GENERAL SPECIFICATIONS

Shipping Weight	46.2 metric tons (50.92 tons), includes 10% fuel, boom, 3,350 mm (11' - 0") arm, standard bucket and standard shoes
Operating Weight	Add weight of full fuel tank and operator.
Shipping Weights With Optional Track Shoes	46.20 metric tons (50.93 tons) for 600 mm (24") shoes
	46.90 metric tons (51.70 tons) for 750 mm (29.5") shoes
	47.20 metric tons (52.03 tons) for 800 mm (31.5") shoes
	47.60 metric tons (52.47 tons) for 900 mm (35.4") shoes
Major Component Weights	Standard Boom 7,100 mm (23' - 4") 3,282.0 kg (7,240 lbs)
	3,350 mm (11' - 0") Arm 1,549.0 kg (3,410 lbs)
	2,900 mm (9' - 6") Arm 1,446.0 kg (3,190 lbs)
	4,000 mm (13' - 1") Arm 1,784.0 kg (3,930 lbs)
	Boom Cylinders 424.0 kg (930 lbs) each
	Arm Cylinder 662.0 kg (1,460 lbs)
	Bucket Cylinder 381.0 kg (840 lbs)
	Counterweight 8,500.0 kg (18,740 lbs)
	Upper Turntable 18,120.0 kg (39,950 lbs) (Including counter weight, w/o front)
	Lower - 18,560.0 kg (40,920 lbs) (Including swing bearing)
Digging Forces (At Power boost):	
Bucket Cylinder	24,500.0 kg (54,010 lbs) with 3,350 mm (11' - 0") arm
Arm Cylinder	20,400.0 kg (44,970 lbs) with 3,350 mm (11' - 0") arm
	22,900.0 kg (50,490 lbs) with 2,400 mm (7' - 10") arm
	20,400.0 kg (44,970 lbs) with 2,900 mm (9' - 6") arm
	18,100.0 kg (39,900 lbs) with 4,000 mm (13' - 1") arm
	13,500.0 kg (29,760 lbs) with 6,000 mm (19' - 8") arm
	10,500.0 kg (23,150 lbs) with 8,000 mm (26' - 3") arm
Fuel Tank Capacity	670.0 liters (177 U.S. gal.)
Hydraulic Reservoir Capacity	340.0 liters (90 U.S. gal.)
Bucket Heaped Capacity Range	CECE 1.10 ~ 2.50 cu. m (1.44 ~ 3.27 cu. yd.)
	IMPORTANT: Refer to the Load Weight, Bucket and Arm Length Compatibility Table for information on which bucket sizes may be used safely with which arm length, for load material weights.
Shoe Type	Triple Grouser
Shoe Width and Optional Sizes	600 mm (23.62 in.) - standard
	750 mm (29.53 in.) - optional
	800 mm (31.50 in.) - optional
	900 mm (35.43 in.) - optional
Ground Pressure Ratings:	
Standard 600 mm (23.62 in.) shoe	0.798 bar (11.44 psi)
Optional 750 mm (29.53 in.) shoe	0.638 bar (9.25 psi)

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Reference Number	Description
1	Fuel Tank
2	Filter
3	O-ring
4	Cover
5	Bolt
6	Spring Washer
7	Cock
8	Bolt
9	Shim
10	Shim

Reference Number	Description
11	Fuel Filter
12	Cap
13	Plug
14	Level Gauge
18	Cover Flange
19	O-ring
20	Socket Bolt
23	Hard Washer
24	Bolt

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REMOVAL

⚠ CAUTION!

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

1. Park on firm and level ground.
2. Lower bucket to ground.
3. Shut engine down and remove key from starter switch.

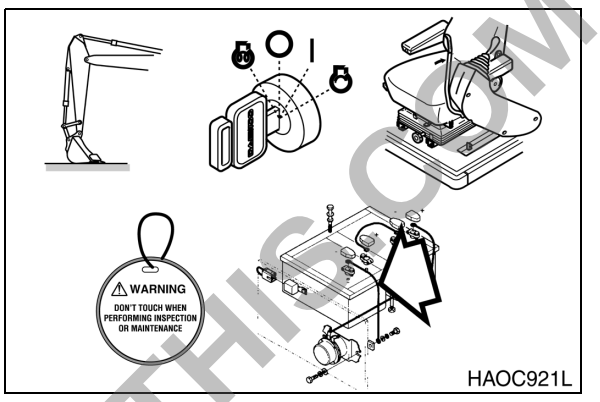


Figure 1

⚠ WARNING!

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

4. Set safety lever on "LOCK" position.
5. Hang maintenance warning tag on controls.
6. Disconnect negative (-) battery cable leading to frame from battery.
7. Prepare cab shell for removal by disconnecting wiring connectors for:
   - A. Cab interior lighting.
   - B. External light wiring.
   - C. Radio antenna and connections.
   - D. Wiper/washer connections.

