SQR484F COOLING SYSTEM

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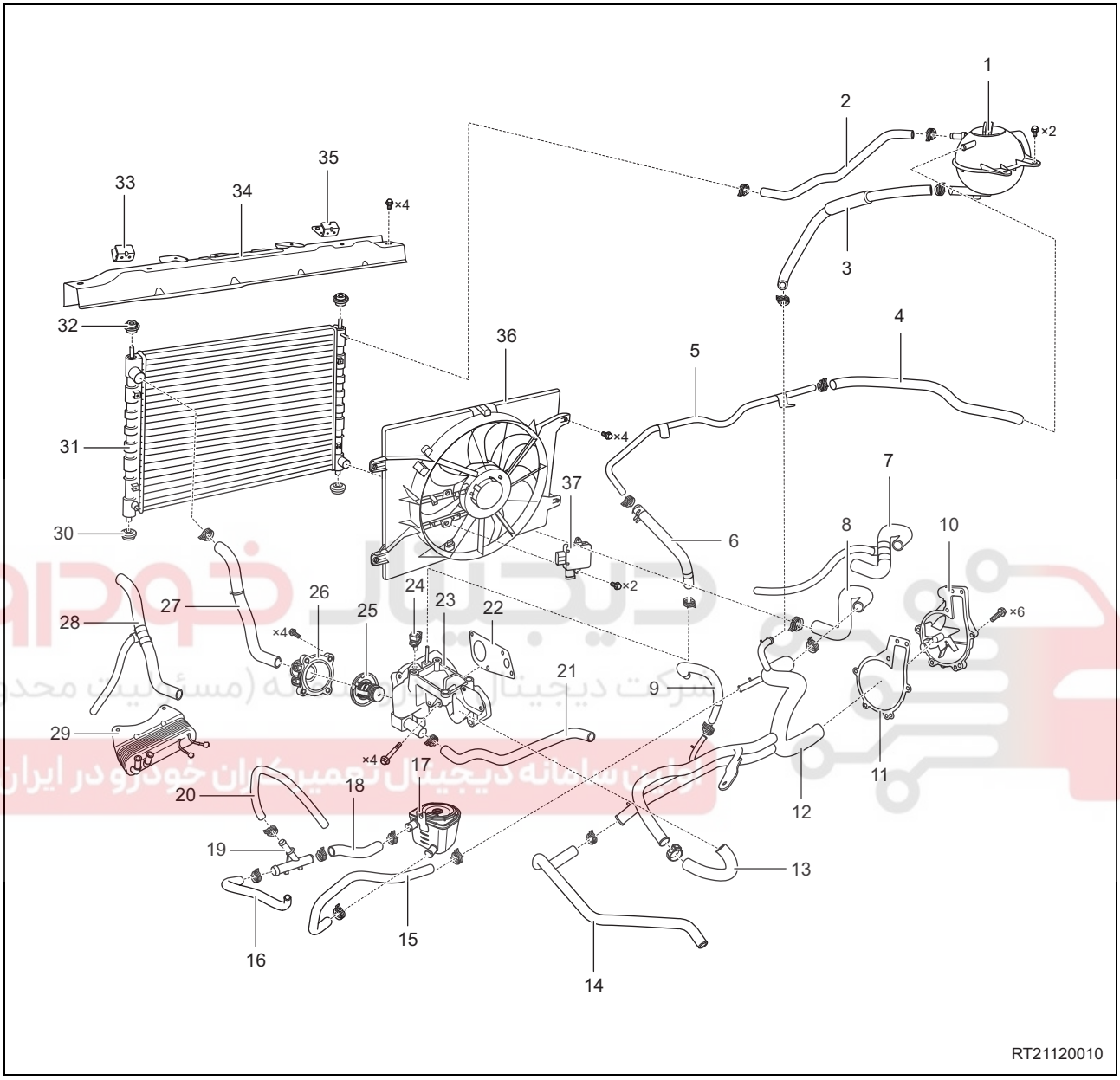
GENERAL INFORMATION

Description



1 - Expansion Tank	2 - Radiator Discharge Hose
3 - Expansion Tank Outlet Hose	4 - Discharge Pipe I
5 - Discharge Steel Pipe	6 - Engine Discharge Hose
7 - Engine Inlet Pipe	8 - Engine Inlet Pipe (for CVT Model)
9 - Throttle Body Glow Outlet Hose	10 - Water Pump Assembly
11 - Water Pump Assembly Gasket	12 - Small Circulation Metal Tube
13 - Small Circulation Outlet Hose	14 - Heater Outlet Pipe
15 - Oil Cooler Outlet Hose	16 - Oil Cooler Inlet Hose I
17 - Oil Cooler	18 - Oil Cooler Inlet Hose II
19 - T-joint	20 - Throttle Body Glow Inlet Hose
21 - Heater Inlet Pipe	22 - Thermostat Seat Gasket
23 - Thermostat Seat	24 - Coolant Temperature Sensor
25 - Thermostat	26 - Thermostat Housing
27 - Engine Outlet Hose	28 - Engine Outlet Hose (for CVT Model)
29 - Oil Cooler Assembly (for CVT Model)	30 - Rubber Cushion
31 - Radiator Assembly	32 - Bush Rubber
33 - Radiator Left Tension Plate	34 - Tank Upper Crossmember Assembly
35 - Radiator Right Tension Plate	36 - Cooling Fan Assembly
37 - Fan Controller	

Engine cooling system adjusts the 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 the system by water pump and forces the coolant to circulate in the engine cylinder block, and distributes excessive heat to the radiator by the flow of coolant, and radiates it to the air by the cooling fan. Also, the engine cooling system provides heat to the heater core in the cabin to improve driving comfort.

Specifications

Torque Specifications

Description	Torque (N·m)
Coupling Bolt Between Air Induction Pipe Assembly and Tank Upper Crossmember Assembly	7 ± 1
Radiator Left Tension Plate Fixing Bolt	7 ± 1
Radiator Right Tension Plate Fixing Bolt	7 ± 1
Tank Upper Crossmember Assembly Fixing Bolt	7 ± 1
Expansion Tank Fixing Bolt	7 ± 1
Activated Charcoal Canister Solenoid Valve Bracket Fixing Bolt	7 ± 1
Thermostat Housing Fixing Bolt	8 ± 3
Engine Ground Wire Fixing Bolt	7 ± 1
Engine Speed Sensor Bracket Fixing Bolt	7 ± 1
Thermostat Seat Fixing Bolt	8 + 3
Coolant Temperature Sensor	11 - 16
Fan Controller Fixing Bolt	7 ± 1.5
Cooling Fan Assembly Fixing Bolt	7 ± 1
Timing Belt Idler Pulley Fixing Bolt	40 + 5
Water Pump Assembly Fixing Bolt	8 + 3

