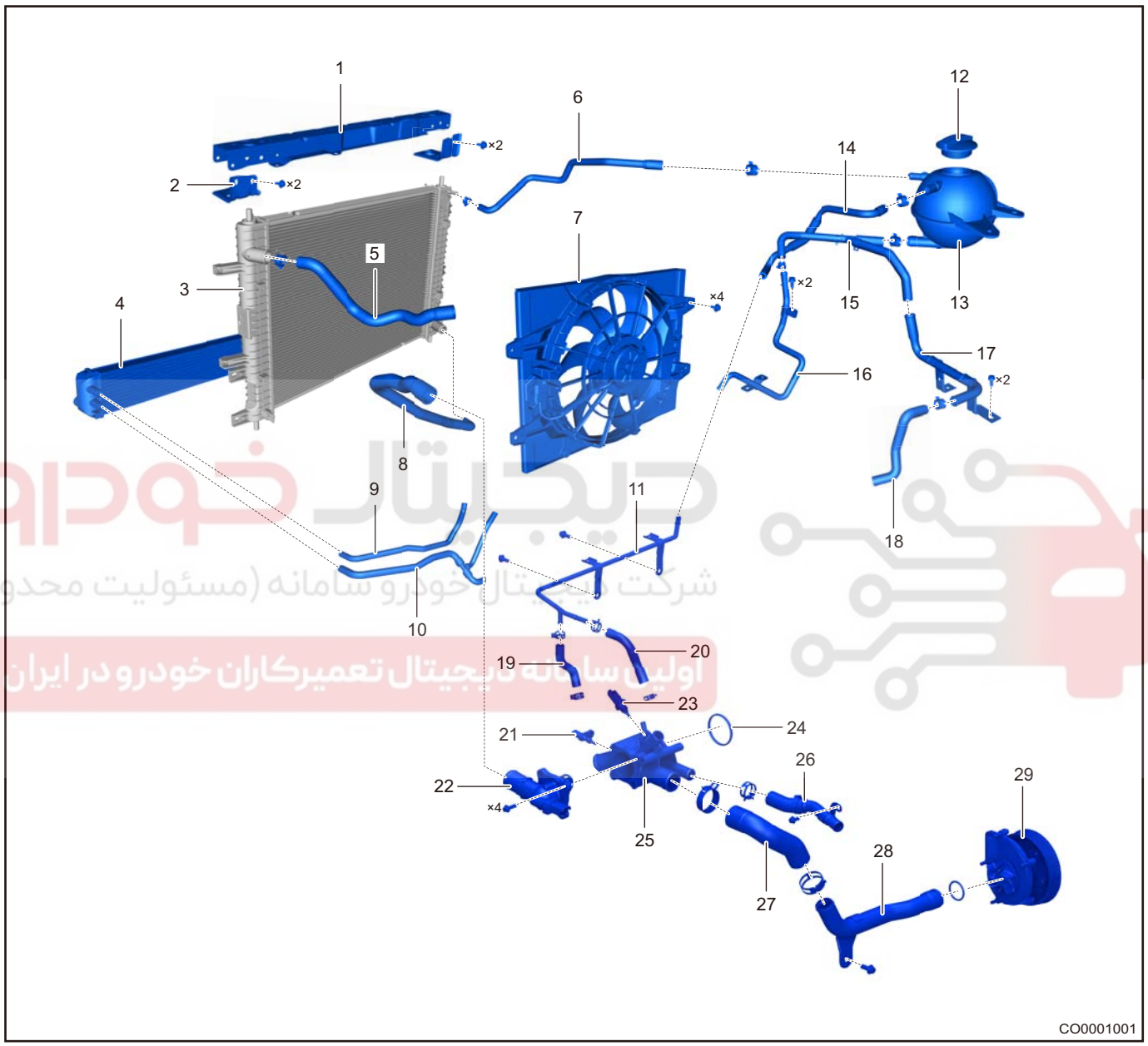
SQRE4T15C COOLING SYSTEM

SQRE4T15C COOLING SYSTEM

GENERAL INFORMATION

Components

Description



1 - Tank Upper Crossmember Body	2 - Tank Mounting Bracket
3 - Radiator Assembly	4 - Low Temperature Radiator Assembly
5 - Engine Outlet Pipe	6 - Water Pipe - Radiator to Expansion Tank
7 - Cooling Fan Assembly	8 - Engine Inlet Pipe
9 - Low Temperature Radiator Inlet Pipe	10 - Low Temperature Radiator Outlet Pipe
11 - Discharge Steel Pipe	12 - Expansion Tank Cap
13 - Expansion Tank Body	14 - Water Pipe - Engine to Expansion Tank
15 - Water Pipe - Expansion Tank to Water Pump	16 - Water Pipe 2 - Expansion Tank to Water Pump
17 - Water Pipe - Expansion Tank to Water Pump II	18 - Water Pipe - Expansion Tank to Water Pump III

19 - Engine Discharge Hose III	20 - Engine Discharge Hose I
21 - Coolant Temperature Sensor Outlet	22 - Electronic Thermostat
23 - Coolant Temperature Sensor Inlet	24 - Seal Ring - Thermostat Seat
25 - Thermostat Seat Assembly	26 - Heating Pipe Assembly
27 - Small Circulation Water Pipe	28 - Cooling Pipe Assembly
29 - Water Pump	

Operation

- Engine cooling system adjusts engine operating temperature by the flow of coolant and makes engine operate normally under various operating conditions.
- Engine cooling system is a forced circulation system, which supplies circulation pressure for cooling system by water pump and forces coolant to circulate in the engine cylinder block, and distributes excessive heat to radiator by the flow of coolant, and radiates it to the air by cooling fan. Also, engine cooling system provides heat to the heater core in cabin to improve driving comfort.

Specifications

Torque Specifications

Description	Torque (N·m)
Expansion Tank Fixing Bolt	5 ± 1
Electronic Thermostat Housing Fixing Bolt	8 + 3
Thermostat Seat Fixing Bolt	8 + 3
Coolant Temperature Sensor	15 ± 1
Cooling Fan Fixing Bolt	5 ± 1
Radiator Upper Crossmember Fixing Bolt	9 ± 1
Water Pump Fixing Bolt	8 + 3
Coupling Bolt Between Radiator and Condenser	7 ± 1
Water Pump Pulley Fixing Bolt	20 ＋ 5
Discharge Steel Pipe Fixing Bolt	8 + 3
Intelligent Intake Grille Fixing Bolt	5 ± 1

Coolant Capacity

Item	Capacity (L)
Cooling System	9.0

Coolant Concentration

G11 Additive	Soft Water
53%	47%

Coolant Freezing Point

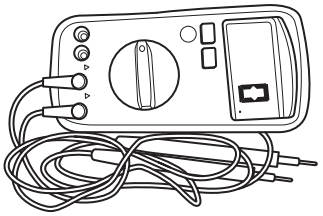
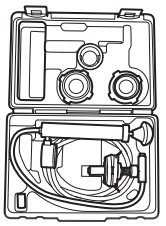
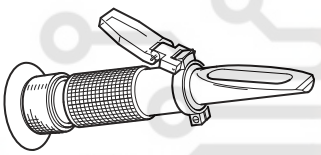
Item	Freezing Point Value (℃)
Coolant	-40

Cooling System Test Pressure

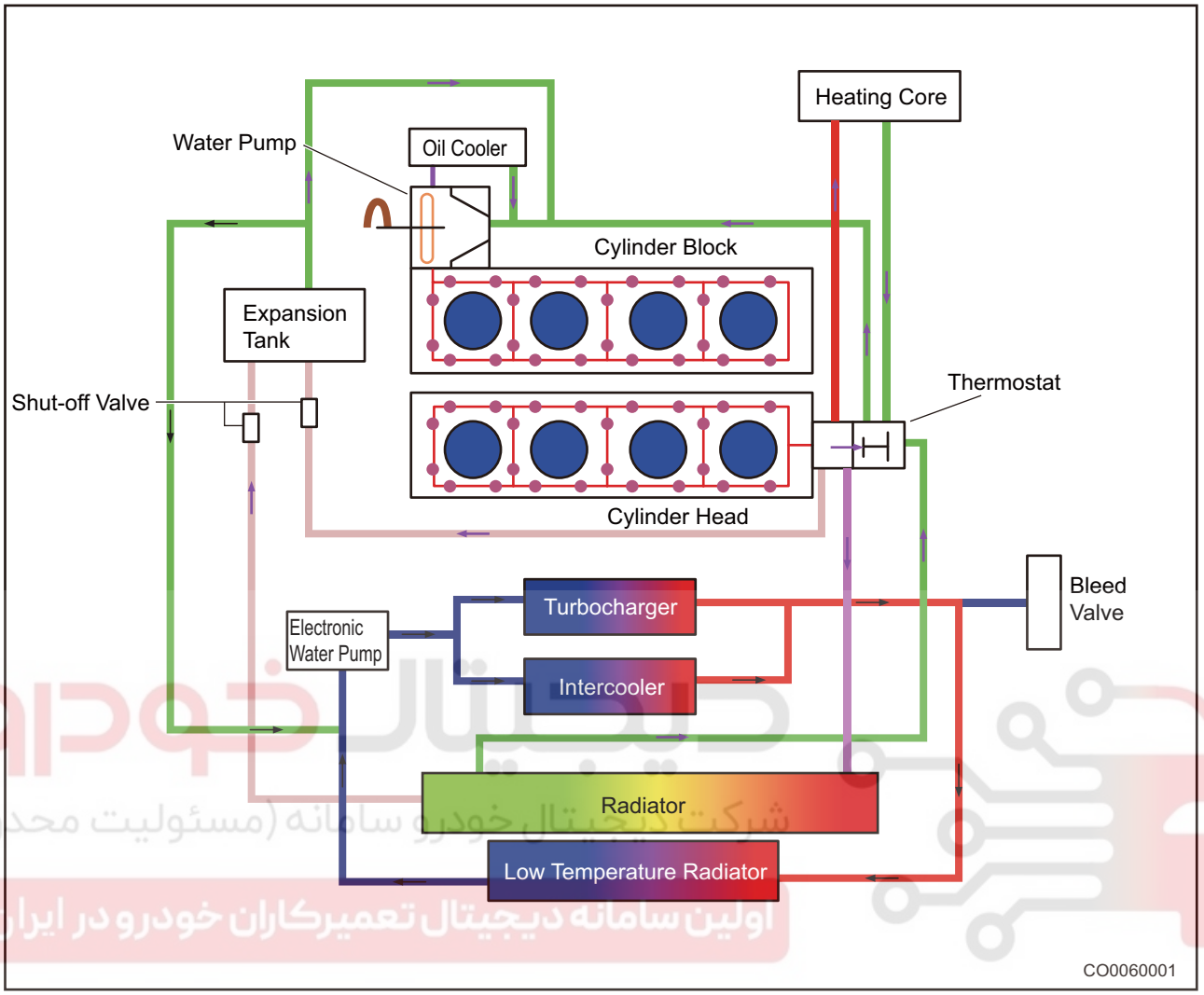
Item	Test Pressure (bar)
Cooling System (Test Pressure)	1.2

