

ENGINE 4J SERIES

SECTION 6C ENGINE FUEL

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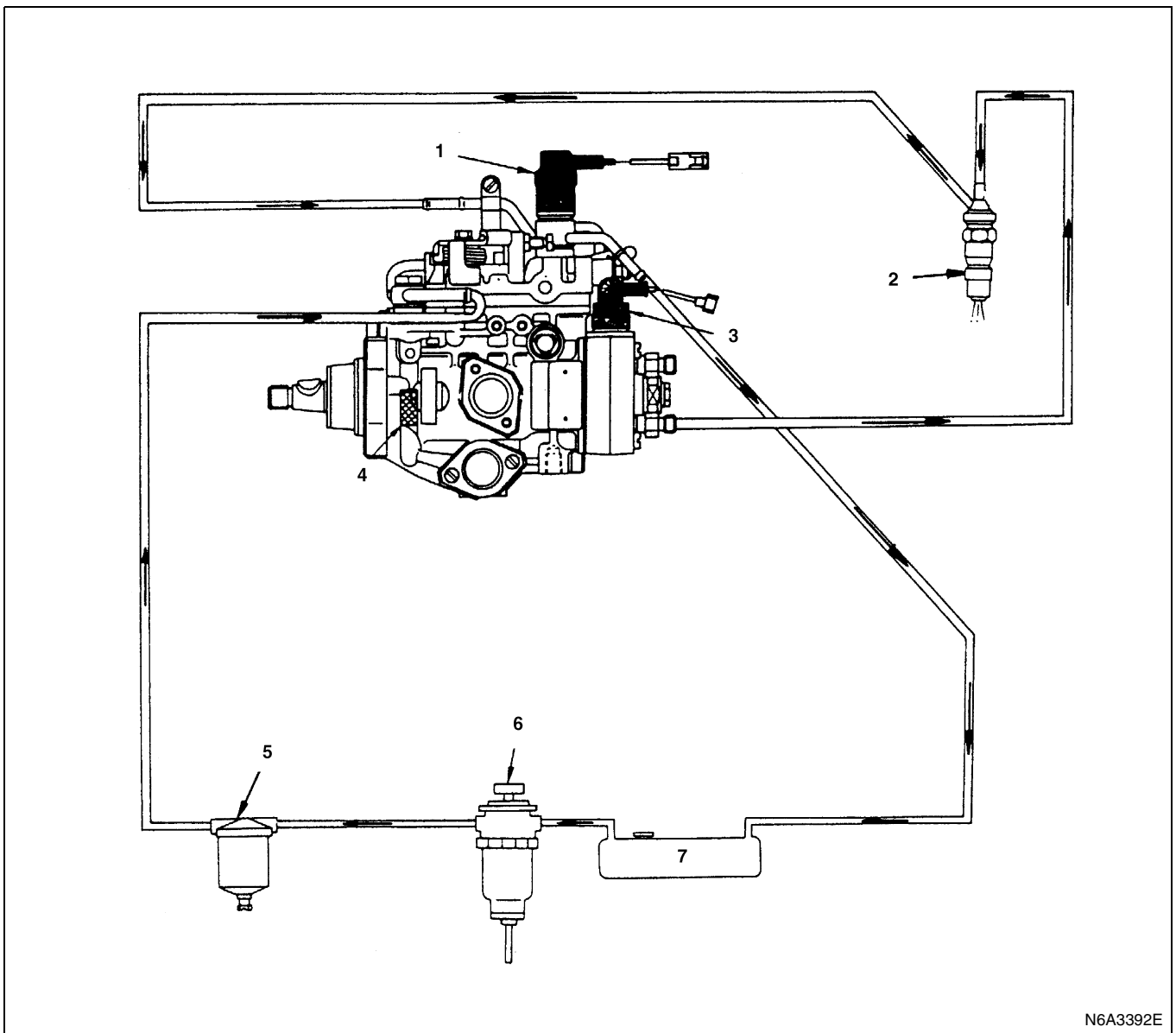
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GENERAL DESCRIPTION

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 where 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 repairs.
- The 4JH1-TC engine is equipped with the electronically controlled fuel injection system.
For information on fuel injection pump maintenance and/or part replacement, contact the Bosch Automotive Systems Corporation.
- Contact the Bosch Automotive Systems Corporation for information on 4JH1-TC engine fuel injection nozzle maintenance.

Fuel Flow



N6A3392E

Legend

- | | |
|----------------------------|--------------------|
| 1. CSD solenoid valve | 5. Fuel filter |
| 2. Nozzle | 6. Water separator |
| 3. Fuel cut solenoid valve | 7. Fuel tank |
| 4. VE type injection pump | |

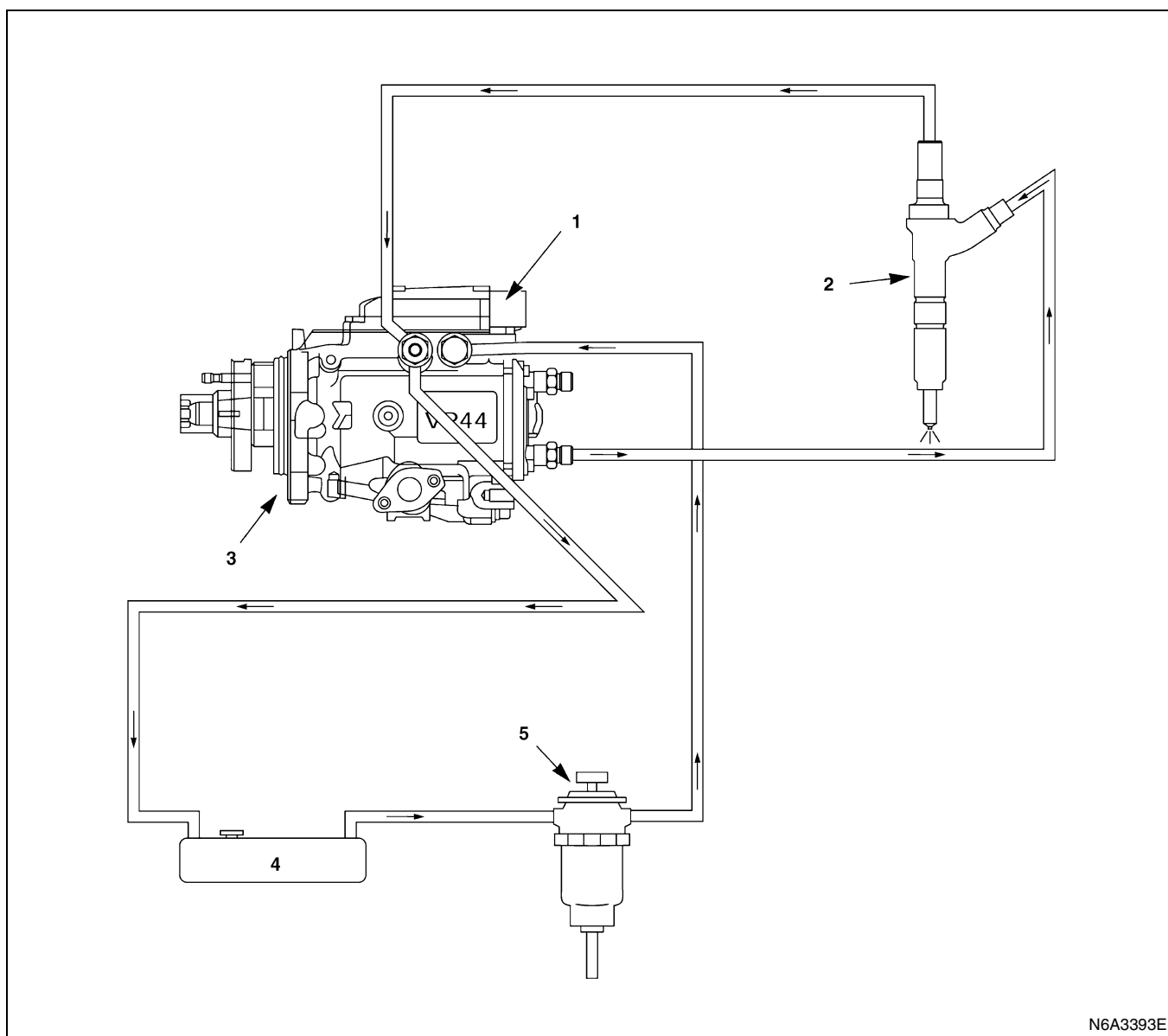
The fuel system consists of the fuel tank, the water separator, the fuel filter, the injection pump, and the injection nozzle.

The fuel from the fuel tank passes through the water separator and the fuel filter where water particles and other foreign material are removed from the fuel.

Fuel, fed by the injection pump plunger, is delivered to the injection nozzle in the measured volume at the optimum timing for efficient engine operation.

6C-4 ENGINE FUEL

Fuel Flow (4JH1-TC)

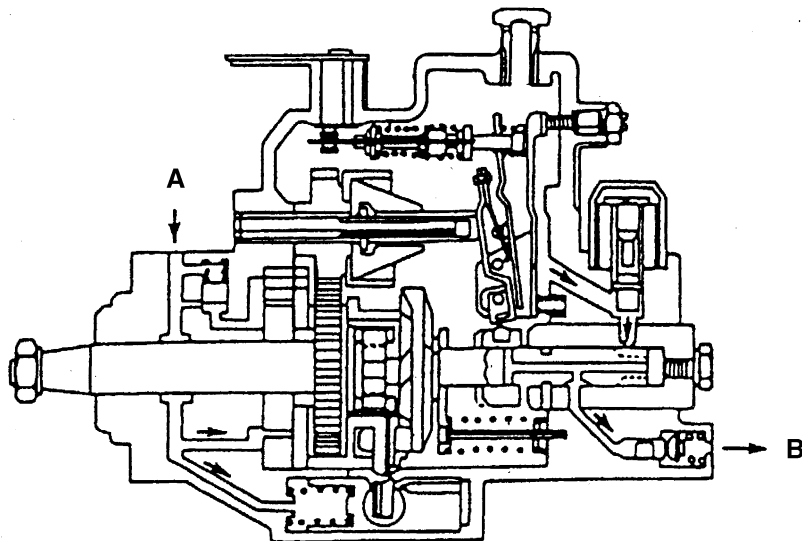
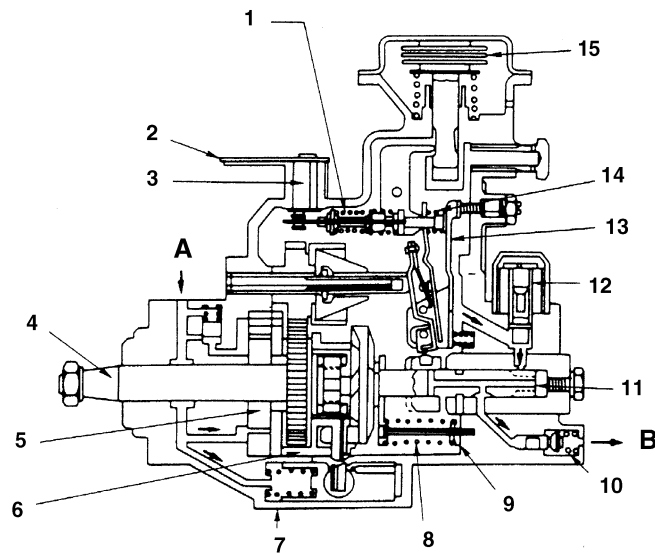


N6A3393E

Legend

- | | |
|-------------------|----------------|
| 1. EDU | 4. Fuel tank |
| 2. Nozzle | 5. Fuel filter |
| 3. Injection pump | |

Injection Pump



N6A3394E

Legend

- | | |
|------------------------|-----------------------------|
| A. From fuel filter | 8. Plunger spring |
| B. To nozzle | 9. Control sleeve |
| 1. Governor spring | 10. Delivery valve |
| 2. Control lever | 11. Plunger |
| 3. Control lever shaft | 12. Fuel cut solenoid valve |
| 4. Drive shaft | 13. Tension lever |
| 5. Feed pump gear | 14. Collector lever |
| 6. Driver disc | 15. Aneroid compensator |
| 7. Timer | |

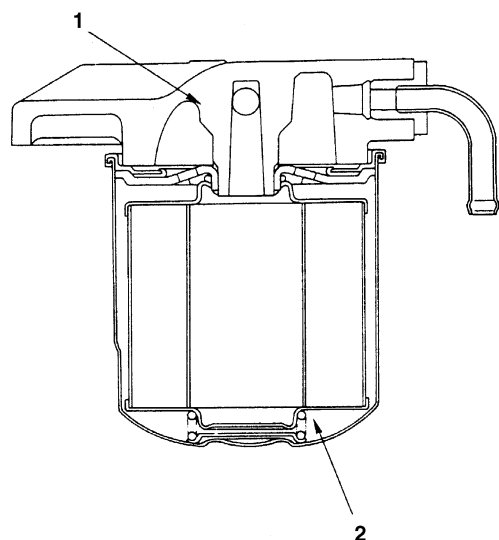
A Bosch Distributor Type Injection Pump is used. A single reciprocating/revolving plunger delivers the fuel uniformly to the injection nozzles, regardless of the number of cylinders.

The governor, the injection timer, and the feed pump are all contained in the injection pump housing.

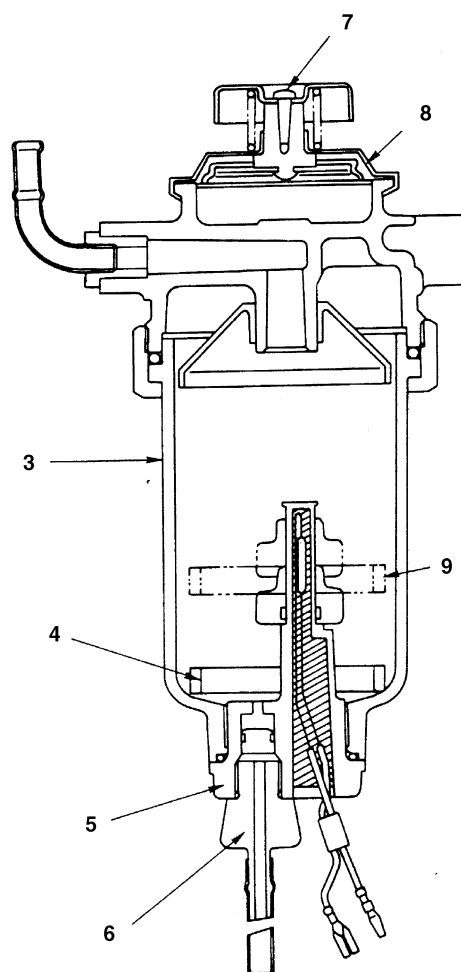
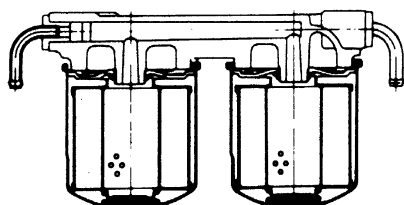
The injection pump is compact, light weight, and provides reliable high-speed operation.

An aneroid compensator is available as an option for vehicles to be operated at high altitudes. It adjusts the fuel and air mixing ratio.

Fuel Filter and Water Separator



A



N6A3395E

Legend

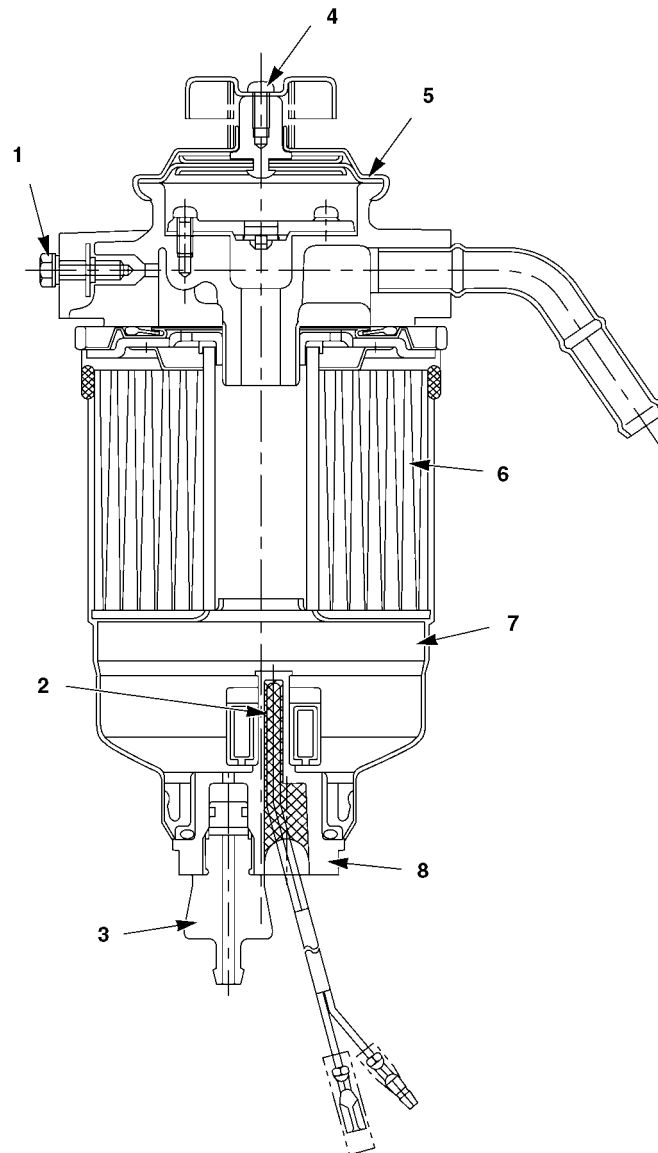
- | | |
|---------------------|-------------------------|
| A. Dual type | 5. Level sensor |
| 1. Body assembly | 6. Drain plug |
| 2. Filter cartridge | 7. Priming pump |
| 3. Case | 8. Body assembly |
| 4. Float | 9. Water draining level |

A cartridge type fuel filter and a water separator are used along with the VE type injection pump.

As the inside of the injection pump is lubricated by the fuel which it is pumping, the fuel must be perfectly clean. The fuel filter and the water separator remove water particles and other foreign material from the fuel before it reaches the injection pump.

The water separator has an internal float. When the float reaches the specified level, a warning light comes on to remind you to drain the water from the water separator.

A diaphragm type priming pump is installed at the top of the water separator. It is used during the water draining and the air bleeding procedures.

Fuel Filter With Built-in Water Separator (4JH1-TC)

N6A3396E

Legend

- | | |
|---------------------|--------------------------|
| 1. Air bleeder plug | 5. Body assembly |
| 2. Float | 6. Filter element |
| 3. Drain plug | 7. Filter cartridge |
| 4. Priming pump | 8. Level sensor assembly |

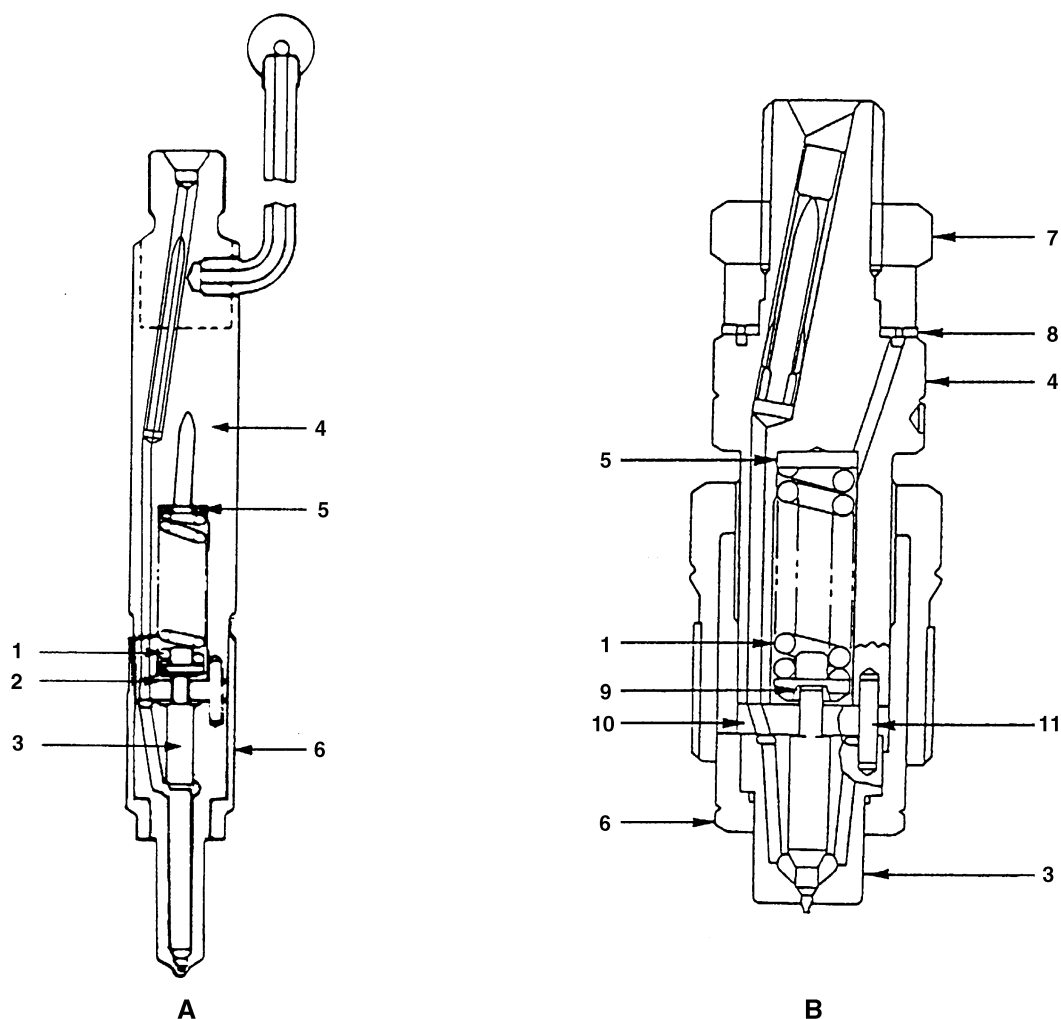
A fuel filter with a built-in water separator is used along with the VE type injection pump.

As the inside of the injection pump is lubricated by the fuel which it is pumping, the fuel must be perfectly clean. The fuel filter and the water separator remove water particles and other foreign material from the fuel before it reaches the injection pump.

The water separator has an internal float. When the float reaches the specified level, a warning light comes on to remind you to drain the water from the water separator.

A diaphragm type priming pump is installed at the top of the water separator. It is used during the water draining and the air bleeding procedures.

Injection Nozzle



N6A3397E

Legend

- | | |
|------------------------------|------------------|
| A. Direct injection nozzle | 6. Retaining nut |
| B. Indirect injection nozzle | 7. Nut |
| 1. Spring | 8. Gasket |
| 2. Spring seat | 9. Push rod |
| 3. Injection nozzle | 10. Spacer |
| 4. Nozzle holder | 11. Pin |
| 5. Adjusting shim | |

For 4J Series diesel engines, there are two types available: Direct injection engine (4JB1) and Indirect injection engine (4JG2). Accordingly, the injection nozzles to be used are different depending on the type of the engine and the combustion chamber.

The injection nozzle sprays pressurized fuel from the injection pump into the combustion chamber through the injection nozzle orifices.

4JB1 engines employ a hole type nozzle with four injection orifices. The nozzle is made up of the nozzle body and the needle valve assembly.

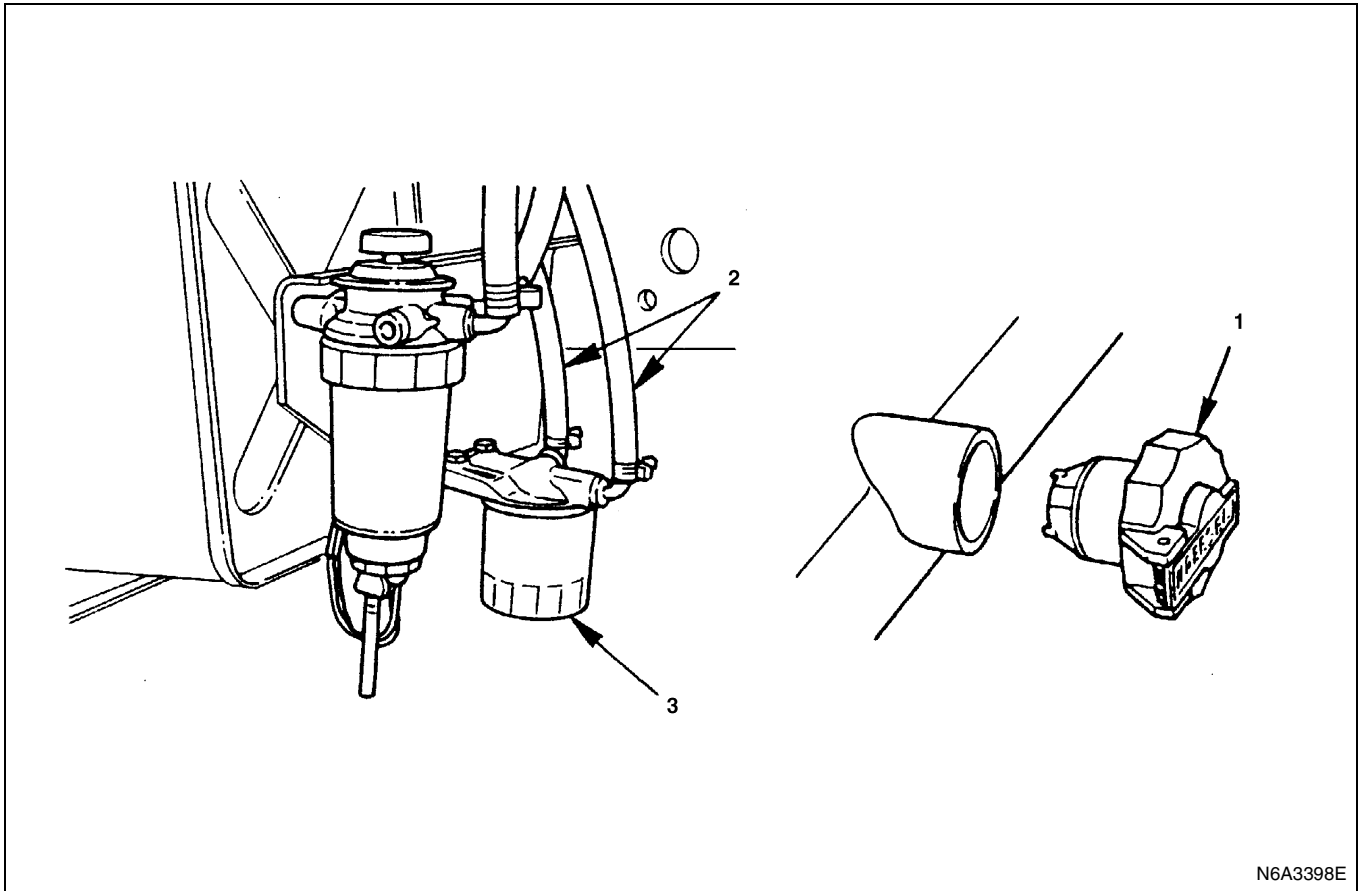
Pressurized fuel from the injection pump is sprayed by the injection nozzle into the combustion chamber through the nozzle body orifices.

4JB1-TC Engine

The two-spring nozzle holder has been developed to reduce NOx (Nitrogen Oxides) and particulates from direct injection diesel engine exhaust.

FUEL FILTER ASSEMBLY

Components



Legend

- | | |
|--------------------|-------------------------|
| 1. Fuel filler cap | 3. Fuel filter assembly |
| 2. Fuel hose | |

Removal

Preparation

- Disconnect battery ground cable.
1. Fuel Filler Cap
 2. Fuel Hose
 - Disconnect fuel hose from filter body.
 - Plug the hose ends to prevent fuel spillage.
 3. Fuel Filter Assembly
 - Remove the fixing bolts on fuel filter bracket.

Installation

1. Fuel Filter Assembly
 - Install the fuel filter bracket, then tighten fixing bolt.
2. Fuel Hose
 - Connect hoses to filter body.
3. Fuel Filler Cap
 - Connect the battery ground cable.
 - Feed fuel to the injection pump by means of the priming, and bleed the fuel system.

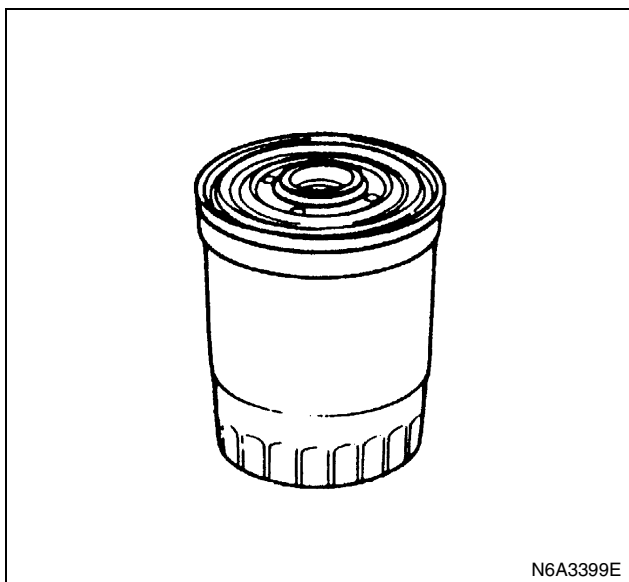
FUEL FILTER CARTRIDGE

Removal

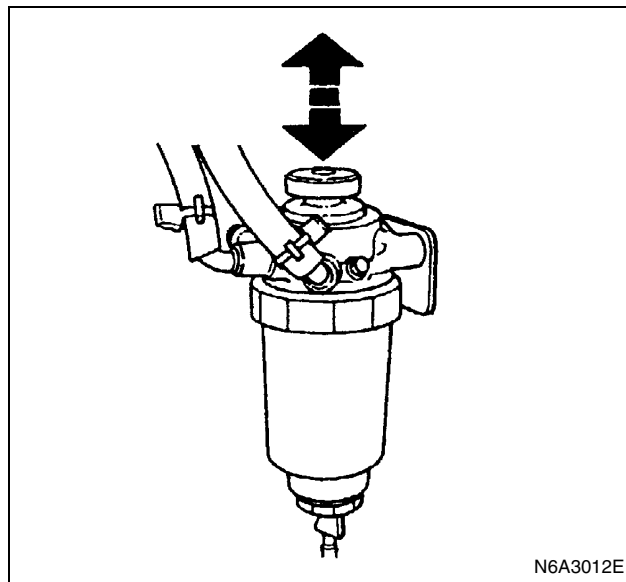
- Remove the cartridge using a filter wrench.
Filter wrench: 5-8840-0253-0 (J-22700)

Installation

- Clean the cartridge mounting surface of filter body so that the cartridge can be securely.
Apply engine oil thinly to new cartridge O-ring.
- To facilitate bleeding, fill the new cartridge with light oil.
- Tighten the cartridge until O-ring comes in contact with the sealing, taking care not to spill the light oil.
- Retighten 1/3 — 2/3 using a filter wrench.
Filter wrench: 5-8840-0253-0 (J-22700)



- Operate the priming pump several times to check for fuel leakage.
- Check and see the warning light is off.



Air Bleeding

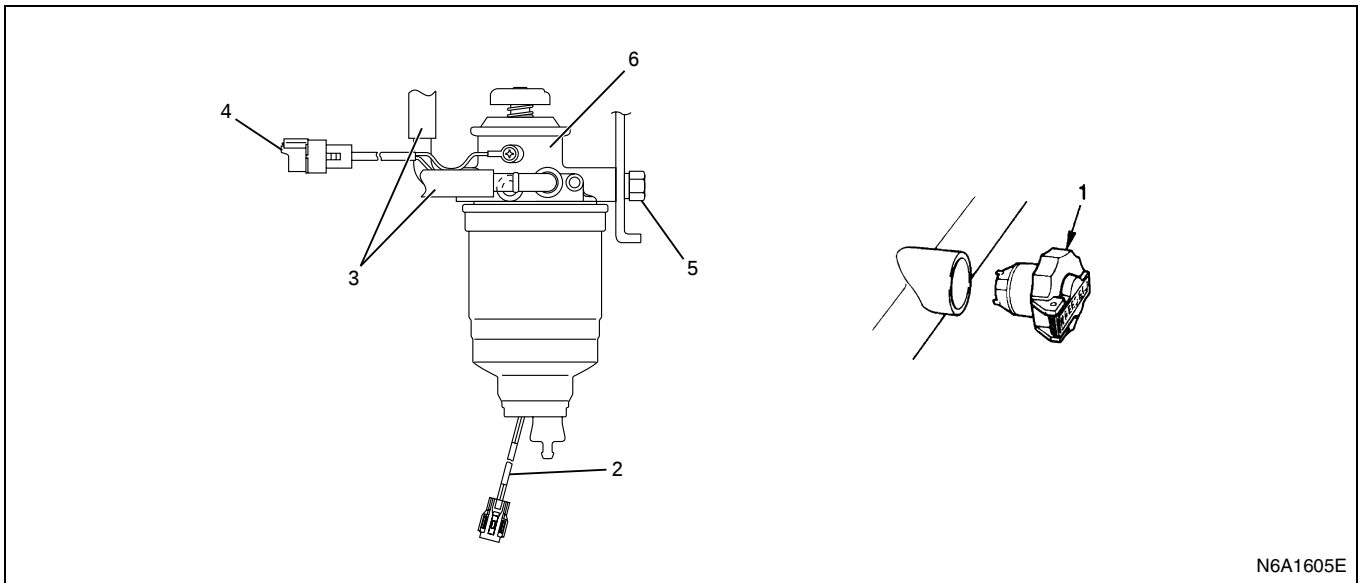
- Operate priming pump to send the air in the fuel system to the injection pump.
- Loosen injection pump bleeding plug, and operate the priming pump until no bubble is made.
- Tighten the bleeding plug.
- Start the engine, and if it is not started in 10 seconds or less, repeat the bleeding steps.
- Make sure of no fuel leakage, and tighten the priming pump.

Draining

- When the water in the sedimentor reaches the specified volume, warning light is actuated.
In this case, follow the draining steps below.
- Set a vinyl hose over the drain plug.
- Loosen the drain plug.
- To drain the water, operate the priming pump several times.
- After draining, tighten the drain plug.

FUEL FILTER ASSEMBLY (4JH1-TC)

Components



Legend

- | | |
|------------------------------|--------------------------|
| 1. Filler Cap | 4. Fuel Heater Connector |
| 2. Fuel Sedimenter Connector | 5. Bolt |
| 3. Fuel Hose | 6. Fuel Filter Assembly |

Removal

1. Remove the filler cap.
2. Remove the fuel sedimenter connector and fuel heater connector.
3. Remove the feed hose and the return hose from the fuel filter and plug it so that the fuel does not flow out.
4. Remove the bolts for mounting the fuel filter.
5. Remove the fuel filter assembly.

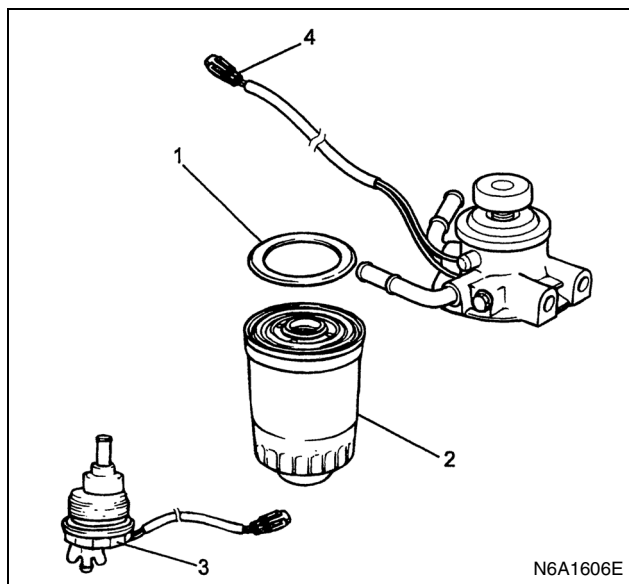
Installation

1. Install the fuel filter assembly.
2. Install the bolts for mounting the fuel filter.
3. Install the feed hose and the return hose.
4. Install the fuel sedimenter and fuel heater connector.
5. Install the filler cap.
6. Bleed out the air.
 - Refer to "Fuel Filter Cartridge (4JH1-TC)".

FUEL FILTER CARTRIDGE (4JH1-TC)

Removal

1. Remove the cartridge using the filter wrench.
Filter wrench: J-22700
2. Remove the sedimenter sensor.

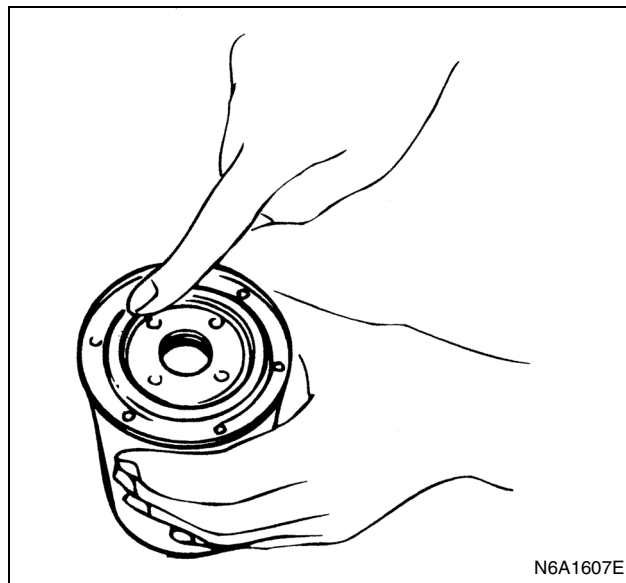


Legend

1. O-ring
2. Cartridge
3. Sedimenter Sensor
4. Fuel Heater Connector

Installation

1. Assemble the sedimenter sensor in the new cartridge.
2. Clean the cartridge mounting surface in the filter body so that the cartridge can be seated securely.
3. Coat a thin layer of engine oil on the O-ring in the new cartridge.
4. To simplify air bleed, fill light oil on the new cartridge.
5. Tighten the cartridge until the O-ring touches the sealing surface. During this process take adequate care that the light oil that is inside does not flow out.
6. Use the filter wrench and tighten rotating by 1/3 to 2/3.
Filter wrench: J-22700



Injection Pump Air Bleeding (4JH1-TC)

Injection pump air bleeding is required to start the engine when —

- The fuel supply has been exhausted (running out of gas).
- The fuel filter has been replaced.
- The injection pump has been replaced.

