
GROUP 13B**FUEL SUPPLY****CONTENTS**

SERVICE SPECIFICATIONS.....	13B-2	FUEL TANK DIFFERENTIAL PRESSURE SENSOR CHECK.....	13B-9
FUEL SUPPLY DIAGNOSIS	13B-2	FUEL TANK TEMPERATURE SENSOR CHECK	13B-10
INTRODUCTION.....	13B-2	LEVELING VALVE CHECK.....	13B-11
TROUBLESHOOTING STRATEGY	13B-2	FUEL TANK	13B-12
SYMPTOM PROCEDURES	13B-2	REMOVAL AND INSTALLATION	13B-12
SPECIAL TOOLS.....	13B-5	DISASSEMBLY AND ASSEMBLY	13B-15
ON-VEHICLE SERVICE.....	13B-7	DISASSEMBLY AND ASSEMBLY	13B-17
FUEL PUMP OPERATION CHECK	13B-7	FUEL FILLER NECK	13B-18
FUEL LEVEL SENSOR CHECK.....	13B-7	REMOVAL AND INSTALLATION	13B-18
FUEL PUMP MODULE REPLACEMENT.....	13B-7		

SERVICE SPECIFICATIONS

M1135000300398

Item	Standard value
Fuel tank differential pressure sensor output voltage V	2.0 – 3.0
Fuel tank temperature sensor resistance k Ω [at -10 – 70°C (14 – 158°F)]	0.43 – 12.3

FUEL SUPPLY DIAGNOSIS

INTRODUCTION

The fuel system is used to supply an appropriate fuel mixture to the engine. The system consists of the fuel tank, fuel filter, fuel pump and fuel pipes. An evaporative emission system is provided to prevent evaporated fuel from escaping into the atmosphere.

Engine malfunctions caused by insufficient fuel supply and evaporative emission system operation malfunctions can be caused by faults in the vapor line, fuel pipe, hose, or fuel tank pressure control valve, etc.

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TROUBLESHOOTING STRATEGY

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure to find most of the fuel supply faults.

1. Gather information from the customer.

2. Verify that the condition described by the customer exists.
3. Find the malfunction by following the Symptom Procedure.
4. Verify malfunction is eliminated.

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SYMPTOM PROCEDURES

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Inspection Procedure 1 : Engine Malfunctions Due to Insufficient Fuel Supply

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Fuel injector failed.
- Open or shorted fuel injector circuit, or loose connector.
- Bent, twisted or clogged fuel main pipe or fuel high-pressure tube.
- Malfunction of the fuel pump module.

DIAGNOSIS

STEP 1. Using scan tool (M.U.T.-III), read the MFI system diagnostic trouble code.

⚠ CAUTION

To prevent damage to scan tool (M.U.T.-III), always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool (M.U.T.-III).

- (1) Turn the ignition switch to the "LOCK" (OFF) position and then connect scan tool (M.U.T.-III) to the data link connector [Refer to GROUP 13A – Diagnostic Function, How to Connect the Scan Tool (M.U.T.-III) [P.13A-10](#)].
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI system diagnostic trouble code (Refer to GROUP 13A – Diagnostic Function, How to Read and Erase Diagnostic Trouble Codes [P.13A-10](#)).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the DTC set?

YES : Repair MFI system (Refer to GROUP 13A – Diagnostic Trouble Code Chart [P.13A-47](#)). Then go to Step 6.

NO : Go to Step 2.

STEP 2. Check the fuel pressure.

Release residual pressure from the fuel line to prevent fuel spray (Refer to GROUP 13A – On-vehicle Service, Fuel Pressure Test [P.13A-639](#)).

Q: Is the fuel pressure in good condition?

YES : Go to Step 5.

NO : Go to Step 3.

STEP 3. Check for bending, twisting or clogging of the fuel main pipe and fuel high-pressure tube.

Q: Are the fuel main pipe and fuel high-pressure tube in good condition?

YES : Go to Step 4.

NO : Repair or replace the fuel main pipe or fuel high-pressure tube. Then go to Step 6.

STEP 4. Check the fuel pump module operation.

Refer to GROUP 13A – On-vehicle Service, Fuel Pump Operation Check [P.13A-642](#).

Q: Is the fuel pump module operation in good condition?

YES : Go to Step 5.

NO : Replace the fuel pump module (Refer to [P.13B-7](#)). Then go to Step 6.

STEP 5. Check the inside of the fuel tank for contamination and rust.

(1) Drain fuel.

(2) Remove the fuel tank (Refer to [P.13B-12](#)).

Q: Is the fuel tank in good condition?

YES : Go to Step 6.

NO : Replace the fuel filter, and clean the fuel tank and fuel line. Then go to Step 6.