Tools

General Tools

Digital Multimeter	 RCH0002006
Cooling System Pressure Tester	 RCH005506
Freezing Point Tester	 RCH000706

Cooling System Operation Flowchart



Small circulation: When coolant temperature is below 82 ± 2 ℃ , electronic thermostat assembly closes. Coolant only circulates inside the cylinder block and warms up other engine parts that need heat. Water pump assembly circulates engine coolant through cylinder block, oil cooler assembly, turbocharger and cylinder head. The coolant does not radiate heat through radiator.

Large circulation: When coolant temperature is higher than 95 ℃ , electronic thermostat assembly opens fully and all coolant flowing out of cylinder block enters radiator for radiating. It then returns to cylinder block for circulation by water pump. Due to radiating in radiator, engine coolant temperature decreases quickly to prevent engine from overheating.

DIAGNOSIS & TESTING

Problem Symptoms Table

Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area
Insufficient coolant	Coolant pipe (deteriorated and leaks)
	Expansion tank (leaks)
	Radiator (leaks)
	Heater core (leaks)
	Electronic thermostat assembly (improperly sealed)
	Electronic thermostat seat assembly (cracked and damaged)
	Water pump (leaks)
	Engine cylinder head gasket (damaged)
	Engine cylinder head (cracked and leaks)
	Engine cylinder block (water jacket leaks and cylinder block cracked)
Engine overheating	Low coolant level
	Air resistance exists in pipe
	Expansion tank cap (damaged)
	ECU (Engine Control Module) failure
	Cooling fan
	Radiator
	Electronic thermostat assembly
Engine undercooling	Electronic thermostat assembly
	Cooling fan
Unable to reach normal engine temperature	Cooling fan (constantly operating)
	Electronic thermostat assembly
Cooling fan does not operate or abnormal air speed	Fan controller
	Cooling fan
	Wire harness
	ECU (Engine Control Module) failure

Cooling System Leakage Test

Warning:

- Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.

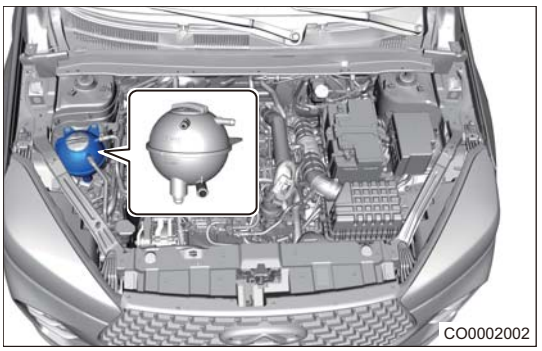
Caution:

- When testing cooling system, please pressurize the system to specified pressure. Otherwise, system components may be damaged.
- Before testing cooling system, do not perform operation until coolant temperature drops to normal level. Otherwise, it may cause scald.

Test Procedures

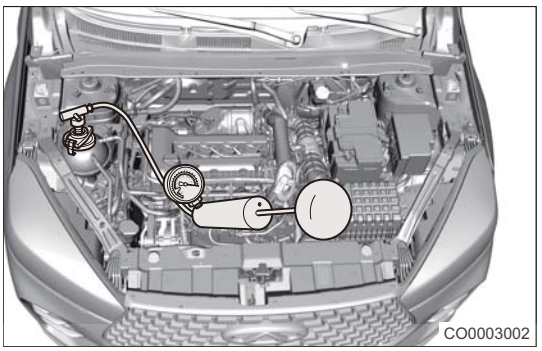
1. Turn off all electrical equipment and ENGINE START STOP switch.

2. Check if coolant level is between "MAX" and "MIN" lines. If coolant level is below "MIN" line, add coolant.



3. Connect cooling system pressure tester to coolant pressure release cap opening (expansion tank cap opening) and tighten it slowly.

   Caution:
   Make sure there is no leakage in connecting part of coolant system pressure tester, in order to avoid pressure leakage during test.



4. Pressurize cooling system to 1.2 bar with the cooling system pressure tester, and then observe the pressure changes. If system pressure does not drop within 2 minutes, it indicates there is no leakage in system. If pressure changes greatly, it indicates that there is a leakage in system; find the leaking area and perform troubleshooting.

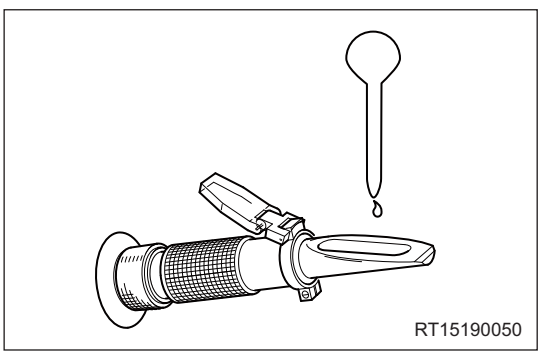
Coolant Freezing Point Test

Caution:

- DO NOT mix different colors or types of coolant.
- Please select coolant which is suitable for local climate in different areas.
- Please read measured value at the scale line. In order to distinguish the scale line more clearly, drip a drop of water on the glass of freezing point tester with a pipette, then the scale line can be clearly distinguished via a "waterline".

Test Procedures

- As shown in illustration, drip a drop of coolant on the glass of freezing point tester with a pipette, and then observe freezing point value of coolant.

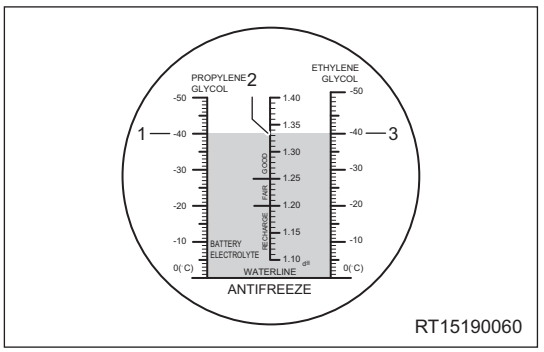


- As shown in illustration, observe scale 3 of freezing point tester to read ethylene glycol coolant freezing point value. The freezing point value must be kept at -40 °C (value varies with geography, climate or freezing point).

  If freezing point is beyond the specified value, replace the coolant.

  Hint:

  Scale 1 is used to measure the freezing point value of propylene glycol coolant, and scale 2 is used to measure the battery electrolyte concentration.



Coolant Replacement

Engine System Coolant Draining

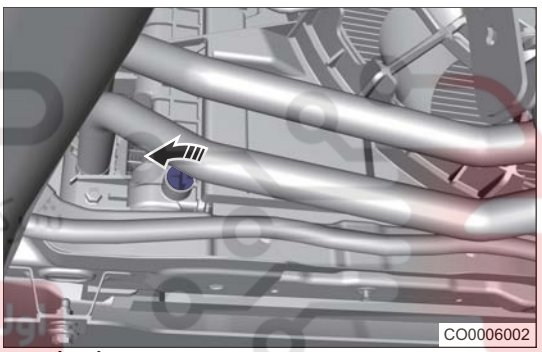
Warning/Caution/Hint

Warning:

- Never remove pressure release cap when engine is operating or temperature is higher. Otherwise, it may cause scald.
- Be careful when opening pressure release cap, the high-pressurized hot engine coolant and steam may flow out and cause serious burns.
- Wait until the engine has cooled down, and then cover the pressure release cap with a piece of damp cloth and turn it one turn slowly (counterclockwise). Step back when releasing cooling system pressure. After confirming that all pressure has been released, turn the pressure release cap with cloth covered and remove it.
- Violating above descriptions may cause serious personal injury.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the expansion tank cap when engine temperature and radiator temperature are low.
4. Remove the engine lower protector assembly.
5. Drain the coolant.