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

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

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Symptoms	Possible Causes	Remedies
1. No rotation and –		
a. Pressure at swing motor inlet *increases*	Swing brake not releasing	Check brake engagement and disengagement, check release pressure
	Internal damage to gearbox drive train	Replace broken gears, drive train assemblies
	Overload	Reduce load weight
b. Pressure at swing motor inlet shows *no increase,* **and** the swing motor is making irregular noises	Swing motor drive shaft damage	Replace swing motor
	Internal damage to gearbox drive train	Repair/replace broken or faulty assemblies
c. Pressure at swing motor inlet shows *no increase,* but **without** irregular *noises* from the swing motor	Hydraulic pump or valve broken	Troubleshoot hydraulic system
2. Oil leakage		
a. From drive shaft	Oil seal damaged	Replace oil seal
b. From bolted connections or other assembled surfaces	Assembly compound (joint sealer) old and not sealing, bolt not tight or flange warped	Disassemble and check mating surfaces. Reapply Loctite, torque bolts to specifications
3. Excess heat		
Gearbox casing becomes excessively hot, with or without irregular noise(s) during operation	Low oil level	Replace oil, refill to specified level
	Bearings or gear worn but not completely inoperative	Repair or replace gearbox

HAOE960L

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GENERAL DESCRIPTION

Schematic(s) presented in this section are laid out on facing pages.

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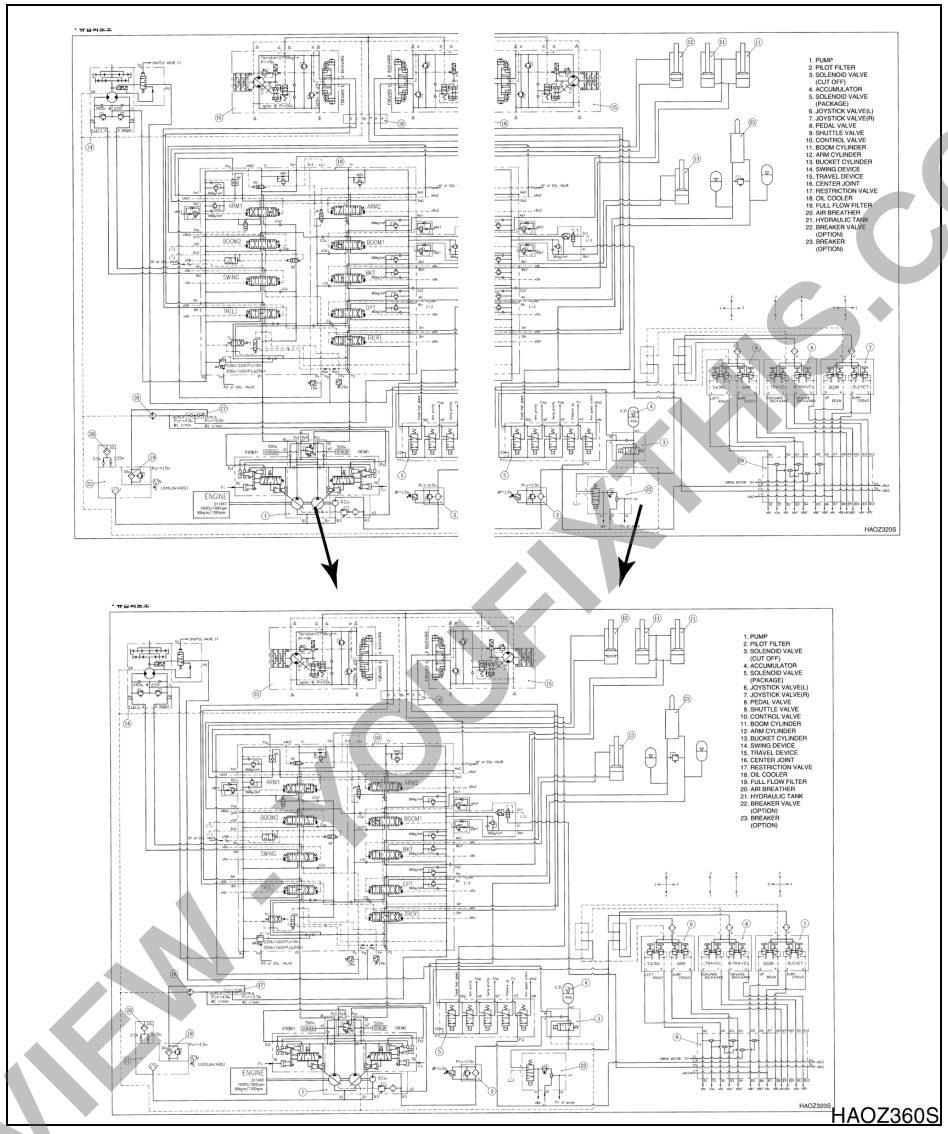


Figure 1

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GENERAL DESCRIPTION

Schematic(s) presented in this section are laid out on facing pages.

