Product Label 

Instructions

Trim Out The Label Along The Lines And Insert Into Pocket On The Binder Spine

DX300LC

Serial Number 5001 and Up

Pub.No. K1006409E

DOOSAN

Infracor

Pub. No. K1006409E

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 load.

Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX300LC	5001 and Up

Breathing Masks, Ear Protection May Be Required

Do not forget that some risks to your health may not be immediately apparent. Exhaust gases and noise pollution may not be visible, but these hazards can cause disabling or permanent injuries.

NOTE: *The equivalent continuous A-weighted sound pressure level at the workstation for this machine is 73 dB(A).*

Measurement is obtained on a dynamic machine following the procedures and cabin conditions as described in ISO 6396.

NOTE: *The guaranteed sound power level emitted by the machinery for this machine is 104 dB(A).*

Measurement is obtained on a dynamic machine with the procedures as described in 2000/14/EC.

Vibration Level Information

Hands/Arms: The weighted root mean square acceleration to which the hands/arms are subjected, is less than 2.5 m/s^2.

Whole body: The weighted root mean square acceleration to which the whole body is subjected, is less than 0.5 m/s^2.

Measurements are obtained on a representative machine, using measuring procedures as described in the following standard: ISO 2631/1. ISO 5349, and SAE J1166.

Recommendations for Limiting Vibrations

1. Select the right machine, equipment and attachments for a particular application.
2. Replace any damaged seat by a genuine *DOOSAN* part. Keep the seat maintained and adjusted.
   - Adjust the seat and suspension for the weight and size of the operator.
   - Inspect and maintain the suspension and adjustment mechanisms of the seat regularly.
3. Check that the machine is properly maintained.
   - Tire pressure, brakes, steering, linkages, etc.
4. Steer, brake, accelerate, shift gears, move the attachments and load the attachments smoothly.
5. Adjust the machine speed and travel path to reduce the vibration level.
   - Slow down if it is necessary when passing rough terrain.

- Warm up the engine and hydraulic oil before operating machine.
- Before moving the machine, check the position of undercarriage. The normal travel position is with idler wheels to the front under the cabin and the drive sprockets to the rear. When the undercarriage is in the reversed position, the travel controls must be operated in opposite directions.

fluids. Before you weld on pipes or on tubes or before you flame cut on pipes or on tubes, clean the pipes or tubes thoroughly with a nonflammable solvent.

Burn Prevention

When checking the radiator coolant level, shut down engine, let the engine and radiator cool down, then check the coolant recovery tank. If the coolant level in the coolant recovery tank is near the upper limit, there is enough coolant in the radiator.

Loosen the radiator cap gradually to release the internal pressure before removing the radiator cap.

If the coolant level in the coolant recovery tank is below the lower limit, add coolant.

Cooling system conditioner contains alkali. Alkali can cause personal injury. Do not allow alkali to contact the skin, the eyes, or the mouth.

Allow cooling system components to cool before you drain the cooling system.

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact the skin.

Remove the hydraulic tank filter plug only after the engine has been stopped. Make sure that the hydraulic tank filter plug is cool before you remove it with your bare hand. Remove the hydraulic tank filter plug slowly to relieve pressure.

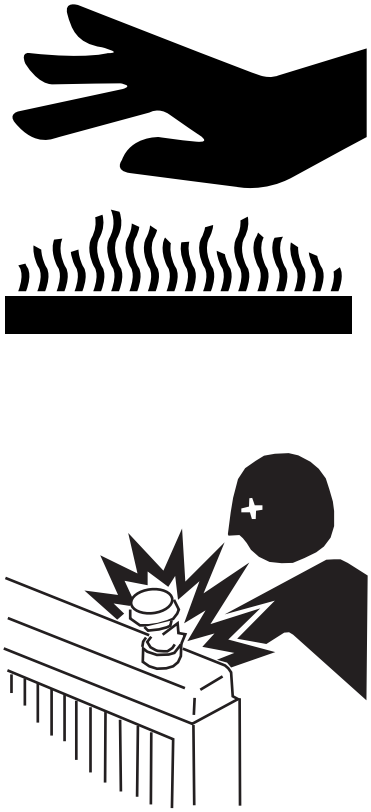
Relieve all pressure in the hydraulic oil system, in the fuel system, or in the cooling system before you disconnect any lines, fittings, or related items.

Batteries give off flammable fumes that can explode.

Do not smoke while you are checking the battery electrolyte levels.

Electrolyte is an acid. Electrolyte can cause personal injury. Do not allow electrolyte to contact the skin or the eyes.

Always wear protective glasses when you work on batteries.



HAAE1980

Figure 34

Welding Repairs

CAUTION!

When you connect or disconnect connectors between ECU and Engine or connector between ECU and the machine, always disconnect the source power to protect damage of the ECU.

If you don't observe this procedure, the ECU would be damaged or the engine would operate abnormally.

SHIPPING AND TRANSPORTATION

Obey State and Local Over-the-Road Regulations

Check state and local restrictions regarding weight, width and length of a load before making any other preparation for transport.

The hauling vehicle, trailer and load must all be in compliance with local regulations governing the intended shipping route.

Partial disassembly or teardown of the excavator may be necessary to meet travel restrictions or particular conditions at the work site. See the Shop Manual for information on partial disassembly.

Refer to the Transportation and Shipping section of this Operation and Maintenance Manual for information on loading, unloading and towing.

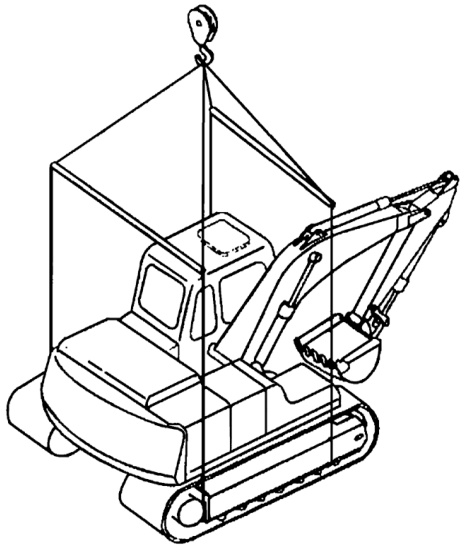
LIFTING WITH SLING

⚠ WARNING!

Improper lifting can allow load to shift and cause injury or damage.

1. Refer to Specification section of Operation and Maintenance Manual for information on weight and dimensions.
2. Use properly rated cables and slings for lifting.
3. Position machine for a level lift.
4. Lifting cables should have a long enough length to prevent contact with the machine. Spreader bars may be required.

If spreader bars are used, be sure that cables are properly secured to them and that the angle of the cables is factored into the lift strength.



HAOJ410L

Figure 47

GENERAL DESCRIPTION

The excavator has three main component sections:

- The Upper Turntable
- The Lower Undercarriage and Track Frames
- The Excavator Front-end Attachment

The following illustration identifies main components and their locations. (See Figure 1 on page -8.)

Condition	Specification
Engine Model	DL08
Barometric Pressure	760 mmHg (20°C (68°F))
Cooling Fan	711 mm, SUCKER (28 in)
Alternator	24V x 50A
Air Cleaner	Installed
Muffler	Installed

Performance Standard	DIN 6270
Power	200 ps @ 1,900 rpm (197 hp @ 1,900 rpm)
Max. Torque	93 kg•m @ 1,300 rpm (673 ft lb @ 1,300 rpm)
Fuel Consumption (Rated)	165 g/ps•h (5.47 oz/hp•h)

General Maintenance

MAINTENANCE SERVICE AND REPAIR PROCEDURE

General Precautions

Fluid level and condition should always be checked whenever any other type of maintenance service or repair is being performed.

NOTE: *If the unit is being used in an extreme temperature environment (in sub-freezing climates or in high temperature, high humidity tropical conditions), frequent purging of moisture condensation from the hydraulic reservoir drain tap should be a regular and frequent part of the operating routine. In more moderate, temperate climates, draining reservoir sediment and moisture may not be required more than once or twice every few months.*

Inspect drained oil and used filters for signs of abnormal coloring or visible fluid contamination at every oil change. Abrasive grit or dust particles will cause discoloration and darkening of the fluid. Visible accumulations of dirt or grit could be an indication that filter elements are overloaded (and will require more frequent replacement) or that disintegrating bearings or other component failures in the hydraulic circuit may be imminent or have already occurred. Open the drain plugs on the main pump casings and check and compare drain oil in the pumps. Look for evidence of grit or metallic particles.

Vibration or unusual noise during operation could be an indication of air leaking into the circuit (Refer to the appropriate Troubleshooting section for component or unit for procedures.), or it may be evidence of a defective pump. The gear type pilot pump could be defective, causing low pilot pressure, or a main pump broken shoe or piston could be responsible.

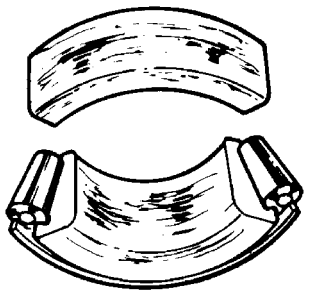
NOTE: *If equipped, indicated operating pressure, as shown on the multidisplay digital gauge on the Instrument Panel ("F-Pump" and "R-Pump") will be reduced as a result of a mechanical problem inside the pump. However, pressure loss could also be due to cavitation or air leakage, or other faults in the hydraulic system.*

Check the exterior case drain oil in the main pumps. If no metallic particles are found, make sure there is no air in the system. Unbolt and remove the tank return drain line from the top part of the swing motor, both travel motors and each main pump. If there is air in any one of the drain lines, carefully prefill the assembly before bolting together the drain line piping connections. Run the system at low rpm.

Frettage

Corrosion set up by small relative movement of parts with no lubrication.

Replace bearing. Clean all related parts. Check seals and check for proper lubrication.



HASA590S

Figure 16

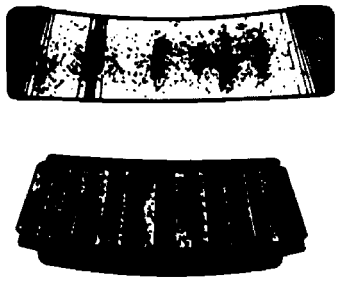
Heat Discoloration

Heat discoloration can range from faint yellow to dark blue resulting from overload or incorrect lubrication.

Excessive heat can cause softening of races or rollers.

To check for loss of temper on races or rollers, a simple file test may be made. A file drawn over a tempered part will grab and cut metal, whereas a file drawn over a hard part will glide readily with no metal cutting.

Replace bearing if over heating damage is indicated. Check seals and other related parts for damage.



HASA600S

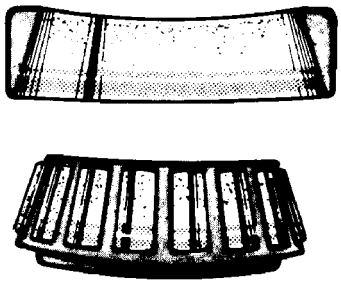
Figure 17

Stain Discoloration

Discoloration can range from light brown to black caused by incorrect lubrication or moisture.

if the stain can be removed by light polishing or if no evidence of overheating is visible, the bearing can be reused.

Check seals and other related parts for damage.



HASA610S

Figure 18

TYPE 8 PHOSPHATE COATED HARDWARE

This chart provides tightening torque for general purpose applications using original equipment standard hardware as listed in the Parts Manual for the machine involved. **DO NOT SUBSTITUTE**. In most cases, original equipment standard hardware is defined as Type 8, coarse thread bolts and nuts and thru hardened flat washers (Rockwell "C" 38 - 45), all phosphate coated and assembled without supplemental lubrication (as received) condition.

The torques shown below also apply to the following:

1. Phosphate coated bolts used in tapped holes in steel or gray iron.
2. Phosphate coated bolts used with phosphate coated prevailing torque nuts (nuts with distorted threads or plastic inserts).
3. Phosphate coated bolts used with copper plated weld nuts.

Markings on bolt heads or nuts indicate material grade ONLY and are NOT to be used to determine required torque.

Nominal Thread Diameter	Standard Torque ±10%	
	Kilogram Meter (kg•m)	Foot Pounds (ft lb)
1/4"	1.1	8
5/16"	2.2	16
3/8"	3.9	28
7/16"	6.2	45
1/2"	9.7	70
9/16"	13.8	100
5/8"	19.4	140
3/4"	33.2	240
7/8"	53.9	390
1"	80.2	580
1 - 1/8"	113.4	820
1 - 1/4"	160.4	1160
1 - 3/8"	210.2	1520
1 - 1/2"	279.4	2020
1 - 3/4"	347.1	2510
2	522.8	3780

Cabin

Edition 1

Counterweight

Edition 1

Fuel Tank

Edition 1

18. Remove six bolts (25 and 26, Figure 10) and stay (27) from fuel tank and frame.

    Remove four bolts (28 and 29) and fuel tank cover (30) from fuel tank.

    Remove two bolts (31) and bracket (32) from tank.

    Remove four bolts (33) and battery cover (34) from frame.

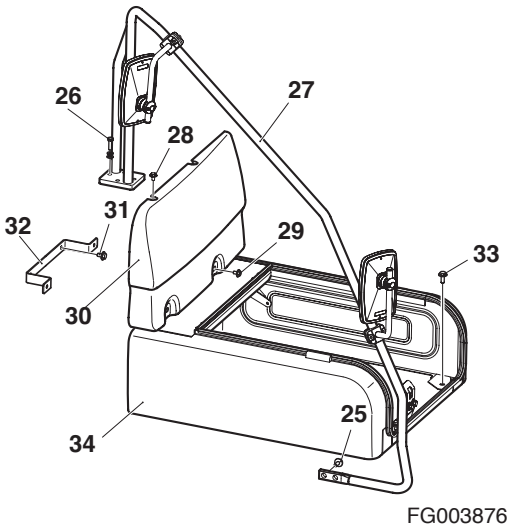


Figure 10

19. Tag and disconnect wires leading to fuel sender (16, Figure 11) on side of fuel tank (1).

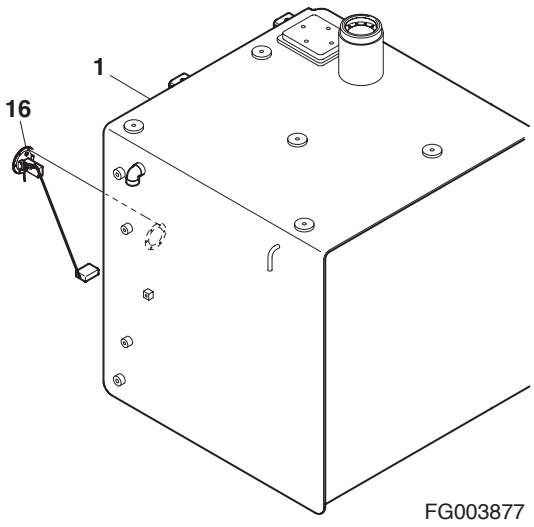


Figure 11

20. Remove four bolts (35 and 36, Figure 12) and cover (37) from fuel tank and support.

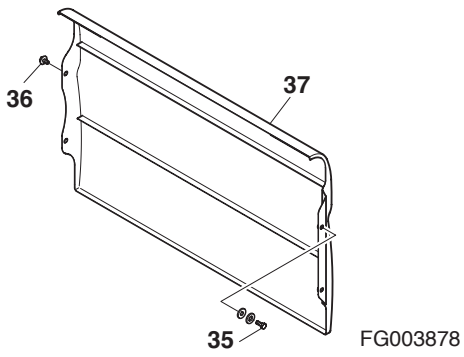


Figure 12

SAFETY PRECAUTIONS

CAUTION!