Coolant Capacity

Item	Capacity (L)
Cooling System	7.5

Coolant Concentration

G11 Additive	Soft Water
50%	50%

Coolant Freezing Point

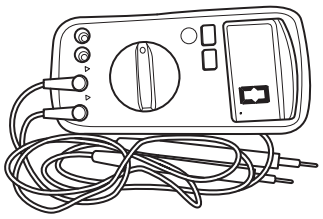
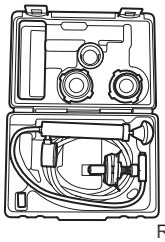
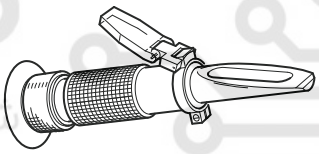
Item	Freezing Point Value (°C)
Coolant	-35

Cooling System Test Pressure

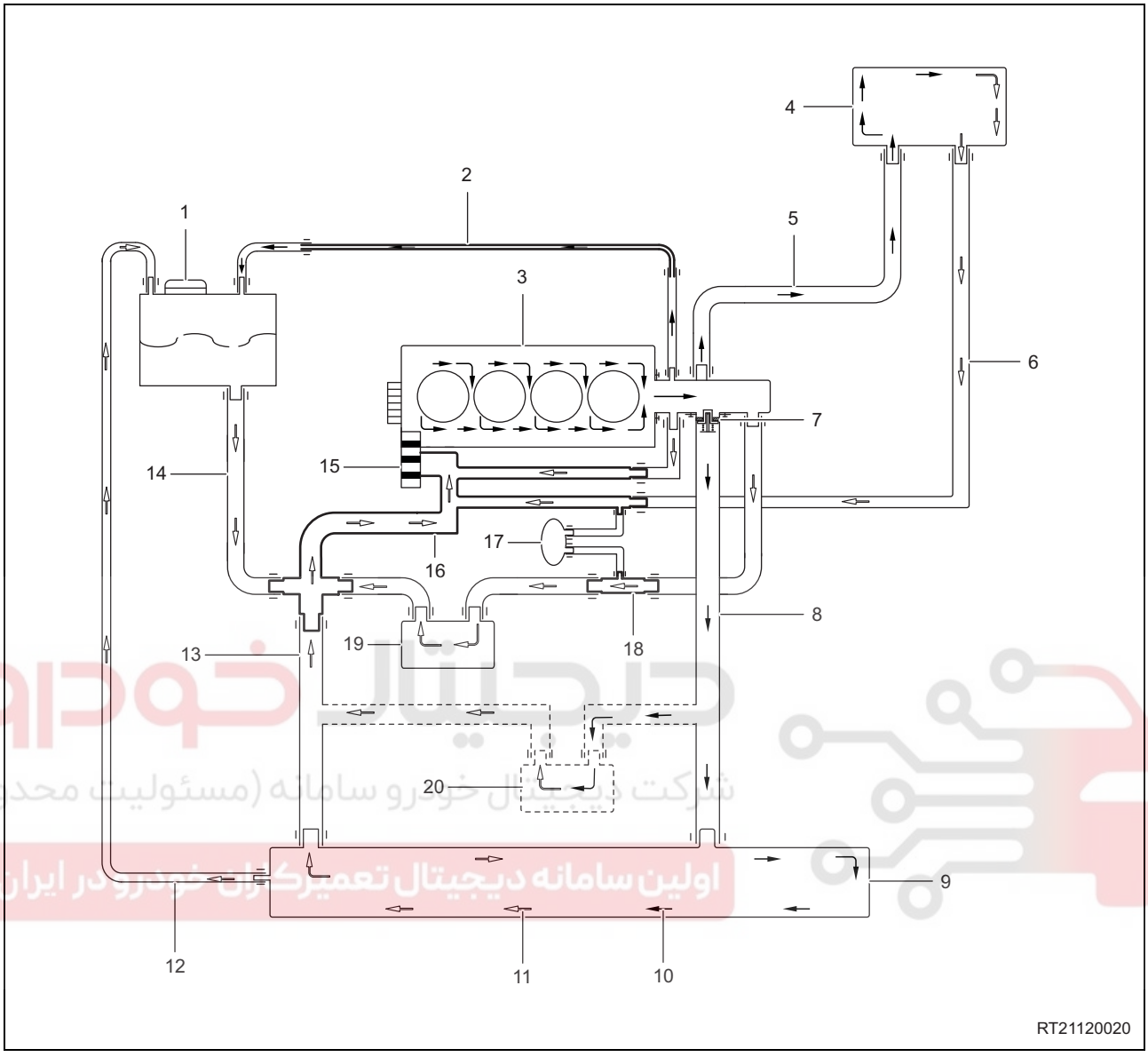
Item	Test Pressure (bar)
Cooling System (Test Pressure)	1.3 ± 0.2

Tools

General Tools

Digital Multimeter	 RCH0000002
Cooling System Pressure Tester	 RCH0000055
Freezing Point Tester	 RCH0000007

Cooling System Operation Flowchart



1 - Expansion Tank	2 - Engine Discharge Hose
3 - Cylinder Block	4 - Heater Core
5 - Heating Inlet Pipe	6 - Heating Outlet Pipe
7 - Thermostat	8 - Engine Outlet Pipe
9 - Radiator	10 - Black Solid Arrow (Indicates High Temperature Coolant)
11 - Hollow Arrow (Indicates Low Temperature Coolant)	12 - Radiator Discharge Hose
13 - Engine Inlet Pipe	14 - Expansion Tank Outlet Hose
15 - Water Pump	16 - Small Circulation Metal Tube
17 - Electronic Throttle	18 - T-Tube
19 - Oil Cooler	20 - Transmission Oil Cooler Assembly (for CVT Model)

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

Large circulation: when coolant temperature is higher than 103 ± 1°C, the thermostat opens fully, and all the coolant, which flows out of cylinder block, enters the radiator where coolant heat is lost. The heat-radiated coolant returns to the cylinder block for circulation by water pump. Due to the heat lost in radiator, the engine coolant temperature drops quickly to prevent engine from overheating.

