02 -Engine

Cooling system

Mechanical systems

Components

Name	Specification
Type of thermostat	Pellet type thermostat
Initial temperature of thermostat	82±2 ˚C
Thermostat full open temperature	95±2 ˚C
Water pump type	Mechanical type
Water pump vane number	6

Precautions

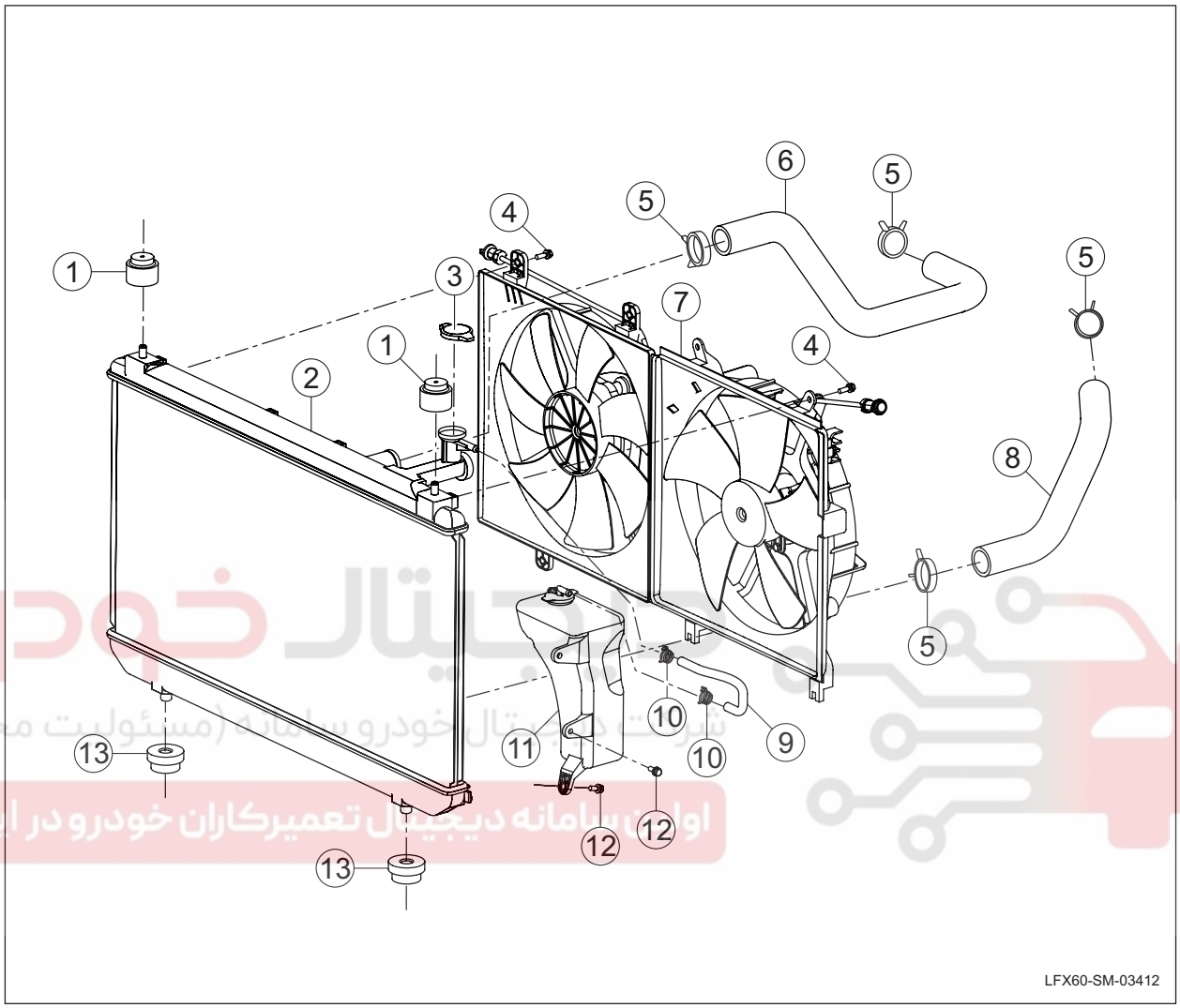
Precautions

1. During the work of cooling system, be sure to start the work after the engine is cooled.
2. During the work, don't splash the cooling fluid on drive belt.
3. During the removal of heat radiator, be sure to avoid any scratch or damage of heat exchanger core.
4. During the reinstallation of cooling system, please ensure the frm firm connection of each hose and proper installation of hose clamps.

Structure and installation location

Component Location Plan

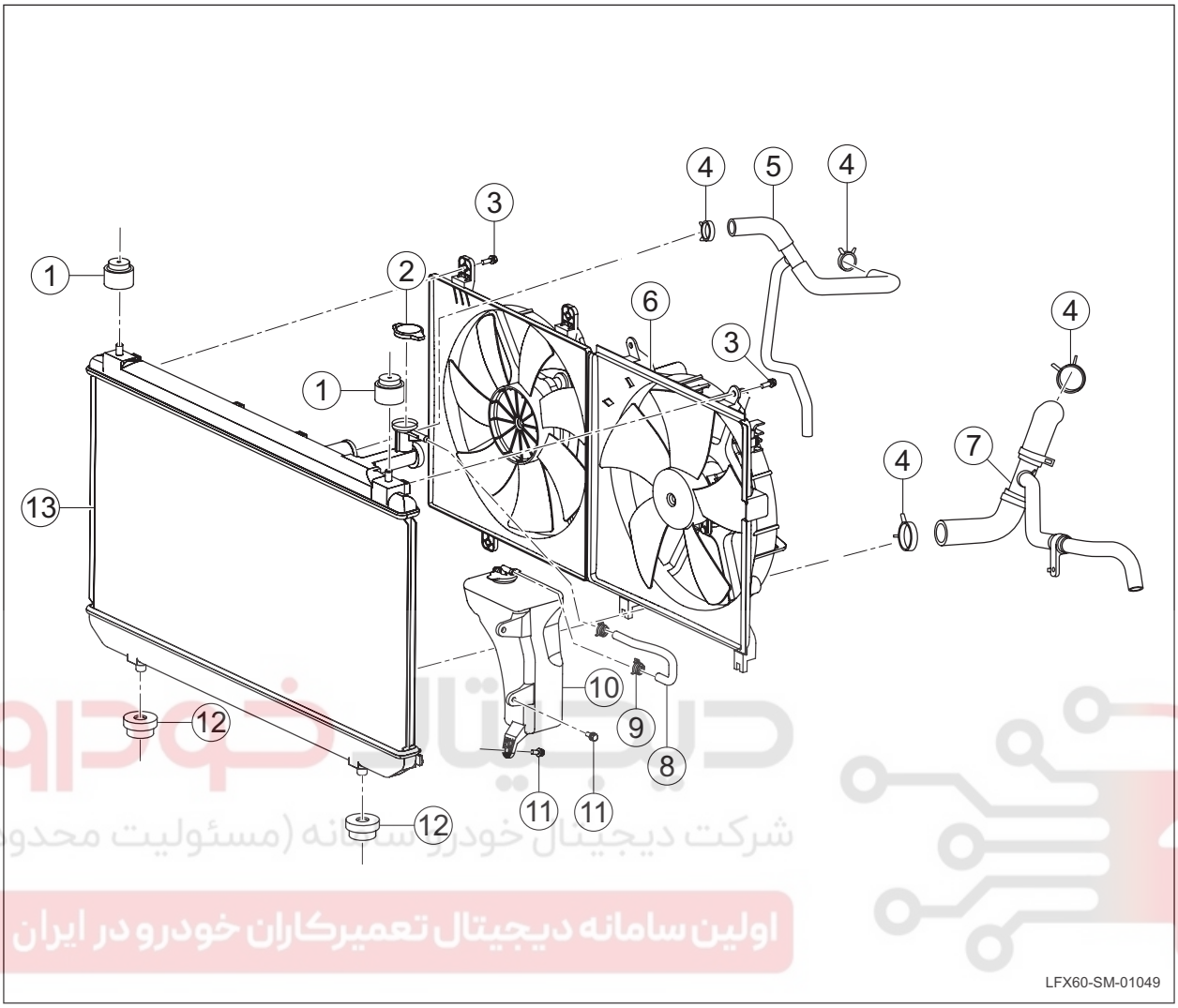
Cooling system (MT)



No.	Part Name
1	Install the bushing to the radiator
2	Radiator assembly
3	Water filler cap
4	Hexagon head bolt and taper elastic washer assembly
5	Steel strip elastic clamp
6	Radiator water inlet pipe
7	Electronic fan with cowl assembly

No.	Part Name
8	Radiator water outlet pipe
9	Expansion tank and radiator connection pipe
10	Steel strip elastic clamp
11	Expansion water tank assembly
12	hexagon flange bolt
13	Radiator lower suspension

