

Multiway Reach Truck

NRM20K

NRM25K

Service Manual



631058 A



The type plate of the truck states the following:

Manufacturer

Truck type

Serial number

Battery minimum weight

Battery terminal voltage

Nominal lifting capacity of the truck

Year of manufacture

CE mark



NOTE: If a plate or sticker is damaged, replace it with a new identical sticker. When you order a sticker, include the serial number of the truck in your order.

8.5 Power stages

Important:

The minus-connections always have to be connected first.

When disconnecting the system, the minus has to be the last one to be disconnected.

Terminals + and -

The power supply (battery voltage) is connected to these terminals. The Power cables have to be protected by a fuse (see 'Technical data' for fuse size). The diameter of the power cables has to be determined according to the dimension of the fuse. To provide for a reverse-connect protection, it is highly recommended to use a main contactor to be controlled by the traction-inverter.



Note: In case that the main contactor is not used, a polarity inversion will damage the inverter.

Terminals U,V,W

The motors are connected to these terminals. Basically, the motors have to be connected to the inverters as U_{motor} to U_{inverter} and so on also for V and W.

With a positive set value, the traction motor should drive the vehicle forward. If it doesn't: Parameter 180 of traction inverter's software changes phase sequence of motor output and encoder input.

With a positive set value, the pump motor should drive the pump in correct direction. If it doesn't: Parameter 180 of pump inverter's software changes phase sequence of motor output and encoder input.

8.6 Control stages

The dimension of the control wires is specified to $0,5\text{mm}^2$ (i.e. all plug-able connections). Bigger diameters can be used alternatively to improve the mechanical stiffness. The MOLEX connector is specified for wire dimensions $0,24$ and $0,82\text{mm}^2$.

The following schematic gives an example of the numbering of a 6- and 10-pin connector:

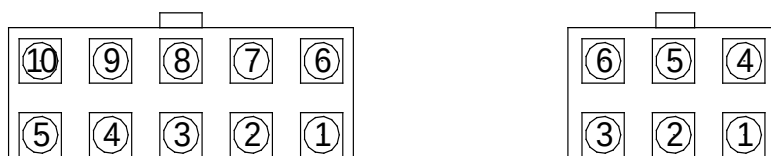


Figure 9: Numbering of connector viewed in direction to the inverter

25	25 Pulse...Pause	Watchdog error 10ms routine
26	26 Pulse...Pause	Error in stepper motor supervision circuit
27	27 Pulse...Pause	Error Lift/Lower High-Side Switch

10.2 Traction and pump controller

Err. nr	blinking code of LED	Description
-	Puls-/ Pausenverhältnis 1:1 (f = 1,25 Hz)	Watchdog
-	Puls-/ Pausenverhältnis 1:3 (f = 2,1 Hz)	RAM-error
-	Puls-/ Pausenverhältnis 3:1 (f = 2,1 Hz)	FLASH-error
2	2 Pulse...Pause	New software version
3	3 Pulse...Pause	Power stage over current
4	4 Pulse...Pause	Low battery voltage
5	5 Pulse...Pause	Battery over voltage
6	6 Pulse...Pause	Overtemperature motor
7	7 Pulse...Pause	Overtemperature inverter
8	8 Pulse...Pause	-
9	9 Pulse...Pause	CAN-bus timeout
10	10 Pulse...Pause	CAN-bus error
11	11 Pulse...Pause	-
12	12 Pulse...Pause	-
13	13 Pulse...Pause	-
14	14 Pulse...Pause	EEPROM fault
15	15 Pulse...Pause	Unrealistic setting of the mot. V/f characteristics
19	19 Pulse...Pause	Unrealistic setting of the gen. V/f characteristics

IDENTIFIER	DESCRIPTION
J#	Reference. All references marked with an even "J" (e.g. J2) are positive (+). All references marked with an odd "J" (e.g. J3) are negative (-).
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 20 shows the reference to which Figure 19 referred.



Figure 20. 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 19.

Pot. FWD. Y%	R / W	212		VCM sets this parameter
Max. speed BWD	R / W	216		VCM sets this parameter
Pot. BWD. Y%	R / W	217		VCM sets this parameter
Slow speed_1 FWD	R / W	221		VCM sets this parameter
Slow speed_1 BWD	R / W	222		VCM sets this parameter
Slow speed_2	R / W	223		VCM sets this parameter
Teach-in speed	R / W	251		VCM sets this parameter

Lower the forks or other implements to the ground before performing any work on the truck. If this cannot be done, make sure the forks or other implements are blocked correctly to prevent them from falling unexpectedly.

Use steps and grab handles (if applicable) when mounting or dismounting a truck. Clean any mud or debris from steps, walkways or work platforms before use. Always face the truck when using steps, ladders and walkways. When it is not possible to use the designed access system, use ladders, scaffolds, or work platforms to perform safe repair operations.

To avoid back injury, use a hoist when lifting components weighing 23 kg (51 lb) or more. Make sure all chains, hooks, slings, etc., are in good condition and of the correct capacity. Make sure all hooks are positioned correctly. Lifting eyes are not to be side-loaded during a lifting operation.

Make sure all protective devices including guards and shields are properly installed and functioning correctly before starting a repair. If a guard or shield must be removed to perform the repair work, use extra caution.