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Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX300LC	5001 and Up

Swing Bearing Basic Operation

The swing bearing, which connects the upper structure with the lower structure, consists of a inner ring, outer ring and ball bearings. During swing movement, power from the swing motor is transferred to the pinion by planetary gears connected to gears on the inner ring, which is fixed in the undercarriage. Ball bearings turn the outer ring.

Reference Number	Description
1	Outer Ring
2	Inner Ring
3	Tapered Pin
4	Plug
5	Ball
6	Retainer
7	Seal A

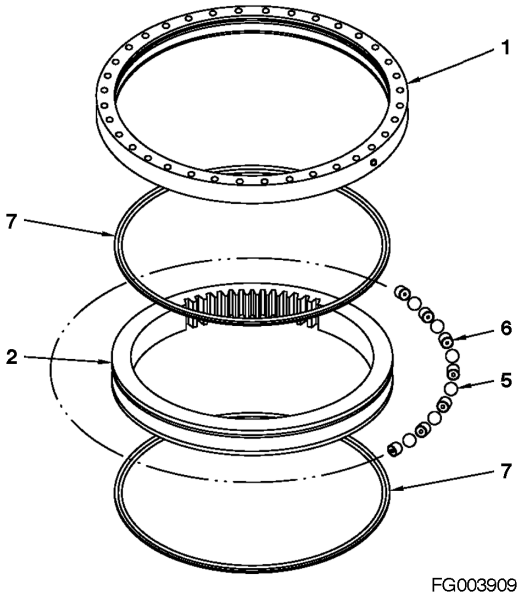


Figure 2

Rebuilding Swing Bearing

1. Remove tip of tapered pin (3, Figure 3) using grinder and tap lightly to remove debris.

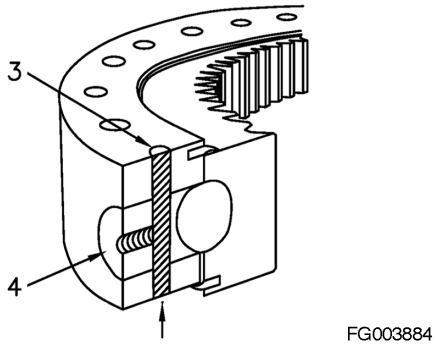


Figure 3

2. Remove plug (4, Figure 4) using a M10 x 1.5 bolt.

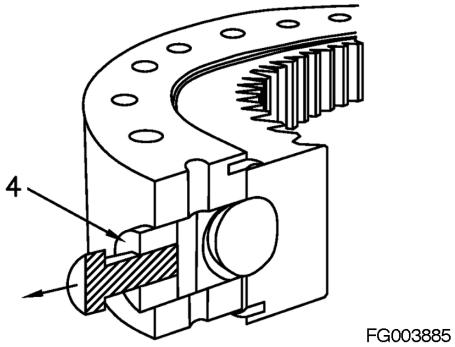


Figure 4

Reference Number	Description
1	Shaft
2	Gear Case
3	No. 2 Carrier
4	No. 2 Sun Gear
5	No. 2 Planetary Gear
6	No. 2 Thrust Plate
7	No. 2 Shaft
8	No. 2 Bushing
9	No. 1 Carrier
10	No. 1 Sun Gear
11	No. 1 Planetary Gear
12	No. 1 Thrust Plate
13	No. 1 Shaft
14	Ring Gear
15	Thrust Plate
17	Lock Pin
18	Spacer
19	Collar
20	Plate

Reference Number	Description
21	Lock Ring
22	Spherical Roller Bearing
23	Spherical Roller Bearing
24	Oil Seal
25	Spring Pin
26	Plug
27	Plug
28	Pinion
29	Socket Head Bolt
30	Pipe
31	Level Gauge
32	No. 3 Thrust Plate
33	Retaining Ring
34	Socket Head Bolt
35	Cover
36	Wire
37	Retaining Ring
38	Case Cover
39	Socket Head Bolt

Specifications

Swing Reduction Gearbox	Specification
Drive Type	Two-stage Planetary Gear
Reduction Ratio	21.968
Maximum Output Speed	59 rpm
Maximum Output Torque	1,875 kg•m (13,560 ft lb)
Weight	340 kg (750 lb)

Pinion Gear	Specification
Type	Spur Gear
Gear P.C.D	196 mm (7.72 in)
No. of Teeth	14
Module	14

12. Using snap ring pliers, remove lock ring and disassemble plate.

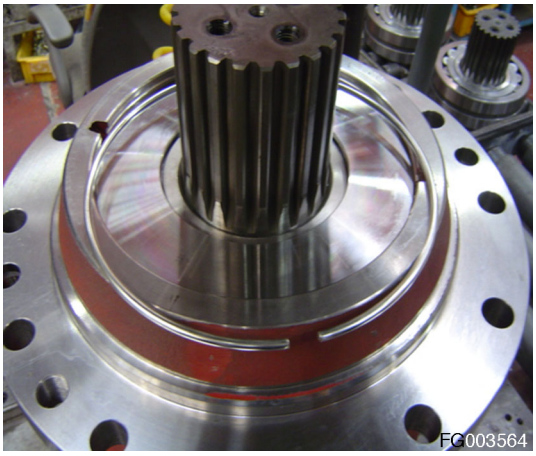


Figure 25

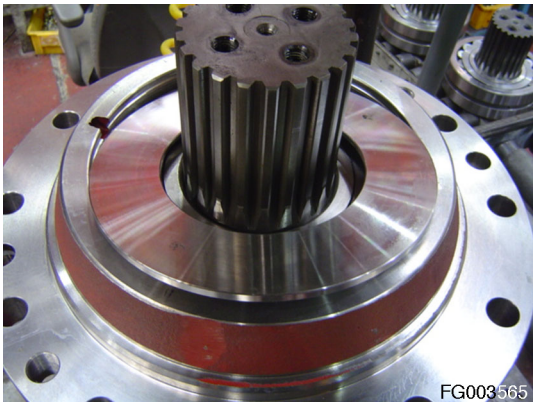


Figure 26

13. Use a rollover machine to turn case over and place a jig on drive shaft. Use a press to remove drive shaft from case.

CAUTION!

Care should be taken not to have drive shaft drop to floor when it is pressed out of case.

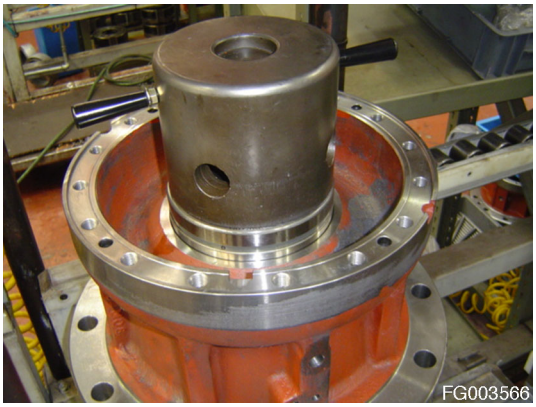
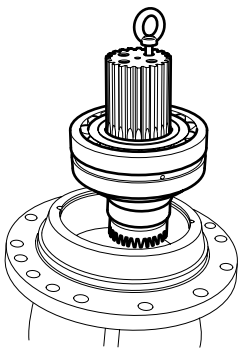
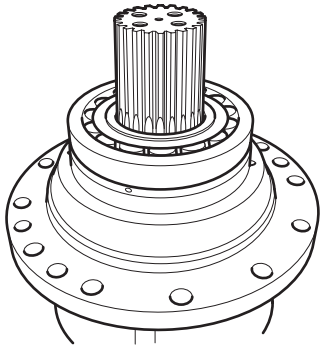


Figure 27



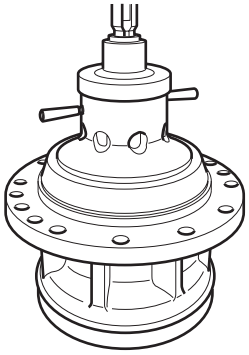
FG000901

Figure 56



FG000902

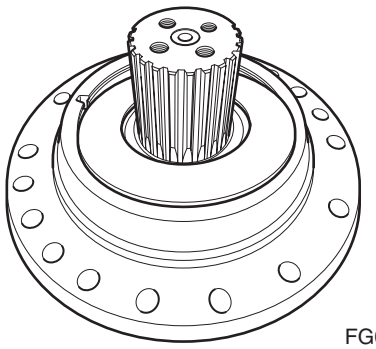
Figure 57



FG000903

Figure 58

2. Remove bearing insertion jig and assemble plate with its step part so it is facing down, as shown in Figure 59.



FG000904

Figure 59

Assembly of Carrier.

1. Using a suitable lifting device, lower No. 2 carrier assembly into ring gear, making sure that planetary gears are engaged. Continue to lower carrier and engaging it onto splines of pinion shaft. Make sure that carrier is resting on bearing.

   NOTE: *Make sure that carrier and drive shaft can rotate.*

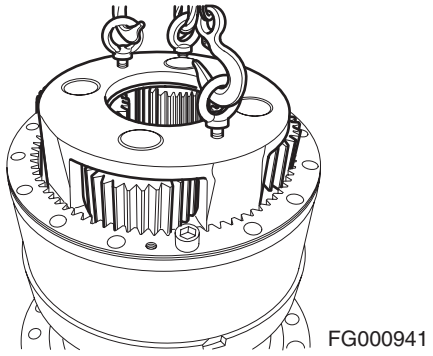


Figure 96

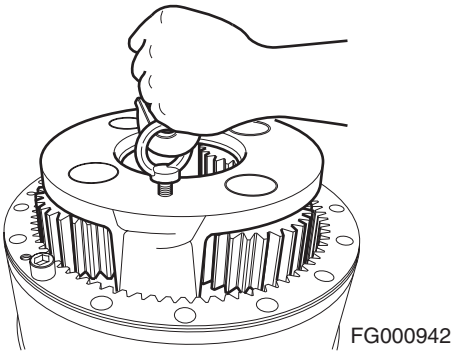


Figure 97

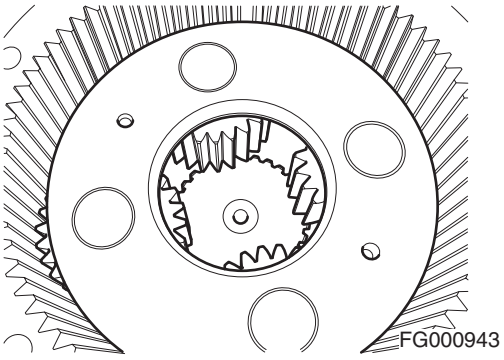


Figure 98

2. Install No. 2 sun gear in No. 2 carrier.
3. Postion thrust plate on No. 2 sun gear.

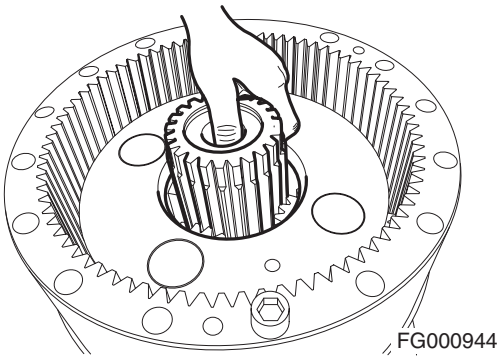


Figure 99

IMPORTANT

If air is not vented from system, it will cause damage to swing motor and bearings.

1. Disconnect drain hose and fill swing motor case with hydraulic oil.
2. Connect drain hose.
3. Start engine and set throttle at "LOW IDLE" and swing upper structure slowly two full revolutions to left and right.
4. Shut engine down and check hydraulic oil level. Fill hydraulic oil tank to "H" mark on sight gauge.
5. Check for oil leaks and clean all fill and venting locations.

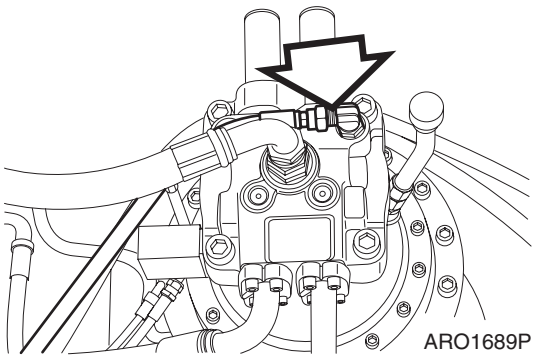


Figure 130

2. Measuring the distance (A, Figure 2) between the bottom of the side frame and the top of the lowest crawler shoe. Recommended tension for operation over most types of terrain is distance "B" on below table.

   NOTE: *This measurement can be thrown off if there is too much mud or dirt or other material in the track assembly. Clean off the tracks before checking clearance.*

3. Too little sag in the crawler track (less than clearance distance "C" on below table) can cause excessive component wear. The recommended adjustment can also be too tight causing accelerated stress and wear if ground conditions are wet, marshy or muddy, or if the ground is hard and full of rocks or gravel.

4. The increased clearance recommended for muddy ground conditions is between distance "D" on below table. The clearance should be approximately distance "E" on below table for operation over gravel, rocky terrain, or over sand or snow.

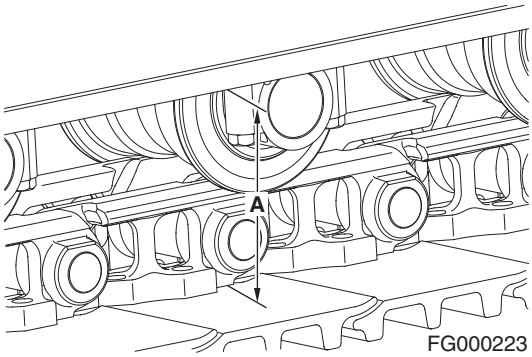


Figure 2

Terrain Type	Distance "A"	
	DX300LC	DX340LC
Normal "B"	320 - 340 mm (12.60 - 13.39 in)	330 - 360 mm (13.0 - 14.17 in)
Minimum "C"	320 mm (12.60 in)	330 mm (13.0 in)
Muddy "D"	340 - 370 mm (13.39 - 14.57 in)	360 - 410 mm (14.17 - 16.14 in)
Gravel, Rocky, Sand or Snow "E"	370 mm (14.57 in)	410 mm (16.14 in)

⚠ WARNING!

The track adjusting mechanism is under very high-pressure. NEVER release pressure too suddenly. The grease cylinder valve should never be backed off more than 1 complete turn from the fully tightened down position. Bleed off pressure slowly and keep your body away from the valve at all times.

Reference Number	Description
1	Roller
2	Shaft
3	Thrust Ring
4	Bushing
5	Bushing
6	Floating Seal
7	O-ring
8	O-ring

Reference Number	Description
9	Plug
10	Cover
11	Washer
12	Bolt
13	Blot
14	Spring Washer
15	Spring Washer

Upper Roller Removal

1. Relieve track tension. This will allow track to be raised so that links clear top of roller.
2. Position a bottle jack on top of track frame and apply pressure to track shoe.
3. Remove mounting hardware holding upper roller assembly to track frame.

