CAT® Lift Trucks

Service Manual

Chassis & Mast

E3000, E3500, EC4000

A4EC1-10200-up
A4EC1-20200-up
A4EC1-30200-up

E4000, E5000

A4EC2-10200-up
A4EC2-20200-up

EX5000, E5500, E6000

A4EC3-20200-up
A4EC3-30200-up
A4EC3-40200-up

E6500

A4EC4-10200-up

99759-8B110

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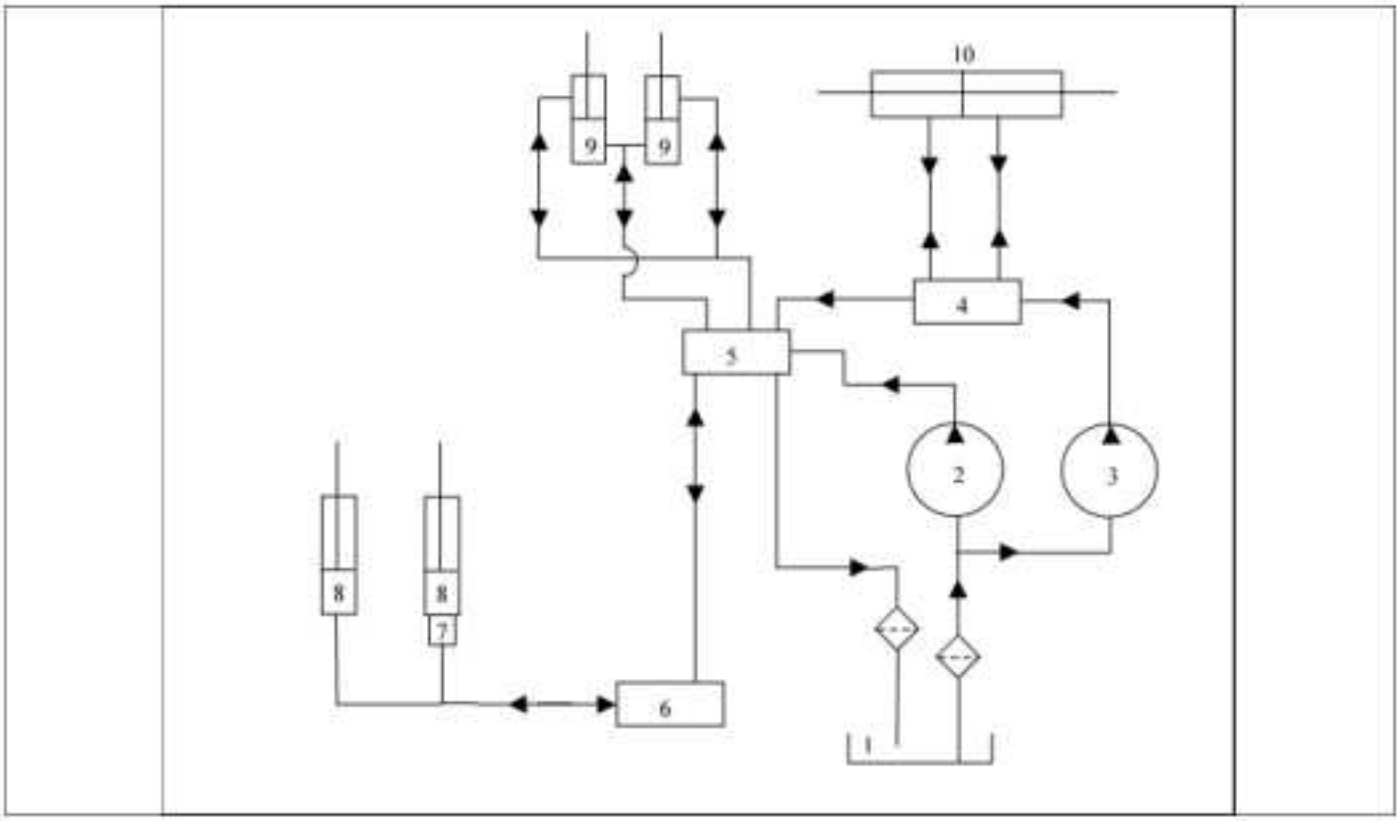
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Hydraulic System

