

SQRE4T15C INTAKE SYSTEM

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

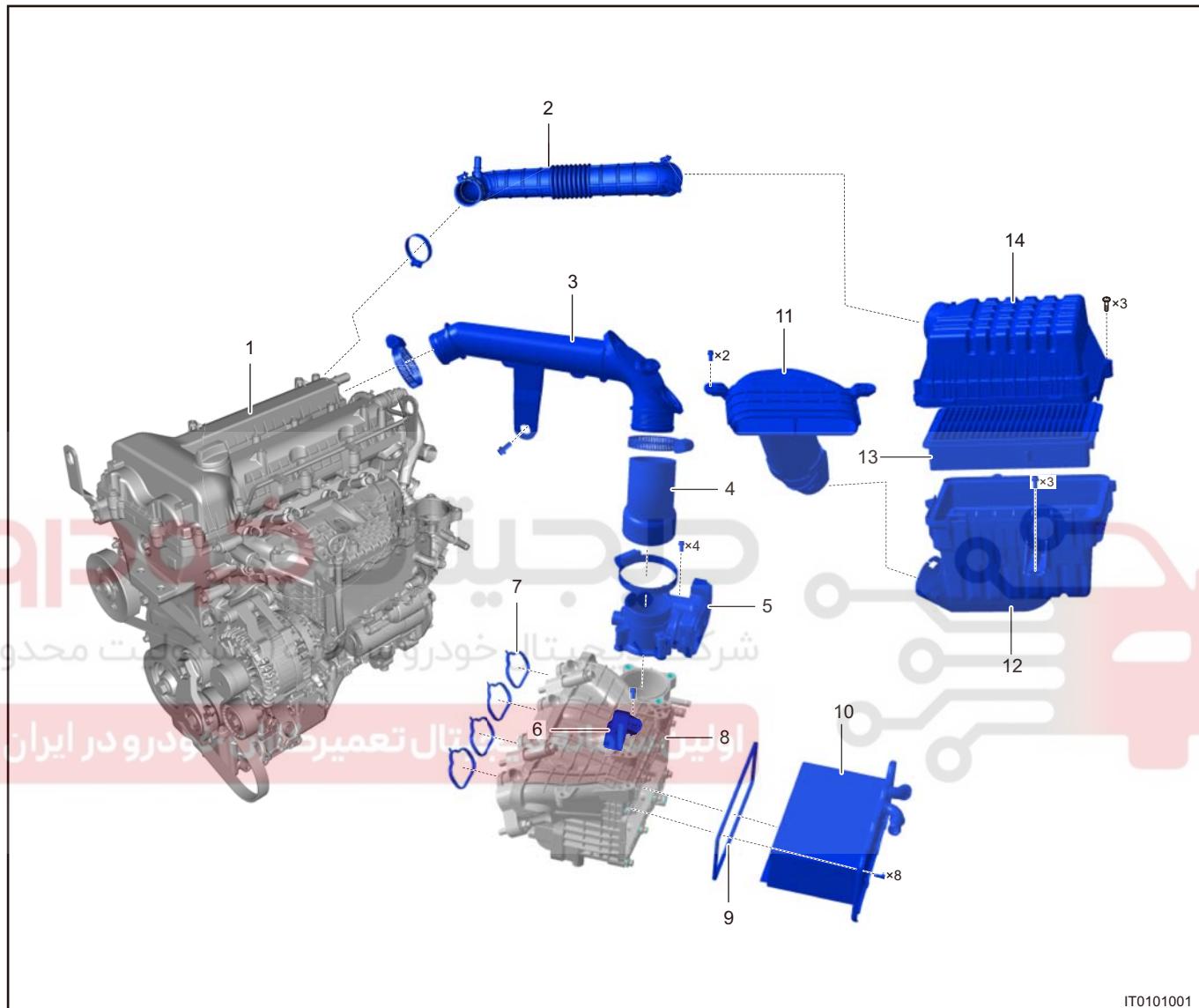
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GENERAL INFORMATION

Overview

Description



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1 - Engine	2 - Intake Hose
3 - Muffler Assembly	4 - Muffler Hose
5 - Electronic Throttle Assembly	6 - Intake Pressure Sensor
7 - Intake Manifold Gasket	8 - Intake Manifold Assembly
9 - Intercooler Gasket	10 - Intercooler Assembly
11 - Air Direct Pipe Assembly	12 - Air Filter Lower Housing
13 - Air Filter Element Assembly	14 - Air Filter Upper Housing

Intake system mainly consists of air direct pipe, air filter assembly, intake hose, turbocharger, booster pressure sensor, electronic throttle assembly, intake pressure/temperature sensor, and intake manifold with intercooler set, etc.

Operation

Intake system uses air filter to remove particulates and dust in the air, uses the turbocharger to pressurize the air, and then the air flows into intake manifold assembly through electronic throttle assembly. At the same time, the air is cooled by the intercooler installed inside intake manifold and mixes with fuel at the end of intake manifold assembly port to form flammable gas mixture, which is transmitted to each cylinder uniformly to coordinate with engine operation. Electronic throttle assembly is a critical part for engine intake system. Its main function is to control intake air volume by adjusting intake passage area according to driver's driving intention to meet intake requirements in different engine operating conditions, and send back position signals of throttle valve plate to control unit to achieve accurate control and run the engine under optimal control state.

