

TROOPER

ENGINE

ENGINE FUEL

CONTENTS

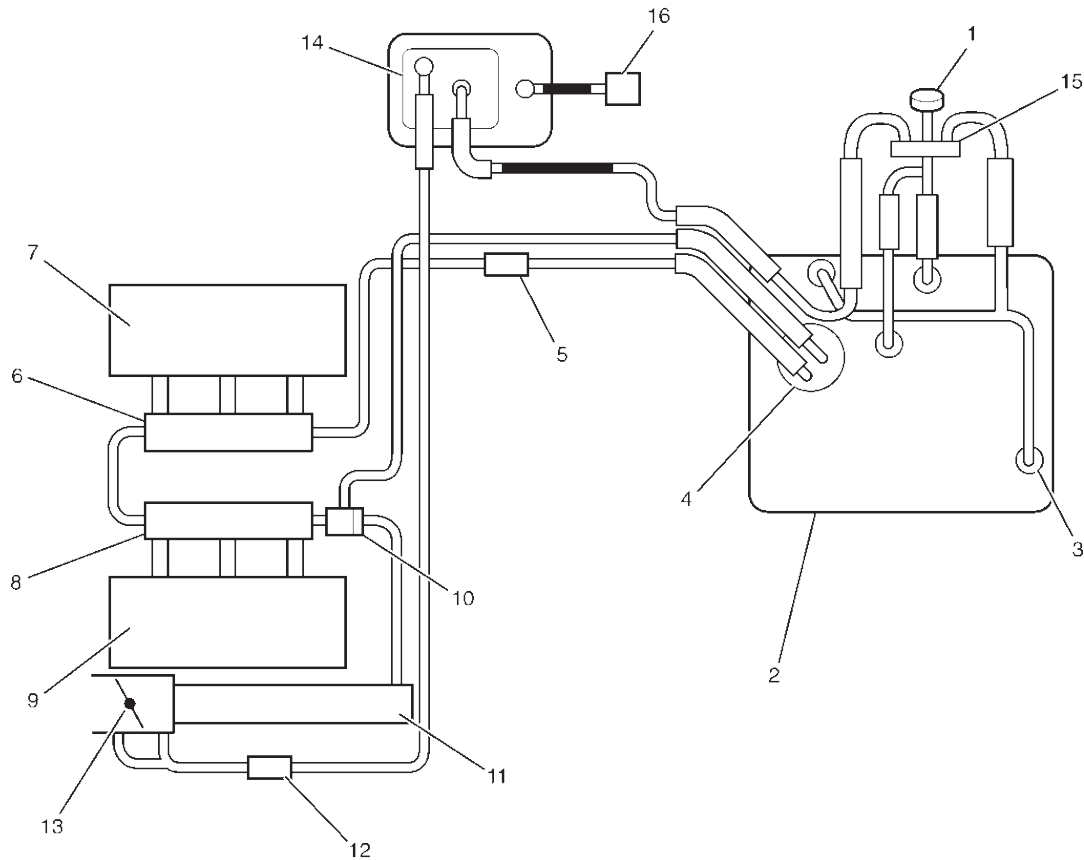
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Service Precaution

WARNING: THIS VEHICLE HAS A SUPPLEMENTAL RESTRAINT SYSTEM (SRS). REFER TO THE SRS COMPONENT AND WIRING LOCATION VIEW IN ORDER TO DETERMINE WHETHER YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING. WHEN YOU ARE PERFORMING SERVICE ON OR NEAR THE SRS COMPONENTS OR THE SRS WIRING, REFER TO THE SRS SERVICE INFORMATION. FAILURE TO FOLLOW WARNINGS COULD RESULT IN POSSIBLE AIR BAG DEPLOYMENT, PERSONAL INJURY, OR OTHERWISE UNNEEDED SRS SYSTEM REPAIRS.

CAUTION: Always use the correct fastener in the proper location. When you replace a fastener, use ONLY the exact part number for that application. ISUZU will call out those fasteners that require a replacement after removal. ISUZU will also call out the fasteners that require thread lockers or thread sealant. UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (Paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and the joint clamping force, and may damage the fastener. When you install fasteners, use the correct tightening sequence and specifications. Following these instructions can help you avoid damage to parts and systems.

General Description



140RY00002

Legend

- | | |
|---|----------------------------------|
| (1) Fuel Filler Cap | (8) Fuel Rail Left |
| (2) Fuel Tank | (9) Left Bank |
| (3) Rollover Valve | (10) Fuel Pressure Control Valve |
| (4) Fuel Pump (Fuel Level Sending Unit/Fuel Tank Pressure Sensor) | (11) Common Chamber |
| (5) Fuel Filter | (12) Duty Solenoid Valve |
| (6) Fuel Rail Right | (13) Throttle Valve |
| (7) Right Bank | (14) Canister |
| | (15) Evaporation Shut Off Valve |
| | (16) Vent Solenoid Cut Valve |

When working on the fuel system, there are several things to keep in mind:

- Any time the fuel system is being worked on, disconnect the negative battery cable except for those tests where battery voltage is required.
- Always keep a dry chemical (Class B) fire extinguisher near the work area.
- Replace all pipes with the same pipe and fittings that were removed.
- Clean and inspect "O" rings. Replace if required.
- Always relieve the line pressure before servicing any fuel system components.
- Do not attempt repairs on the fuel system until you have read the instructions and checked the pictures relating to that repair.

- Adhere to all Notices and Cautions.

All gasoline engines are designed to use only unleaded gasoline. Unleaded gasoline must be used for proper emission control system operation.

Its use will also minimize spark plug fouling and extend engine oil life. Using leaded gasoline can damage the emission control system and could result in loss of emission warranty coverage.

