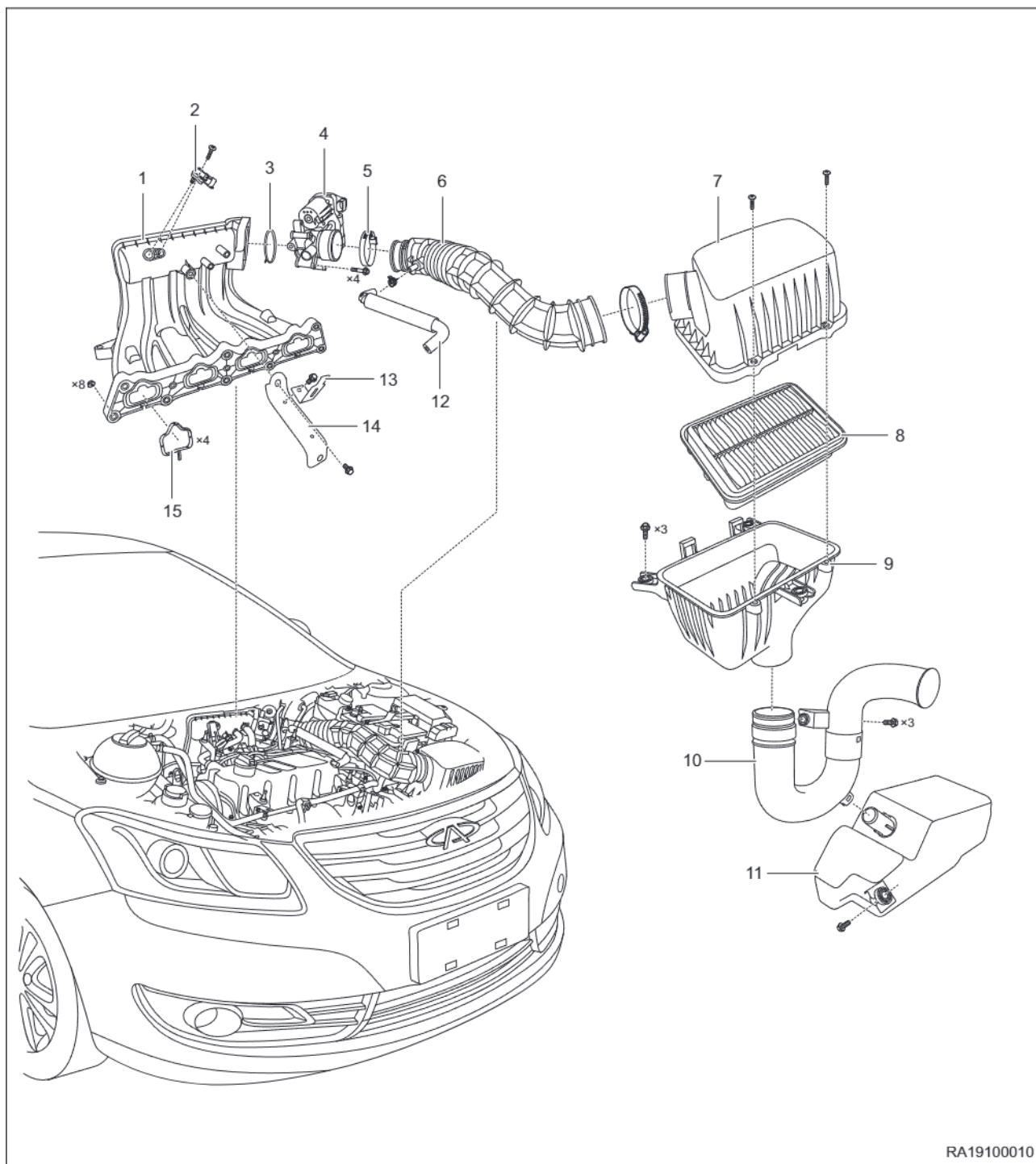

SQR477F INTAKE SYSTEM

GENERAL INFORMATION	10-3	Electronic Throttle Assembly	10-12
Description	10-3	On-vehicle Inspection	10-12
Specifications	10-4	Removal	10-12
Tools	10-5	Inspection	10-13
Circuit Diagram	10-6	Cleaning	10-13
		Installation	10-14
DIAGNOSIS & TESTING	10-8	Intake Manifold Assembly	10-15
Problem Symptoms Table	10-8	Removal	10-15
ON-VEHICLE SERVICE	10-9	Inspection	10-16
Air Filter Element	10-9	Installation	10-16
Replacement	10-9	Electronic Accelerator Pedal	10-17
Installation	10-9	Removal	10-17
Air Filter	10-10	Installation	10-17
Removal	10-10		
Installation	10-11		

GENERAL INFORMATION

Description



10

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

The intake system mainly consists of the air filter, intake hose assembly, electronic throttle assembly, intake pressure/temperature sensor, intake manifold assembly, etc.

The intake system uses the air filter to filter the particles and dust in the air. The air filtered flows into the intake manifold through the throttle assembly and mixes with the fuel at the end of the intake manifold port to form flammable gas mixture, which is transmitted to each cylinder uniformly to coordinate with the operation of the engine.