Specifications

Torque Specifications

Description	Torque (N·m)
Coupling Screw Between Air Filter Upper Housing and Lower Housing	1.3 ± 0.2
Air Filter Assembly Fixing Bolt	7 ± 1
Air Direct Pipe Fixing Bolt	7 ± 1
Electronic Throttle Assembly Fixing Bolt	8 + 3
Electronic Accelerator Pedal Fixing Bolt	9 ± 1.5
Low Temperature Radiator Assembly Fixing Bolt	5 ± 1
Intake Manifold Fixing Bolt	20 + 5
Water Inlet Steel Pipe Fixing Bolt	5 ± 1

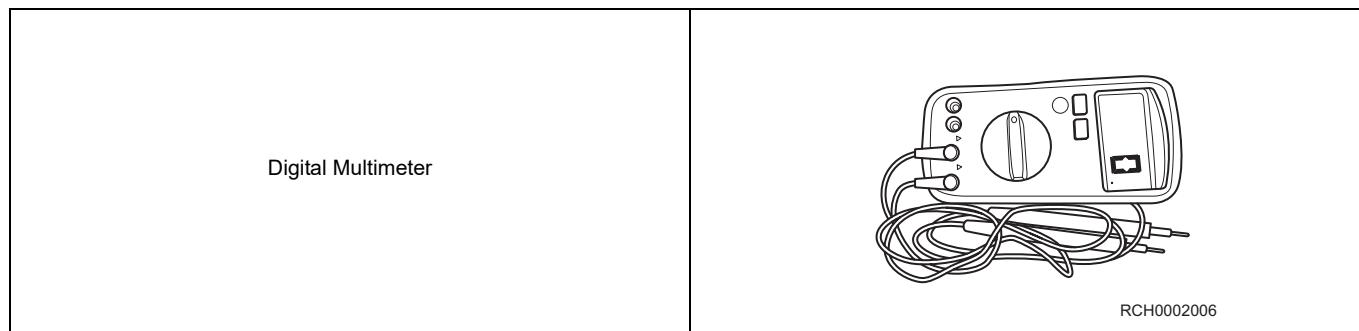
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Tools

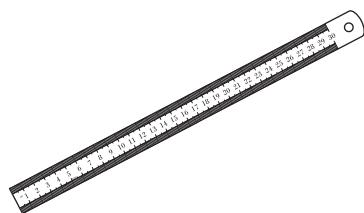
Special Tool



General Tools

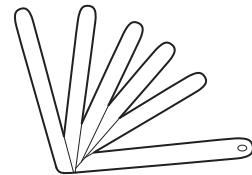


Precision Straightedge



RCH0063006

Feeler Gauge



RCH0060006

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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	Possible Cause
Engine idles roughly	Electronic throttle assembly (dirty)
	Intake manifold assembly (broken, leaked)
	Activated charcoal canister solenoid valve (remains on)
	Intake pressure sensor
	Throttle gasket (damaged)
	Fuel rail injector assembly (installed incorrectly)



Air Filter Element

Removal

Warning/Caution/Hint

Caution:

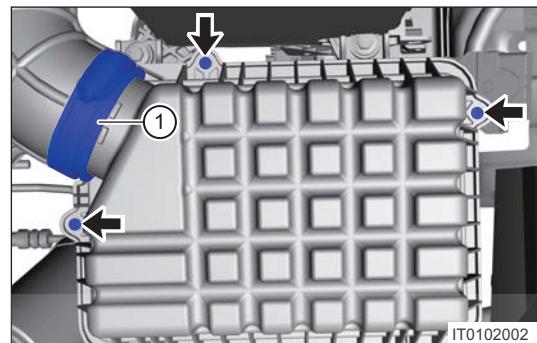
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the air filter element.

(a) Remove 3 fixing screws (arrow) between air filter upper housing and lower housing.

Tightening torque

$1.3 \pm 0.2 \text{ N}\cdot\text{m}$



(b) Loosen worm clamp (1) and disconnect the connection between air filter and intake hose.

Tightening torque

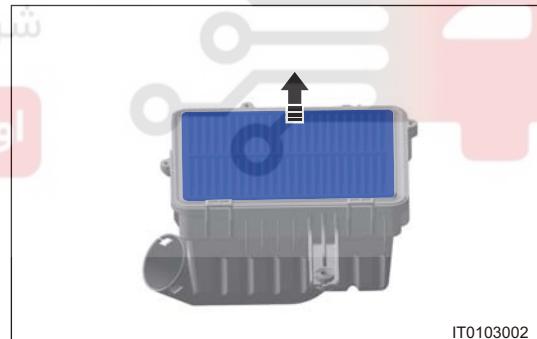
$3 \pm 0.5 \text{ N}\cdot\text{m}$

(c) Remove the air filter upper housing.

(d) Remove the air filter element in the direction of (arrow).

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Installation

1. Clean the air filter upper housing and lower housing.
2. Install a new air filter element.
3. Other installation procedures are in the reverse order of removal.

Warning:

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

Air Filter Assembly

Removal

Warning/Caution/Hint

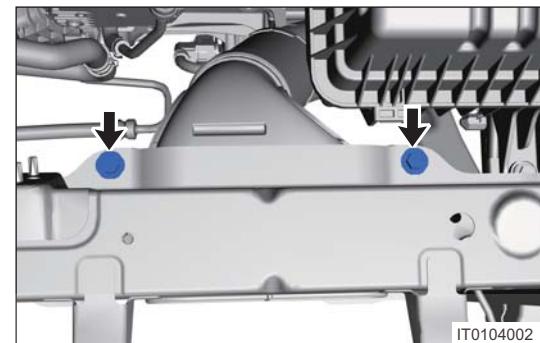
Caution:

- 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 the ENGINE START STOP switch. Wait until engine cools down.
2. Disconnect the negative battery cable.
3. Remove the air direct pipe assembly.
 - (a) Remove 2 fixing bolts (arrow) from air direct pipe.