All cars are equipped with an Evaporative Emission Control System. The purpose of the system is to minimize the escape of fuel vapors to the atmosphere.

Fuel Metering

The Engine Control Module (ECM) is in complete control of this fuel delivery system during normal driving conditions.

The intake manifold function, like that of a diesel, is used only to let air into the engine. The fuel is injected by separate injectors that are mounted over the intake manifold.

The Manifold Absolute Pressure (MAP) sensor measures the changes in the intake manifold pressure which result from engine load and speed changes, which the MAP sensor converts to a voltage output.

This sensor generates the voltage to change corresponding to the flow of the air drawn into the engine. The changing voltage is transformed into an electric signal and provided to the ECM.

With receipt of the signals sent from the MAP sensor, Intake Air Temperature sensor and others, the ECM determines an appropriate fuel injection pulse width feeding such information to the fuel injector valves to effect an appropriate air/fuel ratio.

The Multiport Fuel Injection system utilizes an injection system where the injectors turn on at every crankshaft revolution. The ECM controls the injector on time so that the correct amount of fuel is metered depending on driving conditions.

Two interchangeable "O" rings are used on the injector that must be replaced when the injectors are removed.

The fuel rail is attached to the top of the intake manifold and supplies fuel to all the injectors.

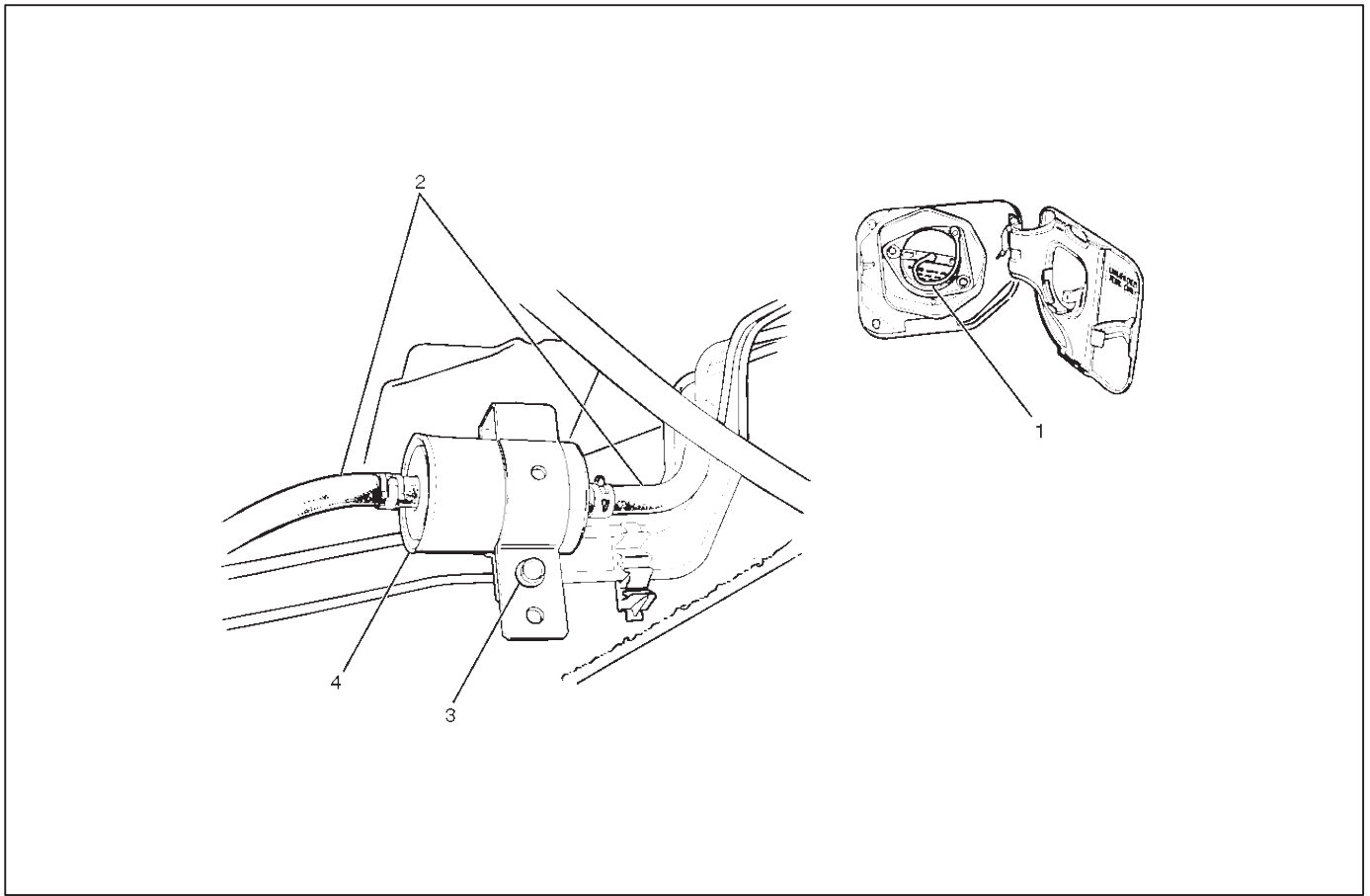
Fuel is recirculated through the rail continually while the engine is running. This removes air and vapors from the fuel as well as keeping the fuel cool during hot weather operation.

The fuel pressure control valve that is mounted on the fuel rail maintains a pressure differential across the injectors under all operating conditions. It is accomplished by controlling the amount of fuel that is recirculated back to the fuel tank based on engine demand.

See Section "Driveability and Emission" for more information and diagnosis.

