CAT® Lift Trucks

Service Manual

Chassis & Mast

EC15N, EC18N
A4EC1-10200-up
A4EC1-20200-up

EC20N, EC25N
A4EC2-10200-up
A4EC2-20200-up

EC25EN, EC25LN, EC30N
A4EC3-20200-up
A4EC3-30200-up
A4EC3-40200-up

99759-6K110

Suggestions for Disassembly

1. Remove the bevel pinion shaft 6 as follows:
   (1) Using a chisel, cut the staked portion of the nut 4, taking care not to damage the bevel pinion shaft.
   (2) Hold the input gear 15 with the special tool to prevent the bevel pinion 6 from rotating, then remove the nut 4 and shims 5.

   Special tool needed

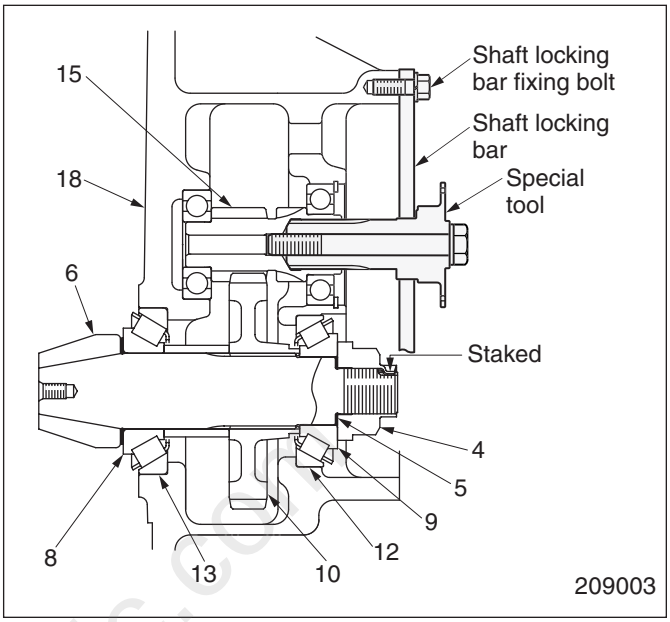
Transfer bearing tool	97E67-00100

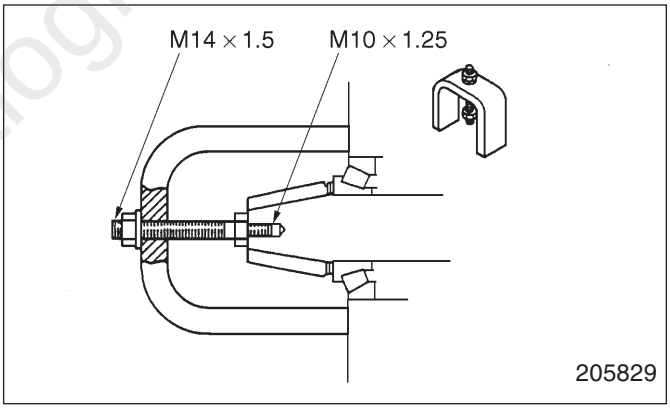
   (3) Using the bevel pinion puller (special tool), pull the bevel pinion 6 out of the bearing cone 9 (See the drawing on the right).

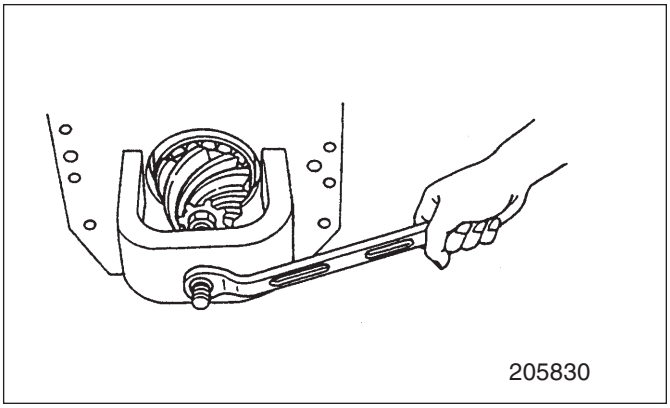
   Special tool needed

Bevel pinion puller	91268-00300

   (4) If the bearing cone 8 needs to be removed, use a bearing puller and a press to pull it from the bevel pinion 6.
   (5) If the bearing cups 12 and 13 need to be removed, use a bearing cup puller to pull them out of the transfer case 18.







