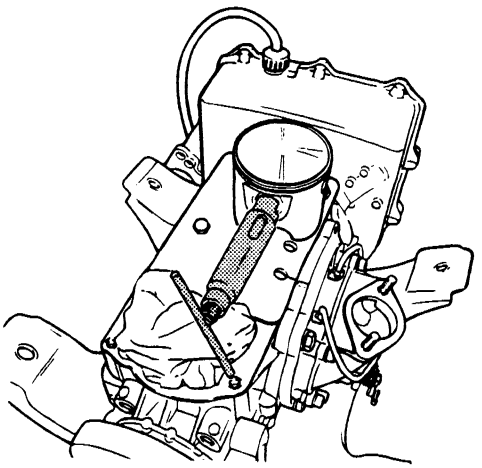
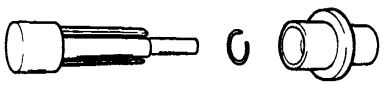
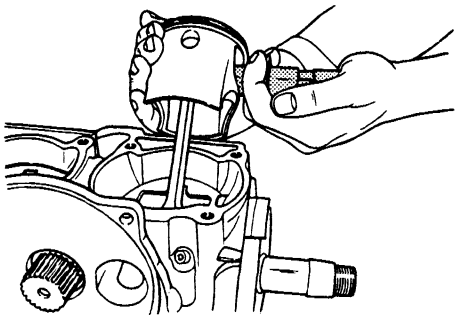
Bombardier Inc.
SEA-DOO Watercraft After Sales Service
Valcourt, (Quebec), Canada

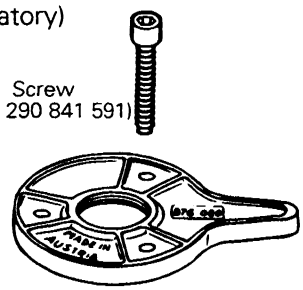
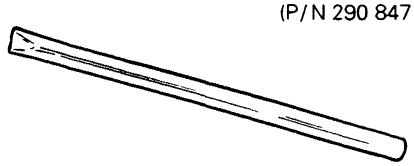
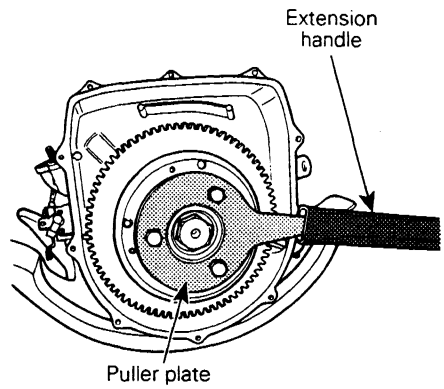
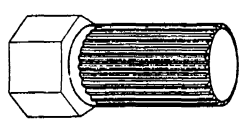
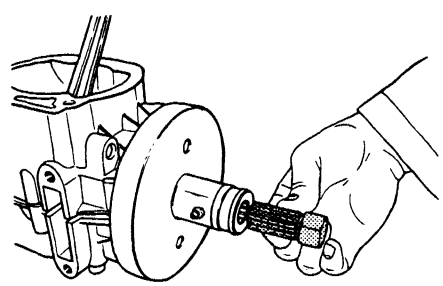
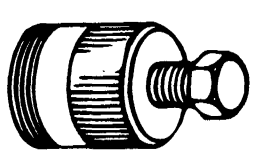
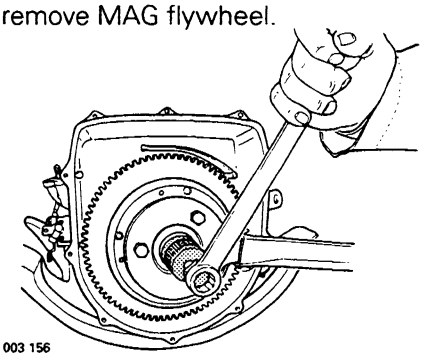
SERVICE TOOLS

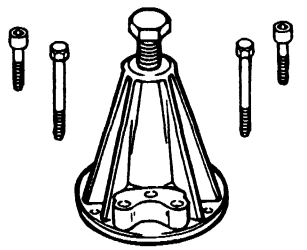
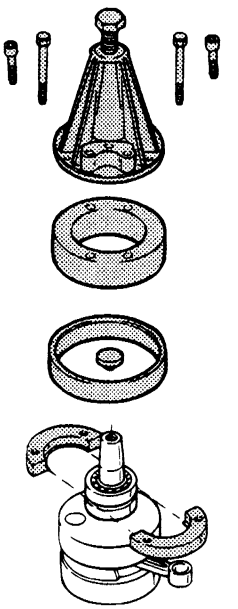
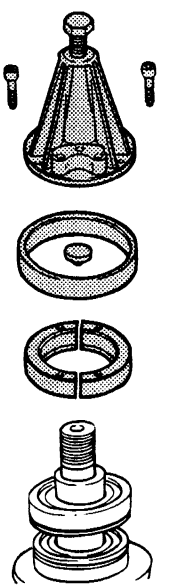
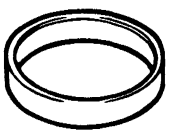
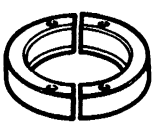
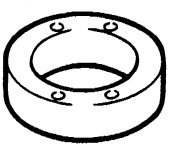
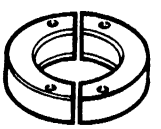
ENGINE (Mandatory Tools)

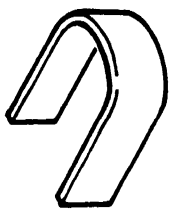
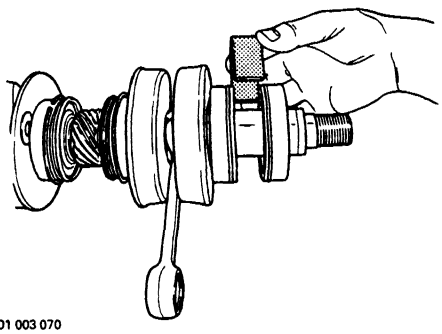
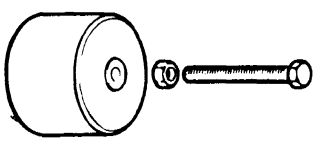
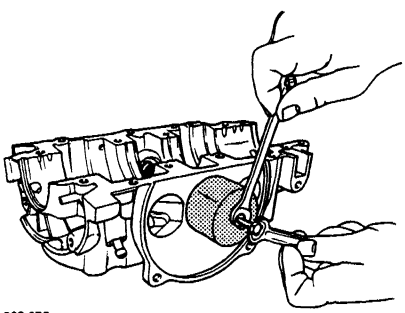
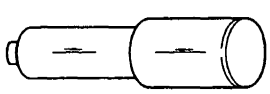
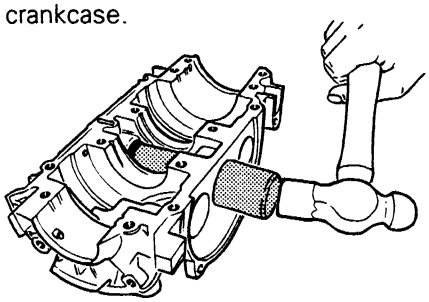
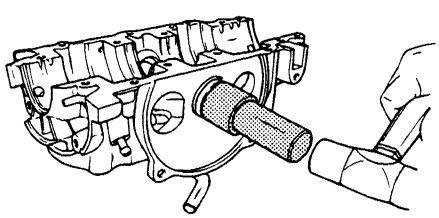
Some of the tools are mandatory, refer to the title of each sections.
Mandatory tool kit is available : P / N 295 000 087.

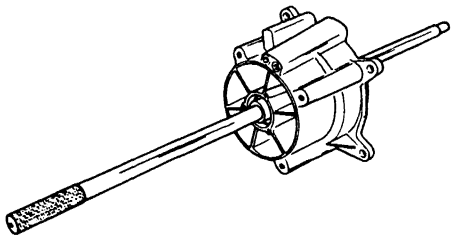
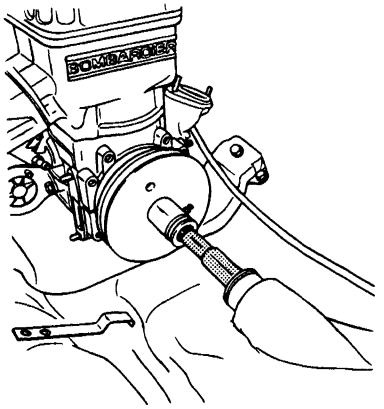
SERVICE TOOL	PURPOSE	APPLICATION
Degree wheel (mandatory) P / N 295 000 007  A000 001 111	To mark timing position of rotary valve, to check crankshaft alignment.  F001 003 093	All models.
Bombardier ignition tester (mandatory) P / N 295 000 008  A000 002 056	To test engine electrical components.  F001 007 100	All models.

SERVICE TOOL	PURPOSE	APPLICATION
Rubber pad (mandatory) P / N 295 000 079  F001 001 019	To avoid needles of connecting rod bearing from falling in crankcase.  F001 003 147	All models.
Piston pin puller (mandatory) P / N 295 000 105 (587 engine) P / N 290 877 092 (657 engine)  F001 001 031	To remove and install piston pin.  F001 003 099	All models.
Piston circlip installer (mandatory) P / N 295 000 077(587 engine) P / N 290 877 016 (657 engine)  A001 001 061	To install circlips on pistons.  F001 003 034	All models.

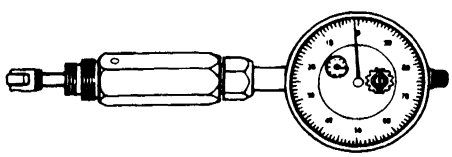
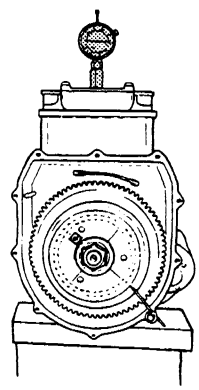
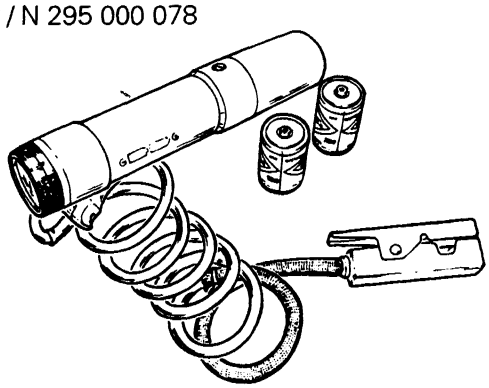
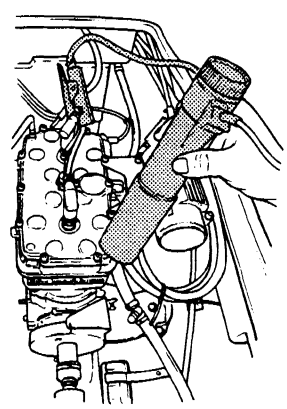
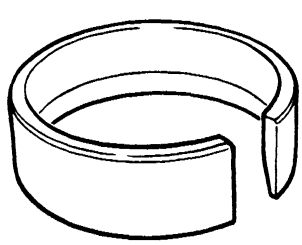
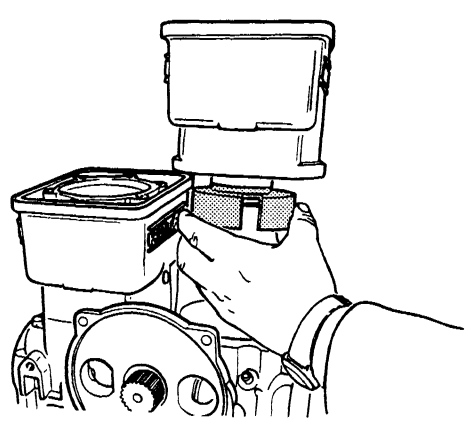
SERVICE TOOL	PURPOSE	APPLICATION
Puller plate (mandatory) P / N 290 876 080 Screw (P/N 290 841 591)  Extension handle P / N 295 000 003 Sleeve (P/N 290 847 220)  F001 003 151	Used with extension handle to retain crankshaft. When removing / installing PTO flywheel and loosen / tighten MAG flywheel nut.  F001 003 152	All models.
Impeller / PTO flywheel remover / installer (mandatory) P / N 295 008 001  F001 009 029	Used to loosen / tighten PTO flywheel and impeller. Must be used in conjonction with puller plate (P / N 290 876 080) and extension handle (P / N 295 000 003).  F001 003 046	All models.
Puller (mandatory) P / N 290 876 065  A000 002 046	Used with puller plate (P / N 290 876 080) and extension handle (P / N 295 000 003) to remove MAG flywheel.  F001 003 156	All models.

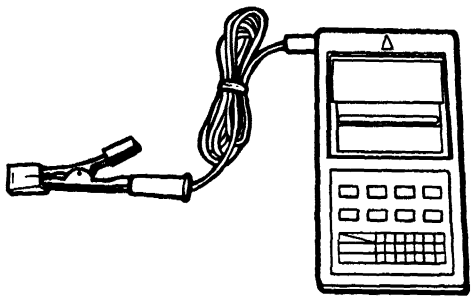
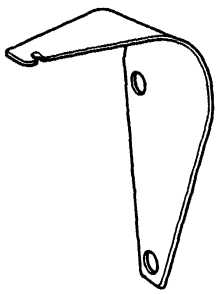
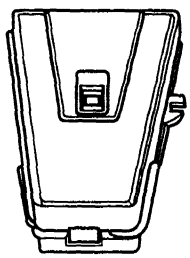
SERVICE TOOL	PURPOSE	APPLICATION
Puller with screws (mandatory) P / N 290 876 298  F001 001 010	To remove crankshaft bearings.  MAG side  PTO side F001 003 094 F001 003 095	All models.
Protective cap (both ends) (mandatory) P / N 290 876 557  F001 001 011		
Ring (both ends) (mandatory) P / N 290 977 490  F001 001 013		
Ring halves (PTO) (mandatory) P / N 290 977 475  F001 001 015		
Distance ring (MAG) (mandatory) P / N 290 876 569  F001 001 012		
Ring halves (MAG) (mandatory) P / N 290 276 025  F001 001 014		

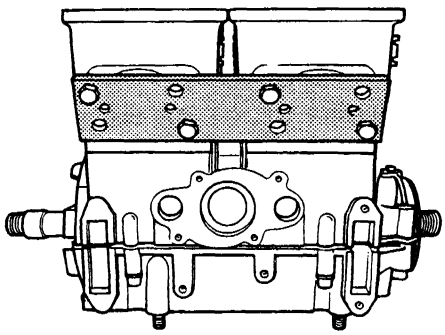
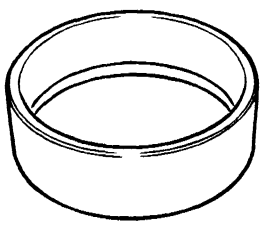
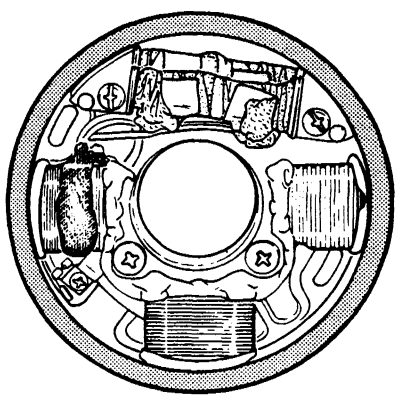
SERVICE TOOL	PURPOSE	APPLICATION
Distance gauge (mandatory) P / N 290 876 826  F001 001 017	To position outer crankshaft bearing on PTO side.  F001 003 070	5806, 5808, 5813 models only.
Puller (mandatory) P / N 290 876 487  F001 001 018	To remove rotary valve shaft from crankcase.  F001 003 076	All models.
Pusher (mandatory) P / N 290 876 500  A000 001 091	To install end bearing of rotary valve shaft in crankcase.  F001 003 086	All models.
Pusher (mandatory) P / N 290 876 605  A000 002 034	To install rotary valve shaft in crankcase.  F001 003 088	All models.

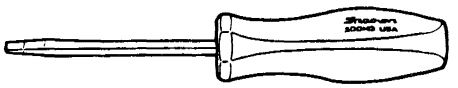
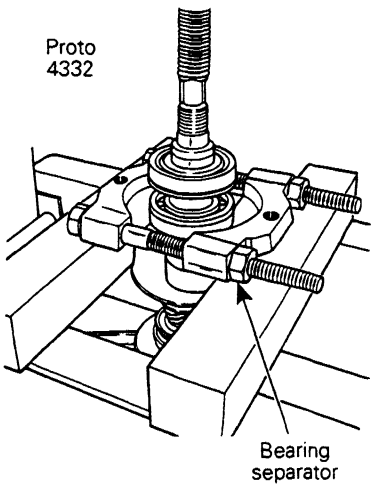
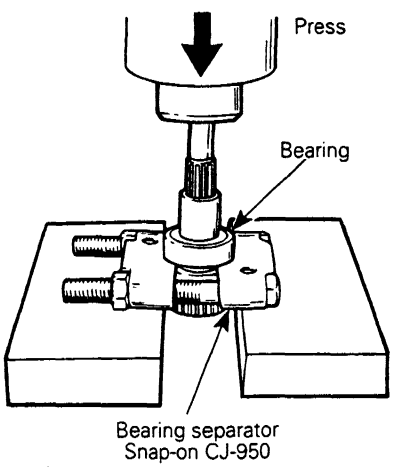
SERVICE TOOL	PURPOSE	APPLICATION
Alignment tool (mandatory) P / N 295 000 089  F001 011 099	To align engine / jet pump whenever either one is removed and reinstalled.  F001 011 101	All models.

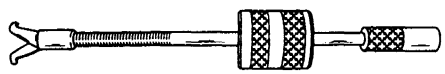
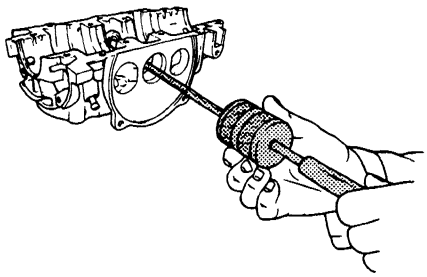
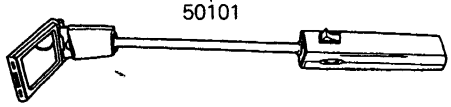
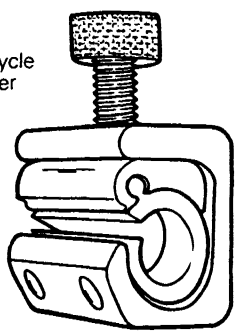
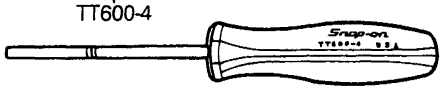
ENGINE (recommended tools)

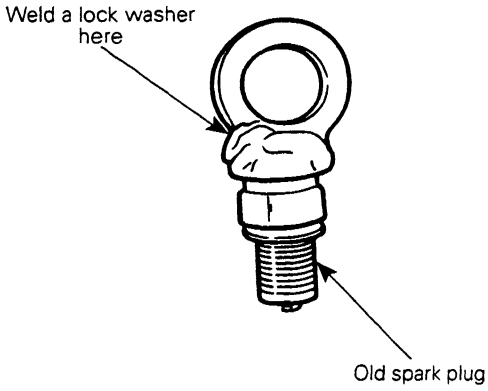
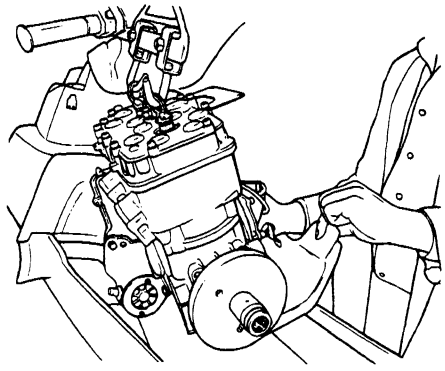
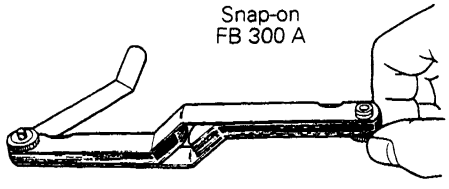
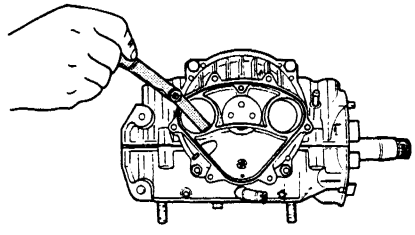
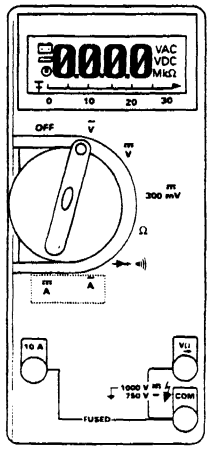
SERVICE TOOL	PURPOSE	APPLICATION
Dial indicator (TDC gauge) (recommended) P / N 295 000 065  A000 001 086	To find TDC position. For ignition timing and rotary valve timing. To check crankshaft alignment.  F001 003 162	All models.
Stroboscopic timing light (recommended) P / N 295 000 078  A001 001 092	To verify ignition timing.  F001 007 090	All models.
Ring compressor (recommended) P / N 290 876 972 (587 engine)  A001 001 065	To compress piston ring when inserting piston in cylinder.  F001 003 036	All models. Except XP 5852.

SERVICE TOOL	PURPOSE	APPLICATION
Digital / induction type tachometer (recommended) P / N 295 000 100  F001 001 052	To verify engine RPM.	All models.
Coupler hose (recommended) P / N 295 500 099  F001 004 035	To cool engine when watercraft is out of water. To clean cooling system.	All models.
Timing mark pointer (recommended) P / N 295 000 102  F001 007 127	Align mark on PTO flywheel with pointer to verify engine timing. F001 007 109	All models.
Spark tester (recommended) Purchase locally Superex Canada Ltd No. 15-785  F001 001 053	To verify spark at spark plug cap outlet.	All models.

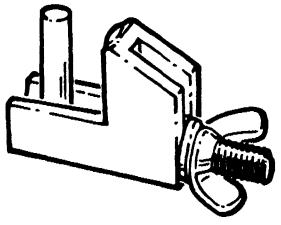
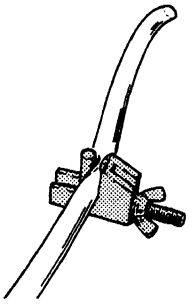
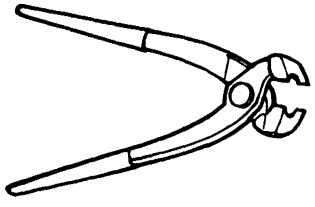
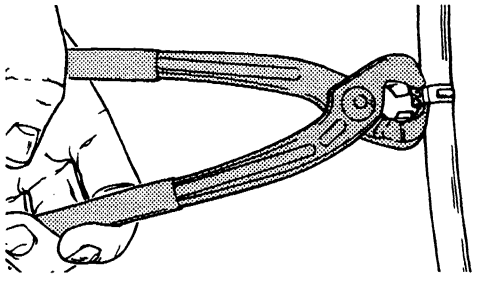
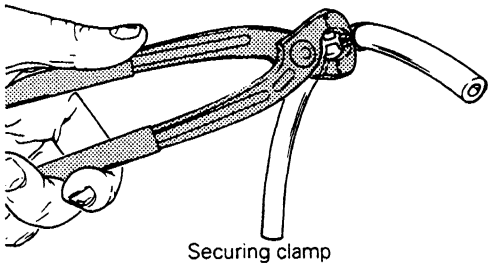
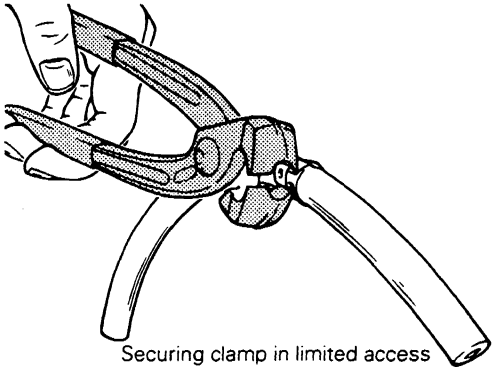
SERVICE TOOL	PURPOSE	APPLICATION
Aligning tool (recommended) P / N 290 876 902  A000 001 008	To align cylinders by exhaust flanges at assembly.  F001 003 037	All models.
Centering tool (recommended) P / N 290 876 922  A001 001 067	To position coils on armature plate at assembly.  A001 004 003	All models.

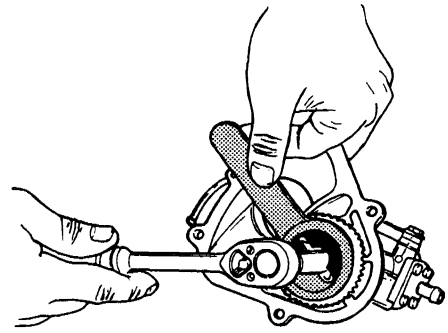
SERVICE TOOL	PURPOSE	APPLICATION
Screw driver (recommended) Not sold by Bombardier Purchase locally Snap-on SDD-143  F001 001 061	To remove / install carburetors pilot jet and main jet.	All models.
Bearing separator (recommended) Not sold by Bombardier Purchase locally Proto 4332  F001 003 061	Pull out bearing.	Crankshaft.
Bearing separator (recommended) Not sold by Bombardier Purchase locally  F001 003 078	Pull out bearing.	Bearing beside distance sleeve on rotary valve shaft.

SERVICE TOOL	PURPOSE	APPLICATION
Slide hammer puller (recommended) Not sold by Bombardier Purchase locally Snap on : Handle CJ93-1 Hammer CJ125-6 Claws CJ93-4  F001 009 035	Pull out rotary valve shaft end bearing / crankcase.  F001 003 080	All models.
Lighted adjustable mirror (recommended) Not sold by Bombardier Purchase locally Snap-on 50101  F001 001 054	See in dark area.	Oil injection pump adjustment.
Cable luber (recommended) Not sold by Bombardier Purchase locally See a motorcycle parts supplier  F001 001 002	Power inject Sea-Doo Lube in throttle cable.	All models.
Terminal remover (recommended) Not sold by Bombardier Purchase locally Snap-on TT600-4  F001 001 055	Remove terminals from connector housing in electrical circuit.	All models.

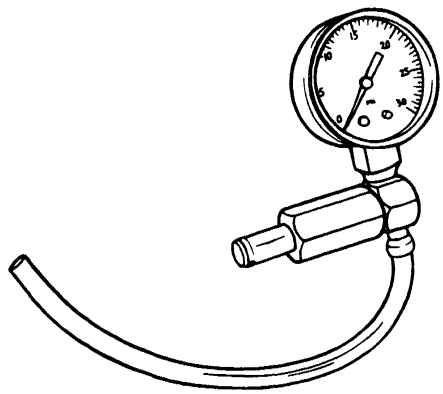
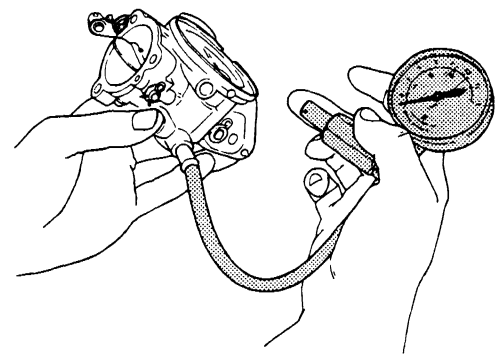
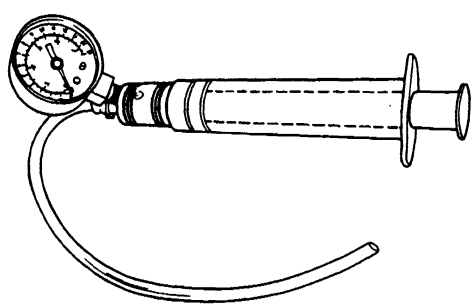
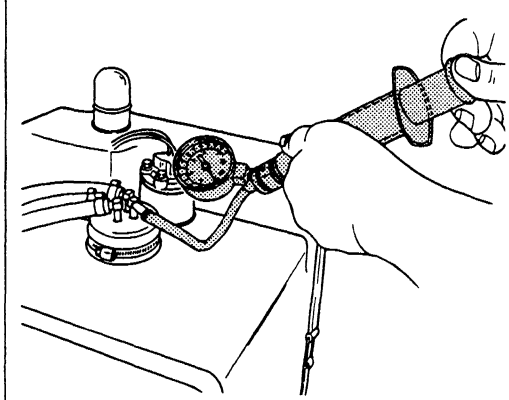
SERVICE TOOL	PURPOSE	APPLICATION
Engine lifting device (recommended) Not sold by Bombardier Do it yourself Refer to *shop manual* section 03-02  F001 003 010	Lift engine out of watercraft.  F001 003 144	All watercraft engines.
Feeler gauge 45° (recommended) Not sold by Bombardier Purchase locally  F001 001 056	To measure rotary valve and rotary valve cover clearance.  F001 003 183	All models.
Digital / analog multimeter (recommended) P / N 529 022 000  F001 001 060	To verify electrical system specifications.	All models.

COOLING / FUEL / OIL SYSTEMS (Mandatory Tools)

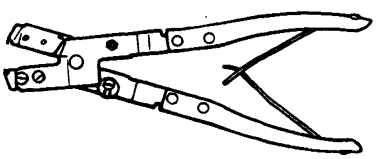
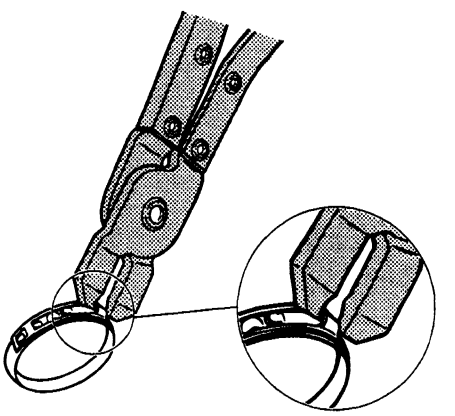
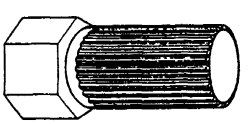
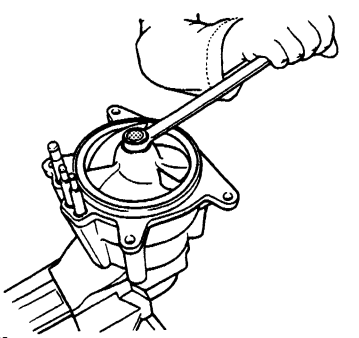
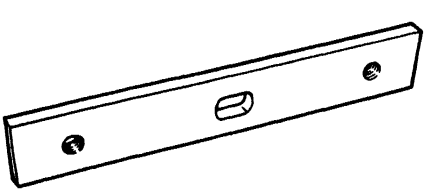
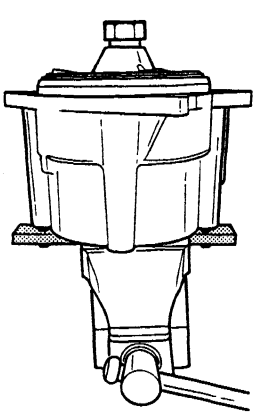
SERVICE TOOL	PURPOSE	APPLICATION
Hose pincher (mandatory) P / N 295 000 076  A001 001 090	To avoid leaks while working on oil / fuel lines.  A001 001 091	All models.
Pliers (mandatory) P / N 295 000 070  F001 003 043	To secure / cut ear clamps on oil / fuel lines and coolant hoses.  Cutting clamp  Securing clamp  Securing clamp in limited access F001 001 003 F001 001 004 F001 001 005	All models.

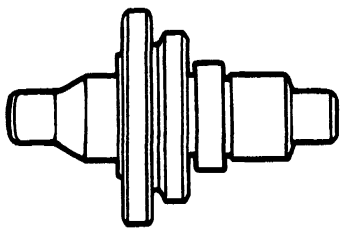
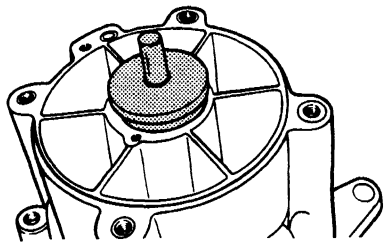
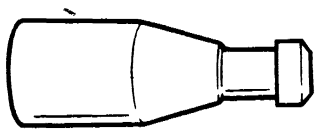
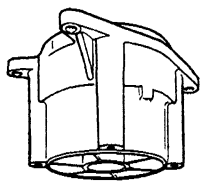
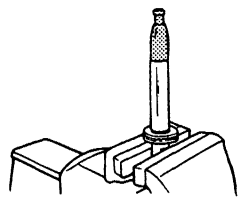
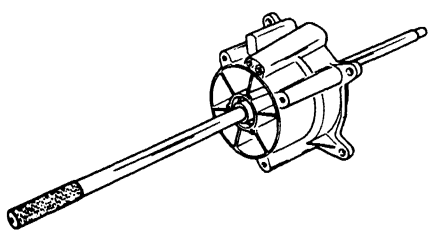
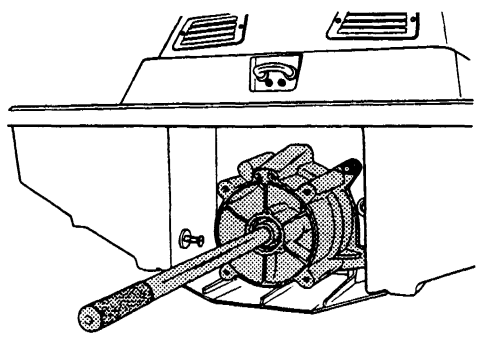
SERVICE TOOL	PURPOSE	APPLICATION
Gear holder (mandatory) P / N 290 277 905  A000 002 042	To remove / install retaining nut of oil injection pump gear.  A000 002 043	All models.

COOLING / FUEL / OIL SYSTEMS (Recommended Tools)

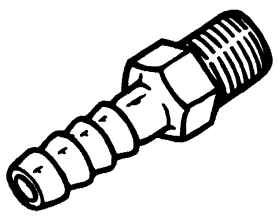
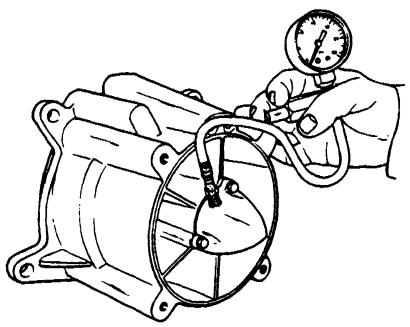
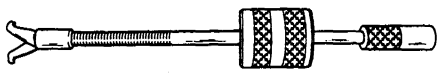
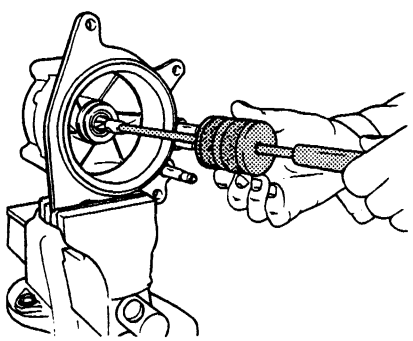
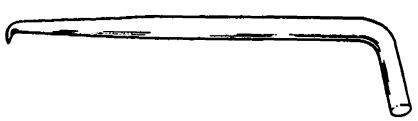
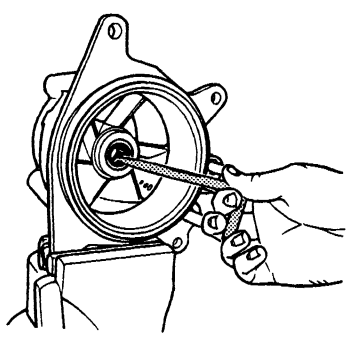
SERVICE TOOL	PURPOSE	APPLICATION
Pump gauge tester (recommended) P / N 295 000 083  F001 001 033	To verify release pressure and leak at carburetor.  F001 005 014	All models.
Pump gauge tester (recommended) P / N 295 000 085 **NOTE :** Must maintain a pressure of 34 kPa (5 PSI) during 10 minutes. Never pressurize over 34 kPa (5 PSI). **CAUTION : Lubricate air pump piston seal using mild soap. Hydrocarbon lubricant destroys rubber seal.**  F001 001 034	To make sure there is no leak by pressurizing the fuel system or oil system.  F001 005 018	All models.

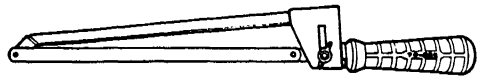
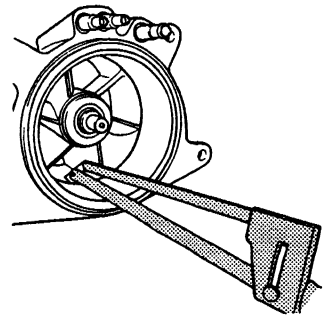
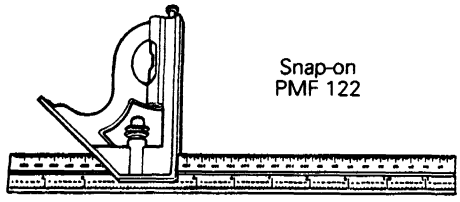
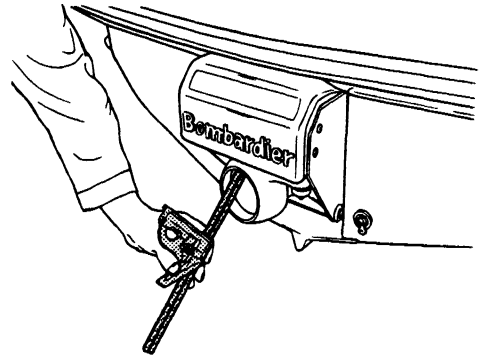
PROPULSION SYSTEM (Mandatory Tools)

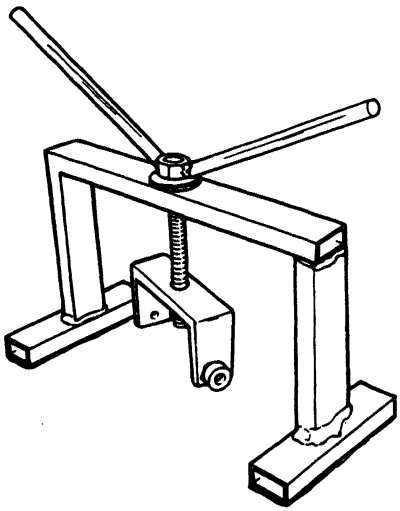
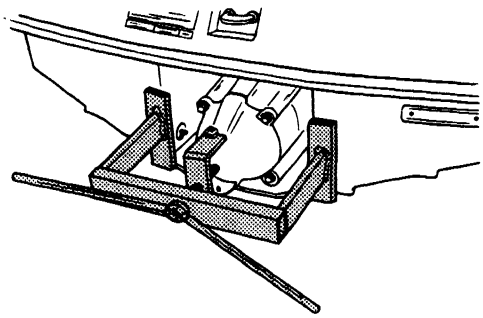
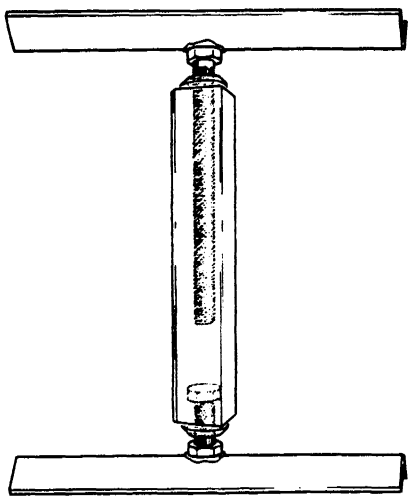
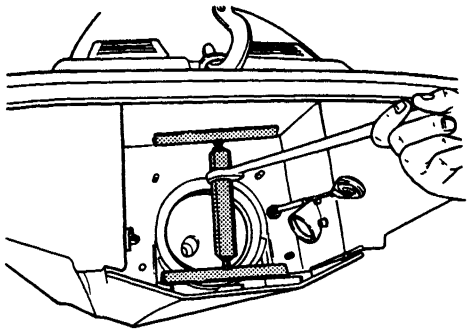
SERVICE TOOL	PURPOSE	APPLICATION
Pliers (mandatory) P / N 295 000 069  F001 003 044	To remove / install drive shaft boot reusable stepless clamps.  F001 009 017	All models.
Impeller / PTO flywheel remover / installer (mandatory) P / N 295 000 001  F001 009 029	Used to loosen / tighten impeller on shaft.  F001 009 030	All models.
Impeller shaft holder (mandatory) P / N 295 000 082  F001 001 032	Used to loosen / tighten impeller on shaft.  F001 009 089	All models.

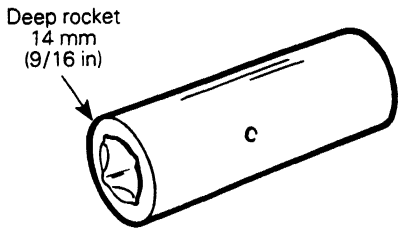
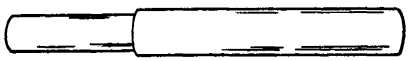
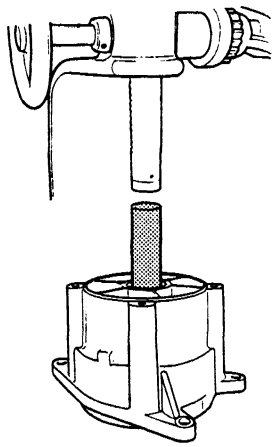
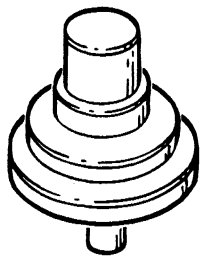
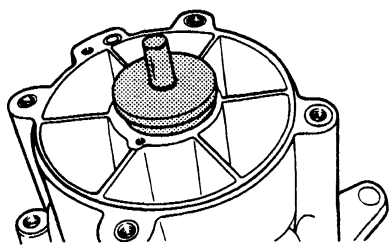
SERVICE TOOL	PURPOSE	APPLICATION
Bearing / seal installer (mandatory) P / N 295 000 107  F001 009 164	To install impeller shaft needle bearings and seal.  F001 009 054	All models.
Impeller shaft guide (mandatory) P / N 295 000 002  F001 009 060	To protect seal lip when installing impeller shaft in its housing.   F001 009 061	All models.
Alignment tool (mandatory) P / N 295 000 089  F001 011 099	To align engine / jet pump whenever either one is removed and reinstalled.  F001 011 100	All models.

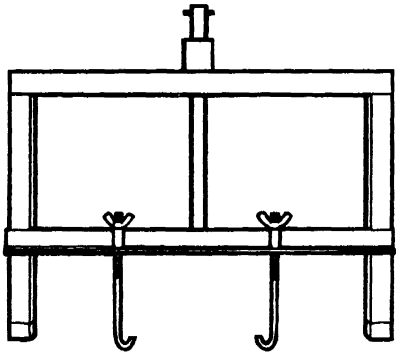
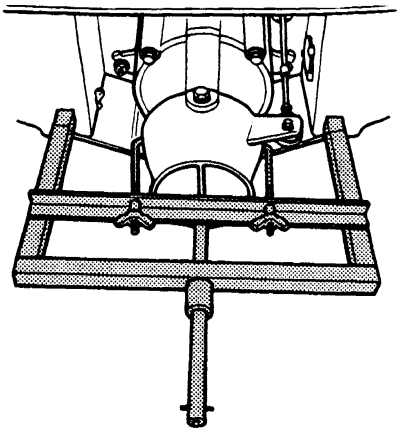
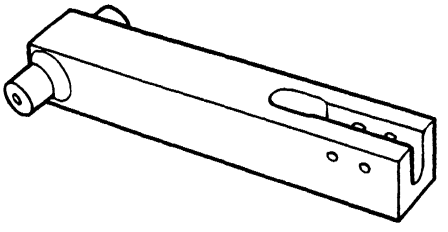
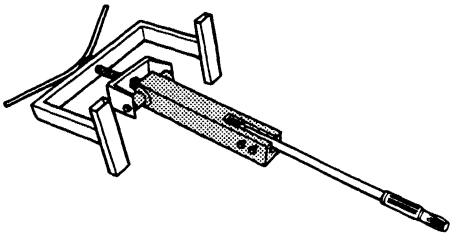
PROPULSION SYSTEM (Recommended Tools)

SERVICE TOOL	PURPOSE	APPLICATION
Fitting (recommended) P / N 295 000 086 **NOTE :** Must maintain a pressure of 70 kPa (10 PSI) during 10 minutes. Never pressurize over 70 kPa (10 PSI).  F001 001 035	To pressurize pump assembly before installation, to verify if any leak.  F001 009 090	All models.
Slide hammer puller (recommended) Not sold by Bombardier Purchase locally Snap-on : Handle CJ93-1 Hammer CJ125-6 Claws CJ93-4  F001 009 035	Pull out impeller shaft seal.  F001 009 036	All models.
Seal puller (recommended) Not sold by Bombardier Purchase locally Snap-on #S6129  F001 009 033	Pull out impeller shaft seal.  F001 009 034	All models.

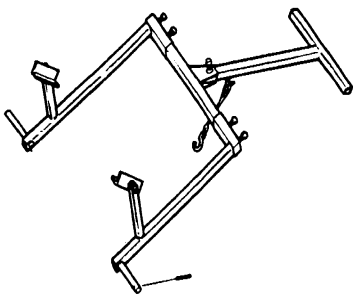
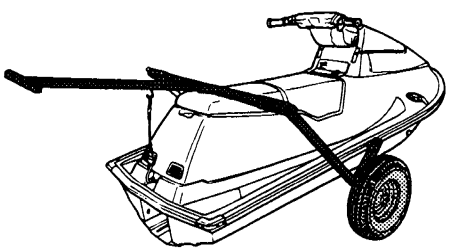
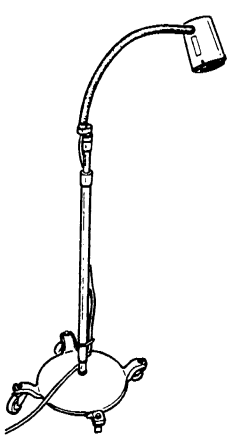
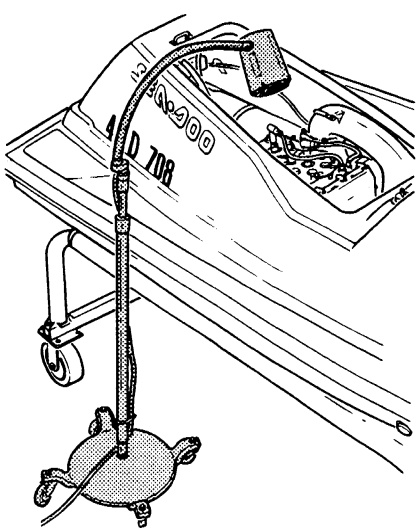
SERVICE TOOL	PURPOSE	APPLICATION
Scraper (recommended) Not sold by Bombardier Purchase locally Snap-on CS-A12A  F001 001 057	Remove silicone.	Impeller housing.
Hacksaw (recommended) Not sold by Bombardier Purchase locally Snap-on HS3  F001 001 058	Cut wear ring.  F001 009 032	All models.
Machinist's square (recommended) Not sold by Bombardier Purchase locally Snap-on PMF 122  P002 001 006	Adjust reverse gate.  F002 009 017	Models equipped with reverse.

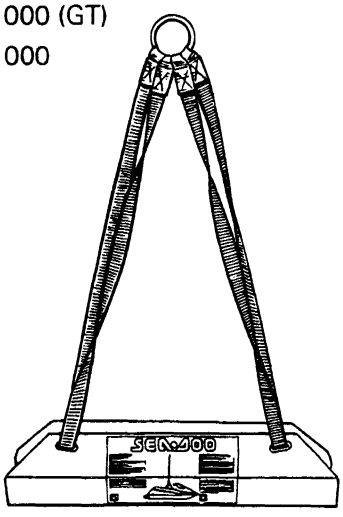
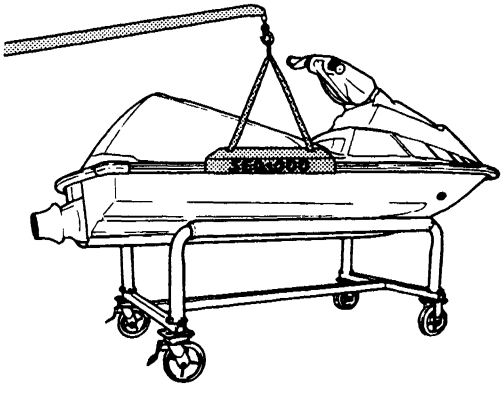
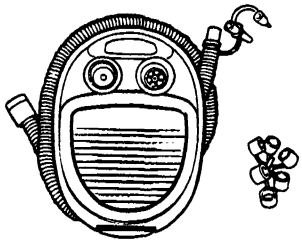
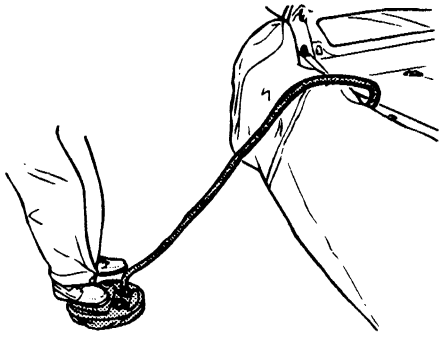
SERVICE TOOL	PURPOSE	APPLICATION
Impeller housing remover (recommended) Not sold by Bombardier Do it yourself Refer to *shop manual* section 08-01  F001 011 096	Remove impeller housing.  F001 011 097	All models. Except XP 5852.
Ride shoe remover (recommended) Not sold by Bombardier Do it yourself Refer to *shop manual* section 08-01  F001 009 025	Remove ride shoe.  F001 009 026	All models.

SERVICE TOOL	PURPOSE	APPLICATION
Fitting remover (recommended) Not sold by Bombardier Do it yourself Refer to *shop manual* section 08-01 Deep rocket 14mm (9/16 in)  F001 009 099	Remove impeller housing fittings.	All models.
Bearing remover (recommended) Not sold by Bombardier Do it yourself Refer to *shop manual* section 08-01  F001 009 037	Remove impeller housing bearings.  F001 009 038	All models.
Bearing installer (recommended) P / N 295 000 014  F001 009 052	To install impeller shaft needle bearings.  F001 009 054	All models.

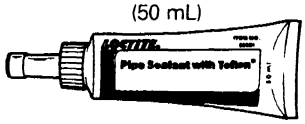
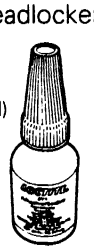
SERVICE TOOL	PURPOSE	APPLICATION
Steering system alignment tool (recommended) Not sold by Bombardier Do it yourself Refer to *shop manual* section 09-01  F001 010 028	Ease handlebar / nozzle alignment.  F001 010 029	All models. Except EXPLORER 5820.
Drive shaft puller (recommended) Not sold by Bombardier Do it yourself Refer to *shop manual* section 08-01  F001 008 005	Remove drive shaft.  F001 008 006	All models.

WATERCRAFT HANDLING (Recommended Tools)

SERVICE TOOL	PURPOSE	APPLICATION
Dolley (recommended) P / N 295 000 004  F001 001 001	To handle watercraft in shop or on beach.  F001 001 008	All models.
Beach wheels (recommended) P / N 295 000 005  F001 001 007		
Shop lamp (recommended) P / N 295 000 081 ◆ **WARNING : Never use electric powered tools on watercraft unless first verifying no gasoline leaks / fumes are present.**  F001 001 021	To facilitate repair when working inside the hull / body.  F001 001 030	All models.

SERVICE TOOL	PURPOSE	APPLICATION
Lift kit (recommended) P / N 298 760 000 (SP and XP) P / N 298 776 000 (GT) P / N 298 780 000 (EXPLORER)  F001 001 059	To handle watercraft in shop.  F001 009 146	All models.
Foot Pump Kit P / N 204 000 047  F003 015 001	To inflate tube.  F003 011 034	EXPLORER model 5820.

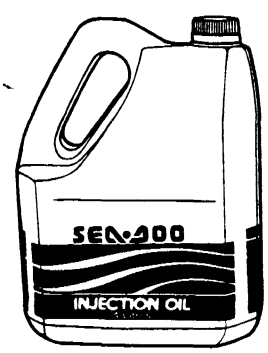
SERVICE PRODUCTS

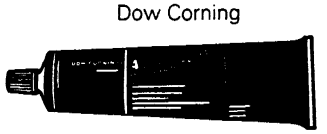
SERVICE PRODUCT	PURPOSE	APPLICATION
Pipe sealant P / N 293 800 018 Loctite 592 (50 mL)  A000 001 104	To seal pipe fittings. Prevents leakage and vibrational loosening.	Plug on impeller housing cover. Plastic fitting (tool P / N 295 000 086) on impeller housing cover.
Removable threadlocker P / N 293 800 015 Loctite 242 (blue) (10 mL)  A000 001 110	A medium-strength adhesive for threadlocking and threadsealing. Vibration-proof nuts, bolts and screws.	Cylinder head cover screws. Exhaust manifold studs and screws. Engine rubber mount screws. Armature plate screws. Magneto flywheel / crankshaft. Carburetor mount nuts. Magneto coil screws. Impeller housing cover screws. Venturi / impeller housing screws. Grill screws. Engine support screws. Impeller housing / hull nuts. Steering nozzle screws. Reverse gate screws.
High strength threadlocker P / N 293 800 005 Loctite 271 (red) (10 mL)  A000 001 102	Hi-strength threadlocking threadsealing adhesive. Apply heat to ease disassembly.	Starter screws / engine. Impeller shaft thread. Steering column screw.

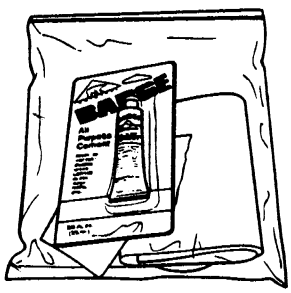
SERVICE PRODUCT	PURPOSE	APPLICATION
High temperature threadlocker P / N 290 899 788 Loctite 648 (green) (5 g)  A000 001 121	Hi-strength threadlocking threadsealing adhesive that resists high temperature.	Crankcase / plug at end of rotary valve shaft. Ring gear / MAG flywheel.
Primer for paste gasket P / N 293 600 012 Loctite Locquic Primer N (4 oz)  A000 001 077	General purpose primer. Primer N assures fixturing of parts in 15-30 minutes and full cure in 12 hours or less. On part life is 30 days, but it is recommended that parts be joined within 10 minutes after adhesive is applied over primer.	Crankcase halves mating surface. Impeller shaft thread. Venturi / impeller housing mating surface.
Solvent P / N 293 800 019 Loctite Safety Solvent 755  A000 001 130	Clean and prepare surface before assembly.	Impeller shaft threads. Drive shaft splines. Impeller threads and splines.
Silicone "Ultra Black" P / N 293 800 030 Silicone "Ultra Black HB" P / N 293 800 028  Loctite 598 (300 mL) Loctite 598 HB ("Heavy Body") (300 mL) F001 001 046	Seal fiberglass and metal parts.	Ride shoe / hull, pump / hull.

SERVICE PRODUCT	PURPOSE	APPLICATION
Paste gasket P / N 293 800 007  Loctite 515 (50 mL) A000 001 101	Makes, dresses and repairs gaskets of sizes and shapes.	Cylinder sleeve / O-ring groove. Crankcase halves mating surface. Impeller housing cover. Impeller shaft seal. Venturi / impeller housing. Seal outer diameter *in seal carrier.*
Retaining compound P / N 413 703 100 Loctite 609 (10 ml)  A000 001 100	Eliminates the need for setscrews. Locks bushings, sleeves and pins in housing and on arms.	Trim ring arm / venturi housing spring pin.
Gelcoat kit P / N 295 500 100  Sea-Doo Gelcote Repair kit F001 001 027	Gelcoat repair.	Body. Hull.
Gelcoat paste (white) P / N 293 500 016  F001 001 051	Gelcoat repair.	Body. Hull.

SERVICE PRODUCT	PURPOSE	APPLICATION
Gelcoat (liquid) 1 liter white P / N 293 500 033 1 liter mauve P / N 293 500 034 1 liter grey P / N 293 500 035 1 liter light grey P / N 293 500 037 1 liter green P / N 293 500 038 1 liter turquoise P / N 293 500 039	Gelcoat repair.	Body. Hull.
Synthetic grease P / N 293 550 010  Bombardier Sea-Doo F001 001 041	Lubricate and provide great wear protection and water resistance.	Under the head of cylinder and cylinder head screws. Carburetor linkage. Impeller shaft seal lips. Both sides of impeller shaft thrust washer. Drive shaft / impeller splines. Seal carrier seals and bearing. PTO flywheel rubber boot.
Penetrating lubricant P / N 293 600 006  Sea-Doo lube F001 001 028	Prevents corrosion and sticking. Protects metallic parts.	In carburetor intake when engine is water flooded and before storage. Throttle cable. Wear ring (when new). Corroded parts.
Synthetic oil P / N 293 600 011  Sea-Doo jet pump synthetic oil F001 001 025	Lubricate.	Jet pump.

SERVICE PRODUCT	PURPOSE	APPLICATION
Injection oil 1 liter P / N 293 600 005  4 liters P / N 293 600 004  F001 001 044	Lubricate engine.	All models.
Anti-seize lubricant P / N 293 550 001 Anti-seize lubricant Loctite (12 oz)  F001 001 043	Protects moving and stationary parts against high temperature seizing. Prevents rust and corrosion on parts exposed to high heat.	Crankshaft thread / PTO flywheel. Crankshaft bearing seat. Spark plug thread. Drive shaft splines. Ignition housing/crankcase screws.

SERVICE PRODUCT	PURPOSE	APPLICATION
732 Multi-purpose sealant P / N 293 800 006 Dow Corning  F001 001 048	To seal joints.	Ride shoe screws (inside hull).
Electrical insulating compound P / N 293 550 004 Dow Corning  F001 001 042	Prevents moisture and corrosion build-up in electric connections.	Battery posts and cable connectors. Thermosensor connectors.
Primer P / N 293 530 012 Sikaflex Primer 449  F001 001 050	Clean and prepare surface for application of sealant (P / N 293 530 011).	Water tank trap / body surface. Rear baffle / body surface.
Sealant P / N 293 530 011 Sikaflex Sealant 221  F001 001 049	Seal fiberglass and plastic parts. For best result use primer (P / N 293 530 012).	Water tank trap / body surface. Rear baffle / body surface.

SERVICE PRODUCT	PURPOSE	APPLICATION
Paint P / N 293 500 040 grey P / N 293 500 041 white P / N 293 500 042 purple Sea-Doo paint  F001 0001 026	Protection of metallic parts.	Metallic parts only.
Tube Repair Kit P / N 204 000 046  F003 015 002	To repair tube minor punctures.	Inflatable tube.
Lubricant Not sold by Bombardier Purchase locally G.E. Versilube G341M  or Esso Beacon 325 A000 001 065	Provide excellent lubrication over long interval of no maintenance.	Sliding surface of starter armature shaft splines.
Epoxy glue Not sold by Bombardier Purchase locally 3M-05900	Glue.	Knurled surface of aluminum hull insert (P / N 292 000 075).

SERVICE PRODUCT	PURPOSE	APPLICATION
Sea-Doo fuel stabilizer P / N 413 408 600	Prevent fuel deterioration during storage.	Fuel tank at storage.
Vinyl protectant Not sold by Bombardier Purchase locally Armor-All	Clean and protect vinyl.	Seat.
Gun Kote Not sold by Bombardier Purchase locally Kal-Gard Coating & Mfg. Corp.	To prevent corrosion.	MAG flywheel and ring gear.

PERIODIC INSPECTION CHART

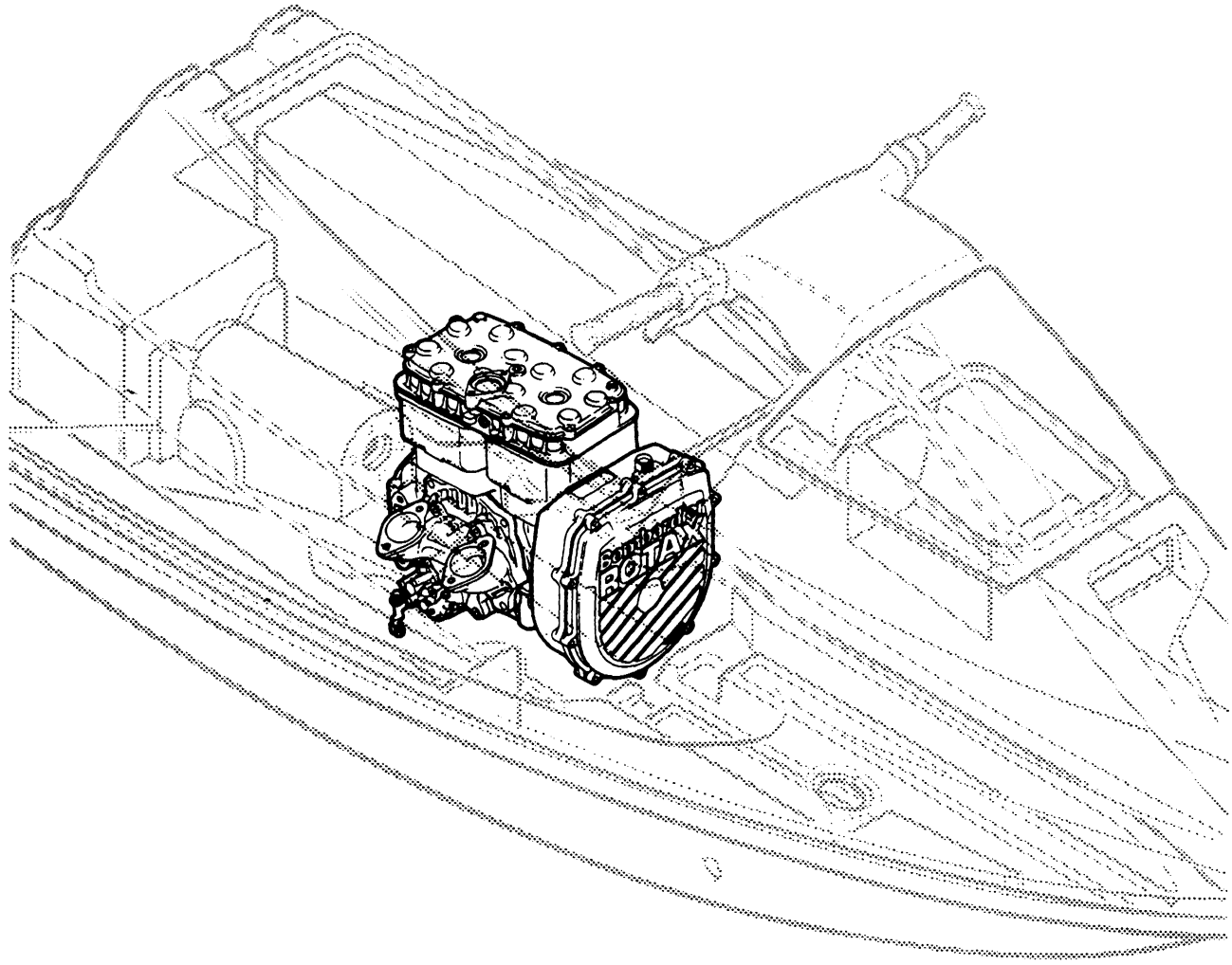
NOTE : Shade area shows the maintenance frequency.

NOTE : Servicing period is given in hours. On an average, three hours is equivalent to using one tank of gasoline.

DESCRIPTION	FREQUENCY			
	10 hours	25 hours	50 hours	100 hours
Lubrication / corrosion protection of metallic components	①		■	
Engine ignition timing				■
Spark plugs, cleaning / adjustment		■		
Throttle / choke cables, inspection / lubrication	①	■		
Flame arrester element, inspection			■	
Carburetor adjustment including choke / throttle cable adjustments and linkage				■
Oil injection pump adjustment				■
Fuel filter cleaning, oil filter inspection	■			
Oil filter, replacement				■
Engine head screws, retorque				■
Steering column wear / steering cable adjustment / condition				■
Reverse system / reverse cable adjustment				■
Fastener tightening (flame arrester mount screws, carburetor mount nuts, engine mount screws, exhaust system, etc).			■	
Muffler, battery and reservoirs fastening devices			■	
Fuel / oil lines, check-valves and hoses inspection, fuel system pressurization			■	
Fuel / oil lines water eliminator valve inspection		■		
Fuel vent line pressure relief valve inspection		■		
Inspect / clean engine drain hose	①	■		
Bilge system / water-trap drains, inspection			■	
Battery, vent line condition			■	
Battery vent line water eliminator valve inspection		■		
Battery and starter cables		■		
Engine overheating beeper / electrical connections			■	
Impeller shaft reservoir oil level / oil condition		■		Replace
Impeller condition and impeller / wear ring clearance		②	■	
Drive shaft boot / splines condition (both ends)		②	■	
Drive shaft, lubricate grease fitting at PTO flywheel	■			
Lubricate grease fitting at seal carrier	■			
Water intake grill condition		②	■	
Hull condition				■
Cooling system flushing ③		■		
Inflatable tube condition		■		④
Zinc anode (Explorer)			■	
Air blower inspection (Explorer)			■	

① Every 10 hours in salt water use.
② These items have to be initially checked after 25 hours. Thereafter, servicing to be made as specified in this chart.
③ Daily flushing in salt water or unclean water use.
④ Inflatable tube should be removed and cleaned. Also verify tube attachment condition.

587 AND 657 ENGINE TYPES



f001 003 141

WATER-FLOODED ENGINE

ENGINE DESCRIPTION

The two stroke ROTAX engine rotates counterclockwise seen from the rear (PTO flywheel). It has a rotary valve to control fuel mixture intake. Lubrication is provided by a variable oil injection pump. It is cooled by water supplied from the jet pump. It has a NIPPONDENSO Capacitor Discharge Ignition System with single coil and an integrated electronic module (587 engine),double coil (657 engine). The fuel is provided by diaphragm carburetor having an integrated fuel pump.

General

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

▼**CAUTION : A water-flooded engine must be properly lubricated, operated then lubricated again, otherwise parts will be seriously damaged.**

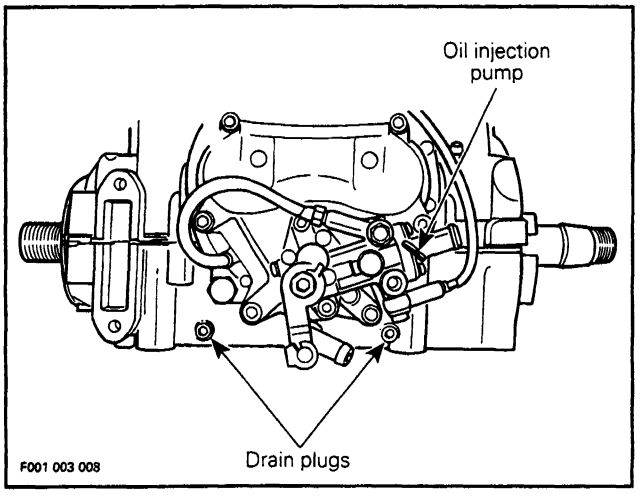
Procedure

Check fuel and oil reservoirs for water contamination. If necessary, siphon and refill with fresh fluids.

Turn fuel valve to OFF position then drain fuel filter bowl.

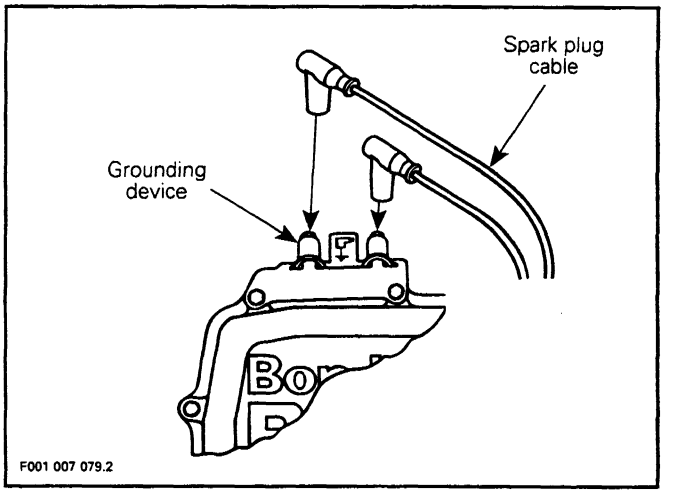
Drain bilge if water is present.

Remove engine crankcase drain plugs located underneath oil injection pump.



Remove spark plug cables and connect them on the grounding device.

◆**WARNING : Never crank engine with spark plugs removed unless spark plug cables are connected to the grounding device.**



Remove spark plugs and dry with a clean dry cloth. A contact cleaner spray can be used, it may be preferable to replace spark plugs. Do NOT install spark plugs on engine.

Crank engine to drain crankcase.

○**NOTE : Whenever the engine is stopped more than 20 seconds, the electrical system has to be reactivated by touching starter button.**

▼**CAUTION : Be careful when cranking engine, water will spray out from spark plug holes.**

Reinstall crankcase drain plugs.

▼**CAUTION : Crankcase drain plugs should have Loctite PST 592 (P / N 293 800 018) applied to threads before reinstalling.**

Crank engine again to allow any remaining water to escape from spark plug holes.

Spray SEA-DOO LUBE (P / N 293 600 006) into spark plug holes.

Crank engine again.

Reinstall spark plugs and spark plug cables then tether cord cap on switch.

Turn fuel valve to ON position.

Press starting button to start engine. It may be necessary to use the choke. If engine does not start, repeat previous steps as necessary.

▼**CAUTION : To avoid starting motor overheating, the cranking period should not exceed 5-10 seconds and a rest period of 30 seconds should be observed between cranking cycles. Never depress the starting button when the engine is running.**

NOTE : If engine does not start after several attempts, check ignition system for spark occurence.

Refer to CDI AND CHARGING SYSTEMS 07-06 then refer to **ignition system testing procedure**. Also a spark tester tool no. 15-785 from Superex Canada Ltd can be used. Check crankshaft if needed, it can become misaligned or deflected.

Refer to BOTTOM END 03-05 then refer to **crankshaft alignment**.

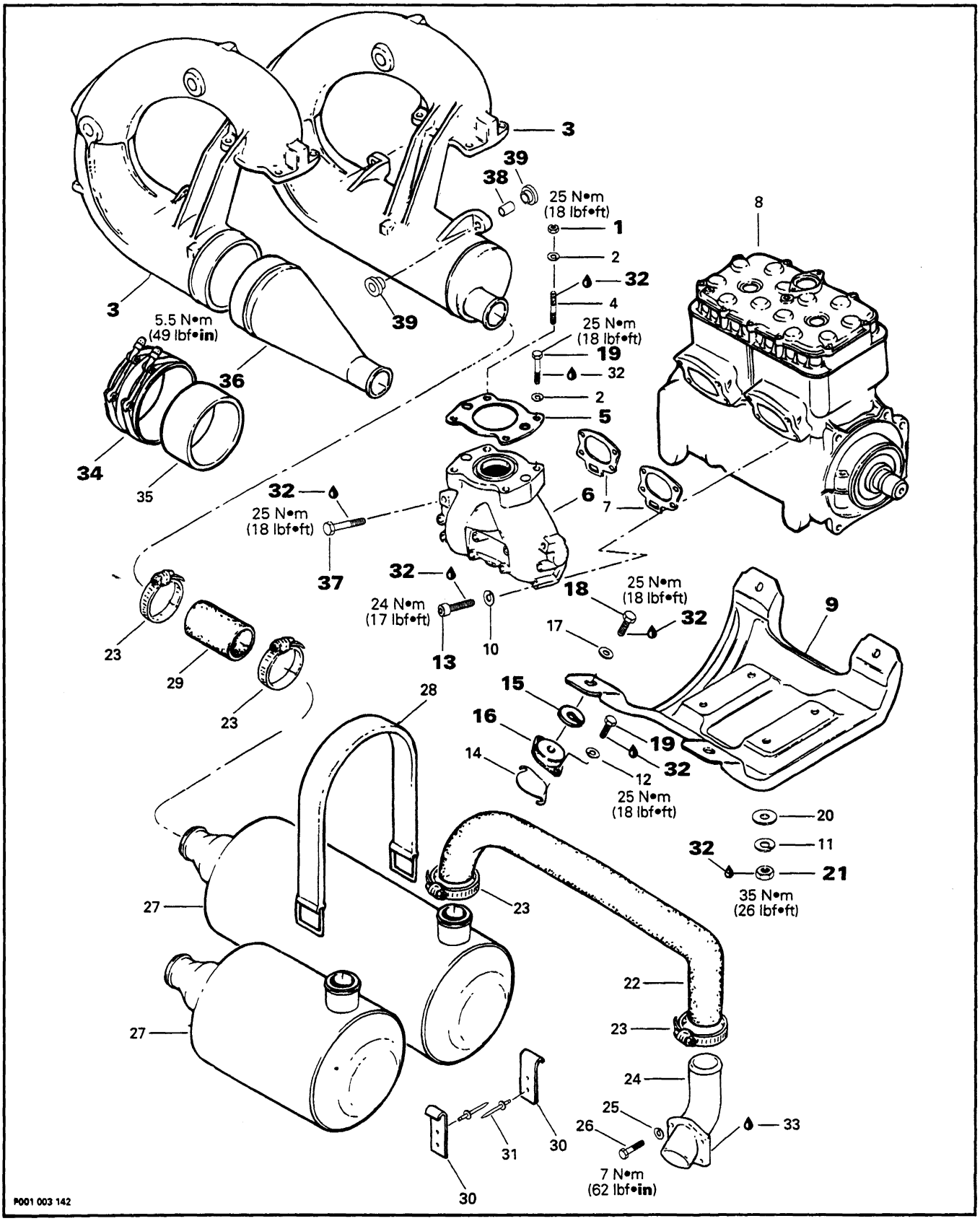
WARNING : Ventilate bilge at least two minutes prior to checking spark.

After engine has started, spray SEA-DOO lube through carburetor intake while engine is running.

Run engine until it reaches its normal operating temperature.

Make sure to supply water to cool engine.

CAUTION : Water must be supplied to cool engine with coupler hose (P / N 295 500 099).



COMPONENTS

1. *Hexagonal nut M8 (1)*
2. *Lock washer M8 (4)*
3. *Tuned pipe*
4. *Stud M8 x 26 (1)*
5. *Gasket*
6. *Exhaust manifold*
7. *Gasket (2)*
8. *Rotax engine*
9. *Engine support*
10. *Lock washer M8 (8)*
11. *Lock washer (4)*
12. *Lock washer M8 (8)*
13. *Allen screw M8 x 75 (8)*
14. *Shim 0.40 mm (0.016 in)*
    Shim 1.40 mm (0.055 in)
15. *Shim 0.40 mm (0.016 in)*
    Shim 1.30 mm (0.051 in)
16. *Rubber mount (4)*
17. *Flat washer 8 mm (4)*
18. *Hexagonal screw M8 x 20 (4)*
19. *Hexagonal screw M8 x 30 (11)*
20. *Flat washer 10 mm (4)*
21. *Elastic stop nut M10 (4)*
22. *Formed hose*
23. *Tridon clamp (4)*
24. *Exhaust outlet*
25. *Flat washer 6 mm (4)*
26. *Allen screw M6 x 20 (4)*
27. *Muffler*
28. *Muffler strap*
29. *Exhaust hose*
30. *Strap clip (2)*
31. *Rivet 3/16 (4)*
32. *Loctite 242*
33. *Sealant Loctite 598 "Ultra Black"*
34. *Exhaust collar*
35. *Rubber strip*
36. *Exhaust cone*
37. *Hexagonal screw M8 x 35 (2)*
38. *Sleeve (2)*
39. *Rubber bushing (4)*

GENERAL

It is not necessary to remove engine from watercraft for TOP END nor PTO FLYWHEEL AND MAGNETO servicing. However engine removal is necessary to repair BOTTOM END AND ROTARY VALVE.

REMOVAL FROM WATERCRAFT

In order to remove engine from watercraft proceed as follows.

Propulsion System

To withdraw jet pump unit ass'y, refer to PROPULSION AND DRIVE SYSTEMS, 08-01 then refer to **removal** and **overhaul**.

Electrical Connections

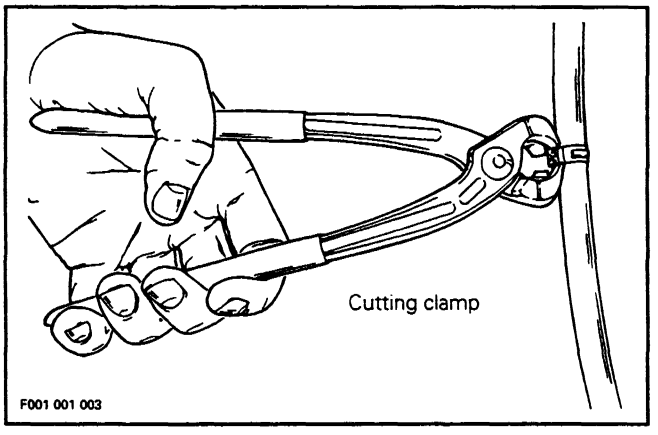
◆ **WARNING : Always disconnect starter or battery cables exactly in the specified order, black negative cable first. Electrolyte or fuel vapors can be present in the engine compartment and a spark might ignite them and possibly cause personal injuries. It is recommended to disconnect electrical connections prior to disconnecting fuel lines.**

First, remove **black** negative cable from battery, **then red** positive cable.

Remove battery holding straps then withdraw battery. Disconnect thermosensor wire and spark plug cables. Connect spark plug cables on grounding device.

Cooling and Exhaust Systems

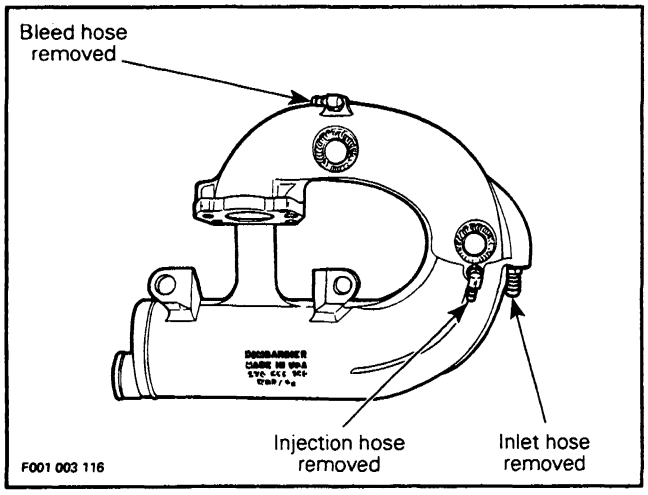
NOTE : To release a clamp from cooling hose / fuel line, use pliers (P / N 295 000 070).



NOTE : For XP model (5852) remove air vent tube support from body opening.

Disconnect hose from water outlet socket on engine. Disconnect inlet hose, injection hose and bleed hose from tuned pipe.

NOTE : On some models the exhaust collar holding exhaust cone and tuned pipe has to be removed first.



NOTE : The tuned pipe is held on exhaust manifold side by one or two retaining screws.

Remove tuned pipe retaining screws from exhaust manifold.

Remove tuned pipe mounting screws and nut ; slightly lift it to release nut as necessary. Withdraw tuned pipe in a forward and rotating movement. Be careful not to drop gasket located on exhaust manifold.

NOTE : For Explorer model, the exhaust manifold does not need to be removed.

Disconnect hose on exhaust manifold fitting. Remove fasteners taking care not to drop any part then withdraw manifold.

Intake System
(Except XP Model (5852) and Explorer Model (5820))

Loosen clamp of air intake silencer hose on carburetor side.

Pivot air intake silencer to rear of watercraft.

Remove both retaining screws of flame arrester support from cylinder head cover.

Remove screws holding flame arrester cover, then withdraw cover.

Intake System
(Explorer Model (5820))

Loosen clamp of air intake silencer hose on carburetor side.

Remove screw holding air intake silencer to front bracket and withdraw air silencer.

NOTE : For Explorer model, flame arrester system components do not need to be removed.

NOTE : Remove reverse cable retaining clamp from cylinder head cover to enable to move reverse cable as needed.

Intake System
(XP Model (5852))

Unlock retaining slides holding air intake silencer cover and remove cover.

Remove screws holding flame arrester retainer and air intake silencer base to flame arrester base. Remove air intake silencer base from watercraft.

Remove screws holding flame arrester base to the cylinder head cover.

Fuel System

Turn fuel valve to OFF position.

Disconnect fuel supply line from carburetor.

Disconnect fuel return line from carburetor.

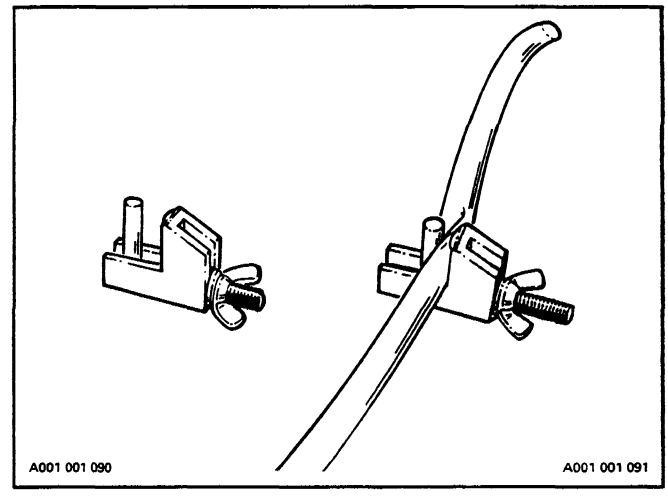
Disconnect throttle and choke cables from carburetor.

Remove screws from flame arrester base then withdraw base.

Pull out electrical box then open electrical box and disconnect wires coming from magneto housing.

Unscrew cable cap. Slide cap and compression grommet away then pull cable out of electrical box.

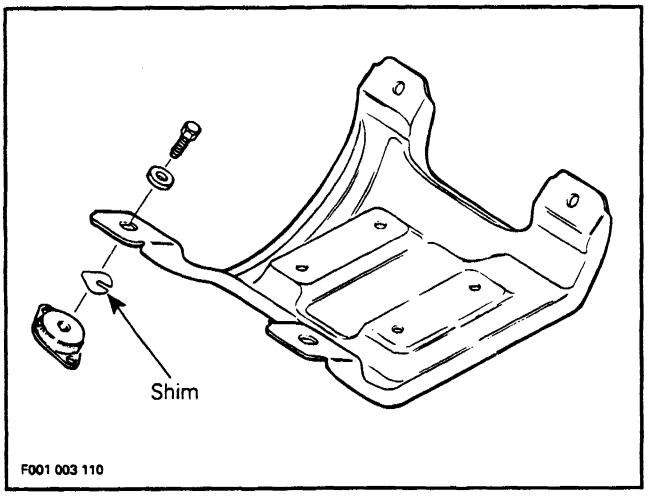
To prevent excessive oil spillage, use a hose pincher (P / N 295 000 076).



Install hose pincher on oil pump supply line then disconnect hose.

Remove engine support mount screws.

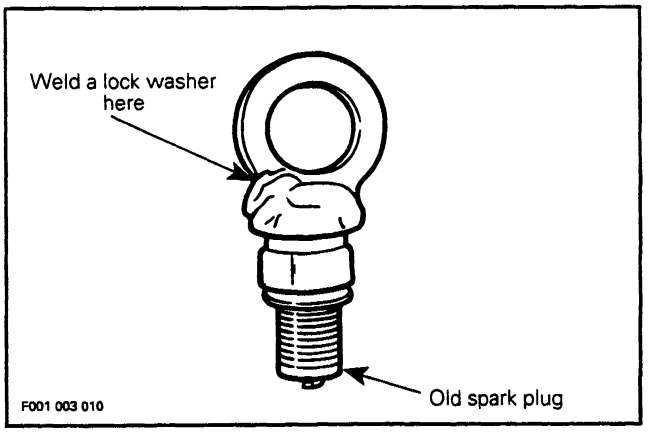
NOTE : Be careful when removing engine support mount screws, shims could have been installed between engine support and rubber mounts.



CAUTION : Be sure to indicate shims location for reinstallation. If shims are interchanged engine and jet pump alignment will be altered.

Engine can be easily lifted using the following suggested tools.

- Cut porcelain from two old spark plugs.
- Weld a lock washer approximately 20 mm diameter on each spark plug as shown.



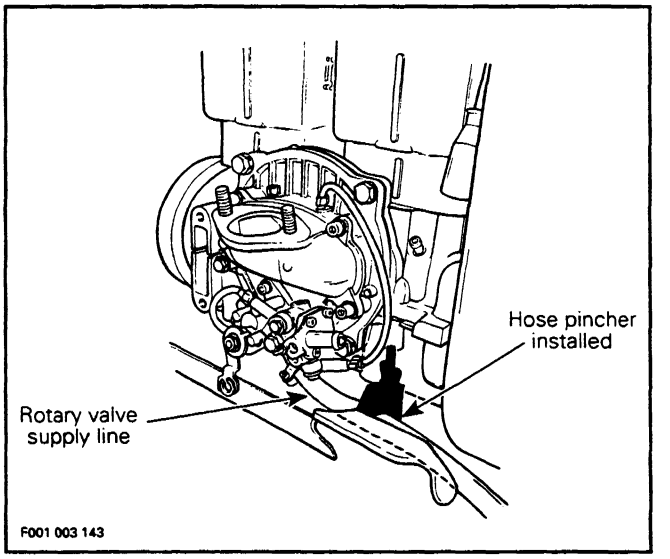
Remove spark plugs and replace by special tools.

Hook a sling into holes of special tools then using a chain block, a hoist or other suitable equipment, slowly lift engine.

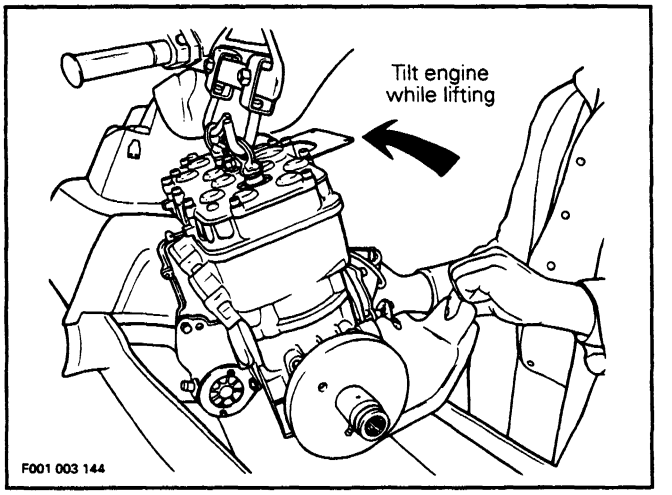
Lift it until rotary valve supply line is reachable. Install a hose pincher on the line, then disconnect.

Install hose pincher on rotary valve oil return line (on top of starter) then disconnect.

Disconnect red positive cable from starter post.



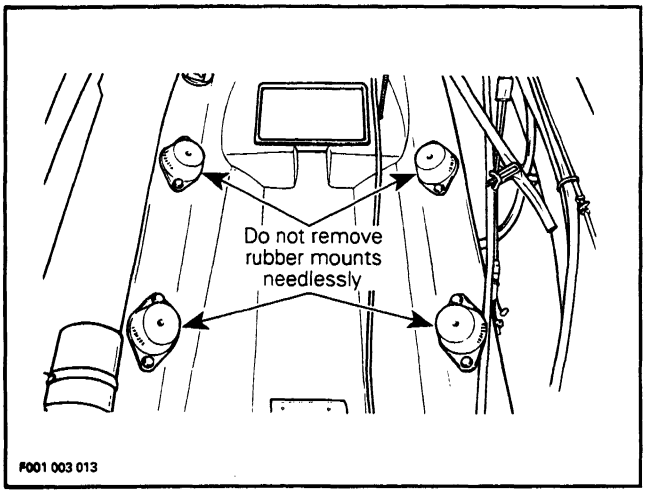
Carry on engine lifting until engine support reaches body opening then tilt engine so that it can completely leave watercraft.



CAUTION : Be careful not to scratch body with engine support or to hit any component.

15,16, Shim and Rubber Mount

Do not remove engine rubber mounts needlessly. They sit on shims which control engine / jet pump alignment. Alignment has been set at the factory. Always remove rubber mounts one at a time and reinstall each shim to its original location.



CAUTION : If shims with different thickness are interchanged, engine and jet pump will be disaligned.

NOTE : If shims location have been mixed up or whenever removing the engine always use engine / jet pump alignment tool (P / N 295 000 089) to check alignment.

CLEANING

Wipe off any spillage in bilge. Clean with a bilge cleaner.

Discard all gaskets and O-rings.

Clean external parts of engine.

INSTALLATION

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

16,19, Rubber Mount and Screw

Check tightness and condition of rubber mounts. If they have been removed, apply Loctite 242 (blue) (P / N 293 800 015) on screw threads. Torque screws to 25 N•m (18 lbf•ft).

CAUTION : Strict adherence to this torque is important to avoid damaging threads of aluminum insert in bilge.

9,21, Engine Support and Nut

Properly install support on crankcase so that rounded portion of support matches with MAG side of crankcase. Apply Loctite 242 (blue) (P / N 293 800 015) on threads then torque nuts in a criss-cross sequence to 35 N•m (26 lbf•ft).

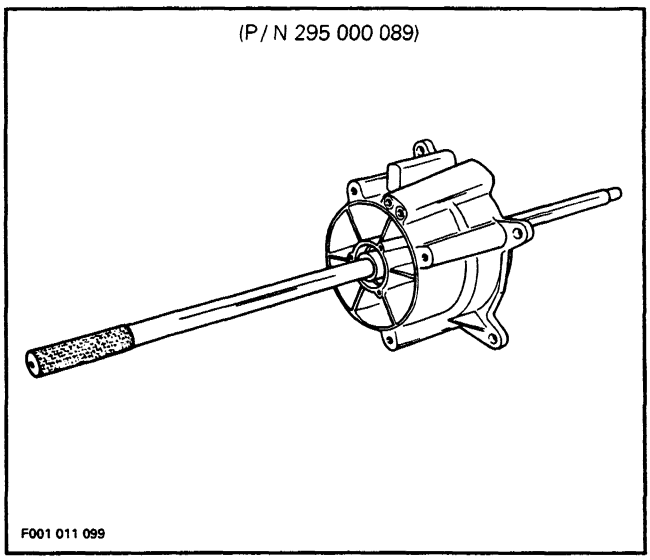
Rotary Valve Supply Line

Make sure to reinstall lines before completely lowering engine in bilge.

NOTE : If fuel line ends are damaged, cut damaged ends before reinstallation. For fuel line clamping, use special pliers (P / N 295 000 070).

Engine / Jet Pump Alignment

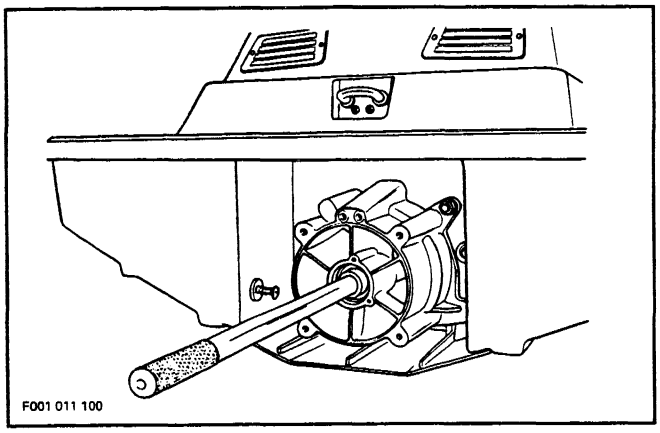
Alignment is necessary to eliminate possible vibration and / or damage to components. The engine / jet pump alignment tool (P / N 295 000 089) must be used.



CAUTION : Some watercraft have a shim between hull and pump, if shim has been removed ensure to reinstall it. If not install, engine and jet pump alignment will be altered.

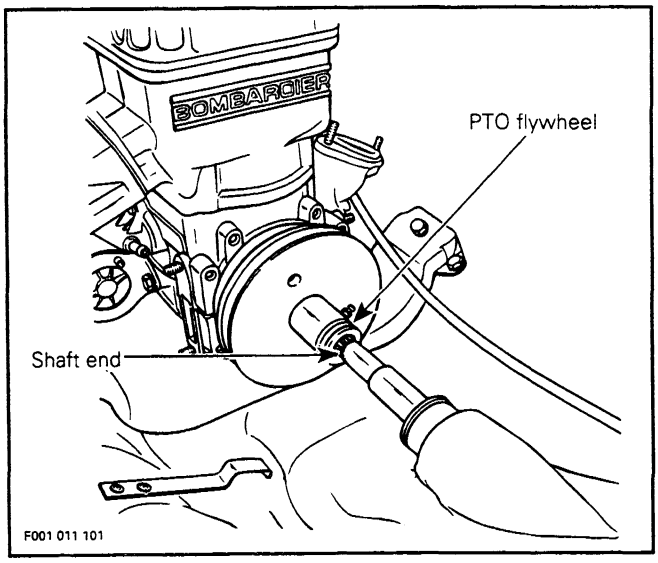
To verify alignment proceed as follows :

- Install housing on hull with four nuts.
- Slide shaft slowly through housing. Pay attention not to hit PTO flywheel.



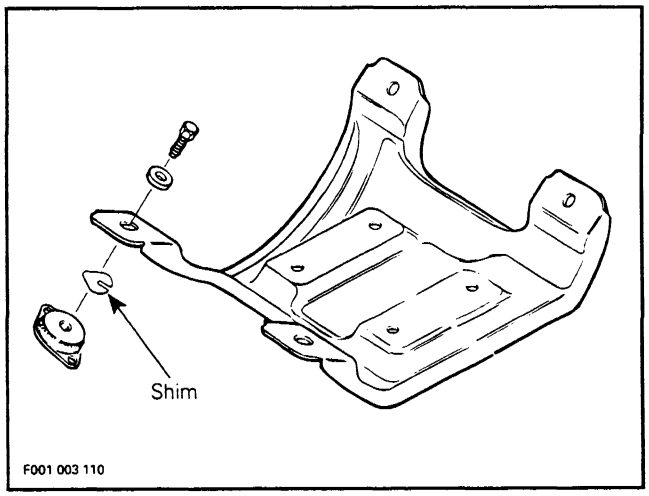
– Insert shaft end into PTO flywheel.

NOTE : The shaft should slide easily in flywheel splines if the alignment is correct.



If the alignment is incorrect loosen engine support screws to enable to align PTO flywheel with shaft end.

NOTE : Use shim(s) (P / N 270 000 024) (P / N 270 000 025) between engine support and rubber mounts to correct alignment.



CAUTION : Whenever shims are used to correct alignment, never install more then 6 mm (0.240 in) shim thickness. If alignment cannot be obtained verify for engine support bending.

18,32, Screw and Loctite 242

Apply Loctite 242 (P / N 293 800 015) on screw threads.

Retorque engine support screws to 25 N•m (18 lbf•ft) when procedure is completed.

NOTE : Whenever alignment tool is not utilized, apply SEA-DOO LUBE on its shaft and inside the housing to eliminate possible corrosion.

Electrical Connections

First, install **red** positive cable on starter post and torque nut to 6 N•m (53 lbf•**in**). Install **black** negative cable on starter mounting bolt apply Loctite 271 on threads torque to 22 N•m (16 lbf•ft) if removed. Apply Neopren Grease on connectors then cover with boot.

NOTE : Install red positive cable with a tie rap located on hull right side.

WARNING : Always connect red positive cable first then black ground cable last. Whenever connecting the red positive cable to the starter motor make sure the battery cables are disconnected to prevent electric shock.

Install cable coming from ignition housing, into electrical box. Connect wires making sure to match wire colors.

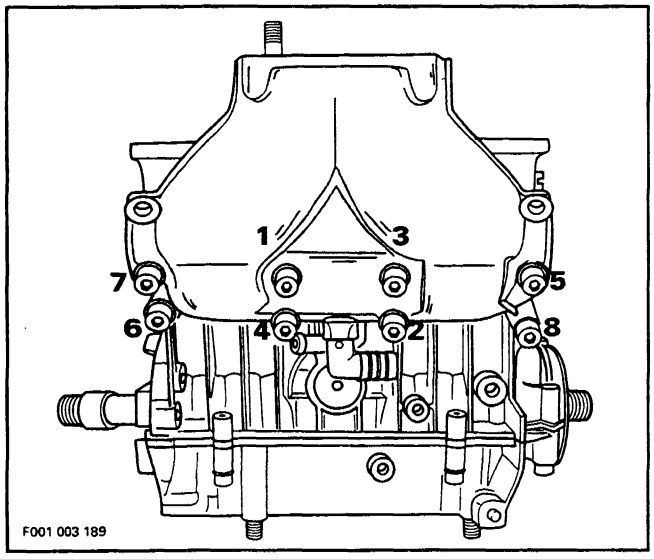
Install compression grommet and cap. It is strongly recommended to use a flare nut wrench to properly tighten cap.

Firmly tighten cap. To ensure water-tight mounting, pull cable ; it must not slide through grommet. Retighten as necessary.

6,13, Exhaust Manifold, Screw

Apply Loctite 242 (P / N 293 800 015) on screw threads.

Install and torque screws to 24 N•m (17 lbf•ft) as per following illustrated sequence.



All Models

1,3,5,37,38,39, Nut, Tuned Pipe, Gasket, Screw, Sleeve and Rubber Bushing

Make sure that gasket is properly located on exhaust manifold prior to finalizing pipe installation.

Ensure rubber bushings and sleeve are not damaged and are properly installed into tune pipe support(s).

▼CAUTION : Damage to bushings and / or sleeve will eventually cause stress to tune pipe and may cause cracking.

Apply Loctite 242 on stud and retaining screw threads. Hand-tighten nut and top screws only and assure that tuned pipe bushing(s) rests against manifold.

Pre-torque nut and top screws in a criss-cross sequence to about 20 N•m (15 lbf•ft).

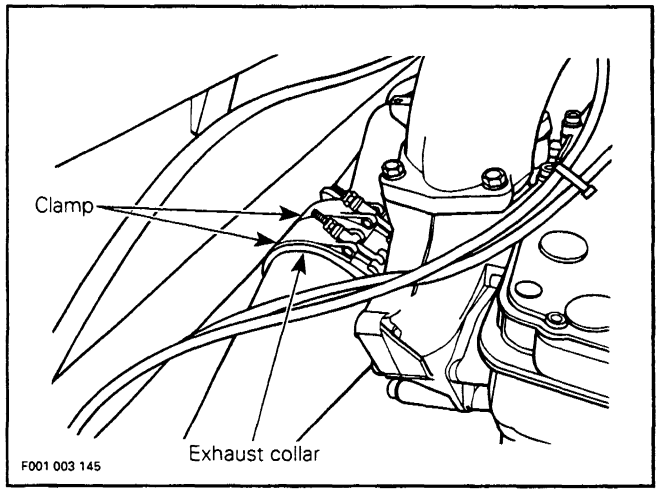
Torque side retaining screw(s) to 25 N•m (18 lbf•ft) and then torque nut and top screws in a criss-cross sequence to 25 N•m (18 lbf•ft).

▼CAUTION : Make sure that a sufficient gap is present between hull and tuned pipe.

5807, 5820, 5852 and 5861 Models

34,36, Exhaust Cone and Exhaust Collar

Install exhaust cone to tuned pipe with exhaust collar. Position exhaust collar as illustrated. Do not tighten collar yet.



With hose removed, align cone outlet with muffler inlet.

NOTE : Due to exhaust cone angle, it may have to be rotated to obtain alignment.

Push cone until it touches tuned pipe, then tighten exhaust collar clamps and torque to 5.5 N•m (49 lbf•**in**).

▼CAUTION : There must be no gap between exhaust cone and tuned pipe.

NOTE : Exhaust collar clamps should be tighten alternatively to assure no leakage and to obtain specified torque.

All Models

Final Inspection

Check throttle cable condition and lubricate cable with SEA-DOO LUBE. After its installation, properly adjust and synchronize oil injection pump as specified in OIL SYSTEM, 06-02.

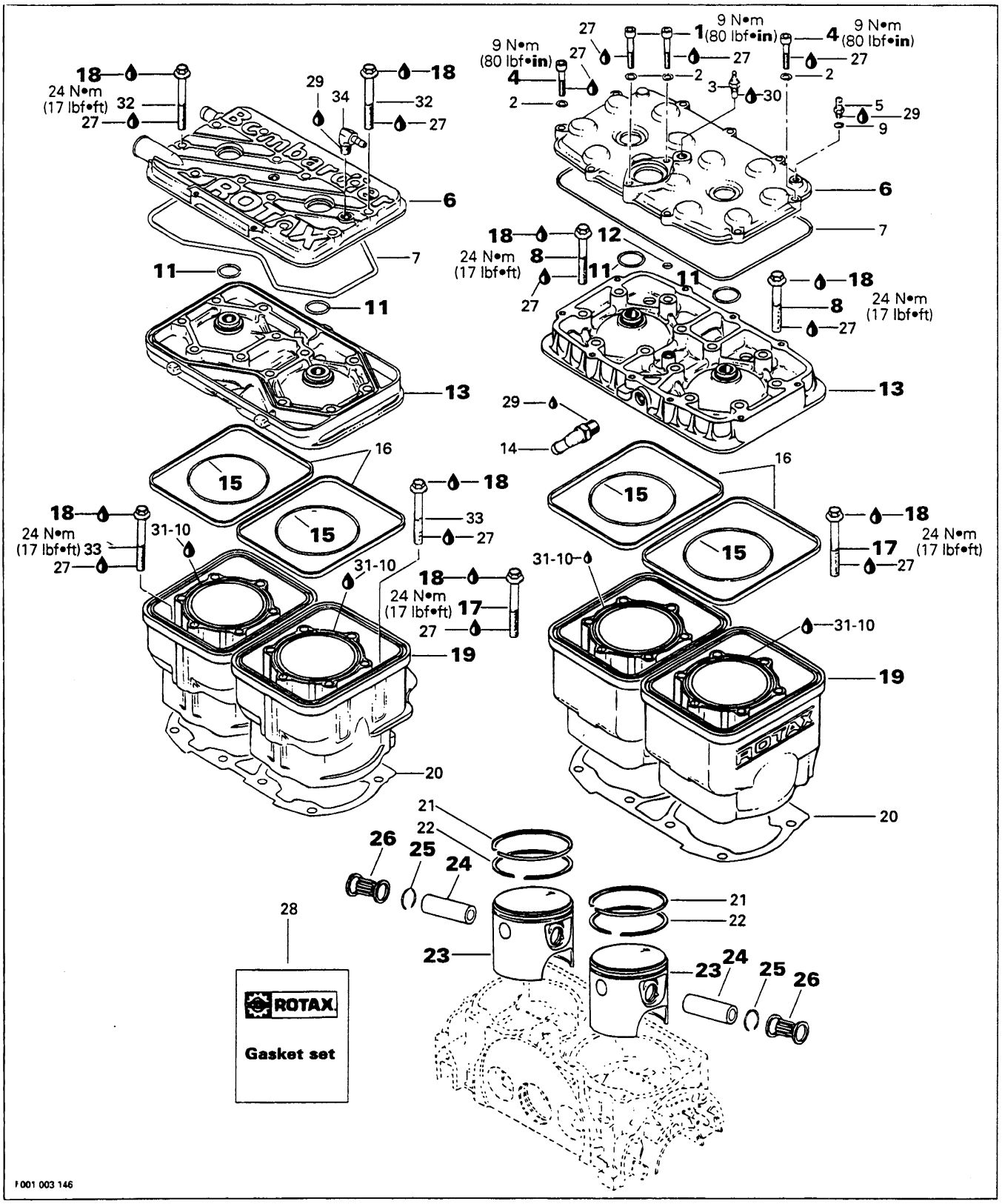
Bleed oil injection pump.

Pressure test fuel system, refer to FUEL SYSTEM 05-03 and look for **fuel system pressurization.** Secure vent line to the battery. Ensure vent line is not kinked or obstructed. Verify all connections and hoses condition.

Run engine and ensure there is no leakage.

▼CAUTION : Water must be supplied to cool engine with coupler hose (P / N 295 500 099).

TOP END



COMPONENTS

1. *Allen screw M6 x 35 (2)*
2. *Lock washer (11)*
3. *Sensor switch*
4. *Allen screw M6 x 25 (9)*
5. *Hose nipple*
6. *Cylinder head cover*
7. *O-ring*
8. *Hexagonal screw M8 x 55 (12)*
9. *Sealing ring*
10. *Loctite 515*
11. *O-ring (2)*
12. *O-ring*
13. *Cylinder head*
14. *Hose nipple (2)*
15. *O-ring (2)*
16. *O-ring (2)*
17. *Hexagonal screw M8 x 70 (8)*
18. *Synthetic grease*
19. *Cylinder with sleeve (2)*
20. *Cylinder gasket*
21. *Semi-trapez ring (2)*
22. *Rectangular ring (2)*
23. *Piston (2)*
24. *Piston pin (2)*
25. *Circlip (4)*
26. *Needle bearing (2)*
27. *Loctite 242*
28. *Gasket set*
29. *Loctite PST 592*
30. *Loctite 515*
31. *Loctite primer N*
32. *Hexagonal screw (12)*
33. *Hexagonal screw (8)*
34. *Elbow fitting*

GENERAL

When repairing a seized engine, connecting rods should be checked for straightness and crankshaft for deflection / misalignment. Refer to BOTTOM END for procedures.

DISASSEMBLY

In order to repair engine top end proceed as follows :

Electrical Connections

Refer to ENGINE REMOVAL AND INSTALLATION 03-02 then look for **electrical connections**.

Exhaust System

To withdraw tuned pipe, refer to ENGINE REMOVAL AND INSTALLATION 03-02 then look for **cooling and exhaust systems**.

Intake System (Except XP Model (5852) and Explorer Model (5820))

Loosen clamp of intake silencer hose on carburetor side.

Pivot intake silencer to rear of watercraft.

Remove both retaining screws of flame arrester support from cylinder head cover.

Remove screws holding flame arrester cover, then withdraw cover.

Remove throttle and choke cables from flame arrester base.

Remove screws from flame arrester base, then withdraw base.

Intake System (Explorer Model (5820))

Loosen clamp of air intake silencer hose on carburetor side.

Remove screw holding air intake silencer to front bracket and withdraw air silencer.

NOTE : Remove reverse cable retaining clamp from engine cover to enable to move reverse cable as needed.

Remove both retaining screws of flame arrester support from cylinder head cover.

Remove screws holding flame arrester cover, then withdraw cover.

Remove throttle and choke cables from flame arrester base.

Remove screws from flame arrester base, then withdraw base.

Intake System (XP Model (5852))

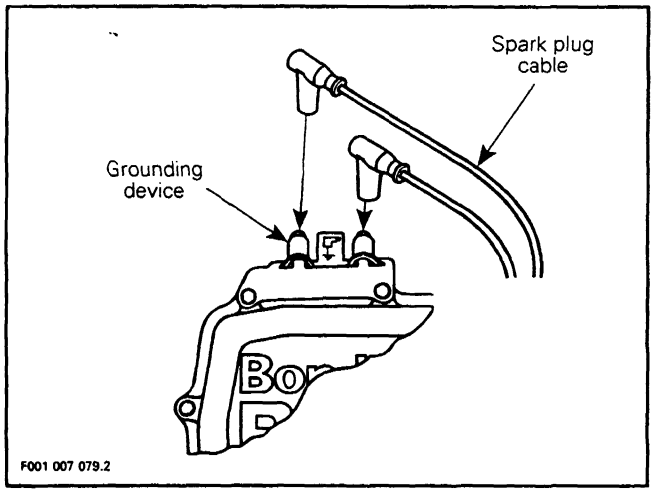
Unlock retaining slides holding air intake silencer cover and remove cover.

Remove screws holding flame arrester retainer and air intake silencer base to flame arrester base. Remove air intake silencer base from watercraft.

Remove screws holding flame arrester base to the cylinder head cover.

Remove throttle and choke cables from flame arrester base.

Remove screws from flame arrester base, then withdraw base.



Remove cylinder head cover.

NOTE : With engine model 657 cylinder head cover screws secure cylinder head also.

If shells, sand, salt or any other particles are present in cylinder head, clean with a vacuum cleaner.

Remove screws then cylinder head.

If shells, sand, salt water or any other particles are present in cylinder cooling jacket, clean with a vacuum cleaner.

Remove screws then pull cylinder up, being careful that connecting rod does not hit crankcase edge.

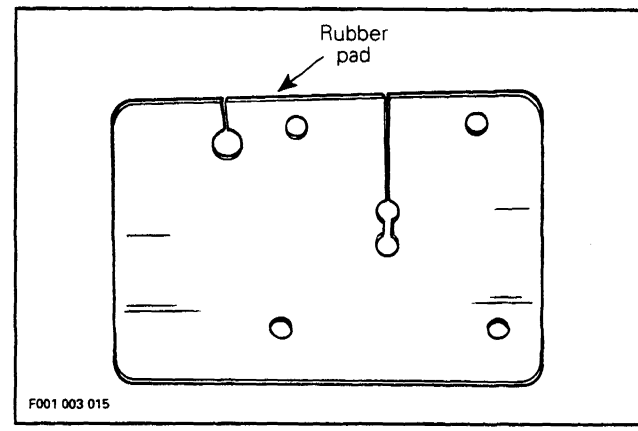
WARNING : If screws need to be heated for removal when engine is in watercraft, fuel system pressurization must be done first. Do not use open flame ; use a heat gun. An explosion might occur since vapors can be present in engine compartment.

NOTE : Even if only one cylinder needs repair, both cylinders should be lifted to allow one-piece cylinder base gasket replacement.

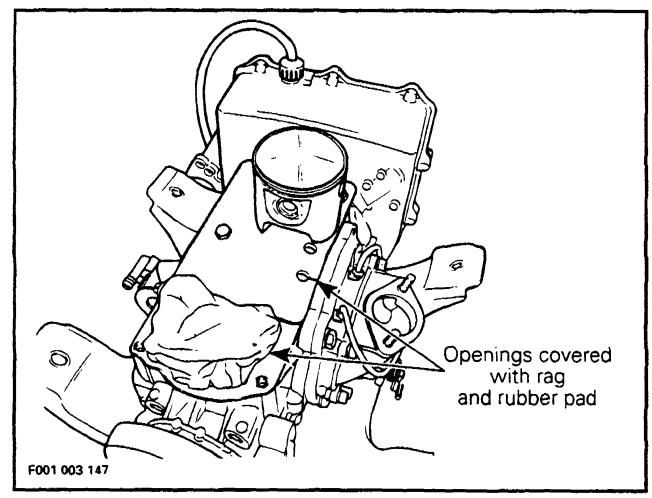
23,24,25,26, Piston, Piston Pin, Circlip and Needle Bearing (cageless)

CAUTION : These engines design feature cageless piston pin bearing. At piston disassembly, rollers may fall out, use rubber pad to prevent rollers from dropping in crankcase.

Bring piston to Top Dead Center and install rubber pad (P / N 295 000 079) over crankcase opening. Secure with screws. Lower piston until it sits on pad.

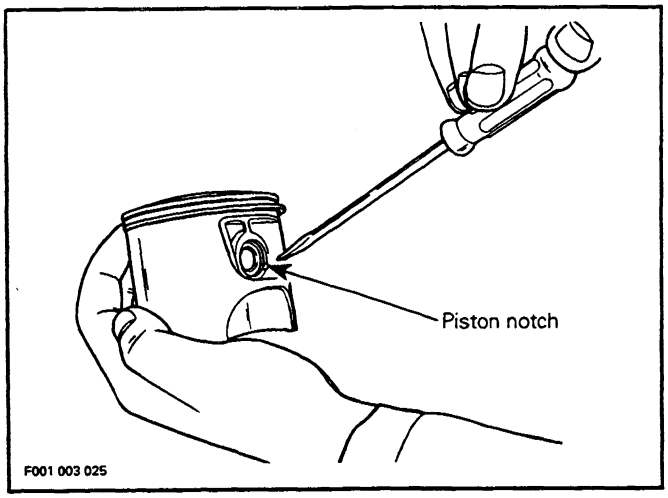


If other cylinder has been removed, completely cover its opening with a clean rag.



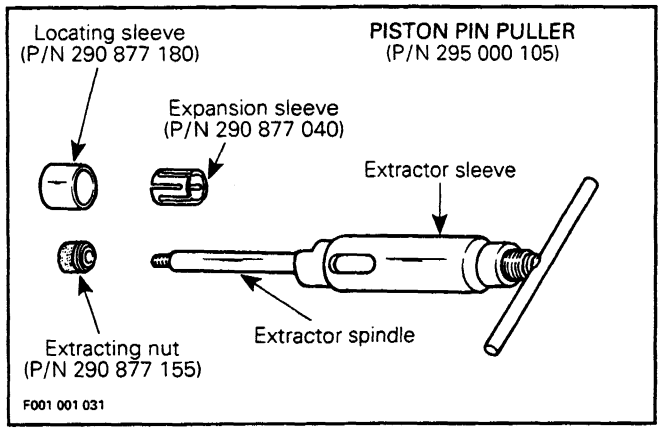
To remove circlip, insert a pointed tool in piston notch then pry it out and discard.

WARNING : Always wear safety glasses when removing piston circlips.

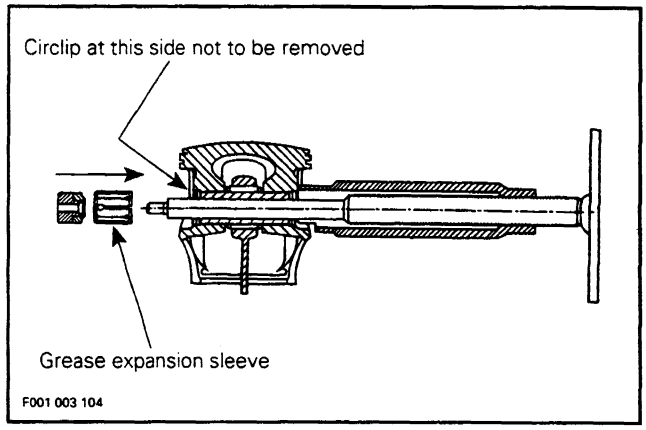


To extract piston pin, use either piston pin puller (P / N 295 000 105) or (P / N 290 877 092) (657 engine) as follows :

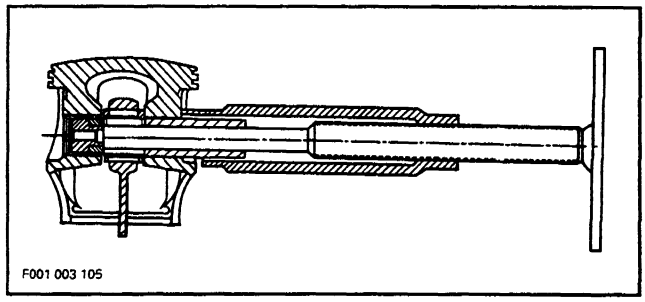
- Fully thread on puller handle.
- Insert extractor spindle into the piston pin.
- Slide the expansion sleeve (P / N 290 877 040) onto the spindle.
- Screw in extractor nut (P / N 290 877 155) with the movable extracting ring towards spindle.



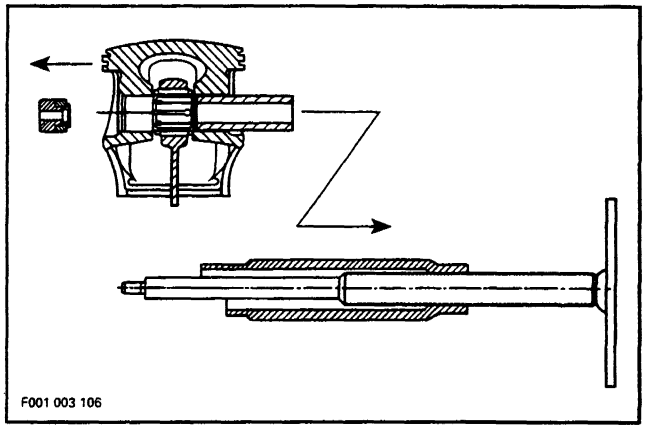
- Firmly hold puller and rotate handle to pull piston pin.



- By turning the spindle, pull out piston pin until it is completely removed from bearing.



- Rotate spindle until extracting nut can be removed.
- Remove spindle and extractor sleeve from piston pin.
- Carefully remove the piston.



- The needles, thrust washers and the expansion sleeve remain in the connecting rod bore and may be used again.

REMOVAL OF NEEDLE BEARING

To remove needles with the thrust washers from the connecting rod bore, push them together with the expansion sleeve into the locating sleeve (P / N 290 877 180) using any suitable pusher 21 mm (.826 in) dia. (587 engine) and suitable pusher 23 mm (.905 in) dia. (657 engine).

▼ **CAUTION : Recover rollers, make sure that 31 rollers are found for each piston on 587 engine and 34 rollers for each piston on 657 engine.**

CLEANING

Discard all gaskets and O-rings.

Clean all metal components in a solvent.

Clean water passages and make sure they are not clogged.

Remove carbon deposits from cylinder exhaust port, cylinder head and piston dome.

Clean piston ring grooves with a groove cleaner tool, or a piece of broken ring.

INSPECTION

Visually inspect all parts for corrosion damage.

Inspect piston for damage. Light scratches can be sanded with a fine sand paper.

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.

The inspection of engine top end should include the following measurements.

MEASUREMENTS 587 ENGINE	TOLERANCES		
	NEW PARTS (min.)	(max.)	WEAR LIMIT
Cylinder Taper	N.A.	N.A.	0.08 mm (.0031 in)
Cylinder Out of Round	N.A.	N.A.	0.05 mm (.0020 in)
Cylinder / Piston Clearance	0.05 mm (.002 in)	0.07 mm (.0028 in)	0.20 mm (.008 in)
Ring / Piston Groove Clearance	0.05 mm (.002 in)	0.08 mm (.003 in)	0.20 mm (.008 in)
Ring End Gap	0.25 mm (.010 in)	0.40 mm (.016 in)	1.0 mm (.039 in)

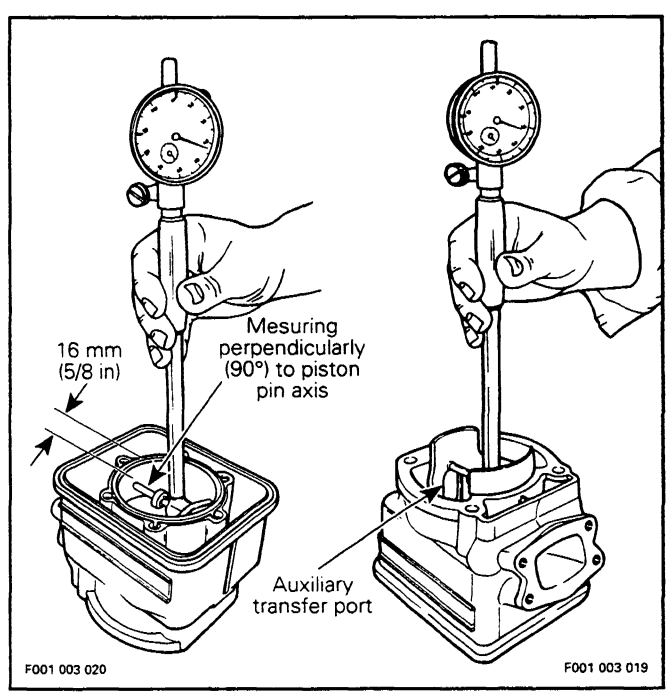
MEASUREMENTS 657 ENGINE	TOLERANCES		
	NEW PARTS (min.)	(max.)	WEAR LIMIT
Cylinder Taper	N.A.	N.A.	0.08 mm (.0031 in)
Cylinder Out of Round	N.A.	N.A.	0.05 mm (.0020 in)
Cylinder / Piston Clearance	0.06 mm (.0024 in)	0.09 mm (.0035 in)	0.15 mm (.006 in)
Ring / Piston Groove Clearance	0.05 mm (.002 in)	0.08 mm (.003 in)	0.20 mm (.008 in)
Ring End Gap	0.25 mm (.010 in)	0.40 mm (.016 in)	1.0 mm (.039 in)

NOTE : Replacement cylinder sleeves are available if necessary. Consult a specialized shop for installation.

NOTE : 0.25 and 0.5 mm oversize piston and rings are available if necessary.