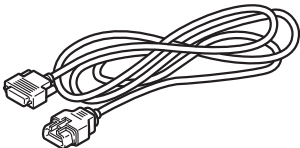
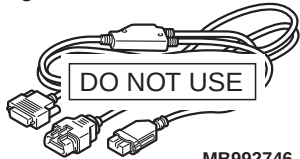
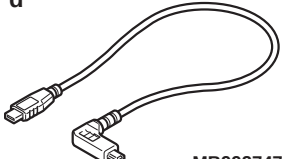
STEP 6. Retest the system.**Q: Is the engine malfunction eliminated?**

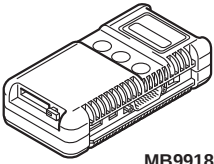
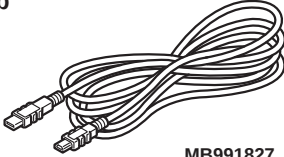
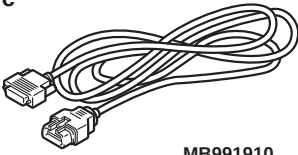
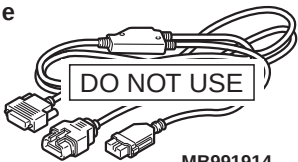
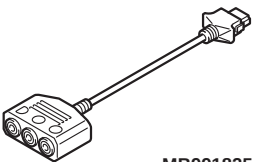
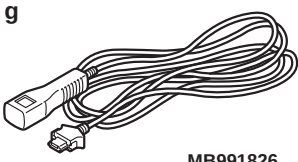
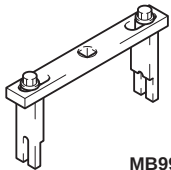
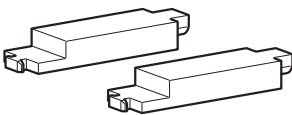
YES : The procedure is complete.

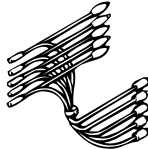
NO : Return to Step 1.

SPECIAL TOOLS

M1135000601251

Tool	Tool number and name	Supersession	Application
a  MB992744	a. MB992744 b. MB992745 c. MB992746 d. MB992747 e. MB992748	–	Checking diagnostic trouble codes
b  MB992745	a. Vehicle communication interface-Lite (V.C.I.-Lite) b. V.C.I.-Lite main harness A (for vehicles with CAN communication)		
c  MB992746	c. V.C.I.-Lite main harness B (for vehicles without CAN communication) d. V.C.I.-Lite USB cable short e. V.C.I.-Lite USB cable long		
d  MB992747			
e  MB992748 ACB05421AB			

Tool	Tool number and name	Supersession	Application
a  MB991824 b  MB991827 c  MB991910 d  MB991911 e  MB991914 f  MB991825 g  MB991826 MB991958	MB991958 a. MB991824 b. MB991827 c. MB991910 d. MB991911 e. MB991914 f. MB991825 g. MB991826 M.U.T.-III sub-assembly a. Vehicle communication interface (V.C.I.) b. M.U.T.-III USB cable c. M.U.T.-III main harness A (Vehicles with CAN communication system) d. M.U.T.-III main harness B (Vehicles without CAN communication system) e. M.U.T.-III main harness C (for Chrysler models only) f. M.U.T.-III measurement adapter g. M.U.T.-III trigger harness	MB991824-KIT <i>NOTE: G: MB991826 M.U.T.-III Trigger Harness is not necessary when pushing V.C.I. ENTER key.</i>	⚠ CAUTION M.U.T.-III main harness A (MB991910) should be used. M.U.T.-III main harness B and C should not be used for this vehicle. Checking diagnostic trouble codes
 MB992202	MB992202	Fuel tank cap wrench	Fuel pump module L-ring removal and installation
 MB992909	MB992909	Fuel tank cap wrench attachment	

Tool	Tool number and name	Supersession	Application
 MB991658	MB991658 Test harness set	Tool not available	Fuel tank differential pressure sensor check

ON-VEHICLE SERVICE

FUEL PUMP OPERATION CHECK

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Refer to GROUP 13A – On-vehicle Service, Fuel Pump Operation Check [P.13A-642](#).

FUEL LEVEL SENSOR CHECK

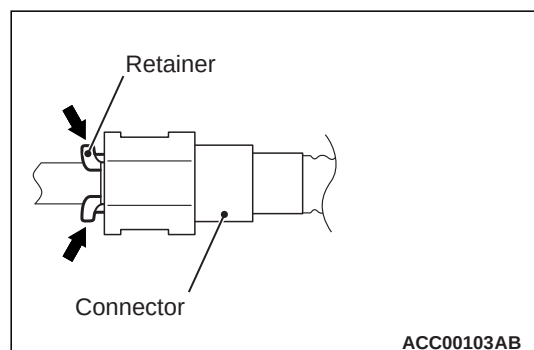
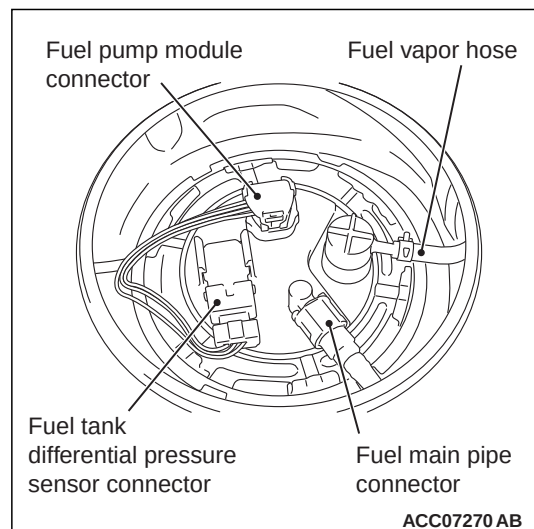
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Refer to GROUP 54A – Combination Meter, On-vehicle Service, Fuel Level Sensor Check [P.54A-54](#).

