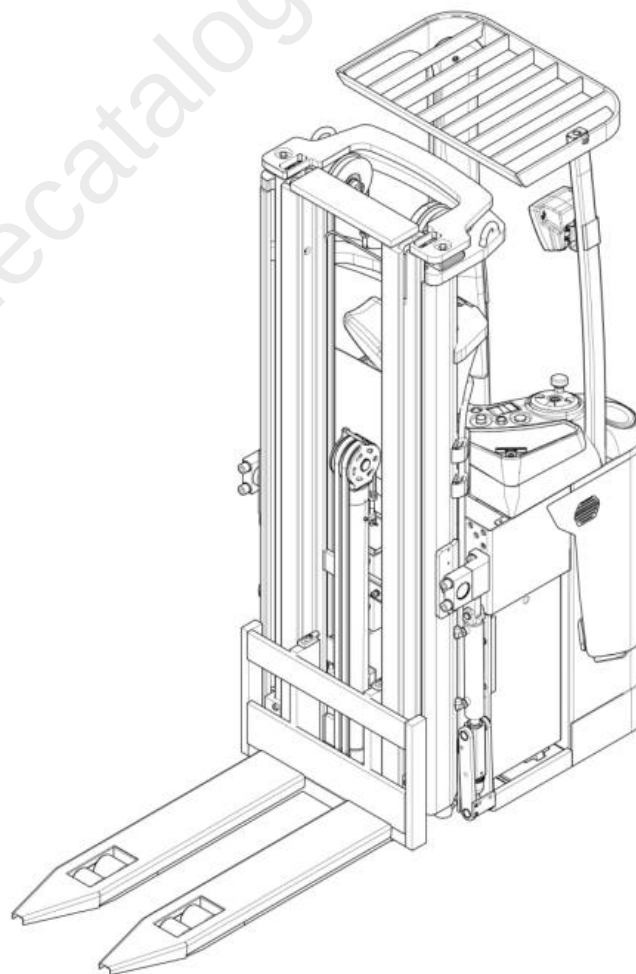


SERVICE MANUAL

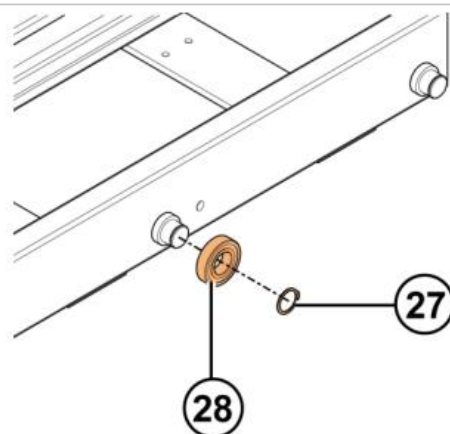
NSR

12N/16N/16NI/20N

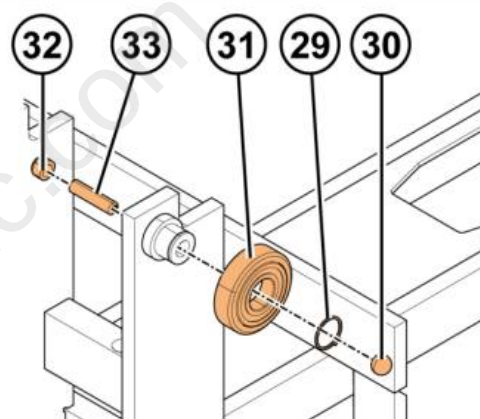


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27. Remove the circlip from the main rollers of the internal mast.
28. Remove the main rollers.

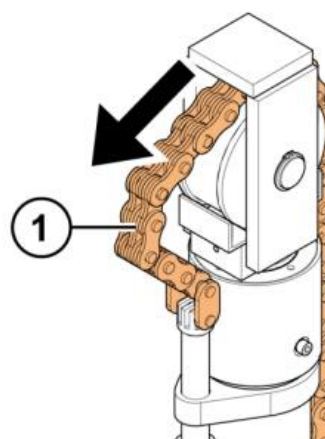


29. Remove the circlips from the lifting carriage's main rollers.
30. Remove the ball bearings from the main rollers.
31. Remove the main rollers from the lifting carriage.
32. Remove the nuts of the main rollers.
33. Remove the screws of the main rollers.



5.10.5.4 Duplex mast with free lift

1. Slide the chains off the chain wheels.



8.4.10.1 Adjusting the air gap of the magnetic brake

During maintenance, check the air gap of the magnetic brake. Measure the air gap at the adjustment screws with a clearance gauge. The air gap must be 0.3 – 0.4 mm at all the adjustment screws, i.e. throughout the magnetic brake.



