

Thermostat Removal and Installation

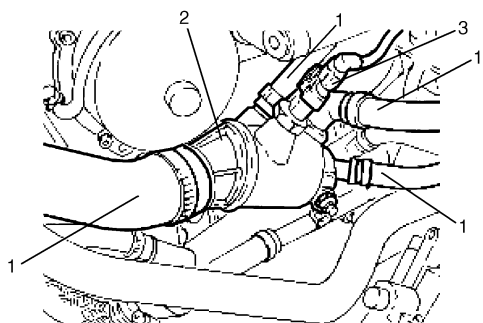
S5RW0D1606022

⚠ CAUTION

Never disassemble thermostat. Disassembly will spoil its original function. If faulty condition is found, replace it with new one.

Removal

- 1) Disconnect negative (-) cable at battery.
- 2) Remove EGR cooler referring to “EGR Valve Removal and Installation in Section 1D”.
- 3) Disconnect water hoses (1) from thermostat (2).
- 4) Disconnect ECT sensor connector (3).
- 5) Remove thermostat (2) from cylinder head.



I5RW0D160003-01

- 6) Remove ECT sensor referring to “Engine Coolant Temperature (ECT) Sensor Removal and Installation in Section 1C”, if necessary.

Installation

Reverse removal procedure for installation noting the following.

- Clean mating surface of thermostat and cylinder head.
- Use new O-ring.
- Tighten thermostat bolts to specified torque.

Tightening torque

Thermostat bolt: 26 N·m (2.6 kgf-m, 19.0 lb-ft)

- Refilling cooling system referring to “Cooling System Refilling”.
- After installation, verify there is no coolant leakage each connection.

Specifications

Tightening Torque Specifications

S5RW0D1607001

Fastening part	Tightening torque			Note
	N·m	kgf-m	lb-ft	
Cooling fan bolt	4	0.4	3.0	☞
Water pump bolt	26	2.6	19.0	☞
Thermostat bolt	26	2.6	19.0	☞

Reference:

For the tightening torque of fastener not specified in this section, refer to “Fasteners Information in Section 0A in related manual”.

Fuel System

Precautions

Precautions on Fuel System Service

S5RW0D1700001

▲ WARNING

- Before attempting service of any type on fuel system, the following should be always observed in order to reduce the risk of fire and personal injury.
 - Disconnect negative (–) cable at battery.
 - Do not smoke, and place no smoking signs near work area.
 - Be sure to have CO₂ fire extinguisher handy.
 - Be sure to perform work in a well-ventilated area and away from any open flames (such as gas ho theater).
 - Wear safety glasses.
 - To relieve fuel vapor pressure in fuel tank, remove fuel filler cap from fuel filler neck and then reinstall it.
 - As fuel feed line is still under high fuel pressure even after engine was stopped, loosening or disconnecting fuel feed line directly may cause dangerous spout of fuel to occur where loosened or disconnected. Before loosening or disconnecting fuel high presser line, make sure to relieve fuel pressure referring to “Fuel Pressure Relief Procedure”.
 - A small amount of fuel may be released after the fuel line is disconnected. In order to reduce the chance of personal injury, cover the fitting to be disconnected with a lint-free cloth. Be sure to put that cloth in an approved container when disconnection is completed.
 - When connecting fuel pipe flare nut, first tighten flare nut by hand and then tighten it to specified torque.
 - The system can inject the diesel fuel into the engine at a pressure up to 160,000 kPa (1,600 kg/cm², 22,760 psi). Before carrying out any work, check that the injector rail is not under pressure and that the fuel temperature is not too high.
 - Do not place your hand near to a leak on the high pressure fuel circuit.
 - Do not run engine with disconnecting fuel pipe and/or removing fuel system components.
 - Do not expose removed fuel system parts to dust. Keep always clean.
 - When servicing the fuel tank, it should be treated with respect, with no contact with sharp edges or hot surfaces. In addition, the fuel tank should not be dropped since fuel tank, fuel pump and other components can be damaged by the impact. If dropped, all components should be replaced because there is a risk of damage.
 - Note that fuel hose connection varies with each type of pipe. Be sure to connect and clamp each hose correctly referring to “Fuel Hose Disconnecting and Reconnecting”.
After connecting, mark sure that it has no twist or kink.
 - Fuel vapor is hazardous. It can very easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leaks are dangerous. Fuel can ignite and cause serious injuries or death and damage.
-
- The fuel system must be checked for leaks after service work referring to “Fuel Leakage Check Procedure”.
 - The fuel system is very sensitive to contamination. The risks caused by the introduction of contamination are:
 - damage or destruction of the high pressure injection system and the engine.
 - seizing or leaking of a component.
 - When servicing on the high pressure direct injection system, must be performed under very clean conditions. This means that no impurities (particles a few microns in side) get into the system during dismantling or into the circuits via the fuel unions.
 - The cleanliness principle must be applied from the fuel filter to the fuel injectors.

1G-2 Fuel System:

- Contamination is caused by:
 - metal or plastic chips,
 - paint,
 - fibres: boxes, brushes, paper, clothing, cloths,
 - foreign bodies such as hair,
 - ambient air,
 - etc.
- It is not possible to clean the engine using a high pressure washer because of the risk of damaging connections. In addition, moisture may collect in the connectors and create electrical connection problems.
- The technician should wear clean overalls.
- Ensure that you have the plug caps (1) for the unions to be opened. Plug caps are to be used once only. After use, they must be thrown away (once used they are soiled and cleaning is not sufficient to make them reusable). Unused plug caps must be thrown away, also.

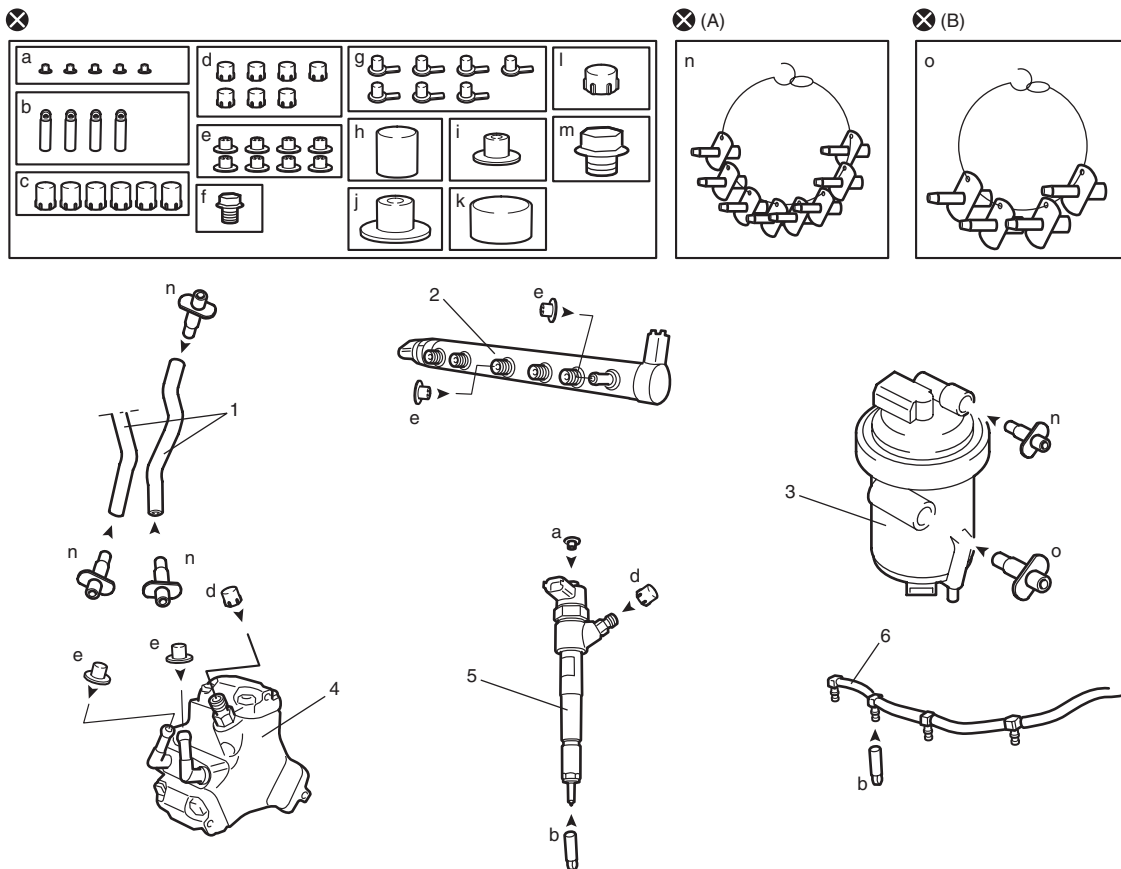
NOTE

- Plug cap sets are available as a spare part and a special tool.
- Plug unions as soon as possible when removing / disconnecting fuel system component in order to prevent dust from invading. Similarly, do not remove plug cap immediately before when installing / connecting fuel system component.

Special tool

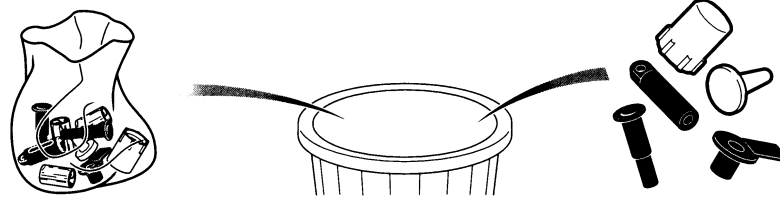
(A): 09919-48320

(B): 09919-48310



1. Fuel hose	4. High pressure pump
2. Common rail	5. Fuel injector
3. Fuel filter	6. Fuel return hose

- Ensure that you have hermetically resalable plastic bags for storing removed parts. Stored parts will therefore be less subject to the risk of impurities. The bags must be used only once, and after use they must be thrown away.



I4RH0A170052-01

- Make sure that lint-free towelettes. The use of a normal cloth or paper for cleaning purposes is forbidden. These are not lint-free and may contaminate the fuel circuit of the system. Each lint-free cloth should only be used once.
- Carry out any servicing as much as possible with the plug cap installed in order to prevent impurities from entering the system.
- Instructions to be followed before opening the fuel circuit.
 - For each operation, use new thinner (used thinner contains impurities). Pour it into a clean receptacle.
 - For each operation, use a clean brush which is in good condition (the brush must not shed its bristles).
 - Use a brush and thinners to clean the connections to be opened.
 - Blow compressed air over the cleaned parts (tools, cleaned the same way as the parts, connections and injection system zone). Check that no bristles remain adhered.
 - Wash your hands before and during the operation if necessary.
 - When wearing leather protective gloves, cover these with latex gloves.
- Instructions to be followed during the operation.
 - As soon as the circuit is open, all openings must be plugged to prevent impurities from entering the system by using the plug cap. They must not, under any circumstances, be reused.
 - Close the hermetically sealed bag, even if it has to be reopened shortly afterwards. Ambient air carries contamination.
 - All components of the injection system that are removed must be stored in a hermetically sealed plastic bag once the plugs have been inserted.
 - The use of a brush, thinner, bellows, sponge or normal cloth is strictly forbidden once the circuit has been opened. These items are likely to allow impurities to enter the system.
 - A new component replacing an old one must not be removed from its packaging until it is to be fitted to the vehicle.

Fuel System Description

S5RW0D1700002

⚠ CAUTION

This engine requires the unleaded fuel only. The leaded and/or low lead fuel can result in engine damage and reduce the effectiveness of the emission control system.