NOTE

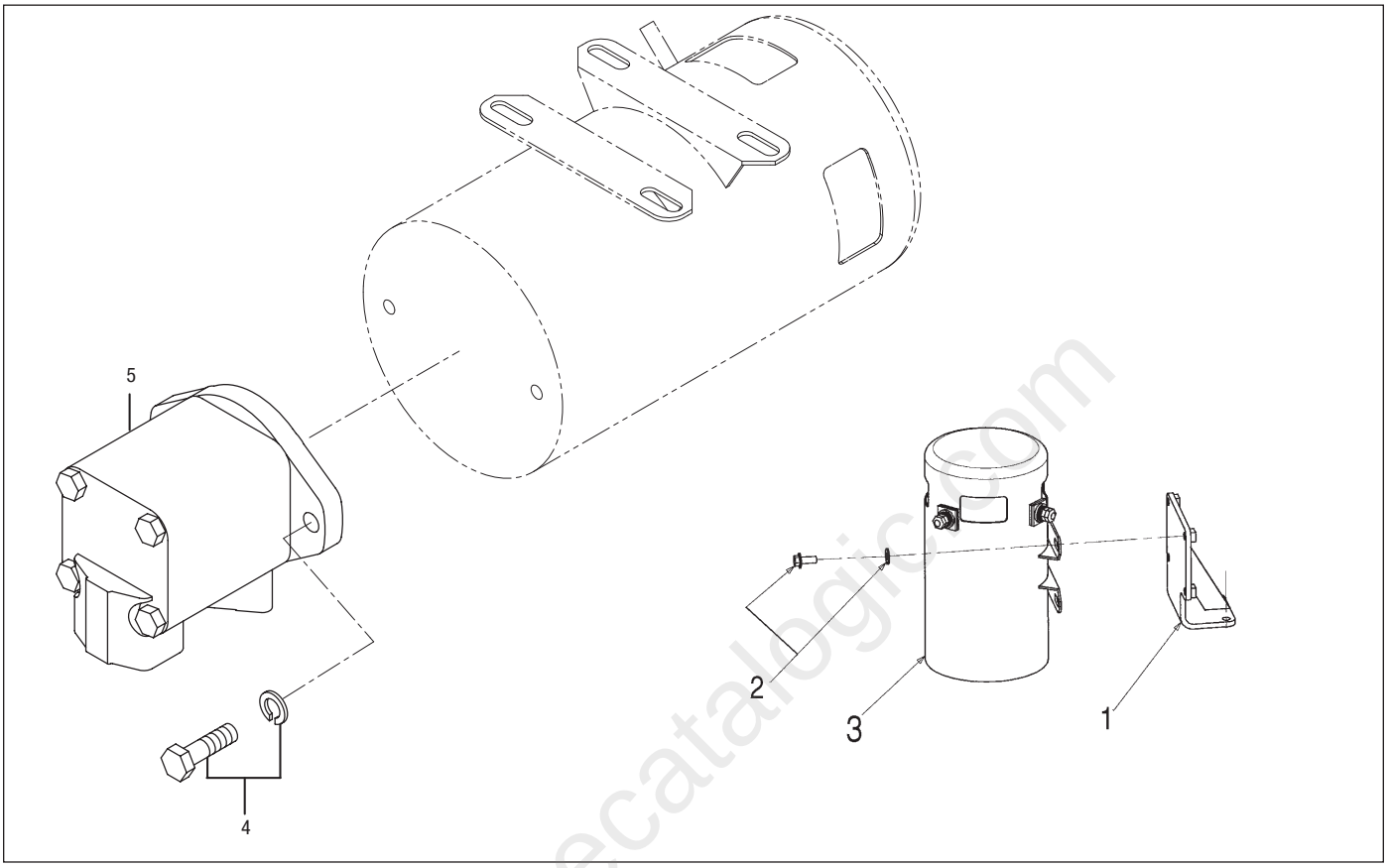
(1) The taper roller bearing cup and cone are an exclusive pair. If either the cup or cone of a pair is faulty, replace them as a set.