The electronic throttle is a critical part for the engine intake system. Its main function is to adjust the intake passage area according to the driver's driving intention. It controls the intake air volume to meet the intake requirement of the engine in different operating conditions, sends back the position signals of the throttle valve plate to the control unit to achieve accurate control, and the engine runs under the optimal control state.

Specifications

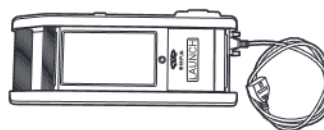
Torque Specifications

Description	Torque (N·m)
Coupling Screw Between Air Filter Upper and Lower Housing	3 ± 1
Air Filter Fixing Bolt	7 ± 1.5
Resonant Cavity Assembly Fixing Bolt	7 ± 1.5
Air Direct Pipe Right Fixing Bolt	7 ± 1.5
Air Direct Pipe Left Fixing Bolt	7 ± 1.5
Electronic Throttle Assembly Fixing Bolt	8 - 11
Intake Pressure/Temperature Sensor Fixing Bolt	8 ± 1
Intake Manifold Fixing Nut	22.5 ± 2.5
Canister Solenoid Valve Bracket Fixing Bolt	10 ± 2
Intake Manifold Upper Bracket Fixing Bolt	18 ± 2
Electronic Accelerator Pedal Fixing Bolt	10 ± 2
Worm Clamp	2.5 ± 0.5

