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SAFETY INSTRUCTIONS

WARNING

AVOID DEATH OR SERIOUS INJURY

Instructions are necessary before operating or servicing machine. Read and understand the Operation and Maintenance Manual and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments repairs or service. Untrained operators and failure to follow instructions can cause death or serious injury.

APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX140LC-3	1001 and Up, 50001 and Up
DX180LC-3	1001 and Up, 50001 and Up
DX225LC-3	1001 and Up, 50001 and Up
DX255LC-3	1001 and Up, 50001 and Up
DX300LC-3	1001 and Up, 50001 and Up
DX340LC-3	1001 and Up, 10001 and Up
DX350LC-3	1001 and Up, 10001 and Up
DX380LC-3	10001 and Up
DX420LC-3	10001 and Up
DX490LC-3	10001 and Up
DX530LC-3	10001 and Up

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Electrical System

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Swing Bearing SP002329

Lower Structure and Chassis

Track Assembly SP002607

Engine and Drivetrain

Engine Coolant Heater (Option) SP002328
Drive Coupling (Main Pump) SP002411

Hydraulics

Hydraulic System Troubleshooting, Testing and Adjustment SP002412
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Swing Device SP002413
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Gear Pump SP002568
Fan Motor for Oil Cooler SP002552
Fan Pump SP002553
Main Control Valve SP002416
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Travel Control Valve (with Damper) SP002381
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Hydraulic Schematic SP002610

Electrical System

Electrical System SP002418
Electrical Schematic SP002419

Attachments

Boom and Arm SP002605
Bucket SP002421

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Since there is a potential hazard that sparks could be generated, always do the following:

- Do not let tools, rings or other metal objects make any contact between battery terminals. Do not leave tools or other metal objects lying near battery.
- When disconnecting battery terminals, wait for approximately one minute after turning engine starter switch key to "O" (OFF) position, and be sure to disconnect grounding terminal; negative (-) terminal first. Conversely, when connecting them, begin with positive (+) terminal and then grounding (-) terminal, Make sure that all terminals are connected securely.
- Flammable hydrogen gas is generated when battery is charged. Remove battery from machine, take it to a well ventilated place, and remove battery caps, before charging it.
- After charging, tighten battery caps securely.
- After charging, secure battery back in machine.

When repairing or welding electrical system, wait for approximately one minute after turning engine starter switch key "OFF". Then disconnect negative (-) terminal of battery to stop flow of electricity.

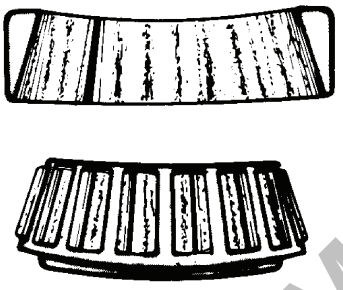
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Etching

Bearing surfaces appear gray or grayish black in color with related etching away of material usually at roller spacing.

Replace bearings - check seals and check for proper lubrication.



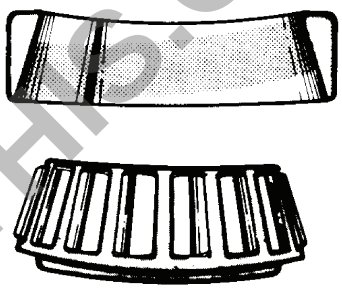
HASA500S

Figure 7

Misalignment

Outer race misalignment because of foreign object.

Clean related parts and replace bearing. Make sure races are properly seated.



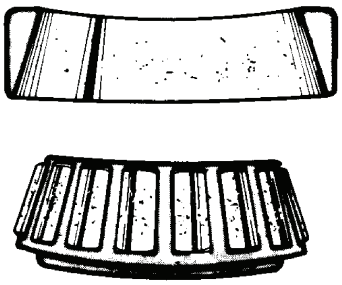
HASA510S

Figure 8

Indentations

Surface depressions on race and rollers caused by hard particles of foreign materials.

Clean all parts and housings, check seals and replace bearings if rough or noisy.



HASA520S

Figure 9

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18. If equipped, remove components from fuel filler pump port (22, Figure 10) on side of fuel tank (1).