Tightening torque

$7 \pm 1 \text{ N}\cdot\text{m}$

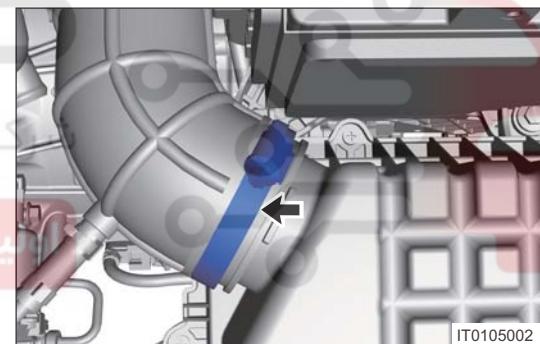


4. Remove the air filter assembly.

- (a) Loosen worm clamp (arrow) and disconnect the connection between air filter and intake hose.

Tightening torque

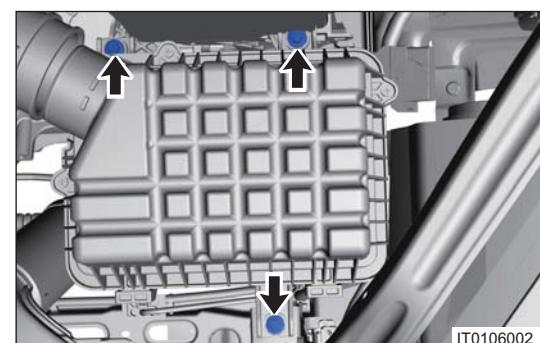
$3 \pm 0.5 \text{ N}\cdot\text{m}$



- (b) Remove 3 fixing bolts (arrow) from air filter assembly.

Tightening torque

$7 \pm 1 \text{ N}\cdot\text{m}$



- (c) Remove the air filter assembly.

Caution:

- After removing air filter assembly, block intake hose with suitable blocking pieces to prevent foreign matter from entering, causing damage to the components.

Installation

1. Installation is in the reverse order of removal.

Caution:

- Check for foreign matter in air filter and hose when installing. Avoid inhaling foreign matter after engine running, causing damage to the components.

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Muffler and Muffler Hose

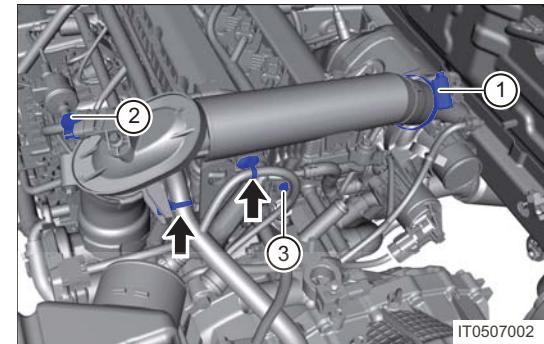
Removal

Warning/Caution/Hint

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 intake hose assembly.
4. Remove the muffler assembly.
 - (a) Remove engine wire harness and fixing clip (arrow) from muffler assembly.



IT0507002

- (b) Loosen worm clamp (1), disconnect the connection between muffler assembly and turbocharger.

Tightening torque

$5 \pm 1 \text{ N}\cdot\text{m}$

- (c) Disconnect the booster pressure/temperature sensor connector (2).
- (d) Remove the muffler assembly fixing bolt (3).

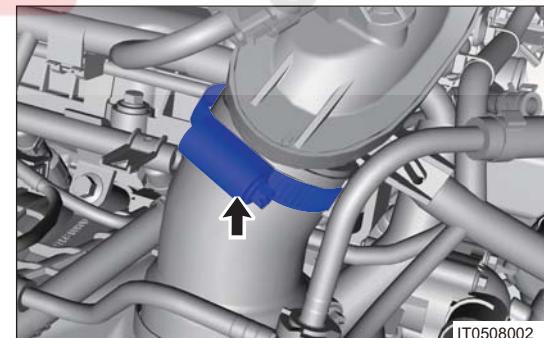
Tightening torque

$9 \pm 1.5 \text{ N}\cdot\text{m}$

- (e) Loosen worm clamp (arrow), disconnect the connection between muffler assembly and muffler hose.

Tightening torque

$5 \pm 1 \text{ N}\cdot\text{m}$



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- (f) Remove the muffler assembly.

Caution:

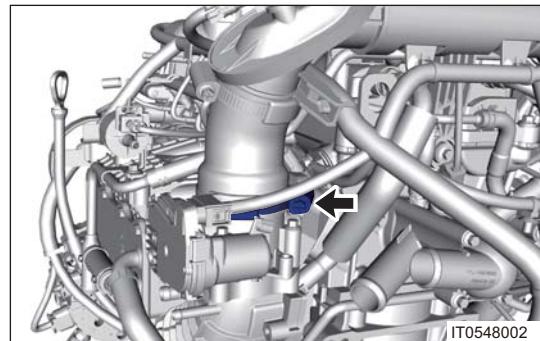
- After removing muffler assembly, block outlet side of turbocharger with suitable blocking pieces to prevent foreign matter from entering, causing damage to the components.