Tools

Special Tool

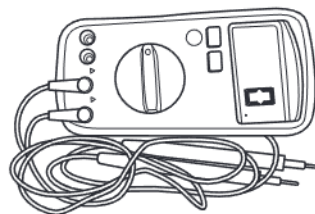
X-431 3G Diagnostic Tester



RCH0000001

General Tool

Digital Multimeter

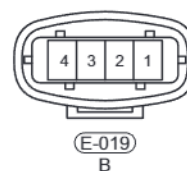
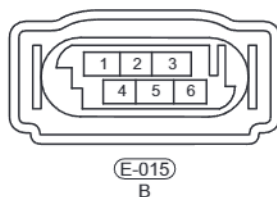
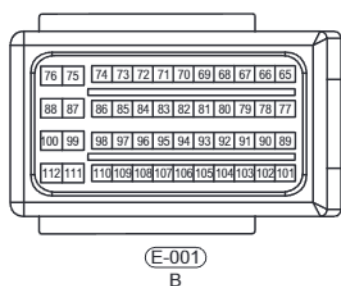
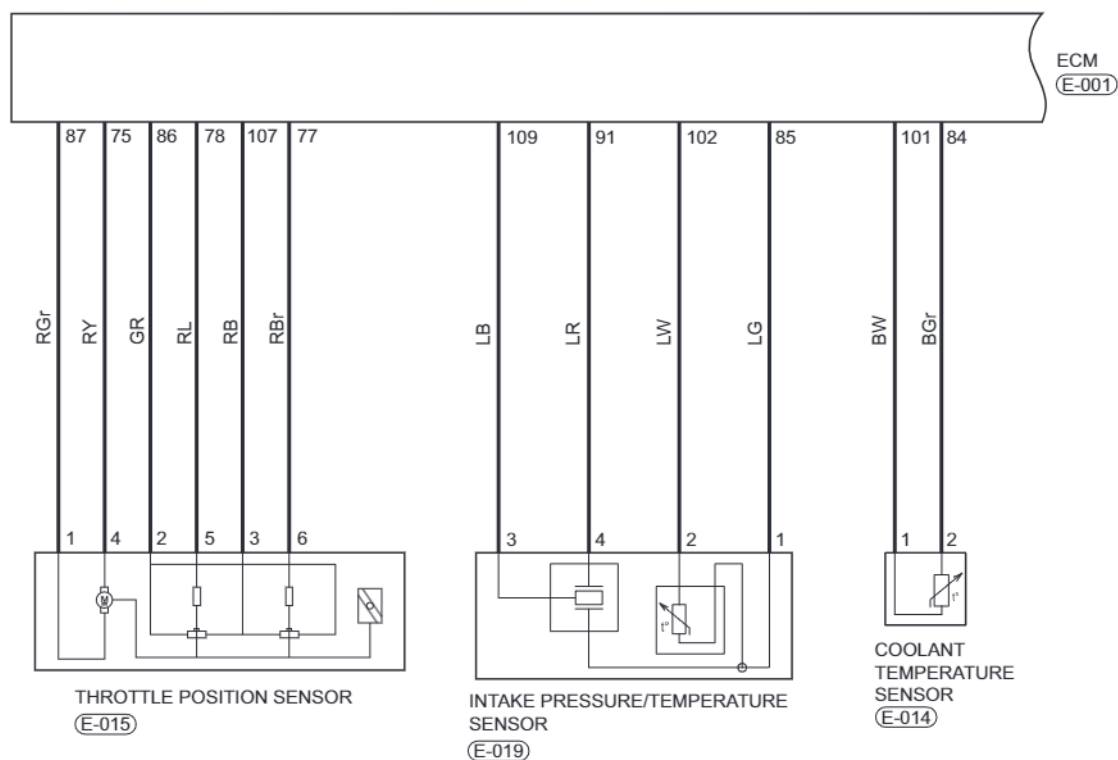


RCH0000002

10

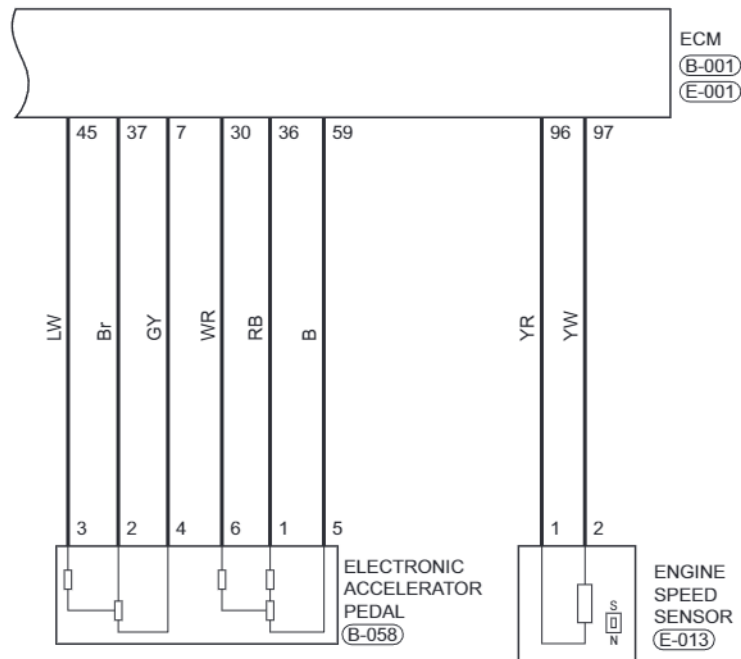
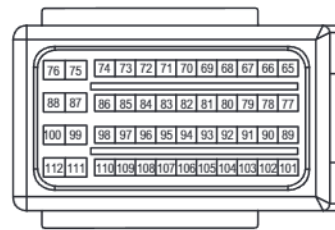
Circuit Diagram

