DAEWOO
DAEWOO HEAVY INDUSTRIES & MACHINERY LTD.

2022-7153E
Oct. 1997

Shop Manual

HYDRAULIC EXCAVATOR

SOLAR 010

1.5 EQUIPMENT

1. Rough Operation May Require Use of Certified Safety Equipment

Work in mines, tunnels, deep pits or on loose or wet surfaces could produce danger from falling rock, roll over or hazardous flying objects.

Any reinforcement system that is installed on the machine must pass safety and certification standards and carry appropriate labeling and rating information.

Never attempt to alter or modify any type of protective structure reinforcement system, by drilling holes, welding or remounting or relocating fasteners. Any serious impact or damage to the system requires a complete integrity reevaluation. Reinstallation, recertification and/or replacement of the system may be necessary.

2. Install Additional Safety Equipment If Conditions Require

When working with a breaker or in some shear work applications, a front guard over the windshield may be required. The windshield guard may or may not be OPS/certified, depending upon the specific application and working situation.

Laminate glass protection for the front, side or rear windows may also be recommended depending upon particular site conditions.

Contact your Daewoo distributor for a available safety guards and/or recommendations if there is any danger of getting hit by objects that could strike the operator’s cab. Make sure that all other work site crew members are kept well away from the excavator and safe from potential hazards.

3. Movement Alarms

If the excavator is equipped with an audible travel movement alarm or visible swing movement alarm(strobe light), test the alarm on a daily basis. The audible alarm should sound as soon as the travel system is engaged. The strobe light should begin to flash as soon as the swing system is engaged.

4. Keep a Fire Extinguisher at Hand

It is recommended that an appropriately sized(2.27 kg [5 lb] or larger) multi-purpose “A/B/C” fire extinguisher be mounted in the cab. Check and service the fire extinguisher at regular intervals and make sure that all work site crew members are adequately trained in its use.

5. Maintain Standard Safety Equipment in Good Condition

Machinery guards and body panel covers must be in place at all times. Keep well clear of rotating parts. Pinch point hazards such as cooling fan and alternator drive belts could catch hair, jewelry or oversize or very loose clothing.

Safety labels must be replaced if they are damaged or become unreadable. The information on labels gives work crew members an important safety reminder exactly where it will do the most good.

2.6 HYDRAULIC SYSTEM COMPONENT SPECIFICATIONS

Manin Pump	
Quantity	1
Displacement	4.1 cc/rev (0.25 cu in)
Max Flow Rate	10 ℓ/min X 2
Relief Pressure	150 kg/cm² (2,133 psi)
Bucket	180 kg/cm² (2,560 psi)
Arm	190 kg/cm² (2,702 psi)
Control Valve	
P1 Spools*	Dozer Travel, right Boom swing Boom Bucket
P2 Spools*	Auxiliary Travel, left Arm Swing
*Diameter 10 mm(0.39 in)	
Relief Valves (Main)	2 X 150 kg/cm²(2,133 psi)

Hydraulic Cylinders

	Boom	Arm	Bucket	Dozer	Boom swing
Quantity	1	1	1	1	1
Inner Diameter mm (in)	50 (1.97)	55 (2.16)	50 (1.97)	50 (1.97)	50 (1.97)
Stroke mm (in)	300 (11.82)	315 (11.22)	285 (2.75)	70 (14.57)	370 (11.82)
Rod, outer dia. mm (in)	25 (.98)	30 (1.18)	25 (.98)	25 (.98)	25 (.98)
Cylinder length, retracted mm (in)	555 (21.8)	540 (21.2)	505 (19.8)	330 (13.0)	588 (23.1)

5.2 DISASSEMBLY

1. Detach and separate hydraulic lines and linkage from control valve. See Figure 5-1.

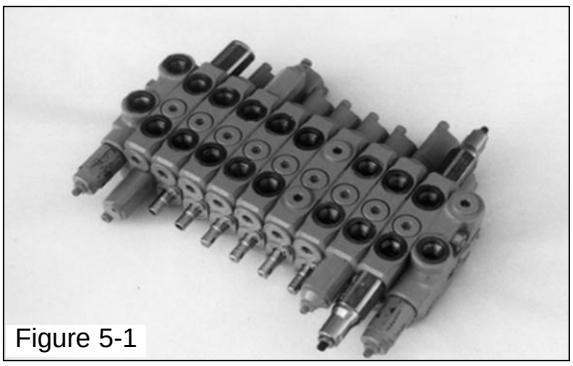


Figure 5-1

2. Loosen and remove plugs from cylinder and tank ports. See Figure 5-2.

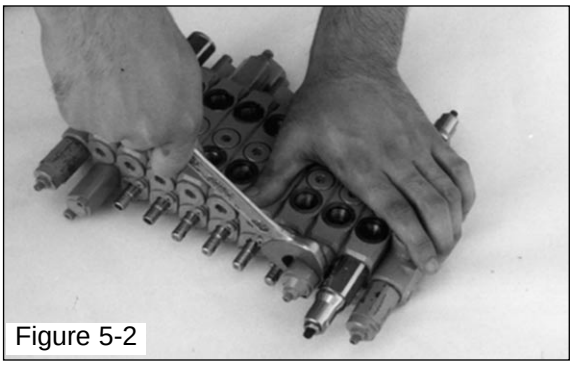


Figure 5-2

3. Remove accessory valves (overload relief, combination relief and anti-cavitation valves). See Figure 5-3.

NOTE : *Replace accessory valves when defective, and use new O-rings when reusing valves.*