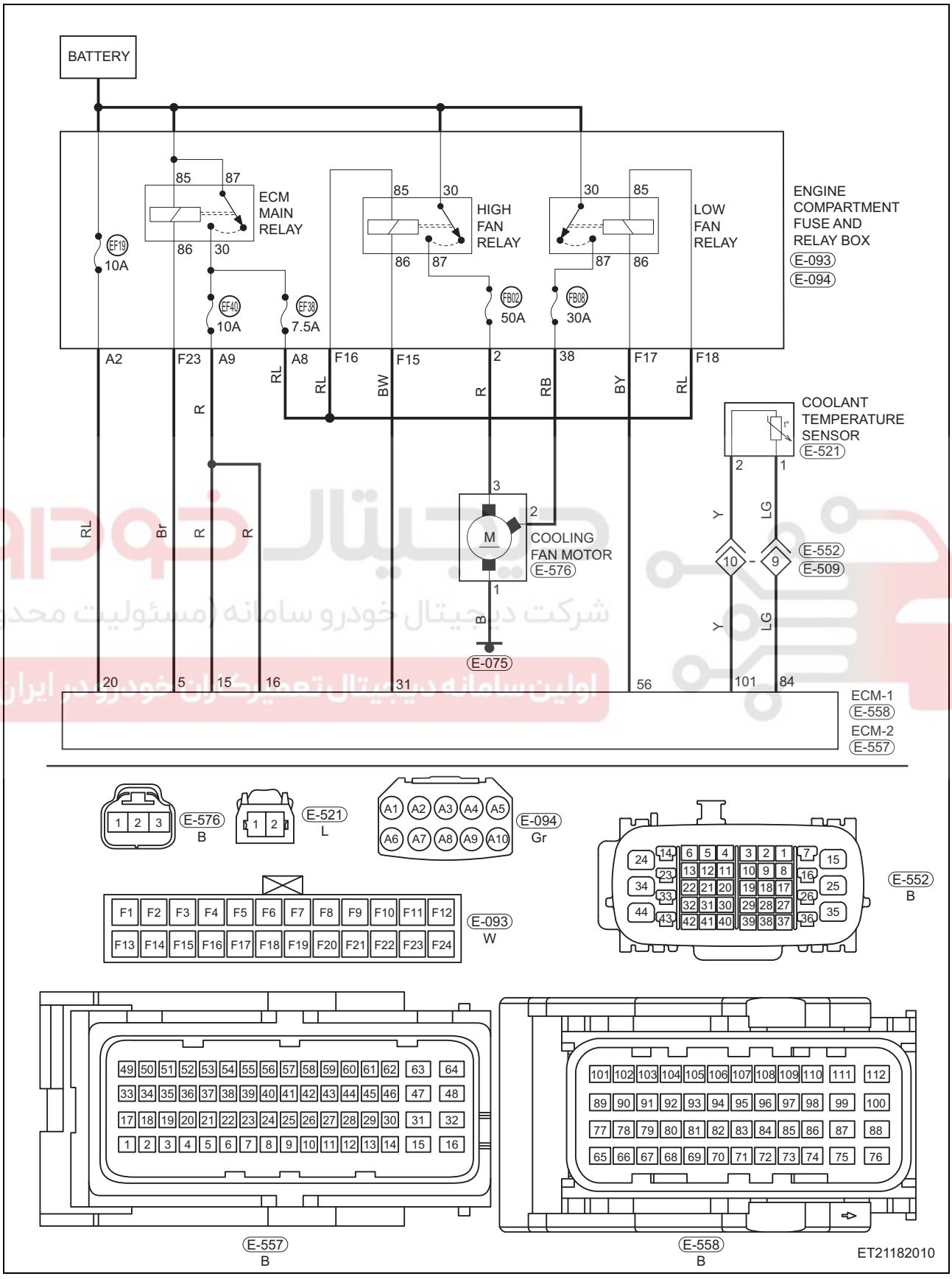
For CVT model, coolant will enter the transmission oil cooler assembly under the large circulation, so that the temperature of transmission oil in transmission decreases.

When engine operates properly, the cooling fan operates under the following conditions:

a. If engine coolant temperature sensor malfunctions, the cooling fan remains rotate when engine operates properly;
b. When A/C compressor is operating, the cooling fan operates at low speed.
c. When A/C compressor is operating and receives request signal from the A/C pressure switch, the cooling fan operates at high speed.
d. When coolant temperature is higher than 96°C, the cooling fan starts to operate at low speed;
e. When coolant temperature is higher than 102°C, the cooling fan starts to operate at high speed;
f. When coolant temperature is below 99°C, the cooling fan stops at high speed;
g. When coolant temperature is below 93°C, the cooling fan stops at low speed.

Circuit Diagram

Cooling System



DIAGNOSIS & TESTING

Problem Symptoms Table

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

Symptom	Suspected Area	See page
Insufficient coolant	Coolant pipe (deteriorated and leaked)	-
	Expansion tank (leaked)	18-18
	Radiator assembly (leaked)	18-29
	Heater core assembly (leaked)	42-77
	Thermostat (improperly sealed)	18-19
	Thermostat seat (cracked and damaged)	18-22
	Water pump (bearing loose and leaked)	18-31
	Engine cylinder head gasket (damaged)	07-55
	Engine cylinder head (water jacket leaked)	07-55
	Engine block (water jacket leaked)	07-78
Engine overheating	Low coolant level	18-14
	Air resistance exists in pipe	-
	Expansion tank cap (damaged)	-
	Fan controller	18-25
	Cooling fan assembly	18-26
	Radiator assembly	18-29
	Thermostat	18-19
	Leakage in engine	-
Unable to reach normal engine temperature	Fan controller	18-25
	Cooling fan assembly (constantly operating)	18-26
	Thermostat	18-19
Cooling fan does not operate or abnormal air speed	Fan controller	18-25
	Cooling fan assembly	18-26
	Wire harness	-
	ECM (Engine Control Module) failure	06-257

Cooling System Leakage Test

⚠ WARNING

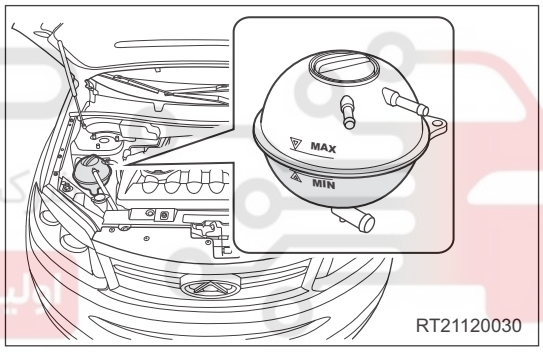
- Always make sure engine is cold before operating cooling system.
- Never open expansion tank cap or remove drain cock plug when engine is operating or cooling system overheats. The overheated engine coolant and steam with high-pressure may flow out and cause serious personal injury.

CAUTION

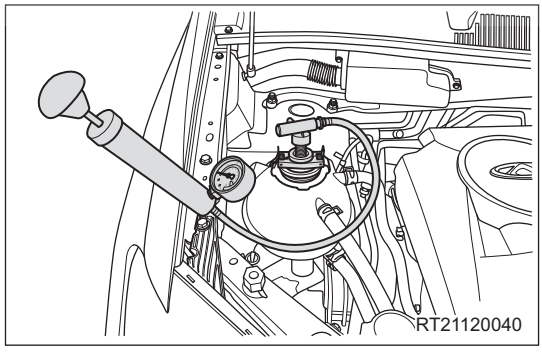
- When testing cooling system, please pressurize the system to specified pressure. Otherwise it may damage system components.
- Before testing cooling system, do not perform operation until coolant temperature drops to normal level. Otherwise it may cause scald.

Test Procedures

1. Turn off all the electrical equipment and ignition switch.
2. Check if coolant level is between "MAX" and "MIN" lines. If coolant level is below "MIN" line, add coolant.



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



CAUTION

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

4. Pressurize the cooling system to 1.3 ± 0.2 bar with the cooling system pressure tester, and then observe the pressure changes. If the system pressure does not drop within 2 minutes, it indicates there is no leakage in the system. If the pressure changes greatly, it indicates that there is a leakage in the system; find the leaking area and perform troubleshooting.

