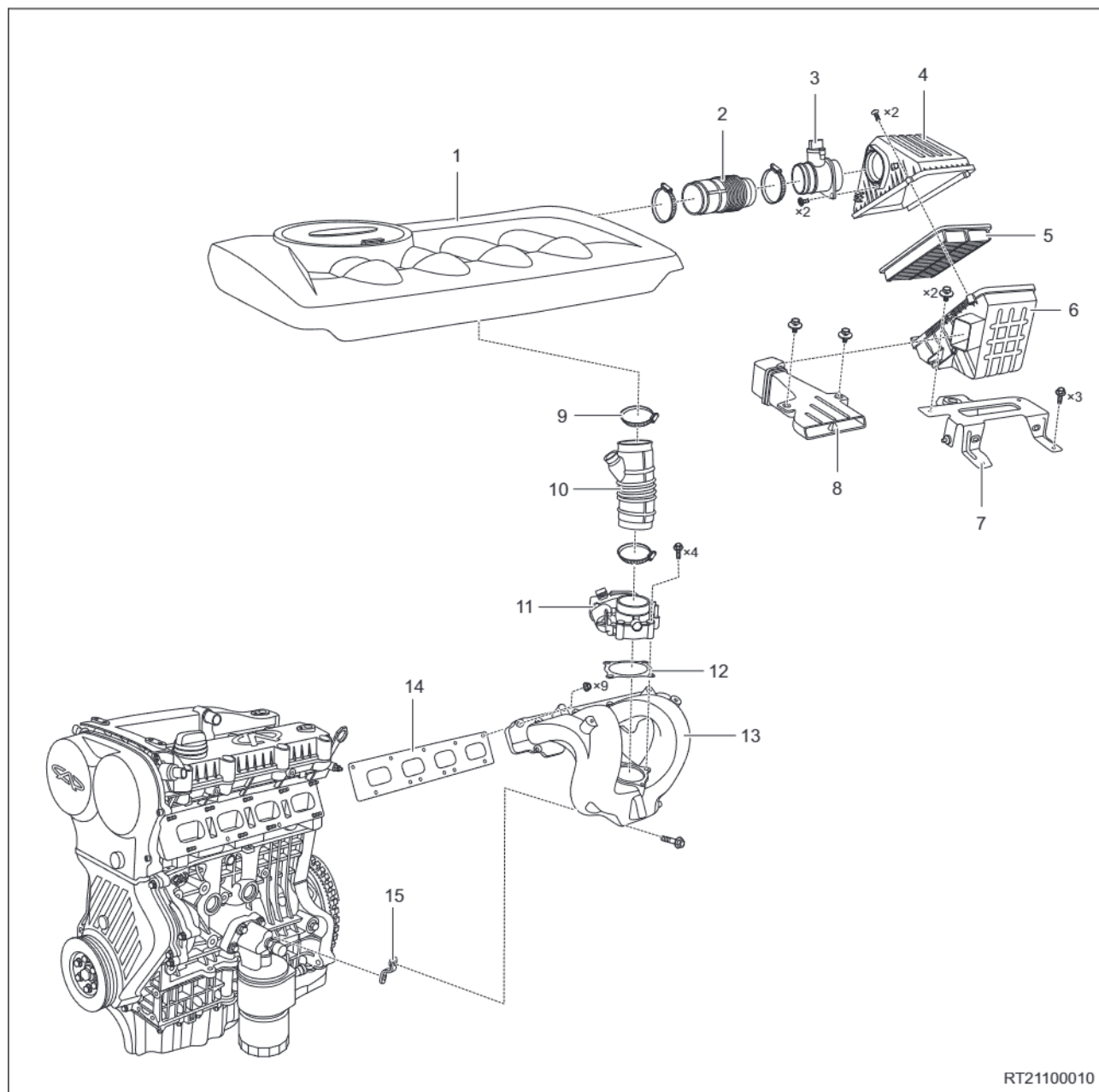


SQR484F INTAKE SYSTEM

GENERAL INFORMATION	10-3	Air Induction Pipe Assembly	10-16
Description	10-3	Removal	10-16
Specifications	10-4	Installation	10-16
Tools	10-4	Air Filter Assembly & Bracket	10-17
Circuit Diagram	10-6	Removal	10-17
DIAGNOSIS & TESTING	10-9	Installation	10-19
Problem Symptoms Table	10-9	Electronic Throttle Assembly	10-20
ON-VEHICLE SERVICE	10-10	On-vehicle Inspection	10-20
Engine Trim Cover Assembly & Bracket	10-10	Removal	10-20
Removal	10-10	Inspection	10-22
Installation	10-12	Cleaning	10-22
Hot Wire Air Flow Meter	10-13	Installation	10-23
Removal	10-13	Intake Manifold Assembly	10-24
Installation	10-13	Removal	10-24
Air Filter Element	10-14	Inspection	10-26
Removal	10-14	Installation	10-26
Installation	10-15	Electronic Accelerator Pedal	10-27
		Removal	10-27
		Installation	10-27

GENERAL INFORMATION

Description



10

RT21100010

1 - Engine Trim Cover Assembly	2 - Rear Intake Hose
3 - Hot Wire Air Flow Meter	4 - Air Filter Upper Housing
5 - Air Filter Element	6 - Air Filter Lower Housing
7 - Air Filter Assembly Bracket	8 - Air Induction Pipe Assembly
9 - Worm Clamp	10 - Front Intake Hose
11 - Electronic Throttle Assembly	12 - Electronic Throttle Assembly Gasket
13 - Intake Manifold Assembly	14 - Intake Manifold Gasket
15 - Intake Manifold Assembly Lower Bracket	

Intake system mainly consists of air induction pipe, air filter assembly, hot wire air flow meter, intake hose, electronic throttle assembly and intake manifold assembly, etc.

Intake system uses air filter to filter particles and dust in air. The air filtered flows into intake manifold 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 adjust the intake passage area according to driver's driving intention. It controls intake air volume to meet intake requirement of engine in different operating conditions, and sends back position signals of throttle valve plate to control unit to achieve accurate control.