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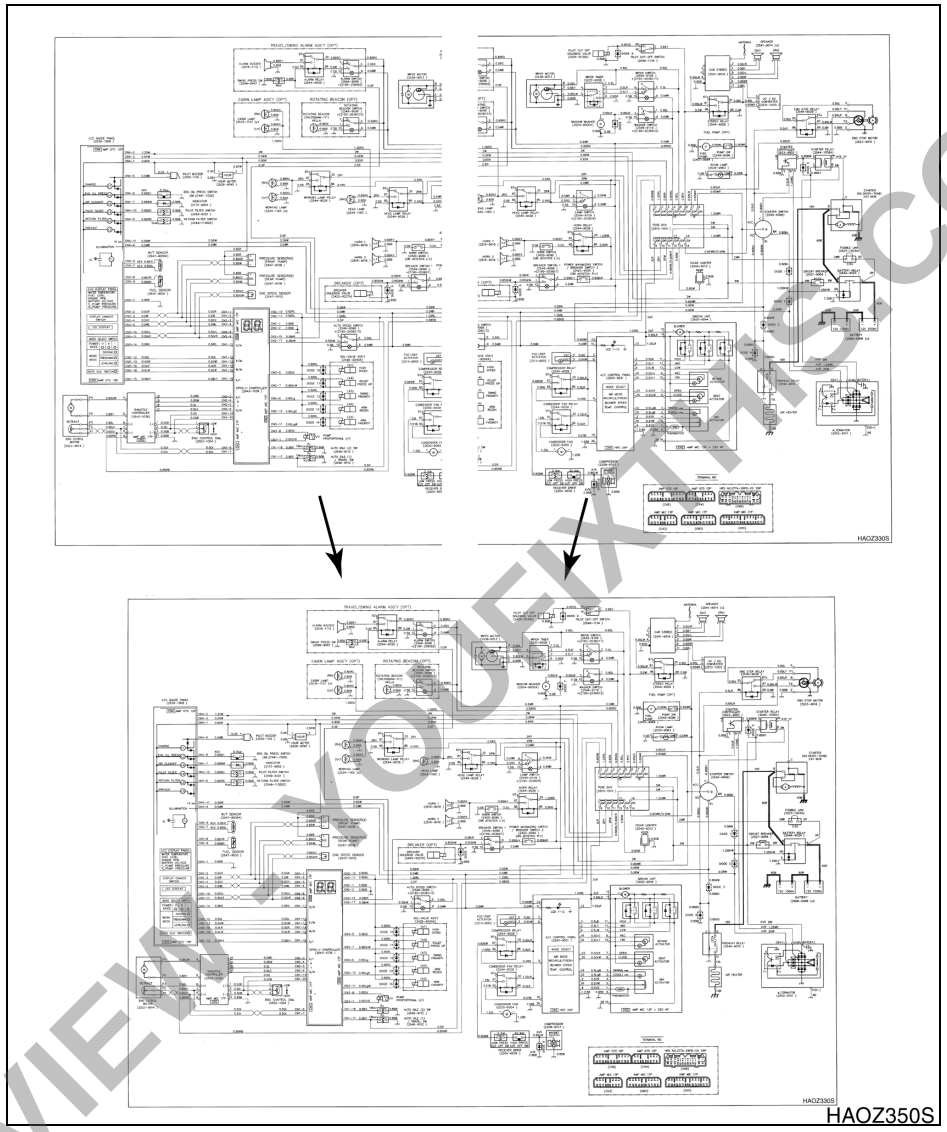


Figure 1

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TRACK EXCAVATOR SAFETY

⚠ 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 is in good working order.

Use lifting and hoisting equipment capable of safely handling load.

Remember, that ultimately safety is your own personal responsibility.

MODEL	SERIAL NUMBER RANGE
Solar 130LC-V	0001 and Up
Solar 220LC-V	0001 and Up
Solar 170LC-V	1001 and Up
Solar 220N-V	1001 and Up
Solar 250LC-V	1001 and Up
Solar 290LC-V	0001 and Up
Solar 330LC-V	1001 and Up
Solar 400LC-V	1001 and Up
Solar 450LC-V	1001 and Up

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SPECIFICATIONS FOR SOLAR 450LC-V

⚠ CAUTION!

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

Use lifting and hoisting equipment capable of safely handling load.

Remember, that ultimately safety is your own personal responsibility.

MODEL	SERIAL NUMBER RANGE
Solar 450LC-V	1001 and UP

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

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

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

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

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

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

BEARING INSPECTION

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

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

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

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

After inspection lightly coat the bearing and related parts with oil and wrap in a clean lintless cloth or paper and protect them from moisture and other foreign materials until installation.

It is also important to inspect the bearing housing and/or shaft for grooved, galled or burred conditions that indicate that the bearing has been turning in its housing or on its shaft.