Low-pressure fuel supply circuit [A]

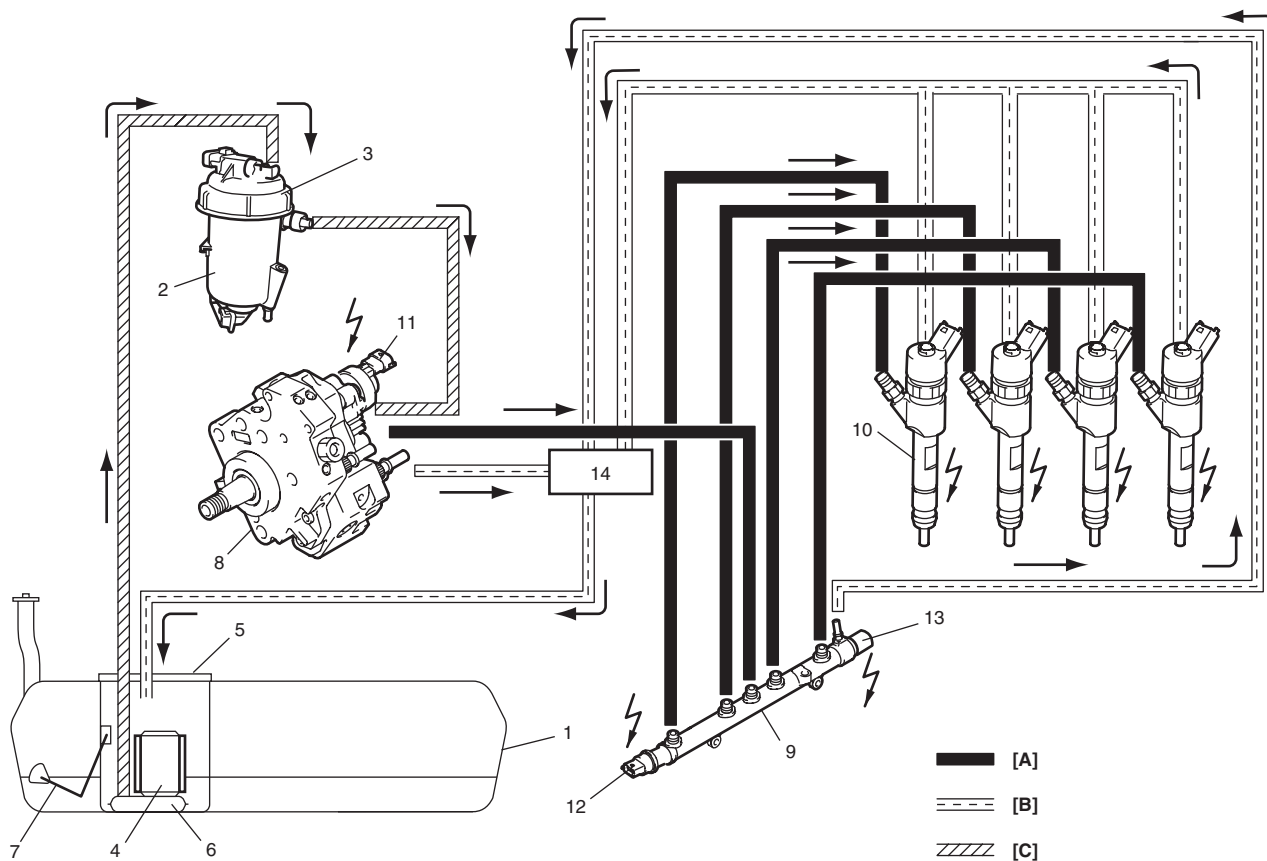
The fuel in the fuel tank (1) is pumped up to the high pressure fuel supply circuit [B] through the fuel filter (2) and the fuel heater (3) by the fuel pump (4) in fuel tank.

The fuel pump assembly (5) is composed of a fuel pump (4) a fuel suction filter (6), a main fuel level gauge (7). The fuel pump is an in-tank type electric pump.

High-pressure fuel supply circuit [B]

The high pressure pump (8) driven by engine rotation creates high-pressure fuel from the low pressure fuel. The high pressure fuel is supplied to the common rail (9) through the high-pressure fuel pipe. And, the injectors (10) atomize the fuel in the cylinders.

The fuel flow actuator (11) located on the high pressure pump. The fuel flow actuator and the fuel pressure regulator valve (13) regulates the quantity of fuel to the high pressure pump by ECM.signal in order to control the fuel pressure in the common rail.



[C]: Return for circuit	12. Fuel pressure sensor	14. Fuel damper
-------------------------	--------------------------	-----------------

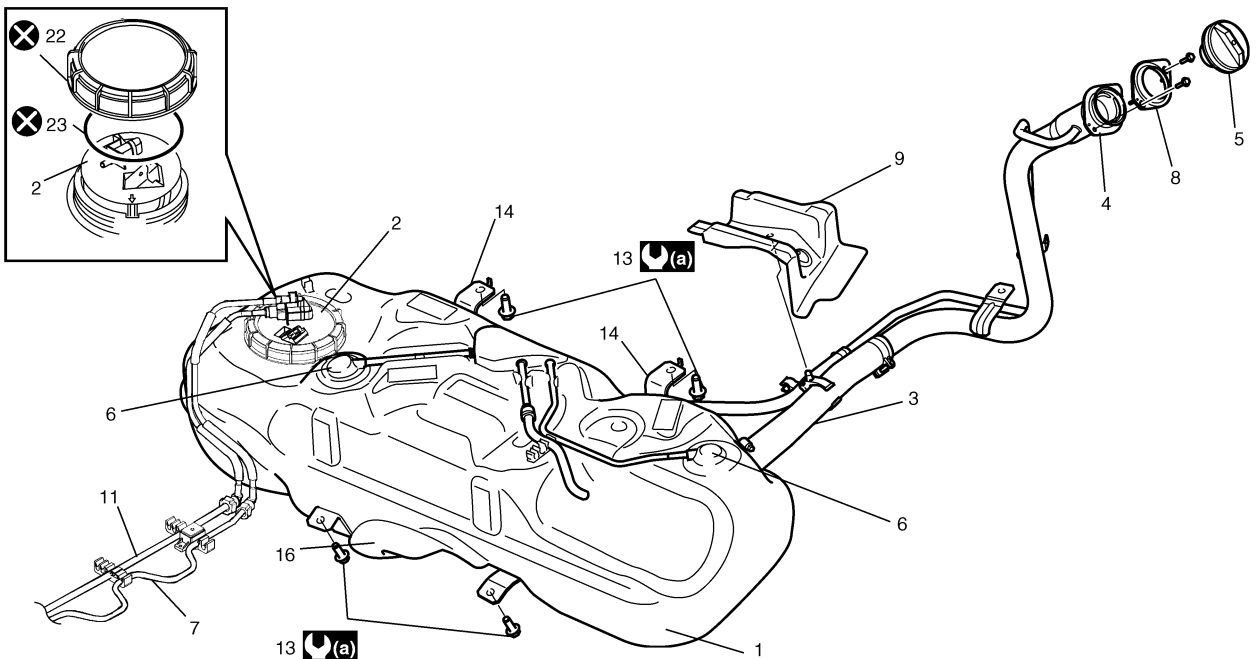
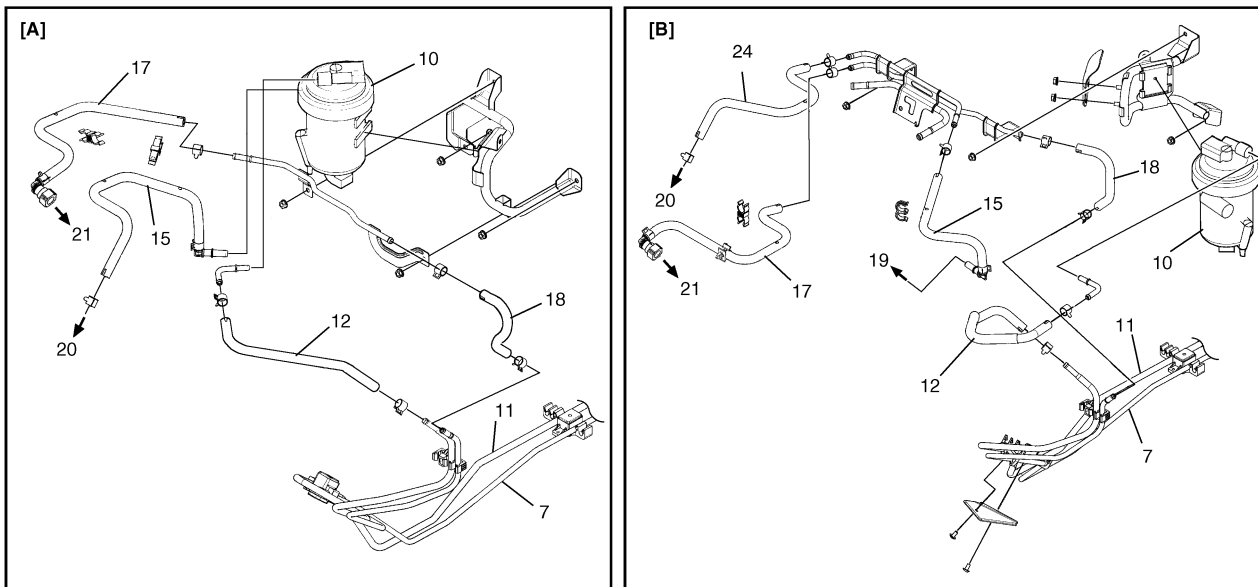
I5RW0D170001-01

