CAT® Lift Trucks

Service Manual

Chassis, Mast & Options

DP70E T20C-70001-up

For use with the S6S Engine Service Manual. 99709-81100

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GENERAL INFORMATION

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6.6.6 Troubleshooting Guide for Solenoid Control Valves

Trouble symptoms	Possible causes	Remedies
The pump discharge pressure will not build up	1. Unload solenoid not working	Remedies
	2. Sticky plunger in proportioning solenoid of reducing valve, or sticky shuttle in reducing valve	Remedies
	3. Open in lead wire or in solenoid coil	Repair or replace.
	4. Input current to solenoid too small	Check to make sure that solenoid is drawing specified maximum input current.
	5. Unload valve stuck open	• Check unload solenoid for action. • Check unload valve for action.
	6. Spool stuck in flow-divider valve	Disassemble and clean by washing.
Sticky spool	Sticky plunger in proportioning solenoid of reducing valve, or sticky shuttle in reducing valve.	Disassemble and clean by washing. If plunger is sticky, replace solenoid.

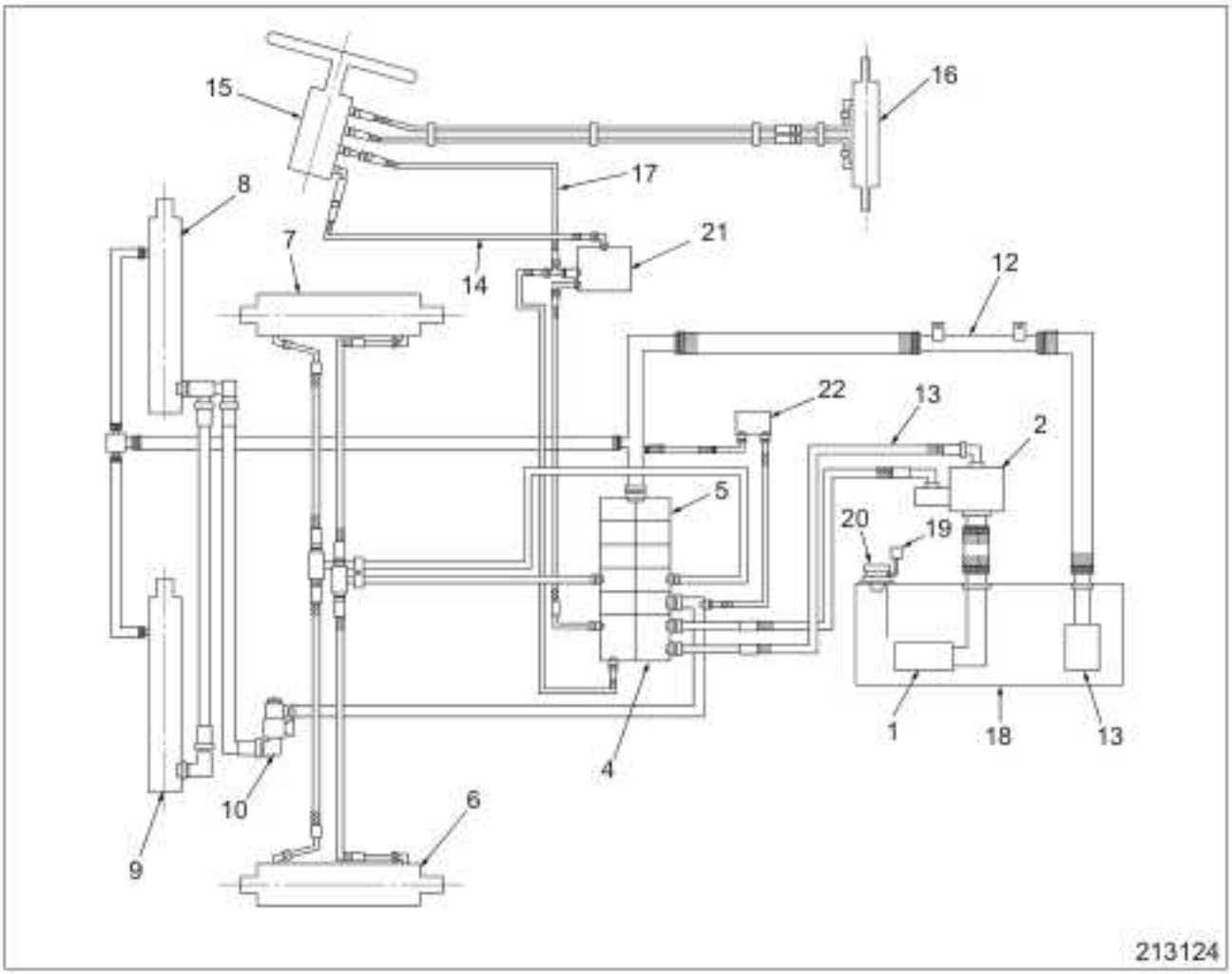
6.6.7 Troubleshooting Guide for Solenoid Control Valves

