IGNITION SYSTEM

SERVICE TOOLS

Description	Part Number	Page
ECM ADAPTER TOOL	529 036 166	2, 5–6
FLUKE 115 MULTIMETER	529 035 868	5

GENERAL

⚠ WARNING

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

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

SYSTEM DESCRIPTION

The battery supplies the primary side of ignition coil through the main relay (R2) while the ECM completes the circuit for each cylinder by switching it to ground at the right moment. The ECM can detect an open and short circuit in the primary winding but it does not check the secondary winding.

The EMS controls the ignition system. For more information, refer to *ENGINE MANAGEMENT* subsection.

Ignition Timing

Ignition timing is not adjustable.

TROUBLESHOOTING

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

Always refer to the *WIRING DIAGRAM* when troubleshooting an electrical circuit.

Refer to *POWER DISTRIBUTION AND GROUNDS* for fuse and relay information.

DIAGNOSTIC GUIDELINES

The following is provided to help in diagnosing the probable cause of a problem. It is a guideline and should not be assumed to list all possible causes.

ENGINE WILL NOT START (ENGINE TURNS OVER)

1. Fouled or defective spark plug
   - *Replace.*
2. Defective CPS
   - *Check operation of CPS and replace if necessary. Refer to ELECTRONIC FUEL INJECTION (EFI) subsection.*
3. Defective trigger wheel
   - *Inspect trigger wheel. Refer to MAGNETO SYSTEM subsection.*
4. Defective ignition circuit
   - *Check fuse 5 of fuse box 1, ignition coil and wiring condition.*
5. Defective fuel pump
   - *Check fuel pump, refer to FUEL SYSTEM subsection.*
6. Defective fuel injectors or circuit
   - *Check fuel injectors, refer to ENGINE MANAGEMENT subsection.*

ENGINE HARD TO START

1. Spark plug faulty, fouled or worn out
   - *Check spark plug condition. Replace if necessary.*
2. Low fuel pressure
   - *Test fuel pressure, refer to FUEL SYSTEM subsection.*

ENGINE MISFIRES, RUNS IRREGULARLY

1. Fouled, defective, worn spark plugs
   - *Check/verify heat range/gap/replace.*
2. Damaged trigger wheel/loose CPS
   - *Inspect trigger wheel. Refer to MAGNETO SYSTEM subsection.*
3. Defective ignition circuit
   - *Check ignition coil, fuse 5, and wiring condition.*
4. Poor engine grounds
   - *Check/clean/repair.*

ENGINE CONTINUALLY BACKFIRES

1. Fouled, defective spark plugs
   - *Clean/replace spark plugs.*
2. Damaged trigger wheel/defective or loose CPS
   - *Inspect trigger wheel and CPS, refer to MAGNETO SYSTEM and ELECTRONIC FUEL INJECTION (EFI) subsections.*

PROCEDURES

IGNITION SWITCH

Ignition Switch Quick Test

Turn ignition switch to ON position.

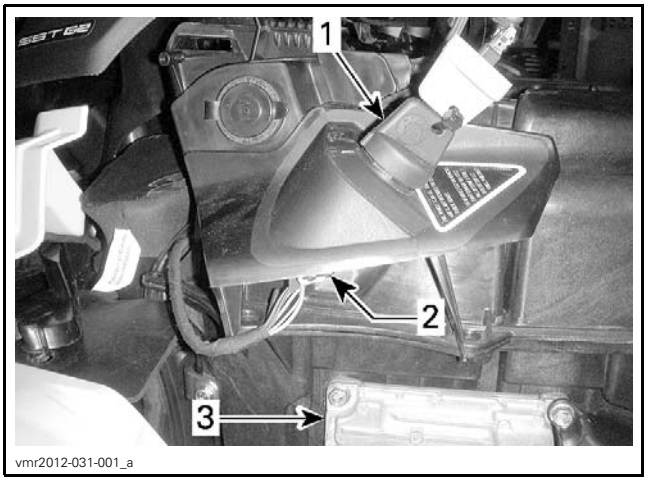
If multifunction gauge turns on (assuming it works), the ignition switch is good.

If multifunction gauge does not turn on, check the following in this order:

– Battery
– Fuses 1 of fuse box 2
– Fuse 4 and 8 of fuse box 1
– ECM is properly powered (refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection)
– Ignition switch
– Emergency engine stop switch.