Fuel Filter

Fuel Filter and Associated Parts



041RW014

Legend

- | | |
|---------------------|-----------------------------|
| (1) Fuel Filler Cap | (3) Fuel Filter Fixing Bolt |
| (2) Fuel Hose | (4) Fuel Filter |

Removal

CAUTION: When repair to the fuel system has been completed, start engine and check the fuel system for loose connection or leakage. For the fuel system diagnosis, see Section "Driveability and Emission".

1. Disconnect battery ground cable.
2. Remove Fuel filler cap(1).
3. Disconnect fuel hoses(2) from fuel filter on both engine side and fuel tank side.
4. Fuel filter fixing bolt(3).
 - Remove the fuel filter fixing bolt(3) on fuel filter holder.
5. Remove fuel filter(4).

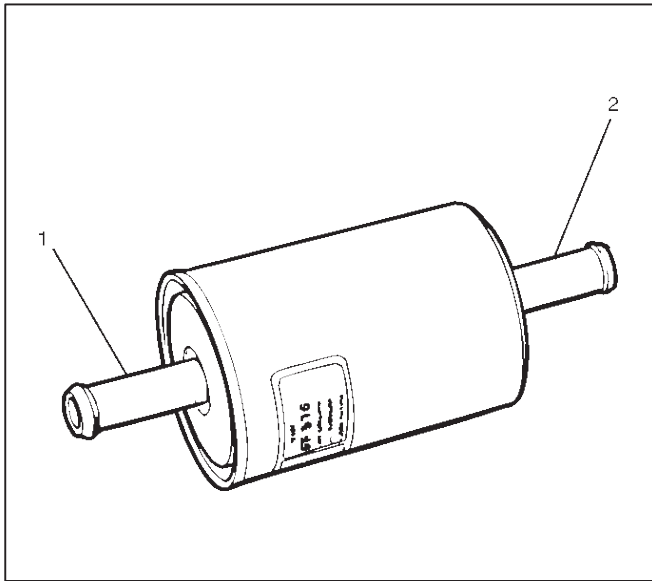
Inspection

1. Replace the fuel filter if the fuel leaks from fuel filter body or if the fuel filter body itself is damaged.
2. Replace the filter if it is clogged with dirt or sediment.
3. Check the drain of receive rubber and if it is clogged with dust, clean it up with air.

Installation

1. Install the fuel filter in the proper direction.
2. Install fuel filter holder fixing bolt.

3. Connect fuel hoses on engine side(1) and fuel tank side(2).



4. Install fuel filler cap
5. Connect the battery ground cable.

Inspection

After installation, start engine and check for fuel leakage.

In-Tank Fuel Filter

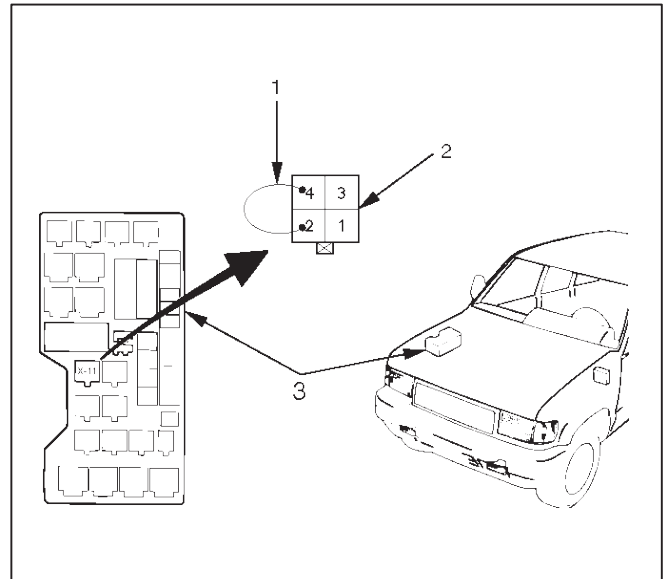
The filter is located on the lower end of fuel pickup tube in the fuel tank. It prevents dirt from entering the fuel pipe and also stops water unless the filter is completely submerged in the water. It is a self cleaning type, not requiring scheduled maintenance. Excess water and sediment in the tank restricts fuel supply to the engine, resulting in engine stoppage. In such a case, the tank must be cleaned thoroughly.

Fuel Pump Flow Test

If reduction of fuel supply is suspected, perform the following checks:

1. Make sure that there is fuel in the tank.
2. With the engine running, check the fuel feed pipe and hose from fuel tank to injector for evidence of leakage. Retighten, if pipe or hose connection is loose. Also, check pipes and hoses for squashing or clogging.
3. Insert the hose from fuel feed pipe into a clean container, and check for fuel pump flow rate.

4. Connect the pump relay terminals with a jumper wire(1) as shown and start the fuel pump to measure delivery.



CAUTION: Never generate sparks when connecting a jumper wire.