Repair Instructions

Fuel System Components

S5RW0D1706001

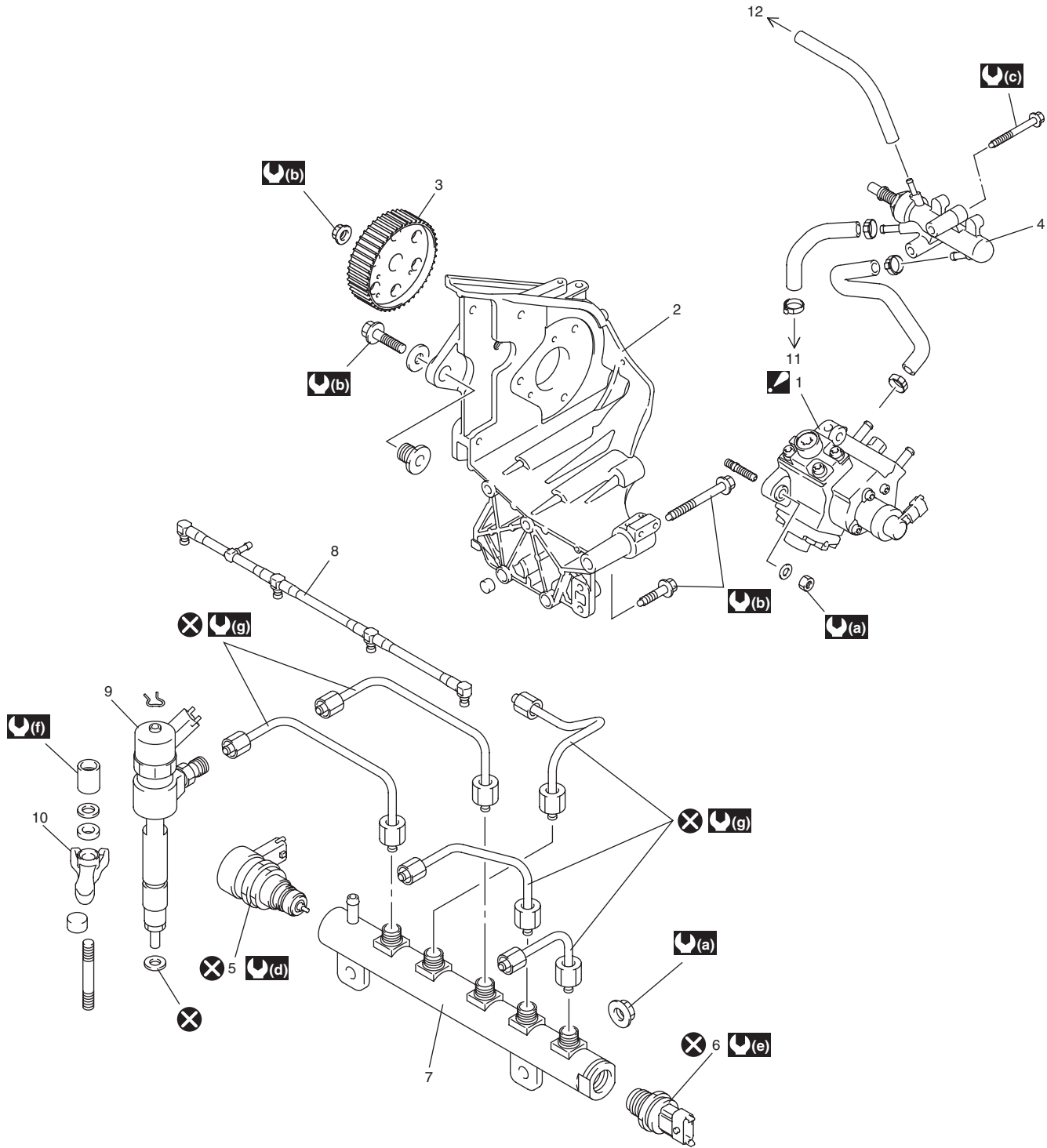
Low-pressure fuel supply circuit



I5RW0D170042-01

[A]: LH steering vehicle	6. Fuel cut valve	13. Fuel tank bolt	20. To high pressure pump
[B]: RH steering vehicle	7. Fuel return pipe	14. Fuel tank belt	21. To fuel damper
1. Fuel tank	8. Fuel filler packing	15. Fuel feed hose No.2	22. Fuel pump lock nut
2. Fuel pump assembly	9. Rear cross member	16. Fuel tank protector	23. O-ring
3. Fuel tank filler hose	10. Fuel filter	17. Fuel return hose No.1	24. Fuel feed hose No.3
4. Fuel tank filler neck	11. Fuel feed pipe	18. Fuel return hose No.2	(a) : 55 N·m (5.5 kgf-m, 40.0 lb-ft)
5. Fuel filler cap	12. Fuel feed hose No.1	19. To fuel filter	: Do not reuse.

High-pressure fuel supply circuit



I5RW0D170043-01

1. High pressure pump : Do not disassemble.	8. Fuel return hose	(c) : 25 N-m (2.5 kgf-m, 18.0 lb-ft)
2. High pressure pump mounting	9. Fuel injector	(d) : 70 N-m (7.0 kgf-m, 51.0 lb-ft)
3. High pressure pump pulley	10. Injector bracket	(e) : 85 N-m (8.5 kgf-m, 61.5 lb-ft)
4. Fuel damper	11. To common rail	(f) : 30 N-m (3.0 kgf-m, 22.0 lb-ft)
5. Fuel presser regulator valve	12. To fuel return hose	(g) : 23 N-m (2.3 kgf-m, 17.0 lb-ft)
6. Fuel presser sensor	(a) : 26 N-m (2.6 kgf-m, 19.0 lb-ft)	X : Do not reuse.
7. Common rail	(b) : 50 N-m (5.5 kgf-m, 36.5 lb-ft)	

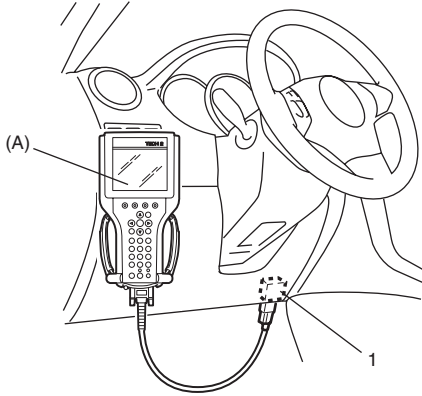
Fuel Pressure Relief Procedure

S5RW0D1706044

- 1) Check that engine is cold.
- 2) Connect SUZUKI scan tool to DLC (1) with ignition switch turned OFF.

Special tool

(A): SUZUKI scan tool



I5JB0A110019-01

- 3) Turn ON ignition switch.
- 4) Confirm that fuel pressure line is not under pressure by using "Actual Fuel Pressure in rail" parameter of SUZUKI scan tool.

Fuel Leakage Check Procedure

S5RW0D1706003

After performing any service on fuel system, check to make sure that there are no fuel leakages as follows.

- 1) Turn ignition switch to ON position.
- 2) Check for the fuel leakage in each part, witch was serviced.
- 3) Start the engine, and then check for the fuel leakage in each part, which was serviced.
- 4) Run engine at 4000 r/min. for about 30 seconds and then stop engine.
- 5) Check for the fuel leakage in each part, witch was serviced.

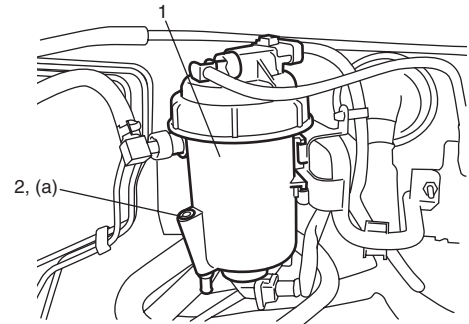
Water Draining of Fuel Filter

S5RW0D1706023

- 1) Disconnect negative (-) cable at battery.
- 2) Place container under fuel filter (1).
- 3) Loosen bleed screw (2), and drain water until fuel flow out from fuel filter.
- 4) Tighten bleed screw (2) to specified torque.

Tightening torque

Bleed screw (a): 1.4 N·m (0.14 kgf-m, 1.0 lb-ft)



I5RW0D170034-01

- 5) Connect negative (-) cable at battery.
- 6) Check fuel leakage referring to "Fuel Leakage Check Procedure".

Air Bleeding of Fuel System

S5RW0D1706045

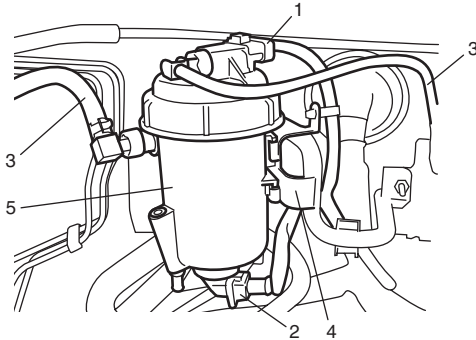
Air bleeding must be carried out when fuel system has been disassembled or when vehicle ran out of fuel. Turn ignition switch ON to operate fuel pump and after about 5 seconds turn it OFF. Repeat this 6 times and then check engine starts.

Fuel Filter Assembly Removal and Installation

S5RW0D1706025

Removal

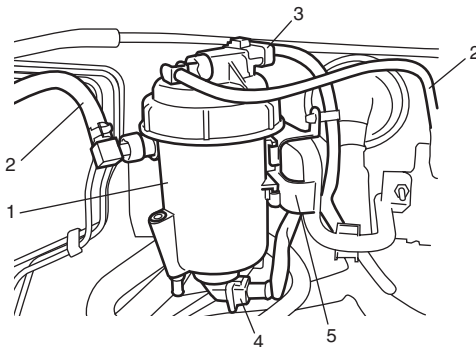
- 1) Disconnect negative (-) cable at battery.
- 2) Disconnect fuel heater connector (1) and fuel filter water detection sensor connector (2).
- 3) Clean filter and its surrounding area.
- 4) Disconnect fuel feed hoses (3) from fuel filter referring to "Fuel Hose Disconnecting and Reconnecting".
- 5) Remove fuel filter (5) from its bracket (4).



I5RW0B170003-01

Installation

- 1) Install fuel filter (1) to its bracket (5).
- 2) Connect fuel feed hoses (2) to fuel filter.
- 3) Connect fuel heater connector (3) and fuel filter water detection sensor (4).



I5RW0B170004-01

- 4) Connect negative (-) cable at battery.
- 5) Bleed fuel system referring to "Air Bleeding of Fuel System".
- 6) Check fuel leakage referring to "Fuel Leakage Check Procedure".

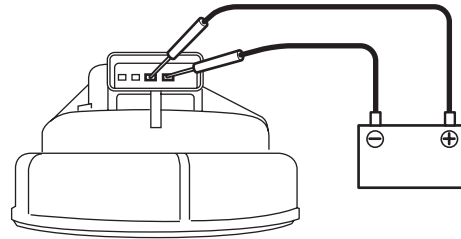
Fuel Heater and Fuel Temperature Sensor Inspection

S5RW0D1706057

Fuel heater

- Check for terminals of fuel heater for damage. If damage is found, replace fuel filter assembly.
- Connect battery to fuel heater terminals as shown in figure. Check that ammeter indicates specified current. If current is out of specification, replace fuel filter assembly.

**Reference: Fuel heater specified current at 13.5 V:
Approx. 18.5 A**



I5RW0D170032-01

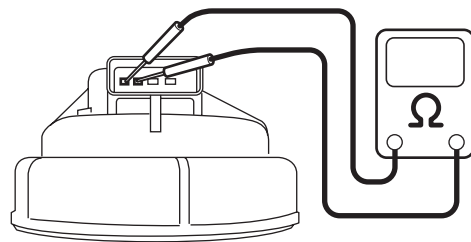
Fuel temperature sensor

- Check for terminals of fuel temperature sensor for damage. If damage is found, replace fuel filter assembly.
- Check resistance between terminals of fuel heater connector. If resistance is out of specification, replace fuel filter assembly.

Fuel temperature sensor resistance:

5466 – 6326 Ω at 0 °C (32 °F)

1942 – 2172 Ω at 25 °C (77 °F)



I5RW0D170033-01

Fuel Filter Element Replacement

S5RW0D1706046

⚠ CAUTION

Before starting the following procedure, be sure to observe "Precautions on Fuel System Service" in order to reduce the risk of fire and personal injury.

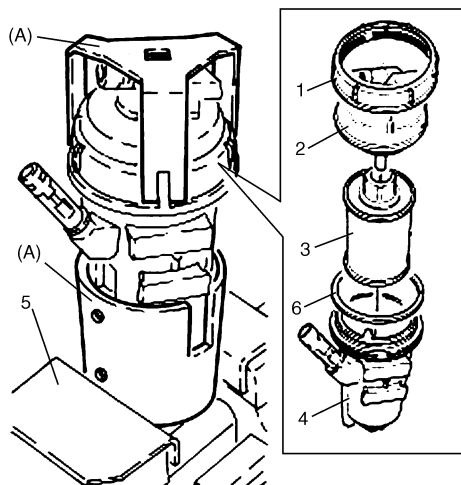
Removal

- 1) Disconnect negative (-) cable at battery.
- 2) Remove fuel filter referring to "Fuel Filter Assembly Removal and Installation".
- 3) Turning fuel filter fastener (1) clockwise, remove fuel filter fastener (1) from fuel filter case (4) using special tools and vise (5).

Special tool

(A): 09915-27910

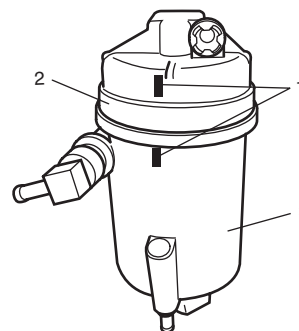
- 4) Remove fuel filter cap (2), fuel filter element (3) and O-ring (6).



I5RW0D170002-01

Installation

- 1) Install new fuel filter element and new O-ring.
- 2) Align mach marks (1) of fuel filter cap (2) and filter case (3).



