Solar 030 / 035

Shop Manual

2023-7091E

November 1996

Daewoo reserves the right to improve our products in a continuing process to provide the best possible product to the market place. These improvements can be implemented at any time with no obligation to change materials on previously sold products. It is recommended that consumers periodically contact their distributors for recent documentation on purchased equipment.

This documentation may include attachments and optional equipment that is not available in your machine's package. Please call your distributor for additional items that you may require.

Illustrations used throughout this manual are used only as a representation of the actual piece of equipment, and may vary from the actual item.

9) How to prevent machine from moving unintentionally and how to park machine.

Jumping onto or attempting to hold on to a moving machine, with or without an operator on board , can result in serious injury.

To prevent the machine from moving unintentionally, follow the procedures below:

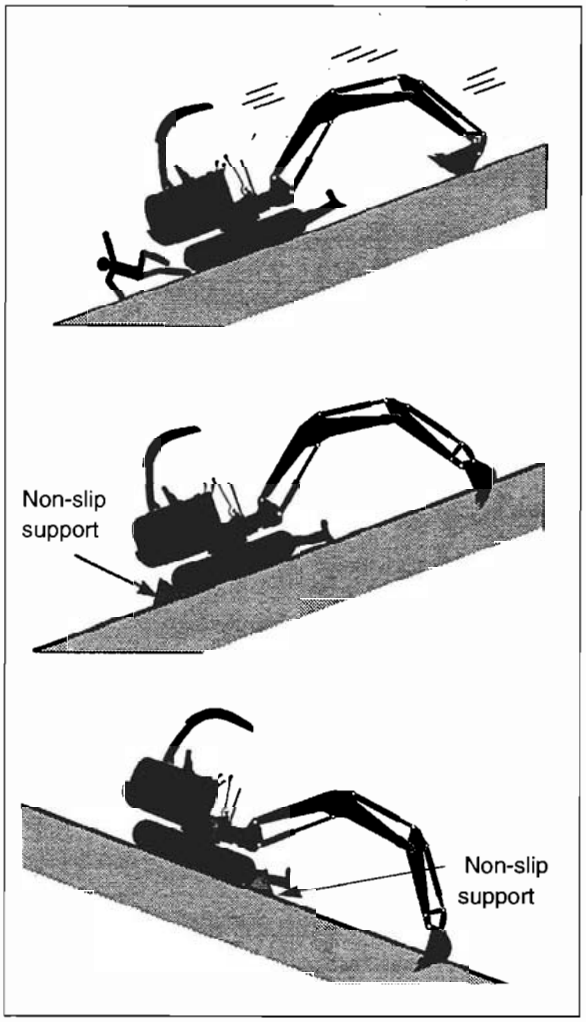
(1) Park on level ground and lower all attachments such as the bucket , blade, etc.

(2) Place throttle control at lowest setting.

(3) Turn ignition switch to OFF and remove key.

(4) If machine must be left on an incline, line it up in the direction of the incline, chock both tracks and drive the point of the bucket into the ground.

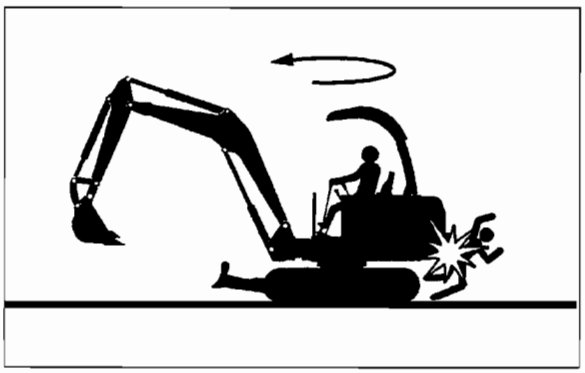
- Park machine so that there is enough clearance from other machines.



10) Precautions for turning and traveling in reverse.

Turning and backing up are potentially dangerous because of restricted visibility. Use a signal man when turning or backing up.

- Watch for people nearby.
- Use horn or other signal to warn people nearby.
- Keep windows, mirrors and head lights clean and in good repair at all times.
- Slow down when visibility is poor due to dust, heavy rain, fog, or other conditions.



31) Fire prevention

(1) Hoses and piping

- Check hoses, lines and connections for leaks, which can cause a fire.
- Check for loose or missing plugs, and frayed or kinked hoses and piping.

(2) Electric cable and wiring

- Check daily for loose, kinked, hardened or frayed electric cables or lines. Electrical wiring with a short can cause a fire.

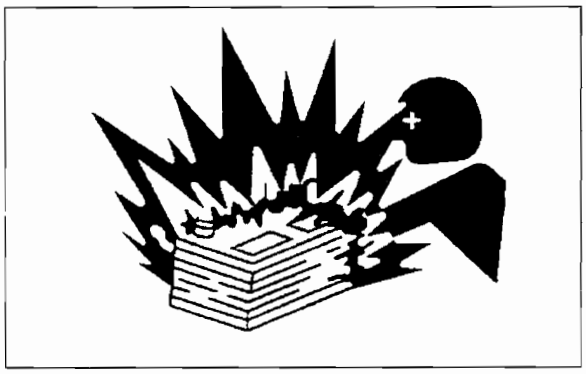
32) Prevention of battery explosion

Batteries emit hydrogen gas, which can explode. Take the following precautions when handling batteries:

(1) Never bring sparks, lighted cigarettes , any source of intense heat or flame near the battery.

(2) Never check battery by shorting positive terminal with a metal object. Use a voltmeter and a hydrometer.

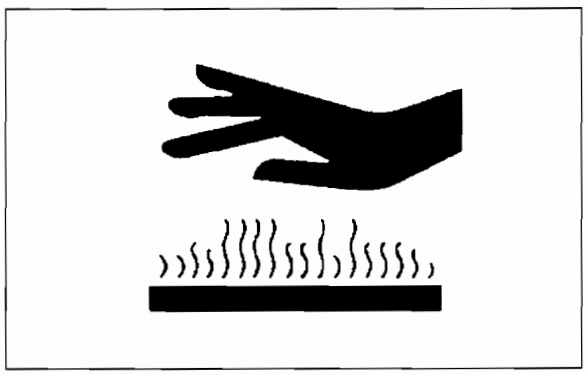
(3) Never recharge frozen batteries. An explosion may result. Heat frozen batteries slowly up to 16°C (60°F) before recharging.



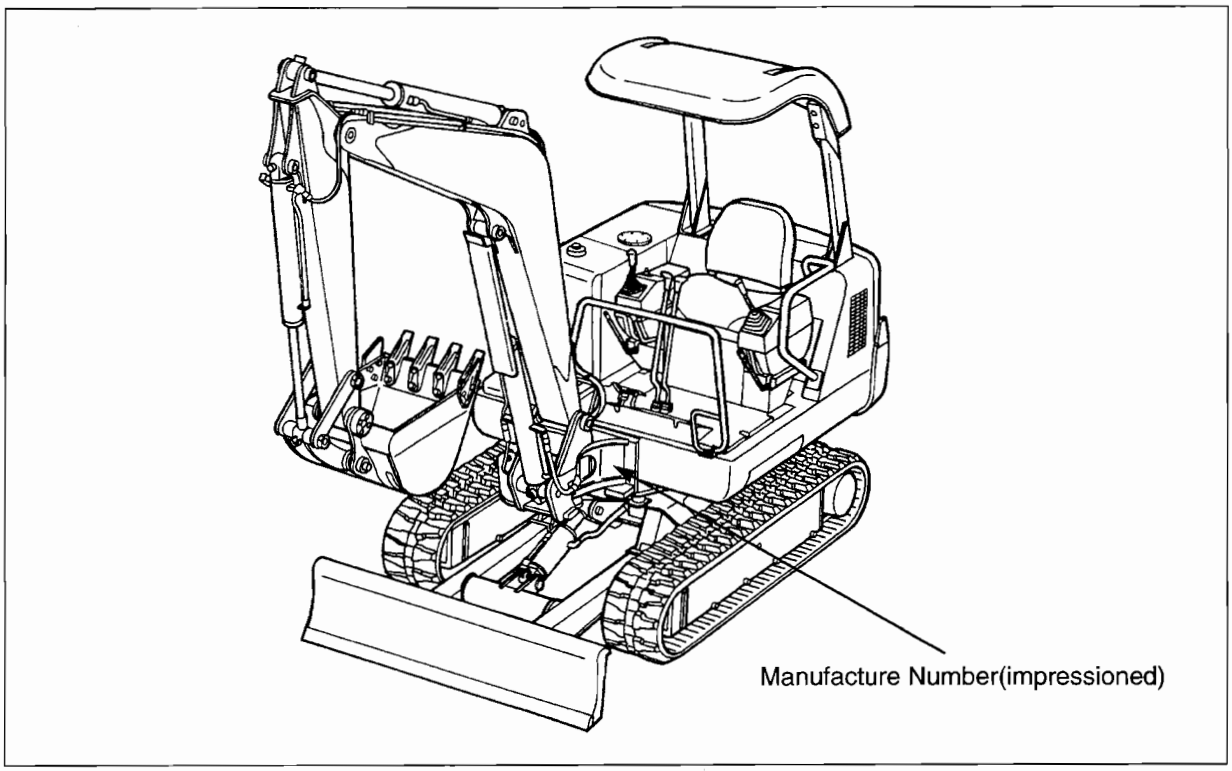
33) Burn Prevention

(1) Be careful not to get burned by hot coolant or steam.