Intake System (Page 1 of 2)



EA19100010

Intake System (Page 2 of 2)

(B-001)
B(E-001)
B(B-058)
B(E-013)
B

EA19100020

DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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

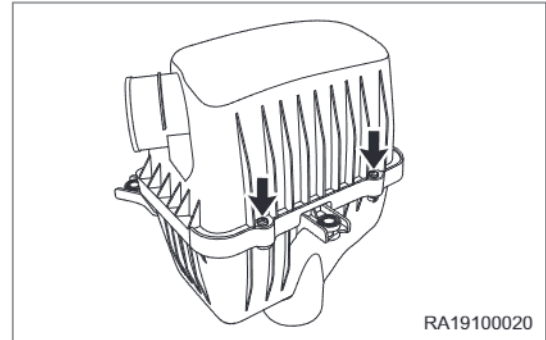
Symptom	Possible Cause	See page
Engine idles roughly	Throttle assembly (dirty)	10-12
	Intake manifold (broken, leaked)	10-15
	Canister solenoid valve (remains open)	09-7
	Intake pressure/temperature sensor	06-203
	Throttle assembly grommet (damaged)	10-12
	Fuel rail injector assembly (incorrect installation)	08-25

ON-VEHICLE SERVICE

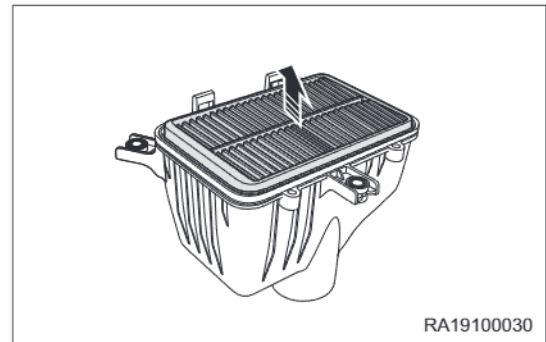
Air Filter Element

Replacement

1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly (See page 10-10).
4. Remove the air filter element.
 - a. Remove 2 coupling screws (arrow) between the air filter upper housing and lower housing.
(Tightening torque: $3 \pm 1 \text{ N}\cdot\text{m}$)



- b. Remove the air filter upper housing.
- c. Remove the air filter element.



10

Installation

1. Clean the air filter assembly and install a new air filter element.
2. Other installation procedures are in the reverse order of removal.



