



Linde Material Handling



## Energy solutions

# LI-ION BATTERIES AND CHARGERS

24 V

### The perfect choice for all kinds of applications

- State of the art technology to reduce energy costs (up to 30 %)
- Multilevel safety concept on cell, module and battery level
- Sustainable, emission and maintenance free battery technology
- Intermediate and fast charging for increased truck availability
- Constant CAN bus communication that guarantees a fully harmonized overall system

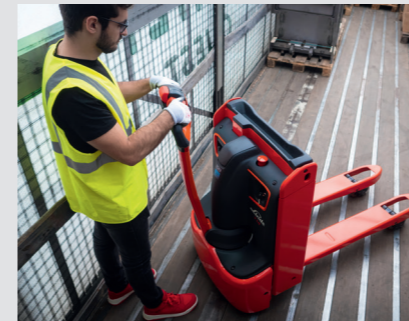
## CHARACTERISTICS



Multi-level safety concept

### Safety

- Multi-stage safety system at cell, module and battery level ensures smooth operation
- Battery management monitors and harmonizes vehicle use, charging processes and battery system and thus protects against damage
- No hazardous gases are produced during operation and charging



High truck availability and compact design

### Efficiency

- Short charging times and the possibility of opportunity charging, e.g. during breaks, significantly increase vehicle availability for multi-shift operation
- New warranty: 4 years, 1500 full charging cycles with 70 % residual capacity are guaranteed
- Li-ION battery system enables up to 30 % higher utilization of electrical energy
- Best fitting battery size and charger selection based on Linde's Li-ION energy tools
- Hardly noticeable voltage drop at low charge level



Quick access for vertical or lateral charging

### Handling

- Elimination of the costly charging infrastructure with separate battery room and gas extraction system
- Chargers can be set up flexibly, e.g. for short opportunity charging near break rooms or close to the area of use
- On-board chargers for location-independent and flexible charging
- Elimination of battery change due to battery capacities and charging capacities adapted to the application

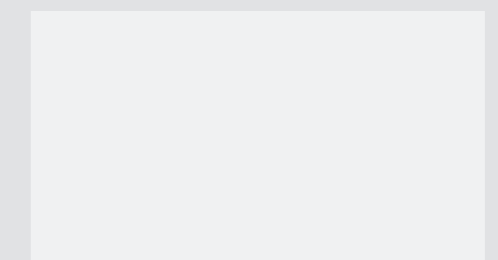


Easy service access

### Service

- Harmonized 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 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

Printed in Germany | DS\_Li-ION\_24V\_en\_A\_0722

Here you can find more content via your smartphone: [Linde Augmented Reality App](#)



