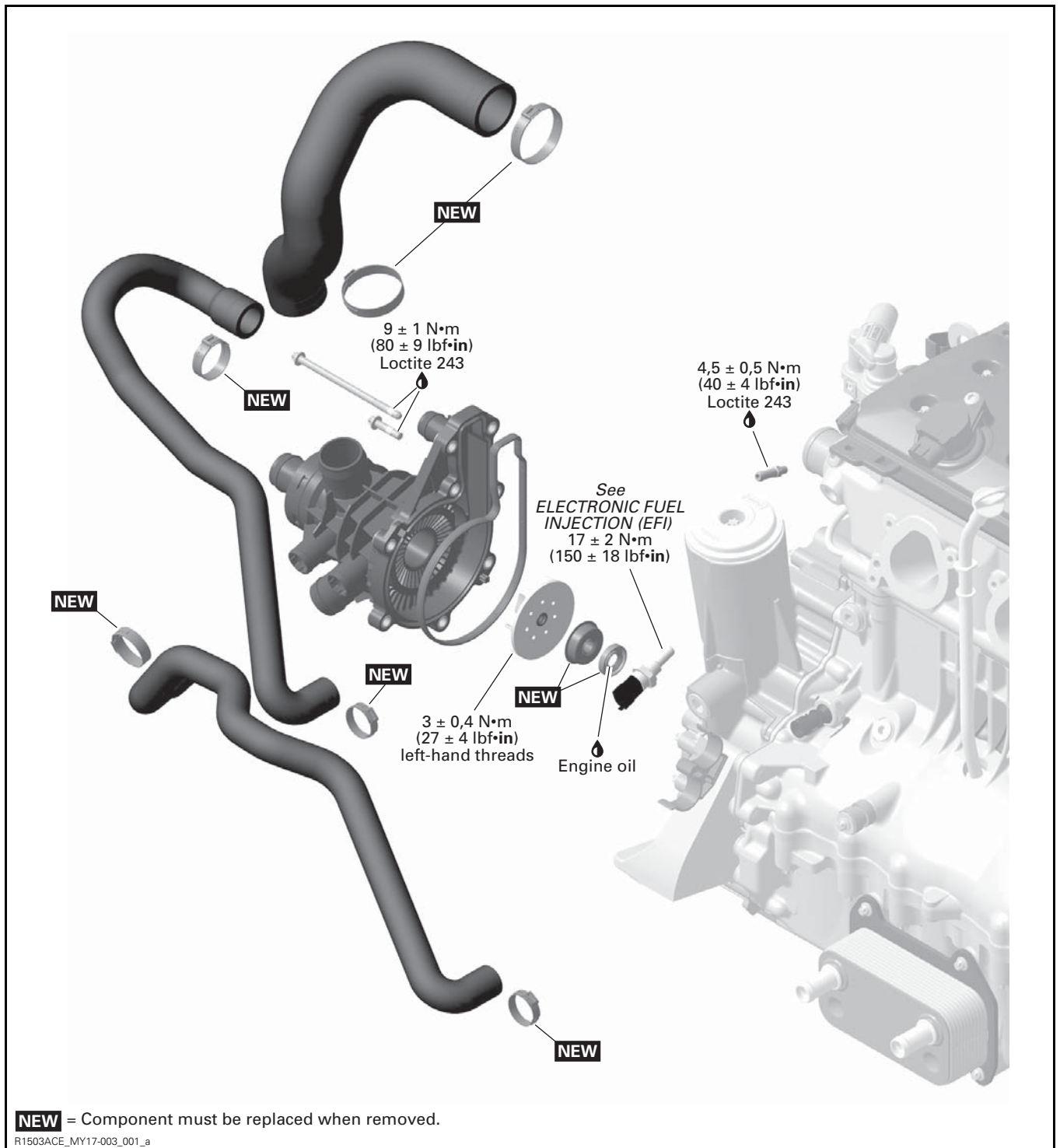


COOLING SYSTEM - ENGINE

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 243 (BLUE).....	293 800 060	4



GENERAL

SYSTEM DESCRIPTION

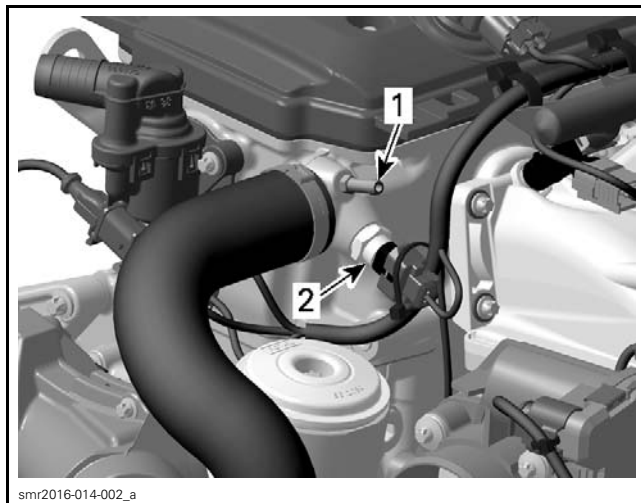
A closed loop cooling system is utilized on the 1503 4-TEC engines, which offers an efficient engine cooling while keeping dirt and salt water out of the cooling system. This system keeps the temperature constant and prevents internal engine corrosion.

