

01-13 INTAKE-AIR SYSTEM

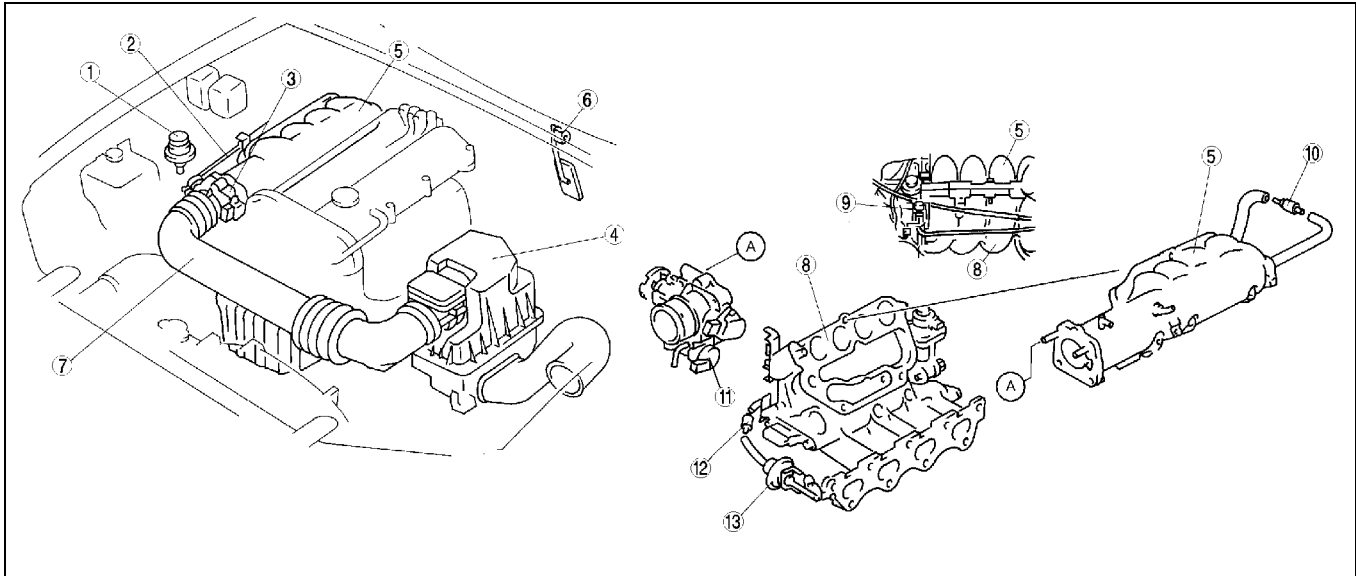
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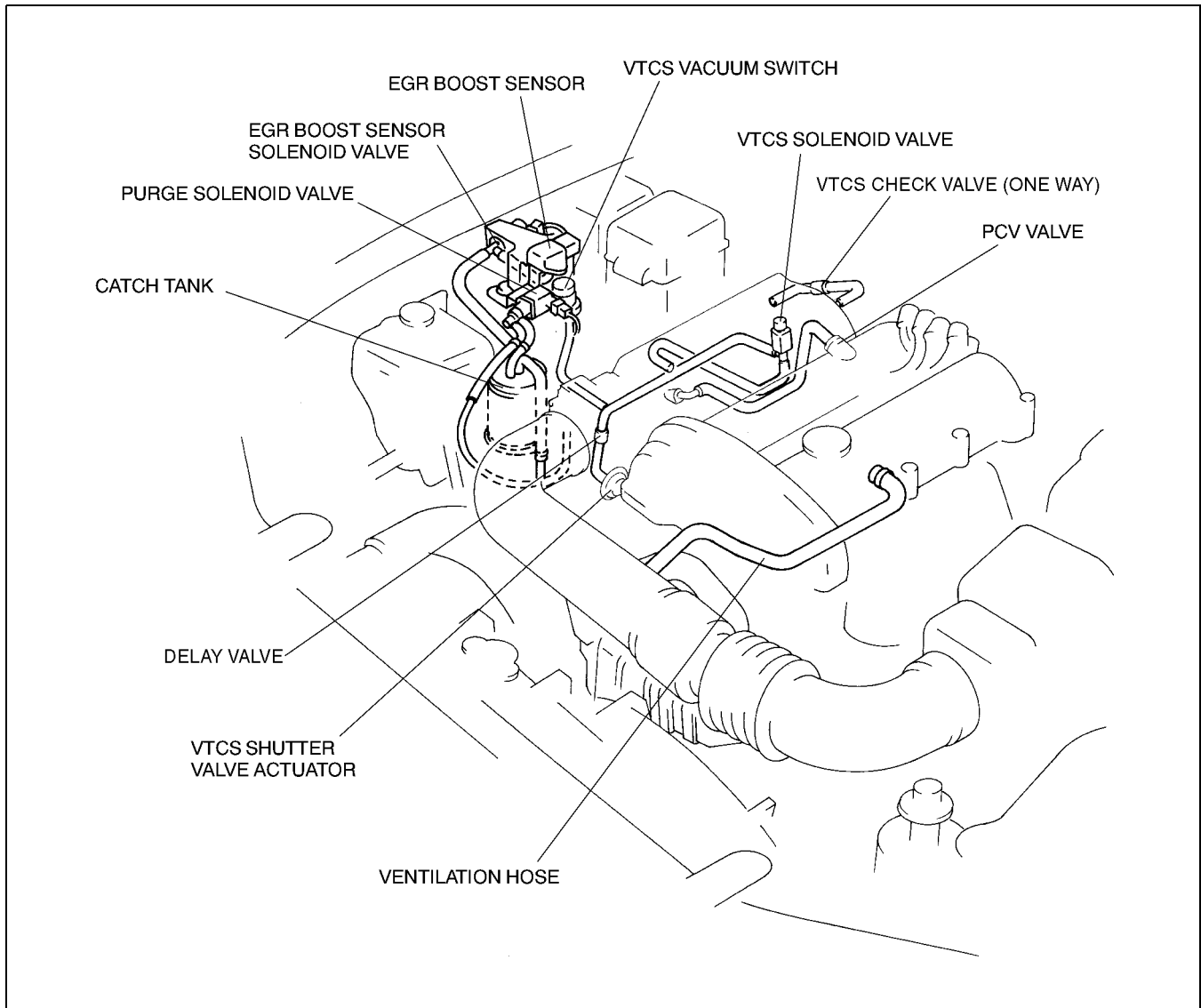
1	VTCS vacuum switch (See 01-13-8 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) VACUUM SWITCH INSPECTION)
2	Accelerator cable (See 01-13-9 ACCELERATOR CABLE INSPECTION/ADJUSTMENT/ADJUSTMENT)
3	Throttle body (TB) (See 01-13-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION)
4	Air cleaner (ACL) (See 01-13-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION)
5	Dynamic chamber (See 01-13-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION)
6	Accelerator pedal (AP) (See 01-13-9 ACCELERATOR PEDAL (AP) REMOVAL/INSTALLATION)
7	Air hose (See 01-13-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION)
8	Intake manifold (See 01-13-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION)
9	VTCS solenoid valve (See 01-13-7 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE REMOVAL/INSTALLATION) (See 01-13-8 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION)

