

Table of Contents

Safety

Track Excavator Safety.....	SP001716
-----------------------------	----------

Specifications

Specification for DX225LCA.....	SP001717
---------------------------------	----------

General Maintenance

General Maintenance Procedures.....	SP000016
Standard Torques.....	SP000813

Upper Structure

Cabin.....	SP000943
Counterweight.....	SP001617
Fuel Tank.....	SP001718
Fuel Transfer Pump.....	SP000021
Swing Bearing.....	SP000022
Swing Reduction Gear.....	SP001618

Lower Structure and Chassis

Track Assembly.....	SP001619
---------------------	----------

Engine and Drive Train

Drive Coupling (Main Pump).....	SP000912
---------------------------------	----------

Hydraulics

Hydraulic System Troubleshooting, Testing and Adjustment.....	SP000913
Accumulator.....	SP000028
Center Joint (Swivel).....	SP001620

Cylinders.....	SP000914
Swing Motor.....	SP000194
Travel Motor.....	SP001621
Gear Pump	SP000931
Main Control Valve	SP001024
Axial Piston Pump.....	SP000932
PTO Server.....	SP000933
Remote Control Valve (Work Lever / Joystick)	SP001646
Travel Control Valve (with Damper).....	SP001647
Solenoid Valve Assembly	SP001622
Breaker EPPR Valve (Opt)	SP000192
Hydraulic Schematic (DX225LC/DX225LCA)	SP001689

Electrical System

Electrical System	SP001727
Electrical Schematic (DX225LCA)	SP001732

Attachments

Boom and Arm.....	SP000937
Bucket.....	SP000939

Clothing and Personal Protective Items

Contain long hair, and avoid loose clothing and jewelry. They can catch on controls or in protruding parts and cause serious injury or death.

Do not wear oily clothes. They are highly flammable.

Full eye protection, a hard hat, safety shoes and gloves may be required at the work site.

While working on the machine, never use inadequate tools. They could break or slip, causing injury, or they may not adequately perform intended functions.



Figure 1

HAOA020L

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 given in the operation manual.*

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 given in the operation manual.*

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.

Do not carry out deep digging under the front of the machine. The ground under the machine may collapse and cause the machine to fall.

Working heavy loads over loose, soft ground or uneven, broken terrain can cause dangerous side load conditions and possible tipover and injury. Travel without a load or a balanced load may also be hazardous.

Never rely on lift jacks or other inadequate supports when work is being done. Block tracks fore and aft to prevent any movement.

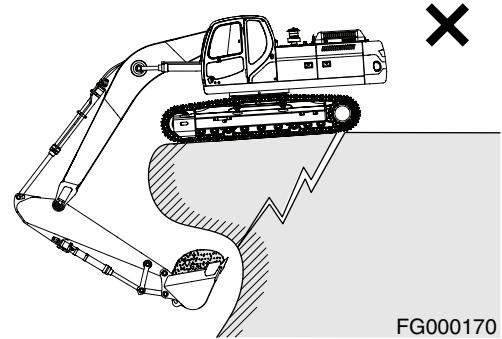


Figure 20

When using the machine, to prevent accidents caused by damage to the work equipment and overturning because of an excessive load, do not use the machine in excess of its ability (in terms of the maximum load and stability determined by the structure of the machine).

When working at the edge of an excavation or on a road shoulder, the machine could tip over, possibly resulting in serious injury or death. Investigate the configuration and ground conditions of the work site beforehand to prevent the machine from falling and to prevent the ground, stockpiles, or banks from collapsing.

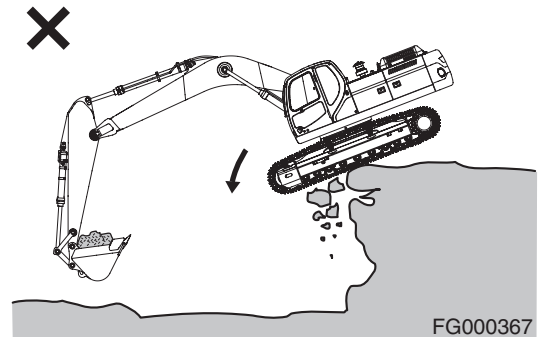


Figure 21

Precautions for Operation

Be careful not to go close to the edge of a cliff by mistake.

