



Operation & Maintenance Manual

NSR12K

NSR16K

NSR20K

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CAT
Controller: NOL10K / NOL10KF / NOM10K / NSR12/16/20K
Program version: Zapi CombiSEM 24V 300A+300A
Zapi's serial number from: COMBI RO 1.23-1.25

Rev. 31
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Calibration instructions for accelerator and lift/lower potentiometer:

1. Program all the parameters and options of CombiSEM controller.
2. Check that SLOW LIFT is not activated (Zapi Console/Main Menu/Tester/).
3. Check that SLOW LOW is not activated (Zapi Console/Main Menu/Tester/).
4. Turn key switch off.
5. Locate connector J1 in Zapi Serial Tiller Card and close it with jumper.
6. Turn key switch on.
7. Rotate accelerator slowly fully forward.
8. Wait 2 seconds.
9. Release accelerator slowly to the neutral position.
10. Wait 2 seconds.
11. Rotate accelerator slowly fully backward.
12. Wait 2 seconds.
13. Release accelerator slowly to the neutral position.
14. Wait 2 seconds.
15. Push lift lever slowly fully forward.
16. Wait 2 seconds.
17. Release lever slowly to the neutral position.
18. Wait 2 seconds.
19. Pull lift lever slowly fully backward.
20. Wait 2 seconds.
21. Release lever slowly to the neutral position.
22. Wait 2 seconds.
23. Open J1.
24. Wait 5...10 seconds.
25. Turn key switch off.
26. Turn key switch on.
27. Check acceleration forward and backward.
28. Check lifting and lowering.

B13	PMC	Positive of the main contactor.
B14	KEY OUT	Output of the Key switch signal.
B15	NOT USED	Free.
B16	PEB	Positive of the electromechanical brake.
B17	PEVP	Positive of the proportional electrovalve.
B18	PEV2	Positive of the electrovalve 2.
B19	PEV1	Positive of the electrovalve 1.
B20	PEV4	Positive of the electrovalve 4.
B21	PEV3	Positive of the electrovalve 3.
B22	PEV5	Positive of the electrovalve 5.

Note:

Proportional valve can be programmed by console as proportional or ON/OFF: if proportional the valve has an acceleration and deceleration ramp and its current is controlled by the lifting potentiometer.

If ON/OFF the valve is completely opened/closed without ramps.

The positive supply to the main contactor is provided from the key (pin 12) through a diode against polarity inversion. The positive supply for the electrobrake is available in the pin 16 only if the tiller switch is closed.

The positive for the brake and all the other ON/OFF valves comes from the main contactor, so these loads do not affect the key input but only the auxiliary fuse.

3.3.3 Connector "C" description

The "C" connector manages the serial link of the tiller card.

C1	-BATT	Negative free for the customer.
C2	BELLY	Quick inversion microswitch input. This signal is directly connected with the Combi for safety reason.
C3	SNAIL + T	Snail microswitch input. It is necessary that the tiller microswitch is cabled in the serial tiller card; in this case it is possible to run the truck also with the handle released at a slow speed.
C4	TILLER	Tiller microswitch input. In this case the tiller is directly connected with the Combi.
C5	DRFT	Data from the serial tiller
C6	-BATT	Negative for the serial tiller card.
C7	KEY OUT	Positive for the serial tiller card (is a key switch signal).
C8	KEY OUT	Positive for the tiller microswitch (is a key switch signal).

Note:

The tiller microswitch can be cabled in the serial tiller (see 'serial tiller' drawing) or directly in the controller (PIN 4 and 8 for the key in the serial tiller).

COMBI SEM1 FAULT CODES

MDI	CONSOLE	DESCRIPTION
1	EVP NOT OK	Wrong evp voltage
5	SERIAL ERROR #1	Problems in serial communication with serial tiller
8	WATCHDOG	Watchdog hardware error or program loop without exit
13	EEPROM KO	problems in eeprom
15	VFIELD NOT OK	Field voltage not at VMN/2 with no traction
18	EB DRIVER KO	Wrong EB voltage
32	VMN NOT OK	Without traction : VMN not at VBATT, with traction: VMN doesn't follow pwm
33	LIFTING BLOCK	Lifting stop
37	CONTACTOR CLOSED	Contacteur closed at keyon
49	I = 0 EVER	No armature current during traction
53	STBY I HIGH	High armature current without traction
57	HIGH FIELD CURR	High field current without traction
58	NO FIELD CUR	No field current during traction
60	CAPACITOR CHARGE	Capacitors don't charge at keyon
62	TH.PROTECTION	Chopper temperature too high (> 75°C)
66	BATTERY LOW	Battery charge <= 20%
70	PUMP VACC NOT OK	Pump set point from tiller card high without lift/low request
73	POWER FAILURE #1	short circuit on ON/OFF valves or on TG or on EB
74	DRIVER SHORTED	main contactor driver shorted
75	CONTACTOR DRIVER	main contactor driver doesn't close
78	VACC NOT OK	Traction set point from tiller card high without forw/reverse request
79	INCORRECT START	Tiller input ON or lift/low/forw/reverse request ON at keyon or wrong start sequence
80	FORW+BACK	Forward and reverse request together
85	STEER HAZARD	Steer hazard input open : blocks traction (D model)
94	INPUT ERROR #2	Tiller card belly input different from chopper belly input: chopper input is OFF
95	INPUT ERROR #1	Tiller card belly input different from chopper belly input: tiller input is OFF
98		Mdi hour meter and chopper hour meter are different (only on MDI)
99	CHECK UP NEEDED	Maintenance needed

