

STANDARD AND OPTIONAL EQUIPMENT

	Model	Li-ION On-board charger	Li-ION charger 9 kW housing	Li-ION charger 18 kW housing
Safety	External start/stop (safety interlock) – prevents sparking, when the charger cable is disconnected while charging is in progress	●	●	●
	Fully harmonised system via CAN bus communication	●	●	●
Service	Calendar function – For time-controlled charging	–	●	●
	Power peak avoidance – system for managing power consumption and charging times to avoid exceeding max current draw limits	–	●	●
	Service contact – displays Aftersales contact details	–	●	●
Comfort	USB interface – For software updates and analyses	–	●	●
	LED strip, charging status indicator – Simple and quick status identification	–	○	○
	In-built display and operational controls	–	●	●
Workplace	Remote display – to control a number of chargers from a central point	–	○	○
	Air pre-filter – Protecting the inside of the charger from dust and dirt	–	○	○
	Standard charger cable 3 m	–	●	●
	Charger cable 5 m	–	○	○
	Charger housing rental	–	○	○
	Charger module small (600)	–	○	○
	Charger module large (1500) – Only in combination with wall bracket	–	○	○
	Wall and floor brackets – For simple and secure installation on the wall or on the floor	–	○	○

● Standard equipment ○ Optional equipment – Not available



Energy solutions

LI-ION BATTERIES AND CHARGERS

48 V

Ideal for all kind of applications

- State-of-the-art technology to reduce energy costs (up to 30%)
- Multi-level safety concept at cell, module and battery level
- Emission- and maintenance-free battery technology
- Intermediate and fast charging for higher truck availability
- Continuous CAN bus communication, guaranteeing a fully harmonised overall system

CHARACTERISTICS



Highest protection in case of accident

Safety

- 25 millimetre thick steel tray protects cells and modules from damage, even when exposed to massive external forces
- Multi-level safety system at cell, module and battery level ensures smooth operation
- Battery management monitors and harmonises vehicle usage, charging processes and the battery system protecting against damage
- No hazardous gases produced during operation and charging



X35 equipped with Li-ION battery

Efficiency

- Short charging times and intermediate (opportunity) charging, e.g. during breaks, significantly increases vehicle availability in multi-shift operations
- 2000 full charging cycles within 5 years with 80% residual capacity are guaranteed
- Li-ION battery system enables up to 30% greater utilisation of electrical energy
- Hardly noticeable voltage drop at low state of charge



Quick access to charge

Handling

- Elimination of costly charging infrastructure with separate battery room and gas extraction system
- Chargers can be set up flexibly, e.g. near break rooms or near the place of use for short intermediate charges
- Elimination of battery replacement due to battery and charging capacities adapted to the application



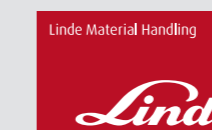
Easy service access

Service

- Harmonised CAN bus communication between vehicle, Li-ION battery and charger, ensures safe and smooth operation and extends the service life of the components
- Maintenance, cleaning or refilling of distilled water is completely unnecessary

Presented by:

Subject to modification in the interest of progress. Illustrations and technical details could include options and are not binding for actual constructions. All dimensions subject to usual tolerances.



Linde Material Handling GmbH
Carl-von-Linde-Platz | 63743 Aschaffenburg | Germany
Phone + 49 6021 99 0 | Fax + 49 6021 99 1570
www.linde-mh.com | info@linde-mh.com

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TECHNICAL DATA Li-ION 48 V BATTERIES