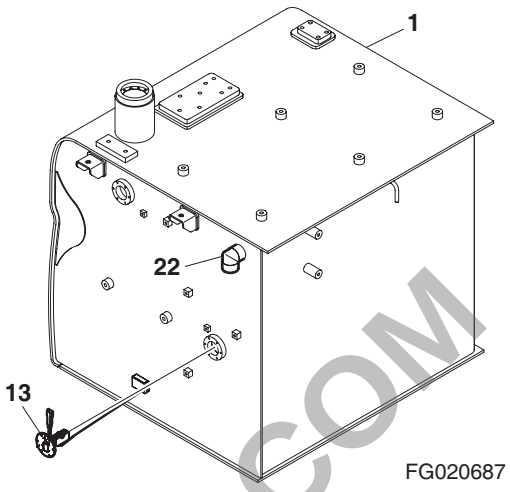


Figure 10

19. Tag and disconnect wires leading to fuel sensor (13, Figure 11) on side of fuel tank (1).

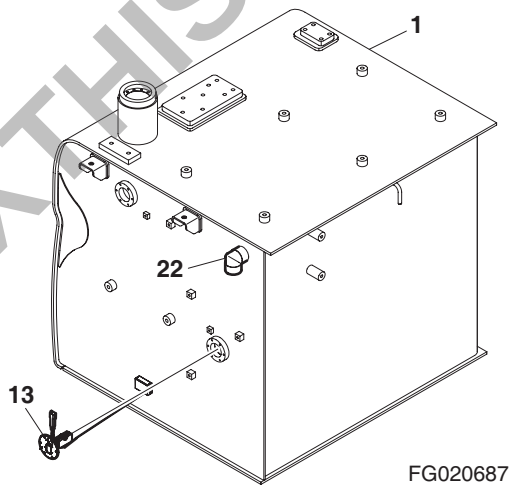


Figure 11

20. Install two 12 mm eyebolts in threaded holes (38 and 39, Figure 12). Using a suitable lifting device, sling eyebolts.

21. Remove six bolts (7) and spacers (11, Figure 12) holding tank (1) to frame. Lift tank 25 mm (1") and make sure it is balanced. Make sure that there are no other electrical wires or hoses connected to tank. Completely remove tank after inspection.

    NOTE: *The clear level gauge on the side of the tank is easily damaged. Be careful of obstacles and wind gusts.*

22. Remove shims (9, Figure 12).

    NOTE: *If tank is to be reused note position and amount of shims used for each mounting bolt location.*