Caution:

If the injection pump has been replaced, the air bleeding procedure will require more time and effort (this is because there is no fuel in the pump).

1. Loosen the air bleed nut on the priming pump plunger (at the top of the fuel filter).
2. Move the priming pump plunger up-and-down until strong resistance is felt (about 15 cycles).
3. Stop pumping and tighten the air bleed nut.
4. Wait for 1 minute.
5. Loosen the air bleed nut on the priming pump plunger again.
6. Move the priming pump plunger up-and-down until strong resistance is felt (about 10 cycles).
7. Stop pumping and tighten the air bleed nut.
8. Wait for 1 minute.
9. Loosen the air bleed nut on the priming pump plunger again.
10. Move the priming pump plunger up-and-down until strong resistance is felt (about 5 cycles).
11. Stop pumping and tighten the air bleed nut.
12. Press the accelerator and clutch pedals all the way to the floor and hold them down. Turn the ignition switch to the ON position. Wait until the glow indicator lamp turns on and off.

Caution:

If the engine is cold, the glow indicator light will stay on for 4 — 7 seconds before turning off.

However, if the engine is hot, the lamp will not turn on.

13. Turn the ignition switch to the START position and crank the engine until it starts (do not crank the engine for more than 10 seconds).

If the engine does not start, repeat Steps 9 — 13.

14. Allow the engine to idle for 5 minutes.

Water drain

A warning lamp will light up if water above the specified volume collects in the sediment. In such cases, drain out the water by performing the following operations:

- Set a container at the tip of the plastic hose.
- Loosen the drain plug.
- Operate the priming pump several times to discharge the water.
- Tighten the drain plug after discharging the water.
- Operate the priming pump several times and check for fuel leakage.
- Check that the warning lamp in the meter is off.

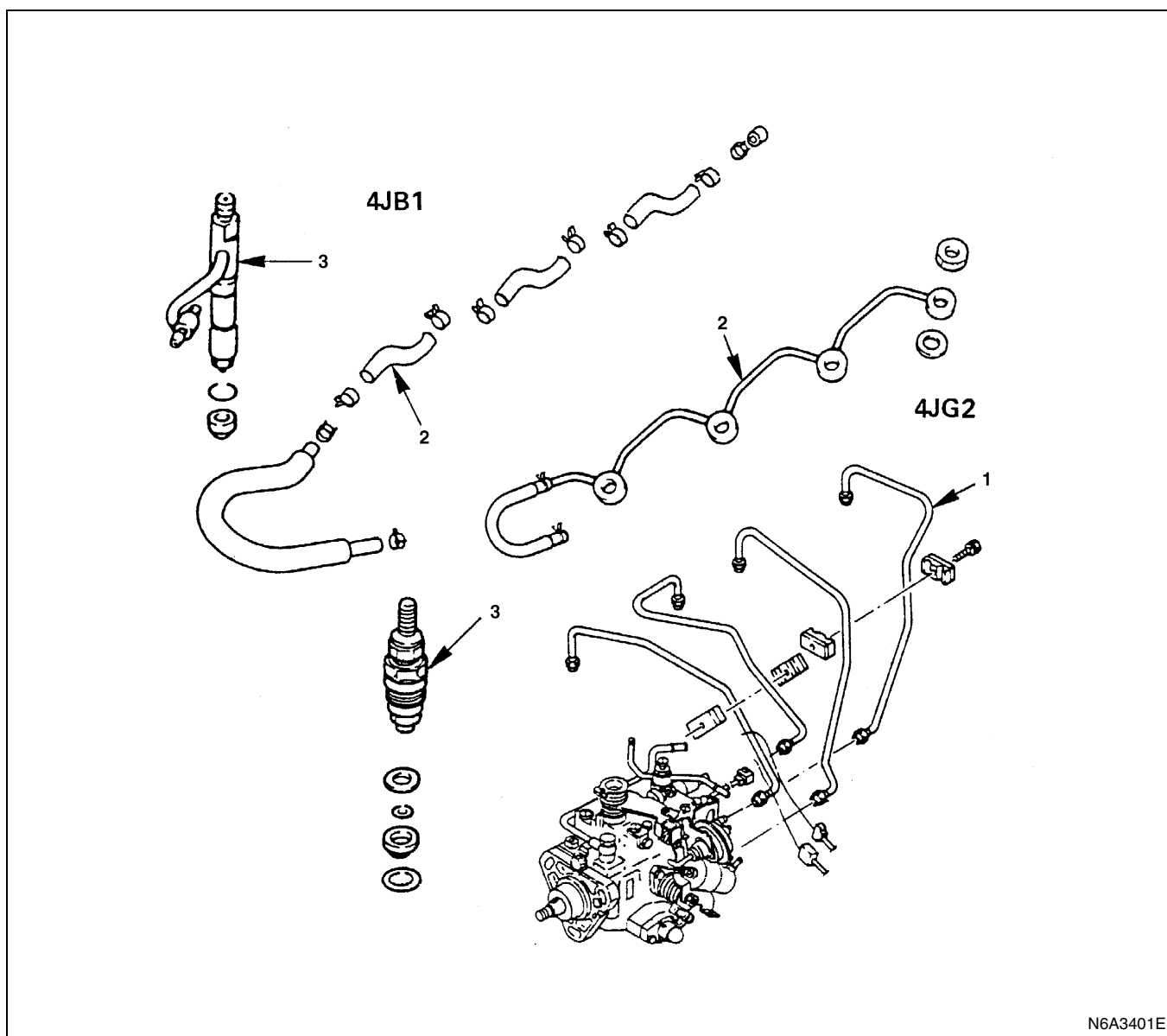
Special Tools

Illustration	Tool Number / Description
	J-22700 Filter wrench

INJECTION NOZZLE

Component

4JB1 / 4JG2



N6A3401E

Legend

- | | |
|--------------------------|---------------------|
| 1. Injection pipe | 3. Injection nozzle |
| 2. Leak off pipe or hose | |

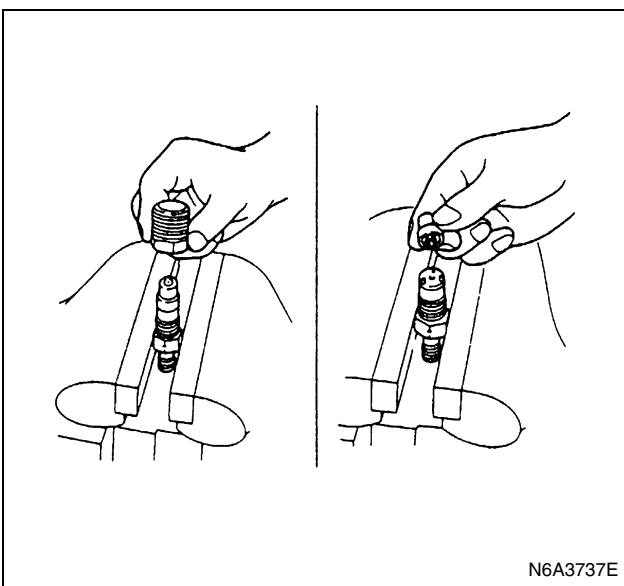
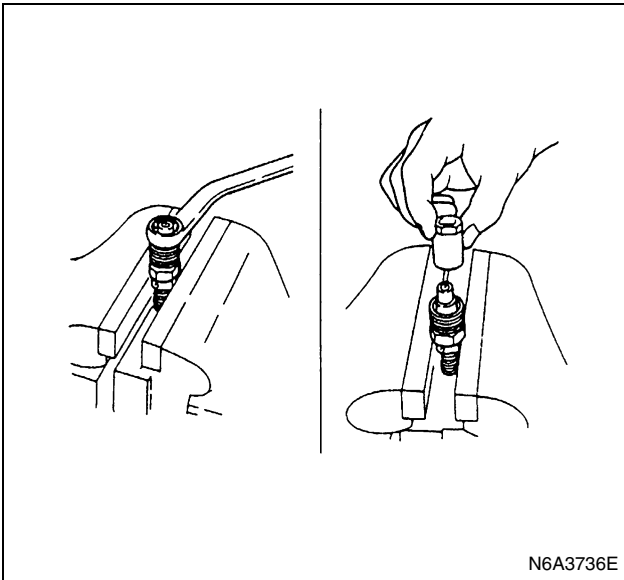
Removal

Preparation:

- Disconnect battery ground cable.
1. Injection Pipe
 - Release injection pipe clip.
 - Loosen the flare nut on the injection pump side.
 - Loosen the flare nut on the injection nozzle side, disconnect and put aside the pipe.
 2. Leak off Pipe or Hose
 3. Injection Nozzle

Disassembly (4JG2 Engine)

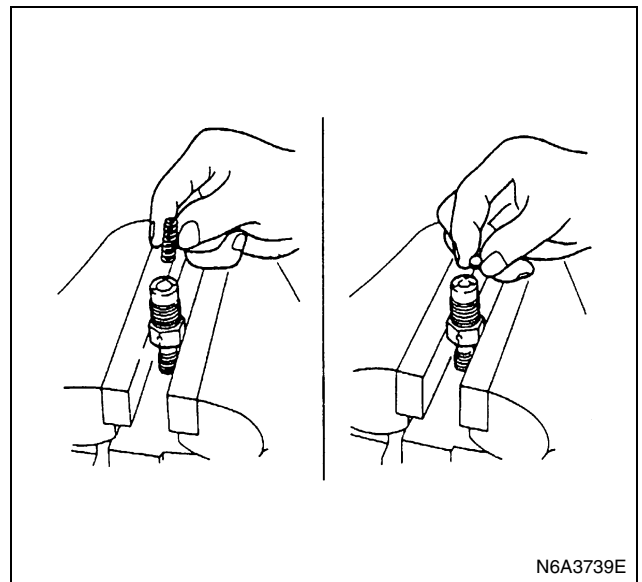
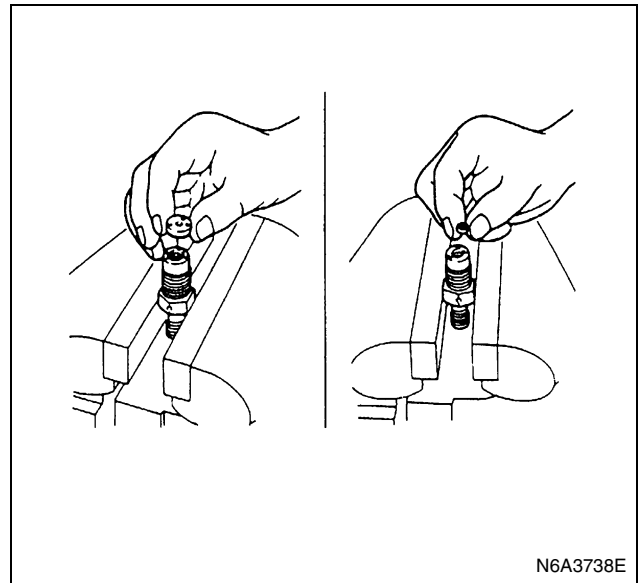
- Grip nozzle holder with a vise, loosen retaining nut and disassemble.
- Loosen holder nut and remove the nozzle.



Caution:

- Be careful not to damage the needle valve.
- Remove spacer, positioning pin, and push rod.

- Remove spring and adjusting shim.



Caution:

- Wash all the parts removed and arrange them on a cylinder basis, care should be taken not to miss any parts.
- Soak the nozzle assembly in a parts receptacle filled with light oil.
- Care should be taken not to miss shim, if used.

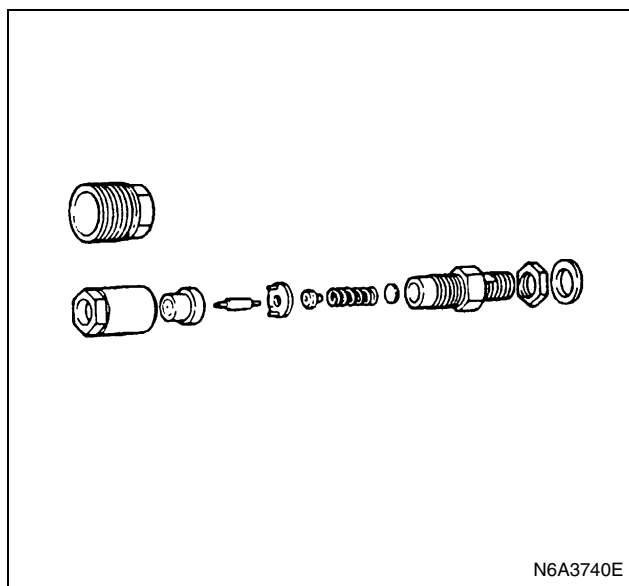
Inspection (4JG2 Engine)

Nozzle

- Soak the nozzle removed in clean light oil, wash nozzle body and needle valve separately, and check and see that the needle valve slide smoothly in the nozzle body.

Caution:

- If the needle valve does not slide smoothly repair or replace with a new nozzle assembly.

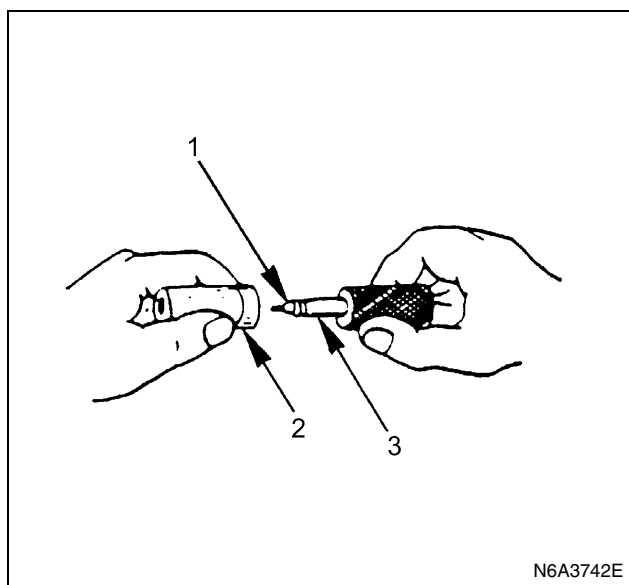


Nozzle Lapping Procedure

- Apply thinly a compound (Oxide chrome kneaded with animal oil) to the seat of needle valve and lap.

Caution:

- Excess compound may cause worn needle valve, and be sure to wash out the compound after lapping.



Legend

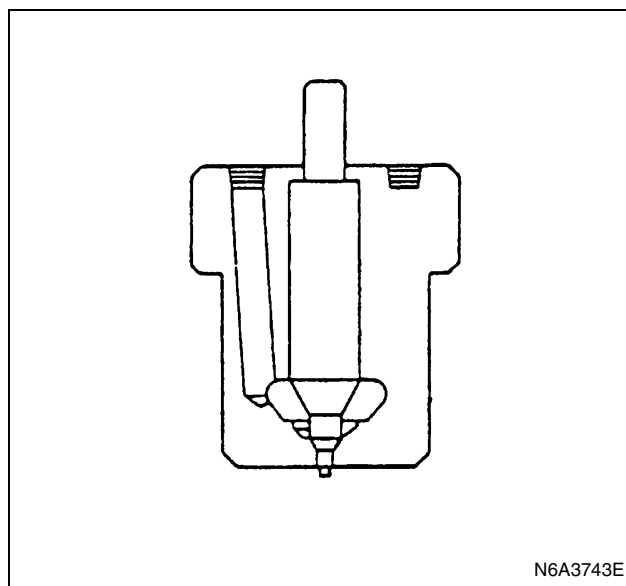
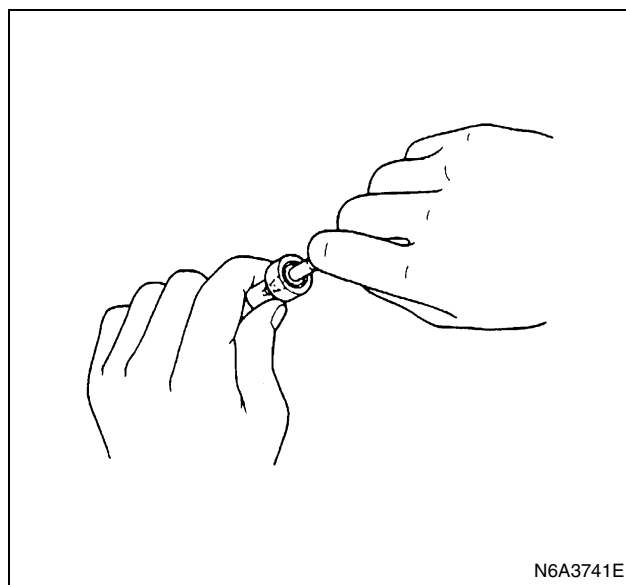
1. Oxidized chrome kneaded with animal oil
2. Nozzle body
3. Needle valve

Nozzle Body & Needle

- Check nozzle body and end for seizure. If significantly seized, replace as a nozzle assembly basis. Also replace as a nozzle assembly basis, if needle valve end is deformed or seized.

Caution:

- If either nozzle body or needle valve is faulty, replace with a new nozzle assembly.

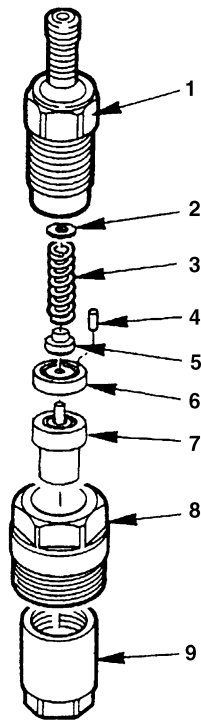


Reassembly (4JG2 Engine)

To reassemble, follow the removal steps in the reverse order, noting the following point.

Caution:

- Be careful to fit spacer because positioning pins are set off.



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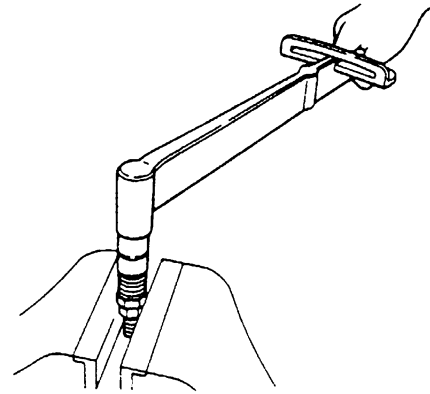
Legend

1. Nozzle holder
2. Adjusting shim
3. Nozzle spring
4. Positioning pin
5. Push rod
6. Spacer
7. Nozzle
8. Holder nut
9. Retaining nut

- Install retaining nut and tighten nut to the specified torque.

Tighten:

Nut to 39 N·m (4.0 kg·m/32 lb·ft)



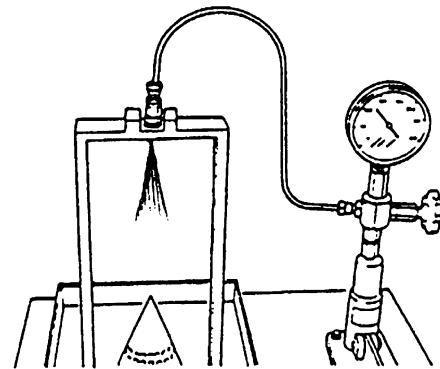
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Adjustment of Injection Opening Pressure (4JG2 Engine)

- Set nozzle holder assembly on a nozzle tester.
- Apply hydraulic pressure by operating tester handle, and make sure fuel can be injected under the following pressure.

Kpa (kg/m²/psi)

14,710 (150/2,133)



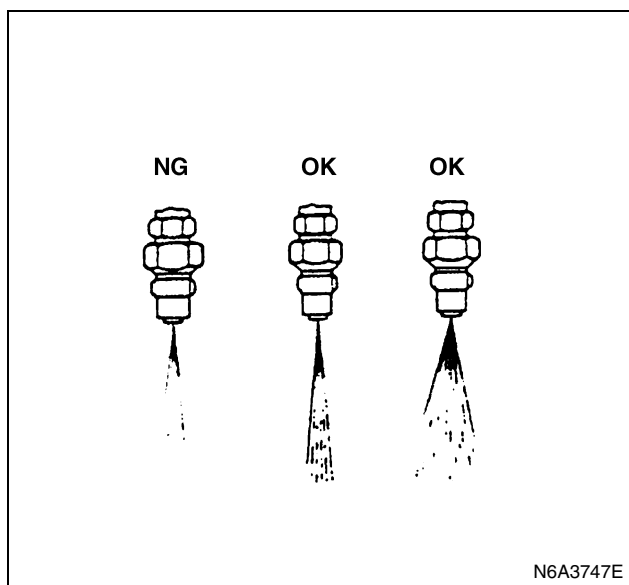
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Caution:

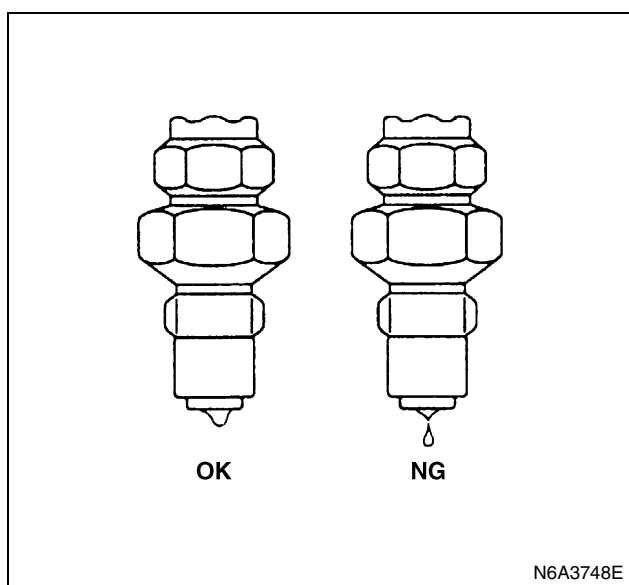
- If not injected under the specified pressure, adjust with adjusting shim.
Types are available in the 1.0 — 1.75 mm (0.039 — 0.069 in) thickness range (on a 0.01 mm (0.00003 in) basis).
- Unless extremely deformed spray is seen, there is no problem.

Caution:

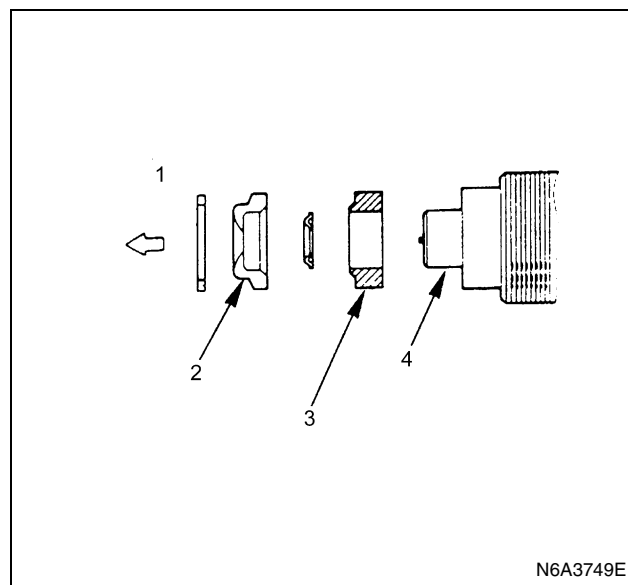
- The spray condition, when judged with a nozzle tester, is deemed as normal so long as the spray form is not excessively deformed.

**Oil Tight Test (4JG2 Engine)**

- After completion of the adjustment of injection pressure, wipe off light oil at the tip of the nozzle with waste.
- With pressure 1,961 Kpa (20 kg/cm²/284 psi) less than the specified injection pressure applied, check to see if an oil drop trickles off the tip of the nozzle within 10 seconds after application of pressure. (There is no problem with the nozzle when oil gathers at the tip, but does not drop off.)
- When an oil drop trickles, clean the nozzle thoroughly. Then reassemble it to check for any dropping of oil. When oil still drops, change it with a new one.

**Installation (4JG2 Engine)****Caution:**

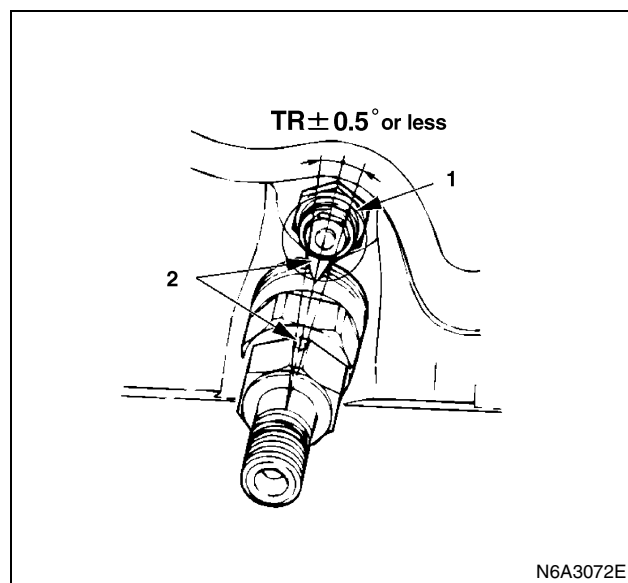
- Nozzle and assembling should be as illustrated.
- Use new heat shield and new corrugated washer.

**Legend**

- Cylinder head side
- Nozzle heat shield
- Gasket heat shield
- Nozzle

1. Injection Nozzle (4JG2 only)

- Lightly tighten the holder nut to such extent that the nozzle holder can turn one word and one word.
- Set positioning confirmation drilled hole ($\phi 2$) within a nozzle turning angle of $\pm 5^\circ$ against the cylinder headside positioning boss.



Legend

1. Glow plug
2. Positioning boss

- Apply a wrench as illustrated and tighten the holder nut to the specified torque using a special tool.

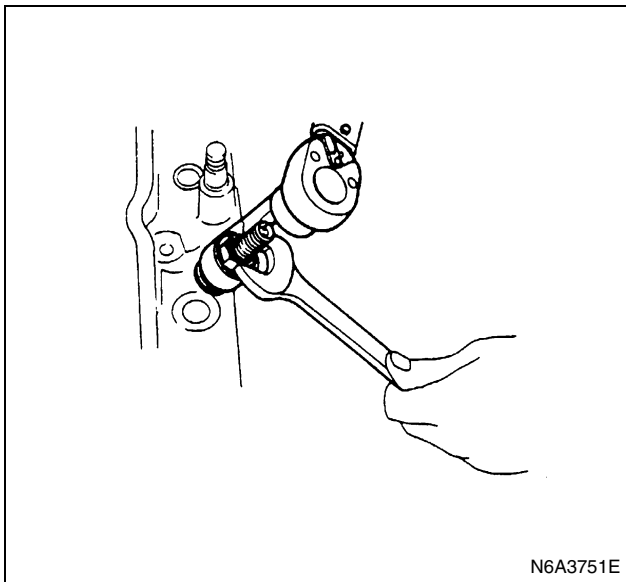
Caution:

- After tightening the holder nut, make sure that the drilled hole makes $\pm 5^\circ$ or smaller with the cylinder head-side positioning boss.
- When mounting leak off pipe, injection nozzle and pipe, clean with air so that dust may not enter.

Tighten:

Nozzle Fixing Nut to 64 N·m (6.5 kg·m/47 lb·ft)

Wrench: nozzle holder 5-8840-0259-0



2. Leak Off Pipe

- Mount using a new copper washer.
- Tighten nut to the specified torque.

Tighten:

Pipe Nut to 29 N·m (3.0 kg·m/22 lb·ft)

3. Injection Pipe

- Connect injection pipe to nozzle holder.
- Tighten the injection pump side.

Tighten:

Sleeve Nut to 29 N·m (3.0 kg·m/22 lb·ft)

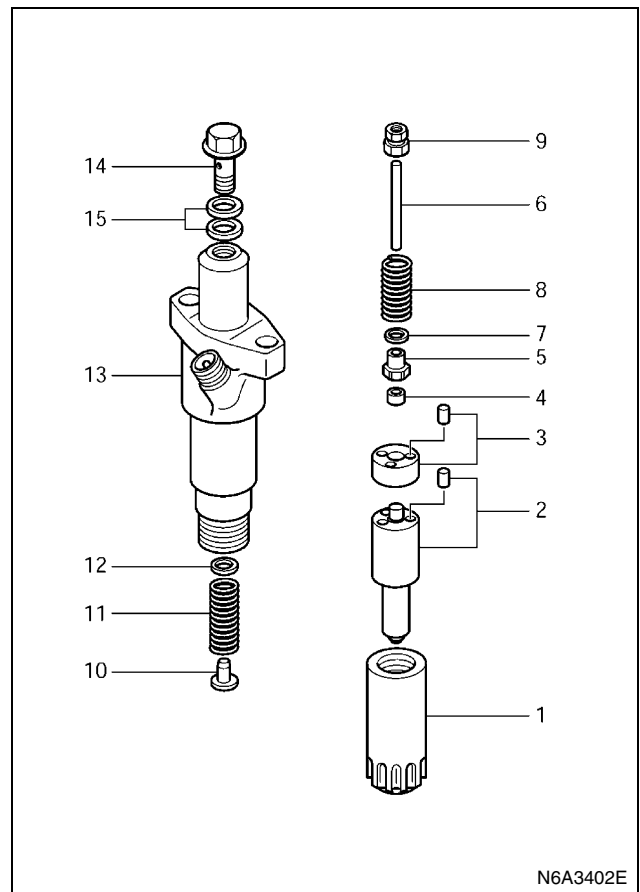
- Fit pipe clip in specified position.

4-1 Injection Nozzle (Two Spring Nozzle Holder) (4JB1-TC)

The two-spring nozzle holder has been developed to reduce NOx (Nitrogen Oxides) and particulates from direct injection diesel engine exhaust.

Disassembly

1. Retaining nut (1)
2. Nozzle & pin (2)
3. Spacer & pin (3)
4. Lift piece (4)
5. Spring seat (5)
6. Push rod (6)
7. Shim (Second nozzle opening pressure adjustment) (7)
8. Second spring (8)
9. Collar (9)
10. Spring seat (10)
11. First spring (11)
12. Shim (First nozzle opening pressure adjustment) (12)
13. Nozzle holder body (13)
14. Eye bolt (14)
15. Gasket (15)



- 1) Before disassembly, remove carbon deposit from nozzle and nozzle holder using a wire brush and wash the outside nozzle holder assembly.

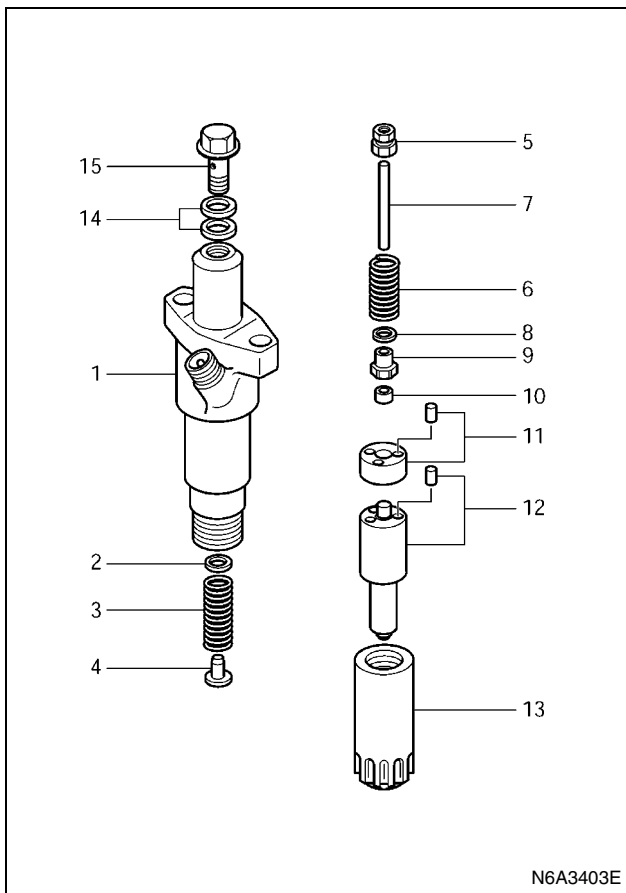
Caution:

Do not touch nozzle holes with the wire brush during cleaning it.

- 2) Disassemble the nozzle holder assembly to numerical order.

Reassembly and Opening Pressure Adjustment (4JB1-TC)

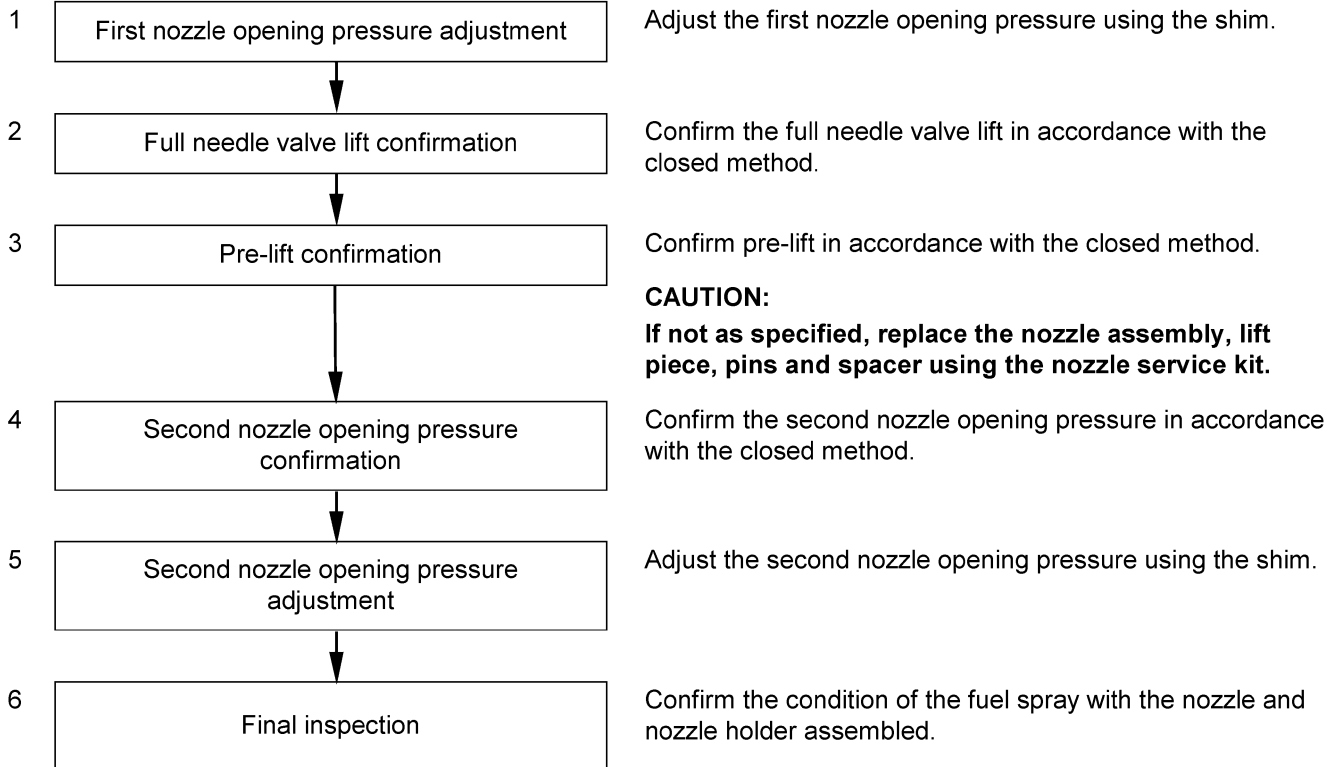
1. Nozzle holder body
2. Shim (First opening pressure adjustment)
3. First spring
4. Spring seat
5. Collar
6. Second spring
7. Push rod
8. Shim (Second opening pressure adjustment)
9. Spring seat
10. Lift piece
11. Spacer & pin
12. Nozzle & pin
13. Retaining nut
14. Gasket
15. Eye bolt



The nozzle holder is adjusted as the components are re-assembled in the sequence above.

As adjustment of the two-spring nozzle holder is made in hundredths of a millimeter, clean the parts thoroughly in light oil to completely remove any dirt or foreign matter.

