

## GROUP 13C

# FUEL SUPPLY

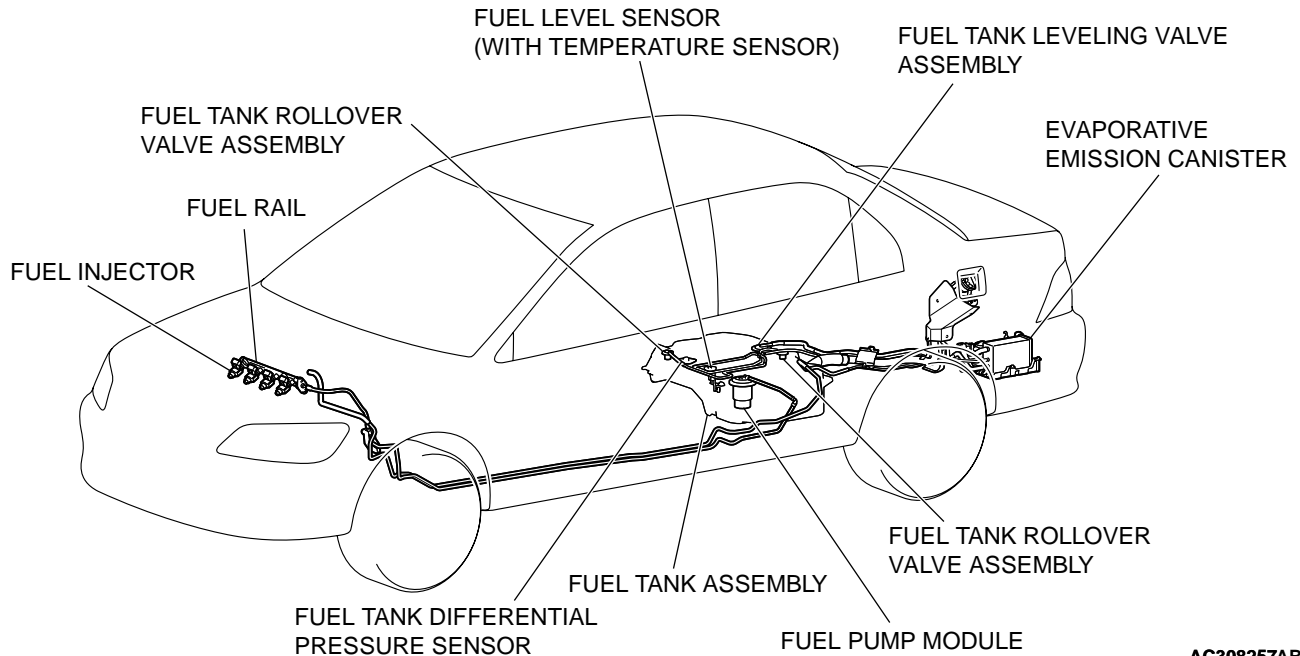
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## GENERAL DESCRIPTION

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- The fuel tank is located under the floor of the rear seats to provide increased protection and a more luggage space.
- A fuel tank rollover valve assembly has been adopted to prevent fuel from leaking out in case of a collision.
- A fuel pump module, including fuel pump, fuel filter and reservoir cup, has been adopted to lighten weight and improve serviceability.



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## FUEL SUPPLY DIAGNOSIS

### INTRODUCTION TO FUEL SUPPLY DIAGNOSIS

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

Engine malfunctions caused by insufficient fuel supply and evaporative emission control 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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### FUEL SUPPLY DIAGNOSTIC TROUBLESHOOTING STRATEGY

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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 Chart.
4. Verify malfunction is eliminated.

### SYMPTOM CHART

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SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Engine malfunctions due to insufficient fuel supply	1	P.13C-3

## SYMPTOM PROCEDURES

### INSPECTION PROCEDURE 1 : Engine Malfunctions Due to Insufficient Fuel Supply

#### TROUBLESHOOTING HINTS (THE MOST LIKELY CAUSES FOR THIS CASE:)

- Injector failed.
- Open or shorted injector circuit, or loose connector.
- Bent, twisted or clogged fuel pipe or hose.
- Malfunction of the fuel pump module.

#### DIAGNOSIS

##### Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
  - MB991824: Vehicle Communication Interface (V.C.I.)
  - MB991827: MUT-III USB Cable
  - MB991911: MUT-III Main Harness B

#### STEP 1. Using scan tool MB991958, read the diagnostic trouble code (DTC).

##### **⚠ CAUTION**

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Ensure that the ignition switch is at the "LOCK" (OFF) position.
- (2) Start up the personal computer.
- (3) Connect special tool MB991827 to special tool MB991824 and the personal computer.
- (4) Connect special tool MB991911 to special tool MB991824.
- (5) Connect special tool MB991911 to the data link connector.
- (6) Turn the power switch of special tool MB991824 to the "ON" position.