Description

Schematic for Trucks



1. Hydraulic tank
2. Hydraulic lift pump
3. Steer pump
4. Steer gear
5. Main control valve
6. Flow regulator valve
7. Down safety valve
8. Lift cylinder
9. Tilt cylinder
10. Steering cylinder

General Information

The hydraulic pump draws oil from the oil tank and delivers it to the main control valve, which dispenses it for lift and tilt functions.

The steer gear and steer pump are covered in the STEERING SYSTEM section and the steering cylinder is covered in the REAR AXLE section.

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Troubleshooting

Front Axle and Reduction Differential

Complaint	Possible Cause	Remedy
Gear noise comes out continuously during normal cruising run	Teeth worn excessively or tooth contact out of adjustment in spiral bevel drive	Readjust or replace
	Bearing preloads too much or too little, or bearings are worn excessively	Readjust or replace
	Hub bearings broken	Replace
	Improper tooth contact between reduction pinion (on output shaft) and reduction gear	Readjust
Irregular noise comes out during normal travel	Bearings associated with spiral bevel drive or hub bearings broken	Replace
	Differential side gears have broken teeth, or thrust washers worn	Replace gears or washer
	Metal piece in axle housing	Clean and replace oil
	Bolts securing axle shaft or differential carrier are loose	Retighten
Abnormal noise comes out when turning a corner	Fit differential gears in differential case are out of specification due to wear	Replace worn parts
	Broken teeth on differential pinions or side gears, or pinions seized on spiders	Replace defective parts
Differential overheats	Bearings broken due to too large a preload	Replace bearing and readjust preload
	Backlash between reduction pinion (on output shaft) and reduction gear too small	Replace bearings and readjust preload and backlash

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Hydraulic System

	Item		Truck Model	E3000	E3500	EC4000	E4000	E5000	EX5000	E5500	E6000 - E6500
Simplex Mast	48 volt lift speed (rated load) mm/sec (fpm)		A	.34 (67)	.32 (64)	.47 (93)	.40 (78)	.38 (74)			.32 (64)
	Lowering speed (rated load) mm/sec (fpm)		A	.58 (115)		.57 (113)	.59 (116)				.52 (102)
	Forward tilt angle		A	5°							
	Backward tilt angle		A	6°							
	Lift cylinder drift (rated load) mm (in.) / 15 min. [Oil temperature 45°C (113°F)]		A	50 (2.0) max						40 (1.6)	
	Tilt cylinder drift (forward) rated load mm(in.) / 15 min. [Oil temperature 45°C (113°F)]		A	22 (0.9)				20 (0.8)		15 (0.6)	
Main relief valve setting, kgf•cm^2, (psi) [kPa]			A	197±kgf/cm^2 (2630 ± 50 psi) [19650 ± 34 kPa]							
Power steering relief valve setting kgf•cm2, (psi) [kPa]			A	51 (725)[5000]			81.5 (1160) [8000]				
Hydraulic Pump	Output, liter (cu. in.) / min	Standard	A	55.2(3360) 2400 rpm		60(3913) 2400 rpm	69.6 (4549) 2400 rpm			60(3913)2400rpm	
		Premium	A	60(3913)2400rpm		DNA				69.6 (4539) 2400 rpm	
	Tightening torque for oil pump bolts kgf•m (lbf•ft) [N•m]		A	4.7 to 5.2 (34 to 38) [46 to 51]							
Control Valve	Tightening torque kgf•m (lbf•ft) [N•m]	Tie bolts (1/2 in.)	A	1.9 (14) [19]							
		Tie bolts (9/16 in.)	A	4.5 (33) [45]							

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

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Basic Hydraulic Switch Adjustments

Install switch on Lift spool per Photo 1. Adjust and torque bolts on switches to 7 ± 1 in-lbs [0.79 N·m ± 0.11 N·m] (0.08 kgf·m ± 0.01 kgf·m).