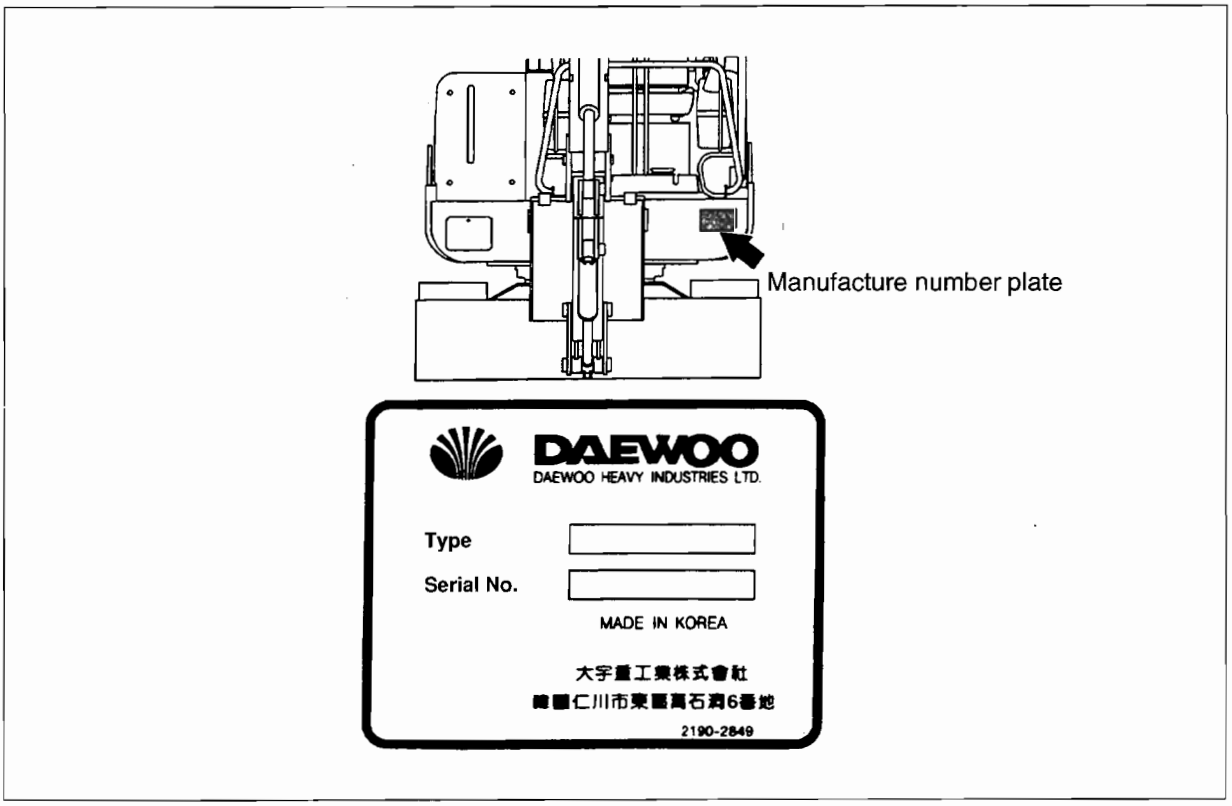
- Coolant in the engine, radiator and heater lines is very hot or is turned to steam during operation. It is also under high pressure. Stop the engine and allow the radiator to cool down before inspection or service.
- After radiator is cool, remove radiator cap slowly to release pressure slowly.



2.5. EXCAVATOR IDENTIFICATION NUMBER



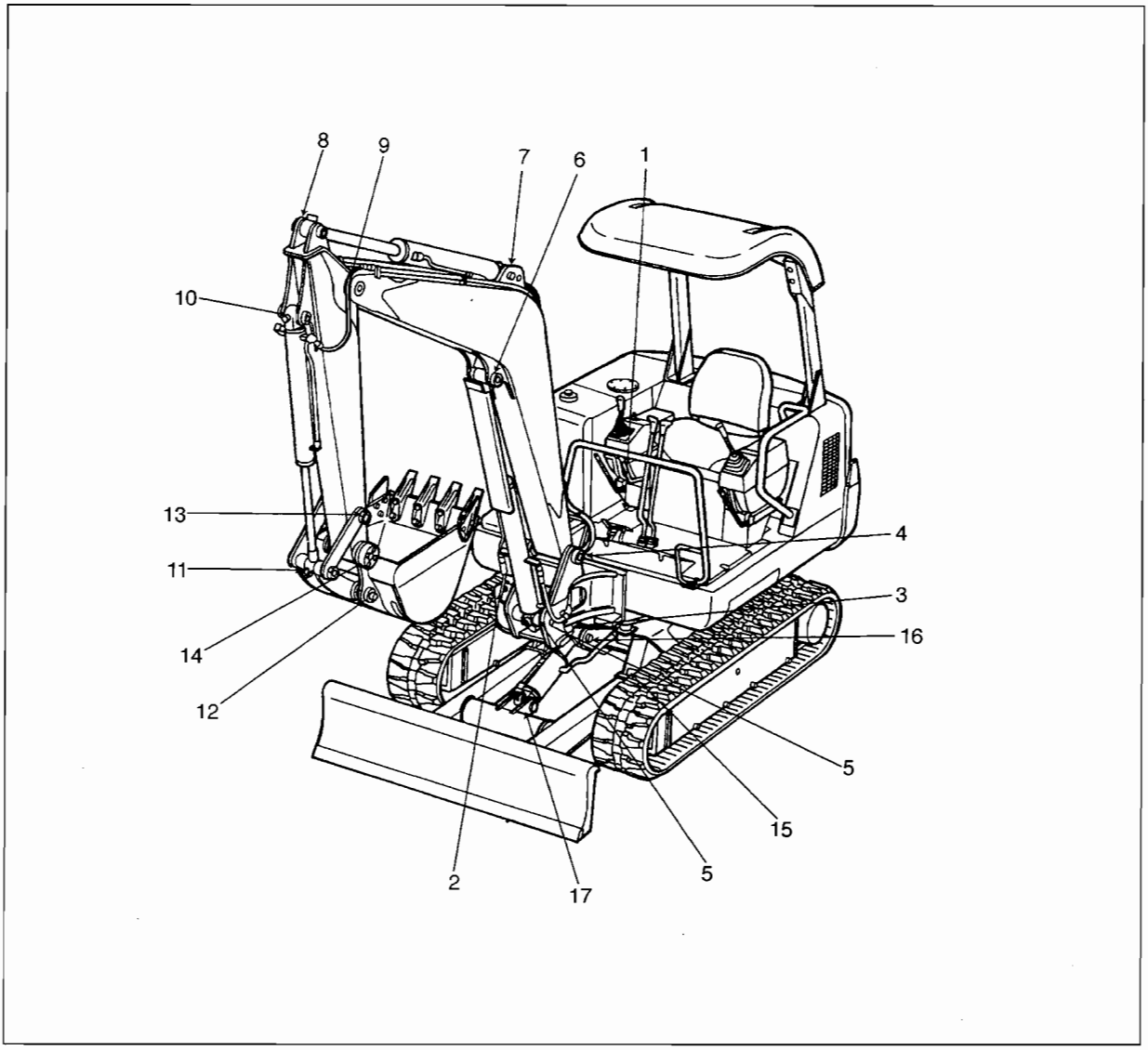
- **Location of Manufacture Number Plate**