Specifications

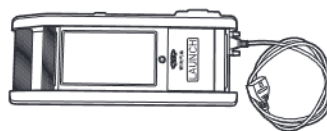
Torque Specifications

Description	Torque (N·m)
Trim Cover Front Bracket Fixing Bolt	7 ± 1
Trim Cover Rear Right Bracket Fixing Bolt	7 ± 1
Trim Cover Rear Left Bracket Fixing Bolt	7 ± 1
Coupling Screw between Air Filter Upper Housing and Lower Housing	1.3 ± 0.2
Air Induction Pipe Assembly Fixing Bolt	7 ± 1
Air Filter Assembly Left Fixing Bolt	7 ± 1
Air Filter Assembly Right Fixing Bolt	7 ± 1
Hot Wire Air Flow Meter Fixing Bolt	4.5 ± 0.5
Air Filter Assembly Bracket Fixing Bolt	7 ± 1
Electronic Throttle Assembly Fixing Bolt	8 ± 3
Intake Manifold Bracket Fixing Bolt	18 ± 2
Oil Dipstick Fixing Bolt	8 ± 3
Engine Wire Harness Fixing Bolt	8 ± 3
Intake Manifold Assembly Fixing Nut	8 ± 3
Electronic Accelerator Pedal Fixing Bolt	10 ± 2
Worm Clamp	5 ± 0.5

Tools

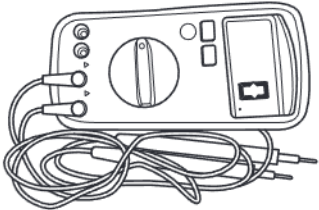
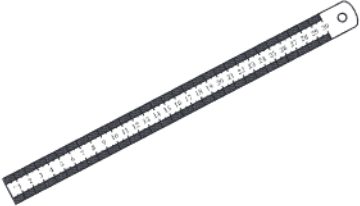
Special Tool

X-431 3G Diagnostic Tester



RCH0000001

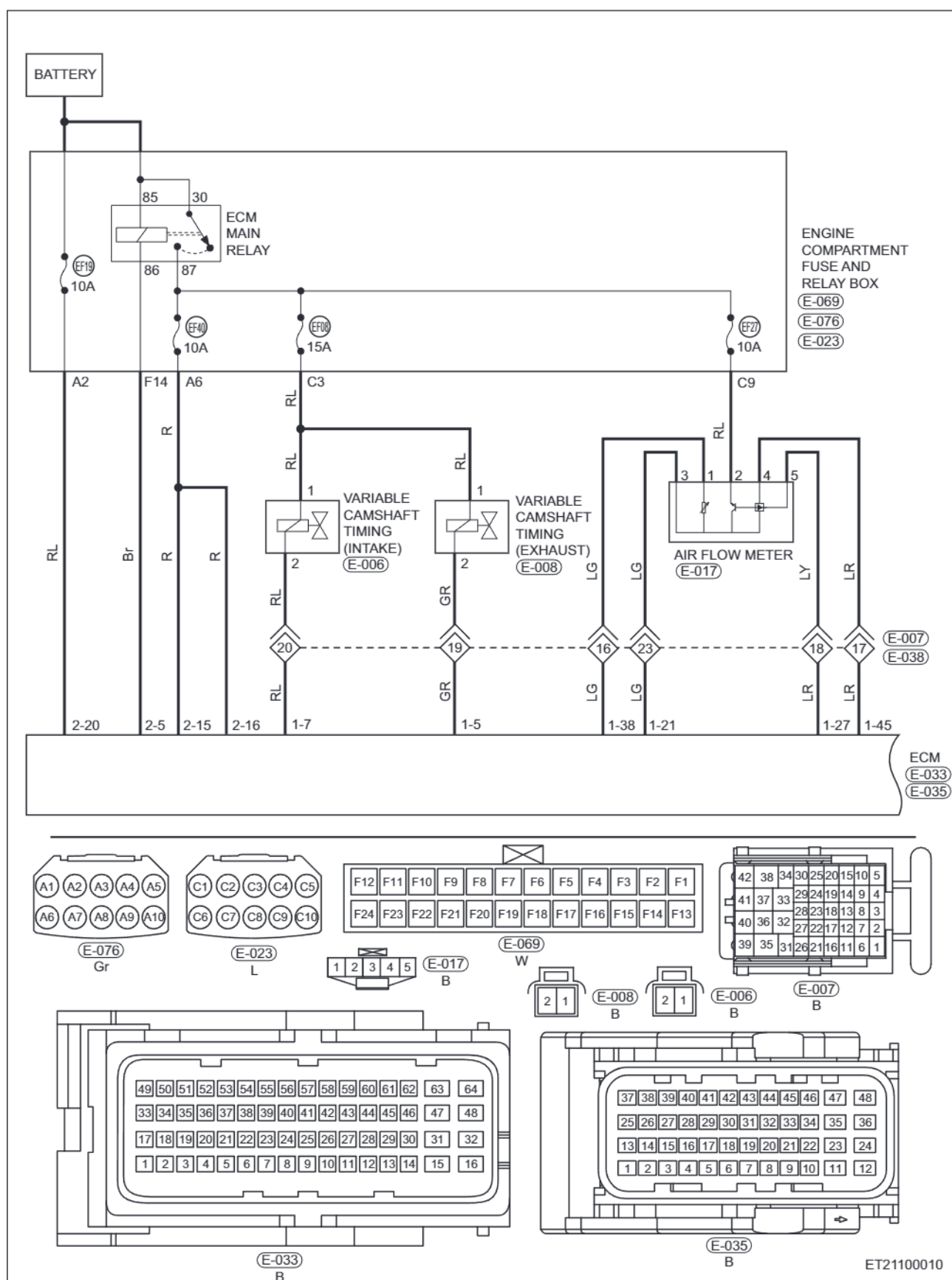
General Tools

Digital Multimeter	 RCH0000002
Precision Ruler	 RCH0000063
Feeler Gauge	 RCH0000060

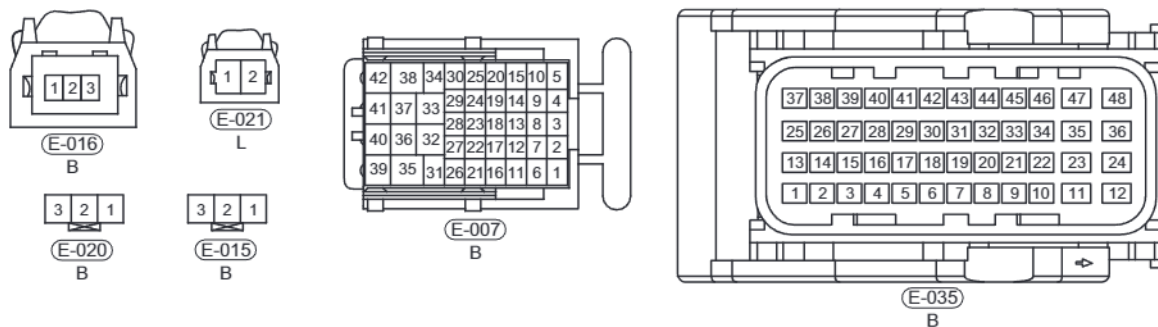
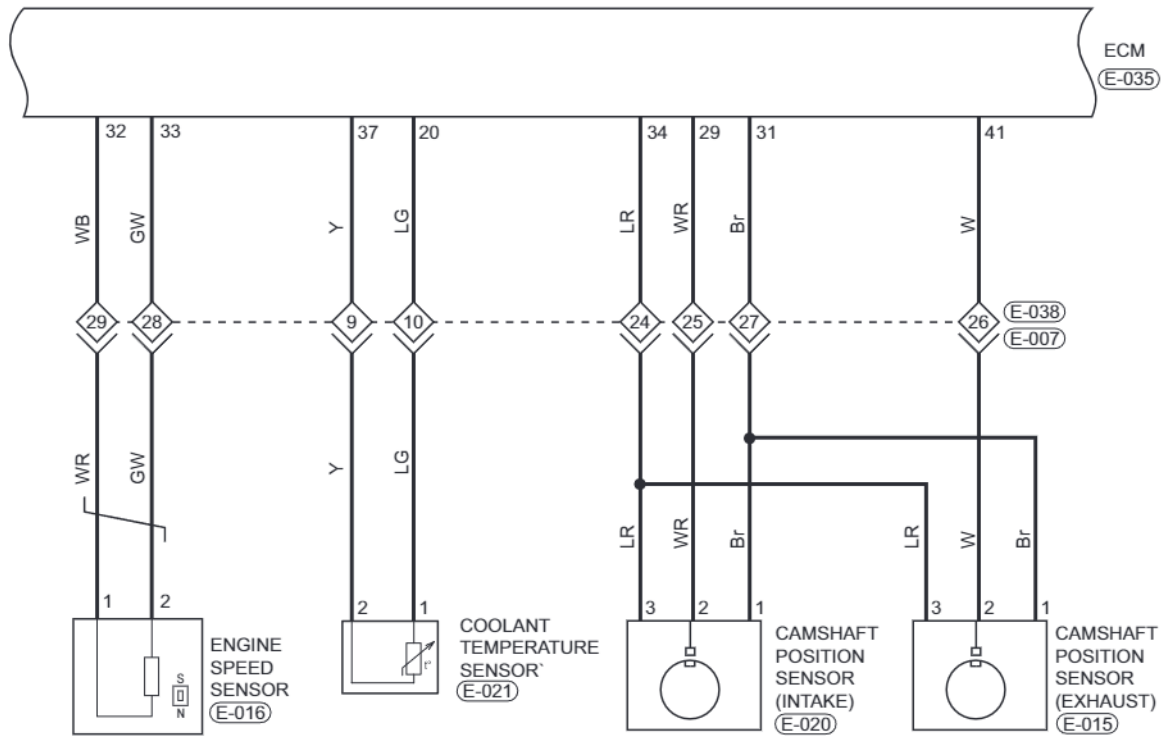
10