Delivery	Delivery
15 seconds	0.38 liters minimum

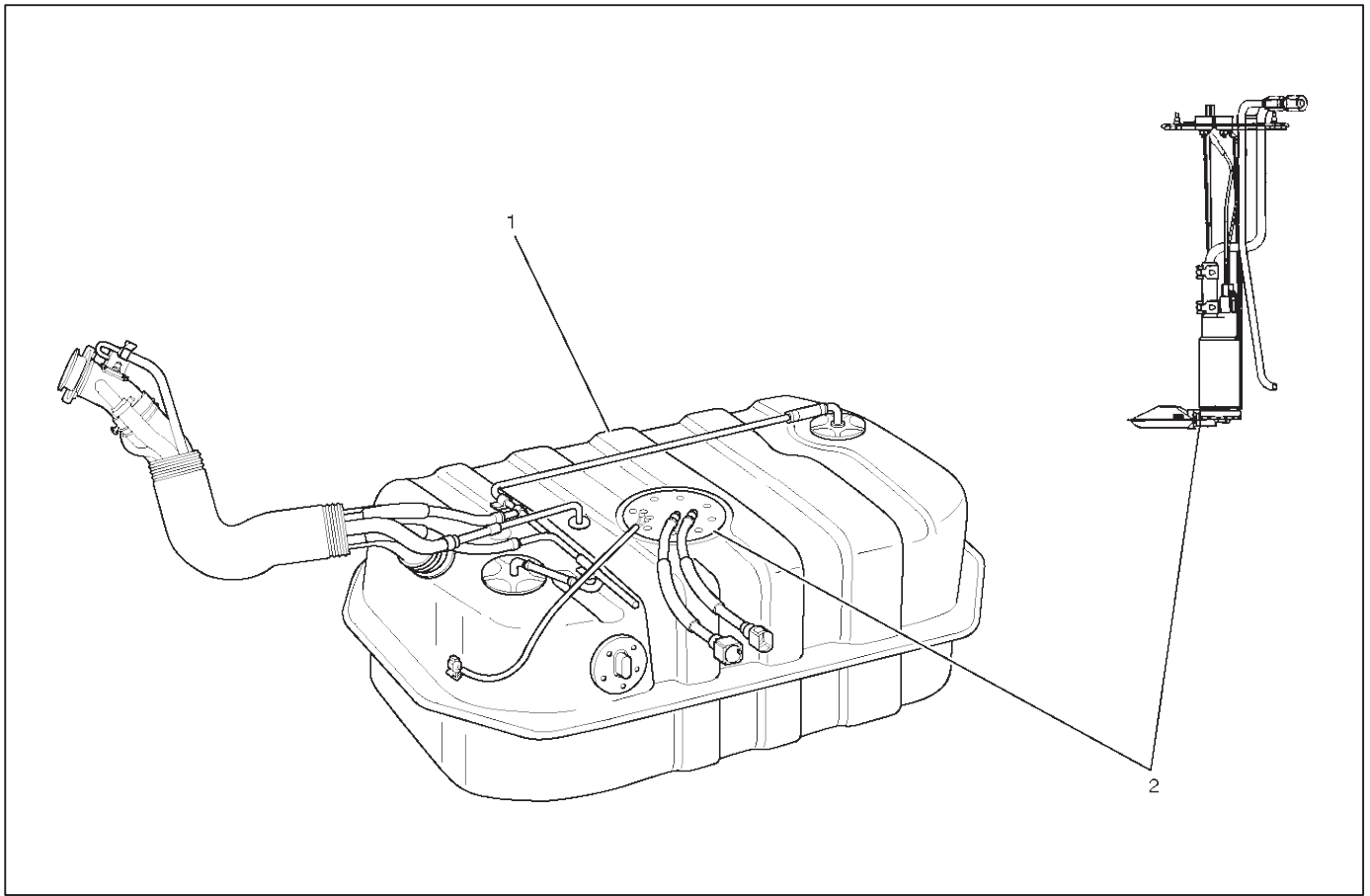
If the measure value is out of standard, conduct the pressure test.

Pressure test

For the pressure test to the fuel system, see Section 6E "Fuel System Electrical Test".

Fuel Pump

Fuel Pump and Associated Parts



035RW030

Removal

CAUTION: When repair to the fuel system has been completed, start engine and check the fuel system for loose connection or leakage. For the fuel system diagnosis, see Section “Driveability and Emission”.

1. Disconnect battery ground cable.
2. Loosen fuel filler cap.
3. Drain fuel.
Tighten drain plug to the specified torque after draining fuel.

Torque: 20 N·m (14 lb ft) — M8

4. Remove fuel tank assembly(1). Refer to “Fuel Tank Removal” in this section.
5. Remove fuel pump (FP) assembly(2) fixing screws and remove the FP assembly.

NOTE: After removing FP, cover fuel tank to prevent any dust entering.

Installation

1. Install FP assembly(2).
2. Install fuel tank assembly(1). Refer to “Fuel Tank Installation”.
3. Fill the tank with fuel and tighten fuel filler cap.
4. Connect battery ground cable.

