
ENGINE WILL NOT SHUT OFF WITH STOP BUTTON OR KEY

(Possible Cause)**(Check Procedure and Correction Method)**

1. [B AND 3B (w/ STOP BUTTON)]
BINDING STOP CABLE

Operate stop lever (adjusting lever) on side of injection pump and check if engine stops.
If so, stop cable is binding or maladjusted and should be repaired accordingly.
If engine does not stop, injection pump is faulty and should be repaired. (See page FU-27)

2. [B AND 3B (w/ EDIC SYSTEM)]
IMPROPER EDIC SYSTEM

Operate stop lever (adjusting lever) on side of injection pump and check if engine stops.
If so, EDIC system is faulty and should be repaired. (See page ST-26)
If engine does not stop, injection pump is faulty and should be repaired. (See page FU-27)

3. [B (w/ FUEL CUT DIAPHRAGM)]
IMPROPER FUEL CUT
DIAPHRAGM OPERATION

Operate stop lever (adjusting lever) on side of injection pump and check if engine stops.
If so, fuel cut diaphragm system is faulty and should be repaired. (See page ST-28)
If engine does not stop, injection pump is faulty and should be repaired. (See page FU-27)

4. [11B, 13B AND 13B-T]
IMPROPER INTAKE SHUTTER
OPERATION

Close the intake shutter and check if engine stops.
If it does, the intake shutter system is faulty and should be repaired. (See page EM-30)

TURBOCHARGER DIAGNOSIS [13B-T]

NOTE: Before troubleshooting the turbocharger, first check the engine itself. (Valve clearance, engine compression, injection timing, etc.)

INSUFFICIENT ACCELERATION, LACK OF POWER OR EXCESSIVE FUEL CONSUMPTION

(Possible Cause)

(Check Procedure and Correction Method)

1. TURBOCHARGING PRESSURE TOO LOW

Check turbocharging pressure. (See page EM-35)

Turbocharging pressure:

0.42 – 0.56 kg/cm²

(6.0 – 8.0 psi, 41 – 55 kPa)

If the pressure is below specification, begin diagnosis from item 2.

2. RESTRICTED INTAKE AIR SYSTEM

Check intake air system, and repair or replace parts as necessary. (See page EM-35)

3. LEAK IN INTAKE AIR SYSTEM

Check intake air system, and repair or replace parts as necessary. (See page EM-35)

4. RESTRICTED EXHAUST SYSTEM

Check exhaust system, and repair or replace parts as necessary. (See page EM-35)

5. LEAK IN EXHAUST SYSTEM

Check exhaust system, and repair or replace parts as necessary. (See page EM-35)

6. ERRATIC TURBOCHARGER OPERATION

Check rotation of impeller wheel. If it does not turn or turns with a heavy drag, replace the turbocharger assembly.

Check axial play of bearing shaft. (See page EM-38)

Axial play: 0.13 mm (0.0051 in.) or less

If not within specification, replace the turbocharger assembly.

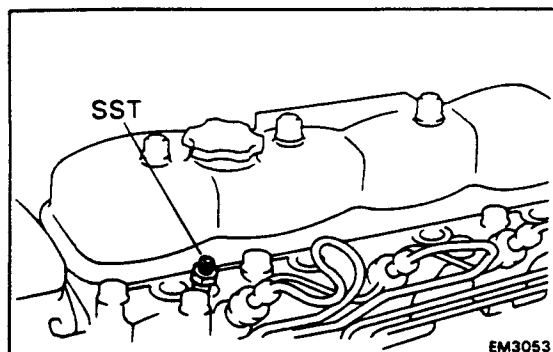
COMPRESSION CHECK [B and 3B]

NOTE: If there is lack of power, excessive oil consumption or poor fuel economy, measure the cylinder compression pressure.

1. WARM UP AND STOP ENGINE

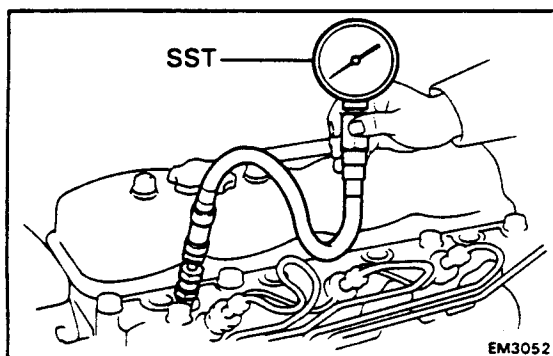
2. REMOVE GLOW PLUGS (See page EM-44)

CAUTION: Make sure the load wire is not grounded.



3. CHECK CYLINDER COMPRESSION PRESSURE

(a) Install SST (gauge adapter) to the glow plug hole.
SST 09992-00023



(b) Connect SST (compression gauge) to SST (gauge adapter).

SST 09992-00023

(c) Fully open the throttle valve.

(d) While cranking the engine with the starter, measure the compression pressure.

NOTE: Always use a fully charged battery to obtain engine revolutions of more than 250 rpm.

(e) Repeat steps (a) through (d) for each cylinder.

Compression pressure:

30.0 kg/cm² (427 psi, 2,942 kPa) or more

Minimum pressure:

20.0 kg/cm² (284 psi, 1,961 kPa)

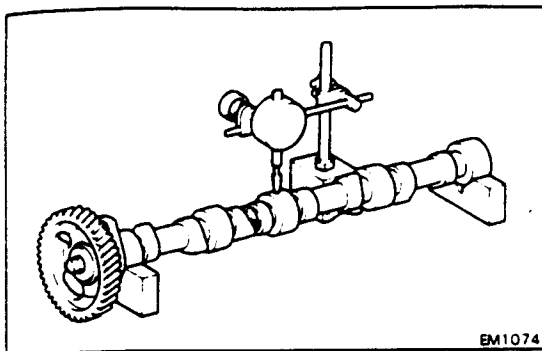
Difference between each cylinder:

2.0 kg/cm² (28 psi, 196 kPa) or less

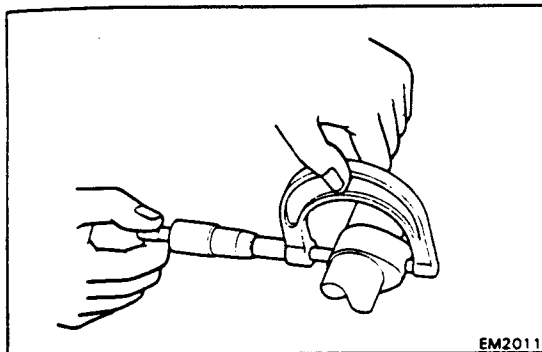
(f) If the cylinder compression in one or more cylinders is low, pour a small amount of engine oil into the cylinder through the glow plug hole and repeat steps (a) through (d) for the cylinder with low compression.

