GENERAL SPECIFICATIONS

COMPONENT			SPECIFICATION			
			STANDARD (1.20m ARM)	1.20m ARM+Q/C	1.33m ARM	1.33m ARM+Q/C
Bucket capacity	SAE (CECE)		0.175 m3 (0.151 m3)			
Operating weight			5.6 tons / 5.4 tons (rubber shoe)			
Engine	Model		4TNV98-Z			
	Displacement (Total dis. Volume)		3,319 cc (202.54 in3)			
	Rated power		41.5 Kw (56.4 hp) @ 2,000 rpm			
			56.4 ps @2,000 rpm			
Front Attachment	Boom length		3,000 mm (9' 11")			
	Arm length (Standard)		1,600 mm (5' 3")			
	Arm length (Optional)		1,900 mm (6' 3")			
Transport Dimension	Length		5,900 mm (19' 4")			
	Height		2,500 mm (8' 2")			
	Height (Boom)		1,985 mm (6' 6")			
	Width		1,880 mm (6' 2")			
Performance	Max.digging force	Bucket	4,200 kgf (9,260 lb)			
		Arm	2,800 kgf (6,170 lb)			
	Traveling speed	1-speed	2.4 km/h (1.49 MPH)			
		2-speed	4.0 km/h (2.49 MPH)			
	Swing speed		9.0 rpm			
	Drawbar pull		4,700 kg (1,0360 lb)			
Hydraulic pump	Type		Variable displacement axial piston pump			
	Max. flow rate		55 x 2 liters/min + 36.6 liters/min (Gear pump: 13 liters/min)			
	Main relief set pressure		210 kg/cm2 (3,000 psi)			
Track	Shoe width		400 mm (15.75 in)			
	Tumbler distance		1,990 mm (78.35 in)			
Control	Lever control type		Hydraulic pilot			
	Lever pattern		SAE			
Tank	Fuel tank		115 liters (30.4 U.S. gal.)			
	Hydraulic tank		72 liters (19 U.S. gal.)			
Ground pressure			0.32 kg/cm2 (4.6 psi)			

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seriously impair its efficiency. Apply a thin coat of Loctite #120 to outer diameter, of metal casing, on oil seals to assure an oil tight fit into retainer. Use extreme care not to get Loctite on lips of oil seals. If this happens, that portion of the seal will become brittle and allow leakage.

When replacing lip type seals, make sure spring loaded side is towards oil to be sealed.

5. If available, use magna-flux or similar process for checking for cracks that are not visible. Examine teeth on all gears carefully for wear, pitting, chipping, nicks, cracks or scores. Replace all gears showing cracks or spots where case-hardening has worn through. Small nicks may be removed with suitable hone. Inspect shafts and quills to make certain they have not been sprung, bent, or splines twisted, and that shafts are true.

   NOTE: *Spline wear is not considered detrimental except where it affects tightness of splined parts.*

   Inspect thrust washers for distortion, scores, burs, and wear. Replace thrust washer if defective or worn.

6. Inspect bores and bearing surfaces of cast parts and machined surfaces for scratches, wear, grooves and dirt. Remove any scratches and burrs with crocus cloth. Remove foreign material. Replace any parts that are deeply grooved or scratched which would affect their operation.

Bearing Inspection

The condition of the bearings are vital to the smooth and efficient operation of the machinery. When any component containing bearings is disassembled, always carefully examine the condition of the bearings and all of its components for wear and damage.

Once the bearing is removed, clean all parts thoroughly using a suitable cleaning solution. If the bearing is excessively dirty soak the bearing assembly in a light solution and move the bearing around until all lubricants and or foreign materials are dissolved and the parts are thoroughly clean.

When drying bearings, moisture free compressed air can be used. Be careful not to direct the air in a direction which will force the bearing to dry spin while not being properly lubricated.

After the bearings have been cleaned and dried, carefully inspect all bearing rollers, cages and cups for wear, chipping or nicks. If the bearing cannot be removed and is to be inspected in place, check for roughness of rotation, scoring, pitting, cracked or chipped races. If any of these defects are found replace the whole bearing assembly. NEVER replace the bearing alone without replacing the mating cup or the cone at the same time.