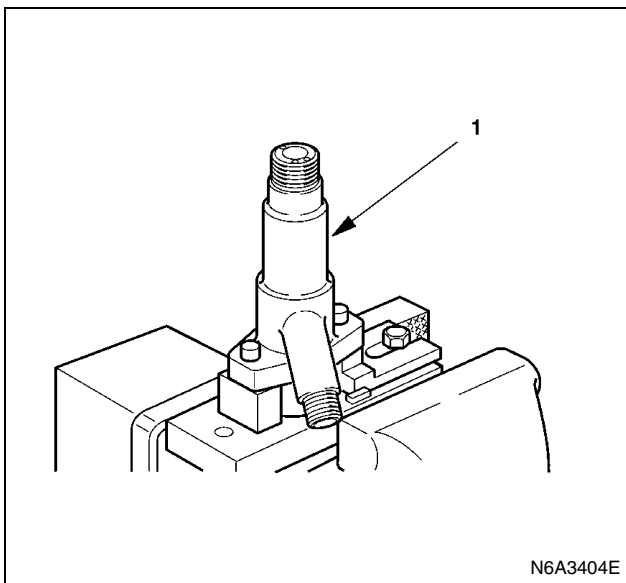
Reassembly and Adjustment Procedure



N6A3692E

First Nozzle Opening Pressure Adjustment

1. Claim the nozzle holder in a vise.

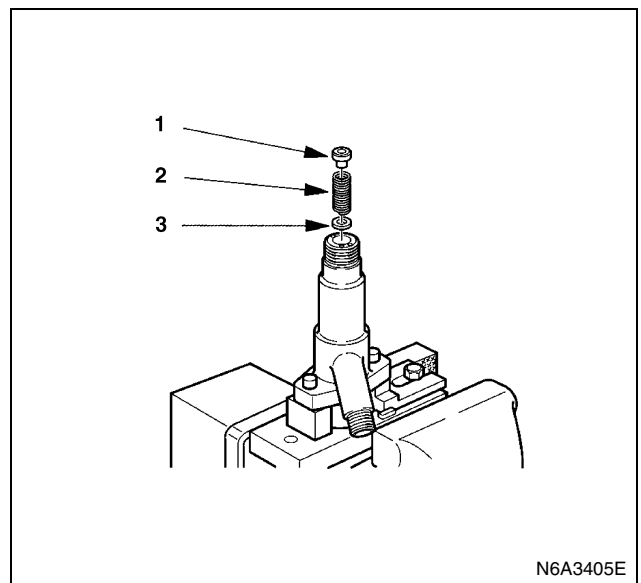


N6A3404E

Legend

1. Nozzle holder body

2. Install the shim, first spring and spring seat in the nozzle holder.

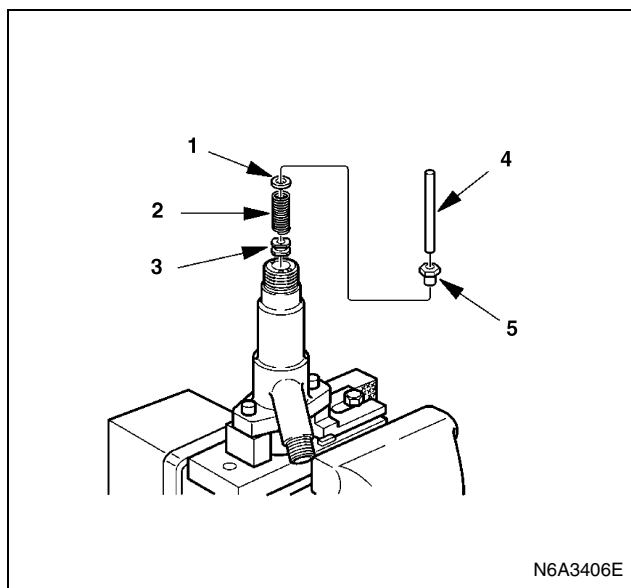


N6A3405E

Legend

1. Spring seat
2. First spring
3. First nozzle opening pressure adjusting shim

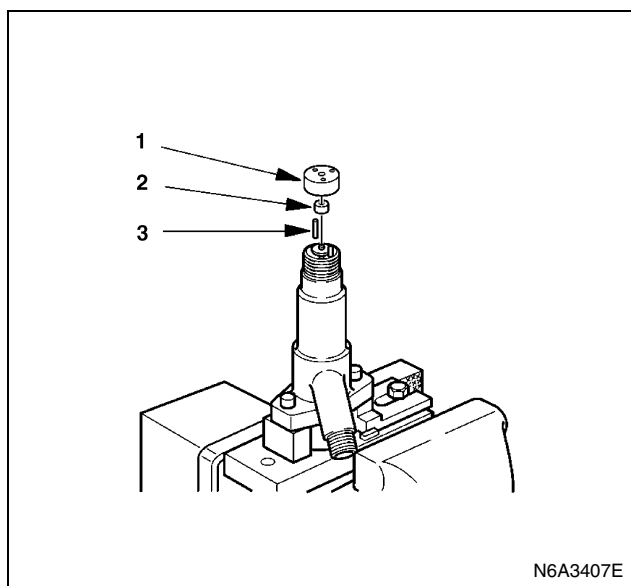
3. Install the collar, second spring, shim, spring seat and push rod in the nozzle holder.



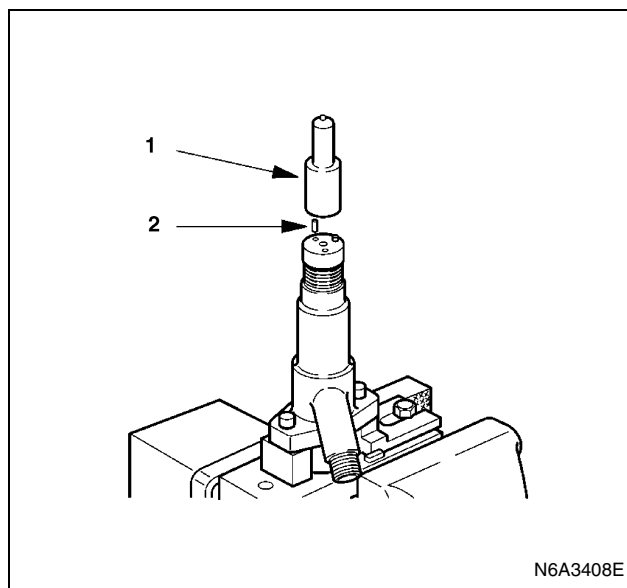
Legend

1. Second nozzle opening pressure adjusting shim
2. Second spring
3. Collar
4. Push rod
5. Spring seat

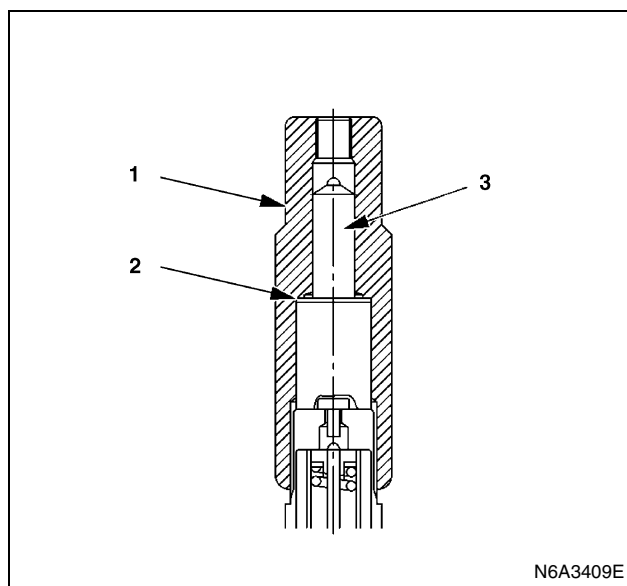
4. Install the pins (3), lift piece (2) and spacer (1) in the nozzle holder.



5. Install the pins (2) in the spacer.
6. Install the nozzle (1) on the spacer.



7. Hand-tighten the adjustment retaining nut together with the gasket to the nozzle holder.
Retaining nut: 5-8677-7140-0
Gasket: 5-8677-7139-0



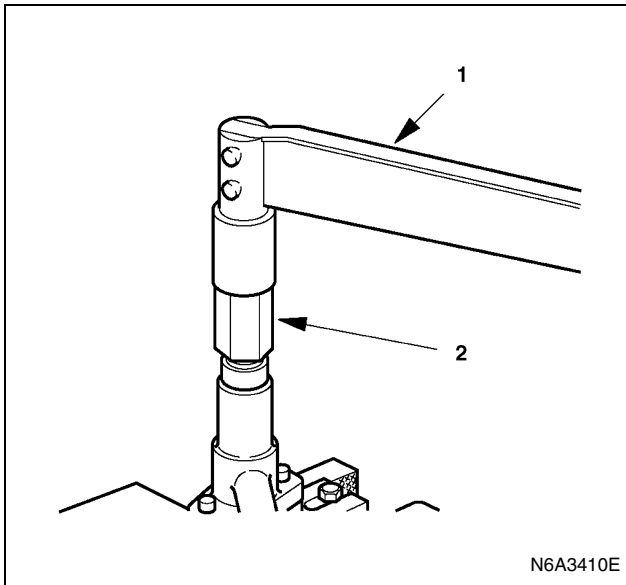
Legend

1. Retaining nut (Special tool)
2. Gasket (Special tool)
3. Nozzle

8. Tighten the adjustment retaining nut to the specified torque.

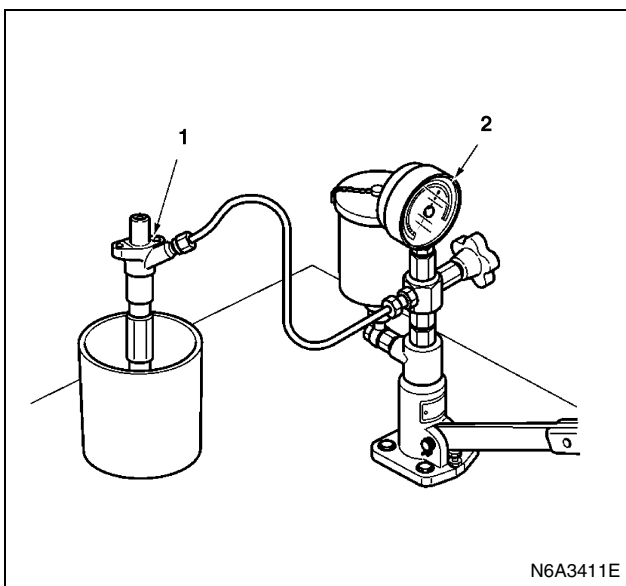
Tighten:

Retaining nut to 29 — 39 N·m (3.0 — 4.0 kg·m)

**Legend**

1. Torque wrench
2. Retaining nut (Special tool)

9. Set the nozzle holder to the nozzle tester.
10. Operate the nozzle tester and measure the first nozzle opening pressure.

**Legend**

1. Nozzle holder
2. Nozzle tester

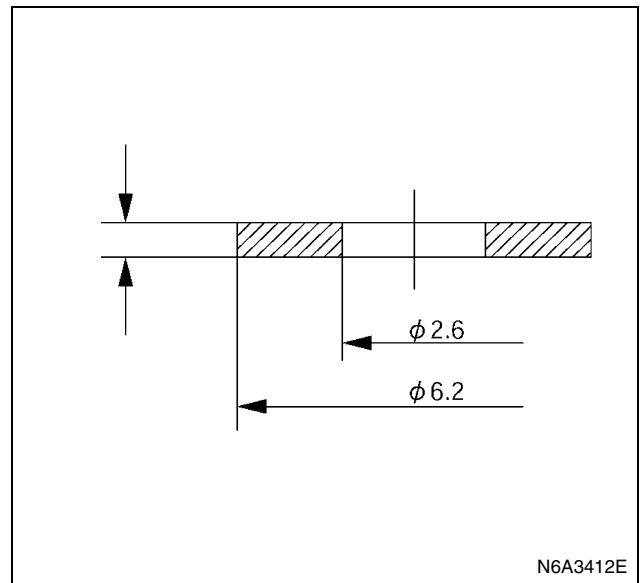
11. If the first nozzle opening pressure is not as specified, disassemble the nozzle holder and replace the shim until the pressure is as specified.

Caution:

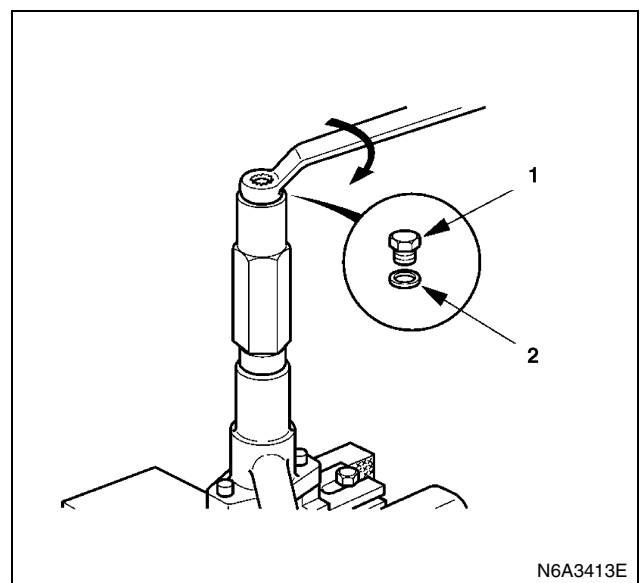
Use a micrometer to measure shim thickness.

- First nozzle opening pressure adjusting shims

Parts No.	Thickness (mm)
1-1534-9042-0	0.40
1-1534-9043-0	0.50
1-1534-9044-0	0.52
1-1534-9045-0	0.54
1-1534-9046-0	0.56
1-1534-9047-0	0.58
1-1534-9048-0	0.60
1-1534-9049-0	0.70

**Full Needle Valve Lift Confirmation**

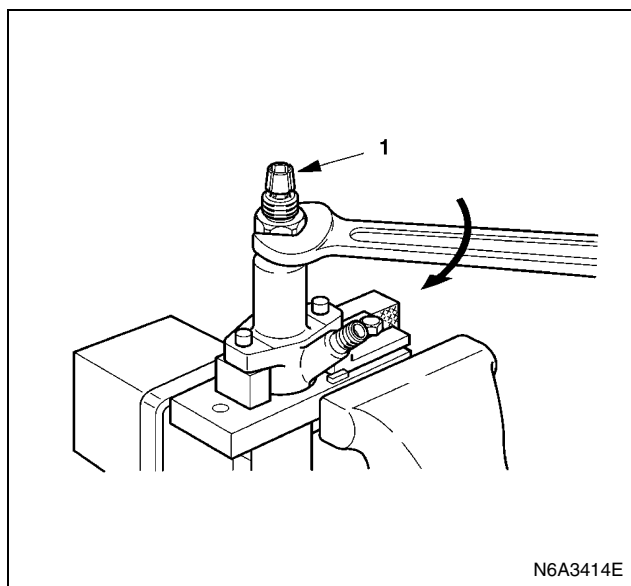
1. Install the gasket (2) and plug (1) on the adjustment retaining nut.
Gasket: 8-9722-7602-0
Plug: 5-8677-7141-0



6C-24 ENGINE FUEL

2. Position the nozzle holder with the nozzle facing down and install the dial gauge holder on the nozzle holder.

Dial gauge holder: 5-8677-7142-0

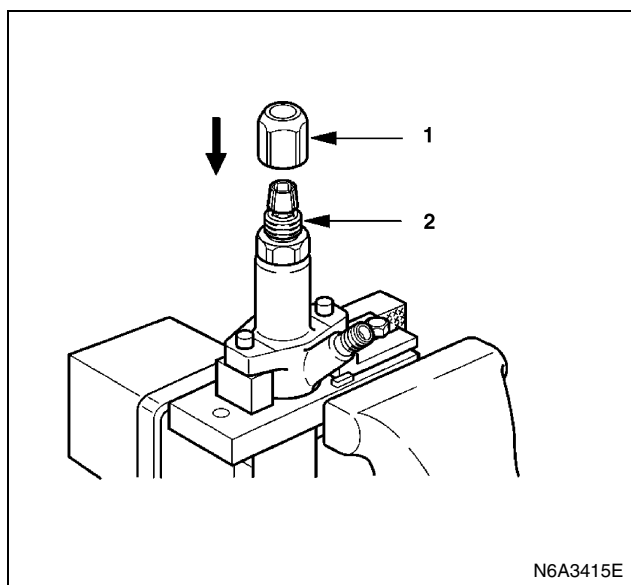


Legend

1. Dial gauge holder (Special tool)

3. Install the nut (1) on the dial gauge holder (2).

Nut: 5-8677-7143-0



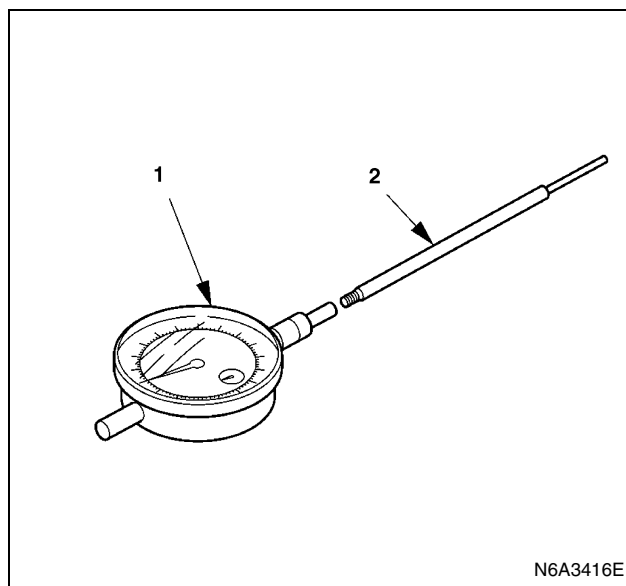
4. Install the pin (2) to the dial gauge (1).

Notice:

The lengths of the pin do not include the threaded portions.

Pin (liter=100 mm): 5-8677-7144-0

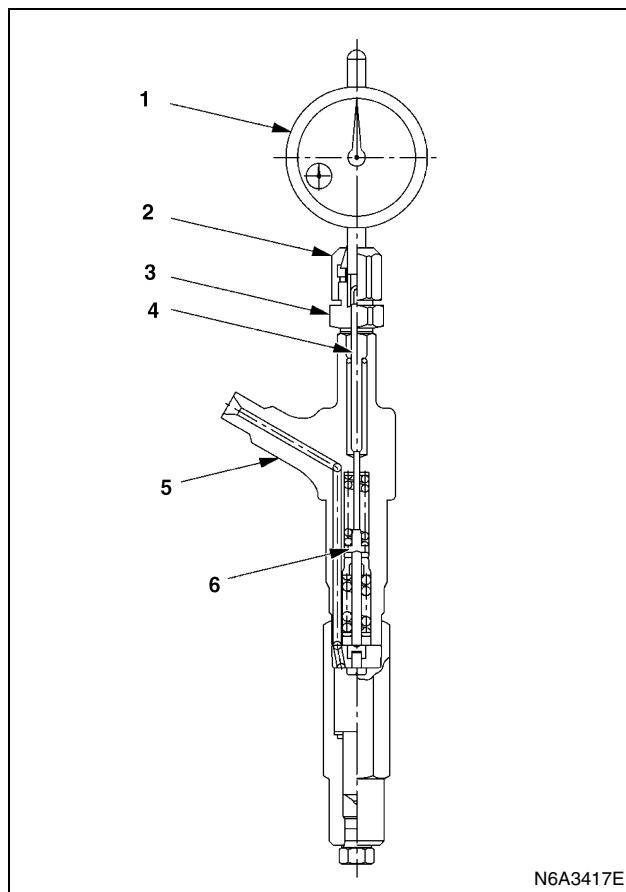
Dial gauge: 1-8531-7015-0



5. Secure the dial gauge to the nozzle holder using the nut so that the pin contacts the tip of the first spring seat.

Caution:

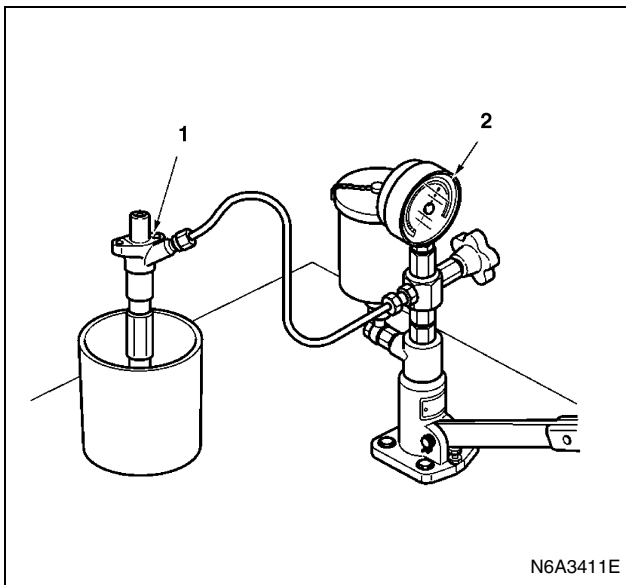
- Secure the dial gauge so that a stroke of 2 mm can be measured.
- Do not over-tighten the nut as the dial gauge shaft may jam. (Confirm from the dial gauge that the shaft moves smoothly.)



Legend

1. Dial gauge
2. Nut
3. Holder
4. Pin
5. Nozzle holder
6. First spring seat

6. Set the nozzle holder (1) to the nozzle tester (2) and put needle to zero on the dial gauge.
7. Operate the nozzle tester (2) to bleed any air from inside the retaining nut and to confirm that no fuel leaks.

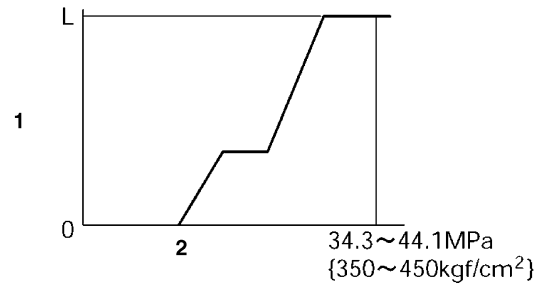


8. Operate the nozzle tester and increase the inline pressure to 34.3 — 44.1 MPa (350 — 450 kg/cm²) so that the nozzle's needle valve moves through its full lift.

Record full lift 'L'. (Read dial gauge)

Notice:

The above operation is used to determine whether the nozzle seat is worn and whether the nozzle assembly is in good condition.



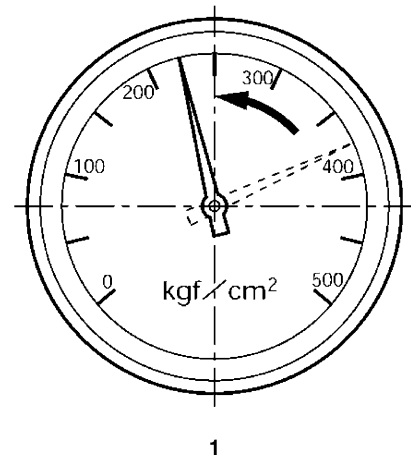
N6A3419E

Legend

- A. Inline pressure
1. Needle valve lift
2. First nozzle opening pressure

Pre-lift Confirmation

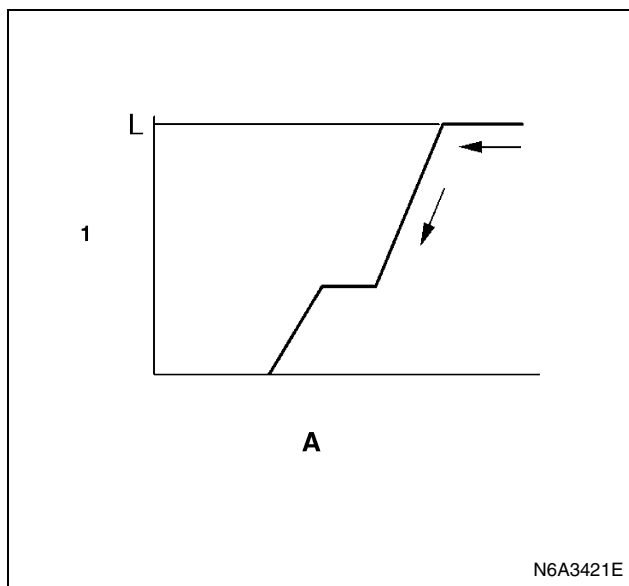
1. With the needle valve at full lift, release the nozzle tester handle.



N6A3420E

Legend

1. Pressure gauge

**Legend**

- A. Inline pressure
- 1. Needle valve lift

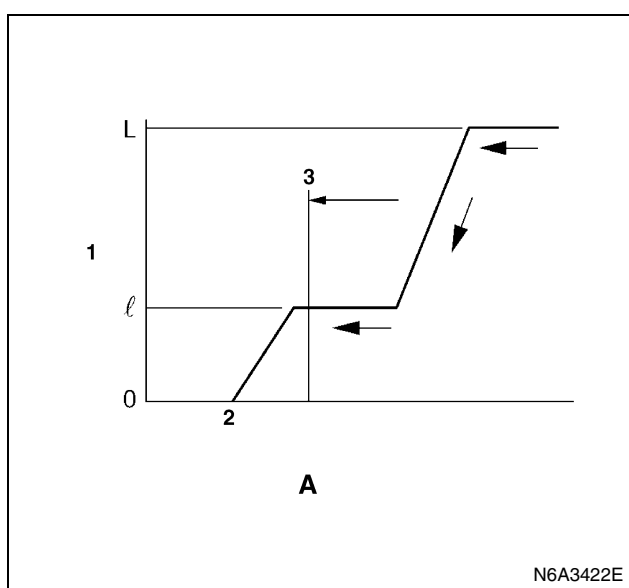
Notice:

The inline pressure will decrease and needle valve lift (as indicated on the dial gauge) will also decrease a little.

2. Read the needle valve lift 'liter' from the dial gauge indication (once the needle valve has descended when the second spring has stopped operating). Refer to the pre-lift measuring point for 'liter'.

Pre-Lift Measuring Point:

Read the dial gauge at first nozzle opening pressure + approx 1 MPa (10 kg/cm²).

**Legend**

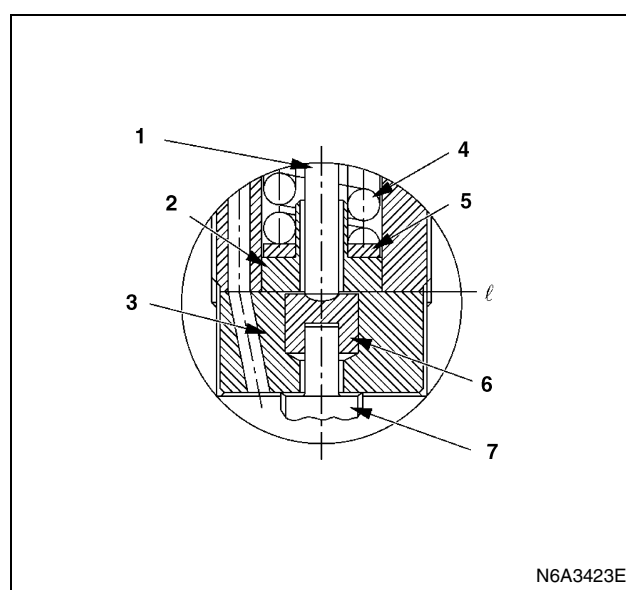
- A. Inline pressure
- 1. Needle valve lift
- 2. First nozzle opening pressure
- 3. Measuring point of pre-lift

Notice:

This point can be found while the pressure is decreasing.

3. Confirm that pre-lift 'liter' is as specified.

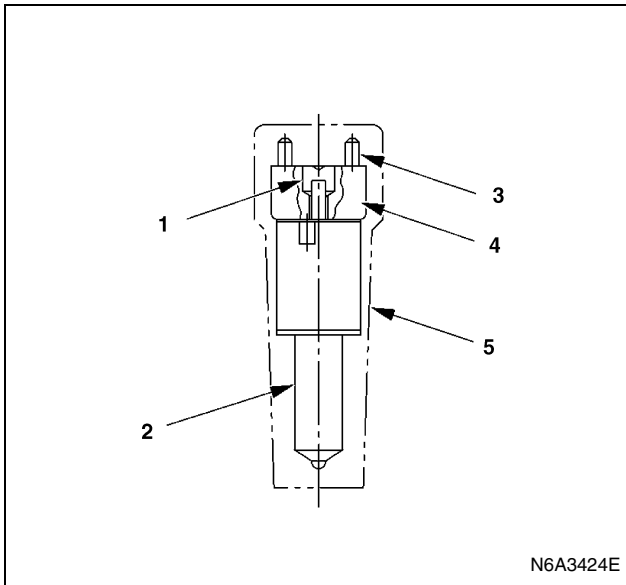
Pre-lift	mm (in)
	0.04 (0.002)

**Legend**

- 1. Push rod
- 2. Spring seat
- 3. Spacer
- 4. Second spring
- 5. Adjusting shim
- 6. Lift piece
- 7. Needle valve

4. If pre-lift is not specified, replace the pins, lift piece, spacer and nozzle assembly with the service kit.

Service kit:
8-9720-3470-1

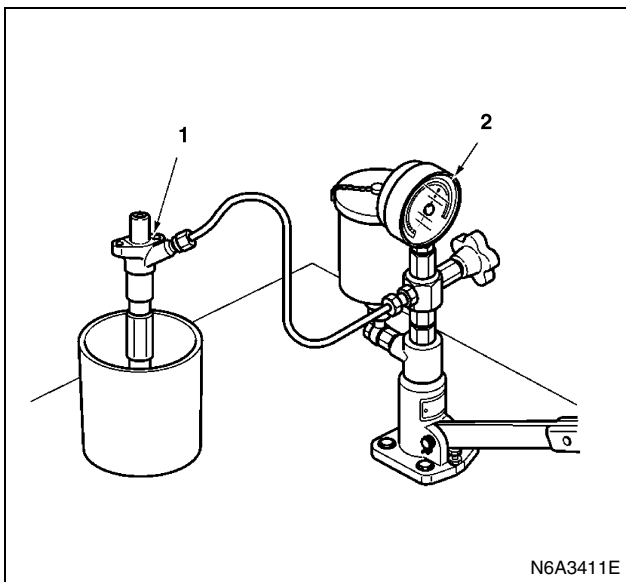


Legend

1. Lift piece
2. Nozzle assembly
3. Pin
4. Spacer
5. Capsule

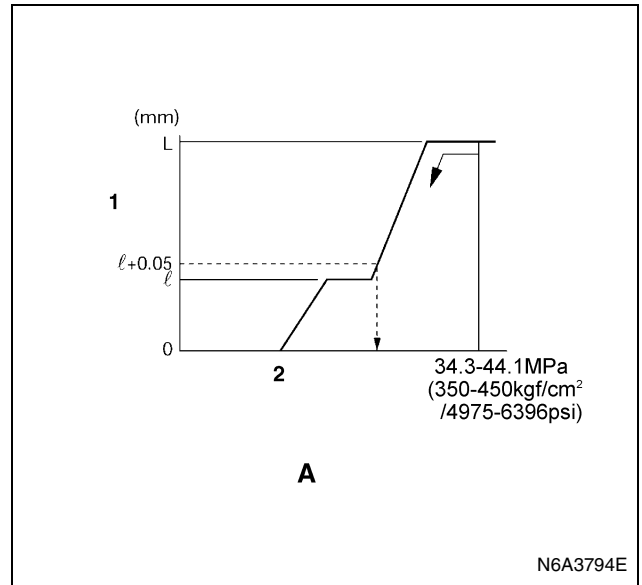
Second Nozzle Opening Pressure Confirmation

1. After pre-lift confirmation, operate the nozzle tester to increase inline pressure to 34.3 — 44.1 MPa (350 — 450 kg/cm²) so that the nozzle's needle valve moves through its full lift.



Legend

1. Nozzle holder
 2. Nozzle tester
2. Release the nozzle tester handle so that inline pressure decreases.



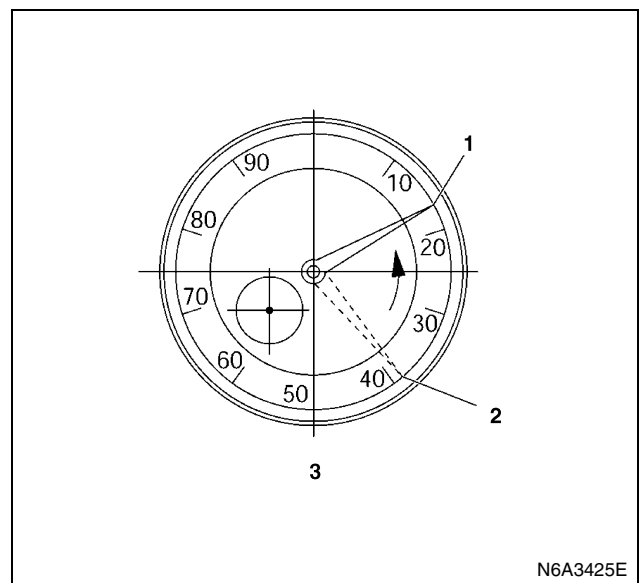
Legend

- A. Inline pressure
1. Needle
2. Second nozzle opening pressure

Notice:

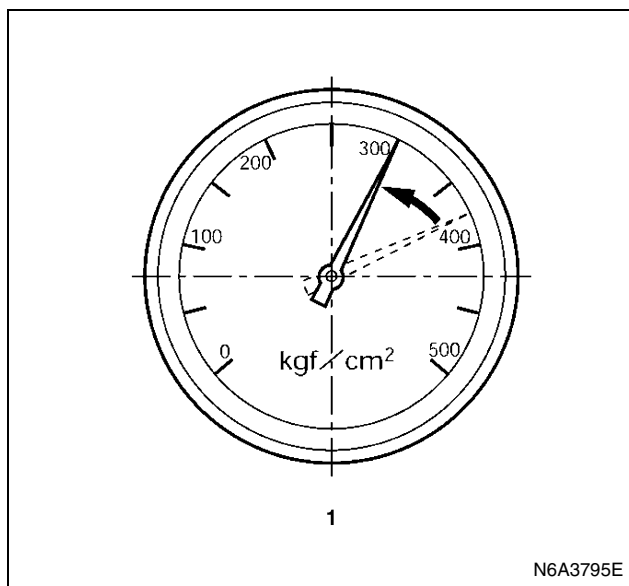
The inline pressure will decrease and needle valve lift (as indicated on the dial gauge) will also decrease a little.

3. Then, read the pressure gauge indication (second nozzle opening pressure) the instant that the dial gauge indicates the specified needle valve lift (usually pre-lift liter + 0.05 mm).



Legend

1. When needle valve lift is $L + 0.05$ mm
2. Full needle valve lift
3. Dial gauge

**Legend**

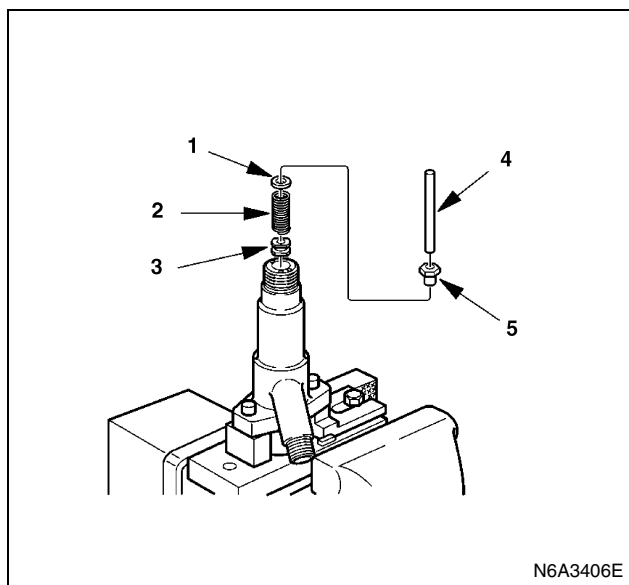
1. Pressure gauge

Second Nozzle Opening Pressure Adjustment

If the second nozzle opening pressure is not as specified, disassemble the nozzle from the nozzle holder and replace the shim until the pressure is as specified.

Caution:

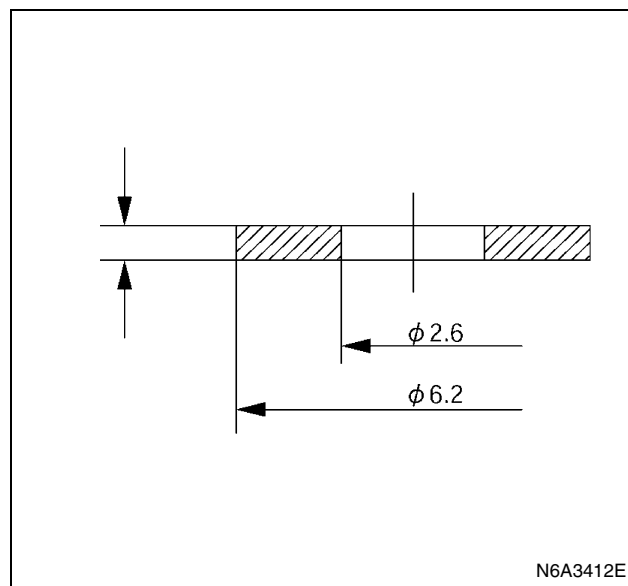
- Because the second opening pressure changes when the first opening pressure changes, the second opening pressure must be adjusted when the first opening pressure changes.
- Use a micrometer to measure shim thickness.