10	VTCS check valve (one way) (See 01-13-6 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE REMOVAL/INSTALLATION) (See 01-13-6 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE INSPECTION)
11	IAC valve (See 01-13-5 IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION) (See 01-13-5 IDLE AIR CONTROL (IAC) VALVE INSPECTION)
12	Delay valve (See 01-13-6 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE REMOVAL/INSTALLATION) (See 01-13-6 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE INSPECTION)
13	VTCS shutter valve actuator (See 01-13-6 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION) (See 01-13-7 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION)

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VACUUM HOSE ROUTING DIAGRAM

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INTAKE-AIR SYSTEM REMOVAL/INSTALLATION

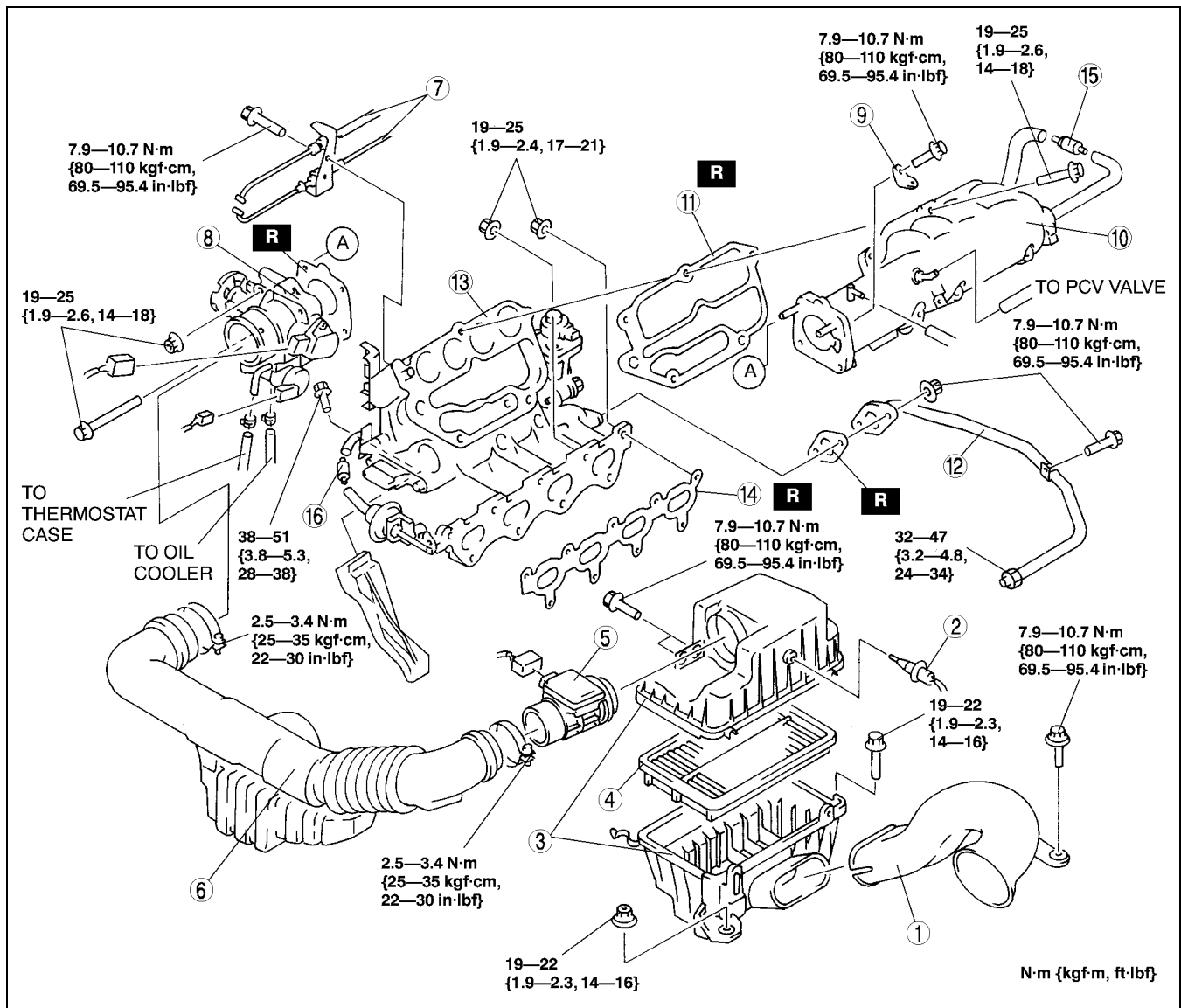
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Warning

- Hot engines and intake-air system can cause severe burns. Turn off the engine and wait until it and the intake-air system are cool before removing the intake-air system.