I5RW0D170003-01

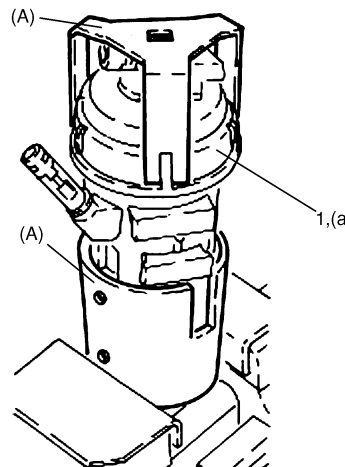
- 3) Install fuel filter cap (1), and tighten fuel filter cap to specified torque by using special tools and vise.

Tightening torque

Fuel filter cap (a): 30 N·m (3.0 kgf·m, 22.0 lb-ft)

Special tool

(A): 09915-27910



I5RW0D170004-01

- 4) Install fuel filter referring to "Fuel Filter Assembly Removal and Installation".
- 5) Connect negative (-) cable at battery.
- 6) Check fuel leakage referring to "Fuel Leakage Check Procedure".

Fuel Hose Disconnecting and Reconnecting

S5RW0D1706038

▲ WARNING

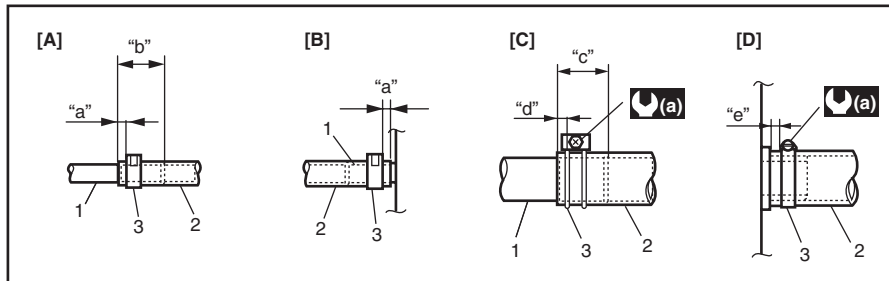
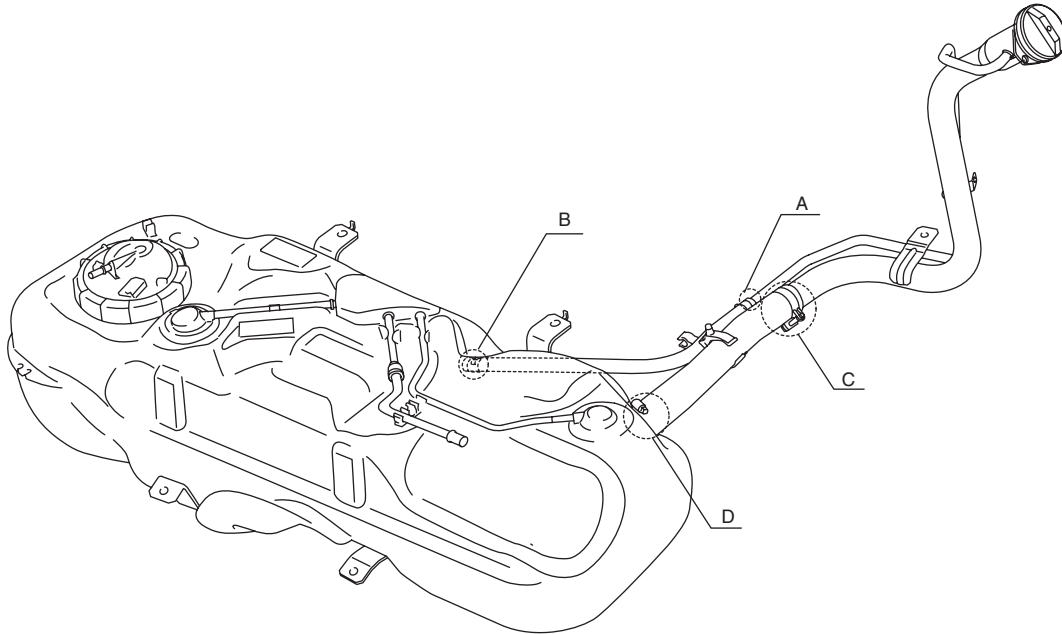
Before starting the following procedure, be sure to observe "Precautions on Fuel System Service" in order to reduce the risk of fire and personal injury.

For Connection Other Than Quick Joint

- Clamp around fuel tank

NOTE

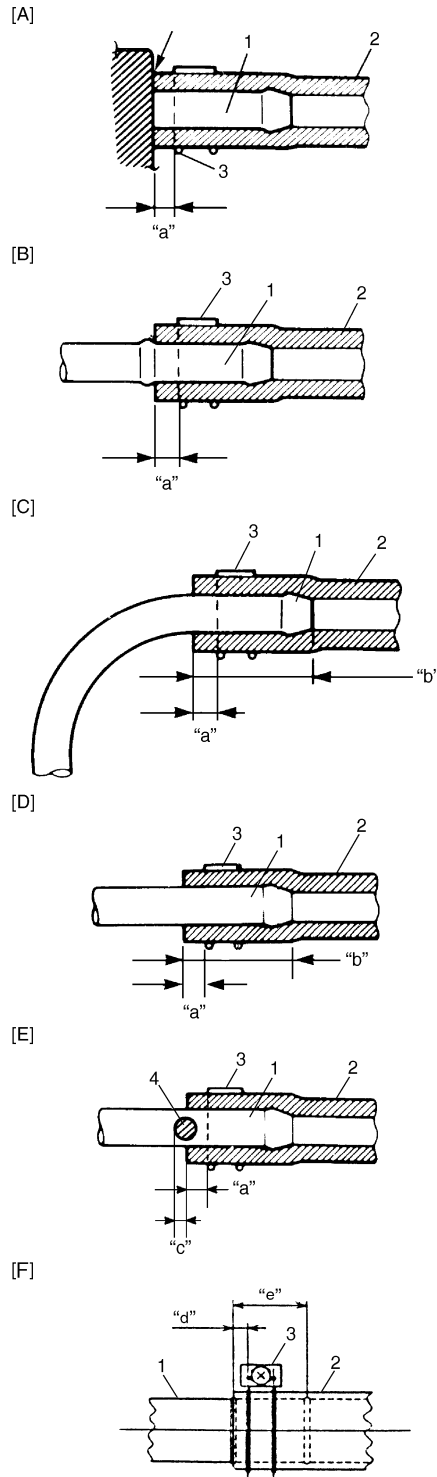
Be sure to install hose to spool of pipe surely.



I5RW0B170005-01

[A]: Connection A	2. Hose	"d": 5 – 12 mm (0.20 – 0.48 in.)
[B]: Connection B	3. Clamp	"e": 5 – 10 mm (0.20 – 0.39 in.)
[C]: Connection C	"a": 3 – 7 mm (0.12 – 0.28 in.)	: 2 N·m (0.2 kgf·m, 1.5 lb-ft)
[D]: Connection D	"b": 30 mm (1.18 in.)	
1. Pipe	"c": 38 mm (1.50 in.)	

- Other than clamp around fuel tank



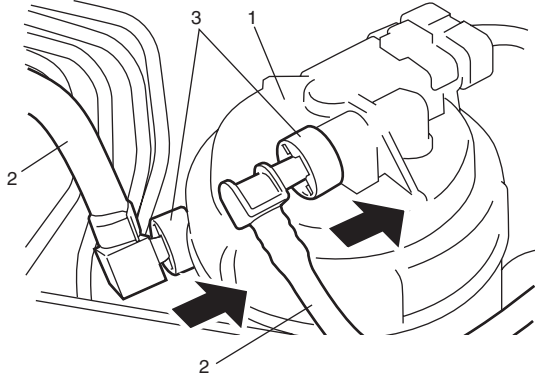
I3RM0A170001-01

[A]: With short pipe, fit hose as far as it reaches pipe joint as shown.	"a": Clamp securely at a position 3 – 7 mm (0.12 – 0.27 in.) from hose end.
[B]: With the following type pipe, fit hose as far as its peripheral projection as shown.	"b": 20 – 30 mm (0.79 – 1.18 in.)
[C]: With bent pipe, fit hose as its bent part as shown or till depth "b".	"c": 0 – 5 mm (0 – 0.19 in.)
[D]: With straight pipe, fit hose till depth "b".	"d": 5 – 12 mm (0.2 – 0.47 in.)
[E]: With red marked pipe, fit hose end reaches red mark on pipe.	"e": 40 mm (1.57 in.)
[F]: For fuel tank filler hose, insert it to spool or welding-bead.	4. Red mark

For Quick Joint (Fuel Filter)

Disconnecting

- 1) Remove mud, dust and/or foreign material between hose (1) and quick joint (2) by blowing compressed air.
- 2) Disconnect quick joint while slide lock ring (3).



I5RW0D170039-01

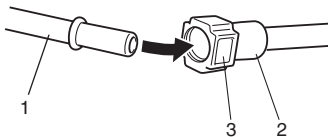
Reconnecting

Insert quick joint to fuel filter until they lock securely (a click is heard), and confirm that quick joint is not disconnected by hand.

For Quick Joint (Fuel Pipe)

Disconnecting

- 1) Remove mud, dust and/or foreign material between pipe (1) and quick joint (fuel pipe) (2) by blowing compressed air.
- 2) Disconnect quick joint while pushing lock button (3).



I5RW0B170006-02

Reconnecting

Insert quick joint to fuel pipe until they lock securely (a click is heard), and confirm that quick joint (fuel pipe) is not disconnected by hand.

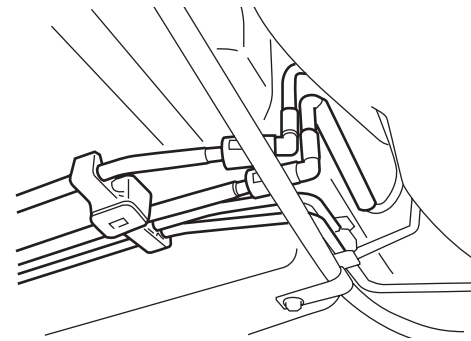
Fuel Lines Inspection

S5RW0D1706004

⚠ CAUTION

Due to the fact that fuel feed line is under high pressure, use special care when servicing it.

Visually inspect fuel lines for evidence of fuel leakage, hose crack and deterioration or damage. Make sure all clamps are secure. Replace parts as needed.



I5RW0B170007-01

Fuel Pipe Removal and Installation

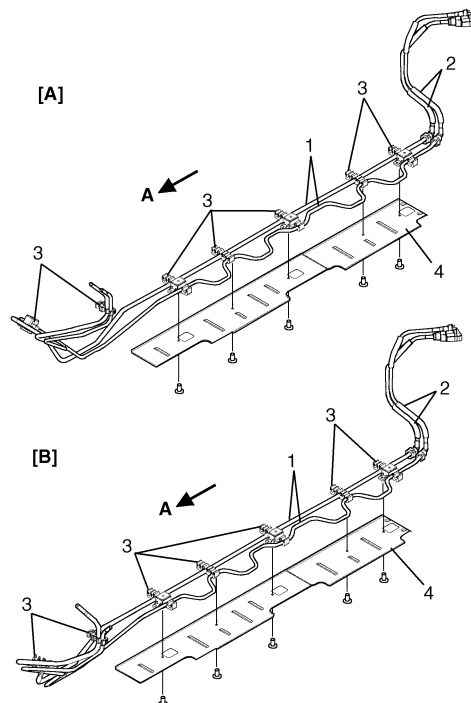
S5RW0D1706005

⚠ WARNING

Before servicing fuel system, be sure to observe "Precautions on Fuel System Service".