**Legend**

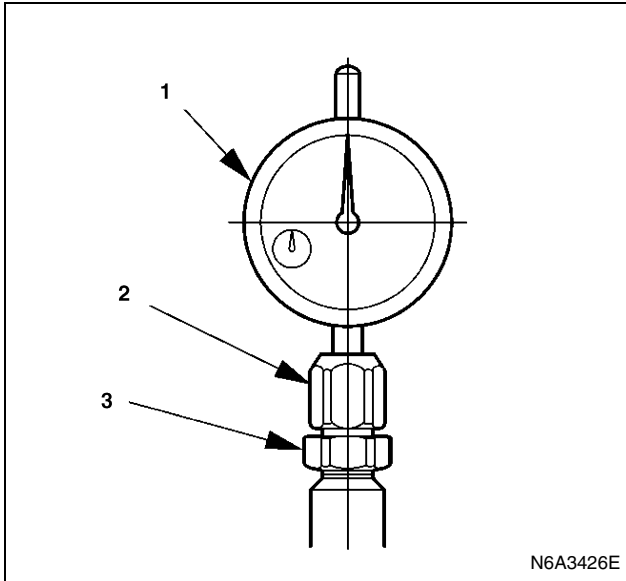
1. Second nozzle opening pressure adjusting shim
2. Second spring
3. Collar
4. Push rod
5. Spring seat

- Second nozzle opening pressure adjusting shims

Part No.	Thickness (mm)
8-9711-6034-0	0.40
8-9711-6035-0	0.50
8-9711-6037-0	0.52
8-9711-6039-0	0.54
8-9711-6041-0	0.56
8-9711-6043-0	0.58
8-9711-6044-0	0.59

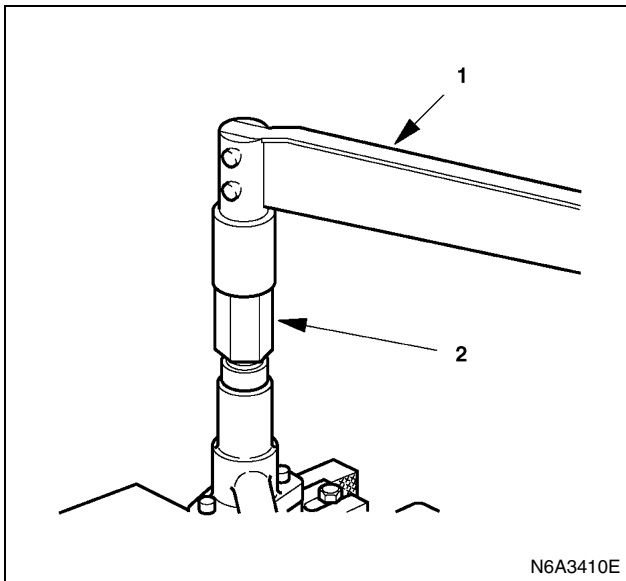
**Final Inspection**

1. Remove the dial gauge (1), nut (2) and dial gauge holder (3).



N6A3426E

2. Remove the adjustment retaining nut and gasket.
3. Install the original retaining nut, confirm that the pins are inserted fully into the nozzle, and then hand-tighten the retaining nut. Then, tighten the original retaining nut to the specified torque.
Torque: 59 — 79 N·m (6.0 — 8.0 kg·m/43.5 — 58.2 lb·ft)

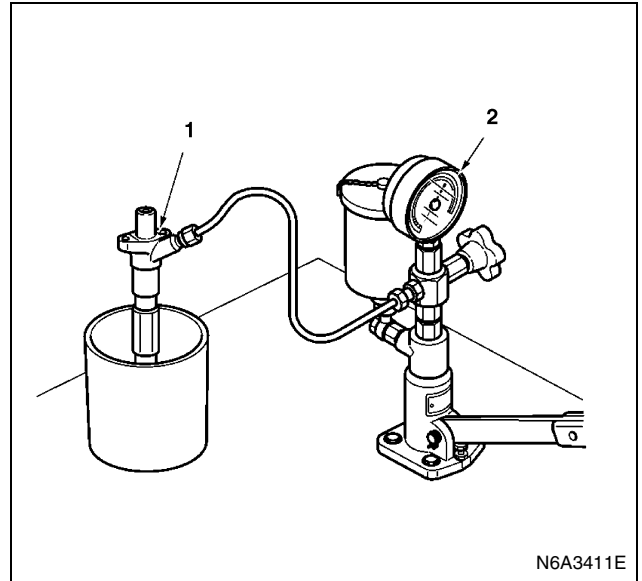


N6A3410E

Legend

1. Torque wrench
2. Retaining nut (Special tool)

4. Set the nozzle holder to the nozzle tester and check first nozzle opening pressure, spray condition, seat oil tightness and each part for oil leaks.



N6A3411E

Legend

1. Nozzle holder
2. Nozzle tester

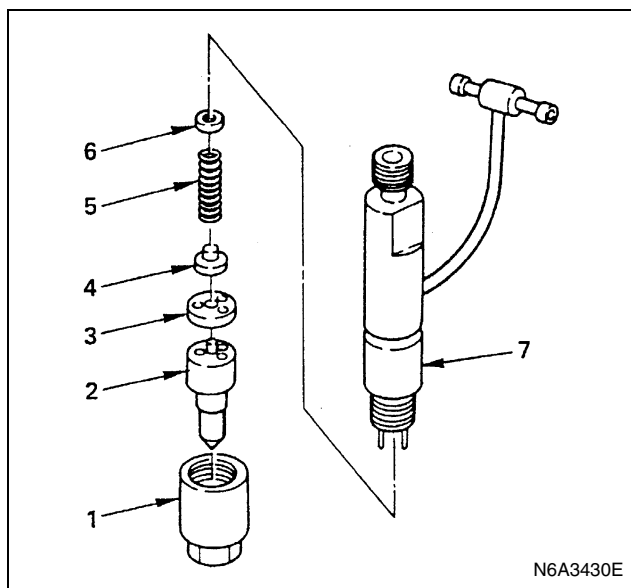
5. When replacing the nozzle, replace the nozzle, lift piece, pins and spacer as a set with the nozzle service kit.

Caution:

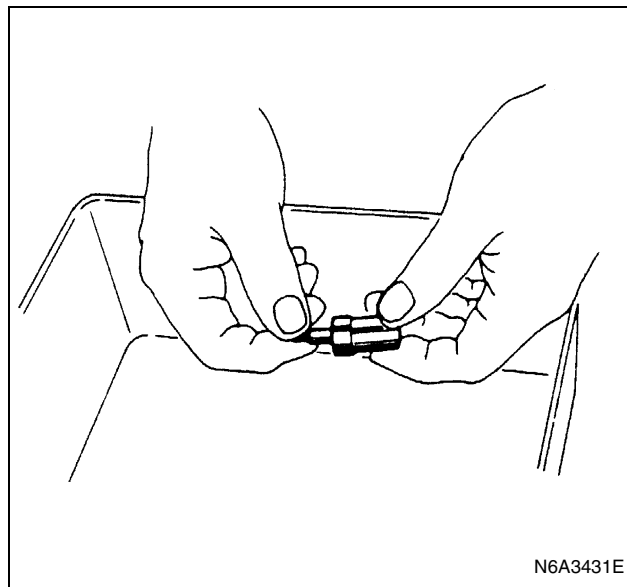
Pre-lift will not be as specified if only the nozzle is replaced.

Disassembly (4JB1 Engine)

1. Retaining Nut (1)
2. Injection Nozzle (2)
 - 1) Remove the nozzle assemblies from the nozzle holders.
Tag the nozzle assemblies and the nozzle holders to ensure that they are reinstalled in their original positions.
The nozzle assembly and nozzle holder combinations must not be interchanged.
 - 2) Immerse the injection nozzle in a tool tray filled with clean diesel oil to protect them from dust.
3. Spacer (3)
4. Spring Seat (4)
5. Spring (5)
6. Adjusting Shim (6)
7. Nozzle Holder (7)



N6A3430E



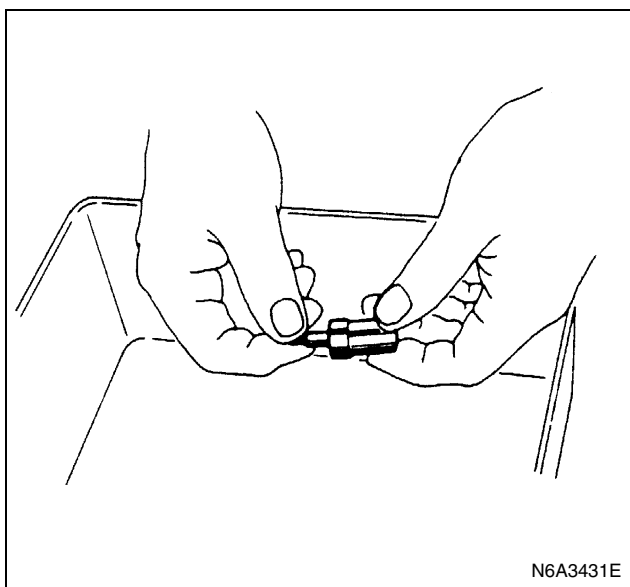
N6A3431E

Nozzle Lapping Procedure

1. Lap the nozzle needle (1) and the nozzle body (2) by applying a compound of oxidized chrome and animal oil (3).

Notice:

Do not apply an excessive amount of the oxidized chrome and animal oil compound to the injection needle valve seat area. Applying too much compound will cause the injection nozzle needle and the injection nozzle body cavity to wear excessively.



N6A3431E

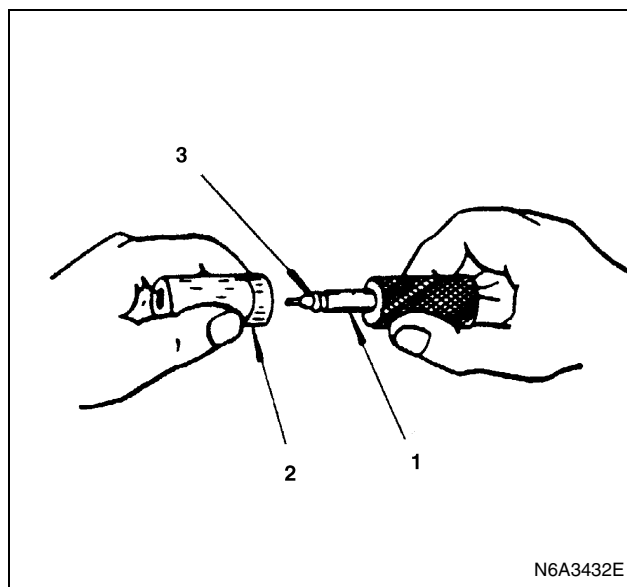
Inspection and Repair (4JB1 Engine)

Make the necessary adjustments, repairs, and part replacements if excessive wear or damage is discovered during inspection.

Inspection Nozzle Needle Inspection

1. Remove the needle from the nozzle body.
2. Carefully wash the nozzle needle and the nozzle body in clean diesel fuel.
3. Check that the nozzle needle moves smoothly inside the injection nozzle body.

If the nozzle needle does not move smoothly, it must be repaired (See "Nozzle Lapping Procedure").



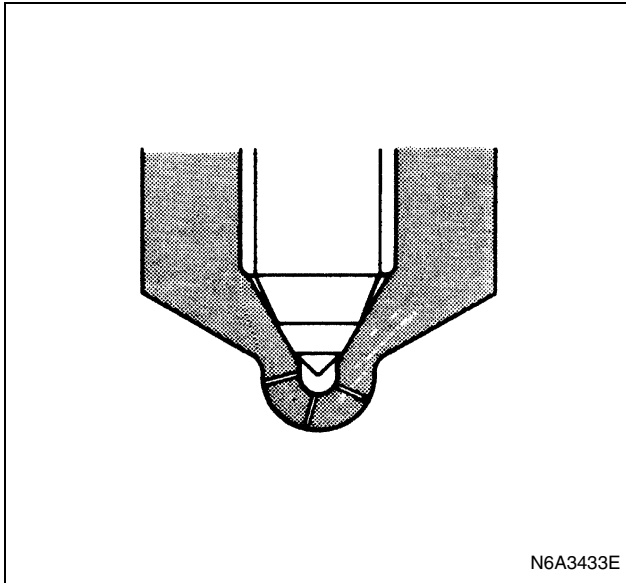
N6A3432E

2. Carefully wash the needle valve and the nozzle body in clean diesel fuel after lapping.

Nozzle Body and Needle Valve Inspection

Check the nozzle body and the needle valve for damage and deformation.

The nozzle and body assembly must be replaced if either of these two conditions are discovered during inspection.

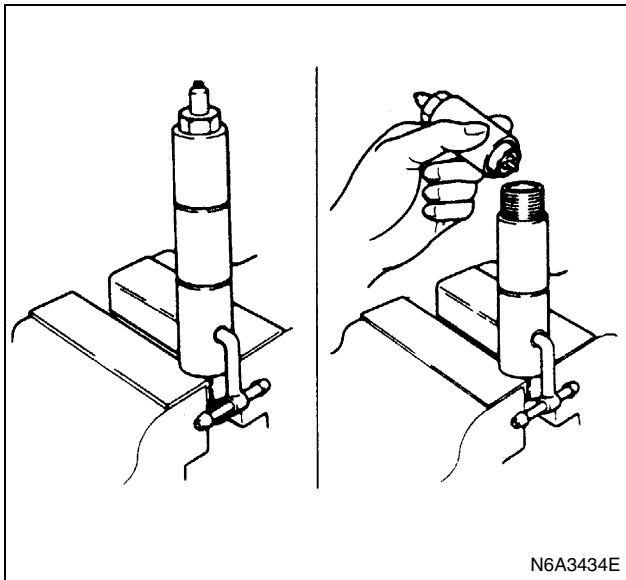


Reassembly

1. Nozzle Holder
2. Adjusting Shim
3. Spring
4. Spring Seat
5. Spacer
6. Injection Nozzle
7. Retaining Nut

Tighten:

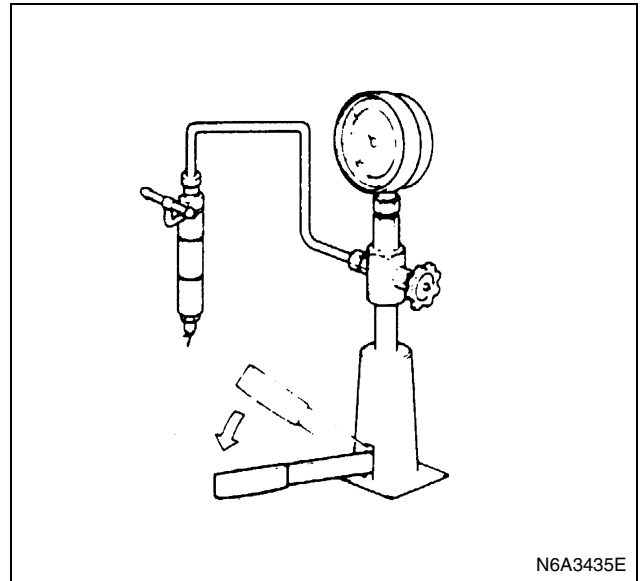
Retaining nut to 34 N·m (3.5 kg·m/25 lb·ft)



Injection Nozzle Adjustment

1. Attach the injection nozzle holder to the injection nozzle tester.
2. Apply pressure to the nozzle tester to check that the injection nozzle opens at the specified pressure.

kPa (kg/cm ² /psi)
18,142 (185/2630)



If the injection nozzle does not open at the specified pressure, install or remove the appropriate number of adjusting shims to adjust it.

Adjusting Shim Availability		mm (in)
Range		0.50 — 1.50 (0.02 — 0.06)
Increment		0.025 (0.001)
Total number of Shims		40

Removing or installing one shim will increase or decrease the nozzle opening pressure approximately 369.46 kPa (3.77 kg/cm² /53.6 psi).

WARNING:

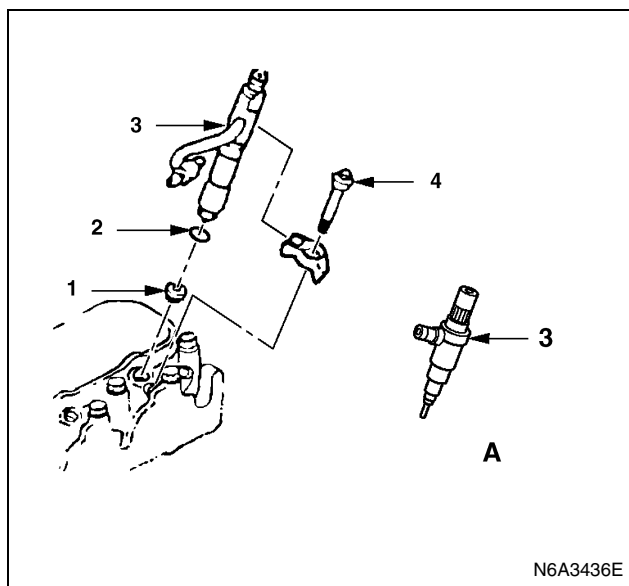
TEST FLUID FROM THE INJECTION NOZZLE WILL SPRAY OUT UNDER GREAT PRESSURE. IT CAN EASILY PUNCTURE A PERSON'S SKIN. KEEP YOUR HANDS AWAY FROM THE INJECTION NOZZLE TESTER AT ALL THE TIMES.

Installation (4JB1/4JH1-TC Engine)

1. Injection Nozzle
 - 1) Install the injection nozzle gasket (1) and the O-ring (2) to the injection nozzle holder (3). Be sure that the O-ring fits snugly in the injection nozzle groove.
 - 2) Apply engine oil to the cylinder head nozzle holder hole.
 - 3) Install the nozzle holder together with the nozzle holder bracket (4) to the cylinder head.

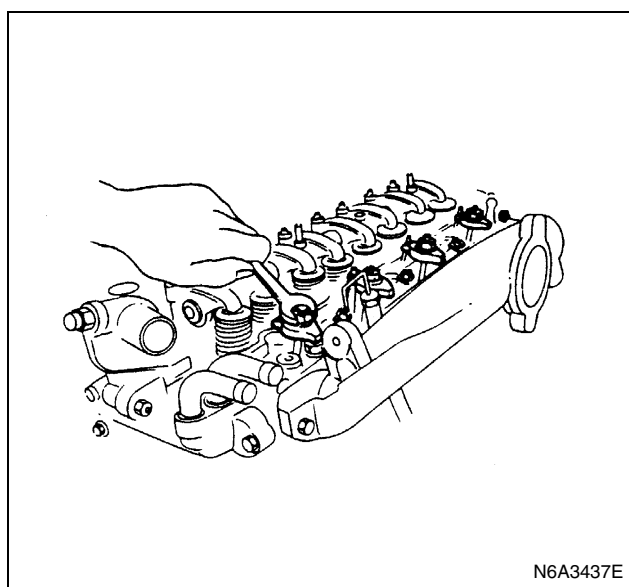
Tighten:

37 N·m (3.8 kg·m/27 lb·ft)



Legend

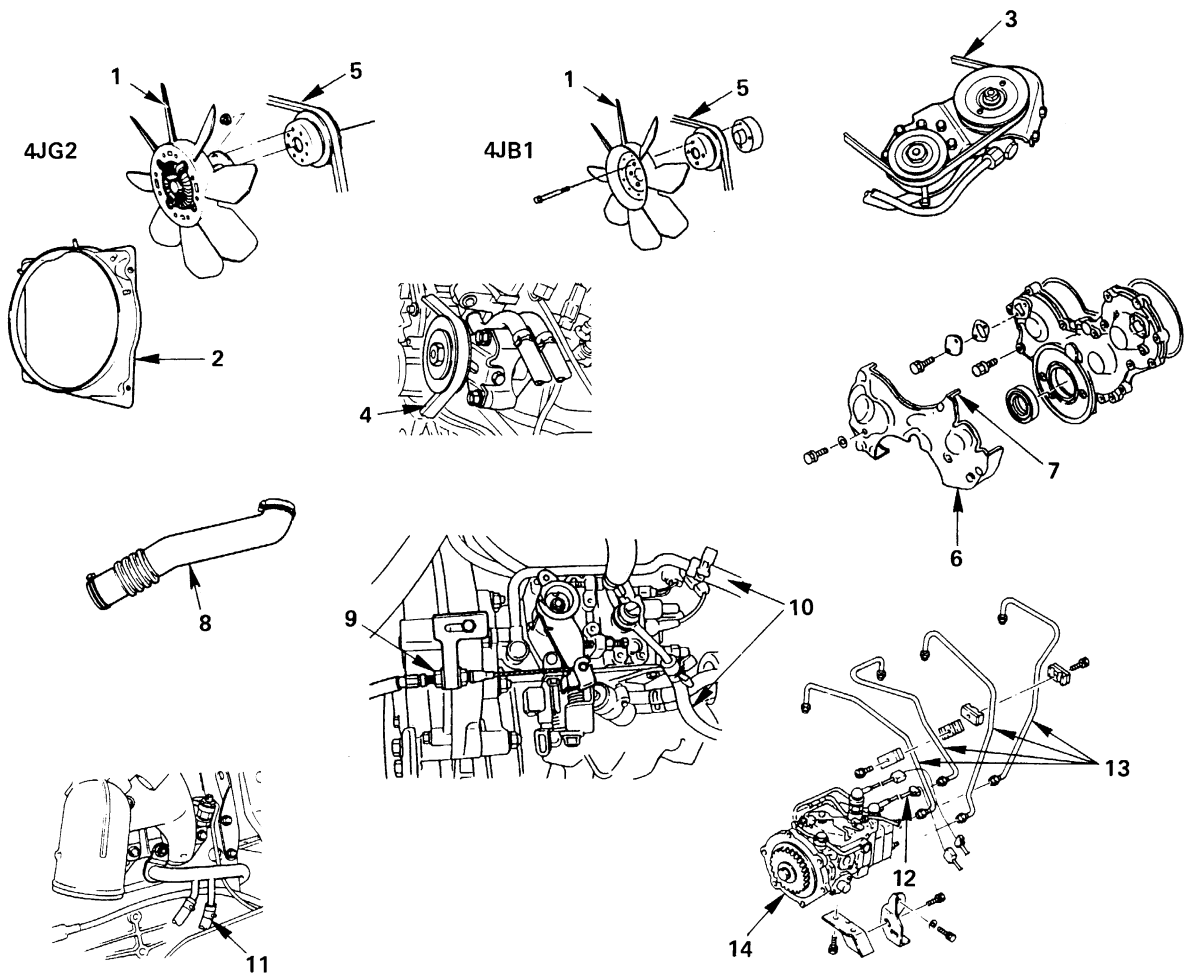
A. 4JH1-TC



- 2. Leak Off Hose
- 3. Injection Pipe

INJECTION PUMP ASSEMBLY (4JB1/4JG2, Gear Drive Type)

Component
4JB1/4JG2



N6A3438E

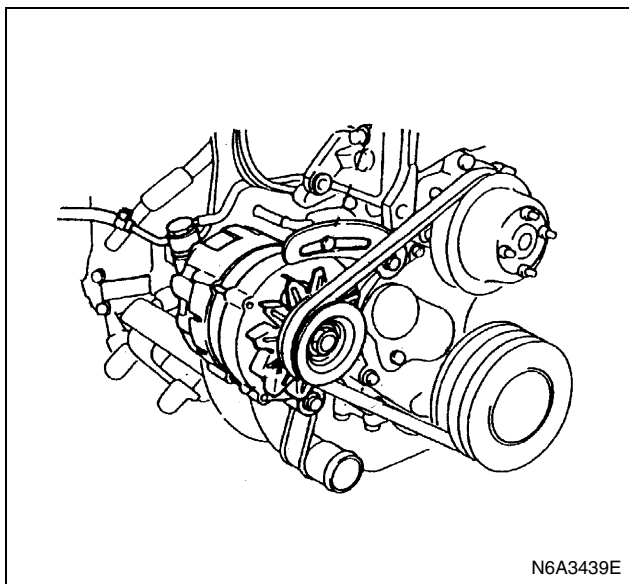
Legend

- | | |
|-----------------------------------|---------------------------------|
| 1. Cooling fan assembly | 8. Air intake duct |
| 2. Fan Shroud | 9. Injection pump control cable |
| 3. Power steering pump drive belt | 10. Fuel hose |
| 4. A/C compressor drive belt | 11. CSD water hose |
| 5. AC generator drive belt | 12. Injection pump harness |
| 6. Noise shield cover | 13. Injection pipe |
| 7. Noise cover spacer | 14. Injection pump assembly |

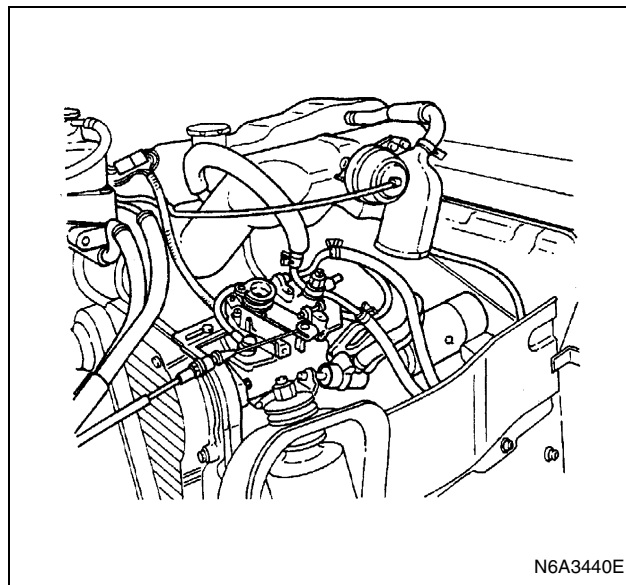
Removal

Preparation:

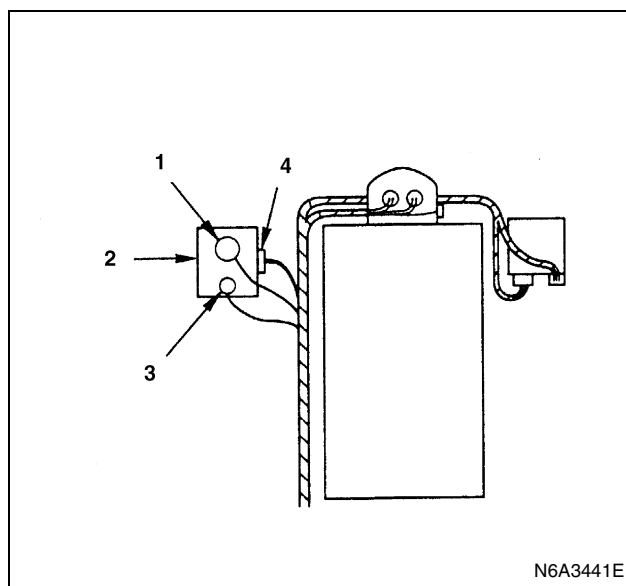
- Disconnect battery ground cable.
 - Drain coolant.
1. Cooling Fan Assembly
 - Remove clamp nut, and remove cooling fan assembly, distant pipe, and fan pulley.
 2. Fan Shroud
 3. Power Steering Pump Drive Belt (P/S Model)
 - Loosen power steering pump mounting bolt and adjust bolt, and remove the drive belt.
 4. A/C Compressor Drive Belt (A/C Model)
 - Loosen A/C compressor idler pulley lock nut, adjust bolt and remove the drive belt.
 5. AC Generator Drive Belt
 - Loosen AC generator mounting bolt (under side) and adjust plate lock bolt, and remove the drive belt.



6. Noise Shield Cover
7. Noise Cover Spacer
8. Air Intake Duct
9. Injection Pump Control Cable
 - Remove the control cable bracket bolt and remove the control lever side.
10. Fuel Hose
 - Disconnect the fuel feed hose and fuel return hose.
11. CSD (Cold Starting Device) Water Hose
 - Disconnect the water hose from injection pump side.



12. Injection Pump Harness
 - Remove the tachometer sensor (with tachometer), CSD solenoid, fuel cut solenoid.



Legend

1. CSD solenoid
2. Injection pump
3. Fuel cut solenoid
4. Tachometer sensor

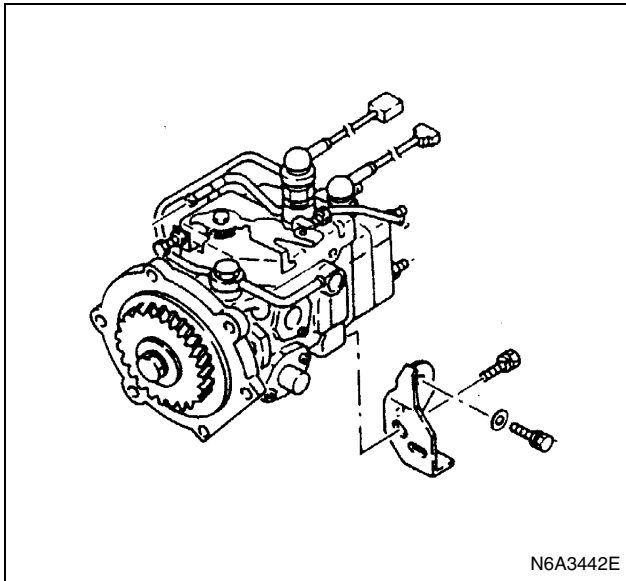
13. Injection Pipe
 - Release pipe clip.
 - Remove the flare nut on the pump side.
 - Remove the flare nut on the injection nozzle side, and remove the injection pipe.

Caution:

- Be sure to plug the injection nozzle holder and delivery holder to prevent the entry of foreign matter.

14. Injection Pump Assembly
 - Remove pump mounting nut.

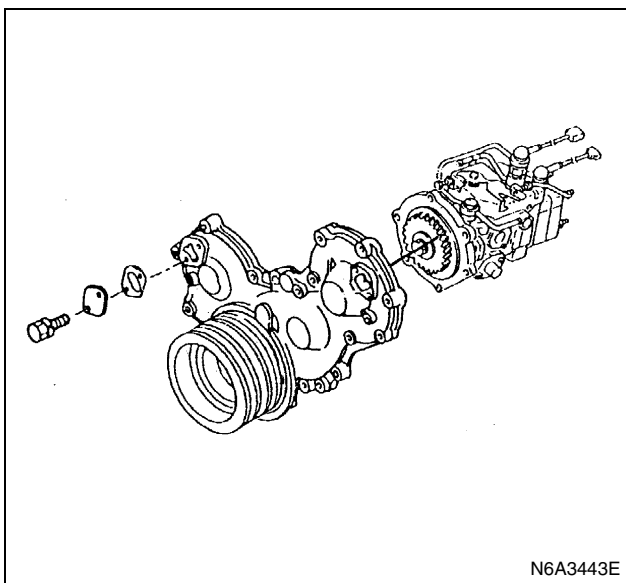
- Loosen injection pump rear bracket adjuster lock bolt.
- Remove the mounting bolt on the engine side, and pull out the pump from the engine.

**Notice:**

Plug the injection pump delivery holder parts with the shipping caps (or the equivalent) to prevent the entry of foreign materials.

Installation

1. Injection Pump Assembly
 - 1) Timing gear case a camshaft timing gear side c injection pump timing gear side check hold cover.



- 2) Turn the crankshaft clockwise to see the TDC mark of the crank pulley to the pointer, and then bring the No. 1 cylinder to the TDC on the compression stroke.

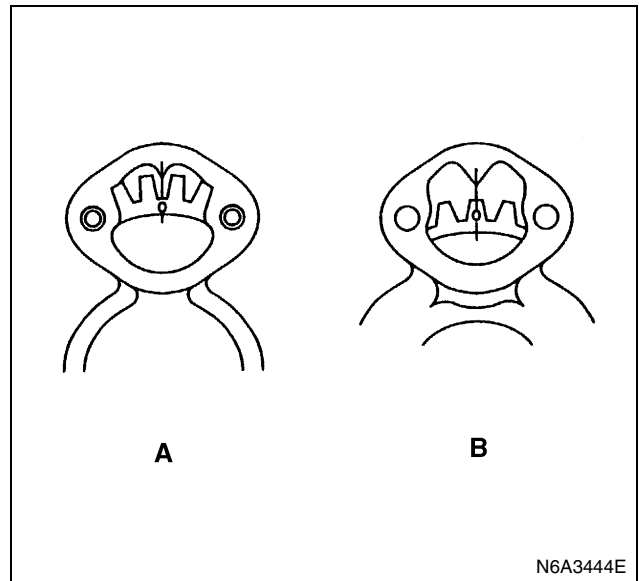
- 3) Look in through the check hole on the crankshaft timing gear side and check to see if the "O" mark on the timing gear is in line with the pointer of the check hole.

- 4) In the condition above with the injection pump gear mark "O" set to the pointer of the check hole, install the injection pump assembly.

- Install the injection pump fixing bolts and tighten them to the specified torque.

Tighten:

Pump Bolts to 15 N·m (1.5 kg·m/11 lb·ft)

**Legend**

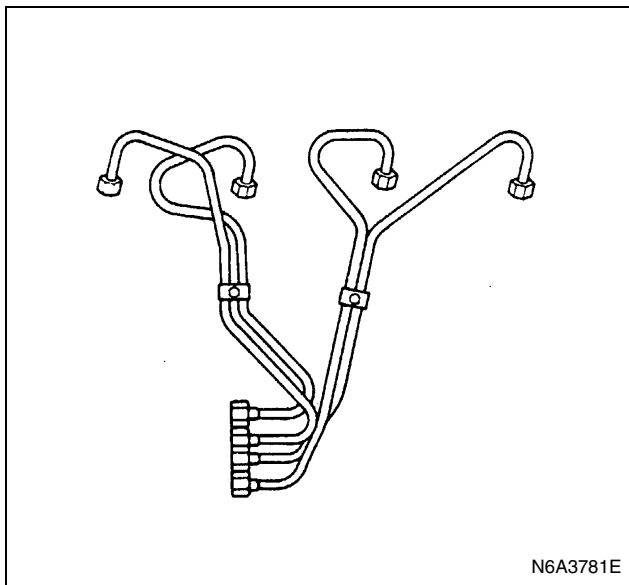
- A. Camshaft gear
- B. Injection pump gear

2. Injection Pipe

- Connect the pump side and nozzle side of the pipe, and tighten securely.
- Install clip where it was.

Tighten:

Sleeve Nut to 29 N·m (3.0 kg·m/22 lb·ft)

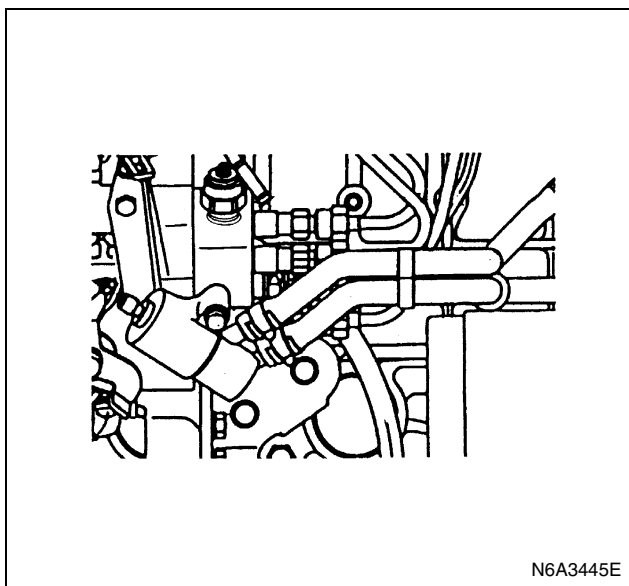


3. Injection Pump Harness

- Mount engine harness and connect it to switches.

4. CSD Water Hose

- Connect the water hose and tighten clip securely.

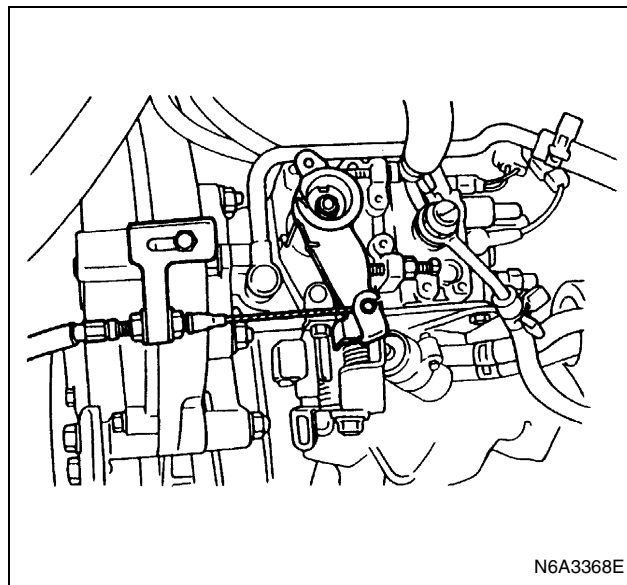


5. Fuel Hose

- Connect the fuel feed hose and fuel return hose.
- Connect the leak off hose.

6. Injection Pump Control Cable

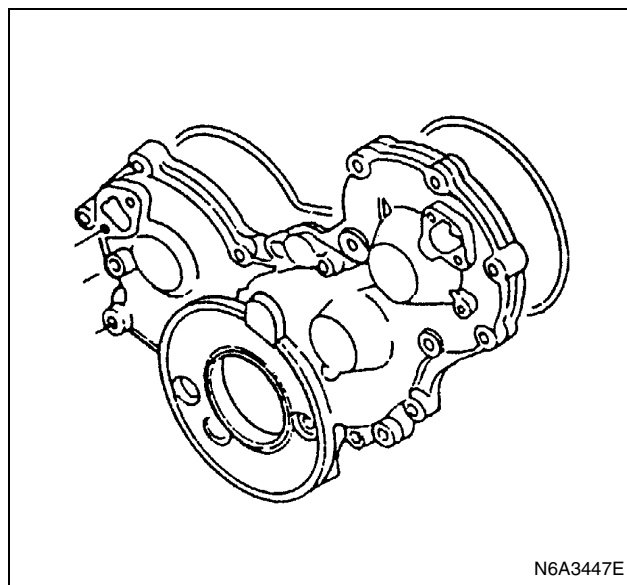
- 1) Install the control wire to the engine control lever.
- 2) Hold the accelerator lever in the fully closed position and stretch the control cable in the direction indicated by the arrow to remove any slack.
- 3) Tighten the accelerator cable bracket bolt.



7. Air Intake Duct

8. Noise Cover Spacer

9. Noise Shield Cover

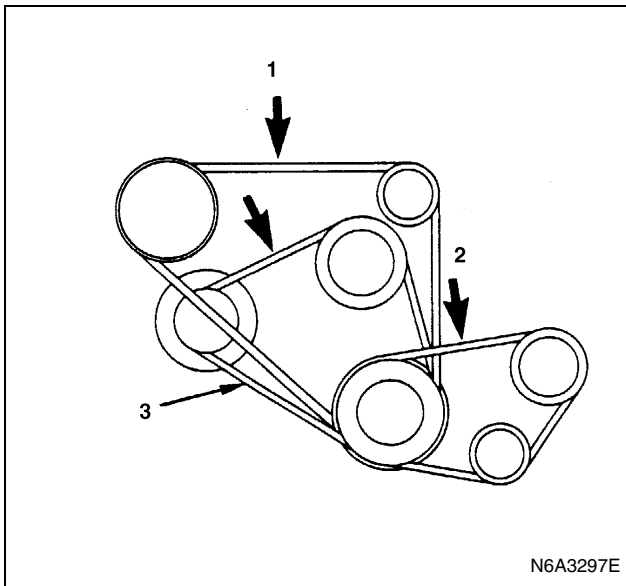


10. AC Generator Drive Belt

- Install AC generator drive belt and adjust belt tension.
- Depress the drive belt mid-portion with a 98 N (10 kg/22 lb) force.

