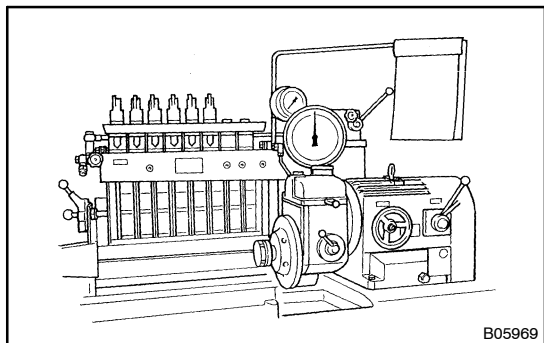
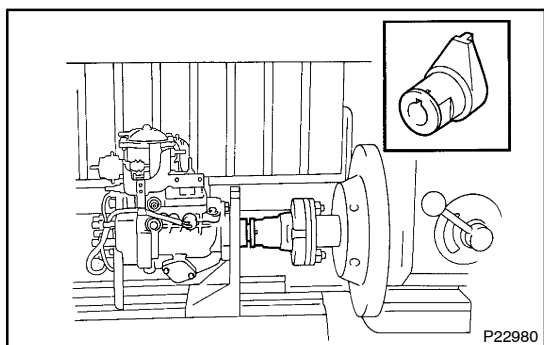


ADJUSTMENT

1. ☐ A/T:
REMOVE THROTTLE POSITION SENSOR AND BRACKET ASSEMBLY (See page FU-53)
2. REMOVE FUEL CUT VALVE CONTROL UNIT (See page FU-53)
3. ☐ REMOVE FUEL PIPES (See page FU-53)
4. w/ A/C:
REMOVE IDLE UP ACTUATOR



5. PRE-TEST CHECK AND PREPARATION
 - (a) The specifications for test nozzle and nozzle holders are as follows.
Test nozzle: DN12SD12 (DENSO)
Test nozzle opening pressure:
14,220 – 15,200 kPa
(145 – 155 kgf/cm², 2,062 – 2,205 psi)



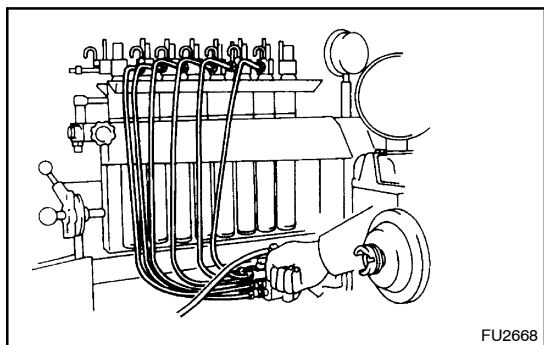
- (b) Check the accuracy of the tachometer.
Allowable error: ± 40 rpm
- (c) Install the angle gauge stand.
- (d) Mount the injection pump body on the pump tester.

HINT:

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

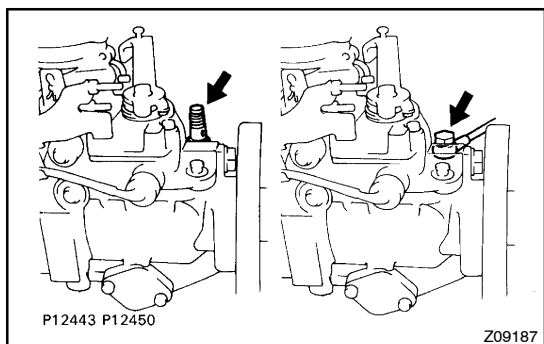
NOTICE:

To prevent vibration or dislocation of the injection pump, fix in place the distributive head of the injection pump.

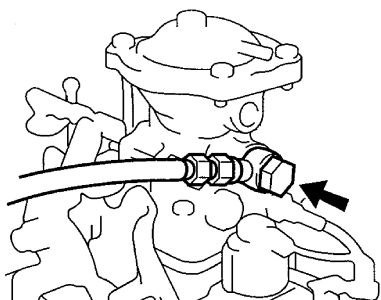
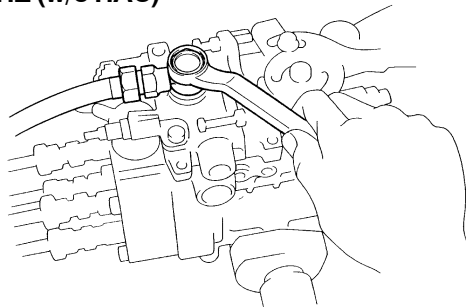


- (e) Install an injection pipe with these specifications.

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.

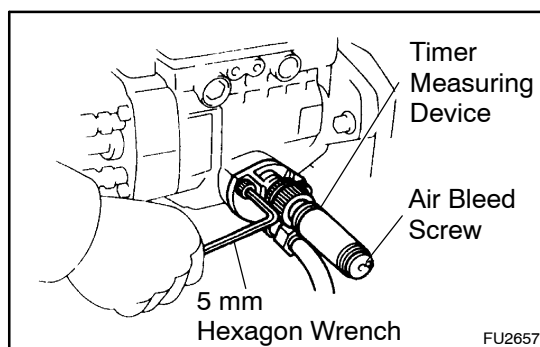
1HZ (w/ HAC) and 1HD-T**1HZ (w/o HAC)**

B05813

- (h) Install an overflow hose with 2 gaskets and union bolts.

HINT:

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



FU2657

- (i) Using a 5 mm hexagon wrench, remove the 2 bolts and RH timer cover.
 (j) Install the inner pressure gauge with the timer measuring device.

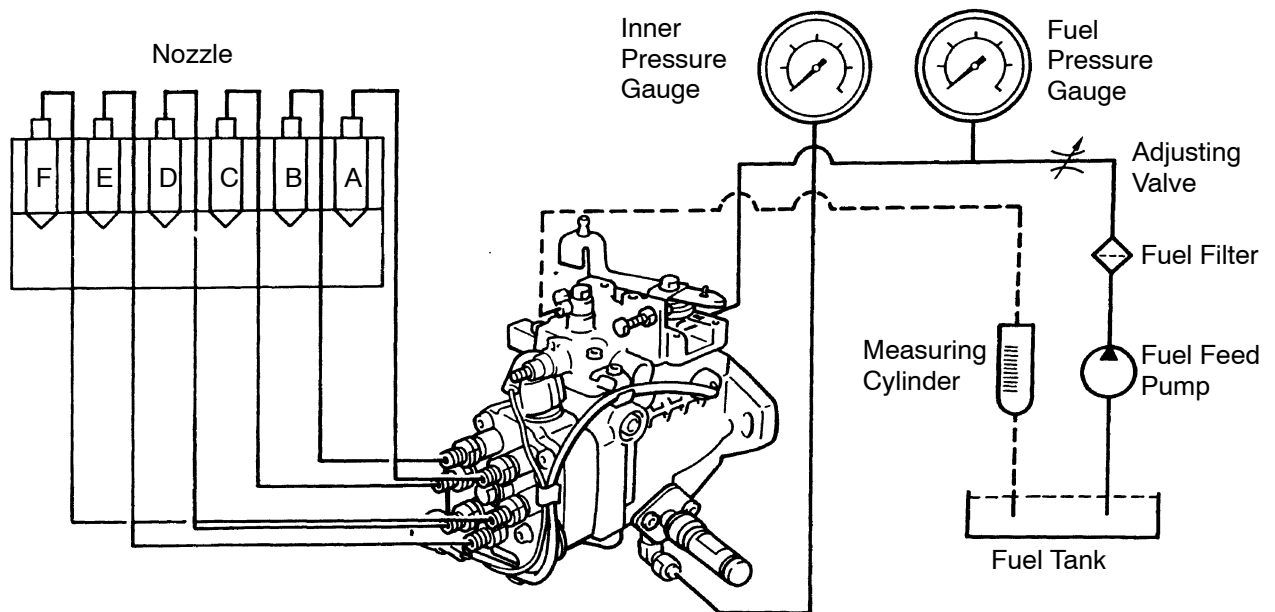
**Part No. 95095-10231 and 95095-10480
 (DENSO)**

HINT:

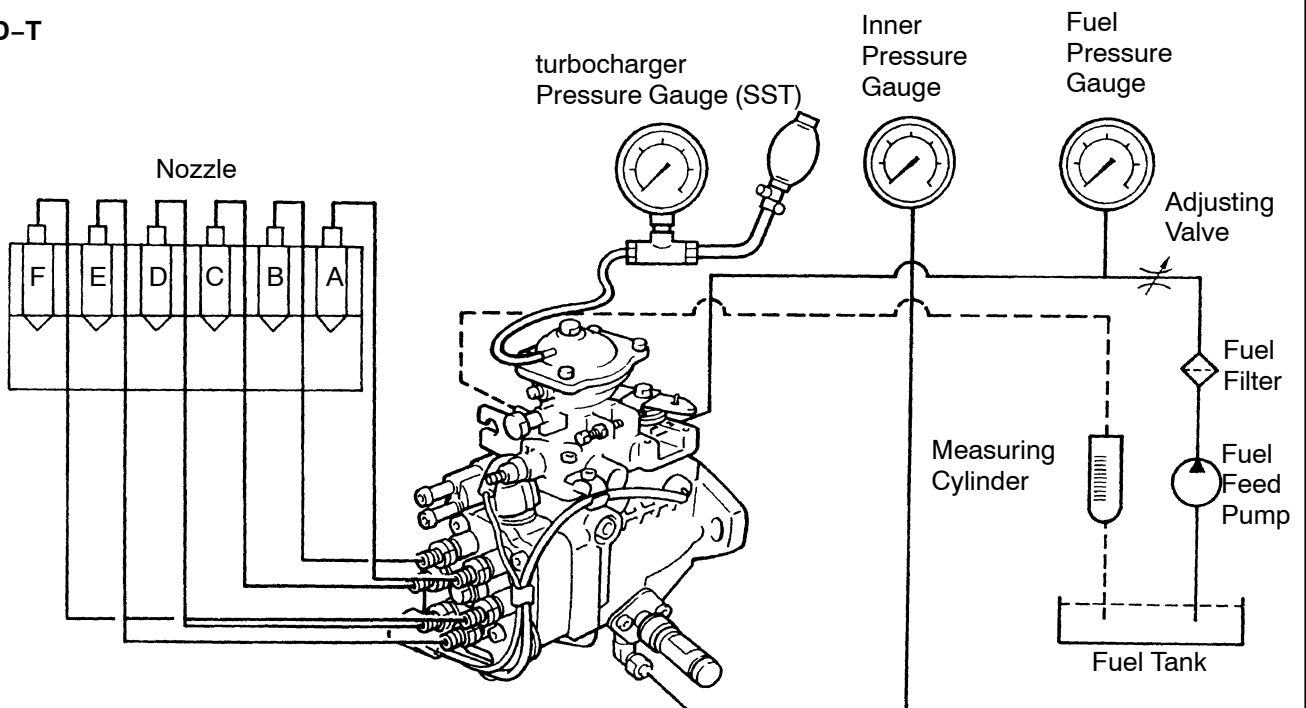
Bleed the air by the air bleed screw.

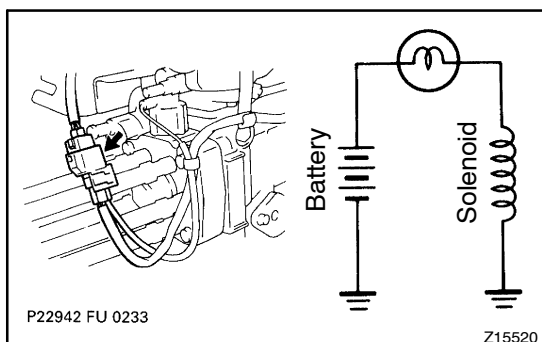
- (k) 1HD-T:
 Connect SST (turbocharger pressure gauge) to the boost compensator.
 SST 09992-00242

1HZ



1HD-T

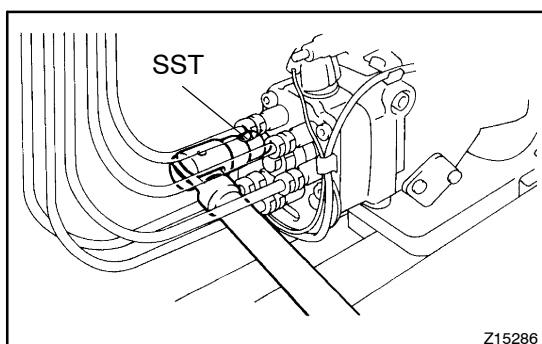
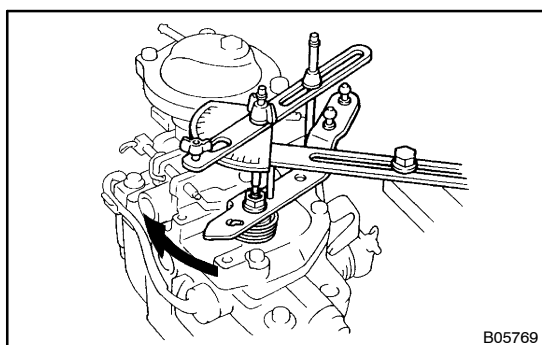




(l) Apply about 6 volts of DC power to the fuel cut solenoid.

NOTICE:

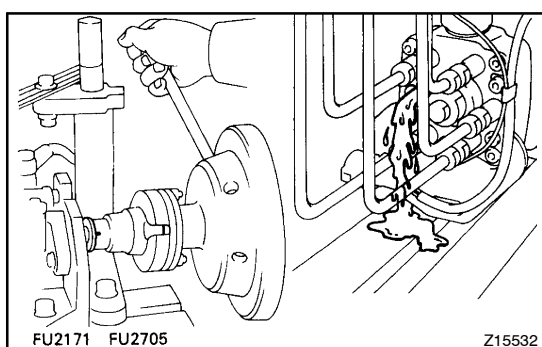
- When applying voltage to the solenoid, position the battery as far away from the solenoid as possible so that a spark does not occur.
 - when connecting the battery cable, connect the solenoid side first.
- (m) The pressure for feeding fuel to the injection pump should be 20 kPa (0.2 kgf/cm², 2.8 psi). 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.
- Part No. 95095–10360 (Stand w/ angle gauge)**
- (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 assembly and gasket.

SST 09260–54012 (09269–54020)



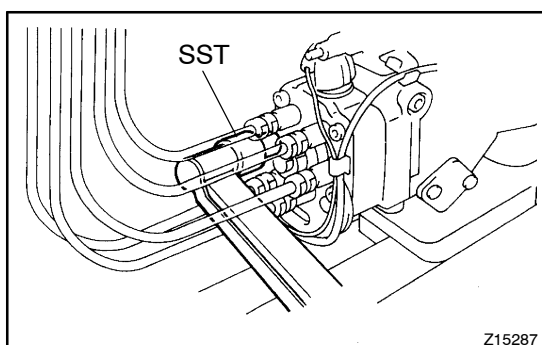
- Check that fuel is flowing out when the mark is in the position shown in the illustration.

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.

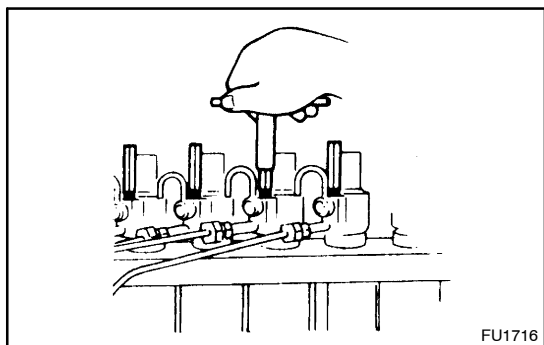


- Using SST, install a new gasket and the delivery valve holder assembly.

SST 09260–54012 (09269–54020)

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)

- Connect the injection pipe.



- (q) Bleed the air from the injection pipes.
 (r) Measure the injection volume.

Pump rpm	No. of measuring strokes	Each injection volume cc (cu in.)
1,080	200	14.92 – 16.52 (0.91 – 1.01)

- (s) Race the injection pump for 5 minutes at 1,200 rpm.

NOTICE:

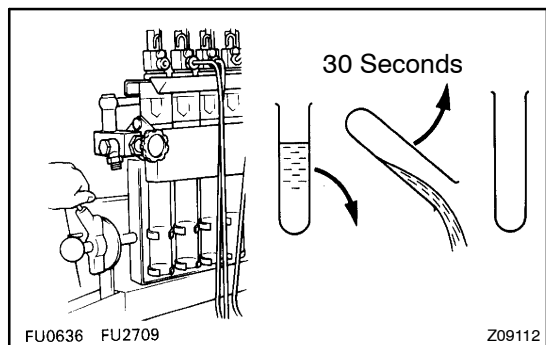
Check that there is no fuel leakage or abnormal noise.

HINT:

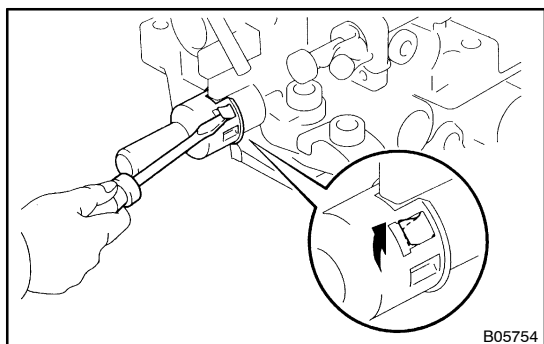
- Measure the volume of each injection cylinder with a measuring cylinder.
- Before measuring the injection volume, first hold the cylinder tilted for at least 30 seconds to discard all the fuel.

