CAT® Lift Trucks

Service Manual

Chassis & Mast

FC/MC

EP13PNT	ETB21-00011-01999 / ETB21-02001-49999
EP15PNT	ETB21-50011-51999 / ETB21-52001-99999
EP16CPNT	ETB22-00011-01999 / ETB22-02001-49999
EP18CPNT	ETB22-50011-51999 / ETB22-52001-99999
EP16PNT	ETB23-00011-01999 / ETB23-02001-49999
EP18PNT	ETB23-50011-51999 / ETB23-52001-99999
EP20PNT	ETB24-00011-01999 / ETB24-02001-99999

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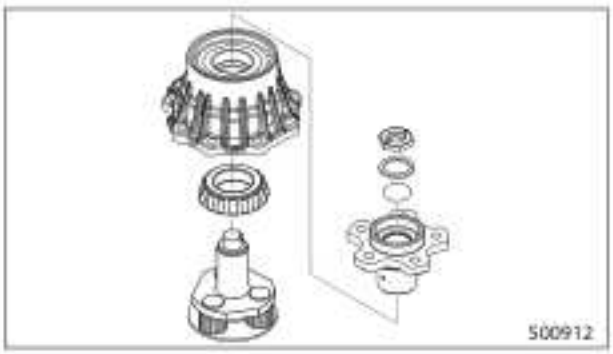
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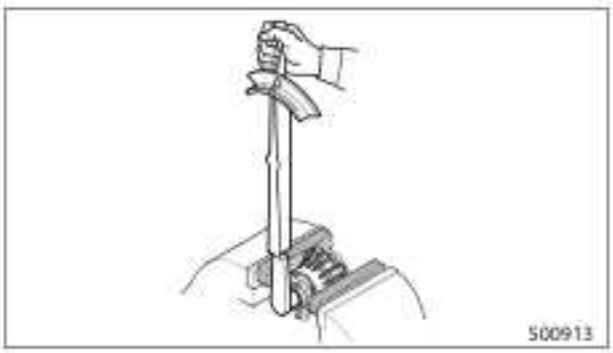
(5) Output carrier, cover and wheel hub assemblies, assembling

- Install the wheel hub assembly and tapered roller bearing.
- Install the cover assembly to the output carrier assembly.
- Install the O-ring and washer to the output carrier and secure it with look nut by hand.



(6) Adjusting preload
Make sure that the wheel hub assembly have a 1 to 2 mm play in axial direction after tightening the locknut by hand.

- Check for dragging by moving each part.
- Tighten the locknut from the above loosened condition to the hub rotary torque plus 1.0 to 3.0 N·m {0.1 to 0.3 kgf·m} [0.74 to 2.21 lbf·ft]
- Install the lock plate and secure it with bolts. Install the hub cap.



Hub rotary torque
Hub rotary torque when the locknut is loosened plus 1.0 to 3.0 N·m {0.1 to 0.3 kgf·m} [0.74 to 2.21 lbf·ft]

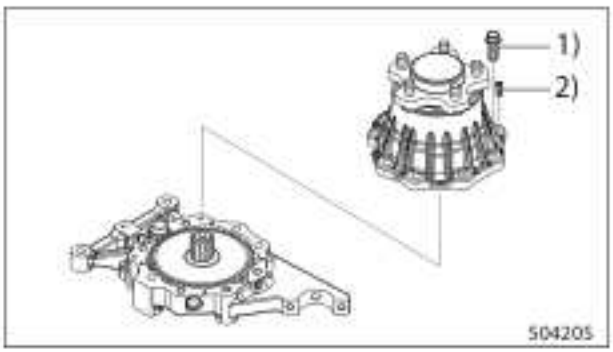
- Install the lock plate to the locknut and tighten with bolt.
  Install the hub cap to the wheel hub.

(7) Overall assembly

- Apply liquid packing to the contact area between the main case and the cover.
- Install the cover assembly to the case assembly.
- Secure the assembly to the main case with the bolts. Tighten the bolts to the specified torque.

Note:

- Fit together by moving the sun gear and the planetary gear.
- Insert a bar into the bolt hole as a guide for easy assembling.



Ref.	Item	Tightening torque
1)	Bolt	200.3 ± 20.0 N·m {20.42 ± 2.04 kgf·m} [147.73 ± 14.75 lbf·ft]
2)	Bolt	13.7 ± 1.4 N·m {1.40 ± 0.14 kgf·m} [10.10 ± 1.03 lbf·ft]

