VARTA Solutions

Power Electronics & Energy Storage event

14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

ENERGY STORAGE
EVENT 2022

Agenda:

- VARTA - At A Glance
- Easy Blade – Industrial Applications
- Easy Pro – Telcom / Data
- CellPac Lite – Product Overview

VARTA AG 2022

Lithium-Ion Solutions & Microbatteries

Micro

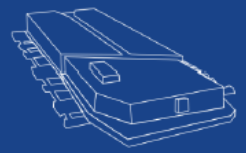
Li-Ion Cells & Solutions

CoinPower

RoundPower

Solutions

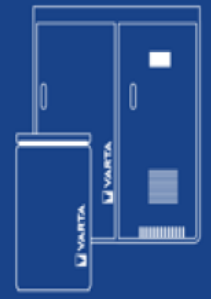
V4Drive



Household Batteries

Consumer

ESS



Thomas Müller

VARTA

Power Electronics & Energy Storage event

POWER ELECTRONICS 2022

ENERGY STORAGE EVENT 2022

14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

At a Glance

Brasov, Romania

Nördlingen

Batam, Indonesia

Turnover 2021

€902,9 million

Cells produced in 2021

approx. 3 billion cells

Employees

approx. 4.700

VARTA

VARTA's Worldwide Footprint

HQ Ellwangen

1.605 Employees

Production capacity of more than 1,200 billion microbatteries p.a.

Packaging capacity of 1 billion microbatteries p.a.

Dischingen

578 Employees

Production capacity of 1,750 billion alkaline batteries p.a.

Nördlingen

1.819 Employees.

Production capacity of more than 200 million microbatteries p.a.

Production capacity of 15.000 energy storage systems p.a.

Romania

473 Employees

Packaging capacity of 300 million microbatteries p.a.

Packaging capacity of 40 million consumer batteries p.a.

Assembly capacity of 50 million micro and round cells p.a

Indonesia

719 Employees

Assembly capacity of 100 million micro and round cells p.a.

China (Shenzen)

12 Employees

Technology Competence Center

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Application **S**pecific **B**atteries (ASB)

VARTA **A**pplication **S**pecific **B**atteries

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Current Basic Building Blocks

VARTA Solutions: **A**pplication **S**pecific **B**atteries
24V & 36V & 48V Lithium Batteries Modules
Scalable from 0,58 kWh to 37,55 kWh

VARTA´s new range of Application Specific Batteries (ASB) offers smart, modular system energy for 24V & 36V& 48V applications. ASB makes building applications easier for OEMs so they can focus on their own product.

VARTA

Choice of Technologies

Easy Blade

NMC

Easy Block

LiFePO4

VARTA

Extendable Capacity

All models can be connected in parallel up to **25 battery modules.**

Model	Easy Blade (NMC)
24	37.55 kWh (1450 Ah)
36	37.55 kWh (1120 Ah)
48	37.55 kWh (725 Ah)

Model	Easy Block (LiFePO4)
24	14.5 kWh (570 Ah)
48	14.5 kWh (285 Ah)

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Shared Features of ASB Series

- Balanced energy density, power and lifetime performance.
- Fast charging to 80% within 1 hour, fully charged in <3 hours
- Zero maintenance or service requirements from the user.
- Modular design for parallel connection up to 25 modules
- Integrated communications – CAN Bus (CANopen)
- Dynamic Master-Slave BMS Identification. One BMS controls the whole system automatically.
- Multi-level safety integrated into each pack.
- Comprehensive design-in resources.

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Easy Blade 24

Easy Blade 24

25.9 V | 58 Ah | 1502 Wh | VKB: 56654 799 098

VARTA Storage GmbH - Rev No. 1 0421

*Illustration only

ELECTRICAL SPECIFICATION

Power connection	Negative terminal: M6 (six) screw type, rated female terminal Positive terminal: M8 (eight) screw type, rated female terminal
CAN BUS connection	Type: 2x (two) M12-5, plug, female sockets Mating style: screw thread Coding: A Model: TE part number T4111002051-000
Nominal voltage	25.9 V
Typical capacity	58 Ah
Typical energy	1502 Wh
Charging method	Constant Current + Constant Voltage
Max. charge voltage	29.05 V
Max. charge current	60 A (not for cycle life)
Rec. charge current	20.6 A
Rec. charge cut off	Current < 2.0 A
Rec. discharge cut off	21 V
Max. continuous discharge current	60 A
Max. pulse discharge current	65 A for 3 sec.
Rec. discharge current	31 A
Exp. cycle life at (0.5 C / 0.5 C), 22 °C ± 2 °C	≥ 80 % of initial capacity at 1,200 cycles

GENERAL
(Battery with safety circuit and plastic/metal combination)