(2) The removed shims should be kept together until they are reinstalled. (This only applies when the bevel pinion and/or taper roller bearing are/is reused.)

(3) The bevel pinion and bevel gear are an exclusive pair. If either of them is defective, replace them as a set.

Steer Pump

Removal



Sequence

1. Motor mounting bracket
2. Motor mounting hardware
3. Motor
4. Pump mounting hardware
5. Pump

Start By:

1. Remove the battery.
2. Remove the acid tray.
3. Disconnect the cables and wires from the steer pump motor. Mark the wire leads and cables so they can be correctly reconnected.
4. Disconnect the hydraulic lines from the pump.

Steering System

Complaint	Possible Cause		Remedy
Slow steering, hard steering or loss of steering	Worn or malfunctioning pump		Replace
	Malfunctioning relief valve		Readjust or replace
	Worn or malfunctioning steer gear		Replace
	Pipe or tube flattened, or restriction in an oil line		Clean or replace
Truck wanders	Air in system	Low level of oil	Fill as required
		Leaking joint	Tighten joint
		Pinched pipe or hose	Straighten or replace
	Worn steer gear		Replace
Steering slip	Worn steer gear		Replace
	Leakage of cylinder seals or at lines between steer gear and cylinder		Repair
Temporary hang-up in steering	Thermal shock—caused by actuation of hydraulic lift and tilt for long periods of time without actuation of steering system, creating more than a 28°C (50° F) temperature differential between the oil in the tank and the oil in the steer gear.		Correct operating procedure
Erratic steering	Air in system	Low level of oil	Fill as required
		Leaking joint	Tighten joint
		Pinched pipe or hose	Straighten or replace
	Thermal shock damage to steer gear		Replace
	Motor not operating at correct speed		Repair/replace
Spongy or soft steering	Air in system	Low level of oil	Fill as required
		Leaking joint	Tighten joint
		Pinched pipe or hose	Straighten or replace
		Air trapped in cylinder	Bleed air

Inspection after Disassembly

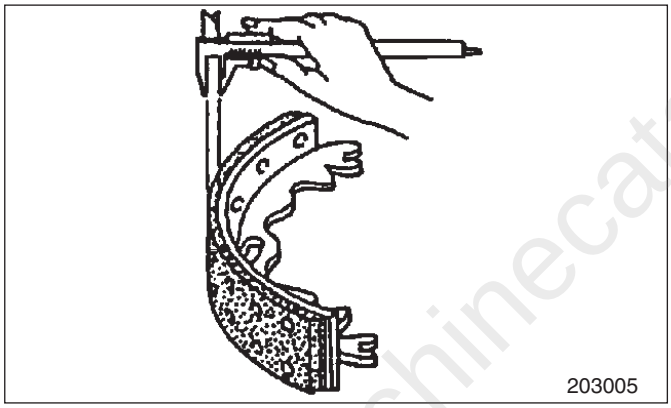
Backing Plate

1. Check the backing plate for cracks.
2. Tighten the backing plate mounting bolts to the specified torque.

Tightening torque for backing plate mounting bolts	16 kgf•m (116 lbf•ft) [157 N•m]

Shoes and Linings

1. Check each shoe and lining for cracks.
2. Replace the lining if it is dirty, greasy, burnt, or glazed.
3. Check the thickness of the lining. Replace the lining if it exceeds the service limit.