Circuit Diagram

Intake System (Page 1 of 3)

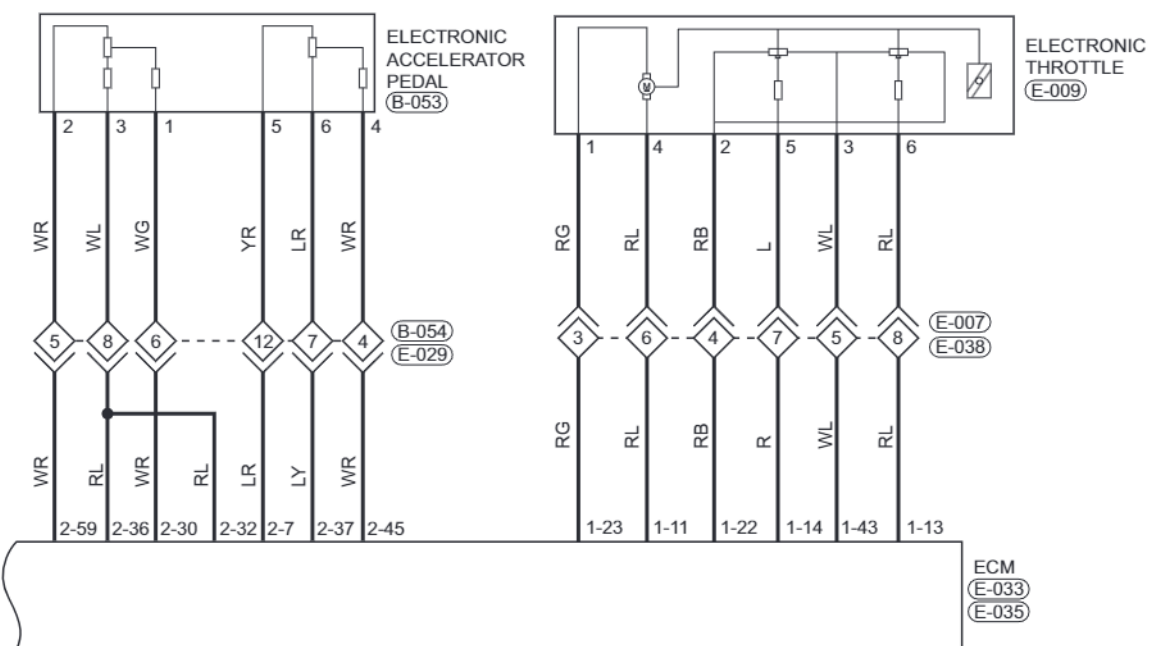
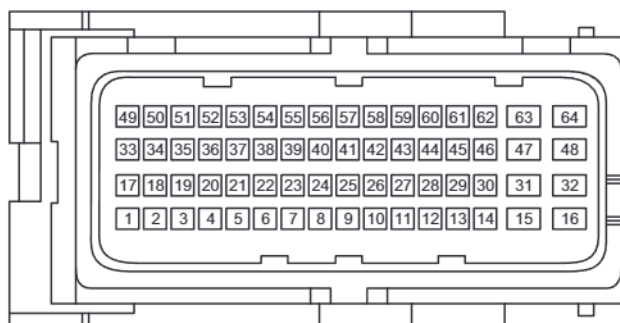
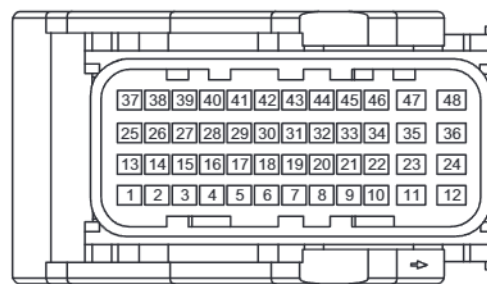


Intake System (Page 2 of 3)



ET21100020

Intake System (Page 3 of 3)

B-053
BE-029
WE-009
BE-007
BE-033
BE-035
B

ET21100030

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 as necessary.

Symptom	Suspected Area	See page
Engine idles roughly	Engine trim cover assembly (broken, leaked)	10-10
	Electronic throttle assembly (dirty)	10-20
	Intake manifold assembly (broken, leaked)	10-24
	Activated charcoal canister solenoid valve (remains open)	09-7
	Hot wire air flow meter	10-13
	Throttle gasket (damaged)	10-20
	Fuel rail injector assembly (installed incorrectly)	08-26
Intake system leaks	Engine trim cover assembly (broken, leaked)	10-10
	Air filter (broken, leaked)	10-17
	Intake manifold assembly (broken, leaked)	10-24
	Electronic throttle assembly	10-20
	Crankcase vent tube	-
	Intake line or component connection	-
Intake system blocked	Air filter element (damaged, blocked)	10-17
	Engine trim cover assembly (blocked)	10-10
	Intake line (blocked)	-

