

# COOLING SYSTEM

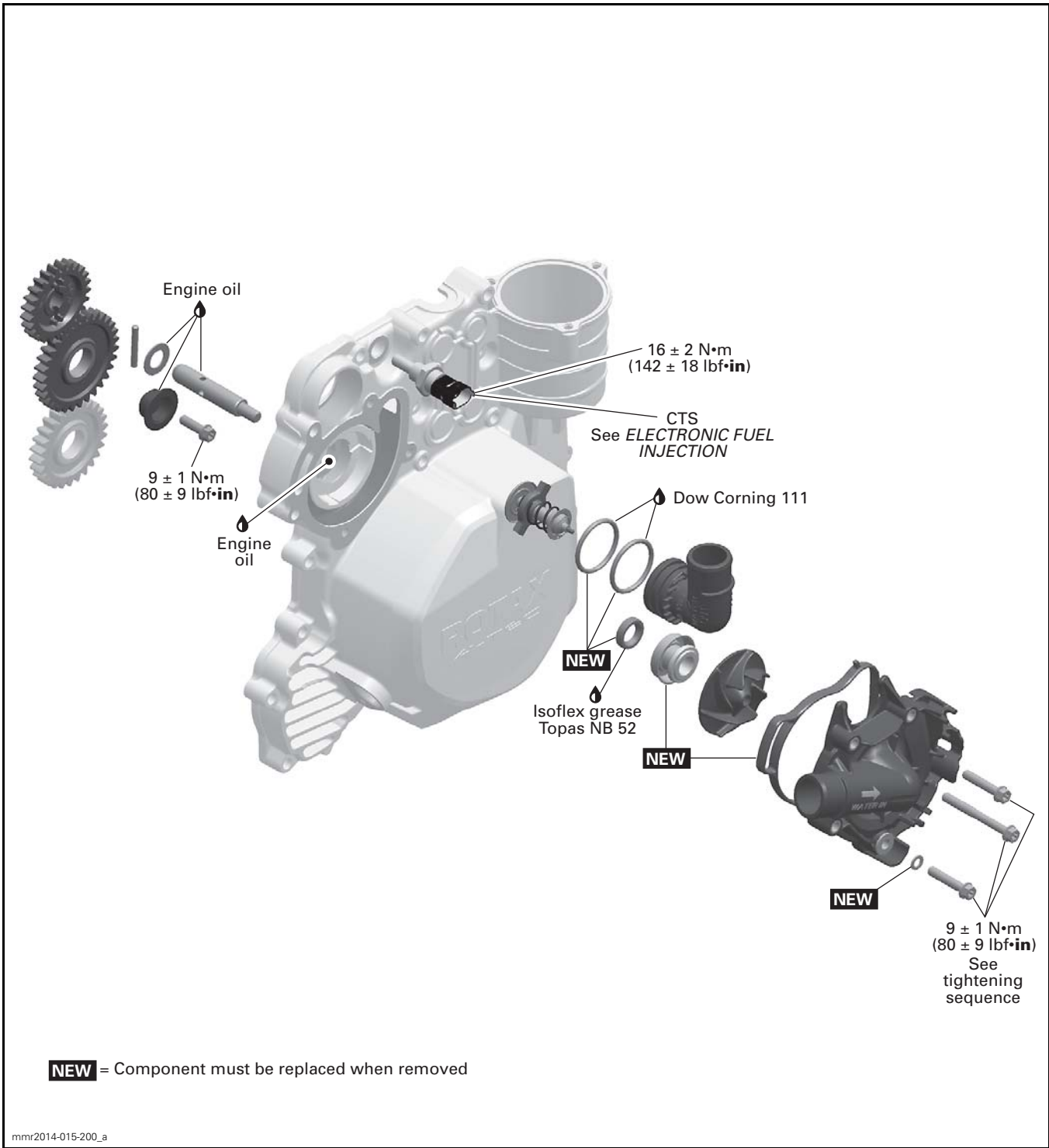
## SERVICE TOOLS

Description	Part Number	Page
HANDLE .....	420 877 650 .....	11
OIL SEAL PUSHER.....	529 036 210 .....	11
ROTARY SEAL INSTALLER .....	529 036 211 .....	12
TEST CAP .....	529 035 991 .....	6
VACUUM/PRESSURE PUMP .....	529 021 800 .....	6

## SERVICE PRODUCTS

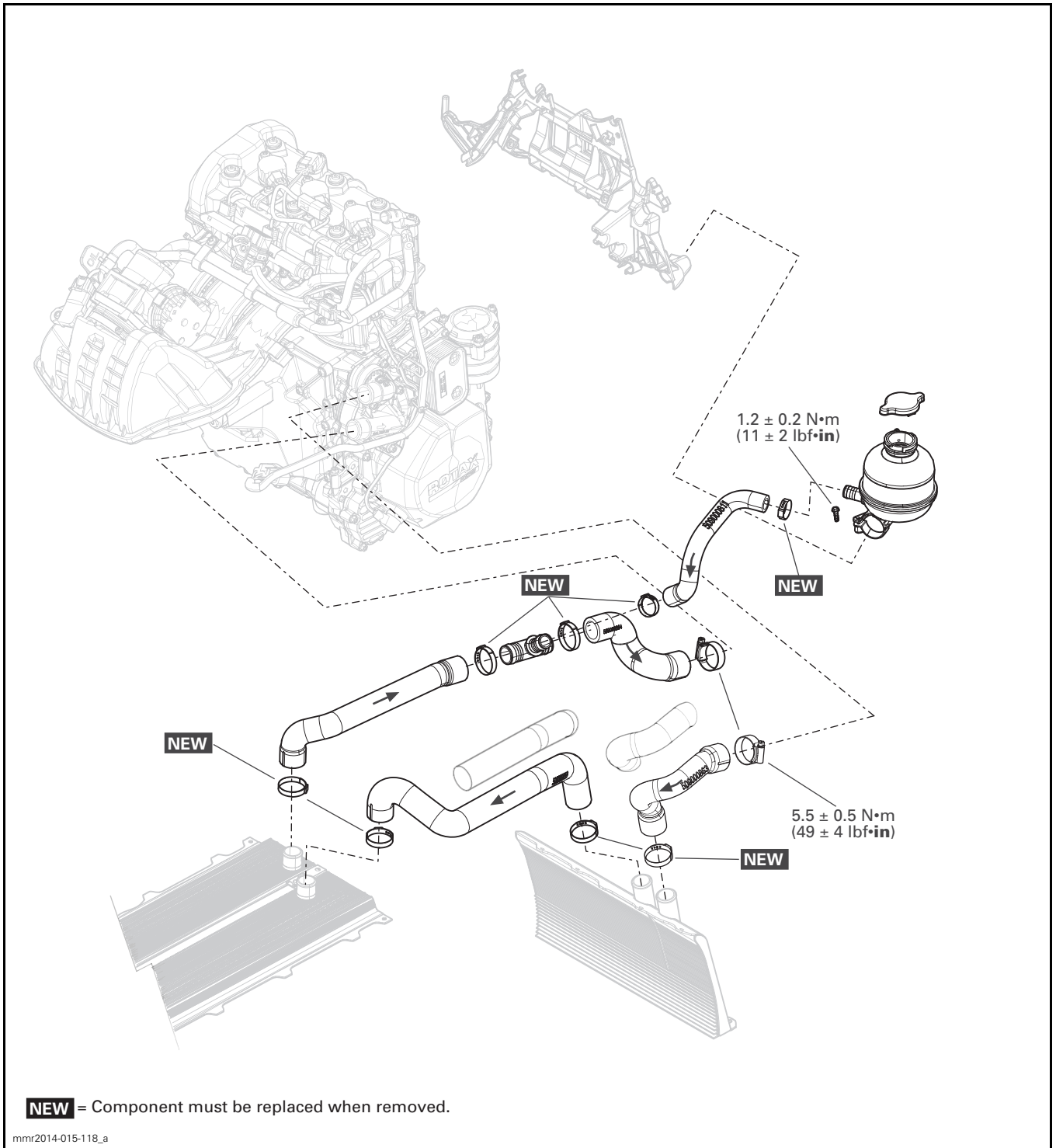
Description	Part Number	Page
DOW CORNING 111 .....	413 707 000 .....	8
ISOFLEX GREASE TOPAS NB 52 .....	293 550 021 .....	11
LOCTITE 380 (BLACK MAX) .....	413 408 300 .....	15