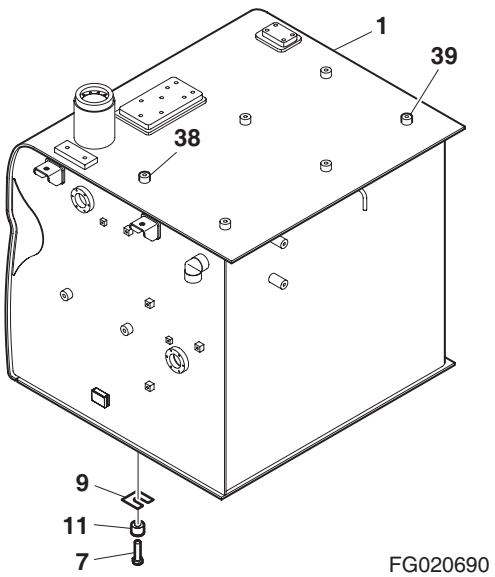


Figure 12

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TRACK SPRING AND TRACK ADJUSTING CYLINDER

Parts List

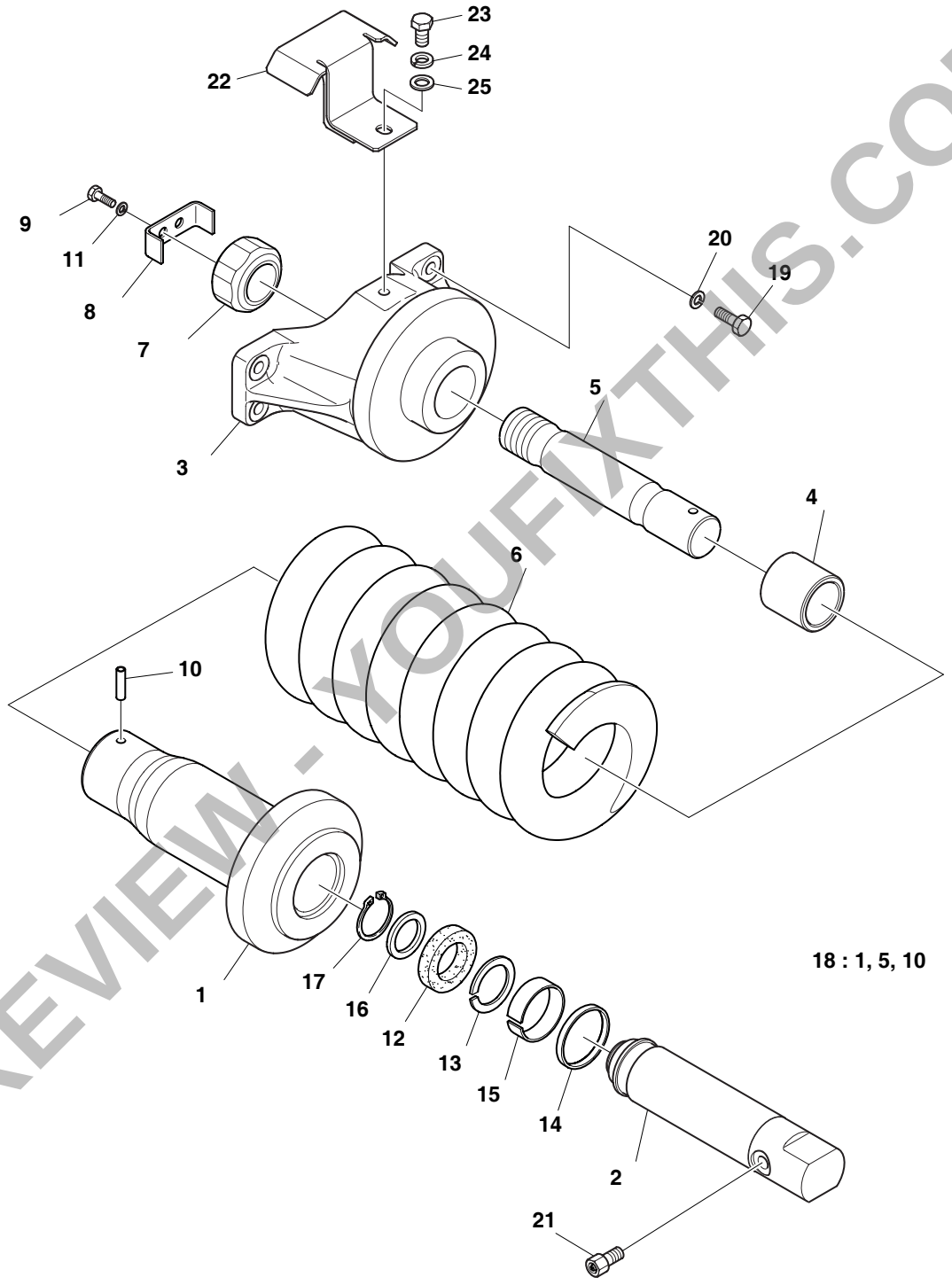


Figure 45

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TROUBLESHOOTING – SWING GEARBOX

Problem	Possible Cause	Remedy
Swing motor fails to operate and:		
Three pressure tests at motor, brake or makeup valve show low reading(s).	Swing relief valve defective. Brake release valve defective. Motor makeup valve defective.	Adjust pressure to recommended range in affected valve. Or Disassemble and clean valve assembly. Replace all valve components that show damage.
All three pressure checks are OK but left travel also fails to run.	Exchange front and rear pump inlet and outlet hoses to test pump function.	If swing and left travel are restored but right travel stops working, replace or repair P1 pump.
All three pressure tests are OK, but machine fails to swing at all.	Brake assembly or motor friction plate failing to release.	Check for binding. Disassemble and repair.
	Pilot (control) pressure low or swing control valve stuck.	Disassemble/Repair pilot pressure swing spool (305) and/or swing control valve.
	Swing motor defective.	Test motor drain rate. Replace/Repair motor.
	Gear train defective.	Refer to "Swing Gear Troubleshooting" procedure.
Swing functions but only at reduced rpm.	Causes listed above could also produce dragging swing, or hot or wrong oil or worn-out parts.	Check above list; then replace oil, test motor drain rate and check for "03" reading (EPOS self-test).
Left travel speed is also reduced.	Low output at P1 pump or external pilot piping leaks/is clogged.	Clean and repair piping or repair or replace pump P1.
Swing control movement is reversed.	Inlet/Outlet piping reversed.	Reset controls or reverse piping.
Machine swings but continues moving past stopping point.	Swing control valve spool not centered.	Replace return spring; clean/ repair valve piston and spool.
	Pilot pressure may be outside range.	Disassemble, clean or replace pilot relief valve or pilot valve.
	Swing relief valve may be faulty.	Repair/Replace swing relief valve.
Swing movement is in one direction only.	Check to see that pilot pressure is the same right and left.	If pilot pressure is unequal, clean or repair piping or repair/replace valve.
	Swing control valve spool may be stuck.	Repair/Replace the swing control valve.
	Swing relief valve may be faulty.	Repair/Replace the swing relief valve.
No rotation and:		
Pressure at swing motor inlet increases.	Swing brake not releasing.	Check brake engagement and disengagement; check release pressure.
	Internal damage to gearbox drivetrain.	Replace broken gears and drivetrain assemblies.
	Overload.	Reduce load weight.

