FUEL SYSTEM

2-8

SUBARU

1988

MECHANISM AND FUNCTION

Fuel Lines

Fuel is delivered from the fuel tank to the fuel pump via the filter inside the tank. It is then delivered to the fuel injectors via the fuel filter.

Part of the fuel is returned by the pressure regulator. On the 2700 cc model, a fuel damper is located in the center of the delivery hose to absorb pulsations produced by the fuel injectors and the pressure regulator. Thus, vibration resulting from fuel pulsation is not transmitted to the passenger compartment.

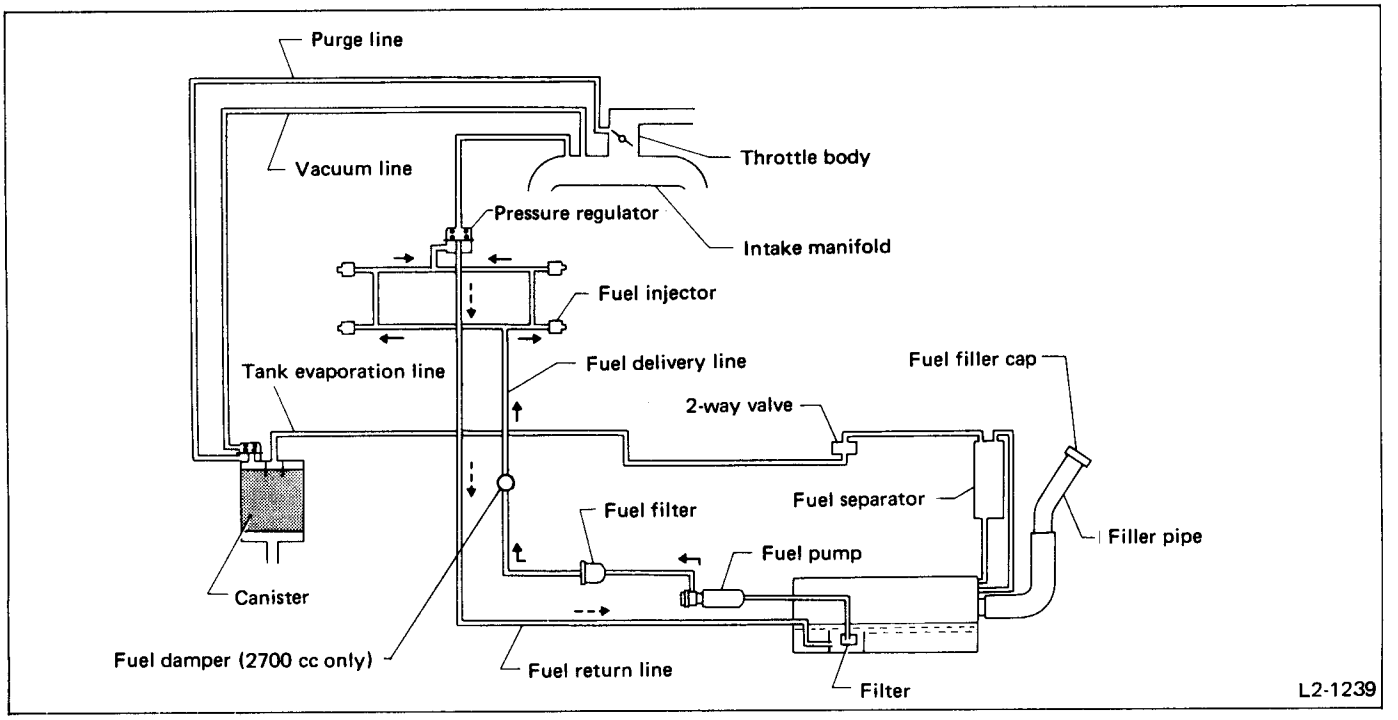


Fig. 1

Fuel Tank

It is provided with a chamber which prevents interruption of fuel flow during cornering.