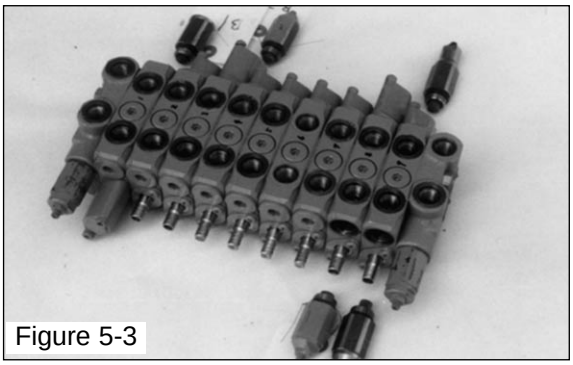


Figure 5-3

4. Remove plugs from valve body. See Figure 5-4.

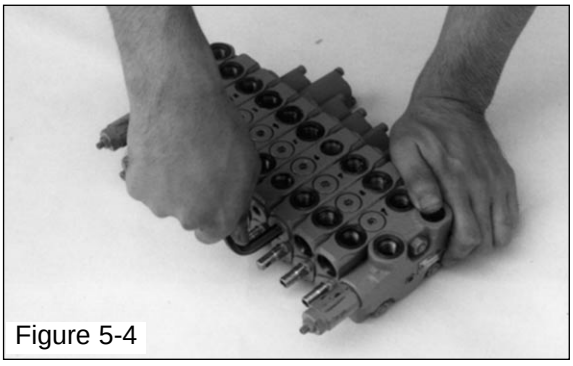


Figure 5-4

6.3 BRAKE VALVE DISASSEMBLY

1. Remove lock nuts. See Figure 6-6.

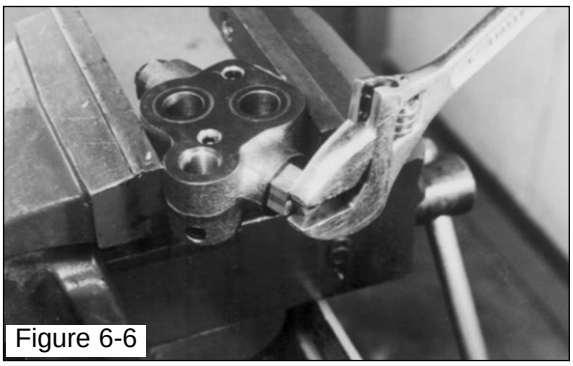


Figure 6-6

2. Unscrew adjusting screws. See Figure 6-7.

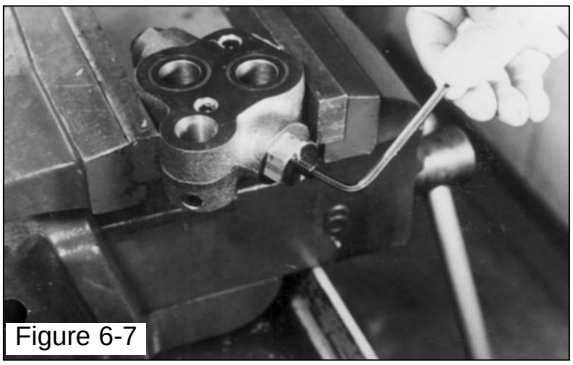


Figure 6-7

3. Loosen plug. See Figure 6-8.

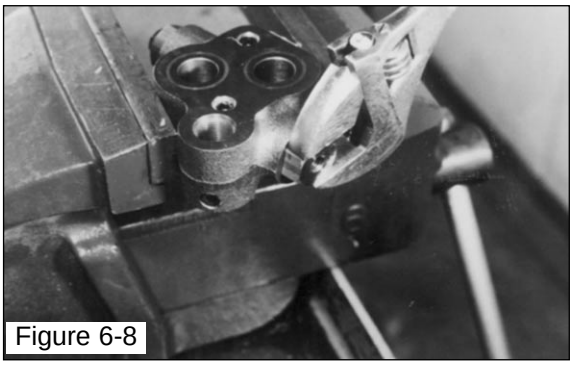


Figure 6-8

4. Remove plug and pull out ball, ball guide, spring, spring seat and sleeve.
   See Figure 6-9.

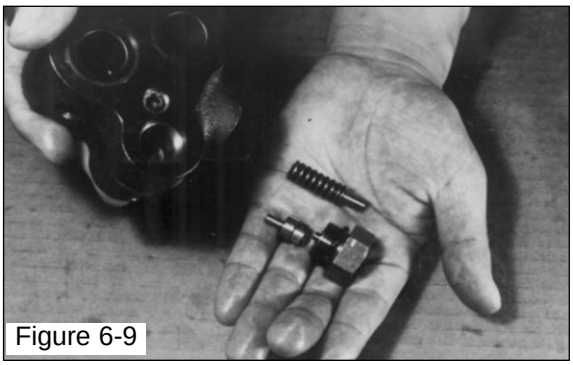


Figure 6-9

6. SWIG MOTOR

8. Remove pinion gear by pressing it out of the bearing housing or by tapping it with plastic hammer from the motor assembly side. See Figure 6-36.

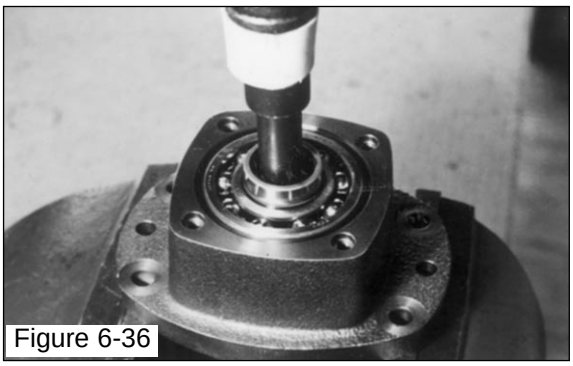


Figure 6-36

9. Remove eight hex socket bolts and remove front retainer from bearing housing. Remove X-ring and back up ring from front retainer, using a tool with a sharp end such as a driver. See Figure 6-37.

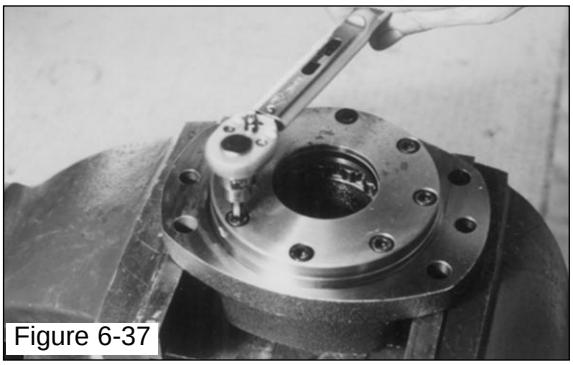


Figure 6-37

10. Remove ball bearing from bearing housing by inserting a metal rod in the flange side of the bearing housing and tapping evenly with hammer on outer frame of ball bearing. See Figure 6-38.

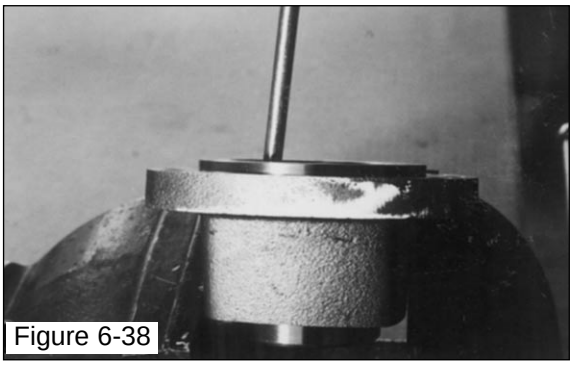


Figure 6-38

11. Remove roller bearing from bearing housing by inserting metal rod in motor side of bearing housing and tapping evenly with hammer on outer frame of roller bearing. See Figure 6-39.

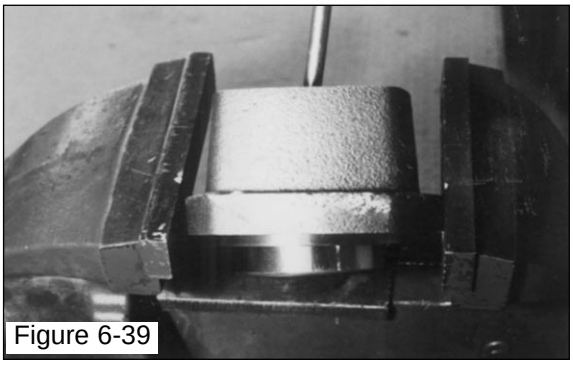
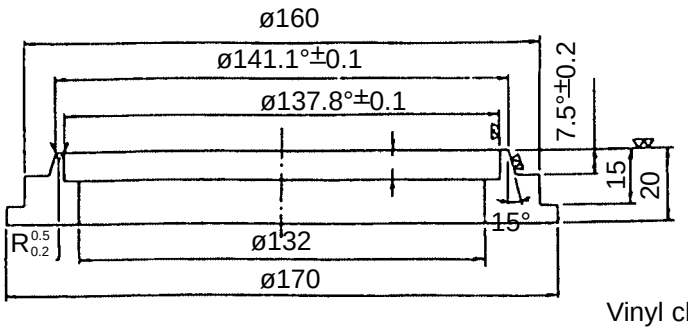


Figure 6-39

7. TRAVEL MOTOR

TOOL NAME	TOOL	REMARKS
Floating seal Jig		Vinyl chloride
Pincette		
Air		
Lubricating oil	EP 90, 220cc	API GL - 4 or equivalent
Puller		
Grease		
Seal tape		

4. Remove plug (37). Remove O-ring (38) from plug (37). See Figure 7-28.

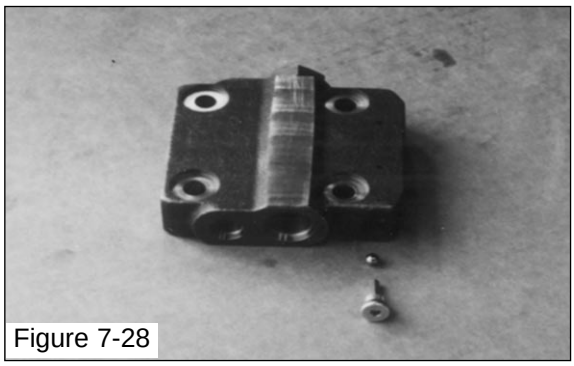


Figure 7-28

5. Remove plugs (42 & 62). See Figure 7-29.

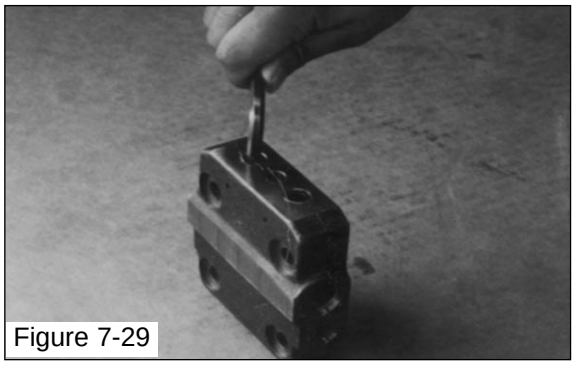


Figure 7-29

7.4.2 Inspection and Repair

1. Clean parts in an approved, clean solvent and dry with compressed air.
2. Keep parts clean and protected from dust and any foreign material.
3. Replace O-rings.