	Components	Trouble	Condition	LED ON-OFF pattern	Threshold	Action	System check lamp
1	-	-	Normal	A	-	No action	OFF
2	Control levers (1) Lift lever (2) Tilt lever (3) Attachment 1 lever (4) Attachment 2 lever	Not in neutral	Control levers are not in their neutral positions when power supply is turned on.	D	128 10 (A/D value)	Turn off corresponding solenoid's outputs.	Flash
		Open circuit	Input level is higher than lever maximum position level.	B	245 to 255 (A/D value)	Turn off corresponding solenoid's outputs.	ON
		Short circuit	Input level is lower than lever minimum position level.	B	0 to 10 (A/D value)	Turn off corresponding solenoid's outputs.	ON
3	Solenoids (1) Lift (2) Tilt (3) Attachment 1 (4) Attachment 2	Open circuit	Abnormal if current is 0 when solenoid output is ON	C	120 mA or lower	Turn off abnormal solenoid's output.	ON
		Short circuit	Abnormal if solenoid output current level is higher than threshold level.	C	2.4 A or higher	Turn off abnormal solenoid's output.	ON
		Leakage	Abnormal current is detected during emergency operation.	C	140 mA or higher	Turn off all solenoids' outputs	ON
4	Seat switch	Open circuit	Check I/O levels. Abnormal if signal stays OFF.	E	OFF for 15 seconds or longer	Turn off all solenoids' outputs	Flash
5	CPU	Abnormality	(CPU does not run.) (WDT causes CPU reset.)	F	-	Turn off all solenoids' outputs	Irregular
6	Battery voltage	Voltage drop, overvoltage	Voltage is out of specification	C	Lower than 10 V; higher than 32 V	Turn off all solenoids' outputs	ON
7	Setting switch	Check mode	Setting of SW 2 (DIP switch)	G	S1 ON	Start check mode operation (solenoid operation)	(OFF)

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2. Structure and Functions

2.1 Hydraulic Line



1 Suction strainer	9 Lift cylinder (L.H.)	17 Oil return line from steering valve
2 Hydraulic pump	10 Flow regulator valve	18 Hydraulic tank
3 Pump delivery hose	11 End cover section	19 Breather
4 Inlet valve	12 Return line	20 Cap
5 Hydraulic control valve	13 Return filter	21 Relief valve
6 Tilt cylinder (L.H.)	14 Oil feed line to steering valve	22 Lift return valve
7 Tilt cylinder (R.H.)	15 Steering valve	
8 Lift cylinder (R.H.)	16 Steering cylinder	

The hydraulic system of this truck includes the mast control circuit and the full-hydraulic steering system circuit.

The oil drawn by the hydraulic pump 2 from the hydraulic tank 18 flows into the control valve inlet valve 4 through the pump delivery hose 3.