If available, use magna-flux or similar process for checking for cracks that are not visible to the naked eye.

The following illustrations will aid in identifying and diagnosing some of the bearing related problems.

NOTE: *The illustrations will only show tapered roller bearings, but the principles of identifying, diagnosing and remedying the defects are common to all styles and types of bearings.*

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FALLING OBJECT PROTECTIVE STRUCTURES (F.O.P.S.)

DANGER!

If the excavator is to be used in mines, for demolition, or in other areas where falling rocks, building materials (concrete blocks, steel beams) or other heavy objects pose a danger to the safety of the operator, a certified Falling Object Protective Structure (F.O.P.S.) must be installed over the roof and/or front of the cab.

NOTE: ***A Falling Object Guard (F.O.G.) is another type of protective structure. In all cases check with all regulatory agencies for your situation.***

Falling Object Protective Structures are available from independent manufacturers or fabricators. A certified, approved F.O.P.S. system should normally have a permanent, environmentally-protected label securely attached to the structure (per Society of Automotive Engineers [SAE] standard J1164, "Labeling of ROPS and FOPS and OPS"), indicating the following:

- Name and address of the manufacturer or fabricator and their certification control.
- Model number of the protective structure and/or the equipment make, model(s) or series the structure is designed to fit.
- Maximum machine weight for which the structure is certified.
- Numbered, dated list of SAE performance criteria that have been met or exceeded; for example, SAE J1040 (Apr88), SAE J231 (Jan81), SAE J1356 (Feb88) and/or other performance criteria or recognized standards (ISO).

WARNING!

Additional protection against projectiles or flying or thrown objects, or supplementary protection for the operator in the event of equipment tip-over could also be required, if operating conditions pose additional hazards.

Roll Over Protective Structures (R.O.P.S.) are designed to work with seat belt protective restraints and shield the operator in the event of an overturn, in situations where equipment is operated over hazardous slopes or other unstable ground conditions. Additional R.O.P.S. performance criteria specify protective measures for fuel tanks, oil reservoirs, batteries and operator's cab edges, corners and projections.

Operator Protective Structures (O.P.S.) are designed to provide additional barrier protection around the operator's cab area. For example, using a shearing attachment on the excavator for demolition work or certain kinds of mining operation could cause violent break-up of materials, posing the threat of hazardous projectiles or flying objects being thrown through the operator's cab wall or window.

IMPORTANT

Observe all recommended equipment installation procedures for O.P.S., F.O.P.S., and/or R.O.P.S. systems. Do not attempt to weld, drill holes in or otherwise modify the structure. The integrity of the system could be compromised. Always use correct fasteners, torqued to specified limits, and follow all manufacturer's instructions for installation, maintenance, and/or transfer or re-installation of the protective system.