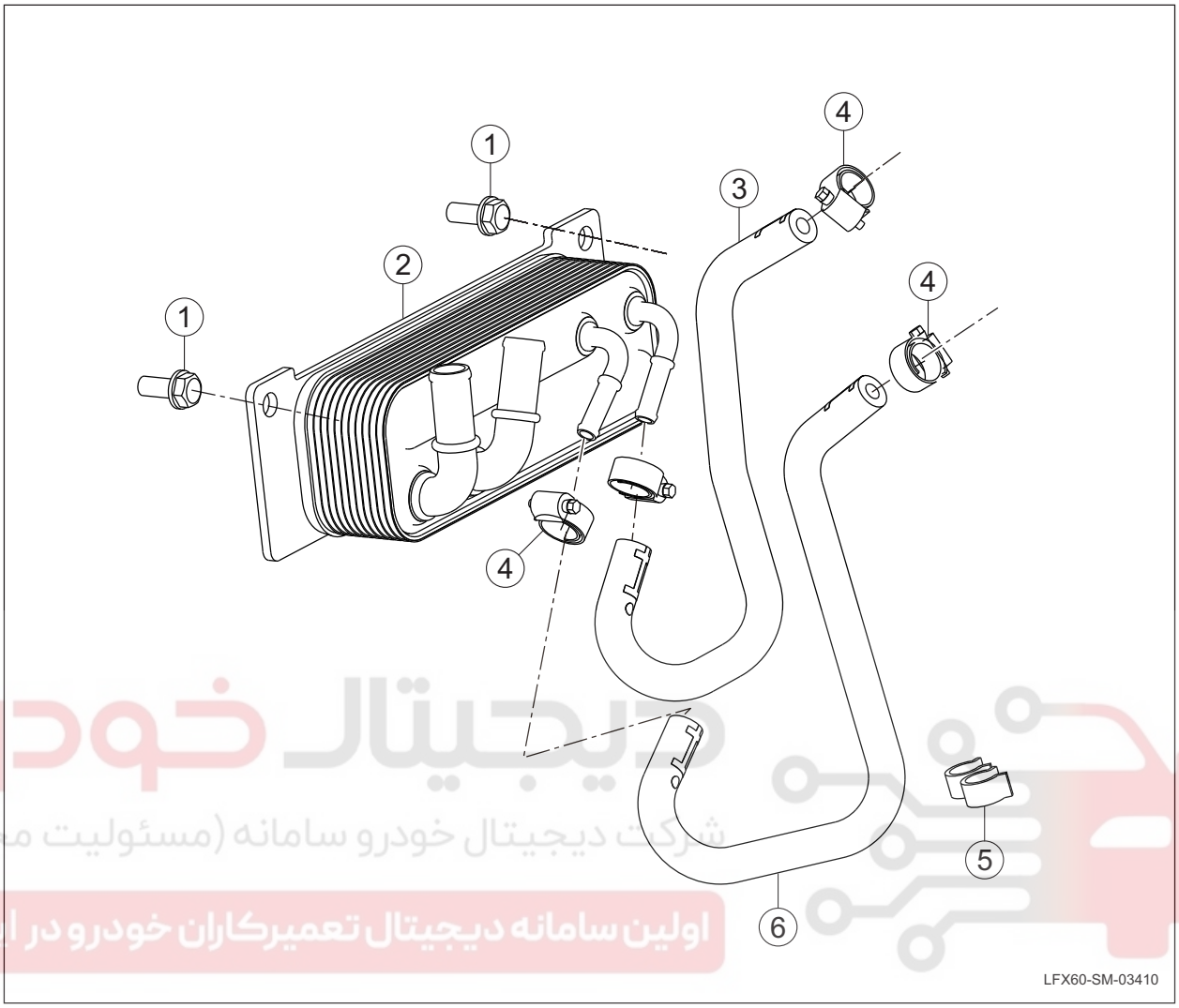
Cooling system(CVT)



No.	Part Name
1	Install the bushing to the radiator
2	Water filler cap
3	Hexagon head bolt and taper elastic washer assembly
4	Steel strip elastic clamp
5	Radiator water inlet pipe
6	Electronic fan with cowl assembly
7	Radiator water outlet pipe

No.	Part Name
8	Expansion tank and radiator connection pipe
9	Steel strip elastic clamp
10	Expansion kettle assembly
11	Hexagon flange bolt
12	Radiator lower suspension
13	Radiator assembly

Transmission oil cooler (CVT)



No.	Part Name
1	Hexagon head bolt and taper elastic washer assembly
2	Oil cooler assembly
3	Oil cooler flowline

No.	Part Name
4	Worm bar clasp
5	Oil cooler pipeline clamp
6	Oil cooler inlet tube

General Inspection

General Inspection

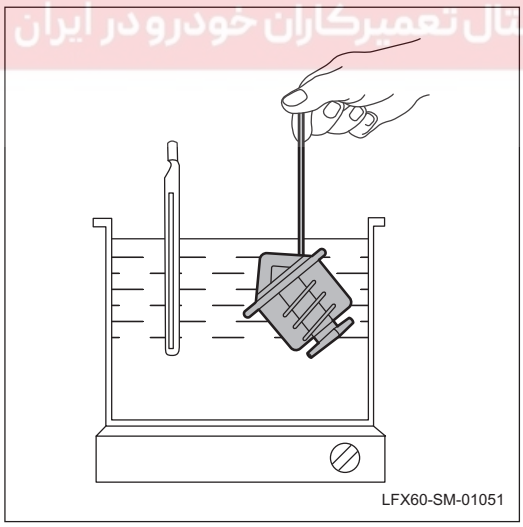
Thermostat test

1. Check if the discharge valve of thermostat is clean. If this valve is blocked, it will cause much heat for engine.
2. Check if there is something unusual in the valve seat. There shall be no unusual object inside; otherwise, the valve cannot be mounted tightly.
3. Check if the sealing pieces of thermostat are broken, deformed or damaged.
4. Check the wax bead by following the steps below under constant temperature:

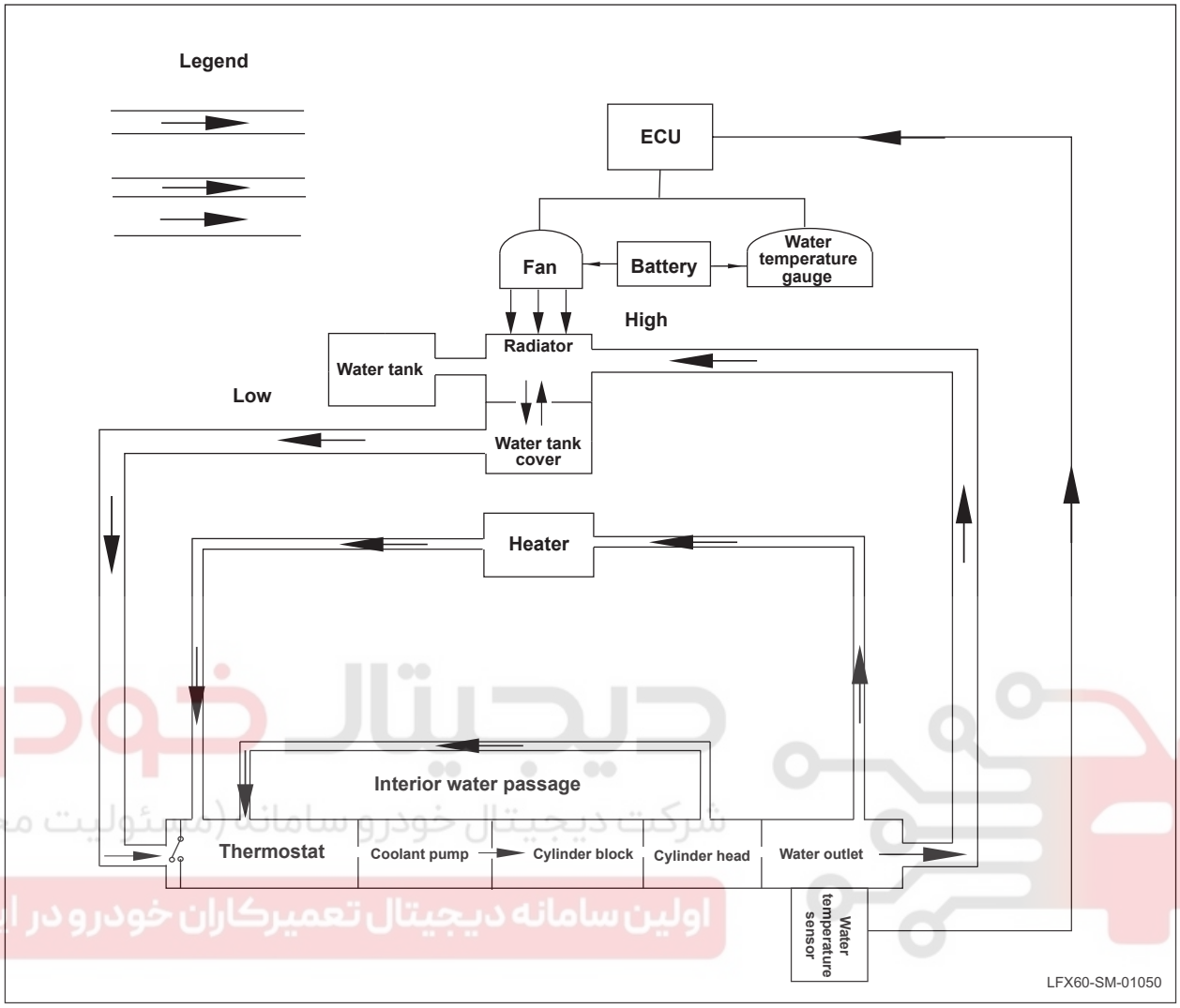
- **Remove the thermostat.**

Refer to:Replacement of thermostat.

- **Immerse the thermostat under water that can be heated.**
- **Put thermometer in water.**
- **Heat water and observe the state of thermostat. Check if valve opening temperature is the same as specified temperature:**
  - Initial temperature of thermostat 82 ˚C
  - full open temperature of thermostat 95 ˚C
- **If the valve opening temperature is obviously lower/higher than specified temperature, change it with new thermostat. Use of thermostat outside specified temperature will result in overheat or over-cooling.**



Functional diagram



Operating Principle

System Overview

The cooling system consists of the radiator, expansion water tank, hose, water pump, electrical fan and thermostat. The radiator is of piping type. When the engine is cold: the normal working temperature of engine is about 95 ˚C .Within this range, the parts in the engine are optimal in cooperation.If the engine cannot reach the desired temperature, wearing will increase.Because if the temperature is low, the mixed gas cannot burn completely in the combustion chamber.It will cause serious carbon deposition.Therefore, if the engine works at a low temperature, it requires its working temperature gets to the normal working temperature soonest in a short time and the heat created by the engine shall be minized in exchanging with external ambient. At this moment, the cooling liquid inside control chamber of thermostat is circulating only inside engine body, thus bringing heat generated around cylinder wall to other parts of engine to increase the temperature quickly. The water pump will circulate cooling liquid inside the cylinder and cooling liquid will circulate inside water sleeve, throttle assembly and cylinder cover, which is called “minor circulation”.