The flow priority valve in the control valve inlet valve 4 preferentially distributes the oil to the steering valve 15 through the oil feed line 14. The priority valve distributes the remainder of the oil to the mast control circuit. In the standard configuration, the following three valve sections are used for the mast control purposes:

(1) Lift control valve section
(2) Tilt control valve section
(3) Attachment control valve section

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(4) Removing tilt cylinder

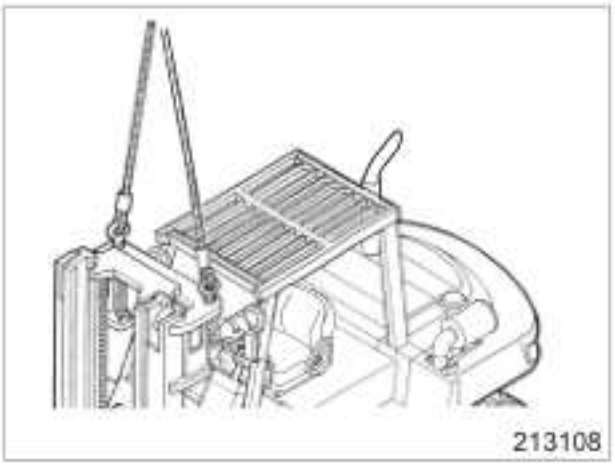
(a) Hitch a sling to the upper cross-member at the top of the mast, then lift with a hoist.

WARNING

For this operation be sure to use a hoist having enough capacity to support the mast assembly.

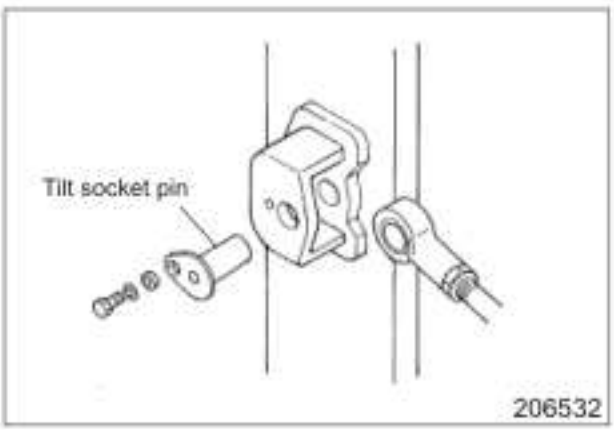
Weight of Each Component (Simplex Mast, raised height: 3 m)

Truck model	DP70E
Outer mast	600 kg
Inner mast	405 kg
Lift bracket (including backrest)	465 kg
Forks (two) Standard fork	300 kg
Lift cylinders, etc.	150 kg
Total	1920 kg



(b) Remove the tilt pin and separate the tilt cylinder from the mast.

(c) Start the engine and pull back the tilt lever to retract the tilt cylinder rods.

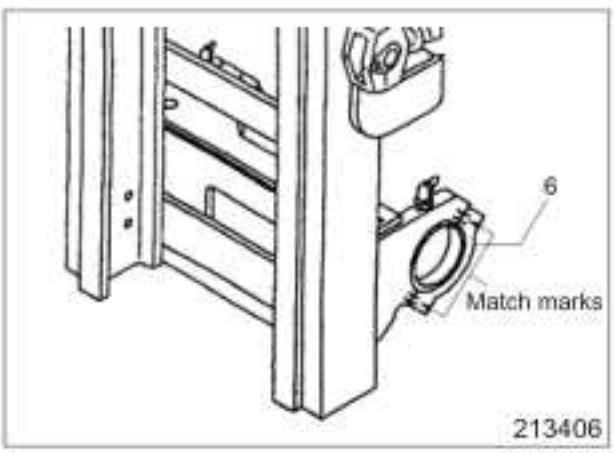


(5) Removing the lift cylinder high-pressure hose: Lower the mast to the bottom, then disconnect the hose from the flow regulator valve.

(6) Removing mast support bearing caps

(a) Put alignment marks on the caps.

