

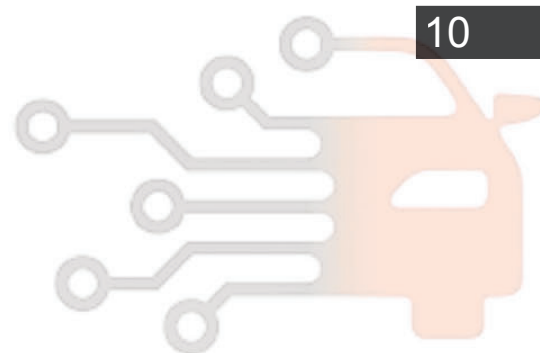
SQRD4G15B INTAKE SYSTEM

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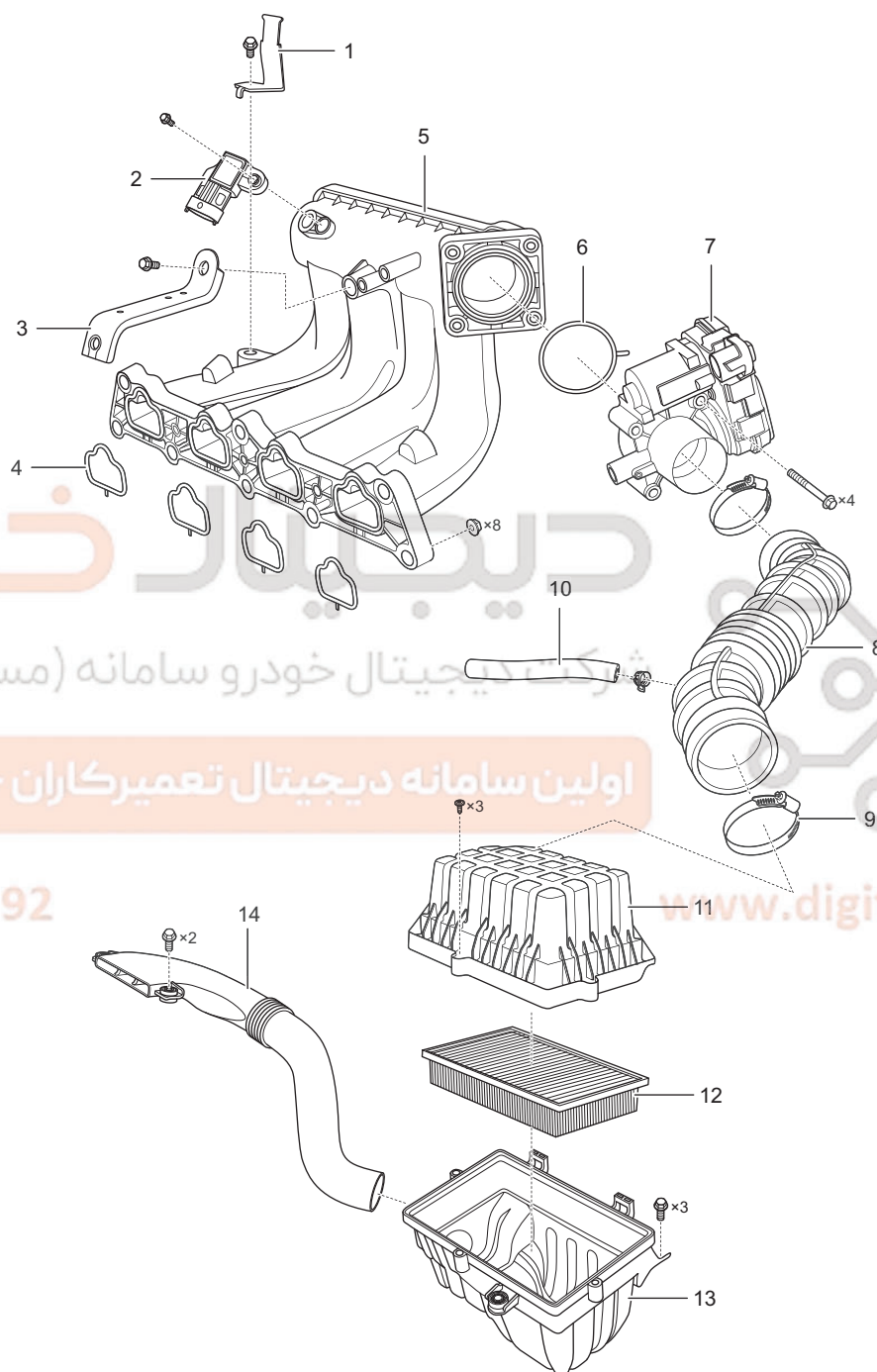
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GENERAL INFORMATION