(a) Put a coolant collector under the vehicle, rotate the radiator drain cock plug (arrow) counterclockwise and drain the coolant in radiator and expansion tank.



Hint:

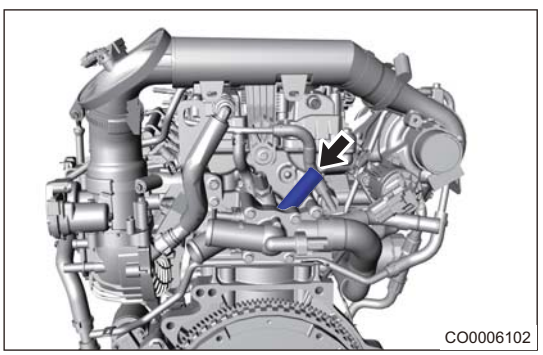
Put a drainage device or similar tool at the radiator outlet, so that coolant can flow into the collector smoothly.

(b) After coolant stops flowing, retighten the radiator drain cock plug.

Caution:

- Tighten drain cock plug to prevent leakage.
- Wasted coolant should be handled by the specialized department according to local laws and regulations. Never discard it at will.

(c) Remove the cooling water inlet and outlet pipe at the engine end and the heating pipe in the engine hood, use the compressed air to aim at the heating water outlet (arrow) and blow out the residual coolant in the engine block and cylinder head, and then use the compressed air to blow out the residual coolant in the heating core.



(d) Successively connect the removed engine / heating pipes with clamps according to the state before removal.

Low Temperature System Coolant Draining

Warning/Caution/Hint

Warning:

- Never remove pressure release cap when engine is operating or temperature is higher. Otherwise, it may cause scald.
- Be careful when opening pressure release cap, the high-pressurized hot engine coolant and steam may flow out and cause serious burns.
- Wait until the engine has cooled down, and then cover the pressure release cap with a piece of damp cloth and turn it one turn slowly (counterclockwise). Step back when releasing cooling system pressure. After confirming that all pressure has been released, turn the pressure release cap with cloth covered and remove it.
- Violating above descriptions may cause serious personal injury.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the expansion tank cap when engine temperature and radiator temperature are low.
4. Remove the front bumper assembly (See page 61-6).
5. Turbocharging Inter-cooling System Coolant Draining
   (a) Put a coolant collector under the vehicle, using a cross screwdriver to rotate the low temperature radiator drain cock plug (arrow) counterclockwise and drain the coolant in low temperature radiator.

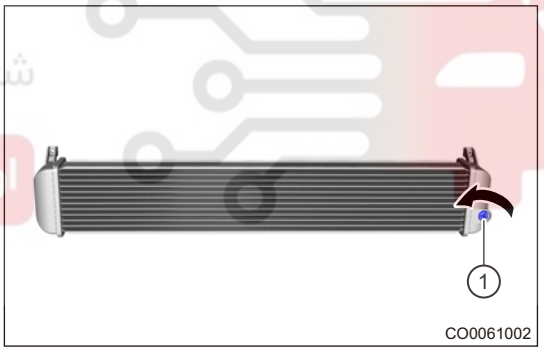
   Caution:

   - Put a drainage device or similar tool at the low temperature radiator outlet, so that coolant can flow into the collector smoothly.

   (b) After coolant stops flowing, retighten the low temperature radiator drain cock plug.

   Caution:

   - Tighten drain cock plug to prevent leakage.
   - Wasted coolant should be handled by the specialized department according to local laws and regulations. Never discard it at will.
   - Carry out turbocharging inter-cooling system bleeding after filling coolant.



Coolant Adding

Caution:

- Only use coolant that meets Chery specifications.

Coolant Capacity

Item	Capacity (L)
Cooling System	9.0

Coolant Concentration

G11 Additive	Soft Water
53%	47%

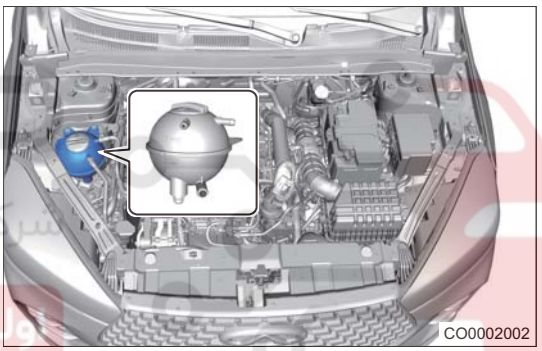
Warning:

- If it is necessary to add coolant when engine is hot, loosen expansion tank cap slightly first to release internal pressure and loosen the cap completely after waiting for a while, and then add coolant.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

Caution:

- DO NOT use inferior coolant.
- DO NOT mix different colors or types of coolant.
- Be careful when adding coolant; avoid spilling coolant on any area of engine.

1. Open expansion tank cap and add coolant until coolant level reaches the "MAX" line.



2. Tighten expansion tank cap, start and run engine. Maintain engine speed between 2000 and 2500 rpm to warm up the engine until cooling fan operates.
   Caution:
   If there is no coolant in expansion tank after engine just starts, perform the followings:
   - Stop the engine;
   - Wait until coolant cools down;
   - Add coolant to "MAX" line on expansion tank.

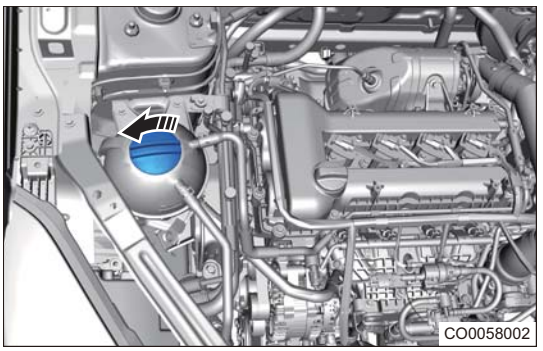
   Run the engine at 2500 rpm until coolant level becomes stable.
3. Stop engine and wait until coolant temperature drops to the ambient temperature. Check that coolant level is between "MAX" and "MIN" lines. If coolant level is below the "MIN" line, repeat all the above procedures. If coolant level is above the "MAX" line, drain coolant until the level is between "MAX" and "MIN" lines.

Turbocharging Inter-cooling System Bleeding

Caution:

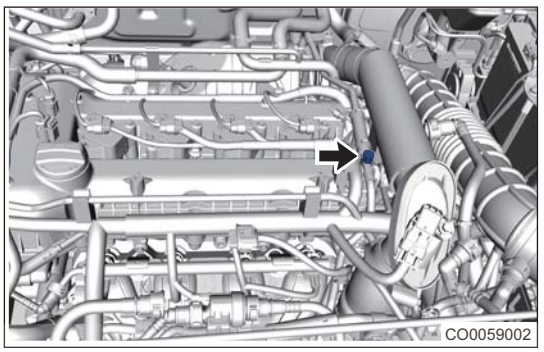
- Carry out turbocharging inter-cooling device cooling system bleeding after replacing coolant or removing and installing turbocharging inter-cooling system related components.
- Never loosen outlet pipe set upper pressure cap in warmed up engine, to prevent coolant from spilling out, causing burns.
- Please wear protection equipment and gloves.

4. Rotate expansion tank cap counterclockwise in cold engine.

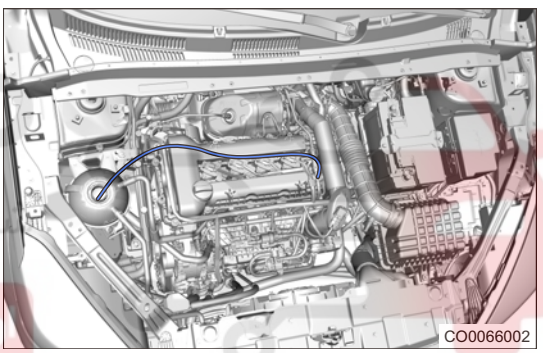

CO0058002

5. Unscrew the outlet pipe set upper pressure cap (arrow) counterclockwise.

   Caution:
   There is grommet inside the pressure cap, take care not to lose it after removing.


CO0059002

6. Connect one end of the proper pipe to exhaust port, and place other end to expansion tank.


CO0066002

   Hint:
   A thin pipe of about 1.5 meters or a gas pipe can be used for antifreeze bleeding.


CO0064002

7. Add the coolant.
8. Let the engine in an idling condition. Wait for electric water pump to operate.
9. When a large amount of coolant flows out (without gas), stop the engine, wait until the system is cooled, install and tighten the pressure cap.
   Caution:
   - Clean up the spilled coolant, to prevent coolant from entering spark plug installation hole.
   - Check if the pressure cap is properly sealed.
10. Add coolant to between MIN and MAX lines (if the coolant is less).
11. Tighten the expansion tank cap.
12. Start the and run engine. Maintain engine speed between 2000 and 2500 rpm to warm up the engine until cooling fan operates.

13.Check each pipe for leaks, lack of antifreeze, if so, handle it.

Caution:

- Do not open the expansion tank cap at high engine temperature to prevent burns.

14.Use diagnostic tester, check for electronic injection system DTCs (especially electric water pump DTCs).

Caution:

- If there is electric water pump idling DTC, such as P1700 00 Charge Air Cooler Coolant Pump Dry Run, it indicates that coolant is not sufficient in inter-cooling system, add coolant and perform bleeding.

Tank Upper Crossmember Assembly

Removal

Warning/Caution/Hint

Warning:

- Perform removal procedures with engine compartment at low temperature, after cooling fan stops completely; otherwise rotating cooling fan or hot components of engine compartment may cause serious injury.