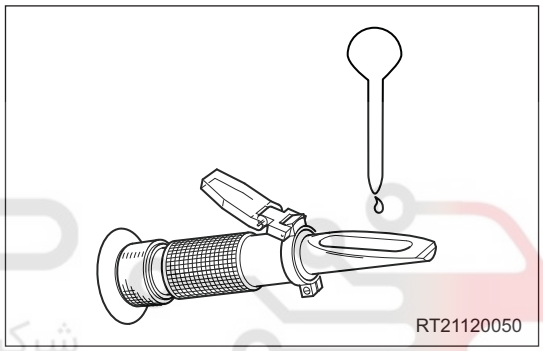
Coolant Concentration Test

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

1. As shown in the illustration, drip a drop of coolant on the glass of freezing point tester with a pipette, and then observe the freezing point value of coolant.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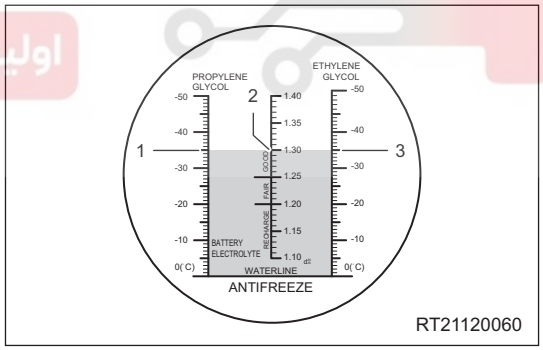
2. As shown in the illustration, observe the scale 3 of freezing point tester to read the ethylene glycol coolant freezing point value. The freezing point value must be kept at -35°C or lower.



If the 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.

ON-VEHICLE SERVICE

Coolant Replacement

Coolant Draining

⚠ WARNING

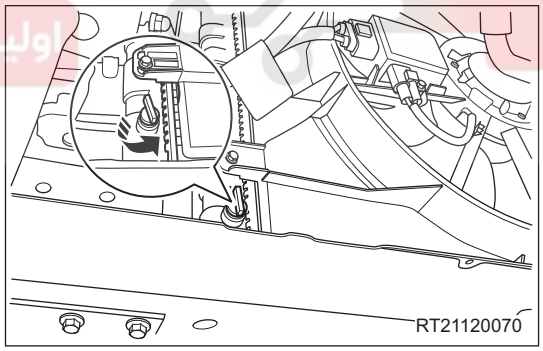
- Always make sure engine is cold before operating cooling system.
- Never open expansion tank cap or remove drain cock plug when engine is operating or cooling system overheats. The overheated engine coolant and steam with high-pressure may flow out and cause serious personal injury.
- If your body 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 the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the expansion tank cap when the engine temperature and radiator temperature are low.
4. Remove the engine lower left protector (See page 62-29).
5. Put a coolant collector under the vehicle, rotate the radiator drain cock plug (arrow) and drain the coolant in the radiator and expansion tank.

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



6. After the coolant stops flowing, retighten the radiator drain cock plug.

CAUTION

- Tighten the drain cock plug to prevent leakage.

ENVIRONMENTAL PROTECTION

- Wasted coolant should be handled by the specialized department according to local laws and regulations. Never discard it at will.

Coolant Adding

Only use coolant that meets Chery specifications.

Coolant Capacity

Item	Capacity (L)
Cooling System	7.5

Coolant Concentration

G11 Additive	Soft Water
50%	50%

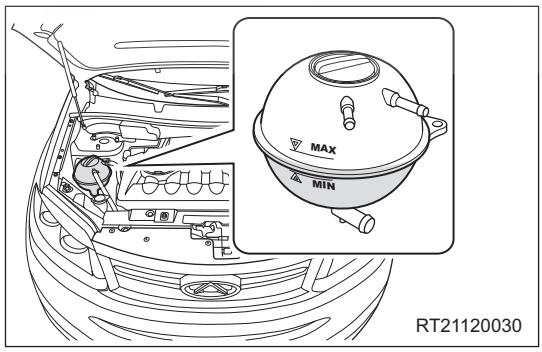
⚠ WARNING

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



2. Tighten the expansion tank cap, start and run the engine. Maintain the engine speed between 2000 and 2500 rpm to warm up the engine until the cooling fan operates.

CAUTION

- If there is no coolant in expansion tank after the engine just starts, perform the followings:
  - Stop engine;
  - Wait until coolant cools down;
  - Add coolant to "MAX" line on expansion tank.
- Run the engine at 2500 rpm until the coolant level becomes stable.

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

Tank Upper Crossmember Assembly

Removal

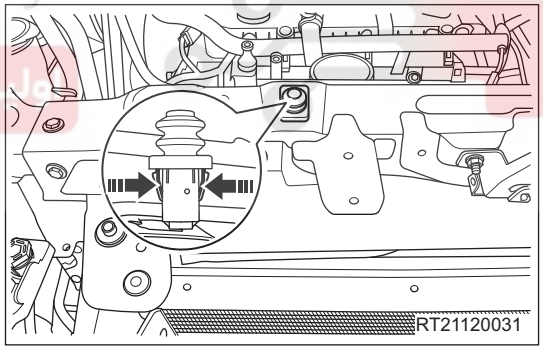
⚠ WARNING

- 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.

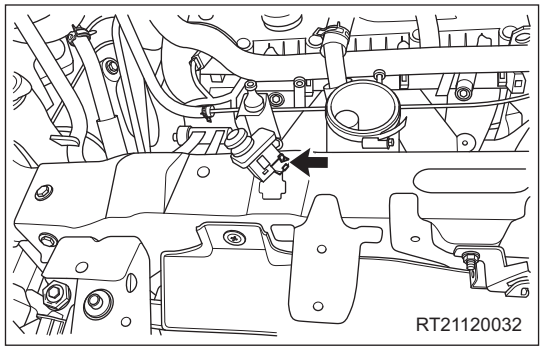
CAUTION

- 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.

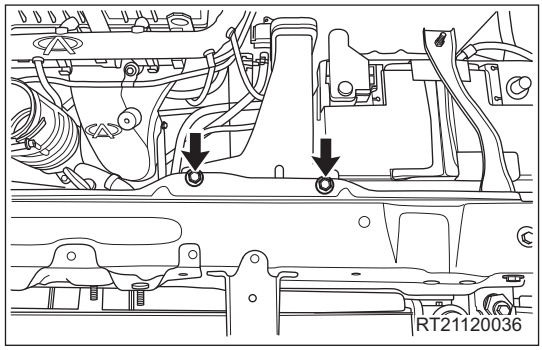
1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 14-9).
4. Remove the radiator grille assembly (See page 62-8).
5. Remove the water tank upper crossmember trim board (See page 62-10).
6. Remove the engine hood lock assembly (See page 50-39).
7. Move away the hood lock cable from tank upper crossmember assembly.
8. Remove the tank upper crossmember assembly.
   a. Press the clips on both sides of engine compartment contact switch in the direction of arrow as shown in the illustration, and remove the engine compartment contact switch from tank upper crossmember assembly.