A separate coolant tank ensures that enough engine coolant is in the circuit during any operating condition.

The coolant flow comes from the water pump impeller into the cylinder block. It goes around the cylinders and straight up to the cylinder head. A smaller quantity of engine coolant enters the cylinder block on the exhaust side for a better cooling. In the cylinder head the water channels flow around the exhaust and then the intake valves and leave the engine through a large hose. From there the coolant goes back to the water pump housing and depending on the engine temperature, it flows through the thermostat directly back to the water pump impeller, or it takes its way through the heat exchanger.

Engine coolant is also directed towards the oil cooler (coolant type).

Coolant temperature sensor and bleed hose fitting are located on the cylinder head.



1. Bleed hose fitting
2. Coolant temperature sensor (CTS)

NOTICE Never modify cooling system arrangement, otherwise serious engine damage could occur.

TROUBLESHOOTING

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

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

ENGINE OVERHEATING

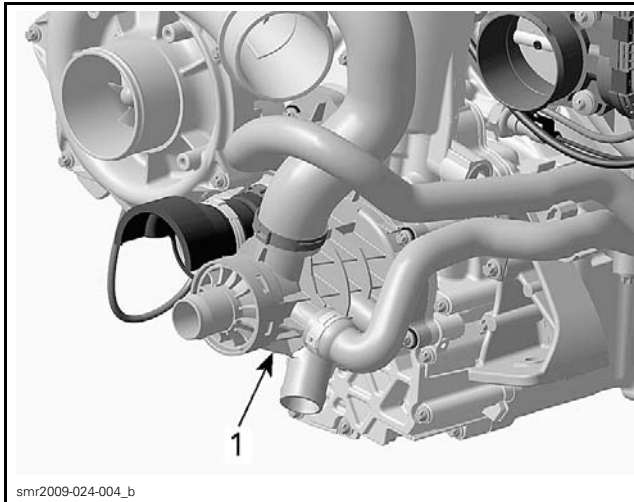
1. **Low coolant level.**
 - Refill and check for leaks (coolant leaking out of engine leak indicator hole, hoses or clamps missing/defective, cylinder head gaskets leaks, ride plate leaking, etc.). Repair or replace.
2. **Air in cooling system**
 - Refill and bleed cooling system.
3. **Thermostat defective (does not open when engine gets hot)**
 - Replace thermostat housing.
4. **Water pump failure**
 - Inspect and replace defective components.
5. **Water temperature sensor defective**
 - Check or replace. Refer to *ELECTRONIC FUEL INJECTION (EFI)*.
6. **Ride plate or hoses damaged**
 - Check or replace damaged components.
7. **Exhaust system clogged**
 - Flush exhaust system.
8. **Internal passage blocked in cooling system**
 - Inspect and clean.

PROCEDURES

COOLANT TEMPERATURE SENSOR (CTS)

Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

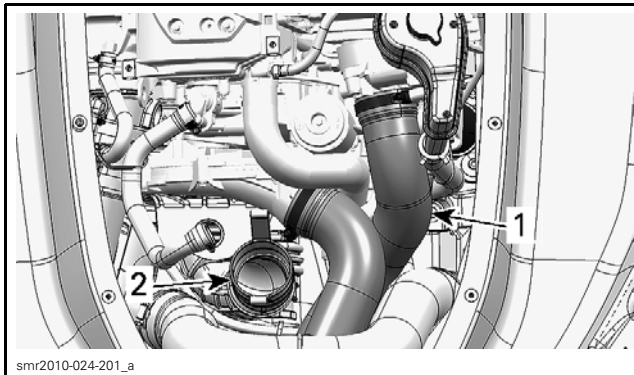
WATER PUMP HOUSING



1. Water pump housing

Water Pump Housing Access

1. Remove the air intake silencer. Refer to *AIR INTAKE SYSTEM* subsection:
2. Detach the air intake hose from the throttle body.
3. Remove the hose from the supercharger (if equipped).