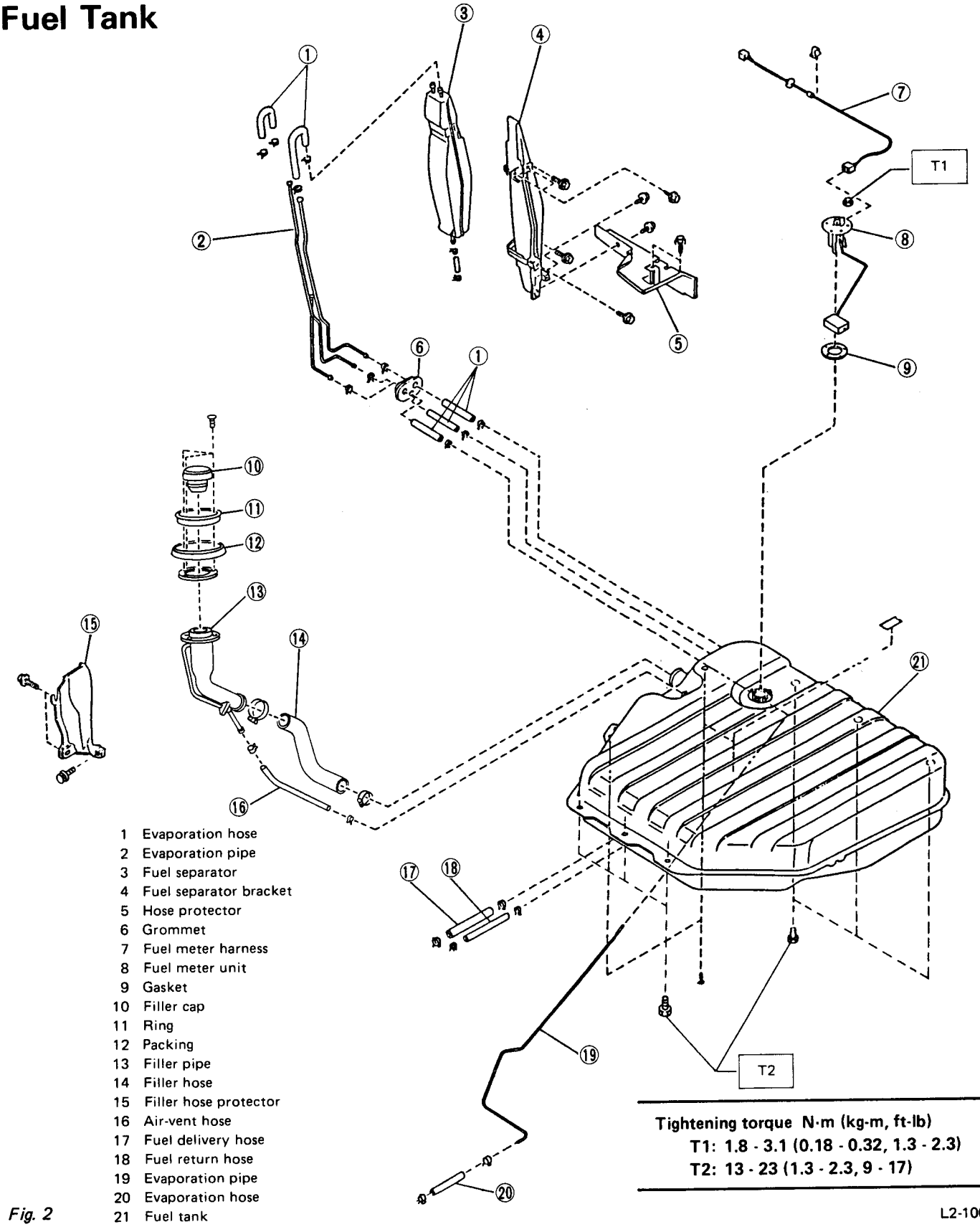
SPECIFICATIONS AND SERVICE DATA

SPECIFICATIONS

Fuel tank	Capacity	60 ℓ (15.9 US gal, 13.2 Imp gal)
	Location	Under rear floor
Fuel pump	Type	Electromagnetic pin roller
	Discharge pressure	422 – 490 kPa (4.3 – 5.0 kg/cm^2, 61 – 71 psi)
	Discharge flow	95 ℓ (25.1 US gal, 20.9 Imp gal)/H min. [12 V at 299.1 kPa (3.05 kg/cm^2, 43.4 psi)]
Fuel filter		Cartridge type
Fuel separator	Capacity	1,250 mℓ (42.3 US fl oz, 44.0 Imp fl oz)

COMPONENT PARTS

Fuel Tank



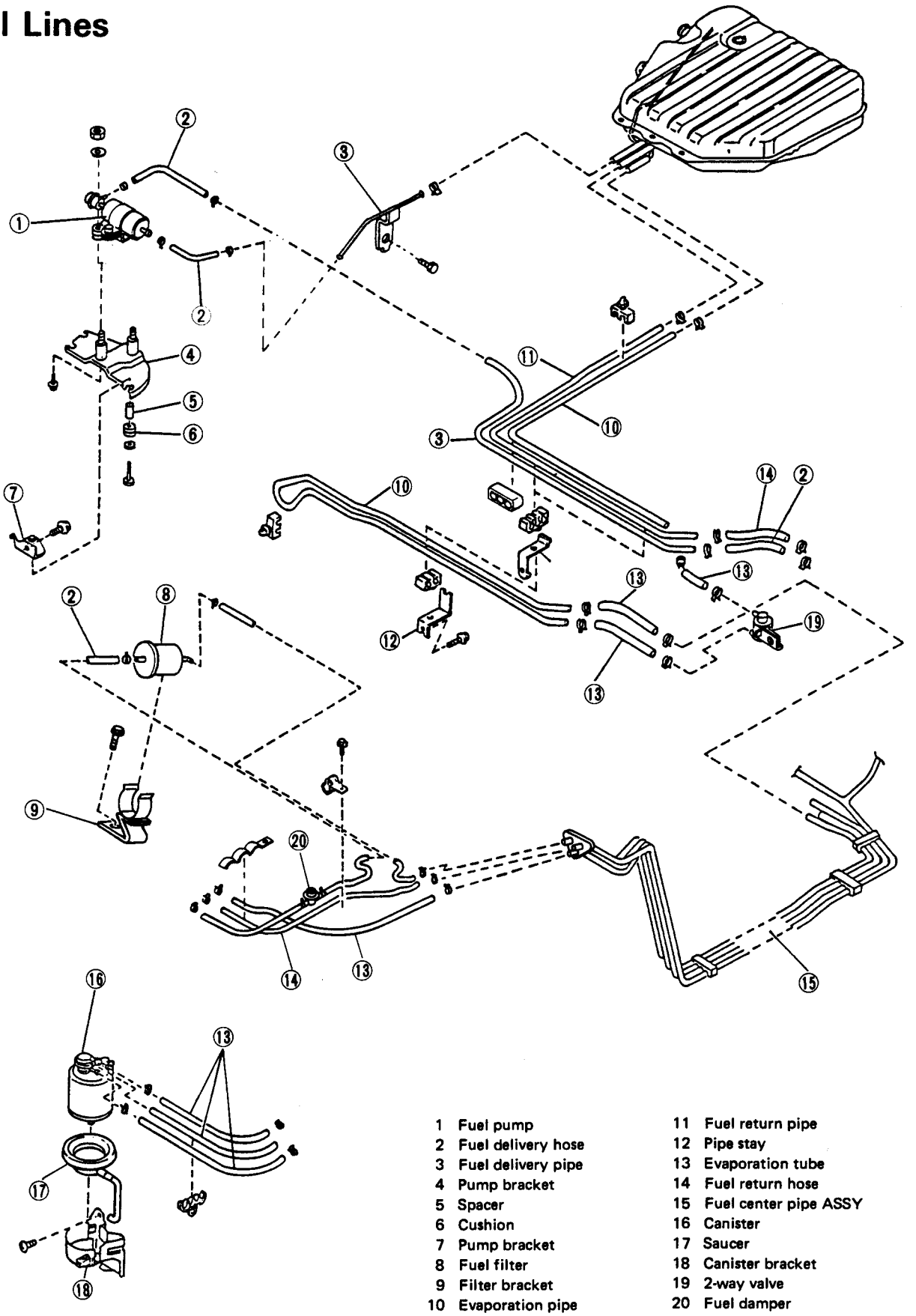
1 Evaporation hose
2 Evaporation pipe
3 Fuel separator
4 Fuel separator bracket
5 Hose protector
6 Grommet
7 Fuel meter harness
8 Fuel meter unit
9 Gasket
10 Filler cap
11 Ring
12 Packing
13 Filler pipe
14 Filler hose
15 Filler hose protector
16 Air-vent hose
17 Fuel delivery hose
18 Fuel return hose
19 Evaporation pipe
20 Evaporation hose
21 Fuel tank