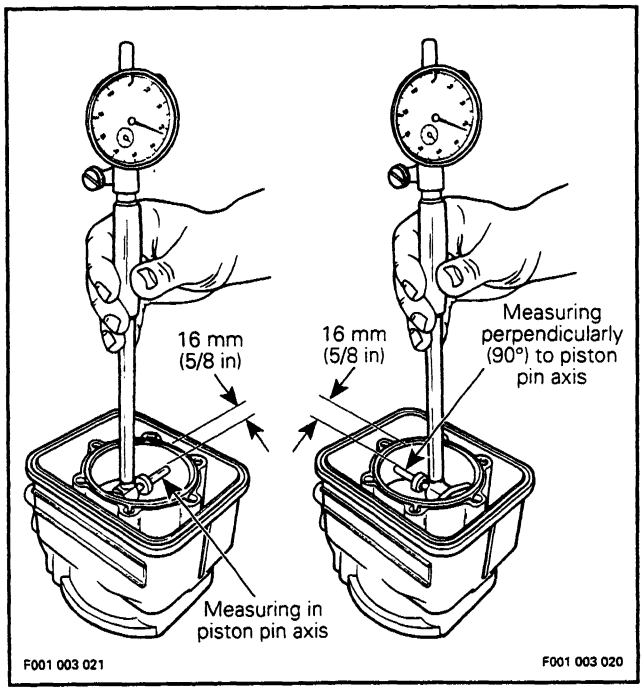
Cylinder Taper

Using a cylinder bore gauge, measure cylinder diameter 16 mm (5/8 in) from top of cylinder to just below auxiliary transfer port, facing exhaust port. If the difference between readings exceed specification, cylinder should be rebored and honed or replaced.



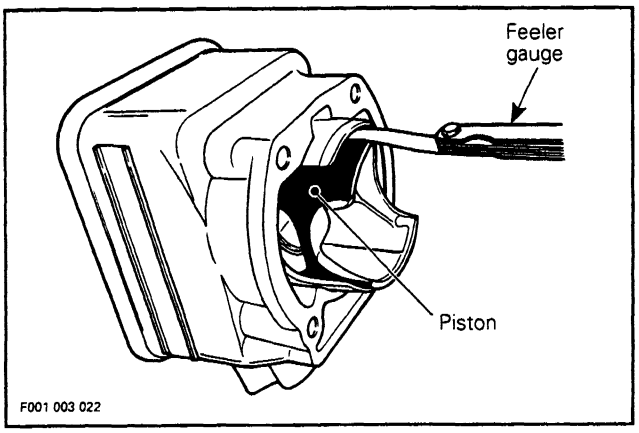
Cylinder Out of Round

Using a cylinder bore gauge, measure cylinder diameter 16 mm (5/8 in) from top of cylinder. Measure diameter in piston pin axis direction then perpendicularly (90°) to it. If the difference between readings exceed specification, cylinder should be rebored and honed or replaced.



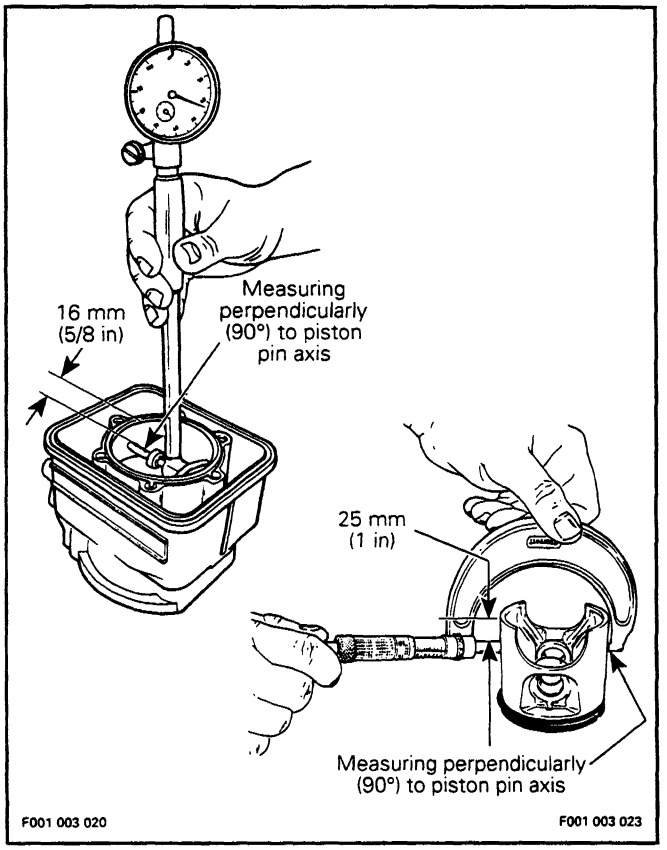
Cylinder / Piston Clearance

Clearance can be quickly checked with a long feeler gauge. Insert feeler gauge in cylinder then slide piston (without piston rings installed) into cylinder as shown in the following illustration.



Or, to accurately determine piston to cylinder wall clearance. Measure piston 25 mm (1 in) below skirt end perpendicularly (90°) to piston pin.

Measure cylinder 16 mm (5/8 in) below its top edge.

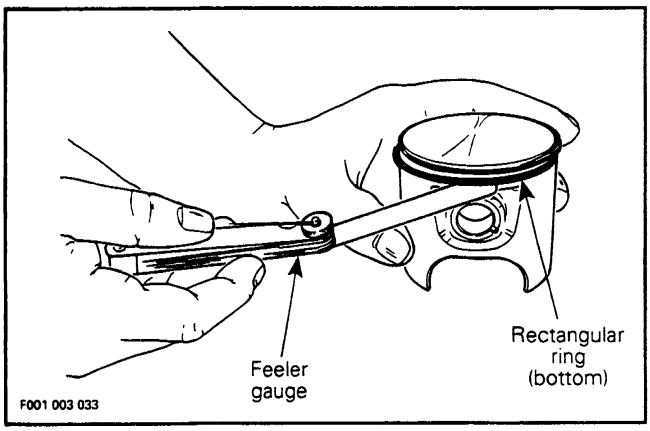


The difference between these two measurements should be within specified tolerance.

Ring / Piston Groove Clearance

Using a feeler gauge, check clearance between rectangular ring and groove. If clearance exceeds specified tolerance, replace piston.

NOTE : Ring / piston groove clearance can be correctly measured only on rectangular ring which is bottom ring.

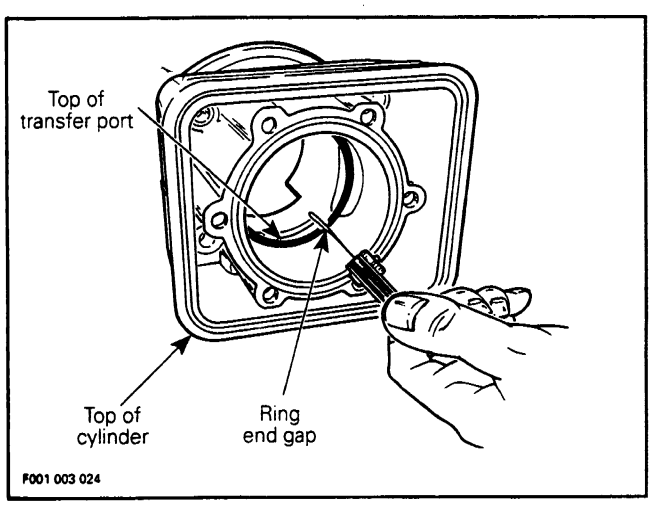


Ring End Gap

Position ring just above transfer ports, in relation with top of cylinder.

NOTE : In order to correctly position ring in cylinder, use piston as a pusher.

Using a feeler gauge, check ring end gap. If gap exceeds specified tolerance, rings should be replaced.



ASSEMBLY

Assembly is essentially the reverse of disassembly procedures. However pay particular attention to the following.

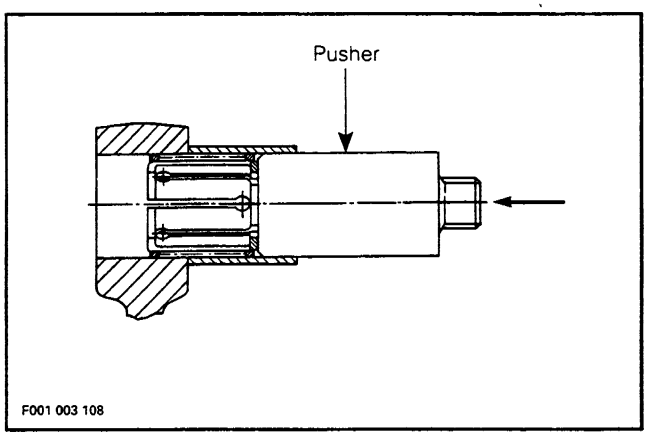
23,24,26, Piston, Piston Pin and Roller Bearing

At assembly, locate piston so that intake hole is on rotary valve side (587 engine).

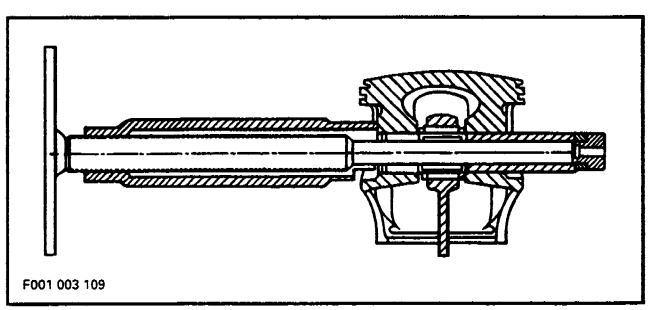
Carefully cover crankcase opening as for disassembly.

To install roller bearing and piston pin use either piston pin puller (P / N 295 000 105) or (P / N 290 877 092), proceed as follows :

- Replacement bearings are held in place by a locating sleeve outside and two plastic cage halves inside.
- Push roller bearing together with inner halves out of the locating sleeve into the connecting rod bore.
- Use any suitable pusher 21 mm (.826 in) dia. (587 engine) and suitable pusher 23 mm (.905 in) dia. (657 engine) as a tool. Make sure thrust washers are present each side of rollers.



- Insert piston pin into piston until it comes flush with inward edge of piston hub.
- Warm piston to approximately 50-60°C (122-140°F) and install it over connecting rod.
- Insert extractor spindle into the piston pin, screw on extracting nut.
- Rotate handle to pull piston pin carefully into the piston.

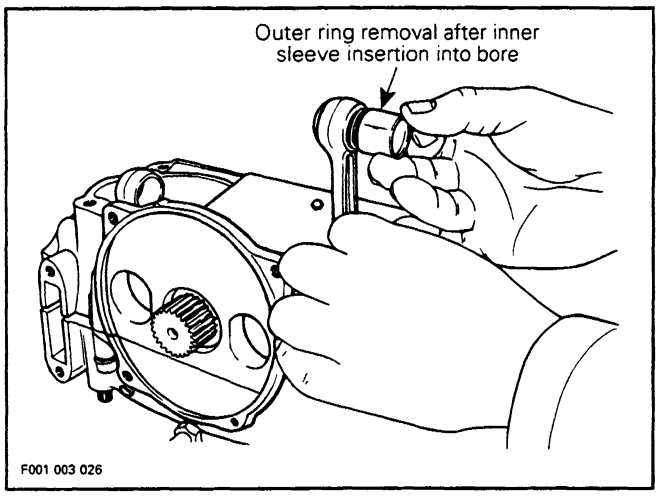


Plastic Mounting Device Method

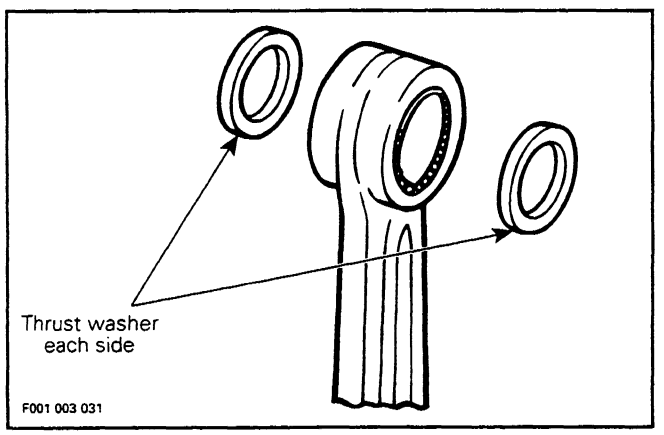
As an alternate method when no service tool is available proceed as follows :

Replacement roller bearings are delivered in a convenient plastic mounting device. For installation, proceed as follows :

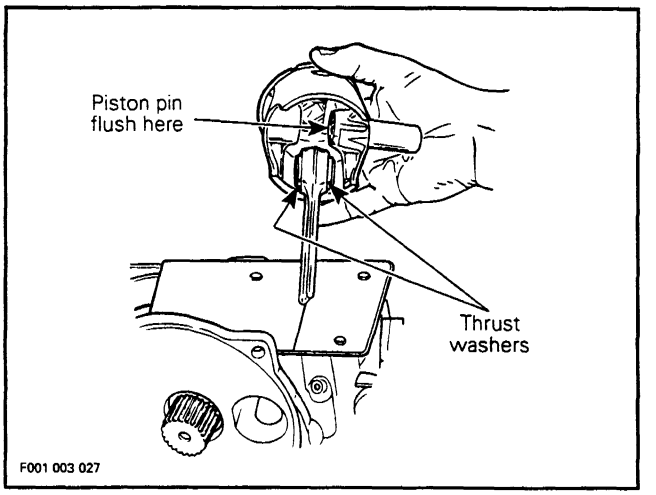
- Align replacement roller bearing with connecting rod bore.
- Carefully push inner plastic sleeve into connecting rod bore ; outer plastic ring will release rollers.



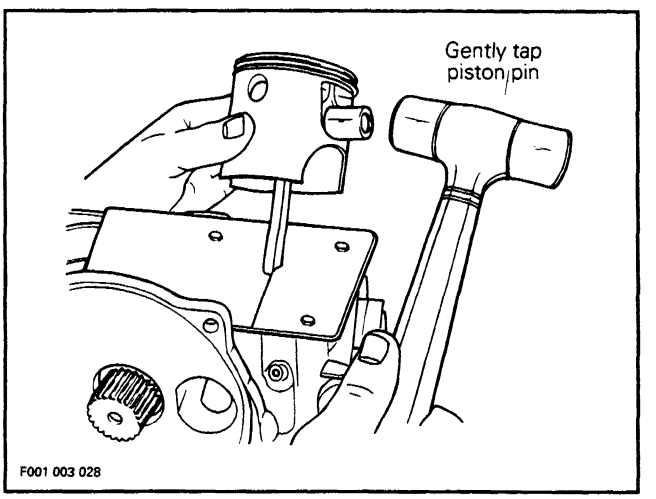
- Make sure thrust washers are present each side of rollers.



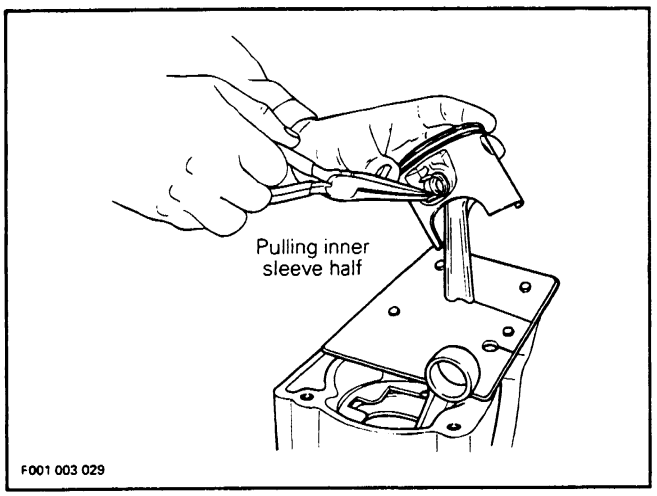
- Insert piston pin into piston until it comes flush with inward edge of piston hub.



- Place piston over connecting rod and align bores, then gently tap piston pin with a fiber hammer to push out inner plastic ring on opposite side. Support piston from opposite side.



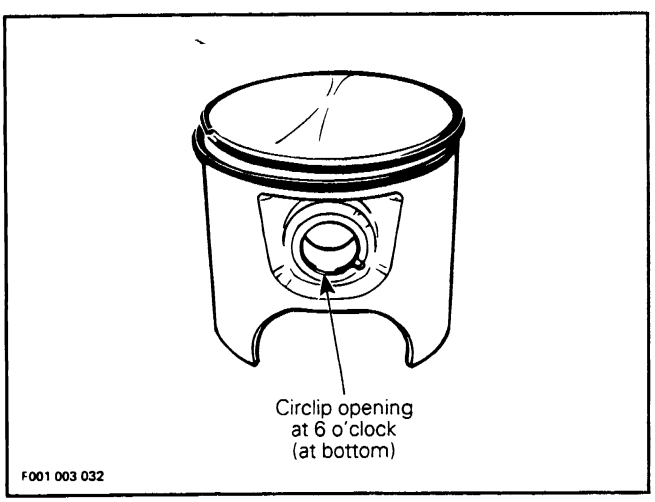
- As necessary, pull halves of inner sleeve with long nose pliers.



25, Circlip

Secure remaining circlip taking into consideration the following.

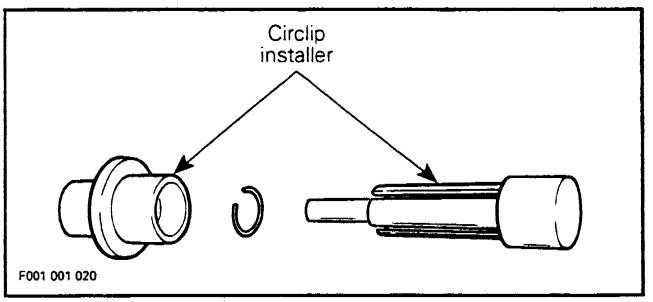
▼CAUTION : To minimize the stress on the circlips, install them so that their openings are located at 6 o'clock (at bottom).



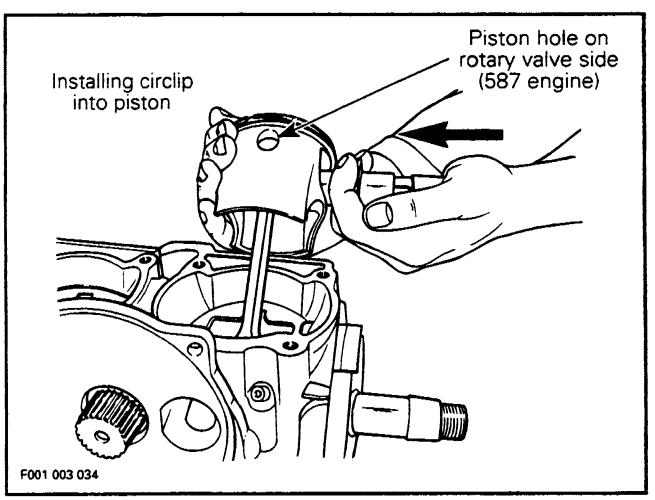
◆ WARNING : Always wear safety glasses when installing piston circlips.

▼CAUTION : Always use new circlips. At installation, take care not to deform them. Overstressed circlips will come loose and will damage engine. Circlips must not move freely after installation, replace if circlip rotates after installation.

To easily insert circlip into piston, use circlip installer (P / N 295 000 077) (587 engine) or (P / N 290 877 016) for 657 engine.

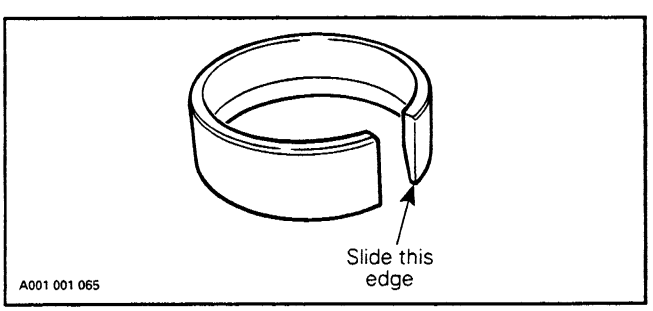


- Remove pusher from tool then insert circlip into its bore.
- Reinstall pusher into tool and push until circlip comes in end of tool.
- Position end of tool against piston pin opening.
- Firmly hold piston against tool and push tool pusher to insert circlip into its groove.



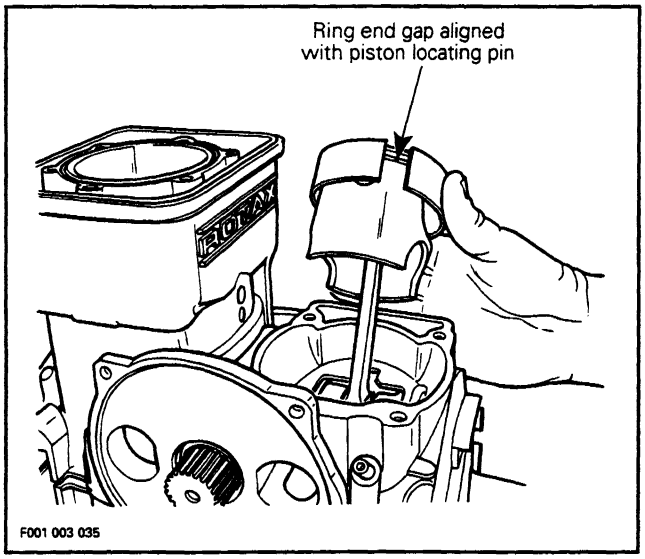
19, Cylinder

To easily slide cylinder over piston, install ring compressor (P / N 290 876 972) over rings.

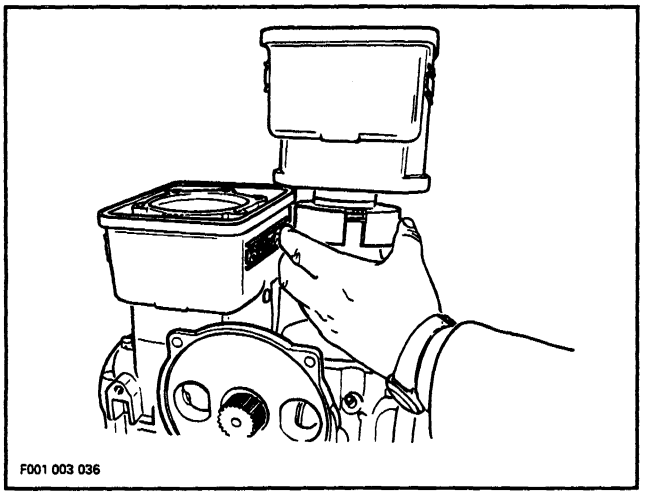


○ NOTE : Ring compressor will not fit on oversize piston / rings.

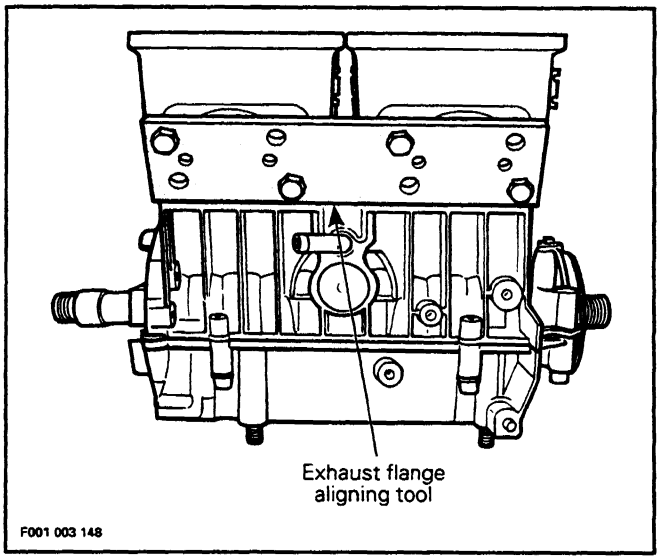
Make sure to align ring end gap with piston locating pin. Slide tool over rings.

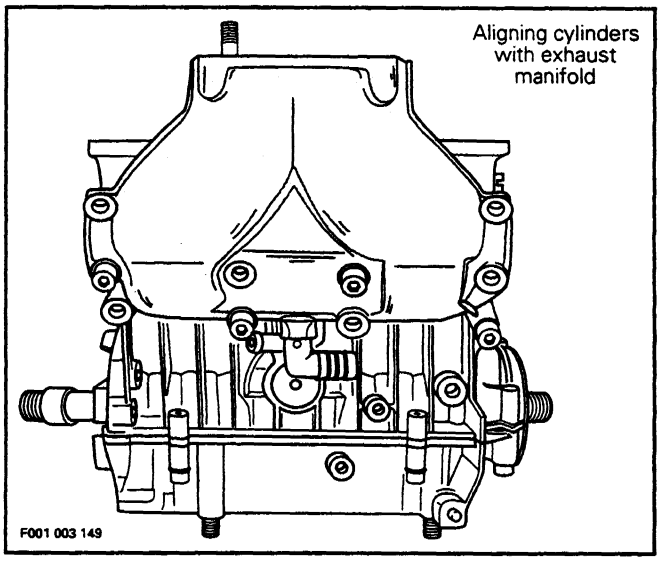


Install cylinder gasket and slide cylinder over piston.



When reassembling cylinders to crankcase, it is important to have them properly aligned so that exhaust flanges properly match up with exhaust manifold. Use aligning tool (P / N 290 876 902) or exhaust manifold itself.

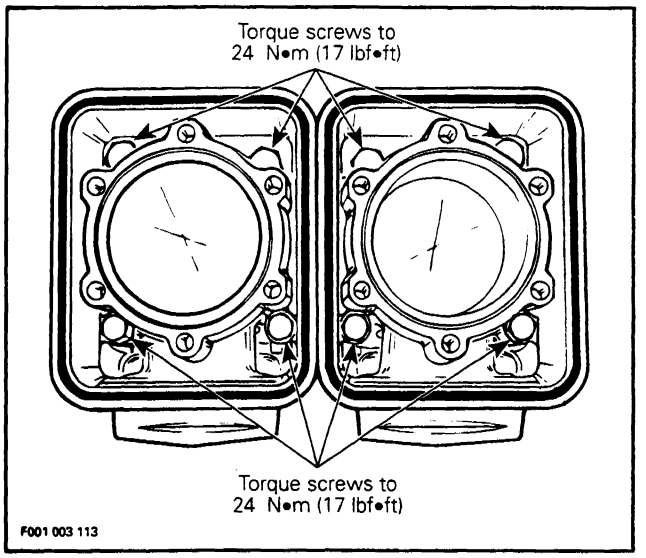




NOTE : If manifold has been used for exhaust flanges alignment, remove it for engine installation in watercraft. Except Explorer model (5820).

17,18,19, Screw, Grease and Cylinder

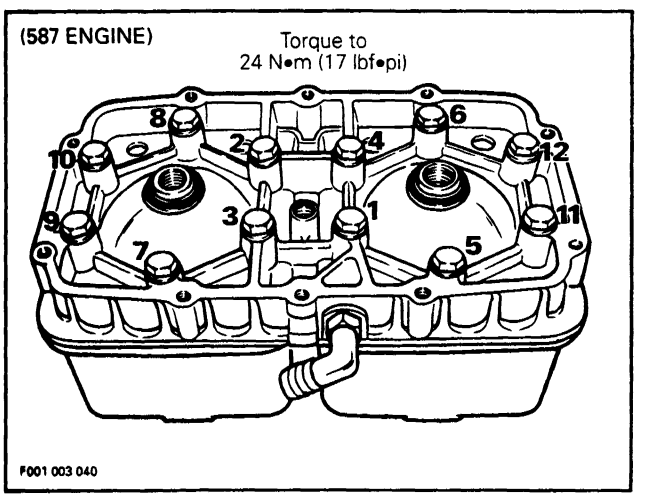
Apply synthetic grease (P / N 293 550 010) below screw head. Apply Loctite 242 (P / N 293 800 015) on screw threads. Install and torque screws in a criss-cross sequence for each cylinder to 24 N•m (17 lbf•ft).



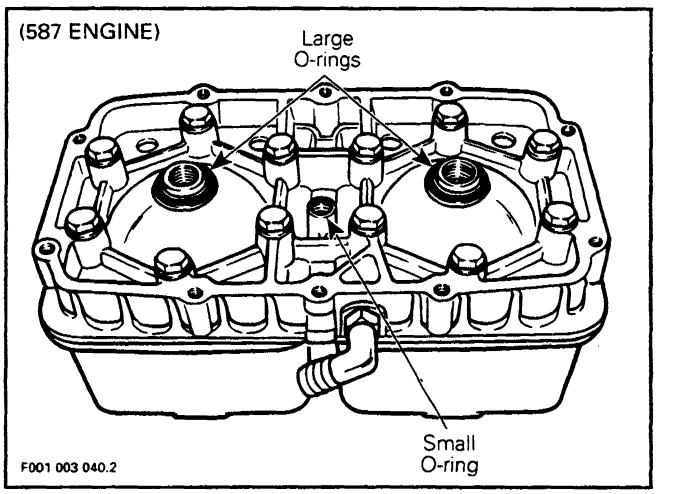
8,11,12,13,15, Screw, O-ring and Cylinder Head (587 Engine)

Apply synthetic grease (P / N 293 550 010) below screw head.

Apply Loctite 515 Gasket Eliminator (P / N 293 800 007) in cylinder sleeve O-ring groove. Apply Loctite 242 (P / N 293 800 015) on screw threads. Install and torque screws to 24 N•m (17 lbf•ft) as per following illustrated sequence.



Make sure to install large O-rings around spark plugs holes and small O-ring where shown.

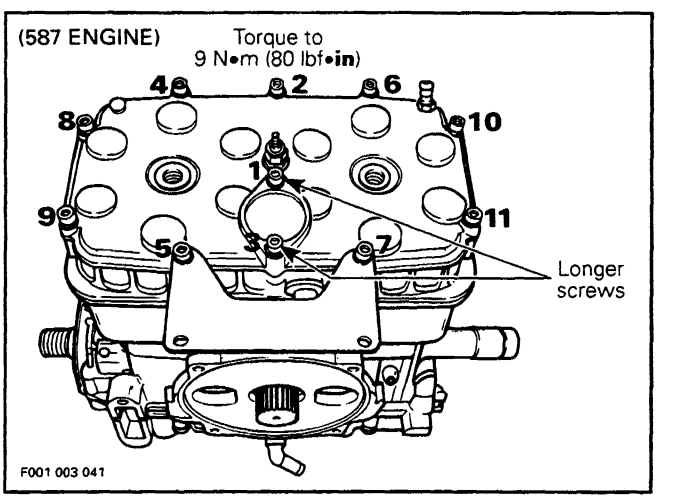


1,4,6, Screw and Cylinder Head Cover (587 Engine)

Install cover over cylinder head. Apply Loctite 242 (P / N 293 800 015) on screw threads. The two longer screws must be installed on oval-shaped housing. Make sure to install flame arrester support.

NOTE : Hand-tighten screws only. Final torque should be carried on after flame arrester / carburetor installation.

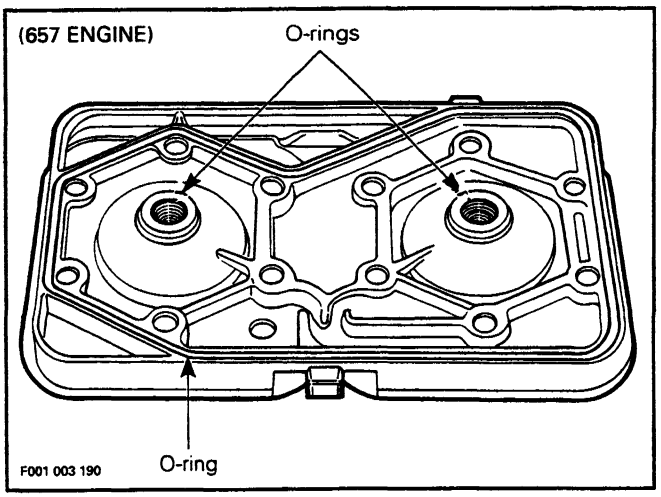
Torque cylinder head cover screws to 9 N•m (80 lbf•**in**) as per following illustrated sequence.



O-ring and Cylinder Head (657 Engine)

Apply Loctite 515 Gasket Eliminator (P / N 293 800 007) in cylinder sleeve O-ring groove.

Make sure to install O-rings around spark plugs holes and cylinder head O-ring where shown.

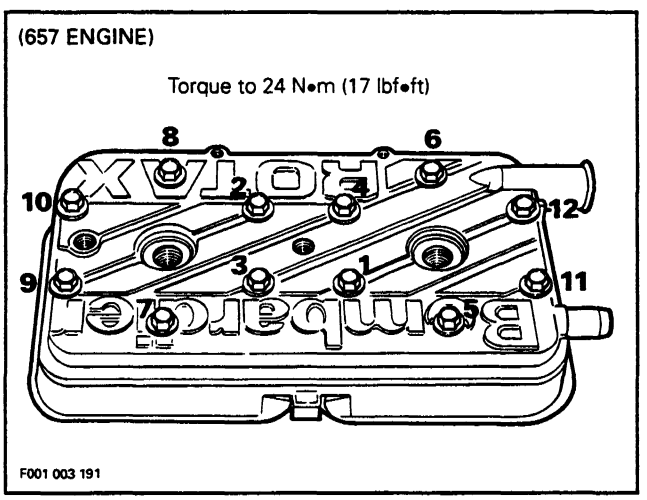


Screw and Cylinder Head Cover (657 Engine)

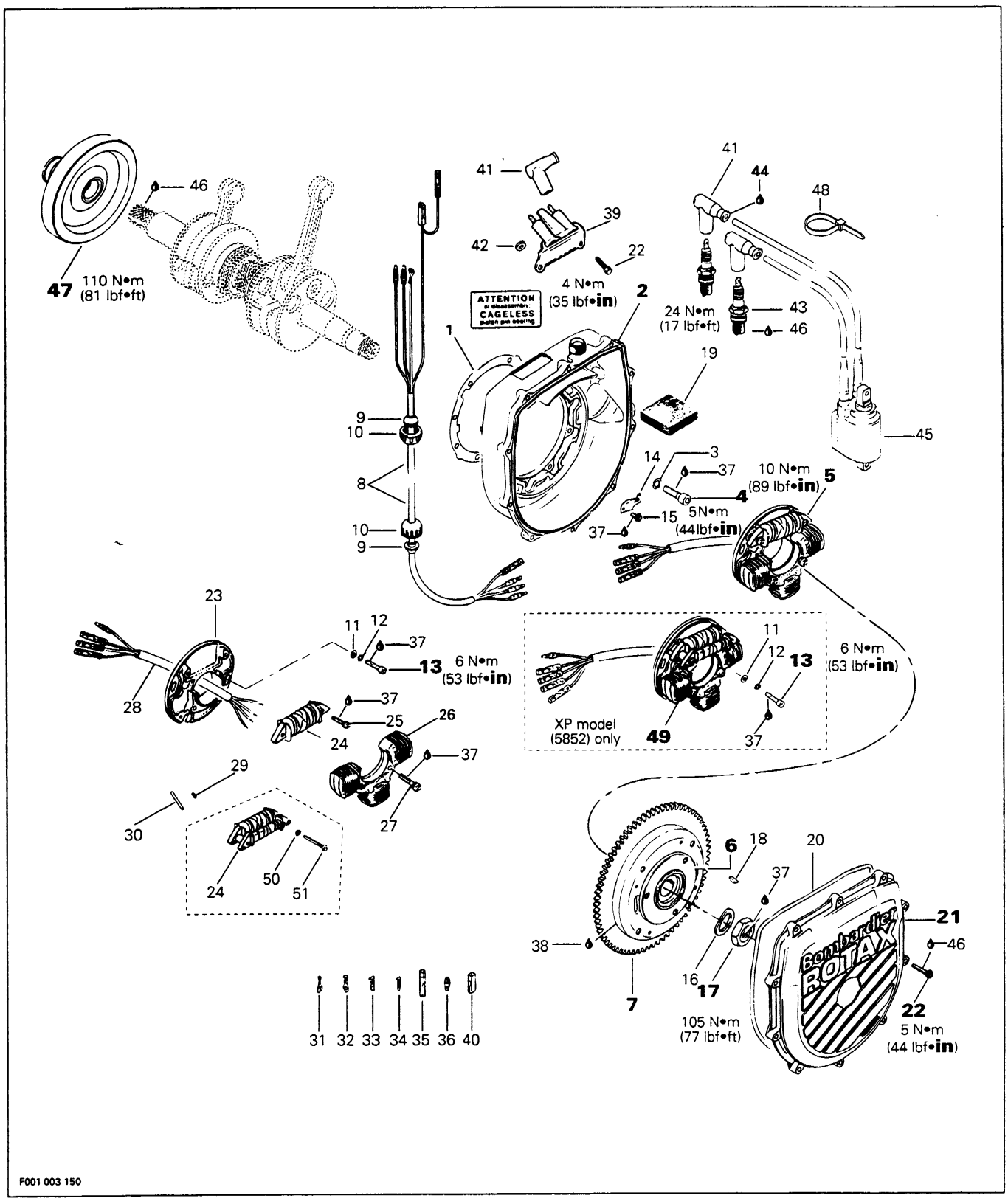
Apply synthetic grease (P / N 293 550 010) below screw head.

Install cover over cylinder head. Apply Loctite 242 (P / N 293 800 015) on screw threads.

Torque cylinder head cover/cylinder head screws to 24 N•m (17 lbf•ft) as per following illustrated sequence.



PTO FLYWHEEL AND MAGNETO



COMPONENTS

1. *Gasket*
2. *Ignition housing*
3. *Lock washer M8 (8)*
4. *Allen screw M8 x 25 (8)*
5. *Armature plate assembly*
6. *Magneto flywheel*
7. *Ring gear 77 teeth*
8. *Harness assembly*
9. *Grommet (2)*
10. *Cap nut (2)*
11. *Washer M5.5 (3)*
12. *Lock washer M5 (3)*
13. *Allen screw M5 x 18 (3)*
14. *Retainer plate*
15. *Taptite screw M5 x 8 (2)*
16. *Lock washer M22*
17. *Hexagonal nut M22*
18. *Woodruff key*
19. *Protection mat*
20. *O-ring*
21. *Ignition housing cover*
22. *Self tapping screw M5 x 25 (12)*
23. *Armature plate*
24. *Generating coil*
25. *Phillips screw M5 x 22 (2)*
26. *Battery charging coil*
27. *Screw M6 x 25 (2)*
28. *Harness assembly*
29. *Terminal clip (4)*
30. *Shrink tube 30 mm (4)*
31. *Female connector*
32. *Ring terminal*
33. *Female terminal*
34. *Male terminal*
35. *Insulation sheath*
36. *Insulation sheath*
37. *Loctite 242*
38. *Loctite 648*
39. *Ground plate*
40. *Protection cap*
41. *Insulator cap (2)*
42. *Star washer M5 (2)*
43. *Spark plug (2)*
44. *Dielectric grease*
45. *Ignition coil*
46. *Anti-seize lubricant*
47. *PTO flywheel*
48. *Tie rap (2)*
49. *Armature plate assembly (double generating coil XP (5852) only)*
50. *Lock washer (2)*
51. *Slotted head screw M5 x 35 (2)*

GENERAL

The following procedures can be performed without removing engine from watercraft. However, battery removal will be required. For only PTO flywheel removal withdraw jet pump unit ass'y, refer to PROPULSION AND DRIVE SYSTEMS 08-01 then refer **to removal and overhaul.**

To ease the removal of PTO flywheel heat center of flywheel with a heat gun to break bond. Always pressurize fuel system first.

◆ **WARNING : Never use a torch in the engine compartment. Electrolyte or fuel vapors can be present it may ignite.**

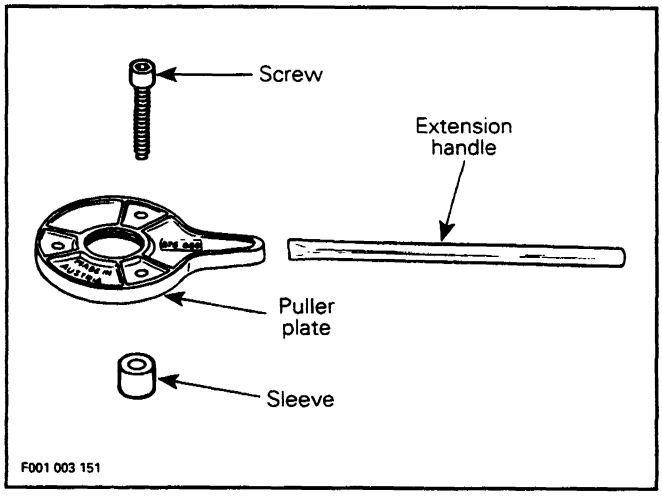
REMOVAL

21,22, Ignition Cover and Screw

Remove screws and spark plug grounding device then withdraw cover.

○ NOTE : PTO side flywheel must be removed prior to removing MAG side flywheel since puller has to be installed on MAG flywheel.

For removal of both flywheels, MAG flywheel is locked with puller plate (P / N 290 876 080), sleeves (P / N 290 847 220) and extension handle (P / N 295 000 003).

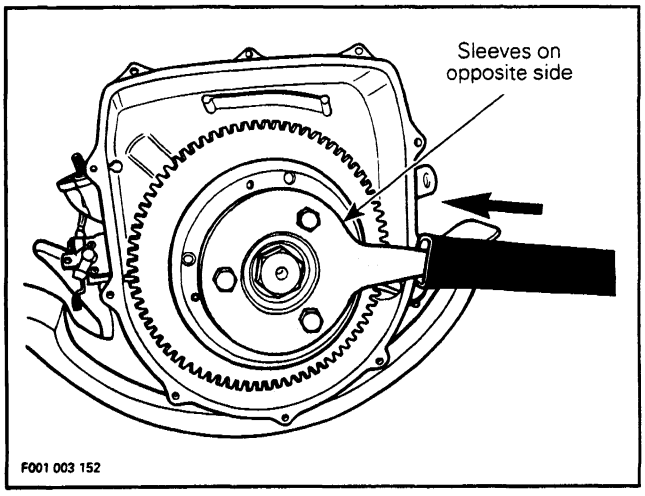


▼ **CAUTION : Never lock crankshaft by inserting any tool through connecting rod bores nor through impulse fitting.**

47, PTO Flywheel

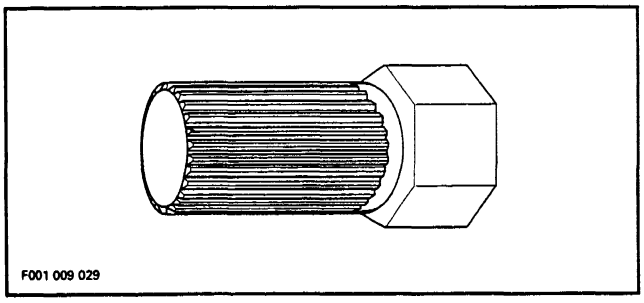
Using three M8 x 35 mm screws (P / N 290 841 591), install screws through puller plate and slide sleeves on screws then secure puller plate on MAG flywheel so that sleeves are against flywheel.

Install extension handle on end of puller plate.

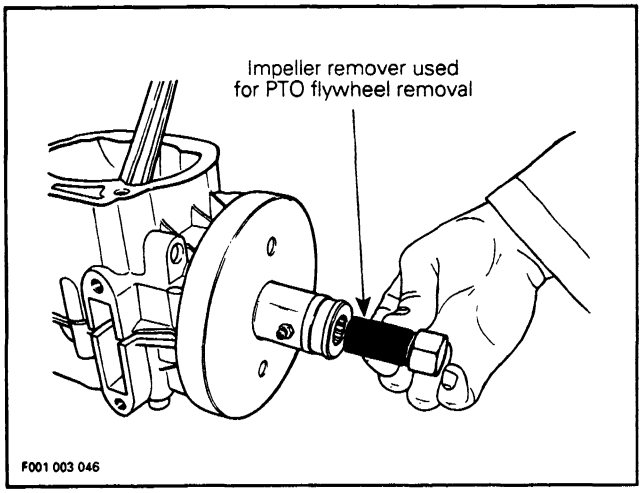


Rotate MAG flywheel so that extension handle end can be held easily before PTO flywheel loosening.

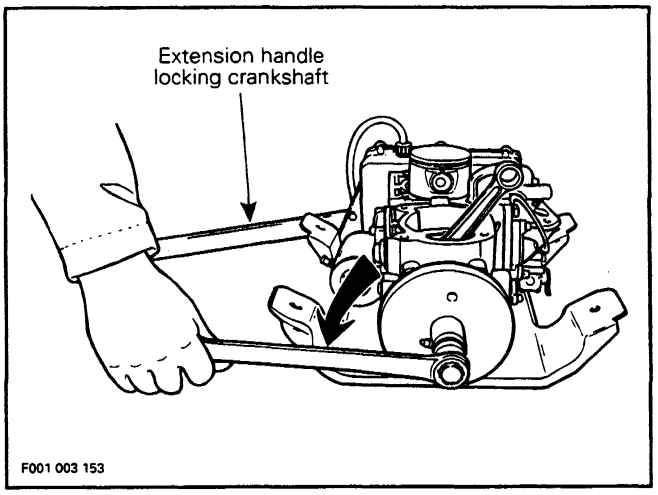
PTO flywheel is loosen using impeller remover (P / N 295 000 001).



Insert special tool in PTO flywheel splines.

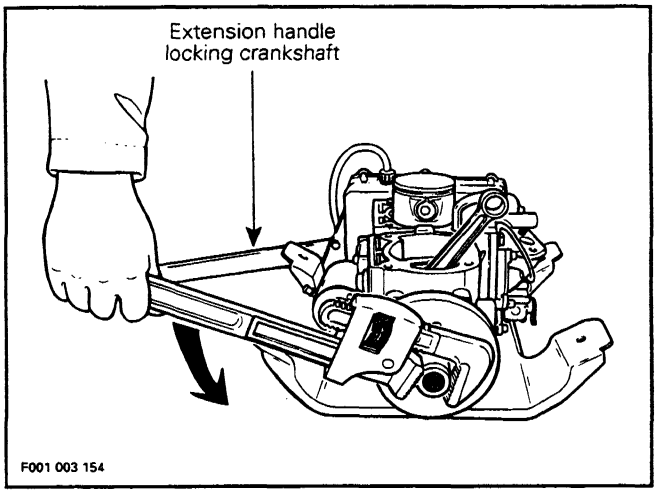


Using a suitable wrench or socket, unscrew PTO flywheel COUNTERCLOCKWISE when facing it.



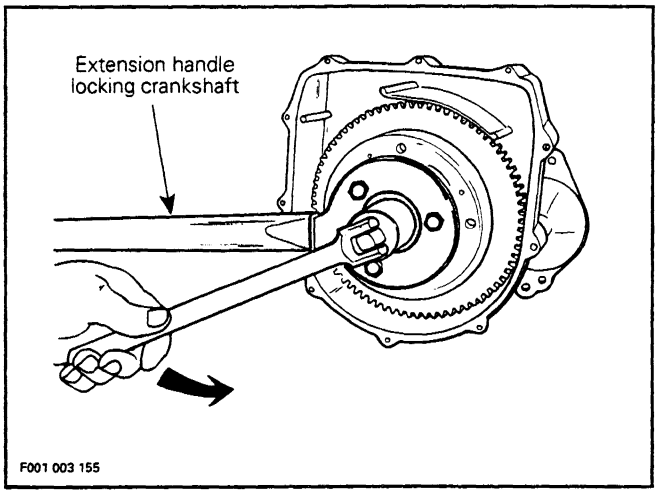
As an alternate method to remove PTO flywheel when PTO flywheel splines are worn out and PTO flywheel remover cannot be used.

Use a pipe wrench and install it on PTO flywheel as illustrated.



6, Magneto Flywheel

With puller plate properly secured as for PTO flywheel removal, rotate MAG flywheel so that extension handle end can be held easily before loosening.

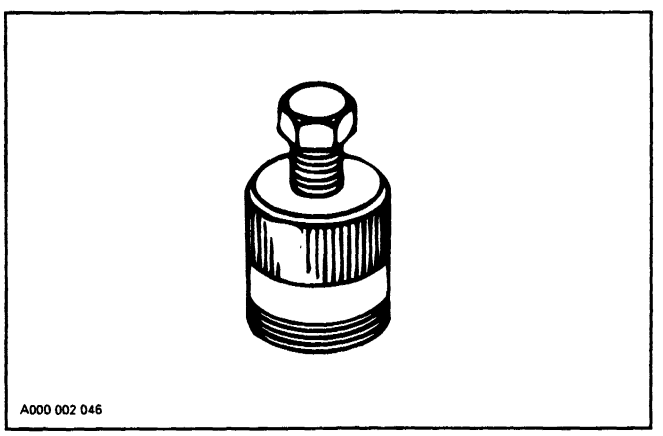


Using a suitable socket, unscrew retaining nut COUNTERCLOCKWISE when facing it.

NOTE : If socket is found too large to be inserted in puller plate, machine or grind its outside diameter as necessary.

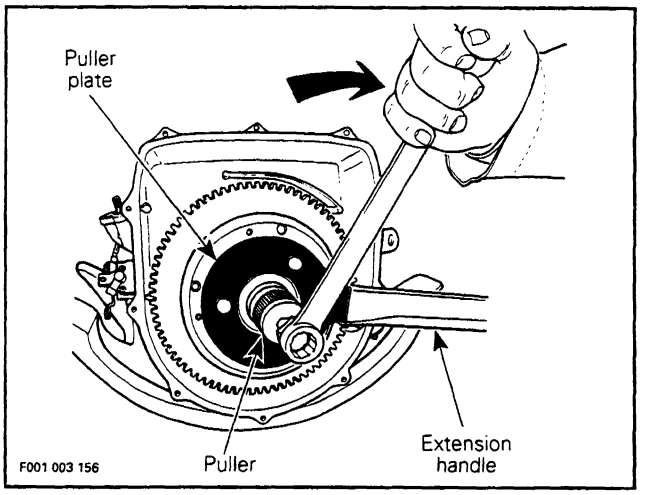
Remove nut and lock washer from MAG flywheel.

MAG flywheel is easily freed from crankshaft with puller (P / N 290 876 065).



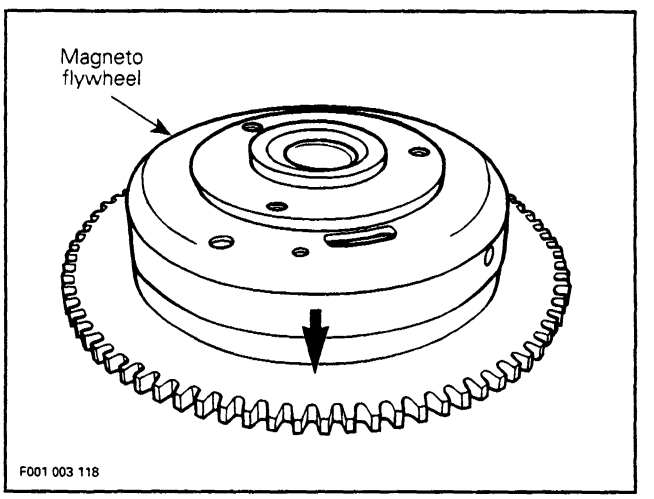
Fully thread on puller in puller plate.

Tighten puller bolt and at the same time, tap on bolt head using a hammer to release MAG flywheel from its taper.



6,7, MAG Flywheel and Ring Gear

Lay MAG flywheel on a steel plate, then to ease removal heat ring gear with a propane torch to approximately 150 °C (300 °F) to break the Loctite bond. Tap lightly on ring gear using a hammer to release it from MAG flywheel.



5,13,49, Screw and Armature Plate Ass'y

To ease reassembly and further ignition timing, indexing marks should be made on armature plate and crankcase.

Remove three retaining screws and withdraw armature plate.

Crankcase Replacement

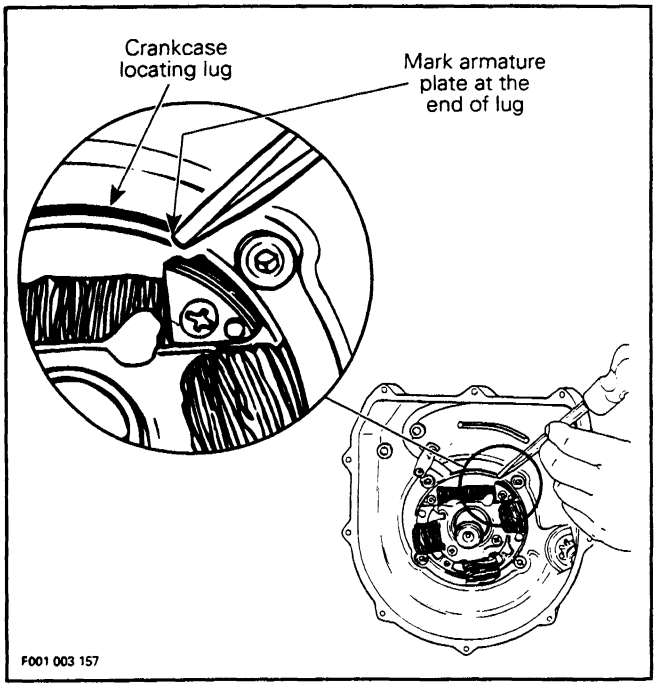
Since replacement crankcases do not have timing mark for armature plate location, indexing marks should be made on armature plate and crankcase to ease reassembly and further ignition timing.

The following procedure is to find a common reference point on both crankcases (old and new) to position armature plate.

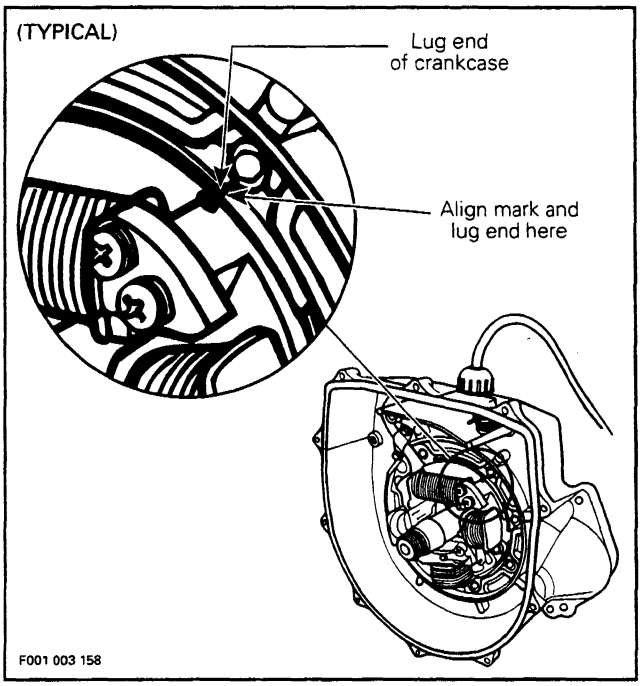
Proceed as follows :

— Find a crankcase locating lug (the top one in this example).

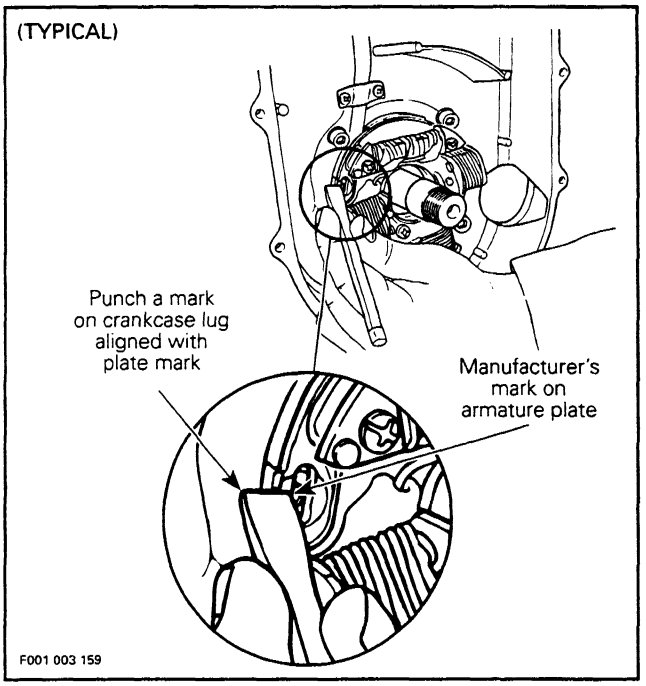
— Place a cold chisel at the end of choosen lug, then punch a mark on armature plate at this point.



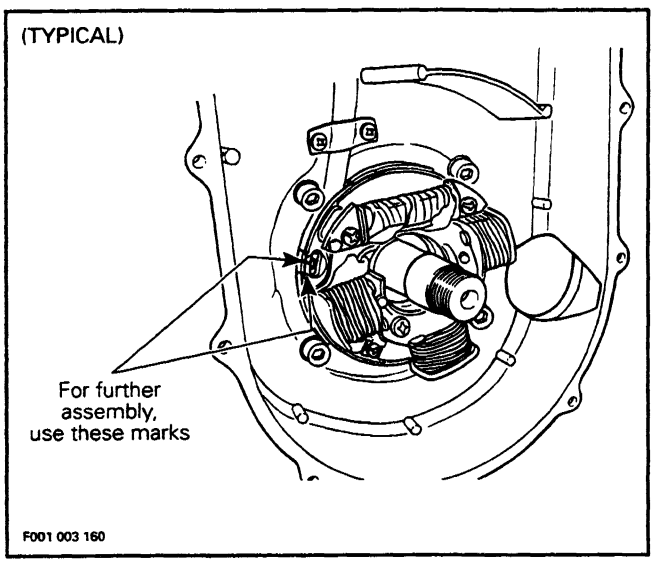
— At assembly, align armature plate mark (previously punched) with the end of the same locating lug on the new crankcase.



— Find manufacturer's mark on armature plate. In line with this mark, punch another mark on adjacent crankcase lug.



From now on, these marks will be used for further assembly positioning as a pre-timing position.



2,4, Ignition Housing and Screw

To remove ignition housing, starter has to be removed. Refer to ELECTRICAL 07-04 under **electric starter** for procedures.

Unscrew retaining screws, then withdraw housing.

CLEANING

Clean all metal components in a solvent.

▼**CAUTION : Clean armature coils and magneto magnets using only a clean cloth.**

Clean crankshaft taper and threads.

INSTALLATION

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

2,4, Ignition Housing and Screw

Install gasket on housing / crankcase mating surfaces.

Apply Loctite 242 (blue) (P / N 293 800 015) on screw threads then torque them in a criss-cross sequence to 10 N•m (89 lbf•**in**).

After housing installation, make sure before reinstalling electric starter, that oil outlet fitting is installed on crankcase.

5,13, Screw and Armature Plate Ass'y

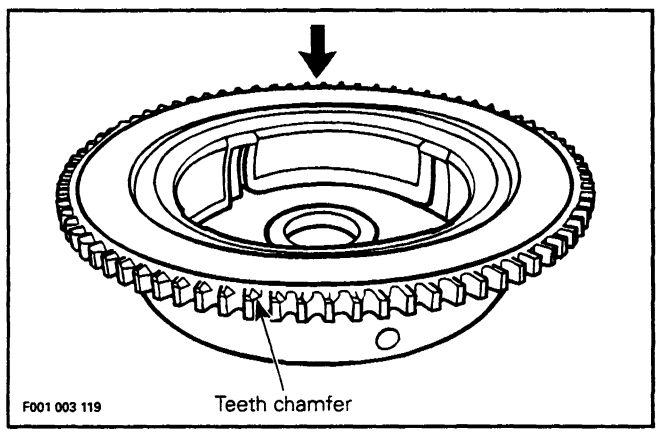
Position armature plate on crankcase, aligning previously traced marks on both parts.

Apply a drop of Loctite 242 (blue) (P / N 293 800 015) on screw threads and torque to 6 N•m (53 lbf•**in**).

6,7, MAG Flywheel and Ring Gear

Apply Loctite 648 (P / N 290 899 788) to MAG flywheel mating surface. Lay ring gear on a steel plate, then heat with a propane torch in order to install it on MAG flywheel.

Pay particular attention to position ring gear teeth chamfer side as per following illustration.



○**NOTE :** Ensure that ring gear contacts MAG flywheel flange. Scribe a new mark on ring gear for further ignition timing if applicable.

Whenever replacing either ring gear or MAG flywheel, Gun Kote must be applied to prevent possible corrosion.

▼**CAUTION : Always assemble MAG flywheel and ring gear prior to apply Gun Kote. If not done correctly, ring gear won't contact MAG flywheel flange.**

To apply Gun Kote proceed as follows:

1. Clean thoroughly and degrease replacement part using a non oil base solvent.

2. Apply coating in light thin coats using a spray gun.

○**NOTE :** Do not spray Gun Kote into MAG flywheel threaded holes.

3. Bake parts in oven at 175 °C (350 °F) for one hour to cure Gun Kote.

▼**CAUTION : Do not eliminate Gun Kote heat curing time because it will lose all its resistance and it won't give any protection.**

▼**CAUTION : At installation of magneto, ring gear teeth chamfer and starter clutch should be facing each other.**

6,17, Magneto and Nut

Apply Loctite 242 (blue) (P / N 293 800 015) on crankshaft taper.

Position Woodruff key, magneto, apply Loctite 242 on nut threads and install fasteners on crankshaft.

Torque nut to 105 N•m (77 lbf•ft).

CAUTION : Never use any type of impact wrench at magneto installation.

47, PTO Flywheel

Apply Loctite 767 Anti-Seize (P / N 293 550 001) on crankshaft threads then screw on PTO flywheel.

Using same tool as for removal, torque PTO flywheel to 110 N•m (81 lbf•ft).

CAUTION : Never use any type of impact wrench at PTO flywheel installation.

CAUTION : PTO flywheel for 657 engine is ticker and larger than the one for 587 engine. Pay attention to install the appropriate one, because PTO flywheel, crankshaft and magneto were balanced as a unit.

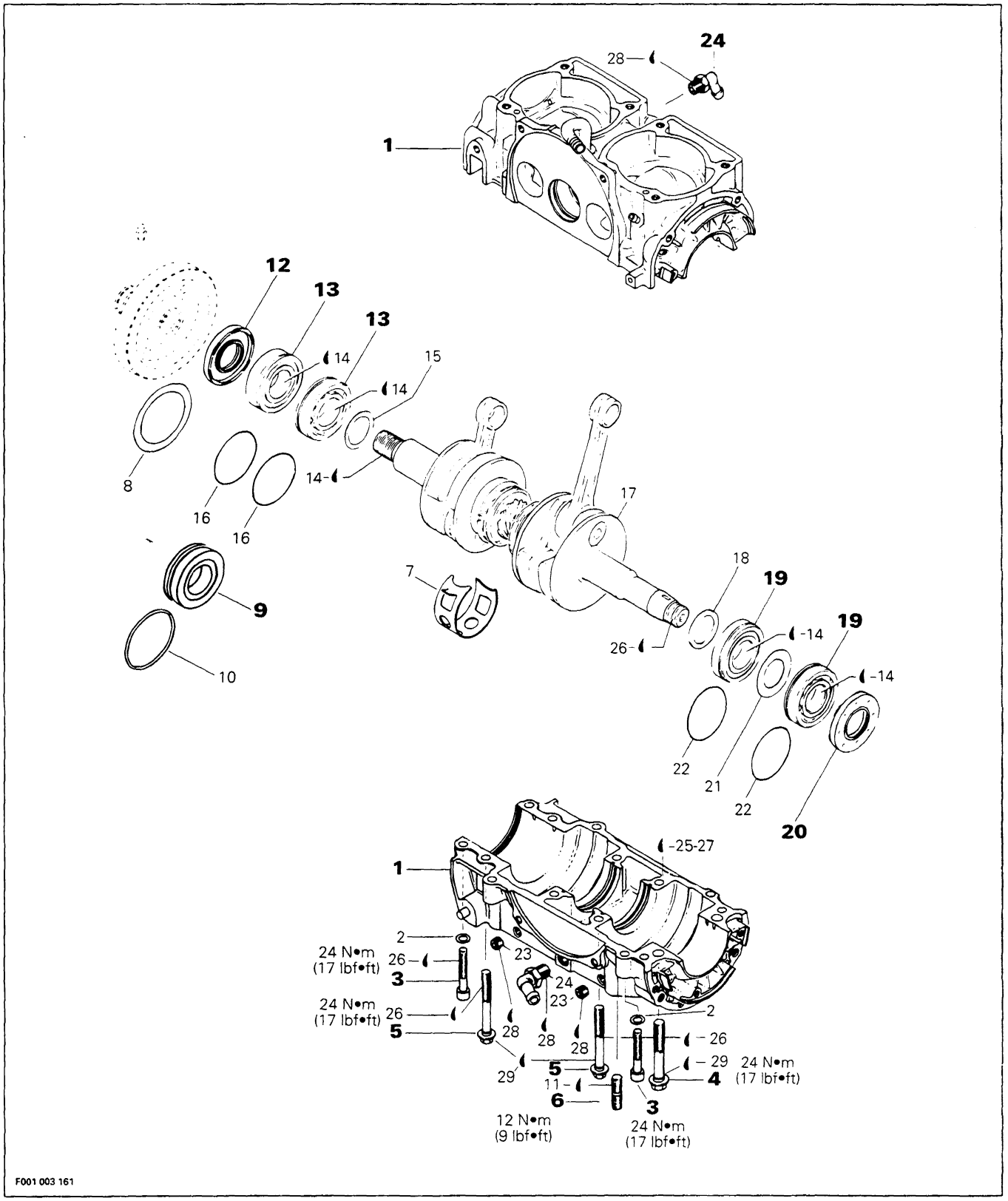
Ignition Timing

For procedures, refer to ELECTRICAL 07-02 under **ignition timing.**

21,22, Ignition Housing Cover and Screw

Properly install O-ring in ignition housing. Apply Loctite 767 Anti-Seize (P / N 293 550 001) on screw threads, install cover and spark plug grounding device then torque screws in a criss-cross sequence to 5 N•m (44 lbf•**in**).

BOTTOM END



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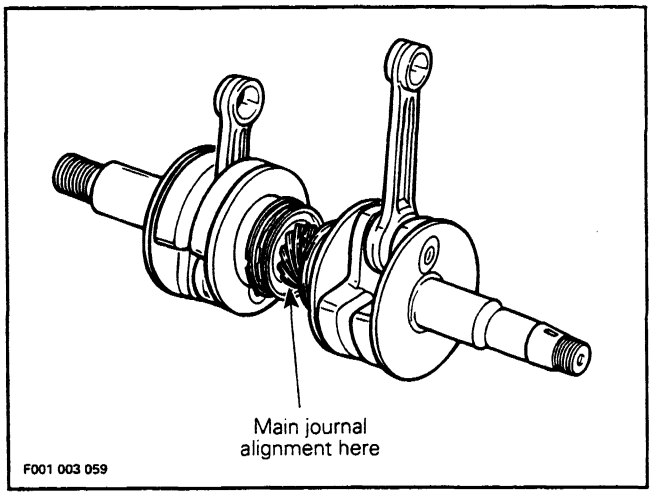
COMPONENTS

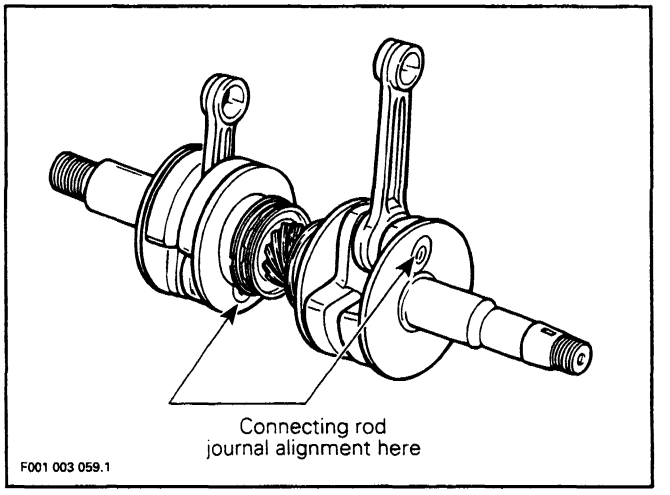
1. *Crankcase ass'y*
2. *Lock washer 8 mm (6)*
3. *Allen screw M8 x 45 (6)*
4. *Hexagonal head screw M10 x 75 (2)*
5. *Hexagonal head screw M8 x 70 (6)*
6. *Stud M10 x 25 / 18 (4)*
7. *Retaining ring*
8. *Retaining shim*
9. *Labyrinth sleeve*
10. *O-ring*
11. *Loctite 271*
12. *Oil seal*
13. *Ball bearing (2)*
14. *Anti-seize lubricant*
15. *Distance ring*
16. *O-ring (2)*
17. *Crankshaft*
18. *Distance ring*
19. *Ball bearing (2)*
20. *Oil seal*
21. *Shim 30.4 / 51 / 1*
22. *O-ring (2)*
23. *Drain plug (2)*
24. *Oil outlet fitting (2)*
25. *Loctite 515*
26. *Loctite 242*
27. *Primer "N"*
28. *Loctite PST 592*
29. *Synthetic grease*

CRANKSHAFT MISALIGNMENT AND DEFLECTION

Since it is an assembled crankshaft it can become misaligned or deflected. Crankshaft can be twisted on center main journal, changing timing of one cylinder in relation with the other.



Counterweights can also be twisted on connecting rod journal on any or both cylinder(s).



Crankshaft Alignment at Center Main Journal

NOTE : The following checks can be performed with engine in watercraft without overhauling engine.

To quickly check, without accuracy, if crankshaft is twisted on center main journal, proceed as follows :

— Remove PTO flywheel guard.

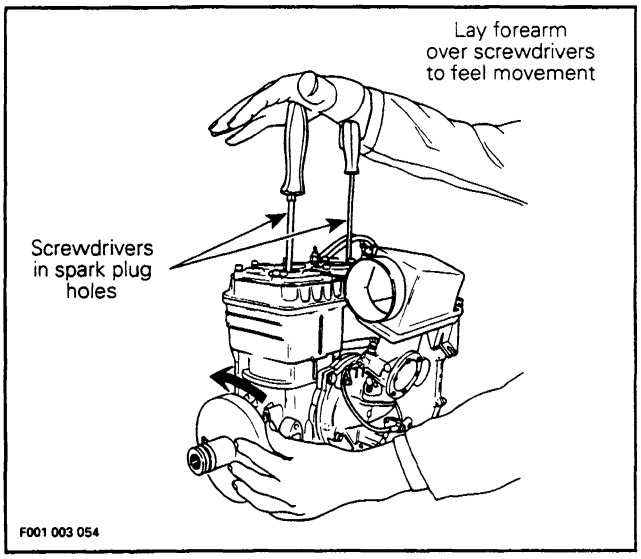
— Remove spark plugs.

— Insert a screwdriver in one spark plug hole.

— Insert a longer screwdriver in the other hole.

— Lay a forearm over both screwdriver handles to feel piston displacements.

— With the other hand, slowly rotate engine by PTO flywheel.



As soon as one piston starts going up, the other must immediately go down. Any interval between strokes indicates a misaligned crankshaft.

Or, to accurately check crankshaft alignment, proceed as follows :

— Remove ignition housing cover.

— Remove MAG flywheel nut. Refer to PTO FLYWHEEL AND MAGNETO 03-04 for procedures.

— Install Bombardier degree wheel (P / N 295 000 007) on crankshaft end. Hand-tighten nut only.

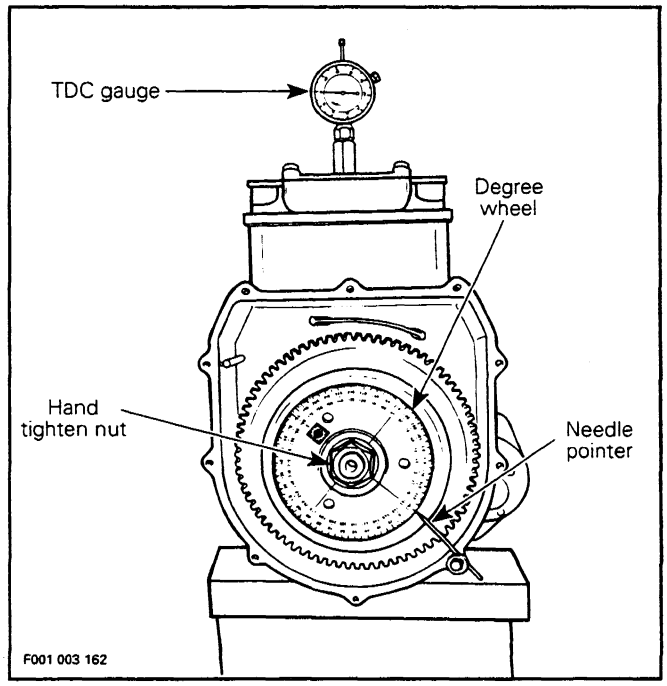
— Remove both spark plugs.

— Install a TDC gauge (P / N 295 000 065) in spark plug hole on **MAG side.**

— Bring **MAG** piston at Top Dead Center.

— As a needle pointer, secure a wire with a cover screw and a washer.

— Rotate degree wheel (NOT crankshaft) so that needle pointer reads 360°.



— Remove TDC gauge and install on **PTO side.**

— Bring **PTO** piston at Top Dead Center.

Interval between cylinders must be exactly 180° therefore, needle pointer must indicate 180° on degree wheel (360° - 180° = 180°).

Any other reading indicates a misaligned crankshaft.

Crankshaft Alignment at Connecting Rod Journal

Such misalignment may cause a crankshaft hard to be manually turned. Verification can be done by measuring deflection each end of crankshaft. Refer to INSPECTION paragraph.

If deflection is found greater than specified tolerance, this indicates worn bearing(s), bent and / or disaligned crankshaft.

GENERAL

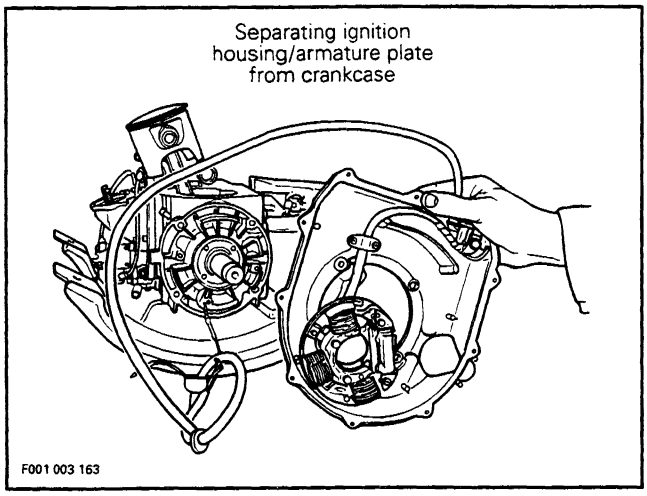
Engine has to be removed from watercraft to open bottom end.

If crankshaft end seal(s) has / have to be replaced, bottom end must be opened.

DISASSEMBLY

Remove the following parts :

— ignition housing and PTO flywheel on opposite side

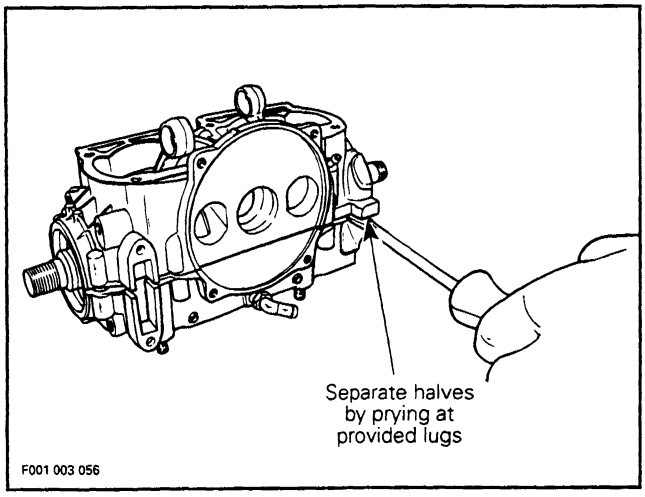


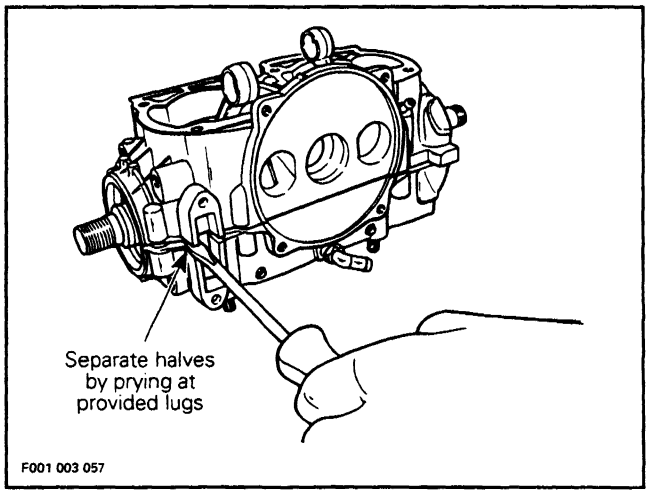
— rotary valve cover and valve

— engine support

— crankcase retaining screws

Insert screwdrivers between crankcase lugs and pry to separate halves being careful not to damage precision machined surfaces.





12,13,19,20, Seal and Bearing

NOTE : Do not needlessly remove crankshaft bearings.

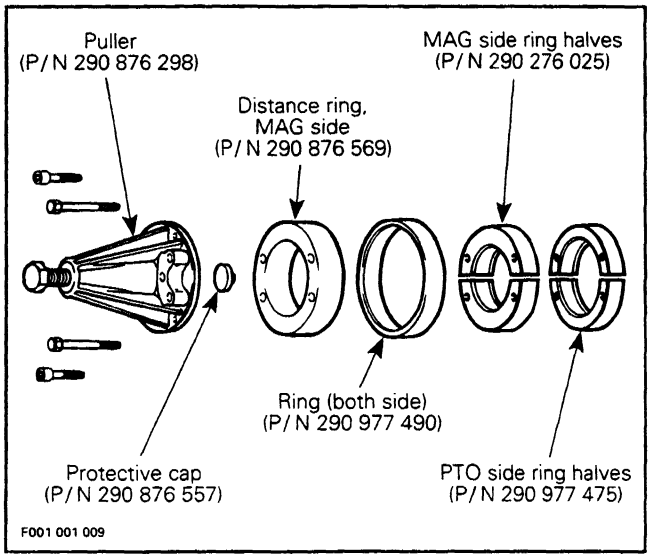
Remove end seals.

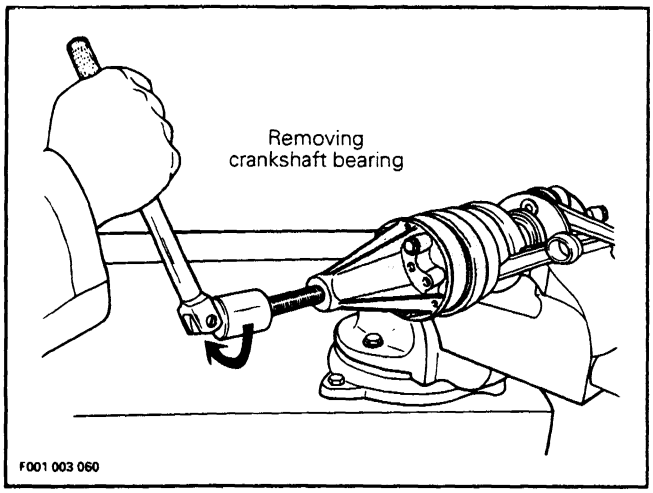
To remove end bearings from crankshaft, use crankshaft end protective cap (P / N 290 876 557) and puller (P / N 290 876 298).

On PTO side, use ring (P / N 290 977 490) with ring halves (P / N 290 977 475).

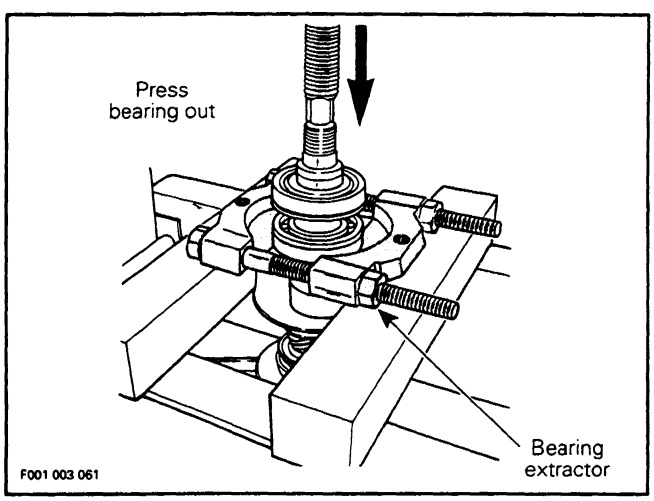
On MAG side, use distance ring (P / N 290 876 569) and ring (P / N 290 977 490) with ring halves (P / N 290 276 025).

NOTE : To facilitate ring or distance ring installation lubricate their inside diameters.





Or, use a bearing extractor such as Proto #4332 and a press to remove two bearings at a time.



NOTE : If bearings are to be replaced, they can be quickly removed using an air hammer.

CLEANING

Discard all oil seals, gaskets, O-rings and sealing rings.

Clean water and oil passages and make sure they are not clogged.

Clean all metal components in a solvent.

Remove old Loctite from crankcase mating surfaces with stripper (P / N 295 000 040).

CAUTION : Never use a sharp object to scrape away old sealant as score marks incurred are detrimental to crankcase sealing.

INSPECTION

Visually inspect parts for corrosion damage.

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.

Inspect crankshaft bearings. Check for scoring, pitting, chipping or other evidence of wear. Make sure plastic cage is not melted. Rotate and make sure they turn smoothly.

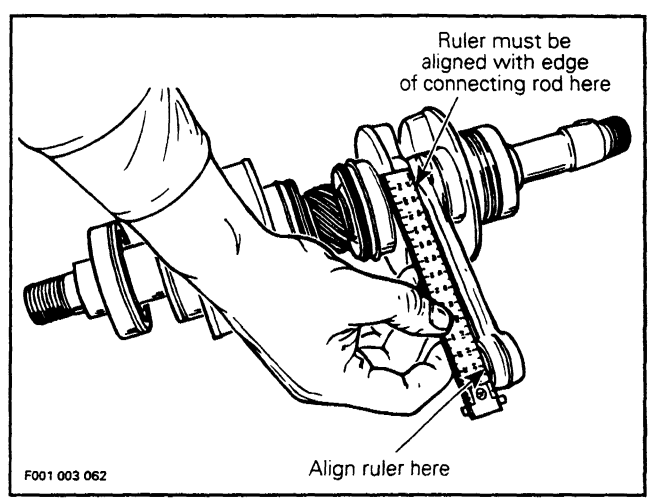
If crankshaft and / or components are found defective, it must be repaired by a specialized shop or replaced.

The inspection of engine bottom end should include the following measurements :

MEASUREMENTS	TOLERANCES		
	NEW PARTS (min.)	NEW PARTS (max.)	WEAR LIMIT
Crankshaft deflection	N.A.	N.A.	0.08 mm (.0031 in)
Connecting rod big end axial play	0.39 mm (.015 in)	.737 mm (.029 in)	1.2 mm (.047 in)

Connecting Rod Straightness

Align a steel ruler on edge of small end connecting rod bore. Check if ruler is perfectly aligned with edge of big end.

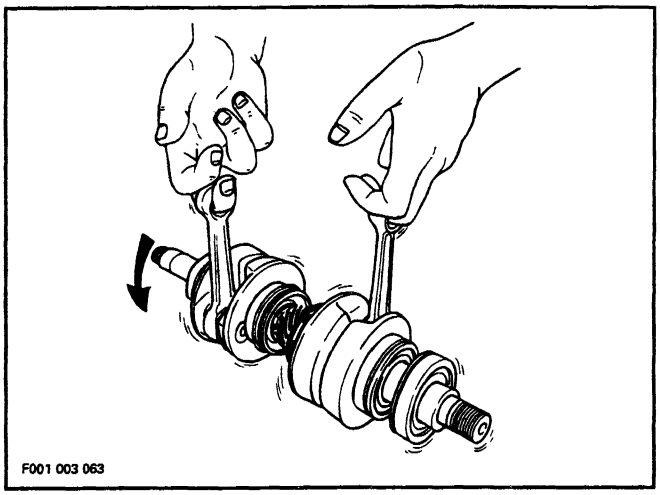


Crankshaft Alignment

A quick check can be made as follows :

— Insert a finger in each connecting rod.

— Lift crankshaft and apply a rotation movement to crankshaft with fingers.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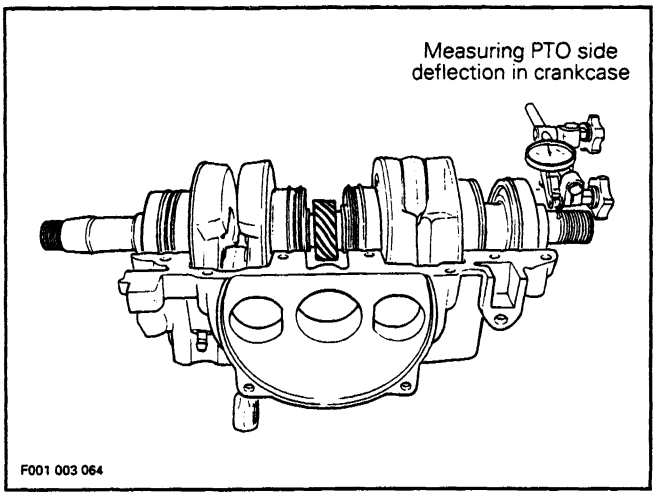
A twisted crankshaft will turn irregularly in an out of round motion.

Crankshaft Deflection

Crankshaft deflection is measured each end with a dial indicator.

First, check deflection with cranckshaft in crankcase. If deflection exceeds the specified tolerance, it can be either ball bearings wear, bent or twisted crankshaft at connecting rod journal.



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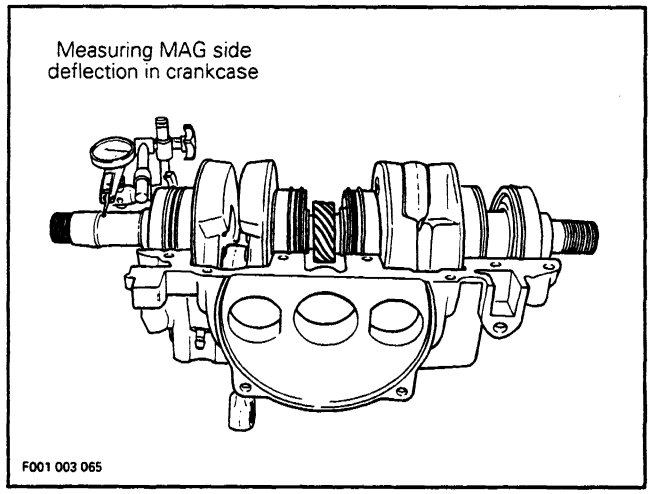
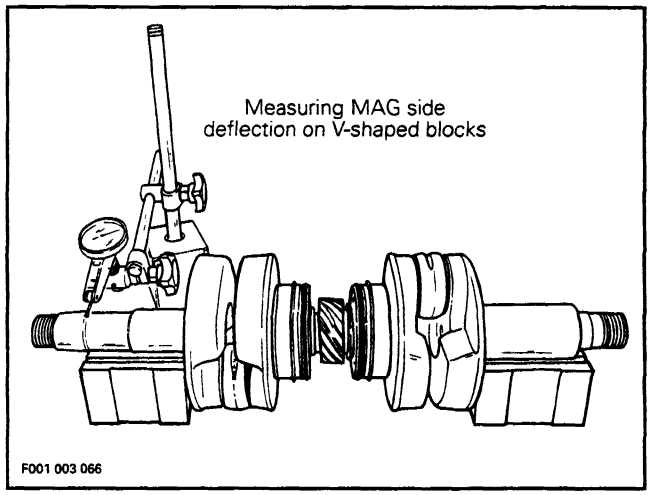
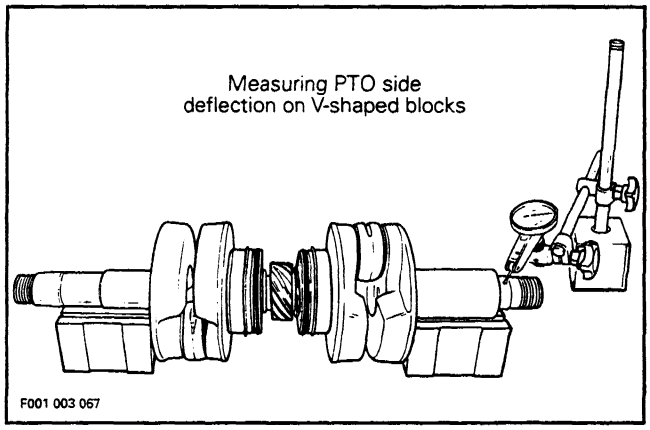


F001 003 065

Remove crankshaft bearings and check deflection again on V-shaped blocks as illustrated.



F001 003 066

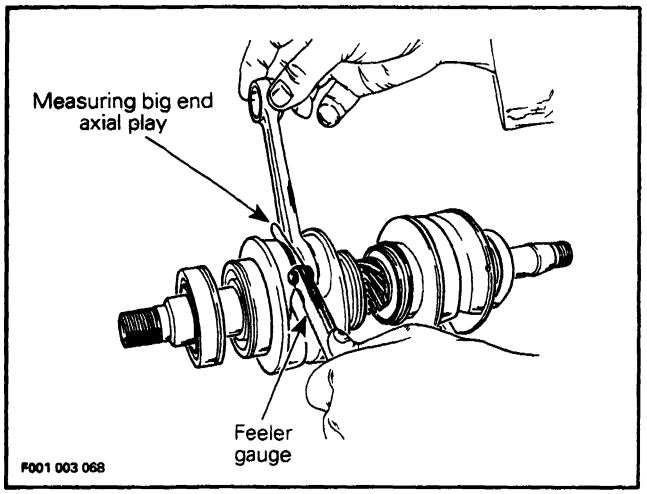


F001 003 067

NOTE : Crankshaft deflection can not be correctly measured between centers of a lathe.

Connecting Rod Big End Axial Play

Using a feeler gauge, measure distance between thrust washer and crankshaft counterweight.



ASSEMBLY

Assembly is essentially the reverse of disassembly procedures. However pay particular attention to the following.

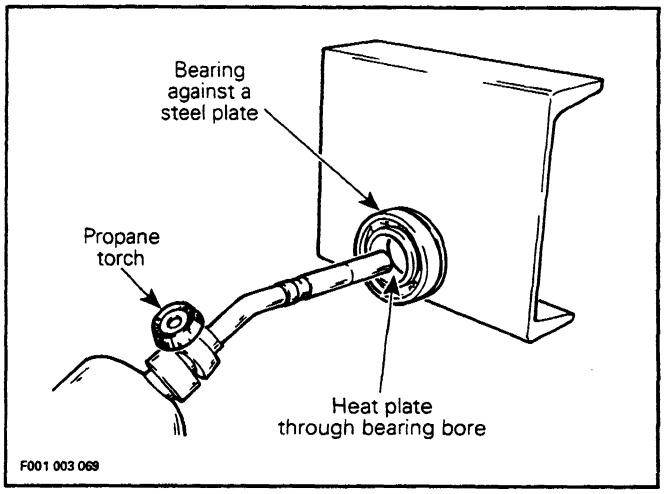
13,19, Bearing

Apply Loctite 767 Anti-Seize (P / N 293 550 001) on bearing seats.

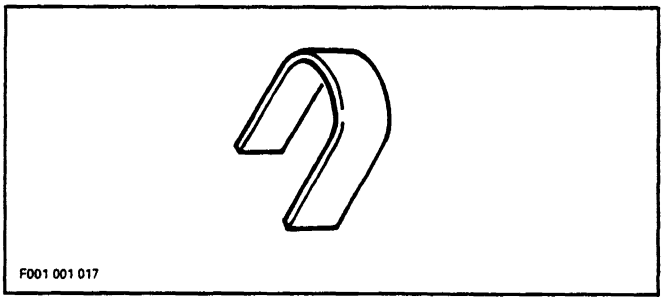
Prior to installation, place bearings into a container filled with oil, previously heated to 75°C (167°F). This will expand bearing and ease installation.

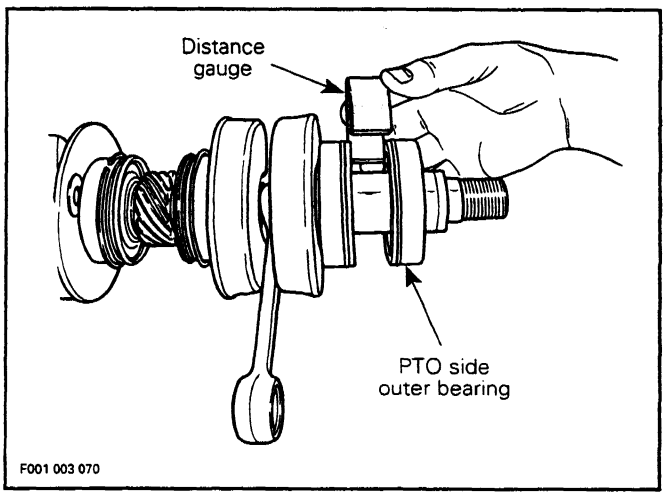
Or, as an alternate method, apply heat with a propane torch. Lay bearing on a steel plate, then heat plate through bearing bore until smoke is noticed from bearing. Install bearing carefully on crankshaft.

▼CAUTION : Immediately stop heating as soon as smoke is noticed. Overheating bearing will melt plastic cage. Practice with used bearings on first try.



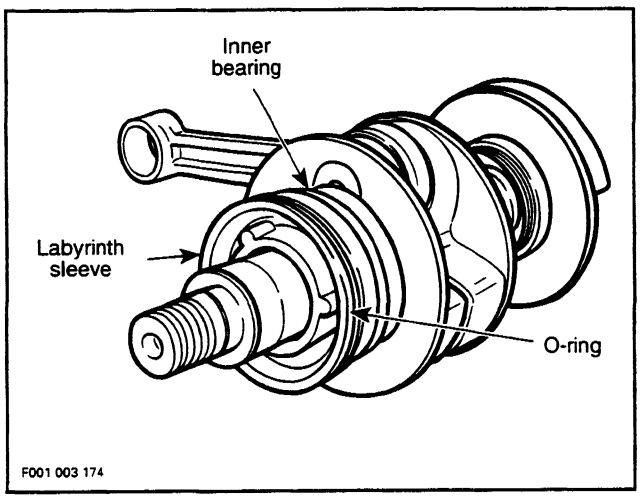
To properly locate outer PTO bearing, temporarily install distance gauge (P / N 290 876 826) against inner bearing. Slide outer bearing until stopped by gauge then remove gauge.



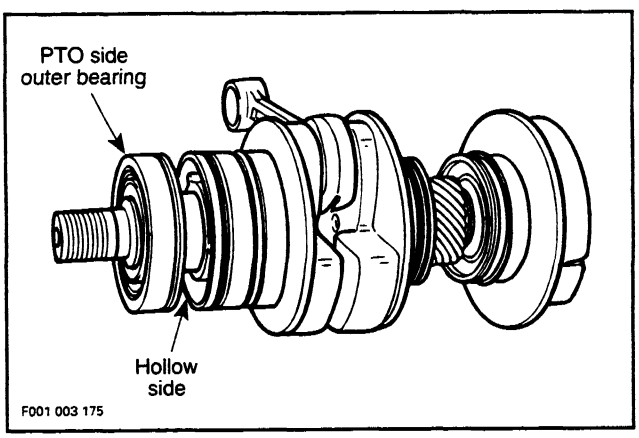


9, Labyrinth Sleeve (5807, 5820, 5852 and 5861 models)

To properly locate outer PTO bearing, install labyrinth sleeve against inner bearing side.

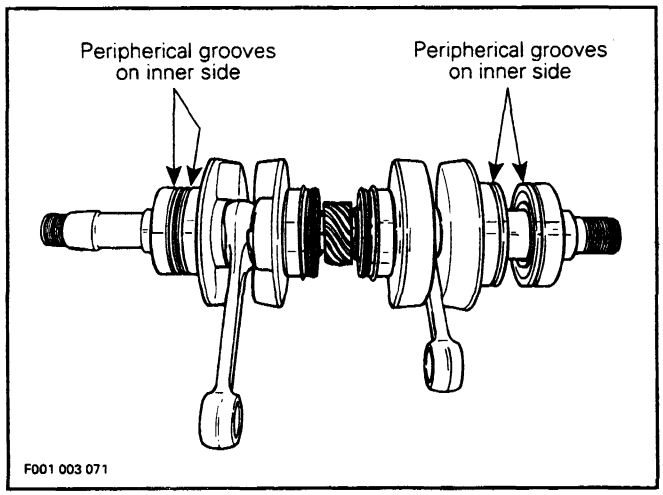


NOTE : Be sure to install labyrinth sleeve with its hollow side facing PTO side outer bearing.



Slide outer bearing until it touches sleeve.

Install bearings so that their peripherical grooves be located as shown in following illustration.



12,20, Seal

At seal assembly, apply a light coat of lithium grease on seal lips.

1, Crankcase

Crankcase halves are factory matched and therefore, are not interchangeable or available as single halves.

Prior to joining crankcase halves, apply a light coat of Loctite 515 Gasket Eliminator (P / N 293 800 007) on mating surfaces. Do not apply in excess as it will spread out inside crankcase.

NOTE : On aluminum material it is recommended to use Loctite Primer N (P / N 293 600 012) to reduce curing time and increase gap filling capability. Refer to manufacturer's instructions.

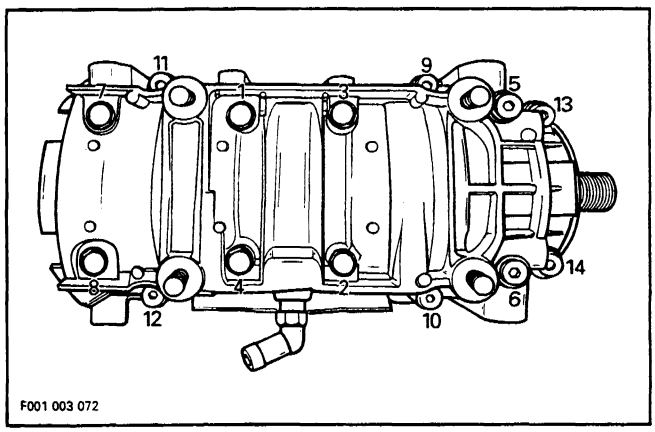
CAUTION : Rotary valve shaft must be installed in crankcase before closing halves. Before joining crankcase halves, make sure that crankshaft gear is well engaged with rotary valve shaft gear.

Position crankcase halves together and hand-tighten bolts.

CAUTION : Temporarily install armature plate to align crankcase halves with each other.

3,4,5, Screw

Apply Loctite 242 (P / N 293 800 015) on screw threads. Torque crankcase screws to 24 N•m (17 lbf•ft) as per following illustrated sequence.



6, Stud

At assembly in crankcase, apply Loctite 271 (P / N 293 800 005) on stud threads. Torque to 12 N•m (9 lbf•ft)

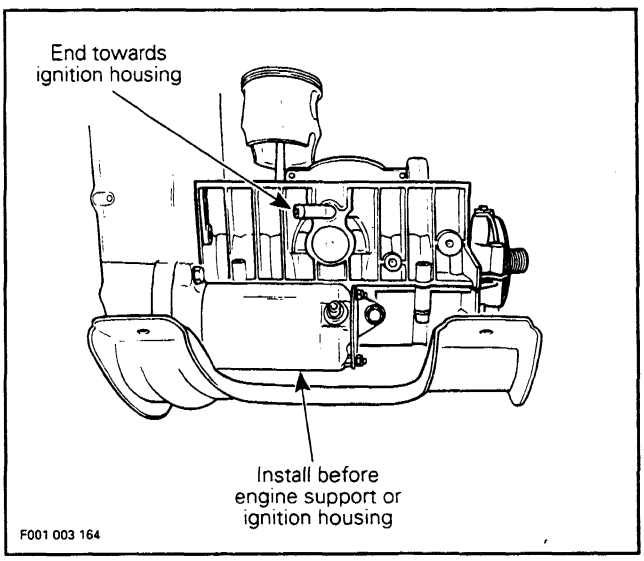
Finalizing Assembly

24, Oil Outlet Fitting

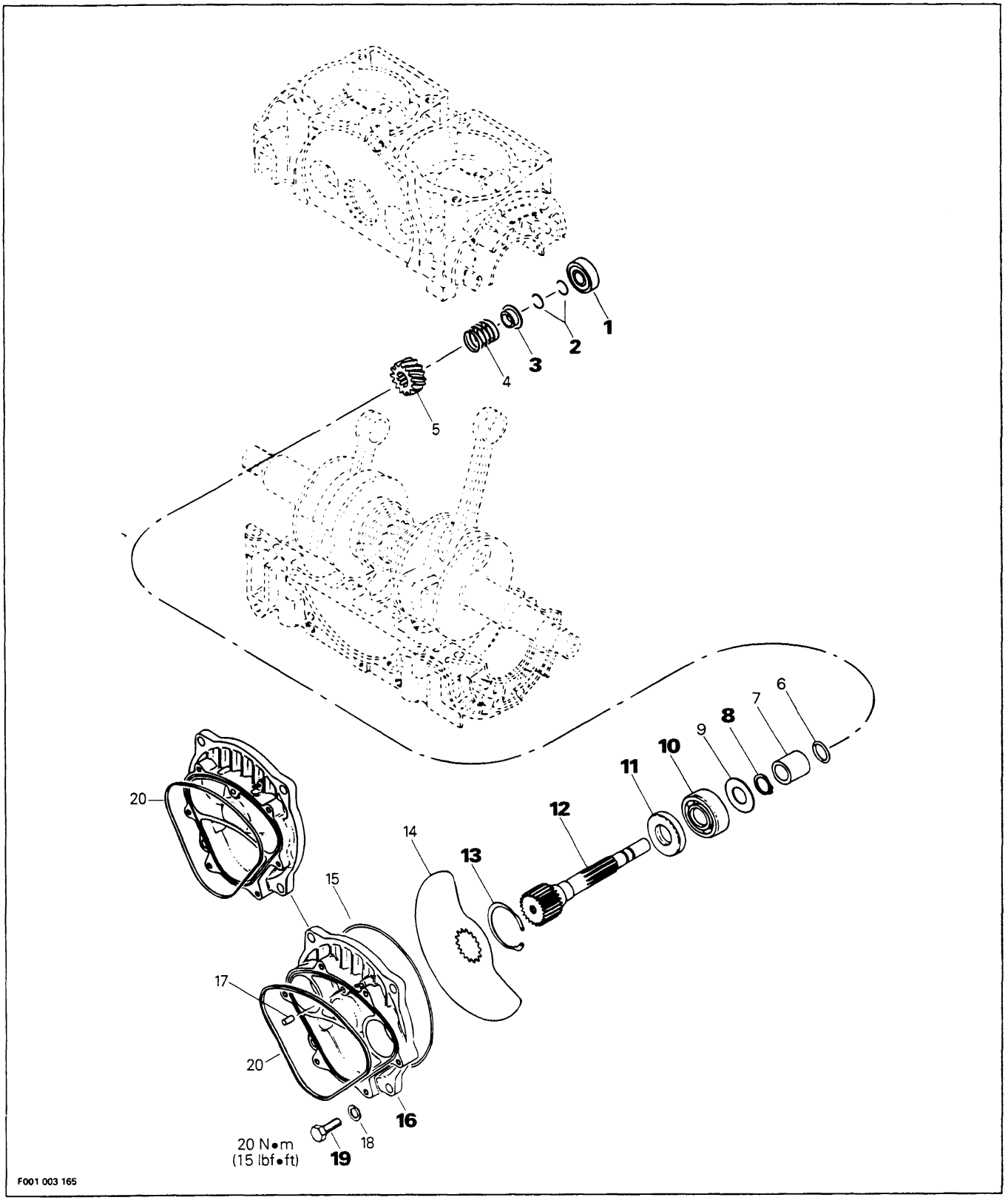
If oil outlet fitting has been removed from crankcase, reinstall it with its end pointing towards ignition housing. Apply Loctite PST 592 (P / N 293 800 018) on fitting threads.

For rotary valve timing and assembly procedures, refer to ROTARY VALVE AND RESERVOIR 03-06.

If engine support is installed on crankcase before ignition housing, electric starter must be installed before engine support.



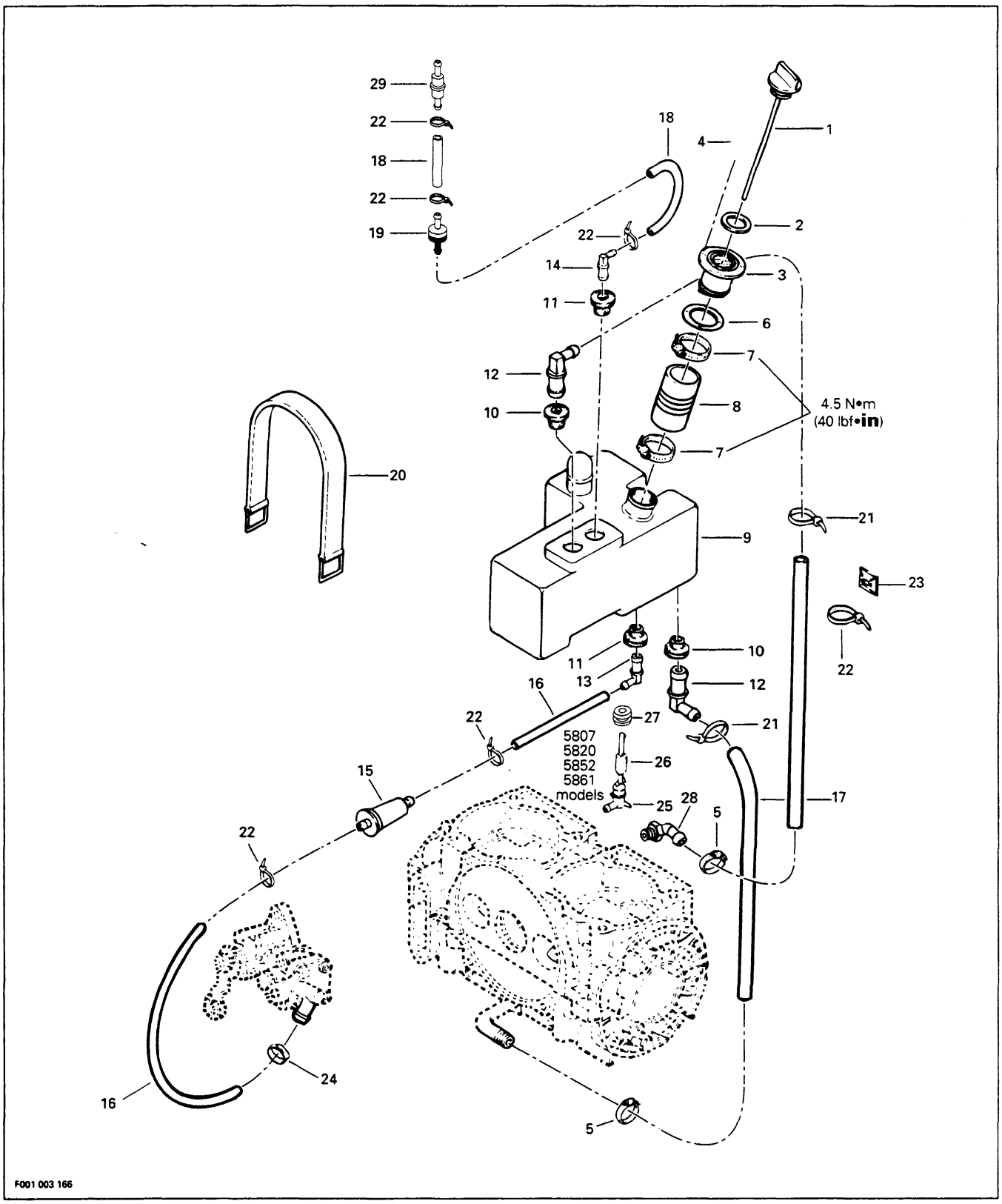
ROTARY VALVE



COMPONENTS

1. *Ball bearing 6201*
2. *Circlip (2)*
3. *Spring seat*
4. *Spring*
5. *Sprocket 14 teeth*
6. *O-ring*
7. *Distance sleeve 24.5 mm*
8. *Snap ring*
9. *Shim*
10. *Ball bearing 6203*
11. *Oil seal*
12. *Rotary valve shaft*
13. *Snap ring*
14. *Rotary valve*
15. *O-ring*
16. *Rotary valve cover*
17. *Dowel pin*
18. *Lock washer 8 mm (4)*
19. *Hexagonal head screw M8 x 20 (4)*
20. *Rubber ring*

RESERVOIR



COMPONENTS

1. *Oil level indicator cap*
2. *O-ring*
3. *Adaptor*
4. *Rivet (4)*
5. *Tridon clamp (2)*
6. *Gasket*
7. *Tridon clamp (2)*
8. *Hose*
9. *Oil tank*
10. *Grommet (2)*
11. *Grommet (2)*
12. *90° Elbow (2)*
13. *90° Elbow*
14. *90° Elbow*
15. *Filter*
16. *Hose 8 mm*
17. *Hose 12 mm*
18. *Hose 6 mm*
19. *One way check valve*
20. *Strap*
21. *Tie rap*
22. *Tie rap*
23. *Tie-mount*
24. *Oetiker clamp*
25. *Oil level sensor (5807, 5820, 5852, 5861 models)*
26. *Float (5807, 5820, 5852, 5861 models)*
27. *Grommet (5807, 5820, 5852, 5861 models)*
28. *Hose fitting*
29. *Water eliminator valve*

GENERAL

The following verification procedures such as clearance between rotary valve and rotary valve cover or crankshaft and rotary valve shaft gear backlash can be performed without removing engine from watercraft. Refer to INSPECTION further in this section.

However engine must be removed from watercraft to work on rotary valve shaft / components. Refer to REMOVAL AND INSTALLATION 03-02 for procedures.

Bottom end must be opened to remove rotary valve shaft.

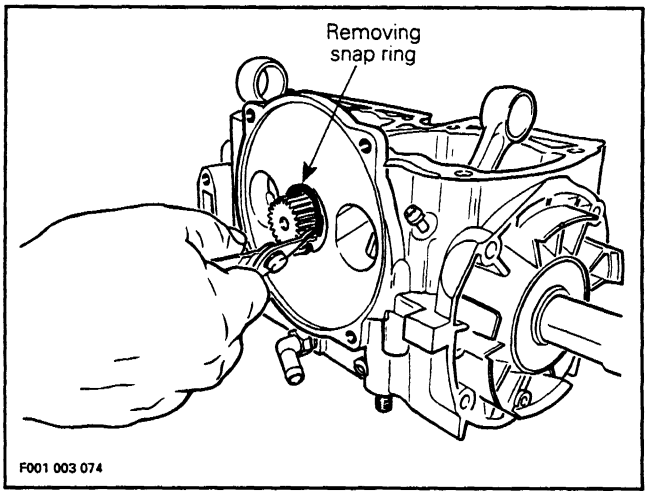
DISASSEMBLY

16,19, Rotary Valve Cover and Screw

Unscrew four retaining screws and withdraw rotary valve cover and valve.

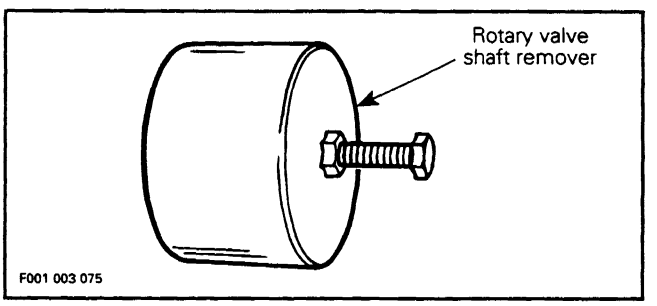
12,13, Rotary Valve Shaft and Snap Ring

To remove rotary valve shaft assembly from crankcase, first remove snap ring from crankcase.

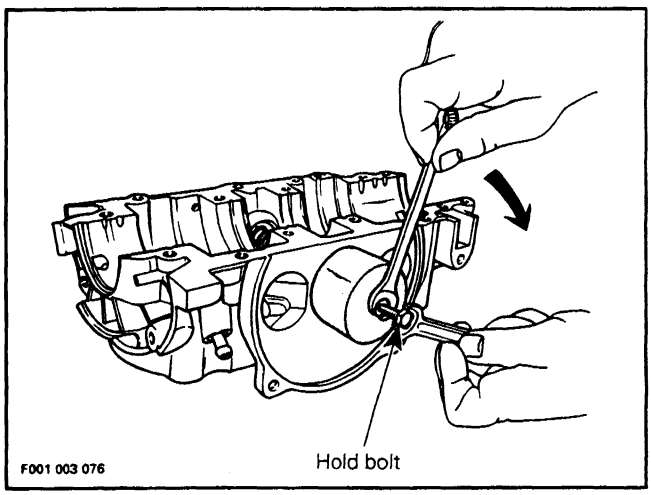


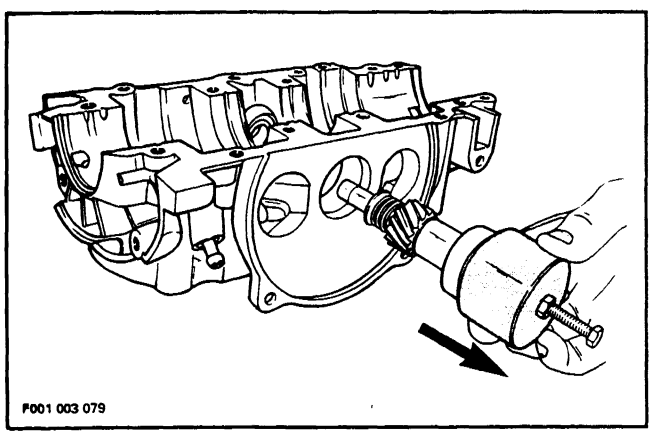
CAUTION : Bottom end must be opened to remove rotary valve shaft.

To remove rotary valve shaft, use a remover (P / N 290 876 487).



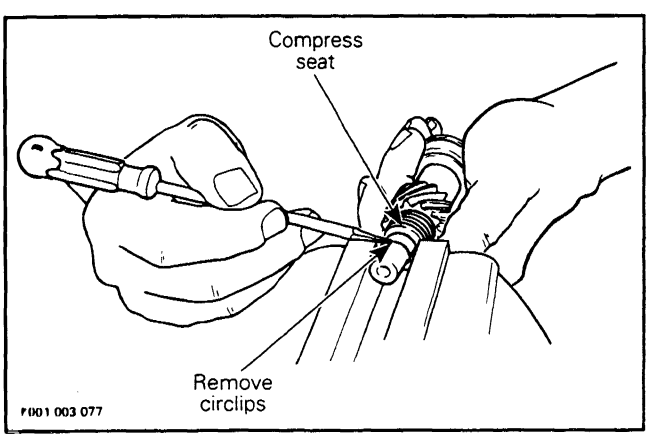
Place puller over rotary valve shaft end and screw on puller bolt into shaft. While retaining bolt with a wrench, turn puller nut CLOCKWISE until shaft comes out.





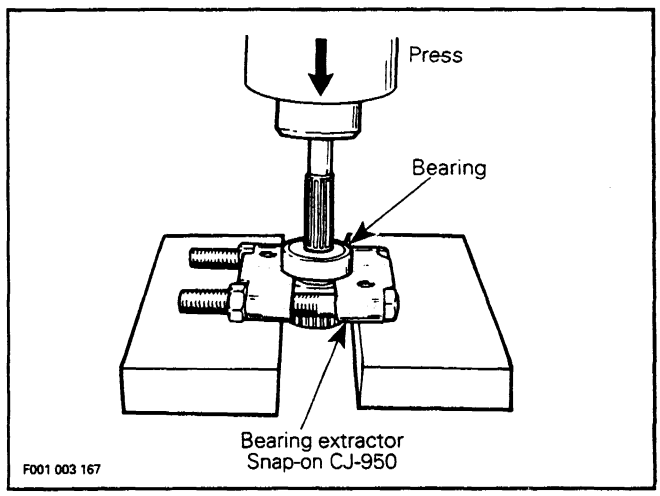
2,3, Circlip and Spring Seat

If it is necessary to disassemble components of rotary valve shaft assembly, use seat to compress spring and remove circlips.



8,10, Snap Ring and Bearing

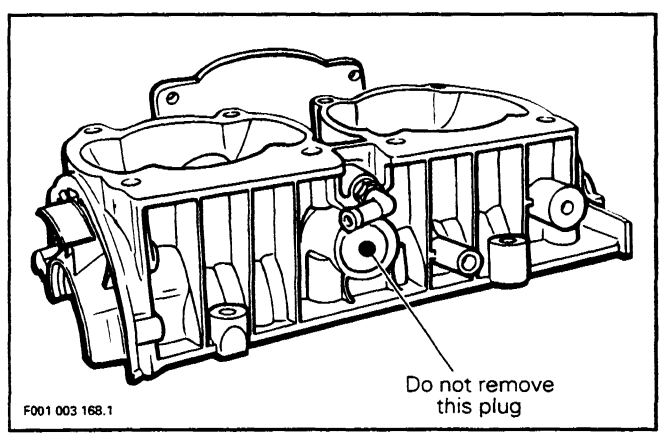
To remove bearing use a bearing extractor such as Snap-on # CJ-950 as illustrated. Slide off distance sleeve, remove snap ring and press shaft out.



▼CAUTION : Ensure that rotary valve shaft is perfectly perpendicular with press tip or damage will occur.

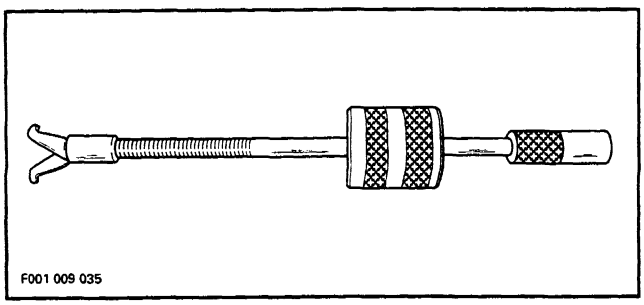
1, Bearing

NOTE : Do not remove plug against bearing in upper crankcase half.



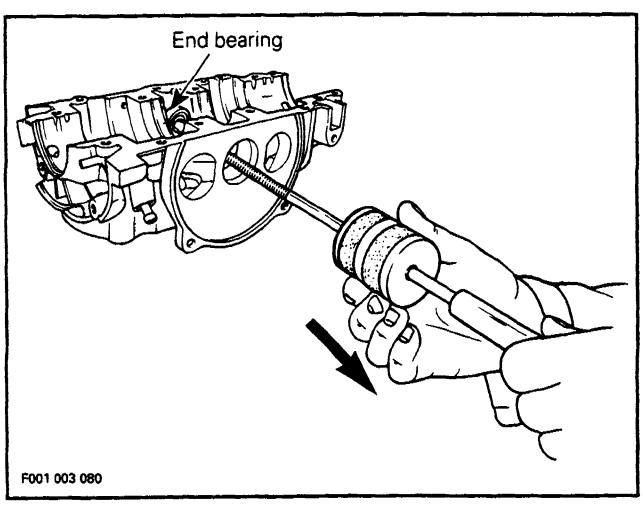
End bearing can be easily removed using the following suggested tool.

Snap-on hammer puller including : Handle CJ93-1
Hammer CJ125-6
Claws CJ93-4


F001 009 035

Close puller claws so that they can be inserted in end bearing. Holding claws, turn puller shaft clockwise so that claws open and become firmly tight against bearing.

Slide puller sleeve outwards and tap puller end. Retighten claws as necessary to always maintain them tight against bearing. Continue this way until bearing completely comes out.



F001 003 080

CLEANING

Discard all seals and O-rings.

Clean all metal components in a solvent.

Clean oil passages and make sure they are not clogged.

Clean rotary valve shaft and inside of distance sleeve.

INSPECTION

Inspect rotary valve cover for warpage. Small deformation can be corrected by surfacing with fine sand paper on a surface plate. Surface part against oiled sand paper.

Inspect bearings. Check for scoring, pitting, chipping or other evidence of wear. Make sure plastic cage (on bigger bearing) is not melted. Rotate them and make sure they turn smoothly.

Check for presence of brass filings in gear housing.

Visually check gear wear pattern. It should be even on tooth lenght all around. Otherwise it could indicate a bent shaft, check deflection. Replace gear if damaged.

The inspection of rotary valve system should include the following measurements.

MEASUREMENTS	TOLERANCES	
	NEW PARTS	WEAR LIMIT
Rotary Valve Cover and Valve Gap	N.A.	0.25 - 0.35 mm (.010 - .014 in)
Rotary Valve Shaft Deflection	N.A.	0.08 mm (.003 in)

NOTE : The following verifications can be performed with engine in watercraft without overhauling engine.

Rotary Valve and Rotary Valve Cover Clearance

There is a choice of two measuring methods.

One with a 45° feeler gauge, the other one with solder.

The clearance between the rotary valve and the rotary valve cover must be 0.30 ± 0.05 mm (0.012 ± 0.002 in).