Description

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RA13T100010

10 - SQRD4G15B INTAKE SYSTEM

1 - Charcoal Canister Solenoid Valve Bracket	2 - Intake Pressure/Temperature Sensor
3 - Intake Manifold Upper Bracket	4 - Intake Manifold Gasket
5 - Intake Manifold	6 - Electronic Throttle Assembly Gasket
7 - Electric Throttle Assembly	8 - Intake Hose
9 - Worm Clamp	10 - Crankcase Vent Hose
11 - Air Filter Upper Housing	12 - Air Filter Element
13 - Air Filter Lower Housing	14 - Air Direct Pipe

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

Intake system uses air filter to filter particulates and dust in air, and then the air filtered flows into intake manifold assembly through electronic throttle assembly 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.

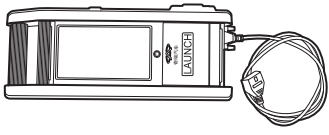
Specifications

10 Torque Specifications

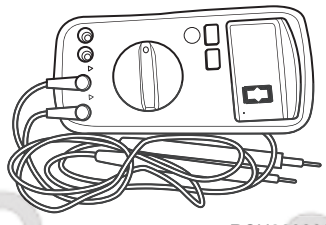
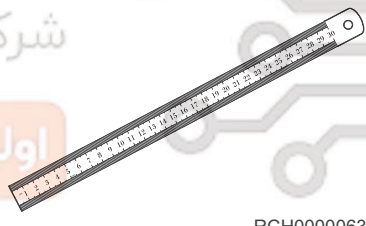
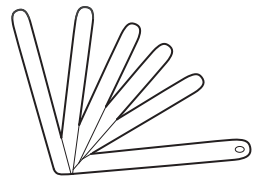
Description	Torque (N·m)
Coupling Screw Between Air Filter Upper Housing and Lower Housing	3 ± 1
Air Filter Assembly Fixing Bolt	10 ± 1
Air Direct Pipe Fixing Bolt	10 ± 1
Electronic Throttle Assembly Fixing Bolt	8 - 11
Intake Pressure/Temperature Sensor Fixing Bolt	8 ± 1
Intake Manifold Fixing Nut	$20 + 5$
Charcoal Canister Solenoid Valve Bracket Fixing Bolt	$20 + 5$
Intake Manifold Upper Bracket Fixing Bolt	$20 + 5$
Electronic Accelerator Pedal Fixing Bolt	10 ± 2
Worm Clamp	3.5 ± 0.5