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LOWER STRUCTURE AND CHASSIS

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TRACK SPRING AND TRACK ADJUSTING CYLINDER

PARTS LIST

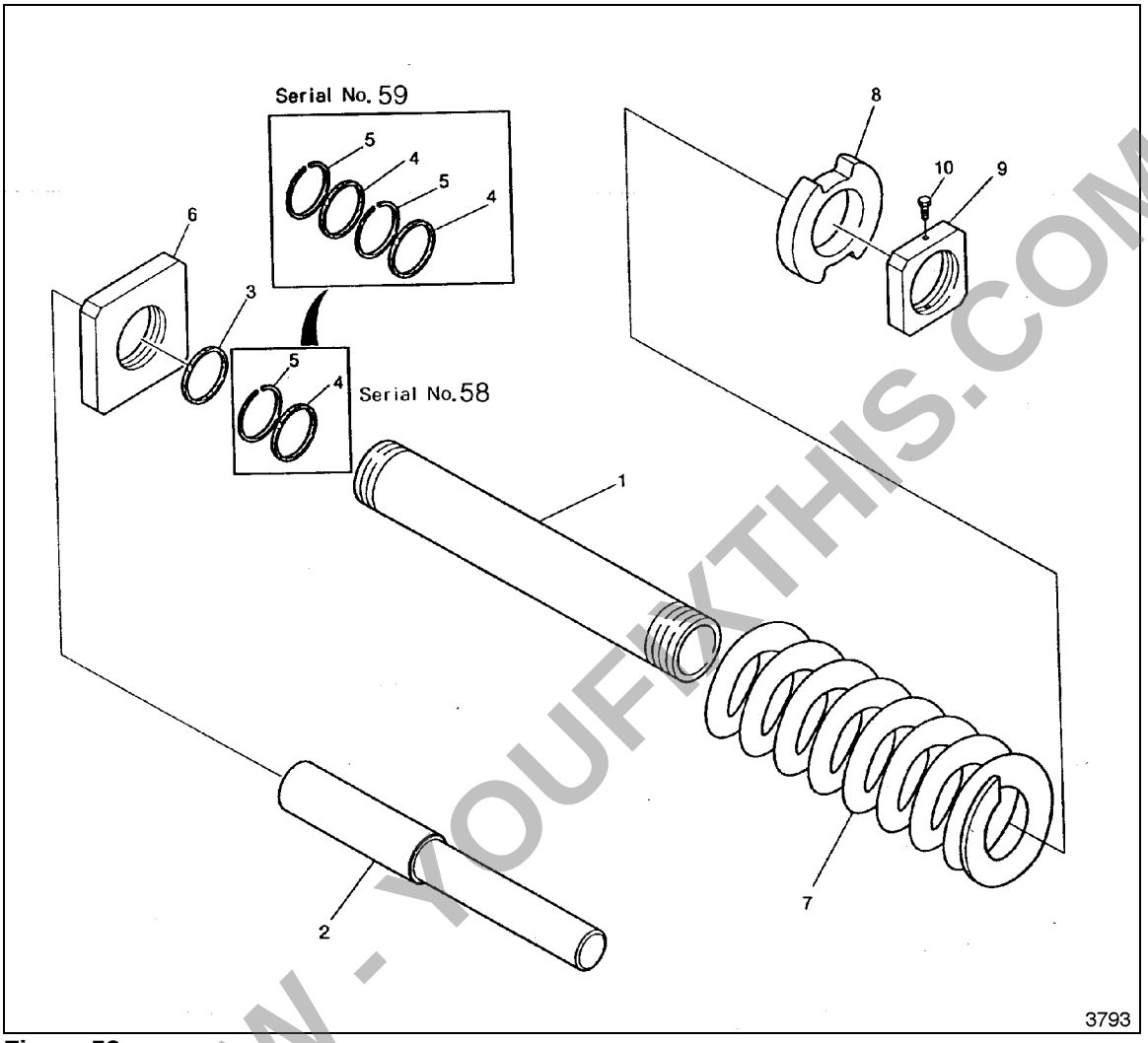


Figure 53

Part No.	Part	Quantity	
	1	Tube	1
	2	Piston Rod	1
	3	Dust Seal	1
	4	U-packing	1 (2)
	5	Backup Ring	1 (2)

Part No.	Part	Quantity	
	6	Nut	1
	7	Track Spring	1
	8	Bracket	1
	9	Nut	1
	10	Bolt (M10 x 1.25)	1

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Inspection Procedure

1. High Pressure Side

   Compressor outlet → condenser inlet → receiver dryer inlet → air-conditioner unit inlet

2. Low pressure side

   Compressor inlet → air-conditioner unit outlet

3. Compressor

   Compressor shaft area, bolt hole area and magnetic clutch area.

4. Receiver dryer

   Pressure switch and plug area.

5. Connection valve area

   Inspect all valve areas.

   Verify all valves are capped to prevent leaking.

   Check for foreign matter inside of valve cap.

6. Interior of air-conditioning unit.

   After stopping engine, insert detector probe into drain hose. (Leave inserted for 10 seconds minimum.)

   NOTE: *When inspecting leakage from the air-conditioning unit, perform the inspection in a well ventilated area.*

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PRESSURE UP VALVE

CHECKS AND ADJUSTMENTS

⚠ WARNING!

This procedure should be done with two people. To reduce the chance of accident or unintended start-up, one person should remain at the operator's control stand while checks and adjustments are made.

Vent hydraulic pressure from the reservoir to install an in-line "t-style" adapter and test gauge (60 bar/1,000 psi) at the pilot pump signal port relief valve outlet.

Start the engine and turn the engine speed dial to maximum. When normal operating temperature is reached.

- Check pilot pressure and readjust it, if required;
- Select the Instrument Panel rear pump "pressure display";
- Select Power Mode III;
- Stall the boom cylinder (towards the extend side);
- Read rear pump pressure on the Instrument Panel display.

Repeat all tests with and without "pressure up" selected through the console rocker switch and joystick button.

If the 2-stage main relief valve was not set correctly and main relief high-stage pressure ("pressure up") is outside the tolerance range, begin valve adjustment by loosening the outside (widest diameter) lock nut on the relief valve. Turn the adjusting screw clockwise to increase pressure, or counterclockwise to decrease it. Pressure must be 350 bars (5075 psi), or up to 10 bars (145 psi) higher.

Because one adjustment can affect the other, check low-stage main relief pressure by repeating the cylinder stall test without "pressure up." Readjust standard relief pressure by turning the inner-most (smallest diameter) screw clockwise to increase the setting, or counterclockwise to decrease it. Pressure should be at least 320.0 bar (4,641.28 psi), but less than 325.0 bar (4,713.80 psi).

IMPORTANT

Pressure adjustments and checks cannot be made if pilot pressure is outside the specified range. Refer to the pilot pump adjustment procedure if required, then proceed with any necessary adjustments to main relief pressure settings.