6. PRE-SET FULL LOAD INJECTION VOLUME

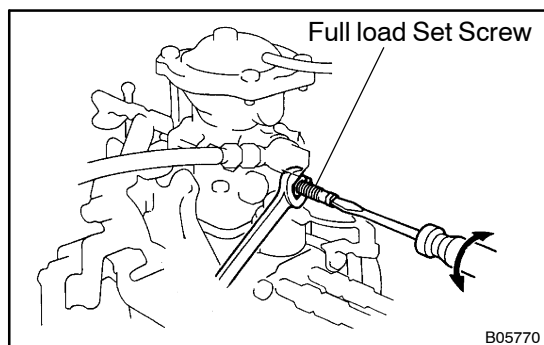
- (a) Set the adjusting lever to maximum position.
 (b) 1HZ (w/ HAC):
 Apply 101.3 ± 0.2 kPa (760 ± 1.5 mmHg, 29.92 ± 0.06 in.Hg) absolute pressure.
 (c) 1HD-T (w/o BACS):
 Apply 80 kPa (0.81 kgf/cm², 11.5 psi) of pressure to the boost compensator.
 (d) 1HD-T (w/ BACS):
 Apply 129 kPa (1.32 kgf/cm², 18.7 psi) of pressure to the boost compensator.
 (e) Measure the injection volume.



Item	Pump rpm	No. of measuring strokes	Each injection volume cc (cu in.)
1HZ	1,200	200	11.84 – 12.24 (0.72 – 0.75)
1HD-T (Philippine)	1,100	200	11.74 – 12.94 (0.72 – 0.79)
1HD-T (Others)	1,100	200	12.18 – 13.38 (0.74 – 0.82)



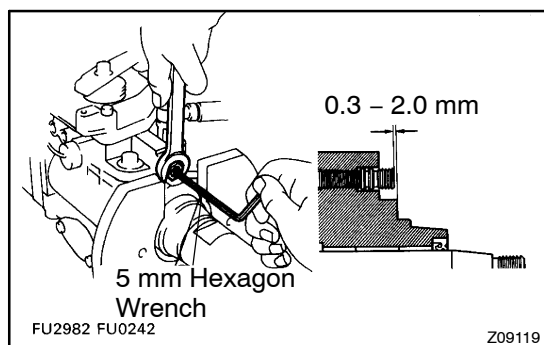
- (f) Remove the cap seal.
 (1) Using a small screwdriver, pry the claws.
 (2) Remove the cap seal.



(g) 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.



7. **Except 1HD-T (w/BACS):**

PRE-SETTING OF LOAD SENSING TIMER

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

Protrusion: 0.3 – 2.0 mm (0.012 – 0.079 in.)

8. **PRE-SET MAXIMUM SPEED**

(a) Set the adjusting lever to maximum position.

(b) 1HZ (w/ HAC):

Apply 101.3 ± 0.2 kPa (760 ± 1.5 mmHg, 29.92 ± 0.06 in.Hg) absolute pressure.

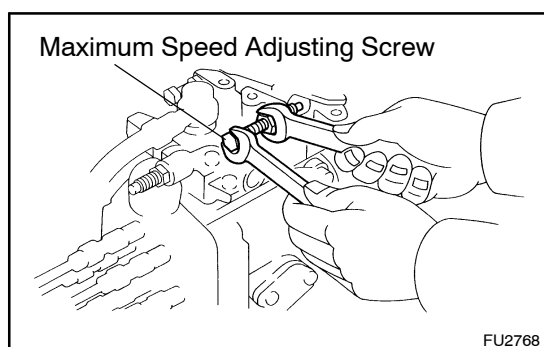
(c) 1HD-T:

Apply 80 kPa (0.81 kgf/cm², 11.5 psi) of pressure to the boost compensator.

(d) Measure the injection volume.

Item	Pump rpm	No. of measuring strokes	Each injection volume cc (cu in.)
1HZ	2,300	200	4.6 – 6.6 (0.28 – 0.40)
1HD-T	2,200	200	1.8 – 4.2 (0.11 – 0.26)

(e) Cut off the seal wire.

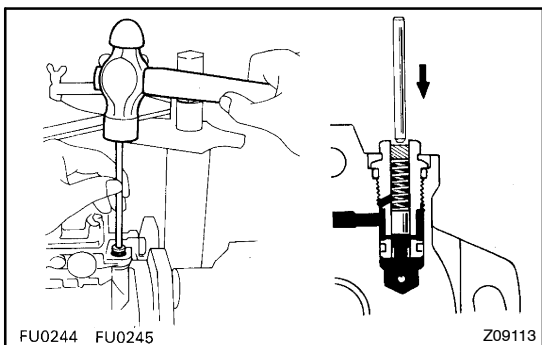


(f) Adjust the injection volume with the maximum speed adjusting screw.

9. **ADJUST PUMP INNER PRESSURE**

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

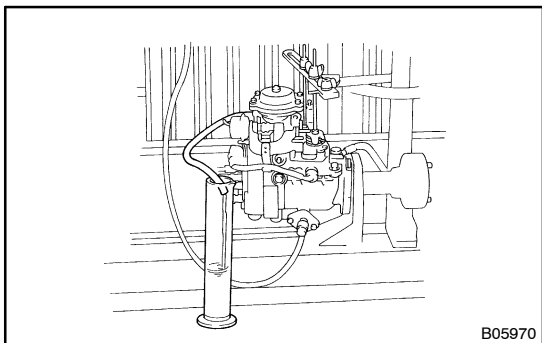
Item	Pump rpm	Inner pressure kPa (kgf/cm ² , psi)
1HZ	500	343 – 402 (3.5 – 4.1, 49 – 58)
	1,900	765 – 824 (7.8 – 8.4, 111 – 119)
1HD-T	500	196 – 294 (2.0 – 3.0, 28 – 43)
	1,800	834 – 932 (8.5 – 9.5, 121 – 135)



- (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.



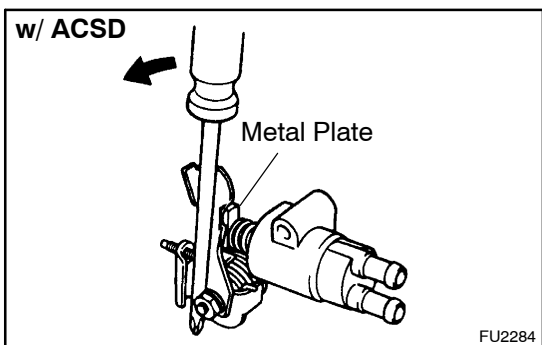
10. CHECK OVERFLOW VOLUME

Measure the overflow volume at the below listed rpm.

Item	Pump rpm	Overflow volume cc/min. (cu in./min.)
1HZ	2,000	366 – 800 (22.3 – 48.8)
1HD-T	1,800	666 – 1,167 (40.6 – 71.2)

HINT:

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



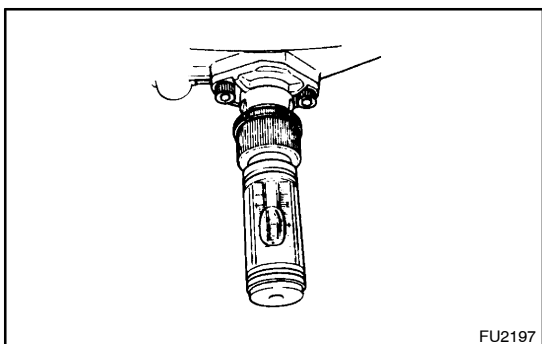
11. w/ ACSD:

RELEASE COLD STARTING SYSTEM FOR NEXT INSPECTIONS

- Using a screwdriver, turn the cold starting lever counter-clockwise approx. 20°.
- Put a metal plate (thickness of 5.0 – 8.0 mm (0.20 – 0.31 in.)) between the cold starting lever and thermo wax plunger.

HINT:

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



12. ADJUST TIMER

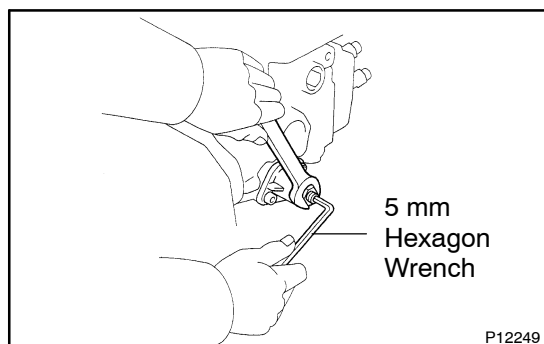
- Set the timer measuring device at zero.

(b) Measure the timer piston stroke at the below listed rpm.