1. Disconnect the negative battery cable.
2. Drain the engine coolant from radiator. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Refill the engine coolant to radiator. (See 01-12-2 ENGINE COOLANT REPLACEMENT.)

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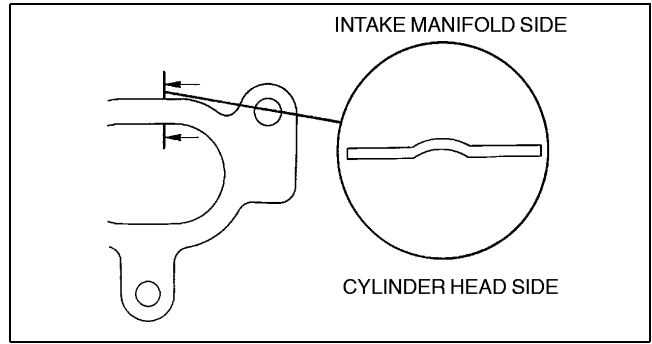
1	Fresh-air duct
2	IAT sensor
3	Air cleaner (ACL)
4	Air cleaner (ACL) element
5	MAF sensor
6	Air hose
7	Accelerator cable (and throttle cable (AT only))
8	Throttle body (TB)
9	Dynamic chamber bracket (See 01-13-5 Dynamic Chamber Bracket Installation Note)
10	Dynamic chamber

11	Dynamic chamber gasket (See 01-13-5 Dynamic Chamber Gasket Installation Note)
12	EGR pipe
13	Intake manifold
14	Intake manifold gasket (See 01-13-5 Intake Manifold Gasket Installation Note)
15	VTCS check valve (one-way)
16	Delay valve

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Intake Manifold Gasket Installation Note

1. Install the intake manifold gasket with convex side of the gasket facing the intake manifold side.

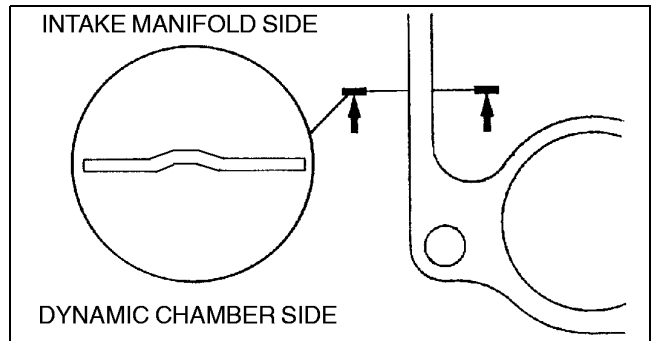


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Dynamic Chamber Gasket Installation Note

1. Install the dynamic chamber gasket with the convex side of the gasket facing the intake manifold side.



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Dynamic Chamber Bracket Installation Note

1. Tighten the bolts firmly, then tighten the dynamic chamber side bolt before tightening the fuel distributor side bolt.

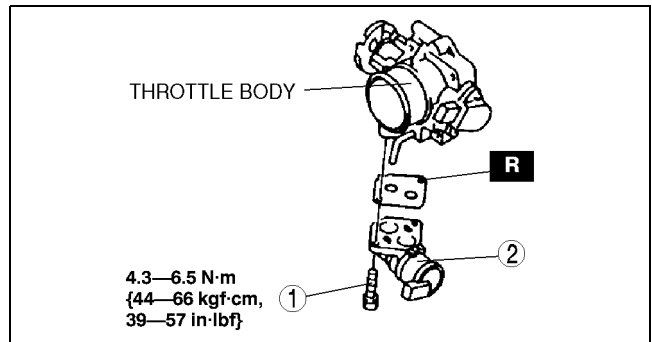
IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION

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1. Disconnect the negative battery cable.
2. Remove the air hose and the throttle body. (See 01-13-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION.)
3. Disconnect the IAC valve connector.
4. Remove in the order indicated in the table.