2.12 OPERATION ENVIRONMENT

Temperature:

Operation	-35°C - +55°C
Storage	-40°C - +70°C

Humidity	100% condensing according to IEC 68-2-30, Db
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2.13 COOLING

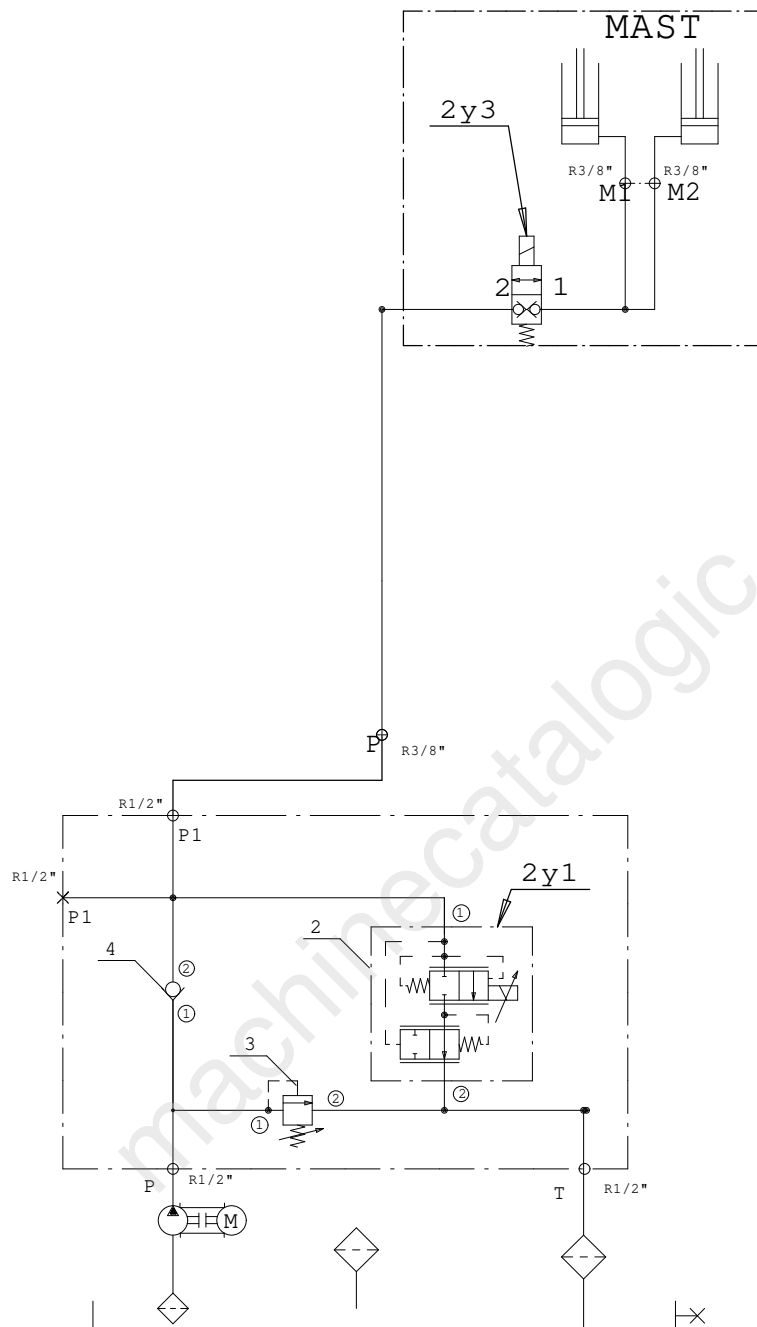
External cooling Contact cooling to metal plate or frame

Isolation 500VAC according to prEN 1175-1

2.14 EMC

Immunity: According to prEN50081-2

Emmission: According to prEN50082-2



CAT Lift Trucks

Tek. 2005-01-19 HAMALPE

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HYDRAULIC DIAGRAM
TH73 0105
NSR12/16/20K

TH73 0105

Full Version Available

Caterpillar NSR16KI Stacker Operator Manual (WHOMM0017)

Caterpillar NSR16KI Stacker operator manual, covers safe operation, controls, inspections, and charging. Downloadable PDF format.

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