Item	Pump rpm	Timer piston stroke mm (in.)
1HZ (w/ACSD)	800	1.84 – 2.84 (0.0724 – 0.1118)
	1,200	3.70 – 4.70 (0.1457 – 0.1850)
	1,520	5.18 – 6.18 (0.2039 – 0.2433)
	1,900	6.95 – 7.65 (0.2736 – 0.3012)
1HZ (w/o ACSD)	800	0.61 – 1.61 (0.0240 – 0.0634)
	1,200	2.47 – 3.47 (0.0972 – 0.1366)
	1,520	3.95 – 4.95 (0.1556 – 0.1949)
	1,900	5.72 – 6.72 (0.2252 – 0.2647)
1HD-T (Philippine)	1,300	0.95 – 1.95 (0.0374 – 0.0768)
	1,440	2.25 – 3.25 (0.0886 – 0.1280)
	1,800	5.50 – 6.50 (0.2165 – 0.2559)
	2,350	7.70 – 8.70 (0.3031 – 0.3425)
1HD-T (Others)	1,000	0.44 – 1.44 (0.0173 – 0.0567)
	1,440	3.25 – 4.25 (0.1280 – 0.1673)
	1,800	5.55 – 6.55 (0.2185 – 0.2579)
	2,350	7.70 – 8.70 (0.3031 – 0.3425)

HINT:

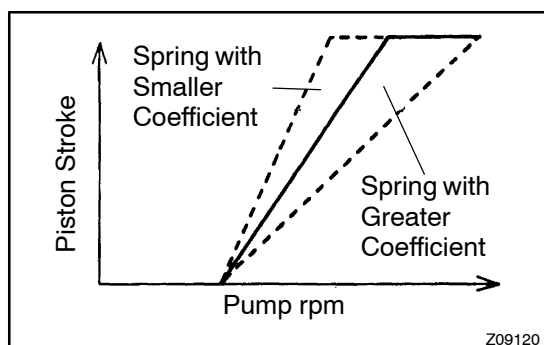
Check that the hysteresis is within 0.3 mm (0.012 in.).



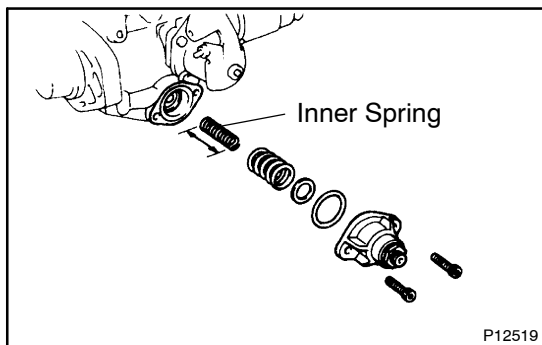
(c) Using a 5 mm hexagon wrench, adjust by turning the timer adjusting screw.

HINT:

Turn clockwise to reduce the stroke, turn counterclockwise to increase the stroke.



(d) Check the timer stroke for characteristic tendency.



If tendency is not as specified, select and replace the inner spring.

Timer inner spring with coefficient (k):

1HZ:

N/mm (kgf/mm)

1.57 (0.16)	1.67 (0.17)	1.77 (0.18)
1.86 (0.19)	1.96 (0.20)	–

1HD-T (Philippine):

N/mm (kgf/mm)

1.08 (0.11)	1.18 (0.12)	1.27 (0.13)
1.37 (0.14)	–	–

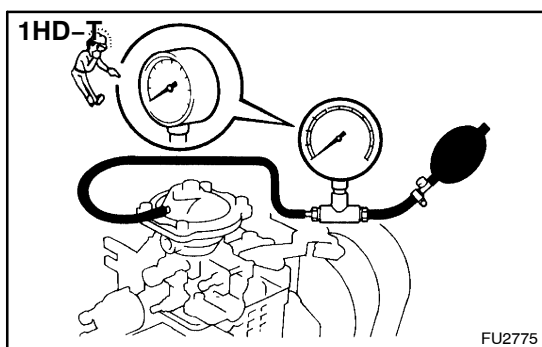
1HD-T (Others):

N/mm (kgf/mm)

1.57 (0.16)	1.77 (0.18)	1.96 (0.20)
2.16 (0.22)	–	–

HINT:

The timer stroke will increase with a long spring and decrease with a short spring.

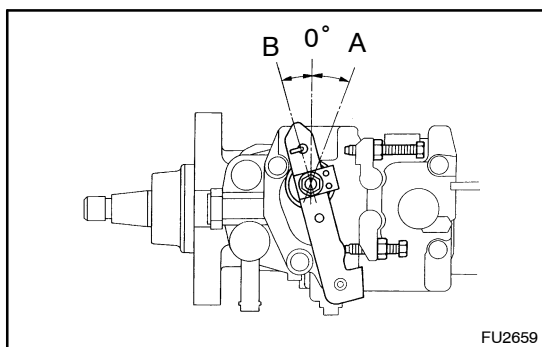


13. 1HD-T:

CHECK BOOST COMPENSATOR FOR AIR TIGHT-NESS

- Apply 98 kPa (1.00 kgf/cm², 14.2 psi) of pressure to the boost compensator.
- Measure the time it takes for pressure to drop to 95 kPa (0.97 kgf/cm², 13.8 psi).

Pressure drop: 10 seconds or more



14. ADJUST FULL LOAD INJECTION VOLUME

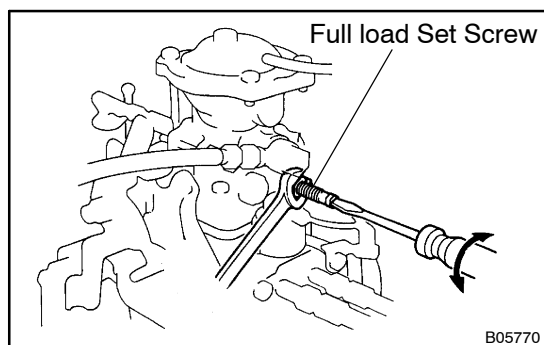
- The adjusting lever angle for the adjustment below should be as shown in the illustration.

Adjusting lever angle:

A (Maximum speed side)	B (Idle speed side)
Plus 21 – 31°	Minus 12 – 22°

- 1HZ (w/ HAC):**
Apply 101.3 ± 0.2 kPa (760 ± 1.5 mmHg, 29.92 ± 0.06 in.Hg) absolute pressure.
- 1HD-T (w/o BACS):**
Apply 80 kPa (0.81 kgf/cm², 11.5 psi) of pressure to the boost compensator.
- 1HD-T (w/ BACS):**
Apply 129 kPa (1.32 kgf/cm², 18.7 psi) of pressure to the boost compensator.
- Measure the full load injection volume.

Item	Adjusting lever angle	Pump rpm	No. of measuring strokes	Each injection volume cc (cu in.)
1HZ	Plus 21 – 31°	1,200	200	11.84 – 12.24 (0.72 – 0.75)
1HD-T (Philippine)	Plus 21 – 31°	1,100	200	11.74 – 12.94 (0.72 – 0.79)
1HD-T (Others)	Plus 21 – 31°	1,100	200	12.18 – 13.38 (0.74 – 0.82)



(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.

15. ADJUST MAXIMUM SPEED

(a) 1HZ (w/ HAC):

Apply 101.3 ± 0.2 kPa (760 ± 1.5 mmHg, 29.92 ± 0.06 in.Hg) absolute pressure.

(b) 1HD-T (w/o BACS):

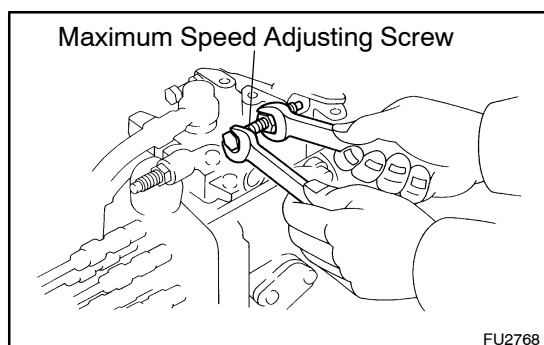
Apply 80 kPa (0.81 kgf/cm², 11.5 psi) of pressure to the boost compensator.

(c) 1HD-T (w/ BACS):

Apply 129 kPa (1.32 kgf/cm², 18.7 psi) of pressure to the boost compensator.