Use the machine only for its main purpose. Using it for other purposes will cause failures.

To ensure an ample view, do as follows:

- When working in dark areas, attach working lights and front lights to the machine. If necessary, set up lighting at the work site.
- Stop operations when the visibility is poor, such as in fog, mist, snow, and rain. Wait for the visibility to improve to a level which causes no problems for the operation.

To avoid hitting the work equipment, always do the following:

- When working in tunnels, on bridges, under electric wires, or when parking the machine or carrying out other operations in places with limited height, be extremely careful not to hit the bucket or other parts.
- To prevent collisions, operate the machine at a safe speed when working in confined spaces, indoors, or in crowded areas.
- Do not pass the bucket over the heads of workers or over the operator's compartment of dump truck.

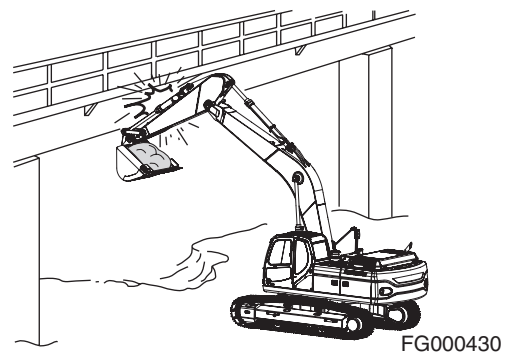


Figure 22

Material	Low Weight or Density 1,100 kg/m³ (1,850 lb/yd³), or Less	Medium Weight or Density 1,600 kg/m³ (2,700 lb/yd³), or Less	High Weight or Density 2,000 kg/m³ (3,370 lb/yd³), or Less
Earth, WET, muddy	-----	-----	1,762 kg/m ³ (2,970 lb/yd ³)
Gypsum, calcined, (heated, powder)	961 kg/m ³ (1,620 lb/yd ³)	-----	-----
Gypsum, crushed to 3 inch size	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Gravel, DRY, packed fragments	-----	-----	1,810 kg/m ³ (3,051 lb/yd ³)
Gravel, WET, packed fragments	-----	-----	1,922 kg/m ³ (3,240 lb/yd ³)
Limestone, graded above 2	-----	1,282 kg/m ³ (2,160 lb/yd ³)	-----
Limestone, graded 1-1/2 or 2	-----	1,362 kg/m ³ (2,295 lb/yd ³)	-----
Limestone, crushed	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Limestone, fine	-----	-----	1,602 kg/m ³ (2,705 lb/yd ³)
Phosphate, rock	-----	1,282 kg/m ³ (2,160 lb/yd ³)	-----
Salt	929 kg/m ³ (1,566 lb/yd ³)	-----	-----
Snow, light density	529 kg/m ³ (891 lb/yd ³)	-----	-----
Sand, DRY, loose	-----	1,522 kg/m ³ (2,565 lb/yd ³)	-----
Sand, WET, packed	-----	-----	1,922 kg/m ³ (3,240 lb/yd ³)
Shale, broken	-----	1,362 kg/m ³ (2,295 lb/yd ³)	-----
Sulphur, broken	529 kg/m ³ (1,620 lb/yd ³)	-----	-----

Fretage

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.

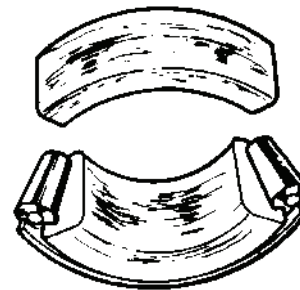


Figure 16

HASA590S

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.

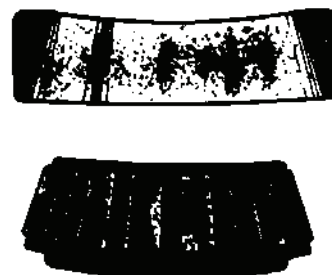


Figure 17

HASA600S

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.