Ignition Switch Access

Refer to *BODY* subsection and remove the LH side panel.



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1. Ignition key
2. Ignition switch connector
3. ECM

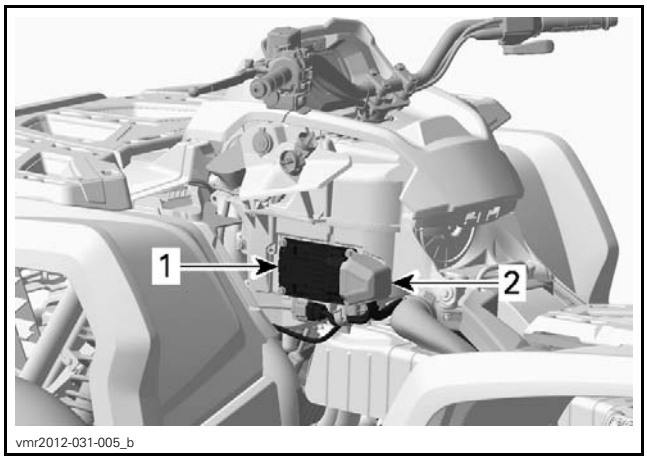
Ignition Switch Wire Identification

FUNCTION	PIN	WIRE COLOR
12 Vdc output (lights)	A	YELLOW/BLUE
12 Vdc input	B	BEIGE/WHITE
Ground (through ECM)	C	BLACK/BROWN
Ground signal to ECM in OFF position	D	BLACK/WHITE
D.E.S.S. signal	E	ORANGE/RED
12 Vdc output to ECM (through emergency engine stop switch) 12 Vdc output to starter solenoid (through emergency engine stop switch and start switch)	F	ORANGE/VIOLET

EMERGENCY ENGINE STOP SWITCH

Emergency Engine Stop Switch Test at ECM

1. Disconnect ECM connector and install it on the ECM adapter tool, refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.



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1. ECM
2. ECM connector cover

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

2. Remove Key switch fuse (F8), refer to *POWER DISTRIBUTION AND GROUNDS* subsection.
3. Turn ignition key to ON position.
4. Test for continuity as per following table.

EMERGENCY ENGINE STOP SWITCH TEST AT ECM			
FUNCTION	FUSE BOX CONTACT	ECM ADAPTER	RESULT
RUN position	5E	A4	Close to 0 Ω
	—	G2 to K3	Open circuit
STOP position	5E	A4	
	—	G2 to K3	Close to 0 Ω

If switch fails the test, refer to *EMERGENCY ENGINE STOP SWITCH TEST AT MULTIFUNCTION SWITCH CONNECTORS*.

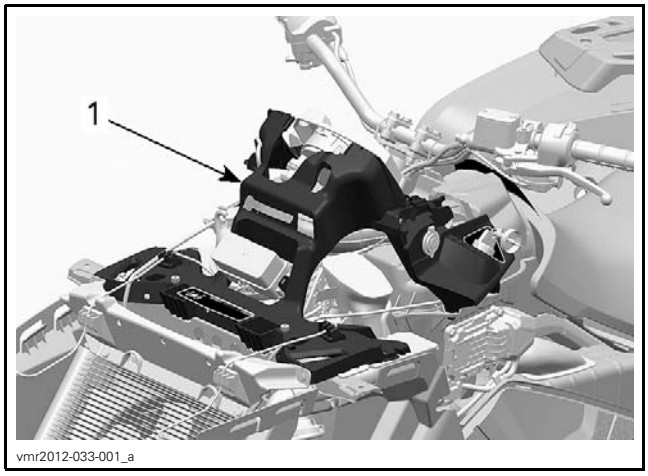
Emergency Engine Stop Switch Test at Multifunction Switch Connectors

The emergency engine stop switch is wired into the LH multifunction switch connectors (MG1 and MG2).

1. Remove gauge support, refer to *LIGHTS, GAUGE AND ACCESSORIES* subsection.
2. Refer to *BODY* subsection and remove:
   – Console panel
   – Front body module.