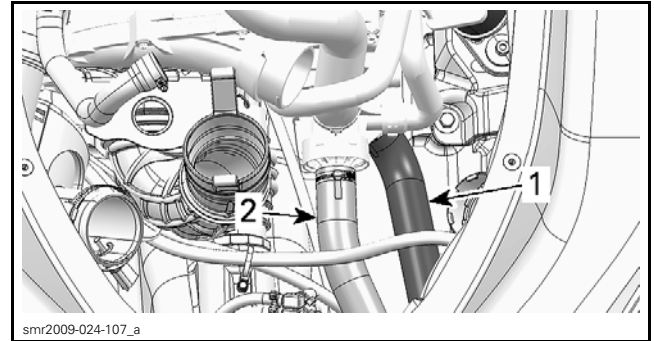
TYPICAL - SUPERCHARGED ENGINE
 1. Detach intake hose at throttle body
 2. Supercharger hose

4. Disconnect exhaust hose from the resonator. Place hose over muffler.

Removing the Water Pump Housing

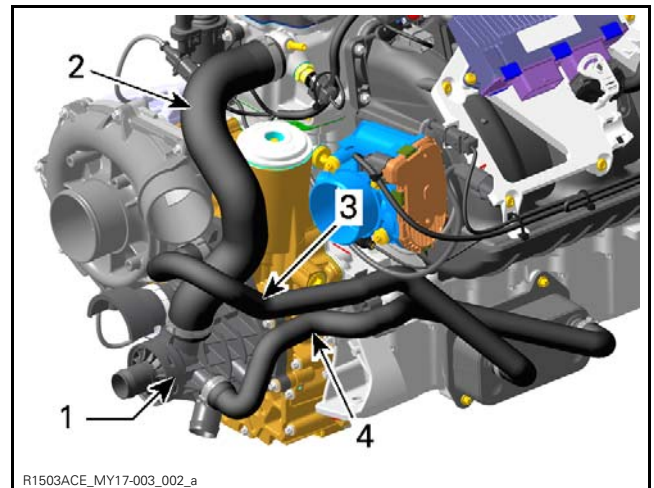
Drain cooling system and engine oil.

Disconnect ride plate hoses from water pump housing.



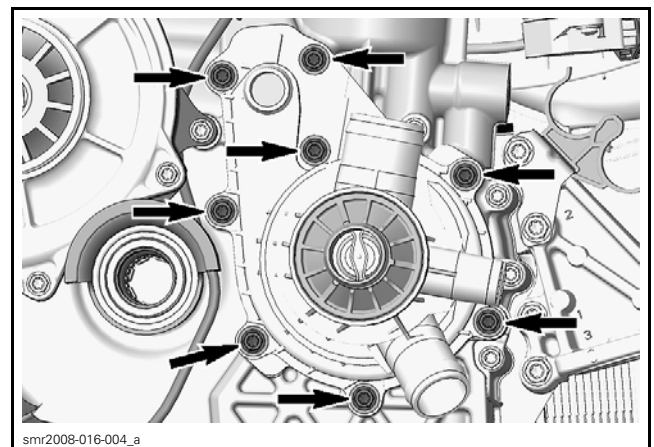
TYPICAL
 1. Ride plate outlet hose
 2. Ride plate inlet hose

Disconnect the cylinder head outlet hose and oil cooler hoses.



1. Water pump housing
 2. Cylinder head hose
 3. Oil cooler inlet hose
 4. Oil cooler outlet hose

Remove water pump housing screws.

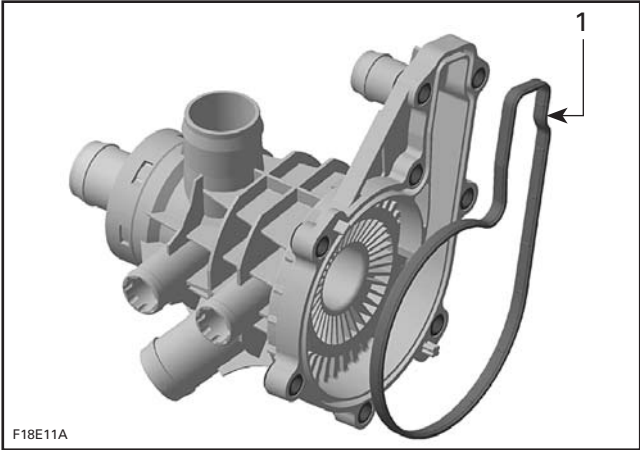


TYPICAL

Pull the water pump housing to remove it.

Inspecting the Water Pump Housing

Check if gasket is brittle, hard or damaged and re-place as necessary.



