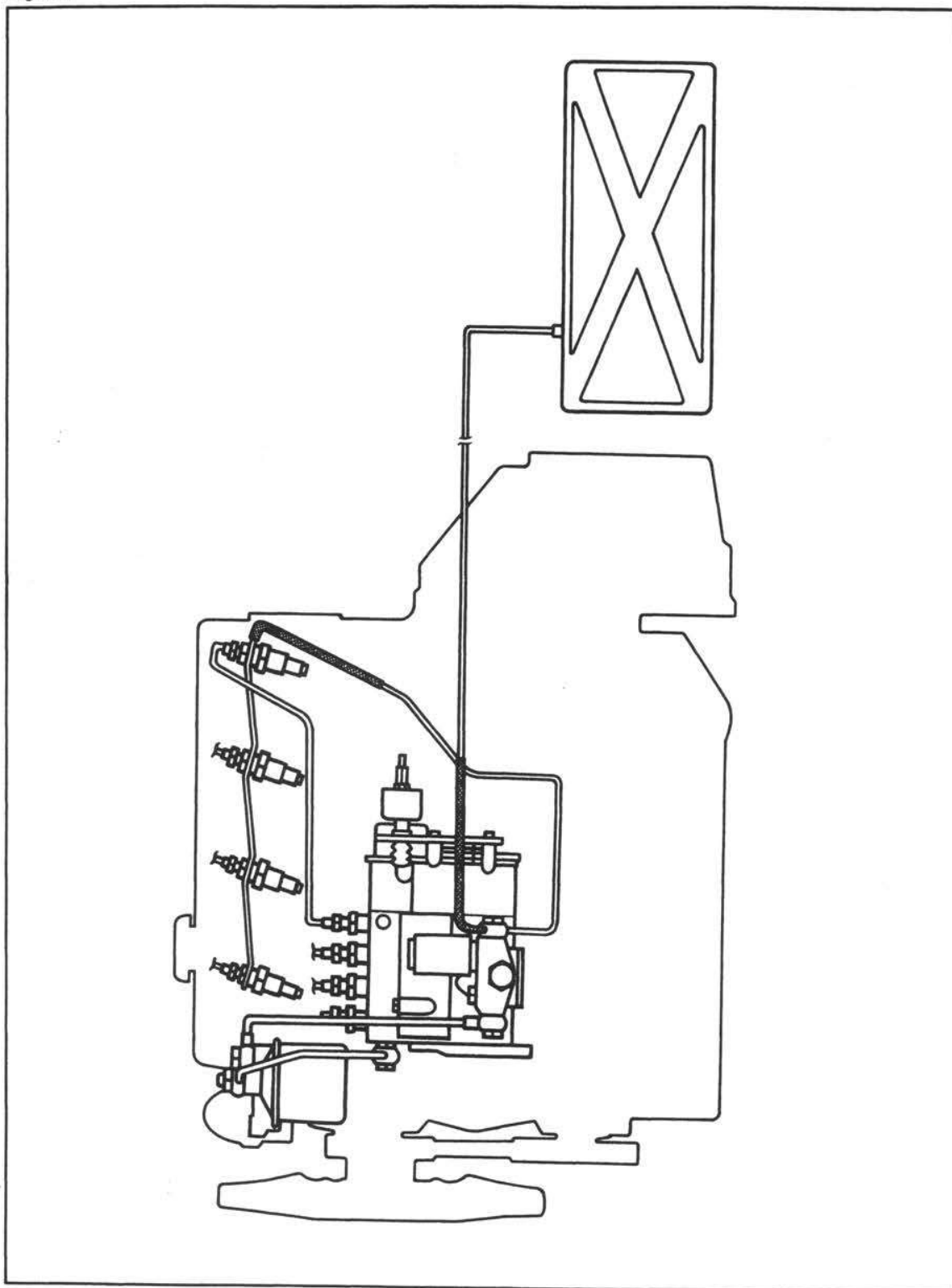


FUEL SYSTEM

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FUEL FEED PUMP	6-13
AUTOMATIC TIMER	6-18
INJECTION PUMP	6-28

6-2 **FUEL SYSTEM** – Fuel System Circuit**FUEL SYSTEM CIRCUIT**

Fig. 6-1

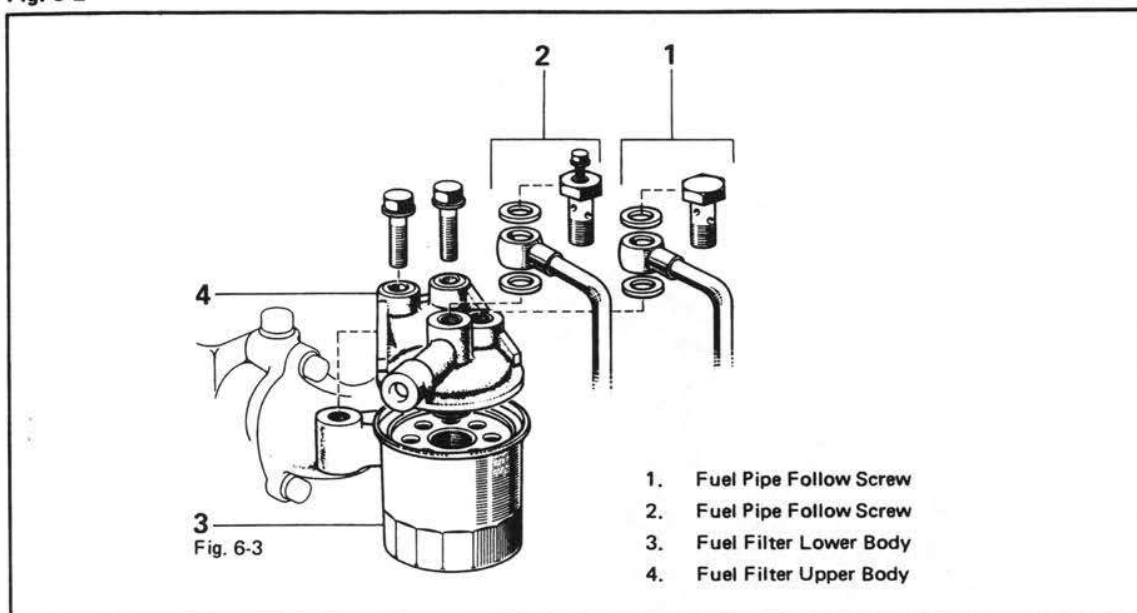
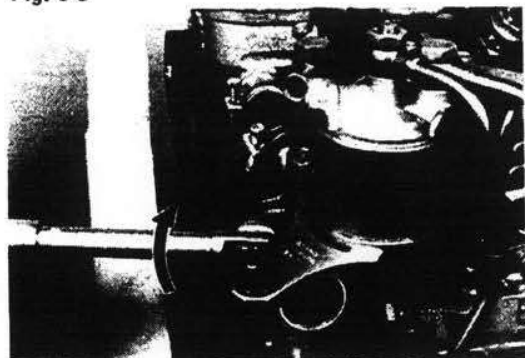


FUEL SYSTEM – Fuel Filter

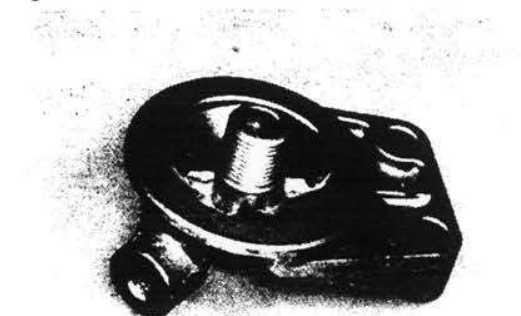
6-3

FUEL FILTER**DISASSEMBLY**

Disassemble in numerical order.

Fig. 6-2**Fig. 6-3**

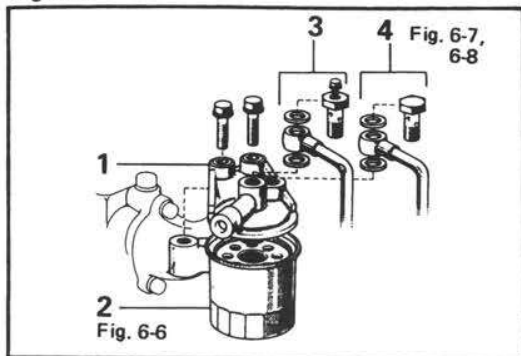
Remove fuel filter with SST [09228-34010].

Fig. 6-4**INSPECTION**

Check the contacting surface for score and cracks.

6-4 FUEL SYSTEM – Fuel Filter

Fig. 6-5

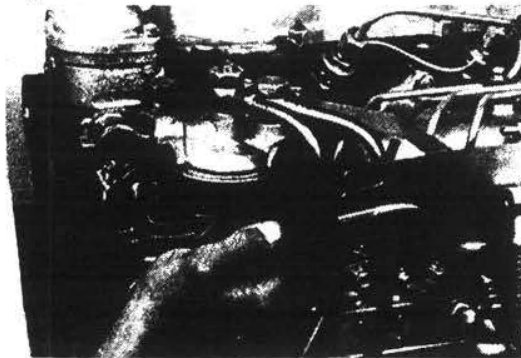


ASSEMBLY



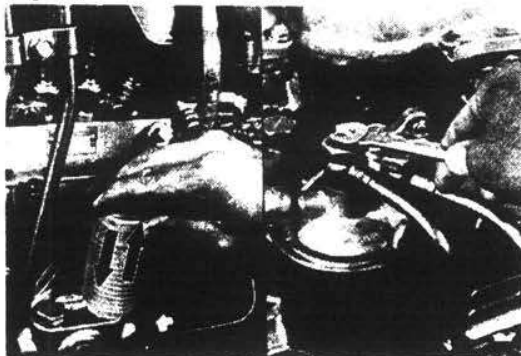
Assemble in numerical order.

Fig. 6-6



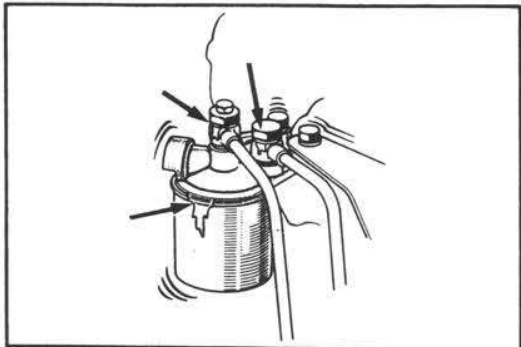
To install, firmly hand tighten the fuel filter.

Fig. 6-7



After installing, bleed air from fuel filter by operating the priming pump.

Fig. 6-8



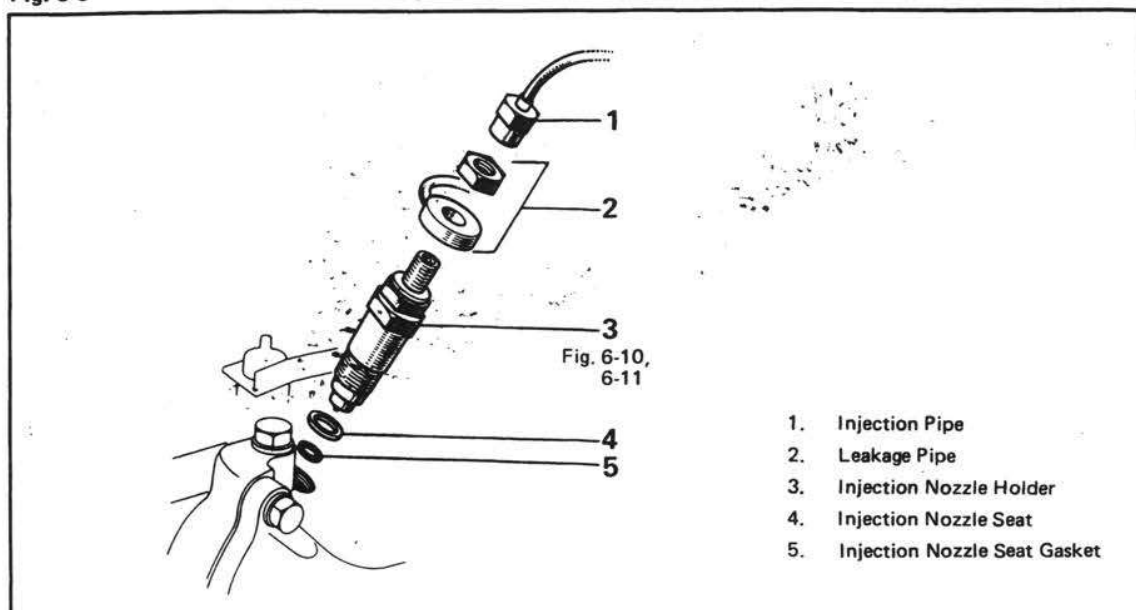
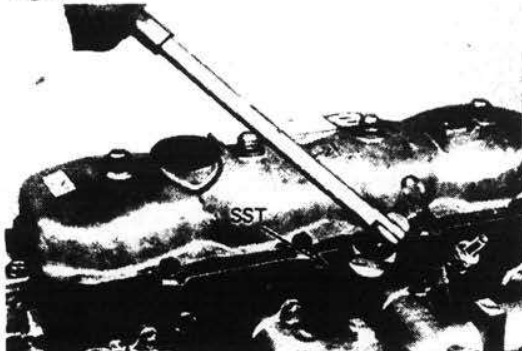
After bleeding air, check gasket and union for fuel leaks.

FUEL SYSTEM — Injection Nozzle

6-5

INJECTION NOZZLE**REMOVAL**

Remove in numerical order.

Fig. 6-9**Fig. 6-10**

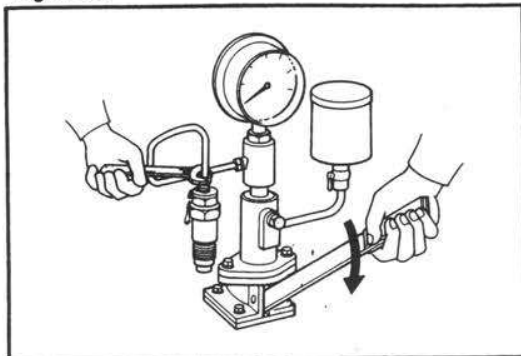
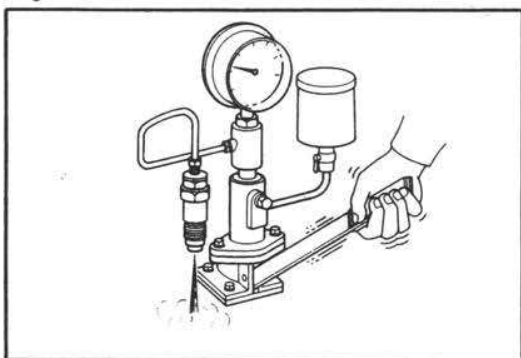
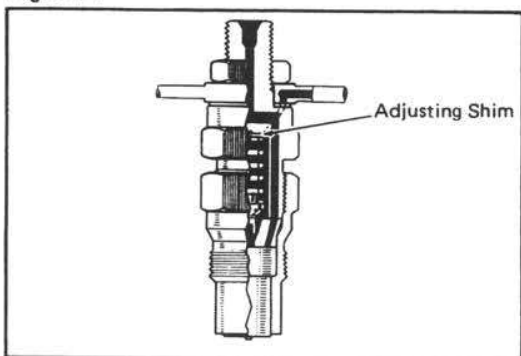
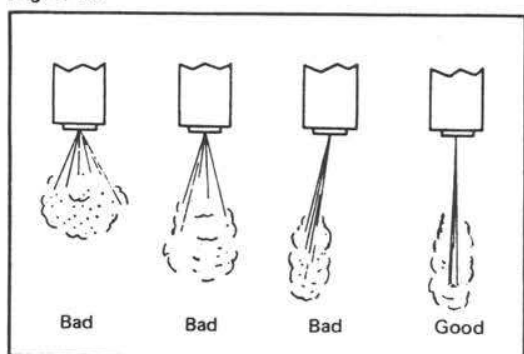
Remove injection nozzle holders with SST[09268-46011].

Fig. 6-11

Keep injection nozzle holders in correct order.



6-6

FUEL SYSTEM – Injection Nozzle**Fig. 6-12****Fig. 6-13****Fig. 6-14****Fig. 6-15****SPRAY TEST**

1. Install nozzle to injection nozzle hand tester and bleed air from union nut.
2. Injection pressure.
 - (1) Pump the tester handle 50 – 60 times/minutes by hand.
 - (2) Read injection starting pressure.

Opening pressure**New nozzle**

115 – 125 kg/cm²
(1636 – 1778 psi)

Reused nozzle

105 – 125 kg/cm²
(1493 – 1778 psi)

– Note –

1. Proper nozzle operation can be determined by the sound of snarl.
2. Adjust the injection starting pressure to 110 – 125 kg/cm² (1565 – 1778 psi), if the reused nozzle was overhauled.

3. To adjust the injection pressure, change the shim on the top of pressure spring.

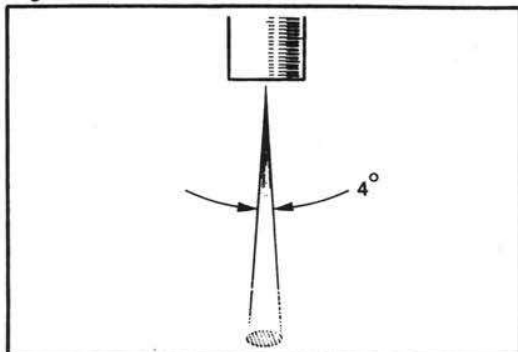
– Note –

1. 20 shims are available, each varying in thickness by 0.05 mm (0.0020 in.) from 1.00 – 1.95 mm (0.0394 – 0.0768 in.).
2. Varying the adjusting shim thickness by 0.05 mm (0.0020 in.) changes the injection pressure by about 5 kg/cm² (71 psi).

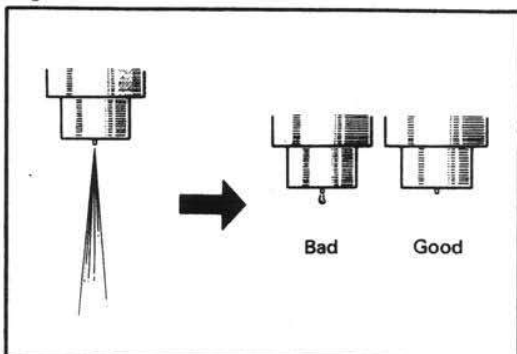
4. Spray patterns.
 - (1) Check the spray patterns, by pumping the tester handle 50 – 60 times/minutes by hand.

FUEL SYSTEM – Injection Nozzle

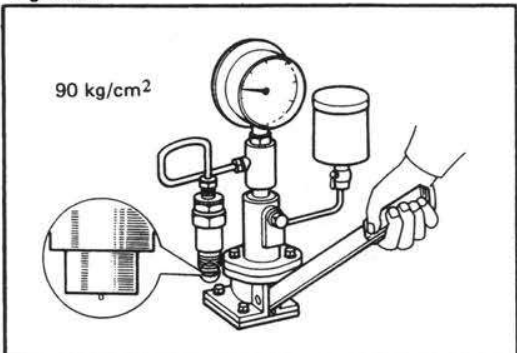
6-7

Fig. 6-16

- (2) Spray should spread evenly down the nozzle center line in 4° conical form.
- (3) Place a white sheet of paper about 30 cm (12 in.) away from the nozzle to check if spray pattern is in circular form.

Fig. 6-17

5. There should be no dripping after injection.

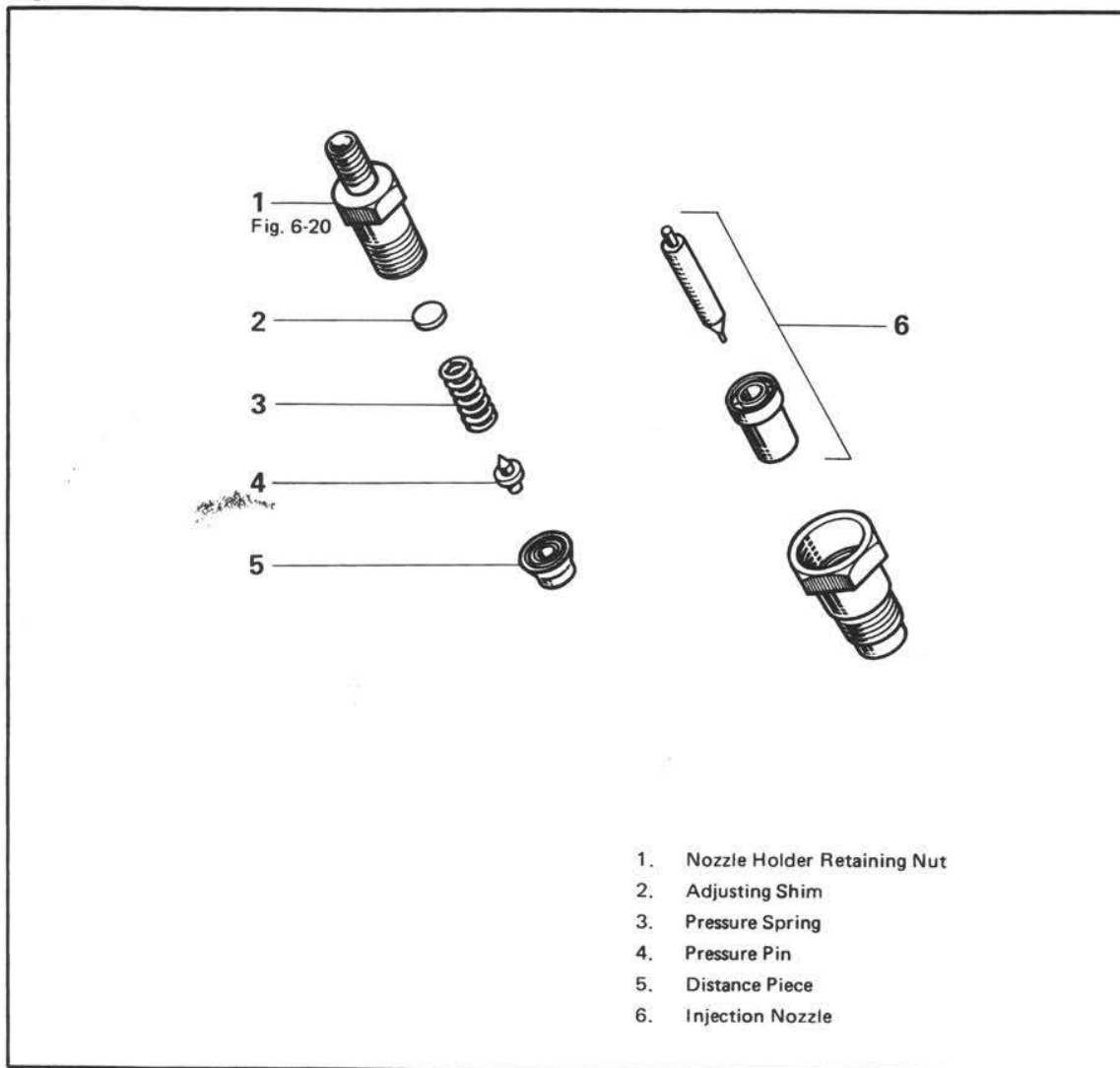
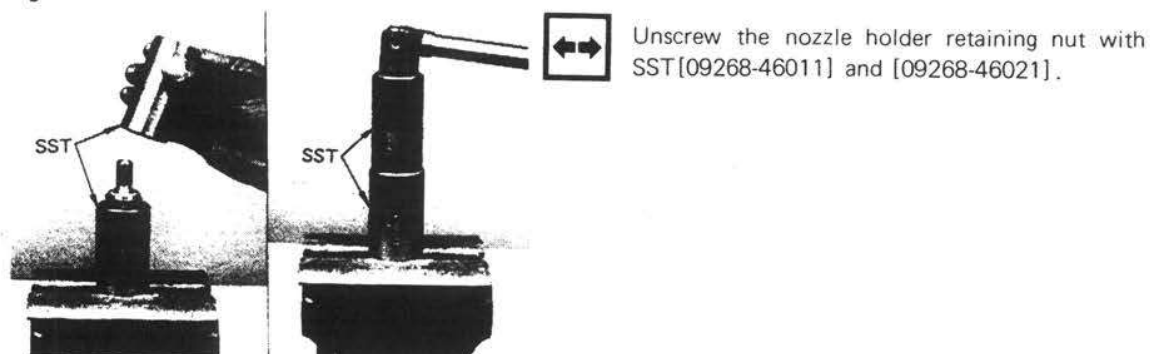
Fig. 6-18

6. Leakage test.
Apply 90 kg/cm² (1,280 psi) of fuel pressure, and check for leaks at nozzle valve seat and retaining nut.

6-8

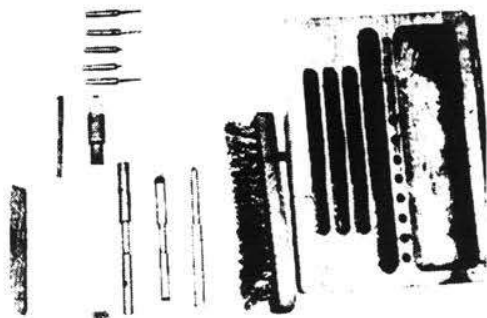
FUEL SYSTEM — Injection Nozzle**DISASSEMBLY**

Disassemble in numerical order.

Fig. 6-19**Fig. 6-20**

FUEL SYSTEM – Injection Nozzle

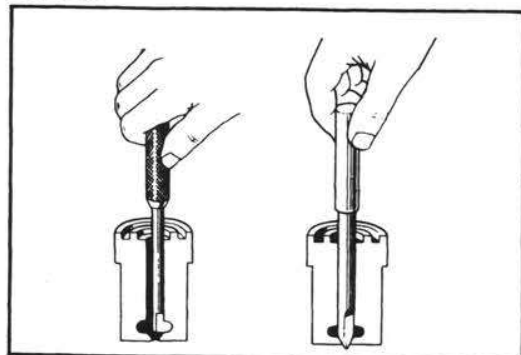
6-9

Fig. 6-21**NOZZLE CLEANING**

1. To wash nozzle, use nozzle cleaning kit, and wash in clean diesel fuel or light oil.

Fig. 6-22

2. Remove off the carbon adhering on nozzle needle tip, using a wooden stick.

**Fig. 6-23**

3. Clean the nozzle seat with a cleaning scraper.

Fig. 6-24

4. Clean the nozzle body orifice with a cleaning needle.



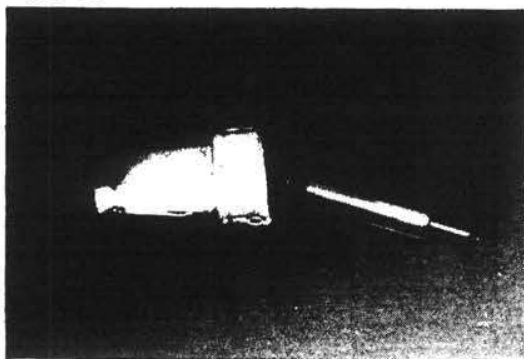
6-10 FUEL SYSTEM – Injection Nozzle

Fig. 6-25



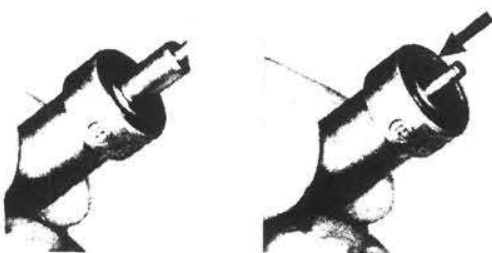
5. Remove the carbon on nozzle body exterior (except wrapping angle) with a brass brush.

