Service Manual

AC Power Pallet

22.07.2005

Revision Level:3

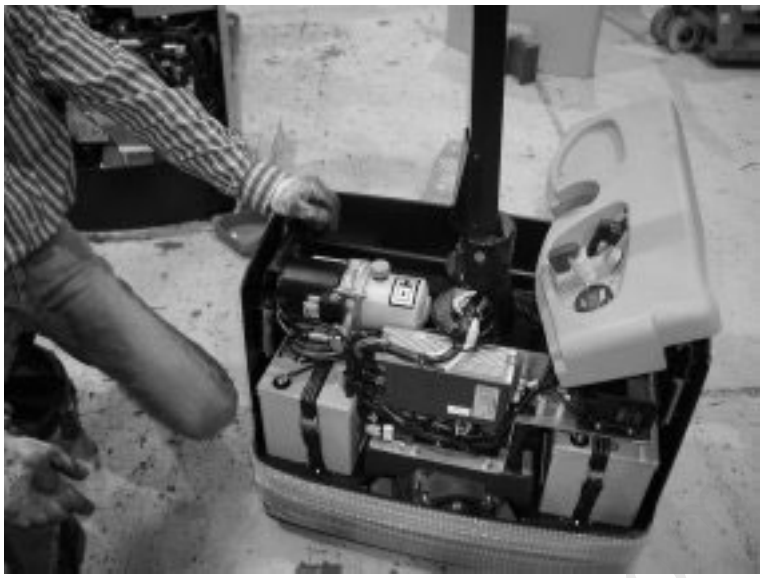

Figure 3.10. Hydraulic tank location (1,300 kg capacity truck model)

On 1,600 kg and 2,000 kg capacity truck models, the tank is installed vertically, and it should be filled to three-quarters (¾) of the capacity when measured from the bottom of the tank to the bottom edge of the filling tube.

the truck is stationary, as the electrical brake should be engaged. The sequence of pins 3 and 4 depends on the direction of travel. They could, for example, indicate the following sequence: first pin 3, then both pin 3 and pin 4, then only pin 4, then neither, then pin 3 again, and so forth.

4.3.2.14. Parameter 50: Connector X5 (diagnostic)

This parameter displays the active pins of connector X5. The possible displayed pins are 3, 4 and 6. Pin 3 indicates that the tiller arm is in the driving position. Pin 4 indicates that the status LED is illuminated. Pin 6 indicates that the tiller arm is either in the upright or in the bottom position.

When the truck is powered on and no faults have occurred, the status LED should be constantly illuminated, that is, pin 4 should be constantly displayed. If a fault has occurred, both the status LED and pin 4 flash in a pulse sequence that indicates the fault type. In other words, the error code can be counted from the sequence.

Move the tiller arm between the upright and bottom positions to check that the tiller switch works correctly. When the tiller arm is in the upright or bottom position, pin 6 should be displayed and the truck should not respond to driving commands, unless the brake release button is pressed.

4.3.2.15. Parameter 51: Connector X6 (diagnostic)

This parameter displays the active pins of connector X6. The possible displayed pins are 2, 3, 4, 5 and 12 (C=12). Pin 2 indicates that the digital input for the forward driving direction is active. Pin 3 indicates that the digital input for the backward direction is active. Pin 4 indicates that the digital input of the safety switch is active. Pin 5 indicates that the digital input of the brake release button is active. Pin 12 indicates that the optional digital input is active.

When the truck is driven, pin 2 or 3 is displayed to indicate the driving direction. Pin 4 is normally displayed and disappears when the safety switch is pressed. Pin 5 appears when the brake release button is pressed to enable traction even when the tiller arm is in the upright or bottom position. Pin 12 (C) is displayed constantly, as it is an optional pin that has been hardwired to the 24-volt supply.

