

GROUP

3

Powertrain

3.1 Engine - 1.6L

3.1.5 Intake System 3.1.5-1

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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Specifications

General Specifications

Application	Specifications
Vacuum degree of intake manifold under idle speed working condition	42 kPa

Torque Specifications

Item	Nm	lb-ft	lb-in
Intake manifold retaining bolt	23	17	-
Intake manifold bracket retaining bolt	23	17	-
Upper and lower case body connecting bolt	13	10	-

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Description and Operation

System Overview

Ambient air enters the air filter first and then the cylinder through the intake pipe, the throttle body and the intake manifold after it has been filtered by the air filter element. The intake pipe is connected with a crankcase vent pipe through which the exhaust gas from the crankcase enters into the cylinder with the fresh air.

cleaner element. And then, the filtered air comes out of the air cleaner upper box.

Component Description

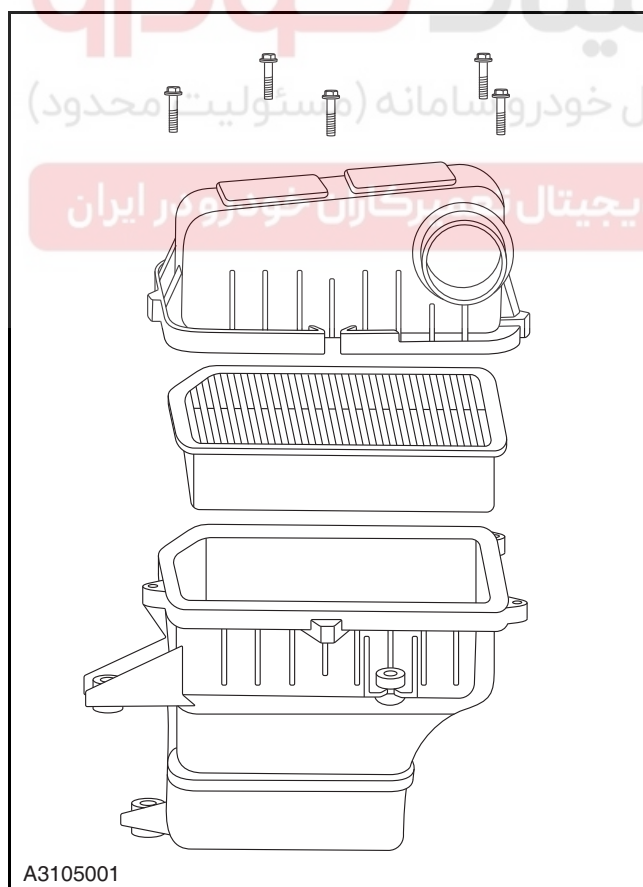
Intake resonator

Installed in the air intake hose, buffered the air, reduced the noise of the intake system effectively.

