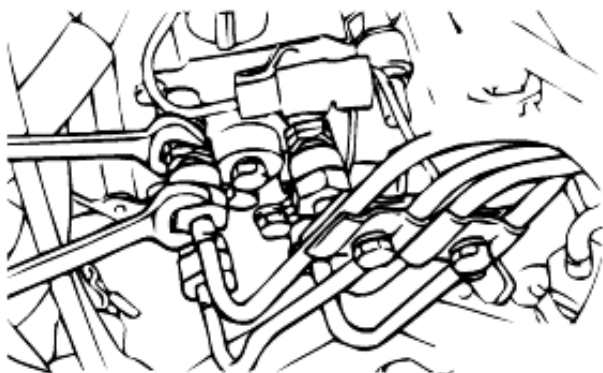
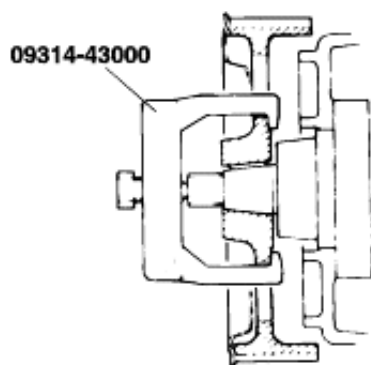


2003 > D 2.5 TCI > D 2.5 TCI > Fuel System > Mechanical Injection Pump > Repair procedures**REMOVAL****Injection pipe****⚠ CAUTION**

Because VE type injection pipe is different from DPC type injection pipe, be careful when you install. (VE type injection pipe is coated yellow)

**Injection pump sprocket****⚠ CAUTION**

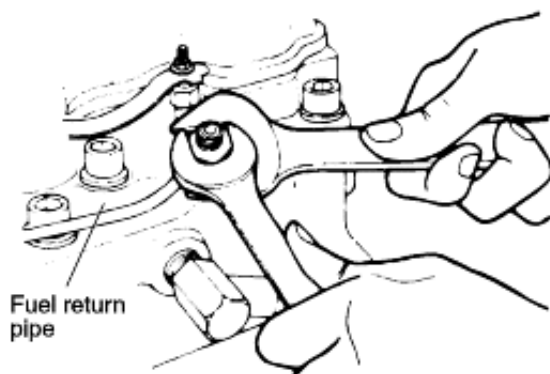
Jarring the sprocket may cause injection pump malfunction.

**Fuel injection pump****⚠ CAUTION**

If you remove the hexagon nut without holding the fuel return pipe nut, the pipe might be damaged. So you must remove the hexagon nut with holding return pipe.

Fuel return pipe nut**⚠ CAUTION**

If you remove the hexagon nut without holding the fuel return pipe nut, the pipe might be damaged. So you must remove the hexagon nut with holding return pipe.

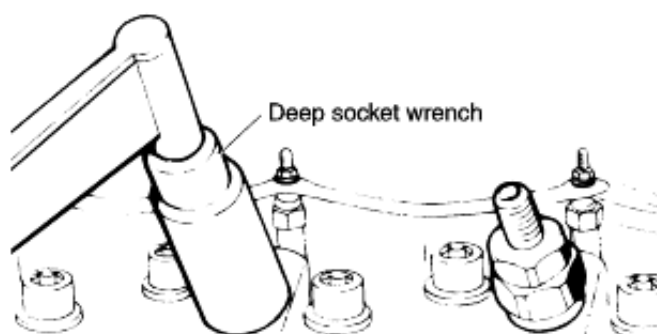


Injection nozzle

⚠ CAUTION

Write the number of the cylinder on the injection nozzle that has been removed.

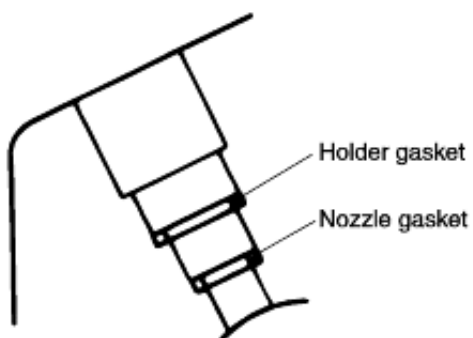
Cover the opening with an appropriate cap to prevent entry of dust, water and foreign material into the fuel passage and combustion chamber.