7.4.3 Assembly

1. Wind seal tape around plugs (42 & 62) and install to end cover (27). See Figure 7-30.

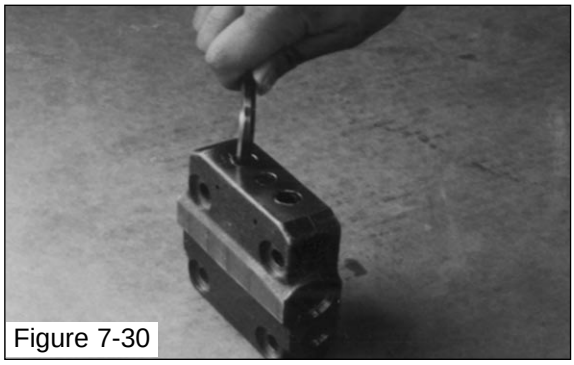


Figure 7-30

14. Install snap ring (24). See Figure 7-64.

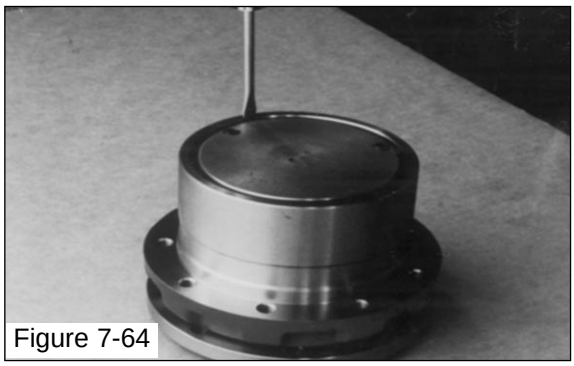


Figure 7-64

8.3.4 Checking Cylinder Injection Interval

1. Align punch mark on control rack with pump reference face on housing. See Figure 8-11.
2. Turn pump by hand to check No. 1 and No. 2 cylinder timing.
3. Adjust timing using plunger shims.

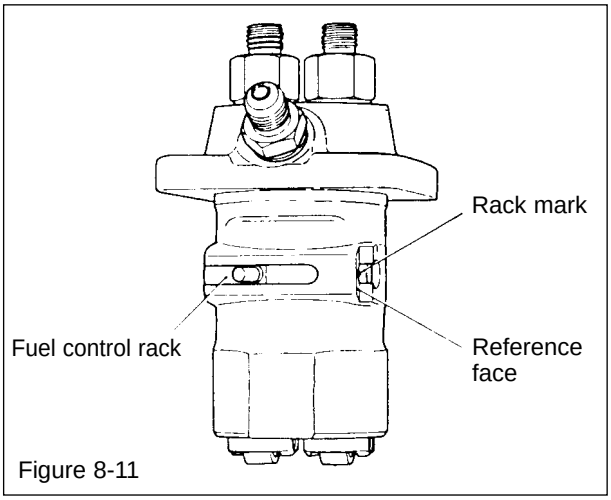


Figure 8-11

8.3.5 Delivery Valve Tightness Test

1. Install a 1,000kg / cm^2 (14,223 psi)pressure gauge on delivery valve holder.
2. Apply 120kg / cm^2 (1,707 psi) of pressure to fuel pump and measure time needed for pressure to drop from 100 kg / cm^2 (1,422 psi) to 90 kg / cm^2 (1,280 psi). Standards are shown in the table below.

Pump speed	200 rpm
Pressure drop standard	20 seconds or more
Pressure drop limit	5 seconds or less

3. If specifications are not met, replace plunger and delivery valve.

9.5 TESTING STARTER

1. With starter pinion extened and with pinion pressed back slightly to take up any play in engagement linkage, measure gap between pinon and pinion stopper. The gap should be 0.3-1. 5 mm (0.012-0.016 in). See Figure 9-6.

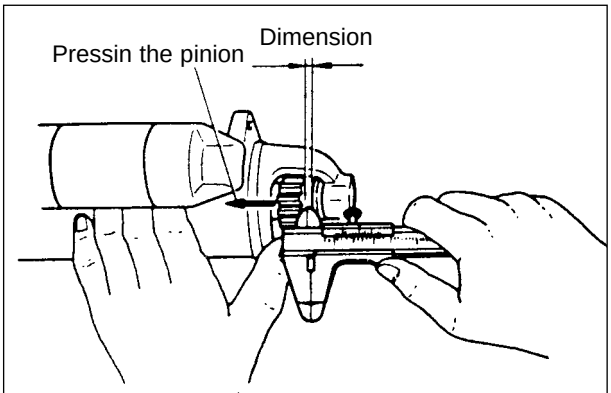


Figure 9-6

2. Adjust stroke of magnetic plunger by installing shim [(0.5 mm (0.0197 in) or 0.8 mm (0.0315 in)]. See Figure 9-7.

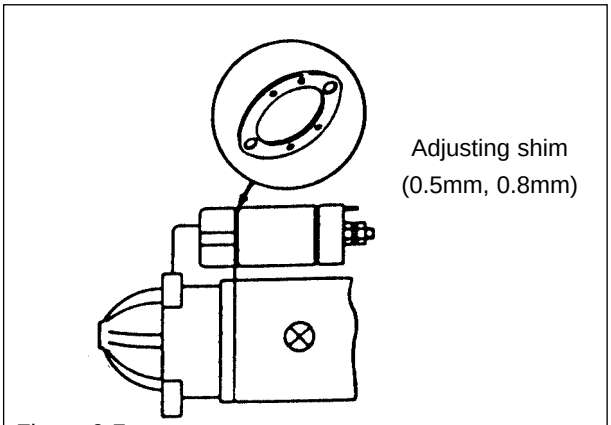


Figure 9-7

3. Check that clearance between flywheel ring gear and starter motor pinion is 3-5 mm (0.1181-0.1969 in). See Figure 9-8.

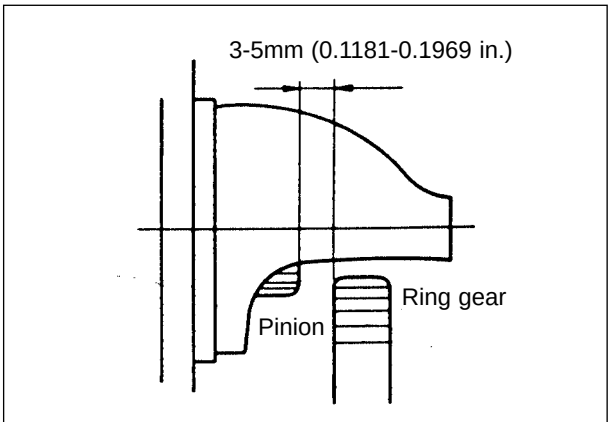


Figure 9-8

DIESEL ENGINE

MODEL TNE SERIES

1-3 3TNE74

*Output conditions: Intake back pressure ≤ 250 mmAq, Exhaust back pressure ≤ 550 mmAq, other conditions complying with JIS D 1005–1986. After minimum 30 hour's run-in.

Item			Model / Unit	3TNE74										
SPECIFICATIONS	Application		—	VM						CH		VH		
	Type		—	Vertical, 4-cycle water-cooled diesel engine										
	Combustion system		—	Special swirl pre-combustion chamber										
	No. of cylinders – Bore × Stroke		mm	3 – 74 × 78										
	Displacement		ℓ	1.006										
	Firing order		—	1 – 3 – 2 – 1										
	Revolution speed		rpm	2000	2200	2400	2600	2800	3000	3000	3600	3200	3400	3600
	Output*	Continuous rating	kW(HP)	—	—	—	—	—	—	15.1 (20.2)	17.4 (23.3)	—	—	—
		Max. rating	kW(HP)	11.0 (14.8)	12.1 (16.2)	13.2 (17.7)	14.3 (19.2)	15.5 (20.8)	16.6 (22.3)	16.6 (22.3)	19.1 (25.6)	16.6 (22.3)	17.1 (22.9)	17.7 (23.7)
	Max. revolution speed at no load		rpm	2180^{+50}_{0}	2375^{+50}_{0}	2570^{+50}_{0}	2780^{+50}_{0}	2970^{+50}_{0}	3180^{+50}_{0}	3180^{+50}_{0}	3780^{+50}_{0}	3455^{+50}_{0}	3670^{+50}_{0}	3890^{+50}_{0}
	Min. revolution speed at no load			≤800						≤1500		≤800		
	Direction of rotation		—	Counterclockwise (viewed from flywheel)										
	Power take off		—	Flywheel										
	Compression ratio		—	23.0										
	Fuel injection timing (FID, b.T.D.C.)		deg	14±1						16±1				
	Compression pressure		MPa (kgf/cm²)	3.43±0.1 (35±1), at 250 rpm										
	Fuel injection pressure		MPa (kgf/cm²)	$11.8^{+1.0}_{0}$ (120^{+10}_{0})										
	Recommended diesel gas oil		—	ISO 8217 DMA, BS 2869 A1 or A2 (Cetane No.: 45 min.)										
	Lubrication system		—	Forced lubrication with trochoid pump										
	Lubricating oil capacity Max/Effective		ℓ	2.4/1.0						3.3/1.4				
	Recommended lubricating oil		—	API grade CC class or higher										
	Cooling system		—	Liquid cooling/Radiator										
	Cooling water capacity		ℓ	0.9 (for engine only)										
	Cooling fan No. of blade × dia.		mm	Pusher type, 5 × ϕ310						Pusher type, 6 × ϕ335				
	Crank V-pulley dia./ Fan V-pulley dia.		mm	ϕ110/ϕ85						ϕ110/ϕ97				
	Governor		—	Mechanical centrifugal governor (All speed type)										
	Starting system		—	Electrical										
	*1 Dimensions L × W × H		mm	469.1 × 440 × 502 / 476.6 × 440 × 502						476.6 × 440 × 502		469.1 × 440 × 502/ 476.6× 440 × 502		
	*1 Dry weight		kg	85 /102						100		85 / 100		
PERFORMANCE	Governing perform-ance (full speed range)	Transient speed difference	%	≤12						≤10		≤12		
		Steady state speed band	%	≤9	≤8		≤7		≤6	≤5		≤8		
		Recovery time	sec	≤6										
		Fluctuation of revolution	rpm	≤30						≤20		≤30		
	L.O. press.	Rated operation	MPa (kgf/cm²)	0.25±0.05 (2.5±0.5)			0.29±0.05 (3.0±0.5)			0.34±0.05 (3.5±0.5)				
		Idling		≥0.06 (≥0.6)										