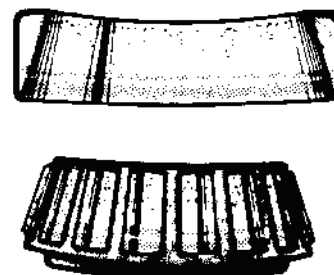


Figure 18

HASA610S

GENERAL

Warning for Counterweight and Front Attachment Removal

DANGER!

DOOSAN warns any user, that the removal of the counterweight from the machine, front attachment or any other part, may affect the stability of the machine. This could cause unexpected movement, resulting in death or serious injuries. *DOOSAN* is not liable for any misuse.

Never remove the counterweight or front attachment unless the upper structure is in-line with the lower structure.

Never rotate the upper structure once the counterweight or front attachment has been removed.

Before any attempt is made to begin removal or installation of the counterweight, the excavator must be parked on a firm and level supporting surface, with no sloping surfaces or soft or muddy ground in the area where the assist lift crane will be working. Position all accessories in the overnight storage position.

WARNING!

The weight of counterweight is given in the following table. Use only rated and approved slings and hardware when removal or installation lifts are being made. Lifting slings, shackles and all other hardware must be rigged safely. An assist crane that is rated above weight capacity is required.

Model	Weight of Counterweight
DX225LC/DX225LCA	4,100 kg (9,039 lb)
	5,300 kg (11,685 lb) (Optional)
DX225NLC	4,100 kg (9,039 lb)
	4,700 kg (10,361 lb) (Optional)

Responsibility should be assigned to one person to be in charge of the lifting crew, and to verify that required safe lifting precautions have been taken before each part of this procedure has been started.

All members of the working crew should know and understand the signals that will be used between the lifting leader, the assist crane operator and the remainder of the work crew.

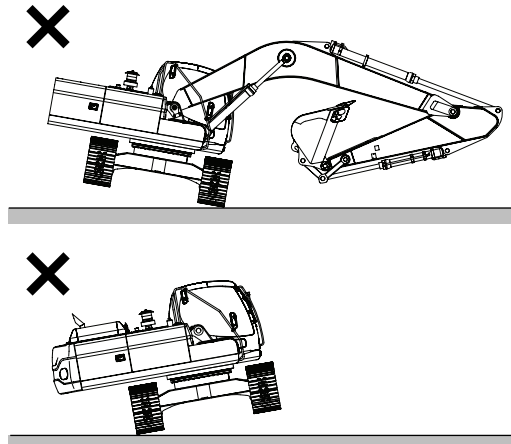


Figure 1

FG000371

SWING BEARING MAINTENANCE

Operating Recommendation

The service life of the swing bearing may be extended if a conscious, daily effort is made to equalize usage over both ends of the excavator. If the excavator is used in the same operating configuration day in and day out (for example, with the travel motors always under the counterweight, or with the attachment over one side of the machine more than the other), the bearing's service life could be reduced. Taking a few minutes in the middle of each work shift to reposition the excavator, to work the opposite end of the bearing, will provide a payoff in terms of more even, gradual rate of wear and extended service life.

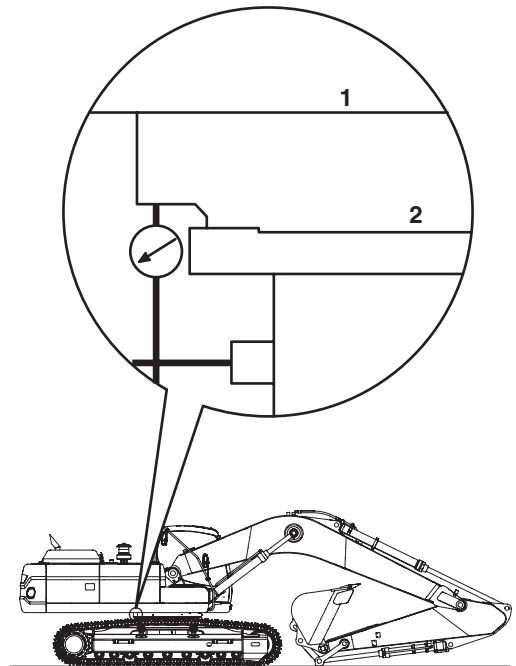
Measuring Swing Bearing Axial Play

Periodic, regular checks of bearing displacement should be made at least twice a year. Use a dial indicator. Push the attachment against the ground to lift the excavator off the ground and take measurements at 4 points, 90° apart, around the circumference of the bearing (Figure 1).