# TECHNICAL DATA Li-ION 24 V BATTERIES

## PALLET TRUCKS AND PALLET STACKERS

Nominal voltage	Available trucks	Usable energy content	Nominal energy content	Nominal capacity in Ah	Weight (± 5 %)	Dimensions (l × w × h) in mm	IP protection class	Full-charging time with on-board charger 24 V/35 A/1 kW <sup>1)3)</sup>	Full-charging time with charger 24 V/120 A/3 kW <sup>1)</sup>	Full-charging time with charger 24 V/225 A/5.5 kW <sup>1)</sup>	Chemical system	Standard charging temperature	Charging temperature with heating option	Standard operating temperature	Operating temperature with heating option	Storage temperature <sup>2)</sup>
24 V	T14, T16	1.5 kWh	1.8 kWh	69	17 kg	560 × 89 × 500	IP67	1 h 54 min	1 h 48 min	1 h 48 min	Nickel-Mangan-Cobalt-Oxide	-5 °C to +45 °C	n.a.	-5 °C to +45 °C	n.a.	-40 °C to +60 °C
	L10 B, L10, L12, L12 i, L10 AS, L12 AS, T20 AP B, T20 AP, T25 AP, T25, T30, D10 B, D10, D10 AP B, D10 AP, D10 FP, L14, L16, L14 AP, L16 AP, D12, D14, D12 AB, D14 AP, L14 AS, L14 AS AP, L16 AS, L16 AS AP, T14 S, L06 AC, L10 AC, L12 AC, L16 AC, T14, T16, T18, T20, T16 L, D08	3.0 kWh	3.6 kWh	138	25 kg	560 × 89 × 500	IP67	3 h 42 min	1 h 48 min	1 h 48 min		-5 °C to +45 °C	-35 °C to +45 °C	-5 °C to +45 °C	-35 °C to +45 °C	-40 °C to +60 °C
	L10 B, L10, L12, L10 AS, L12 AS, T20 AP B, T20 AP, T25 AP, T20 FP, T25 FP, T25, T30, D10 B, D10, D10 AP B, D10 AP, D10 FP, L14, L16, L20, L14 AP, L16 AP, L20 AP, D12, D14, D12 AP, D14 AP, L14 AS AP, L16 AS, L16 AS AP, T20 SF, T25 SF, T14 S, T20 S, T25 S, T20 SR, T25 SR, T20 R, T25 R, T20 RW, T25 RW, D12 SF, D12 S, D12 R, D12 RW, L14 R, L16 R, L14 RW, L16 RW, L06 AC, L10 AC, L12 AC, L16 AC, T16, T18, T20, T20 AP, T25 AP, T20 SP, T25 SP, L12 AP, L12 SP, L14 SP, D12 SP, D14 SP, D12 HP AP, D12 HP SP, T16, T18, T20, T16 L, D08	6.0 kWh	7.1 kWh	276	130 kg	624 × 145 × 570	IP69	7 h 30 min	2 h 12 min	1 h 48 min		-5 °C to +45 °C	-35 °C to +45 °C	-5 °C to +45 °C	-35 °C to +45 °C	-40 °C to +60 °C
	L10 AS, L12 AS, T20 AP B, T20 AP, T25 AP, T20 FP, T25 FP, T25, T30, D10 B, D10, D10 AP B, D10 AP, D10 FP, L14, L16, L20, L14 AP, L16 AP, T20 SF, T25 SF, T14 S, T20 S, T25 S, T20 SR, T25 SR, T20 R, T25 R, T20 RW, T25 RW, D12 SF, D12 S, D12 R, D12 RW, L14 R, L16 R, L14 RW, L16 RW, L06 AC, L10 AC, L12 AC, L16 AC, T20 AP, T25 AP, T20 SP, T25 SP, L12 AP, L12 SP, L14 SP, L16 RW, L06 AC, L10 AC, L12 AC, L16 AC, T20 AP, T25 AP, T20 SP, T25 SP, L12 AP, L12 SP, L14 SP, D12 SP, D14 SP, D12 HP AP	9.0 kWh	10.7 kWh	414	180 kg	624 × 212 × 570	IP69	11 h 12 min	3 h 18 min	1 h 48 min		-5 °C to +45 °C	-35 °C to +45 °C	-5 °C to +45 °C	-35 °C to +45 °C	-40 °C to +60 °C
		12.0 kWh	14.3 kWh	552	180 kg	624 × 212 × 570	IP69	14 h 54 min	4 h 24 min	2 h 18 min		-5 °C to +45 °C	-35 °C to +45 °C	-5 °C to +45 °C	-35 °C to +45 °C	-40 °C to +60 °C

## ORDER PICKERS AND TOW TRACTORS

Nominal voltage	Available trucks	Usable energy content	Nominal energy content	Nominal capacity in Ah	Weight (± 5 %)	Dimensions (l × w × h) in mm	IP protection class	Full-charging time with on-board charger 24 V/35 A/1 kW <sup>1)3)</sup>	Full-charging time with charger 24 V/120 A/3 kW <sup>1)</sup>	Full-charging time with charger 24 V/225 A/5.5 kW <sup>1)</sup>	Chemical system	Standard charging temperature	Charging temperature with heating option	Standard operating temperature	Operating temperature with heating option	Storage temperature <sup>2)</sup>
24 V	V08-01 0.7t, V08-01 1t, N20 B, N20, N25, N20 HP, N25 HP, N16 Li, N20 D, N20 D HP, N20 LoL, N20 XL	3.0 kWh	3.6 kWh	138	25 kg	560 × 89 × 500	IP67	3 h 42 min	1 h 48 min	1 h 48 min	Nickel-Mangan-Cobalt-Oxide	-5 °C to +45 °C	-35 °C to +45 °C	-5 °C to +45 °C	-35 °C to +45 °C	-40 °C to +60 °C
	N20 C B, N20 C, N25 C, N25 C HP, N20 C D, N20 C LoL, N20 C L, N20 C LX, V08-01 0.7t, V08-01 1t, P40 C B, P40 C, P60 C, V08-01 0.7t, V08-01 1t, N20 B, N20, N25, N20 HP, N25 HP, N16 Li, N20 D, N20 D HP, N20 LoL, N20XL	6.0 kWh	7.1 kWh	276	130 kg	624 × 145 × 570	IP69	7 h 30 min	2 h 12 min	1 h 48 min		-5 °C to +45 °C	-35 °C to +45 °C	-5 °C to +45 °C	-35 °C to +45 °C	-40 °C to +60 °C
	N20 C B, N20 C, N25 C, N25 C HP, N20 C D, N20 C LoL, N20 C L, N20 C LX, V08-01 0.7t, V08-01 1t, V08-02 0.8t, P40 C B, P40 C, N20 B, N20, N25, N20 HP, N25 HP, N16 Li, N20 D, N20 D HP, N20 LoL, N20 XL	9.0 kWh	10.7 kWh	414	180 kg	624 × 212 × 570	IP69	11 h 12 min	3 h 18 min	1 h 48 min		-5 °C to +45 °C	-35 °C to +45 °C	-5 °C to +45 °C	-35 °C to +45 °C	-40 °C to +60 °C
		12.0 kWh	14.3 kWh	552	180 kg	624 × 212 × 570	IP69	14 h 54 min	4 h 24 min	2 h 18 min	-5 °C to +45 °C	-35 °C to +45 °C	-5 °C to +45 °C	-35 °C to +45 °C	-40 °C to +60 °C	