5. Remove the muffler hose.

(a) Loosen worm clamp (arrow) and disconnect the connection between muffler hose and throttle assembly.

Tightening torque $3 \pm 0.5 \text{ N}\cdot\text{m}$ **Caution:**

- After removing muffler hose assembly, block throttle with suitable blocking pieces to prevent foreign matter from entering, causing damage to the components.

**Installation**

1. Installation is in the reverse order of removal.

Caution:

- Check for foreign matter in muffler and hose when installing. Avoid inhaling foreign matter after engine running, causing damage to the components.

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Low Temperature Radiator

Removal

Warning/Caution/Hint

Caution:

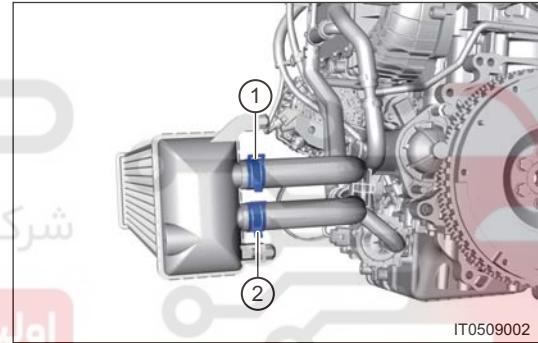
- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the engine compartment lower protector assembly.
4. Remove the front bumper assembly (See page 61-6).

Caution:

- Prevent the front bumper from scratch and damage during removal.

5. Remove the front bumper beam assembly.
6. Remove the left/right air deflectors (See page 61-16).
7. Remove the low temperature radiator assembly.
 - (a) Drain the coolant of intercooling system before removing the low temperature radiator (Refer to Cooling System).
 - (b) Loosen elastic clamp (1) and disconnect the connection between low temperature radiator inlet pipe and low temperature radiator assembly.



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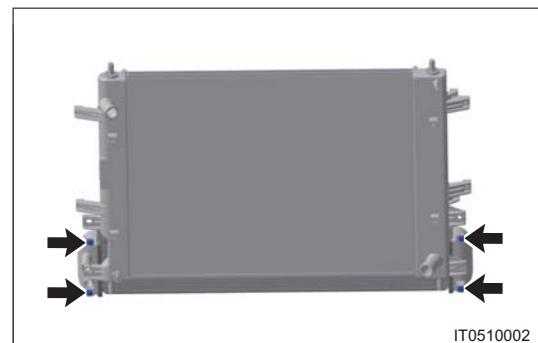
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- (c) Loosen the elastic clamp (2). Disconnect the connection between low temperature radiator outlet pipe and low temperature radiator assembly.
- (d) Remove 4 fixing bolts (arrow) from low temperature radiator assembly.

Tightening torque

$5 \pm 1 \text{ N}\cdot\text{m}$



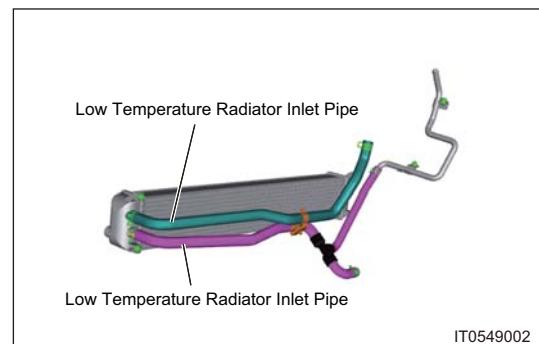
- (e) Remove the low temperature radiator assembly.

Installation

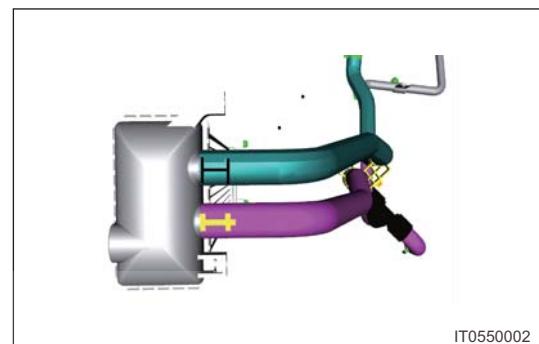
1. Installation is in the reverse order of removal.

Caution:

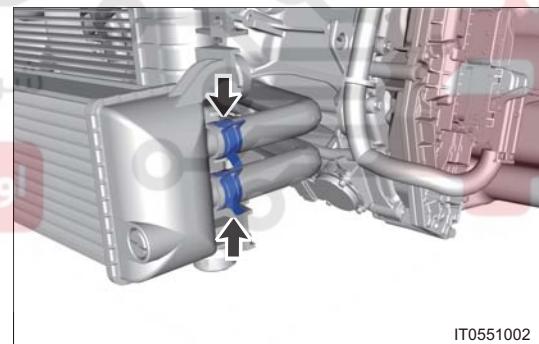
- When installing the inlet and outlet pipes, the pipes should not be crossed or twisted, the inlet and outlet pipes should not be installed reversely. Make sure to clamp the elastic clamp in place with clamp pliers.



- The inlet pipe is marked with "工" and connected to the upper interface of low temperature radiator.



- The outlet pipe is marked with " 土 " and connected to the lower interface of low temperature radiator.
- When installing low temperature radiator inlet pipe, align the "工" mark on pipe port with boss, and align center position of elastic clamp tab with "—" position of "工" mark, clamp the elastic clamp in the "工" mark with the tab facing outward, and mark it with a marking pen.