ON-VEHICLE SERVICE

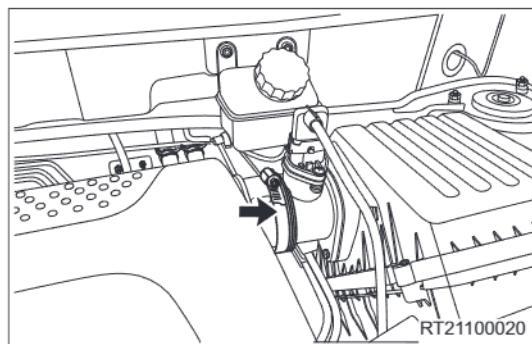
Engine Trim Cover Assembly & Bracket

Removal

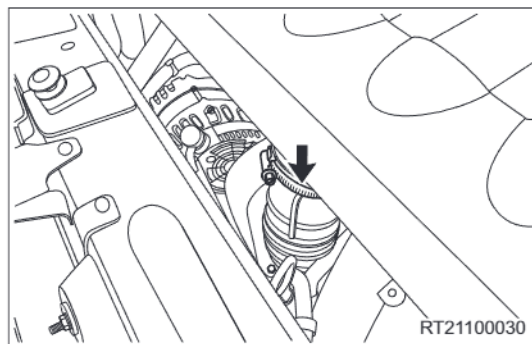
CAUTION

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

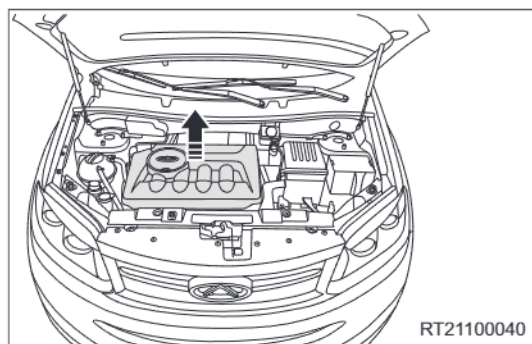
1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly.
 - a. Loosen the worm clamp (arrow) and disconnect the connection between rear intake hose and hot wire air flow meter.
(Tightening torque: $5 \pm 0.5 \text{ N}\cdot\text{m}$)



- b. Loosen the worm clamp (arrow) and disconnect the connection between front intake hose and engine trim cover assembly.
(Tightening torque: $5 \pm 0.5 \text{ N}\cdot\text{m}$)



- c. Remove the engine trim cover assembly from the bracket.

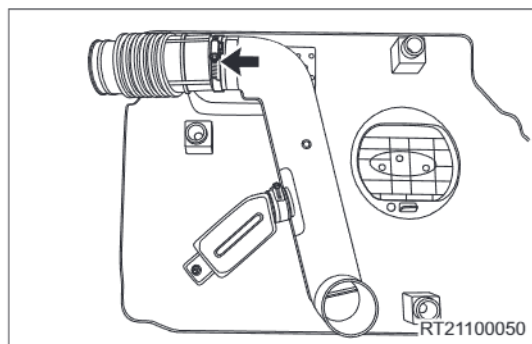


CAUTION

- Cover front intake hose with a plastic bag after removing engine trim cover assembly to prevent foreign matter entering front intake hose.

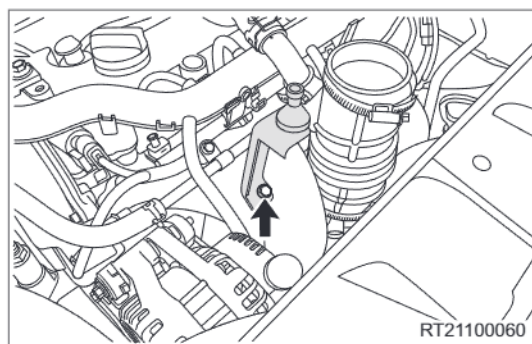
4. Remove the rear intake hose.

- Loosen the worm clamp (arrow) and remove the rear intake hose from the engine trim cover assembly. (Tightening torque: $5 \pm 0.5 \text{ N}\cdot\text{m}$)



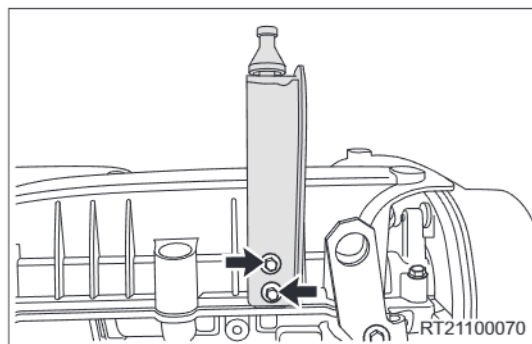
5. Remove the trim cover front bracket.

- Remove the trim cover front bracket fixing bolt (arrow), and remove the trim cover front bracket. (Tightening torque: $7 \pm 1 \text{ N}\cdot\text{m}$)

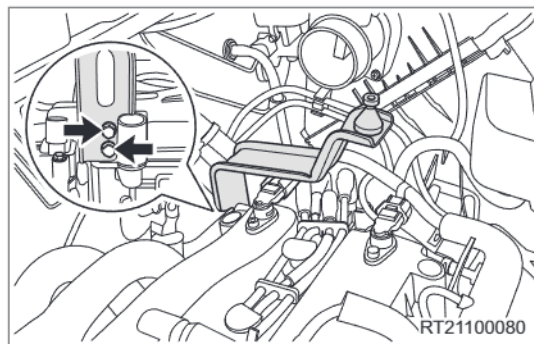


6. Remove the trim cover rear right bracket.

- Remove the exhaust manifold heat insulator.
- Remove 2 fixing bolts (arrow) from the trim cover rear right bracket, and remove the trim cover rear right bracket. (Tightening torque: $7 \pm 1 \text{ N}\cdot\text{m}$)



7. Remove the trim cover rear left bracket.
 - a. Remove 2 fixing bolts (arrow) from the trim cover rear left bracket, and remove the trim cover rear left bracket.
(Tightening torque: $7 \pm 1 \text{ N}\cdot\text{m}$)



Installation

Installation is in the reverse order of removal.

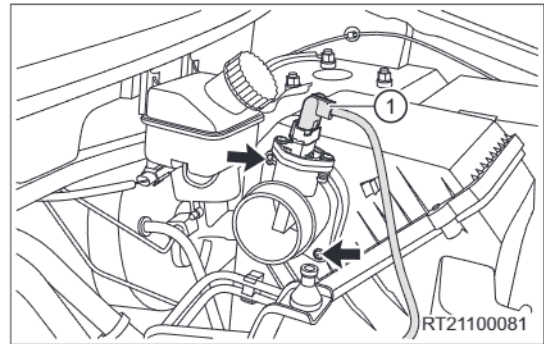
Hot Wire Air Flow Meter

Removal

CAUTION

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

1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly ([See page 10-10](#)).
4. Remove the hot wire air flow meter.
 - a. Disconnect the hot wire air flow meter connector (1).
 - b. Remove 2 fixing bolts (arrow) from the hot wire air flow meter.
(Tightening torque: $4.5 \pm 0.5 \text{ N}\cdot\text{m}$)



10

- c. Remove the hot wire air flow meter.

Installation

Installation is in the reverse order of removal.