Air filter

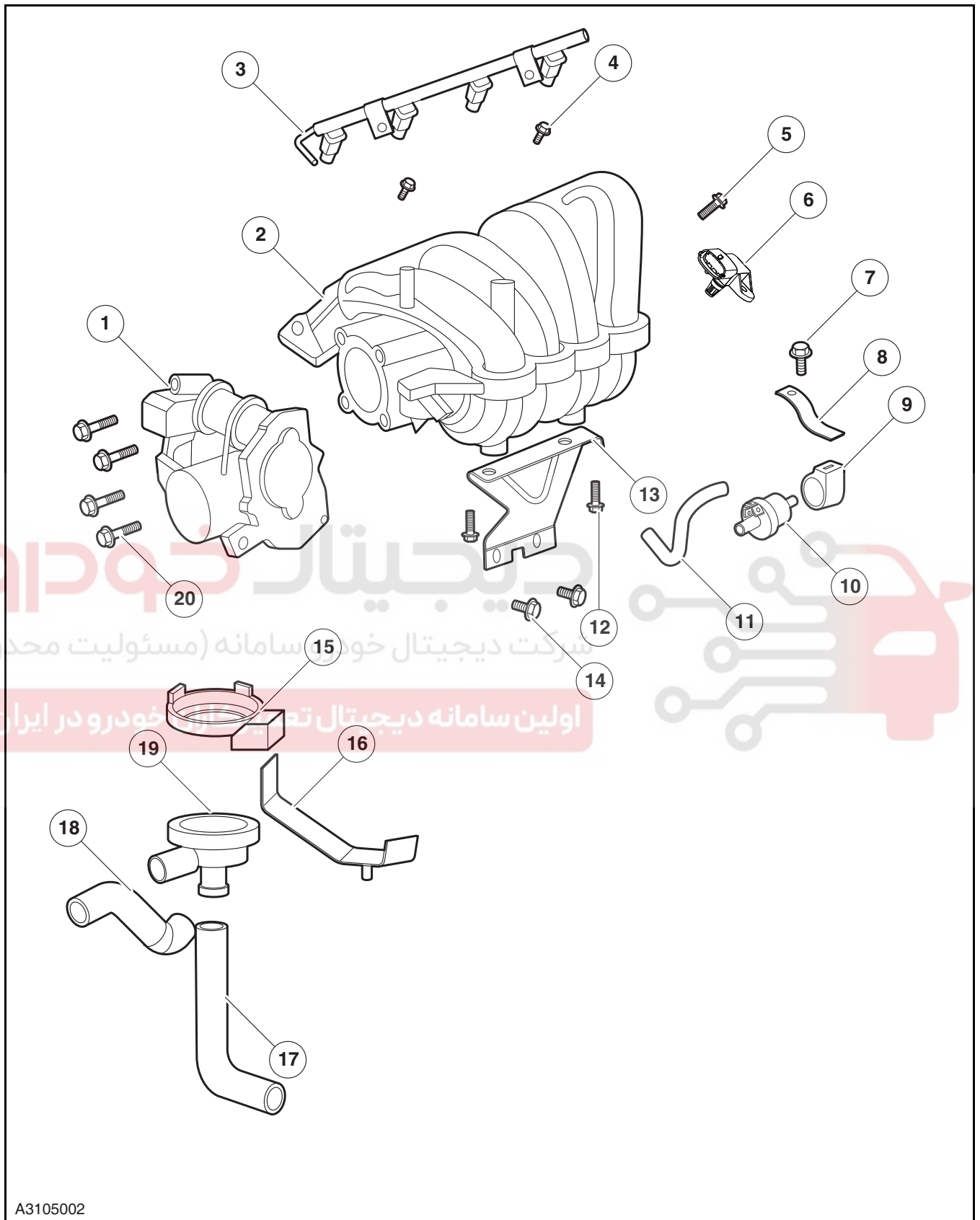
The air filter consists of:

- Air cleaner lower box
- Air filter element
- Air cleaner upper box



Dry air comes from the resonator into the air cleaner lower box and goes through the air

Exploded View



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Intake System

3.1.5-4

Item	Description	Item	Description
1	Electronic throttle body	11	Carbon canister control valve exhaust hose
2	Intake manifold assembly	12	Bolt
3	Fuel pipe assembly	13	Intake manifold bracket assembly
4	Bolt	14	Bolt
5	Hex flange bolt	15	Pressure regulator valve assembly gaiter
6	Intake temperature pressure sensor assembly	16	Pressure regulator valve bracket
7	Bolt	17	PRV valve exhaust hose
8	Carbon canister control valve bracket	18	PRV valve breather pipe
9	Carbon canister control valve gaiter	19	Pressure regulator valve assembly
10	Carbon canister control valve	20	Bolt

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General Procedures

General Equipment

Vacuum gauge

⚠ WARNING: The components of the engine are at high temperatures when the engine is running. Pay much attention to components at high temperatures during the removal. Or, serious scalding will be caused.

Vacuum Degree of Intake Air System Inspection

1. Stop the engine and turn the ignition switch to "LOCK" position.
2. Disconnect the vacuum hose, canister purge solenoid valve on the intake manifold.
3. Connect a suitable vacuum hose to the connector of the canister purge solenoid valve and connect the disconnected vacuum tube and the connected testing vacuum tube and the vacuum gauge testing tube to the tee joint respectively.
4. Start the engine and measure the vacuum degree of the intake air system at idle speed of the engine.

Standard Vacuum Degree: 42 kPa

5. Remove the vacuum gauge and reconnect the vacuum tube.



Symptom Diagnosis and Testing

General Equipment

Vacuum gauge

Inspection and Verification

1. Verify the customer concern.
2. Visually inspect for obvious signs of mechanical or electrical damage.

Visual Inspection Chart

Mechanical
<ul style="list-style-type: none"> • Air filter components • Air filter inlet pipe • Air filter outlet pipe • Throttle body • Intake Manifold

3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible), before proceeding to the next step.
4. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.



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Symptom Chart

If the fault occurs, but there is no DTC stored in the ECM for this fault, and can not confirm the cause, then follow the procedure to diagnose the fault and eliminate it.