NOTE : If the clearance is below 0.25 mm (0.010 in) this could create an overheating situation and if the clearance is over 0.35 mm (0.014 in) this could create a hard starting situation.

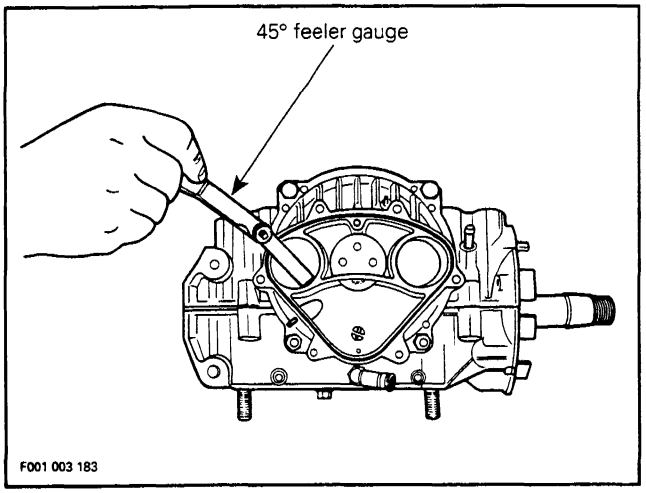
45° Feeler Gauge Method

Remove rotary valve cover and its O-ring.

Reinstall cover in place WITHOUT its O-ring and torque screws to 20 N•m (15 lbf•ft).

Feeler gauge blade from 0.25 mm (.010 in) to 0.35 mm (.014 in) thickness should fit between rotary valve and cover.

Insert feeler gauge blade through cover inlet ports to verify clearance. At least verify clearance at two different places in each port.



Solder Method

Remove rotary valve cover and its O-ring.

Use the following type of solder :

— rosin core

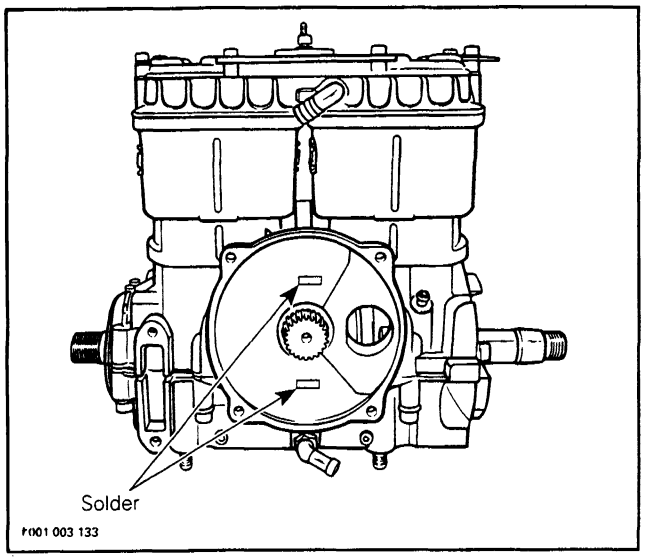
— diameter : 0.8 mm (0.032 in)

— electronic application (available at electronic stores)

Install two short pieces (13 mm (1/2 in) long) of solder directly on rotary valve, one above and one below rotary valve gear. Apply grease to hold solder in position.

Reinstall cover in place WITHOUT its O-ring and torque screws to 20 N•m (15 lbf•ft).

Remove cover then clean and measure compressed solder thickness, it must be within the specified tolerance 0.30 ± 0.05 mm (0.012 ± .002 in).



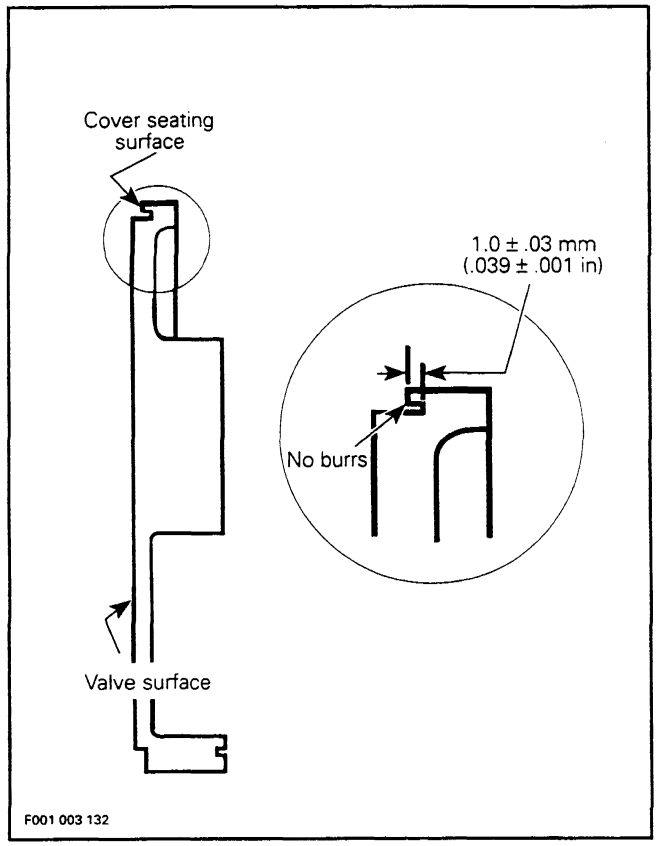
If rotary valve/rotary valve cover clearance is out of specification, machine rotary valve cover seating surface or replace the cover.

Machining Information

The amount of **mm** (in) over tolerance must be removed from the rotary valve cover seating surface.

Also cut the O-ring groove and equal amount to obtain 1.0 ± .03 mm (.039 ± .001 in) between the bottom of the groove and the seating surface.

Remove burrs on the edges of the seating surface and O-ring groove.



Reverify the clearance.

At assembly the rotary valve timing must remain as per original setting.

Crankshaft and rotary valve shaft gear backlash

Remove PTO flywheel guard.

Remove spark plugs, rotary valve cover and valve.

Manually feel backlash at one position, then turn crankshaft about 1/8 turn and recheck. Continue this way to complete one revolution.

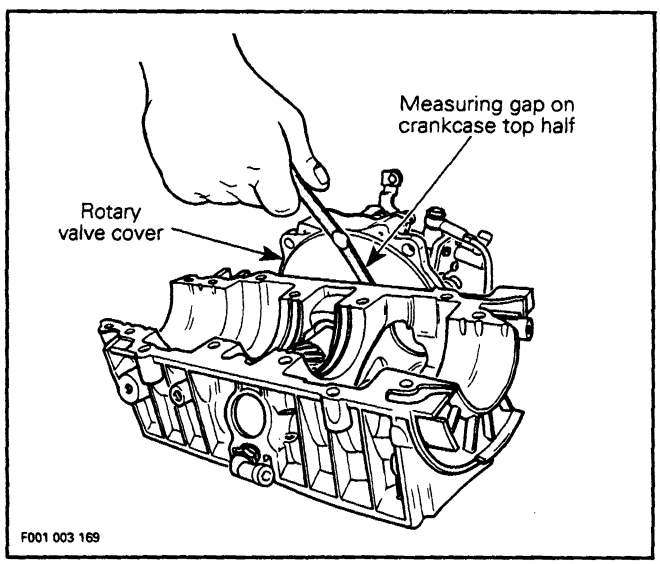
Backlash must be even at all positions. Otherwise overhaul engine to find which part is faulty (gear, rotary valve shaft or crankshaft with excessive deflection).

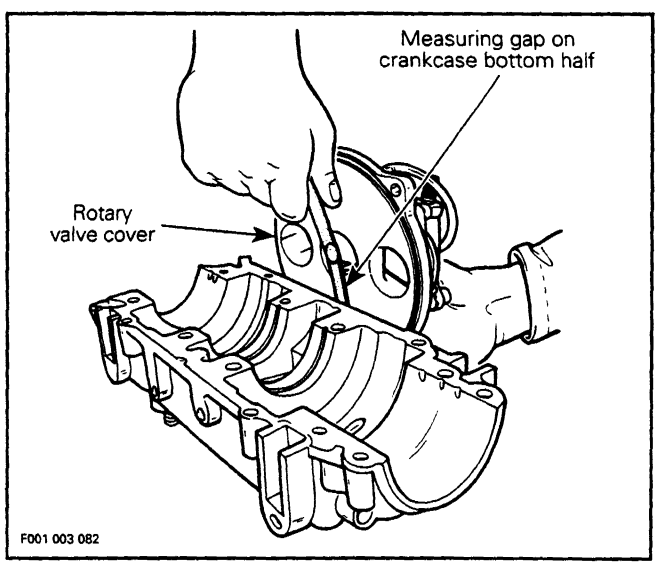
Rotary Valve Cover and Valve Gap

A gap must be maintained between rotary valve and crankcase.

To measure this gap, use a feeler gauge inserted between rotary valve and upper half crankcase with rotary valve cover in place WITHOUT its O-ring.

Check as much surface as possible. Follow the same procedure for lower half crankcase.



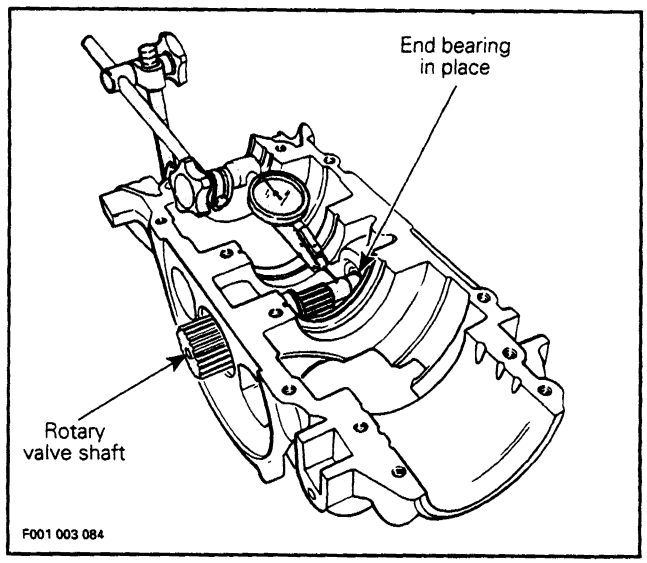


Rotary Valve Shaft Deflection

Deflection is measured with a dial gauge. Install rotary valve shaft in crankcase half, without its gear.

NOTE : End bearing must be in crankcase half.

Measure shaft deflection near gear mounting area.



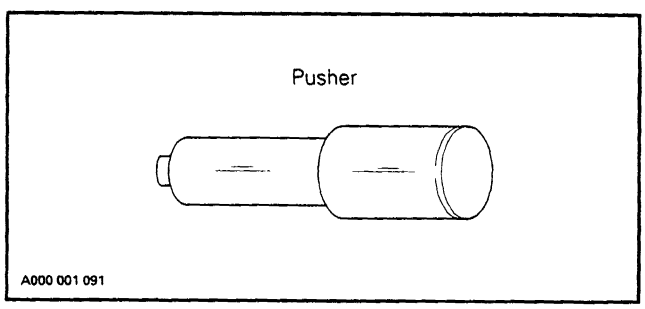
Deflection must not exceed specified value. Replace shaft as necessary.

ASSEMBLY

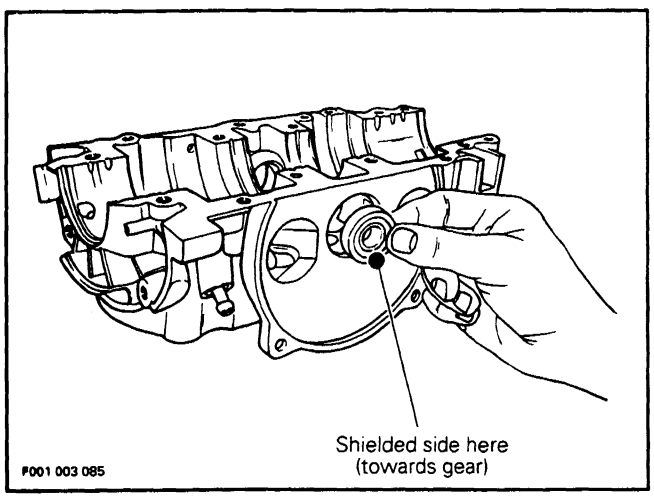
Assembly is essentially the reverse of disassembly procedures. However pay particular attention to the following.

1, Bearing

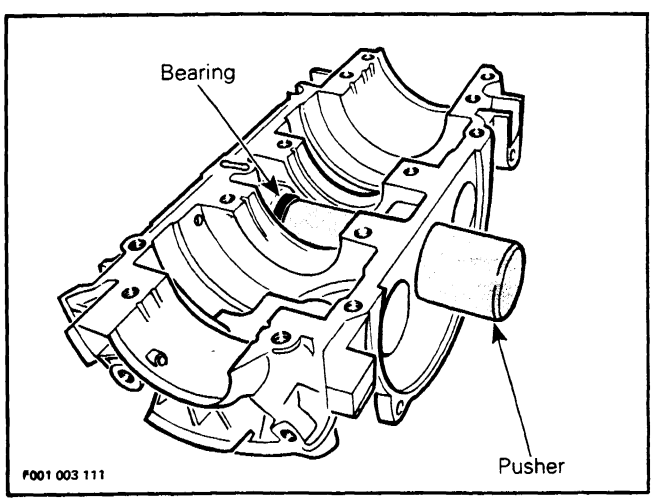
To install end bearing in crankcase, use a pusher (P / N 290 876 500).



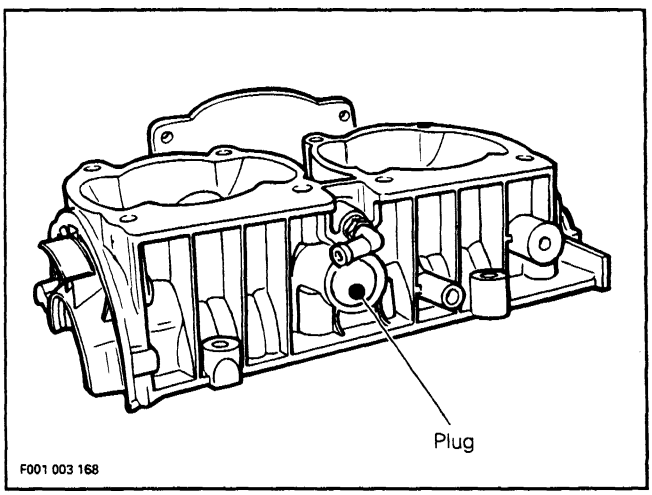
Position ball bearing shielded side towards rotary valve.



Push bearing until it stops on its seat.



NOTE : Do not remove plug against bearing in crankcase half.



If plug has been removed, clean plug and crankcase hole with Loctite Safety Primer (P / N 293 800 019).

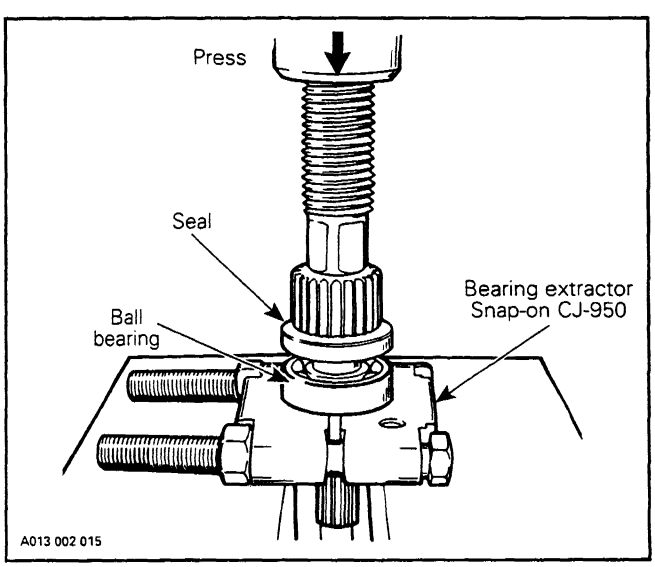
Apply Loctite Primer "T" and Loctite 648 (green) (P / N 290 899 788) inside crankcase hole, then press plug into crankcase.

11,12, Seal, Rotary Valve Shaft

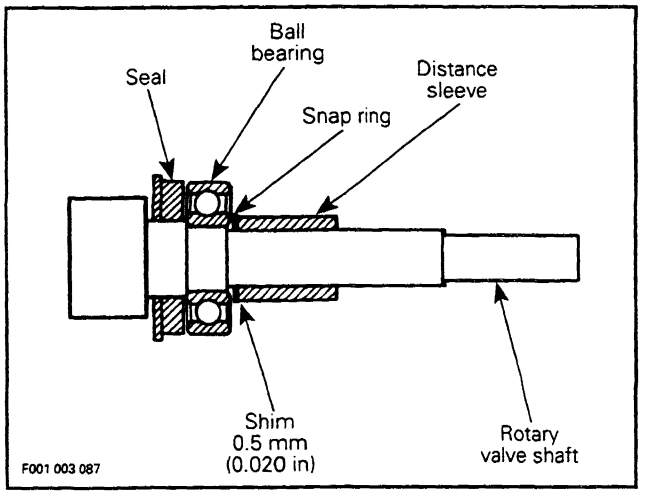
Apply lithium grease on seal lips. Position seal with shielded portion against shaft splines.

8,10,12, Snap Ring, Bearing and Rotary Valve Shaft

Install ball bearing as illustrated.



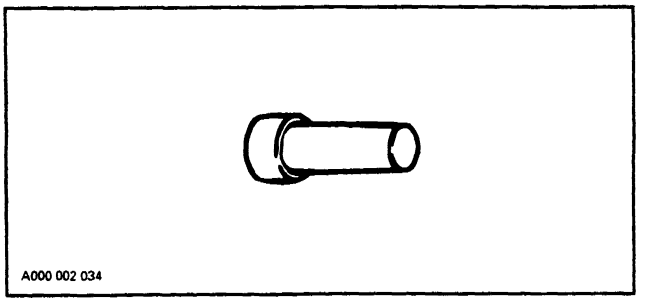
Install shim, snap ring and slide distance sleeve on shaft.



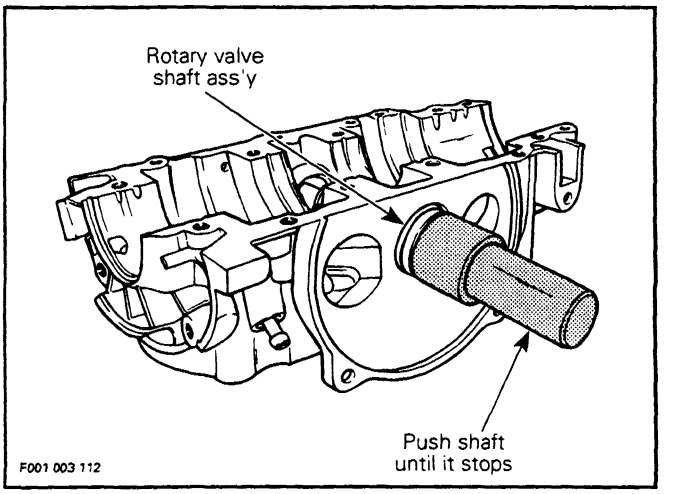
12,13, Rotary Valve Shaft Ass'y and Snap Ring

▼CAUTION : Crankcase halves must be separated and crankshaft must not be present to install rotary valve shaft ass'y in crankcase.

To install rotary valve shaft in crankcase, use a pusher (P / N 290 876 605).



Push shaft until its stops on bearing seat.



At snap ring installation, position it so that its sharp edge faces outwards.

ROTARY VALVE

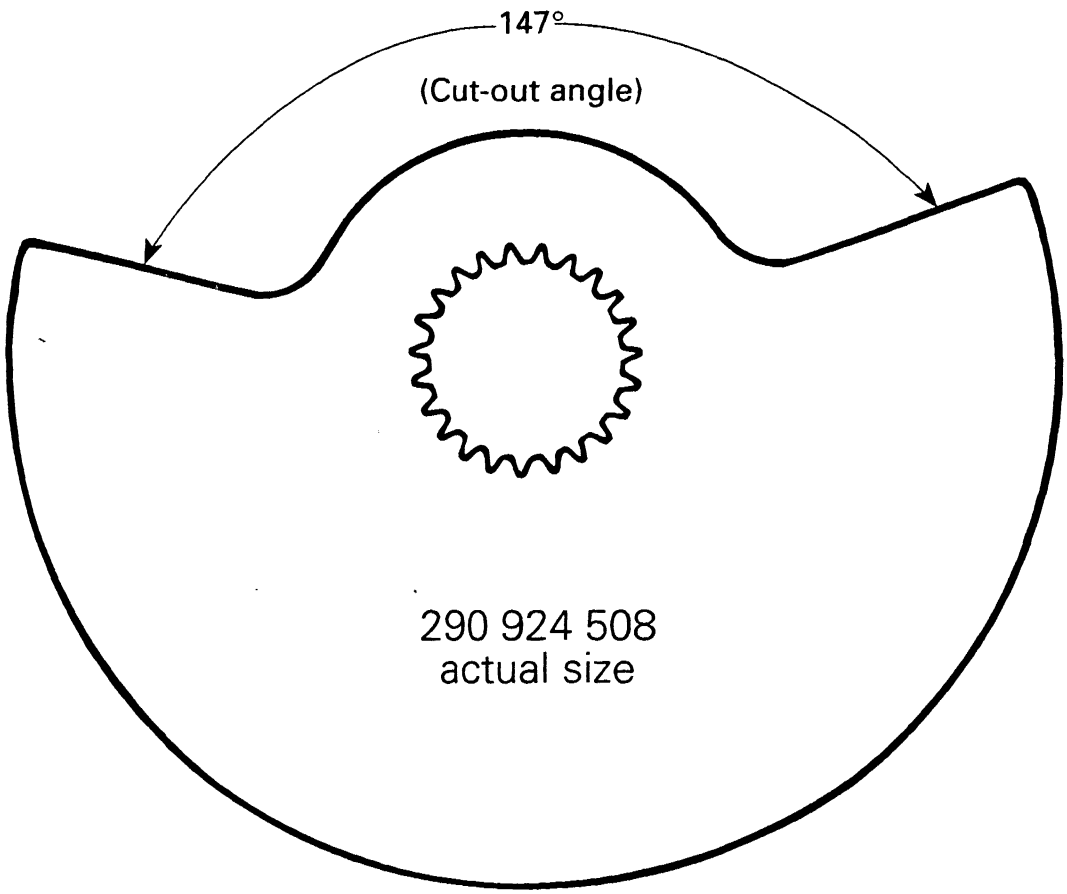
The rotary valve controls the opening and closing of the inlet ports. Therefore its efficiency will depend on the precision of its installation.

Identification of the rotary valve

Watercraft Model no.	Rotary Valve P / N	Valve Cut-out Angle
SP 5806 SPX 5807 SPI 5808 GTS 5813 EXPLORER 5820 XP 5852 GTX 5861	290 924 508	147°

There is no identification code on the valves. To find out the angle, place an angle finder on the valve and measure the valve cut-out angle or use the following template.

Template



A000 000 034

Rotary Valve Cover and Valve Clearance

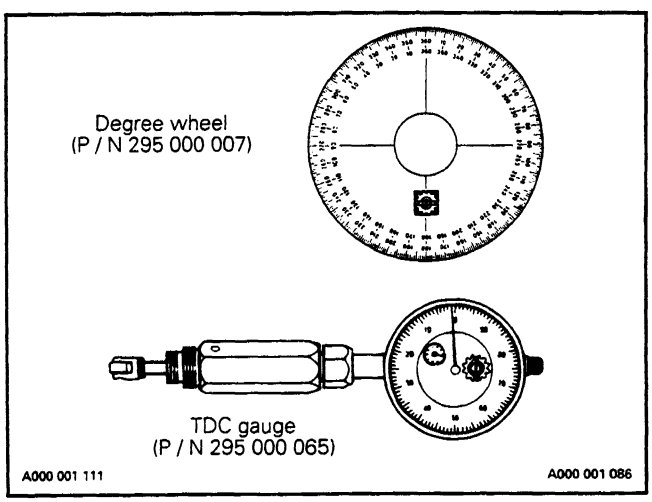
The clearance between rotary valve cover and valve must be 0.30 ± 0.05 mm (0.012 ± 0.002 in).

NOTE : If clearance is below 0.25 mm (0.010 in) it could create an overheating situation and if clearance is over 0.35 mm (0.014 in) it could create a hard starting situation.

Rotary Valve Timing

CAUTION : Never use the ridge molded in crankcase as a timing mark.

The following tools are required to measure rotary valve opening and closing angles in relation with MAG side piston.



Rotary valve must be set so that timing occurs as follows

WATERCRAFT MODEL NO.	TIMING	
	OPENING BTDC	CLOSING ATDC
SP 5806 SPI 5808 GTS 5813	115° + 5 - 5	80° + 5 - 5
SPX 5807 EXPLORER 5820 XP 5852 GTX 5861	130° + 5 - 5	65° + 5 - 5

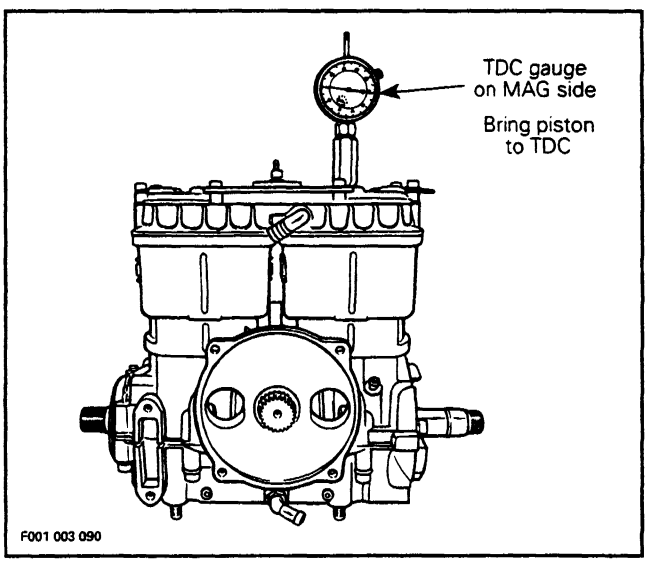
For the following instructions, let's use these specifications as example :

OPENING : 115° BTDC

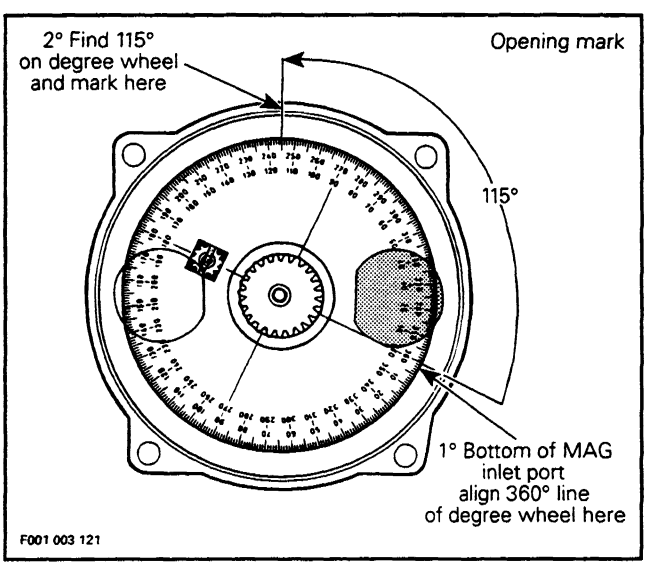
CLOSING : 80°ATDC

Proceed as follows :

— Turning crankshaft, bring **MAG side** piston to Top Dead Center using a TDC gauge.

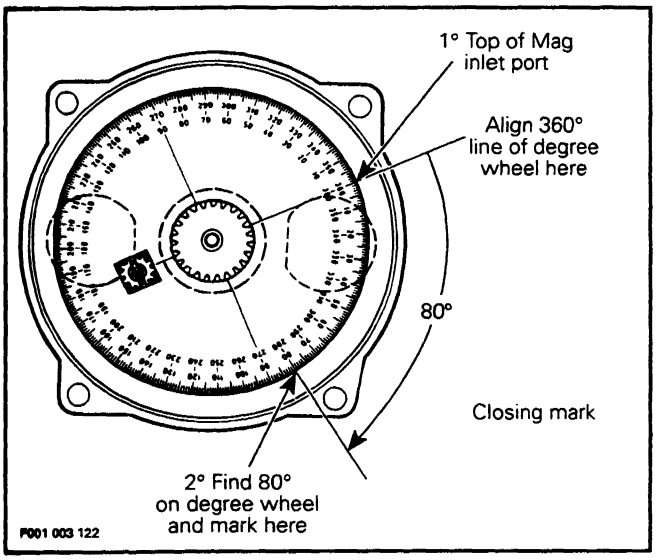


— For **opening** mark, first align 360° line of degree wheel with BOTTOM of **MAG side** inlet port. Then, find 115° line on degree wheel and mark crankcase at this point.



NOTE : Do not rotate the crankshaft.

— For **closing** mark, first align 360° line of degree wheel with TOP of **MAG side** inlet port. Then, find 80° line on degree wheel and mark crankcase at this point.



— Remove degree wheel.

— Position rotary valve on shaft splines to have edges as close as possible to these marks with the MAG piston at TDC.

NOTE : Rotary valve is asymmetrical. Therefore, try flipping it over then reinstall on splines to obtain best installation position.

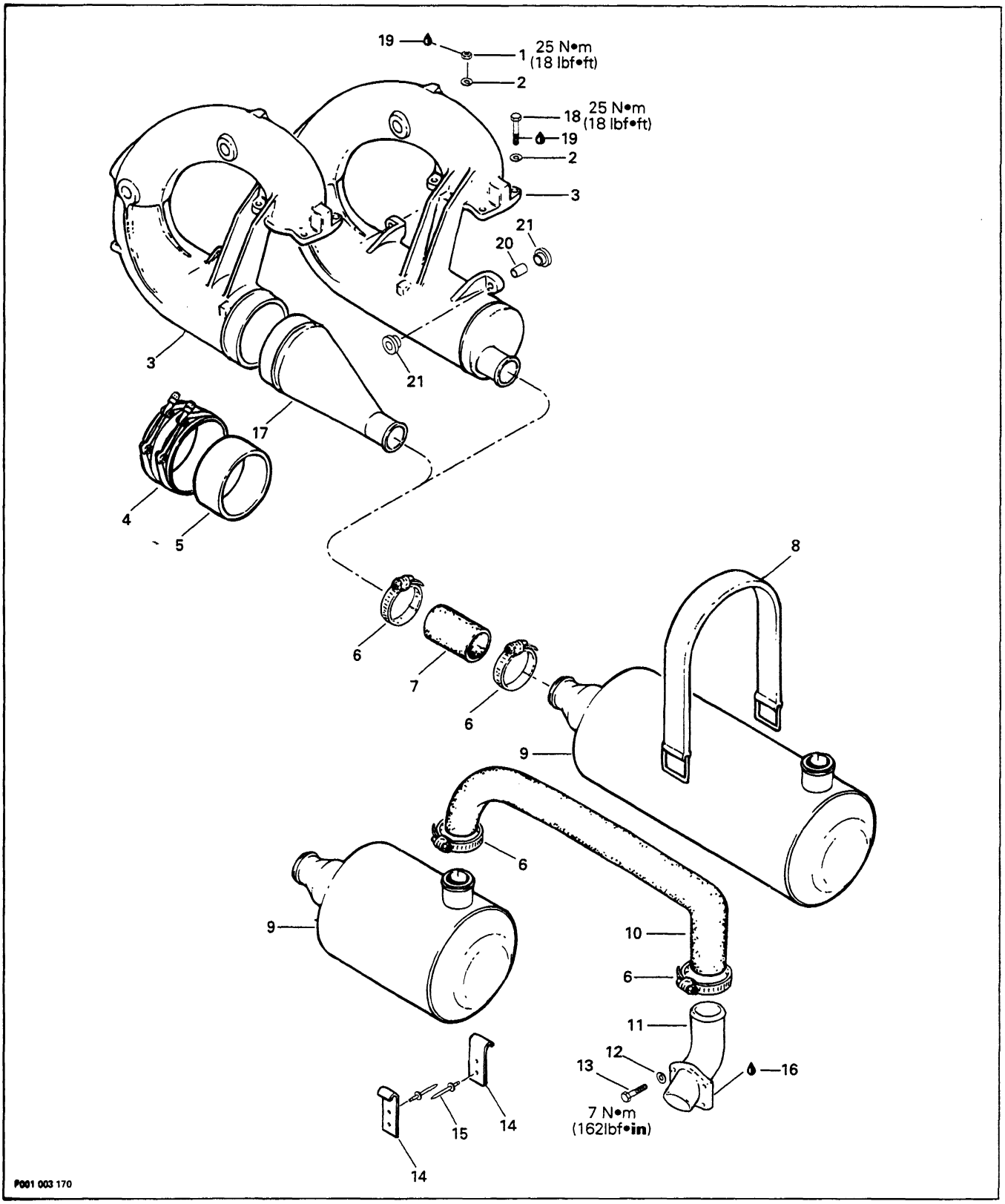
Apply SEA-DOO injection oil on rotary valve before reassembling rotary valve cover.

— Remove TDC gauge.

16,19, Rotary Valve Cover and Screw

Install O-ring and cover then torque screws to 20 N•m (15 lbf•ft) in a criss-cross sequence.

EXHAUST SYSTEM



COMPONENTS

1. *Hexagonal nut M8 (1)*
2. *Lock washer M8 (4)*
3. *Tuned pipe*
4. *Exhaust clamp*
5. *Rubber collar*
6. *Tridon clamp (4)*
7. *Exhaust hose*
8. *Muffler strap*
9. *Muffler*
10. *Formed hose*
11. *Exhaust outlet*
12. *Flat washer 6 mm (4)*
13. *Allen screw M6 x 20 (4)*
14. *Strap clip (2)*
15. *Rivet 3/16 (4)*
16. *Loctite 598 "Ultra Black"*
17. *Exhaust cone*
18. *Hexagonal screw M8 x 30 (3)*
19. *Loctite 242*
20. *Sleeve (2)*
21. *Rubber bushing (4)*

TUNED PIPE REPAIR

This procedure is given to repair tuned pipe cracks using T.I.G. welding process.

Procedure

— Sand the cracked area to obtain bare metal.

— Perform a 1.50 mm (1/16 in) depth chamfer over crack.

— Use pure argon gas with 5.55 mm (3/32 in) tungsten electrode (puretung "green", zirtung "brown") and AC current.

— Use aluminum welding rod 5.55 mm (3/32 in) (# 4043), to fill crack.

— Sand welding slightly to remove material surplus.

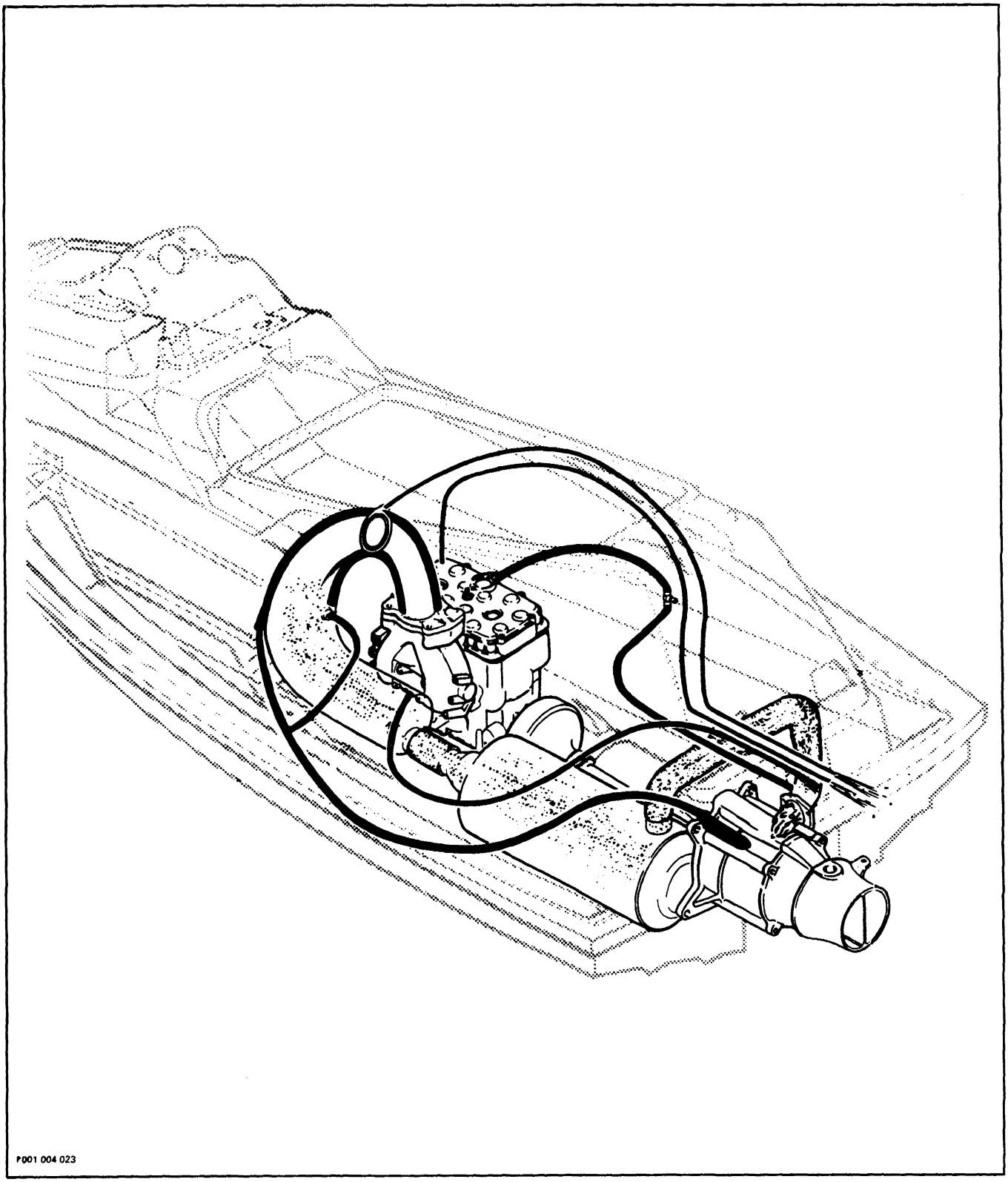
Test :

— Use compressed air at 124 kPa (18 PSI) to pressurize tuned pipe.

NOTE : Prior to verify leaks plug all holes and pressurize tuned pipe while immerging it in water.

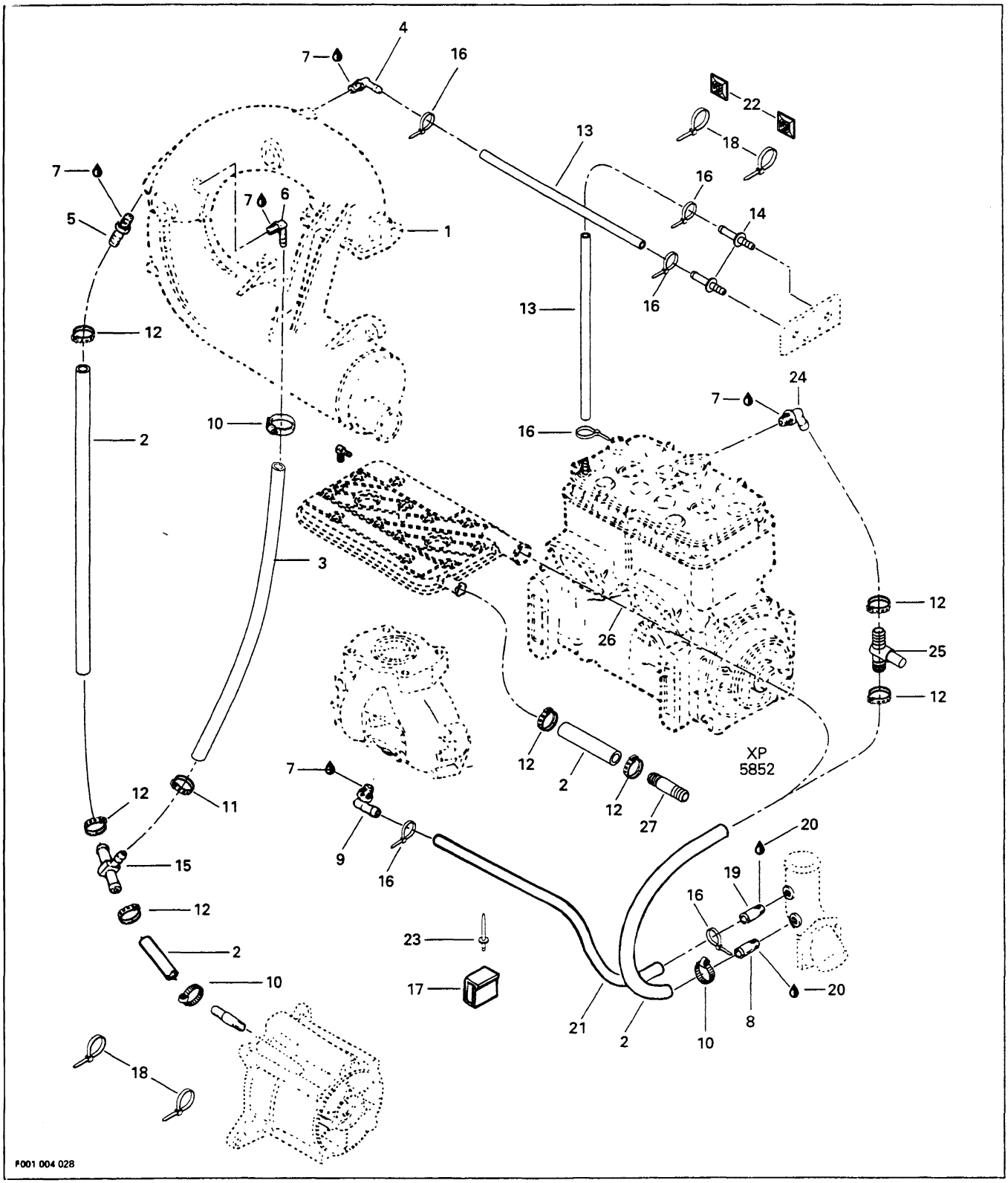
CAUTION : Always ensure water passages are not blocked partially or completely while welding tuned pipe.

COOLING SYSTEM



P001 004 023

COMPONENTS



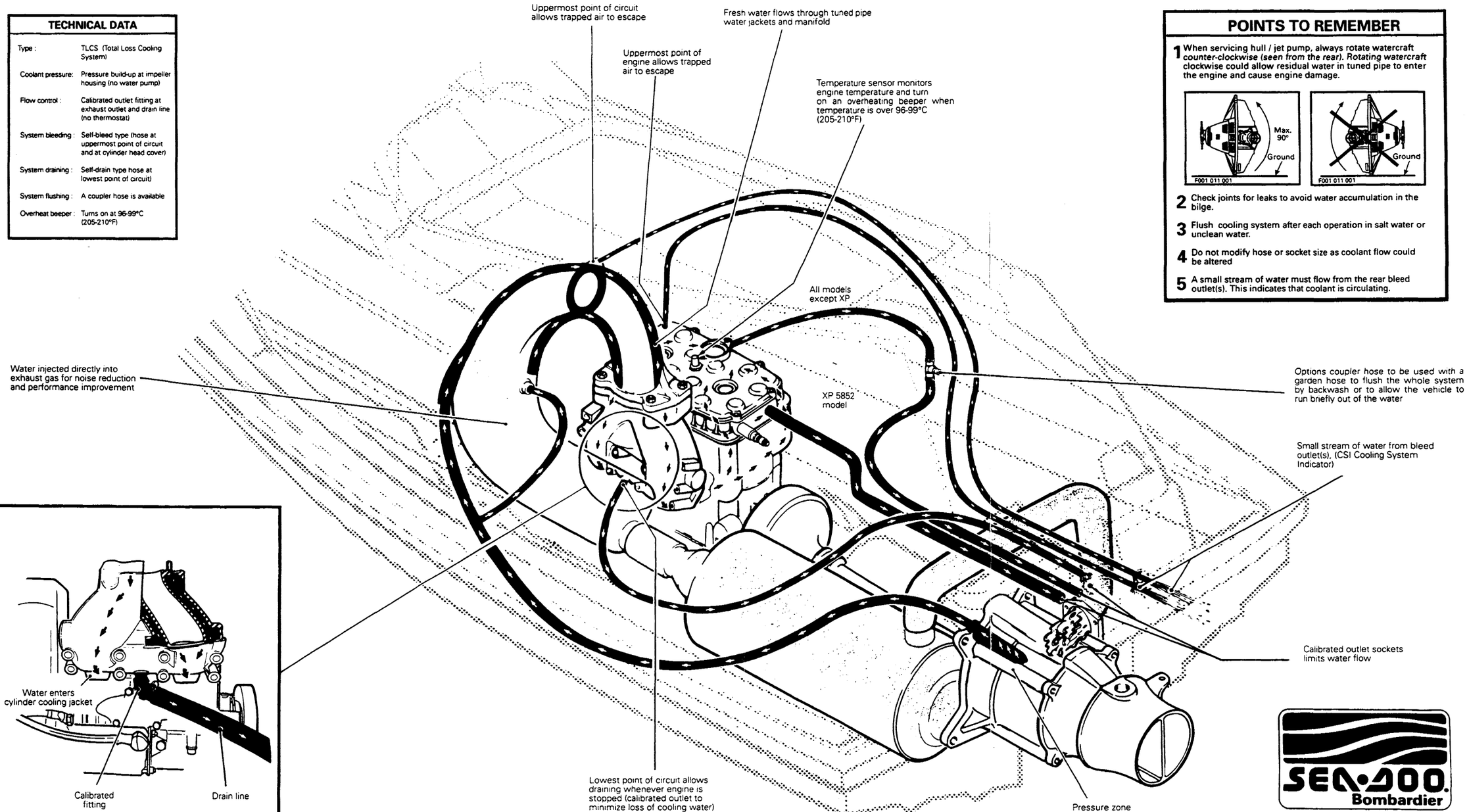
COMPONENTS

1. *Tuned pipe*
2. *Hose 12.5 mm*
3. *Hose 8 mm*
4. *Elbow fitting 90°*
5. *Male connector*
6. *Elbow fitting 90°*
7. *Loctite *PST 567*
8. *Male connector*
9. *Elbow fitting 90°*
10. *Tridon clamp (5)*
11. *Oetiker clamp*
12. *Oetiker clamp (4)*
13. *Hose 6 mm*
14. *Bleed fitting (2)*
15. *Tee fitting*
16. *Tie rap*
17. *Tie rap mount*
18. *Tie rap*
19. *Male connector*
20. *Loctite 592*
21. *Hose 8 mm*
22. *Tie rap mount (2)*
23. *Rivet*
24. *Elbow fitting 90°*
25. *Tee fitting (flushing)*
26. *Hose 20 mm (5852 model)*
27. *Fitting (flushing) (5852 model)*

SEA-DOO® WATERCRAFT COOLING SYSTEM

TECHNICAL DATA

Type :	TLCS (Total Loss Cooling System)
Coolant pressure:	Pressure build-up at impeller housing (no water pump)
Flow control :	Calibrated outlet fitting at exhaust outlet and drain line (no thermostat)
System bleeding :	Self-bleed type (hose at uppermost point of circuit and at cylinder head cover)
System draining :	Self-drain type hose at lowest point of circuit)
System flushing :	A coupler hose is available
Overheat beeper :	Turns on at 96-99°C (205-210°F)



POINTS TO REMEMBER

1. When servicing hull / jet pump, always rotate watercraft *counter-clockwise (seen from the rear). Rotating watercraft* clockwise could allow residual water in tuned pipe to enter the engine and cause engine damage.

2. Check joints for leaks to avoid water accumulation in the bilge.
3. Flush cooling system after each operation in salt water or unclean water.
4. Do not modify hose or socket size as coolant flow could be altered
5. A small stream of water must flow from the rear bleed outlet(s). This indicates that coolant is circulating.

F001 004 025

▼CAUTION : All hoses and fittings of the cooling system have calibrated inside diameters to assure proper cooling of the engine. Always replace using appropriate Bombardier part number.

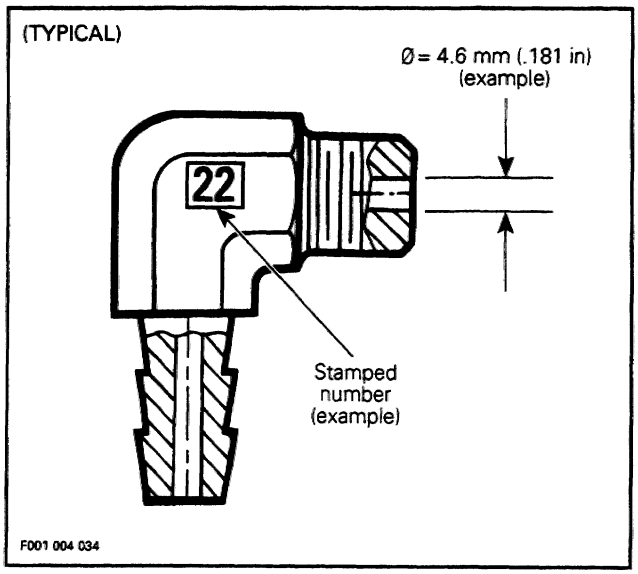
6, Elbow Fitting

Water injection used on exhaust system cools the exhaust gases to obtain maximum performance from the tuned pipe. The water intake elbow fitting has a calibrated inside diameter to optimize water flow in each model.

The water injection also helps in reducing noise level and cools components of the exhaust system.

▼CAUTION : The water intake elbow fittings are calibrated for each model and can not be interchanged with one of a different size as severe engine damage could result.

The elbow fitting can be identified by using the two digits number stamped onto the fitting or by measuring its inside diameter. Refer to the following illustration and chart.



Watercraft model	Stamped number on fitting	Fitting P / N	Fitting inside diameter	Fitting location
All models except XP (5852)	22	293 700 022	4.6 mm (.181 in)	On tuned pipe
XP (5852)	37	293 710 037	3.5 mm (.139 in)	On tuned pipe
XP (5852)	37	293 710 037	3.5 mm (.139 in)	On exhaust cone

FLUSHING

When the watercraft is operated in unclean water **and / or particularly in salt water**, flushing of cooling system is necessary.

▼CAUTION : Failure to perform cooling system flushing, when watercraft is used in salt water, will result in damage to watercraft components.

Since the watercraft uses the same water where it sails, for propulsion and cooling systems, this water flows everywhere in water jackets. If the watercraft is being used in salt water and cooling system is not regularly flushed, salt will corrode components.

Infiltration in cooling system of any particle present in the water is unavoidable. Deposit accumulation can clog cooling system and lead to severe engine damage.

Flushing is necessary when the watercraft is operated in :

- salt water
- debris filled water
- shallow water where the bottom is sandy and / or shell covered.

Flushing the cooling system **with fresh water** is essential to neutralize corroding effects of salt or other chemical products present in water. It will help to clear sand, salt, shells or other particles in water jackets (engine, exhaust manifold, tuned pipe) and / or hoses.

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.

▼CAUTION : Failure to flush cooling system, when necessary, will severely damage engine and / or exhaust system. Never flush a hot engine. Make sure engine operates during entire procedure.

◆WARNING : Do not touch any electrical parts or jet pump area when engine is running.

Clean jet pump by spraying water in its inlet and outlet.

◆WARNING : Always remove tether cord cap from switch to prevent accidental engine starting before cleaning the jet pump area. Engine must not be running for this operation.

A convenient coupler hose (P / N 295 500 099) can be installed on the watercraft for flushing.

Proceed as follows :

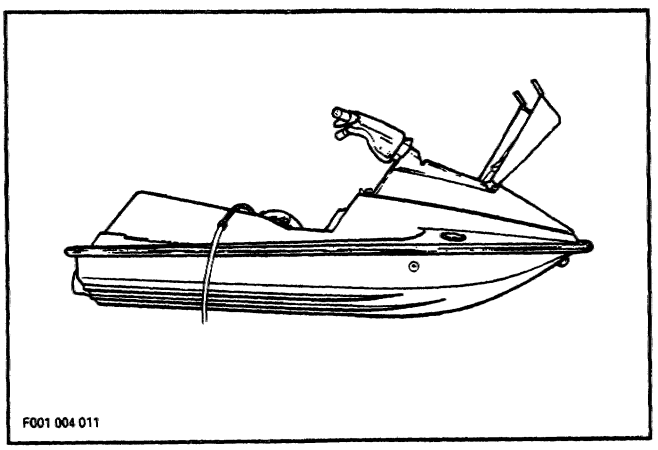
1. Remove seat to allow access to cooling system.
2. Remove dust cap from tee fitting spigot and attach coupler hose. Make sure coupler hose is properly locked to tee fitting spigot.

Attach other end of coupler hose to a garden hose. **Do not open water tap yet.**

NOTE : To allow a more efficient flushing on watercraft, install a hose pincher (P / N 295 000 076) between tee fitting and exhaust socket. This prevents water from exiting through exhaust socket.

NOTE : For XP model 5852 install the hose pincher on outlet hose.

Remove hose pincher after flushing operation.



3. Start the engine **then** immediately open the water tap.

CAUTION : Always start the engine before opening the water tap. Otherwise, water will back flow through the tuned pipe into the engine and may cause damage to internal parts. Open water tap immediately after engine is started to prevent overheating. Follow this procedure exactly.

4. Run the engine about five minutes at a fast idle around 3500 RPM.

CAUTION : Never run engine longer than five minutes. Drive line seal has no cooling when watercraft is out of water.

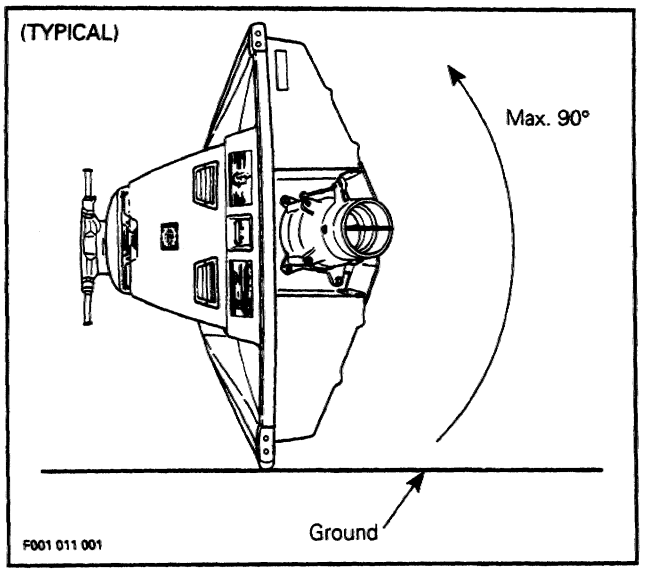
5. Close the water tap **then** stop the engine.

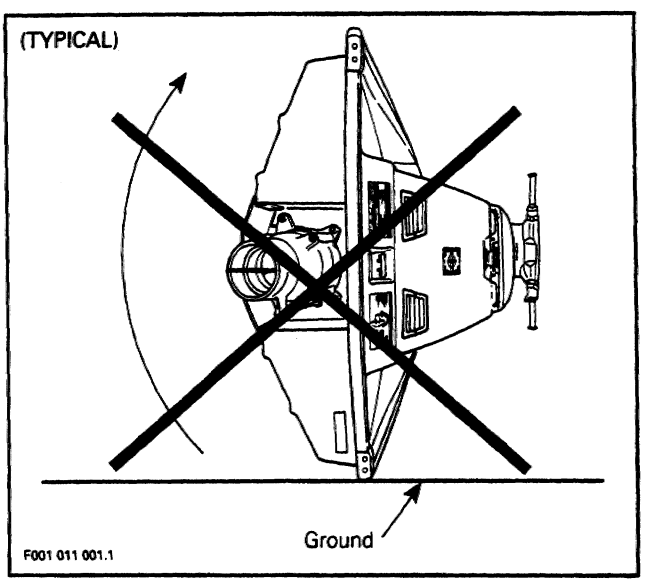
CAUTION : Always close the water tap before stopping the engine. Follow this procedure exactly otherwise severe engine damage could occur.

6. Press unlocking button to remove coupler hose. Reinstall dust cap over tee fitting.
7. Wipe off any residual water on the engine.
8. Reinstall seat and properly latch.

CARE

1. When servicing hull / jet pump, always rotate watercraft counterclockwise (seen from the rear). Rotating watercraft clockwise could allow residual water in tuned pipe to enter the engine and cause damage.





2. Check joints for leaks to avoid water accumulation in the bilge.
3. Do not modify hose or socket size as coolant flow could be altered.
4. When engine is running, water must flow from bleed outlet(s) indicating that water circulates.
5. For hose clamp installation, use special pliers (P / N 295 000 070).
6. When installing hoses onto fittings or when troubleshooting for water intake in the bilge area, confirm that all hoses are properly / tightly secured to the fittings.
7. Check overheating beeper operation by jumping terminal of thermosensor wire to ground. Beeper must operate.

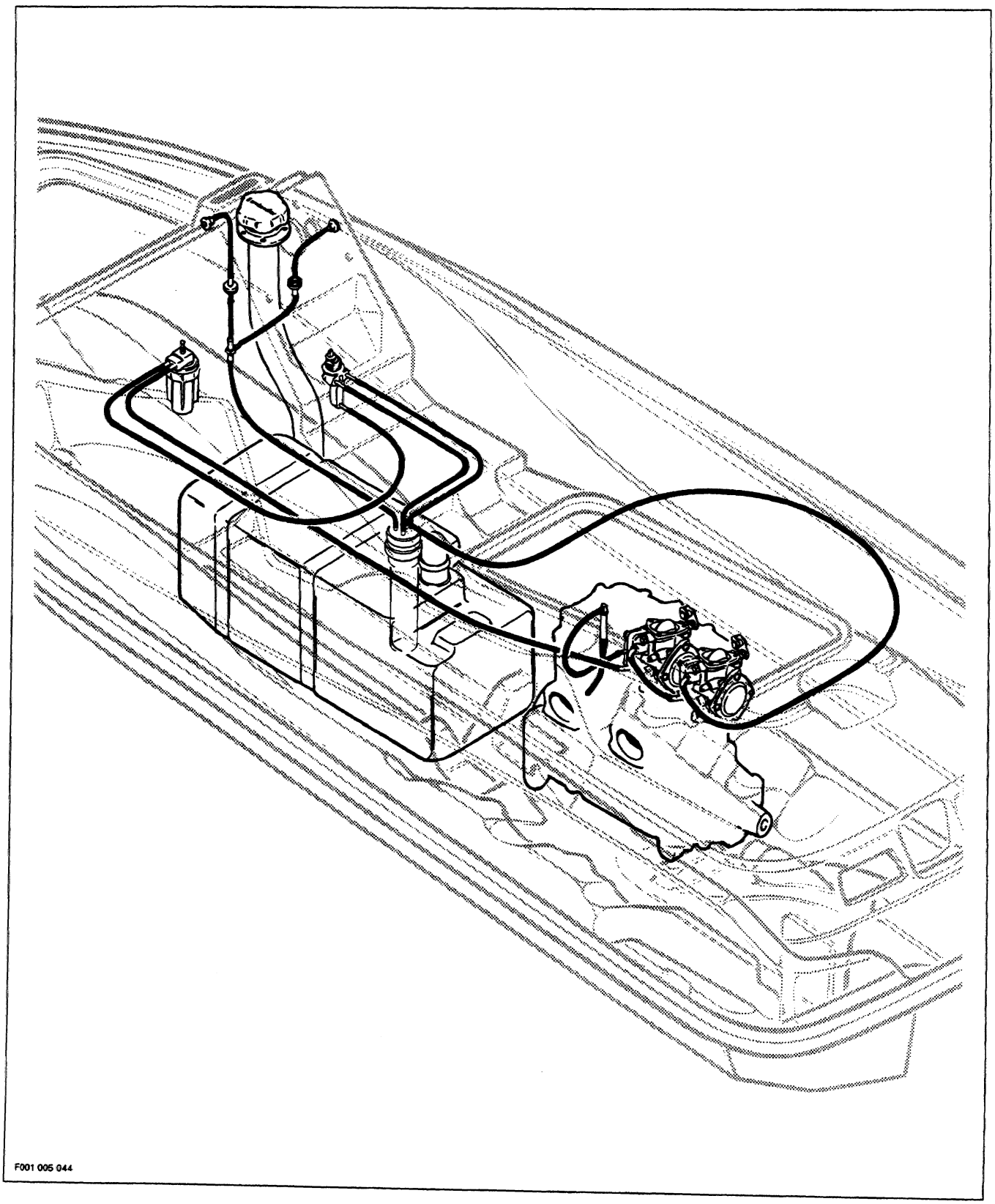
NOTE : Engine has to be started to test beeper operation.

At every verification of overheating beeper always apply dielectric grease (P / N 293 550 004) on thermosensor connector.

Verify wire terminal on connector for tightness. If too loose, squeeze terminal slightly at installation.

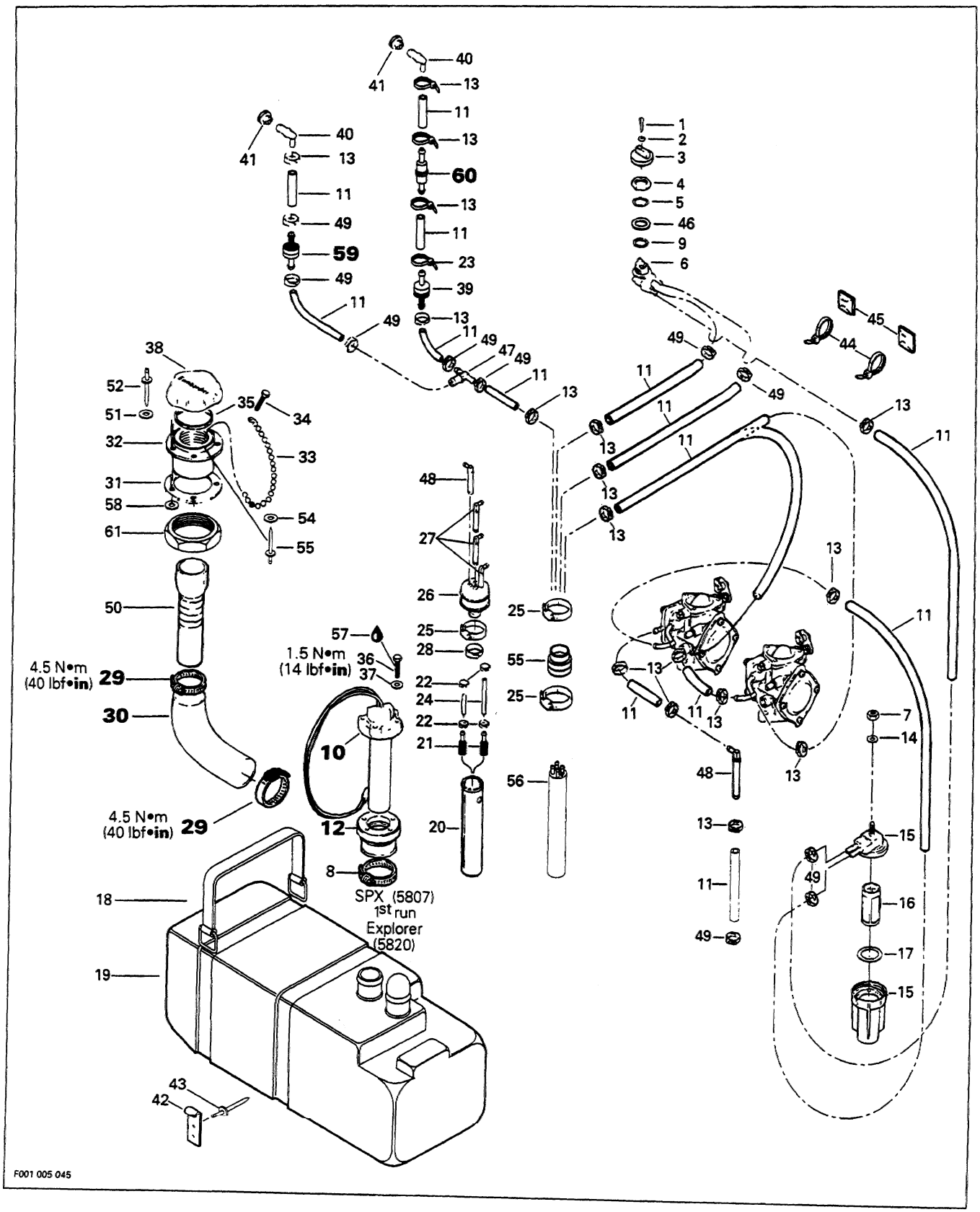
CAUTION : When investigating for no water flow in the cooling system, check all elbows and straight fittings as well as all hoses for blockage.

FUEL SYSTEM



F001 005 044

FUEL CIRCUIT



1. *Countersunk Phillips screw M4 x 8*
2. *Flat washer M4*
3. *Fuel valve knob*
4. *Nut M22*
5. *Gasket*
6. *Fuel valve*
7. *Elastic stop nut M6*
8. *Clamp, Explorer (5820), SPX (5807) 1st Run*
9. *Valve gasket*
10. *Fuel sensor, Explorer (5820), SPX (5807) 1st Run*
11. *Hose 6 mm*
12. *Fuel sensor adaptor, Explorer (5820), SPX (5807) 1st Run*
13. *Oetiker clamp*
14. *Flat washer M6*
15. *Fuel filter housing*
16. *Fuel filter*
17. *O-ring*
18. *Fuel tank strap (2)*
19. *Fuel tank*
20. *Baffle*
21. *Fuel filter screen (2)*
22. *Oetiker clamp (4)*
23. *Tie rap*
24. *Hose 6 mm*
25. *Tridon clamp*
26. *Tube adapter*
27. *Pick up tube (3)*
28. *Tridon clamp*
29. *Tridon clamp (2)*
30. *Filler neck hose*
31. *Gasket*
32. *Filler neck*
33. *Chain*
34. *Cylindrical Phillips screw M3.9 x 9.5*
35. *Gasket*
36. *Hexagonal screw M5 x 25, Explorer (5820), SPX (5807) 1st Run*
37. *Flat washer M5, Explorer (5820), SPX (5807) 1st Run*
38. *Fuel tank cap*
39. *Check valve*
40. *Elbow fitting 90° (2)*
41. *Grommet (2)*
42. *Strap clip (6)*
43. *Rivet 3/16 x .565 (12)*
44. *Tie rap*
45. *Tie mount (6)*
46. *Washer*
47. *«Tee» fitting*
48. *Pick up tube (2)*
49. *Oetiker clamp*
50. *Inner filler neck hose*
51. *O-ring (8)*
52. *Rivet 1/8 x .690 (8)*
53. *Flat washer M3 (2)*
54. *Rivet 1/8 x .502 (2)*
55. *Adapter*
56. *Baffle pick up*
57. *Loctite 242*
58. *Washer (8)*
59. *Pressure relief valve*
60. *Water eliminator valve*
61. *Nut XP (5852)*

GENERAL

Whenever repairing the fuel system, always verify for water infiltration in reservoir.

29, 30, Clamp and Filler Hose

Verify fuel filler neck hose for damage. Always ensure that clamps are well positioned and tightened. Torque clamps to 4.5 N•m (40 lbf•**in**).

59, Pressure Relief Valve

This valve will eliminate fuel spillage when the watercraft is upside down. If pressure is built up in fuel system the valve should open at 10 kPa (1.5 PSI) to release the pressure.

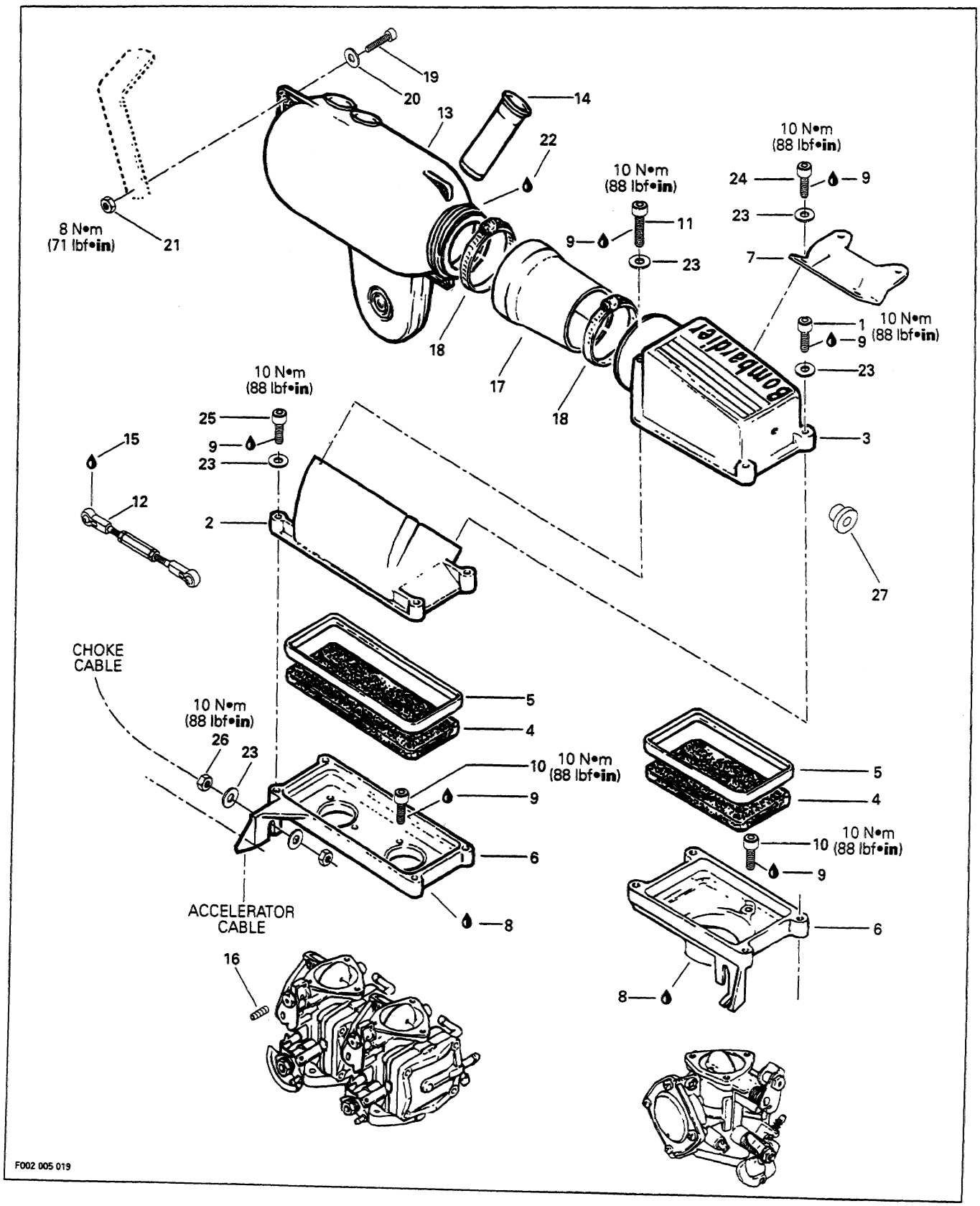
◆ **WARNING : If pressure relief valve is stuck, the pressure in fuel system will build up and it may cause fuel leakage in engine compartment.**

○ NOTE : It is a one way valve with an arrow to indicate the air flow.

60, Water Eliminator Valve

This valve will reduce water intrusion in fuel system. It is a one way valve with an arrow to indicate the air flow.

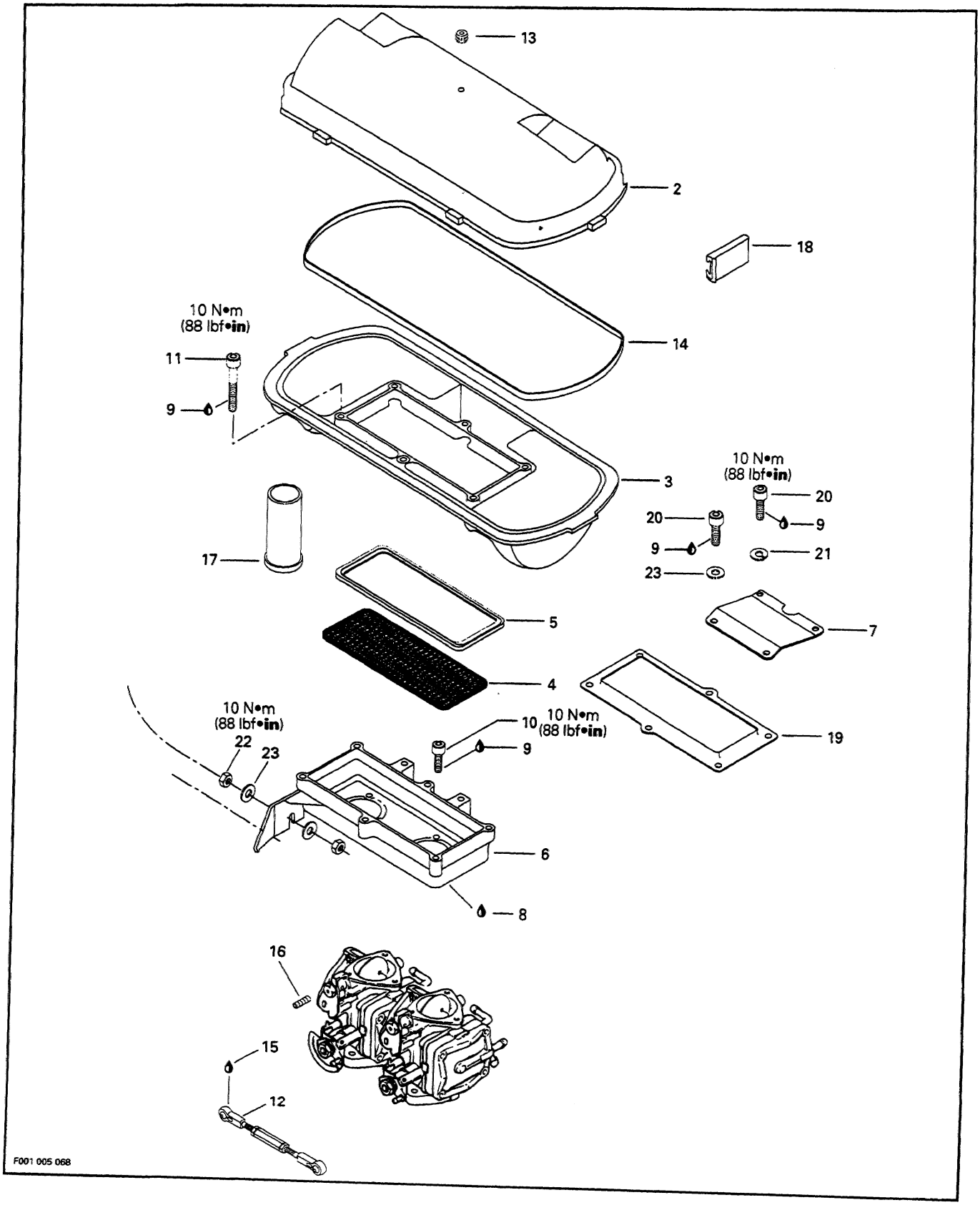
AIR INTAKE



AIR INTAKE

1. *Allen screw M6 x 25 (2)*
2. *Cover adaptor except SP (5806), SPI (5808), GTS (5813)*
3. *Flame arrester cover*
4. *Flame arrester foam*
5. *Isolator*
6. *Base*
7. *Support*
8. *Loctite 515*
9. *Loctite 242*
10. *Allen screw M6 x 16 (6)*
    Allen screw M6 x 30 (3)
11. *Allen screw M6 x 80 (2)*
12. *Carburetor linkage*
13. *Air intake silencer*
14. *Inlet tube (2)*
15. *Synthetic grease*
16. *Screw M4 x 6 (2)*
17. *Performed hose*
18. *Clamp (2)*
19. *Hexagonal Screw M6 x 20*
20. *Flat washer M6*
21. *Hexagonal nut M6*
22. *Silicone 732 RTV*
23. *Flat washer M6 (10)*
24. *Allen screw M6 x 12 (2)*
25. *Allen screw M6 x 30 (4) except SP (5806), SPI (5808), GTS (5813)*
26. *Nut M6 (2)*
27. *Rubber plug*

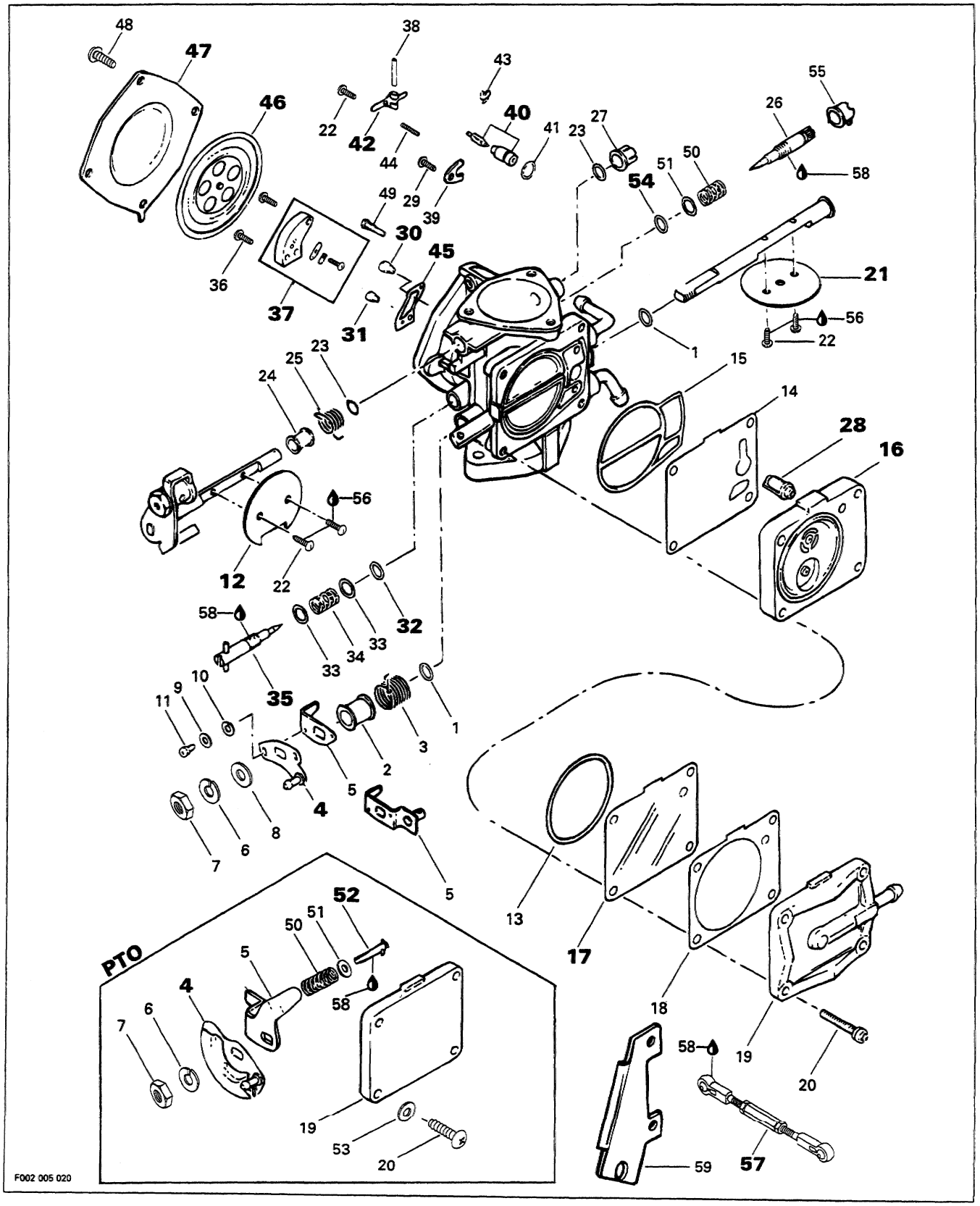
AIR INTAKE XP MODEL (5852)



AIR INTAKE XP MODEL (5852)

1. *Allen screw M6 x 25 (2)*
2. *Air silencer cover*
3. *Air silencer base*
4. *Flame arrester foam*
5. *Isolator*
6. *Base*
7. *Support*
8. *Loctite "515"*
9. *Loctite "242"*
10. *Allen screw M6 x 16 (6)*
11. *Allen screw M6 x 30*
12. *Carburetor linkage*
13. *Rubber plug*
14. *Gasket*
15. *Synthetic grease*
16. *Screw M4 x 6 (2)*
17. *Inlet tube (4)*
18. *Retaining slide (6)*
19. *Holder*
20. *Allen screw M6 x 12 (4)*
21. *Hexagonal washer M6 (2)*
22. *Nut M6 (2)*
23. *Washer M6 (2)*

CARBURETORS



CARBURETORS

1. *Sealing ring (2)*
2. *Sleeve*
3. *Spring*
4. *Throttle lever*
5. *Throttle lever stopper*
6. *Lock washer*
7. *Nut*
8. *Ring*
9. *Washer*
10. *Lock washer*
11. *Screw*
12. *Choke valve*
13. *O-ring*
14. *Gasket*
15. *O-ring*
16. *Pump body*
17. *Diaphragm*
18. *Gasket*
19. *Pump cover*
20. *Screw (4)*
21. *Throttle valve*
22. *Screw and spring washer (5)*
23. *Sealing ring (2)*
24. *Sleeve*
25. *Spring*
26. *Main jet screw (locked)*
27. *Ring*
28. *Filter*
29. *Screw and spring washer*
30. *Main jet*
31. *Pilot jet*
32. *O-ring*
33. *Washer (2)*
34. *Spring*
35. *Low speed mixture screw*
36. *Screw (2)*
37. *Check valve housing*
38. *Pin*
39. *Plate*
40. *Needle valve*
41. *O-ring*
42. *Needle valve lever*
43. *Clip*
44. *Spring*
45. *Gasket*
46. *Diaphragm*
47. *Cover*
48. *Screw (4)*
49. *Plug*
50. *Spring (2)*
51. *Washer (2)*
52. *Screw*
53. *Washer (4)*
54. *O-ring*
55. *Cap*
56. *Loctite 242*
57. *Carburetor linkage*
58. *Synthetic grease*
59. *Bracket (twin carburetor only)*

REMOVAL FROM ENGINE

To remove carburetors from engine, proceed as follows :

Intake and Fuel Systems (Single Carburetor)

Loosen clamp of air intake silencer hose on flame arrester cover.

Move air intake silencer hose to rear of watercraft. Remove screws holding flame arrester cover to engine, then remove screws from cover and withdraw cover. Remove throttle cable from flame arrester base and unhook cable from throttle rope lever. Unscrew Allen screw holding choke cable rod to choke shaft levers then remove cable rod.

NOTE : Choke cable does not need to be removed from flame arrester base.

Unscrew base retaining screws then remove base from carburetor and move it to front of watercraft.

Turn fuel valve to OFF position.

Disconnect impulse line, fuel supply line and fuel return line from fuel pump.

Remove two nuts, lock washers from carburetor base and withdraw carburetor.

NOTE : For easier access to right carburetor base nut, throttle rope lever should be removed from throttle shaft.

Intake and Fuel Systems (Twin Carburetors Except XP Model (5852))

Loosen clamp of air intake silencer hose on flame arrester cover.

Move air intake silencer hose to rear of watercraft. Remove screws holding flame arrester cover to engine, then remove screws from cover and flame arrester adaptor. Remove cover and adaptor from watercraft. Remove throttle cable from flame arrester base and unhook cable from throttle rope lever. Unscrew Allen screws holding choke cable rod to choke shaft levers then remove cable rod.

NOTE : Choke cable does not need to be removed from flame arrester base.

Unscrew base retaining screws then remove base from carburetors and move it to front of watercraft.

Turn fuel valve to OFF position.

Disconnect impulse line from fuel pump.

Disconnect fuel supply line from fuel pump.

Disconnect fuel return line from PTO side carburetor.

Remove oil injection cable bracket from fuel pump cover.

Remove four bolts, lock washers from rotary valve cover then move carburetors and rotary valve cover together on top of engine.

NOTE : Oil lines from oil pump don't need to be removed and don't disconnect oil injection cable from oil pump lever.

Intake and Fuel Systems (XP Model (5852))

Remove air vent tube support from body opening.

Unlock retaining slides holding air intake silencer cover and remove cover.

Remove screws holding flame arrester retainer and air intake silencer base to flame arrester base. Remove air instake silencer base from watercraft.

Remove throttle cable from flame arrester base and unhook cable from throttle rope lever. Unscrew Allen screws holding choke cable rod to choke shaft levers then remove cable rod.

NOTE : Choke cable does not need to be removed from flame arrester base.

Remove screws holding flame arrester base to cylinder head cover

Unscrew base retaining screws then remove base from carburetors and move it to front of watercraft.

Turn fuel valve to OFF position.

Disconnect impulse line from fuel pump.

Disconnect fuel supply line from fuel pump.

Disconnect fuel return line from PTO side carburetor.

Remove oil injection cable bracket from fuel pump cover.

Remove four bolts, lock washers from rotary valve cover then move carburetors and rotary valve cover together on top of engine.

NOTE : Oil lines from oil pump don't need to be removed and don't disconnect oil injection cable from oil pump lever.

CLEANING

The entire carburetor should be cleaned with a general solvent and dried with compressed air before disassembly.

CAUTION : Be careful at carburetor cleaning not to remove paint. Paint removal will cause carburetor to rust very rapidly. Repaint if necessary.

Carburetor body and jets should be cleaned in a carburetor cleaner following manufacturer's instruction.

WARNING : Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as they are flammable and explosive.

CAUTION : Heavy duty carburetor cleaner may be harmful to the rubber parts, O-ring, etc. Therefore, it is recommended to remove those parts prior to cleaning.

Discard O-rings, diaphragms and gaskets.

INSPECTION

Inspect parts for corrosion damage (shaft, butterfly, spring, screw, check valve housing, etc).

40, Needle Valve

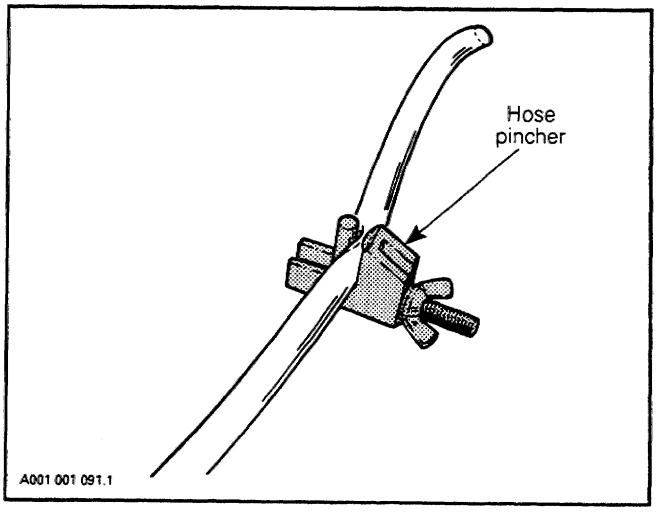
Inspect needle valve tip for a grooved condition. If worn, needle and seat must be replaced as a matched set.

35, Low-Speed Mixture Screw

Check tip for a grooved condition. Replace if necessary.

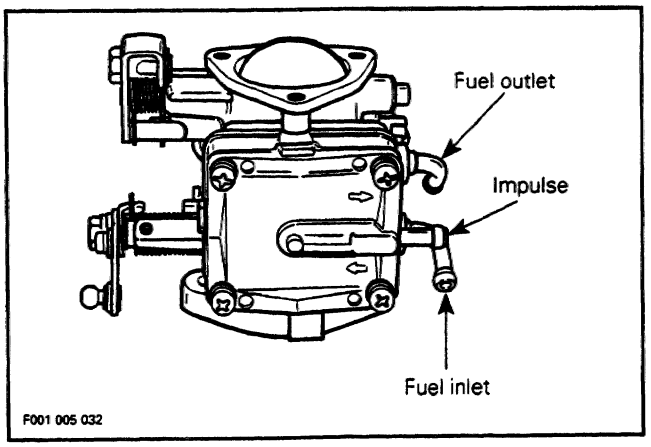
PUMP VERIFICATION

Install a hose pincher (P / N 295 000 076) on fuel supply line close to pump inlet. Disconnect fuel inlet line.



Disconnect fuel outlet line.

Disconnect impulse line.



Check fuel pump valves operation as follows :

Connect a clean plastic tubing to the inlet nipple and alternately apply pressure and vacuum with the mouth. The inlet valve should release with pressure and hold under vacuum.

Repeat the same procedure at the outlet nipple. This time the outlet valve should hold with pressure and release under vacuum.

◆ **WARNING : Some fuel may be present in fuel pump. Be Careful not to swallow fuel when under vacuum.**

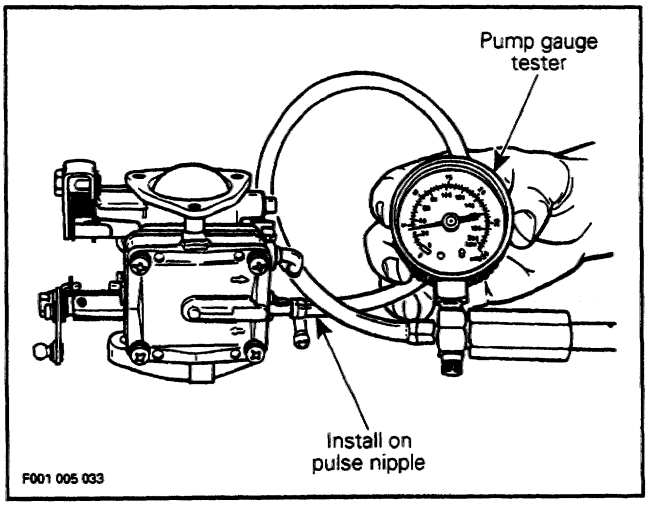
17, Diaphragm

Pump Diaphragm Leak Test

Using a suitable pump gauge tester, perform the following test proceeding as follows :

— Install pump gauge tester (P / N 295 000 083) on pulse nipple.

— Pump tester until it reaches 28 kPa (4 PSI).



Diaphragm must stand pressure for 10 seconds. If pressure drops, replace diaphragm.

16, Pump Body

Inspect valves. The pumping area should be free of holes, tears or imperfections. Replace as needed.

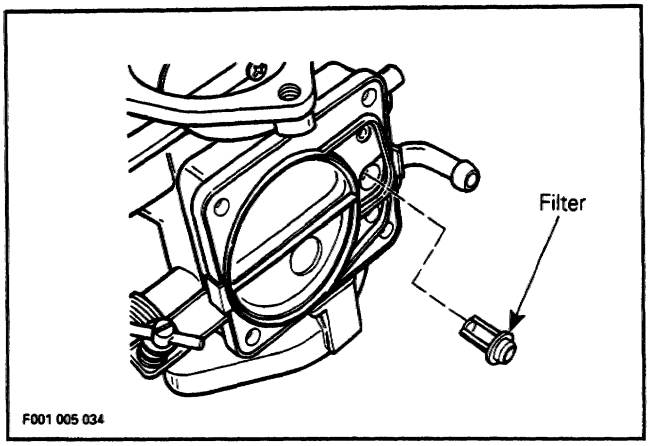
28, Filter

To verify filter condition proceed as follows :

Remove pump cover, gasket, diaphragm and then pump body and gasket.

Remove filter from carburetor body then clean filter and blow carefully with compressed air (low pressure).

Replace filter if damaged.



ASSEMBLY

When assembling pump, ensure to properly position components together. Refer to previous illustrations if necessary.

12,21, Choke Valve and Throttle Valve

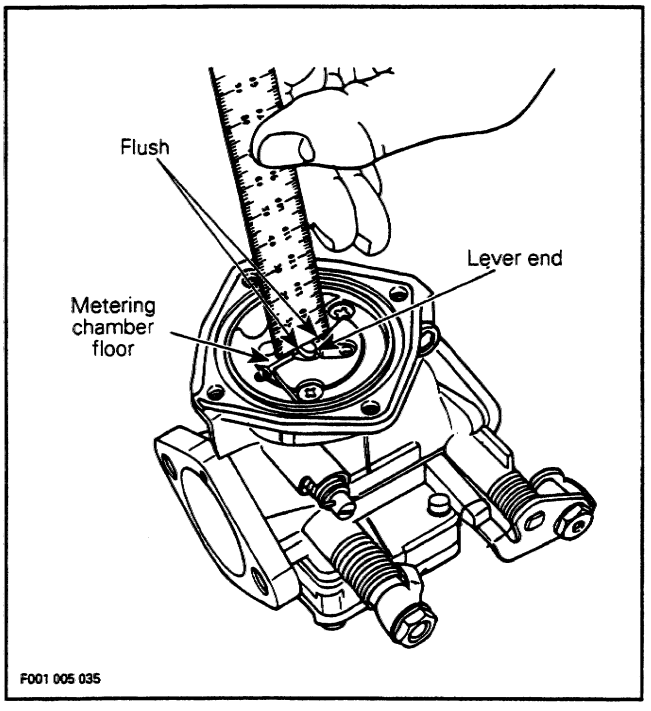
When installing butterfly onto shaft, close butterfly so that it centers into carburetor bore. Firmly tighten screws.

▼CAUTION : Always apply Loctite 242 (blue) on screw threads prior to installing screws.

42, Needle Valve Lever

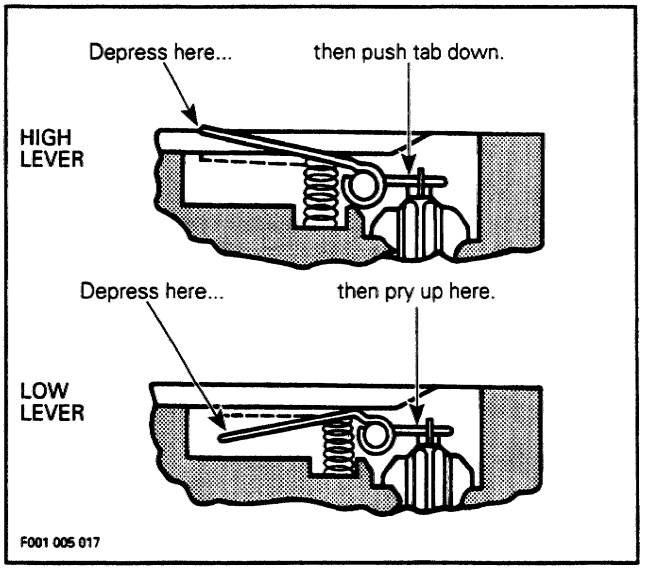
Inlet Control Lever

Rounded end of needle valve lever must be flush with surrounding metering chamber floor and not with body assembly. Place the end of a ruler over lever to check adjustment.



To adjust, bend lever very slightly to change its height.

▼CAUTION : When adjusting lever, do not pry it so that it applies pressure on needle. This could damage valve seat / needle.



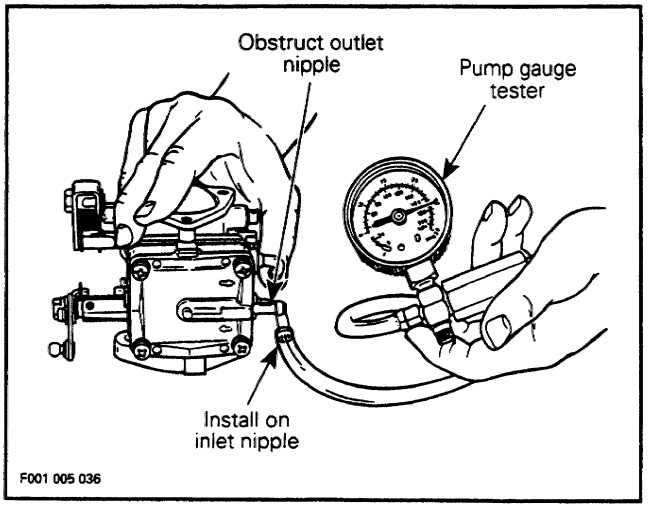
Pressure Test

Proceed as follows :

- Install pump gauge tester on carburetor inlet nipple.
- Obstruct outlet nipple with a finger.
- Pump tester until inlet release pressure is reached (seen by a sudden pressure drop). This must occur within 150-225 kPa (21-32 PSI) then pressure will drop.

The pressure drop will vary, but it should not go less then 100 kPa (15 PSI).

○NOTE : Pressure test should be performed three times to obtain a valid reading.



If release pressure is not within specification, check control lever adjustment. Replace spring as necessary.

▼ **CAUTION : Do not stretch or cut spring.**

Leak Test

Needle valve must stand a pressure of 69 kPa (10 PSI) for 30 seconds. Otherwise, hold carburetor upside down, pour oil over needle valve and apply pressure.

Check for bubbles. If they come from seat O-ring, bubbles will exit around seat. Retighten as necessary.

If it still leaks remove needle and seat and replace O-ring.

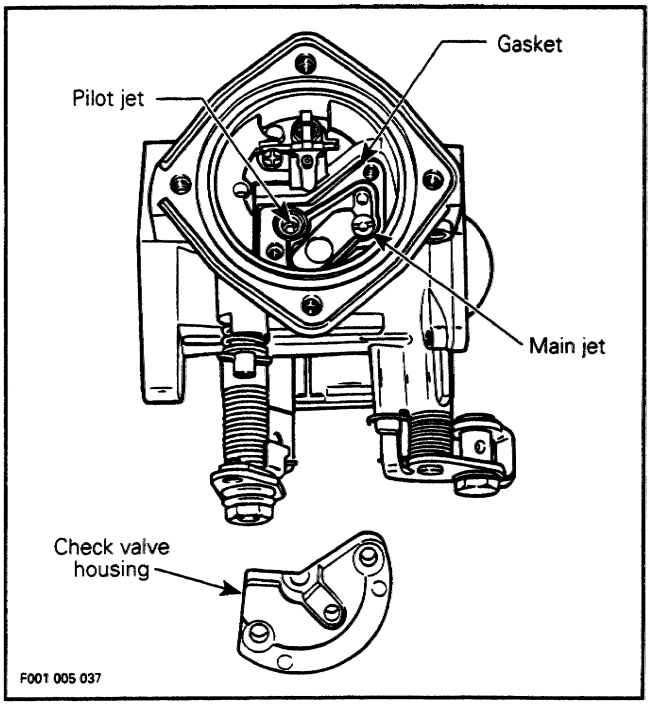
If bubbles come from needle, replace needle and seat.

30,31, Main Jet and Pilot Jet

Pilot jet and main jet are replaceable. Different jet sizes are available to suit temperature and altitude conditions. Always inspect spark plug tip condition when dealing with pilot jet and main jet. Spark plug tip condition gives a good indication of carburetor mixture setting.

▼ **CAUTION : Adjustments vary with temperature and altitude. Always observe spark plug condition for proper jetting.**

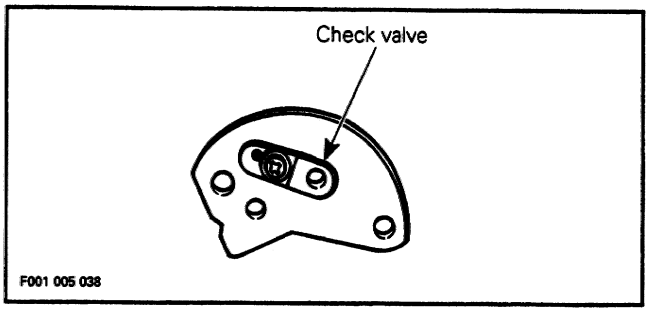
○ NOTE : To have access to pilot jet or main jet, check valve housing must be removed.



37,45, Check Valve, Gasket and Check Valve Housing

The check valve is needed if a back pressure occurs into carburetor. It will prevent fuel from flowing back into carburetor lower portion.

Inspect check valve, it should be free of holes, tears or imperfections. Replace as needed.



○ NOTE : Prior to check valve housing installation, remember to set gasket.

46,47, Diaphragm and Cover

Install diaphragm with its integrated O-ring into carburetor groove. Make sure that the tab of cover is inserted into carburetor notch.

32,54, O-ring

When installing O-rings of low-speed mixture screw and main jet screw, apply some SEA-DOO LUBE (P / N 293 600 006) to prevent sticking.

Carburetor Mount Nuts

Install lock washers and apply Loctite 242 (P / N 293 800 015) on threads then torque nuts to 25 N•m (18 lbf•ft).

Fuel Lines and Hose Clamps

If fuel line ends are damaged, cut damaged end before reinstallation.

Properly tighten clamps with special pliers (P / N 295 000 070).

◆ **WARNING : Make sure there is no leak in fuel system.**

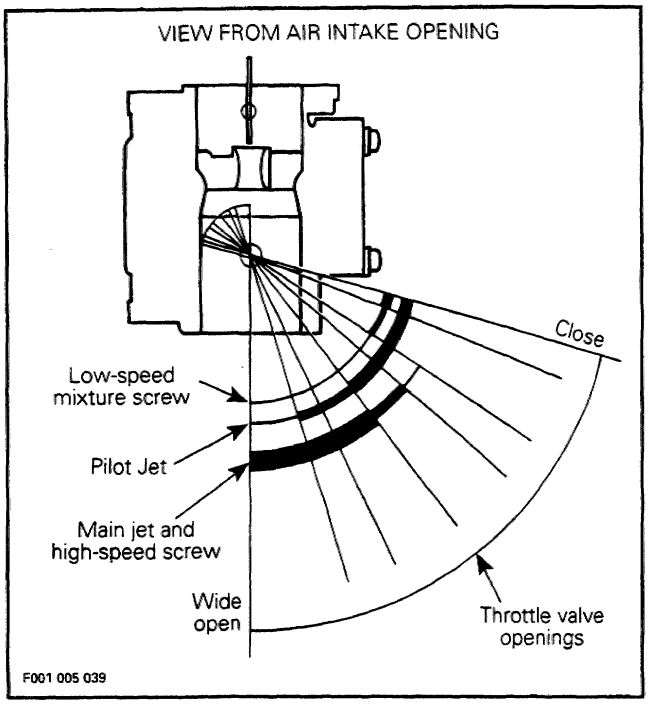
Refer to **fuel system pressurization.**

Flame Arrester

Always verify if flame arrester is dirty or restricted.

◆ **WARNING : Never operate watercraft without flame arrester.**

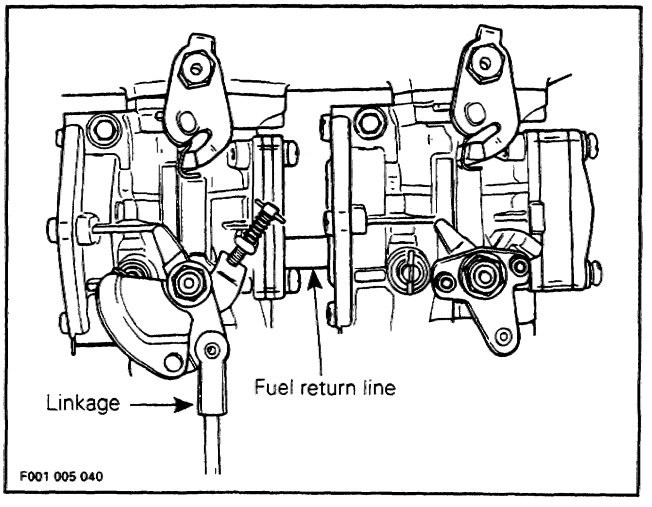
The following illustration shows which part of the carburetor begins to function at different throttle valve openings.



DISASSEMBLY (Twin carburetor)

57, Carburetor Linkage

Disconnect fuel return line between carburetors and disconnect linkage from carburetor. Unscrew carburetor mount nuts and remove carburetor.



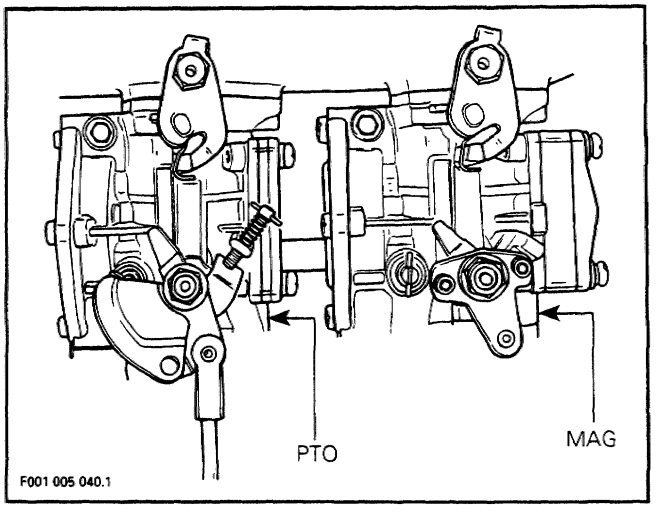
ASSEMBLY

Carburetor Synchronization (SPX Model (5807) 1st Run and Explorer (5820))

At assembly, pay attention to the following.

MAG Carburetor and PTO Carburetor

When installing carburetors pay attention on which side of oil pump mounting flange carburetors are to be located. To ensure proper installation, carburetors are identified on the side with MAG or PTO. Refer to following illustration.

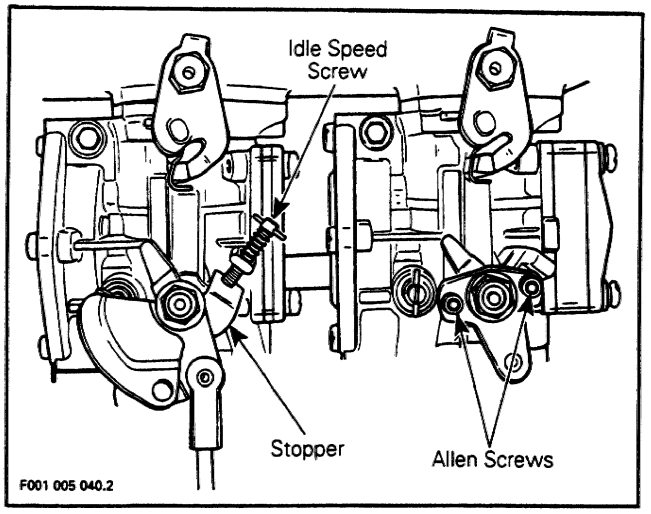


4,52, Throttle Levers and Idle Speed Screw

With idle speed screw not touching stopper on PTO carburetor, both throttle levers are in closed position.

Loosen Allen screws on MAG carburetor throttle lever.

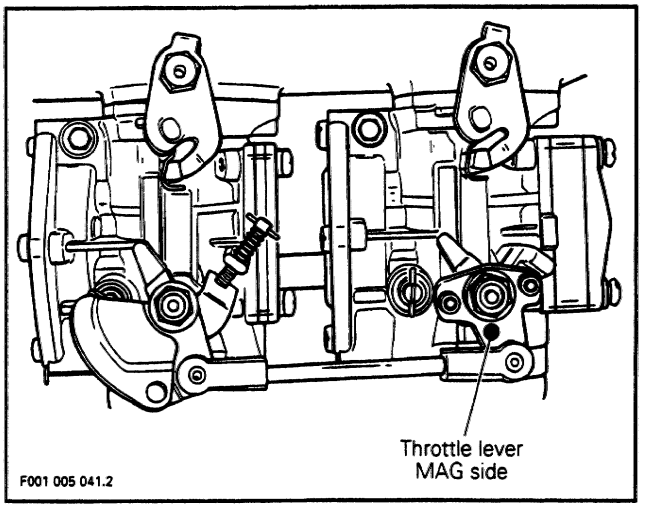
NOTE : Ensure throttle lever is released. Paint could possibly hold lever.



NOTE : Grease carburetor linkage at both ends with synthetic grease (P / N 293 550 010).

Connect linkage between both carburetor levers and fully tighten Allen screws on carburetor throttle lever MAG side. Be careful not to rotate lever while tightening it.

CAUTION : This set-up is done to ensure good synchronization between carburetor throttle levers when throttle lever is pushed at handlebar grip.



CAUTION : Throttle valves must open simultaneously. Otherwise this will cause engine to vibrate and / or back fire.

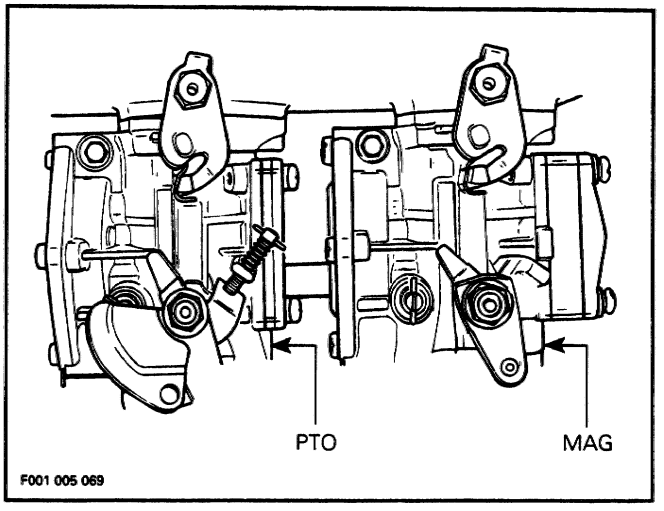
Carburetor Synchronization (All Models Except SPX Model (5807) 1st Run and Explorer (5820))

At assembly, pay attention to the following.

MAG Carburetor and PTO Carburetor

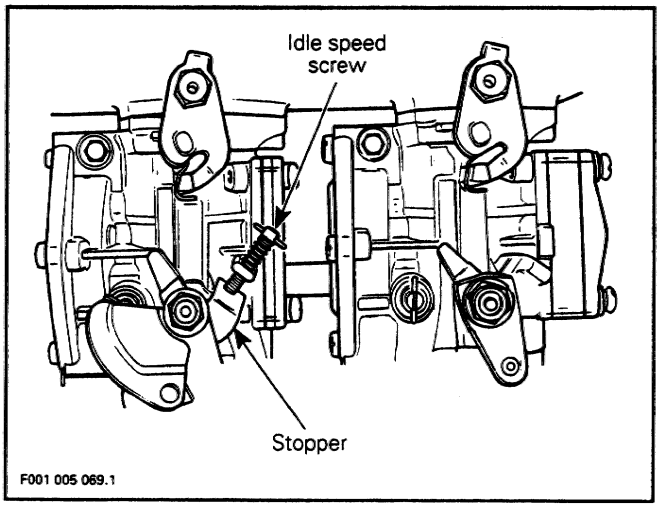
When installing carburetors pay attention on which side of oil pump mounting flange carburetors are to be located. To ensure proper installation, carburetors are identified on the side with MAG or PTO. Refer to following illustration.

CAUTION : The XP (5852) model carburetors are different from the others only in the jetting. Carburetors are identified on body by a yellow dot. Ensure to install the appropriate carburetors on the proper engine, because damage to engine components could occur.



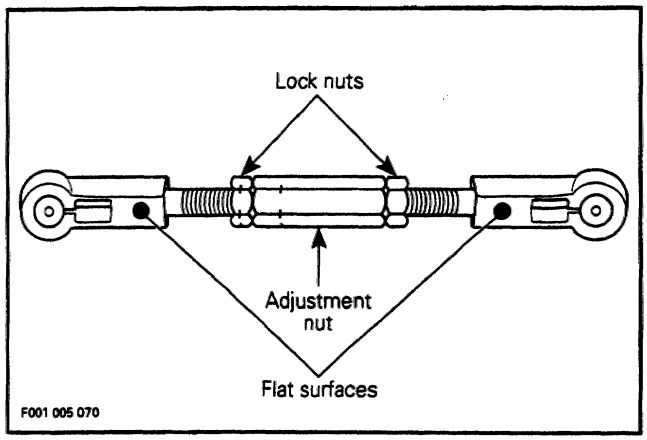
4,52 Throttle Levers and Idle Speed Screw

With idle speed screw not touching stopper on PTO carburetor, both throttle levers are in closed position.



Loosen lock nuts on carburetor linkage and adjust linkage with adjustment nut.

Make sure threads length is the same on each side of linkage and flat surfaces of both ends are parallel with each other.



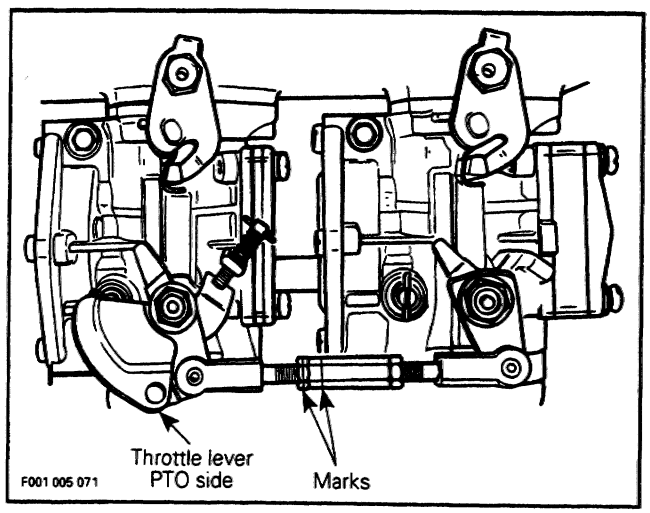
Tighten lock nuts and torque to 1.5 N•m (14 lbf•**in**).

NOTE : Grease carburetor linkage at both ends with synthetic grease (P / N 293 550 010).

Connect linkage between both carburetor levers and ensure that marks on lock nut and adjustment nut are located near PTO carburetor throttle lever side.

Ensure both throttle valves are still in closed position.

CAUTION : This set-up is done to ensure good synchronization between carburetor throttle levers when throttle lever is pushed at handlebar grip.



NOTE : The linkage installation is done with the marks located near PTO carburetor throttle lever to ease adjustment if to be performed in the watercraft.

CAUTION: Throttle valves must open simultaneously. Otherwise this will cause engine to vibrate and / or back fire.

Return Line Orifice

The fuel return line orifice of carburetor MAG side is 3.0 mm (.118 in) and the one on carburetor PTO side is 0.5 mm (.020 in).

CAUTION : If carburetors are installed on wrong side, the carburetor PTO side will run very lean because of low fuel flow.

WARNING : Always verify tightness of clamps and hoses.

Carburetor Mount Nuts

Install lock washers and apply Loctite 242 (P / N 293 800 015) on threads then torque nuts to 25 N•m (18 lbf•ft).

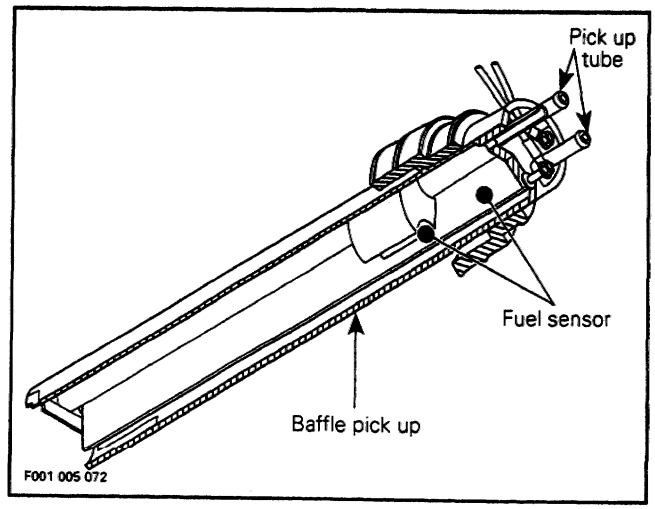
Rotary Valve Cover and Screws

Install O-ring and cover then torque screws to 20 N•m (15 lbf•ft) in a criss-cross sequence.

Baffle Pick Up

(All Models Except SPX Model (5807) 1st Run and Explorer (5820)

NOTE : The baffle pick up has an integrated fuel sensor on models which have a fuel level gauge.



◆ **WARNING : Always disconnect battery cables exactly in the specified order, black negative cable first. Electrolyte or fuel vapors can be present in the engine compartment and a spark might ignite them and possibly cause personal injuries.**

Disconnect the **red** positive cable **last.**

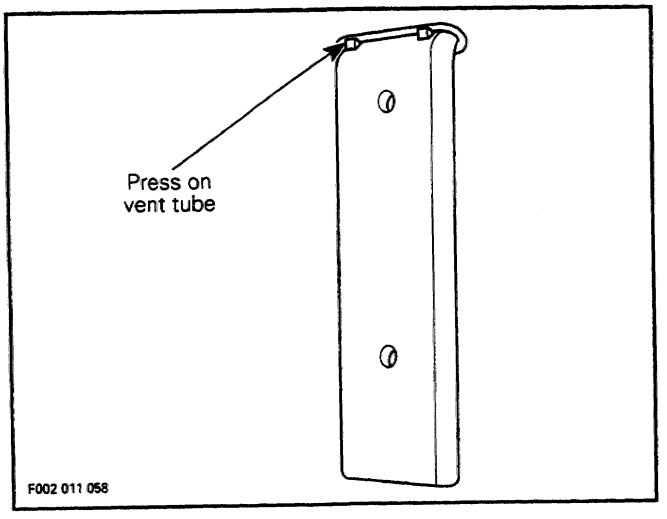
Empty fuel tank.

◆ **WARNING : 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. Always wipe off fuel spillage from the watercraft.**

Remove storage basket from watercraft.

GTS (5813) GTX (5861) Models Only

Press on vent tube upper part to enable to withdraw tube from body.



◆ **WARNING : Vent tube must be in place to provide proper bilge ventilation.**

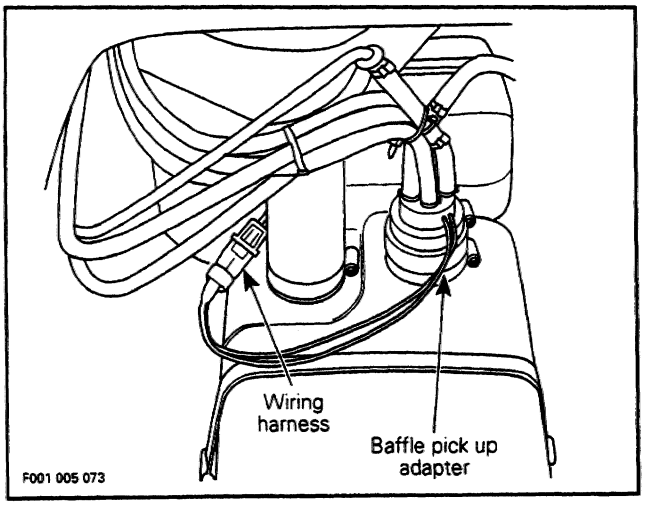
Disconnect filler neck hose from fuel tank.

Remove retaining straps from fuel tank and move tank forward.

All Models Except SPX (5807) 1st Run and Explorer (5820)

Remove hoses from baffle pick up and disconnect fuel sensor wiring harness if applicable.

Remove lower clamp from baffle pick up adapter and pull out baffle from fuel tank.



Remove upper clamp from adapter and slide adapter from baffle.

○ **NOTE :** Assembly is assentially the the reverse of disassembly procedures.

Slide adapter onto baffle pick up until it stops on rib. Install clamp.

Install baffle pick up into fuel tank and push it until it sits on fuel tank neck. Install clamp and torque both clamps to 4.5 N•m (40 lbf•**in**)

Fuel Sensor and Fuel Sensor Adapter, (SPX Model (5807) 1st Run and Explorer (5820).

◆ **WARNING : Always disconnect battery cables exactly in the specified order, black negative cable first. Electrolyte or fuel vapors can be present in the engine compartment and a spark might ignite them and possibly cause personal injuries.**

Disconnect the **red** positive cable **last.**

Empty fuel tank.

◆ **WARNING : Fuel is flammable and explosive under certain conditions. Always work in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity. Always wipe off fuel spillage from the watercraft.**

Explorer Model (5820) only

Remove windscreen from console and then remove air blower.

Remove steering stem arm from steering stem and then remove steering cable from steering bracket.

Disconnect engine overheating beeper and engine stop switch wiring harnesses.

Remove wave pin from reverse shaft and unscrew reverse handle.

Remove four screws and washers which hold console to body then move console aside.

Pull off ventilation plate from body which is installed just underneath console.

Disconnect filler neck hose from fuel tank.

Remove battery and its support.

Remove retaining strap from oil reservoir.

Remove two screws which hold oil filler neck to body. Pull oil reservoir, disconnect oil sensor wires and move reservoir rearward.

Remove retaining straps from fuel tank and pull tank rearward.

SPX Model (5807) 1st Run and Explorer (5820)

Disconnect and remove fuel sensor from fuel tank.

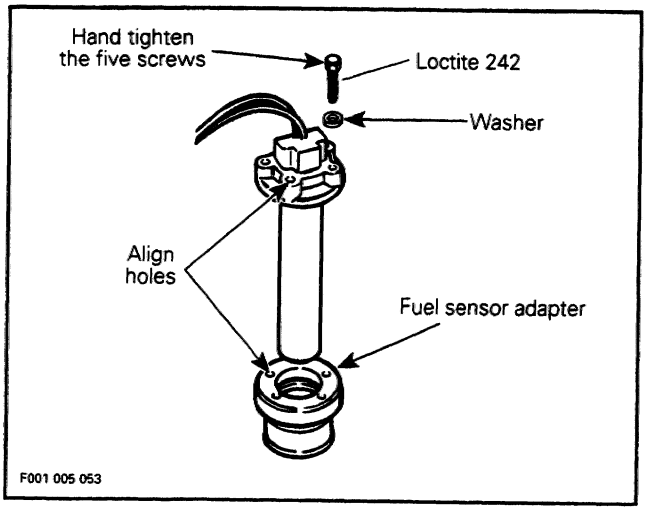
Remove fuel sensor adapter from fuel sensor.

