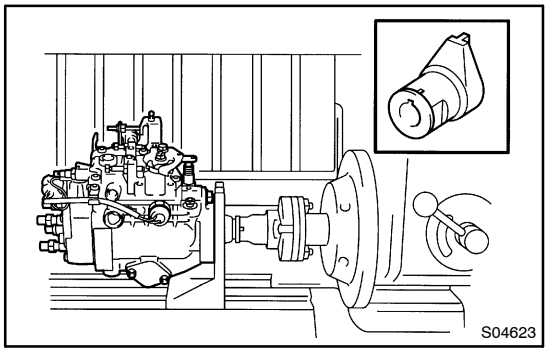
FU05X–02

ADJUSTMENT

1. 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/cm^2, 2,062 – 2,205 psi)

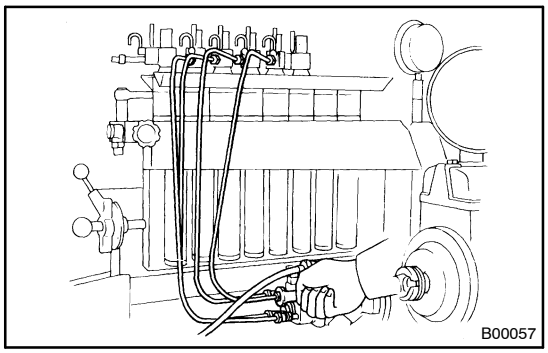
(b) Check the accuracy of the tachometer.
Allowable error: ± 40 rpm


S04623

(c) Install the angle gauge stand.

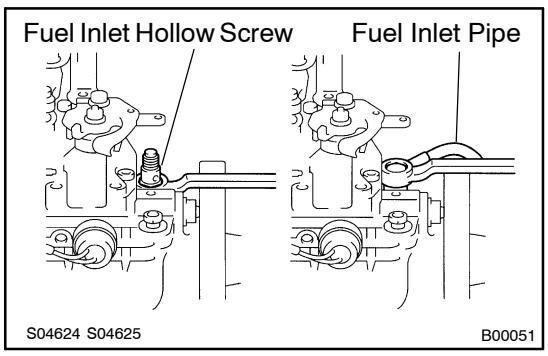
(d) Mount the injection pump body on the pump tester.

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


B00057

(e) Install an injection pipe with these specifications:

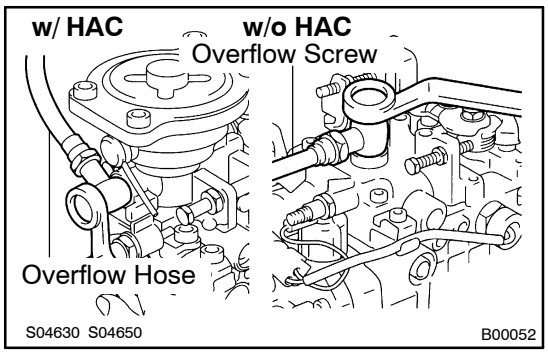
Outer diameter	6.0 mm (0.236 in.)
Inner diameter	2.0 mm (0.079 in.)
Length	840 mm (33.07 in.)
Minimum bending radius	25 mm (0.98 in.) or more



S04624 S04625 B00051

(f) Remove the fuel inlet hollow screw.

(g) Connect the fuel inlet pipe with an adapter.
Torque: 24.55 N·m (250 kgf·cm, 18 ft·lbf)

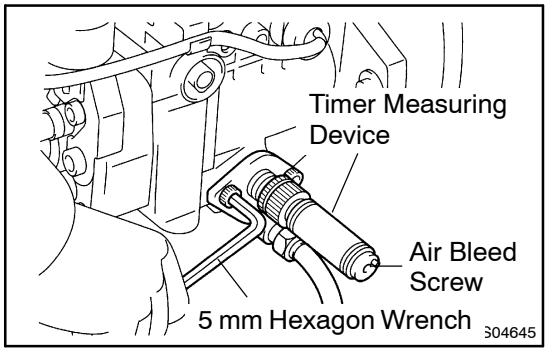


S04630 S04650 B00052

(h) Install an overflow hose with the 2 gaskets and an overflow screw.
Torque: 24.55 N·m (250 kgf·cm, 18 ft·lbf)

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

(i) Using a 5 mm hexagon wrench, remove the 2 bolts and RH timer cover.

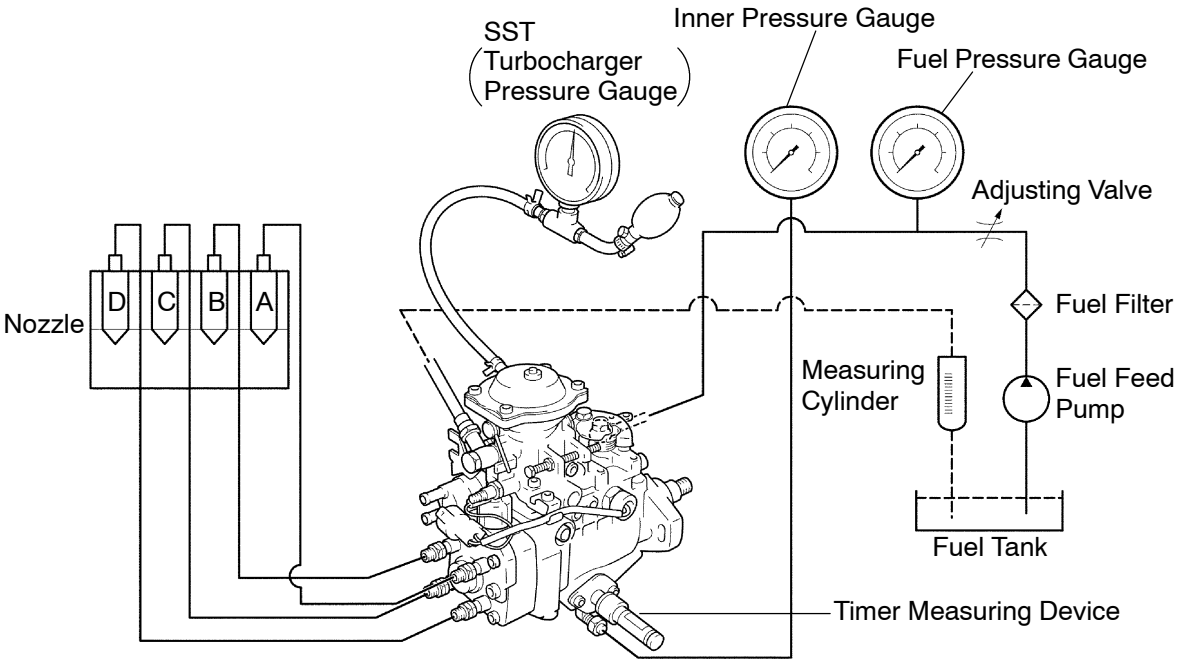


(j) Install the inner pressure gauge with the timer measuring device.
Part No. 95095–10231, 95095–10480 (DENSO)
Torque: 8.35 N·m (85 kgf·cm, 74 in.·lbf)

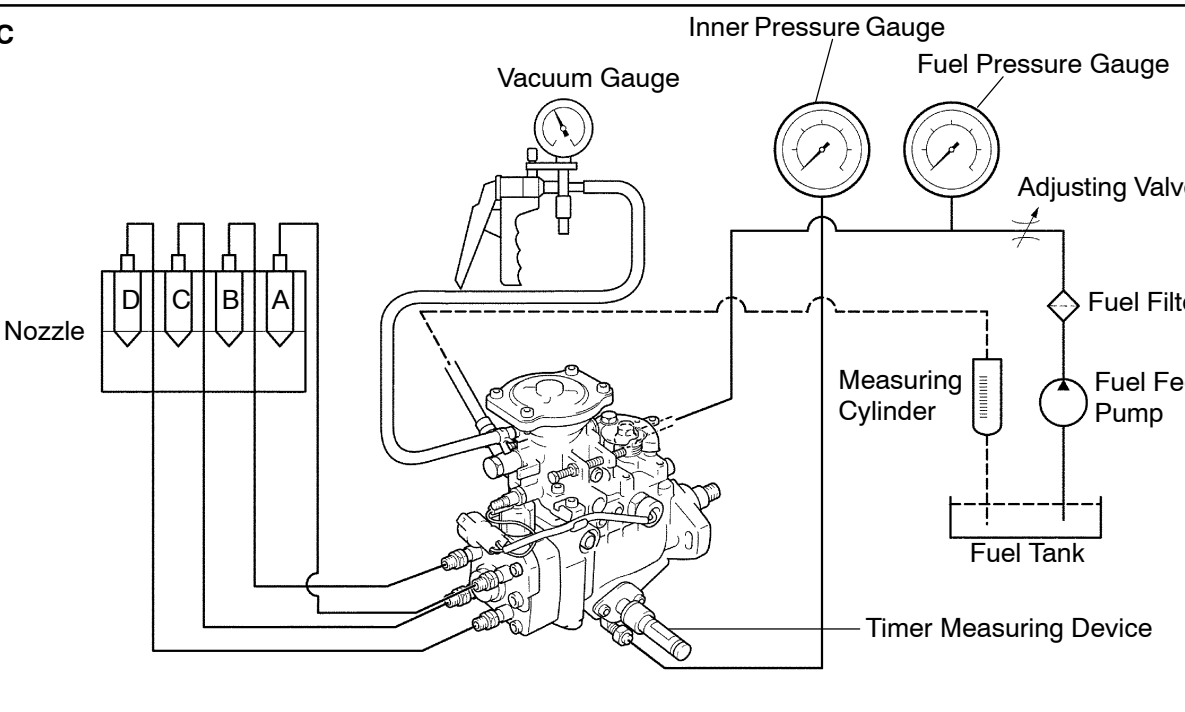
HINT:
Bleed the air by the air bleed screw.