Figure 114. Adjusting the air gap of the magnetic brake

8.4.10.2 Coil resistance measurement

Use a multimeter to measure the brake coil resistance. The coil resistance has to be measured between the brake wires. The value should be $\sim 15 \Omega$.

8.5 Pump motor

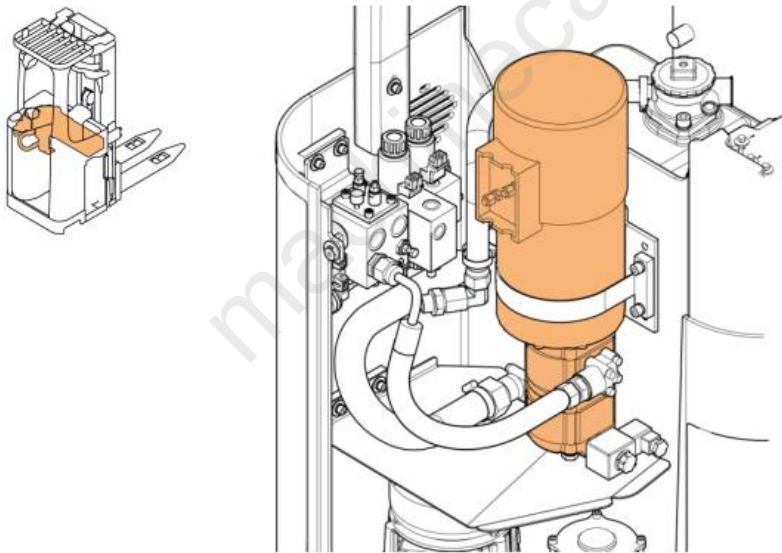


Figure 115. Pump motor overview

13.2 Pump controller



NOTE: Before you start to troubleshoot the truck, make sure that all the power supplies, fuses and connections are in order. Low voltage in the controller can cause different sorts of alarms.

The fault diagnostic system of the pump controller is divided into two main groups:

- Alarms

These are faults, which open the power bridge and, when possible, also the main contactor is opened and the magnetic brake activated. Failures in the motor, the controller or the safety functions cause alarms.

- Warning

These are faults, which do not stop the truck or stop the truck by using regeneration braking. The controller is working well, but it has detected some conditions that reduce the performance or stop the truck without opening the power devices. Incorrect operation sequences or conditions requiring performance reductions (for example, high temperatures) cause warnings.

The text "Stored" means that the alarm or warning is stored in the pump controller logbook.

Table 23. Pump controller alarm codes

CODE	ALARM / CONSOLE DESCRIPTION		
8	Self diagnosis test failed WATCHDOG	(Alarm)	Stored
	This is a safety-related self diagnosis test within the logic between the master (drive) and slave (pump) microcontrollers. The alarm indicates that the master and slave watchdog message is missing or late. This alarm can be caused by a CAN bus malfunction, which blinds the master-slave communication. Check all the CAN bus cables and measure the bus resistance between CAN high and low. The bus resistance value should be 60 Ω. Measure also the CAN cables' resistance between the truck chassis and the 0 cables. There should not be any significant connection and the resistance value should be over 1 MΩ. If CAN bus is OK, the problem is in the controller and it must be replaced.		
13	Controller memory error EEPROM KO	(Warning)	Stored
	This warning is caused by a hardware or software defect of the non-volatile embedded memory supporting the controller parameters. This alarm does not prevent truck operation, but the truck will work with the default values. In case of this warning, perform a CLEAR EEPROM operation. Switch the key off and on to check the result. If the alarm occurs permanently, replace the pump controller. If the alarm disappears, the previously stored parameter values will have been replaced by the default values.		

IDENTIFIER	DESCRIPTION
M#	Motor
V#	Diode
A#	Controllers and displays
K#	Contactors and relays
X#	Connector. Contact numbers are marked on individual wires.
XX#	Splice. Multiple wires are connected together at this point.

Figure 89 shows the reference to which Figure 88 referred.

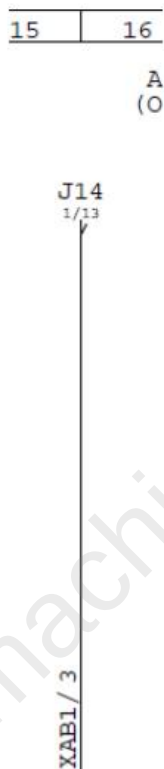


Figure 89. Page 8, zone 16, wiring reference J14

Once again, note the numbers below the wiring reference J14. These numbers (1/13) direct you back to the page (and zone) shown in Figure 88.