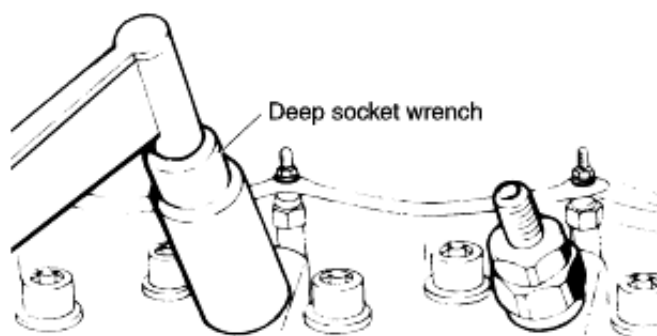
INSTALLATION

Nozzle gasket and holder gasket

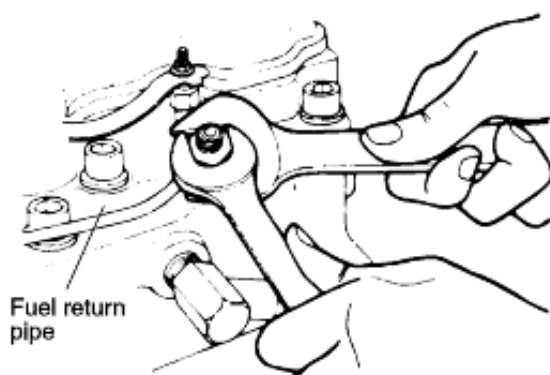
1. Clean nozzle holder installation area of the cylinder head.
2. Fit a new nozzle gasket and holder gasket into the nozzle holder hole in the cylinder head.



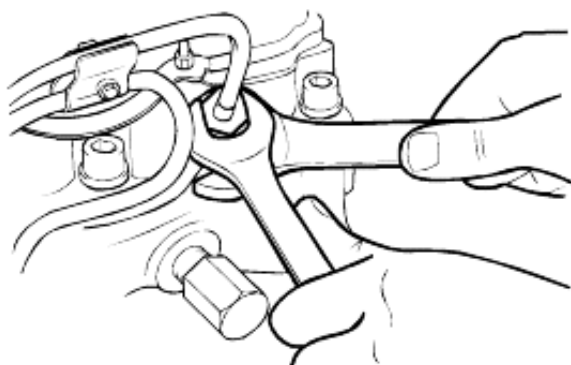
Injection nozzle



Fuel return pipe nut



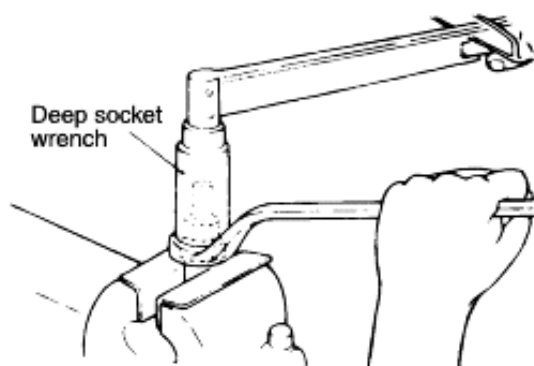
Injection pipe



DISASSEMBLY

Retaining nut

1. Lightly clamp the retaining nut with a cushion bracket
2. Hold the retaining nut with a box wrench, and loosen the nozzle holder body using a deep socket wrench.