Removal

- 1) Disconnect negative (-) cable at battery.
- 2) Remove fuel pipe cover (4).
- 3) Disconnect fuel hose (1) from fuel pipe (2) at the front and rear of each fuel pipe referring to "Fuel Hose Disconnecting and Reconnecting".
- 4) Mark the location of clamps (3) on fuel pipes (1), so that the clamps can be reinstalled to where they were.
- 5) Remove pipes (2) with clamps (3) from vehicle.
- 6) Remove clamps (3) from pipes (2).



I5RW0B170008-01

[A]: LH steering vehicle	A: Vehicle forward
[B]: RH steering vehicle	

Installation

- 1) Install clamps to painted part of pipes. If clamp is deformed, its claw is bent or broken, replace it with new one.
- 2) Install pipes with clamps to vehicle.
- 3) Connect fuel hoses and pipes to each pipe referring to "Fuel Hose Disconnecting and Reconnecting".
- 4) Install fuel pipe cover.
- 5) Connect negative (-) cable at battery.
- 6) Check fuel leakage referring to "Fuel Leakage Check Procedure".

High Pressure Pipe Removal and Installation

S5RW0D1706047

⚠ WARNING

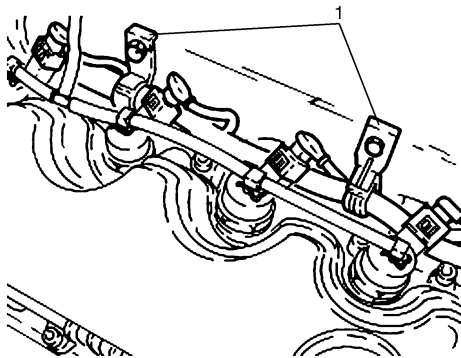
Before servicing fuel system, be sure to observe "Precautions on Fuel System Service".

Removal

⚠ CAUTION

A small amount of fuel may come out during removal of high pressure pipes, cover high pressure pipes with lint-free cloth.

- 1) Relief fuel pressure referring to "Fuel Pressure Relief Procedure".
- 2) Disconnect negative (-) cable at battery.
- 3) Remove engine cover and fuel injector silencer.
- 4) Remove inlet throttle valve referring to "Inlet Throttle Valve Removal and Installation in Section 1D".
- 5) Remove EGR valve referring to "EGR Valve Removal and Installation in Section 1D".
 - For high pressure pipe between fuel injector and common rail.
 - a. Remove wire harness bracket (1) from intake manifold.

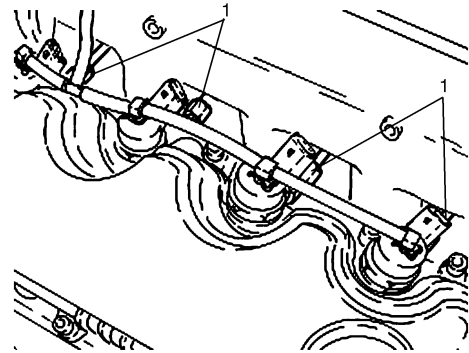


I5RW0D170005-01

- b. Loosen high pressure pipe union nuts (1) from injector.

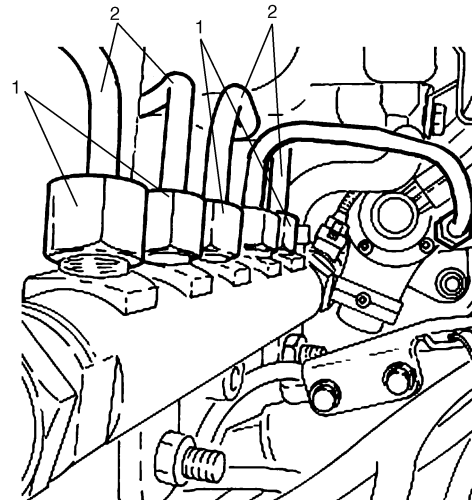
⚠ CAUTION

When loosening union nut of injector side, hold union nut with wrench. Otherwise, pipe may bend or break.



I5RW0D170007-01

- c. Loosen high pressure pipe union nuts (1) from common rail, and remove high pressure pipes (2).



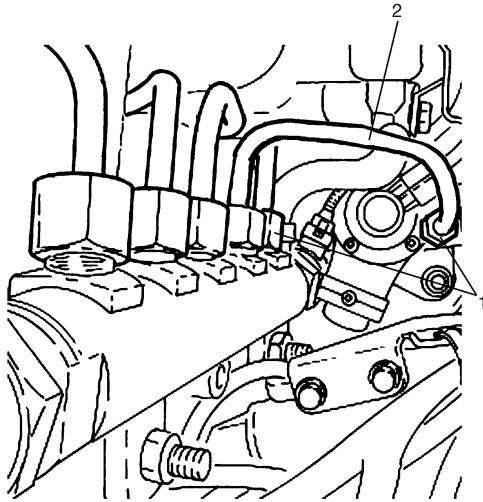
I5RW0D170006-01

1G-14 Fuel System:

- For high pressure pipe between high pressure pump and common rail
 - Loose high pressure pipe union nuts (1), and remove high pressure pipe (2).

⚠ CAUTION

When loosening union nut of high pressure pump side, hold union nut with wrench.



I5RW0D170008-02

Installation

⚠ CAUTION

- Do not touch pipes with wrench when tightening union nut to avoid a damage of high pressure pipe.
- In case of extension special tool combined with torque wrench, reading value of torque wrench is smaller than specified tightening torque. When using extension special tool, reading value should be calculated according to formula below.
- When tightening union nut of high pressure pump side and injector side, hold union nut with wrench.

Edited by Foxit PDF Editor
Copyright (c) by Foxit Software Company, 2004
For Evaluation Only.

Tightening torque formula.

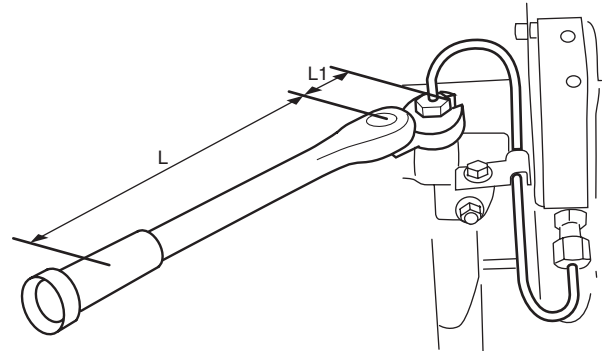
$$M = T \times L / (L + "a")$$

M: Reading value using extension special tool

T: Specified tightening torque

L: Length of torque wrench

"a": Length of special tool



I5RW0D170035-01

Reverse removal procedure for installation noting the following.

- Use new high pressure pipe.
- Tighten each nuts to specified torque.

Tightening torque

High pressure pipe union nut: 23 N·m (2.3 kgf-m, 17.0 lb-ft)

- Check fuel leakage referring to "Fuel Leakage Check Procedure".

Fuel Injector On-Vehicle Inspection

S5RW0D1706048

Check fuel injector for damage. Replace as necessary.

Fuel Injector Removal and Installation

S5RW0D1706049

⚠ WARNING

Before servicing fuel system, be sure to observe "Precautions on Fuel System Service".

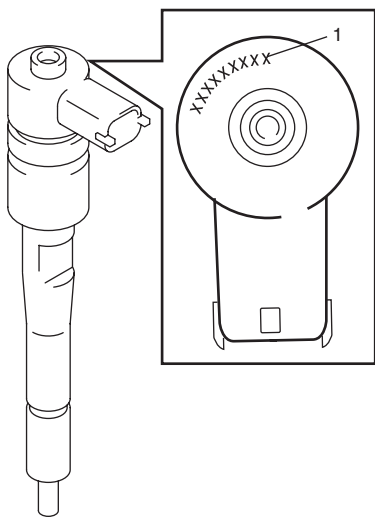
⚠ CAUTION

- Never disassemble fuel injector. Disassembly will spoil its original function. If faulty condition is found, replace it with new one.
- Never use ultrasound and wire brush.

Removal

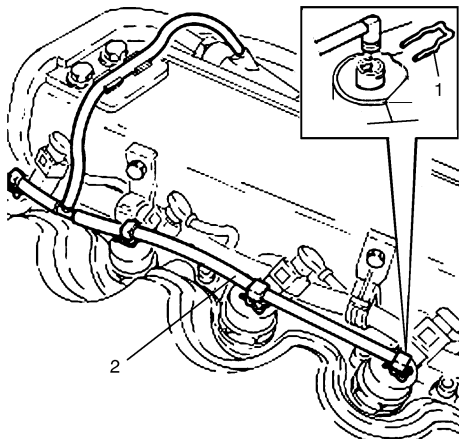
NOTE

The calibration code (1) is given to each fuel injector, and it represents the performance characteristics of the fuel injector. It is registered in ECM, and ECM controls fuel injection according to the performance characteristics of the fuel injector. Therefore, after removing fuel injectors, be sure to install them as they were. In case that the fuel injectors were replaced with new ones, be sure to register each calibration code in ECM referring to "ECM Registration in Section 1C". If it is not registered correctly, DTC is stored in ECM and warning light is turned ON. Also calibration codes registration in ECM can be checked by SUZUKI scan tool.



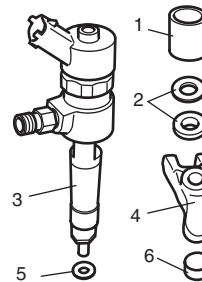
I3RM0B172010-01

- 1) Remove high pressure pipe between fuel injector and common rail referring to "High Pressure Pipe Removal and Installation".
- 2) Disconnect fuel injector connectors.
- 3) Remove clips (1) and fuel return hose (2).



I5RW0D170009-04

- 4) Remove fuel injector bracket nut (1) and washers (2).
- 5) Remove fuel injector (3), injector bracket (4), gasket (5) and seat (6).



I5RW0D170040-01

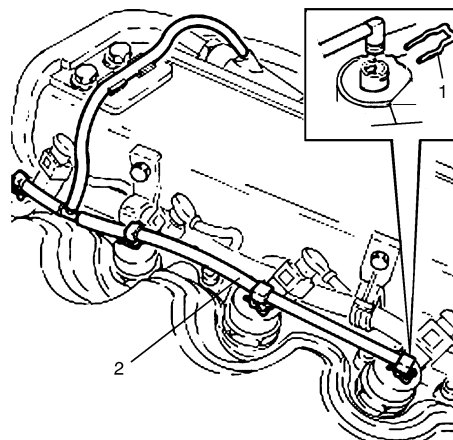
Installation

- 1) Install fuel injector as follows.
 - a) Install seat, new gasket, fuel injector and bracket.
 - b) Install washers and bracket nut.
 - c) Tighten bracket nut to specified torque.

Tightening torque

Fuel injector bracket nut: 30 N·m (3.0 kgf-m, 22.0 lb-ft)

- 2) Install fuel return hose (2) to fuel injector, and clips (1).
- 3) Connect fuel injector connectors.



I5RW0D170009-04

- 4) Install high pressure pipe referring to "High Pressure Pipe Removal and Installation".

High Pressure Pump Removal and Installation

S5RW0D1706050

▲ WARNING

Before servicing fuel system, be sure to observe "Precautions on Fuel System Service".

Removal

- 1) Relief fuel pressure referring to "Fuel Pressure Relief Procedure".
- 2) Disconnect negative (-) cable at battery.
- 3) Remove cowl top garnish referring to "Cowl Top Components in Section 9K in related manual".
- 4) Remove inlet throttle valve referring to "Inlet Throttle Valve Removal and Installation in Section 1D".
- 5) Remove EGR valve referring to "EGR Valve Removal and Installation in Section 1D".
- 6) Dismount generator referring to "Generator Dismounting and Remounting in Section 1J in related manual".
- 7) Remove timing belt referring to "Timing Belt, Belt tensioner and Idler Removal and Installation in Section 1D".
- 8) Install engine right mount bracket No.2 (1), and tighten new engine right mounting bracket No.2 to specified torque.