Outlander Models

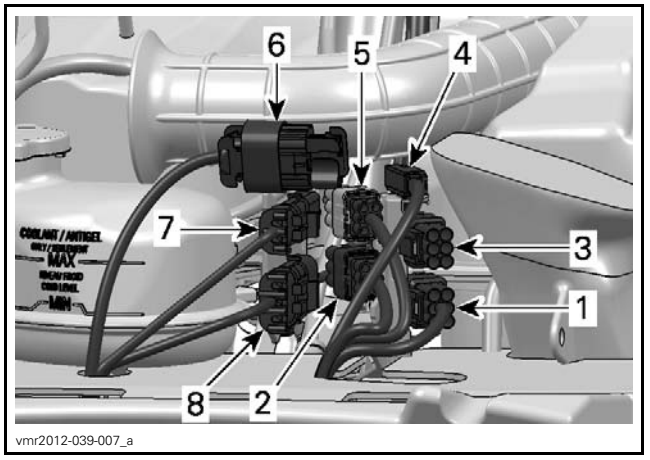
3. Remove dashboard support.



1. Dash board support

All Models

4. Disconnect MG1 and MG2 connectors.



STEERING CONNECTOR IDENTIFICATION
1. MG1 (LH multifunction switch)
2. MG2 (LH multifunction switch)
3. MG3 (LH multifunction switch)
4. DC3 (DC power connector)
5. HIC1 (Engine interconnect)
6. HICA (Accessory interconnect)
7. SWW 2 (Switch winch)
8. SWW 1 (Switch winch)

5. Test switch continuity as per following table.

EMERGENCY ENGINE STOP SWITCH PIN-OUT		
FUNCTION	PROBE	RESULT
RUN position	MG1-3 to MG2-3	Open circuit
	MG1-1 to MG1-2	Close to 0 Ω
STOP position	MG1-3 to MG2-3	
	MG1-1 to MG1-2	Open circuit

If switch tests good, test continuity of wiring. Refer to *WIRING DIAGRAM*.

IGNITION COIL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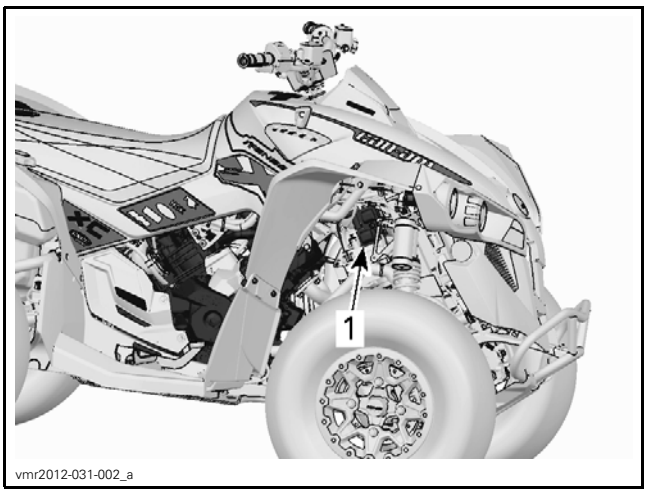
Ignition Coil Access

Refer to *BODY* subsection and remove RH inner fender panel(s) for access to the ignition coil.



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TYPICAL
1. *Ignition coil location*

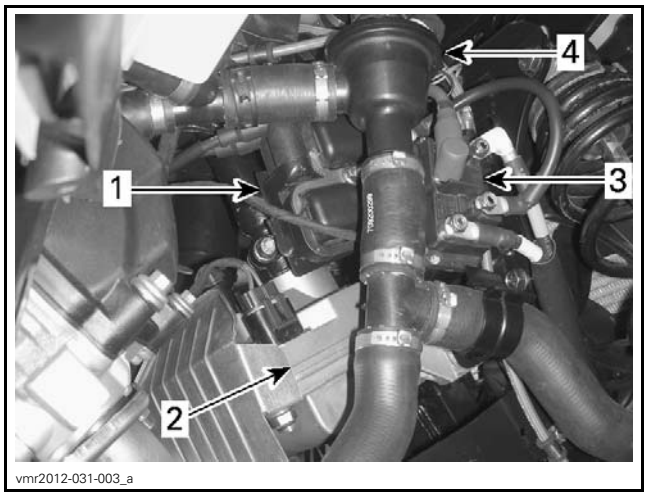
Ignition Coil Connector Access

800R Models Without a DPS or Winch

Ignition coil connector is accessible from the RH side.

