

FUEL SYSTEM

REFER TO 2L, 3L ENGINE REPAIR MANUAL
(Pub. No. RM123E)

NOTE: The following pages contain only the points which differ from the above listed manual.

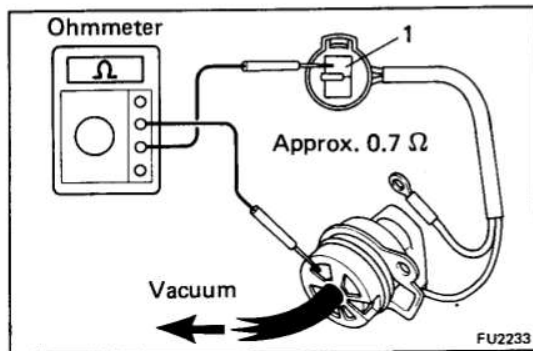
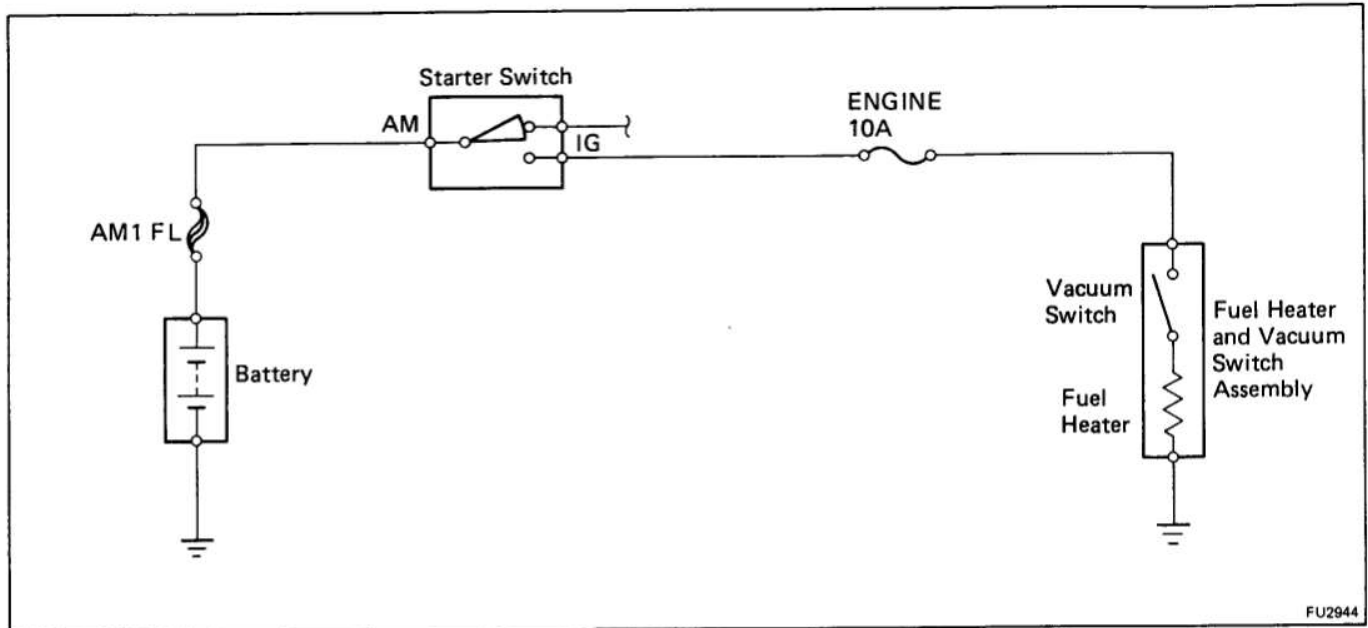
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FUEL HEATER SYSTEM (LJ)	FU-2
INJECTION PUMP	FU-3

FU-2

FUEL SYSTEM – Fuel Heater System (LJ)

FUEL HEATER SYSTEM (LJ)

SYSTEM CIRCUIT



INSPECTION OF COMPONENTS

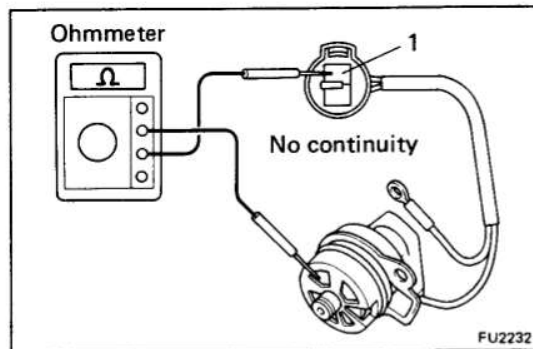
Fuel Heater

INSPECT FUEL HEATER

- Apply a vacuum of 285 ± 50 mmHg (11.22 ± 1.97 in.Hg, 38.0 ± 6.7 kPa) or more to the vacuum switch port.
- Using an ohmmeter, measure the resistance between terminal 1 and the switch body.

Resistance: Approx. 0.7Ω at 20°C (68°F)

If the resistance is not as specified, replace the fuel heater and vacuum switch assembly.



Vacuum Switch

1. INSPECT SWITCH CONTINUITY

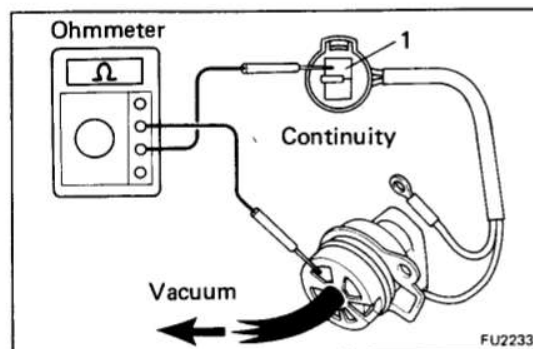
Using an ohmmeter, check that there is no continuity between terminal 1 and the switch body.

If continuity is not as specified, replace the fuel heater and vacuum switch assembly.

2. INSPECT SWITCH OPERATION

- Apply a vacuum of 285 ± 50 mmHg (11.22 ± 1.97 in.Hg, 38.0 ± 6.7 kPa) or more to the vacuum switch port.
- Using an ohmmeter, check that there is continuity between terminal 1 and the switch body.

If operation is not as specified, replace the fuel heater and vacuum switch assembly.

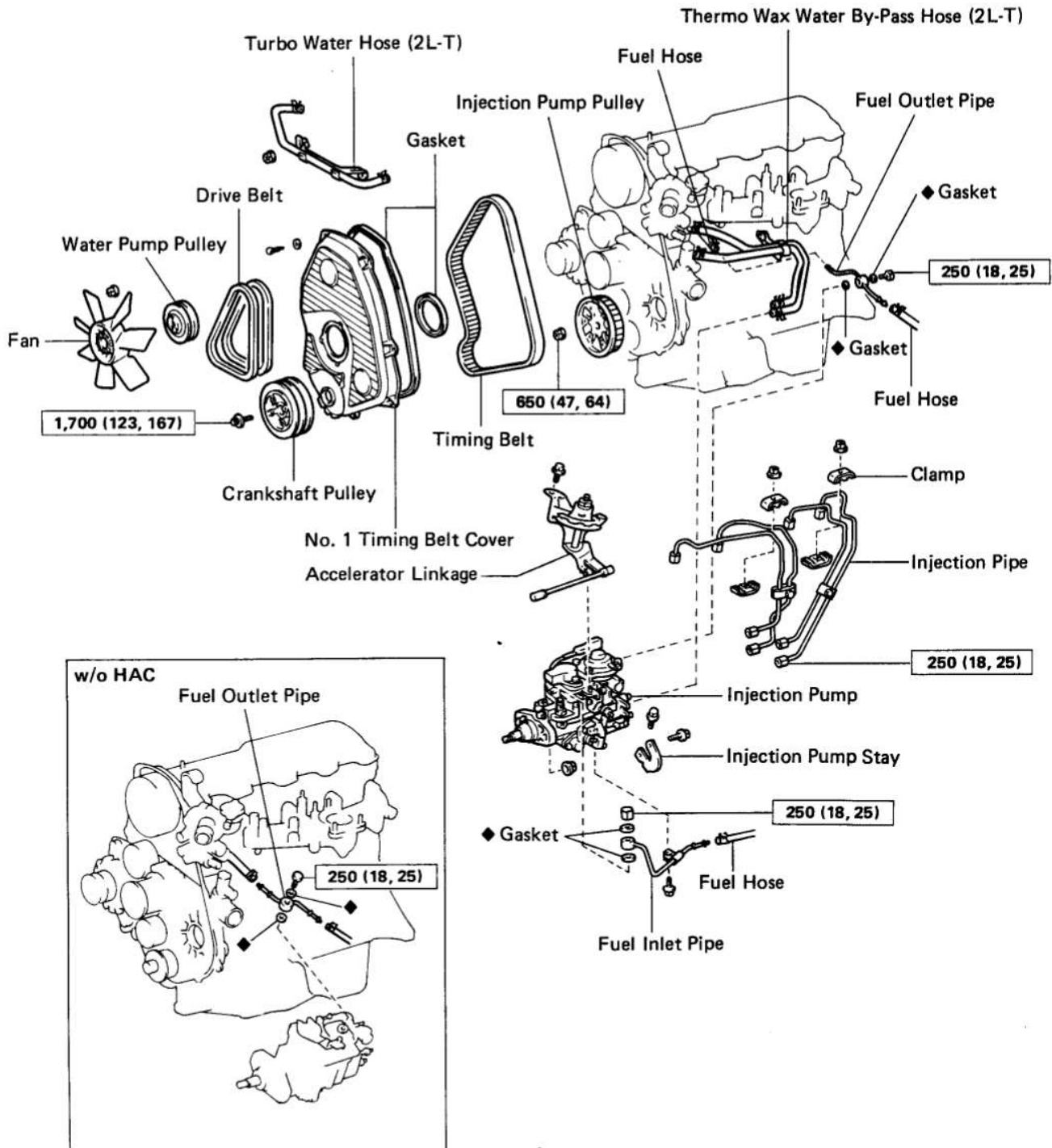


FUEL SYSTEM – Injection Pump

FU-3

INJECTION PUMP

REMOVAL OF INJECTION PUMP



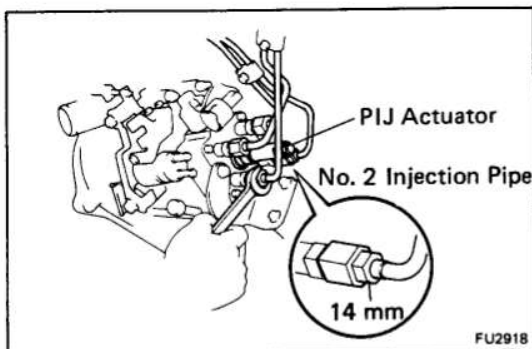
kg-cm (ft-lb, N-m) : Specified torque

◆ Non-reusable part

FU2917

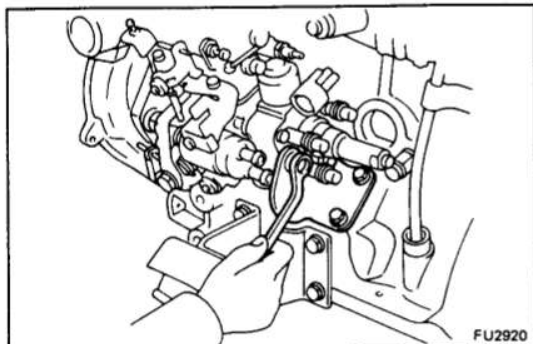
FU-4**FUEL SYSTEM – Injection Pump**

1. (2L-T)
DRAIN ENGINE COOLANT (See page CO-4)
2. (2L-T)
REMOVE TURBO WATER HOSE
3. REMOVE DRIVE BELTS, FAN AND WATER PUMP PULLEY
4. REMOVE CRANKSHAFT PULLEY
5. REMOVE NO. 1 TIMING BELT COVER
6. SET NO. 1 CYLINDER TO TDC/COMPRESSION
7. REMOVE TIMING BELT
8. REMOVE INJECTION PUMP DRIVE PULLEY
9. REMOVE ACCELERATOR LINKAGE
10. (2L-T)
DISCONNECT BOOST COMPENSATOR HOSE
11. (w/ A/C)
DISCONNECT A/C IDLE-UP VACUUM HOSE
12. (2L-T)
DISCONNECT WATER BY-PASS HOSES FROM THERMO WAX
13. DISCONNECT INJECTION PUMP CONNECTOR(S)
14. DISCONNECT FUEL HOSES FROM INJECTION PUMP

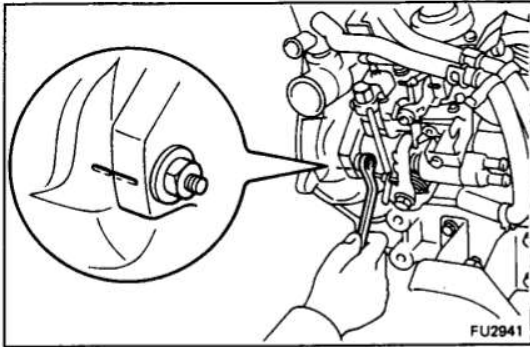
**15. REMOVE INJECTION PIPES**

- (a) Loosen the union nuts of the injection pipes from the injection nozzles.
- (b) Loosen the union nuts of the injection pipes from the injection pump.
- (c) Remove the four clamps and injection pipes.

NOTICE: On vehicles with PIJ (2L-T Austria), do not interfere with the PIJ actuator with the spanner. Use a 14 mm spanner when loosening the union nut of the No. 2 injection pipe.

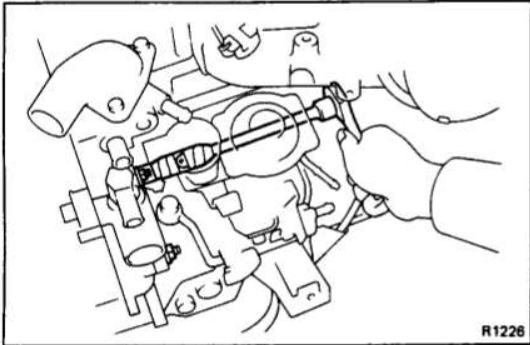
**16. REMOVE INJECTION PUMP**

- (a) Remove the four bolts and pump stay.

FUEL SYSTEM – Injection Pump**FU-5**

(b) Before removing the injection pump, check if the period lines are aligned.

If not, place new matchmarks for reinstallation.



(c) Remove the two nuts and injection pump.

NOTICE:

- Do not hold or carry the injection pump by the adjusting lever.
- Do not put the injection pump (2L-T and w/ HAC) at an angle more than 45° from the horizontal.

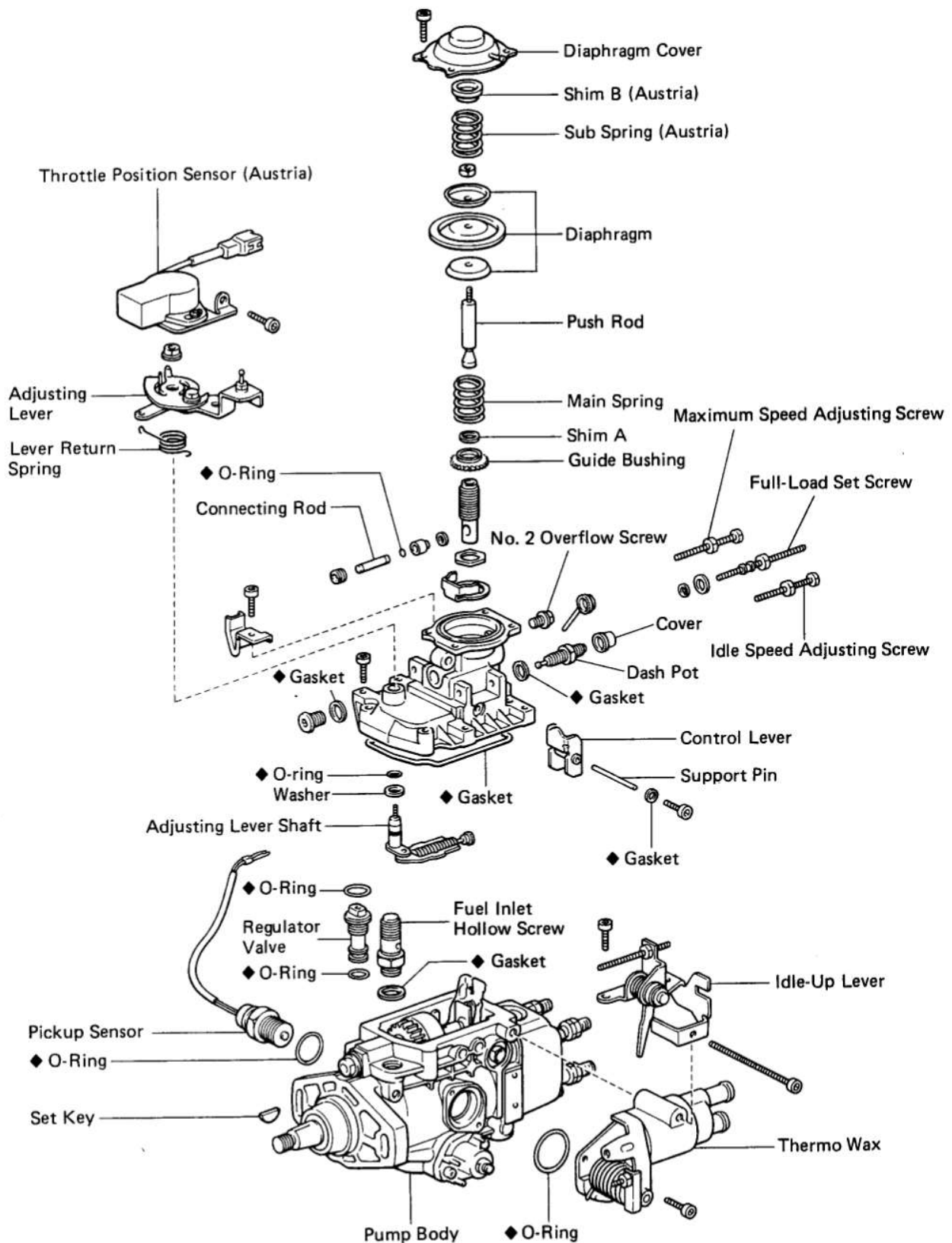
17. REMOVE FUEL INLET AND OUTLET PIPES FROM INJECTION PUMP

FU-6

FUEL SYSTEM – Injection Pump

COMPONENTS

2L-T



◆ Non-reusable part

FU2921

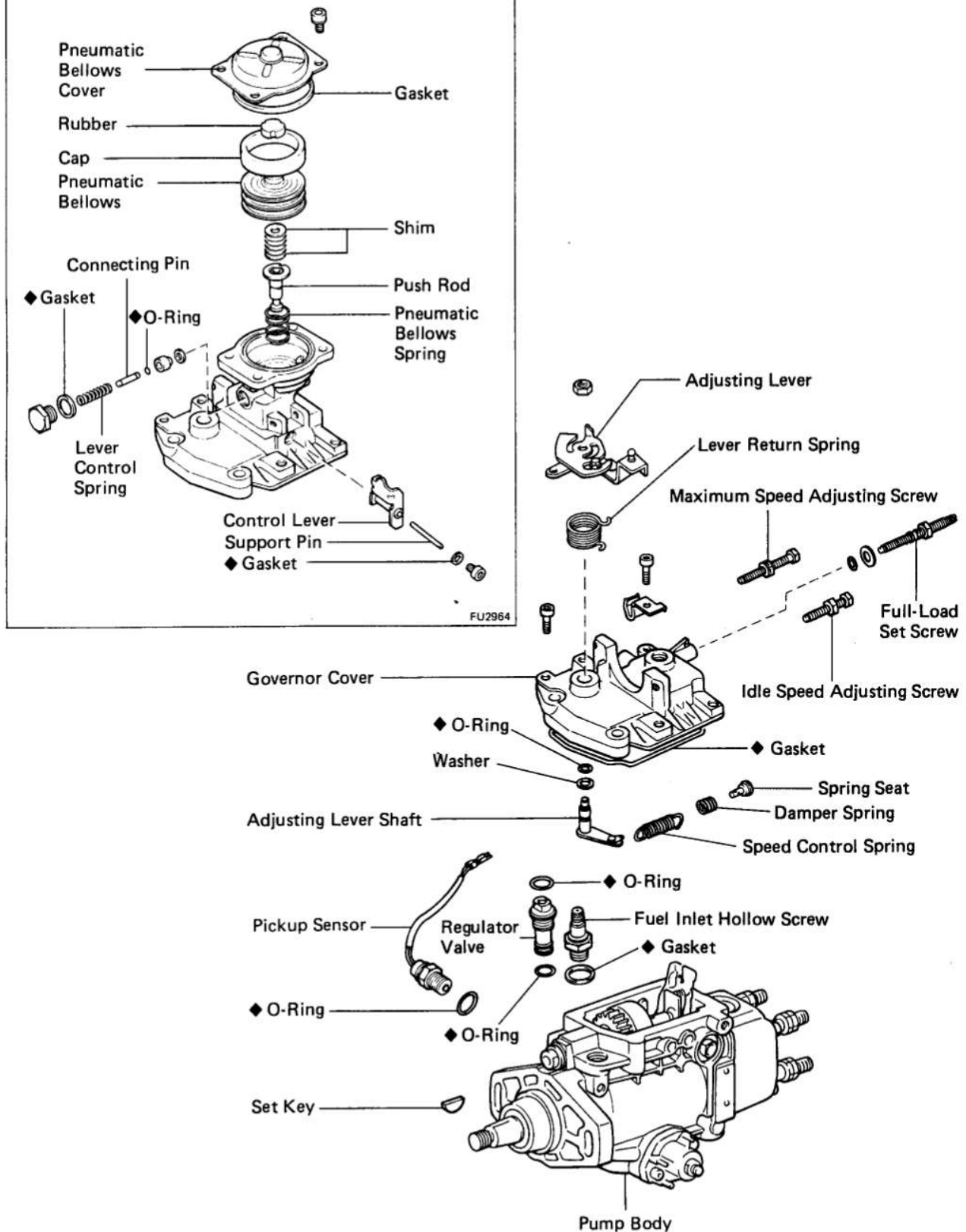
FUEL SYSTEM — Injection Pump

FU-7

COMPONENTS (Cont'd)