Fuel Pump Relay

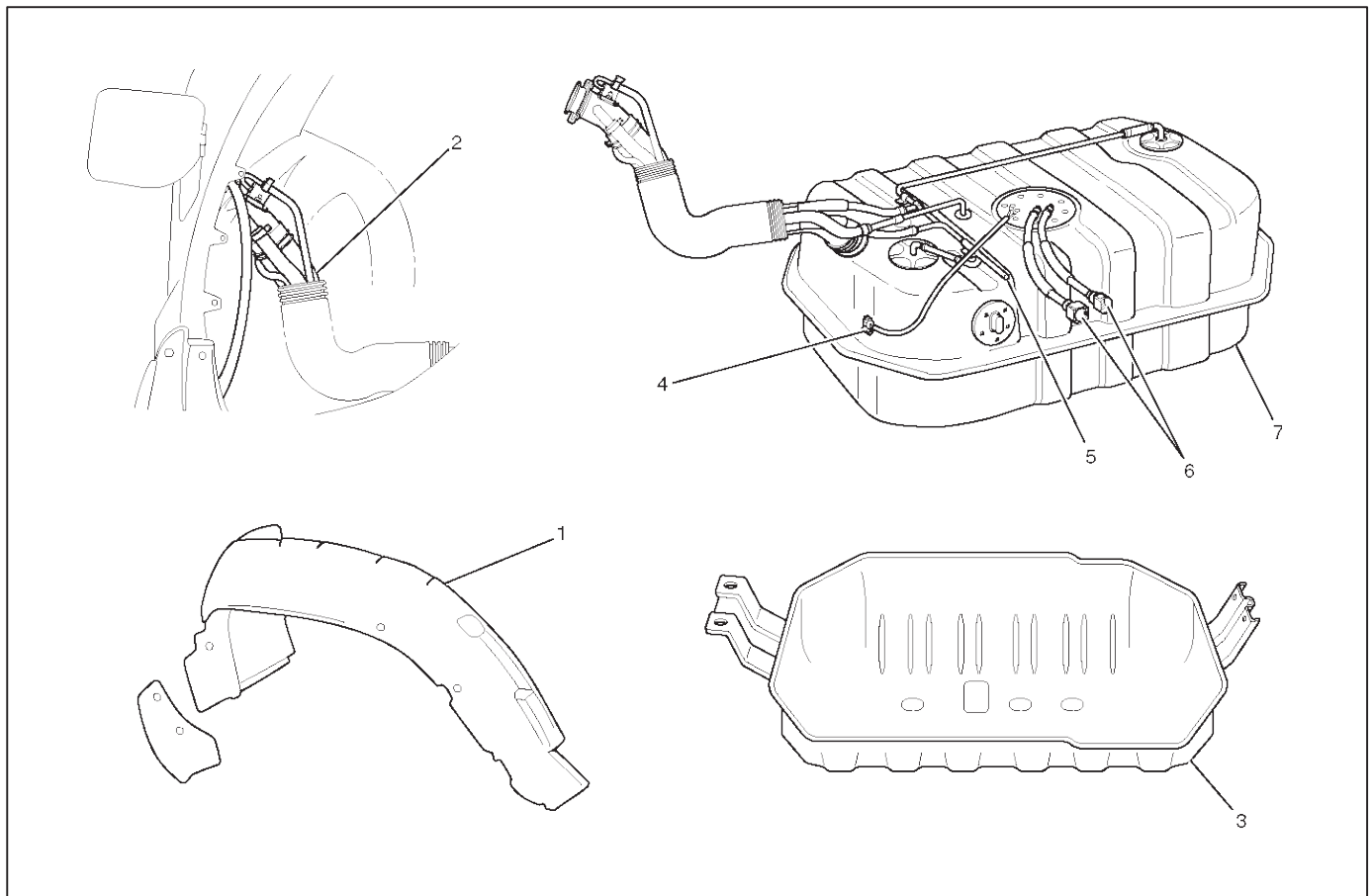
General Description

In order to control the FP operation, the FP relay is provided. When the starter switch is turned to “ON” position, the FP relay operates the FP for 2 seconds.

When it is turned to “START” position, the Power Train Control Module (PCM) receives the reference pulse from the Ignition Control Module and it operates the relay, again causing the FP to feed fuel.

Fuel Tank

Fuel Tank and Associated Parts



035RW032

Legend

- | | |
|---|--|
| (1) Fender Liner | (4) Fuel Tank Wiring Connector |
| (2) Fuel Filler Hose and Air Breather Hose and Evapo Hose | (5) Evapo Fuel Hose |
| (3) Undercover | (6) Fuel Feed Tube and Fuel Return Tube/Quick-Connect Fittings |
| | (7) Fuel Tank |

Removal

CAUTION: When repair to the fuel system has been completed, start engine and check the fuel system for loose connection or leakage. For the fuel system diagnosis, see Section “Driveability and Emission”.

1. Disconnect battery ground cable.
2. Loosen fuel filler cap.
3. Drain fuel.
Tighten drain plug to the specified torque after draining fuel.

Torque: 20 N·m (14 lb ft) — M8

4. Remove fender liner (1) of wheel well on rear right side.
5. Fuel filler hose, air breather hose and evapo hose (2).
6. Remove undercover fixing bolts on both sides and remove under cover(3).
7. Disconnect two fuel tank wiring connectors(4) on front right side of tank.

8. Disconnect evapo fuel hose(5).
9. Disconnect fuel feed tube and fuel return tube(6).

NOTE: Handling of the fuel tube, be sure to refer “Fuel Tube/Quick-Connect Fittings” in this section.

10. Remove fuel tank fixing bolts on both sides and remove fuel tank(7).

Installation

1. Install fuel tank(7).
 - Place a flange on right side of tank on the bracket.
 - Install a flange on left side on the bracket from the bottom, and tighten bolts to the specified torque.

Torque: 36 N·m (27 lb ft)

2. Connect fuel feed tube and fuel return tube(6).
3. Connect evapo fuel hose(5).
4. Connect fuel tank wiring connector(4).
5. Install undercover(3).

6. Connect fuel filler hose, air breather hose and evapo hose(2).
7. Install fender liner(1).
 - Mount fender liner to the wheel well.

- Fill the tank with fuel and tighten fuel filler cap.
- Connect battery ground cable.

Fuel Tube / Quick – Connect Fittings

Precautions

- Lighting of Fires Prohibited.
- Keep flames away from your work area to prevent the inflammable from catching fire.
- Disconnect the battery negative cable to prevent shorting during work.
- When welding or conducting other heat-generating work on other parts, be sure to provide pretreatment to protect the piping system from thermal damage or spattering.