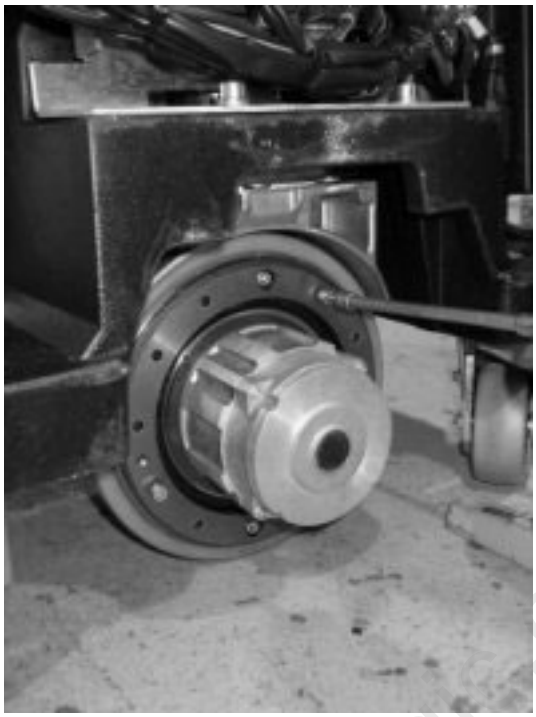

Figure 6.2. Removing the drive wheel fixing screws on 1,300 and 1,600 kg capacity trucks

6. Lift the truck from under the chassis using a suitable jack so that the drive wheel is lifted off the supporting surface.

7. Remove the old drive wheel.

8. Attach the new drive wheel.

9. Replace all truck covers and test the operation of the drive unit.

6.1.2. Replacing the load wheels

The load wheels are located near the ends of the forks. Their main purpose is to support the weight of the load. Depending on the truck model, there is either a single or a double load wheel in each fork.

To replace single load wheels:

1. Loosen the locking pin from the axle using a 5 mm pin punch. The locking pin is located on the outside end of the axle.

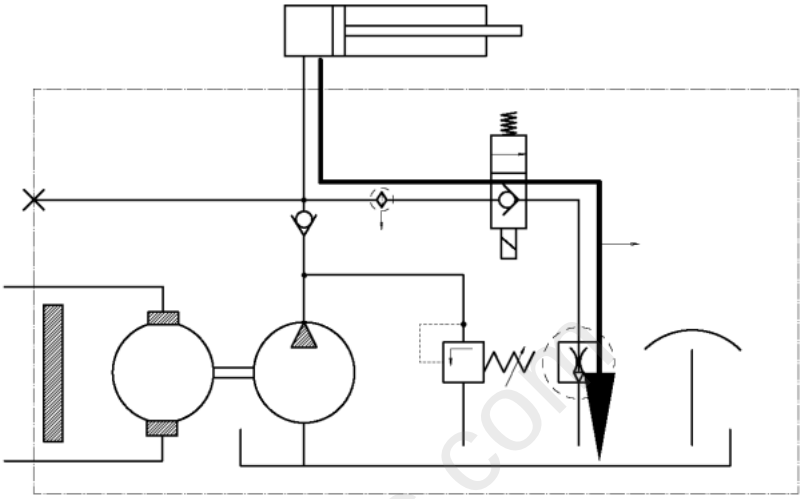

Figure 5.3. Hydraulic fluid flow during lowering

Various truck models can have different configurations of the hydraulic system.

5.2. Hydraulic maintenance and repairs

The following sections illustrate various hydraulic maintenance procedures not covered in *Chapter 3 Regular maintenance*.

5.2.1. Replacing gaskets

NOTE When the gasket of the hydraulic cylinder needs to be replaced, the wiper and guide strips are also replaced.

To replace gaskets:

1. Pull out the piston rod from the cylinder.
2. Remove the wiper from the cylinder using suitable pliers.
3. Pull the old gasket carefully out of the cylinder.

The status LED indicates the possible fault with a distinct repeating flashing sequence. For example, four flashes and a pause indicates a low battery. The error indication may also be due to incorrect operation. Switch off the truck's power and turn it back on with the tiller arm in the upright position and without giving the truck any commands through its controls while it starts up. If the status LED continues to flash, power down the truck and contact local maintenance staff.

2.3.1.4. Display unit (4)

The display unit shows the accumulated operating time of the truck in hours. It also displays the battery charge level. If an internal fault has occurred, the display unit also shows the error code.

2.3.2. Tiller arm head controls

The tiller arm head assembly contains the controls used for driving the truck and controlling the forks.