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TORQUE VALUES FOR STANDARD METRIC FASTENERS

NOTE: *The units for the torque values are kg•m (ft lb).*

Dia. x Pitch (mm)	Grade										
	3.6 (4A)	4.6 (4D)	4.8 (4S)	5.6 (5D)	5.8 (5S)	6.6 (6D)	6.8 (6S)	6.9 (6G)	8.8 (8G)	10.9 (10K)	12.9 (12K)
M5 x Std.	0.15 (1.08)	0.16 (1.15)	0.25 (1.80)	0.22 (1.59)	0.31 (2.24)	0.28 (2.02)	0.43 (3.11)	0.48 (3.47)	0.50 (3.61)	0.75 (5.42)	0.90 (6.50)
M6 x Std.	0.28 (2.02)	0.30 (2.16)	0.45 (3.25)	0.40 (2.89)	0.55 (3.97)	0.47 (3.39)	0.77 (5.56)	0.85 (6.14)	0.90 (6.50)	1.25 (9.04)	1.50 (10.84)
M7 x Std.	0.43 (3.11)	0.46 (3.32)	0.70 (5.06)	0.63 (4.55)	0.83 (6.00)	0.78 (5.64)	1.20 (8.67)	1.30 (9.40)	1.40 (10.12)	1.95 (14.10)	2.35 (16.99)
M8 x Std.	0.70 (5.06)	0.75 (5.42)	1.10 (7.95)	1.00 (7.23)	1.40 (10.12)	1.25 (9.04)	1.90 (13.74)	2.10 (15.18)	2.20 (15.91)	3.10 (22.42)	3.80 (27.48)
M8 x 1	0.73 (5.28)	0.80 (5.78)	1.20 (8.67)	1.00 (7.23)	1.50 (10.84)	1.35 (9.76)	2.10 (15.18)	2.30 (16.63)	2.40 (17.35)	3.35 (24.23)	4.10 (29.65)
M10 x Std.	1.35 (9.76)	1.40 (10.12)	2.20 (15.91)	1.90 (13.74)	2.70 (19.52)	2.35 (19.99)	3.70 (26.76)	4.20 (30.37)	4.40 (31.18)	6.20 (44.84)	7.20 (52.07)
M10 x 1.25	1.50 (10.84)	1.60 (11.57)	2.50 (18.08)	2.10 (15.18)	3.10 (22.42)	2.80 (20.25)	4.30 (31.10)	4.90 (35.44)	5.00 (36.16)	7.00 (50.63)	8.40 (60.75)
M12 x Std.	2.40 (17.35)	2.50 (18.08)	3.70 (26.76)	3.30 (23.86)	4.70 (33.99)	4.20 (30.37)	6.30 (45.56)	7.20 (52.07)	7.50 (54.24)	10.50 (75.94)	12.50 (90.41)
M12 x 1.25	2.55 (18.44)	2.70 (19.52)	4.00 (28.93)	3.50 (25.31)	5.00 (36.16)	4.50 (32.54)	6.80 (49.18)	7.70 (55.69)	8.00 (57.86)	11.20 (81.00)	13.40 (96.92)
M14 x Std.	3.70 (26.76)	3.90 (28.20)	6.00 (13.23)	5.20 (37.61)	7.50 (54.24)	7.00 (50.63)	10.00 (72.33)	11.50 (83.17)	12.00 (86.79)	17.00 (122.96)	20.00 (144.66)
M14 x 1.5	4.10 (29.65)	4.30 (31.10)	6.60 (47.73)	5.70 (41.22)	8.30 (60.03)	7.50 (54.24)	11.10 (80.28)	12.50 (90.41)	13.00 (94.02)	18.50 (133.81)	22.00 (159.12)
M16 x Std.	5.60 (40.50)	6.00 (43.39)	9.00 (65.09)	8.00 (57.86)	11.50 (83.17)	10.50 (75.94)	15.50 (112.11)	17.90 (129.47)	18.50 (133.81)	26.00 (188.05)	31.00 (224.22)
M16 x 1.5	6.20 (44.84)	6.50 (47.01)	9.70 (70.16)	8.60 (62.20)	12.50 (90.41)	11.30 (81.73)	17.00 (122.96)	19.50 (141.04)	20.00 (144.66)	28.00 (202.52)	35.50 (256.77)
M18 x Std.	7.80 (56.41)	8.30 (60.03)	12.50 (90.41)	11.00 (79.56)	16.00 (115.72)	14.50 (104.87)	21.00 (151.89)	27.50 (198.90)	28.50 (206.14)	41.00 (296.55)	43.00 (311.01)
M18 x 1.5	9.10 (65.82)	9.50 (68.71)	14.40 (104.15)	12.50 (90.41)	18.50 (133.81)	16.70 (120.79)	24.50 (177.20)	27.50 (198.90)	28.50 (206.14)	41.00 (296.55)	49.00 (354.41)
M20 x Std.	11.50 (83.17)	12.00 (86.79)	18.00 (130.19)	16.00 (115.72)	22.00 (159.12)	19.00 (137.42)	31.50 (227.83)	35.00 (253.15)	36.00 (260.38)	51.00 (368.88)	60.00 (433.98)
M20 x 1.5	12.80 (92.58)	13.50 (97.64)	20.50 (148.27)	18.00 (130.19)	25.00 (180.82)	22.50 (162.74)	35.00 (253.15)	39.50 (285.70)	41.00 (296.55)	58.00 (419.51)	68.00 (491.84)
M22 x Std.	15.50 (112.11)	16.00 (115.72)	24.50 (177.20)	21.00 (151.89)	30.00 (216.99)	26.00 (188.05)	42.00 (303.78)	46.00 (332.71)	49.00 (354.41)	67.00 (484.61)	75.00 (542.47)
M22 x 1.5	17.00 (122.96)	18.50 (133.81)	28.00 (202.52)	24.00 (173.59)	34.00 (245.92)	29.00 (209.75)	47.00 (339.95)	52.00 (44.76)	56.00 (405.04)	75.00 (542.47)	85.00 (614.80)
M24 x Std.	20.50 (148.27)	21.50 (155.50)	33.00 (238.68)	27.00 (195.29)	40.00 (289.32)	34.00 (245.92)	55.00 (397.81)	58.00 (419.51)	63.00 (455.67)	82.00 (593.10)	92.00 (655.43)
M24 x 2.0	23.00 (166.35)	35.00 (253.15)	37.00 (267.62)	31.00 (224.22)	45.00 (325.48)	38.00 (202.52)	61.00 (441.21)	67.00 (484.61)	74.00 (535.24)	93.00 (672.66)	103.00 (744.99)