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1.2 FC model

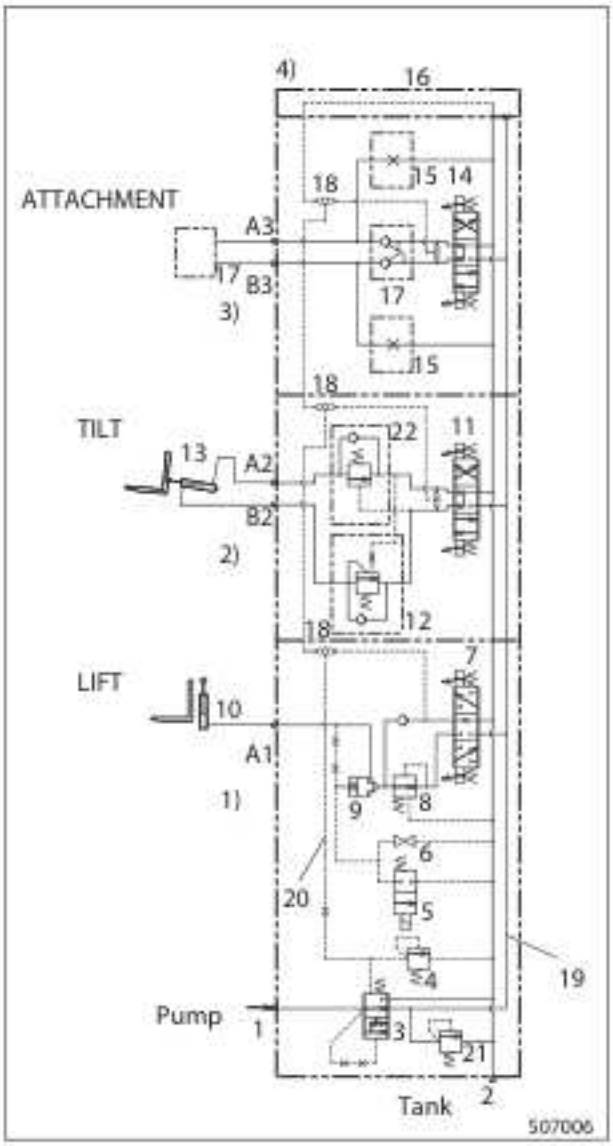
Item			Specification
Hydraulic system	Gear pump	Type	Gear pump
		Model type	TMG1-18
		Rated discharge volume	18.9 cc/rev. (1.15 cu.in./rev.)
		Drive system	Direct connection with pump motor
	Control valve	Main relief pressure	18.6 ± 0.2 MPa (189.67 ± 2.04 kgf/cm^2) [2697.7 ±29.0 psi]
	Simplex Mast (Dual-stage Panoramic Mast) lift cylinder	Inside diameter	45 mm (1.77 in.)
		Stroke	1645 mm (64.76 in.)
	Simplex Mast (Dual-stage Panoramic Mast) tilt cylinder	Inside diameter	60 mm (2.36 in.)
		Stroke	2000/2560, 4480/5000 : 70 mm (2.76 in.) 2760 - 4090 : 88 mm (3.46 in.) 5500/6000 : 59 mm (2.32 in.)
	Duplex Mast (Dual-stage Full Free Panoramic Mast) first lift cylinder	Inside diameter	45 mm (1.77 in.)
		Stroke	850 mm (33.46 in.)
	Duplex Mast (Dual-stage Full Free Panoramic Mast) second lift cylinder	Inside diameter	45 mm (1.77 in.)
		Stroke	1595 mm (62.80 in.)
	Duplex Mast (Dual-stage Full Free Panoramic Mast) tilt cylinder	Inside diameter	60 mm (2.36 in.)
		Stroke	77 mm (3.03 in.)
	Triplex Mast (Triple-stage Panoramic Mast) first lift cylinder	Inside diameter	45 mm (1.77 in.)
		Stroke	875 mm (34.45 in.)
	Triplex Mast (Triple-stage Panoramic Mast) second lift cylinder	Inside diameter	45 mm (1.77 in.)
		Stroke	1180 mm (46.46 in.)
	Triplex Mast (Triple-stage Panoramic Mast) tilt cylinder	Inside diameter	60 mm (2.36 in.)
		Stroke	3710 - 4750 : 77 mm (3.03 in.) 5090 - 7000 : 59 mm (2.32 in.)
	Operating oil volume	Low level	12.1 L (3.20 U.S. gal)
		High level	13.3 L (3.51 U.S. gal)

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22.2 FC Hydraulic System Circuit

Overview of Hydraulic System with Circuit Diagram

For the construction of each valve, refer to the operational description of the relevant valve.



Note: Hydraulic circuit for lift and valve (3-10)
Hydraulic circuit for tilt and valve (11-13)
Hydraulic circuit for attachment and valve (14-18)

1. From hydraulic pump
2. To hydraulic tank
3. Bleed-off valve (BO valve)
4. Relief valve (Pilot valve)
5. Lift lock solenoid valve
6. Shut-off valve
7. Lift spool
8. Flow control valve
9. Lift lock valve
10. Lift cylinder
11. Tilt spool
12. Tilt lock valve (counterbalance valve for forward)
13. Tilt cylinder
14. Attachment spool
15. Port for relief valve
16. Port relief valve (OP)
17. Double pilot check valve
18. Shuttle valve
19. Supply oil gallery to the circuit
20. Load pressure (Load sensing)
21. Surge cut valve
22. Tilt lock valve (Counterbalance valve for backward)
1) Inlet section
2) Tilt section
3) Attachment section
4) End plate

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