When the temperature reaches to 82 ˚C , the engine coolant is extracted to the water jacket of engine, intake manifold, cylinder head and radiator.This status is called as “general circulation”.

Part instructions

Coolant

When the engine reaches the normal working temperature: along with the operation of engine, the engine coolant inside rises rapidly in temperature.When it reaches the general circulation system of thermostat, it is the standard system.The coolant in the radiator expands because of heat and overflows to the expansion water tank.When the system cools down, the coolant returns to the radiator.

Note:

Alcohol or methanol coolant or water only cannot be used for the cooling system. Otherwise, the cooling system will be in trouble.

Diagnostic Information and Procedures

Diagnosis Instructions

Before trouble-shooting, first understand and get familiar with the working principle of cooling system.This is helpful to determine the correct procedures of trouble-shooting when the trouble occurs.More important, it is also helpful to determine if the status described by the client is normal operation.

Any trouble-shooting for the cooling system shall start from the inspection for the induction cooling system, then guide the maintenance personnel to take next logic procedure to perform trouble-shooting.Comprehend and correctly use the diagnostic flow chart to shorten the diagnosis time and avoid the misjudgement.

General equipment

Digital multimeter
Diagnostic equipment of vehicle

Visual Inspection

1. Confirm the customer's question.
2. Visually check for obvious signs of mechanical or electrical damage.

Visual inspection table

Mechanical	Electrical
• Coolant leaking • Cooling water hose • Gasket or seal • Coolant filler cap and seal • Expansion tank • Thermostat • Water pump • Driving belt • Oil cooler	• Fuse • Harness or plug • Engine compartment fuse box • Cooling fan relay • Water temperature sensor • Fan • ECM

3. If the observed or raised problem is the evident and the cause has been found, ensure to fix this fault before proceeding with the next step.
4. If for the problem, there are no obvious findings, then confirm the fault and refer to the symptom table.

List of fault symptoms

If the vehicle fails, no trouble code is detected by the engine control module (ECM), and no significant fault location is found after visual inspection and general inspection, it is recommended that troubleshooting should be carried out according to diagnostic ideas and processes of the table below.

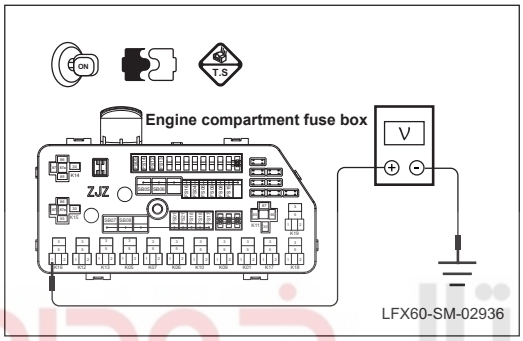
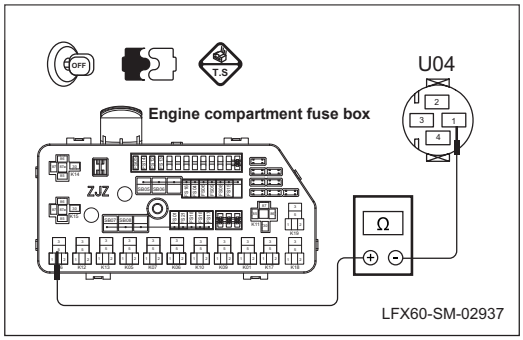
Symptom	Possible Cause	Recommended Measures
Coolant leaking	• Cooling pipeline aged or connected wrong.	• Replace the aged hose or reconnect the pipeline.
	• Coolant filler cap or seal abnormal	• Replace the coolant filler cap.
	• Thermostat or seal components broken	• Replace the thermostat or seal components **Refer to:Replacement of thermostat**
	• Expansion tank assembly leaking	• Replace the expansion tank. **Refer to:Replacement of expansion tank assembly**
	• Radiator assembly leaking	• Replace the radiator assembly **Refer to:Replacement of the radiator assembly**
	• Heating water tank leaking	• Replace the heating water tank **Refer to:Replacement of heating water tank assembly**
	• Water pump and seal components	• Replace the water pump or seal components. **Refer to:Replacement of water pump assembly**
	• Engine cylinder cushion leaking	• Check the engine cylinder cushion, head and body. **Refer to:Engine machinery**
	• Transmission oil cooler.	• Replace the transmission oil cooler. **Refer to:Replacement of oil cooler assembly**
The engine coolant cannot reach the normal temperature (the instrument indicates the coolant temperature is low)	• Water temperature sensor in trouble	• Replace the water temperature sensor. **Refer to:Replacement of the water temperature sensor**
	• The thermostat has a fault	• Check the thermostat (replace the thermostat if necessary) **Refer to:Replacement of thermostat**
	• Electrical fan working abnormal (running all the time)	**Refer to:Diagnosis flow for electronic fan always running at low speed** **Refer to:Diagnosis flow for electronic fan always running at high speed**
	• Electrical fan working abnormal (not running all the time)	
	• Combination instrument.in trouble	• Check the combination instrument. **Refer to:Replacement of instrument cluster assembly**

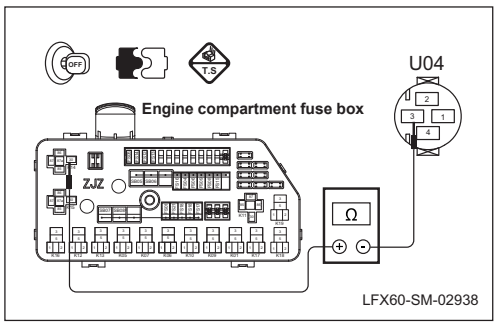
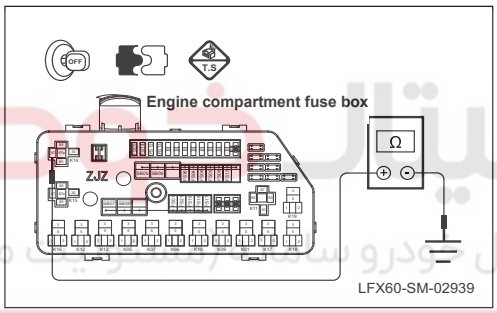
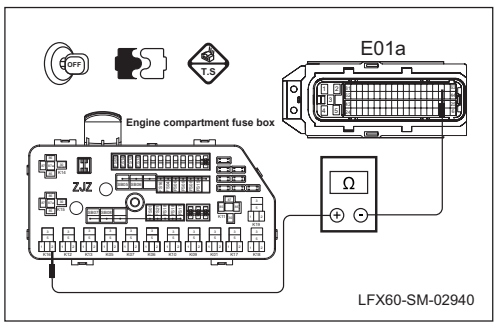
Symptom	Possible Cause	Recommended Measures
Engine overheated (coolant boiling)	• Cooling system pressure abnormal	• Release the air in the cooling system.
	• Coolant filler cap or seal broken	• Check if the coolant filler cap is abnormal in tightening or the seal components are broken (if necessary, replace the coolant filler cap).
	• Cooling liquid contamination	• Replace the coolant. **Reference: Discharging and filling procedure for engine coolant.**
	• Radiator blocked	• Check if the radiator gets blocked inside or there is any foreign object on the radiating surface (if necessary, repair or replace the radiator assembly).
	• The thermostat has a fault	• Replace the thermostat. **Reference: thermostat replacement.**
	• Water pump in trouble	• Check if the water pump leaks or the blades are broken (if necessary, replace the water pump assembly). **Refer to:Replacement of water pump assembly**
	• Accessory drive belt in trouble	• Check if the accessory drive belt slips or works abnormally (replace it if necessary). **Refer to:Accessories belt replacement**
	• Electrical fan in trouble	• Check if the electrical fan is broken (if necessary replace it) • Check if the electrical fan works properly. **Reference: trouble-shooting for electrical fan not running.**
	• Engine mechanical fault	• Check the engine cylinder cap, cushion and body. **Refer to:Engine machinery**
Electrical fan not running at the low speed.	• Fuse	**Refer to: Trouble-shooting for electrical fan not running at the low speed**
	• Relay	
	• Line	
	• Engine compartment fuse box	
	• Electronic fan	
	• ECM	
Electrical fan not running at the high speed.	• Fuse	**Refer to: Trouble-shooting for electrical fan not running at the high speed**
	• Relay	
	• Line	
	• Engine compartment fuse box	
	• Electronic fan	
	• ECM	

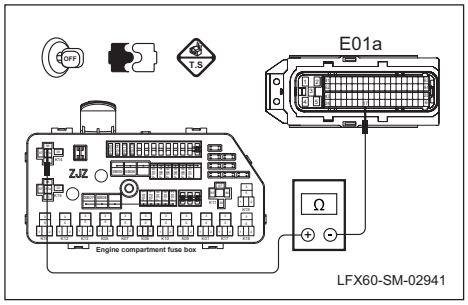
Symptom	Possible Cause	Recommended Measures
Diagnosis flow for electronic fan always running at low speed	• Relay	**Refer to:Diagnosis flow for electronic fan always running at low speed**
	• Engine compartment fuse box	
	• Line	
	• ECM	
Diagnosis flow for electronic fan always running at high speed	• Relay	**Refer to:Diagnosis flow for electronic fan always running at high speed**
	• Engine compartment fuse box	
	• Line	
	• ECM	

Trouble-shooting for electrical fan not running at the low speed

Test condition	Details/results/measures
1. Check the engine DTC.	
	A. Operate the ignition switch to turn the power to OFF and connect the diagnostic meter. B. Operate the ignition switch to turn the power to ON state. C. Turn on the diagnostic meter and check the engine system. Is there DTC related to electronic fan control? →**Yes** **Refer to:Diagnostic trouble code (DTC) list. Perform DTC diagnostic procedure.** →**No** To step 2.
2. Perform the low speed drive of electrical fan.	
	A. Operate the ignition switch to turn the power to ON state. B. Switch on the automobile diagnosis equipment. C. Perform the low speed drive of electrical fan. If the electrical fan works properly at the low speed? →**Yes** Check the coolant temperature sensor. →**No** To step 3.
3. Replace the low speed fuse of electrical fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Check the low speed fuse SB06 of electrical fan in the forecabin electrical box. **Fuse rated capacity: 30A** Is it OK after checking? →**Yes** To step 4. →**No** Replace the low speed fuse of electrical fan.
4. Check the K161 fan relay.	
	A. Operate the ignition switch to turn the power to OFF state. B. Exchange K161 fan relay with that of the same model vehicle. Is the electronic fan low speed running normal? →**Yes** Replace K161 electrical fan relay. →**No** To step 5.