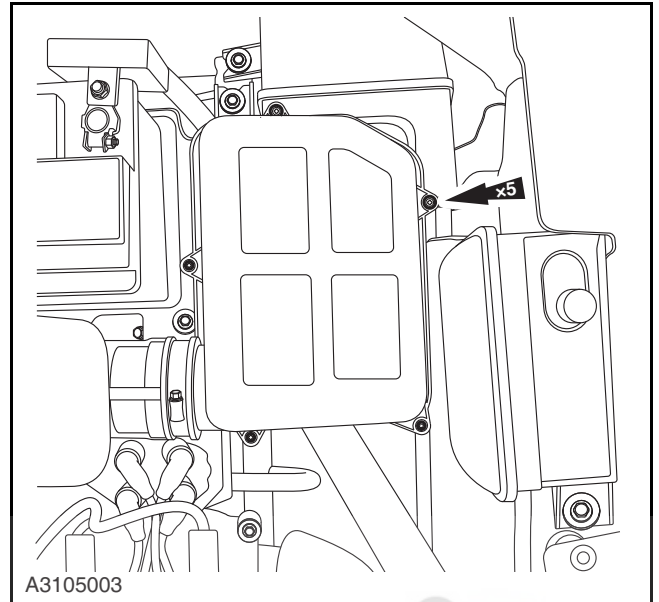
Symptom	Possible Sources	Action
Intake leak	<ul style="list-style-type: none"> • Air filter • Intake Manifold • Electronic throttle body • Crankcase vent pipe • Fuel tank evaporative emission pipe • Component connections 	<p>Refer to: Air Intake System Leakage Diagnosis (3.1.5 Intake System, Symptom Diagnosis and Testing).</p>
Intake blocking	<ul style="list-style-type: none"> • Air cleaner element 	<ul style="list-style-type: none"> • Inspect the air cleaner and install a new one when necessary. Install a new air cleaner. <p>Refer to: Air Cleaner Element (3.1.5 Intake System, Removal and Installation).</p>
	<ul style="list-style-type: none"> • Foreign matters in the intake pipe 	<ul style="list-style-type: none"> • Disassemble the air filter cover and inspect the air filter and the intake pipe for any possible foreign matters and clear them. Disassemble the air cleaner cover. <p>Refer to: Air Cleaner Element (3.1.5 Intake System, Removal and Installation).</p>

Intake Air Leak(s) Diagnosis

Test Conditions	Details/Results/Actions
1. Inspect for any leak noise	<p>A. Start the engine.</p> <p>B. Inspect for any leak noise by listening.</p> <p>Is there any leak noise like hiss?</p> <p>Y</p> <p>Inspect the leaking point(s) and repair the component(s) that leaks.</p> <p>N</p> <p>Go to step 2.</p>
2. Inspect all pipe lines which is connecting with the intake manifold	<p>A. Inspect whether the crankcase vent pipe and the evaporative emission pipe is aging or leak.</p> <p>Is all pipe lines normal?</p> <p>Y</p> <p>Go to step 3.</p> <p>N</p> <p>Repair the related pipe line (s).</p>
3. Inspect the vacuum degree of the intake air system	<p>A. Carry out the inspection procedures for the vacuum degree of the intake air system.</p> <p>Standard Vacuum Degree: 42 kPa</p> <p>Is the vacuum degree normal?</p> <p>Y</p> <p>The system is normal.</p> <p>N</p> <p>Go to step 4.</p>
4. Inspect the intake manifold or throttle body	<p>A. Inspect the intake manifold or the throttle body for leak.</p> <p>Does the intake manifold or the throttle body leak?</p> <p>Y</p> <p>Repair the seal of the intake manifold or throttle body.</p> <p>N</p> <p>Inspect the engine valve train.</p> <p>Refer to: Timing Gear (3.1.2 Mechanical System, Removal and Installation).</p>

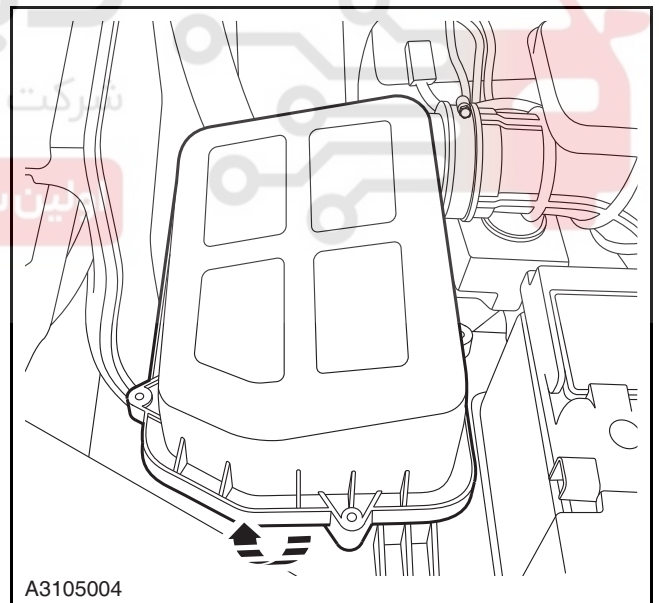
Removal and Installation**Air Filter Element****Removal**