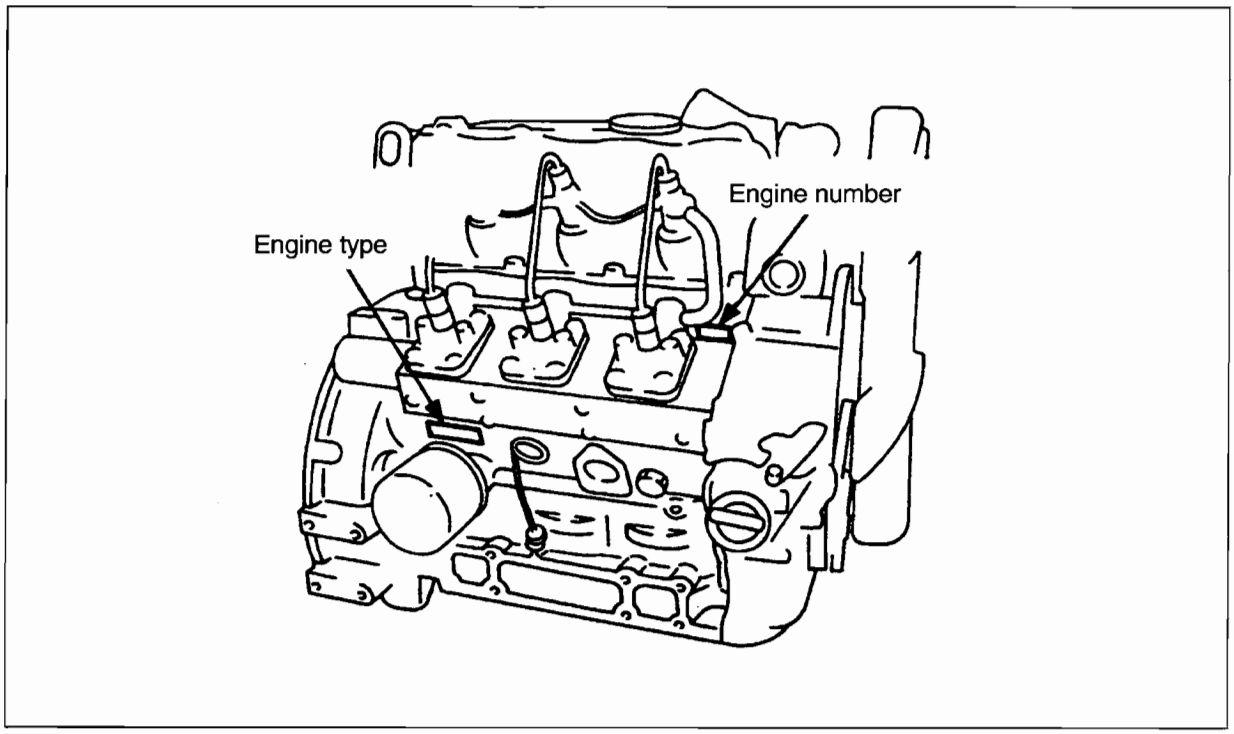
3. WORKING ATTACHMENTS

3.1. MAINTENANCE STANDARDS

3.1.1. Working attachments



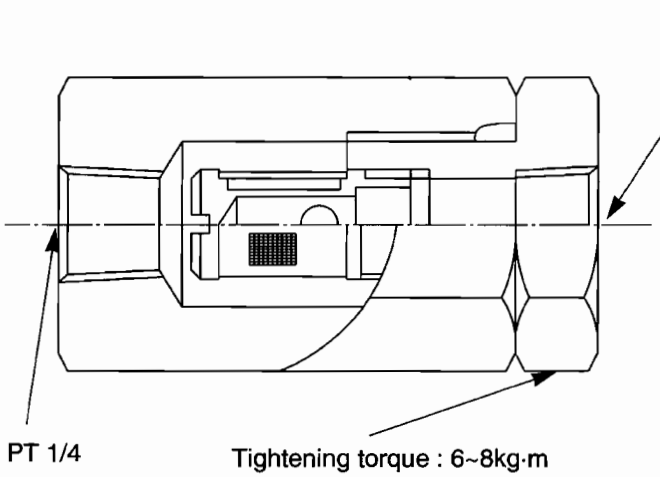
4.3. ENGINE NUMBER LOCATION



4.4. ENGINE RPM STANDARDS(FOR A NEW VEHICLE)

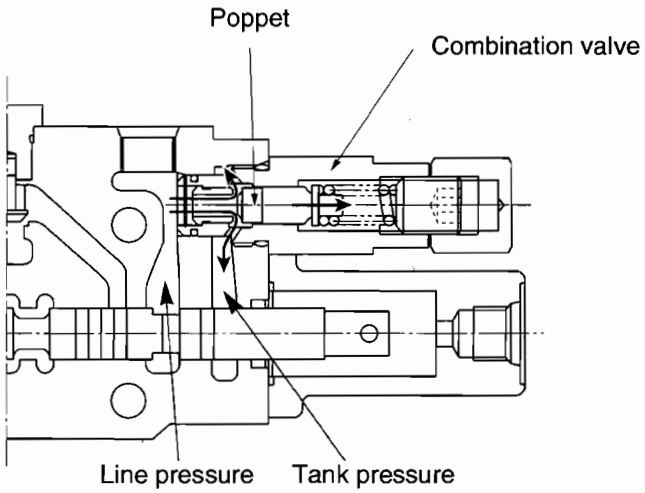
Conditions	Engine rpm	
	SOLAR 030	SOLAR 035
Maximum rpm at no-load	2100±50 rpm	2100±50 rpm
At P1 relief	2090±70 rpm	2130±70 rpm
At P2 relief	2050±70 rpm	2050±70 rpm

6.2.3. Pilot line filter(for joy stick)

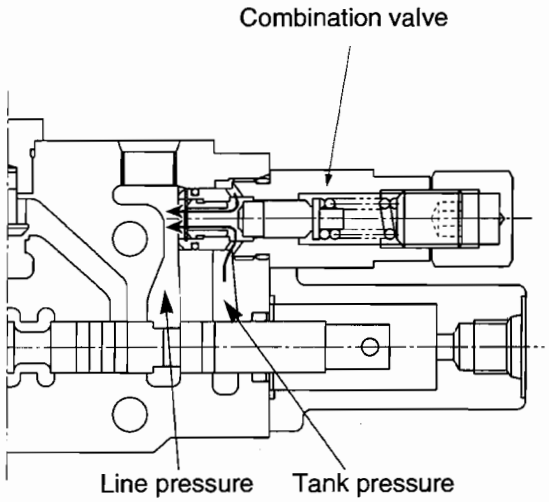


Quantity of flow	20 L/min
Rated pressure	40 kg/cm²
Filtering ability	31 μ
Filtering area	5 cm²
Oil temperature	-20°C~120°C

2. Combination valve

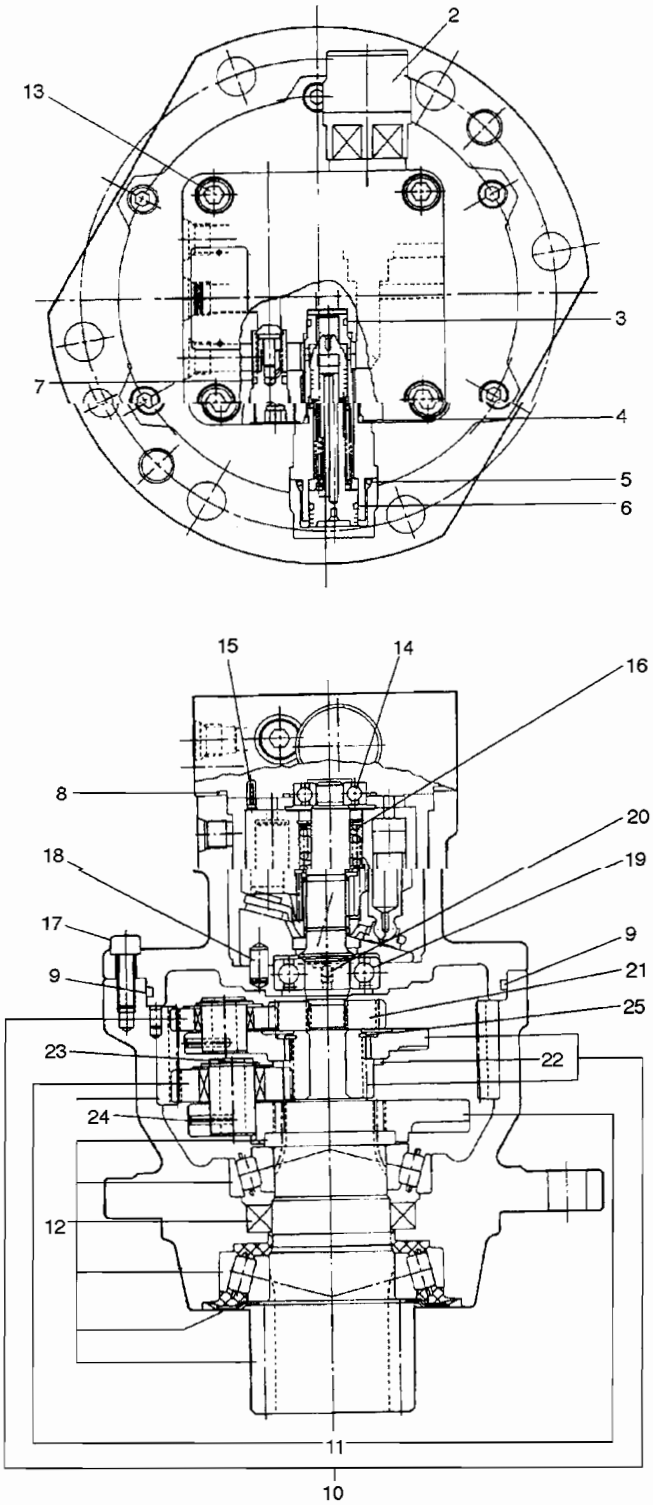


If the line pressure exceeds the set pressure, the poppet is pushed to the right side to make the line pressure flow to the tank.



The suction pressure activates the line pressure to make the seat move to the left side, and oil flows in the line from the tank. If the oil flows into the line to release the exhaust pressure, the seat moves to the right side again and is separated from the tank.

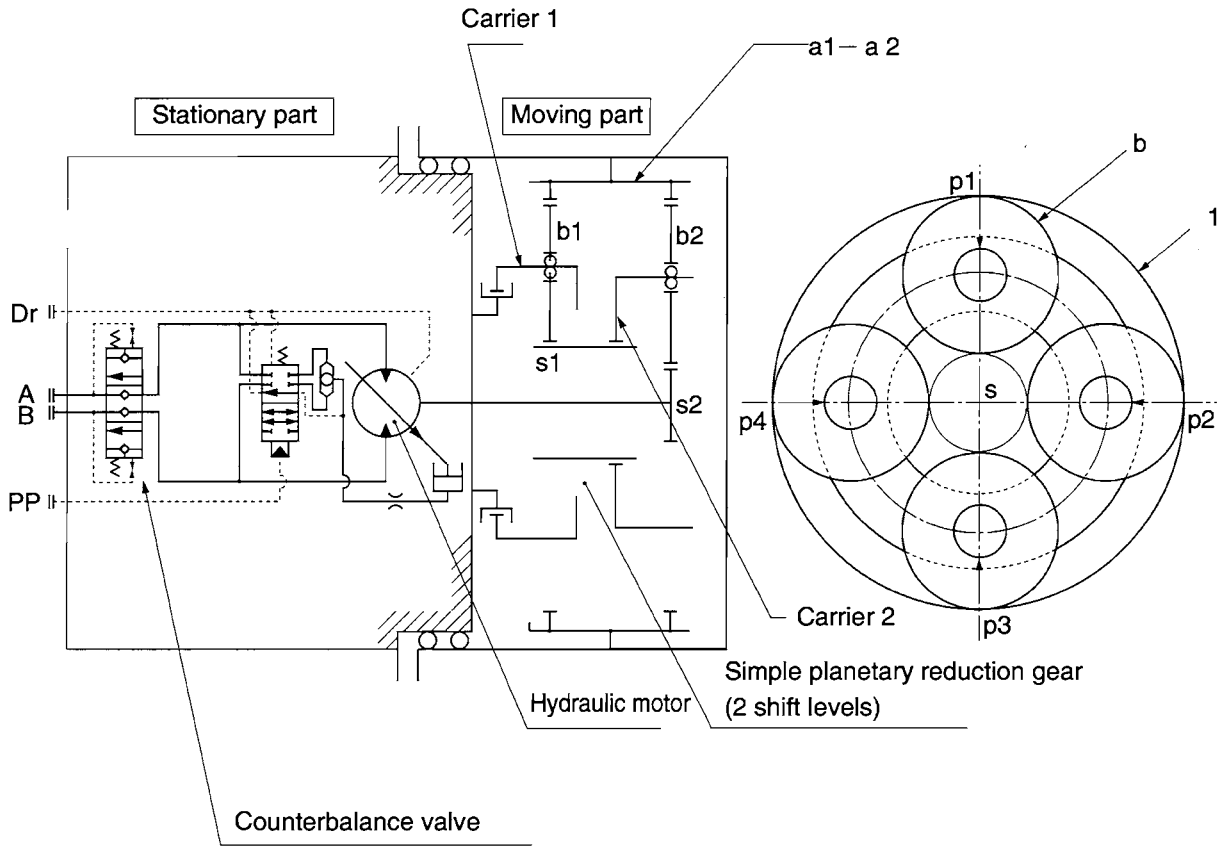
- **Internal structure(SOLAR 035)**



1. Swing motor assembly
2. Relief valve assembly
3. O-ring
4. O-ring
5. O-ring
6. O-ring
7. O-ring
8. O-ring
9. O-ring
10. Carrier gear assembly(2)
11. Carrier gear assembly(1)
12. Pinion gear assembly
13. Bolt
14. Bearing
15. Spring pin
16. Snap ring
17. Bolt
18. Parallel pin
19. Bearing
20. Filter
21. S2 gear
22. Thrust collar
23. Snap ring(S)
24. Spring pin
25. Snap ring(SA)