1	Bolt
2	IAC valve

5. Install in the reverse order of removal.



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IDLE AIR CONTROL (IAC) VALVE INSPECTION

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Note

- Perform the following test only when directed.

Simulation Test

1. Carry out the "Idle Air Control (IAC) Inspection". (See 01-03-56 Idle Air Control (IAC) Inspection.)
 - If not as specified, perform the further inspection for the IAC valve.

Resistance Inspection

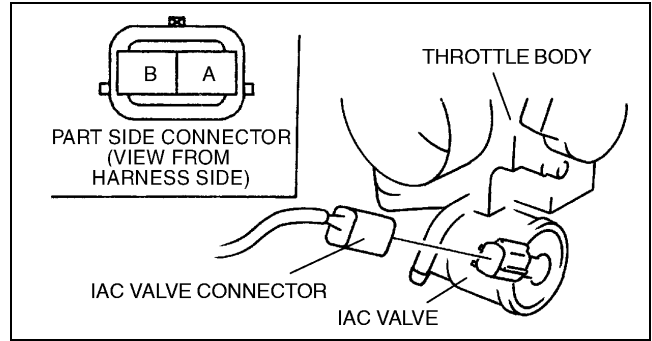
1. Disconnect the negative battery cable.
2. Disconnect the IAC valve connector.

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3. Measure the resistance between the IAC valve terminals using an ohmmeter.
 - If as specified but the Simulation Test is failed, carry out the "Circuit Open/Short Inspection".
 - If not as specified, replace the IAC valve. (See 01-13-5 IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION.)

Resistance

8.7—10.5 ohms (24°C {75°F})



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4. Remove the IAC valve, and inspect it for any damage or clogging.
 - Replace the IAC valve if not as specified. (See 01-13-5 IDLE AIR CONTROL (IAC) VALVE REMOVAL/INSTALLATION.)

Circuit Open/Short Inspection

Open circuit

- Power circuit (IAC valve connector terminal A and PCM connector terminal 2P)
- GND circuit (IAC valve connector terminal B and PCM connector terminal 2Q)

Short circuit

- IAC valve connector terminal A and PCM connector terminal 2P to GND

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE REMOVAL/INSTALLATION

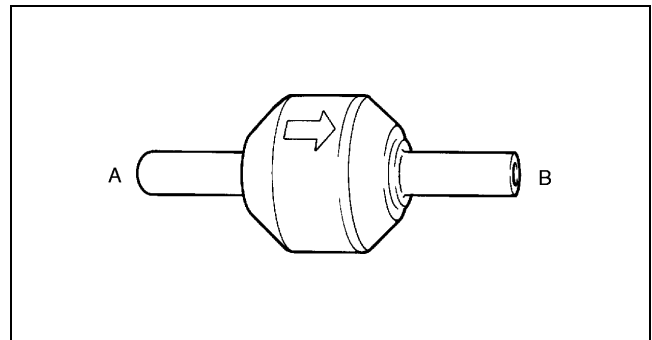
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1. Remove the VTCS check valve (one-way) or delay valve. (See 01-13-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION.)

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE INSPECTION

A5U011313995W02

1. Remove the VTCS check valve (one-way) or delay valve. (See 01-13-6 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) CHECK VALVE (ONE-WAY), DELAY VALVE REMOVAL/INSTALLATION.)
2. Blow through A and verify that the air flows from B.
3. Blow through B and verify that the air does not flow from A.
 - If not as specified, replace the VTCS check valve (one-way) or delay valve.



