

GROUP 17

**ENGINE AND
EMISSION
CONTROL**

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ENGINE CONTROL

GENERAL DESCRIPTION

M1171000100233

A cable-type accelerator mechanical suspended-type pedal has been adopted.

ENGINE CONTROL SYSTEM DIAGNOSIS

INTRODUCTION TO ENGINE CONTROL SYSTEM DIAGNOSIS

M1171002000221

If there is a malfunction in the engine control system, the accelerator cable, accelerator pedal or throttle lever may be faulty.

ENGINE CONTROL SYSTEM DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1171002100240

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find an engine control system fault.

1. Gather information from the customer.

2. Verify that the condition described by the customer exists.

3. Find the malfunction by following the Symptom Chart.

4. Verify that the malfunction is eliminated.

SYMPTOM CHART

M1171002200258

SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Throttle valve will not fully open or close	1	P.17-3
Accelerator pedal operation not smooth (over acceleration)	2	P.17-4

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Throttle Valve Will Not Fully Open or Close

DIAGNOSIS

STEP 1. Check the accelerator cable adjustment.

Q: Is the accelerator cable properly adjusted?

YES : Go to Step 2.

NO : Adjust the accelerator cable (Refer to P.17-4). Then go to Step 4.

STEP 2. Check the return spring of the throttle body.

Q: Is the return spring damaged or deformed?

YES : Replace the throttle body (Refer to GROUP 13A, throttle body P.13A-883). Then go to Step 4.

NO : Go to Step 3.

STEP 3. Check the throttle lever of the throttle body.

Q: Is the throttle lever damaged or deformed?

YES : Replace the throttle body (Refer to GROUP 13A, throttle body P.13A-883). Then go to Step 4.

NO : Go to Step 4.

STEP 4. Retest the system.

Q: Does the throttle valve fully open and close?

YES : The procedure is complete.

NO : Return to Step 1.

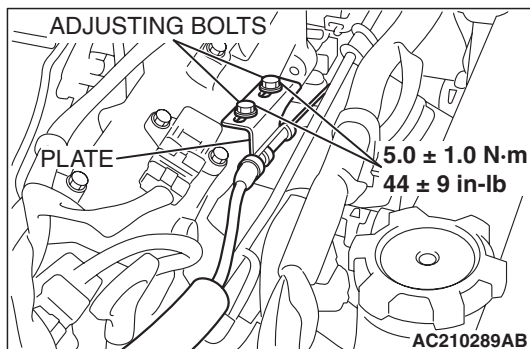
INSPECTION PROCEDURE 2: Accelerator Pedal Operation not Smooth (Over Acceleration)**DIAGNOSIS****STEP 1. Check the accelerator pedal.****Q: Is the accelerator pedal good condition?****YES :** Go to Step 2.**NO :** Replace the accelerator pedal (Refer to P.17-5). Then go to Step 5.**STEP 2. Check the installation condition of the accelerator pedal.****Q: Is the accelerator pedal loose?****YES :** Tighten, then go to Step 5.**NO :** Go to Step 3.**STEP 3. Check the accelerator cable wiring.****Q: Is the accelerator cable routing bent sharply?****YES :** Repair, then go to Step 5.**NO :** Go to Step 4.**STEP 4. Check the accelerator cable lubricant.****Q: Is the accelerator cable lubricated sufficiently?****YES :** Go to Step 5.**NO :** Refill or replace the lubricant, then go to Step 5.**STEP 5. Retest the system.****Q: Does the accelerator pedal work normally?****YES :** The procedure is complete.**NO :** Return to Step 1.**ON-VEHICLE SERVICE****ACCELERATOR CABLE CHECK AND ADJUSTMENT**

M1171000900262

1. Turn off air conditioning and all lights. Inspect and adjust at no load.
2. Start engine and allow to idle unit it reaches normal operating temperature.
3. Confirm the idle speed is at standard value.
Standard value: 850 ± 50 r/min
4. Stop the engine [ignition switch in the "LOCK" (OFF) position].
5. Confirm there are no sharp bends in the accelerator cable.
6. Check the inner cable for correct slack.

Standard value: 1 – 2 mm (0.04 – 0.08 inch)

7. If there is too much slack or no slack, adjust the cable as follows:
 - (1) Loosen the adjusting bolts to release the cable.
 - (2) Move the plate until the inner cable play is at the standard value, and then tighten the adjusting bolts to specified torque.

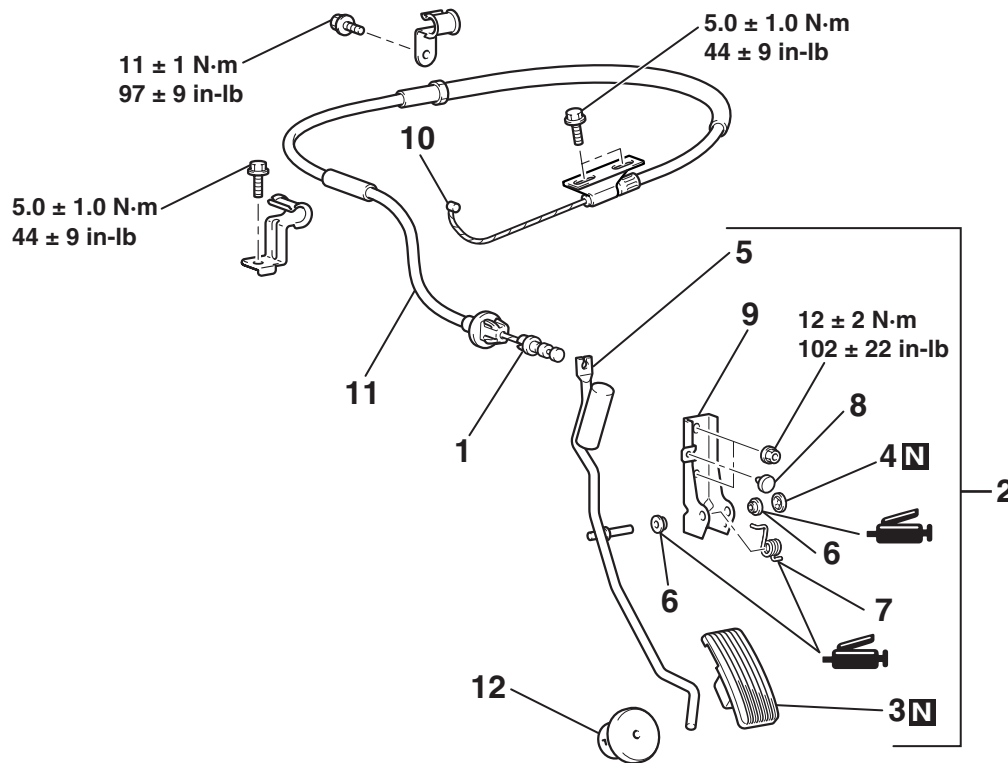


ACCELERATOR CABLE AND PEDAL REMOVAL AND INSTALLATION

M1171001200307

Post-installation Operation

Adjusting the Accelerator Cable (Refer to P.17-4).



AC210290AB

ACCELERATOR PEDAL REMOVAL STEPS

- >>C<< 1. INNER CABLE CONNECTION (ACCELERATOR PEDAL SIDE)
- 2. ACCELERATOR PEDAL ASSEMBLY
- >>B<< 3. PEDAL PAD
- 4. PUSH-ON SPRING NUT
- 5. ACCELERATOR PEDAL ARM ASSEMBLY
- 6. BUSHING
- 7. SPRING
- 8. STOPPER
- 9. ACCELERATOR PEDAL BRACKET

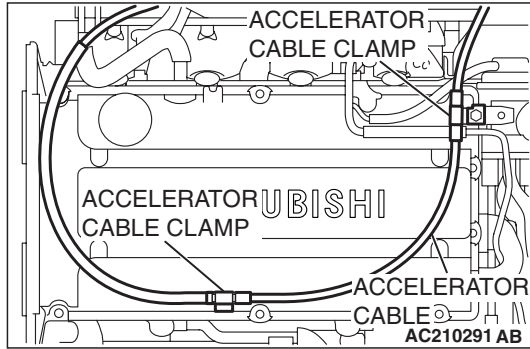
ACCELERATOR CABLE REMOVAL STEPS

- >>C<< 1. INNER CABLE CONNECTION (ACCELERATOR PEDAL SIDE)
- 10. INNER CABLE CONNECTION (THROTTLE LEVER SIDE)
- >>A<< 11. ACCELERATOR CABLE ASSEMBLY
- ACCELERATOR PEDAL STOPPER REMOVAL**
- 12. ACCELERATOR PEDAL STOPPER

INSTALLATION SERVICE POINTS

>>A<< ACCELERATOR CABLE ASSEMBLY INSTALLATION

Securely fit the accelerator cable to the accelerator cable clamps as shown.



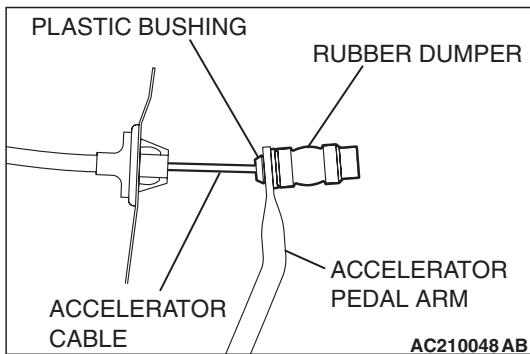
>>B<< ACCELERATOR PEDAL PAD INSTALLATION

Warm the peg of the accelerator pedal pad with a dryer before installing the pad.