Cautions During Work

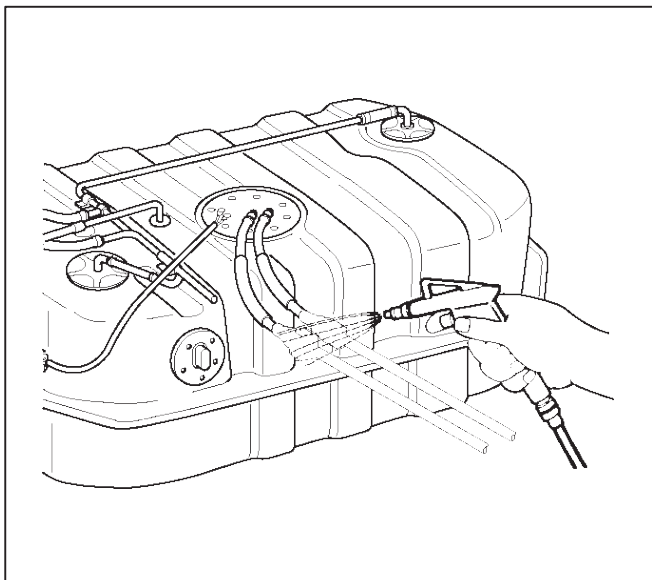
Do not expose the assembly to battery electrolyte or do not wipe the assembly with a cloth used to wipe off spilt battery electorolyte.

The piping wet with battery electrolyte cannot be used. Be careful not to give a bending or twisting force to the piping during the work. If deformed, replace with a new piping.

Removal

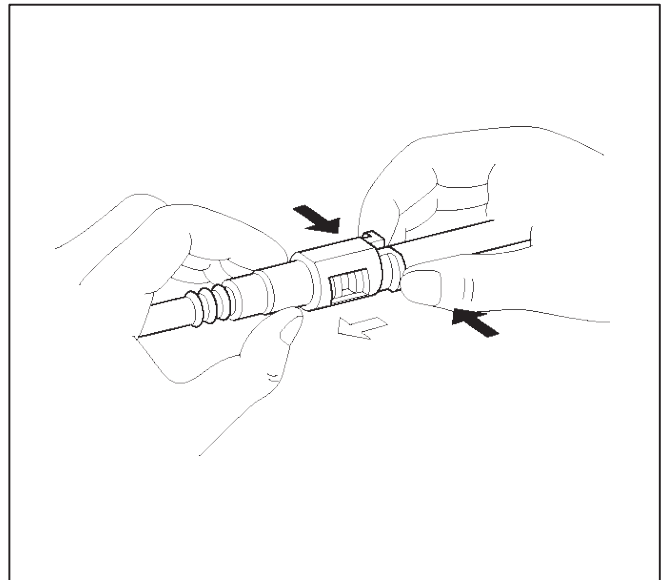
1. Open the fuel cap to relieve the fuel pressure in the tank.

If the fuel quick-connect fittings are dusty, clean with an air blower, etc. and then remove it.

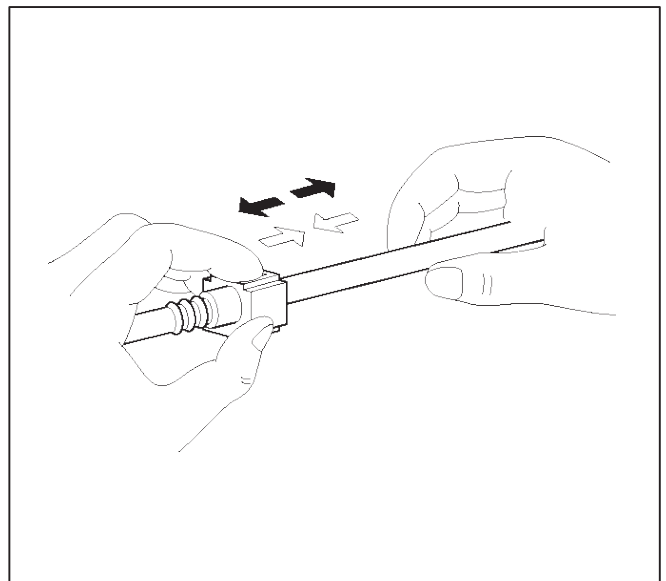


As some pressure may remain in the piping, cover the connector with a cloth, etc. to prevent the splashing of fuel in the first disconnection of the piping.

2. For removal of the delivery pipe (feeding fuel to the engine), hold the connector in one hand, and hold the retainer tab with the other hand and pull out the connector, as illustrated. The pipe can be removed with the retainer attached.

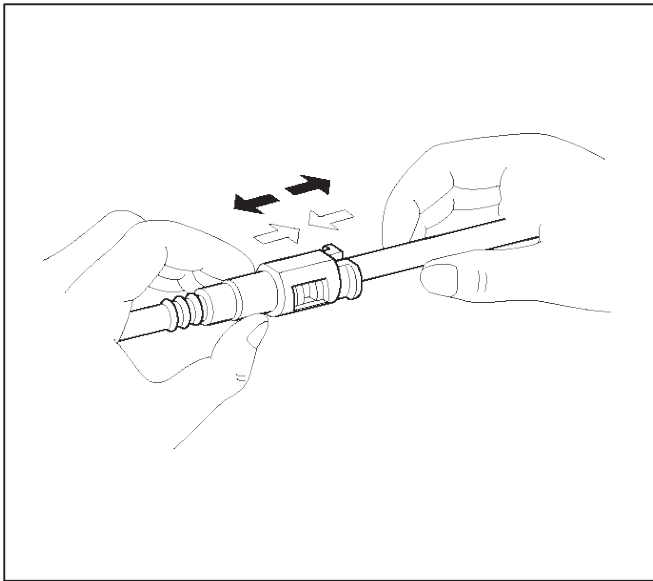


3. For removal of the return pipe (returning fuel to the tank), hold the pipe in one hand, and pull out the connentor with the other hand while pressing the square relieve button of the retainer, as illustrated.