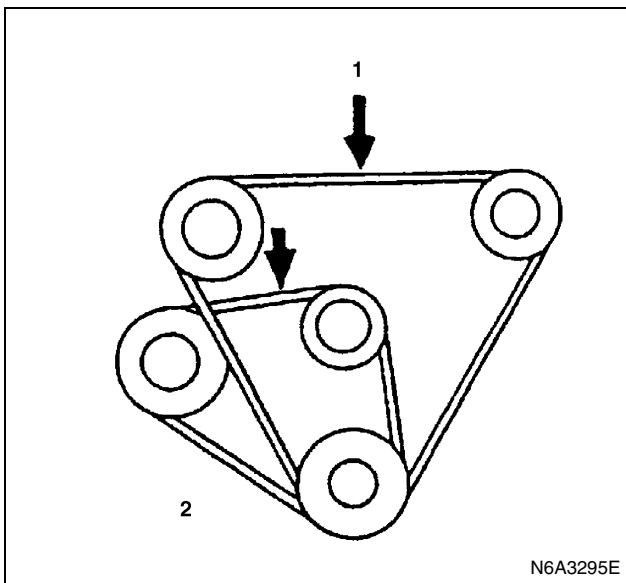
Drive Belt Deflection	mm (in)
8 (0.31) — 12 (0.47)	

4JG2

**Legend**

1. A/C compressor drive belt
2. P/S oil pump drive belt
3. AC generator fan pulley drive belt

4JB1

**Legend**

1. A/C compressor drive belt & P/S pump drive belt
2. AC generator & fan pulley drive belt

- Install fixing bolt and tighten bolts to the specified torque.

Tighten:

- Generator Fixing Bolt to 40 N·m (4.1 kg·m/30 lb·ft)
 - Adjust Plate Fixing Bolt to 19 N·m (1.9 kg·m/14 lb·ft)
11. A/C Compressor Drive Belt (A/C Model)

- Install A/C compressor drive belt and adjust belt tension.
- Depress the drive belt mid-portion with a 98N (10 kg/22 lb) force.

Drive Belt Deflection	mm (in)
8 (0.31) — 12 (0.47)	

- Tighten the idler lock nut to the specified torque.

Tighten:

27 N·m (2.8 kg·m/20 lb·ft)

12. Power Steering Pump Drive Belt (P/S Model)

- Install P/S pump drive belt and adjust belt tension.
- Depress the drive belt mid-portion with a 98 N (10 kg/ 22 lb) force.

Drive Belt Deflection	mm (in)
8 (0.31) — 12 (0.47)	

- Tighten the idler lock nut to the specified torque.

Tighten:

27 N·m (2.8 kg·m/20 lb·ft)

13. Fan Shroud

- Install the fan shroud and reservoir tank hose.

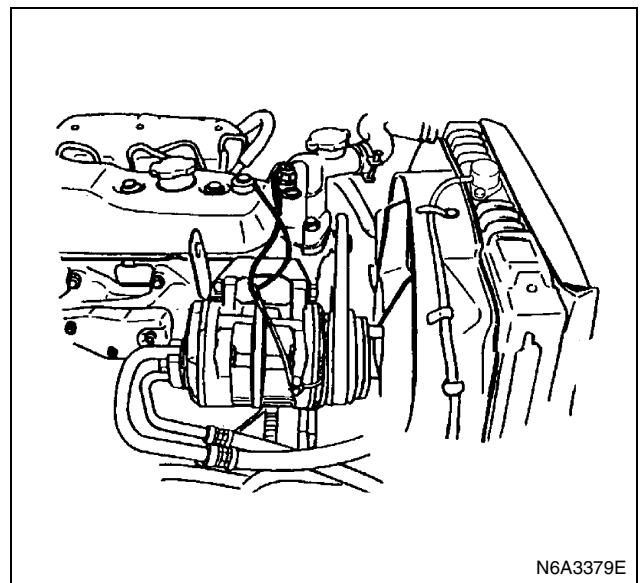
14. Cooling Fan Assembly

- Mount fan pulley, distance piece, and cooling fan assembly (in this order) on the water pump, and tighten to the specified torque.

Tighten:

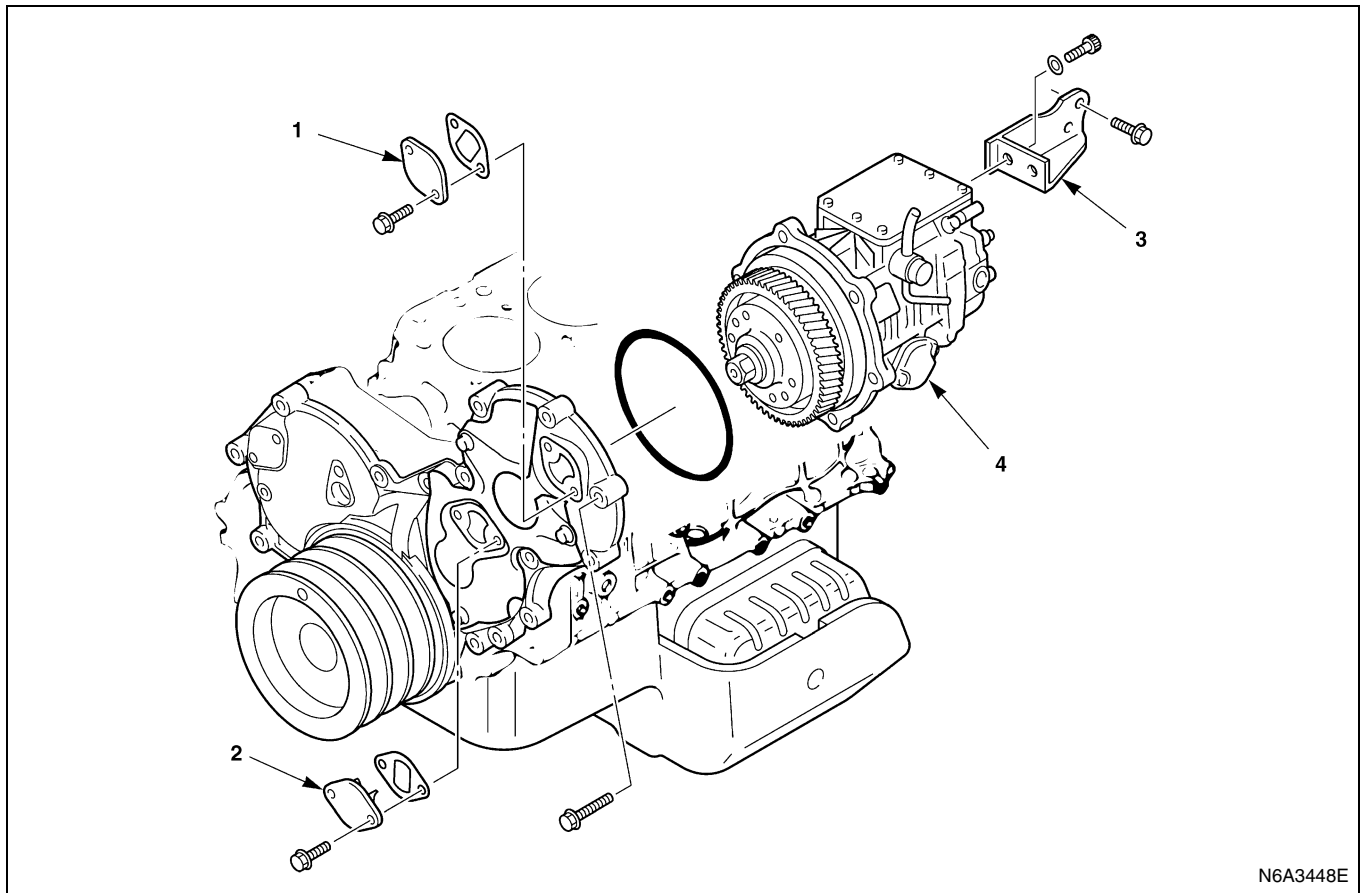
8 N·m (0.8 kg·m/69 lb·ft)

- Connect battery ground cable.
- Pour coolant.



INJECTION PUMP ASSEMBLY (4JH1-TC)

Component



N6A3448E

Legend

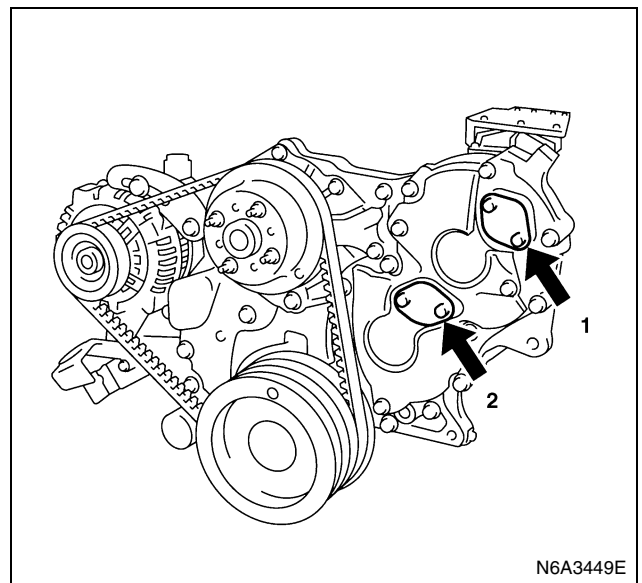
- | | |
|--|----------------------------|
| 1. Check hole cover: Injection pump gear | 3. Injection pump bracket |
| 2. Check hole cover: Scissor gear | 4. Injection pump assembly |

Removal

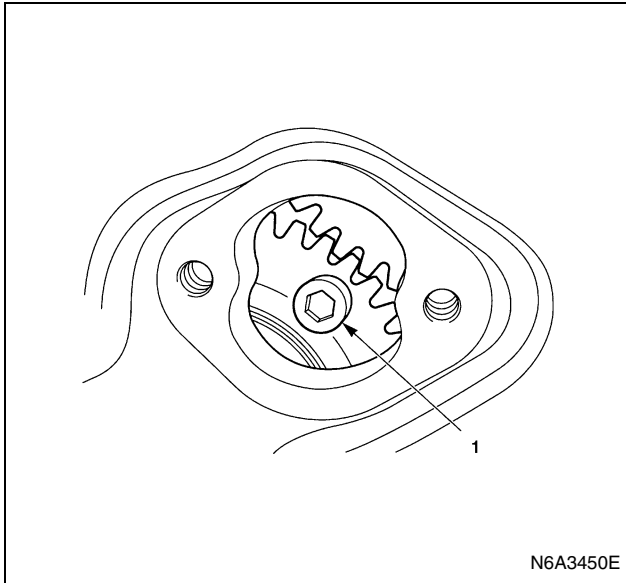
Preparation:

Remove the fuel pipe and the injection pipe.

1. Check Hole Cover: Injection Pump Gear
Remove the check hole cover (1).
2. Check Hole Cover: Scissor Gear
 - Remove the check hole cover (2).
 - Rotate the crank pulley until the hole used to fix the scissor gear (the hole extends from the check hole cover) becomes visible.
 - Thread the lock bolt into the hole in the scissor gear.



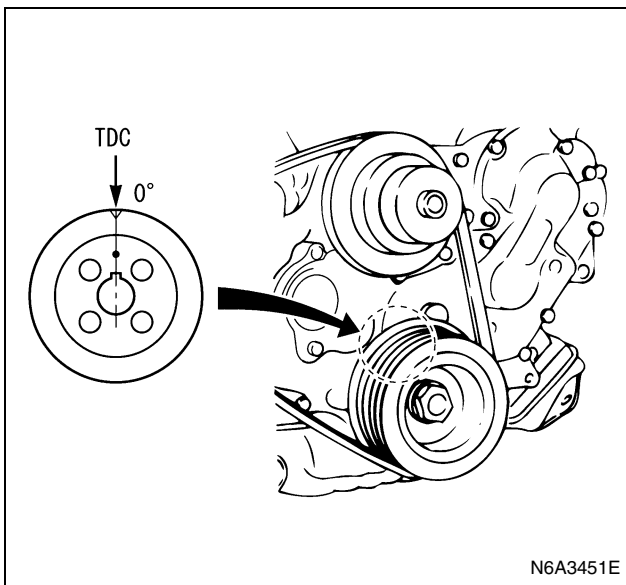
N6A3449E



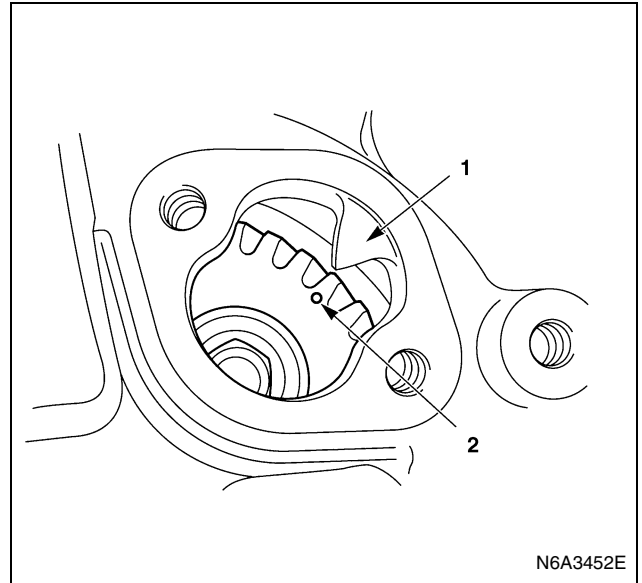
Legend

1. Lock bolt

- Rotate the crank pulley to align the dot on the pulley with the crankshaft TDC mark.



- Check that the injection pump mark is aligned with the arrow mark. If the marks are not aligned, rotate the crank pulley an additional full turn.



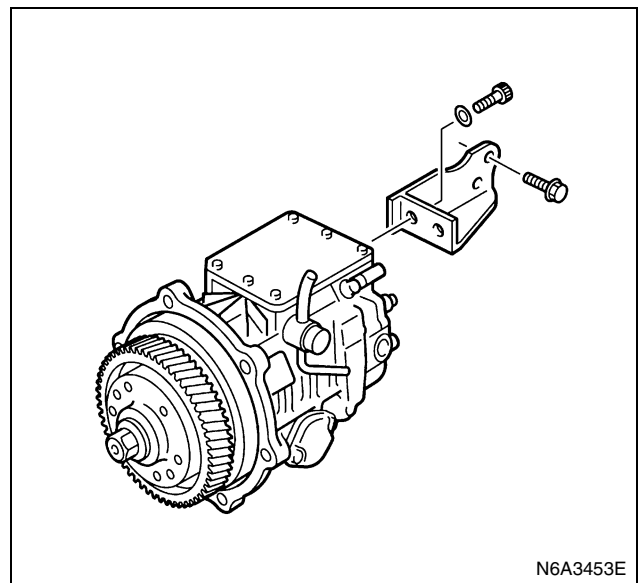
Legend

1. Arrow mark
2. Mark

Notice:

When the scissor gear and check hole cover are not installed, the crank pulley can be turned with the scissor gear lock bolt in place.

3. Injection Pump Bracket
Remove the bracket fixing bolts at the rear of the injection pump.
4. Inspection Pump Assembly
Loosen the 6 bolts holding the injection pump assembly.



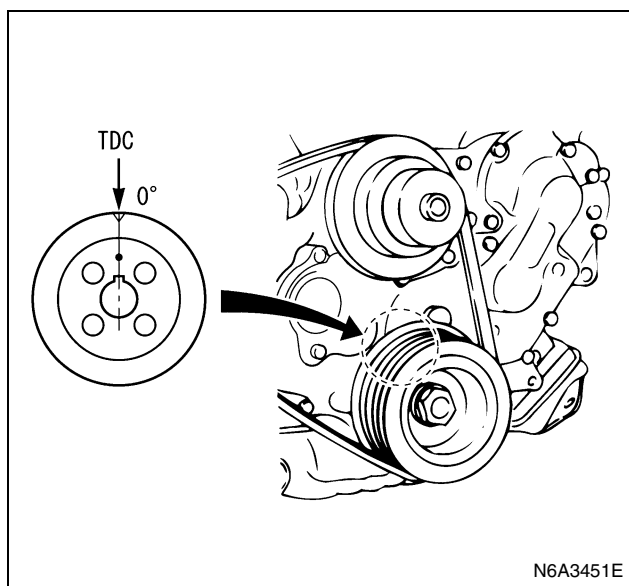
Notice:

Plug the injection pump delivery holder openings with the shipping caps (or some similar object) to prevent the entry of foreign material.

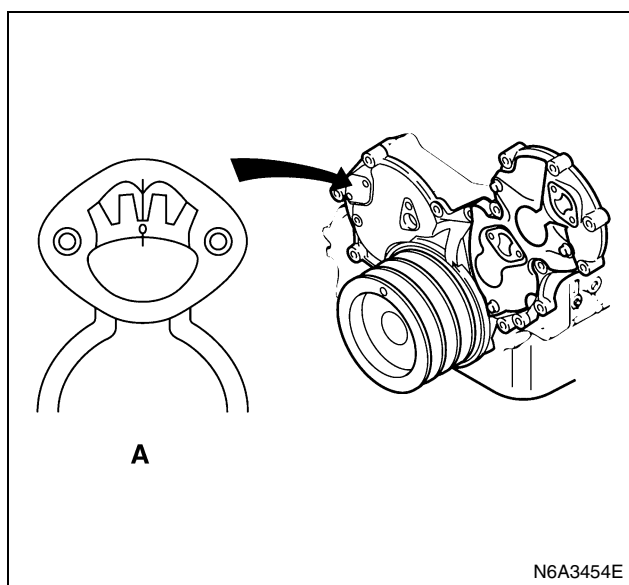
Installation

1. Injection Pump Assembly

- Check the pulley alignment mark and the crankshaft TDC mark are aligned.



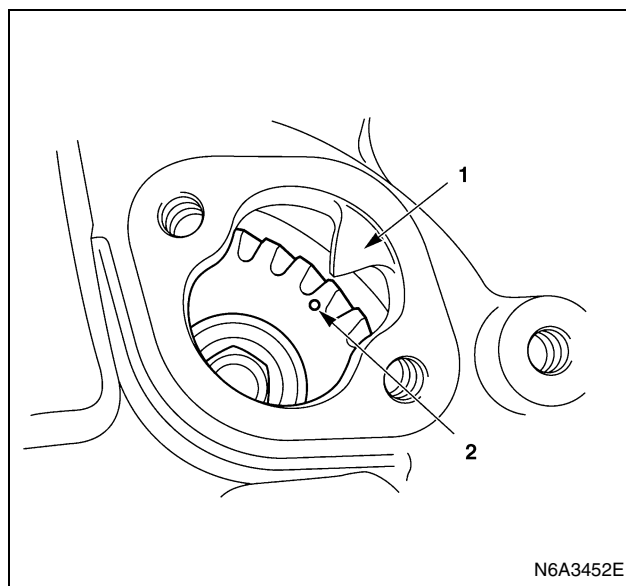
- Remove the camshaft gear check hole cover to check camshaft gear mark alignment.



Legend

A. Camshaft gear

- Install the O-ring.
- Install the injection pump assembly. Maintain injection pump gear mark and arrow mark alignment during the installation procedure (look through the check hole).



Legend

1. Arrow mark
2. Mark

- Tighten the injection pump bolts to the specified torque.

Tighten:

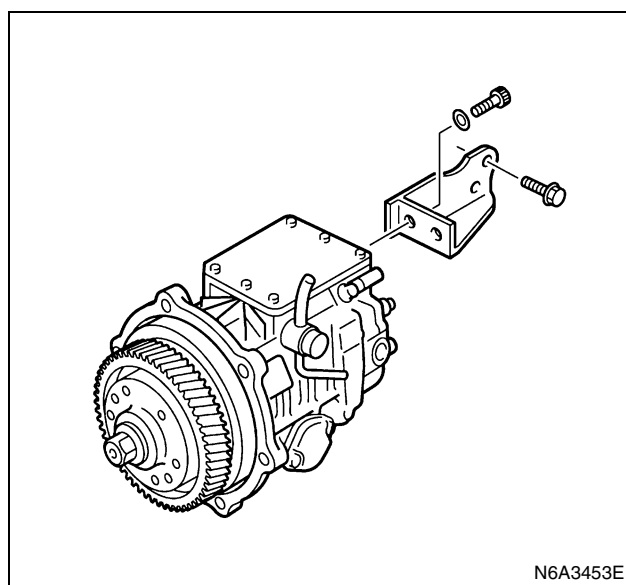
Pump Bolt to 15 N·m (1.5 kg·m/11 lb·ft)

2. Injection Pump Bracket

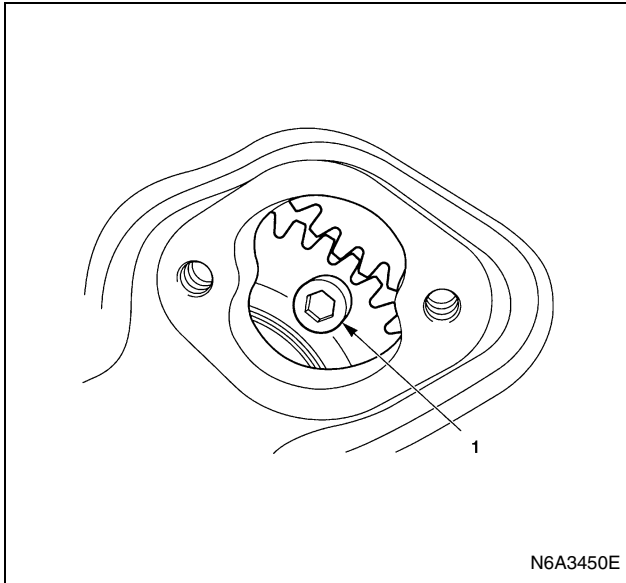
- Install the injection pump bracket to the gear of the injection pump and tighten the bolts to the specified torque.

Tighten:

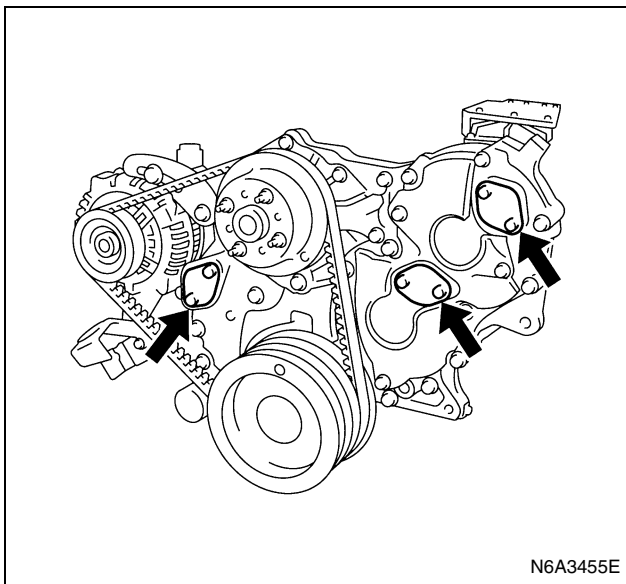
Bracket Bolt to 25 N·m (2.5 kg·m/18 lb·ft)



- Rotate the crank pulley until the scissor gear lock bolt is visible through the check hole. Remove the bolt.

**Legend**

1. Lock bolt
3. Check Hole Cover: Scissor Gear
4. Check Hole Cover: Injection Pump

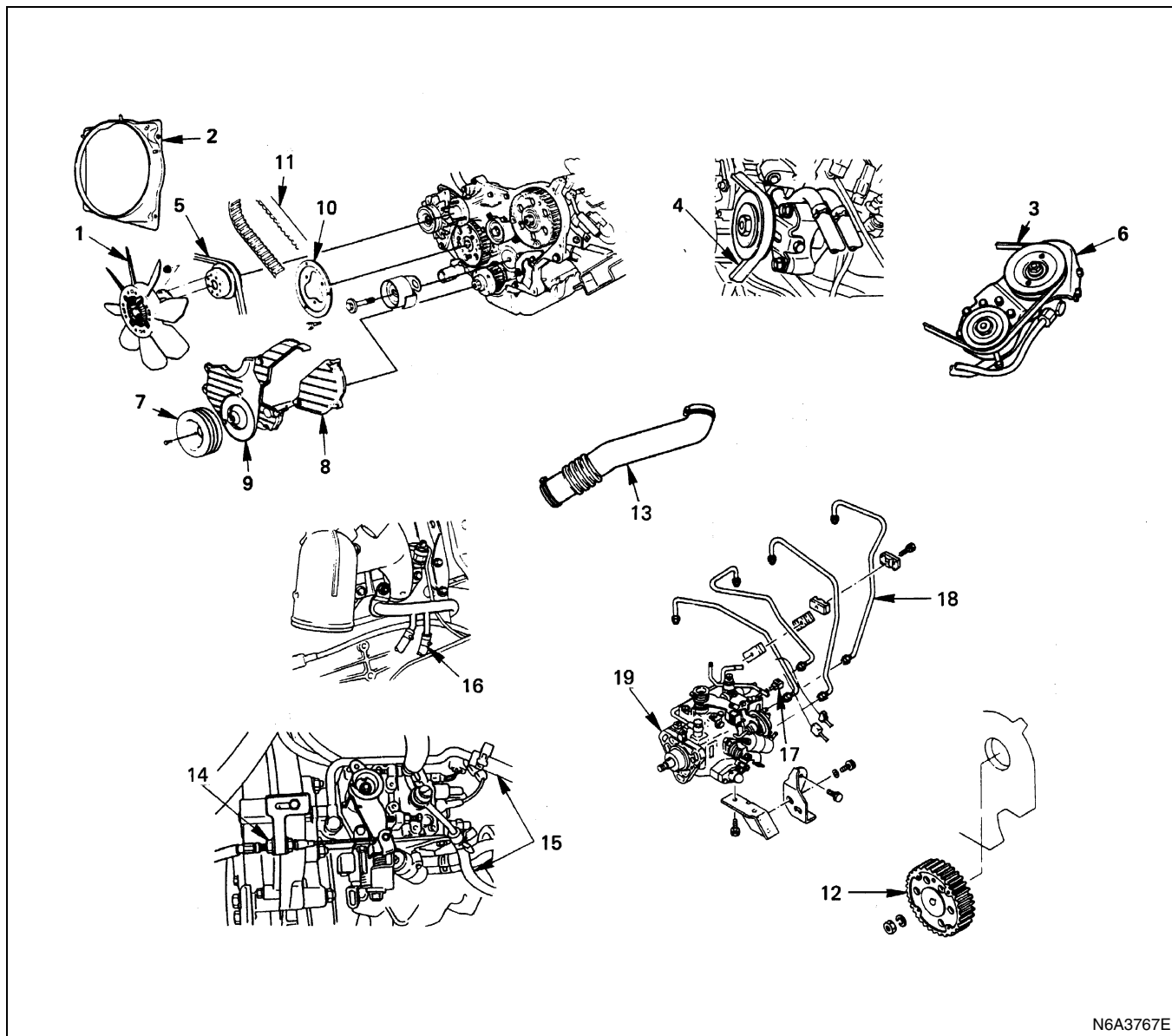
**Caution:**

Install the check hole covers.

- Be absolutely sure that the check hole covers are properly installed.
- Rotate the crank pulley 2 full turns to confirm that the lock bolt has been removed (if you have forgotten to remove the bolt, the bolt will strike the check hole guides and the crank pulley will not turn).

INJECTION PUMP ASSEMBLY (4JG2 Belt Drive Type)

Component



N6A3767E

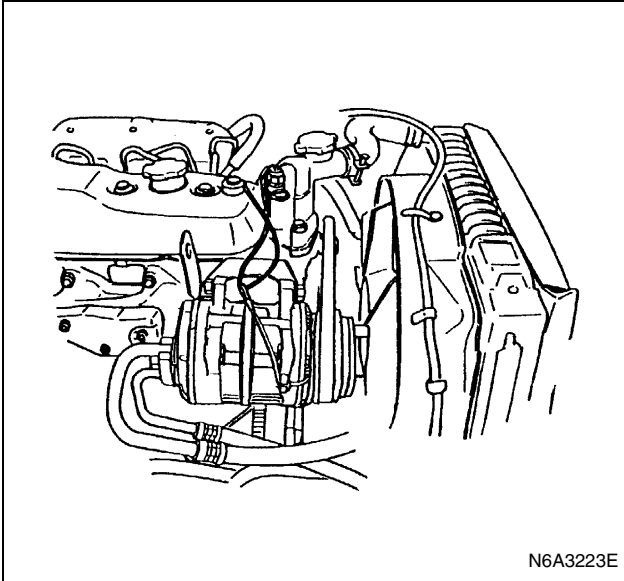
Legend

- | | |
|---|----------------------------------|
| 1. Cooling fan assembly | 11. Timing belt |
| 2. Fan shroud | 12. Injection pump timing pulley |
| 3. Power steering pump drive belt | 13. Air intake duct |
| 4. A/C compressor drive belt | 14. Injection pump control cable |
| 5. AC generator drive belt | 15. Fuel hose |
| 6. Power steering pump & bracket assembly | 16. CSD water hose |
| 7. Crankshaft damper pulley | 17. Injection pump harness |
| 8. Timing pulley upper cover | 18. Injection pipe |
| 9. Timing pulley lower cover | 19. Injection pump assembly |
| 10. Flange; Camshaft pulley | |

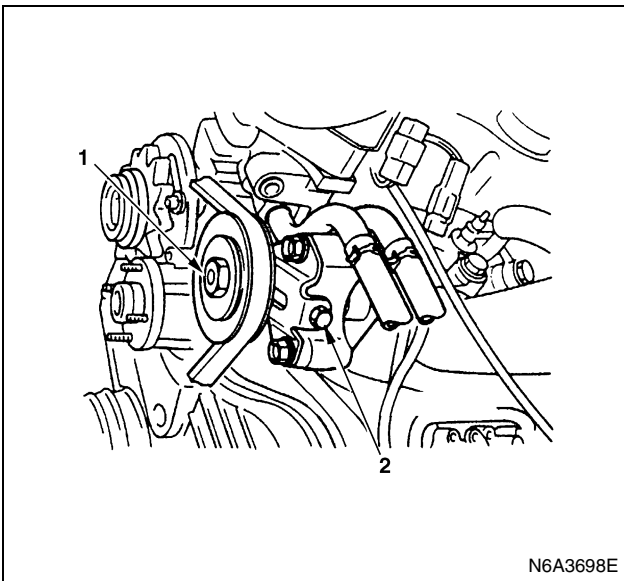
Removal

Preparation:

- Disconnect battery ground cable.
 - Drain coolant.
1. Cooling Fan Assembly
 - Remove clamp nut, and remove cooling fan assembly, distant pipe, and fan pulley.
 2. Fan Shroud
 - Remove reservoir tank hose and fan shroud.

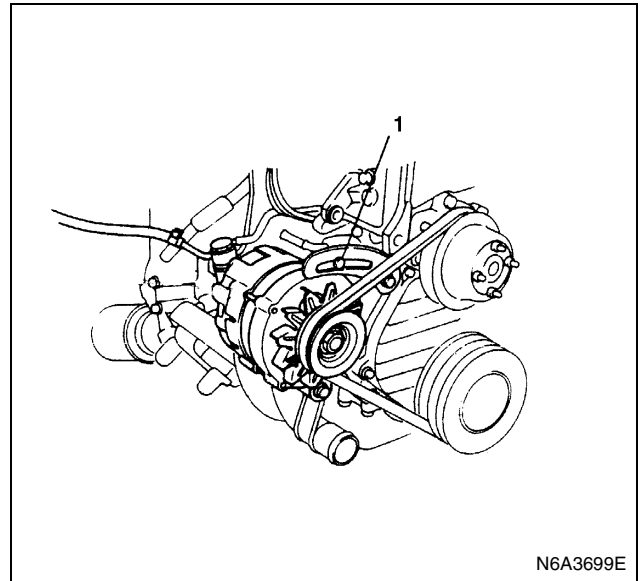


3. Power Steering Pump Drive Belt (P/S Model)
 - Loosen power steering pump idle pulley lock nut and adjust bolt, and remove the drive belt.
4. A/C Compressor Drive Belt (A/C Model)
 - Loosen A/C compressor idler pulley lock nut (1), adjust bolt (2), and remove the drive belt.



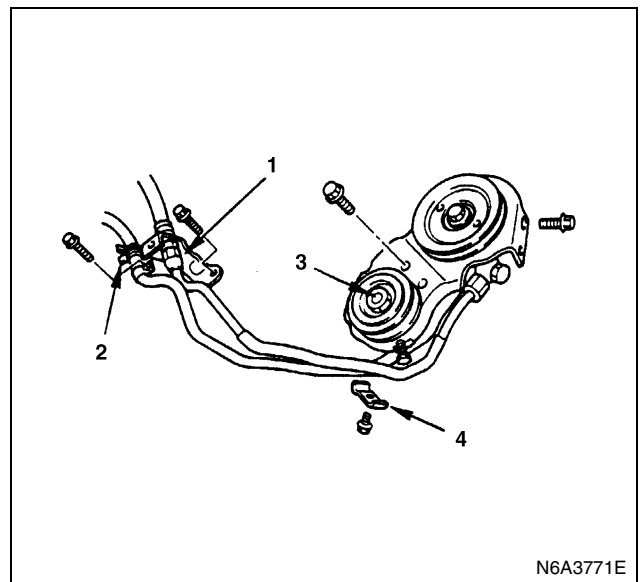
5. AC Generator Drive Belt

- Loosen AC generator mounting bolt (under side) and adjust plate lock bolt (1), and remove the drive belt.



6. Power Steering Pump & Bracket Assembly (P/S Model)

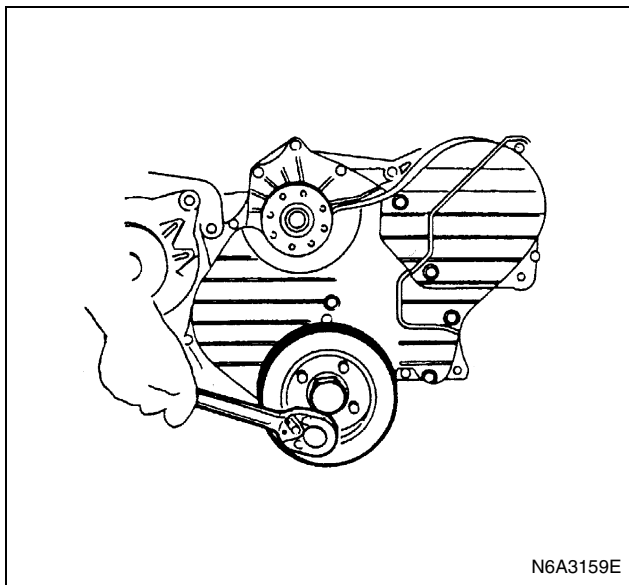
- Loosen power steering oil pipe bracket (1) and clip (2).
- Remove P/S pump bracket assembly and hang the P/S pump bracket assembly.



Legend

1. Bracket
2. Clip
3. Lock nut
4. P/S pump bracket

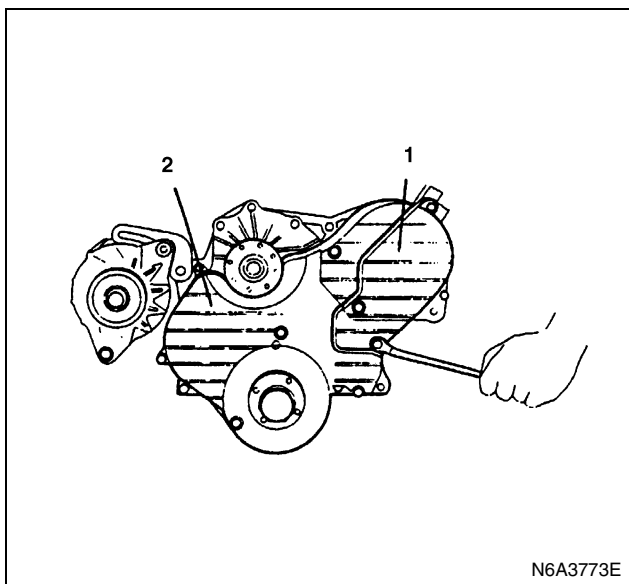
7. Crankshaft Dumper Pulley



N6A3159E

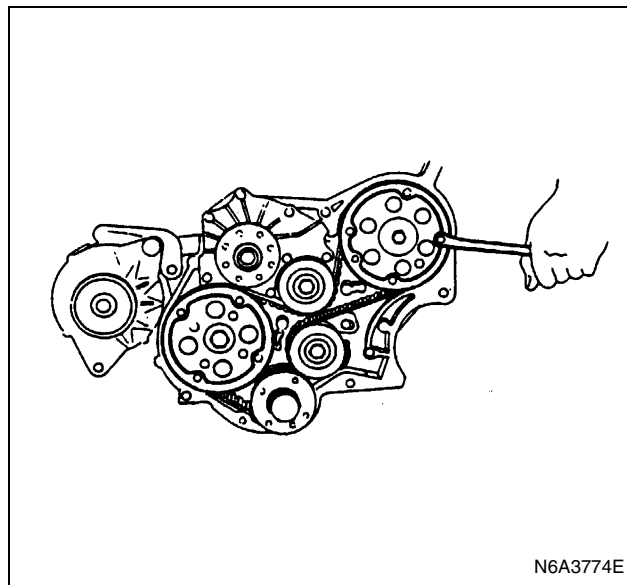
8. Timing Pulley Upper Cover (1)

9. Timing Pulley Lower Cover (2)



N6A3773E

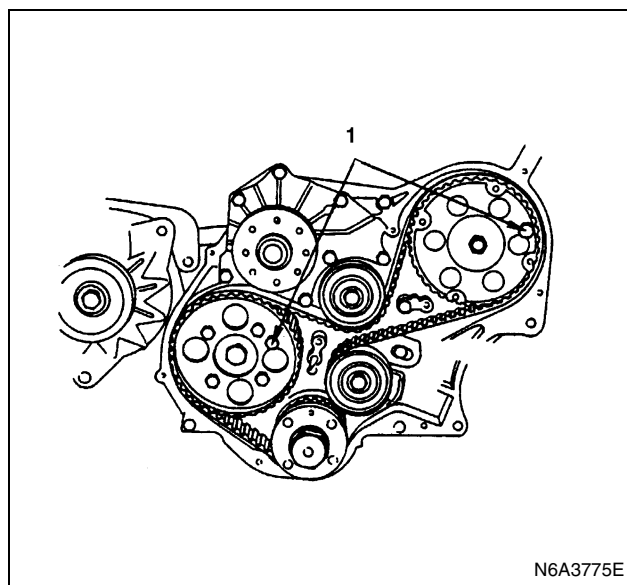
10. Flange; Camshaft Pulley



N6A3774E

11. Timing Belt

- Prepare a fixing bolt (M8 × 40, P=1.25).
- Turn crankshaft timing pulley in the normal direct pulley side mark to timing pulley housing side mark.
- Make sure that the camshaft pulley and injection timing pulley fixing bolt holes are set to each other. Then fit in a fixing bolt and lightly tighten.