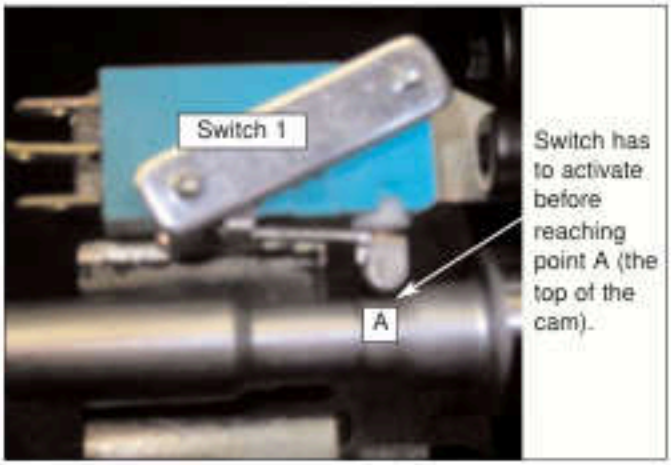


Photo 1

Install switch 2 on Lift spool per Photo 2 centered on identification groove. Adjust and torque bolts on the switches to 7 ± 1 in-lbs [0.79 N·m ± 0.11 N·m] (0.08 kgf·m ± 0.01 kgf·m).

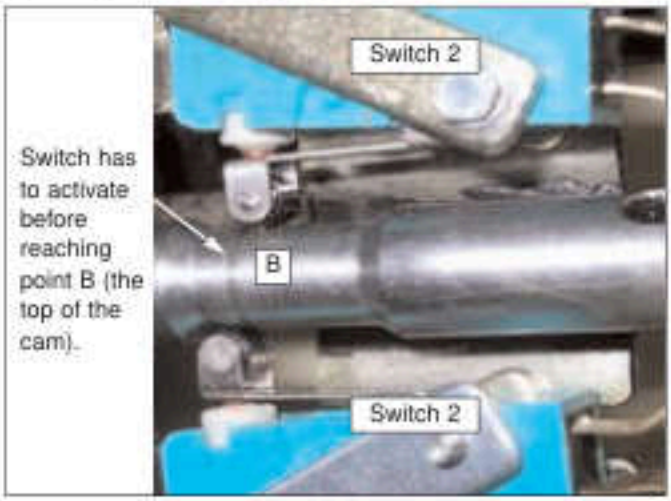


Photo 2

Install switch on Tilt spool or Auxiliary spool per Photo 3 centered on spool lobe. Adjust and torque bolts on switches to 7 ± 1 in-lbs [0.79 N·m ± 0.11 N·m] (0.08 kgf·m ± 0.01 kgf·m).