*1. Designation of engine dimension and dry weight in numerals.
CL/CH application: engine with flywheel housing
VM/VH application: engine with back plate/with flywheel hausing

1-13. 4TNE84T

*** Output conditions:** Intake back pressure ≤ 250 mmAq, Exhaust back pressure ≤ 550 mmAq, other conditions complying with JIS D 1005–1986. After minimum 30 hour's run-in.

Item			Model / Unit	4TNE84T												
SPECIFICATIONS	Application		—	CL		VM						CH		VH		
	Type		—	Vertical, 4-cycle water-cooled diesel engine												
	Combustion system		—	Direct injection system												
	No. of cylinders – Bore × Stroke		mm	4 – 84 × 90												
	Displacement		ℓ	1.995												
	Firing order		—	1 – 3 – 4 – 2 – 1												
	Revolution speed		rpm	1500	1800	2000	2200	2400	2600	2800	3000	3000	3600	3200	3400	3600
	Output*	Continuous rating	kW(HP)	19.1 (25.6)	24.3 (32.6)	—	—	—	—	—	—	37.1 (49.8)	40.8 (54.7)	—	—	—
		Max. rating	kW(HP)	21.3 (28.6)	26.9 (36.1)	28.0 (37.5)	30.5 (40.9)	33.5 (44.9)	35.7 (47.9)	38.6 (51.8)	41.2 (55.3)	41..2 (55.3)	45.6 (61.2)	42.7 (57.3)	44.1 (59.1)	45.6 (61.2)
	Max. revolution speed at no load		rpm	1600^{+50}_{0}	1900^{+50}_{0}	2175^{+50}_{0}	2375^{+50}_{0}	2600^{+50}_{0}	2800^{+50}_{0}	3000^{+50}_{0}	3225^{+50}_{0}	—	—	—	—	—
	Min. revolution speed at no load			1200^{+50}_{0}		800^{+50}_{0}						—		—		
	Direction of rotation		—	Counterclockwise (viewed from flywheel)												
	Power take off		—	Flywheel												
	Compression ratio		—	18.0												
	Fuel injection timing (FID, b.T.D.C.)		deg	10±1		12±1		14±1		16±1		—		—	—	—
	Compression pressure		MPa (kgf/cm²)	2.94±0.1 (30±1), at 250 rpm												
	Fuel injection pressure		MPa (kgf/cm²)	$19.6^{+1.0}_{0}$ (200^{+10}_{0})						$19.6^{+1.0}_{0}$ (200^{+10}_{0})						
	Recommended diesel gas oil		—	ISO 8217 DMA, BS 2869 A1 or A2 (Cetane No. 45 min.)												
	Lubrication system		—	Forced lubrication with trochoid pump												
	Lubricating oil capacity Max/Effective		ℓ	5.8/2.3								—				
	Recommended lubricating oil		—	API grade CC class or higher												
	Cooling system		—	Liquid cooling/Radiator												
	Cooling water capacity		ℓ	2.7 (for engine only)												
	Cooling fan No. of blade × dia.		mm	Discharge type, 6 × φ370												
	Crank V-pulley dia./ Fan V-pulley dia.		mm	φ110/φ90		φ110/φ110										
	Governor		—	Mechanical centrifugal governor (All speed type)												
	Starting system		—	Electrical												
	*1 Dimensions L × W × H		mm	674 × 498.5 × 713		641 × 498.5 × 713 / 649 × 498.5 × 713						—		—		
	*1 Dry weight		kg	184		165 / 175						—		—		
PERFORMANCE	Governing perform-ance (full speed range)	Transient speed difference	%	≤10	≤8	≤12						—	—	—		
		Steady state speed band	%	≤5	≤4	≤9		≤8		≤7		—	—	—		
		Recovery time	sec	≤5		≤6						—		—		
		Fluctuation of revolution	rpm	≤15		≤22						—				
	L.O. press.	Rated operation	MPa (kgf/cm²)	0.29±0.05 (3.0±0.5)		0.34±0.05 (3.5±0.5)										
		Idling		≥0.06 (≥0.6)												

*1. Designation of engine dimension and dry weight in numerals.
CL/CH application: engine with flywheel housing
VM/VH application: engine with back plate/with flywheel hausing

4-2. Trouble diagnosis through measurement of compression pressure

* : *For the compression pressure measuring procedure, refer to chapter 6, 6-1. Measurement of compression pressure.*

Reduction in compression pressure of the cylinder is one of major causes of an increase in blow-by gas (which causes contamination and increased consumption of lubricating oil, and other trouble) as well as the engine starting failure.
The compression pressure is influenced by the following factors:

1. Degree of clearance between the piston and cylinder.
2. Degree of clearance around intake/exhaust valve seats.
3. Gas leak through the nozzle gasket or cylinder head gasket.

In addition, the compression pressure decreases as the engine parts are worn and lose durability through use of the engine for a long period.
Scratches on the cylinder or piston caused by dust or foreign matter through the soiled air cleaner element, and wear or breakage of piston rings also decrease the compression pressure.
For this reason, diagnose the engine status by measuring the compression pressure.

(1) Causes and countermeasures to be taken when the compression pressure is less than the limit value.

* *For the compression pressure limit values, refer to Chapter 6, 6-1 Measurement of compression pressure.*

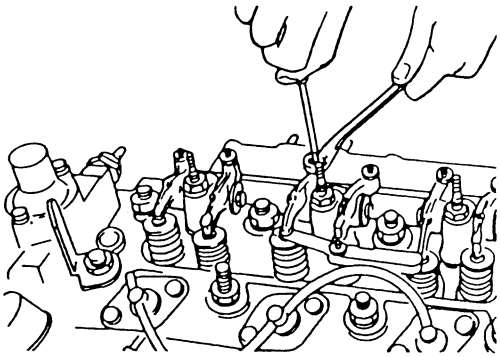
No.	Item	Cause	Countermeasures
1	· Filter element of air cleaner	· Clogged filter element · Broken filter element · Defective filter element seal	· Clean the filter element. · Replace the filter element with a new one.
2	· Valve clearance	· Excessive valve clearance or no clearance	· Adjust the valve clearance (*Refer to Chapter 6, 6-2.*)
3	· Valve timing	· Improper valve timing · Improper valve clearance	· Adjust the valve clearance (*Refer to Chapter 6, 6-2.*) · Inspect and adjust of the valve rocker arm. (*Refer to Chapter 7, 7-3, 7-6 and 7-8.*)
4	· Cylinder head gasket · Nozzle gasket	· Gas leak through the gasket	· Replace the gasket. · Re-tighten the cylinder head and nozzle to the specified torque. (*Refer to Chapter 10, 10-1.*)
5	· Intake/exhaust valve · Valve seat	· Gas leak caused by worn valve seats or trapped foreign matter · Seizure of valves	· Rap valve seats. (*Refer to Chapter 7, 7-1. 2.*) · Replace the intake/exhaust valves.
6	· Piston · Piston ring · Cylinder	· Gas leak caused by scratches and wear of piston, piston ring and cylinder	· Perform honing and use oversize parts. (*Refer to Chapter 7, 7-2. 3. and 7-4. 8.*)

6-2. Adjusting the valve head clearance

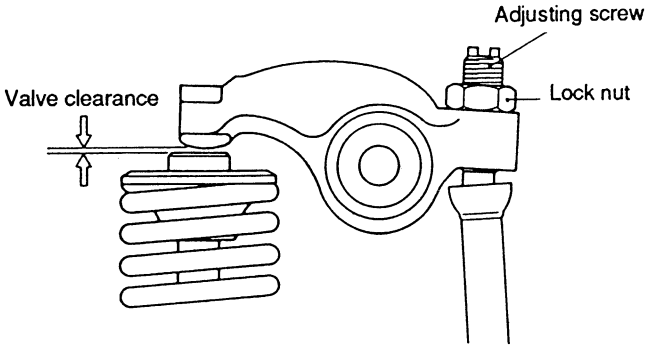
(1) Inspect and adjust a valve head clearance while the engine is in cold state.