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Model	Cylinder	ø$A^{+0.2}_{+0.1}$	$B^{+0.2}_{+0.1}$	Model (Cylinder)
DX140LC-3	Boom	110.0 mm (4.33 in)	28.5 mm (1.12 in)	
	Arm	115.0 mm (4.53 in)	28.5 mm (1.12 in)	
	Bucket	100.0 mm (3.94 in)	28.5 mm (1.12 in)	
	Arti	140.0 mm (5.51 in)	28.5 mm (1.12 in)	
DX140W-3	Boom	110.0 mm (4.33 in)	28.5 mm (1.12 in)	
	Arm	115.0 mm (4.53 in)	28.5 mm (1.12 in)	
	Bucket	95.0 mm (3.74 in)	28.5 mm (1.12 in)	
	Arti	140.0 mm (5.51 in)	28.5 mm (1.12 in)	
DX180LC-3	Boom	115.0 mm (4.53 in)	28.5 mm (1.12 in)	
	Arm	125.0 mm (4.92 in)	28.5 mm (1.12 in)	
	Bucket	110.0 mm (4.33 in)	28.5 mm (1.12 in)	
	Arti	160.0 mm (6.30 in)	34.5 mm (1.36 in)	
DX190W-3	Boom	120.0 mm (4.72 in)	28.5 mm (1.12 in)	
	Arm	125.0 mm (4.92 in)	28.5 mm (1.12 in)	
	Bucket	110.0 mm (4.33 in)	28.5 mm (1.12 in)	
	Arti	160.0 mm (6.30 in)	34.5 mm (1.36 in)	
DX225LC-3	Boom	125.0 mm (4.92 in)	28.5 mm (1.12 in)	
	Arm	140.0 mm (5.51 in)	28.5 mm (1.12 in)	
	Bucket	120.0 mm (4.72 in)	28.5 mm (1.12 in)	
	Arti	150.0 mm (5.91 in)	28.5 mm (1.12 in)	
DX255LC-3	Boom	130.0 mm (5.12 in)	28.5 mm (1.12 in)	
	Arm	140.0 mm (5.51 in)	28.5 mm (1.12 in)	S/ARM
	Bucket	130.0 mm (5.12 in)	28.5 mm (1.12 in)	S/BUCKET
	Arti	160.0 mm (6.30 in)	34.5 mm (1.36 in)	
DX300LC-3	Boom	140.0 mm (5.51 in)	28.5 mm (1.12 in)	
	Arm	150.0 mm (5.91 in)	28.5 mm (1.12 in)	
	Bucket	135.0 mm (5.31 in)	28.5 mm (1.12 in)	
DX340LC-3/ DX350LC-3	Boom	150.0 mm (5.91 in)	28.5 mm (1.12 in)	OPT BOOM
	Arm	170.0 mm (6.69 in)	34.5 mm (1.36 in)	OPT ARM
	Bucket	150.0 mm (5.91 in)	28.5 mm (1.12 in)	OPT BUCKET

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9. Remove the socket bolts (R31) to remove the ring gear (R7).

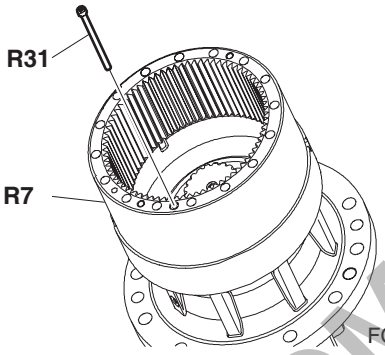


Figure 72

10. Install eyebolts in the two M10 bolt holes on top and remove the ring gear (R7).

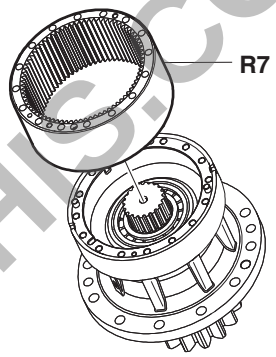


Figure 73

11. Remove the pin (R32).

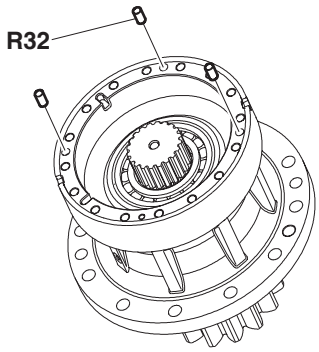


Figure 74

12. Remove the magnet (R23).

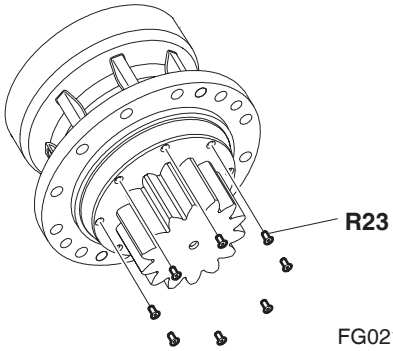


Figure 75

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21. Install the plug (52) at specified torque.
    - Plug (52) tightening torque: 370 kg•cm