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

Item	Adjusting lever angle	Pump rpm	No. of measuring strokes	Each injection volume cc (cu in.)	Remarks
1HZ	Plus 21 – 31°	2,300	200	4.6 – 6.6 (0.28 – 0.40)	Adjust
	Minus 12 – 22°	2,300		2.0 (0.12) or less	–
1HD-T	Plus 21 – 31°	2,200	200	1.8 – 4.2 (0.11 – 0.26)	Adjust
	Minus 12 – 22°	2,200		1.0 (0.06) or less	–



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

16. CHECK INJECTION VOLUME**(a) 1HZ:**

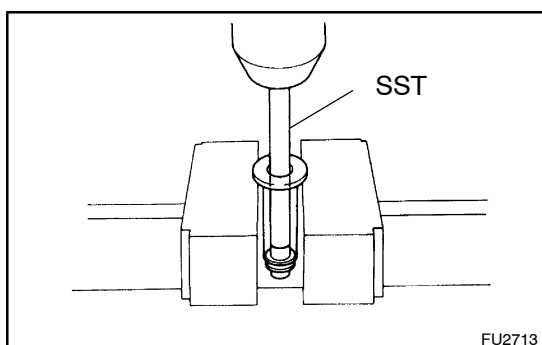
Measure the injection volume at each pump rpm and absolute pressure.

Item	Adjusting lever angle	Pump rpm	Absolute pressure kPa (mmHg, in.Hg)	No. of measuring strokes	Each injection volume cc (cu in.)	Variation limit cc (cu in.)	Remarks
1HZ (w/ HAC)	Plus 21 – 31°	1,200	101.3 (760, 29.92)	200	11.84 – 12.24 (0.72 – 0.75)	0.5 (0.03)	Basic full-load injection volume
			84 (630, 24.80)		10.78 – 11.38 (0.66 – 0.69)	–	–
			70.7 (530, 20.88)		9.82 – 10.24 (0.60 – 0.64)	–	–
		100	101.3 (760, 29.92)		10.00 – 14.00 (0.61 – 0.86)	1.4 (0.09)	Volume during starting
		500			10.48 – 11.48 (0.64 – 0.70)	0.6 (0.04)	–
		1,500			11.38 – 12.58 (0.69 – 0.77)	–	–
		1,900			10.42 – 11.62 (0.64 – 0.71)	0.6 (0.04)	–
		1HZ (w/o HAC)	Plus 21 – 31°		1,200	101.3 (760, 29.92)	200
100	10.00 – 14.00 (0.61 – 0.86)			1.4 (0.09)	Volume during starting		
500	10.48 – 11.48 (0.64 – 0.70)			0.6 (0.04)	–		
1,500	11.38 – 12.58 (0.69 – 0.77)			–	–		
1,900	10.42 – 11.62 (0.64 – 0.71)			0.6 (0.04)	–		

(b) 1HD-T:

Measure the injection volume at each pump rpm and boost pressure.

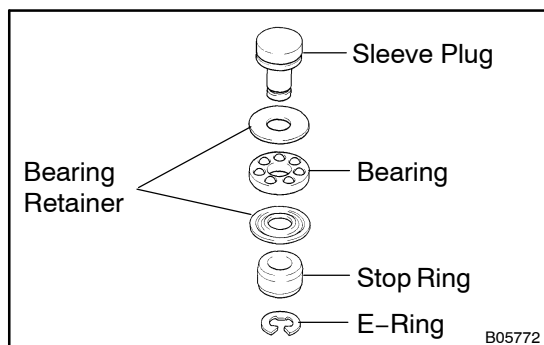
Item	Adjusting lever angle	Pump rpm	Boost pressure kPa (kg/cm ² , psi)	No. of measuring strokes	Each injection volume cc (cu in.)	Variation limit cc (cu in.)	Remarks
1HD-T (Philippine)	Plus 21 – 31°	1,100	80 (0.81, 11.5)	200	11.74 – 12.94 (0.72 – 0.79)	0.7 (0.04)	Basic full-load injection volume
		100	0 (0, 0)		9.50 – 14.30 (0.58 – 0.87)	1.4 (0.09)	Volume during starting
		500	0 (0, 0)		7.30 – 8.10 (0.45 – 0.49)	0.8 (0.05)	–
		900	80 (0.81, 11.5)		11.60 – 12.80 (0.71 – 0.78)	–	–
		1,800	80 (0.81, 11.5)		12.80 – 13.60 (0.78 – 0.83)	1.3 (0.08)	–
1HD-T (Others) (w/o BACS)	Plus 21 – 31°	1,100	80 (0.81, 11.5)	200	12.18 – 13.38 (0.74 – 0.82)	0.7 (0.04)	Basic full-load injection volume
		100	0 (0, 0)		9.50 – 14.30 (0.58 – 0.87)	1.4 (0.09)	Volume during starting
		500	0 (0, 0)		7.30 – 8.10 (0.45 – 0.49)	0.8 (0.05)	–
		900	80 (0.81, 11.5)		12.26 – 13.46 (0.75 – 0.82)	–	–
		1,800	80 (0.81, 11.5)		12.50 – 13.30 (0.76 – 0.81)	1.3 (0.08)	–
1HD-T (Others) (w/ BACS)	Plus 21 – 31°	1,100	129 (1.32, 18.7)	200	12.18 – 13.38 (0.74 – 0.82)	0.7 (0.04)	Basic full-load injection volume
		100	49.3 (0.50, 7.2)		9.50 – 14.30 (0.58 – 0.87)	1.4 (0.09)	Volume during starting
		500	49.3 (0.50, 7.2)		7.30 – 8.10 (0.45 – 0.49)	0.8 (0.05)	–
		900	129 (1.32, 18.7)		12.26 – 13.46 (0.75 – 0.82)	–	–
		1,800	129 (1.32, 18.7)		12.50 – 13.30 (0.76 – 0.81)	1.3 (0.08)	–



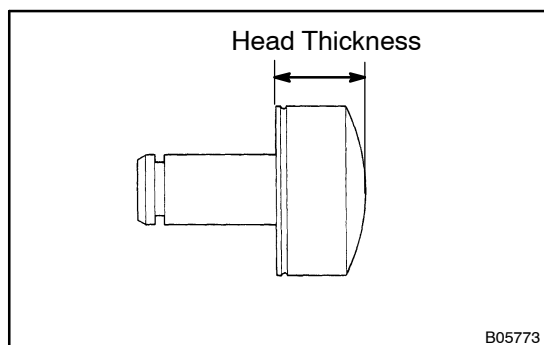
If the injection volume at 100 rpm is not as specified, replace the governor sleeve plug as follows:

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

SST 09236-00101 (09237-00070)



- Remove the E-ring, stop ring, bearing and 2 bearing retainers from the sleeve plug.



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

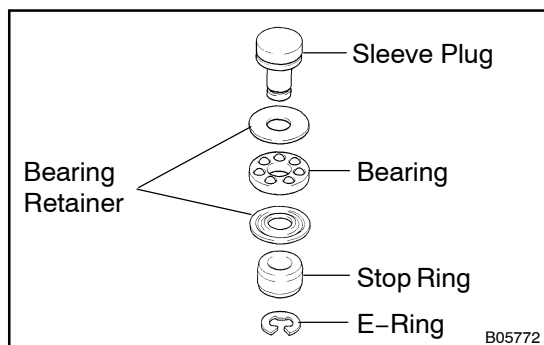
Sleeve plug head thickness for 1HZ		mm (in.)
3.0 (0.118)	3.5 (0.138)	4.0 (0.158)
3.1 (0.122)	3.6 (0.142)	4.1 (0.161)
3.2 (0.126)	3.7 (0.146)	4.2 (0.165)
3.3 (0.130)	3.8 (0.150)	
3.4 (0.134)	3.9 (0.154)	

Sleeve plug head thickness for 1HD-T		mm (in.)
3.0 (0.118)	4.3 (0.169)	5.6 (0.220)
3.1 (0.122)	4.4 (0.173)	5.7 (0.224)
3.2 (0.126)	4.5 (0.177)	5.8 (0.228)
3.3 (0.130)	4.6 (0.181)	5.9 (0.232)
3.4 (0.134)	4.7 (0.185)	6.0 (0.236)
3.5 (0.138)	4.8 (0.189)	6.1 (0.240)
3.6 (0.142)	4.9 (0.193)	6.2 (0.244)
3.7 (0.146)	5.0 (0.197)	6.3 (0.248)
3.8 (0.150)	5.1 (0.201)	6.4 (0.252)
3.9 (0.154)	5.2 (0.205)	6.5 (0.256)
4.0 (0.158)	5.3 (0.209)	6.6 (0.260)
4.1 (0.161)	5.4 (0.213)	
4.2 (0.165)	5.5 (0.216)	

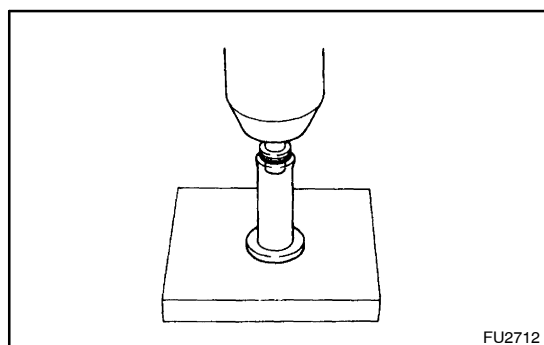
HINT:

Lengthening the plug by 0.1 mm (0.004 in.) will decrease injection volume by 0.6 cc (0.04 in.).