Size (l x w x h) in mm	330 x 80 x 230
General	Lithium-Nickel-Manganese-Cobalt-Oxide with BMS
Communications	CAN Bus (CANopen)
Weight	Approx. 9.6 kg

CELL&BATTERY PROTECTION

Safety function	Short circuit protection: 300A / 0.1ms Over discharge current protection 1: 65A / 5s; level 2: 85A / 50ms Over charge current protection 1: 65A / 5s; level 2 85A / 50ms
Fuse	100A

ENVIROMENTAL CONDITIONS

Charge	0 °C to +50 °C
Discharge	-20 °C to +55 °C
Storage	1 to 3 months at -20 °C to +45 °C 1 year at -20 °C to +24 °C
Humidity	25 to 85 RH %
IP rating	IP 30, not water resistant

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642.
This battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
This battery is certified according to IEC62133-2:2017 and UN38.3.

FEATURES

- Active cooling for improved lifetime.
- Easily connected up to 25 modules in parallel for higher capacities.
- Housing with locking feature for easy attachment to adjacent module.
- No external battery management needed.
- Automatic master-slave status established.
- Zero maintenance, zero emissions.
- Limited 2 year warranty.

Minimum order quantity: 260 pcs / Order multiples: 20 pcs
Product for OEM customers only. Distributor MOQs may vary.

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Easy Blade 36

Easy Blade 36

37 V | 44,8 Ah nominal | 1658 Wh | VKB: 56654799089

VARTA Storage GmbH - Rev No. 10421

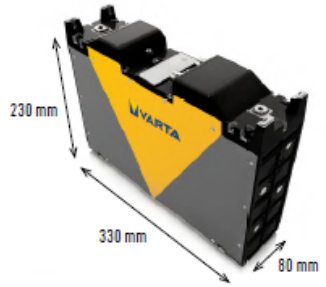


*Illustration only

ELECTRICAL SPECIFICATION

Power connection	Negative terminal: M6 (six) screw type, rated female terminal Positive terminal: M8 (eight) screw type, rated female terminal
CAN BUS connection	Type: 2x (two) M12-5, plug, female sockets Mating style: screw thread Coding: A Model: TE part number T4111002051-000
Nominal voltage	37 V
Typical capacity	44,8 Ah
Typical energy	1658 Wh
Charging method	Constant Current + Constant Voltage
Max. charge voltage	41.5 V
Max. charge current	44.8 A
Rec. charge cut off	Current < 2.24 A
Rec. discharge cut off	30 V
Max. continuous discharge current	60 A
Rec. discharge current	22.4 A
Exp. cycle life at (0.5 C / 0.5 C), 22 °C ± 2 °C	≥ 80 % of initial capacity at 1.200 cycles

GENERAL

(Battery with safety circuit and plastic/metal combination)

Size (l x w x h) in mm	330 x 80 x 230
General	Lithium-Nickel-Manganese-Cobalt-Oxide with BMS
Communications	CAN Bus (CANopen)
Weight	Approx. 9,6 kg

CELL&BATTERY PROTECTION

Safety function	Short circuit protection: 300A / 0.1ms Over discharge current protection 1: 65A / 5s; level 2: 85A / 50ms Over charge current protection 1: 65A / 5s; level 2 85A / 50ms
Fuse	100A

ENVIROMENTAL CONDITIONS

Charge	0 °C to +50 °C
Discharge	-20 °C to +55 °C
Storage	1 to 3 months at -20 °C to +45 °C 1 year at -20 °C to +24 °C
Humidity	25 to 85 RH %
IP rating	IP 30, not water resistant

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for Lilon & LiPolymer.
The cell used is a UL recognized component according to UL1642.
This battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
This battery is certified according to UL2595 and IEC60335.

FEATURES

- Active cooling for improved lifetime.
- Easily connected up to 25 modules in parallel for higher capacities.
- Housing with locking feature for easy attachment to adjacent module.
- No external battery management needed.
- Automatic master-slave status established.
- Zero maintenance, zero emissions.
- Limited 2 year warranty.

Minimum order quantity: 260 pcs / Order multiples: 20 pcs
Product for OEM customers only. Distributor MOQs may vary.