NOTE: If it is difficult to fit, apply soapy water to the peg lightly.

>>C<< INNER CABLE INSTALLATION

Securely fit the plastic bushing on the inner cable of the accelerator cable to the accelerator pedal arm as shown.



EMISSION CONTROL

GENERAL DESCRIPTION

M1173000100325

The emission control system consists of the following subsystems:

- Positive crankcase ventilation system

- Evaporative emission system
- Exhaust emission control system

DIAGNOSIS

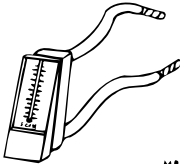
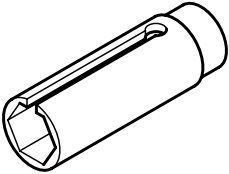
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SYMPTOM	PROBABLE CAUSE	REMEDY
Engine will not start or hard to start	Vacuum hose disconnected or damaged	Repair or replace
	The EGR valve is not closed.	Repair or replace
	Malfunction of the evaporative emission purge solenoid	Repair or replace

SYMPTOM	PROBABLE CAUSE	REMEDY
Rough idle or engine stalls	The EGR valve is not closed.	Repair or replace
	Vacuum hose disconnected or damaged.	Repair or replace
	Malfunction of the positive crankcase ventilation valve	Replace
	Malfunction of the purge control system	Check the system; If there is a problem, check its component parts.
Engine hesitates or poor acceleration	Malfunction of the exhaust gas recirculation system	Check the system; If there is a problem, check its component parts.
Excessive oil consumption	Positive crankcase ventilation line clogged	Check positive crankcase ventilation system
Poor fuel mileage	Malfunction of the exhaust gas recirculation system	Check the system; If there is a problem, check its component parts.

SPECIAL TOOL

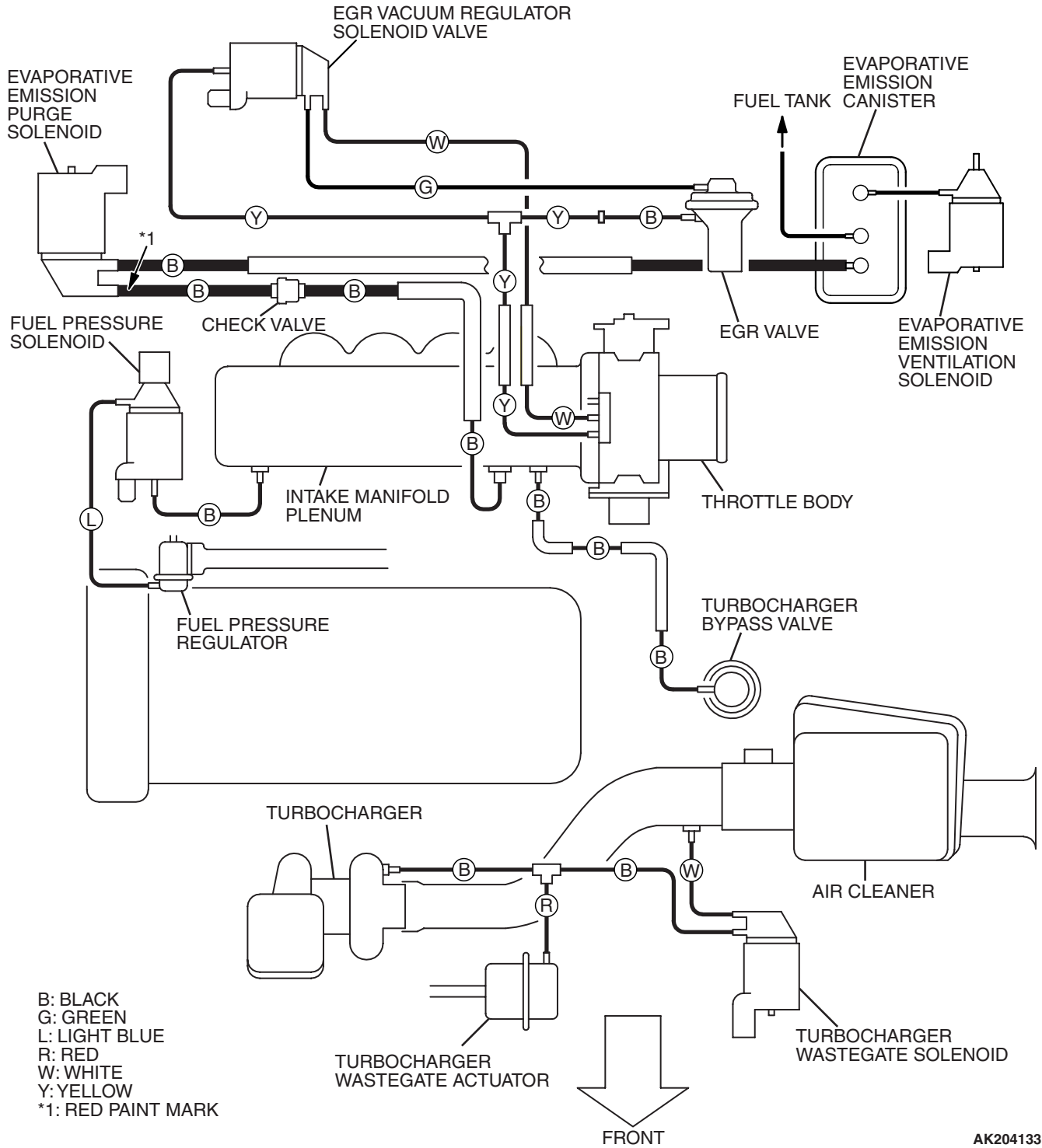
M1173000600438

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 MB991700	MB995061 Purge flow indicator	MLR6890A Part of MIT280220	Inspection of purge control system
	MD998770 Oxygen sensor wrench	MD998770-01 or General service tool	Removal and installation of heated oxygen sensor

VACUUM HOSES

VACUUM HOSE ROUTING

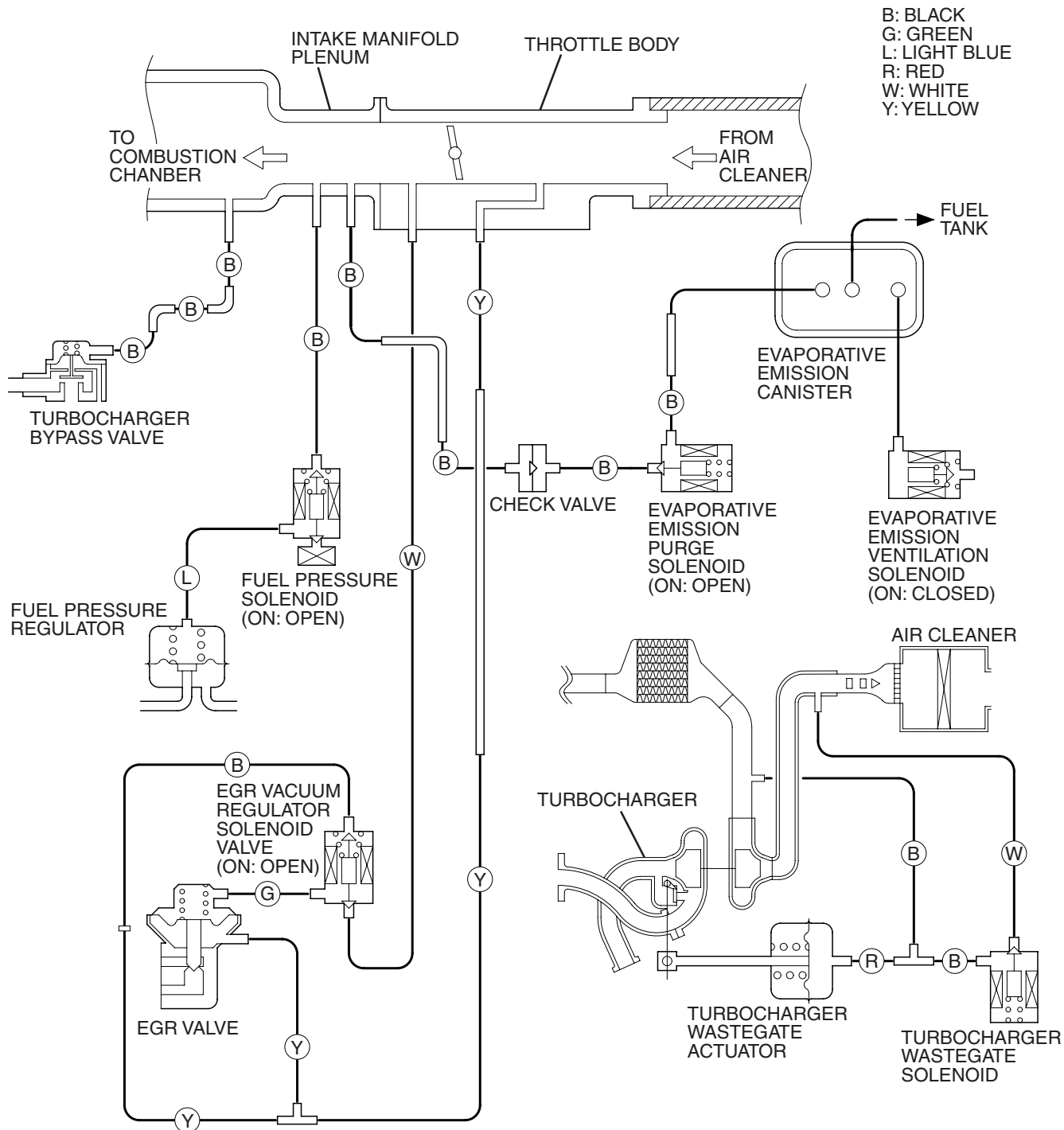
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AK204133AB

VACUUM CIRCUIT DIAGRAM

M1173007100359



AK204134AC

VACUUM HOSE INSTALLATION

M1173007200088

1. When connecting the vacuum hoses, they should be securely inserted onto the nipples.
2. Connect the hoses correctly, using the VACUUM HOSE ROUTING diagram as a guide.