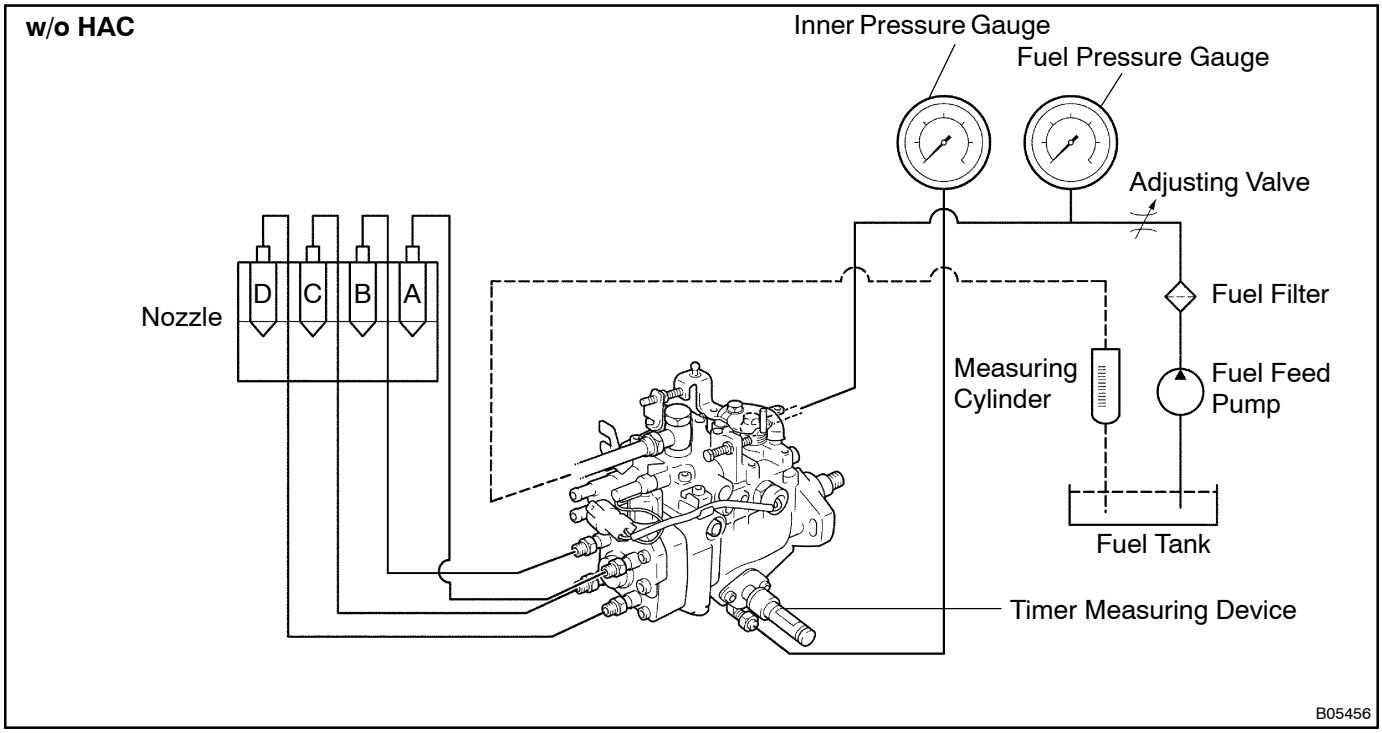
(k) Connect SST (turbocharger pressure gauge) to the boost compensator
SST 09992–00241

2L–T



w/ HAC





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

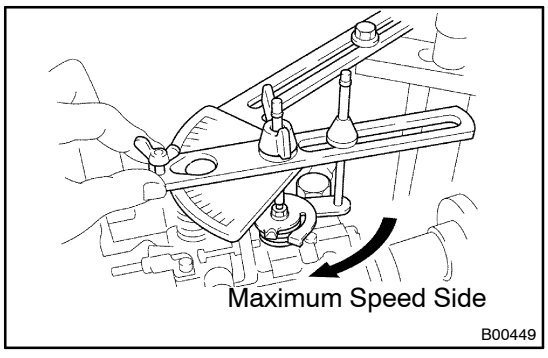
NOTICE:

- **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.**

HINT:

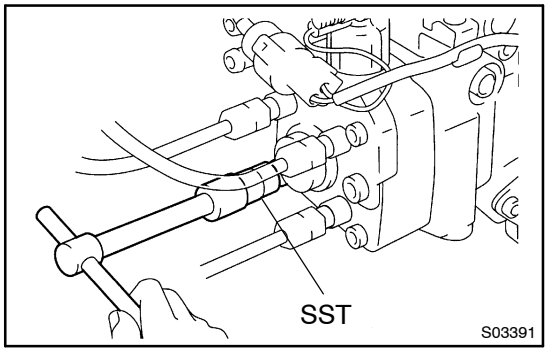
Connect the battery through a 10 W bulb.

(m) The pressure for feeding fuel to the injection pump should be 20 kPa (0.2 kgf/cm^2, 2.8 psi). The fuel temperature for pump testing should be 40 – 45°C (104 – 113°F).

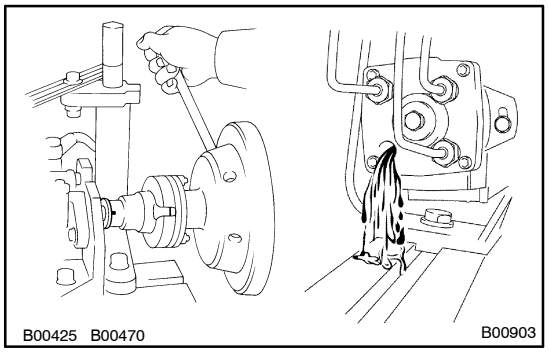


(n) Install an angle gauge to the stand, and set it to the adjusting lever.
Part No. 95095 – 10360 (Stand w/ angle gauge)

(o) Secure the adjusting lever fully on the maximum speed side.



(p) Check the installation direction of the camplate as follows:
(1) Disconnect the injection pipe from the position marked ”C” on the distributive head.
(2) Using SST, remove the delivery valve holder.
SST 09260–54012 (09269–54020)

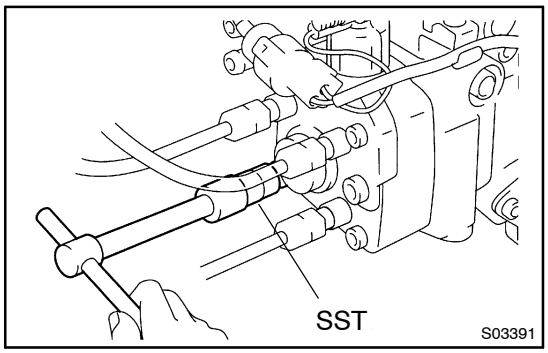


(3) Check that fuel is flowing out when the mark is in the position shown in the illustration.

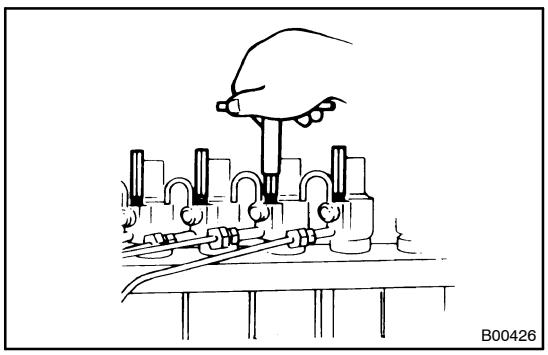
If not, it is improperly assembled.

(4) Disassemble and change the camplate position 180° in the opposite direction.

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



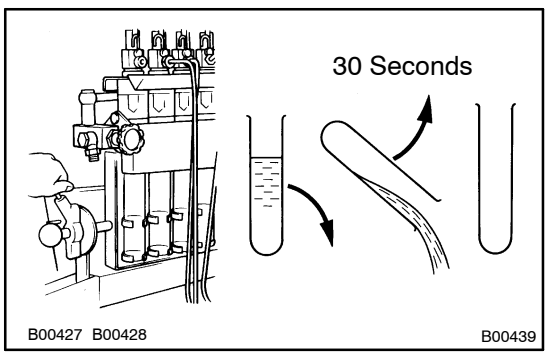
(5) Using SST, install the delivery valve holder.
SST 09260–54012 (09269–54020)
Torque: 58.85 N·m (600 kgf·cm, 43 ft·lbf)
(6) Connect the injection pipe.