1. Water pump housing gasket

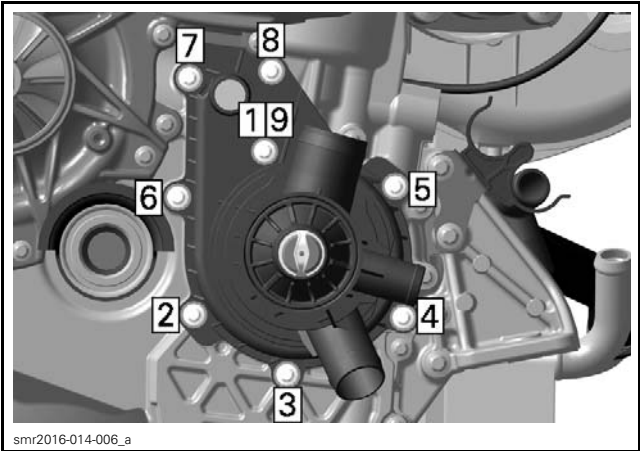
Check if thermostat is in good condition. Refer to *THERMOSTAT* in this subsection.

Installing the Water Pump Housing

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

NOTICE Take care that the gaskets are exactly in groove when you reinstall the water pump housing.

Tighten screws to specification using the following sequence.



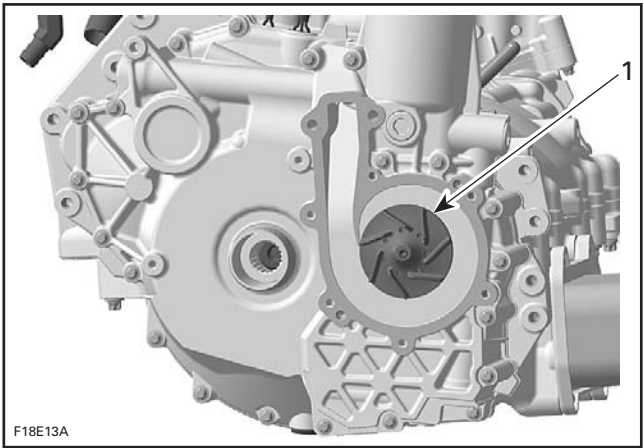
TIGHTENING TORQUE	
Service product	LOCTITE 243 (BLUE) (P/N 293 800 060)
Water pump housing screws	9 N•m (80 lbf•in)

WATER PUMP IMPELLER

Removing the Water Pump Impeller

Remove the *WATER PUMP HOUSING*, see procedure in this subsection.

Unscrew the impeller clockwise.



1. Impeller

NOTICE Coolant/oil pump shaft and impeller have left-hand threads.

Inspecting the Water Pump Impeller

Check impeller for cracks or other damage. Replace impeller if damaged.

Installing the Water Pump Impeller

The installation is the opposite of the removal procedure. Pay attention to the following details.

NOTICE Be careful not to damage impeller wings during installation.

Torque impeller to specification.

TIGHTENING TORQUE	
Water pump impeller (left hand threads)	3 N•m ± 0.4 N•m (27 lbf•in ± 4 lbf•in)

THERMOSTAT

The thermostat is a single action type.

Removing the Thermostat

Remove the *WATER PUMP HOUSING*, see procedure in this subsection.

NOTE: The thermostat is located inside the water pump housing.

Testing the Thermostat

To check the operation of the thermostat, put it in water and heat water.

Look inside the cylinder head return hose connection to see the movement of the thermostat..

THERMOSTAT OPENING TEMPERATURE	
Water pump housing thermostat	87°C (189°F)

If there is no operation, replace the water pump housing.

Installing the Thermostat

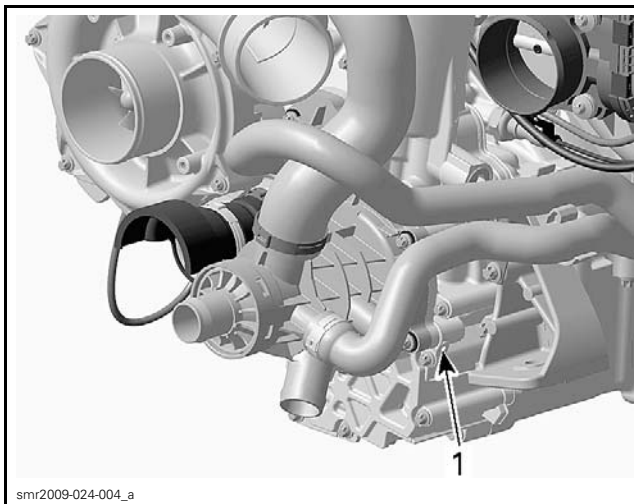
Refer to *WATER PUMP HOUSING* in this subsection.

ROTARY SEAL

Inspecting the Rotary Seal

Check leak indicator hole for oil or coolant leak:

- Leaking coolant indicates a defective rotary seal
- Leaking oil indicates a faulty oil seal.



1. Leak indicator hole

Rotary seal and oil seal must be replaced together.

Replacing the Rotary Seal

Refer to *LUBRICATION SYSTEM* subsection.