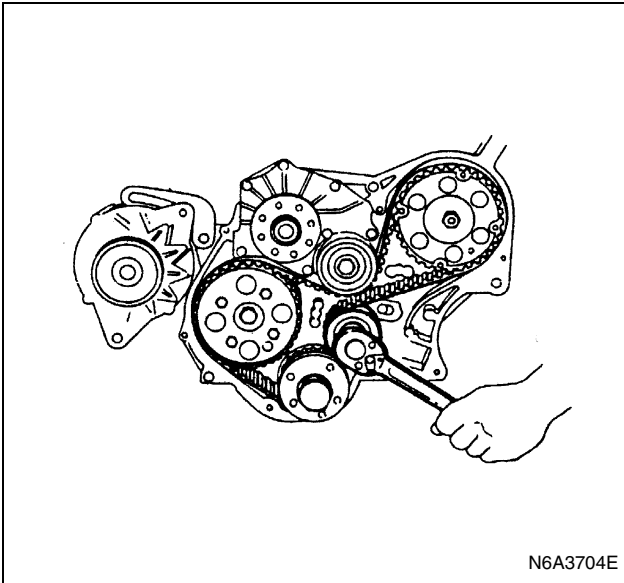


N6A3775E

- No. 1 cylinder should be at top dead center. If the fixing bolt holes are not set (No. 4 cylinder is at top dead center) give another turn.
- Remove tensioner and timing belt.

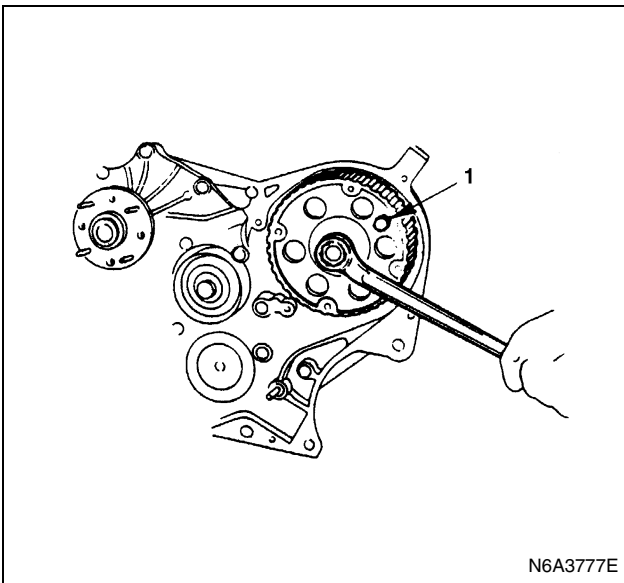
WARNING:

- IF CRANKSHAFT AND CAMSHAFT ARE TURNED WITH TIMING BELT BEING NOT MOUNTED, PISTON AND VALVE WILL INTERFERE WITH EACH OTHER. THEREFORE, THE SHAFTS MUST NOT BE TURNED.

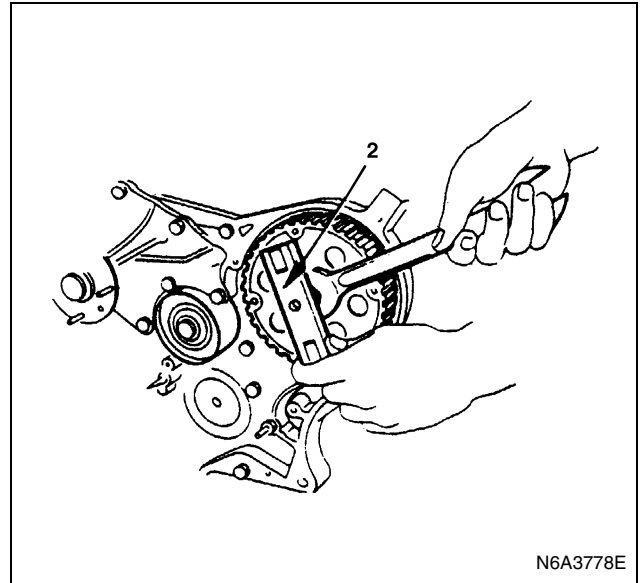


12. Injection Pump Timing Pulley

- Install the stopper bolt (1) to the timing pulley to prevent it from turning.



- Use the timing pulley puller (2) to remove the injection pump timing pulley.
Timing Pulley Puller: 5-8840-0086-0
- Remove the stopper bolt.



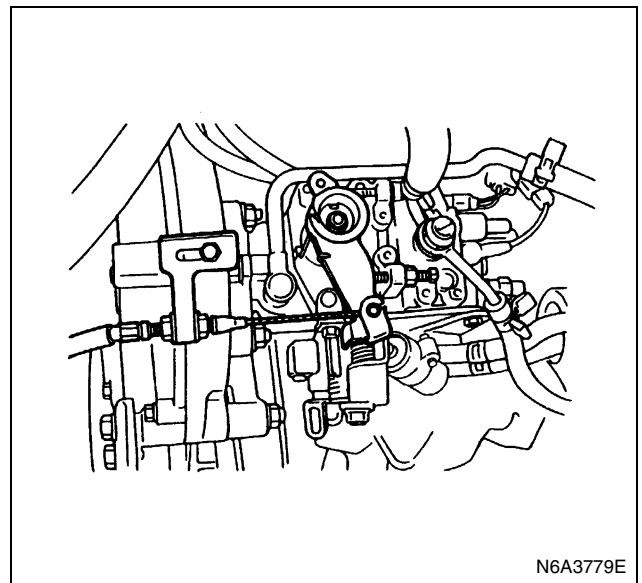
13. Air Intake Duct

14. Injection Pump Control Cable

- Remove the control cable bracket bolt and remove the control lever side.

15. Fuel Hose

- Disconnect the fuel feed hose and fuel return hose.



16. CSD Water Hose

17. Injection Pump Harness

18. Injection Pipe

19. Injection Pump Assembly

- Remove the pump bracket bolt engine side.
- Remove the adjust lock bolt.
- Remove the injection pump fixing bolt and take out injection pump.

Installation

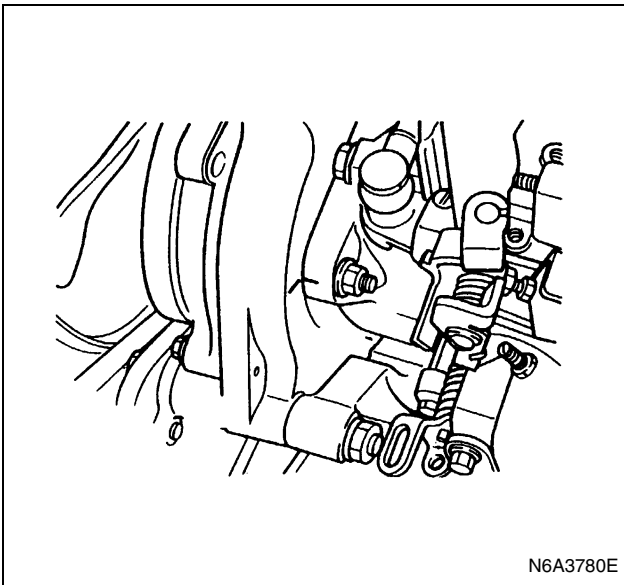
1. Injection Pump Assembly

- Put the timing pulley housing side and injection pump side setting marks together, and temporarily tighten.
- After adjusting injection timing retighten.
- Mount rear bracket on cylinder block and tighten to the specified torque.

Tighten:

Rear bracket on cylinder block to 19 N·m (1.9 kg·m/14 lb·ft)

- Install adjust lock bolt and lightly tighten.
- After adjusting injection timing, retighten.

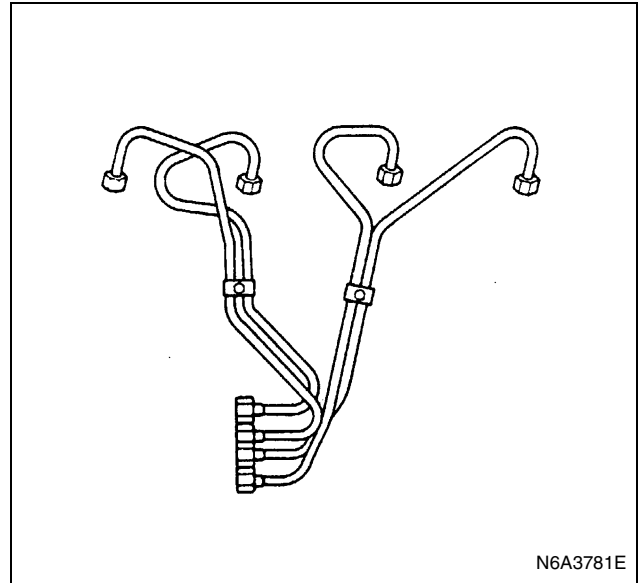


2. Injection Pipe

- Connect the pump side and nozzle side of the pipe, and tighten securely.
- Install clip where it was.

Tighten:

Sleeve Nut to 29 N·m (3.0 kg·m/22 lb·ft)

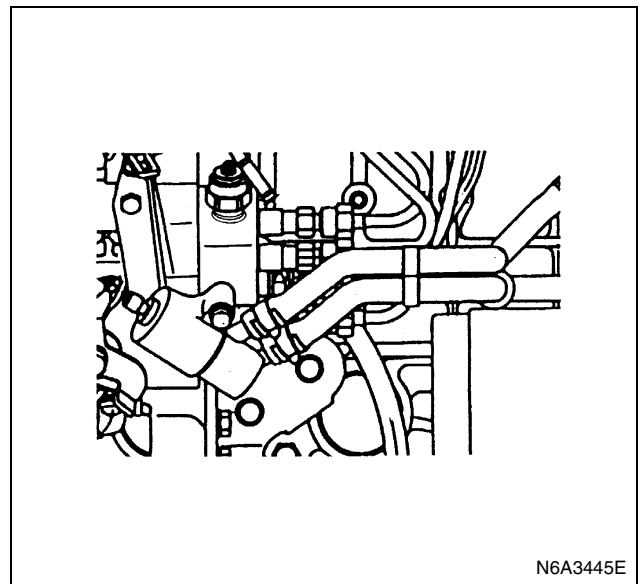


3. Injection Pump Harness

- Mount engine harness and connect it to switches.

4. CSD Water Hose

- Connect the water hose and tighten clip securely.

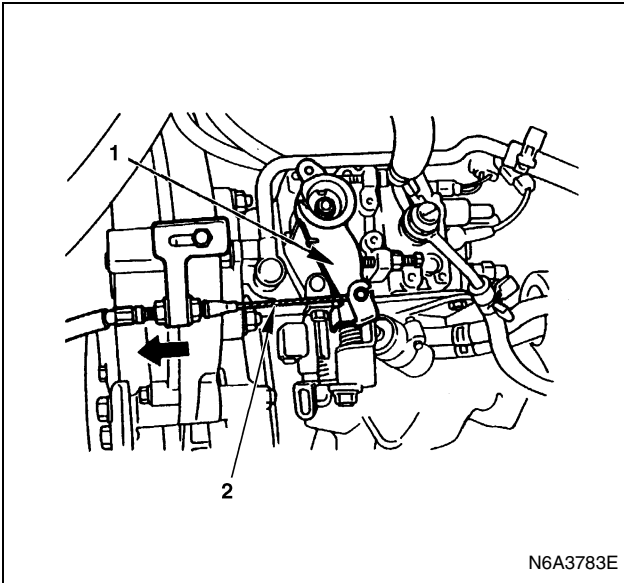


5. Fuel Hose

- Connect the fuel feed hose and fuel return hose.
- Connect the rear off hose.

6. Injection Pump Control Cable

- 1) Install the Control wire to the engine control lever.
- 2) Hold the accelerator lever (1) in the fully closed position and stretch the control cable (2) in the direction indicated by the arrow to remove any slack.
- 3) Tighten the accelerator cable bracket bolt.



7. Air Intake Duct

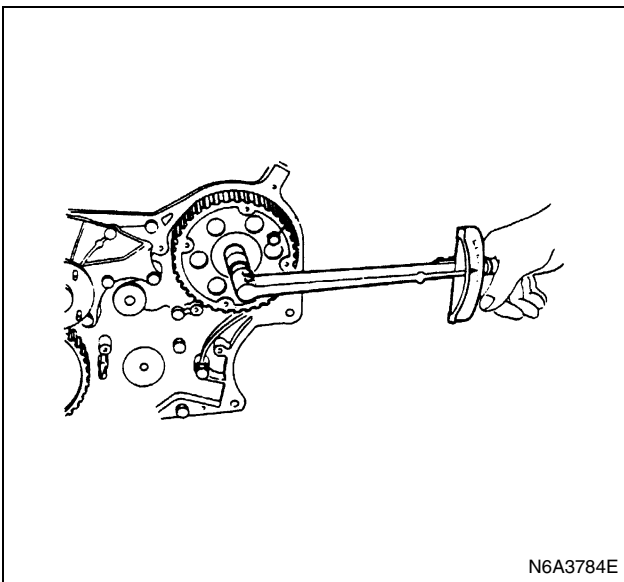
- Connect the air intake duct and tighten clip securely.

8. Injection Pump Timing Pulley

- Align the timing pulley with the pump shaft key.
- Install the stopper bolt to the timing pulley. This will prevent the timing pulley from moving.
- Tighten the timing pulley nut to the specified torque.

Tighten:

Injection pump timing pulley nut to 64 N·m (6.5 kg·m/47 lb·ft)



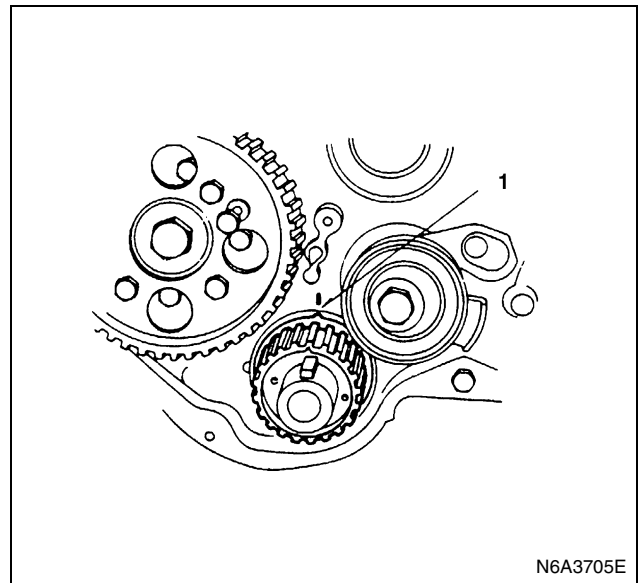
- Remove the stopper bolt from the injection timing pulley.

9. Timing Belt

- When removing the belt, make sure the marks on the bolt fixed camshaft, injection pulley and crankshaft timing pulley are set to each other.

Caution:

- Do not turn crankshaft because otherwise piston and valve will interfere with each other.

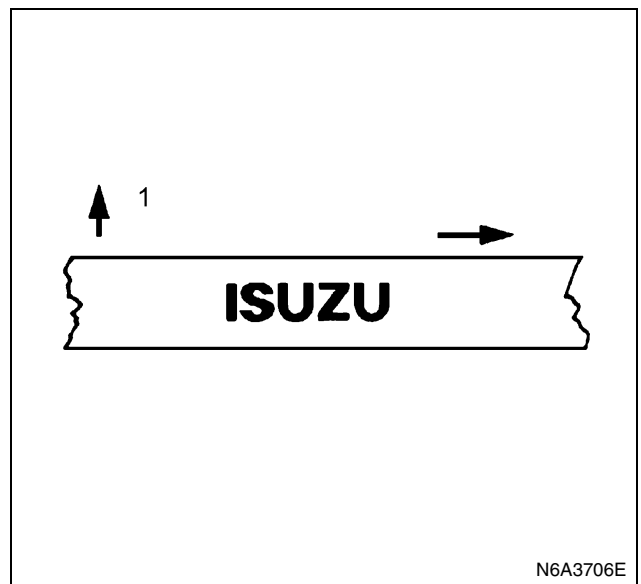


Legend

1. Setting mark

Caution:

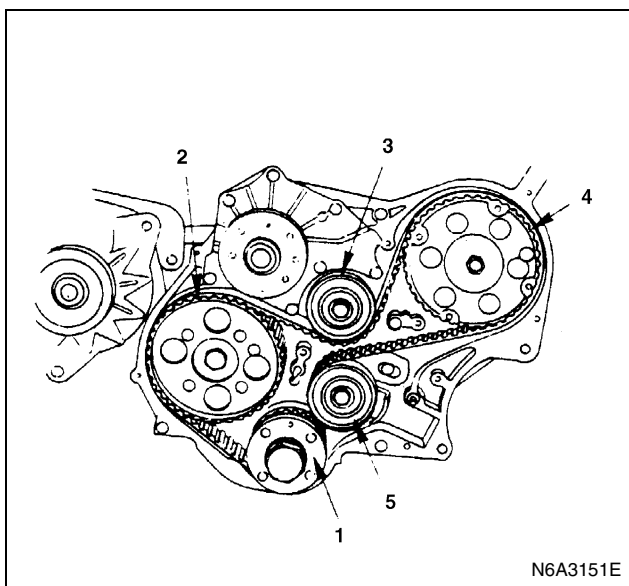
- For accurate mounting, be sure to mount the belt in the direction that letters on the belt are readable.



Legend

1. Cylinder head side

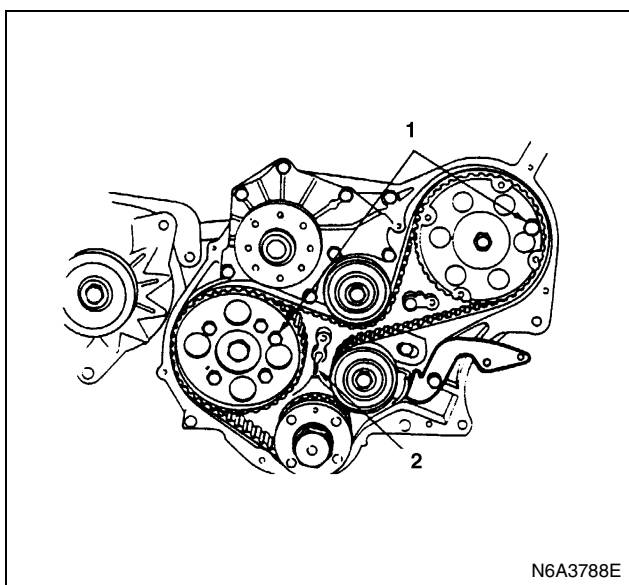
- Mount new timing belt on pulleys in the following steps.
Crankshaft timing pulley (1) → Camshaft
Timing pulley (2) → Idle pulley (3) → Injection
Pump pulley (4) → Tensioner (5)



- Set the belt on crankshaft timing pulley and hold with one hand.
- Stretch and pass the belt round each pulley with the other hand.
- After passing it round injection pump pulley, install tensioner while taking care not to slacken the belt.

Caution:

- On completion of belt passing, make sure that the setting mark on crankshaft timing pulley is set.

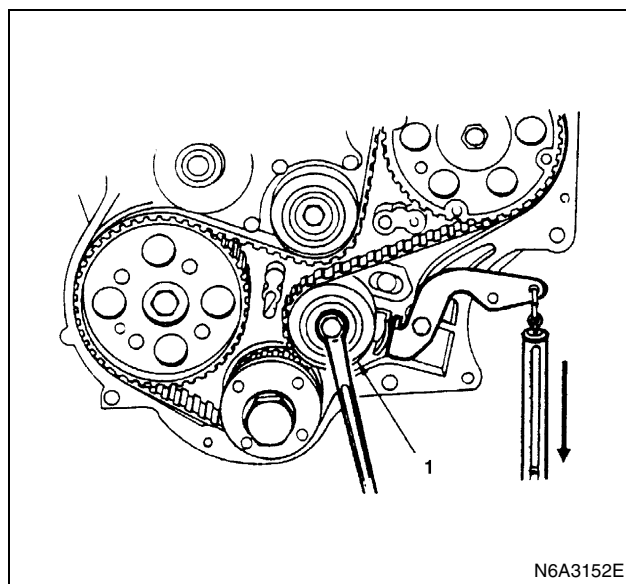


Legend

1. Lock bolt
2. Setting mark

- If not set, reset the mark and repeat the belt passing.
- Remove tension adjust, lever mounting bolt, and loosen the fulcrum bolt to such extent that the lever is movable.

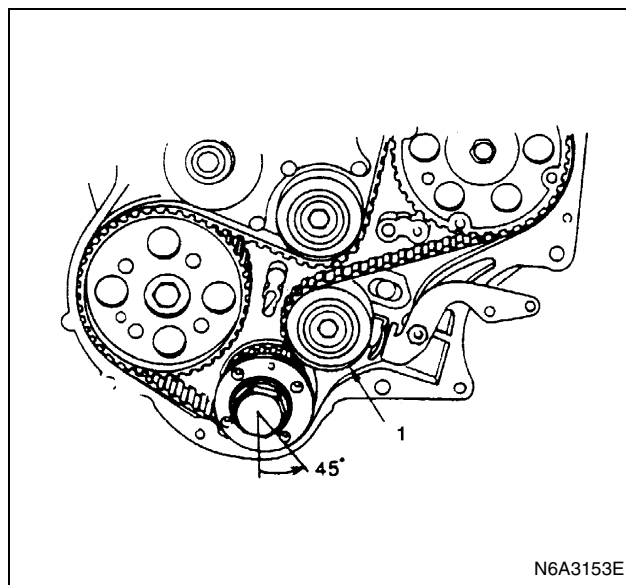
- Hung a spring balance from the end hole of tension adjust lever, and with the balance pulled down with 88 N (9 Kg/20 lb), loosen once the tensioner mounting bolt and then retighten it.



Legend

1. Tensioner

- Turn the crankshaft by 45° counterclockwise to shift belt slackness on the tensioner.



Legend

1. Tensioner

- Again hand the spring balance hanging from the end hole of tension adjust lever and pull it down with the specified force. Under this condition, loosen tensioner mounting bolt to absorb belt slackness and retighten it to specified torque.

Belt Tension	N (Kg/lb)
98 — 118 (10 — 12/22 — 26)	

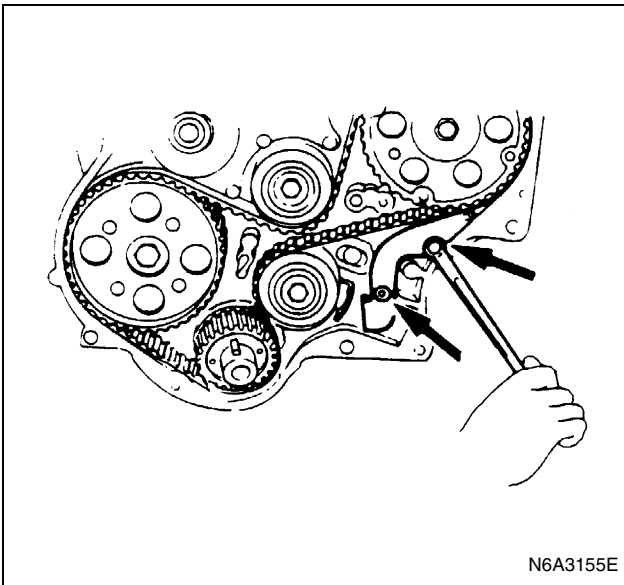
Tighten:

Bolt to 76 N·m (7.8 kg·m/56 lb·ft)

- Fix the tension adjust lever.

Caution:

- In case where the timing belt has been replaced with the actuation of warning light, put off the light with change over switch on the reverse side of meter.
- Refer to Cab and Chassis Electrical in Section 8.
- Tighten the tension adjusting lever nut and bolt.

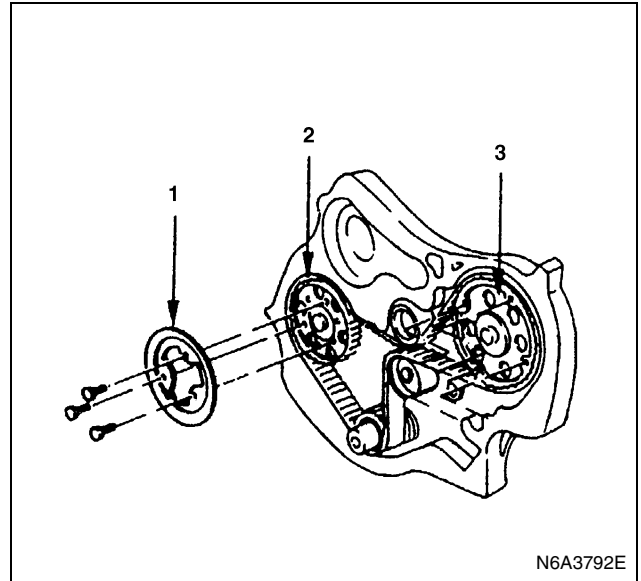


10. Flange; Camshaft Pulley

- Install the timing pulley flange (1) to the camshaft (2).
- Tighten the timing pulley flange bolts to the specified torque.

Tighten:

19 N·m (1.9 kg·m/14 lb·ft)



11. Timing Pulley Lower Cover

- Install timing pulley lower cover and tighten bolt to the specified torque.

Tighten:

Bolt to 8 N·m (0.8 kg·m/69 lb·in)

12. Timing Pulley Upper Cover

- Install timing pulley upper cover and tighten bolt to the specified torque.

Tighten:

Bolt to 8 N·m (0.8 kg·m/69 lb·in)

13. Crankshaft Damper Pulley

- Install crankshaft damper pulley and tighten bolt to the specified torque.

Tighten:

Bolt to 19 N·m (1.9 kg·m/14 lb·ft)

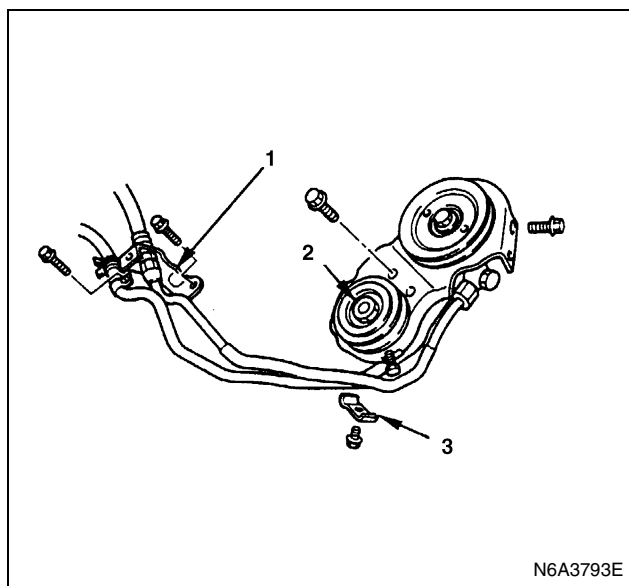
14. Power Steering Pump & Bracket Assembly (P/S Model)

- Install the pipe bracket, clip and tighten bolts to the specified torque.

Tighten:

Pipe bracket bolts to 19 N·m (1.9 kg·m/14 lb·ft)

Pipe clip bolts to 10 N·m (1.0 kg·m/7 lb·ft)

**Legend**

1. Pipe bracket
2. Lock nut
3. Clip

- Install the Power Steering pump & bracket assembly.

Tighten:

- 10M bolts to 40 N·m (4.1 kg·m/30 lb·ft)
- 8M bolts to 19 N·m (1.9 kg·m/14 lb·ft)
- Lock nut to 27 N·m (2.8 kg·m/20 lb·ft)

15. AC Generator Drive Belt

- Install AC generator drive belt and adjust belt tension.
- Depress the drive belt mid-portion with a 98N (10 kg/ 22 lb) force.

Drive Belt Deflection	mm (in)
8 (0.31) — 12 (0.47)	

- Install fixing bolt and tighten bolts to the specified torque.

Tighten:

- Generator fixing bolt to 40 N·m (4.1 kg·m/30 lb·ft)
- Adjust Plate Fixing Bolt to 19 N·m (1.9 kg·m/14 lb·ft)

16. A/C Compressor Drive Belt (A/C Model)

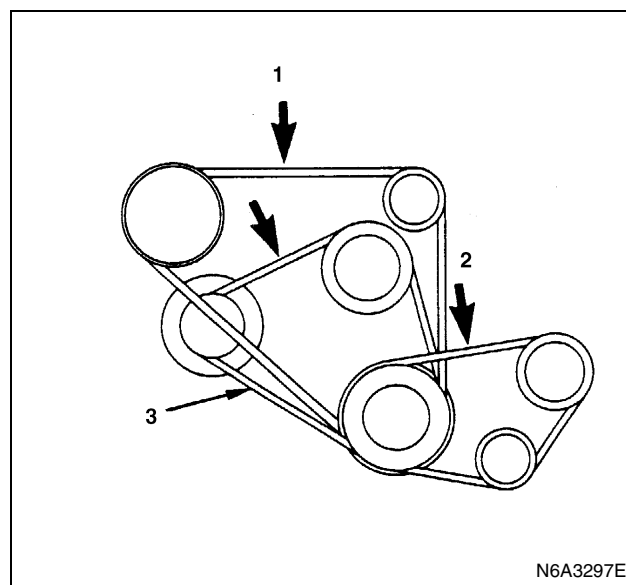
- Install A/C compressor drive belt and adjust belt tension.
- Depress the drive belt mid-portion with a 98N (10 kg/22lb) force.

Drive Belt Deflection	mm (in)
8 (0.31) — 12 (0.47)	

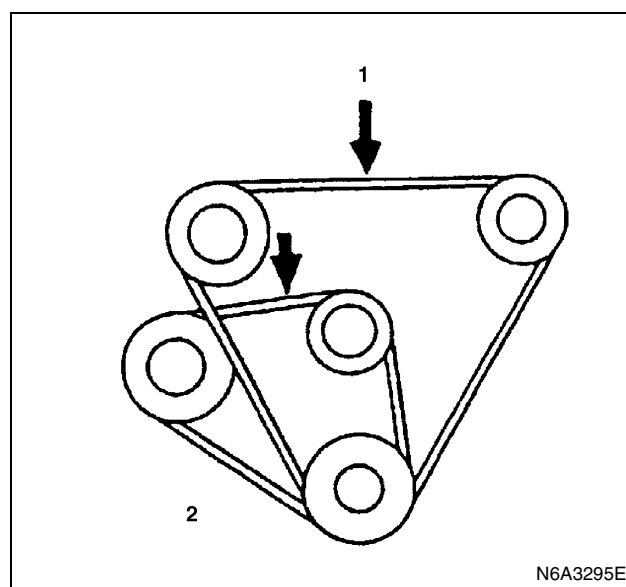
- Tighten the Idler lock nut to the specified torque.

Tighten:

Idler lock nut to 27 N·m (2.8 kg·m/ 20 lb·ft)

4JG2**Legend**

1. A/C compressor drive belt
2. P/S oil pump drive belt
3. AC generator fan pulley drive belt

4JB1**Legend**

1. A/C compressor drive belt & P/S pump drive belt
2. AC generator & fan pulley drive belt

17. Power Steering Pump Drive Belt (P/S Model)

- Install power steering pump drive belt and adjust belt tension.

- Depress the drive belt mid-portion with a 98 N (10 kg/22 lb) force.

Drive Belt Deflection	mm (in)
8 (0.31) — 12 (0.47)	

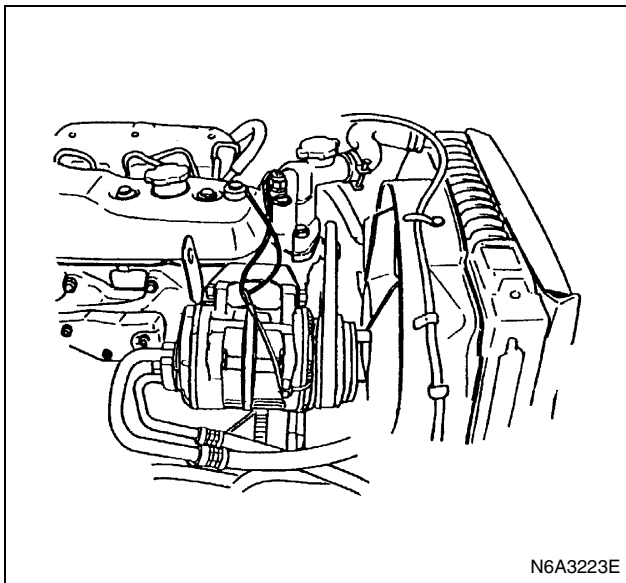
- Tighten the idler lock nut to the specified torque.

Tighten:

Idler lock nut to 27 N·m (2.8 kg·m/ 20 lb·ft)

18. Fan Shroud

- Install the fan shroud and reservoir tank hose.



19. Cooling Fan Assembly

- Mount fan pulley, distance piece, and cooling fan assembly (in this order) on the water pump, and tighten to the specified torque.

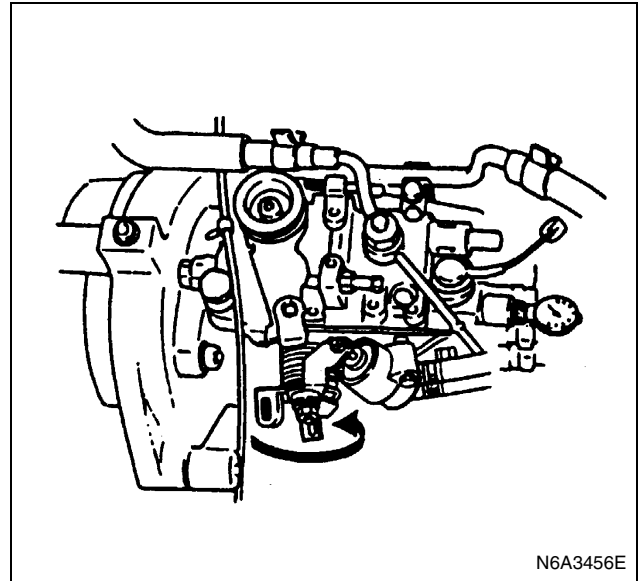
Tighten:

Nut to 8 N·m (0.8 kg·m/69 lb·in)

- Connect battery ground cable.
- Pour coolant.
- Start the engine and check coolant leakage.

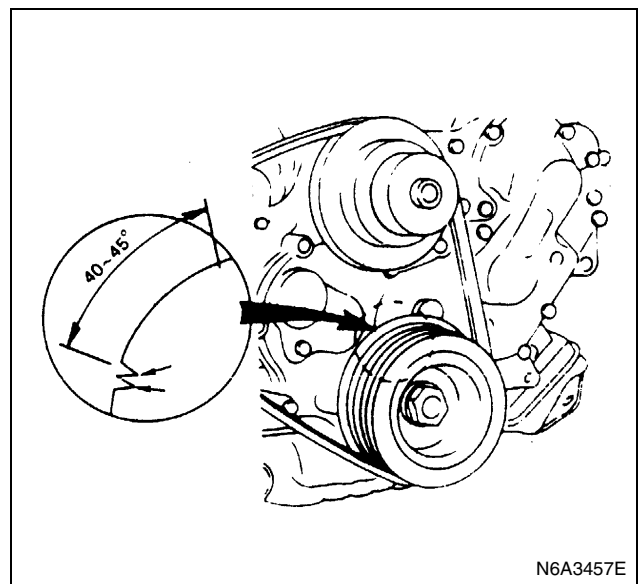
Injection Timing Adjustment

- Set No. 1 cylinder to top dead center.
- Remove injection pump distributor head plug.
- Cancel wax CSD with the handle of a screw driver.
- Fit a dial gauge and set lift to 2 mm.



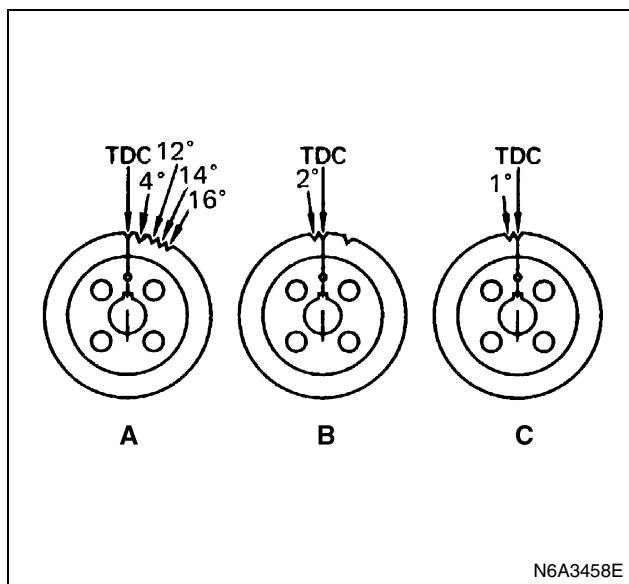
Measuring device: 5-8840-0145-0

- Set crankshaft damper pulley top dead center mark about 45° before top dead center from the pointer.



- Set dial gauge in the "0" position.
- Turn the crankshaft a little clockwise and counter-clockwise and see if the pointer is stable in the "0" position.
- Turn the crankshaft in the normal direction and read the measuring device's indication at as follows.

4JB1	BTDC 14°, BTDC 12° ('91/ 542A)
4JB1-TC	BTDC4°
4JG2 (Belt Drive Type)	ATDC 1° ('91/ 542A) TDC 0° ('91/ 542B)
4JG2 (Gear Drive Type)	ATDC 2 ('91/ 542A)

**Legend**

- A. 4JB1
- B. 4JG2 Gear drive type
- C. 4JG2 Belt drive type

Measuring Device's Indication	mm (in)
Standard	0.5 (0.0197)

- If it reads abnormal, loosen injection pump fixing nut and pump bracket adjust bolt, make adjustment by changing the pump mounting angle, and tighten the nut and bolt to the specified torque where the dial indicates the specified valve.