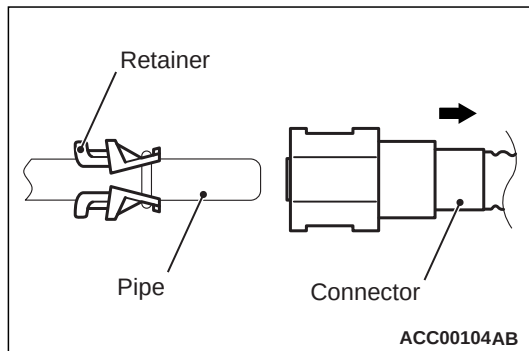
FUEL PUMP MODULE REPLACEMENT

M1135004901997

1. Release the fuel pressure in the fuel line. (Refer to GROUP 13A – On-vehicle Service, Reduce Pressurized Fuel Lines [P.13A-641](#)).
2. Disconnect the fuel tank differential pressure sensor connector.
3. Follow the steps below to unlock the fuel main pipe connector.



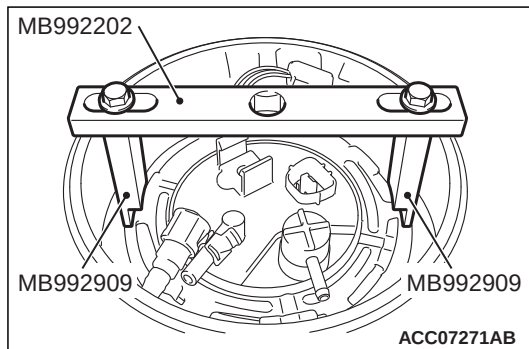
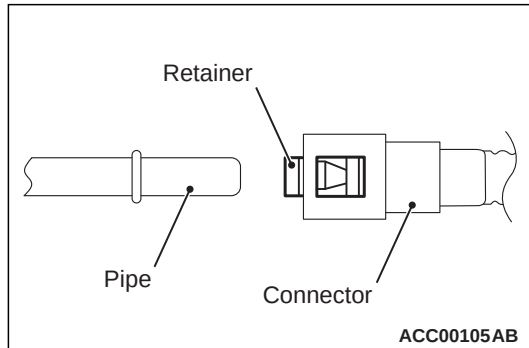
- (1) Compress the retainer tabs of the fuel main pipe connector to unlock it.



- (2) Pull out the connector with the retainer still attached to the pipe of the fuel pump module.

NOTE: Remove the retainer from the pipe and then assemble the retainer into the connector.

4. Disconnect the fuel vapor hose.



5. Using the following special tools, remove the L-ring on fuel pump module.

- Fuel tank cap wrench (MB992202)
- Fuel tank cap wrench attachment (MB992909)

CAUTION

Pay attention not to damage the fuel level sensor and float of the fuel pump module when removing the fuel pump module from the fuel tank.

6. Remove the fuel pump module from service hole.

NOTE: When disassembling and reassembling the fuel pump module, refer to [P.13B-17](#).

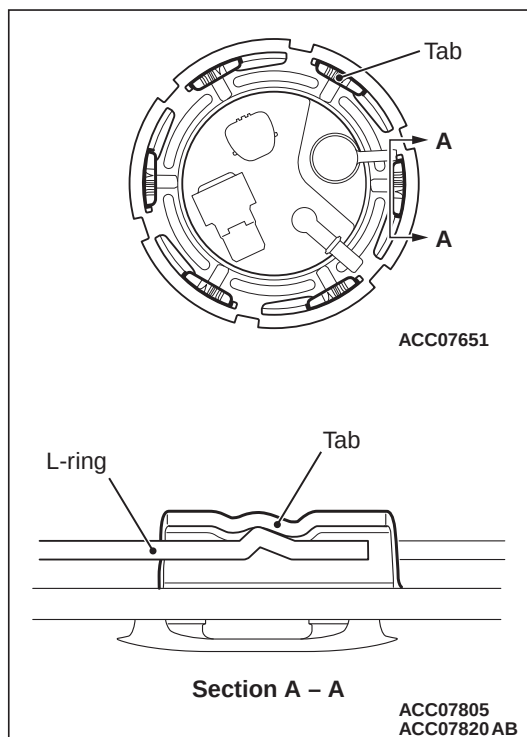
7. Replace the fuel pump packing with new one.

CAUTION

- **Pay attention not to damage the fuel level sensor and the float of the fuel pump module when installing it to the fuel tank.**
- **When installing the fuel pump module to the fuel tank, check that the fuel level sensor moving area moves smoothly.**

8. Install the fuel pump module to the fuel tank through the service hole.

9. Use the special tools to tighten the L-ring on the fuel pump module securely using the same procedure as for removal.



10. Check that the L-ring is engaged securely into six tabs on the fuel tank.

11. Connect the fuel vapor hose.

CAUTION

After the installation, slightly pull the fuel main pipe to check that it is connected securely. At this time, also check that there is approximately 1 mm (0.04 inch) play.

12. Follow the steps below to lock the fuel main pipe connector.

- (1) Make sure that the pipe of the fuel pump module and the fuel main pipe connector remains straight.
- (2) Insert the connector into the fuel pump module until it clicks into place.

13. Connect the fuel tank differential pressure sensor connector and fuel pump module connector.

14. Check the fuel leak of fuel tank.

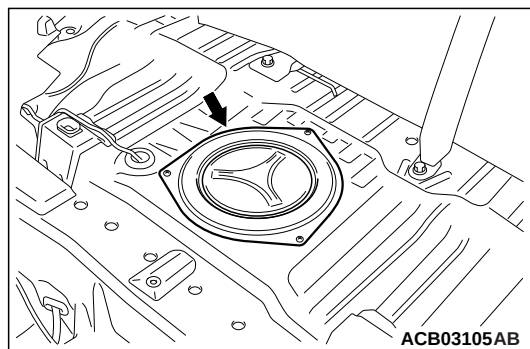
15. Install the inspection lid.