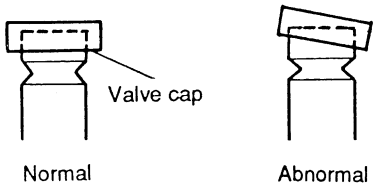
(2) Raise the piston in the cylinder to be measured to the top dead center (TDC) of compression.

(3) Loosen the lock nut and adjusting screw. Make sure that the valve cap is free from inclination or trapped dirt.



(4) Insert a thickness gauge in between the rocker arm and valve cap. Tighten the adjusting screw until the clearance listed below is attained.





(Adjusting the valve head clearance)

(mm)

	All models
Intake/exhaust valve head cleaarance	0.15 ~ 0.25

✱ : *1. If the valve cap is worn or otherwise damaged on the head, replace it with a new one.*

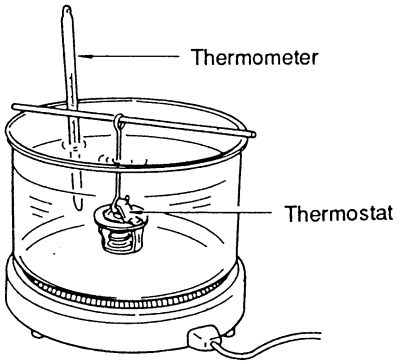
2. Make sure that the valve cap is nested on the head of intake/exhaust valves.

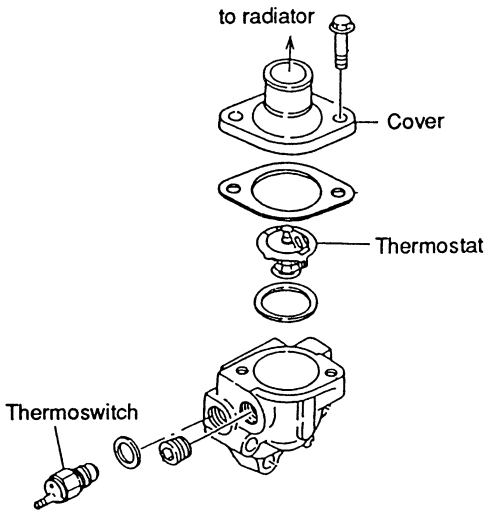
6-9. Checking the sensors

1. Checking the thermostat and thermoswitch

(1) Thermostat

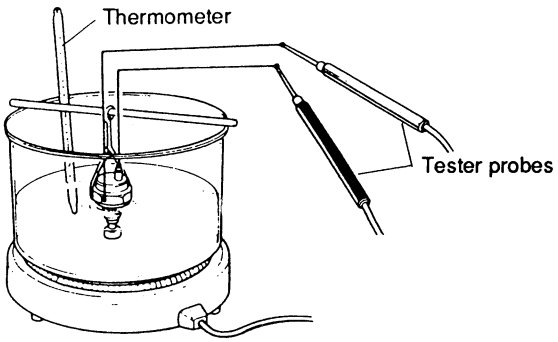
Put a thermostat into water in a container. While measuring water temperature, heat the water. Make sure that the thermostat functions at a temperature of 69.5-72.5°C. (80.5 ~ 83.5°C are used as option parts)





(2) Thermoswitch

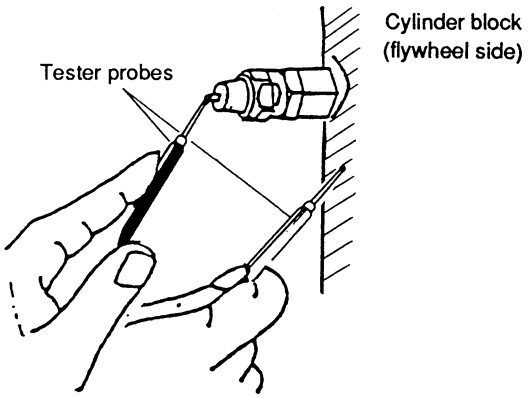
Put a thermoswitch into an antifreeze or oil in a container. While measuring liquid temperature, heat the liquid. If the tester shows continuity at a temperature of 107-113°C, the thermoswitch is acceptable.



2. LO pressure switch

Remove the connector from the LO pressure switch.

While running the engine, bring the tester probes into contact with the switch terminal and cylinder block. If the tester shows continuity, the LO pressure switch is defective.



(Continuity test)

7-2. Cylinder block

1. Checking the cylinder block

(1) Visually check to see if the cylinder block is free from water leak, oil leak and cracks. If any cylinder block is suspected to be cracked, check it by color check.

(2) Replace the cylinder block if badly damaged and incorrectable.

(3) Thoroughly clean each oil hole. Make sure that it is not clogged.

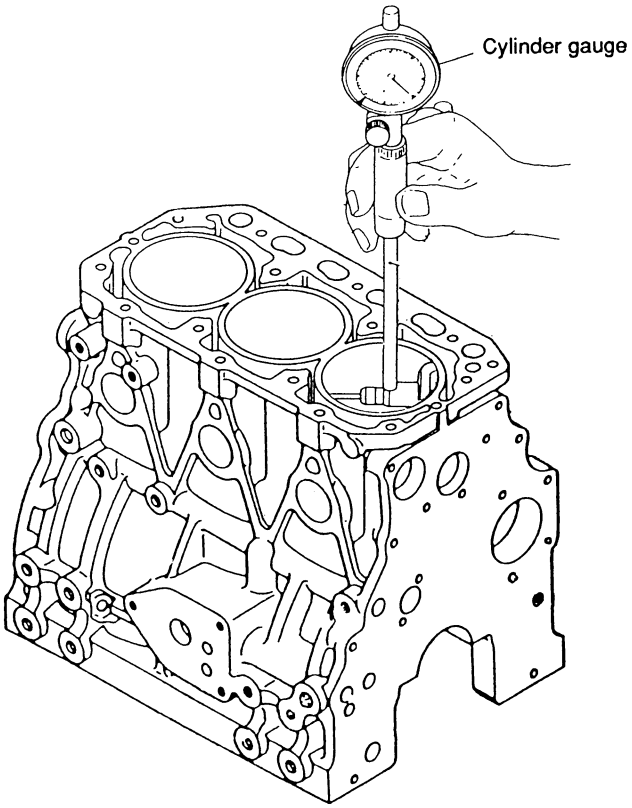
2. Measuring the bore and distortion of the cylinder

Measure the bore of each cylinder with a cylinder gauge. Measure the cylinder at point a, approx. 20 mm below the crest of the liner, and at points b and c at equal pitch (a–b = b–c).
Obtain distortion (roundness and cylindricity of each cylinder) from the measured values as follows:

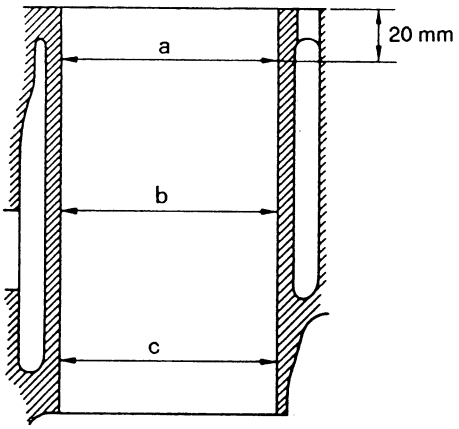
- ○ Roundness:
  Difference between max. and min. bore values on the same cross section of each liner.
- ○ Cylindricity:
  Difference between max. and min. bore values in the same direction of each liner.

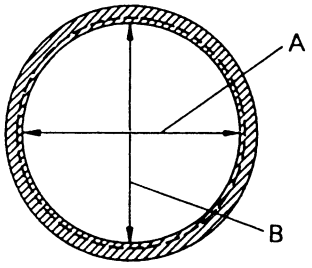
Honing (honing and boring) is required when the measured value exceeds the limit.

* *For oversized piston and piston ring, refer to this chapter, 7-4, 8.*



(Measuring the cylinder bore)





Note: Measurement should be made at a, b and c in the directions of A and B.