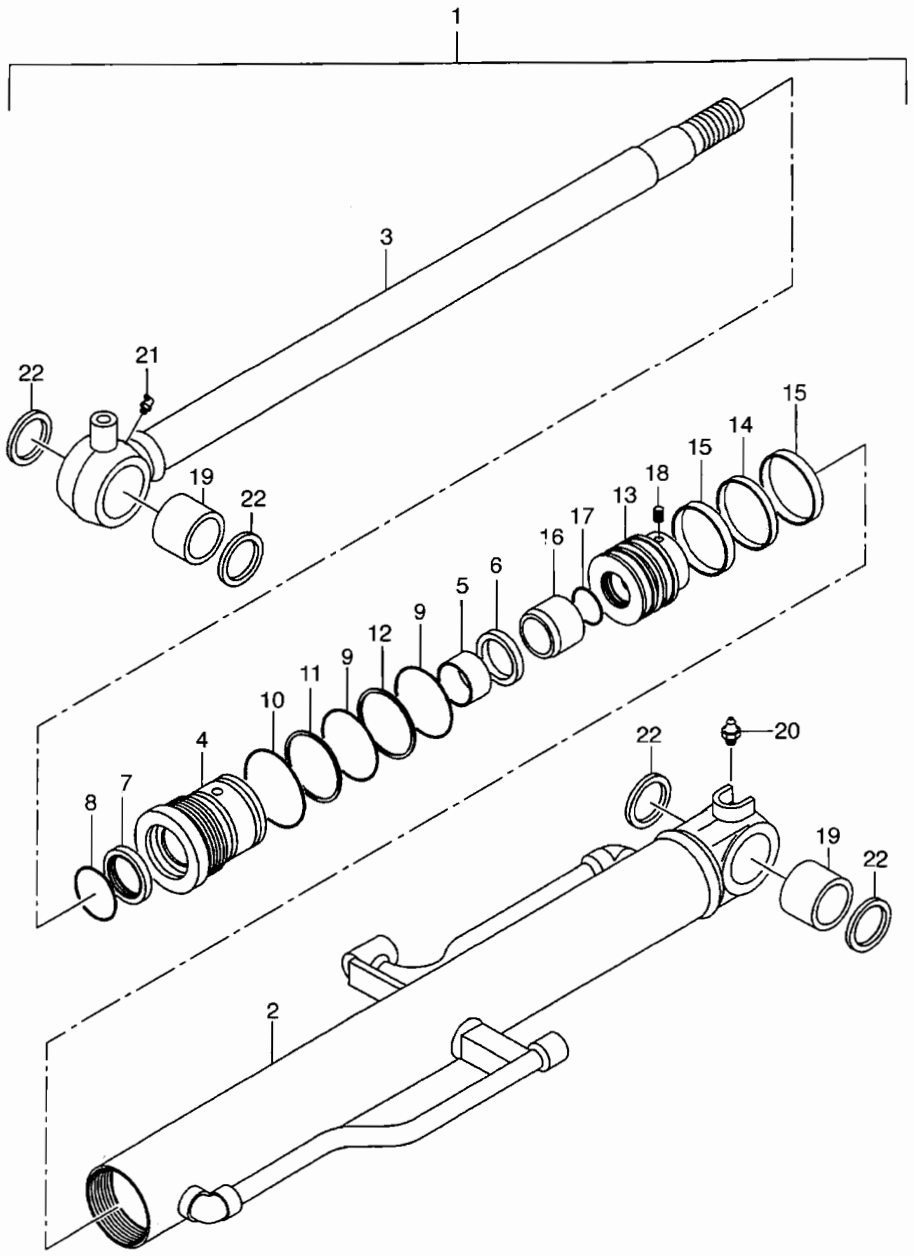
9.3. PRINCIPLES OF OPERATION

- **SOLAR 030**



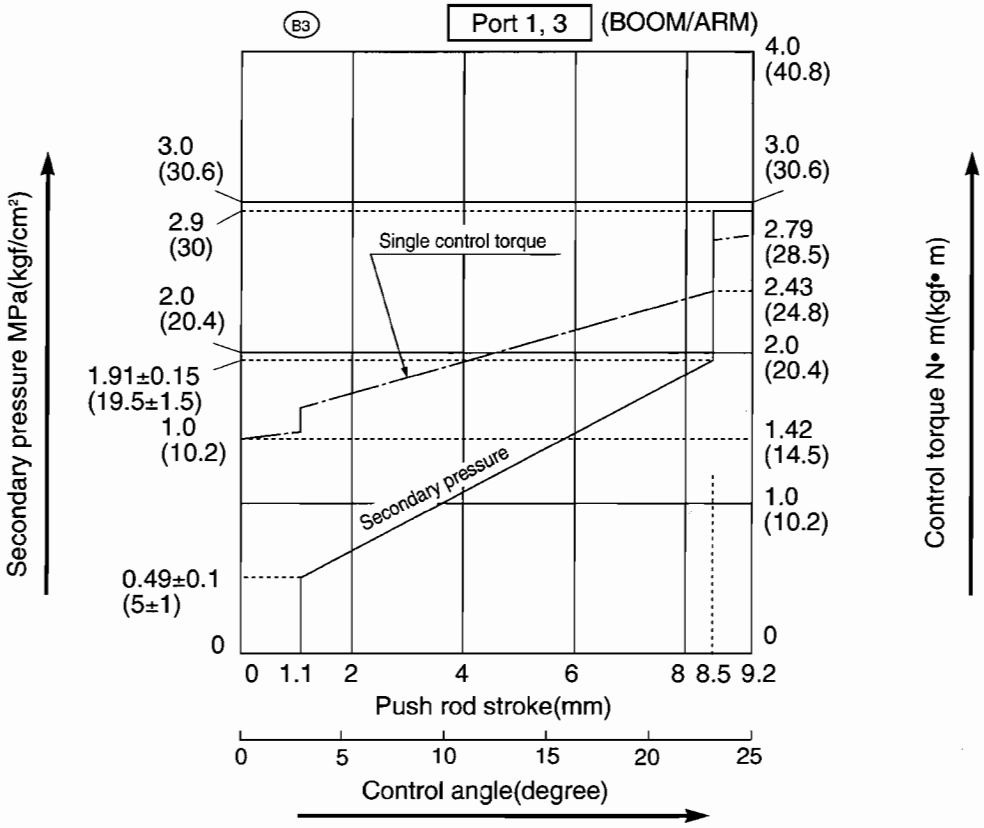
The hydraulic motor output shaft is connected to the s2 gear by the spline as shown above, and the rotation of the s2 gear is reduced preliminarily by the s2, b2, and a2 gear.
The rotation reduced at the first level is reduced further by the s1, b1, a1 gear connected to the carrier 2 by the spline, and this rotation reduced finally at the second level is transferred to the rotor body through the a1, a2 internal gear to produce driving force.

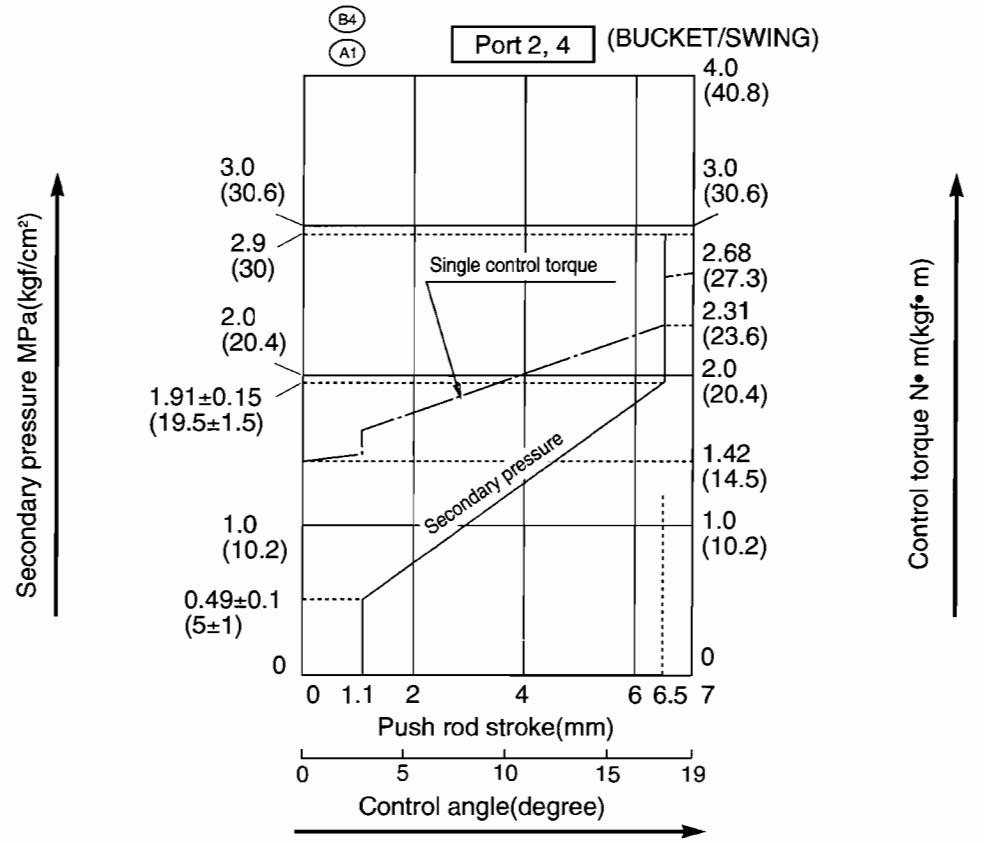
• **Internal construction(SOLAR030)**



1. Cylinder assembly
2. Cylinder tube assembly
3. Piston rod assembly
4. Rod cover
5. Bush
6. Rod packing
7. Dust seal
8. Snap ring
9. O-ring
10. O-ring
11. Backup ring
12. Backup ring
13. Piston
14. Piston packing
15. Wear ring
16. Cushion plunger
17. O-ring
18. Set screw
19. Bush
20. Grease nipple
21. Grease nipple
22. Dust seal