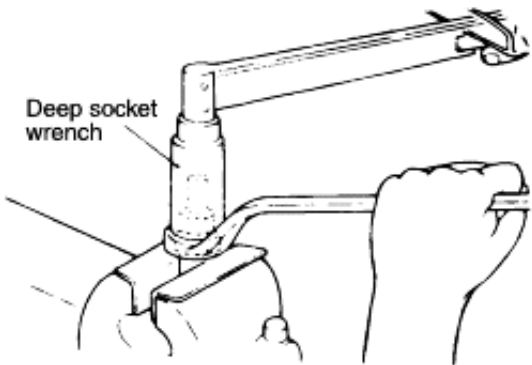


REASSEMBLY

Retaining nut

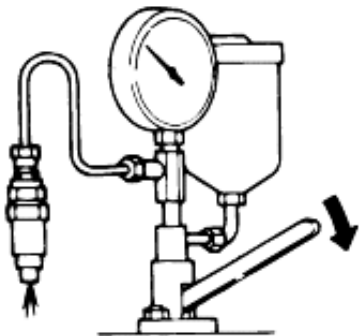
- 1. Finger-tighten the nozzle holder body.
- 2. Lightly clamp the retaining nut in a vise with cushion plates.
- 3. While holding the retaining nut with a box wrench, tighten the nozzle holder body to the specified torque with a deep socket wrench.

35-40 Nm (3.5-4.0 kgm)



INSPECTION

Injection nozzle



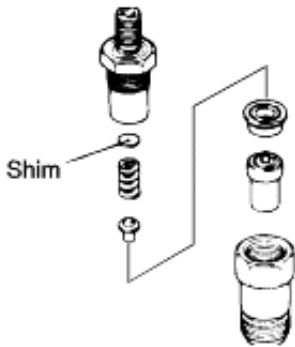
Checking of injection pressure

- 1. Mount nozzle on nozzle tester and operate tester handle to bleed the nozzle.
- 2. Operate tester handle at a rate of approximately one stroke/sec and read the pressure gauge.
If the pressure reading is below the service limit, disassemble nozzle and adjust it by replacing the interior shim so that the pressure reading will be within the standard value range.

Standard value :	
	150 bar
Service limit :	
	132 bar

NOTICE

- 1) Increase of 0.1 mm shim thickness will result in increase of pressure to 12 bar.
- 2) 20 different shims available ranging in thickness from 1.00-1.95 mm.



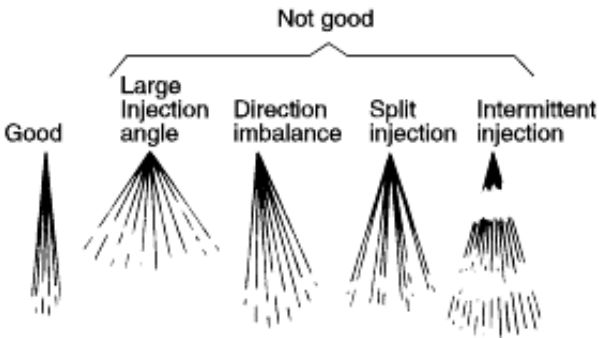
Checking of spray characteristics

- 1. Operate tester handle at a rate of approximately on stroke/sec. When the tester handle is moved, the nozzle should inject fuel producing a characteristic intermittent noise, and vibration of needle valve should be palpable at the tester handle.

NOTICE

Fuel may remain at the nozzle tip after injection. This sometimes occurs when checking the nozzle but it does not mean that the nozzle is malfunctioning.

- 2. Spray condition
Only one shows the good spray condition, others being poor. Spray may be shaped like a rod with coarse fuel particles and the gas oil may be present at the orifice after injection. This is a symptom that occurs uniquely during this inspection and does not represent any abnormal condition of the nozzle.
- 3. Operate the tester handle 4 to 6 strokes per second. The shape of spray is conical with an angle of about 30 degree.



Nozzle oil tightness

INSPECTION

FUEL INJECTION PUMP AND INJECTION NOZZLE ON VEHICLE

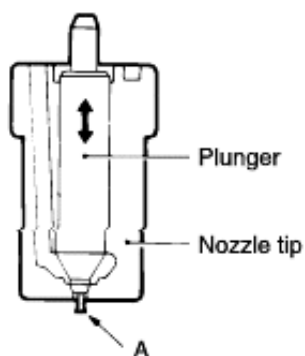
Description	Check procedure	Criteria
Idling run	Measure rpm	702-780 rpm
Color of exhaust gas	Give fast acceleration under no load and check color of exhaust gas. (Measure smoke value).	Voluminous black smoke is unacceptable. (Smoke ref. value : within 50%)
Timer	Operate accelerator lever to maintain an engine speed of approx. 1,500 rpm. In this condition, manually	Engine noise changes.

	operate accelerator switch knob to see how engine speed changes.	
Fuel cut solenoid	Turn on and off ignition switch	Actuating sound (click) is heard.