VACUUM HOSE CHECK

M1173007300126

1. Using the VACUUM HOSE ROUTING diagram as a guide, check that the vacuum hoses are correctly connected.
2. Check the connection of the vacuum hoses, (removed, loose, etc.) and confirm that there are no sharp bends or damage.

POSITIVE CRANKCASE VENTILATION SYSTEM**GENERAL DESCRIPTION (POSITIVE CRANKCASE VENTILATION SYSTEM)**

M1173005000594

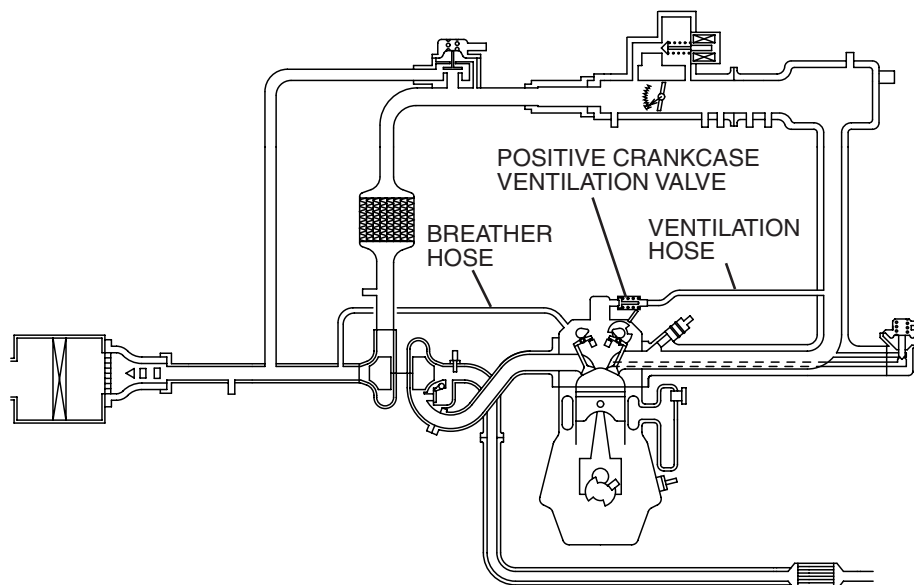
The positive crankcase ventilation (PCV) system prevents the escape of blow-by gases from inside the crankcase into the atmosphere.

Fresh air is sent from the air cleaner into the crankcase through the breather hose to be mixed with the blow-by gas inside the crankcase.

The blow-by gas inside the crankcase is drawn into the intake manifold through the PCV valve.

The PCV valve is designed to lift the plunger according to the intake manifold vacuum so as to regulate the flow of blow-by gas properly.

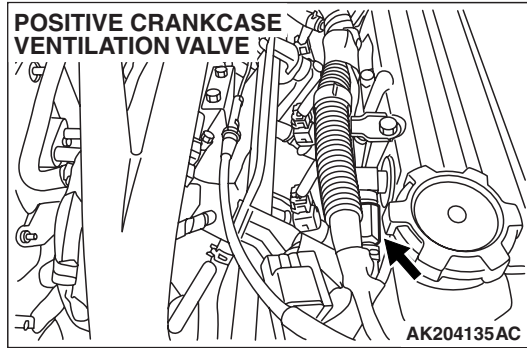
In other words, the blow-by gas flow is regulated during low load engine operation to maintain engine stability, while the flow is increased during high load operation to improve the ventilation performance.

SYSTEM DIAGRAM

AK401846AB

COMPONENT LOCATION

M1173007400286



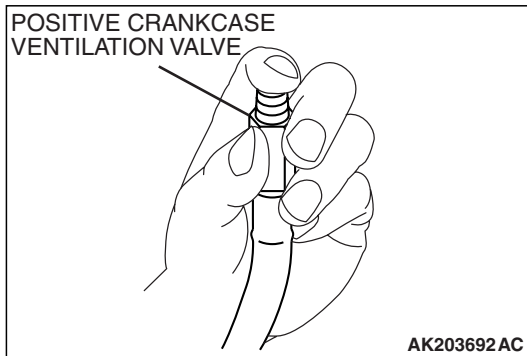
POSITIVE CRANKCASE VENTILATION SYSTEM CHECK

M1173001100232

1. Remove the positive crankcase ventilation (PCV) valve from the rocker cover, then reconnect the PCV valve to the vacuum supply hose.
2. With the engine idling, put your finger on the open end of the PCV valve, and check for negative pressure (vacuum).

NOTE: At this time, the plunger in the PCV valve should move back and forth as the open end is covered and uncovered.

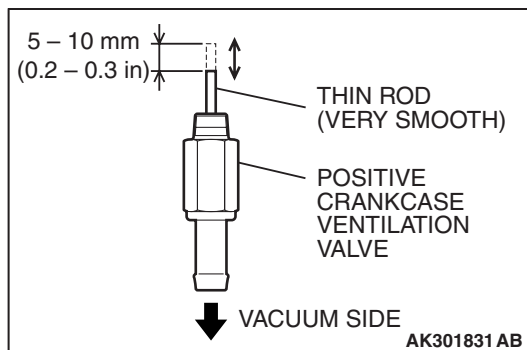
3. If negative pressure is not felt, clean or replace the PCV valve. Inspect the vacuum supply hose and vacuum supply hose port for restriction or plugged condition.



POSITIVE CRANKCASE VENTILATION VALVE CHECK

M1173001200228

1. Hold the positive crankcase ventilation (PCV) valve with the vacuum side down. Insert a thin rod, and using light pressure, depress the end of the PCV valve spring by 5 – 10 mm (0.2 – 0.3 inch). Release pressure on the rod to see if the PCV valve spring will lift the rod to its original position.
2. If the rod returns quickly to its original position, the PCV valve is OK. If the stick does not return quickly, clean or replace the PCV valve.



EVAPORATIVE EMISSION CONTROL SYSTEM

GENERAL DESCRIPTION (EVAPORATIVE EMISSION SYSTEM)

M1173005100728

The evaporative emission (EVAP) system prevents fuel vapors generated in the fuel tank from escaping into the atmosphere.

Fuel vapors from the fuel tank flow through the vapor pipe/hose to be stored temporarily in the EVAP canister.

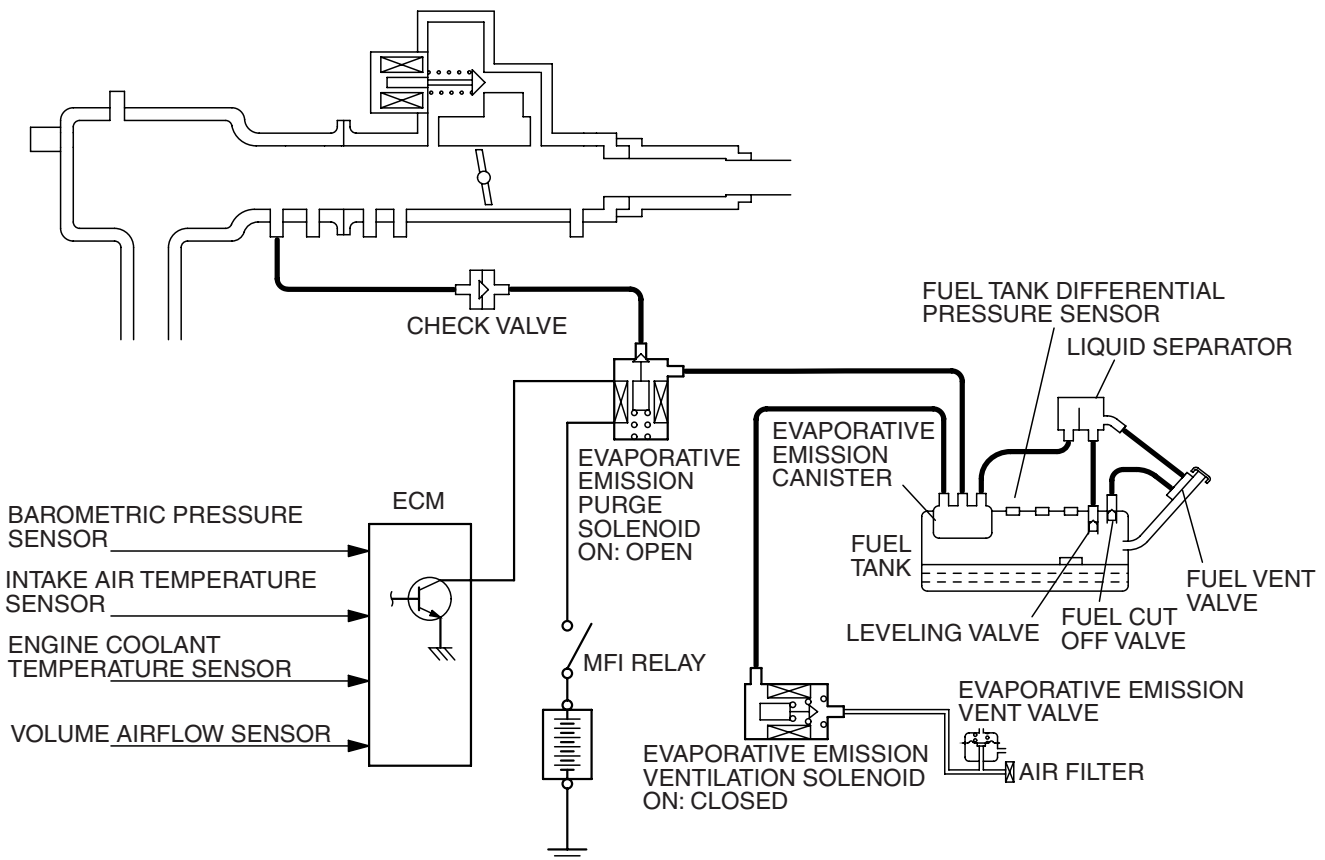
When the vehicle is in operation, fuel vapors stored in the EVAP canister flow the EVAP purge solenoid, purge port and intake manifold plenum to the combustion chamber.

