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Caterpillar

Service Manual

922 Traxcavator

S/n 94A, 88J1,

74J1 & 97A1 & up

Service Manual

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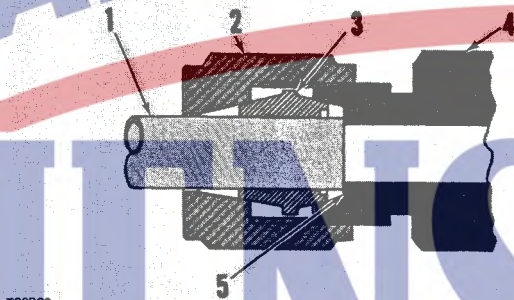
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3. Install the assembled tube onto the tube end of the body, finger-tight. Tighten the nut positioning the body. Then tighten the nut on the tube assembly.

### Assembly of Sleeves onto Tubes

#### Type A

It is necessary to preset this type of sleeve onto the tube before the tube assembly is installed on the fitting body.



Typical example of a sleeve-type fitting. Parts are: 1-Tube, 2-Nut, 3-Sleeve, 4-Presetting tool, 5-Shoulder of tool (4).

1. Lubricate the sleeve and the threads on presetting tool and nut.

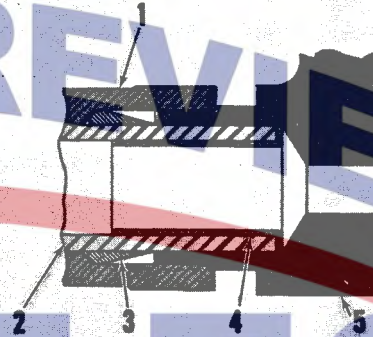
#### NOTE

Presetting tools are commercially available; however, the fitting body can be used in place of a presetting tool. If the fitting body is used, the body should be removed from the machine to permit satisfactory presetting.

2. Place the nut on the tube with the threaded end of the nut toward the end of the tube.
3. Place the sleeve onto the tube so the short-tapered heavy end faces the presetting tool as illustrated.
4. Bottom tube end against shoulder of tool.
5. Assemble the nut to the tool finger-tight. Then tighten the nut until the threads on the tool are no longer visible.
6. Remove the tube from the presetting tool. Check to be certain sleeve does not move longitudinally. (The sleeve can rotate on the tube.)
7. When the tube assembly is assembled onto the fitting body, tighten the nut until the threads on the body are no longer visible. Refer to the topic FITTING BODIES WITH STRAIGHT THREADS AND O-RING SEALS for the installation of the fitting bodies.

#### Type B

1. Place the nut and sleeve onto the tube. Install the sleeve so the thick end faces away from the body.
2. Install the insert into the tube.

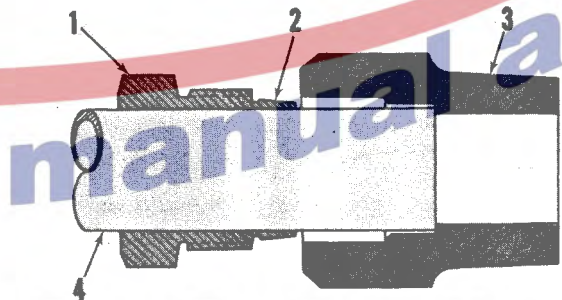


T88383

Typical example of sleeve and insert-type fitting. Parts are: 1-Nut, 2-Tube, 3-Sleeve, 4-Insert, 5-Fitting body.

3. Bottom the tube and insert in the body as illustrated.
4. Tighten the nut 1 1/2 turns past finger-tight.

#### Type C



T88384

Typical example of a shear-type fitting. Parts are: 1-Nut, 2-Sleeve, 3-Fitting body, 4-Tube.

With the nut and sleeve installed loosely in the body, install the tube through the nut and sleeve until the end of the tube is seated against the shoulder in the fitting body.

Grip the tube firmly to prevent twisting or turning and tighten nut until a slight "give" or decreased resistance is felt. The "give" indicates that the sleeve has been sheared from the nut. Tighten the nut an additional 1 1/2 turns. It is not necessary to tighten the nut all the way down.