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REMOVAL

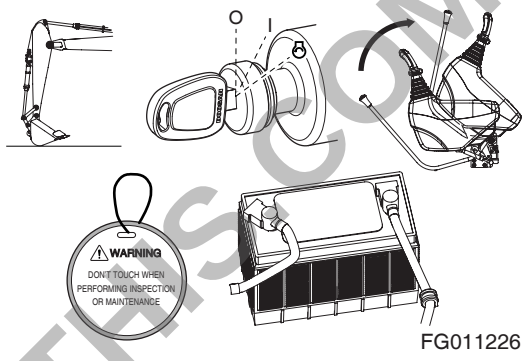
CAUTION

Avoid disassembling cabin if there are strong wind gusts, which could catch large surface area of cabin shell and push it sideways during lift.

1. Park on firm and level ground.
2. Lower front attachment (bucket) to ground.
3. Shut down engine.
4. Set safety lever on "RELEASED" position.
5. Turn starter switch to "I" (ON) position.

WARNING

If engine must be run while performing maintenance, use extreme care. Always have one person in the cabin at all times. Never leave the cabin with the engine running.



FG011226

Figure 1

6. Fully stroke work levers (joysticks) in all directions to relieve pressure from accumulators.
7. Set safety lever on "LOCK" position.
8. Turn key to "O" (OFF) position and remove from starter switch.
9. Hang maintenance warning tag on controls.
10. Disconnect the battery cable from the negative (-) battery terminal.
11. Prepare cabin shell for removal by disconnecting wiring connectors for :
    A. Main harness.
    B. Left stand harness.
    C. Right stand harness.
    D. Harness passing next to the air conditioner box.

NOTE: *Control console wiring harnesses and hydraulic piping lines that pass through the floor of the cabin do not need to be disassembled.*

NOTE: *If unit is equipped with a cabin protective structure (for forestry, or hazardous working conditions), it must be removed.*

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SAFETY PRECAUTIONS

⚠ CAUTION

Follow all safety recommendations and safe shop practices outlined in the front of this manual or those contained within this section.

Always use tools and equipment that are in good working order.

Use lifting and hoisting equipment capable of safely handling the load.

Remember that ultimate safety is your own responsibility.

APPLICABLE MODELS

The contents of this section apply to the following models and serial number ranges.

MODEL	SERIAL NUMBER RANGE
DX55	50001 and Up

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Remote Control Valve (Work Lever / Joystick) SP001489
Dozer Valve SP001490
Pedal Valve..... SP001491
Hydraulic Schematic (DX55)..... SP001492

Electrical System

Electrical System SP001493
Electrical Schematic (DX55) SP001494

Attachments

Boom and Arm..... SP001495
Bucket..... SP001496

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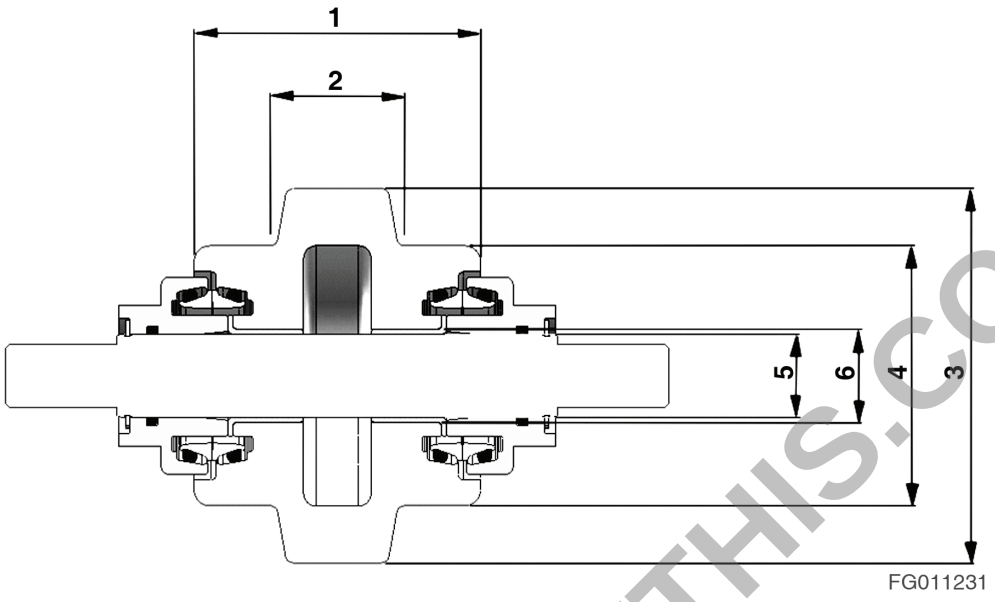


Figure 16

No.	Item	Standard			Limits	Remarks
1	Body Length	110.0 mm (4.33 in)			-	-
2	Flange Width	46.6 mm (1.83 in)			40.6 mm (1.59 in)	Repair
3	Diameter of Flange	144 mm (5.11 in)			-	-
4	Diameter of Link	100 mm (3.93 in)			92 mm (3.62 in)	Repair
5	Shaft-Bushing Clearance	Standard dimension	Tolerance		Standard Clearance	Allowable wear limit
			Shaft	Hole		
		32 mm (1.26 in)	31.95	32.33	Max : 0.37	Undefinable
			31.925	32.28	Min : 0.20	
6	Body-Bushing Press Fit	Standard dimension	Tolerance		Standard Fit	Allowable wear limit
			Bushing	Hole		
		36 mm (1.41 in)	36.15	36.05	Max : -0.13	Nonoccurrence
			36.10	36.02	Min : -0.05	

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CAUTION!