- When installing low temperature radiator outlet pipe, align center position of elastic clamp tab with center position of " 土 " mark, clamp in " 土 " mark with the tab facing outward.
- When installing the front bumper assembly, pay attention to the principle: "1. plug, 2. pull, 3. confirm". And adjust the matching of front bumper, headlight and fender.
- Add the coolant and bleed the intercooling system (Refer to Cooling System).
- After installation, it is necessary to check the relevant functions, check whether there are any left objects in engine compartment, and clean them.

Electric Throttle Assembly

On-vehicle Inspection

1. Check the electronic throttle assembly.
 - (a) When flipping it by hand with power off and it can rotate smoothly. If catching occurs, it indicates that internal components may be damaged, and replace the electronic throttle assembly.
 - (b) Connect the diagnostic tester to diagnostic interface.
 - (c) Turn ENGINE START STOP switch to ON and turn on the diagnostic tester.
 - (d) Read datastream on diagnostic tester.

Hint:

Accelerator pedal released

Datastream Name	Specification (V)
Sensor voltage from throttle potentiometer 1	0.76
Sensor voltage from throttle potentiometer 2	4.21

Hint:

Accelerator pedal depressed fully

Datastream Name	Specification (V)
Sensor voltage from throttle potentiometer 1	4.25
Sensor voltage from throttle potentiometer 2	0.72

If result is not as specified, check wire harness, ECU, or replace electronic throttle assembly.

Removal

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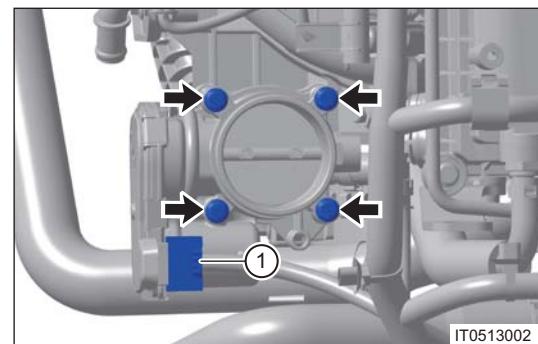
Warning/Caution/Hint

Caution:

- Temperature in engine compartment is very high when engine is running. Before removal, you must make sure that engine has shut off, and engine compartment has cooled down sufficiently, otherwise, there is a risk of scald injury.
- 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 muffler and muffler hose.
5. Remove the electronic throttle assembly.

- (a) Disconnect the electronic throttle connector (1).



- (b) Remove 4 fixing bolts (arrow) from electronic throttle.

Tightening torque

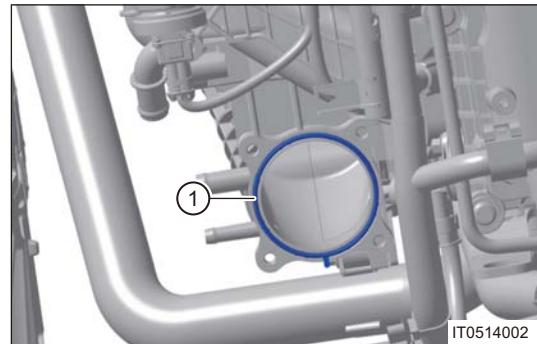
8 + 3 N·m

- (c) Remove the electronic throttle assembly.

(d) Remove throttle gasket (1) from intake manifold.

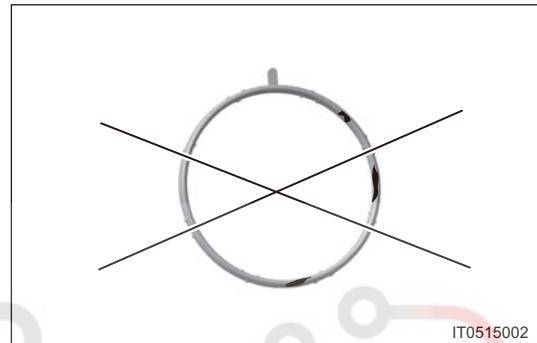
Caution:

- After removing throttle assembly, block intake manifold intake port with suitable blocking pieces to prevent foreign matter from entering, causing damage to the components.



Inspection

- Check the electronic throttle assembly gasket.



Check electronic throttle assembly gasket for wear or deterioration. If there is wear or deterioration, replace electronic throttle assembly gasket.

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Cleaning

- Cleaning Tool
 - Thin stick: used to support throttle valve plate for cleaning the carbon deposited on contact wall between valve plate and throttle. Please use plastic, wooden or bamboo thin stick. Do not use metal thin stick to avoid scratching or deforming the valve plate.
 - Clean cloth or paper towel.
- Cleaning Process
 - Remove electronic throttle assembly, and make the valve plate face upward in free condition. Avoid cleaner flowing into electronic element through valve plate shaft, resulting in functional failure.
 - Start to clean when it is as shown in the right illustration.



- Apply appropriate amount of cleaner to the inner wall of throttle valve body, and wipe off the carbon with clean cloth.

(d) Support the throttle valve plate with a thin stick, and clean the carbon on valve plate and throttle valve body inner wall.



IT0518002

(e) Turn over the throttle 90°, and clean with the same procedures as above. Repeat several times until it is clean.
 (f) Push the valve plate by hand, and check if it rotates smoothly. If it is stuck, clean again according to the cleaning procedures.
 (g) After cleaning, wipe off the cleaner in throttle valve body with absorbent paper.