3L

w/ HAC

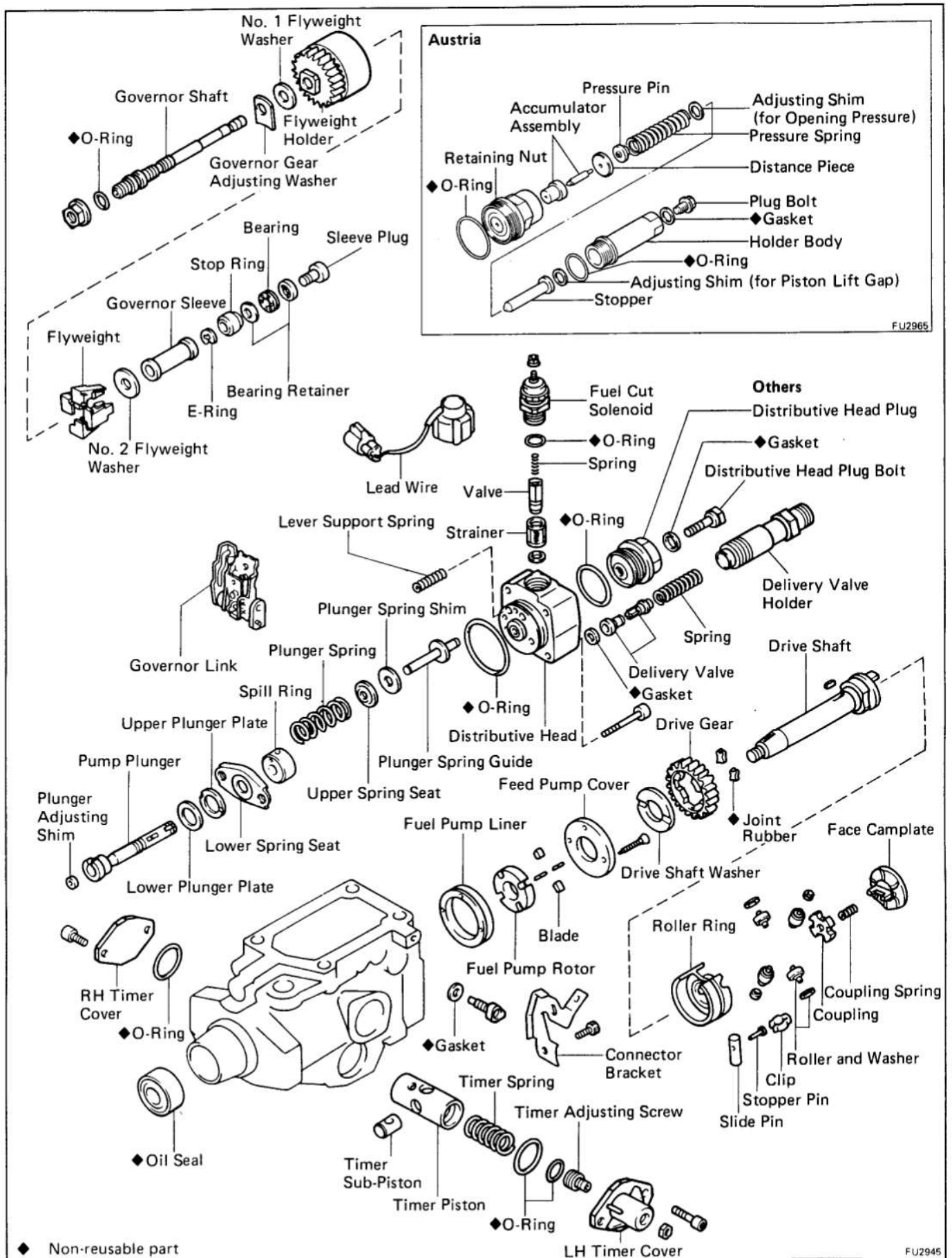


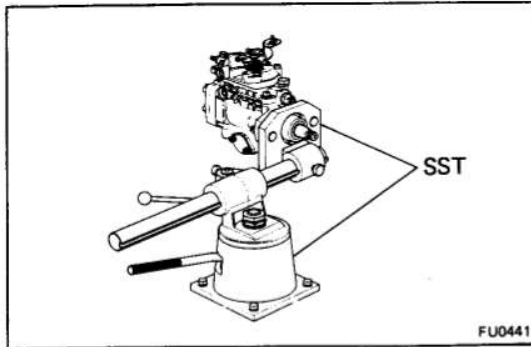
FU2922

FU-8

FUEL SYSTEM – Injection Pump

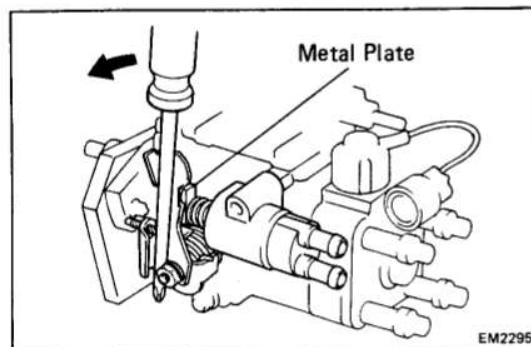
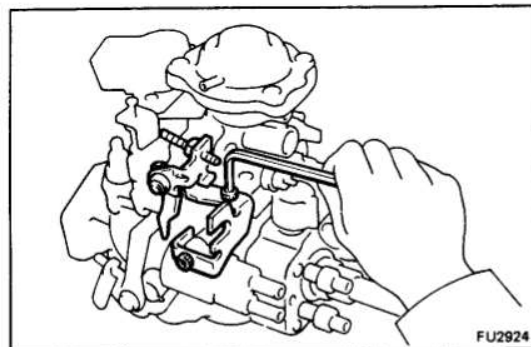
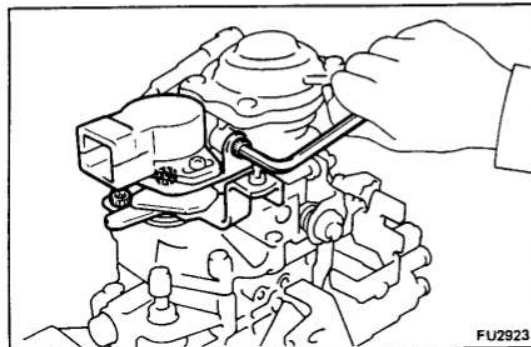
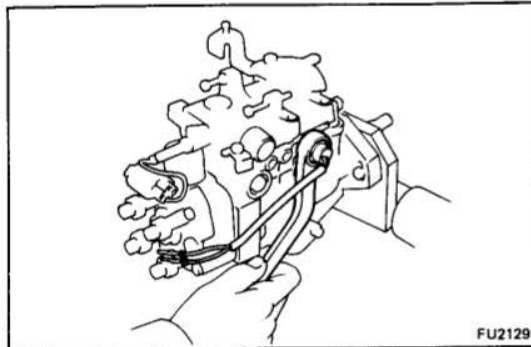
COMPONENTS (Cont'd)

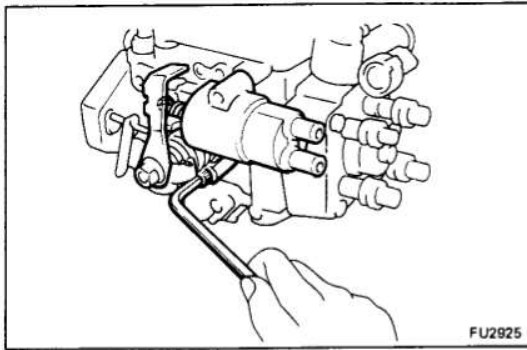


FUEL SYSTEM — Injection Pump**FU-9****DISASSEMBLY OF INJECTION PUMP**

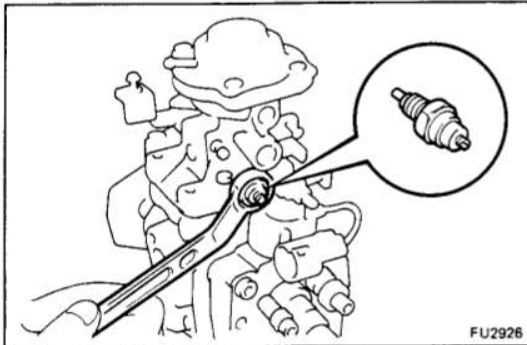
(See pages FU-6 to 8)

1. **MOUNT PUMP ASSEMBLY TO SST (STAND)**
SST 09241-76022 and 09245-54010
2. **REMOVE SET KEY OF DRIVE PULLEY FROM DRIVE SHAFT**
3. (w/ A/C)
REMOVE IDLE-UP ACTUATOR
4. (w/ Tachometer)
REMOVE PICKUP SENSOR
 - (a) Disconnect the lead wires from the connector.
 - (b) Remove the pickup sensor and O-ring.
5. (2L-T Austria)
REMOVE THROTTLE POSITION SENSOR
Using a 5 mm hexagonal wrench, remove the three bolts and throttle position sensor.
6. (2L-T)
REMOVE IDLE-UP LEVER
Using a 5 mm hexagonal wrench, remove the three bolts and idle-up lever.
7. (2L-T)
REMOVE THERMO WAX
 - (a) Using a screwdriver, turn the cold starting lever counterclockwise approx. 20°.
 - (b) Put a metal plate (thickness of 8.5 – 10 mm (0.335 – 0.394 in.)) between the cold starting lever and thermo wax plunger.

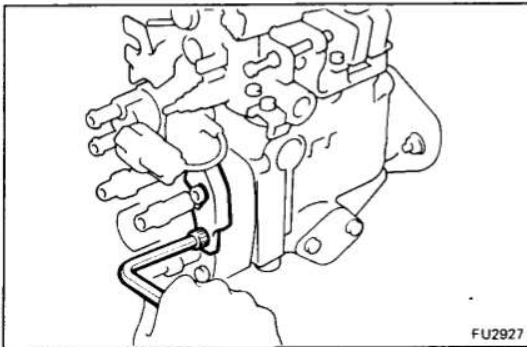


FU-10**FUEL SYSTEM – Injection Pump**

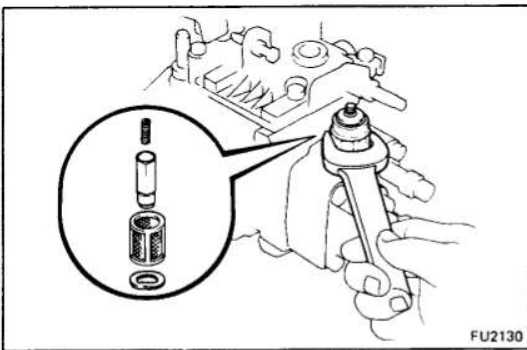
- (c) Using a 5 mm hexagonal wrench, remove the two bolts, thermo wax and O-ring.



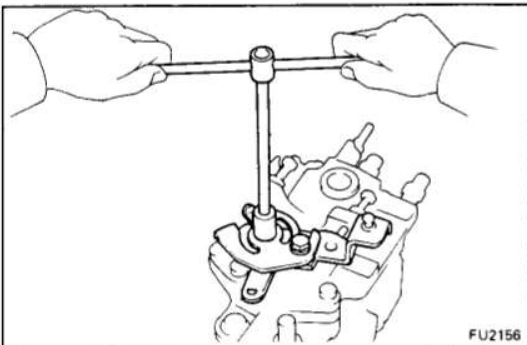
- 8. (2L-T)
REMOVE DASH POT**
Remove the dash pot and gasket.



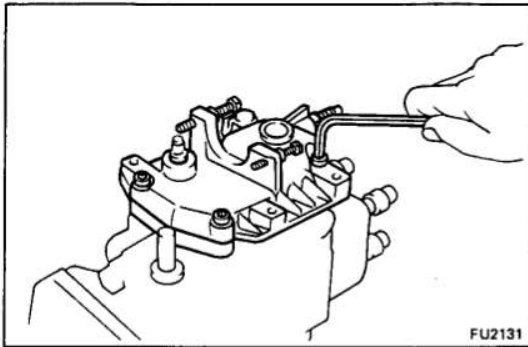
- 9. REMOVE FUEL CUT SOLENOID**
- (a) Using a 6 mm hexagonal wrench, remove the bolt and connector bracket.
 - (b) Disconnect the lead wire connector from the bracket.
 - (c) Disconnect the dust cover from the fuel cut solenoid.
 - (d) Remove the nut, lead wire and dust cover.



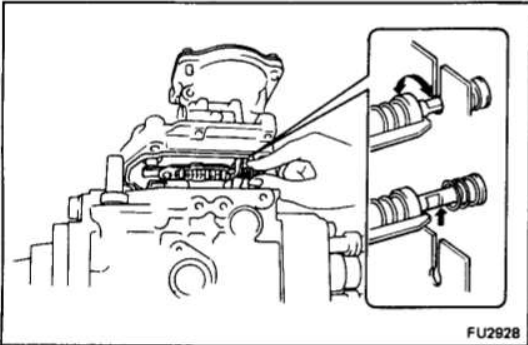
- (e) Remove the fuel cut solenoid, O-ring, spring, valve, strainer and wave washer.



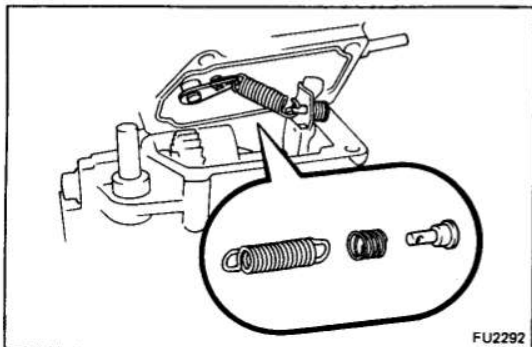
- 10. REMOVE ADJUSTING LEVER**
Remove the bolt, nut, adjusting lever and return spring.

FUEL SYSTEM – Injection Pump**FU-11****11. REMOVE GOVERNOR COVER**

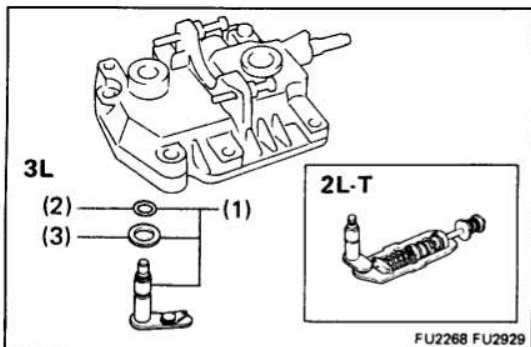
- (a) (2L-T and w/ HAC)
Remove the idle speed adjusting screw.
- (b) Using a 5 mm hexagonal wrench, remove the four bolts.



- (c) (2L-T)
Disconnect the adjusting shaft assembly from the governor link and remove the governor cover and gasket.

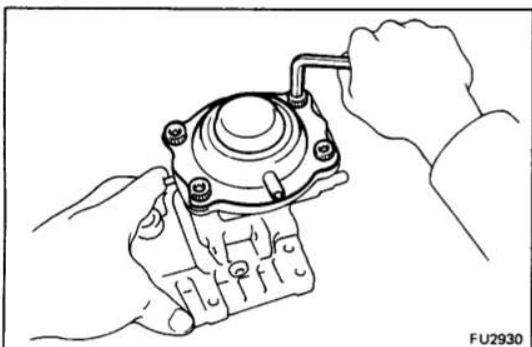


- (d) (3L)
Disconnect the speed control spring from the spring seat, and remove the spring seat, damper spring, speed control spring, governor cover, adjusting lever shaft assembly and gasket.

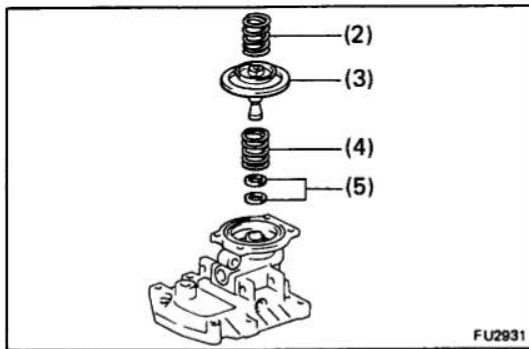
**12. REMOVE GOVERNOR ADJUSTING LEVER SHAFT FROM GOVERNOR COVER**

Remove the following parts from the governor cover.

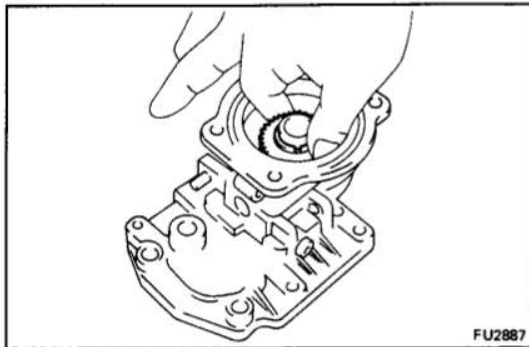
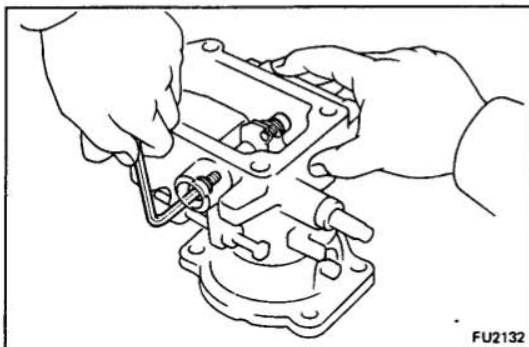
- (1) Adjusting lever shaft, O-ring and washer assembly
- (2) O-ring
- (3) Washer

**13. (2L-T) DISASSEMBLE BOOST COMPENSATOR****A. Remove boost compensator diaphragm**

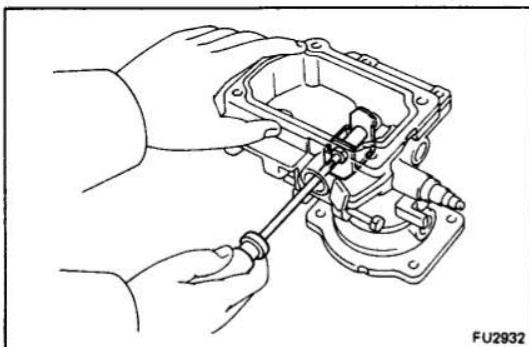
- (a) Using a 5 mm hexagonal wrench, remove the four bolts, and diaphragm cover.

FU-12**FUEL SYSTEM – Injection Pump**

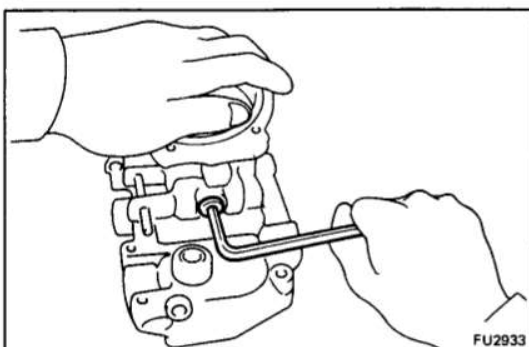
- (b) Place the matchmarks on the diaphragm and governor cover.
- (c) Remove the following parts:
 - (1) Boost compensator shim B (Austria only)
 - (2) Sub spring (Austria only)
 - (3) Diaphragm and push rod
 - (4) Main spring
 - (5) Boost compensator shim A

**B. Remove guide bushing****C. Remove control lever**

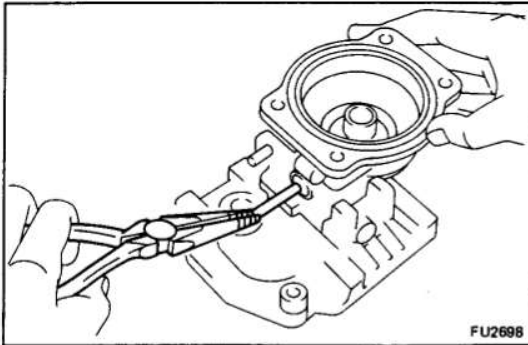
- (a) Using a 4 mm hexagonal wrench, remove the two bolts and gaskets.



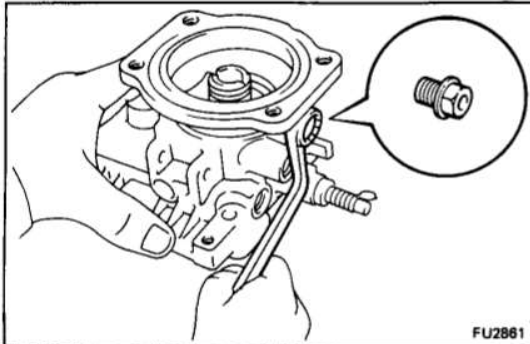
- (b) Using a small screwdriver, push out the support pin and remove the control lever.



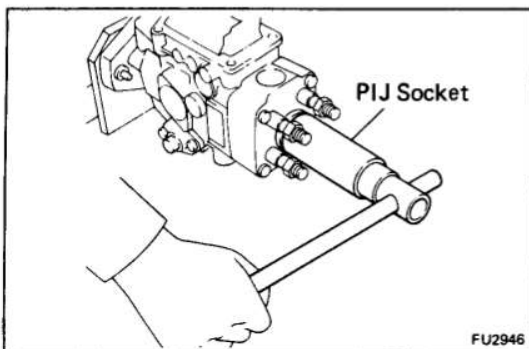
- (c) Using a 4 mm hexagonal wrench, remove the plug and gasket.