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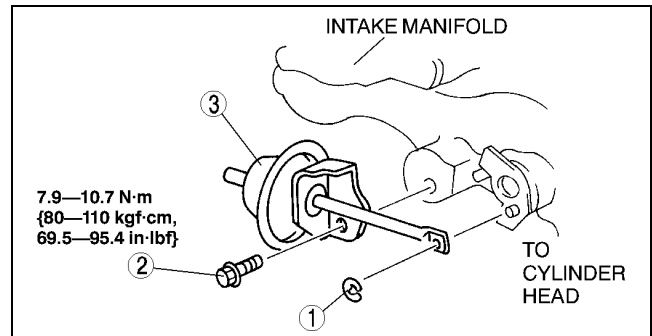
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION

A5U011320152W01

1. Remove the air hose. (See 01-13-3 INTAKE-AIR SYSTEM REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

1	E ring
2	Bolt
3	VTCS shutter valve actuator

3. Install in the reverse order of removal.



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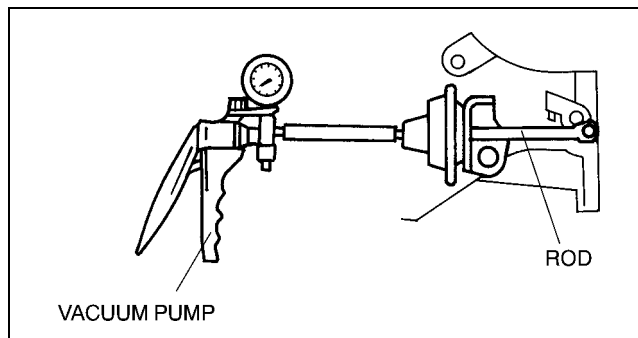
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR INSPECTION

A5U011320152W02

Note

- Perform the following test only when directed.

1. Disconnect the vacuum hose from the VTCS shutter valve actuator.
2. Connect a vacuum pump to the VTCS shutter valve actuator.
3. Apply vacuum slowly and inspect the rod movement of the VTCS shutter valve actuator under the following condition.
 - If not as specified, replace the VTCS shutter valve actuator. (See 01-13-6 VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SHUTTER VALVE ACTUATOR REMOVAL/INSTALLATION.)
 - If as specified but the Simulation Test fails, inspect for the following:
Vacuum hose improper routing, kinks or leakage.



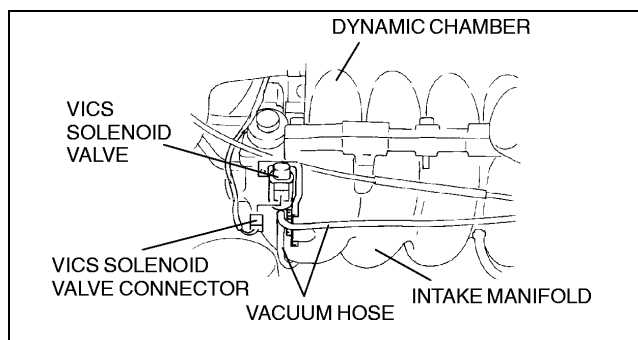
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Step	Vacuum kPa {mmHg, inHg}	Rod movement
1	Approx. -9.3 {-69.8, -2.7}	Start to move
2	Below -34.7 {-260, -10.2}	Fully pulled
3	Above -6.7 {-51, -2.0}	Not pulled

VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE REMOVAL/INSTALLATION

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1. Disconnect the negative battery cable.
2. Disconnect the VTCS solenoid valve connector.
3. Disconnect the vacuum hose from the VTCS solenoid valve.