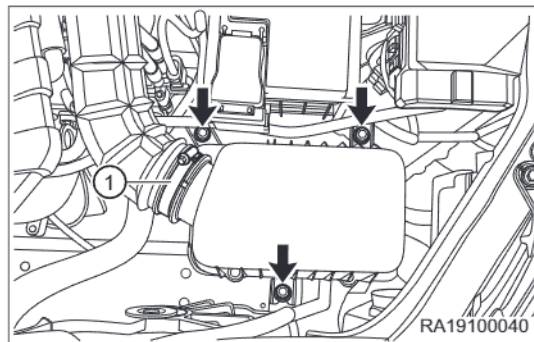
ENVIRONMENTAL PROTECTION

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

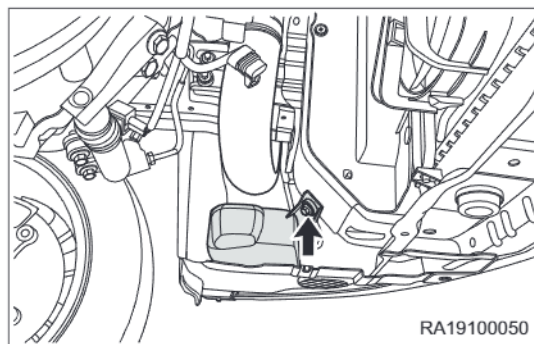
Air Filter

Removal

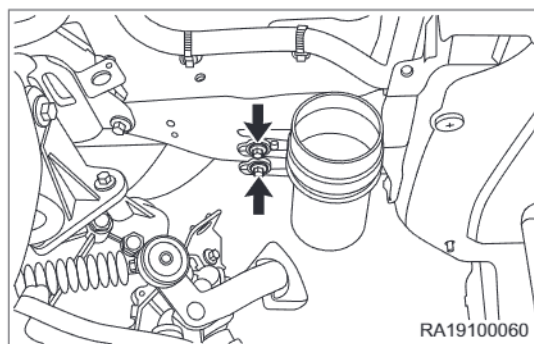
1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air filter assembly.
 - a. Loosen the worm clamp (1) and disconnect the connection between air filter and intake hose.
(Tightening torque: $2.5 \pm 0.5 \text{ N}\cdot\text{m}$)
 - b. Remove 3 fixing bolts (arrow) from the air filter.
(Tightening torque: $7 \pm 1.5 \text{ N}\cdot\text{m}$)



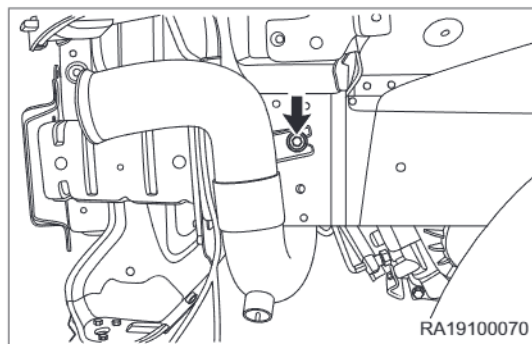
- c. Remove the air filter assembly.
4. Remove the resonant cavity assembly.
 - a. Remove the resonant cavity assembly fixing bolt (arrow).
(Tightening torque: $7 \pm 1.5 \text{ N}\cdot\text{m}$)



- b. Remove the resonant cavity assembly from the air direct pipe.
5. Remove the air direct pipe.
 - a. Remove 2 fixing bolts (arrow) from the right side of air direct pipe.
(Tightening torque: $7 \pm 1.5 \text{ N}\cdot\text{m}$)



- b. Remove the fixing bolt (arrow) from the left side of air direct pipe.
(Tightening torque: 7 ± 1.5 N·m)



- c. Remove the air direct pipe.

Installation

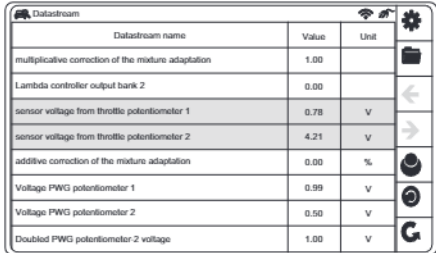
Installation is in the reverse order of removal.

Electronic Throttle Assembly

On-vehicle Inspection

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

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



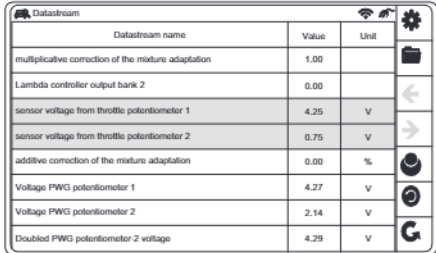
Datastream name	Value	Unit
multiplicative correction of the mixture adaptation	1.00	
Lambda controller output bank 2	0.00	
sensor voltage from throttle potentiometer 1	0.78	V
sensor voltage from throttle potentiometer 2	4.21	V
additive correction of the mixture adaptation	0.00	%
Voltage PWD potentiometer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