When the engine coolant temperature is low or when the intake air quantity is small (when the engine is at idle, for example), the engine control module (ECM) brings the EVAP purge solenoid into the OFF state to shut off the fuel vapor flow to the intake manifold plenum. This ensures driveability when the engine is cold or running under low load and also stabilizes the emission level.

An EVAP ventilation solenoid is provided between the EVAP canister and atmosphere to monitor for OBD-II EVAP leaks. This solenoid is normally OFF. However, it turns ON when monitoring the OBD-II EVAP leaks and shuts off the atmosphere flow to the EVAP canister. Then the fuel tank differential pressure sensor monitors the fuel vapor pressure to detect OBD-II EVAP leaks. The fuel overflow limiter valve and the leveling valve prevent fuel from being overfilled. The fuel overflow limiter valve and the leveling valve prevent fuel leaks if the vehicle rolls over in an accident.

The EVAP vent valve releases the air from the fuel tank through the EVAP canister into the atmosphere when the fuel tank pressure increases due to refueling, etc. The EVAP vent valve and the air filter supply the atmospheric air to the EVAP canister when the fuel tank pressure decreases.

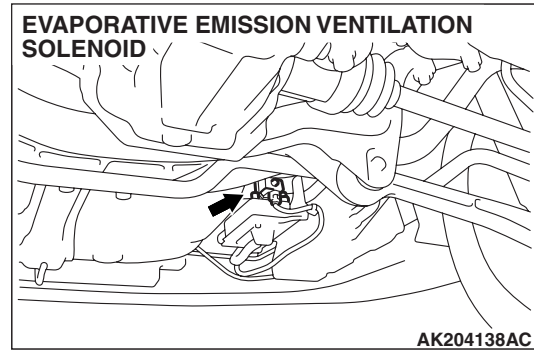
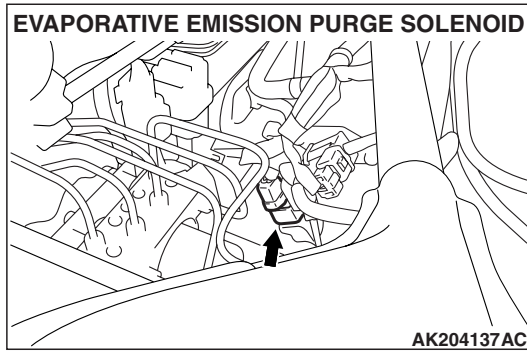
SYSTEM DIAGRAM



AK401848AB

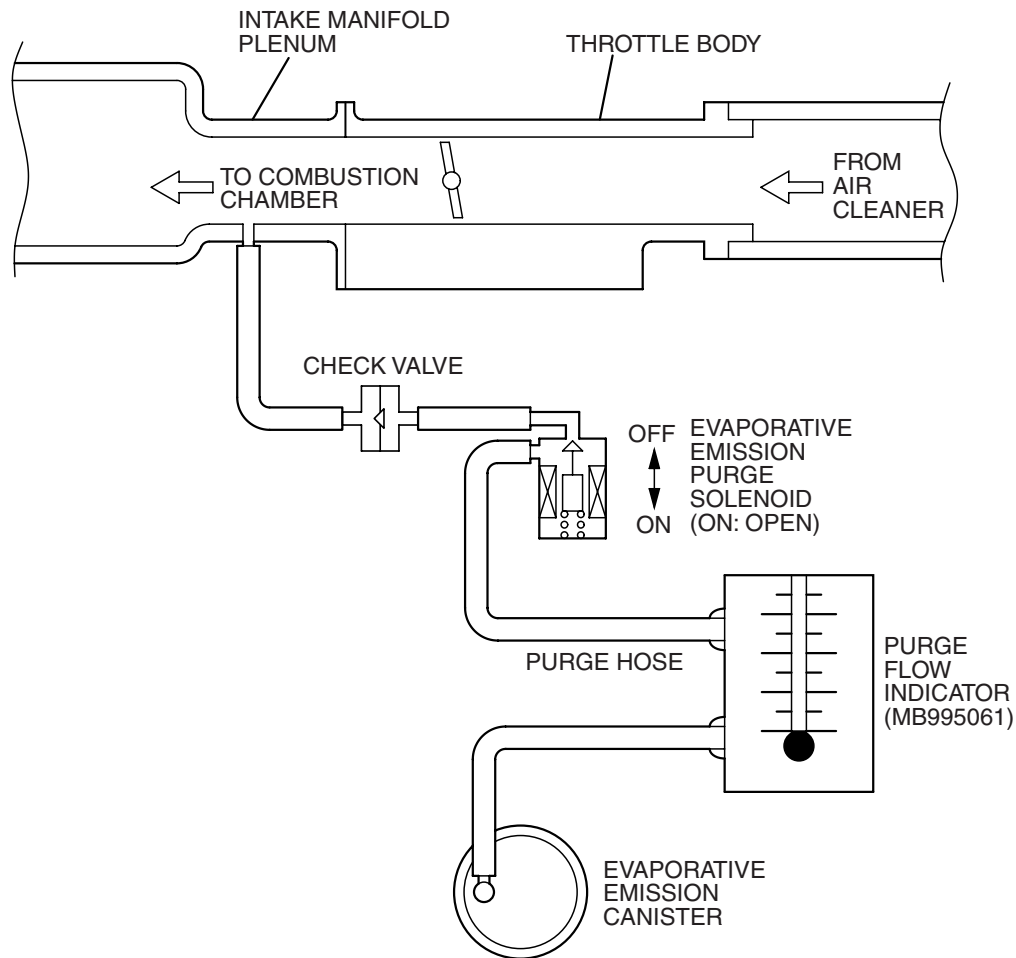
COMPONENT LOCATION

M1173007500294



PURGE CONTROL SYSTEM CHECK (PURGE FLOW CHECK)

M1173001400415



AK204162AB

Required Special Tool:

- MB995061: Purge Flow Indicator

1. Disconnect the purge hose from the evaporative emission (EVAP) purge solenoid, and connect special tool MB995061 between the EVAP purge solenoid and the purge hose.

2. Before inspection and adjustment, set the vehicle in the following conditions:
 - Engine coolant temperature: 80 – 95° C (176 – 203° F)
 - Lights, electric cooling fan and accessories: OFF
 - Transaxle: Neutral
3. Run the engine at idle for more than four minutes.
4. Check the purge flow volume when engine is revved suddenly several times.

Standard value: Momentarily 20 cm³/s (2.5 SCFH) or more.

5. If the purge flow volume is less than the standard value, check it again with the vacuum hose disconnected from the EVAP canister. If the purge flow volume is less than the standard value, check the vacuum port and the vacuum hose for clogging. Also check the EVAP purge solenoid. If the purge flow volume is at the standard value, with the EVAP canister disconnected, replace the EVAP canister.

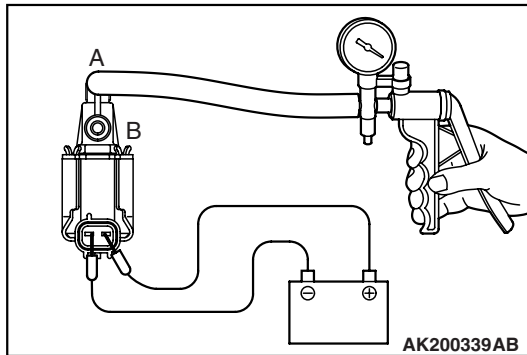
EVAPORATIVE EMISSION PURGE SOLENOID CHECK

M1173001700308

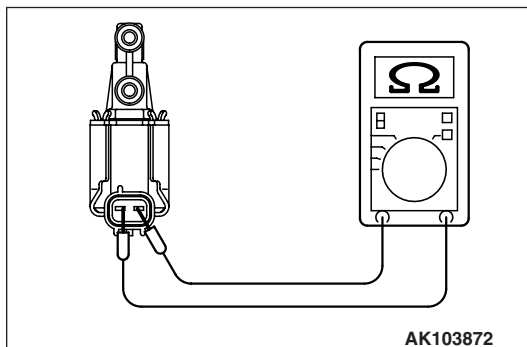
1. Disconnect the vacuum hose (black, black with red paint mark) from the evaporative emission (EVAP) purge solenoid.