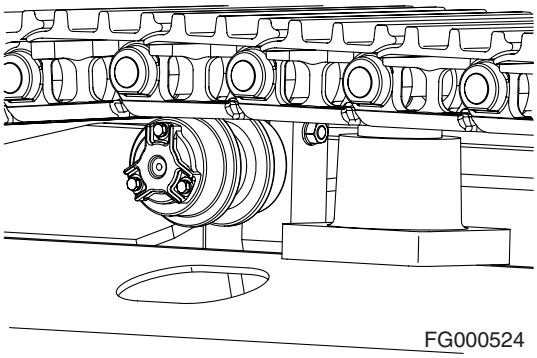


Figure 35

Upper Roller Disassembly

1. Remove the plug (9, Figure 36) from the cover and drain oil.

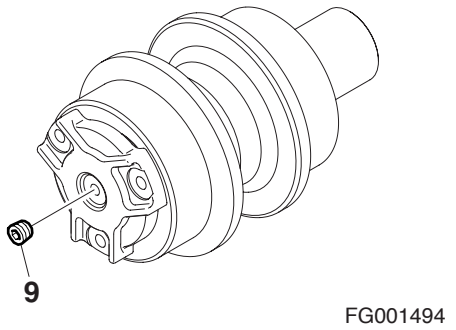


Figure 36

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 load.

Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

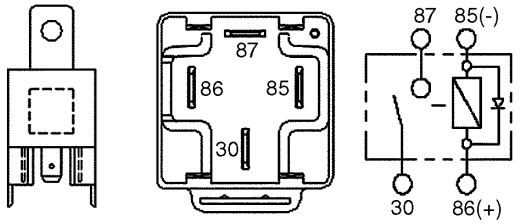
The contents of this section apply to the following models and serial number ranges.

MODEL	SERIAL NUMBER RANGE
DX300LC	5001 and Up

Relay - Blower

Power is supplied to the blower motor when the system is turned on.

Specifications	
Rated voltage	24V
Rated current	20A



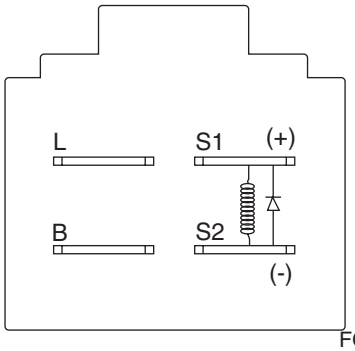
FG001057

Figure 13

Relay - A/C

Power is supplied to the magnetic clutch of the compressor.

Specifications	
Rated voltage	24V
Rated current	10A



FG001058

Figure 14

Duct Sensor

It is inserted in the core of the evaporator to prevent freezing of the evaporator.

The sensor consist of negative characteristic thermistor that resistant value increases and decreases when the temperature rises and falls, respectively.

Temp (°C)	Resistance (KΩ)
0	11.36 ±0.1
2	10.39 ±0.2
2.5	10.17 ±0.2
3	9.95 ±0.2
3.5	9.73 ±0.2
4	9.52 ±0.2
5	9.12 ±0.2
10	7.36 ±0.15
25	4.02 ±0.08
30	3.33 ±0.07

FG001059

Figure 15

Compressor

Categories	Specifications
Output	155.3 cc/rev (9.48 in∏)
Oil Level	120 cc (ND-OIL8) (7.32 in∏ (ND-OIL8))
Refrigerant	R134a
Rated Voltage	24V
Relief Valve	Open: 35 - 42.2 kg/cm^{2}G (500 - 600 psi) Close: 28.1 kg/cm^{2}G (400 psi)

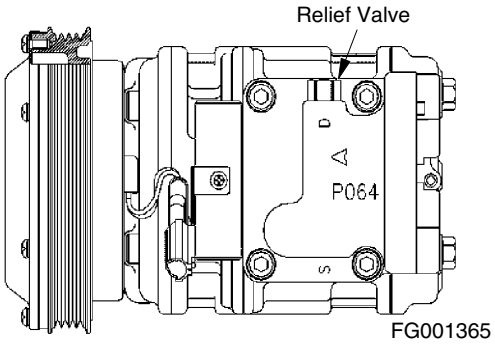


Figure 23

Compressor sucks in refrigerant which evaporates completely in the evaporator and discharges it to the condenser.

Refrigerant undergoes repeated status change in the order of liquid, gas, and liquid in the freezing cycle, and the compressor makes evaporated refrigerant a high temperatures and high-pressured gas to freeze it in the condenser.

Receiver Dryer

The receiver dryer reserves refrigerant enough to ensure smooth freezing cycle responding immediately to the change of level in the freezing cycle.

As liquid refrigerant from the condenser may contain refrigerant gas with bubbles whose presence in the expansion valve decreases the freezing power excessively, it separates liquid and gas and sends liquid only to the expansion valve.

Water in refrigerant shall be eliminated with dryer and through filter.

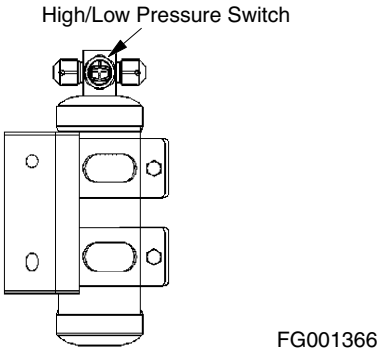


Figure 24

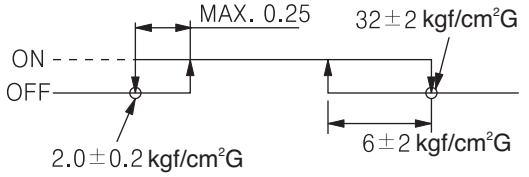


Figure 25

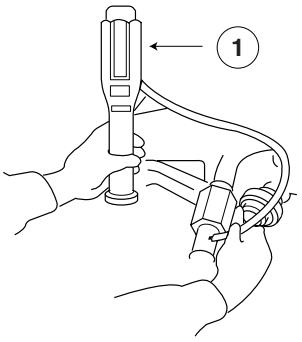
Volume of refrigerant by model

Model	Volume of refrigerant (g)
DX300LC	800±50
DX140W	800±50

2. Charge system until the low side gauge dial indicates a pressure of 1 kg/cm^2 (14 psi) and close the high side valve.
3. Using a refrigerant leak detector or soapy water check each joint for leakage.

Reference Number	Description
1	Refrigerant Leak Detection Device

4. If a leak is detected, check for O-ring damage or correct tightening torque and replace or repair as necessary.
5. If no leaks are detected, proceed with the charging process.



HDA6071L

Figure 33

WARNING!

For accurate refrigerant leak detection, perform leak detection procedure in a well ventilated area.

Refrigerant Charging

1. Perform the vacuuming procedure, vacuum holding and leaking tests as described in the proceeding headings.

   NOTE: *First charge the refrigerant system with 100g (3.5 ounces) of refrigerant with the engine off. Then using the manifold gauges as a guide fully charge the system with the engine running.*

   When exchanging refrigerant containers, press the manifold gauge low side valve to eliminate air from the charging hose.

Reference Number	Description
1	To Compressor
2	Low-pressure Side
3	High-pressure Side
4	From Receiver
5	Refrigerant Supply Container

2. Charge the system by opening the manifold gauge low side valve.

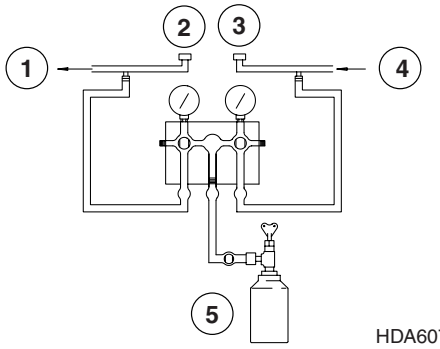
   Initial charge amount: 100 g (3.5 ounces).

3. If refrigerant does not flow freely into system, try starting engine first before operating air conditioner.

   - Temperature control switch setting: Maximum Cooling

     Blower Speed Setting: Hi (3 step)

     Engine Speed: 1,300 - 1,500 rpm



HDA6072L

Figure 34

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 load.

Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX300LC	5001 and Up
DX340LC	5001 and Up
DX420LC	5001 and Up
DX480LC	5001 and Up

SAFETY PRECAUTIONS

CAUTION!

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Use lifting and hoisting equipment capable of safely handling load.

Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX300LC	5001 and Up

PROCEDURAL TROUBLESHOOTING BASELINE RECOMMENDATIONS

Initial Checks and Tests to Establish Operating Condition of the Excavator

Triage Summary

An excavator that fails to deliver designed performance should be checked for the following:

- Hydraulic flow, first, and.
- Hydraulic pressure, afterwards, in a specified order of priority through different points of the system.

To verify adequate available hydraulic flow, before any other tests are performed through the circuit:

Check engine operation -

- at 1,950 rpm with no load.
- at 1,950 rpm stall load.

If engine rpm drops excessively with a load or fails to surpass rated speed (1,900 rpm), performance problems may be due to inadequate hydraulic flow caused by lagging rotational speed.

NOTE: *Verify actual flow on the excavator against rated performance, with a flow meter.*

If engine tests meet specifications and adequate torque and horsepower are available at the pump drive flex coupling, pull out the electrical tray under the operator's seat to inspect the self-diagnostic display.

If the EPOS trouble code display is clear, check hydraulic functions in the following sequence:

- Pilot pressure.
- Negacon, negative control pressure.
- Main relief pressure (front and rear pump)
- Swing pressure.
- Port relief pressure (individual control functions; boom, arm, bucket, swing, and travel)
- Power boost circuit.
- Standard performance tests; cylinder speed, hydraulic motor (travel and swing) speed, cylinder oil tightness "permissible drift" test.

  NOTE: *System specification performance tests of individual activator function are determined by flow rate through the*

the output of the other. It is not necessary to adjust both regulators at the same time, but after checking or adjusting one of them, the remaining unit should also be checked.

Start the engine and turn the engine speed dial to maximum. When normal operating temperature is reached, loosen the largest diameter lock nut around the adjustment screw (2) for the outer regulator spring. Tightening the screw shifts the P/Q (Pressure/Flow) control curve to the right, and increases compensating control pressure.

On the other hand, if the persistent cause of performance problems is engine overloading, decreasing the adjustment by turning the larger diameter adjusting screw (2) out will decrease pump input horsepower. 1/4 turn on the adjusting screw is equal to approximately 17 horsepower.

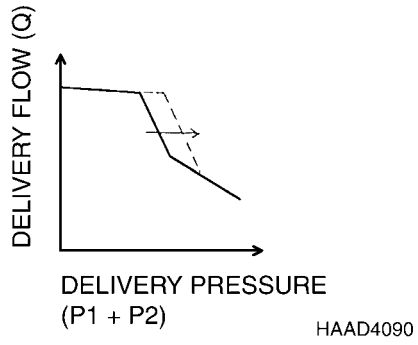


Figure 13

IMPORTANT

Because changing the position of adjusting screw (2) also affects the setting of the adjustment for the inner spring, the smaller diameter adjusting screw (1), turn in the inner screw 198° (slightly more than 1/2 turn, 180°) before screw (2) is backed out 1/4 turn (90°).

NOTE: *For each full turn of adjustment on the larger diameter screw (2), the square-tipped adjusting screw should be turned in the opposite direction 2.2 turns to avoid changing inner spring adjustment.*

Pump input power adjustments are normally made in small increments, 1/4 turn (90°) or less, each time.

Turning the square-tipped, smaller diameter screw (1) clockwise moves the flow curve up, increasing flow and then input horsepower.

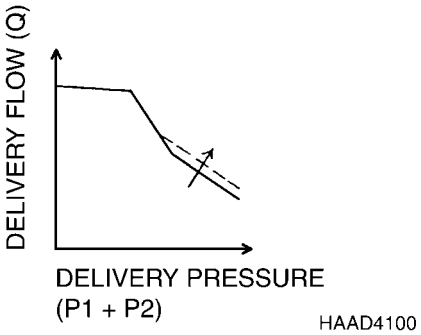


Figure 14

The adjusting screw (1, Figure 16) affects the delivery rate (Q) of the pump. Tightening the adjusting screw decreases the maximum cut flow (as shown in Figure 15) while backing out the screw increases cut flow delivery rate.

Balance both pumps for equal output.

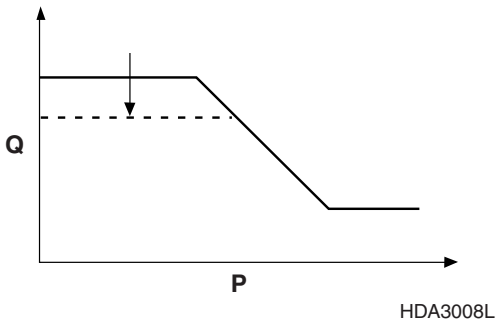


Figure 15

the required level and free of oil leaks or air in the system that could cause cavitation problems.

Problem	Possible Cause	Remedy
Main relief valve.	Particulate contamination.	Disassemble, clean main poppet.
	Broken or damaged spring.	Replace.
	Adjusting screw loose.	Readjust.
	Main poppet sticking.	Repair/replace.
	Clogged orifice in pilot passage to control valve.	Clean/replace.
Cylinder goes down in spool neutral.	Excessive clearance between casing and spool.	Replace spool or casing.
	Spool does not return to neutral/ sticking spool.	Check secondary pilot pressure.
	Spool does not return to neutral because of dirt or other contaminants.	Clean.
	Broken or damaged spring.	Replace.
	Main relief or port relief not operating properly.	See above.
	Impurities in pilot circuit.	Clean.
Cylinder drops before start at boom up operation.	Rod check valve damaged or clogged.	Clean/replace.
	Poppet sticking.	Clean/replace.
	Broken or damaged spring.	Replace.
Slow operation or response.	Excessive clearance between spool or casing.	Check pilot pressure and/or replace spool or casing.
	Sticking spool.	Clean/replace.
	Broken or damaged spring.	Replace.
	Main or port relief valve damaged.	Check pressure/replace.
Swing priority not operating correctly.	Sticking spool.	Clean/replace.
	Solenoid valve faulty.	Replace.
Boom and arm cylinders do not perform normally in combined operation.	Priority valve faulty or spool sticking.	Check pilot pressure.
	Broken or deformed spring.	Replace.
	Excess clearance between right and left casing and valve spool.	Clean/replace.
	Clogged spool passage.	Clean/replace, replace filter.
Relief valve malfunctions:		
Pressure does not increase at all.	Main poppet or pilot poppet stuck open.	Clean/replace.
Irregular or uneven pressure.	Poppet seat damaged or pilot piston sticking to main poppet.	Clean/replace.
	Loose lock nut and adjusting screw.	Readjust.
	Components worn out, past wear limits.	Replace.

of the diaphragm eventually seals off the lower oil passage. Just after the needle on the gauge reaches its highest point (when there is 0 bar (0 psi) resistance from hydraulic system pressure) pressure on the gauge will drop sharply to zero, as the accumulator is completely emptied of oil and the diaphragm button closes.

Record the highest gauge reading and compare to the "P1" rated precharge pressure on the accumulator manufacturer's data label. Repeat this test at least once a year to verify proper functioning of the accumulator.