		EC15N–EC18N	EC20N–EC30N
Lining thickness	A	4.87 (0.19)	6 (0.24)
	B	2.5 (0.10) maximum	3 (0.12) maximum

Unit: mm (in.)
A = Assembly standard B = Repair or service limit

Brake Drums

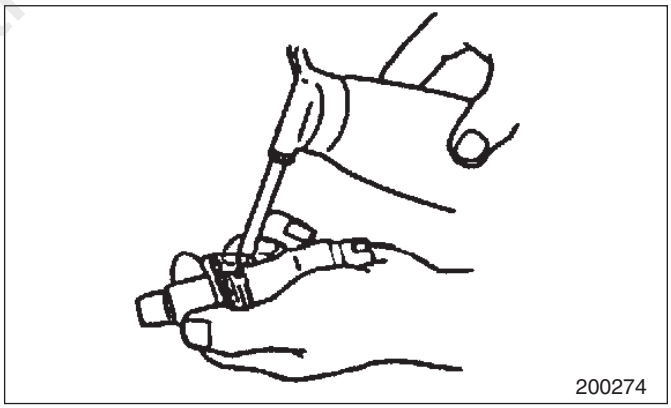
Check the inside (friction) surface of the drum for abnormal wear, grooving, and other defects. Minor grooving can be removed by grinding, provided that the service limit on the inside diameter is not exceeded.

		EC15N–EC18N	EC20N–EC30N
Inside diameter of brake drum	A	$254 + {}^{0.13}_{0}$ $(10.0 + {}^{0.0051}_{0})$	$310 + {}^{0.15}_{0}$ $(12.2 + {}^{0.0059}_{0})$
	B	256 (10.08)	312 (12.28)

Unit: mm (in.)
A = Assembly standard B = Repair or service limit

Adjusting Screws

Check the wheel teeth for wear. Turn the screw by hand to ensure its rotating parts turn freely.



Parking Brake Cable

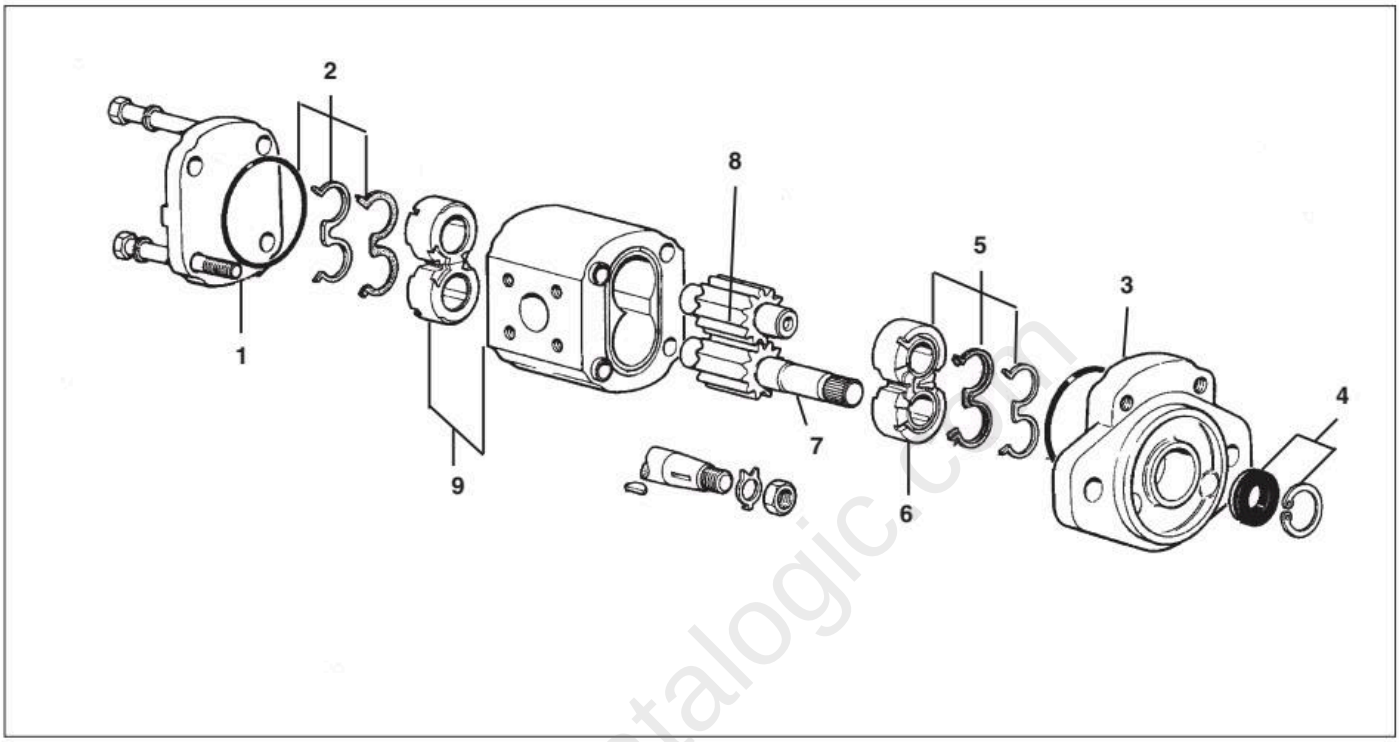
Replace a cable if it is permanently stretched, rusted, or damaged.