### Hydraulic Valves

Examine all valves, valve bores and valve seats for nicks, burrs and/or scratches. (Rough spots may be removed with a crocus cloth or fine emery

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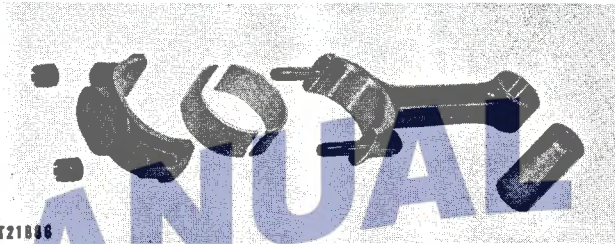
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## ENGINE

### PISTONS, RINGS AND CONNECTING RODS

Parts service connecting rods and rod caps with no cylinder number marks must be stamped or etched to assure correct installation of the rods.



**CONNECTING ROD AND PISTON PIN**

#### Removing and Installing Connecting Rod Bearings

The connecting rod bearings can be removed, inspected and replaced through the inspection opening on the side of the block without removing the rod and piston assembly from the engine.

1. Drain the engine lubricating oil and coolant.
2. Remove all items interfering with the removal of the inspection cover.
3. Remove the inspection cover and rotate the engine crankshaft until the bearing to be removed is accessible.
4. Remove the cotter pins and nuts from the connecting rod bolts and remove the cap and bearing lower half.

#### CAUTION

Be sure the connecting rod bearing halves are reinstalled in their original location if they are not replaced with new bearings.

5. Remove the bearing upper half by turning the crankshaft or pushing the rod up slightly.



**REMOVING CONNECTING ROD BEARING CAP**

6. Inspect the connecting rod bearings. See the covering topic.
7. Before installing the bearing cap be sure the protruding tab on the back of each bearing half lines up with its corresponding recess in the connecting rod and bearing cap. This locks the bearing in place and keeps it from rotating.

#### CAUTION

Wipe the back of bearing halves and the rod bearing bore surface dry before installing the bearing halves to allow the bearing to seat properly and have the correct installed clearance.

Lubricate the bearing surface and install the cap with the identifying cylinder number toward the inspection opening and tighten the cap nuts to the torque value listed in the SPECIFICATIONS.

Tighten the nut additionally to align the nearest cotter pin hole and install **new** cotter pins.

#### Connecting Rod Bearing Inspection

Connecting rod bearings are steel-backed, aluminum-lined. Larger particles of dirt and abrasives in the oil do not tend to embed in aluminum bearings. Such particles roll around between the bearing and crankshaft journal causing scratches in the aluminum bearing without actually becoming embedded in the aluminum. Such scratches are not necessarily harmful and do not indicate that the bearings should be replaced.

If there is any question about the surface of a bearing, wash it with cleaning solvent to remove the oil. If the surface feels rough and abrasive, install a new bearing. Another indication of dirt in the bearing is excessive crankshaft wear.

Undersize connecting rod bearings are available for reground crankshafts. Clearances and tolerances for undersized as well as new connecting rod bearings are listed in the SPECIFICATIONS.

Bent rods should be discarded. Do not attempt to align the connecting rods by bending them.

Connecting rod bearing clearance can be measured by installing the lower bearing half and cap in place with a piece of 5B1161 Lead Wire between the crankshaft and the bearing. The lead wire should extend across the width of the bearing and may be held in place with grease when installing the cap. Tighten the cap bolts to the torque value listed in the SPECIFICATIONS, then remove the cap and measure the thickness of the deformed wire. If the clearance exceeds the permissible value in the SPECIFICATIONS, or if the engine is being recon-

**STARTING ENGINE**

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## STARTING ENGINE SPECIFICATIONS

See the topic SPECIFICATIONS in the GENERAL INSTRUCTIONS

Bore and stroke	2 <sup>3</sup> / <sub>8</sub> in. x 2 <sup>3</sup> / <sub>8</sub> in.
High idle speed	4150 RPM
Low idle speed	2200 RPM

### Camshaft

Journal Diameter	1.498 - 1.499 in.
Bearing bore	1.500 - 1.503 in.
Bearing clearance	.001 - .005 in.
Permissible clearance	.006 in.
End clearance	.001 - .005 in.
Permissible end clearance	.010 in.

### Clutch

Clutch springs:	
Free length	2 11/64 in.
Lbs. force	69 - 81
When compressed to	1 <sup>3</sup> / <sub>4</sub> in.
Adjustment:	
Clearance between spherical head of adjusting screw in release lever and the clutch spring retaining plate	.055 - .065 in.
Clearance between brake back-up plate and rollers	.030 in.
Free travel in linkage assembly	.030 in.