3. As hydraulic system pressure overcomes accumulator precharge pressure, the flexible diaphragm begins to retract upward.

4. When system oil is at highest working pressure and the accumulator fills to maximum reserve capacity, the flexible diaphragm is pushed up into the top of the upper chamber.

   The highest working pressure is sometimes referred to as the "P3" pressure and can also be referenced on the manufacturer's data label on the exterior of the accumulator.

5. If system oil pressure begins to fall off or is momentarily checked or interrupted, the energy stored on the other side of the diaphragm, in the form of compressed gas, pushes oil back out of the lower chamber, maintaining oil pressure of the circuit.

6. With minimal system pressure, an equilibrium point may be reached in which accumulator precharge pressure and hydraulic system oil pressure achieve a rough balance. In this condition a minimal amount of oil is stored in the accumulator.

DISASSEMBLY

Refer to the assembly drawing of the swivel joint for component references (Figure 1).

IMPORTANT

Do not unbolt the center joint from the lower car body until an adequate number of piping block-off plates are available, for disconnected piping lines. Be sure that system pressure has been vented - including the hydraulic accumulator and tank reserve pressure - before disassembly is started.

1. Clean off the exterior of the swivel joint after it has been removed.
2. Scribe or otherwise mark a line across the cover and the body of the center joint, to allow reassembly in the same configuration.
3. Unbolt the four 12 mm fasteners holding the cover. Use a vise or V-block to hold the assembly in place.
4. Remove the cover, withdraw the O-ring and remove the retaining ring holding the thrust plate, taking care to support the spindle assembly, so that it will not separate and fall out when retaining ring is removed.
5. If the spindle assembly doesn't separate easily when the thrust plate and retaining ring are removed, use a wooden block and hammer to drive it out of the housing.
6. O-rings and seals should be replaced whenever the assembly is being overhauled or rebuilt. For repair procedures or emergency tear down, use a thin but rounded tip, smoothedge scraper or spatula to remove O-rings or seals, to avoid causing damage to those that must be reused.

   NOTE: *The "backup ring" shown in the assembly drawing (above the swivel joint spindle lower seals) should not be overlooked. It is tucked behind the top slip ring, doubled up inside the same groove in the body of the spindle.*

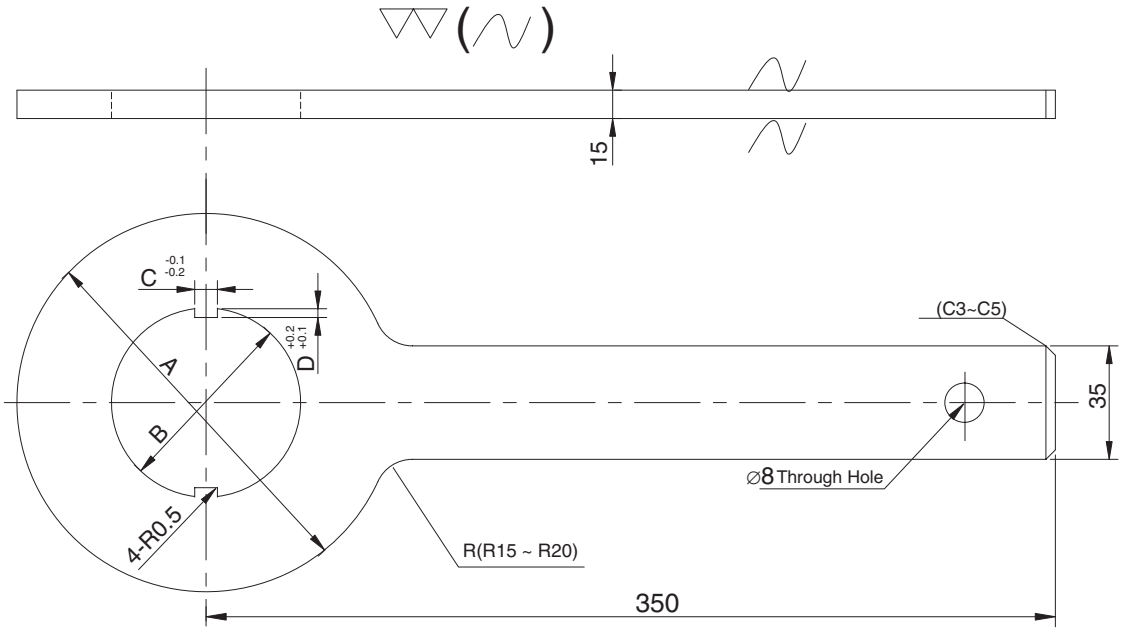
7. Before reassembling the center swivel, visually inspect ball bearing surfaces for visible signs of wear, damage or discoloration and replace any worn component.

   Check clearance between the spindle and thrust plate. Replace any component that shows more than 0.5 mm (0.020") of visible wear.

   Clearance between the spindle and body of the center swivel must be tight. Replace or repair either component if there is more than 0.1 mm (0.0039") of measurable wear.

SPECIAL TOOLS AND MATERIALS

Piston Nut



ARS4730L

Figure 6

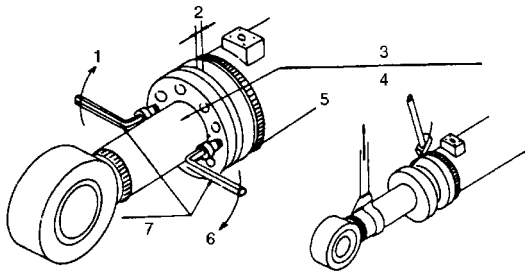
Material SM45C (AISI 1045)

Rockwell Harden from 22 - 27

Oil Quench

MODEL	CYLINDER	øA	øB	C	D	MODEL (CYLINDER)
DX300LC	BOOM	142.0 mm (5.59 in)	102.0 mm (4.02 in)	12.0 mm (0.47 in)	5.0 mm (0.20 in)	
	ARM	147.0 mm (5.79 in)	107.0 mm (4.21 in)	12.0 mm (0.47 in)	5.0 mm (0.20 in)	S/ARM
	BUCKET	140.0 mm (5.52 in)	98.0 mm (3.86 in)	12.0 mm (0.47 in)	5.0 mm (0.20 in)	S/BUCKET

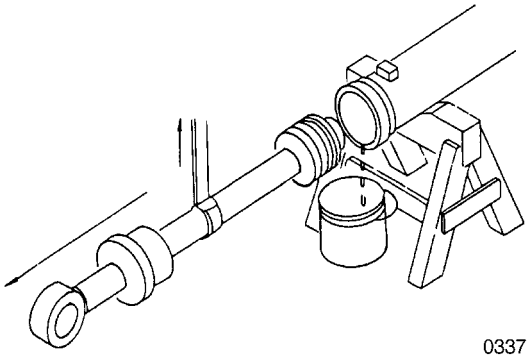
4. Tap two bolts into cover of cylinder head, 180° apart. Tighten them in a staggered, even sequence, to back off piston rod end cover from edge of cylinder wall. Look for adequate clearance between cover and end of cylinder wall before using a plastic or other soft-faced hammer for final disassembly.



HAOF610S

Figure 15

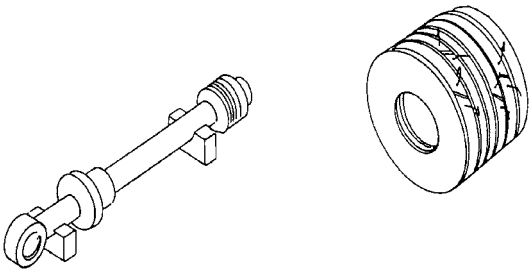
5. Begin withdrawing piston rod assembly, away from cylinder. Attach a lifting support when final 1/3 of rod is still inside barrel of cylinder. Prepare support blocks for piston rod before it has been completely withdrawn.



0337

Figure 16

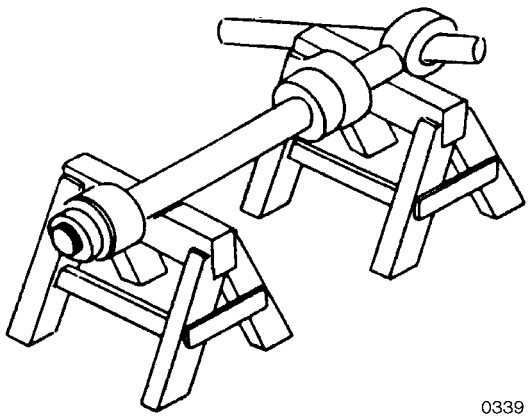
6. Lower piston rod to support blocks and detach wear ring (outer surface) (18) from end of rod.



HAOF620S

Figure 17

7. Immobilize piston rod by inserting a wooden or other nonscoring, nonmetallic support through end of rod.



0339

Figure 18

Table of Contents

Swing Motor

TROUBLESHOOTING, TESTING AND ADJUSTMENT

General Precautions

1. Observe any abnormalities and any possible causes that have noting to do with the motor before starting work.
2. Make sure that no foreign substance is involved when disassembling the machine, which is the most frequent cause of its wear.
3. Treat carefully and pay attention to avoid any damage against it that is machined precisely.

How to Check Faults of Hydraulic Motor

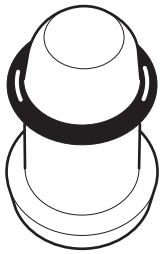
1. Remove the drain plug and check oil in the case. Too much chips and metal dust in oil causes the possible wear of parts in the motor.
2. Abnormal noise. Check any abnormal noise from the main body of the motor.
3. Pressure measurement at each part. Check any possible faults by measuring circuit pressure up to the hydraulic motor before disassembling the motor.

Troubleshooting

Problem	Possible Cause	Remedy
Abnormal operation of driving devices.		
Motor pressure does not increase.	Oil bypassing in relief valve (33)	Replace or repair relief valve.
	Check spring broken.	Replace check spring.
	Crack in channel in valve casing.	Replace valve casing.
	Abnormal wear on check surface.	Replace check.
Pressure increases but hydraulic motor does not rotate.	Friction and/or separation plates stuck.	Replace friction and/or separation plates.
	Slideway stuck.	Replace stuck slideway.
Number of rotations is below specification.		
Insufficient rotation.	Lack of incoming oil.	Check hydraulic circuits up to motor.
	Too high oil temperature.	Low oil temperature.
	Too much leakage.	Replace or repair faulty parts.
Low-pressure.	Low set pressure in relief valve.	Adjust pressure.
Brake released but weak driving force.	Sticking or abnormal wear of slideways.	Replace or repair slideway.
Hard to control brake.		

CLEANING AND INSPECTION (WEAR LIMITS AND TOLERANCES)

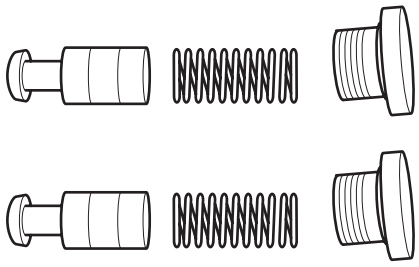
For general cleaning and inspection procedures, refer to "General Maintenance Procedures" section.



FG000743

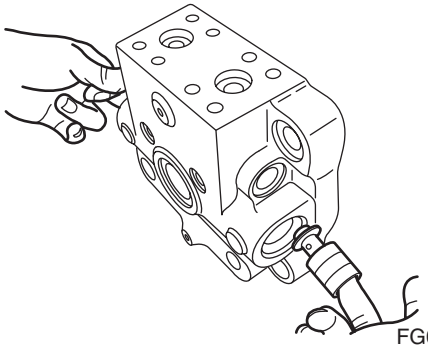
Figure 74

4. Insert poppet (24), spring (25), and plug (26) in rear cover (19). Tighten plug with L wrench. (Left and right symmetrically.)



FG000708

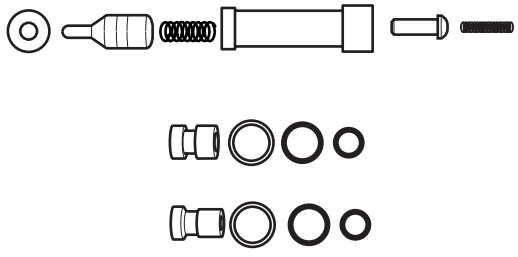
Figure 75



FG000744

Figure 76

5. Assemble anti-inversion valve. Assemble body, spring seat, spring, poppet, poppet seat, stopper, and spring. Then assemble O-ring (31), backup ring (32), and O-ring (30).



FG000745

Figure 77

SAFETY PRECAUTIONS

CAUTION!

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

Use lifting and hoisting equipment capable of safely handling load.

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APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX300LC	5001 and Up

Reference Number	Description
101	Shaft
102	Roller Bearing
103	Needle Bearing
106	Spacer - Bearing
107	Retaining Ring
111	Cylinder Block
114	Spring Cylinder
116	Spacer
121	Piston and Shoe Assembly
122	Bushing and Push Plate Assembly
131	Valve Plate
201	Swash Assembly
272	Shaft Casing
281	Name Plate
303	Valve Casing
350	Relief Valve Assembly
361	Spool - Counterbalance Valve
362	Spring - Counterbalance Valve
363	Orifice Screw
364	Damping Check Assembly
365	Cap - Counterbalance Valve (Left)
366	Cap - Counterbalance Valve (Right)
367	Hex Socket Head Bolt
368	Hex Socket Head Bolt
369	O-ring
381	Plunger- Counterbalance Valve
382	Stopper - Check
383	Backup Ring
384	Spring - Check
401	Hex Socket Head Bolt
402	Hex Socket Head Bolt
435	Lock Ring
451	Valve Plate Pin
452	Support Pin

Reference Number	Description
461	Plug
464	HP Plug
472	O-ring
485	O-ring
491	Oil Seal
501	Swash Piston
502	Swash Piston
503	Stopper (Left)
504	O-ring
505	Swash Rod
506	Lock Screw
507	Hex Nut
508	O-ring
509	O-ring
512	Backup Ring
513	Backup Ring
514	Stopper (S)
531	Swash Spool
533	Swash Spring
541	Seat
542	Stopper
543	Ball
545	Orifice Screw
546	Orifice Screw
567	HP Plug
568	O-ring
571	Plug
572	O-ring
702	Brake Piston
705	Brake Spring
707	Piston Ring
708	Piston Ring
709	Brake Pin
741	Separator Plate
742	Friction Plate