Tightening torque N·m (kg-m, ft-lb)
T1: 1.8 - 3.1 (0.18 - 0.32, 1.3 - 2.3)
T2: 13 - 23 (1.3 - 2.3, 9 - 17)

Fig. 2

L2-1001

Fuel Lines



1 Fuel pump
2 Fuel delivery hose
3 Fuel delivery pipe
4 Pump bracket
5 Spacer
6 Cushion
7 Pump bracket
8 Fuel filter
9 Filter bracket
10 Evaporation pipe
11 Fuel return pipe
12 Pipe stay
13 Evaporation tube
14 Fuel return hose
15 Fuel center pipe ASSY
16 Canister
17 Saucer
18 Canister bracket
19 2-way valve
20 Fuel damper

Fig. 3

L2-1241

SERVICE PROCEDURE

a. Before starting the job, be sure to carry out the following.
1) Place "No fire" signs near the working area.
2) Disconnect ground cable from battery.
b. Be careful not to spill fuel on the floor.

Fuel Tank

REMOVAL

1) Remove muffler and rear differential ASSY. (4WD model only)
2) Remove fuel filler cap and drain fuel from fuel tank.
3) Remove fuel filler pipe protector.

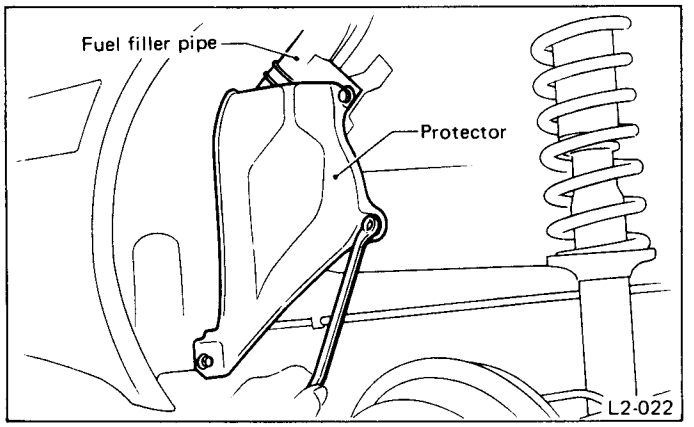


Fig. 4

4) Remove clamp and disconnect fuel filler hose from fuel filler pipe.
5) Remove clamp and disconnect air vent hose from fuel filler pipe.
6) Loosen clips and disconnect delivery hose, return hose and evaporation tube from fuel tank.

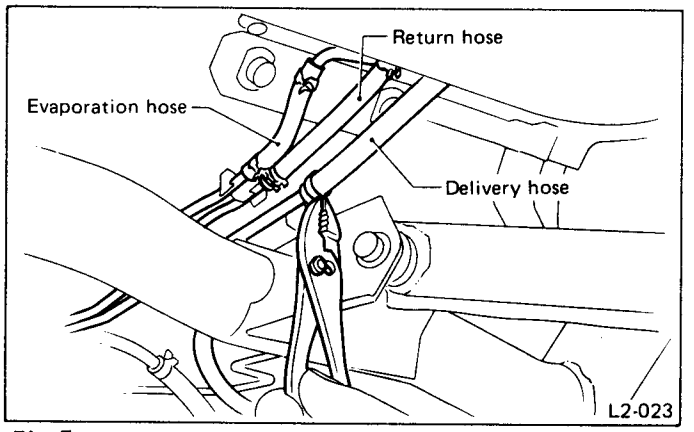


Fig. 5

7) While holding fuel tank, remove six mounting bolts from fuel tank and dismount it.

a. Two men are required to perform step 7) above.
b. Have a helper support fuel tank, as shown in the figure, when disconnecting fuel meter harness or evaporation tube.

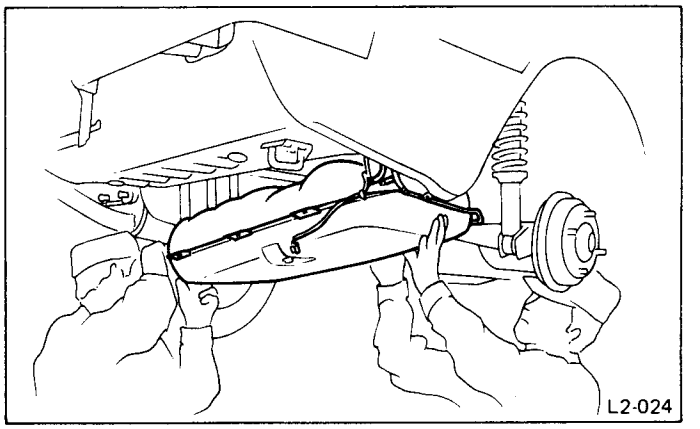


Fig. 6

8) Disconnect harness connector from fuel meter unit.
9) Loosen clips, disconnect evaporation tube, and dismount fuel tank.