Never attempt to modify the engine's design or safety features such as defeating the engine speed limit control or the diesel fuel injection quantity control.

Modifications may impair the engine's safety and performance characteristics and shorten the engine's life. Any alterations to this engine may void its warranty. Be sure to use genuine replacement parts.

CAUTION!

Identify all parts and their location using an appropriate method. It is important that all parts are returned to the same position during the reassembly process.

CAUTION!

Each pressure adjusting shim remived or added changes the pressure threshold by approximately 275 psi (1.9 MPa, 19 kgf/cm^2). Addingadjusting shims increases the threshold pressure.

Removing adjusting shims reduces the pressure threshold.

CAUTION!

Do not rotate the crankshaft with the injection pump removed.

CAUTION!

Keep the piston pin parts, piston assemblies, and connecting rod assemblies together to be returned to the same position during the reassembly process. Label the parts using an appropriate method.

CAUTION!

Do not allow the honing tool to operate in one position for any length of time. Damage to the cylinder wall will occur. Keep the tool in constant up-and-down motion.

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WARNING

Battery electrolyte contains sulfuric acid and can quickly burn the skin and eat holes in clothing. If you spill acid on yourself, immediately flush the area with water.

Battery acid could cause blindness if splashed into the eyes. If acid gets into the eyes, flush them immediately with large quantities of water and see a doctor at once.

If you accidentally drink acid, drink a large quantity of water or milk, beaten egg or vegetable oil. Call a doctor or poison prevention center immediately.

When working with batteries, always wear safety glasses or goggles.

Battery generates hydrogen gas, so there is a danger of an explosion. Do not bring lighted cigarettes near the battery, or do anything that will cause sparks.

Before working with batteries, shut down engine and turn the starter switch to the "O" (OFF) position.

Avoid short-circuiting the battery terminals through accidental contact with metallic objects, such as tool.

When removing or installing, check which is the positive (+) terminal and negative (-) terminal.

When removing the battery, first disconnect the negative (-) terminal. When installing the battery, first connect the positive (+) terminal.

If the terminals are loose, there is a danger that defective contact may generate sparks that will cause an explosion. When installing the terminals, install them tightly.

Batteries in Cold Weather

In colder weather a greater drain is placed on the batteries when they are used for the preheat cycle and when starting a cold engine. Battery performance decreases as the temperature gets lower.

In extremely cold weather, remove batteries at night and move them to a warm location. This will help to keep them at a higher power level.

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Reassembly of the Valve Cover

1. Lightly grease a new valve cover gasket (6, Figure 159). Place the gasket in the groove of the valve cover (3, Figure 159).
2. Place the valve cover on the cylinder head.
3. Be sure new O-rings (5, Figure 159) are installed on the valve cover nuts. Reinstall and tighten the valve cover nuts (4, Figure 159).
4. Reinstall the fuel injector grommets (1, Figure 159).
5. Reinstall the exhaust manifold using a new gasket. Tighten the bolts to specification.
6. Reinstall the intake manifold using a new gasket. Tighten the bolts to specification.
7. Reconnect the fuel injector return hose and fuel injection pump coolant hoses.
8. Reinstall the high-pressure fuel line grommets into the valve cover.
9. Reinstall the high pressure and fuel return lines. See “Installation of the Fuel Injectors” on page -194
10. Reinstall the coolant pump. Reassembly of Engine Coolant Pump.
11. Reinstall the alternator. See “Installation of Alternator” on page -245
12. Reconnect the turbocharger oil supply and drain lines.
13. Reconnect the air intake hose.

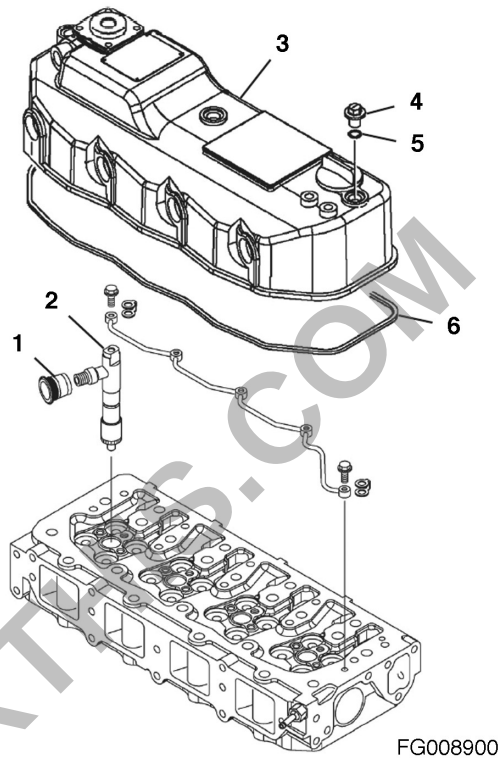


Figure 159

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Stop Solenoid

The MP fuel injection pumps are equipped with a stop solenoid that controls the fuel flow inside the fuel injection pump.