Tools

Special Tool

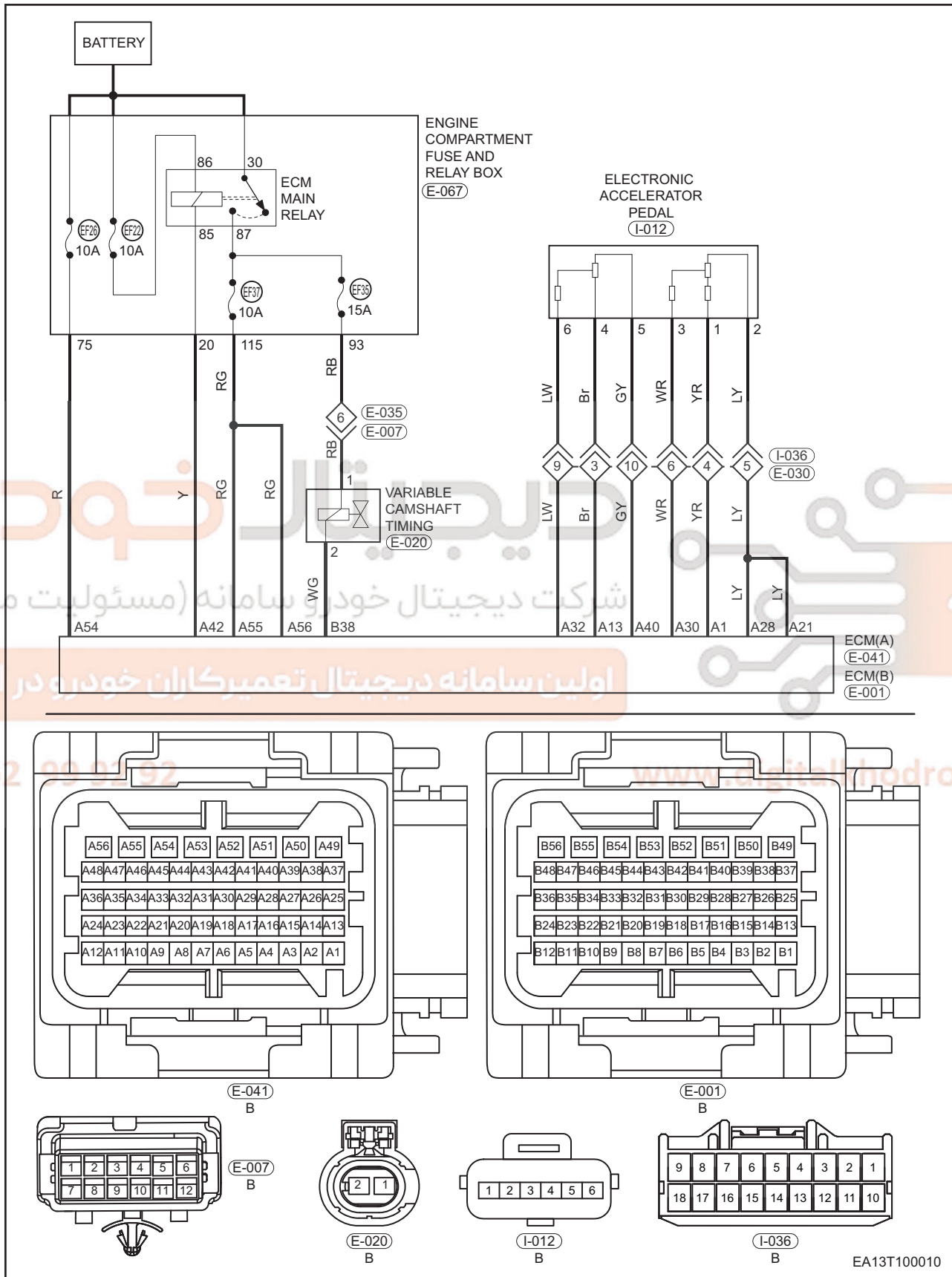
X-431 3G Diagnostic Tester	 RCH0000001
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General Tools

Digital Multimeter	 RCH0000002
Precision Straightedge	 RCH0000063
Feeler Gauge	 RCH0000060