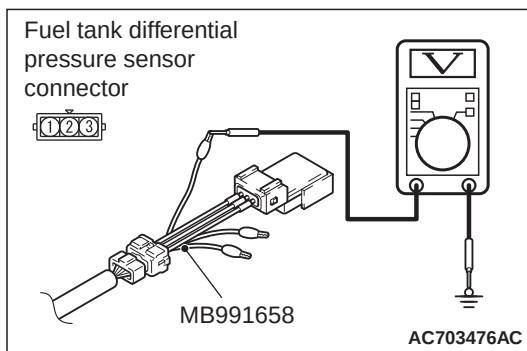
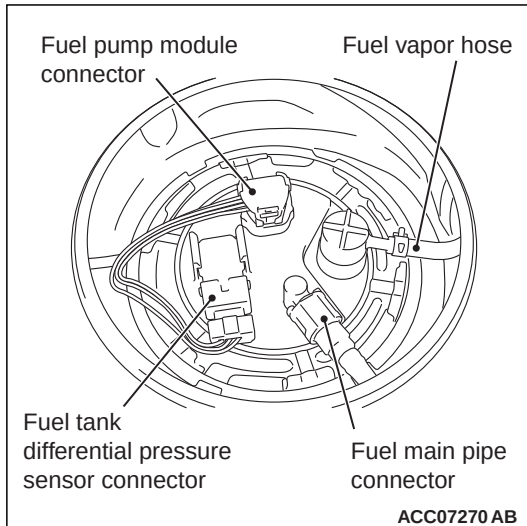
16. Install the rear seat cushion assembly (Refer to GROUP 52A – Rear Seat Assembly [P.52A-23](#)).

FUEL TANK DIFFERENTIAL PRESSURE SENSOR CHECK

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1. Remove the rear seat cushion assembly (Refer to GROUP 52A – Rear Seat Assembly [P.52A-23](#)).
2. Remove the inspection lid.





3. Disconnect the fuel tank differential pressure sensor connector.

4. Connect special tool test harness set (MB991658) between the terminals of the disconnected connector.
5. Turn the ignition switch to "ON" position and measure the voltage between terminal 1 and ground.

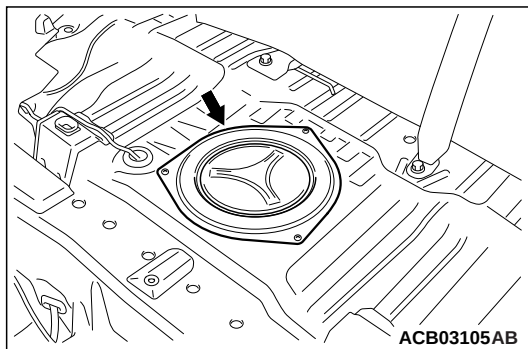
Standard value: 2.0 – 3.0 V

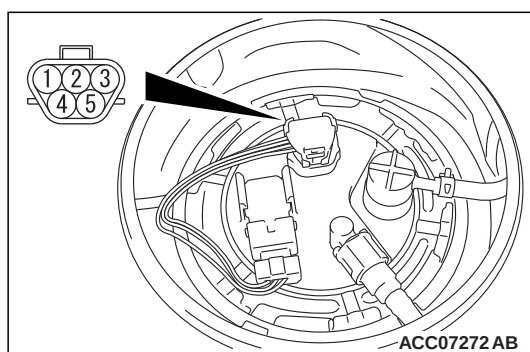
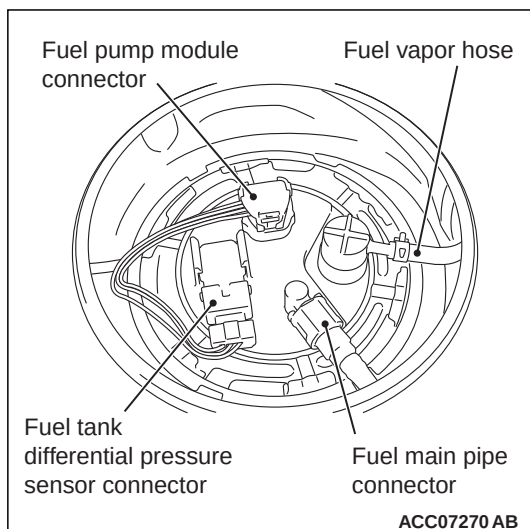
6. If not within the standard value, replace the fuel tank differential pressure sensor.
7. Connect the fuel tank differential pressure sensor connector.
8. Install the inspection lid.
9. Install the rear seat cushion assembly (Refer to GROUP 52A – Rear Seat Assembly [P.52A-23](#)).

FUEL TANK TEMPERATURE SENSOR CHECK

M1135007300010

1. Remove the rear seat cushion assembly (Refer to GROUP 52A – Rear Seat Assembly [P.52A-23](#)).
2. Remove the inspection lid.





3. Disconnect the fuel pump module connector.

4. Measure the resistance between connector terminals No. 1 and No. 3 of the fuel pump module (incorporating fuel tank temperature sensor).