FUEL SYSTEM – Injection Pump**FU-13**

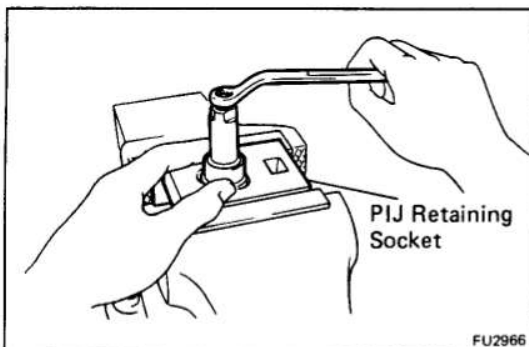
- (d) Using needle nose pliers, remove the connecting pin.
NOTICE: Be careful not to damage the connecting pin.
 Tape the tip of the pliers.



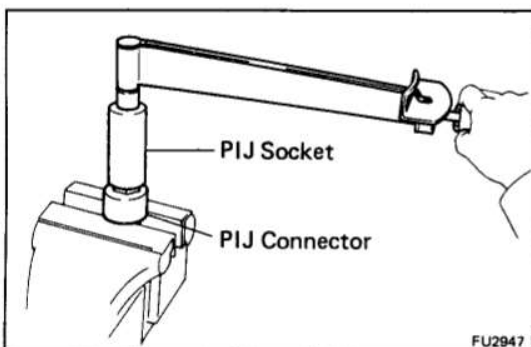
- D. Remove No. 2 overflow screw**
 Remove the cover and No. 2 overflow screw.



- 14. (2L-T Austria)**
REMOVE PILOT INJECTION (PIJ) ACTUATOR
 Using the PIJ socket, remove the PIJ actuator.
 Part No. 95096-10380 (NIPPONDENSO)



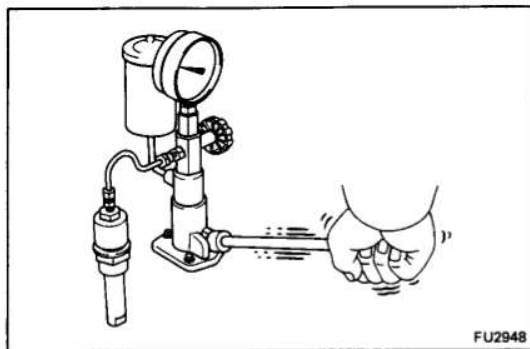
- 15. (2L-T Austria)**
PIJ INJECTION PRESSURE TEST
 (a) Using the PIJ retaining socket, remove the plug bolt and gasket.
 Part No. 95096-10390 (NIPPONDENSO)



- (b) Using the PIJ socket, install the PIJ actuator on the PIJ connector, and torque.
 Part No. 95096-10380 and 95096-10400 (NIPPONDENSO)
 Torque: 675 kg-cm (49 ft-lb, 66 N·m)

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FUEL SYSTEM – Injection Pump



- (c) Install the PIJ actuator to the injection hand tester and pump the tester handle a few times.

HINT: After the PIJ valve opens (making a clicking sound as the pressure is raised), wait until injection occurs (the pressure gradually decreases and stops at a certain pressure), then raise the pressure again.

- (d) Pump the tester handle slowly and observe the pressure gauge.

HINT: Increase the pressure at a steady pace so that the PIJ opens at the end of one stroke.

- (e) Read the pressure gauge just as the injection pressure begins to drop.

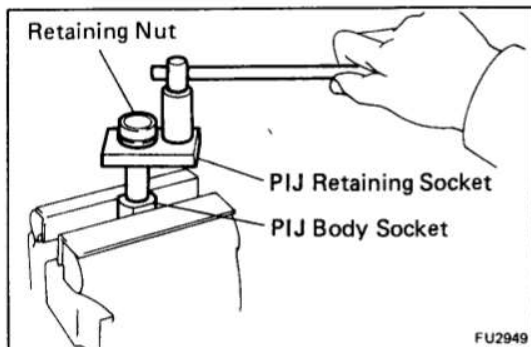
Opening pressure: 123 – 127 kg/cm²
(1,749 – 1,806 psi)
(12,054 – 12,446 kPa)

If the opening pressure is not as specified, disassemble the PIJ actuator and change the adjusting shim on the top of the pressure spring.

Adjusting shim thickness					mm (in.)
0.500 (0.0197)	1.025 (0.0404)	1.300 (0.0512)	1.575 (0.0620)	1.850 (0.0728)	2.250 (0.0886)
0.550 (0.0217)	1.050 (0.0413)	1.325 (0.0522)	1.600 (0.0630)	1.875 (0.0738)	2.300 (0.0906)
0.600 (0.0236)	1.075 (0.0423)	1.350 (0.0531)	1.625 (0.0640)	1.900 (0.0748)	2.350 (0.0925)
0.650 (0.0256)	1.100 (0.0433)	1.375 (0.0541)	1.650 (0.0650)	1.925 (0.0758)	2.400 (0.0945)
0.700 (0.0276)	1.125 (0.0443)	1.400 (0.0551)	1.675 (0.0659)	1.950 (0.0768)	2.450 (0.0965)
0.750 (0.0295)	1.150 (0.0453)	1.425 (0.0561)	1.700 (0.0669)	1.975 (0.0778)	2.500 (0.0984)
0.800 (0.0315)	1.175 (0.0463)	1.450 (0.0571)	1.725 (0.0679)	2.000 (0.0787)	
0.850 (0.0335)	1.200 (0.0472)	1.475 (0.0581)	1.750 (0.0689)	2.050 (0.0807)	
0.900 (0.0354)	1.225 (0.0482)	1.500 (0.0591)	1.775 (0.0699)	2.100 (0.0827)	
0.950 (0.0374)	1.250 (0.0492)	1.525 (0.0600)	1.800 (0.0709)	2.150 (0.0846)	
1.000 (0.0394)	1.275 (0.0502)	1.550 (0.0610)	1.825 (0.0719)	2.200 (0.0866)	

HINT:

- Varying the adjusting shim thickness by 0.025 mm (0.0010 in.) changes the injection pressure by about 2.7 kg/cm² (38.4 psi, 245 kPa).
- For the second measurement or more, wait until the PIJ has injected first (the pressure drops to a certain level).



16. (2L-T Austria)

DISASSEMBLE PILOT INJECTION (PIJ) ACTUATOR

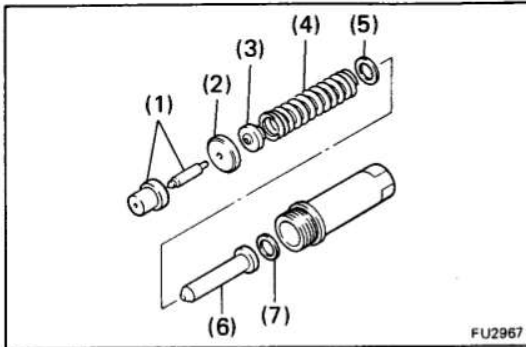
- (a) Using the PIJ body socket and PIJ retaining socket, remove the retaining nut.

Part No. 95096-10390 and 95096-10400 (NIPPONDENSO)

NOTICE: Do not drop the accumulator.

FUEL SYSTEM – Injection Pump

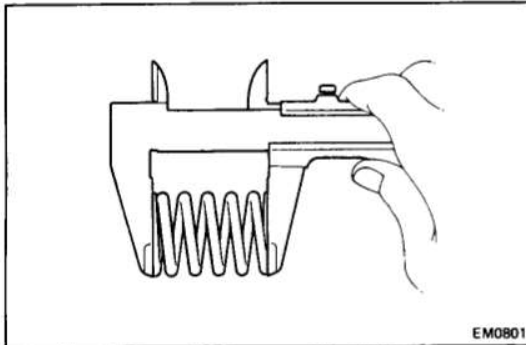
FU-15



(b) Remove the following parts from the holder body.

- (1) Accumulator assembly
- (2) Distance piece
- (3) Pressure pin
- (4) Pressure spring
- (5) Adjusting shim (for opening pressure)
- (6) Stopper
- (7) Adjusting shim (for piston lift gap)

HINT: The shims in (5) and (7) are the same shape so keep them separate to distinguish between them.



INSPECTION OF INJECTION PUMP COMPONENTS

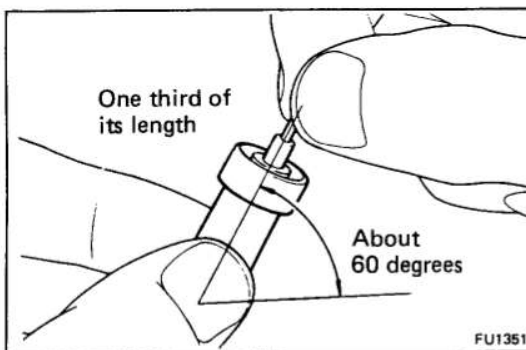
1. INSPECT SPRING LENGTH

Using vernier calipers, measure the free length of each spring.

Spring free length:

Delivery valve spring	24.4 mm (0.961 in.)
Plunger spring	30.0 mm (1.181 in.)
Coupling spring	16.0 mm (0.630 in.)
Pneumatic bellows spring (w/ HAC)	35.0 mm (1.378 in.)
Boost compensator main spring	
2L-T (Austria)	24.1 mm (0.949 in.)
2L-T (Others)	19.4 mm (0.764 in.)
Boost compensator sub spring (2L-T Austria)	22.3 mm (0.878 in.)

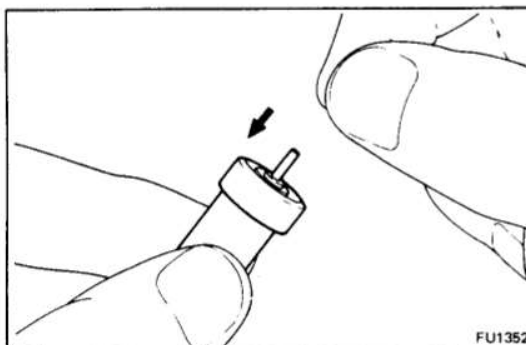
If the free length is not as specified, replace the spring(s).

2. (2L-T Austria)
INSPECT ACCUMULATOR ASSEMBLY

(a) Wash the accumulator in clean diesel oil.

NOTICE: Do not touch the accumulator mating surfaces with your fingers.

(b) Tilt the accumulator guide about 60 degrees and pull the piston out about one third of its length.



(c) When released, the piston should sink down into the guide vent smoothly by its own weight.

(d) Repeat this test, rotating the piston slightly each time.

If the piston does not sink freely, replace the accumulator assembly.

FU-16

FUEL SYSTEM – Injection Pump

ASSEMBLY OF INJECTION PUMP

(See pages FU-6 to 8)

1. ADJUST PLUNGER SPRING SHIM

(a) Install the following parts to the distributive head:

- (1) Two plunger spring guides
- (2) Two upper spring seats
- (3) Two plunger springs
- (4) Lower spring seat
- (5) Upper plunger plate
- (6) Lower plunger plate
- (7) Pump plunger

HINT: Do not assemble the plunger spring shims at this time.

(b) Using vernier calipers, measure clearance A indicated in the illustration.

(c) Determine the plunger spring shim size by using the following formula and chart.

2L-T (Austria)

New plunger spring shim thickness = $6.1 - A$

2L-T (Others) and 3L

New plunger spring shim thickness = $5.9 - A$

A ... Measured plunger position

Plunger spring shim selection chart for 2L-T (Austria)

mm (in.)

Measured clearance	Shim thickness	Measured clearance	Shim thickness
More than 4.6 (0.181)	1.5 (0.059)	3.6 – 3.8 (0.142 – 0.150)	2.5 (0.098)
4.3 – 4.5 (0.169 – 0.177)	1.8 (0.071)	3.3 – 3.5 (0.130 – 0.138)	2.8 (0.110)
4.1 – 4.2 (0.161 – 0.165)	2.0 (0.079)	Less than 3.2 (0.126)	3.0 (0.118)
3.9 – 4.0 (0.154 – 0.157)	2.2 (0.087)	—	—

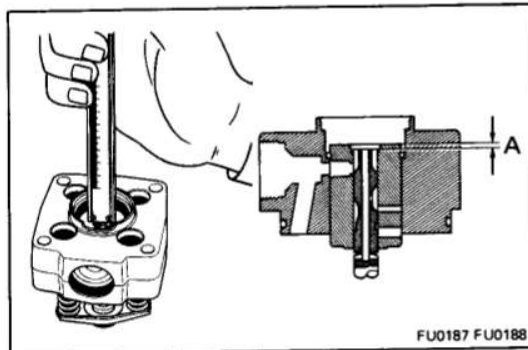
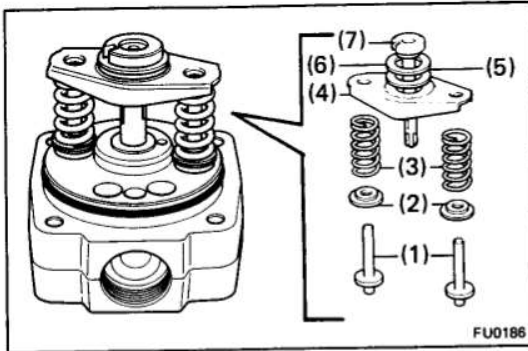
Plunger spring shim selection chart for 2L-T (Others) and 3L

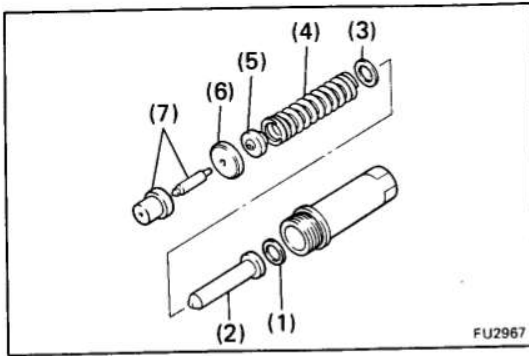
mm (in.)

Measured clearance	Shim thickness	Measured clearance	Shim thickness
More than 5.3 (0.209)	0.5 (0.020)	4.3 – 4.5 (0.169 – 0.177)	1.5 (0.059)
5.0 – 5.2 (0.196 – 0.205)	0.8 (0.031)	4.0 – 4.2 (0.157 – 0.165)	1.8 (0.071)
4.8 – 4.9 (0.189 – 0.193)	1.0 (0.039)	Less than 3.9 (0.154)	2.0 (0.079)
4.6 – 4.7 (0.181 – 0.185)	1.2 (0.047)	—	—

HINT:

- For a measurement between listed sizes, use the next larger size. Ex. If thickness is 1.1 mm (0.043 in.) by calculation, use a 1.2 mm (0.047 in.) shim.
- Select two shims which have the same thickness.



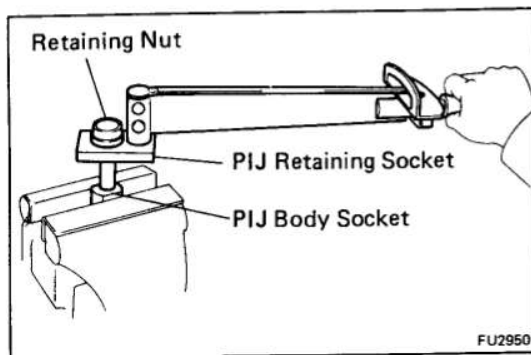
FUEL SYSTEM – Injection Pump**FU-17**

**2. (2L-T Austria)
ASSEMBLY AND ADJUSTING PILOT INJECTION
(PIJ) ACTUATOR**

(a) Install the following parts to the holder body.

- (1) Adjusting shim (for piston lift gap)
- (2) Stopper
- (3) Adjusting shim (for opening pressure)
- (4) Pressure spring
- (5) Pressure pin
- (6) Distance piece
- (7) Accumulator assembly

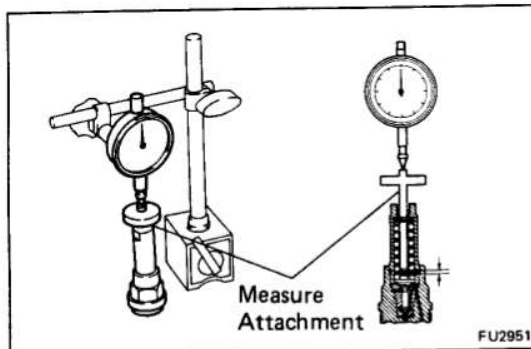
NOTICE: Do not mix up the shims in (1) and (3) above.



(b) Using the PIJ body socket and PIJ retaining socket, install the retaining nut.

Part No. 95096-10390 and 95096-10400 (NIPPONDENSO)

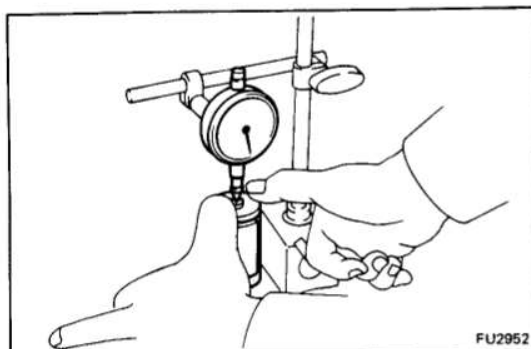
Torque: 675 kg-cm (49 ft-lb, 66 N-m)



(c) Place the PIJ actuator and magnet stand on top of the surface plate, insert the measure attachment in the thread hole in the plug bolt, and set the dial gauge.

Part No. 95096-10420 (NIPPONDENSO)

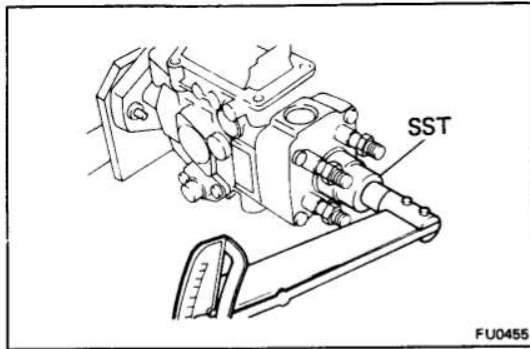
(d) Set the dial indicator scale to 0 mm (0 in.) on top of the measure attachment.



(e) Press down on the edges of the measure attachment and measure the piston lift gap.

Piston lift gap: 0.175 – 0.475 mm
(0.00689 – 0.01870 in.)

If the piston lift gap is not as specified, change the shim.
(See page FU-14)

FU-18**FUEL SYSTEM — Injection Pump**

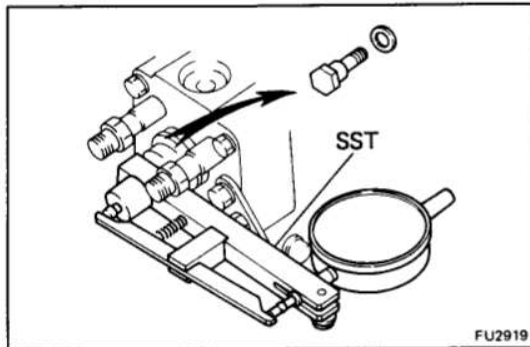
3. (2L-T Austria) CHECK PLUNGER STROKE

NOTICE: Perform this only when overhauling the injection pump itself.

- (a) Using SST, install the conventional distributive head plug.

SST 09260-54012 (09262-54010)

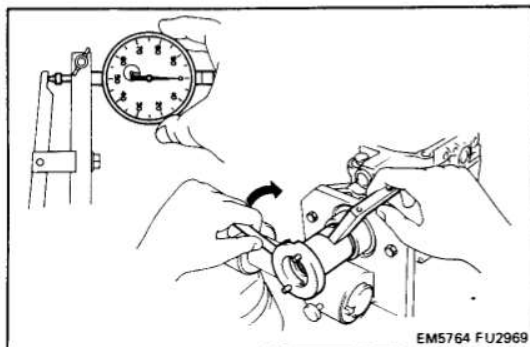
Torque: 700 kg-cm (51 ft-lb, 69 N-m)



- (b) Remove the plug bolt from the distributive head plug and gasket of the injection pump.

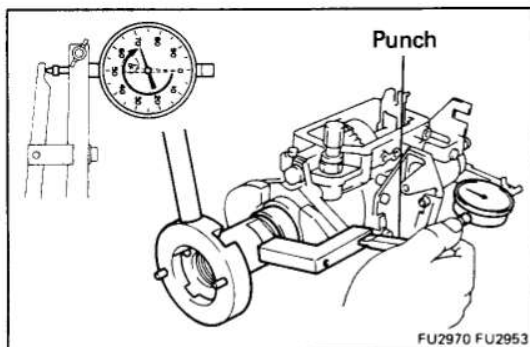
- (c) Install SST (plunger stroke measuring tool) and a dial indicator to the plug bolt hole of distributive head plug.

SST 09275-54010



- (d) Install the marking guide to the drive shaft, align the plunger with lower dead center and set the dial indicator at 0 mm (0 in.).

Part No. 95096-10430 (NIPPONDENSO)

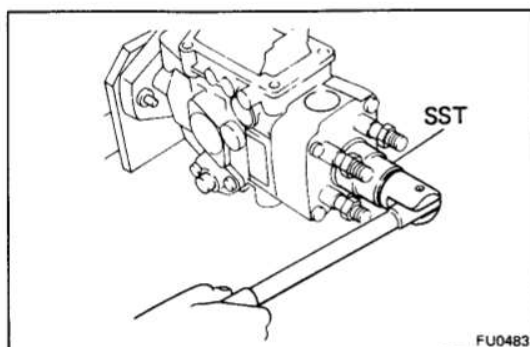


- (e) Rotate the drive shaft in the pump rotation direction and use a punch to engrave the flange when the plunger lift (plunger stroke) is at maximum valve.