Power Mode	Operation	Main Pressure and Tolerance	Pilot Pressure and Tolerance
Mode III	Neutral, No Operation	20 - 40 bar (290 - 580 psi)	30 bar + 10 bar (435 psi + 145 psi)
Mode III	Cylinder Stall	320.0 bar + 5 bar (4,640 psi + 75 psi)	30 bar + 10 bar (435 psi + 145 psi)
Mode III W/ pressure Up	Cylinder Stall	350 bar + 10 bar (5,075 psi + 145 psi)	30 bar + 10 bar (435 psi + 145 psi)

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SPECIAL TOOLS

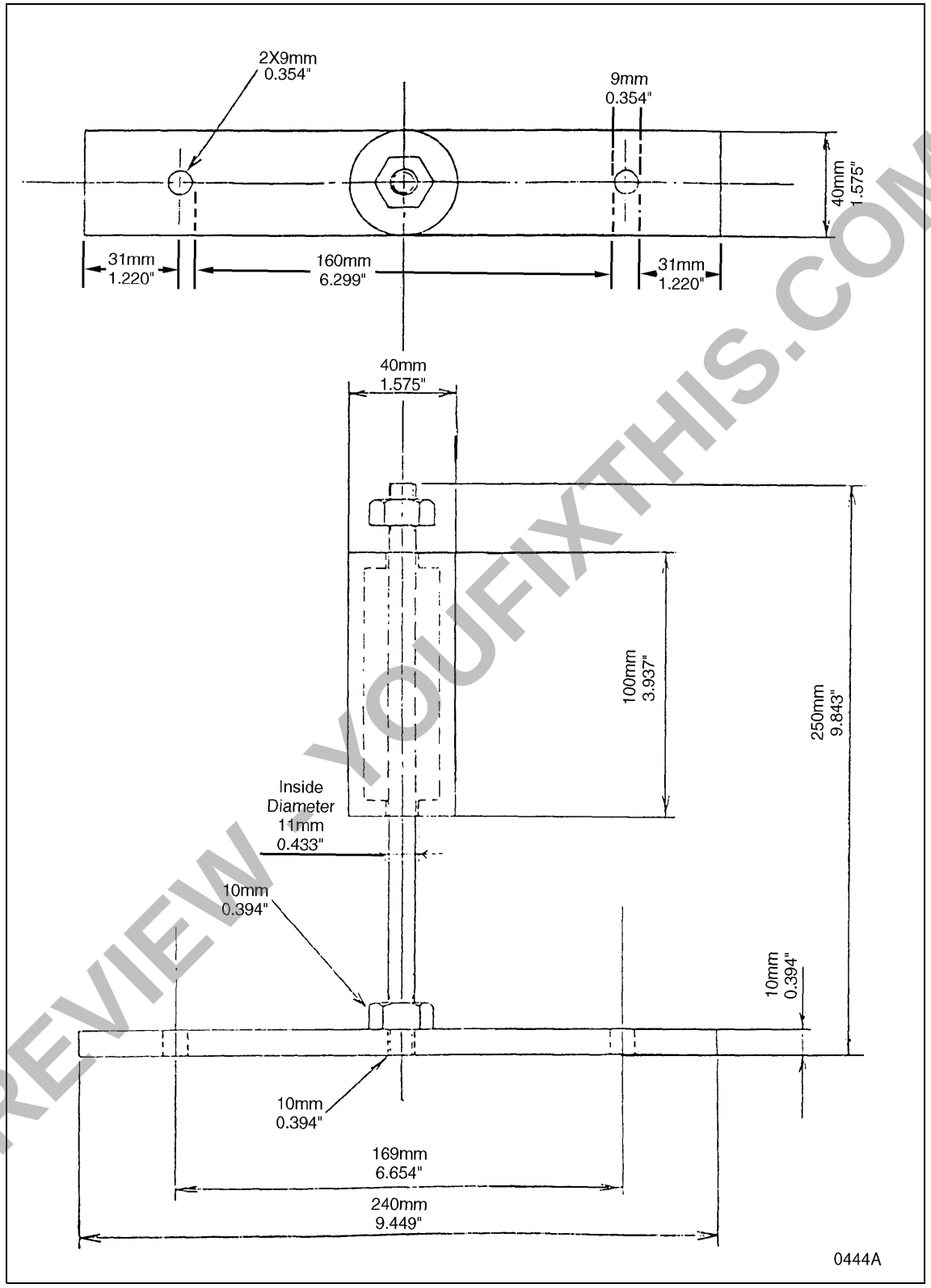


Figure 5

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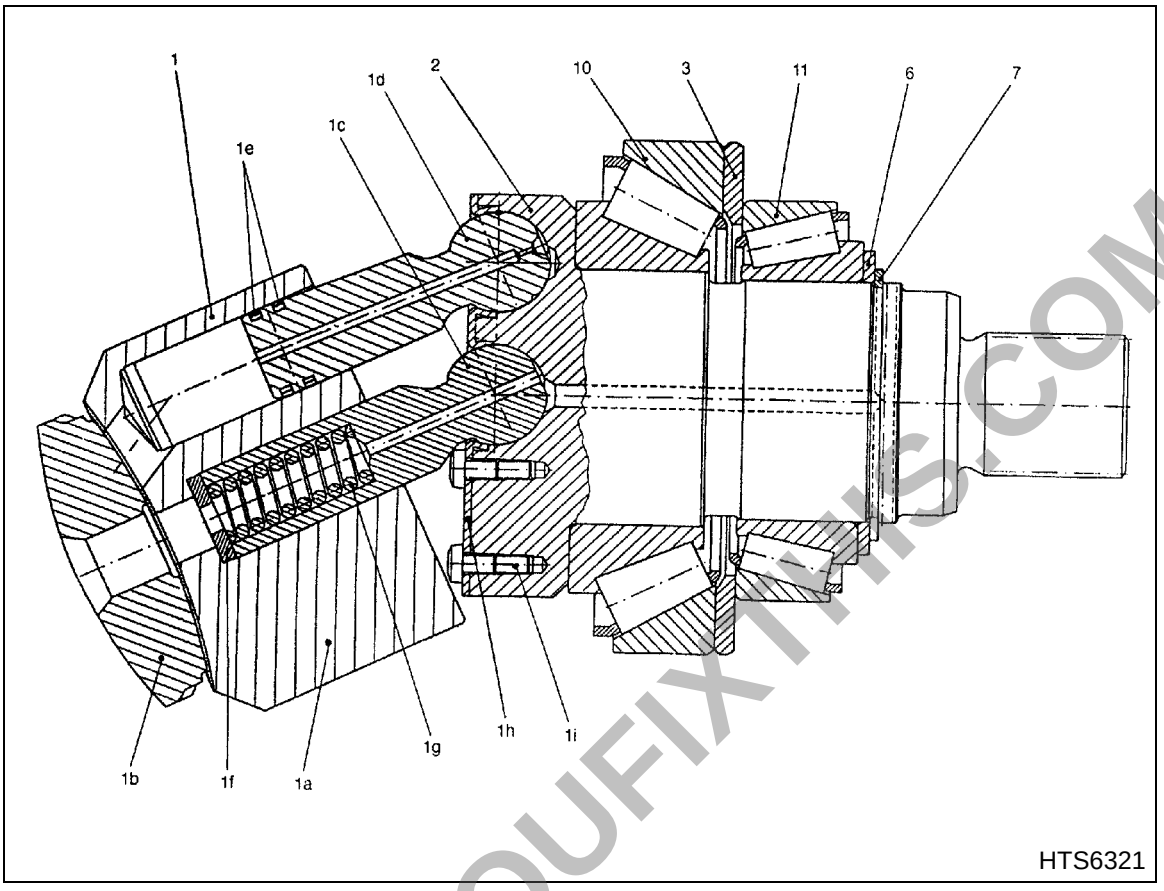


Figure 13

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27. Remove bushing from hub using a jig. Figure 89.