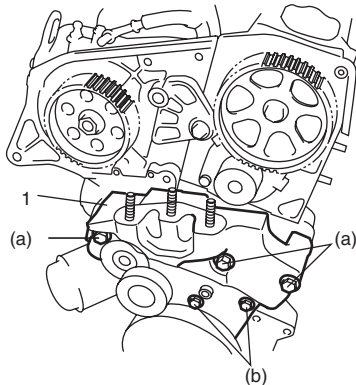
Tightening torque

Engine right mounting bracket No.2 bolt (M10)

(a): 50 N·m (5.0 kgf-m, 36.5 lb-ft)

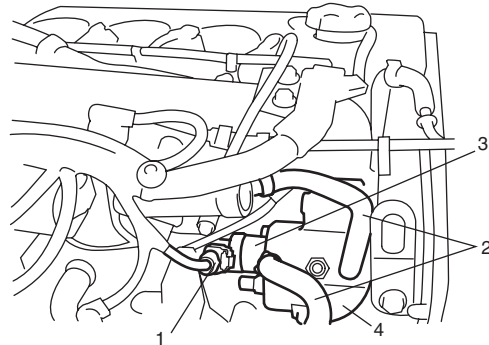
Engine right mounting bracket No.2 bolt (M8)

(b): 25 N·m (2.5 kgf-m, 18.0 lb-ft)



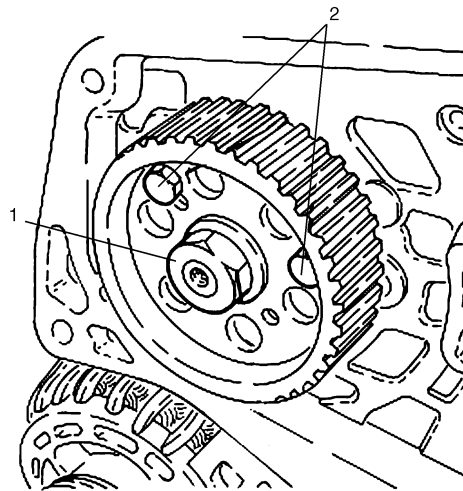
I5RW0D140055-02

- 9) Install engine right mounting bracket No.1 referring to "Engine Mounting Components in Section 1D", and remove engine support.
- 10) Remove high pressure pipe between high pressure pump and common rail referring to "High Pressure Pipe Removal and Installation".
- 11) Remove CMP sensor bracket and degassing tank inlet pipe bracket from high pressure pump mounting.
- 12) Disconnect fuel flow actuator connector (1) from fuel flow actuator (3).
- 13) Disconnect fuel hoses (2) from high pressure pump (4).



I5RW0D170013-01

- 14) Fix high pressure pump pulley using two bolts (2) of M6 size and 1.00 mm pitch.
- 15) Loosen high pressure pump pulley nut (1).



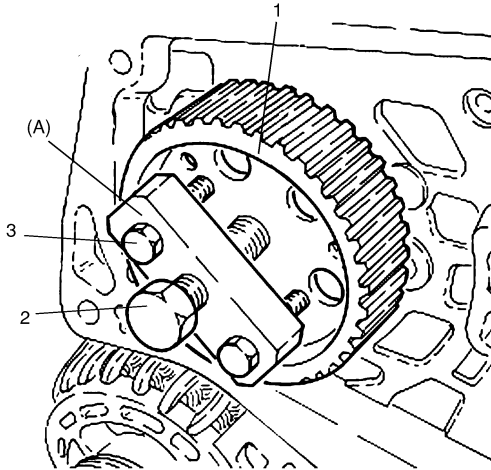
I5RW0D170014-01

- 16) Remove two bolts of M6 size and 1.00 mm pitch.
- 17) Fit special tool to high pressure pump pulley using bolts (3) of M6 size and 1.00 mm pitch.

Special tool

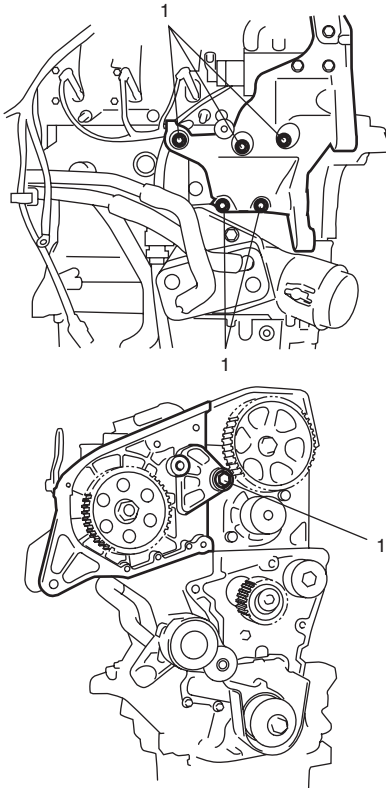
(A): 09918-47910

- 18) Remove high pressure pump pulley (1) by tightening bolt (2) of special tool.



I5RW0D170015-01

- 19) Loosen high pressure pump mounting bolts (1), and remove high pressure pump mounting with high pressure pump.



I5RW0D170016-02

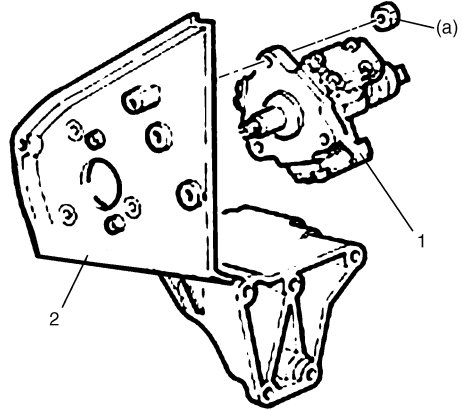
- 20) Remove high pressure pump (1) to high pressure pump mounting.

Installation

- 1) Install high pressure pump (1) to high pressure pump mounting (2).

Tightening torque

High pressure pump nut (a): 26 N·m (2.6 kgf-m, 19.0 lb-ft)



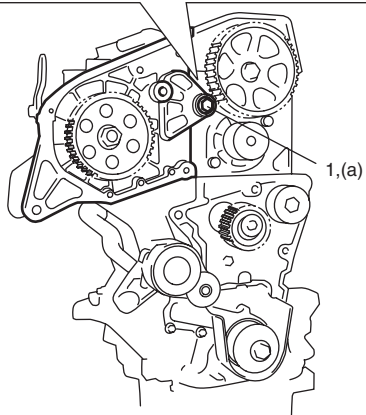
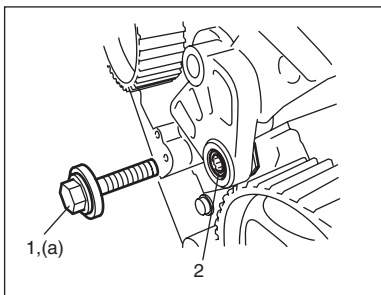
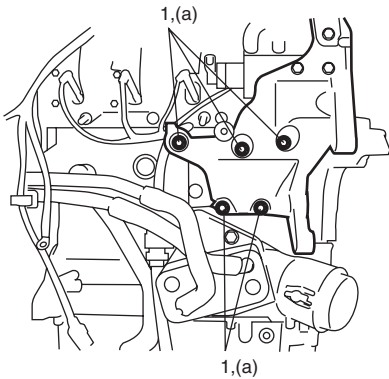
I5RW0D170017-01

1G-18 Fuel System:

- 2) Install high pressure pump with high pressure pump mounting.
 - a) Tighten adjusting bolt (2) of high pressure pump mounting comes contact with cylinder head.
 - b) Tighten new high pressure pump mounting bolts (1) to specified torque.

Tightening torque

High pressure pump mounting bolt (a): 50 N·m (5.0 kgf-m, 36.5 lb-ft)



I5RW0D170018-03

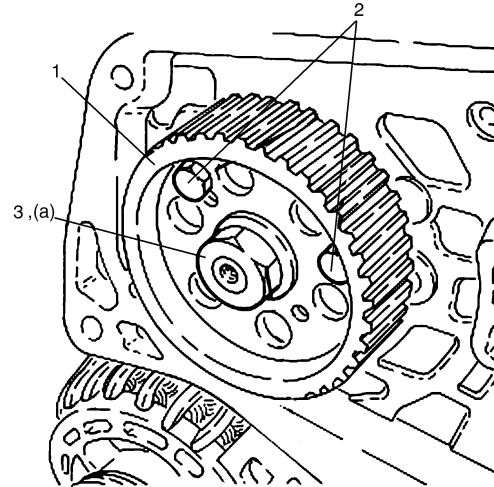
Edited by Foxit PDF Editor
Copyright (c) by Foxit Software Company, 2004
For Evaluation Only.

- 3) Fix high pressure pump pulley (1) using two bolts (2) M6 size and 1.00 mm pitch.
- 4) Tighten high pressure pump pulley nut to specified torque.

Tightening torque

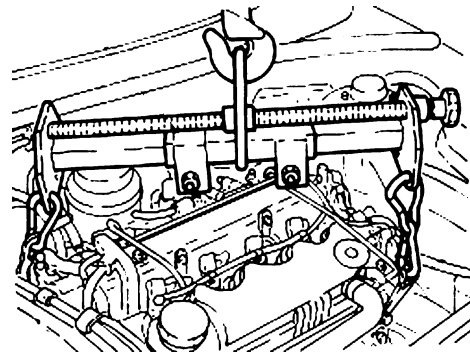
High pressure pump pulley nut (a): 50 N·m (5.0 kgf-m, 36.5 lb-ft)

- 5) Remove two bolts M6 size and 1.00 mm pitch.



I5RW0D170019-02

- 6) Connect fuel hoses to high pressure pump.
- 7) Connect fuel flow actuator connector to fuel flow actuator.
- 8) Install CMP sensor bracket and degassing tank inlet pipe bracket from high pressure pump mounting.
- 9) Install high pressure pipe between high pressure pump and common rail referring to "High Pressure Pipe Removal and Installation".
- 10) Install engine support, and remove engine right mounting bracket referring to "Engine Mounting Components in Section 1D".



I5RW0D140020-01

- 11) Remove engine right mount bracket No.2.
- 12) Install timing belt referring to "Timing Belt, Belt tensioner and Idler Removal and Installation in Section 1D".
- 13) Install generator referring to "Generator Dismounting and Remounting in Section 1J in related manual".
- 14) Install EGR valve referring to "EGR Valve Removal and Installation in Section 1D".
- 15) Install inlet throttle valve referring to "Inlet Throttle Valve Removal and Installation in Section 1D".
- 16) Install cowl top garnish referring to "Cowl Top Components in Section 9K in related manual".
- 17) Check fuel leakage referring to "Fuel Leakage Check Procedure".

Fuel Flow Actuator Inspection

S5RW0D1706052

Check fuel flow actuator for damage. Replace as necessary.

Common Rail, Fuel Pressure Sensor and Fuel Pressure Regulator Valve Removal and Installation

S5RW0D1706053

▲ WARNING

Before servicing fuel system, be sure to observe "Precautions on Fuel System Service".