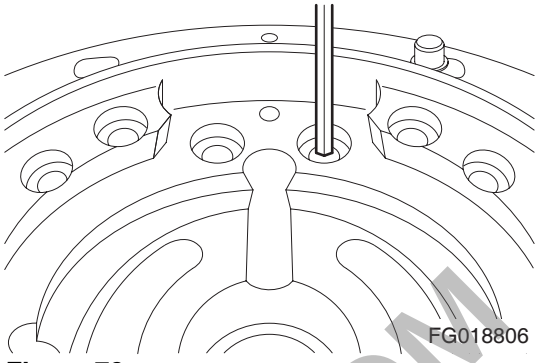


Figure 73

22. Install the orifice (71) at specified torque.
    - Orifice (71) tightening torque: 36 kg•cm

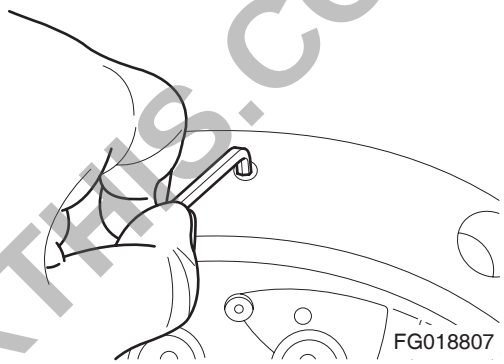


Figure 74

23. Install the counterbalance spool (2) and washer (7) with the rear flange (1).

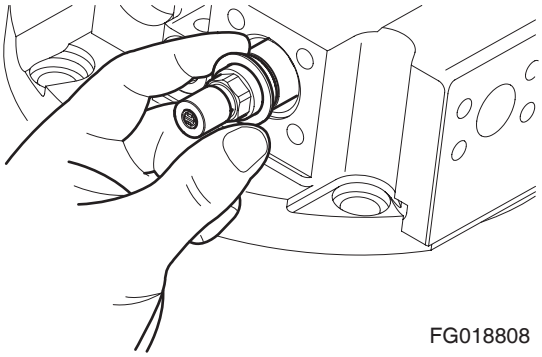


Figure 75

24. Install the O-ring (13) (P44).

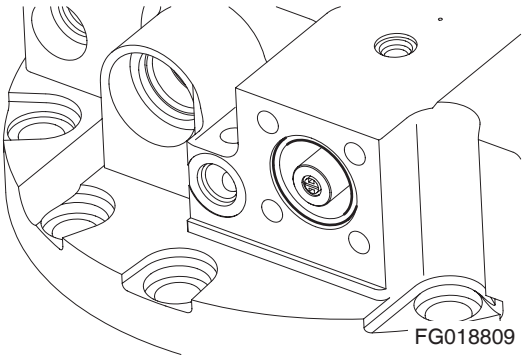


Figure 76

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Cleaning and Care

IMPORTANT

Damage to the surface caused by solvents and aggressive detergents!

Aggressive detergents may damage the seals on the axial piston unit and reduce their service lift.

- **Never use solvents or aggressive detergents.**

IMPORTANT

Damage to the hydraulic system and the seals!

A high-pressure cleaner's water pressure could damage the electronics and the seals of the axial piston unit.

- **Do not point the high-pressure cleaner at sensitive components, e.g. shaft seal ring, electrical connections and electrical components.**

For cleaning and care of the axial piston unit, observe the following:

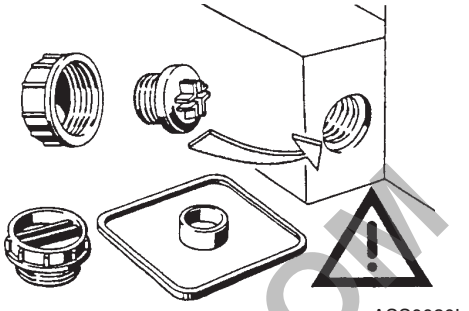
1. Plug all openings with suitable protective caps/devices.
2. Check whether all seals and fittings on the connections are securely seated to ensure that no moisture can penetrate into the axial piston unit during cleaning.
3. Use only water and, if necessary, a mild detergent to clean the axial piston unit.
4. Remove coarse dirt from the outside of the machine and keep sensitive components such as solenoids, valves, indicators and sensors clean.