INPUTS & OUTPUTS	4 / 9	REV H
	3-7109	

Figure 90. Page numbers (4/9), circuit diagram number (3-7109) and revision letter (H)

10.4 Hydraulic aggregate

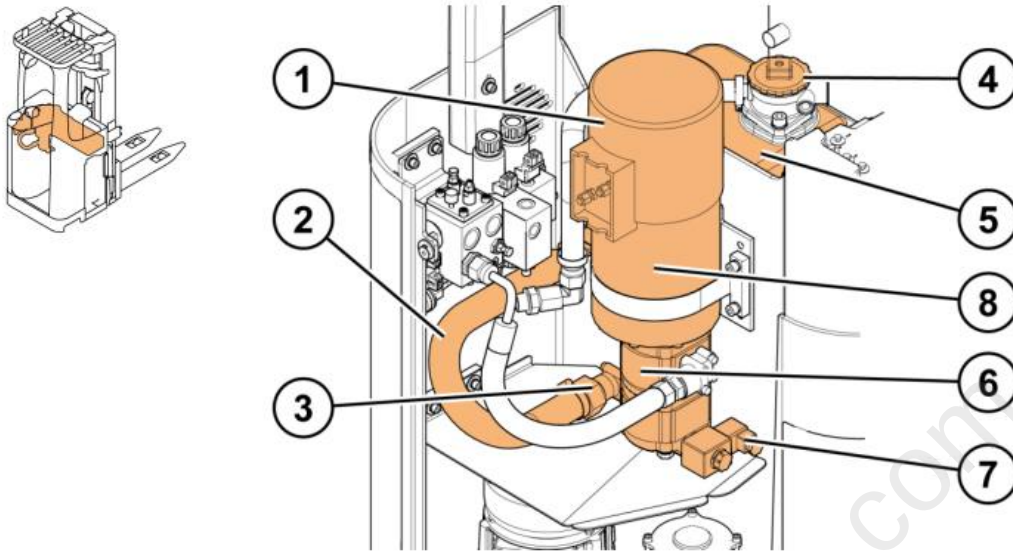


Figure 130. Hydraulic aggregate overview

- | | |
|-----------------------------------|----------------------|
| 1. Hydraulic aggregate | 5. Oil tank |
| 2. Hydraulic oil hose | 6. Pump |
| 3. Hydraulic connector | 7. Solenoid valve M7 |
| 4. Filling hole for hydraulic oil | 8. Pump motor |

The hydraulic aggregate consists of the electric pump motor, the hydraulic gear pump unit, the oil tank, the suction filter, the pressure relief valve, the solenoid valve, hydraulic hoses and connections for various hydraulic equipment.

The hydraulic aggregate is used to control the load handling device.

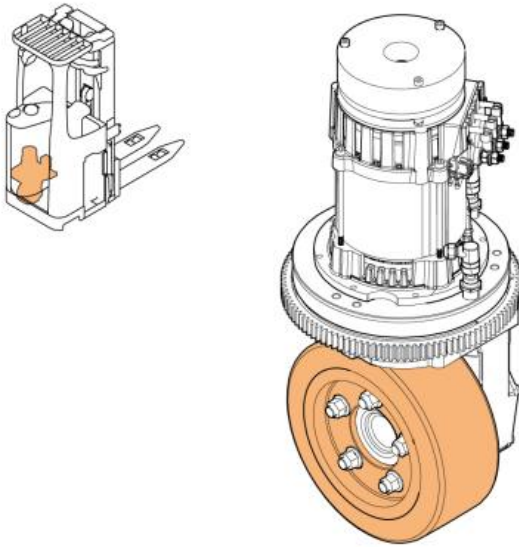


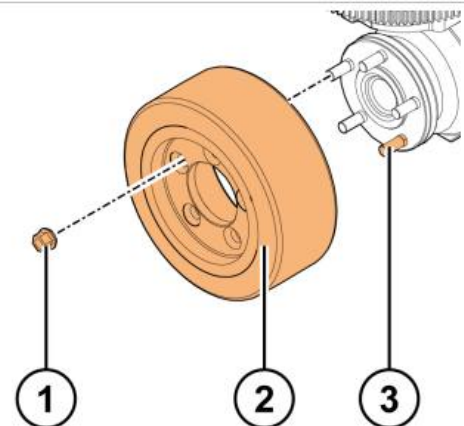
Figure 45. Traction wheel overview

Check the wear of the traction wheel:

- When the traction wheel's diameter reaches 220 mm, adjust the castor wheel as instructed in section 5.9.
- When the traction wheel's diameter reaches 214 mm, replace the traction wheel and adjust the castor wheel as instructed in section 5.9.