RA19100071

10

- Depress the accelerator pedal

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



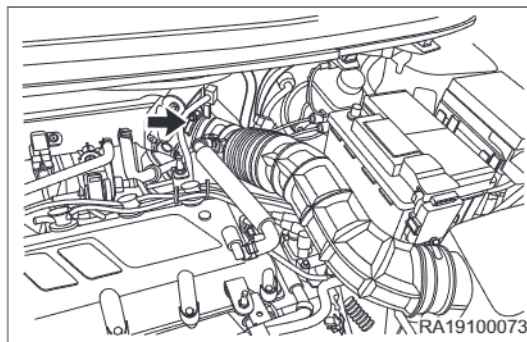
Datastream name	Value	Unit
multiplicative correction of the mixture adaptation	1.00	
Lambda controller output bank 2	0.00	
sensor voltage from throttle potentiometer 1	4.25	V
sensor voltage from throttle potentiometer 2	0.75	V
additive correction of the mixture adaptation	0.00	%
Voltage PWD potentiometer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

RA19100072

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

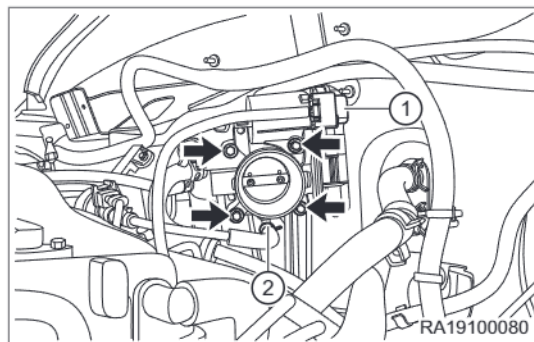
Removal

1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Move away the intake hose on the electronic throttle assembly side.
 - a. Loosen the worm clamp (arrow) between intake hose and electronic throttle assembly.
(Tightening torque: 2.5 ± 0.5 N·m)

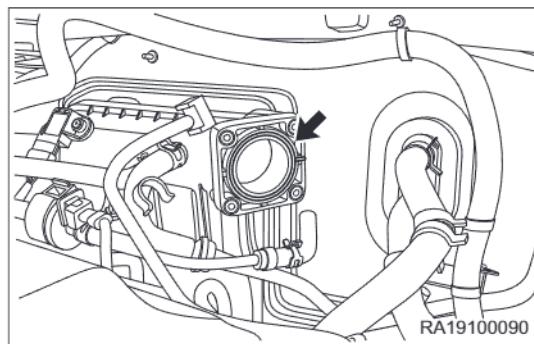


- b. Disconnect the connection between intake hose and electronic throttle assembly, and move the intake hose to one side.

5. Remove the electronic throttle assembly.
 - a. Disconnect the electronic throttle assembly connector (1).
 - b. Loosen the spring clamp (2), and disconnect the connection between canister solenoid valve output pipe and electronic throttle assembly.
 - c. Remove 4 fixing bolts (arrow) from the electronic throttle assembly.
(Tightening torque: 8 - 11 N·m)



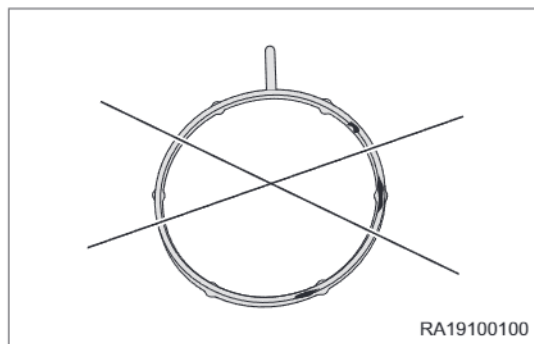
- d. Remove the electronic throttle assembly.
6. Remove the electronic throttle assembly grommet (arrow) from intake manifold.



10

Inspection

1. Check the electronic throttle assembly grommet.
If the electronic throttle assembly grommet is deteriorated or damaged, replace it.