Part No. 95096-10440 (NIPPONDENSO)

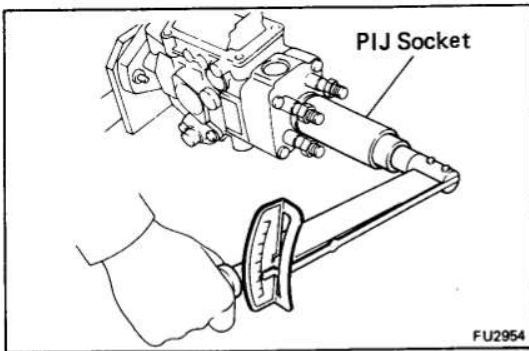
Plunger stroke: 0.60 – 0.80 mm (0.0236 – 0.0315 in.)

NOTICE: If the old mark and new mark are located in different positions, file off the old mark.



- (f) Using SST, remove the distributive head plug.

SST 09260-54012 (09262-54010)

FUEL SYSTEM – Injection Pump**FU-19**

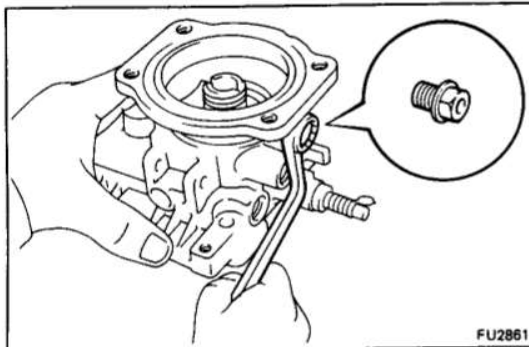
**4. (2L-T Austria)
INSTALL PILOT INJECTION (PIJ) ACTUATOR**

- (a) Install a new O-ring to the PIJ actuator.
- (b) Using the PIJ socket, install the PIJ actuator.

Part No. 95096-10380 (NIPPONDENSO)

Torque: 900 kg-cm (65 ft-lb, 88 N-m)

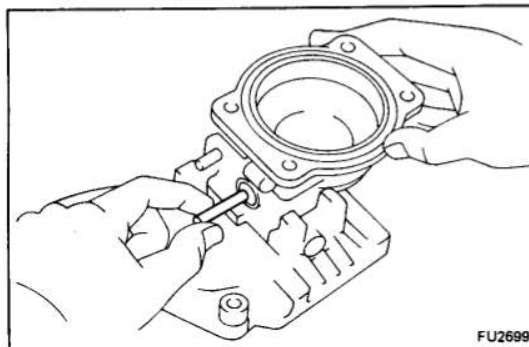
NOTICE: Check that the PIJ actuator and injection are clean and free of foreign material.



**5. (2L-T)
ASSEMBLE BOOST COMPENSATOR**

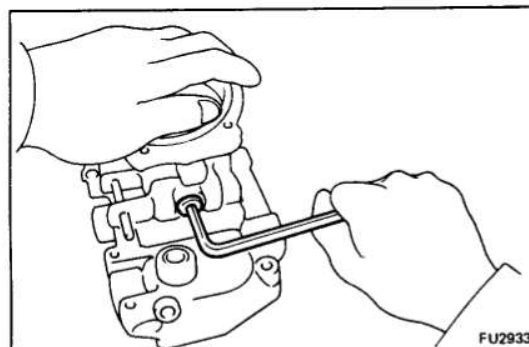
A. Install No. 2 overflow screw

Install the No. 2 overflow screw and cover.

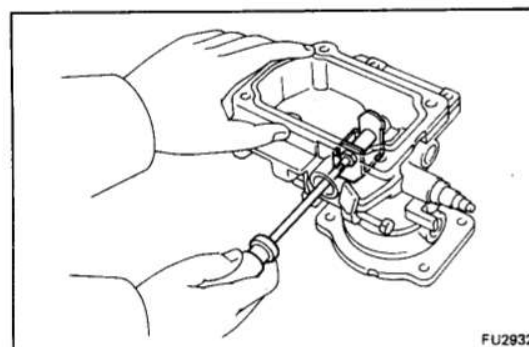


B. Install control lever

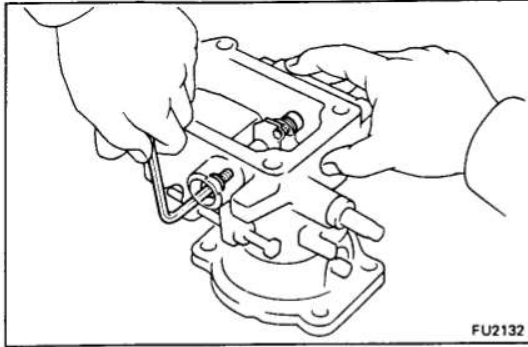
- (a) Insert the connecting pin into the governor cover.



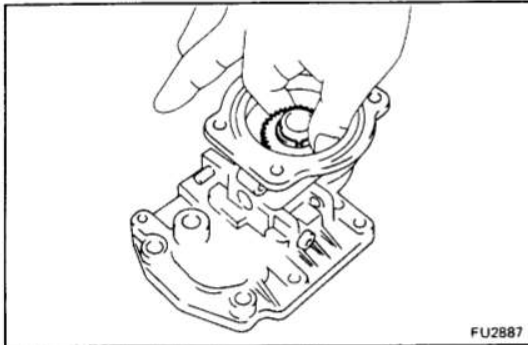
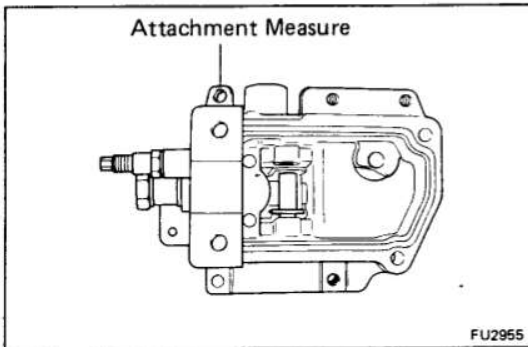
- (b) Using a 4 mm hexagonal wrench, install the plug with a new gasket.



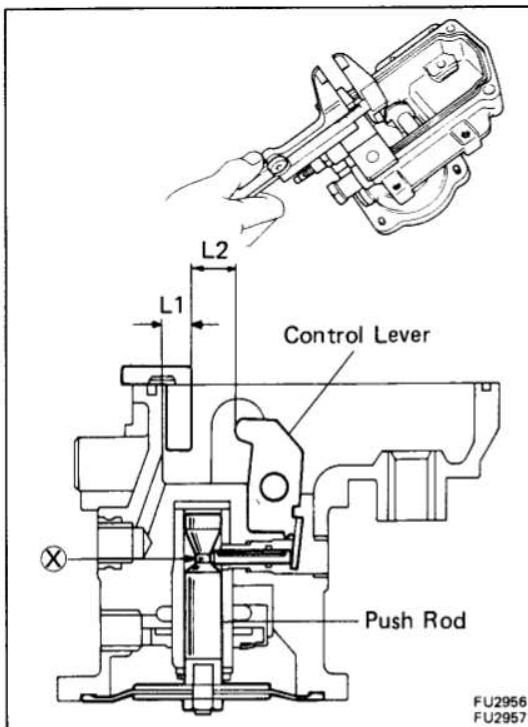
- (c) Using a small screwdriver, install the control lever with the support pin.

FU-20**FUEL SYSTEM – Injection Pump**

- (d) Using a 4 mm hexagonal wrench, install two new gas-kets and the two bolts.

**C. Install guide bushing****D. Install boost compensator diaphragm**

- (a) Install the attachment measure to the governor cover.
Part No. 95096-10330 (NIPPONDENSO)



- (b) Measure the distance between the end surface of the control lever and the attachment measure.

- (1) Install the shim and diaphragm.

HINT: Do not assemble the spring.

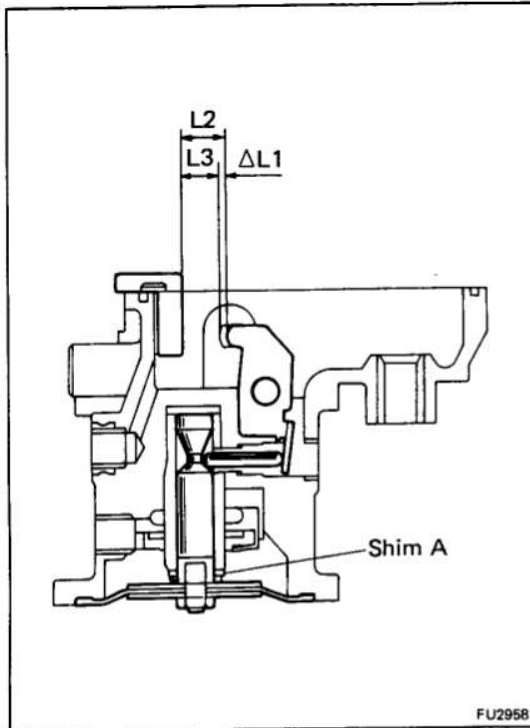
- (2) With the push rod against the ⊗ surface (flat part), measure dimension "L2" with vernier calipers as shown.

Dimension "L2":

Austria Approx. 10.75 mm (0.4232 in.)

Others Approx. 10.39 mm (0.4091 in.)

HINT: Dimension "L1" of attachment measure is 10 mm (0.39 in.).

FUEL SYSTEM – Injection Pump**FU-21**

- (3) With the push rod pushed in to the maximum, measure dimension "L3" with vernier calipers as shown.
Select shim A to adjust " $\Delta L1$ " obtained as the difference between "L3" and "L2" obtained in (2) above.

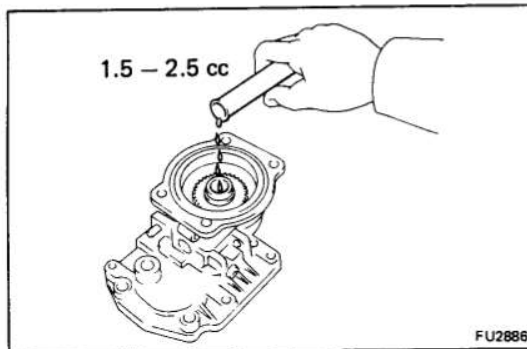
Difference " $\Delta L1$ ":

Austria	0.67 – 0.97 mm (0.0264 – 0.0382 in.)
Others	1.23 – 1.33 mm (0.0484 – 0.0524 in.)

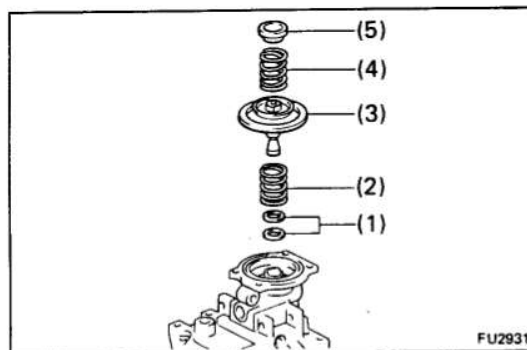
Adjusting shim thickness:

1.1 mm (0.043 in.)
1.3 mm (0.051 in.)
1.5 mm (0.059 in.)
1.7 mm (0.067 in.)
1.9 mm (0.075 in.)
2.1 mm (0.083 in.)
2.3 mm (0.090 in.)
2.5 mm (0.098 in.)
2.7 mm (0.106 in.)
2.9 mm (0.114 in.)
3.1 mm (0.122 in.)
3.3 mm (0.130 in.)

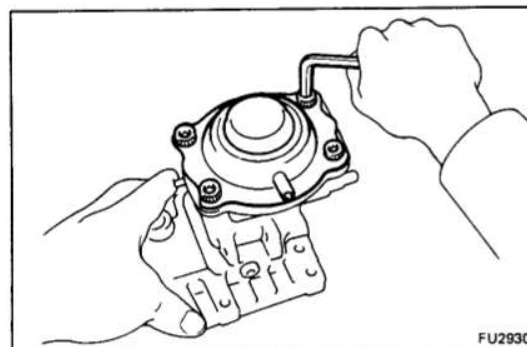
- (4) Remove the diaphragm and push rod.



- (c) Insert 1.5 – 2.5 cc (0.09 – 0.15 cu in.) of engine oil into the bushing hole.



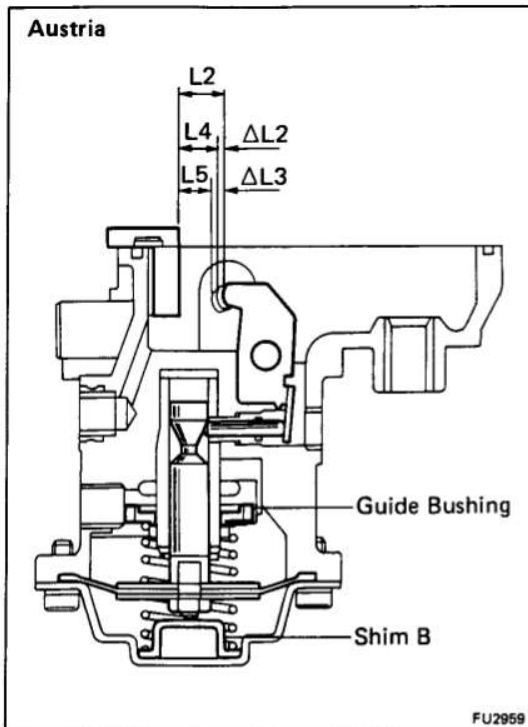
- (d) Install the following parts:
- (1) Boost compensator shim A
 - (2) Main spring
 - (3) Diaphragm and push rod
 - (4) Sub spring (Austria only)
 - (5) Boost compensator shim B (Austria only)



- (e) Using a 5 mm hexagonal wrench, install the four bolts and governor cover.

FU-22

FUEL SYSTEM — Injection Pump



- (f) Measure the distance between the control lever end surface and the attachment measure.

(Austria)

- (1) Measure dimension "L4" with vernier calipers as shown.

Adjust the difference " $\Delta L2$ " between "L2" measured in (b) and "L4" by rotating the guide bushing.

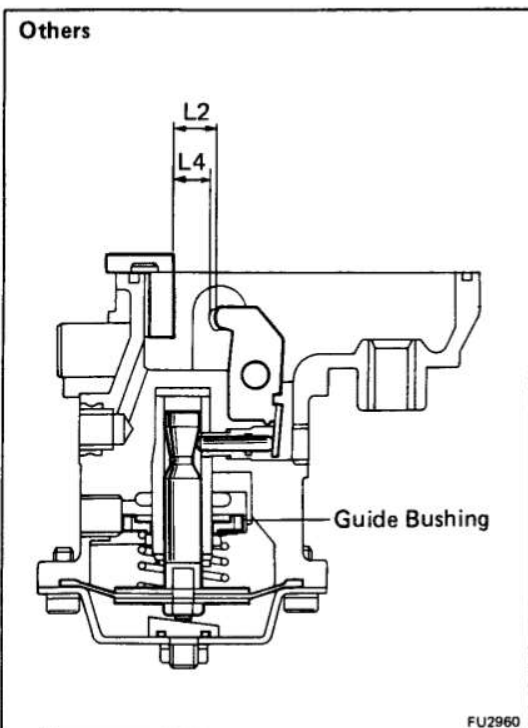
Difference " $\Delta L2$ ": 1.30 – 1.50 mm (0.0512 – 0.0591 in.)

- (2) Apply 350 mmHg (13.8 in.Hg, 46.7 kPa) of absolute pressure to the boost compensator and measure dimension "L5" with vernier calipers as shown. Select shim B to adjust " $\Delta L3$ " obtained as the difference between "L5" and "L2" measured in (b).

Difference " $\Delta L3$ ": 1.70 – 1.94 mm (0.0669 – 0.0764 in.)

Adjusting shim thickness:

12.90 mm (0.508 in.)
13.15 mm (0.518 in.)
13.40 mm (0.528 in.)



(Others)

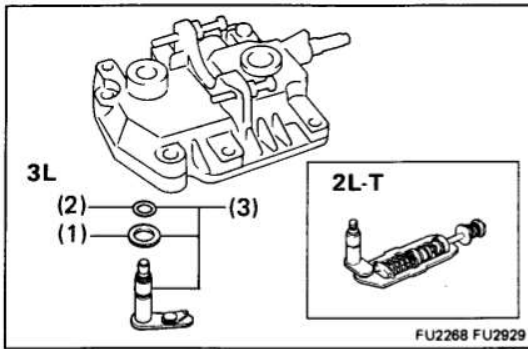
Apply 0.27 kg/cm² (3.8 psi, 26 kPa) of pressure to the boost compensator and measure dimension "L4" with vernier calipers as shown.

Adjust "L4" by rotating the guide bushing.

Dimension "L4": 9.85 – 9.95 mm (0.3878 – 0.3917 in.)

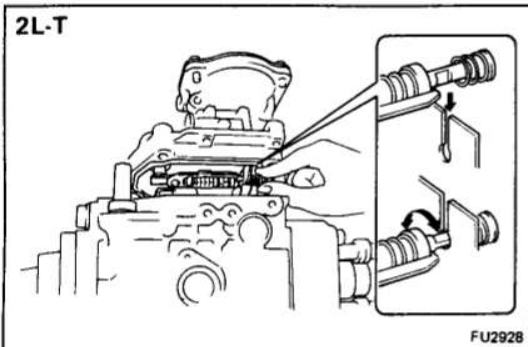
- (g) Remove the attachment measure.

Part No. 95096 – 10030 (NIPPONDENSO)

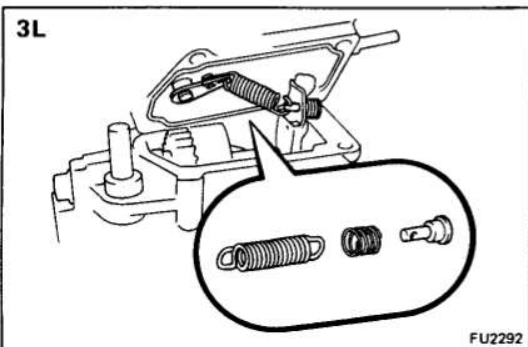
FUEL SYSTEM — Injection Pump**FU-23****6. INSTALL ADJUSTING LEVER SHAFT TO GOVERNOR SHAFT**

Install the following parts to the governor cover:

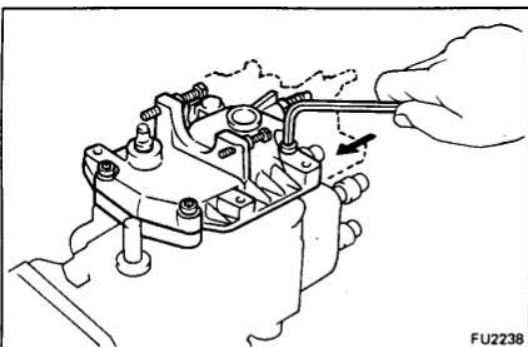
- (1) Plate washer
- (2) New O-ring
- (3) Adjusting lever shaft, O-ring and plate washer assembly

**7. INSTALL GOVERNOR COVER**

- (a) Install a new gasket to the groove of the governor cover.
- (b) (2L-T)
Connect the adjusting lever shaft to the governor link and twist the shaft lightly.



- (c) (3L)
Install the speed control spring to the adjusting lever shaft.
- (d) (3L)
Install the damper spring and spring seat, and connect the speed control spring to the spring seat.

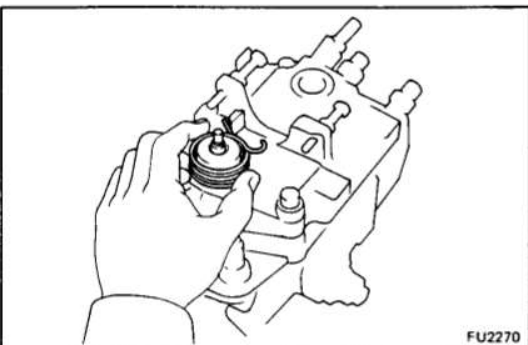


- (e) Using a 5 mm hexagonal wrench, install the governor cover with the four bolts.

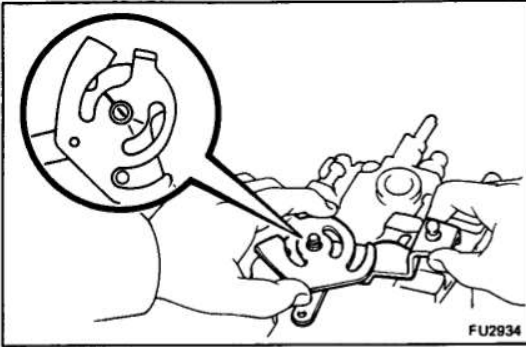
Torque: 85 kg-cm (74 in.-lb, 8.3 N-m)

HINT: Use the bolt which is 35 mm (1.38 in.) length.

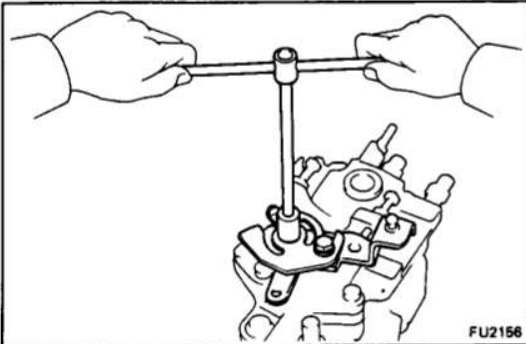
- (f) (2L-T and w/ HAC)
Install the idle speed adjusting screw.

**8. INSTALL ADJUSTING LEVER**

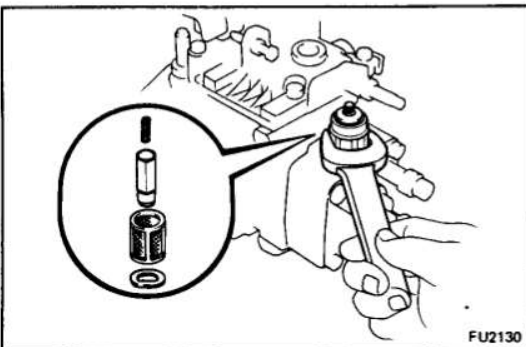
- (a) Place the return spring on the governor cover.