Figure 2.2. Tiller arm controls

2.3.2.1. Safety button (1)

The safety button is located at the far end of the tiller arm. Its purpose is to prevent the operator from being crushed between the truck and an object. The safety button is functional when the

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software version: 85_10449

	Pin number	Status shown in BPK	Pin description
Connector X1	1		Key Input
	2		-
	3		-
	4		-
Connector X2	1		+24V
	2		+24V
	3	x	Option input 1
	4	x	Option output 1
	5		0V (B-)
	6	x	Option input 2
Connector X3	1		+24V
	2		+24V
	3		Horn
	4		Lower
	5		Lift
	6	x	Safety Socket
	7	x	Lift limit
	8		0V (B-)
	9		0V (B-)
	10/A	x	Lift enabled
Connector X4	1		+24V
	2		Temp sensor
	3	x	Encoder A
	4	x	Encoder B
	5	x	Brake control
	6		Temp sensor
Connector X5	1		+24V
	2		+24V
	3	x	Tiller NO
	4	x	LED
	5		0V (B-)
	6	x	Tiller NC
Connector X6	1		+24V
	2	x	FWD
	3	x	BWD
	4	x	Belly
	5	x	Brake release
	6		0-5V
	7		0V (B-)
	8		Lift
	9		Lower
	10/A		Horn
	11/B		+10V
	12/C	x	speed reduction / platform present

Error code (nr.of pulses)	Error description
2	*New Software version* *Runtime monitoring*
3	*Overcurrent* *Runtime monitoring*
4	*Low Voltage Battery* *Runtime monitoring*
5	*Over Voltage Battery* *Runtime monitoring*
6	*Over Temperature Motor* *Runtime monitoring*
7	*Over Temperature Inverter* *Runtime monitoring*
8	*Drive Switch Monitoring* *Input active in start-up*
9	*Sensor Bearing Monitoring* *Runtime monitoring*
10	*Belly Switch* *Input active in start-up*
11	*Tiller Switch* *Input active in start-up*
12	*Set Value Monitoring* *In start-up*
13	*error in platform switch (at power-on)*
14	*EEPROM Fault* *Runtime monitoring*
15	*Internal Parameter fault* *Runtime monitoring*
16	*Internal Parameter fault* *Runtime monitoring*
17	*Tiller Switch* *Runtime monitoring*
18	*Option speed reduction* *Input active in start-up*
19	*Brake release* *Input active in start-up*
20	*Safety Socket* *Input active in start-up*
22	*multiple error (at power-on)* *(tiller, safety socket, platform, forward…)*

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List of succeeding displayable parameters:

text	**parameter number**
software version	0
serial number	7
operating hours	9
actual speed	10
speed set value	11
temp. inverter	17
operating state	25
value speed pot.	30
temp. inverter	32
battery voltage	33
connector X1	46
connector X2	47
connector X3	48
connector X4	49
connector X5	50
connector X6	51

Description of the parameters:

Serial number: Explicit number identifying each individual unit
Operating hours: Actual counted time in which the motor has been operated.
Actual speed: The actual measured speed of the controlled motor.
Speed set value: The actual speed demand of the controlled motor.
Operating state: 0= Fault, 1= Ready, 2= Power stage active (current in motor)
Speed potentiom.: Displays the analog voltage on input pin X6.6 in the range of 0..1023. This input is the speed reference coming from the tiller head.
Battery voltage: Displayed in % of the nominal voltage (e.g. 24V, 48V or 80V)

State display for connectors X1 - X6:

Example 1:

Connector X1

connector X1 **2**

This display shows that the pin 2 on connector X1 is active, meaning that the internal transistor connects pin 2 to battery minus.

Pin 1: Key Switch (Battery voltage)
Pin 2: Digital output 2
Pin 3: Analogue output minus
Pin 4: Analogue output

Example 2:

Connector X3

connector X3 **67 A**

This display shows that the inputs pin 6, pin 7 and pin 10 (A=10) are activated.

Pin 1: Protected key switch voltag
Pin 2: Protected key switch voltag
Pin 3: Supply voltage for the horn
Pin 4: Supply voltage for the lowering valve
Pin 5: Supply voltage for the contactor that switches on the pump-motor
Pin 6: Input safety socket

Full Version Available

Caterpillar NPP20MR Pallet Truck Service, Operator and Schematic Manual (WHSM0001)

Caterpillar NPP20MR Pallet Truck service manual, covers hydraulics, drive unit, wiring, and schematics. Searchable PDF download.