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Easy Blade 48

Easy Blade 48

51.8 V | 29 Ah | 1502 Wh | VKB: 56654 799 092

VARTA Storage GmbH - Rev No. 1 0421

*Illustration only

ELECTRICAL SPECIFICATION

Power connection	Negative terminal: M6 (six) screw type, rated female terminal Positive terminal: M8 (eight) screw type, rated female terminal
CAN BUS connection	Type: 2x (two) M12-5, plug, female sockets Mating style: screw thread Coding: A Model: TE part number T4111002051-000
Nominal voltage	51.8 V
Typical capacity	29 Ah
Typical energy	1502 Wh
Charging method	Constant Current + Constant Voltage
Max. charge voltage	58.1 V
Max. charge current	31 A (not for cycle life)
Rec. charge current	10.3 A
Rec. charge cut off	Current < 1.0 A
Rec. discharge cut off	42 V
Max. continuous discharge current	31 A
Max. pulse discharge current	65 A for 3 sec. and 60 A for 30 sec.
Rec. discharge current	15.5 A
Exp. cycle life at (0.5 C / 0.5 C), 22 °C ± 2 °C	≥ 80 % of initial capacity at 1,200 cycles

GENERAL

(Battery with safety circuit and plastic/metal combination)

Size (l x w x h) in mm	330 x 80 x 230
General	Lithium-Nickel-Manganese-Cobalt-Oxide with BMS
Communications	CAN Bus (CANopen)
Weight	Approx. 9.6 kg

CELL & BATTERY PROTECTION

Safety function	Short circuit protection: 300A / 0.1ms Over discharge current protection 1: 65A / 5s; level 2: 85A / 50ms Over charge current protection 1: 65A / 5s; level 2 85A / 50ms
Fuse	100A

ENVIROMENTAL CONDITIONS

Charge	0 °C to +50 °C
Discharge	-20 °C to +55 °C
Storage	1 to 3 months at -20 °C to +45 °C 1 year at -20 °C to +24 °C
Humidity	25 to 85 RH %
IP rating	IP 30, not water resistant

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for Lilon & LiPolymer.
The cell used is a UL recognized component according to UL1642.
This battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
This battery is certified according to IEC62133-2:2017, UN38.3. UL 2595 and IEC 60335

FEATURES

- Active cooling for improved lifetime.
- Easily connected up to 25 modules in parallel for higher capacities.
- Housing with locking feature for easy attachment to adjacent module.
- No external battery management needed.
- Automatic master-slave status established.
- Zero maintenance, zero emissions
- Water sealed power connectors

Minimum order quantity: 260 pcs / Order multiples: 20 pcs
Product for OEM customers only. Distributor MOQs may vary.

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Easy Block 24

Easy Block 24

25.6 V | 22.8 Ah | 583 Wh | VKB: 56650 764 099

VARTA Storage GmbH - Rev No. 1 0421

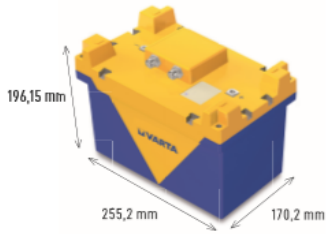


*Illustration only

ELECTRICAL SPECIFICATION

Power connection	Negative terminal: M6 (six) screw type, rated female terminal Positive terminal: M8 (eight) screw type, rated female terminal
CAN BUS connection	Type: 2x (two) M12-5, plug, female sockets Mating style: screw thread Coding: A Model: TE T4111002051-000 or similar
Typical voltage	25.6 V
Typical capacity	22.8 Ah
Nominal energy	583 Wh
Charging method	Constant Current + Constant Voltage
Max. charge voltage	29.2 V
Max. charge current	22.8 A
Rec. charge current	20 A
Rec. charge cut off	Current < 1.2 A
Rec. discharge cut off	20 V
Max. continuous discharge current	60 A
Max. pulse discharge current	65 A for 3 sec.
Rec. discharge current	20 A
Exp. cycle life at (0.9 °C / 0.9 °C), 22 °C ± 2 °C	≥ 80 % of initial capacity at 4,000 cycles ≥ 60 % of initial capacity at 10,000 cycles

GENERAL (Battery with safety circuit)

Size (l x w x h) in mm	255,2 x 170,2 x 196,15
General	LI-Iron-Phosphate
Communications	CAN Bus (CANopen)
Weight	Approx. 7.5 kg

CELL&BATTERY PROTECTION

Safety function	Short circuit protection: 300A / 0.1ms Over discharge current protection 1: 65A / 5s; level 2: 85A / 50ms Over charge current protection 1: 65A / 5s; level 2 85A / 50ms
Fuse	100A (one time)

ENVIROMENTAL CONDITIONS

Charge	0 °C to +50 °C
Discharge	-20 °C to +60 °C
Storage	1 to 3 months at -20 °C to +45 °C 1 year at -20 °C to +24 °C
Humidity	25 to 85 RH %
IP rating	IP 30, not water resistant

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642.
This battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
This battery is certifi ed to according to IEC62133-2:2017 and UN38.3.

FEATURES

- Extra-long cycle life for heavy duty cycle projects and reduced total cost of ownership.
- Easily connected up to 25 modules in parallel for higher capacities.
- Housing with locking feature for easy attachment to adjacent module.
- No external battery management needed.
- Automatic master-slave status established.
- Zero maintenance, zero emissions.
- Limited 2 year warranty.