FU-24**FUEL SYSTEM – Injection Pump**

- (b) Hook the return spring to the adjusting lever, and turn and place the adjusting lever on the governor shaft.
- (c) Align the lines of the adjusting lever shaft and adjusting lever.

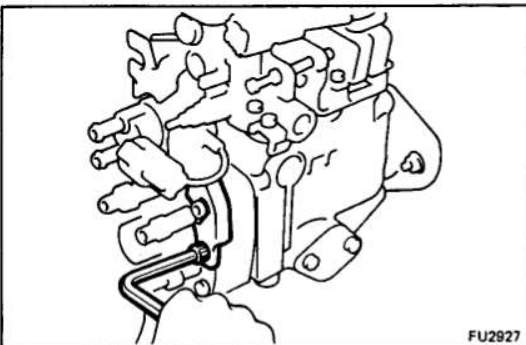


- (d) Install the adjusting lever with the nut.

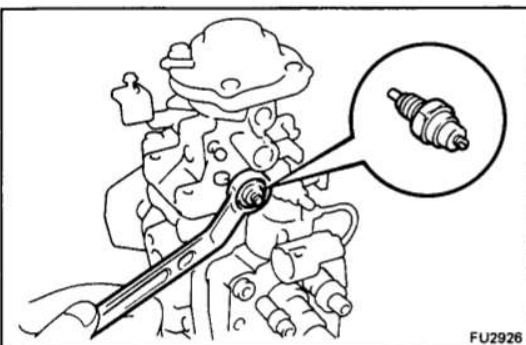
**9. INSTALL FUEL CUT SOLENOID**

- (a) Install a new O-ring on the fuel cut solenoid.
- (b) Install the strainer, valve, spring, a new gasket and the fuel cut solenoid.

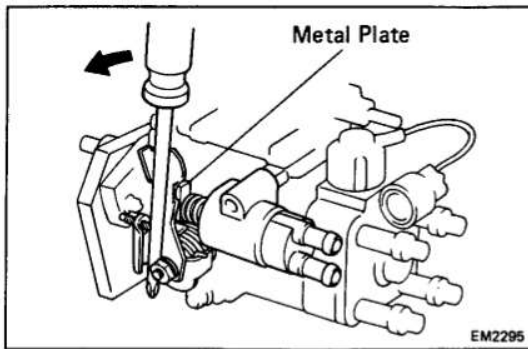
Torque: 225 kg-cm (16 ft-lb, 22 N·m)



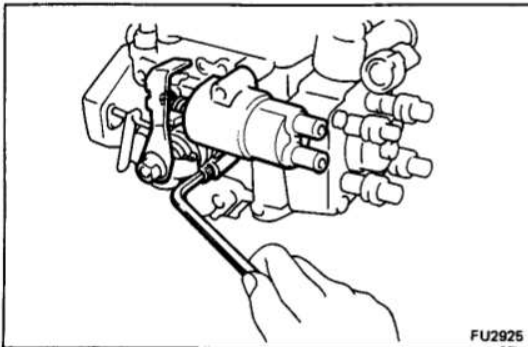
- (c) Install the lead wire to the fuel cut solenoid with the nut.
- (d) Install the dust cover to the fuel cut solenoid.
- (e) Install the lead wire connector to bracket.
- (f) Using a 6 mm hexagonal wrench, install the connector bracket with the bolt.

**10. (2L-T)
INSTALL DASH POT**

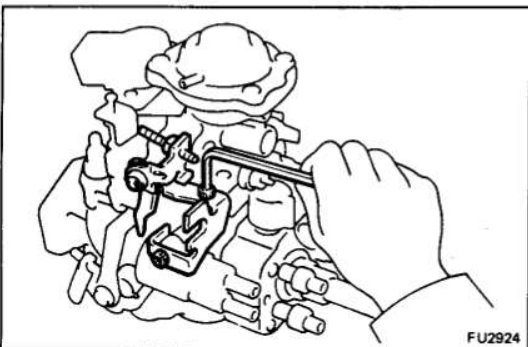
Install a new gasket and the dash pot.

FUEL SYSTEM – Injection Pump**FU-25**
11. (2L-T)
INSTALL THERMO WAX

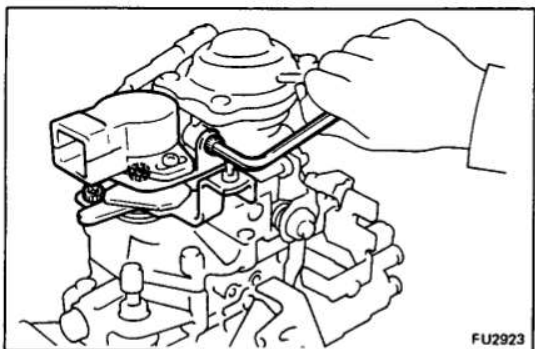
- (a) Using a screwdriver, turn the cold starting lever counterclockwise approx. 20°.
- (b) Put a metal plate (thickness of 8.5 – 10 mm (0.335 – 0.384 in.)) between the cold starting lever and thermo wax plunger.



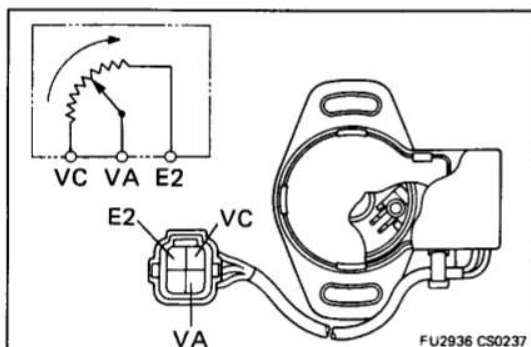
- (c) Install a new O-ring to the pump body.
- (d) Using a 5 mm hexagonal wrench, install the thermo wax with the two bolts.


12. (2L-T)
INSTALL IDLE-UP LEVER

Using a 5 mm hexagonal wrench, install the idle-up lever with the three bolts.


13. (2L-T Austria)
INSTALL AND CHECK THROTTLE POSITION SENSOR

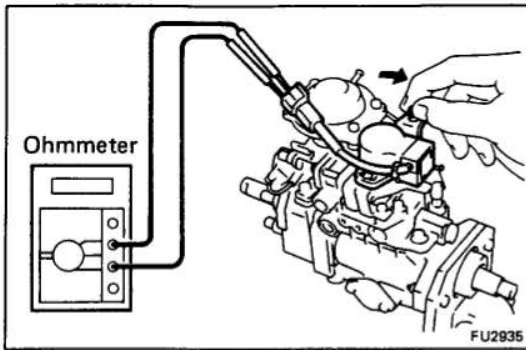
- (a) Using a 5 mm hexagonal wrench, install the throttle position sensor with the three bolts.



- (b) Using an ohmmeter, check that there is continuity between the terminals VC and E2.

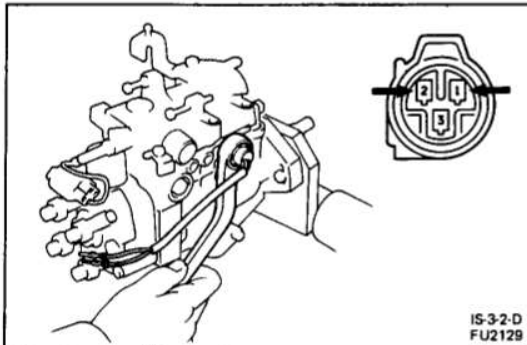
FU-26

FUEL SYSTEM – Injection Pump



- (c) Using an ohmmeter, measure the resistance between terminals VA and E2.

Resistance: As the opening angle of the adjusting lever increases, the resistance should continue to decrease.



**14. (w/ Tachometer)
INSTALL PICKUP SENSOR**

- (a) Install a new O-ring and pickup sensor.
(b) Connect the two lead wires to the connector.

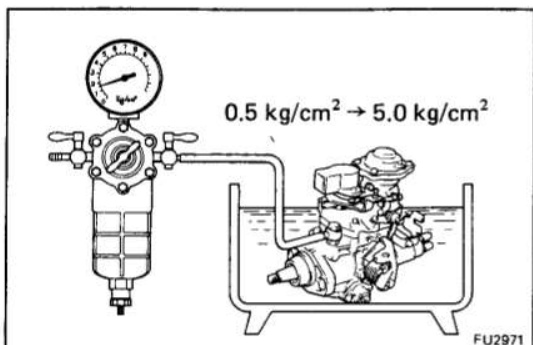
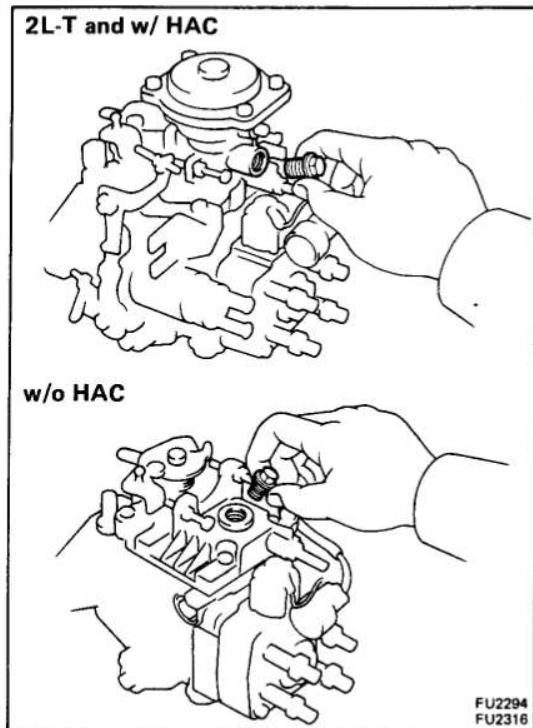
Torque: 210 kg-cm (15 ft-lb, 21 N-m)

**15. (w/ A/C)
INSTALL IDLE-UP ACTUATOR**

**16. REMOVE INJECTION PUMP FROM SST (STAND)
SST 09241-76022 and 09245-54010**

17. PERFORM AIR TIGHT TEST

- (a) Install a bolt to the overflow port.

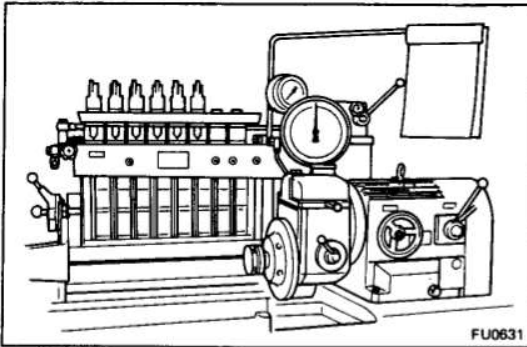


- (b) Connect an air hose to the fuel inlet pipe and place the injection pump into diesel fuel.

NOTICE: On vehicles with the throttle position sensor (2L-T Austria), be careful not to immerse sensor in diesel fuel.

- (c) Apply 0.5 kg/cm² (7 psi, 49 kPa) of pressure and confirm that there are not leaks.
(d) Next check that there are no leaks with 5.0 kg/cm² (71 psi, 490 kPa) of pressure applied.

**18. INSTALL SET KEY OF INJECTION PUMP DRIVE
PULLEY ON DRIVE SHAFT**

FUEL SYSTEM — Injection Pump**FU-27****ADJUSTMENT OF INJECTION PUMP****1. PRE-TEST CHECK AND PREPARATION**

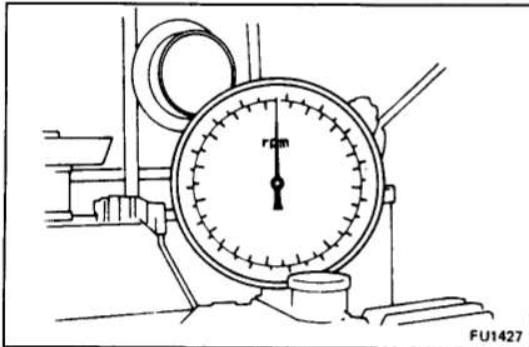
- (a) The specifications for test nozzle and nozzle holders are as follows.

Test nozzle: DN12SD12 (NIPPONDENSO)

Test nozzle opening pressure:

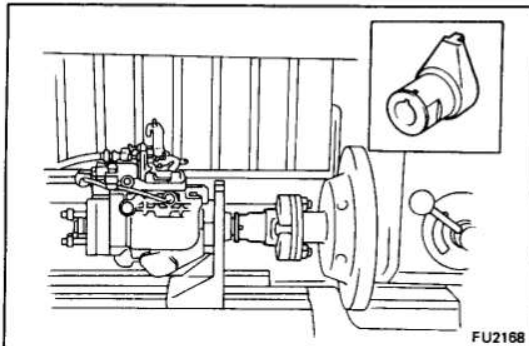
145 – 155 kg/cm²

(2,062 – 2,205 psi, 14,220 – 15,200 kPa)



- (b) Check the accuracy of the tachometer.

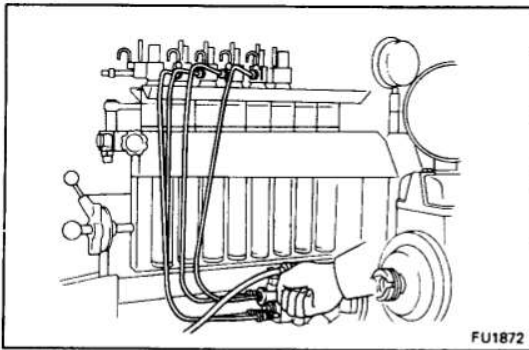
Allowable error: ± 40 rpm



- (c) Install the angle gauge stand.

- (d) Mount the injection pump body on the pump tester.

HINT: Place a mark on the key groove portion of the coupling.



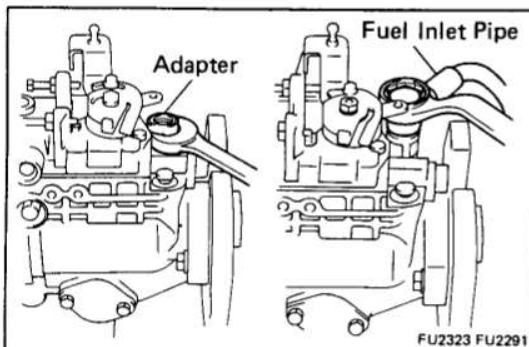
- (e) Install an injection pipe with the following specifications.

Outer diameter: 6.0 mm (0.236 in.)

Inner diameter: 2.0 mm (0.079 in.)

Length: 840 mm (33.07 in.)

Minimum bending radius: 25 mm (0.98 in.) or more

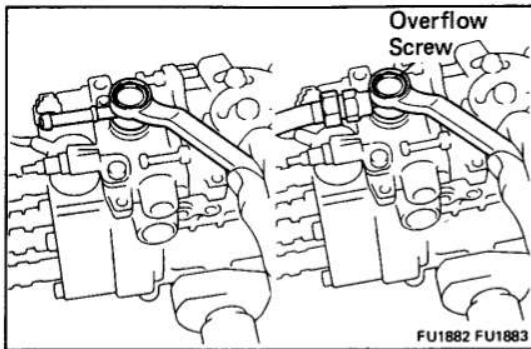


- (f) Remove the fuel inlet hollow screw.

- (g) Connect the fuel inlet pipe with an adapter.

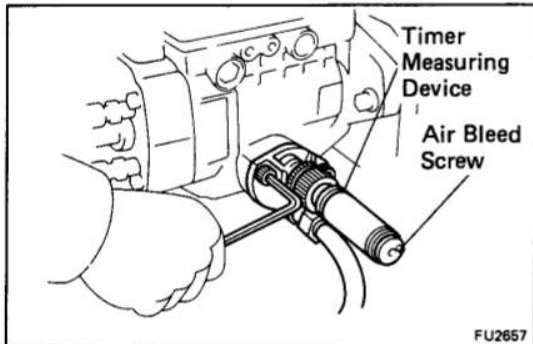
FU-28

FUEL SYSTEM – Injection Pump



(h) Install the overflow hose with the overflow screw.

HINT: Always use the overflow screw installed on the pump to be adjusted.



(i) Using a 5 mm hexagonal wrench, remove the two bolts and RH timer cover.

(j) Install the inner pressure gauge with the timer measuring device.

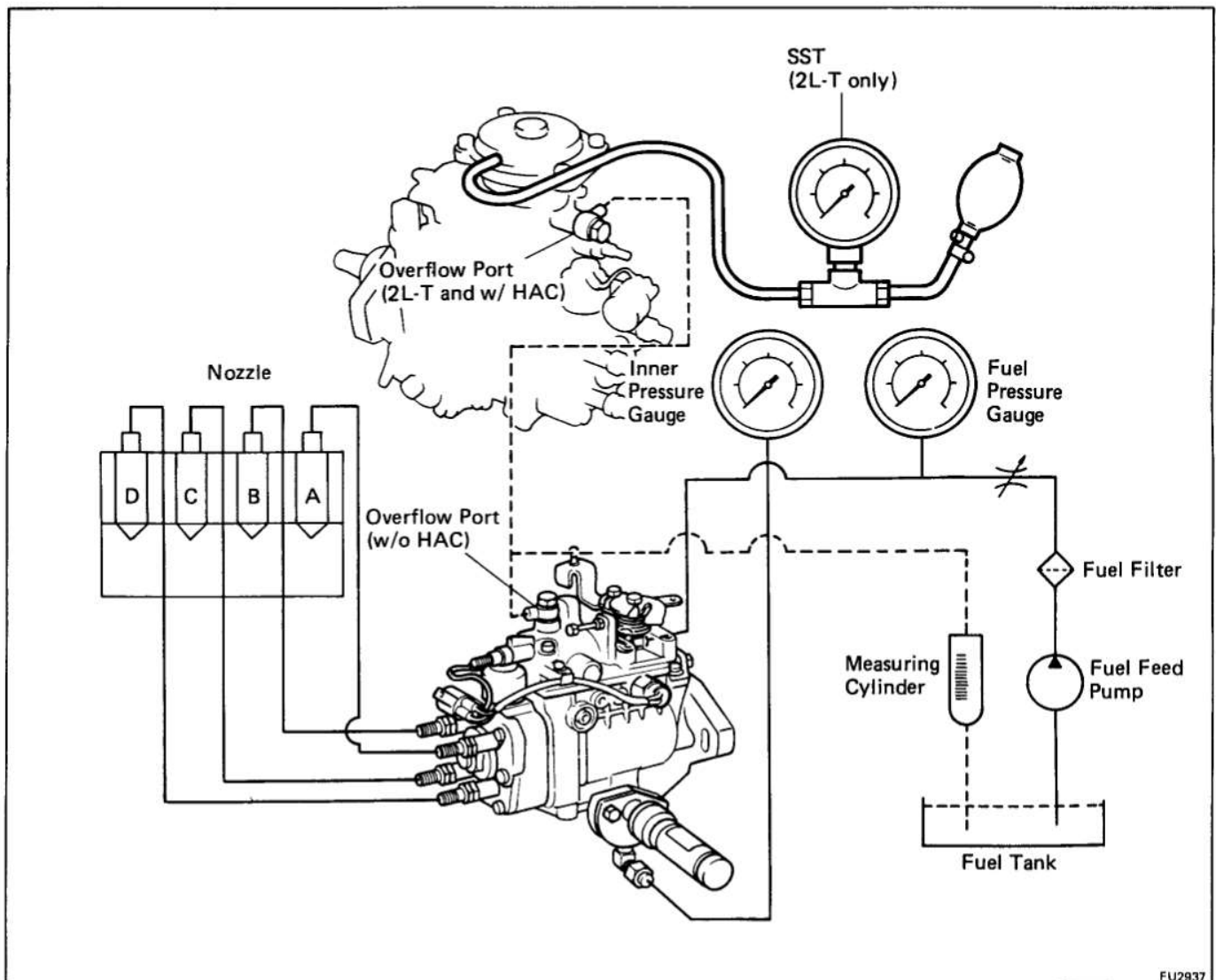
Part No. 95095-10220 and 95095-10231 (NIPPONDENSO)

HINT: Bleed air by the air bleed screw.

(k) (2L-T)

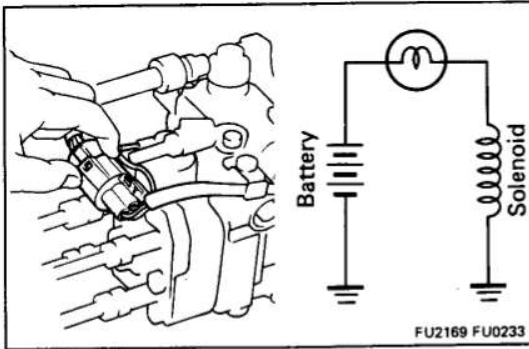
Connect SST (turbocharger pressure gauge) to the boost compensator.

SST 09992-00241



FUEL SYSTEM – Injection Pump

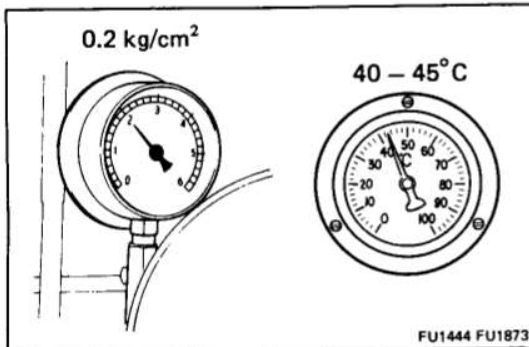
FU-29



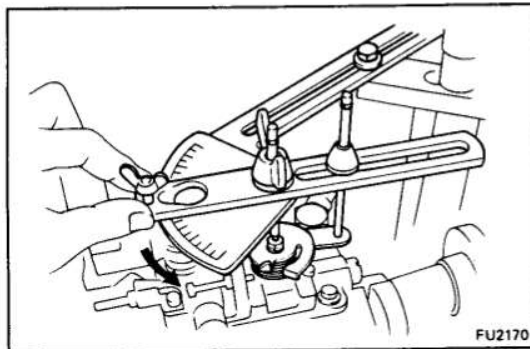
- (l) Apply about 6 volts of DC power to the fuel cut solenoid.