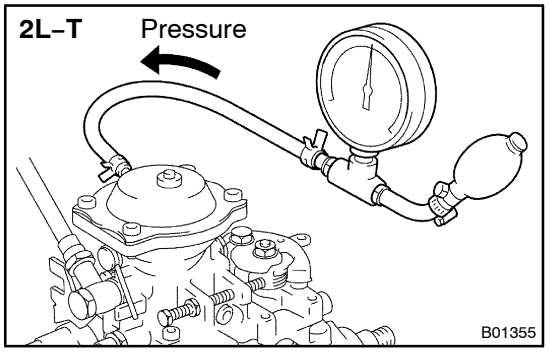
(q) Bleed the air from the injection pipes.
(r) Race the injection pump for 5 minutes at 2,000 rpm.

HINT:
Do this operation by replacing the overflow screw to a hollow screw.

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.

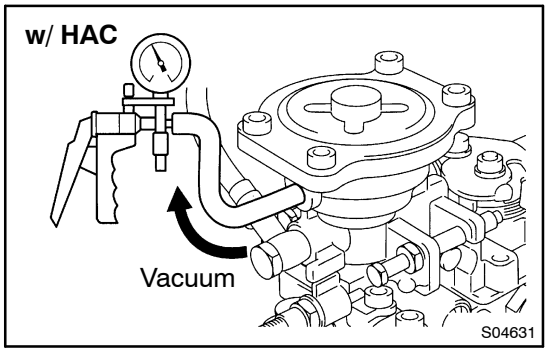


2. 2L–T:
CHECK BOOST COMPENSATOR FOR AIR TIGHTNESS

(a) Operate the boost compensator with 0 kPa (0 kgf/cm^2, 0 psi) to 120 ± 6.7 kPa (1.22 ± 0.07 kgf/cm^2, 17.4 ± 1.0 psi) of pressure for 10 seconds for each and repeat this operation 4 times.

(b) Apply 133 kPa (1.36 kgf/cm^2, 19.3 psi) of pressure to the boost compensator.

(c) Measure the time it takes for pressure to drop to 131 kPa (1.34 kgf/cm^2, 19.1 psi).
Pressure drop: 10 seconds or more



3. w/ HAC:
CHECK HIGH ALTITUDE COMPENSATOR FOR AIR TIGHTNESS

(a) Apply 73 kPa (548 mmHg, 21.56 in.Hg) of vacuum to the high altitude compensator.

(b) Measure the time it takes for vacuum to drop to 72 kPa (540 mmHg, 21.26 in.Hg).
Vacuum drop: 5 seconds or more

4. PRE–SET FULL LOAD INJECTION VOLUME

(a) Set the adjusting lever to maximum position.

(b) 2L–T:
Apply 62.7 kPa (0.64 kgf/cm^2, 9.1 psi) of pressure to the boost compensator.

(c) w/ HAC:
Apply 101 kPa (760 mmHg, 29.83 in.Hg) of vacuum to the high altitude compensator.

(d) Measure the injection volume.
2L w/ ACSD:
(Part No. 22100–5B320, 5B360)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	11.04 – 11.36 (0.67 – 0.69)

2L w/o ACSD:
(Part No. 22100–54770, 54780, 54800, 54810)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	10.42 – 10.74 (0.64 – 0.66)

2L–T:
(Part No. 22100–5B870)

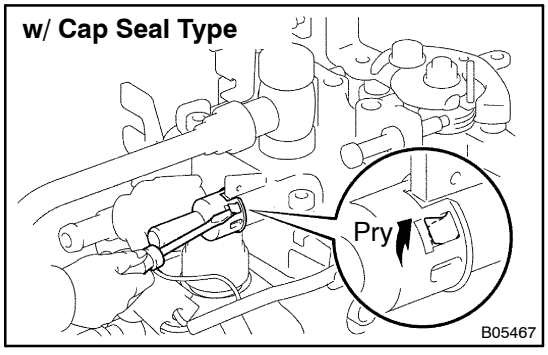
Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
900	200	13.70 – 14.02 (0.84 – 0.86)

5L w/ HAC:
(Part No. 22100–5B720)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,600	200	12.82 – 13.14 (0.78 – 0.80)

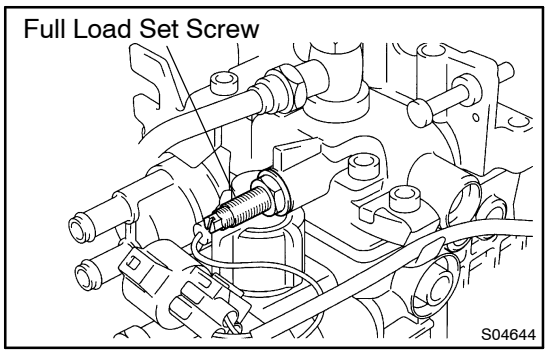
5L w/o HAC:
(Part No. 22100–5B710)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	12.18 – 12.50 (0.74 – 0.76)



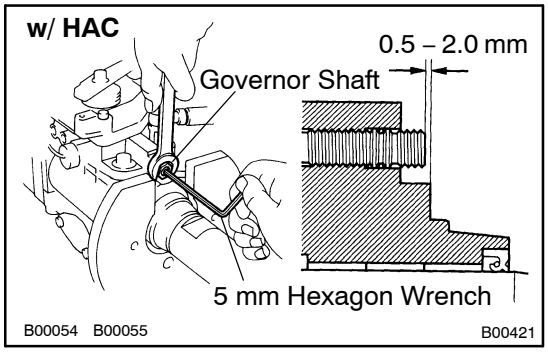
(e) w/ Cap Seal Type:
(1) Disconnect the dust cover from the fuel cut solenoid.
(2) Using a small screwdriver, pry the 4 claws.
(3) Remove the cap seal.

(f) w/ Wire Seal Type:
Cut off the wire 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.



5. w/o HAC:

PRE–SET LOAD SENSING TIMER

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

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

6. PRE–SET MAXIMUM SPEED

(a) Set the adjusting lever to maximum position.

(b) 2L–T:
Apply 62.7 kPa (0.64 kgf/cm^2, 9.1 psi) of pressure to the boost compensator.

(c) w/ HAC:
Apply 101 kPa (760 mmHg, 29.83 in.Hg) of vacuum to the high altitude compensator.

(d) Measure the injection volume.

2L w/ ACSD:

(Part No. 22100–5B320, 5B360)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
2,575	200	4.0 – 5.6 (0.24 – 0.34)

2L w/o ACSD:

(Part No. 22100–54770, 54780, 54800, 54810)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
2,450	200	4.0 – 5.6 (0.24 – 0.34)

2L–T:

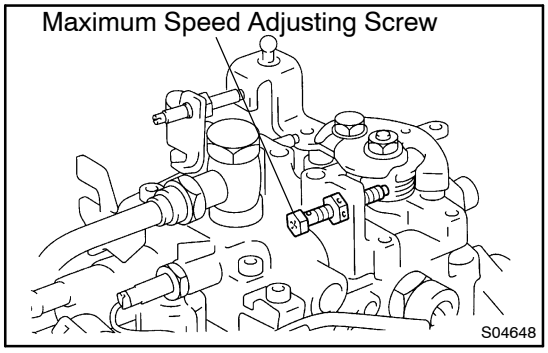
(Part No. 22100–5B860)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
2,400	200	4.3 – 6.3 (0.26 – 0.38)

5L:

(Part No. 22100–5B710, 5B720)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
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.

7. ADJUST PUMP INNER PRESSURE

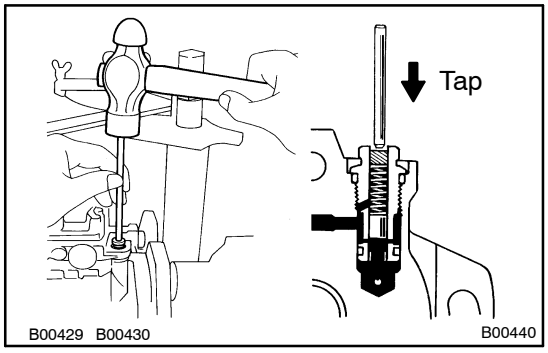
(a) Set the adjusting lever to maximum position.
(b) 2L–T:
Apply 62.7 kPa (0.64 kgf/cm^2, 9.1 psi) of pressure to the boost compensator.
(c) w/ HAC:
Apply 101 kPa (760 mmHg, 29.83 in.Hg) of vacuum to the high altitude compensator.
(d) Measure the pump inner pressure at the below listed rpm.

2L, 5L:

Pump rpm	Inner pressure kPa (kgf/cm^2, psi)
500	314 – 372 (3.2 – 3.8, 46 – 54)
2,100	648 – 706 (6.6 – 7.2, 94 – 102)

2L–T:

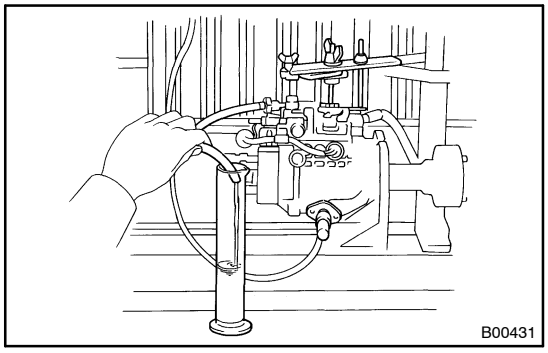
Pump rpm	Inner pressure kPa (kgf/cm^2, psi)
500	353 – 411 (3.6 – 4.2, 51 – 60)
2,100	687 – 745 (7.0 – 7.6, 100 – 108)



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.