With the starter switch in the OFF position, no current flows to the stop solenoid and the solenoid plunger is extended holding the fuel injection pump fuel rack in the "closed" position and not allowing fuel to flow through the injection pump and to the engine.

When the starter switch is turned to the start position, the "pull coil" (36.5 Amp draw / white wire) inside the solenoid is activated and pulls the solenoid plunger into the solenoid. This releases the fuel injection pump fuel rack, allowing fuel to flow through the injection pump and allowing the engine to start and run.

When the starter switch is returned to the ON or RUN position, the "pull coil" no longer receives current and the "hold coil" (0.5 Amp draw / red wire) inside the solenoid is activated. The "hold coil" holds the solenoid plunger in the RUN position, allowing fuel to continue flowing and he engine to continue running.

To stop the engine, the key switch is turned to the OFF position. Current no longer flows to the stop solenoid "hold coil", and the solenoid plunger extends and moves the injection pump fuel rack to the "closed" position, shutting off the fuel flow and stopping the engine.

Failure of the stop solenoid could result in the engine not starting, the engine stopping suddenly, the engine not continuing to run with the key switch returned to the ON or RUN position, or the engine failing to stop when the key switch is turned to the OFF position. Use a multimeter or continuity light to check for 12V at the stop solenoid connector in the correct sequence.

Electronically controlled engines 4TNV84T-Z, 4TNV98-Z, 4TNV98-E, and 4TNV98T-Z are designed so that, when the key is turned on or off, the corresponding signal is sent to the E-ECU.

Thus the E-ECU controls the rack actuator to provide a sufficient injection rate when the engine is started up (the key is turned on) or cut the fuel supply and stop then engine when the key is turned off. Therefore, this electronically controlled engines does not have a stop solenoid.

Cold Start Device

The TNV model engines are equipped with a cold start device (CSD).

The cold start device is located in the upper section of the fuel injection pump and is connected to the engine°Øs cooling system.

- The cold start device improves engine starting at lower temperatures. At engine cooling system temperatures below 41°F (5°C), the cold start device advances the fuel injection timing and slightly increases the fuel injection volume.
- For approximately the first 5 minutes of operation, the idle speed of the engine will be slightly elevated.

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Introduction

This section of the Service Manual covers the servicing of the starter motor. Standard equipment on TNV model engine is used in this section to show the service procedures for a representative start motor and it may be different from acfural equipment.

Starter Motor Specifications

Nominal Output			3.0 hp (2.3 kW)
Weight			12.1 lb (5.5 kg)
Revolution Direction (As Viewed From Pinion)			Clockwise
Engagement System			Magnetic Shift
No-load	Terminal Voltage / Current		11 V / 140 A max
	Revolution		4100 rpm (min^{-1})
	Terminal Voltage / Current		2.5 V / 1050 A max
	Torque		18 ft-lb (24.5 N•m; 2.5 kgf/m) minimum
Clutch System			Overrunning
Pinion Projection Voltage at 212°F (100 °C)			8.6 V max
Pinion DP or Module / Number of Teeth			M3/9
Difference (O-ring, Oil Seal)			Dry (none)
Application			Standard
Brush	Spring Force		7.868 lbf (35 N; 3.6 kgf)
	Height	Standard	0.591 in. (15 mm)
		Limit	0.354 in. (9 mm)
Magnetic Switch	Series Coil Resistance		0.27 W at 68°F (20°C)
	Shunt Coil Resistance		0.60 W at 68°F (20°C)
Commutator	Outside Diameter	Standard	1.437 in. (36.5 mm)
		Limit	1.398 in. (35 mm)
	Run-Out	Standard	0.001 in. (0.03 mm)
		Limit	0.008 in. (0.2 mm)
	Insulation Depth	Standard	0.020 - 0.031 in. (0.5 - 0.8 mm)
		Limit	0.008 in. (0.2 mm)
Armature	Run-Out	Standard	0.001 in. (0.03 mm)
		Limit	0.008 in. (0.02 mm)
Bearing Type	Armature Front	Nominal Number	6903DDU
	Armature Rear		608DDU
	Pinion Front		60004DDU
	Pinion Rear		6904DDU
Pinion Projection Length (Length L)			0.012 - 0.059 in. (0.3 - 1.5 mm)

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Measured Value and Troubleshooting