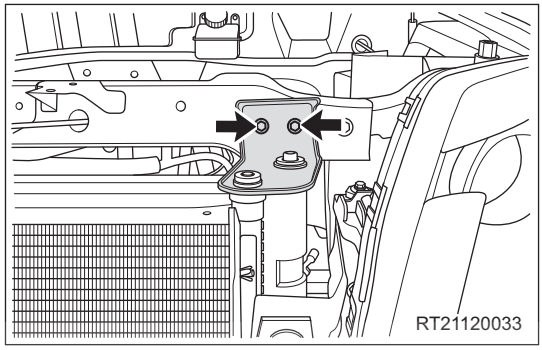
   b. Disconnect the connector (arrow) from engine compartment contact switch, and remove the engine compartment contact switch.



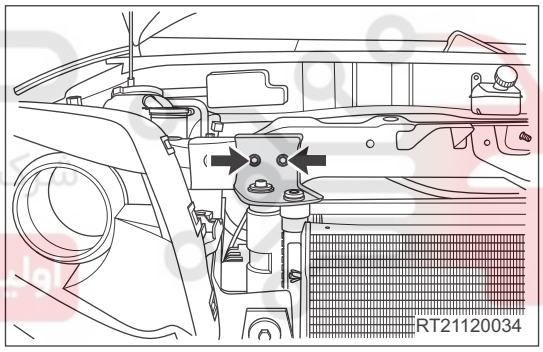
c. Remove 2 coupling bolts (arrow) between air induction pipe assembly and tank upper crossmember assembly.
(Tightening torque: 7 ± 1 N·m)



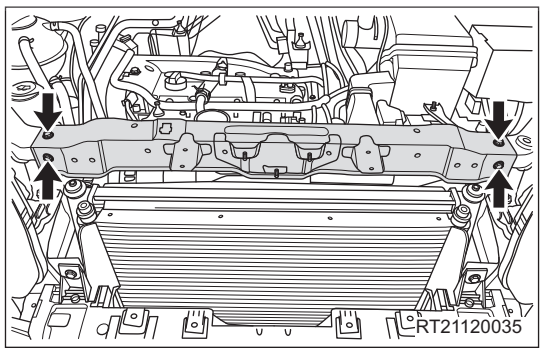
d. Remove 2 fixing bolts (arrow) from radiator left tension plate, and remove the radiator left tension plate.
(Tightening torque: 7 ± 1 N·m)



e. Remove 2 fixing bolts (arrow) from radiator right tension plate, and remove the radiator right tension plate.
(Tightening torque: 7 ± 1 N·m)



f. Remove 4 fixing bolts (arrow) from tank upper crossmember assembly.
(Tightening torque: 7 ± 1 N·m)



g. Remove the tank upper crossmember assembly.

Installation

Installation is in the reverse order of removal.

Expansion Tank

Removal

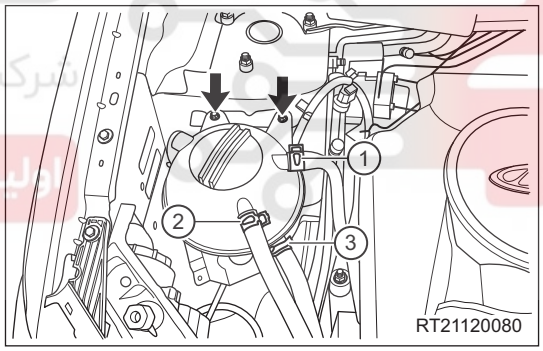
⚠ WARNING

- 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 overheats. The overheated engine coolant and steam with high-pressure may flow out and cause serious personal injury.
- 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 the electrical equipment and ignition switch.
2. Drain the coolant (See page 18-13).
3. Remove the expansion tank.
   a. Loosen the elastic clamp (1) and disconnect the connection between expansion tank and discharge pipe I.
   b. Loosen the elastic clamp (2) and disconnect the connection between expansion tank and discharge pipe II.
   c. Loosen the elastic clamp (3) and disconnect the connection between expansion tank and expansion tank outlet hose.
   d. Remove 2 fixing bolts (arrow) from expansion tank. (Tightening torque: 7 ± 1 N·m)
   e. Remove the expansion tank from expansion tank bracket.



Installation

Installation is in the reverse order of removal.

CAUTION

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

Thermostat

Removal

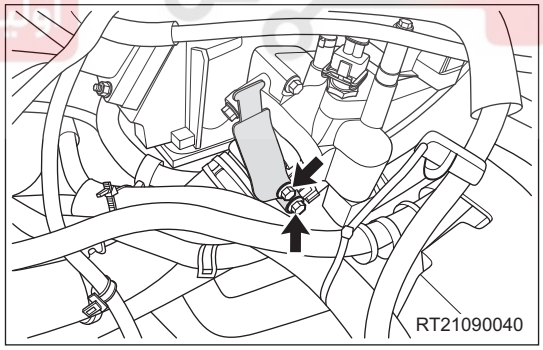
⚠ WARNING

- 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 overheats. The overheated engine coolant and steam with high-pressure may flow out and cause serious personal injury.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

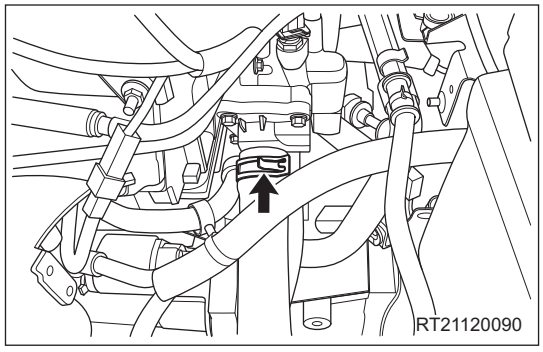
CAUTION

- 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.

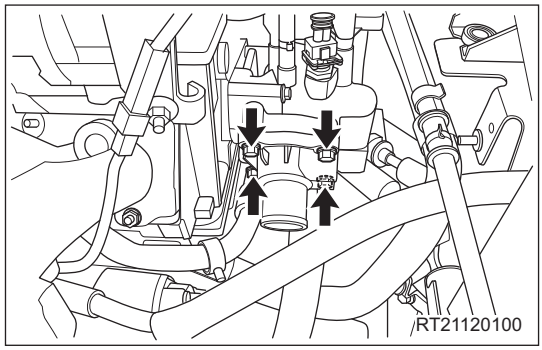
1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 14-9).
4. Remove the air induction pipe assembly (See page 14-16).
5. Drain the coolant (See page 18-13).
6. Remove the canister solenoid valve bracket.
   a. Move away the canister solenoid valve from the bracket.
   b. Remove 2 fixing bolts (arrow) from activated charcoal canister solenoid valve bracket, and remove the activated charcoal canister solenoid valve bracket. (Tightening torque: 7 ± 1 N·m)



7. Remove the thermostat housing.
   a. Loosen the elastic clamp (arrow) and disconnect the connection between engine outlet hose and thermostat housing.

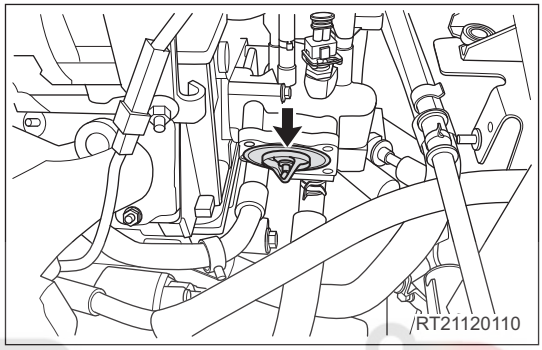


b. Remove 4 fixing bolts (arrow) from thermostat housing.
(Tightening torque: 8 + 3 N·m)



c. Remove the thermostat housing.