Minimum order quantity: 256 pcs / Order multiples: 32 pcs
Product for OEM customers only. Distributor MOQs may vary.

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Easy Block 48

Easy Block 48

51.2 V | 11.4 Ah | 583 Wh | VKB: 56650 764 098

VARTA Storage GmbH - Rev No. 10421

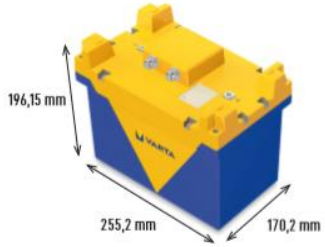


*Illustration only

ELECTRICAL SPECIFICATION

Power connection	Negative terminal: M6 (six) screw type, rated female terminal Positive terminal: M8 (eight) screw type, rated female terminal
CAN BUS connection	Type: 2x (two) M12-5, plug, female sockets Mating style: screw thread Coding: A Model: TE T4111002051-000 or similar
Nominal voltage	51.2 V
Typical capacity	11.4 Ah
Typical energy	583 Wh
Charging method	Constant Current + Constant Voltage
Max. charge voltage	57.6 V
Max charge current	11.4 A
Rec. charge current	10 A
Rec. charge cut off	Current < 600 mA
Rec. discharge cut off	40 V
Max. continuous discharge current	60 A
Max. pulse discharge current.	65 A for 3 sec
Rec. discharge current	10 A
Exp. cycle life at (0.9 °C / 0.9 °C), 22 °C ± 2 °C	≥ 80 % of initial capacity at 4,000 cycles ≥ 60 % of initial capacity at 10,000 cycles

GENERAL (Battery with safety circuit)

Size (l x w x h) in mm	255,2 x 170,2 x 196,15
General	Li-Iron-Phosphate
Communications	CAN Bus (CANopen)
Weight	Approx. 7.5 kg

CELL&BATTERY PROTECTION

Safety function	Short circuit protection: 300A / 0.1ms Over discharge current protection 1: 65A / 5s; level 2: 85A / 50ms Over charge current protection 1: 65A / 5s; level 2 85A / 50ms
Fuse	100A (one time)

ENVIROMENTAL CONDITIONS

Charge	0 °C to +50 °C
Discharge	-20 °C to +60 °C
Storage	1 to 3 months at -20 °C to +45 °C 1 year at -20 °C to +24 °C
Humidity	25 to 85 RH %
IP rating	IP 30, not water resistant

SAFETY CERTIFICATIONS

Please follow VARTA handling and safety precautions for LiIon & LiPolymer.
The cell used is a UL recognized component according to UL1642.
This battery meets the requirements of battery directives and the battery parts are RoHS-compliant.
This battery is certifi ed to according to IEC62133-2:2017 and UN38.3.

FEATURES

- Extra-long cycle life for heavy duty cycle projects and reduced total cost of ownership.
- Easily connected up to 25 modules in parallel for higher capacities.
- Housing with locking feature for easy attachment to adjacent module.
- No external battery management needed.
- Automatic master-slave status established.
- Zero maintenance, zero emissions.
- Limited 2 year warranty.

Minimum order quantity: 256 pcs / Order multiples: 32 pcs
Product for OEM customers only. Distributor MOQs may vary.

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Application Specific Chargers (ASB)

Easy Charger 48

48 V | VKB: 57021101401

VARTA Storage GmbH - Rev No. 1 0421
Preliminary - Specifications subject to change.

Charger for

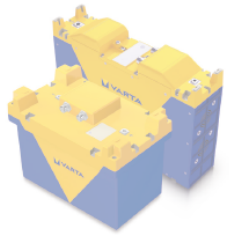


*Illustration only

GENERAL

Charger Software	Delta-Q Charger ICL1500 58 V VARTA specific software; tested and approved
Size (l x w x h) in mm	300 x 179 x 80
General	Charger for Easy Blade 48 V and Easy Block 48 V
Communications	CAN Bus (CANopen)
Weight	3.55 kg

ELECTRICAL SPECIFICATION

AC input connector	IEC320/C14
DC output connector	Poka-Yoke threaded fasteners for ring terminals. Negative: M6, Positive: M8
Signal connector	TE AmpSeal automotive connector (IP6K9K rated) - mates with TE Connectivity AmpSeal Plug (p/n: 776262-4): Signals for CAN bus (isolated); Remote status indicators; Signal Interlock

ENVIROMENTAL CONDITIONS

Operating temperature	-40°C to +65°C
Full nominal output power	-35°C to +40°C
Storage	-40°C to +85°C
IP rating	IP 66

AC INPUT

Max AC input current	14.0 A
Nominal AC	11.1 A @ 120 VAC
input current	7.2 A @ 230 VAC