Warning:

- Cleaner is a kind of flammable and corrosive fluid. Follow safety cautions to prevent accidents, and avoid skin contacting with cleaner.
- Pay attention to that the amount of cleaner should not be too much, so as to overflows into sensor and motor, resulting in functional failure.

Installation

Warning/Caution/Hint

Caution:

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- Clean fitting surface of electronic throttle assembly.
- Perform throttle self-learning procedures after installation. After self-learning is completed, start the vehicle and check for proper operation.

1. Installation is in the reverse order of removal.

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Intake Manifold Assembly

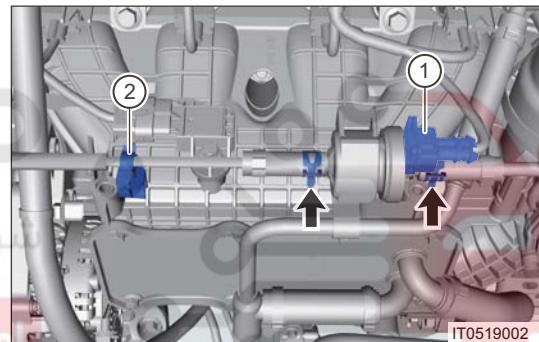
Removal

Warning/Caution/Hint

Caution:

- Temperature in engine compartment is very high when engine is running. Before removal, you must make sure that engine has shut off, and engine compartment has cooled down sufficiently, otherwise, there is a risk of scald injury.
- 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.

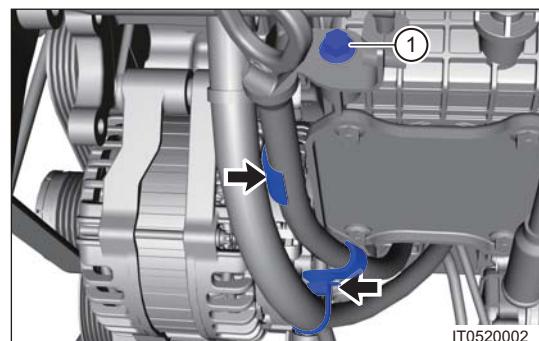
- Release the fuel system pressure.
- Turn off all electrical equipment and ENGINE START STOP switch.
- Disconnect the negative battery cable.
- Remove the engine trim cover.
- Remove the fuel rail injector assembly.
- Remove muffler assembly and muffler hose.
- Remove the electronic throttle assembly.
- Remove the charcoal canister solenoid valve assembly.
 - Disconnect the charcoal canister solenoid valve connector (1).



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- Loosen 2 elastic clamps (arrow) and disconnect the connection between fuel vapor hose and charcoal canister solenoid valve.

- Remove fuel vapor hose from fixing tube clamp (2).
- Remove the charcoal canister solenoid valve assembly.
- Remove the oil dipstick guide assembly.
 - Disconnect the engine wire harness fixing clip (arrow).

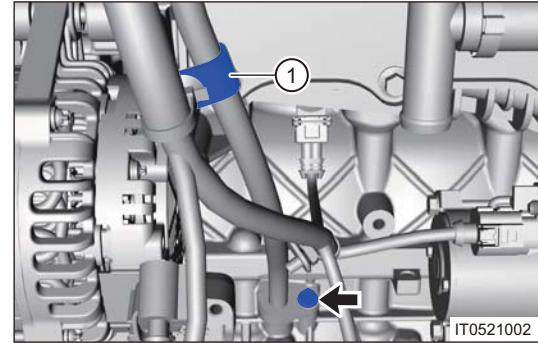


- Remove coupling bolt (1) between oil dipstick guide and intake manifold assembly.

Tightening torque

8 + 3 N·m

(c) Disconnect the engine wire harness fixing clip (1).



(d) Remove coupling bolt (arrow) between oil dipstick guide and cylinder block frame assembly.

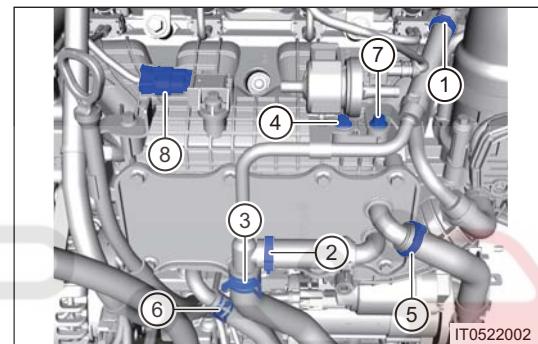
Tightening torque

$8 + 3 \text{ N}\cdot\text{m}$

(e) Remove the oil dipstick guide assembly.

10. Remove the intake manifold assembly.

(a) Loosen clamping ring (1) and disconnect the connection between outlet pipe set and outlet pipe set - intercooler.



(b) Loosen clamping ring (2) and disconnect the connection between outlet pipe set - intercooler and intercooler assembly.

(c) Loosen elastic clamp (3) and disconnect the connection between outlet pipe set - intercooler and low temperature radiator inlet pipe.

(d) Remove fixing bolts (4) and outlet pipe set - intercooler.

Tightening torque

$8 + 3 \text{ N}\cdot\text{m}$

(e) Loosen clamping ring (5) and disconnect the connection between inlet pipe set and intercooler assembly.