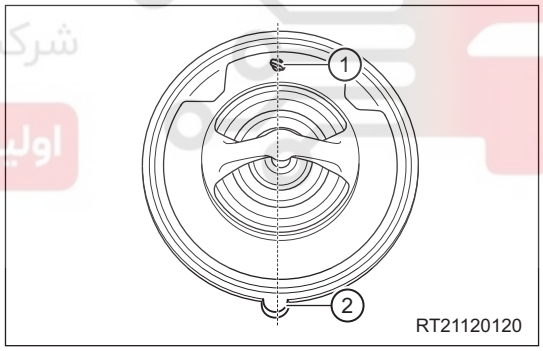
8. Remove the thermostat.
   a. Take out the thermostat (arrow) from thermostat seat.



Inspection

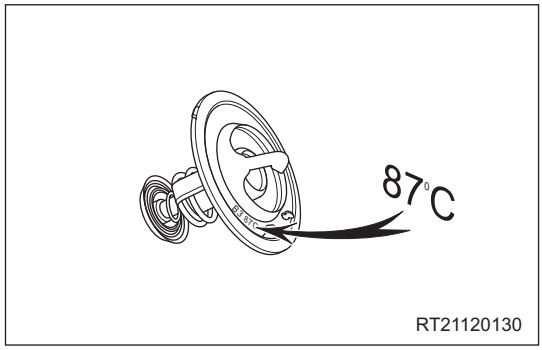
1. As show in the illustration, check if the protrusion (2) of thermostat grommet and chock (1) of thermostat are installed at an angle of 180°.

   If the result is not as specified, adjust the thermostat grommet to the specified position or replace the thermostat with a new one.

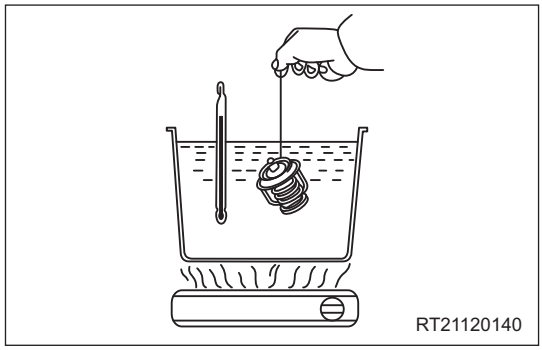


2. Check the opening temperature and maximum lift of thermostat.

   HINT:
   Valve opening temperature is engraved in the thermostat.



a. Soak the thermostat in water, heat the water gradually and perform inspection.
   - Opening temperature of thermostat is 82 ± 2°C.
   - Maximum lift of thermostat is no less than 8 mm.
   - Temperature is 103 ± 1°C when thermostat opens fully.



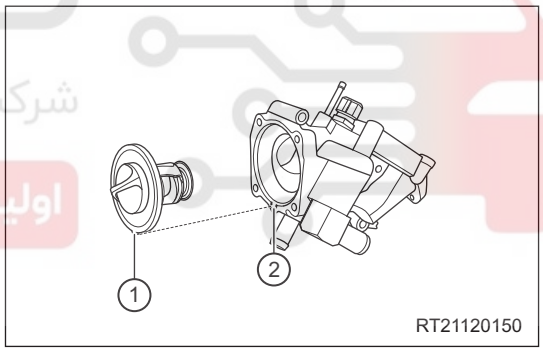
b. Check that the thermostat closes when temperature is low (5°C lower than the opening temperature).
c. If above conditions are not met, replace the thermostat.

Installation

Installation is in the reverse order of removal.

CAUTION

- As shown in the illustration, align the protrusion (1) of thermostat grommet and groove (2) of thermostat seat during installation.
- Check that coolant has been added to the specified level after installation.



Thermostat Seat

Removal

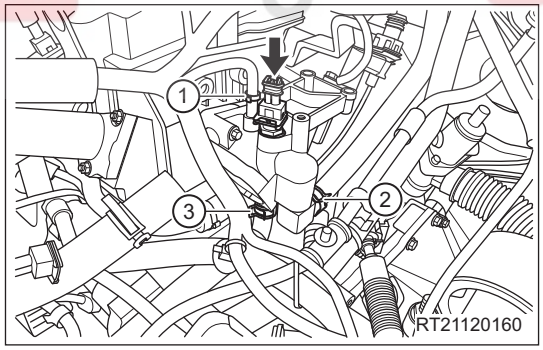
⚠ WARNING

- 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 overheats. The engine coolant and steam with high-pressure and overheat may flow out and cause serious personal injury.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

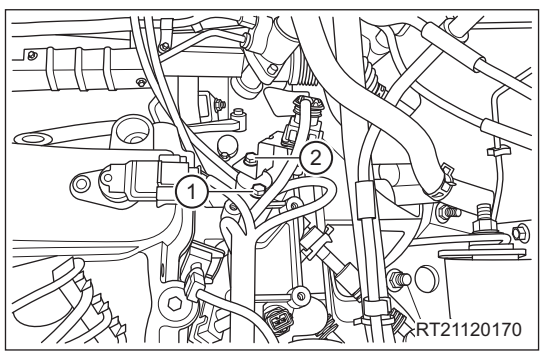
CAUTION

- 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.

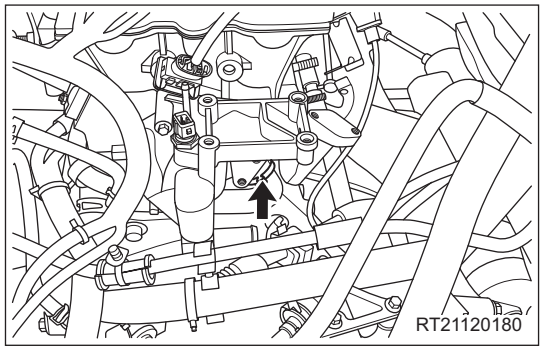
1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 14-9).
4. Remove the air filter assembly and bracket (See page 14-16).
5. Remove the ignition coil (See page 22-10).
6. Drain the coolant (See page 18-13).
7. Remove the thermostat (See page 18-19).
8. Remove the thermostat seat.
   a. Disconnect the coolant temperature sensor connector (arrow).
   b. Loosen the elastic clamp (1) and disconnect the connection between thermostat seat and engine discharge hose.
   c. Loosen the elastic clamp (2) and disconnect the connection between thermostat seat and heater inlet pipe.
   d. Loosen the elastic clamp (3) and disconnect the connection between oil cooling pipe assembly I and thermostat seat.