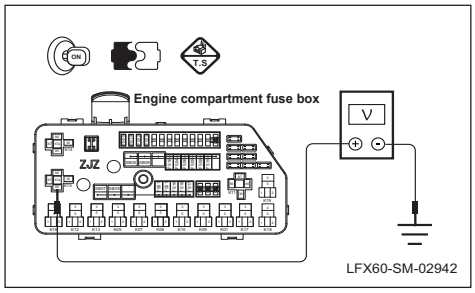
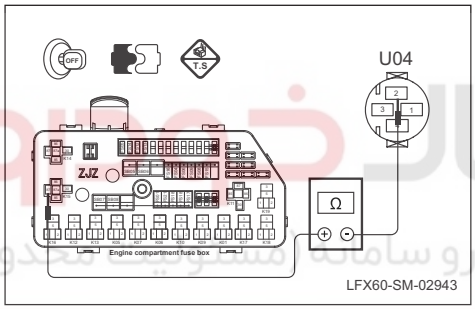
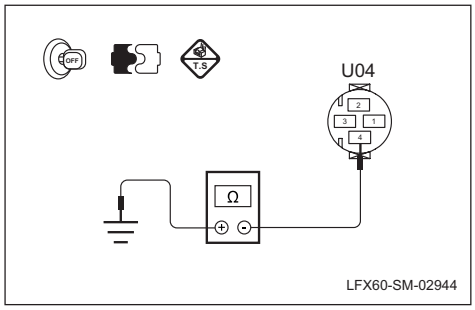
Test condition	Details/results/measures
5. Check the K14 fan speed regulation relay.	
	A. Operate the ignition switch to turn the power to OFF state. B. Exchange K14 fan speed regulation relay with that of the same model vehicle. Is the electronic fan low speed running normal? →**Yes** Replace the K14 fan speed regulation relay. →**No** To step 6.
6. Check the power supply circuit of K161 fan relay.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Remove the engine compartment fuse box K161 fan relay. D. Connect the battery negative terminal. E. Operate the ignition switch to turn the power to ON state. F. Measure the voltage between No.1 and 3 terminals of K161 fan relay in the forecabin electrical box and the reliable grounding with a multimeter **Standard value:11 ~ 14V** Is the voltage normal? →**Yes** To step 7. →**No** Check the power supply circuit of K161 fan relay and replace the harness if necessary.
7. Check the power supply input circuit of low speed fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Dismount K161 fan relay in the forecabin electrical box D. Disconnect the electronic fan harness plug U04. E. Measure the resistance between No.5 terminal of K161 fan relay in the forecabin electrical box and No.1 terminal of electrical fan harness plug U04 with a multimeter **Standard value:Less than 5Ω** Is the resistance normal? →**Yes** To step 8. →**No** Repair the low speed fan power input line fault and replace the harness if necessary.

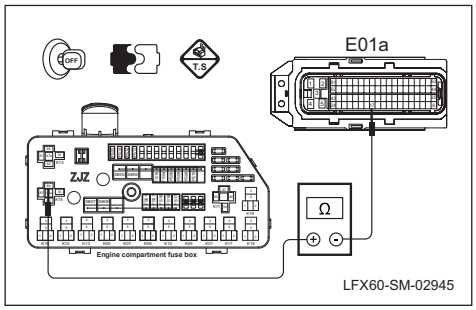
Test condition	Details/results/measures
8. Check the power supply output circuit of low speed fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Remove the engine compartment fuse box K14 fan speed regulation relay. D. Disconnect the electronic fan harness plug U04. E. Measure the resistance between No.30 terminal of K14 fan relay in the forecabin electrical box and No.3 terminal of electrical fan harness plug U04 with a multimeter **Standard value:Less than 5Ω** Is the resistance normal? **→Yes** To step 9. **→No** Repair the low speed fan power output line fault and replace the harness if necessary.
9. Check the grounding circuit of low speed fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Remove the engine compartment fuse box K14 fan speed regulation relay. D. Measure the resistance between No.87 terminal of K14fan relay in the forecabin electrical box and the reliable grounding with a multimeter **Standard value:Less than 5Ω** Is the resistance normal? **→Yes** To step 10. **→No** Check the grounding circuit of low speed fan and replace the harness if necessary.
10. Check the control circuit of low speed fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the ECM harness connector E01b. D. Dismount the K161 fan relay in the forecabin electrical box. E. Measure the resistance between No.2 terminal of K161 fan relay in the forecabin electrical box and No.65 terminal of ECM harness plug E01awith a multimeter **Standard value:Less than 5Ω** Is the resistance normal? **→Yes** To step 11. **→No** Repair the low speed fan control line fault and replace the harness if necessary.

Test condition	Details/results/measures
11. Check the control circuit of high speed fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the ECM harness connector E01b. D. Remove the engine compartment fuse box K14 fan speed regulation relay. E. Measure the resistance between No.86 terminal of K14 fan relay in the forecabin electrical box and No.17 terminal of ECM harness plug E01awith a multimeter **Standard value:Less than 5Ω** Is the resistance normal? **→Yes** To step 12. **→No** Repair the high speed fan control line fault and replace the harness if necessary.
12. Check the low speed electrical fan.	
	A. Replace the low speed electrical fan. **Refer to:Replacement of electronic fan with guard ring assembly** Is the system normal? **→Yes** Replace the low speed electrical fan. **→No** To step 13.
13. Check ECM.	
	A. Replace ECM. **Refer to:REPLACEMENT OF ECM** Confirm the fault is eliminated

Trouble-shooting for electrical fan not running at the high speed

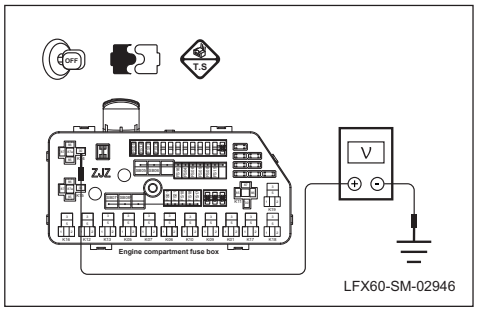
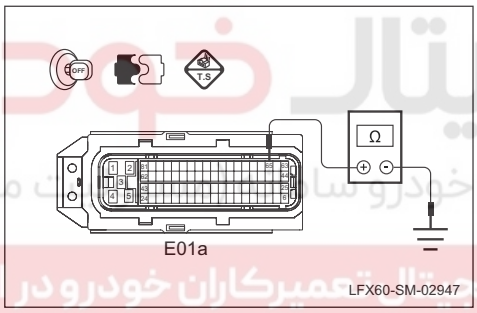
Test condition	Details/results/measures
1. Check the engine DTC.	
	A. Operate the ignition switch to turn the power to OFF and connect the diagnostic meter. B. Operate the ignition switch to turn the power to ON state. C. Turn on the diagnostic meter and check the engine system. Is there DTC related to electronic fan control? →**Yes** **Refer to:Diagnostic trouble code (DTC) list. Perform DTC diagnostic procedure.** →**No** To step 2.
2. Perform the test of electrical fan running at the high speed.	
	A. Operate the ignition switch to turn the power to ON state. B. Switch on the automobile diagnosis equipment and enter into the input and output function control C. Perform the test of electrical fan running at the high speed. If the electrical fan works properly at the high speed? →**Yes** Check the coolant temperature sensor. →**No** To step 3.
3. Check the high speed fuse of electrical fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Check the low speed fuse SB05 of electrical fan in the forecabin electrical box. **Fuse rated capacity: 30 A** Is it OK after checking? →**Yes** To step 4. →**No** Replace the high speed fuse of electrical fan.
4. Check the relay of K152 fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Exchange the relay of K152 fan with the same model of vehicle. If the electrical fan works properly at the high speed? →**Yes** Replace the relay of K152 fan. →**No** To step 5.

Test condition	Details/results/measures
5. Check the K125 fan relay power supply line.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Remove the engine compartment fuse box K152 fan relay. D. Connect the battery negative terminal. E. Operate the ignition switch to turn the power to ON state. F. Measure the voltage between No.30 and 85 terminals of K152 fan relay in the forecabin electrical box and the reliable grounding with a multimeter **Standard value:11 ~ 14V** Is the voltage normal? →**Yes** To step 6. →**No** Check the power supply circuit of K152 fan relay and replace the harness if necessary.
6. Check the power supply input circuit of high speed fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Remove the engine compartment fuse box K152 fan relay. D. Disconnect the electronic fan harness plug U04. E. Measure the resistance between No.87 terminal of K152 fan relay in the forecabin electrical box and No.2 termianl of harness plug U04 of electrical fan with a multimeter. **Standard value:Less than 5Ω** Is the resistance normal? →**Yes** To step 7. →**No** Repair the low speed fan power input line fault and replace the harness if necessary.
7. Check the power supply input circuit of high speed fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the electronic fan harness plug U04. D. Measure the resistance between No.4 terminal of harness plug U04 of electrical fan and the grounding with a multimeter. **Standard value:Less than 5Ω** Is the resistance normal? →**Yes** To step 8. →**No** Repair the high speed fan power input line fault and replace the harness if necessary.