NOTE: When disconnecting the vacuum hose, always place an identification mark so that it can be reconnected at its original position.

2. Disconnect the harness connector.
3. Connect a hand vacuum pump to nipple (A) of the EVAP purge solenoid (refer to the illustration at left).
4. As described in the chart below, check airtightness by applying a vacuum with voltage applied directly from the battery to the EVAP purge solenoid valve and without applying voltage.



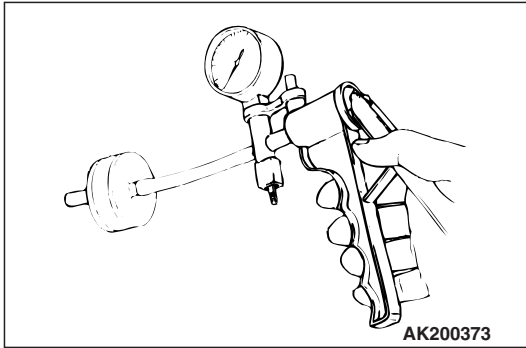
BATTERY POSITIVE VOLTAGE	NORMAL CONDITION
Applied	Vacuum leaks
Not applied	Vacuum maintained



5. Measure the resistance between the terminals of the EVAP purge solenoid.

Standard value: 30 – 34 Ω [at 20° C (68° F)]

6. Replace the solenoid if resistance is out of specification.



CHECK VALVE CHECK

M1173006200063

Connect a hand vacuum pump to the check valve, apply negative pressure and check the airtightness.

CONNECTED NIPPLE COLOR	NORMAL CONDITION
Black	Negative pressure leaks
Brown	Negative pressure is maintained

VOLUME AIRFLOW SENSOR CHECK

M1173007900559

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-41](#).

BAROMETRIC PRESSURE SENSOR CHECK

M1173008000258

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-41](#).

ENGINE COOLANT TEMPERATURE SENSOR CHECK

M1173008100482

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-41](#).

INTAKE AIR TEMPERATURE SENSOR CHECK

M1173008200252

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-41](#).

FUEL TANK DIFFERENTIAL PRESSURE SENSOR CHECK

M1173007700179

To inspect the sensor, refer to GROUP 13B, Fuel Supply –Fuel Tank –Fuel Tank Inspection – Fuel Tank Differential Pressure Sensor Check [P.13B-19](#).

EVAPORATIVE EMISSION VENTILATION SOLENOID CHECK

M1173007800239

Refer to Emission Control –Evaporative Emission Canister and Fuel Tank Pressure Relief Valve –Inspection [P.17-22](#).

EXHAUST GAS RECIRCULATION (EGR) SYSTEM**GENERAL DESCRIPTION (EXHAUST GAS RECIRCULATION SYSTEM)**

M1173005200587

The exhaust gas recirculation (EGR) system lowers the nitrogen oxides (NOx) emission level. When the air/fuel mixture combustion temperature is high, a large quantity of NOx is generated in the combustion chamber. Therefore, this system recirculates part of exhaust gas from the exhaust port of the cylinder head to the combustion chamber through the intake manifold to decrease the air/fuel mixture combustion temperature, resulting in reduction of NOx.

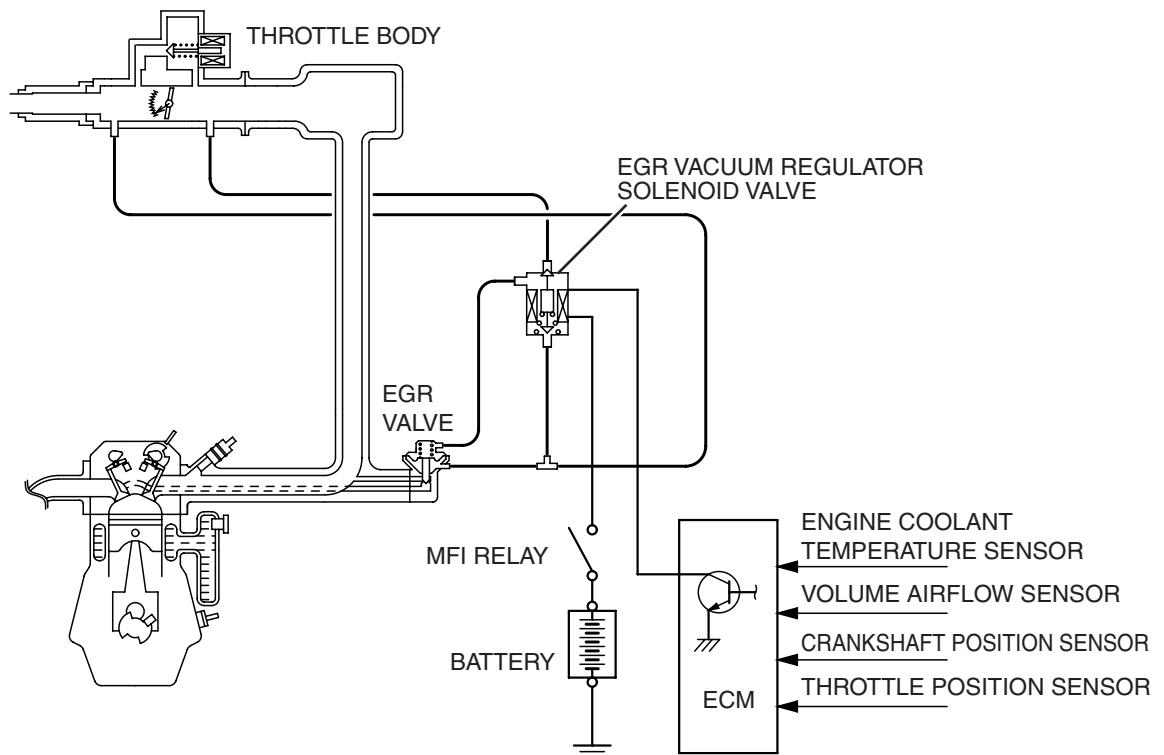
The EGR flow rate is controlled by the EGR valve for driveability quality.

OPERATION

When the engine coolant temperature is low, when the engine is at idle or when a wide open throttle operation is performed, the EGR valve is kept closed, achieving no EGR.

After warming up of the engine, the EGR valve can be opened by the engine control module (ECM).

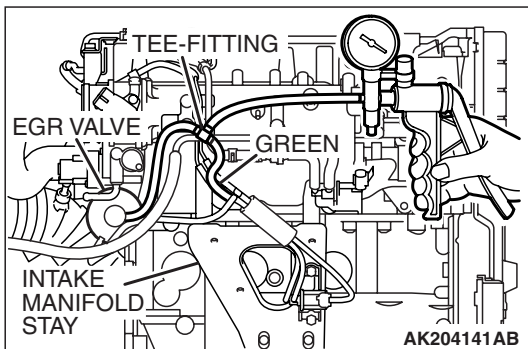
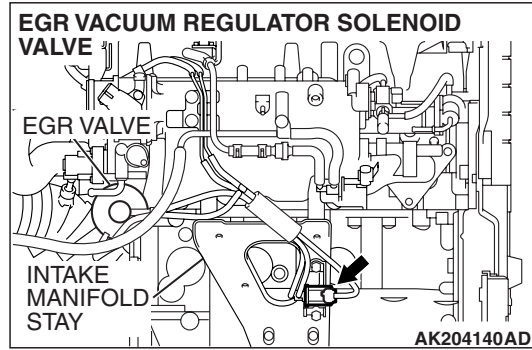
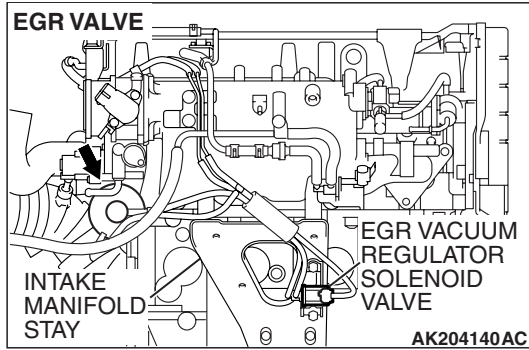
The ECM monitors the EGR system and illuminates the Malfunction Indicator Lamp (SERVICE ENGINE SOON) to indicate that there is a malfunction.

SYSTEM DIAGRAM

AK401847AB

COMPONENT LOCATION

M1173007600291



EGR SYSTEM CHECK

M1173002600304

1. Disconnect the vacuum hose (green) from the EGR valve, and then connect a hand vacuum pump via the Tee-fitting.
2. Start the engine. As described in the chart below, check the vacuum condition when the throttle valve is opened suddenly (revving) during cold and hot engine conditions. If the engine is hot and the vacuum does not rise over 13 kPa (3.9 in Hg), perform the vacuum control valve check and EGR port vacuum check. Then continue to Step 3. If vacuum rises momentarily, proceed to Step 3.