(f) Loosen elastic clamp (6) and disconnect the connection between water inlet steel pipe and low temperature radiator outlet pipe set.

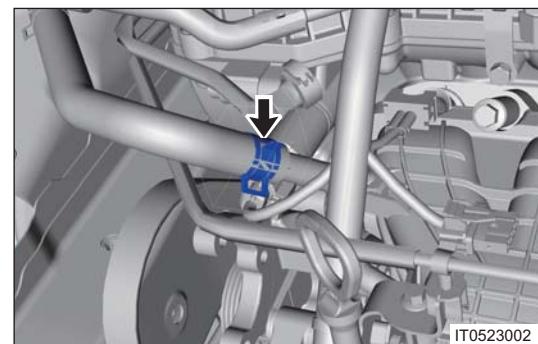
(g) Remove fixing bolt (7) from brake vacuum pipe bracket.

Tightening torque

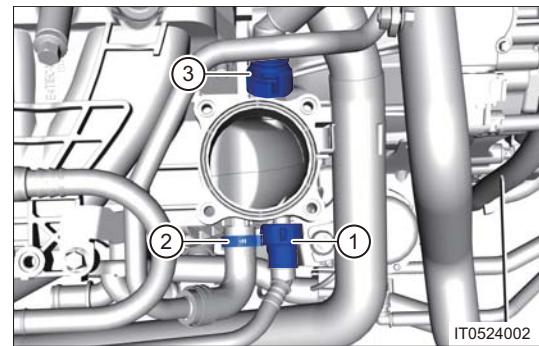
$8 + 3 \text{ N}\cdot\text{m}$

(h) Disconnect the intake pressure/temperature sensor connector (8).

(i) Loosen elastic clamp (arrow) and disconnect the connection between expansion tank water outlet pipe set and water inlet steel pipe.



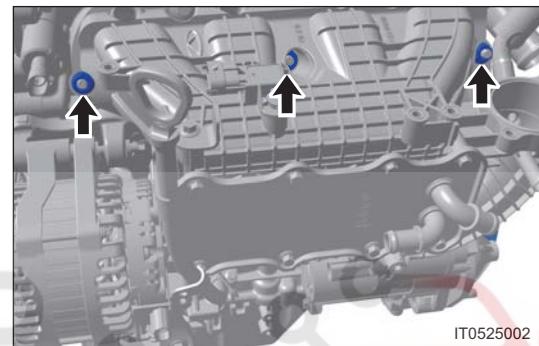
(j) Loosen elastic clamp (1) and disconnect the connection between fuel vapor outlet pipe set and intake manifold assembly.



(k) Loosen elastic clamp (2) and disconnect the connection between brake vacuum pipe and intake manifold assembly.
 (l) Loosen clamping ring (3) and disconnect the connection between crankcase ventilation tube and intake manifold assembly.
 (m) Remove 3 fixing nuts (arrow) from intake manifold assembly.

Tightening torque

20 + 5 N·m



(n) Remove the intake manifold assembly.

Caution:

- After removing intake manifold assembly, block both ends of intake manifold and intake port of cylinder head with suitable blocking pieces to prevent foreign matter from entering, causing damage to the components.

11. Removal intake pressure sensor and water inlet steel pipe.

(a) Remove 2 fixing bolts (arrow) from water inlet steel pipe.

Tightening torque

5 ± 1 N·m



(b) Remove fixing bolt (1) from intake pressure sensor.

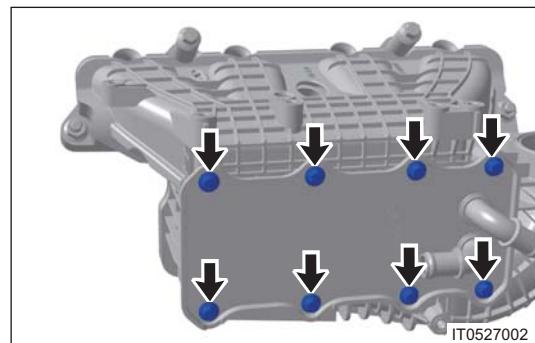
Tightening torque

7 ± 1 N·m

(c) Remove intake pressure sensor and water inlet steel pipe.

12. Remove the intercooler assembly.

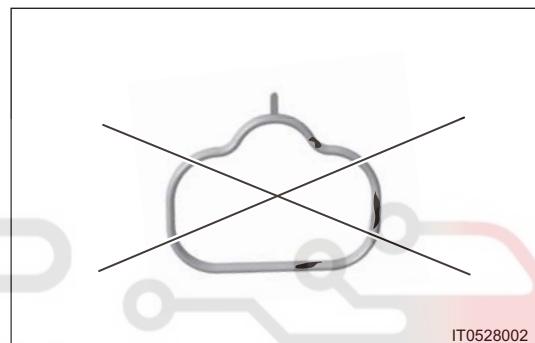
(a) Remove 8 fixing bolts (arrow) from intercooler.



(b) Remove intercooler assembly and gasket.

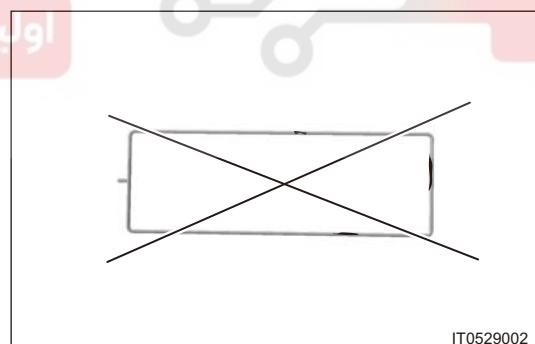
Inspection

1. Check the intake manifold gasket.



Check the intake manifold gasket, and replace if it is deteriorated or damaged.