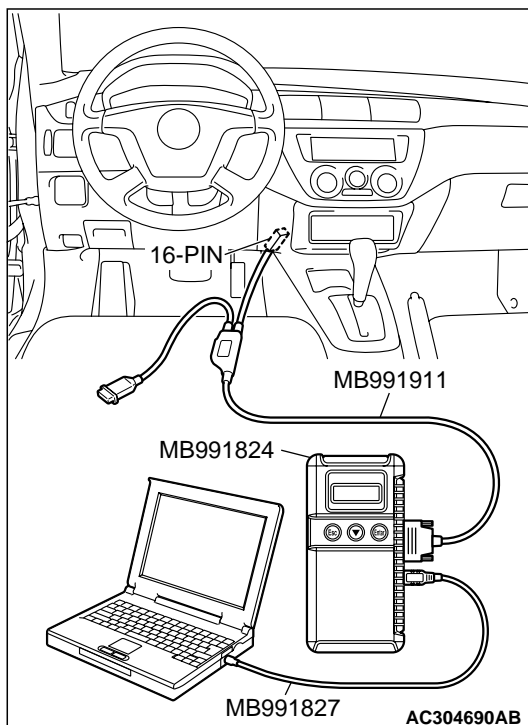
*NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in a green color.*

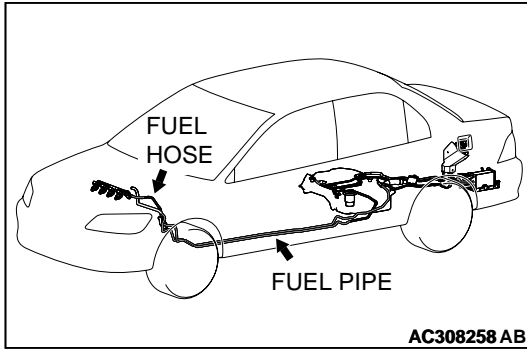
- (7) Start the MUT-III system on the personal computer.
- (8) Turn the ignition switch to the "ON" position.
- (9) Select "Interactive Diagnosis" from the start-up screen.
- (10) Select "System select."
- (11) Choose "MFI" from the "POWER TRAIN" tab.
- (12) Select "MITSUBISHI."
- (13) Select "Diagnostic Trouble Code."
- (14) If a DTC is set, it is shown.

#### Q: Is the DTC set?

**YES** : Refer to GROUP 13A, Diagnostic Trouble Code Chart [P.13A-29](#) <2.0L>, GROUP 13B, Diagnostic Code Chart [P.13B-31](#) <2.4L>.

**NO** : Go to Step 2.





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**STEP 2. Check for bending or twisting of the fuel pipe or hose.**

**Q: Are the fuel pipe and hose in good condition?**

**YES :** Go to Step 3.

**NO :** Repair or replace damaged fuel pipe and hose. Then go to Step 4.

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**STEP 3. Check the fuel pressure.**

Perform the fuel pressure test. Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test [P.13A-905](#) <2.0L>, GROUP 13B, On-vehicle Service – Fuel Pressure Test [P.13B-903](#) <2.4L>.

**Q: Is the fuel pressure in good condition?**

**YES :** Go to Step 4.

**NO :** Replace or repair defective part(s) by referring to the section "FUEL PRESSURE TEST" (Refer to GROUP 13A, On-vehicle Service – Fuel Pressure Test [P.13A-905](#) <2.0L>, GROUP 13B, On-vehicle Service – Fuel Pressure Test [P.13B-903](#) <2.4L>). Then go to Step 4.

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**STEP 4. Retest the system.**

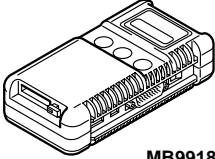
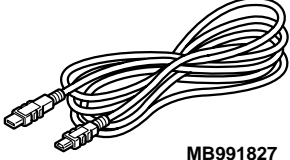

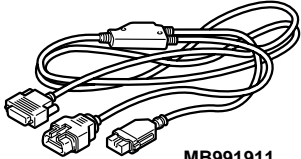
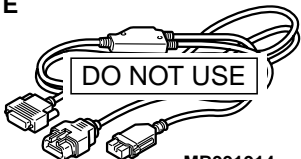
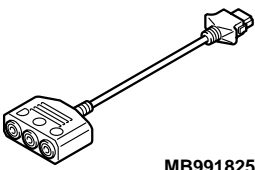
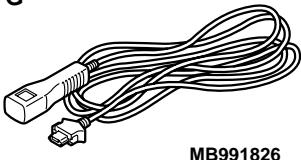