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GENERAL REPAIR GUIDELINES

1. Close off all openings of hydraulic unit.

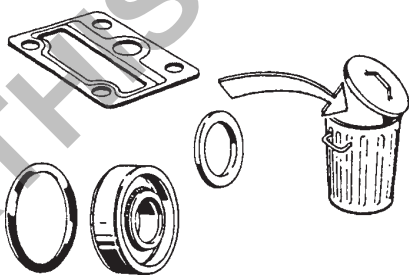


ASS0030L

Figure 3

2. Replace all seals.

   Use only original replacement parts

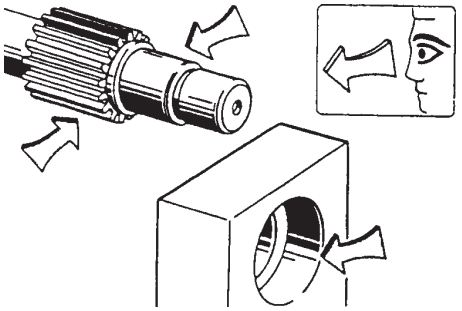


ASS0040L

Figure 4

3. Check all sealing and sliding surfaces for wear.

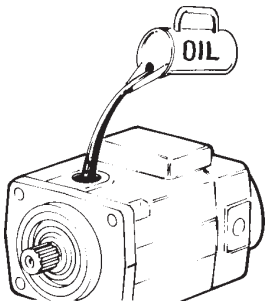
   NOTE: *Do not rework sliding surfaces using crocus cloth or other similar materials, can damage surface.*



ASS0050L

Figure 5

4. Fill hydraulic unit with clean hydraulic oil before putting into operation.



ASS0060L

Figure 6

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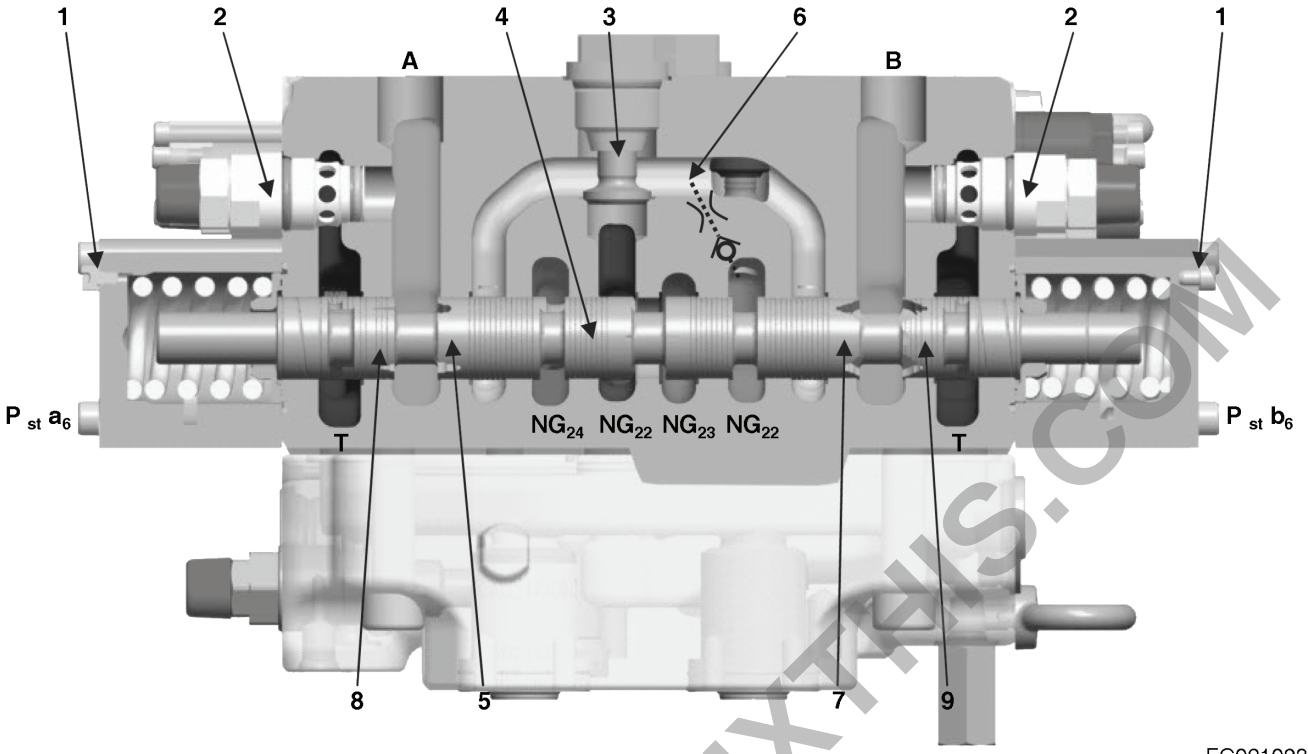


Figure 24

Reference Number	Description
1	Control Cover with Spring Plate, Control Spring and Stroke Stop
2	Pressure Relief Valve and Anticavitation Valve
3	Load-holding Valve
4	S6 Control Piston
5	Supply Orifice Clip →Consumer A

Reference Number	Description
6	Clip Connection for the Supply (Meter in) Orifice
7	Supply Orifice Clip →Consumer B
8	Outflow (Meter Out) Orifice Consumer A →Tank
9	Outflow Orifice Consumer B →Tank

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WARNING

AVOID DEATH OR SERIOUS INJURY

- **Switch off all pumps.**
- **Support vertical cylinders mechanically against sinking.**
- **Only new, structurally identical and tested components, spare parts and lubricants in original equipment quality are admitted for replacement/use.**
- **Make sure that all protective devices and especially all protective functions which could impair the safety-shutdown strategy are correctly installed and checked for functionality before each re-commissioning.**
- **After the completion of all works, please remove all tools and devices used for maintenance from the hydraulic product.**

Personal injuries caused by not functioning spare parts

Spare parts that do not meet the technical requirements specified by Bosch Rexroth may cause personal injuries.