Always support the mast and carriage to keep the carriage or attachments raised when performing maintenance or repair work that requires the mast to be in the raised position.

3.2 Personal safety

Remove all rings, watches and other pieces of metal jewellery before you start working on the truck. If a metal object gets into contact with an electrically conductive part, it can cause a short circuit or a serious burn.

Always wear protective glasses and protective shoes when working around trucks. In particular, wear protective glasses when using a hammer or sledge on any part of the truck or its attachments. Use welder's gloves, hood/goggles, apron and other protective clothing appropriate to the welding job being performed. Do not wear loose fitting or torn clothing.

3.3 Work safety

Unauthorized truck modification is not permitted. No modifications or alterations to a powered industrial truck, which could affect, for example, capacity, stability or safety requirements of the truck, shall be made without the prior written approval of the original truck manufacturer, its authorized representative, or a successor thereof. This includes changes affecting, for example, braking, steering, visibility and the addition of removable attachments. When the manufacturer or his successor approves a

11.1 NRM20K, NRM25K

	IDENTIFICATION			
1.1	Manufacturer			
1.2	Model		NRM20K	NRM25K
1.3	Power source		Electric	Electric
1.4	Operating mode (pedestrian, stand-on, sit on)		Sit-on	Sit-on
1.5	Nominal capacity / load	Q [kg]	2000	2500
1.6	Load centre	c [mm]	600	600
1.8	Load wheel axle to fork face (forks lowered)	x [mm]	See table	See table
1.9	Wheelbase (forks lowered)	y [mm]	1485	1485
	WEIGHTS			
2.1	Truck weight (with nominal load & battery 1100kg)	[kg]	6550	7300
2.3	Axle loadings (without load & with battery) Drive / Load side	[kg]	2700 / 2x925	2900 / 2x950
2.4	Axle loadings (with nominal load & battery) mast out, Drive / Load side	[kg]	850 / 2x2850	600 / 2x3350
2.5	Axle loadings (with nominal load & battery) mast retracted, Drive / Load side	[kg]	2200 / 2x2175	2400 / 2x2450
	WHEELS & TYRES			
3.1	Tyres, material (R=rubber/Vul=Vulkollan) Drive / Load side		vul/vul	vul/vul
3.2	Load wheel dimensions (diameter x width)	[mm]	Ø285x75	Ø285x75
3.3	Drive wheel dimensions (diameter x width)	[mm]	Ø343x140	Ø343x140
3.5	Number of the wheels (x=driven) Drive / Load side	[mm]	1 / 4	1 / 4
3.6	Track width (centre of tyres) Load side	b10 [mm]	1410	1410
	DIMENSIONS			
4.1	Mast or fork tilting, forwards/backwards	°	2 / 6	2 / 6
4.2	Lowered mast height (see tables)	h1 [mm]	See table	See table
4.3	Free lift	h2 [mm]	See table	See table
4.4	Lift	h3 [mm]	See table	See table
4.5	Raised mast height (see tables)	h4 [mm]	See table	See table
4.7	Height of the overhead guard	h6 [mm]	2185	2185
4.8	Seat (compressed or platform height)	h7 [mm]	1055	1055
4.10	Height of the support legs	h8 [mm]	485	485
4.15	Fork height, fully lowered	h13 [mm]	50	50
4.19	Overall length (platform up / down)	l1 [mm]	2590	2590
4.20	Powerhead length (to fork face)(platform up / down)	l2 [mm]	See table	See table
4.21	Chassis (overall width)	b1/b2 [mm]	1700	1700
4.22	Fork dimensions (thickness/ width/ length)	s/e/l [mm]	50 / 120 / 1150	50 / 120 / 1150
4.24	Width of the fork carriage	b3 [mm]	1680	1680
4.25	Outside width over forks	b5 [mm]	560 - 1970	560 - 1970
4.26	Inner width of the support legs	b4 [mm]	900	900
4.28	Reach movement	l4 [mm]	See table	See table
4.31	Ground clearance	m1 [mm]	80	60
4.32	Ground clearance, centre of wheelbase (forks lowered)	m2 [mm]	80	60
4.33	Working aisle width (Ast3), pallet 1000x1200 mm, load crosswise (platform up / down)	Ast [mm]	See table	See table
4.34	Working aisle width (Ast3), pallet 800x1200 mm, load lengthwise (platform up / down)	Ast [mm]	See table	See table
4.35	Turning radius (forks lowered, platform up / down)	Wa [mm]	1800	1800

Final Operational Checks in Vehicle

1. With the main contactor open (not enabled), apply battery power to the AC SuperDrive's B+ (or +) terminal through the inrush current limiting resistance.
2. Before enabling the main contactor, verify that the AC SuperDrive's filter capacitors have charged. The filter capacitors are fully charged when the voltage measured between the AC SuperDrive's + and B- terminals has reached battery voltage level.
3. Enable the main contactor.

Verify that the AC SuperDrive and its associated motor start, stop and run properly at slow speed and at full operational speed.



CAUTION

- For lift applications, make sure the pump rotates in the proper direction. Rotation in the wrong direction may damage the pump.

Full Version Available

Caterpillar NRM20K Reach Truck Service, Operator and Schematic Manual (631058)

Caterpillar NRM20K Reach Truck service manual, covers hydraulics, wiring, controllers, and alarm codes in searchable PDF. Instant PDF download.

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