ENGINE COMPONENTS

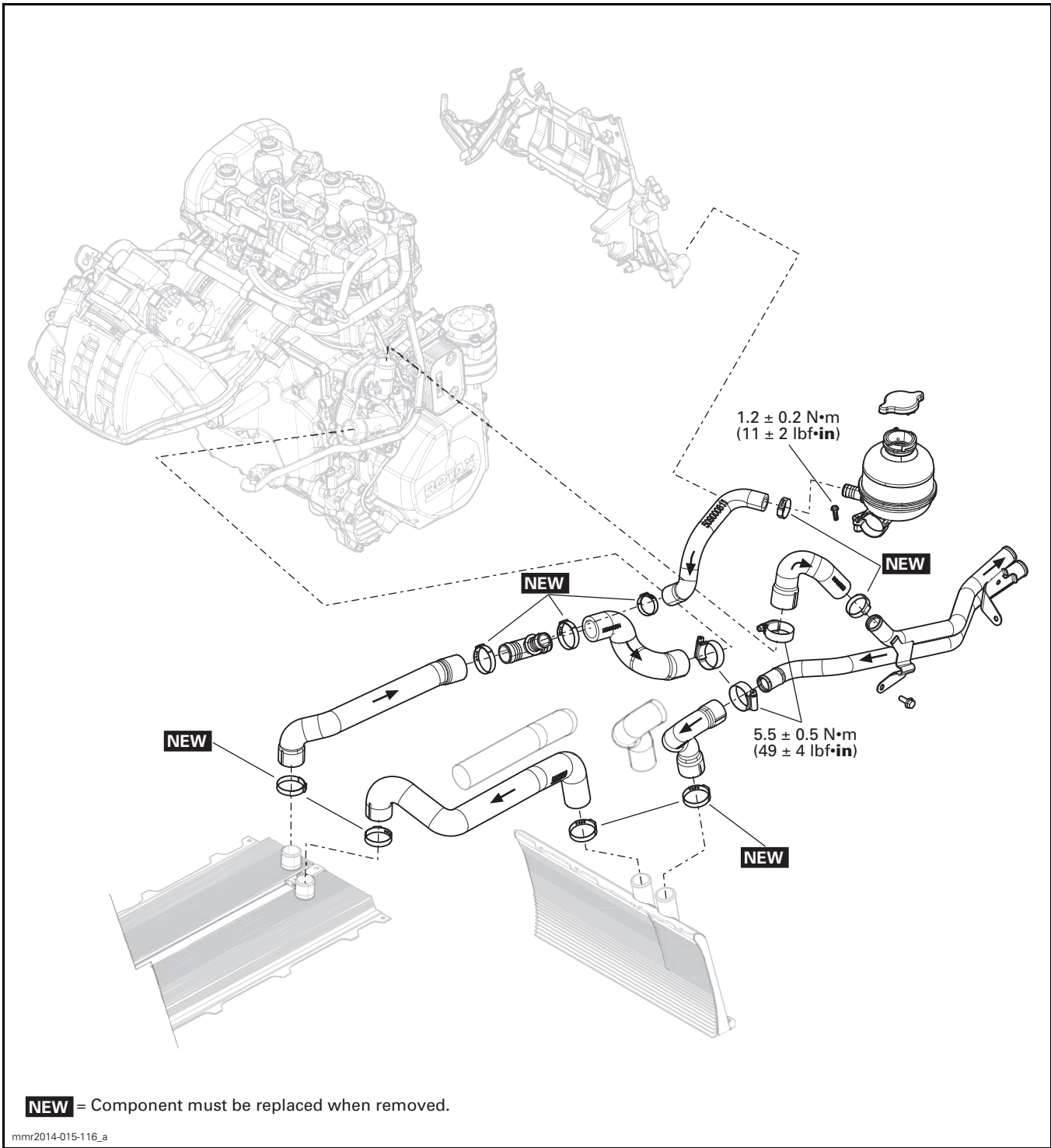


## VEHICLE COMPONENTS

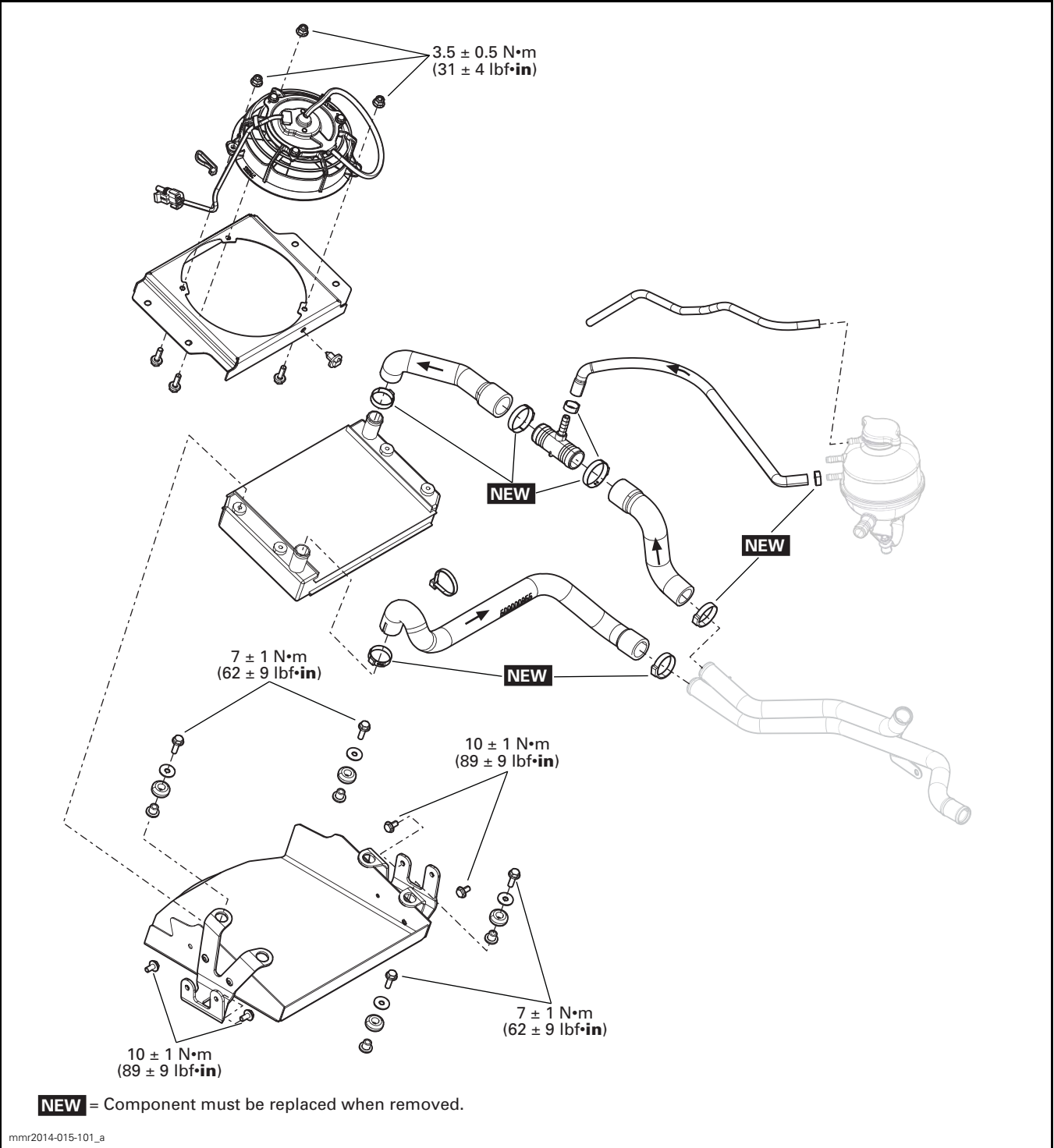
*Models without Front Radiator*



Models with Front Radiator



Models Equipped with Front Radiator




GENERAL

For a better understanding, some illustrations were taken with engine out of vehicle.

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

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

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

 **WARNING**

To avoid potential burns, do not remove the coolant tank cap or loosen the cooling drain plug if the engine is hot.

 **WARNING**

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



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

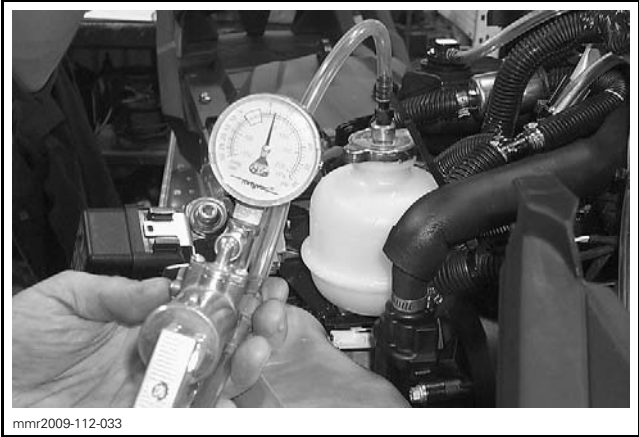
INSPECTION

COOLING SYSTEM LEAK TEST

**NOTE:** This test confirms if there is a leak in the cooling system, including the engine.

Pressurize cooling system through coolant reservoir.

REQUIRED TOOL	
TEST CAP (P/N 529 035 991)	
VACUUM/PRESSURE PUMP (P/N 529 021 800)	
COOLING SYSTEM LEAK TEST	
100 kPa (15 PSI)	

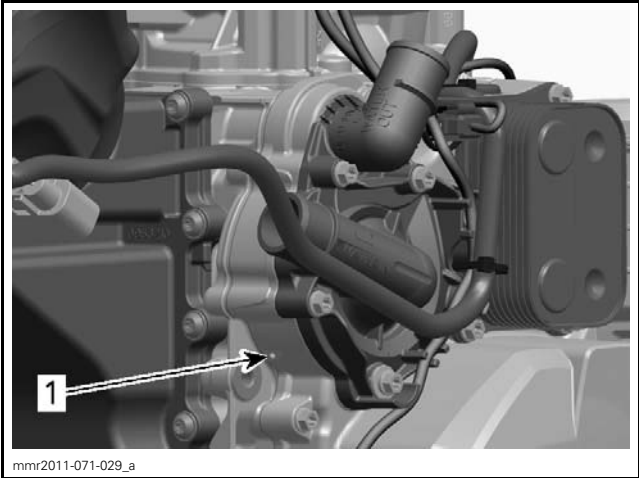


TYPICAL

If pressure drops, check all hoses and engine for coolant leaks. Spray a soap/water solution and look for air bubbles.

Check the leak indicator hole if there is oil or coolant leaking.

**NOTE:** In general leaking coolant indicates a damaged rotary seal. Leaking oil indicates a damaged oil seal. If either seal is leaking, both seals must be replaced at the same time. Refer to *WATER PUMP* in this subsection.



1. Leak indicator hole

TROUBLESHOOTING

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

Always check for fault codes. If a fault code is detected, service the fault code first.

## ENGINE OVERHEATING

1. **Low coolant level.**
  - Refill and check for leaks (coolant leaking out of leak indicator hole, hoses or clamps missing or defective, or cylinder head gaskets leaks). Repair or replace.
2. **Dirty heat exchanger.**
  - Clean heat exchanger fins. Replace heat exchanger as required.
3. **Air in cooling system.**
  - Refill and bleed cooling system.
4. **Defective thermostat (does not open when engine is warm up).**
  - Replace thermostat.
5. **Defective water pump.**
  - Inspect and replace defective components.
6. **Coolant temperature sensor defective.**
  - Check and replace.
7. **Wrong coolant concentration.**
  - Check and adjust coolant concentration according to BRP's recommendations or replace coolant.
8. **Defective coolant reservoir cap.**
  - Replace cap.
9. **Defective cooling fan.**
  - Check cooling fan motor operation.
  - Check fuse and relay of cooling fan motor.
  - Check wiring harness of cooling fan motor.
10. **Snow guard is too high.**
  - Check and adjust rear suspension.

## PROCEDURES

### COOLANT RESERVOIR CAP

#### Coolant Reservoir Cap Test

Using a pressure cap tester, check the efficiency of coolant reservoir cap. If the efficiency is weak, replace the cap.