8. CHECK OVERFLOW VOLUME

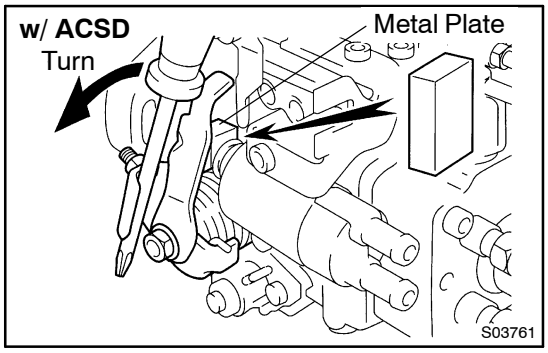
(a) Set adjusting lever to maximum position.
(b) 2L–T:
Apply 62.7 kPa (0.64 kgf/cm^2, 9.1 psi) of pressure to the boost compensator.
(c) w/ HAC:
Apply 101 kPa (760 mmHg, 29.83 in.Hg) of vacuum to the high altitude compensator.


B00431

(d) Measure the overflow volume at the below listed rpm.

Pump rpm	Overflow volume cc/min. (cu in./min.)
2,200	367 – 800 (22.4 – 48.8)

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

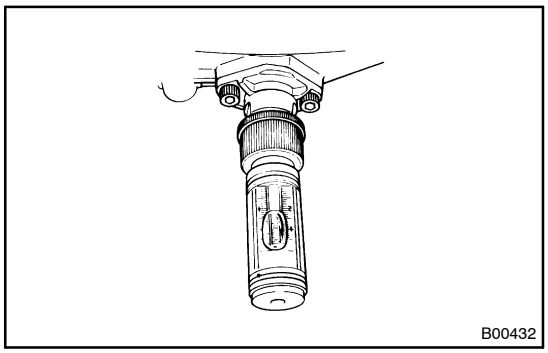


S03761

9. w/ ACSD:
RELEASE COLD STARING SYSTEM

(a) Using a screwdriver, turn the cold starting lever counterclockwise approx. 20°.
(b) Put a metal plate (thickness of 8.5 – 10.0 mm (0.335 – 0.394 in.)) between the cold starting lever and thermo wax plunger.

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


B00432

10. ADJUST TIMER

(a) Set the timer measuring device at zero.
(b) 2L–T:
Apply 62.7 kPa (0.64 kgf/cm^2, 9.1 psi) of pressure to the boost compensator.
(c) w/ HAC:
Apply 101 kPa (760 mmHg, 29.83 in.Hg) of vacuum to the high altitude compensator.
(d) Measure the timer piston stroke at the below listed rpm.

2L w/ ACSD:
(Part No. 22100–5B320, 5B360)

Pump rpm	Piston stroke mm (in.)
600	w/ TCV OFF 1.00 – 1.80 (0.0394 – 0.0709)
1,200	w/ TCV OFF 4.00 – 4.80 (0.1575 – 0.1890) w/ TCV ON 3.70 – 5.10 (0.1457 – 0.2008)
2,000	w/ TCV OFF 8.00 – 8.80 (0.3150 – 0.3465)
2,300	w/ TCV OFF 8.76 – 9.24 (0.3449 – 0.3638)

2L w/o ACSD:
(Part No. 22100–54790)

Pump rpm	Piston stroke mm (in.)
600	1.20 – 2.00 (0.0413 – 0.0811)
1,000	3.20 – 3.60 (0.0827 – 0.1142)
2,000	6.70 – 7.50 (0.1929 – 0.2244)
2,300	7.26 – 7.74 (0.2307 – 0.2496)

2L–T:
(Part No. 22100–5b860)

Pump rpm	Piston stroke mm (in.)
600	w/ TCV OFF 0.87 – 1.67 (0.0324 – 0.0623)
1,200	w/ TCV OFF 4.00 – 4.80 (0.1575 – 0.1890) w/ TCV ON 3.70 – 5.10 (0.1457 – 0.2008)
1,750	w/ TCV ON 8.00 – 8.80 (0.3150 – 0.3465)
2,300	w/ TCV ON 8.76 – 9.24 (0.3449 – 0.3638)

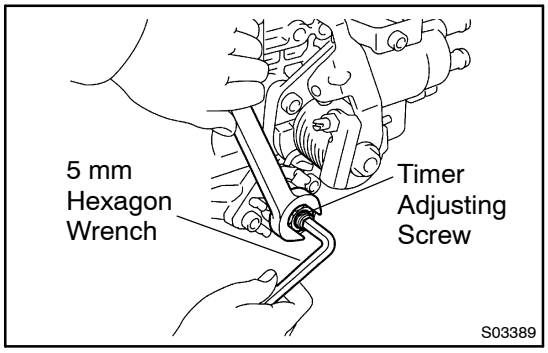
5L w/ ACSD:
(Part No. 22100–5B710)

Pump rpm	Piston stroke mm (in.)
800	1.65 – 2.45 (0.0650 – 0.0965)
1,200	3.41 – 4.21 (0.1343 – 0.1657)
1,900	6.49 – 7.29 (0.2555 – 0.2870)
2,200	6.96 – 7.44 (0.2740 – 0.2929)

5L w/o ACSD:
(Part No. 22100–5B720)

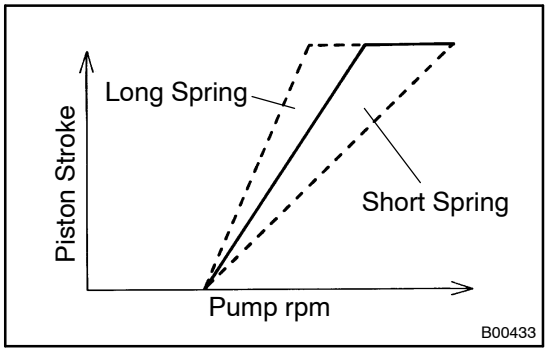
Pump rpm	Piston stroke mm (in.)
850	0.23 – 1.03 (0.0091 – 0.0406)
1,200	1.77 – 2.57 (0.0697 – 0.1012)
2,000	5.30 – 6.10 (0.2087 – 0.2402)
2,300	6.36 – 6.84 (0.2504 – 0.2693)

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

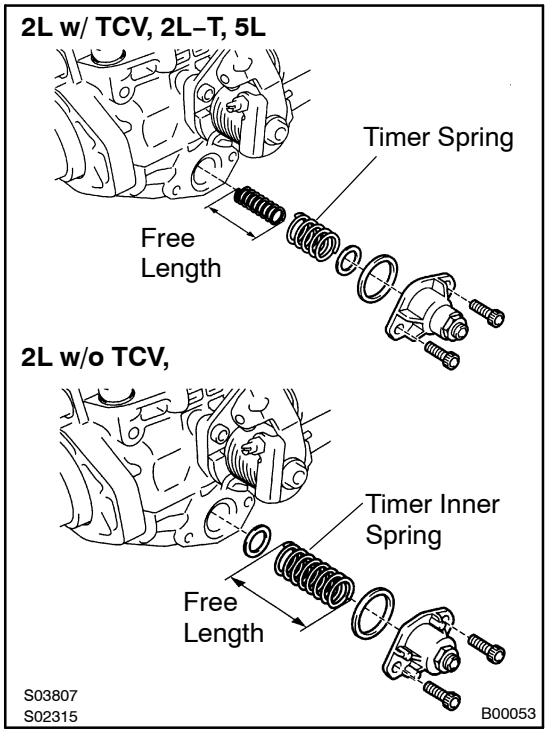


(e) Using a 5 mm hexagon wrench, adjust by turning the timer adjusting screw.

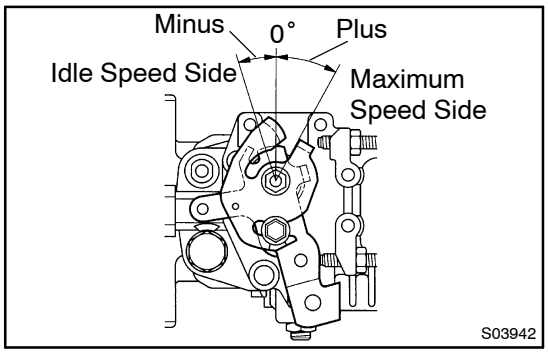
HINT:
Turn clockwise to reduce the stroke, turn counterclockwise to increase the stroke.



(f) Check the timer stroke for characteristic tendency.



If tendency is not as specified, select and replace the timer (inner) spring.
HINT:
The timer stroke will increase with a long spring and decrease with a short spring.



11. 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:
Apply 62.7 kPa (0.64 kgf/cm^2, 9.1 psi) of pressure to the boost compensator.

(c) w/ HAC:
Apply 101 kPa (760 mmHg, 29.83 in.Hg) of vacuum to the high altitude compensator.

(d) Measure the full load injection volume.