5.8.1 Disassembly of the traction wheel

1. Remove the five rounded cone nuts holding the traction wheel in place.
2. Remove the traction wheel.
3. Check the condition of the wheel shaft bolts. Replace the bolts, if needed. For instructions, see section 5.8.1.1 below.



15.10 Joystick

As an option, the standard mini levers of the control panel can be replaced with a joystick controller. With the joystick controller, the driving of the truck and the handling of the forks is handled with one controller instead of two separate levers.



NOTE: The joystick option is installed to the truck during manufacturing, so this option needs to be selected prior to purchasing the truck.

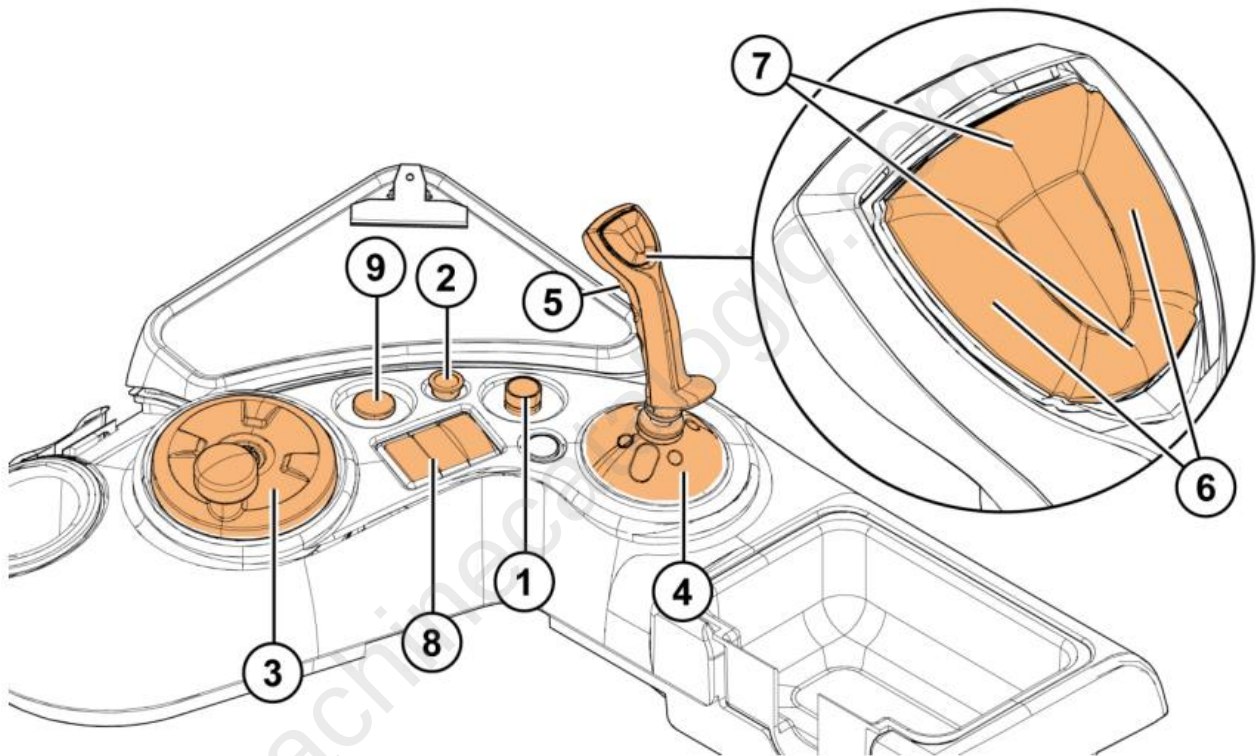


Figure 148. Control panel with the joystick controller

- | | |
|------------------------------|--|
| 1. Emergency stop button | 6. Buttons for lifting and lowering the side stabilizers |
| 2. Start button / key switch | 7. Buttons for lifting and lowering initial lift |
| 3. Steering wheel | 8. Switch for auxiliary device |
| 4. Joystick controller | 9. Warning light for side stabilizers |
| 5. Horn | |

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Caterpillar NSR16N Stacker Service and Operator Manual (619098)

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