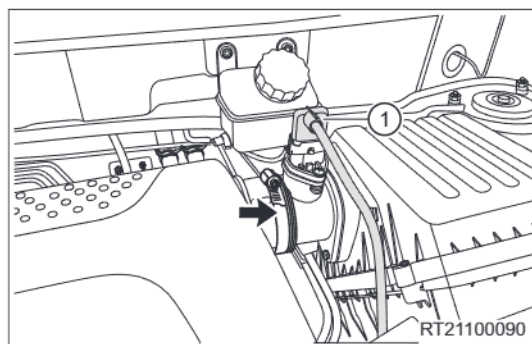
Air Filter Element

Removal

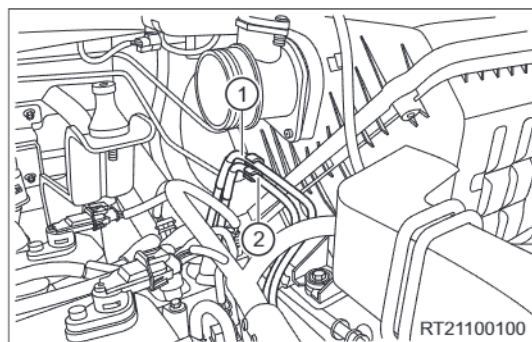
CAUTION

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

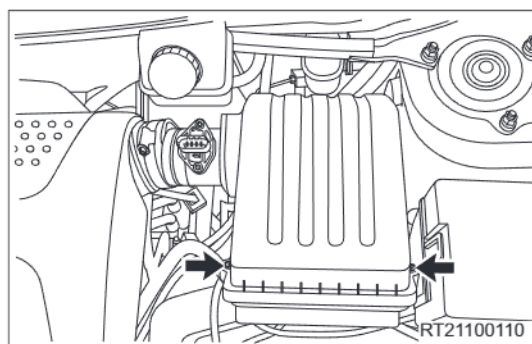
1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air filter element.
 - a. Loosen the worm clamp (arrow) and disconnect the connection between rear intake hose and hot wire air flow meter.
(Tightening torque: $5 \pm 0.5 \text{ N}\cdot\text{m}$)
 - b. Disconnect the hot wire air flow meter connector (1).



- c. Move the inlet pipe II assembly (1) and fuel vapor tube III assembly (2) from the pipe clamp on the air filter upper housing.

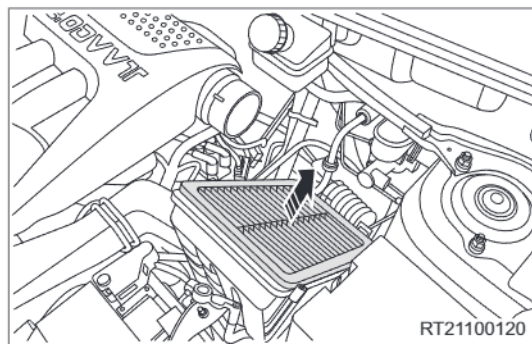


- d. Remove 2 coupling screws (arrow) between air filter upper housing and lower housing.
(Tightening torque: $1.3 \pm 0.2 \text{ N}\cdot\text{m}$)



- e. Remove the air filter upper housing.

- f. Take out the air filter element.



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

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

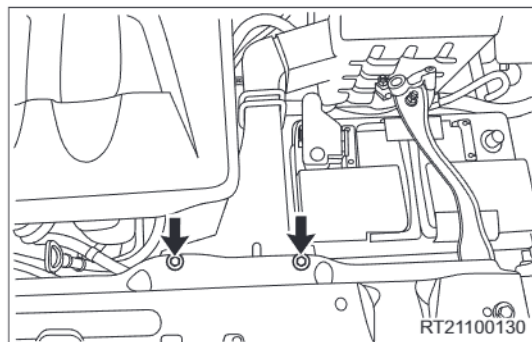
Air Induction Pipe Assembly

Removal

CAUTION

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

1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air induction pipe assembly.
 - a. Remove 2 fixing bolts (arrow) from the air induction pipe assembly.
(Tightening torque: 7 ± 1 N·m)



- b. Remove the air induction pipe assembly from the air filter assembly.

Installation

Installation is in the reverse order of removal.

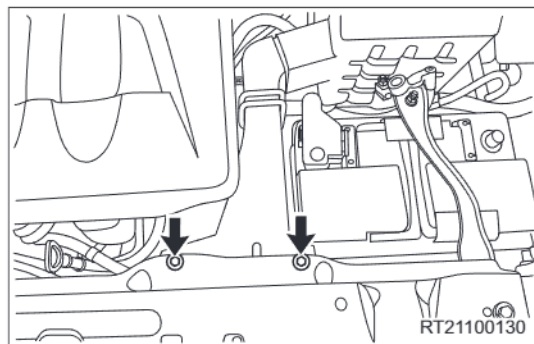
Air Filter Assembly & Bracket

Removal

CAUTION

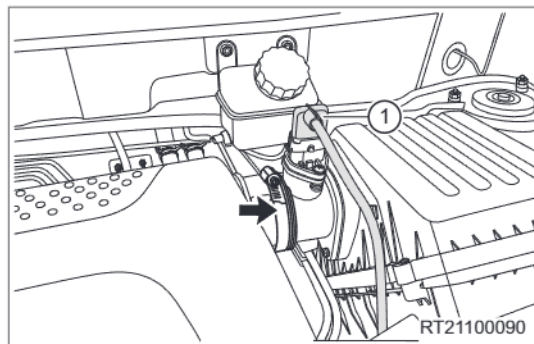
- Be sure to wear necessary safety equipment when repairing to prevent accidents.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the air induction pipe assembly.
 - a. Remove 2 fixing bolts (arrow) from the air induction pipe assembly.
(Tightening torque: $7 \pm 1 \text{ N}\cdot\text{m}$)

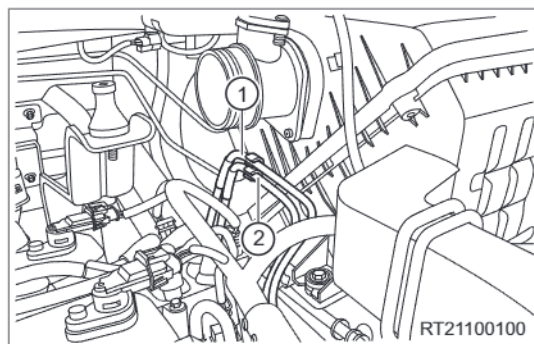


10

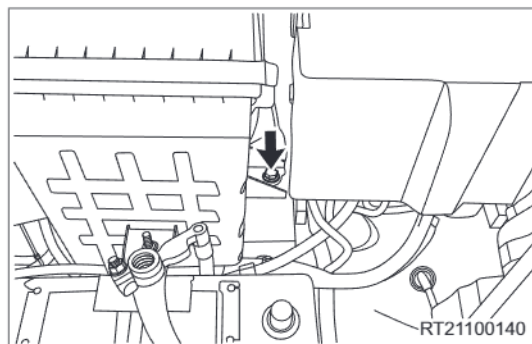
- b. Remove the air induction pipe assembly.
4. Remove the air filter assembly.
 - a. Loosen the worm clamp (arrow) and disconnect the connection between rear intake hose and hot wire air flow meter.
(Tightening torque: $5 \pm 0.5 \text{ N}\cdot\text{m}$)
 - b. Disconnect the hot wire air flow meter connector (1).