2L w/ ACSD:
(Part No. 22100–5B320, 5B360)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	11.04 – 11.36 (0.67 – 0.69)

2L w/o ACSD:
(Part No. 22100–54770, 54780, 54800, 54810)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	10.42 – 10.74 (0.64 – 0.66)

2L–T:
(Part No. 22100–5B460, 5B670)

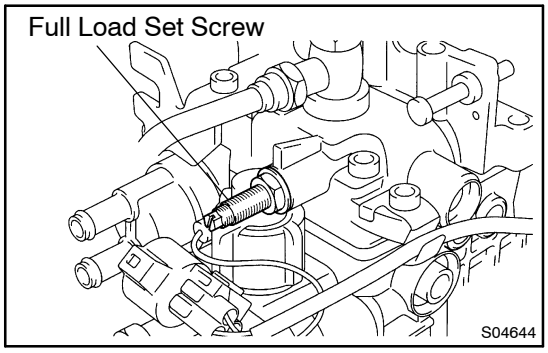
Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,000	200	13.70 – 14.02 (0.84 – 0.86)

5L w/ HAC:
(Part No. 22100–5B720)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,600	200	12.82 – 13.14 (0.78 – 0.80)

5L w/o HAC:
(Part No. 22100–5B710)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	12.18 – 12.50 (0.74 – 0.76)



(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.

12. ADJUST MAXIMUM SPEED

(a) w/ HAC:
Apply 101 kPa (760 mmHg, 29.83 in.Hg) of vacuum to the high altitude compensator.

(b) 2L–T:
Apply 62.7 kPa (0.64 kgf/cm^2, 9.1 psi) of pressure to the boost compensator.

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

2L w/ ACSD:
(Part No. 22100–5B320, 5B360)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Remark
Plus 23.5 – 33.5°	2,200	200	8.0 – 9.6 (0.49 – 0.59)	–
	2,575		4.0 – 5.6 (0.24 – 0.34)	Adjust
	2,850		1.3 (0.08) or less	–

2L w/o ACSD:
(Part No. 22100–54770, 54780, 54800, 54810)

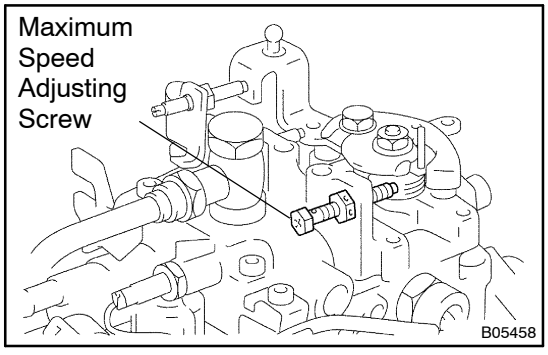
Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Remark
Plus 23.5 – 33.5°	2,250	200	7.66 – 9.26 (0.47 – 0.57)	–
	2,450		4.0 – 5.6 (0.24 – 0.34)	Adjust
	2,700		1.3 (0.08) or less	–

2L–T:
(Part No. 22100–5B460, 5B670)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Remark
Plus 23.5 – 33.5°	2,250	200	6.72 – 8.92 (0.41 – 0.54)	–
	2,400		4.3 – 6.3 (0.26 – 0.38)	Adjust
	2,750		1.3 (0.08) or less	–

5L:
(Part No. 22100–5B710, 5B720)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Remark
Plus 23.5 – 33.5°	2,100	200	9.4 – 11.4 (0.37 – 0.45)	–
	2,300		4.6 – 6.2 (0.28 – 0.38)	Adjust
	2,550		1.3 (0.08) or less	–



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

13. CHECK INJECTION VOLUME

Measure the injection volume at each pump rpm.

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Variation limit cc (cu in.)	Remark
Plus 23.5 – 33.5°	100	200	11.6 – 16.4 (0.71 – 1.00)	1.4 (0.09)	Volume during starting
	500		9.46 – 10.46 (0.58 – 0.64)	0.5 (0.03)	–
	1,200		11.58 – 11.90 (0.71 – 0.73)	0.4 (0.02)	Basic full load injection volume
	2,000		10.65 – 11.55 (0.65 – 0.70)	0.5 (0.03)	–

14. CHECK IN INJECTION VOLUME

Measure the injection volume at each pump rpm, boost pressure (2L–T) and HAC vacuum (w/ HAC).

2L w/ HAC:
(Part No. 22100–54800, 54810)

Adjusting lever angle	Pump rpm	HAC vacuum kPa (mmHg, in.Hg)	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Variation limit cc (cu in.)	Remark
Plus 23.5 – 33.5°	100	101 (760, 29.83)	200	10.6 – 15.4 (0.65 – 0.94)	1.2 (0.07)	Volume during starting
	350	101 (760, 29.83)		11.2 – 13.8 (0.68 – 0.84)	–	–
	500	101 (760, 29.83)		9.32 – 10.32 (0.57 – 0.63)	0.5 (0.03)	–
	1,200	101 (760, 29.83)		10.42 – 10.74 (0.64 – 0.66)	0.4 (0.02)	Basic full load injection volume
		90.7 (680, 26.78)		9.88 – 10.48 (0.60 – 0.64)	–	–
		70.7 (530, 20.88)		8.38 – 8.98 (0.51 – 0.55)	–	–
	2,100	101 (760, 29.83)		8.95 – 9.85 (0.55 – 0.60)	0.5 (0.03)	–

2L w/o HAC for w/ ACSD: (Part No. 22100–5B320, 5B360)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Variation limit cc (cu in.)	Remark
Plus 23.5 – 33.5°	100	200	10.6 – 15.4 (0.65 – 0.94)	1.2 (0.07)	Volume during starting
	500		10.1 – 11.1 (0.62 – 0.68)	0.5 (0.03)	–
	1,200		11.04 – 11.36 (0.67 – 0.69)	0.4 (0.02)	Basic full load injection volume
	2,000		9.7 – 10.7 (0.59 – 0.65)	0.5 (0.03)	–

2L w/o HAC for w/o ACSD: (Part No. 22100–54770, 54780)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Variation limit cc (cu in.)	Remark
Plus 23.5 – 33.5°	100	200	10.6 – 15.4 (0.65 – 0.94)	1.2 (0.07)	Volume during starting
	350		11.2 – 13.8 (0.65 – 0.84)	–	–
	500		9.32 – 10.32 (0.57 – 0.63)	0.5 (0.03)	–
	1,200		10.42 – 10.74 (0.64 – 0.66)	0.4 (0.02)	Basic full load injection volume
	2,100		8.95 – 9.85 (0.55 – 0.60)	0.5 (0.03)	–

2L–T: (Part No. 22100–5B460, 5B670)

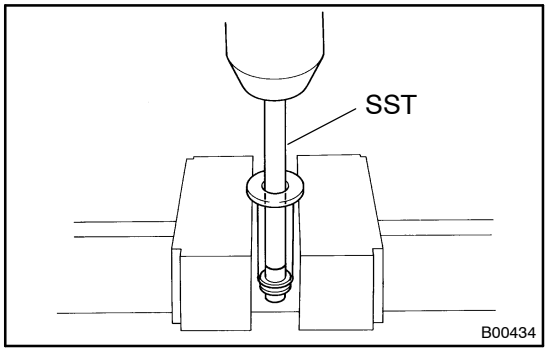
Adjusting lever angle	Pump rpm	Boost pressure kPa (kg/cm^2, psi)	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Variation limit cc (cu in.)	Remark
Plus 23.5 – 33.5°	100	0 (0, 0)	200	13.6 – 18.4 (0.83 – 1.12)	1.2 (0.07)	Volume during starting
	700	0 (0, 0)		10.94 – 11.74 (0.67 – 0.72)	0.5 (0.03)	–
	1,000	62.7 (0.64, 9.1)		13.70 – 14.02 (0.84 – 0.86)	0.4 (0.02)	Basic full load injection volume
	1,800	62.7 (0.64, 9.1)		11.48 – 12.48 (0.70 – 0.76)	0.5 (0.03)	–

5L w/ HAC:
(Part No. 22100–5B720)

Adjusting lever angle	Pump rpm	HAC vacuum kPa (mmHg, in.Hg)	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Variation limit cc (cu in.)	Remark
Plus 23.5 – 33.5°	100	101 (760, 29.83)	200	13.6 – 18.4 (0.83 – 1.12)	1.2 (0.07)	Volume during starting
	500	101 (760, 29.83)		10.92 – 12.32 (0.67 – 0.75)	0.5 (0.03)	–
	1,600	101 (760, 29.83)		12.82 – 13.14 (0.78 – 0.80)	0.4 (0.02)	Basic full load injection volume
		85.3 (640, 25.19)		11.10 – 11.70 (0.68 – 0.71)	–	–
	1,900	101 (760, 29.83)		12.30 – 12.98 (0.75 – 0.79)	0.5 (0.03)	–

5L w/o HAC:
(Part No. 22100–5B710)