If the variation limit is greater than specified, replace the delivery valve.



- Install the bearing , 2 bearing retainer and stop ring to the new sleeve plug with a new E-ring:



- Using a press, press in the sleeve plug assembly to the governor sleeve.

17. 1HD-T:

ADJUST FULL LOAD MINIMUM INJECTION VOLUME

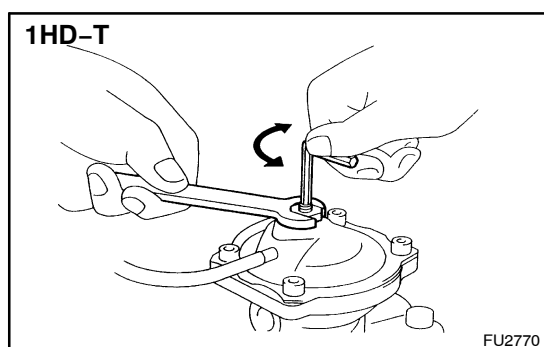
- Set the adjusting lever to maximum position.
- Release the pressure from the boost compensator.
- Measure the injection volume.

w/o BACS:

Pump rpm	No. of measuring strokes	Each injection volume cc (cu in.)
500	200	7.30 – 8.10 (0.45 – 0.49)

w/ BACS:

Pump rpm	No. of measuring strokes	Each injection volume cc (cu in.)
500	200	5.60 – 6.40 (0.34 – 0.39)



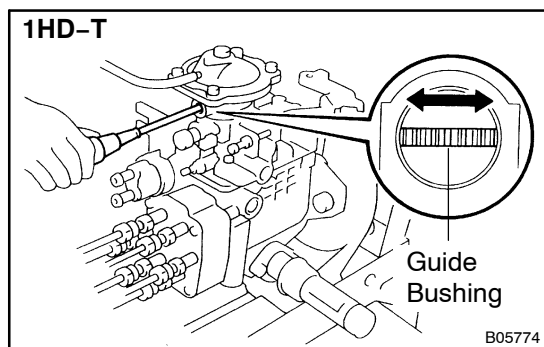
- Using a 5 mm hexagon wrench, adjust by turning the timer slide pin.

18. 1HD-T:

ADJUST BOOST COMPENSATOR CHARACTERISTIC

- Apply pressure to the boost compensator.
- Measure the injection volume.

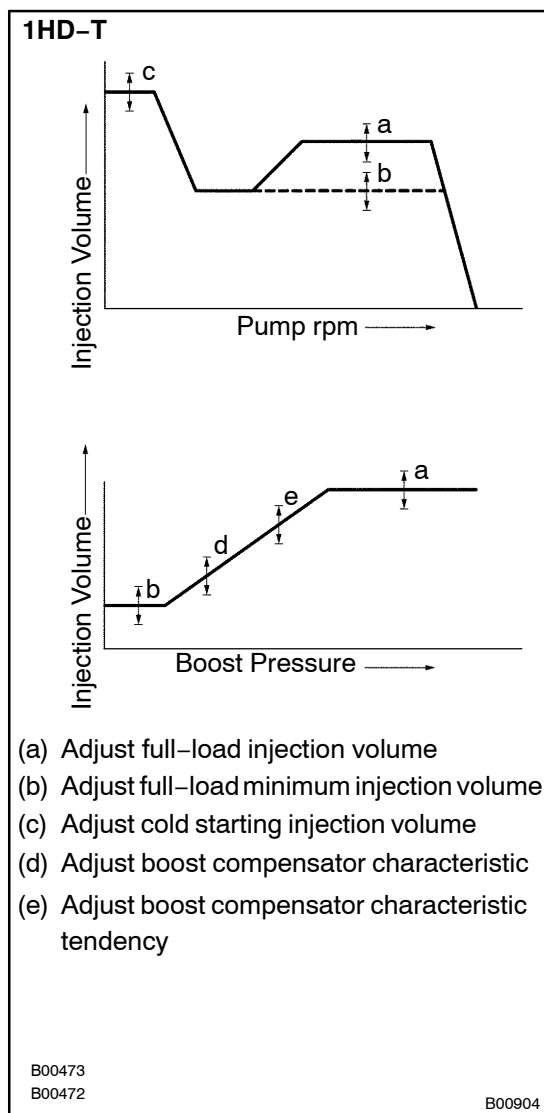
Item	Pump rpm	Boost pressure kPa (kg/cm ² , psi)	No. of measuring strokes	Each injection volume cc (cu in.)
Philippine	1,100	37.4 (0.38, 5.4)	200	10.92 – 12.10 (0.67 – 0.74)
Others (w/o BACS)	1,100	37.4 (0.38, 5.4)	200	10.84 – 12.04 (0.66 – 0.73)
Others (w/ BACS)	500	49.3 (0.50, 7.2)	200	7.30 – 8.10 (0.45 – 0.49)



- (c) Using a screwdriver, adjust the injection volume by the guide bushing.

HINT:

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



19. 1HD-T:

CHECK FOR CHARACTERISTIC TENDENCY

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

Item	Pump rpm	Boost pressure kPa (kg/cm ² , psi)	No. of measuring strokes	Each injection volume cc (cu in.)
Philippine	1,100	30.7 (0.31, 4.4)	200	9.20 – 10.00 (0.56 – 0.61)
Others (w/o BACS)	1,100	24.0 (0.24, 3.5)	200	9.54 – 10.74 (0.58 – 0.66)
Others (w/ BACS)	500	86.7 (0.88, 12.6)	200	8.64 – 9.84 (0.53 – 0.60)

20. 1HD-T: CHECK HYSTERESIS

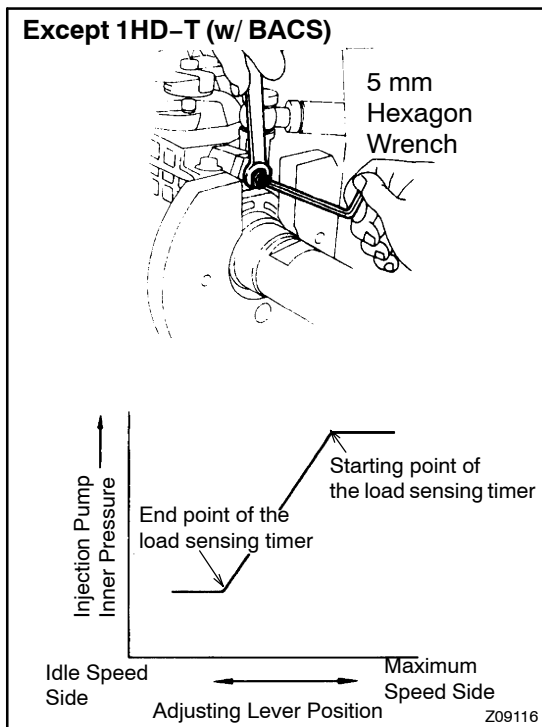
- (a) w/o BACS:
Compare the injection volume when the boost compensator pressure is lowered from 80 kPa (0.81 kgf/cm², 11.5 psi) to 0 kPa (0 kgf/cm², 0 psi) and, conversely, when it is raised from zero.
- (b) w/ BACS:
Compare the injection volume when the boost compensator pressure is lowered from 129 kPa (1.32 kgf/cm², 18.7 psi) to 0 kPa (0 kgf/cm², 0 psi) and, conversely, when it is raised from zero.

HINT:

Make measurements after moving the adjusting lever between idle and maximum 3 times for each lowering of the pressure.