- If adding oil helps the compression, chances are that the piston rings and/or cylinder bore are worn or damaged.
- If pressure stays low, a valve may be sticking or seating improperly, or there may be leakage past the gasket.

4. INSTALL GLOW PLUGS (See page EM-62)



EM1074



EM2011

INSPECTION OF TIMING GEARS AND CAMSHAFT

1. INSPECT CAMSHAFT

- (a) Place the camshaft on V-blocks and, using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.06 mm (0.0024 in.)

If the circle runout is greater than maximum, replace the camshaft.

- (b) Using a micrometer, measure the cam lobe height.

Standard cam lobe height:

Intake	B and 3B	45.067 – 45.157 mm (1.7743 – 1.7778 in.)
	11B and 13B	44.705 – 44.795 mm (1.7600 – 1.7636 in.)
	13B-T	44.909 – 44.999 mm (1.7681 – 1.7716 in.)
Exhaust	B and 3B	45.065 – 45.155 mm (1.7742 – 1.7778 in.)
	11B, 13B and 13B-T	44.774 – 44.864 mm (1.7628 – 1.7663 in.)

Minimum cam lobe height:

Intake	B and 3B	44.63 mm (1.7571 in.)
	11B and 13B	44.27 mm (1.7429 in.)
	13B-T	44.47 mm (1.7508 in.)
Exhaust	B and 3B	44.63 mm (1.7571 in.)
	11B, 13B and 13B-T	44.34 mm (1.7457 in.)

If the lobe height is less than minimum, replace the camshaft.

- (c) Using a micrometer, measure the journal diameter.

Journal diameter (from front side):

No. 1	53.459 – 53.475 mm (2.1047 – 2.1053 in.)
No. 2	53.209 – 53.225 mm (2.0948 – 2.0955 in.)
No. 3	52.959 – 52.975 mm (2.0850 – 2.0856 in.)
No. 4	52.709 – 52.725 mm (2.0752 – 2.0758 in.)
No. 5	52.459 – 52.475 mm (2.0653 – 2.0659 in.)

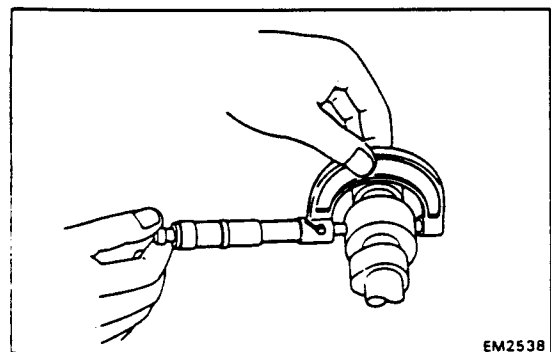
If the journal diameter is not within specification, check the oil clearance. (See page EM-97)

- (d) Using a feeler gauge, measure the thrust clearance between the camshaft and thrust plate.

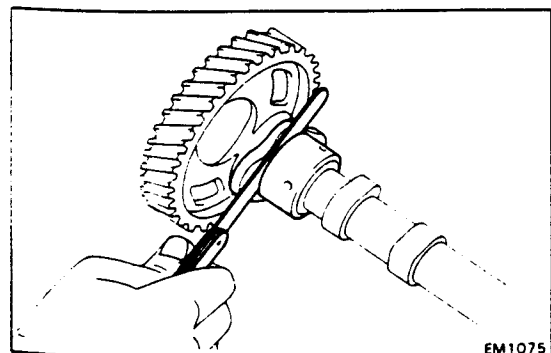
Standard clearance: 0.06 – 0.13 mm
(0.0024 – 0.0051 in.)

Maximum clearance: 0.30 mm (0.0118 in.)

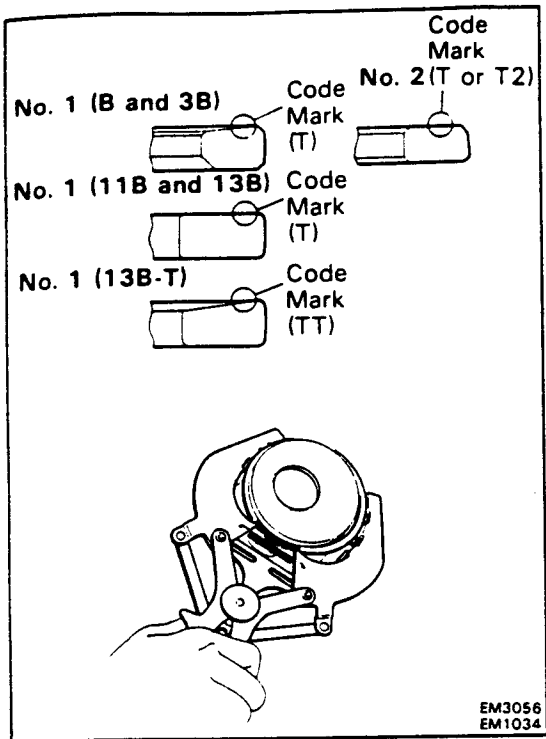
If the thrust clearance is greater than maximum, replace the thrust plate. If necessary, replace the camshaft. (See page EM-71)



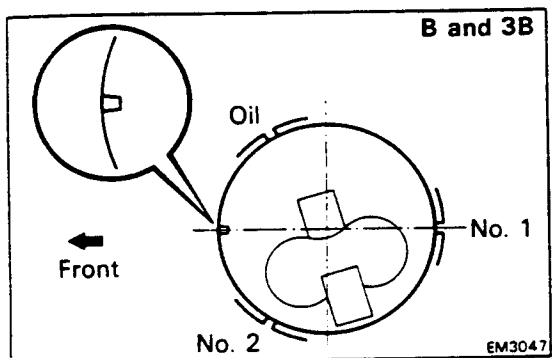
EM2538



EM1075

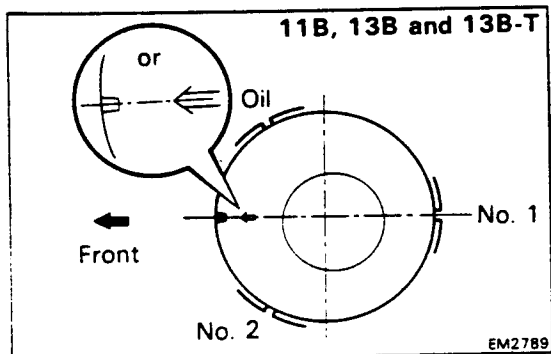


- (b) Using a piston ring expander, install the two compression rings with the code mark facing upward.