Cleaning

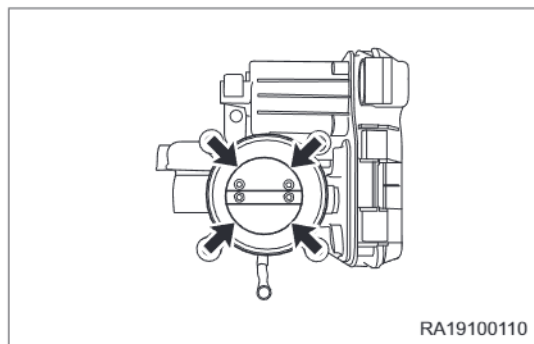
Cleaning Tool

1. Thin stick: used to support throttle valve plate to clean 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 the throttle body, and make the valve plate face upward in free condition. Avoid the cleaner flowing into the electronic element through valve plate shaft, resulting in functional failure.

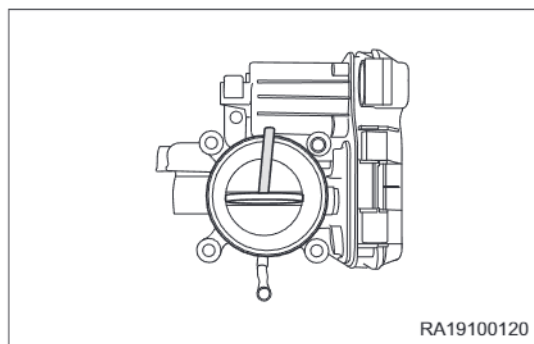
2. Start to clean when it is as shown in the illustration.



⚠ WARNING

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

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



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

Installation

Installation is in the reverse order of removal.

👁 CAUTION

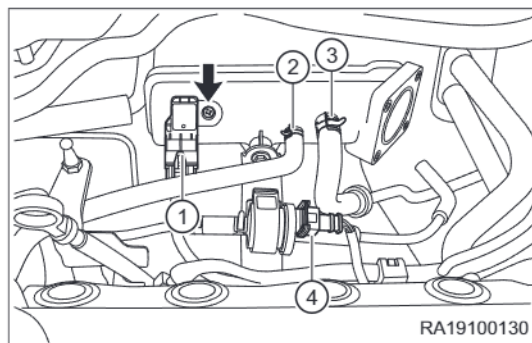
- Replace with a new grommet during installation.
- Perform the throttle self-learning procedures after installation ([See page 06-19](#)). After the self-learning completed, start the vehicle and observe if it operates properly.

Intake Manifold Assembly

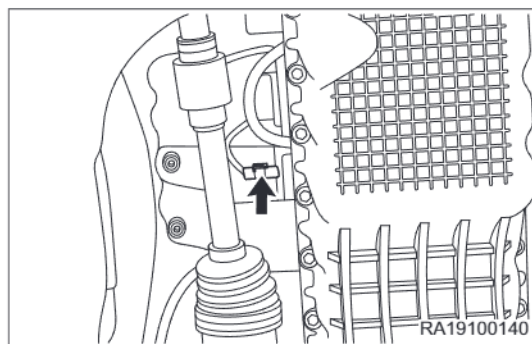
Removal

1. Release the fuel system pressure ([See page 08-11](#)).
2. Turn off all the electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove the engine trim cover.
5. Remove the fuel rail injector assembly ([See page 08-25](#)).
6. Remove the electronic throttle assembly ([See page 10-12](#)).
7. Remove the intake manifold assembly.