▲ CAUTION

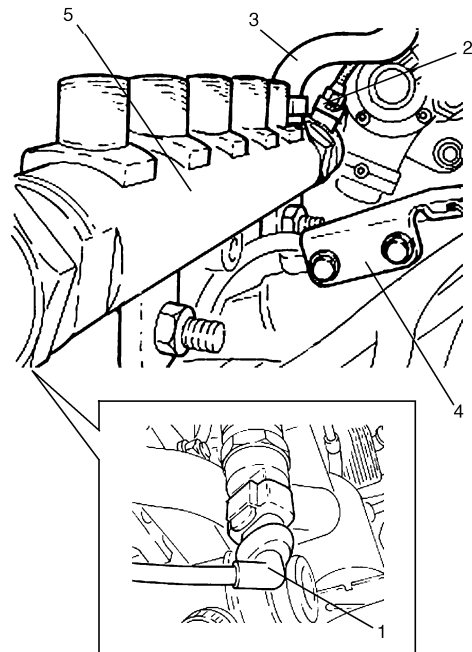
- Do not reuse fuel pressure regulator valve and fuel pressure sensor because it has the possibility that fuel leaks.
- Never leave fuel pressure regulator valve and fuel pressure sensor orifice open. Replace new fuel pressure regulator valve and fuel pressure sensor at once in order to prevent fuel circuit from contamination.

NOTE

If fuel pressure sensor is replaced, initialize fuel pressure sensor data in ECM referring to "ECM Registration in Section 1C".

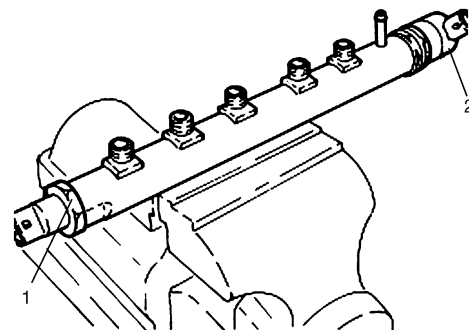
Removal

- 1) Relief fuel pressure referring to "Fuel Pressure Relief Procedure".
- 2) Disconnect negative (-) cable at battery.
- 3) Remove high pressure pipe referring to "High Pressure Pipe Removal and Installation".
- 4) Disconnect fuel pressure sensor connector (1).
- 5) Disconnect fuel pressure regulator valve connector (2).
- 6) Remove fuel return hose (3) from common rail.
- 7) Remove wire harness bracket (4).
- 8) Remove common rail (5).



I5RW0D170023-01

- 9) Remove fuel pressure sensor (1) and/or fuel pressure regulator valve (2), if necessary.



I5RW0D170024-01

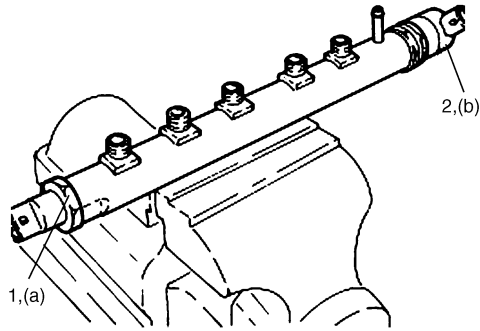
Installation

- 1) Install new fuel pressure sensor (1) and/or new fuel pressure regulator valve (2), if removed.

Tightening torque

Fuel pressure sensor (a): 70 N·m (7.0 kgf-m, 51.0 lb-ft)

Fuel pressure regulator valve (b): 85 N·m (8.5 kgf-m, 61.5 lb-ft)



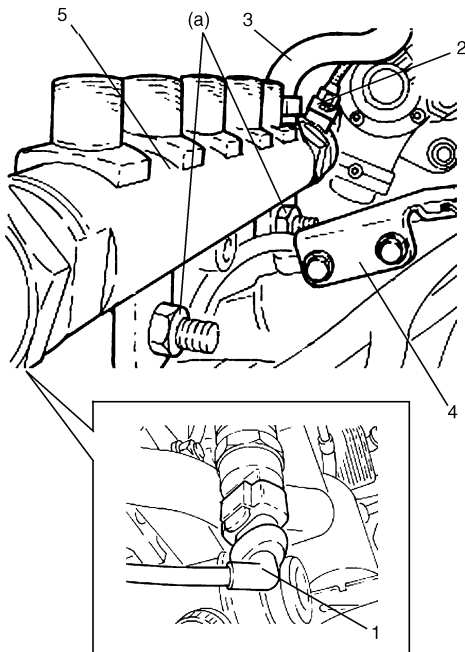
I5RW0D170025-01

- 2) Install common rail (5).

Tightening torque

Common rail nut (a): 26 N·m (2.6 kgf-m, 19.0 lb-ft)

- 3) Install wire harness bracket (4).
- 4) Install fuel return hose (3) to common rail.
- 5) Connect fuel pressure sensor connector (1).
- 6) Connect fuel pressure regulator valve connector (2).



I5RW0D170026-01

- 7) Install high pressure pipe referring to “High Pressure Pipe Removal and Installation”.
- 8) Connect negative (-) cable at battery.

- 9) Check fuel leakage referring to “Fuel Leakage Check Procedure”.
- 10) When replacing new fuel pressure sensor, initialize fuel pressure sensor data in ECM referring to “Fuel Pressure Sensor Data Initialization in Section 1C”.

Fuel Pressure Regulator Valve Inspection

S5RW0D1706054

Check fuel pressure regulator valve for damage. Replace as necessary.

Fuel Pressure Sensor Inspection

S5RW0D1706055

Check fuel pressure sensor for damage. Replace as necessary.

Fuel Damper Removal and Installation

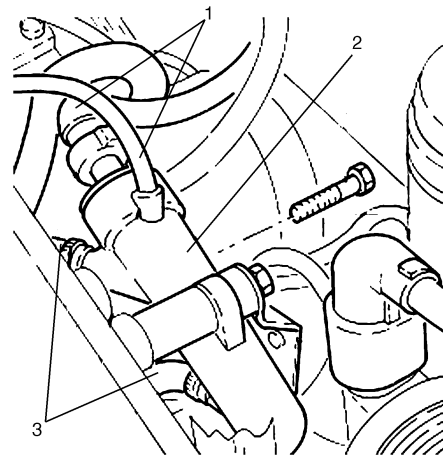
S5RW0D1706056

▲ WARNING

Before servicing fuel system, be sure to observe “Precautions on Fuel System Service”.

Removal

- 1) Relief fuel pressure referring to “Fuel Pressure Relief Procedure”.
- 2) Disconnect negative (-) cable at battery.
- 3) Remove engine cover.
- 4) Disconnect fuel return hose (1).
- 5) Remove fuel damper (2).
- 6) Disconnect fuel return hose (3).



I5RW0D170027-01

Installation

Reverse removal procedure for installation noting the following.

- Tighten fuel damper bolt to specified torque.

Tightening torque

Fuel damper bolt: 25 N·m (2.5 kgf-m, 18.0 lb-ft)

- Check fuel leakage referring to “Fuel Leakage Check Procedure”.

Fuel Filler Cap Inspection

S5RW0D1706011

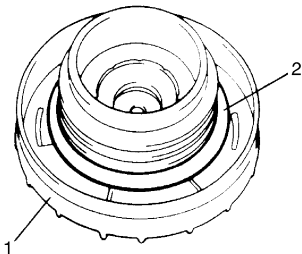
⚠ WARNING

Before servicing fuel system, be sure to observe "Precautions on Fuel System Service".

⚠ CAUTION

If cap requires replacement, only a cap with the same features should be used. Failure to use correct cap can result in critical malfunction of system.

Remove cap (1), and check gasket for even filler neck imprint, and deterioration or any damage. If gasket (2) is in malcondition, replace cap.



I2RH01170008-01

Fuel Tank Removal and Installation

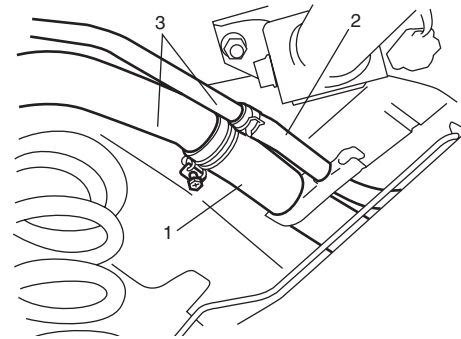
S5RW0D1706012

⚠ WARNING

Before servicing fuel system, be sure to observe "Precautions on Fuel System Service".

Removal

- 1) Disconnect negative (-) cable at battery.
- 2) Hoist vehicle.
- 3) Remove diesel particulate filter referring to "Diesel Particulate Filter (with Main Catalytic Converter) Removal and Installation in Section 1K".
- 4) Remove exhaust center pipe.
- 5) For 4WD model, remove propeller shaft assembly referring to "Propeller Shaft Assembly Removal and Installation in Section 3D in related manual".
- 6) Disconnect fuel filler hose (1) and breather hose (2) from filler neck (3).



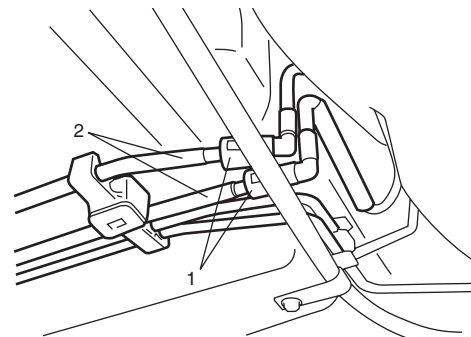
I5RW0D170028-02

- 7) Due to absence of fuel tank drain plug, drain fuel tank by pumping fuel out through fuel tank filler. Use hand operated pump device to drain fuel tank.

⚠ CAUTION

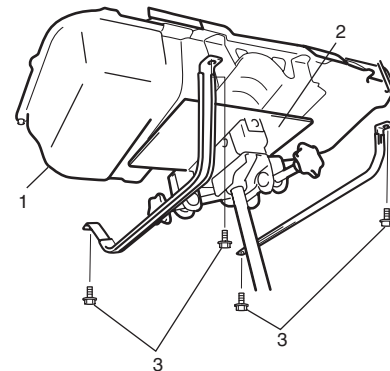
Never store fuel in an open container due to possibility of fire or explosion.

- 8) Disconnect fuel hoses (1) from fuel pipe (2) referring to "Fuel Hose Disconnecting and Reconnecting".



I5RW0A170014-02

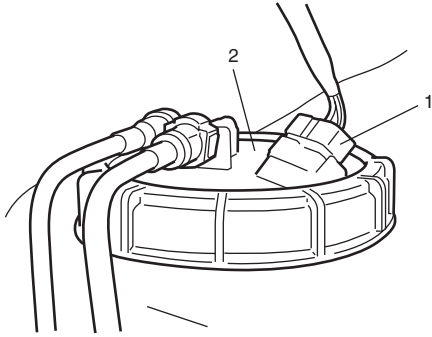
- 9) Support fuel tank (1) with jack (2) and remove its mounting bolts (3).



I5RW0A170013-01

1G-22 Fuel System:

- 10) Lower fuel tank a little so as to disconnect connector (1) of fuel pump (2) then remove fuel tank.



I5RW0B170009-01

Installation

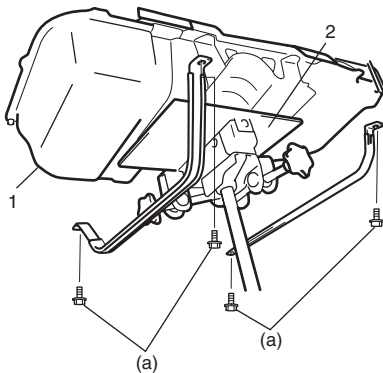
⚠ CAUTION

When connecting joint, clean outside surfaces of pipe where joint is to be inserted, push joint into pipe till joint lock clicks and check to ensure that pipes are connected securely, or fuel leak may occur.

- 1) If parts have been removed from fuel tank, install them before installing fuel tank to vehicle.
- 2) Raise fuel tank (1) with jack (2), and connect connectors of fuel pump and clamp wire harness.
- 3) Install fuel tank to vehicle.