CAP OPENING PRESSURE
110 kPa (16 PSI)

### COOLANT RESERVOIR

#### Coolant Reservoir Removal

1. Siphon coolant from reservoir.
2. Disconnect coolant hoses from reservoir.
3. Remove coolant reservoir from vehicle.

### Coolant Reservoir Installation

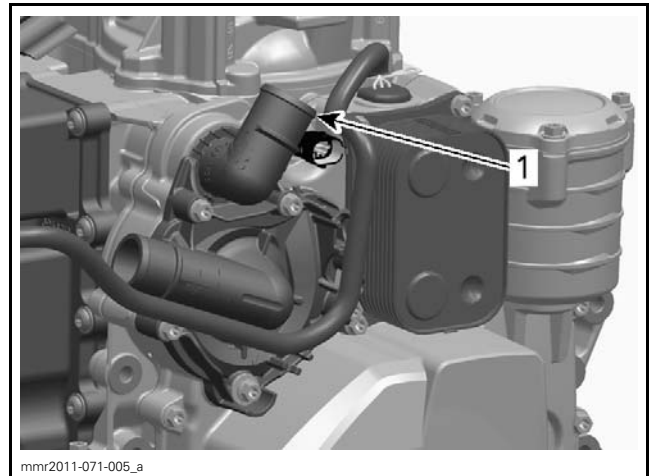
For installation, reverse the removal procedure. However, pay attention to the following.

Refill and bleed cooling system as described in *PERIODIC MAINTENANCE PROCEDURES* subsection.

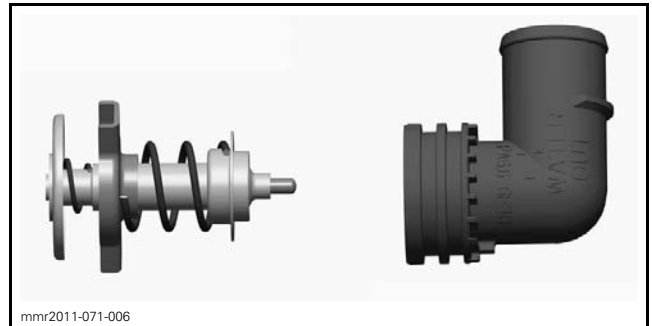
## THERMOSTAT

### Thermostat Location

The thermostat is located on engine MAG side.



1. Thermostat housing



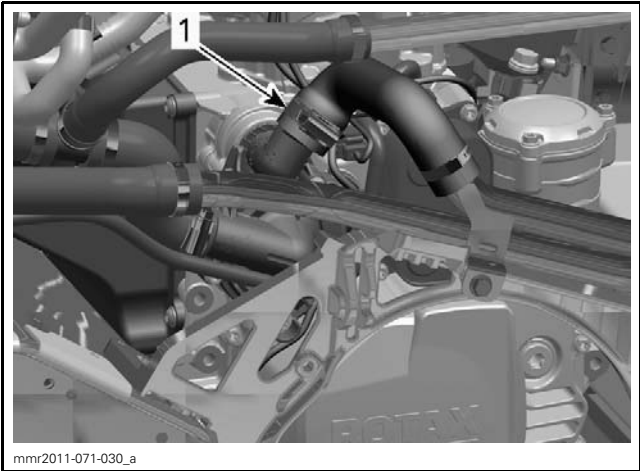
### Thermostat Access

1. Remove RH side panel.
2. Remove muffler. Refer to *EXHAUST SYSTEM* subsection.

### Thermostat Removal

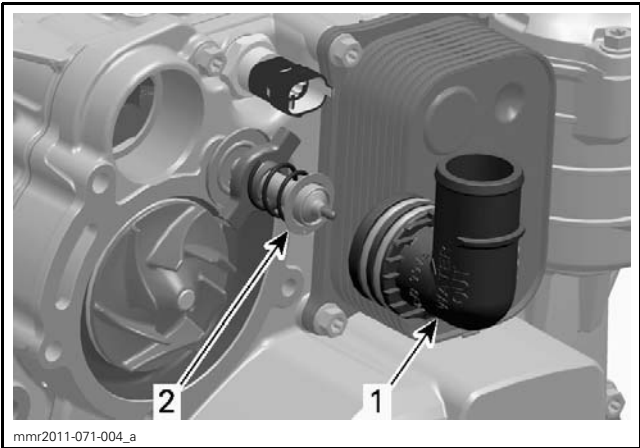
1. Drain engine coolant. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
2. Disconnect outlet hose from thermostat housing.

Subsection 05 (COOLING SYSTEM)



TYPICAL  
1. Thermostat housing outlet hose

- 3. Proceed with *WATER PUMP HOUSING REMOVAL*. See procedure in this subsection.
- 4. Remove thermostat housing then thermostat.



1. Thermostat housing  
2. Thermostat

**NOTE:** Use shop rags to catch any spilled engine coolant.

Thermostat Test

To check thermostat, put it in water and heat water.

THERMOSTAT TEMPERATURE	
Starts to open	75°C (167°F)
Fully open	90°C (194°F)

Replace thermostat if out of specification.

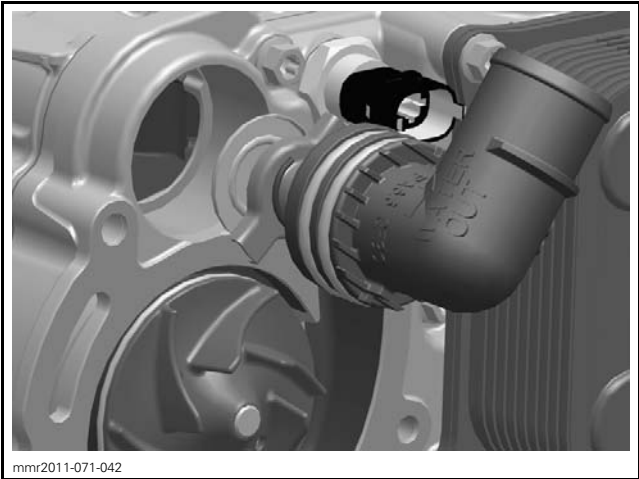
Thermostat Installation

The installation is the reverse of removal procedure, however pay attention to the following.  
Install **NEW** O-rings on thermostat housing.

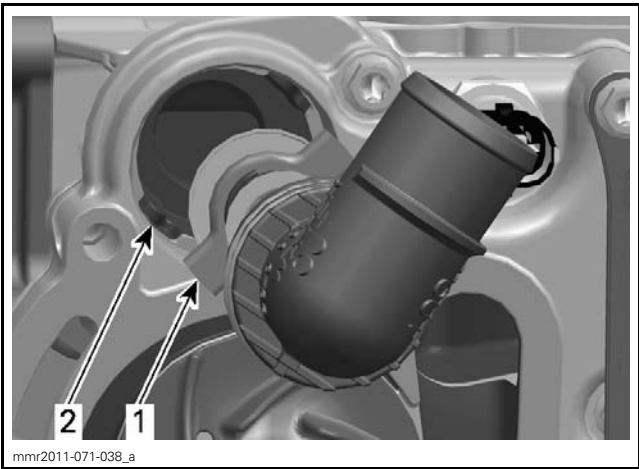
Lubricate O-rings.

THERMOSTAT HOUSING O-RING	
Service product	DOW CORNING 111 (P/N 413 707 000)

Fit thermostat in thermostat housing.



Align both tabs of thermostat with the recess in the magneto cover.



1. Thermostat tabs  
2. Magneto cover recess

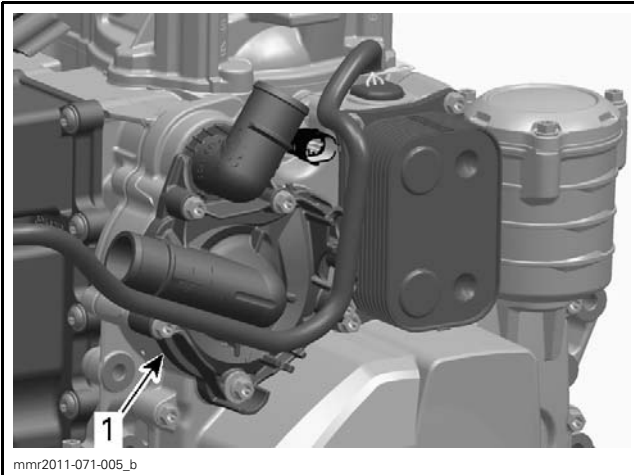
Install water pump housing, refer to *WATER PUMP HOUSING INSTALLATION* in this subsection.

Refill and bleed cooling system. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

WATER PUMP

Water Pump Location

The water pump is located on engine MAG side.



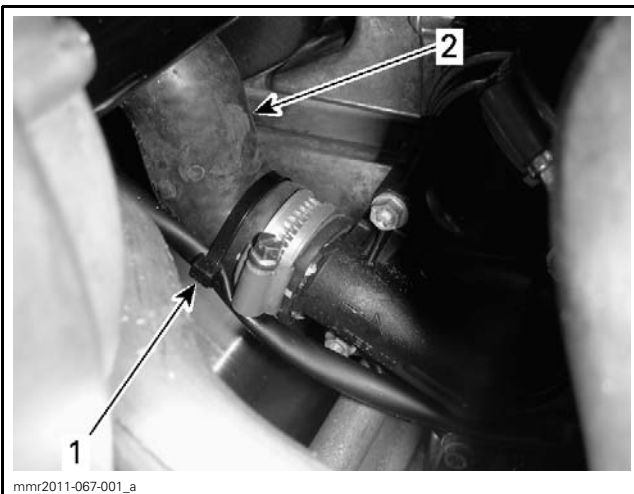
1. Water pump

### Water Pump Access

1. Remove RH side panel.
2. Remove muffler. Refer to *EXHAUST SYSTEM* subsection.

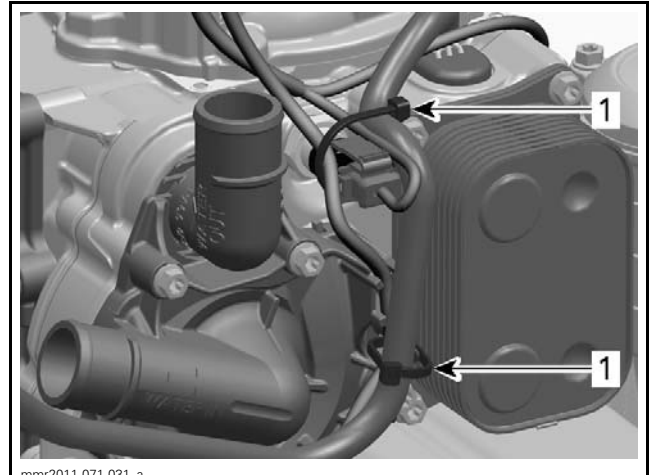
### Water Pump Housing Removal

1. Drain engine coolant. Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
2. Remove locking tie on water pump inlet hose.
3. Disconnect outlet hose from thermostat housing.
4. Disconnect inlet hose from water pump.