When engine is cold

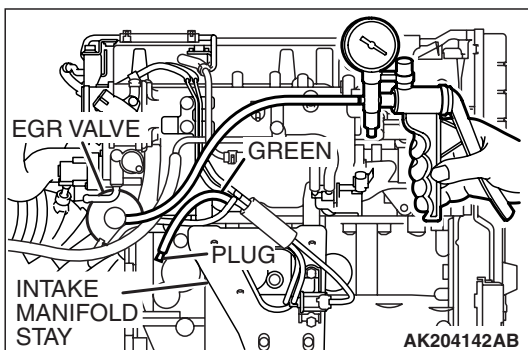
[Engine coolant temperature: 20° C (68° F) or less]

THROTTLE VALVE	NORMAL VACUUM CONDITION
Open quickly	No vacuum (Remained as barometric pressure).

When engine is hot

[Engine coolant temperature: 80° C (176° F) or more]

THROTTLE VALVE	NORMAL VACUUM CONDITION
Open quickly	Momentarily rises over 13 kPa (3.9 in Hg)



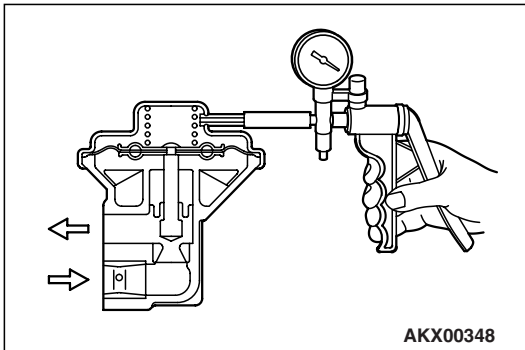
3. Stop the engine. Remove the Tee-fitting and the hand vacuum pump.
4. Connect the hand vacuum pump directly to the EGR valve.
5. Start the engine and run at idle until warm.
6. The engine idling speed should be rough when a vacuum of 27 kPa (7.9 in Hg) or more is applied to the EGR valve.
7. If engine idles rough, EGR passage is open and the system is OK. If engine idle is not rough, the EGR passage and the valve must be checked for restrictions. Perform the EGR valve check. Then repeat the EGR system check.

EGR VALVE CHECK

M1173002800201

1. Remove the EGR valve and inspect for sticking, carbon deposits, etc. If necessary, clean with a suitable solvent so that the valve seats correctly.
2. Connect a hand vacuum pump to the EGR valve.
3. Apply 67 kPa (20 in Hg) of vacuum, and check to be sure that the vacuum is maintained.
4. As described in the chart below, apply a vacuum and check the passage of air by blowing through one side of the EGR passage.

NOTE: Passage of air should be checked by blowing into the valve port.



VACUUM	PASSAGE OF AIR
5.3 kPa (1.6 in Hg) or less	Air is not blown out
27 kPa (7.9 in Hg) or more	Air is blown out

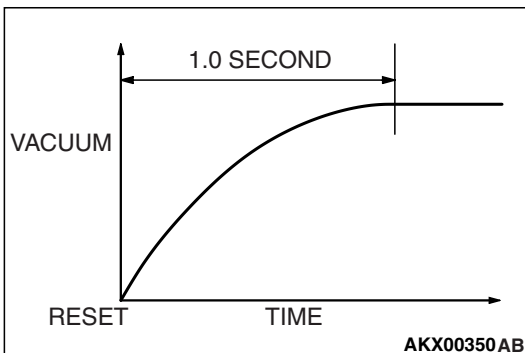
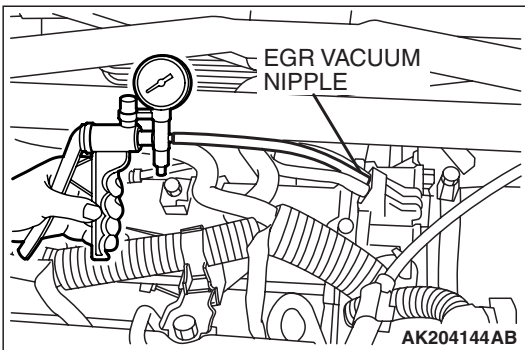
5. Reinstall the EGR valve, using a new gasket, and tighten to the specified torque.

Tightening torque: 20 ± 2 N·m (14 ± 1.4 ft-lb)

EGR PORT VACUUM CHECK

M1173002900134

1. Disconnect the vacuum hose (yellow stripe) from the throttle body EGR vacuum nipple and connect a hand vacuum pump to the nipple.

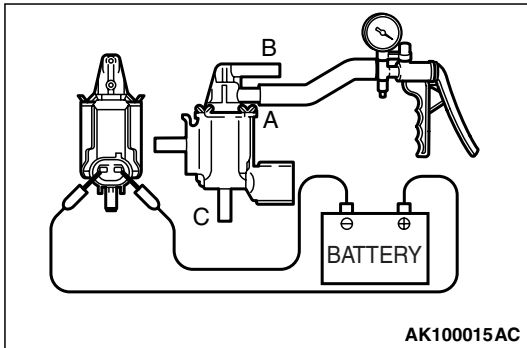


2. Start the engine.
3. Measure engine vacuum at idle.
Standard value: 51 kPa (15 in Hg) or more
4. Reset the vacuum pump to "0" (Release vacuum).
5. Using a stop watch, measure how long it takes for the vacuum gauge to reach 51 kPa (15 in Hg).
Standard value: 1.0 second or less
6. If it takes more than 1.0 second for the gauge to reach 51 kPa (15 in Hg), the EGR may be restricted and should be cleaned.

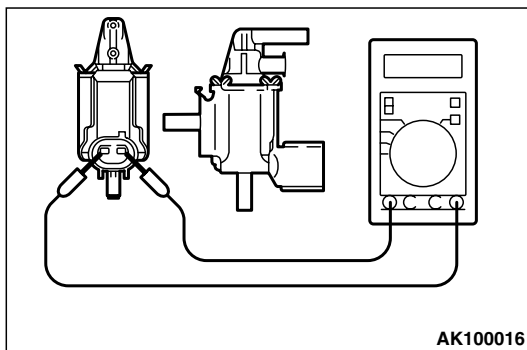
EGR VACUUM REGULATOR SOLENOID VALVE CHECK

M1173003100302

1. Disconnect the vacuum hose from the EGR vacuum regulator solenoid valve.
NOTE: When disconnecting the vacuum hose, always make sure that it can be reconnected at its original position.
2. Disconnect the harness connector.
3. Connect a hand vacuum pump to nipple (A) of the EGR vacuum regulator solenoid valve. (Refer to the illustration at left.)
4. As described in the chart below, check airtightness by applying a vacuum with voltage applied directly from the battery to the EGR vacuum regulator solenoid valve and without applying voltage.



BATTERY POSITIVE VOLTAGE	NIPPLE CONDITION	NORMAL CONDITION
Applied	Both nipples open	Vacuum leaks
	Nipple (B) is closed	Vacuum maintained
Not Applied	Both nipples open	Vacuum leaks
	Nipple (C) is closed	Vacuum maintained



5. Measure the resistance between the terminals of the EGR vacuum regulator solenoid valve.
Standard value: 29 – 35 Ω [at 20° C (68° F)]
6. Replace the EGR vacuum regulator solenoid valve if resistance is out of specification.

VOLUME AIRFLOW SENSOR CHECK

M1173007900560

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-41](#).

ENGINE COOLANT TEMPERATURE SENSOR CHECK

M1173008100512

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-41](#).