DC OUTPUT

Lithium final charging voltage	36-58 VDC
Max DC output voltage	58.1 VDC
Max DC output current. V_{in} > 200	33.3 A
Max DC output power. V_{in} > 200	1500 W (V_{out} > 48V)
Max DC output current. V_{in} < 200	33.3 A
Max DC output power. V_{in} < 200	1200 W (V_{out} > 24V)
Dry contact interlock current rating	0.3 A

SAFETY CERTIFICATIONS

Voltage Class A (less than 60 VDC)
This battery charger is certified to
UL 1564, EN 60335-2-29, AZ/NZS 60335 (RCM)

FEATURES

- Active cooling - Forced convection with variable speed fan
- Sealed aluminum die-cast enclosure protects against vibration, shock, dirt, chemicals and fluids.
- Charge algorithms to precisely charge lithium batteries while balancing charge time, battery life and application requirements.
- Power cable is not included. Can be ordered under the part number 37000727150 (AC CORD 3 m USA) and 37000800751 (AC CORD 3 m EU)

Minimum order quantity: 50 pcs / Order multiples: 10 pcs
Product for OEM customers only. Distributor MOQs may vary.

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

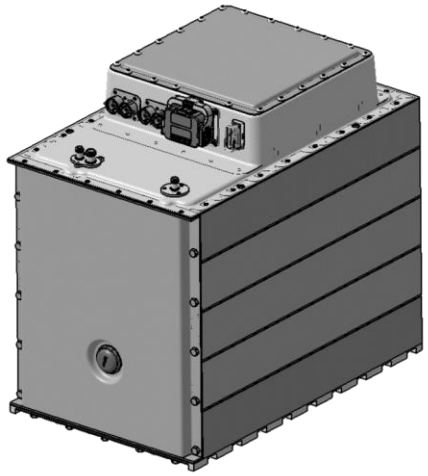
Three Options – one Solution

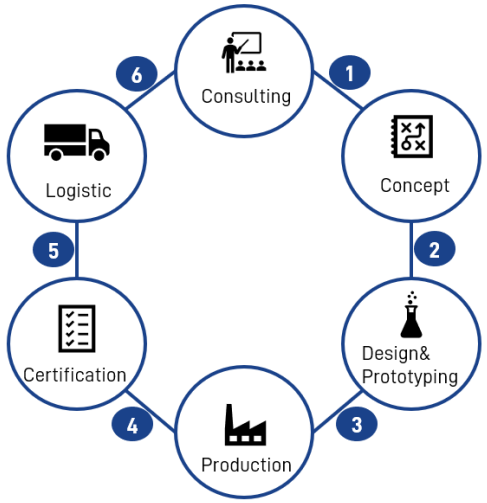
The Easy Series

Off the shelf batteries

The Modular Series

Semi customized modular kit





- Cloud-enhanced, wireless-connected
- Fixed and wireless-charged
- As a service

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Application Specific Batteries and Universal CAN Gateway