1) At cell temperature +25 °C, different cell temperature can lead to increased charging times 2) Maximum values for short time storage, recommended +25 °C 3) Availability of on-board charger depending on its release per truck

# TECHNICAL DATA Li-ION 24 V CHARGERS

Manufacturer		Linde	Linde	Linde
Model		24 V 35 A 1 kW*	24 V 120 A 3 kW	24 V 225 A 5.5 kW
Mains voltage		1~ NPE 230 V (-15 % / +10 %)	1~ NPE 230 V (±15 %)	3~NPE 400 V (±10 %)
Grid frequency	(Hz)	50/60	50/60	50/60
Mains fuse protection	(A)	16	16	16
Leakage current	(mA)	< 3.5	< 3.5	< 3.5
Minimum mains cross section	(mm <sup>2</sup> (in <sup>2</sup> ))	1 (0.0015)	1.5 (0.0024)	2.5 (0.0039)
Length mains cable (AC)	(m)	-	2.5	3
Duty cycle	(%)	-	100	100
EMC device class		B	B	B
RCD Type		A	B	B
Protection class		I	I	I
Degree of protection	(IP)	20	21	20
Overvoltage Category		II	III	III
Operating Temperatur	(°C (°F))	-15/+50 (5/122)	-20/+40 (-4/104)	-20/+40 (-4/104)
Storage Temperatur	(°C (°F))	-45/+80 (-49/176)	-25/+80 (-13/176)	-25/+80 (-13/176)
Maximum Relative Humidity	(%)	95	85	85
Maximum Altitude above MSL	(m (ft.))	2000 (6561)	2000 (6561)	2000 (6561)
Product Standard		EN 62368-1 NF EN 61000-6-1 NF EN 61000-6-2 NF EN 61000-6-3 NF EN 61000-6-4	EN 62477-1	EN 62477-1
Dimensions	(mm)	103.6 × 69.6 × 252	417 × 110 × 198	633 × 180 × 344
Weight	(kg (lb))	2 (4.41)	9.3 (20.50)	25 (55.12)
Pollution Level/degree		2	3	3
Maximum AC current	(A)	9.5	15.5	12.8
Maximum AC Power	(W)	1040	3360	7490
Nominal DC voltage	(V)	24	24	24
Maximum DC current	(A)	35	120	225
PF λ (Uac Nom, 50Hz, Udc Nom, Idc max)		0.7	0.999	0.934
THDi (Uac Nom, 50Hz, Udc Nom, Idc max)	(%)	100	1.61	41.55
Efficiency	(%)	85	91	91

\* On-board charger

# STANDARD AND OPTIONAL EQUIPMENT

	Model	Li-ION On-board charger	Li-ION charger 3 kW housing	Li-ION charger 5.5 kW housing
Safety	External start/stop – Preventing sparking, if the charging lead is disconnected while charging is in progress	●	●	●
	Fully harmonized system via CAN bus communication	●	●	●
Service	Calendar function – For time-controlled charging	–	●	●
	Current peak avoidance – System managing power consumption and charging periods to avoid peak load	–	●	●
	Dealer text – Display of service contact when error arises	–	●	●
Comfort	USB interface – For software updates and analysis	–	●	●
	LED strip, charging status indicator – Easy and fast status identification	–	○	○
	Operate directly from the device – Through intuitive display	–	●	●
Workplace	Remote display	–	–	○
	Air pre-filter – Protecting the inside of the charger from contamination	–	○	○
	Standard charging cable 3 m	–	●	●
	Charging cable 5 m	–	○	○
	Charging housing rental	–	–	○
	Charging module small (600)	–	–	○
Charging 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