Fig. 6-26



6. Wash the nozzle in clean diesel fuel or light oil.

Fig. 6-27



7. Perform the sinking test.
 - (1) Pull out the needle about half way from the body and then release.
 - (2) Needle should sink down into the body extremely smoothly by its own weight.
 - (3) Repeat this test rotating needle slightly after each test.

— Note —

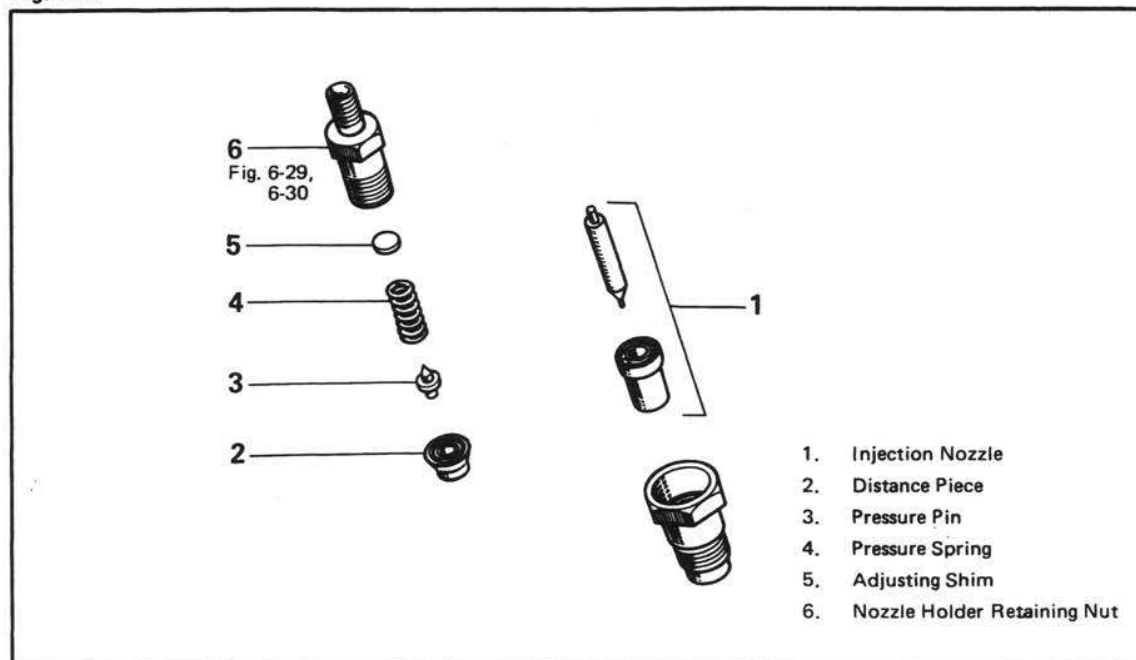
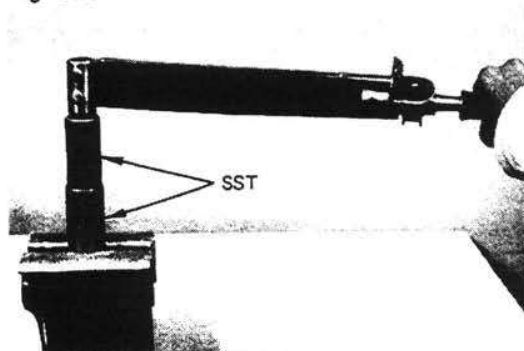
If the needle fails to sink smoothly at any position, replace both the needle and the body as a unit.

FUEL SYSTEM – Injection Nozzle

6-11

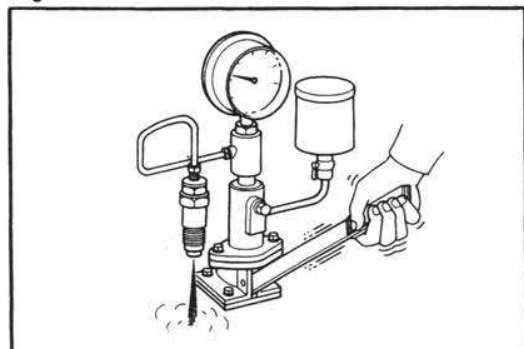
ASSEMBLY

Assemble in numerical order.

Fig. 6-28**Fig. 6-29**

Tighten the retaining nut with SST[09268-46011] and [09268-46021].

Torque 6.0 – 8.0 kg-m (43.4 – 57.8 ft-lb)

Fig. 6-30

After assembling the injection nozzle, perform the spray test and adjust if necessary.



6-12

FUEL SYSTEM – Injection Nozzle**INSTALLATION**

Install in numerical order.

Fig. 6-31

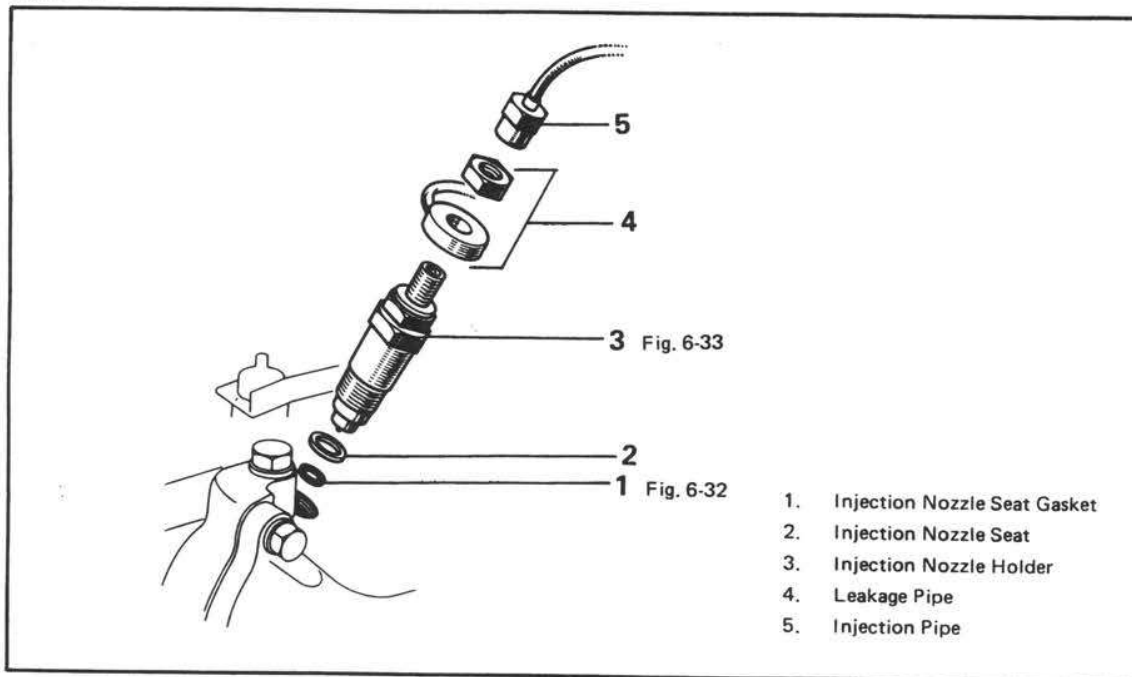
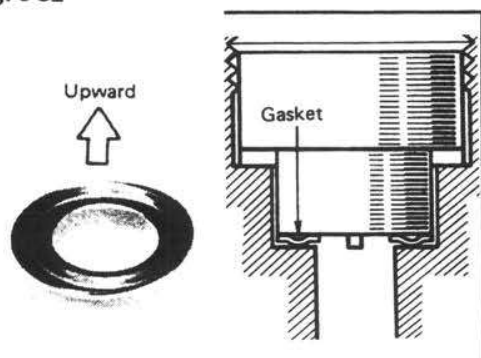
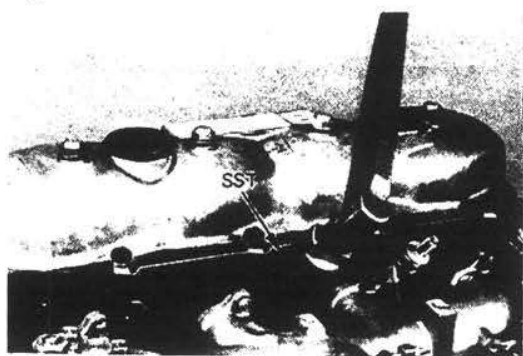


Fig. 6-32



Note the orientation of the nozzle seat gasket as shown in the figure.

Fig. 6-33

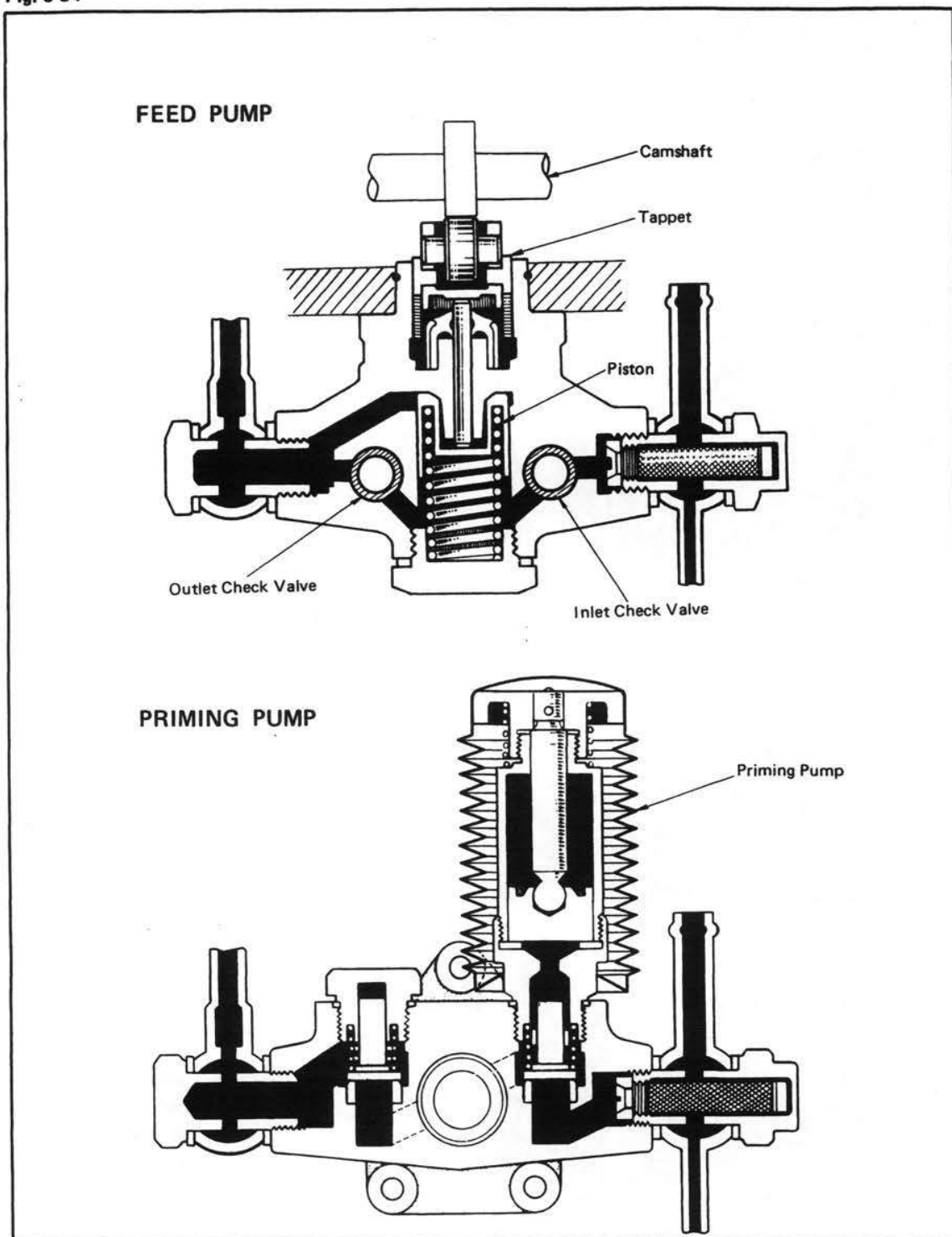


Tighten the nozzle holder with SST[09268-46011].

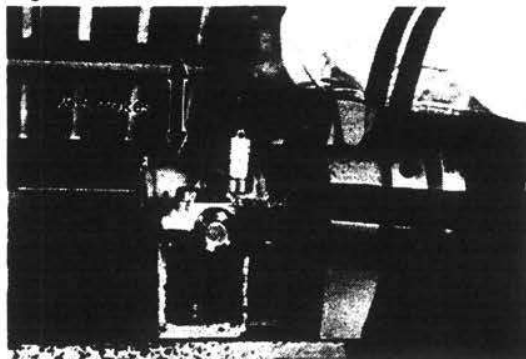
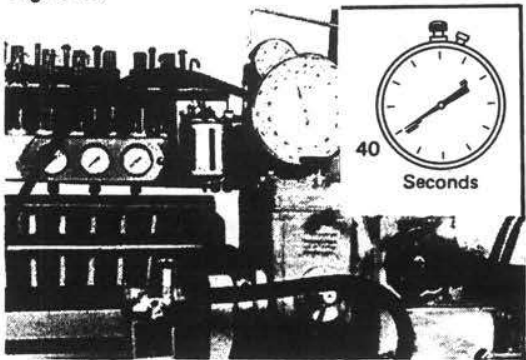
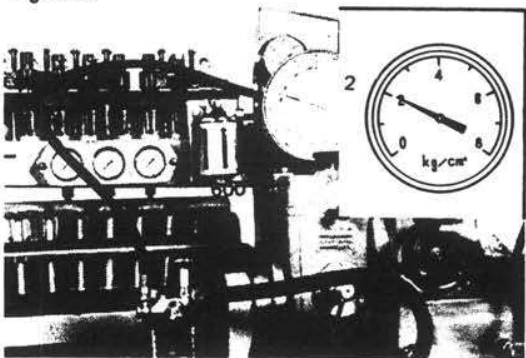
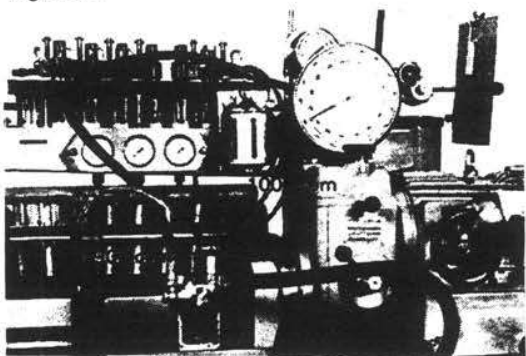
Torque 6.0 – 8.0 kg-m (44 – 57 ft-lb)

– Note –

After installing, bleed out the air.

FUEL FEED PUMP**CROSS SECTIONAL VIEW****Fig. 6-34**

6-14

FUEL SYSTEM — Fuel Feed Pump**Fig. 6-35****Fig. 6-36****Fig. 6-37****Fig. 6-38****FEED PUMP TEST****1. Suction capacity test**

The size of the suction pipes should be:

Pipe inner diameter 8 mm (0.31 in.)

Pipe length 2 m (78.7 in.)

Suction height 1 m (39.4 in.)

- (1) Operate the priming pump for one minute at 60 strokes per minute.

Suction capacity

Fuel must discharge within
25 strokes.

- (2) Set the feed pump tester at 150 rpm and test the feed pump suction capacity.

Suction capacity

Fuel must discharge within
40 seconds.

2. Discharge performance test

Connect the pressure gauge to the feed pump discharge side.

- (1) Operate the feed pump at 600 rpm.

Discharge pressure

1.8 – 2.2 kg/cm²

(25.6 – 31.3 psi)

- (2) Operate the feed pump at 1,000 rpm. Measure discharge volume from the discharge side nozzle.

Discharge side nozzle diameter

1.54 mm (0.0606 in.)

Discharge volume capacity

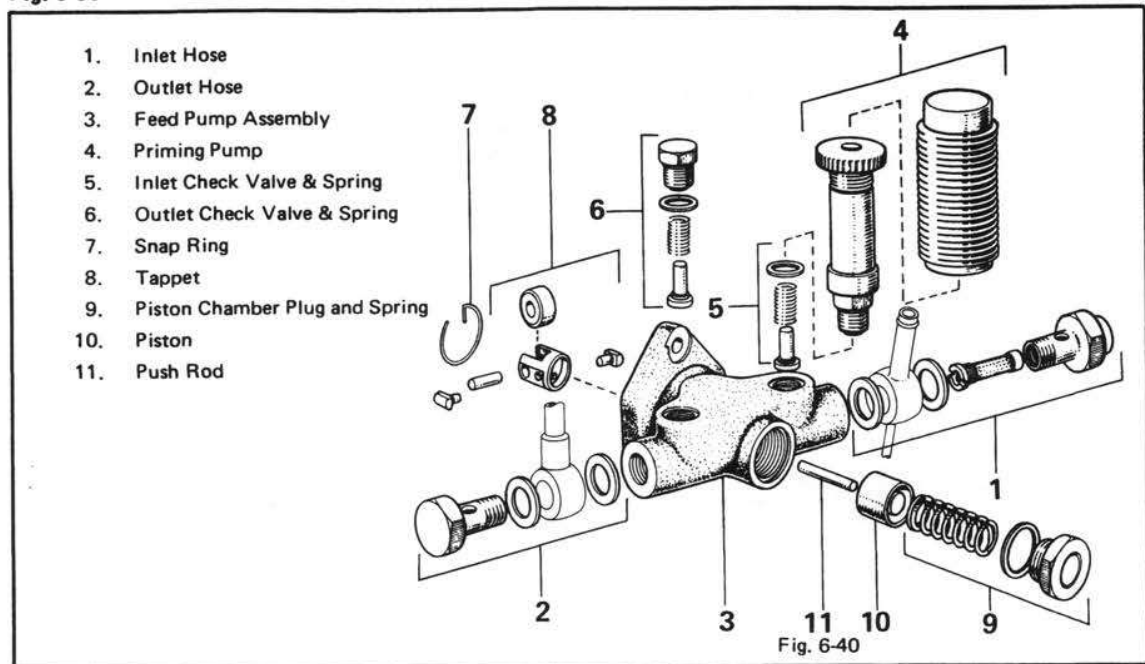
More than 900 cc (54.9 cu.in.)/
min.

FUEL SYSTEM – Fuel Feed Pump

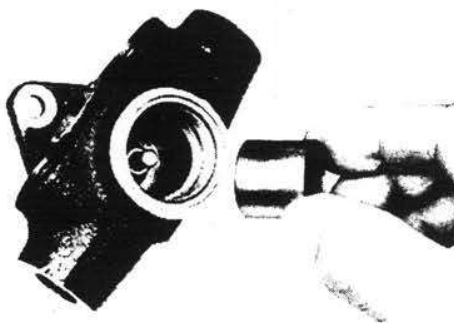
6–15

DISASSEMBLY

Disassemble in numerical order.

Fig. 6-39**Fig. 6-40**

Since the push rod is precisely fitted into the feed pump housing, do not remove the rod unless necessary. If removed, make sure to confirm assembly direction.

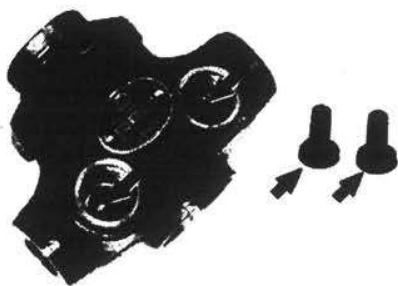
Fig. 6-41**INSPECTION**

Inspect the piston, push rod and feed pump housing for wear and damage.

Clearance STD (Reference)

Piston	0.009 – 0.013 mm (0.0004 – 0.0005 in.)
Push Rod	0.003 – 0.006 mm (0.0001 – 0.0002 in.)

6-16

FUEL SYSTEM – Fuel Feed Pump**Fig. 6-42**

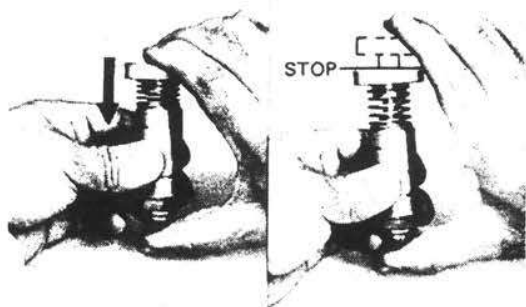
Inspect the check valve and valve seat for wear.

Fig. 6-43

Inspect the tappet and roller for wear.

Fig. 6-44

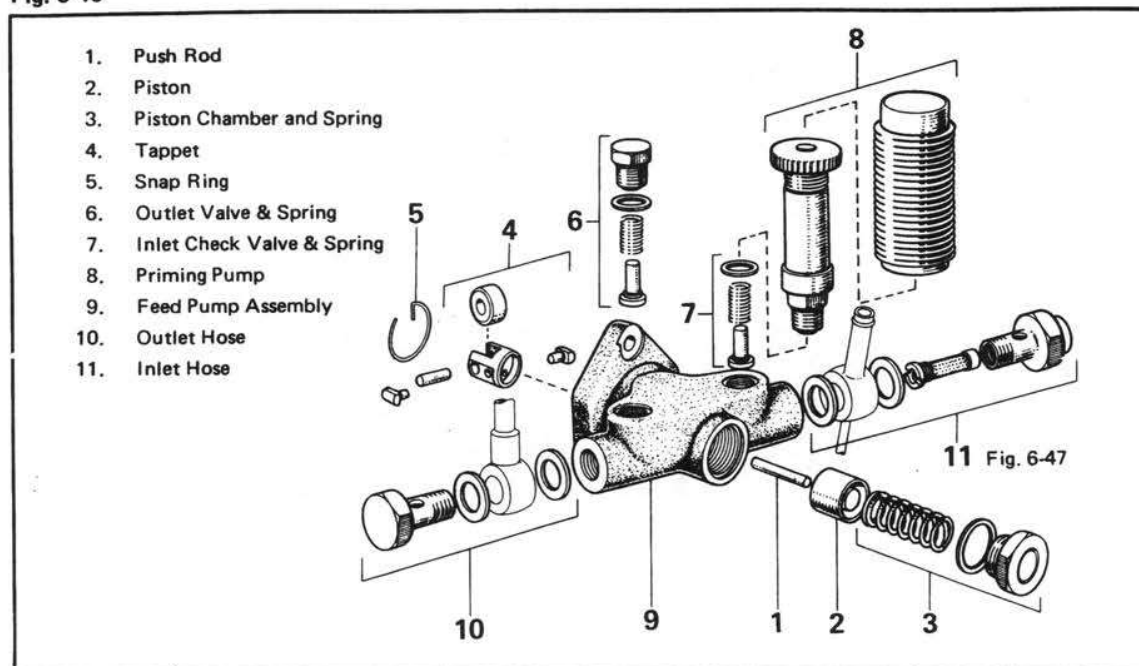
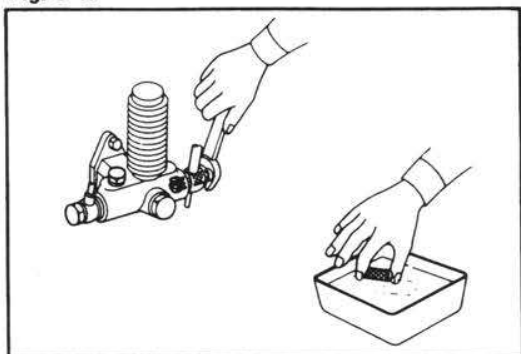
Inspect the check valve and piston springs for damage.

Fig. 6-45

Plug the priming pump inlet port strongly with a finger, and inspect if the pressure and vacuum are created when the pump is operated.

FUEL SYSTEM – Fuel Feed Pump**6-17****ASSEMBLY**

Assemble in numerical order.

Fig. 6-46**Fig. 6-47**

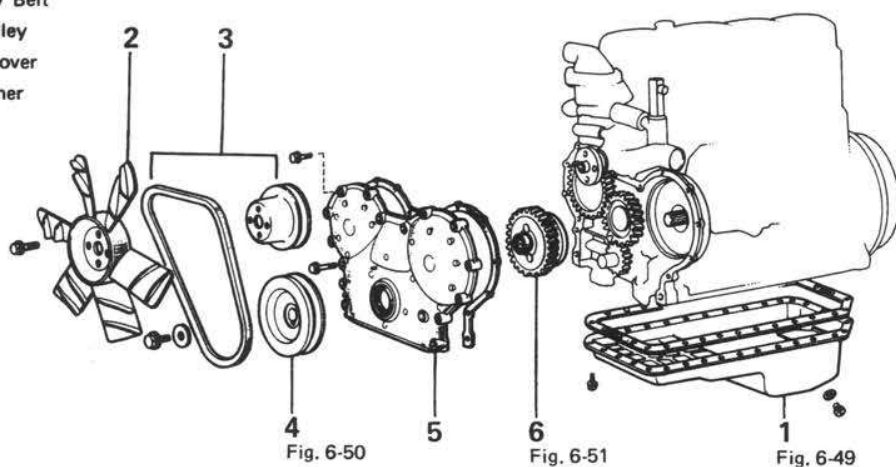
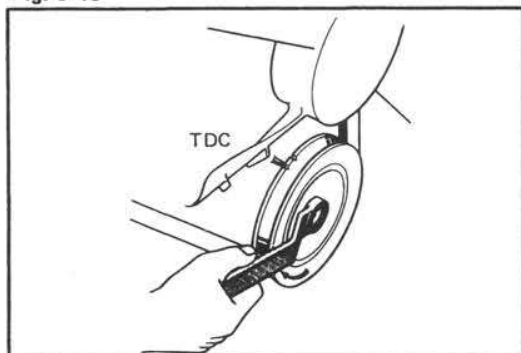
Before assembling, clean the filter inside the union bolt.

6-18 **FUEL SYSTEM – Automatic Timer****AUTOMATIC TIMER****REMOVAL**

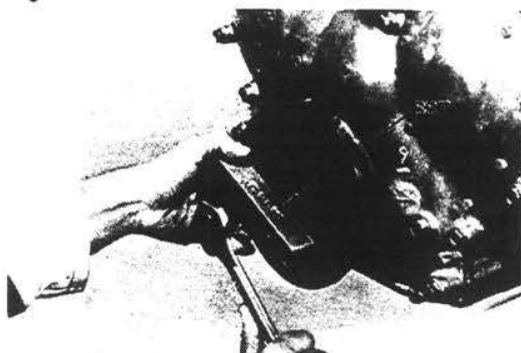
Remove in numerical order.

Fig. 6-48

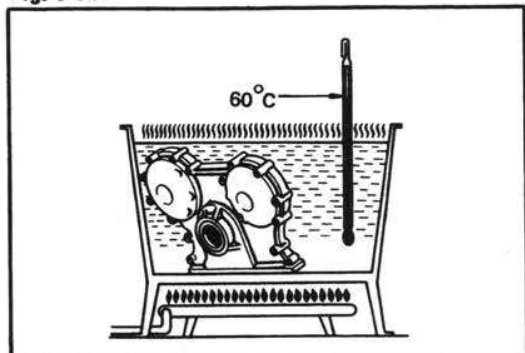
1. Oil Pan
2. Cooling Fan
3. Fan Pulley & V Belt
4. Crankshaft Pulley
5. Timing Gear Cover
6. Automatic Timer

**Fig. 6-49**

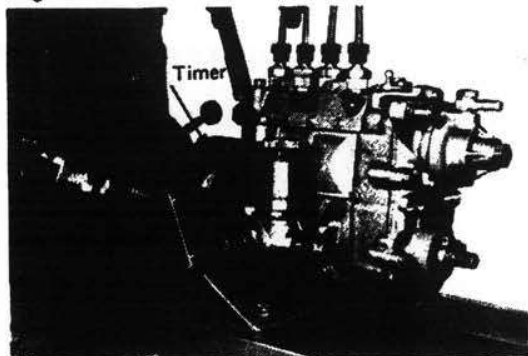
Before starting work, set the No.1 cylinder piston at TDC/Compression.