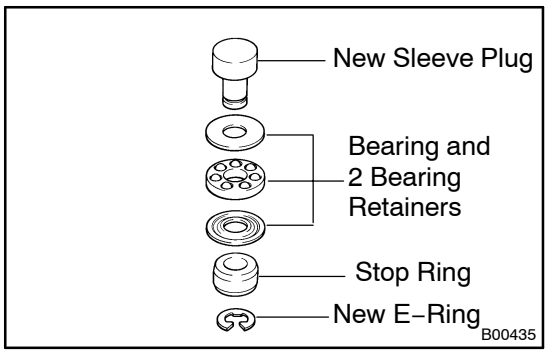
Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Variation limit cc (cu in.)	Remark
Plus 23.5 – 33.5°	100	200	13.6 – 18.4 (0.83 – 1.12)	1.2 (0.07)	Volume during starting
	500		10.36 – 11.36 (0.63 – 0.69)	0.5 (0.03)	–
	1,200		12.18 – 12.50 (0.74 – 0.76)	0.4 (0.02)	Basic full load injection volume
	2,000		11.01 – 11.91 (0.67 – 0.73)	0.5 (0.03)	–



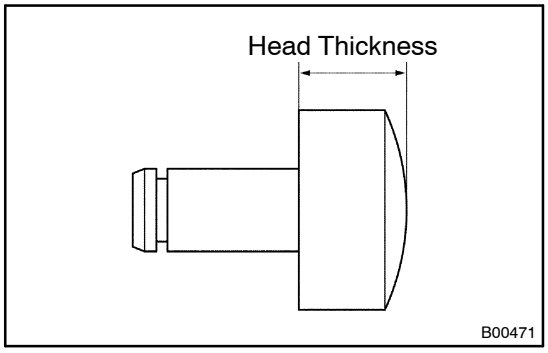
If the injection volume at 100 rpm is not as specified, replace the governor sleeve plus as follows:

(1) Using SST and a press, press out the sleeve plug assembly from the governor sleeve.

SST 09236–00101 (09237–00070)



(2) Remove the E–ring, stop ring, bearing and 2 bearing retainers from the sleeve plug.

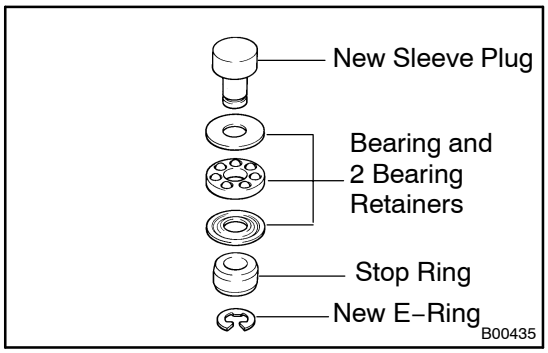


(3) Measure the head thickness of the sleeve plug, and select a new sleeve plug.

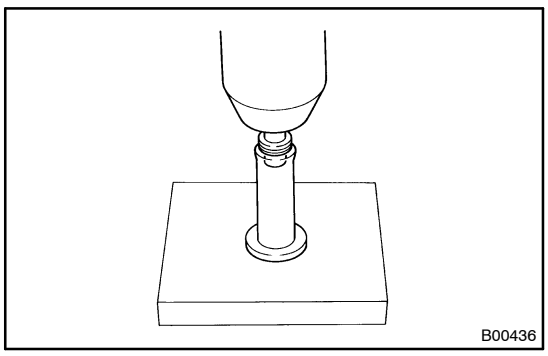
Governor sleeve plug head thickness: mm (in.)

3.0 (0.118)	3.5 (0.138)	4.0 (0.157)
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 by 0.1 mm (0.004 in.) will decrease injection volume by 0.6 cc (0.04 cu in.).
If the variation limit is greater than specified, replace the delivery valve.



(1) Install the bearing, 2 retainers and stop ring to the new sleeve plug with a new E–ring.

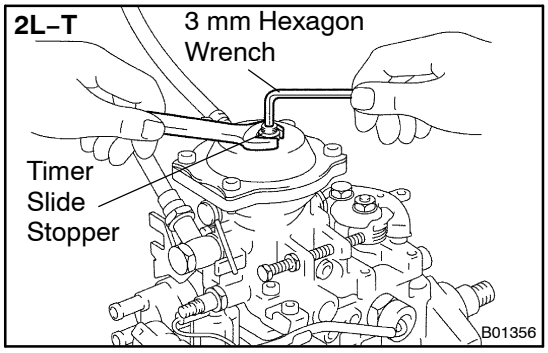


(2) Using a press, press in the sleeve plug assembly to the governor sleeve.

15. 2L–T:
ADJUST FULL LOAD MINIMUM INJECTION VOLUME

(a) Set the adjusting lever to maximum position.
(b) Release the pressure from the boost compensator.
(c) Measure the injeciton volume.
(Part No. 22100–5B460, 5B670)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
700	200	10.94 – 11.74 (0.67 – 0.72)

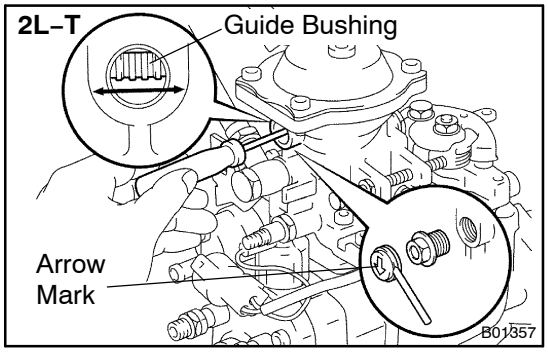


(d) Using a 3 mm hexagon wrench, adjust by turning the timer slide stopper.

16. 2L–T:
ADJUST BOOST COMPENSATOR

(a) Set the adjusting lever to maximum position.
(b) Apply 13.3 kPa (0.14 kPa (0.14 kgf/cm^{2,} 2.0 psi) of pressure to boost compensator.
(c) Measure the injeciton volume.
(Part No. 22100–5B460, 5B670)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,000	200	10.76 – 11.56 (0.66 – 0.71)

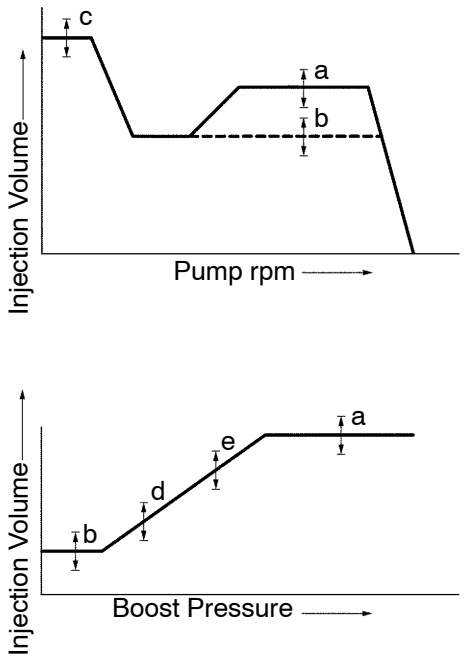


(d) Remove the rubber cap and overflow screw.
(e) Using a screwdriver, adjust the injection volume by the guide bushing.

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

(f) Install the overflow screw.
Torque: 24.55 N·m (250 kgf·cm, 18 ft·lbf)
(g) Install the rubber cap with the arrow mark facing downward.

2L–T



(a) Adjust full–load injection volume
(b) Adjust full–load minimum injection volume
(c) Adjust cold starting injeciton volume
(d) Adjust boost compensator characteristic
(e) Adjust boost compensator characteristic tendency

B00473
B00472
B00904

17. 2L–T:
CHECK FOR CHARACTERISTIC TENDENCY

(a) Set the adjusting lever to maximum position.
(b) Apply 40.0 kPa (0.41 kgf/cm^2, 5.8 psi) of pressure to boost compensator.
(c) Measure the injeciton volume.
(Part No. 22100–5B460, 5B670)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,000	200	12.54 – 13.14 (0.77 – 0.80)

18. 2L–T:
CHECK HYSTERESIS

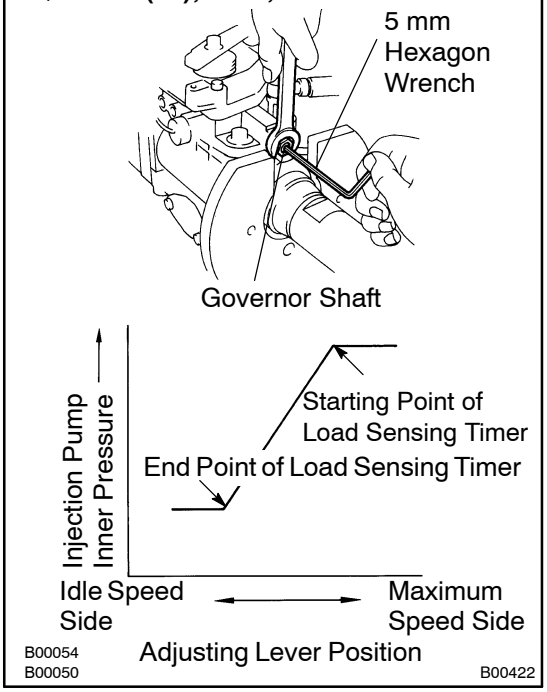
Compare the injection volume when the boost compensator pressure is lowered from 107.0 kPa (1.09 kgf/cm^2, 15.5 psi) to 13.3 kPa (0.14 khf/cm^2, 2.0 psi), and conversely, when it is raised from zero.
HINT:
Make measurements after moving the adjusting lever between idle and maximum 3 times for each lowering of the pressure.