Tighten:

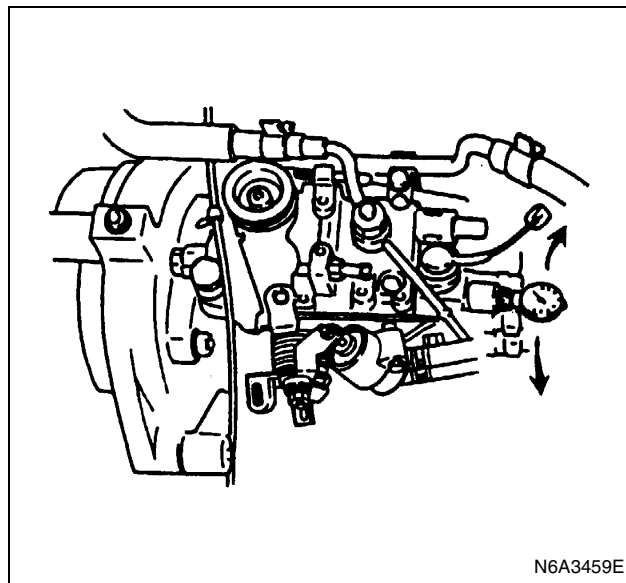
- Pump fixing nut to 24 N·m (2.4 kg·m/17 lb·ft)
- Adjust bolt to 19 N·m (1.9 kg·m/14 lb·ft)
 - Remove the measuring device and tighten the distributor head plug to the specified torque.

Tighten:

17 N·m (1.7 kg·m/12 lb·ft)

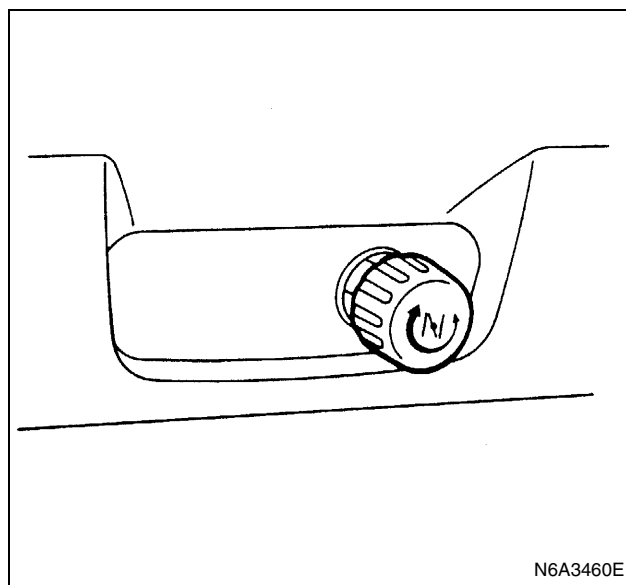
Caution:

- When installing the distributor head plug, be sure to use new copper washer.
- Connect injection pipe.
- Fit pipe clip where specified.

**Adjustment of Idling Speed**

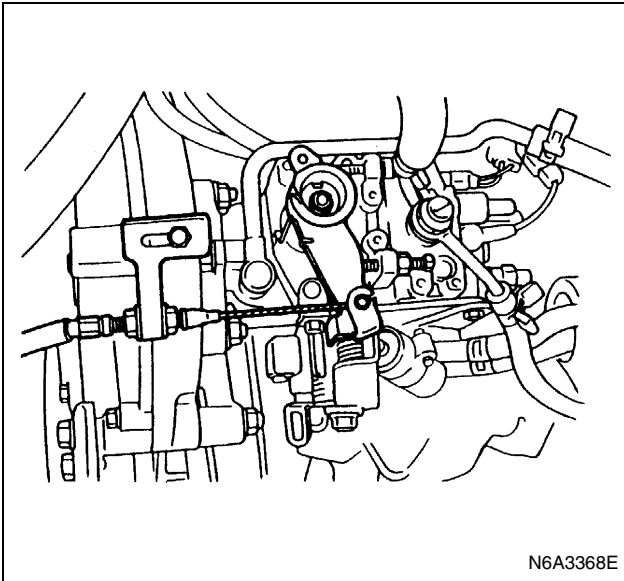
- Pull the parking brake and lock the wheels.
- Set the transmission gear to the neutral position.
- Start the engine and idle it until the water temperature gets to 70 to 80°C (158 to 176°F).
- Turn back the idling control button, and remove the control cable from the control lever (injection pump).
- Set the engine tachometer.
- Check the idling rotation. When the idling rotation is outside the range of the specified value, adjust it correctly.

Specified value (rpm) = **750 — 790 (4JB1)**
 700 — 740 (4JG2)
 675 — 725 (4JH1-TC)



- Loosen the lock nut of the idling set bolt.
- Rotate the idling set bolt to set the idling rotation to the specified value.

- 3) Tighten the lock nut to lock the set bolt.
- 4) Check the tension of the control cable, and remove any slackening as required.



INJECTION PUMP DATA

Test Conditions

Items	Conditions		
Engine Type	4JB1 (Gear)	4JG2 (Belt) (For '91/542B) Euro 2	4JB1 (Gear) (For '91/542A) Euro 1
Injection Nozzle			
ZEXEL Part Number	105780-0000	105780-0000	
Bosch Type Number	DN12SD12T	DN12SD12	
Injection Nozzle holder			
ZEXEL Part Number	105780-2080	105780-2080	
Bosch Type Number	EF8511/9	EF8511/9	
Injection Nozzle Opening Pressure			
MPa (kg/cm ² /psi)	14.7 (150 / 2,133)		13.0 (133 / 1,891)
Injection Line dimensions			
mm (in)			
Inside Diameter		2 (0.079)	
Outside Diameter		6 (0.236)	
Length	840 (33.1)		450 (17.7)
Fuel delivery Pressure		20 (0.2 / 2.84)	
kPa (kg/cm ² /psi)			
Test Fuel	SAE Standard Test Diesel Fuel (SAE967D) ISO Standard Test Diesel Fuel (ISO4113)		
Test Fuel Temperature		48 - 52 (118-126)	
°C(°F)			
Identification Numbers	104746-1230	196000-1042	104742-1451
	104746-1240		104742-1461
	104746-1250		104742-1471
	104746-1260		104742-1480
	104746-1270		104742-1490
	104746-1280		
	104746-1290		
	104746-1370		

Notice:

'91/542A; Euro 1

'91/542B; Euro 2

Items	Conditions
Engine Type	4JB1-TC
Injection Nozzle	
ZEXEL Part Number	105780-0060
Bosch Type Number	
Injection Nozzle holder	
ZEXEL Part Number	105780-2150
Bosch Type Number	—
Injection Nozzle MPa (kg/cm ² /psi)	13.0 (133 / 1,891)
Opening Pressure	
Injection Line di-	
mensions mm (in)	
Inside Diameter	2 (0.079)
Outside Diameter	6 (0.236)
Length	450 (17.7)
Fuel delivery Pres- kPa (kg/cm ² /psi)	20 (0.2 / 2.84)
sure	
Test Fuel	SAE Standard Test Diesel Fuel (SAE967D) ISO Standard Test Diesel Fuel (ISO4113)
Test Fuel Tempera- °C(°F)	48 — 52 (118 — 126)
ture	
Identification Numbers	104746-6601 104766-6620

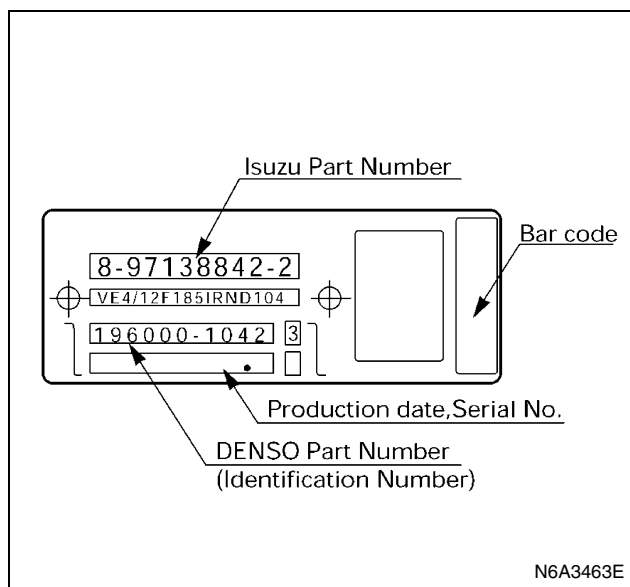
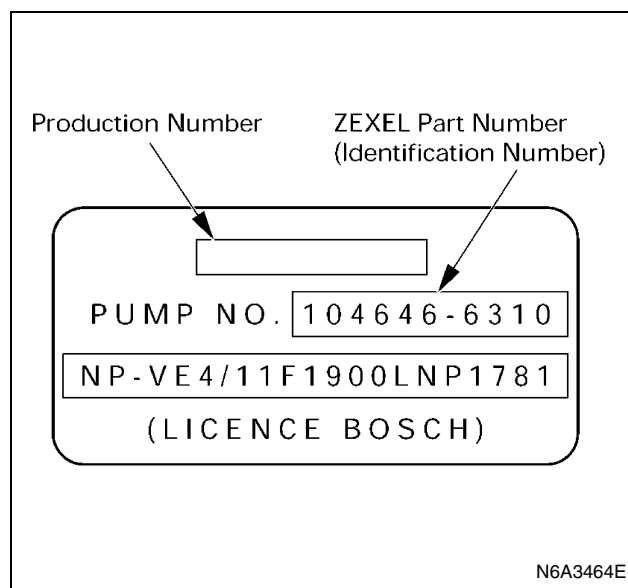
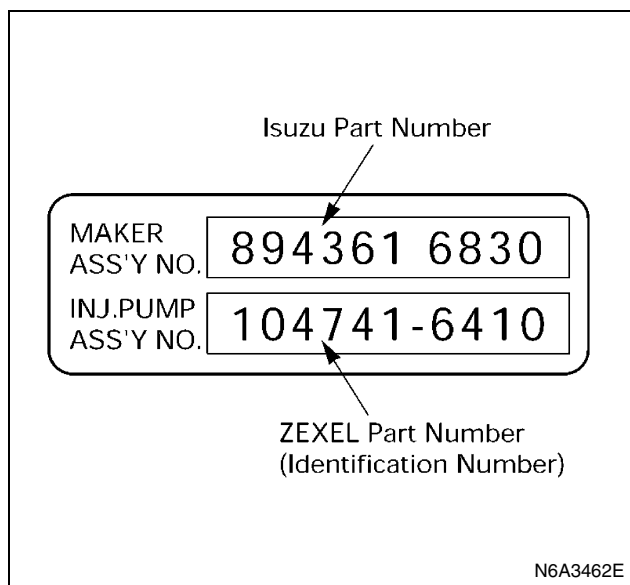
Notice:

'91/542A ; Euro 1

'91/542B ; Euro 2

Identification Plate and Number

Use the data following the injection pump identification number to adjust the injection volume.



INJECTION VOLUME AND GOVERNOR PERFORMANCE DIAGRAM

Governor Performance Diagram

Engine ; 4JB1

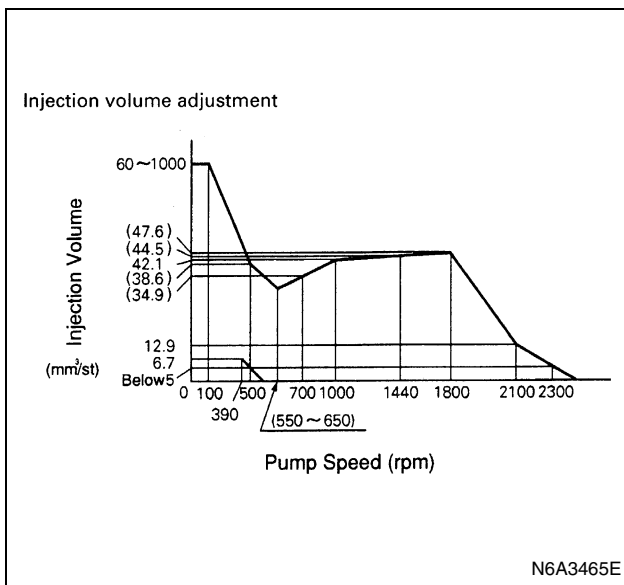
Injection pump assembly No. ;

8943616830 (104741-6410)

8943616850 (104741-6430)

Adjustment specification of injection volume

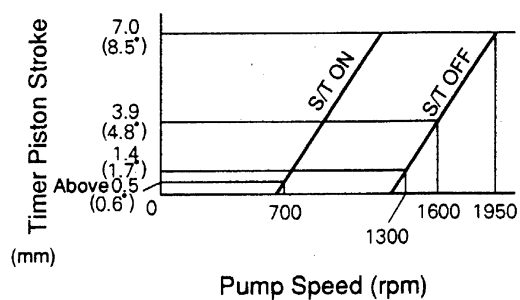
Pump rotation (rpm)	Average injection quantity (mm ³ /ST)	Uneven amplitude (mm ³ /ST)	Oil temperature (°C)	Remarks
500	(38.6)	—	48±2	
700	34.9±2.5	—	50±2	
1000	42.1±1.0	4.0	50±2	Standard
1450	44.5±2.5	—	50±2	
1800	47.6±3.0	—	60±2	
2100	12.9±3.0	4.0	52±2	
390	6.7±3.0	2.0	48±2	
100	60 -100	—	48±2	



Adjustment specification of timer and pump case pressure

Pump rotation (rpm)	Timer piston stroke (mm)		Air pressure of pump (kPa (kg/cm ²))		Remarks
	Solenoid timer		Solenoid timer		
	ON	OFF	ON	OFF	
700	Over 0.5	—	—	—	
1300	—	1.4±0.4	—	—	
1600	—	3.9±2	—	490±20 (5.0±0.2)	Standard
1950	—	7.0 ^{+ 0.4} _{-0.3}	—	—	

Timer adjustment

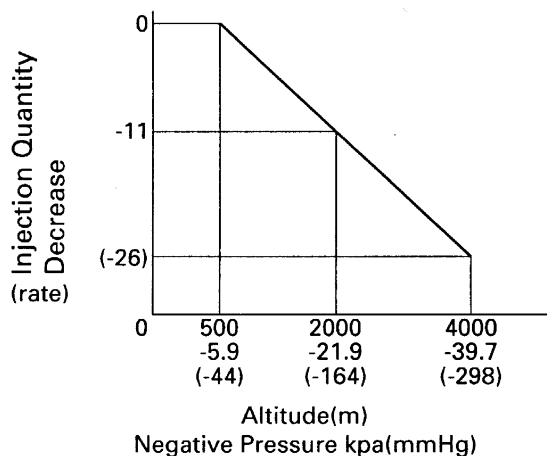


N6A3466E

Adjustment specification of aneroid compensator

Pump rotation (rpm)	Altitude (m)	Air pressure difference (kPa (mmHg))	Amount of reduction (mm ³ /ST)	Rate of reduction (%)
1000	0	0	0	0
	(500)	-5.9±3.3 (-44±3)	Inflation point	Inflation point
	2000	-21.9 (-164)	-4.6±1	-11±3

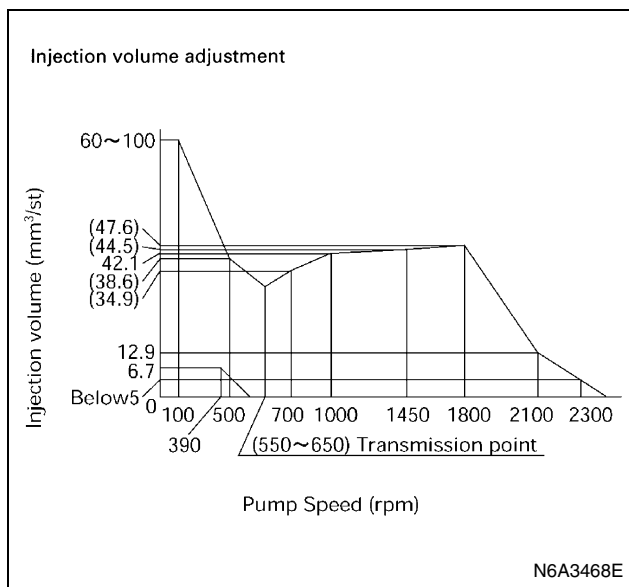
Aneroid compensator adjustment



N6A3467E

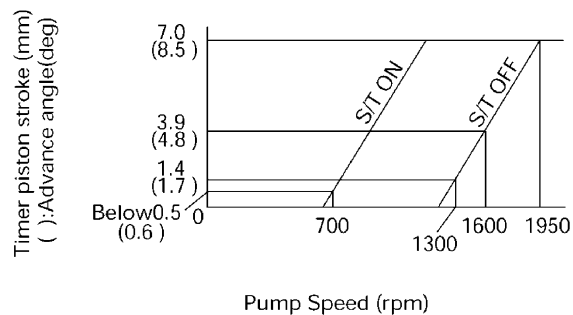
Engine ; 4JB1**Injection pump identification No. ; 104746-1230, 1240, 1250, 1260, 1280, 1290, 1370****Adjustment specification of injection volume**

Pump rotation (rpm)	Average injection quantity (mm ³ /ST)	Uneven amplitude (mm ³ /ST)	Oil temperature (°C)	Remarks
500	(38.6)	—	48±2	
700	34.9±2.5	—	50±2	
1000	42.1±1.0	4.0	50±2	Standard
1450	44.5±2.5	—	50±2	
1800	47.6±3.0	—	50±2	
2100	12.9±3.0	4.0	52±2	
390	6.7±2.0	2.0	48±2	
100	60 -100	—	48±2	

**Adjustment specification of timer and pump case pressure**

Pump rotation (rpm)	Timer piston stroke (mm)		At pressure of pump (MPa(kg/cm ²))		Remarks
	Solenoid timer		Solenoid timer		
	ON	OFF	ON	OFF	
700	Over 0.5	—	—	—	
1300	—	1.4±0.4	—	—	
1600	—	3.9±2	—	0.49±0.02 (5.0±0.2)	Standard
1950	—	7.0 ^{+ 0.4} _{-0.3}	—	—	

Timer adjustment

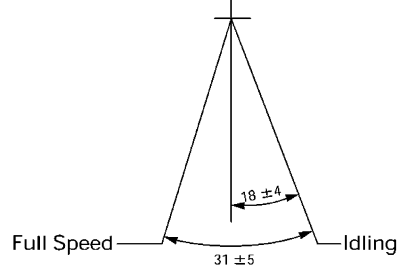


N6A3469E

Adjustment specification of aneroid compensator (For 104746-1230,14746- 1280)

Pump rotation (rpm)	Altitude (m)	Air pressure difference (kPa (mmHg))	Amount of reduction (mm ³ /ST)	Rate of reduction (%)
1000	0	0	0	0
	(500)	-5.9±3.3 (-44±25)	Inflation point	Inflation point
	2000	-21.9 (-164)	-4.6±1	-11±3

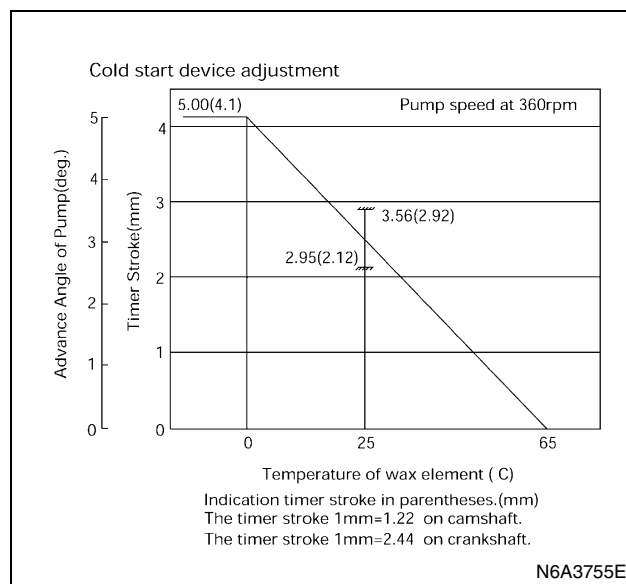
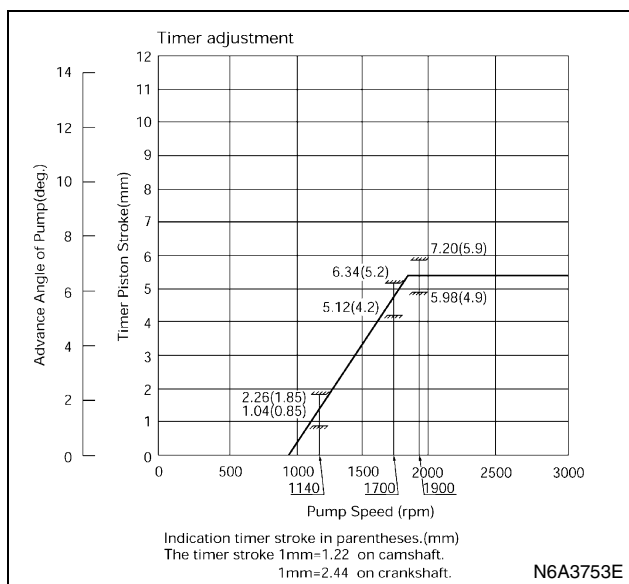
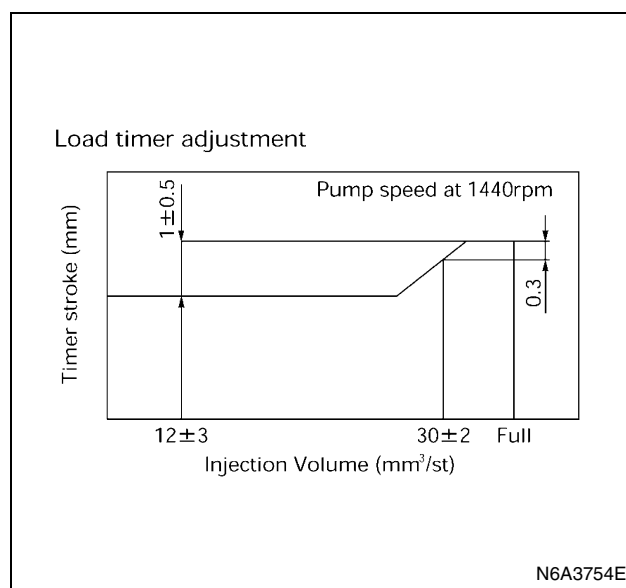
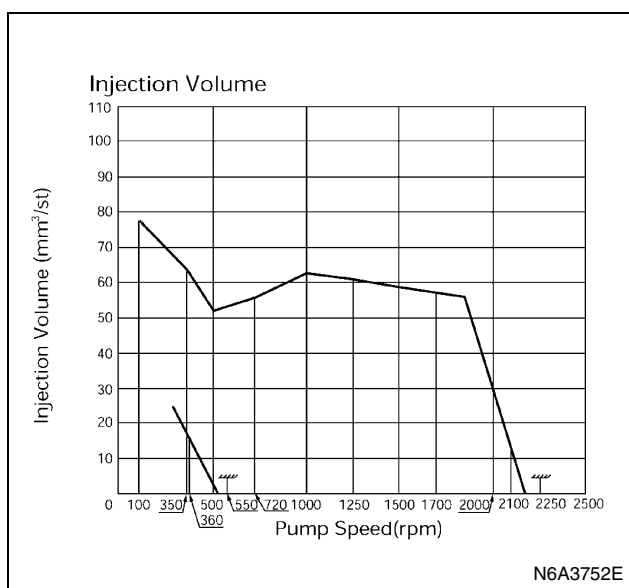
Speed control lever adjustment



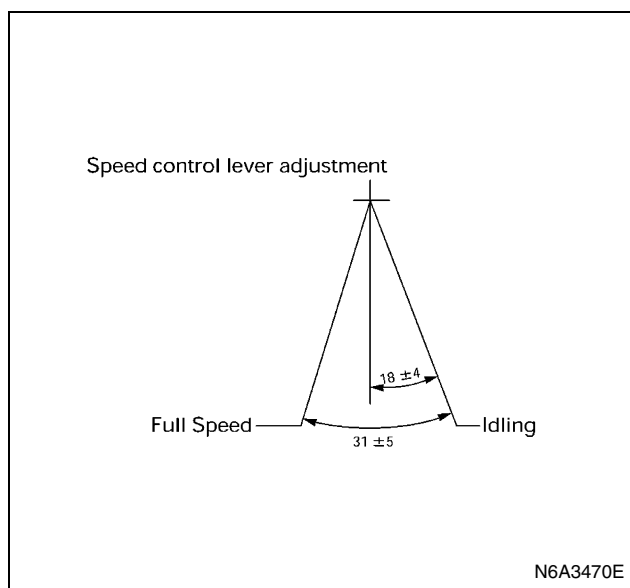
N6A3470E

Engine ; 4JG2 (For '91/542B) (Belt drive)
Injection pump assembly No. ; 897138-8422 (196000-1042)
Adjustment specification of injection volume

Pump rotation (rpm)	Average injection quantity (mm ³ /ST)	Uneven amplitude (mm ³ /ST)	Remarks
100	78±12	—	
350	64±6.0	—	
500	52±3.0	—	
720	55.9±3.4	—	
1000	62.6±1.0	4.0	
1250	60.9±3.5	—	
1700	574±3.5	4.0	
2100	13±5.0	—	
2250	Below 5.0	—	
360	15.9±3.0	2.5	
550	Below 3.0	—	

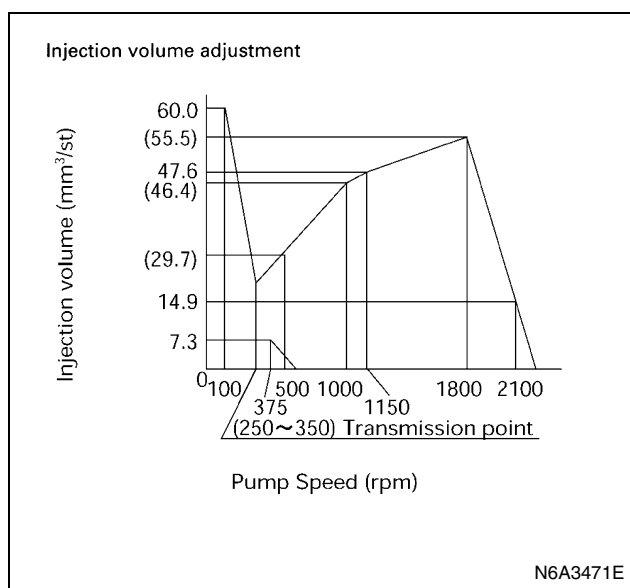


6C-62 ENGINE FUEL



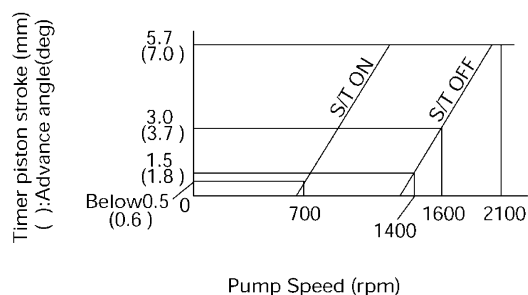
Engine ; 4JB1 (For '91/542A) (Gear drive)
Injection pump identification No. ; 104742-1451, 1461, 1471
Adjustment specification of injection volume

Pump rotation (rpm)	Average injection quantity (mm ³ /ST)	Uneven amplitude (mm ³ /ST)	Oil temperature (°C)	Remarks
500	(29.7±4.5)	—	48±2	
1000	(46.4±3.5)	—	50±2	
1150	47.6±1.0	3.5	50±2	Standard
1800	(55.5 ^{+0.4} _{-6.0})	—	50±2	
2100	14.9±3.0	4.0	52±2	Standard
375	7.3±2.0	2.0	48±2	Standard



Adjustment specification of timer and pump case pressure

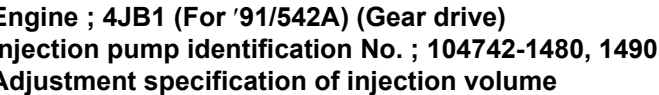
Pump rotation (rpm)	Timer piston stroke (mm)		At of pressure pump (MPa(kg/cm ²))		Remarks
	Solenoid timer		Solenoid timer		
	ON	OFF	ON	OFF	
700	Over 0.5	—	—	—	
1400	—	1.5±0.4	—	—	
1600	—	3.0±0.2	—	0.53±0.02 (5.4±0.2)	Standard
2100	—	5.7 ^{+0.4} _{-0.3}	—	—	

Timer adjustment

N6A3617E

Adjustment specification of aneroid compensator (For 104742-1471)

Pump rotation (rpm)	Altitude (m)	Air pressure difference (kPa (mmHg))	Amount of reduction (mm ³ /ST)	Rate of reduction (%)
1150	0	0	0	0
	(500)	-5.9±3.3 (-44±25)	Inflation point	Inflation point
	2000	-21.9 (-164)	(-5.2±1.3)	(-11±3)



Injection volume (mm³/st)

60.0
(55.5)
47.6
(46.4)
29.7
14.9
7.3

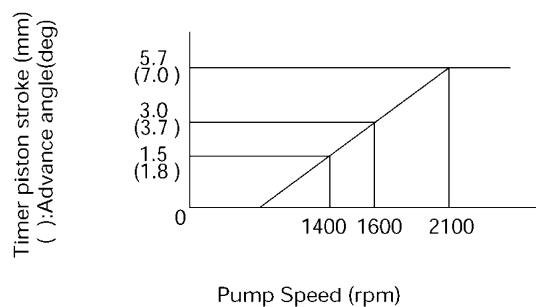
0 100 500 1000 1800 2100

375 1150
(250~350) Transmission point

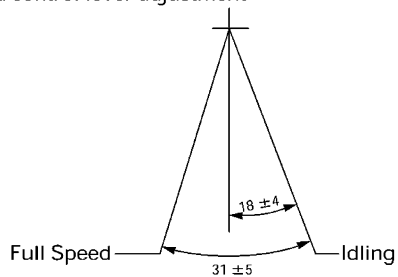
Pump Speed (rpm)

Adjustment specification of timer and pump case pressure

Pump rotation (rpm)	Timer piston stroke (mm)	At pressure of pump (MPa (kg/cm ²))	Remarks
1400	(1.5±0.4)	—	
1600	3.0±0.2	0.53±0.02 (5.4±0.2)	Standard
2100	5.7 ^{+0.4} _{-0.3}	—	

Timer adjustment

N6A3619E

Speed control lever adjustment

N6A3470E

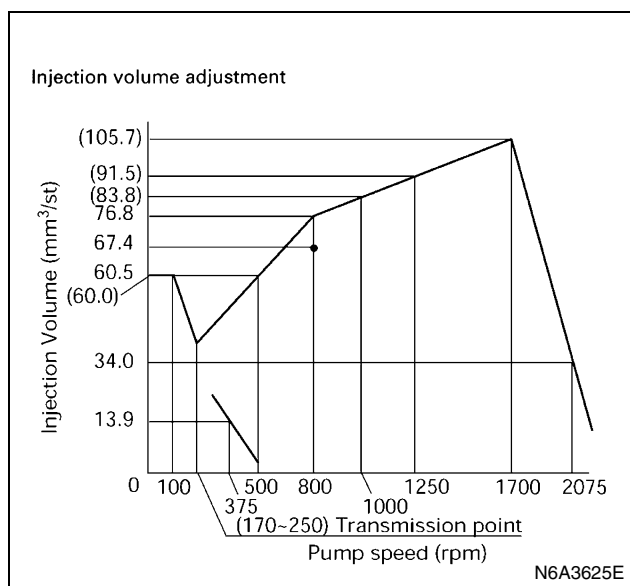
6C-66 ENGINE FUEL

Engine ; 4JB1-TC

Injection pump identification No. ; 104746-6601

Adjustment specification of injection volume

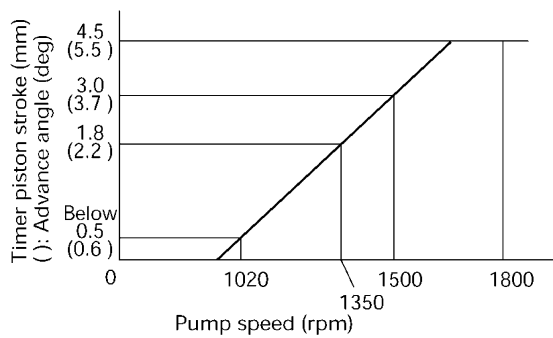
Pump rotation (rpm)	Average injection quantity (mm ³ /ST)	Uneven amplitude (mm ³ /ST)	Boost pressure (kPa (kg/cm ²))	Oil temperature (°C)	Remarks
500	60.5±1.0	5.0	0	48±2	Standard
800	67.4±1.0	5.5	52.0 (0.531)	50±2	Standard
800	76.8±1.0	6.0	80.0 (0.821)	50±2	Standard
1000	(83.8±6.5)		80.0 (0.821)	50±2	
1250	(91.5±6.5)		80.0 (0.821)	50±2	
1700	(105.7±6.5)		80.0 (0.821)	50±2	
2075	34.0±3.0	7.0	80.0 (0.821)	52±2	Standard
375	13.9±2.0	2.0	0	48±2	Standard
100	60 ⁺⁴⁰ ₋₀		0	48±2	



Adjustment specification of timer and pump case pressure

Pump rotation (rpm)	Timer piston stroke (mm)	At pressure of pump (MPa (kg/cm ²))	Boost Pressure (kPa (kg/cm ²))	Remarks
1020	Below 0.5		80.0 (0.82)	
1350	1.8±0.2	471±29 (4.8±0.3)	80.0 (0.82)	Standard
1500	(3.0±0.4)		80.0 (0.82)	
1800	4.5 ^{+0.4} _{-0.3}		80.0 (0.82)	

Timer adjustment

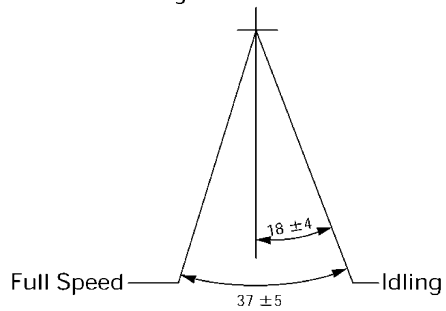


N6A3626E

Potentiometer adjustment

Pump speed (r/min)	Out-put voltage (V)	Average injection quantity (mm ³ /st)	BoostPressure (kPa (kg/cm ²))	Remarks
1080	3.56±0.03	27.5±2.0	0	Standard
375	(0.93±0.45)	13.9±2.0	0	Standard

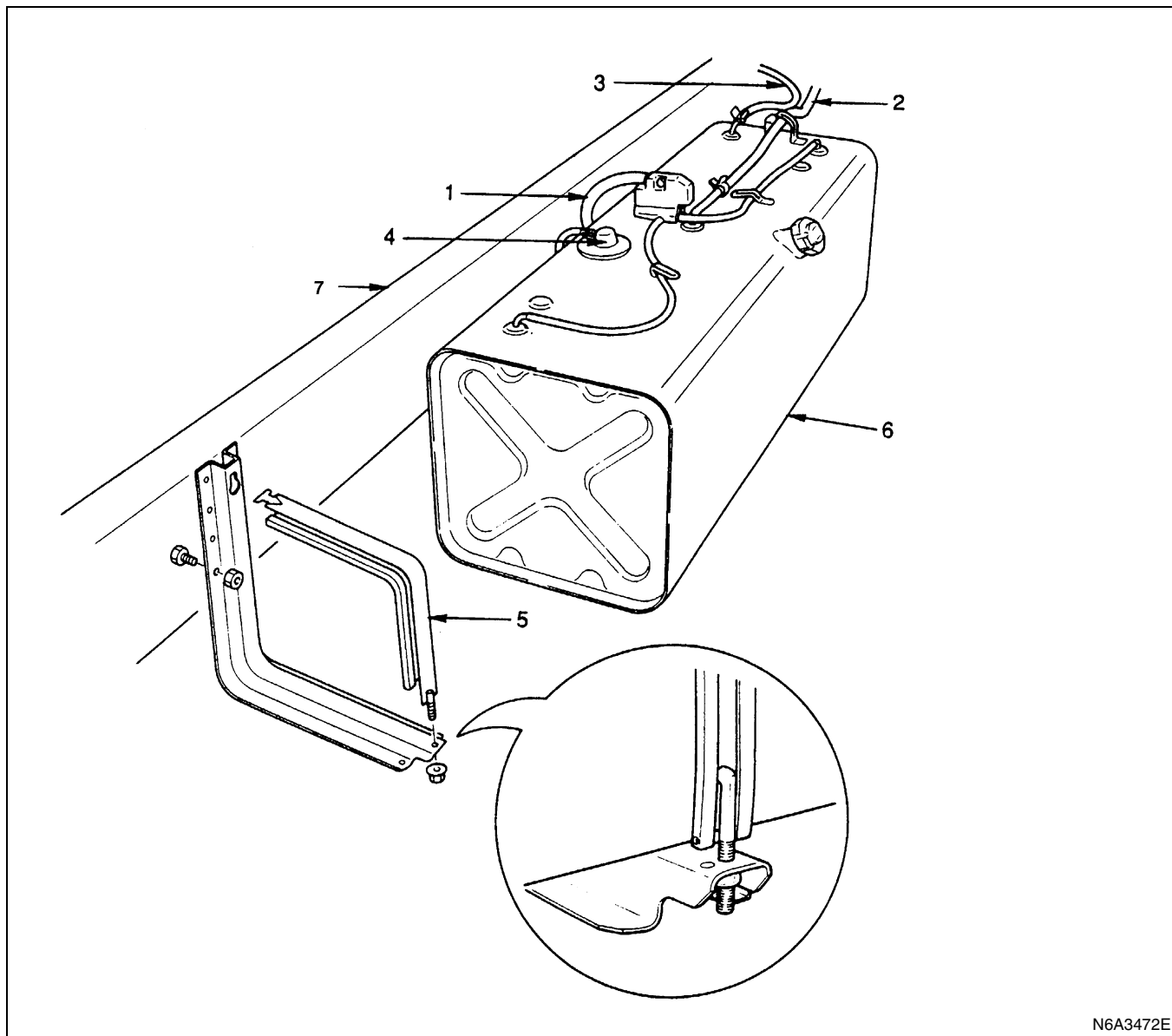
Speed control lever adjustment



N6A3622E

FUEL TANK

Component



N6A3472E

Legend

- | | |
|------------------------------|--------------|
| 1. Evaporator fuel hose | 5. Band |
| 2. Fuel feed hose | 6. Fuel tank |
| 3. Fuel return hose | 7. Frame |
| 4. Fuel gauge unit connector | |

Removal

Preparation:

- Disconnect battery ground cable.
- Loosen fuel filler cap.
- Drain fuel from drain plug.
- After the drain fuel, tighten the drain plug to the specified torque.