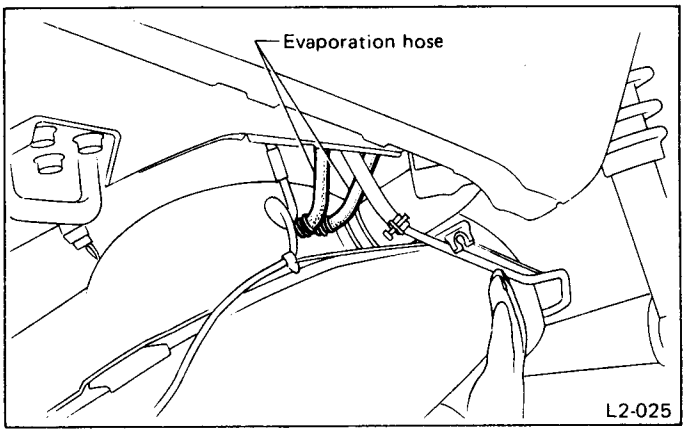


Fig. 7

INSTALLATION

Installation is in the reverse order of removal procedures. Observe the following:
1) When installing fuel tank, have a helper hold fuel tank while connecting hoses, tubes and harness connector.
2) Before tightening fuel tank mounting bolts, make sure hoses, harnesses, etc. are not caught between fuel tank and car body.

3) Install hose and tube holddown clips at positions indicated in the figure.

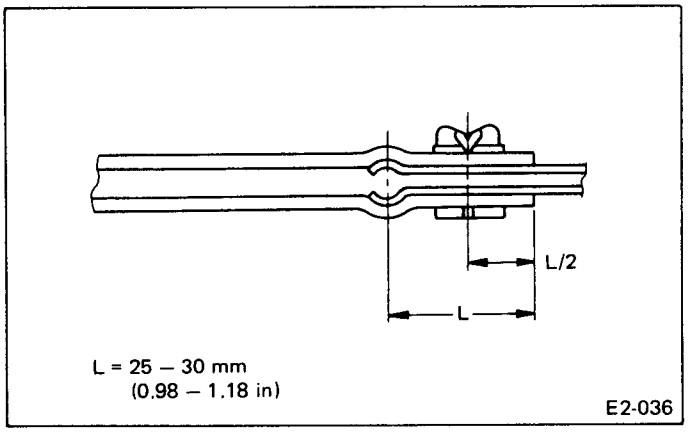


Fig. 8

Fuel Meter Unit

REMOVAL

1) Remove floor mat from luggage compartment.
2) Remove access hole lid.
3) Disconnect harness connector from fuel meter unit.

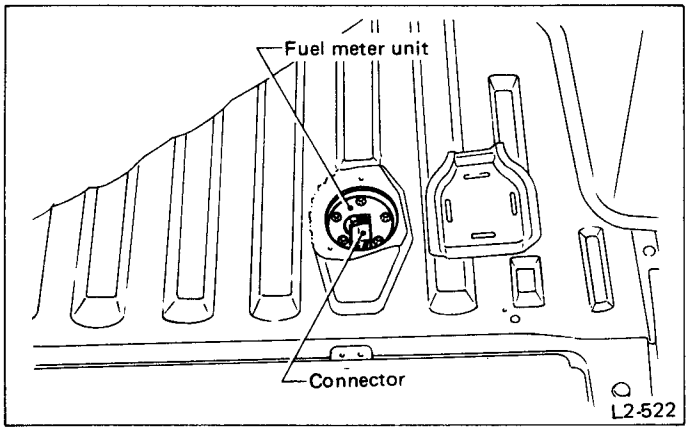


Fig. 9

4) Remove five nuts and detach fuel meter unit.

INSTALLATION

Installation is in the reverse order of removal procedures. Observe the following:

1) Be sure to alternately tighten fuel meter unit mounting nuts in a criss-cross fashion.
2) Apply a sealant to the edge of access hole lid before installation.

Fuel Filler Pipe

REMOVAL

1) Completely drain fuel from fuel tank.
2) Remove right rear tire.
3) Open fuel filler flap and remove filler cap.
4) Remove three screws holding packing in place.
5) Remove fuel filler pipe protector.
6) Remove clips and disconnect fuel filler hose and air vent hose from fuel filler pipe.

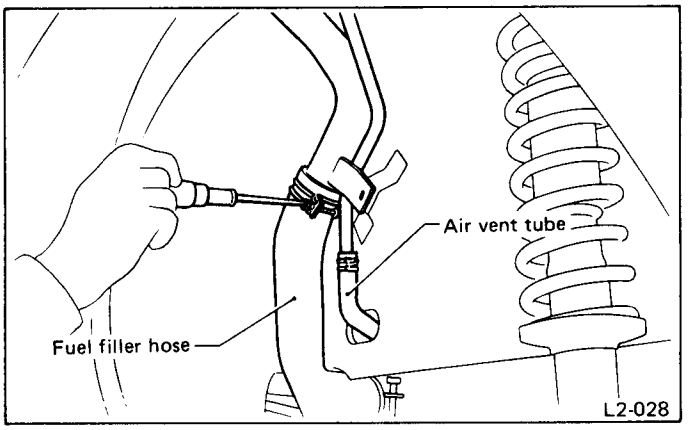


Fig. 10

7) Disconnect fuel filler pipe from underside of car.

INSTALLATION

1) Hold fuel filler flap open.
2) Insert fuel filler pipe into hole in fuel saucer from the inner side of apron. Align holes in fuel filler pipe neck and packing and tighten screws.

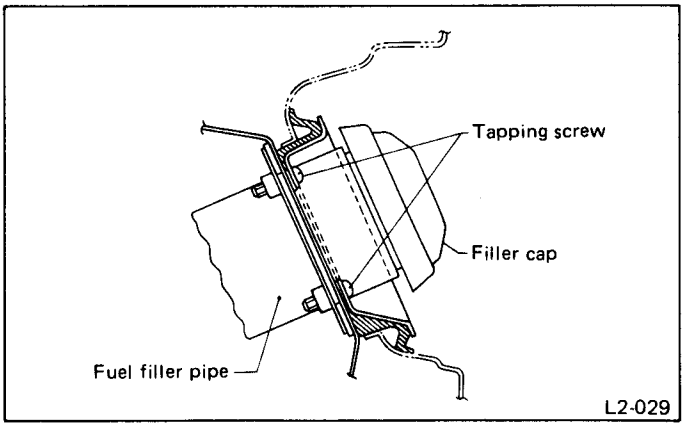


Fig. 11

3) If edges of rubber packing are folded toward the inside, straighten it with a standard screwdriver.
4) Insert fuel filler hose approximately 25 to 35 mm (0.98 to 1.18 in) over the lower end of fuel filler pipe and tighten clamps. Do not allow clips to touch protector and air vent pipe.
5) Insert air vent hose approximately 25 to 30 mm (0.98 to 1.18 in) into the lower end of air vent pipe and tighten with clips, as shown in figure.