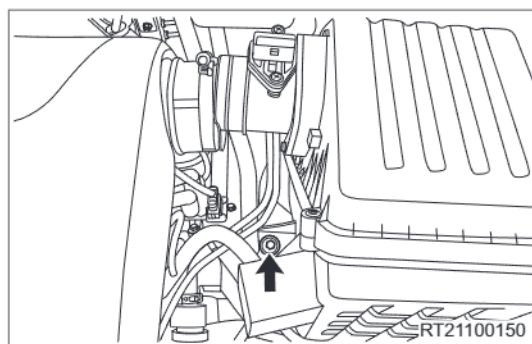
- c. Move the inlet pipe II assembly (1) and canister solenoid valve inlet pipe (2) from the bracket on air filter upper housing.



- d. Remove the air filter assembly left fixing bolt (arrow).
(Tightening torque: 7 ± 1 N·m)



- e. Remove the air filter assembly right fixing bolt (arrow).
(Tightening torque: 7 ± 1 N·m)



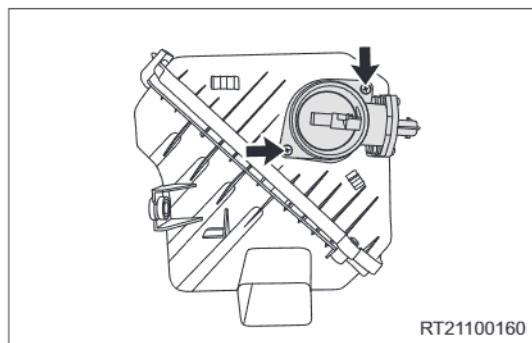
10

- f. Remove the air filter assembly from the bracket.

HINT:

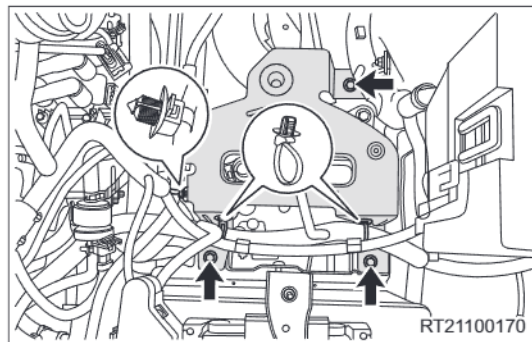
Make sure that connection between wire harness and air filter assembly is disconnected.

5. Remove the hot wire air flow meter.
a. Remove 2 fixing bolts (arrow) from the hot wire air flow meter.
(Tightening torque: 4.5 ± 0.5 N·m)



- b. Remove the hot wire air flow meter from the air filter assembly.

6. Remove the air filter assembly bracket.
 - a. Disconnect 3 wire harness clips from the air filter assembly bracket.
 - b. Remove 3 fixing bolts (arrow) from the air filter assembly bracket.
(Tightening torque: 7 ± 1 N·m)



- c. Remove the air filter assembly bracket.

Installation

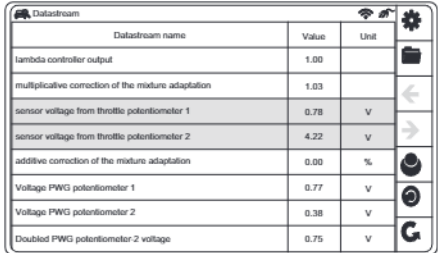
Installation is in the reverse order of removal.

Electronic Throttle Assembly

On-vehicle Inspection

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

Data Flow Name	Specification (V)
Throttle potentiometer 1 signal voltage	0.78
Throttle potentiometer 2 signal voltage	4.22



DataStream name	Value	Unit
lambda controller output	1.00	
multiplicative correction of the mixture adaptation	1.03	
sensor voltage from throttle potentiometer 1	0.78	V
sensor voltage from throttle potentiometer 2	4.22	V
additive correction of the mixture adaptation	0.00	%
Voltage PWG potentiometer 1	0.77	V
Voltage PWG potentiometer 2	0.38	V
Doubled PWG potentiometer 2 voltage	0.75	V

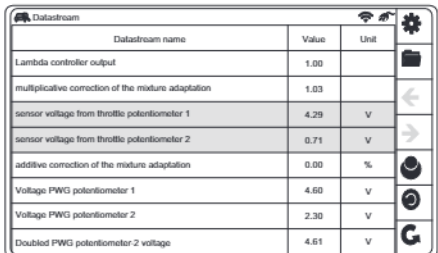
RT21100171

10

- Depress accelerator pedal.

Data Flow Name	Specification (V)
Throttle potentiometer 1 signal voltage	4.29
Throttle potentiometer 2 signal voltage	0.71

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



DataStream name	Value	Unit
lambda controller output	1.00	
multiplicative correction of the mixture adaptation	1.03	
sensor voltage from throttle potentiometer 1	4.29	V
sensor voltage from throttle potentiometer 2	0.71	V
additive correction of the mixture adaptation	0.00	%
Voltage PWG potentiometer 1	4.60	V
Voltage PWG potentiometer 2	2.30	V
Doubled PWG potentiometer 2 voltage	4.61	V

RT21100172

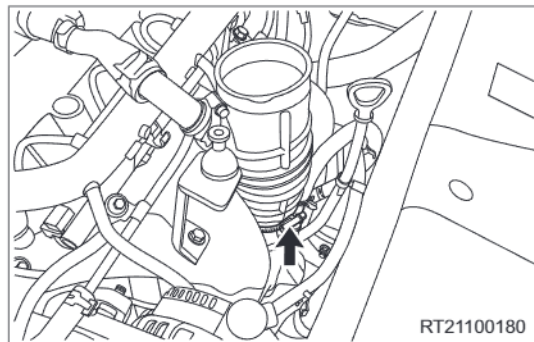
Removal

CAUTION

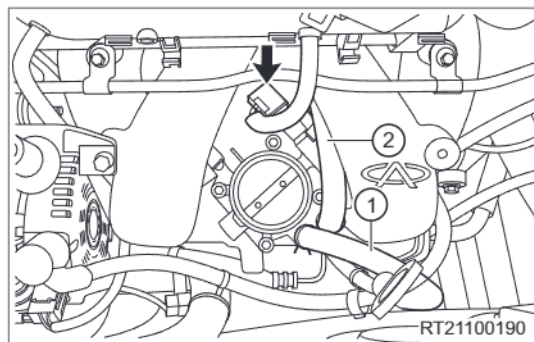
- Temperature of hood is very high when engine is running. Before removal, make sure engine has stopped running and hood has cooled down, otherwise, there is a risk of scald injury.
- Be sure to wear necessary safety equipment when repairing to prevent accidents.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all the electrical equipment and ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover assembly (See page 10-10).
4. Remove the electronic throttle assembly.