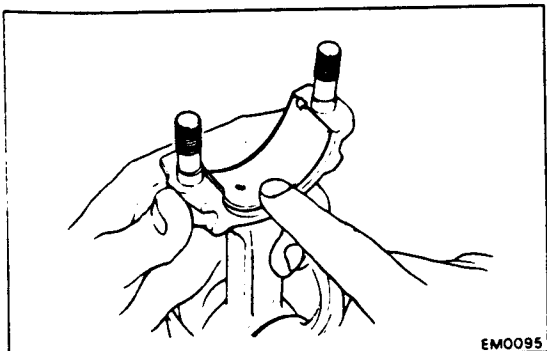
- (c) Position the piston rings so that the ring end gaps are as shown.

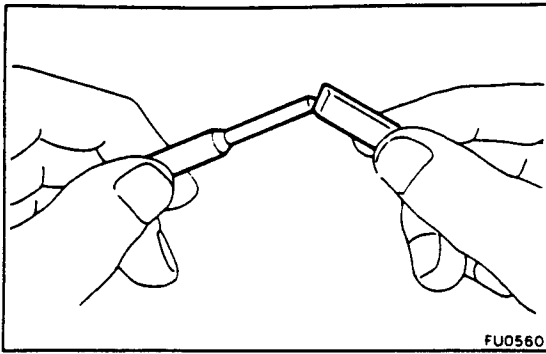
CAUTION: Do not align the end gaps.



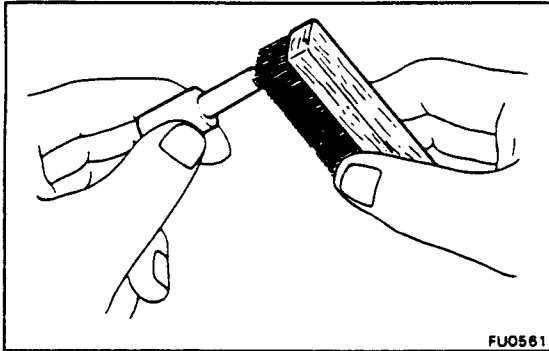
3. INSTALL BEARINGS

- Align the bearing claw with the claw groove of the connecting rod or connecting rod cap.
- Install the bearings in the connecting rod and connecting rod cap.

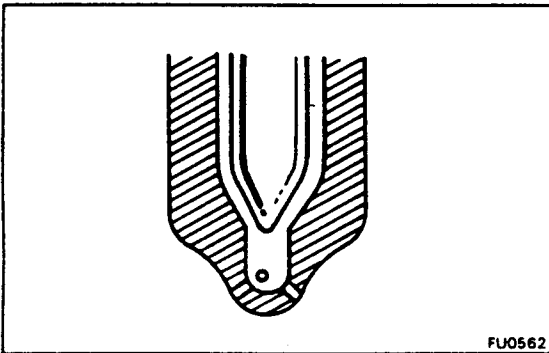




- (b) Using a wooden stick, remove the carbon adhering to the nozzle needle tip.



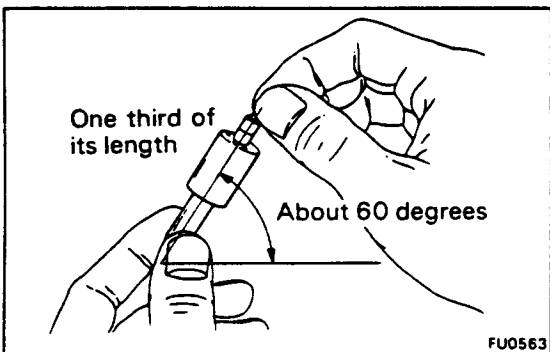
- (c) Using a brass brush, remove the carbon from the exterior of the nozzle body.



- (d) Inspect the nozzle body for burns or corrosion.

- (e) Inspect the nozzle needle tip for damage or corrosion.

If any of these conditions are present, replace the nozzle assembly.

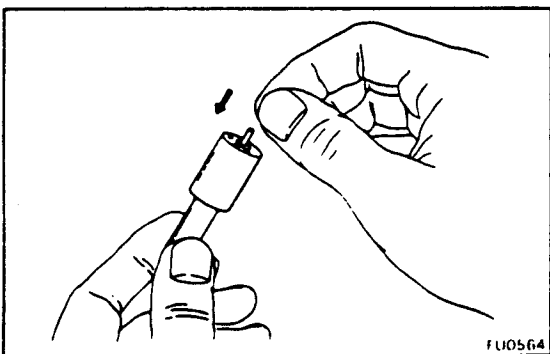


3. SINKING TEST

- (a) Wash the nozzle in clean diesel fuel.

NOTE: Do not touch the nozzle mating surfaces with your fingers.

- (b) Tilt the nozzle body about 60 degrees and pull the needle out about one third of its length.