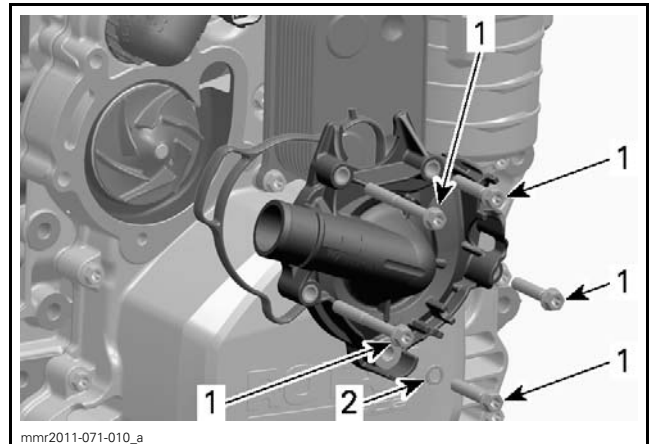
1. Locking tie  
2. Water pump inlet hose

5. Remove both locking ties securing magneto wires.



1. Locking ties

6. Remove retaining screws of water pump housing.
7. Discard sealing washer.
8. Remove water pump housing from magneto cover.



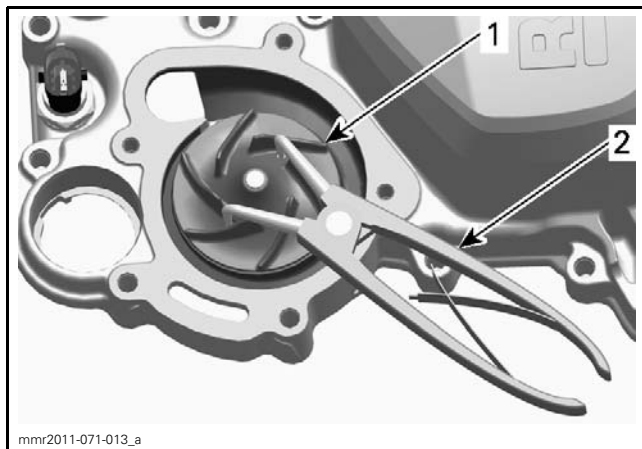
1. Retaining screws  
2. Sealing washer

**NOTE:** Use shop rags to catch any spilled engine coolant.

### Water Pump Disassembly

1. Unscrew impeller counterclockwise using appropriate pliers.

## Subsection 05 (COOLING SYSTEM)

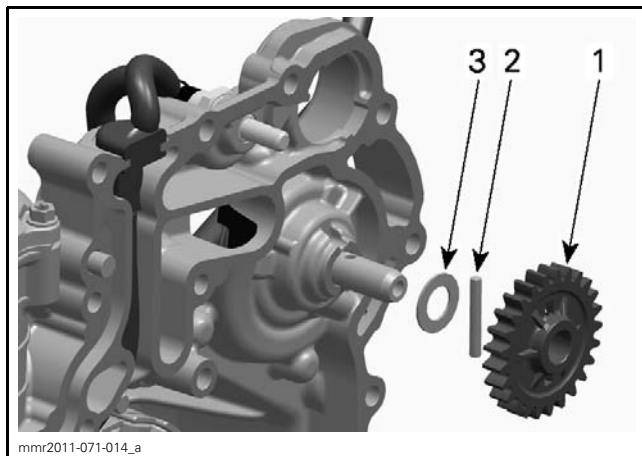


1. Impeller
2. Pliers

2. Remove magneto cover. Refer to *MAGNETO AND STARTER* subsection.

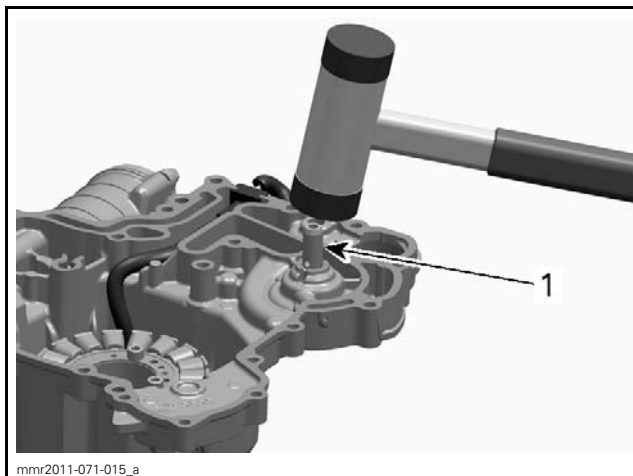
3. Remove the following components from magneto cover:

- Water pump gear
- Needle pin
- Thrust washer.



1. Water pump gear
2. Needle pin
3. Thrust washer

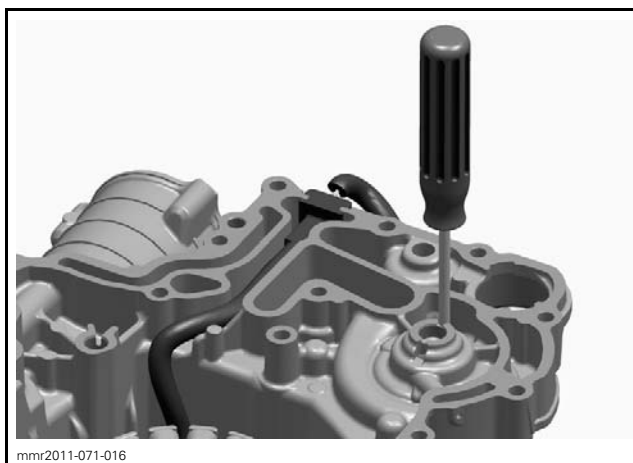
4. Remove water pump shaft using a plastic mallet.



1. Water pump shaft

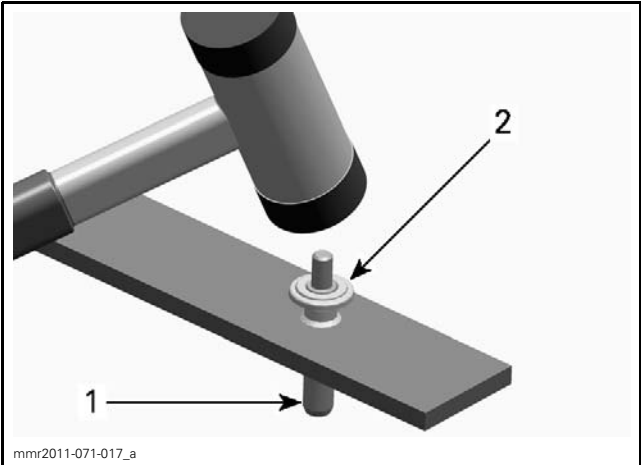
5. Remove the following components from magneto cover:

- Oil seal
- Remaining parts of rotary seal.



**NOTICE** Be careful not to damage the surface of the rotary seal bore in the magneto cover.

6. Separate rotary seal from water pump shaft.



1. Water pump shaft.  
2. Rotary seal

### Water Pump Inspection

Check area of water pump housing for cracks or other visible damage.

Check water pump gear for wear or broken teeth.

Check if housing gasket is brittle, hard or damaged.

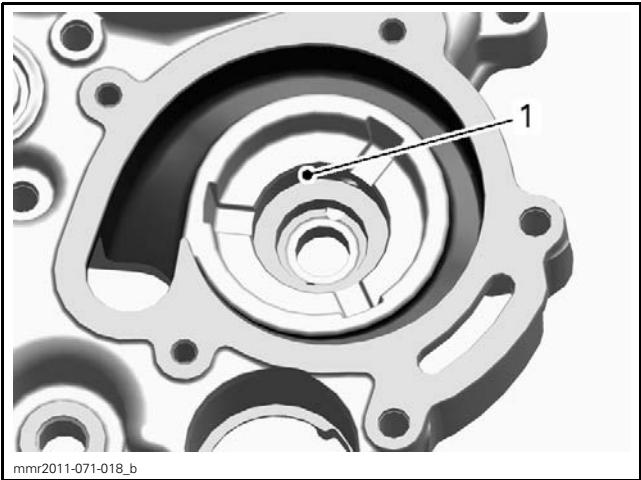
Check water pump shaft for visible damage.

Replace parts if necessary.

### Water Pump Assembly

**NOTE:** Always replace oil seal and rotary seal at the same time.

1. Clean rotary seal surface from old sealant.





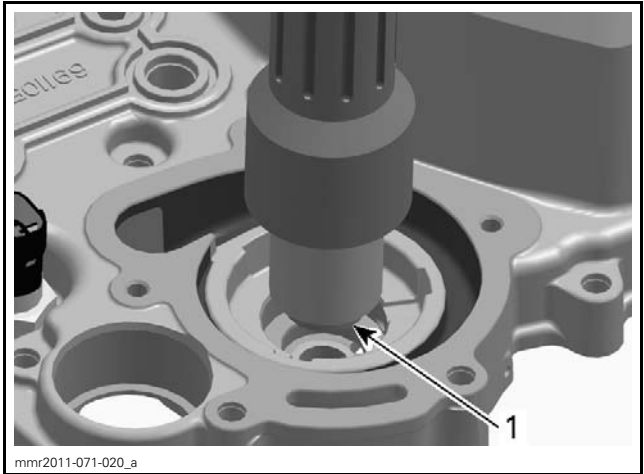
1. Clean surface

2. Apply engine oil on the press fit area of oil seal.

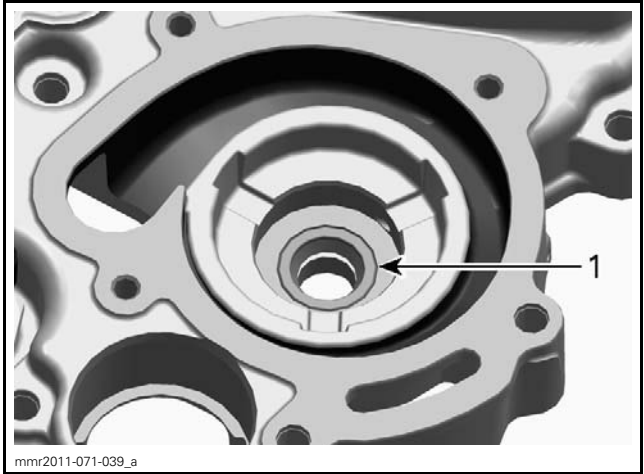
**NOTICE** Never use engine oil on the press fit area of the rotary seal.