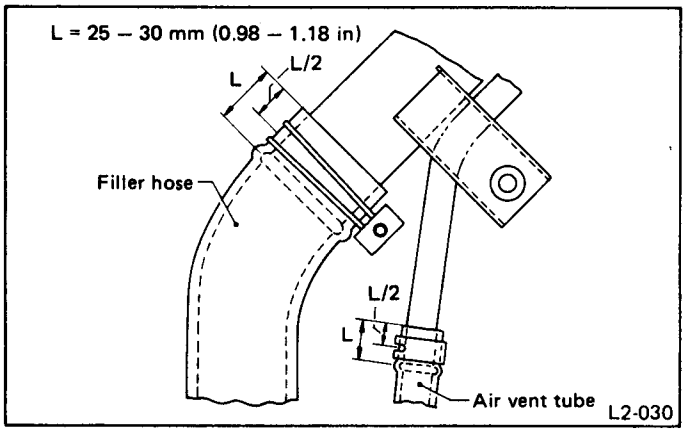


Fig. 12

6) Install protector together with fuel filler pipe. Check to be sure clamp for filler hose and clip for air vent hose do not touch apron.

Fuel Separator

REMOVAL

1) Remove right trim from luggage compartment.
2) Remove hose protector.
3) Remove fuel separator and bracket as a unit. Be sure not to scratch the inner side of car body.
4) Disconnect evaporation tube from pipe held to bracket.

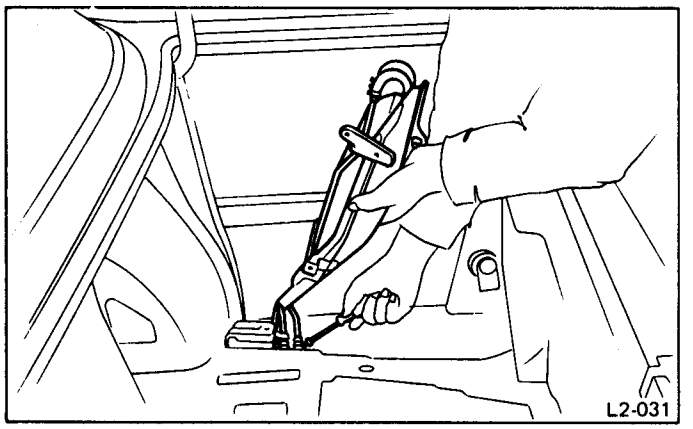


Fig. 13

5) Remove fuel separator from bracket.
6) Disconnect tube from fuel separator.

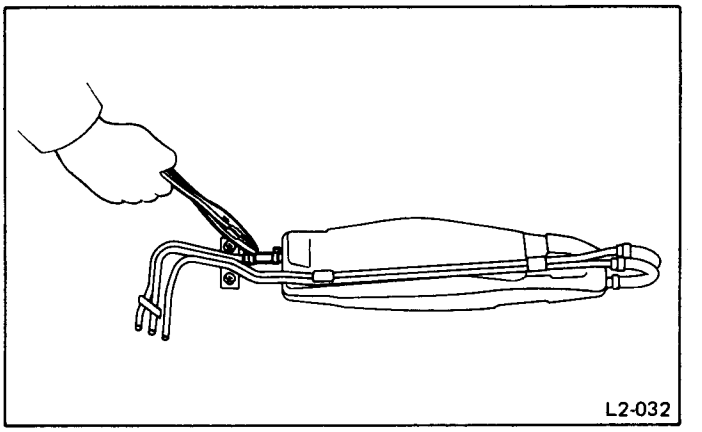


Fig. 14

INSTALLATION

Installation is in the reverse order of removal procedures. Observe the following:
1) When connecting tube between fuel separator and pipe, insert until it butts up against nipple on the separator side, and insert the other end up to the marked position on the pipe side.
2) Install fuel separator on bracket such that the pipe can run through the hollowed section of separator.

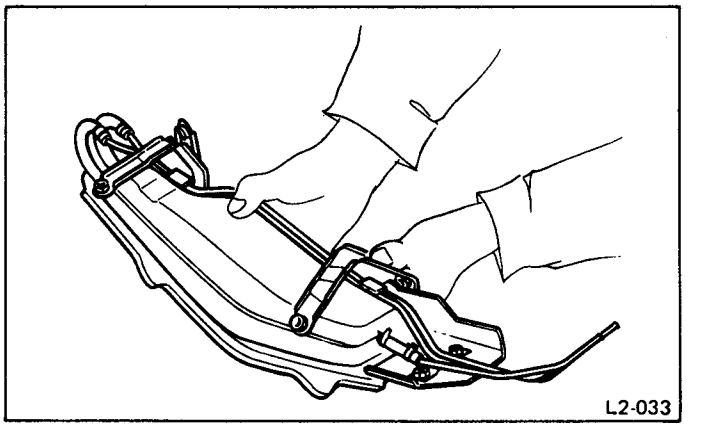


Fig. 15

3) Be sure to insert evaporation tube approximately 15 to 20 mm (0.59 to 0.79 in) into pipe on bracket. Install clips in a direction which does not touch other tubes.

Fuel Filter

REMOVAL

1) The fuel system is pressurized. Before removing the hose, filter, pump, etc., be sure to release the fuel pressure, as follows:
   (1) Disconnect the wiring connector of the fuel pump.
   (2) Crank the engine for more than five seconds.
   If the engine starts, let the engine run until it stops.
   (3) After turning IG switch to OFF, connect the wiring connector of the fuel pump.
2) Loosen the screw of the hose clamp and pull off the hose from the filter.
3) Remove the filter from the holder.