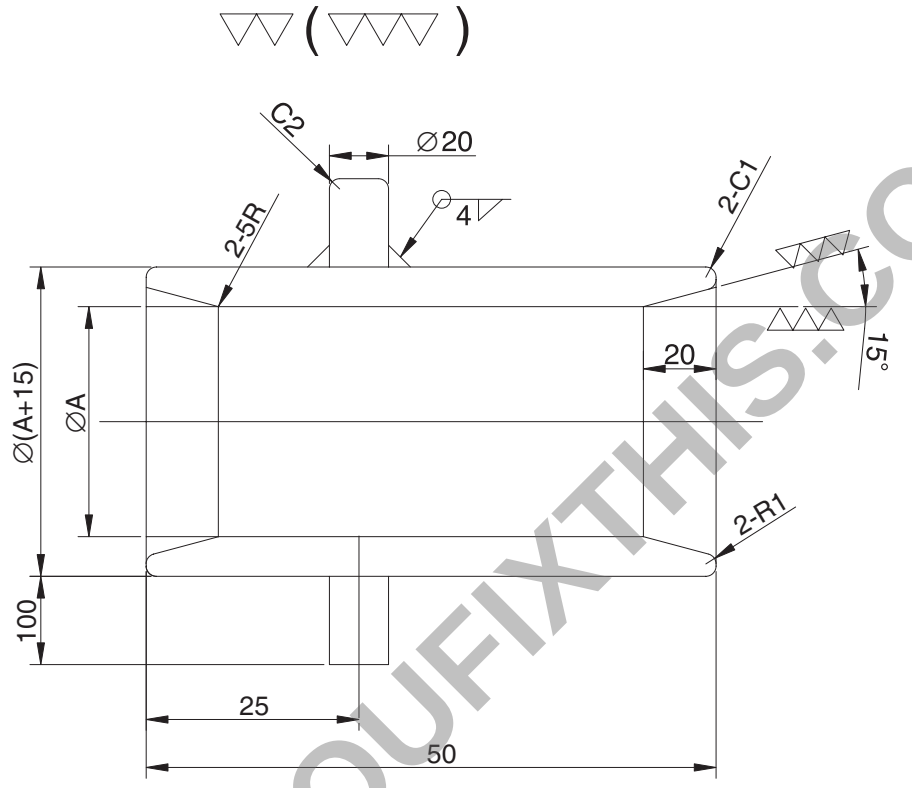
When the measured compression pressure is below the limit value, inspect each part by referring to the table below.

No.	Item	Cause	Corrective Action
1	Air Cleaner Element	Clogged element	Clean the element.
		Broken element	Replace the element.
		Defect at element seal portion	
2	Valve Clearance	Excessive or no clearance	Adjust the valve clearance.
3	Valve Timing	Incorrect valve clearance	Adjust the valve clearance.
4	Cylinder Head Gasket	Gas leak from gasket	Replace the gasket.
			Retighten the cylinder head bolts to the specified torque.
5	Intake / Exhaust Valve	Sticking valve	Replace the intake / exhaust valve.
	Valve Seat	Gas leak due to worn valve seat or foreign matter trapped in valve	Lap the valve seat.
6	Piston	Gas leak due to scratching or wear	Perform honing and use an oversized part.
	Piston		
	Cylinder		

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Slipper Seal Straightening Jig



ARS4780L

Figure 12

MODEL	CYLINDER	$\text{øA}^{+0.2}_{+0.1}$	MODEL (CYLINDER)
DX55	ARM	90 mm (3.54 in)	
	BOOM	115 mm (4.53 in)	
	DOZER	100 mm (3.94 in)	
P/S: Power Steering			

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8. Remove inner race of taper roller bearing (1-8, Figure 42).

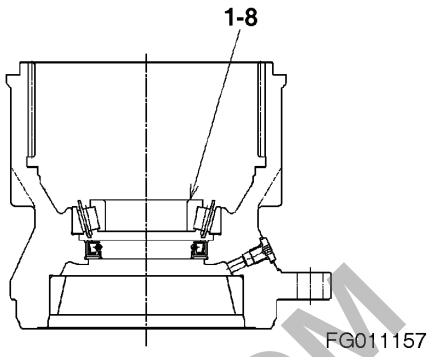


Figure 44

9. Break oil seal (1-7, Figure 44) to remove it.

CAUTION

The removed oil seal must not be used again.
When removing it, exercise with care to prevent damage to outer races of taper roller bearings (1-8, Figure 42) and (1-6, Figure 45).

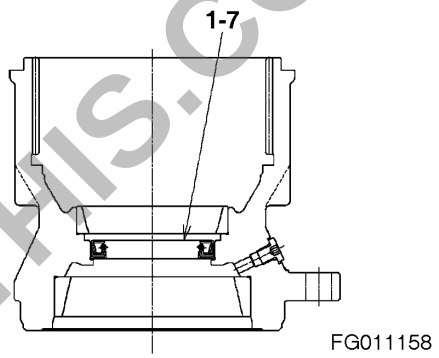


Figure 45

10. Remove outer race of taper roller bearing (1-8, Figure 42) and plug (1-35, Figure 46).

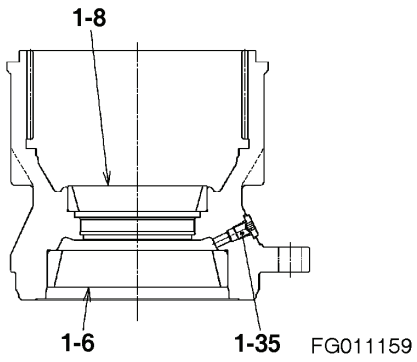


Figure 46

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Spur Gear Removal

1. Take out two retaining rings (25) from crank shaft (9).



Figure 41

CAUTION

Be careful when removing the retaining ring. You could become injured if tip of the pliers comes out of the retaining ring hole, and the retaining ring jumps out.