(Part No. 22100–5B460, 5B670)

Pump rpm	Boost pressure kPa (kg/cm^2, psi)	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Hysteresis cc (cu in.)
1,000	107.0 (1.09, 15.5)	200	13.5 (0.82) or less	0.4 (0.02) or less
	73.3 (0.75, 10.7)		13.60 – 14.12 (0.83 – 0.86)	
	40.0 (0.41, 5.8)		12.54 – 13.14 (0.77 – 0.80)	
	13.3 (0.14, 2.0)		10.76 – 11.56 (0.66 – 0.71)	

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

w/o HAC (2L), 2L–T, 5L



19. w/o HAC (2L), 2L–T, 5L:
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) Measure the injection volume.

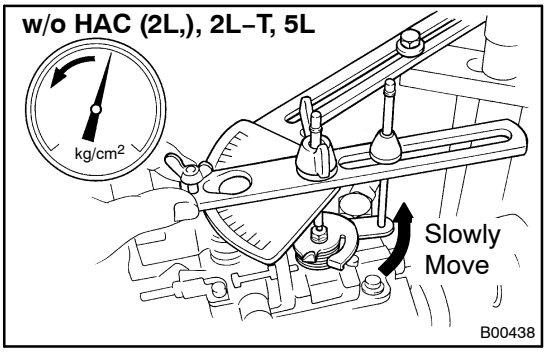
2L,5L:

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

2L–T:

Adjusting lever position	Pump rpm	No, of measuring strokes
Maximum speed side	1,000	200

w/o HAC (2L,), 2L–T, 5L



(d) 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.

(e) Measure the injection volume at the drop point (starting point).

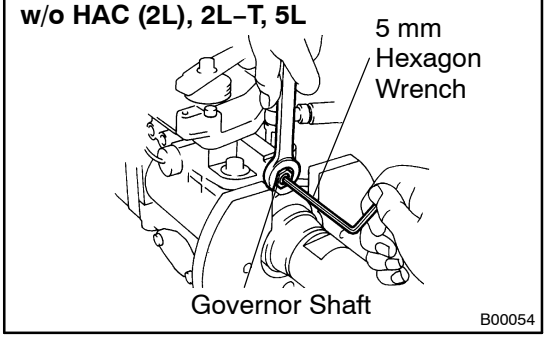
2L,5L:

Pump rpm	No of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	Measured value at step (d) minus 1.0 (0.06) ± 0.4 (0.02)

2L–T:

Pump rpm	No of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,000	200	Measured value at step (d) minus 0.6 (0.04) ± 0.4 (0.02)

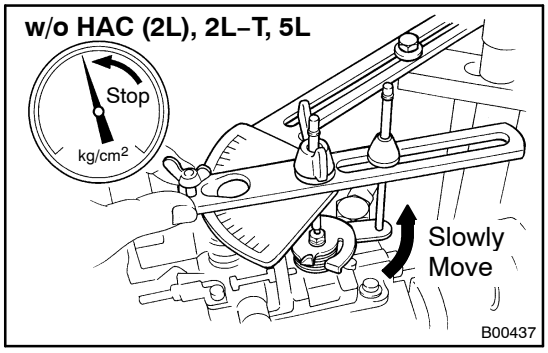
w/o HAC (2L), 2L–T, 5L



(f) Using a 5 mm hexagon 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.



(g) 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.

2L w/ ACSD:
(Part No. 22100–5B320, 5B360)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	9.0 – 9.4 (0.55 – 0.57)

2L w/o ACSD:
(Part No. 22100–54770, 54780)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	8.38 – 8.78 (0.51 – 0.54)

2L–T:
(Part No. 22100–5B460, 5B670)

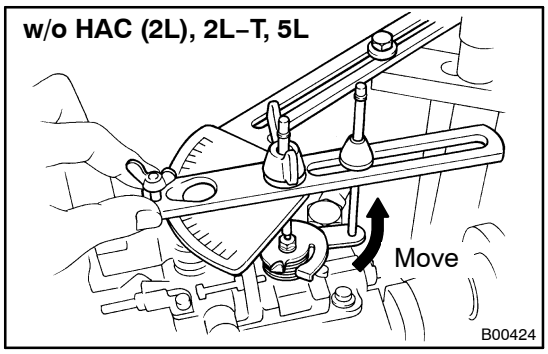
Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,000	200	8.0 – 8.4 (0.49 – 0.51)

5L w/ ACSD:
(Part No. 22100–5B710)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	9.5 – 9.9 (0.58 – 0.60)

5L w/o ACSD:
(Part No. 22100–5B720)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
1,200	200	9.58 – 9.98 (0.58 – 0.61)



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

2L w/ ACSD:
(Part No. 22100–5B320, 5B360)

Pump rpm	Timer piston fluctuation mm (in.)
1,200	w/ TCV OFF 1.80 – 2.60 (0.0709 – 0.1024)

2L w/o ACSD:
(Part No. 22100–54770, 54780)

Pump rpm	Timer piston fluctuation mm (in.)
1,200	0.62 – 1.02 (0.0244 – 0.0402)

2L–T:
(Part No. 22100–5B460, 5B670)

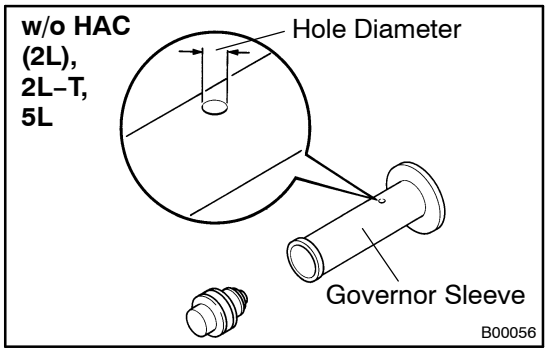
Pump rpm	Timer piston fluctuation mm (in.)
1,000	1.40 – 1.80 (0.0551 – 0.0709)

5L w/ ACSD:
(Part No. 22100–5B710)

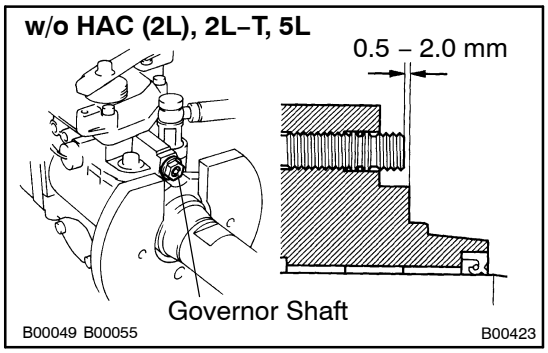
Pump rpm	Timer piston fluctuation mm (in.)
1,200	1.03 – 1.43 (0.0406 – 0.0563)

5L w/o ACSD:
(Part No. 22100–5B720)

Pump rpm	Timer piston fluctuation mm (in.)
1,200	0.82 – 1.22 (0.0323 – 0.0480)



If the timer stroke is not as specified when the load sensing is at maximum retard angle, select a new governor sleeve.
HINT:
A large hole diameter decreases the timer stroke and a smaller hole diameter increases the timer stroke.



(i) Check the protrusion of the governor shaft.
Protrusion: 0.5 – 2.0 mm (0.020 – 0.079 in.)

20. ADJUST IDLE SPEED

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

2L:
(Part No. 22100–54770, 54780, 54800, 54810, 5B320, 5B360)

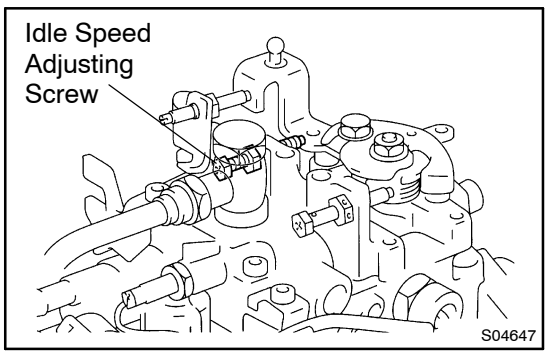
Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Variation limit cc (cu in.)	Remark
Minus 12.5 – 22.5°	350	200	1.7 – 2.7 (0.10 – 0.16)	0.34 (0.02)	Adjust
	525		1.2 (0.07) or less	–	–

2L–T:
(Part No. 22100–5B460, 5B670)

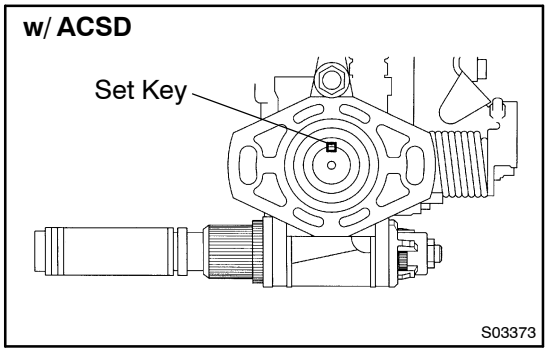
Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Variation limit cc (cu in.)	Remark
Minus 9.5 – 19.5°	350	200	3.18 – 4.18 (0.19 – 0.26)	0.34 (0.02)	Adjust

5L:
(Part No. 22100–5B710, 5B720)