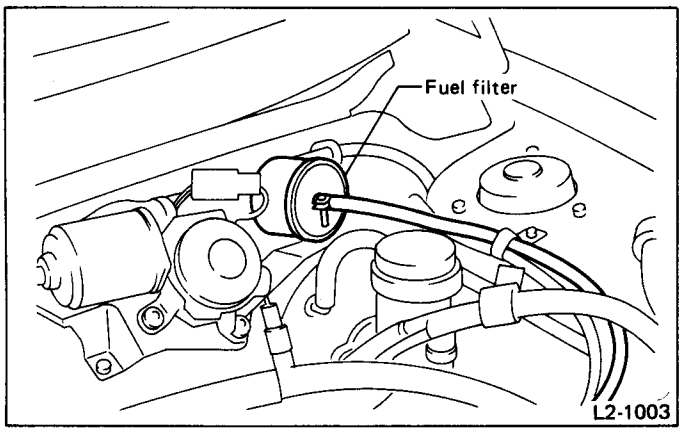


Fig. 16

INSTALLATION

1) Connect the hose as illustrated below:

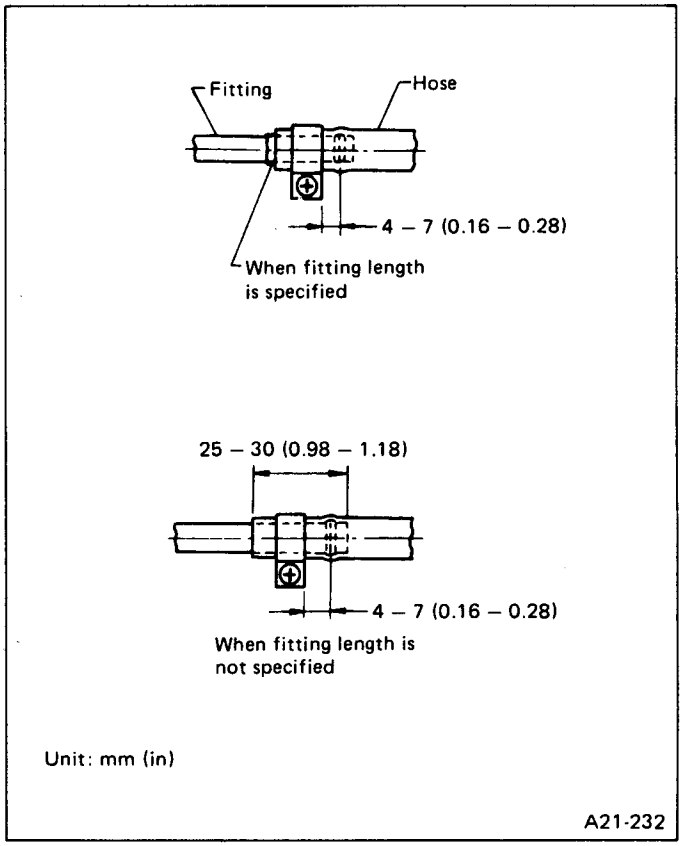


Fig. 17

2) Tighten the hose clamp screw to the specified torque.

Tightening torque:
1.0 - 1.5 N·m (0.1 - 0.15 kg-m, 0.7 - 1.1 ft-lb)

3) If the hose is damaged at the clamping portion, replace the hose with a new one.
4) If the hose clamp is too deformed, replace with a new one.
5) Fit the hose to the filter, then install the filter to the holder. Correct the hose position by removing any twist so that it will not interfere with the filter body or washer tank, before tightening the screw of the hose clamp.

INSPECTION

1) Check the inside of the filter for dirt and water sediment.
2) If the filter is clogged or cracked, or if the replacement interval has been reached, replace the filter.
3) If water is found in the filter, shake the filter with its inlet port facing down, to expel the water.

Fuel Pump

REMOVAL

1) Release the pressure of the fuel system.

Refer to "REMOVAL 1)" in Fuel Filter.

2) Keep the pump harness connector disconnected.
3) Jack up the vehicle.
4) Clamp the middle portion of the thick hose connecting the pipe (coupling) and pump. Prevent the fuel from flowing out of the fuel tank.

Do not bend the hose sharply; otherwise, it may be damaged.

5) Loosen the hose clamp, and disconnect the hose.
6) Remove three pump bracket mounting bolts, and remove the pump together with the pump damper.

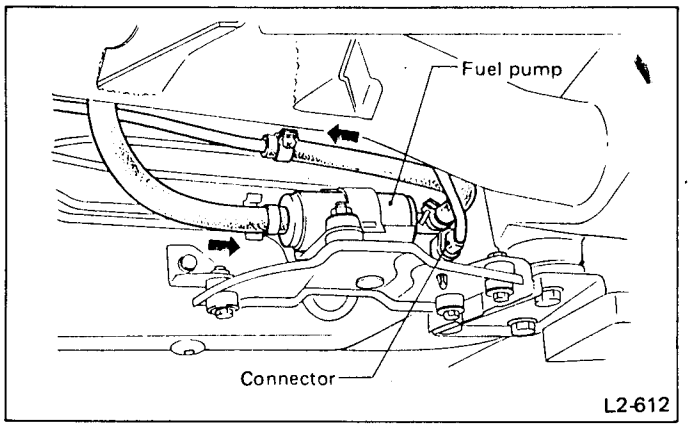


Fig. 18

INSPECTION

1) Connect the leads to the harness connector, and apply a 12-volt power supply to check whether the pump operates.

a. Keep the battery apart from the pump as far as possible.
b. Be sure to turn the 12 V supply ON and OFF on the battery side.
c. Do not run the pump for a long time under non-loaded condition.

INSTALLATION

1) If the pump and damper have been removed from the pump bracket, tighten the mounting bolts to the specified torque.
2) Install the hose using the same procedure as that explained in "Fuel Filter".
3) Install the pump bracket in position to the vehicle body, and secure it with bolts.

Use care not to drop the spacer of the cushion rubber.

4) Install the hose.
5) Connect the pump harness connector.
6) Run the pump and check for fuel leaks.