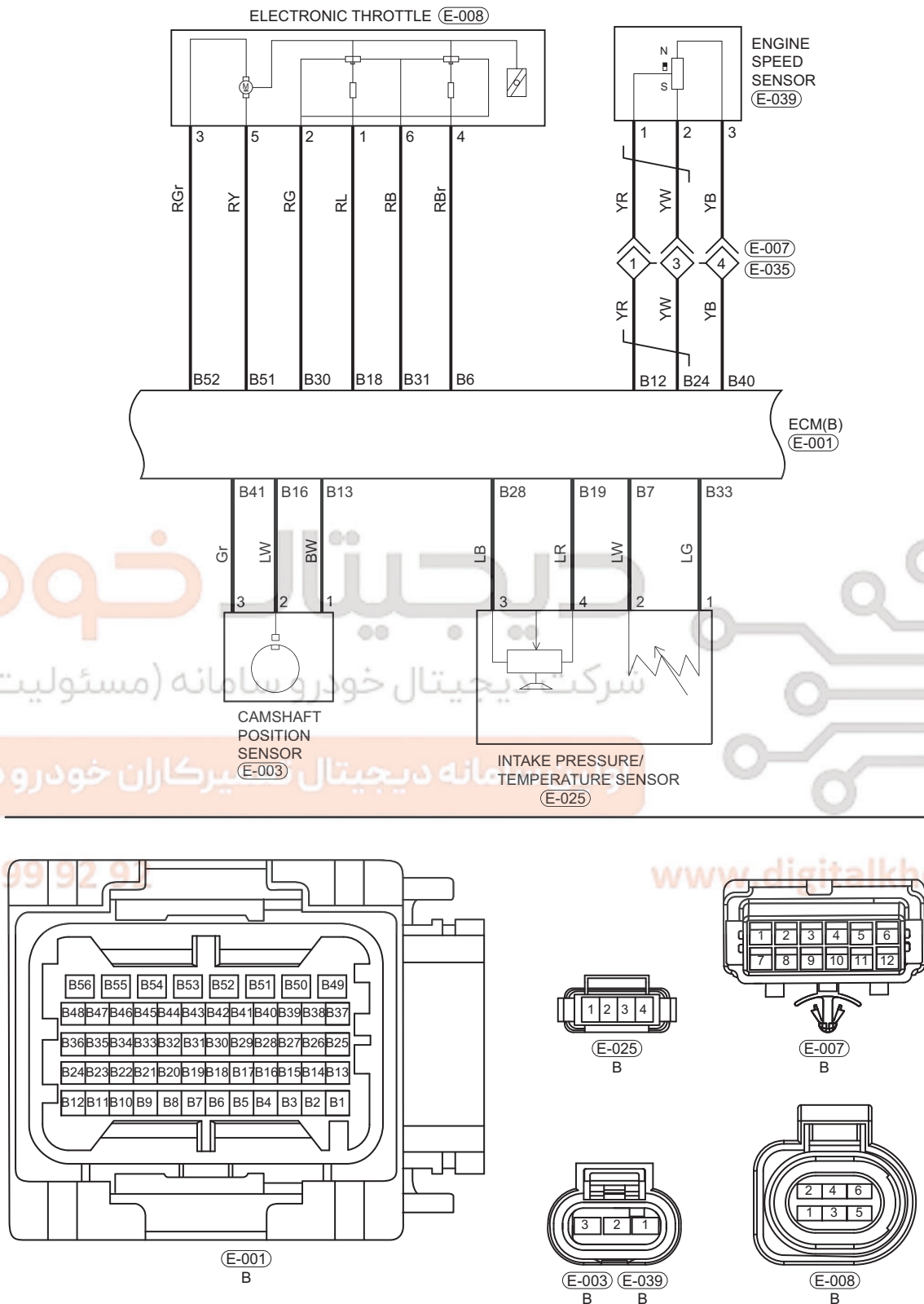
Circuit Diagram

Intake System (Page 1 of 2)



Intake System (Page 2 of 2)

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EA13T100020

DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

Symptom	Possible Cause	See page
Engine idles roughly	Electronic throttle assembly (dirty)	10-11
	Intake manifold assembly (broken, leaked)	10-15
	Activated charcoal canister solenoid valve (remaining on)	09-8
	Intake pressure/temperature sensor	10-15
	Throttle gasket (damaged)	10-13
	Fuel rail injector assembly (installed incorrectly)	08-22



ON-VEHICLE SERVICE

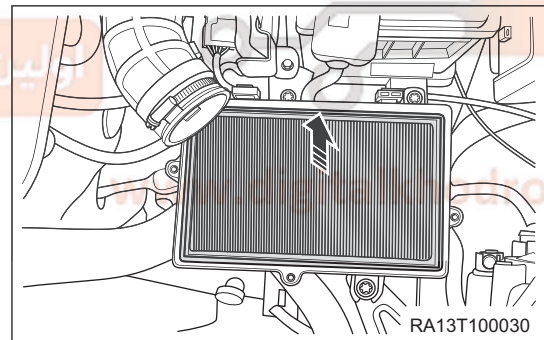
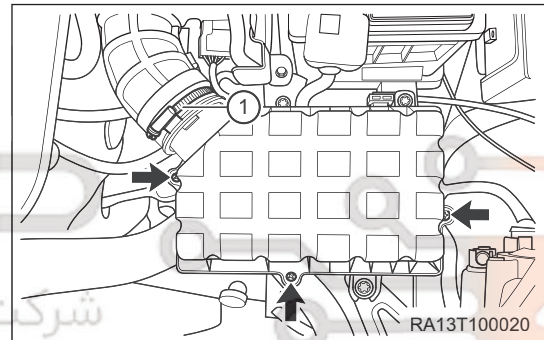
Air Filter Element

Removal

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 ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air filter element.
 - a. Remove 3 coupling screws (arrow) between air filter upper housing and lower housing.
(Tightening torque: 3 ± 1 N·m)
 - b. Loosen worm clamp (1), and disconnect air filter and intake hose.
(Tightening torque: 3.5 ± 0.5 N·m)
 - c. Remove the air filter upper housing.
 - d. Remove the air filter element.