Record and keep all measurements. Play in the bearing should increase minimally from one inspection to the next. Eventually, however, as the bearing begins to approach the limit of its service life, clearance increases become much more pronounced and the actual measured play in the bearing could exceed twice the value that was measured when the machine was new.

Measuring Bearing Lateral Play

When vertical checks are made, the side to side play in the bearing can be checked by fully retracting the arm and bucket cylinders and extending the tip of the bucket as far forward as it will go. With the excavator parked on a flat, level surface and the bucket tip just off the ground, push against the bucket sideways to take up all of the lateral clearance in the bearing. (Less than 100 lb of force should be required to move the bucket over all the way.) Check lateral play in both directions and record the values. When the bearing is beginning to approach the end of its service life, measured lateral clearance should start to show larger and larger increases.



FG000533

Figure 1

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
DX225LC	5001 and Up
DX225LCA	5167 and Up

SWING SYSTEM TROUBLESHOOTING

Precautions/Initial Checks

1. Stop work. Release all weight or any type of load safely before proceeding. Avoid risking injury or adding to damage.
2. Shut down engine and disengage control functions until initial tests are ready to be made.



Prevent possible injury and/or loss of operating control. Stop work and park the excavator at the first indication of:

1. **Equipment breakdown.**
 2. **Inadequate control response.**
 3. **Erratic performance.**
-

Stop the machine, put the boom and arm in the inoperative (overnight park) position and begin by making the fastest, simplest checks first:

- Check oil level.
- Check for overheating, oil leaks, external oil cooler clogging or broken fan belt. Consult service record for prior repair/service work.
- Drain some tank oil into a clean, clear container. Look for metal shavings/grit, cloudiness/water or foam/air bubbles in the oil.
NOTE: *Dispose of drained fluids according to local regulations.*
- Check for wobble through the engine/pump flex coupling. Run engine with the pump input hydraulic power control nut turned to the lowest power to check the engine.
- Investigate unusual operating noises or vibration. Check for loose bolts, connections.

MODEL	CYLINDER	$\phi A_{-0.15}^{-0.05}$	$\phi B (\pm 0.1)$	E	$F_{0}^{+0.05}$	Part	MODEL (CYLINDER)
DX225LC	BOOM	80.0 mm (3.15 in)	95.0 mm (3.74 in)	40.0 mm (1.58 in)	6.5 mm (0.26 in)		
	ARM	80.0 mm (3.15 in)	95.0 mm (3.74 in)	40.0 mm (1.58 in)	6.5 mm (0.26 in)		
	BUCKET	80.0 mm (3.15 in)	95.0 mm (3.74 in)	40.0 mm (1.58 in)	6.5 mm (0.26 in)		
DX225NLC	BOOM	80.0 mm (3.15 in)	95.0 mm (3.74 in)	40.0 mm (1.58 in)	6.5 mm (0.26 in)		
	ARM	80.0 mm (3.15 in)	95.0 mm (3.74 in)	40.0 mm (1.58 in)	6.5 mm (0.26 in)		
	BUCKET	80.0 mm (3.15 in)	95.0 mm (3.74 in)	40.0 mm (1.58 in)	6.5 mm (0.26 in)		
DX225LCA	BOOM	80.0 mm (3.15 in)	95.0 mm (3.74 in)	40.0 mm (1.58 in)	6.5 mm (0.26 in)		
	ARM	80.0 mm (3.15 in)	95.0 mm (3.74 in)	40.0 mm (1.58 in)	6.5 mm (0.26 in)		
	BUCKET	80.0 mm (3.15 in)	95.0 mm (3.74 in)	40.0 mm (1.58 in)	6.5 mm (0.26 in)		
DX300LC	BOOM	90.0 mm (3.54 in)	105.0 mm (4.13 in)	40.0 mm (1.58 in)	7.0 mm (0.28 in)		
	ARM	90.0 mm (3.54 in)	105.0 mm (4.13 in)	40.0 mm (1.58 in)	6.5 mm (0.26 in)		S/ARM
	BUCKET	90.0 mm (3.54 in)	105.0 mm (4.13 in)	40.0 mm (1.58 in)	7.0 mm (0.28 in)		S/BUCKET
DX340LC	BOOM	100.0 mm (3.94 in)	115.0 mm (4.53 in)	45.0 mm (1.77 in)	7.5 mm (0.30 in)		OPT BOOM
	ARM	100.0 mm (3.94 in)	115.0 mm (4.53 in)	45.0 mm (1.77 in)	7.5 mm (0.30 in)		OPT ARM
	BUCKET	100.0 mm (3.94 in)	115.0 mm (4.53 in)	45.0 mm (1.77 in)	7.5 mm (0.30 in)		OPT BUCKET
DX420LC	BOOM	110.0 mm (4.33 in)	130.0 mm (5.12 in)	70.0 mm (2.76 in)	11.0 mm (0.43 in)		
	ARM	110.0 mm (4.33 in)	130.0 mm (5.12 in)	70.0 mm (2.76 in)	11.0 mm (0.43 in)		
	BUCKET	110.0 mm (4.33 in)	130.0 mm (5.12 in)	70.0 mm (2.76 in)	11.0 mm (0.43 in)		