Other:

1. Check the return springs for cracks or fatigue.
2. Check the adjusting springs for cracks or fatigue.
3. Check the fitting cables for stretching.

Reassembly

Trucks with Standard Hydraulic Pump



Sequence

1. End cover
2. O-ring, bush seal, and back-up seal
3. Flange
4. Shaft seal and retainer ring
5. O-ring, bush seal, and back-up seal
6. Front bushes
7. Drive shaft
8. Gear pack
9. Body and rear bushes

Start By:

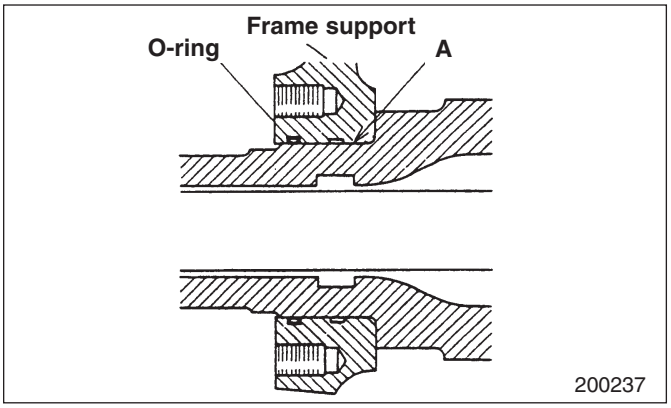
Ensure that all parts are perfectly clean. Lubricate the bushes and gears with clean hydraulic fluid. Ensure that the O-ring recess and end faces of the body remain dry. This will assist the assembly of the components with the body bores.

Reassembly

To reassemble, reverse the steps of the disassembly sequence and do the following steps.

Axle Housing

1. Install the O-ring in the outer groove (of the two grooves in the bore of each frame support).
2. Apply grease to the surfaces A of the support and axle housing.

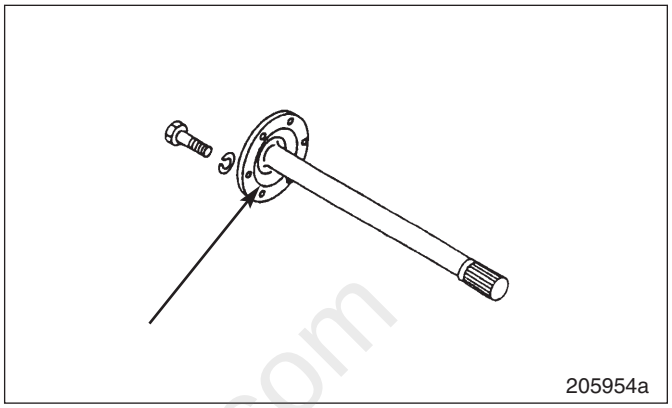


Check for excessive movement between frame support and axle housing.