2. Draw out two spur gears (7) from crank shaft (9).



Figure 42

Rear Flange Removal

1. Turn the work bench so rear flange (201) is on top.
2. Loosen plugs (224) (2 plugs).

   NOTE: *Temporarily loosen the plugs to make work easier later.*

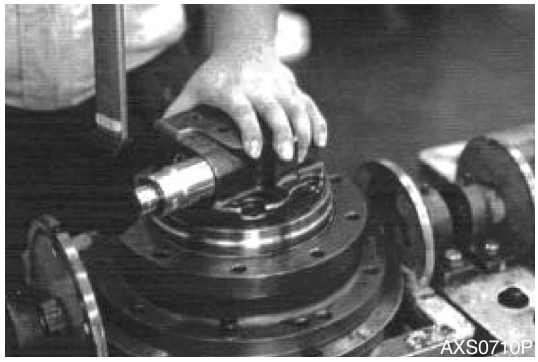


Figure 43

3. Loosen plugs (226) (2 plugs).

   NOTE: *Temporarily loosen the plugs to make work easier later.*

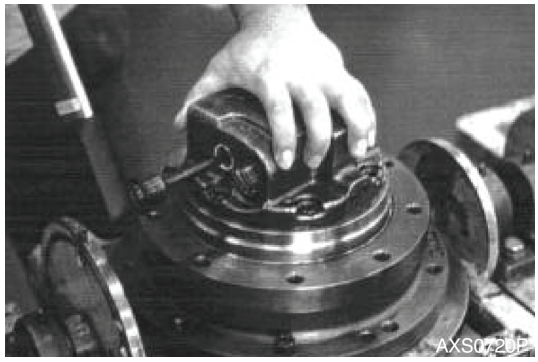


Figure 44

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7. Arm 2 function
   If operating the arm cylinder, working oil from the P1 pump side (No.1 section) and the P2 pump side (No.6 section) are mixed by the outside pipe.

8. Boom2 function
   When performing Lift Up operation on the Boom, working oil in the Boom2 section of the P2 pump group is mixed with Boom1 section through the inside passage of the control valve.

9. Anti-drift valve
   An anti-drift plate is installed to reduce natural drop volume in the bottom part of Boom cylinder.

10. Boom right rotation circuit
    Poppet with the throttle valve adhered is installed in the parallel passage so that Boom operates in simultaneous operation of Lift Up on boom + Bucket Crowd.
    Same as for simultaneous operation of Boom + Arm2.

Operation of main section

Arm2

1. For neutral (Figure 16)
   Working oil discharging from the pump is returned to the tank through neutral passage. Working oil of both A1 and B1 cylinder port is closed.

2. Crowd operation (Figure 17)
   If converting the spool by pressurizing the Pa1 port, flow of the neutral passage is closed and working oil in the neutral passage pushes up the load check valve at both places and flow through "A1".
   Working oil of the cylinder port "B" returns to the tank from the Arm1 section.

3. Crowd operation in simultaneous operation with boom (Figure 18)
   Working oil pushes up the load check valve (parallel) with throttle valve and flows through the cylinder port "A".

4. Dump operation (Figure 19)
   Like Crowd operation, return working oil returns to the tank from the cylinder port "A".

Boom1

1. For neutral (Figure 20)
   An anti-drift plate is installed to reduce natural drop volume in the bottom part of cylinder.

2. Move up operation (Figure 21)
   Working oil pushes up the poppet of the anti-drift plate as well as load check valve and flows through the cylinder port "B3". Return working oil returns to the tank from the cylinder port "A".

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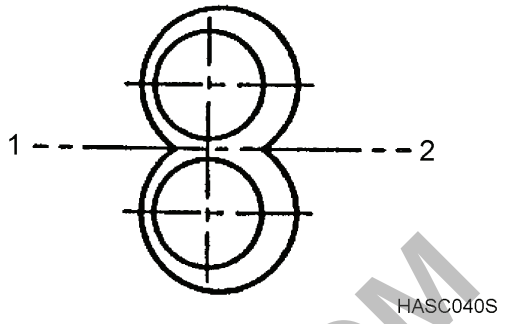
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Reference Number	Description
1	Intake Side
2	Discharge Side



HASC040S

Figure 104

7. Install square ring.

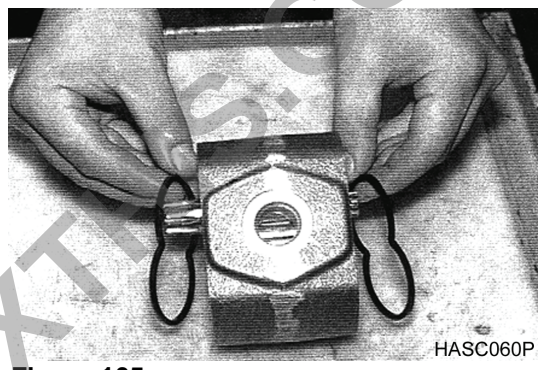

HASC060P

Figure 105

8. Insert two alignment pins into front cover.

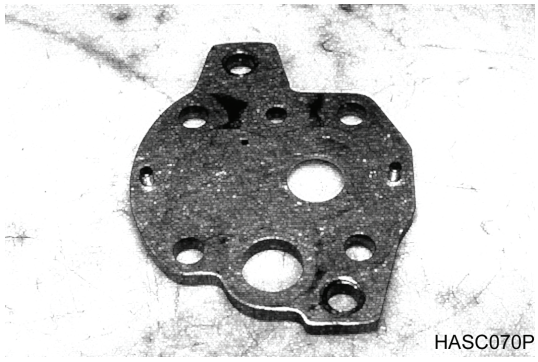

HASC070P

Figure 106

9. Install front cover.

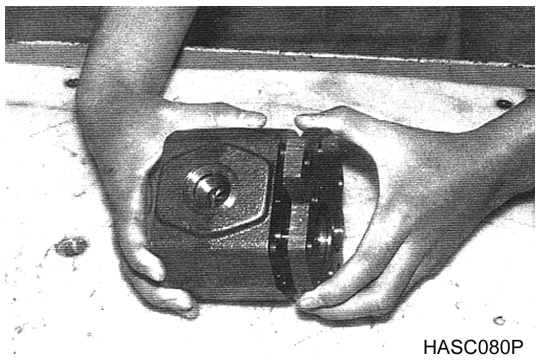

HASC080P

Figure 107

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16. Disassemble the spring (8) from the casing [1] (1).