- **Secondary pressure characteristics and control torque**

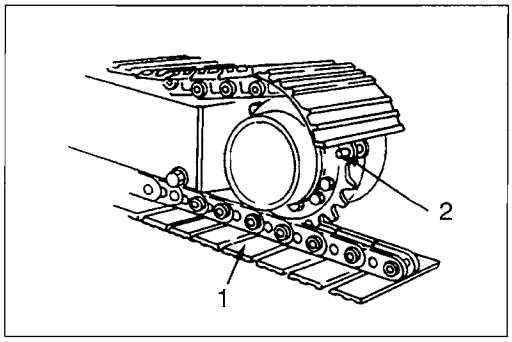




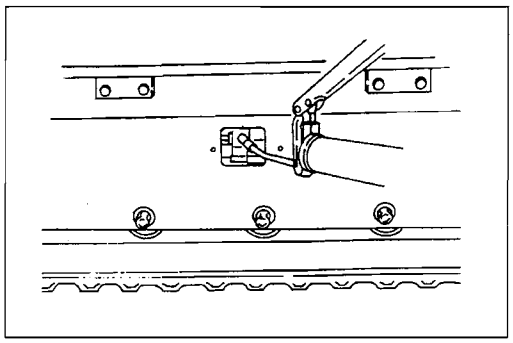
14.2.2. Crawler installation

- Crawler installation operation may very dangerous as it should be done with the machine inclined. Never move the machine during removal operation so that the machine may not be tipped over.

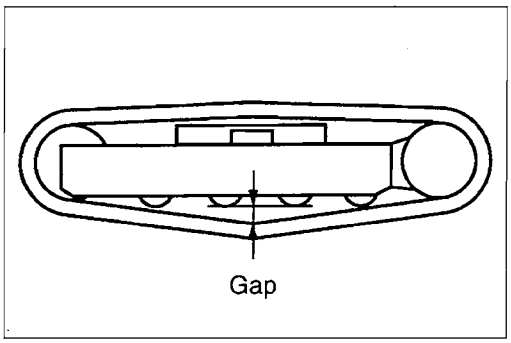
1. Crawler installation
   - Lift the machine in one side using the front and install wood block under the machine.
   - Index the crawler(1) with the sprocket teeth and then install it on top of the idler.
   - For steel crawlers, insert the the master pin(2).
     For rubber crawlers, install the crawler over the idler.



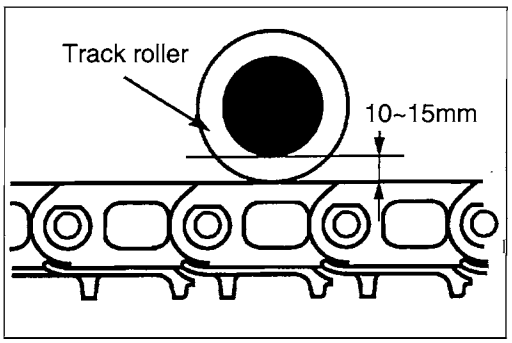
2. Track tension adjustment
   - With a grease gun, inject grease into the grease nipple.



   - Check
     Measure the distance between the rolling surface of the track roller and the contact surface of the crawler.

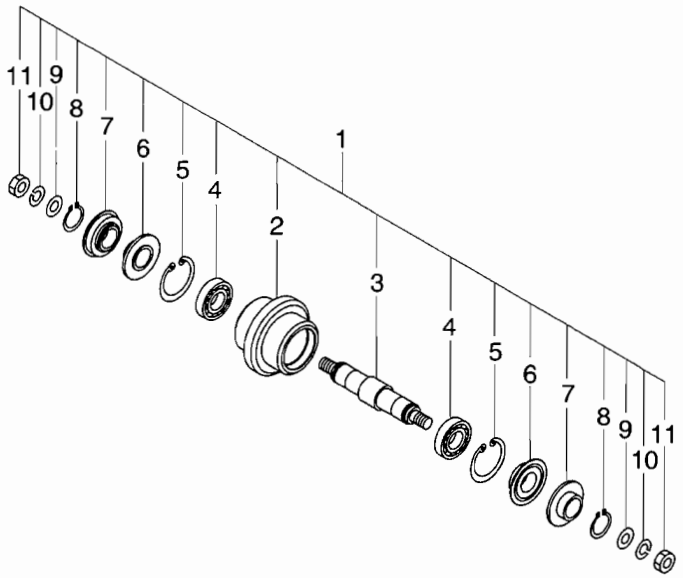


   a. For steel crawlers
      It is accepted if the distance between the rolling surface of the track roller and the contact surface of the crawler is 10~15mm.



17. TRACK ROLLER

17.1. CONSTRUCTION



1. Track roller assembly
2. Track roller
3. Shaft
4. Bearing(6207)
5. C-type stopper ring(H-72)
6. Oil seal(QLF35, 72.12, 19.5)
7. Spacer
8. C-type stopper ring(S-35)
9. Washer
10. Spring washer
11. Nut(M20)

17.2. DISASSEMBLY AND REASSEMBLY

1. Disassembly procedure
   - Remove the crawler.
   - Loosen the nut(11) and remove the track roller from the track frame.
   - Remove the nut(11), spring washer(10), and washer (9), and then remove the C-type stopper ring(8) and spacer(7).
   - Use a screw driver to take out the oil seal(6).
     * Once removed, the oil seal should not be reused.
   - Remove the C-type stopper ring(5) and disconnect the bearing(4) and shaft(3).

2. Reassembly procedure
   - Clean segregated parts with cleansing oil.
   - Inject clean gear oil or engine oil(100cc) before assembling the oil seal(6).
   - Refer to "Crawler Installation" to assemble the crawlers.

20.2.3. Alternator

Complaints	Causes	Corrections
Fails to charge	• Cords between each terminal open or connector improperly contacted	Correct
	• Improper grounding	Correct
	• Improper contact between brush and spring	Correct• Replace
	• Start coil open or lost	Correct• Replace
	• Rotor coil open or lost	Correct• Replace
	• Diode lost	Replace
Insufficiently charged	• Cords between each terminal loosened	Correct
	• V-belt slipped	Correct
	• Improper contact between brush and spring	Sleeve ring worn
	• Rotor coil short	Correct• Replace
	• Start coil open or short	Correct• Replace
	• Bad diode	Replace
Overcharged	• Circuits for terminal A and F short	Correct
Received current unstable	• Cords between each terminal loosened	Correct
	• V-belt loosened	Correct
	• Brush contact improper	Correct • Replace
	• Rotor coil open or short	Correct • Replace
	• Start coil open or short	Correct • Replace
	• Start coil and diode loosely contacted	Correct
Joints	• Bad joining face	Replace
	• V-belt defective	Replace
	• Bearing unacceptable	Replace
	• Diode defective	Correct • Replace
	• Start cord unacceptable	
	• Correct	
Fuse open	• +/- sides of diode improper	Replace
	• Insufficient capacity	Replace

APPEARANCE

1. MODELS 3LA1 AND 3LB1

(1) Left side view

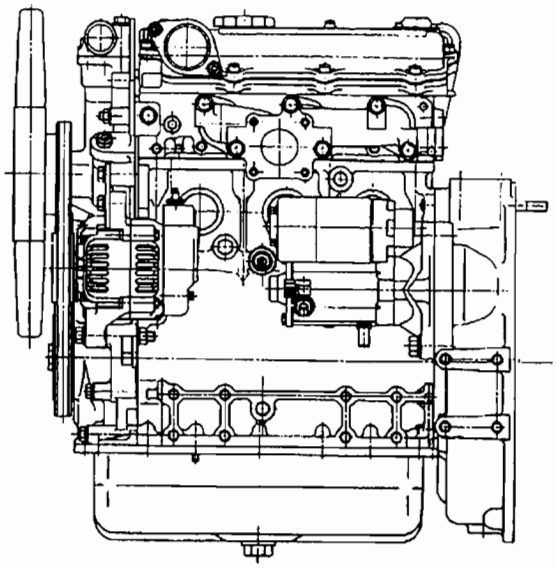


Fig. 2

(2) Right side view

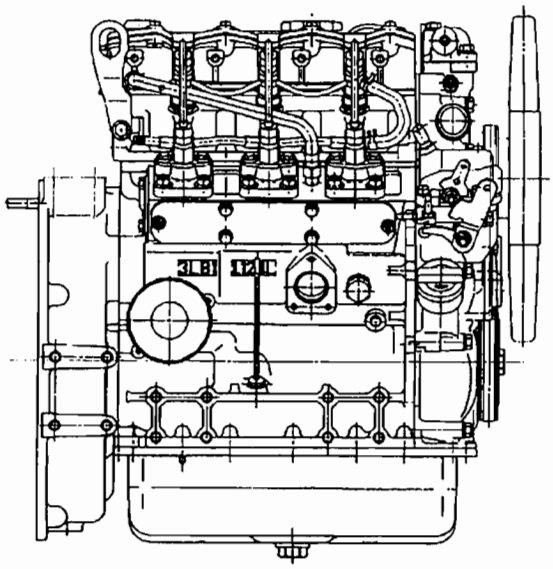


Fig. 3

3. CYLINDER BLOCK AND OTHER COMPONENTS (1)

kg·m (ft.·lbs.)