Tightening torque

Fuel tank bolt (a): 55 N·m (5.5 kgf-m, 40.0 lb-ft)



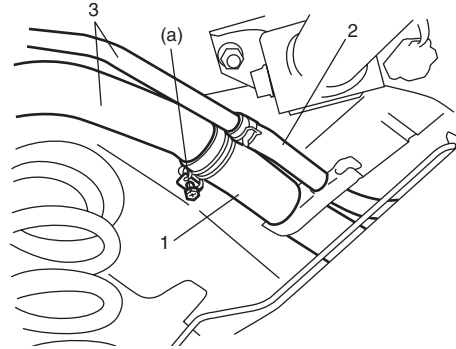
I5RW0A170016-01

Edited by Foxit PDF Editor
Copyright (c) by Foxit Software Company, 2004
For Evaluation Only.

- 4) Connect fuel filler hose (1) and breather hose (2) to filler neck (3) as shown in figure, and clamp them securely.

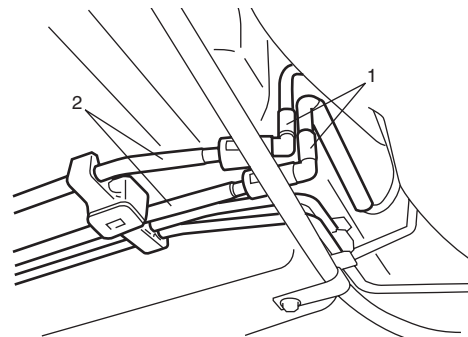
Tightening torque

Fuel filler hose clamp (a): 2 N·m (0.2 kgf-m, 1.5 lb-ft)



I5RW0A170017-01

- 5) Connect fuel feed hoses (1) to each pipe (2) as shown in figure, and clamp them securely referring to "Fuel Hose Disconnecting and Reconnecting".



I5RW0B170010-01

- 6) Install propeller shaft assembly referring to "Propeller Shaft Assembly Removal and Installation in Section 3D in related manual".
- 7) Install exhaust center pipe referring to "Exhaust System Components in Section 1K".
- 8) Install diesel particulate filter referring to "Diesel Particulate Filter (with Main Catalytic Converter) Removal and Installation in Section 1K".
- 9) Connect negative (-) cable at battery.
- 10) Check fuel leakage referring to "Fuel Leakage Check Procedure".

Fuel Tank Inspection

S5RW0D1706013

After removing fuel tank, check hoses and pipes connected to fuel tank for leaks, loose connections, deterioration or damage. Also check fuel level gauge assembly gaskets for leaks, visually inspect fuel tank for leaks and damage.

Replace any damaged or malconditioned parts.

Fuel Tank Purging Procedure

S5RW0D1706014

▲ WARNING

This purging procedure will not remove all fuel vapor.

Do not attempt any repair on tank using heat of flame as an explosion resulting in personal injury could occur.

- 1) After removing fuel tank, remove all hoses, pipes and fuel level gauge assembly from fuel tank.
- 2) Drain all remaining fuel from tank.
- 3) Move tank to flushing area.
- 4) Fill tank with warm water or tap water, and agitate vigorously and drain. Repeat this washing until inside of tank is clean. Replace tank if its inside is rusty.
- 5) Completely flush out remaining water after washing.

▲ CAUTION

Never remain water in fuel tank after washing, or fuel tank inside will get corrosion.

Fuel Pump Assembly Removal and Installation

S5RW0D1706019

▲ WARNING

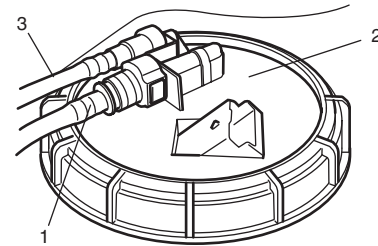
Before servicing fuel system, be sure to observe "Precautions on Fuel System Service".

▲ CAUTION

Never disassembly fuel pump assembly. Disassembly will spoil its original performance. If faulty condition is found, replace it with new one.

Removal

- 1) Remove fuel tank from vehicle. Refer to "Fuel Tank Removal and Installation".
- 2) Disconnect fuel feed pipe (1) and fuel return pipe (3) from fuel pump assembly (2) referring to "Fuel Hose Disconnecting and Reconnecting".

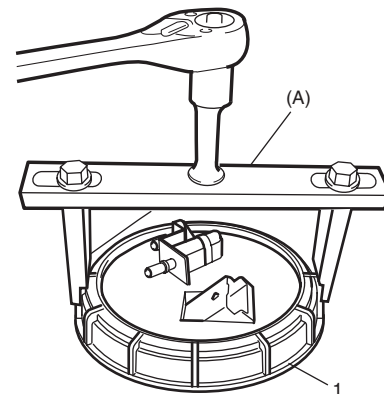


I5RW0B170011-01

- 3) Remove fuel pump lock nut (1) from fuel tank by using special tool.

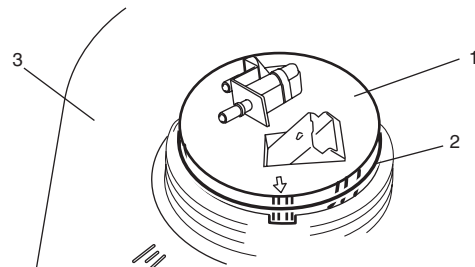
Special tool

(A): 09941-51010



I5RW0B170012-01

- 4) Remove fuel pump assembly (1) and O-ring (2) from fuel tank (3).



I5RW0B170016-01

Installation

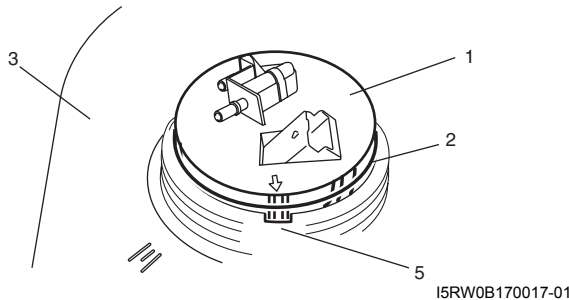
⚠ CAUTION

When connecting joint, clean outside surface of pipe where joint is to be inserted, push joint into pipe till joint lock clicks and check to ensure that pipes are connected securely, or fuel leak may occur.

- 1) Clean mating surfaces of fuel pump assembly (1) and fuel tank.
- 2) Install fuel pump assembly (1) and new O-ring (2) to fuel tank (3).

NOTE

Be sure to position arrow mark (4) to crena of fuel tank (5).



- 3) Install new fuel pump lock nut (1) to fuel tank as follows.
 - a) Tighten new fuel pump lock nut (1) by hand.

NOTE

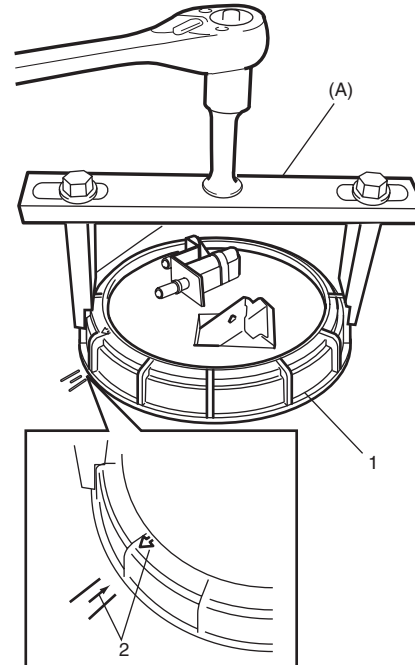
Tighten new lock nut while pressing straight on it so that it will not tilt.

- b) Using special tool, tighten fuel pump lock nut (1) until indexes (2) of fuel pump lock nut and fuel tank are aligned.

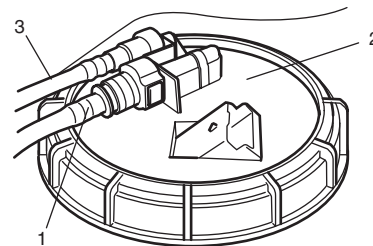
NOTE

- Indexes are aligned when fuel pump lock nut is tightened by approx. 1 and 1/3 rotations.
- After tightening fuel pump lock nut, check for loosening and play.

Special tool
(A): 09941-51010



- 4) Connect fuel feed hose (1) and return hose (3) to fuel pump assembly (2).
- 5) Install fuel tank to vehicle referring to “Fuel Tank Removal and Installation”.



Fuel Pump Inspection

S5RW0D1706043

- Check fuel pump assembly for damage.
- Check fuel suction filter for evidence of dirt and contamination. If present, replace or clean and check for presence of dirt in fuel tank.
- For electrical circuit.
- For inspection of fuel level gauge, refer to “Fuel Level Sensor Inspection in Section 9C in related manual”.

Specifications

Tightening Torque Specifications

S5RW0D1707001

Fastening part	Tightening torque			Note
	N·m	kgf·m	lb·ft	
Bleed screw	1.4	0.14	1.0	☞
Fuel filter cap	30	3.0	22.0	☞
High pressure pipe union nut	23	2.3	17.0	☞
Fuel injector bracket nut	30	3.0	22.0	☞
Engine right mounting bracket No.2 bolt (M10)	50	5.0	36.5	☞
Engine right mounting bracket No.2 bolt (M8)	25	2.5	18.0	☞
High pressure pump nut	26	2.6	19.0	☞
High pressure pump mounting bolt	50	5.0	36.5	☞
High pressure pump pulley nut	50	5.0	36.5	☞
Fuel pressure sensor	70	7.0	51.0	☞
Fuel pressure regulator valve	85	8.5	61.5	☞
Common rail nut	26	2.6	19.0	☞
Fuel damper bolt	25	2.5	18.0	☞
Fuel tank bolt	55	5.5	40.0	☞
Fuel filler hose clamp	2	0.2	1.5	☞

NOTE

The specified tightening torque is also described in the following.

“Fuel System Components”

“Fuel Hose Disconnecting and Reconnecting”

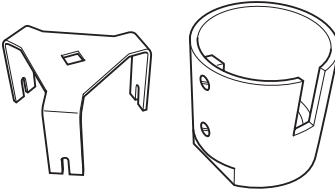
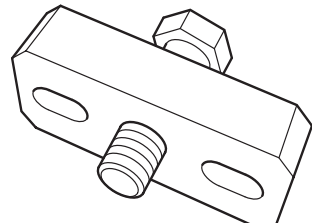

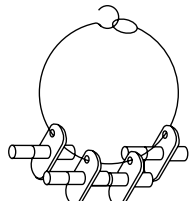

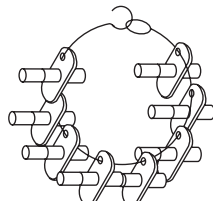


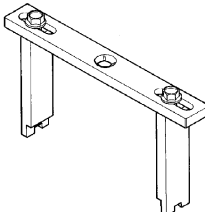

Reference:

For the tightening torque of fastener not specified in this section, refer to “Fasteners Information in Section 0A in related manual”.

Special Tools and Equipment

Special Tool

S5RW0D1708001

<p>09915-27910 Fuel filter wrench / adapter </p>	<p>09918-47910 Pulley remover </p>
<p>09919-48310 Plug kit KM-6015 </p> 	<p>09919-48320 Plug kit KM-807 </p> 
<p>09941-51010 Lock ring wrench  / </p> 	<p>SUZUKI scan tool — This kit includes following items. 1. Tech 2, 2. PCMCIA card, 3. DLC cable, 4. SAE 16/19 adapter, 5. Cigarette cable, 6. DLC loop back adapter, 7. Battery power cable, 8. RS232 cable, 9. RS232 adapter, 10. RS232 loop back connector, 11. Storage case, 12. Power supply </p> 