

Excellent Technology, Efficiency and Quality

New energy for the future



LICUBE®

Lithium-ion energy systems
for the materials handling industry

LICUBE® – Higher energy efficiency reduces your costs and protects the environment!

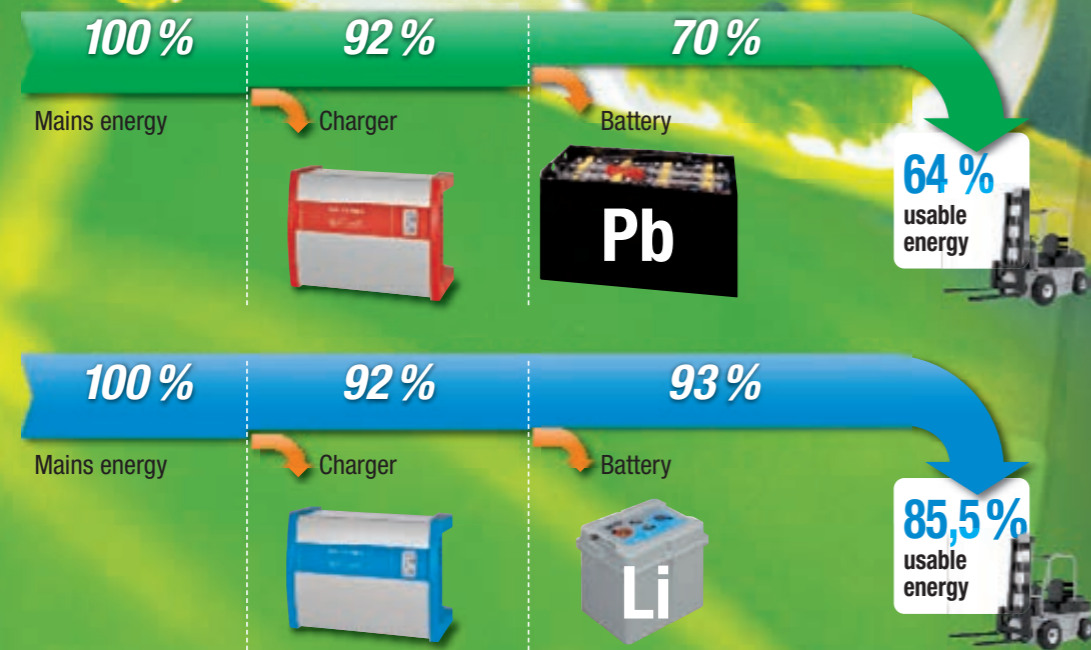


Fig. 1: Comparison of usable energy for lead-acid and lithium batteries

LICUBE® energy systems provide up to 5 times longer life

The modular LICUBE® energy systems are scalable in terms of voltage and capacity (parallel and series connection) so that they can be adapted to different electrically operated vehicles. These include for example:

- Material handling equipment
- Automated Guided Vehicles (AGV)
- Tractors
- Lifting Platforms
- Commercial vehicles
- Cleaning Machines
- Golf Cars
- Electric Boats
- Wheelchairs

Maximum energy efficiency, lower TCO

If LICUBE® energy systems are used instead of lead-acid batteries the useful energy for the electric vehicle is increased from 64% to 85.5%. This is due to a significantly better energy efficiency (see Fig. 1).

Three to five times longer life

Small capacity lead-acid (grid plate) batteries achieve approximately 400 – 700 cycles when 80% discharged per cycle. In comparison, LICUBE® energy systems offer more than 2500 cycles, 3 – 5 times longer life.

No investment in central charging stations

Since no gassing occurs during the recharge process, charging can occur on a decentralized basis. Investment in the establishment of special charging stations can thus be avoided.