24V & 48V lithium batteries. Modules scalable from 0,58 kWh to 37,5 kWh

CAN Bus A

Cloud

Connection with any interface and the cloud

CAN Bus B

Charger

Wireless Charger

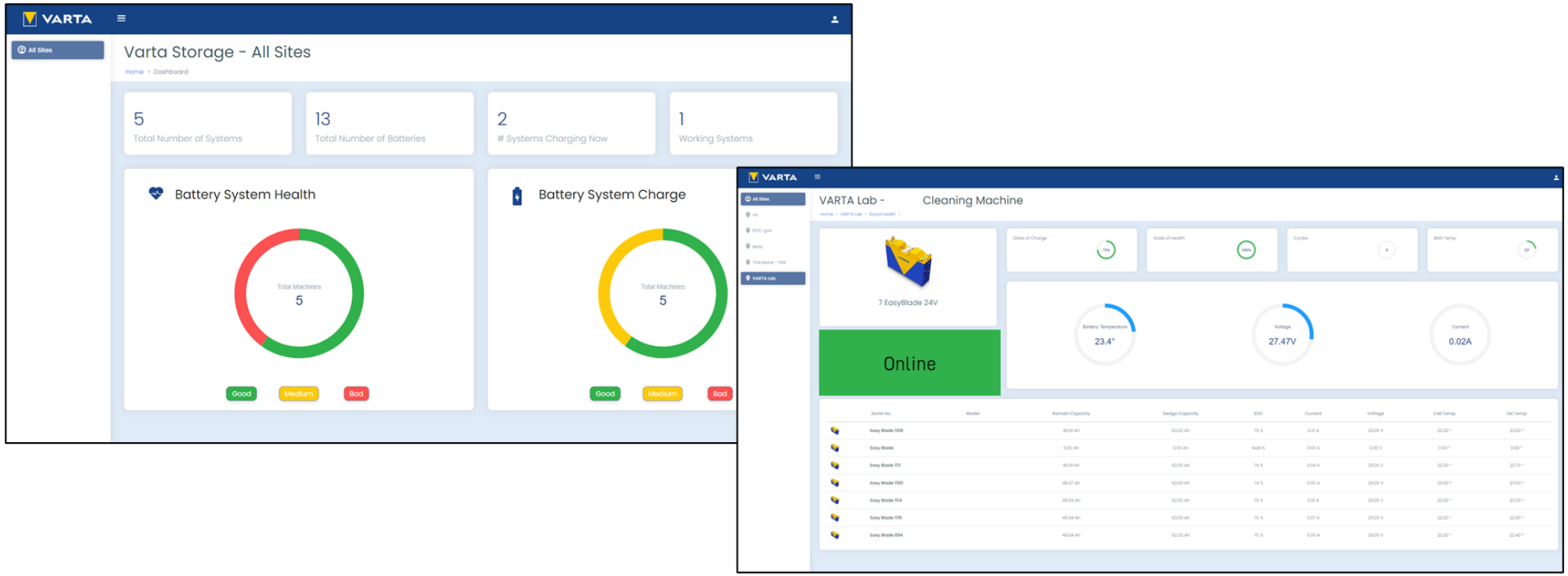
Application

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Batteries in the Cloud

VARTA Smart Services Stage 1



VARTA enables customers to have more transparency about the condition and operation of the battery through cloud services.

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Industrial Automation
Varta Easy Blade & Block

Unique Selling Points (USPs)

- Available off the shelve
- Battery & Charger = Ready „Scalable“ Solution
- Easy to implement
- Successstories available

What are we looking for - Examples

1. Floor Machines (Cleaning):

- Cleaning Equipment either robotic or user operated without mains electric connection

2. Automated Guided Vehicle (AGV/AMR)

- Autonomous mobile robots (AMR)
- Automated Guided Carts (AGCs)
- Automated tow tractors or fork lifts

3. Agriculture

Agricultural Robotics

- Crop Picking
- Weeding
- Movement of goods

- Industrial / professional Lawn Mowers – could be companies that currently use petrol engines and then we look for those that would move to battery power

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

What are we looking for - Examples

4. LEV / Autnomous robots

- Last mile delivery

5. Arial Work Plattforms

- Aerial Work Platform (AWP)
- „Boom Lift“ & „Scissor Lift“
- Set and operated by one person

6. Material Handling Forklifts

- Material handling equipment (MHE)
- Forklift
- Pallet Truck

VARTA

What are we looking for - Examples

6. Construction Machines

- Wheel Loader
- Crawler Excavator
- Compact Track Loaders

7. Others

- No Limit
- Everything what is moving and can take a battery

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Communication (5G / Telecom / Broadcast)
Varta Easy Pro

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Telecom As Growth Driver

1. **Bloomberg** forecast backup power for lithium in the telecommunications and data centre market will be grow from 0% in 2016 to 36% in 2025.
2. **Vertiv** reported a increase in Lithium vs Lead sales from of 5% -17% in between 2018 - 2020.
3. Lithium in telecom will be favoured in 5G sites that have a high density of traffic and therefore require more power. (real estate space and weight are an issue for telecom equipment and lead-acid is heavy and requires more space)
4. Most existing lead-acid companies are responding to the threat, but lack electronics and software competencies.
5. The **data centre and telecom markets** are linked and growing closer. A further trend in the market will be 'power-to-the-edge" not covered in this study.
6. Both market segments see the benefits of lithium, understand the value proposition as price lowers, but are cautious about safety concerns. Uptake has been more rapid in the US, but Europe will catch up!
7. Lithium prices are falling dramatically and are likely to continue.
8. In general the telecom sector prefers LFP or NMC for Lithium due to price, safety and availability.

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

5G Site Challenges

Wind load & weight
- Size of antennas and active antenna system (AAS).
- Increased weight for new active antenna radios.

Physical space
- Number of radios are increased as new bands are added.

Increased power consumption
- Site power need >10kW.
- Increased battery banks to support larger loads.

Critical 5G applications
- Require secure connectivity.
- Longer backup times needed.
- Physical security more important.
- Safe Environment for data processing needed.