3. Install **NEW** oil seal in magneto cover.

REQUIRED TOOL	
OIL SEAL PUSHER (P/N 529 036 210)	
HANDLE (P/N 420 877 650)	



1. Oil seal



1. Oil seal correctly installed


4. Lubricate sealing lip of the oil seal.

OIL SEAL	
Service product	ISOFLEX GREASE TOPAS NB 52 (P/N 293 550 021)

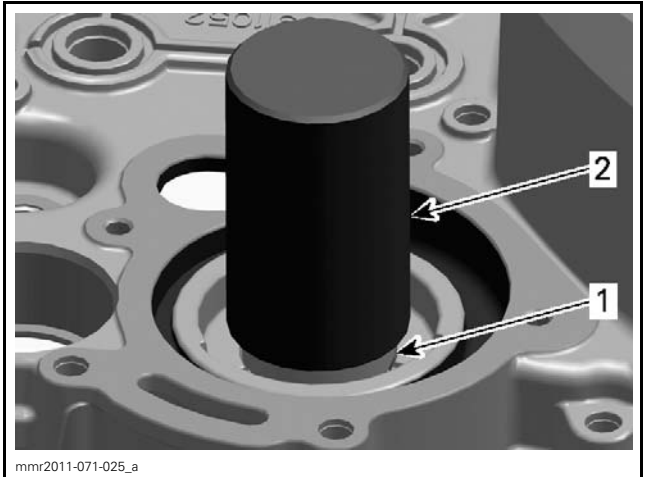
5. Install **NEW** rotary seal on magneto cover using a press.

**NOTE:** Prior to installing, ensure that sealing lip of rotary seal is not damaged.

Subsection 05 (COOLING SYSTEM)

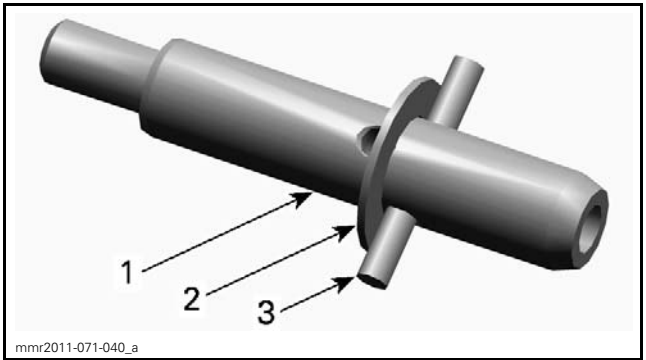
REQUIRED TOOL	
Press	
ROTARY SEAL INSTALLER (P/N 529 036 211)	

**NOTICE** Never use a hammer for rotary seal installation. Only use a press to avoid damaging the ceramic component.



- 1. Rotary seal
- 2. Rotary seal installer

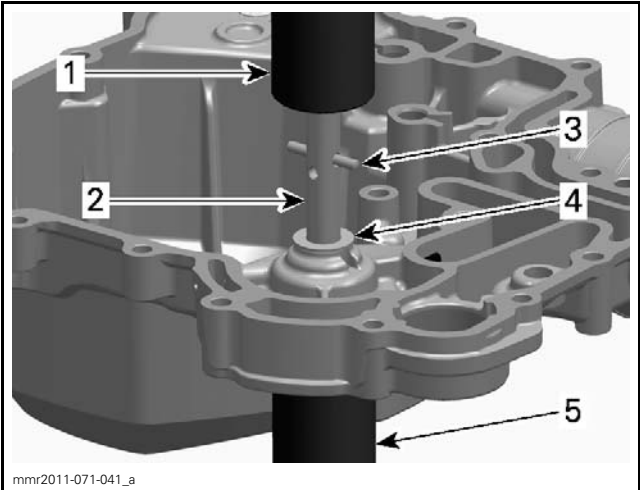
6. Assemble the following components onto water pump shaft.
- Needle pin
  - Thrust washer.



- 1. Water pump shaft
- 2. Thrust washer
- 3. Needle pin

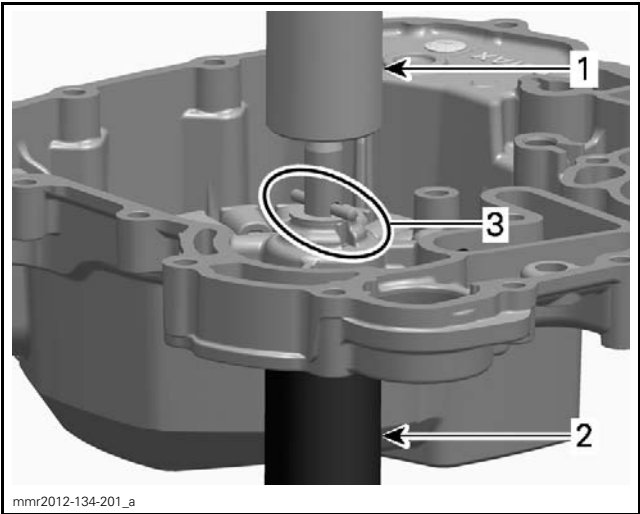
7. Slide water pump shaft into rotary seal using a press.

**NOTE:** To avoid damaging the rotary seal and to achieve the proper preload support the rotary seal with the ROTARY SEAL INSTALLER (P/N 529 036 211).



- 1. Press
- 2. Water pump shaft
- 3. Needle pin
- 4. Thrust washer
- 5. Rotary seal installer

8. Carefully press water pump shaft until needle pin touches thrust washer.



- 1. Press
- 2. Rotary seal installer
- 3. Needle pin touches thrust washer

**NOTICE** Never use a hammer to install water pump shaft into rotary seal.

**NOTE:** After installation, water pump shaft must rotate freely.

9. Screw impeller clockwise using appropriate pliers.

**NOTICE** Be careful not to damage impeller wings during its installation.

10. Install magneto cover. Refer to *MAGNETO AND STARTER* subsection.

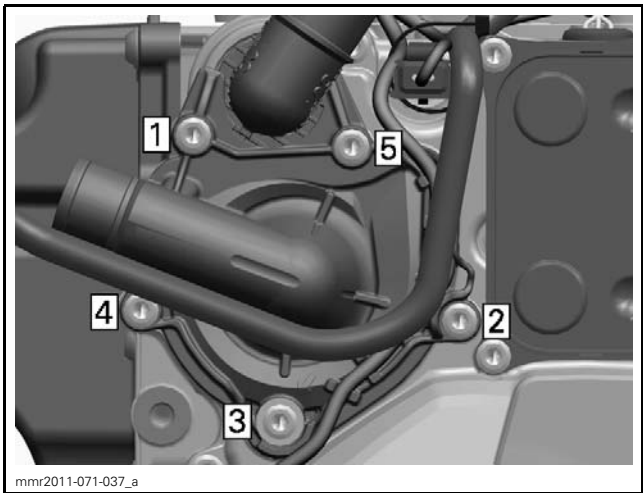
Water Pump Housing Installation

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

**NOTICE** To prevent leaking, take care that the new gasket is exactly in groove when you reinstall the water pump housing.

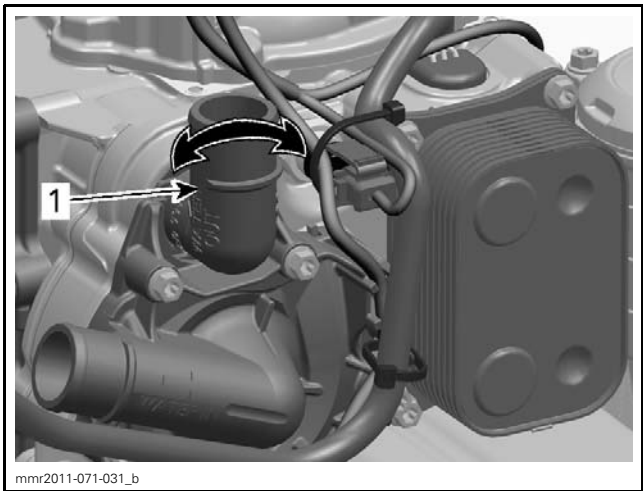
Install a **NEW** sealing washer on drain screw.  
Tighten water pump housing retaining screws to specification as per the following procedure.

WATER PUMP HOUSING RETAINING SCREWS	
Tightening torque	9 N•m ± 1 N•m (80 lbf•in ± 9 lbf•in)



TIGHTENING SEQUENCE

Turn thermostat housing to proper position.



1. Thermostat housing

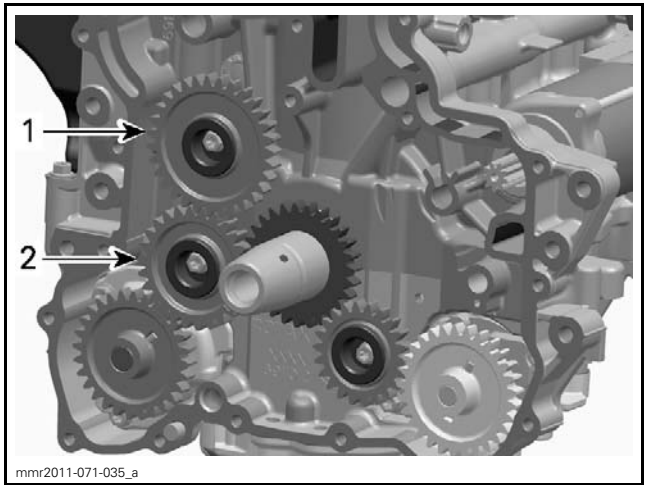
Tighten hose clamps to specification.