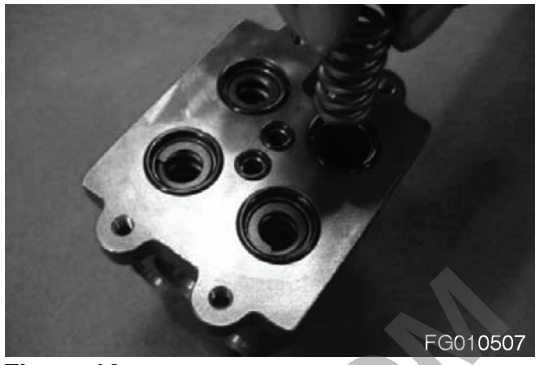


Figure 16

17. Disassemble the O-ring (11), (28) from the casing [1] (1).

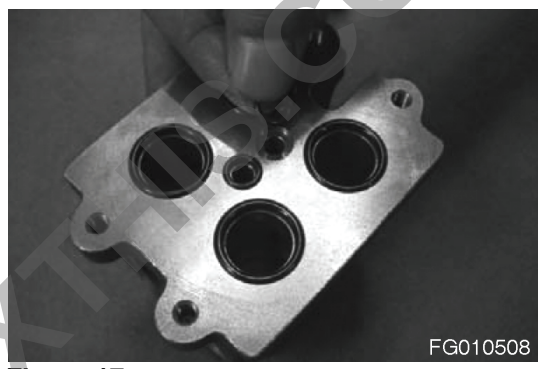


Figure 17

18. Press the spring sheet (10) down and disassemble it from the spool (5).



Figure 18

19. Disassemble the spring (9), washer (7) and washer (6) from the spool in this order.

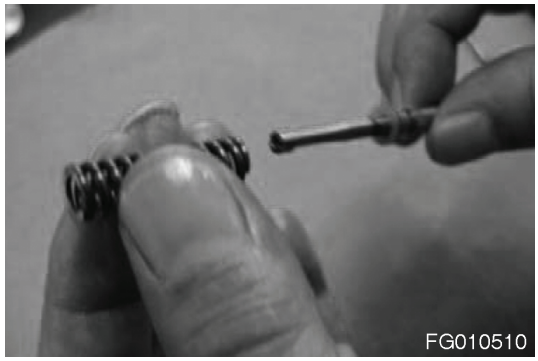


Figure 19

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No	Item	Failure detection conditions	Operation when failure occurs	Action/ condition for recovery	Category	Number of flashes
19	Sensor 5V failure	Monitoring voltage is approx. 0 V. Monitoring voltage is 4.5 V or less. Monitoring voltage is 5.5 V or more.	Engine runs normally.	Turn key off.	Always enable	2-4
20	E-ECU overheat alarm	E-ECU temperature exceeds 105°C. Alarm is canceled when E-ECU temperature decreases to 100°C. (option can change)	Engine runs normally. (Option can change)	Correct failure.	Default to disable	2-5
21	Oil pressure low	Oil pressure switch fails to turn off when engine is running.	Engine runs normally. (Option can change)	Correct failure.	Default to disable	3-1
22	Charge failure	Charge switch fails to turn off when engine is running.	Engine runs normally.	Turn key off.	Default to disable	3-2
23	Coolant temperature abnormal	Coolant temperature switch turns on.	Engine runs normally. (Option can change)	Turn key off.	Default to disable	3-3
24	Air cleaner blockage alarm	Air cleaner switch turns on.	Engine runs normally. (Option can change)	Turn key off.	Default to disable	3-4
25	Oily water separator alarm	Oily water separator switch turns on.	Engine runs normally. (Option can change)	Turn key off.	Default to disable	3-5
26	Coolant temperature high alarm	Coolant temperature is 115°C or higher. alarm is canceled when Coolant temperature decreases to 110°C. (Option can change)	Engine runs normally.	Correct failure.	Default to disable	3-6
27	E-ECU failure [ROM error]	Flash ROM suffers checksum error.	Engine stops.	Turn key off.	Always enable	4-1
28	E-ECU failure [EEPROM error]	Reading /Writing fails. EEPROM suffers checksum error.	Engine runs normally.	Turn key off.	Always enable	4-1
29	E-ECU failure [EEPROM failure]	E-ECU fails to communicate with sub CPU.	Engine runs normally.	Turn key off.	Always enable	4-1
30	E-ECU failure [Mapping error]	Map format is invalid.	Engine stops.	Turn key off.	Always enable	4-1
31	E-ECU failure [E-ECU temperature sensor failure]	Sensor voltage is 4.6V or more, or 1.0V or less.	Engine runs normally.	Correct failure.	Always enable	4-1

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