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Installation

1. Clean 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.

ENVIRONMENTAL PROTECTION

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

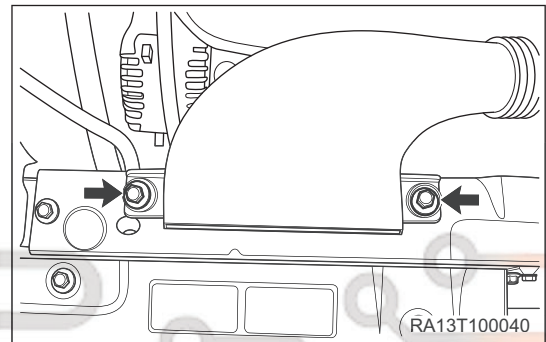
Air Filter Assembly

Removal

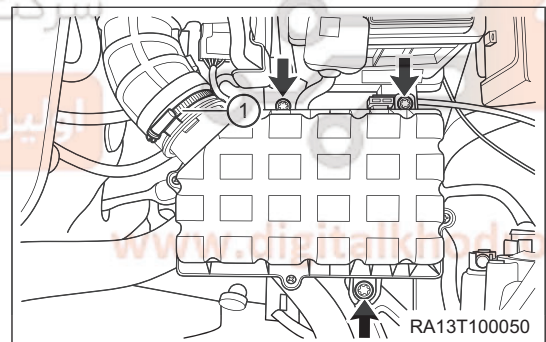
CAUTION

- 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 ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air direct pipe assembly.
 - a. Remove 2 fixing bolts (arrow) from air direct pipe, and remove air direct pipe.
(Tightening torque: $10 \pm 1 \text{ N}\cdot\text{m}$)



4. Remove the air filter assembly.
 - a. Loosen worm clamp (1), and disconnect air filter and intake hose.
(Tightening torque: $3.5 \pm 0.5 \text{ N}\cdot\text{m}$)
 - b. Remove 3 fixing bolts (arrow) from air filter.
(Tightening torque: $10 \pm 1 \text{ N}\cdot\text{m}$)



- c. Remove the air filter assembly.

Installation

Installation is in the reverse order of removal.

Electric Throttle Assembly

On-vehicle Inspection

1. Check the electronic throttle assembly.
 - a. Throttle valve plate should be in NLP position with power off and can rotate smoothly when flipping it by hand. If seizing occurs, it indicates that internal components may be damaged, and replace electronic throttle assembly.
 - b. Connect X-431 3G diagnostic tester to Data Link Connector (DLC).
 - c. Turn ignition switch to ON and turn on X-431 3G diagnostic tester.
 - d. Read datastream on X-431 3G diagnostic tester.

Accelerator pedal released

Datastream Name	Specification (V)
Sensor voltage from throttle potentiometer 1	0.78
Sensor voltage from throttle potentiometer 2	4.21

Datastream name	Value	Unit
multiplicative correction of the mixture adaptation	1.00	
Lambda controller output bank 2	0.00	
sensor voltage from throttle potentiometer 1	0.78	V
sensor voltage from throttle potentiometer 2	4.21	V
additive correction of the mixture adaptation	0.00	%
Voltage PWG potentiometer 1	0.99	V
Voltage PWG potentiometer 2	0.50	V
Doubled PWG potentiometer-2 voltage	1.00	V

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Accelerator pedal depressed

Datastream Name	Specification (V)
Sensor voltage from throttle potentiometer 1	4.25
Sensor voltage from throttle potentiometer 2	0.75

Datastream name	Value	Unit
multiplicative correction of the mixture adaptation	1.00	
Lambda controller output bank 2	0.00	
sensor voltage from throttle potentiometer 1	4.25	V
sensor voltage from throttle potentiometer 2	0.75	V
additive correction of the mixture adaptation	0.00	%
Voltage PWG potentiometer 1	4.27	V
Voltage PWG potentiometer 2	2.14	V
Doubled PWG potentiometer-2 voltage	4.29	V

RA13T100070

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

Removal

⚠ WARNING

- The temperature of 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.