**Q: Is the engine malfunction eliminated?**

**YES :** The procedure is complete.

**NO :** Return to Step 1.

# SPECIAL TOOLS

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TOOLS	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
<p><b>A</b></p>  <p>MB991824</p> <p><b>B</b></p>  <p>MB991827</p> <p><b>C</b></p>  <p>MB991910</p> <p><b>D</b></p>  <p>MB991911</p> <p><b>E</b></p>  <p>MB991914</p> <p><b>F</b></p>  <p>MB991825</p> <p><b>G</b></p>  <p>MB991826 MB991958</p>	<p>MB991958</p> <p>A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826</p> <p>MUT-III sub assembly</p> <p>A: Vehicle communication interface (V.C.I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III main harness C (for Daimler Chrysler models only) F: MUT-III measurement adapter G: MUT-III trigger harness</p>	<p>MB991824-KIT</p> <p><i>NOTE: G: MB991826 MUT-III Trigger Harness is not necessary when pushing V.C.I. ENTER key.</i></p>	<ul style="list-style-type: none"> <li>Reading diagnostic trouble code</li> <li>MFI system inspection</li> </ul> <p><b>CAUTION</b></p> <p><b>MUT-III main harness B (MB991911) should be used. MUT-III main harness A and C should not be used for this vehicle.</b></p>
 <p>MB991348</p>	<p>MB991348</p> <p>Test harness set</p>	<p>MB991348-01</p>	<p>Fuel tank differential pressure sensor check</p>

## ON-VEHICLE SERVICE

### FUEL LEVEL SENSOR CHECK

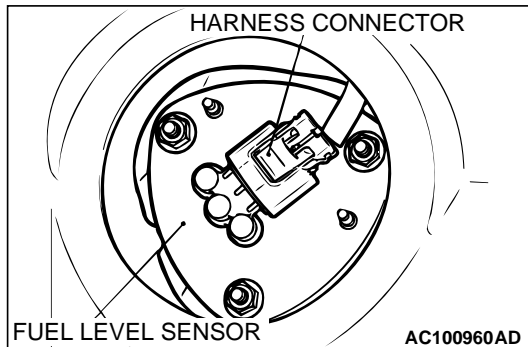
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Refer to GROUP 54A, Combination Meter Assembly –  
On-vehicle Service [P.54A-44](#).

### FUEL LEVEL SENSOR REPLACEMENT

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1. Remove the rear seat cushion assembly (Refer to GROUP 52A, Rear Seat Assembly [P.52A-23](#)).
2. Prise out the service hole cover.
3. Disconnect the harness connector.



#### **⚠ CAUTION**

Pay attention not to damage the sensor unit and the float of the fuel level sensor when withdrawing it from the service hole.

4. Remove the fuel level sensor mounting bolts and remove the fuel level sensor from service hole.

*NOTE: Check the fuel level sensor (Refer to GROUP 54A, Combination Meter Assembly – On-vehicle Service [P.54A-44](#)). If defective, replace it.*

#### **⚠ CAUTION**

Pay attention not to damage the sensor unit and the float of the fuel level sensor when inserting it from the service hole.

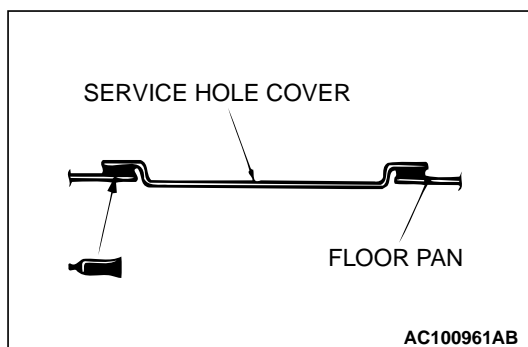
5. Install the fuel level sensor. Tighten the mounting nuts to the specified torque.

**Tightening torque:  $2.5 \pm 0.5$  N·m ( $23 \pm 4$  in-lb)**

6. Connect the harness connector.
7. Apply the specified sealant to the contact surfaces of the service hole cover and the floor pan, and install the service hole cover.

**Specified sealant: 3M™ 8513 Grommets Windshield Sealer (Black)**

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



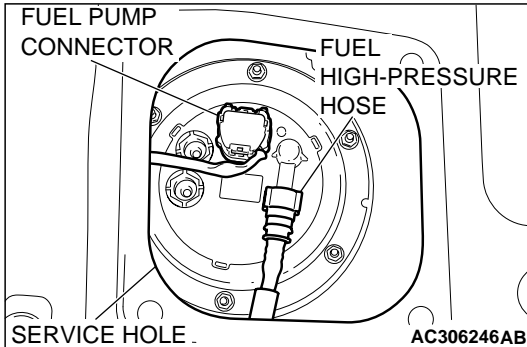
## FUEL PUMP OPERATION CHECK

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Refer to GROUP 13A, On-vehicle Service [P.13A-909](#).