COOLANT HOSE CLAMPS	
Tightening torque	5.5 N•m ± 0.5 N•m (49 lbf•in ± 4 lbf•in)

WATER PUMP DRIVE GEAR

Water Pump Drive Gear Location

The water pump drive gear is located behind the magneto cover.



1. Water pump drive gear 31 T
2. Intermediate gear, refer to LUBRICATION SYSTEM

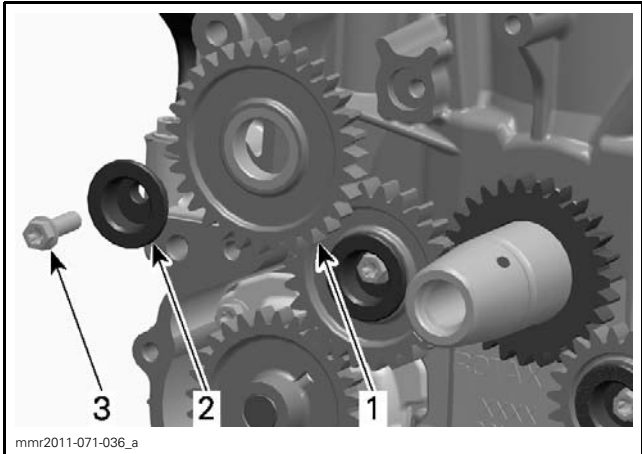
Water Pump Drive Gear Access

Refer to *MAGNETO AND STARTER* subsection and remove:

- Magneto cover
- Magneto flywheel.

Water Pump Drive Gear Removal

1. Remove screw securing water pump drive gear.
2. Remove bearing sleeve.
3. Slide off water pump drive gear.



- 1. Water pump drive gear 31 T
- 2. Bearing sleeve
- 3. M6 x 20 screw

Water Pump Drive Gear Inspection

Inspect gear for wear or other damage.  
Replace gear if necessary.

Water Pump Drive Gear Installation

The installation is the reverse of the removal procedure. However, pay attention to the following.  
Apply engine oil on bearing sleeve.  
Tighten water pump drive gear to specification.

WATER PUMP DRIVE GEAR RETAINING SCREW	
Tightening torque	9 N•m ± 1 N•m (80 lbf•in ± 9 lbf•in)

HEAT EXCHANGERS

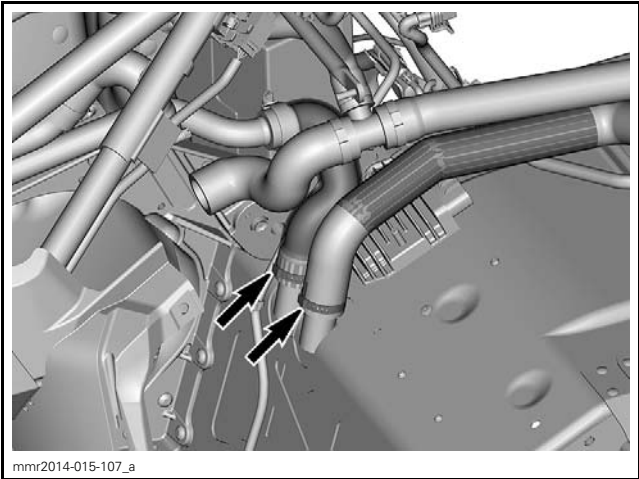
Heat Exchangers Cleaning and Inspection

Remove all debris between heat exchanger fins.  
Check if heat exchanger fins are damaged. Replace if necessary.

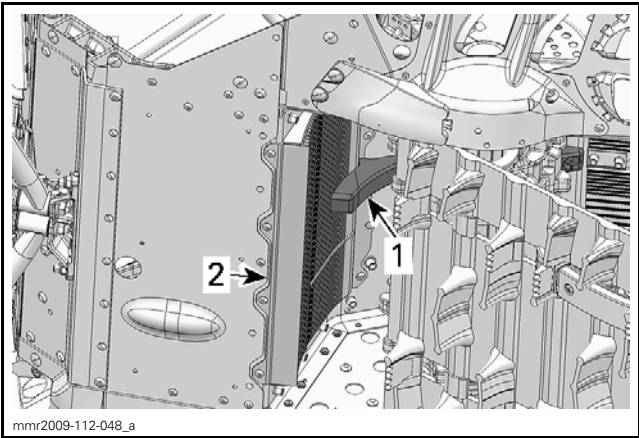
**NOTE:** A heat exchanger with many broken fins does not work properly.

Front Heat Exchanger Removal

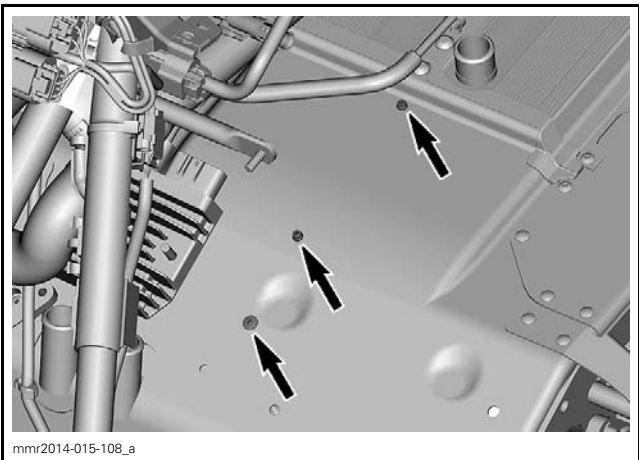
- 1. Remove the engine from the vehicle. Refer to *ENGINE REMOVAL AND INSTALLATION* subsection.
- 2. Lift and secure rear of vehicle.
- 3. Remove both hoses from heat exchanger tubes.



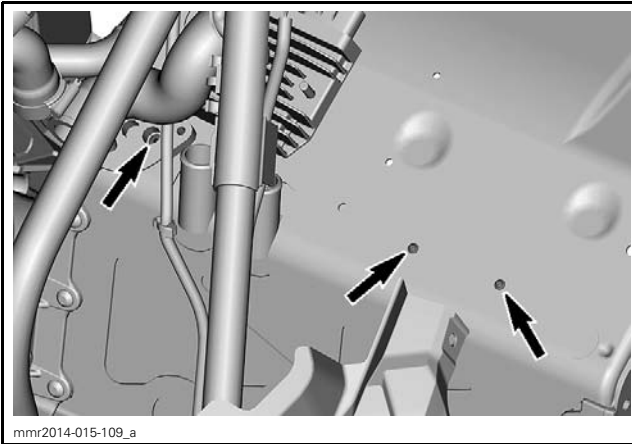
- 4. From engine compartment, drill the 3 rivets retaining the heat exchanger protector.



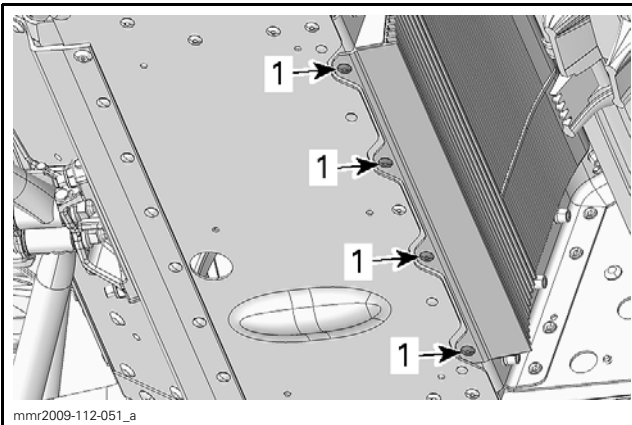
- 1. Heat exchanger protector (in front of track)
- 2. Front heat exchanger



- 5. Remove the upper rivets retaining the front heat exchanger to the frame.

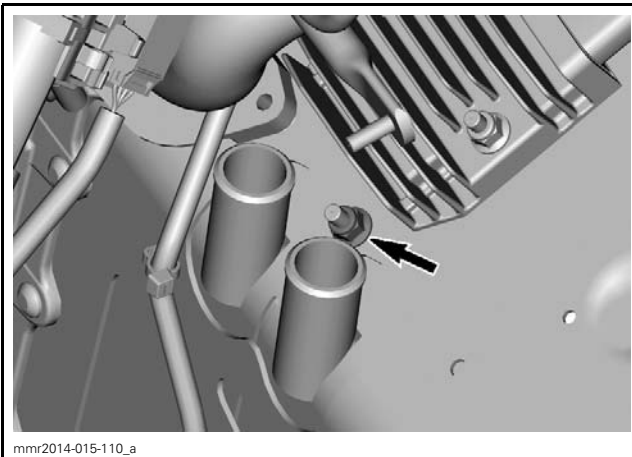


6. From underneath frame, drill or grind the lower rivets of front heat exchanger.



1. Lower rivets

7. Remove nuts securing the front heat exchanger to frame.



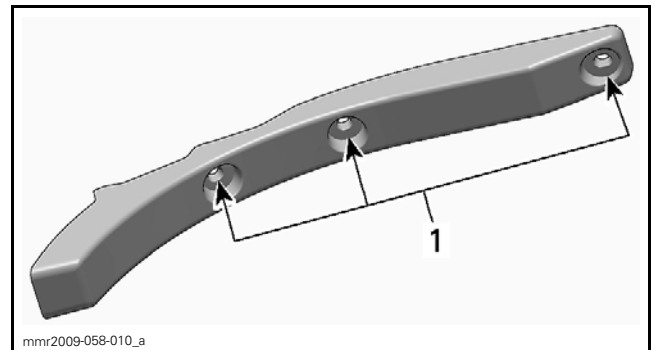
8. Remove front heat exchanger from vehicle.