Test condition	Details/results/measures
8. Check the relay control circuit of K152 fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the ECM harness connector E01b. D. Dismount the relay of K152 fan in the forecabin electrical box. E. Measure the resistance between No.86 terminal of K152 fan relay in the forecabin electrical box and No.17termianl of ECM harness plug E01awith a multimeter. **Standard value:Less than 5Ω** Is the resistance normal? →**Yes** To step 9. →**No** Repair the low speed fan control line fault and replace the harness if necessary.
9. Check the high speed electrical fan.	
	A. Replace the high speed electrical fan. **Refer to:Replacement of electronic fan with guard ring assembly** Is the system normal? →**Yes** Replace the high speed electrical fan. →**No** To step 10.
10. Check ECM.	
	A. Replace ECM. **Refer to:REPLACEMENT OF ECM** Confirm the fault is eliminated

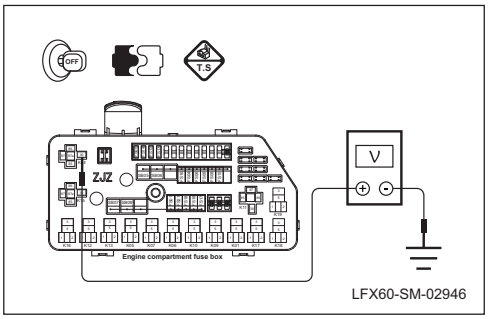
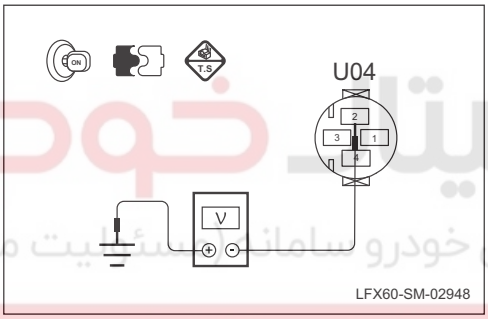
Diagnosis flow for electronic fan always running at low speed

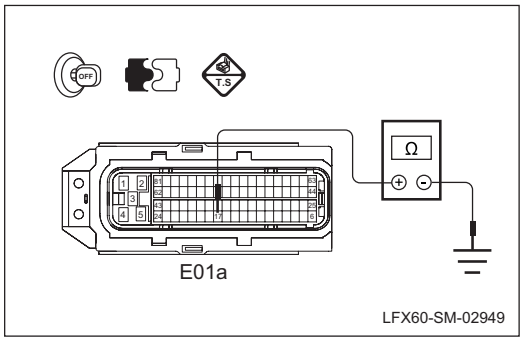
Test condition	Details/results/measures
1. Check the engine DTC.	
	A. Operate the ignition switch to turn the power to OFF and connect the diagnostic meter. B. Operate the ignition switch to turn the power to ON state. C. Turn on the diagnostic meter and check the engine system. Is there DTC related to electronic fan control? →**Yes** **Refer to:Diagnostic trouble code (DTC) list. Perform DTC diagnostic procedure.** →**No** To step 2.
2. Read the engine coolant temperature data stream.	
	A. Operate the ignition switch to turn the power to ON state. B. Turn on the diagnostic meter and read the read data stream. C. Read the engine coolant temperature data stream. Is the coolant temperature high? →**Yes** Repair the high coolant temperature fault. →**No** To step 3.
3. Check the K161 fan relay.	
	A. Operate the ignition switch to turn the power to OFF state. B. Exchange the relay of K161 fan with the same model of vehicle. If the electrical fan stops working at the low speed? →**Yes** Replace the electronic K161 fan relay. →**No** To step 4.
4. Check the K14 fan speed regulation relay.	
	A. Operate the ignition switch to turn the power to OFF state. B. Exchange K14 fan speed regulation relay with that of the same model vehicle. If the electrical fan stops working at the low speed? →**Yes** Replace the K14 fan speed regulation relay. →**No** To step 5.

Test condition	Details/results/measures
6. Check the low speed input circuit of electrical fan	
 LFX60-SM-02946	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Remove the engine compartment fuse box K161 fan relay. D. Remove the engine compartment fuse box K14 fan speed regulation relay. E. Connect the battery negative terminal. F. Operate the ignition switch to turn the power to ON state. G. Measure the voltage between No.30 terminal of governing speed relay of K14fan and the reliable grounding with a multimeter. **Standard value:0 V** Is the voltage normal? →**Yes** To step 7. →**No** Check the low speed input circuit of electrical fan and replace the harness if necessary.
7. Check the low speed control circuit of electrical fan.	
 LFX60-SM-02947	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Remove the engine compartment fuse box K161 fan relay. D. Disconnect the ECM harness connector E01b. E. Measure the resistance between No.65 terminal of ECM harness plug E01aand the reliable grounding with a multimeter. **Standard value:10 MΩ or higher** Is the resistance normal? →**Yes** To step 8. →**No** Check the low speed control circuit of electrical fan and replace the harness if necessary.
8. Check ECM.	
	A. Replace ECM. **Refer to:REPLACEMENT OF ECM** Confirm the fault is eliminated

Diagnosis flow for electronic fan always running at high speed

Test condition	Details/results/measures
1. Check the engine DTC.	
	A. Operate the ignition switch to turn the power to OFF and connect the diagnostic meter. B. Operate the ignition switch to turn the power to ON state. C. Turn on the diagnostic meter and check the engine system. Is there DTC related to electronic fan control? →**Yes** **Refer to:Diagnostic trouble code (DTC) list. Perform DTC diagnostic procedure.** →**No** To step 2.
2. Read the engine coolant temperature data stream.	
	A. Operate the ignition switch to turn the power to ON state. B. Turn on the diagnostic meter and read the read data stream. C. Read the engine coolant temperature data stream. Is the coolant temperature high? →**Yes** Repair the high coolant temperature fault. →**No** To step 3.
3. Check the K161 fan relay.	
	A. Operate the ignition switch to turn the power to OFF state. B. Exchange K161 fan relay with that of the same model vehicle. Is the electronic fan high speed running stopped? →**Yes** Replace the electronic K161 fan relay. →**No** To step 4.
4. Check the K161 fan relay.	
	A. Operate the ignition switch to turn the power to OFF state. B. Exchange the relay of K152 fan with the same model of vehicle. Is the electronic fan high speed running stopped? →**Yes** Replace the electronic K152 fan relay. →**No** To step 5.

Test condition	Details/results/measures
5. Check the circuit of speed governing relay of K14fan.	
 LFX60-SM-02946	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Dismount the speed governing relay of K14fan D. Connect the battery negative terminal. E. Operate the ignition switch to turn the power to ON state. F. Measure the voltage between No.30 terminal of speed governing relay of K14fan in the forecabin electrical box and the reliable grounding with a multimeter. **Standard value:0V** Is the voltage normal? →**Yes** To step 6. →**No** Check the circuit of governing relay of K14fan and replace the harness if necessary.
6. Check the high speed input circuit of electrical fan	
 LFX60-SM-02948	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Disconnect the electronic fan harness plug U04. D. Remove the engine compartment fuse box K14 fan speed regulation relay. E. Remove the engine compartment fuse box K152 fan relay. F. Connect the battery negative terminal. G. Operate the ignition switch to turn the power to ON state. H. Measure the voltage between No.2 terminal of harness plug U04 of electrical fan and the reliable grounding with a multimeter. **Standard value:0V** Is the voltage normal? →**Yes** To step 7. →**No** Check the high speed control circuit of electrical fan and replace the harness if necessary.

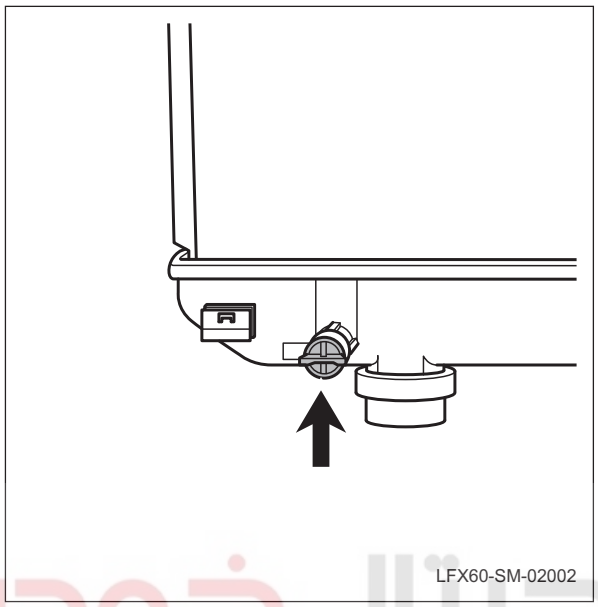
Test condition	Details/results/measures
7. Check the high speed control circuit of electrical fan.	
	A. Operate the ignition switch to turn the power to OFF state. B. Disconnect the battery negative connector. C. Remove the engine compartment fuse box K152 fan relay. D. Remove the engine compartment fuse box K14 fan speed regulation relay. E. Disconnect the E01aplug of ECM harness. F. Measure the resistance between No.17 terminal of ECM harness plug E01aand the reliable grounding with a multimeter. **Standard value:10 MΩ or higher** Is the resistance normal? →**Yes** To step 8. →**No** Check the high speed control circuit of electrical fan and replace the harness if necessary.
8. Check ECM.	
	A. Replace ECM. **Refer to:REPLACEMENT OF ECM** Confirm the fault is eliminated

Removal and Installation

Procedure for discharging and filling the engine coolant

Emission

1. Discharge the engine coolant.



(a). Open the cover of expansion tank.