Make sure there is no obstructions in threaded holes of fuel sensor adapter.

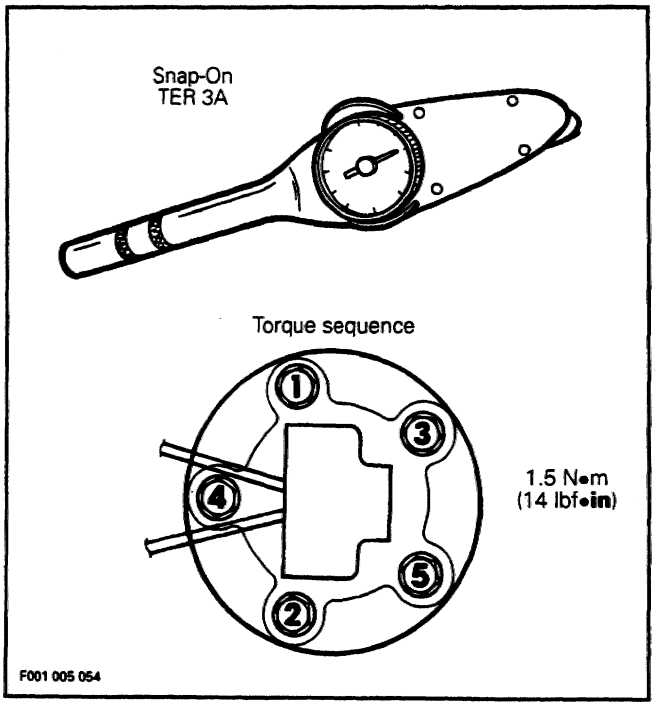
Slide fuel sensor adapter on fuel sensor. Align sensor holes with adapter holes.

◆ **WARNING : A good hole alignment is necessary.**

Apply some Loctite 242 (blue) on the five screws, install washers and hand tighten to eliminate play between sensor and adapter.

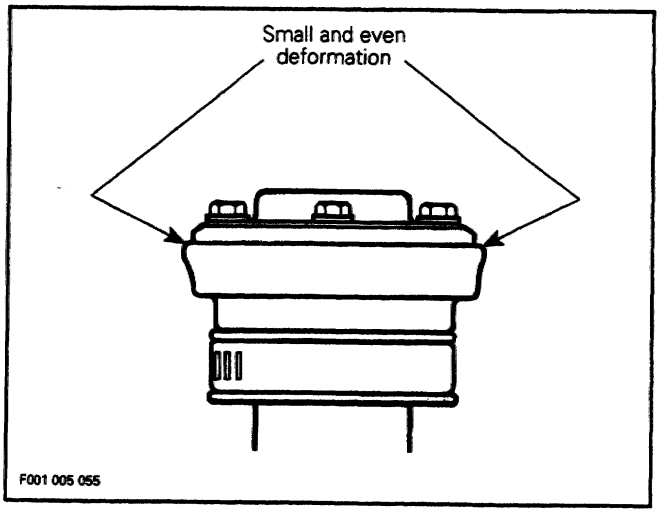


Torque screws in a criss-cross sequence to 1.5 N•m (14 lbf•in) using an appropriate torque wrench such as Snap-On TER 3A.



◆ **WARNING : Do not over torque. Torque wrench tightening specifications must be strictly adhere to.**

○ NOTE : It is normal to have a small and even deformation all around fuel sensor adapter.



Torque applied to materials such as rubber, plastic and fiberglass will decrease automatically. The torque reduction is caused by material creeping. This situation is normal and should not cause any installation problem.

CAUTION : Do not retorque after a while, this could lead to an excessive deformation and / or components damages.

NOTE : Assembly is essentially the reverse of disassembly procedures. However pay particular attention to the following. At clamps installation on fuel tank filler hose, ensure that clamp tightening screws are placed face to face. Torque clamps to 4.5 N•m (40 lbf•**in**).

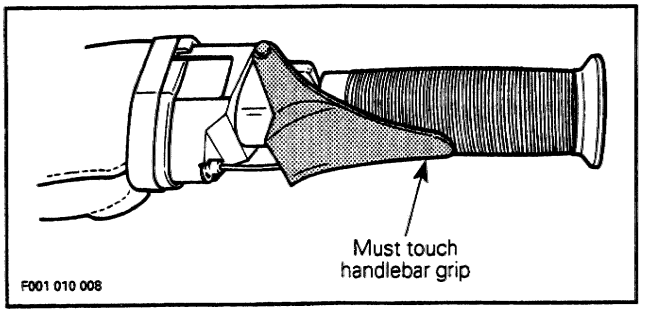
ADJUSTMENTS (Single carburetor)

Throttle Cable

CAUTION : Make sure engine is turned off before adjusting throttle cable.

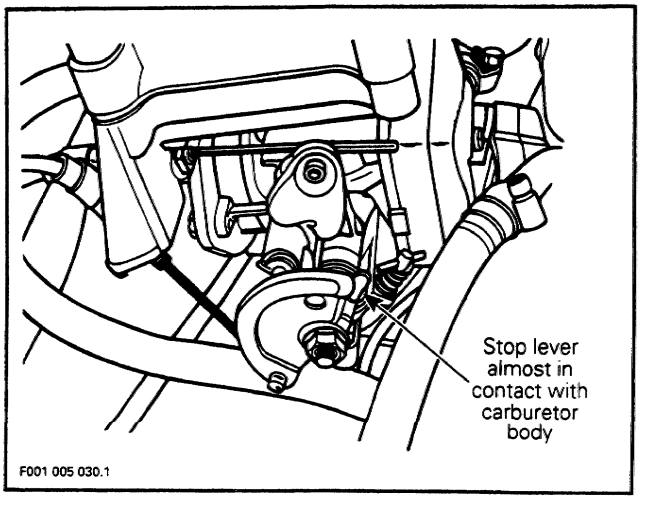
Lubricate cable with SEA-DOO LUBE.

Throttle lever must reach handlebar grip without causing strain to cable or carburetor cable bracket.



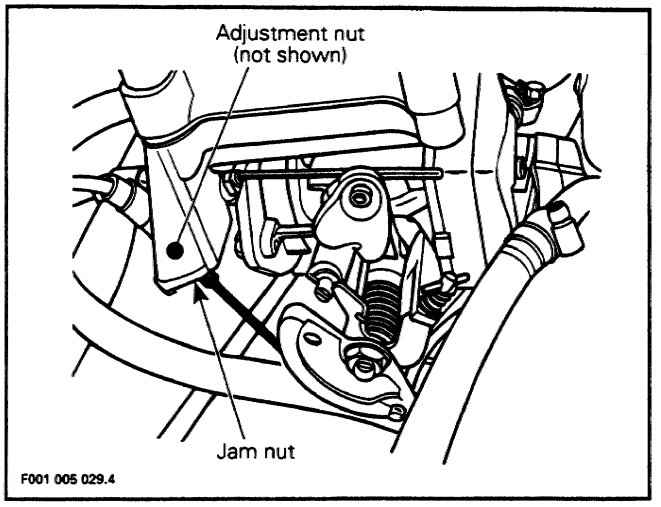
Insure carburetor butterfly is fully open at full throttle position. At this position throttle stop lever is almost in contact (0.5 mm (1/64 in)) with carburetor body.

WARNING : Insure lock tab on throttle handle is installed over cable barrel opening.



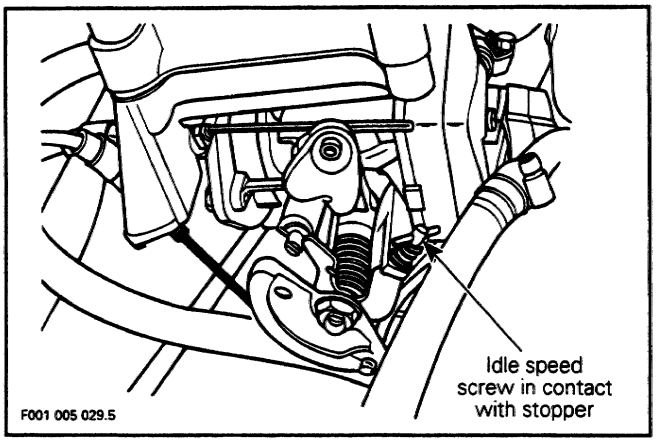
CAUTION : Improper cable full throttle adjustment will cause strain on cable and / or damage cable bracket or throttle lever at handlebar.

To adjust, loosen jam nut then turn adjustment nut as necessary.



Tighten jam nut and recheck adjustment.

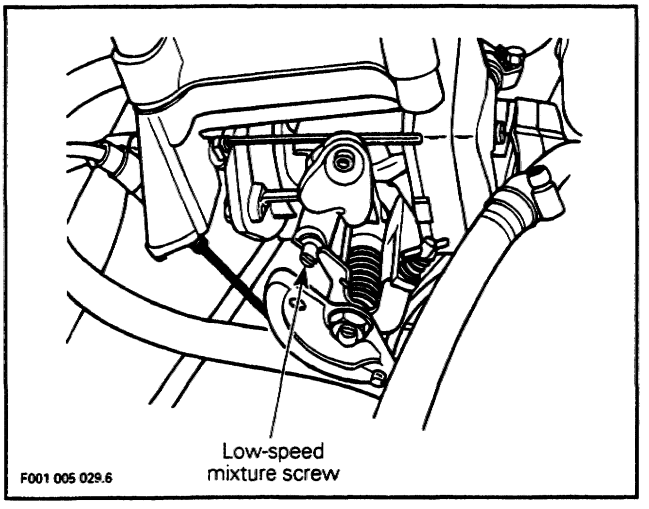
WARNING : Make sure idle speed screw contacts stopper when throttle lever is fully released at handlebar.



After throttle cable adjustment, always proceed with oil injection pump adjustment.

CAUTION : Improper oil injection pump synchronization with carburetor can cause serious engine damage.

35, Low-Speed Mixture Screw



▼**CAUTION : Do not attempt to set engine idle speed with low-speed mixture screw. Severe engine damage can occur.**

As a preliminary set-up, tighten screw in until a slight resistance is felt then back off 3/4 to 1-1/4 turn.

Start and warm engine.

▼**CAUTION : Water must be supplied to cool engine with coupler hose (P / N 295 500 099).**

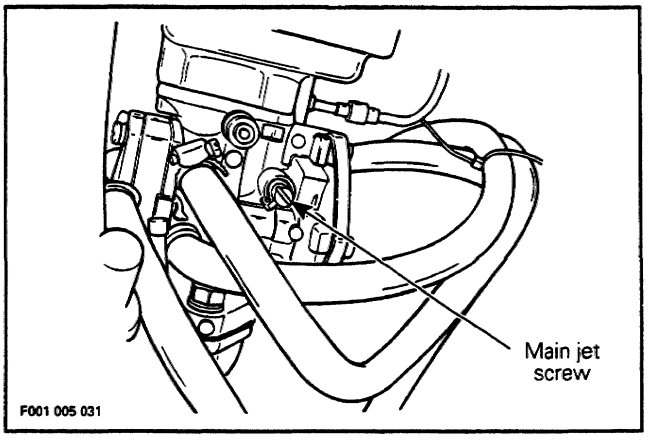
Turning screw clockwise leans mixture and turning screw counterclockwise enriches mixture.

Turn low-speed mixture screw so that engine reaches the most suitable idle and runs smoothly. Make sure engine reacts quickly to throttle lever depression.

26, Main Jet Screw

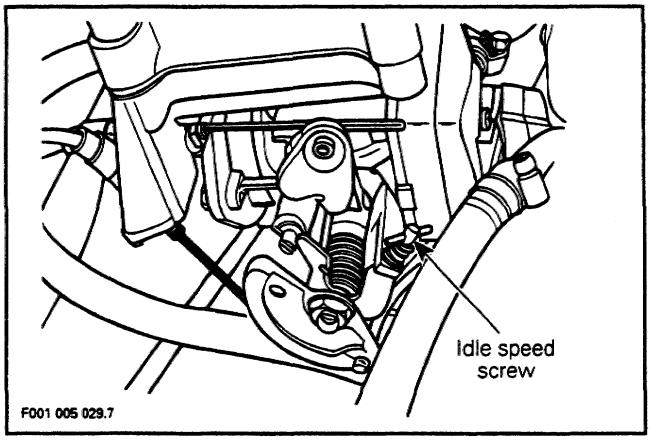
The main jet screw is sealed with a plastic cap that allows an adjustment of 1/4 turn.

○ **NOTE :** Turning screw 1/4 turn counterclockwise enriches mixture and turning screw clockwise leans mixture.



▼**CAUTION : Do not attempt to adjust main jet screw. Severe engine damage can occur.**

52, Idle Speed Screw



Turning screw clockwise increases engine idle speed and turning screw counterclockwise decreases engine idle speed.

Connect an induction-type tachometer (P / N 295 000 100) on spark plug cable of magneto side to measure engine speed.

Start engine and bring to normal operating temperature.

▼**CAUTION : Water must be supplied to cool engine with coupler hose (P / N 295 500 099).**

Turn screw so that engine idles between 1300 to 1500 RPM (in water) or 2400 to 2600 RPM (out of water).

Stop engine and recheck oil injection pump aligning marks and readjust as necessary.

▼**CAUTION : Oil injection pump adjustment must be checked each time carburetor is adjusted. Improper oil pump adjustment can cause severe engine damage.**

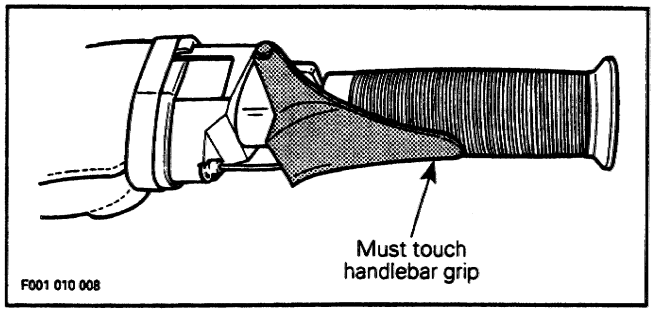
ADJUSTMENTS (Twin Carburetors)

Thottle Cable

▼ **CAUTION : Make sure engine is turned off before adjusting throttle cable.**

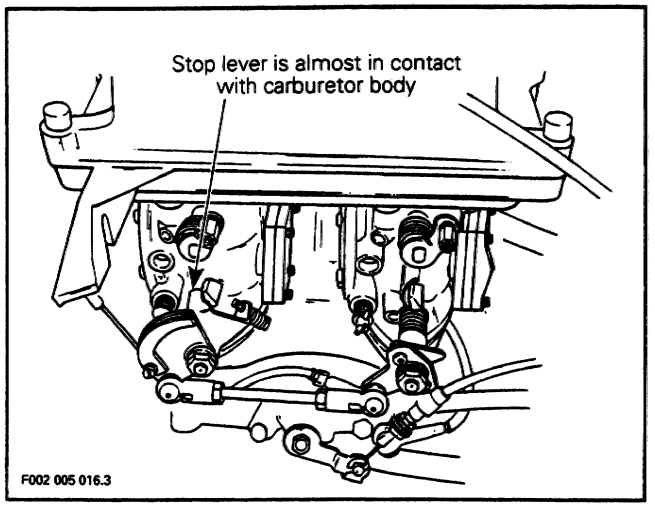
Lubricate cable with SEA-DOO LUBE.

Throttle lever must reach handlebar grip without causing strain to cable or carburetor cable bracket.



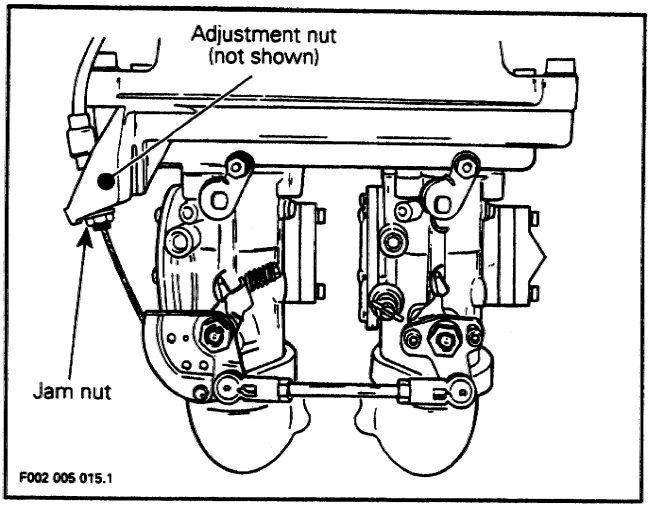
Insure carburetor butterflies are fully open at full throttle position. At this position throttle stop lever is almost in contact (0.5 mm (1/64 in)) with carburetor body.

◆ **WARNING : Insure lock tab on throttle handle is installed over cable barrel opening.**



▼ **CAUTION : Improper cable full throttle adjustment will cause strain on cable and / or damage cable bracket or throttle lever at handlebar.**

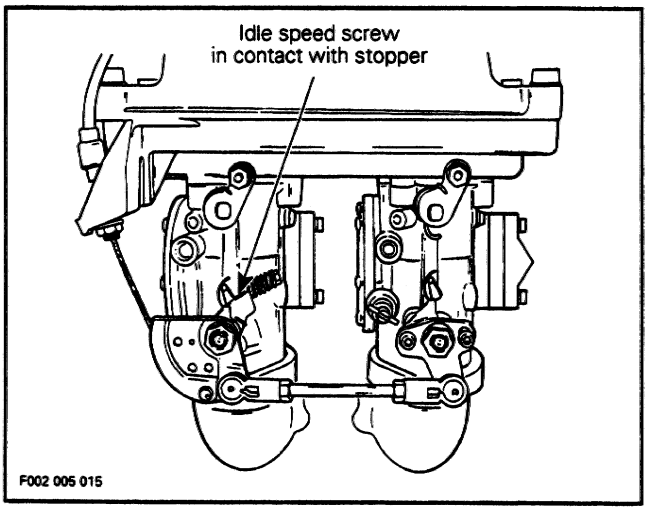
To adjust, loosen jam nut then turn adjustment nut as necessary.



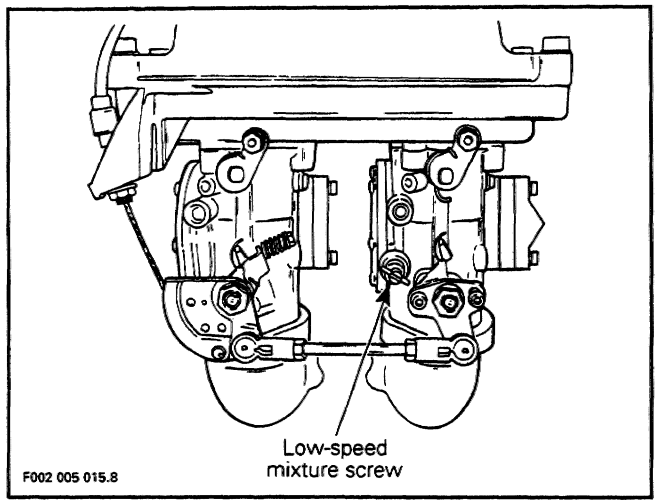
Tighten jam nut and recheck adjustment.

◆ **WARNING : Make sure idle speed screw contacts stopper when throttle lever is fully released at handlebar.**

○ **NOTE :** There is only one idle speed screw for both carburetors. It is located on the PTO side carburetor.



35, Low-speed Mixture Screw



▼**CAUTION : Do not attempt to set engine idle speed with low-speed mixture screw. Severe engine damage can occur.**

As a preliminary set-up tighten screw in until a slight resistance is felt then back off 1 to 1-1/2 turn.

Start and warm engine.

▼**CAUTION : Water must be supplied to cool engine with coupler hose (P / N 295 500 099).**

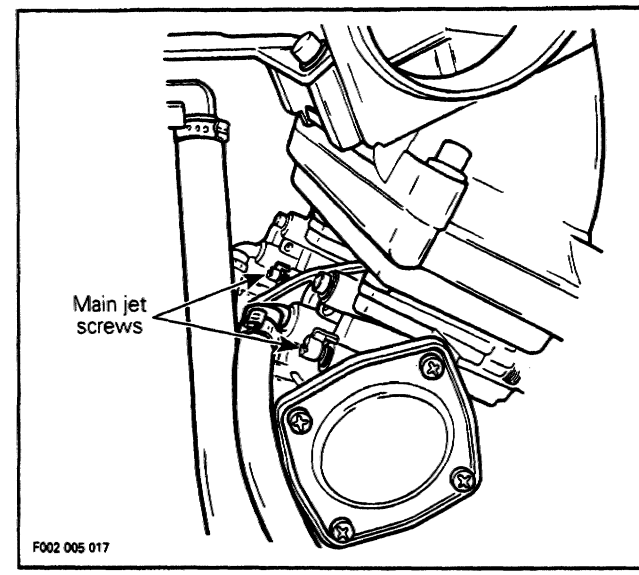
Turning screw clockwise leans mixture and turning screw counterclockwise enriches mixture.

Turn low-speed mixture screw so that engine reaches the most suitable idle and runs smoothly. Make sure engine reacts quickly to throttle lever depression.

26, Main Jet Screw

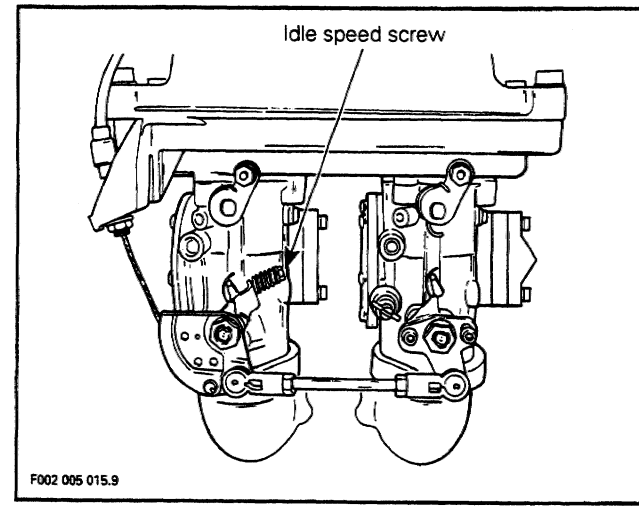
The main jet screw is sealed with a plastic cap that allows an adjustment of 1/4 turn.

○**NOTE :** Turning screw 1/4 turn counterclockwise enriches mixture and turning clockwise leans mixture.



▼**CAUTION : Do not attempt to adjust main jet screw. Severe engine damage can occur.**

52, Idle Speed Screw (on PTO Side Carburetor Only)



Turning screw clockwise increases engine idle speed and turning screw counterclockwise decreases engine idle speed.

Connect an induction tachometer (P / N 295 000 100) on spark plug cable of magneto side to measure engine speed.

Start engine and bring to normal operating temperature.

▼**CAUTION : Water must be supplied to cool engine with coupler hose (P / N 295 500 099).**

Turn screw so that engine idles between 1300 to 1500 RPM (in water) or 2800 to 3000 RPM (out of water).

Stop engine and recheck oil injection pump aligning marks and readjust as necessary.

▼CAUTION : Oil injection pump adjustment must be checked each time carburetors are adjusted. Improper oil pump adjustment can cause severe engine damage.

FUEL SYSTEM PRESSURIZATION

◆ 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 and / or re-leasing watercraft to customer.

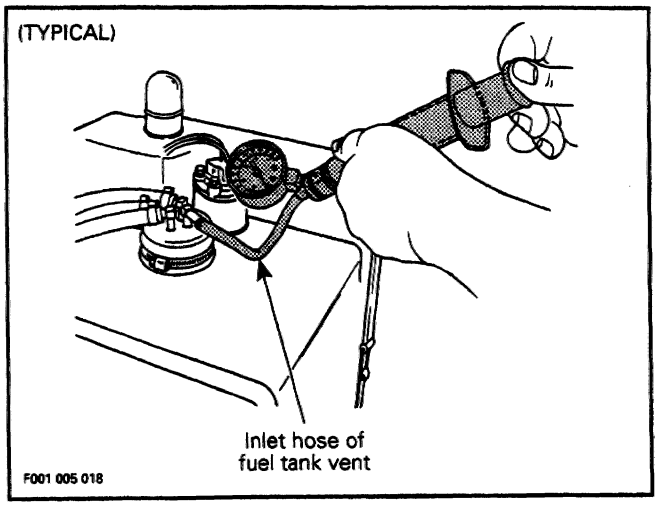
▼CAUTION : Ensure to verify fuel line ends for damage. Always cut damaged end before reinstallation.

Pressure Test

Proceed as Follows :

- Fill up fuel tank.
- Remove inlet hose of fuel tank vent from body.
- Install a hose pincher (P / N 295 000 076) on outlet hose of fuel tank vent.
- Connect pump gauge tester (P / N 295 000 085) to inlet hose.
- Turn fuel valve to OFF and pressurize fuel system to 34 kPa (5 PSI). If no leaks are found, turn fuel valve to ON and pressurize once more.
- If pressure is not maintained locate leak and repair / replace component leaking. To ease leak search spray a solution of soapy water on components, bubbles will indicate leak location.

○NOTE : To minimize time of fuel system pressurization the fuel tank should be quite full. The system must maintain a pressure of 34 kPa (5 PSI) during 10 minutes. Never pressurize over 34 kPa (5 PSI).



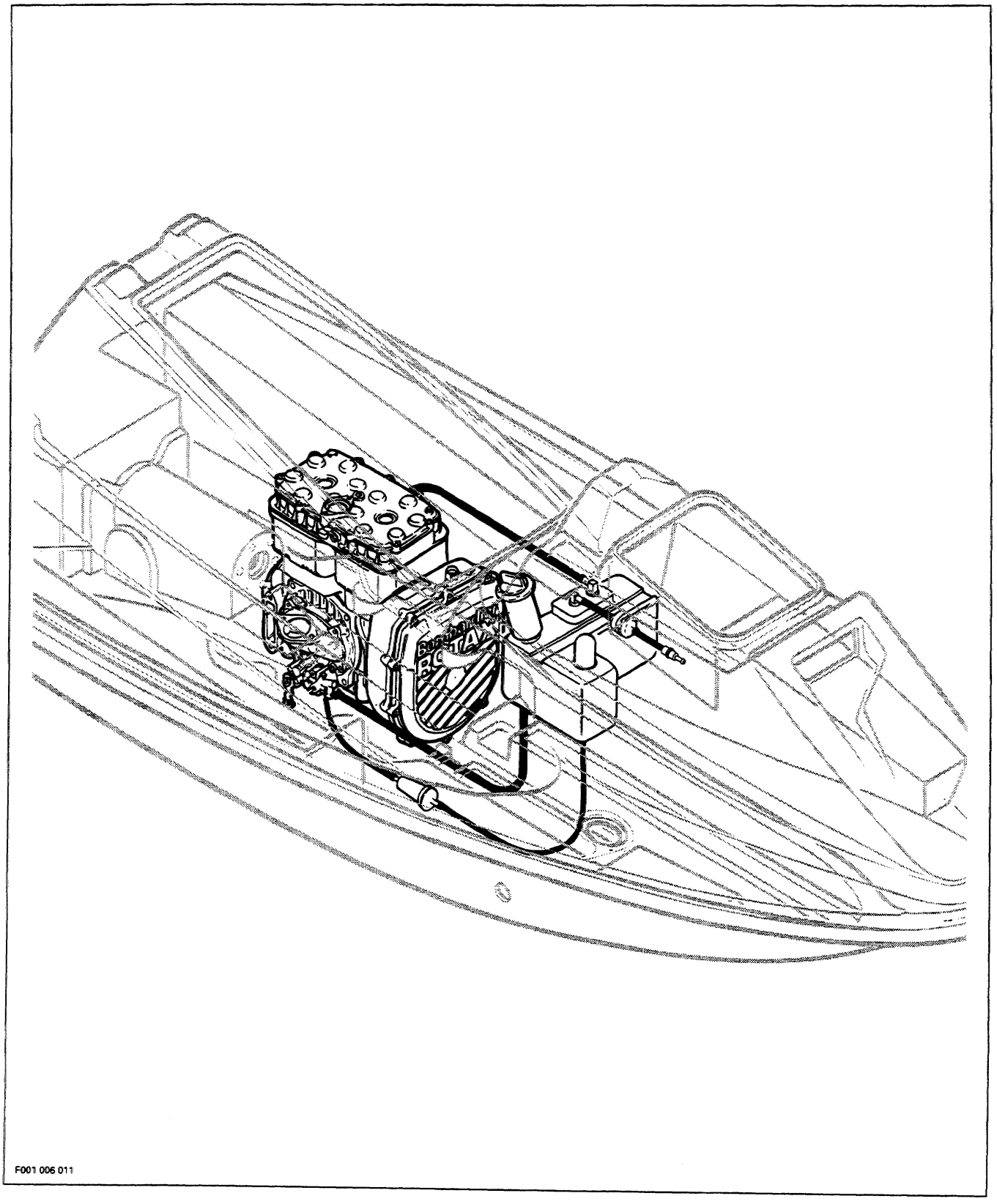
◆ WARNING : If any leak is found, do not start the engine and wipe off any fuel leakage. Failure to correct a leak could lead to an explosion. Do not use electric powered tools on watercraft unless system has been verified for no leaks.

Reconnect inlet hose of fuel tank vent on body.

○NOTE : Before removing the hose pincher, block with your finger, the outlet hole to feel if air is coming out when removing hose pincher. This will indicate that pressure relief valve and the outlet fitting are not blocked.

Remove hose pincher from outlet hose of fuel tank vent.

OIL SYSTEM



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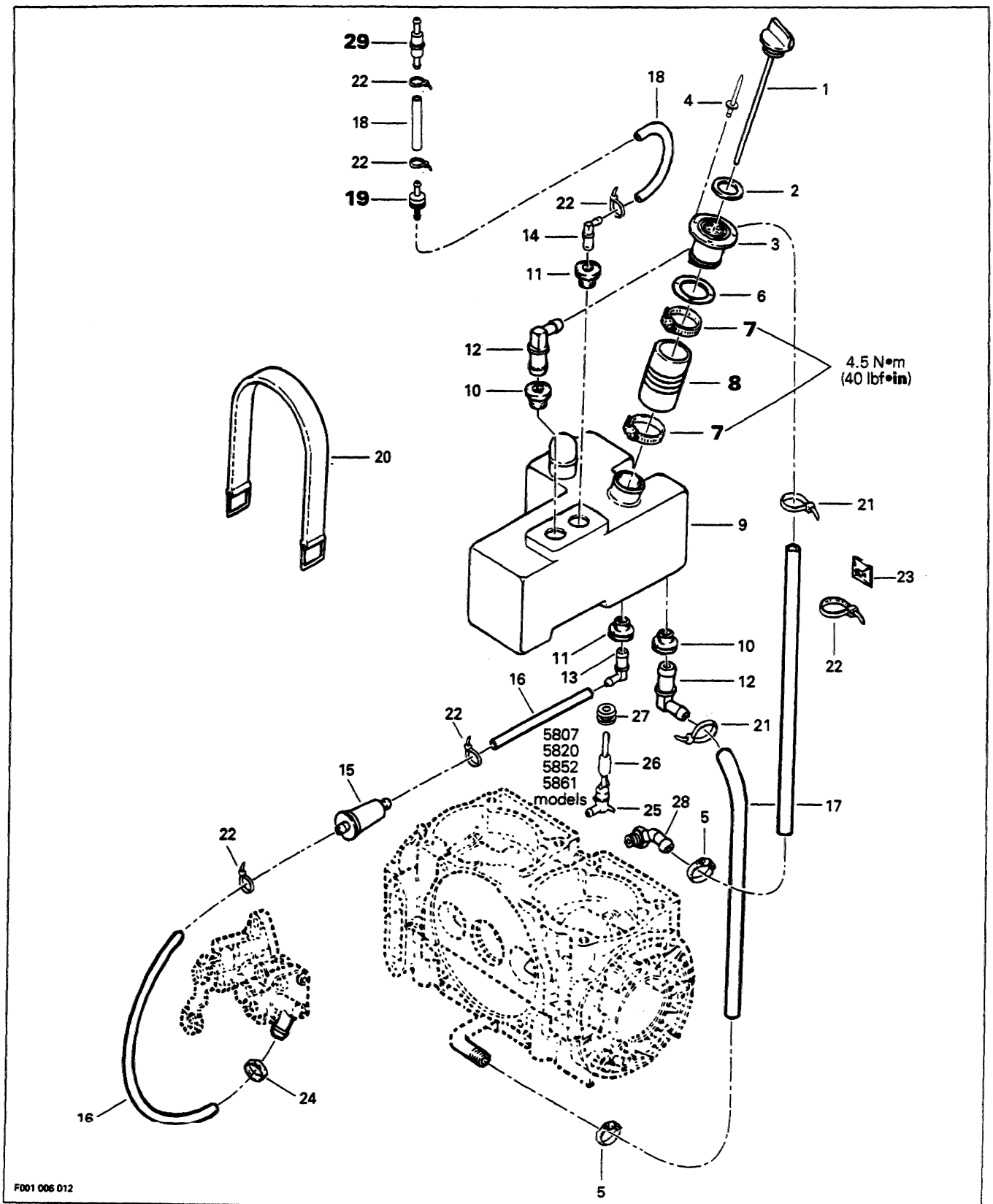
OIL INJECTION RESERVOIR



COMPONENTS

1. *Oil gauge*
2. *O-ring*
3. *Filler neck*
4. *Rivet 1/8 x .640 (4)*
5. *Clamp (2)*
6. *Gasket*
7. *Clamp (2)*
8. *Filler neck hose*
9. *Oil tank*
10. *Grommet (2)*
11. *Grommet (2)*
12. *Elbow fitting (2)*
13. *Elbow fitting*
14. *Elbow fitting*
15. *Oil filter*
16. *Hose 8 mm*
17. *Hose 12 mm*
18. *Hose 6 mm*
19. *Check valve*
20. *Strap*
21. *Tie rap*
22. *Tie rap*
23. *Tie mount (2)*
24. *Oetiker clamp*
25. *Oil level sender (5807, 5820, 5852, 5861 models)*
26. *Float (5807, 5820, 5852, 5861 models)*
27. *Grommet (5807, 5820, 5852, 5861 models)*
28. *Hose fitting*
29. *Water eliminator valve*

GENERAL

Whenever repairing the oil injection system, always verify for water infiltration in reservoir.

7,8, Clamp and Hose

Verify oil filler neck hose for damage. Always ensure that clamps are well positioned and tightened. Torque clamps to 4.5 N•m (40 lbf•**in**).

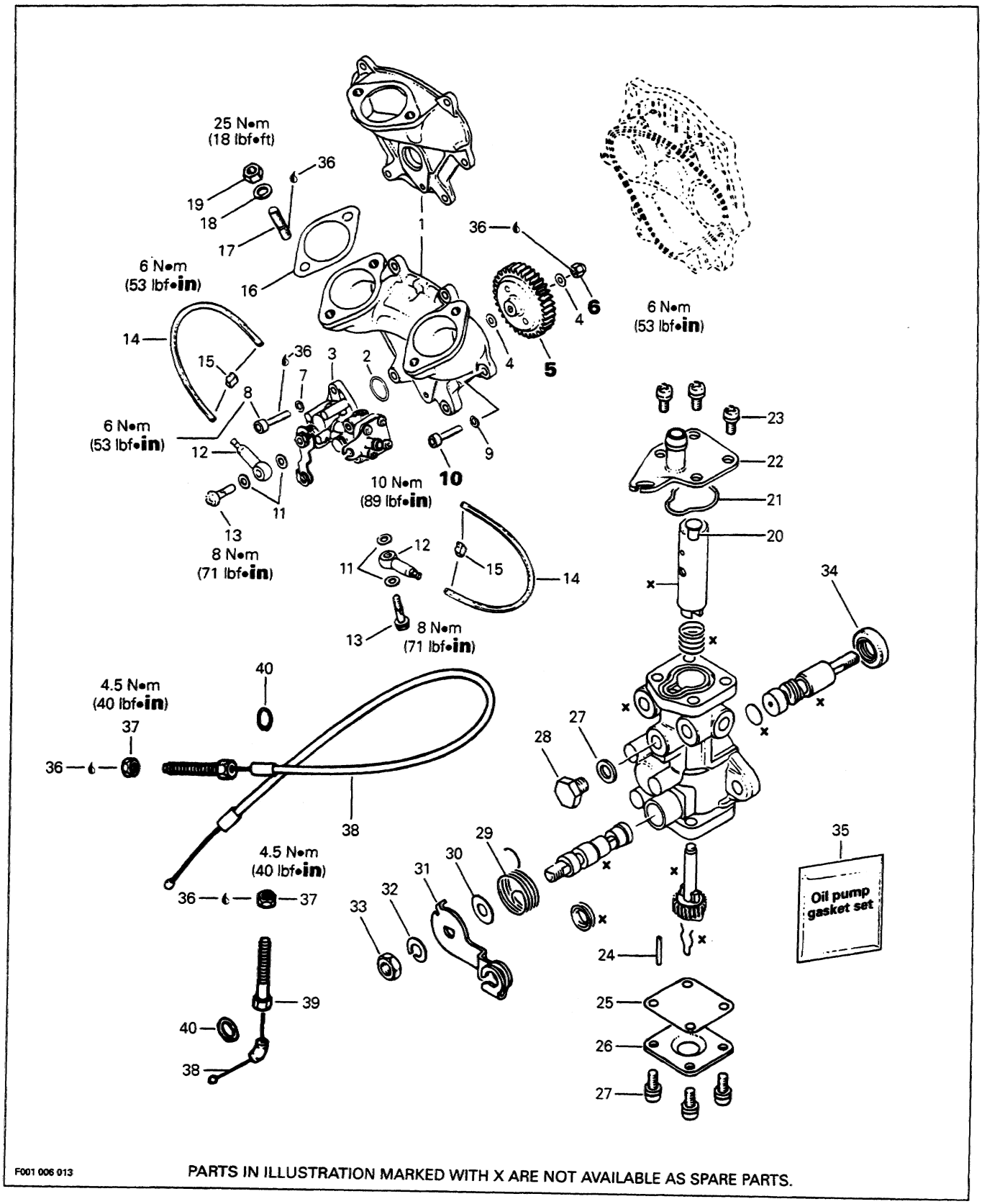
19, Check Valve

Black side of the one-way check valve is the valve outlet.

29, Water Eliminator Valve

This valve will reduce water intrusion in oil system. It is a one-way valve with an arrow to indicate the air flow.

OIL INJECTION PUMP, REPAIR AND ADJUSTMENT



F001 006 013

PARTS IN ILLUSTRATION MARKED WITH X ARE NOT AVAILABLE AS SPARE PARTS.

COMPONENTS

1. *Oil pump flange*
2. *O-ring*
3. *Oil pump*
4. *Washer (2)*
5. *Oil pump gear 41 teeth*
6. *Lock nut M6*
7. *Lock washer (2)*
8. *Allen screw M5 x 16 (2)*
9. *Lock washer M6 (6)*
10. *Allen screw M6 x 20 (6)*
11. *Oil banjo gasket (4)*
12. *Check valve (2)*
13. *Valve bolt M6 x 16 (2)*
14. *Oil line*
15. *Clamp (4)*
16. *Gasket*
17. *Stud M8 x 19 (2)*
18. *Lock washer M8 (2)*
19. *Nut M8 (2)*
20. *Retainer*
21. *O-ring*
22. *Upper plate*
23. *Screw with lock washer M4 x 8 (8)*
24. *Stop pin*
25. *Gasket*
26. *Pump lower plate*
27. *Gasket*
28. *Hexagonal screw M6 x 8*
29. *Spring*
30. *Flat washer M6*
31. *Lever*
32. *Lock washer M6*
33. *Nut M6*
34. *Seal*
35. *Gasket set*
36. *Loctite "242"*
37. *Nut M6*
38. *Injection cable*
39. *Cable guide*
40. *Circlip*

Parts in illustration marked with X are not available as spare parts.

CLEANING

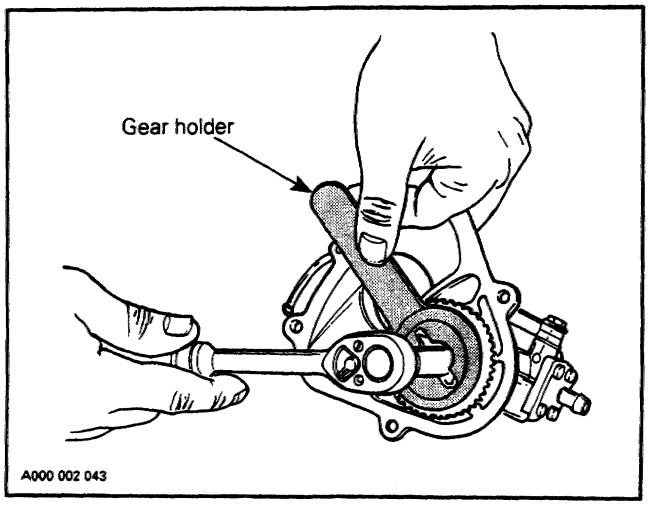
Discard all seals and O-rings. Clean metal components in a solvent.

DISASSEMBLY

NOTE : Some oil pump parts are not available in single parts.

5,6, Oil Pump Gear and Lock Nut

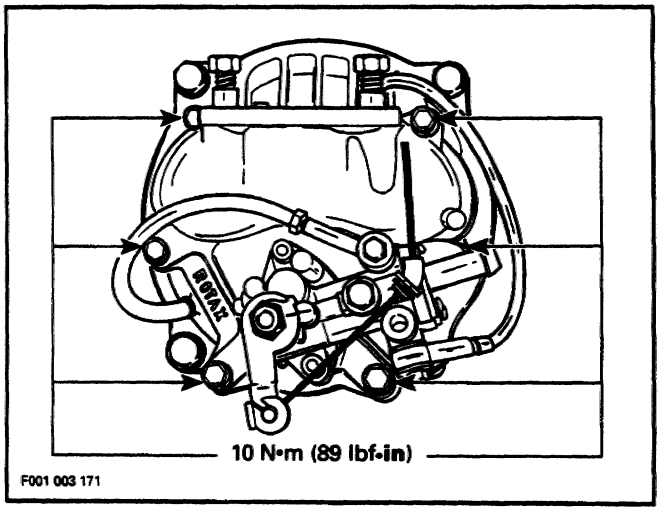
To remove retaining nut, lock gear using gear holder (P / N 290 277 905).



ASSEMBLY

10, Screw

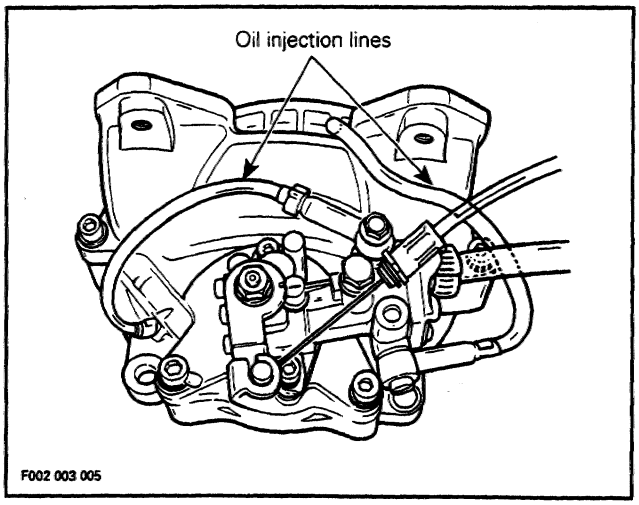
Torque to 10 N•m (89 lbf•**in**).



6, Lock Nut

Apply Loctite 242 (P / N 293 800 015) on nut threads and torque to 6 N•m (53 lbf•**in**).

CAUTION : Whenever oil injection lines are removed, always make the routing as shown.



ADJUSTMENTS

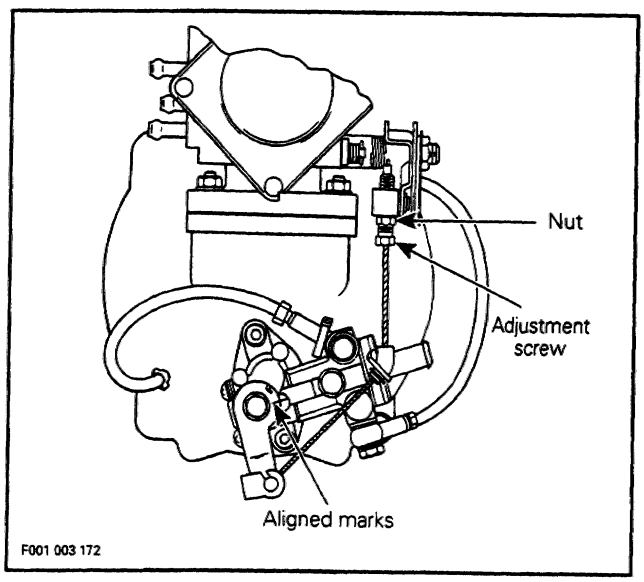
Synchronization

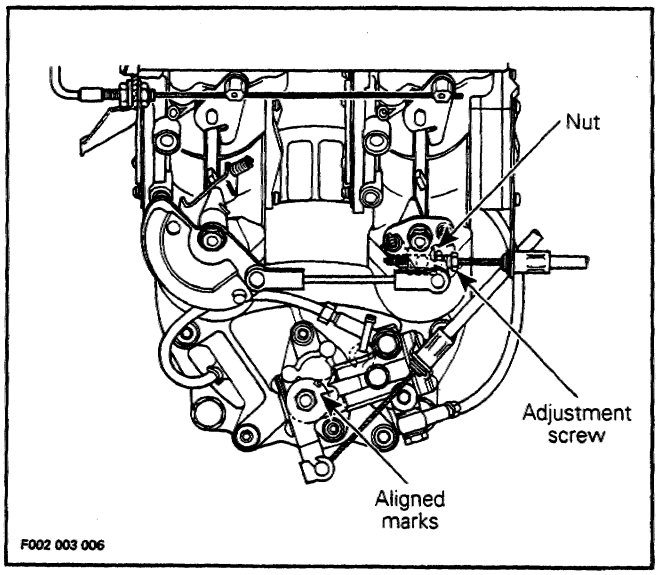
▼CAUTION : As oil injection pump adjustment is dependant on throttle cable position, make sure to perform throttle cable adjustment first.

Eliminate throttle cable free-play by depressing throttle lever until a slight resistance is felt. In this position, marks on pump body and lever must align.

NOTE : A mirror may be used to facilitate this verification.

If necessary, turn cable adjustment screw to obtain pump mark alignment.





Tighten nut and recheck alignment marks.

▼CAUTION : Proper oil injection pump adjustment is very important. Any delay in the opening of pump can result in serious engine damage.

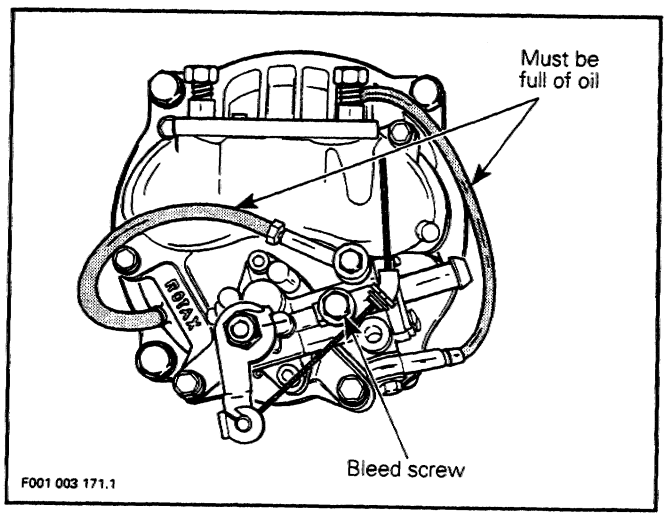
Bleeding

▼CAUTION : Oil injection system must be bled and adjustment checked before operating engine.

Ensure oil injection reservoir is sufficently filled.

Install a dry rag below oil injection pump.

Remove bleed screw to allow oil to flow.



Keep bleeding until all air has escaped from line. Make sure no air bubbles remain in oil feed line.

Reinstall and tighten bleed screw.

Wipe any oil spillage.

Check small oil lines between pump and intake manifold. They must be full of oil.

If not, run engine at idle speed while manually holding pump lever in fully open position. Do not activate throttle lever.

▼**CAUTION : Water must be supplied to cool engine with coupler hose (P / N 295 500 099).**

CHECKING OPERATION

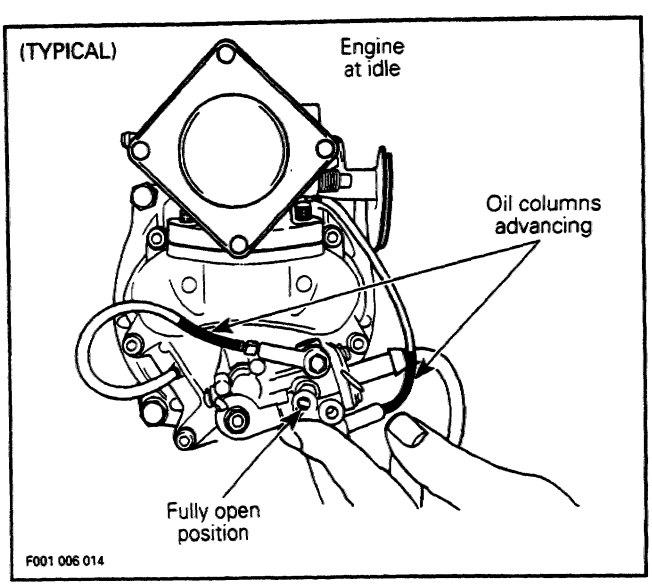
On Watercraft

○**NOTE :** Main oil line must be full of oil. See bleeding procedure above.

Unscrew banjo fittings from pump. Start engine and stop it as soon as it fires.

Ensure that oil level in small oil lines is passed banjo fitting by about 25 mm (1 in) (oil lines are clear tube, therefore the verification can be done easily). Repeat the procedure until this condition is attained.

Reconnect banjo fittings with a washer on each side, start engine and run at idle while holding the pump lever in fully open position. Oil columns must advance into small oil lines.



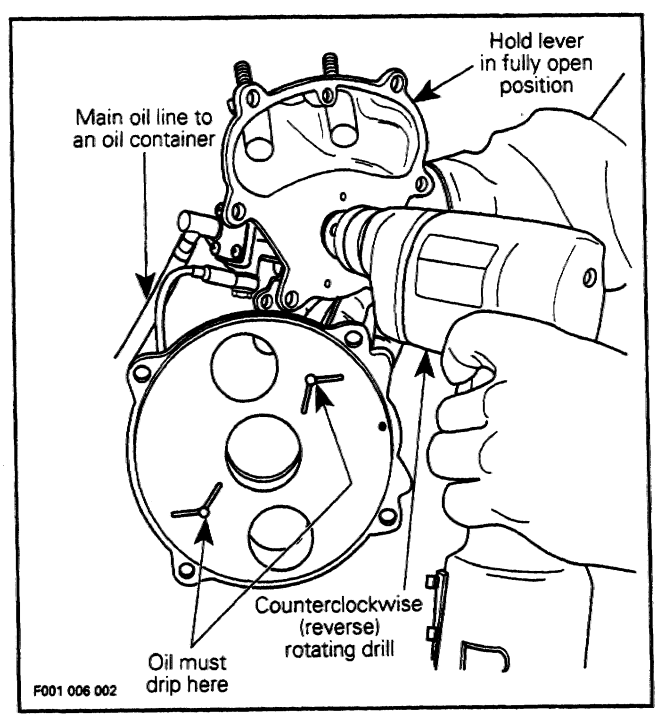
If not, remove pump assembly and check the pump gear and drive shaft (if applicable) for defects, replace as necessary. Test pump as describes below :

○**NOTE :** Through normal use, oil level must not drop in small tubes. If oil drops, verify check valve operation in banjo fittings. Replace as necessary.

Bench Test

The oil pump must be removed out of watercraft.

Connect a hose filled with injection oil to main line fitting. Insert other hose end in an injection oil container. Using a counterclockwise (reverse position) rotating drill rotate pump shaft. Oil must drip from outer holes while holding lever in a fully open position. If not replace pump.



OIL SYSTEM PRESSURIZATION

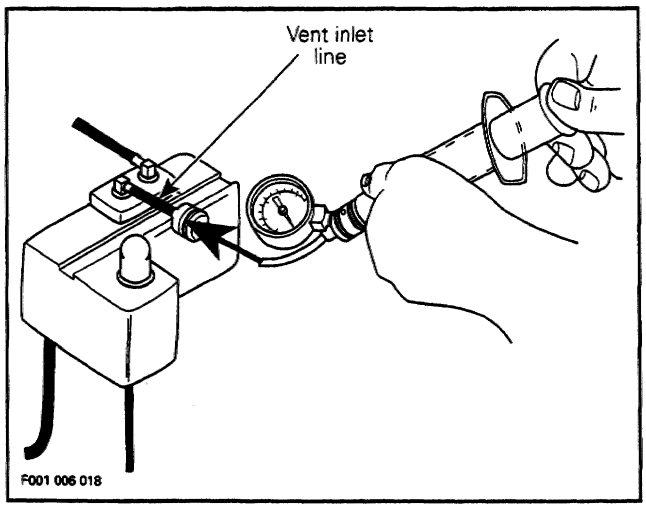
▼**CAUTION : Whenever oil system components are disconnected or replaced, a pressure test must be done before starting engine and / or releasing watercraft to customer. Ensure to verify oil line ends for damage. Always cut damaged end before reinstallation.**

Pressure Test

Proceed as follows :

- Fill up oil reservoir
- Install hose pinchers (P / N 295 000 076) on oil inlet lines close to oil pump and to rotary valve.
- Install a hose pincher (P / N 295 000 076) on oil return line.
- Connect pump gauge tester to oil reservoir vent inlet line.
- Pressurize oil system to 21 kPa (3 PSI). If pressure is not maintained locate leak and repair / replace component leaking. To ease leak search spray a solution of soapy water on components, bubbles will indicate leak location.

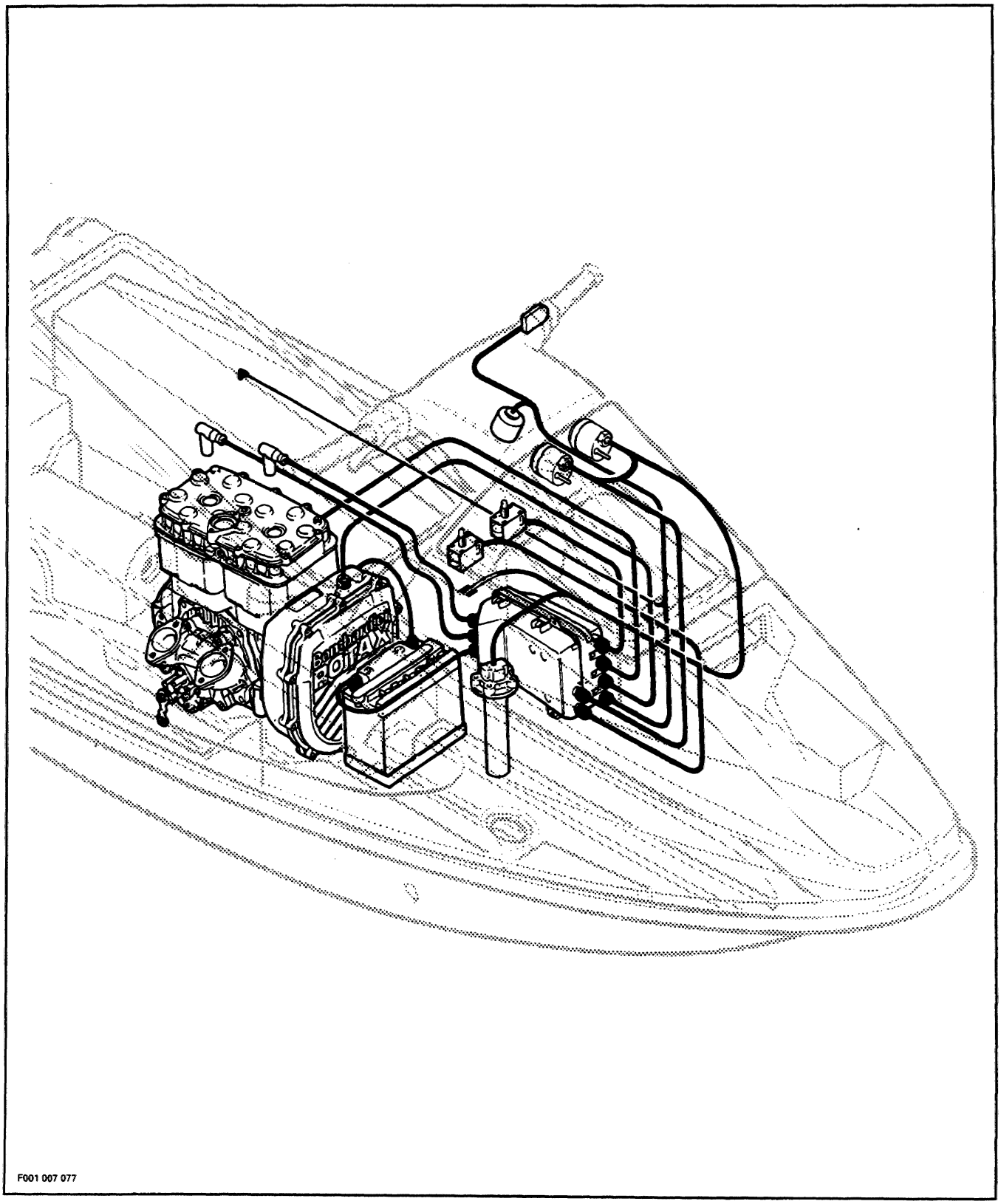
NOTE : To minimize time of oil system pressurization the oil reservoir should be quite full. The system must maintain a pressure of 21 kPa (3 PSI) for at least 10 minutes. Never pressurize over 21 kPa (3 PSI).



CAUTION : If any leak is found, do not start the engine and wipe off any oil leakage. Failure to correct a leak could cause serious damage to engine components.

Remove hose pinchers from inlet lines and return line.

ELECTRICAL



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WIRING DIAGRAM

WIRING COLOR CODES

First color of a wire is the main color. Second color is the tracer color.

Ex. : YELLOW / BLACK is a YELLOW wire with a BLACK tracer.

Some wires have a colored-identification tube near wire terminal. On wires having such a tube, tube color (NOT wire color) will be used.

Ex. : A BLUE wire with a yellow identification tube is referred as a YELLOW wire.

Color Codes

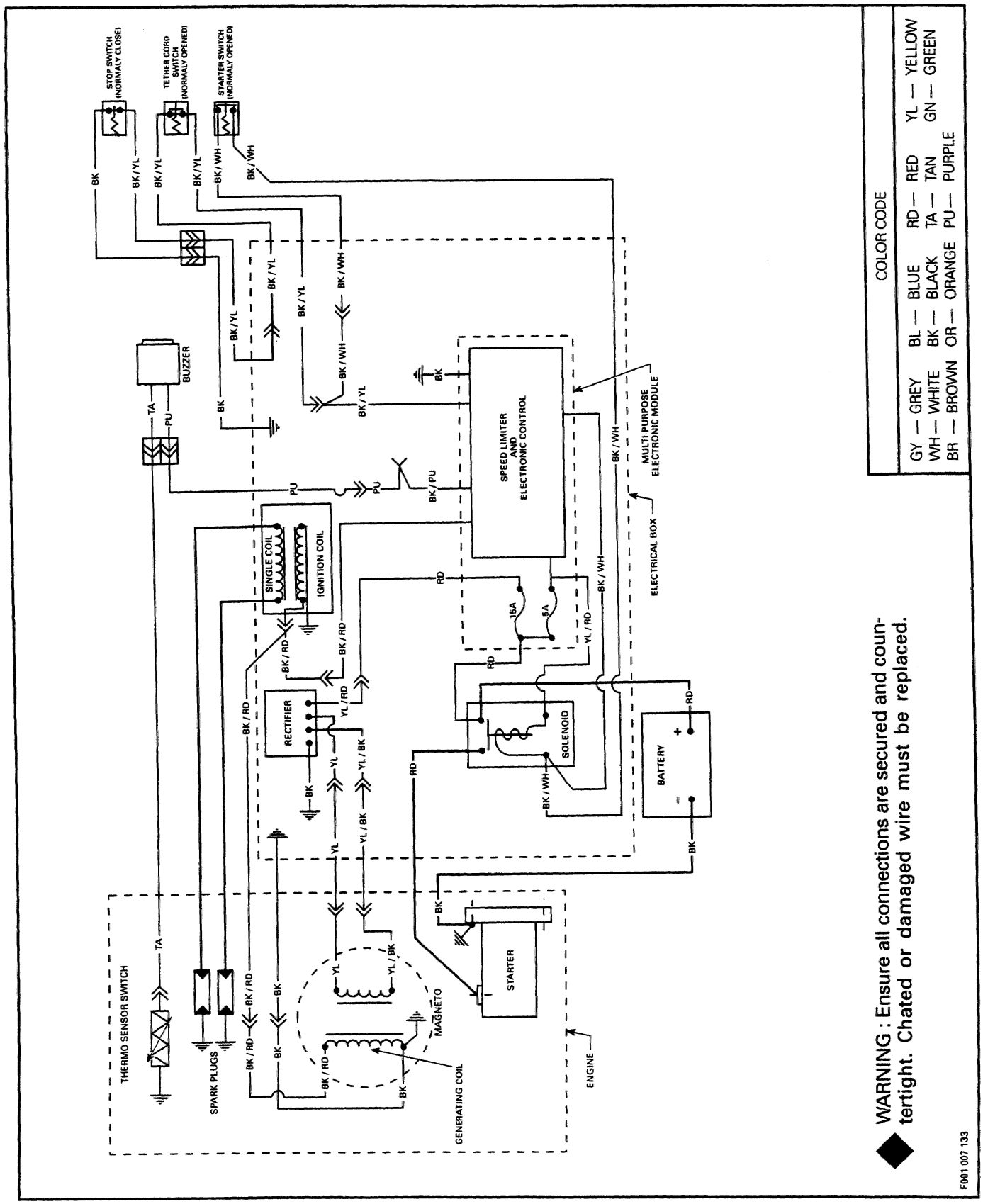
YL = YELLOW
BK = BLACK
BR = BROWN
BL = BLUE
GN = GREEN
GY = GREY
PU = PURPLE
RD = RED
TA = TAN
WH = WHITE
OR = ORANGE

◆ **WARNING : Ensure all terminals are properly crimped on wires and connector housings are properly fastened. Ensure electrical box is watertight.**

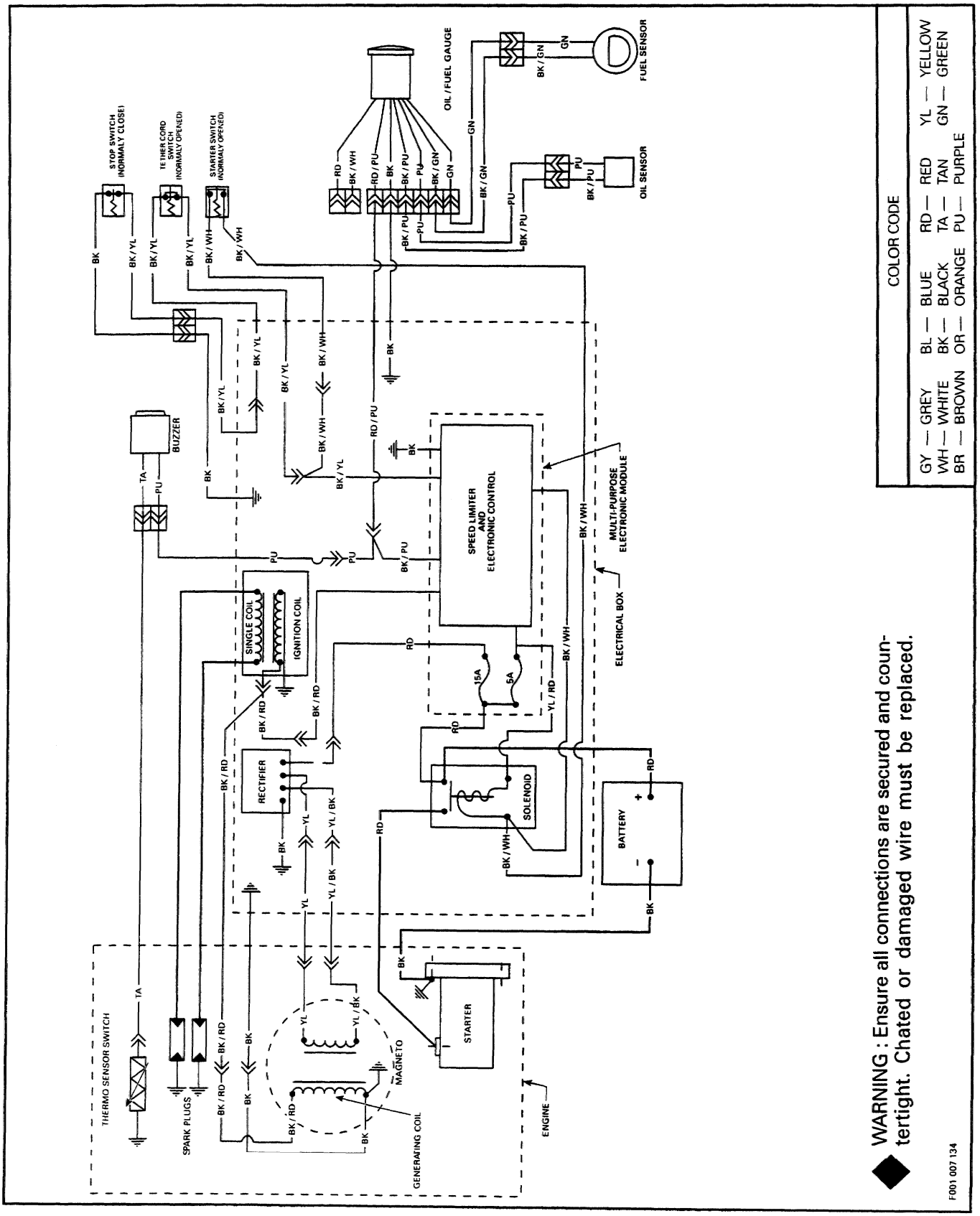
WIRE TERMINAL REMOVAL

To remove terminal from connector housing use Snap-on TT600-4 tool.

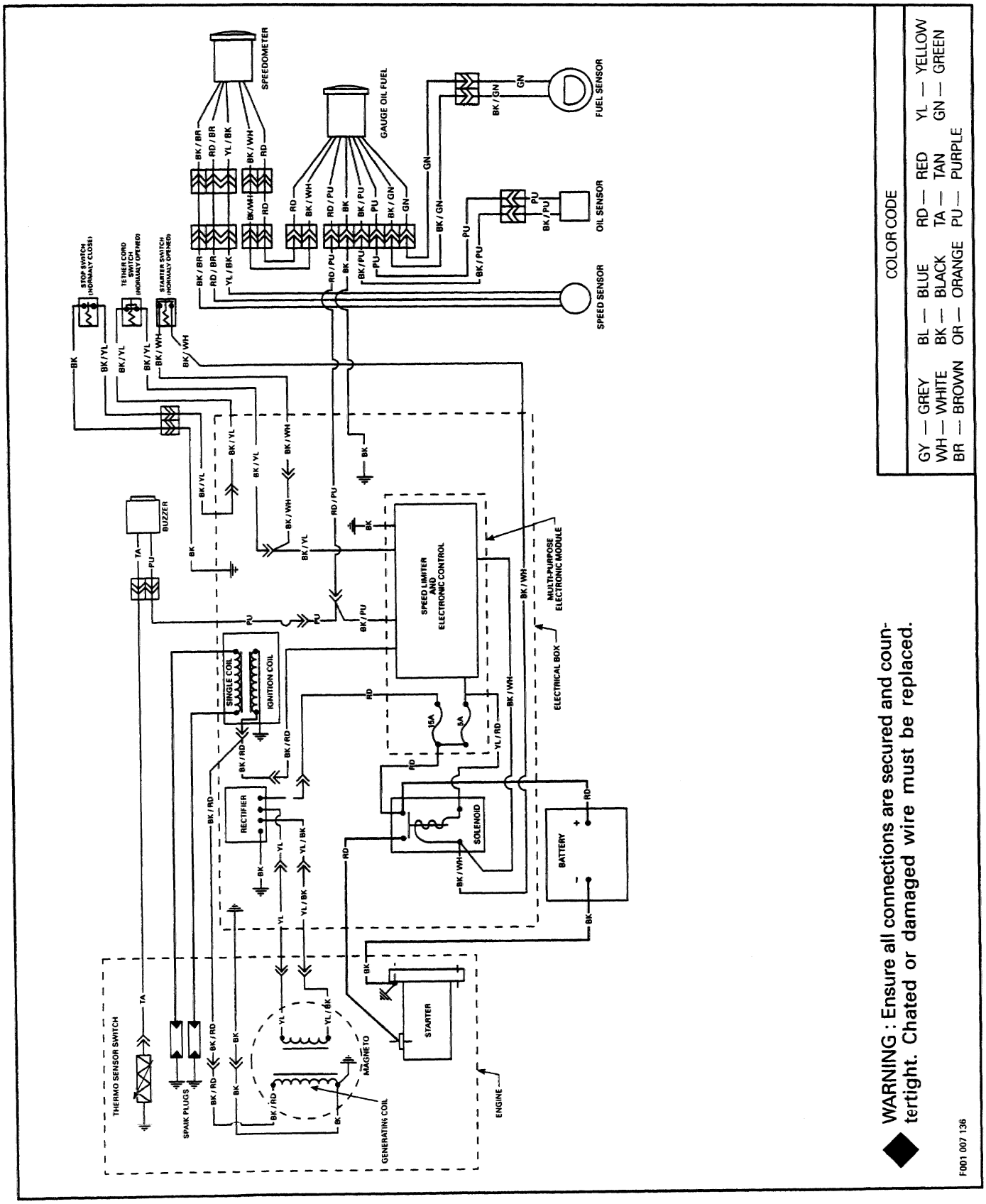
WIRING DIAGRAM FOR 5806, 5808 AND 5813 MODELS



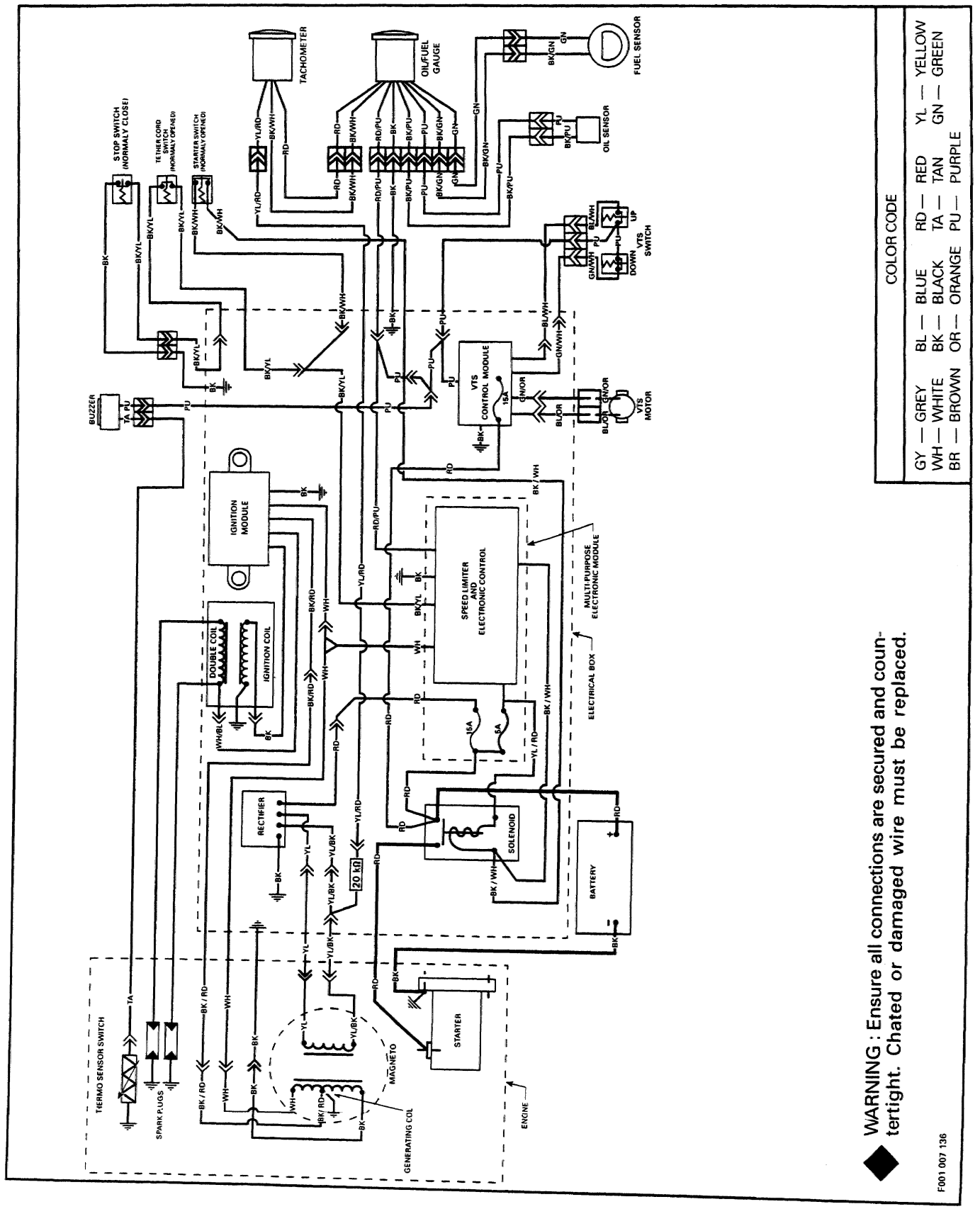
WIRING DIAGRAM FOR 5807 MODEL



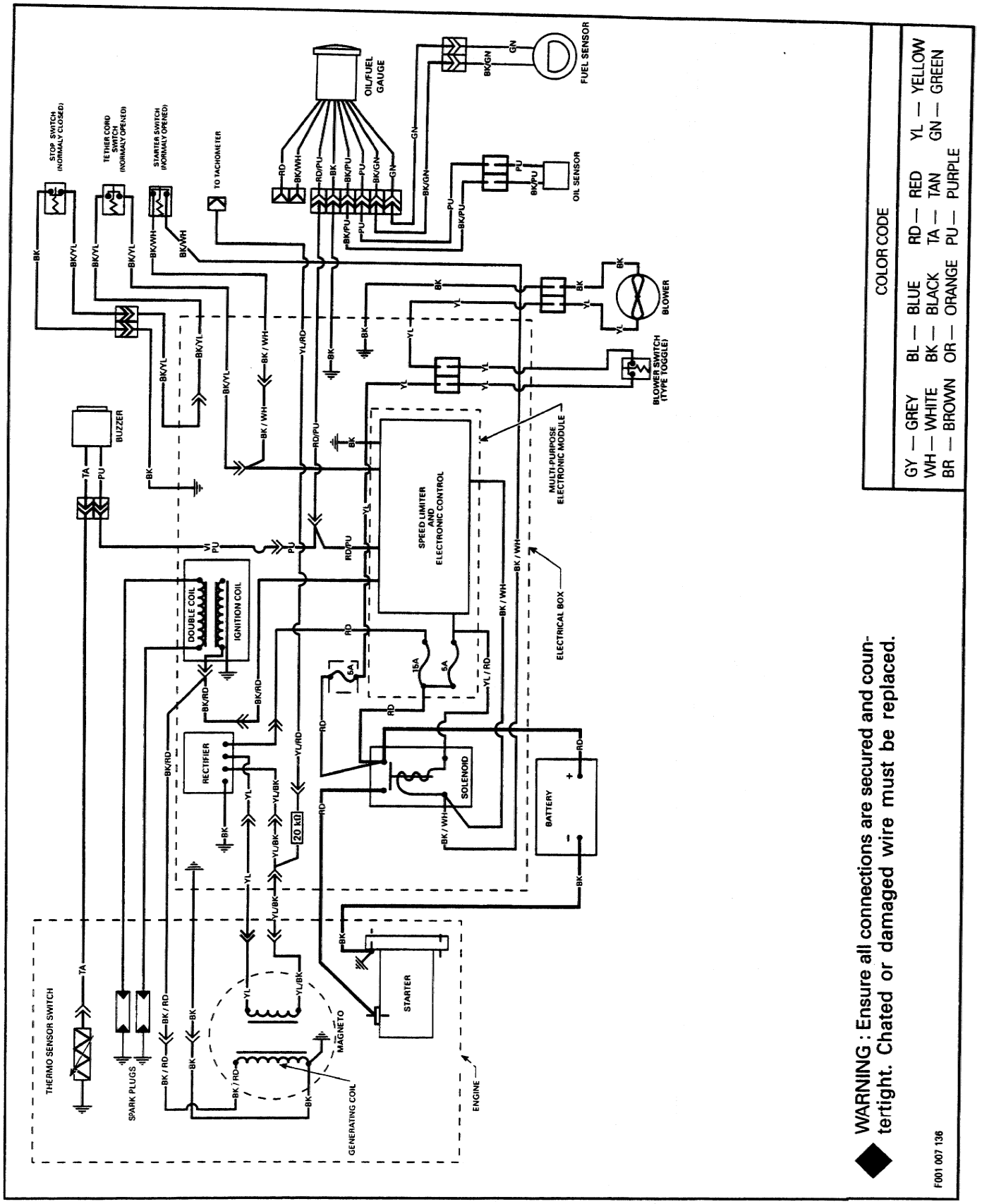
WIRING DIAGRAM FOR 5861 MODEL



WIRING DIAGRAM FOR 5852 MODEL



WIRING DIAGRAM FOR 5820 MODEL



IGNITION TIMING

ELECTRONIC IGNITION SYSTEM

This section is mainly divided in two parts, the first one using a top dead center (TDC) gauge **to verify PTO flywheel timing mark position**. The second one using a stroboscopic timing light **to check ignition timing**.

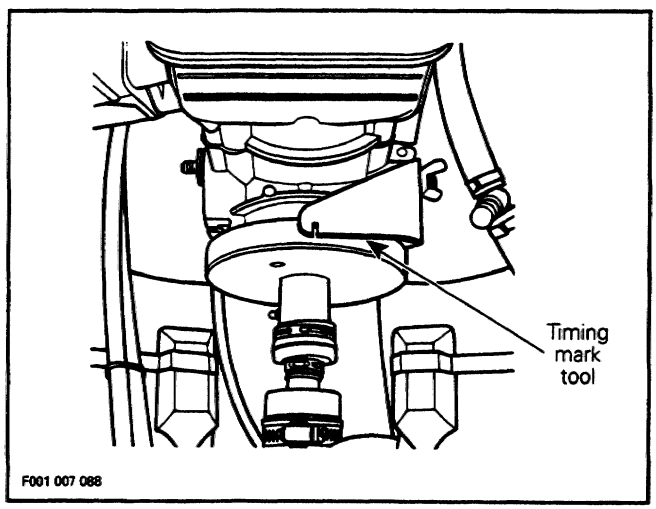
Flywheel timing mark position verification is required to :

1. Troubleshoot a missing or broken magneto flywheel woodruff key.
2. Troubleshoot a magneto flywheel corresponding to a different engine type.
3. Scribe the timing mark on a new service PTO flywheel.

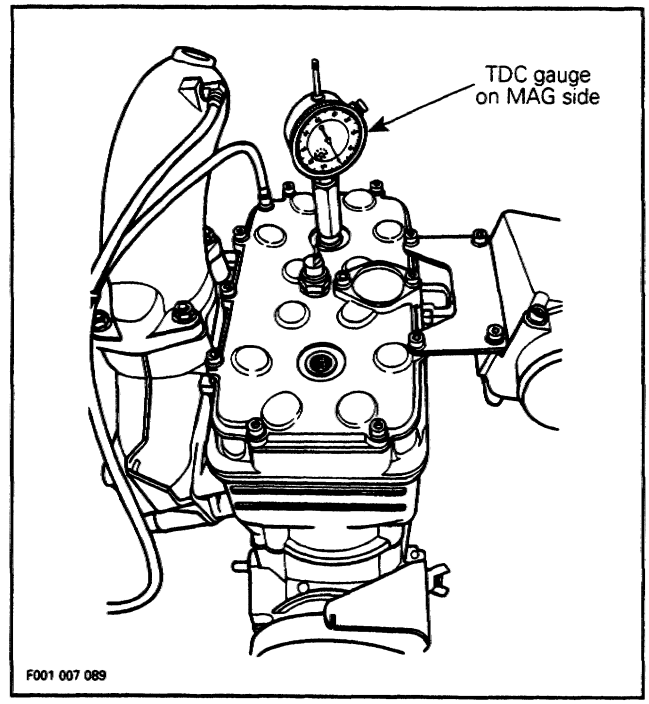
Always verify PTO flywheel timing mark position before checking ignition timing.

Verifying PTO Flywheel Timing Mark Position

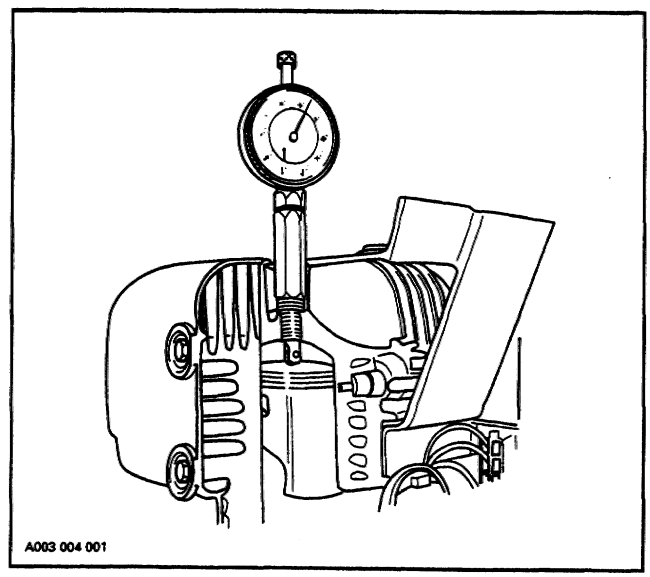
1. Disconnect MAG side spark plug wire and connect wire to grounding device then remove spark plug.
2. Remove PTO flywheel guard.
3. Install timing mark tool (P / N 295 000 102) on engine right side using wing nut previously removed.



4. Install and adjust a TDC gauge (P / N 295 000 065) in spark plug hole as follows :



Rotate PTO flywheel counterclockwise (when facing it) until piston is just before top dead center.



— Loosen adaptor lock nut then holding gauge with dial facing toward PTO, screw adaptor in spark plug hole.

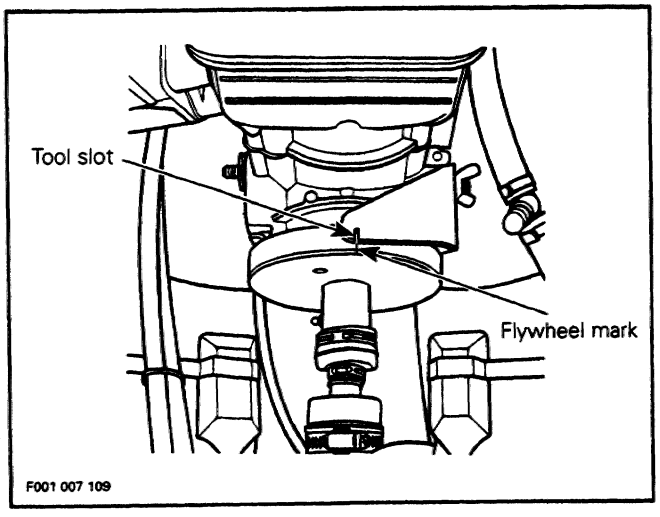
— Slide gauge far enough into adaptor to obtain a reading then finger tighten adaptor lock nut.

— Rotate PTO flywheel counterclockwise until piston is at Top Dead Center.

— Unlock outer ring of dial and turn it until zero (0) on dial aligns with pointer.

— Lock outer ring in position.

5. From this point, rotate flywheel back 1/4 turn then rotate it counterclockwise to reach 2.65 mm (.104 in) BTDC (Before Top Dead Center) for 587 engine or 2.59 mm (0.102 in) BTDC for 657 engine.
6. Using timing tool slot as reference mark, scribe in middle of tool slot a mark onto PTO flywheel.



This mark becomes the reference when using stroboscopic timing light.

▼CAUTION : Timing mark position verification cannot be used as a timing procedure, therefore, always check the timing with a stroboscopic timing light at 6000 RPM after the marks have been checked.

Checking Ignition Timing

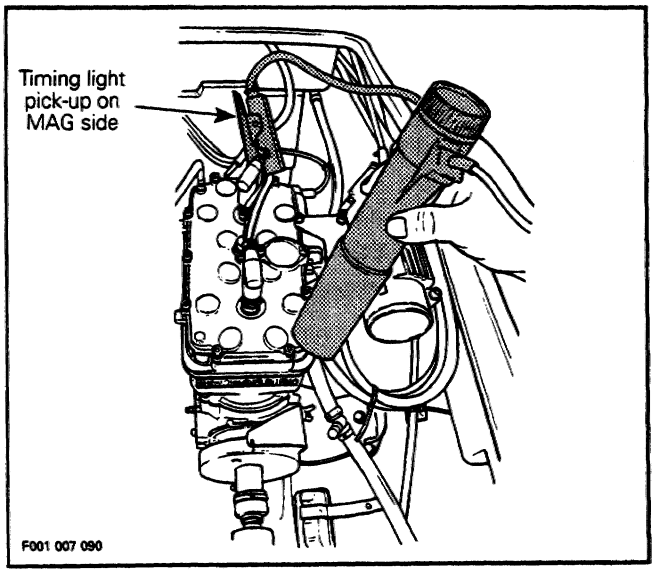
NOTE : To perform this procedure it is recommended to use a stroboscopic timing light rated to work up to 6000 RPM.

To check ignition timing, use a timing light (P / N 295 000 078).

NOTE : This timing light is battery powered (two batteries, type C) and therefore needs no auxiliary power source.

The ignition components are affected by temperature variation, therefore, timing must be checked when engine is cold, after MAXIMUM 20 seconds idling.

1. Connect timing light pick-up to MAG side spark plug lead.



2. Connect an induction-type tachometer to spark plug wire.
3. Start engine and point timing light straight in line with timing tool slot. Bring engine to 6000 RPM for a brief instant.

NOTE : On this NIPPONDENSO system, timing advance decreases as engine speed increases. When marks are aligned at 6000 RPM, spark occurence is still before top dead center.

4. Check if PTO flywheel mark (or reference one previously scribed) aligns with timing tool slot.

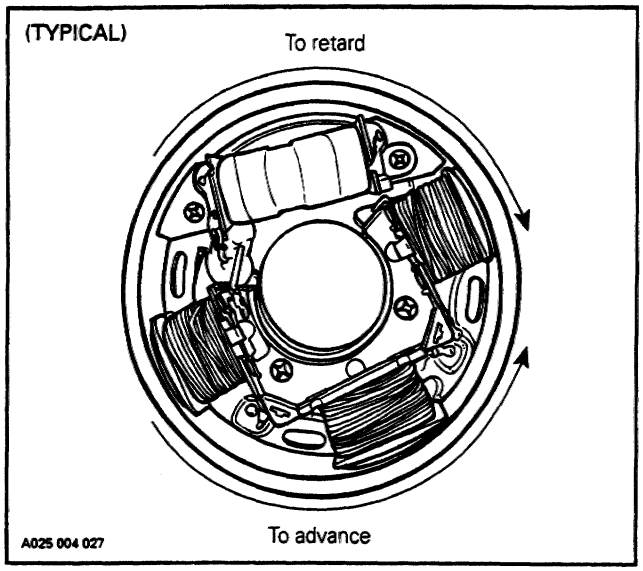
▼CAUTION : If engine is to be run more than a few minutes, connect coupler hose (P / N 295 500 099) to properly cool engine.

If timing marks align, timing is correct.

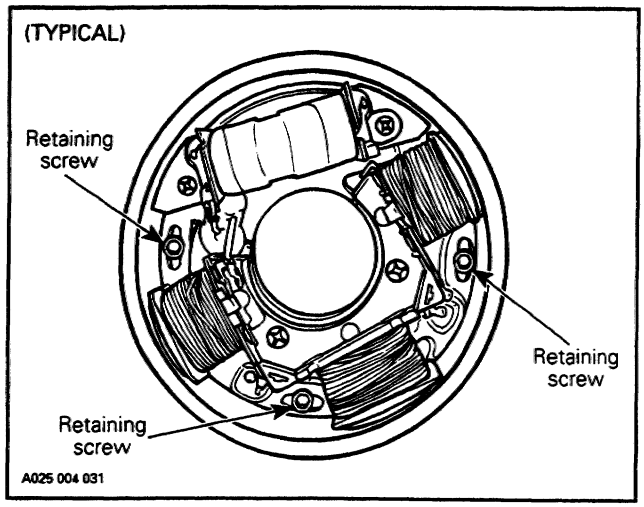
▼CAUTION : Always verify timing marks with TDC gauge before checking the timing. Particularly if PTO flywheel has been replaced, it could possibly move slightly.

IGNITION TIMING ADJUSTMENT

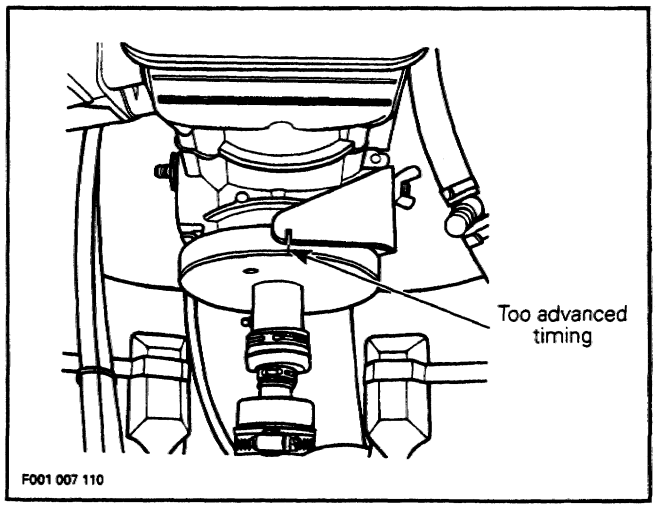
Timing is performed by moving armature plate, clockwise to retard spark occurence or counterclockwise to advance.



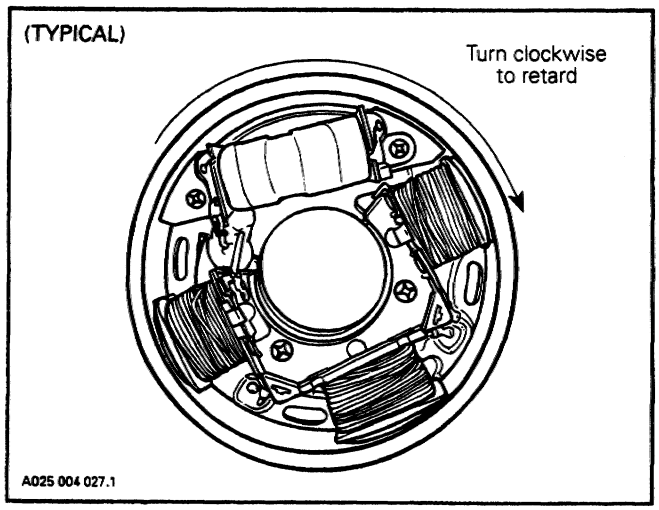
To adjust, loosen three armature plate retaining screws and slightly rotate armature plate in proper direction.



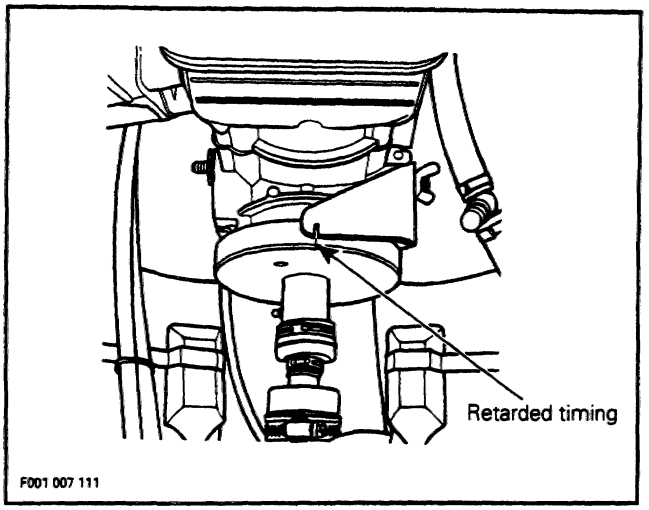
When PTO flywheel mark is on **right** side of timing tool slot, it indicates **advanced** timing.



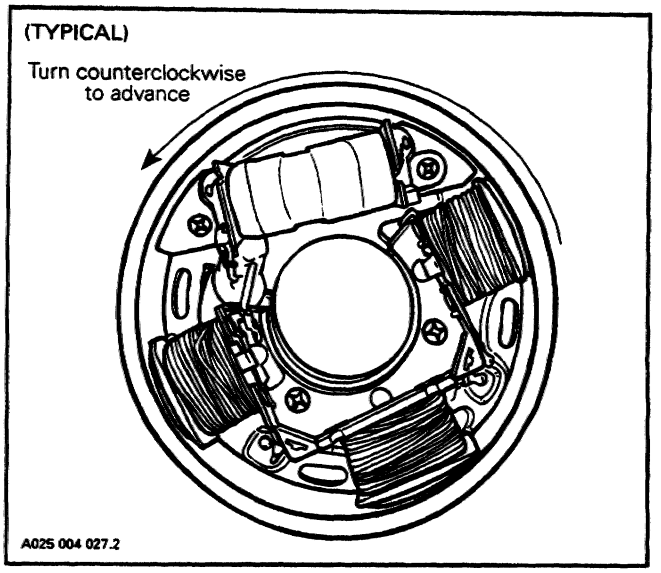
In this case, turn armature plate **clockwise.**



When PTO flywheel mark is on **left** side of timing tool slot, it indicates **retarded** timing.



In this case, turn armature plate **counterclockwise.**



After adjustment, tighten armature plate retaining screws.

▼CAUTION : Armature plate screws must have Loctite 242 (blue) (P / N 293 800 015) applied before tightening. Make sure armature plate screws are well secured.

Reinstall removed parts.

Recheck ignition timing (make sure engine is cold).

BATTERY

TROUBLESHOOTING

Symptom	Cause	Remedy
Discharged or weak battery	1. Battery posts and / or cable terminal oxidized	Clean and coat with dielectric grease
	2. Loose or bad connections	Check wiring and connectors cleanliness, damaged or short circuit
	3. Faulty battery (sulfated, doesn't keep a full charge, damaged casing, loose post)	Replace
	*4. 15 amp fuse burnt or faulty rectifier	First check charging coil. If it is in good condition replace fuse or rectifier
	**5. Faulty charging coil	Replace

* To test charging system, refer to CDI AND CHARGING SYSTEMS 07-06 then look for **current test.**

** To test charging coil, refer to CDI AND CHARGING SYSTEMS 07-06 then look for **battery charging coil.**

REMOVAL

◆ **WARNING : Battery black negative cable must always be disconnected first and connected last. Never charge or boost battery while installed on vehicle. Electrolyte or fuel vapors can be present in engine compartment and a spark might ignite them and possibly cause personal injuries.**

Proceed as follows :

1. Disconnect the **black** negative cable **first.**
2. **Then disconnect** the **red** cable last.
3. Remove the vent line from the battery.
4. Remove the holding straps.
5. Withdraw battery from vehicle being careful not lean it so that electrolyte flows out of vent elbow.

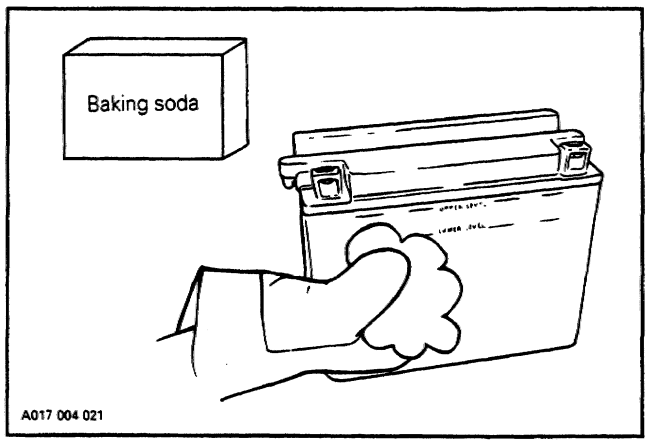
▼ **CAUTION : Should any electrolyte spillage occur, immediately wash off with a solution of baking soda and water to prevent damage to vehicle components.**

◆ **WARNING : Electrolyte is poisonous, dangerous and explosive. It contains sulfuric acid and can cause severe burns. Avoid contact with eyes, skin and clothing.**

CLEANING

Clean the battery casing, caps, cables and battery posts using a solution of baking soda and water.

▼ **CAUTION : Do not allow cleaning solution to enter battery interior since it will destroy the electrolyte chemical properties.**



Remove corrosion from battery cable terminals and battery posts using a firm wire brush. Rinse with clear water and dry well.

INSPECTION

Visually inspect battery casing for cracks or other possible damage. If casing is damaged, replace battery and thoroughly clean battery tray and close area with water and baking soda.

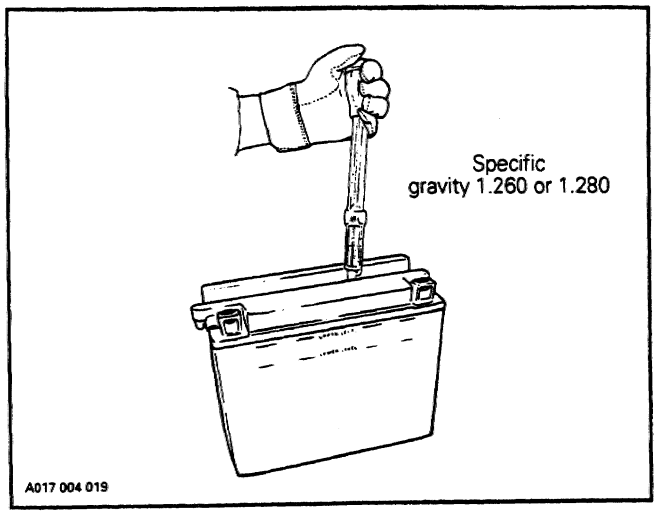
◆ **WARNING : Should the battery casing be damaged, wear a suitable pair of non-absorbent gloves when removing the battery by hand.**

Inspect battery posts for security of mounting.

Inspect for cracked or damaged battery caps, replace defective caps.

◆ **WARNING : Battery caps do not have vent holes. Make sure that vent line is not obstructed.**

HYDROMETER TEST



A hydrometer measures the charge of a battery in terms of specific gravity of the electrolyte. Most hydrometers give a true reading at 21°C (70°F).

In order to obtain correct readings, adjust the initial reading by **adding** .004 points to the hydrometer readings for each 5.5°C (10°F) **above** 21°C (70°F) and by **subtracting** .004 point for every 5.5°C (10°F) **below** 21°C (70°F).

This chart will be useful to find the correct reading.

ELECTROLYTE TEMPERATURE		OPERATION TO PERFORM		
°C	°F			
38	100	add	.012	to the reading
32	90		.008	
27	80		.004	
21	**70**	**correct reading**		
16	60	subtract	.004	from the reading
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 Sp. Gr.
Corrected Sp. Gr. is 1.234

EXAMPLE NO. 2

Temperature above 21°C (70°F) :
Hydrometer reading : 1.235
Electrolyte temperature : 38°C (100°F)
Add .012 Sp. Gr.
Corrected Sp. Gr. is 1.247

BATTERY STORAGE

Disconnect and remove battery from the vehicle.

Check electrolyte level in each cell, add distilled water up to upper level line.

▼CAUTION : Do not overfill.

The battery must always be stored in fully charged condition. If required, charge until specific gravity of 1.260 is obtained.

▼CAUTION : Battery electrolyte temperature must not exceed 50°C (122°F). The casing should not feel hot.

Clean battery terminals and cable connections using a wire brush. Apply a light coat of dielectric grease (P / N 293 550 004) or petroleum jelly on terminals.

Clean battery casing and caps using a solution of baking soda and water. **(Do not allow cleaning solution to enter battery, otherwise it will destroy the electrolyte).** Rinse battery with clear water and dry well using a clean cloth.

Store battery on a wooden shelf 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. As necessary, keep the battery at its upper level line and near full charge as possible (trickle charge).

ACTIVATION OF NEW BATTERY

◆WARNING : Never charge or boost battery while installed on vehicle.

A new battery is factory fresh dry charged. For storage purposes, it is fitted with a temporary sealing tube.

Do not remove the sealing tube or loosen battery caps unless activation is desired.

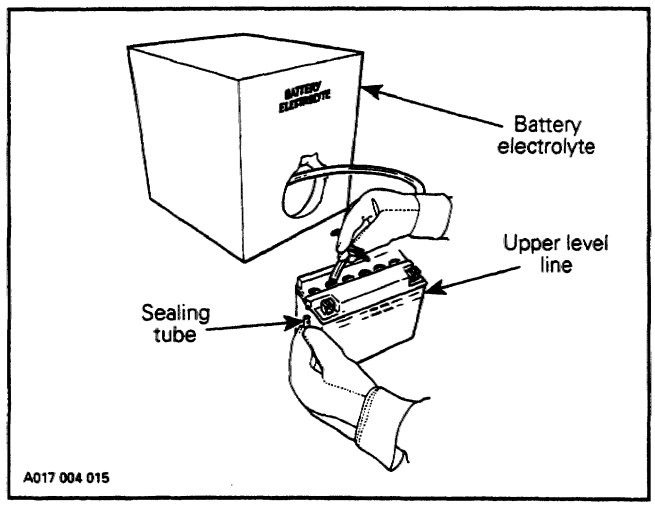
▼CAUTION : Do not leave a new battery standing on a shelf without its sealing tube.

In case of accidental premature removal of caps or sealing tube, battery should be given a full charge.

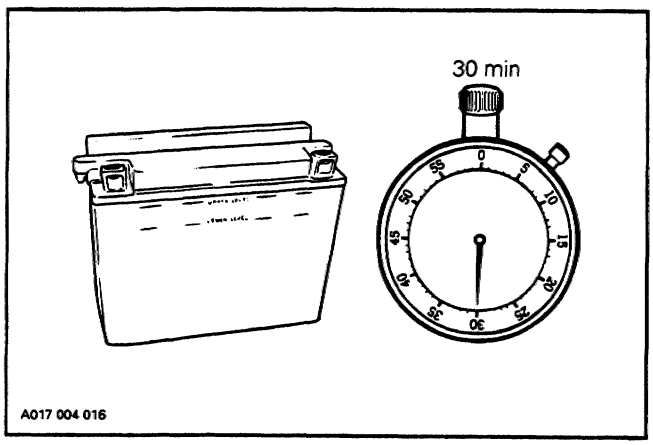
Perform the following operations anytime a new battery is to be installed.

1. Remove the sealing tube from the vent elbow.

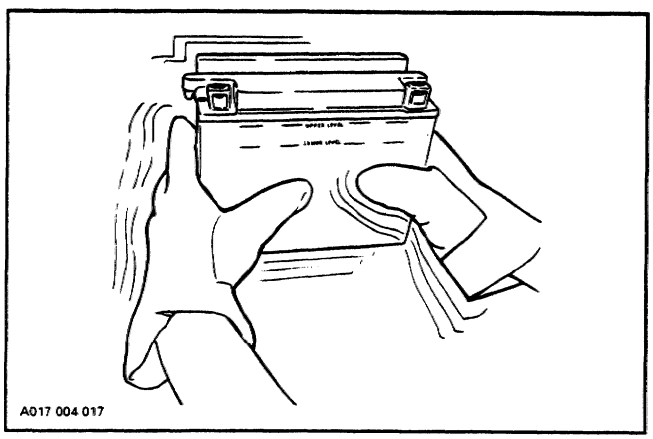
◆WARNING : Failure to remove the sealing tube could result in an explosion.



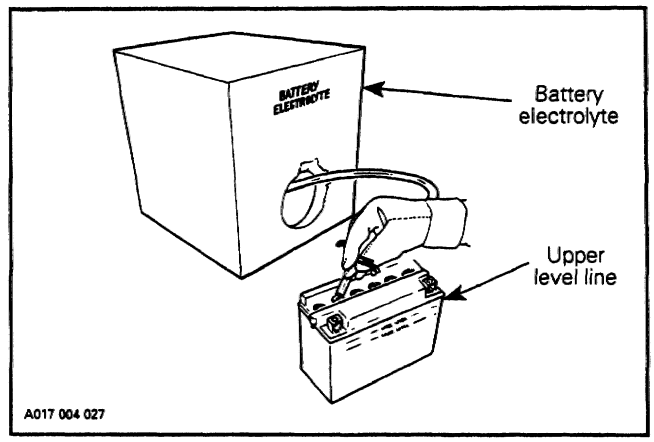
2. Remove caps and fill battery to UPPER LEVEL line with electrolyte (specific gravity : 1.260 or 1.280 at 21°C (70°F)).
3. Allow the battery to stand for 30 minutes MINIMUM so that electrolyte soak through battery cells.



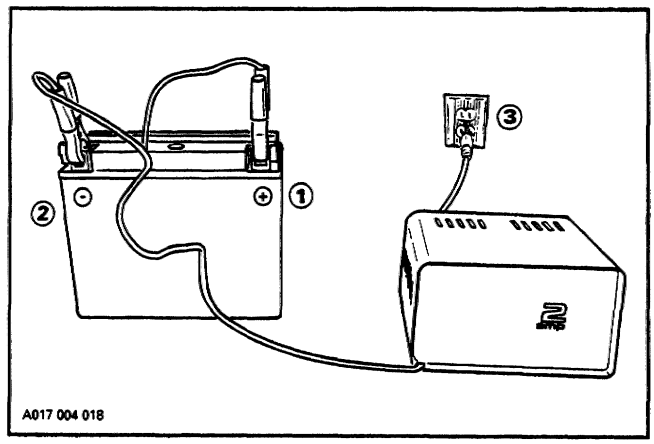
4. Allow gas bubbles to escape by lightly shaking battery by hand.



5. Readjust the electrolyte level to the UPPER LEVEL line.



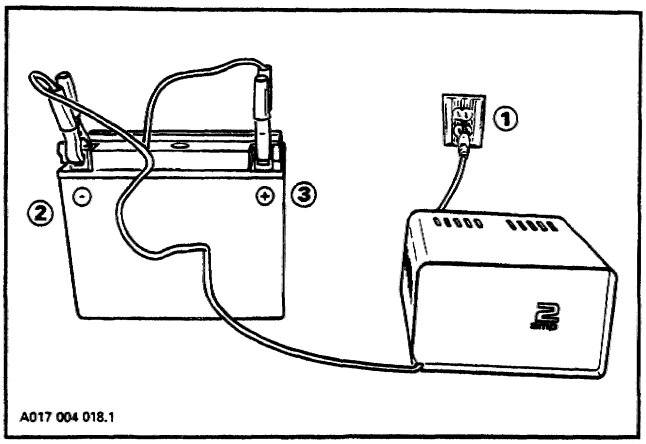
6. Connect a 2 A battery charger for three to five hours.



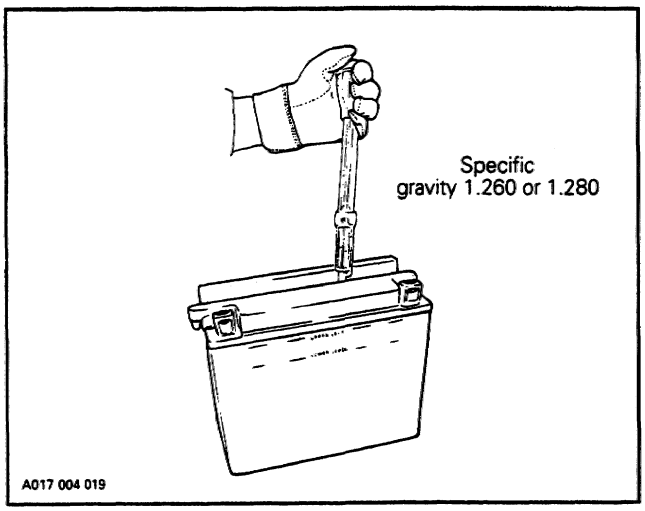
▼CAUTION : If charging rate raises higher than 2.4 A reduce it immediately. If cell temperature rises higher than 50°C (122°F) or if the casing feels hot, discontinue charging temporarily or reduce the charging rate.

◆WARNING : Gases given off by a battery being charged are highly explosive. Always charge in a well ventilated area. Keep battery away from cigarettes or open flames. Always turn battery charger off prior to disconnecting cables. Otherwise a spark will occur and battery might explode.

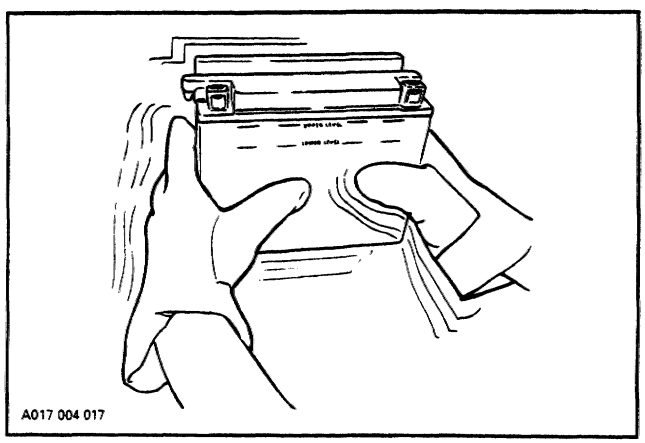
7. Disconnect battery charger.



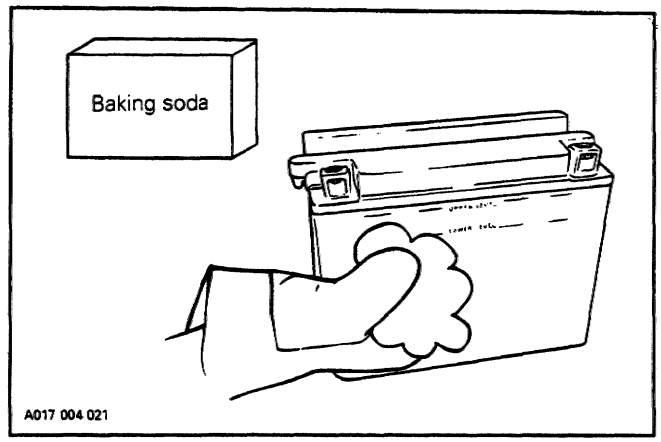
8. Test battery state of charge. Use a hydrometer.



9. Allow gas bubbles to escape by lightly shake battery.



10. If electrolyte level has dropped after charging, fill with distilled water to UPPER LEVEL line. After water is added, continue charging for one to two hours to mix water with electrolyte.
11. Reinstall caps and clean any electrolyte spillage using a solution of baking soda and water.



▼**CAUTION : Do not allow cleaning solution to enter battery interior since it will destroy the electrolyte chemical properties.**

12. Reinstall battery. Hook up battery cables observing correct polarity and coat terminals with silicone dielectric grease (P / N 293 550 004) or petroleum jelly. Install vent line.

○ **NOTE :** On XP model (5852) a check valve is installed on vent line to prevent water to flow back into battery.

▼**CAUTION : Negative battery terminal should always be disconnected FIRST and reconnected LAST.**

◆ **WARNING : Vent line must be free and open. A kinked or bent line will restrict ventilation and create gas accumulation that might result in an explosion.**

○ **NOTE :** It is recommended to verify the battery charge once a month. If necessary, fully charge battery.

SERVICING

Electrolyte Level

Since a battery has been activated (see above), add distilled water to top up electrolyte.

TIPS FOR CHARGING A USED BATTERY

▼ **CAUTION : Prior to charging the battery, always remove it from the vehicle to prevent electrolyte spillage.**

For best results, battery should be charged when the electrolyte and the plates are at room temperature. A battery that is cold may not accept current for several hours after charging begun.

Do not charge frozen battery. If the battery charge is very low, the battery may freeze. If it is suspected to be frozen, keep it in a heated area for about two hours before charging.

◆ **WARNING : Do not place battery near open flame.**

The time required to charge a battery will vary depending on some factors such as :

— Battery temperature : The charging time is increased as the temperature goes down. The current accepted by a cold battery will remain low. As the battery warm up, it will accept a higher rate of charge.

— State of charge : Because the electrolyte is nearly pure water in a completely discharged battery, it cannot accept current as well as electrolyte. This is the reason the battery will not accept current when the charging cycle first begins. As the battery remains on the charger, the current from the charger causes the electrolytic acid content to rise which makes the electrolyte a better conductor and then, the battery will accept a higher charging rate.

— Type of charger : Battery chargers vary in the amount of voltage and current that they can supply. Therefore, the time required for the battery to begin accepting measurable current will also vary.

Charging a Very Flat or Completely Discharged Battery :

Unless this procedure is properly followed, a good battery may be needlessly replaced.

— 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, in term of milliamperes, because electrolyte is nearly pure water as explained above. 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 seem not to accept any charge.

— Exceptionnally 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 telling how to bypass or override this circuitry so that the charger will turn on and charge a low-voltage battery.

— Since the battery chargers vary in the amount of voltage and current they provide, the time required for the battery to accept measurable charger current might be up to approximatively 10 hours or more.

— If the charging current is not up to a measurable amount at the end of about 10 hours, the battery should be replaced.

— If the charging current is measurable before the end or at the end of about 10 hours, the battery is good and charging should be completed in the normal manner as specified in **Activation of a new battery**.

— It is recommended that any battery recharged by this procedure be load tested prior to returning it to service.

BATTERY CHARGING EQUIPMENT

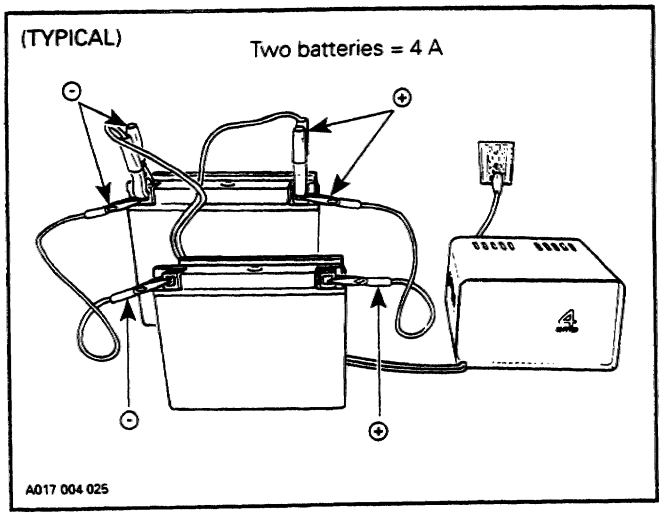
The battery charger should have an adjustable charging rate. Variable adjustment is preferred, but a unit which can be adjusted in small increments is acceptable.

The battery charger must be equipped with an ammeter capable of accurately measuring current of less than one ampere.

Charging Two or More Batteries at a Time

Connect all positives together and use a charger with a capacities (rated) equal to : number of battery to be charged multiply by 2 A.

For example : Charging five batteries at a time requires a 10 A rated charger (5 x 2 A = 10 A).



INSTALLATION OF BATTERY

◆ **WARNING : Always connect battery cables exactly in the specified order, red positive cable first black negative cable last.**

Proceed as follows :

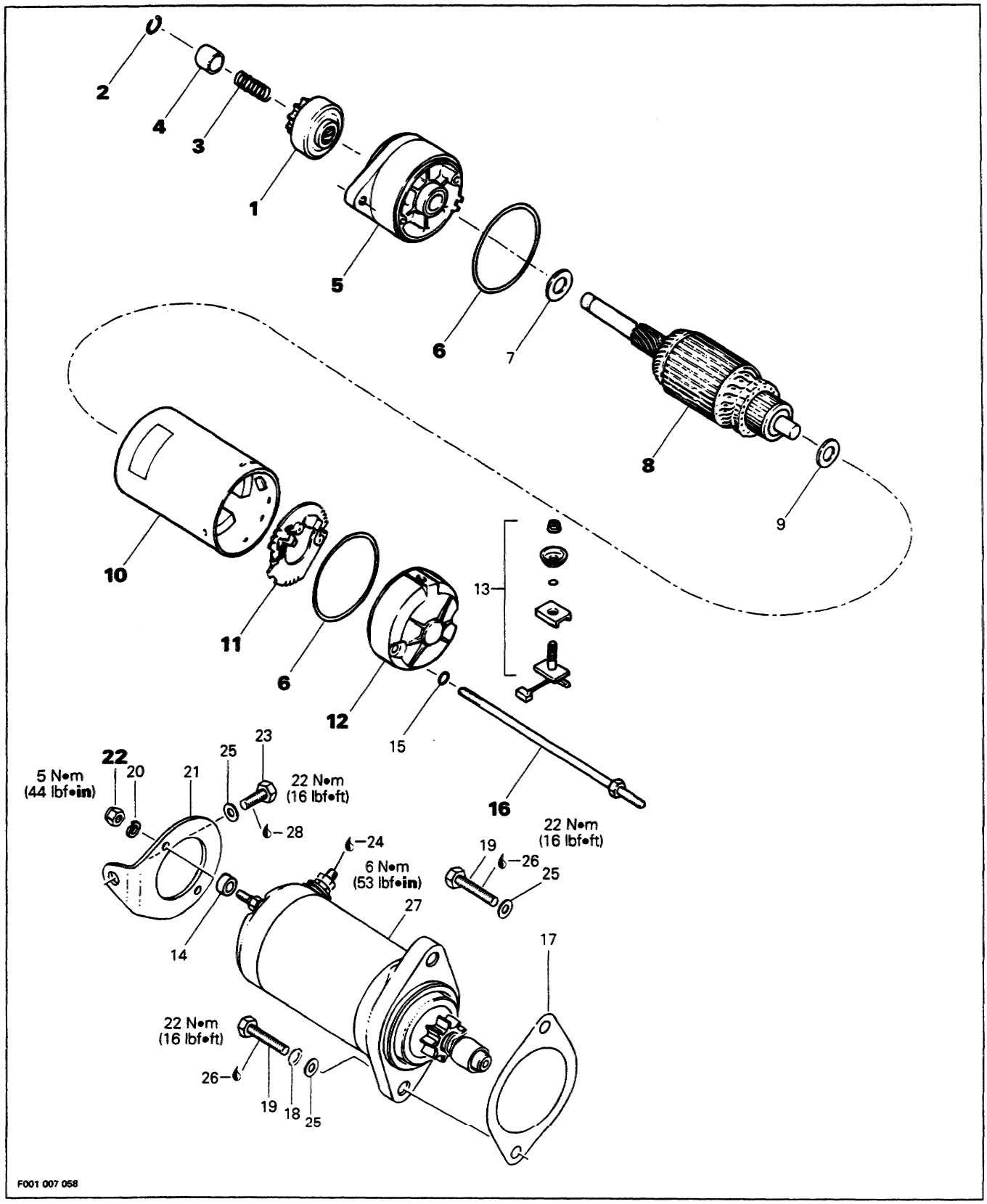
1. Install battery in its emplacement.
2. Secure vent line to the battery. Ensure vent line is not kinked or obstructed.

○ **NOTE :** Ensure check valve is not blocked if applicable.

◆ **WARNING : Vent line must be free and open. If not, it will restrict ventilation and create a gas accumulation that could result in an explosion. Gases given off by a battery being charged are highly explosive. Always charge in a well ventilated area. Keep battery away from cigarettes or open flames. Avoid skin contact with electrolyte.**

3. **First** connect **red** positive cable.
4. Then connect **black** negative cable **last.**
5. Apply anticorrosion product (salt water resistant) such as dielectric grease (P / N 293 550 004) or the equivalent on battery posts.
6. Verify cable routing and attachment.