7. Rotate disassembly/reassembly jig 90° so motor is horizontal. Remove cylinder and piston subassembly.

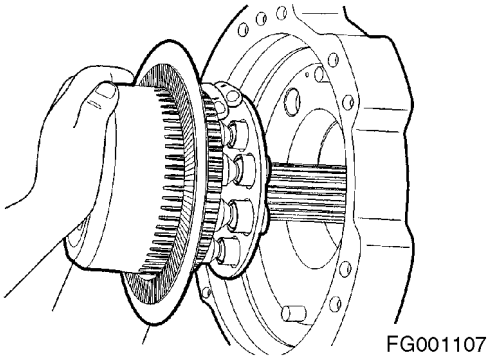


Figure 20

8. Disassemble stopper L (503) and swash plate piston (502).

   NOTE: *Swash plate piston: M5 bolt used.*

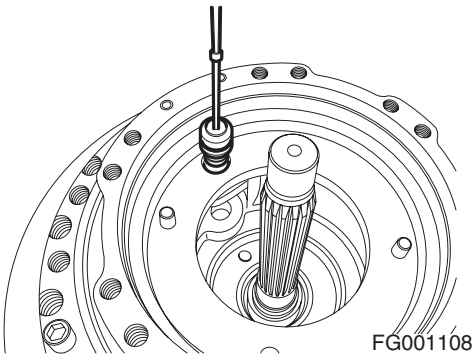


Figure 21

9. Remove swash plate (201).

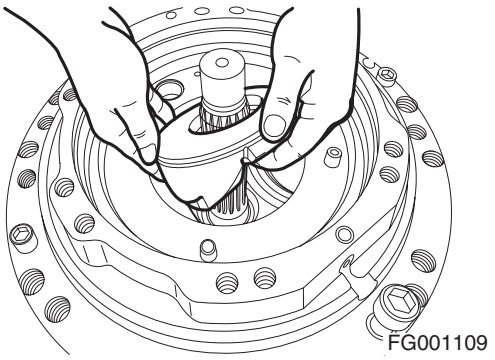


Figure 22

10. Insert M12 bolts in support (201) and disassemble support.

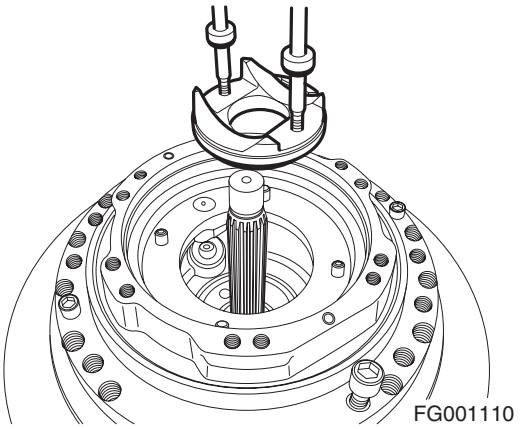


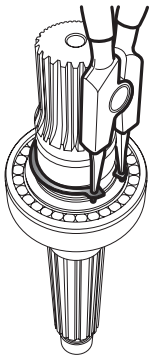
Figure 23

FG001128

Figure 45

2. Assemble ring stop (107) using retaining ring pliers.

   NOTE: *Pay attention to direction of ring stop (its round part faces bearing).*



FG001129

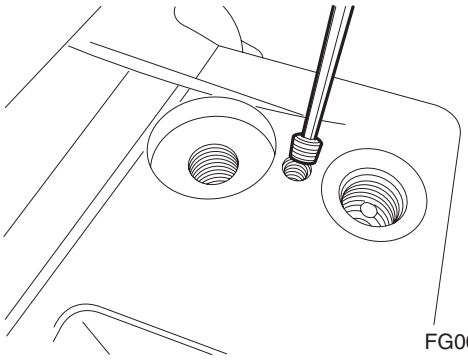
Figure 46

Assembly of Valve Casing Subassembly

1. Connect 5 plugs (461) to valve casing (303) according to a specified torque.

   NOTE: *Wrap sealing tape around plug, or spread Loctite before starting assembly.*

   NOTE: *Connection Torque: 70 ~ 110 kg•cm (5 ~ 8 ft lb).*

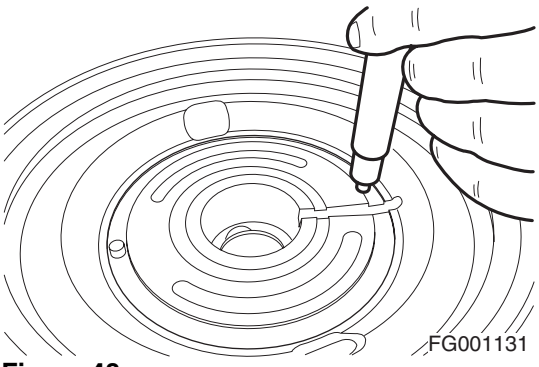


FG001130

Figure 47

2. Insert pin (451).

   NOTE: *Use hammer to adjust pin that its height is 5 mm (0.20 in) above valve plate surface.*



FG001131

Figure 48

12. Install brake spring (705).

    NOTE: *Qty: Ten springs and eleven holes.*

    NOTE: *The top brake piston shall not be assembled.*

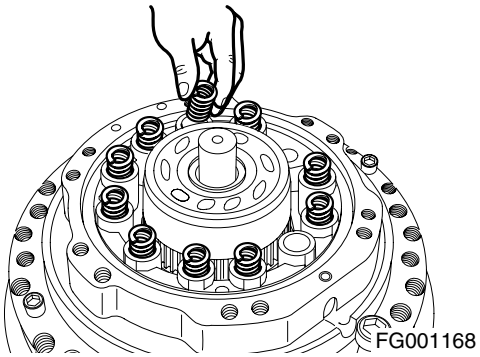


Figure 85

13. Install orifice screw (545 and 546) according to a specified torqued and insert O-ring (509).

    NOTE: *Qty and size:*
    2 (546) with ø0.8
    1 (545) with ø1.5

    NOTE: *Connection torque: 70 kg•cm (5 ft lb).*

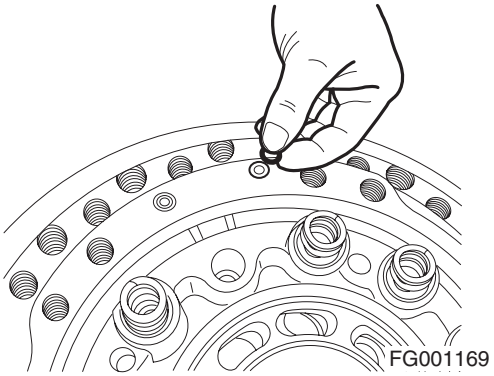


Figure 86

14. Insert valve plate (131) in valve casing and connect it to shaft casing with a hex socket head bolt (401 and 402).

    A. Apply grease to rear side of valve plate to prevent it from falling out.

    B. Use a suitable lifting device, to assemble it into valve plate shaft casing.

    C. Assembly should be done so that holes in valve plate face entrance of valve casing.

    D. Apply grease to tilting spool in tilting spring to prevent it from falling out of spring.

    E. Connection torque: 2,400 kg•cm (175 ft lb).

15. Install relief valve (350) according to a specified torque.

    NOTE: *Connection torque: 1800 ±100 kg•cm (130 ±7 ft lb).*

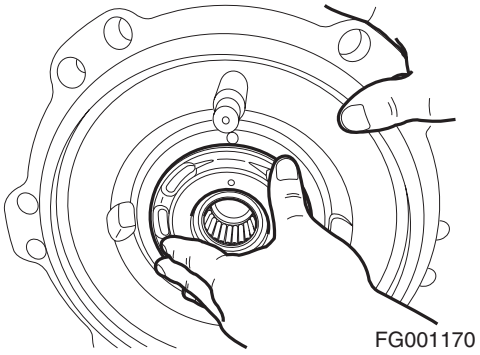


Figure 87

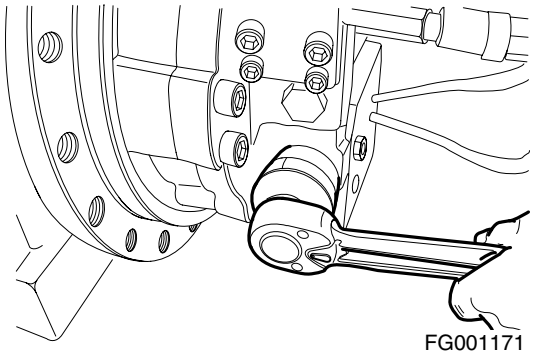


Figure 88

3. Install retaining ring in groove.

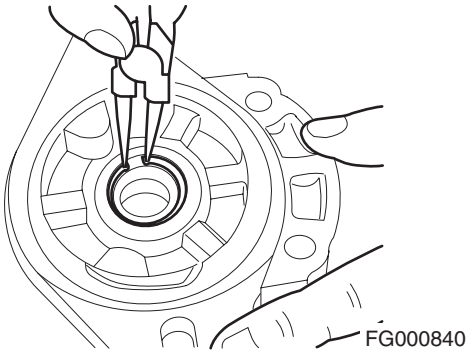


Figure 12

4. Install O-ring on both sides of rear section of body.

   NOTE: *Coat O-rings with grease to hold O-rings in body.*

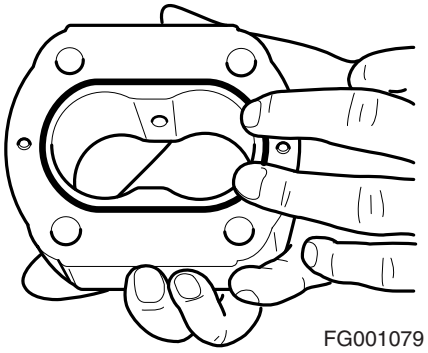


Figure 13

5. Install rear section body on rear cover.

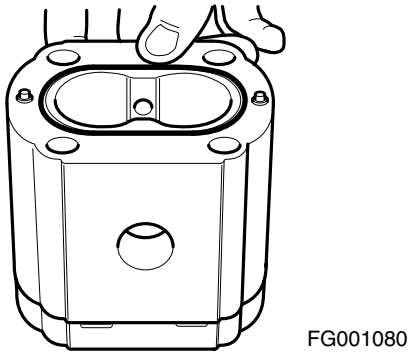


Figure 14

6. Install seals in pressure plate(s) groove. Then install backup ring in groove with seals. Coat seals with grease.

   NOTE: *The front and rear pressure plates and seals and backup rings are the same.*

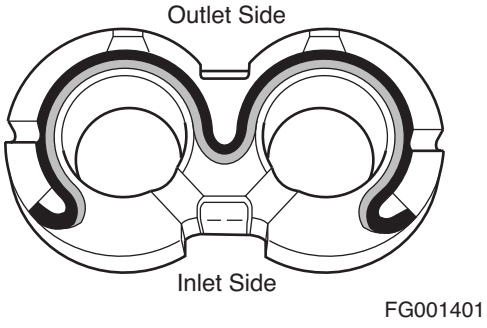


Figure 15

Main Control Valve

Edition 1

Signal Passage

Oil supplied to port (PP) flows through orifice (Lc3) to port (PT) and simultaneously flows through land (Lc4), passage (5), and land (Rc3) into tank passage (Ta).

The same oil supplied to port (PP), then flows through orifice (Lc5) into port (PA), and it also flows through passages (L4, 7 and R4) to bucket spool land (Rc4) and then flows into drain passage (DR).

The oil passing through orifice (Lc6) flows through land (Lc7) to tank passage (Ta) or flows through passage (4) to travel spool land (Rc5) and then flows into tank passage (Ta).

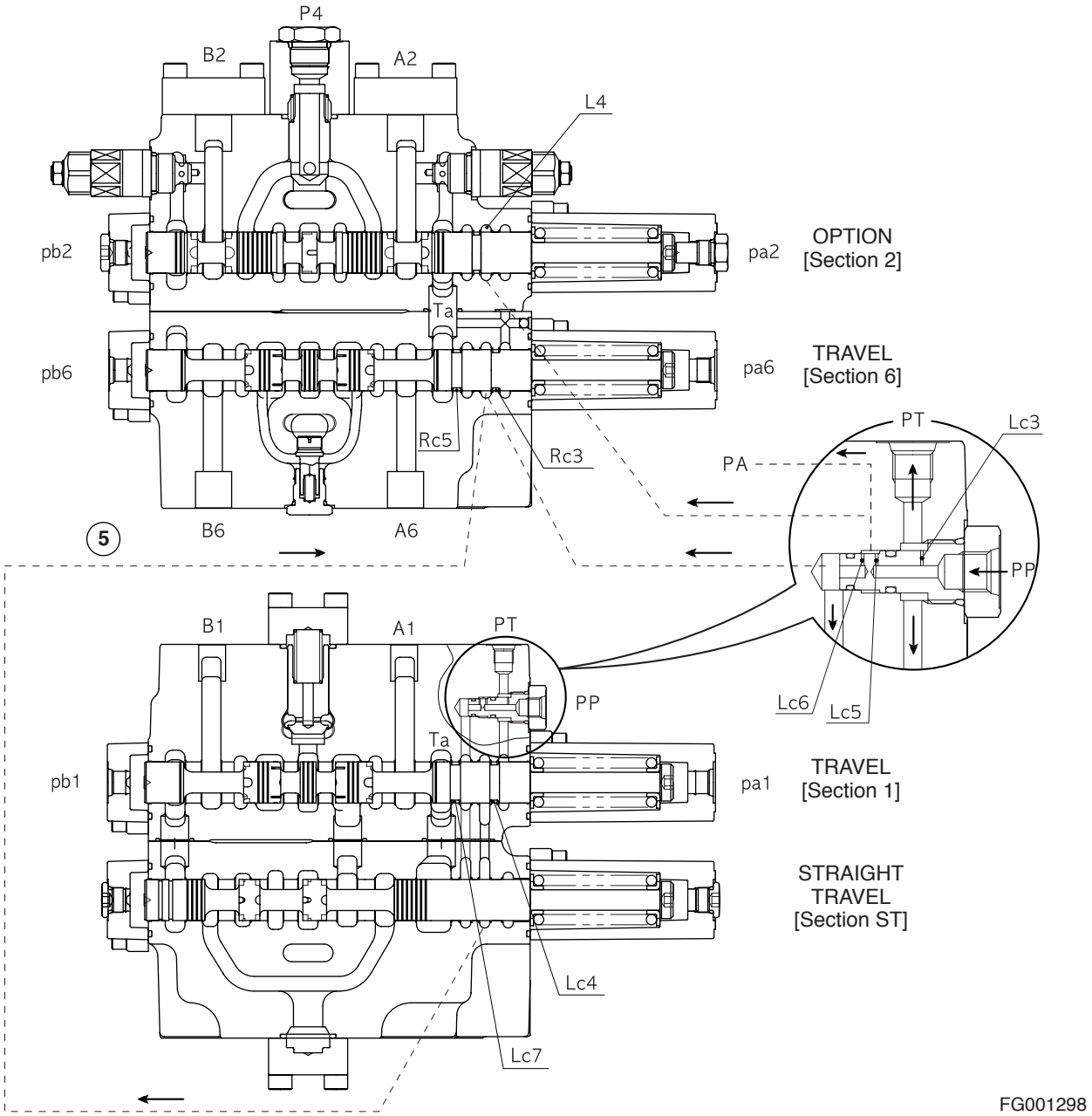


Figure 4

2. Arm in

A. 2-pump confluence

When arm 1 spool is shifted by increasing pressure of arm 1 (Section 5) pilot port (Pb5), oil supplied to port (P1) flows through neutral passage (L1), load check valve (S5-2), passage (S5-1) and spool into port (B5).

When arm 2 spool is shifted by increasing pressure of arm 2 (Section 9) pilot port (pb9), oil supplied to port (P2) flows through neutral passage (R1), load check valve (S9-1), passage (S9-2), and spool to passage (8) and joins at port (B5).