- a. Loosen the worm clamp (arrow) and disconnect the connection between front inlet hose and electronic throttle assembly.
(Tightening torque: $5 \pm 0.5 \text{ N}\cdot\text{m}$)



- b. Disconnect the electronic throttle assembly connector (arrow).
c. Loosen the elastic clamp, and disconnect the connection between throttle body preheat water intake hose (1) and electronic throttle assembly.
d. Loosen the hose clamp, and disconnect the connection between throttle body preheat water outlet hose (2) and electronic throttle assembly.



10

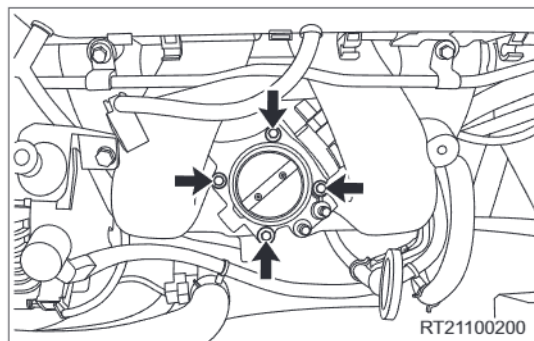
CAUTION

- After disconnecting throttle body preheat water inlet hose and outlet hose, cover the hoses with wooden corks or equivalent to prevent coolant in hoses from flowing out.
- If your body contacts coolant accidentally, clean it with water immediately. If it is serious, please go to hospital.
- DO NOT allow engine coolant enter electronic throttle assembly. If the coolant enters, wipe them with a clean cotton yarn immediately.

ENVIRONMENTAL PROTECTION

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

- e. Remove 4 fixing bolts (arrow) from the electronic throttle assembly.
(Tightening torque: $8 + 3 \text{ N}\cdot\text{m}$)

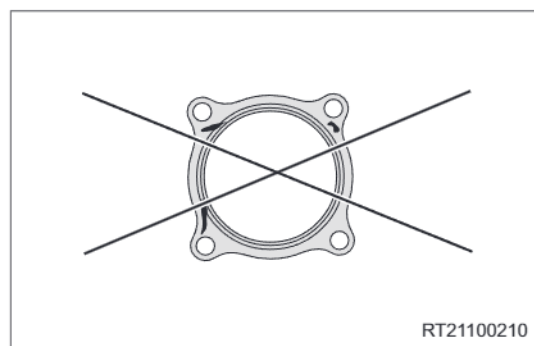


- f. Remove the electronic throttle assembly and its gasket.

Inspection

1. Check electronic throttle assembly gasket.

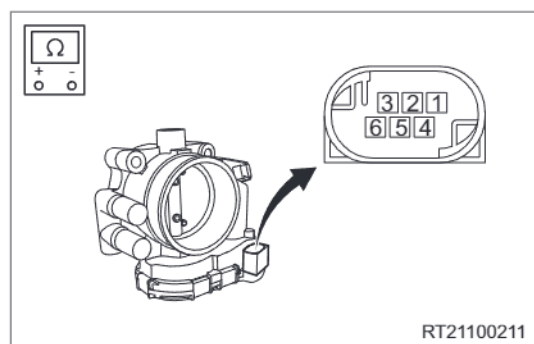
Check electronic throttle assembly gasket for worn or bent. If there is worn or bent, replace electronic throttle assembly gasket.



2. Check electronic throttle.

Measure electronic throttle resistance according to the table below.

Tester Connection	Adjustment	Specified Condition
Terminal 3 - Terminal 2	Normal temperature	1.067 k Ω
Terminal 6 - Terminal 2 Terminal 6 - Terminal 3	Rotate throttle	Resistance between terminal 6 and terminal 2 increases as throttle opens; resistance between terminal 6 and terminal 3 decreases as throttle opens.
Terminal 5 - Terminal 2 Terminal 5 - Terminal 3	Rotate throttle	Resistance between terminal 5 and terminal 2 decreases as throttle opens; resistance between terminal 5 and terminal 3 increases as throttle opens.



10

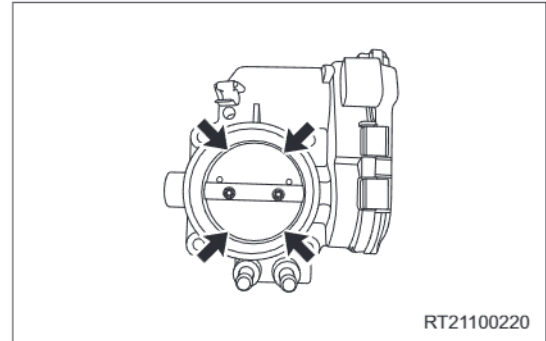
Cleaning

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, avoiding scratching or deforming the valve plate.
- Clean cloth or paper towel

Cleaning Process

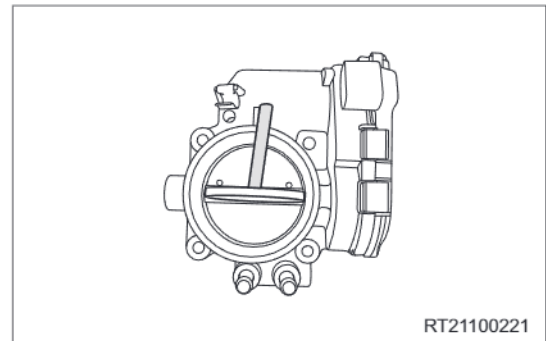
1. Remove throttle body, and make the valve plate face upward in free condition. Avoid cleaner flowing into electronic element through valve plate shaft, resulting in functional failure.
2. Start to clean when it is as shown in the illustration.



WARNING

- Cleaner is a kind of flammable and corrosive fluid. Follow 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 a clean cloth.
4. Support the throttle valve plate with thin stick, and clean the carbon on valve plate and throttle valve body inner wall.



10

5. Turn over the throttle 180°, and perform cleaning with the same procedures as above. Repeat several times until it is clean.
6. Push the valve plate by hand, and check if valve plate rotates smoothly. If it is stuck, clean the valve plate again following the 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 06-19](#)). After self-learning completed, start vehicle and observe if it operates properly.
- Check and add engine coolant.

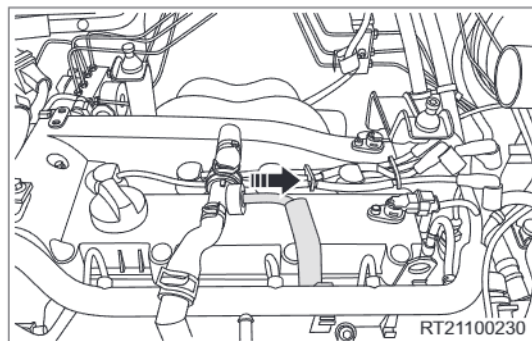
Intake Manifold Assembly

Removal

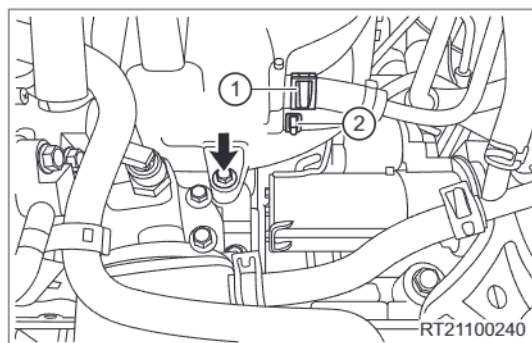
CAUTION

- Temperature of hood is very high when engine is running. Before removal, make sure engine has stopped running and hood has cooled down, otherwise, there is a risk of scald injury.
- Be sure to wear necessary safety equipment when repairing to prevent accidents.
- Try to prevent body paint surface from being scratched during removal and installation.