Special Features

Modular scalable

- flexibility to adapt to different requirements

Efficient, easy to use and compact

- saves energy and reduces CO₂ emissions
- low weight and volume

Opportunity charging

- high availability and high degree of autonomy
- no special battery rooms required

High cycle life

- more than 2500 cycles at 80% DOD

Maintenance and emission-free

- completely sealed (IP67)

Low self-discharge

- less than 3% per month at 23°C

Integrated battery management system (BMS)

- high intrinsic safety and stability

Industry standard

- CE, EMV, UN38.3,
- rugged design



Figure 2: External state of charge and status display

Specifications:

Nominal energy	0.6 kWh	0.9 kWh	1.5 kWh
Rated Voltage		12.8 V	
Charge voltage		14.4 V	
End of discharge voltage		11.2 V	
Nominal capacity	50 Ah	70 Ah	120 Ah
Recommended charging current	25 A (0.5C, 2h)	35 A (0.5C, 2h)	60 A (0.5C, 2h)
Max Load current	50 A (1C, 1h)	70 A (1C, 1h)	120 A (1C, 1h)
Pulse currents of	500 A (6 seconds) / 1000 A (2 sec)		
Discharge temperature	-20°C ... +50°C		
Charging temperature	0°C ... +45°C		
Storage	0°C ... +35°C (6 Mth.) / -40°C ... +60°C (1 Mth.) at 60% SOC		
Self-discharge	<3% per month at 23°C		
Cell type	LiFePO ₄ / LFP		
Interconnection	max. 64 in series, max. 10 parallel		
Contact	M8 flat contacts / M10 bolt		
Standards	IP 67, UN38.3, CE, various EMC standards		
Display	LED display for load and operating condition		
System integration	CAN open Gateway (Cia 418)		
Dimensions (LxWxH)	225mm x 175mm x 200mm	225mm x 175mm x 230mm	225mm x 175mm x 320mm
Weight	9.6 kg	12.2 kg	17.8 kg

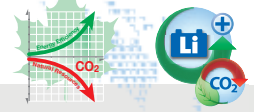
Subject to technical changes.

BENNING worldwide

ISO
9001

ISO
14001

SCC



Austria

Benning GmbH
Elektrotechnik und Elektronik
Eduard-Klinger-Str. 9
3423 ST. ANDRÄ-WÖRDERN
Tel.: +43 (0) 22 42 / 3 24 16-0
Fax: +43 (0) 22 42 / 3 24 23
E-mail: info@benning.at

Belarus

1000 BENNING
ul. Belorusskaya, 51-25
224025, BREST, REPUBLIK BELARUS
Tel.: +375 (0) 1 62 / 97 47 82
Fax: +375 (0) 1 62 / 29 33 77
E-mail: info@benning.brest.by

Belgium

Benning Belgium
Power Electronics
Z. 2 Essenestraat 16
1740 TERNAT
Tel.: +32 (0) 2 / 5 82 87 85
Fax: +32 (0) 2 / 5 82 87 69
E-mail: info@benning.be

Croatia

Benning Zagreb d.o.o.
Trnjanska 61
10000 ZAGREB
Tel.: +385 (0) 1 / 6 31 22 80
Fax: +385 (0) 1 / 6 31 22 89
E-mail: info@benning.hr

Czech Republic

Benning CR, s.r.o.
Zahradní ul. 894
293 06 KOSMONOSY
(Mladá Boleslav)
Tel.: +420 / 3 26 72 10 03
Fax: +420 / 3 26 72 25 33
E-mail: odbyt@benning.cz

France

Benning
conversion d'énergie
43, avenue Winston Churchill
B.P. 418
27404 LOUVIERS CEDEX
Tel.: +33 (0) / 2 32 25 23 94
Fax: +33 (0) / 2 32 25 13 95
E-mail: info@benning.fr

Germany

Benning Elektrotechnik und Elektronik
GmbH & Co. KG
Factory I: Münsterstr. 135-137
Factory II: Robert-Bosch-Str. 20
46397 BOCHOLT
Tel.: +49 (0) 28 71 / 93-0
Fax: +49 (0) 28 71 / 93 297
E-mail: info@benning.de

Great-Britain

Benning Power Electronics (UK) Ltd.
Oakley House
Hogwood Lane
Finchampstead
BERKSHIRE
RG 40 4QW
Tel.: +44 (0) 1 18 / 9 73 15 06
Fax: +44 (0) 1 18 / 9 73 15 08
E-mail: info@benninguk.com