Front Wheel Hub

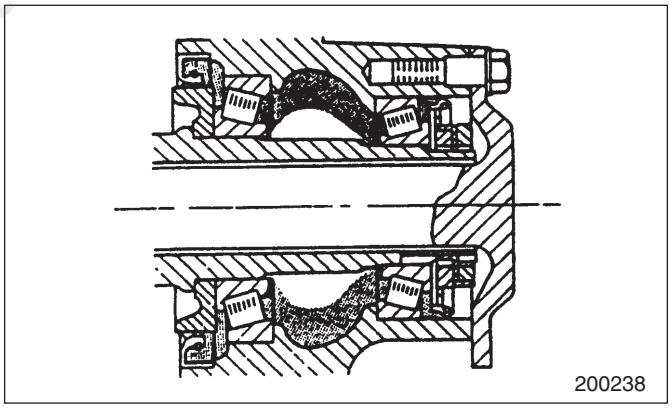
1. Fill the front wheel hub, especially the roller holder and oil seal lip groove, with grease.

   Pack both bearings with grease.

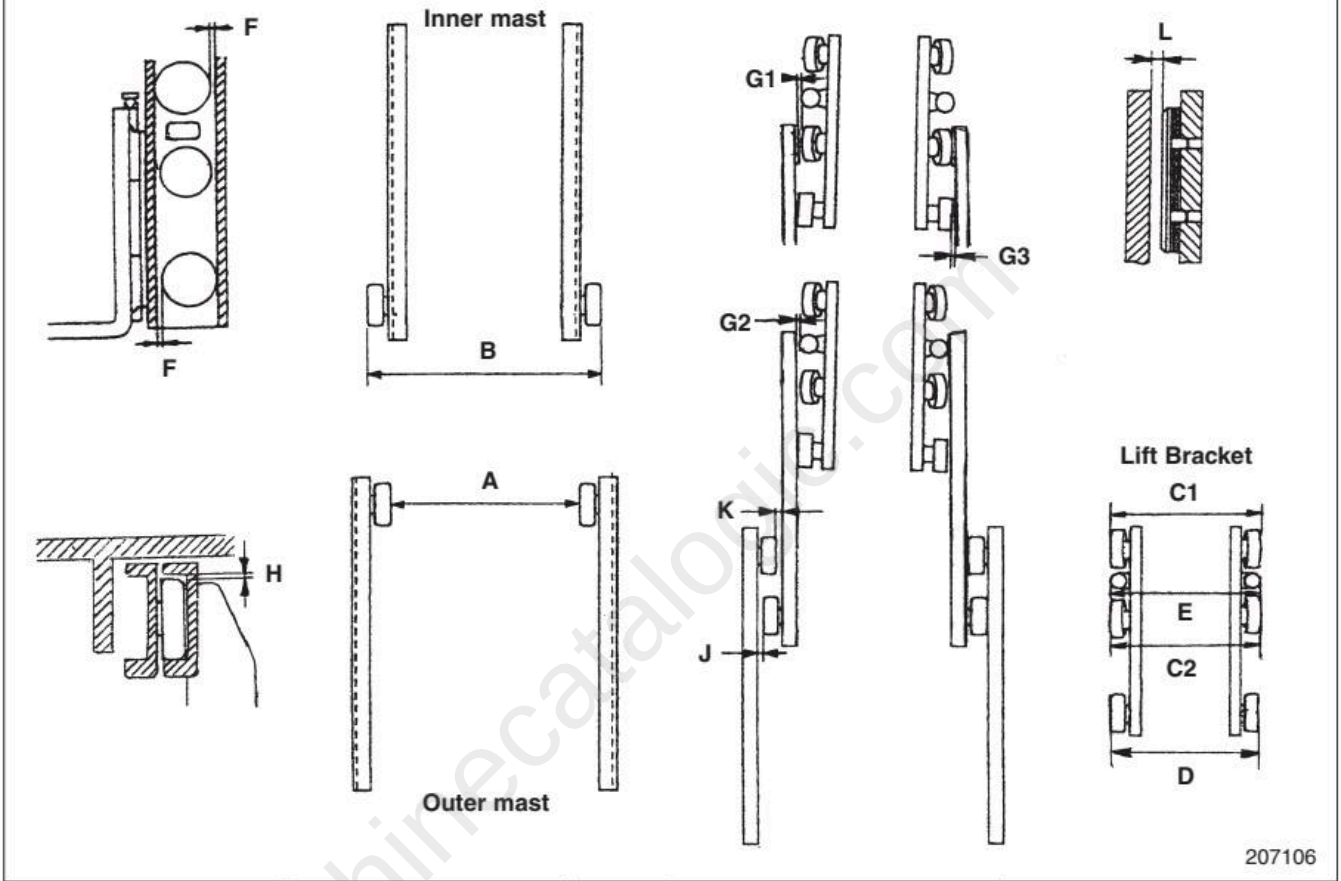


NOTE

Be careful not to apply grease to the brake drum.



Mast and Forks

Item		Truck Model	EC15N	EC18N	EC20N EC25LN	EC30N
Mast and Lift Bracket/Later Version						
Tightening torque, kgf•m (lbf•ft) [N•m]	Mast support bolts	A	7.5 (54) [74]		18.2 (132) [178]	
	Chain wheel support bolts	A	9.9 (72) [97]			
Distortion of finger bar		A	5 (0.2)			

A = Assembly Standard B = Repair or service limit
Unit: mm (in.)

10. Always use tools that are in good condition and be sure you understand how to use them before performing any service work.
11. Reinstall all fasteners with same part number. Do not use a lesser quality fastener if replacements are necessary.
12. If possible, make all repairs with the truck parked on a level, hard surface. Block truck so it does not roll while working on or under truck.
13. Disconnect battery and discharge any capacitors (electric trucks) before starting to work on truck. Hang "Do not Operate" tag in the Operator's Compartment.
14. Repairs, which require welding, should be performed only with the benefit of the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures. Determine type of metal being welded and select correct welding procedure and electrodes, rods or wire to provide a weld metal strength equivalent at least to that of parent metal.
15. Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged nor will it be damaged in operation by contacting sharp corners, or by rubbing against some object or hot surface. Place wiring away from oil pipe.
16. Be sure all protective devices including guards and shields are properly installed and functioning correctly before starting a repair. If a guard or shield must be removed to perform the repair work, use extra caution.
17. Always support the mast and carriage to keep carriage or attachments raised when maintenance or repair work is performed, which requires the mast in the raised position.