ELECTRIC STARTER



COMPONENTS

1. *Starter clutch assembly*
2. *Circlip*
3. *Spring*
4. *Pinion stop collar*
5. *Starter clutch housing*
6. *O-ring (2)*
7. *Washer*
8. *Armature*
9. *Thrust washer*
10. *Yoke assembly*
11. *Brush holder*
12. *Commutator end frame*
13. *Brush kit*
14. *Spacer (2)*
15. *O-ring (2)*
16. *Through bolt (2)*
17. *Gasket*
18. *External teeth lock washer 8 mm*
19. *Hexagonal head screw M8 x 30 (2)*
20. *Lock washer 5 mm (2)*
21. *Starter support*
22. *Elastic stop nut M5 (2)*
23. *Hexagonal head screw M8 x 16*
24. *Grease dielectric*
25. *Washer 8 mm (3)*
26. *Loctite 271 (red)*
27. *Starter*
28. *Loctite 242 (blue)*

STARTER SPECIFICATION					
Nominal output		0.6 kW			
Voltage		12 V			
Rated time		30 seconds			
Rotation		Counterclockwise (viewed from pinion side)			
Weight		Approx. 2 kg (4.4 lb)			
Performance		Test condition			
Spec. at 20°C (68°F)	No load	11.5 V	20 A max.	5500 RPM	
	Load	8.5 V	170 A max.	2200 RPM	2 N•m (18 lbf•in)
	Stall	5 V	350 A max.	0 RPM	3 N•m (27 lbf•in)
Battery		19 Ah			

TROUBLESHOOTING

Causes of troubles are not necessarily related to starter but may be due to a faulty battery, switches, electrical cables and / or connections. Consult the following troubleshooting table.

◆ **WARNING : Short circuiting electric starter is always a danger, therefore disconnect the battery ground cable before carrying out any kind of maintenance on starting system. Do not place tools on battery.**

STARTING SYSTEM TROUBLESHOOTING TABLE

SYMPTOM	CAUSE	REMEDY
Starter does not turn.	Burnt fuse 5A.	Check wiring condition and replace fuse.
	Weak battery.	Recharge battery.
	Poor contact of starter switch contact points.	Repair or replace switch.
	Open circuit between starter switch / tether cord switch / stop switch and solenoid switch.	Repair.
Starter turns ; but does not crank the engine.	Poor contact of battery terminal(s).	Clean and tighten terminal(s).
	Poor battery ground cable connection.	Clean and tighten.
	Burnt or poor contact of solenoid switch contact disc.	Replace solenoid switch.
	Poor contact of brush.	Straighten commutator and brush.
	Burnt commutator.	Turn commutator in lathe.
	Worn commutator segments.	Undercut mica.
	Shorted armature.	Repair or replace armature.
	Weak brush spring tension.	Replace brush holder or spring.
	Weak magnet.	Replace yoke assembly.
	Worn bushings.	Replace bushings.
	Weak battery.	Recharge battery.
	Shorted battery cell(s).	Replace battery.
Starter turns, but overrunning clutch pinion does not mesh with ring gear.	Worn clutch pinion gear.	Replace clutch.
	Defective clutch.	Replace clutch.
	Poor movement of clutch on splines.	Clean and correct.
	Worn clutch bushing.	Replace clutch.
	Worn starter bushing(s).	Replace bushing(s).
	Worn ring gear.	Replace ring gear.
Starter motor keeps running.	Shorted solenoid switch winding.	Replace solenoid switch.
	Melted solenoid switch contacts.	Replace solenoid switch.
	Starter switch returns poorly.	Verify if rubber cap holds switch button down or replace starter switch.
	Sticking or defective starter clutch.	Lubricate or replace.
	Presence of salt water in the electrical box which gives continuity.	Verify electrical box watertightness.

REMOVAL

Disconnect black cable ground connection from battery.

◆ **WARNING : Always disconnect ground cable first and reconnect last.**

Disconnect red cable connection from battery.

Remove the following parts.

— cables from starter

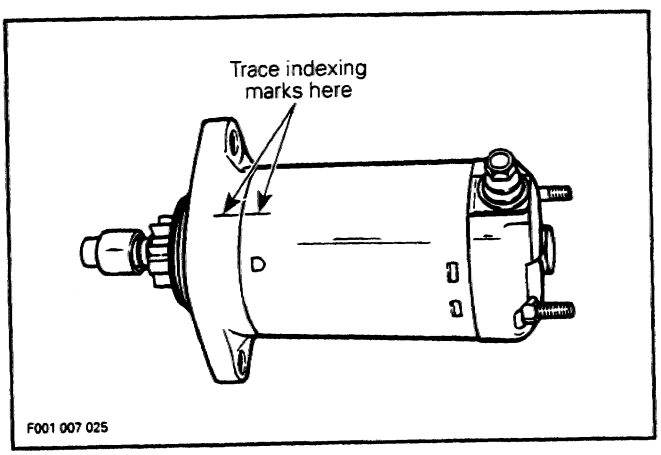
— screw of starter rear support (item #23)

— starter mount screws (item #19)

DISASSEMBLY

10,11,12,16,22, Yoke, Brush Holder, End Frame, Through Bolt and Nut

Before disassembling, trace index marks on yoke and clutch housing to ease further assembly.



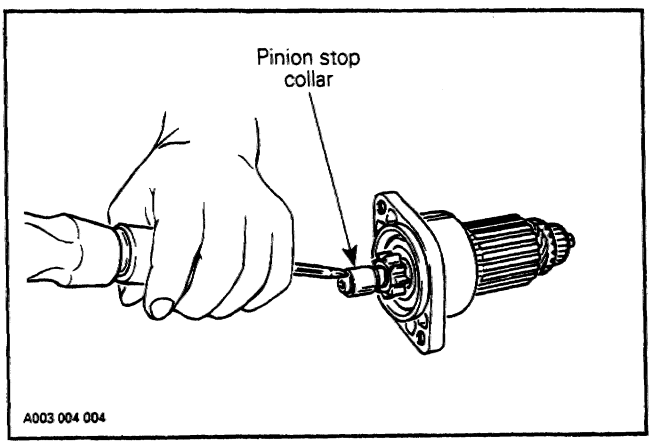
Remove starter support nuts then through bolts. Separate end frame from yoke assembly. Withdraw yoke assembly from armature.

Brush holder can be removed from end frame by unscrewing nut retaining terminal.

Check that the radial play between the armature shaft and end frame is not greater than 0.20 mm (.008 in). Replace end frame if so.

2,3,4, Circlip, Spring and Pinion Stop Collar

Tap the pinion stop collar using a screwdriver. Remove circlip. Disassemble pinion stop collar and spring.



1,5,6,8, Clutch Ass'y, Housing, O-ring and Armature

Turn assembly counterclockwise to remove it from armature assembly.

Pull housing from armature.

CLEANING

▼ **CAUTION : Yoke ass'y and drive unit assembly must not be immersed in cleaning solvent.**

Discard all O-rings and gasket.

Clean brushes and holders with a clean cloth soaked in solvent. Brushes must be dried thoroughly with a clean cloth.

Blow brush holders clean using compressed air.

◆ **WARNING : Always wear safety glasses when using compressed air.**

Remove dirt, oil or grease from commutator using a clean cloth soaked in suitable solvent. Dry well using a clean, dry cloth.

Clean engine ring gear teeth and drive unit (clutch).

○ **NOTE :** Bushings must not be cleaned with grease dissolving agents.

Immerse all metal components in cleaning solution. Dry using a clean, dry cloth.

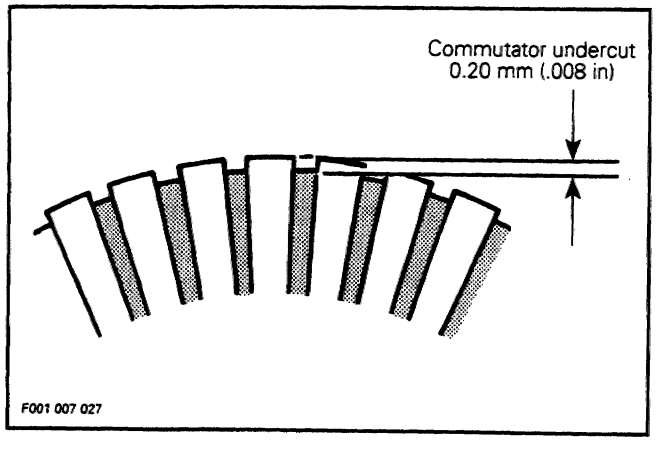
INSPECTION

Armature

NOTE : An ohmmeter may be used for the following testing procedures, except for the one concerning shorted windings in armature.

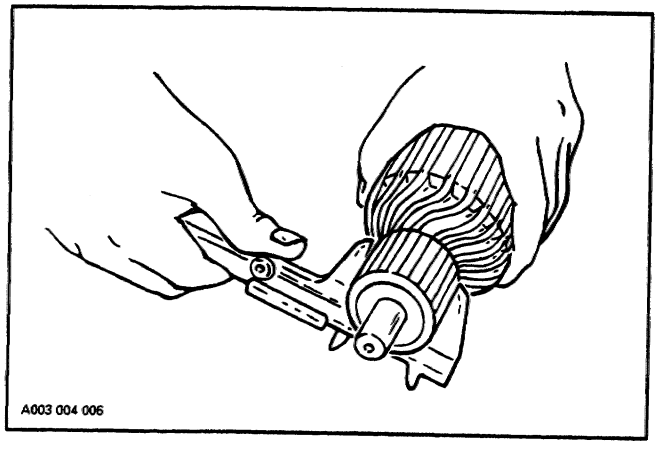
Check commutator for roughness, burnt or scored surface. If necessary, turn commutator on a lathe, enough to resurface only.

Check commutator for mica depth. If depth is less than 0.20 mm (.008 in), undercut mica. Be sure that no burrs are left and no copper dust remains between segments after undercutting operation is completed.



Check commutator out of round condition with V-shaped blocks and an indicator. If commutator out of round is more than 0.40 mm (.016 in), commutator should be turned on a lathe.

Check commutator outer diameter. If less than 27 mm (1.063 in), replace.



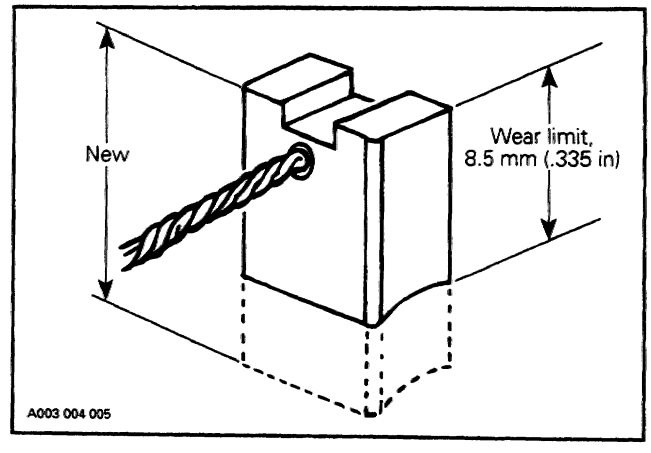
Brush Holder

Check brush holder for insulation using an ohmmeter. Place one test probe on insulated brush holder and the other test probe on brush holder plate. If continuity is found, brush holder has to be repaired or replaced.

Brush Length

Measure brush length. If less than 8.5 mm (.335 in), replace them.

NOTE : New brush length is 12 mm (.472 in).



Overrunning Clutch

Pinion of overrunning clutch should turn smoothly in clockwise direction, and should not slip in a counter-clockwise direction. If defective, replace.

Check pinion teeth for wear and damage. If defective, replace.

NOTE : Always check engine ring gear teeth for wear and damage. If defective replace ring gear. Refer to ENGINE 03-04 then refer to **ring gear**.

Starter Switch

Switch condition can be checked with an ohmmeter. Install test probes on both BLACK / WHITE wires of switch. Measure resistance, it should be high when button is released and must be close to zero (0) ohm when activated.

Solenoid Switch

Inspect connections and clean as necessary. Solenoid switch condition can be checked with an ohmmeter. Install test probes on large connectors of solenoid. Measure resistance when current is applied to small connectors ; +12 V on YELLOW / RED wire and negative(–) on BLACK / WHITE wire. If it is more than a few ohms, replace solenoid switch.

IMPORTANT : No current must be present on large cables when using ohmmeter, otherwise meter could be damaged.

ASSEMBLY

Reverse the order of disassembly to reassemble starter. However, attention should be paid to the following operations.

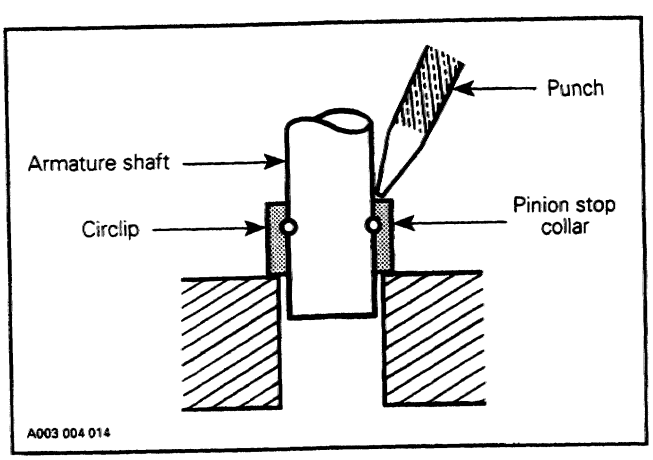
Prior to assembling, coat sliding surfaces on armature shaft splines, overrunning clutch and bushing with G.E. Versilube G 341 M or ESSO Beacon 325 lubricant or equivalent.

Apply motor oil on metal bushings.

2,4, Circlip and Pinion Stop Collar

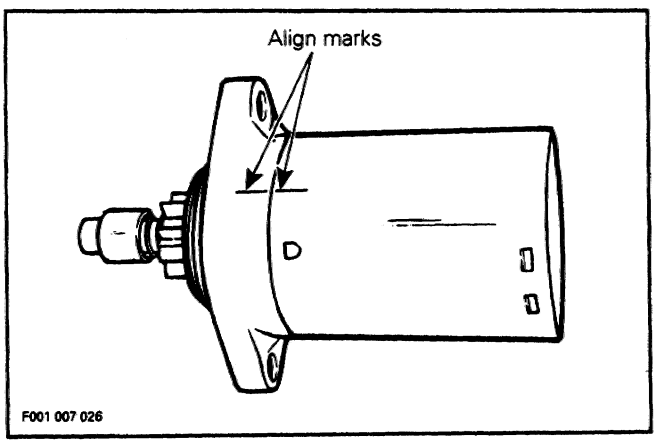
After placing stop collar on armature shaft, fit circlip into armature shaft, then make sure that it is properly secured.

Slide stop collar over circlip and secure in place by punching it at two or three places.



5,10, Housing and Yoke Ass'y

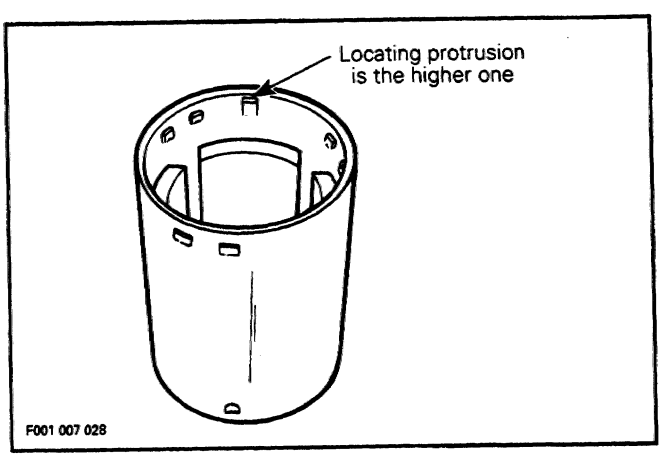
Align previously traced indexing marks.

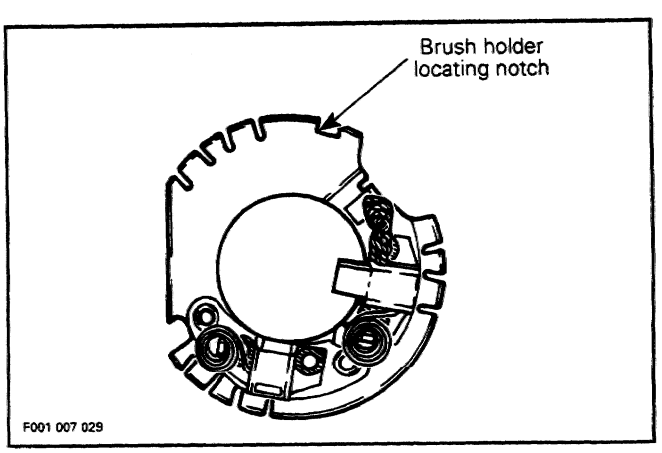


10,12,16, Yoke Ass'y, End Frame and Through Bolt

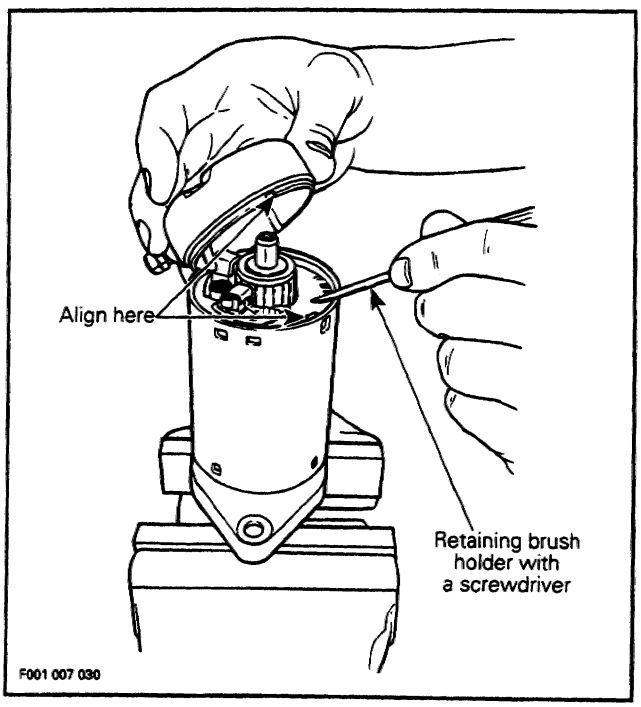
Open brushes and slide over commutator.

Align end frame locating notch with yoke locating protrusion and properly sit brush holder into yoke.





To ease end frame installation, retain brush holder with a small screwdriver while installing end frame.



Align end frame notch with brush holder notch / yoke protrusion.

▼ **CAUTION : Make sure end frame fits perfectly on yoke.**

INSTALLATION

Make sure that starter and engine mating surfaces are free of debris. Serious trouble may arise if starter is not properly aligned.

○ **NOTE :** Make sure to install starter screws in their proper holes of ignition housing. Install upper screw in lower hole and lower screw in upper hole.

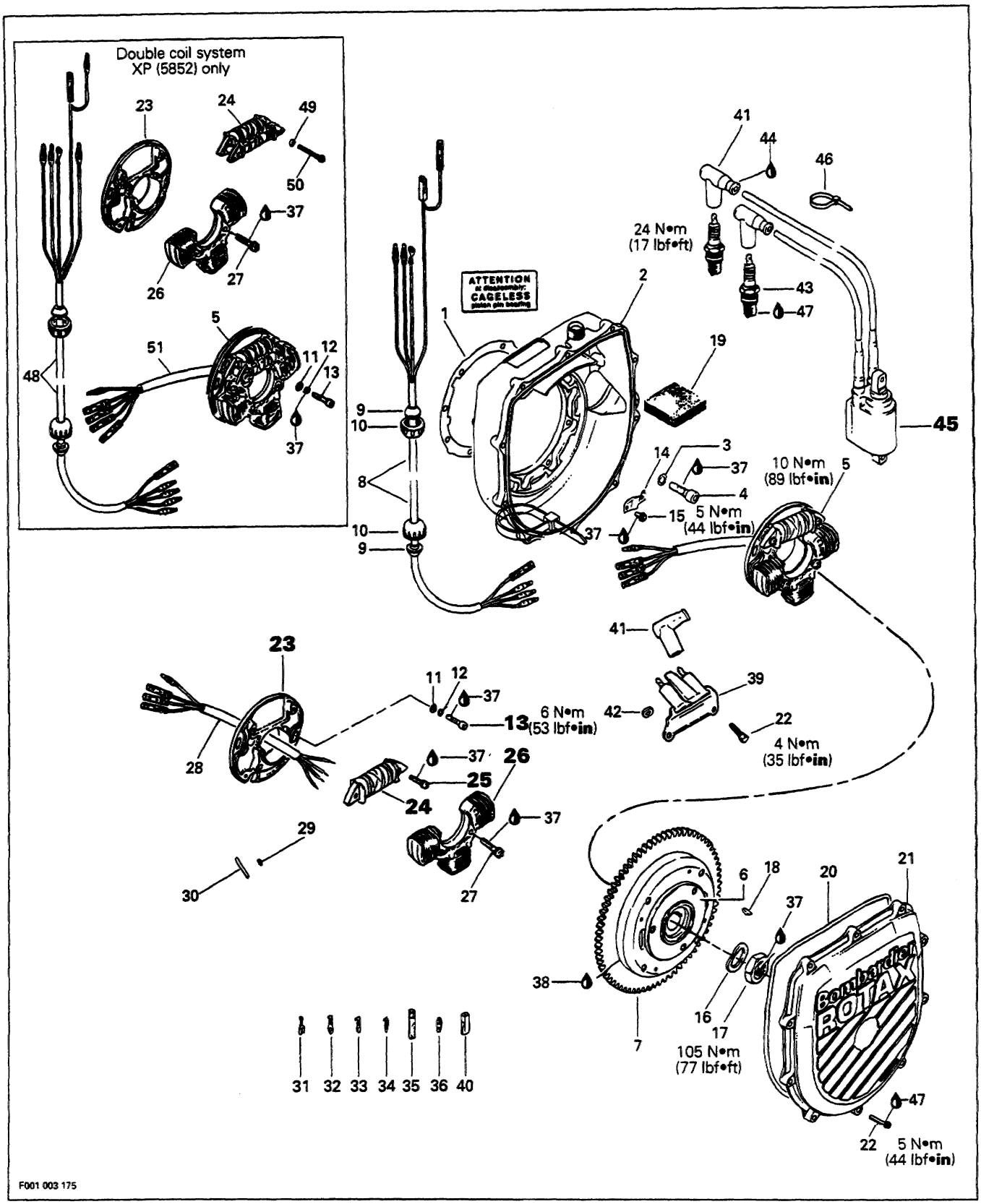
Install starter apply Loctite 242 on starter support screw threads and torque screw to 22 N•m (16 lbf•ft).

Connect the red battery cable to the starter and torque nut to 6 N•m (53 lbf•**in**). Apply neopren grease on terminal and nut.

Then connect black cable to starter using a flat washer, a teeth washer and a screw with Loctite 271 on threads. Torque screws to 22 N•m (16 lbf•ft). Apply neopren grease on terminal and screw.

◆ **WARNING : Always connect red positive cable first then black negative cable last. Whenever connecting the red positive cable to the starter motor make sure the battery cables are disconnected to prevent electric shock.**

MAGNETO SYSTEM, REPAIR



COMPONENTS

1. *Gasket*
2. *Ignition housing*
3. *Lock washer M8 (8)*
4. *Allen screw M8 x 25 (8)*
5. *Armature plate assembly*
6. *Magneto flywheel*
7. *Ring Gear 77 teeth*
8. *Harness assembly*
9. *Grommet (2)*
10. *Nut cap (2)*
11. *Washer M5.5 (3)*
12. *Lock washer M5 (3)*
13. *Allen screw M5 x 18 (3)*
14. *Retainer plate*
15. *Taptite screw M5 x 8 (2)*
16. *Lock washer M22*
17. *Hexagonal nut M22*
18. *Woodruff key*
19. *Protection mat*
20. *O-ring*
21. *Ignition housing cover*
22. *Self tapping screw M5 x 25 (10)*
23. *Armature plate*
24. *Generating coil*
25. *Phillips screw M5 x 22 (2)*
26. *Battery charging coil*
27. *Screw M6 x 25 (2)*
28. *Harness assembly*
29. *Terminal clip (4)*
30. *Shrink tube 30 mm (4)*
31. *Female connector*
32. *Ring terminal*
33. *Female terminal*
34. *Male terminal*
35. *Insulation sheath*
36. *Insulation sheath*
37. *Loctite 242*
38. *Loctite 648*
39. *Ground plate*
40. *Protection cap*
41. *Insulator (2)*
42. *Star washer M5 (2)*
43. *Spark plug (2)*
44. *Dielectric grease*
45. *Ignition coil*
46. *Tie rap (2)*
47. *Anti-seize lubrificant*
48. *Harness assembly*
49. *Lock washers (2)*
50. *Slotted head screw M5 x 35 (2)*
51. *Harness assembly*

REMOVAL

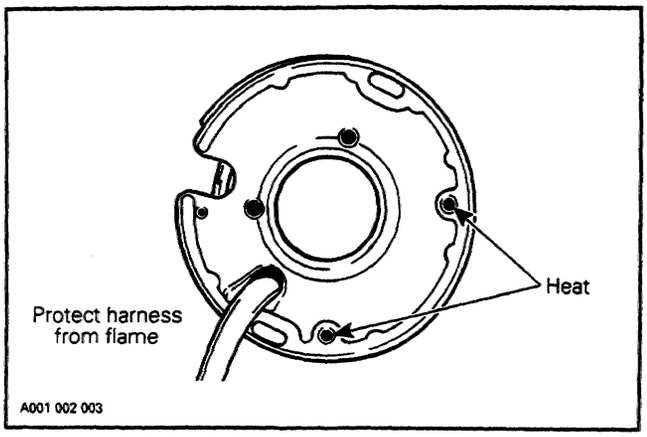
Refer to ENGINE section 03-04 then look for **PTO flywheel** and **magneto** for parts removal.

DISASSEMBLY

24, Generating Coil (Single)

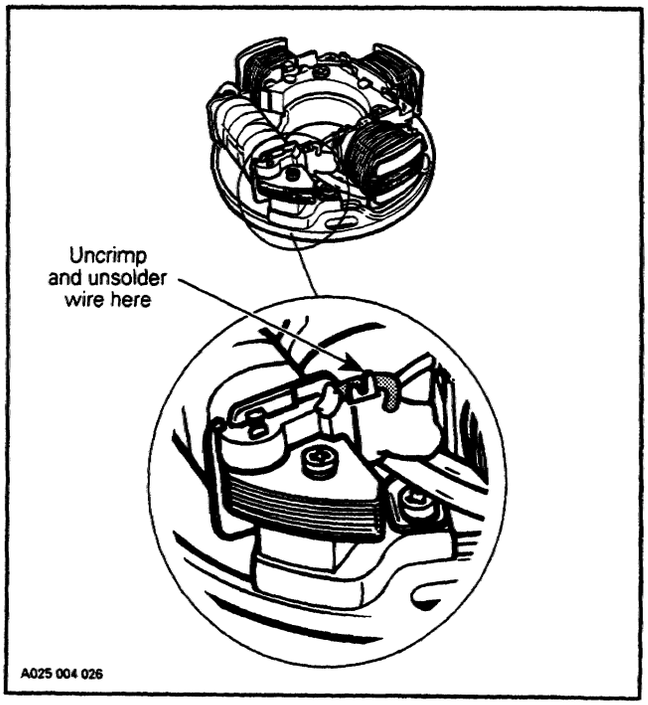
To replace generating coil :

- Heat the armature plate to 93 °C (200 °F) around the screw holes to break the threadlocker bond.



CAUTION : Protect harness from flame.

- Remove screws.
- Uncrimp and unsolder BLACK / RED wire from coil terminal.

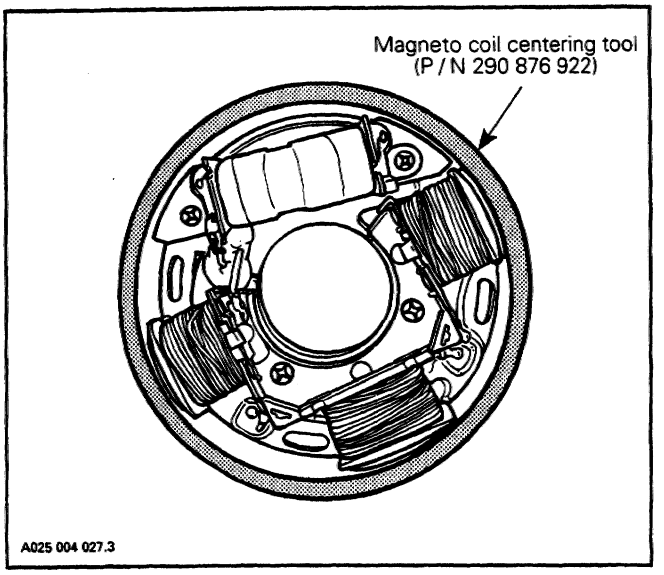


- Strip end of old wire then crimp and solder on new coil.

24,25, Generating Coil and Screw

Apply Loctite 242 (blue, medium strength) to screws and install the new coil on armature plate.

Use magneto coil centering tool (P / N 290 876 922) and install so that it fits around armature plate before tightening screws.

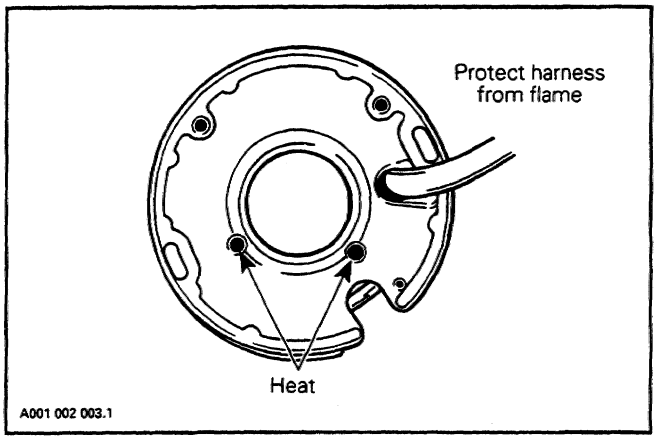


CAUTION : Before reinstalling the magneto, remove the loose epoxy from harness.

26, Battery Charging Coil

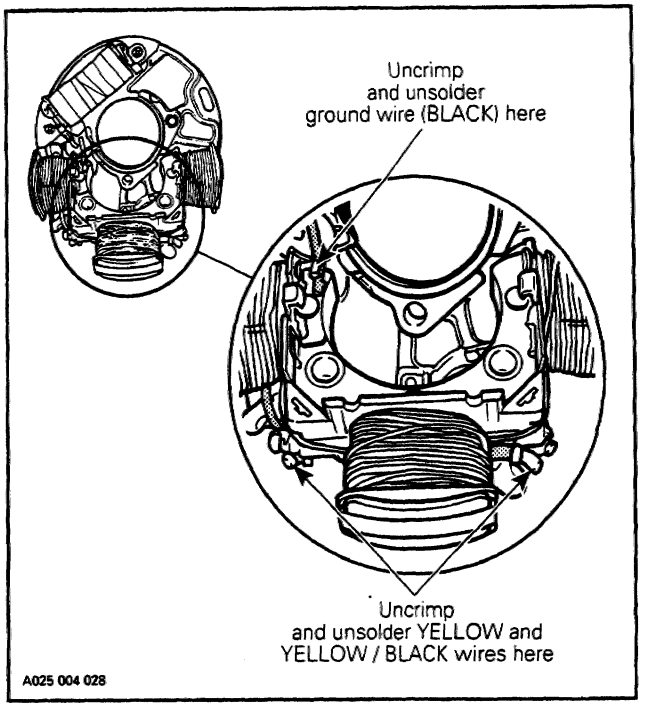
To replace battery charging coil :

- Heat the armature plate to 93 °C (200 °F) around the screw holes to break the threadlocker bond.



CAUTION : Protect harness from flame.

- Remove screws.
- Uncrimp and unsolder YELLOW and YELLOW / BLACK wires from coil terminals.
- Uncrimp and unsolder ground wire (BLACK) from coil core.

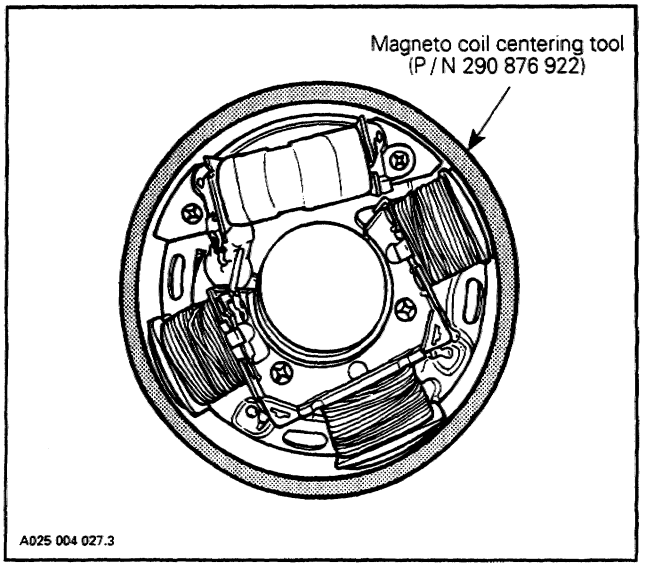


- Position new coil, crimp and solder all wires.

26,27, Battery Charging Coil and Screw

Prior to assembly, apply Loctite 242 (blue, medium strength).

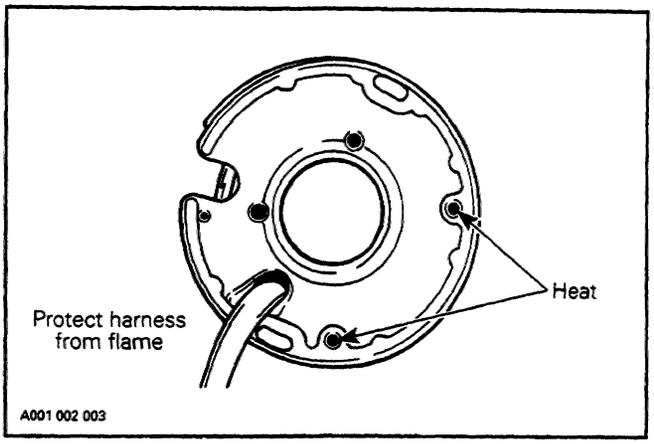
Use magneto coil centering tool (P / N 290 876 922) and install it so that it fits around armature plate before tightening screws.



Generating Coil (Double)

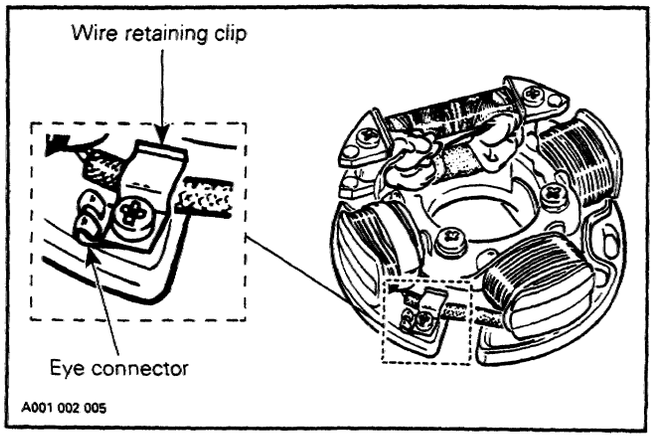
To replace generating coil :

- Heat the armature plate to 93 °C (200 °F) around the screw holes to break the threadlocker bond.



▼CAUTION : Protect harness from flame.

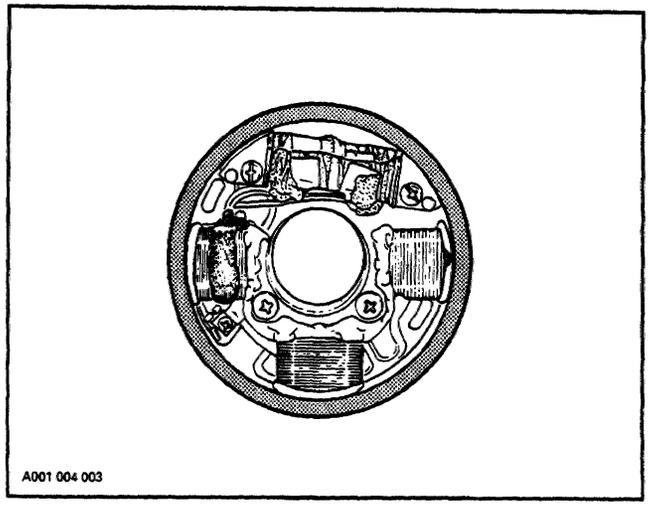
- Remove screws.
- Cut the three wires as close as possible to the coil body.
- To pass new coil wires in harness, tape the old wires to the end of new wires and pull them through the harness protector tube.
- Strip end of old wires and solder on new coil wires.
- To install the ground connector to the armature plate, tape the new black lead to the old one and pull it under the charging coil with the old wire.
- Solder an eye connector to the lead and fasten it under the wire retaining clip.



Generating Coil and Screw

Apply Loctite 242 (blue, medium strength) to screws and install the new coil on armature plate.

Use magneto coil centering tool (P / N 290 876 922) and install so that it fits around armature plate before tightening screws.

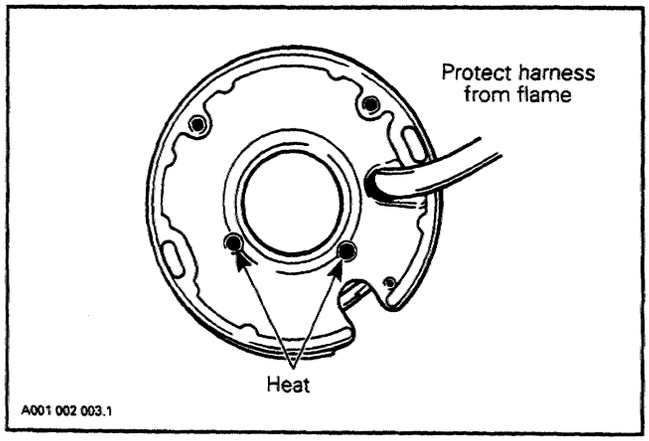


▼CAUTION : Before reinstalling the magneto, remove the loose epoxy from harness.

Battery Charging Coil

To replace battery charging coil :

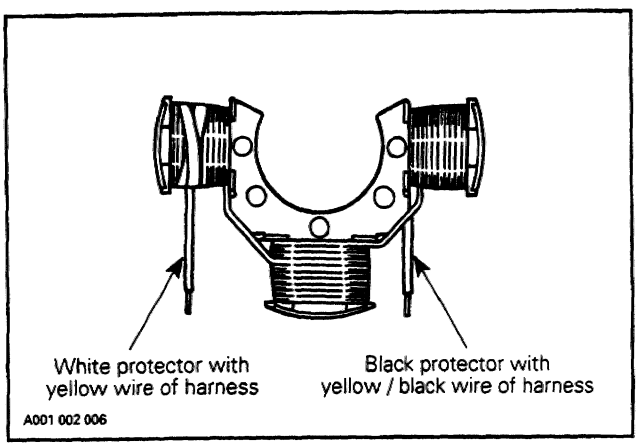
- Heat the armature plate to 93 °C (200 °F) around the screw holes to break the threadlocker bond.



▼CAUTION : Protect harness from flame.

- Remove screws.
- Remove the wire retaining clip from armature plate.
- Pull out protector tubes and unsolder the splice connectors.

- Solder the yellow wire in the harness to the white tube protected wire of the coil.
- Solder the yellow / black striped wire in the harness to the black tube protected wire of the coil.



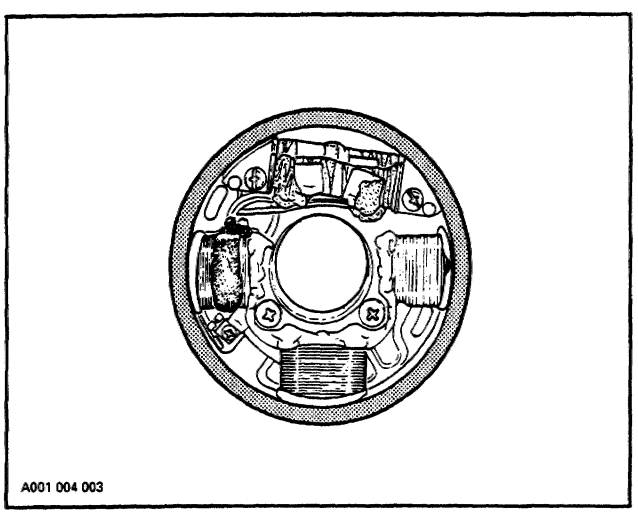
Protector Tube

Position protector tubes over connections.

Battery Charging Coil and Screw

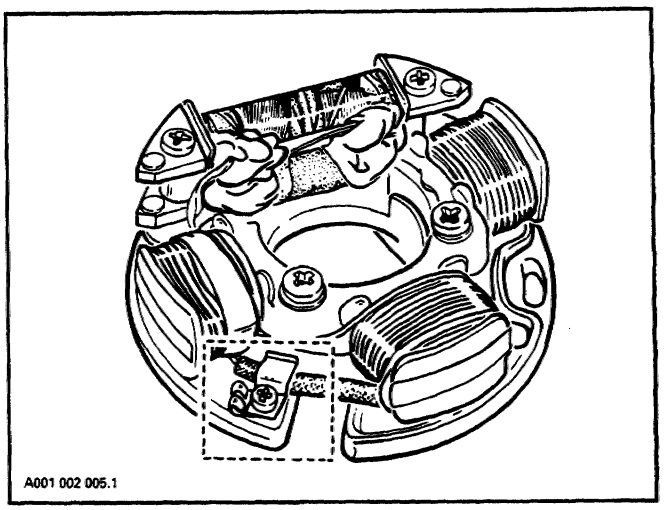
Prior to assembly, apply Loctite 242 (blue, medium strenght).

Use magneto coil centering tool (P / N 290 876 922) and install it so that it fits around armature plate before tigghtening screws.



- Fasten retaining clip onto protector tubes.

The ground terminal from generating coil must be fastened under this clip.



▼CAUTION : Before reinstalling the magneto, remove the loose epoxy from harness.

ASSEMBLY

O NOTE : Always apply dielectric grease on all electrical connections.

13,23, Screw and Armature Plate

Position the armature plate on the crankcase, aligning the marks on both parts.

Apply a drop of Loctite 242 on screw threads and tighten.

45, Ignition Coil

Connect BLACK / RED wire to ignition coil terminal (with single generating coil).

Connect wires to ignition coil, connect BLACK wire with "–" symbol underneath coil and WHITE / BLUE wire with "+" symbol (with double generating coil).

Identification of Magneto Flywheels

There are two ways to differentiate the two magneto flywheels :

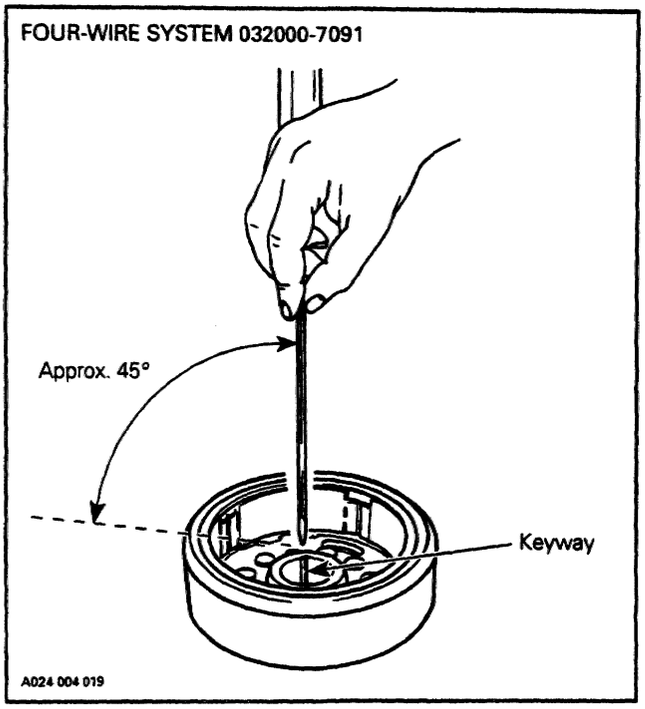
1. Nippondenso part number stamped on flywheel is different for each system :

   Four-wire system flywheel : (P / N 290 995 119) - Nippondenso P / N is 032000-7091 ;

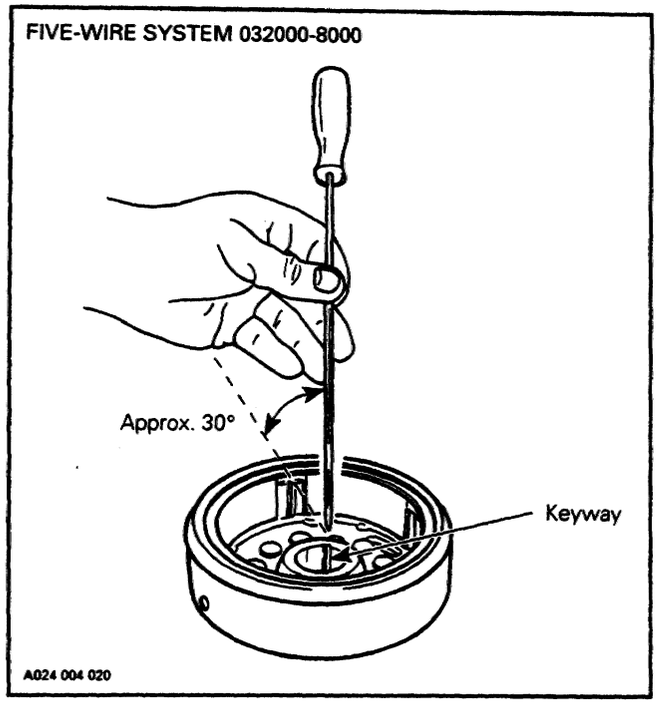
   Five-wire system flywheel : (P / N 290 995 113) - Nippondenso P / N is 032000-8000 ;

2. The glued-in magnets have a different angle towards the keyway.

FOUR-WIRE SYSTEM 032000-7091



FIVE-WIRE SYSTEM 032000-8000

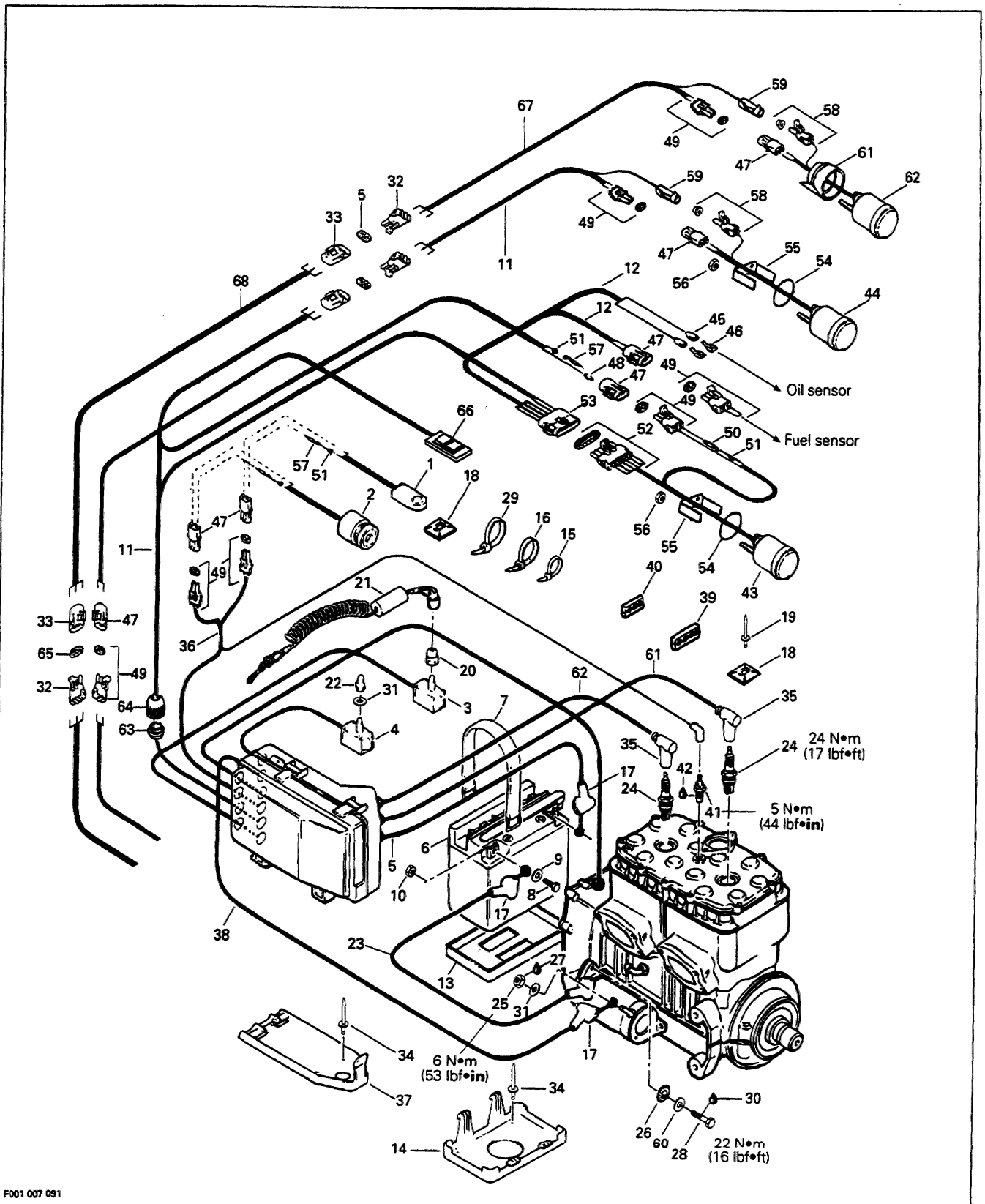


INSTALLATION

Refer to ENGINE section 03-04 then look for **PTO flywheel** and **magneto** for installation.

Perform ignition timing.

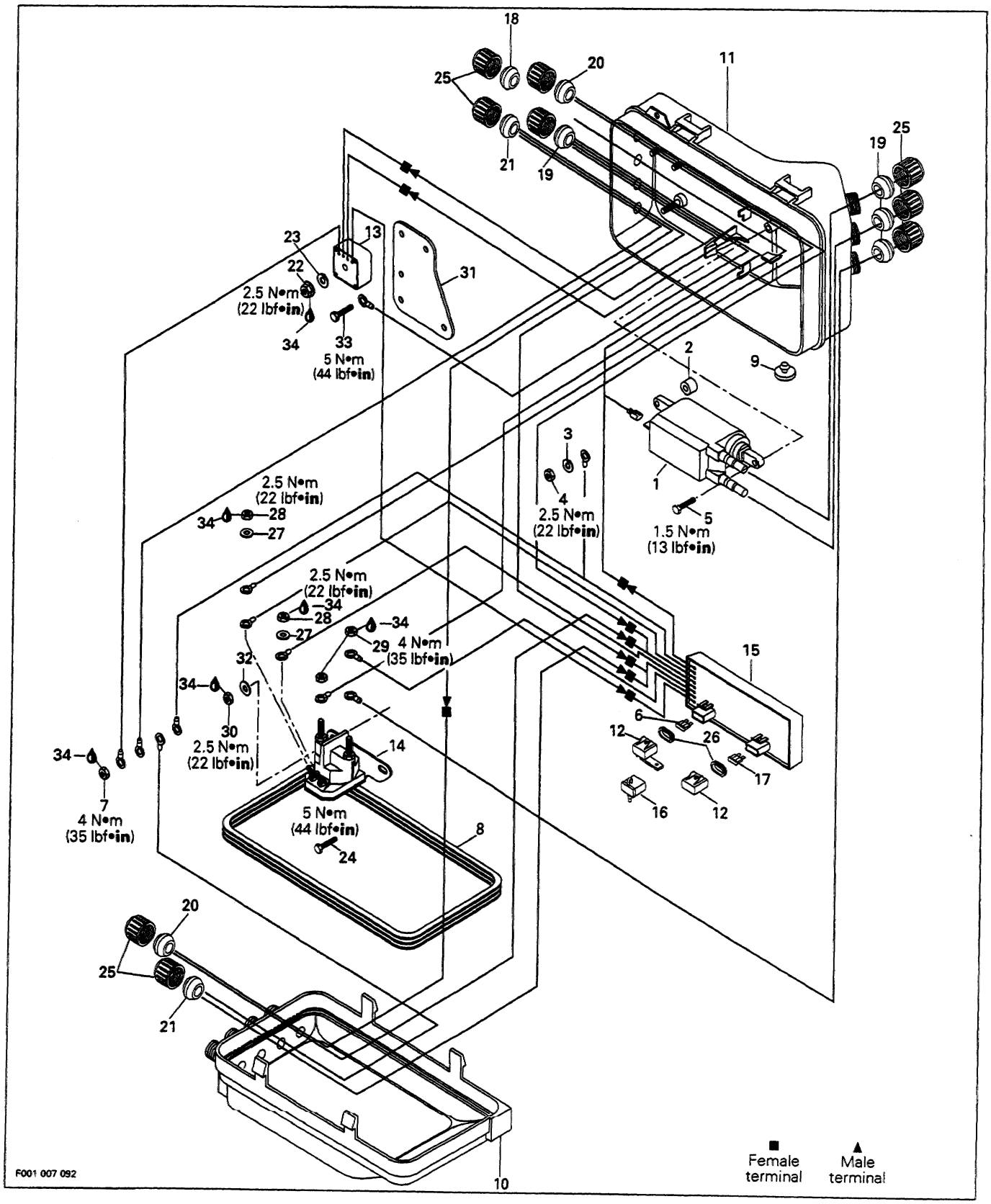
CDI AND CHARGING SYSTEMS ; TESTING PROCEDURES



COMPONENTS

1. *Stop switch assembly*
2. *Buzzer assembly*
3. *Tether cord switch*
4. *Ignition starter switch*
5. *Red battery cable (positive)*
6. *Battery*
7. *Strap*
8. *Screw M6 x 16 (2)*
9. *Washer M6 (2)*
10. *Nut M6 (2)*
11. *Harness (3 ways) assembly*
12. *Harness (4 ways) assembly*
13. *Battery lower pad*
14. *Battery support*
15. *Tie rap*
16. *Tie rap*
17. *Protector cap (3)*
18. *Tie mount*
19. *Rivet 1/8" x .640"*
20. *Switch nut*
21. *Tether cord*
22. *Cap*
23. *Battery ground cable*
24. *Spark plug (2)*
25. *Lock nut M6*
26. *External teeth lock washer M8*
27. *Dielectric grease*
28. *Hexagonal screw M8 x 16 (2)*
29. *Tie rap*
30. *Loctite 271*
31. *Washer*
32. *Male tab housing (3 ways)*
33. *Female tab housing (3 ways)*
34. *Rivet*
35. *Spark plug cap (2)*
36. *Buzzer / stop switch harness assembly*
37. *Electrical box support*
38. *Starter cable*
39. *Four wires support (2)*
40. *Three wires support*
41. *Thermo sensor*
42. *Loctite 515*
43. *Oil / fuel gauge*
44. *Tachometer*
45. *Sheath (2)*
46. *Female terminal (2)*
47. *Female tab housing (2 ways) (5)*
48. *Wire seal (2)*
49. *Male tab housing (2 ways) (5)*
50. *Female terminal*
51. *Wire seal*
52. *Male tab housing (6 ways)*
53. *Tab housing (6 ways)*
54. *O-ring*
55. *Gauge support*
56. *Plastic nut (2)*
57. *Male terminal*
58. *Male tab housing (1 way)*
59. *Tab housing (1 way)*
60. *Flat washer M8*
61. *Gauge support*
62. *Speedometer*
63. *Grommet*
64. *Nut cap*
65. *Wire seal*
66. *VTS switch*
67. *Harness (3 ways) assembly*
68. *Harness (3 ways) assembly*

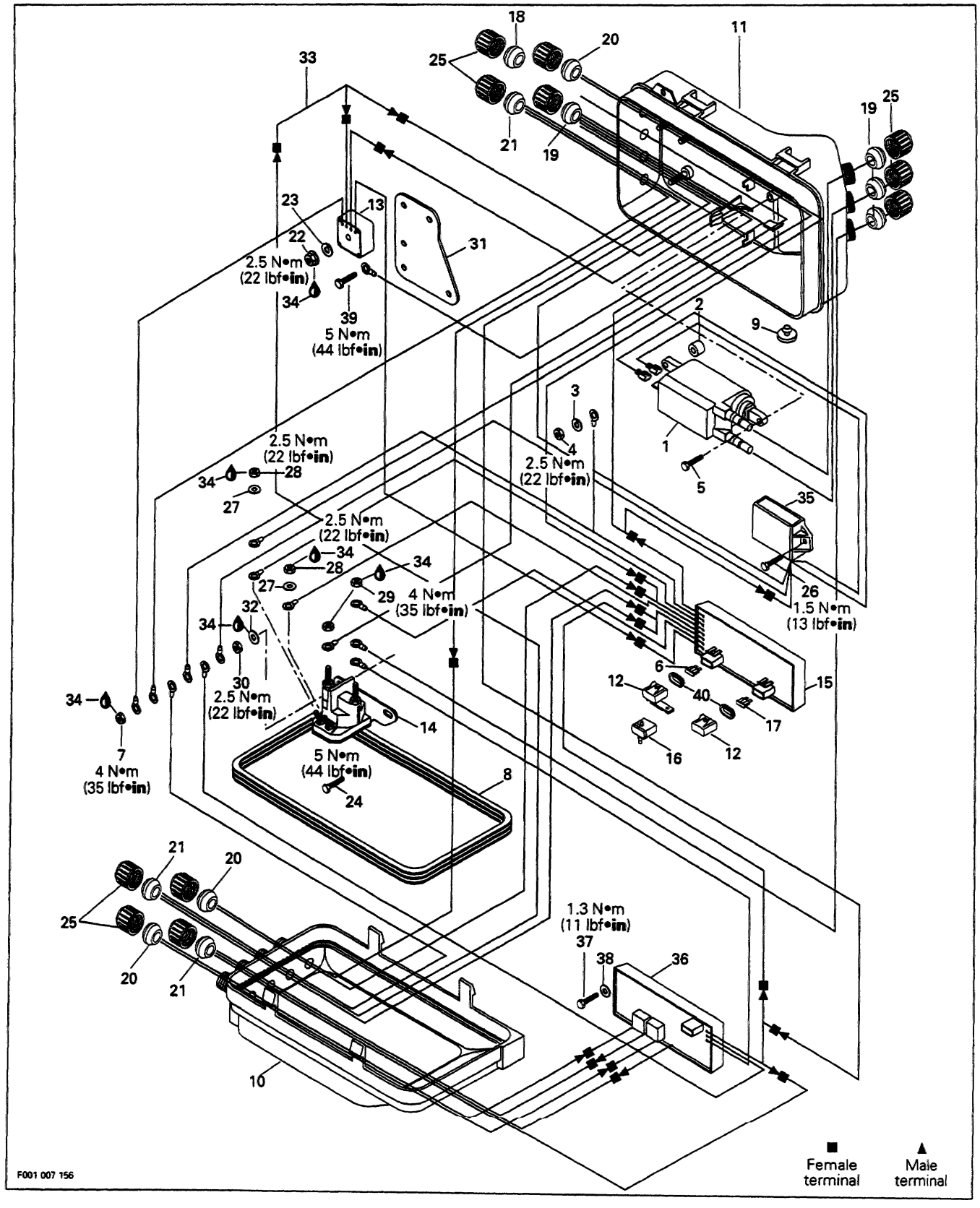
ELECTRICAL BOX



COMPONENTS

1. *Ignition coil*
2. *Spacer*
3. *Lock washer M6*
4. *Nut M6*
5. *Tapping screw M6.3 x 25*
6. *Fuse 15 Amp.*
7. *Elastic stop nut M6*
8. *Gasket*
9. *Rubber bumper (4)*
10. *Cover*
11. *Electric box base*
12. *Fuse cap (2)*
13. *Rectifier*
14. *Solenoid*
15. *Multi-purpose electronic module*
16. *Fuse holder*
17. *Fuse 5 Amp.*
18. *Grommet*
19. *Grommet (2)*
20. *Grommet (6)*
21. *Grommet (2)*
22. *Nut M6*
23. *Lock washer M6*
24. *Self tapping screw M6.3 x 13*
25. *Nut cap (9)*
26. *Seal (2)*
27. *Flat washer M5 (2)*
28. *Elastic stop nut 10-32 (2)*
29. *Elastic nut 1/4-20 (2)*
30. *Nut M6*
31. *Mounting plate*
32. *Washer M6*
33. *Self tapping screw M6 x 10 (2)*
34. *Dielectric grease*

ELECTRICAL BOX XP MODEL (5852)

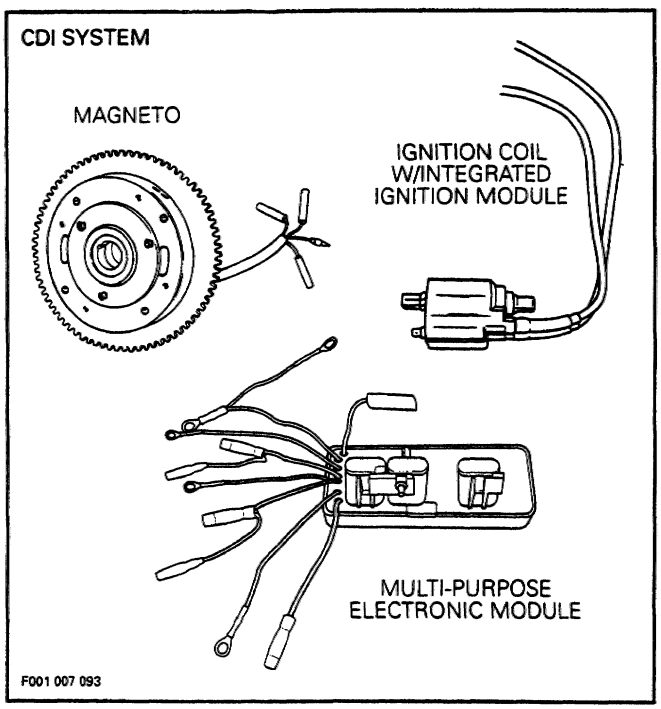


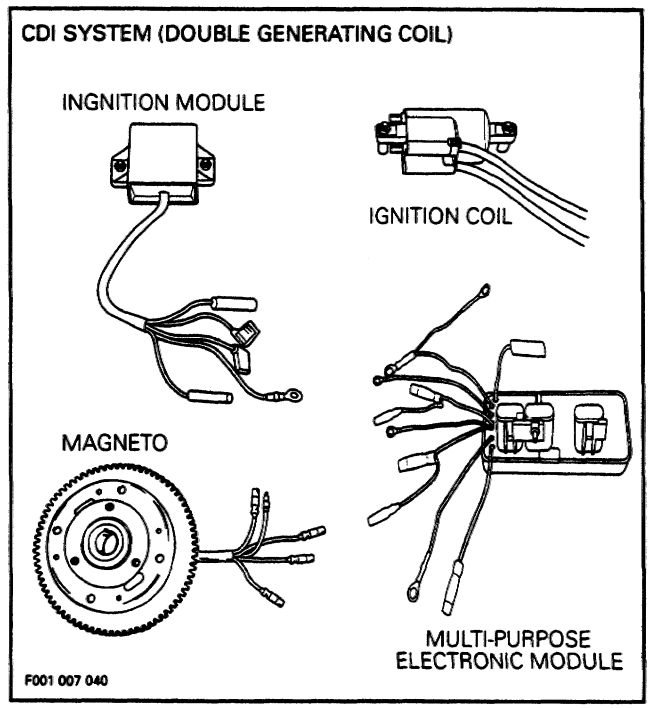
COMPONENTS

1. *Ignition coil*
2. *Spacer*
3. *Lock washer M6*
4. *Nut M6*
5. *Tapping screw M6.3 x 38*
6. *Fuse 15 Amp.*
7. *Elastic stop nut M6*
8. *Gasket*
9. *Rubber bumper (4)*
10. *Cover*
11. *Electric box base*
12. *Fuse cap (2)*
13. *Rectifier*
14. *Solenoid*
15. *Multi-purpose electronic module*
16. *Fuse holder*
17. *Fuse 5 Amp.*
18. *Grommet*
19. *Grommet (2)*
20. *Grommet (6)*
21. *Grommet (2)*
22. *Nut M6*
23. *Lock washer M6*
24. *Self tapping screw M6.3 x 13*
25. *Nut cap (9)*
26. *Self tapping screw M6.3 x 25*
27. *Flat washer M5 (2)*
28. *Elastic stop nut 10-32 (2)*
29. *Elastic nut 1/4-20 (2)*
30. *Nut M6*
31. *Mounting plate*
32. *Washer M6*
33. *"Y" wire*
34. *Dielectric grease*
35. *Ignition module*
36. *Variable trim system control module*
37. *Self tapping screw M6.3 x 13 (2)*
38. *Flat washer M6 (2)*
39. *Self tapping screw M6 x 10 (2)*
40. *Seal (2)*

GENERAL

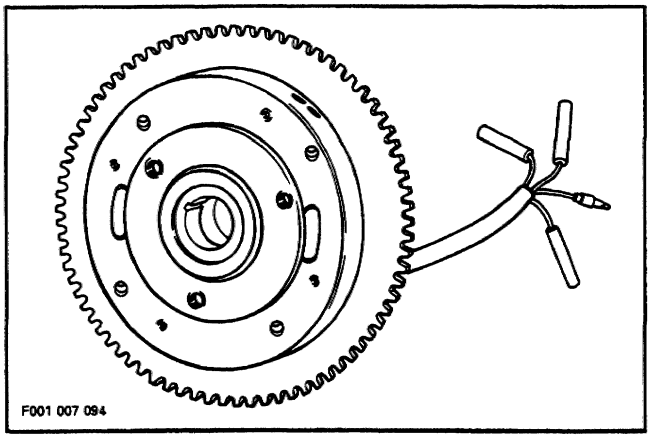
The Capacitor Discharge Ignition system includes the following components :





Magneto

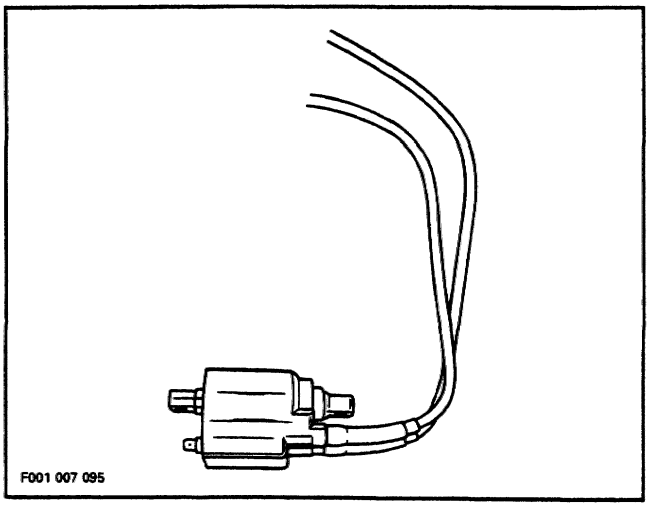
It is the primary source of electrical energy. It transforms magnetic field into electric current through a generating coil.



Ignition Coil (Single Generating Coil)

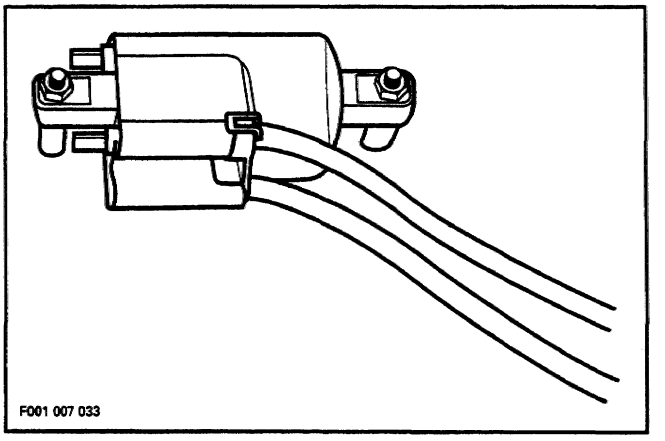
It receives its energy from generating coil via a BLACK / RED wire. The generating coil allows a current flow through ignition coil with its integrated CDI module and through primary windings.

Ignition coil induces voltage to a high level in secondary windings to produce a spark at spark plug.



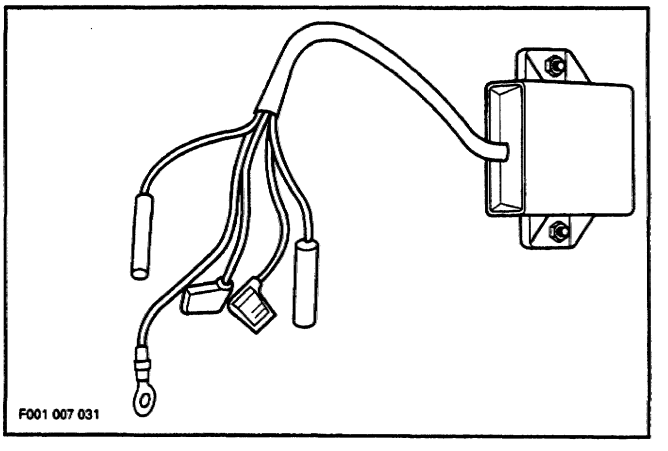
Ignition Coil (Double Generating Coil)

It receives its energy from ignition module via two wires. It induces voltage to a high level in secondary windings to produce a spark at spark plug.



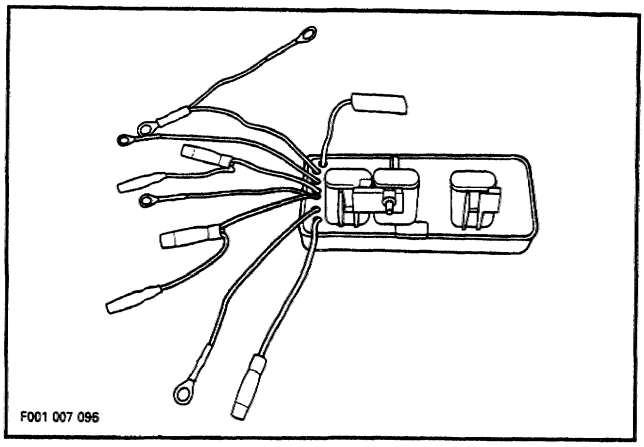
Ignition Module

It receives its primary electric current from magneto via two wires which charges a capacitor. It controls sprak occurence by discharging capacitor to primary windings of ignition coil.



Multi-Purpose Electronic Module

It receives its current from the battery. It includes the engine speed limiter and also integrated in the module a 20 to 30 seconds timer delay which cut off the electrical circuit.



NOTE : The fuses connectors are directly mounted onto the MPEM.

Engine Speed Limiter

It has three functions :

- Keeps high voltage away from tether cord switch.
- Provides engine stop by grounding the primary coil.
- Limits engine RPM to prevent over-reving.

NOTE : It is integrated in the multi-purpose electronic module.

A defective speed limiter may cause the following problems :

- No spark.
- Uninterruption of spark when engine stop / tether cord switch is used.
- Incorrectly controlled engine max. RPM.
- Misfiring / black fouled spark plugs.

To check engine speed limitation function, run engine and check its maximum speed, it should be around 6550 ± 100 RPM for 587 engine and 7050 ± 50 RPM for 657 engine.

IGNITION SYSTEM TESTING PROCEDURE

When dealing with ignition problems, the following items should be verified in this order.

1. Spark occurence / spark plug condition.
2. Battery condition.
3. Electrical connections.
4. Engine stop / tether cord switches.
5. Ignition relay.
6. Multi-purpose electronic module (MPEM).
7. Variable trim system (VTS) switches (XP (5852) model only).
8. VTS control module (XP (5852) model only).
9. Magneto output.
10. Ignition coil output.

CAUTION : Whenever replacing a component in ignition system, check ignition timing.

NOTE : Spark occurence can be checked with tester from Superex Canada Ltd part number 15-785.

The first three items can be checked with known automotive equipment and other items as follows :

NOTE : To perfom verification a good quality multimeter such as Fluke 73 (P / N 529 022 000) can be used.

Engine Stop / Tether Cord Switches Verification

Both switches can be verified together because they are connected in series. Disconnect stop switch BLACK wire in electrical box. Disconnect tether cord switch BLACK / YELLOW wire from MPEM BLACK / YELLOW wire in electrical box. Using an ohmmeter connect test probes to BLACK and BLACK / YELLOW wires. Install tether cord cap over the switch and if the reading is infinity (∞), verify both swicthes separately. Proceed as follows :

Engine Stop Switch

Disconnect the BLACK and BLACK / YELLOW wires in the electrical box. Using an ohmmeter, connect test probes to switch BLACK and BLACK / YELLOW wires.

Measure resistance, it must be close to zero ohm in its operating position and an open circuit when depressed.

Tether Cord Switch

Disconnect the BLACK / YELLOW wires in the electrical box. Using an ohmmeter, connect test probes to switch BLACK / YELLOW wires.

Measure resistance, it must be close to zero ohm when cap is over switch and an open circuit when removed.

Ignition Relay Verification

The relay is integrated into the MPEM.

The ignition relay is working off a 20 to 30 seconds timer delay and could be the problem of some faulty ignition situations.

Always confirm first that the fuses are in good condition.

NOTE : To confirm the relay function, it should stay on for about 20 to 30 seconds and then turn off.

Multi-Purpose Electronic Module (MPEM) Verification

The multi-purpose electronic module testing must be done with all wires disconnected from circuit. Otherwise testing equipment (ohmmeter) could be damaged.

CAUTION : When disconnecting wires, BLACK / RED or WHITE wire must never touch solenoid positive terminal.

NOTE : The MPEM BLACK / RED wire has been changed for a WHITE wire on XP (5852) model for identification purpose.

CAUTION : Do not install MPEM module having a WHITE wire on other models than the XP (5852) damage could occur to components.

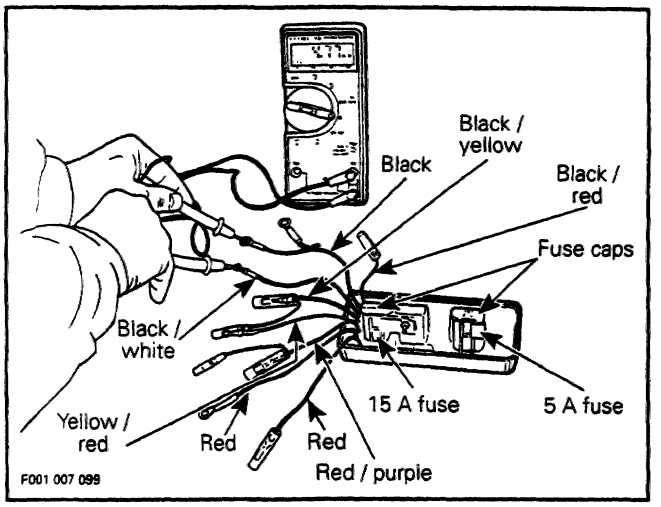
MPEM testing equipment :

Use an ohmmeter with an input impedance up to 20 mega ohm (2 000 000 ohm).

Refer to the following chart for MPEM testing. Always respect polarity in chart.

Meter (–) lead	Meter (+) lead	Minimum value	Wires will be connected to :
Black	Black / red or white	300 kΩ	MPEM / Engine speed limiter
Black / red or white	Black	150 kΩ	
Black	Black / white (ring terminal)	500 kΩ	Solenoid
Black / white (ring terminal)	Black	1 MΩ	
Black	Black / yellow	30 kΩ	Stop switch / Tether cord switch
Black / yellow	Black	34 kΩ	
Black	Yellow / red	100 kΩ	Solenoid
Yellow / red	Black	1 MΩ	
Black	Red / purple	1 MΩ	Buzzer
Red / purple	Black	100 kΩ	
Black	Red (ring terminal)	1 MΩ	Battery (+)
Red (ring terminal)	Black	1 MΩ	
Black	Red (female terminal)	1 MΩ	Rectifier
Red (female terminal)	Black	1 MΩ	
Red / purple	Black / red or white	600 kΩ	CDI module
Black / red or white	Red / purple	1 MΩ	

NOTE : These values are minimum. If obtained values are even or higher then these, the module should function properly.



Most of circuit can be tested with an ohmmeter but a 100 % test doesn't mean the MPEM is in perfect condition.

NOTE : Sometimes only parts replacement can solve the problem.

CAUTION : Whenever connecting MPEM, always have battery disconnected from circuit. If MPEM must be connected when circuit is activated, always connect BLACK / RED or WHITE wire first to ignition coil / CDI module to prevent wire from touching solenoid positive terminal.

CAUTION : Whenever connecting wires, never connect RED / PURPLE and RED wires together. Damage could occur to multi-purpose electronic module.

Variable Trim System (VTS) Switches Verification (XP (5852) Model Only)

Disconnect the PURPLE wire, BLUE / WHITE wire and GREEN / WHITE wire in the electrical box. Using an ohmmeter, connect test probes to switch PURPLE and BLUE / WHITE wires. Connect test probes to PURPLE and GREEN / WHITE wires.

Measure resistance, it should be high when button is released and must be close to zero when activated.

Always confirm first that the fuse is in good condition. Make sure that color code match with color code of the VTS module.

Whenever pushing on UP and DOWN button simultaneously, the nozzle should not move. However a vibration should be noticed, but it should stop immediately.

NOTE : Pushing simultaneously on both switches, GREEN / ORANGE and BLUE / ORANGE wires will be at +12 volts in relation to battery negative terminal.

VTS Control Module Verification (XP (5852) Model Only)

It receives its current from the battery. It is protected by its own 15 amp. fuse. Also integrated in the module two relays which trigger when motor is overloaded.

Voltage test

Disconnect motor wires from the VTS module. Using a voltmeter, connect positive test probe to BLUE / ORANGE wire. Connect negative test probe to GREEN / ORANGE wire.

Push on VTS switch UP button, the reading should be +12 V. Push on DOWN button, the reading should be (–)12 V.

If readings are different the VTS module could be defective.

NOTE : Ensure VTS switches connections were not reversed.

The VTS control module testing must be done with all wires disconnected from circuit. Otherwise testing equipment (ohmmeter) could be damaged.

▼CAUTION : When disconnecting wires other then RED wire, wires must never touch solenoid positive terminal.

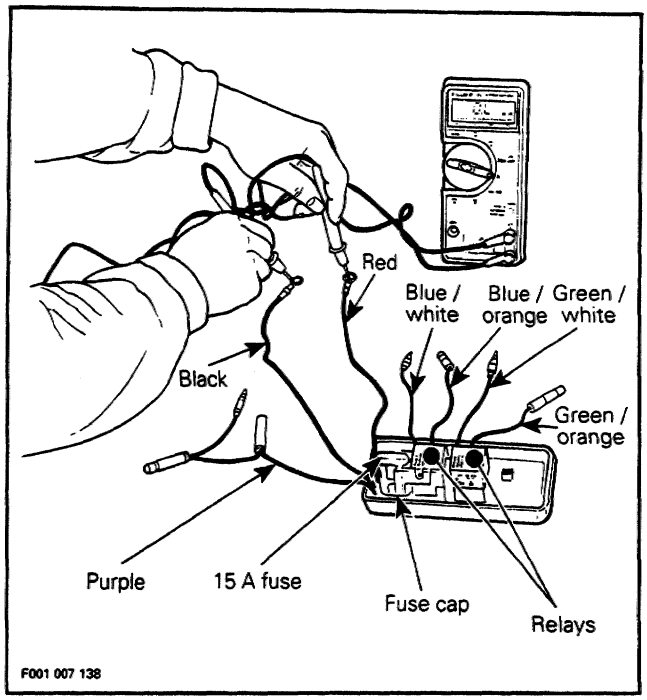
VTS control module testing equipment :

Use an ohmmeter with an input impedance up to 20 mega ohm (2 000 000 ohm).

Refer to the following chart for VTS control module testing. Always respect polarity in chart.

Meter (–) lead	Meter (+) lead	Minimum value	Wires will be connected to :
Black	Red	1 MΩ	Solenoid
Red	Black	1 MΩ	
Black	Purple	200 kΩ	VTS Switch / buzzer / Starter switch
Purple	Black	1 MΩ	
Black	Blue / white	140 kΩ	VTS Switch position "UP"
Blue / white	Black	140 kΩ	
Black	Green / white	140 kΩ	VTS Switch position "DOWN"
Green / white	Black	140 kΩ	
Black	Blue / orange	0 Ω	Motor position "UP"
Blue / orange	Black	0 Ω	
Black	Green / orange	0 Ω	Motor position "DOWN"
Green / orange	Black	0 Ω	
Green / orange	Blue / orange	0 Ω	Motor
Blue / orange	Green / orange	0 Ω	

○NOTE : These values are minimum. If obtained values are even or higher then these, the module should function properly.



Most of circuit can be tested with an ohmmeter but a 100 % test doesn't mean the VTS control module in perfect condition.

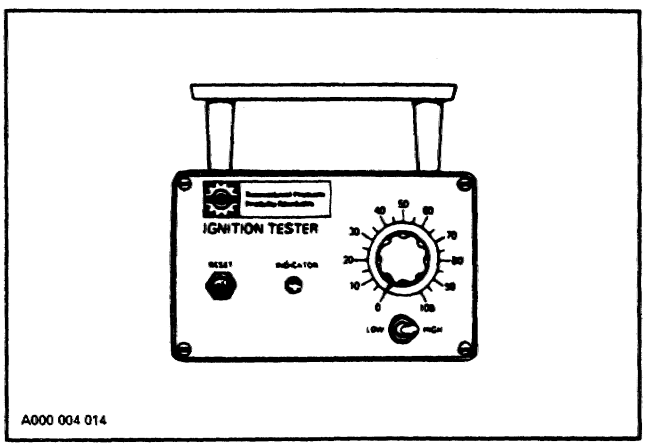
○NOTE : Sometimes only parts replacement can solve the problem.

▼CAUTION : Whenever connecting VTS control module, always have battery disconnected from circuit. If VTS control module must be connected when circuit is activated, always connect RED wire last to solenoid positive terminal.

▼CAUTION : Whenever connecting wires, never connect PURPLE and RED wires together. Damage could occur to VTS control module.

BOMBARDIER IGNITION TESTER

The remaining items can be easily checked with Bombardier ignition tester (P / N 295 000 008).



For more information concerning operation and maintenance of the tester, refer to its instruction manual.

Use of Bombardier Ignition Tester

This tester can verify generating coil, ignition module, ignition coil and battery charging coil.

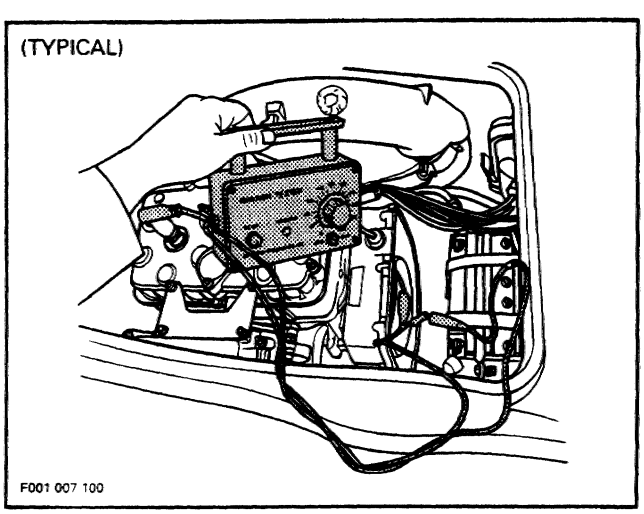
Always make sure that tester batteries are in good condition.

Test Condition

All tests are performed on watercraft at cranking speed with spark plugs installed.

Always proceed in the following order :

1. Connect tester P and N clip leads as indicated for each specific test.



2. Follow test procedure sequence.
3. Install cap over tether cord switch and depress starting button until light turns on, or otherwise, for a maximum of five seconds.
4. If engine starts when performing some test, allow it to idle while observing indicator. Then, shut engine off.
5. After every test that lights the indicator lamp, RESET the indicator circuit by depressing the reset button.

Analysis of Test Results

Indicator Lamp Lights at Specific Setting

Output is as specified. Test results should repeat three times. If readings do not repeat, output is erratic and cause should be investigated (loose connections or components, etc.).

Indicator Lamp Lights at Lower Setting

This indicates that the output is less than that designed to operate in a satisfactory manner. However, before coming to the conclusion of a faulty condition be certain that correct engine cranking conditions were met before condemning the tested part.

Indicator Lamp Does Not Light

One component is defective. Proceed as instructed to find defective component.

Intermittent Ignition Problems

In dealing with intermittent problems there is no easy diagnosis. For example, problems that occur only at normal engine operating temperature have to be tested under similar conditions.

In most cases of temperature and / or vibration failure, only parts replacement can solve the problem as most of these failures return to normal when engine is not running.

Multiple Problems

There is always the possibility of more than one faulty part. If after a component has been replaced, the problem still persists, carefully repeat the complete test procedure to find the other faulty part.

Safety Precautions

◆ **WARNING : To prevent powerful electric shocks while cranking engine, neither touch any electronic ignition components (ignition coil, high tension wire, wire harness, etc.) nor tester lead clips. Also make sure that tester leads do not touch any metallic object. Ventilate bilge at least two minutes prior to performing any test.**

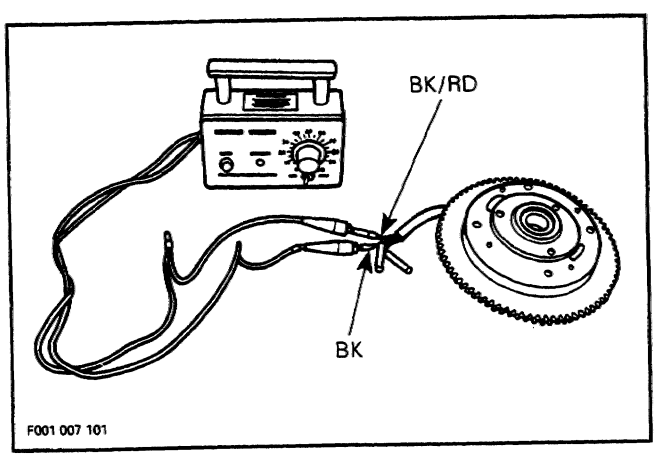
TESTS

Magneto and Generating Coil Output (Single Coil)

1. Disconnect BLACK / RED wire between ignition coil / ignition module and magneto. Disconnect BLACK ground wire.
2. Connect tester wires then set switch and dial as follows :

NOTE : BLACK wire must be connected to ground in order to start engine.

Tester wires	Component wires	Tester switch position	Tester dial position
N	BLACK / RED of magneto harness	LOW	85
P	BLACK of magneto harness		



3. Start engine and observe indicator.
4. Push reset button and repeat step 3 twice.

Results :

a) **Indicator lamp lights :** Ignition generating coil output is up to specifications.

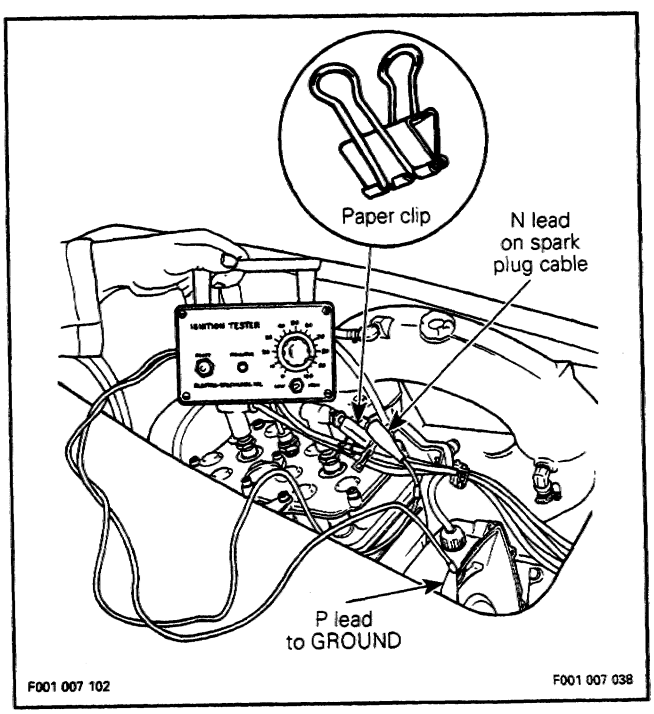
b) **Indicator lamp does not light :** The problem is a faulty ignition generating coil. Replace it.

Ignition Coil Output (Single Generating Coil)

A paper clip of approximately 20 mm (3/4 in) will be used as a test adapter for the following test.

1. Install the test adapter to spark plug cable close to MAG side spark plug.
2. Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	Tester adapter (paper clip) on spark plug cable	LOW	35
P	Engine Ground		



3. Start engine and observe indicator.

NOTE : If engine starts, allow it to idle while observing indicator. Then, shut engine off.

4. Push reset button and repeat step 3 twice.

Results :

a) **Indicator lamp lights :** Ignition coil is OK.

b) **Indicator lamp does not light on one or both cylinder(s) :** Ignition coil is faulty. Replace it.

SUMMARY TABLE

Test to perform	Tester wires	Component wires	Switch	Dial
Generating coil ouput	N	BLACK / RED of magneto harness	LOW	85
	P	BLACK of magneto harness		
Ignition coil output	N	Test adapter on MAG spark plug cable	LOW	35
	P	Engine ground		

IGNITION COMPONENTS RESISTANCE MEASUREMENT

As an alternate method, ignition components can be checked with an ohmmeter (preferably a digital one). Proceeding by elimination, check magneto generating coil then ignition coil / ignition module.

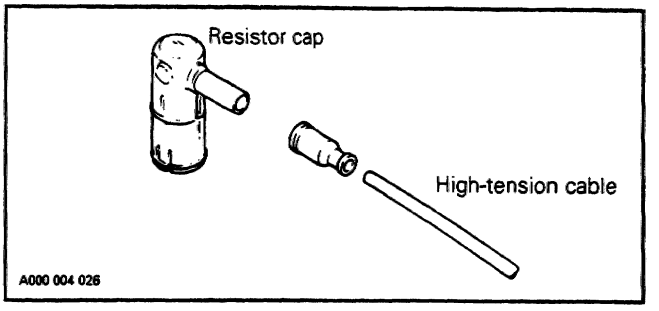
Disconnect connectors at ignition coil and magneto junction. Check resistance between each terminal with a high-sensitivity ohmmeter. Refer to the following table for values and wire colors.

NOTE : An ignition coil with good resistance measurement can still be faulty. Voltage leak can occur at high voltage level which is not detectable with an ohmmeter.

MAGNETO		
PART NAME	WIRE COLOR	RESISTANCE (OHM) (Ω)
Generating coil (single)	BLACK with BLACK / RED	40 - 76
IGNITION COIL		
PART NAME	WIRE COLOR	RESISTANCE (OHM) (Ω)
Secondary winding	End of each spark plug cable, spark plug caps removed	9 - 15 k

NOTE : A short circuit will read zero (0 ohm) (or close to) on ohmmeter.

The spark plug caps must be removed from high tension cables, because they are resistor caps. The cap resistance is 4.48 K ohms.

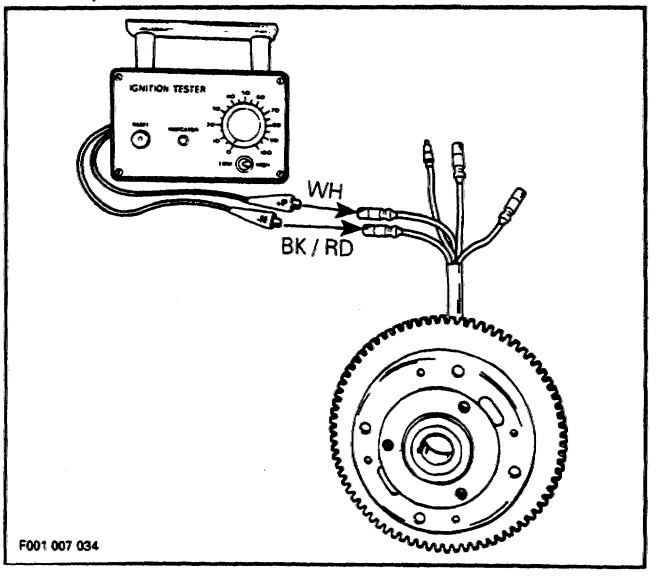


TESTS

Magneto and High Speed Generating Coil Output

1. Disconnect BLACK / RED and WHITE wires between ignition module and magneto.
2. Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	BLACK / RED of magneto harness	LOW	85
P	WHITE of magneto harness		



3. Start engine and observe indicator.
4. Push reset button and repeat step 3 twice.

Results :

a) Indicator lamp lights : High speed generating coil is OK. Proceed with low speed generating coil test.

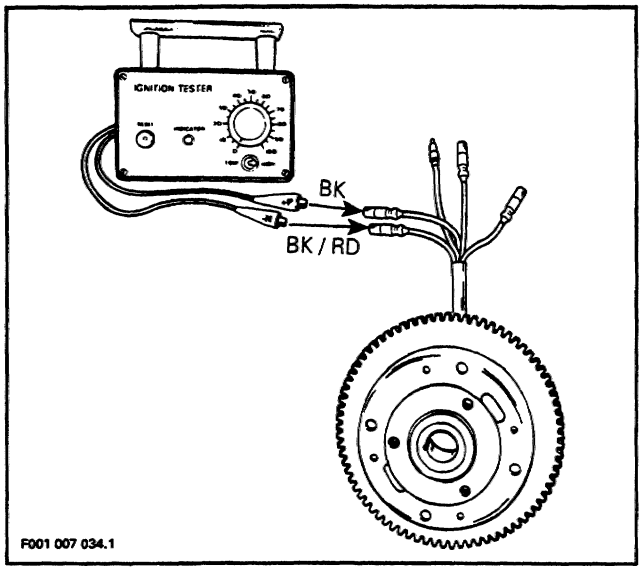
b) Indicator lamp does not light : The problem is a faulty high speed generating coil. Replace it.

Magneto and Low Speed Generating Coil

1. Disconnect BLACK / RED wire between ignition module and magneto. Disconnect BLACK ground wire.
2. Connect tester wires then set switch and dial as follows :

NOTE : BLACK wire must be connected to ground in order to start engine.

Tester wires	Component wires	Tester switch position	Tester dial position
N	BLACK / RED of magneto harness	HIGH	From 20 to 35
P	BLACK of magneto harness		



3. Start engine and observe indicator.
4. Push reset button and repeat step 3 twice.

Results :

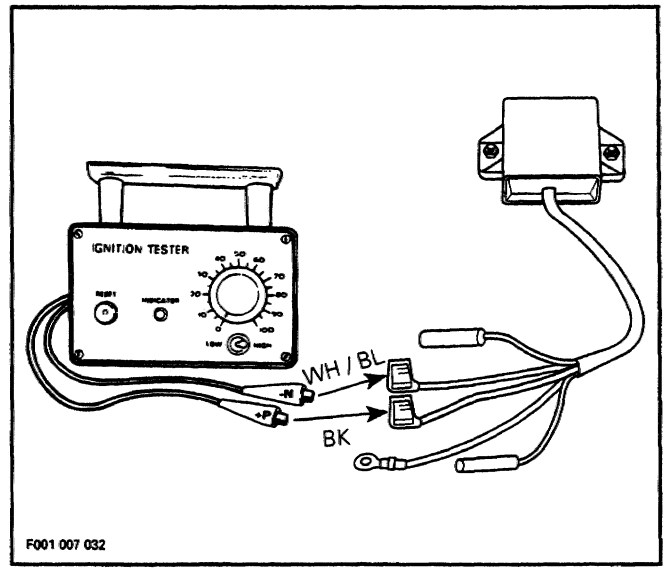
a) Indicator lamp lights : Low speed generating coil is OK. Proceed with ignition module test.

b) Indicator lamp does not light : Low speed generating coil is faulty. Replace it.

Ignition Module

1. Disconnect WHITE / BLUE and BLACK wires between ignition module and coil.
2. Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	WHITE / BLUE of ignition module	HIGH	From 70 to 75
P	BLACK of ignition module		



3. Start engine and observe indicator.
4. Push reset button and repeat step 3 twice.

Results :

a) Indicator lamp lights : Ignition module is OK. Proceed with ignition coil test.

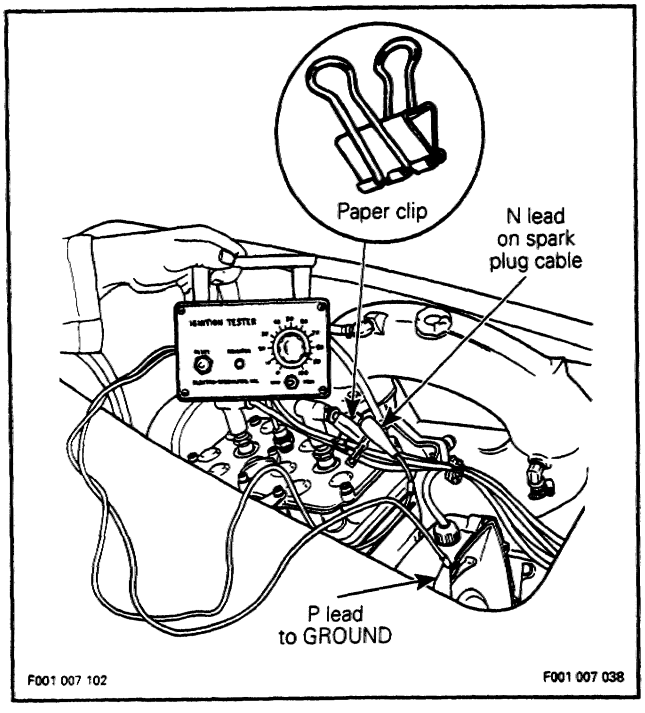
b) Indicator lamp does not light : Ignition module is faulty. Replace it.

Ignition Coil Output

A paper clip of approximately 20 mm (3/4 in) will be used as a test adapter for the following test.

1. Install the test adapter to spark plug cable close to MAG side spark plug.
2. Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	Tester adapter (paper clip) on spark plug cable	LOW	70
P	Engine Ground		



3. Start engine and observe indicator.

NOTE : If engine starts, allow it to idle while observing indicator. Then, shut engine off.

4. Push reset button and repeat step 3 twice.

Results :

a) Indicator lamp lights : Ignition coil is OK.

b) Indicator lamp does not light on one or both cylinder(s) : Ignition coil is faulty. Replace it.

SUMMARY TABLE

Test to perform	Tester wires	Component wires	Switch	Dial
High speed generating coil	N	BLACK / RED of magneto harness	LOW	85
	P	WHITE of magneto harness		
Low speed generating coil	N	BLACK / RED of magneto harness	HIGH	From 20 to 35
	P	BLACK of magneto harness		
Ignition module	N	WHITE / BLUE of ignition module	HIGH	From 70 to 75
	P	BLACK of ignition module		
Ignition coil	N	Test adapter on MAG spark plug cable	LOW	70
	P	Engine ground		

IGNITION COMPONENTS RESISTANCE MEASUREMENT

As an alternate method, ignition components can be checked with an ohmmeter (preferably a digital one). Proceeding by elimination, check magneto generating coils then ignition coil. If everything is OK then it is a malfunction of ignition module.

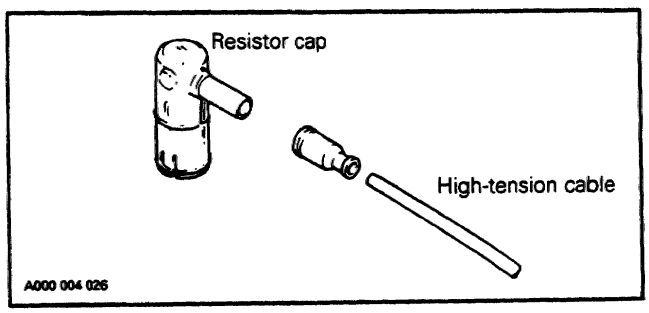
Disconnect wires at ignition module, ignition coil and magneto junction. Check resistance or continuity between each terminal with a high-sensitivity ohmmeter. Refer to the following table for values and wire colors.

NOTE : An ignition coil with good resistance measurement can still be faulty. Voltage leak can occur at high voltage level which is not detectable with an ohmmeter.

PART NAME		WIRE COLOR	RESISTANCE (OHM) (Ω)
MAGNETO	High speed generating coil	WHITE with BLACK / RED	2.8 - 4.2
	Low speed generating coil	BLACK with BLACK / RED	120 - 180
IGNITION COIL	Primary winding	BLACK with WHITE / BLUE	0.23 - 0.43
	Secondary winding	End of each spark plug cable, spark plug caps removed	5.85 - 6.50 k
	Insulation	Check each wire of primary and secondary windings with ground for short circuit	open circuit (∞)

NOTE : A short circuit will read zero (0 ohm) (or close to) on ohmmeter.

The spark plug caps must be removed from high tension cables, because they are resistor caps. The cap resistance is 4.48 K ohms.



BATTERY CHARGING SYSTEM

GENERAL

Magneto

It is the primary source of electrical energy. It transforms magnetic field into electric current through a three-pole coil. It outputs Alternating Current AC.

Rectifier / Regulator

A half-wave rectifier receives magneto AC current and transforms it into Direct Current DC to allow battery charging. Battery is the DC source for electric starter, multi-purpose electronic module / engine speed limiter, engine overheat beeper and accessories.

Included in the same unit, a regulator keeps voltage at a steady level to prevent any damage to components.

TESTING PROCEDURE

NOTE : First, ensure that battery is in good condition prior to performing the following test using current indicator such as Snap-on MT 110.

Current Test

Proceed as follows :

- Start engine.
- Install tester over battery positive cable.
- Bring engine to approximately 5500 RPM.

Depending on battery charge, current reading should be approximately 5 A (amperes). If not, check magneto output prior to concluding that rectifier is faulty.

Voltage Test

Proceed as follows :

- Start engine.
- Connect a voltmeter (set on DC volt scale) on battery posts.
- Bring engine to approximately 5500 RPM.

If voltmeter reads over 15 volts, regulator is defective. Replace it.

NOTE : Whatever the voltmeter type used (peak voltage or RMS), the voltage must not exceed 15 V. A faulty regulator will allow voltage to exceed 15 V as engine speed is increased.

CAUTION : During this test the battery cables must be reconnected to the battery.

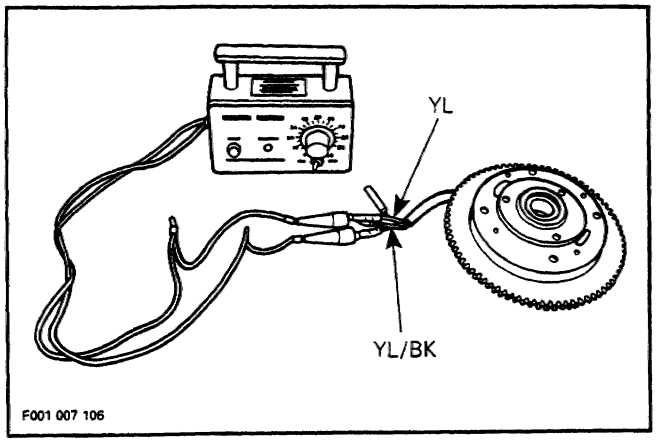
Magneto, Battery Charging Coil (Single Generating Coil System)

With Bombardier Ignition Tester

Operate it as for ignition system verifications.

1. Disconnect YELLOW and YELLOW / BLACK wires coming from magneto wiring harness.
2. Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	YELLOW of magneto harness	LOW	70
P	YELLOW / BLACK of magneto harness		



3. Start engine and observe indicator.
4. Push reset button and repeat step 3 twice.

Results :

a) Indicator lamp lights : Battery charging coil output is up to specifications.

b) Indicator lamp does not light : Battery charging coil is faulty. Replace it.

Resistance Measurement

As an alternate method, battery charging coil can be checked with an ohmmeter (preferably a digital one).

Use the following table :

MAGNETO		
PART NAME	WIRE COLOR	RESISTANCE (OHM) (Ω)
Battery charging coil	YELLOW with YELLOW / BLACK of magneto harness	0.05 - 0.6

NOTE : A short circuit will read zero (0 ohm) (or close to) on ohmmeter.

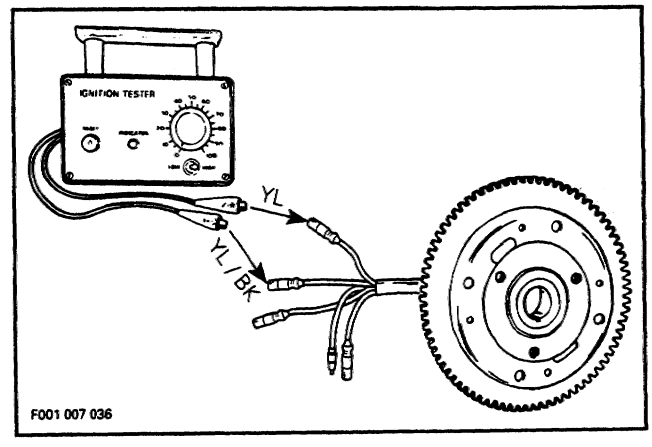
Magneto, Battery Charging Coil (Double Generating Coil System)

With Bombardier Ignition Tester

Operate it as for ignition system verifications.

1. Disconnect YELLOW and YELLOW / BLACK wires coming from magneto wiring harness.
2. Connect tester wires then set switch and dial as follows :

Tester wires	Component wires	Tester switch position	Tester dial position
N	YELLOW of magneto harness	LOW	85
P	YELLOW / BLACK of magneto harness		



3. Start engine and observe indicator.
4. Push reset button and repeat step 3 twice.

Results :

a) Indicator lamp lights : Battery charging coil output is up to specifications.

b) Indicator lamp does not light : Battery charging coil is faulty. Replace it.

Resistance Measurement

As an alternate method, battery charging coil can be checked with an ohmmeter (preferably a digital one).

Use the following table :

PART NAME		WIRE COLOR	RESISTANCE (OHM) (Ω)
MAGNETO	Battery charging coil	YELLOW with YELLOW / BLACK of magneto harness	0.21 - 0.31
	Insulation	Check each wire with ground for short circuit	open circuit (∞)

NOTE : A short circuit will read zero (0 ohm) (or close to) on ohmmeter.

DESIGN SYMBOLS USED ON NGK SPARK PLUGS

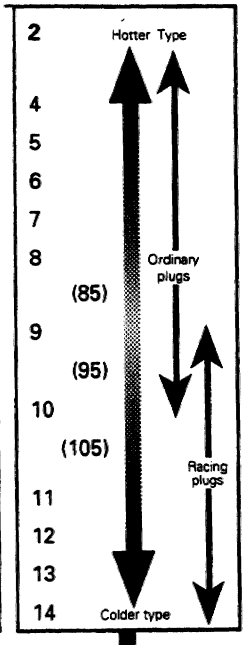
First letter prefix for thread and hexagon size

Letter	Thread size	Hexagon size
A	18 mm	25.4 mm
B	14 mm	20.6 mm
C	10 mm	16.0 mm
D	12 mm	18.0 mm
F	7/8 in-18	23.8 mm
G	PF 1/2 in-14	23.8 mm

Second and third letter prefix for construction feature, except single prefix

Letter	Construction feature
B	Hexagon size 20.6 mm
C	Hexagon size 16.0 mm
G	Hexagon size 23.8 mm
L	Compact type (SHORTY)
M	Compact type (BANTAM)
P	Projected insulator nose type
R	Resistor type
S	Shielded type
U	Surface discharge type

Heat rating number



First letter suffix for thread : reach

Letter	Thread reach
None	12.0 mm (thread dia. 18 mm)
	9.5 mm (thread dia. 14 mm)
	22.5 mm (thread dia. PF1/2 in-14 mm)
	16.0 mm (thread dia. 7/8 in-18 mm)
L	11.2 mm
H	12.7 mm (racing type 12.5 mm)
E	19.0 mm (racing type 18.0 mm)
F	Conical seat type
	A - F 10.9 mm
	B - F 11.2 mm
	B M-F 7.8 mm
	BE - F 17.5 mm

Second letter suffix for construction feature, etc.

Letter	Construction feature, etc.
A	Specials
B	Special plug for Honda vehicles
C	Competition type
G	Racing plugs, center electrode of nickel alloy
GV	Racing plugs, center electrode of precious metal
N	Racing plugs, nickel electrode
P	Racing plugs, platinum ground electrode
R	Shielded resistor plugs
S	Copper core center electrode (super)
V	Center electrode of precious metal
W	Tungsten electrode
X	Series gap plugs
Y	V-Grooved center electrode

Multiple ground electrodes type

K	2	T	3
M	2	Q	4

Others: Except for above letters, there are special plugs of J, L, Z, etc.

(*Standard regulation is drawn here. There also exists a few extraordinary symbols.

Wide gap type (mm)

B P 6 E S 11

DISASSEMBLY

First unscrew the spark plug one turn.

Clean the spark plug and cylinder head with pressurize air then completely unscrew.

HEAT RANGE

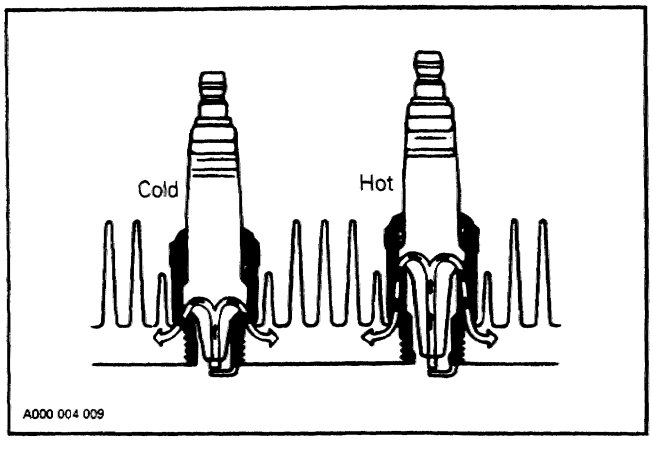
The proper operating temperature or heat range of the spark plugs is determined by the spark plug ability to dissipate the heat generated by combustion.

The longer the heat path between the electrode tip to the plug shell, the hotter the spark plug operating temperature will be – and inversely, the shorter the heat path, the colder the operating temperature will be.

A "cold" type plug has a relatively short insulator nose and transfers heat very rapidly into the cylinder head.

Such a plug is used in heavy duty or continuous high speed operation to avoid overheating.

The "hot" type plug has a longer insulator nose and transfers heat more slowly away from its firing end. It runs hotter and burns off combustion deposits which might tend to foul the plug during prolonged idle or low speed operation.



CAUTION : Severe engine damage might occur if a wrong heat range plug is used.

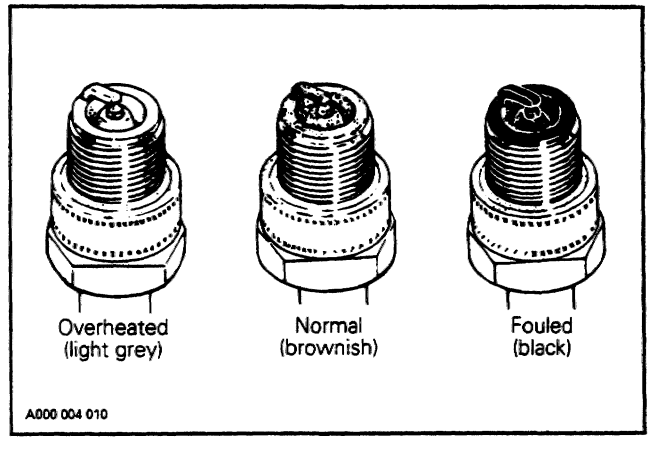
A too "hot" plug will result in overheating and pre-ignition, etc.

A too "cold" plug will result in fouling (shorting the spark plug) or may create carbon build up which can heat up red-hot and cause pre-ignition or detonation.

FOULING

Fouling of the spark plug is indicated by irregular running of the engine, decreased engine speed due to misfiring, reduced performance, and increased fuel consumption. This is due to a loss of compression. Other possible causes are : prolonged idling, or running on a too rich mixture due to a faulty carburetor adjustment or incorrect fuel. The plug face of a fouled spark plug has either a dry coating of soot or an oily, glossy coating given by an excess either of oil or of oil with soot. Such coatings form a conductive connection between the center electrode and ground.

SPARK PLUG ANALYSIS

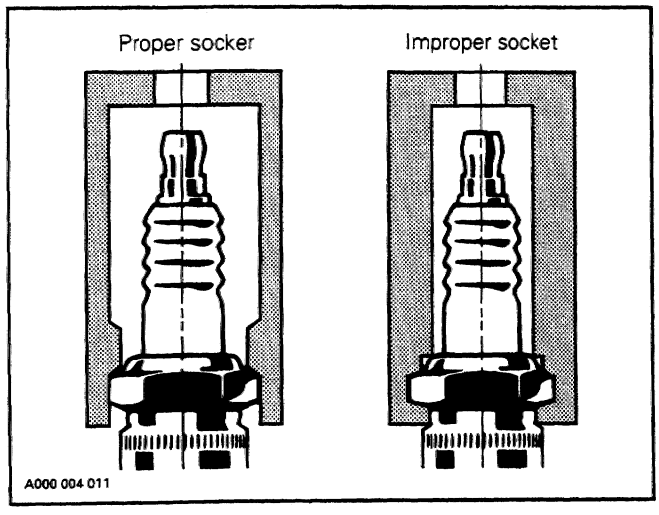


The plug face (and piston dome) reveals the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug face (i.e. the part of the plug projecting into the combustion chamber) and the piston dome.

SPARK PLUG INSTALLATION

Prior to installation make sure that contact surfaces of the cylinder head and spark plug are free of grime.

1. Using a wire feeler gauge, set electrode gap according to chart below.
2. Apply antiseize lubricant (P / N 293 550 001) over the spark plug threads to prevent possible seizure.
3. Hand screw spark plug into cylinder head and tighten with a torque wrench and a proper socket.



SPARK PLUG CHART

Models	Engine type	Spark plugs	Torque N•m (lbf•ft)	Gap mm (inch)
5806 (SP) 5807 (SPX) 5808 (SPI) 5813 (GTS) 5820 (EXPLORER) 5861 (GTX)	587	NGK BR7ES	24 (17)	0.50 (0.020)
5852 (XP)	657	NGK BR8ES	24 (17)	0.50 (0.020)

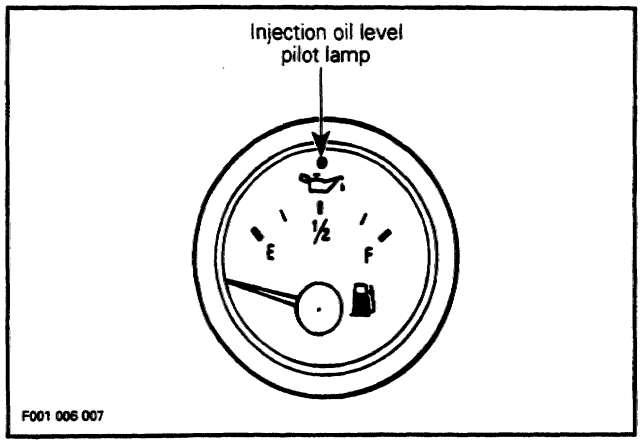
INSTRUMENTS

GENERAL

The oil / fuel level gauge has a pointer which indicates fuel level. To verify if fuel pointer works, first touch starter switch button to activate electrical system for about 20 to 30 seconds.

NOTE : The electrical system can be activated without tether cord install.

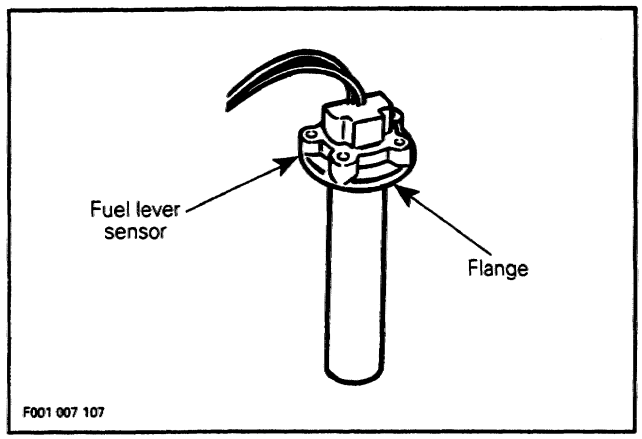
The oil level pilot lamp is part of the fuel level gauge. It will light when injection oil level is low.



Fuel Level Sensor Verification (SPX model (5807) 1st Run and Explorer (5820))

The fuel level sensor with its integrated float gives to fuel gauge its reading.

To verify fuel sensor a resistance test should be performed with an ohmmeter allowing the float to move up through a sequence.

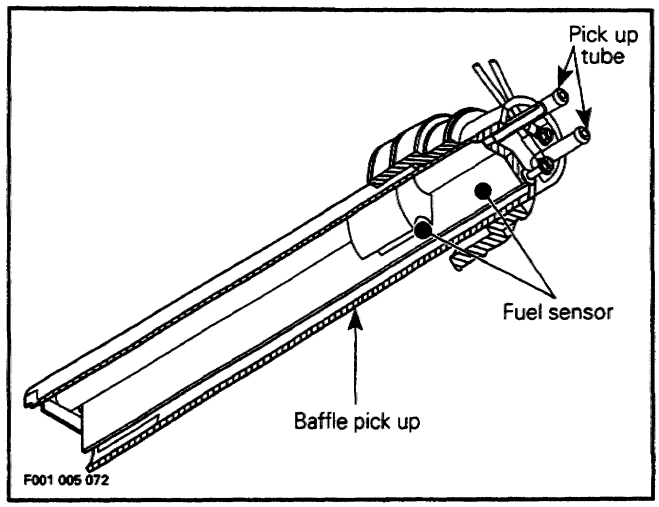


The resistance measured between BLACK / GREEN and GREEN wires must be in accordance with fuel level (measured from under the flange) as specified in the following chart.

Fuel Baffle Pick Up Sensor Verification

The baffle pick up has an integrated fuel sensor on models which are provided with an oil / fuel level gauge.

To verify fuel sensor a resitance test should be performed with an ohmmeter allowing the float to move up through a sequence.



The resistance measured between BLACK / GREEN and GREEN wires must be in accordance with fuel level (measured from under the flange) as specified in the following chart.

FUEL LEVEL AND RESISTANCE

FUEL LEVEL mm	FUEL LEVEL (in)	RESISTANCE (Ω)
From 33.1 @ 55.6	(1-5/16 @ 2-3/16) (Full)	0.0 ± 0.1
From 55.6 @ 79.3	(2-3/16 @ 3-1/8)	17.8 ± 0.2
From 79.3 @ 103	(3-1/8 @ 4-1/16)	27.8 ± 0.3
From 103 @ 126.7	(4-1/16 @ 5)	37.8 ± 0.4
From 126.7 @ 150.4	(5 @ 5-15/16)	47.8 ± 0.5
From 150.4 @ 174.1	(5-15/16 @ 6-13/16)	57.8 ± 0.6
From 174.1 @ 197.8	(6-13/16 @ 7-3/4)	67.8 ± 0.7
From 197.8 @ 221.5	(7-3/4 @ 8-11/16)	77.8 ± 0.8
From 221.5 @ 246.2	(8-11/16 @ 9-11/16) (Empty)	89.8 ± 0.9

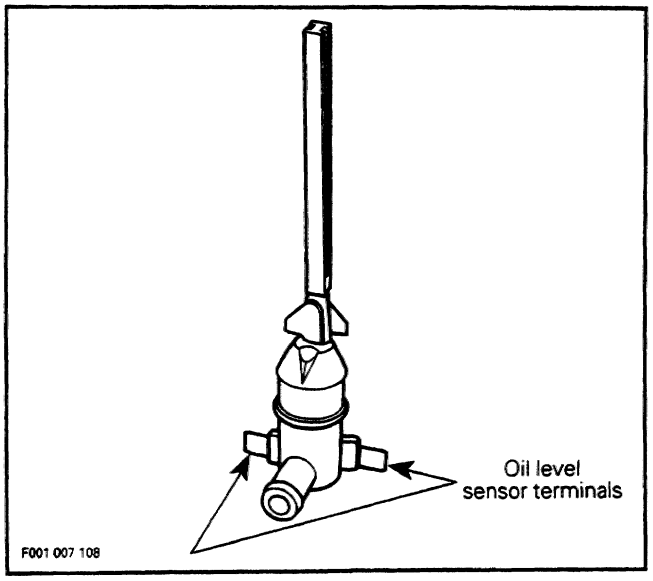
Oil Level Sensor Verification

The oil level sensor completes the ground for the oil injection pilot light.

With the oil down to caution level, contacts are made to complete the ground circuit.

To verify oil level sensor a resistance test should be performed with an ohmmeter between BLACK / PURPLE and PURPLE wire terminals.

There should be no resistance (0 ohm) between terminals. If a resistance is noticed sensor is defective.