Fig. 6-50

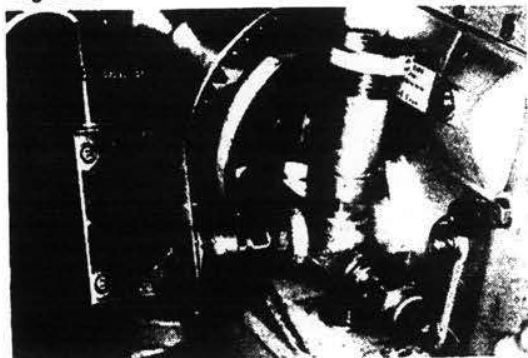
Pull out the crankshaft pulley with SST[09213-31021].

FUEL SYSTEM – Automatic Timer**6–19****Fig. 6-51**

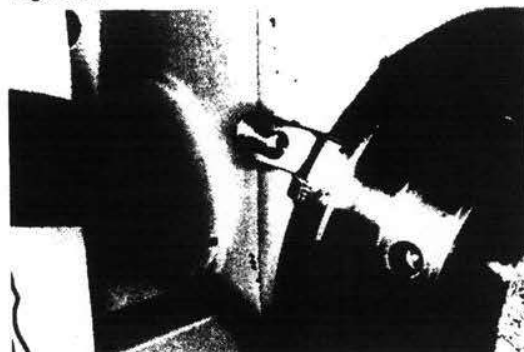
Remove the timer from timing gear cover after heating the cover to about 60°C (140°F).

Fig. 6-52**INSPECT ADVANCE ANGLE**

1. Install the automatic timer on the pump spline shaft and mount the injection pump on the pump tester.
2. Fill the pump camshaft chamber with engine oil.

Fig. 6-53

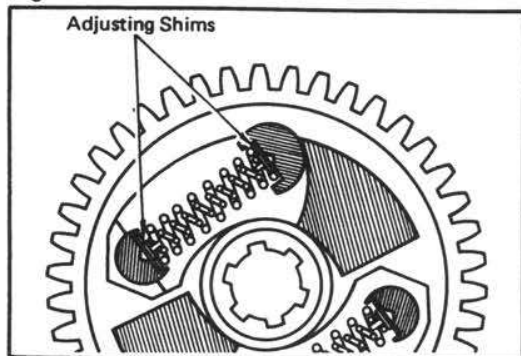
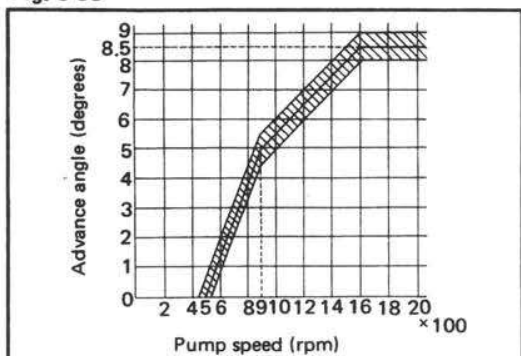
3. Install the timer breaker box to the piston bore of the feed pump by using an adapter.

Fig. 6-54

4. Check advance angle by using the timing light.

Pump rpm	Advance Angle
500	Advance begins ($\leq 0.5^\circ$)
700	2.0 – 3.0°
900	4.5 – 5.5°
1200	6.0 – 7.0°
1600	8.0 – 9.0°
1700	8.0 – 9.0°

6-20

FUEL SYSTEM – Automatic Timer**Fig. 6-55****Fig. 6-56**

5. If the advance angle is not within specified range, adjust by changing inner and outer timer spring shims.

— Note —

1. Use outer spring shim to adjust the timing advance characteristics in low speed range, and inner spring shim in high speed range.

Outer adjusting shim thickness

0.1, 0.2, 0.5 mm

(0.004, 0.008, 0.020 in.)

Inner adjusting shim thickness

0.1, 0.2, 0.5 mm

(0.004, 0.008, 0.020 in.)

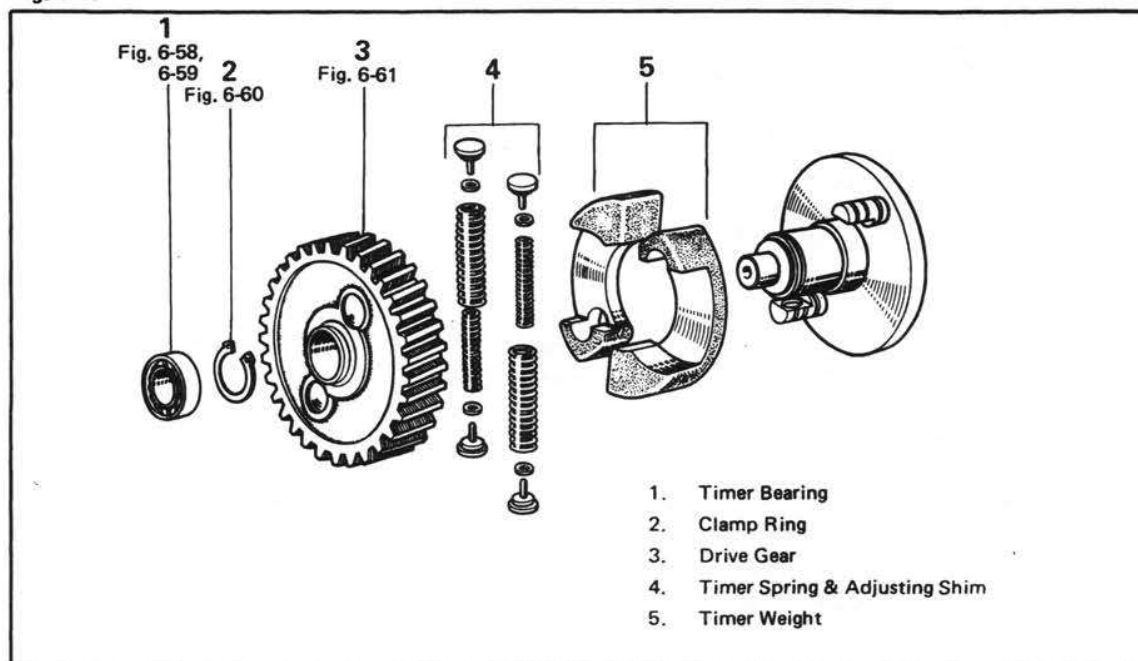
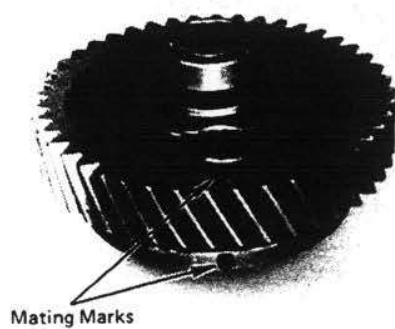
2. When injection timing is retarded, decrease shim thickness.
When injection timing is advanced, increase shim thickness.

FUEL SYSTEM – Automatic Timer

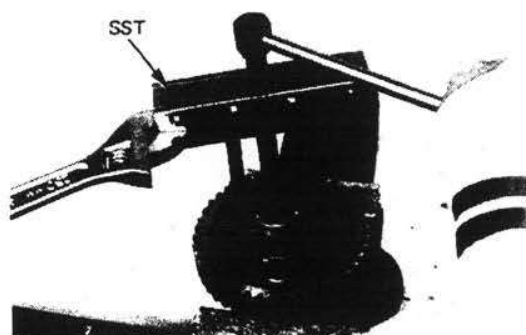
6-21

DISASSEMBLY

Disassemble in numerical order.

Fig. 6-57**Fig. 6-58**

Put the mating marks onto the timer hub and drive gear.

Fig. 6-59

Pull out the timer bearing with SST[09213-36010].

6-22 FUEL SYSTEM – Automatic Timer

Fig. 6-60



Remove the snap ring with a snap ring expander.

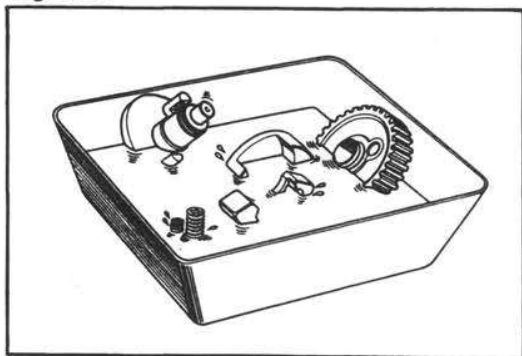
Fig. 6-61



Hold the timer hub in a vise and pull up the drive gear.

— Caution —
Make sure that the springs and shims do not fly out.

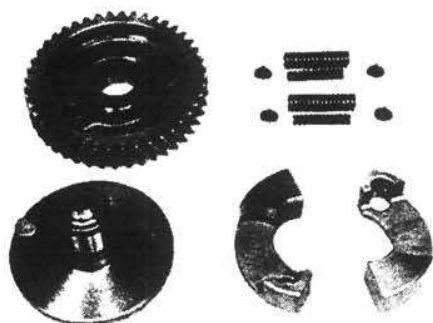
Fig. 6-62



INSPECTION

Clean the parts.

Fig. 6-63



Check all parts for wear or damage.

ASSEMBLY

Assemble in numerical order.

Fig. 6-64

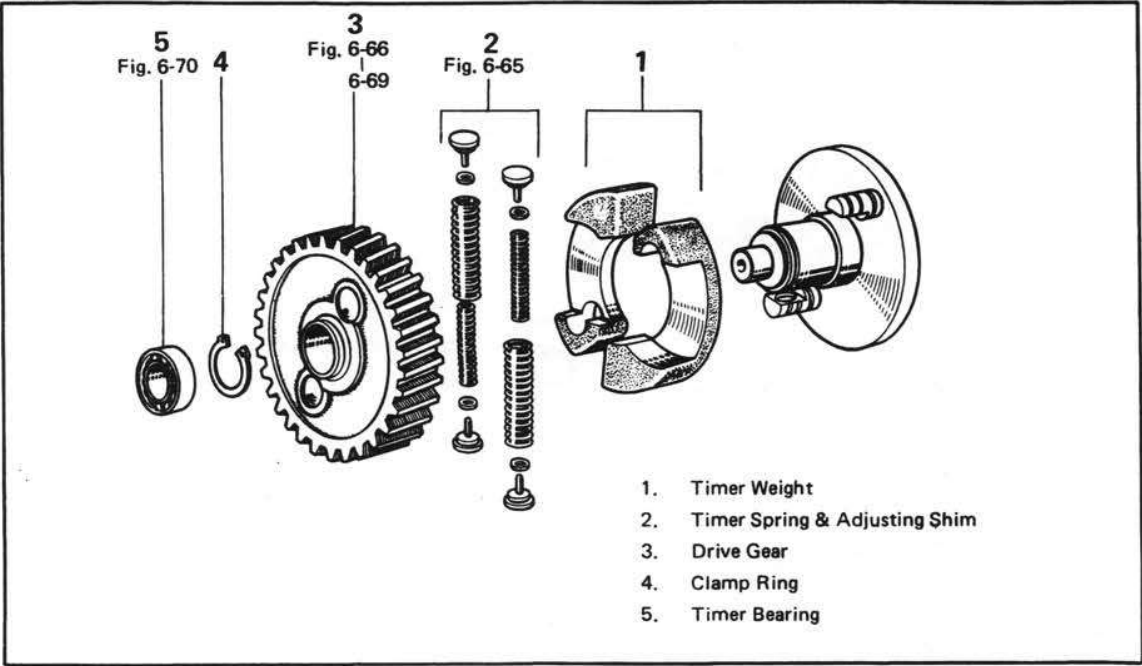
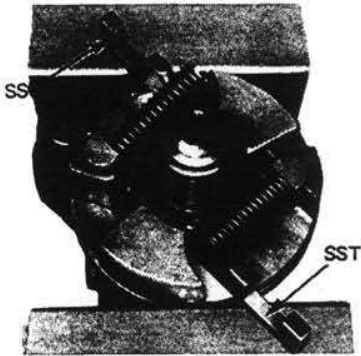
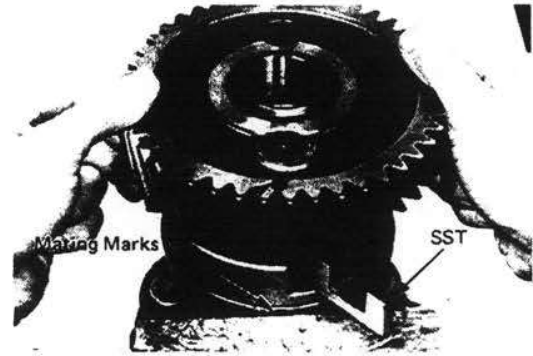


Fig. 6-65

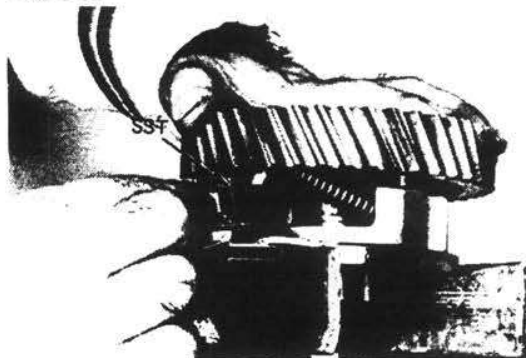


Set the timer springs, adjusting shims and spring seats with SST [09280-76010].

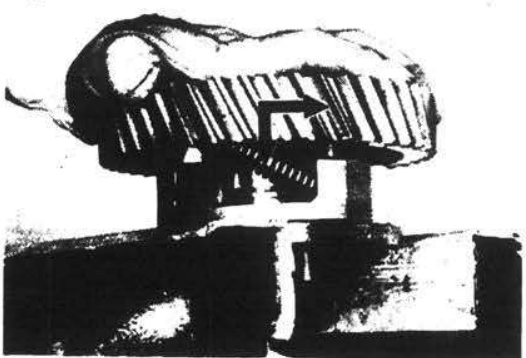
Fig. 6-66



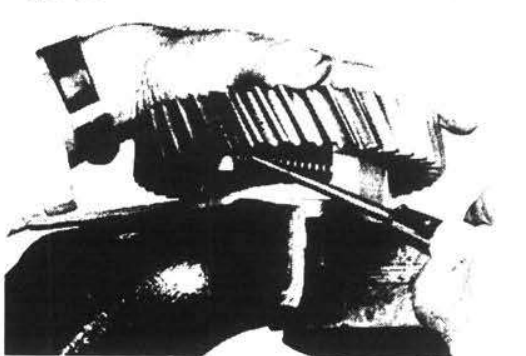
Match the mating marks when installing the drive gear.

6-24 FUEL SYSTEM – Automatic Timer**Fig. 6-67**

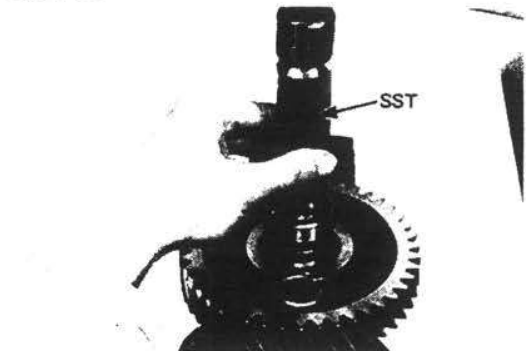
Remove the SST[09280-76010] by holding the drive gear so that the springs will not fall out.

Fig. 6-68

Press down and turn drive gear to install on the hub.

Fig. 6-69

Seat the timer spring snugly with a screw driver.

Fig. 6-70

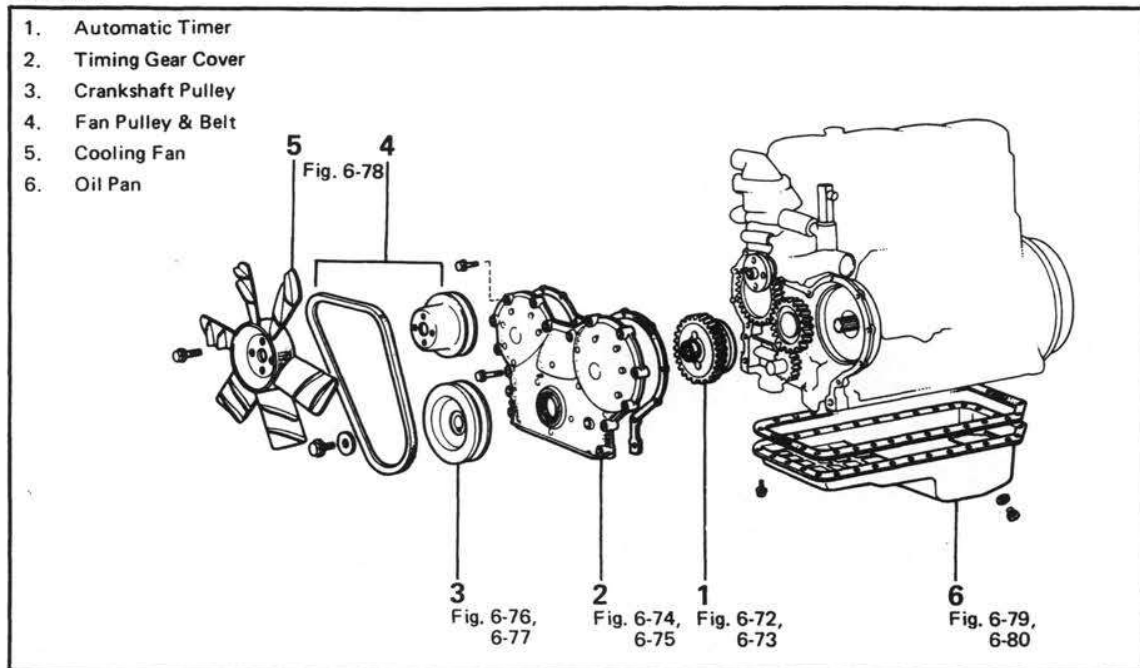
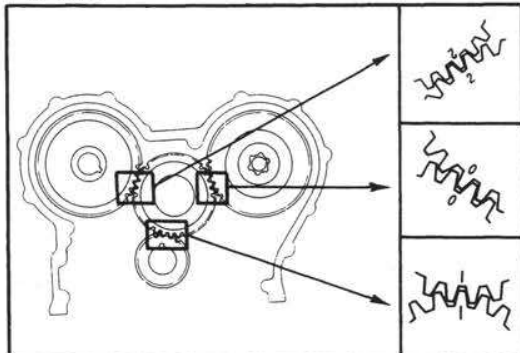
Drive in the timer bearing into the timer hub by using SST[09238-76010].

FUEL SYSTEM – Automatic Timer

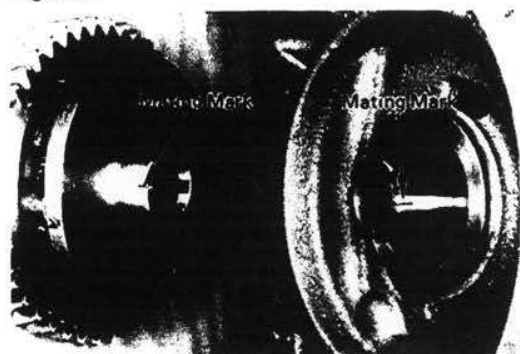
6-25

INSTALLATION

Install in numerical order.

Fig. 6-71**Fig. 6-72**

Set the idle gear aligning marks "1" and "2" respectively against crankshaft gear mark "1" and camshaft gear mark "2".

Fig. 6-73

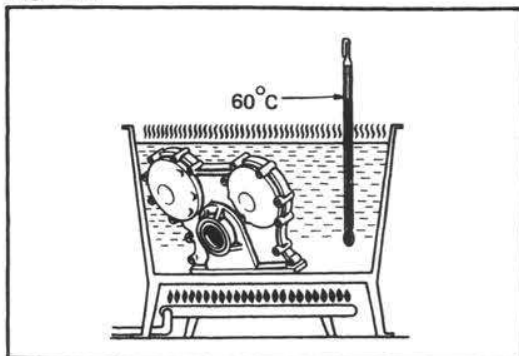
Align the mating marks on injection pump spline shaft and timer drive shaft, and at the same time align the idle gear mark "O" against the timer drive gear mark "O" as shown in Fig. 6-72.



— Note —

Coat MP grease on the splines and bearing.

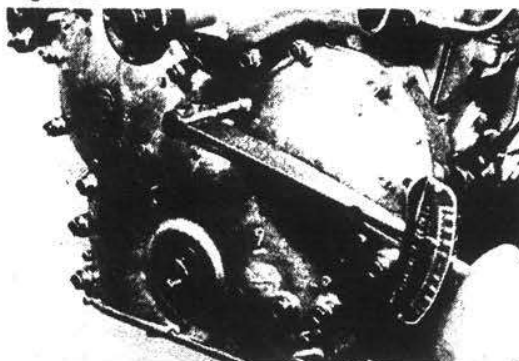
6-26

FUEL SYSTEM – Automatic Timer**Fig. 6-74**

Heat the timing gear cover to about 60°C (140°F) before installing.

– Note –

The timing gear cover should be installed over a new gasket.

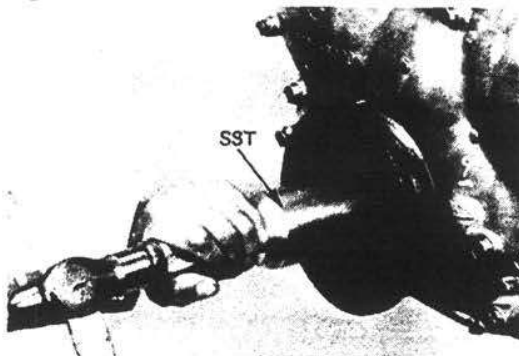
Fig. 6-75

Tighten the timing gear cover.

Torque

8 mm bolt 1.5 – 2.2 kg-m (11 – 15 ft-lb)

10 mm bolt 3.0 – 4.5 kg-m (22 – 32 ft-lb)

Fig. 6-76

Drive in the crankshaft pulley with SST[09214-60010].

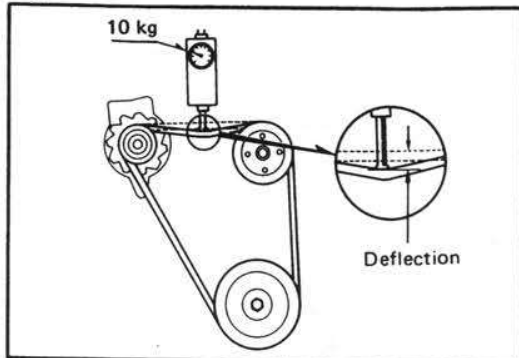
Fig. 6-77

Tighten the retaining bolt.

Torque 20.0 – 24.0 kg-m (145 – 173 ft-lb)

FUEL SYSTEM – Automatic Timer

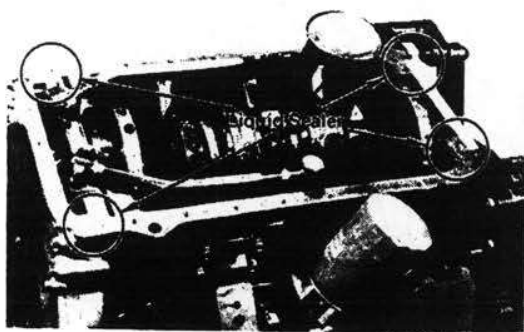
6-27

Fig. 6-78

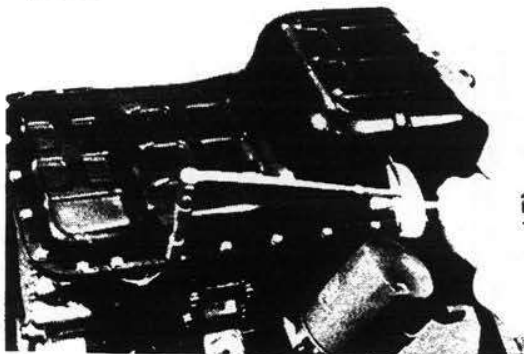
Adjust the "V" belt tension.

Deflection at 10 kg (22 lb) force

B engine	10 – 13 mm (0.4 – 0.5 in.)
2B engine	8 – 11 mm (0.3 – 0.4 in.)

Fig. 6-79

Apply liquid sealer to the cylinder block and gear cover.

Fig. 6-80

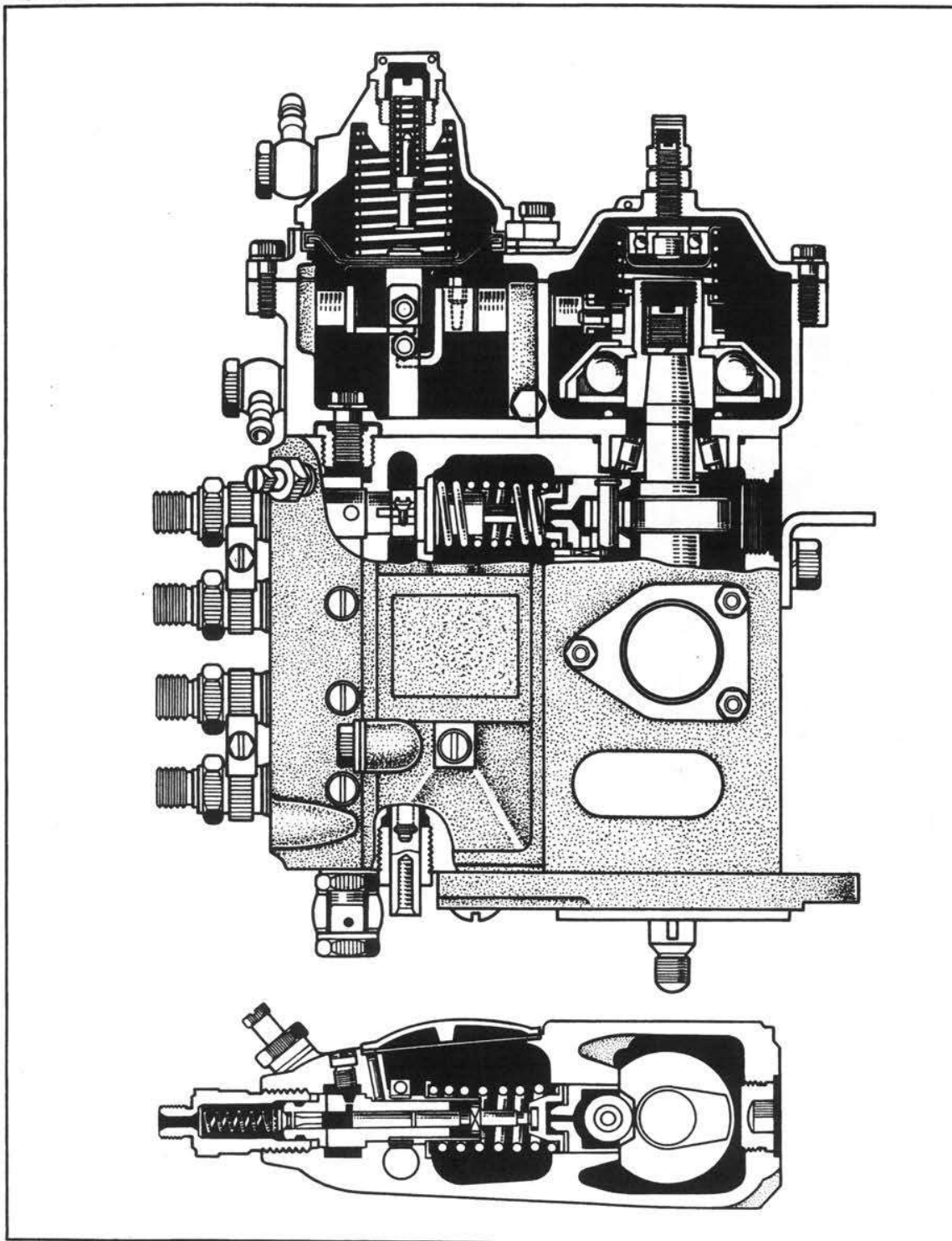
Install the oil pan.