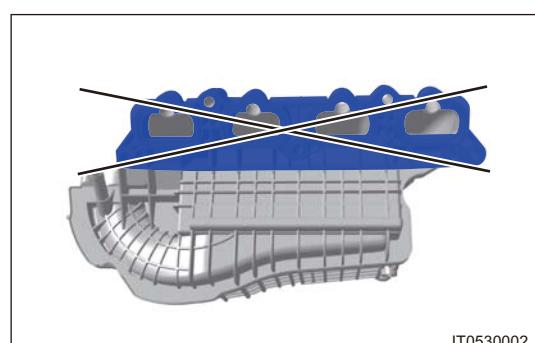
2. Check the intercooler gasket.



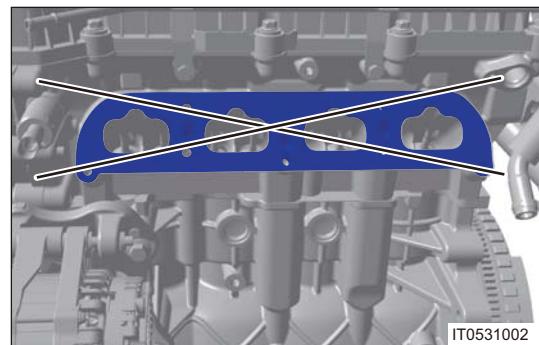
Check the intercooler gasket, and replace if it is deteriorated or damaged.

3. Check flatness on intake manifold fitting surface.

(a) Clean and check contact surface between intake manifold assembly side and cylinder head.
(b) Using a precision straightedge and feeler gauge, measure intake manifold flatness. If warpage on surface is greater than 0.8 mm, replace intake manifold assembly.



4. Check warpage on cylinder head surface on installation side of intake manifold.
 - (a) Clean and check contact surface between intake manifold assembly and cylinder head side.
 - (b) Using a precision straightedge and feeler gauge, measure warpage on cylinder head side surface. If warpage on surface is greater than 0.04 mm, replace cylinder head assembly.



Installation

Warning/Caution/Hint

Caution:

- Clean the fitting surface of intake manifold assembly.
- Replace the intake manifold gasket if it is damaged during installation.

1. Installation is in the reverse order of removal.

Caution:

- Check for foreign matter in intake manifold when installing. Avoid inhaling foreign matter after engine running, causing damage to the components.

دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

Electronic Accelerator Pedal

On-vehicle Inspection

1. Check the electronic accelerator pedal assembly.
 - (a) Connect diagnostic tester to diagnostic interface.
 - (b) Turn ENGINE START STOP switch to ON and turn on the diagnostic tester.
 - (c) Read datastream on diagnostic tester.

Hint:

Accelerator pedal released

Datastream Name	Specification (V)
Accelerator pedal 1 voltage signal	0.72 - 0.74
Accelerator pedal 2 voltage signal	0.36 - 0.37

Hint:

Accelerator pedal depressed fully

Datastream Name	Specification (V)
Accelerator pedal 1 voltage signal	3.95
Accelerator pedal 2 voltage signal	1.97

If result is not as specified, check wire harness, ECU, or replace electronic throttle assembly.

Removal

Warning/Caution/Hint

Caution:

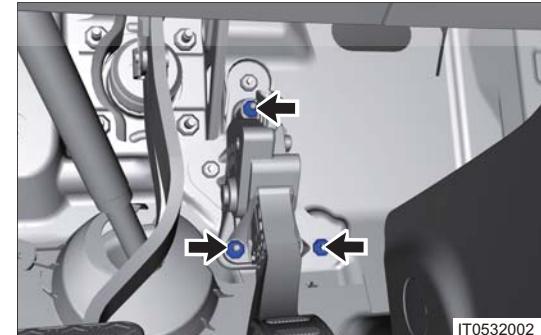
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- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent interior from being scratched during removal and installation.

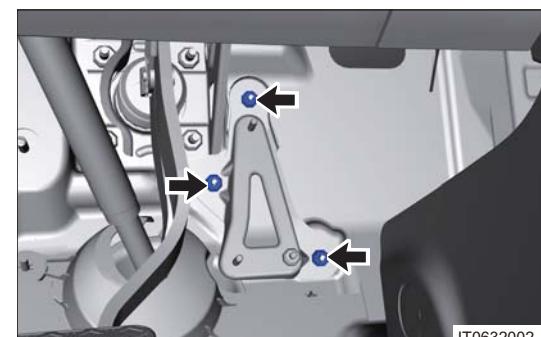
1. Turn off all electrical equipment and ENGINE START STOP switch.
2. Disconnect the negative battery cable.
3. Remove the electronic accelerator pedal.
 - (a) Disconnect the electronic accelerator pedal connector.
 - (b) Remove 3 fixing nuts (arrow) from electronic accelerator pedal.

Tightening torque

$9 \pm 1.5 \text{ N}\cdot\text{m}$



- (c) Remove the electronic accelerator pedal.
- (d) Remove 3 fixing nuts (arrow) from electronic accelerator pedal bracket.



(e) Remove the electronic accelerator pedal bracket.

Installation

1. Installation is in the reverse order of removal.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

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