INSPECTION

Nozzle tip

1. Check the nozzle tip for carbon deposits: Scrape off carbon deposits with a piece of wood land clean each part with petrol. After cleaning, keep parts submerged in diesel fuel. Take particular care to protect the nozzle tip needle valve from damage.
2. While the nozzle tip is submerged in diesel fuel, check that the needle valve slides smoothly. If the needle valve does not slide smoothly, replace the nozzle tip. When replacing the nozzle tip, completely wash off the anticorrosive oil from the new nozzle tip with clean diesel fuel before using it.
3. Check plunger tip "A" for deformation and breakage. If "A" is damaged or broken replace it.



Distance piece

Pressure spring

ADJUSTMENT

1. Loosen (but do not remove) two nuts and two bolts holding the injection pump.
2. Loosen (but do not remove) the 4 nuts on the injection pump side which hold the injection pipes.

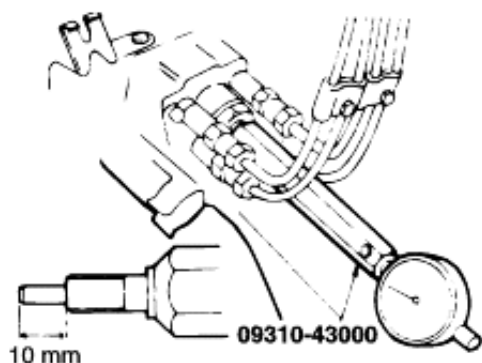
⚠ CAUTION

When loosening the nuts, hold the delivery valve holder with a wrench to prevent it from turning along with the nut.

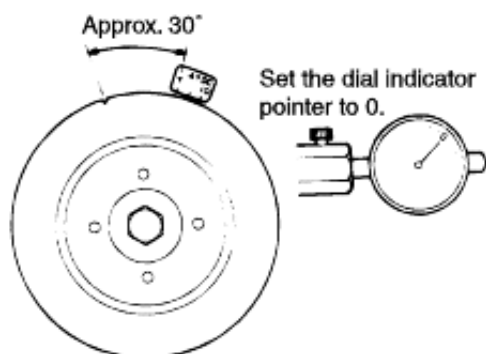
3. Remove the plug from the rear of injection pump, and attach the special tool and dial indicator.

⚠ CAUTION

Before installing the adapter, make sure that the push rod projects 10mm. Push rod projection can be adjusted by means of the interior nut.

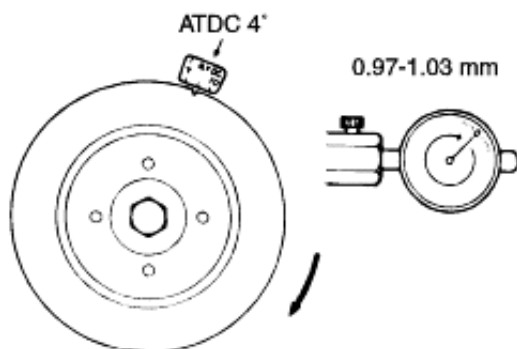


4. Set the notch on the crank pulley at approximately 30° BTDC of the compression stroke of the No.1 cylinder. With the notch in this position, set the dial indicator at zero. Turn the crank pulley slightly in both directions to make sure that the dial indicator pointer does not deviate from the zero position. If the pointer deviates, the notch position is not correct. Readjust it to 30° BTDC.



5. Turn the crankshaft clockwise to bring the notch on the pulley to 4° ATDC, and check to be sure that the dial indicator reading is within the standard value range.

0.97-1.03 mm



6. If dial indicator reading is not within the standard value range, tilt the injection pump body to the right or left until the reading is within the standard value range. Then, temporarily tighten the injection pump nuts and bolts.
7. Repeat Steps 4 and 6 to make sure that the adjustment has been correctly performed.
8. Remove the dial indicator and the special tool.
9. Tighten the bolts and nuts to the specified torque.