### Front Heat Exchanger Installation

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

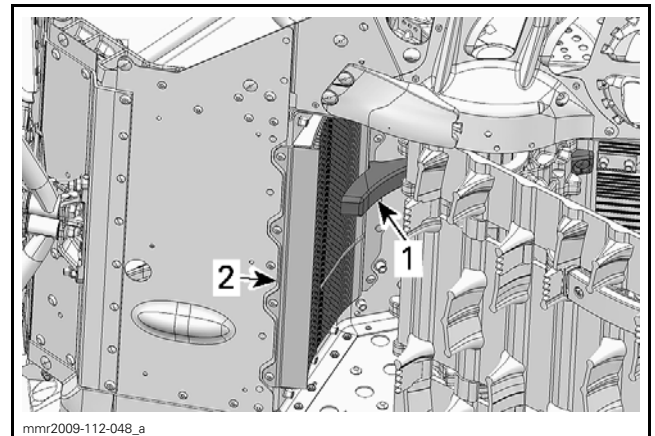
1. Install nut to secure heat exchanger. Do not torque yet.
2. Install all rivets.
3. Tighten nut to 5 N•m (44 lbf•in).
4. Install the heat exchanger protector. To avoid removing the track, proceed as follow:
  - 4.1 Using LOCTITE 380 (BLACK MAX) (P/N 413 408 300), glue 3 washers (P/N 517 124 300) in protector bores.

**NOTE:** Only apply a slight quantity of glue between washers and protector.



1. Glue washers here

- 4.2 From underneath frame, position protector.



1. Heat exchanger protector (in front of track)
2. Front heat exchanger

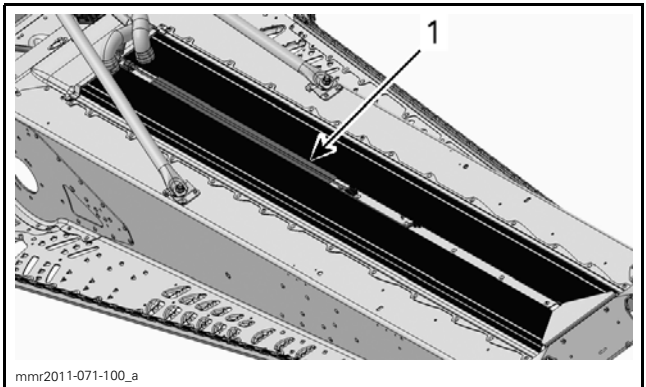
- 4.3 Apply pressure on protector to ensure that it makes contact with frame.
- 4.4 From engine compartment, secure protector with the rivets. Ensure to insert the rivet ends in washers.
5. Reinstall remaining removed parts.

Subsection 05 (COOLING SYSTEM)

6. Refill cooling system as described in this subsection.

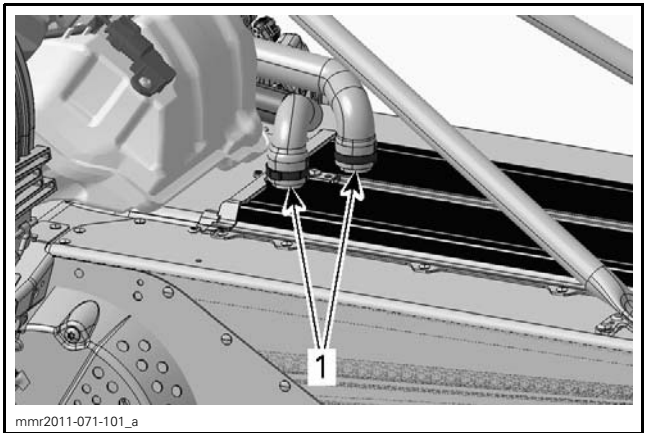
Rear Heat Exchanger Removal

- 1. Drain cooling system, Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.
- 2. Remove rear suspension. Refer to *REAR SUSPENSION* subsection.
- 3. Remove fuel tank. Refer to *FUEL TANK AND FUEL PUMP* subsection.
- 4. Remove luggage rack.
- 5. Remove snow guard.
- 6. Remove plastic cover from heat exchanger.
- 7. Remove rear bumper
- 8. Remove polystyrene board from heat exchanger.
- 9. Move wiring harness aside.



1. Wiring harness

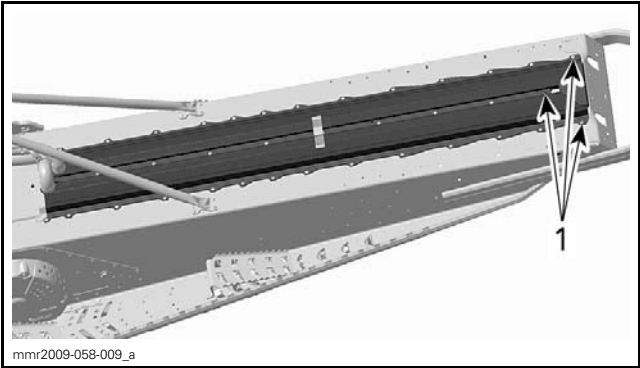
10. Disconnect coolant hoses from heat exchanger.



1. Coolant hoses

11. Using a grinding disk, grind all rivet rows retaining heat exchanger to frame.

**NOTE:** Work from the top of frame.



1. Grind all rivet rows

**NOTE:** When pushing the grinded rivets out, support the frame around the rivet with a socket on the opposite side to avoid warpage.

12. Remove heat exchanger from vehicle.

Rear Heat Exchanger Installation

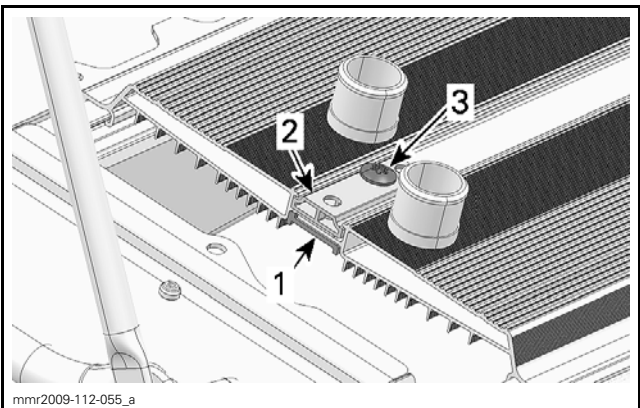
The installation is the reverse of the removal procedure. However, pay attention to the following. Slide heat exchanger into frame.

Near heat exchanger tube, replace both HUCK rivets by the following parts.

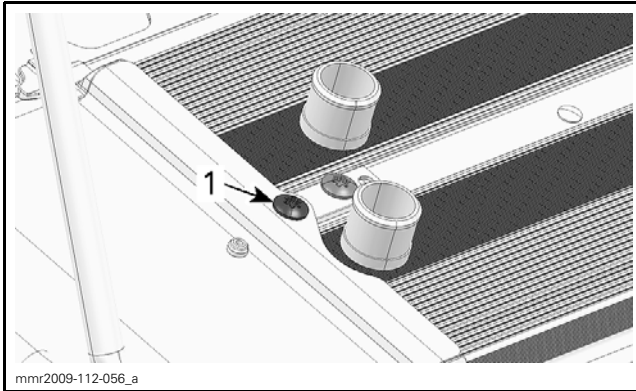
NEW FASTENERS	
TORX screw M6 x 25 (2x)	(P/N 250 000 284)
Hexagonal flanged elastic stop nut M6 (2x)	(P/N 233 261 414)

Install both reinforcement plates using **new** fasteners as follows:

- Install the rear screw. Place it head on the top. Do not torque yet.
- Move heat exchanger forward and install the second screw.
- Tighten screws to 10 N•m (89 lbf•in).



1. Lower reinforcement plate  
2. Upper reinforcement plate  
3. Screw M6 x 25



1. Screw M6 x 25

Secure heat exchanger to frame using **new** rivets. Position rivets with the head on top. Install **new** Oetiker clamps to secure coolant hoses.

**NOTICE** If traction enhancing products (studs) are used on vehicle, install the appropriate heat exchanger protector. Refer to *TRACK* subsection to choose the proper protectors kit.

## FRONT RADIATOR

### Front Radiator Removal

1. Refer to appropriate subsection and remove:

#### *REV-XS*

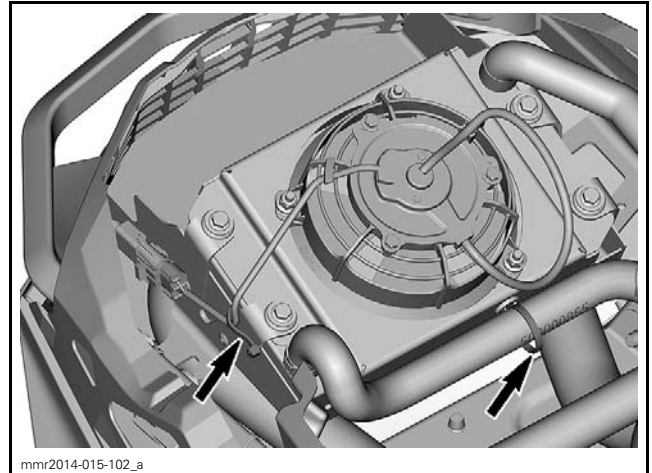
- Side panels
- Top module
- Bottom pan cover.

#### *REV-XR*

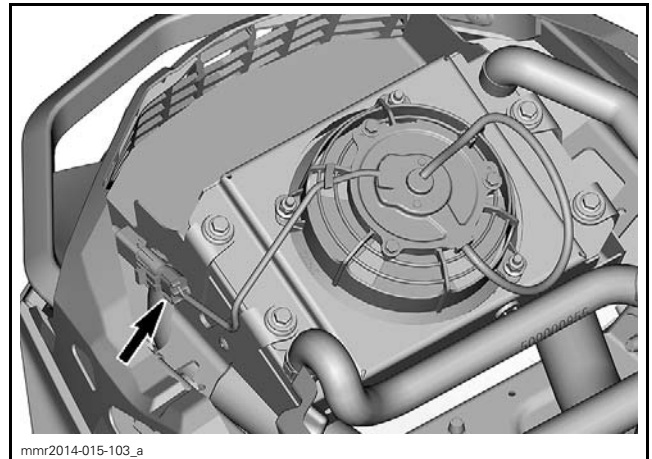
- Hood
- Side panels
- Air intake silencer and gauge support assembly.