- **Only use genuine spare parts from Bosch Rexroth.**

NOTE: *Penetrating dirt and liquids will cause faults!*

Safe function of the control block is no longer ensured.

- *Always ensure absolute cleanliness when working on the control block.*
- *Cover all openings with the appropriate protective equipment in order to prevent detergents from penetrating the system.*
- *Check that all seals and plugs of the plug-in connection are firmly fitted so that no humidity can penetrate the control block during cleaning.*
- *Dust accumulations on the control block have to be removed at regular intervals.*

NOTE: *Damage to the surface from solvents and aggressive cleaning agents!*

Aggressive detergents may damage the seals on the control block and let them age faster.

- *Never use solvents or aggressive detergents.*
- *Only clean the control block using a damp, lint-free cloth. Only use water to do this and, if necessary, a mild detergent.*

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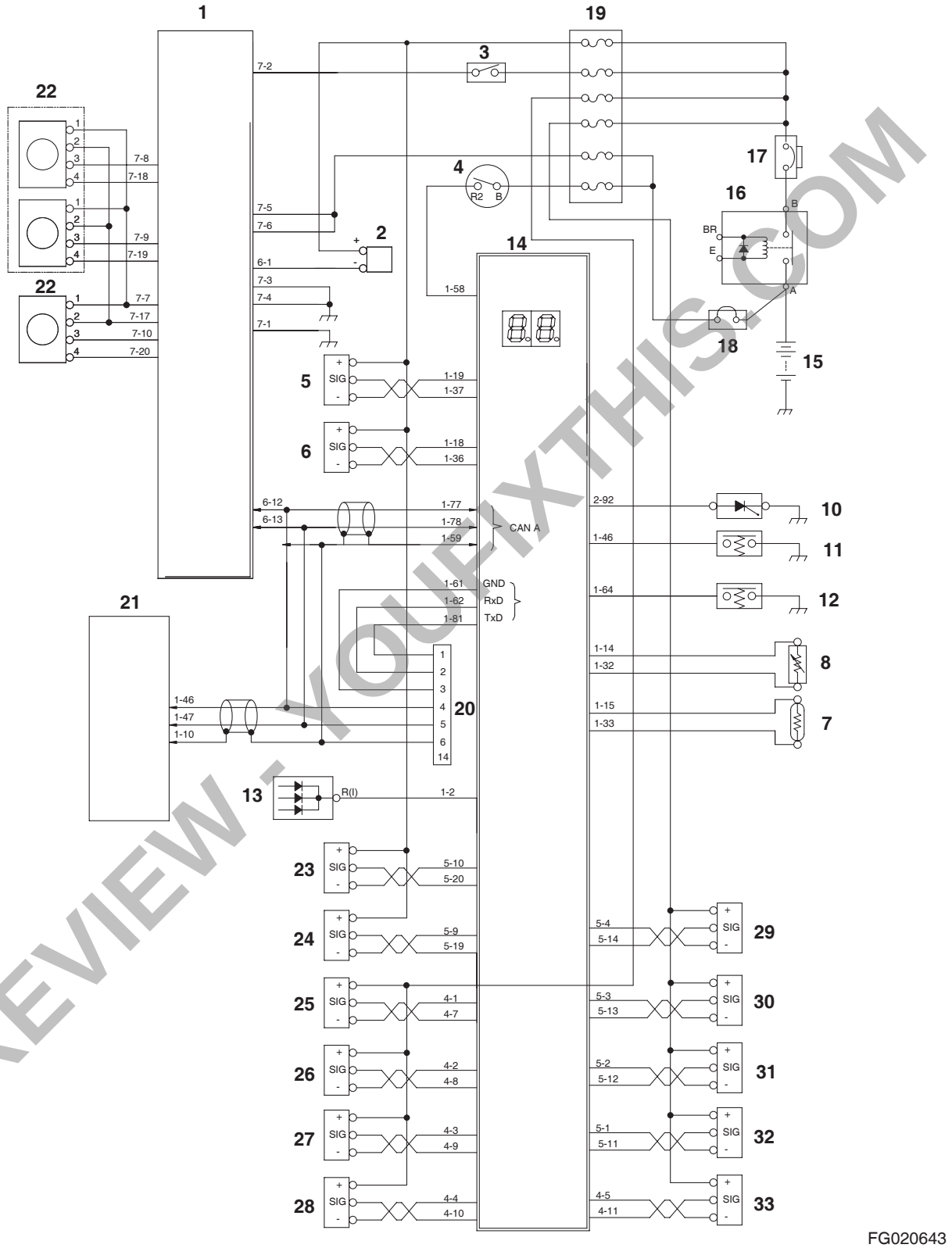
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Monitoring System Schematic