NOTICE:

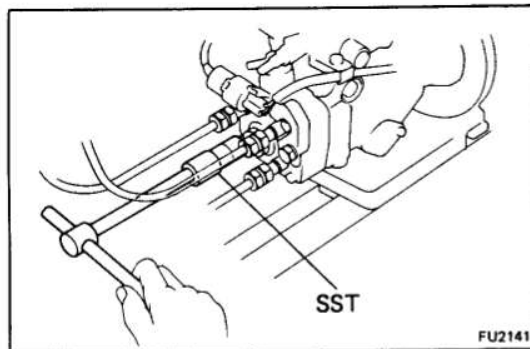
- When applying voltage to the solenoid, position the battery as far away from the solenoid as possible so that a spark does not occur.
- When connecting the battery cable, connect the solenoid side first.



- (m) The pressure for feeding fuel to the injection pump should be 0.2 kg/cm² (2.8 psi, 20 kPa). The fuel temperature for pump testing should be 40 – 45°C (104 – 113°F).



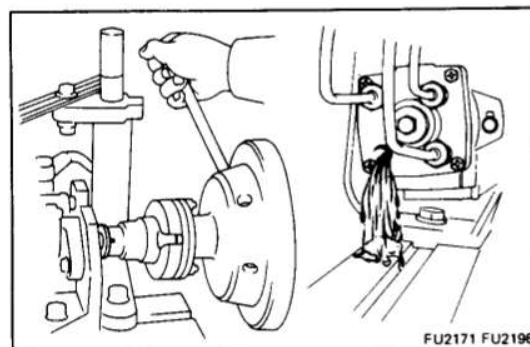
- (n) Install an angle gauge to the stand and set it to the adjusting lever.
- (o) Secure the adjusting lever fully on the maximum speed side.



- (p) Check the installation direction of the camplate as follows:

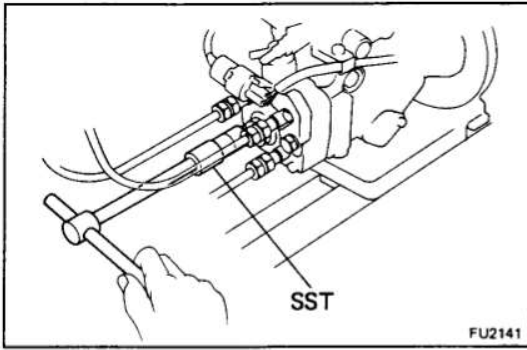
- Disconnect the injection pipe from the position marked "C" on the distributive head.
- Using SST, remove the delivery valve holder.

SST 09260-54012 (09269-54020)

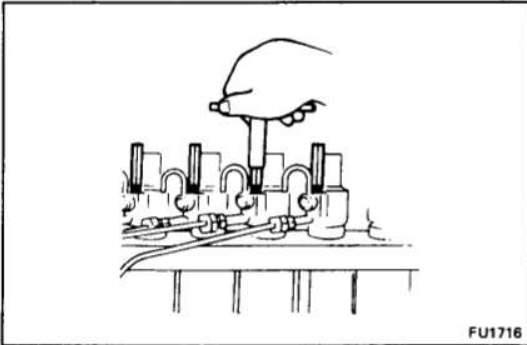


- Check that fuel is flowing out when the mark is in the position shown in the illustration. If not, it is improperly assembled.
- Disassemble and change the camplate position 180° in the opposite direction.

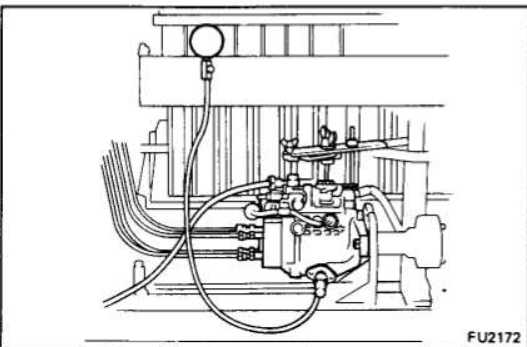
HINT: At this time, disconnect the fuel cut solenoid wire harness.

FU-30**FUEL SYSTEM – Injection Pump**

- Using SST, install the delivery valve holder.
SST 09260-54012 (09269-54020)
- Connect the injection pipe.

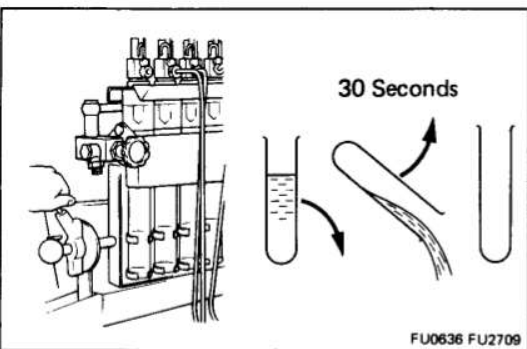


(q) Bleed the air from the injection pipes.



(r) Race the injection pump for 5 minutes at 2,000 rpm.

NOTICE: Check that there is no fuel leakage or abnormal noise.

**HINT:**

- Measure the volume of each injection cylinder with a measuring cylinder.
- Before measuring the injection volume, first hold the cylinder tilted for at least 30 seconds to discard all the fuel.

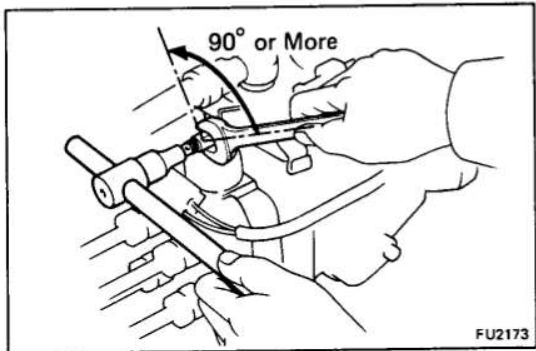
FUEL SYSTEM – Injection Pump

FU-31

2. PRE-SET FULL LOAD INJECTION VOLUME

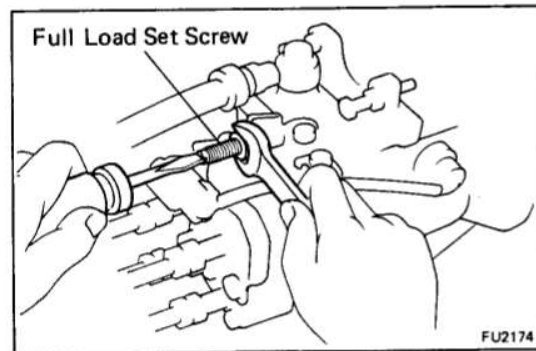
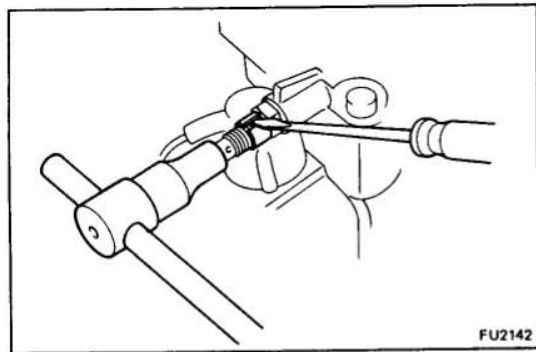
- (a) Set the adjusting lever to maximum position.
- (b) (2L-T Austria)
Apply 0.68 kg/cm² (9.6 psi, 66 kPa) of pressure to the boost compensator.
- (c) (2L-T Others)
Apply 0.63 kg/cm² (9.0 psi, 62 kPa) of pressure to the boost compensator.
- (d) Measure the injection volume.

Item		Pump rpm	No. of measuring strokes	Injection volume cc (cu in.)
2L-T	Austria	1,400	200	14.04 – 14.36 (0.86 – 0.88)
	Others	1,200	200	13.94 – 14.26 (0.85 – 0.87)
3L	Hong Kong, Singapore, Malaysia	1,200	200	10.96 – 11.28 (0.67 – 0.69)
	Others	1,200	200	11.56 – 11.88 (0.71 – 0.72)

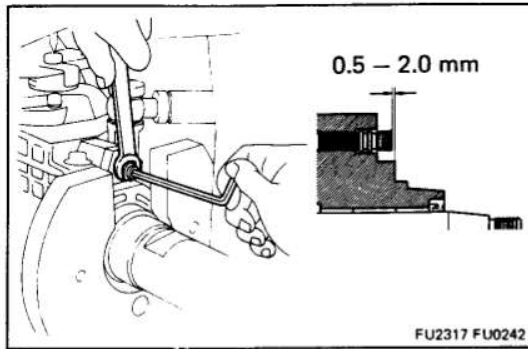


- (e) Remove the collar seal as follows:
- Hold the full load set screw, and release the collar seal from the spot weld by turning the lock nut counterclockwise 90° or more.

- Using a screwdriver, remove the collar seal.



- (f) Adjust by turning the full load set screw.
- HINT: The injection volume will increase about 3 cc (0.18 cu in.) with each 1/2 turn of the screw.

FU-32**FUEL SYSTEM – Injection Pump**
**3. (2L-T and w/o HAC)
PRE-SETTING OF LOAD SENSING TIMER**

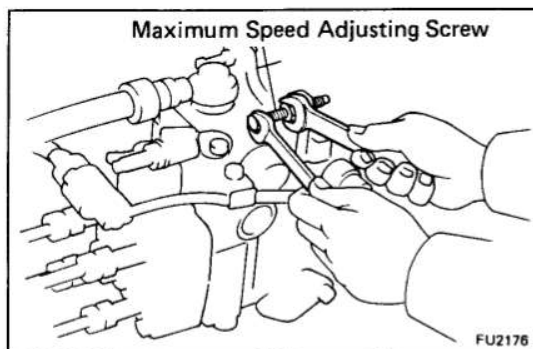
Using a 5 mm hexagonal wrench, adjust the protrusion of the governor shaft.

Protrusion: 0.5 – 2.0 mm (0.020 – 0.079 in.)

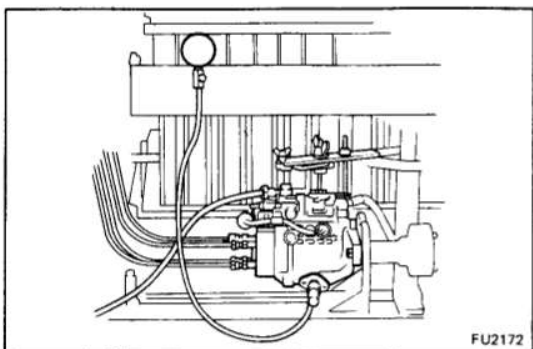
4. PRE-SET MAXIMUM SPEED

- (a) Set the adjusting lever to maximum position.
- (b) (2L-T Austria)
Apply 0.68 kg/cm² (9.6 psi, 66 kPa) of pressure to the boost compensator.
- (c) (2L-T Others)
Apply 0.63 kg/cm² (9.0 psi, 62 kPa) of pressure to the boost compensator.
- (d) Measure the injection volume.

Item		Pump rpm	No. of measuring strokes	Injection volume cc (cu in.)
2L-T	Austria	2,450	200	4.3 – 6.3 (0.26 – 0.38)
	Others	2,400	200	4.3 – 6.3 (0.26 – 0.38)
3L	Hong Kong, Singapore, Malaysia	2,200	200	4.6 – 6.2 (0.28 – 0.38)
	Others	2,300	200	4.6 – 6.2 (0.28 – 0.38)

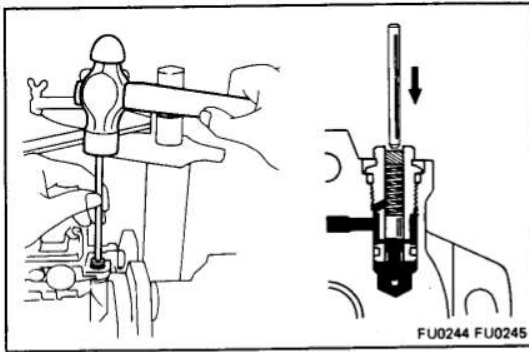


- (e) Cut off the seal wire.
- (f) Adjust the injection volume with the maximum speed adjusting screw.


5. ADJUST PUMP INNER PRESSURE

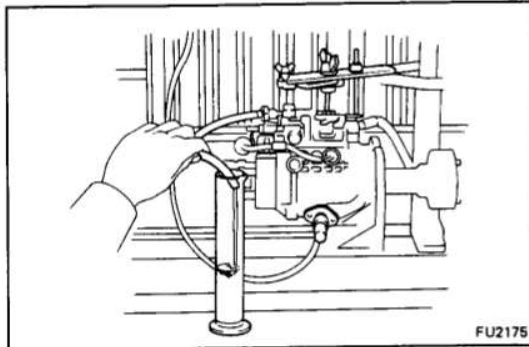
- (a) Measure the pump inner pressure at the below listed rpm.

Pump rpm	Inner pressure kg/cm ² (psi, kPa)
500	3.2 – 3.8 (46 – 54, 314 – 373)
2,100	6.6 – 7.2 (94 – 102, 647 – 706)

FUEL SYSTEM – Injection Pump**FU-33**

- (b) If the pressure is low, adjust by lightly tapping the regulator valve piston while watching the pressure gauge.

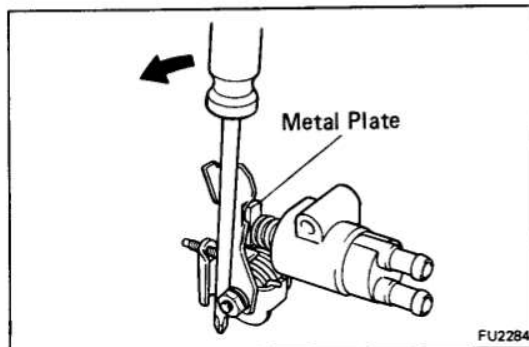
HINT: If the pressure is too high or if the regulator valve was tapped in too far, the regulator valve must be replaced.

**6. CHECK OVERFLOW VOLUME**

Measure the overflow volume at the below listed rpm.

Pump rpm	Overflow volume cc/min. (cu in./min.)
2,200	370 – 800 (22.6 – 48.8)

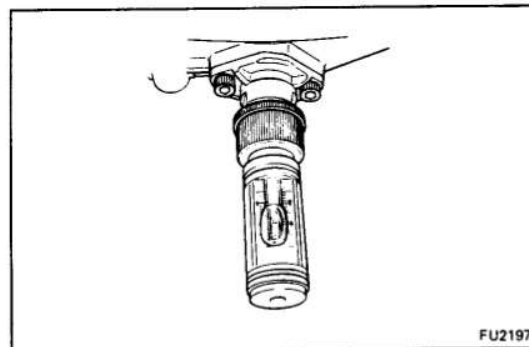
HINT: Always use the overflow screw installed on the pump to be adjusted.



**7. (2L-T)
RELEASE COLD STARTING SYSTEM FOR NEXT INSPECTIONS**

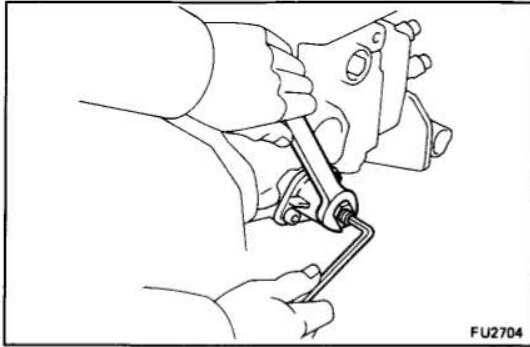
- (a) Using a screwdriver, turn the cold starting lever counterclockwise approx. 20°.
- (b) Put a metal plate (thickness of 8.5 – 10 mm (0.33 – 0.39 in.)) between the cold starting lever and thermo wax plunger.

HINT: Keep the cold starting system released until all measurements and adjustments are finished.

**8. ADJUST TIMER**

- (a) Set the timer measuring device at zero.
- (b) Measure the piston stroke at the below listed rpm.

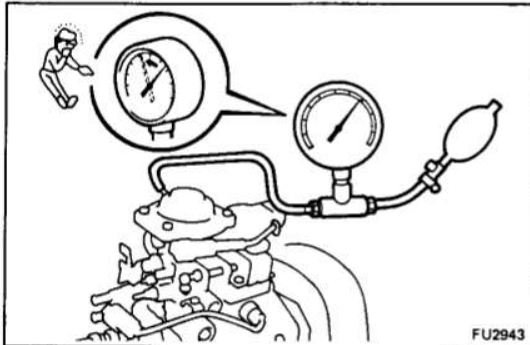
Item		Pump rpm	Piston stroke mm (in.)
2L-T	Austria	800	1.2 – 2.0 (0.047 – 0.079)
		1,200	2.5 – 3.3 (0.098 – 0.130)
		2,000	5.4 – 6.0 (0.213 – 0.236)
		2,300	5.4 – 6.0 (0.213 – 0.236)
	Others	800	1.4 – 2.2 (0.055 – 0.087)
		1,200	3.0 – 3.8 (0.118 – 0.150)
		1,800	5.5 – 6.3 (0.217 – 0.248)
		2,300	6.7 – 7.5 (0.264 – 0.295)
3L		800	0.6 – 1.4 (0.024 – 0.055)
		1,200	1.8 – 2.6 (0.071 – 0.102)
		2,000	4.4 – 5.2 (0.173 – 0.205)
		2,300	4.7 – 5.5 (0.185 – 0.217)

FU-34**FUEL SYSTEM – Injection Pump**

HINT: Check that the hysteresis is within 0.3 mm (0.012 in.).

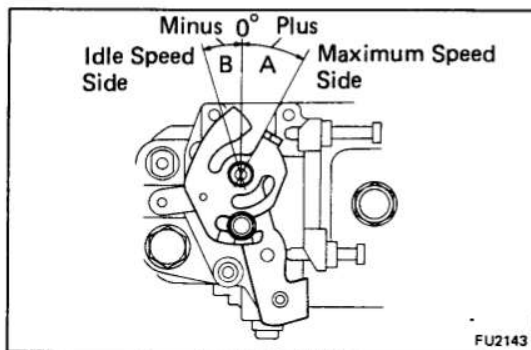
- (c) Using a 5 mm hexagonal wrench, adjust by the timer adjusting screw.

HINT: The stroke will decrease with turn to clockwise and increase with turn to counterclockwise.

**9. (2L-T)****CHECK AIR TIGHTNESS OF BOOST COMPENSATOR**

- (a) Apply 1.36 kg/cm² (19.3 psi, 133 kPa) of pressure to the boost compensator.
- (b) Measure the time it takes for the pressure to drop to 1.33 kg/cm² (18.9 psi, 130 kPa).

Pressure drop: 10 seconds or more

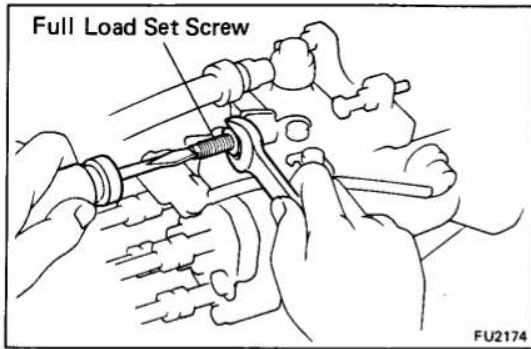
**10. ADJUST FULL LOAD INJECTION VOLUME**

- (a) The adjusting lever angle for the adjustment below should be as shown in the illustration.

Adjusting lever angle			
A (Maximum speed side)		B (Idle speed side)	
Plus	23.5 – 33.5°	Minus	12.5 – 22.5°

- (b) (2L-T Austria)
Apply 0.68 kg/cm² (9.6 psi, 66 kPa) of pressure to the boost compensator.
- (c) (2L-T Others)
Apply 0.63 kg/cm² (9.0 psi, 62 kPa) of pressure to the boost compensator.
- (d) Measure the full load injection volume.

Item		Adjusting lever angle position	Pump rpm	No. of measuring strokes	Injection volume cc (cu in.)
2L-T	Austria	Plus 23.5 – 33.5°	1,400	200	14.04 – 14.36 (0.86 – 0.88)
	Others	Plus 23.5 – 33.5°	1,200	200	13.94 – 14.26 (0.85 – 0.87)
3L	Hong Kong, Singapore, Malaysia	Plus 23.5 – 33.5°	1,200	200	10.96 – 11.28 (0.67 – 0.69)
	Others	Plus 23.5 – 33.5°	1,200	200	11.56 – 11.88 (0.71 – 0.72)

FUEL SYSTEM – Injection Pump**FU-35**

(e) Adjust by turning the full load set screw.

HINT: The injection volume will increase about 3 cc (0.18 cu in.) with each 1/2 turn of the screw.

11. ADJUST MAXIMUM SPEED

(a) (2L-T Austria)

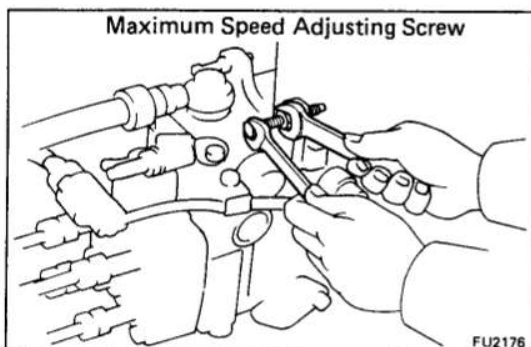
Apply 0.68 kg/cm² (9.6 psi, 66 kPa) of pressure to the boost compensator.