Standard value: 0.43 – 12.3 kΩ [at -10 – 70°C (14 – 158°F)]

5. If not within the standard value, replace the fuel level sensor and fuel tank temperature sensor (Refer to [P.13B-17](#)).
6. Connect the fuel pump module connector.
7. Install the inspection lid.
8. Install the rear seat cushion assembly (Refer to GROUP 52A – Rear Seat Assembly [P.52A-23](#)).

LEVELING VALVE CHECK

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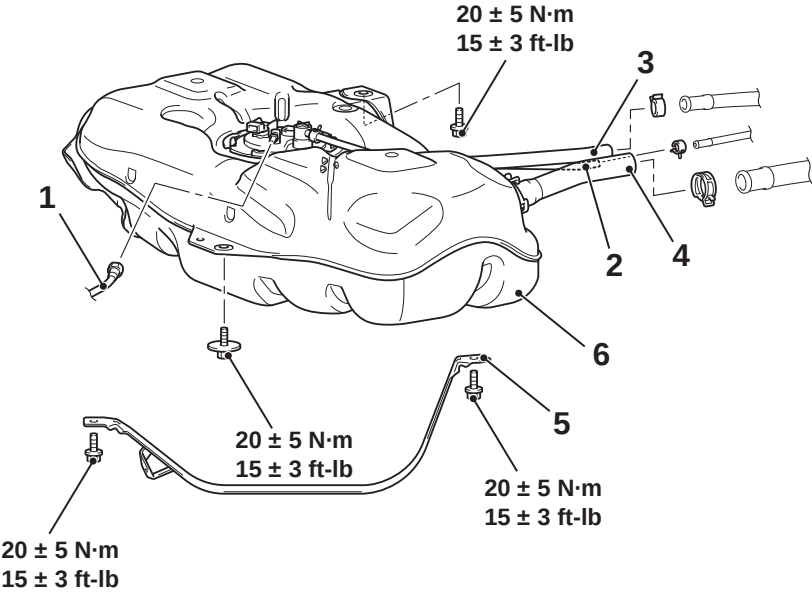
1. Place a drain pan, and disconnect the leveling hose at fuel filler neck side (Refer to [P.13B-18](#)).
NOTE: If fuel leaks from the leveling hose at this stage, the leveling valve may be defective.
2. Open the fuel filler cap, and fill the fuel tank up.
3. If fuel does not leak from the leveling hose with the fuel tank full, the leveling valve is normal. If not so, the leveling valve may be defective. Replace the fuel tank (Refer to [P.13B-15](#)).
4. Reconnect the leveling hose at the fuel filler neck side.

FUEL TANK

REMOVAL AND INSTALLATION

M1135001904083

Pre-removal Operation - Fuel Draining - Rear Seat Cushion Assembly Removal (Refer to GROUP 52A – Rear Seat Assembly P.52A-23).	Post-installation Operation - Checking for Fuel Leaks. - Rear Seat Cushion Assembly Installation (Refer to GROUP 52A – Rear Seat Assembly P.52A-23). - Refilling Fuel
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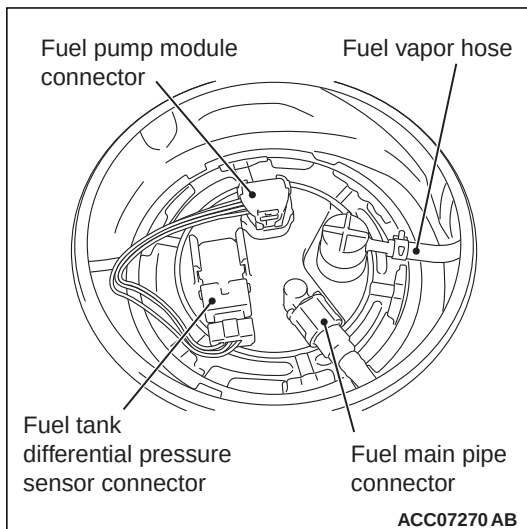
ACC06910AB

		Removal steps	Removal steps (Continued)
<<A>>	>>A<<	1. Fuel main pipe connection	2. Fuel vapor hose connection
<>		Main muffler and heat protector panel rear (Refer to GROUP 15 – Exhaust Pipe and Main Muffler P.15-10).	3. Leveling hose connection
	>>B<<		4. Fuel filler hose connection
<<C>>	>>B<<		5. Fuel tank band
			6. Fuel tank assembly

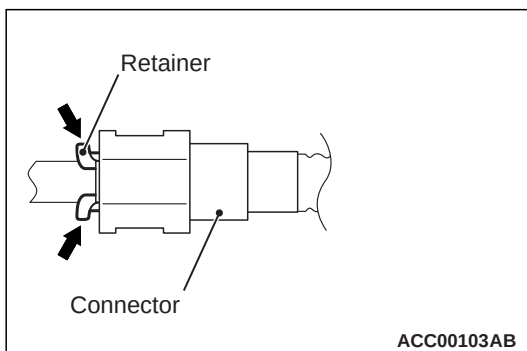
REMOVAL SERVICE POINTS

<<A>> FUEL MAIN PIPE DISCONNECTION

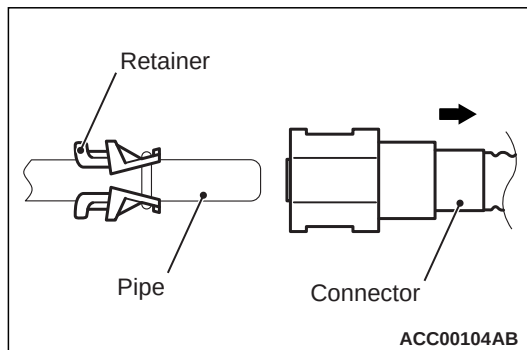
- Release the fuel pressure in the fuel line (Refer to GROUP 13A – On-vehicle Service, Reduce Pressurized Fuel Lines [P.13A-641](#)).