Adjusting lever angle	Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)	Variation limit cc (cu in.)	Remark
Minus 12.5 – 22.5°	350	200	2.54 – 3.54 (0.16 – 0.22)	0.34 (0.02)	Adjust
	575		1.2 (0.07) or less	–	–



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

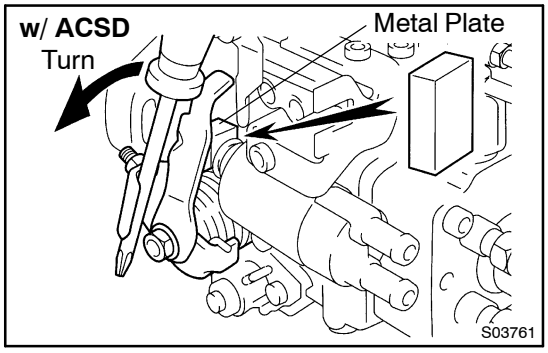


21. w/ ACSD:
ADJUST COLD STARTING SYSTEM

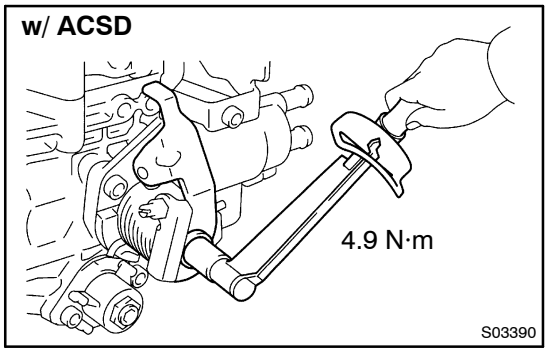
(a) Remove the overflow screw and check the fuel temperature in the fuel pump.
Fuel temperature: 15 – 35°C (59 – 95°F)

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



(f) Torque the cold starting lever clockwise to approx. 4.9 N·m (50 kgf·cm, 43 in.·lbf) and keep the lever tightened for about 10 seconds. Then release the torque.
(g) Measure the timer piston stroke.

2L:
(Part No. 22100–5B320, 5B360)

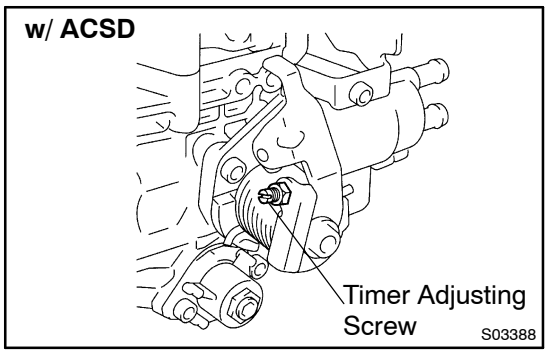
Fuel temperature C (°F)	Pump rpm	Piston stroke mm (in.)
25 (77)	350	1.50 – 1.90 (0.0591 – 0.0748)

2L–T:
(Part No. 22100–5B460, 5B670)

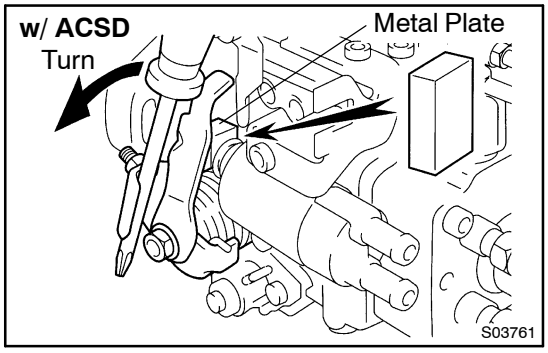
Fuel temperature C (°F)	Pump rpm	Piston stroke mm (in.)
25 (77)	350	1.70 – 1.90 (0.0669 – 0.0748)

5L:
(Part No. 22100–5B710)

Fuel temperature C (°F)	Pump rpm	Piston stroke mm (in.)
25 (77)	400	1.10 – 1.30 (0.0433 – 0.0512)



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



22. w/ ACSD:
ADJUST FAST IDLE SPEED

(a) Release the cold starting system.
  (1) Using a screwdriver, turn the cold starting lever counterclockwise approx. 20°.
  (2) Put a metal plate (thickness of 8.5 – 10.0 mm (0.335 – 0.394 in.)) between the cold starting lever and thermo wax plunger.

(b) Set the adjusting lever to idle position.

(c) Measure the injection volume.

2L:
(Part No. 22100–5B320, 5B360)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
350	200	q = 1.7 – 2.7 (0.10 – 0.16)

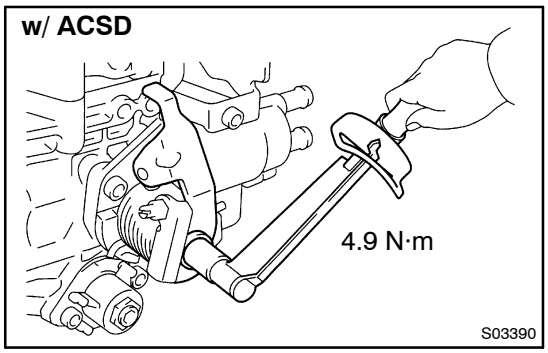
2L–T:
(Part No. 22100–5B460, 5B670)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
350	200	q = 3.18 – 4.18 (0.19 – 0.26)

5L:
(Part No. 22100–5B710)

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
400	200	q = 2.54 – 3.54 (0.16 – 0.22)

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



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

(f) Measure the injection volume.

2L, :

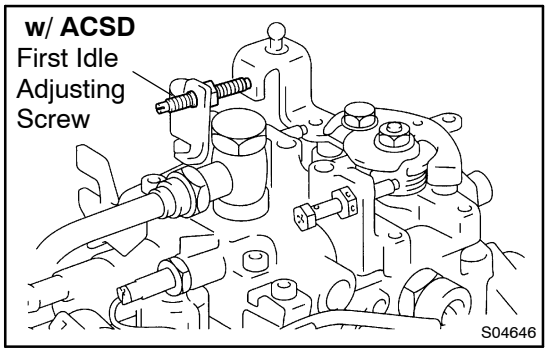
Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
350	200	q plus 2.0 – 2.2 (0.12 – 0.13)

2L–T:

Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
350	200	q plus 0.22 – 0.42 (0.01 – 0.03)

5L:

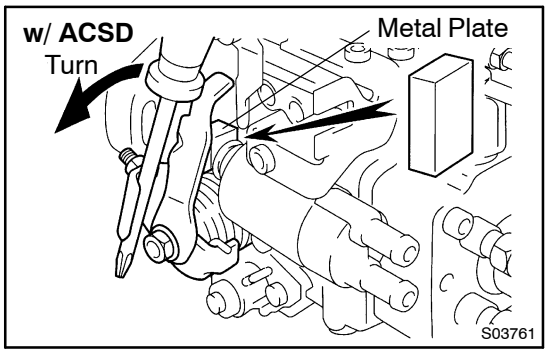
Pump rpm	No. of measuring strokes	Injection volume of each cylinder cc (cu in.)
400	200	q plus 1.24 – 1.44 (0.08 – 0.09)



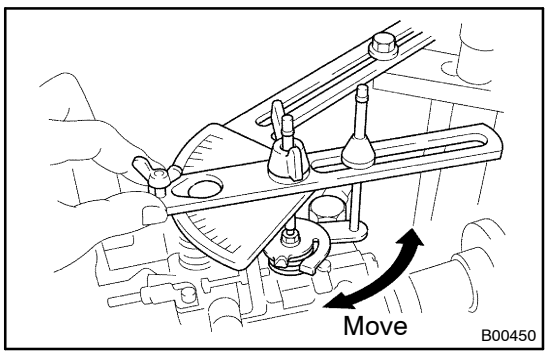
(g) Adjust the injection volume by turning the fast idle adjusting screw.

23. POST ADJUSTMENT CHECK

(a) Check the injection stops when the fuel cut solenoid harness is removed.
Pump revolution: 100 rpm



(b) w/ ACSD:
Release the cold starting system.
(1) Using a screwdriver, turn the cold starting lever counterclockwise approx. 20°.
(2) Put a metal plate (thickness of 8.5 – 10.0 mm (0.335 – 0.394 in.)) between the cold starting lever and thermo wax plunger.

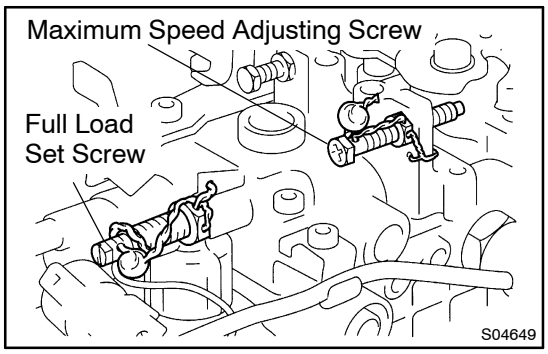


(c) Check the adjusting lever movement.
Adjusting lever angle:

2L, 5L	43 – 49°
2L–T	41 – 51°

(d) w/ ACSD:
Remove the metal plate between the cold starting lever and thermo wax plunger.

24. REMOVE INJECTION PUMP FROM PUMP TESTER



25. SEAL PARTS

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