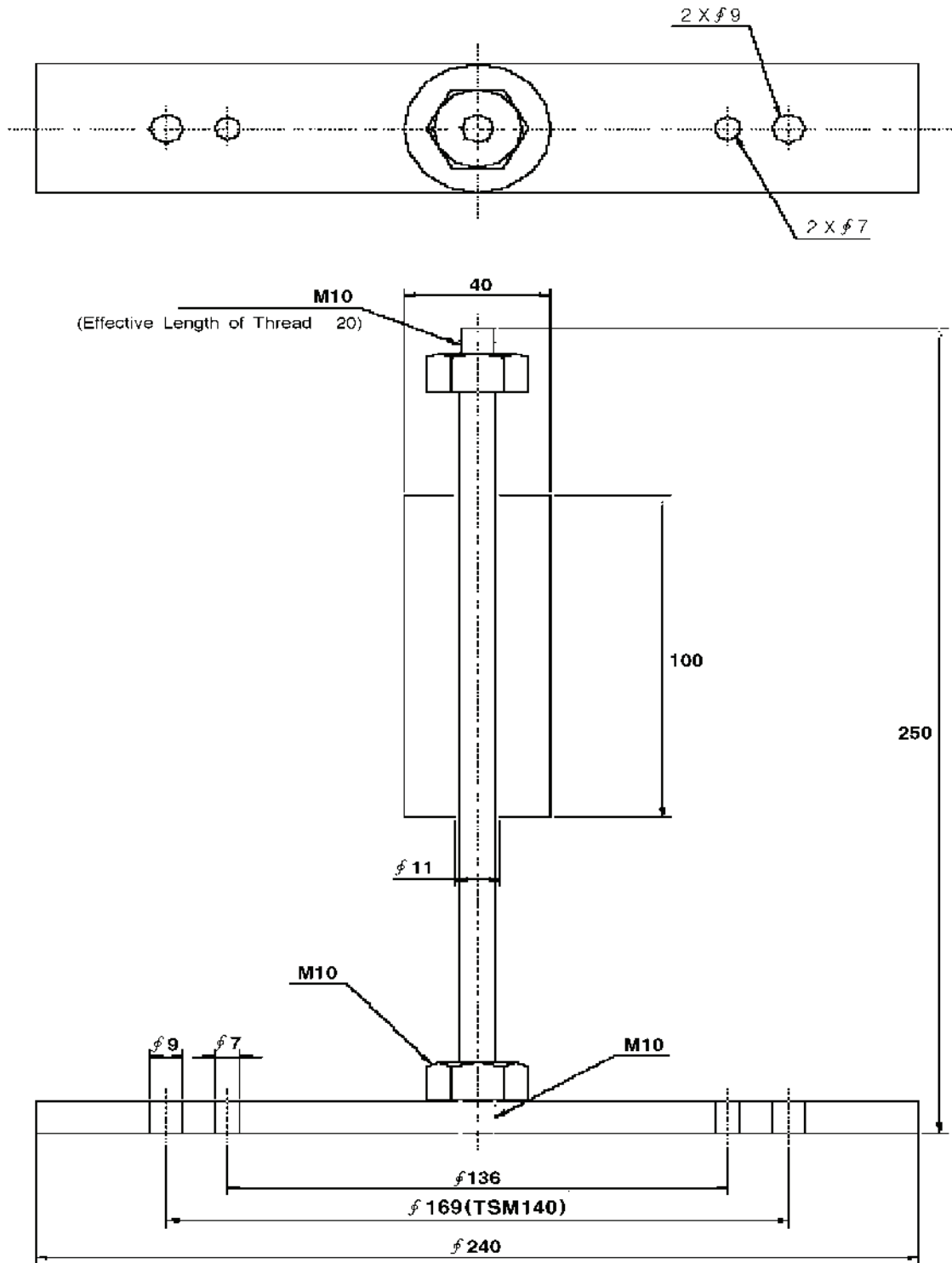


Figure 11 (Brake piston disassemble tool)