All Other Models

Ignition coil connector is accessible from the LH side.



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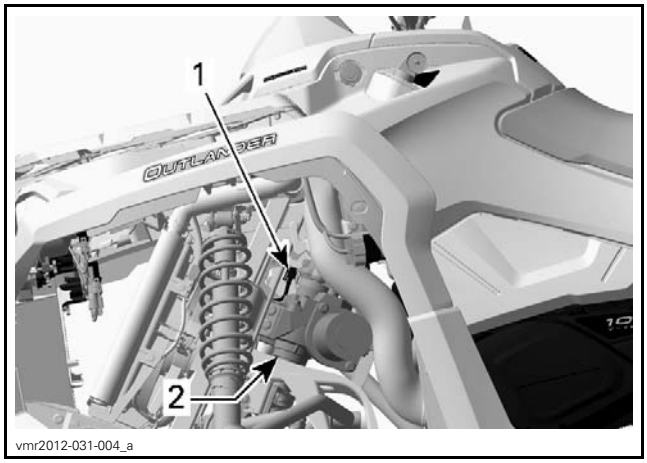
VIEW RH SIDE OF VEHICLE, OUTLANDER XT 1000 MODEL
1. *Ignition coil*
2. *DPS*
3. *Winch relay*
4. *Cooling system thermostat (1000 engine)*

Remove the LH inner fender panel(s) for access to the ignition coil connector.



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VIEW LH SIDE OF VEHICLE, OUTLANDER XT 1000 MODEL
1. *Ignition coil connector*
2. *DPS*

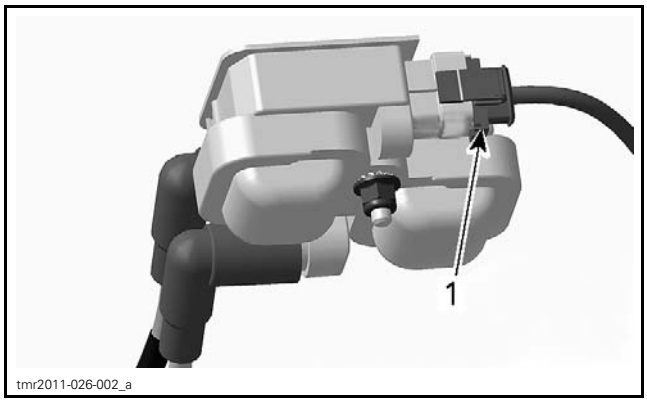
Ignition Coil Installation

Install a new elastic nut and tighten to the specified torque.

IGNITION COIL RETAINING BOLT TIGHTENING TORQUE
8 N•m ± 1 N•m (71 lbf•**in** ± 9 lbf•**in**)

Ignition Coil Input Voltage Test

1. Disconnect the 3-pin connector from the ignition coil. Refer to *IGNITION COIL CONNECTOR ACCESS*.



1. Ignition coil connector

2. Set emergency engine stop switch to RUN.
3. Turn ignition switch to ON.
4. Read voltage as per following table.

REQUIRED TOOL	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

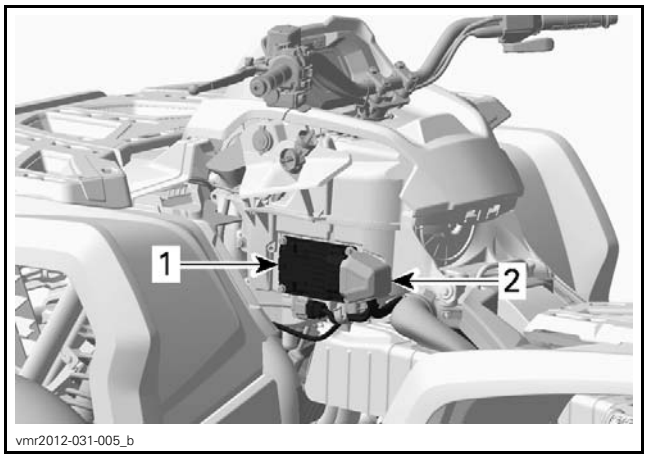
IGNITION COIL INPUT VOLTAGE TEST	
IGNITION COIL CONNECTOR	VOLTAGE
Pin 2 with battery ground	Battery voltage

Battery voltage should be read.