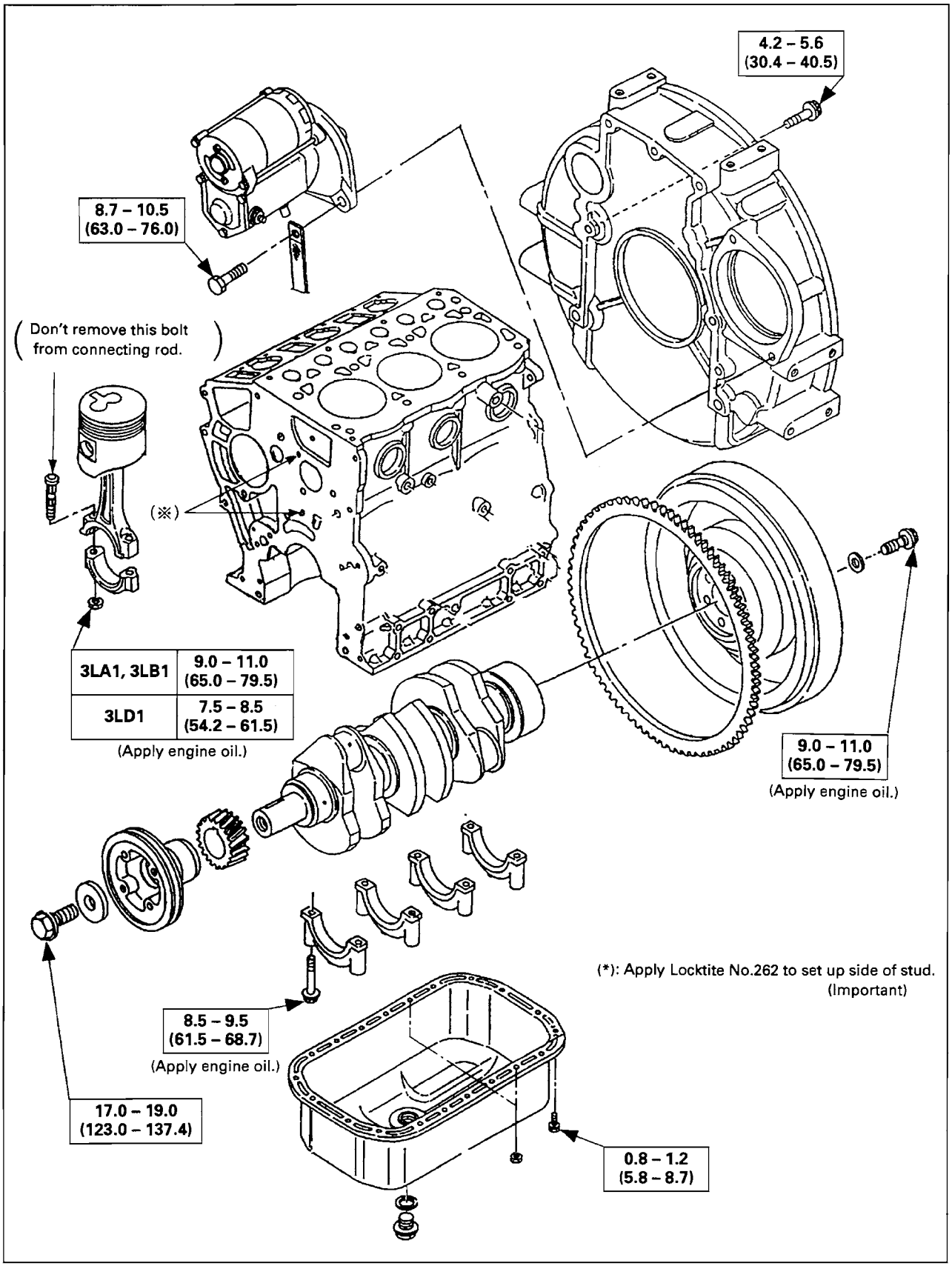


Fig. 15

RECOMMENDED LUBRICATING OIL

TYPE OF LUBRICANTS (API)	DIESEL ENGINE OIL; CC OR CD GRADE

ENGINE OIL VISCOSITY CHART

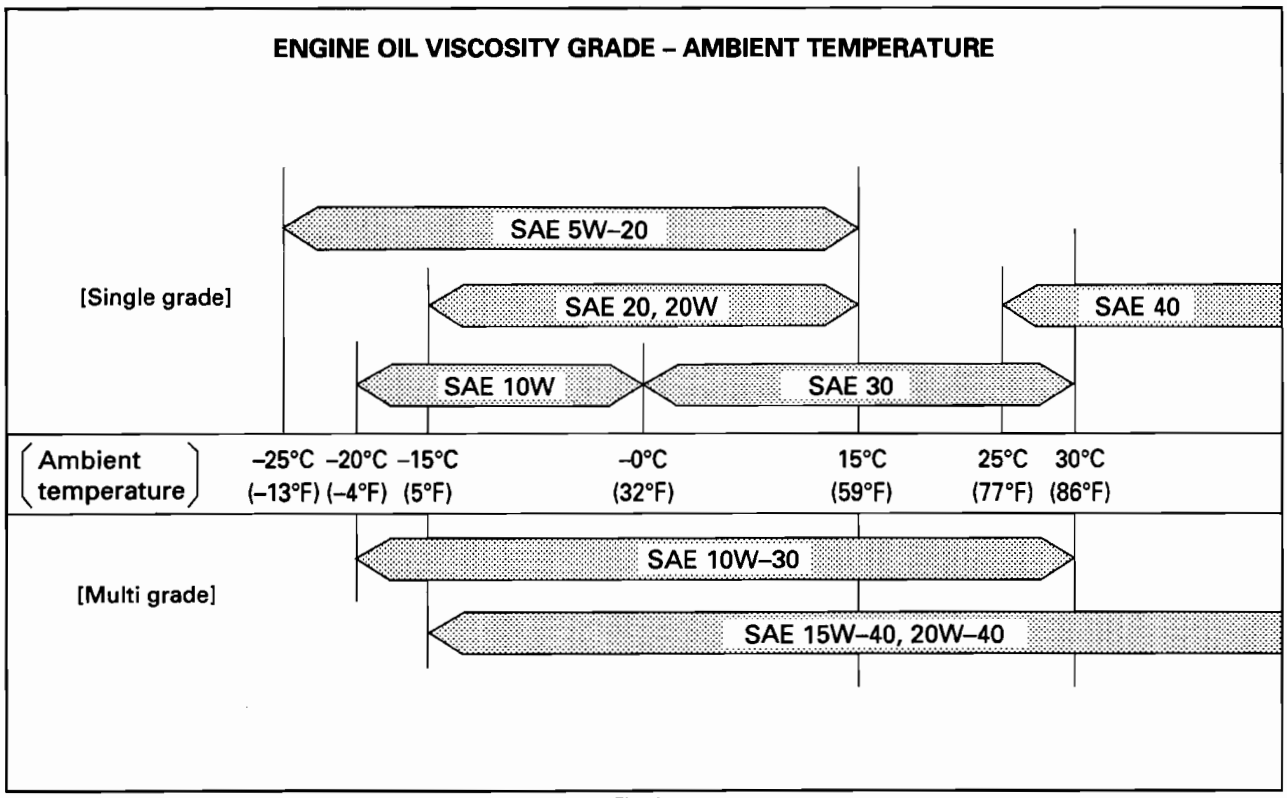


Fig. 35

Internal Parts (2/3)