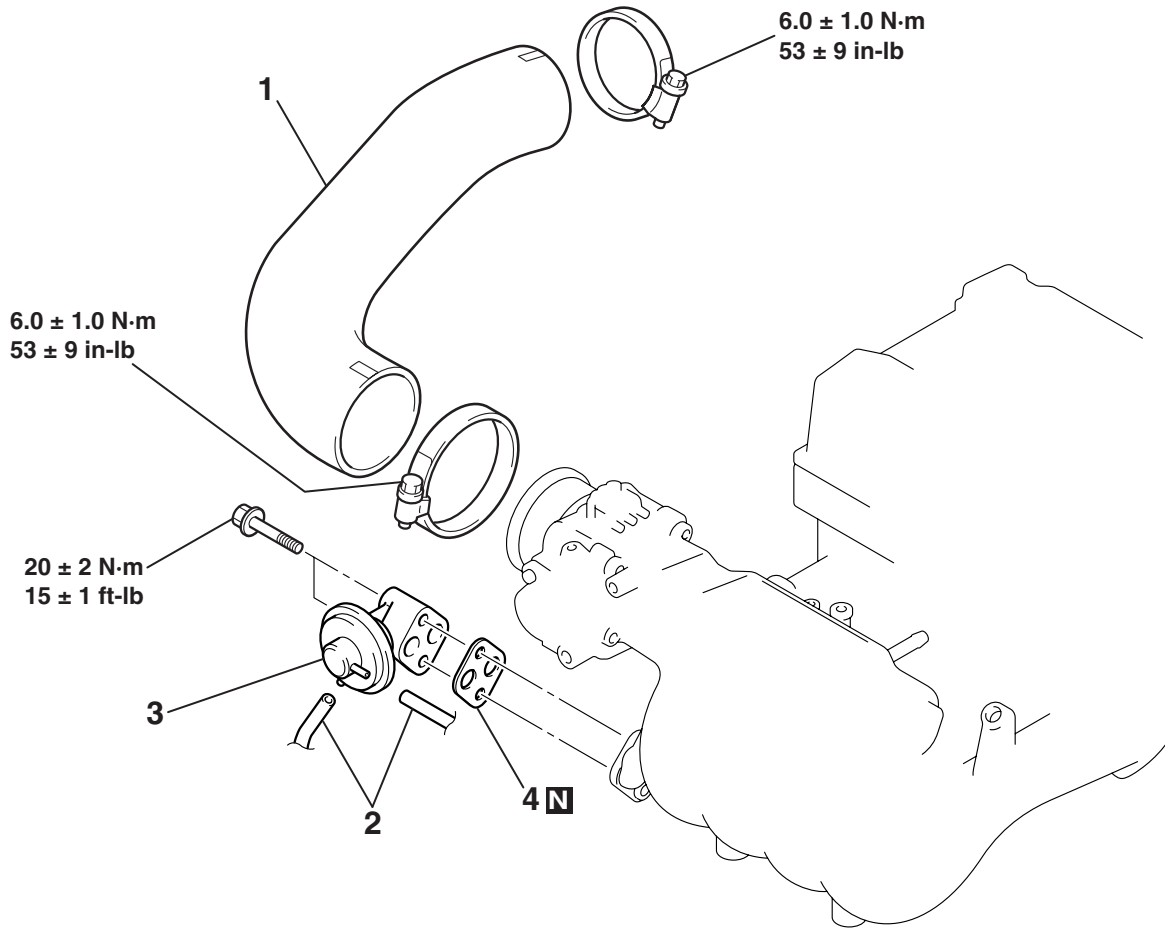
CRANKSHAFT POSITION SENSOR CHECK

M1173008300260

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-41](#).

REMOVAL AND INSTALLATION

M1173010500119



AC210292AB

- REMOVAL STEPS**
- <<A>> >>A<<
- STRUT TOWER BAR
 - 1. CHARGE AIR COOLER AIR HOSE E

- REMOVAL STEPS (Continued)**
- 2. VACUUM HOSE CONNECTION
 - 3. EGR VALVE
 - 4. EGR VALVE GASKET

REMOVAL SERVICE POINT

<<A>> STRUT TOWER BAR REMOVAL

- 1. Remove the strut tower bar. (Refer to GROUP 42, Strut Tower Bar [P.42-12](#)).
- 2. After removing the strut tower bar, install the top of the strut assembly temporarily with the strut tower bar mounting nuts.

INSTALLATION SERVICE POINTS

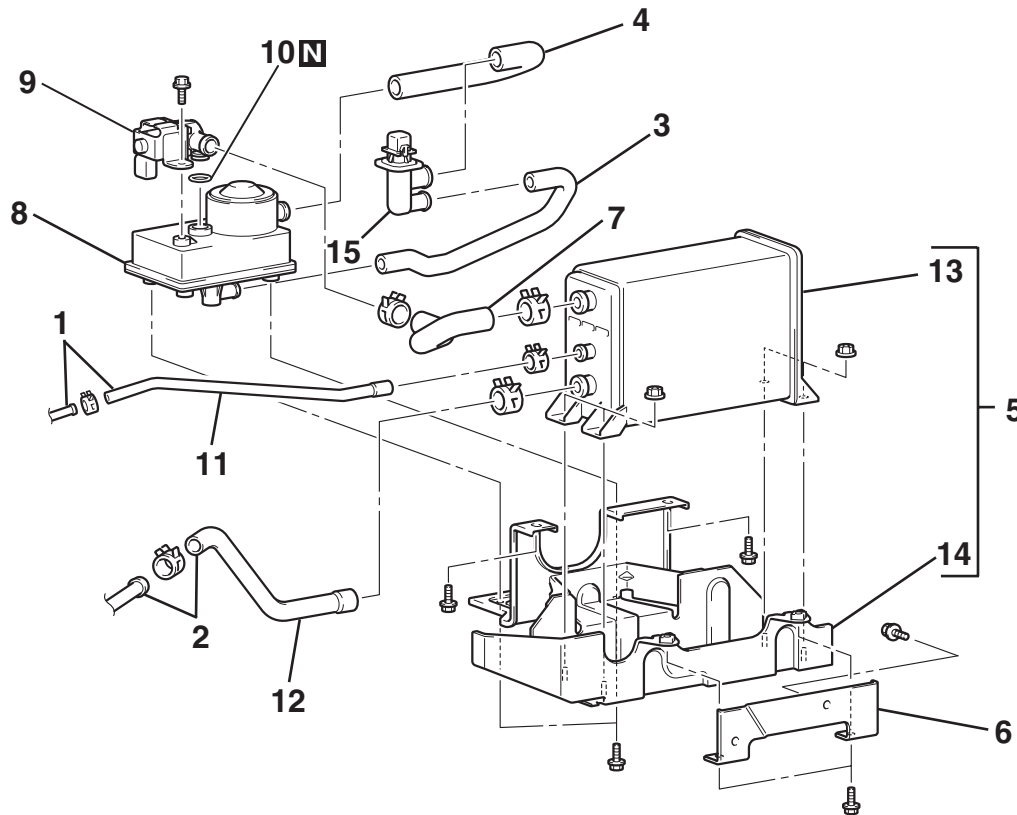
>>A<< STRUT TOWER BAR INSTALLATION

1. Remove the nuts that are temporarily securing the strut assembly.
2. Install the strut tower bar. (Refer to GROUP 42, Strut Tower Bar P.42-12).

EVAPORATIVE EMISSION CANISTER AND FUEL TANK PRESSURE RELIEF VALVE

REMOVAL AND INSTALLATION

M1173004800274



AC210293AB

REMOVAL STEPS

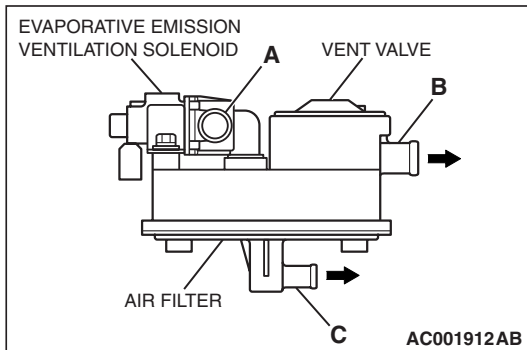
1. PURGE HOSE B CONNECTION
2. VAPOR HOSE CONNECTION
3. VENT HOSE C
4. VENT HOSE B
5. ONBOARD REFUELING VAPOR RECOVERY (ORVR) VENT VALVE MODULE AND EVAPORATIVE EMISSION CANISTER ASSEMBLY
6. EVAPORATIVE EMISSION CANISTER BRACKET
7. VENT HOSE A

REMOVAL STEPS (Continued)

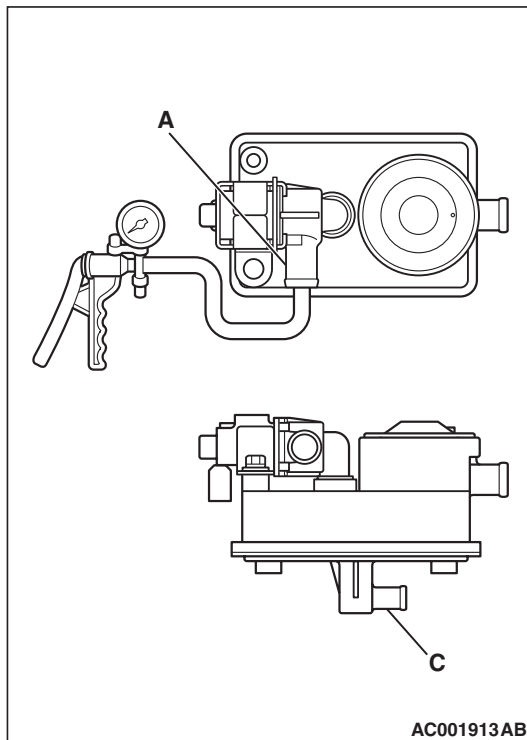
8. ORVR VENT VALVE MODULE
9. EVAPORATIVE EMISSION VENTILATION SOLENOID
10. O-RING
11. PURGE HOSE B
12. VAPOR HOSE
13. EVAPORATIVE EMISSION CANISTER
14. EVAPORATIVE EMISSION CANISTER BRACKET
15. VENT PIPE ASSEMBLY