E-TRUCKS

Nominal voltage	Available trucks	Minimum nominal energy content in kWh	Minimum usable energy content in kWh	Minimum nominal capacity in Ah	Weight (±5%) in kg	Dimensions (l × w × h) in mm	IP protection class	Full-charging time with on-board charger 48 V/170 A/8 kW ^{1) 2) 4)}	Full-charging time with charger 48 V/185 A/9 kW ^{1) D1}	Full-charging time with charger 48 V/375 A/18 kW ^{1) F1}	Chemical system	Standard charging temperature ²⁾	Charging temperature with low temp. protection ²⁾	Standard operating temperature ²⁾	Operating temperature with low temp. protection ²⁾	Storage temperature ¹⁾
48 V	E14, E16 C, EG16, EG16 P, EG16 H, EG16 PH, EG20 PH	17,2	13,7	360	708	830 × 522 × 632	IP 6k9k	2 h 12 min	2 h	2 h	Nickel-Mangan-Cobalt-Oxide/Lithium-Ferro Phosphate	0°C to +45°C	-	0°C to +45°C	-	-35°C to +60°C
		18,8 ³⁾	15,1	368				<6h	<6h	<6h		+5°C to +45°C	-	+5°C to +45°C	-	-20°C to +45°C
		26,5	22,9	536				3 h 24 min	3 h	2 h		0°C to +45°C	-25°C to +45°C	0°C to +45°C	-25°C to +45°C	-35°C to +60°C
	44,2	39,7	920	5 h 42 min	5 h 6 min	2 h 30 min		0°C to +45°C	-25°C to +45°C	0°C to +45°C		-25°C to +45°C	-35°C to +60°C			
	E16, E16 P, E18, E16 H*, E16 PH*, E18 PH*, E20 PH*	17,2	13,7	360	856	830 × 630 × 632		2 h 12 min	2 h	2 h		0°C to +45°C	-	0°C to +45°C	-	-35°C to +60°C
		18,8 ³⁾	15,1	368				<6h	<6h	<6h		+5°C to +45°C	-	+5°C to +45°C	-	-20°C to +45°C
		26,5	22,9	536				3 h 24 min	3 h	2 h		0°C to +45°C	-25°C to +45°C	0°C to +45°C	-25°C to +45°C	-35°C to +60°C
	44,2	39,7	920	5 h 42 min	5 h 6 min	2 h 30 min		0°C to +45°C	-25°C to +45°C	0°C to +45°C		-25°C to +45°C	-35°C to +60°C			
	E16 L, E18 L, E20 L, E20 PL, E20 PHL	17,2	13,7	360	1013	830 × 738 × 632		2 h 12 min	2 h	2 h		0°C to +45°C	-	0°C to +45°C	-	-35°C to +60°C
26,5		22,9	536	3 h 24 min			3 h	2 h	0°C to +45°C	-25°C to +45°C	0°C to +45°C	-25°C to +45°C	-35°C to +60°C			
44,2		39,7	920	5 h 42 min			5 h 6 min	2 h 30 min	0°C to +45°C	-25°C to +45°C	0°C to +45°C	-25°C to +45°C	-35°C to +60°C			

REACH TRUCKS

Nominal voltage	Available trucks	Minimum nominal energy content in kWh	Minimum usable energy content in kWh	Minimum nominal capacity in Ah	Weight (±5%) in kg	Dimensions (l × w × h) in mm	IP protection class	Full-charging time with on-board charger 48 V/170 A/8 kW ^{1) 2) 4)}	Full-charging time with charger 48 V/185 A/9 kW ^{1) D1}	Full-charging time with charger 48 V/375 A/18 kW ^{1) F1}	Chemical system	Standard charging temperature ²⁾	Charging temperature with low temp. protection ²⁾	Standard operating temperature ²⁾	Operating temperature with low temp. protection ²⁾	Storage temperature ¹⁾
48 V	R14, R16, R20, R25, R20 HD, R10 B, R12 B, R14 B, R16 B	13,2	11,9	276	750	1223 × 282 × 747	IP 6k9k	-	2 h	2 h	Nickel-Mangan-Cobalt-Oxide/Lithium-Ferro Phosphate	0°C to +45°C	-	0°C to +45°C	-	-35°C to +60°C
		26,5	22,9	552	939/1119	1224 × 742 × 355/385		-	3 h	2 h		0°C to +45°C	-25°C to +45°C	0°C to +45°C	-25°C to +45°C	-35°C to +60°C
		44,2	39,7	736	939/1119	1225 × 742 × 355/385		-	5 h 6 min	2 h 30 min		0°C to +45°C	-25°C to +45°C	0°C to +45°C	-25°C to +45°C	-35°C to +60°C
	R14 G, R16 G, R 20 G, R14 HD, R16 HD	26,5	22,9	552	939/1119	1224 × 742 × 355/385		-	3 h	2 h		0°C to +45°C	-25°C to +45°C	0°C to +45°C	-25°C to +45°C	-35°C to +60°C
		44,2	39,7	736	939/1119	1225 × 742 × 355/385		-	5 h 6 min	2 h 30 min		0°C to +45°C	-25°C to +45°C	0°C to +45°C	-25°C to +45°C	-35°C to +60°C
		18,8 ³⁾	15,1	368	939	1223 × 742 × 355		-	<6h	<6h		+5°C to +45°C	-	+5°C to +45°C	-	-20°C to +45°C