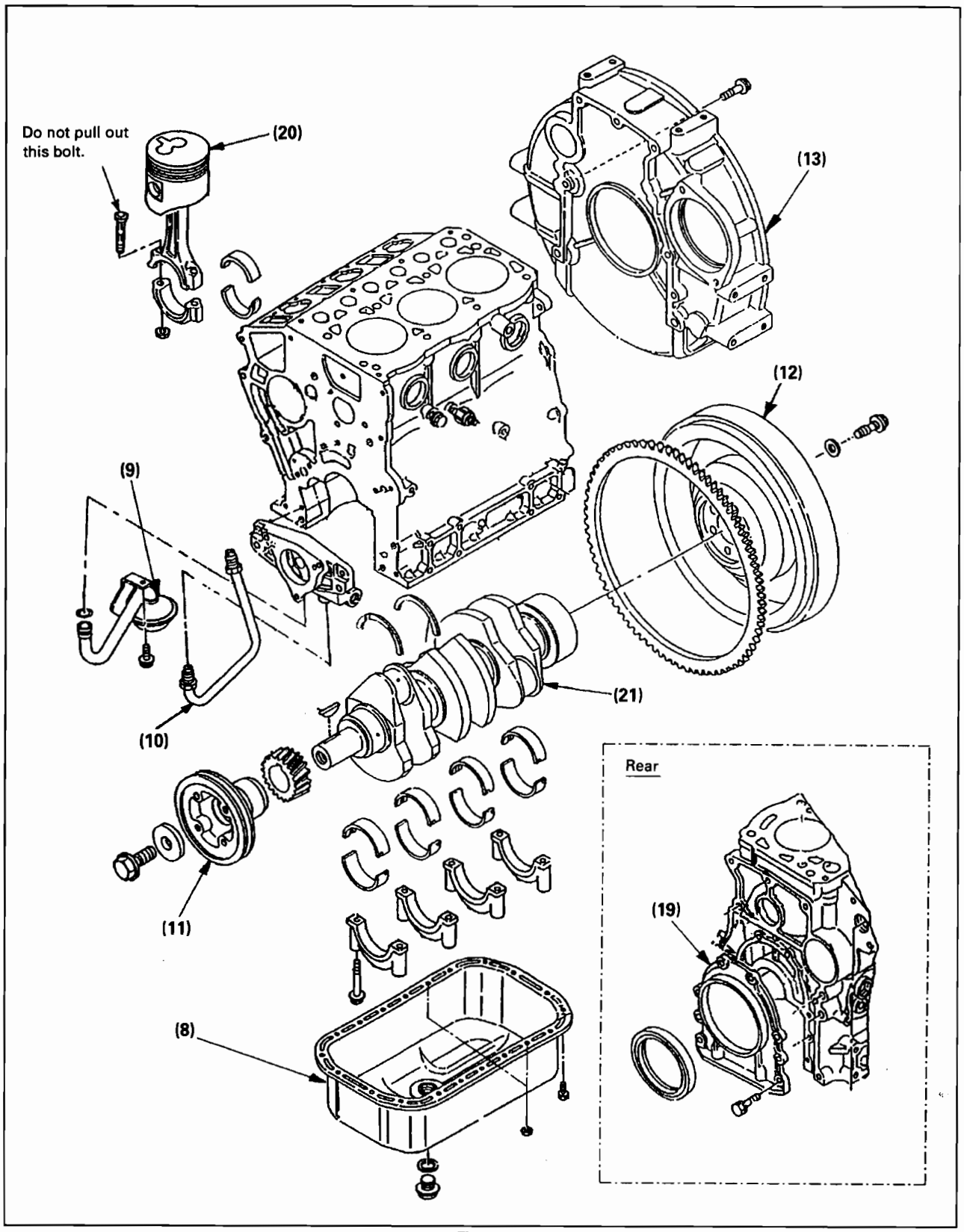


Fig. 45

2. CYLINDER HEAD

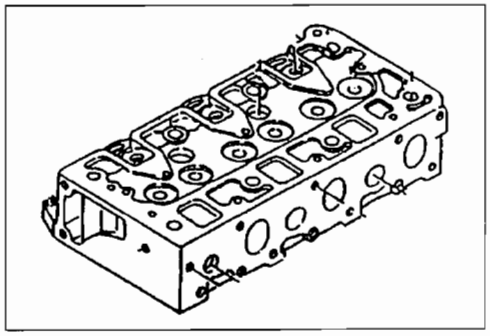


Fig. 63

Cylinder head inspection

Remove carbon deposit on the bottom surface of the head with care not to damage the valve seat.

Leakage: Water pressure test 5kg/cm² (for 3 minutes)

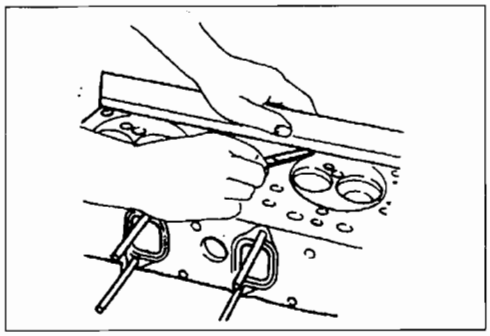


Fig. 64

Cylinder Head Lower Face Warpage

1. Use a straight edge and a feeler gauge to measure the four sides and the two diagonals of the cylinder head lower face.
2. Regrind the cylinder head lower face if the measured values are greater than the specified limit but less than the maximum grinding allowance.

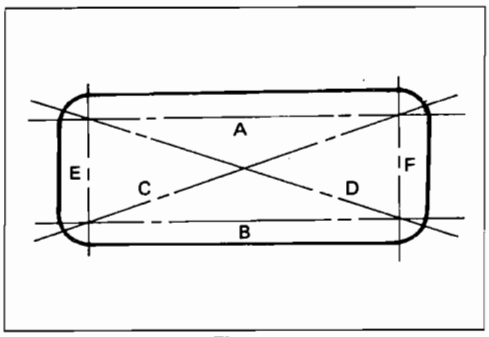


Fig. 65

If the measured values exceed the maximum grinding allowance, the cylinder head must be replaced.

Cylinder Head Lower Face Warpage mm (in.)

Standard	Limit	Maximum Grinding Allwance
0.075 (0.0029)	0.15 (0.0059)	0.3 (0.0118)

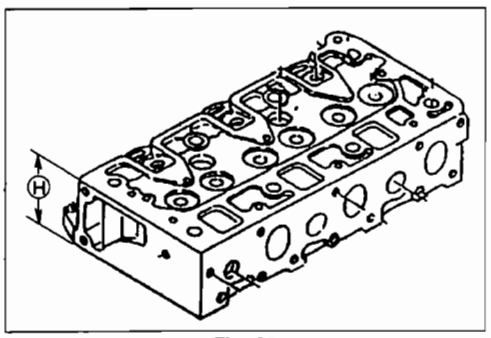


Fig. 66

Cylinder Head Height Ⓗ (Reference) mm (in.)

Standard Ⓗ	Limit
64 (2.5197)	63.7 (2.5079)

Note:

If the cylinder head lower face is reground, valve depression must be checked.

Clearance between piston pin and piston pin hole

mm (in.)

	Standard
3LA1, 3LB1, 3LD1	0.002 – 0.012 (0.00008 – 0.00047)

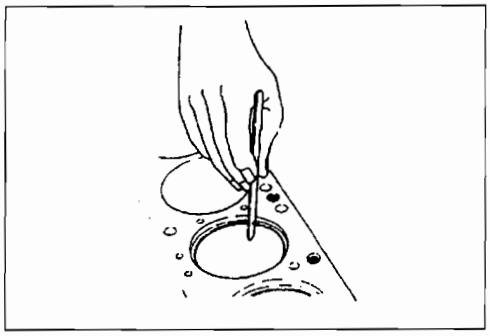


Fig. 100

Piston ring gap

With the ring inserted into the cylinder bore, push it in with the piston head so that it becomes a right angle to the cylinder, and then measure the gap of the piston ring.

If worn beyond the limit, replace the rings.

mm (in.)

		Standard	Limit
1st compression ring		0.2 – 0.35 (0.0079 – 0.0138)	2.0 (0.07874)
2nd compression ring	3LA1 3LB1	0.2 – 0.4 (0.0079 – 0.0157)	
	3LD1	0.35 – 0.5 (0.0138 – 0.0197)	
Oil ring		0.2 – 0.4 (0.0079 – 0.0157)	1.0 (0.03937)

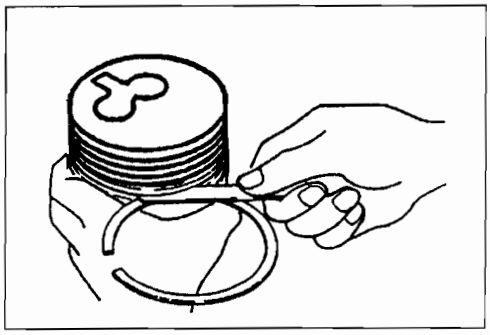


Fig. 101

Clearance between piston ring groove and ring

Measure clearance at several places on the circumference.

If worn beyond the limit, replace the rings or piston.

3LA1 mm (in.)

	Standard	Limit
1st compression ring	0.065 – 1.0 (0.0026 – 0.0039)	0.3 (0.0012)
2nd compression ring	0.03 – 0.065 (0.0012 – 0.0026)	
Oil ring	0.02 – 0.06 (0.0008 – 0.0024)	0.15 (0.0059)

3LB1 mm (in.)

	Standard	Limit
1st compression ring	0.065 – 1.0 (0.0026 – 0.0039)	0.3 (0.0012)
2nd compression ring	0.03 – 0.07 (0.0012 – 0.0026)	
Oil ring	0.02 – 0.06 (0.0008 – 0.0024)	0.15 (0.0059)

Internal Parts (1/3)

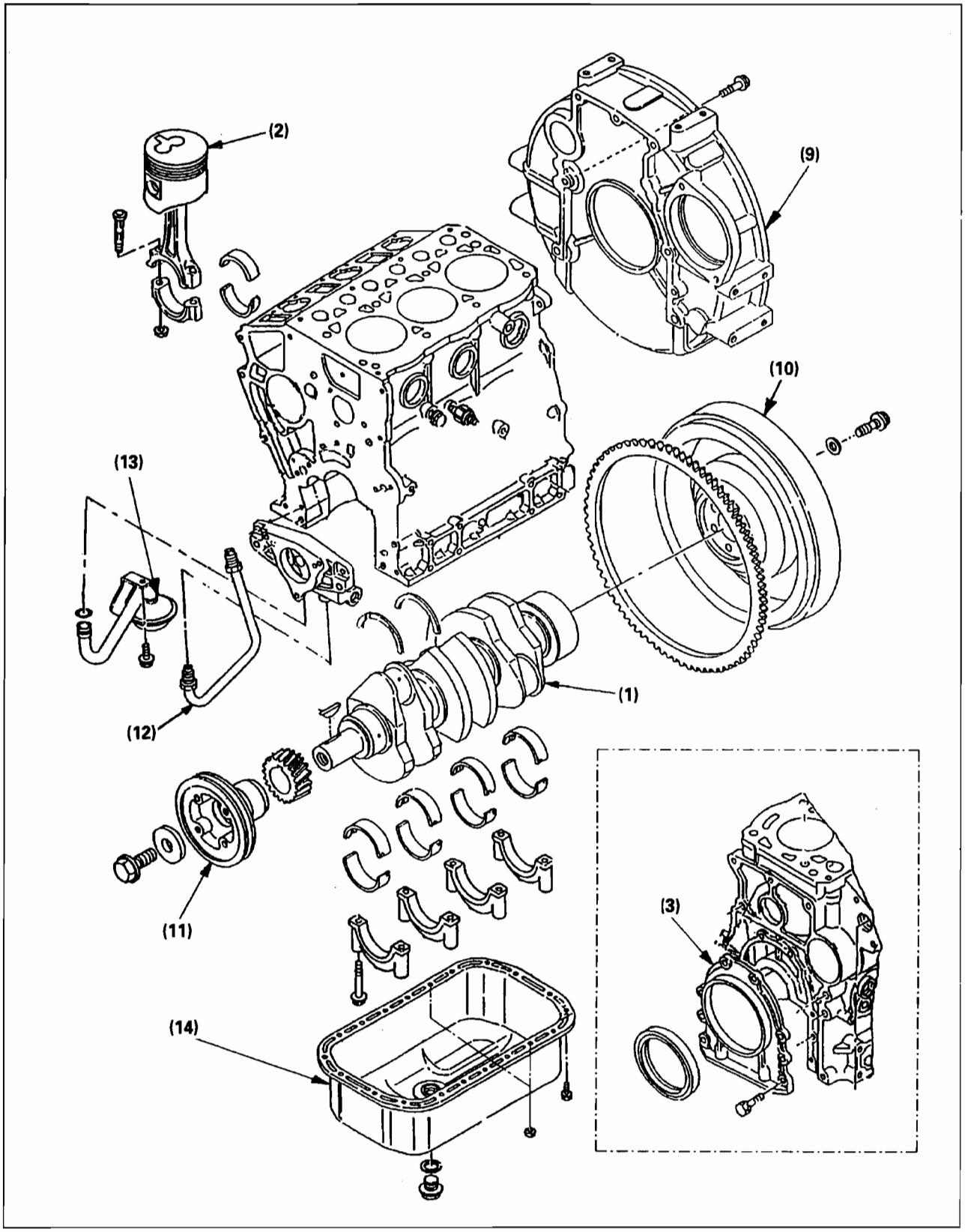


Fig. 127

Refer to Section "General Information – Maintenance" (on page 20).