## FUEL PUMP MODULE REPLACEMENT

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1. Remove the rear seat assembly (Refer to GROUP 52A, Rear Seat Assembly [P.52A-23](#)).
2. Fuel pump connector disconnection (Refer to GROUP 13A - On-vehicle Service [P.13A-908](#)).
3. Remove the service hole cover mounting screws to remove the cover.
4. Disconnect the fuel pump connector.

**NOTE:** Check the fuel pump (Refer to GROUP 13A, On-vehicle Service [P.13A-909](#)). If defective, replace the fuel pump, which is incorporated in the fuel pump module.

5. Disconnect fuel high-pressure hose.
6. Remove the mounting nuts and plate, and remove the fuel pump module from the service hole.

**NOTE:** To disassemble or assemble the fuel pump module, refer to the section "Fuel pump (module) disassembly and assembly [P.13C-12](#)".

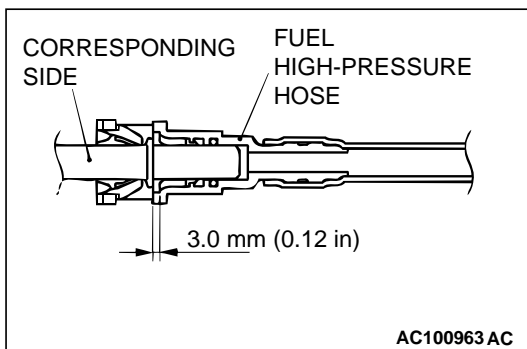
7. Replace the fuel pump gasket.
8. Install the fuel pump module to the fuel tank through the service hole.
9. Install the plate to the fuel tank and tighten the mounting nuts to the specified torque.

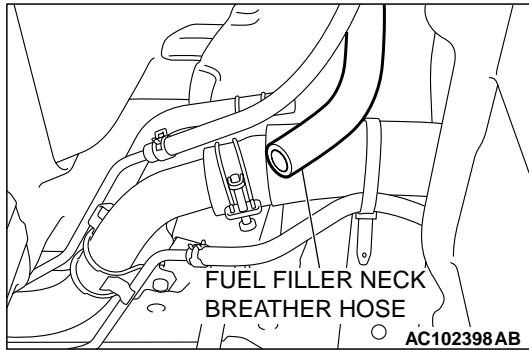
**Tightening torque:  $2.5 \pm 0.5$  N·m ( $23 \pm 4$  in-lb)**

### **CAUTION**

**Snap the fuel high-pressure hose one-touch joint into place, then pull back slightly on the hose to assure it is secure. However, the connection should have a play of approximately 3.0 mm (0.12 inch).**

10. Connect the fuel pump connector, fuel high-pressure hose and fuel hose.
11. Retain the service hole cover with the screws.
12. Install the rear seat cushion assembly (Refer to GROUP 52A, Rear Seat Assembly [P.52A-23](#)).





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**LEVELING VALVE CHECK**

1. Place a drain pan, and disconnect the fuel filler neck breather hose at pipe side.

*NOTE: If fuel leaks from the fuel filler neck breather hose at this stage, the leveling valve may be defective.*

2. Open the fuel tank filler cap, and fill the fuel tank up.
3. If fuel does not leak from the fuel tank filler neck breather hose with the fuel tank full, the leveling valve is normal. If not so, the leveling valve may be defective. Lower the fuel tank from the vehicle and replace the valve.
4. Reconnect the fuel filler neck breather hose at the pipe side.