1. Remove the air filter housing retaining screw.



2. Remove the air filter housing, and detach the air filter.

3. Inspect the air filter element for any dirt.

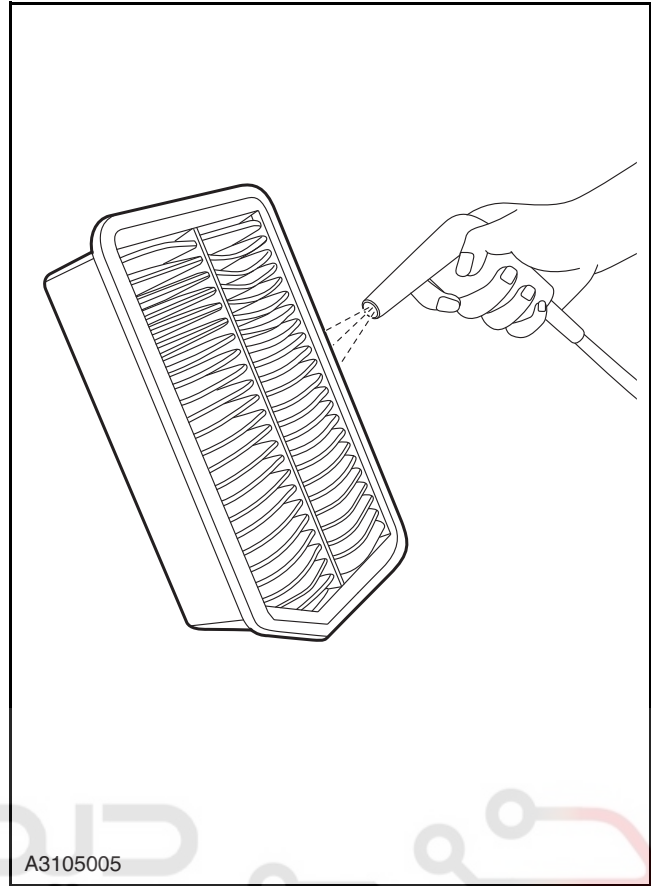


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Intake System

3.1.5-10

4. Blow away the dirt from the air outlet of the element with compressed air if necessary. Install a new element if it is too dirty.

**Installation** شرکت دیجیتال خودرو سامانه (مسئولیت ندارد)

1. To install, reverse the removal procedure.

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Intake Manifold

Removal

1. Release the fuel pressure.

Refer to: [Fuel System Pressure Test \(3.1.7 Fuel System, General Procedures\)](#).

2. Disconnect the battery negative cable.

Refer to: [Battery Inspection \(3.1.10 Charging System, General Procedures\)](#).

3. Lift the vehicle.

Refer to: [Lifting \(1.1.3 Traction and Lifting, Description and Operation\)](#).

4. Remove the 4 retaining bolts on the intake manifold bracket.

Torque: 23 Nm

5. Lower the vehicle.

6. Remove the fuel main pipe.

Refer to: [Fuel Injector \(3.1.13 Electronic Control System - ME7, Removal and Installation\)](#).

7. Remove the PRV valve.

Refer to: [PRV Valve \(3.1.11 Exhaust Control System, Removal and Installation\)](#).

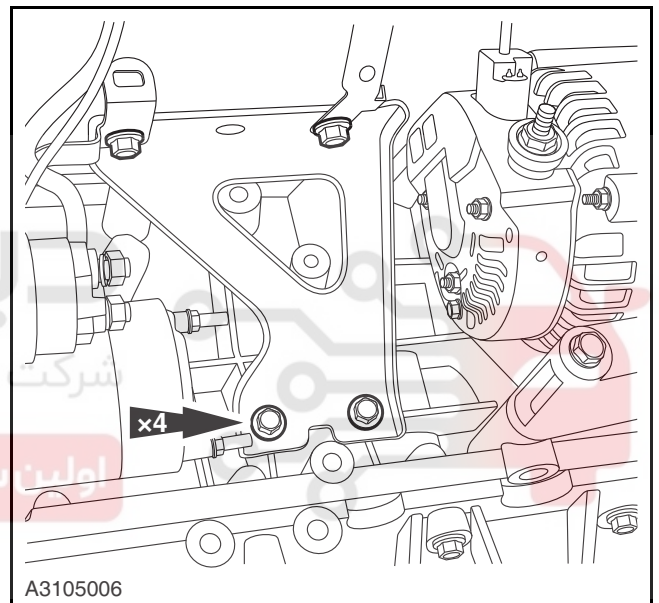
8. Remove the EVAP purge valve.