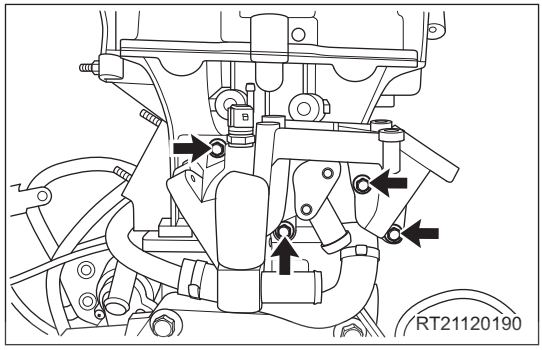
   e. Remove the fixing bolt (1) from engine ground wire, and disconnect the engine wire harness.
   (Tightening torque: 7 ± 1 N·m)
   f. Remove the fixing bolt (2) from engine speed sensor bracket.
   (Tightening torque: 7 ± 1 N·m)



g. Loosen the elastic clamp (arrow) and disconnect the connection between small circulation outlet hose and thermostat seat.

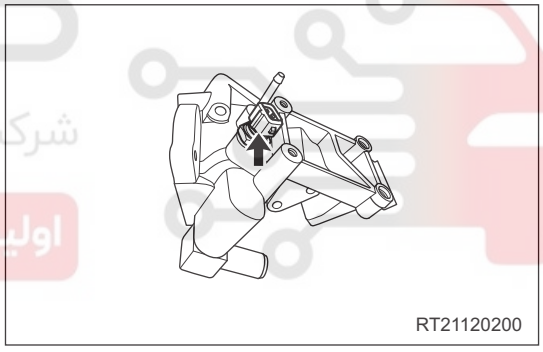


h. Remove 4 fixing bolts (arrow) from thermostat seat. (Tightening torque: 8 + 3 N·m)



i. Remove the thermostat seat and thermostat seat gasket.

9. Remove the coolant temperature sensor (arrow) from the thermostat seat.
(Tightening torque: 11 - 16 N·m)



Installation

Installation is in the reverse order of removal.

CAUTION

- Check that coolant has been added to the specified level after installation.
- Replace thermostat seat gasket with a new one during installation, and the removed gasket cannot be reused.

Fan Controller

Removal

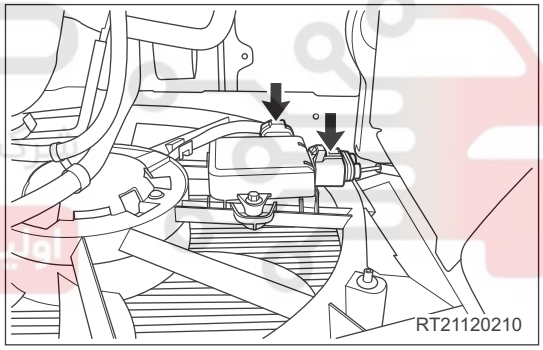
⚠ WARNING

- 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.

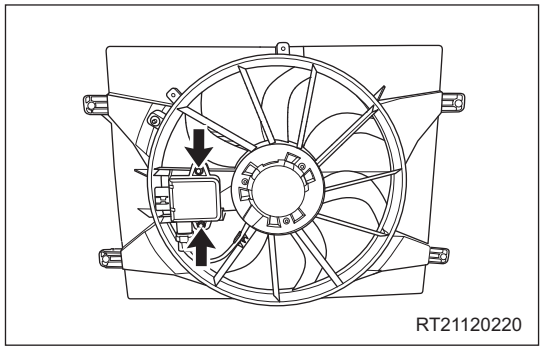
CAUTION

- 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 the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 14-9).
4. Remove the fan controller.
   a. Disconnect the fan controller connectors (arrow).



   b. Remove 2 fixing bolts (arrow) from fan controller. (Tightening torque: 7 ± 1.5 N·m)



   c. Remove the fan controller from cooling fan assembly.

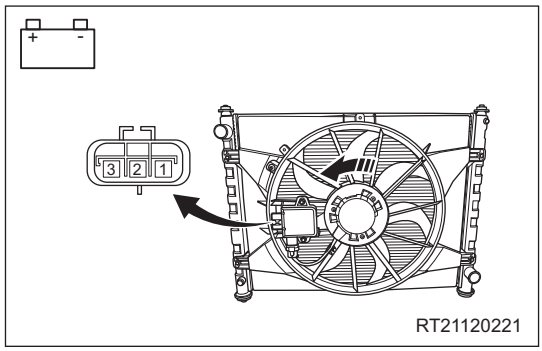
Installation

Installation is in the reverse order of removal.

Cooling Fan Assembly

On-vehicle Inspection

1. Apply battery voltage to the specified connector terminals of cooling fan respectively according to the table below, and check that the cooling fan operates smoothly when applying battery voltage.



Multimeter Condition	Condition	Specified Condition
Battery positive (+) - Terminal 1	Always	Operates smoothly
Battery negative (-) - Terminal 3		

If result is not as specified, replace cooling fan assembly (See page 18-26).

Removal

⚠ WARNING

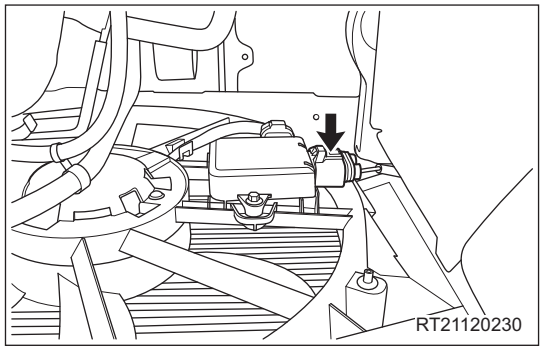
- Perform removal procedures with engine compartment at low temperature after cooling fan stops completely, otherwise rotating cooling fan or hot components of engine compartment may cause serious injury.

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.

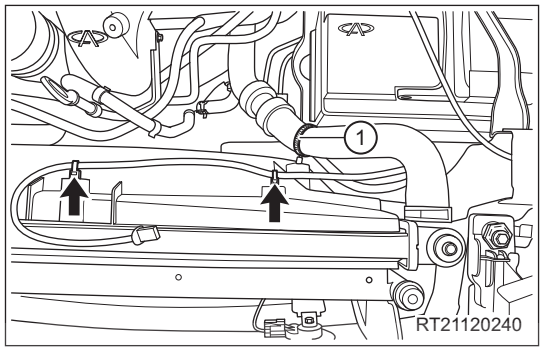
1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 14-9).
4. Remove the air induction pipe assembly (See page 14-15).
5. Remove the radiator grille assembly (See page 62-8).
6. Remove the water tank upper crossmember trim board (See page 62-10).
7. Remove the engine hood lock assembly (See page 50-39).
8. Remove the tank upper crossmember assembly (See page 18-16).
9. Remove the cooling fan assembly.

a. Disconnect the fan controller connector (arrow).