# FUEL TANK

## REMOVAL AND INSTALLATION

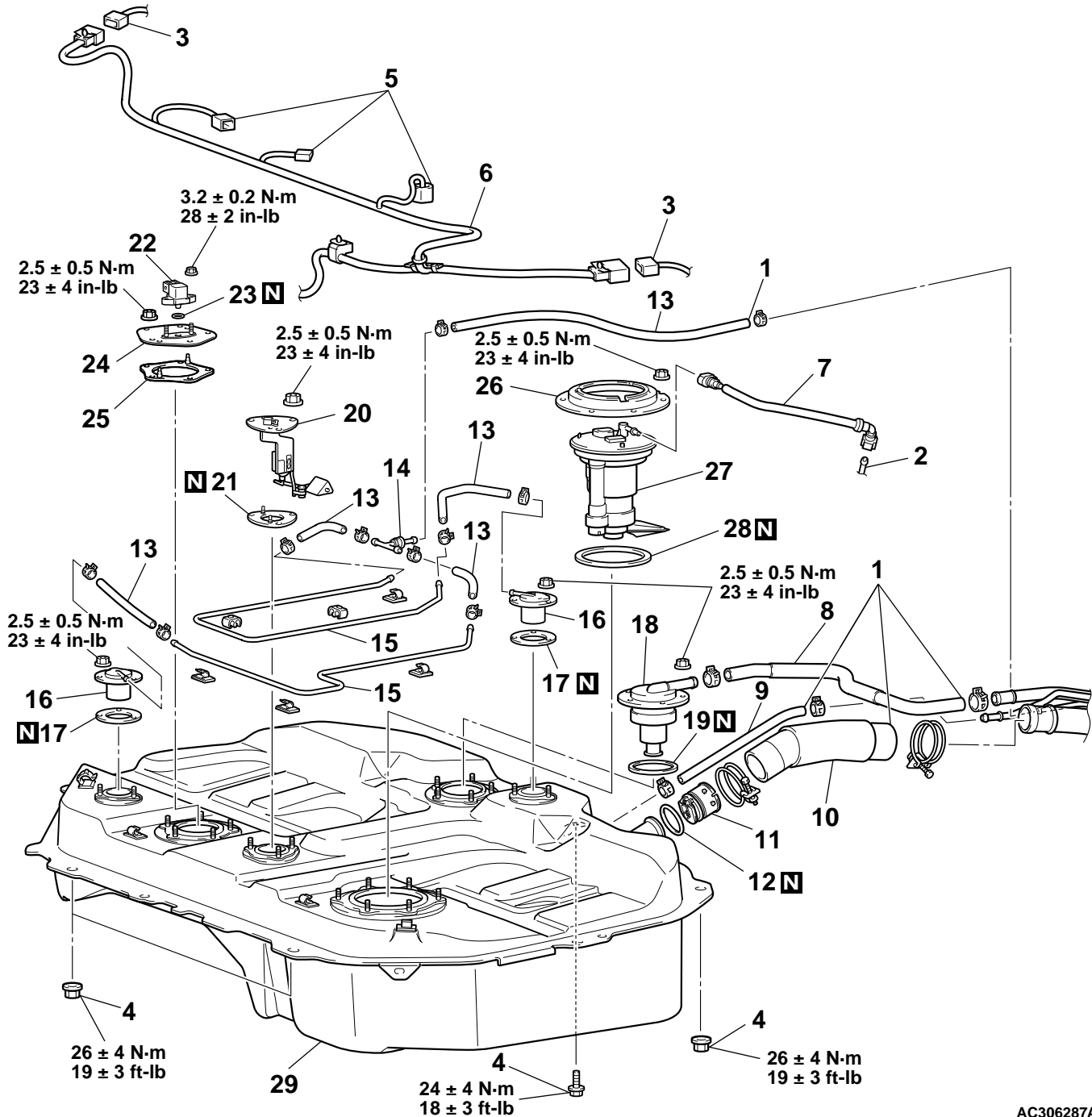
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### Pre-removal Operation

- Draining Fuel
- Fuel Pump Connector Disconnection (How to Reduce Fuel Pressure) (Refer to GROUP 13A, On-vehicle Service P.13A-908).
- Center Exhaust Pipe Removal (Refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-13).

### Pre-installation Operation

- Center Exhaust Pipe Installation (Refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-13).
- Refilling Fuel
- Checking for Fuel Leaks



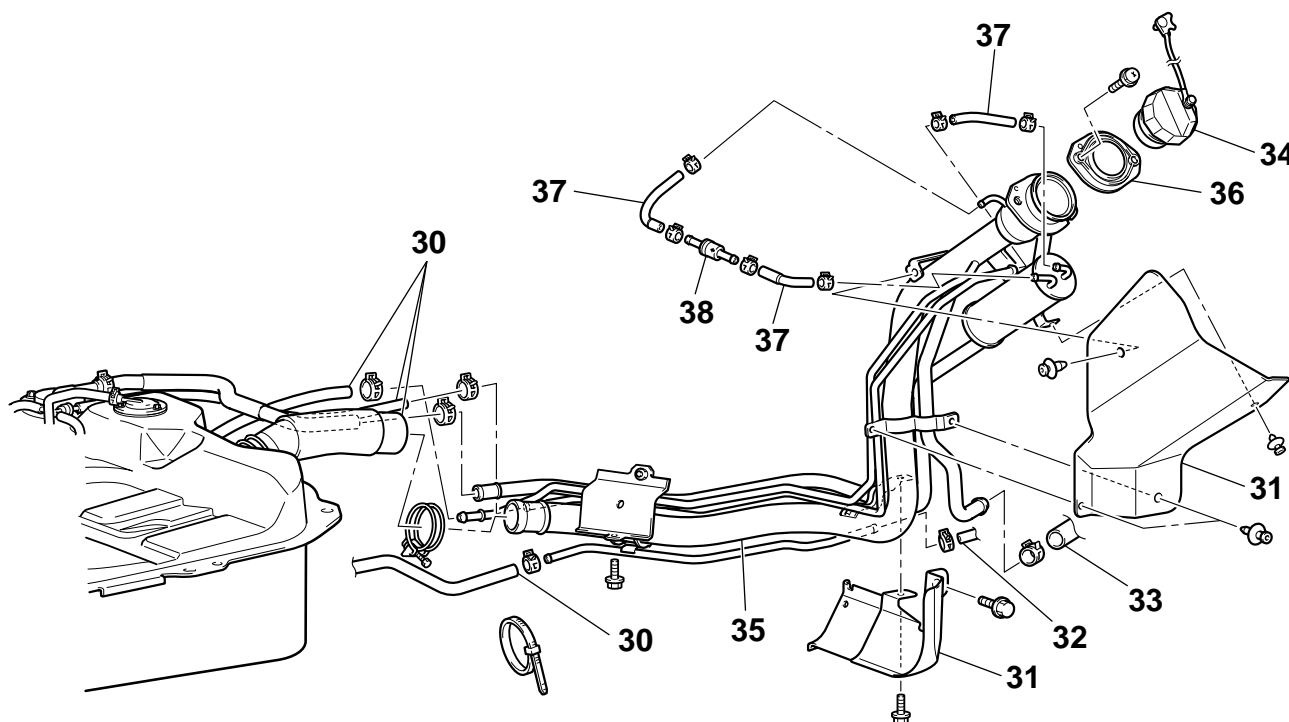
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**REMOVAL STEPS**