FG004590

Basic Structure and Diagrams

Assembly Cross Section

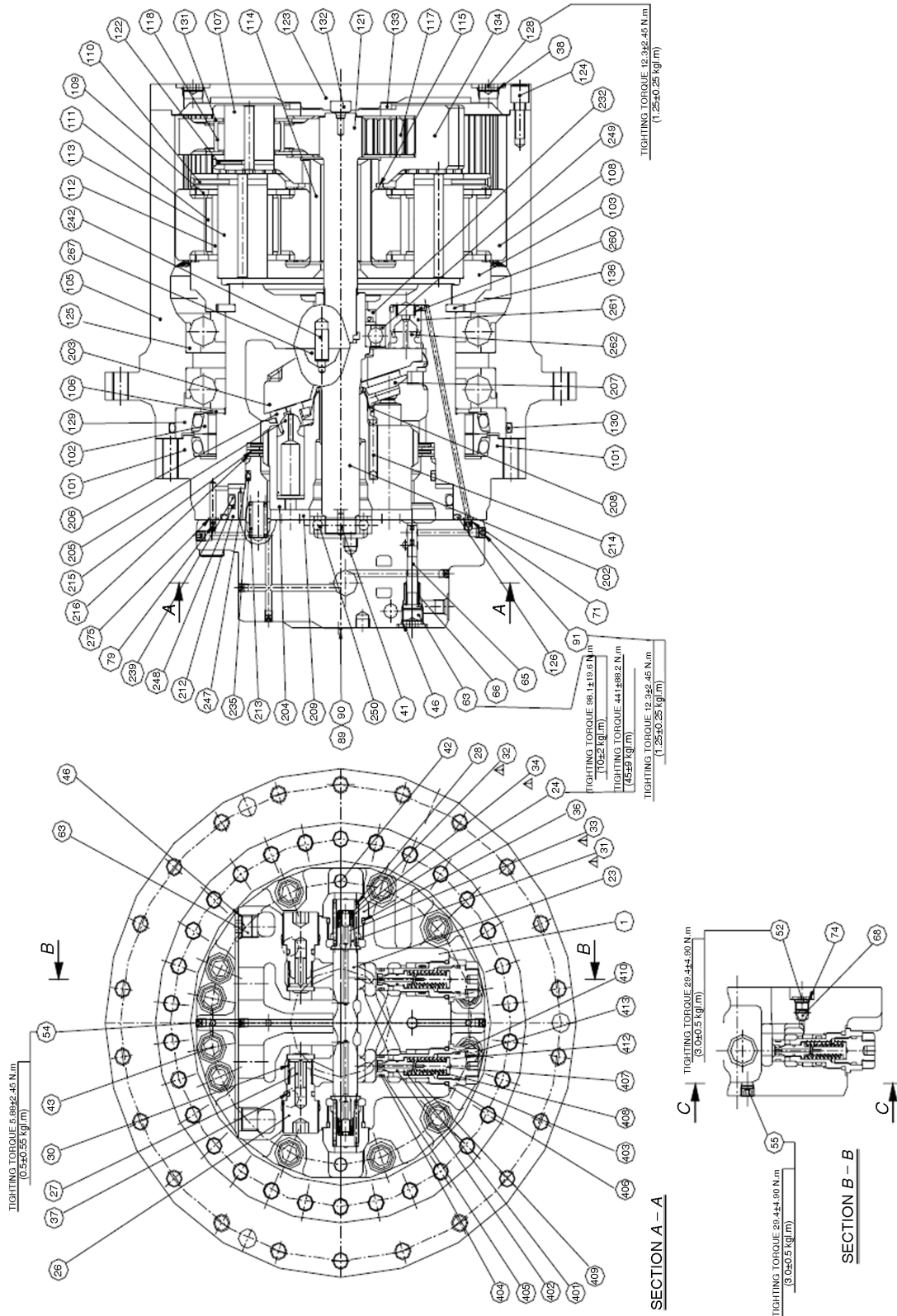


Figure 15

FG013311

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.

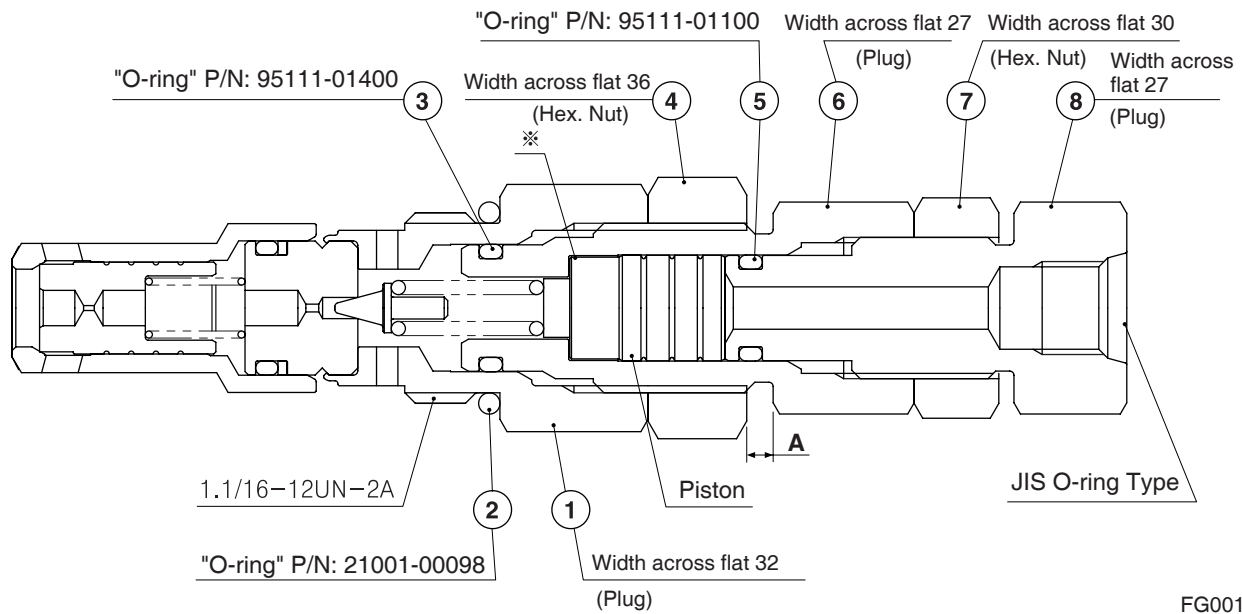
APPLICABLE MODELS

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

MODEL	SERIAL NUMBER RANGE
DX225LC	5001 and Up
DX225NLC	5001 and Up
DX225LCA	5167 and Up
DX300LC	5001 and Up

Maintenance of Relief Valves

Reassembly of Main Relief Valve



FG001317

Figure 41

1. Check if there is dirt and paint chips around threads of plug (1, 6 and 8) and nut (4 and 7). Replace O-ring with new one. Clean installation portion of relief valve and valve housing. Install valve, and then tighten plug (1, width across flats: 32 mm). Tightening torque: 7.95 - 8.97 kg•m (58 - 65 ft lb).

NOTE: The torque values are based on use of lubricated threads.

NOTE: If relief valve was disassembled, adjust pressure by referring to "Main Relief Valve" on page 45.