If Battery voltage is NOT read, check continuity of ignition coil supply circuit. Refer to *WIRING DIAGRAM*.

Ignition Coil Ground Circuit Continuity Test

1. Disconnect the ECM connector and connect it to the ECM adapter tool. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.



1. ECM
2. ECM connector cover

REQUIRED TOOLS	
ECM ADAPTER TOOL (P/N 529 036 166)	
FLUKE 115 MULTIMETER (P/N 529 035 868)	

2. Check wiring continuity as per following table.

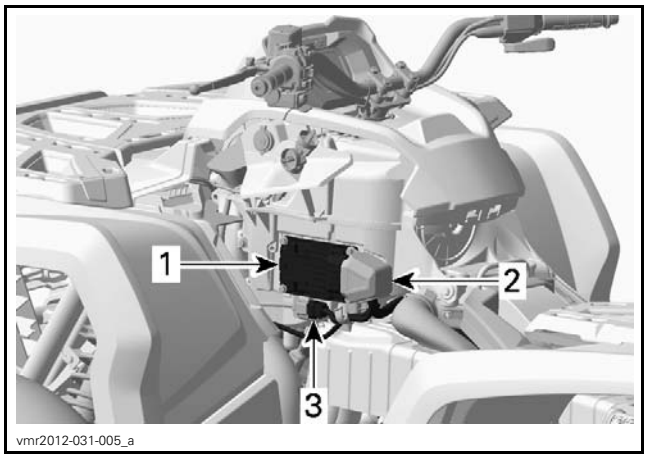
IGNITION COIL GROUND CIRCUIT CONTINUITY TEST		
COMPONENT	PIN (IGNITION COIL CONNECTOR)	PIN (ECM CONNECTOR)
Cylinder 1 (front)	1	M1
Cylinder 2 (rear)	3	M2

Ignition Coil Resistance Test

An ignition coil with good resistance measurement can still be faulty. Voltage leakage can occur at high voltage levels which is not detectable with an ohmmeter. Replacing the ignition coil may be necessary as a test.

Primary Windings

1. Disconnect HIC2 connector.



1. ECM
2. ECM connector cover
3. HIC2 connector

2. Disconnect ECM connector and connect it to the ECM adapter tool.

REQUIRED TOOL	
ECM ADAPTER TOOL (P/N 529 036 166)	

3. Using a multimeter set to Ω, check resistance in primary windings as follows.

IGNITION COIL RESISTANCE TEST			
Primary Circuit	**Engine Connector (HIC)**	**ECM Connector**	**Resistance @ 20°C (68°F)**
Cylinder 1 (front)	Pin C	M1	.3 - .6 Ω
Cylinder 2 (rear)		M2	

If any resistance is not good, measure resistance directly on coil. If second test is ok, check wiring.

Secondary Windings

Due to the integrated diode, it is not possible to take any resistance measurement of the secondary winding.

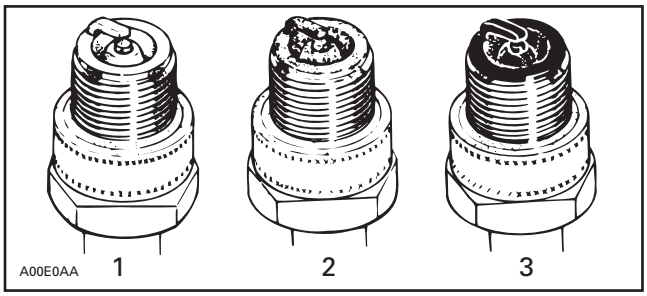
SPARK PLUG

For spark plug replacement procedure, refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

Troubleshooting Fouled Spark Plug

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 low-speed riding, a clogged air filter, incorrect fuel, defective ignition system, incorrect spark plug gap, lubricating oil entering the combustion chamber, or too cold spark plug. The plug face of a fouled spark plug has either a wet black deposit or a black carbon fouling. Such coatings form a conductive connection between the center electrode and ground.

Spark Plug Analysis



TYPICAL
1. Overheated (light grey, white)
2. Normal (light brown, brown)
3. Fouled (black, wet or dry, dark deposits, grey, melted coating)

The plug face reveals the condition of the engine, operating condition, method of driving and fuel mixture. For this reason it is advisable to inspect the spark plug at regular intervals, examining the plug face (i.e. the part of the plug projecting into the combustion chamber).