1. FUEL FILLER HOSE, FUEL LEVELING HOSE, FUEL TANK VAPOR HOSE CONNECTION <FUEL FILLER NECK SIDE>
2. FUEL MAIN PIPE
3. WHEEL SPEED SENSOR
- <<A>> 4. FUEL TANK INSTALLATION NUTS AND BOLTS
- <<A>> 5. HARNESS CONNECTOR CONNECTION
- <<A>> 6. FUEL WIRING HARNESS CONNECTION
- <<A>> • FUEL TANK ASSEMBLY
- >>A<< 7. FUEL HIGH-PRESSURE HOSE
8. FUEL FILLER NECK BREATHER HOSE
9. FUEL VAPOR HOSE
10. FUEL FILLER HOSE
11. FUEL SHUT-OFF VALVE
12. O-RING

**REMOVAL STEPS (Continued)**

13. FUEL TANK VAPOR HOSE
14. FUEL TANK CHECK VALVE
15. FUEL TANK VAPOR PIPE
16. FUEL TANK ROLLOVER VALVE ASSEMBLY
17. PACKING
18. FUEL TANK LEVELING VALVE ASSEMBLY
19. PACKING
20. FUEL LEVEL SENSOR
21. PACKING
22. FUEL TANK DIFFERENTIAL PRESSURE SENSOR
23. O-RING
24. PLATE
25. PACKING
26. FUEL PUMP BRACKET PLATE
27. FUEL PUMP MODULE
28. PACKING
29. FUEL TANK

**REMOVAL STEPS**

30. FUEL FILLER HOSE, FUEL LEVELING HOSE, FUEL TANK VAPOR HOSE CONNECTION <FUEL FILLER NECK SIDE>
31. FUEL FILLER NECK PROTECTOR
32. FUEL VAPOR PURGE HOSE B

**REMOVAL STEPS (Continued)**

33. FUEL VAPOR HOSE
34. FUEL TANK FILLER CAP
35. FUEL FILLER NECK
36. PACKING
37. FUEL VAPOR HOSE
38. FUEL FILLER NECK VALVE

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**Required Special Tool:**

- MB991348: Test Harness Set

## REMOVAL SERVICE POINTS

### <<A>> DISCONNECT HARNESS CONNECTOR/FUEL WIRING HARNESS/FUEL TANK ASSEMBLY REMOVAL

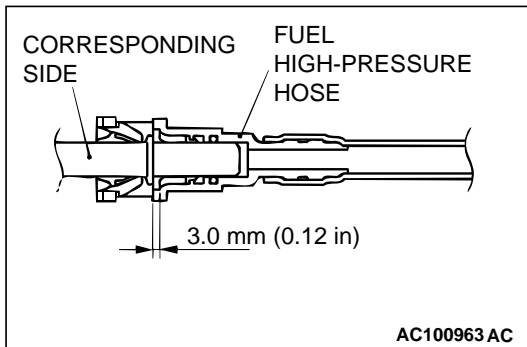
Lower the fuel tank assembly halfway to disconnect the fuel tank harness connector and fuel wiring harness.