(b) (2L-T Others)

Apply 0.63 kg/cm² (9.0 psi, 62 kPa) of pressure to the boost compensator.

(c) Measure the injection volume at each pump rpm.

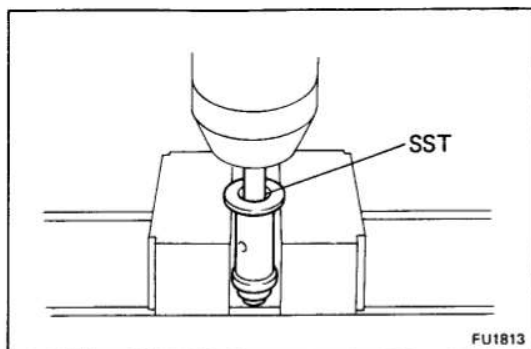
Item		Adjusting lever angle position	Pump rpm	No. of measuring strokes	Injection volume cc (cu in.)	Remarks
2L-T	Austria	Plus 23.5 – 33.5°	2,450	200	4.3 – 6.3 (0.26 – 0.38)	Adjust
			2,250		8.3 – 10.5 (0.51 – 0.64)	—
			2,750		1.3 (0.8) or less	—
	Others	Plus 23.5 – 33.5°	2,400	200	4.3 – 6.3 (0.26 – 0.38)	Adjust
			2,250		7.1 – 9.3 (0.43 – 0.57)	—
			2,750		1.3 (0.8) or less	—
3L	Hong Kong, Singapore, Malaysia	Plus 23.5 – 33.5°	2,200	200	4.6 – 6.2 (0.28 – 0.38)	Adjust
			2,000		8.44 – 10.44 (0.52 – 0.64)	—
			2,400		1.3 (0.8) or less	—
	Others	Plus 23.5 – 33.5°	2,300	200	4.6 – 6.2 (0.28 – 0.38)	Adjust
			2,100		9.08 – 11.08 (0.55 – 0.68)	—
			2,550		1.3 (0.8) or less	—



(d) Adjust by turning the maximum speed adjusting screw.

FU-36

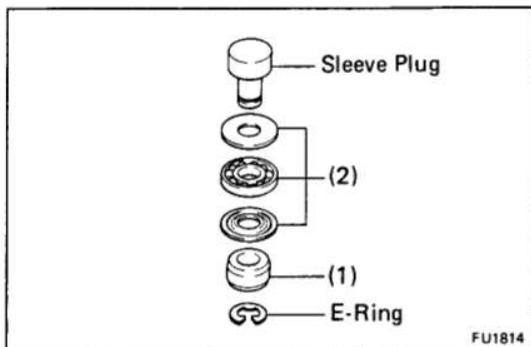
FUEL SYSTEM – Injection Pump



If the injection volume at 100 rpm is not as specified, replace the governor sleeve plug as follows:

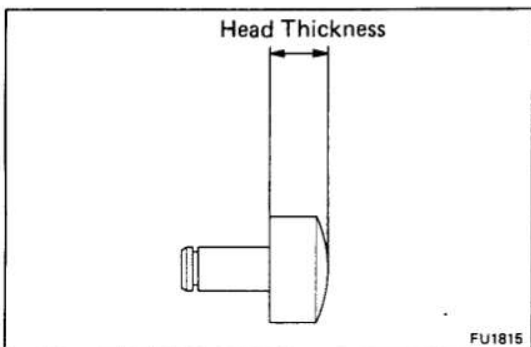
- Using SST and a press, press out the sleeve plug assembly from the governor sleeve.

SST 09236-00101 (09237-00070)



- Remove the E-ring and following parts from the sleeve plug:

- (1) Stop ring
- (2) Bearing and two bearing retainers



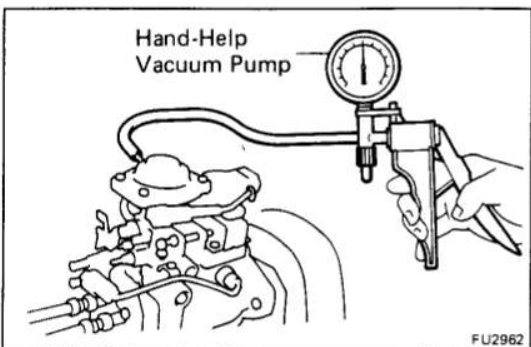
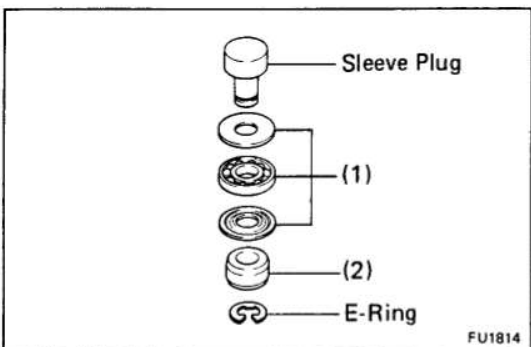
- Measure the head thickness of the sleeve plug, and select a new sleeve plug.

Sleeve plug head thickness		mm (in.)
3.0 (0.118)	3.5 (0.138)	4.0 (0.158)
3.1 (0.122)	3.6 (0.142)	4.1 (0.161)
3.2 (0.126)	3.7 (0.146)	4.2 (0.165)
3.3 (0.130)	3.8 (0.150)	
3.4 (0.134)	3.9 (0.154)	

HINT: Lengthening the plug 0.1 mm (0.004 in.) will increase injection volume by 0.6 cc (0.04 cu in.).

- Install the following parts to the new sleeve plug with a new E-ring:

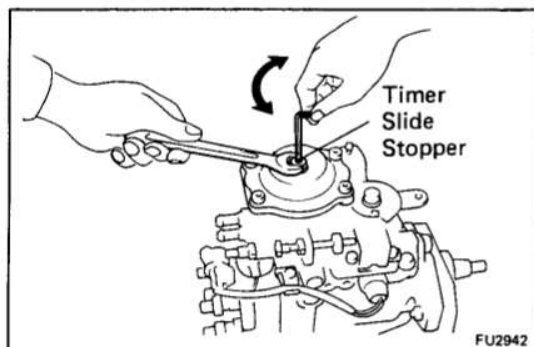
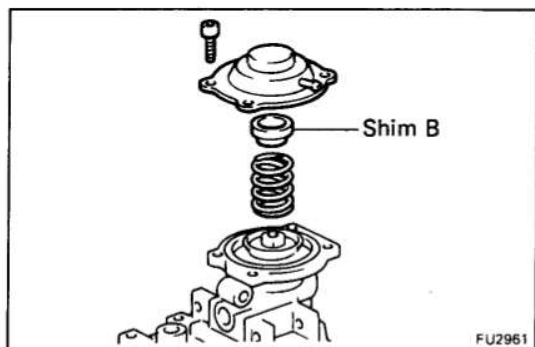
- (1) Bearing and two retainers
- (2) Stop ring



12. (2L-T) CHECK AND ADJUST FULL LOAD MINIMUM INJECTION VOLUME

- (a) (Austria)

Using the hand-help vacuum pump, apply 200 mmHg of (7.9 in.Hg, 26.7 kPa) absolute pressure to the boost compensator.

FUEL SYSTEM – Injection Pump**FU-37****(b) Measure the injection volume**

Item	Pump rpm	No. of measuring strokes	Injection volume cc (cu in.)
Austria	1,400	200	8.8 – 10.0 (0.54 – 0.61)
Others	500	200	10.6 – 11.4 (0.65 – 0.70)

(c) (Austria)

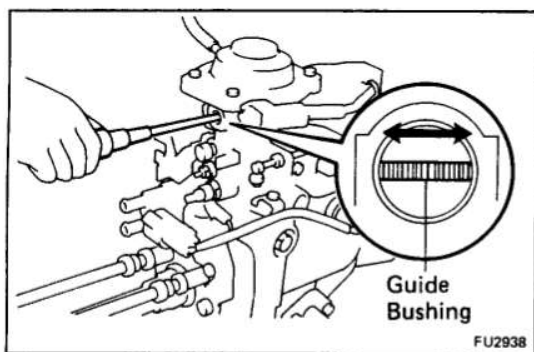
If the injection volume is not as specified, adjust by using shim B. (See page FU-22)

(d) (Others)

Using a 3 mm hexagonal wrench, adjust the timer slide stopper.

13. (2L-T)**ADJUST BOOST COMPENSATOR CHARACTERISTIC****(Others)****(a) Apply pressure to the boost compensator.****(b) Measure the injection volume bushing.**

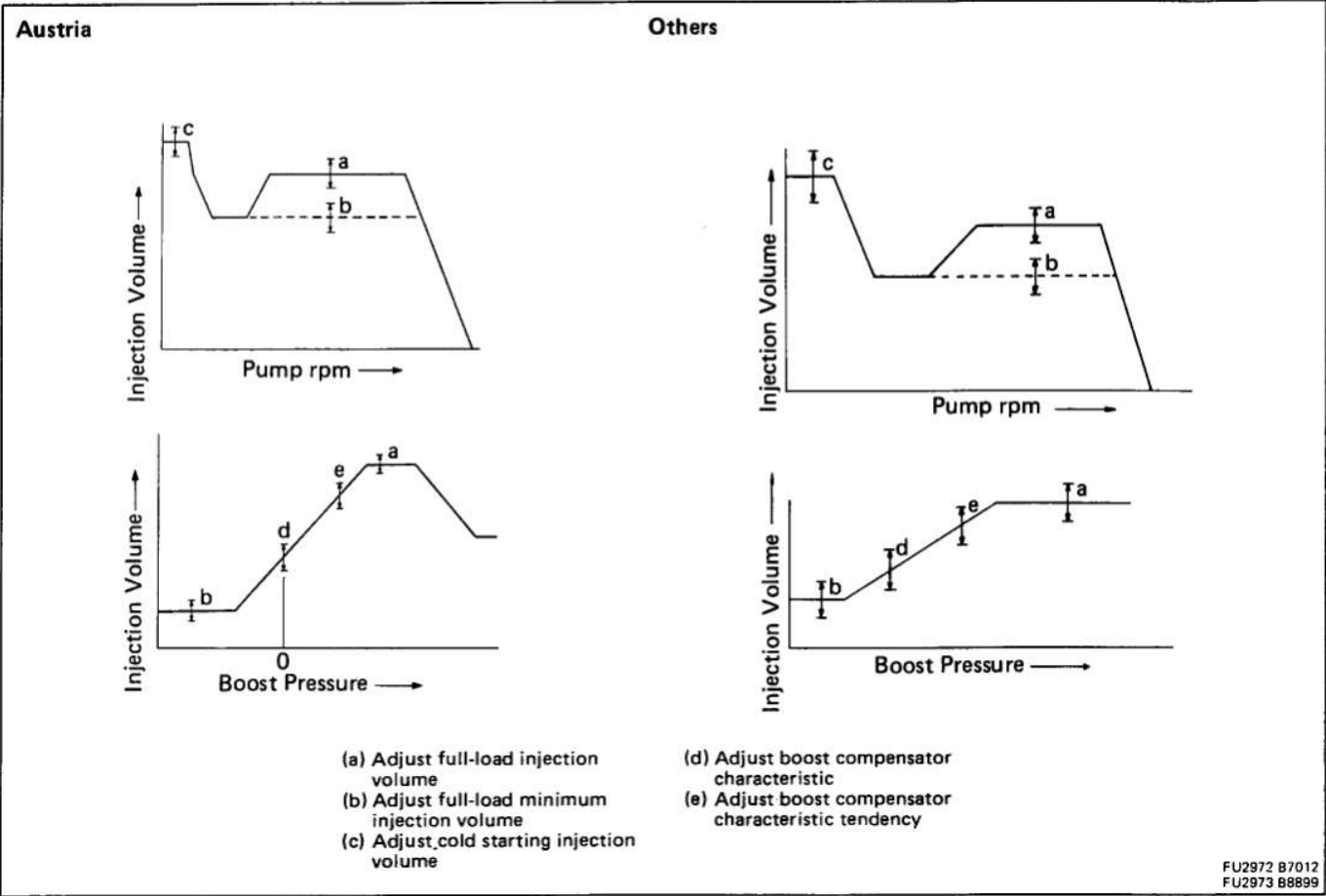
Item	Pump rpm	Boost pressure kg/cm ² (psi, kPa)	No. of measuring strokes	Injection volume cc (cu in.)
Austria	500	0 (0, 0)	200	10.8 – 11.6 (0.65 – 0.71)
Others	1,200	0.41 (5.9, 40)	200	12.9 – 13.5 (0.79 – 0.82)

**(c) Using a screwdriver, adjust the guide bushing.**

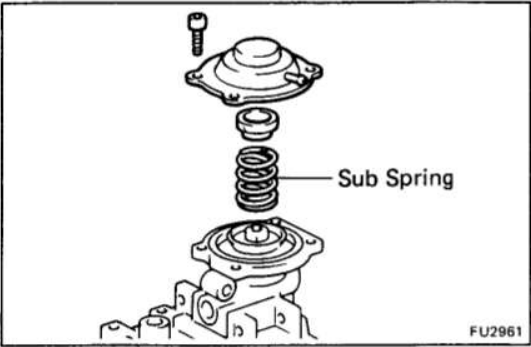
HINT: When the guide bushing is turned clockwise, as seen from above, the injection volume will increase.

14. (2L-T)
INSPECT AND ADJUST BOOST COMPENSATOR
CHARACTERISTIC TENDENCY

- (a) Apply pressure to the boost compensator.
- (b) Measure injection volume.



Item	Pump rpm	Boost pressure kg/cm ² (psi, kPa)	No. of measuring strokes	Injection volume cc (cu in.)
Austria	500	0.41 (5.9, 40)	200	14.6 – 15.4 (0.89 – 0.93)
Others	1,200	0.14 (1.9, 13)	200	11.2 – 12.0 (0.68 – 0.73)



- (c) (Austria)
If the injection volume is not as specified, replace the sub spring of the boost compensator with one with different spring constant.

Spring constant: 1.2 kg/cm (1.04 lb/in.)
1.4 kg/cm (1.22 lb/in.)

FUEL SYSTEM – Injection Pump

FU-39

15. (2L-T) CHECK HYSTERESIS (Austria)

Compare the injection volume when the boost compensator pressure is lowered from 0.74 kg/cm² (10.5 psi, 73 kPa) to 0 kg/cm² (0 psi, 0 kPa) and, conversely, when it is raised from zero.

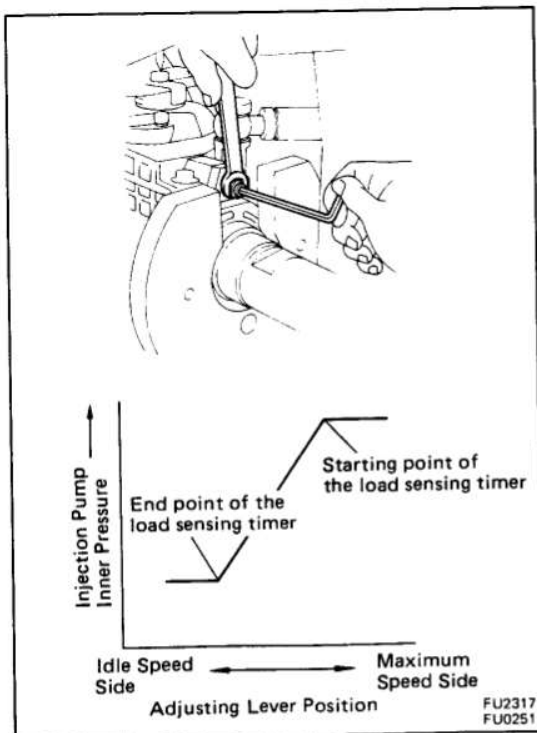
(Others)

Compare the injection volume when the boost compensator pressure is lowered from 0.78 kg/cm² (11.1 psi, 77 kPa) to 0.14 kg/cm² (2.0 psi, 14 kPa) and, conversely, when it is raised from zero.

HINT: Make measurements after moving the adjusting lever between idle and maximum three times for each lowering of the pressure.

Item	Pump rpm	Boost pressure kg/cm ² (psi, kPa)	No. of measuring strokes	Injection volume cc (cu in.)	Hysteresis cc (cu in.)
Austria	1,400	0.74 (10.5, 73)	200	13.84 – 14.36 (0.84 – 0.88)	–
	1,400	0.68 (9.6, 66)		13.94 – 14.26 (0.85 – 0.87)	–
	500	0.41 (5.9, 40)		14.60 – 15.40 (0.89 – 0.94)	0.3 (0.02) or less
	500	0 (0, 0)		10.80 – 11.60 (0.66 – 0.71)	–
Others	1,200	0.74 (10.5, 73)	200	13.84 – 14.36 (0.84 – 0.88)	–
	1,200	0.63 (9.0, 62)		13.94 – 14.26 (0.85 – 0.87)	–
	1,200	0.41 (5.9, 40)		12.90 – 13.50 (0.79 – 0.82)	0.3 (0.02) or less
	1,200	0.14 (2.0, 14)		11.20 – 12.00 (0.68 – 0.73)	–

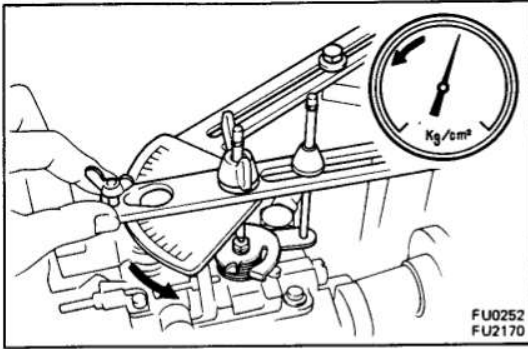
If not within standard value, check each sliding part of the boost compensator and check whether or not there is any oil.



16. (2L-T and w/o HAC) ADJUST LOAD SENSING TIMER

- Using a 5 mm hexagonal wrench, adjust the starting and end points of the load sensing timer by turning the governor shaft.
- Measure the injection volume.

Adjusting lever position	Pump rpm	No. of measuring strokes
Maximum speed side	1,200	200

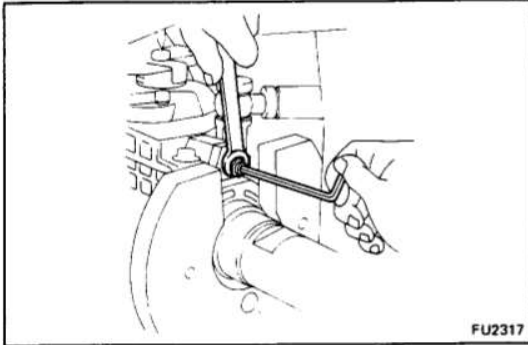
FU-40**FUEL SYSTEM – Injection Pump**

- (e) Slowly move the adjusting lever from the maximum speed side to the idle speed side, and secure it at the point where the pump inner pressure begins to drop.
- (f) Measure the injection volume at the drop point (starting point).

Item	Pump rpm	No. of measuring strokes	Injection volume mm (cu in.)
2L-T	1,200	200	Measured value at step (b) minus 0.6 (0.04) ± 0.4 (0.02)
3L	1,200	200	Measured value at step (b) minus 1.0 (0.06) ± 0.4 (0.02)

- (g) Using a 5 mm hexagonal wrench, adjust the load sensing timer by turning the governor shaft, and perform the measurement again as specified.

HINT: The injection volume will increase approx. 3 cc (0.2 cu in.) with each 1/2 turn of the governor shaft.



- (h) Check the end point injection volume by slowly moving the adjusting lever from the maximum speed side to the idle speed side, and secure it at the point where the pump inner pressure stops dropping.

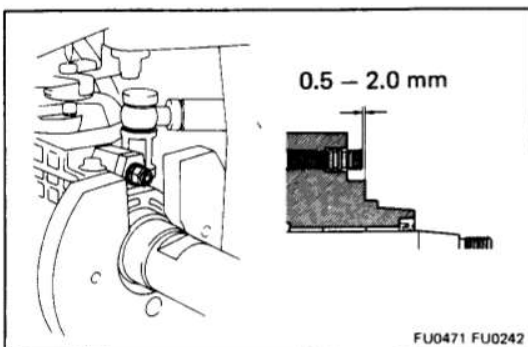
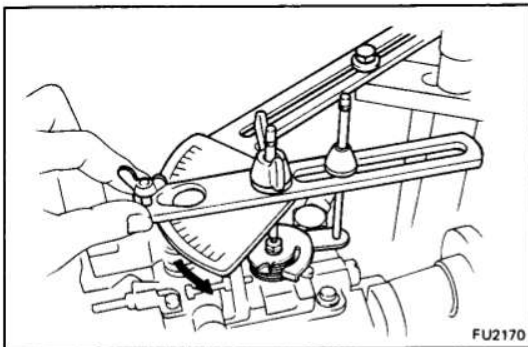
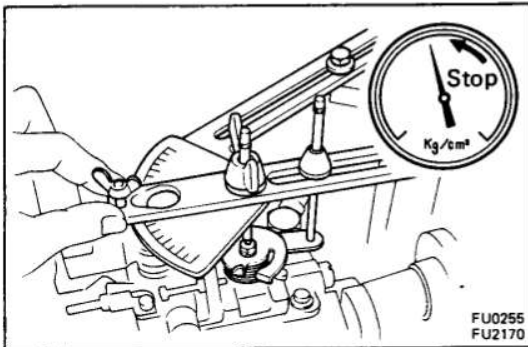
Item	Pump rpm	No. of measuring strokes	Injection volume cc (cu in.)
2L-T	1,200	200	8.10 – 8.50 (0.49 – 0.52)
3L	Hong Kong, Singapore, Malaysia	1,200	8.12 – 8.52 (0.50 – 0.52)
	Others	1,200	8.72 – 9.12 (0.52 – 0.56)

- (i) Check the timer piston fluctuation when the adjusting lever is moved from the maximum speed side to the idle speed side.