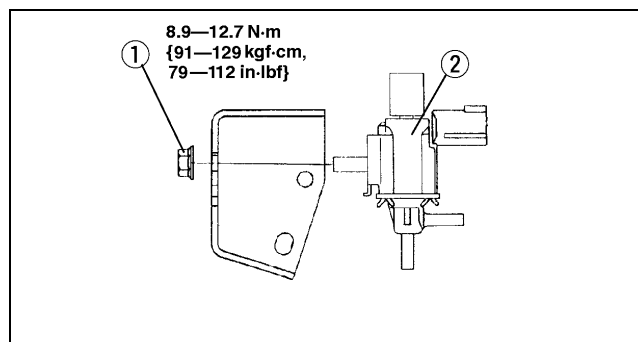


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4. Remove in the order indicated in the table.

1	Nut
2	VTCS solenoid valve

5. Install in the reverse order of removal.



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VARIABLE TUMBLE CONTROL SYSTEM (VTCS) SOLENOID VALVE INSPECTION

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Airflow Inspection

Note

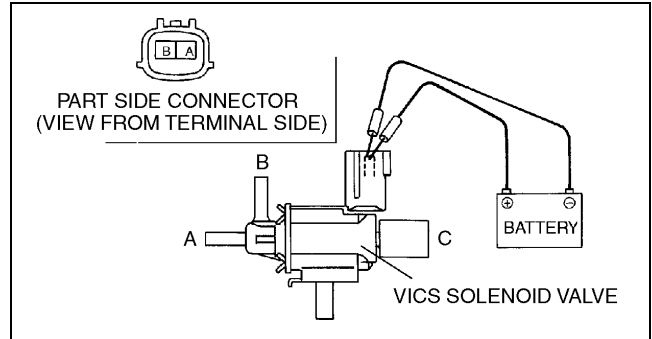
- Perform the following test only when directed.

- Remove the VTCS solenoid valve.
- Inspect for airflow between each port under the following condition.
 - If as specified but the Simulation Test is failed, inspect for the following and carry out the "Circuit Open/Short Inspection".
Vacuum hose improper routing, kinks or leakage.
 - If not as specified, replace the VTCS solenoid valve.

○—○ : Continuity ○=○ : Airflow

Step	Terminal		Port		
	A	B	A	B	C
1	○—○	○—○		○=○	○=○
2	B+	GND	○=○	○=○	

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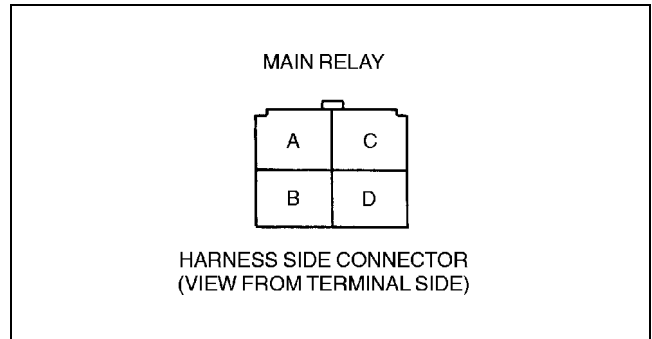
Circuit Open/Short Inspection

Open circuit

- Power circuit (VTCS solenoid valve connector terminal A and main relay connector terminal D through common connector)
- GND circuit (VTCS solenoid valve connector terminal B and PCM connector terminal 2N)

Short circuit

- VTCS solenoid valve connector terminal A and main relay connector terminal D through common connector to GND



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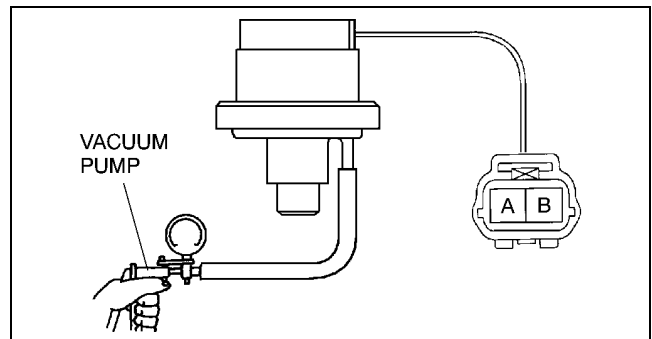
VARIABLE TUMBLE CONTROL SYSTEM (VTCS) VACUUM SWITCH INSPECTION