## INSTALLATION SERVICE POINT

### >>A<< FUEL HIGH-PRESSURE HOSE INSTALLATION

#### CAUTION

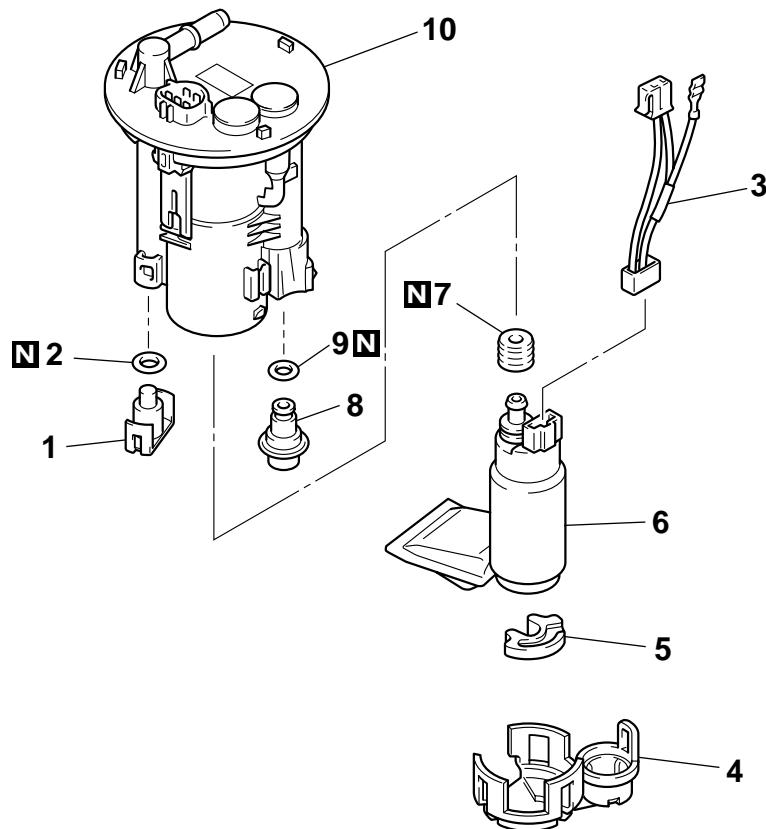
After connecting the quick action joint of the fuel high-pressure hose, pull the joint lightly away from the quick action joint to confirm that it is secure. In addition, confirm that there is a play of approximately 3.0 mm (0.12 inch) at the joint.



## FUEL PUMP MODULE DISASSEMBLY AND ASSEMBLY

M1135004600368

NOTE: For removal and installation, refer to On-vehicle service - Fuel pump (module) replacement [P.13C-7](#).



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## DISASSEMBLY STEPS

- >>A<<
1. CAP
  2. O-RING
  3. PUMP HARNESS
  4. FUEL PUMP BRACKET
  5. FUEL PUMP CUSHION
  6. FUEL PUMP

## DISASSEMBLY STEPS

- >>A<<
7. GROMMET
  8. FUEL PUMP PRESSURE REGULATOR
  9. O-RING
  10. FUEL TANK PUMP HOUSING

## ASSEMBLY SERVICE POINT

## &gt;&gt;A&lt;&lt; GROMMET/O-RING INSTALLATION

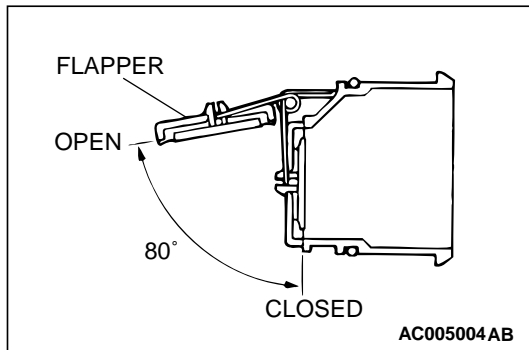
Apply gasoline on the grommet and the O-ring before mounting them to prevent damage or twisting.

## INSPECTION

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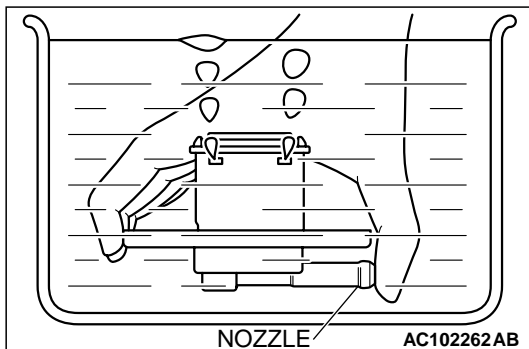
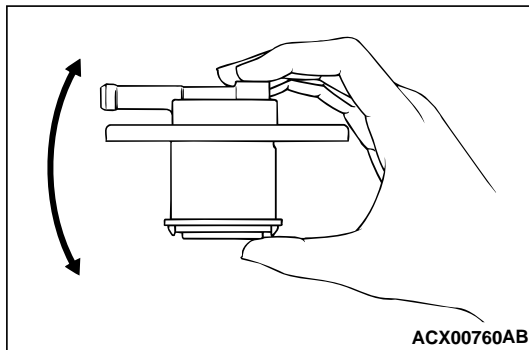
### FUEL SHUT-OFF VALVE CHECK

Check that the flapper of the fuel shut-off valve opens and closes as shown in the illustration.