2. Disconnect the fuel tank differential pressure sensor connector.
3. Follow the steps below to unlock the fuel main pipe connector.

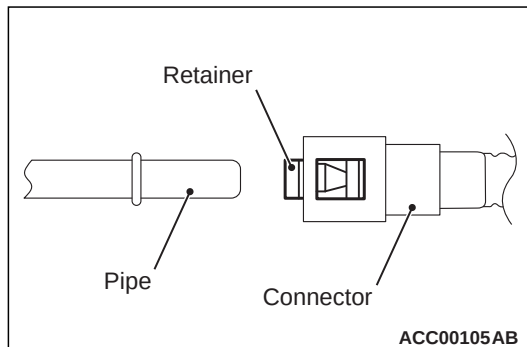


- (1) Compress the retainer tabs of the fuel main pipe connector to unlock it.



- (2) Pull out the connector with the retainer still attached to the pipe of the fuel pump module.

NOTE:



Remove the retainer from the pipe and then assemble the retainer into the connector.

**<> MAIN MUFFLER/HEAT PROTECTOR
PANEL REAR REMOVAL**

1. Remove the two muffler hangers on the vehicle rear side to create sufficient clearance for the removal and installation of the heat protector panel rear.
2. Remove the heat protector panel rear.

<<C>> FUEL TANK ASSEMBLY REMOVAL

Support the fuel tank assembly with a transmission jack, and remove the mounting bolts of the fuel tank assembly. Then, remove the fuel tank assembly.

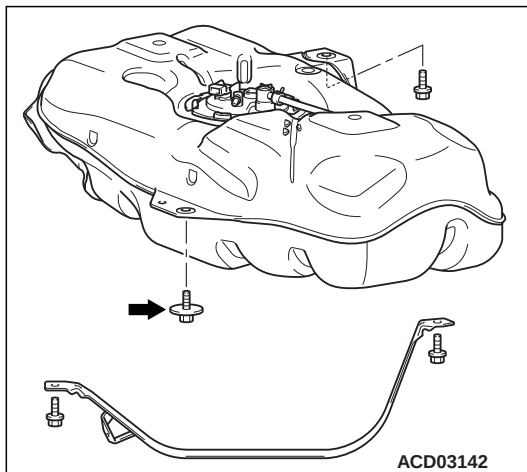
INSTALLATION SERVICE POINT**>>A<< FUEL MAIN PIPE CONNECTION****⚠ CAUTION**

After the installation, slightly pull the fuel main pipe to check that it is connected securely. At this time, also check that there is approximately 1 mm (0.04 inch) play. Follow the steps below to lock the fuel main pipe connector.

1. Make sure that the pipe of the fuel pump module and the fuel main pipe connector remains straight.
2. Insert the connector into the fuel pump module until it clicks into place.

**>>B<< FUEL TANK ASSEMBLY/FUEL TANK BAND
INSTALLATION**

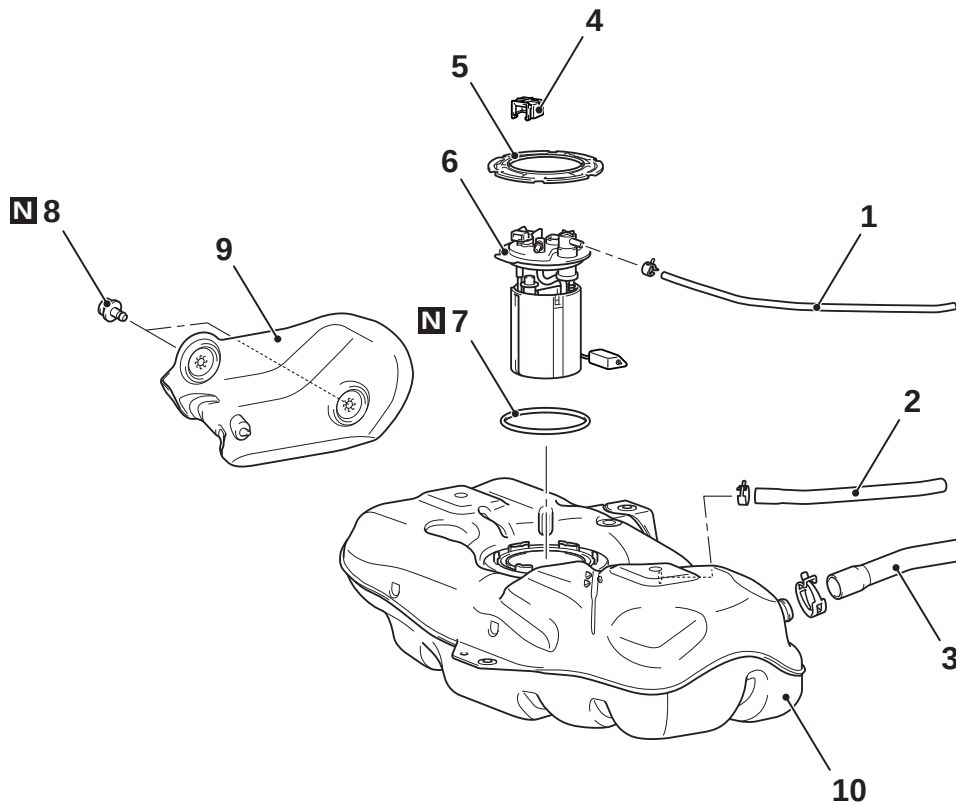
The shape of the mounting bolt shown in the figure differs from that of the other mounting bolts (3 locations).