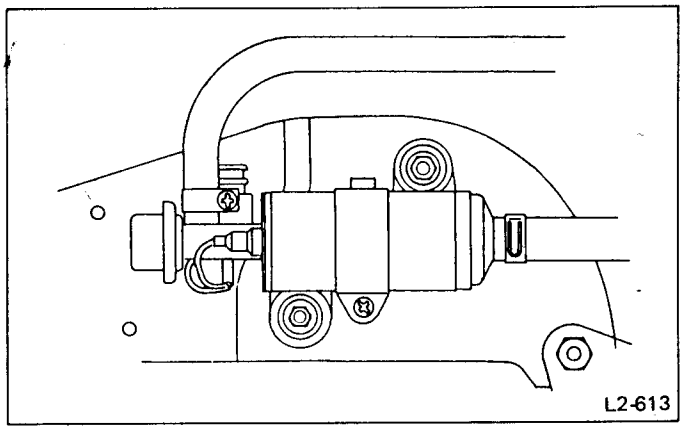


Fig. 19

Fuel Delivery, Return and Evaporation Lines

REMOVAL

1) Under body floor, detach fuel delivery hoses, return hoses, evaporation tubes and 2-way valves.

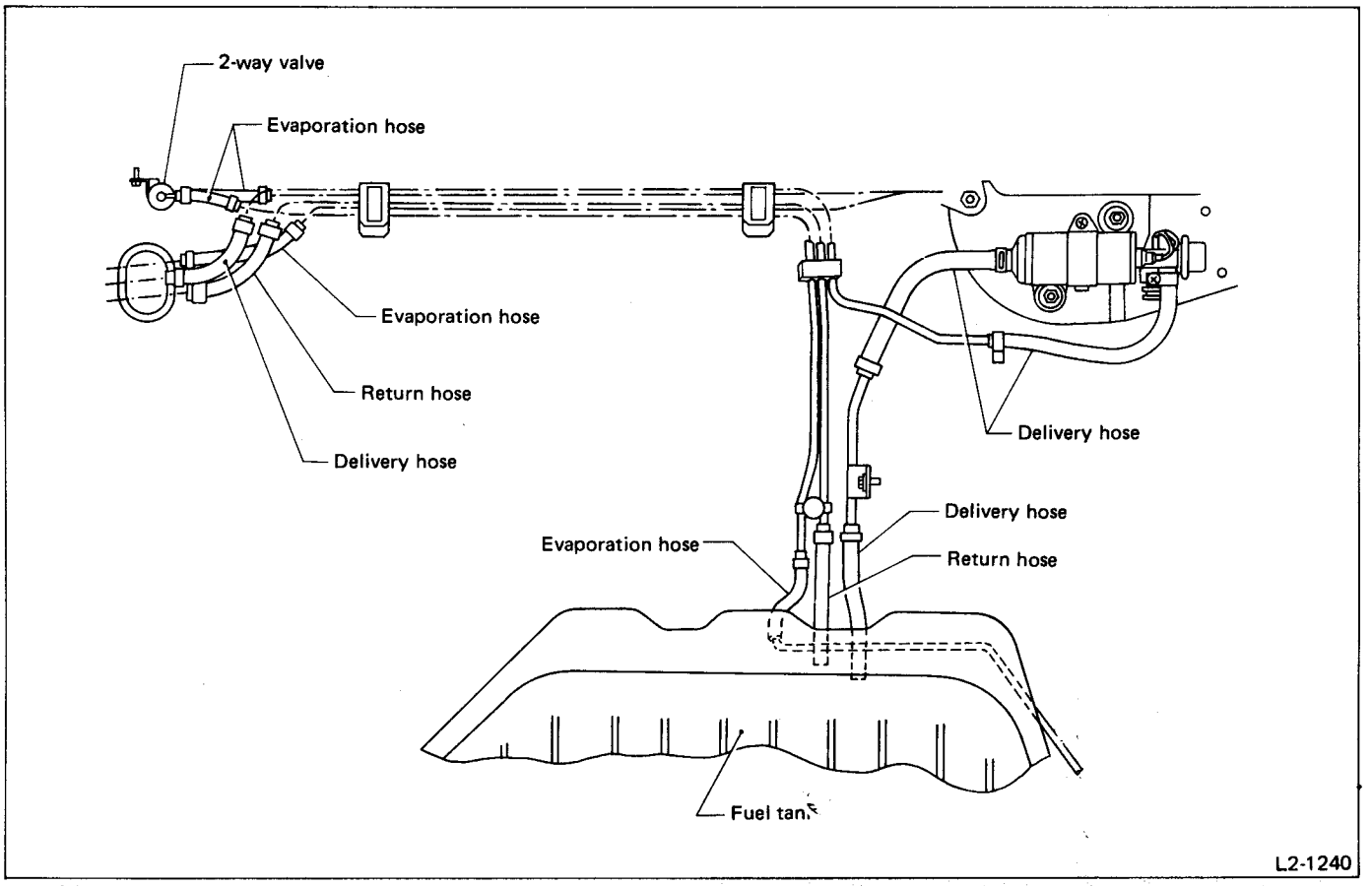


Fig. 20

2) In engine compartment, detach fuel delivery hoses, return hoses, evaporation tubes and canister.