(Cylinder bore measuring positions)

7-5. Connecting rod

1. Visual inspection

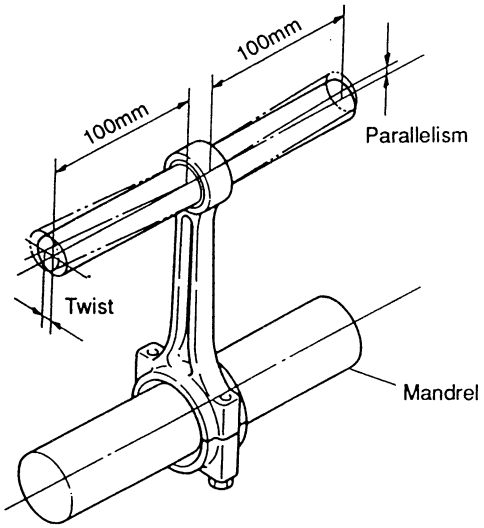
Inspect the portion near the boundary of the chamfered portion and I-beam section of the big and small ends of the connecting rod as well as the portion near the oil hole of the bushing at the small end for cracks, deformation, and discoloration.

2. Measuring the twist and parallelism

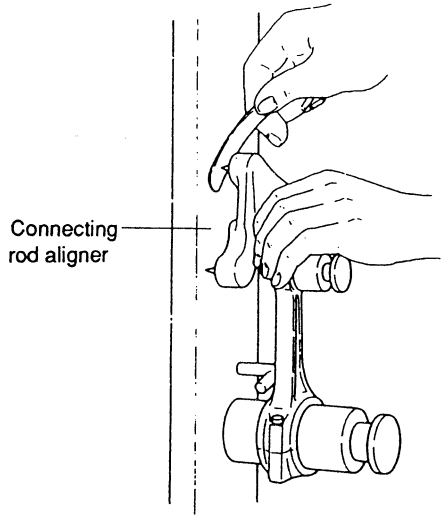
Measure the twist and parallelism by use of the connecting rod aligner.

(mm)

	All models	
	Standard	Wear limit
Twist and parallelism	0.03 or less per 100 mm	0.08



(Measuring the twist and parallelism)



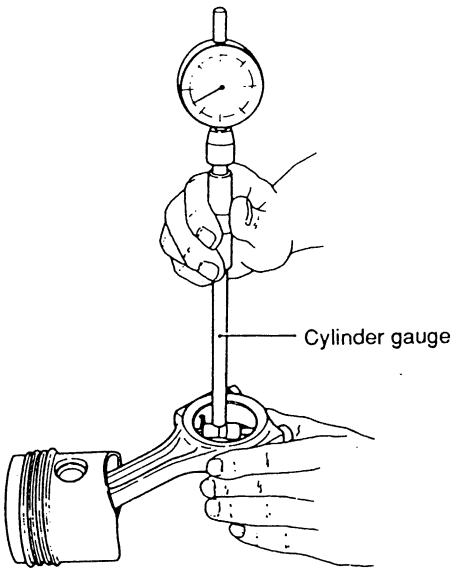
(Measuring the twist with connecting rod aligner)

3. Measuring the crankpin and bushing clearance

To measure the oil clearance of the crankpin and bushing, measure the inside diameter of the crankpin metal and outside diameter of the crankpin, and obtain the difference between them.

If the measured oil clearance exceeds or near the wear limit, replace the crankpin metal. If the crankpin is excessively or unevenly worn, grind the crankpin, and use an oversized crankpin metal.

* *To measure the inside diameter of the crankpin metal, reassemble the crankpin metal to the connecting rod and tighten the rod bolt to the specified torque, making sure each metal is fitted on the correct position.*



(Measuring the inside diameter of the crankpin metal)

(kgf-m)

	2/3TNE68 3TNE74	3TNE78A 3TNE82A	3/4TNE82, 3/4TNE84(T), 3/4TNE88
	Specified torque		
Rod bolt tightening torque (Apply lube oil to the rod bolt)	2.3~2.8	3.8~4.2	4.5~5.5

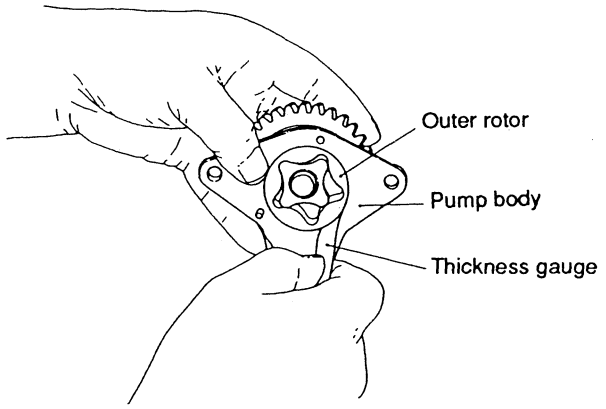
7-9. Trochoid pump

1. Clearance between outer rotor and pump body

Insert a thickness gauge between the outer rotor and pump body to measure the clearance.

(mm)

	All models	
	Standard	Wear limit
Clearance between outer rotor and pump body	0.10~0.16	0.25



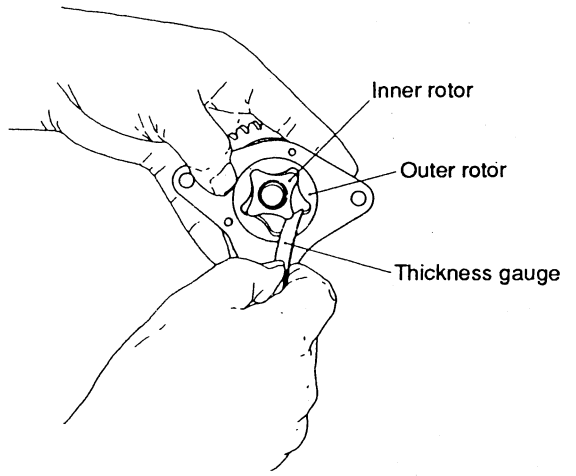
(Measuring the clearance between outer rotor and pump body)

2. Clearance between outer rotor and inner rotor

Insert a thickness gauge between the top of the inner rotor tooth and the top of the outer rotor tooth to measure the clearance.

(mm)

	All models	
	Standard	Wear limit
Clearance between outer rotor and inner rotor	—	0.15



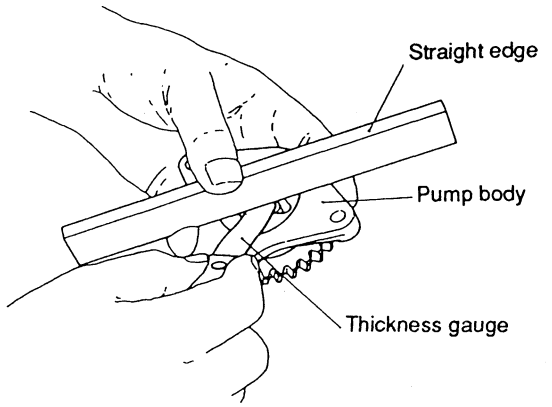
(Measuring the clearance between outer rotor and inner rotor)

3. Side clearance between pump body and inner rotor, outer rotor

Place a straight-edge against the end of the pump and insert a thickness gauge between the straight-edge and the rotors to measure the side clearance.

(mm)

	2/3TNE68 3TNE74		3TNE78A 3TNE82A		3/4TNE82, 3/4TNE84(T), 3/4TNE88	
	Standard	Wear limit	Standard	Wear limit	Standard	Wear limit
Pump body and inner-, outer-rotor side clearance	0.03 ~0.09	0.13	0.05 ~0.10	0.15	0.03 ~0.09	0.15



(Measuring the clearance between the pump body and inner-, outer-rotor)

4. Clearance between rotor shaft and side cover hole

Measure the rotor shaft outside diameter and the side cover hole diameter, and calculate the difference between the hole diameter and the outside diameter.

(mm)

	All models	
	Standard	Wear limit
Clearance between rotor shaft and side cover hole	0.013 ~0.043	0.2

5. Others

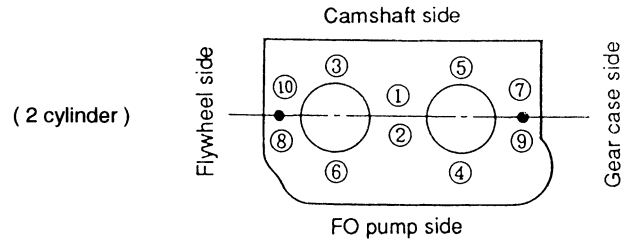
(1) Check for looseness of drive gear/rotor shaft fitting, and replace the entire assembly if loose or wobbly.