DISASSEMBLY AND ASSEMBLY

<FUEL TANK ASSEMBLY>

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ACC06911AB

Disassembly steps

1. Fuel vapor hose
2. Leveling hose
3. Fuel filler hose
4. Fuel tank differential pressure sensor cover
5. L-ring

<<A>> >>B<<

Disassembly steps

6. Fuel pump module
7. Fuel pump packing
8. Clip
9. Fuel tank heat protector
10. Fuel tank

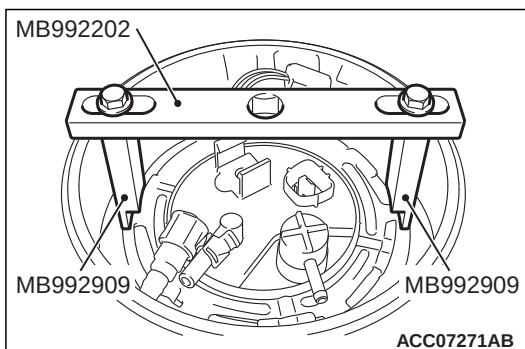
<> >>A<<

DISASSEMBLY SERVICE POINTS

<<A>> L-RING REMOVAL

Using the following special tools, remove the L-ring on fuel pump module.

- Fuel tank cap wrench (MB992202)
- Fuel tank cap wrench attachment (MB992909)

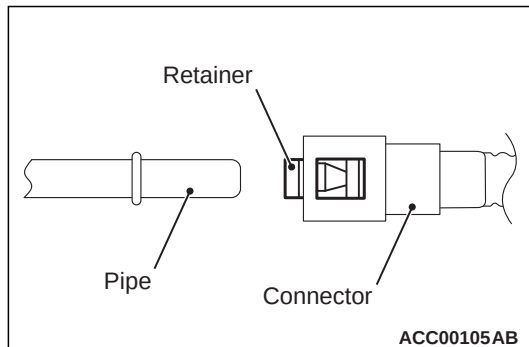


<> FUEL PUMP MODULE REMOVAL

⚠ CAUTION

Pay attention not to damage the fuel level sensor and the float of the fuel pump module when removing the fuel pump module from the fuel tank.

NOTE: When the fuel pump module is replaced, remove the retainer from the pipe and then assemble the retainer into the connector.



ASSEMBLY SERVICE POINTS

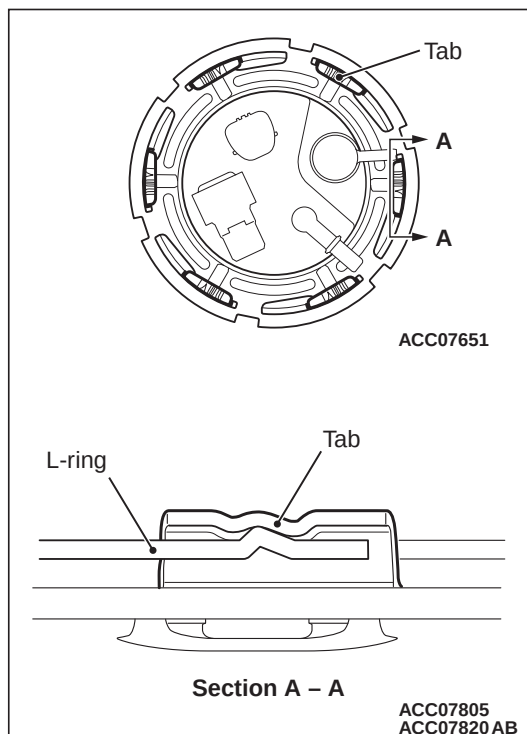
>>A<< FUEL PUMP MODULE INSTALLATION

⚠ CAUTION

- Pay attention not to damage the fuel level sensor and the float of the fuel pump module when installing it to the fuel tank.
- When installing the fuel pump module to the fuel tank, check that the fuel level sensor moving area moves smoothly.

>>B<< L-RING INSTALLATION

1. Use the special tools to tighten the L-ring on the fuel pump module securely using the same procedure as for removal.
2. Check that the L-ring is engaged securely into six tabs on the fuel tank.