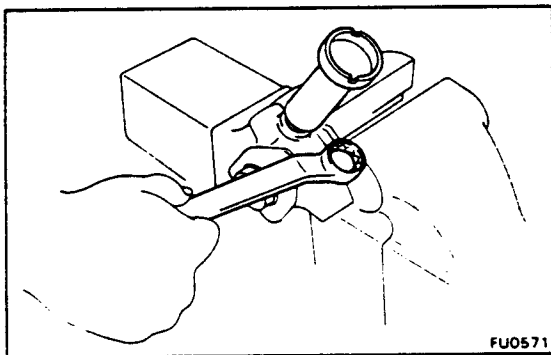
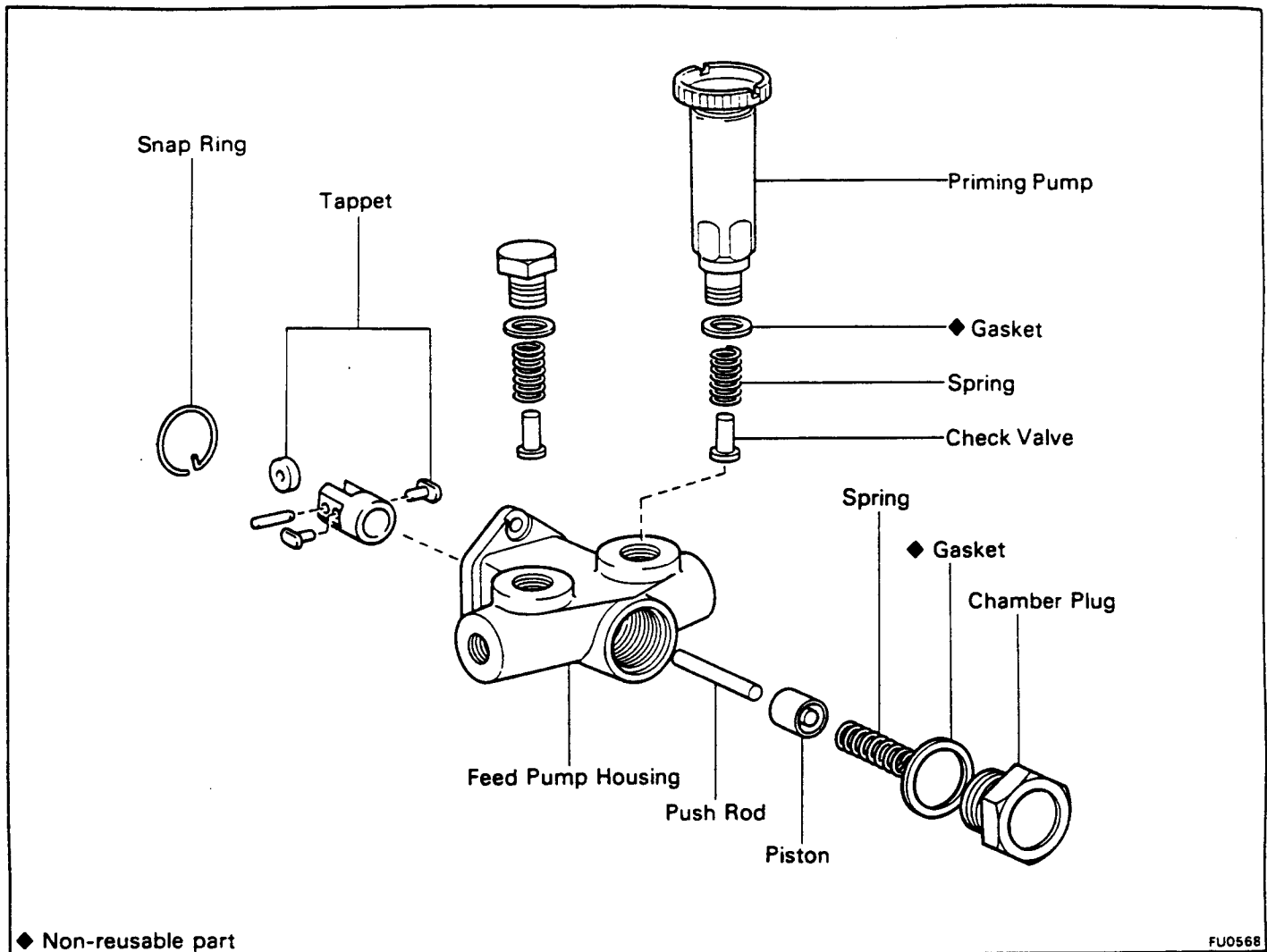


- (c) When released, the needle should sink down into the body vent smoothly by its own weight.

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

If the needle does not sink freely, replace the nozzle assembly.

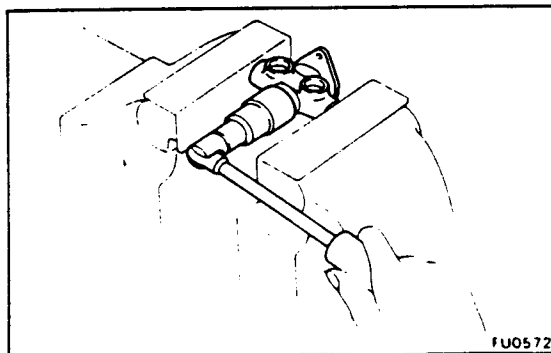
COMPONENTS



DISASSEMBLY OF FUEL FEEL PUMP

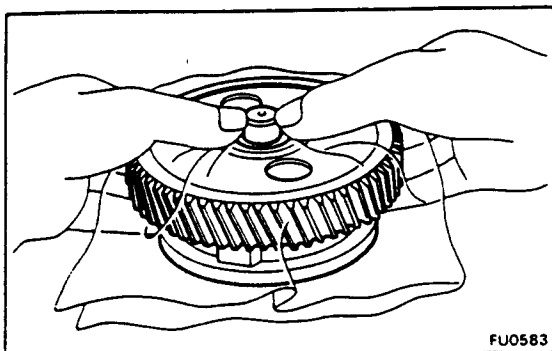
1. REMOVE PRIMING PUMP AND CHECK VALVES

- Remove the chamber plug, gasket, spring and check valve.
- Remove the priming pump, gasket, spring and check valve.

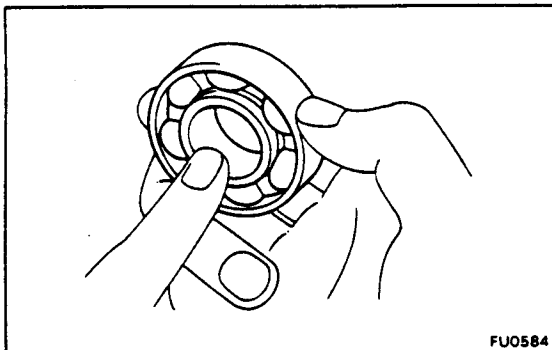


2. REMOVE FEED PUMP PISTON

Remove the chamber plug, gasket, spring and piston.



- (b) Cover the timer with a shop towel to prevent the spring seats (B), springs and adjusting shims from flying out.
- (c) Pull up the drive gear, and remove the spring seats (B), springs and adjusting shims.
- (d) Remove the timer weights from the timer hub.

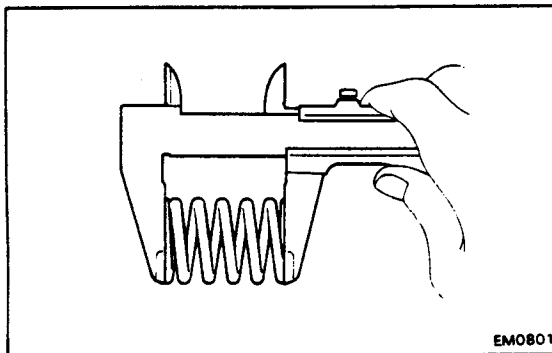


INSPECTION OF AUTOMATIC TIMER

1. INSPECT TIMER BEARING

Check that the timer bearing operation is not rough or noisy.