Adjustment of valve clearance

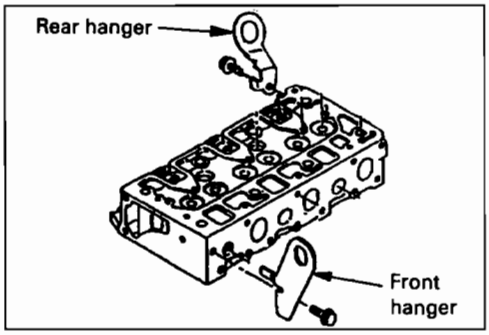


Fig. 155

Front hanger and rear hanger

Tighten them to the specified torque shown below.

kg·m (ft. lbs.)

Tightening torque	1.9 – 2.9 (14.0 – 21.0)

MEMO

2. STRUCTURAL DRAWING OF GOVERNOR (2)

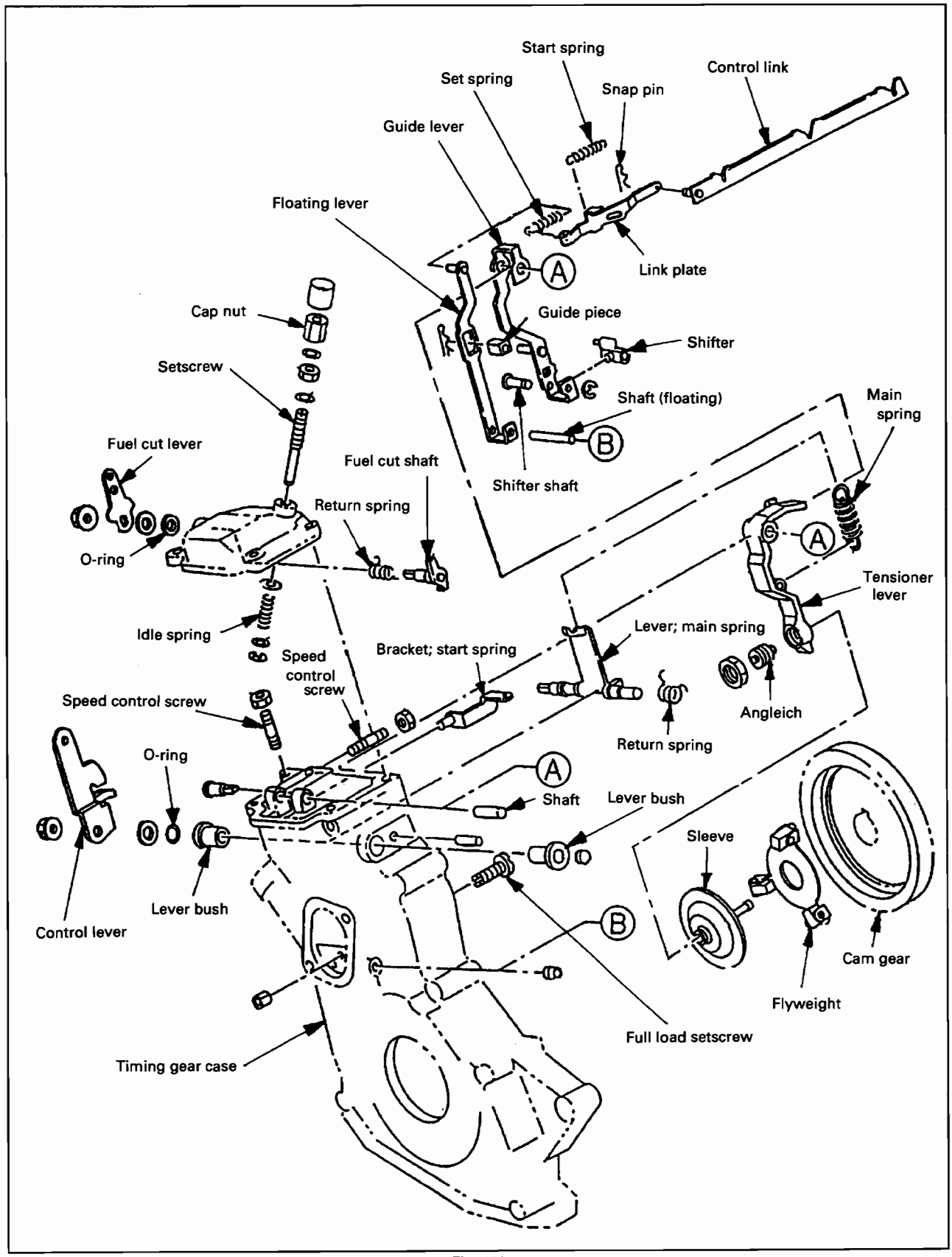
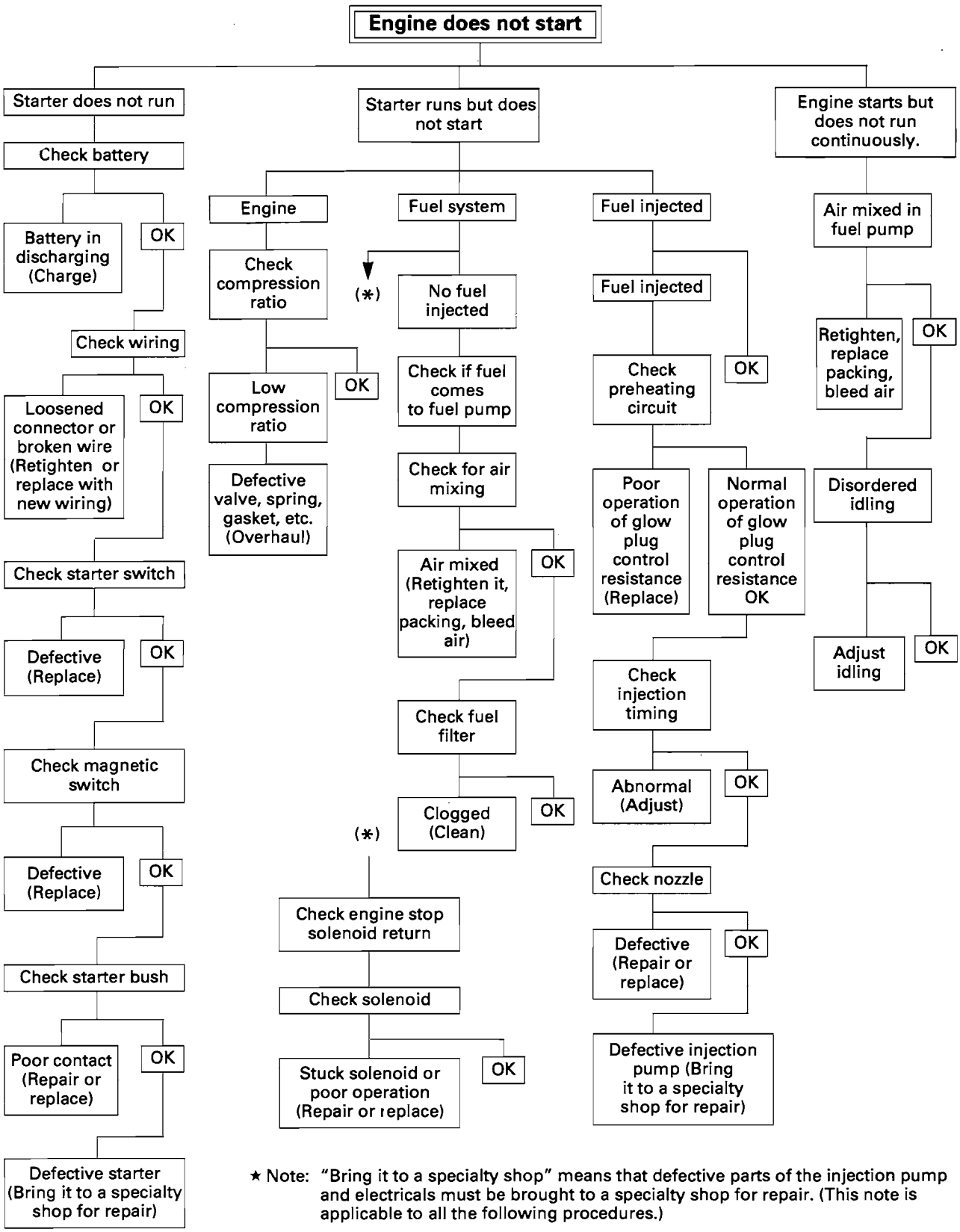


Fig. 190

SECTION 6

TROUBLESHOOTING



★ Note: "Bring it to a specialty shop" means that defective parts of the injection pump and electricals must be brought to a specialty shop for repair. (This note is applicable to all the following procedures.)