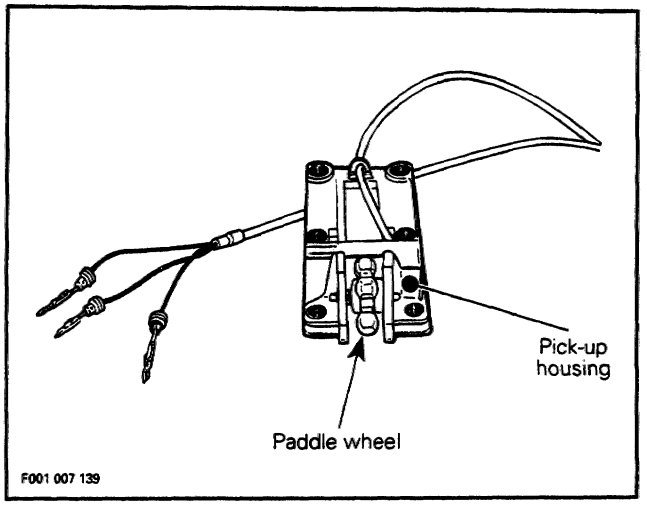


CAUTION : Whenever connecting wires, never connect RED / PURPLE and RED wires together. Damage could occur to multi-purpose electronic module.

Speed Sensor Verification (GTX Model (5861) only)

The speedometer gives a reading through a speed sensor. Speed sensor is installed in center of ride shoe. It works with the water flow which turns a magnetic paddle wheel that triggers on electronic pick-up that in turn sends a speed signal to the speedometer.

The paddle wheel is protected by the pick-up housing.



To verify speed sensor a resistance test should be performed with an ohmmeter. Disconnect speed sensor wires from inside bilge.

Refer to the following chart for speed sensor testing. Always respect polarity in chart.

Meter (–) lead	Meter (+) lead	Approx. value
red / brown	black / brown	∞
black / brown	red / brown	21.8 MΩ
yellow / black	black / brown	3.6 MΩ
black / brown	yellow / black	∞
red / brown	yellow / black	∞
yellow / black	red / brown	3 MΩ

VTS Motor (XP Model (5852) only)

Motor condition can be checked with an ohmmeter. Disconnect wiring harness, install test probes on both BLUE / ORANGE and GREEN / ORANGE wires. Measure resistance, it should be close to 1.5 ohm.

Ensure motor wire connections to the VTS module are not reversed. If so, when pushing on VTS switch UP button the nozzle will go down and vice versa.

If motor seems to jam and it has not reached the end of its stroke, the following test could be performed.

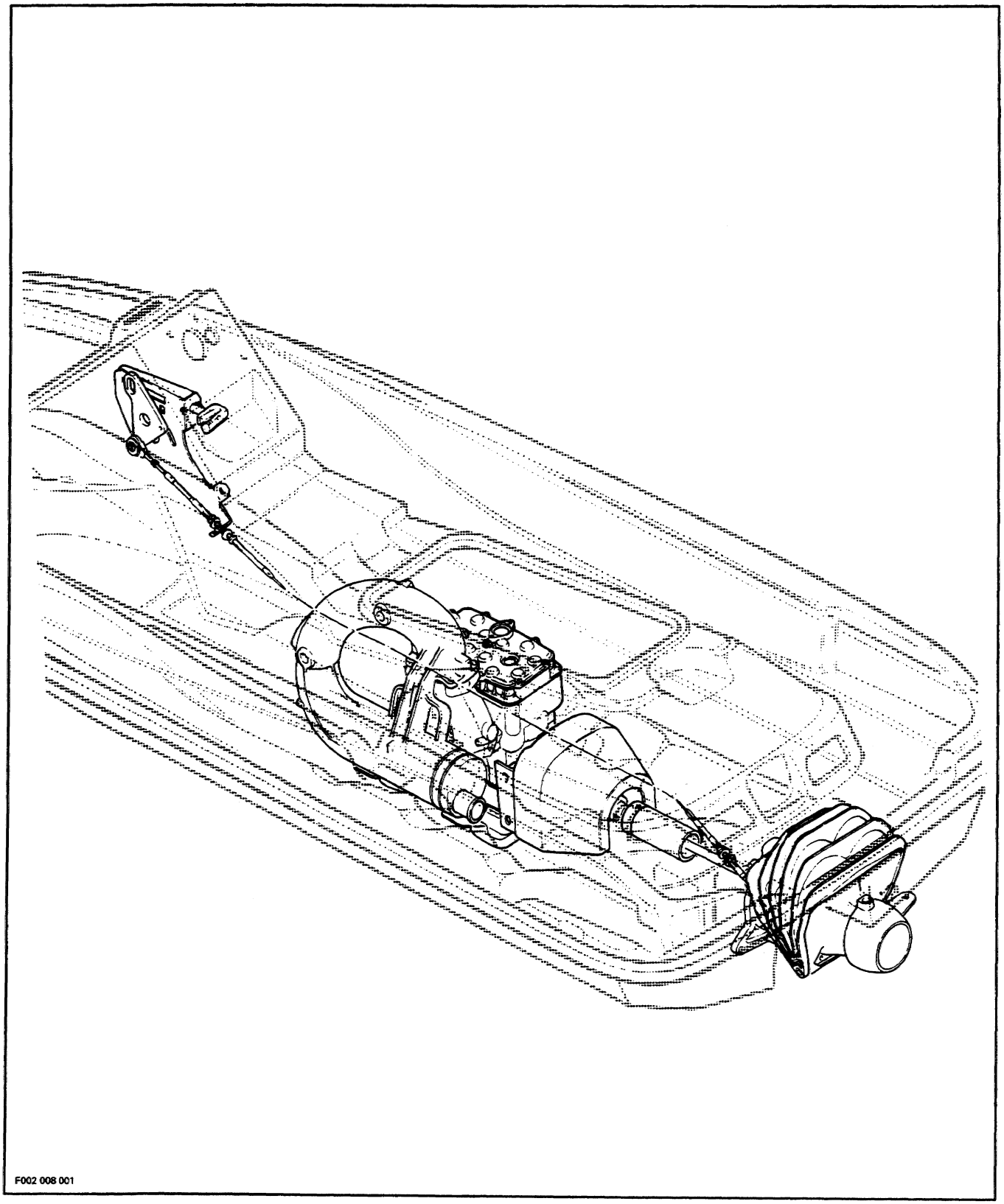
First remove motor, refer to PROPULSION AND DRIVE SYSTEMS 08-03 then refer to **disassembly**. Then manually rotate worm to verify VTS system actuating mechanism for free operation.

Connect motor through a 15 A fuse directly to the battery.

Connect wires one way then reverse polarities to verify motor rotation in both ways.

If VTS actuating mechanism is correct and the motor turns freely in both ways, VTS module could be defective.

PROPULSION AND DRIVE SYSTEMS



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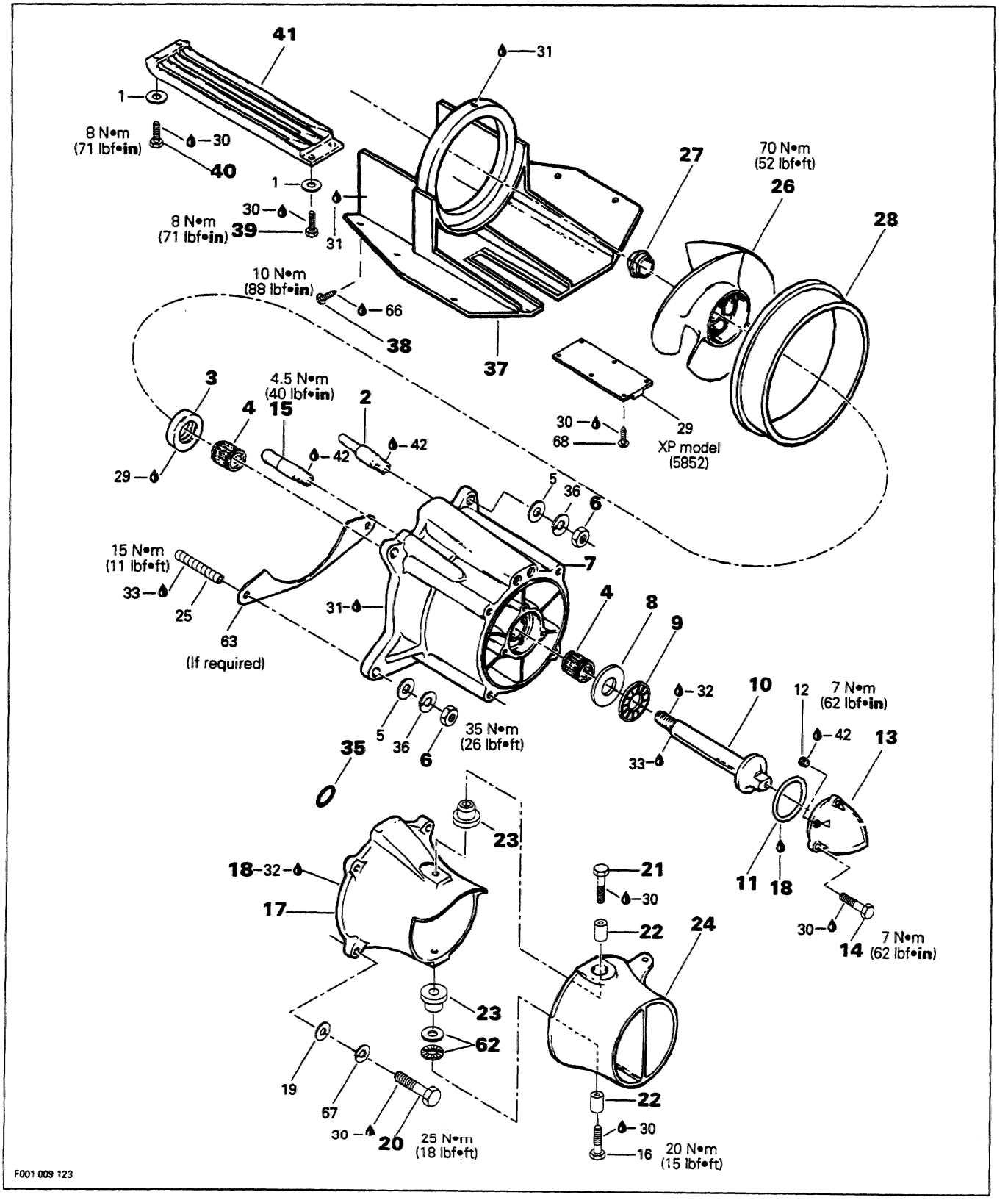
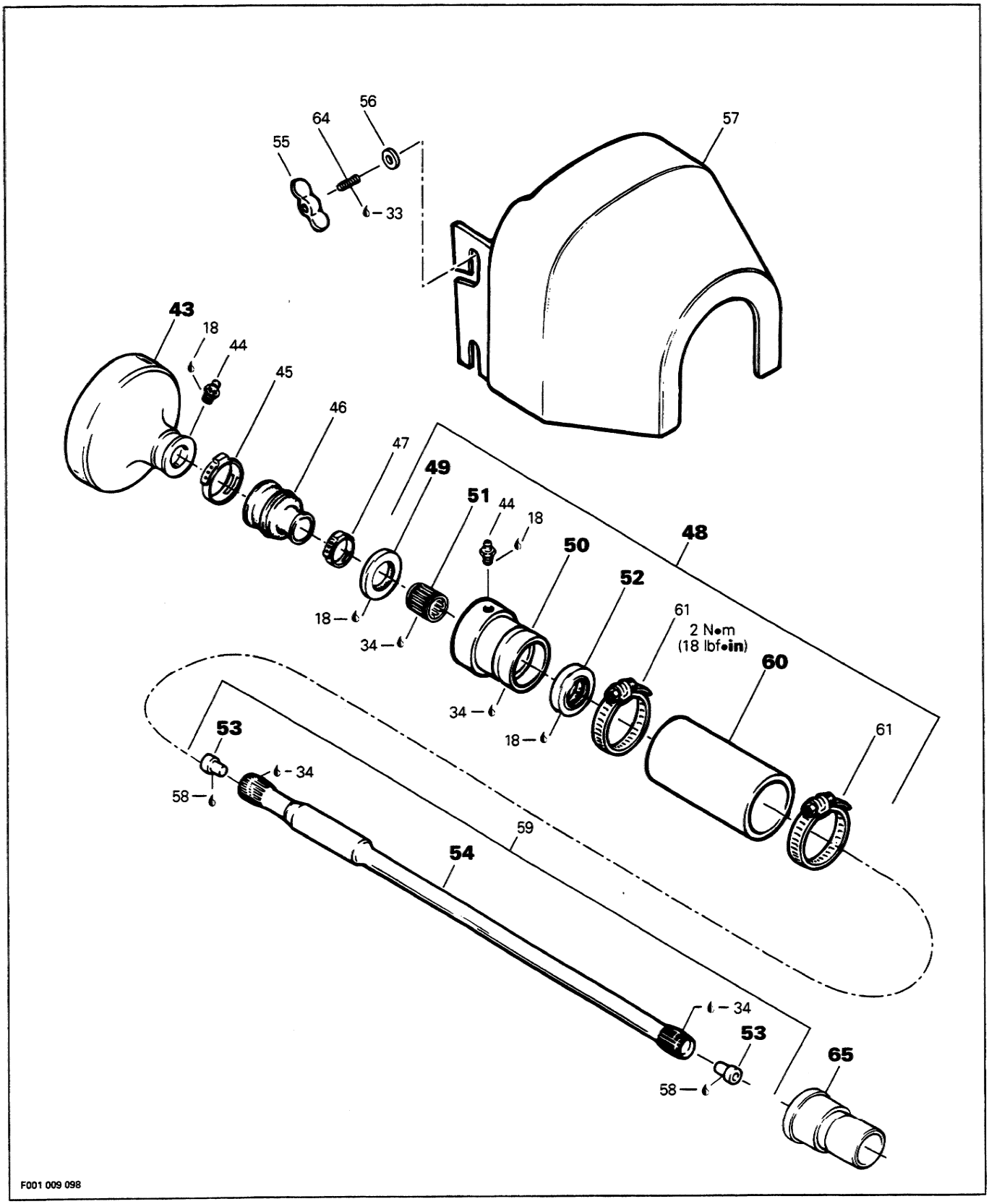
JET PUMP UNIT



DRIVE SHAFT AND SEAL CARRIER



COMPONENTS

1. *Flat washer M6 (4)*
2. *Fitting (bailer pick-up) (2)*
3. *Seal (double lip)*
4. *Needle bearing (2)*
5. *Flat washer M10 (4)*
6. *Nut M10 (4)*
7. *Impeller housing*
8. *Thrust washer*
9. *Thrust bearing*
10. *Impeller shaft*
11. *O-ring*
12. *Plug*
13. *Housing cover*
14. *Hexagonal head screw M5 x 20 (3)*
15. *Fitting (pump)*
16. *Hexagonal head screw M8 x 30 (1)*
17. *Venturi*
18. *Loctite 515*
19. *Flat washer M8 (4)*
20. *Hexagonal head screw M8 x 35 (4)*
21. *Hexagonal head screw M8 x 25 (1)*
22. *Sleeve (2)*
23. *Bushing (2)*
24. *Nozzle*
25. *Stud M10 x 45 (4)*
26. *Impeller*
27. *Boot*
28. *Wear ring*
29. *Ride shoe plate (5852 model)*
30. *Loctite 242 (blue)*
31. *Loctite 598 ultra black*
32. *Loctite primer N*
33. *Loctite 271 (red)*
34. *Synthetic grease*
35. *O-ring (2)*
36. *Lock washer M10 (4)*
37. *Ride shoe*
38. *Countersunk Phillips screw M6 x 35 (6)*
39. *Hexagonal head screw M6 x 16 (2)*
40. *Hexagonal head screw M6 x 20 (2)*
41. *Grill*
42. *Loctite PST 592*
43. *PTO flywheel*
44. *Grease fitting (2)*
45. *Clamp*
46. *Rubber boot*
47. *Clamp*
48. *Seal carrier assembly*
49. *Seal (single lip)*
50. *Seal carrier*
51. *Needle bearing*
52. *Seal (double lip)*
53. *Damper*
54. *Drive shaft*
55. *Wing nut M8 (2)*
56. *Flat washer M8 (2)*
57. *PTO Flywheel guard*
58. *Loctite 414 super bonder*
59. *Drive shaft assembly*
60. *Protective hose*
61. *Gear clamp (2)*
62. *Locking disk (2) (5806, 5807, 5808 models)*
63. *Shim*
64. *Stud M8 x 15*
65. *Hull insert*
66. *Loctite 732 RTV silicone*
67. *Lock washer M8 (4)*
68. *Countersunk Phillips screw M5 x 10 (6) (5852 model)*

Disconnect battery.

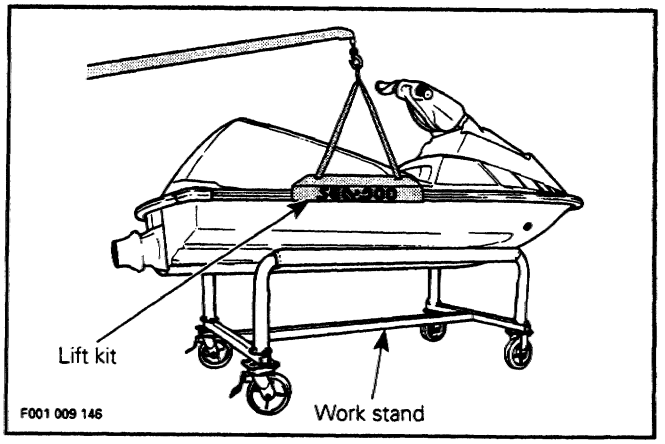
◆ **WARNING : Battery black negative cable must always be disconnected first and connected last.**

JET PUMP SERVICING

NOTE : This portion outlines some routine procedures. To obtain complete information concerning these procedures, inspection, parts, illustrations, sealing / thread locking products, tightening torques etc, refer to REMOVAL AND OVERHAUL and following portion.

To work on watercraft, securely install it on a stand. Thus, if access is needed to water inlet area, it will be easy to slide underneath watercraft. Working on the water intake grill, jet pump, ride shoe, etc, can be done by simply blocking the rear of vehicle above work stand.

A lift kit (P / N 298 760 000), (P / N 298 776 000), (P / N 298 780 000) can be use to install watercraft on a stand.

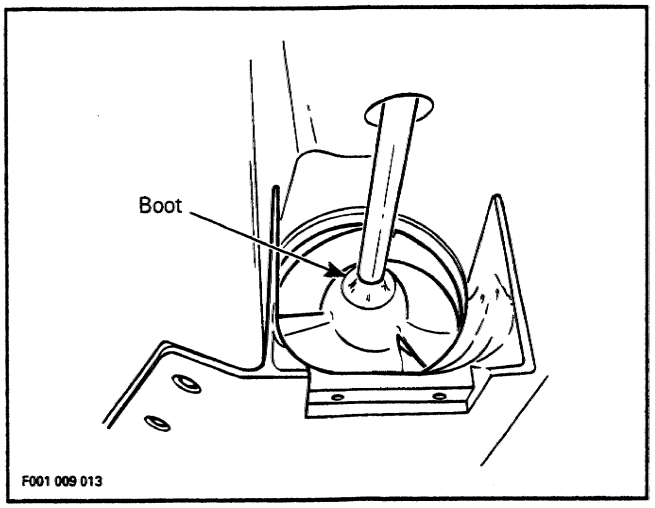


Impeller Condition and Impeller / Wear Ring Clearance

NOTE : These verifications can be performed without removing impeller housing and thus, avoiding cleaning and sealing jet pump to hull.

Impeller Condition

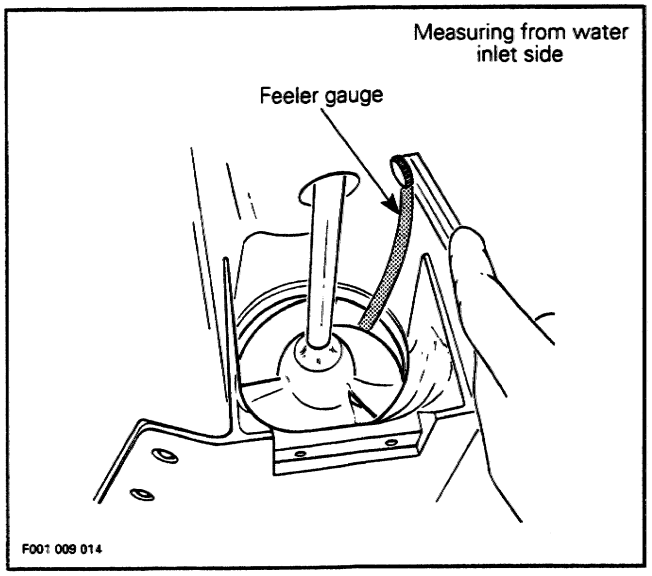
Impeller and boot condition can be quickly checked from underneath of the watercraft. Remove grill and look through water inlet opening.

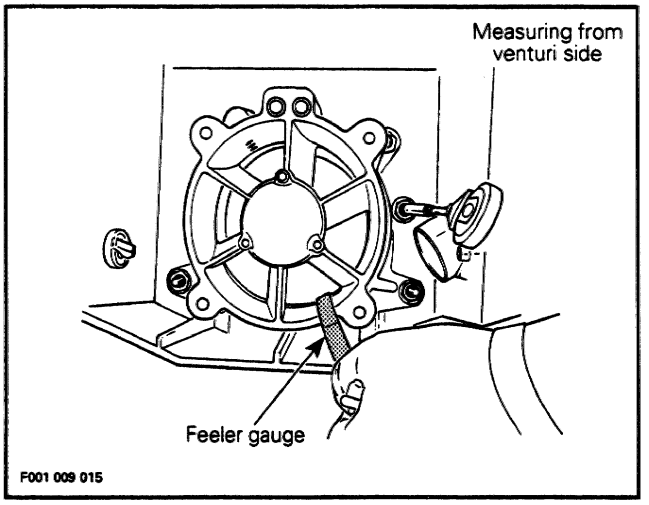


Impeller / Wear Ring Clearance

This clearance is critical for jet pump performance.

Clearance can be checked from water inlet opening, after inlet grill removal, or from venturi side, after venturi / nozzle assembly removal, however this may be more difficult.





Using a long feeler gauge 30 cm (12 in) blades, measure clearance between impeller blade tip and wear ring. Measure each blade at its center. Clearance should not exceed .5 mm (.020 in). If clearance is greater, disassemble jet pump and inspect impeller and wear ring. Renew worn parts.

Oil Inspection / Replacement

Detach ball joint of steering cable from nozzle.

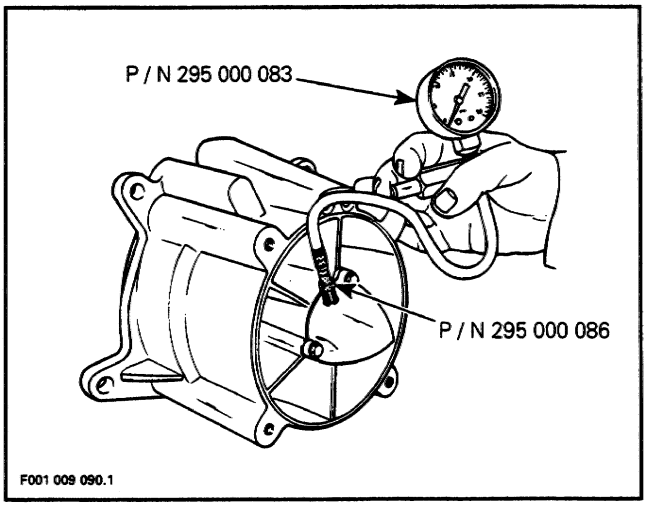
Remove four retaining screws from venturi.

Pull venturi and nozzle assembly from impeller housing.

Remove housing cover plug.

Check oil level, it should be at bottom of hole threads.

If oil level is low, check impeller shaft housing for leaks. Drain oil and use the following tools.



Pressurize to a maximum of 70 kPa (10 PSI) during 10 minutes. If there is no pressure drop impeller housing does not leak.

If there is a pressure drop spray soapy water around housing cover. If bubbles are noticed, replace housing cover O-ring and / or housing cover. If there are no bubbles, impeller shaft, impeller shaft seal, or impeller housing is leaking through porosity and has to be replaced. Jet pump unit has to be overhauled.

If everything is correct, add proper amount of oil.

To check oil condition, insert a wire through opening then withdraw. A whitish oil indicates water contamination.

This may involve defective impeller shaft seal and / or O-ring of housing cover. Jet pump unit should be overhauled to replace seal.

To replace oil, remove housing cover.

Thoroughly clean reservoir and inside of cover with a solvent.

Reinstall cover with its O-ring and apply Loctite 515. Remove plug from cover.

Pour approximately 65 mL (2.2 oz) of oil through hole until oil reaches the bottom of hole threads. Use SEA-DOO JET PUMP SYNTHETIC OIL (P / N 293 600 011) only. Oil will penetrate slowly in housing, wait a few minutes and readjust oil level.

▼ **CAUTION : This is a synthetic oil. Do not mix with mineral based oil. Do not mix oil brands.**

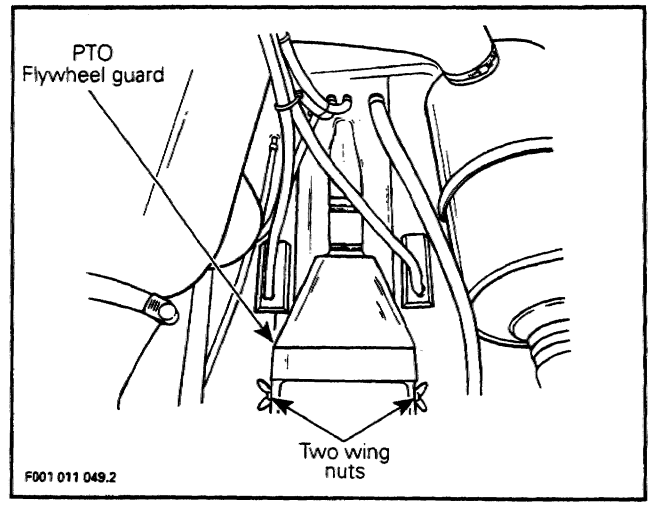
Properly reinstall removed parts.

REMOVAL AND OVERHAUL

NOTE : Whenever removing a part, visually check for damage such as : corrosion, crack, split, break, porosity, cavitation, deformation, distortion, heating discoloration, wear pattern, missing plating, missing or broken needle on needle bearing, water damage diagnosed by black-colored spots, etc. Renew any damaged part. As a quick check, manually feel clearance and end play, where applicable, to detect excessive wear.

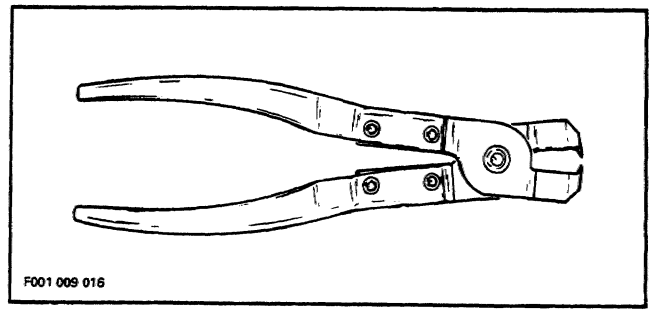
Remove air vent tube support from body opening (XP model (5852)).

Remove PTO flywheel guard.

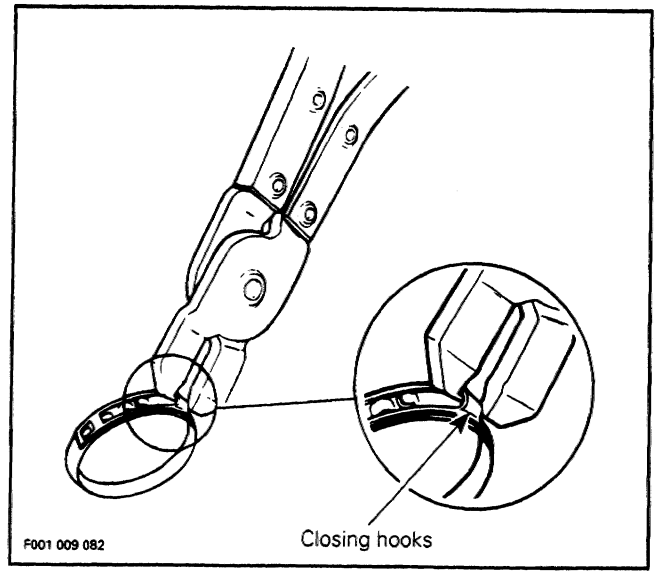


Unfasten **small** clamp on drive shaft boot as follows :

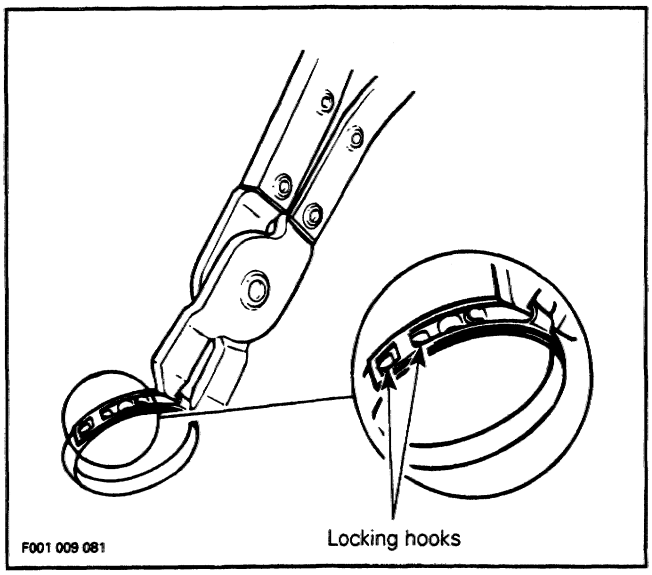
- Use pliers (P / N 295 000 069).



- Insert pointed tips of pliers in closing hooks.

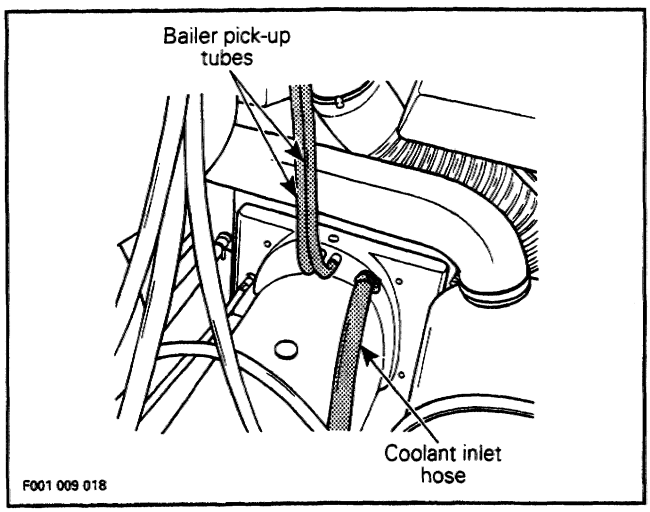


– Squeeze pliers to draw hooks together and disengage windows from locking hooks.



– Keep clamp for later use.

From inside bilge, disconnect coolant inlet hose and both bailer pick-up tubes from impeller housing.



Remove ball joint fasteners to release steering cable from nozzle.

21,22,23,24,62, Screw, Sleeve, Bushing, Nozzle and Locking Disk (if applicable)

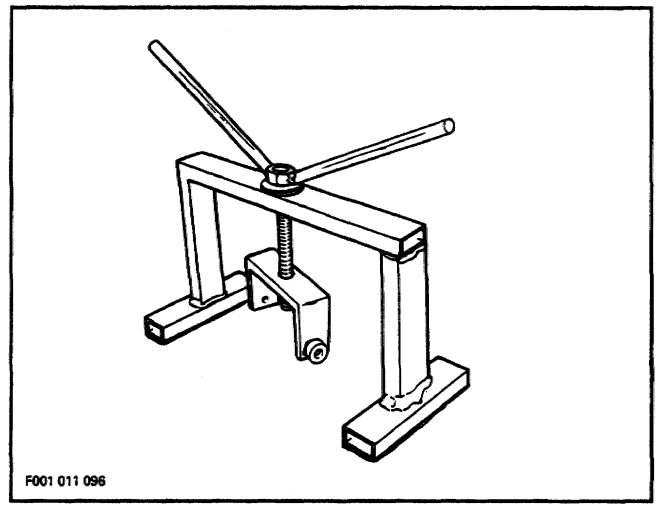
Remove two retaining screws, locking disks (if applicable) and withdraw nozzle.

Push sleeves and bushings out of nozzle.

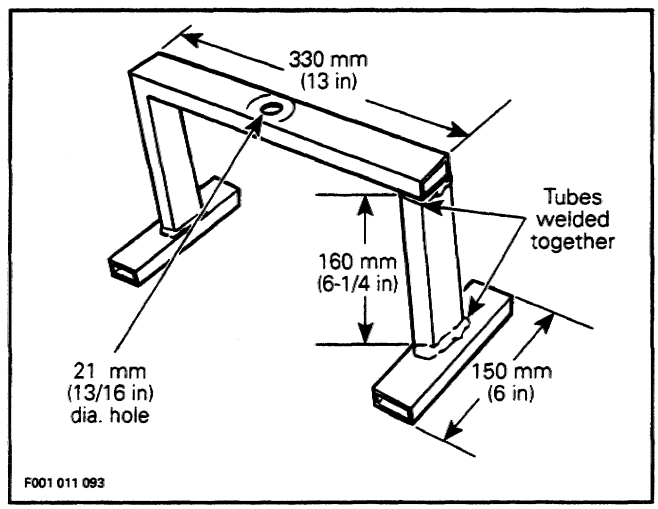
6,7, Nut and Impeller Housing

Remove nuts retaining impeller housing to hull.

Make the following tool to easily separate impeller housing from hull.



– Use rectangular tube 38 x 19 x 1.5 mm (1-1/2 x 3/4 x 1/16 in) thick. Five pieces of rectangular tube are needed. One piece 330 mm (13 in) long, two pieces 160 mm (6 -1/4 in) long and two other pieces 150 mm (6 in) long.
– Drill one 21 mm (13/16 in) diameter hole in center of the 330 mm (13 in) tube.
– Weld rectangular tubes together as shown in the following illustration.

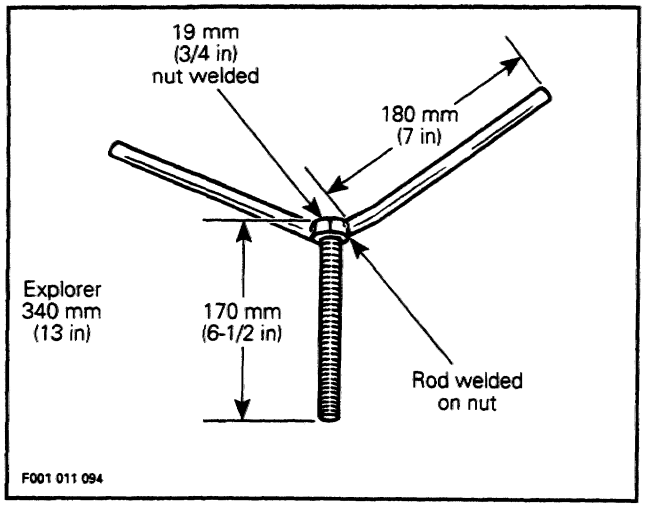


- Use threaded rod 19 x 170 mm (3/4 N.C. x 6-1/2 in) long. On one end install a 19 mm (3/4 in) diameter nut flush with the end and weld it.

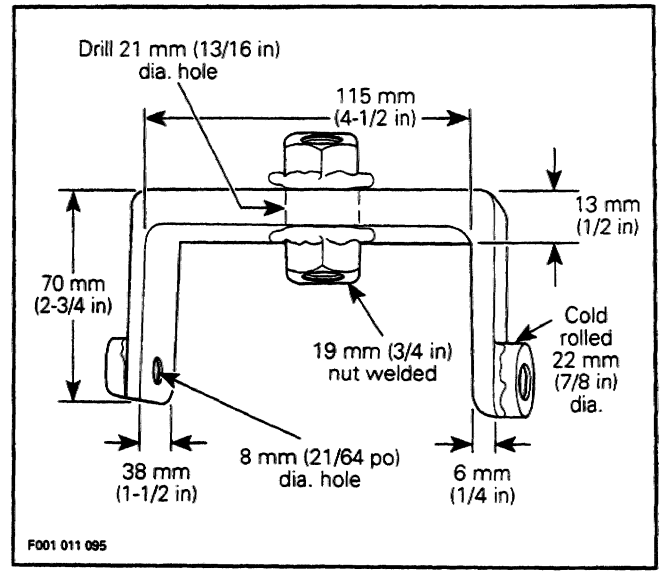
NOTE : Use commercial grade threaded rod to eliminate the possibility of stripping threads.

NOTE : For the EXPLORER model the threaded rod length must be 340 mm (13 in).

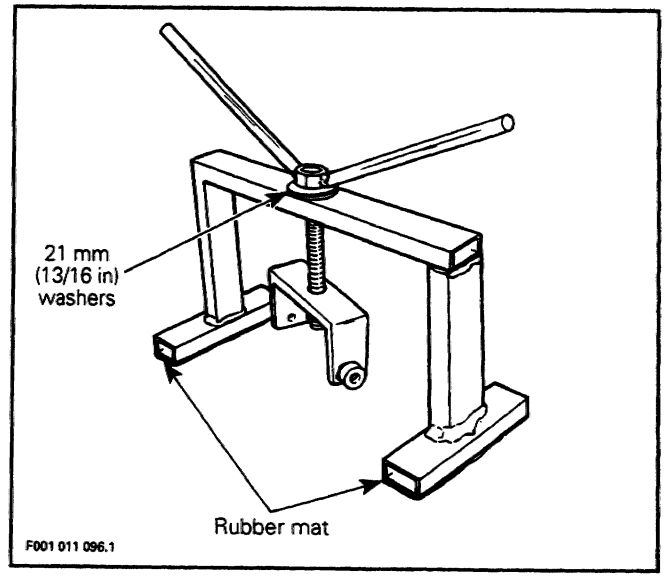
- Weld two cold rolled rods 10 x 180 mm (3/8 x 7 in) long on the nut as shown in the following illustration.



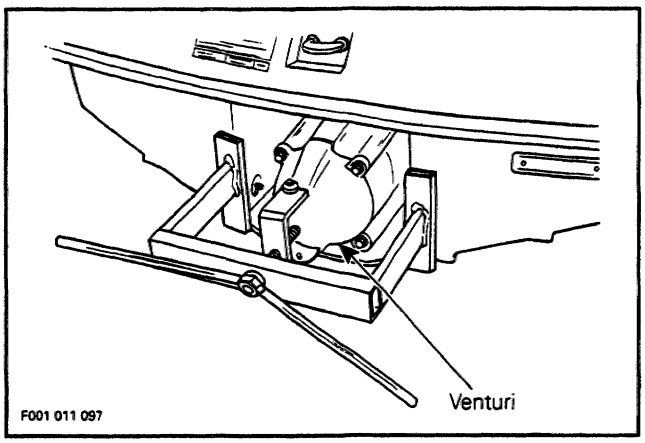
- Use one steel flat bar 38 x 13 mm (1-1/2 x 1/2 in) thick x 115 mm (4-1/2 in) long or two flat bars 6 mm (1/4 in) thick welded together.
- Drill one 21 mm (13/16 in) diameter hole in center of flat bar.
- Align two 19 mm (3/4 in N.C.) diameter nuts over the hole already drilled in flat bar and weld them in place.
- Use two steel flat bars 38 x 6 mm (1-1/2 x 1/4 in) thick x 70 mm (2-3/4 in) long.
- Weld two pieces of cold rolled steel 22 mm (7/8 in) diameter x 10 mm (3/8 in) thick on each flat bar at the center end.
- Drill one 8 mm (21/64 in) diameter hole in center of each cold rolled bushing through flat bar.
- Weld flat bars together as shown in the following illustration.



- Install two 21 mm (13/16 in) washers on threaded rod before final assembly.
- Glue a rubber mat or similar protective material on support to prevent scratching hull rear section.

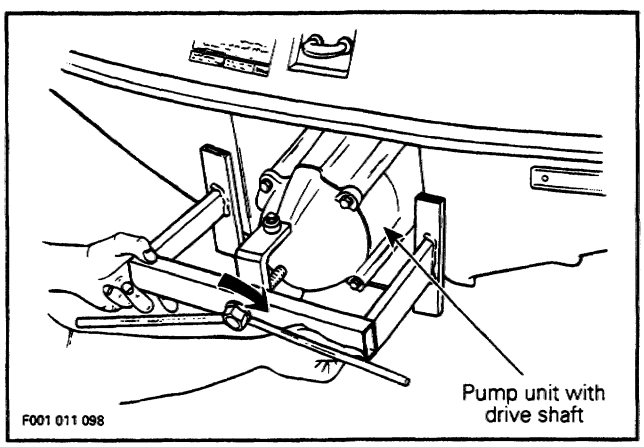


Using screws previously removed from nozzle, install pump remover on venturi.



Rotate handle clockwise to remove jet pump. Withdraw pump unit and drive shaft together.

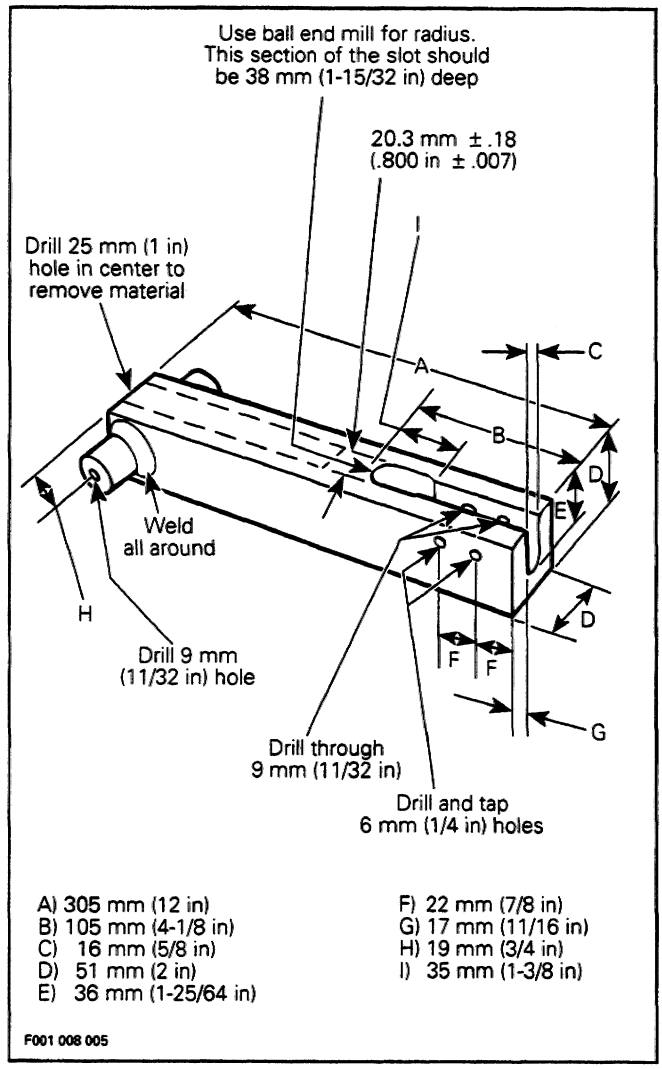
CAUTION : When removing pump unit a shim could have been installed between hull and pump housing be careful not to damage shim. If shim is not reinstalled engine and jet pump alignment will be altered.



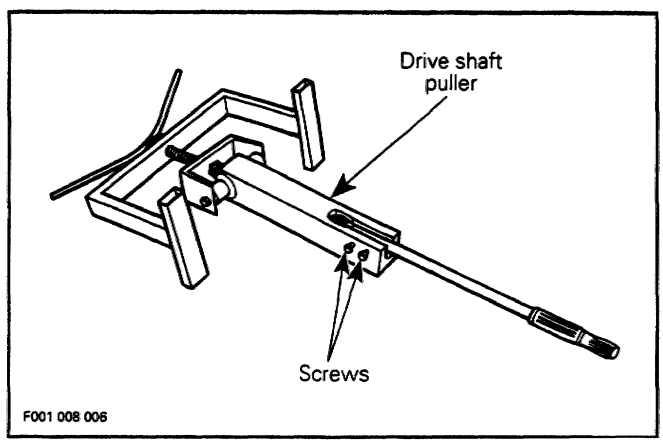
If the drive shaft is jammed into PTO flywheel or if bearing is seized on shaft at seal carrier level, make the following tool and use it in conjunction with pump remover to withdraw drive shaft.

Raw material :

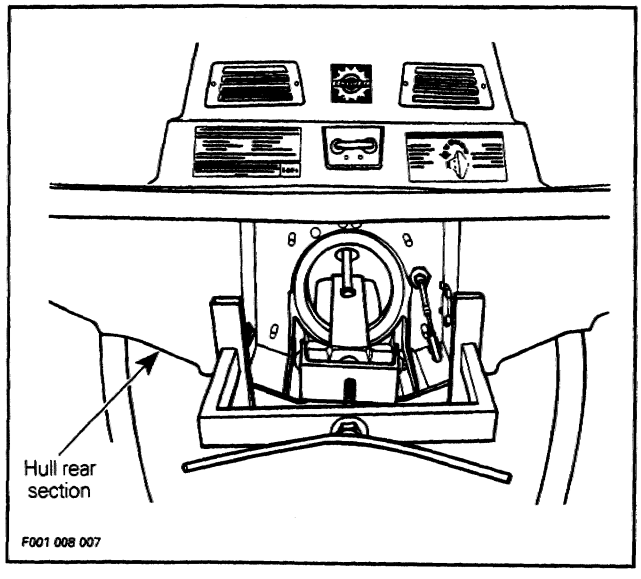
- 1 aluminum alloy square 51 mm (2 in) x 305 mm (12 in).
- 2 aluminum rod 28.5 mm (1-1/8 in) dia. x 30 mm (1-3/16 in).



Mount on pump unit remover drive shaft puller, then install assembly on drive shaft using screws.

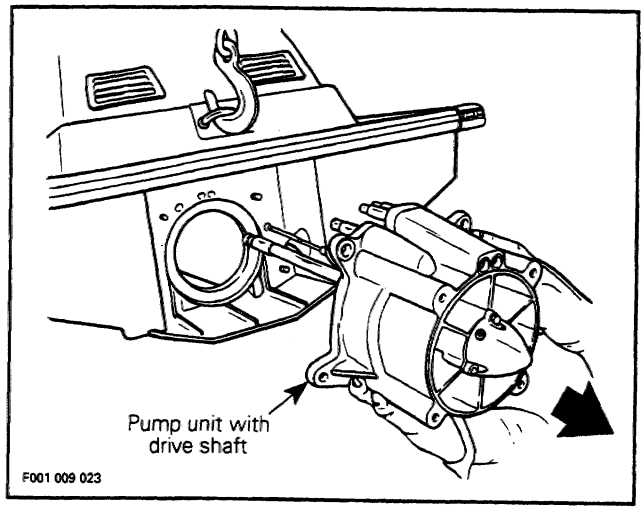


CAUTION : Be careful not to damage hull rear section or engine rubber mounts.



17,20,35, Venturi, Screw and O-ring

Remove four retaining screws and withdraw venturi.



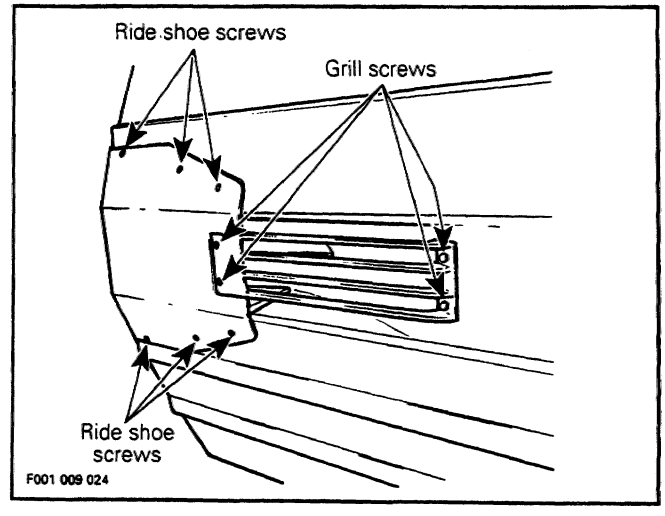
37,38,39,40,41, Ride Shoe, Screw and Grill

NOTE : Grill must be removed prior to ride shoe removal. Impeller housing must be removed to allow ride shoe removal.

NOTE : An impact screwdriver can be used to loosen tight screws.

Remove four retaining screws of grill then withdraw it.

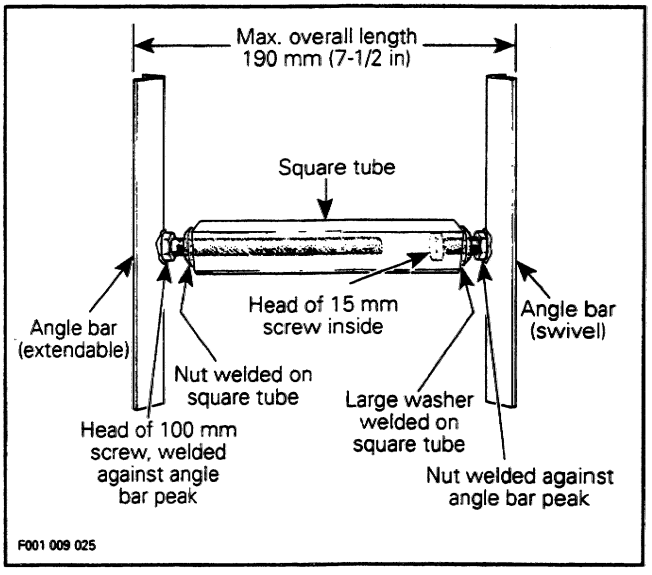
Remove six retaining screws of ride shoe then withdraw it.



Make the following tool to easily separate ride shoe from hull.

CAUTION : Prying ride shoe is likely to be damageable. Use special tool when ride shoe needs to be removed without damage.

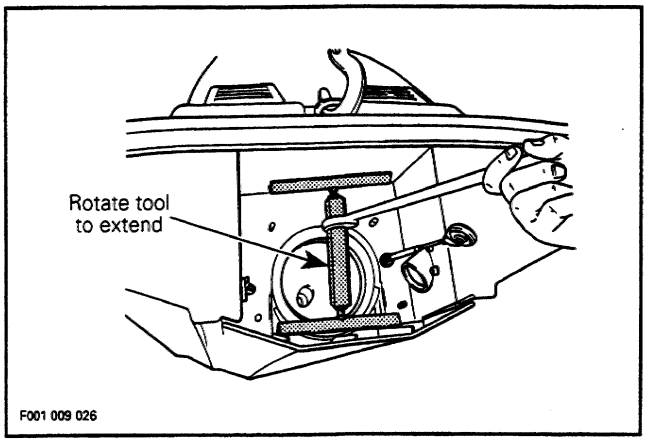
- Use two steel angle bars 25 x 25 x 3 mm (1 x 1 x 1/8 in) thick x 225 mm (9 in) long.
- A kind of turnbuckle is needed to apply extension force between ride shoe and hull. Use a 25 mm (1 in) square tube by approximately 125 mm (5 in) long so that, with all parts welded, its overall length will not exceed 190 mm (7-1/2 in).
- On one end, weld a 10 mm (3/8 in) dia. nut.
- Weld the head of a 10 x 100 mm (3/8 x 4 in) screw on top of one angle bar then screw in square tube.
- Insert a 10 x 15 mm (3/8 x 1/2 in) screw through a large and thick washer or a suitable sleeve.
- Install a nut on screw. Do not fully tighten, ensure screw can easily rotate into washer. Weld the top of other angle bar to nut.
- Weld the washer to the remaining end of square tube.



Insert special tool between ride shoe ribs and hull as shown.

▼ CAUTION : Ensure lower part of tool sits at least on outer ribs in order to reduce applied pressure for removal. Ensure that tool is installed vertically.

Using a wrench, turn tool body so that it extends to unstick and release ride shoe from hull.



48,60, Seal Carrier Ass'y and Protective Hose

NOTE : Drive shaft / pump housing or engine must be removed to allow removal of seal carrier ass'y.

Since it is sealed to prevent water intrusion inside bilge, seal carrier ass'y should not be removed needlessly.

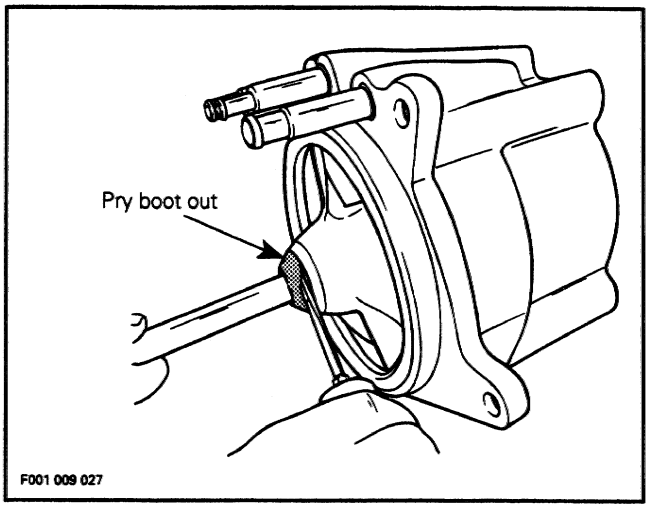
Loosen gear clamp holding seal carrier protective hose, then carefully pull hose and seal carrier from hull insert.

DISASSEMBLY

27, Boot

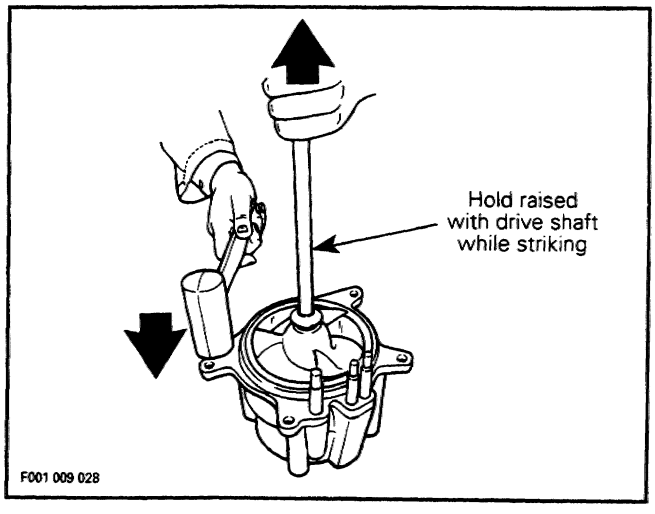
▼ CAUTION : Do not pull drive shaft to release it from impeller, this could damage boot. Boot must be slipped out of impeller before removing drive shaft.

Insert a screwdriver blade between impeller and boot flange. Carefully pry boot all around to release from impeller. To ease this operation, apply liquid soap between boot and impeller, as they begin to separate.



Withdraw drive shaft.

NOTE : A jammed drive shaft can be removed by holding pump unit by drive shaft, slightly raised unit above a smooth surface, then strike all around of impeller housing with a fiber hammer. Corroded parts can be loosened by applying penetrating oil such as SEA-DOO LUBE (P / N 293 600 006).

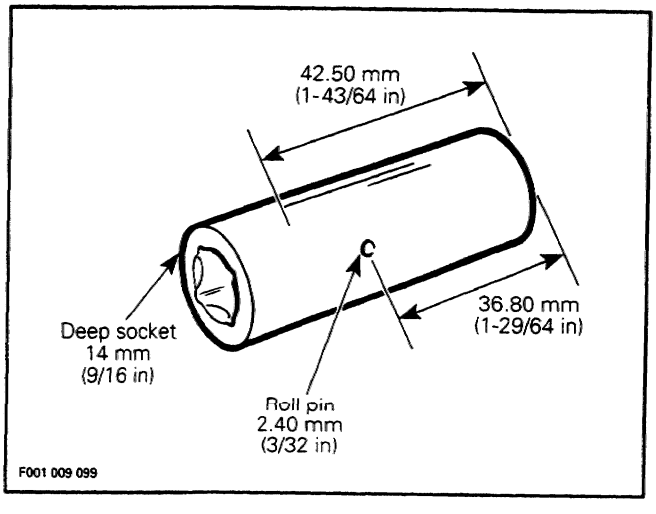


2,15, Fitting

Fittings can be removed with deep socket or vise grip. Do not contact hose mounting area.

Fitting can be removed from pump housing with following suggested tool :

- Use a deep socket 14 mm (9/16 in).
- Drill deep socket with a 14 mm (9/16 in) drill bit, starting at hexagone head end as shown in following illustration.
- Drill one 2.40 mm (3/32 in) hole in center of deep socket as shown in following illustration.
- Install 2.40 mm (3/32 in) roll pin in the center hole.



13,14, Housing Cover and Screw

With pump assembly in horizontal position, remove three retaining screws.

Place container under cover to catch oil.

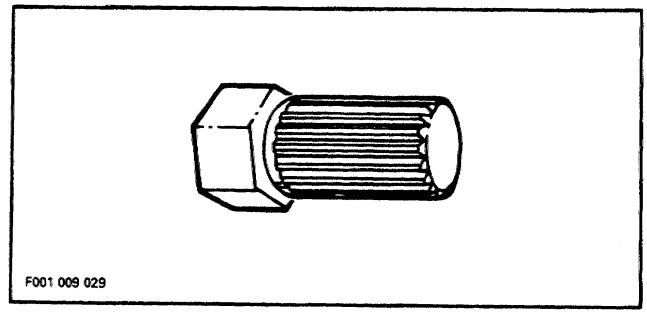
Using a fiber hammer, gently tap cover to release from impeller housing.

26, Impeller

Insert impeller shaft holder (P / N 295 000 082) on impeller shaft flat end.

Using two screws previously removed from venturi, secure shaft holder to housing. To ease removal heat impeller center with a propane torch to approximately 150°C (300°F) to break the Loctite bond.

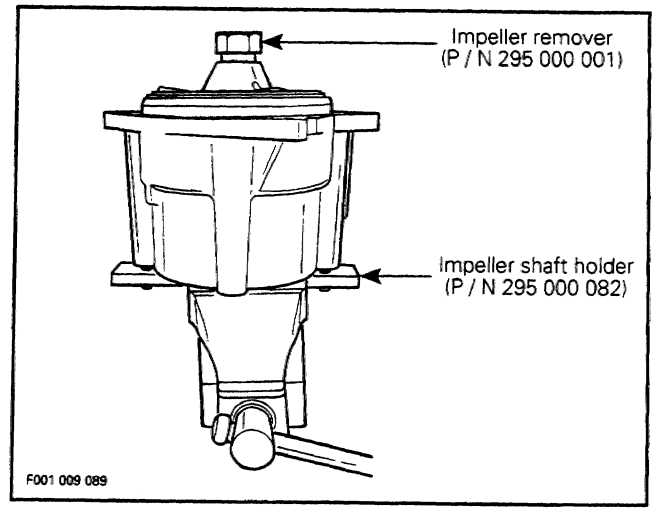
Impeller is loosen using impeller remover (P / N 295 000 001).



Install shaft holder in a vice.

Insert special tool in impeller splines.

Rotate impeller remover counterclockwise and unscrew completely impeller.



CAUTION : Never use any impact wrench to loosen impeller.

To remove impeller, apply a rotating movement and pull at same time. Slide impeller out of housing and remove tool from impeller.

Remove two screws holding impeller housing to shaft holder.

Lift impeller housing away from impeller shaft.

Slide thrust washer and thrust bearing off from shaft.

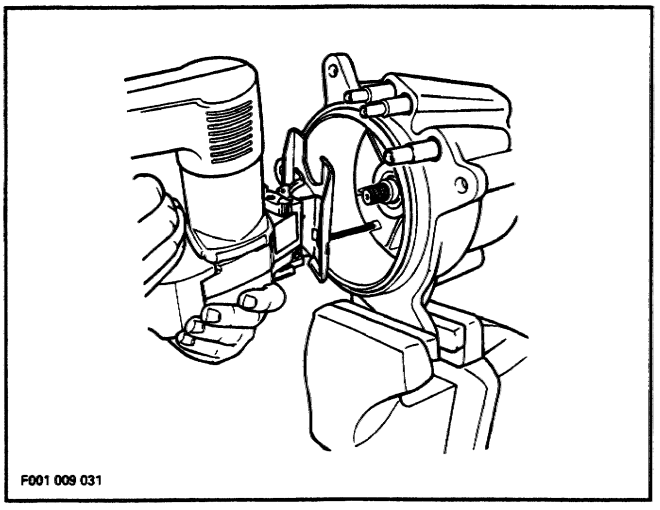
28, Wear Ring

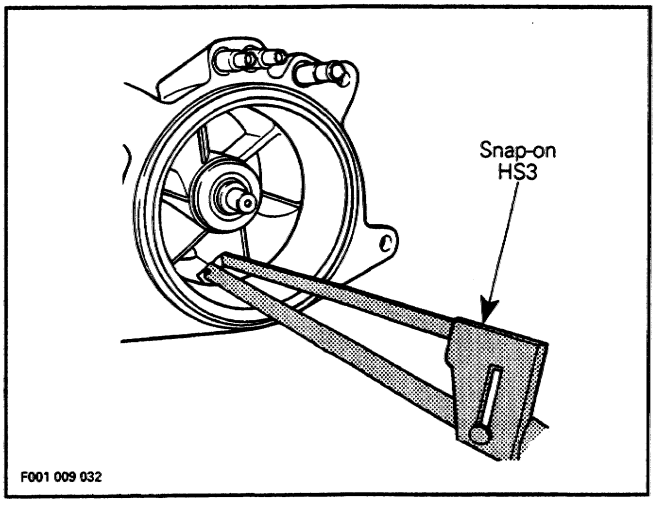
Place impeller housing in a brass jaw vise so that it is firmly retained by a lug.

Cut wear ring.

NOTE : Wear ring can be cut using a jigsaw, a small buffer or a low clearance hacksaw such as Snap-on HS3 or equivalent.

CAUTION : When cutting ring, be careful not to damage impeller housing.


F001 009 031



F001 009 032

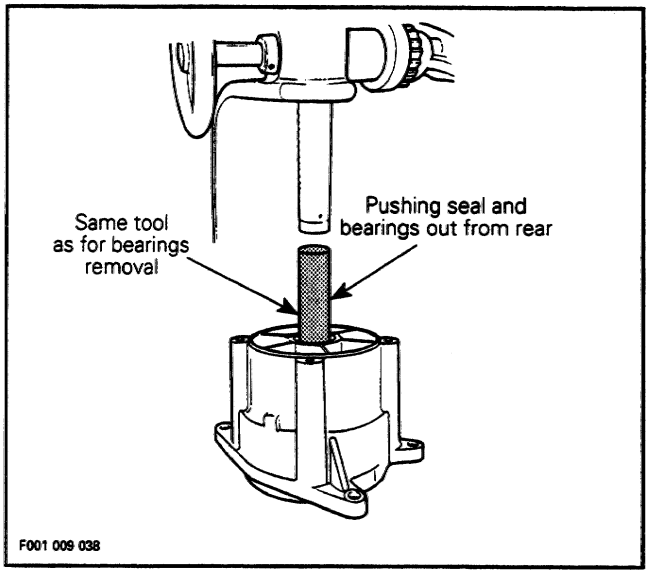
After cutting ring, insert a screwdriver blade between impeller housing and one end of ring.

Lift ring end so that both ends overlap each other.

Pull ring out.

3, Seal

NOTE: If bearings and seal need to be renewed, the special pusher described further on in **bearing removal** can be used. Simply insert pusher from the rear and push towards the front.



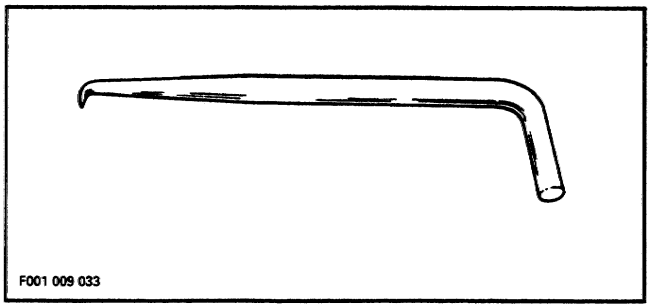
F001 009 038

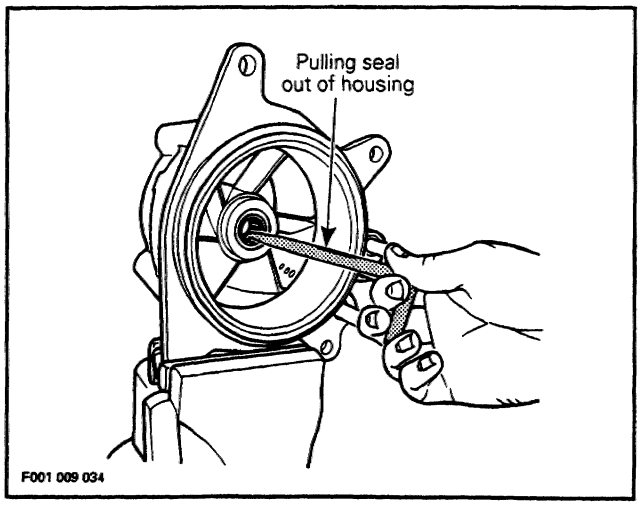
If only seal needs to be renewed, proceed as follows:

CAUTION : It is not recommended to push seal out with a punch. Housing and / or bearing(s) could be damaged.

Seal should be removed using the following suggested tool.

Seal puller, Snap-on #S6129.


F001 009 033

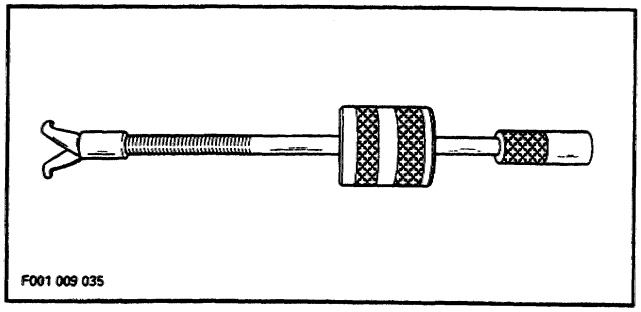


Or, use a Snap-on hammer puller including :

Handle CJ93-1

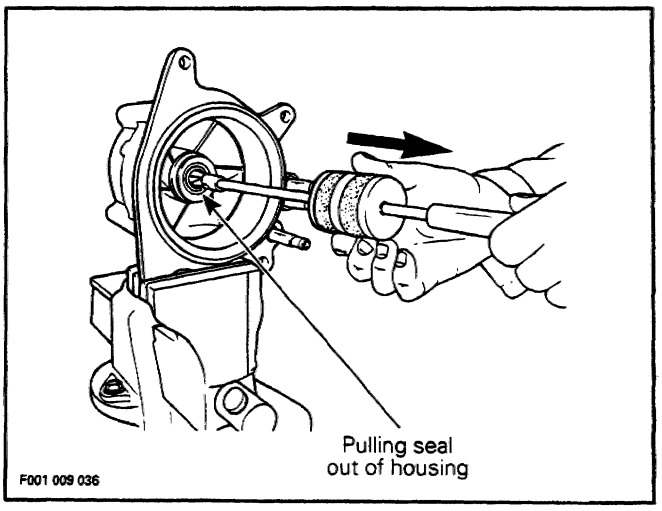
Hammer CJ125-6

Claws CJ93-4



Close puller claws so that they can be inserted between seal and bearing. Holding claws, turn puller shaft clockwise so that claws open and tighten against seal.

Slide puller sleeve outwards and **gently** tap puller end. Work with small strikes otherwise claws will slip out. As soon as seal begins to slide out, retighten claws to always maintain them tight against seal. Continue pulling until seal is out.

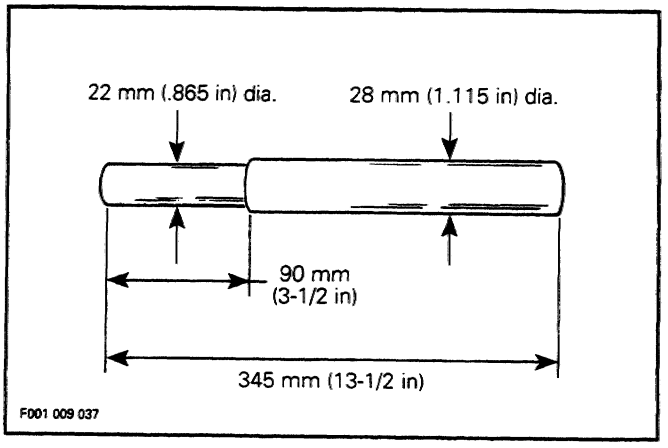


4, Needle Bearing

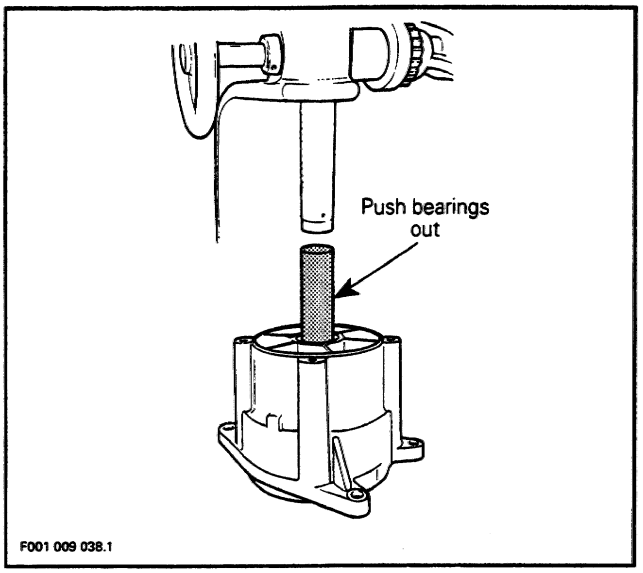
NOTE : It is always recommended to renew both bearings, even if only one needs to be replaced.

Bearings can be easily removed with the following suggested pusher.

Use a 30 mm dia. x 345 mm long (1-1/8 dia. x 13-1/2 in) steel shaft. Machine shaft as per the following drawing.



Insert pusher into one bearing then push tool using a arbor press until bearings are out. However, care should be taken not to damage bearing journals.



NOTE : If seal is to be renewed at same time, simply insert pusher from the side opposite of seal then push seal and bearings out.

49,50,51,52, Seal, Seal Carrier and Needle Bearing

Seals and bearing can be removed using same suggested tools as for pump unit.

Properly support seal carrier when removing seals and bearing.

CLEANING

NOTE : Bailer tube fittings and cooling supply fitting can be removed to ease cleaning of impeller housing mating surface.

Most silicone can be removed with a scraper such as Snap-on #CS-A12.

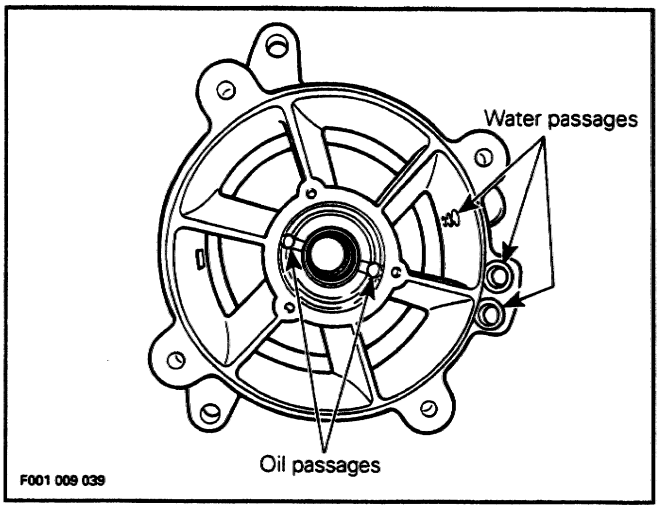
Remaining silicone can be removed with a steel brush (disc) mounted on a drill.

Bombardier stripper (P / N 295 000 040) can be used to remove remaining silicone. Carefully apply on mating surfaces taking care not to exceed this area because paint will be damaged. Let product dissolve silicone then scrape it.

Properly clean all threads.

Discard all O-rings and clean parts in a solvent.

Carefully check water passages (bailer pick-up, cooling system) and oil passages. Blow low pressure compressed air through them and make sure they are not clogged.



INSPECTION

26,43,54, Impeller, PTO Flywheel and Drive Shaft

Visually inspect drive shaft splines, impeller and PTO flywheel. Check for wear or deformation. Renew any damaged part.

NOTE : If PTO flywheel splines are very worn, a pipe wrench can be used to remove PTO flywheel instead of special tool (P / N 295 000 001). Refer to ENGINE 03-04 then look for **PTO flywheel and magneto**.

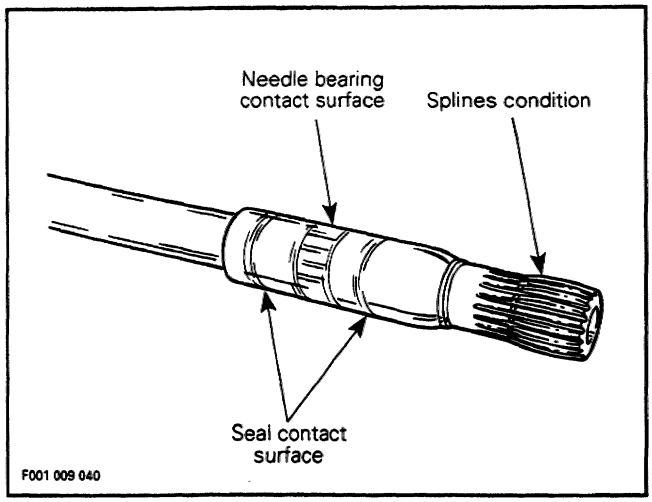
51,53,54, Needle Bearing, Damper and Drive Shaft

Wear

Visually inspect shape of dampers for deformation or other damage. Ensure they are firmly retained.

Inspect seal carrier needle bearing and its contact surface. Check for scoring, pitting, chipping or other evidence of wear.

With a finger tip, feel contact surfaces of bearing and seals. If any irregular surface is found, renew drive shaft.

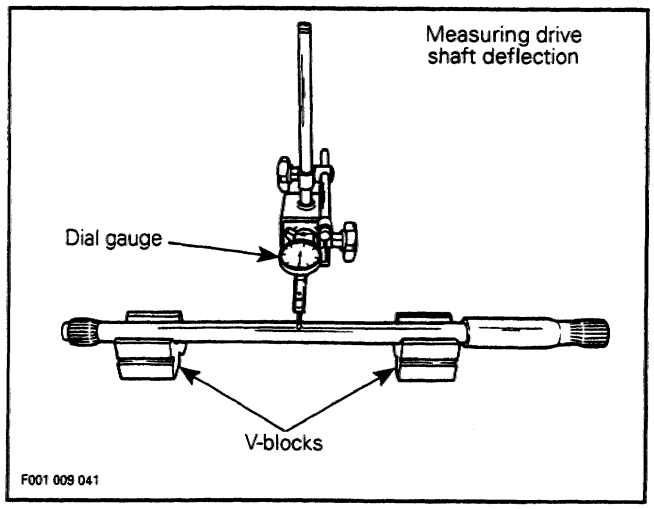


Deflection

Excessive deflection could cause vibration and damage to drive shaft splines, impeller, flywheel or seal carrier.

Install drive shaft in V- blocks and set 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.

Maximum permissible deflection is 0.5 mm (.020 in).

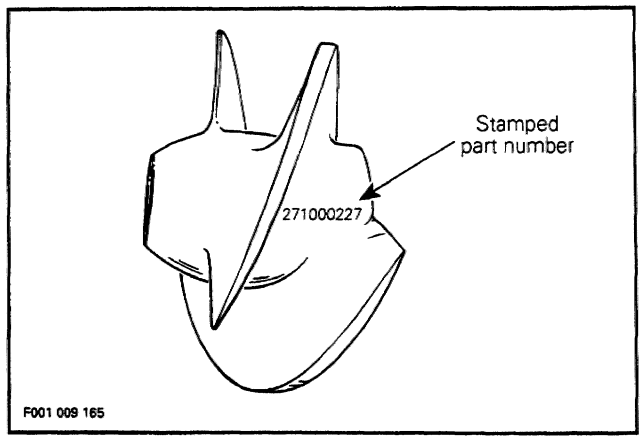


26, Impeller

Identification

To identify the impellers refer to the following illustration and chart.

NOTE : Aluminum impeller does not have any identification number.

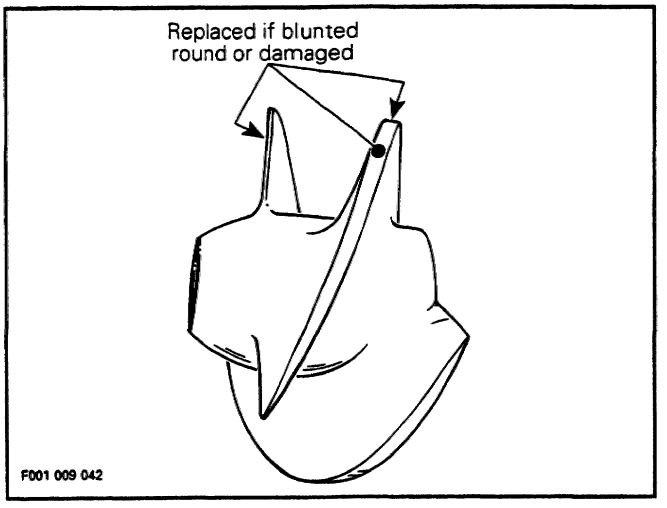


VEHICLE MODEL NO.	IMPELLER P / N	MATERIAL	PITCH	
SP (5806)	271 000 235	Aluminum	18°	
SPX (5807)	271 000 230	Stainless steel	Progressive pitch 16°-20.5°	Stamped code 1150
SPI (5808)	271 000 227	Stainless steel	17.7°	
GTS (5813)	271 000 215	Stainless steel	17°	
XP (5852)	271 000 182	Stainless steel	Progressive pitch 15°-20.5°	
GTX (5861)	271 000 123	Stainless steel	18.3°	
EXPLORER (5820)	271 000 199	Stainless steel	17.7°	
Model 5806, 5808 and 5820 only	271 000 046 (optional)	Polished stainless steel	Pitch 17.7°	Stamped code 77

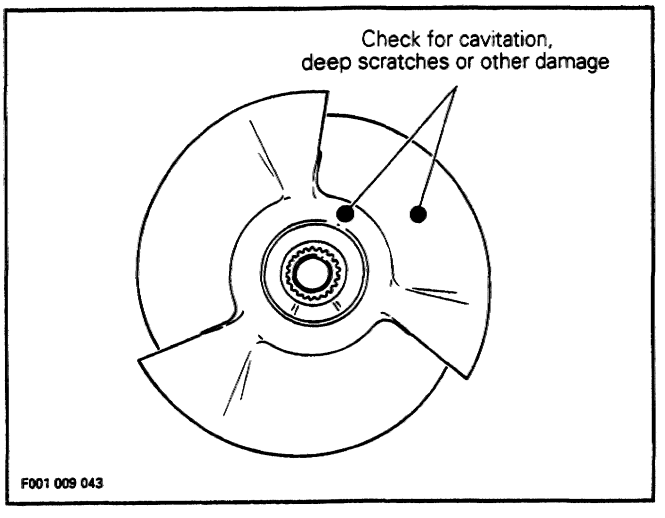
26,28, Impeller and Wear Ring

Examine impeller in wear ring for distortion.

Check if blade tips are blunted round, chipped or broken. Such impeller is unbalanced and will vibrate and damage wear ring, impeller shaft, shaft seal or bearings. Renew if damaged.



Check impeller for cavitation damage, deep scratches or any other damage.



Check wear ring for deep scratches, irregular surface or any apparent damage.

If impeller / wear ring clearance is too large and impeller is in good shape, renew wear ring.

4,10, Needle Bearing and Impeller Shaft

Wear

Inspect needle bearings and their contact surface. Check for scoring, pitting, chipping or other evidence of wear.

With a finger tip, feel contact surface of seal. If any irregular surface is found, renew impeller shaft.

Install bearings then install impeller shaft and rotate it. Make sure it turns smoothly.

Radial Play

Radial play is critical for jet pump unit life span.

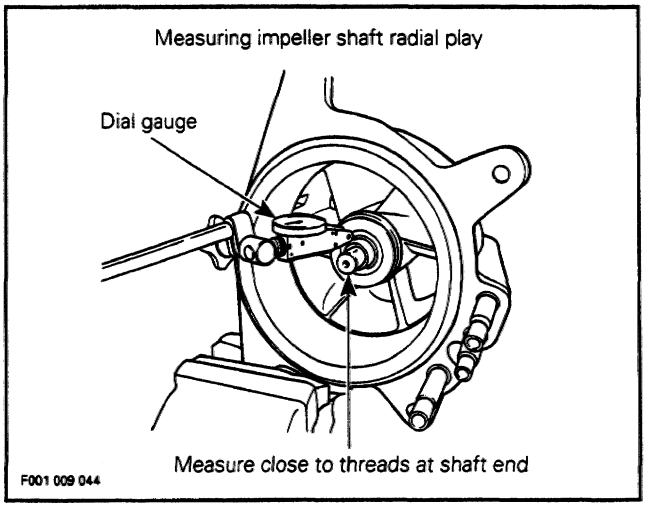
Radial play of impeller shaft is checked with shaft in housing, without impeller.

Retain housing in a brass jaw vise making sure not to damage housing lug.

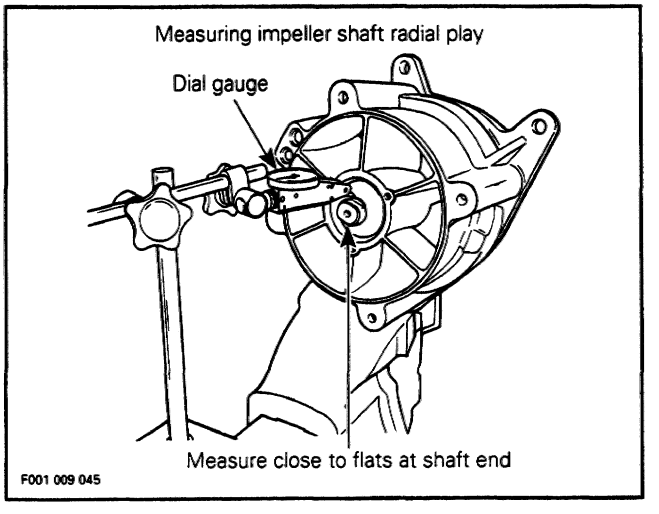
Set a dial gauge and position its tip onto shaft end, close to end of threads.

Move shaft end up and down. Difference between highest and lowest dial gauge reading is radial play.

Maximum permissible radial play is 0.05 mm (.002 in).



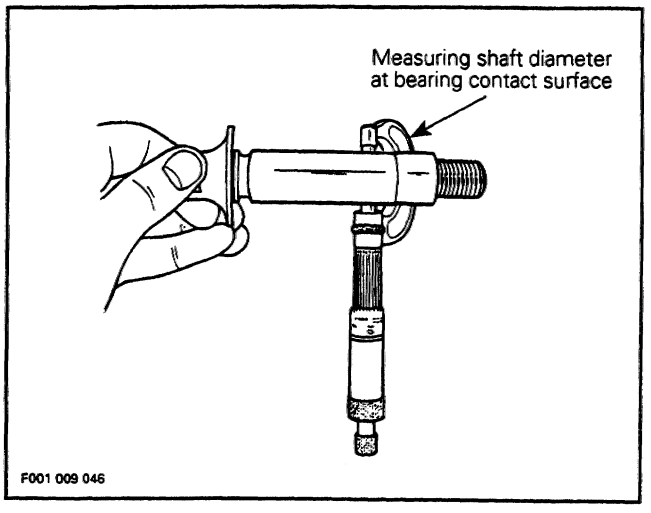
To check both bearings, proceed the same way with other shaft end. Position gauge tip on diameter, close to flats on shaft.



Excessive play can come either from worn bearings or impeller shaft or damaged impeller housing bearing surfaces.

Measuring shaft diameter will determine defective part.

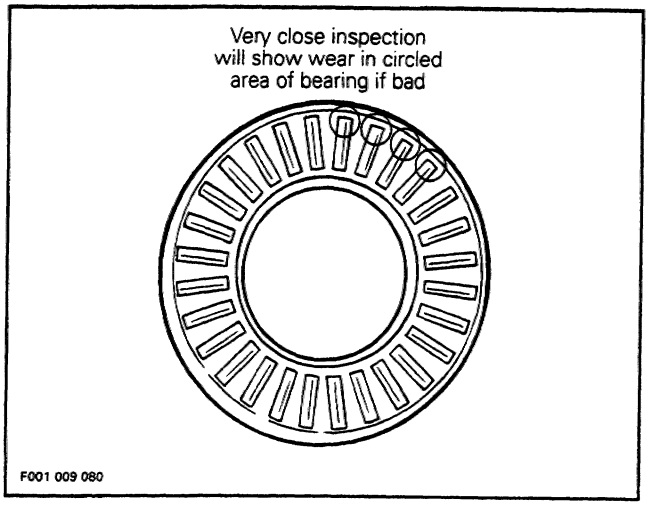
Using a micrometer, measure diameter on bearing contact surfaces. **Minimum** shaft diameter should be 22.24 mm (.876 in). A shaft within tolerance indicates worn bearings. Replace both bearings.



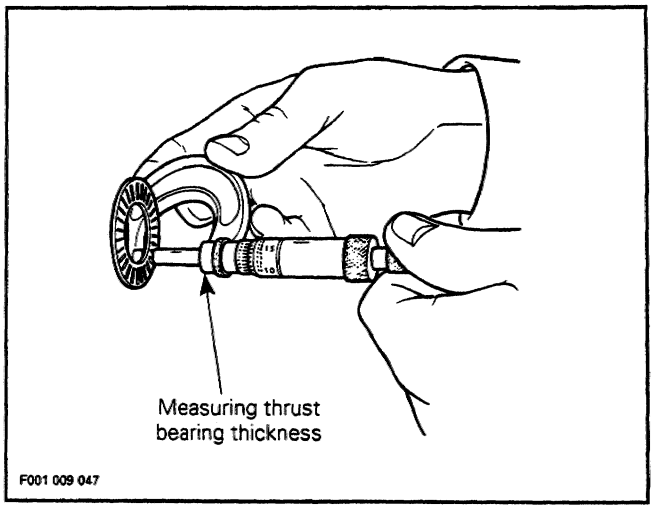
NOTE : If shaft is to be replaced, it is recommended to replace both bearings at same time. In addition, it is suggested to replace thrust bearing and thrust washer.

8,9, Thrust Washer and Thrust Bearing

Visually inspect thrust washer, thrust bearing and their contact surface. Check for scoring, pitting, chipping or other evidence of wear.



Measure thrust bearing thickness. If roller diameter is found smaller than 1.93 mm (.076 in), renew it.



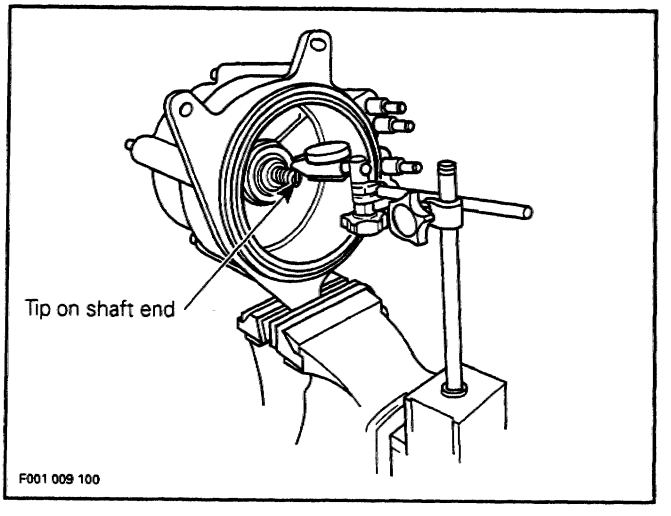
NOTE : When replacing either washer or bearing, it is recommended to renew both.

13, Housing Cover

End Play

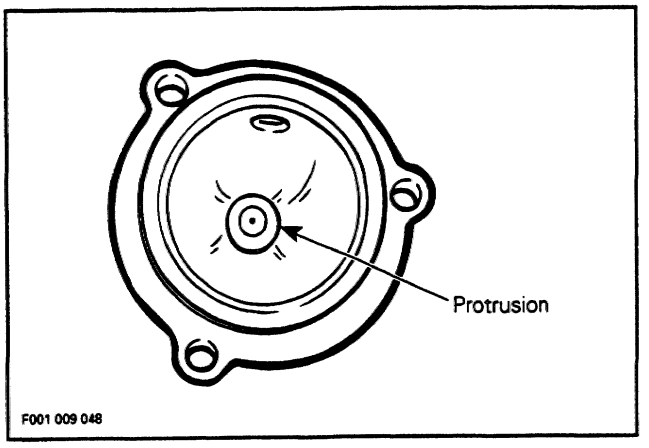
End play of impeller shaft is checked with shaft in housing, without impeller and with housing cover installed.

Retain housing in a brass jaw vise making sure not to damage housing lug. Set a dial gauge and position its tip on the end of shaft. Move shaft end by pulling and pushing. Difference between highest and lowest dial gauge reading is end play. Maximum permissible end play (new) is 0.12 - 0.54 mm (.005 - .021 in).



Excessive play comes from worn protrusion inside housing cover.

Visually inspect protrusion inside cover. If worn, a small peak in center will be apparent.



3,49,52, Seal

Carefully inspect seal lips. Make sure that lips are not worn, distorted, cracked or present any other damages. Renew as necessary.

ASSEMBLY

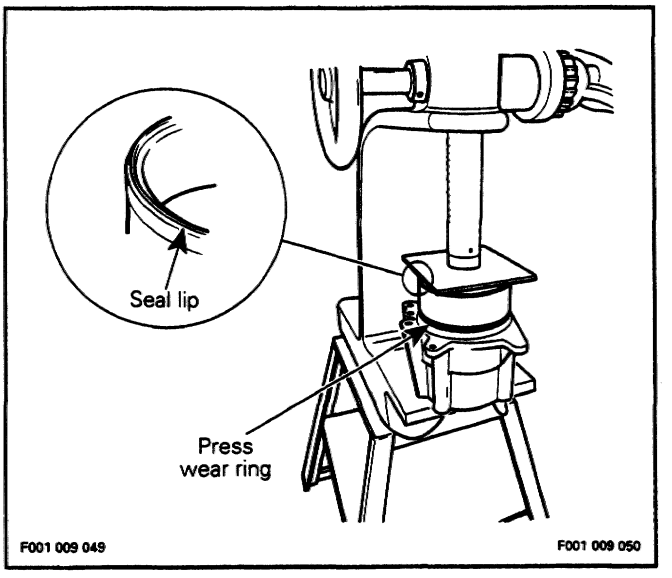
28, Wear Ring

The wear ring features a lip on one edge, position lip outwards of housing.

To ease insertion into housing, apply SEA-DOO LUBE (P / N 293 600 006) onto outside circumference of wear ring.

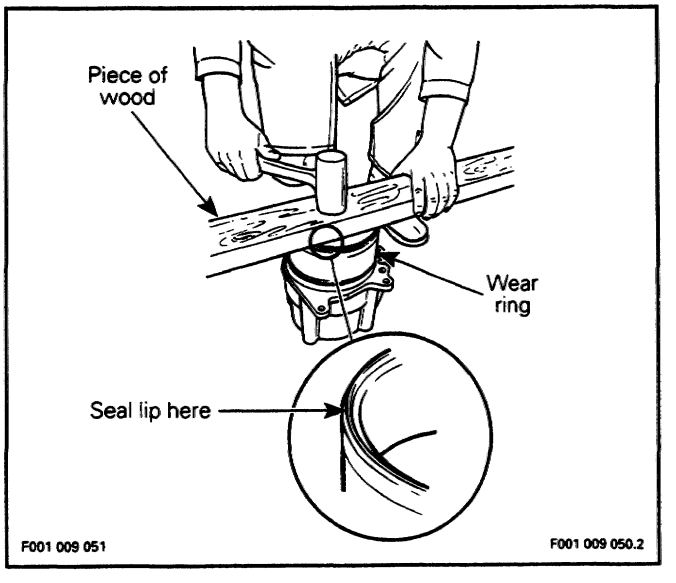
To install ring in housing, use a square steel plate approx. 180 x 180 mm x 6 mm thick (7 x 7 in x 1/4 in) and a press.

Manually engage ring in housing making sure it is equally inserted all around. Press ring until it seats into bottom of housing.



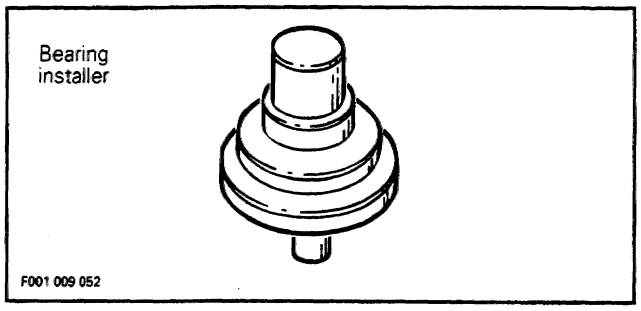
If a press is not readily available, a piece of wood such as a 2 x 4 x 12 in. long, can be used.

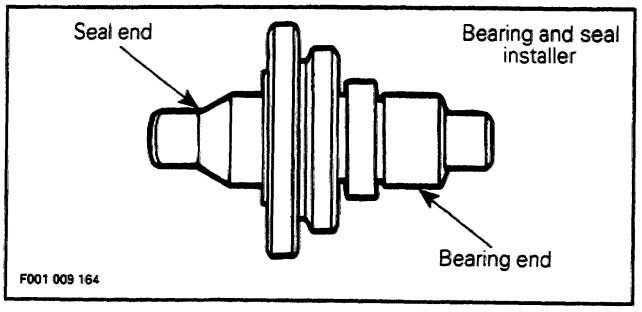
Manually engage ring in housing making sure it is equally inserted all around. Place wood piece over ring. Using a hammer, strike on wood to push ring. Strike one side then rotate wood piece about 90° and strike again. Frequently rotate wood piece so that ring slides equally all around until it seats into bottom of housing.



3,4, Seal and Needle Bearing

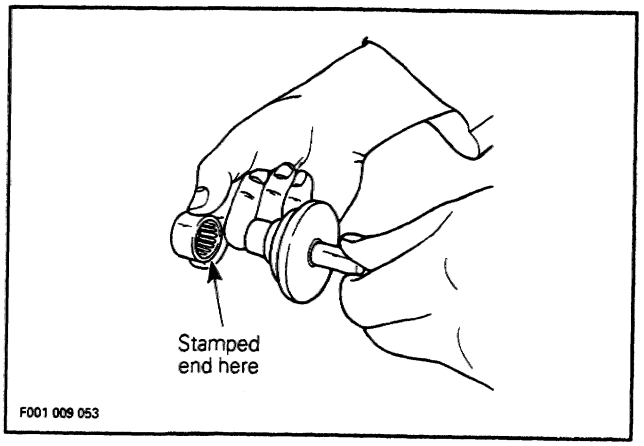
Bearings will be properly installed in housing using bearing installer tool (P / N 295 000 014) or use special tool (P / N 295 000 107) to install properly bearings and seal.



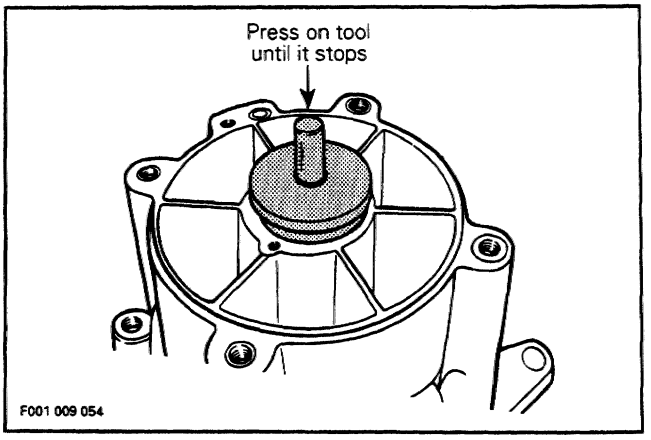


Stamped end of bearings (showing identification markings) must be located toward outside of housing.

Properly insert bearing on tool. Using an arbor press only, push tool until tool flange contacts housing. Proceed the same way for both bearings.

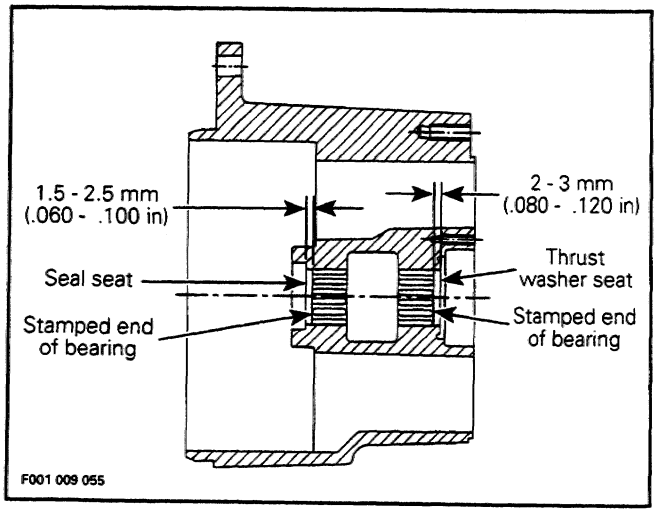


CAUTION : Never hammer the bearing into its housing.



CAUTION : These tool have been designed to properly position bearings and seal, thus providing space for lubrication purposes. The tool flanges allow this. If a different pusher type is being used, components must be properly positioned as follows.

Bearing on impeller side must be 1.5 to 2.5 mm (.060 - .100 in) inside reservoir measured from seal seat. Bearing on venturi side must be 2 to 3 mm (.080 - .120 in) inside reservoir measured from thrust washer seat. Refer to following illustration.



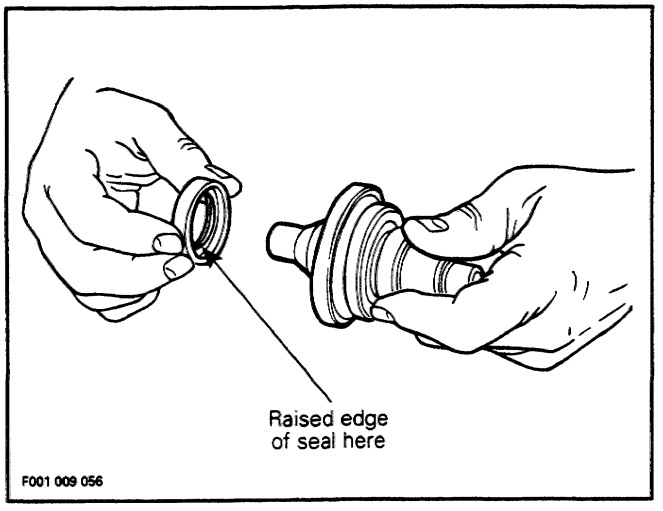
The special tool (P / N 295 000 107) will be used to install seal in housing.

Seal must be installed so that lips raised edges are toward outside of housing (toward impeller).

Apply Loctite 515 (P / N 293 800 007) in seal housing, all around outer diameter and on seal seat.

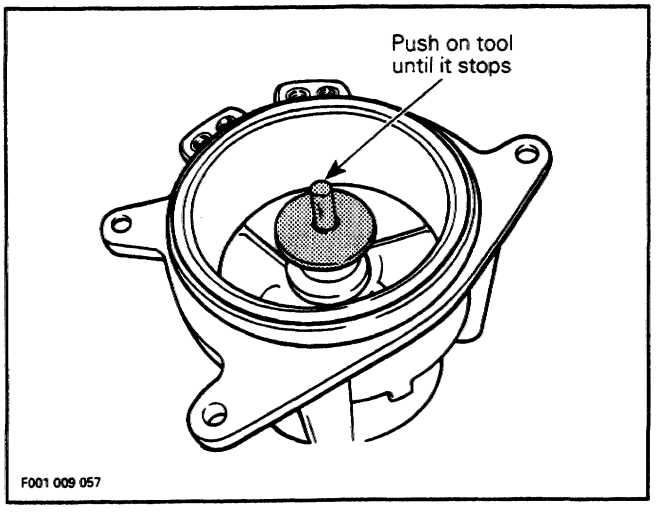
Properly insert seal on tool.

NOTE : Be careful when installing seals to pack seal with grease before inserting bearing / seal installer tool. Properly insert tool in seal with a rotating movement.

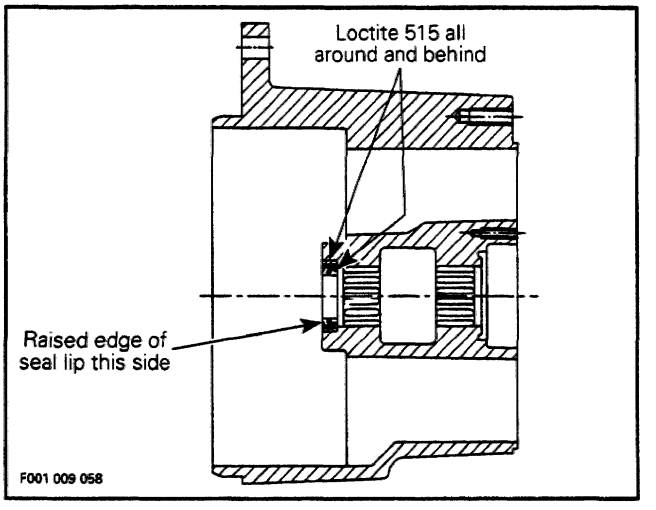


CAUTION : Take care that no sealant contacts any roller of bearing.

Push on tool end with a press until tool flange contacts housing.



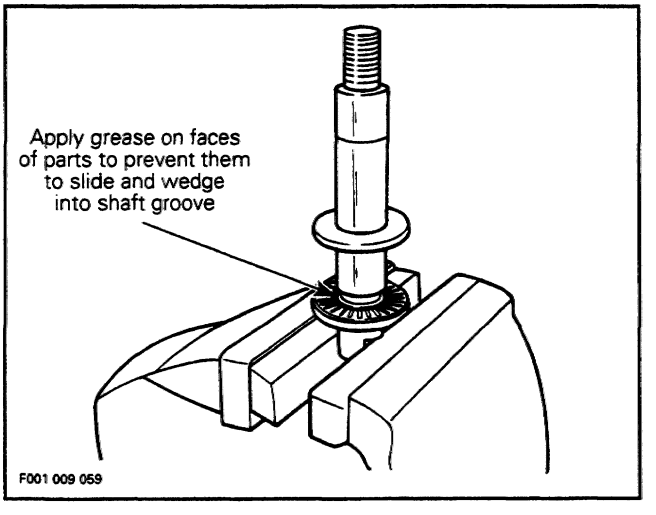
Apply synthetic grease (P / N 293 550 010) between seal lips.



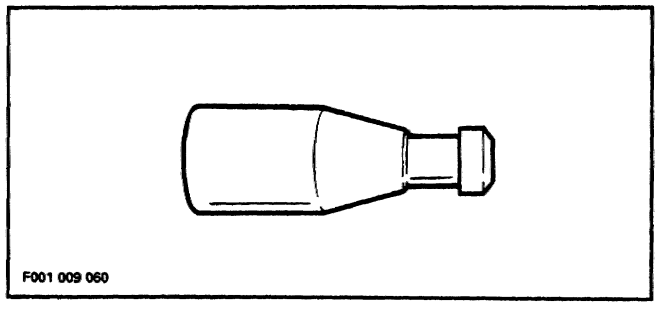
7,8,9,10,26, Impeller Housing, Thrust Washer, Thrust Bearing, Impeller Shaft and Impeller

Insert impeller shaft flats in a vise so that shaft is vertical.

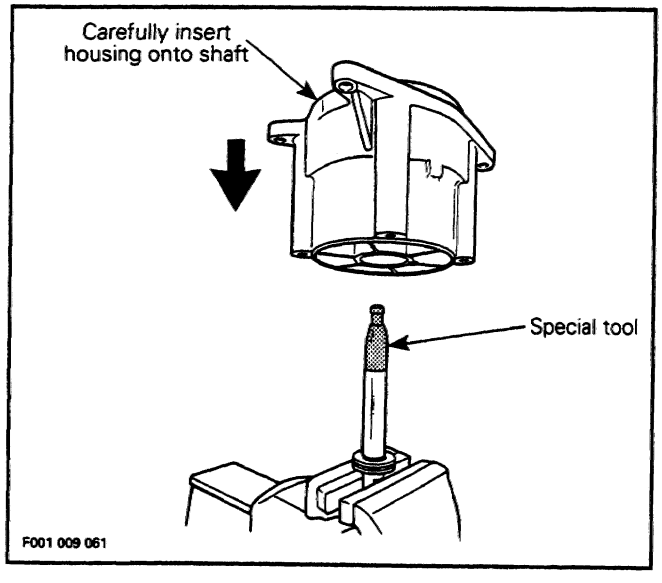
Apply synthetic grease (P / N 293 550 010) on both sides of thrust bearing then insert onto shaft followed by thrust washer. Make sure bearing is leaning against shaft flange and washer is properly centered. Grease will prevent parts from sliding at installation and thus possibly wedging thrust bearing into shaft groove.



To prevent seal lip damage when inserting impeller shaft, use impeller shaft guide (P / N 295 000 002).


F001 009 060

Insert tool onto shaft end then carefully slide housing over shaft.



F001 009 061

Remove special tool.

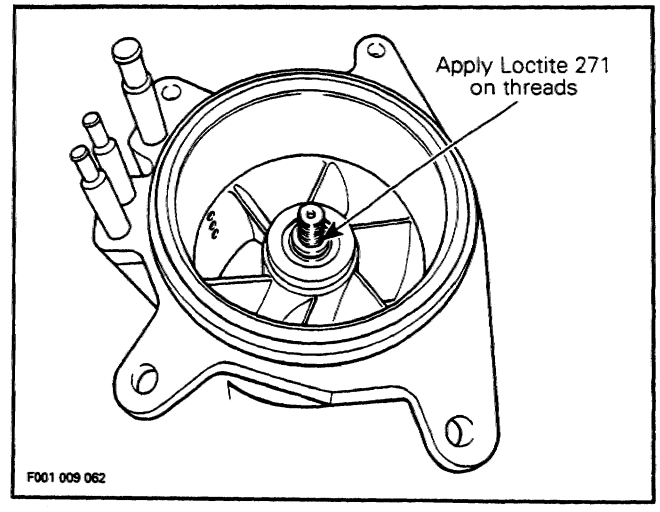
Brush and clean impeller shaft threads and impeller splines with Loctite Safety solvent 755 (P / N 293 800 019) or equivalent. Free threads and splines from any residue. Allow solvent to dry thoroughly.

CAUTION : Be careful not to damage impeller shaft diameter.

Apply Loctite primer N (P / N 293 600 012) on impeller shaft threads. Allow to dry for two minutes.

NOTE : Loctite primer is used to reduce Loctite 271 curing time and to activate stainless steel and aluminum surfaces for better bonding action. If applied, complete curing time is 6 hours, if not, 24 hours is needed.

Apply Loctite 271 red (P / N 293 800 005) to shaft threads.



F001 009 062

CAUTION : Make sure thrust washer and bearing have not slipped in shaft groove.

Using two screws previously removed from venturi, secure impeller shaft holder (P / N 295 000 082) to housing. Install shaft holder in a vice.

NOTE : Pump pressurization should be performed at this time. If it leaks, it is easier to determine where. Refer to **pump pressurization** further in this section.

To ease impeller installation, apply liquid soap or Sea-Doo lube (P / N 293 600 006) on wear ring.

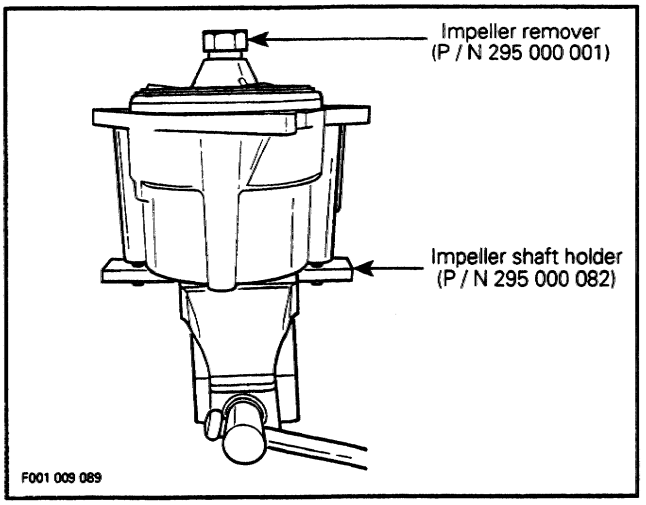
Insert impeller into wear ring. Manually rotate impeller and push so that it slides on impeller shaft threads. Carefully engage threads making sure they are well aligned.

Install impeller remover (P / N 295 000 001) into impeller splines and tighten.

CAUTION : Make sure thrust washer and bearing are not wedged in shaft groove. To check, manually pull and push impeller housing, an axial play must be felt.

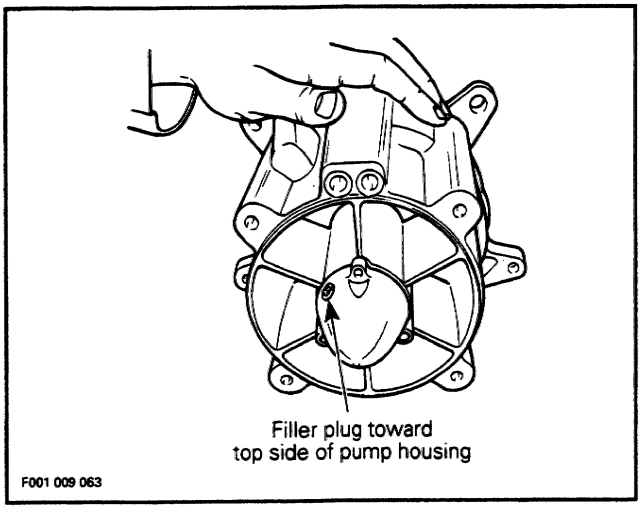
Torque impeller to 70 N•m (52 lbf•ft) then remove tools.

CAUTION : Never use any impact wrench to tighten impeller.



11,13,18, O-ring, Housing Cover, Loctite 515

Apply Loctite 515 (P / N 293 800 007) on O-ring and install on housing cover then carefully insert cover on impeller housing making sure to properly position plug on top side.



Apply Loctite 242 (blue) (P / N 293 800 015) on screw threads and evenly tighten cover screws. Torque to 7 N•m (62 lbf•**in**).

PUMP PRESSURIZATION

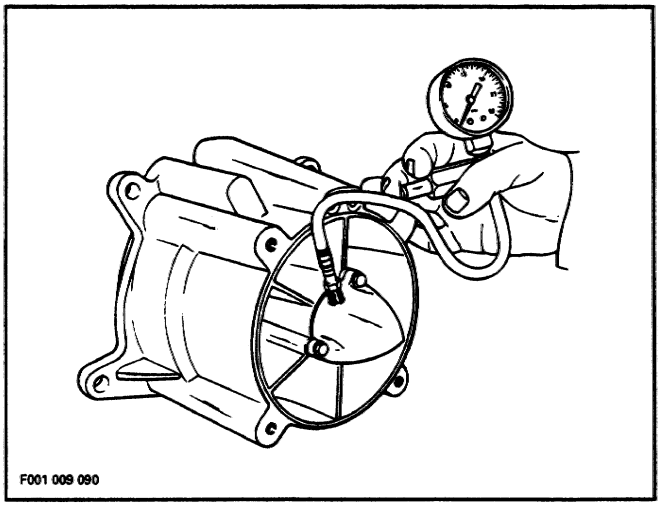
Whenever doing any type of repair on the pump, pressure test should be done to check for any leakage.

Pressure Test

Proceed as follows :

- Remove plug from housing cover. Drain oil.
- Apply Loctite PST 592 (P / N 293 800 018) on threads fitting (P / N 295 000 086) then secure on cover.
- Connect pump gauge tester (P / N 295 000 083) to fitting.
- Pressurize pump to a maximum of 70 kPa (10 PSI).

Pump must maintain this pressure for 10 minutes.



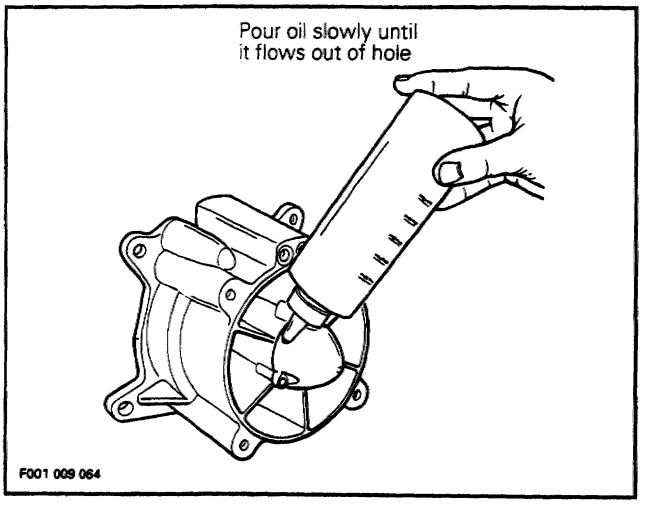
▼ **CAUTION : Repair any leak, failure to correct a leak will lead to premature wear of pump components.**

If there is a pressure drop spray soapy water around housing cover. If there are no bubbles, impeller shaft, impeller shaft seal, or impeller housing is leaking through porosity and has to be replaced. Jet pump unit has to be overhauled.

Place housing horizontally as in its operating position so that fitting in cover is located in top. Remove fitting from cover. Pour SEA-DOO JET PUMP SYNTHETIC OIL (P / N 293 600 011) in reservoir until oil comes level with bottom of hole. Let oil penetrates in housing and after a few minutes pour oil again until it is level with bottom of hole. Oil capacity is 65 mL (2.2 oz).

▼ **CAUTION : This is a synthetic oil. Do not mix with mineral based oil. Do not mix oil brands.**

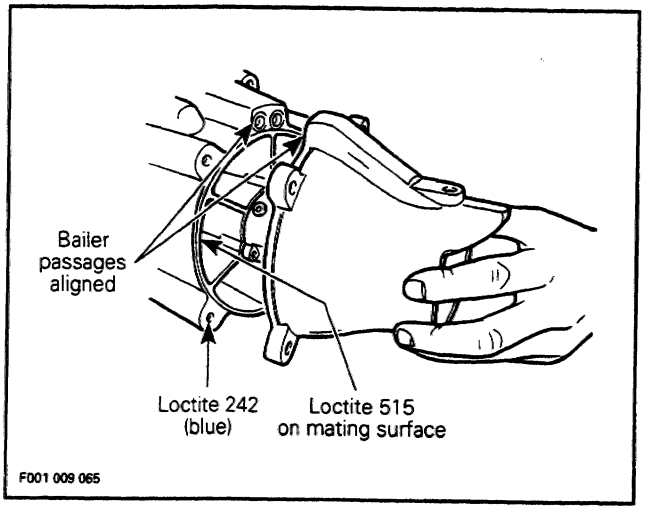
○ NOTE : When filling, oil must be poured into cover quite slowly to allow complete housing fill.



Apply Loctite PST 592 (P / N 293 800 018) on plug threads then secure it on cover.

17,20,35, Venturi, Screw and O-ring

Install new O-rings around bailer passages. Position venturi with bailer passages on top. Apply Loctite 515 Gasket Eliminator (P / N 293 800 007) on mating surface. Apply Loctite 242 (blue) (P / N 293 800 015) on threads and install screws and washers then torque to 25 N•m (18 lbf•ft) in a criss-cross sequence.



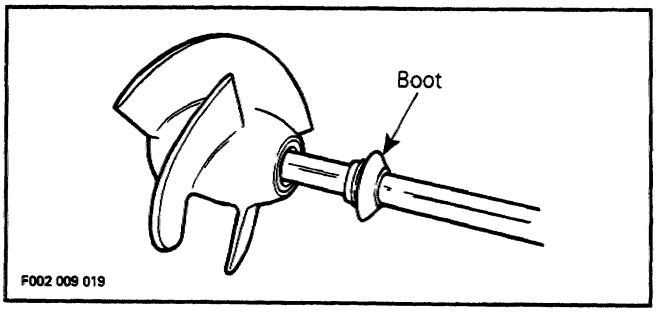
NOTE : On aluminum material it is recommended to use Loctite primer N (P / N 293 600 012) to reduce curing time and to increase gap filling capability. Refer to manufacturer's instructions.

2,15, Fitting

Apply Loctite PST 592 (P / N 293 800 018) on plastic fitting threads. Then thread fittings into pump housing until threads are bottomed.

27, Boot

Slide a new boot on drive shaft. To ease installation, apply some liquid soap on outer circumference of boot.

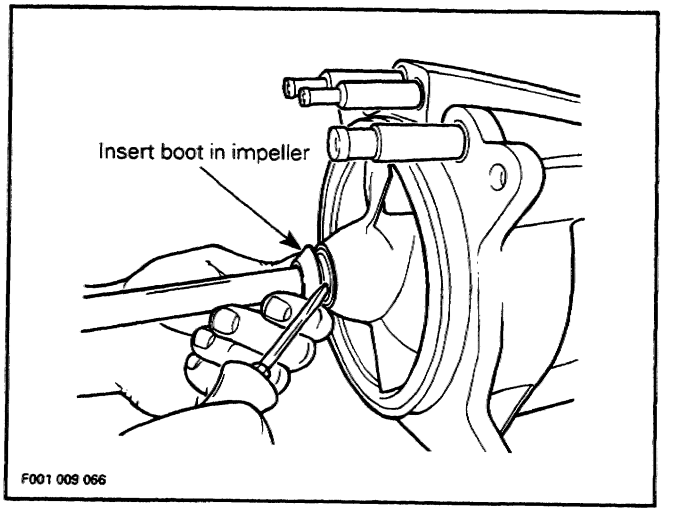


Clean drive shaft splines with Loctite solvent 755 (P / N 293 800 019). Free splines from any residue. Allow solvent to dry thoroughly.

Generously apply synthetic grease (P / N 293 550 010) on drive shaft splines and impeller splines.

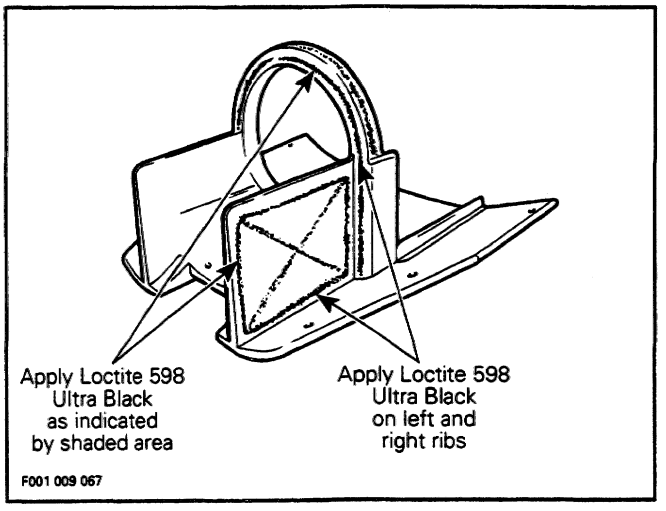
Make sure rubber damper is on drive shaft end.

Insert drive shaft in impeller then carefully insert boot in impeller. Use screwdriver blade to push on boot.



37,38,39,40,41, Ride Shoe, Screw and Grill

Apply Loctite 598 Ultra Black (P / N 293 800 030) or (P / N 293 800 028) on ride shoe as shown in the following illustration.



Carefully install ride shoe on hull. Apply Loctite 242 (blue) (P / N 293 800 015) on screw threads, install and tighten in a criss-cross sequence. Torque to 10 N•m (88 lbf•**in**).

From inside of bilge, apply Loctite 732 RTV Silicone (P / N 293 800 006) on end of screws to completely seal hull.

Apply Loctite 242 (blue) (P / N 293 800 015) on grill screw threads, install and tighten. Torque screws to 8 N•m (71 lbf•**in**).