If necessary, replace the timer bearing.



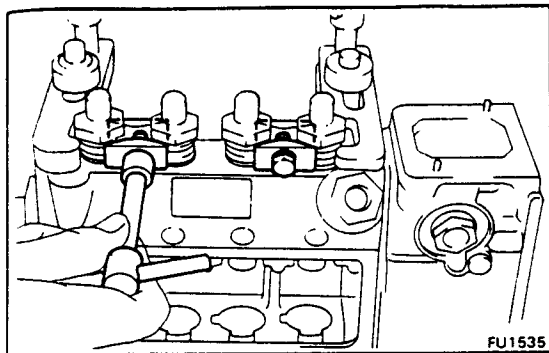
2. INSPECT TIMER SPRINGS

Using calipers, measure the free length of the spring.

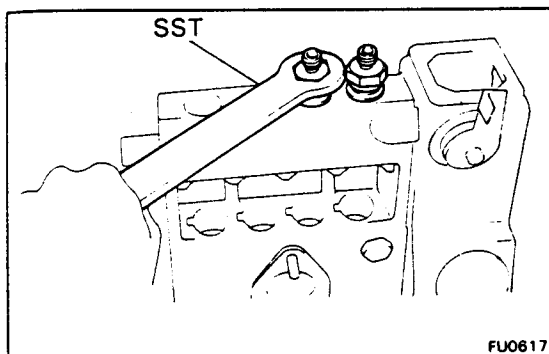
Free length:

B	Inner	43.7 mm (1.720 in.)
	Outer	54.2 mm (2.134 in.)
3B		50.7 mm (1.996 in.)
11B (w/o HAC) and 13B (w/o HAC)		50.3 mm (1.980 in.)
11B (w/ HAC) and 13B (w/ HAC)		44.4 mm (1.748 in.)
13B-T		48.5 mm (1.909 in.)

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

**10. REMOVE DELIVERY VALVES AND PUMP CYLINDERS**

- (a) Remove the two lock plates.

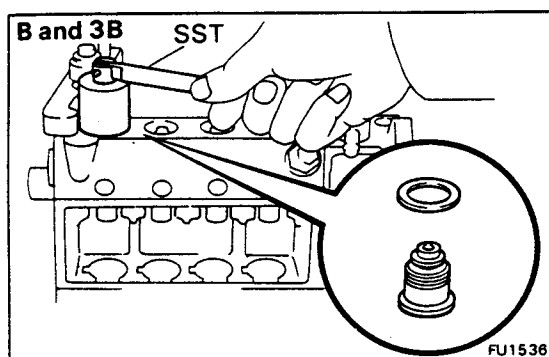


- (b) [B and 3B]
Using SST, remove the delivery valve holder and spring.

SST 09260-76017 (09270-76010)

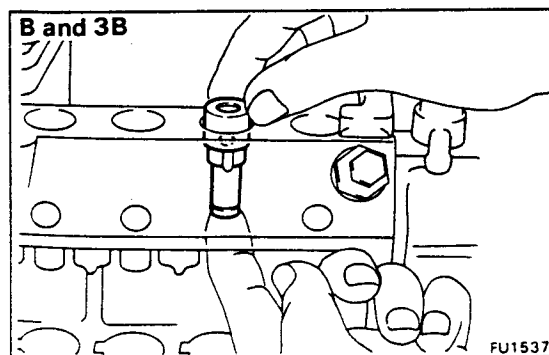
- (c) [11B, 13B and 13B-T]
Using SST, remove the delivery valve holder, O-ring, stopper, spring and gasket.

SST 09260-58010 (09270-76010)

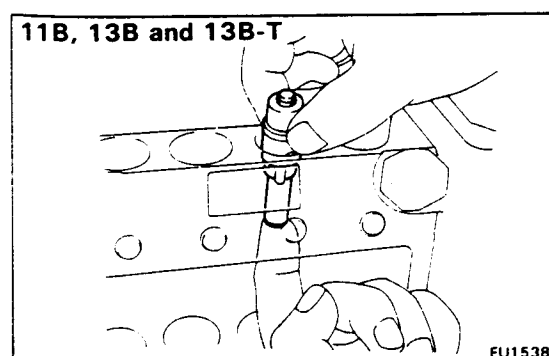


- (d) [B and 3B]
Using SST, remove the delivery valve and gasket.

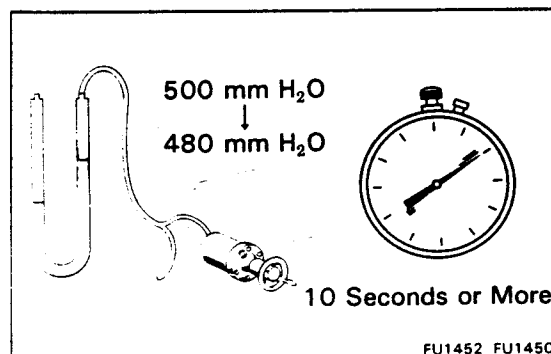
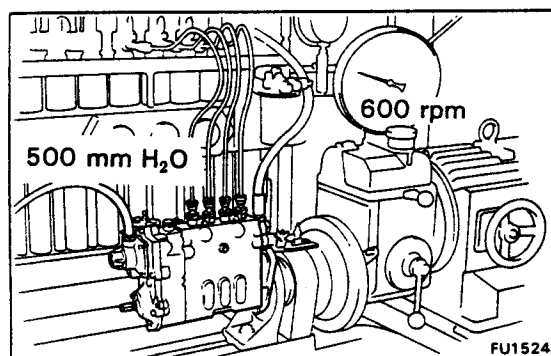
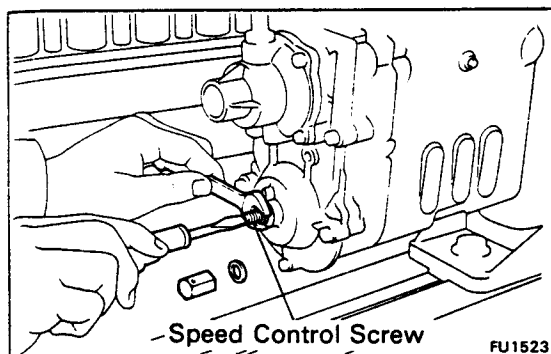
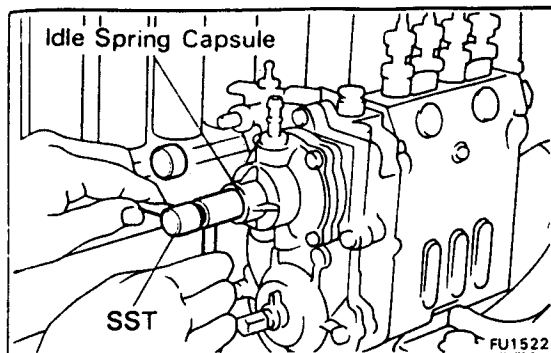
SST 09260-76017 (09271-76011)



- (e) [B and 3B]
Raise the pump cylinder with your forefinger, and remove it.