The return oil from port (B5) flows through regeneration check valve in spool, and then flows to port B to regenerate, and some oil returns through variable regeneration release valve to tank (Ta). (Refer to section 2-2)

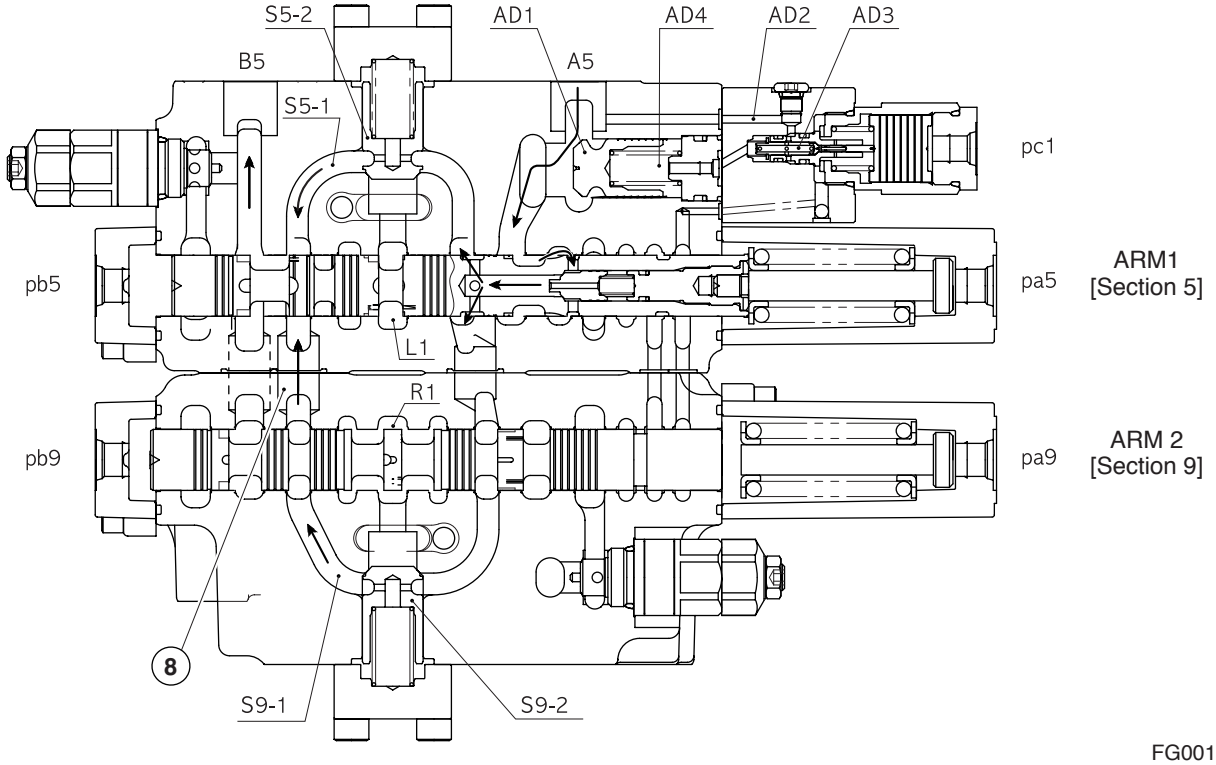


Figure 12

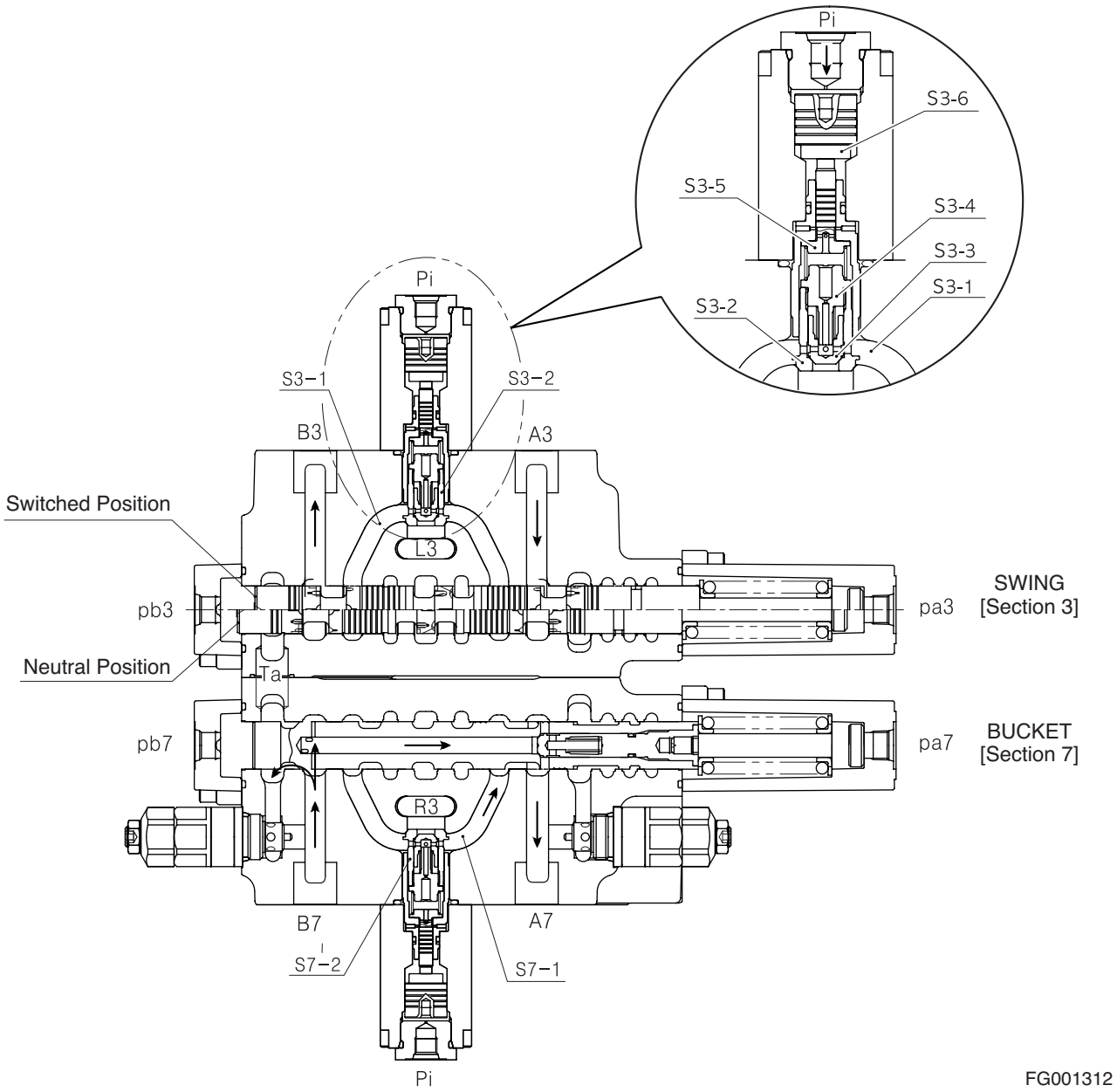

Pi
S3-6
S3-5
S3-4
S3-3
S3-1
S3-2
Pi
S3-1
S3-2
B3
A3
Switched Position
L3
pb3
pa3
SWING
[Section 3]
Neutral Position
Ta
pb7
pa7
BUCKET
[Section 7]
R3
B7
A7
S7-2
S7-1
Pi
FG001312

Figure 19

Reference Number	Description
1	Housing Valve
2	Arm Spool Assembly 2
3	Boom Spool Assembly 1
4	Bucket Spool Assembly
5	Travel Spool Assembly
6	T/S Spool Assembly
7	O-ring
8	Cap
12	Cap
13	Housing Valve
14	Arm Spool Assembly 1
15	Boom Spool Assembly 2

Reference Number	Description
16	Swing Spool Assembly
17	Option Spool Assembly
50	Plug
62	O-ring
63	Orifice Plug
65	O-ring
66	O-ring
70	Foot Relief Valve
72	Plug Assembly
74	Socket Bolt (M10x28L)
91	Plug
105	Plug Assembly

18. Grip body (96) in vise. Remove plug (94), piston (95) and O-ring (102).

Disassembly of Antidrift Valve Part

NOTE: *The part including the assembly is shown (assembly number-part number).*

CAUTION!

Removing antidrift valve seat, when pressure is not fully released, or bucket is not lowered to ground, is very dangerous. A part in the valve may spring out and drop the bucket at the same time. Always lower bucket to ground and fully release pressure before disassembling.

1. Remove socket head bolt assembly (76, four places per section, width across flats: 8 mm) and antidrift valve assembly (67, two places).
2. Remove O-ring (41 and 42) from valve housing. Remove O-ring (40-4) from spacer assembly.
3. Screw socket head bolt (78, M6*1) into spacer, and remove spacer assembly (40) from valve housing.
4. Remove O-ring (40-2) and backup ring (40-3).
5. Remove spring (39) and poppet (38) from valve housing.
6. Disassembly of antidrift valve assembly

CAUTION!

Removing inner parts of antidrift valve, when pressure is not fully released, or bucket is not lowered to ground, is very dangerous. A part in the valve may spring out and drop the bucket at the same time. Always lower bucket to ground and fully release pressure before disassembling.

Slowly loosen plug assembly (67-14) and plug (67-3), check if there is a resistance by remaining pressure and remove.

A. Remove plug assembly (67-14, width across flats: 38 mm) and O-ring.

B. Remove piston (67-4), spool (67-5), and spring (67-7).

C. Remove plug (67-3, width across flats: 38 mm) and O-ring (67-13).

D. Remove sleeve (67-6) and poppet (67-2) from body. Remove O-ring (67-9 and 10) and backup ring (67-11 and 12) from outside diameter of sleeve.

Assembly of Relief Valve

1. Install main relief valve (68). Tightening torque: Tightening torque: 7.95 - 8.97 kg•m (58 - 65 ft lb).
2. Install overload relief valve (69, six places) in each section. Tightening torque: 7.95 - 8.97 kg•m (58 - 65 ft lb).
3. Install spring seat (67-16) on small diameter of poppet. Then insert spring (67-8) and them with sleeve to body (67-1). Tightening torque: 11 - 12 kg•m (76 - 83 ft lb).

Assembly of Load Check Valve

1. Install O-ring (36) on arm (1 and 2, section D-D), boom (1 and 2, section E-E) and swing section (Section F-F). Install poppet (34) and spring (35). Mount flange (37) and install socket head bolt (75). Tightening torque: 5.91 - 6.53 kg•m (43 - 47 ft lb).
2. Install O-ring (36) on travel section (Section H-H). Install poppet (51) and spring (35). Mount flange (37) and install socket head bolt (75). Tightening torque: 6 - 6.5 kg•m (43 - 47 ft lb).
3. Install O-ring (36) on travel straight section (Section H-H). Mount flange (37) and install socket head bolt (75). Tightening torque: 5.91 - 6.53 kg•m (43 - 47 ft lb).
4. Install poppet (51) and spring (35) in common (Section I-I). Insert spacer (53) with O-ring (54) and backup ring (55). Tightening torque: 3.98 - 4.49 kg•m (29 - 32 ft lb).

CAUTION!

Be careful of installation position of O-ring and backup ring.

If they are reversed, the O-ring will be damaged and an oil leak can occur.

5. Install O-ring (36) on option section (Section G-G). Install poppet (44) and spring (45). Mount flange (43) and install socket head bolt (96). Tightening torque: 6 - 6.5 kg•m (43 - 47 ft lb).
6. Tighten flange assembly (92) with O-ring. Tightening torque: 21 - 23 kg•m (151 - 167 ft lb).
7. Insert poppet (49) and spring (48) in travel section (Section G-G). Install plug (46) with O-ring (47). Tightening torque: 10.91 - 11.93 kg•m (79 - 86 ft lb).
8. Bucket section (Section F-F)
   A. Insert piston (95) and O-ring (102) on plug (94) and install in body (96). Tightening torque: 11 - 12 kg•m (76 - 83 ft lb).

Table of Contents

Hydraulic Schematic (DX300LC)

Table of Contents

Axial Piston Pump

General Cautions

This section describes the countermeasures to be taken if any abnormality is detected during the operation of the Kawasaki swash plate type axial piston pump.

The general cautions are as follows:

1. Consider the condition before starting work.
2. Judge the nature of the abnormality, before starting work. Especially, judge if it is a problem in the circuit or caused by the regulator or attached valves and determine that something is truly wrong with the pump or not.
3. Read and understand the maintenance manual before disassembling and follow the right disassembling procedures.
4. Even when any section is to be disassembled, not to make dust or let it enter into the pump.
5. Since the parts are finely finished, handle them carefully to prevent damage.

Check Pump Proper for Abnormalities

The pump is often fitted with a regulator, accessory valves and associated pump. It is very difficult to find the cause of the failure. Investigate the following items, and the abnormal point will be revealed.

1. Check filter and drain oil.

   Check filters for excessive amount of abnormal impurities. Since the shoes and cylinder may give off worn metal particles, a small quantity may be detected there. However if a excessive amount of metal particles is found in the filters, it should be considered that shoes may be damaged. Similarly, check drain oil in the pump casing.

2. Existence of abnormal noises or vibrations.

   Check the pump for abnormal noises and vibrations. If any, investigate if it is a noise in the regular frequency, such as hunting of the regulator or the relief valve of an accessory valve, or not. If it is an abnormal vibration or noise, it may be the result of cavitation or damage inside the pump.

3. Case where two pumps are used.

   For the circuit with two single pumps or motors or for the duplex pump, exchange the piping of one pump with that of the other one. With the results of this exchange, it will be determined if the trouble is the problem of the circuit downstream the pump or not.