NOTE: This work should be done by hands. Do not use any tools. Should the pipe can hardly be removed from

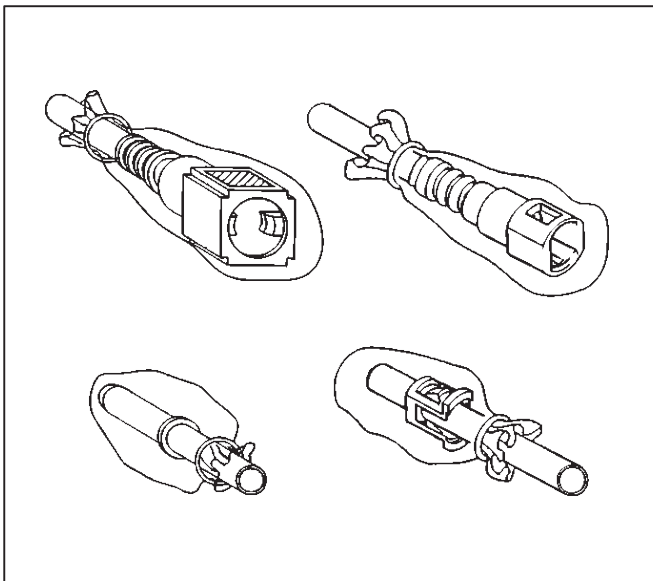
the connector, use a lubricant (light oil) and/or push and pull the connector longitudinally until the pipe is removed.



141RW021

When reusing the delivery pipe retainer, reuse without removing the retainer from the pipe. If the retainer is damaged or deformed, however, replace with a new retainer.

Cover the connectors removed with a plastic bag, etc. to prevent the entry of dust or rain water.



141RW022

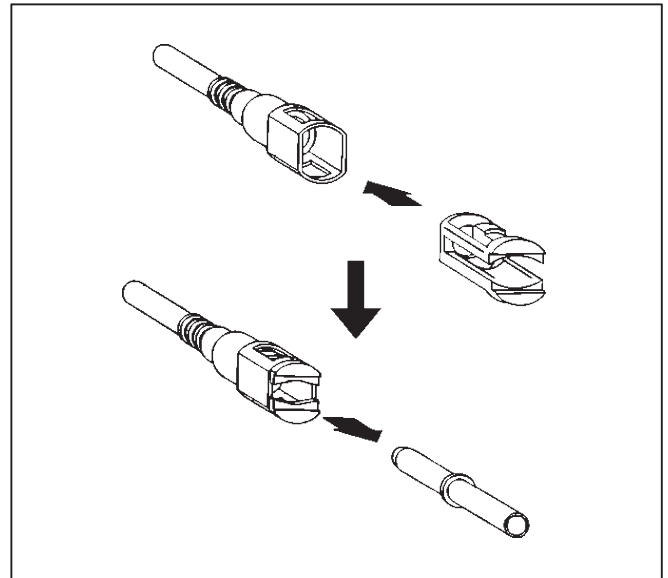
Reuse of Quick-Connector

(Delivery Pipe)

- Replace the pipe and connector if scratch, dent or crack is found.
- Remove mud and dust from the pipe and make sure that the end including spool is free of defects, such as scratch, rust, and dent, which may cause poor sealability. If defective, replace with a new pipe.

- If the retainer removed according to the removal step above is attached to the pipe, clean and insert it straight into the quick-connector till it clicks. After it clicks, try pulling it out to make sure that it is not drawn and is securely locked.

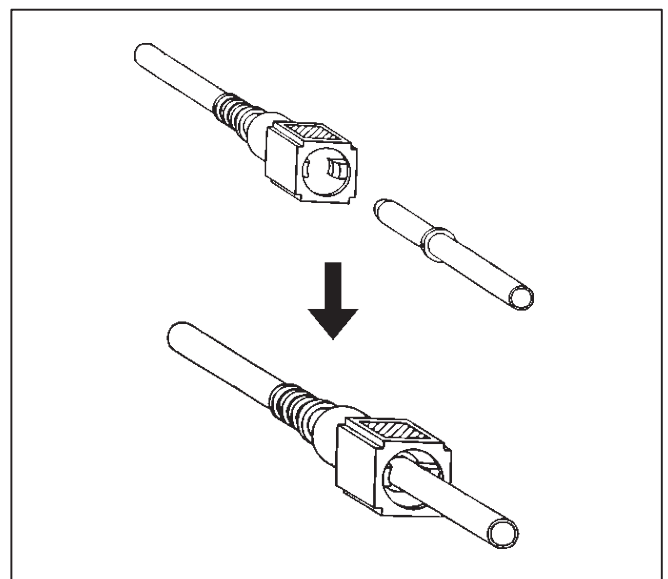
NOTE: The retainer, once removed from the pipe, cannot be reused. Just replace with a new retainer. Insert the new retainer into the connector side until it clicks, and connect the pipe as inserting it into the retainer until it clicks.



141RW016

(Return Pipe)

- Replace the pipe and connector if scratch, dent or crack is found.
- Remove mud or dust from the pipe and make sure that the end including spool is free from defects, such as scratch, rust, and dent, which may cause poor sealability. If defective, replace with a new pipe.
- After cleaning the pipe, insert it straight into the connector until it clicks. After it clicks, try pulling it out to make sure that it is not drawn and is securely locked.