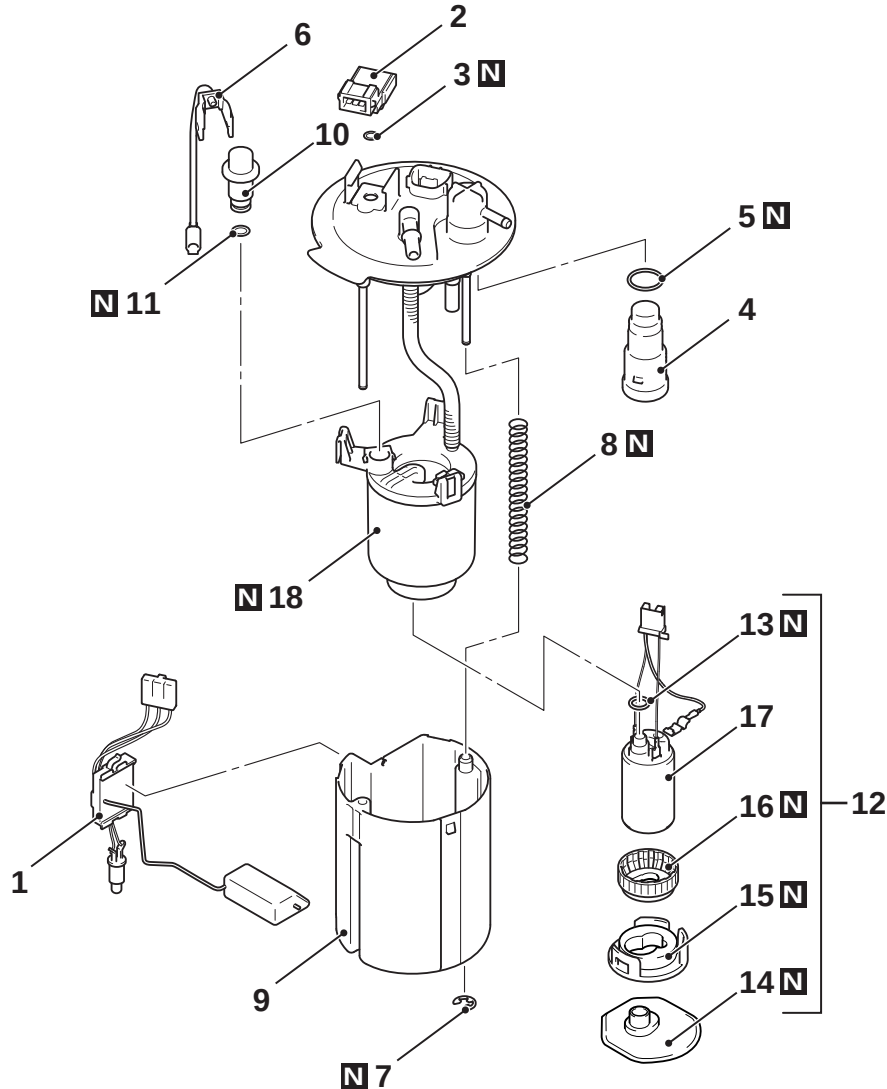


DISASSEMBLY AND ASSEMBLY

M1135004601811

<FUEL PUMP MODULE>

NOTE: For the removal and installation procedures, refer to [P.13B-7](#).



ACC06912AB

Disassembly steps

1. Fuel level sensor and fuel tank temperature sensor
2. Fuel tank differential pressure sensor
- >>A<< 3. O-ring
4. Fuel cut off valve
- >>A<< 5. O-ring
6. Fuel pressure regulator holder
7. Clip
8. Spring
9. Reservoir cup

Disassembly steps

- >>A<< 10. Fuel pressure regulator
11. O-ring
12. Fuel filter and fuel pump assembly
- >>A<< 13. O-ring
14. Fuel filter
15. Fuel pump holder
16. Cushion
17. Fuel pump
18. Fuel flange and filter assembly

ASSEMBLY SERVICE POINT

>>A<< O-RING INSTALLATION

To avoid twisting and damage, apply gasoline before installation of the O-ring.

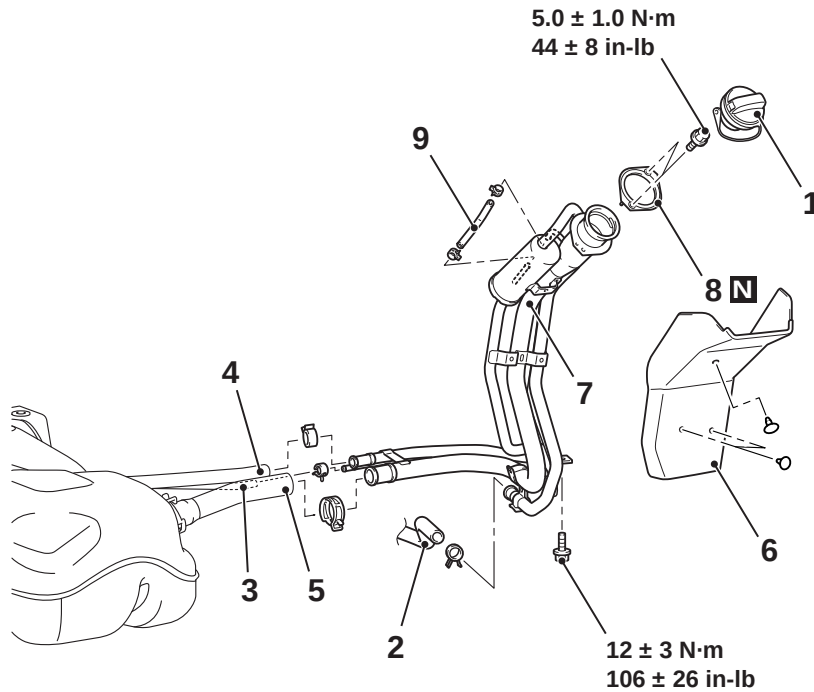
FUEL FILLER NECK

REMOVAL AND INSTALLATION

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Post-installation Operation

- Checking for Fuel Leaks.



ACC06913AB

Removal steps

1. Fuel filler cap
2. Fuel vapor hose connection
3. Fuel vapor hose connection
4. Leveling hose connection
5. Fuel filler hose connection

Removal steps (Continued)

6. Filler neck protector
7. Fuel filler neck
8. Packing
9. Fuel vapor hose