Torque **0.5 – 1.0 kg-m (4 – 7 ft-lb)**

6-28

FUEL SYSTEM — Injection Pump**INJECTION PUMP
CROSS SECTIONAL VIEW**

Fig. 6-81

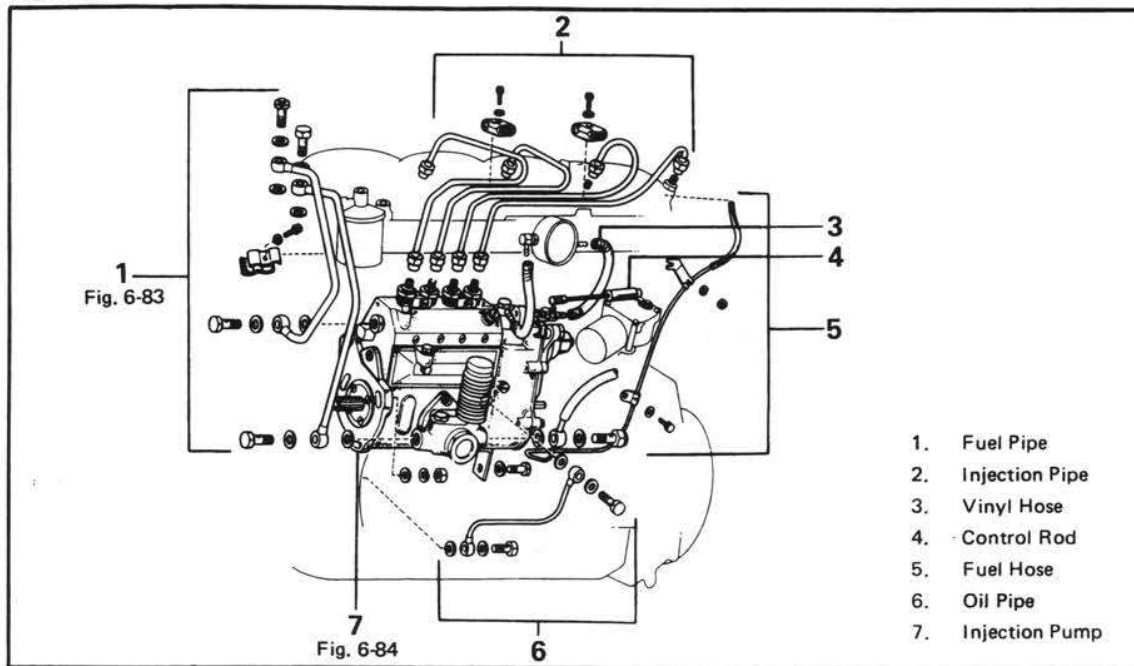
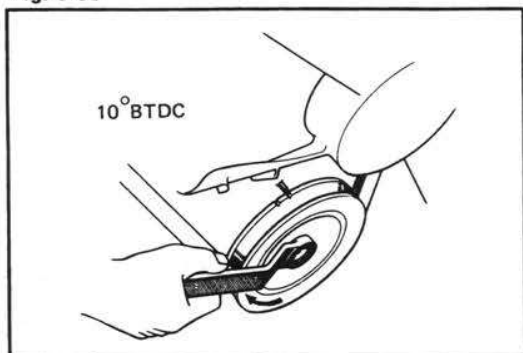


FUEL SYSTEM – Injection Pump

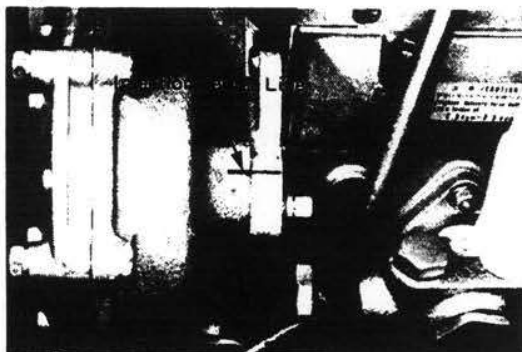
6-29

REMOVAL

Remove in numerical order.

Fig. 6-82**Fig. 6-83**

Set No.1 cylinder piston to 10° BTDC /Compression before removing the injection pump.

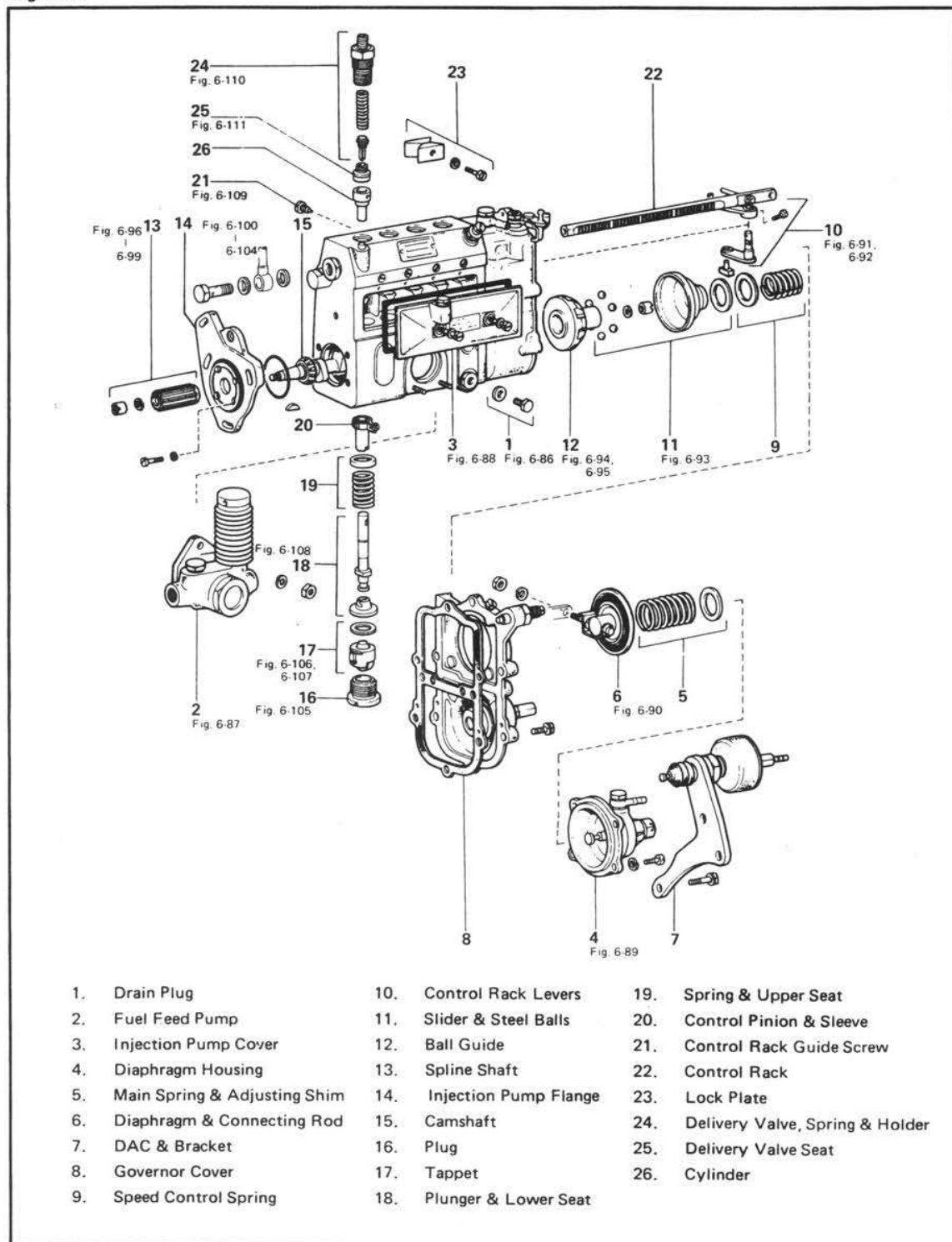
Fig. 6-84

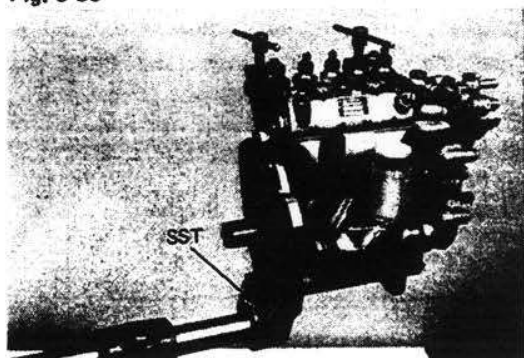
Check the position of the injection period line.

6-30

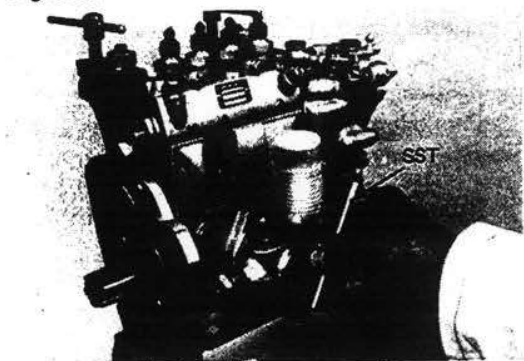
FUEL SYSTEM – Injection Pump**DISASSEMBLY**

Disassemble in numerical order.

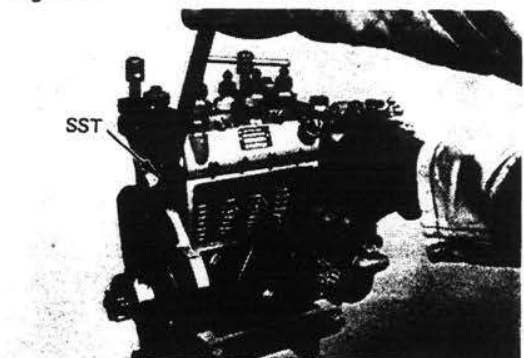
Fig. 6-85

FUEL SYSTEM – Injection Pump**6-31****Fig. 6-86**

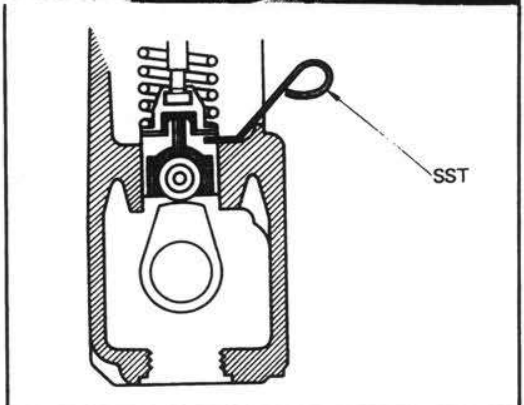
Mount the injection pump on work stand, SST[09241-76021].

Fig. 6-87

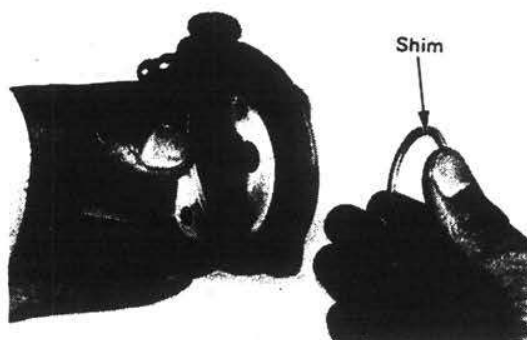
Remove the fuel pump with SST[09276-76010].

Fig. 6-88

Using SST[09278-46010], turn the camshaft and insert SST[09274-46010] into the tappet service openings respectively when the tappets are at their highest positions.



6-32

FUEL SYSTEM – Injection Pump**Fig. 6-89**

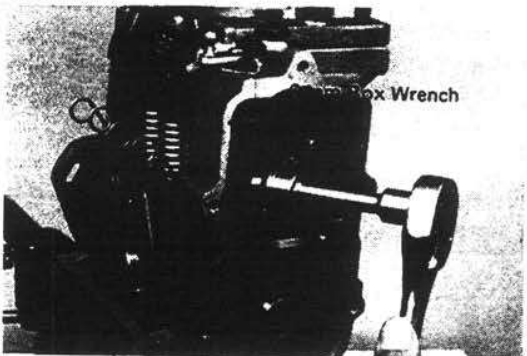
When a number of main spring shims are used, use special care to prevent any from being misplaced or getting mixed up.

Fig. 6-90

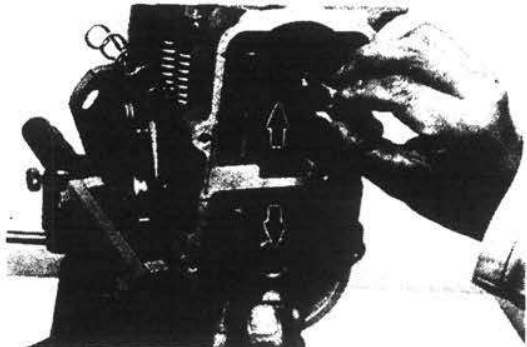
Disconnect the diaphragm from control rack.

— Caution —

Do not allow any engine oil, fuel or grease to get on the diaphragm.

Fig. 6-91

Remove the stop lever bolt with 6 mm box wrench.

Fig. 6-92

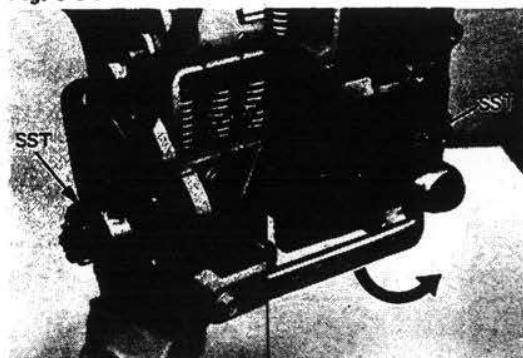
Remove two control rack levers by pulling respectively upwards and downwards.

FUEL SYSTEM – Injection Pump**6-33****Fig. 6-93**

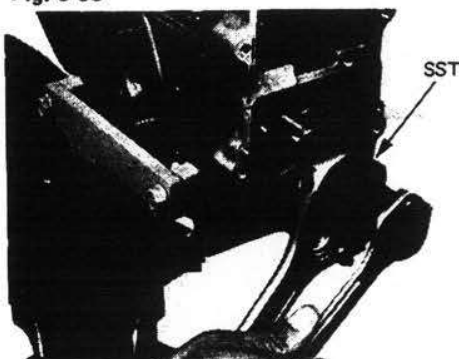
Remove the spring seat and slider, and then take out the six steel balls.

— Caution —

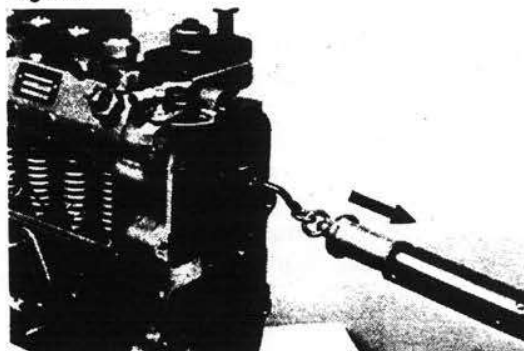
Take care not to allow the steel balls to drop.

Fig. 6-94

Hold the spline shaft with SST[09278-46010] and remove the round nut with SST[09266-67011].

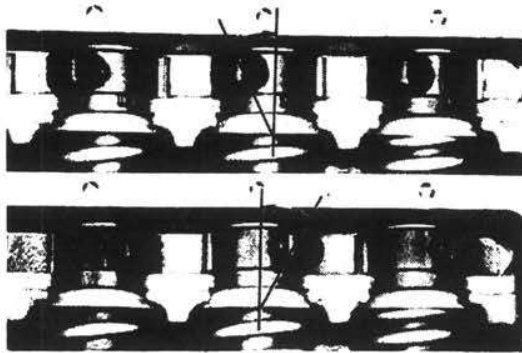
Fig. 6-95

Pull out the ball guide with SST [09267-76011].

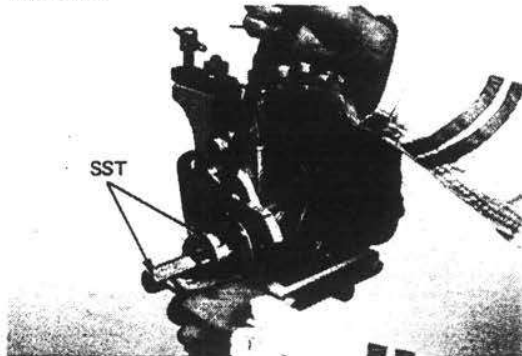
Fig. 6-96

Check the sliding resistance of control rack.

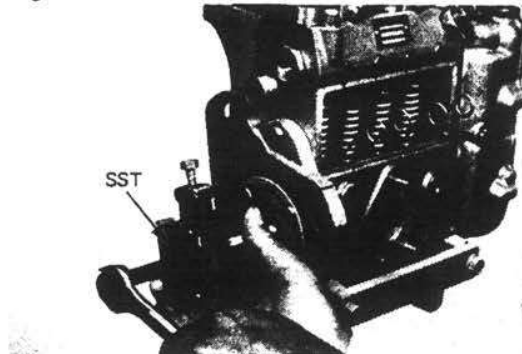
Sliding resistance
Less than 150 g (5.3 oz)

6-34 **FUEL SYSTEM — Injection Pump****Fig. 6-97**

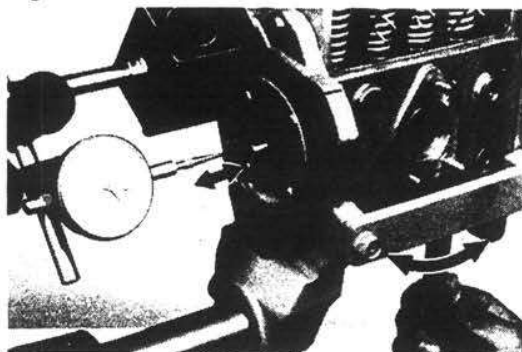
To prevent error upon assembling, confirm the control pinion stop position by moving control rack fully to left and right.

Fig. 6-98

Hold the spline shaft with SST[09278-46010] and remove the round nut with SST[09266-46011].

Fig. 6-99

Pull out the spline shaft with SST[09286-46011].

Fig. 6-100

Measure Camshaft Thrust Clearance.
[When Dial Gauge is used]

1. Set the magnetic base on injection pump flange and contact the dial gauge to the end of the camshaft.
2. Pry the camshaft with a wooden rod and check the thrust clearance.

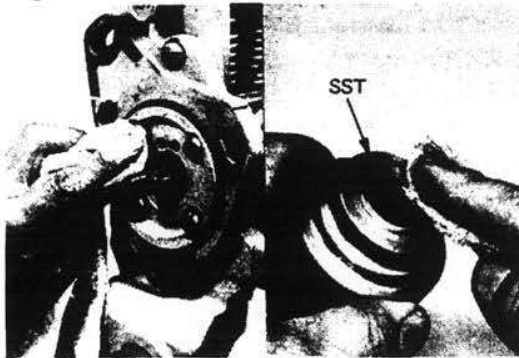
Thrust clearance

STD	0.03 – 0.05 mm (0.0012 – 0.0020 in.)
Limit	0.1 mm (0.004 in.)

FUEL SYSTEM – Injection Pump

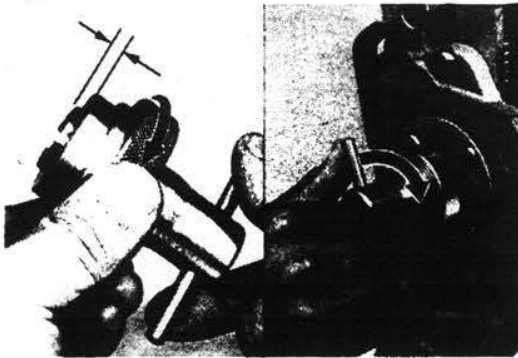
6-35

Fig. 6-101

**[When SST [09287-76010] is used]**

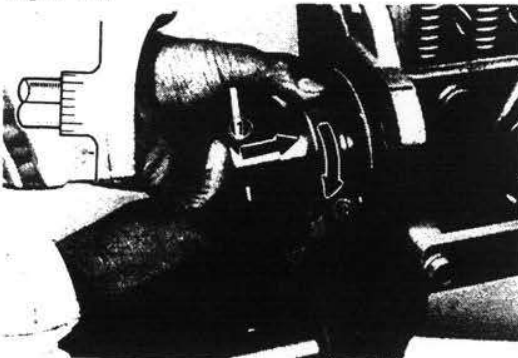
1. Clean the injection pump flange and SST [09287-76010].

Fig. 6-102



2. Firmly install SST [09287-76010] to the camshaft.

Fig. 6-103

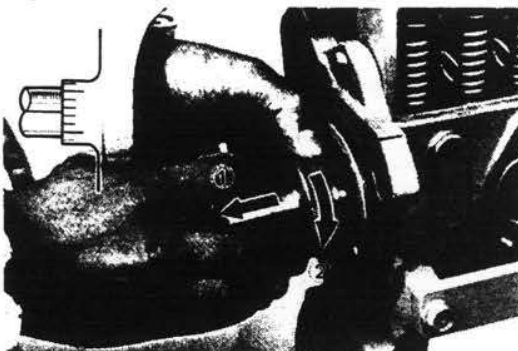


3. Push SST toward the pump side, and contact the outer dial to the pump flange by screwing the outer dial.
4. Read the scale on outer dial.

— Note —

A unit on the outer dial scale is equivalent to indicate 0.01 mm (0.0004 in.).

Fig. 6-104

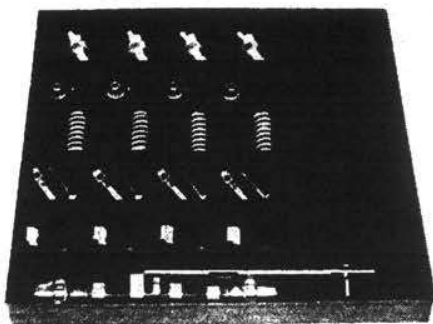


5. Pull SST toward the front, and contact the outer dial to the pump flange by screwing the outer dial.
6. The screwing distance is camshaft thrust clearance.

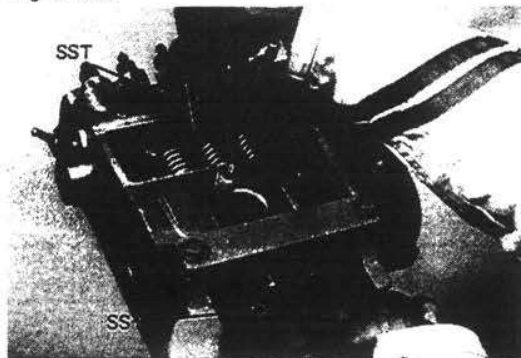
Thrust clearance

STD	0.03 – 0.05 mm (0.0012 – 0.0020 in.)
Limit	0.1 mm (0.004 in.)

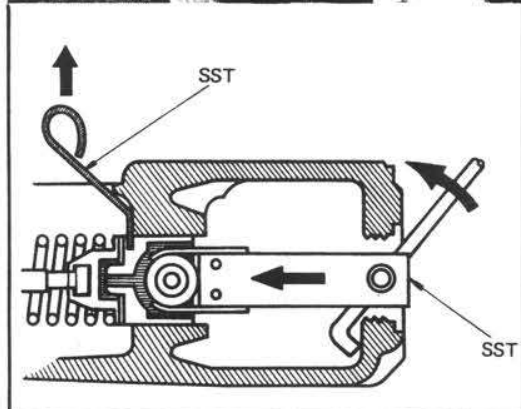
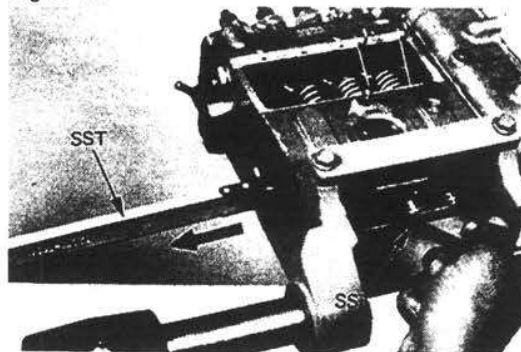
6-36

FUEL SYSTEM — Injection Pump**Fig. 6-105**

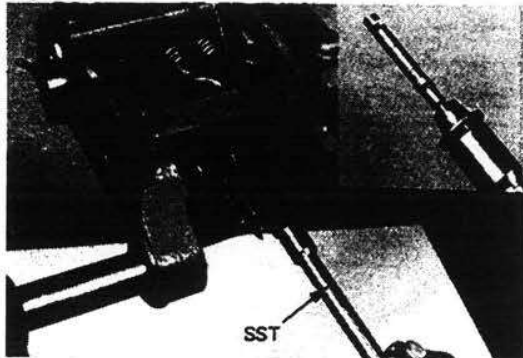
Keep all parts in order for each cylinder in the disassembly pan.

Fig. 6-106

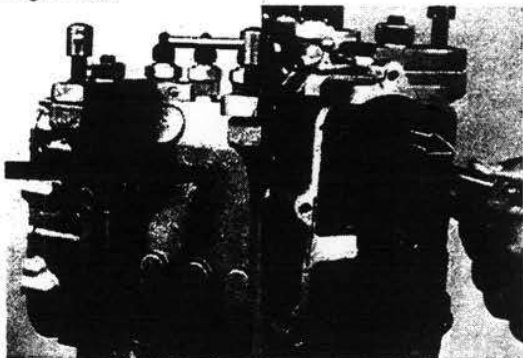
Using SST[09272-76011], lift the tappet to remove SST[09274-46010].

**Fig. 6-107**

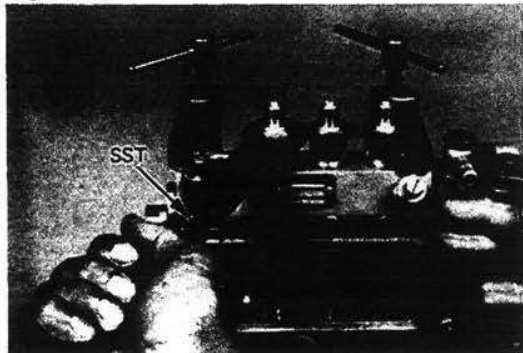
Hold the tappet in the camshaft chamber with SST[09272-76011] and take out the tappet through the camshaft bearing hole by using SST[09273-76011].