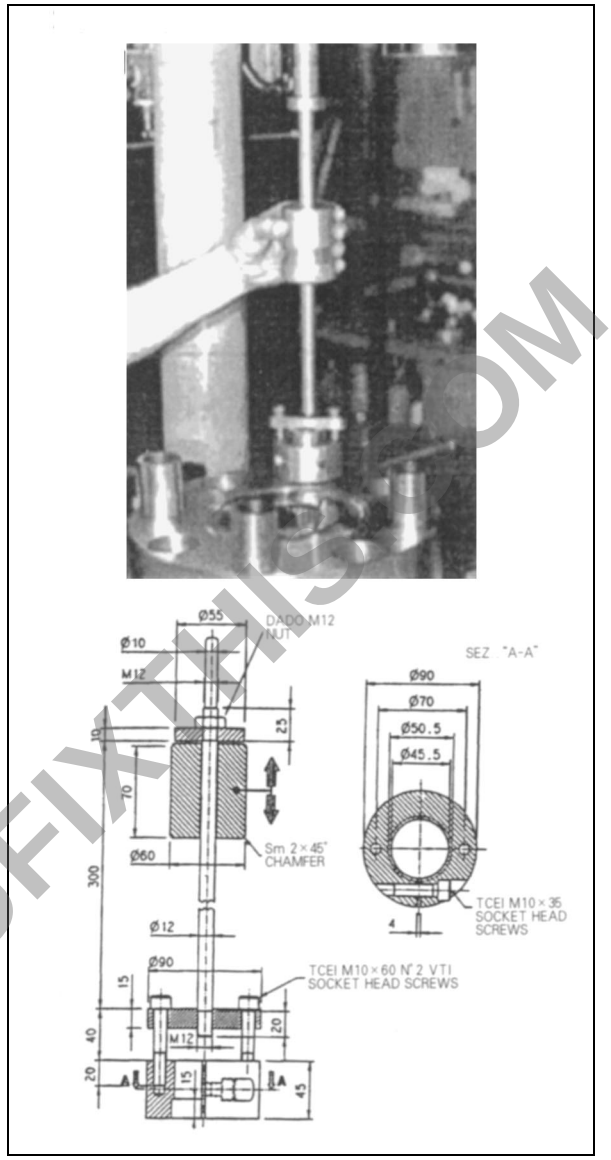


Figure 89

28. Remove bearing inner race and spacer from hub, using puller. Figure 90.

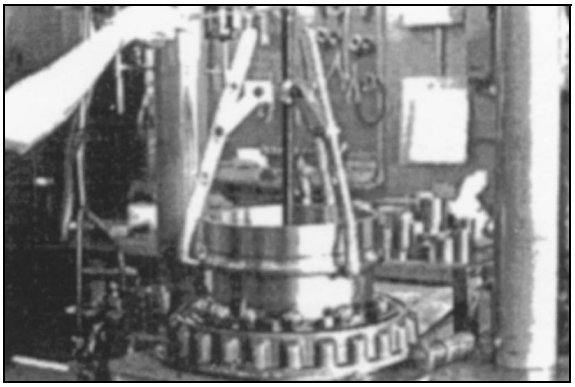


Figure 90

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Reference Number	Description
4	Gear Pump
111	Shaft (F)
113	Shaft (R)
114	Spline Coupling
123	Roller Bearing
124	Needle Bearing
127	Bearing Spacer
141	Cylinder Block
151	Piston
152	Shoe
153	Push Plate
156	Spherical Bushing
157	Cylinder Spring
158	Spacer
211	Shoe Plate
212	Swash Plate
214	Tilting Bushing
251	Support Plate
261	Seal Cover (F)
263	Rear Cover
271	Pump Casing
312	Valve Block
313	Valve Plate (R)
314	Valve Plate (L)
401	Socket Bolt
406	Socket Bolt
413	Socket Bolt

Reference Number	Description
466	VP Plug
468	VP Plug
490	Expander
531	Tilting Pin
532	Servo Piston
534	Stopper (L)
535	Stopper (S)
548	Feedback Pin
702	O-ring
710	O-ring
717	O-ring
719	O-ring
724	O-ring
726	O-ring
728	O-ring
732	O-ring
774	Oil Seal
789	Backup Ring
792	Backup Ring
808	Nut
824	Snap Ring
885	Pin
886	Spring Pin
901	Eye Bolt
953	Set Screw
954	Adjusting Screw

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DISASSEMBLY

1. Lift up the boot (3) and pull the switch cord through the hole in the housing.



Figure 3



Figure 4

2. Loosen nut (4) from hex nut (5) and detach handle assembly.

   NOTE: *Handle assembly may vary from model to model depending upon front attachments. (Example; breakers, scrap grapples, logging grapples, etc.)*

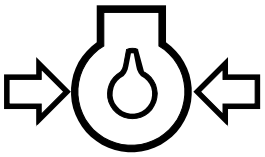
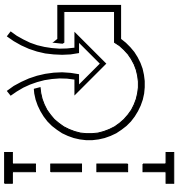
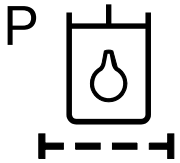
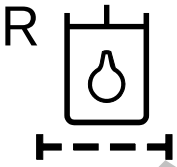


Figure 5

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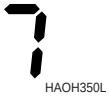
PILOT LIGHTS

Symbol	Description	Input Terminal	Operation	Remarks
 HAOH240L	Engine Oil Pressure	CN4 - 6	Lights up when oil pressure drops below 0.3 kg/sq cm.	After starting engine, if engine oil pressure is insufficient after 8 seconds, a warning buzzer will sound.
 HAOH250L	Air Cleaner	CN4 - 7	Lights up when air cleaner is clogged	
 HAOH260L	Pilot Filter	CN4 - 10	Lights up when pressure increases over 1kg/sq cm.	
 HAOH270L	Return Filter	CN4 - 9	Lights up when pressure increases over 1kg/sq cm.	
 HAOH280L	Preheat	CN4 - 11	Lights up when preheat process is completed. (Approximately 19 seconds from start)	

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3. Normal Operation Display Readout

Mode Selection		Display Readout		Operation Status
		Upper Digit	Lower Digit	
Power Mode	Power Mode III	 HAOH340L		Normal Operation Power Mode III
	Power Mode II	 HAOH350L		Normal Operation Power Mode II
	Power Mode I	 HAOH360L		Normal Operation Power Mode I
Work Mode	Digging		 HAOH370L	Normal Operation Digging Mode
	Trenching		 HAOH380L	Normal Operation Trenching Mode
	Leveling		 HAOH390L	Normal Operation Leveling Mode

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