Caution:

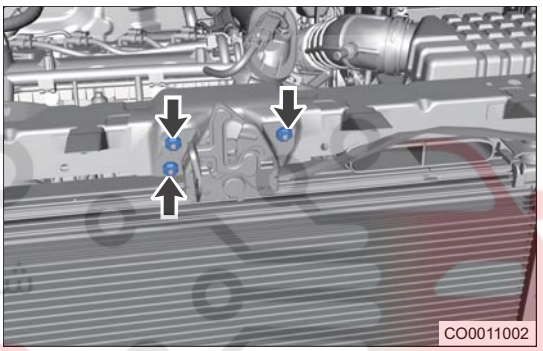
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

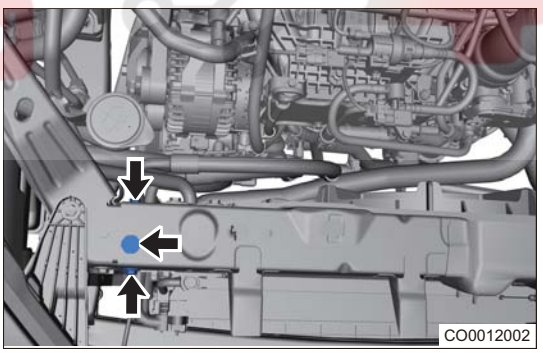
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly (See page 61-6).
4. Remove the upper air deflector (See page 61-16).
5. Remove the air filter assembly.
6. Remove the tank upper crossmember assembly.

(a) Remove 3 fixing nuts (arrow) from engine hood lock assembly.

Tightening torque

9 ± 1 N·m

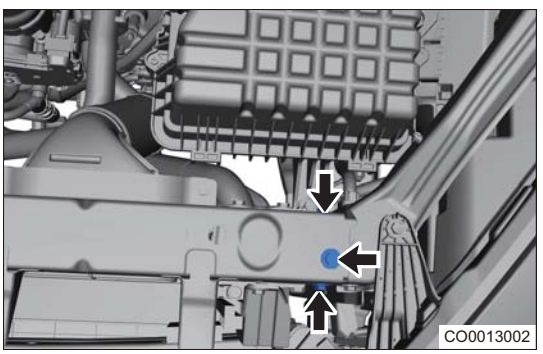




(b) Remove 6 fixing bolts (arrow) from tank upper crossmember.

Tightening torque

9 ± 1 N·m



(c) Remove the tank upper crossmember assembly.

Installation

1. Installation is in the reverse order of removal.

Expansion Tank

Removal

Warning/Caution/Hint

Warning:

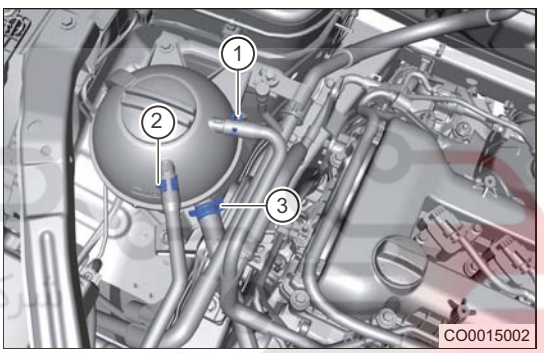
- Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

Caution:

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Drain the coolant.
4. Remove the expansion tank.

(a) Loosen elastic clamp (1) and disconnect connection between expansion tank and engine discharge pipe.



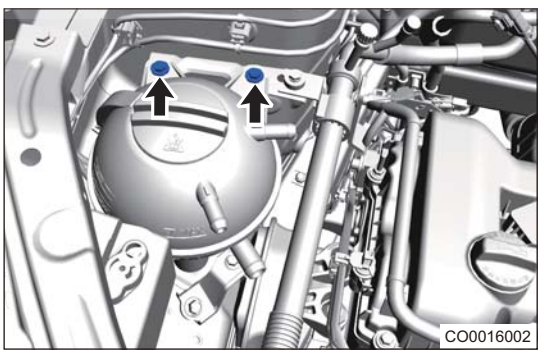
(b) Loosen elastic clamp (2) and disconnect connection between expansion tank and radiator discharge pipe.

(c) Loosen elastic clamp (3) and disconnect connection between expansion tank and water supply pipe.

(d) Remove 2 fixing bolts (arrow) from expansion tank.

Tightening torque

5 ± 1 N·m



(e) Remove the expansion tank assembly.

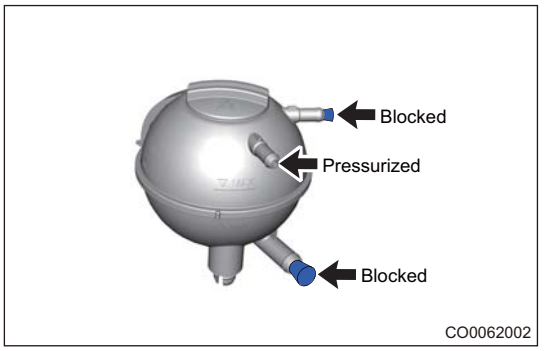
Inspection

Expansion Tank

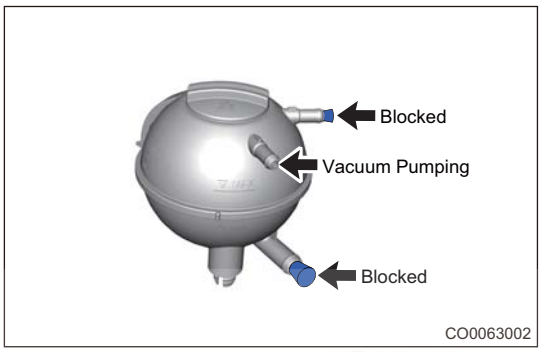
1. Check that the expansion tank is welded firmly, and there are no defects such as fractures and cracks at the weld.
2. The expansion tank should be colorless and transparent. During use of vehicle, expansion tank assembly is not allowed to have discoloration that affects the appearance and function, and scale line should be clearly visible.

Expansion Tank Cap

1. Block two holes of expansion tank and pressurize one of them. When pressure reaches the opening pressure of relief valve (120 - 150 kpa), the pressure in expansion tank should be maintained at the relief valve opening pressure value.



2. Block two holes of expansion tank and vacuumize one of them. When vacuum pressure reaches the opening pressure of vacuum valve (-2 - 10kpa), vacuum pressure in expansion tank should be maintained at the vacuum valve opening pressure value.



Installation

1. Installation is in the reverse order of removal.

Caution:

- When connecting water supply pipe and expansion tank, align the " 土 " mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of " 土 " mark, align the edge of elastic clamp with lower edge of " 二 " position of " 土 " mark.
- When connecting engine discharge pipe and expansion tank, align the "工" mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of " 工 " mark, align the edge of elastic clamp with lower edge of " 二 " position of " 工 " mark.
- When connecting radiator discharge pipe and expansion tank, align the " 工 " mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of " 工 " mark, align the edge of elastic clamp with lower edge of " 二 " position of " 工 " mark.
- Check that coolant has been added to the specified level after installation.

Electronic Thermostat Assembly

Removal

Warning/Caution/Hint

Warning:

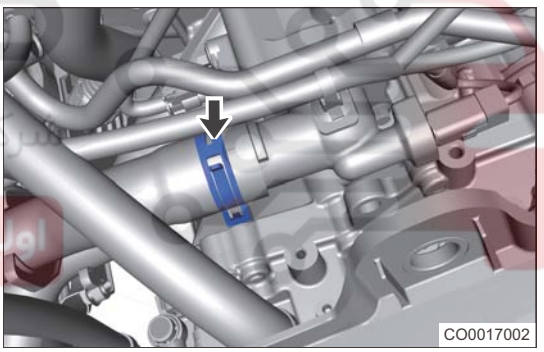
- Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

Caution:

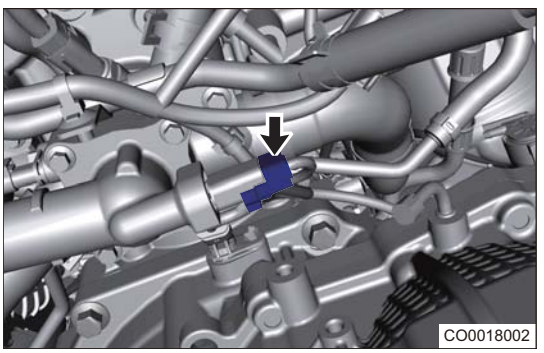
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the battery.
5. Remove the battery tray.
6. Remove the air filter assembly.
7. Drain the coolant.
8. Remove the electronic thermostat assembly.

(a) Loosen the elastic clamp (arrow) and disconnect the connection between engine inlet pipe and electronic thermostat housing.

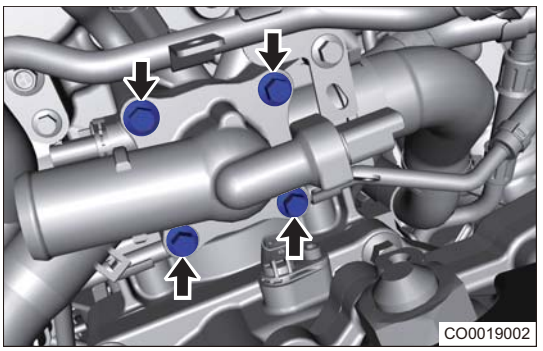


(b) Disconnect the electronic thermostat assembly connector (arrow).