Note:

- **Any hot steam or hot coolant may cause injuries.**
- **When the engine is under the operating temperature, the cooling system will be under overpressure condition.**
- **Cover the coolant expansion tank cap with the rag and carefully open the cap to release the excessive pressure.**
- **The heating steam may escape when the expansion tank cap opens. Must wear protective glasses and protective clothing, to avoid burns and other injuries.**

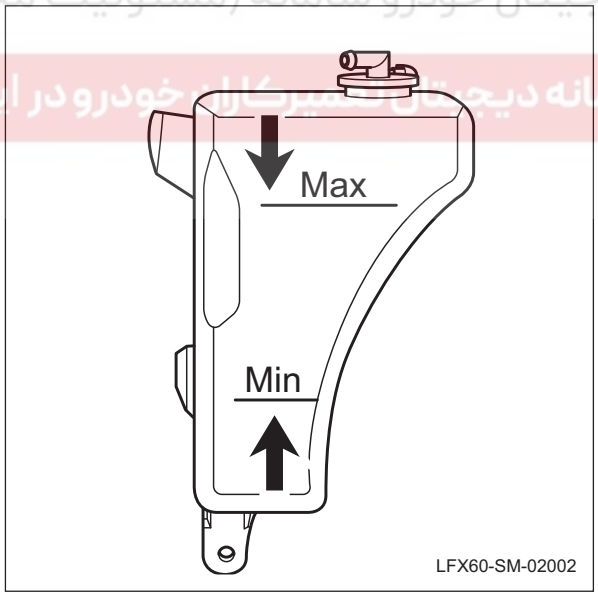
(b). Lift the vehicle.

(c). Dismount the release bolt of radiator to discharge the coolant completely.

(d). Install the release bolt of radiator

Filling

1. Fill the engine coolant.



(a). Fill the engine coolant to the standard scale.

Replacement of the assembly of radiator overflow pipe and expansion tank

Removal

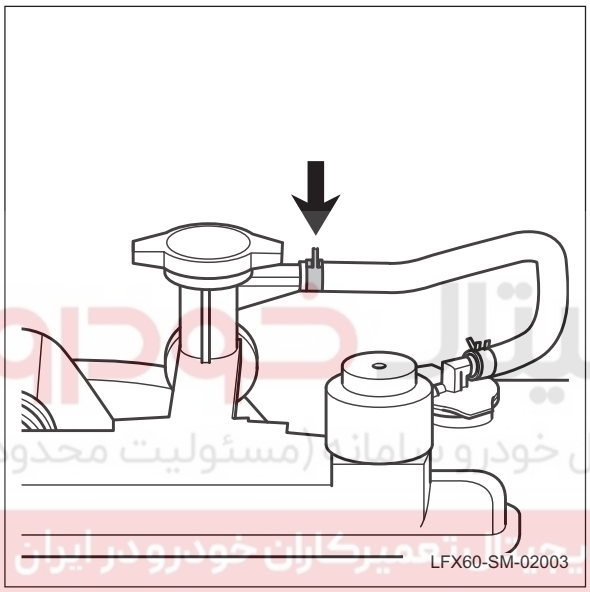
1. Dismount the assembly of radiator overflow pipe and expansion tank

Note:

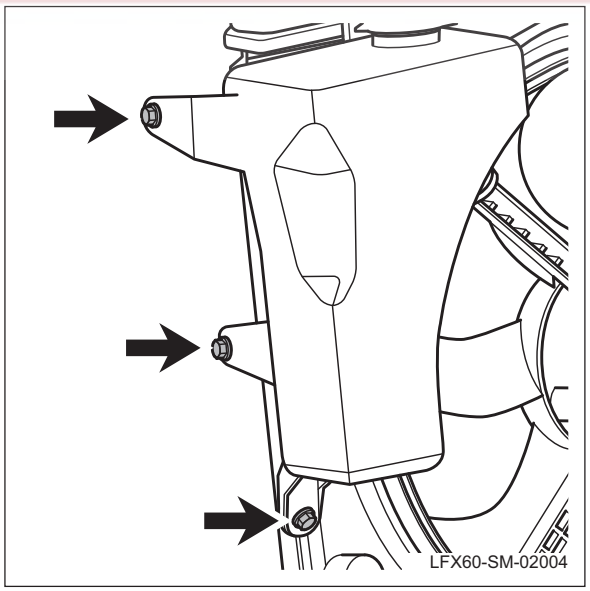
- **Any hot steam or hot coolant may cause injuries.**
- **When the engine is under the operating temperature, the cooling system will be under overpressure condition.**
- **Cover the coolant expansion tank cap with the rag and carefully open the cap to release the excessive pressure.**
- **The heating steam may escape when the expansion tank cap opens. Must wear protective glasses and protective clothing, to avoid burns and other injuries.**

(a). Empty the coolant. **Refer to engine coolant draining and filling procedures.**

(b). Remove the air filter assembly. **Refer to the replacement of air filter assembly.**



(a). Dismount the bar clasp of radiator overflow pipe and detach the pipe.



(b). ismount the tap bolts of expansion tank.

(c). Detach the assembly of radiator overflow pipe and expansion tank

Installation

1. Install the assembly of radiator overflow pipe and expansion tank.

(a) The installation sequence is the reverse of the disassembly order.

(b). Fill the coolant,**Refer to engine coolant draining and filling procedures.**

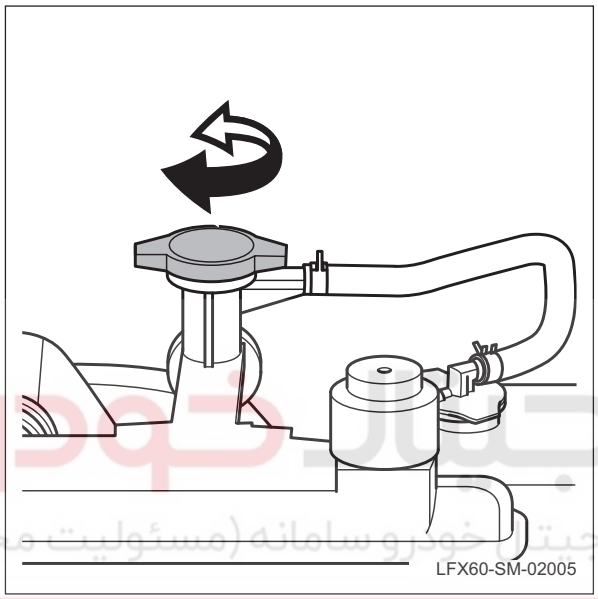
Replacement of radiator filler cover.

Removal

1. Dismount the radiator filler cover.

ℹNote:

- **Any hot steam or hot coolant may cause injuries.**
- **When the engine is under the operating temperature, the cooling system will be under overpressure condition.**
- **Cover the coolant expansion tank cap with the rag and carefully open the cap to release the excessive pressure.**
- **The heating steam may escape when the expansion tank cap opens. Must wear protective glasses and protective clothing, to avoid burns and other injuries.**



(a). Dismount the radiator filler cover.

Installation

1.Install the radiator filler cover.

(a). The installation sequence is the reverse of the disassembly order.

Replacement of radiator delivery hose

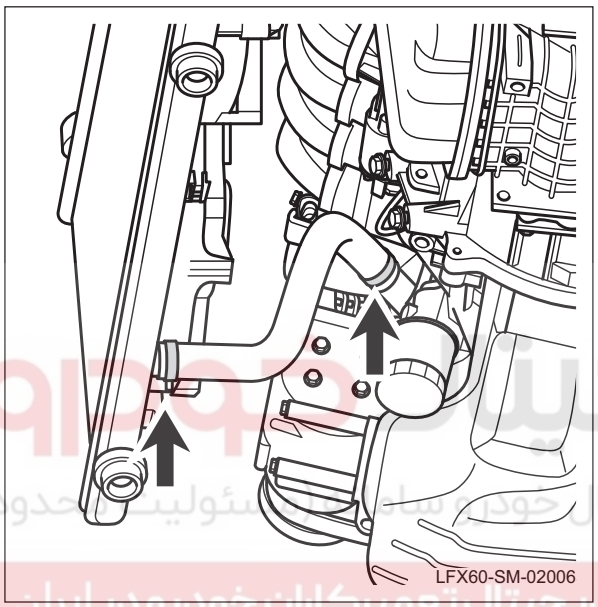
Removal

1. Dismount the radiator delivery hose.

Note:

- **Any hot steam or hot coolant may cause injuries.**
- **When the engine is under the operating temperature, the cooling system will be under overpressure condition.**
- **Cover the coolant expansion tank cap with the rag and carefully open the cap to release the excessive pressure.**
- **The heating steam may escape when the expansion tank cap opens. Must wear protective glasses and protective clothing, to avoid burns and other injuries.**

(a). Empty the coolant. **Refer to engine coolant draining and filling procedures.**



(b). Dismount the bar clasp of radiator delivery hose.

(c). Detach the radiator delivery hose.

Installation

1. Install the radiator delivery hose.

(a) The installation sequence is the reverse of the disassembly order.

(b). Fill the coolant,**Refer to engine coolant draining and filling procedures.**

Replacement of radiator water supply hose.