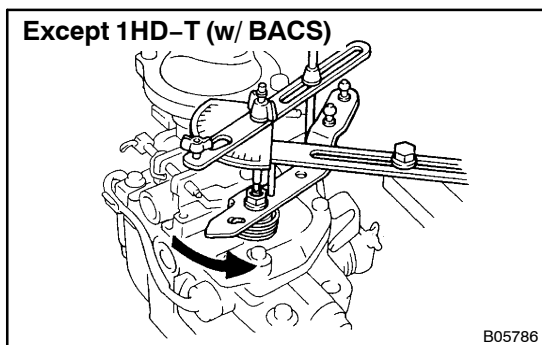
Item	Pump rpm	Boost pressure kPa (kg/cm ² , psi)	No. of measuring strokes	Each injection volume cc. (cu in.)	Hysteresis cc. (cu in.)
Philippine	1,100	80.0 (0.81, 11.5)	200	11.74 – 12.94 (0.72 – 0.79)	–
	1,100	37.4 (0.38, 5.4)	200	10.92 – 12.10 (0.67 – 0.74)	–
	1,100	26.7 (0.27, 3.9)	200	9.20 – 10.00 (0.56 – 0.61)	0.3 (0.02) or less
	600	0 (0, 0)	200	8.76 – 10.16 (0.53 – 0.62)	–
Others (w/o BACS)	1,100	80.0 (0.81, 11.5)	200	12.18 – 13.38 (0.74 – 0.82)	–
	1,100	37.4 (0.38, 5.4)	200	10.84 – 12.04 (0.66 – 0.73)	–
	1,100	24.0 (0.24, 3.5)	200	9.54 – 10.74 (0.58 – 0.66)	0.3 (0.02) or less
	1,100	0 (0, 0)	200	8.38 – 9.78 (0.53 – 0.62)	–
(w/ BACS)	1,100	136 (139, 19.7)	200	12.18 – 13.38 (0.74 – 0.82)	–
	500	86.7 (0.88, 12.6)	200	8.64 – 9.84 (0.53 – 0.62)	0.3 (0.02) or less
	500	49.3 (0.50, 7.2)	200	7.30 – 8.10 (0.45 – 0.49)	–
	500	0 (0, 0)	200	5.60 – 6.40 (0.34 – 0.39)	–

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

**21. Except 1HD-T (w/BACS):****ADJUST LOAD SENSING TIMER**

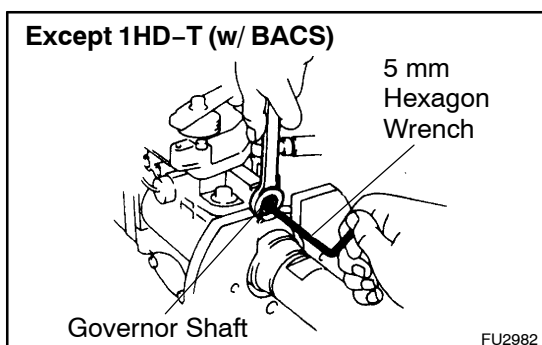
- (a) Using a 5 mm hexagon wrench, adjust the starting and end points of the load sensing timer by turning the governor shaft.
- (b) Set the adjusting lever to maximum position.
- (c) 1HZ (w/ HAC):
Apply 101.3 ± 0.2 kPa (760 ± 1.5 mmHg, 29.92 ± 0.06 in.Hg) absolute pressure.
- (d) 1HD-T:
Apply 80 kPa (0.81 kgf/cm², 11.5 psi) of pressure to the boost compensator.
- (e) Measure the injection volume.

Item	adjusting lever position	Pump rpm	No. of measuring strokes
1HZ	Maximum speed side	1,520	200
1HD-T	Maximum speed side	1,440	200



- (f) 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.
- (g) Measure the injection volume at the drop point (starting point).

Item	Pump rpm	No. of measuring strokes	Each injection volume cc (cu in.)
1HZ	1,520	200	Measured value at step (f) minus 1.4 (0.09) $\pm$ 0.4 (0.02)
1HD-T	1,800	200	Measured value at step (f) minus 1 - 1.6 (0.06 - 0.01)



- (h) Using a 5 mm hexagon wrench, adjust the load sensing timer by turning the governor shaft, and to 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.

- (i) 1HZ:
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.

Pump rpm	No. of measuring strokes	Each injection volume cc (cu in.)
1,520	200	7.6 (0.46) or more

- (j) 1HD-T (Philippine):
Check the timer piston stroke when the pump rpm is 1,800 rpm and timer piston stroke is maximum delayed.

Timer piston stroke: 3.7 mm (0.146 in.) or more

- (k) 1HD-T (Others):
Check the injection volume when the pump rpm is 1,440 rpm and injection volume is 7.0 – 7.8 cc (0.43 – 0.48 cu in.).

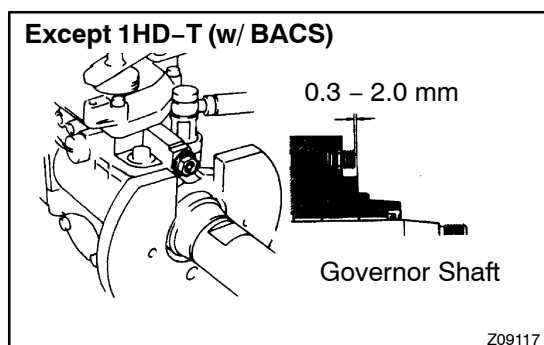
Timer piston stroke: 2.5 mm (0.098 in.) or less

HINT:

The end point for 1HD-T engine is hard to identify, so use the methods used in the (j) or (k) above.

- (l) When the adjusting lever is moved slowly from the maximum speed side to the idle speed side.

Item	Pump rpm	Timer piston fluctuation mm (in.)
1HZ (w/ ACSD)	1,520	3.86 – 4.66 (0.1520 – 0.1835)
1HZ (w/o ACSD)	1,520	2.63 – 3.43 (0.1035 – 0.1350)
1HD-T (Philippine)	1,440	0.8 (0.0315)
1HD-T (Others)	1,440	1.5 – 2.5 (0.0591 – 0.0984)

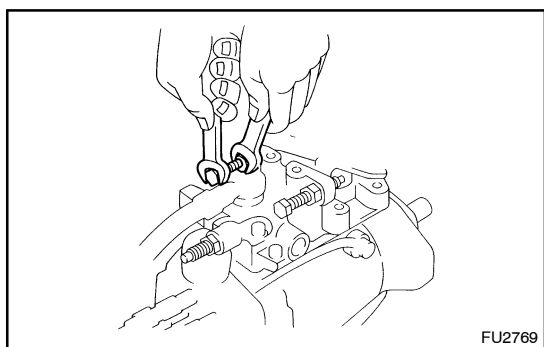


- (m) Check the protrusion of the governor shaft.
Protrusion: 0.3 – 2.0 mm (0.012 – 0.079 in.)

22. ADJUST IDLE SPEED

(a) Measure the injection volume for each pump rpm.

Item	Adjusting lever angle	Pump rpm	No. of measuring strokes	Each injection volume cc. (cu in.)	Variation limit cc (cu. in.)	Remarks
1HZ (M/T)	Minus 12 – 22°	375	200	$q = 2.30 - 3.30$ (0.14 – 0.20)	–	Pre-set
		350		More than q plus 0.5 (0.03)	–	–
		450		q Minus 1.2 – 2.4 (0.07 – 0.15)	–	
		325		3.36 – 4.36 (0.21 – 0.27)	0.5 (0.03)	Adjust
1HZ (A/T)	Minus 12 – 22°	375	200	$q = 2.40 - 3.40$ (0.15 – 0.21)	–	Pre-set
		350		More than q plus 0.5 (0.03)	–	–
		450		q Minus 1.2 – 2.4 (0.07 – 0.15)	–	
		375		2.40 – 3.40 (0.15 – 0.21)	0.5 (0.03)	Adjust
1HD-T (M/T)	Minus 12 – 22°	325	200	0.70 – 1.70 (0.04 – 0.10)	0.5 (0.03)	Adjust
1HD-T (A/T)	Minus 12 – 22°	390	200	0.70 – 1.70 (0.04 – 0.10)	0.5 (0.03)	Adjust



(b) Adjust injection volume by turning the idle speed adjusting screw.

23. w/ACSD:**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) Check that the cam part of the camplate is not on top of the roller ring.

(c) Set the scale of the timer measuring device to zero.

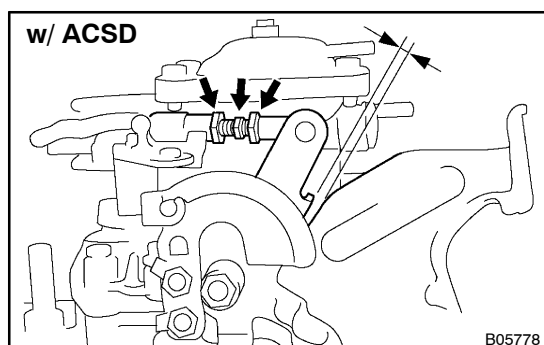
(d) A/T:

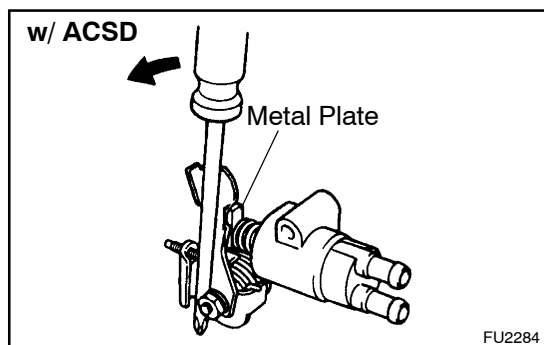
Check the adjusting lever opening angle and consider this angle as zero.

(e) Measure the clearance between the idle-up lever and idle-up lever bracket.