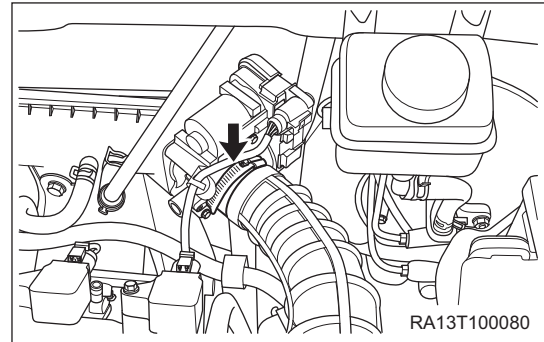
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.

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4. Move away intake hose from electronic throttle assembly side.

- a. Loosen worm clamp (arrow) between intake hose and electronic throttle assembly.

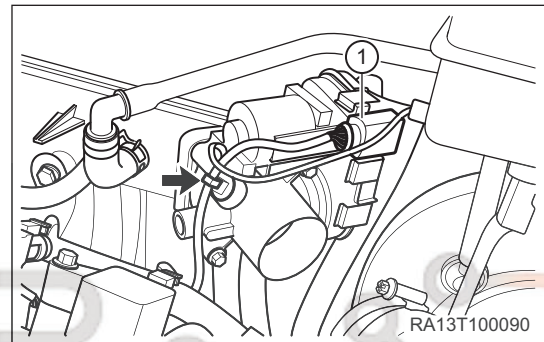
(Tightening torque: 2.5 ± 0.5 N·m)



- b. Disconnect intake hose and electronic throttle assembly, and move intake hose to one side.

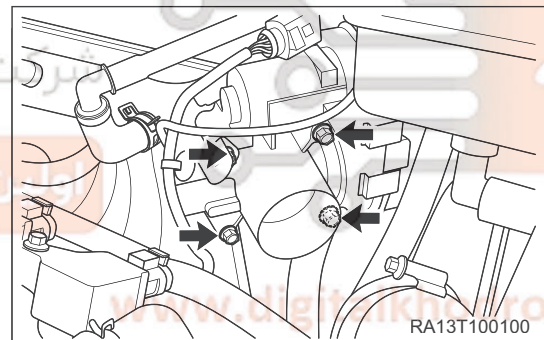
5. Remove the electronic throttle assembly.

- a. Disengage the wire harness clip (arrow).
- b. Disconnect the electronic throttle assembly connector (1).



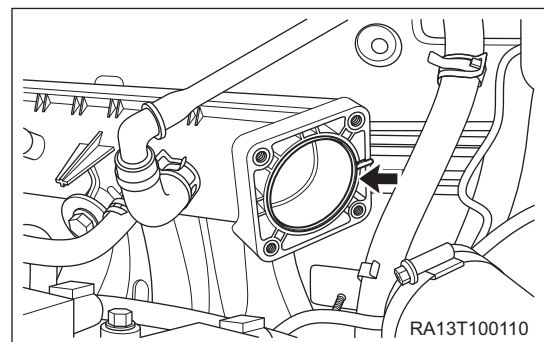
- c. Remove 4 fixing bolts (arrow) from electronic throttle assembly.

(Tightening torque: 8 - 11 N·m)



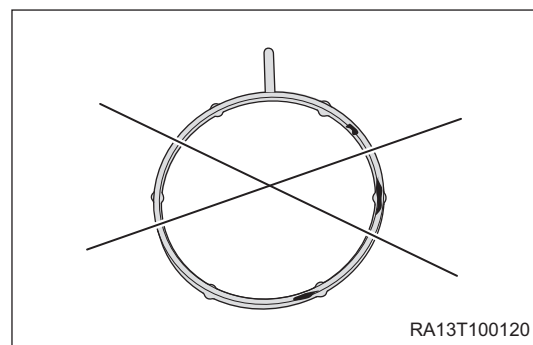
- d. Remove the electronic throttle assembly.

- e. Remove electronic throttle assembly gasket (arrow) from intake manifold.