(c) Remove 4 fixing bolts (arrow) from electronic thermostat assembly.

Tightening torque
8 + 3 N·m



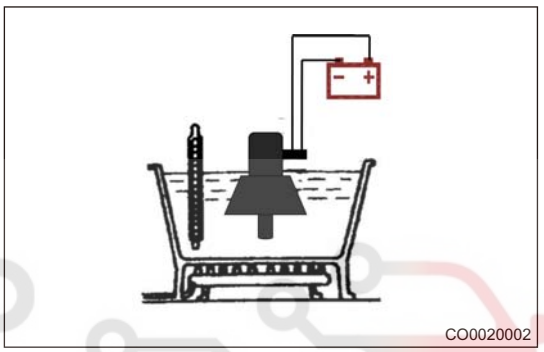
(d) Remove the electronic thermostat assembly.

Inspection

1. Check the electronic thermostat.

(a) Heat the thermostat in boiling water and power on the thermostat to see if it can be turned on.

Hint:
One cycle shall not exceed 60s when energized.



Installation

1. Installation is in the reverse order of removal.

Caution:

- When connecting engine outlet pipe and electronic thermostat housing, position the " ⊥ " mark on pipe port right above, and rotate elastic clamp and center line of mark 90°.
- Check that coolant has been added to the specified level after installation.

Electronic Thermostat Seat Assembly

Removal

Warning/Caution/Hint

Warning:

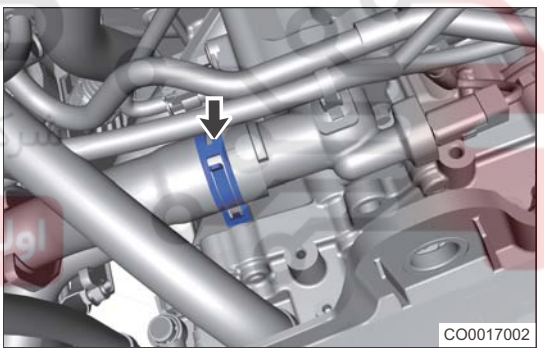
- Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

Caution:

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the battery.
5. Remove the battery tray.
6. Drain the coolant.
7. Remove the air filter assembly.
8. Remove the electronic thermostat seat assembly.

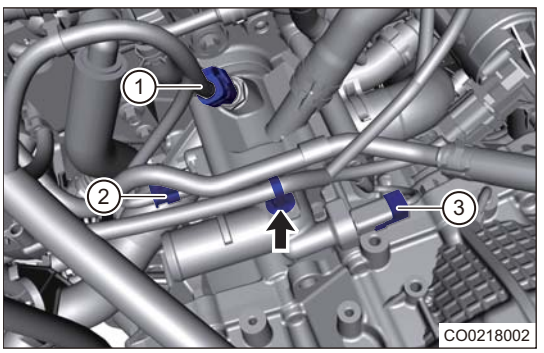
(a) Loosen the elastic clamp (arrow) and disconnect the connection between engine inlet pipe and electronic thermostat housing.



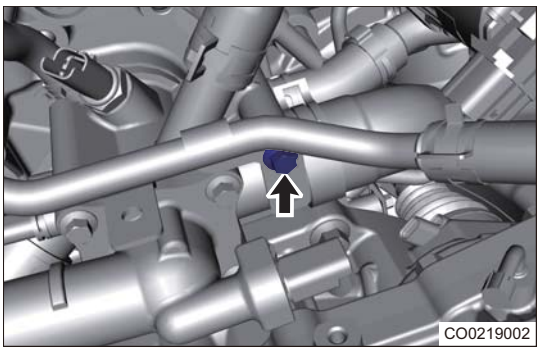
(b) Disconnect the coolant temperature sensor connector (1) (2).

(c) Disconnect the electronic thermostat connector (3).

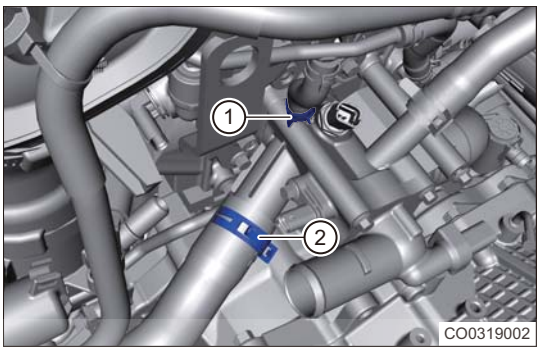
(d) Disconnect wire harness fixing clip (arrow).



(e) Remove 1 fixing bolt (arrow) from vacuum tube.

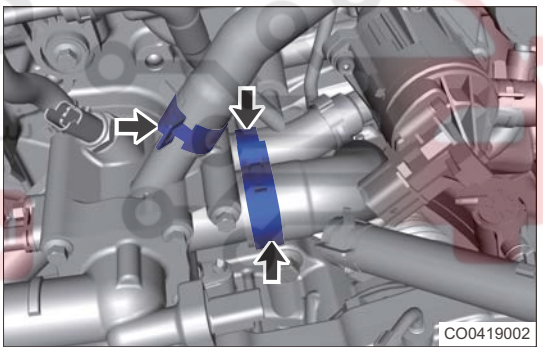


(f) Loosen elastic clamps (1) and disconnect connection between the hose of discharge steel pipe and electronic thermostat seat assembly.



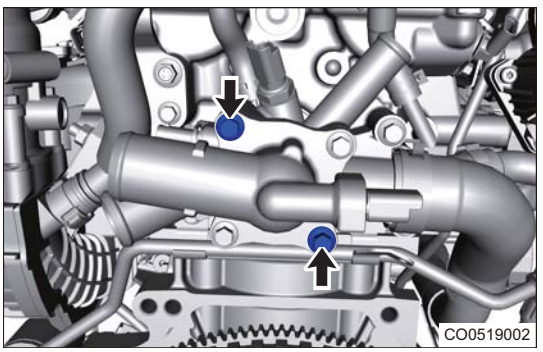
(g) Loosen elastic clamp (2) and disconnect connection between engine outlet pipe and electronic thermostat seat assembly.

(h) Loosen the elastic clamp (arrow) and disconnect all cooling water pipes.

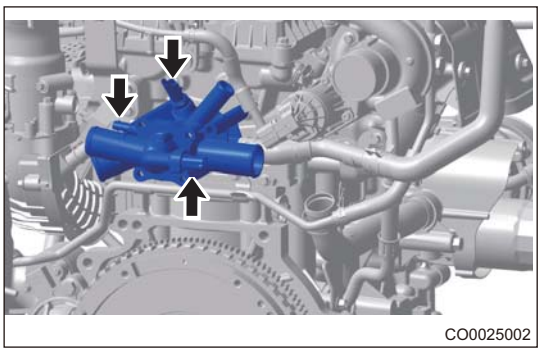


(i) Remove 2 fixing bolts (arrow) and electronic thermostat seat.

Tightening torque
8 + 3 N·m



(j) Remove coolant temperature sensors 1, coolant temperature sensors 2 and electronic thermostat from thermostat seat assembly.


CO0025002

Installation

1. Installation is in the reverse order of removal.

Caution:

- Replace electronic thermostat seat O-ring with a new one during installation, and removed electronic thermostat seat O-ring cannot be reused.
- When connecting engine discharge hose and electronic thermostat seat, align the "T" mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of "T" mark, align the edge of elastic clamp with lower edge of " 一 " position of "T" mark.
- When connecting small circulation water pipe and electronic thermostat seat, align the "T" mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of "T" mark, align the edge of elastic clamp with lower edge of " 一 " position of "T" mark.
- When connecting engine inlet pipe and electronic thermostat seat, align the "工" mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of " 工 " mark, align the edge of elastic clamp with lower edge of " 二 " position of " 工 " mark.
- When connecting heating inlet pipe and electronic thermostat seat, align the " 土 " mark on pipe port right above, and align center position of elastic clamp tabs with "I" position of " 土 " mark, align the edge of elastic clamp with lower edge of " 二 " position of " 土 " mark.
- When connecting heating outlet pipe and electronic thermostat seat, align the " 工 " mark on pipe port with limited post, and align center position of elastic clamp tabs with "I" position of " 工 " mark, align the edge of elastic clamp with lower edge of " 二 " position of " 工 " mark.
- Check that coolant has been added to specified level after installation, and check for leakage at the removal and installation position.

Discharge Steel Pipe Assembly

Removal

Warning/Caution/Hint

Warning:

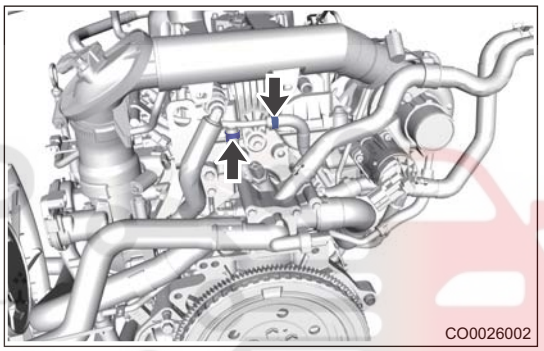
- Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

Caution:

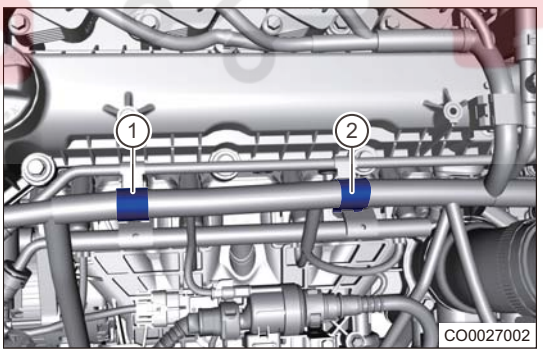
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the discharge steel pipe assembly.