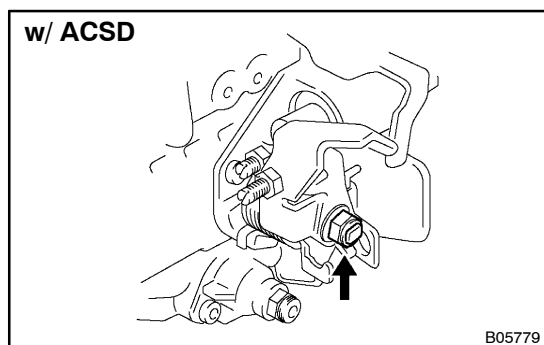
Clearance: 1.5 – 2.5 mm (0.059 – 0.098 in.)

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

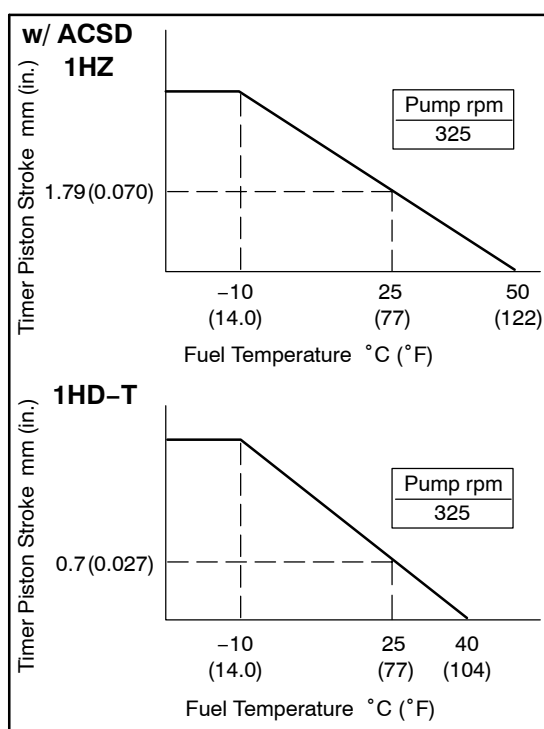




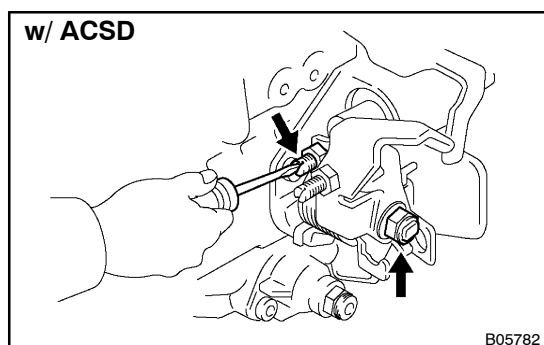
- (g) Remove the metal plate between the cold starting lever and thermo wax plunger.



- (h) Loosen the nut from the cold starting lever.



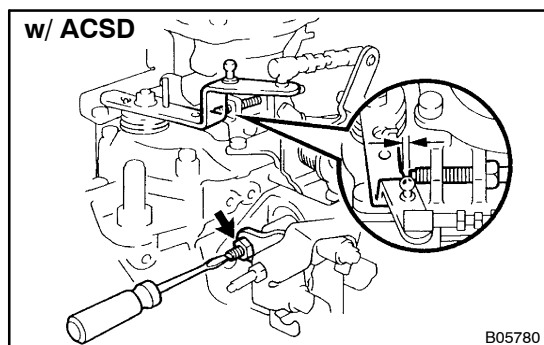
- (i) Measure the timer piston stroke.



- (j) Adjust by turning the timer adjusting screw.

HINT:

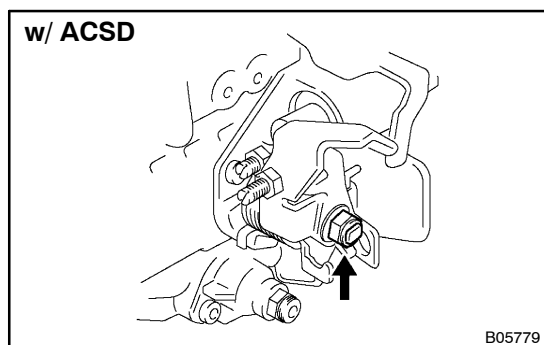
Screw in for stroke decrease.



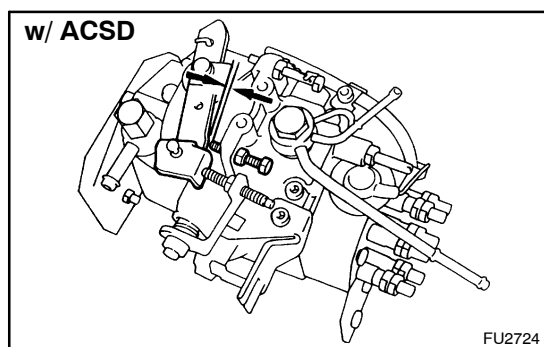
- (k) Measure the clearance between the adjusting lever and idle speed adjusting screw.

Item	Fuel temperature	Clearance
1HZ	25°C (77°F)	0.71 mm (0.028 in.)
	40°C (104°F)	0 mm (0 in.)
1HD-T	25°C (77°F)	0.28 mm (0.011 in.)
	40°C (104°F)	0 mm (0 in.)

- (l) Adjust by turning the cold starting adjusting screw.



- (m) Torque the nut to the cold starting lever.
Torque: 13 N·m (137 kgf·cm, 9.5 ft·lbf)

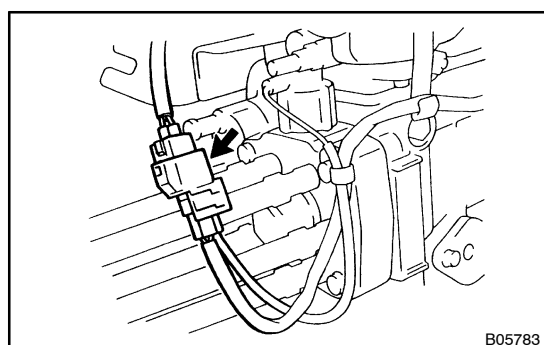
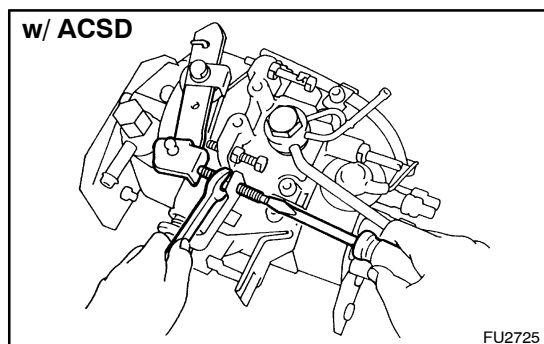


24. w/ ACSD: ADJUST FAST IDLE

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

Item	Fuel temperature	Clearance
1HZ	25°C (77°F)	0.71 mm (0.028 in.)
	40°C (104°F)	0 mm (0 in.)
1HD-T	25°C (77°F)	0.28 mm (0.011 in.)
	40°C (104°F)	0 mm (0 in.)

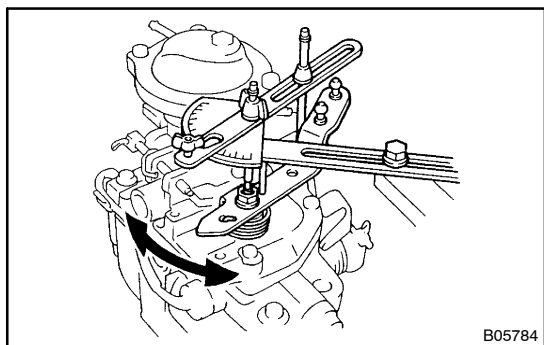
- (b) Adjust by turning the fast idle adjusting screw.



25. POST ADJUSTMENT CHECK

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

Item	Adjusting lever angle	Pump rpm	Each injection volume cc (cu in.)
1HZ	Minus 12 – 22°	100	0.6 (0.04)
1HD–T		300	
		1,000	



- (b) Check the adjusting lever movement.

Adjusting lever angle: 38 - 48°

26. A/T:

INSTALL THROTTLE POSITION SENSOR AND BRACKET (See page FU-92)

27. SEAL PARTS

- (a) Seal the full load set screw with new cap seal.
 (b) Seal the maximum speed adjusting screw with new lead seal.

28. w/ Fuel Cut Valve Control Unit:

INSTALL FUEL CUT VALVE CONTROL UNIT (See page FU-92)

29. INSTALL FUEL PIPES (See page FU-92)

30. w/ A/C:

INSTALL IDLE-UP ACTUATOR

Torque: 9.35 N·m (95 kgf·cm, 83 in.·lbf)

31. **REMOVE INJECTION PUMP FROM SST (STAND)**

SST 09241-76022, 09245-54010