A5U011313012W01

Operation Inspection

- Disconnect the negative battery cable.
- Disconnect the vacuum hose from the VTCS vacuum switch.
- Connect a vacuum pump to the VTCS vacuum switch.
- Apply vacuum slowly and verify that continuity between the VTCS vacuum switch terminals changes as indicated in the table using an ohmmeter.
 - If not as specified, replace the VTCS vacuum switch.
 - If VTCS vacuum switch is okay but PID value is out of specification, perform the "Circuit Open/Short Inspection".

Step	Condition	Continuity
1	Apply pressure pf $-36 \sim -27$ kPa $\{-270 \sim -203$ mmHg, $-10 \sim -8$ inHg}.	From no continuity to continuity
2	Disconnect vacuum hose.	From continuity to no continuity



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- Reconnect the VTCS vacuum switch connector.

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Circuit Open/Short Inspection

Open circuit

- If there is no continuity and the circuit is open, repair or replace the harness.
 - Power circuit (VTCS vacuum switch connector terminal A and PCM connector terminal 4J through common connector)
 - GND circuit (VTCS vacuum switch connector terminal B and GND through common connector)

Short circuit

- If there is no continuity and the circuit is shorted, repair or replace the harness.
 - VTCS vacuum switch connector terminal A and PCM connector terminal 4J through common connector to GND

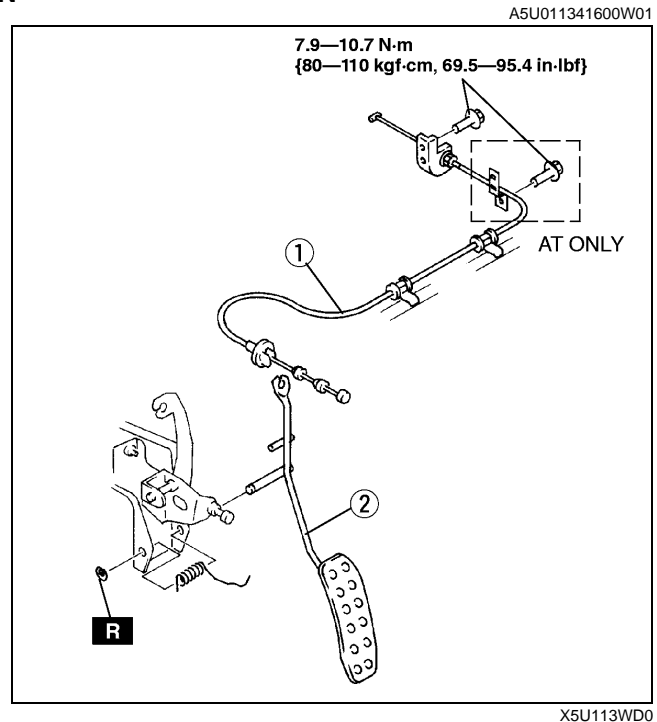
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ACCELERATOR PEDAL (AP) REMOVAL/INSTALLATION

1. Remove in the order indicated in the table.

1	Accelerator cable (See 01-13-9 Accelerator Cable Installation Note)
2	AP

2. Install in the reverse order of removal.



Accelerator Cable Installation Note

1. Carry out the "ACCELERATOR CABLE INSPECTION/ADJUSTMENT" procedure after installing the accelerator cable.

ACCELERATOR CABLE INSPECTION/ADJUSTMENT

1. Verify that the throttle valve is at the closed throttle position (TP).
2. Measure the free play of the accelerator cable.
 - If not within the specification, adjust by turning locknuts A.

Free play

1—3 mm {0.04—0.11 in}

Tightening torque

9.9—14.0 N·m {1.0—1.5 kgf·m, 7.3—10.0 ft·lbf}