(a) Loosen fixing clamp (arrow) and disconnect connection between discharge hose and discharge steel pipe assembly.



(b) Disconnect the engine wire harness fixing clips (1) and (2) from discharge steel pipe assembly.

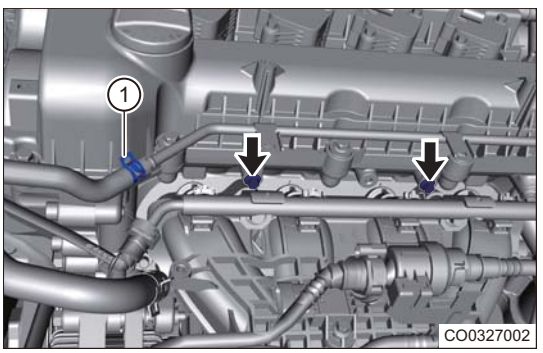


(c) Loosen elastic clamp (1) and disconnect connection between discharge hose and discharge steel pipe assembly.

(d) Remove 2 fixing bolts (arrow) from discharge steel pipe assembly.

Tightening torque

8 + 3 N·m



(e) Remove discharge steel pipe assembly.

Installation

1. Installation is in the reverse order of removal.

   Caution:

   - When connecting discharge hose 1 and discharge steel pipe, align the "T" mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of "T" mark, align the edge of elastic clamp with lower edge of " 一 " position of "T" mark.
   - When connecting discharge hose 2 and discharge steel pipe, align the "土" mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of " 土 " mark, align the edge of elastic clamp with lower edge of " 二 " position of " 土 " mark.
   - When connecting discharge hose 3 and discharge steel pipe, align the "T" mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of "T" mark, align the edge of elastic clamp with lower edge of " 一 " position of "T" mark.
   - Check that coolant has been added to specified level after installation, and check for leakage at the removal and installation position.

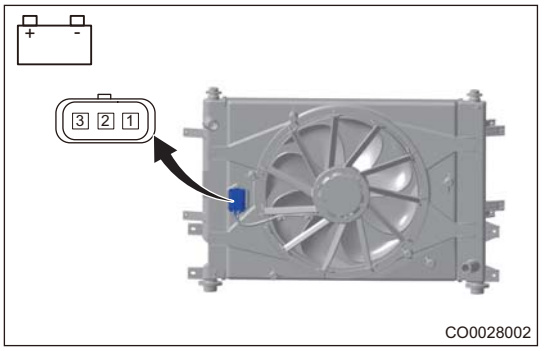
Cooling Fan Assembly

On-vehicle Inspection

1. Using a digital multimeter, measure resistance of cooling fan.

   (a) Cooling fan

Measurement Condition	Condition	Specification (Ω)
Terminal 1 - Terminal 2	Normal temperature (20°C)	0.8 ± 0.1
Terminal 1 - Terminal 3	Normal temperature (20°C)	0.6 ± 0.1

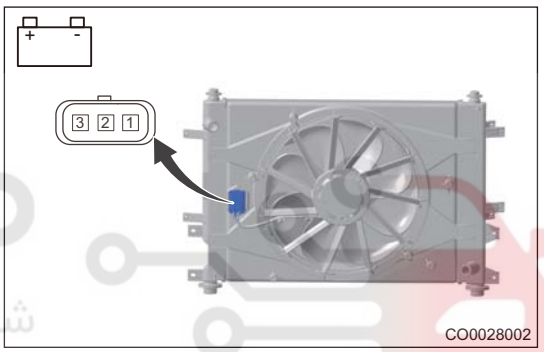


If inspection result is not as specified, replace cooling fan assembly.

2. Connect battery positive (+) and negative (–) to cooling fan connector terminal as shown in table below, to observe if cooling fan runs smoothly.

   (a) Cooling fan

Measurement Condition	Condition	Specified Condition
Battery positive (+) - Terminal 2 Battery negative (–) - Terminal 3	Always	Runs at low speed
Battery positive (+) - Terminal 1 Battery negative (–) - Terminal 3	Always	Runs at high speed



If inspection result is not as specified, replace cooling fan assembly.

Removal

Warning/Caution/Hint

Warning:

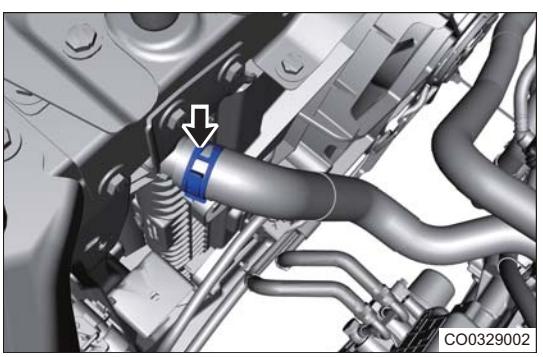
- Perform removal procedures with engine compartment at low temperature, after cooling fan stops completely, to prevent accidents.

Caution:

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

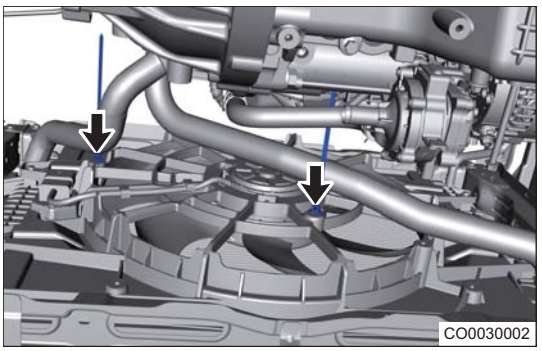
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
4. Remove the cooling fan assembly (CVT).

   (a) Loosen the elastic clamp (arrow) and disconnect the connection of engine inlet pipe.

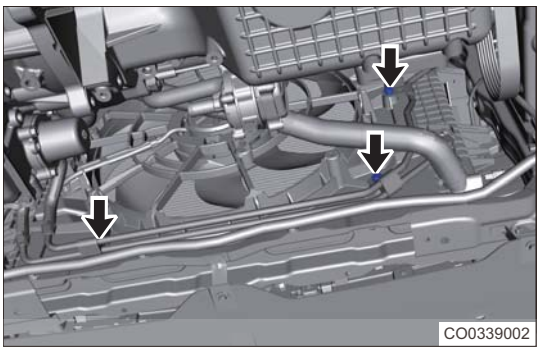


   (b) Remove the engine inlet pipe fixing clip (arrow) from cooling fan.

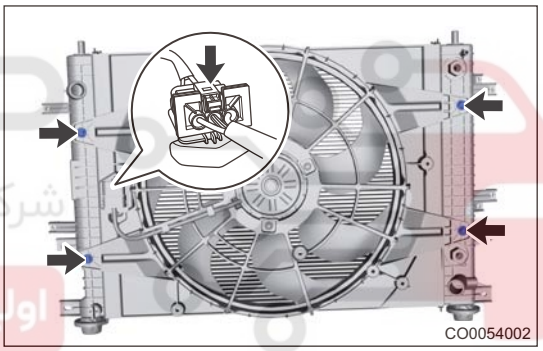
(c) Remove the engine outlet pipe fixing clip (arrow) from cooling fan.



(d) Remove 3 coupling bolts (arrow) between transmission cooling oil pipe and cooling fan.



(e) Disconnect the cooling fan connector (arrow).



(f) Remove 4 fixing bolts (arrow) from cooling fan assembly.

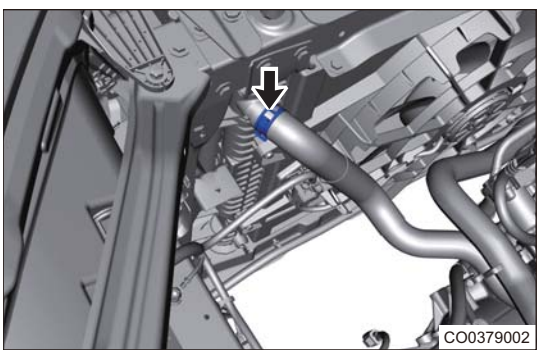
Tightening torque

5 ± 1 N·m

(g) Remove the cooling fan assembly.

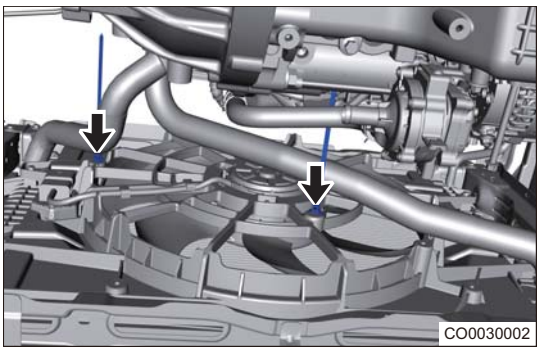
5. Remove the cooling fan assembly (MT)

(a) Loosen the elastic clamp (arrow) and disconnect the connection of engine inlet pipe.