- (f) [11B, 13B and 13B-T]
Raise the pump cylinder with your forefinger, and remove it together with the delivery valve.



1. PRE-TEST CHECK AND PREPARATION (See page FU-63)

2. PREPATATION

- Remove the sealing screw plug.
- Using SST, loosen the idle spring capsule to keep it inoperative.

SST 09260-76017 (09282-76010)

- Remove the cap nut and gasket.
- Fully tighten the speed control screw.

3. CHECK AIR-TIGHT OF VACUUM CHAMBER

- Set the pump speed at 600 rpm.
- Apply 500 mm H₂O (19.69 in. H₂O, 4.90 kPa) of vacuum to vacuum chamber.

- Measure the time it takes for the vacuum to drop to 480 mm H₂O (18.9 in. H₂O, 6.28 kPa).

Pressure drop: 10 seconds or more

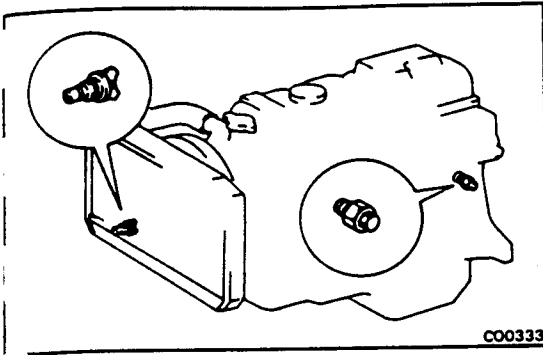
If the pressure is less than specification, retighten the screws of the governor diaphragm housing. If necessary, replace the governor diaphragm.

4. ADJUST PNEUMATIC GOVERNOR SECTION

A. Adjust initial position of control rack

- Measure the control rack position.

Item	Pump rpm	Vacuum mm H ₂ O (in. H ₂ O, kPa)	Control rack position mm (in.)
B	600	600 (23.62, 5.88)	11.7 (0.461)
3B	600	400 (15.75, 3.92)	12.9 (0.508)



3. REPLACE ENGINE COOLANT

- (a) Remove the radiator cap.
- (b) Drain the coolant from radiator and engine drain cocks. (Engine drain cock is at left front of engine block.)
- (c) Close the drain cocks.
- (d) Fill the system with coolant.

Use a good brand of ethylene-glycol base coolant, mixed according to the manufacturer's directions.

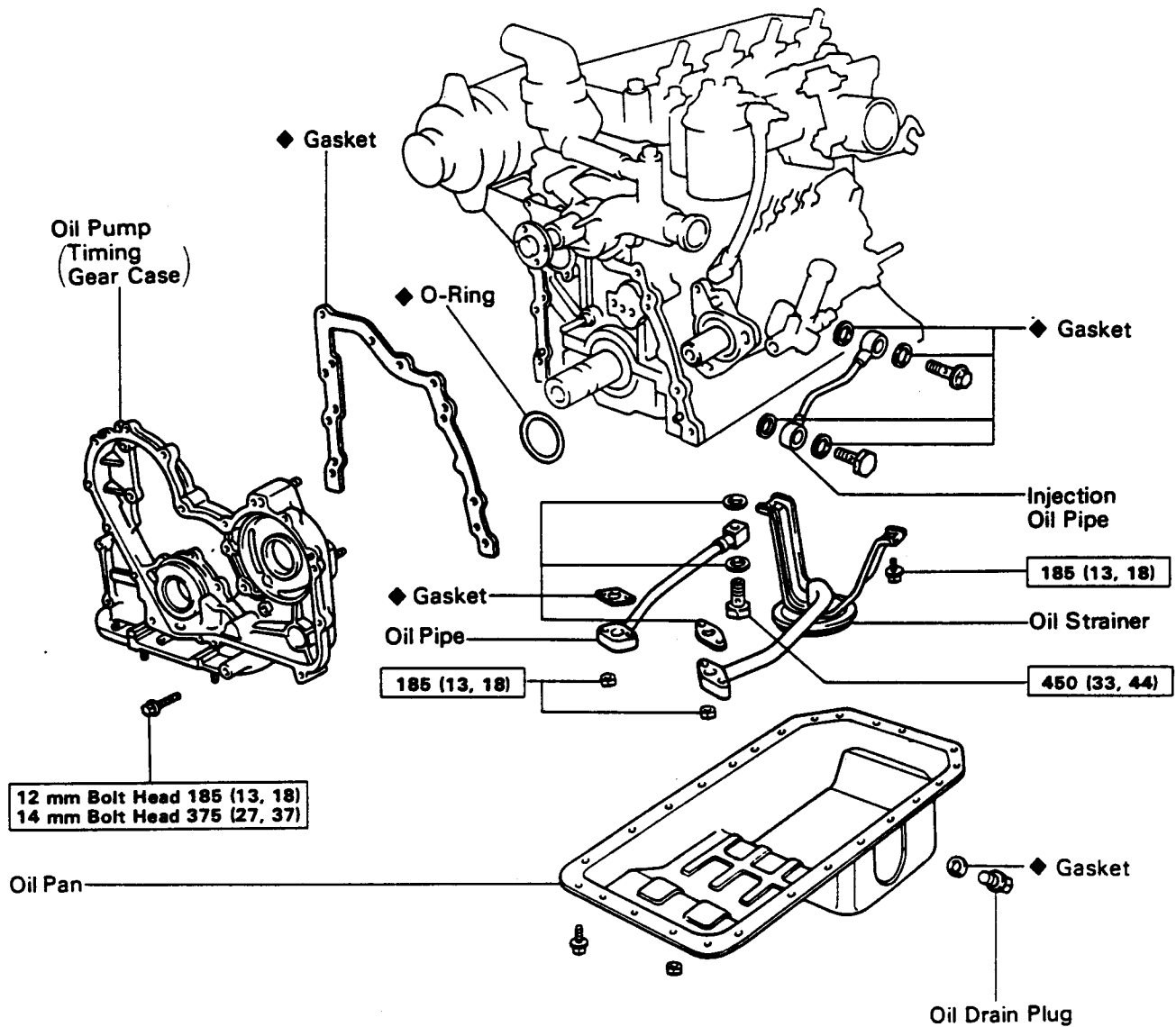
Capacity (w/ Heater)