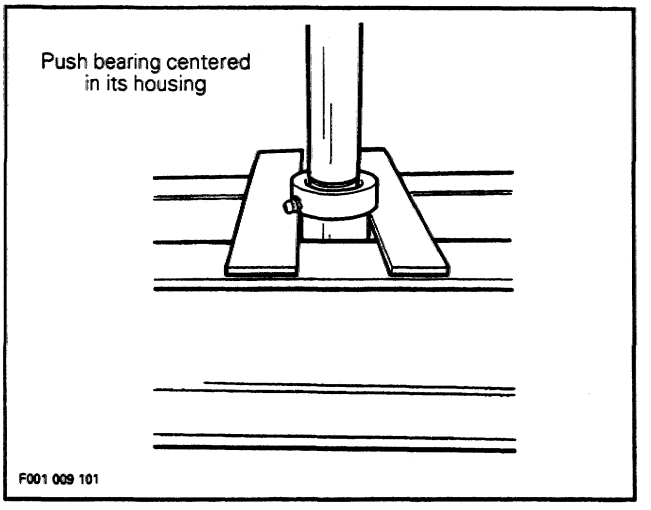
50,51, Seal Carrier and Needle Bearing

Properly support seal carrier when installing seals and bearing.

▼ **CAUTION : Ensure to install stamped end of bearing (showing identification markings) first on pusher. Bearing damage will occur if not done properly.**

Push bearing with same pusher used at disassembly. Center bearing in longitudinal axis of housing.

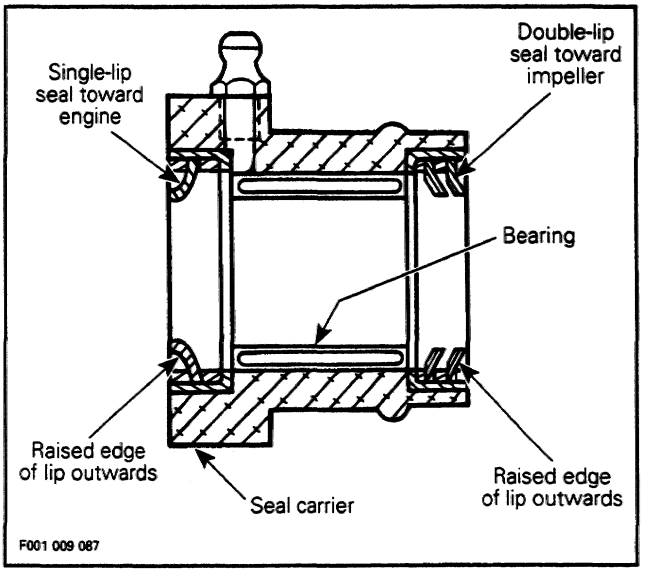
▼ **CAUTION : Never hammer the bearing into its housing.**



49,50,52, Seal and Seal Carrier

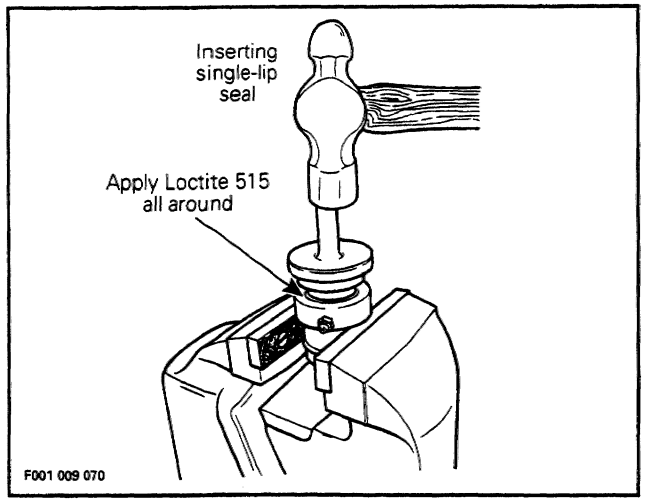
Install double-lip seal toward impeller side and single lip seal toward engine side.

On both seals, raised edge of lip must be located outwards of seal carrier.



Apply Loctite 515 (P / N 293 800 007) all around seals outside diameter.

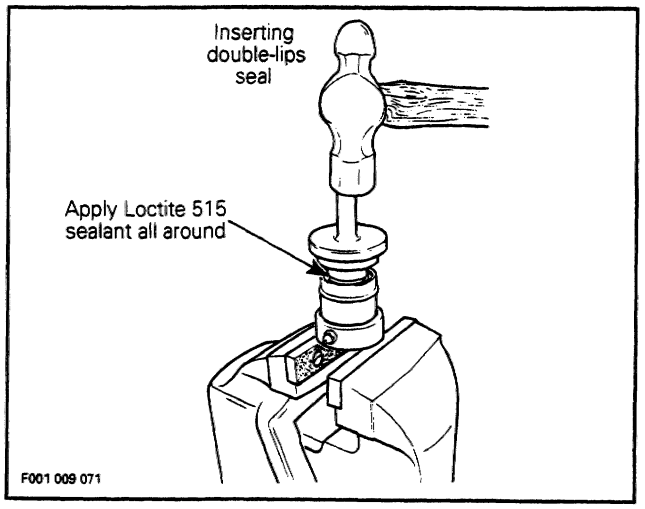
Single-lip seal can be carefully inserted, using a suitable pusher to avoid seal damage. Push seal until it comes flush with its housing.



It is recommended to use a suitable pusher to avoid lip damage on double-lip seal.

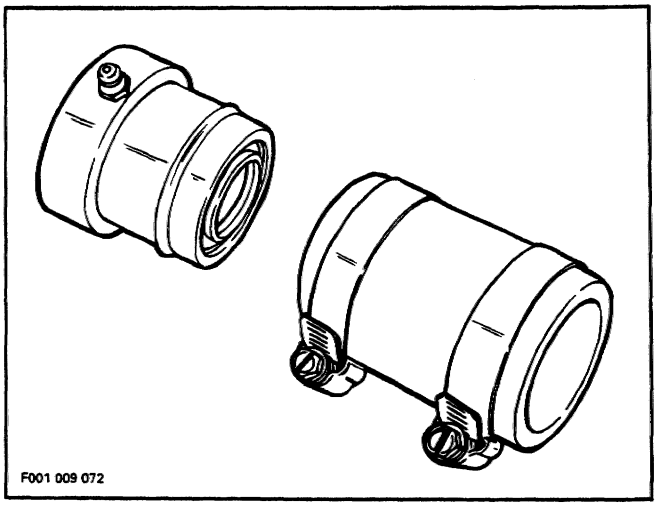
Push seal until it comes flush with its housing.

NOTE : Always install seal with its protector facing the impeller.



Pack seals and bearing with synthetic grease (P / N 293 550 010).

Install seal carrier and protective hose to hull insert with gear clamps.



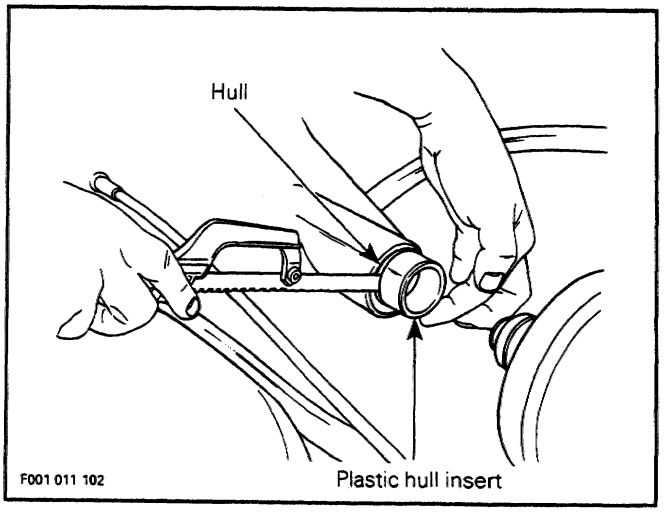
NOTE : Seal carrier gear clamps should not be tightened until jet pump is installed, to insure perfect alignment.

INSTALLATION

65, Hull Insert

For hull insert repair proceed as follows:

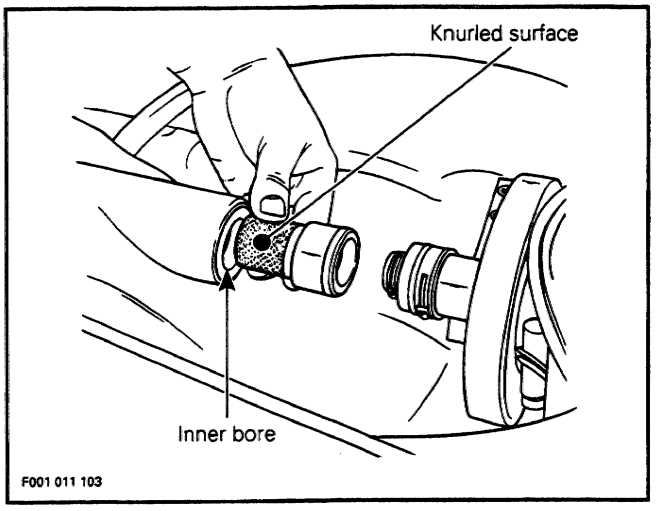
Cut plastic hull insert flush with hull using a saw.



Mix epoxy glue (3M-05900), follow manufacturer instructions.

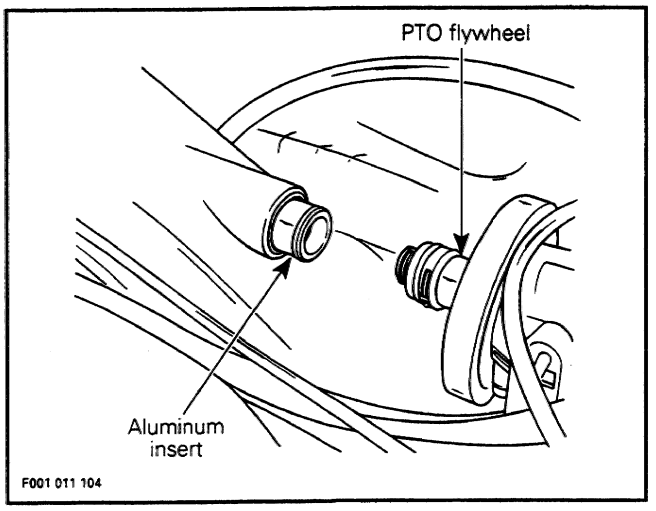
Apply epoxy glue on aluminum insert (P / N 292 000 075) knurled surface and on plastic insert inner bore.

▼ CAUTION : A clearance between plastic insert and aluminum insert could possibly be noticed. If so, ensure to fill gap with epoxy glue to obtain aluminum insert adhesion.



Install insert into plastic hull insert.

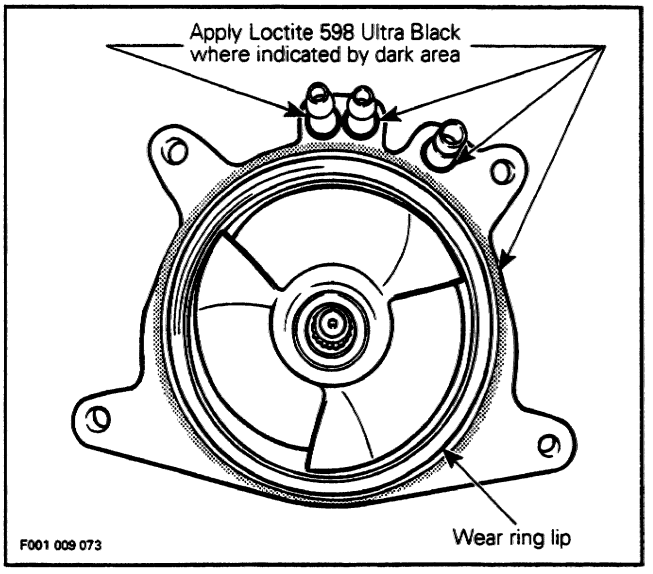
○ NOTE : Align aluminum insert as much as possible with PTO flywheel.



○ NOTE : The epoxy glue curing time is 30 minutes.

Pump Unit

Apply Loctite 598 Ultra black (P / N 293 800 030) or (P / N 293 800 028) on pump as shown in the following illustration.



Make sure rubber damper is on drive shaft end.

▼ CAUTION : Some watercraft have a shim between hull and pump, if shim has been removed ensure to reinstall it. If not install, engine and jet pump alignment will be altered.

Put a piece of tape over drive shaft splines to prevent damage to seal carrier seals.

Insert drive shaft end through hull tunnel. Slide through seal carrier being careful not to damage seals. Push on pump until shaft comes close to PTO flywheel.

▼ CAUTION : When sliding the drive shaft through seal carrier, the double lip seal could be folded over. This could cause a seal carrier bearing failure.

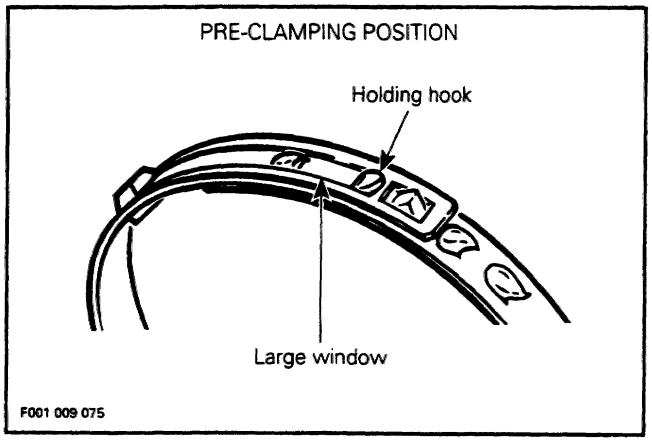
Remove tape from drive shaft splines. Generously apply synthetic grease (P / N 293 550 010) on drive shaft splines and PTO flywheel splines.

While holding pump, guide and engage shaft splines in PTO flywheel. Rotate shaft to properly index splines. Make sure boot is well positioned over shaft end.

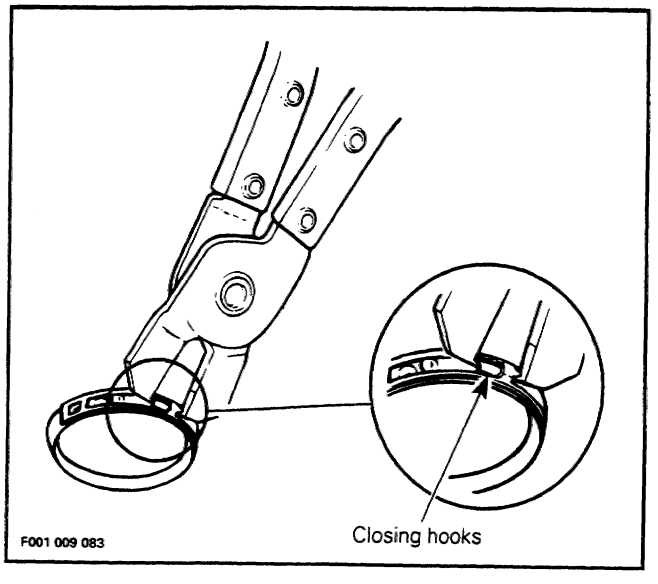
If necessary, tap pump end with a rubber hammer until retaining nuts and washers can be installed. Apply Loctite 242 (blue) (P / N 293 800 015) on threads and equally tighten nuts in a criss-cross sequence and torque to 35 N•m (26 lbf•ft).

Secure boot clamp as follows :

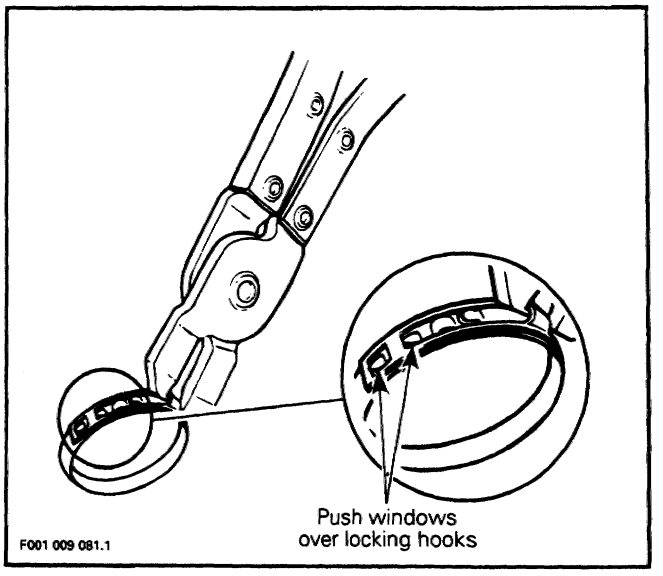
- Use pliers (P / N 295 000 069) as for removal.
- Manually engage holding hook in large window. This is a pre-clamping position only.



- Insert pointed tips of pliers first in closing hooks.

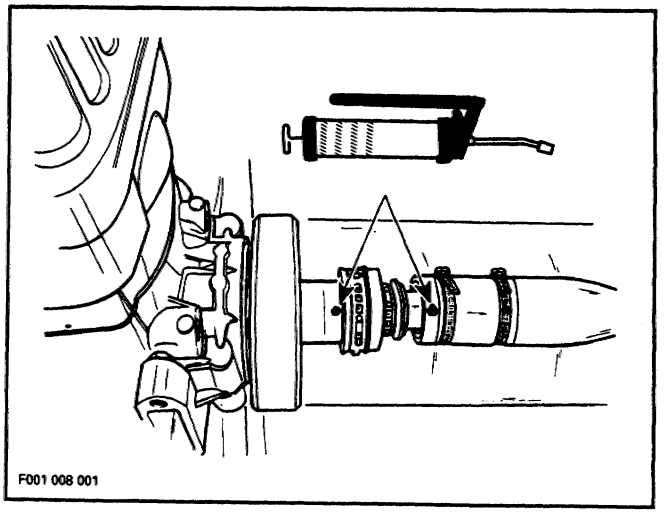


- Squeeze pliers. When both large and small windows are directly over the two locking hooks, press those windows down to engage hooks in windows.



Using a grease gun, carefully lubricate, with synthetic grease (P / N 293 550 010), at grease fitting until boot is just beginning to expand. From this point, immediately stop.

Secure seal carrier protective hose to hull insert with gear clamps. Lubricate at seal carrier grease fitting until grease is just coming out on engine side. From this point immediately stop.



Secure flywheel guard to engine studs with washers and wing nuts.

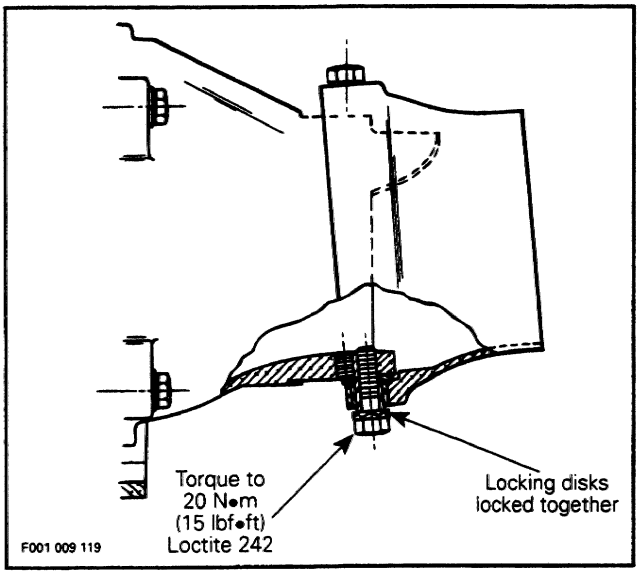
Secure coolant inlet hose and both bailer tubes to impeller housing.

Reinstall air vent tube support onto body (XP model (5852)).

21,22,23,24, Screw, Sleeve, Bushing and Nozzle

Insert bushings in nozzle, positioning their flanges from inside of nozzle. Apply SEA-DOO LUBE (P / N 293 600 006) on outer circumference of sleeve then insert in nylon bushings.

Install nozzle on venturi, position its steering arm on RH side. Apply Loctite 242 (blue) on threads. Install screws position bottom screw in one of the holes with **locking disks** (if applicable) then torque to 20 N•m (15 lbf•ft).



◆ **WARNING : Whenever removing screw always renew both locking disks. The recommended Loctite must be applied on screw threads and screw must be torqued as specified.**

Reinstall steering cable ball joint on nozzle and check handlebar / nozzle alignment.

Manually turn nozzle from side to side ; it must pivot easily.

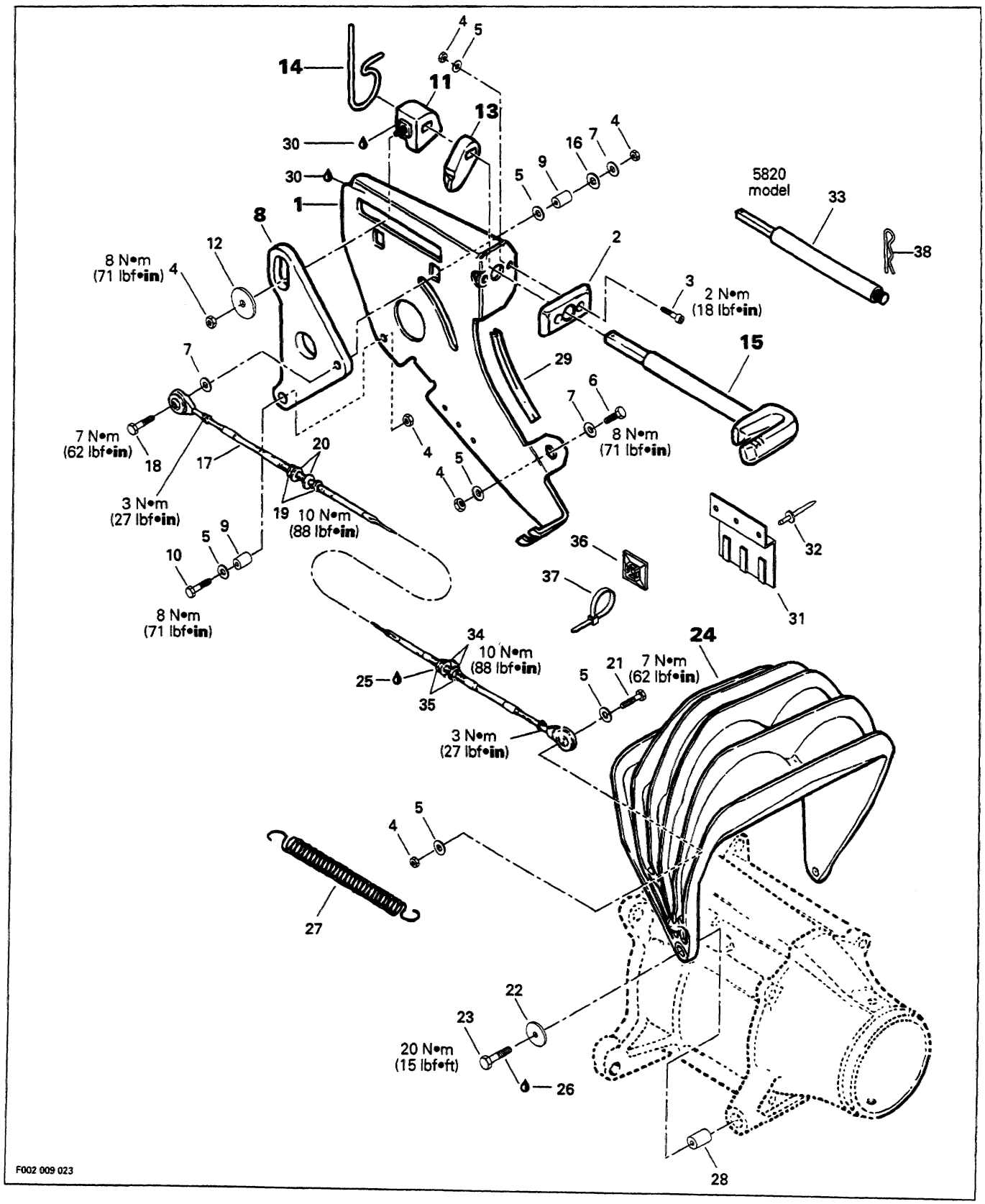
○ NOTE : To ease steering operation, inside of nylon bushings can be slightly enlarged with a 13 mm (1/2 in) round file (rat tail type).

Slightly lubricate wear ring with SEA-DOO LUBE (P / N 293 600 006) before starting to minimize friction during initial start.

To allow impeller adjustment into wear ring, start engine to let impeller rotate for a few seconds.

▼ **CAUTION : Water must be supplied to cool engine with coupler hose (P / N 295 500 099).**

REVERSE SYSTEM



COMPONENTS

1. *Reverse support plate*
2. *Guide plate*
3. *Allen screw M6 x 20 (2)*
4. *Elastic stop nut M6 (7)*
5. *Flat washer M6 (6)*
6. *Hexagonal head screw M6 x 20*
7. *Flat washer M6 (3)*
8. *Triangular lever*
9. *Bushing (2)*
10. *Hexagonal head screw M6 x 25*
11. *Sliding block*
12. *Flat washer M6*
13. *Locking lever*
14. *Spring*
15. *Reverse handle*
16. *Plastic washer M10*
17. *Reverse cable*
18. *Hexagonal head screw M6 x 40*
19. *Adjustment nut (2)*
20. *Washer (2)*
21. *Hexagonal head screw M6 x 45*
22. *Flat washer M8 (2)*
23. *Hexagonal head screw M8 x 35 (2)*
24. *Reverse gate*
25. *Loctite 598 Ultra Black*
26. *Loctite 242*
27. *Reverse gate spring (2)*
28. *Sleeve (2)*
29. *Protector*
30. *Synthetic grease*
31. *Wiring harness support*
32. *Rivet 1/8 (2)*
33. *Reverse shaft (5820 model)*
34. *Jam nut 7/16 (2)*
35. *Washer 7/16 (2)*
36. *Tie mount*
37. *Tie rap*
38. *Wave pin (5820 model)*

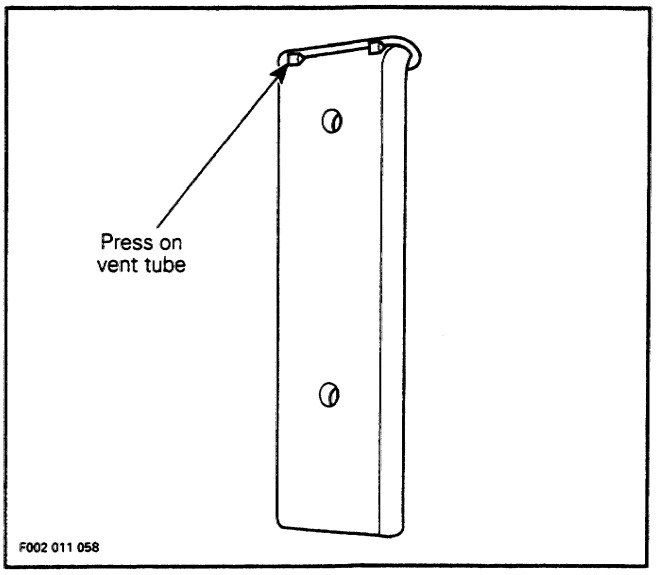
GENERAL

It is not necessary to remove reverse system from watercraft for servicing. However reverse system removal is necessary to replace reverse support plate.

DISASSEMBLY

Remove storage basket from watercraft.

Press on vent tube upper part to enable to withdraw tube from body.



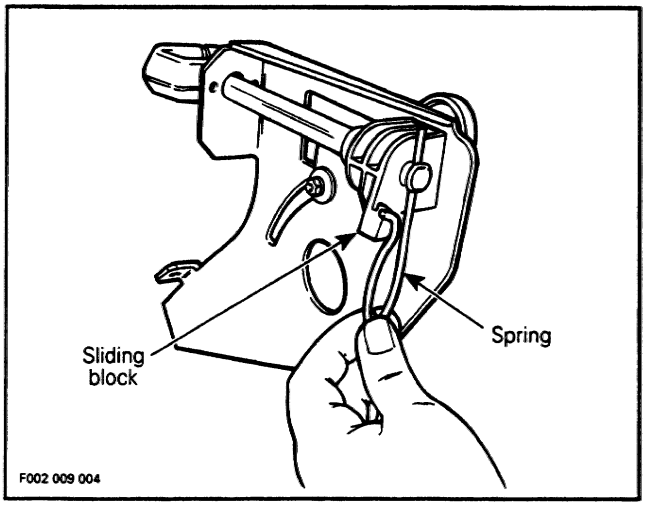
◆ **WARNING : Vent tube must be in place to provide proper bilge ventilation.**

13,14,15, Locking Lever, Spring and Reverse Handle

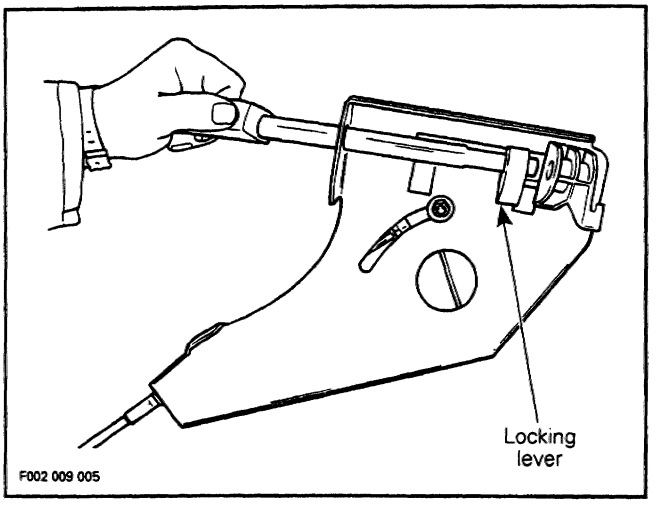
To remove reverse handle, unhook spring from sliding block and pull spring from reverse handle stem.

NOTE : For the Explorer model (5820) remove wave pin from reverse shaft and rotate reverse handle clockwise to remove it.

NOTE : In order to have access to the following items on the Explorer model (5820), console and ventilation plate must be removed.



Withdraw reverse handle stem and locking lever from sliding block, then slide off locking lever from stem.

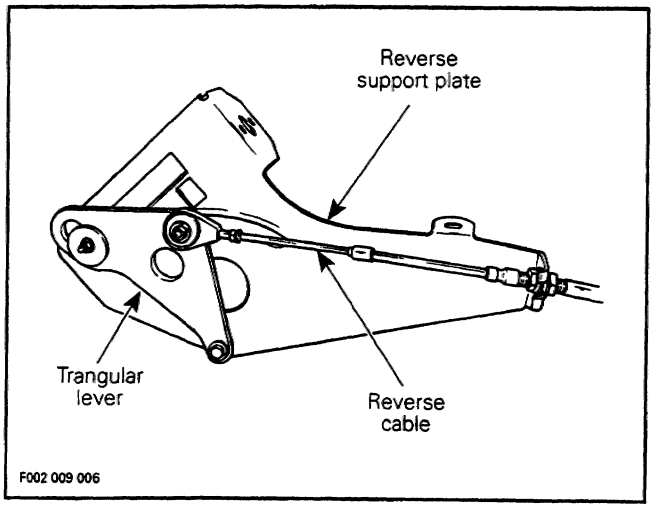


8,11, Triangular Lever and Sliding Block

Remove screw, lock nut, washers and bushing holding reverse cable to triangular lever.

Remove lock nut and washer holding sliding block to triangular lever and to support plate.

Remove screw, lock nut, washer and bushing holding triangular lever to reverse support plate.

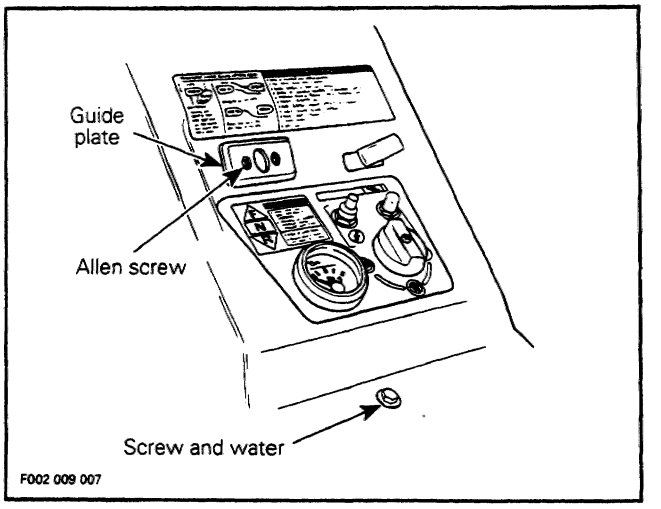


1, Reverse Support Plate

In order to have access to screw holding lower part of reverse support plate, remove front seat by pulling on each side to release it from body.

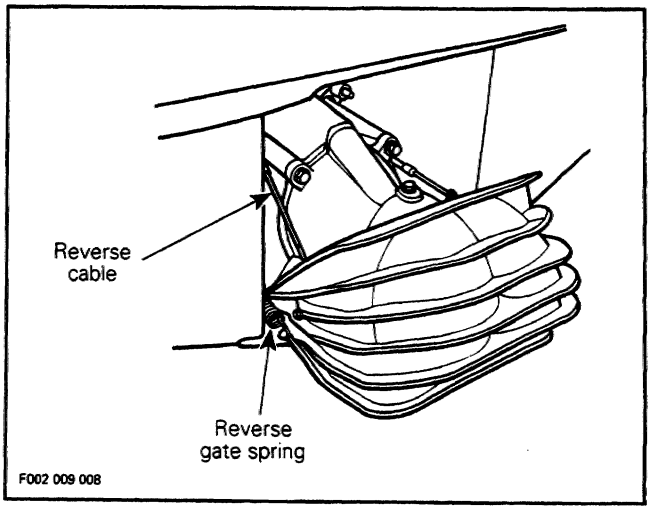
Remove screw, lock nut and washers holding support plate lower part.

Remove two Allen screws, lock nut and washer holding guide plate and support plate.

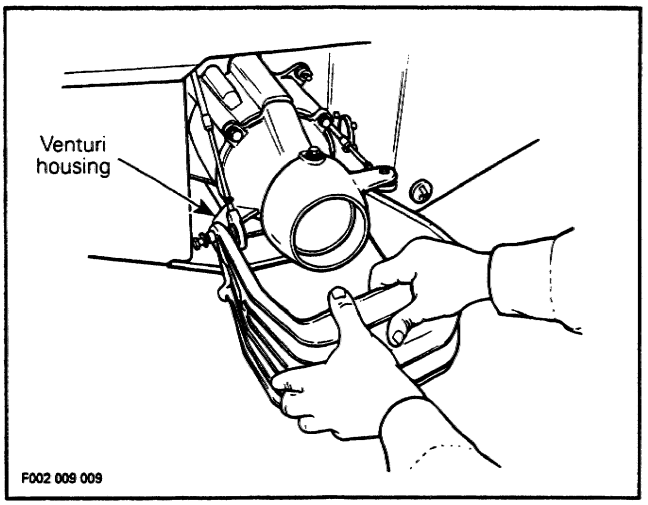


24, Reverse Gate

Unhook reverse gate springs and remove reverse cable from left side of reverse gate.



Unscrew reverse gate retaining screws from venturi housing, then remove gate.



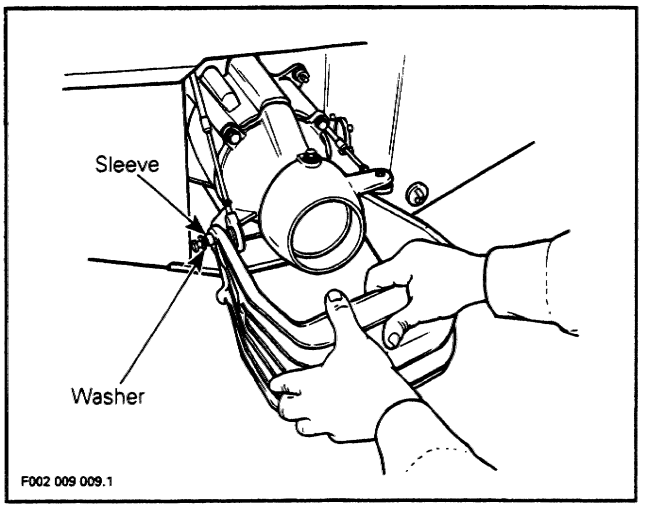
ASSEMBLY

Assembly is essentially the reverse of disassembly procedures. However pay particular attention to the following.

24, Reverse Gate

Install reverse gate with sleeve and washer. Apply Loctite 242 (P / N 293 800 015) on threads and torque to 20 N•m (15 lbf•ft).

CAUTION : Always hook reverse gate springs in order to ease reverse gate operation.



1, Reverse Support Plate

For reverse support plate installation torque screw to 8 N•m (71 lbf•**in**) and Allen screws to 2 N•m (18 lbf•**in**).

8,11, Triangular Lever and Sliding Block

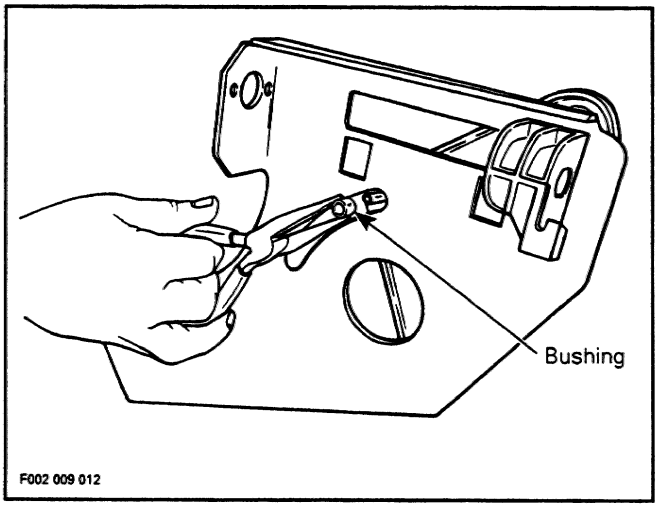
Insert bushing in triangular lever and then install lever to reverse support. Install reverse cable to triangular lever with bushing , plastic washer and flat washers.

NOTE : The plastic washer is installed to opposite side of reverse cable on support plate.

Torque cable screw to 7 N•m (62 lbf•**in**).

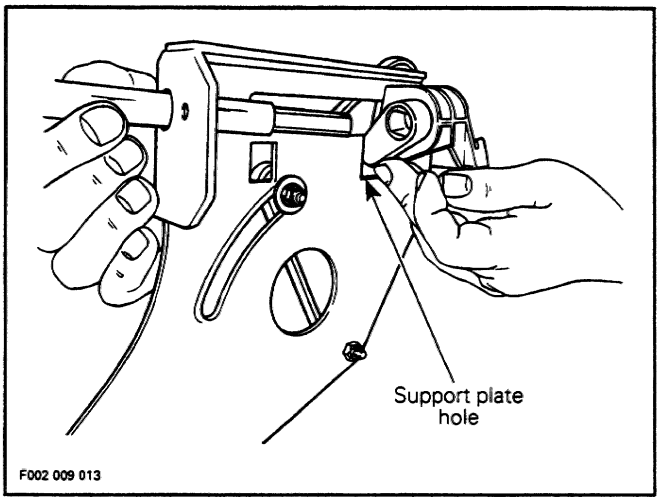
Torque triangular lever lower screw to 8 N•m (71 lbf•**in**).

Install sliding block to lever and torque nut to 8 N•m (71 lbf•**in**).

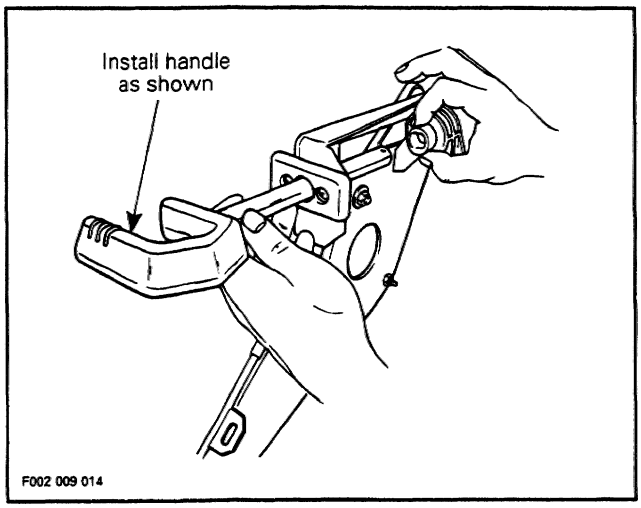


13,14,15, Locking Lever, Spring and Reverse Handle

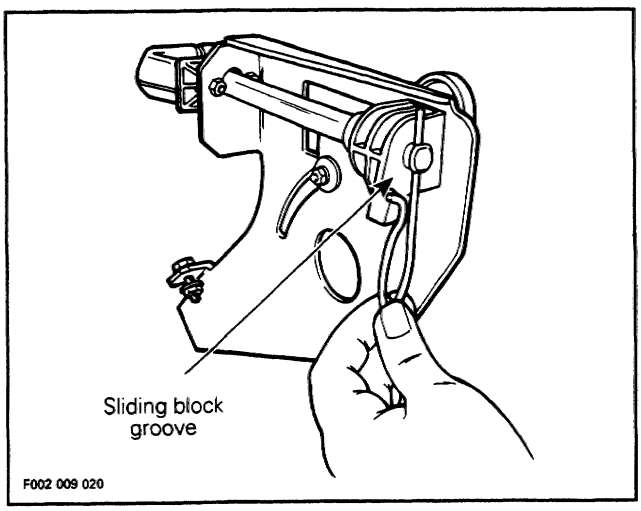
Insert locking lever end in support plate hole then align lever and sliding block holes.



NOTE : Always install reverse handle with its open end facing left side of watercraft, then push handle stem or reverse shaft (Explorer model (5820)) through lever and sliding block holes.



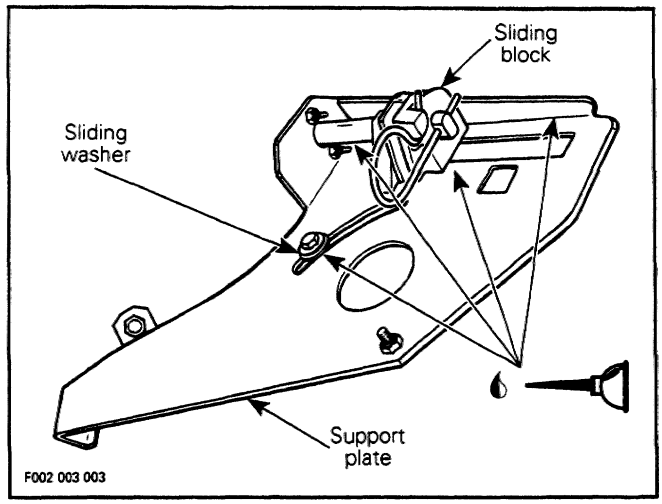
Insert spring in handle stem hole and then install curved end in sliding block groove.



NOTE : At reverse handle installation on the Explorer model (5820) rotate reverse handle counterclockwise and install wave pin to lock reverse shaft and reverse handle together.

Reverse Handle System Lubrication

Lubricate sliding block support plate sliding area and triangular lever with synthetic grease (P / N 293 550 013). Also lubricate sliding washer and reverse handle stem.

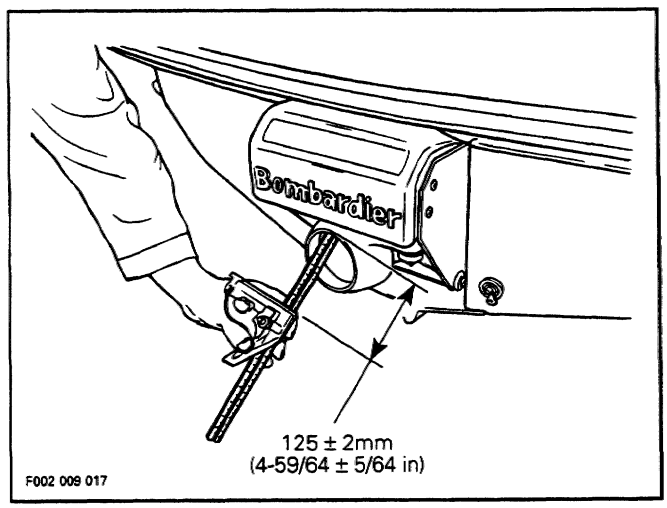


ADJUSTMENTS

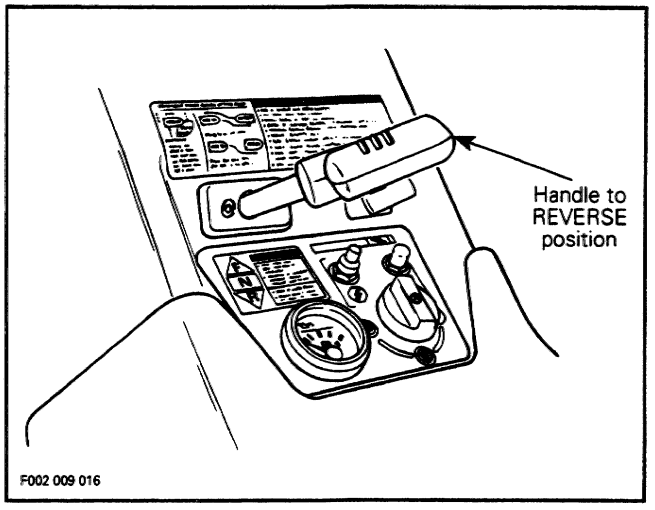
Reverse Gate

Position handlebar in a straight ahead position, nozzle should be parallel to rear of watercraft.

Using a square, set it to 125 ± 2 mm (4-59/64 ± 5/64 in), then position square end at the top middle of nozzle.

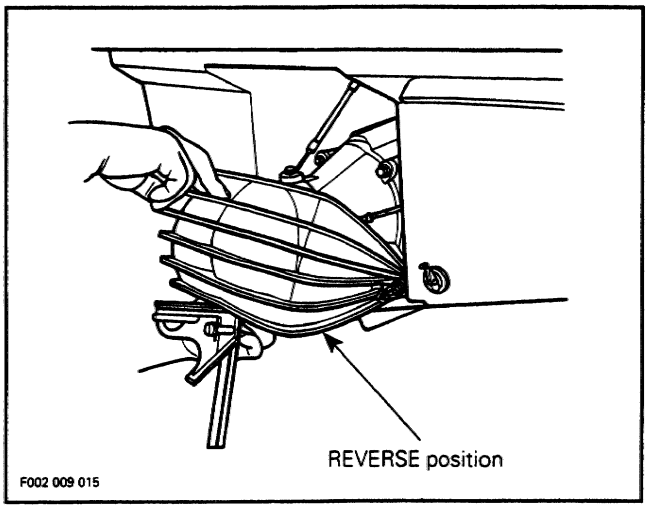


Pull reverse handle to REVERSE position.

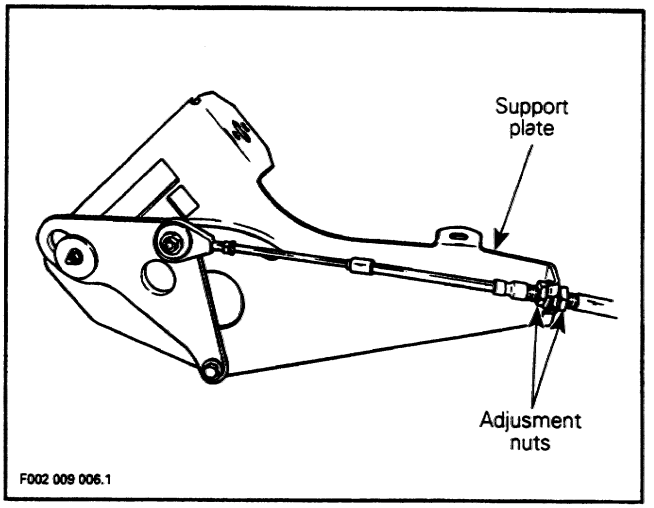


With the gate down to REVERSE position it should be at the specification.

NOTE : Push slightly on the gate in order to recover spring tension and to obtain proper position of the gate.



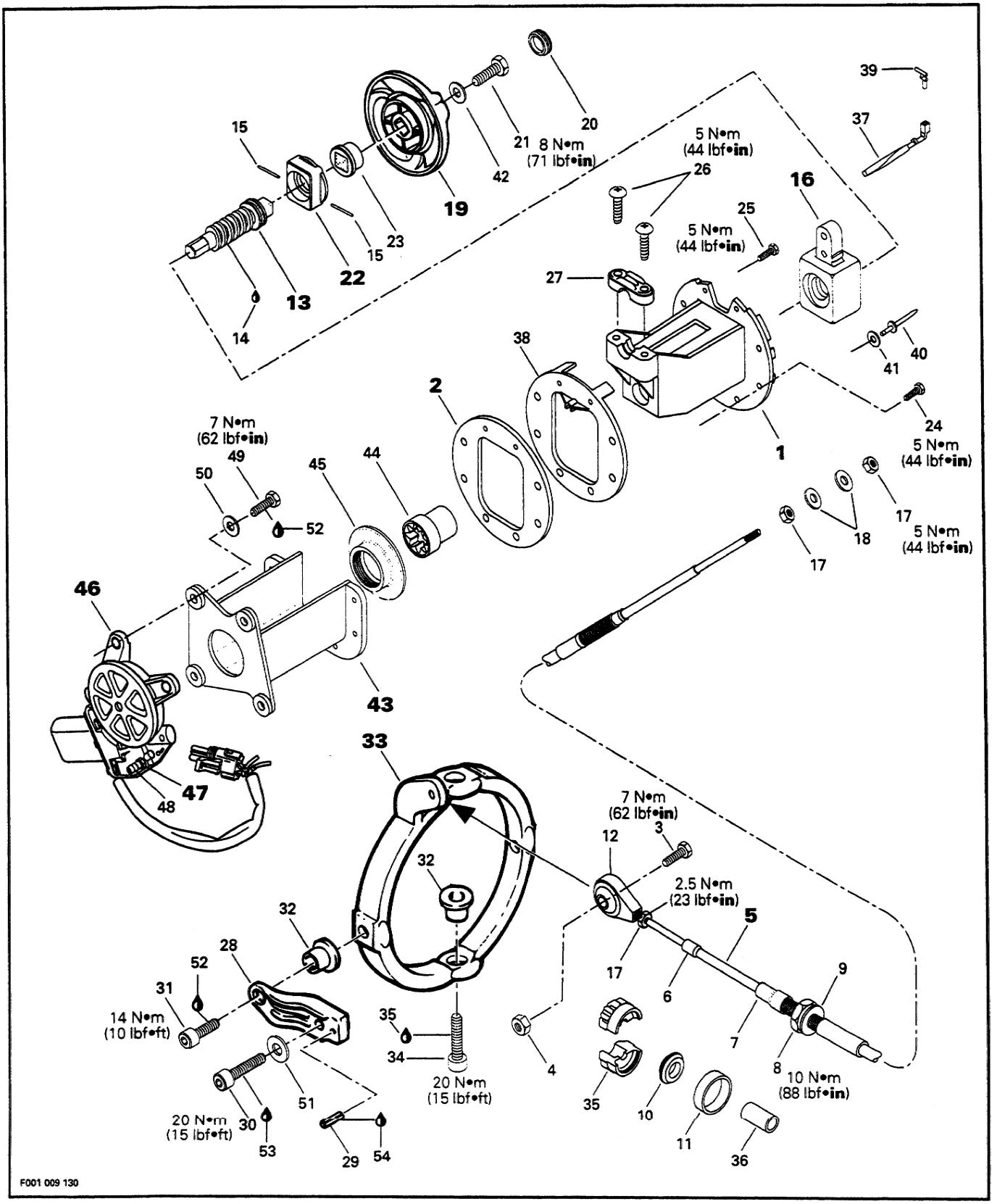
If reverse gate needs to be readjusted, it can be done at support plate with adjustment nuts. Turn cable nuts to obtain position.



Tighten adjustment nuts and recheck gate position.

NOTE : If reverse gate adjustment is not done adequately, performance and steering control will be reduced at reverse position.

VARIABLE TRIM SYSTEM



COMPONENTS

1. *Housing*
2. *Gasket*
3. *Hexagonal screw M6 x 30*
4. *Elastic stop nut M6*
5. *Trim cable*
6. *Small boot*
7. *Large boot*
8. *Jam nut*
9. *Washer*
10. *Rubber washer*
11. *Ring retainer*
12. *Ball joint*
13. *Worm*
14. *Synthetic grease*
15. *Retaining pin (2)*
16. *Sliding collar*
17. *Nut*
18. *Flat washer M5 (2)*
19. *Trimming knob*
20. *Snap cap*
21. *Hexagonal screw M6.3 x 35*
22. *Retaining block*
23. *Knob adaptor*
24. *Tapping screw (2)*
25. *Tapping screw (4)*
26. *Phillips screw (2)*
27. *Retaining plate*
28. *Arm (2)*
29. *Spring pin (2)*
30. *Allen screw M8 x 20 (2)*
31. *Allen screw M8 x 8 (2)*
32. *Plastic bushing (4)*
33. *Trimming ring*
34. *Allen screw M8 x 10 (2)*
35. *Half ring (2)*
36. *Spacer*
37. *Twisted rod*
38. *Spacer*
39. *Position indicator*
40. *Rivet (2)*
41. *Washer (2)*
42. *Washer*
43. *Motor support*
44. *Motor adaptor*
45. *Seal*
46. *Electric motor*
47. *Seal washer (not illustrated)*
48. *Fitting*
49. *Hexagonal screw M6 x 16 (4)*
50. *Lock washer M6 (4)*
51. *Washer M8 (2)*
52. *Loctite 242*
53. *Loctite 271*
54. *Loctite 609*

GENERAL

It is not necessary to remove variable trim system (VTS) from watercraft for servicing. However, variable trim system removal is necessary to replace either worm, sliding collar, housing gasket and housing.

DISASSEMBLY

In order to obtain an easy access to either trim cable or electric motor, remove storage basket from watercraft.

Disconnect battery.

◆ **WARNING : Battery black negative cable must always be disconnected first and connected last.**

Electric Motor

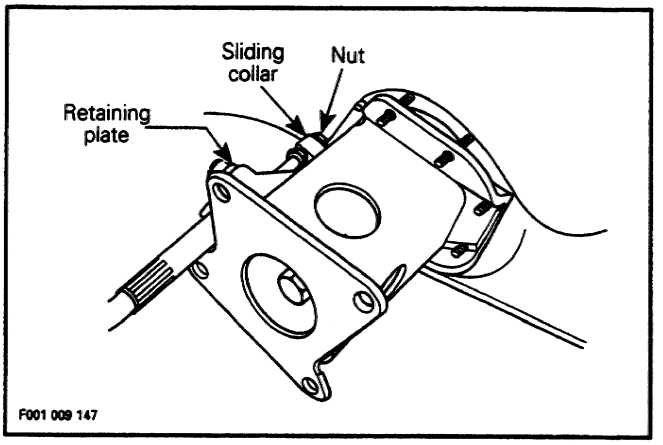
To replace motor, disconnect wiring harness and remove screws holding motor to motor support.

○ NOTE : At removal, the motor adaptor and its seal might come off.

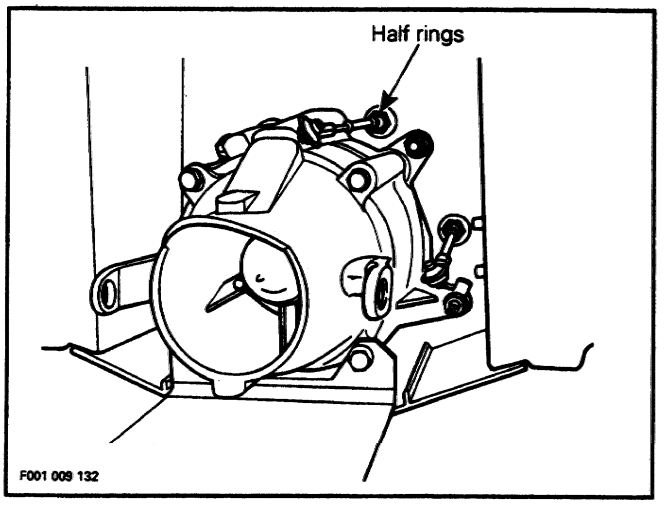
5, Trim Cable

To replace trim cable, remove nut from the end of cable at sliding collar. Untighten screws from retaining plate and slide off cable from housing.

○ NOTE : To ease cable removal and installation the motor should be removed.



Remove ball joint from trim ring then unscrew ball joint from cable. Remove half rings, ring retainer and rubber washer from cable at the outside of hull. Pull out cable from inside the hull.



1,2,19, Housing Ass'y, Gasket and Trimming Knob

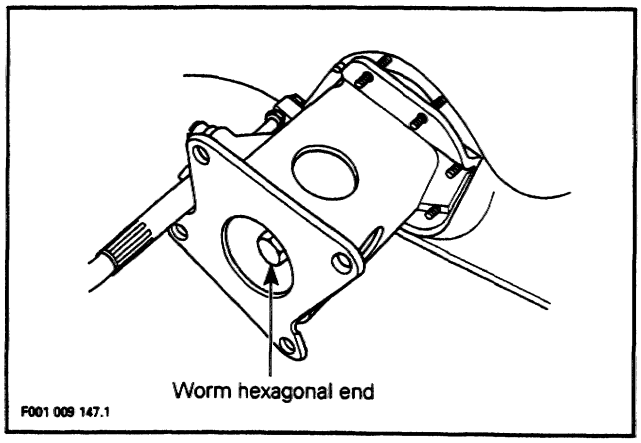
To remove housing assembly, remove motor and withdraw trim cable from sliding collar and from housing.

Remove snap cap from trimming knob center, remove screw then pull knob and remove knob adapter from worm.

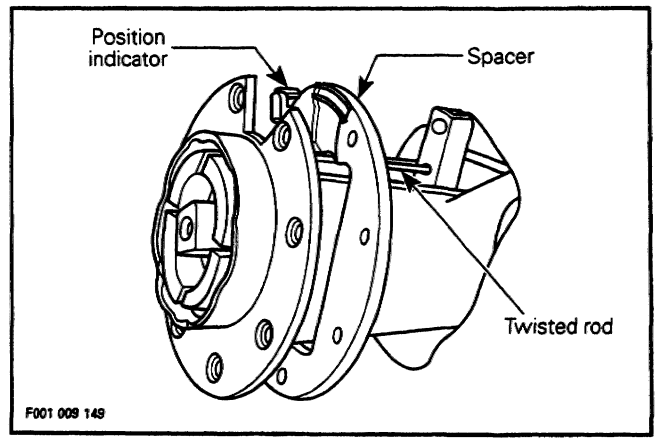
Drill rivets which hold housing to body, remove screws holding housing and motor support to body then pull out housing assembly from body.

NOTE : To withdraw housing assembly from body, the sliding collar must be moved towards motor end.

To move sliding collar, install a 13 mm (1/2 in) socket on worm hexagonal end.



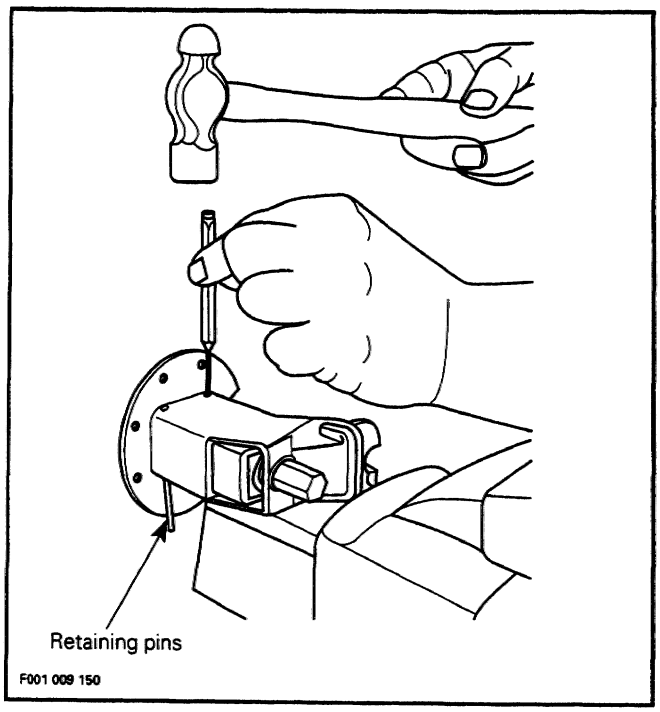
Remove position indicator from twisted rod end and slide off spacer from housing. Pull twisted rod from sliding collar.

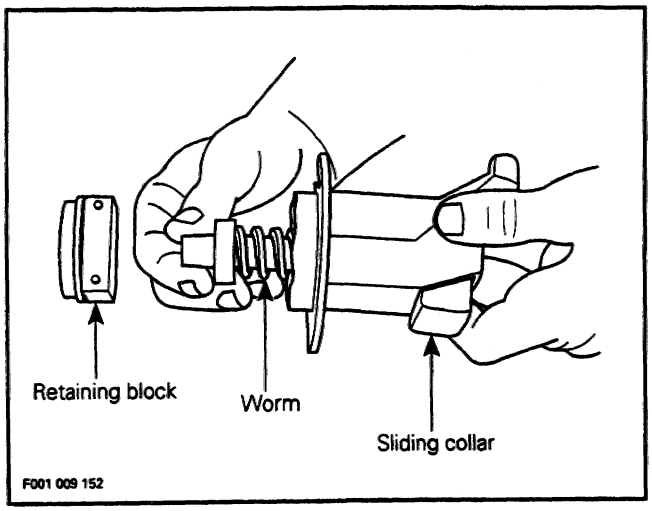


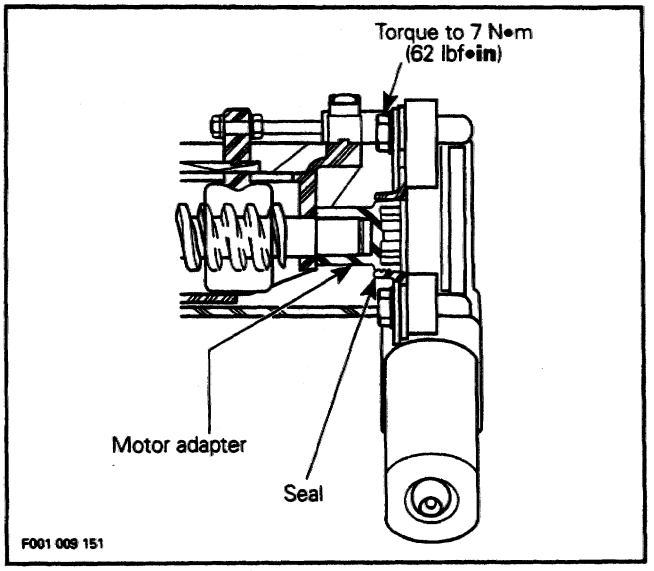
13,16, Retaining block, Worm and Sliding Collar

Remove retaining pins from retaining block and housing then remove retaining block.

Unscrew worm and remove sliding collar from housing.







ASSEMBLY

Assembly is essentially the reverse of disassembly procedures. However pay particular attention to the following.

13,16, Worm and Sliding Collar

Whenever replacing either worm or sliding collar, always lubricate worm with synthetic grease (P / N 293 550 010).

1, Housing Ass'y and Motor Support

At housing and motor support installation, position the long screws on motor support recess edge side. Torque all screws to 5 N•m (44 lbf•**in**).

Electric Motor

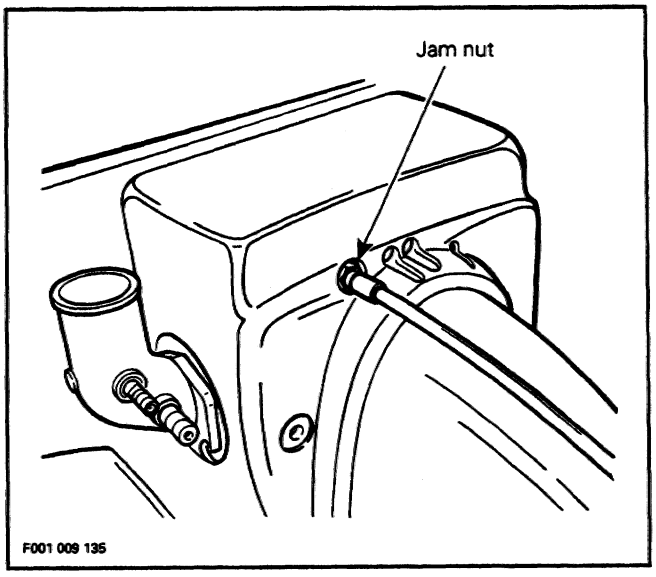
Install motor with the motor adapter, ensure to position seal on adapter to eliminate possible water intrusion in motor.

NOTE : Always lubricate adapter gear side with synthetic grease (P / N 295 550 010).

Apply Loctite 242 (P / N 293 800 015) on screw threads and install screws with lock washers and torque to 7 N•m (62 lbf•**in**).

5, Trim Cable

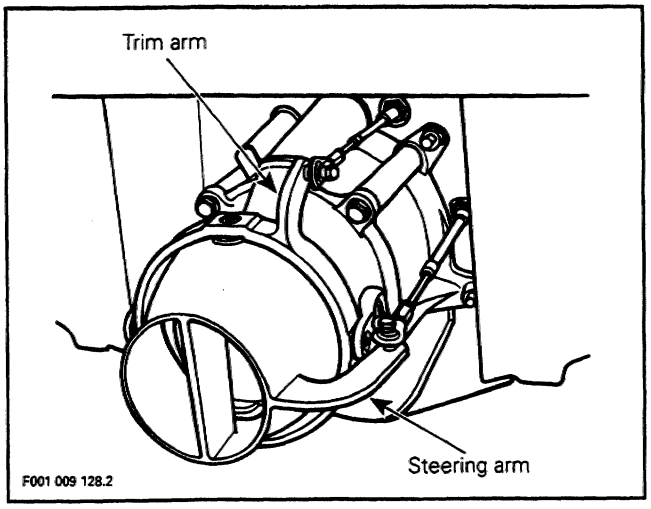
Install cable from inside the hull and install flat washer, spacer and torque jam nut to 10 N•m (88 lbf•**in**).



ADJUSTMENTS

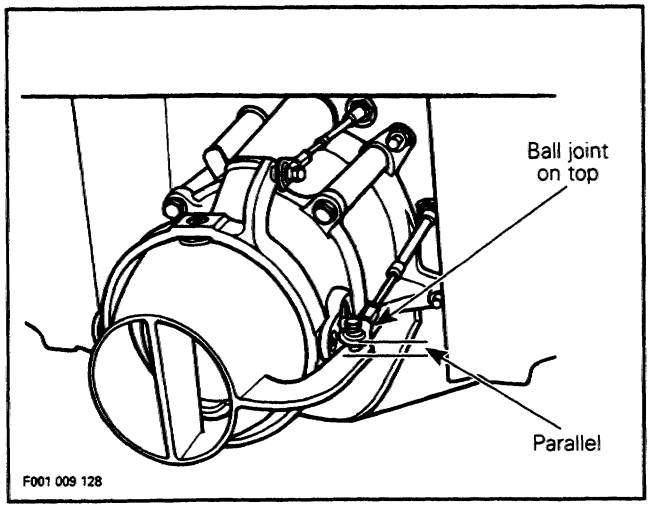
33, Trim Ring

Make sure jet pump nozzle steering arm is on right side and that trim arm is above venturi housing.



Ensure ball joint is on top of steering arm.

Make sure screw is installed on top of ball joint and that ball joint is parallel to steering arm. Secure ball joint with a lock nut and torque to 7 N•m (62 lbf•**in**).

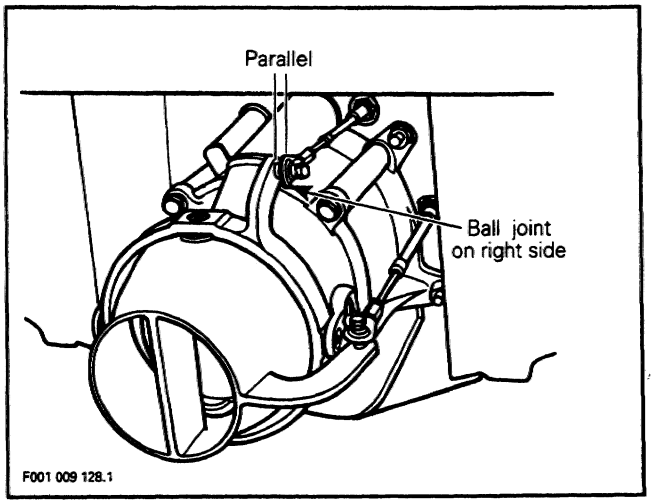


5, Trim Cable

Install ball joint and thread it in completely.

Secure ball joint on right side of trim arm using screw and nut. Make sure screw is installed on right side of trim arm and that ball joint is parallel to trim arm.

Torque screw to 7 N•m (62 lbf•**in**).

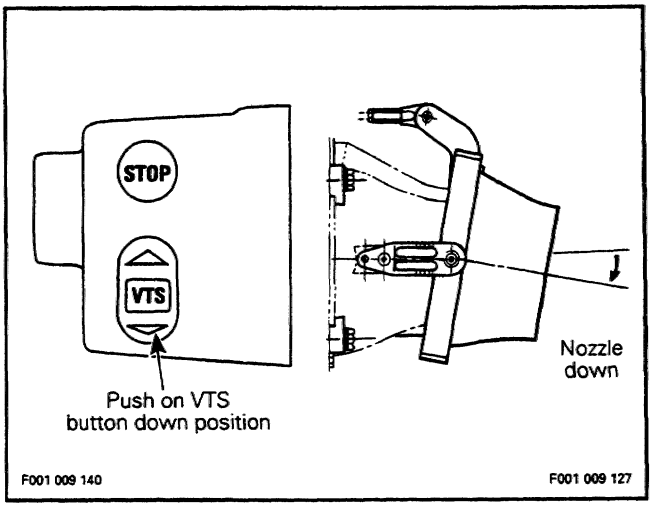


Torque ball joint lock nut to 2.5 N•m (23 lbf•**in**).

CAUTION : Ball joints must be installed face to face. Damage to cables could result if not done properly.

16, Sliding Collar

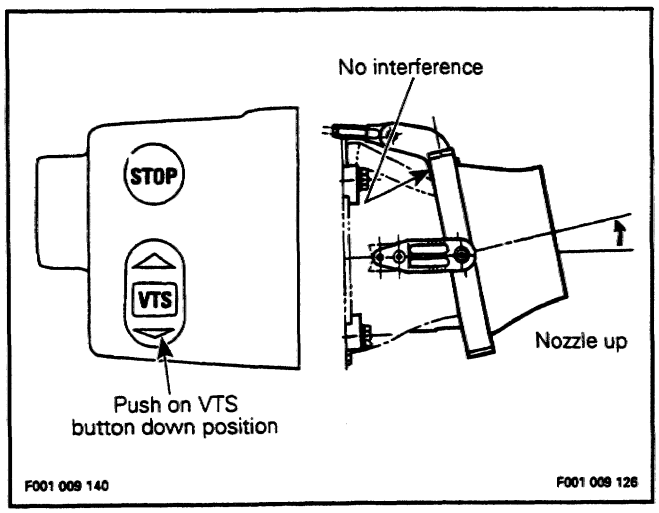
Push on VTS button down position, the sliding collar must move towards motor end until it stops. Make sure the nozzle is in down position.



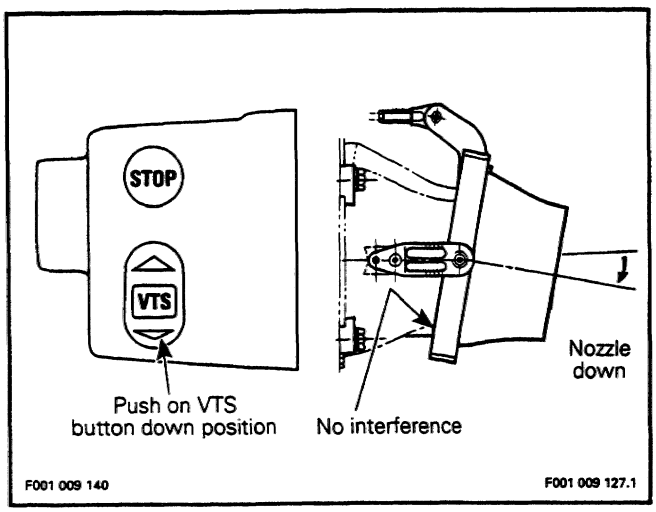
Install cable in sliding collar with washer and nut on each side. Torque nuts to 5 N•m (44 lbf•**in**). Install retaining plate over cable housing.

NOTE : Push cable as far as possible in sliding collar without moving trim ring from its down position.

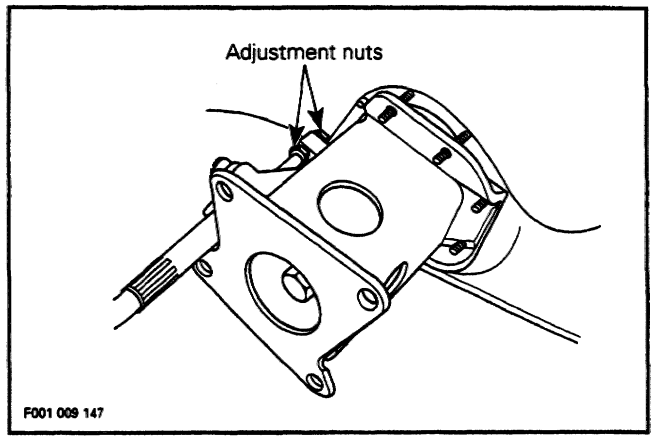
Push on VTS button up position until the sliding collar stops. The nozzle should be up (10°) without interfering with venturi housing.



Push on VTS button down position until sliding collar stops. The nozzle must be down (10°) and it must not interfere with venturi housing.

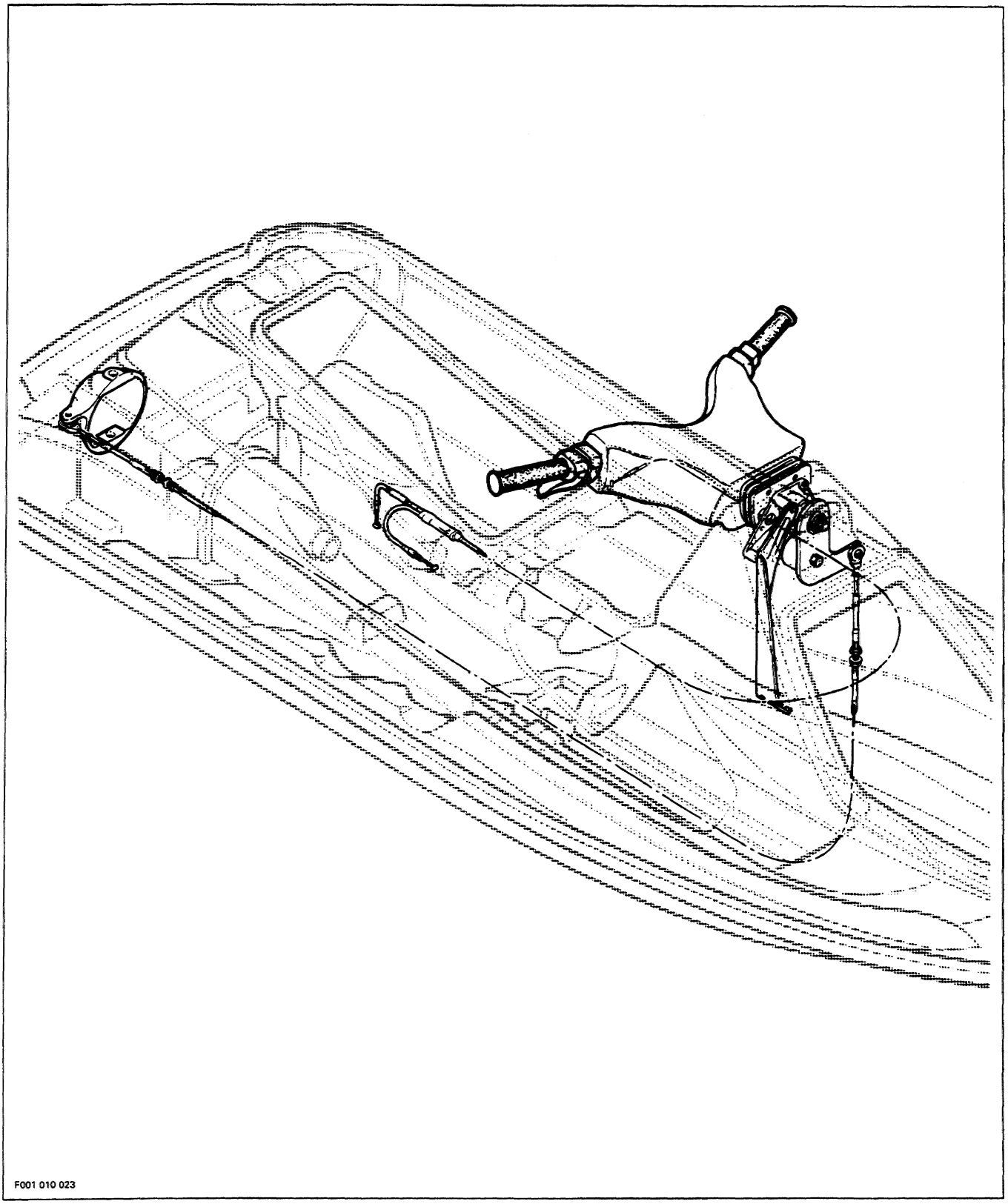


If trim ring needs to be readjusted, it can be done at sliding collar with adjustment nuts.



CAUTION : Trim ring and / or nozzle must not interfer at any position. Damage to cables and / or venturi housing will occur if adjustments are not done adequately.

STEERING SYSTEM



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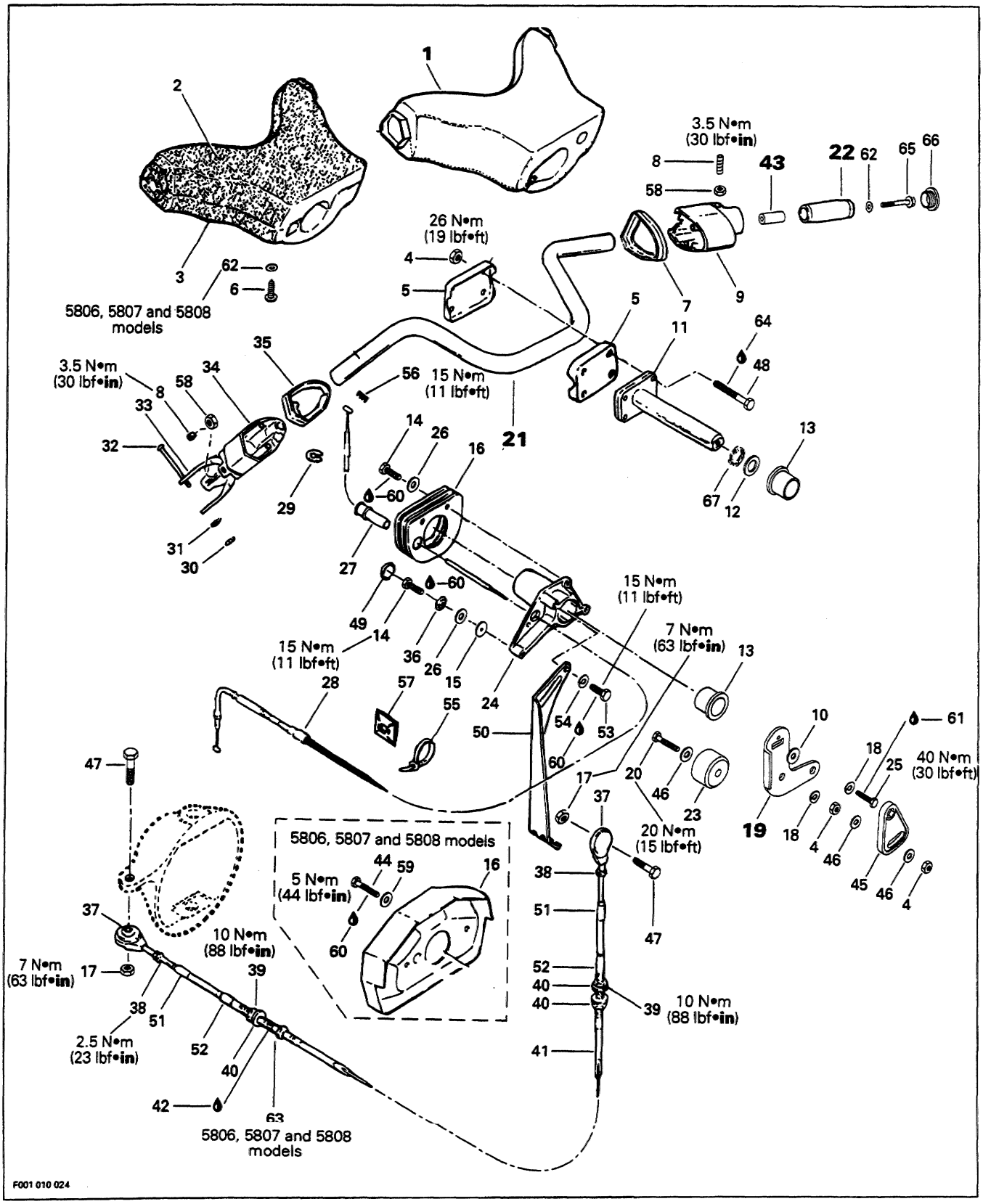
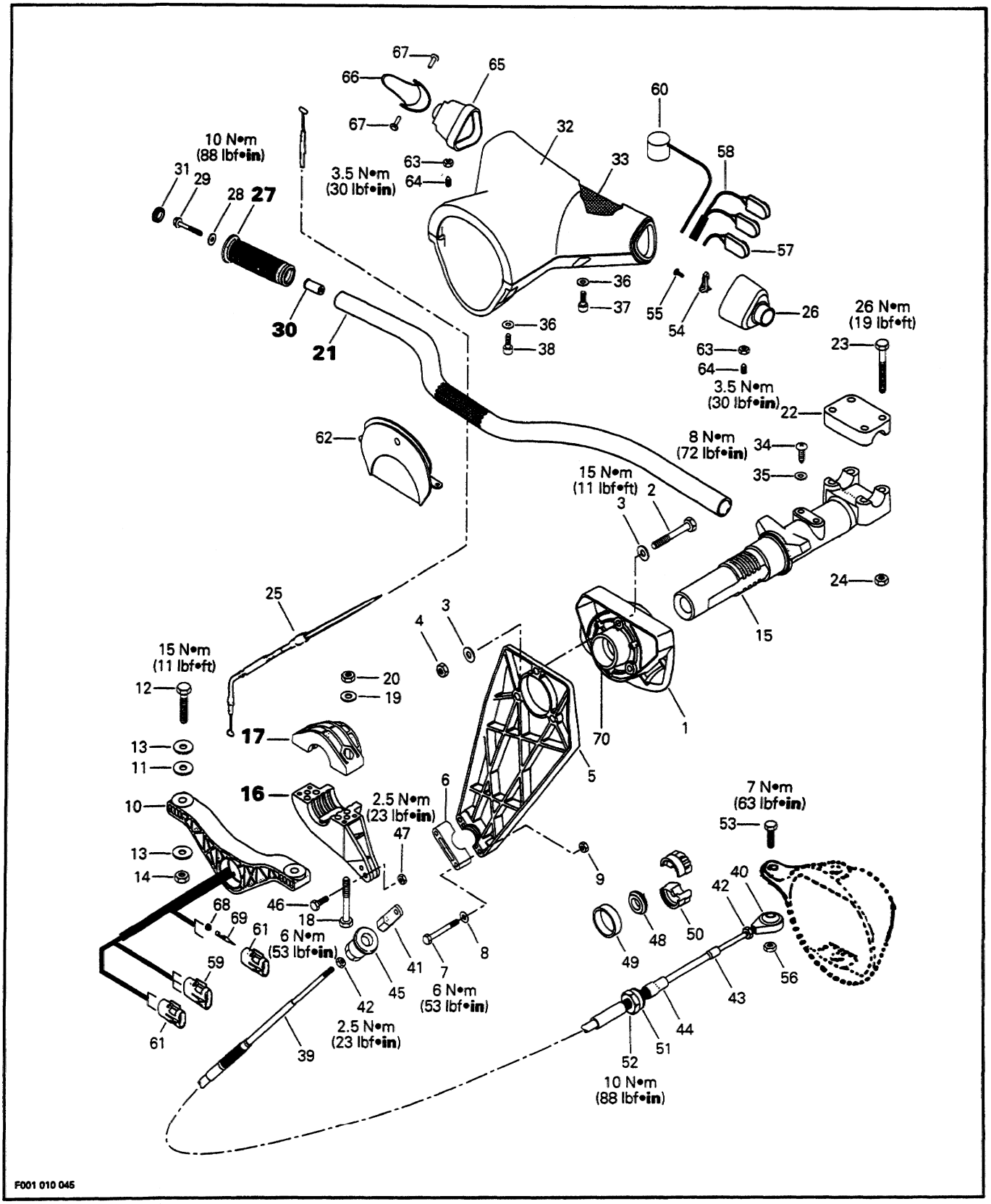
STEERING SYSTEM



COMPONENTS

1. *Cover*
2. *Foam (top)*
3. *Foam (bottom)*
4. *Elastic stop nut M8 (6)*
5. *Steering clamp (2)*
6. *Phillips screw (4)*
7. *Adapter*
8. *Set screw (2)*
9. *Left handle housing*
10. *Large flat washer*
11. *Steering Stem*
12. *Washer (shim)*
13. *Bushing (2)*
14. *Hexagonal head screw M8 x 25 (4)*
15. *Plastic washer (2)*
16. *Collar*
17. *Elastic stop nut M6 (2)*
18. *Lock washer M8 (2)*
19. *Steering stem arm*
20. *Hexagonal head screw M8 x 45*
21. *Handlebar*
22. *Grip (2)*
23. *Stopper bushing*
24. *Steering support*
25. *Hexagonal head screw M8 x 25*
26. *Washer 8 mm (4)*
27. *Grommet*
28. *Throttle cable*
29. *Circlip*
30. *Circlip*
31. *Washer*
32. *Pin*
33. *Throttle handle*
34. *Throttle handle housing*
35. *Adapter*
36. *Retaining washer (2)*
37. *Ball joint (2)*
38. *Nut 10-32 (2)*
39. *Jam nut 7/16 (4)*
40. *Washer 7/16 (3)*
41. *Cable*
42. *Loctite U Black*
43. *Grip retainer (2)*
44. *Hexagonal head screw M6 x 20 (2)*
45. *Locking plate*
46. *Flat washer M8 (3)*
47. *Hexagonal head screw M6 x 30 (2)*
48. *Hexagonal head screw M8 x 55 (4)*
49. *Snap cap (2)*
50. *Cable support*
51. *Small boot*
52. *Large boot*
53. *Hexagonal head screw M8 x 16 (2)*
54. *Lock washer M8 (2)*
55. *Tie rap*
56. *Locking tab*
57. *Tie-mount*
58. *Hexagonal nut M6 (2)*
59. *Flat washer M6 (2)*
60. *Loctite 242*
61. *Loctite 271*
62. *Flat washer M6 (6)*
63. *Flat washer 7/16*
64. *Anti-seize lubricant*
65. *Screw M 6.3 x 45 (2)*
66. *Cap (2)*
67. *Spring washer*

STEERING SYSTEM XP MODEL (5852)



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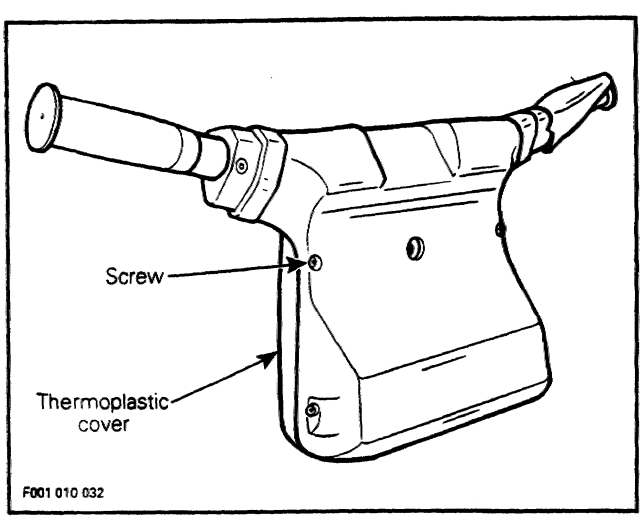
COMPONENTS

1. *Rear support*
2. *Hexagonal screw M8 x 65 (3)*
3. *Flat washer M8 (6)*
4. *Elastic stop nut M8 (3)*
5. *Steering cable bracket*
6. *Retaining plate*
7. *Hexagonal screw M6 x 50 (2)*
8. *Flat washer M6 (2)*
9. *Elastic stop nut M6 (2)*
10. *Front support*
11. *Plastic washer (2)*
12. *Hexagonal screw M8 x 40 (2)*
13. *Flat washer M8 (4)*
14. *Elastic stop nut (2)*
15. *Steering stem*
16. *Steering stem arm*
17. *Steering stem arm support*
18. *Allen screw M6 x 25 (2)*
19. *Flat washer M6 (2)*
20. *Elastic stop nut M6 (2)*
21. *Handlebar*
22. *Steering clamp*
23. *Hexagonal screw M8 x 50 (4)*
24. *Elastic stop nut M8 (4)*
25. *Throttle cable*
26. *Housing*
27. *Grip (2)*
28. *Flat washer M6*
29. *Hexagonal screw M6.3 x 2.2 x 45 (2)*
30. *Grip retainer (2)*
31. *Cap (2)*
32. *Cover*
33. *Top foam*
34. *Taptite hexagonal screw 1/4-20 (2)*
35. *Flat washer M6 (2)*
36. *Flat washer M5 (4)*
37. *Allen screw (2)*
38. *Allen screw (2)*
39. *Steering cable*
40. *Ball joint*
41. *Joint*
42. *Nut 10-32 (2)*
43. *Small boot (2)*
44. *Large boot (2)*
45. *Adjustment nut*
46. *Hexagonal screw M6 x 25*
47. *Elastic stop nut M6*
48. *Rubber washer*
49. *Ring retainer*
50. *Half ring (2)*
51. *Flat washer*
52. *Jam nut*
53. *Hexagonal screw M6 x 30*
54. *Retainer plate*
55. *Tapping screw*
56. *Nut M6*
57. *Stop switch assembly*
58. *"VTS" switch assembly*
59. *Female tab housing (3 ways)*
60. *Buzzer assembly*
61. *Female tab housing (2 ways) (2)*
62. *Plate*
63. *Elastic nut M6 (2)*
64. *Set screw M6 x 12 (2)*
65. *Throttle handle housing*
66. *Throttle handle*
67. *Pin*
68. *Wire seal*
69. *Male terminal*
70. *Syntetic grease*

REMOVAL AND ASSEMBLY

1, Cover

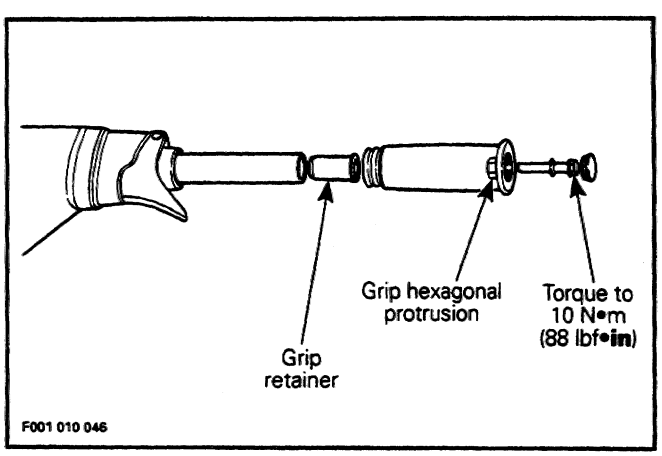
To replace the cover, just remove and reinstall four screws and washers.



22,43, Grip and Grip Retainer

To remove grip, just pull out cap from grip end and remove screw. To verify grip retainer for damage, remove it from handlebar.

NOTE : At grip retainer installation on XP (5852) model, slide grip retainer key into handlebar slot. At grip installation, ensure to insert properly grip hexagonal protrusion into grip retainer.



Install flat washer and screw, torque screw to 10 N•m (88 lbf•**in**).

CAUTION : Ensure to install flat washer because screw will damage grip end.

19,21, Steering Stem Arm and Handlebar (All Models Except XP (5852))

Insert throttle cable through dashboard hole and slide grommet on cable.

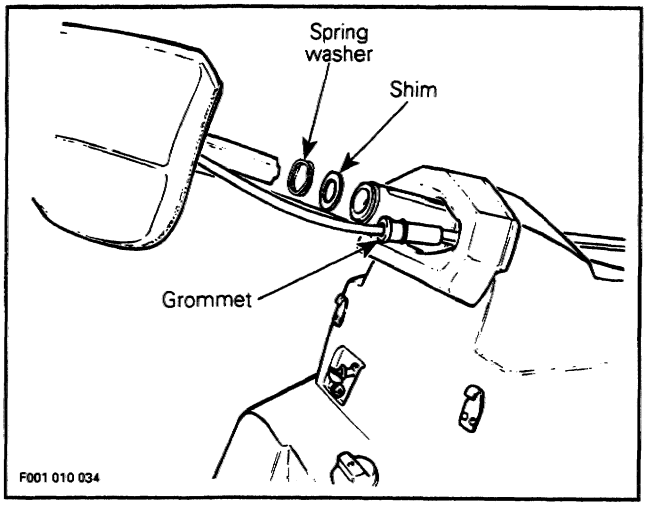
Insert grommet in dashboard hole and pull it from inside bilge.

NOTE : To ease installation, apply water on grommet.

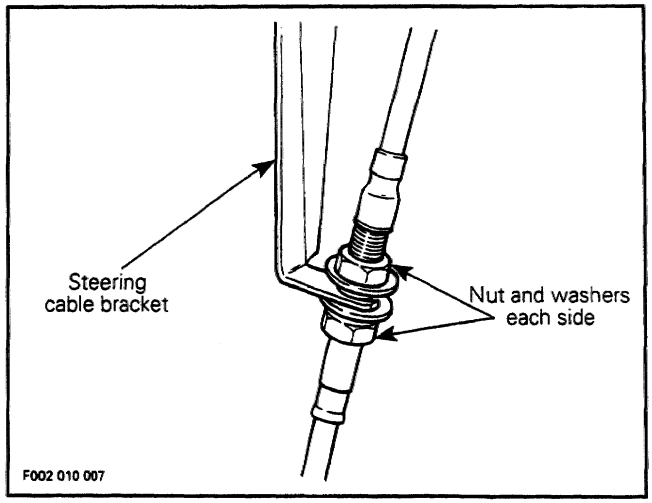
Insert wires of engine overheating beeper / engine stop switch through grommet.

Insert spring washer and the shim onto steering stem.

Insert handlebar ass'y into steering column support.

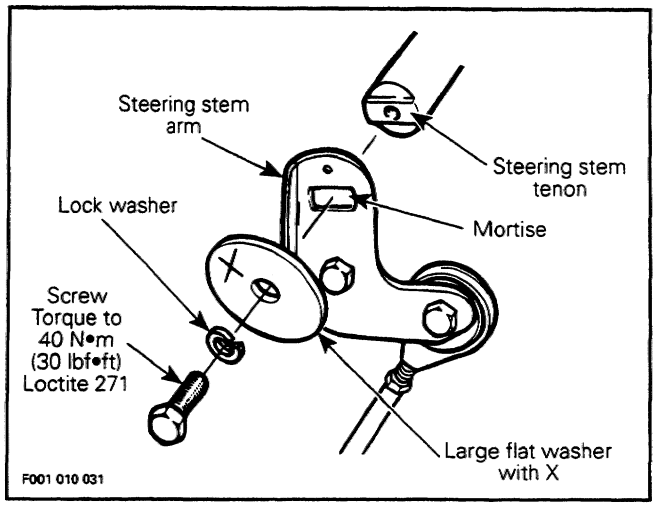


Install steering cable in its bracket with one washer and one nut each side of bracket.



Ensure to interlock nuts prior to torque to 10 N•m (88 lbf•**in**) using a crowfoot wrench such as Snap-on FRH220S.

Properly position steering stem arm on steering stem as shown. Make sure to insert stem tenon into arm mortise. Apply Loctite 271 (P / N 293 800 005) on screw threads, install large flat washer, lock washer and screw. Torque to 40 N•m (30 lbf•ft).



CAUTION : Always install large flat washer with the X stamped side facing the lock washer.

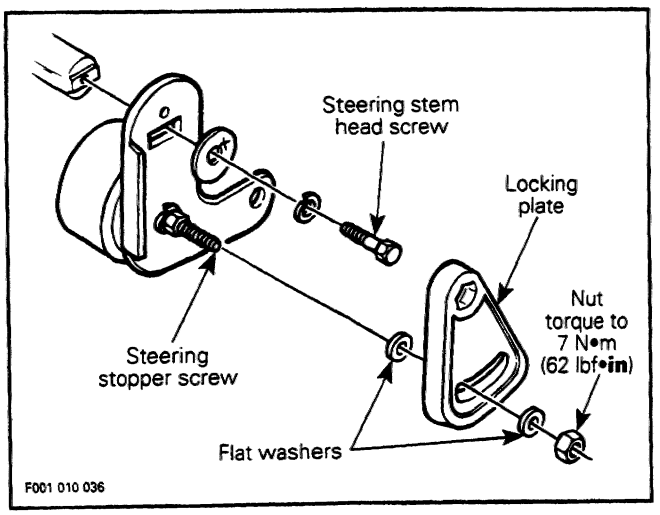
WARNING : The recommended torque and Loctite must be applied on screw.

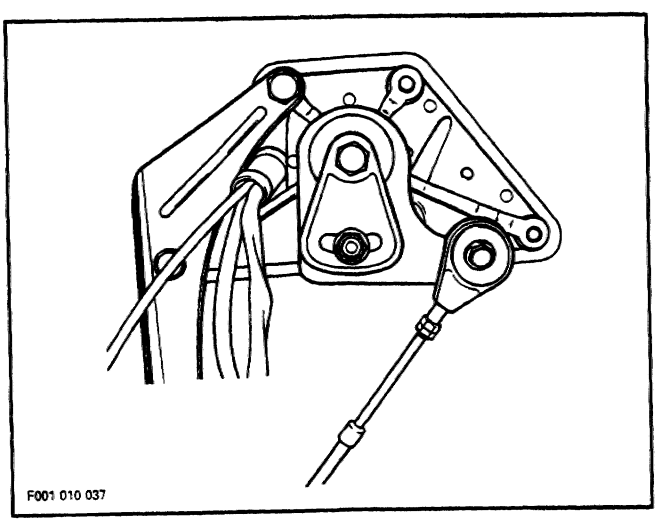
Position a flat washer on steering stopper screw then install locking plate over steering stem head screw.

Ensure steering stopper screw is positionned into locking plate slot.

NOTE : The locking plate can be turned over to obtain its proper position.

Install a flat washer and secure locking plate using a stop nut. Torque to 7 N•m (62 lbf•**in**).



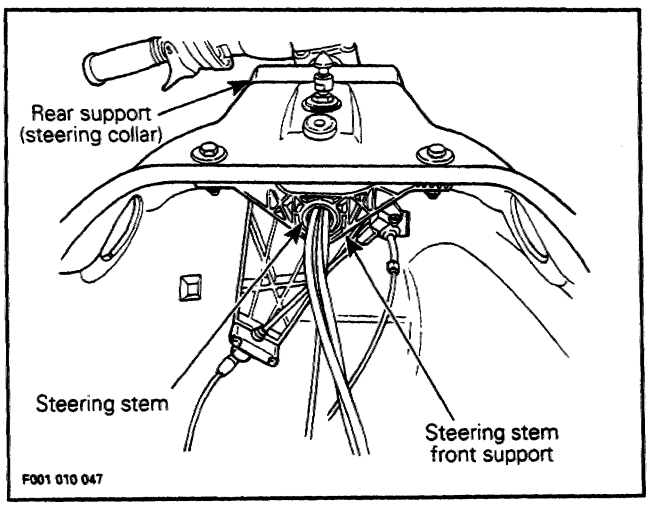


Steering Stem Arm, Steering Stem Arm Support and Handlebar (XP Model (5852) Only)

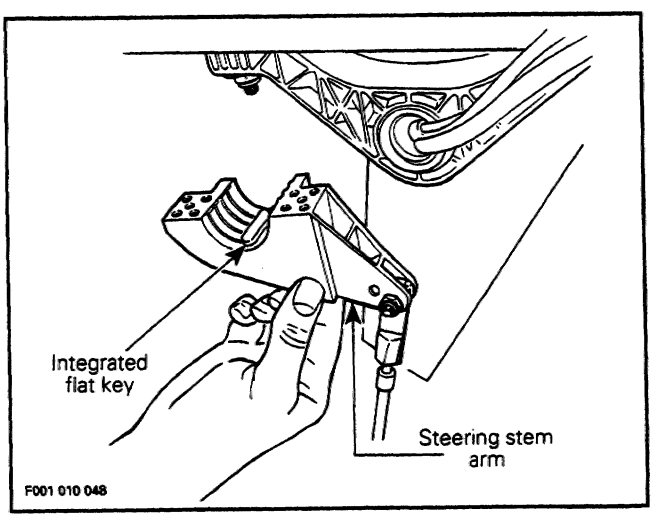
Insert throttle cable and wiring harnesses through rear support (steering collar) and through steering stem front support.

Insert handlebar ass'y into rear support and through steering stem front support.

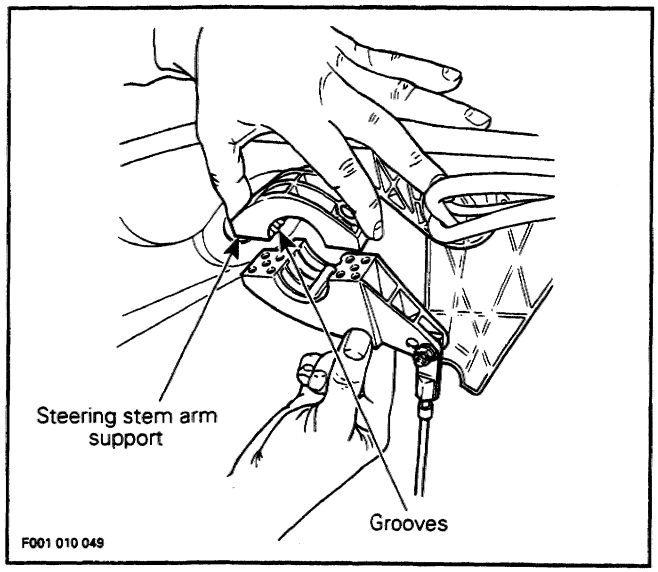
NOTE : Always lubricate steering stem rear and front supports with synthetic grease (P / N 293 550 010).



Position steering stem arm onto steering stem and ensure to insert stem arm integrated flat key into steering stem groove.



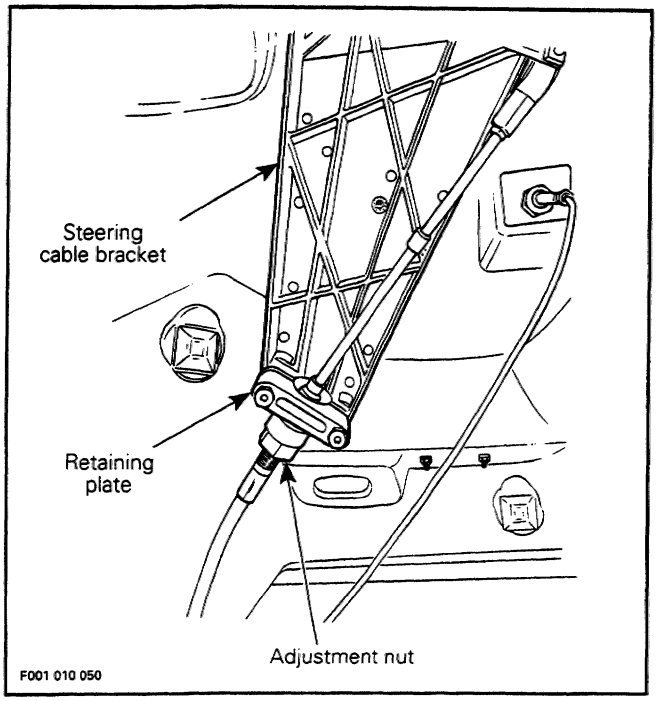
Position steering stem arm support onto steering stem ensuring the support grooves seat onto steering stem protrusions.



Secure steering stem arm and its support onto steering stem using elastic stop nut, flat washer and screw. Torque screws to 6 N•m (53lbf•**in**).

▼CAUTION : Always ensure to insert steering stem arm integrated flat key into steering stem groove and to insert steering stem arm support grooves onto steering stem protrusions.

Install steering cable with its adjustment nut onto bracket with the retaining plate. Secure retaining plate using elastic stop nut, flat washer and screw. Torque screws to 6 N•m (53 lbf•**in**).



ADJUSTMENT

Steering and Jet Pump Nozzle

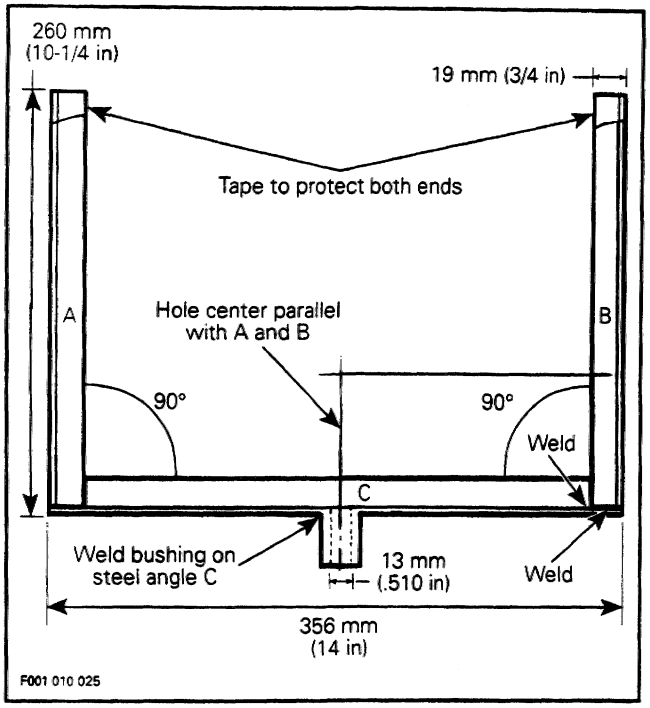
Make the following tool to ease alignment.

Raw Material :

- 2 steel angle : 19 mm x 254 mm (3/4 x 10 in).
- 2 steel angle : 19 mm x 356 mm (3/4 x 14 in).
- 1 bushing : 13 mm (.510 in) inside diameter, 19 mm (3/4 in) long.
- 1 rod : 12.7 mm x 230 mm (.500 x 9 in).
- 1 spring pin : 19 mm (3/4 in) long.
- 2 rods for hooks (bolt with head removed) : 152 mm (6 in) x 6 mm (1/4 in) with a threaded portion of at least 65 mm (2-1/2 in).
- 2 bushings : 7 mm (9/32 in) inside diameter, 10 mm (3/8 in) outside diameter, 19 mm (3/4 in) long.
- 2 wing nuts : 6 mm (1/4 in).

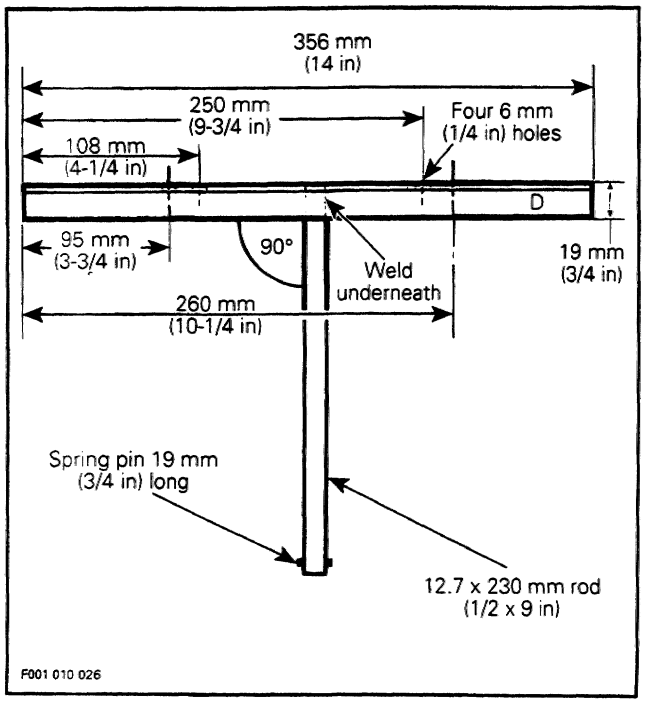
Weld steel angles A, B, C and bushing as per illustration and pay attention to the following :

- Dimension 260 mm (10-1/4 in) must be respected on both side.
- Steel angles A and B and hole center of bushing must be parallel.
- Weld bushing on steel angle C and drill steel angle.

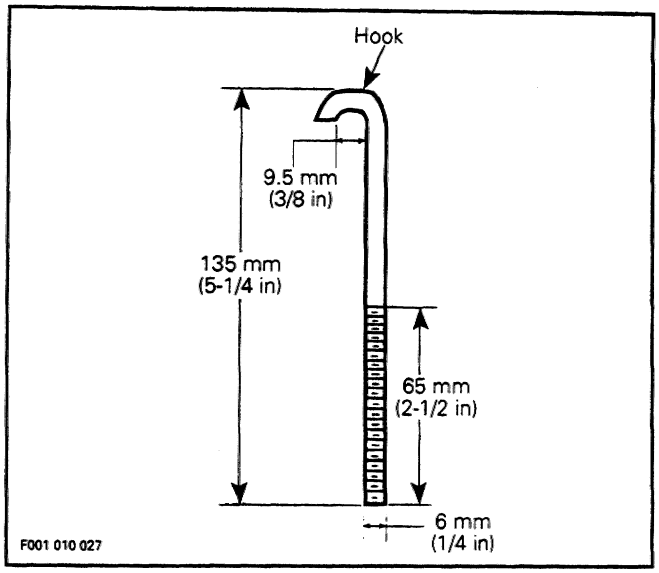


Drill four 6 mm (1/4 in) holes in steel angle D.

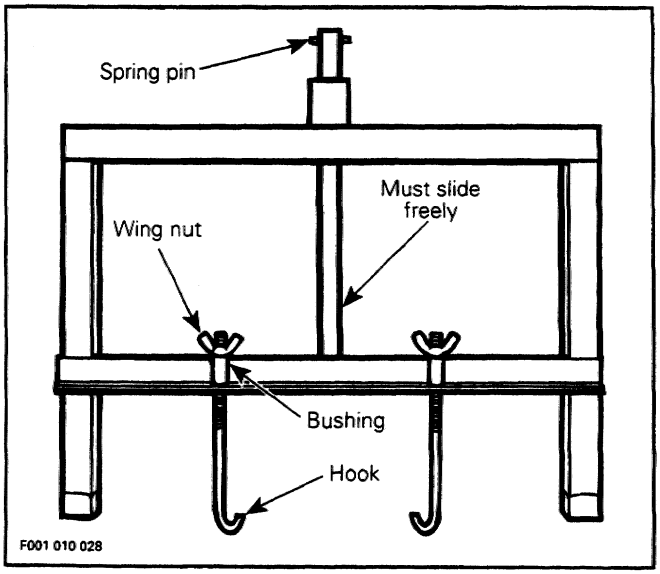
Weld steel angle D with the 12.7 mm (1/2 in) rod making sure both parts are at 90 ° :



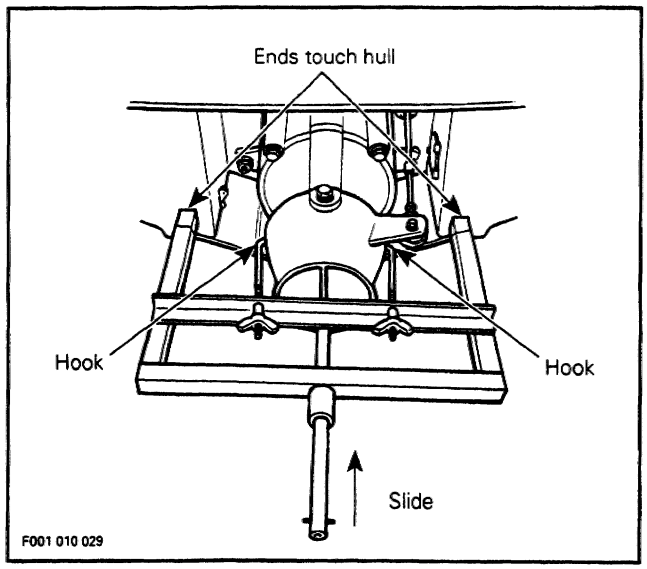
Heat the unthreaded end of the 6 mm (1/4 in) rod and bend it as per following illustration.



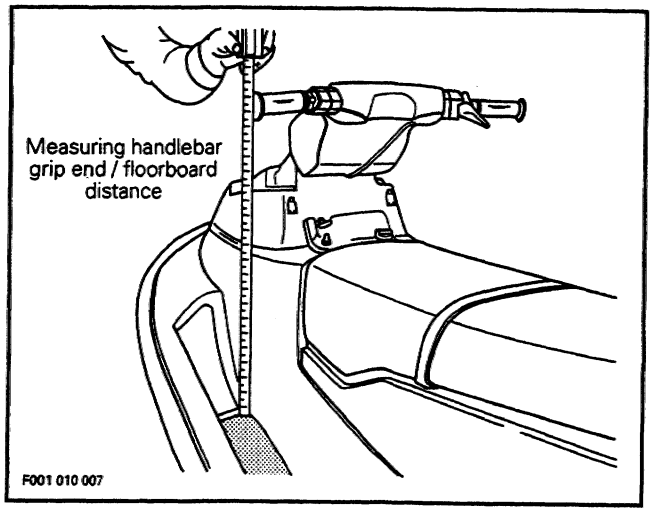
Assemble tool as per illustration.



Hook tool on jet pump nozzle and slide it until both ends touch hull.

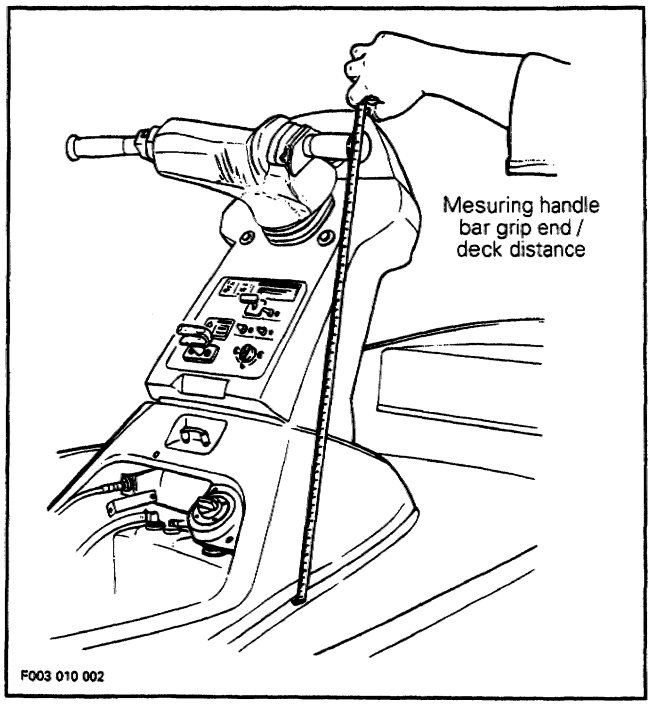


Verify handlebar position by measuring each side the distance from handlebar grip end to floorboard. They have to be equal.

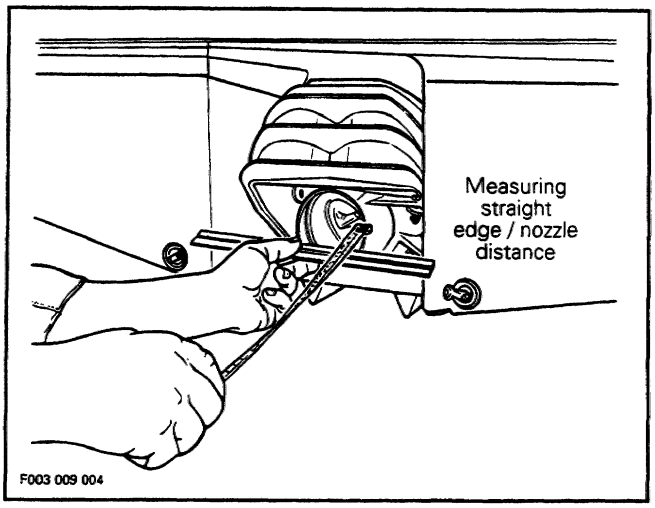


Explorer Model Only

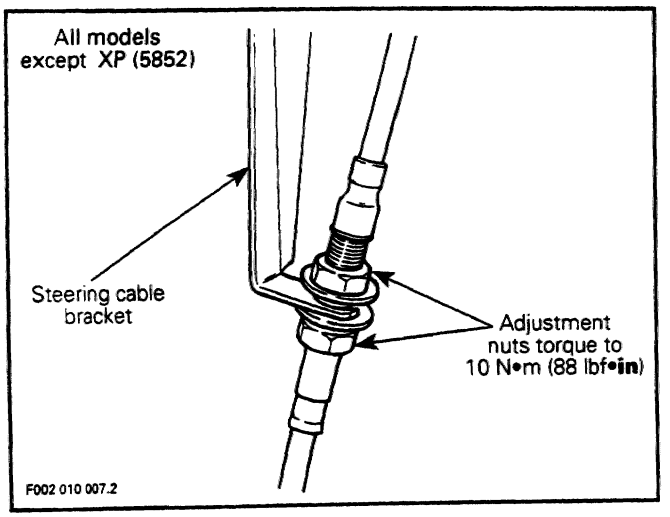
Position handlebar in straight ahead position by measuring each side the distance from handlebar grip end to deck.



Check jet pump nozzle position by placing a straight edge on hull rear section. The distance from straight edge to either side of nozzle must be the same.

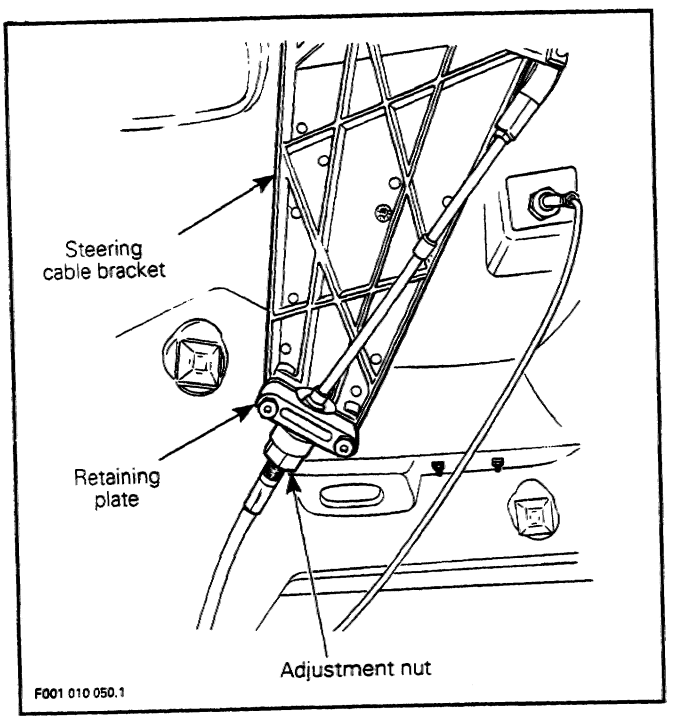


Steering alignment adjustment should be performed on outer cable adjustment nuts on steering cable bracket near steering stem.



NOTE : On XP model (5852) steering alignment adjustment should be performed with adjustment nut on steering cable.

Loosen retaining plate screws and rotate adjustment nut accordingly.

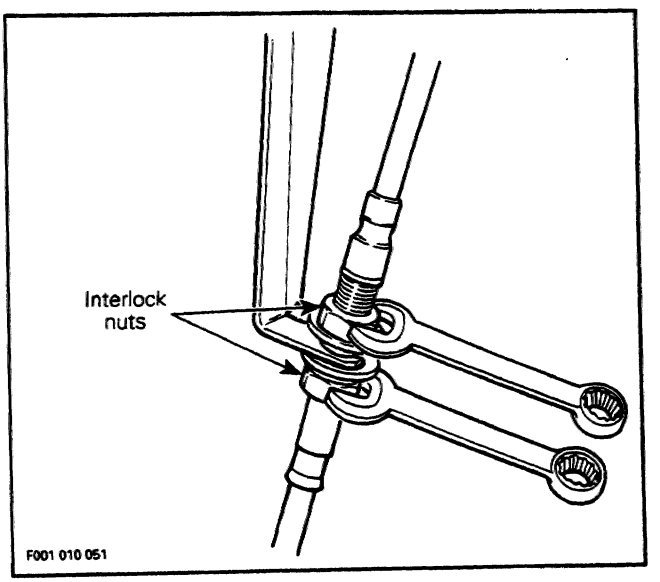


Remove alignment tool and verify the following before tightening nuts or screws.