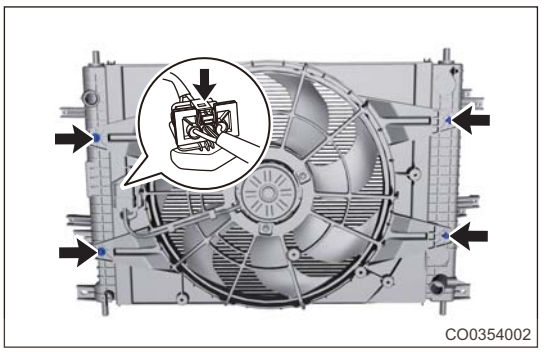


(b) Remove the engine inlet pipe fixing clip (arrow) from cooling fan.

(c) Remove the engine outlet pipe fixing clip (arrow) from cooling fan.



(d) Disconnect the cooling fan connector (arrow).



(e) Remove 4 fixing bolts (arrow) from cooling fan assembly.

Tightening torque

5 ± 1 N·m

(f) Remove the cooling fan assembly.

Inspection

1. Check cooling fan blade for dirt. If so, clean the cooling fan.
2. Check cooling fan blade for missing, cracks, etc. If so, replace cooling fan.

Installation

Warning/Caution/Hint

Caution:

- Check that coolant has been added to the specified level after installation.

1. Installation is in the reverse order of removal.

Radiator Assembly

Removal

Warning/Caution/Hint

Warning:

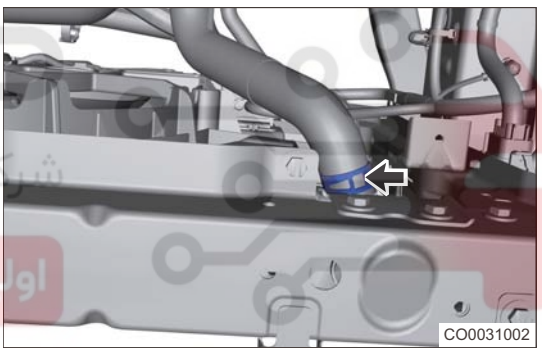
- Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

Caution:

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

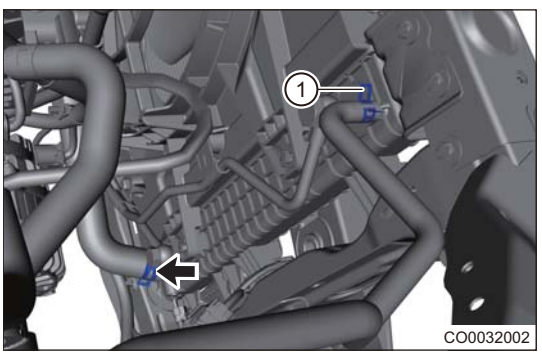
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the front bumper assembly (See page 61-6).
4. Remove the intake grille assembly.
5. Drain the coolant.
6. Remove the cooling fan assembly.
7. Remove the radiator assembly (CVT).

(a) Loosen elastic clamp (arrow) and disconnect connection between engine inlet hose and radiator assembly.

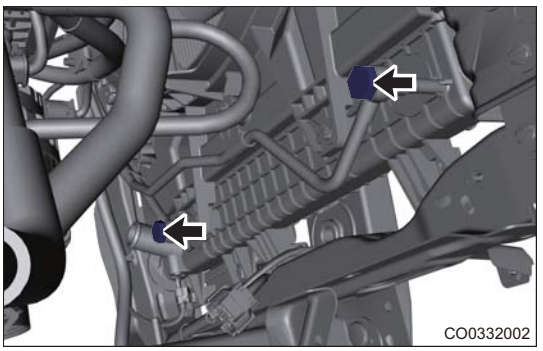


(b) Loosen elastic clamp (1) and disconnect connection between radiator discharge hose and radiator assembly.

(c) Loosen elastic clamp (arrow) and disconnect connection between engine outlet hose and radiator assembly.

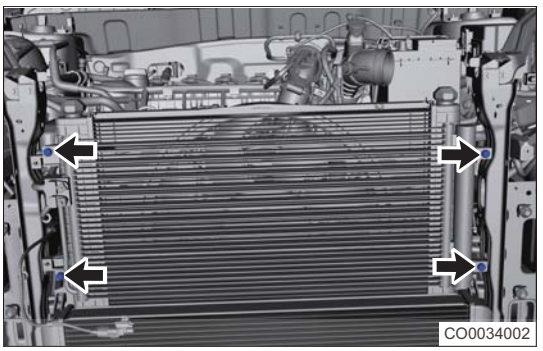


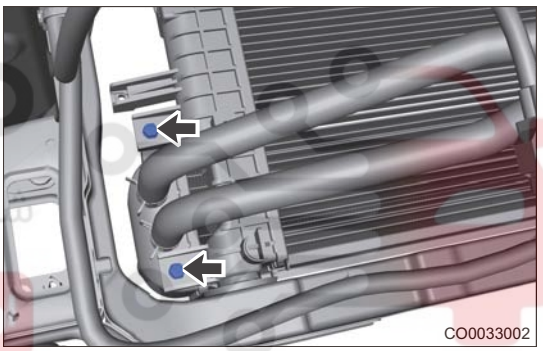
(d) Remove 2 coupling bolts (arrow) between transmission cooling oil pipe and radiator.



(e) Remove 4 fixing bolts (arrow) between radiator assembly and condenser assembly.

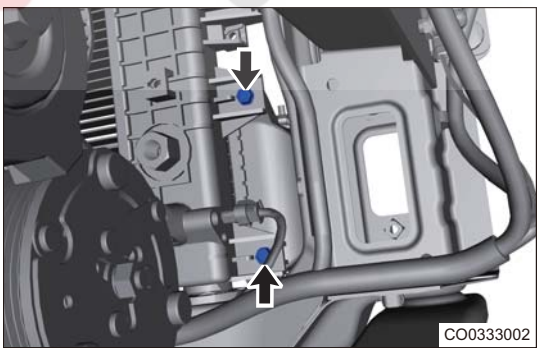
Tightening torque
5 ± 1 N·m



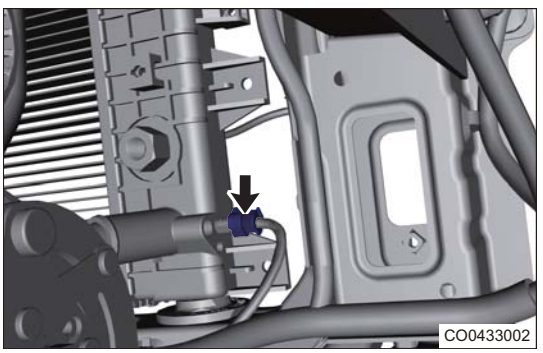


(f) Remove 4 fixing bolts (arrow) between radiator assembly and low temperature radiator.

Tightening torque
5 ± 1 N·m



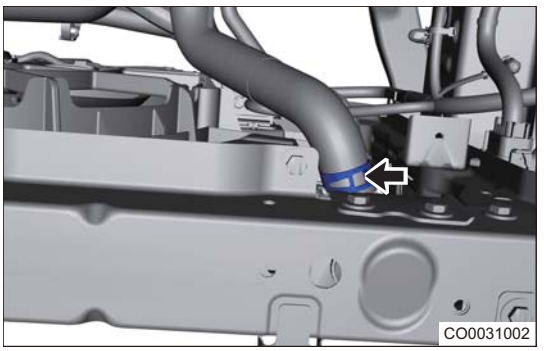
(g) Disconnect the coolant temperature sensor III connector (arrow).



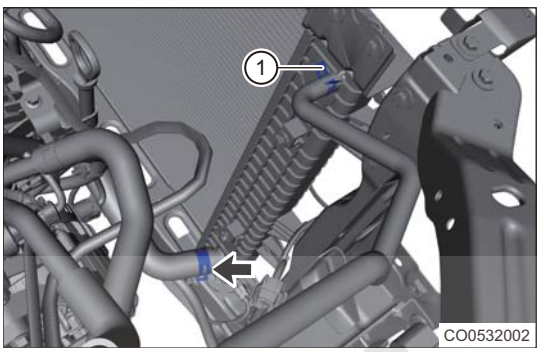
(h) Carefully remove the radiator assembly.

8. Remove the radiator assembly (MT)

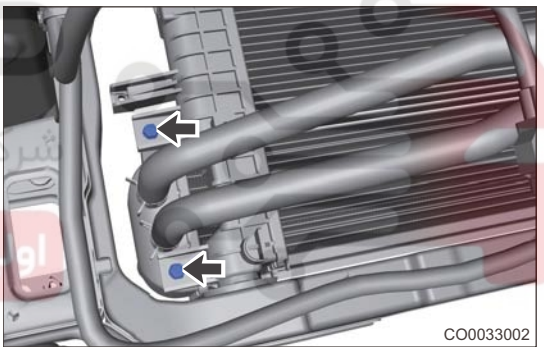
(a) Loosen elastic clamp (arrow) and disconnect connection between engine inlet hose and radiator assembly.



(b) Loosen elastic clamp (1) and disconnect connection between radiator discharge hose and radiator assembly.



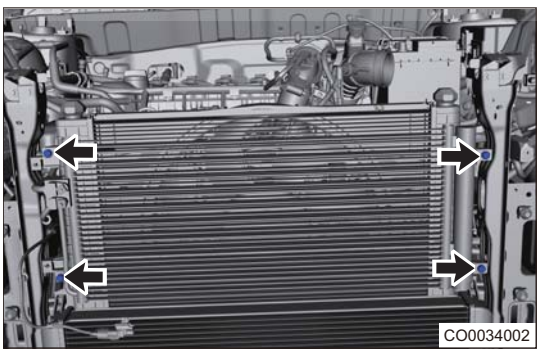
(c) Loosen elastic clamp (arrow) and disconnect connection between engine outlet hose and radiator assembly.