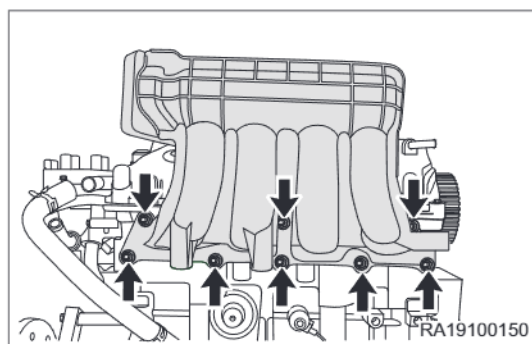
- a. Disconnect the intake pressure/temperature sensor connector (1), loosen and remove the intake pressure/temperature sensor fixing bolt (arrow), and remove the intake pressure/temperature sensor.
(Tightening torque: $8 \pm 1 \text{ N}\cdot\text{m}$)



- b. Loosen the elastic clamp (2) and disconnect the connection between PCV valve hose and intake manifold.
- c. Loosen the elastic clamp (3) and disconnect the connection between vacuum booster hose and intake manifold.
- d. Disconnect the canister solenoid valve connector (4), and move away the canister solenoid valve from the bracket.
- e. Disconnect the oil pressure switch connector (arrow) and wiring harness clip.



- f. Remove 8 fixing nuts (arrow) from the intake manifold.
(Tightening torque: $22.5 \pm 2.5 \text{ N}\cdot\text{m}$)

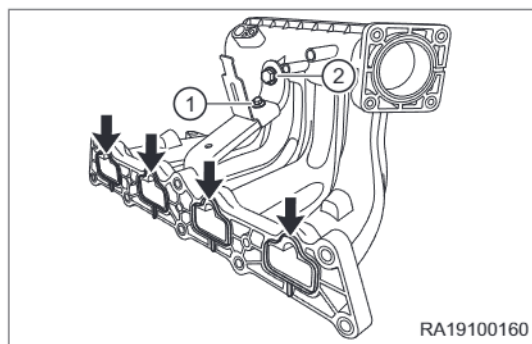


- g. Move away the oil dipstick tube and engine wiring harness bracket, and remove the engine right lifting eye and intake manifold assembly.

HINT:

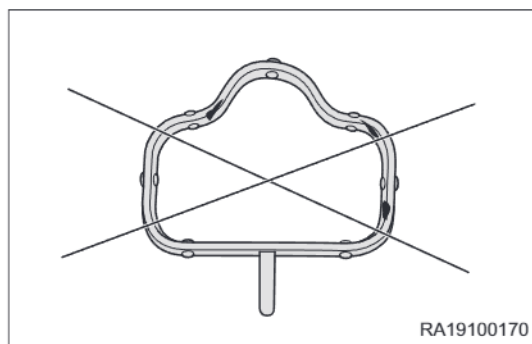
Pull out the oil dipstick from the oil dipstick tube if necessary.

8. Disassemble the intake manifold.
 - a. Remove the canister solenoid valve bracket fixing bolt (1), and remove the canister solenoid valve bracket. (Tightening torque: 10 ± 2 N·m)
 - b. Remove the intake manifold upper bracket fixing bolt (2), and remove the intake manifold upper bracket. (Tightening torque: 18 ± 2 N·m)
 - c. Remove the gaskets (arrow) from the intake manifold.



Inspection

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



10

Installation

Installation is in the reverse order of removal.

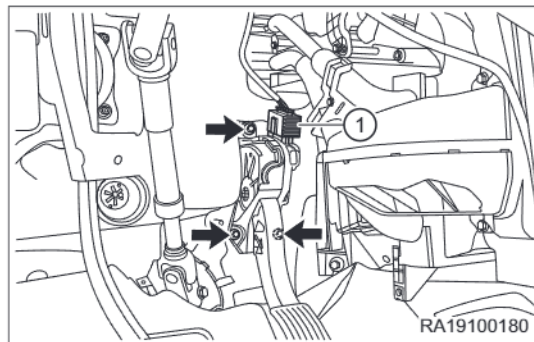
CAUTION

- Clean all the surfaces of the intake manifold and cylinder head.
- If the intake manifold gasket is damaged, replace it.

Electronic Accelerator Pedal

Removal

1. Turn off all the electrical equipment and 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 bolts (arrow) from the electronic accelerator pedal.
(Tightening torque: $10 \pm 2 \text{ N}\cdot\text{m}$)



- c. Remove the electronic accelerator pedal.

Installation

Installation is in the reverse order of removal.