INSPECTION

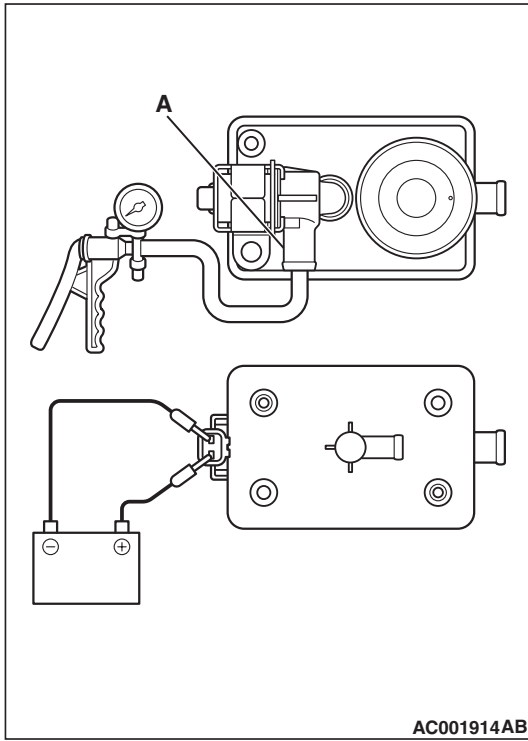
ORVR VENT VALVE MODULE CHECK



1. Blow air through orvr vent valve module nipple (A). Check that the air flows out of nipple (B) and nipple (C).

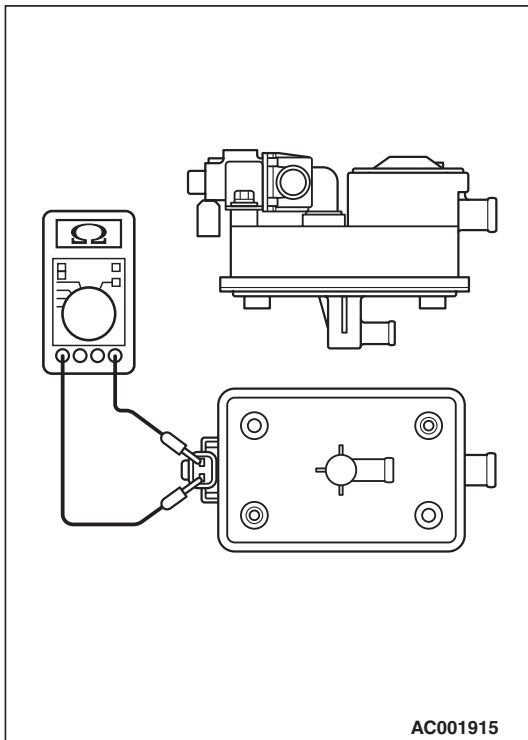


2. Connect a hand vacuum pump to nipple (A) of the over vent valve module.
3. With air flow through nipple (C) obstructed, apply a vacuum and check that the vacuum is maintained.



4. Check air tightness by applying a vacuum with voltage applied directly from the battery to the over vent valve module and without applying voltage.

BATTERY VOLTAGE	NORMAL CONDITION
Applied	Vacuum maintained
Not applied	Vacuum leaks



5. Measure the resistance between the terminals of the solenoid.

Standard value: 17 – 21 Ω [at 20° C (68° F)]

6. Replace over vent valve module if resistance is out of specification.

CATALYTIC CONVERTER

GENERAL DESCRIPTION (CATALYTIC CONVERTER)

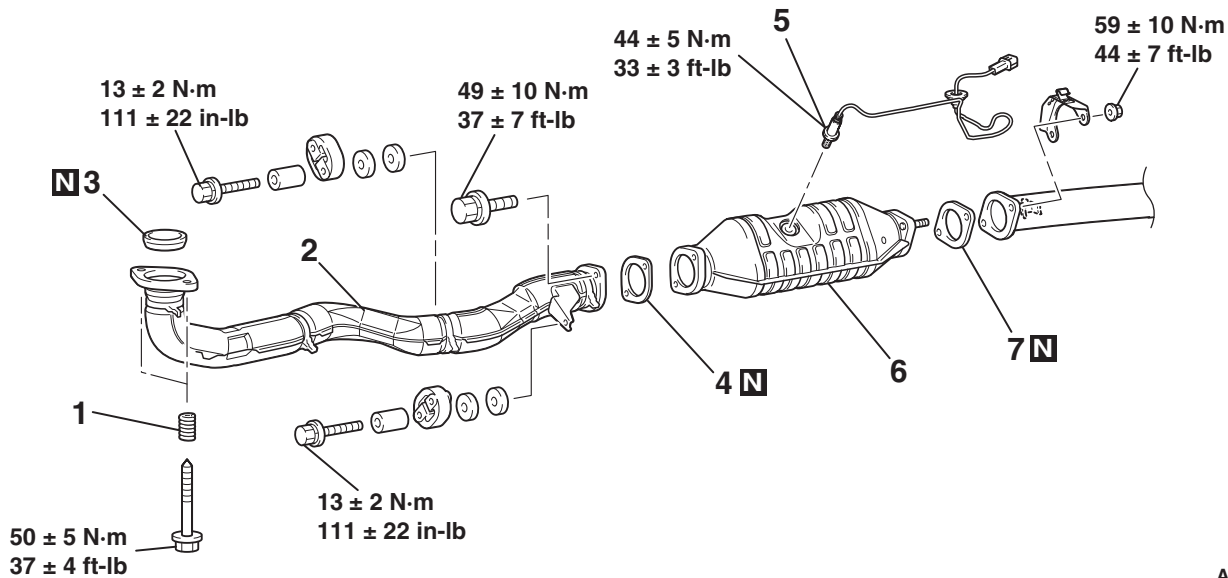
The three way catalytic converter, together with the closed loop air-fuel ratio control based on the oxygen sensor signal, oxidizes carbon monoxides (CO) and hydrocarbons (HC), also reduces nitrogen oxides (NOx).

When the mixture is controlled at stoichiometric air-fuel ratio, the three way catalytic converter provides the highest purification against the three constituents, namely, CO, HC and NOx.

M1173005300131

REMOVAL AND INSTALLATION

M1173003900825



AC505085AB

REMOVAL STEPS

1. SPRING
2. FRONT EXHAUST PIPE
3. SEAL RING
4. GASKET

REMOVAL STEPS (Continued)

- <<A>> >>A<<
5. HEATED OXYGEN SENSOR (REAR)
 6. CATALYTIC CONVERTER
 7. GASKET

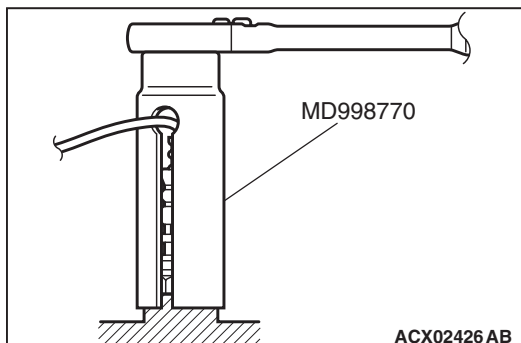
Required Special Tool:

- MD998770: Oxygen Sensor Wrench

REMOVAL SERVICE POINT

**<<A>> HEATED OXYGEN SENSOR (REAR)
REMOVAL**

Use special tool MD998770 to remove the heated oxygen sensor (rear).

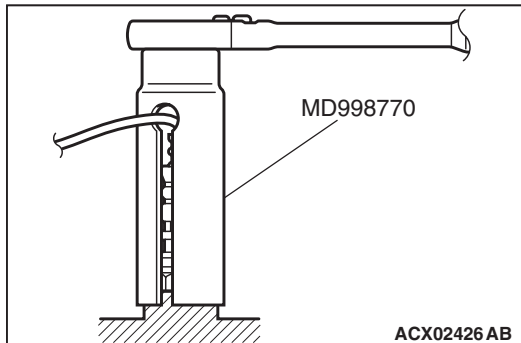


ACX02426 AB

INSTALLATION SERVICE POINT

**>>A<< HEATED OXYGEN SENSOR (REAR)
INSTALLATION**

Use special tool MD998770 to install the heated oxygen sensor (rear).



SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1173006400454

ITEM	SPECIFICATION
Engine control system	
Accelerator cable attaching bolt	5.0 ± 1.0 N· m (44 ± 9 in-lb)
Accelerator cable clamp attaching bolt	11 ± 1 N· m (97 ± 9 in-lb)
Accelerator cable clamp attaching bolt	5.0 ± 1.0 N· m (44 ± 9 in-lb)
Accelerator pedal bracket installation nut	12 ± 2 N· m (102 ± 22 in-lb)
Emission control system	
EGR valve bolt	20 ± 2 N· m (15 ± 1 ft-lb)
Charge air cooler air hose E clamp bolt	6.0 ± 1.0 N· m (53 ± 9 in-lb)
Catalytic converter nut	59 ± 10 N· m (44 ± 7 ft-lb)
Front exhaust pipe bolt (catalytic converter side)	49 ± 10 N· m (37 ± 7 ft-lb)
Front exhaust pipe bolt (exhaust fitting side)	50 ± 5 N· m (37 ± 4 ft-lb)
Hanger bolt	13 ± 2 N· m (111 ± 22 in-lb)
Heated oxygen sensor (rear)	44 ± 5 N· m (33 ± 3 ft-lb)

SERVICE SPECIFICATIONS

M1173000300437

ITEMS	STANDARD VALUE
Engine control system	
Accelerator cable free play mm (in)	1 – 2 (0.04 – 0.08)
Curb idle speed r/min	850 ± 50
Emission control system	
Purge flow cm ³ /s (SCFH) [at 80 – 95° C (176 – 205° F) with sudden revving]	20 (2.5)
Evaporative emission purge solenoid coil resistance [at 20° C (68° F)] Ω	30 – 34
EGR port vacuum [at idle] kPa (in Hg)	51 (15) or more
Required time for EGR vacuum to reach 51 kPa (15 in Hg) second	1.0 or less
EGR vacuum regulator solenoid valve coil resistance [at 20° C (68° F)] Ω	29 – 35
Evaporative emission ventilation solenoid coil resistance [at 20° C (68° F)] Ω	17 – 21