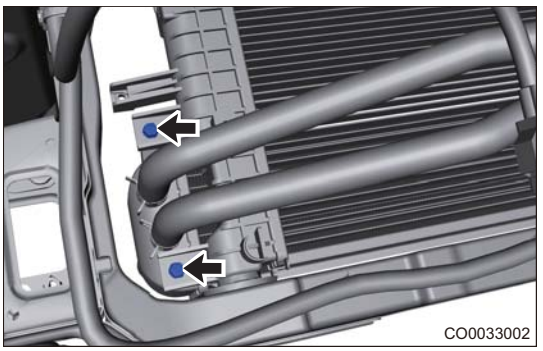


16

(d) Remove 4 fixing bolts between radiator assembly and condenser assembly.

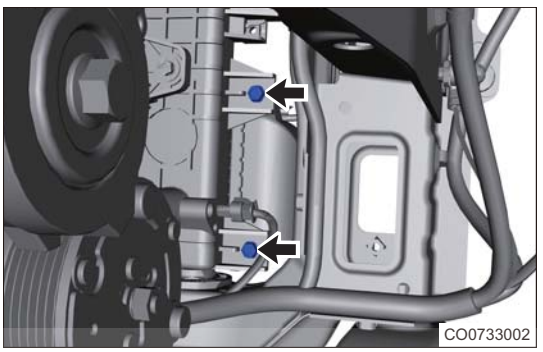
Tightening torque
5 ± 1 N·m



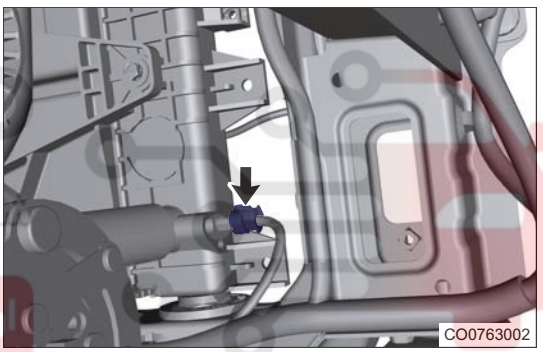


(e) Remove 4 fixing bolts (arrow) between radiator assembly and low temperature radiator.

Tightening torque
5 ± 1 N·m



(f) Disconnect the coolant temperature sensor III connector (arrow).



(g) Carefully remove the radiator assembly.

Inspection

1. Check radiator surface for dirt. If so, clean radiator surface.

Installation

1. Installation is in the reverse order of removal.

Caution:

- When connecting engine outlet pipe and radiator, align the " 工 " mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of " 工 " mark, align the edge of elastic clamp with lower edge of " 二 " position of " 工 " mark.
- When connecting engine inlet pipe and radiator, align the " 土 " mark on pipe port with boss, and align center position of elastic clamp tabs with "I" position of " 土 " mark, align the edge of elastic clamp with lower edge of " 二 " position of " 土 " mark.
- Check that coolant has been added to specified level after installation, and check for leakage at the removal and installation position.

Water Pump Assembly

Removal

Warning/Caution/Hint

Warning:

- Always make sure engine is cold before operating cooling system. Never open expansion tank cap or remove drain cock plug, when engine is operating or cooling system temperature is high. High-pressurized hot engine coolant and steam may flow out and cause serious burns.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

Caution:

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Drain the coolant.
4. Move away the accessory drive belt (See page 06-19).
5. Remove the water pump assembly.

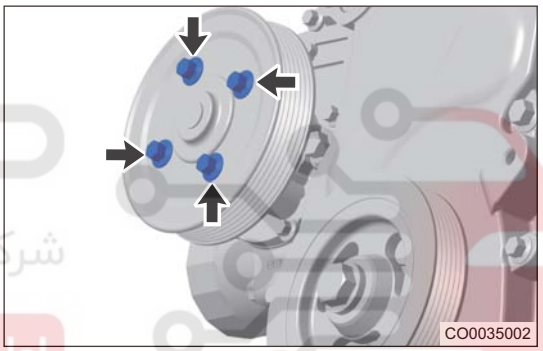
(a) Remove 4 fixing bolts (arrow) from water pump pulley, and remove water pump pulley assembly.

Tightening torque

20 + 5 N·m

Hint:

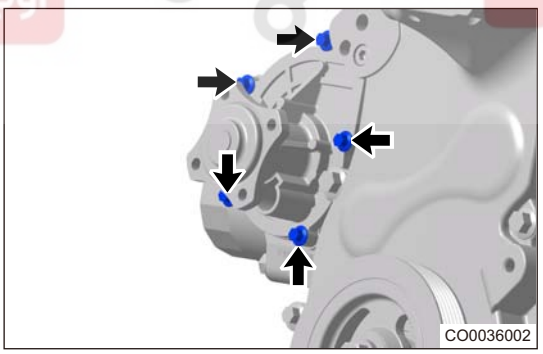
Loosen water pump pulley fixing bolts with a wrench, and then move away accessory drive belt.



(b) Remove 5 fixing bolts (arrow) from water pump assembly.

Tightening torque

8 + 3 N·m



(c) Remove the water pump assembly.

Inspection

1. Check whether the water pump bearing is too loose. If there is too much looseness, replace the water pump assembly.

Installation

Warning/Caution/Hint

Caution:

- Clean installation surface of water pump assembly.
- If water pump is damaged, replace rather than attempt to repair it.
- Check that coolant has been added to the specified level after installation.
- Perform cooling system pressure test after adding coolant, to check cooling system for leakage.

Electric Water Pump Assembly and Bracket & Water Pipe

Removal

Warning/Caution/Hint

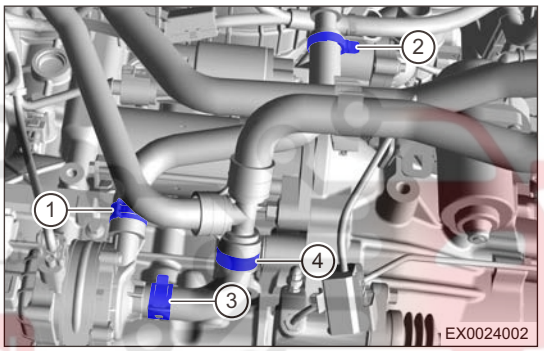
Warning:

- Before operation, it is necessary to ensure that the engine cooling system is in a low temperature state. When the engine is hot, the high-pressure overheated coolant may flow out, causing serious personal injury.
- If your body accidentally comes into contact with coolant. Wash immediately with water. If it is serious, please go to the hospital.

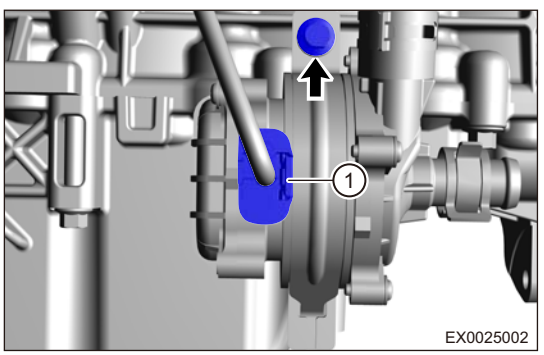
Caution:

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Drain the coolant.
5. Remove the electric water pump inlet and outlet pipes.
   (a) Loosen elastic clamp (1) and disconnect connection between electric water pump assembly and electric water pump outlet hose.



   (b) Loosen clamping ring (2) and disconnect connection between electric water pump outlet hose and inlet set.
   (c) Loosen elastic clamp (3) and disconnect connection between electric water pump outlet hose and electric water pump assembly.
   (d) Loosen elastic clamp (4) and disconnect connection between electric water pump inlet hose and low temperature radiator outlet hose.
   (e) Remove electric water pump inlet and outlet pipes assembly.
6. Remove the electric water pump assembly.
   (a) Disconnect the electronic water pump assembly connector (1).

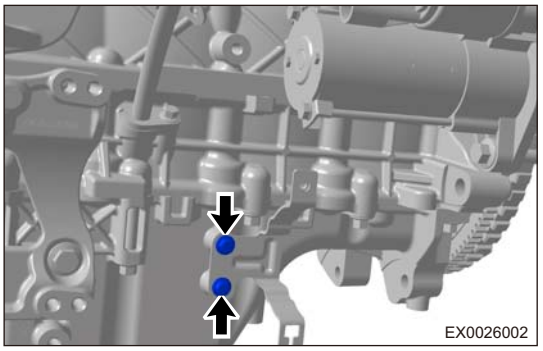


   (b) Remove 1 fixing bolt (arrow) from electronic water pump assembly.
   Tightening torque
   8 + 3 N·m
   (c) Remove the electric water pump assembly.

7. Remove the electric water pump assembly mounting bracket.

   (a) Remove 2 fixing bolts (arrow) from electronic water pump assembly bracket.

   Tightening torque
   8 + 3 N·m



   (b) Remove the electric water pump assembly bracket.

Installation

1. Installation is in the reverse order of removal.

   Caution:
   - After installation, check that coolant has been added to standard level, carry out turbocharging inter-cooling system bleeding and check for leakage at the removal and installation position.