4. Pressure measurement at various points.

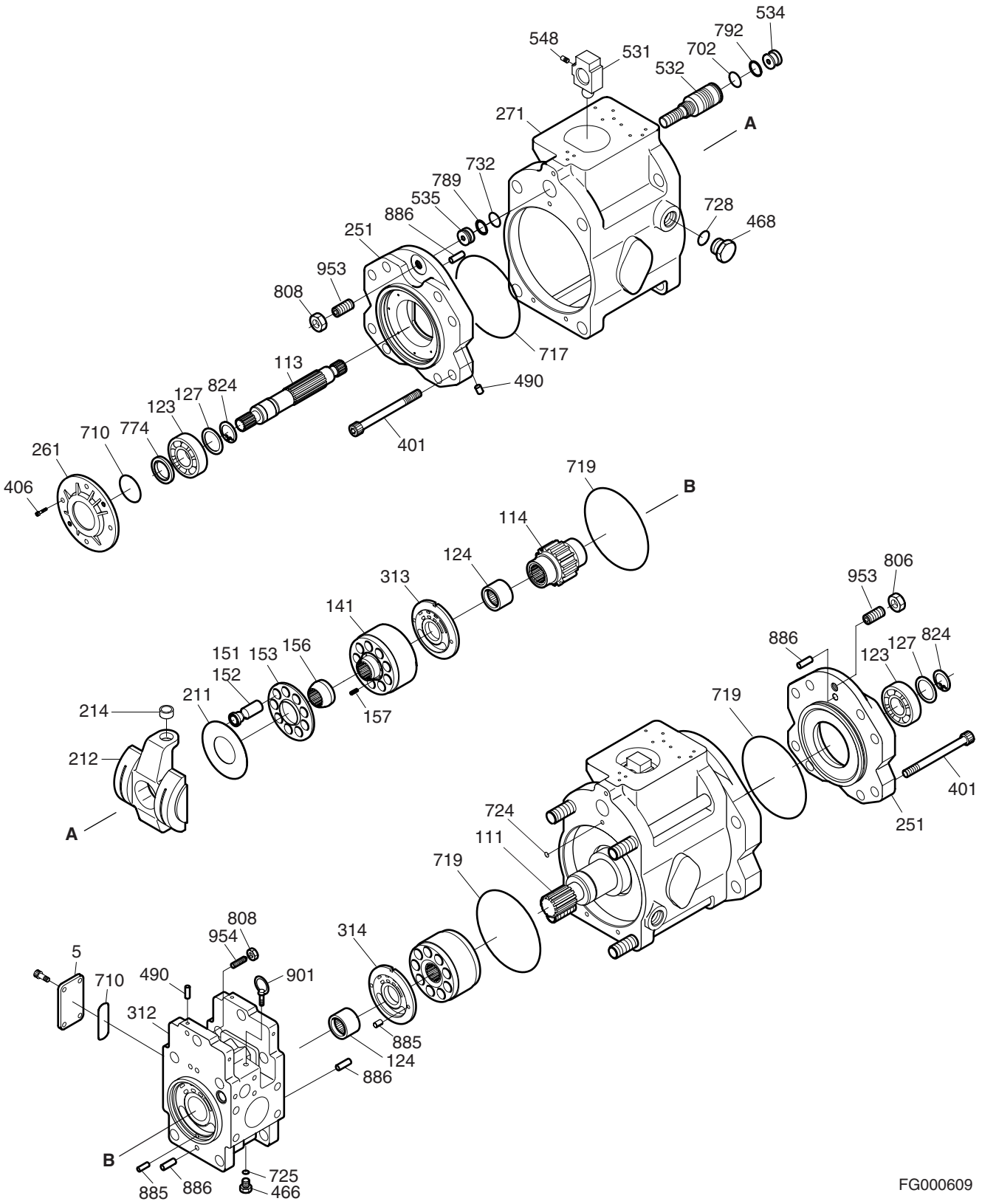

534
792
548
702
531
532
271
A
732
789
535
886
251
728
468
953
808
717
113
490
824
127
123
774
710
401
261
406
719
B
114
124
313
141
806
953
886
151
153
156
152
211
157
123
127
824
719
214
212
A
401
251
724
111
719
808
954
314
5
710
490
901
312
885
124
886
B
725
885
886
466
FG000609

Figure 17

section of the servo piston via Port C liter, causes the servo piston move to the right, reduces the pump delivery flow rate, and prevents the prime mover from being overloaded.

The movement of the servo piston is transmitted to the feedback lever via point D. Then the feedback lever rotates around the fulcrum of point F and the spool is shifted to the left. The spool moves till the opening between the spool and sleeve (651) is closed.

B. Flow Reset Function

As the self pump delivery pressure P1 or the companion pump delivery pressure P2 decreases, the compensating rod (623) is pushed back by the action of the springs (625 and 626) to rotate Lever 1 around point E. Rotating of Lever 1 causes the feedback lever to rotate around the fulcrum of point D and then the spool to move to the left. As a result, Port C liter opens a way to the tank port. This causes the servo piston to move to the left and the pump's delivery rate to increase.

The movement of the servo piston is transmitted to the spool by the action of the feedback mechanism to move it till the opening between the spool and sleeve is closed.

2. Low tilting angle (low flow) command preferential function

As mentioned above, flow control and horsepower control tilting angle commands are transmitted to the feedback lever and spool via the large-hole sections (C and F) of levers 1 and 2. However, since sections C and F have the pins (∅4) protruding from the large hole (∅8), only the lever lessening the tilting angle contacts the pin (897); the hole (∅8) in the lever of a larger tilting angle command is freed without contacting the pin (897). Such a mechanical selection method permits preference of the lower tilting angle command of the flow control and horsepower control.

3. Adjustment of Input horsepower

Since the regulator is of total cumulative horsepower type, adjust the adjusting screws of both the front and rear pumps, when changing the horsepower set values. The pressure change values by adjustment are based on two pumps pressurized at the same time, and the values will be doubled when only one pump is loaded.

Regulator Reassembly

For assembly, reverse disassembly procedures, but pay attention to the following.

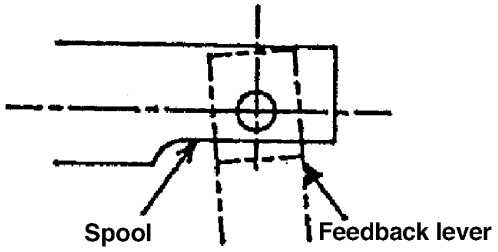
- Always repair parts that were scored at disassembly. Get replacement parts ready beforehand.
- Mixing of foreign material will cause malfunction. Therefore, wash parts well with cleaning oil, let them dry with jet air and handle them in clean place.
- Always tighten bolts, plugs, etc. to their specified torques.
- Do not fail to coat sliding surfaces with clean hydraulic oil before assembly.
- Replace seals such as O-rings with new ones as a rule.

1. Put compensating rod (623) into compensating hole of casing (601).
2. Press fit pin in lever (1) (612) into groove of compensating rod and fit lever (1) to pin press fitted in casing.
3. Install spool (652) and sleeve (651) into hole in spool of casing.

IMPORTANT

Confirm that spool and sleeve slide smoothly in casing without binding.

Pay attention to orientation of spool.



ARS0530S

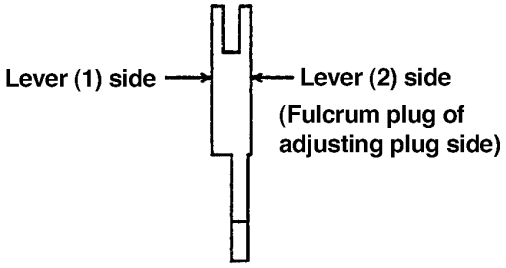
Figure 39

4. Install feedback lever (611), matching its pin hole with pin hole in spool. Then insert pin (874).

IMPORTANT

Insert pin in feedback lever a little to ease operation.

Do not mistake direction of feedback lever.



ARS0560S

Figure 40

5. Insert pilot piston (643) into pilot hole of casing.

IMPORTANT

Confirm that pilot piston slides smoothly without binding.

GENERAL DESCRIPTION

Theory of Operation

Structure

The remote control valve contains four push rods, spring holders, spools and return springs, which are in the valve casing. The valve works as a pressure reduction valve.

The housing has six ports, which include input port P, tank port T, and four secondary pressure ports.

The electric horn button is installed in the valve handle.

Gear pump pressure is used for operating control spools.

Function

1. Neutral Position

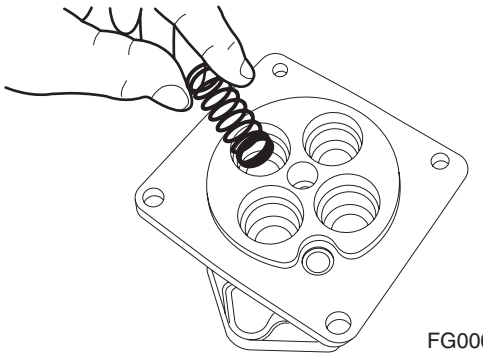
   When the lever is in neutral mode, the spool is pushed upward by return spring. The force of balancing spring, which determines the secondary discharge pressure, is not transmitted to the spool. The input port is closed and the pressure of the output port is the same as the pressure of the tank port T.

2. Control Switch

   Pressing of the push rod starts to press the balance spring, whose force is transferred to the spool to connect the P and T ports, transferring the pilot pressure. Output pressure acts on the bottom of the spool and press the spool upwards until it is balanced with the force of the balance spring.

   In short, the second pressure (output pressure) changes in proportion to the pressing force of the balance spring.

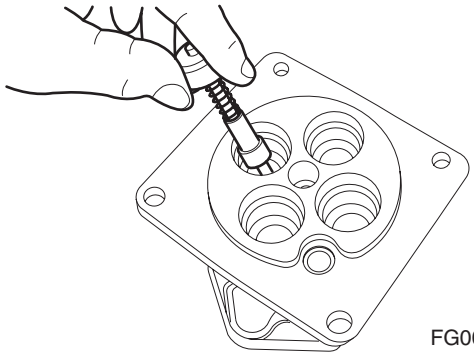
4. Install spring (9) into case (1).



FG000820

Figure 24

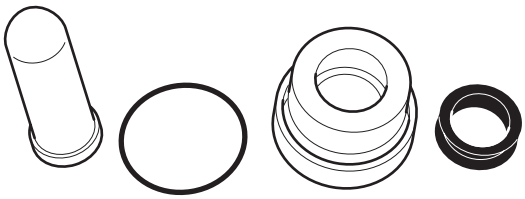
5. Install spool kit assembly into case (1). (The same way is used for four parts.)



FG000821

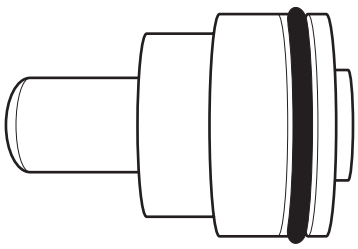
Figure 25

6. Assemble plug kit insert rod seal (18), O-ring (17), and push rod (2) into plug (16) in proper order.



FG000822

Figure 26



FG000810

Figure 27

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 load.

Remember, that ultimately safety is your own personal responsibility.

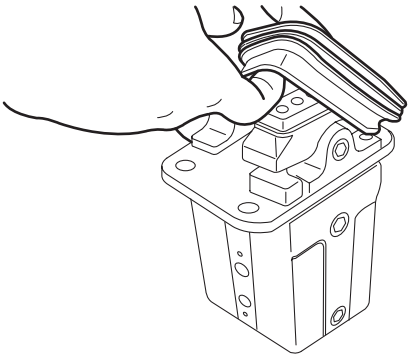
APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX300LC	5001 and Up
DX340LC	5001 and Up
DX420LC	5001 and Up
DX480LC	5001 and Up

DISASSEMBLY

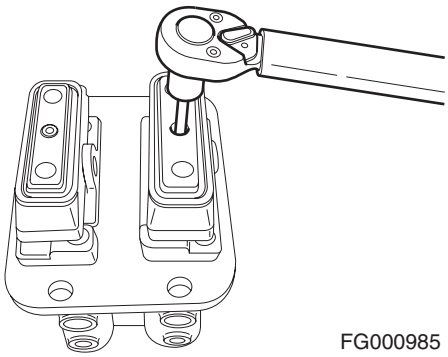
1. Remove bellows (33).



ARS1870P

Figure 8

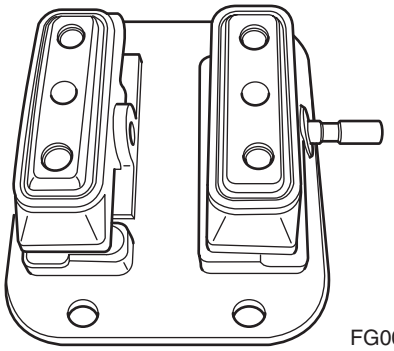
2. Remove set screw (30) from cam (27).



FG000985

Figure 9

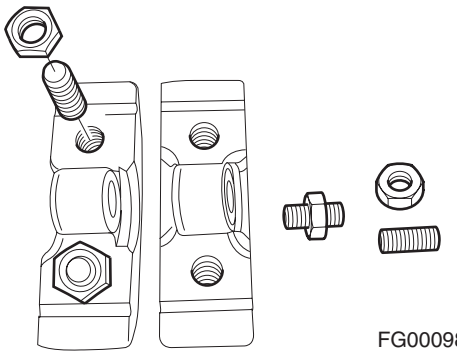
3. Remove cam shaft (29) and cover (25) from cam (27).



FG000986

Figure 10

4. Remove hex nut (32) and swash plate (31) from cam.



FG000987

Figure 11

INSTALLATION

1. Position pedal valve (1, Figure 47) on cabin floor plate and install four bolts and washers (2).

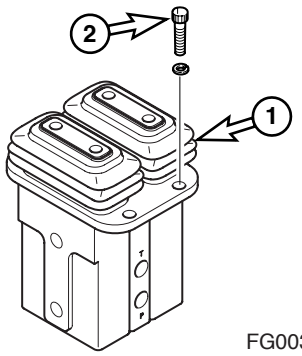


Figure 47

2. Install pedal brackets (3) and levers (4, Figure 48) on pedal valve and install four bolts and washers (2).
3. Install rubber boots (1, Figure 48).

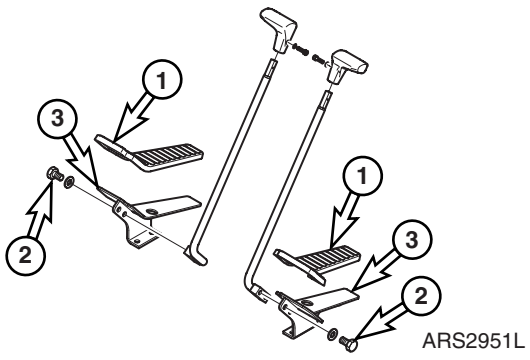


Figure 48

4. Connect hoses as tagged during removal to pedal valve (1, Figure 49).
5. Install cabin under cover by tightening bolts.

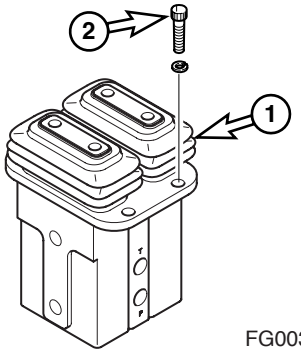


Figure 49

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 load.

Remember, that ultimately safety is your own personal responsibility.

APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX300LC	5001 and Up

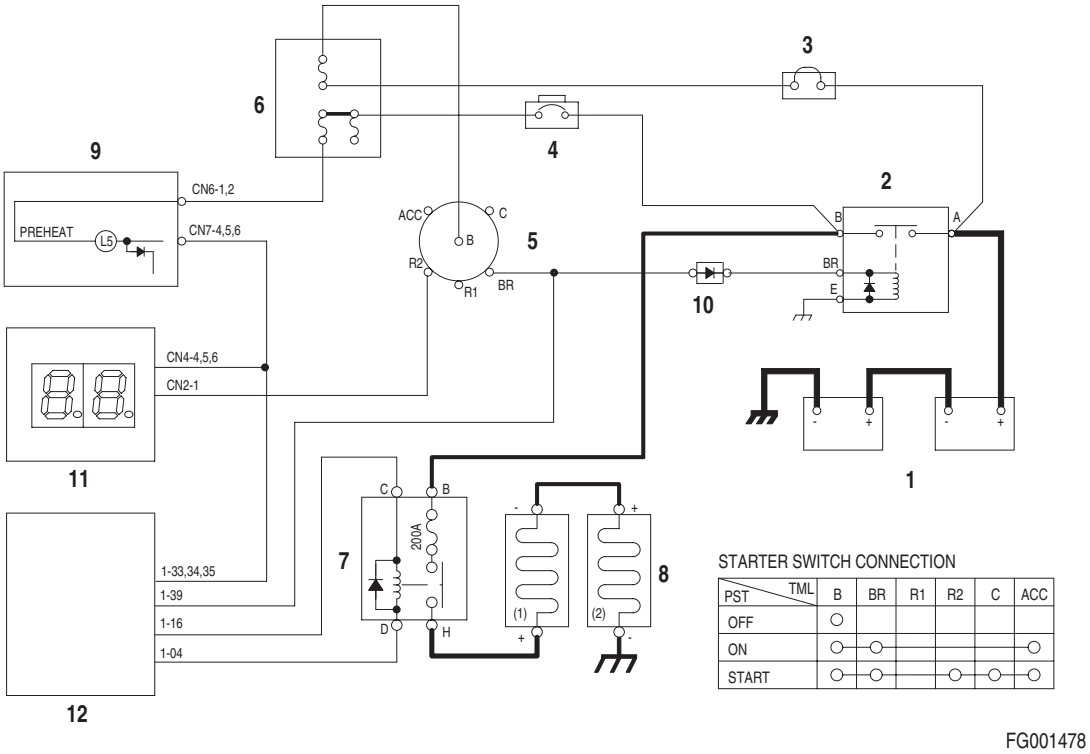


Figure 5 ENGINE PREHEAT CIRCUIT

Reference Number	Description
1	Battery
2	Battery Relay
3	Fusible Link
4	Circuit Breaker
5	Starter Switch
6	Fuse Box

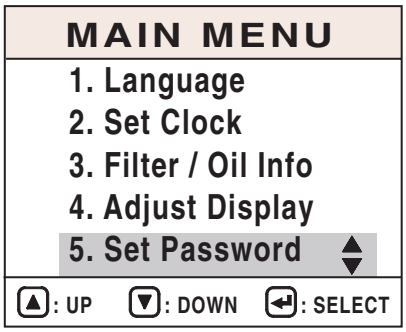
Reference Number	Description
7	Preheat Relay
8	Air Heater
9	Preheat Indicator Light
10	Diode
11	e-EPOS Controller
12	Engine Controller

Function	Display	Sensor Specification	
		Input Terminal	Input Specification
Tachometer	**E/G SPEED 1700 RPM** FG000049	ECU-CAN Communication	N = 162 f / 60 N = Engine speed (rpm) f = Frequency of engine speed sensor (Hz)
Voltmeter	**BATTERY 28.0 VOLT** FG000050	CN2-14	0 - 32 VDC
Main pump discharge pressure (front pump)	**FRONT PUMP 320 BAR** FG000051	CN3-1 CN3-2	V = 0.00816 x P + 1.0 V: Sensor output voltage (V) P: Displayed pressure (Bar)
Main pump discharge pressure (rear pump)	**REAR PUMP 313 BAR** FG000052	CN3-3 CN3-4	

Set Password

This menu is used to apply (lock), release, or change password.

Please refer to the Operation Manual for detailed information on Password Setting.



FG000227

Figure 23

Code	Failure Component	Measuring Points	Correct Value		Remarks
			Active	Passive	
V220	Front Pump Press. Sensor	CN3-1 CN3-2	V = IV	-	It has to be measured in engine stop state.
V221	Rear Pump Press. Sensor	CN3-3 CN3-4	V = IV	-	
V222	Hyd. Oil Temperature Sensor	CN3-9 CN3-10	-	R = 2.45 ±0.25 kΩ (25°C (77°F)) R = 320 ±32 Ω (80°C (176°F))	
V223	Water Temperature Sensor		-	-	N.A.
V224	Engine Speed Sensor		-	-	N.A.
V225	Fuel Level Sensor	CN3-7 CN3-8	-	Empty: 5 ±0.25 kΩ Full: 320 ±32 Ω	
V226	Alternator Potential	CN2-14 CN1-8	V = 2 ±1V	-	It has to be measured in engine stop state.
V227	Dial	CN3-16 CN3-7	-	R = 1.0 ±0.3 kΩ R = 4.0 ±1.5 kΩ	
V228	Tps (Wheel)		-	-	N.A.
V229	Parking Brake Press. Sensor		-	-	N.A.
V230	E/g Control Motor Sensor		-	-	N.A.

NOTE: *1. Active value: Starter switch has to be turned "ON"*

Measuring points between component and wire harness have to be connected.

2. Passive value: Starter switch has to be turned "OFF"

Measuring points between component and wire harness have to be disconnected.

3. Measuring points are engine controller's points and passive value is each component's value.

4. V_batt: Source power of equipment.

Reference Number	Description
1	Instrument Panel
2	e-EPOS Controller
3	Engine Controller (ECU)
4	Main Pump
5	Aux Pump
6	Control Valve
7	Pressure Switch
8	Pump Pressure Sensor
9	Electromagnetic Proportional Pressure Reducing Valve (Attachment)
10	Electromagnetic Proportional Pressure Reducing Valve (Mode Control)

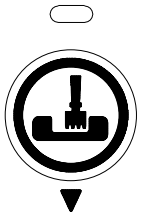
Reference Number	Description
11	Solenoid Valve (Boost)
12	Solenoid Valve (Swing Priority)
13	Solenoid Valve (High Speed)
14	Solenoid Valve (Breaker)
15	Travel Motor
16	Main Relief Valve
17	Engine Control Dial
18	Breaker/Boost/Shear Selector Switch
19	Auto Travel Selector Switch
20	Boost Switch (Right Work Lever)
21	Sensor
22	Aux Mode Switch
23	Aux Mode Resistor

1. Digging Mode

This mode is used for general digging work, loading work and ground leveling work requiring quick stops. The current to the solenoid valve for swing priority is shut off.

2. Trenching Mode

This mode is used for heavy duty ditch digging work or for loading work requiring big swing angles. The voltage is assigned to the swing priority control valve activating the swing control valve restricting the flow of oil to the boom and the arm.



ARO0270L

Figure 57

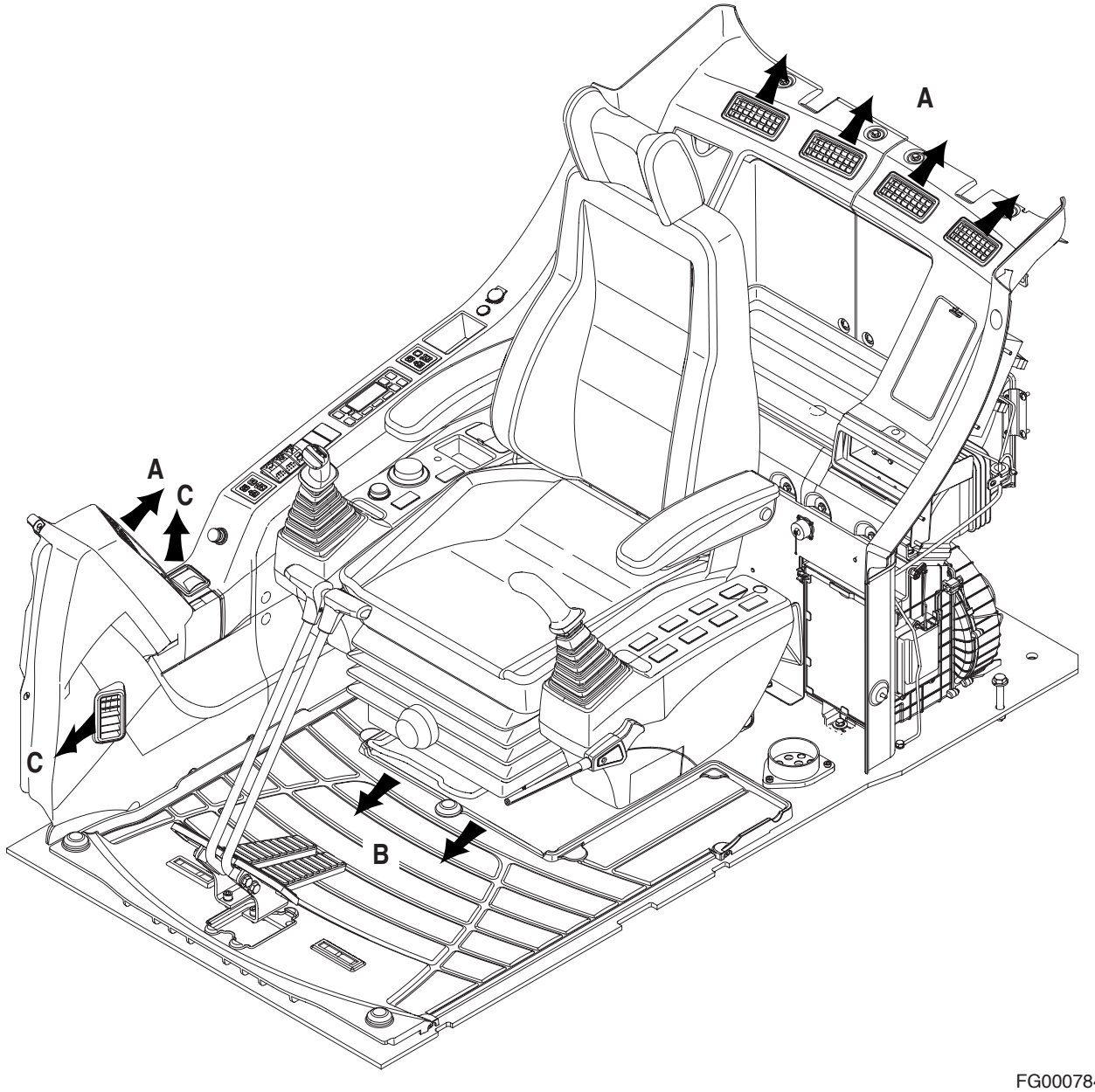
When the engine coolant temperature increases to over 107°C (225°F), the engine controller detects it from the sensor mounted in the coolant line and will send a signal to the e-EPOS controller. The e-EPOS controller sends a overheat signal to the instrument panel turning "ON" the warning light and buzzer simultaneously.

Also, the e-EPOS controller returns an overheat signal to the engine controller and changes power mode to standard mode. The engine speed is then set to a low speed by the engine controller.

When coolant temperature falls below 95°C (203°F), normal operation will resume.

AIR CONDITIONER SYSTEM

Outline



FG000784

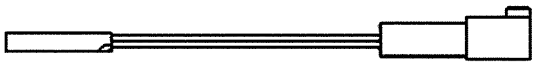
Figure 69

Solid-type heater and air conditioner are installed in the cover behind the operator's seat.

Temperature of the operator's room is adjusted automatically to the temperature set by operator.

Water Temperature Sensor: It senses the temperature of coolant water in the heater core.

Temperature (°C)	Resistance (KΩ)
-10	55.8 ±1.7
0	32.9 ±0.9
15	15.76 ±0.5
25	10.0 ±0.3
35	6.5 ±0.2

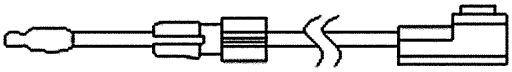


FG001060

Figure 84

Internal Air Temperature Sensor: Built in the internal air filter, it senses the internal temperature.

Temperature (°C)	Resistance (KΩ)
-15	218.2 ±7.5
0	97.83 ±0.9
15	47.12 ±0.7
25	30.0 ±0.36
35	19.60 ±0.3



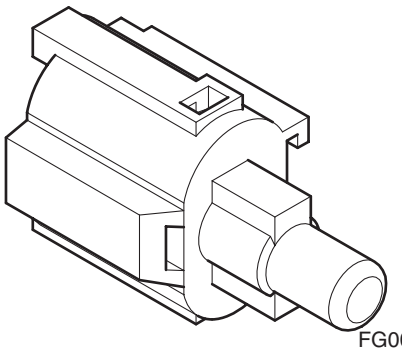
FG001061

Figure 85

Ambient Air Temperature Sensor

Built at the bottom of the cockpit, it senses the temperature of external air.

Temperature (°C)	Resistance (KΩ)
-10	163 ±4.9
0	96.9 ±2.9
10	59.4 ±1.8
20	37.4 ±1.1
25	30 ±0.9
30	24.2 ±0.7



FG001064

Figure 86

Wiper operation

Continuous operation

- Operation of wiper motor

Pressing the successive operation switch on the wiper switch panel (7) changes the voltage of the "5" terminal of the wiper controller (6) from HIGH (about 5.5 ±0.5V) to LOW (0+0.5V) and also current flows via the "3" terminal of the wiper controller (6) → the "2" and "4" terminals of the wiper motor (5) → the "4" terminal of the wiper controller (6) to run the wiper motor (5) continuously.

- Stop of wiper motor

Pressing again the successive operation switch on the wiper switch panel (7) changes the voltage of the "5" terminal of the wiper controller (6) from LOW (0+0.5V) to HIGH (about 5.5 ±0.5V). As the "5" and "6" terminals of the wiper motor are connected still that power is supplied to the "6" terminal of the wiper controller (6),

However, the controller (6) runs the wiper motor continuously and then rotates the motor reversely by " letting current flow via the "4" terminal of the wiper controller (6) → the "2" and "4" terminals of the wiper motor (5) → the "3" terminal of he wiper controller (6) when the "1" and "6" terminals of he wiper motor (5) are connected and thus power voltage is supplied to the "7" terminal of the wiper controller (6).

The Wiper motor (5) stops reverse revolution when the contact of a cam switch connected to the "6" terminal of the wiper motor (5) moves to an insulation area of the cam plate to disconnect the "5" and "6" terminals of the wiper motor (5).

When the wiper motor (5) stops, arm and blade connected to it move to the stop positions of the right pole in the cabin.

Intermittent operation

- Intermittent 1st (3-second)

Pressing once the Intermittent switch in the switch panel (7) changes voltage of the "8" terminal in the wiper controller (6) from HIGH (about 5.5 ±0.5V) to LOW (0+0.5V) and current flows through the "3" terminal in the wiper controller (6) → the "2" and "4" terminals in the wiper motor (5) → the "4" terminal in the wiper controller (6) to start the cycle that wiper stops 3 seconds after every operation.

- Intermittent 2nd (6-second)

Pressing twice the Intermittent switch in the switch panel (7) changes voltage of the "10" terminal in the wiper controller (6) from HIGH (about 5.5 ±0.5V) to LOW (0+0.5V) and current flows through the "3" terminal in the wiper controller (6) → the "2" and "4" terminals in the wiper motor (5) → the "4" terminal in the wiper controller (6) to start the cycle that wiper stops 6 seconds after every operation.

Table of Contents

Electrical Schematic (DX300LC)

Boom and Arm

Edition 1

Boom Removal Procedure

NOTE: *Boom removal may be simplified if the shell of the operator's cabin is taken off the turntable deck first. Refer to the Operator's Cabin Removal procedure before continuing, if both components are to be removed from the excavator.*

After the bucket, arm and arm cylinder have been removed, lower the end of the boom to a stable, secure blocking support.

Attach the assist crane sling to the body of either boom cylinder, break the mounting pin connection to the boom by tapping through the pin from the same side of the boom and repeat for the opposite cylinder.

Release hydraulic pressure and disconnect line couplings as previously outlined in the Arm Removal Procedure, observing the same precautions.

Disconnect wiring for work light assemblies and any other accessory lines or connections. Locate the sling of the assist crane near the center of gravity, optimum lift point for the boom, and use the crane to take pressure off the boom foot pin. Drive out the pin after disassembling retainers and carefully lift away the boom.

⚠ WARNING!

Traveling the excavator, swinging the turntable or movement over bumps or sloping, uneven surfaces could all produce loss of control and possible accidents or injuries, if the turntable deck has been unbalanced by removal of weight from one end only.

To maintain stability, the counterweight should be removed whenever the front attachment is taken off the machine.