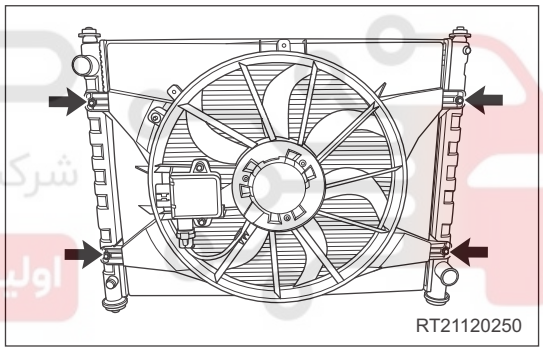


b. Remove the wire harness clips (arrow) from engine compartment contact switch, and move away the engine compartment contact switch from cooling fan assembly.

c. Remove the fixing band (1) of engine outtlet hose from cooling fan assembly.



d. Remove 4 fixing bolts (arrow) from cooling fan assembly.
(Tightening torque: 7 ± 1 N·m)

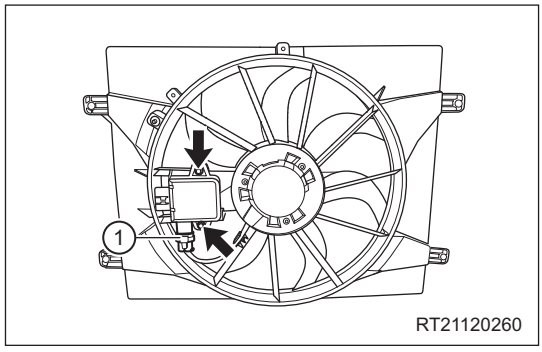


e. Remove the cooling fan assembly from radiator assembly.

10. Remove the fan controller.

a. Disconnect the fan controller connector (1).

b. Remove 2 fixing bolts (arrow) from the fan controller, and remove the fan controller from the cooling fan assembly.
(Tightening torque: 7 ± 1.5 N·m)



Installation

Installation is in the reverse order of removal.

CAUTION

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

Radiator Assembly

Removal

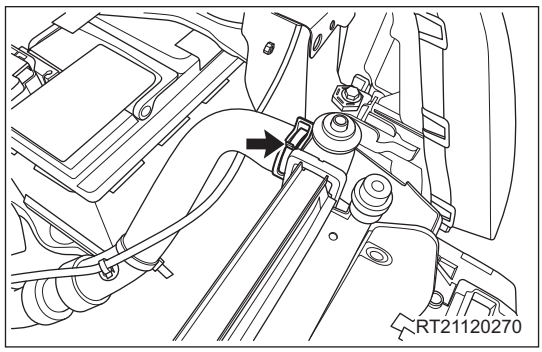
⚠ WARNING

- 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 overheats. The engine coolant and steam with high-pressure and overheat may flow out and cause serious personal injury.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

CAUTION

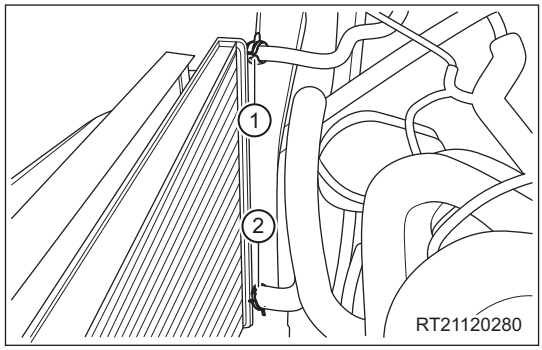
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 14-9).
4. Remove the radiator grille assembly (See page 62-8).
5. Remove the water tank upper crossmember trim board (See page 62-10).
6. Remove the engine hood lock assembly (See page 50-39).
7. Move away the hood lock cable from tank upper crossmember assembly.
8. Remove the tank upper crossmember assembly (See page 18-16).
9. Drain the coolant (See page 18-13).
10. Remove the cooling fan assembly (See page 18-26).
11. Remove the radiator assembly.
    a. Loosen the elastic clamp (arrow) and disconnect the connection between engine outlet hose and radiator assembly.



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

c. Loosen the elastic clamp (2) and disconnect the connection between engine inlet pipe and radiator assembly.



d. Remove the radiator.

Installation

Installation is in the reverse order of removal.

Water Pump Assembly

Removal

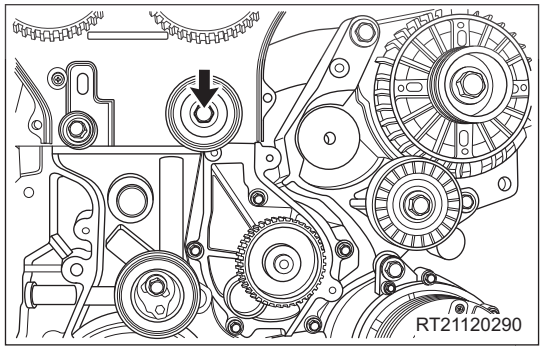
⚠ WARNING

- 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 overheats. The engine coolant and steam with high-pressure and overheat may flow out and cause serious personal injury.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.

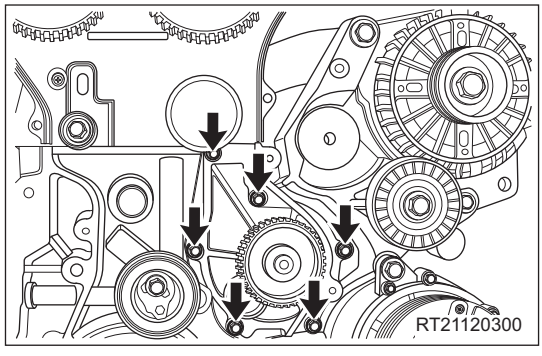
CAUTION

- 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 the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 14-9).
4. Drain the coolant (See page 18-13).
5. Remove the accessory drive belt (See page 07-24).
6. Use an engine equalizer to hang the engine.
7. Remove the engine right mounting assembly (See page 07-68).
8. Remove the engine timing belt (See page 07-29).
9. Remove the water pump assembly.
   a. Remove the fixing bolt (arrow) from timing belt idler pulley, and remove the timing belt idler pulley.
   (Tightening torque: 40 + 5 N·m)



   b. Remove 6 fixing bolts (arrow) from water pump assembly.
   (Tightening torque: 8 + 3 N·m)

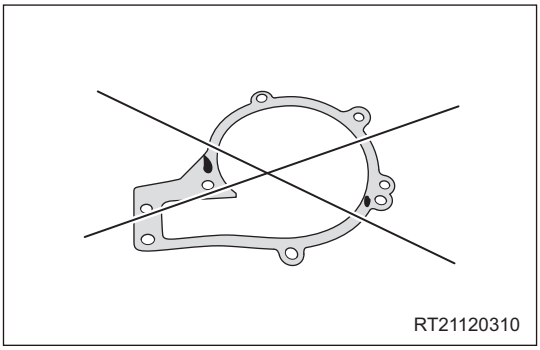


c. Remove the water pump assembly and gasket.

Inspection

1. Check water pump gasket.

   Check water pump gasket for wear or bends. If wear or bends are found, replace the gasket.



2. Check water pump assembly.

   Check water pump assembly carefully. If any of the following occurs, replace the water pump assembly immediately.

   a. Contact surfaces of water pump assembly and cylinder block is uneven.
   b. Impeller of water pump assembly is damaged.
   c. Bearing of water pump assembly is loosened.
   d. There is abnormal noise when water pump assembly is turning.

Installation

Installation is in the reverse order of removal.

CAUTION

- Clean the 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. check for leakage in the cooling system.