Inspection

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



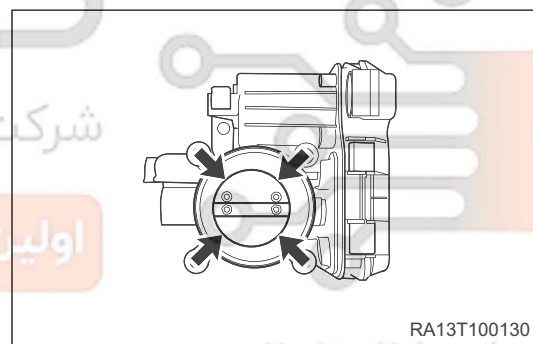
Cleaning

Cleaning Tool

1. 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.
2. Clean cloth or paper towel.

Cleaning Process

1. Remove electronic throttle assembly, and face valve plate upward in free condition. Avoid cleaner flowing into electronic element through valve plate shaft, resulting in functional failure.
2. Start to clean when it is as shown in illustration.

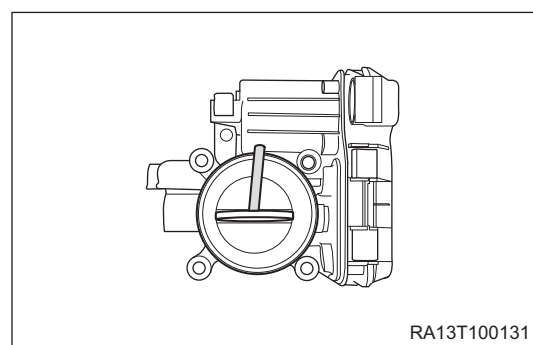


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⚠ WARNING

Cleaner is a kind of flammable and corrosive fluid. Follow safety cautions to prevent accidents, and avoid skin contacting with cleaner.

3. Apply appropriate amount of cleaner to inner wall of throttle valve body, and remove the carbon with clean cloth.
4. Support the throttle valve with a thin stick, and clean carbon on valve plate and throttle valve body inner wall.



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5. Turn over the throttle 180°, and clean with the same procedures as above. Repeat several times until it is clean.
6. Push valve plate by hand, and check if it rotates smoothly. If it is stuck, perform cleaning again according to cleaning procedures.
7. After cleaning, wipe off cleaner in throttle valve body with absorbent paper.

Installation

Installation is in the reverse order of removal.

CAUTION

- Clean fitting surface of electronic throttle assembly.
- Perform throttle self-learning procedures after installation (See page 06-20). After self-learning is completed, start the vehicle and check for proper operation.

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Intake Manifold Assembly

Removal

CAUTION

- The temperature of exhaust system is very high when engine is running. Before removal, you must make sure that engine has shut off, and exhaust system 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. Release the fuel system pressure (See page 08-10).
2. Turn off all electrical equipment and the ignition switch.
3. Disconnect the negative battery cable.
4. Remove the engine trim cover.
5. Remove the fuel rail injector assembly (See page 08-22).
6. Remove the electronic throttle assembly (See page 10-11).
7. Remove the intake manifold assembly.

- a. Disconnect intake pressure/temperature sensor connector (1), loosen and remove fixing bolt (arrow), then remove intake pressure/temperature sensor.

(Tightening torque: $8 \pm 1 \text{ N}\cdot\text{m}$)

- b. Loosen elastic clamp (1), and disconnect PCV hose and intake manifold.

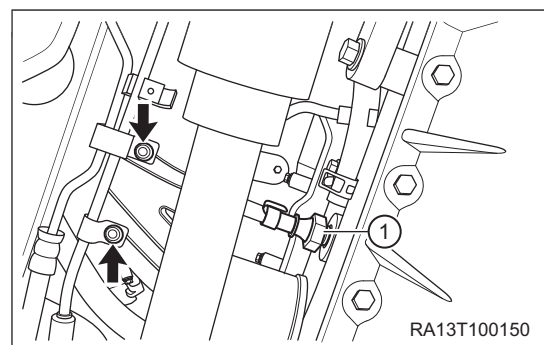
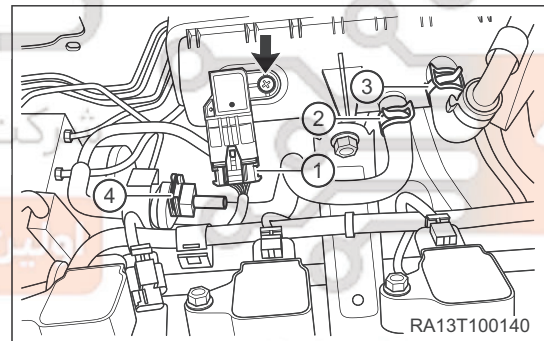
- c. Loosen elastic clamp (3), and disconnect vacuum booster hose and intake manifold.