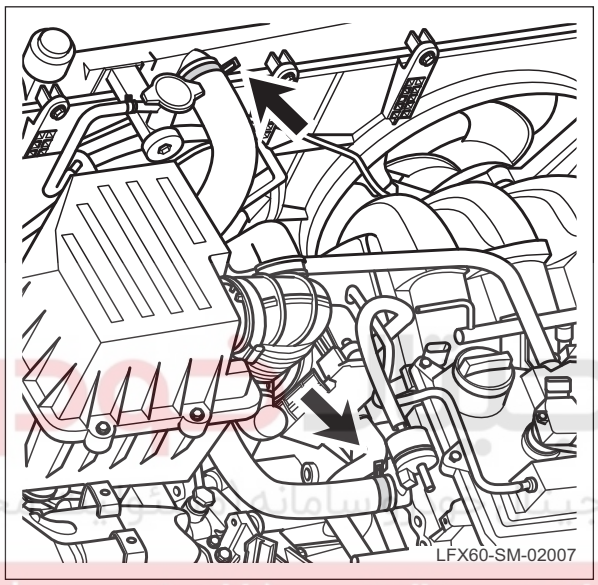
Removal

1. radiator water supply hose.

ℹNote:

- **Any hot steam or hot coolant may cause injuries.**
- **When the engine is under the operating temperature, the cooling system will be under overpressure condition.**
- **Cover the coolant expansion tank cap with the rag and carefully open the cap to release the excessive pressure.**
- **The heating steam may escape when the expansion tank cap opens. Must wear protective glasses and protective clothing, to avoid burns and other injuries.**

(a). Empty the coolant. **Refer to engine coolant draining and filling procedures.**



(b). Dismount the bar clasp of radiator water supply hose.

(c). Detach the radiator water supply hose.

Installation

1. Installation water supply hose.

(a). The installation sequence is the reverse of the disassembly order.

(b). Fill the coolant,**Refer to engine coolant draining and filling procedures.**

Replacement of warm braw hose

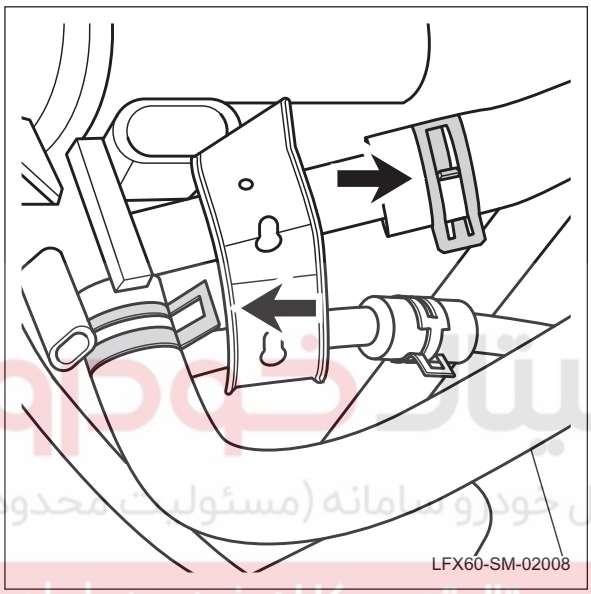
Removal

1. Dismount the warm braw hose.

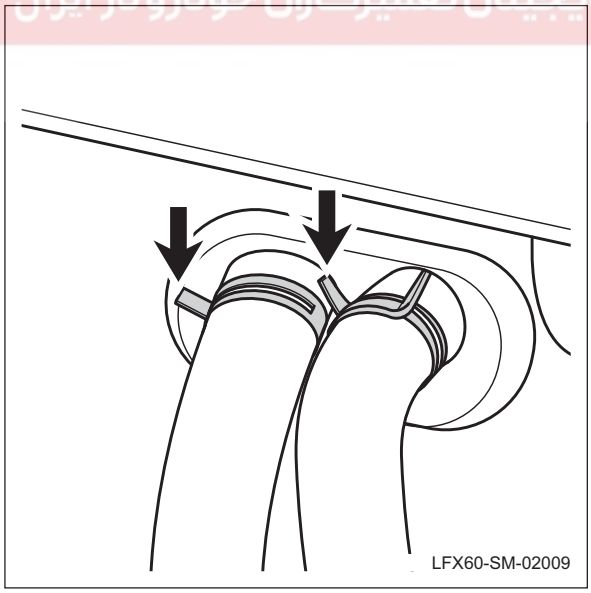
Note:

- **Any hot steam or hot coolant may cause injuries.**
- **When the engine is under the operating temperature, the cooling system will be under overpressure condition.**
- **Cover the coolant expansion tank cap with the rag and carefully open the cap to release the excessive pressure.**
- **The heating steam may escape when the expansion tank cap opens. Must wear protective glasses and protective clothing, to avoid burns and other injuries.**

(a). Empty the coolant. **Refer to engine coolant draining and filling procedures.**



(b). Dismount the bar clasp of warm braw hose.



(c). Dismount the bar clasp of warm braw hose.

(d). Detach the warm braw hose

Installation

1. Install the warm braw hose.

(a). The installation sequence is the reverse of the disassembly order.

(b). Fill the coolant,**Refer to engine coolant draining and filling procedures.**

Replacement of thermostat

Removal

1. Remove thermostat.

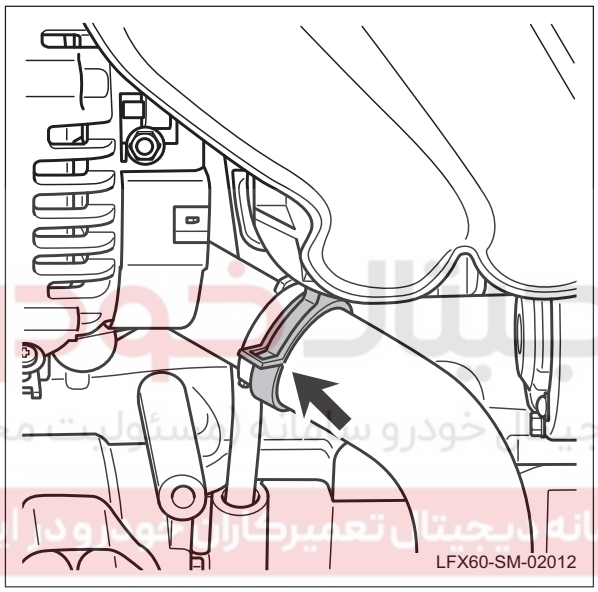
Note:

- **Any hot steam or hot coolant may cause injuries.**
- **When the engine is under the operating temperature, the cooling system will be under overpressure condition.**
- **Cover the coolant expansion tank cap with the rag and carefully open the cap to release the excessive pressure.**
- **The heating steam may escape when the expansion tank cap opens. Must wear protective glasses and protective clothing, to avoid burns and other injuries**

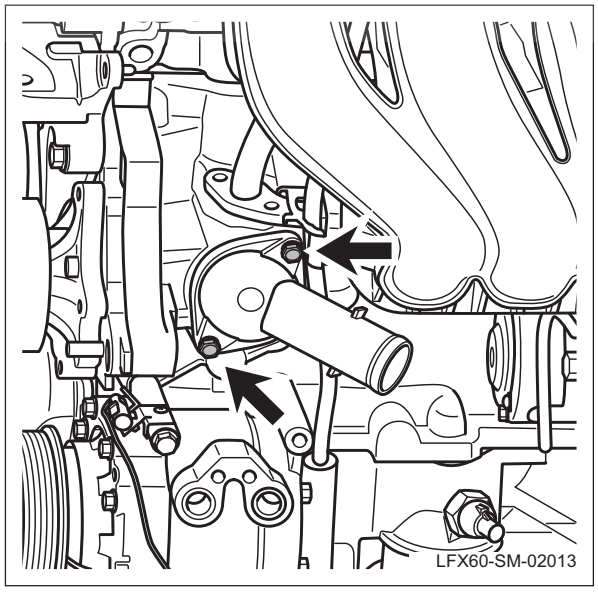
(a). Empty the coolant. **Refer to engine coolant draining and filling procedures.**

(b). Remove the accessory belt. **Refer to replacement of accessory belt.**

(c). Dismount the engine.**Reference: Replacement of engine**



(d). Dismount the bar clasp of radiator delivery hose and detach the hose.



(e). Dismount the tap bolts of thermostat housing.

(f). Detach the thermostat.

Installation

1. Installation thermostat.

(a). The installation sequence is the reverse of the disassembly order.

(b). Fill the coolant,**Refer to engine coolant draining and filling procedures.**

Replacement of the assembly of electrical fan with air shield

Removal

1. Dismount the assembly of electrical fan with air shield.

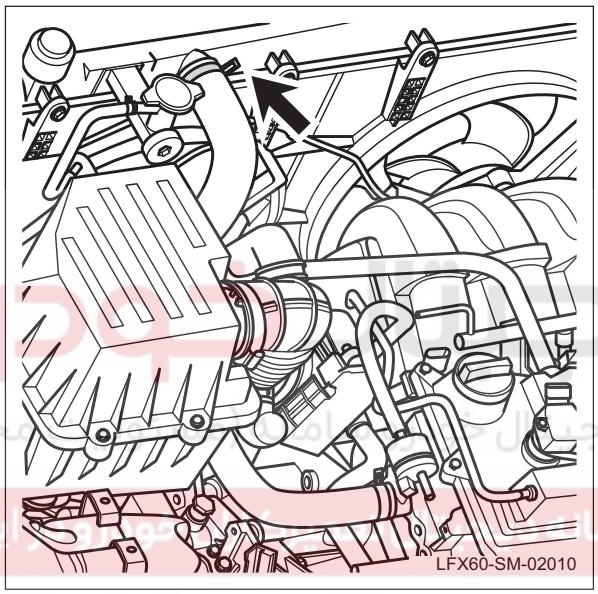
ℹNote:

- **Any hot steam or hot coolant may cause injuries.**
- **When the engine is under the operating temperature, the cooling system will be under overpressure condition.**
- **Cover the coolant expansion tank cap with the rag and carefully open the cap to release the excessive pressure.**
- **The heating steam may escape when the expansion tank cap opens. Must wear protective glasses and protective clothing, to avoid burns and other injuries**

(a). Empty the coolant. **Refer to engine coolant draining and filling procedures.**

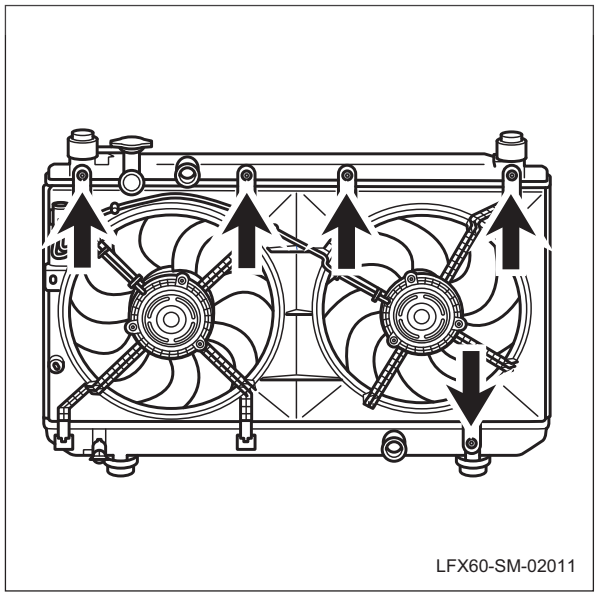
(b). Disconnect the battery negative terminal .

(c). Disconnect the harness plug of electrical fan.



LFX60-SM-02010

(d). Dismount the bar clasp of radiator water supply hose and detach the hose.



LFX60-SM-02011

(e). Dismount the tap bolts of the assembly of electrical fan with air shield.

(f). Detach the assembly of electrical fan with air shield.

Installation

1. Install the assembly of electrical fan with air shield.

(a). The installation sequence is the reverse of the disassembly order.

(b). Fill the coolant,**Refer to engine coolant draining and filling procedures.**

Replacement of radiator assembly

Removal

1. Remove the radiator assembly.

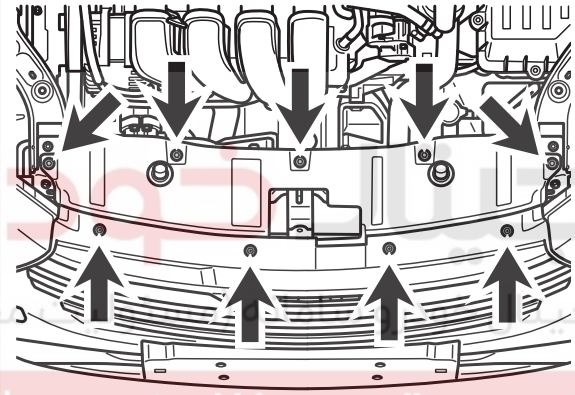
Note:

- **Any hot steam or hot coolant may cause injuries.**
- **When the engine is under the operating temperature, the cooling system will be under overpressure condition.**
- **Cover the coolant expansion tank cap with the rag and carefully open the cap to release the excessive pressure.**
- **The heating steam may escape when the expansion tank cap opens. Must wear protective glasses and protective clothing, to avoid burns and other injuries.**

(a). Disconnect the battery negative connector.

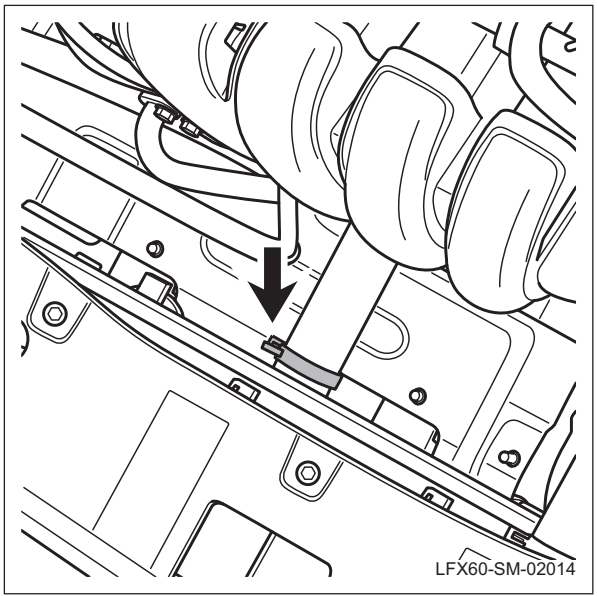
(b). Empty the coolant. Refer to engine coolant draining and filling procedures.

(c). Remove the radiator's air escape tube and expansion tank assembly. Reference: Replacement of the radiator's air escape tube and expansion tank assembly.



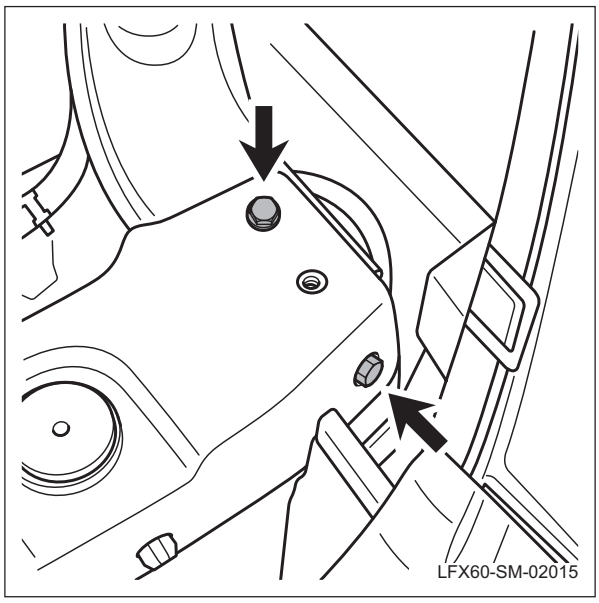
LFX60-SM-10002

(d). Remove the fixing bolts and screws of the decorative plate on the front bumper, and take the decorative plate.

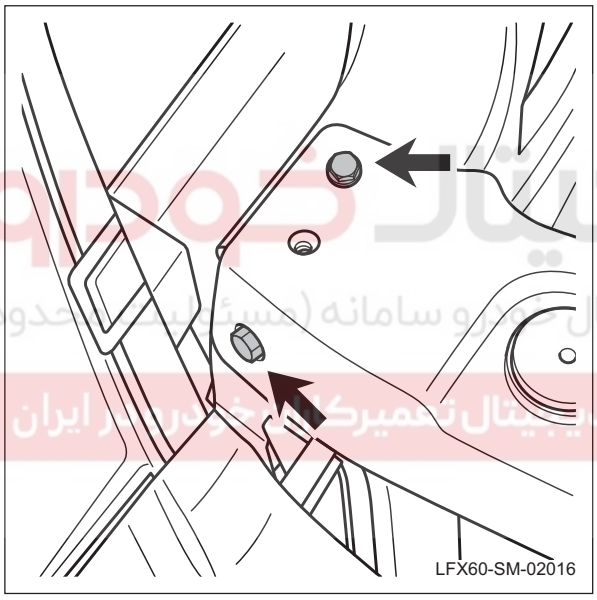


LFX60-SM-02014

(e). Remove the clamps from the outlet hose on radiator, and take the outlet hose.



(f). Remove the beam fixing bolts on the radiator.



(g). Remove the beam fixing bolts on the radiator.
(h). Disconnect the radiator from the bushing on the radiator.
(i). Remove the electronic fan belt guard assembly. **Reference: the replacement of electronic fan belt guard assembly.**
(j). Remove the radiator assembly.

Installation

1. Install the radiator assembly.

(a). The installation sequence is the reverse of the disassembly order.

Replacement of pump assembly

Removal

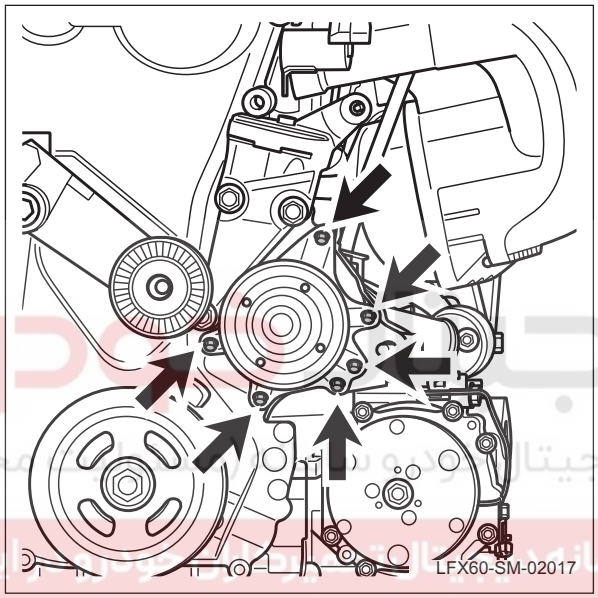
1. Dismantle water pump assembly.

Note:

- **Hot steam and hot coolant may cause burns.**
- **When the engine is under the operating temperature, the cooling system will be under overpressure condition.**
- **Cover the coolant expansion tank cap with the rag and carefully open the cap to release the excessive pressure.**
- **The heating steam may escape when the expansion tank cap opens.Must wear protective glasses and protective clothing, to avoid burns and other injuries.**

(a). Empty the coolant. Refer to engine coolant draining and filling procedures.

(b). Remove the accessory belt. Refer to replacement of accessory belt.



(c). Remove the pump fixing bolts.

(d). Remove the pump.

Installation

1. Install the pump assembly.

(a). The installation sequence is the reverse of the disassembly order.