VARTA

Telecom Network Architecture

Towers and Fixed central systems

On Roof and fixed systems

Concealed systems in urban areas

Relay systems power by Utilities

VARTA

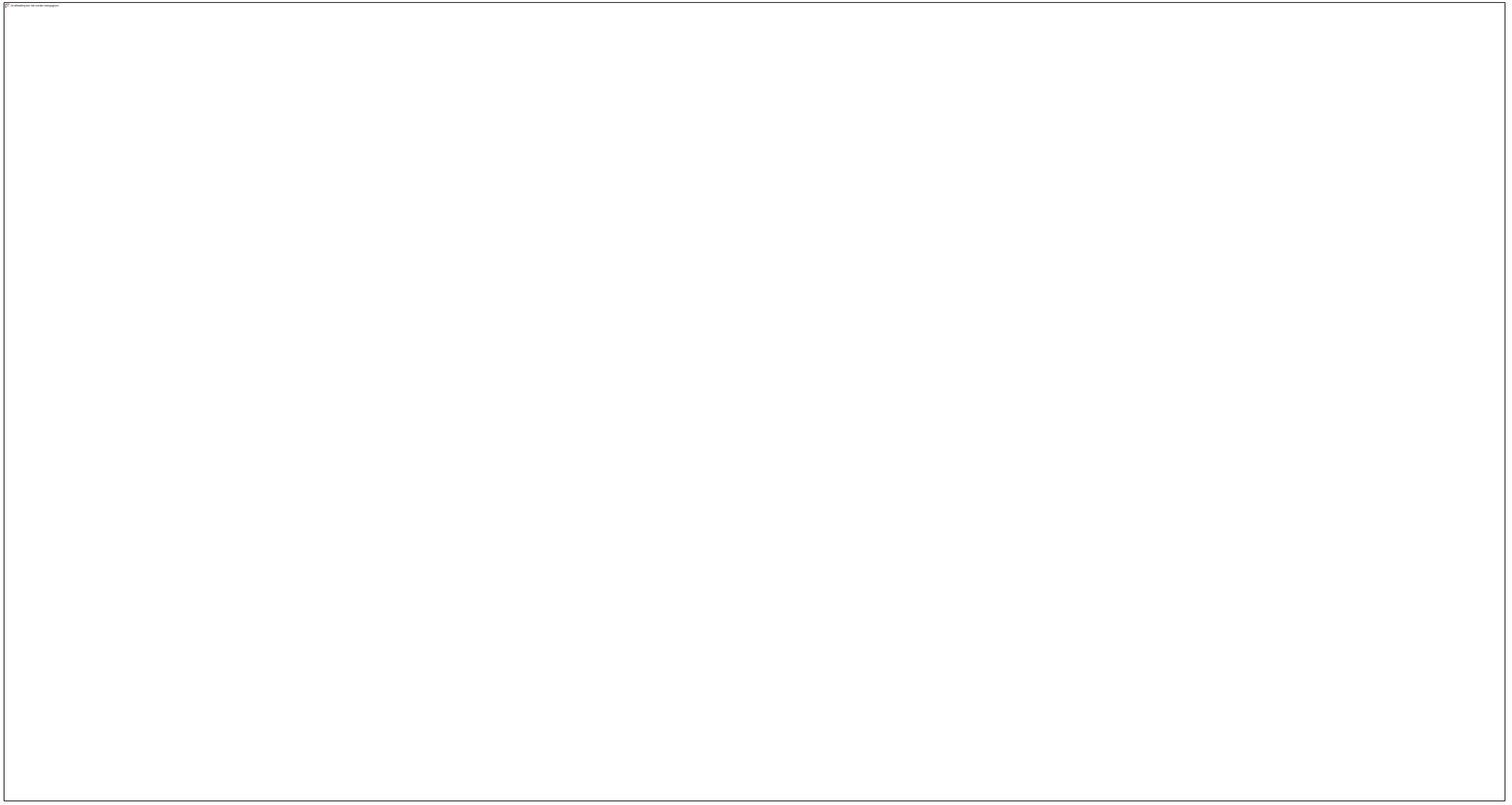
Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Macro Tower