- d. Disconnect charcoal canister solenoid valve connector (4), and move away charcoal canister solenoid valve from bracket.

- e. Disconnect oil pressure switch connector (1) and wire harness clip.

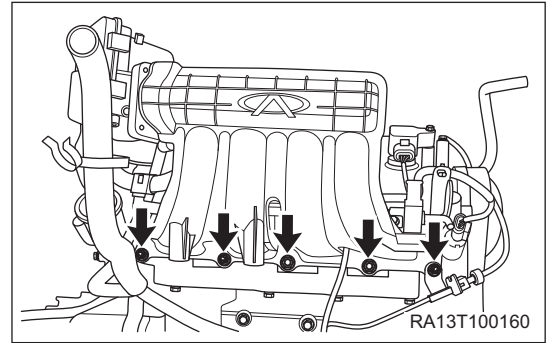
- f. Remove 2 fixing bolts (arrow) from booster pipe.

(Tightening torque: $25 \pm 3 \text{ N}\cdot\text{m}$)



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- g. Remove 8 fixing nuts (arrow) from intake manifold.
(Tightening torque: 20 +5 N·m)



- h. Move away engine wire harness bracket, remove engine right lifting eye and intake manifold assembly.

8. Disassemble the intake manifold.

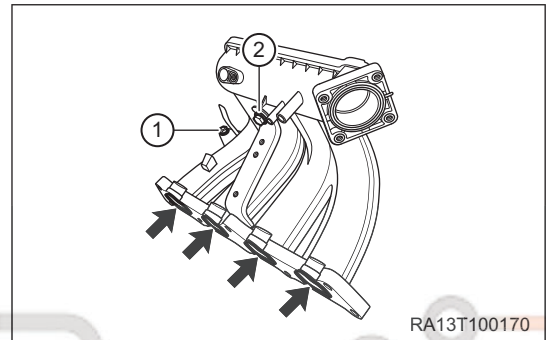
- a. Remove fixing bolt (1) from charcoal canister solenoid valve bracket, and remove charcoal canister solenoid valve bracket.

(Tightening torque: 20 +5 N·m)

- b. Remove fixing bolt (2) from intake manifold upper bracket, and remove intake manifold upper bracket.

(Tightening torque: 20 +5 N·m)

- c. Remove gasket (arrow) from intake manifold.

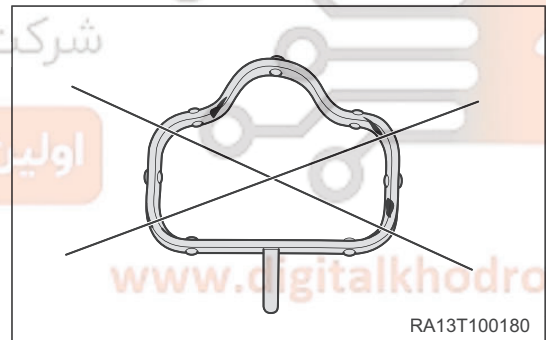


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Inspection

1. Check the intake manifold gasket.

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



Installation

Installation is in the reverse order of removal.

CAUTION

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

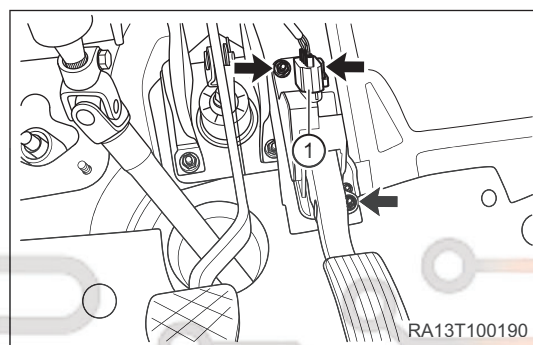
Electronic Accelerator Pedal

Removal

CAUTION

- 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 the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the electronic accelerator pedal.
 - a. Disconnect the electronic accelerator pedal connector (1).
 - b. Remove 3 fixing nuts (arrow) from electronic accelerator pedal.
(Tightening torque: 10 ± 2 N·m)



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- c. Remove the electronic accelerator pedal.

Installation

Installation is in the reverse order of removal.

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