Refer to: [EVAP Purge Valve \(3.1.11 Exhaust Control System, Removal and Installation\)](#).

9. Remove the electrical throttle body.

Refer to: [Electrical Throttle Body \(3.1.13 Electrical Control System - ME7, Removal and Installation\)](#).

10. Detach the wiring harness connector of the intake temperature and pressure sensor.



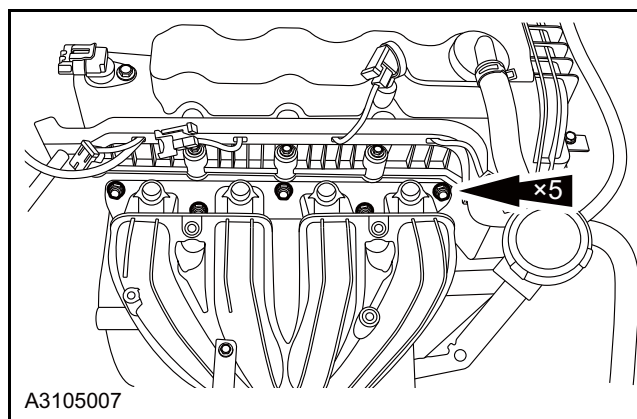
3.1.5-12

Intake System

3.1.5-12

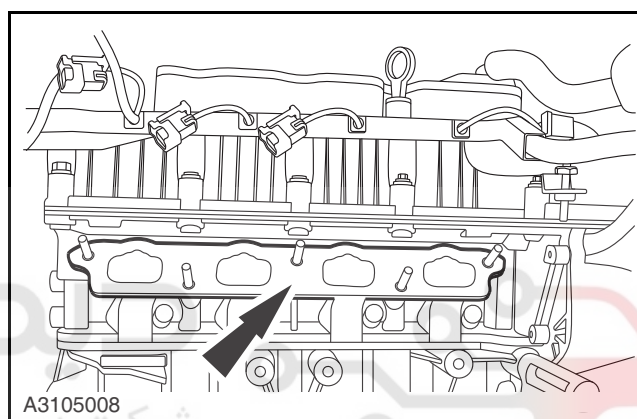
- Remove the intake manifold 5 retaining bolts and nuts.

Torque: 23 Nm



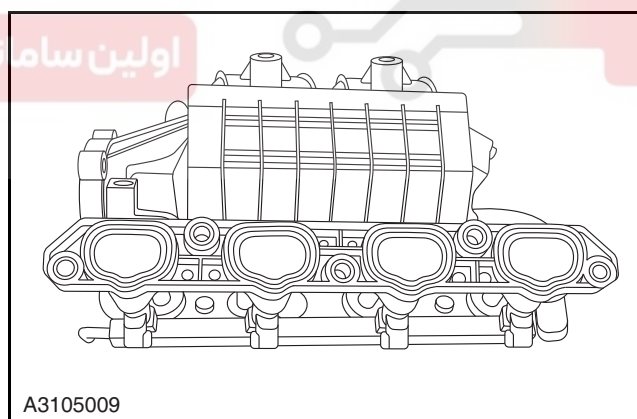
Inspection

- Inspect and clean the installing end face between the intake manifold and the cylinder head.




- Inspect the intake manifold end face, measure the surface deformation degree at 6 positions at least with the straight gauge and the feeler, level the surface or replace the intake manifold if the value exceeds the limit.

Deformation Limit: 0.07 mm




Installation

1. To install, reverse the removal procedure.

 **CAUTION:** After installation, inspect whether the intake manifold leaks.

Refer to: Air Intake System Leakage Diagnosis (3.1.5 Intake System, Symptom Diagnosis and Testing).

 **CAUTION:** Inspect the fuel for any possible leaks after the installation.

Refer to: Fuel System Pressure Test (3.1.7 Fuel System, General Procedures).

 **CAUTION:** Inspect the coolant for any possible leaks after the installation.

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