FUEL SYSTEM – Injection Pump**6-37****Fig. 6-108**

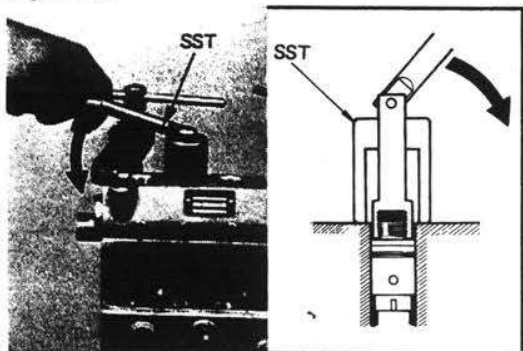
Using SST[09275-46010], hold the spring lower seat and take it out together with the plunger.

Fig. 6-109

Loosen the rack guide screw and pull out the control rack.

Fig. 6-110

Remove the delivery valve holder with SST[09271-76011].

Fig. 6-111

Turn the handle of SST[09271-76011] and screw SST into the valve seat service thread. Using the handle as lever, pull out the delivery valve seat and gasket as a set.

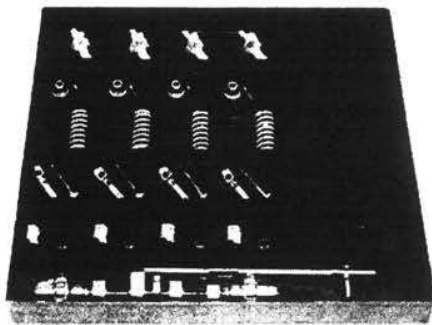
6-38 **FUEL SYSTEM** – Injection Pump

Fig. 6-112

**INSPECTION & REPAIR**

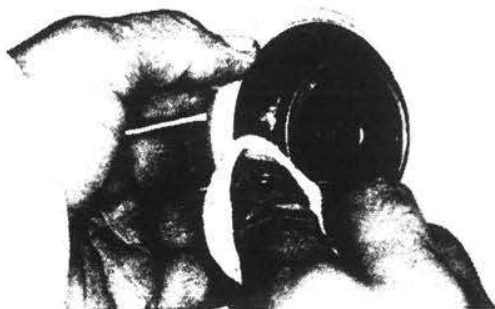
Use care not to touch the sliding surfaces of pump elements and delivery valves with your hand when handling them.

Fig. 6-113



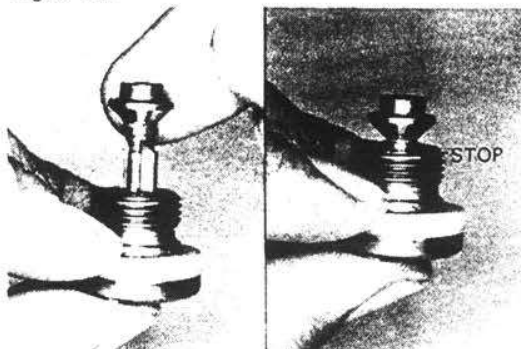
Wash the parts in clean light oil before inspecting. Wash and clean the outer surfaces of housings with a soft brush, and blow out the tapped holes with compressed air.

Fig. 6-114

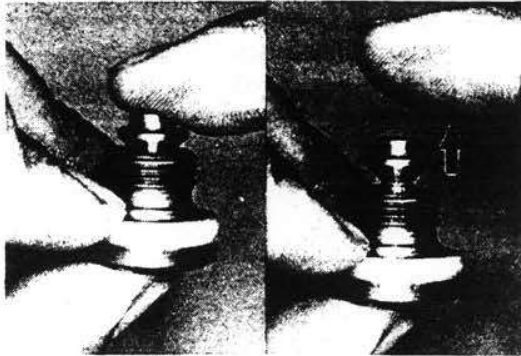
**Diaphragm**

Wipe the diaphragm with cloth. Do not allow gasoline, light oil or other petroleum products to get on the diaphragm.

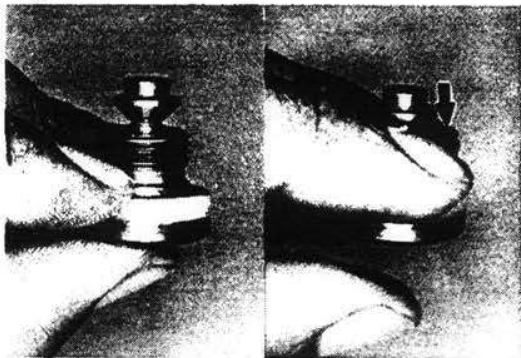
Fig. 6-115

**Delivery Valve**

1. Pull up the valve and close the hole at valve seat bottom end with the thumb. When the valve is released, it should sink down quickly and stop at the position where the relief ring closes the valve seat hole. If defective, replace the valve as a set.

FUEL SYSTEM – Injection Pump**6–39****Fig. 6-116**

2. Close the hole at valve seat bottom end with the thumb.
Insert the valve into the valve seat and press down with finger. When the finger is released, the valve should rise back to its original position.
Replace if defective.

Fig. 6-117

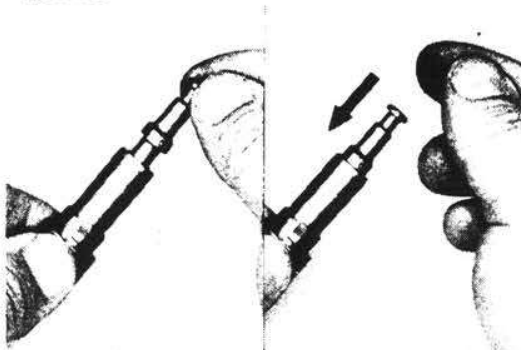
3. Remove thumb from the valve seat hole.
The valve should close completely by its own weight.
Replace if defective.

— Note —

Before using a new valve set, wash off the rust preventing compound with light oil or gasoline. Then re-wash with light oil and perform the above tests.

Fig. 6-118**Plunger and Cylinder**

Inspect the sliding parts, and if damaged, replace the element as a set.

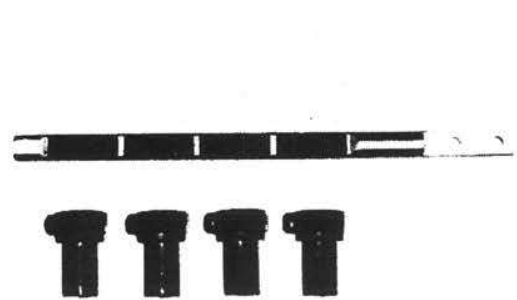
Fig. 6-119**Test for fit. (Sinking test)**

1. Tilt the cylinder slightly and pull out the plunger.
2. The plunger when released should sink down smoothly in the cylinder by its own weight.
3. Rotate the plunger and repeat the test at various positions. If the plunger sticks at any position, replace the element as a set.

6-40

FUEL SYSTEM – Injection Pump

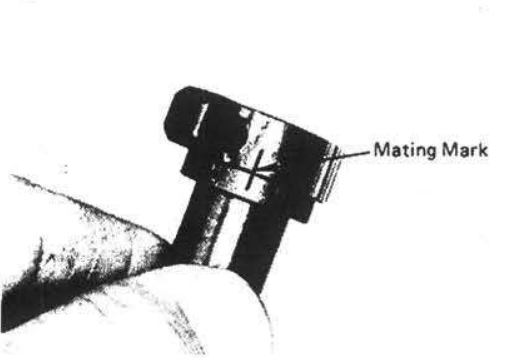
Fig. 6-120



Control Rack and Pinion

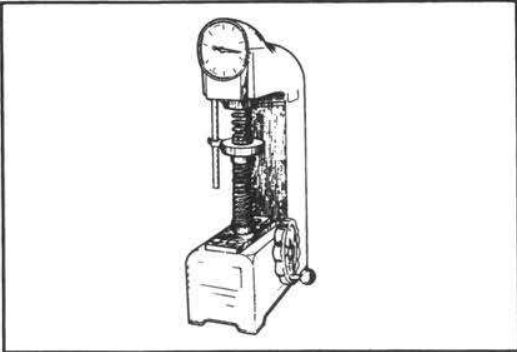
Inspect the tooth faces of control rack and pinion for damage and wear, and replace if defective.

Fig. 6-121



If necessary to disassemble, make sure of the installed condition of pinion and sleeve before disassembling.

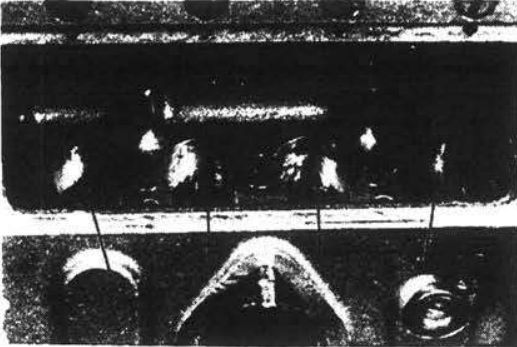
Fig. 6-122



Spring

Spring Items	Plunger Spring	Delivery Valve Spring	Governor Main Spring	Speed Control Spring
Free Length	49.4 mm (1.944 in.)	37.0 mm (1.457 in.)	45.6 mm (1.795 in.)	38.0 mm (1.496 in.)
Installed Length	44.0 mm (1.732 in.)	25.9 mm (1.020 in.)	35.0 mm (1.378 in.)	27.0 mm (1.063 in.)
Installed Load	15.1 kg (33.3 lb)	4.42 kg (9.74 lb)	0.95 kg (33.5 oz)	3.30 kg (7.28 lb)

Fig. 6-123

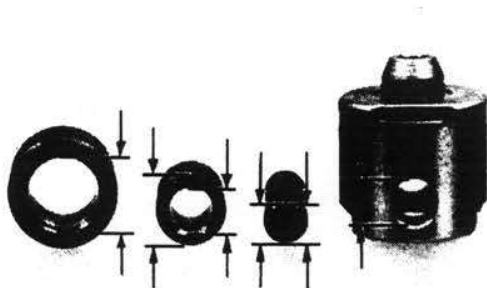


Tappet

Check the tappet holes of pump housing for wear and excessive damage.

FUEL SYSTEM – Injection Pump**6-41****Fig. 6-124**

Check the tappet, roller bushing and pin for wear and damage.

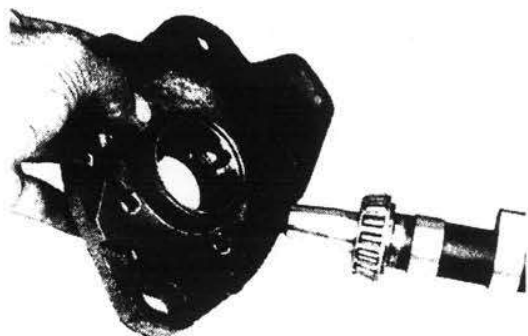
Fig. 6-125

Measure the overall looseness with the tappet roller in assembled state, and replace if it exceeds the specified limit.

Overall looseness limit 0.3 mm (0.012 in.)

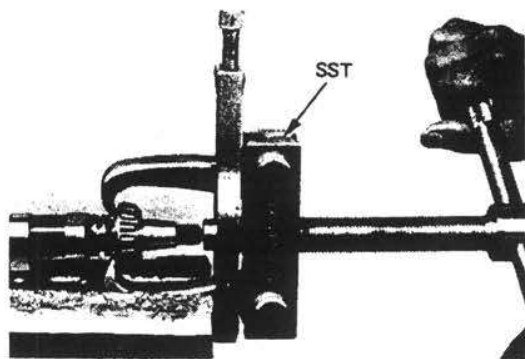
Fig. 6-126**Camshaft**

Check the oil seal contacting part and cam surfaces for damage and wear.

Fig. 6-127**Camshaft Bearing**

Check the roller and race for wear and damage.

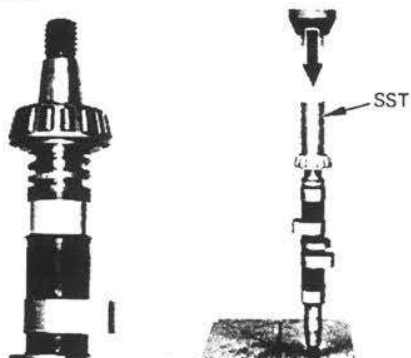
6-42

FUEL SYSTEM – Injection Pump**Fig. 6-128****Replace Camshaft Bearing**

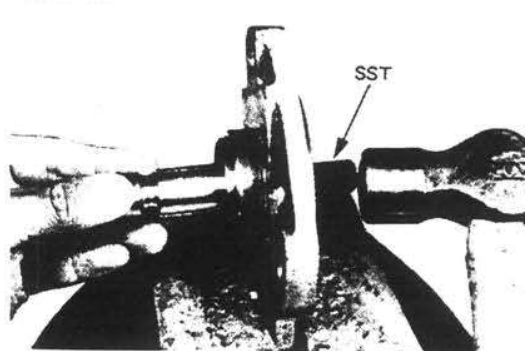
1. Pull out the front bearing with SST [09950-20011].

Fig. 6-129

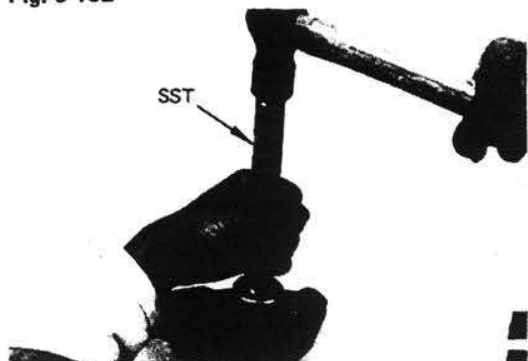
2. Keep the removed shims separately to prevent being lost or getting mixed up with other shims.

Fig. 6-130

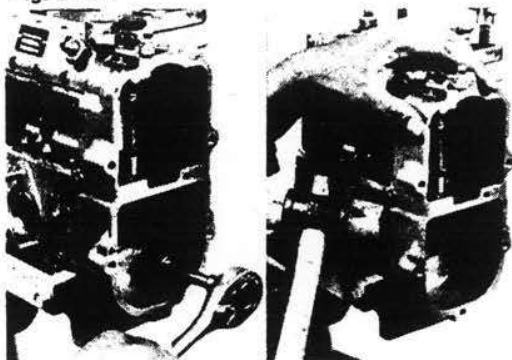
3. Press in the camshaft adjusting ring, shims and bearing onto the camshaft by using SST [09285-76010] and a press.

Fig. 6-131

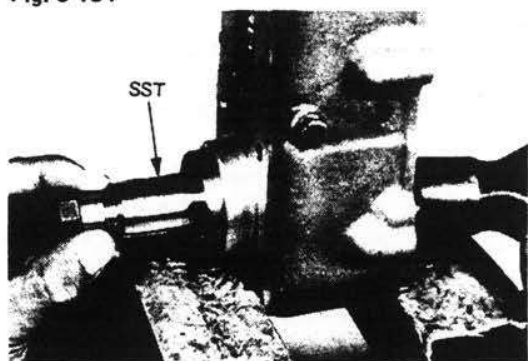
4. Remove the bearing outer race from bearing cover by using SST [09286-76011].

FUEL SYSTEM – Injection Pump**6-43****Fig. 6-132**

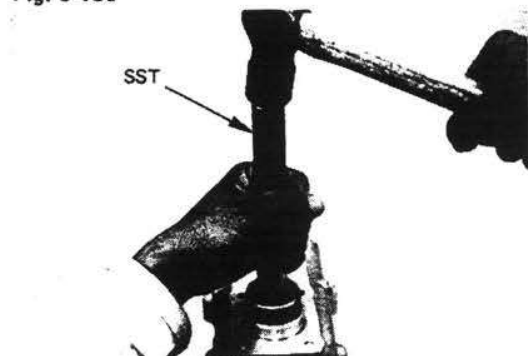
5. Drive in the new bearing outer race into the cover with SST [09608-12010].

Fig. 6-133

6. Remove the governor housing from pump body.

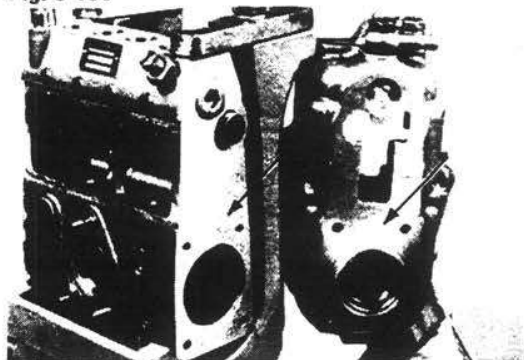
Fig. 6-134

7. Remove the bearing outer race from governor housing by using SST [09286-76011].

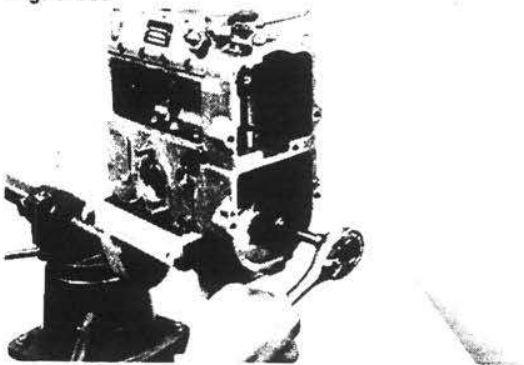
Fig. 6-135

8. Drive in the new bearing outer race into the governor housing with SST [09608-12010].

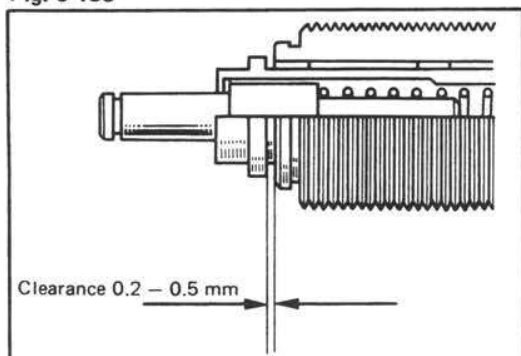
6-44

FUEL SYSTEM – Injection Pump**Fig. 6-136**

9. Clean the installing surfaces.

Fig. 6-137

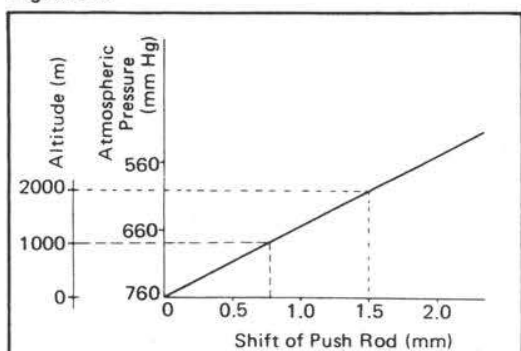
10. Install the new gasket and the governor housing.

Fig. 6-138**Diesel Altitude Compensator (DAC)**

1. Check DAC for correct clearance between full stop capsule flange and DAC body.

Clearance at seal level

0.2 – 0.5 mm
(0.008 – 0.020 in.)

Fig. 6-139

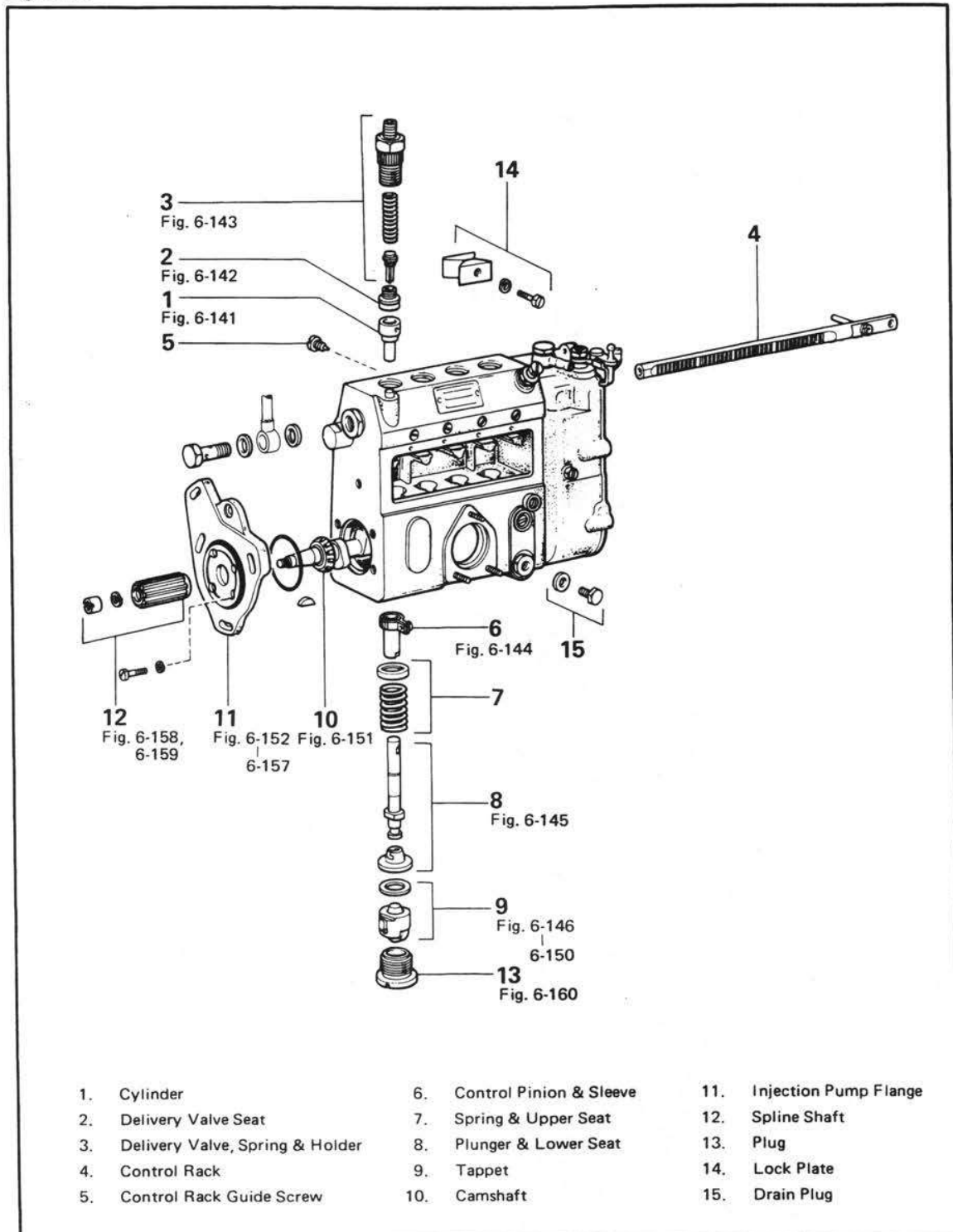
2. Since the position of the push rod depends on altitude, the clearance mentioned above must be 0.2 to 0.5 mm (0.008 – 0.020 in.) plus amount of push rod shift as shown.

FUEL SYSTEM — Injection Pump

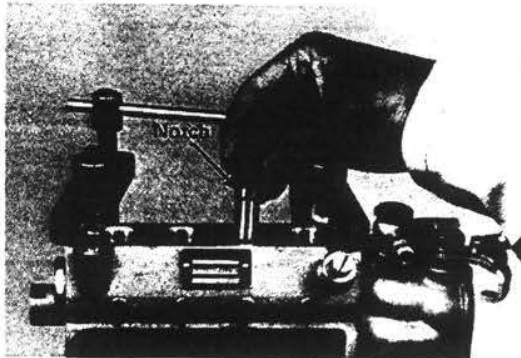
6-45

ASSEMBLY (PUMP BODY)

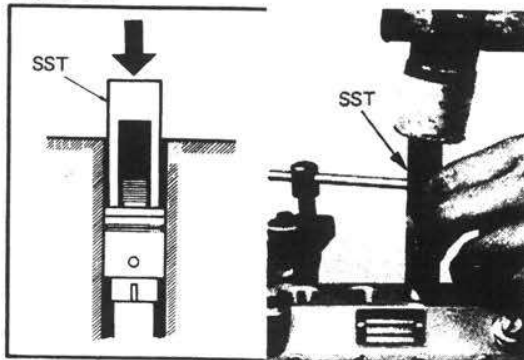
Assemble in numerical order.

Fig. 6-140

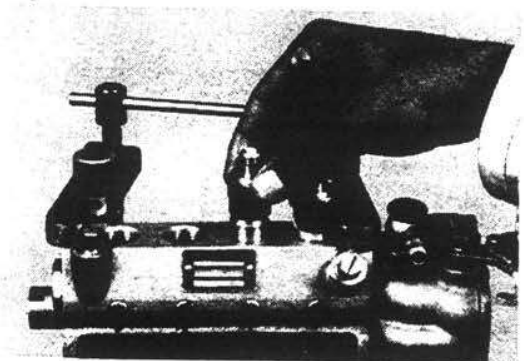
6-46

FUEL SYSTEM – Injection Pump**Fig. 6-141**

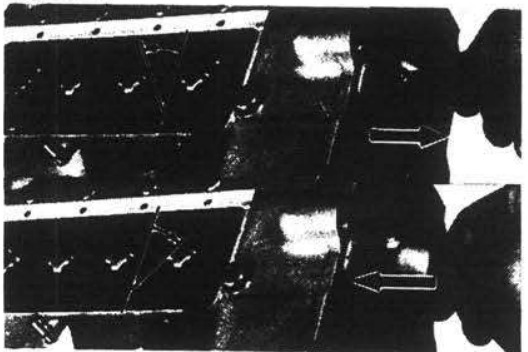
Match the pump cylinder notch with the pump housing knock pin to assemble the cylinder.

Fig. 6-142

Drive in the pump cylinder lightly with SST [09262-76010].

Fig. 6-143

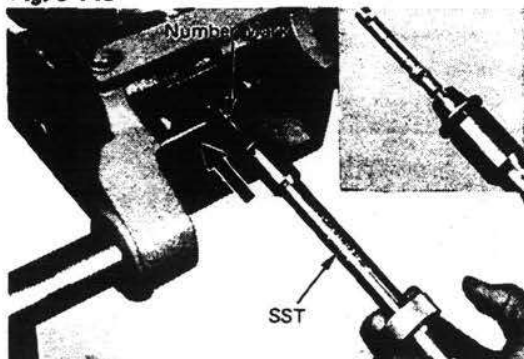
Lightly tighten the delivery valve holder by hand.

Fig. 6-144

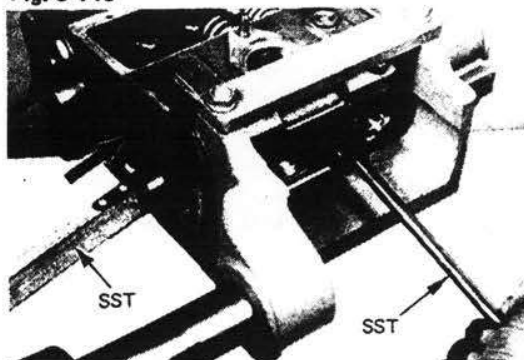
Assemble so that the pinion swings evenly to left and right when rack is moved to right and left. When assembling the sleeves, inspect fitting condition by moving rack.