141RW017

Assembling Advice

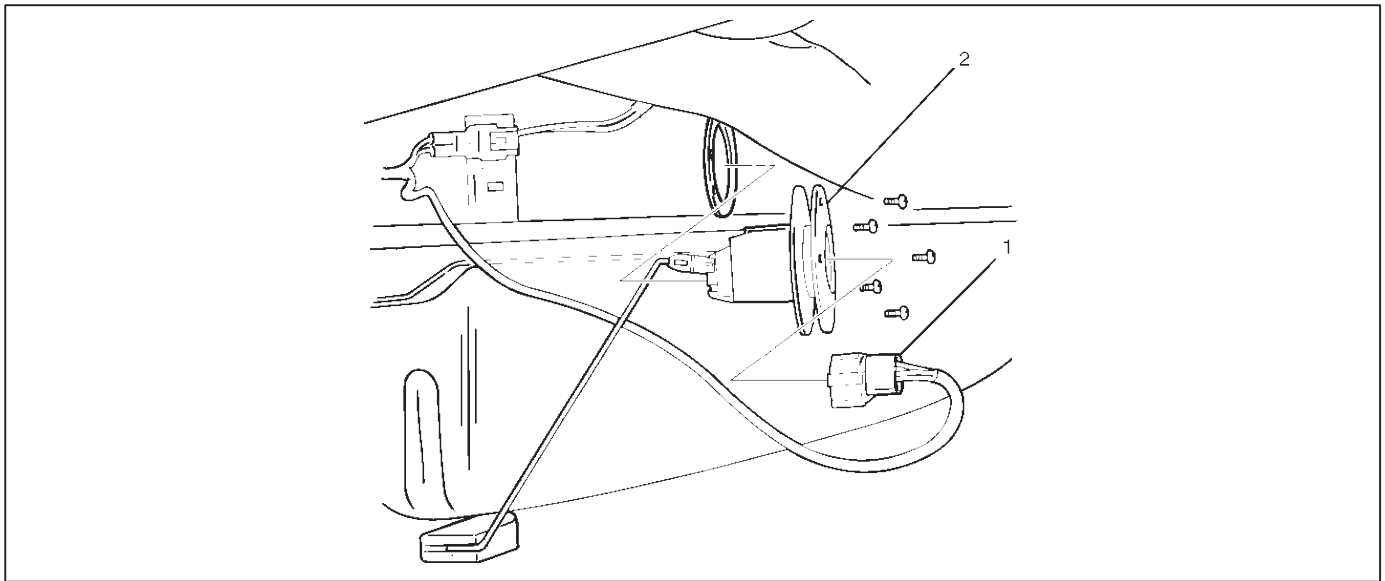
Application of engine oil or light oil to the pipe facilitates connecting work. The work should be started immediately after lubrication, since dust may stick to the pipe surface to cause poor sealability if a long time passes after lubrication.

Test/Inspection After Assembling

1. Reconnect the battery negative cable.
2. Turn the ignition key to the "ON" position and check pump startup sound. As the pump is actuated to raise fuel pressure, check and see fuel leak from the piping system.
3. Make sure of no fuel leakage by conducting the above fuel leak check a few times.
4. Start the engine and make sure of stable idling speed and normal vehicle run. The entry of dust during the work may sometimes affect the fuel injection system.

Fuel Gauge Unit

Fuel Gauge Unit and Associated Parts



140RS004

Legend

- (1) Wiring Connector
- (2) Fuel Gauge Unit

Removal

CAUTION: When repair to the fuel system has been completed, start engine and check the fuel system for loose connection or leakage. For the fuel system diagnosis, see Section "Driveability and Emission".

1. Disconnect battery ground cable.
2. Loosen fuel filler cap.
3. Drain fuel.
Tighten drain plug to the specified torque after draining fuel.

Torque: 20 N·m (14 lb ft) — M8

4. Wiring connector
 - Disconnect wiring connector(1) from the unit.
5. Fuel gauge unit
 - Remove the fixing screws, then the fuel gauge unit(2).

NOTE: After removing fuel gauge unit, cover fuel tank to prevent any dust entering

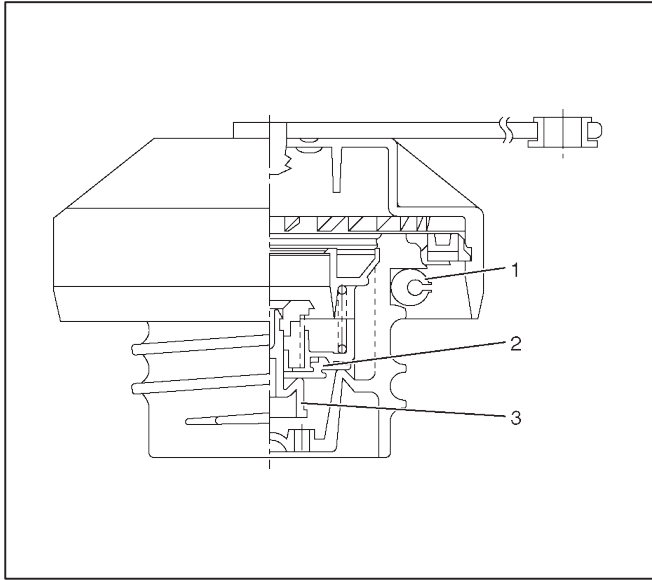
Installation

1. Fuel gauge unit(2).
2. Wiring connector(1).
 - Connect the wiring connector to the fuel gauge unit.
 - Fill the tank with fuel and tighten fuel filler cap.
 - Connect battery ground cable.

Fuel Filler Cap

General Description

Fuel filler cap includes vacuum valve and pressure valve. In case any high vacuum and any high pressure happen in tank, each valve works to adjust the pressure to prevent the tank from being damaged.



140R200028

Legend

- (1) Vacuum Valve
- (2) Pressure Valve
- (3) Seal Ring

Inspection

Check the seal ring in the filler cap for presence of any abnormality and for seal condition. Replace the filler cap, if abnormal.

CAUTION: The fuel filler cap valves have characteristics.

A defective valve, no valve at all or a valve with the wrong characteristics will do a lot of harm to engine operating characteristics; be sure to use the same fuel filler cap as installed in this vehicle.

Main Data and Specifications

Torque Specification