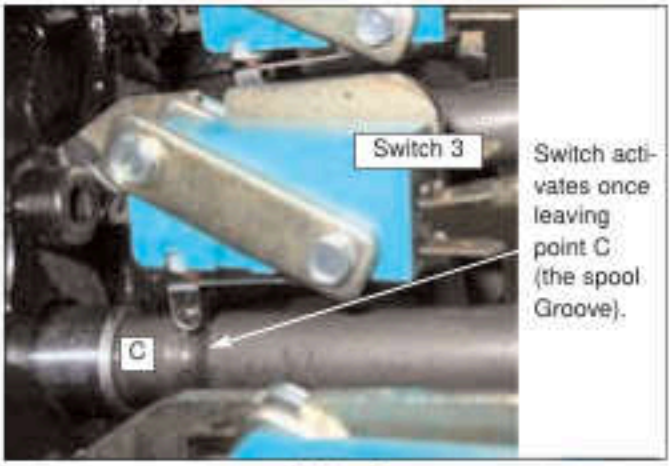
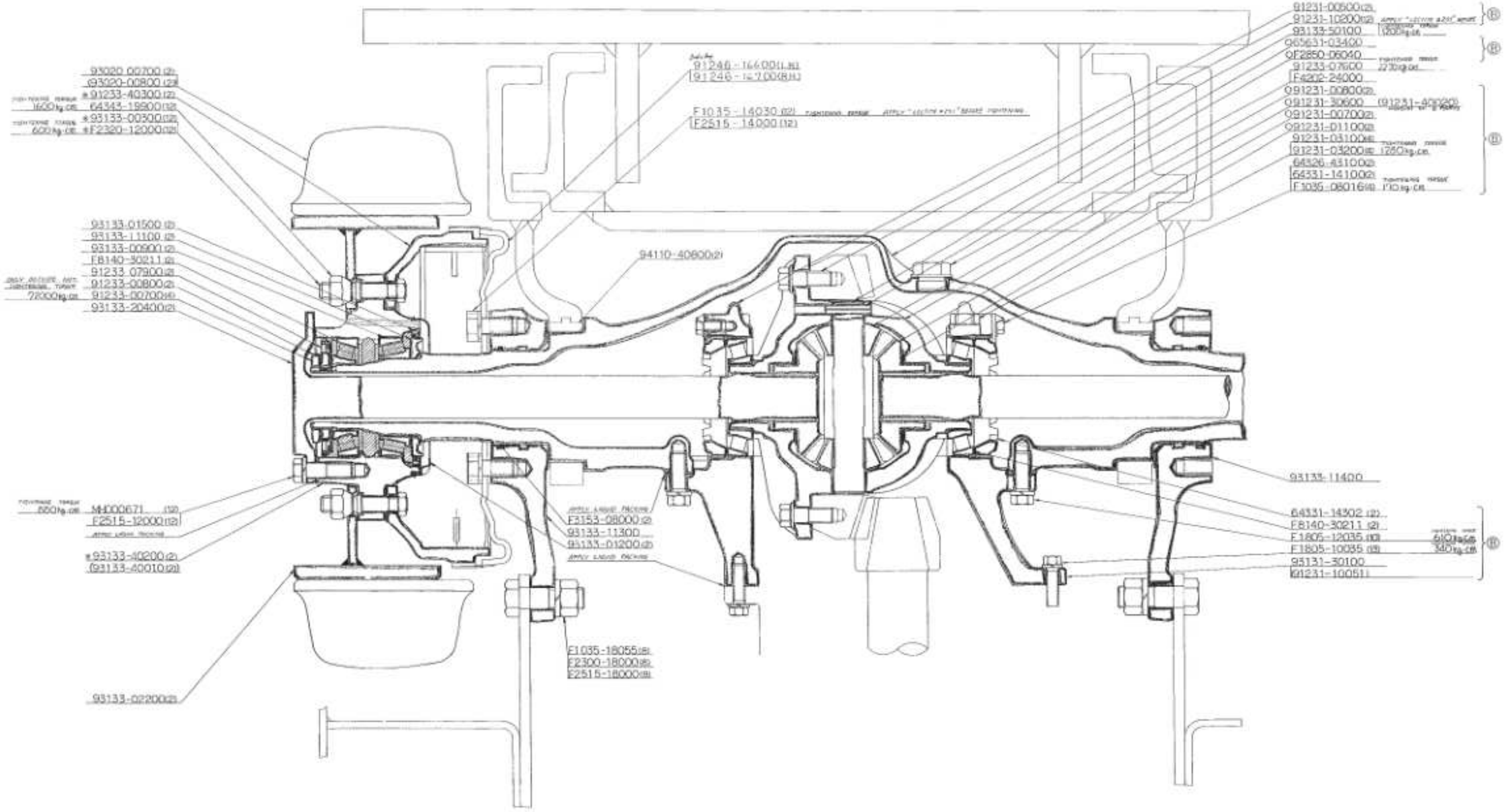


Photo 3

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FRONT AXLE ASSEMBLY



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