FUEL SYSTEM – Injection Pump

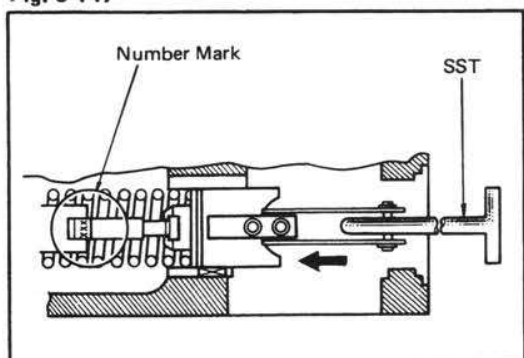
6-47

Fig. 6-145

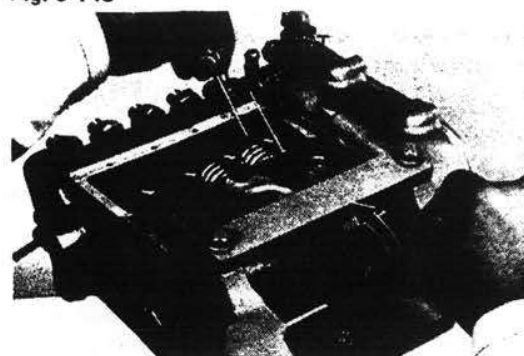
Assemble the plunger and spring lower seat, inserting the driving face marked with number and lower seat notch part upward (cover plate side) by using SST [09275-46010].

Fig. 6-146

Insert the tappet into housing with SST [09273-76011] and [09272-76011].

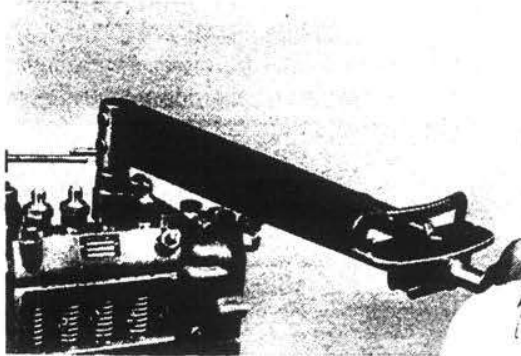
Fig. 6-147

Fit the driving face into the cylinder groove, facing its number mark to pump cover side.

Fig. 6-148

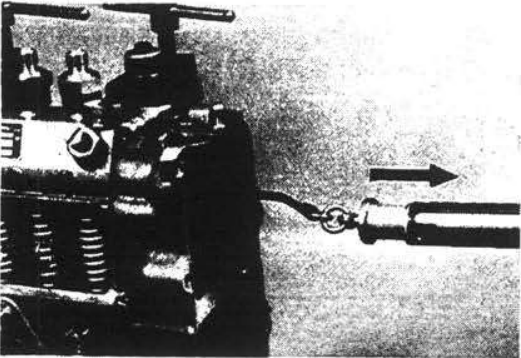
Press in tappet with SST [09272-76011] and hold it with SST [09274-46010].

6-48

FUEL SYSTEM — Injection Pump**Fig. 6-149**

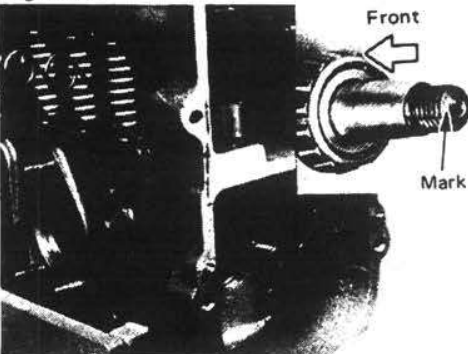
When one delivery valve holder is tightened, move the control rack to right and left and inspect the tightness of rack.

Torque **2.5 – 3.5 kg-m**
 (18.1 – 25.3 ft-lb)

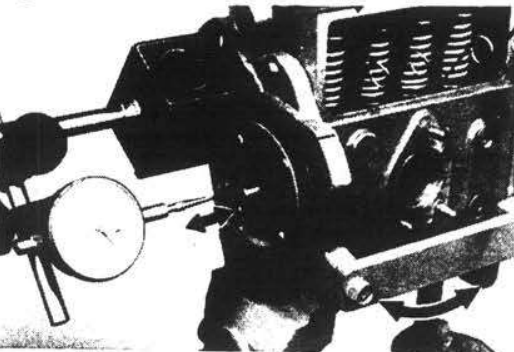
Fig. 6-150

Measure the control rack sliding resistance with a spring scale, and make sure that the resistance is less than 150 g (5.3 oz) and the rack moves smoothly.

Sliding resistance
 Less than 150 g (5.3 oz)

Fig. 6-151

To assemble the camshaft, the mark at the end of the camshaft should be at the governor side.

Fig. 6-152

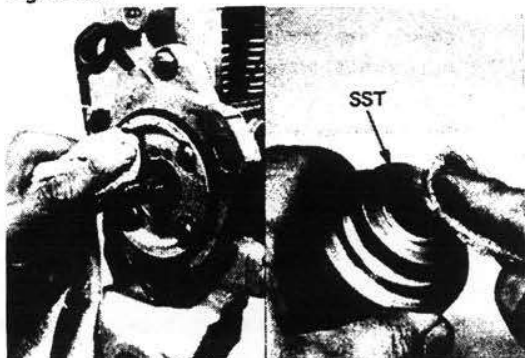
Measure Camshaft Thrust Clearance.
[When Dial Gauge is used]

1. Set the magnetic base on injection pump flange and contact the dial gauge to the end of camshaft.
2. Pry the camshaft with a wooden stick and check the thrust clearance.

Thrust clearance

STD **0.03 – 0.05 mm**
 (0.0012 – 0.0020 in.)
Limit **0.1 mm (0.004 in.)**

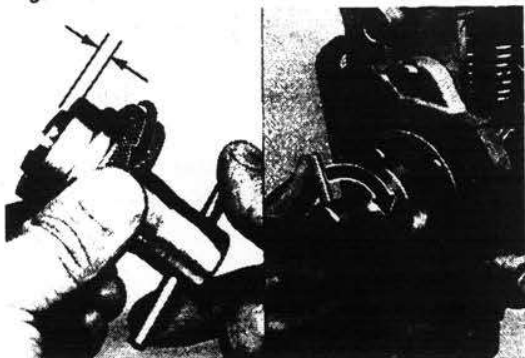
Fig. 6-153



**Measure Camshaft Thrust Clearance.
[When SST [09287-76010] is used]**

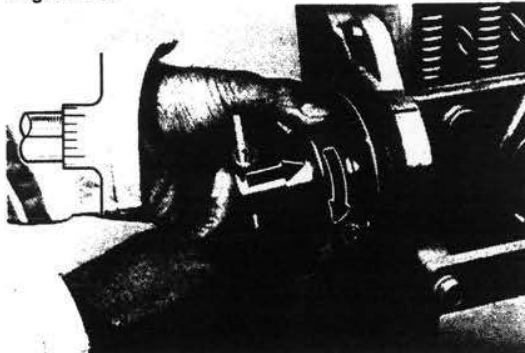
1. Clean the injection pump flange and SST [09287-76010].

Fig. 6-154



2. Firmly install SST [09287-76010] to the camshaft.

Fig. 6-155

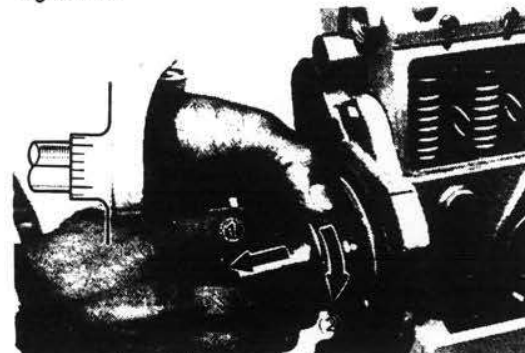


3. Push SST toward the pump side, and contact the outer dial to the pump flange by screwing the outer dial.
4. Read the scale on outer dial.

— Note —

A unit on the outer dial scale is equivalent to 0.01 mm (0.0004 in.).

Fig. 6-156



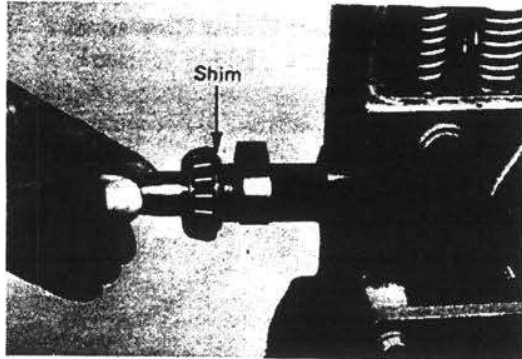
5. Pull SST toward the front side, and contact outer dial to the pump flange by screwing the outer dial.
6. The screwing distance is camshaft thrust clearance.

Thrust clearance

STD	0.03 – 0.05 mm (0.0012 – 0.0020 in.)
Limit	0.1 mm (0.004 in.)

6-50 FUEL SYSTEM – Injection Pump

Fig. 6-157



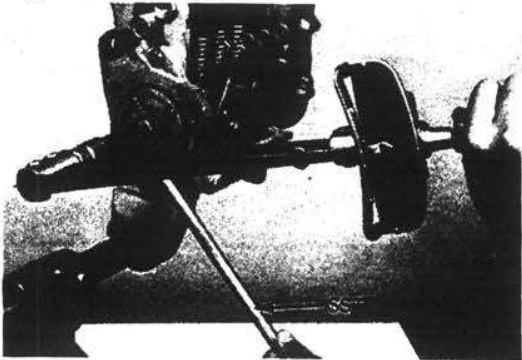
To adjust the thrust clearance, increase or decrease camshaft adjusting shim.

Shim thickness: 0.10, 0.12, 0.14, 0.16, 0.18, 0.50 mm
(0.0039, 0.0047, 0.0055, 0.0063, 0.0071, 0.0197 in.)

— Note —

Refer to "Replace Camshaft Bearing" on page 6-42 for replacement of adjusting shim.

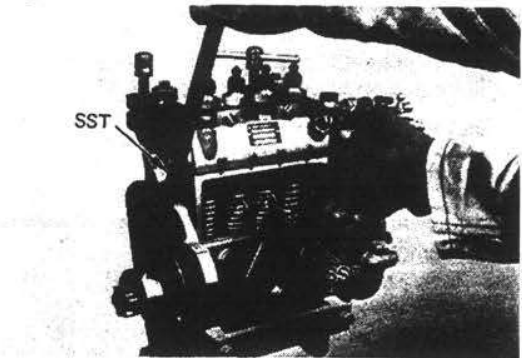
Fig. 6-158



Hold the spline shaft with SST[09278-46010] and tighten the round nut with SST[09266-46011] and torque wrench.

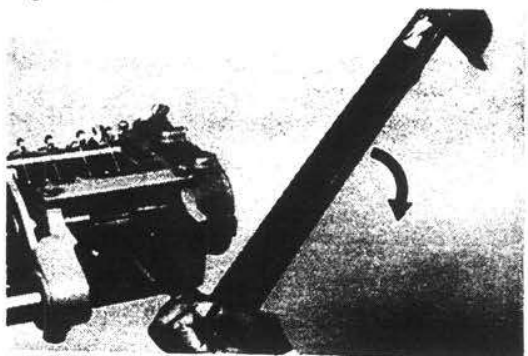
Torque 6.0 – 7.0 kg-m
(43.4 – 50.6 ft-lb)

Fig. 6-159



Using SST[09278-46010], rotate the camshaft and remove SST[09274-46010].

Fig. 6-160



Install the felt plate plugs.

Torque 5.5 – 7.5 kg-m
(39.8 – 54.2 ft-lb)

FUEL SYSTEM – Injection Pump

6–51

ADJUST (PUMP BODY)**Pump Body Adjustment Items****Preparations of Pump Tester**

Nozzle type	Opening pressure	DN 4 SD-24	
Nozzle	Outer diameter	120 – 130 kg/cm ²	(1707 – 1849 psi)
Injection pipe	Inner diameter	6 mm	(0.24 in.)
	Length	2 mm	(0.08 in.)
	Minimum bending radius	600 mm	(23.62 in.)
Fuel temperature		More than 25 mm	(0.98 in.)
Fuel feeding pressure		40 – 45°C	(104 – 113°F)
		0.5 kg/cm ²	(7.1 psi)

Control Rack Sliding Resistance

Pump rpm	Sliding Resistance	
0	Less than 150 g	(5.3 oz)
1000	Less than 50 g	(1.8 oz)

Injection Timing

Pre-stroke	1.9 – 2.0 mm	(0.075 – 0.079 in.)
	[Control rack position at 8 mm (0.31 in.)]	
Injection Interval	90° ± 30'	
Tappet Clearance	More than 0.2 mm	(0.008 in.)

Injection Volume Adjustment**For B Engine**

Rack Position	Pump rpm	Measuring Strokes	Injection Volume	Variation Limit
16.0 mm (0.630 in.)	100	200	14.0 – 16.0 cc (0.854 – 0.976 cu.in.)	1.2 cc (0.073 cu.in.)
12.0 mm (0.472 in.)	1100	200	10.6 – 11.2 cc (0.647 – 0.683 cu.in.)	0.4 cc (0.024 cu.in.)
8.6 mm (0.330 in.)	1000	200	4.6 – 5.6 cc (0.281 – 0.342 cu.in.)	0.4 cc (0.024 cu.in.)
6.5 mm (0.256 in.)	300	500	2.5 – 4.5 cc (0.153 – 0.275 cu.in.)	1.0 cc (0.061 cu.in.)

For 2B Engine

Rack Position	Pump rpm	Measuring Strokes	Injection Volume	Variation Limit
16.0 mm (0.630 in.)	100	200	14.0 – 16.0 cc (0.854 – 0.976 cu.in.)	1.2 cc (0.073 cu.in.)
11.9 mm (0.469 in.)	1100	200	11.0 – 11.6 cc (0.671 – 0.708 cu.in.)	0.4 cc (0.024 cu.in.)
8.0 mm (0.315 in.)	1000	200	4.3 – 5.1 cc (0.262 – 0.311 cu.in.)	0.4 cc (0.024 cu.in.)
6.5 mm (0.256 in.)	300	500	2.5 – 4.5 cc (0.153 – 0.275 cu.in.)	1.0 cc (0.061 cu.in.)

Pressure Test

Plunger pressure	More than 150 kg/cm ² (2133 psi) [Pump speed at 200 rpm, Rack position at 6.5 mm (0.256 in.)]
Delivery valve pressure	More than 5 seconds for holder internal pressure to drop 10 kg/cm ² (142 psi) [Holder internal pressure more than 150 kg/cm ² (2133 psi), Rack position at 0 mm]

6-52

FUEL SYSTEM – Injection Pump

Fig. 6-161

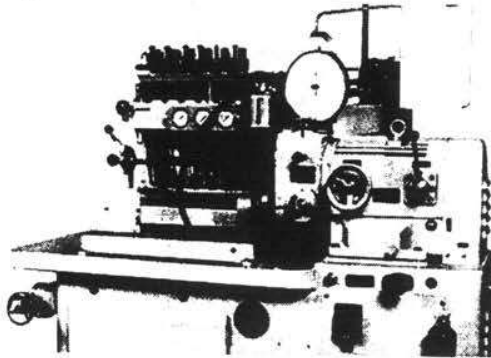


Fig. 6-162

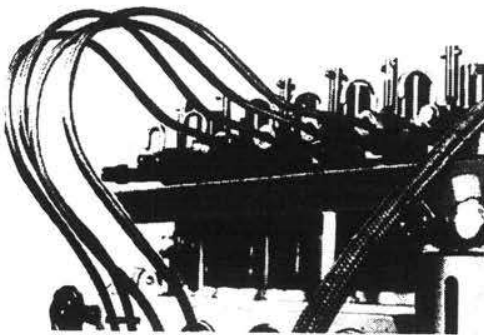


Fig. 6-163

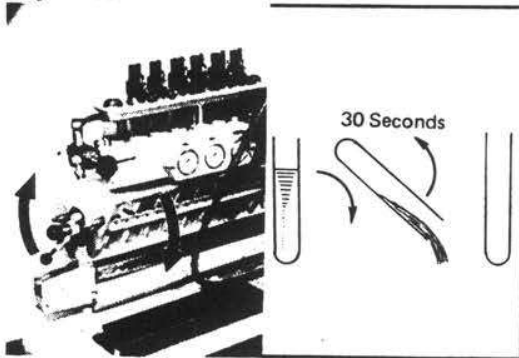
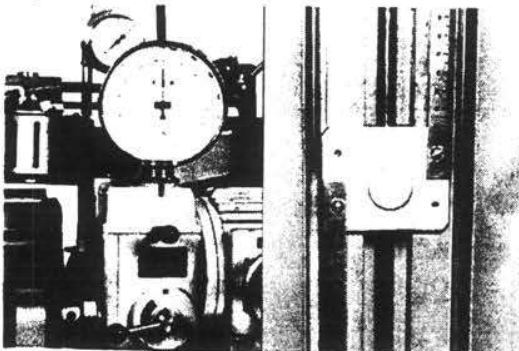


Fig. 6-164

**Check & Preparations before Test**

1. Specifications for test nozzle and nozzle holder are as follows:

Nozzle ND4 SD-24
Nozzle holder valve opening pressure
 120 – 130 kg/cm²
 (1707 – 1849 psi)

2. Use injection pipes with the following specifications.

Outer diameter 6 mm (0.24 in.)
Inner diameter 2 mm (0.08 in.)
Length 600 mm (23.62 in.)
Minimum bending radius
 More than 25 mm (0.98 in.)

3. Measure injection of each cylinder with specified measuring cylinder.
4. Tilt the measuring cylinders for 30 seconds for light oil to gush out, and then, raise cylinders upright and measure.

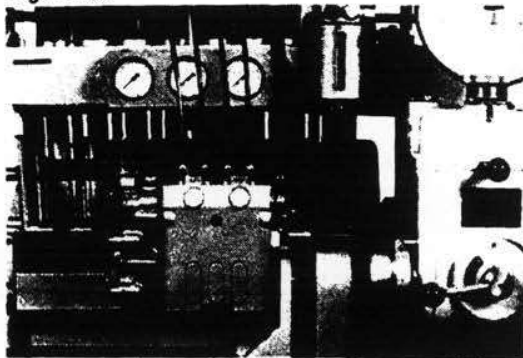
5. Check tachometer accuracy.

± 40 rpm

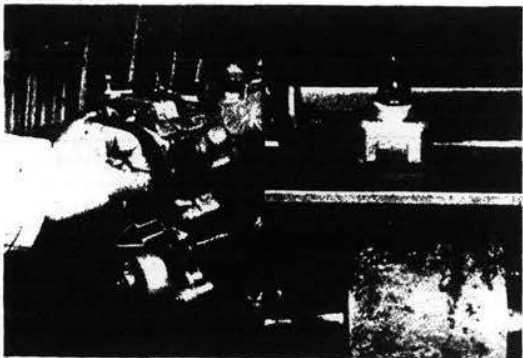
6. To measure vacuum pressure, observe water column of U-tube at zero point and at adjusting points, and correct if necessary.

FUEL SYSTEM – Injection Pump

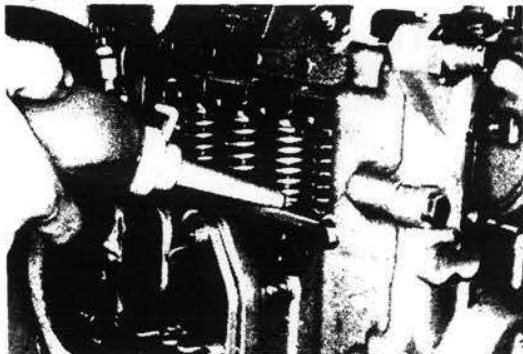
6-53

Fig. 6-165

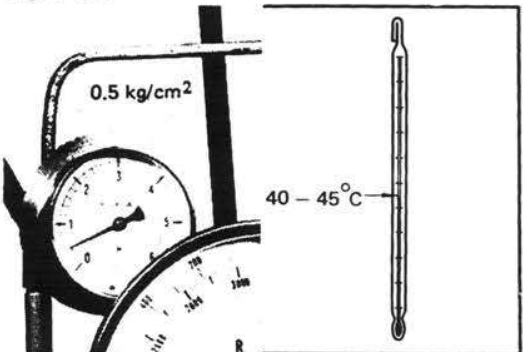
7. Mount the injection pump body on the pump tester.

Fig. 6-166

8. Install the rack scale so that its zero point will be at the position where the control rack is pushed fully toward the governor side, and set to allow easy reading of scale graduations.

Fig. 6-167

9. Install cover to the feed pump mounting surface, and fill the pump camshaft chamber with lubricating oil.

Fig. 6-168

10. Fuel feeding pressure to injection pump should be 0.5 kg/cm² (7.1 psi).
11. Fuel temperature to use pump testing should be 40° – 45°C (104° – 113°F).

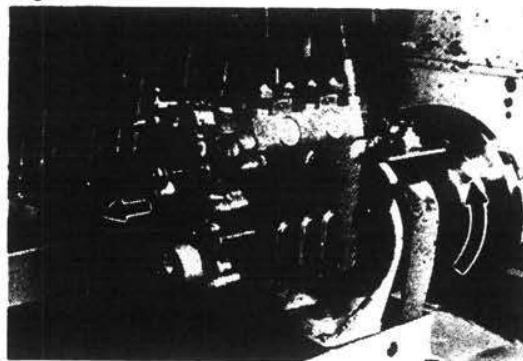
6-54 **FUEL SYSTEM – Injection Pump**

Fig. 6-169



12. Bleed air from pump housing.

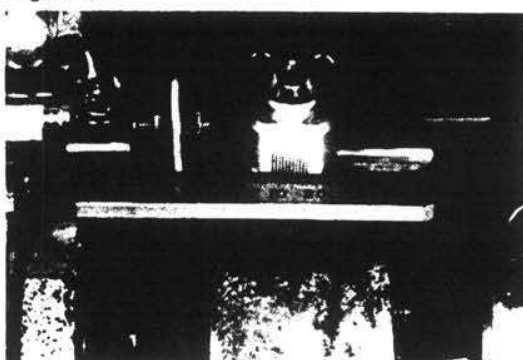
Fig. 6-170

**Control Rack Sliding Resistance**

Measure the control rack sliding resistance with spring scale (spring balancer).

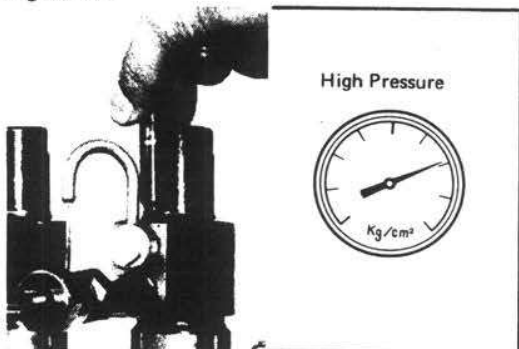
Pump Revolution	Sliding Resistance
0 rpm	Less than 150 g (5.3 oz)
1,000 rpm	Less than 50 g (1.8 oz)

Fig. 6-171

**Adjust Injection Timing**

1. Pre-stroke (for No.1 plunger)
 - (1) Set the control rack position at 8 mm (0.315 in).

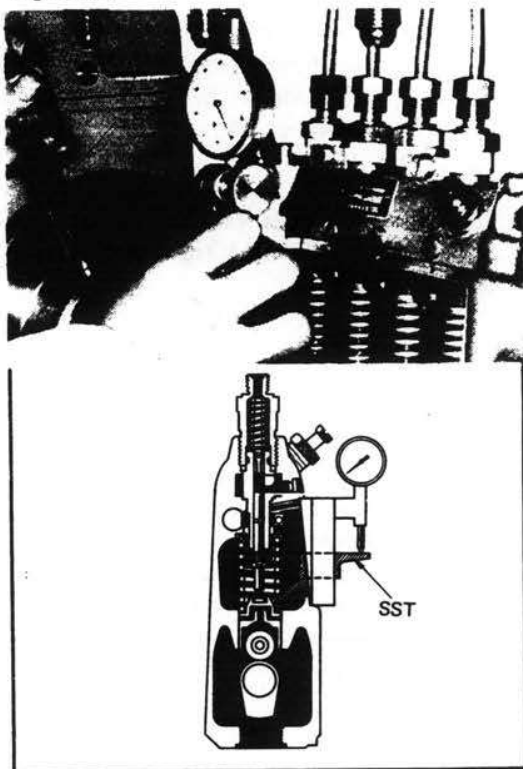
Fig. 6-172



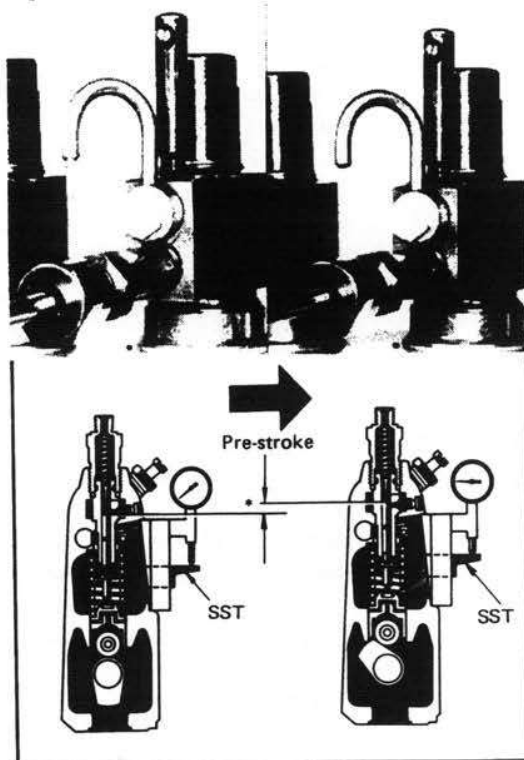
- (2) Loosen overflow cock of the pump tester bench nozzle holder.
- (3) Fuel feeding pressure to injection pump should be on the high side.

FUEL SYSTEM – Injection Pump

6-55

Fig. 6-173

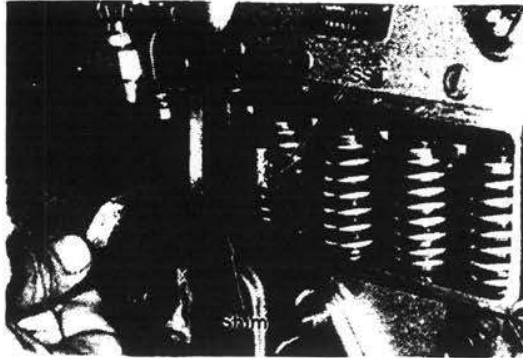
- (4) Set No.1 tappet to BDC position, and set dial gauge on No.1 tappet by using SST [09283-46010].

Fig. 6-174

- (5) Rotate the camshaft clockwise, and measure the lift of No.1 plunger when the plunger moves from BDC to injection starting position (Until fuel flowing from overflow pipe just stops).

Pre-stroke **1.9 – 2.0 mm**
 (0.075 – 0.079 in.)

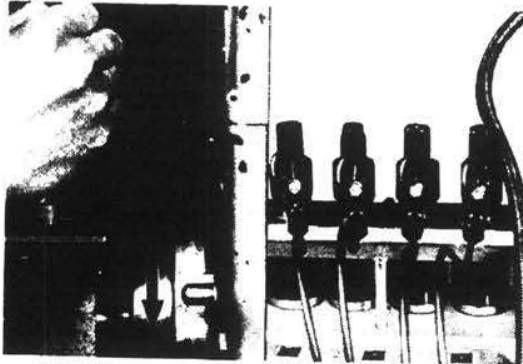
6-56

FUEL SYSTEM – Injection Pump**Fig. 6-175**

- (6) If the pre-stroke is not within specification, use SST [09280-46010] and adjust by changing tappet adjusting shim.