2. Drain cooling system, Refer to *PERIODIC MAINTENANCE PROCEDURES* subsection.

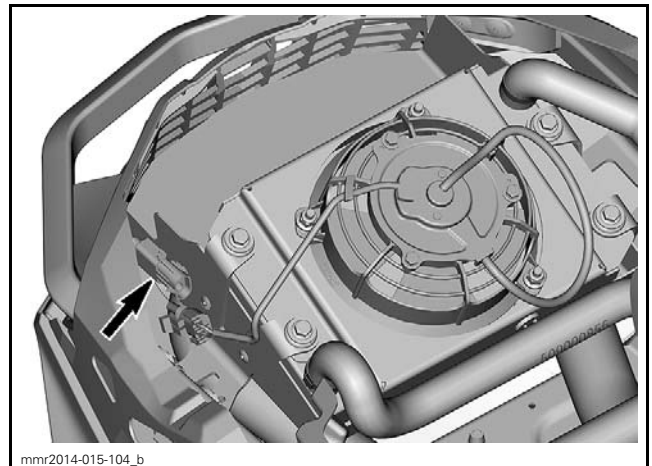
3. Cut locking ties securing cooling fan connector and radiator hose.



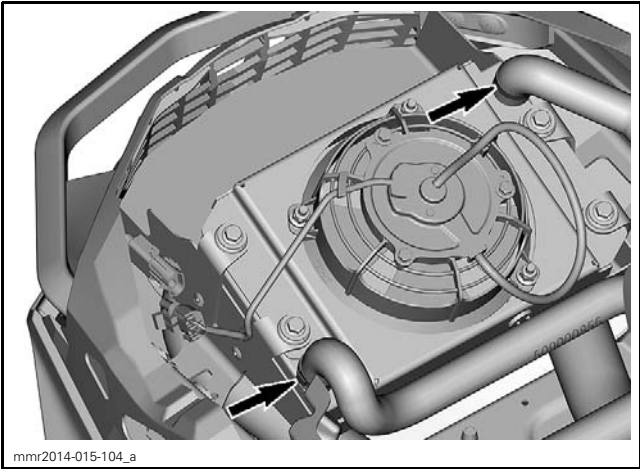
4. Disconnect front radiator cooling fan connector.



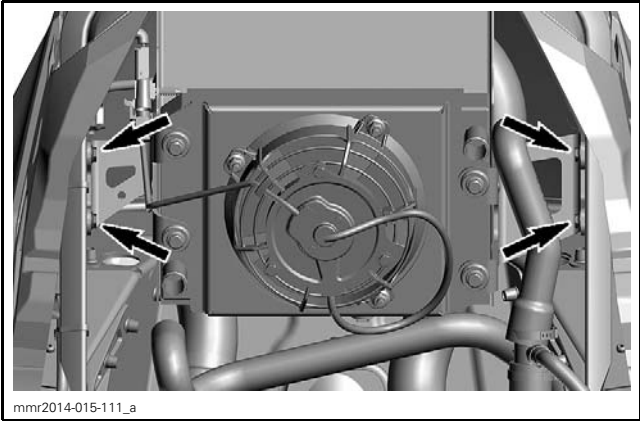
5. Remove connector housing from radiator support.



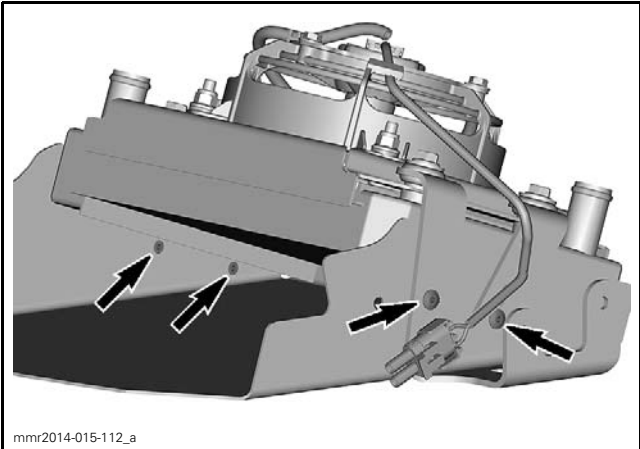
6. Disconnect coolant hoses from front radiator.



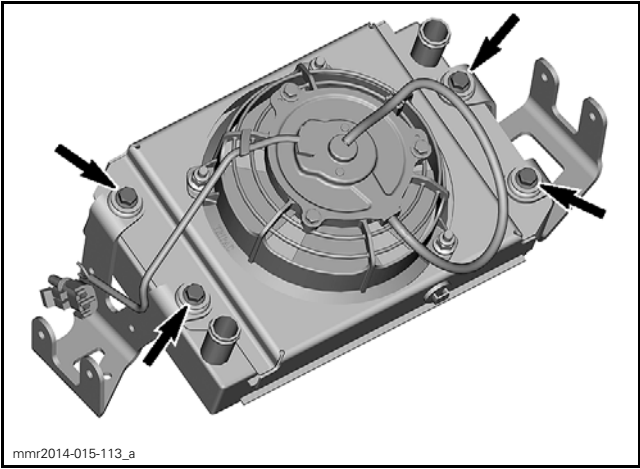
7. Remove screws securing the radiator support to body and frame.



8. Remove front radiator assembly from vehicle.  
9. Drill rivets securing supports to the shroud.



10. Remove screws securing radiator to supports.



Front Radiator Installation

The installation is the reverse of the removal procedure. However, pay attention to the following. Install **new** Oetiker clamps to secure coolant hoses.

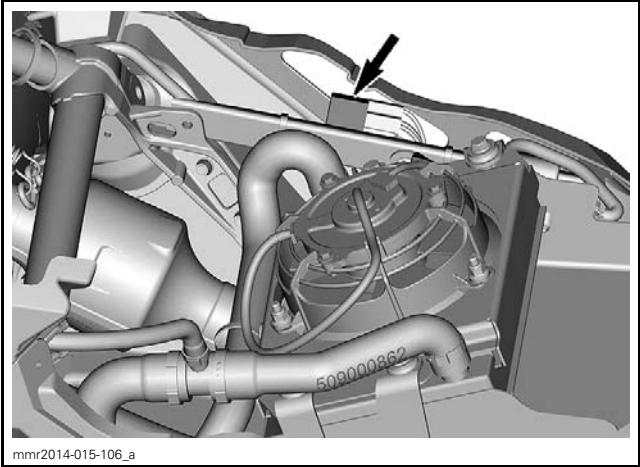
COOLING FAN

Cooling Fan Operating Condition

RADIATOR COOLING FAN		
ENGINE TEMPERATURE	COOLING FAN RELAY	COOLING FAN OPERATION
> 100°C (212°F)	Close	Starts
< 95°C (203°F)	Open	Stops

Cooling Fan Relay Location

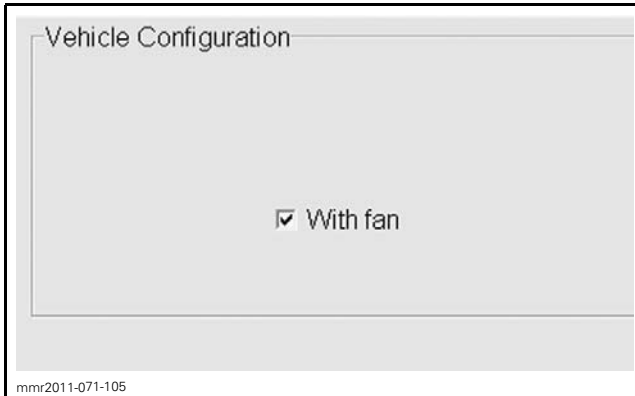
The cooling fan relay is located on the cooling fan harness.



Cooling Fan Configuration in B.U.D.S.

1. Connect vehicle to B.U.D.S., refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

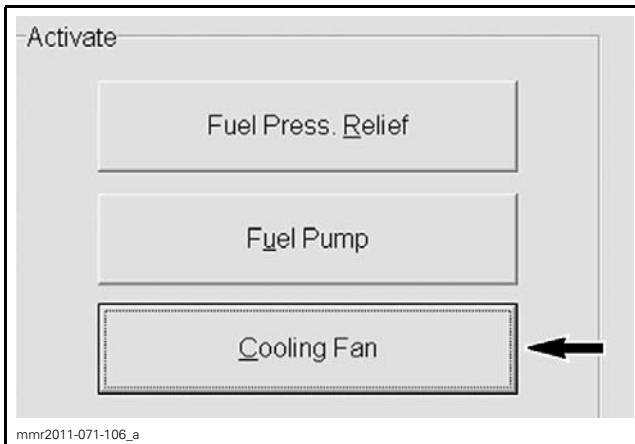
2. In B.U.D.S., select the following:
  - **Read Data** button
  - **Setting** tab
  - **ECM** page.
3. Ensure that **With fan** box is properly checked.



VEHICLE CONFIGURATION BOX

## Cooling Fan Motor Operation Test

1. Go to:
  - **Activation** tab
  - **ECM** page.
2. Press **Cooling Fan** button to activate cooling fan motor.



COOLING FAN ACTIVATION BUTTON

3. If cooling fan motor does not work, see *COOLING FAN TESTING SEQUENCE*.

## Cooling Fan Testing Sequence

If B.U.D.S is properly configured and cooling fan does not work, follow this testing sequence to diagnose problem.

1. Check cooling fan connector and terminal condition.
2. Check cooling fan fuse.
  - Refer to *POWER DISTRIBUTION*.

3. Check cooling fan relay.
  - Refer to *POWER DISTRIBUTION*.
4. Check cooling fan motor operation.
  - Refer to *COOLING FAN MOTOR OPERATION TEST*.
5. Check input voltage at cooling fan motor.

**NOTE:** Engine must be started and engine temperature must be > 100°C (212°F).

INPUT VOLTAGE AT COOLING FAN MOTOR	
TEST PROBES	VOLTAGE
RD	Battery voltage (±12 Vdc)
BK	

6. Check input voltage at cooling fan relay.

INPUT VOLTAGE AT COOLING FAN RELAY	
TEST PROBES	VOLTAGE
Pin 85 (RD/VI)	Battery voltage (±12 Vdc)
Battery negative (-) post	

INPUT VOLTAGE AT COOLING FAN RELAY	
TEST PROBES	VOLTAGE
Pin 30 (RD/VI)	Battery voltage (±12 Vdc)
Battery negative (-) post	

7. Check ECM ground continuity test (relay).

ECM GROUND CONTINUITY TEST (RELAY)	
TEST PROBES	VOLTAGE
ECM-B pin 4J	Close to 0 Ω
Relay pin 86 (OR/YL)	