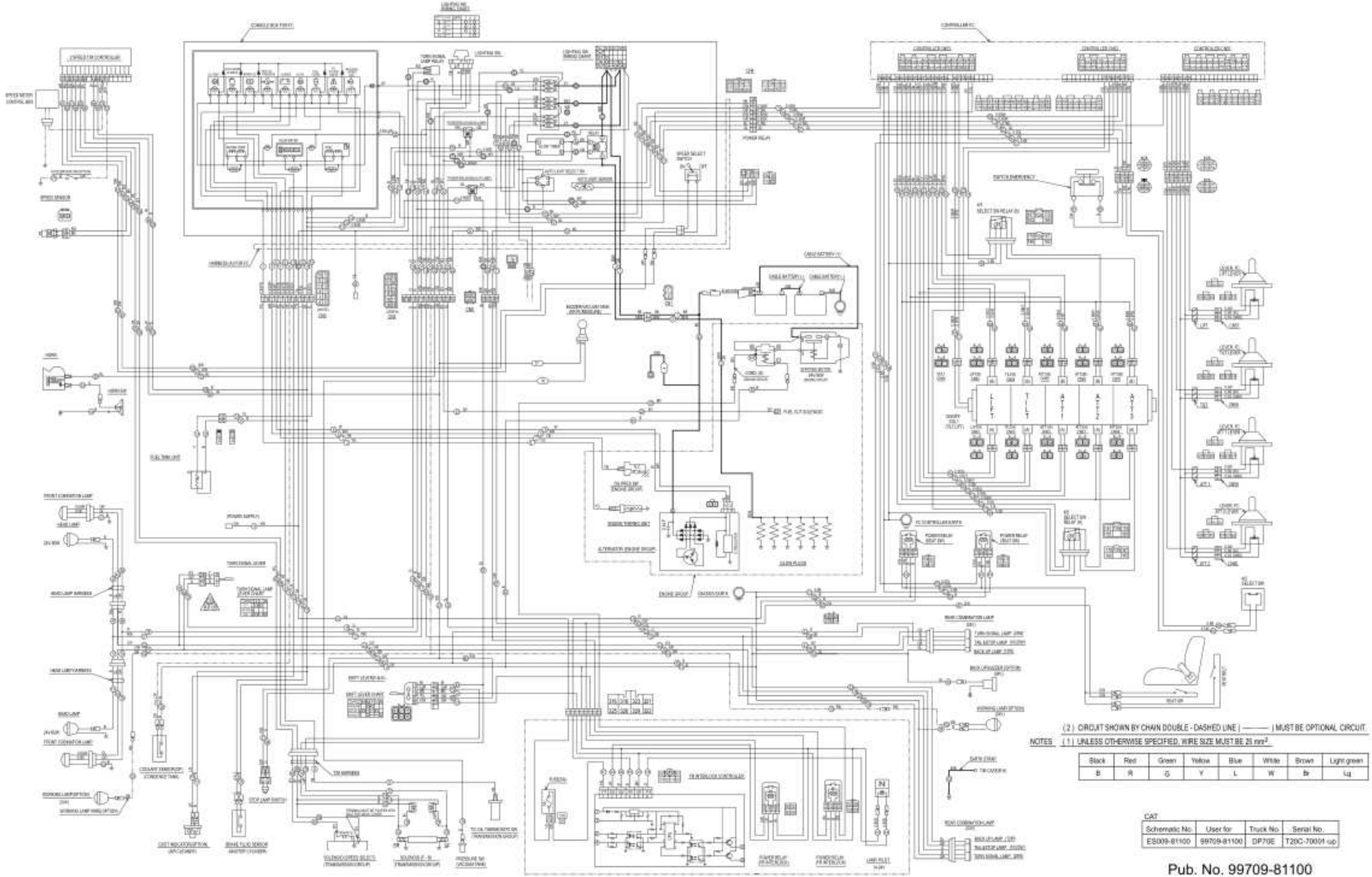
(b) Remove the cap mounting bolts and separate the whole mast assembly while lifting it up from the truck. Lay it down flat with the tilt bracket side facing upward on a level ground.



NOTE

In order to avoid any obstructions during disassembly, lay the removed mast assembly in an area with sufficient space. This will allow the mast to slide in both directions (top and bottom) without interference.

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(2) CIRCUIT SHOWN BY CHAIN DOUBLE - DASHED LINE | ——— | MUST BE OPTIONAL CIRCUIT.

NOTES (1) UNLESS OTHERWISE SPECIFIED, WIRE SIZE MUST BE 25 mm²

Black	Red	Green	Yellow	Blue	White	Brown	Light green
B	R	G	Y	L	W	Br	Lg

CAT

Schematic No.	User for	Truck No.	Serial No.
ES009-81100	99709-81100	DP70E	T20C-70001-up

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