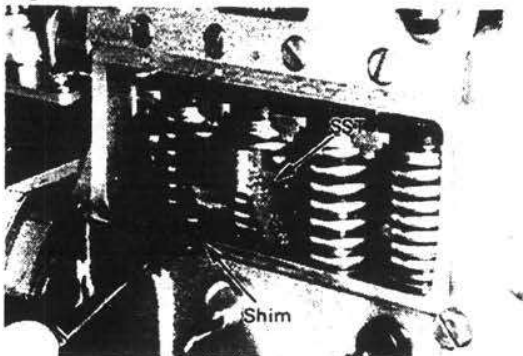
– Note –

15 shims are available, each varying in thickness by 0.1 mm (0.004 in.) from 0.1 – 1.5 mm (0.004 – 0.059 in.).

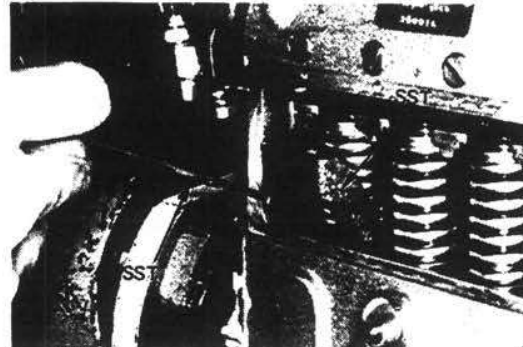
Fig. 6-176**2. Injection Interval**

- (1) Setting No.1 cylinder injection starting time position as a base, inspect and adjust injection starting angle in the order of injection.
- (2) Injection starting angle.

Cylinder No.	1	3	4	2
Injection Starting Angle	89°30'	179°30'	269°30'	90°30'

Fig. 6-177

- (3) If the injection starting angle is not within specification, adjust by using the same procedure as for pre-stroke adjustment.

Fig. 6-178**3. Tappet Clearance**

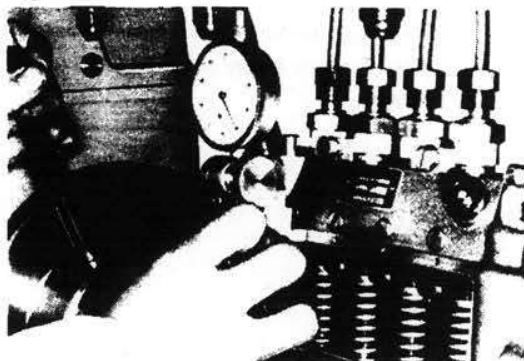
- (1) Using SST [09280-46010], insert the 0.2 mm (0.008 in.) gauge of SST [09288-46011] between the spring lower seat and adjusting shim, and rotate the camshaft slowly.
- (2) The camshaft should turn easily.

Tappet clearance

More than 0.2 mm (0.008 in.)

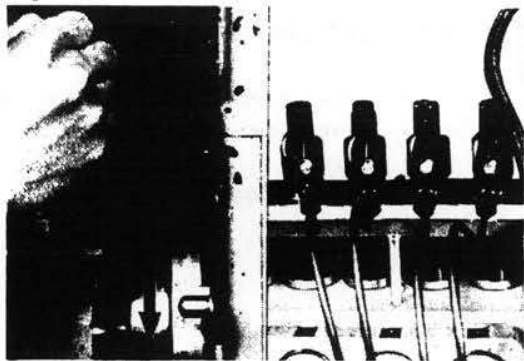
FUEL SYSTEM – Injection Pump

6-57

Fig. 6-179

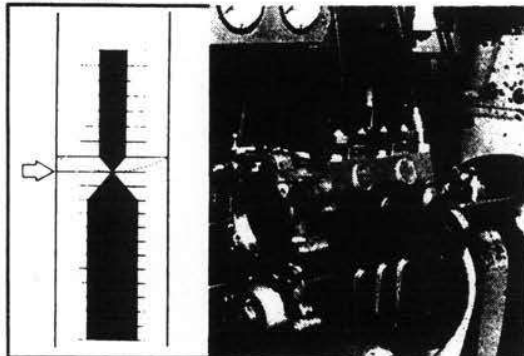
- (3) If the tappet clearance is less than 0.2 mm (0.008 in.), recheck and adjust the pre-stroke.

Pre-stroke 1.9 – 2.0 mm
(0.075 – 0.079 in.)

Fig. 6-180

- (4) Recheck and adjust the injection starting angle.

Cylinder No.	1	3	4	2
Injection Starting Angle	89°30'	179°30'	269°30'	270°30'
	90°30'	180°30'	270°30'	

Fig. 6-181**Adjust Injection Volume**

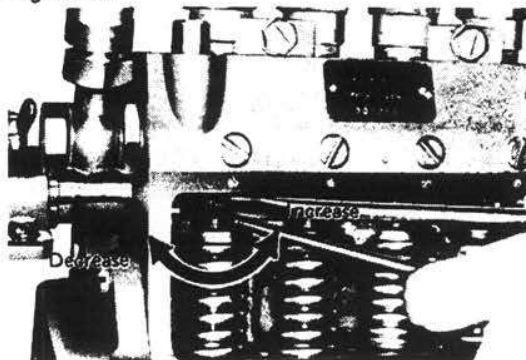
1. Measure the injection volume for each control rack position and pump rpm.

Engine Model	Rack Position	Pump rpm	Measuring Strokes	Injection Volume	Variation Limit
B	16.0 mm (0.630 in.)	100	200	14.0 – 16.0 cc (0.854 – 0.976 cu.in.)	1.2 cc (0.073 cu.in.)
	12.0 mm (0.472 in.)	1100	200	10.6 – 11.2 cc (0.647 – 0.683 cu.in.)	0.4 cc (0.024 cu.in.)
	8.6 mm (0.330 in.)	1000	200	4.6 – 5.6 cc (0.281 – 0.342 cu.in.)	0.4 cc (0.024 cu.in.)
	6.5 mm (0.256 in.)	300	500	2.5 – 4.5 cc (0.153 – 0.275 cu.in.)	1.0 cc (0.061 cu.in.)
2B	16.0 mm (0.630 in.)	100	200	14.0 – 16.0 cc (0.854 – 0.976 cu.in.)	1.2 cc (0.073 cu.in.)
	11.9 mm (0.469 in.)	1100	200	11.0 – 11.6 cc (0.671 – 0.708 cu.in.)	0.4 cc (0.024 cu.in.)
	8.0 mm (0.315 in.)	1000	200	4.3 – 5.1 cc (0.262 – 0.311 cu.in.)	0.4 cc (0.024 cu.in.)
	6.5 mm (0.256 in.)	300	500	2.5 – 4.5 cc (0.153 – 0.275 cu.in.)	1.0 cc (0.061 cu.in.)

6-58

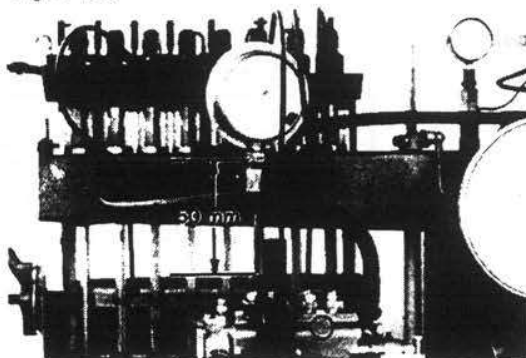
FUEL SYSTEM – Injection Pump

Fig. 6-182



2. To adjust the injection volume, loosen the pinion clamp screw and rotate the control sleeve.

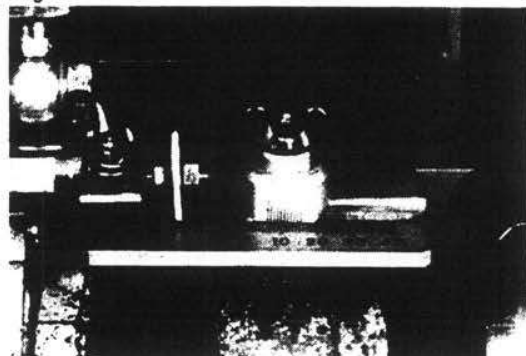
Fig. 6-183

**Test Plunger & Delivery Valve**

1. Plunger test
 - (1) Install pressure gauge on delivery valve holder.

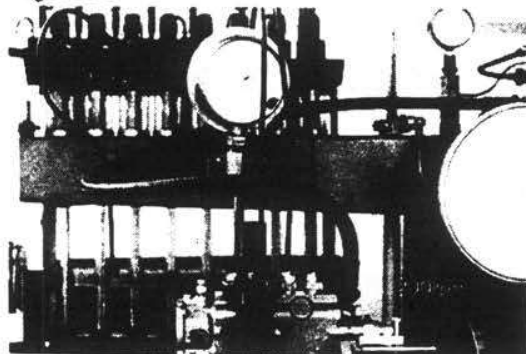
**Injection pipe length 50 mm
(1.97 in.)**

Fig. 6-184



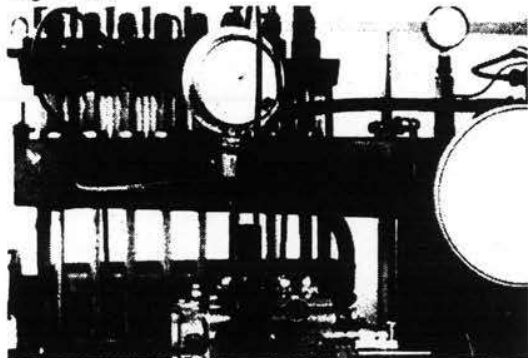
- (2) Set control rack position at 6.5 mm (0.256 in.).

Fig. 6-185

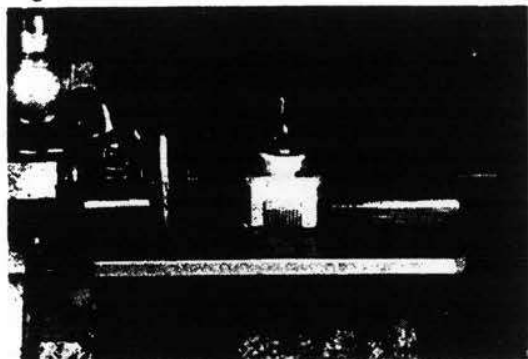


- (3) Measure the maximum pressure with pump revolution at 200 rpm.

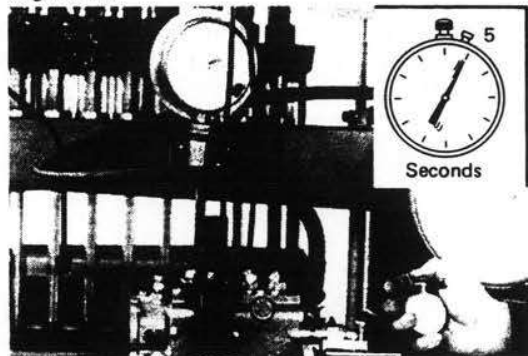
**Pressure Above 150 kg/cm²
(2133 psi)**

FUEL SYSTEM – Injection Pump**6-59****Fig. 6-186****2. Delivery valve test**

- (1) Stop the pump revolution when the pressure gauge reading exceeds 150 kg/cm² (2133 psi).

Fig. 6-187

- (2) Set the control rack position at 0 mm.

Fig. 6-188

- (3) Measure the time required by valve holder to lose its pressure by 10 kg/cm² (142 psi).

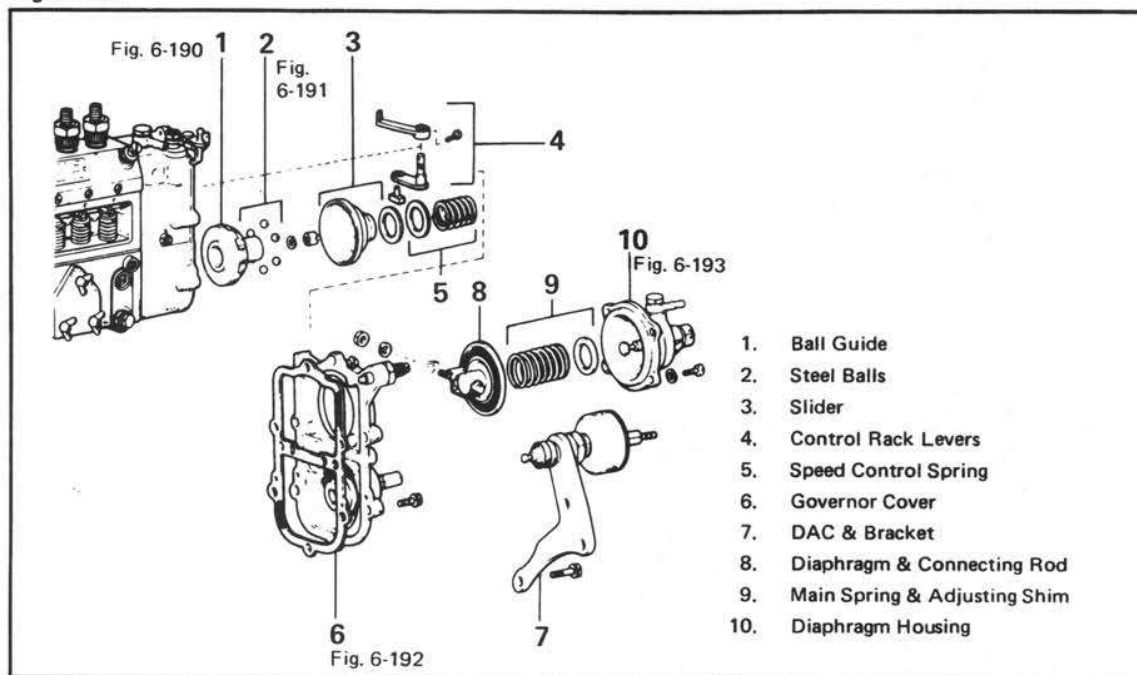
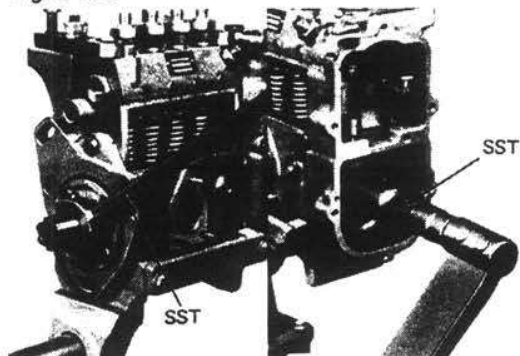
**Time required for losing 10
kg/cm² (142 psi)
More than 5 seconds**

- (4) If under the limit, replace both plunger and delivery valve.

6-60

FUEL SYSTEM – Injection Pump**ASSEMBLY (COMBINED GOVERNOR)**

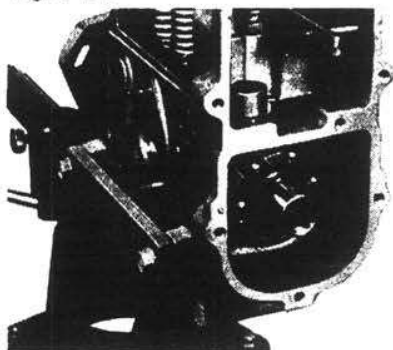
Assemble in numerical order.

Fig. 6-189**Fig. 6-190**

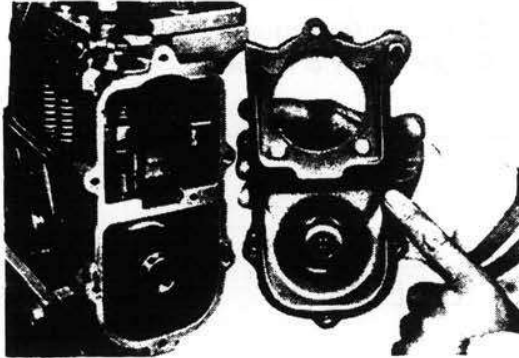
Hold the spline shaft with SST[09278-46010] and tighten the round nut with SST[09266-67011].

Torque

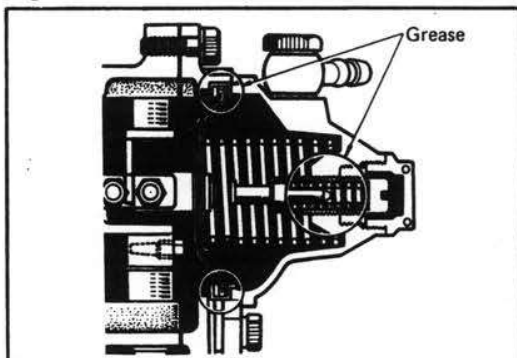
5.0 – 6.0 kg-m
(36.2 – 43.4 ft-lb)

Fig. 6-191

Apply grease to the ball guide groove and put six steel balls in the groove.
Place slider onto the ball guide.

FUEL SYSTEM –Injection Pump**6–61****Fig. 6-192**

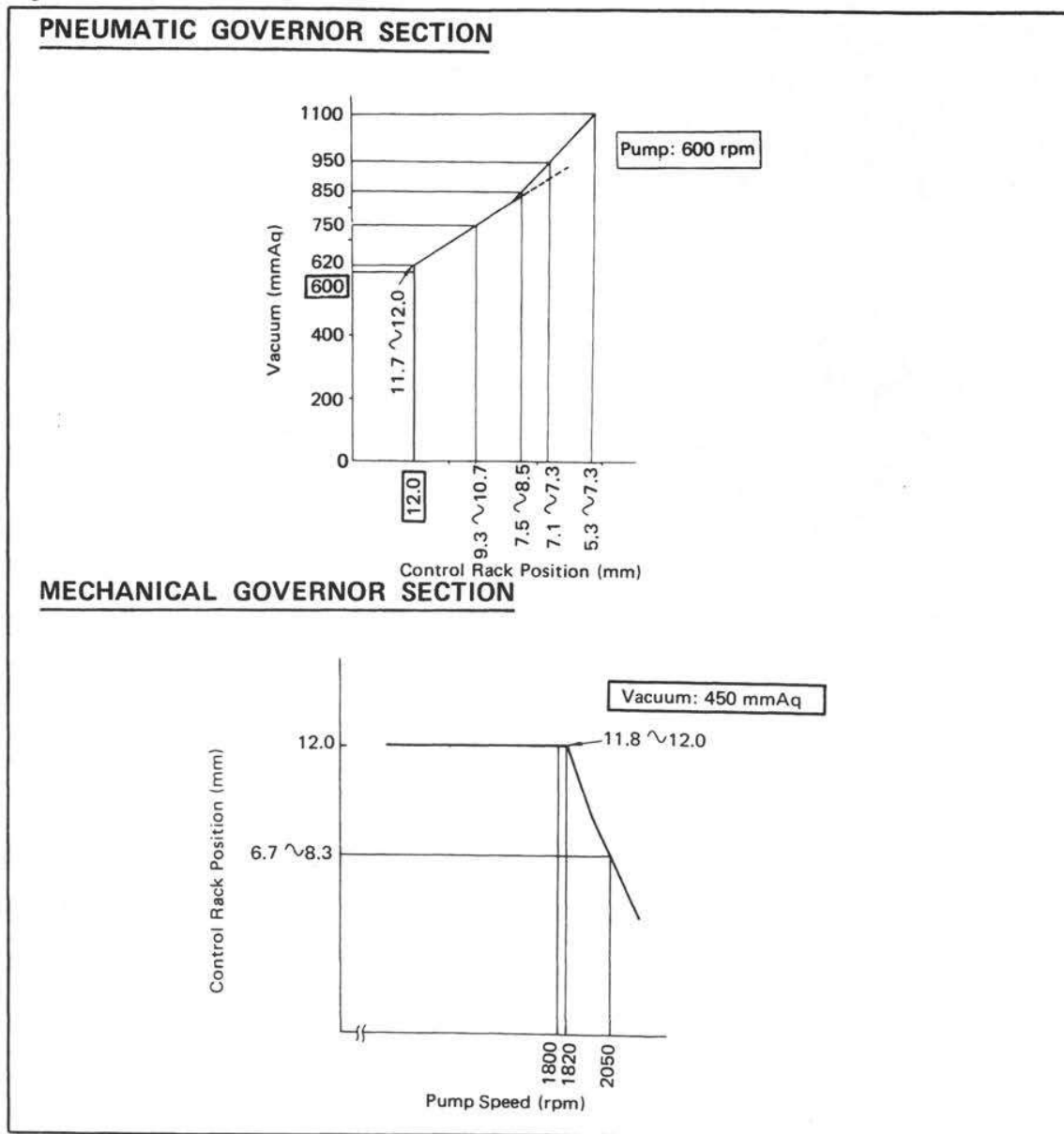
Lightly coat the liquid sealer to the new governor cover gasket before installing.

Fig. 6-193

Coat diaphragm housing and idling capsule with grease to keep vacuum chamber airtight.

6-62 **FUEL SYSTEM – Injection Pump****ADJUST (COMBINED GOVERNOR)****Combined Governor Characteristic
Diagram (For B Engine)**

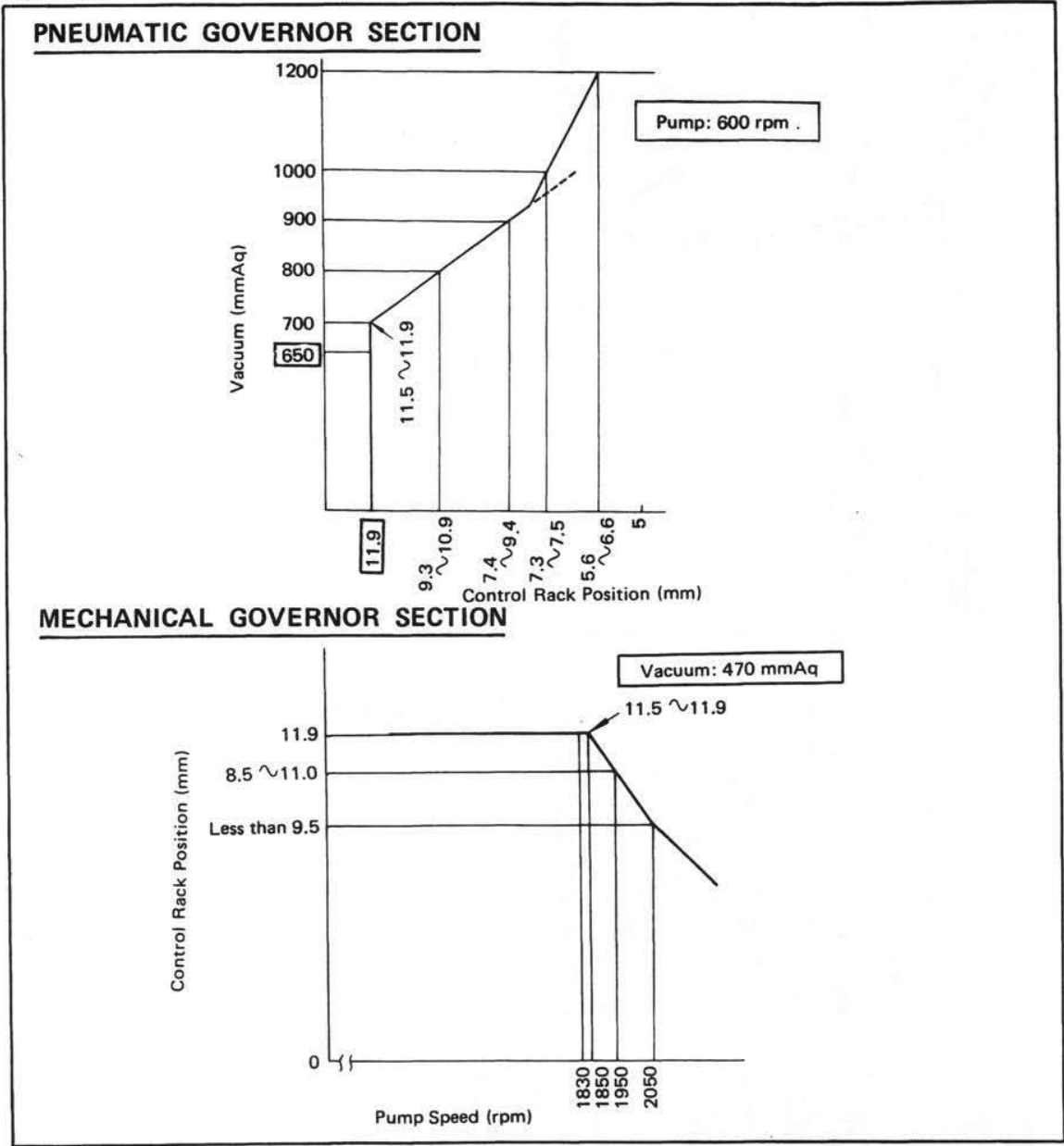
Fig. 6-194

**Total Injection Volume (For B Engine)**

Measuring Strokes	Pump rpm	Vacuum	Total Injection Volume
500	1100	120 mmAq (4.72 in.Aq)	106.0 – 110.0 cc (6.47 – 6.71 cu.in.) For ECE 101.0 – 105.0 cc (6.16 – 6.41 cu.in.)

Combined Governor Characteristic Diagram (For 2B Engine)

Fig. 6-195

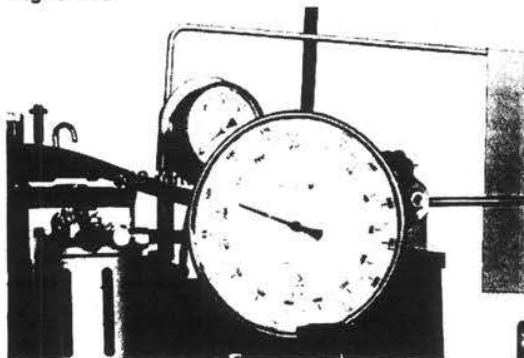


Total Injection Volume (For 2B Engine)

Measuring Strokes	Pump rpm	Vacuum	Total Injection Volume
500	1100	200 mmAq (7.87 in.Aq)	111.0 – 115.0 cc (6.77 – 7.02 cu.in.)

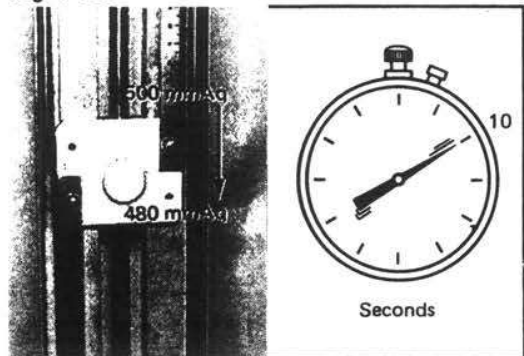
6-64 **FUEL SYSTEM – Injection Pump**

Fig. 6-196

**Test Airtightness**

1. Set the injection pump revolution at 600 rpm.

Fig. 6-197

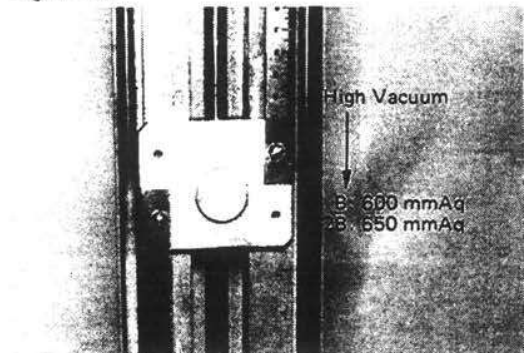


2. Measure the time required by vacuum chamber to lose its vacuum down to 480 mmAq (18.90 in.Aq).

Vacuum Loss	Time
From 500 mmAq to 480 mmAq (19.69 in.Aq) (18.90 in.Aq)	More than 10 seconds

3. Retighten the diaphragm housing or inspect the diaphragm if airtightness is unsatisfactory.

Fig. 6-198

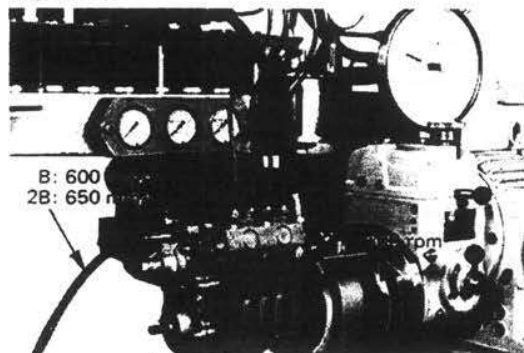
**Adjust Initial Set of Control Rack**

1. Set the vacuum to specified value.

— Note —

When altering the vacuum, set to specified value after altering largely, and read graduation when it becomes steady.