Adjust nut(s) so that nozzle pivots from side to side but does not contact venturi housing on either side. To verify, insert a paper sheet or a feeler gauge 0.13 mm (.005 in) between nozzle and venturi.

After adjustment, properly tighten nuts.

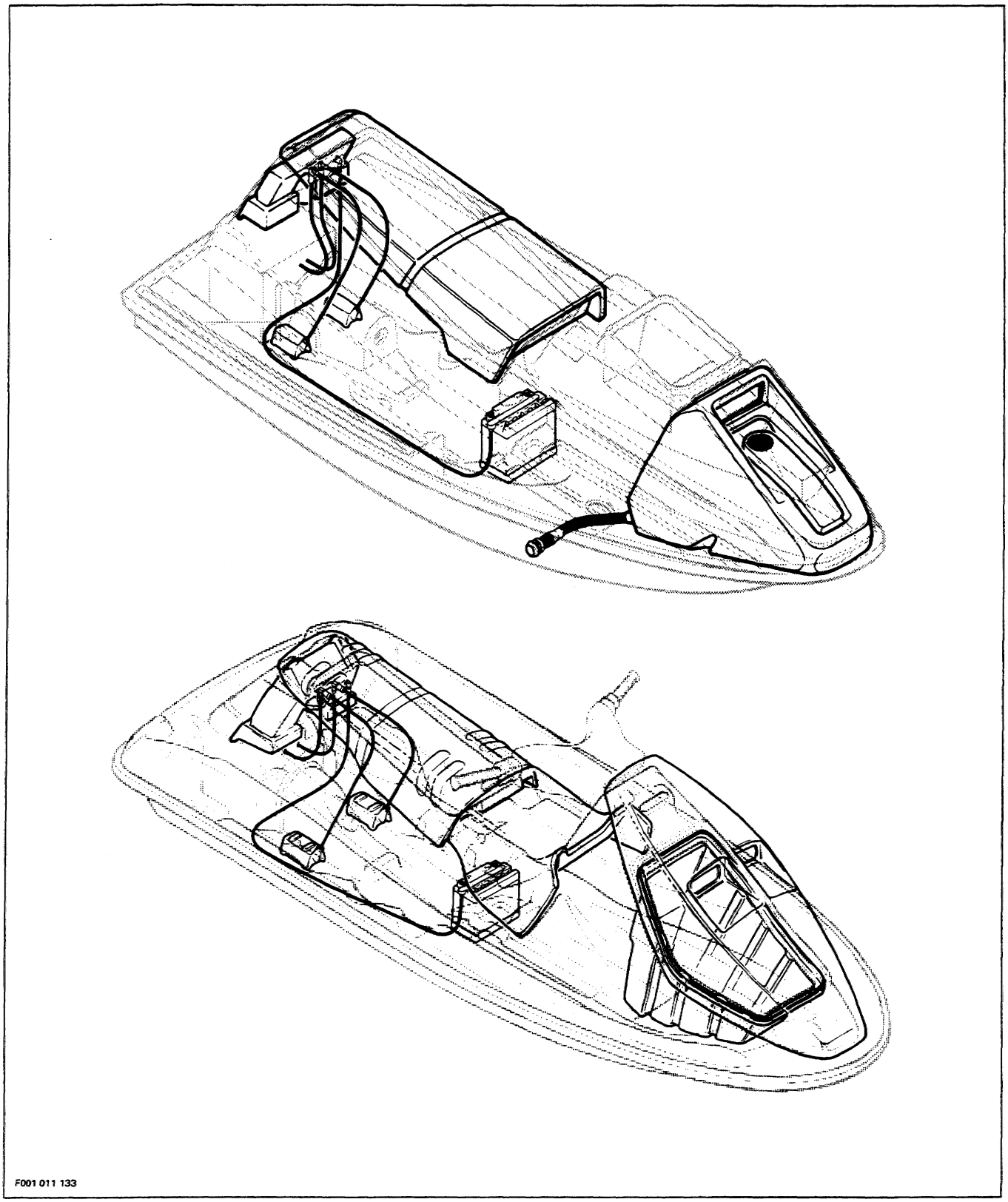
Ensure to interlock nuts prior to torque to 10 N•m (88 lbf•**in**) using a crowfoot wrench such as Snap-on FRH 220S.



For XP (5852) model torque retaining plate screws to 6 N•m (53 lbf•**in**).

◆ **WARNING : Ensure handlebar and jet pump nozzle operate freely from side to side and that jet pump nozzle does not contact the side of venturi housing.**

HULL / BODY



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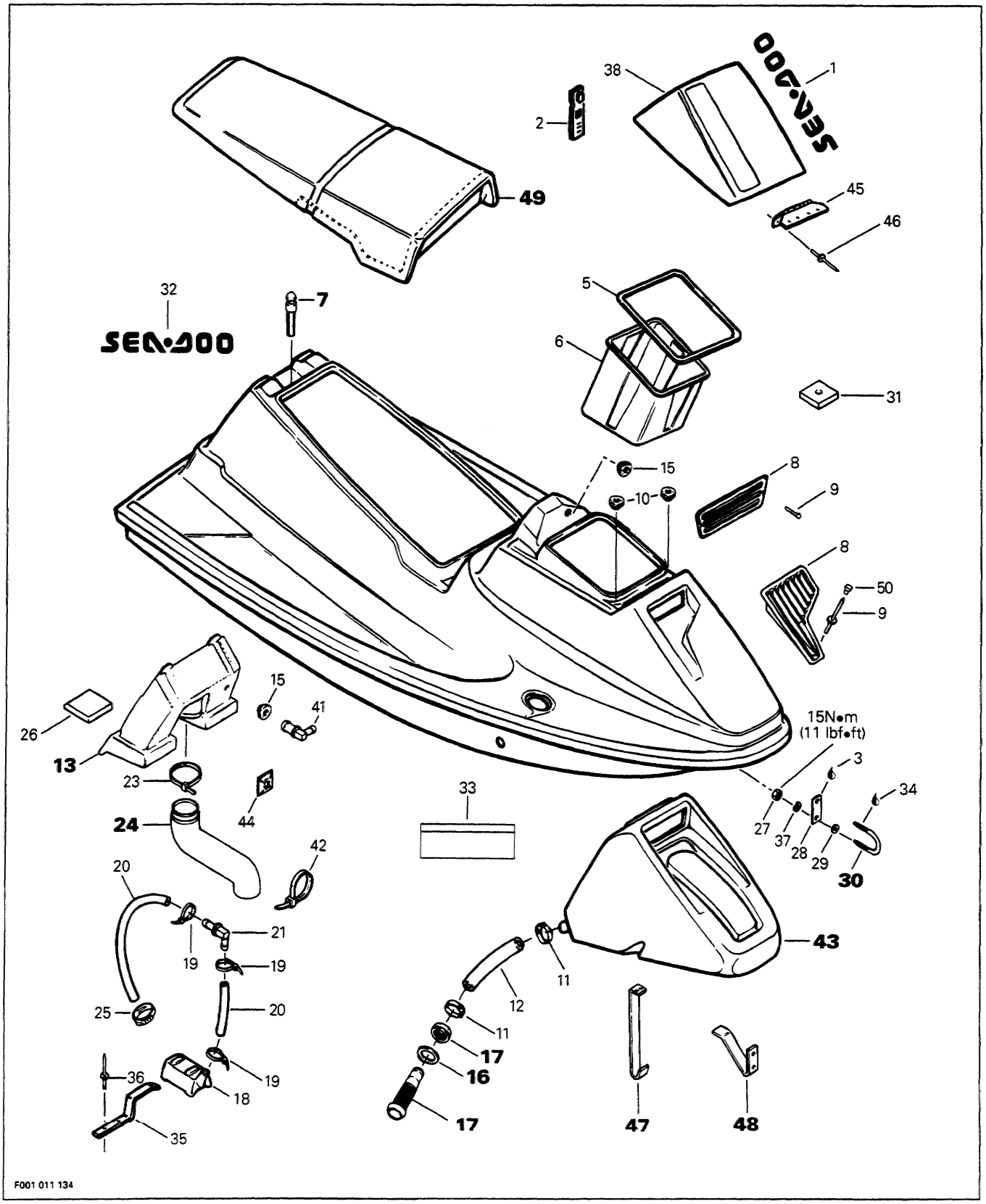
HULL / BODY

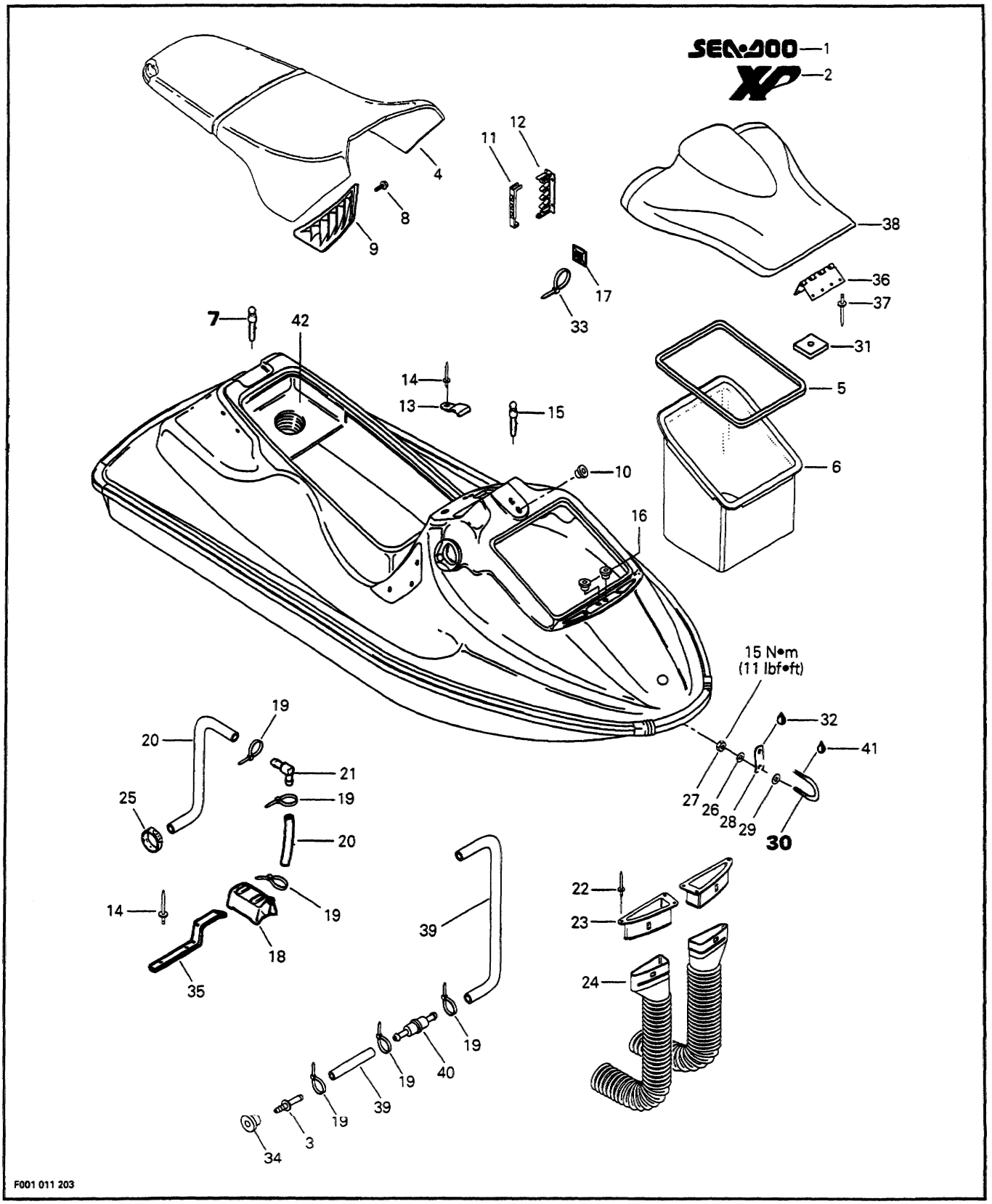


COMPONENTS

1. *"Sea-Doo" sticker*
2. *Latch (2)*
3. *Silicone 732 RTV*
5. *Seal*
6. *Storage basket*
7. *Lock pin*
8. *Grill*
9. *Rivet (2)*
10. *Grommet*
11. *Clamp (4)*
12. *Hose*
13. *Rear baffle*
15. *Grommet*
16. *Gasket (2)*
17. *Fitting (2)*
18. *Bailer pick-up (2)*
19. *Tie rap*
20. *Hose*
21. *Elbow fitting 90°*
23. *Tie rap (2)*
24. *Rear vent hose*
25. *Gear clamp (2)*
26. *Floater (2)*
27. *Elastic stop nut M8 (2)*
28. *Plate*
29. *Washer M8 (2)*
30. *Tow hook*
31. *Neopren pad*
32. *"Sea-Doo" sticker (2)*
33. *"Fuel" sticker*
34. *Loctite 271*
35. *Spring clip (2)*
36. *Rivet (4)*
37. *Lock washer (2)*
38. *Storage cover*
41. *Elbow fitting 90°*
42. *Tie rap*
43. *Water tank trap*
44. *Tie mount*
45. *Hinge*
46. *Rivet (5)*
47. *Rear bracket (2)*
48. *Front bracket*
49. *Seat*
50. *Cap*

NOTE : Some reference numbers are deliberately missing.

HULL / BODY XP (5852) MODEL



F001 011 203

COMPONENTS

1. *"Sea-Doo" sticker*
2. *"XP" sticker*
3. *Straight fitting*
4. *Seat*
5. *Seal*
6. *Storage basket*
7. *Lock pin*
8. *Screw (2)*
9. *Intake grill (2)*
10. *Grommet*
11. *Tie-block clip*
12. *Tie-block*
13. *Cable clip*
14. *Rivet*
15. *Lock pin*
16. *Grommet (2)*
17. *Tie mount*
18. *Bailer pick-up (2)*
19. *Tie rap*
20. *Hose 8 mm*
21. *Elbow fitting 90° (2)*
22. *Rivet*
23. *Vent adaptor (2)*
24. *Vent tube (2)*
25. *Tridon clamp*
26. *Lock washer M8 (2)*
27. *Elastic stop nut M8 (2)*
28. *Plate*
29. *Washer M8 (2)*
30. *Tow hook*
31. *Neoprene pad*
32. *Silicone "732 RTV"*
33. *Tie rap*
34. *Grommet*
35. *Spring clip (2)*
36. *Hinge*
37. *Rivet*
38. *Storage cover*
39. *Vent hose 6 mm*
40. *Water eliminator valve*
41. *Loctite 271*
42. *Air vent tube support*

GENERAL

In the situation when the water tank trap could possibly move from its position, the following procedures can be performed without removing jet pump unit ass'y and engine from watercraft. However if water tank trap is broken these assemblies will have to be removed from watercraft.

REMOVAL

30,43, Tow Hook and Water Tank Trap

Drill storage cover rivets and remove cover.

Remove fuel tank from watercraft and pull water tank trap from its position.

◆ **WARNING : The fuel valve must be set to OFF. Remove fuel cap slowly. Fuel may be under pressure and might spray out when removing cap. Fuel is flammable and explosive under certain conditions. Always work in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity. Always wipe off any fuel spillage from the watercraft.**

Remove tow hook nuts.

○ NOTE : From this point if water tank trap is broken the jet pump unit and engine removal will be required. Withdraw jet pump unit ass'y, refer to PROPULSION AND DRIVE SYSTEMS 08-01 then look for **removal**.

Withdraw engine, refer to ENGINE 03-02 then look for **removal**.

16,17, Gasket and Fitting

This procedure can be used to repair the water tank trap fittings.

Remove the air intake grill then remove gear clamp holding drain hose to fitting.

Remove fitting from water tank.

13,24, Rear Baffle and Vent Hose

Remove air silencer, exhaust formed hose, rear vent hose and then the rear baffle.

○ NOTE : Verify if glue remains on rear baffle, if none install a new baffle.

▼ **CAUTION : Verify if glue remaining on rear baffle comes off easily. If it does install a new baffle. If not install the same baffle. Disregarding the installation of a new baffle when required will result into the same situation shortly.**

CLEANING

Clean glue left on water tank trap, rear baffle (if applicable) and body surfaces.

NOTE : It is not necessary to remove all the glue but it is important to have smooth surfaces in order to get a good adherence.

INSTALLATION

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

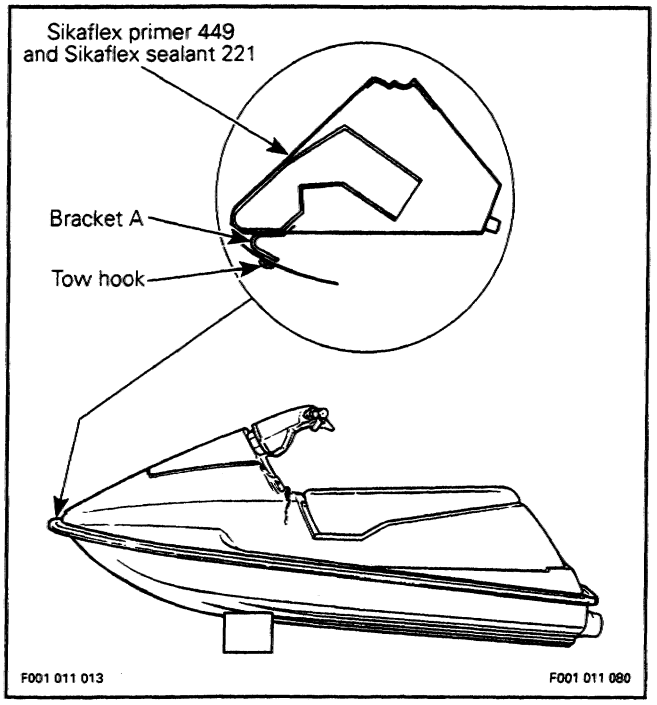
30,43,47,48, Tow Hook, Water Tank Trap, Rear Bracket and Front Bracket

Install bracket A (P / N 291 000 214) on tow hook and apply Loctite 271 (P / N 293 800 005) on treads then re-install nuts.

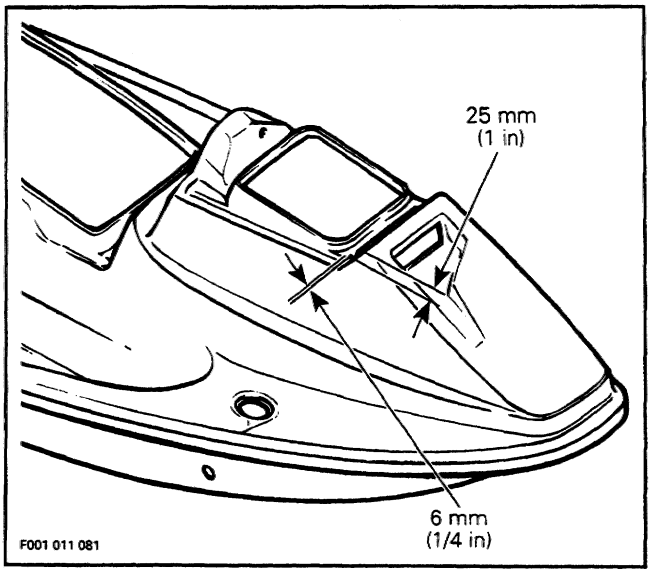
Apply Sikaflex primer 449 (P / N 293 530 012) on water tank trap and body surfaces.

CAUTION : Allow at least 30 minutes for primer to cure.

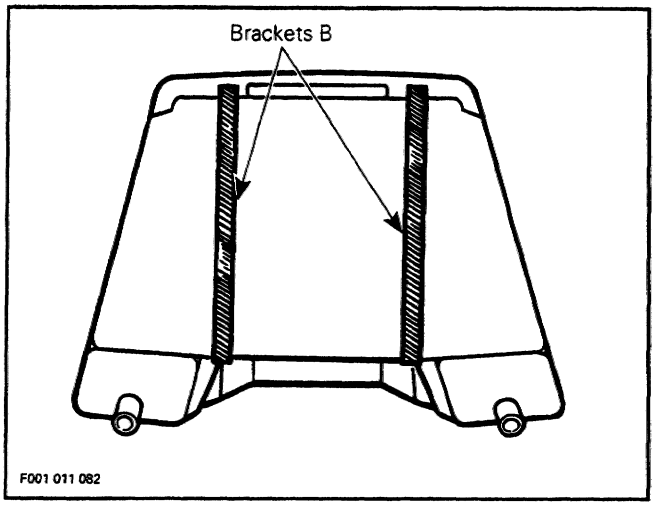
Apply Sikaflex sealant 221 (P / N 293 530 011) on water tank trap and slide it back to its position.



Drill a 5mm (3/16 in) hole each side storage cover hinge position as illustrated.



Install brackets B (P / N 291 000 213) to support the rear section of tank and secure them with M5 stainless screws (P / N 210 000 009) and lock nuts (P / N 212 000 004).



Install fuel tank and storage cover.

To install engine, refer to ENGINE 03-02 then look for **installation**.

Install jet pump unit ass'y, refer to PROPULSION AND DRIVE SYSTEMS 08-01 then look for **installation**.

Verify tightness of all fuel lines and clamps and pressurize fuel system. For pressurization procedure refer to FUEL SYSTEM 05-03.

◆ **WARNING : If any leak is found do not start the engine and correct the leak. Failure to correct a leak could lead to an explosion. If any fuel spillage and / or leak had occurred the bilge should be cleaned with hot water and detergent or bilge cleaner to remove fuel deposits.**

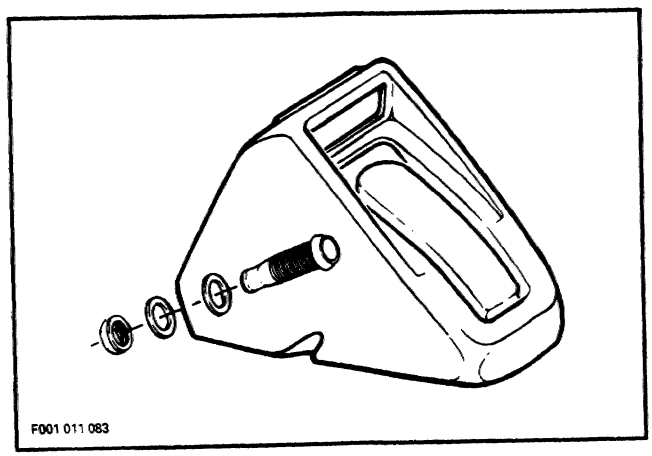
Before using watercraft wait three days for Sikaflex curing time.

16,17, Gasket and Fitting

Slide gasket on fitting. Install through air intake hole the fitting in water tank trap.

Install on the outside of tank a second gasket on the fitting, install the nut and then tighten until the gaskets are compressed.

Install drain hose on the fitting and tighten with gear clamp.

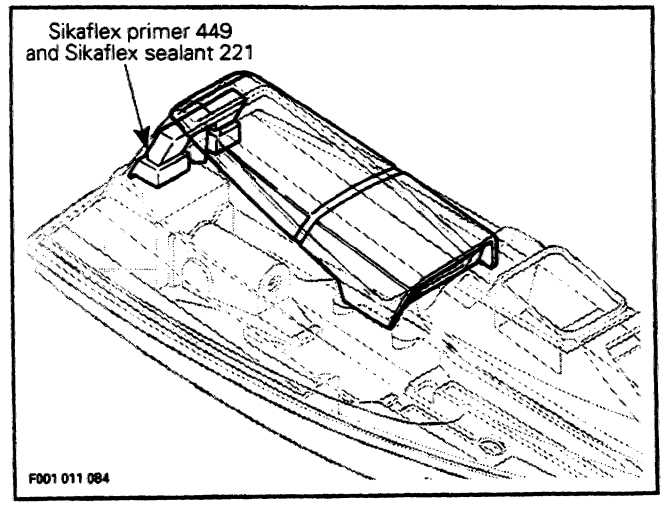


13,24, Rear Baffle and Vent Hose

Apply Sikaflex primer 449 (P / N 293 530 012) on rear baffle and body sections to be sealed.

▼ **CAUTION : Allow at least 30 minutes for primer to cure.**

Apply Sikaflex sealant 221 (P / N 293 530 011) on rear baffle section to be sealed.



Install rear baffle on body, align properly rear inlet grill openings and hold in position with a light pressure. Reinstall rear vent hose, exhaust formed hose and air silencer.

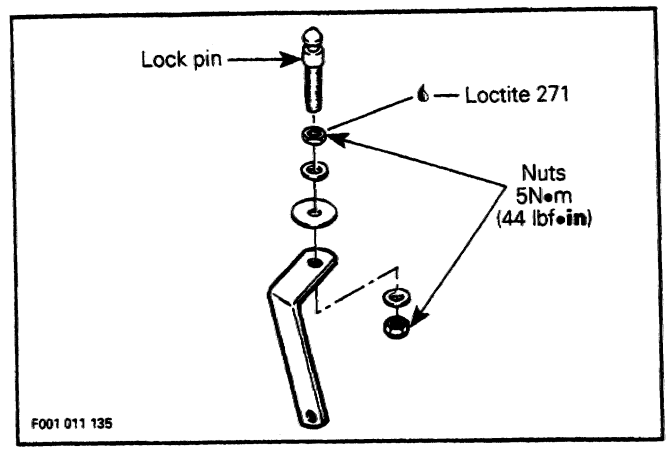
Before using the watercraft wait three days for Sikaflex curing time.

7,49, Lock Pin and Seat

Adjust front and rear hooks so that when seat is latched, seal is compressed to insure a water-tight fit.

To adjust rear hook untighten lock pin nuts.

Thread in or out lock pin as needed.



Install seat and verify if seal is compressed.

Remove seat.

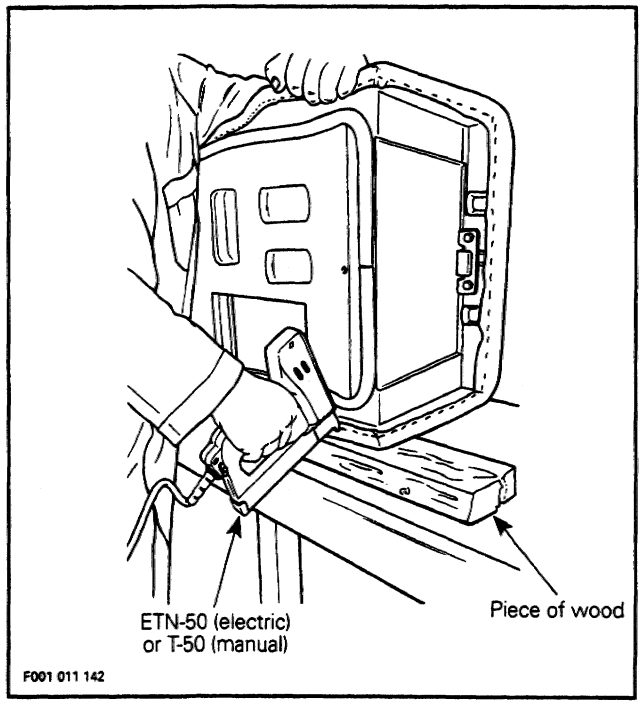
Torque nuts to 5 N•m (44 lbf•**in**).

Seat Cover

Install staples with an electric tacker such as Arrow tacker no. ETN-50 or with a manual tacker such as Arrow tacker no. T-50.

NOTE : For an easier installation it's highly recommended to use an electric tacker.

Ensure that the seat rest firmly against a hard surface such as a piece of wood. This is done to get the staples completely pushed in place.



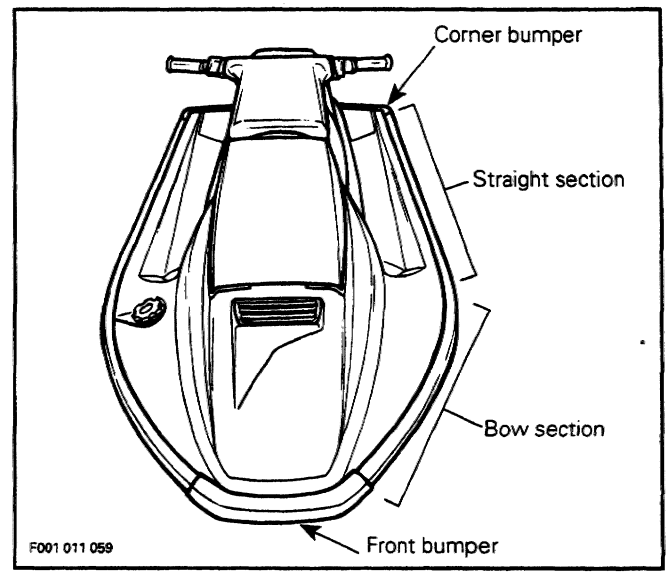
After cover installation cut all around the excess of material.

Bumper

1 - Remove trim from side bumper rail.

2 - Drill pop rivets to remove side bumper rail.

3 - Mark hole positions on body straight and bow sections.



4 - Slide bumper rail under front bumper.

5 - Using a 4.80 mm (3/16 in) drill bit, drill first hole through bumper rail at front of bow section. Use locating mark as a guide. Then install a rivet.

CAUTION : When drilling, be careful not to damage bumper rail and / or hull.

6 - Position bumper rail properly onto body and cut excess length if necessary.

7 - Slide bumper rail in corner bumper.

8 - Using hole positions previously marked on body, drill holes in bumper rail and install rivets.

9 - Install trim using soapy water.

10 - Repeat procedure for the other side.

Hull and Body Repair

Body is made of fiberglass. Hull is made of fiberglass featuring aluminum inserts to allow strong structural attachment points.

Fiberglass finish is made of Gelcoat layer which gives its color and smooth finish.

Fiberglass repair kit is available through automotive or marine suppliers.

Gelcoat repair kits are available through regular channel.

Gelcote® kit (small repair) : P / N 295 500 100.

Gelcote paste (white, 300 mL (10 oz)) : P / N 293 500 016. This paste is included in kit P / N 295 500 100 but can be ordered separately.

Liquid Gelcote, (1 liter) :
white : P / N 293 500 033
mauve : P / N 293 500 034
grey : P / N 293 500 035
light grey : P / N 293 500 037
green : P / N 293 500 038
turquoise : P / N 293 500 039

How to use gelcote kit for small repair :

Clean damaged area free of wax, dirt, grease etc.

Enough paste should be mixed to make all repairs. Mix approximately 1 part pigment to 20 parts paste.

Place enough of the already matched pigmented paste on a piece of wood or cardboard. Mix four drops of hardener in 1 teaspoon of paste, mix thoroughly. This will give approximately 15 minutes of working time at 70°F or 21°C.

Apply mix to damaged area, working it into the area with a wooden or plastic spatula, squeeze off excess paste to the contour of the surrounding area. Care should be taken not to have excess paste on surrounding undamaged surface.

For higher gloss and greater smoothness, the repair should be covered with a piece of clear plastic release film and let to cure.

After approximately 2 hours remove the plastic film. Deep damage may require several applications. For a quality repair job you can sand repair area with 600 Grit Wet sand paper, then buff with a fine rubbing coumpound and wax.

How to use liquid gelcote (1 liter) for large repair :

Clean damaged area making sure it is free of any dirt, grease etc.

Before spraying, all fiberglass surface repairs should be done with Bombardier Small Repair Gelcote (P / N 293 500 016 or 295 500 100) to mask cracks.

Mixing of spray Gelcote :

Mix four drops of catalyst per teaspoon of Gelcote. This will allow you 15 minutes of working time at 21°C (70°F).

To mix one liter of Gelcote, 14 mL (1/2 oz) to 21 mL (3/4 oz) of catalyst is required.

Adding too much catalyst may change Gelcote color.

Spray the work area with the mix.

To ease spraying add acetone (10 % is sufficient) to the mix.

Allow to cure completely overnight.

Hand sand using a 400 - 600 grit wet paper.

Finish the repair area by rubbing or buffing with a fine rubbing compound. When using a power buffer, be sure not to cut through surface and do not keep buffer on the same area for a prolonged time, this prevents heat build-up and discoloration.

PAINTING

NOTE : When using gelcoat it is not necessary to paint over it.

The following was prepared in conjunction with PPG Industries Inc. It contains a list of SEA-DOO parts with their respective PPG color codes and two painting procedures, CONCEPT™ the most commonly used and DELTA™ (with low VOC) mainly used in California.

PPG Industries Inc. sells paint and related products and these are **not** available through Bombardier Inc. network. To find your nearest PPG dealer dial one of the following numbers.

NORTH AMERICA

CANADA

Phone : 1-800-363-2816

U.S.A.

Phone : (216) 572-6100
(This phone number is also good for all countries. Communications are available in english, french and spanish)

PACIFIC RIM

JAPAN

Phone : 81-3-3280-2851

KOREA

Phone : 82-32-529-8141
82-32-523-8600
82-51-624-8221
82-2-792-2477

EUROPE

DENMARK

Phone : 45-31-54-9211

FRANCE

Phone : 33-1-48-35-7777
33-27-14-9700
33-27-14-4600

GERMANY

Phone : 49-202-788-1

ITALY

Phone : 39-81-831-1222
39-2-37-701
39-131-7701

PORTUGAL

Phone : 351-230-17-43

SPAIN

Phone : 34-3-588-2000
34-3-711-51-54
34-6-154-7035
34-83-54-0400 / 04

SWEDEN

Phone : 46-479-14-445

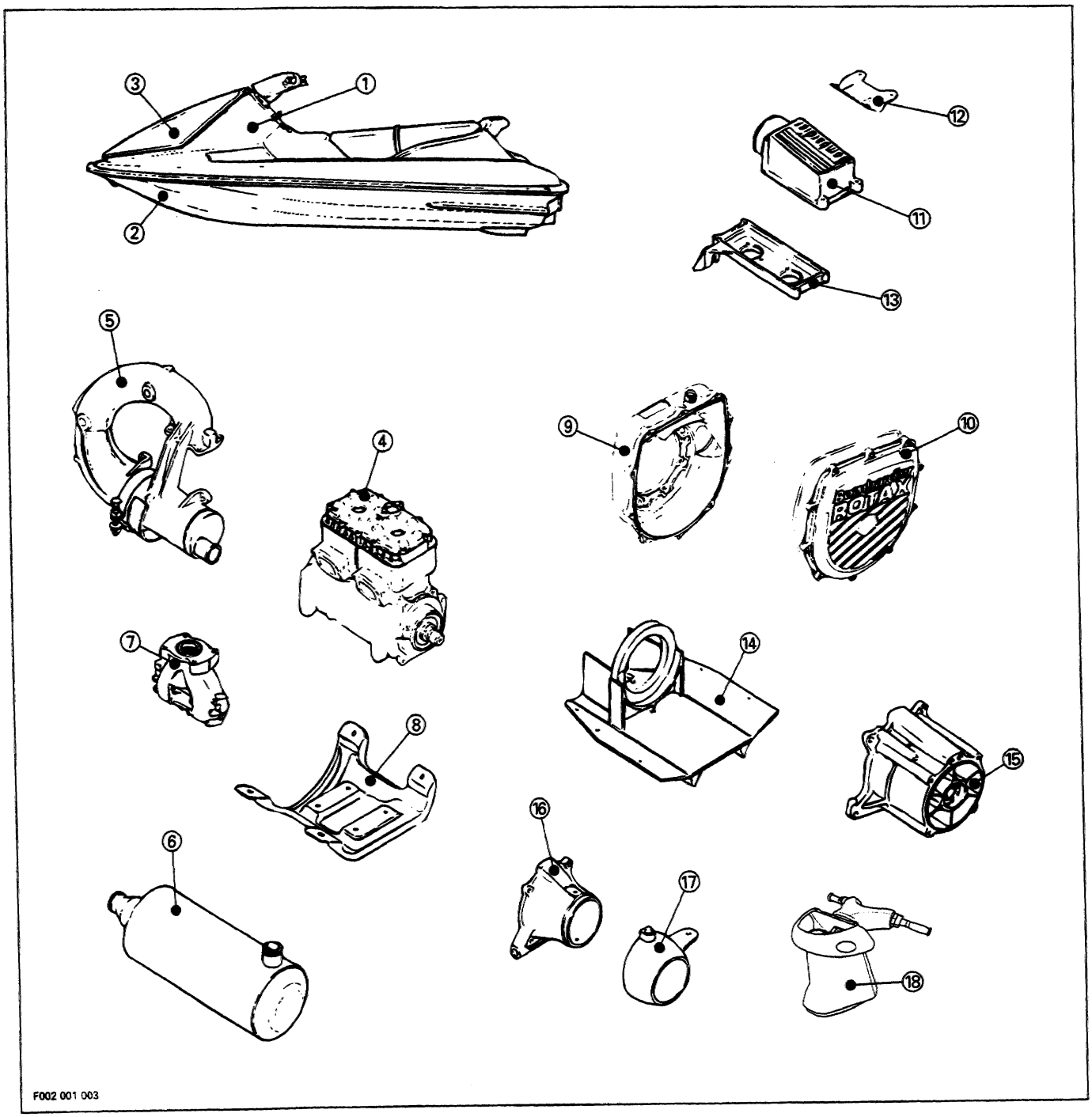
UNITED KINGDOM

Phone : 44-21-455-9866
44-926-410-255

PPG paint for Sea-Doo is not available in spray can. For best result it must be applied by a professional painter.

For fast touch up on **metallic parts only** refer to the appropriate Bombardier *Sea-Doo parts catalog*, it contains a few spray can part numbers.

PARTS THAT CAN BE PAINTED



1. *Body*
2. *Hull*
3. *Storage cover*
4. *Engine*
5. *Tuned pipe*
6. *Muffler*
7. *Exhaust manifold*
8. *Engine support*
9. *Ignition housing*
10. *Ignition housing cover*
11. *Flame arrester cover*
12. *Flame arrester support*
13. *Flame arrester base*
14. *Ride shoe*
15. *Impeller housing*
16. *Venturi*
17. *Steering nozzle*
18. *Console*

PPG COLOR CHART

		SEA-DOO MODELS					
		SP (5806) SPI (5808)	SPX (5807)	XP (5852)	GTS (5813)	GTX (5861)	EXPLORER (5820)
1. Body	COLOR PPG no.	White 98223	White 98223	White 98223	White 98223	White 98223	White 98223
2. Hull	COLOR PPG no.	Light Grey 38287	Med. Blue 19518	Light Green 49580	White 98223	White 98223	White 98223
3. Storage cover	COLOR PPG no.	Not applicable	Not applicable	Not applicable	Lavender 59974	Magenta 59973	White 98223
4. Engine	COLOR PPG no.	White 98209	White 98209	White 98209	White 98209	White 98209	White 98209
5. Tuned pipe	COLOR PPG no.	Grey 38269	Grey 38269	Purple 59962	Grey 38269	Purple 59962	Grey 38269
6. Muffler	COLOR PPG no.	Grey 38269	Grey 38269	Purple 59962	Grey 38269	Purple 59962	Grey 38269
7. Exhaust manifold	COLOR PPG no.	White 98209	White 98209	White 98209	White 98209	White 98209	White 98209
8. Engine support	COLOR PPG no.	Black 9551	Black 9551	Black 9551	Black 9551	Black 9551	Black 9551
9. Ignition housing	COLOR PPG no.	White 98209	White 98209	White 98209	White 98209	White 98209	White 98209
10. Ignition housing cover	COLOR PPG no.	White 98209	White 98209	White 98209	White 98209	White 98209	White 98209
11. Flame arrestor cover	COLOR PPG no.	Grey 38269	Grey 38269	Not applicable	Grey 38269	Purple 59962	Grey 38269
12. Flame arrestor support	COLOR PPG no.	Grey 38269	Grey 38269	White 98209	Grey 38269	Purple 59962	Grey 38269
13. Flame arrestor base	COLOR PPG no.	Grey 38269	Grey 38269	Purple 59962	Grey 38269	Purple 59962	Grey 38269
14. Ride shoe	COLOR PPG no.	Black 9551	Black 9551	Black 9551	Black 9551	Black 9551	Black 9551
15. Impeller housing	COLOR PPG no.	Black 9551	Black 9551	Black 9551	Black 9551	Black 9551	Black 9551
16. Venturi	COLOR PPG no.	Black 9551	Black 9551	Black 9551	Black 9551	Black 9551	Black 9551
17. Steering nozzle	COLOR PPG no.	Black 9551	Black 9551	Black 9551	Black 9551	Black 9551	Black 9551
18. Console	COLOR PPG no.	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	White 98223

NOTE : Due to natural discoloration it may be necessary to completely repaint the part.

CONCEPT ™ PAINTING PROCEDURE

For additional information refer to *PPG P-Bulletin* no. 168.

SURFACE PREPARATION

Prepare and clean surface consistent with good painting practices.

Primer

DP Epoxy Primer / DP 401 Catalyst ; DX 1791 / 1792 (Prime before topcoating).

Primer Surfacer

K36 / K201, K200 / K201 or DZ KONDAR® Primer Surfacers.

NOTE : KONDAR must be sealed before applying CONCEPT color.

Sealer

KTS30 2K Sealer, DP Epoxy Primer reduced as a sealer or DAS 1980 or DAS 1987.

Direct Gloss Color

How to Mix

Standard Air Dry : Mix CONCEPT Color 2:1:1 - two parts color with one part DT Reducer best suited to shop temperatures and one part DU 4 (below 85°F (29°C)) or DU 5 (above 85°F (29°C)) Hardener.

Standard Force Dry : Mix CONCEPT Color 2:1:1 - Application temperatures below 85°F (29°C) use DU 5 Hardener, above 85°F (29°C) use DU 6.

Medium Solids (MS) Application : For faster film build, when using solid colors, mix two parts CONCEPT color with half part DT Reducer and one part DU 5 or DU 6 Hardener. Select the DT Reducer appropriate for shop temperature.

Pot Life

Pot life of ready-to-spray CONCEPT color is six to eight hours at 70°F (21°C). Medium solids option is two to four hours at 70°F (21°C).

FULL PANEL AND OVERALL REPAIRS

Application

Apply one medium wet coat and give 5-10 minutes flash, followed by two wet coats with 15 minutes flash time between each coat. Adjust metallic on the last full wet coat. If necessary, apply a mist coat. For medium solids option apply two full wet coats.

Air Pressure

40-50 lbs. at-the-gun.

Dry Time

— Dust free : 30 minutes.

— Tack free : two to three hours.

— Tape print free : six hours.

— Dry to handle : six to eight hours at 70°F (21°C.).

— Force dry : 40 minutes at 140°F (60°C).

Faster dry times may be obtained by using 1/2 oz (15 mL) of DXR 81 Accelerator per sprayable quart, however, the pot life is reduced to two hours.

SPOT / PANEL REPAIRS

Application

Spray medium wet coat of color on the repair area and allow 5-10 minutes flash time. Apply two additional full coats until hiding is achieved, extending each coat beyond the previous coat. Flash 15 minutes between each coat. For medium solids option apply two full wet coats.

Blending

Add DT 95 Reducer to a second gun cup. Reduce the fluid feed of the gun and lower the air pressure to 30 PSI. Dust the dry edge until a slight wet look appears, then stop. Or mix reduced and catalyzed color with equal parts of reduced and catalyzed CONCEPT DCU 2020 Clear.

DELTA™ PAINTING PROCEDURE
(with low VOC, mainly in California)

For additional information refer to *PPG P-Bulletin* no. 157.

SURFACE PREPARATION

Primer : DELTA™ PRIME DPU 166.

DELTA™ 2800, COLOR

How to Mix

Mix DELTA™ 2800 2:1, two parts Colors to one DU 6 Catalyst.

Application

Apply two coats of DELTA™ Polyurethane Color. Apply the first coat at 1.5 -1.8 wet mils. Allow a minimum of 15 minutes flash time prior application of the second coat. Apply a second coat of DELTA™ using the same technique as the first application, paying strict attention to gun set up and proper equipment choices.

RECOMMENDED SPRAY EQUIPMENT

Gun Manufacturer	DeVilbiss	Binks	Graco	HVLP
Gun Model	JGA	62	800N	Can Am Model 900
Fluid Tip Size	FF (0.055) 1.4 mm	63D (0.059) 1.5 mm	02N (0.047) 1.2 mm	HT #9072 (0.098) 2.5 mm
Air Cap	797 / 264	63PW	02 / 03	C9062
Gun Distance	10"-12"	10"-12"	10"-12"	10"-12"
Fluid Delivery oz. / min.	8-12	8-12	8-12	8-12
Air Pressure (At-the-Gun)	60-75#	60-75#	60-75#	9#

Dry Time (at 70°F (21°C))

— Dust free : 25-35 minutes.

— Tack free : Two and a half - three hours.

— Tape / Sand : Overnight.

Force Dry

Allow 20 minutes purge time at 80-90°F (27-32°C) before bake. Bake 75 minutes at 150°F (65°C) or 40 minutes at 180°F (82°C). Allow to cool after force dry, before sanding or taping.

DECALS

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.

Pull decal slowly and when necessary apply more heat to ease removal on the area that has to be peeled off.

To know when decal has enough heat : if decal tears while pulling off it needs 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 off.

Installation

There are two types of decals used on watercraft. One having a protective film on back side and the other one a protective film on both sides. They are used on three types of materials ; plastic, gelcoat and metal.

INSTALLATION OF DECALS HAVING A PROTECTIVE FILM ON BACK SIDE ONLY

These decals usually contain written information (ex : warning) and are used on gelcoat or metal.

Clean surface with a good solvent such as ACRYLI-CLEAN DX 330 from PPG or equivalent (refer to manufacturer instructions).

Using a pencil and the decal as a template, mark the area where decal will be located.

Remove from decal one half of its 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.

INSTALLATION OF DECALS HAVING A PROTECTIVE FILM ON BOTH SIDES

These decals usually contain graphics and are used on gelcoat or plastic.

Installation on gelcoat

Clean surface with a good solvent such as ACRYLI-CLEAN DX 330 from PPG or equivalent (refer to manufacturer instructions).

For best result apply an activator (P / N 293 530 036) to prepare the surface using a clean cloth. After a few seconds, when the activator evaporates, the surface is ready.

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 (storage cover)

Clean surface with isopropyl alcohol.

Using a pencil and the decal as a template, mark the area where decal will be located.

Apply an activator (P / N 293 530 036) to prepare the surface using a clean cloth. After a few seconds, when the activator evaporates, the surface is ready.

▼CAUTION : 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.

REMOVAL

Deflate all tube sections. Remove front and rear retaining plates screws.

Spray soapy water all along hull slots.

Pull and slide tube toward front of watercraft.

▼**CAUTION : Whenever tube is folded, place a shield between lateral bumper and tube. If both parts touches for a certain period of time, permanent stains will remain on tube.**

CLEANING

When the watercraft is operated in unclean water and **particularly in salt water**, tube must be rinsed frequently with fresh water.

Occasionally, wash the tube with warm water and soap (only use mild detergent).

Stubborn stains and scuff marks may be removed using methylethyl ketone, toluene or acetone.

▼**CAUTION : Never clean decals with strong detergent, methyl ethyl ketone, toluene or acetone. Limit application of these solvents on tube joints to avoid glue dilution.**

INSTALLATION

Spray soapy water all along tube cordes.

○ NOTE : Tube must be deflated.

Starting with the rear of the tube, insert cordes in hull slot front openings and slide tube slowly toward the rear of the watercraft.

Once in place, secure front and rear retaining plates with screws.

TUBE REPAIR

How to Find Slow Leaks

Confirm with customer which tube section (s) is leaking.

○ NOTE : If customer complains of a general deflation of sections, it is most likely due to temperature variations that affects tube. Always adjust.

Inflate tube section to 21 kPa (3 PSI).

With valve cap removed, spray soapy water on valve. Check for air bubbles.

○ NOTE : If a leak is found, it is recommended to continue testing as the possibility of more than one leak.

If air bubbles are coming out around the valve, retighten valve using pliers.

If plunger is leaking, remove valve after tube inspection. Check for dirt or damage seal. Clean or replace valve as necessary.

Spray soapy water on tube section. Check for air bubbles.

○ NOTE : Half-deflate tube section to ease inspection near hull. Wash dirt accumulation.

Tears Repair of Less than 5 cm (2 in)

For best results, repairs should be performed at temperatures ranging from 18° to 25° C (64° F to 77° F). Avoid carrying out repairs in direct sunlight, rain or in high humidity conditions.

○ NOTE : Any major repair (rear bumper replacement, cord replacement, etc) must be performed only at the factory.

Deflate completely tube section to be repaired.

Cut a patch about 3 cm (1 in) larger than the tear all around. Always round corners.

Using only a pencil, trace on tube the patch position.

▼**CAUTION : Do not use pen or felt-tip pen as ink will permanently mark tube.**

Sand thoroughly tube area with a 80 grit sandpaper.

○ NOTE : Protect surface in vicinity with masking tape.

○ NOTE : Supplied materials included in repair kit don't need to be sanded.

Remove masking tape.

Clean the patch and tube areas with a solvent such as methyl ethyl ketone, toluene or acetone. Allow solvent to completely evaporate.

Apply a **thin** layer of adhesive (included in repair kit or use Bostik 2402-A with hardener 2402-B) to the patch and tube. Allow adhesive to dry so that it is dry to the touch.

○ NOTE : Mix Bostik glue and hardener as per instruction on its package. Apply a second **thin** layer of adhesive on both parts.

Allow the second coat to dry until tacky to the touch; then, position the patch.

Smooth out the patch using a spoon-shaped tool beginning at center and working outward to remove all excess glue and air bubbles.

Allow 24 hours to dry before inflating.

Clean any glue excess.

Tears Repair of More than 5 cm (2 in)

For best results, repairs should be performed at temperatures ranging from 18° to 25° C (64° F to 77° F). Avoid carrying out repairs in direct sunlight, rain or in high humidity conditions.

NOTE : Any major repair (rear bumper replacement, cord replacement, etc) must be performed only at the factory.

Deflate completely tube section to be repaired.

Cut two patches about 3 cm (1 in) larger than the tear all around. Always round corners.

Using only a pencil, trace the patch position on tube.

CAUTION : Do not use pen or felt-tip pen as ink will permanently mark tube.

Sand thoroughly tube areas (inner and outer) with a 80 grit sandpaper.

NOTE : Protect the outer surface in vicinity with masking tape.

NOTE : Supplied materials included in repair kit don't need to be sanded.

Remove masking tape.

Clean the patch and tube areas with a solvent such as methylethyl ketone, toluene or acetone. Allow solvent to completely evaporate.

Apply a **thin** layer of adhesive (included in repair kit or use Bostik 2402-A with hardener 2402-B) to one patch and to inner section tube. Allow adhesive to dry so that it is dry to the touch.

NOTE : Mix Bostik glue and hardener as per instruction on its package. Apply a second **thin** layer of adhesive on both parts.

Allow the second coat to dry until tacky to the touch; then, position the patch.

NOTE : To ease patch installation, roll it tightly and insert it through the tube tear.

Smooth out the patch using a spoon-shaped tool beginning at center and working outward to remove all excess glue and air bubbles.

Repeat the same bonding procedure for the outer patch.

Allow 24 hours to dry before inflating.

Clean any glue excess.

Grab Handle Replacement

To replace a broken handle, proceed as follows :

Set tube section pressure to 14 kPa (2PSI). Using a heat gun, remove handle.

Clean tube surface with a solvent such as methylethyl ketone, toluene or acetone.

Sand thoroughly tube area and the new handle with a 80 grit sandpaper.

NOTE : Protect tube surface in vicinity with masking tape.

Remove masking tape.

Clean the handle and tube areas with a solvent such as methylethyl ketone, toluene or acetone. Allow solvent to completely evaporate.

Apply a **thin** layer of adhesive (included in repair kit or use Bostik 2402-A with hardener 2402-B) to the handle and tube. Allow adhesive to dry so that it is dry to the touch.

NOTE : Mix Bostik glue and hardener as per instruction on its package. Apply a second **thin** layer of adhesive on both parts.

Allow the second coat to dry until tacky to the touch; then, position the handle.

Smooth out the handle using a spoon-shaped tool beginning at center and working outward to remove all excess glue and air bubbles.

Allow 24 hours to dry.

Clean any glue excess.

Lateral Bumper Bonding

If part of the lateral bumper needs to be bonded, proceed as follows :

Set tube section pressure to 14 kPa (2PSI).

Clean tube and bumper surfaces with a solvent such as methylethyl ketone, toluene or acetone.

Sand thoroughly tube area with a 80 grit sandpaper.

NOTE : Protect tube surface in vicinity with masking tape.

Remove masking tape.

Clean tube area with solvent. Allow solvent to completely evaporate.

Apply a **thin** layer of adhesive (use Bostik no. 7127 or a PVC plastic glue) to the bumper and tube.

Allow adhesive to dry so that it is dry to the touch.

Apply a second **thin** layer of adhesive on both parts.

Allow the second coat to dry until tacky to the touch; then, install the lateral bumper.

Allow 24 hours to dry.

Clean any glue excess.

STORAGE

It is during winter or when the watercraft is not to be in use for a prolonged time that a proper storage is a necessity. Storage during long periods of inactivity consists of checking and replacing missing, broken or worn parts and protecting cooling system against freezing and corrosion and deflating tube of the EXPLORER.

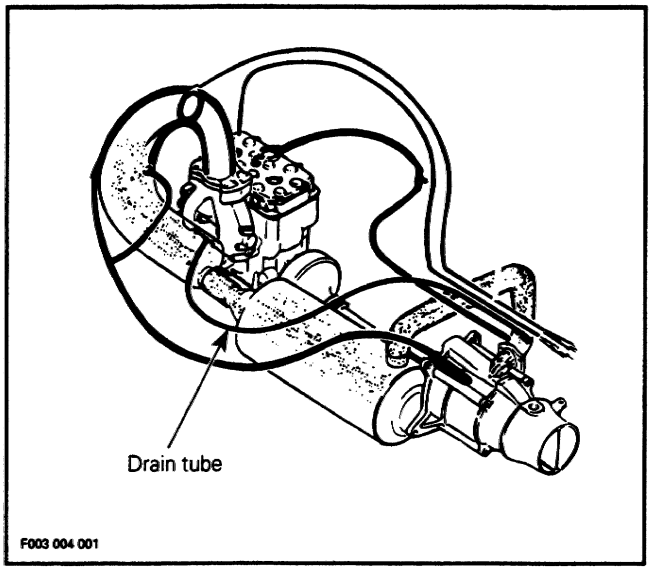
NOTE : If possible store the EXPLORER with its tube 90% inflated. If not possible, fold the tube onto deck and tie it loosely.

Proper lubrication and treatment should be performed to insure that parts do not become corroded and in general, preparing the watercraft so that when the time comes to use it again, it will be in top condition.

Engine Draining

Check engine drain tube running from engine manifold socket to exhaust outlet socket. Make sure there is no sand or other particles in it and that it is not obstructed so that water can leave the engine. Clean tube and fitting (on exhaust outlet) as necessary.

CAUTION : Water in engine drain tube must be free to flow out, otherwise water could be trapped in engine. Should water freeze in engine, severe damage will occur. Check engine drain tube for obstructions.



Fuel System

A fuel stabilizer, such as Sta-Bil® (or equivalent), can be added in fuel tank to prevent fuel deterioration and carburetor(s) gumming. Follow manufacturer's instructions for proper use.

CAUTION : Fuel stabilizer should be added prior engine lubrication to ensure carburetor(s) protection against varnish deposit.

WARNING : Fuel is flammable and explosive under certain conditions. Always work in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity. Always wipe off any fuel spillage from the watercraft.

Cooling System Flushing and Engine Internal Lubrication

Cooling system has to be flushed with **fresh water** to prevent salt, sand or dirt accumulation which will clog water passages. This will be achieved with the coupler hose (P / N 295 500 099).

Engine must be lubricated to prevent corrosion on internal parts. This will be achieved by spraying SEA-DOO LUBE (P / N 293 600 006) through air intake opening.

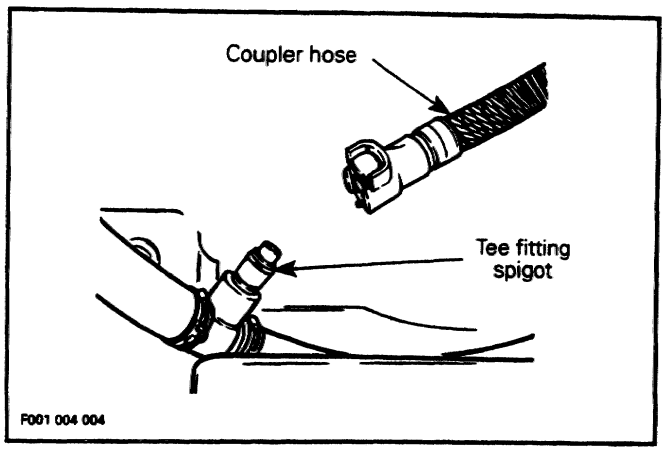
Procedure

WARNING : Perform this operation in a well ventilated area.

1. Clean jet pump by spraying water in its inlet and outlet and then SEA-DOO LUBE.

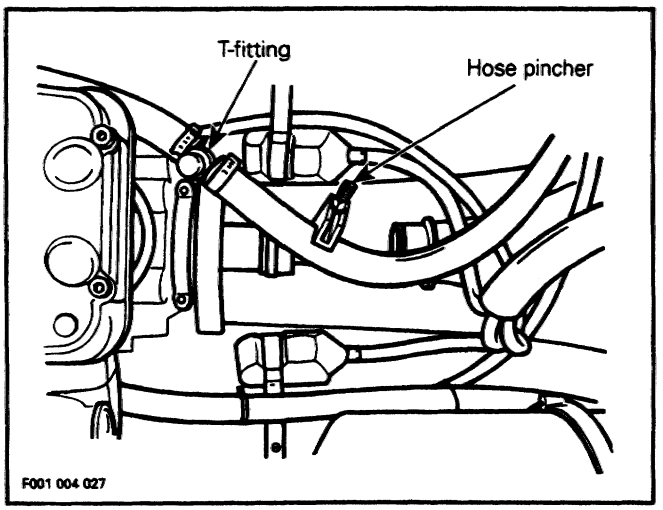
WARNING : Always remove tether cord cap from switch to prevent accidental engine starting before cleaning the jet pump area. Engine must not be running for this operation.

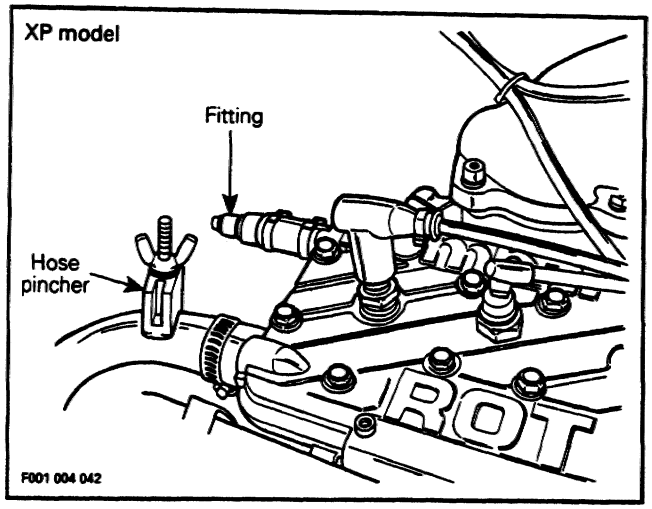
2. Remove seat to allow access of cooling system.
3. Remove dust cap from tee fitting spigot and attach coupler hose. Make sure coupler hose is properly locked to tee fitting spigot.



Attach other end of coupler hose to a garden hose. **Do not open water tap yet.**

NOTE : To allow a more efficient flushing on watercraft, install a hose pincer (P / N 295 000 076) between T-fitting and exhaust socket. This prevents water from exiting through exhaust socket. Remove hose pincher after flushing operation.





4. Start the engine **then** immediately open the water tap.

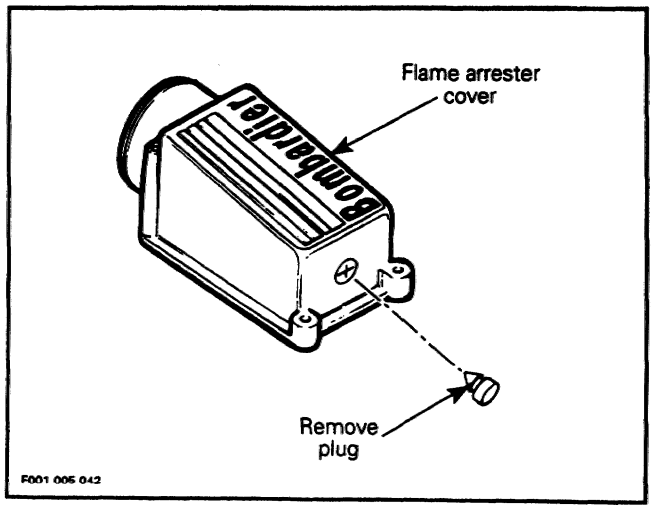
WARNING : Do not touch any electrical part or jet pump area when engine is running.

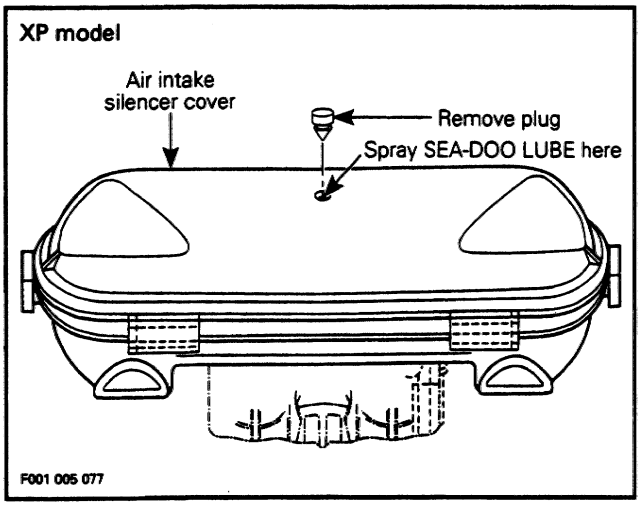
CAUTION : Never flush a hot engine. Always start the engine before opening the water tap. Otherwise, water will back flow through the tuned pipe into the engine and may cause damage to internal parts. Open water tap immediately after engine is started to prevent overheating. Follow this procedure exactly.

5. Run the engine about five minutes at a fast idle around 3500 RPM.

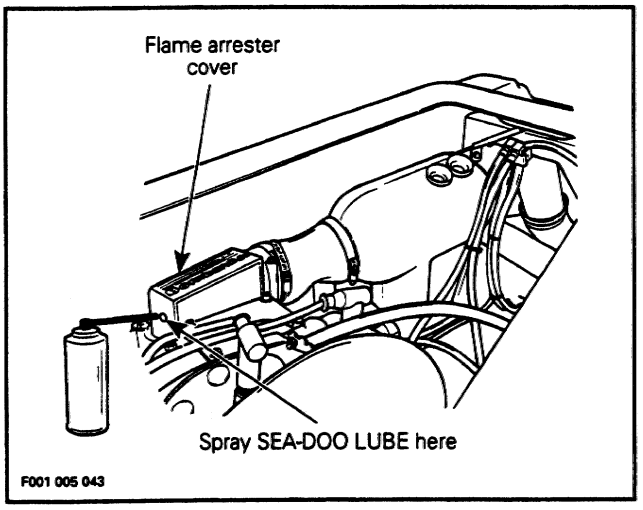
CAUTION : Never run engine longer than five minutes. Drive line seal has no cooling when watercraft is out of water.

6. Remove plug from flame arrester cover.





7. Spray SEA-DOO LUBE (P / N 293 600 006) through flame arrester cover keeping engine at fast idle.



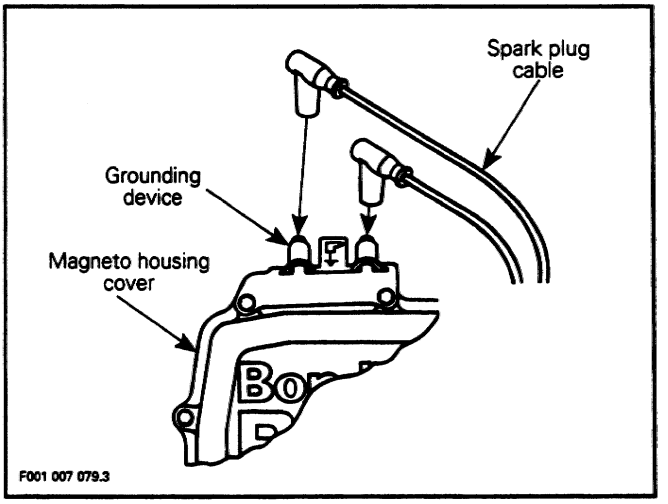
Lubrication of engine should be done at least for one minute. After approximately half a minute, close fuel tank valve to run engine out of fuel while lubricating.

▼CAUTION : When engine begins to run irregularly because of fuel starvation, immediately stop water flow before engine dies. Severe engine damage could result if not done in this order.

8. Close the water tap then stop the engine.

▼CAUTION : Always close the water tap before stopping the engine. Follow this procedure exactly otherwise severe engine damage could occur.

9. Press unlocking button to remove coupler hose. Reinstall dust cap over tee fitting.
10. Wipe up any residual water on the engine.
11. Remove spark plug cables and connect them on the grounding device.



Remove both spark plugs and spray SEA-DOO LUBE into each cylinder.

Crank the engine a few turns to distribute the oil onto cylinder wall.

12. Apply anti-seize lubricant on spark plug threads then reinstall them.
13. Reinstall plug on flame arrester cover.

▼CAUTION : Do not run the engine during the storage period.

Watercraft Rinsing

Thoroughly rinse the watercraft hull, bilge, engine compartment, with **fresh water**.

Propulsion System

Lubricant in impeller shaft reservoir should be drained and reservoir cleaned refilled with 65 mL (2.2 U.S. oz) of SEA-DOO synthetic oil polyolester (P / N 293 600 011) 75W 90 GL5 type "C" gear lube. Refer to PROPULSION AND DRIVE SYSTEMS 08-01 then look for **oil inspection / replacement**.

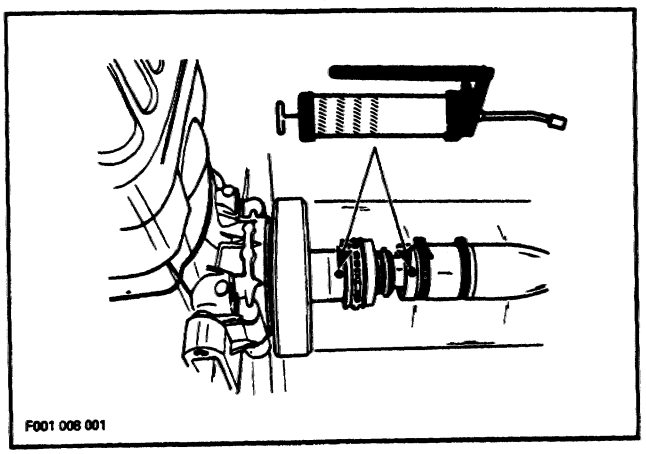
▼CAUTION : Use only SEA-DOO jet pump oil or equivalent synthetic gear oil, otherwise component service life could be reduced. Do not mix oil brands or types.

Lubricate drive shaft splines through grease fitting at PTO flywheel end with synthetic grease (P / N 293 550 010).

▼CAUTION : Do not lubricate excessively. Immediately stop when a slight movement is noticed on rubber boot.

Lubricate at seal carrier grease fitting until grease is just coming out on engine side.

▼CAUTION : As soon as grease comes out the seal immediately stop lubricating to prevent seal damage and overheating.



▼CAUTION : Never leave any clothing, tool or other objects near PTO flywheel and seal carrier.

Battery

Refer to BATTERY 07-03 then look for **removal** to remove and clean the battery. Apply some dielectric grease (P / N 293 550 004) or petroleum jelly on battery posts and all exposed cable connectors.

Add distilled water if necessary then give the battery a full charge at a maximum rate of two amperes.

Refer to BATTERY 07-03 then look for **charging**.

Store the battery on a wood shelf in a warm dry place away from direct sunlight.

To prevent battery sulphating and discharging, have it charged every month.

Anticorrosion Treatment

Wipe off any residual water in the engine compartment.

Spray SEA-DOO LUBE over all metallic components in engine compartment.

Additional Recommended Protection

Cooling system may be filled with a 50 / 50 water / antifreeze solution.

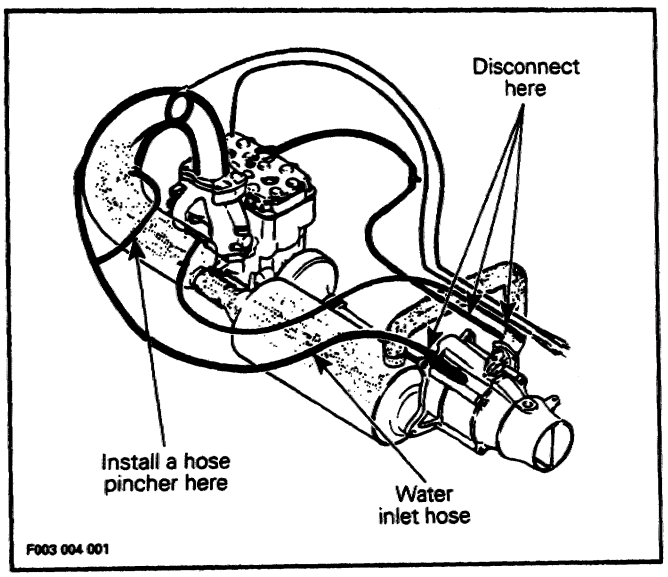
▼CAUTION : Always use ethylene-glycol antifreeze containing corrosion inhibitors specifically recommended for aluminum engines.

○NOTE : The engine will not have to run during this operation.

Three hoses have to be disconnected to allow air to escape and antifreeze solution to completely fill cooling system water jackets.

Install a hose pincher on water injection hose.

Disconnect hoses where shown.

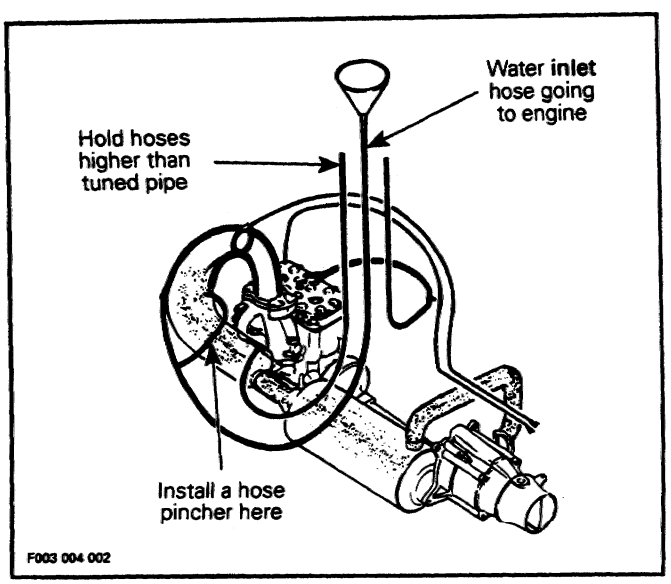


Raise all hoses above the highest point of tuned pipe and temporarily tie them together.

Insert a funnel into **inlet** hose going to the water inlet socket at tuned pipe. Pour about two liters (1/2 gal) of antifreeze solution through the funnel.

Tie up all hoses higher than tuned pipe.

○NOTE : If hoses are not attached higher than tuned pipe, coolant will drain out.



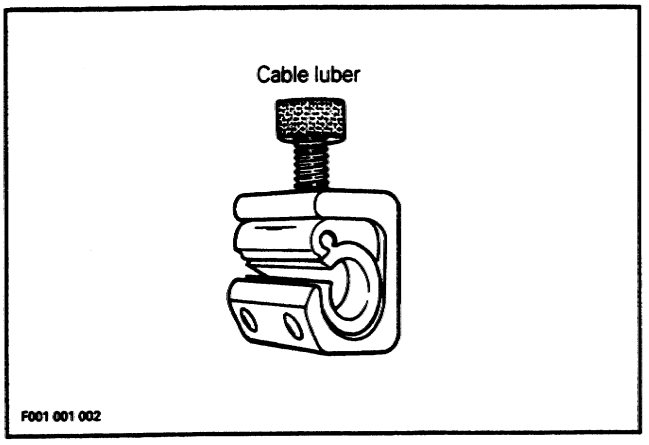
The following steps should be performed to provide the watercraft enhanced protection.

Remove muffler and drain out as much water as possible. Reinstall muffler.

OR : Disconnect one hose from muffler and pour some antifreeze liquid inside muffler. Reconnect hose.

Lubricate the throttle cable with SEA-DOO LUBE.

NOTE : A cable luber can be used on throttle cable end to inject SEA-DOO LUBE. Refer to a motorcycle parts supplier for availability.



Clean the bilge with hot water and mild detergent or with bilge cleaner. Rinse thoroughly. Lift front end of watercraft to completely drain bilge. If any repairs are needed to body or to the hull, touch up paint and Gelcote® repair kit are available. Refer to SERVICE TOOLS AND PRODUCTS 01-02. Replace damaged labels / decals.

NOTE : Bilge cleaning should be done prior anti-corrosion treatment.

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

CAUTION : Never clean apparent fiberglass and plastic parts with strong detergent, degreasing agent, paint thinner, acetone, etc.

Thoroughly wash inflatable tube (EXPLORER only) with **fresh soapy water.** Stubborn stains and scuff marks may be removed with a pretroleum based solvent such as acetone or toluene then wash tube.

CAUTION : Never clean decals with strong detergent, methylethyl ketone, toluene or acetone. Limit application of these solvents on tube joints to avoid glue dilution.

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.

CAUTION : The watercraft must never be left in water for storage. Never leave the watercraft stored in direct sunlight. UV radiation will dull finishes.

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

NOTE : If the watercraft is stored outside with seat partially opened and without a tarpaulin, remove the rear drain plug(s) in order to avoid water build up in the bilge during rainfall. Tilt the watercraft to the rear so that water can flow out of floorboard.

SP 5806, SPI 5808, SPX 5807 MODELS

ENGINE		SP (5806)	SPI (5808)	SPX (5807)
Engine type		Bombardier-Rotax 587, water cooled		
Induction type		Rotary valve		
Exhaust system	Type	Water cooled, water injected		
	Water injection fitting	4.6 mm (0.181 in)		
Starting system		Electric start		
Lubrication	Fuel / oil mixture	VROI (Variable rate of injection)		
	Oil injection pump	Gear		
	Oil type	SEA-DOO injection oil		
Number of cylinders		2		
Bore	Standard	76.0 mm (2.992 in)		
	First oversize	76.25 mm (3.002 in)		
	Second oversize	76.50 mm (3.012 in)		
Stroke		64 mm (2.520 in)		
Displacement		580.7 cm^3 (35.4 in^3)		
Compression ratio	(uncorrected)	11.5:1		
	(corrected)	6.5:1		
Engine maximum torque		64 N•m (47 lbf•ft) @ 5500 RPM		67 N•m (49 lbf•ft) @ 5750 RPM
Cylinder head warpage		N.A.		
Piston ring type and quantity		1 Semi-Trapez — 1 Rectangular		
Ring end gap	New	0.25 - 0.40 mm (.010 - .016 in)		
	Wear limit	1.00 mm (.039 in)		
Ring / piston groove clearance	New	0.05 - 0.08 mm (.002 - .003 in)		
	Wear limit	0.2 mm (.008 in)		
Piston / cylinder wall clearance	Neuf	0.05 - 0.07 mm (.002 - .003 in)		
	Wear limit	0.2 mm (.008 in)		
Cylinder taper (maximum)		0.08 mm (.003 in)		
Cylinder out of round (maximum)		0.05 mm (.002 in)		
Connecting rod big end axial play	New	0.39 - 0.74 mm (.015 - .029 in)		
	Wear limit	1.2 mm (.047 in)		
Crankshaft deflection		0.08 mm (.003 in)		
Rotary valve timing	Opening	115°±5 BTDC		130°±5 BTDC
	Closing	80°±5 ATDC		65°±5 ATDC
Rotary valve plate opening		147°		
Crankcase / rotary valve gap		0.25 - 0.35 mm (.010 - .014 in)		
Connecting rod / crankshaft pin radial clearance	New	0.020 - 0.033 mm (.0008 - .0013 in)		
	Wear linit	0.050 mm (.002 in)		
Connecting rod / piston pin radial clearance	New	0.003 - 0.012 mm (0.00012 - 0.00047 in)		
	Wear limit	0.015 mm (0.00059 in)		
ADDITIONAL INFORMATION:				
Squish gap		1.3 - 1.7 mm (0.051 - 0.067 in)		

ELECTRICAL (engine)		SP (5806)	SPI(5808)	SPX (5807)
Magneto generator output		160 W @ 6000 RPM		
Ignition system, type		CDI 4/5 p		
Spark plug	Make and type	NGK BR7ES		
	Gap	0.5 mm (.020 in)		
Ignition timing	BTDC	2.65 mm (.104 in) (21° ± 1)		
	Engine speed (cold)	6000 RPM		
Generating coil		40 - 76 Ω		
Battery charging coil		.05 - .6 Ω		
High tension coil	Secondary	9 - 15 KΩ		
Engine RPM limiter operation		6550 ± 100		
ADDITIONAL INFORMATION:				

CARBURETION		SP (5806)	SPI (5808)	SPX (5807)
Carburetor	Type	Diaphragm		
	Quantity	1		2
Main jet		125		107.5
Pilot jet		67.5		62.5
Adjustment	Low-speed mixture screw	1 turn ± 1/4		1-1/4 turn ± 1/4
	High-speed screw	0		
	Idle speed (in water)	1400 RPM		
	Idle speed (out of water)	2400 RPM		3000 RPM
Fuel	Type	Regular unleaded		
	Octane no.	87 (Ron + Mon) / 2		
Fuel return line orifice		0.5 mm (0.020 in)		0.5 mm (0.020 in) (PTO side)
Leak test (pop off pressure)		150-200 kPa (22-29 PSI)		
ADDITIONAL INFORMATION:				

COOLING	SP (5806)	SPI (5808)	SPX (5807)
Type	Open circuit - Direct flow from jet propulsion unit		
Thermostat	None		
Overheating beeper setting	96-99°C (205-210°F)		
ADDITIONAL INFORMATION:			

PROPULSION			SP (5806)	SPI (5808)	SPX (5807)
Propulsion system			Bombardier Formula Pump		
Jet pump type			Axial flow single stage		
Impeller rotation (seen from rear)			Counterclockwise		
Transmission			Direct drive		
Coupling type			Crown splines		
PROPULSION UNIT	Oil type		SEA-DOO JET PUMP SYNTHETIC OIL Polyolester75W90 GL5 (P/N 293 600 011)		
	Steering nozzle pivoting angle		26°		
	Trim nozzle pivoting angle		N.A.		
	Minimum required water level		60 cm (24 in)		
	Drive shaft deflection maximum		0.5 mm (.020 in)		
	Impeller outside diameter		139.5 mm (5.490 in)		
	Impeller / wear ring clearance	Wear limit (performance)	0.5 mm (.020 in)		
		Wear limit	1.02 mm (.040 in)		
	Impeller shaft end play (new)		0.12 - 0.54 mm (.005 - .021 in)		
	Impeller shaft side play		0.05 mm (.002 in)		
	Impeller pitch / material		18°/ aluminium	17.7°/ stainless steel	Progressive pitch 16°-20.5°/ stainless steel
	ADDITIONAL INFORMATION: Do not mix different trademarks or type of oil.				

DIMENSIONS		SP (5806)	SPI (5808)	SPX (5807)
Number de passenger (driver incl.)		2		
Length, overall		256 cm (100.5 in)		
Width, overall		105 cm (41.5 in)		
Height, overall		92 cm (36.2 in)		
Mass		167 kg (368 lb)		168 kg (370 lb)
Load limit (passenger + luggage)		160 kg (352 lb)		
MATERIALS	Hull	Composite		
	Air intake silencer	Thermoplastic		
	Flame arrester	Multi-layer wire screen		
	Exhaust muffler	Aluminum		
	Steering padding	Thermoplastic elastomer with polystyrene foam		
	Fuel tank	Polyethylene		
	Injection oil tank	Polyethylene		
	Seat	Polyurethane foam		
ADDITIONAL INFORMATION:				

PERFORMANCE		SP (5806)	SPI (5808)	SPX (5807)
Pump static thrust		170 kg (375 lb)	200 kg (441 lb)	200 kg (441 lb)
Maximum fuel consumption at wide open throttle		20.8 L / h (5.5 U.S. gal / h)		22.7 L / h. (6 U.S. gal / h)
Cruising time at full throttle	Fuel tank without reserve	1 hour 45 minutes		1 hour 20 minutes
	Fuel tank reserve	20 minutes		13 minutes
ADDITIONAL INFORMATION:				

ELECTRICAL (vehicle)	SP (5806)	SPI (5808)	SPX (5807)
Battery	12 V, 19 A•h		
Starting system fuse	5 A		
Charging system fuse	15 A		
ADDITIONAL INFORMATION:			

CAPACITIES		SP (5806)	SPI (5808)	SPX (5807)
Fuel tank		33 L (8.7 U.S. gal.)		
Impeller shaft reservoir	Capacity	65 mL (2.2 U.S. oz)		
	Oil level height	To bottom of cover hole		
Injection oil tank		2.8 L (95 U.S. fl oz)		
ADDITIONAL INFORMATION:				

STANDARD EQUIPMENT	SP (5806)	SPI (5808)	SPX (5807)
Tether cord	STD		
Tool kit	STD		
Fuel tank reserve	STD		
Overheating warning device	STD		
Electric fuel level gauge	OPT.		STD
Injection oil low level warning device	OPT.		STD
Tachometer	OPT.		
Variable trim system (VTS)	OPT.		
Reverse	N.A.		
Storage compartment	STD		
Rear grab handle	OPT.		STD
Extinguisher holder	STD		
ADDITIONAL INFORMATION:			

TIGHTENING TORQUES			SP (5806), SPI (5808) et SPX (5807)	
ENGINE	Exhaust manifold, screws (8)		24 N•m (17 lbf•ft)	
	Magneto ring nut		105 N•m (77 lbf•ft)	
	Flywheel (PTO side)		110 N•m (81 lbf•ft)	
	Crankcase screws	M6	10 N•m (88 lbf•**in**)	
		M8	24 N•m (17 lbf•ft)	
	Crankcase / engine support nuts		35 N•m (26 lbf•ft)	
	Engine support / hull		25 N•m (18 lbf•ft)	(1)
	Cylinder head screws		24 N•m (17 lbf•ft)	(1)
	Crankcase / cylinder screws		24 N•m (17 lbf•ft)	(1)
	Tuned pipe flange nut and screws		25 N•m (18 lbf•ft)	
	Tuned pipe fixation screws		25 N•m (18 lbf•ft)	(1)
	Cylinder head cover screws		9 N•m (80 lbf•**in**)	(1)
	Flame arrester screws		10 N•m (88 lbf•**in**)	(1)
PUMP	Impeller on shaft		70 N•m (52 lbf•ft)	(2)
	Pump / hull		35 N•m (26 lbf•ft)	(1)
	Venturi / housing		25 N•m (18 lbf•ft)	(1)
	Nozzle / venturi		20 N•m (15 lbf•ft)	(1)
	Housing cover		7 N•m (62 lbf•**in**)	(1)
	Grill		8 N•m (71 lbf•**in**)	(1)
	Ride shoe		10 N•m (88 lbf•**in**)	(1)
STEERING	Steering cable nuts		10 N•m (88 lbf•**in**)	
	Steering support screws		15 N•m (11 lbf•ft)	(1)
	Steering collar screws		5 N•m (44 lbf•**in**)	(1)
	Sterring stem screw		40 N•m (30 lbf•ft)	(2)
	Handlebar saddle screws, nuts		26 N•m (19 lbf•ft)	
	Reverse gate / venturi		N.A.	
	Cable / reverse gate		N.A.	
	Steering cable / stem arm		7 N•m (62 lbf•**in**)	
	Steering cable / nozzle		7 N•m (62 lbf•**in**)	
ELECTRICAL	Ignition housing cover		5 N•m (44 lbf•**in**)	
	Starter mounting screws		22 N•m (16 lbf•ft)	(2)
	Starter lock nuts		6 N•m (53 lbf•**in**)	
	Spark plug		24 N•m (17 lbf•ft)	

ADDITIONAL INFORMATION : Apply where indicated

(1) Loctite 242
(2) Loctite 271
(3) Loctite 515

GTS 5813, GTX 5861 MODELS

ENGINE		GTS (5813)	GTX (5861)
Engine type		Bombardier-Rotax 587, water cooled	
Induction type		Rotary valve	
Exhaust system	Type	Water cooled, water injected	
	Water injection fitting size	4.6 mm (0.181 in)	
Starting system		Electric start	
Lubrication	Fuel / Oil mixture	VROI (Variable rate oil injection)	
	Oil injection pump	Gear	
	Oil type	SEA-DOO injection oil	
Number of cylinders		2	
Bore	Standard	76.0 mm (2.992 in)	
	First oversize	76.25 mm (3.002 in)	
	Second oversize	76.50 mm (3.012 in)	
Stroke		64 mm (2.520 in)	
Displacement		580.7 cm^3 (35.4 in^3)	
Compression ratio	(uncorrected)	11.5:1	
	(corrected)	6.5:1	
Engine maximum torque		64 N•m (47 lbf•ft) @ 5500 RPM	67 N•m (49 lbf•ft) @ 5750 RPM
Cylinder head warpage		N.A.	
Piston ring type and quantity		1 Semi-Trapez — 1 Rectangular	
Ring end gap	New	0.25 - 0.40 mm (.010 - .016 in)	
	Wear limit	1.00 mm (.039 in)	
Ring / piston groove clearance	New	0.05 - 0.08 mm (.002 - .003 in)	
	Wear limit	0.2 mm (.008 in)	
Piston / cylinder wall clearance	New	0.05 - 0.07 mm (.002 - .003 in)	
	Wear limit	0.2 mm (.008 in)	
Cylinder taper (maximum)		0.08 mm (.003 in)	
Cylindre out of round (maximum)		0.05 mm (.002 in)	
Connecting rod big end axial play	New	0.39 - 0.74 mm (.015 - .029 in)	
	Wear limit	1.2 mm (.047 in)	
Crankshaft deflection		0.08 mm (.003 in)	
Rotary valve timing	Opening	115°±5 BTDC	130°±5 BTDC
	Closing	80°±5 ATDC	65°±5 ATDC
Rotary valve plate opening		147°	
Crankcase / rotary valve gap		0.25 - 0.35 mm (.010 - .014 in)	
Connecting rod / crankshaft pin radial clearance	New	0.020 - 0.033 mm (.0008 - .0013 in)	
	Wear limit	0.050 mm (.002 in)	
Connecting rod / piston pin radial clearance	New	0.003 - 0.012 mm (0.00012 - 0.00047 in)	
	Wear limit	0.015 mm (0.00059 in)	
ADDITIONAL INFORMATION:			
Squish gap		1.3 - 1.7 mm (0.051 - 0.067 in)	

ELECTRICAL (engine)		GTS (5813)	GTX (5861)
Magneto generator output		160 W @ 6000 RPM	
Ignition system, type		CDI 4/5 p	
Spark plug	Make and type	NGK BR7ES	
	Gap	0.5 mm (.020 in)	
Ignition timing	BTDC	2.65 mm (.104 in) (21° ± 1)	
	Engine speed (cold)	6000 RPM	
Generating coil		40 - 76 Ω	
Battery charging coil		.05 - .6 Ω	
High tension coil	Secondary	9 - 15 KΩ	
Engine RPM limiter operation		6550 ± 100	
ADDITIONAL INFORMATION:			

CARBURETION		GTS (5813)	GTX (5861)
Carburetor	Type	Diaphragm	
	Quantity	1	2
Main jet		125	107.5
Pilot jet		67.5	62.5
Adjustment	Low-speed mixture screw	1 turn ± 1/4	1-1/4 turn ± 1/4
	High-speed screw	0	
	Idle speed (in water)	1400 RPM	
	Idle speed (out of water)	2500 RPM	2800 RPM
Fuel	Type	Regular unleaded	
	Octane no.	87 (Ron + Mon) /2	
Fuel return line orifice		0.5 mm (0.020 in)	0.5 mm (0.020 in) (PTO side)
Leak test (pop off pressure)		150-200 kPa (22-29 PSI)	
ADDITIONAL INFORMATION:			

COOLING	GTS (5813)	GTX (5861)
Type	Open circuit - Direct flow from jet propulsion unit	
Thermostat	None	
Overheating beeper setting	96-99°C (205-210°F)	
ADDITIONAL INFORMATION:		

PROPULSION			GTS (5813)	GTX (5861)
Propulsion system			Bombardier Formula pump	
Jet pump type			Axial flow single stage	
Impeller rotation (seen from rear)			Counterclockwise	
Transmission			Direct drive	
Coupling type			Crown splines	
PROPULSION UNIT	Oil type		SEA-DOO JET PUMP SYNTHETIC OIL Polyolester 75W90 GL5 (P / N 293 600 011)	
	Steering nozzle pivoting angle		26°	
	Trim nozzle pivoting angle		N.A.	
	Minimum required water level		90 cm (36 in)	
	Drive shaft deflection maximum		0.5 mm (.020 in)	
	Impeller outside diameter		139.5 mm (5.490 in)	
	Impeller / wear ring clearance	Wear limit (performance)	0.5 mm (.020 in)	
		Wear limit	1.02 mm (.040 in)	
	Impeller shaft end play (new)		0.12 - 0.54 mm (.005 - .021 in)	
	Impeller shaft side play		0.05 mm (.002 in)	
	Impeller pitch / material		17°/stainless steel	18.3°/stainless steel
	ADDITIONAL INFORMATION: Do not mix different trademarks or type of oil.			

DIMENSIONS		GTS (5813)	GTX (5861)
Number of passenger (driver incl.)		3	
Length (overall)		302 cm (119.0 in)	
Width (overall)		119 cm (46.8 in)	
Heigth (overall)		95 cm (37.4 in)	
Mass		210 kg (465 lb)	
Load limit (passengers + luggage)		225 kg (496 lb)	
MATERIALS	Hull	Composite	
	Air intake silencer	Thermoplastic	
	Flame arrester	Multi-layer wire screen	
	Exhaust muffler	Aluminum	
	Steering padding	Thermoplastic elastomer with polystyrene foam	
	Fuel tank	Polyethylene	
	Injection oil tank	Polyethylene	
	Seat	Polyurethane foam	
ADDITIONAL INFORMATION:			

PERFORMANCE		GTS (5813)	GTX (5861)
Pump static thrust		195 kg (429 lb)	210 kg (462 lb)
Maximum fuel consumption at wide open throttle		20.8 L / h (5.5 U.S. gal / h)	22.7 L / h. (6 U.S. gal / h)
Cruising time at full throttle	Fuel tank without reserve	1 hour 45 minutes	1 hour 20 minutes
	Fuel tank reserve	20 minutes	13 minutes
ADDITIONAL INFORMATION:			

ELECTRICAL (vehicle)	GTS (5813)	GTX (5861)
Battery	12 V, 19 A•h	
Starting system fuse	5 A	
Charging system fuse	15 A	
ADDITIONAL INFORMATION:		

CAPACITIES		GTS (5813)	GTX (5861)
Fuel tank		33 L (8.7 U.S. gal.)	
Impeller shaft reservoir	Capacity	65 mL (2.2 U.S. oz)	
	Oil level height	To bottom of cover hole	
Injection oil tank		2.8 L (95 U.S. fl oz)	
ADDITIONAL INFORMATION:			

STANDARD EQUIPMENT	GTS (5813)	GTX (5861)
Tether cord	STD	
Tool kit	STD	
Fuel tank reserve	STD	
Overheating warning device	STD	
Electric fuel level gauge	OPT.	STD
Injection oil low level warning device	OPT.	STD
Tachometer	OPT.	OPT.
Speedometer	OPT.	STD
Variable trim system (VTS)	N.A.	
Reverse	STD	
Storage compartment	STD	
Rear grab handle	STD	
Extinguisher holder	STD	
ADDITIONAL INFORMATION:		

TIGHTENING TORQUES			GTS (5813) and GTX (5861)	
ENGINE	Exhaust manifold, screws (8)		24 N•m (17 lbf•ft)	
	Magneto flywheel nut		105 N•m (77 lbf•ft)	
	Flywheel (PTO side)		110 N•m (81 lbf•ft)	
	Crankcase screws	M6	10 N•m (88 lbf•**in**)	
		M8	24 N•m (17 lbf•ft)	
	Crankcase / engine support nuts		35 N•m (26 lbf•ft)	
	Engine support / hull		25 N•m (18 lbf•ft)	(1)
	Cylinder head screws		24 N•m (17 lbf•ft)	(1)
	Crankcase / cylinder screws		24 N•m (17 lbf•ft)	(1)
	Tuned pipe flange nut and screws		25 N•m (18 lbf•ft)	
	Tuned pipe fixation screws		25 N•m (18 lbf•ft)	(1)
	Cylinder head cover screws		9 N•m (80 lbf•**in**)	(1)
	Flame arrester screws		10 N•m (88 lbf•**in**)	(1)
PUMP	Impeller on shaft		70 N•m (52 lbf•ft)	(2)
	Pump / hull		35 N•m (26 lbf•ft)	(1)
	Venturi / housing		25 N•m (18 lbf•ft)	(1)
	Nozzle / venturi		20 N•m (15 lbf•ft)	(1)
	Housing cover		7 N•m (62 lbf•**in**)	(1)
	Grill		8 N•m (71 lbf•**in**)	(1)
	Ride shoe		10 N•m (88 lbf•**in**)	(1)
STEERING	Steering cable lock nuts		10 N•m (88 lbf•**in**)	
	Steering support screws		15 N•m (11 lbf•ft)	(1)
	Steering collar screws		5 N•m (44 lbf•**in**)	(1)
	Steering stem screw		40 N•m (30 lbf•ft)	(2)
	Handlebar saddle screws, nuts		26 N•m (19 lbf•ft)	
	Reverse gate / venturi		20 N•m (15 lbf•ft)	
	Cable / reverse gate		7 N•m (62 lbf•**in**)	
	Steering gate / stem arm		7 N•m (62 lbf•**in**)	
	Steering cable / nozzle		7 N•m (62 lbf•**in**)	
ELECTRICAL	Ignition housing cover		5 N•m (44 lbf•**in**)	
	Starter mounting screws		22 N•m (16 lbf•ft)	(2)
	Starter lock nuts		6 N•m (53 lbf•**in**)	
	Spark plug		24 N•m (17 lbf•ft)	

ADDITIONAL INFORMATION: Apply where indicated

(1) Loctite 242
(2) Loctite 271
(3) Loctite 515

XP 5852 MODEL

ENGINE		XP (5852)
Engine type		Rotax 657, water cooled
Induction type		Rotary valve
Exhaust system	Type	Water cooled, water injected
	Water injection fitting ①	3.5 mm (.139 in)
	Gas cooling fitting ②	3.5 mm (.139 in)
Starting system		Electric start
Lubrication	Fuel / oil mixture	VROI (Variable rate oil injection)
	Oil injection pump	Gear
	Oil type	SEA-DOO injection oil
Number of cylinders		2
Bore	Standard	78.0 mm (3.07 in)
	First oversize	78.25 mm (3.08 in)
	Second oversize	78.50 mm (3.09 in)
Stroke		68 mm (2.68 in)
Displacement		650 cm^3 (39.67 in^3)
Compression ratio	(uncorrected)	12.25 : 1
	(corrected)	6.7 :1
Engine maximum torque		80 N•m (59 lbf•ft) @ 6250 RPM
Cylinder head warpage		N.A.
Piston ring type and quantity		1 Semi-Trapez — 1 Rectangular
Ring end gap	New	0.25 - 0.40 mm (.010 - .016 in)
	Wear limit	1.00 mm (.039 in)
Ring / piston groove clearance	New	0.05 - 0.08 mm (.002 - .003 in)
	Wear limit	0.2 mm (.008 in)
Piston / cylinder wall clearance	New	0.06 - 0.09 mm (.0024 - .0035 in)
	Wear limit	0.15 mm (.0059 in)
Cylinder taper (maximum)		0.08 mm (.003 in)
Cylinder out of round (maximum)		0.05 mm (.002 in)
Connecting rod big end axial play	New	0.39 - 0.74 mm (.015 - .029 in)
	Wear limit	1.2 mm (.047 in)
Crankshaft deflection		0.08 mm (.003 in)
Rotary valve timing	Opening	130°±5 BTDC
	Closing	65°±5 ATDC
Rotary valve plate opening		147°
Crankcase / rotary valve gap		0.25 - 0.35 mm (.010 - .014 in)
Connecting rod / crankshaft pin radial clearance	New	0.020 - 0.033 mm (.0008 - .0013 in)
	Wear limit	0.050 mm (.002 in)
Connecting rod / piston radial clearance	New	0.003 - 0.012 mm (0.00012 - 0.00047 in)
	Wear limit	0.015 mm (0.00059 in)
ADDITIONAL INFORMATION: ① At tuned pipe ② At exhaust cone		
Squish gap		0.9 - mn (0.035 - 0.051 in)

ELECTRICAL (engine)		XP (5852)
Magneto generator output		160 W @ 6000 RPM
Ignition system, type		CDI, 4/5 p
Spark plug	Make and type	NGK BR8ES
	Gap	0.5 mm (.020 in)
Ignition timing	BTDC	2.59 mm (.102 in) (20° ± 1)
	Engine speed (cold)	6000 RPM
Generating coil	Low speed	120 - 180 Ω
	High speed	2.8 - 4.2 Ω
Battery charging coil		.21 - .31 Ω
High tension coil	Primary	0.23 - 0.43 Ω
	Secondary	3.85 - 7.15 KΩ
Engine RPM limiter operation		7050 ± 50
ADDITIONAL INFORMATION:		

CARBURETION		XP (5852)
Carburetor	Type	Diaphragm
	Quantity	2
Main jet		125
Pilot jet		60
Adjustment	Low-speed mixture screw	1-1/4 turn ± 1/4
	High-speed screw	0
	Idle speed (in water)	1500 RPM
	Idle speed (out of water)	3300 RPM
Fuel	Type	Regular unleaded
	Octane no.	87 (Ron + Mon)/2
Fuel return line orifice		0.5 mm (0.020 in) (PTO side)
Leak test (pop off pressure)		150-200 kPa (22-29 PSI)
ADDITIONAL INFORMATION:		

COOLING	XP (5852)
Type	Open circuit - Direct flow from jet propulsion unit
Thermostat	None
Overheating beeper setting	96-99°C (205-210°F)
ADDITIONAL INFORMATION:	

PROPULSION			XP (5852)
Propulsion system			Bombardier Formula pump
Jet pump type			Axial flow single stage
Impeller rotation (seen from rear)			Counterclockwise
Transmission			Direct drive
Coupling type			Crown splines
PROPULSION UNIT	Oil type		SEA-DOO JET PUMP SYNTHETIC OIL Polyolester 75W90 GL5 (P/N 293 600 011)
	Steering nozzle pivoting angle		26°
	Trimming nozzle pivoting angle		± 10°
	Minimum required water level		60 cm (24 in)
	Drive shaft deflection maximum		0.5 mm (.020 in)
	Impeller outside diameter		139.5 mm (5.490 in)
	Impeller / wear ring clearance	Wear limit (performance)	0.5 mm (.020 in)
		Wear limit	1.02 mm (.040 in)
	Impeller shaft end play (new)		0.12 - 0.54 mm (.005 - .021 in)
	Impeller shaft side play		0.05 mm (.002 in)
	Impeller pitch / material		Progressive pitch 15°-20.5°/ stainless steel
	ADDITIONAL INFORMATION : Do not mix different brands or type of oil.		

DIMENSIONS		XP (5852)
Number of passager (driver incl.)		2
Length, overall		256 cm (100.5 in)
Width, overall		105 cm (41.5 in)
Height, overall		92 cm (36.2 in)
Mass		169 kg (373 lb)
Load limit (passenger + luggage)		160 kg (352 lb)
MATERIALS	Hull	Composite
	Air intake silencer	Thermoplastic
	Flame arrester	Multi-layer wire screen
	Exhaust muffler	Aluminum
	Steering padding	Thermoplastic elastomer with polystyrene foam
	Fuel tank	Polyethylene
	Injection oil tank	Polyethylene
	Seat	Polyurethane foam
ADDITIONAL INFORMATION:		

PERFORMANCE		XP (5852)
Pump static thrust		230 kg (510 lb)
Maximum fuel consumption at wide open throttle		29.5 L / h. (7.8 U.S. gal / h)
Cruising time at full throttle	Fuel tank without reserve	1 hour 5 minutes
	Fuel tank reserve	10 minutes
ADDITIONAL INFORMATION:		

ELECTRICAL (vehicle)	XP (5852)
Battery	12 V, 19 A•h
Starting system fuse	5 A
Charging system fuse	15 A
VTS system fuse	15 A
ADDITIONAL INFORMATION:	

CAPACITIES		XP (5852)
Fuel tank		34 L (9 U.S. gal)
Impeller shaft reservoir	Capacity	65 mL (2.2 U.S. oz)
	Oil level height	To bottom of cover hole
Injection oil tank		4.5 L (153 U.S. fl oz)
ADDITIONAL INFORMATION:		

STANDARD EQUIPMENT	XP (5852)
Tether cord	STD
Tool kit	STD
Fuel tank reserve	STD
Overheating warning device	STD
Electric fuel level gauge	STD
Injection oil low level warning device	STD
Tachometer	STD
Speedometer	OPT.
Electric variable trim system (VTS)	STD
Reverse	N.A.
Storage compartment	STD
Rear grab handle	STD
Extinguisher holder	STD
ADDITIONAL INFORMATION:	

	TIGHTENING TORQUES		XP (5852)	
ENGINE	Exhaust manifold, screws (8)		24 N•m (17 lbf•ft)	
	Magneto flywheel nut		105 N•m (77 lbf•ft)	
	Flywheel (PTO side)		110 N•m (81 lbf•ft)	
	Crankcase screws	M6	10 N•m (88 lbf•**in**)	
		M8	24 N•m (17 lbf•ft)	
	Crankcase / engine support nuts		35 N•m (26 lbf•ft)	
	Engine support / hull		25 N•m (18 lbf•ft)	(1)
	Cylinder head screws		24 N•m (17 lbf•ft)	(1)
	Crankcase / cylinder screws		24 N•m (17 lbf•ft)	(1)
	Tuned pipe flange nut and screws		25 N•m (18 lbf•ft)	
	Tuned pipe fixation screws		25 N•m (18 lbf•ft)	(1)
	Cylinder head cover screws		24 N•m (17 lbf•ft)	(1)
	Flame arrester screws		10 N•m (88 lbf•**in**)	(1)
PUMP	Impeller on shaft		70 N•m (52 lbf•ft)	(2)
	Pump / hull		35 N•m (26 lbf•ft)	(1)
	Venturi / housing		25 N•m (18 lbf•ft)	(1)
	Nozzle / venturi		20 N•m (15 lbf•ft)	(1)
	Housing cover		7 N•m (62 lbf•**in**)	(1)
	Grill		8 N•m (71 lbf•**in**)	(1)
	Ride shoe		10 N•m (88 lbf•**in**)	(1)
	Trim cable / trim ring		7 N•m (62 lbf•**in**)	
STEERING	Sterring cable / nozzle		7 N•m (62 lbf•**in**)	
	Rear steering support screws (collar)		15 N•m (11 lbf•ft)	
	Front steering support screws		15 N•m (11 lbf•ft)	
	Steering cable retaining plate		6 N•m (53 lbf•**in**)	
	Handlebar saddle screws, nuts		26 N•m (19 lbf•ft)	
	Reverse gate / venturi		N.A.	
	Cable /reverse gate		N.A.	
	Steering cable / stem arm		3 N•m (26 lbf•**in**)	
ELECTRICAL	Ignition housing cover		5 N•m (44 lbf•**in**)	
	Starter mounting screws		22 N•m (16 lbf•ft)	(2)
	Starter lock nuts		6 N•m (53 lbf•**in**)	
	Spark plug		24 N•m (17 lbf•ft)	

ADDITIONAL INFORMATION: Apply where indicated

(1) Loctite 242
(2) Loctite 271
(3) Loctite 515

EXPLORER 5820 MODEL

ENGINE		EXPLORER (5820)
Engine type		Rotax 587, water cooled
Induction type		Rotary valve
Exhaust system	Type	Water cooled, water injected
	Water injection fitting size	4.6 mm (.181 in)
Starting system		Electric start
Lubrication	Fuel / oil mixture	VROI (Variable rate oil injection)
	Oil injection pump	Gear
	Oil type	SEA-DOO injection oil
Number of cylinders		2
Bore	Standard	76.0 mm (2.992 in)
	First oversize	76.25 mm (3.002 in)
	Second oversize	76.50 mm (3.012 in)
Stroke		64 mm (2.520 in)
Displacement		580.7 cm^3 (35.4 in^3)
Compression ratio	(uncorrected)	11.5 :1
	(corrected)	6.5 :1
Engine maximum torque		67 N•m (49 lbf•ft) @ 5750 RPM
Cylinder head warpage		N.A.
Piston ring type and quantity		1 Semi-Trapez — 1 Rectangular
Ring end gap	New	0.25 - 0.40 mm (.010 - .016 in)
	Wear limit	1.00 mm (.039 in)
Ring / piston groove clearance	New	0.05 - 0.08 mm (.002 - .003 in)
	Wear limit	0.2 mm (.008 in)
Piston / cylinder wall clearance	New	0.05 - 0.07 mm (.002 - .003 in)
	Wear limit	0.2 mm (.008 in)
Cylinder taper (maximum)		0.08 mm (.003 in)
Cylinder out of round (maximum)		0.05 mm (.002 in)
Connecting rod big end axial play	New	0.39 - 0.74 mm (.015 - .029 in)
	Wear limit	1.2 mm (.047 in)
Crankshaft deflection		0.08 mm (.003 in)
Rotary valve timing	Opening	130°±5 BTDC
	Closing	65°±5 ATDC
Rotary valve plate opening		147°
Crankcase / rotary valve gap		0.25 - 0.35 mm (.010 - .014 in)
Connecting rod / crankshaft pin radial clearance	New	0.020 - 0.033 mm (.0008 - .0013 in)
	Wear limit	0.050 mm (.002 in)
Connecting rod / piston radial clearance	New	0.003 - 0.012 mm (0.00012 - 0.00047 in)
	Wear limit	0.015 mm (0.00059 in)
ADDITIONAL INFORMATION:		
Squish gap		1.3-1.7 mm (0.051 - 0.067 in)

ELECTRICAL (engine)		EXPLORER (5820)
Magneto generator output		160 W @ 6000 RPM
Ignition system, type		CDI, 4/5 p
Spark plug	Make and type	NGK BR7ES
	Gap	0.5 mm (.020 in)
Ignition timing	BTDC	2.65 mm (.104 in) (21° ± 1)
	Engine speed (cold)	6000 RPM
Generating coil		40 - 76 Ω
Battery charging coil		.05 - .6 Ω
High tension coil	Secondary	9 - 15 KΩ
Engine RPM limiter operation		6550 ± 100
ADDITIONAL INFORMATION:		

CARBURETION		EXPLORER (5820)
Carburetor	Type	Diaphragm
	Quantity	2
Main jet		107.5
Pilot jet		62.5
Adjustment	Low-speed mixture screw	1-1/4 turn ± 1/4
	High-speed screw	0
	Idle speed (in water)	1400 RPM
	Idle speed (out of water)	2800 RPM
Fuel	Type	Regular unleaded
	Octane no.	87 (Ron + Mon)/2
Fuel return line orifice		0.5 mm (0.020 in) (PTO side)
Leak test (pop off pressure)		150-200 kPa (22-29 PSI)
ADDITIONAL INFORMATION:		

COOLING	EXPLORER (5820)
Type	Open circuit - Direct flow from jet propulsion unit.
Thermostat	None
Overheating beeper setting	96-99°C (205-210°F)
ADDITIONAL INFORMATION:	

PROPULSION			EXPLORER (5820)
Propulsion system			Bombardier Formula pump
Jet pump type			Axial flow single stage
Impeller rotation (seen from rear)			Counterclockwise
Transmission			Direct drive
Coupling type			Crown splines
PROPULSION UNIT	Oil type		SEA-DOO JET PUMP SYNTHETIC OIL Polyolester 75W90 GL5 (P/N 293 600 011)
	Steering nozzle pivoting angle		26°
	Trimming nozzle pivoting angle		N.A.
	Minimum required water level		90 cm (36 in)
	Drive shaft deflection maximum		0.5 mm (.020 in)
	Impeller outside diameter		139.5 mm (5.490 in)
	Impeller / wear ring clearance	Wear limit (performance)	0.5 mm (.020 in)
		Wear limit	1.02 mm (.040 in)
	Impeller shaft end play (new)		0.12 - 0.54 mm (.005 - .021 in)
	Impeller shaft side play		0.05 mm (.002 in)
	Impeller pitch / material		17.7°/stainless steel
	ADDITIONAL INFORMATION: Do not mix different brands of type or oil.		

DIMENSIONS		EXPLORER (5820)
Numbre of passager (driver incl.)		5
Length, overall		396 cm (155.9 in)
Width, overall		206 cm (81.1 in)
Height, overall		119 cm (46.8 in)
Mass		295 kg (655 lb)
Load limit (passengers + luggage)		475 kg (1050 lb)
MATERIALS	Hull	Composite
	Air intake silencer	Thermoplastic
	Flame arrester	Multi-layer wire screen
	Exhaust muffler	Aluminum
	Steering padding	Vinyl with polystyrene foam
	Fuel tank	Polyethylene
	Injection oil tank	Polyethylene
	Seat	Polyurethane foam
	Inflatable tube	Neopren, hypalon, polyester reinforced
ADDITIONAL INFORMATION:		

PERFORMANCE		EXPLORER (5820)
Pump static thrust		210 kg (462 lb)
Maximum fuel consumption at wide open throttle		22.7 L / h. (6 U.S. gal / h)
Cruising time at full throttle	Fuel tank without reserve	2 hours
	Fuel tank reserve	13 minutes
ADDITIONAL INFORMATION:		

ELECTRICAL (vehicle)	EXPLORER (5820)
Battery	12 V, 19 A•h
Starting system fuse	5 A
Charging system fuse	15 A
Blower system fuse	5 A
ADDITIONAL INFORMATION:	

CAPACITIES		EXPLORER (5820)
Fuel tank		48 L (12.6 U.S. gal)
Impeller shaft reservoir	Capacity	65 mL (2.2 U.S. oz)
	Oil level height	To bottom of cover hole
Injection oil tank		2.8 L (95 U.S. fl oz)
ADDITIONAL INFORMATION:		

STANDARD EQUIPMENT	EXPLORER (5820)
Tether cord	STD
Tool kit	STD
Fuel tank reserve	STD
Overheating warning device	STD
Electric fuel level gauge	STD
Injection oil low level warning device	STD
Tachometer	OPT.
Variable trim system (VTS)	N.A.
Reverse	STD
Storage compartment (front and rear)	STD
Rear grab bar	STD
Extinguisher holder	STD
ADDITIONAL INFORMATION:	

TIGHTENING TORQUES			EXPLORER (5820)	
ENGINE	Exhaust manifold, screws (8)		24 N•m (17 lbf•ft)	
	Magneto flywheel nut		105 N•m (77 lbf•ft)	
	Flywheel (PTO side)		110 N•m (81 lbf•ft)	
	Crankcase screws	M6	10 N•m (88 lbf•**in**)	
		M8	24 N•m (17 lbf•ft)	
	Crankcase / engine support nuts		35 N•m (26 lbf•ft)	
	Engine support / hull		25 N•m (18 lbf•ft)	(1)
	Cylinder head screws		24 N•m (17 lbf•ft)	(1)
	Crankcase / cylinder screws		24 N•m (17 lbf•ft)	(1)
	Tuned pipe flange nut and screws		25 N•m (18 lbf•ft)	
	Tuned pipe fixation screws		25 N•m (18 lbf•ft)	(1)
	Cylinder head cover screws		9 N•m (80 lbf•**in**)	(1)
	Flame arrester screws		10 N•m (88 lbf•**in**)	(1)
PUMP	Impeller on shaft		70 N•m (52 lbf•ft)	(2)
	Pump /hull		35 N•m (26 lbf•ft)	(1)
	Venturi / housing		25 N•m (18 lbf•ft)	(1)
	Nozzle / venturi		20 N•m (15 lbf•ft)	(1)
	Housing cover		7 N•m (62 lbf•**in**)	(1)
	Grill		8 N•m (71 lbf•**in**)	(1)
	Ride shoe		10 N•m (88 lbf•**in**)	(1)
STEERING	Steering cable lock nuts		10 N•m (88 lbf•**in**)	
	Steering support screws		15 N•m (11 lbf•ft)	(1)
	Steering collar screws		5 N•m (44 lbf•**in**)	(1)
	Steering stem screw		40 N•m (30 lbf•ft)	(2)
	Handlebar saddle screws, nuts		26 N•m (19 lbf•ft)	
	Reverse gate / venturi		20 N•m (15 lbf•ft)	
	Cable / reverse gate		7 N•m (62 lbf•**in**)	
	Steering cable / stem arm		7 N•m (62 lbf•**in**)	
	Steering cable / nozzle		7 N•m (62 lbf•**in**)	
ELECTRICAL	Ignition housing cover		5 N•m (44 lbf•**in**)	
	Starter mounting screws		22 N•m (16 lbf•ft)	(2)
	Starter lock nuts		6 N•m (53 lbf•**in**)	
	Spark plug		24 N•m (17 lbf•ft)	

ADDITIONAL INFORMATION: Apply where indicated

(1) Loctite 242
(2) Loctite 271
(3) Loctite 515

TROUBLESHOOTING

The following chart is provided to help in diagnosing the probable source of troubles. It is a guideline and should not be assumed to have all causes for all problems.

ENGINE WILL NOT START

OTHER OBSERVATION	POSSIBLE CAUSE	REMEDY
Engine does not turn over	• Tether cord worn or removed • Fuse open • 5A fuse keeps on burning • Discharged battery • Battery connections • Water / fuel hydrolock • Starter or solenoid • Seized engine • Seized jet pump • Jammed pump	• Replace / reinstall • Check wiring then replace fuse • Check wiring then replace MPEM and fuse • Check / recharge • Check / clean/tighten • Check, refer to section 03-01 • Check, refer to section 07-04 • Check / repair as needed • Check, refer to section 08-01 • Check / clean out debris
Engine slowly turns	• Discharged / weak battery • Restriction in jet pump • Seizure in jet pump • Seal carrier seizure • Partial engine hydrolock • Partial engine seizure • Starter worn • Wear ring improperly installed	• Check / charge/replace • Check / clean pump • Inspect, refer to section 08-01 • Check, refer to section 08-01 • Check, refer to section 03-01 • Check compression, refer to section 03-03 • Check, refer to section 07-04 • Check / replace, refer to section 08-01
Engine turns over	• Fuel tank empty • Fuel water-contaminated • Dirty fuel filter • Fouled spark plugs • Water in engine • Misuse of choke (fuel flooded) • Carburetion • Ignition • Engine flooded — Needle valve stuck open • Choke(s) not closing completely • Excessive rotary valve clearance • Internal engine damage • Sheared flywheel key • Incorrect rotary valve timing	• Refill • Renew supply • Clean / replace • Replace • Check, refer to section 03-01 • Use only with cold engine • Check, refer to section 05-03 • Check, refer to section 07-02 and 07-06 • Check, refer to section 05-03 • Adjust for complete closure • Check, refer to section 03-06 • Check, refer to section 03-03 and 03-05 • Check timing mark, refer to section 07-02 • Check, refer to section 03-06

OTHER OBSERVATION	POSSIBLE CAUSE	REMEDY
Engine turns over (contd.) • No spark at spark plugs • Sparks occur at spark plugs when disconnecting BLACK / RED or WHITE wire from MPEM • MPEM BLACK and BLACK / RED or WHITE wires have a close circuit (0 reading on ohmmeter) • Fuel / oil gauge and tachometer give a reading while cranking	• MPEM BLACK / RED or WHITE wire has touched a positive terminal (as the solenoid post)	• Replace MPEM

ENGINE MISFIRES, RUNS IRREGULARLY

OTHER OBSERVATION	POSSIBLE CAUSE	REMEDY
Weak spark	• Fouled, defective, worn spark plugs • Faulty RPM limiter / stop switch • Faulty ignition • Sheared flywheel key	• Check / verify heat range / gap / replace • Check, refer to section 07-06 • Check, refer to section 07-06 • Check timing mark, refer to section 07-02
Lean fuel mixture Dry spark plug (except when water fouled)	• Fuel level low • Stale or water fouled fuel • Fuel filter dirty or restricted • Carburetion dirty or out of adjustment • Leaking crankshaft seal(s), rotary valve cover O-ring(s) • Fuel valve restricted • Loose carburetor	• Check / refill • Check / siphon and refill • Check / clean/replace • Check / clean / adjust, refer to section 05-03 • Check / test / replace, refer to engine section 03-05 and 03-06 • Check / replace • Tighten carburetor(s)
Rich fuel mixture Fouled spark plug	• Partially closed choke(s) • Flame arrester dirty or restricted • Carburetor adjustment or setting • Main jet loose • Main jet O-ring damage • Rotary valve shaft seal leaking • Oil pump adjustment • Watercraft transportation • Worn, needle(s) and seat(s) • Excessive rotary valve clearance	• Check / adjust choke cable • Check / clean / replace • Check / clean / adjust, refer to section 05-03 • Check, refer to section 05-03 • Check / replace, refer to section 05-03 • Check / replace, refer to section 03-06 • Check / adjust, refer to section 06-02 • Turn fuel valve to OFF • Check, refer to section 05-03 • Check, refer to section 03-06
Difficult to start	• Incorrect rotary valve timing • Excessive rotary valve clearance	• Check / adjust, refer to section 03-06 • Check, refer to section 03-06

ENGINE OVERHEATS

OTHER OBSERVATION	POSSIBLE CAUSE	REMEDY
Overheat beeper sounds	• Restricted jet pump water intake • Cooling system restriction • Grounded temperature sensor or sensor wire	• Check / clean • Check / flush, refer to section 04-03 • Check / repair / replace

ENGINE CONTINUALLY BACKFIRES

OTHER OBSERVATION	POSSIBLE CAUSE	REMEDY
Weak spark	• Fouled, defective spark plugs • RPM limiter malfunction	• Clean / replace • Check / replace, refer to section 07-06
Ignition timing	• Incorrect setting • Flywheel key sheared	• Check / reset, refer to section 07-02 • Check / replace
Rotary disc valve	• Timing incorrect	• Check / reset, refer to section 03-06
Carburetor	• Carburetion too lean	• Check / adjust, refer to section 05-03
Engine	• Intake leak / crankshaft seal failure	• Pressure check engine to 48 kPa (7 PSI)

ENGINE DETONATION OR PINGING

OTHER OBSERVATION	POSSIBLE CAUSE	REMEDY
Ignition	• Timing too far advanced • Spark plug heat range too high	• Check / reset • Check / change to correct range
Engine temperature	• Engine overheating • Poor quality fuel	• Check, refer to section 03-01 and 04-01 or to engine overheat • Use good quality fuel

ENGINE LACKS ACCELERATION OR POWER

OTHER OBSERVATION	POSSIBLE CAUSE	REMEDY
	• Weak spark	• Check / replace, refer to section 07-06
	• Carburetion, jetting too rich / lean	• Check / reset / rejet, refer to section 05-03
	• Throttle does not reach full open	• Checkt / readjust
	• Low compression	• Check / repair, refer to section 03-03
	• Exhaust system restriction	• Check / clean
	• Water in gas or oil	• Check / siphon / replace
	• Debris in needle valve	• Check / clean, refer to section 05-03
	• Impeller trailing edge damaged	• Check / replace, refer to section 08-01
	• Twisted crankshaft	• Check, refer to section 03-05

ENGINE RUNS TOO FAST

OTHER OBSERVATION	POSSIBLE CAUSE	REMEDY
Engine RPM too high	• Faulty RPM limiter • Improper impeller pitch (too low)	• Check, refer to section 07-06 • Check / replace, refer to section 08-01
Jet pump cavitation	• Damaged leading or trailing edge of impeller	• Check / replace NOTE : Leading edge damage contributes to poor performance from start. Trailing edge damage contributes to poor top performance and stator vanes erosion.
Jet pump ventilation	• Pump housing or ride shoe air leak	• Check / reseal, refer to section 08-01

ABNORMAL NOISE FROM PROPULSION SYSTEM

OTHER OBSERVATION	POSSIBLE CAUSE	REMEDY
	• Weeds / debris caught in pump intake or impeller	• Check / clean
	• Low oil level in pump housing	• Check / troubleshoot source of leak / refill supply, refer to section 08-01
	• Damaged or bent drive shaft	• Check / replace, refer to section 08-01
	• Broken motor mounts	• Check / replace, refer to section 03-02
	• Rusted / worn hull seal carrier	• Check / repair, refer to section 08-01