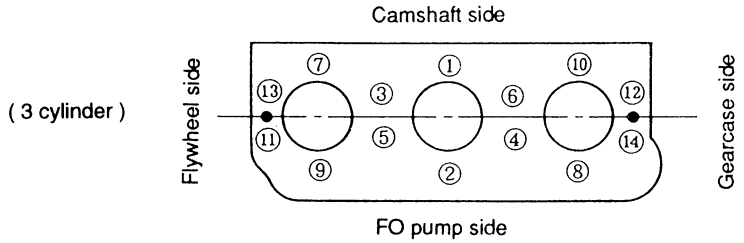
(2) Push the oil pressure regulating valve piston from the oil hole side, and replace the entire assembly if the piston does not return due to spring breakage, etc. (Engine with oil cooler only)

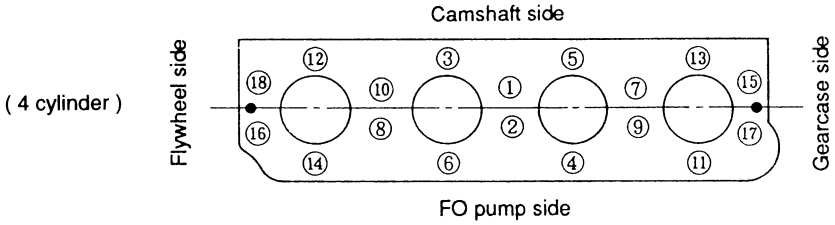
(3) Make sure that the rotor shaft rotates smoothly and easily when the drive gear is rotated.

(10) Order of tightening cylinder heads and tightening torque

Tighten cylinder heads in numerical order shown below to the specified torque.







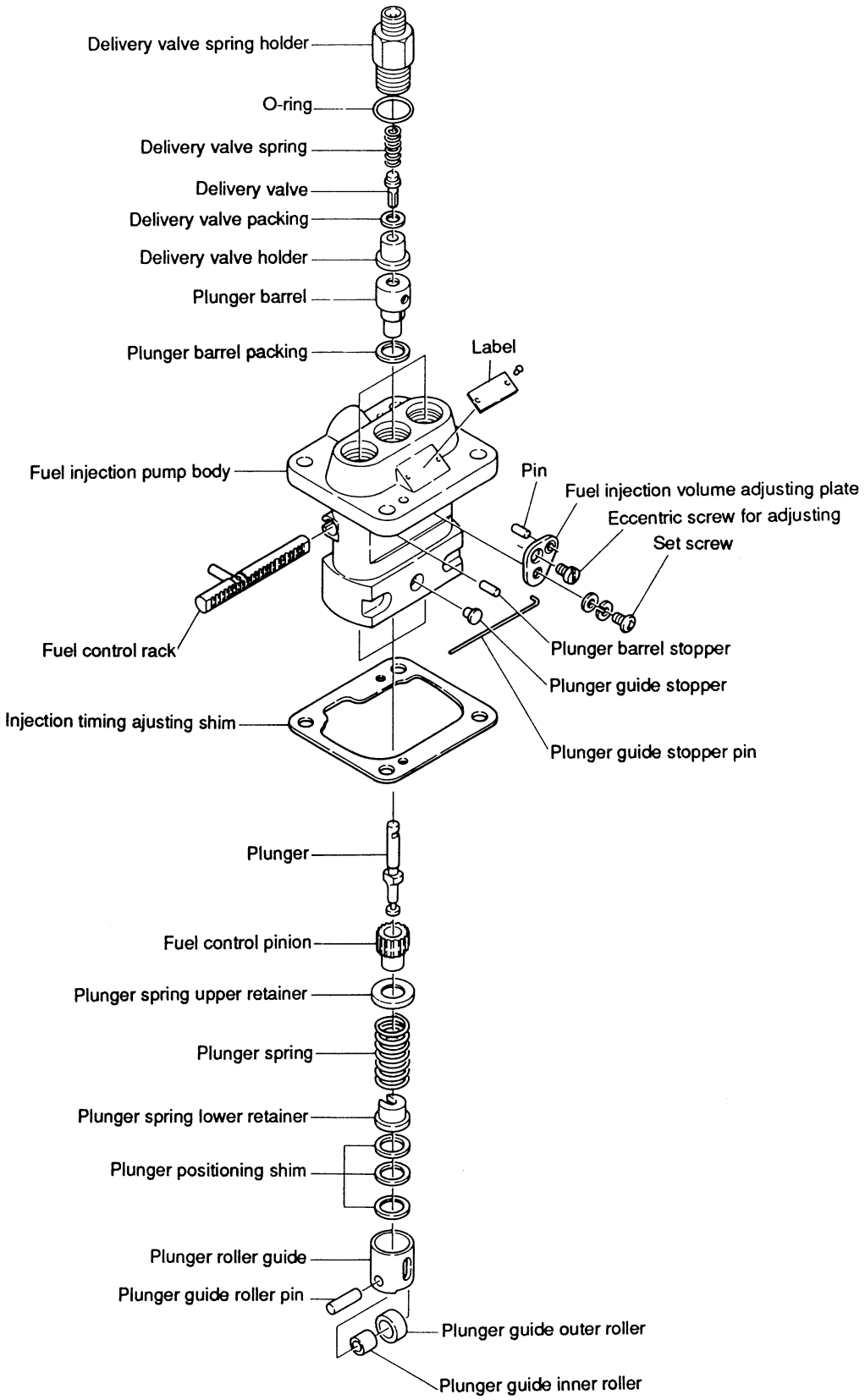
(kgf-m)

	2/3TNE68	3TNE74	3TNE78A 3TNE82A	3/4TNE82 3/4TNE84(T) 3/4TNE88
Tightening torque	3.8 ~4.2	6.0~6.5	6.8~7.2	8.7~9.3

(11) After having reassembled the cylinder heads, carry out confirmation running to see if they are free from leakage of water and oil.

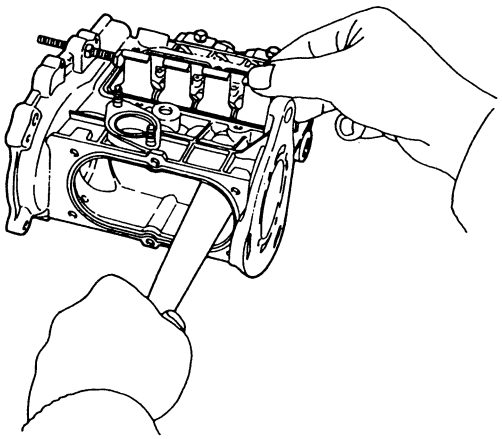
11. Fuel Injection Pump for Indirect Injection System

11-1. Exploded view (YPFR type)



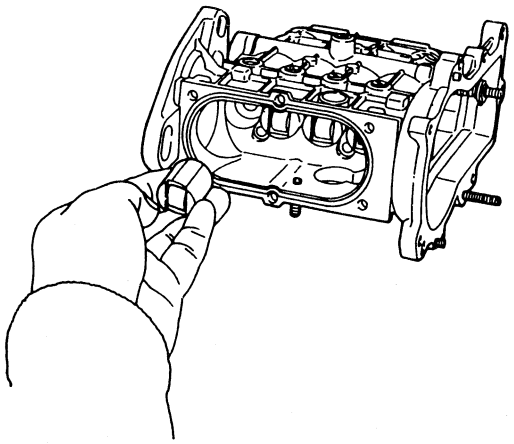
(12) By using the handle of a hammer, etc., push up the plunger guide from the bottom of the pump and take out the tappet holders (special service tool).

* *Use particular care to remove the tappet holder. Carefully prevent the plunger guide, plunger, etc., from jumping out. This is because the plunger spring is powerful enough to force them out.*



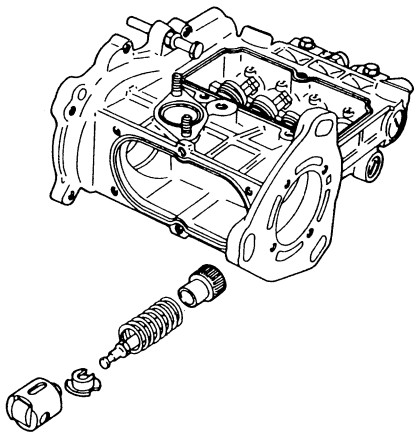
(13) Take out the plunger guide assembly.

* *Do not erect the fuel injection pump body, wherever possible. Otherwise, the plunger guide assembly falls off. Therfore, hold the fuel injection pump body tilted and remove the plunger guide assembly.*

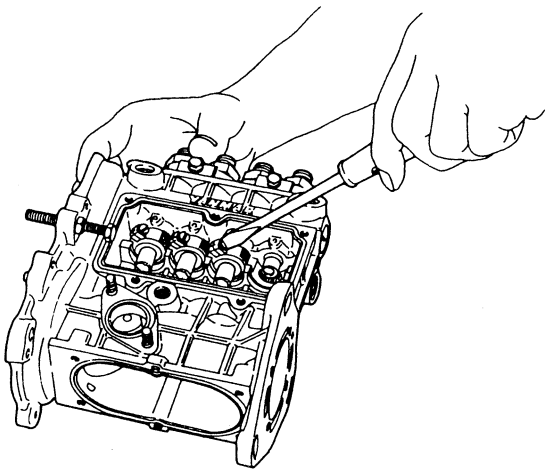


(14) Take out the plunger, plunger spring and plunger spring lower reteiner from the lower part of the fuel injection pump.