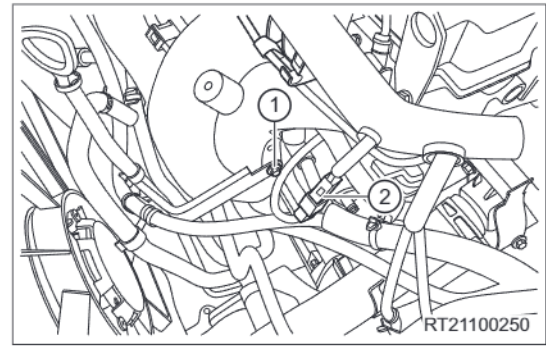
1. Release fuel system pressure ([See page 08-10](#)).
2. Turn off all the electrical equipment and ignition switch.
3. Disconnect the negative battery cable.
4. Remove the engine trim cover assembly ([See page 10-10](#)).
5. Remove the fuel rail injector assembly ([See page 08-26](#)).
6. Remove the electrical throttle assembly ([See page 10-20](#)).
7. Remove the trim cover front bracket ([See page 10-11](#)).
8. Remove the intake manifold assembly.
 - a. Pull out the line assembly with PCV valve assembly from the PCV valve rubber boot in the direction of arrow as shown in the illustration.



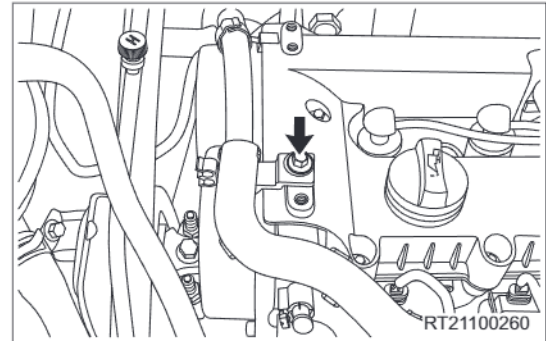
- b. Loosen the elastic clamp (1) and disconnect the connection between vacuum booster hose and intake manifold assembly.
- c. Loosen the elastic clamp (2) and disconnect the connection between canister solenoid valve outlet hose and intake manifold assembly.
- d. Remove the intake manifold bracket fixing bolt (arrow).
(Tightening torque: $18 \pm 2 \text{ N}\cdot\text{m}$)



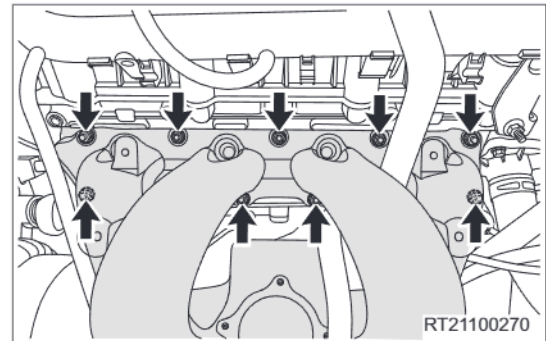
- e. Remove the fixing bolt (1) of oil dipstick on intake manifold assembly.
(Tightening torque: 8 ± 3 N·m)
- f. Disconnect the starter field wire harness connector (2).



- g. Remove the fixing bolt (arrow) of the engine wire harness on cylinder head cover.
(Tightening torque: 8 ± 3 N·m)



- h. Remove 9 fixing nuts (arrow) from the intake manifold assembly.
(Tightening torque: 8 ± 3 N·m)

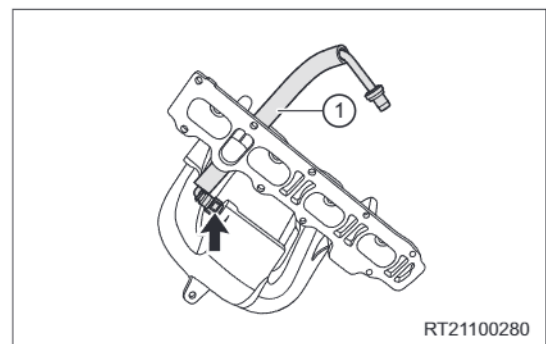


- i. Move the engine wire harness away, and remove the intake manifold assembly.

HINT:

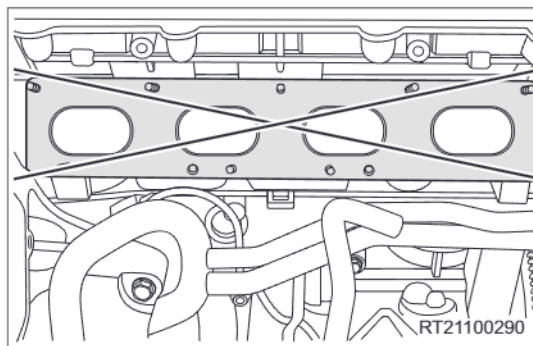
While removing the intake manifold assembly, disconnect the intake camshaft variable timing control valve connector, knock sensor connector, back-up light switch and back-up light switch wire harness clip (for MT model).

9. Disconnect the coupling joint (arrow) between line assembly and intake manifold assembly, and remove the line assembly (1) from the intake manifold assembly.



Inspection

1. Clean and check the fitting surface between intake manifold assembly and cylinder head.
2. Measure the surface warpage of cylinder head intake side with precision ruler and feeler gauge diagonally as shown in the illustration. If surface warpage is more than 0.04 mm, replace the cylinder head.



Installation

Installation is in the reverse order of removal.

CAUTION

- Clean the inner wall of intake manifold assembly and the fitting surface.
- Replace intake manifold gasket.

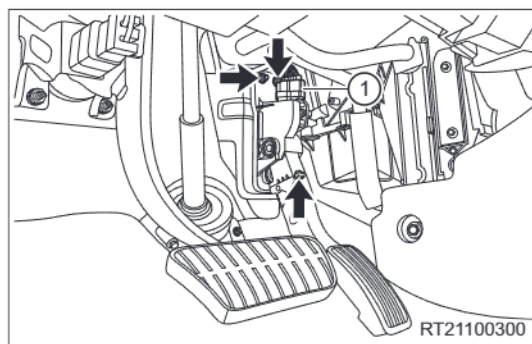
Electronic Accelerator Pedal

Removal

CAUTION

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

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: $10 \pm 2 \text{ N}\cdot\text{m}$)



10

- c. Remove the electronic accelerator pedal.

Installation

Installation is in the reverse order of removal.