18. Loose or damaged fuel, lubricant and hydraulic lines, tubes and hoses can cause fires. Do not bend or strike high pressure lines or install ones which have been bent or damaged. Inspect lines, tubes and hoses carefully. Do not check for leaks with your hands. Pin hole (very small) leaks can result in a high velocity oil stream that will be invisible close to the hose. This oil can penetrate the skin and cause personal injury. Use cardboard or paper to locate pin hole leaks.
19. Tighten connections to the correct torque. Make sure that all heat shields, clamps and guards are installed correctly to avoid excessive heat, vibration or rubbing against other parts during operation. Shields that protect against oil spray onto hot exhaust components in event of a line, tube or seal failure, must be installed correctly.
20. Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.
21. Do not operate a truck if any rotating part is damaged or contacts any other part during operation. Any high speed rotating component that has been damaged or altered should be checked for balance before reusing.
22. When handling the parts containing asbestos, be careful not to inhale the asbestos. Doing so is hazardous to your health.

    If the shop dust may contain asbestos, follow the precautions described below.

    a. Do not use compressed air for cleaning.
    b. Do not brush or apply grinder on asbestos containing materials.
    c. To clean asbestos containing materials, wipe with moistened cloth or use a vacuum cleaner with particle filter.
    d. If you have to handle the parts containing asbestos for a long time, be sure to do it in a well-ventilated area.
    e. If the asbestos in the air cannot be removed, wear a mask.
    f. Be sure to observe the working rules and regulations.
    g. When disposing of materials with asbestos, be sure to observe the environmental protection regulations of your area.
    h. Avoid working in the atmosphere where asbestos particles may be suspended.

Full Version Available

Caterpillar EC25LN Forklift Service Manual (99759-6K110)

Caterpillar EC25LN forklift service manual, covers hydraulics, drive unit, mast, wiring, and electric systems. Searchable PDF download.