Hungary

Benning Kft.
Power Electronics
Rákóczi út 145
2541 LÁBATLAN
Tel.: +36 (0) 33 / 50 76 00
Fax: +36 (0) 33 / 50 76 01
E-mail: benning@vnet.hu

Italy

Benning Conversione di Energia S.r.l.
Via 2 Giugno 1946, 8/B
40033 CASALECCHIO DI RENO (BO)
Tel.: +39 0 51 / 75 88 00
Fax: +39 0 51 / 6 16 76 55
E-mail: info@benningitalia.com

Netherlands

Benning NL
Power Electronics
Peppelkade 42
3992 AK HOUTEN
Tel.: +31 (0) 30 / 6 34 60 10
Fax: +31 (0) 30 / 6 34 60 20
E-mail: info@benning.nl

Poland

Benning Power Electronics Sp. z o.o.
Korczykowska 30
05-503 GŁOSKÓW
Tel.: +48 (0) 22 / 7 57 84 53
Fax: +48 (0) 22 / 7 57 84 52
E-mail: biuro@benning.biz

P. R. China

Benning Power Electronics (Beijing) Co., Ltd.
No. 6 Guangyuan Dongjie
Tongzhou Industrial Development Zone
101113 BEIJING
Tel.: +86 (0) 10 / 61 56 85 88
Fax: +86 (0) 10 / 61 50 62 00
E-mail: info@benning.cn

Russian Federation

000 Benning Power Electronics
Domodedovo town,
microdistrict Severny,
"Benning" estate, bldg.1
142000 Moscow region
Tel.: +7 4 95 / 9 67 68 50
Fax: +7 4 95 / 9 67 68 51
E-mail: benning@benning.ru

Serbia

Benning Power Electronics doo
Srbija
Kornelija Stankovića 19
11000 BEOGRAD
Tel.: +381 (0) 11 / 3 44 20 73
Fax: +381 (0) 11 / 3 44 20 73
E-mail: info@benning.co.rs

Slovakia

Benning Slovensko, s.r.o.
Kukuricná 17
83103 BRATISLAVA
Tel.: +421 (0) 2 / 44 45 99 42
Fax: +421 (0) 2 / 44 45 50 05
E-mail: benning@benning.sk

South East Asia

Benning Power Electronics Pte Ltd
85, Defu Lane 10
#05-00
SINGAPORE 539218
Tel.: +65 / 68 44 31 33
Fax: +65 / 68 44 32 79
E-mail: sales@benning.com.sg

Spain

Benning Conversión de Energía S.A.
C/Pico de Santa Catalina 2
Pol. Ind. Los Linares
28970 HUMANES, MADRID
Tel.: +34 91 / 6 04 81 10
Fax: +34 91 / 6 04 84 02
E-mail: benning@benning.es

Sweden

Benning Sweden AB
Box 990, Hovslagarev. 3B
19129 SOLLENTUNA
Tel.: +46 (0) 8 / 6 23 95 00
Fax: +46 (0) 8 / 96 97 72
E-mail: power@benning.se

Switzerland

Benning Power Electronics GmbH
Industriestrasse 6
8305 DIETLIKON
Tel.: +41 (0) 44 / 8 05 75 75
Fax: +41 (0) 44 / 8 05 75 80
E-mail: info@benning.ch

Turkey

Benning GmbH Turkey Liaison Office
19 Mayıs Mah. Kürkçü Sokak No:16/A
34736 Kozyatağı
Kadıköy / İSTANBUL
Tel.: +90 (0) 2 16 / 4 45 71 46
Fax: +90 (0) 2 16 / 4 45 71 47
E-mail: b.dinler@benning.com.tr

Ukraine

Benning Power Electronics
3 Sim'yi Sosninykh str.
03148 KYIV
Tel.: +380 (0) 44 / 5 01 40 45
Fax: +380 (0) 44 / 2 73 57 49
E-mail: info@benning.ua

U.S.A.

Benning Power Electronics, Inc.
1220 Presidential Drive
RICHARDSON, TEXAS 75081
Tel.: +1 2 14 / 5 53 14 44
Fax: +1 2 14 / 5 53 13 55
E-mail: sales@benning.us

BENNING