BB20, 22, 30	15.0 liter (15.9 US qts, 13.2 Imp. qts)
BJ60	13.3 liter (14.1 US qts, 11.7 Imp. qts)
BJ70, 71, 73, 74, 75	
3B	13.8 liter (14.6 US qts, 12.1 Imp. qts)
13B-T M/T	14.2 liters (15.0 US qts, 12.5 Imp. qts)
13B-T A/T	13.6 liter (14.4 US qts, 12.0 Imp. qts)
BU60, 61, 62, 63, 65, 70, 75, 76, 80, 81, 82, 85, 86	
Regular cab	12.5 liters (13.2 US qts, 11.0 Imp. qts)
Wide cab	13.0 liters (13.7 US qts, 11.4 Imp. qts)
BY33, 42 (w/o Heater)	12.2 liters (12.9 US qts, 10.7 Imp. qts)

- (e) Install the radiator cap (water outlet cap).
- (f) Start the engine and check for leaks.
- (g) Recheck the coolant level and refill as necessary.

OIL PUMP**REMOVAL OF OIL PUMP**

NOTE: When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

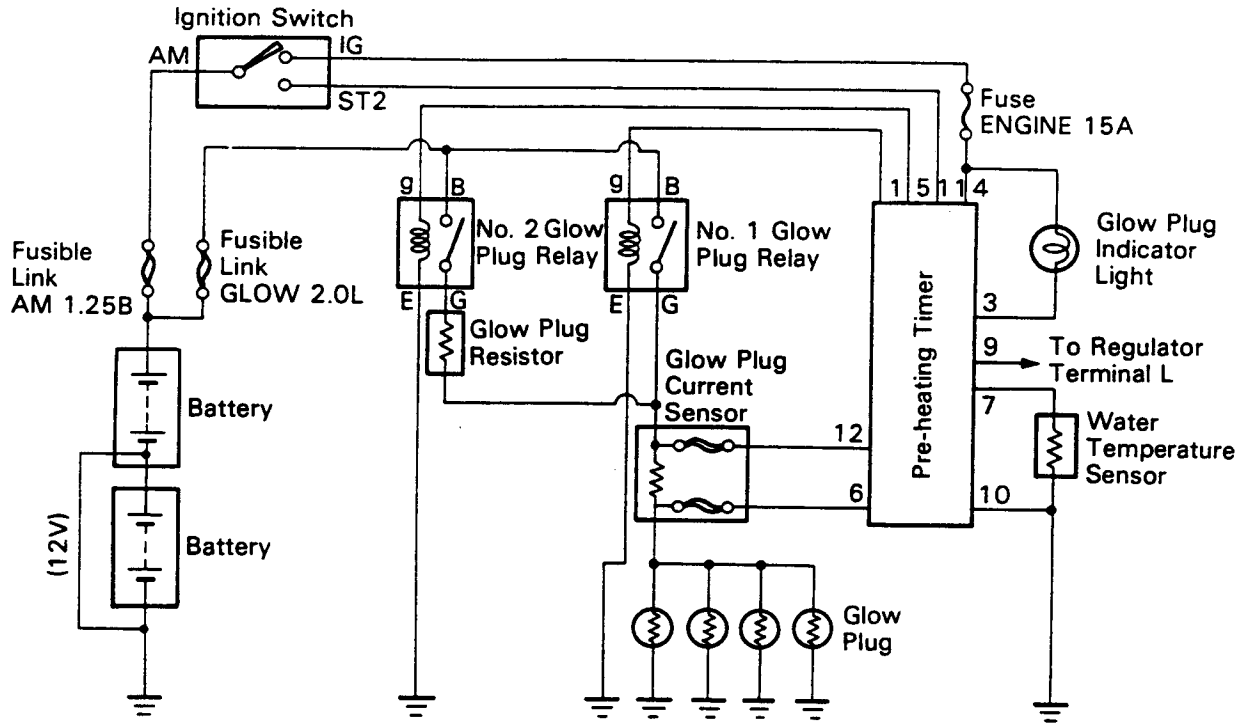


kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

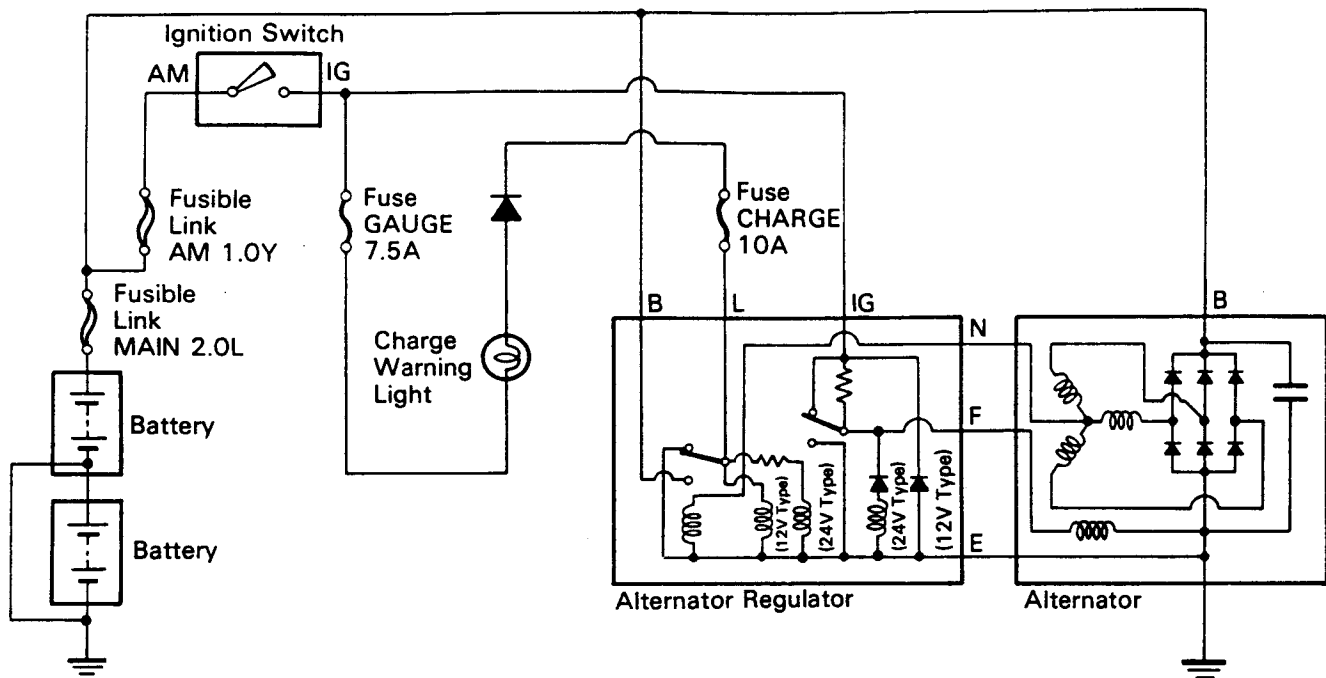
PRE-HEATING SYSTEM [B and 3B] Super Glow Type SYSTEM CIRCUIT