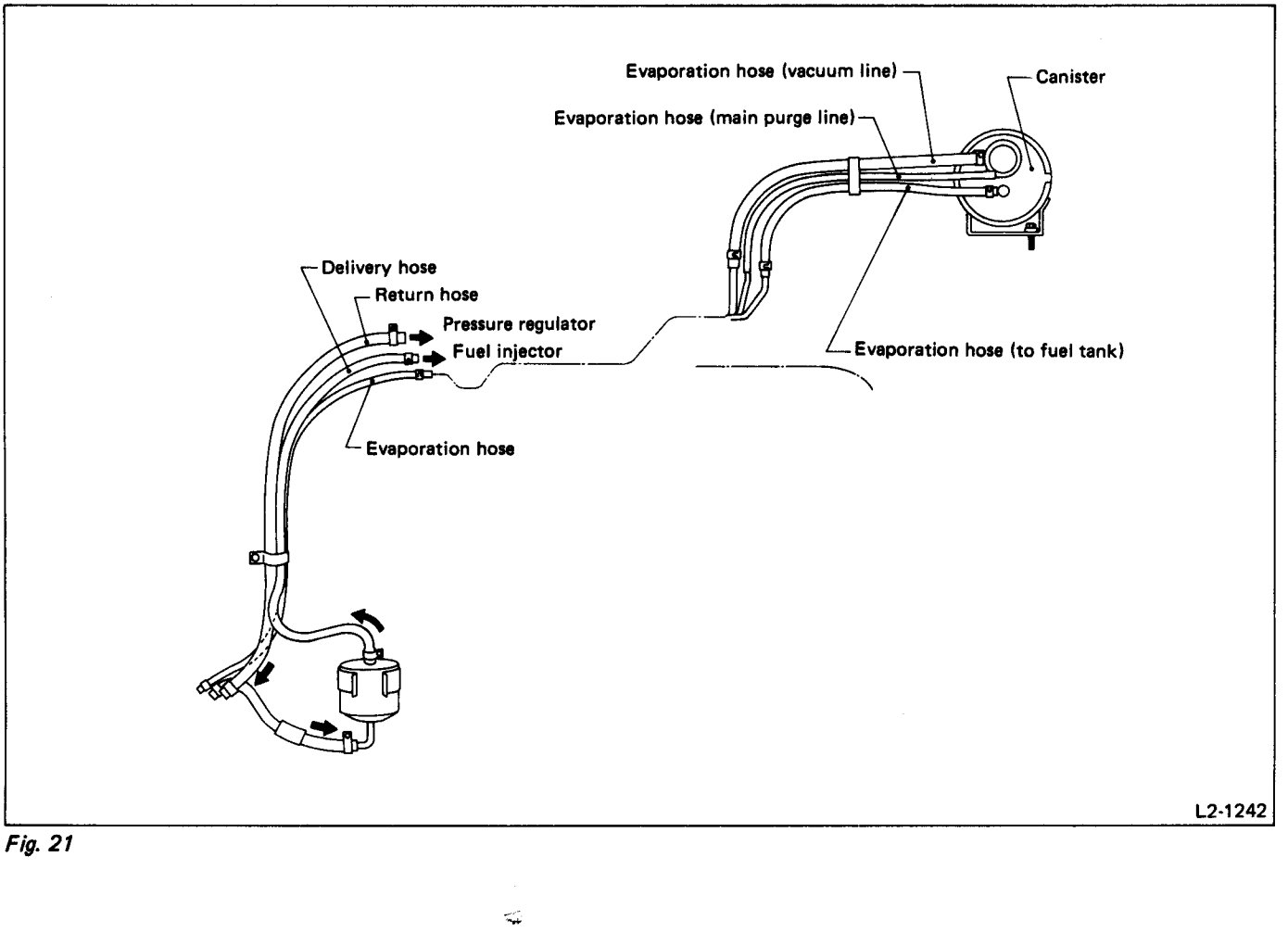


Fig. 21

INSTALLATION

Install in the reverse order of removal.

1) Connect delivery hose to delivery pipe with an overlap of 25 to 30 mm (0.98 to 1.18 in).

2) Connect delivery hoses and fuel return hose to fuel tank, fuel pump and fuel filter until they reach the base of each pipe.

3) Insert evaporation tube into evaporation pipe by approx. 15 mm (0.59 in) and position a clip with approx. 8 mm (0.31 in) from hose end.

4) When installing 2-way valve, install it with its "TO ENGINE" mark facing downward.

5) Be sure to inspect hoses and their connections for any leakage of fuel.

TROUBLESHOOTING

	Trouble and possible cause	Corrective action
1. Insufficient fuel supply to the injector		
1)	Fuel pump will not operate.	
	○ Defective terminal contact.	Inspect connections, especially ground, and tighten securely.
	○ Trouble in electromagnetic or electronic circuit parts.	Replace fuel pump.
2)	Lowering of fuel pump function.	Replace fuel pump.
3)	Clogged dust or water in the fuel filter.	Replace fuel filter, clean or replace fuel tank.
4)	Clogged or bent fuel pipe or hose.	Clean, correct or replace fuel pipe or hose.
5)	Air is mixed in the fuel system.	Inspect or retighten each connection part.
6)	Clogged or bent air breather tube or pipe.	Clean, correct or replace air breather tube or pipe.
7)	Fuel damper will not operate.	Replace.
8)	Damaged diaphragm of pressure regulator.	Replace.
2. Leakage or blow out fuel		
1)	Loosened joints of the fuel pipe.	Retightening.
2)	Cracked fuel pipe, hose and fuel tank.	Replace.
3)	Defective welding part on the fuel tank.	Replace.
4)	Defective drain packing of the fuel tank.	Replace.
5)	Clogged or bent air breather tube or air vent tube.	Clean, correct or replace air breather tube or air vent tube.
3. Gasoline is smelling inside of compartment		
1)	Loosened joints at air breather tube, air bent tube and fuel filler pipe.	Retightening.
2)	Defective packing air tighteness on the fuel saucer.	Correct or replace packing.
3)	Cracked fuel separator.	Replace separator.
4. Defective fuel meter indicator		
1)	Defective operation of fuel meter unit.	Replace.
2)	Defective operation of fuel meter.	Replace.
5. Noise		
1)	Large operation noise or vibration of fuel pump.	Replace.

a. When the vehicle is left unattended for an extended period of time.
1) Water may accumulate in the fuel tank. To prevent water condensation, top off the fuel tank or drain the fuel completely.
2) Also drain water condensation from the fuel filter.

b. Refilling the fuel tank.
   1) Refill the fuel tank while there is still some fuel left in the tank.
c. Protecting the fuel system against freezing and water condensation.
   1) Cold areas
   In snow-covered areas, mountainous areas, skiing areas, etc. where ambient temperatures drop below 0°C (32°F), throughout the winter season, use an anti-freeze solution in the cooling system.
   Refueling will also complement the effect of anti-freeze solution each time the fuel level drops to about one-half.
   After the winter season, drain water which may have accumulated in the fuel filter and fuel tank in the manner same as that described under the Moderate Areas.
   2) Moderate areas
   When water condensation is noticed in the fuel filter, drain water from both the fuel filter and fuel tank or use a water removing agent (or anti-freeze solution) in the fuel tank.
   - Observe the instructions, notes, etc., indicated on the label affixed to the anti-freeze solution (water removing agent) container before use.