Item	Pump rpm	Timer piston fluctuation mm (in.)
2L-T	1,200	1.44 – 1.84 (0.057 – 0.072)
3L	1,200	0.62 – 1.02 (0.024 – 0.040)

- (j) Check the protrusion of the governor shaft.

Protrusion: 0.5 – 2.0 mm (0.020 – 0.079 in.)



FUEL SYSTEM – Injection Pump

FU-41

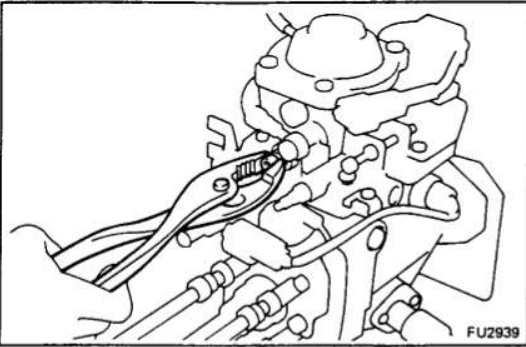
17. CHECK INJECTION VOLUME

- (a) (2L-T Austria)
Apply 0.68 kg/cm² (9.6 psi, 66 kPa) of pressure to the boost compensator.
- (b) (2L-T Others)
Apply 0.63 kg/cm² (9.0 psi, 62 kPa) of pressure to the boost compensator.
- (c) Measure the injection volume for each pump rpm.

Item		Adjusting lever angle position	Pump rpm	No. of measuring strokes	Injection volume cc (cu in.)	Variation limit cc (cu in.)	Remarks
2L-T	Austria	Plus 23.5 – 33.5°	1,400	200	13.94 – 14.26 (0.85 – 0.87)	0.4 (0.02)	Basic full-load injection volume
			100		13.60 – 18.40 (0.83 – 1.12)	1.2 (0.07)	Volume during starting
			1,200		13.70 – 15.10 (0.84 – 0.92)	0.5 (0.03)	—
			1,800		12.30 – 13.70 (0.75 – 0.84)	0.5 (0.03)	—
			2,000		11.60 – 12.80 (0.71 – 0.78)	0.5 (0.03)	—
	Others	Plus 23.5 – 33.5°	1,200	200	13.94 – 14.26 (0.85 – 0.87)	0.4 (0.02)	Basic full-load injection volume
			100		13.60 – 18.40 (0.83 – 1.12)	1.2 (0.07)	Volume during starting
			1,800		12.10 – 13.10 (0.74 – 0.80)	0.5 (0.03)	—
	Hong Kong, Singapore, Malaysia	Plus 23.5 – 33.5°	1,200	200	10.96 – 11.28 (0.67 – 0.69)	0.4 (0.02)	Basic full-load injection volume
			100		11.60 – 16.40 (0.71 – 1.00)	1.2 (0.07)	Volume during starting
			500		9.64 – 11.04 (0.59 – 0.67)	0.5 (0.03)	—
			1,900		9.39 – 10.69 (0.57 – 0.65)	0.5 (0.03)	—
3L	Others	Plus 23.5 – 33.5°	1,200	200	11.56 – 11.88 (0.71 – 0.72)	0.4 (0.02)	Basic full-load injection volume
			100		11.60 – 16.40 (0.71 – 1.00)	1.2 (0.07)	Volume during starting
			500		10.44 – 11.44 (0.64 – 0.70)	0.5 (0.03)	—
			2,000		10.19 – 11.09 (0.62 – 0.68)	0.5 (0.03)	—

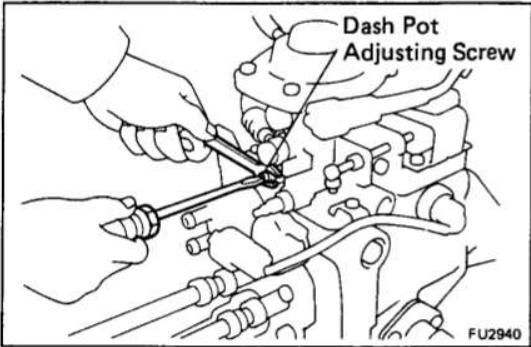
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FUEL SYSTEM – Injection Pump



18. ADJUST IDLE SPEED

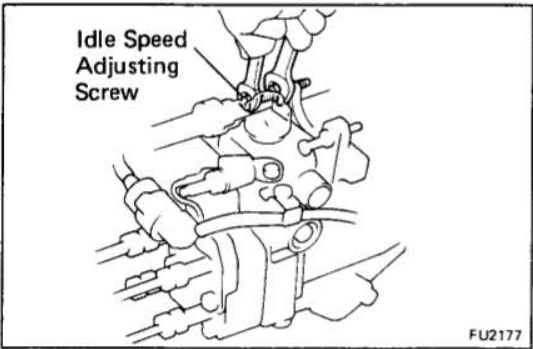
- (a) (2L-T)
Using pliers, remove the dash pot cover.



- (b) (2L-T)
Fully loosen the dash pot adjusting screw.

- (c) Measure the injection volume for each pump rpm.

Item		Adjusting lever angle position	Pump rpm	No. of measuring strokes	Injection volume cc (cu in.)	Variation limit cc (cu in.)	Remark
2L-T	Austria	Minus 13.5 – 21.5°	375	200	q = 2.4 – 2.6 (0.15 – 0.16)	—	Pre-set
			350		q plus 0.5 (0.03) or more	—	—
			450		q minus 1.1 – 2.1 (0.07 – 0.13)	—	—
	Others	Minus 13.5 – 21.5°	375	200	q = 1.5 – 2.5 (0.09 – 0.15)	—	Pre-set
			350		q plus 0.5 (0.03) or more	—	—
			450		q minus 0.7 – 1.7 (0.04 – 0.10)	—	—
3L		Minus 12.5 – 22.5°	350	200	1.8 – 2.8 (0.11 – 0.17)	0.34 (0.02)	Adjust
			525		1.2 (0.07) or less	—	—

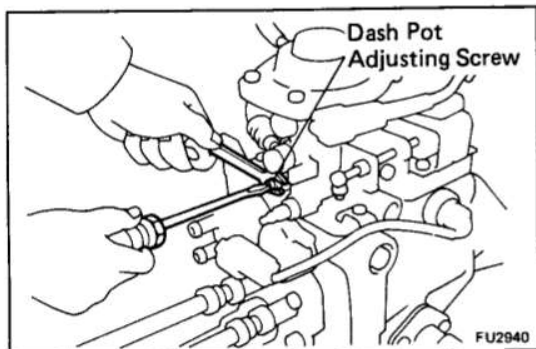


- (d) Adjust by turning the idle speed adjusting screw.

FUEL SYSTEM – Injection Pump**FU-43****(e) (2L-T)**

Set the adjusting lever to the angle for the injection volume shown below.

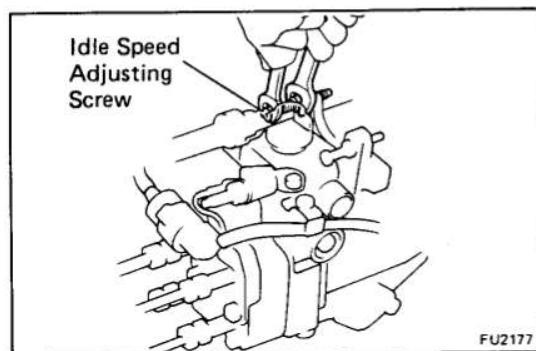
Item	Pump rpm	No. of measuring strokes	Injection volume cc (cu in.)
Austria	600	200	$q = 0.5 - 0.7$ (0.03 – 0.04)
Others	600	200	$q = 0.6 - 0.8$ (0.04 – 0.05)

**(f) (2L-T)**

Adjust the injection volume with the dash pot adjusting screw.

HINT: The stroke will decrease with turn to clockwise and increase with turn to counterclockwise.

Item	Pump rpm	No. of measuring strokes	Injection volume cc (cu in.)
Austria	600	200	$q \text{ plus } 0.2 - 0.4$ (0.01 – 0.02)
Others	600	200	$q \text{ plus } 0.2 - 0.4$ (0.01 – 0.02)

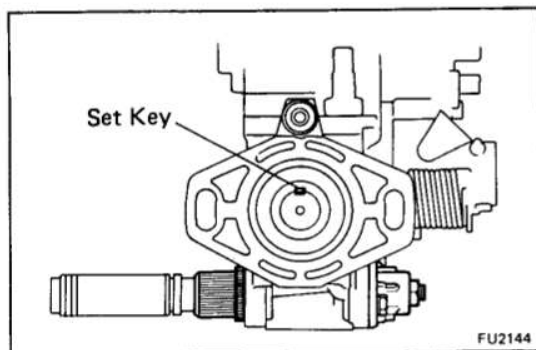
**(g) (2L-T)**

Readjust by turning the idle speed adjusting screw.

Item	Adjusting lever angle position	Pump rpm	Injection volume cc (cu in.)	Variation limit cc (cu in.)
Austria	Minus 13.5 – 21.5°	375	3.0 – 4.0 (0.18 – 0.24)	0.34 (0.02)
Others	Minus 13.5 – 21.5°	375	1.8 – 2.8 (0.11 – 0.17)	0.34 (0.02)

(h) (2L-T)

Install the dash pot cover.

**19. (2L-T)****ADJUST COLD STARTING SYSTEM**

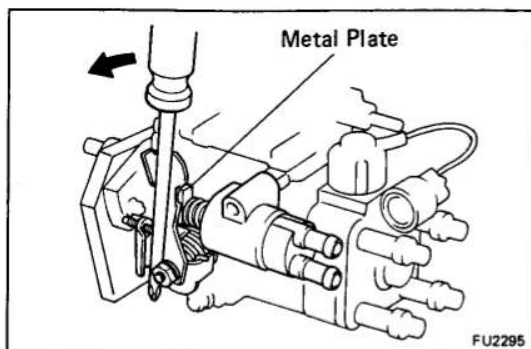
- (a) Remove the overflow screw and check the fuel temperature in the fuel pump.

Fuel temperature: 15 – 35°C (59 – 95°F)

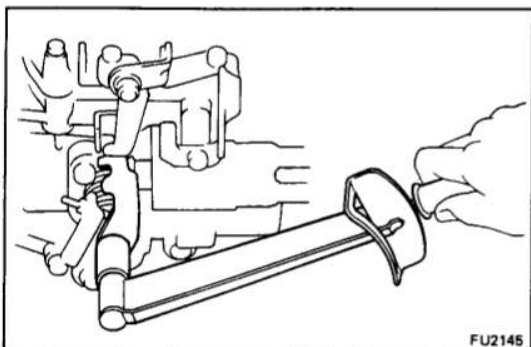
- (b) Set the set key of the pump drive shaft in a vertical or horizontal position.
- (c) Set the scale of the timer measuring device to zero.
- (d) Check the adjusting lever opening angle and consider this angle as zero.

FU-44

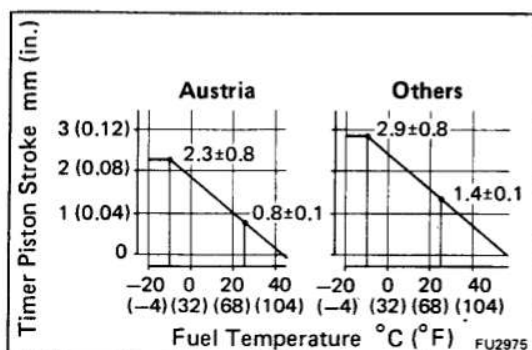
FUEL SYSTEM – Injection Pump



- (e) Remove the metal plate between the cold starting lever and thermo wax plunger.

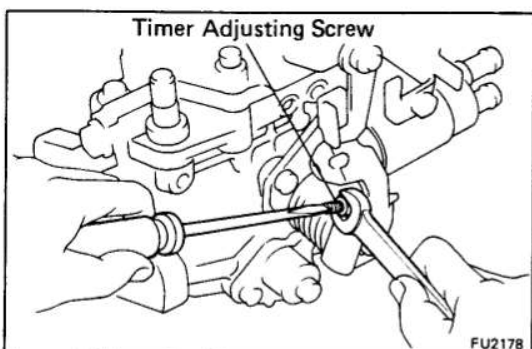


- (f) Torque the cold starting lever clockwise to approx. 50 kg-cm (43 in.-lb, 4.9 N·m) and keep the lever tightened for about 10 seconds. Then release the torque.

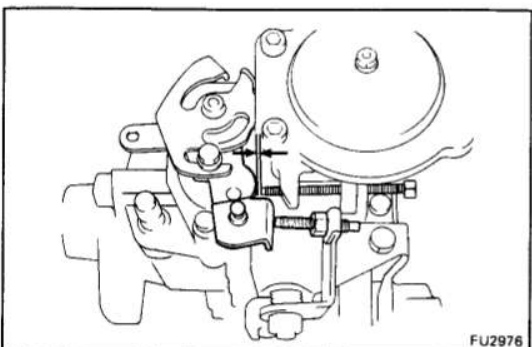


- (g) Measure the timer piston stroke.

Item	Fuel temperature	Timer piston stroke mm (in.)
Austria	25°C (77°F)	0.7 – 0.9 (0.028 – 0.035)
Others	25°C (77°F)	1.3 – 1.5 (0.051 – 0.059)



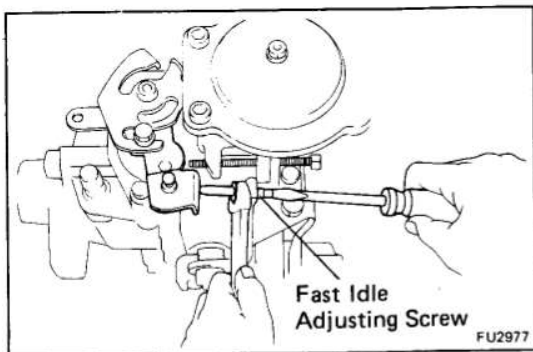
- (h) Adjust by turning the timer adjusting screw.
HINT: Screw in for stroke decrease.



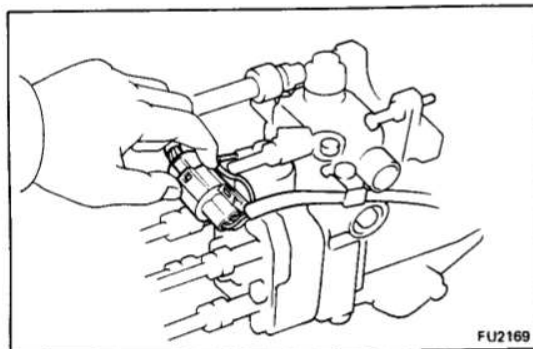
20. (2L-T) ADJUST FAST IDLE

- (a) Measure the clearance between the adjusting lever and idle speed adjusting screw.

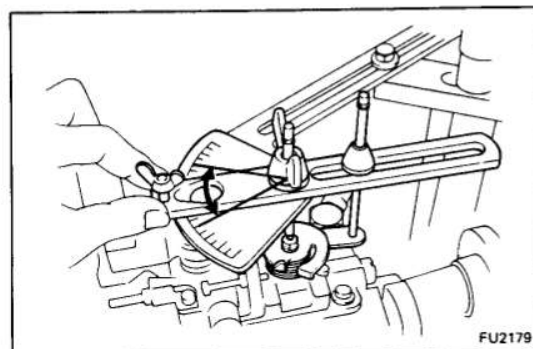
Fuel temperature	Clearance
20°C (68°F)	2.5 mm (0.098 in.)
50°C (122°F)	0 mm (0 in.)

FUEL SYSTEM – Injection Pump**FU-45**

(b) Adjust by turning the fast idle adjusting screw.

**21. POST ADJUSTMENT CHECK**

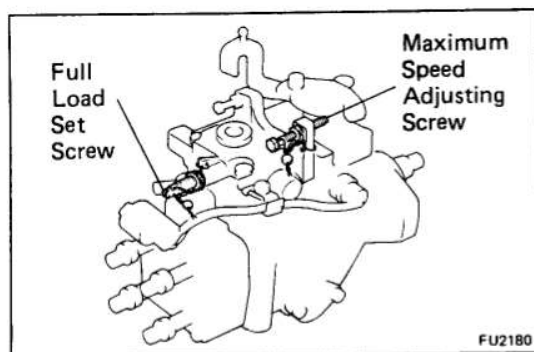
(a) Check that injection stops when the fuel cut solenoid harness is removed.

Pump revolution: 100 rpm

(b) Check the adjusting lever movement.

Adjusting lever angle:

2L-T	41 – 51°
3L	43 – 49°

**22. SEAL PARTS**

Seal the maximum speed adjusting screw and full load set screws with new lead seals.

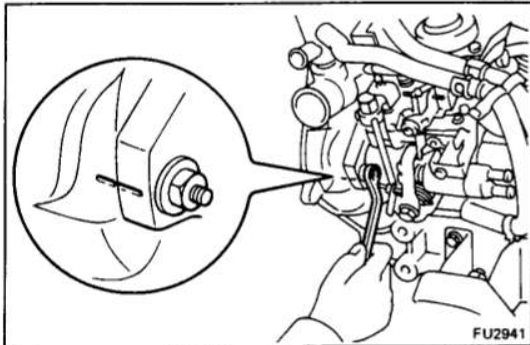
FU-46**FUEL SYSTEM — Injection Pump****INSTALLATION OF INJECTION PUMP**

(See page FU-3)

NOTICE: Do not put the injection pump (2L-T and w/ HAC) at an angle more than 45° from the horizontal.

1. INSTALL FUEL INLET AND OUTLET PIPES TO INJECTION PUMP

Torque: 250 kg-cm (18 ft-lb, 25 N-m)

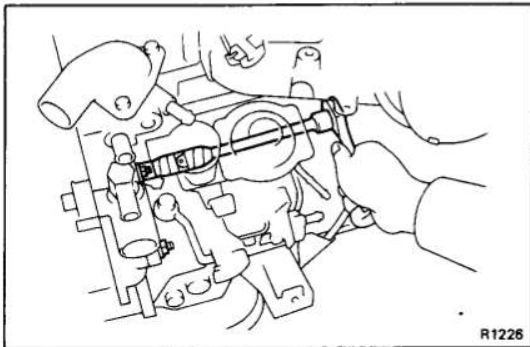


2. INSTALL INJECTION PUMP

(a) Align the period lines (or matchmarks) of the injection pump and timing belt case.

(b) Install the two nuts holding the injection pump to the timing belt case.

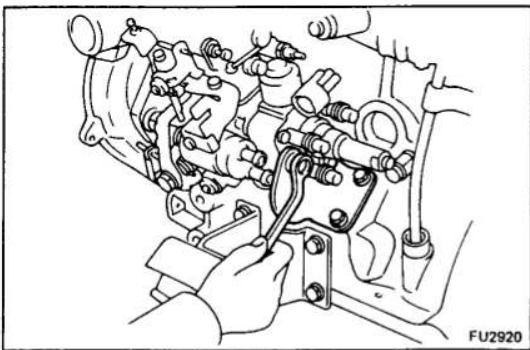
Torque: 210 kg-cm (15 ft-lb, 21 N-m)



(c) Install the pump stay with the four bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N-m)

3. CHECK INJECTION TIMING (See page EM-24 or 25)



4. INSTALL INJECTION PIPES

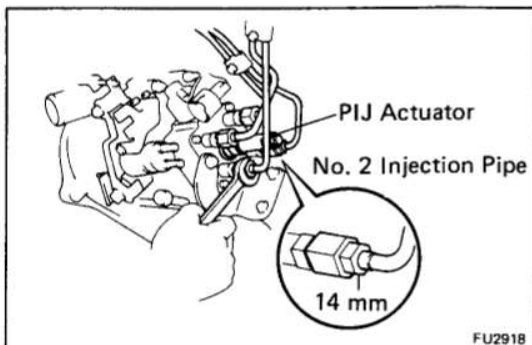
(a) Place the two lower clamps on the intake manifold.

(b) Install the four injection pipes.

Torque: 250 kg-cm (18 ft-lb, 25 N-m)

NOTICE: On vehicles with the PIJ (2L-T Austria), do not interfere with the PIJ actuator with the spanner. Use a 14 mm spanner when tightening the union nut of No. 2 injection pipe.

(c) Secure the injection pipes with the two upper clamps and bolts.



FUEL SYSTEM – Injection Pump**FU-47**

5. **CONNECT FUEL HOSES TO INJECTION PUMP**
6. **CONNECT INJECTION PUMP CONNECTOR(S)**
7. (2L-T)
CONNECT WATER BY-PASS HOSES TO THERMO WAX
8. (w/ A/C)
CONNECT A/C IDLE-UP VACUUM HOSE
9. (2L-T)
CONNECT BOOST COMPENSATOR HOSE
10. **INSTALL ACCELERATOR LINKAGE**
11. **INSTALL INJECTION PUMP DRIVE PULLEY**
Torque: 650 kg-cm (47 ft-lb, 64 N·m)
12. **SET NO. 1 CYLINDER TO TDC/COMPRESSION**
13. **INSTALL TIMING BELT**
14. **CHECK VALVE TIMING**
15. **INSTALL NO. 1 TIMING BELT COVER**
16. **INSTALL CRANKSHAFT PULLEY**
Torque: 1,700 kg-cm (123 ft-lb, 167 N·m)
17. **INSTALL WATER PUMP PULLEY, FLUID COUPLING AND FAN**
18. (2L-T)
INSTALL TURBO WATER HOSE
19. (2L-T)
FILL WITH ENGINE COOLANT (See page CO-5)
20. **START ENGINE AND CHECK FOR FUEL LEAKS**
21. **CHECK IDLE SPEED AND MAXIMUM SPEED**
(See page EM-27)