VNA TRUCKS

Nominal voltage	Available trucks	Minimum nominal energy content in kWh	Minimum usable energy content in kWh	Minimum nominal capacity in Ah	Weight (±5%) in kg	Dimensions (l × w × h) in mm	IP protection class	Full-charging time with on-board charger 48 V/170 A/8 kW ^{1) 2) 4)}	Full-charging time with charger 48 V/185 A/9 kW ^{1) D1}	Full-charging time with charger 48 V/375 A/18 kW ^{1) F1}	Chemical system	Standard charging temperature ²⁾	Charging temperature with low temp. protection ²⁾	Standard operating temperature ²⁾	Operating temperature with low temp. protection ²⁾	Storage temperature ¹⁾
48 V	K-modular	17,2	13,7	360	856	1030 × 529 × 627	IP 6k9k	-	2 h	2 h	Nickel-Mangan-Cobalt-Oxide/Lithium-Ferro Phosphate	0°C to +45°C	-	0°C to +45°C	-	-35°C to +60°C
		26,5	22,9	536	856	1030 × 529 × 627		-	3 h	2 h		0°C to +45°C	0°C to +45°C	0°C to +45°C	0°C to +45°C	-35°C to +60°C
		44,2	39,7	920	856	1030 × 529 × 627		-	5 h 6 min	2 h 30 min		0°C to +45°C	0°C to +45°C	0°C to +45°C	0°C to +45°C	-35°C to +60°C
	V-modular (B)	17,2	13,7	360	708	830 × 522 × 632		-	2 h	2 h		0°C to +45°C	-	0°C to +45°C	-	-35°C to +60°C
		26,5	22,9	536	708	830 × 522 × 632		-	3 h	2 h		0°C to +45°C	0°C to +45°C	0°C to +45°C	0°C to +45°C	-35°C to +60°C
		44,2	39,7	920	708	830 × 522 × 632		-	5 h 6 min	2 h 30 min		0°C to +45°C	0°C to +45°C	0°C to +45°C	0°C to +45°C	-35°C to +60°C
	A-Truck	13,2	11,9	276	750	1223 × 742 × 283		-	2 h	2 h		0°C to +45°C	-	0°C to +45°C	-	-35°C to +60°C
		17,2	13,7	360	856	1030 × 529 × 627		-	2 h	2 h		0°C to +45°C	-	0°C to +45°C	-	-35°C to +60°C
		26,5	22,9	536	856/1119	1030/1223 × 529/742 × 627/385		-	3 h	2 h		0°C to +45°C	0°C to +45°C	0°C to +45°C	0°C to +45°C	-35°C to +60°C
		44,2	39,7	920	856/1119	1030/1223 × 529/742 × 627/385		-	5 h 6 min	2 h 30 min		0°C to +45°C	0°C to +45°C	0°C to +45°C	0°C to +45°C	-35°C to +60°C

¹⁾ Maximum values for short time storage, recommended 25°C

²⁾ Above +45°C limited performance and lifetime reduction

³⁾ Average charging time, deviation of +/-5% possible. At cell temperature +25°C, different cell temperature can lead to increased charging times

⁴⁾ Availability of on-board charger depending on its release per truck

⁵⁾ B-series Li-Ion battery 1500 full charging cycles within 4 years with 70% residual capacity are guaranteed, different tray structure applied

* CO process requested

In case of usage in a cold store application the highest battery capacity should always be chosen

TECHNICAL DATA Li-ION 48 V CHARGERS

Manufacturer		Linde MH	Linde MH	Linde MH
Model		48 V 170 A 8 kW*	48 V 185A 9 kW D1	48 V 375 A 18 kW F1
Mains voltage		3-NPE 400 V (-15% / +10%)	3-NPE 400 V (±10%)	3-NPE 400 V (±10%)
Grid frequency	(Hz)	50/60	50/60	50/60
Mains fuse protection	(A)	16	16	32
Leakage current	(mA)	< 3.5	< 3.5	< 3.5
Minimum mains cross section	(mm ² (in ²))	2.5 (0.0039)	2.5 (0.0039)	6 (0.0093)
Length charging cable (DC)	(m)	-	3	3
Length mains cable (AC)	(m)	-	3	3
Duty cycle	(%)	100	100	100
EMC device class		B	B	B
RCD type		B	B	B
Protection class		I	I	I
Degree of protection	(IP)	65	20	20
Overvoltage category		III	III	III
Operating temperature	(°C (°F))	-25 / +60 (-13 / 140)	-20 / +40 (-4 / 104)	-20 / +40 (-4 / 104)
Storage temperature	(°C (°F))	-45 / +80 (-49 / 176)	-25 / +80 (-13 / 176)	-25 / +80 (-13 / 176)
Maximum relative humidity	(%)	95	85	85
Maximum altitude above Mean Sea Level (MSL)	(m (ft.))	2000 (6561)	2000 (6561)	2000 (6561)
Product standard		EN 61000, EN 62477-1	EN 62477-1	EN 62477-1
Dimensions	(mm)	450 × 300 × 161	633 × 180 × 344	785 × 247 × 392
Weight	(kg (lb))	20 (44.09)	25 (55.12)	47 (103.62)
Pollution level / degree		3	3	3
Maximum AC current	(A)	15.5	15.7	31.5
Maximum AC power	(W)	10700	9940	20340
Nominal DC voltage	(V)	48	48	48
Maximum DC current	(A)	170	185	375
PF λ (Uac Nom, 50 Hz, Udc Nom, Idc max)		0.98	0.948	0.921
THDi (Uac Nom, 50 Hz, Udc Nom, Idc max)	(%)	5	32.2	44.49
Efficiency	(%)	95	92	93

* On-board charger ■ Available for connect-charger