### Connecting Rod

Connecting rod bearing clearance (With lead-tin overlay)	.0009 - .0031 in.
Permissible bearing clearance	.005 in.
Bolt nut torque	180 - 220 lb. in.
Center-to-center distance	3.839 - 3.841 in.
Bore in piston pin bearing	.5409 - .5415 in.

### Crankshaft

Main journal diameter	1.7497 - 1.7503 in.
Permissible main journal wear	.0065 in.
Main bearing clearance	
Front (with lead-tin overlay)	.0005 - .0050 in.
Rear (With lead-tin overlay—clearance to be measured vertically)	.0022 - .0035 in.
Permissible bearing clearance (front)	.007 in.
Permissible bearing clearance (rear)	.008 in.
End clearance	.002 - .013 in.
Permissible end clearance	.019 in.
Main bearing bolt torque (rear)	28 - 30 lb. ft.
Connecting rod journal diameter	1.3747 - 1.3753 in.
Permissible rod journal wear	.0045 in.
Permissible out-of-round	.0025 in.
Gear and sprocket retaining bolt torque	118 - 142 lb. ft.

### Cylinder Bore

Diameter	2.376 - 2.377 in.
Cylinder bore wear limit (out-of-round)	.003 in.
Cylinder bore wear limit (taper)	.005 in.
Cylinder diameter for .020" oversize piston	2.396 - 2.397 in.
Cylinder diameter for .040" oversize piston	2.416 - 2.417 in.

### Cylinder Head

Bolt torque	31 - 39 lb. ft.
-------------	-----------------

### Magneto

Point gap	.015 in.
-----------	----------

### Oil Filter Base

Valve spring:	
Free length	.887 in.
Lbs. force	6.73 - 6.79
When compressed to	.783 in.
Oil pressure, minimum PSI at high idle	40

### Oil Pump

Clearance between gears and end covers (total)		.001 - .003 in.
Shaft diameter		.4919 - .4925 in.
Bearing bore		.4930 - .4936 in.
Bearing clearance		.0005 - .0017 in.
Permissible bearing clearance		.006 in.
Pressure relief spring:		
Free length		.887 in.
Lbs. force		17.5 - 18.5
When compressed to		.611 in.

### Pinion Mechanism

Gear backlash between pinion drive gear and clutch gear (through idler)		.004 - .021 in.
Idler gear bearing diameter (ID)		1.1255 - 1.1275 in.
Bearing clearance		.0225 - .0255 in.
Permissible bearing clearance		.030 in.
Overrunning clutch gear bearing:		
Diameter (ID)		1.9488 - 1.9494 in.
Bearing clearance		.0005 - .0040 in.
Permissible clearance		.006 in.
Plunger spring:		
Free length		1.235 in.
Lbs. force		28.71 - 30.29
When compressed to		.739 in.
Pinion shaft bearing bore (inner)		.8755 - .8775 in.
Bearing clearance		.0015 - .0045 in.
Permissible clearance		.012 in.
Pinion return spring (Conical):		
Free length		2.375 in.
Lbs. force		60 - 70
When compressed to		.560 in.

### Piston Pins

Clearance in rod bearings	.0007 - .0017 in.
Permissible clearance in rod	.0030 in.
Clearance in piston	.0004 - .0012 in.
Permissible clearance	.0025 in.

### Piston Rings

Compression ring gap	.010 - .023 in.
Oil ring gap	.010 - .023 in.
Compression ring side clearance	.0020 - .0035 in.
Oil ring side clearance	.0015 - .0031 in.
Permissible side clearance	.005 in.

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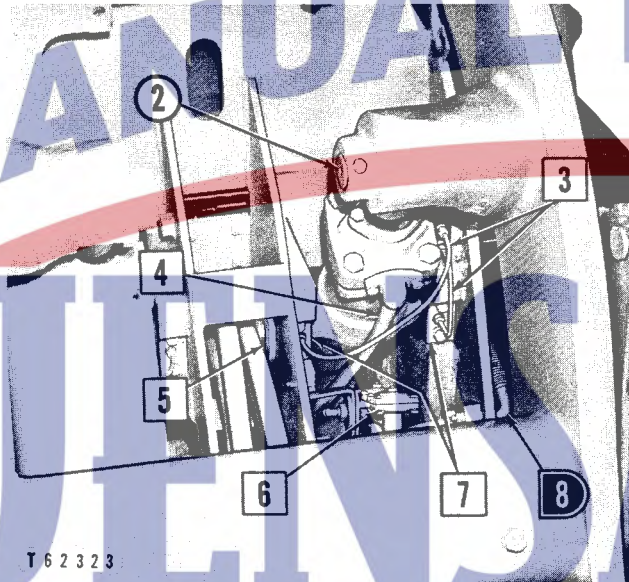
## TRAXCAVATOR PORTION

### HYDRAULIC CYLINDERS — LIFT AND TILT

**WARNING**

Do not attempt to remove the cylinder until the bucket is blocked securely and the hydraulic pressure has been relieved.