FG020643

Figure 11

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Failure Code at Engine

GP Display Code	GP Display Description	Measuring Point	Correct Value		Remarks	
			Active	Passive		
E000051	Throttle Valve Position Sensor	2.15, 2.40	Position angle: 0° = 4.5 V ±1% Position angle: 90° = 0.713V ±3.5% (Supply voltage: 5 ±0.1 V)		Intake throttle opening degree: unknown. * Default value = 0% * Torque limit 10% * EGR valve = 0%	
E000091	Accelerator Pedal Position	1.79, 1.80			CAN Message	
E000100	Oil Pressure Sensor	2.35, 2.06	150 kPa (1.5 bar): V = 0.921 ±0.07 V 500 kpa (5 bar): V = 2.395 ±0.06 V (Ambient temperature 23 ±5°C) (Supply voltage: 5±0.25 V)		Engine oil pressure is default value setting.	
E000102	Boost Pressure Sensor	2.86, 2.90	70 kPa (0.7bar): V = 0.729 ±0.048 V 360 kpa (3.6 bar): V = 4.043 ±0.048 V (Ambient temperature 23 ±5°C) (Supply voltage: 5±0.25 V)		Boost pressure is default value setting. Boost pressure correction is stopped.	
E000108	Barometric Pressure Sensor in ECU	ECU internal			* Torque limit 10% * EGR valve = 0%	Signal range 4877.8 mV/ 178.4 mV
E000110	Coolant Temperature	2.39, 2.59		20°C: R = 2.5 kΩ ±5% 100°C: R=0.186kΩ ±2%	Default value of coolant temperature at engine start: -20°C during engine running: 90°C Torque limit = 1	
E000129	Rail Pressure Sensor	2.36, 2.60	0 MPa (0 bar): V = 0.5 V ±2% 200 MPa (2,000 bar): V = 4.5V ±2% (Ambient temperature 23 ±5°C) (Supply voltage: 5 ±0.25 V)		Actual rail pressure is default value setting. Torque limit level = 1	
E000132	Air Mass Flow Sensor	2.54, 2.30	1 g/s: 3,138 ±25.0 HZ 16 g/s: 7,750 ±2.5 HZ (Ambient temperature 22 ±2°C) (Supply voltage: 13.5 ±0.3 V)		Default value of MAF sensor: 250g/sec. EGR = 0, Torque level 1	
E000157	CP Metering Unit				Torque Limiter 3	
E000158	Battery	1.73, 1.03			No torque limit	key on 24 V, Engine run 27 V

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Compressor

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

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 temperature and high-pressured gas to freeze it in the condenser.

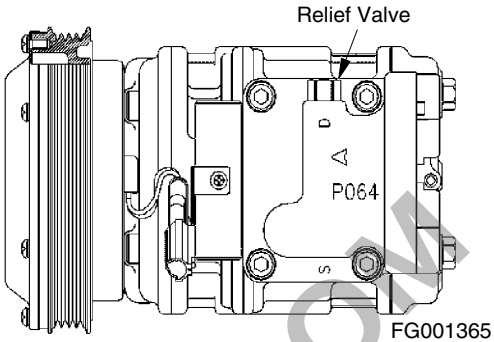


Figure 193

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.

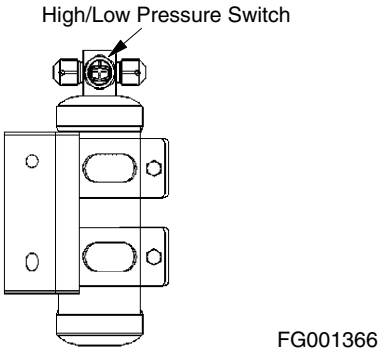


Figure 194

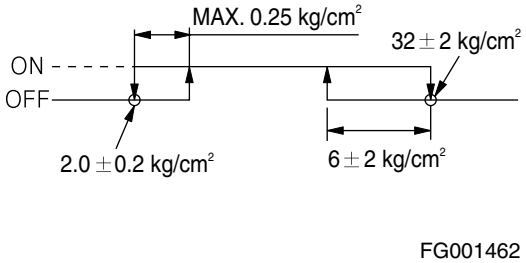


Figure 195

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