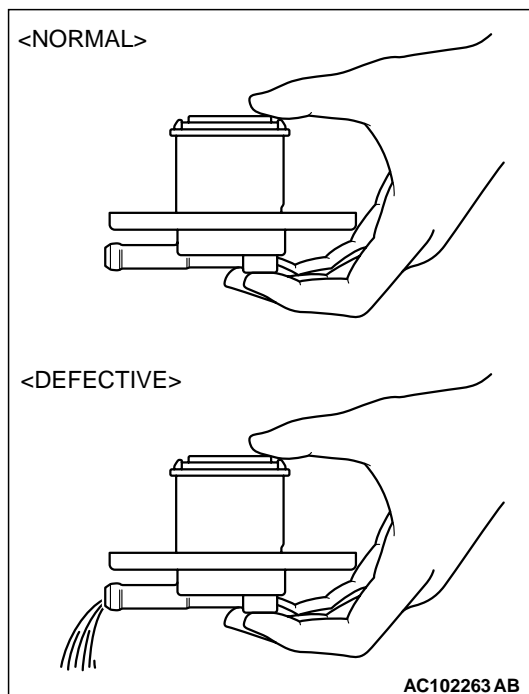


### FUEL TANK ROLLOVER VALVE ASSEMBLY CHECK

1. Shake the fuel tank rollover valve assembly up and down to check the float inside the fuel tank rollover valve assembly is not seized.

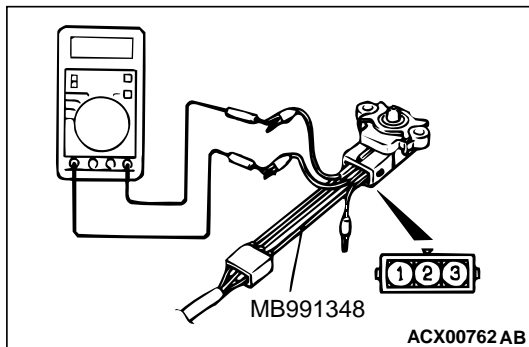


2. Obtain a container, which is full of water.
3. Invert the fuel tank rollover valve assembly, and submerge it slowly in the water while placing your fingers over the nozzle.
4. Check that no more air bubbles appears from the fuel tank rollover valve assembly, and withdraw it slowly.



5. Open the fuel tank rollover valve assembly nozzle. If no water flows out from the nozzle aperture, the valve is normal. If water flows out, the float or spring inside the fuel tank rollover valve is defective. Replace the fuel tank rollover valve assembly.

## FUEL TANK DIFFERENTIAL PRESSURE SENSOR CHECK



1. Disconnect the fuel tank differential pressure sensor connector and connect special tool MB991348 between the terminals of the disconnected connector.
2. Turn the ignition switch to "ON" and measure the output voltage between terminals 2 and 3.

**Standard value: 2.0 – 3.0 V**

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

M1135003900333

ITEM	SPECIFICATION
Fuel level sensor	$2.5 \pm 0.5$ N·m ( $23 \pm 4$ in-lb)
Fuel pump module and fuel pump bracket plate mounting nut	$2.5 \pm 0.5$ N·m ( $23 \pm 4$ in-lb)
Fuel tank rollover valve assembly nut	$2.5 \pm 0.5$ N·m ( $23 \pm 4$ in-lb)
Fuel tank differential pressure sensor assembly nut (With plate)	$2.5 \pm 0.5$ N·m ( $23 \pm 4$ in-lb)
Fuel tank differential pressure sensor nut	$3.2 \pm 0.2$ N·m ( $28 \pm 2$ in-lb)
Levelling valve assembly nut	$2.5 \pm 0.5$ N·m ( $23 \pm 4$ in-lb)
Fuel tank mounting nut	$26 \pm 4$ N·m ( $19 \pm 3$ ft-lb)
Fuel tank mounting bolt	$24 \pm 4$ N·m ( $18 \pm 3$ ft-lb)

### SERVICE SPECIFICATION

M1135000300268

ITEM	STANDARD VALUE
Fuel tank differential pressure sensor output voltage V	2.0 – 3.0

### SEALANT AND ADHESIVE

M1135000500176

ITEM	SPECIFIED SEALANT
Service hole cover and floor pan	3M™ 8513 Grommets windshield sealer (Black)

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## NOTES