Tighten:

29 N·m(3 kg·m/22 lb·ft)

1. Evaporator Fuel Hose
2. Fuel Feed Hose
3. Fuel Return Hose
 - Plug the hose to prevent fuel from getting spilt, and tie it to the frame with the plugged end up.
4. Fuel Gauge Unit Connector
 - Remove the connector of the fuel gauge.
5. Band
 - Remove the nut of the fuel tank fixing band, and then remove the band end on the frame side.
6. Fuel Tank
 - Pull out the fuel tank to the outside.

Notice:

When it is not possible to pull out the fuel tank, remove the bracket and then draw out the fuel tank downward.

Installation

1. Fuel Tank

Notice:

When the bracket was removed to take off the fuel tank, install the bracket to the frame and tighten it to the specified torque.

Tighten:

55 N·m(5.6 kg·m/41 lb·ft)

When mounting the fuel tank on the bracket, be sure to place the packing section pasted on the fuel tank securely on the bracket.

2. Band
 - Tighten the band to the specified torque.

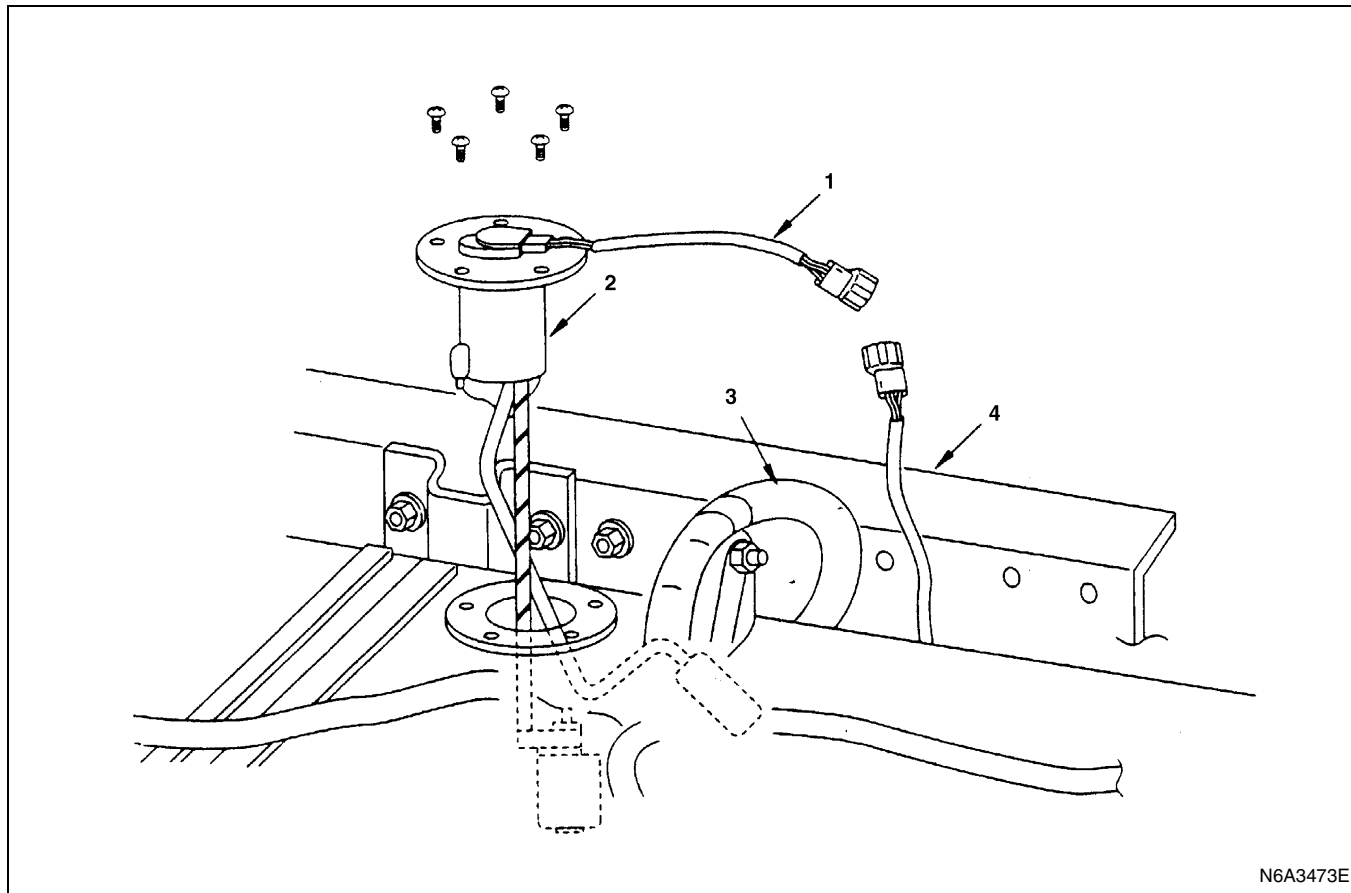
Tighten:

12 N·m(1.2 kg·m/104 lb·ft)

3. Fuel Gauge Unit Connector
 - Connect the fuel gauge unit connector.
4. Fuel Return Hose
5. Fuel Feed Hose
 - Set the hose to the pipe more than 25 mm (0.98 in) deep.
6. Evaporator Fuel Hose
 - Fill the fuel to the fuel tank.
 - Connect battery ground cable.

FUEL GAUGE UNIT

Component



N6A3473E

Legend

- | | |
|------------------------------|-------------------------|
| 1. Fuel gauge unit connector | 3. Evaporator fuel hose |
| 2. Fuel gauge unit | 4. Frame |

Removal

Preparation:

- Disconnect battery ground cable.
1. Fuel Gauge Unit Connector
 - Disconnect fuel gauge unit connector from fuel gauge unit.
 2. Fuel Gauge Unit
 - Remove fuel gauge unit fixing screw and fuel gauge unit.

Notice:

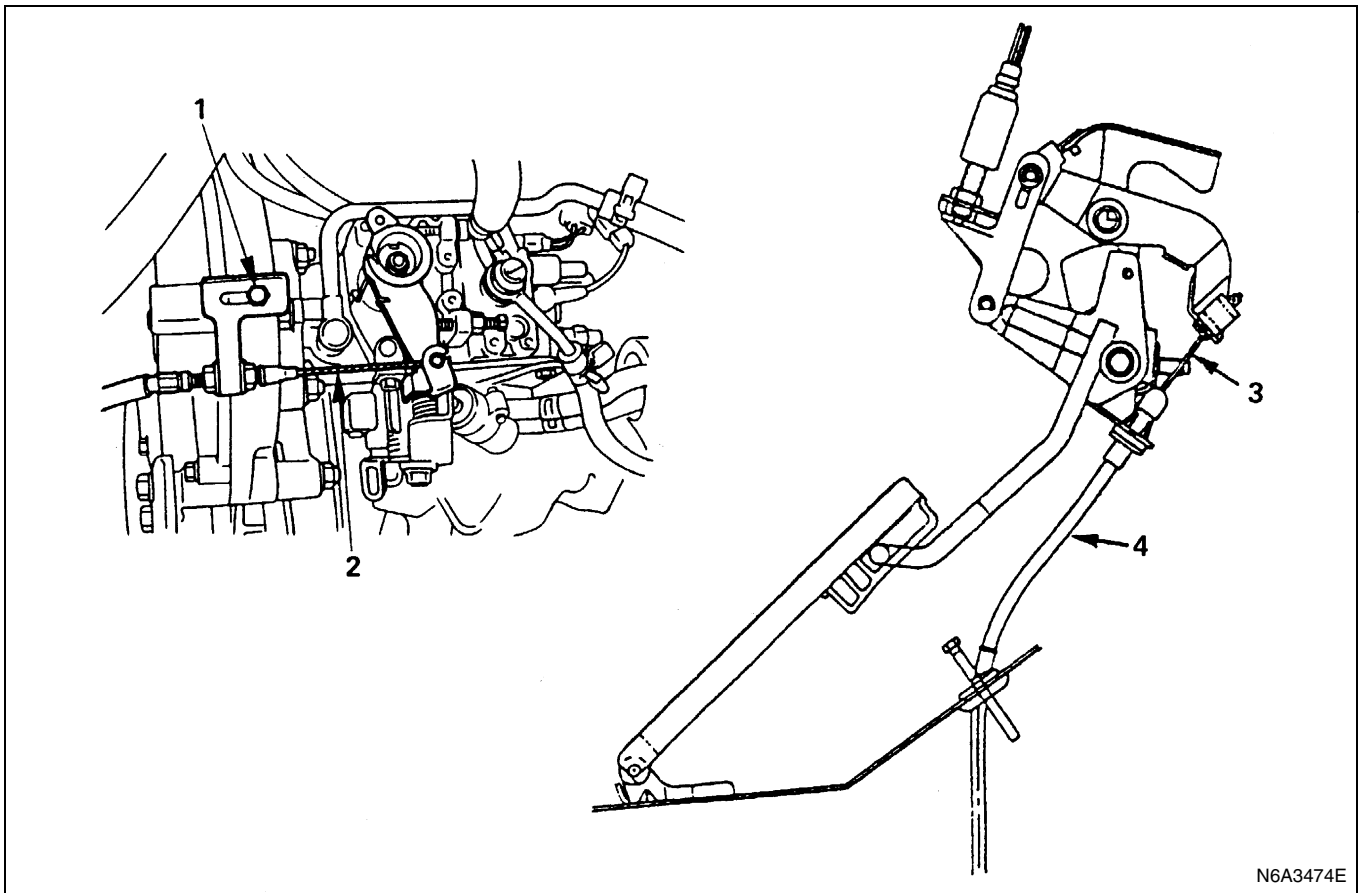
- After removing fuel gauge unit, cover fuel tank with waste to prevent any dust entering.

Installation

1. Fuel Gauge Unit
2. Fuel Gauge Unit Connector
 - Connect the wiring connector to the fuel gauge unit.

ACCELERATOR CONTROL CABLE

Component



N6A3474E

Legend

- | | |
|-----------------------------|------------------------------|
| 1. Adjust unit | 3. Accelerator control wire |
| 2. Accelerator control wire | 4. Accelerator control cable |

Removal

1. Adjust Nut
 - Loosen the adjust nut on the cable bracket mounted on the inlet manifold.
2. Accelerator Control Wire (Injection Pump Side)
 - Remove the control wire from injection pump control lever.
3. Accelerator Control Wire (Accelerator Pedal Side)
 - Remove the accelerator control wire from accelerator pedal.
4. Accelerator Control Cable
 - Remove the cable clip from intake manifold duct.
 - Remove the cable clip from chassis frame.
 - Pull out the wire to the chassis side through the grommet hole of the floor board, and remove the control cable.

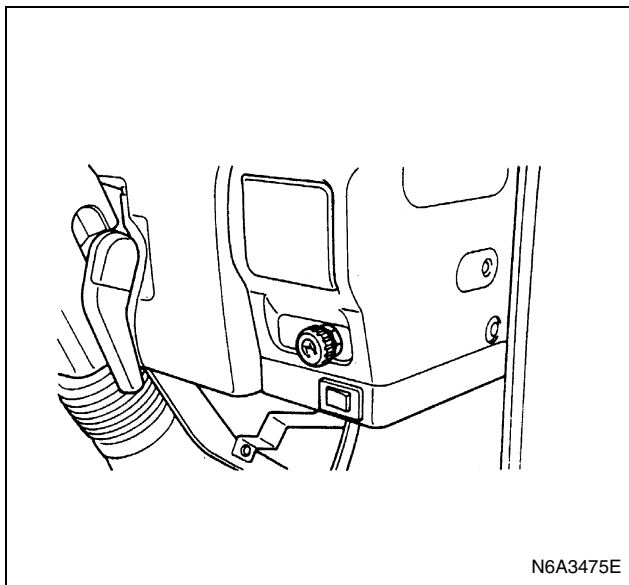
- The control cable should move smoothly.
- The control cable should not be bent or kinked.
- The control cable should be free of damage and corrosion.

Installation

1. Accelerator Control Cable
 - Take care that the core wire of the cable does not get damaged or kinked.
 - Pull the cable through the grommet hole from under the floor.
 - Set the groove of the grommet securely into the floor panel.
 - Lower the cab.
2. Accelerator Control Wire (Accelerator pedal side)
 - Connect the accelerator control wire to the accelerator pedal.
 - Check to see if the idling control knob is fully turned to the left.

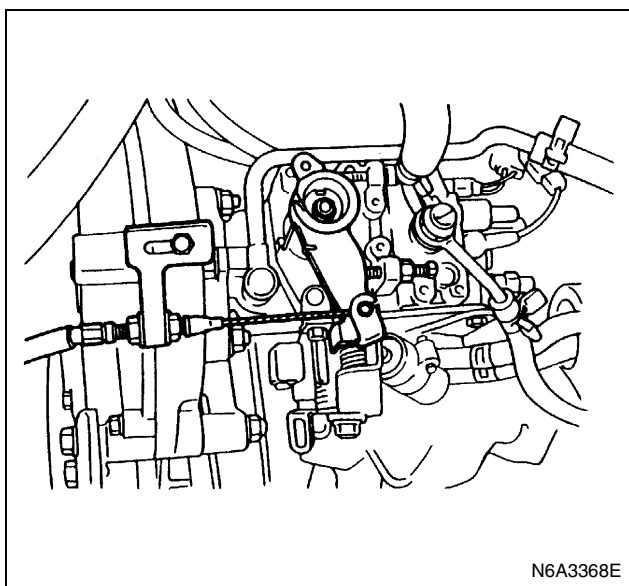
Inspection

Check the following items, and replace the control cable if any abnormality is found.



- In the operating range of the accelerator pedal, check to see if the accelerator pedal and the injection pump lever return without fail to their original positions respectively.

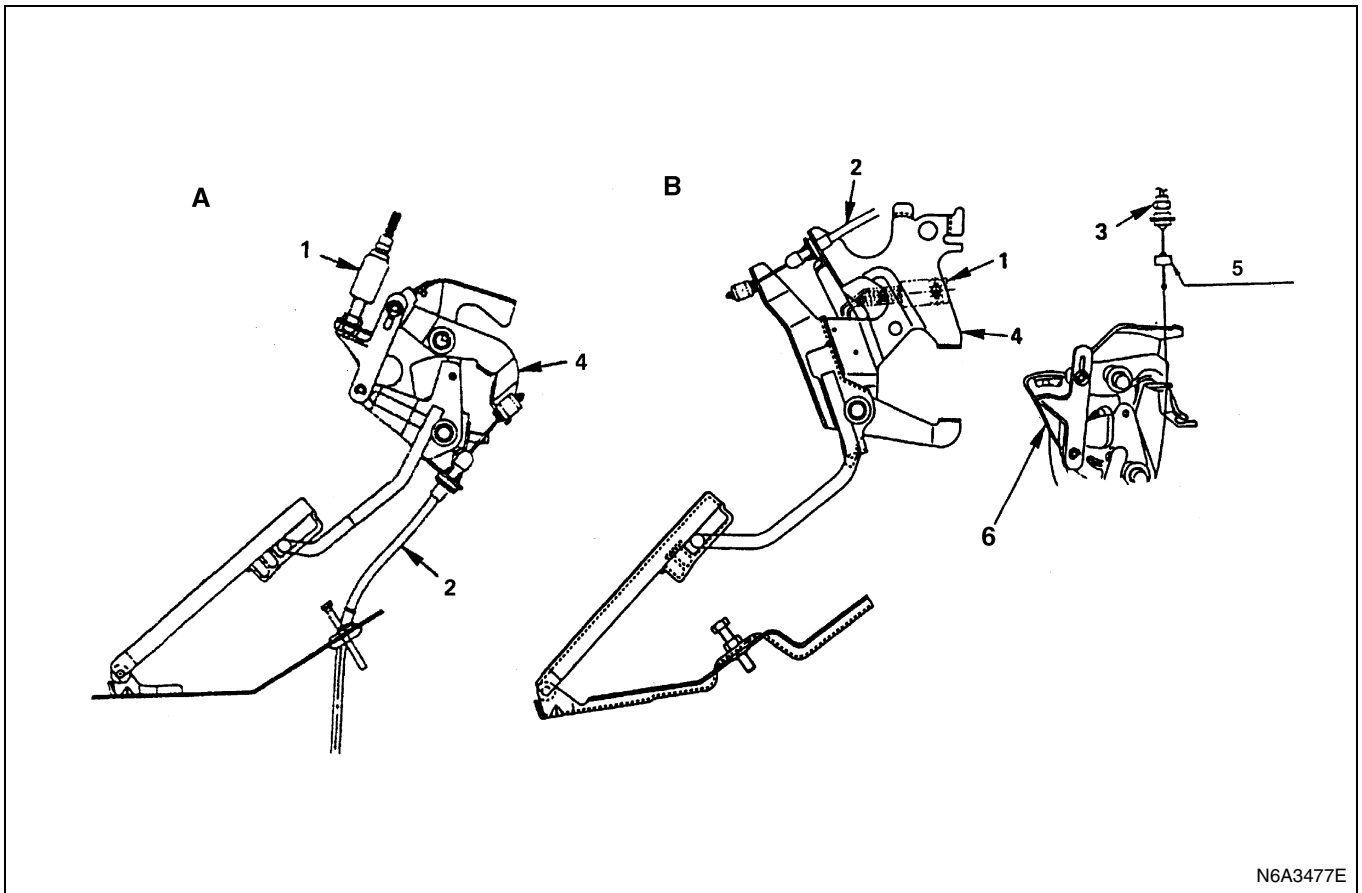
- Tilt up the cab.
3. Accelerator Control Wire (Injection pump side)
- Install the tip end of the wire to the engine control lever.



4. Lock Bolt
- With the accelerator control lever attached to the stopper bolt, pull the cable lightly toward the front of the axis and fasten the cable bracket with the lock bolt.
 - Check to see if the injection pump lever is at the idle position (with the lever in touch with the stopper bolt).
 - Connect the battery ground cable.
 - Lower the cab.
 - Check to see if the accelerator pedal play is in the range of 5 — 10 mm above the pedal pad.
 - Press down on the accelerator pedal fully, and check to see if the engine rotates at the maximum speed with the linkage in the smooth operation.

ACCELERATOR PEDAL

Component



N6A3477E

Legend

- | | |
|------------------------------|-------------------------------|
| A. RHD | 3. Idling control cable |
| B. LHD | 4. Accelerator pedal assembly |
| 1. Idle switch connector | 5. Wire guard |
| 2. Accelerator control cable | 6. Accelerator pedal bracket |

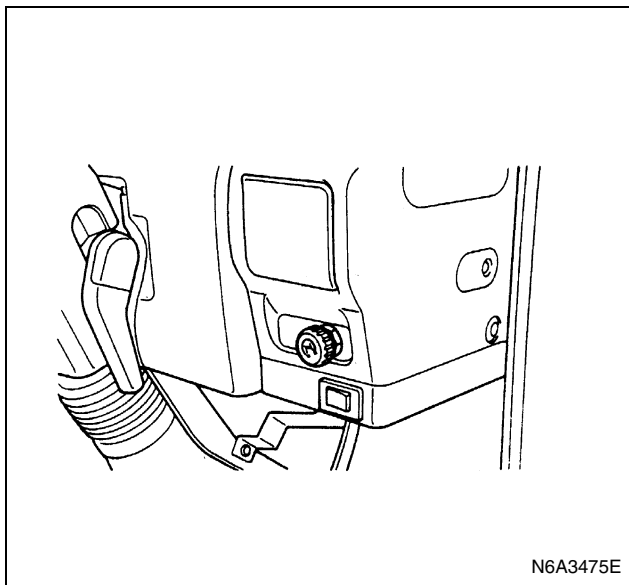
Removal

1. Idle Switch Connector
2. Accelerator Control Cable
 - Remove control cable from accelerator pedal bracket.
3. Idling Control Cable
 - Remove control cable from accelerator pedal bracket.
4. Accelerator Pedal Assembly
 - Remove accelerator pedal assembly from brake pedal bracket.

- Install the cable to the lever of the accelerator pedal bracket.
- 3. Accelerator Control Cable
 - After confirming that the idling control knob is fully turned to the left, install the accelerator control cable.
- 4. Idle Switch Connector

Installation

1. Accelerator Pedal Assembly
 - Apply the sliding section with grease, and install it to the brake pedal bracket.
2. Idling Control Cable



Adjustment of the Press-Down Amount of the Accelerator Pedal

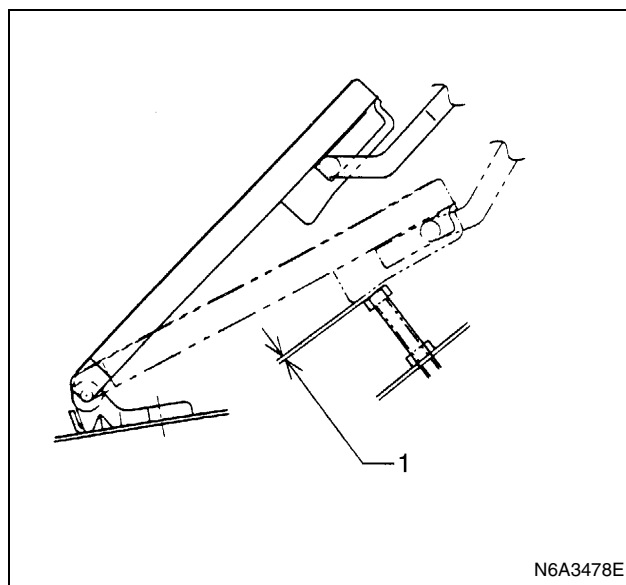
- After installing each cable, give a full stroke to the accelerator pedal while pushing the accelerator pedal pad by hand.
- Adjust the stopper bolt so that the clearance between the pedal pad stopper bolt and the back of the pad becomes 0 — 2 mm (0 — 0.079 in), and tighten the lock nut to the specified torque.

Tighten:

7.4 N·m(0.75 kg·m/65 lb·ft)

- Check to see if the accelerator pedal play is in the range of 5 — 10 mm (0.2 — 0.4 in) above the pedal pad.
- Press down on the accelerator pedal fully, and check to see if the engine rotates at the maximum speed with the linkage in the smooth operation.
- In the operating range of the accelerator pedal, check to see if the accelerator pedal and the injection pump lever return without fail to their original positions respectively.

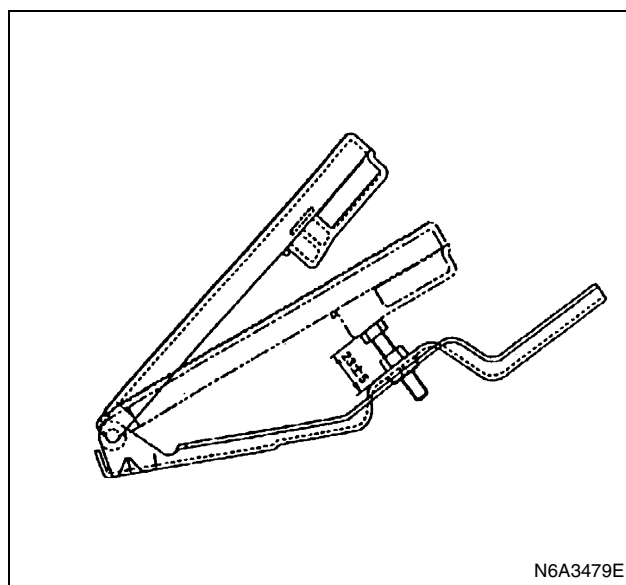
RHD



Legend

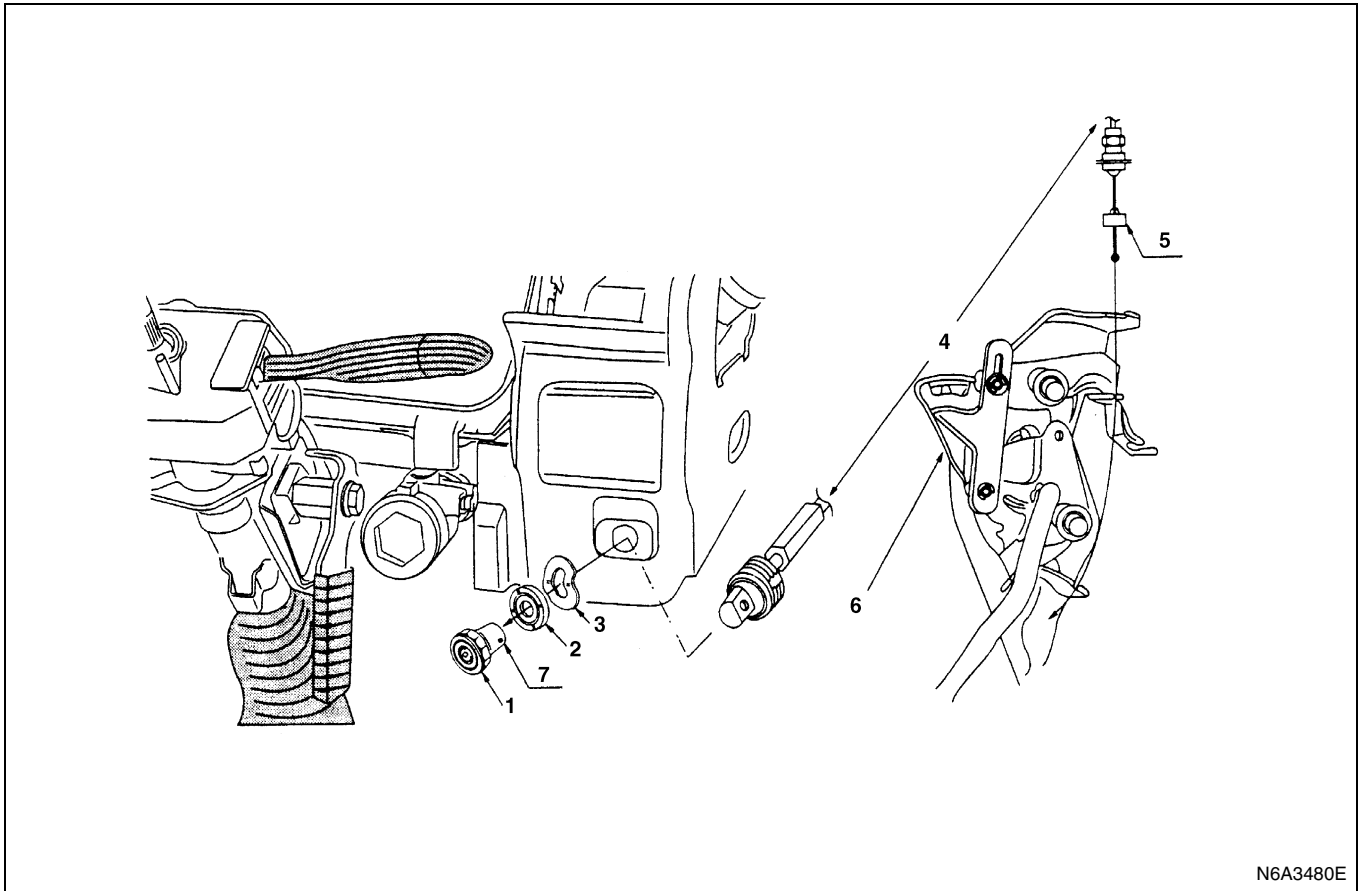
1. Full stroke 0 — 2 mm

LHD



IDLING CONTROL CABLE

Component



N6A3480E

Legend

- | | |
|-----------------------------|------------------------------|
| 1. Idling control knob | 5. Wire guide |
| 2. Idling control cable nut | 6. Accelerator pedal bracket |
| 3. Wave washer | 7. Screw |
| 4. Idling control cable | |

Removal

1. Idling Control Knob
 - Loosen the idling control knob screw and remove the knob from cable.
2. Idling Control Cable Nut
3. Wave Washer
4. Idling Control Cable
 - Remove control cable from accelerator pedal bracket.

Inspection

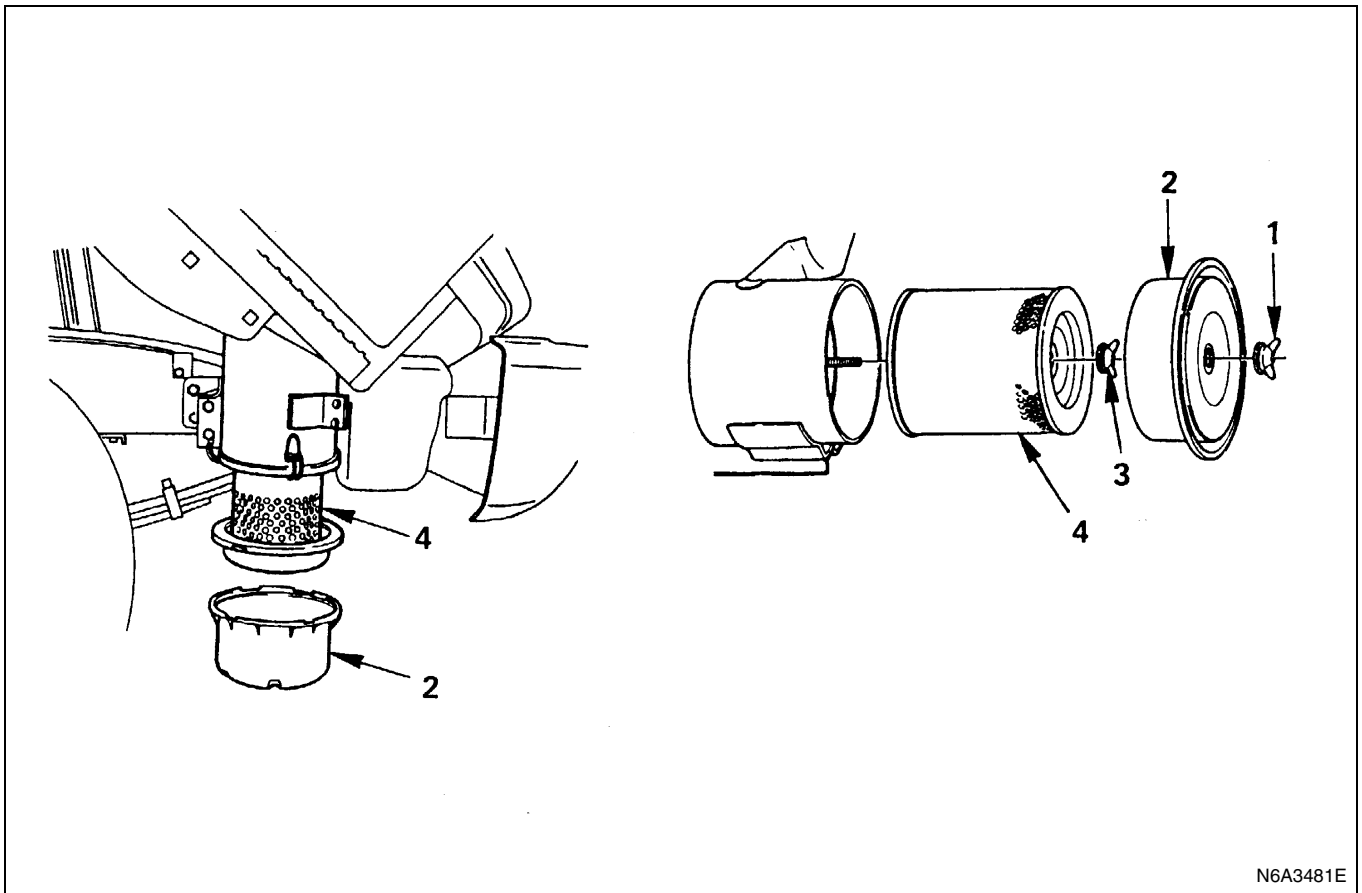
- With the idling control knob not in use, check to see if the injection pump lever is at the idle position (with the lever in contact with the stopper bolt).
- With the idling control knob turned fully to the right, check to see if the engine idles up to 1,500 rpm or more.

Installation

1. Idling Control Cable
 - Install control cable to accelerator pedal bracket.
2. Wave Washer
3. Idling Control Cable Nut
 - Insert the idling control cable into the specified hole of the instrument panel.
 - Install the washer to the cable, and tighten it with the nut.
4. Idling Control Knob
 - Insert the idling control knob into the cable, and tighten the screw.

AIR CLEANER ELEMENT

Component



N6A3481E

Legend

- | | |
|-------------------|------------------------|
| 1. Cover wing nut | 3. Filter wing nut |
| 2. End cover | 4. Air cleaner element |

Removal

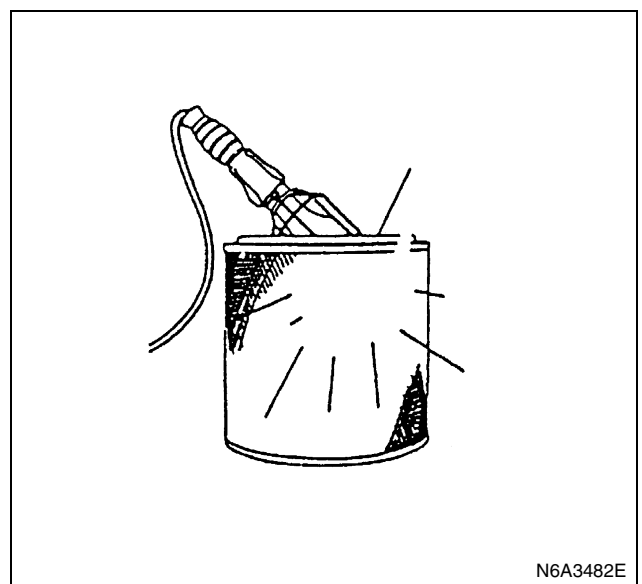
1. Cover Wing Nut
2. End Cover
3. Filter Wing Nut
4. Air Cleaner Element

Clean

- Wipe out the inside of the air cleaner assembly.
- Wipe off the cover.

Inspection

- The air filter with a light for fears or holes.



N6A3482E

Cleaning Method**Dust Fouled Element**

Rotate the element with your hand while applying compressed air to the inside of the element. This will blow the dust free.

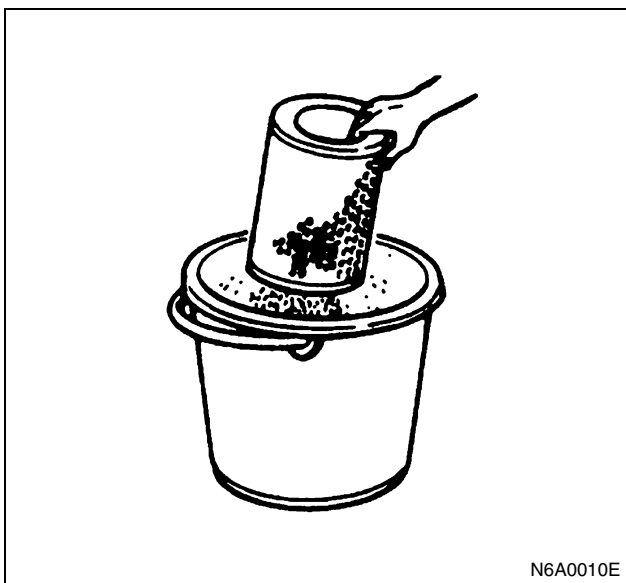
Compressed air pressure	kPa (kg/cm ² /psi)
392 — 490 (4 — 5/57 — 71)	

Caution:

Do not bang the element against another object in an attempt to clean it. Damage to the element will result.

**Carbon and Dust Fouled Element**

1. Prepare a cleaning solution of Isuzu Genuine Element Cleaner (Donaldson D1400) diluted with water.
2. Submerge the element in the solution for twenty minutes.



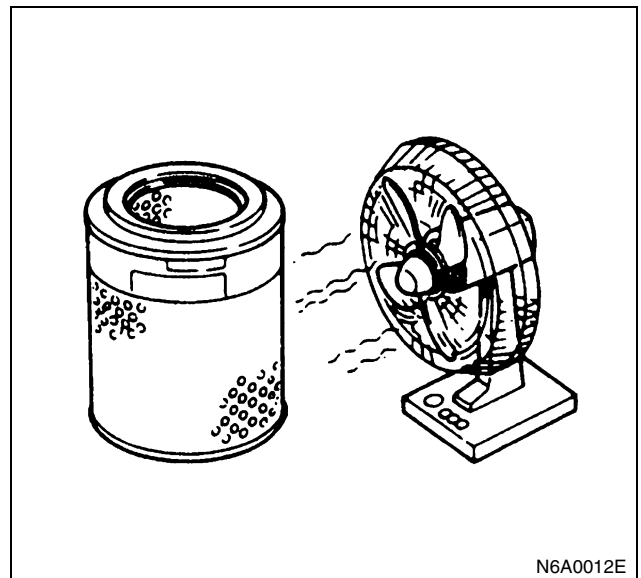
3. Remove the element from the solution and rinse it well with running water. Water pressure must not exceed 274 Kpa (2.8 kg/cm² /40 psi).



4. Dry the element in a well ventilated area. An electric fan will hasten drying.

Notice:

Do not use compressed air or an open flame to dry the element quickly. Damage to the element will result. It will usually take two or three days for the element to dry completely. Therefore, it is a good idea to have a spare on hand to use in the interim.

**Installation**

1. Air Cleaner Element
2. Filter Wing Nut
3. End Cover
4. Cover Wing Nut