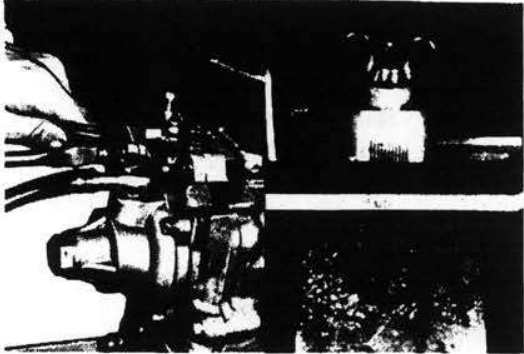
Fig. 6-199



2. Check the initial set point of control rack.

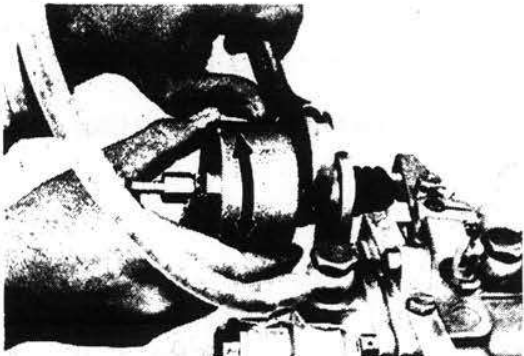
Engine Model	Pump rpm	Vacuum	Control Rack Position
B	600	600 mmAq (23.62 in.Aq)	12.0 mm (0.472 in.)
2B	600	650 mmAq (25.59 in.Aq)	11.9 mm (0.469 in.)

Fig. 6-200



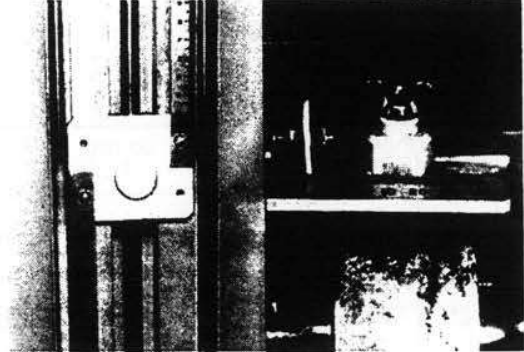
3. Adjust the initial set of control rack by turning full stop capsule.

Fig. 6-201



4. If the governor is equipped with diesel altitude compensator (DAC) instead of full stop capsule, adjust by it.

Fig. 6-202

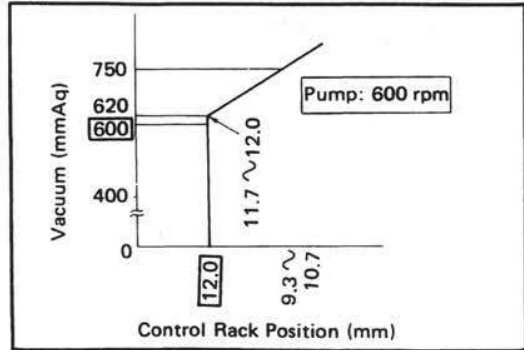


Adjust Main Spring

1. Check the control rack position.

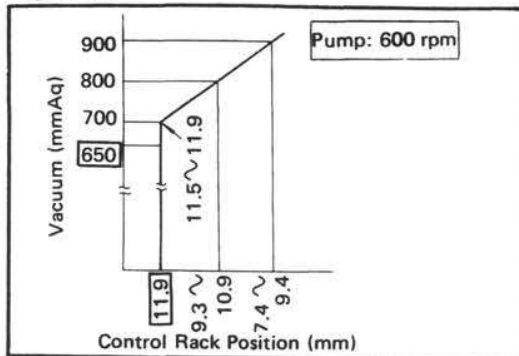
Engine Model	Pump rpm	Vacuum	Rack Position
B	600	620 mmAq (24.41 in.Aq)	11.7 – 12.0 mm (0.461 – 0.472 in.)
		750 mmAq (29.53 in.Aq)	9.3 – 10.7 mm (0.366 – 0.429 in.)
2B	600	700 mmAq (27.56 in.Aq)	11.5 – 11.9 mm (0.453 – 0.469 in.)
		800 mmAq (31.50 in.Aq)	9.3 – 10.9 mm (0.366 – 0.429 in.)
		900 mmAq (35.43 in.Aq)	7.4 – 9.4 mm (0.291 – 0.370 in.)

Fig. 6-203



6-66 **FUEL SYSTEM – Injection Pump**

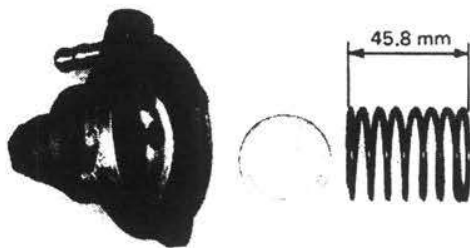
Fig. 6-204



- Adjust the control rack position by increasing number of main spring shim.

Shim Thickness**0.5, 1.0, 2.0, 3.0 mm****(0.020, 0.039, 0.079, 0.118 in.)****– Note –****When rack position is increased.****Increase shim thickness.****When rack position is decrease.****Decrease shim thickness.**

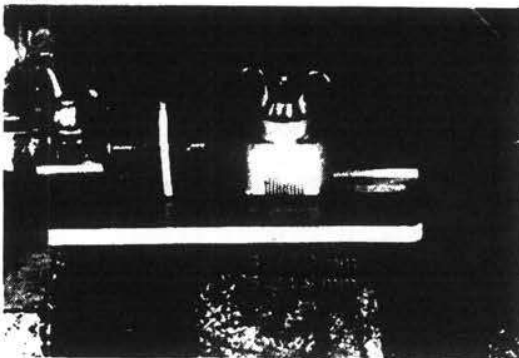
Fig. 6-205



- If the control rack position is not within specification, check the main spring.

Free length 45.8 mm (1.803 in.)

Fig. 6-206

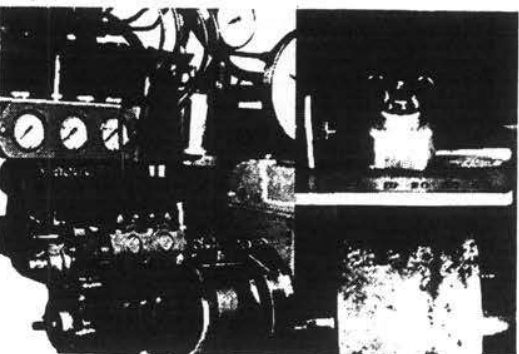


- When adjustment is completed, reconfirm initial setting.

Initial Set of Control Rack

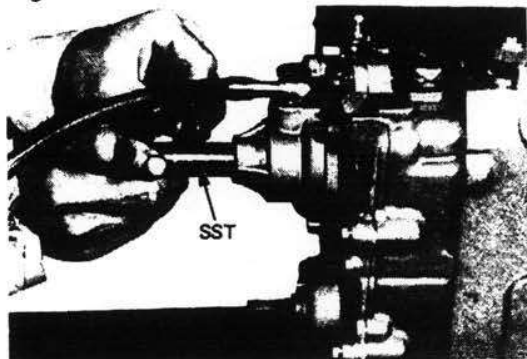
Engine Model	Pump rpm	Vacuum	Control Rack Position
B	600	600 mmAq (23.62 in.Aq)	12.0 mm (0.472 in.)
2B	600	650 mmAq (25.59 in.Aq)	11.9 mm (0.469 in.)

Fig. 6-207

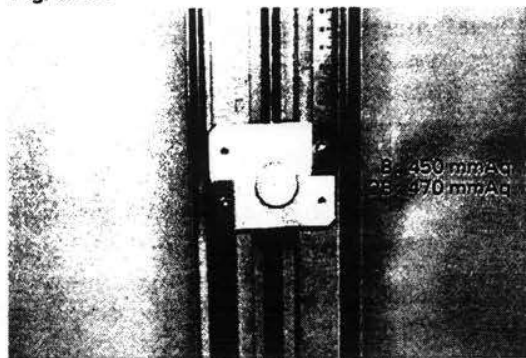
**Adjust Idling Spring Capsule**

- Check the control rack position.

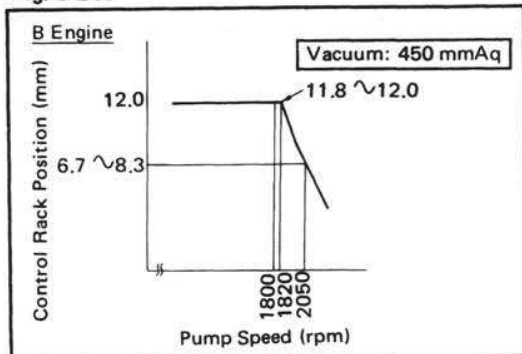
Engine Model	Pump rpm	Vacuum	Control Rack Position
B	600	850 mmAq (33.46 in.Aq)	7.5 – 8.5 mm (0.295 – 0.335 in.)
		950 mmAq (37.40 in.Aq)	7.1 – 7.3 mm (0.280 – 0.287 in.)
		1100 mmAq (43.31 in.Aq)	5.3 – 7.3 mm (0.209 – 0.287 in.)
2B	600	1000 mmAq (39.37 in.Aq)	7.3 – 7.5 mm (0.287 – 0.295 in.)
		1200 mmAq (47.24 in.Aq)	5.6 – 6.6 mm (0.220 – 0.260 in.)

FUEL SYSTEM – Injection Pump**6-67****Fig. 6-208**

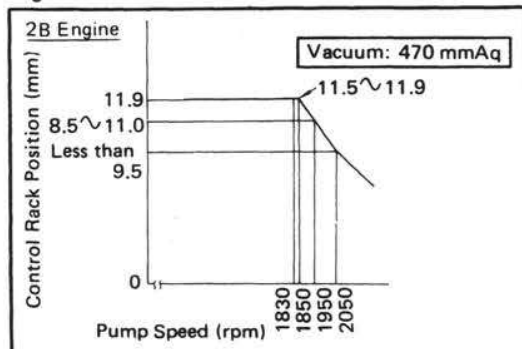
2. Using SST[09282-76010], adjust the control rack position by turning idling capsule.

Fig. 6-209**Adjust Mechanical Governor Section**

1. Set the vacuum to specified value.

Fig. 6-210

2. Check the control rack position.

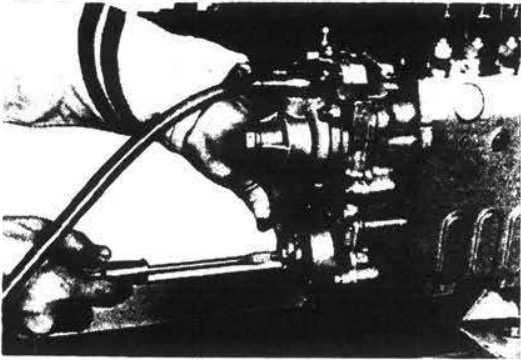
Fig. 6-211

Engine Model	Vacuum	Pump rpm	Control Rack Position
B	450 mmAq (17.72 in.Aq)	1800	12.0 mm (0.472 in.)
		1820	11.8 – 12.0 mm (0.465 – 0.472 in.)
		2050	6.7 – 8.3 mm (0.264 – 0.327 in.)
2B	470 mmAq (18.50 in.Aq)	1830	11.9 mm (0.469 in.)
		1850	11.5 – 11.9 mm (0.453 – 0.469 in.)
		1950	8.5 – 11.0 mm (0.335 – 0.433 in.)
		2050	Less than 9.5 mm (0.374 in.)

6-68

FUEL SYSTEM – Injection Pump

Fig. 6-212



3. Adjust the control rack position by turning speed control screw.

Fig. 6-213

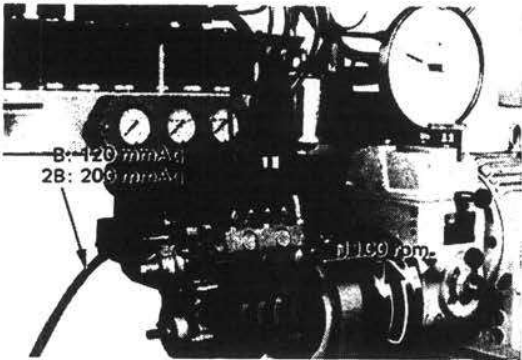
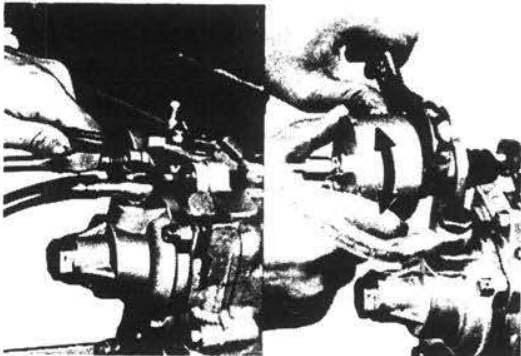


Fig. 6-214



Total Injection Volume

1. Measure the total injection volume at 500 strokes.

Engine Model	Pump rpm	Vacuum	Total Injection Volume
B	1100	120 mmAq (4.72 in.Aq)	106.0 – 110.0 cc (6.47 – 6.71 cu.in.)
B(For ECE)	1100	120 mmAq (4.72 in.Aq)	101.0 – 105.0 cc (6.16 – 6.41 cu.in.)
2B	1100	200 mmAq (7.87 in.Aq)	111.0 – 115.0 cc (6.77 – 7.02 cu.in.)

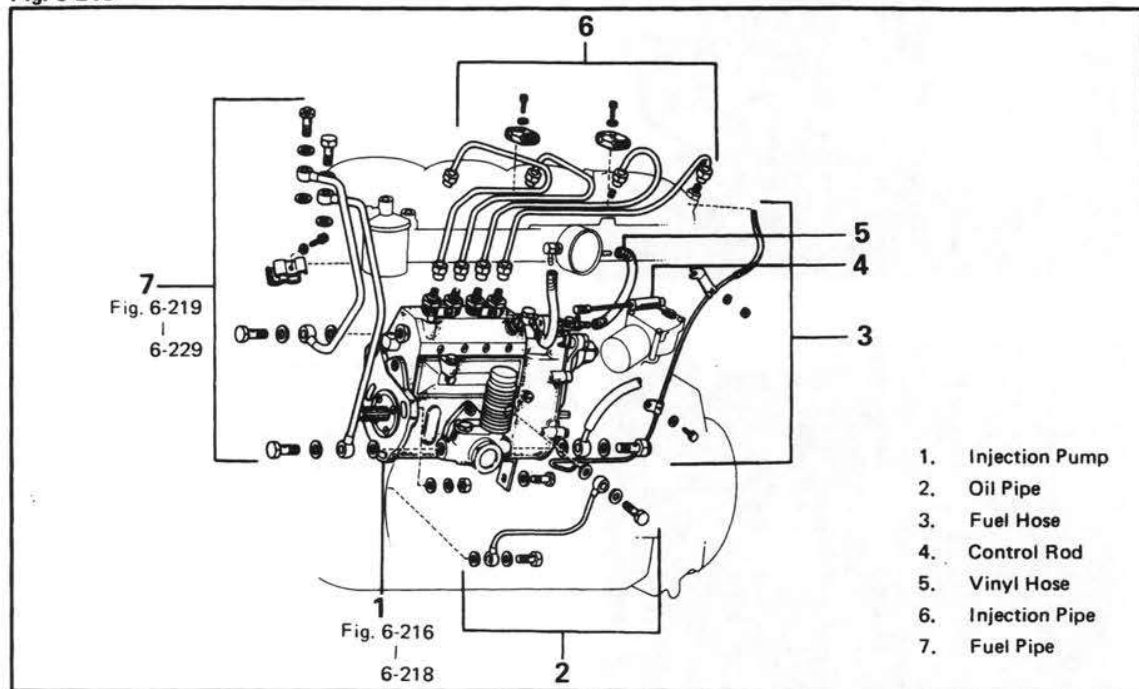
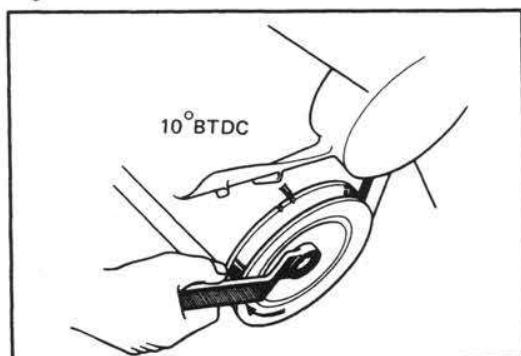
2. If the total injection volume is not within specified value, adjust it by turning full stop capsule or diesel altitude compensator.

FUEL SYSTEM – Injection Pump

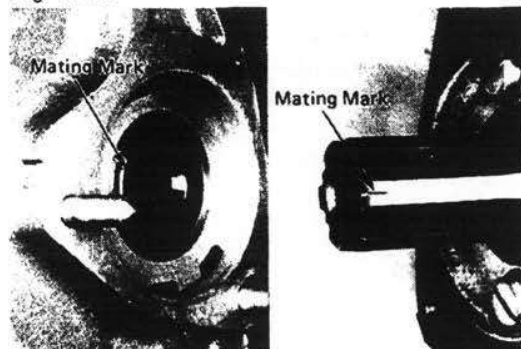
6-69

INSTALLATION

Install in numerical order.

Fig. 6-215**Fig. 6-216**

Make sure that the No.1 cylinder piston is at 10° BTDC/Compression before installing the injection pump.

Fig. 6-217

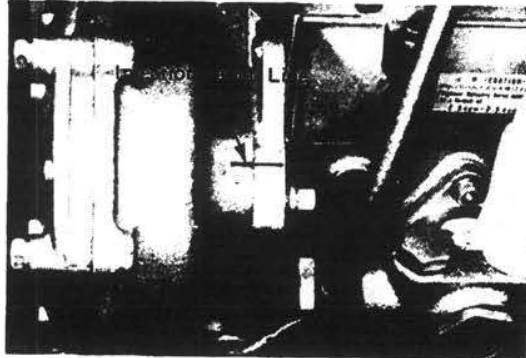
Align the mating marks on the injection pump spline shaft and timer drive shaft when installing the Injection pump.



— Note —
Coat MP grease on the splines.

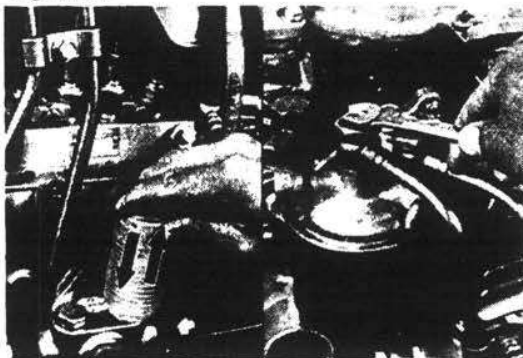
6-70 FUEL SYSTEM – Injection Pump

Fig. 6-218



Set the injection period line to the former position.

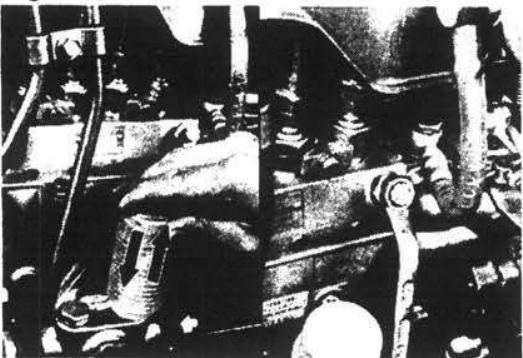
Fig. 6-219



Bleed the air from fuel system after installation is completed.

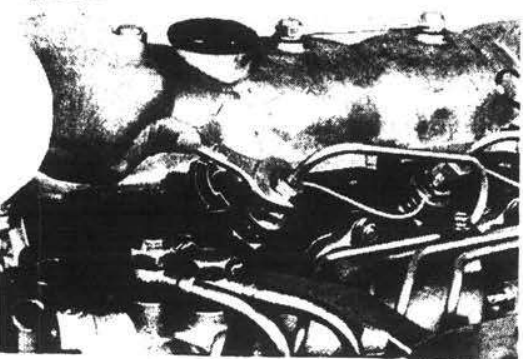
- (1) Bleed the air from fuel filter by operating priming pump.

Fig. 6-220

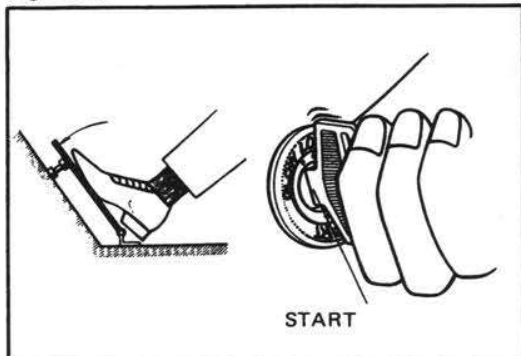


- (2) Bleed the air from injection pump by operating priming pump.

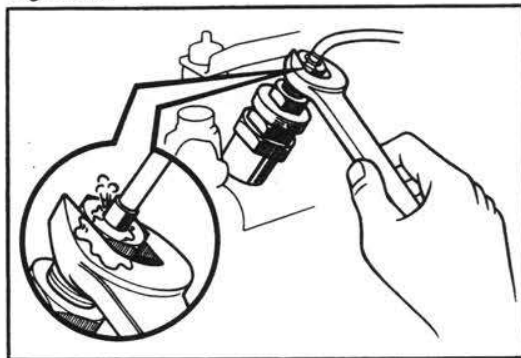
Fig. 6-221



- (3) Loosen all union nuts of the injection pipe at nozzle holder side.

FUEL SYSTEM – Injection Pump**6-71****Fig. 6-222**

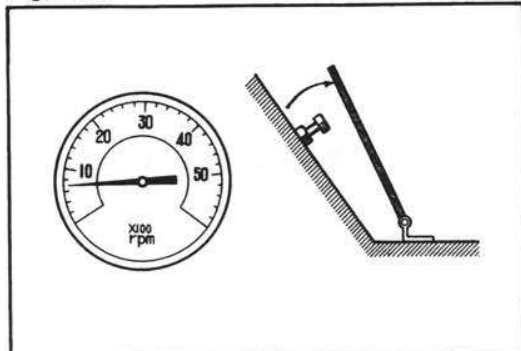
- (4) Turn the engine with the accelerator pedal depressed all the way.

Fig. 6-223

- (5) Bleed the air by cranking the engine and force out the fuel from injection pipe.

– Note –

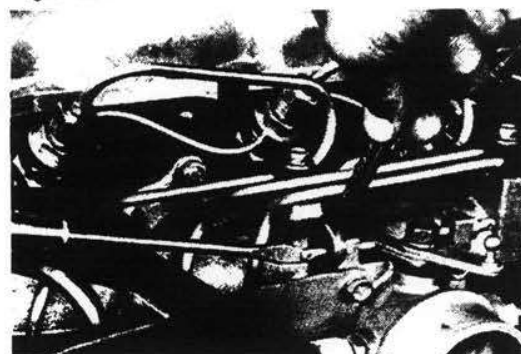
Start the engine and inspect all pipe lines for fuel leaks.

Fig. 6-224

Adjust the engine idle speed and the maximum speed after installation is completed.

- (1) Warm up the engine.
- (2) Check the engine idle speed.

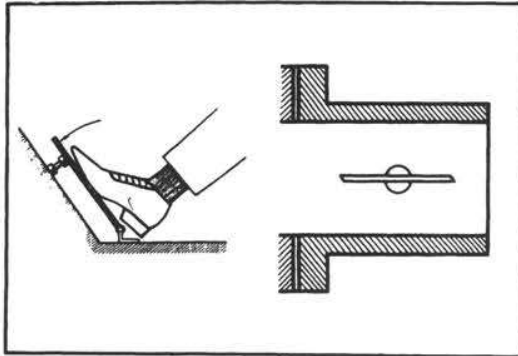
Idle speed 625 – 675 rpm

Fig. 6-225

- (3) Adjust the idle speed to specification by turning the stop plate adjusting screw.

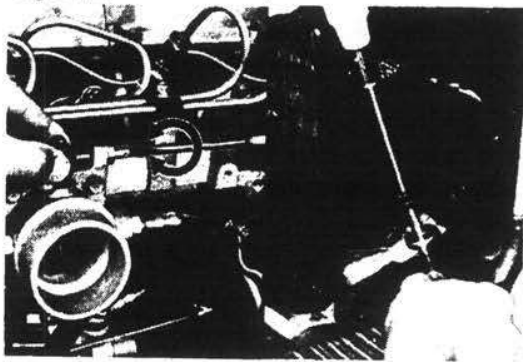
6-72 **FUEL SYSTEM** — Injection Pump

Fig. 6-226



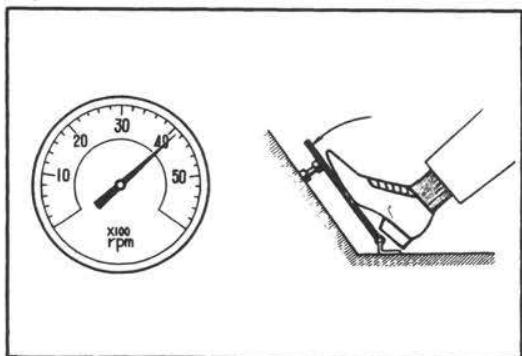
- (4) Make sure that the throttle valve is fully open when the accelerator pedal is depressed all the way.

Fig. 6-227



- (5) Make the full open adjustment through the full throttle adjusting bolt or accelerator pedal stop bolt.

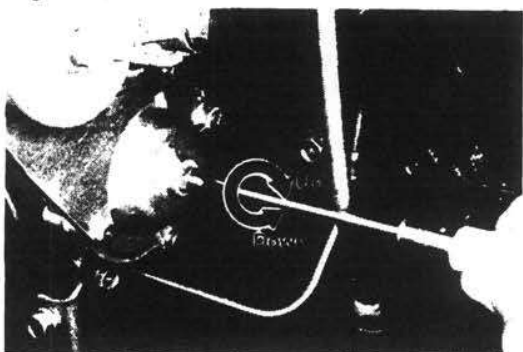
Fig. 6-228



- (6) Check the engine maximum speed when the accelerator pedal is depressed all the way.

Maximum speed 4050 – 41000 rpm

Fig. 6-229



- (7) If the maximum speed is not within specification, adjust by turning the adjusting screw of the injection pump.

