



Energy solutions

LI-ION BATTERIES AND CHARGERS

24 V

Ideal for all kind of applications

- State of the art technology to reduce energy costs (up to 30 %)
- Multilevel safety concept on cell, module and battery level
- 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

TECHNICAL DATA Li-ION 24 V BATTERIES

PALLET TRUCKS AND PALLET STACKERS

Nominal voltage	Available trucks	Energy content	Capacity	Weight (± 5 %)	Dimensions (l × w × h) in mm	IP protection class	Full-charging time with on-board charger 24 V/35 A/1 kW ³⁾
24 V	T16 L, T16-T18, L10-L12, D08	1.8 kWh	82 Ah	51 kg	648 × 156 × 627	IP 54	2 h 08 min
		3.6 kWh	164 Ah	71 kg			4 h 20 min
	T16 L, T16-T20, L14-L16, L14-16 AP, T20-25 AP SP, D12-14 D12 HP, L12 AP, L12-14 SP, D12-D14 SP AP (HP), T20-25 AP (B), T20-25 FP, T25-30, D10 (B), D10 AP (B), D10 FP, T14 S, T20-25 S SF SR R RW, D12 S SF R RW, L14-16 R RW	4.5 kWh	205 Ah	110 kg	718 × 210 × 633		5 h 30 min
		9 kWh	410 Ah	151 kg			11 h 00 min

Nominal voltage	Available trucks	Full-charging time with charger 24 V/120 A/3 kW ³⁾	Full-charging time with charger 24 V/225 A/5.5 kW ³⁾	Chemical system	Charging temperature	Operating temperature	Storage temperature
24 V	T16 L, T16-T18, L10-L12, D08	1 h 15 min	1 h 15 min	Lithium-Ferro Phosphate (LiFePO ₄)	-15 °C to +45 °C	-20 °C to +45 °C	-20 °C to +40 °C
		1 h 25 min	1 h 15 min				
	T16 L, T16-T20, L14-L16, L14-16 AP, T20-25 AP SP, D12-14 D12 HP, L12 AP, L12-14 SP, D12-D14 SP AP (HP), T20-25 AP (B), T20-25 FP, T25-30, D10 (B), D10 AP (B), D10 FP, T14 S, T20-25 S SF SR R RW, D12 S SF R RW, L14-16 R RW	1 h 43 min	1 h 15 min				
		3 h 25 min	2 h 05 min				

ORDER PICKERS AND TOW TRACTORS

Nominal voltage	Available trucks	Energy content	Capacity	Weight (± 5 %)	Dimensions (l × w × h) in mm	IP protection class	Full-charging time with on-board charger 24 V/35 A/1 kW ³⁾
24 V	N20 B, N20-25 (HP), N16 Li, N20 D (HP), N20 LoL, N20 XL, N20 C B, N20-25 C (HP), N20 C D, N20 C LoL, N20 C L, N20 C LX, V08-01, V08-02, P40 C (B), P60 C	4.5 kWh	205 Ah	110 kg	718 × 210 × 633	IP 54	5 h 30 min
		9 kWh	410 Ah	151 kg			11 h 00 min

Nominal voltage	Available trucks	Full-charging time with charger 24 V/120 A/3 kW ³⁾	Full-charging time with charger 24 V/225 A/5.5 kW ³⁾	Chemical system	Charging temperature ¹⁾	Operating temperature	Storage temperature ²⁾
24 V	N20 B, N20-25 (HP), N16 Li, N20 D (HP), N20 LoL, N20 XL, N20 C B, N20-25 C (HP), N20 C D, N20 C LoL, N20 C L, N20 C LX, V08-01, V08-02, P40 C (B), P60 C	1 h 43 min	1 h 15 min	Lithium-Ferro Phosphate (LiFePO ₄)	-15 °C to +45 °C	-20 °C to +45 °C	-20 °C to +40 °C
		3 h 25 min	2 h 05 min				

1) At temperatures below 0 °C the charging time will increase

2) Constant storage below -10 °C/over 40 °C will have negative effects on the lifetime of the battery

3) At ambient/battery temperatur 20 °C

Balancing not included in cases of usage in a cold store application the highest battery capacity should always be chosen.

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	(mm² (in²))	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	—	●	●
	USB interface – For software updates and analysis	—	●	●
Comfort	LED strip, charging status indicator – Easy and fast status identification	—	○	○
	Operate directly from the device – Through intuitive display	—	●	●
	Remote display	—	—	○
Workplace	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 intallation on the wall or on the floor	—	○	○

● Standard equipment ○ Optional equipment — Not available

CHARACTERISTICS



V08 equipped with Li-ION battery

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

Efficiency

- Short charging times and the possibility of intermediate charging, e.g. during breaks, significantly increase vehicle availability for multi-shift operation
- 2500 complete charge cycles with 80 % (48 V and 90 V) or 75 % (24 V) residual capacity are guaranteed
- Li-ION battery system enables up to 30 % higher utilization of electrical energy
- Up to 95 % of the total capacity of the battery can actually be used
- Hardly noticeable voltage drop at low charge level



Quick access to charge

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 intermediate charging near break rooms or close to the area of use
- 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

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.

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