BJ70, 73, 75

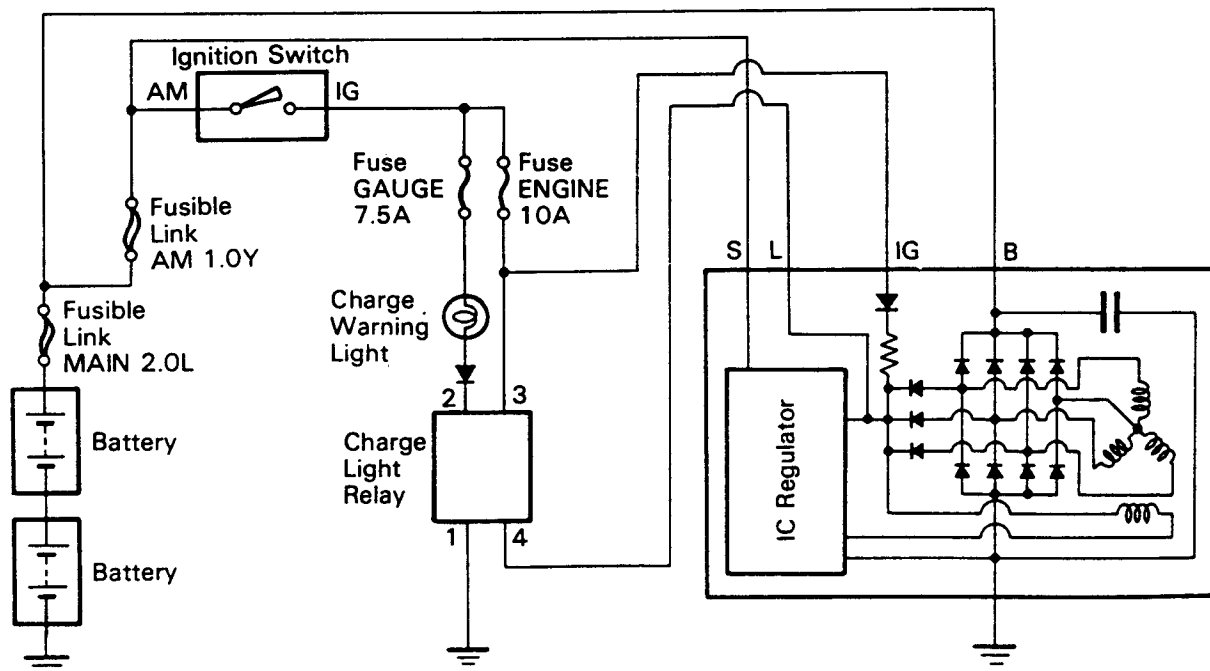


CHARGING SYSTEM CIRCUIT

BB20 [w/o IC Regulator]



BB20, 22, 30 [w/o IC Regulator]



Injection Pump Adjustment (Governor 11B, 13B and 13B-T) (Cont'd)

Idle speed control	Item	Adjusting lever position	Pump rpm	Rack position mm (in.)	
	11B M/T 13B M/T 13B-T M/T	Idle	100	10.6 (0.417) or more	
			325	8.8 – 9.4 (0.346 – 0.370)	
			600	5.6 – 7.0 (0.220 – 0.276)	
			800	3.9 – 4.7 (0.154 – 0.185)	
			1,200	2.4 – 3.8 (0.094 – 0.150)	
	13B A/T	Idle	100	10.6 (0.417) or more	
			400	8.1 – 8.7 (0.319 – 0.343)	
			600	5.7 – 7.1 (0.224 – 0.280)	
			800	4.0 – 4.8 (0.157 – 0.189)	
			1,200	2.5 – 3.9 (0.098 – 0.154)	
	13B-T A/T	Idle	100	10.6 (0.417) or more	
			250	9.9 – 11.1 (0.390 – 0.437)	
			400	8.1 – 8.7 (0.319 – 0.343)	
			600	5.7 – 7.1 (0.224 – 0.280)	
			800	4.0 – 4.8 (0.157 – 0.189)	
			1,200	2.4 – 3.8 (0.094 – 0.150)	
	Adjusting washer thickness		Inner	0.4 mm	0.016 in.
				0.55 mm	0.022 in.
				0.6 mm	0.024 in.
			Outer	0.2 mm	0.008 in.
				0.4 mm	0.016 in.
				0.5 mm	0.020 in.
				0.6 mm	0.024 in.
Medium speed control	Item	Adjusting lever position	Pump rpm	Rack position mm (in.)	
	11B (w/o HAC)	Maximum	500	10.0 – 11.0 (0.394 – 0.435)	
			700	10.0 – 10.8 (0.394 – 0.425)	
			1,100	10.1 – 10.7 (0.398 – 0.421)	
			1,800	9.6 – 10.6 (0.378 – 0.417)	
			1,900	9.3 – 10.1 (0.366 – 0.398)	
	11B (w/ HAC)	Maximum	500	10.1 – 11.1 (0.398 – 0.437)	
			700	10.1 – 10.9 (0.398 – 0.429)	
			1,100	10.1 – 10.7 (0.398 – 0.421)	
			1,800	9.7 – 10.7 (0.382 – 0.421)	
			1,900	9.4 – 10.2 (0.370 – 0.402)	