* *Separate these parts for each cylinder.*

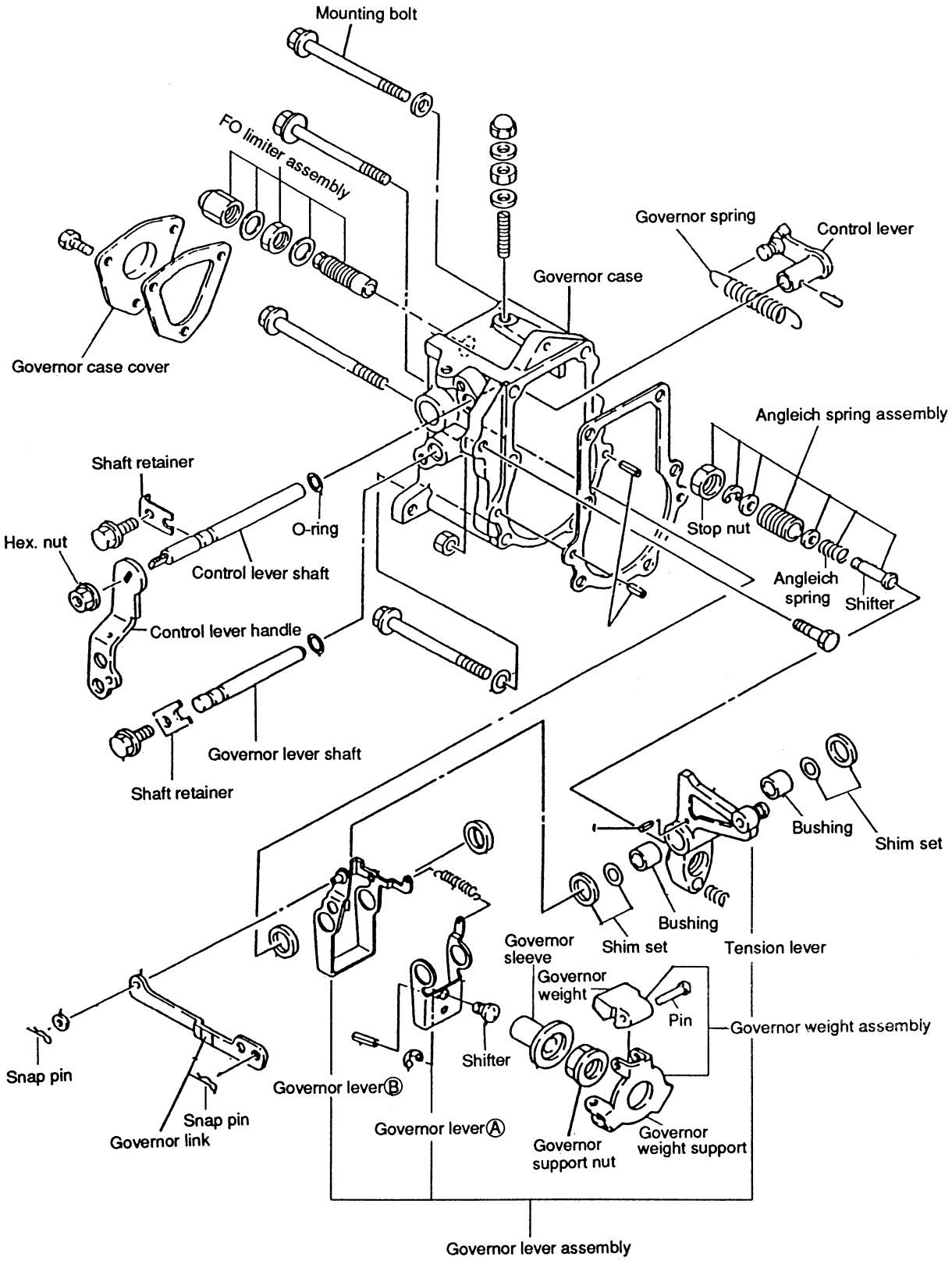


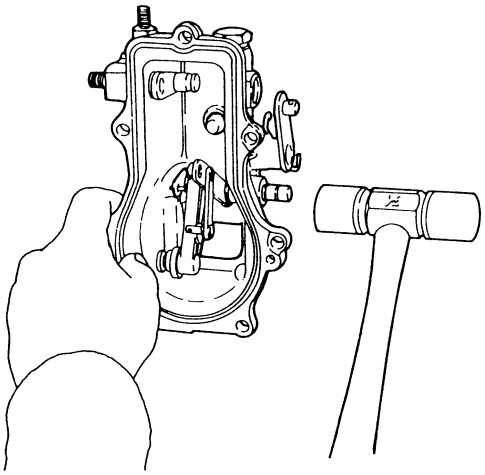
(15) Remove the stop screw from the fuel control pinion.



13. Governor

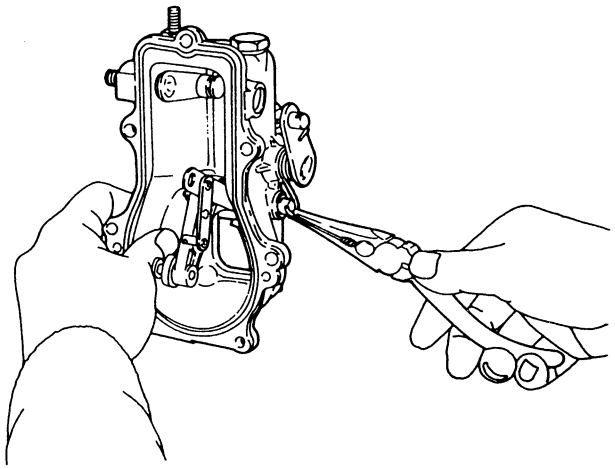
13-1. Exploded views of governor for indirect injection system



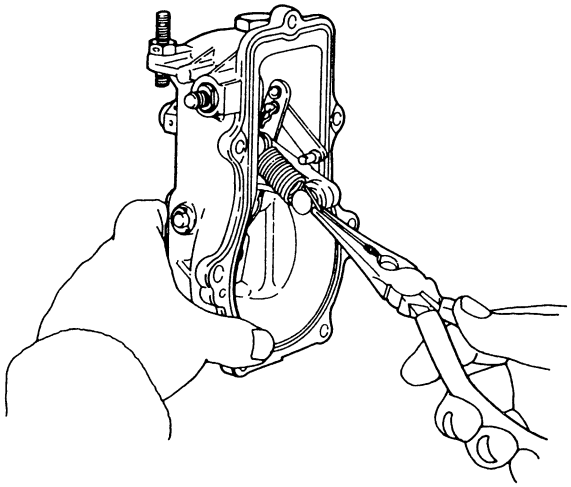


* *After mounting the governor lever assembly, make sure the governor lever assembly moves smoothly.*

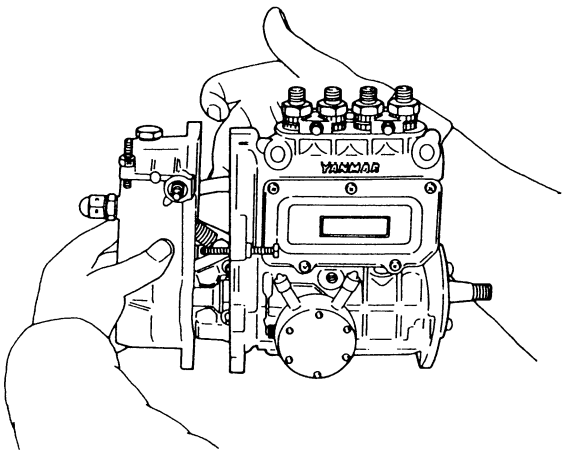
(9) Fit the stop lever return spring to the end of the governor lever shaft. (DI only)



(10) Hook the governor spring on the control lever shaft and tension lever hook with long nosed pliers.



(11) Pull the governor link as far as possible towards the governor case mounting surface, insert the governor link pin in the fuel control rack pin hole and fit the snap pin on it.



(12) Mount the governor case to the fuel injection pump while lightly tapping it with a wooden hammer, and tighten the tightening bolt.

(13) Mount the governor case cover.
On models with idle subspring, insert the adjusting spring and adjusting rod on the governor case cover adjusting bolt.

* *If the angleich spring assembly has been removed, tighten the nut temporarily. The nut should be securely tightened after adjustment.*