2. Remove the bolt which retains the pin (2) and remove the pin (2) by driving the pin toward the outside of the machine.



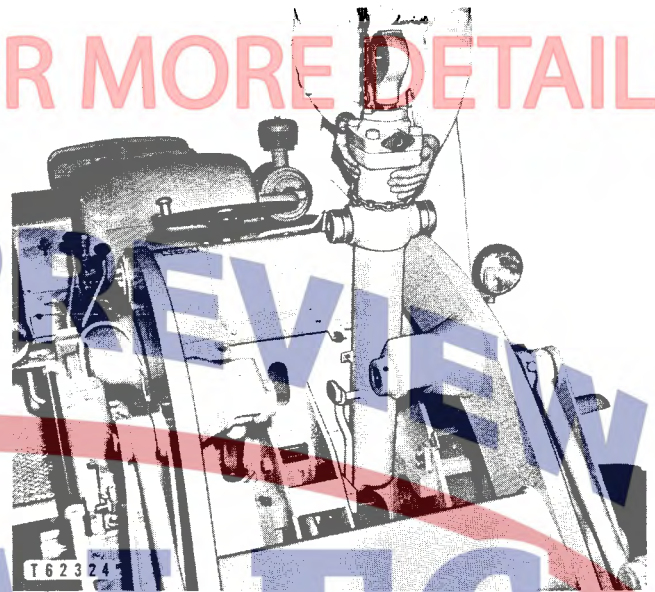
**PREPARING TO REMOVE LIFT CYLINDER**

2-Pin. 3-Tubes. 4-Tube assembly. 5-Retainer. 6-Horn.  
7-Bars. 8-Hose.

**WARNING**

The cylinder will swing to an upright position when the pin (2) is removed. This motion can be restrained with moderate hand force.

3. Retract the rod into the cylinder by placing the hand control lever in the LOWER position.
4. After the rod is fully retracted, move the hand control lever to the HOLD position to prevent the drainage of the hydraulic oil supply tank when the cylinder is disconnected.
5. Disconnect the hose that connects to the tube assembly on the bottom of the cylinder.
6. Cover all openings to keep out foreign particles.
7. Attach a suitable lifting device to the lift cylinder and remove the retainers (5) which serve as pivots for the lift cylinder.
8. Remove the lift cylinder.
9. Install in the reverse order of removal.
10. Install the retainers with the flat side toward the front to allow for installation of the bars (7).



**REMOVING LIFT CYLINDER**

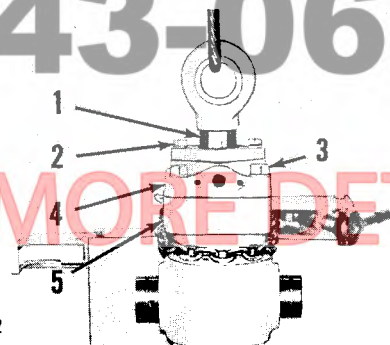
11. See the group HYDRAULIC LINES — LIFT AND TILT for the proper installation procedure for the hydraulic lines.

#### DISASSEMBLY AND ASSEMBLY <sup>®</sup>

The lift and tilt cylinders can be disassembled and assembled in a similar manner. Only the lift cylinder is shown.

Disassemble and assemble the hydraulic cylinder on a clean surface. Clean all metal parts in a non-flammable cleaning fluid.

1. Drain both ends of the cylinder.
2. Loosen bolts (2). Extend rod (1) out of the cylinder to prevent the scoring of the cylinder wall when removing the piston from the cylinder. Remove bolts (3) and free head (4) from cylinder (5). Then remove the rod, piston and head as a unit from the cylinder.



**PREPARING TO REMOVE ROD ASSEMBLY**  
1-Piston rod. 2-Bolts (two). 3-Bolts (four). 4-Head.  
5-Cylinder.

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