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

5G Street furniture

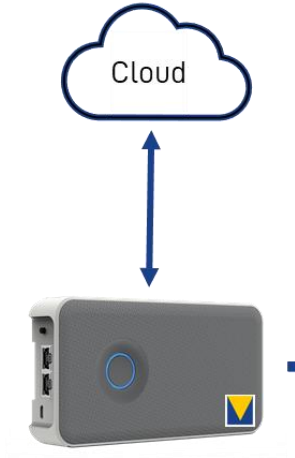


VARTA

VARTA connected Batteries

48V lithium UPS batteries. Modules scalable from 3 kWh to 75 kWh

CAN Bus A



Connection with any interface and the cloud

CAN Bus B

Inverter/ charger

Energy generation system

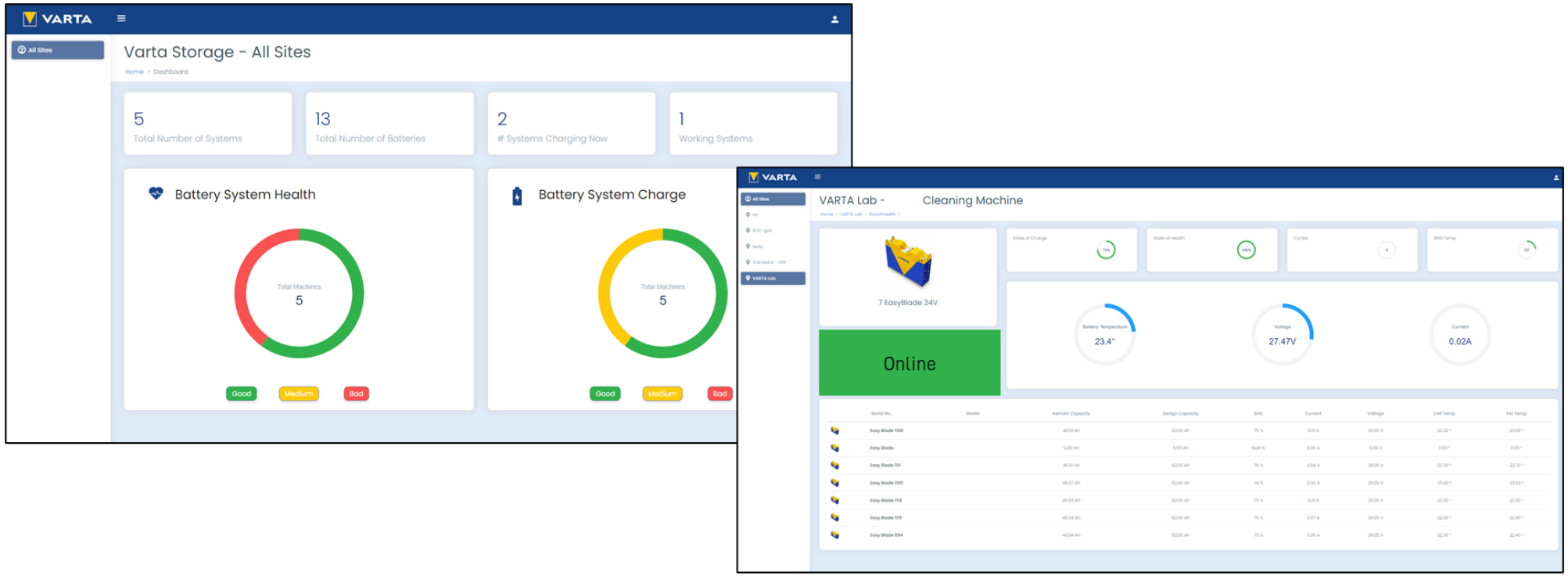
Application

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Batteries in the Cloud

VARTA Smart Services Stage 1



VARTA enables customers to have more transparency about the condition and operation of the battery through cloud services.

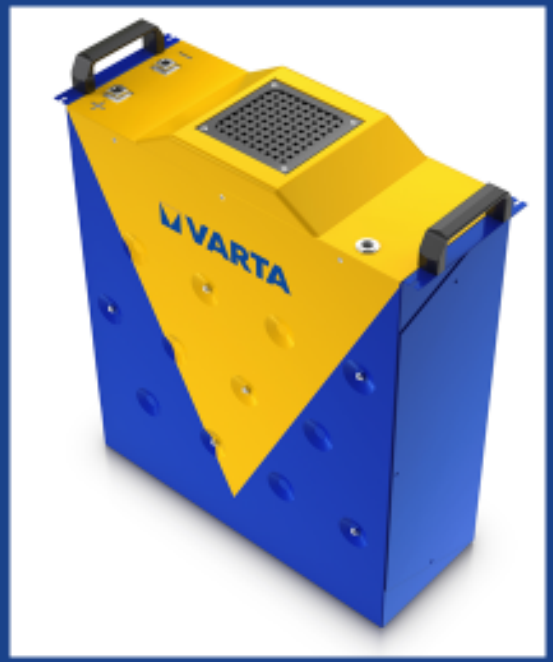
VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

One product many possibilities

VARTA – Easy Pro

A Modular Lithium – Ion Battery Pack



Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Easy Pro 1.0 – Current Spec.

51,2V; 60Ah; 3Kwh

GENERAL

Size (l x w x h) in mm	447 x 174 x 531
General	Li – Iron- Phosphate (Cell flexibility)
Communication	CAN Bus (CanOpen), RS 485,
Weight	Approx 40Kg

ELECTRICAL SPECIFICATION

Power connection	Dual M6/M8 - tbd
Nominal voltage	51,2V
Nominal capacity	60Ah
Nominal energy	3Kwh
Max. charge current	60A
Max. continues discharge	60A
Max. peak current	-
Exp. Cycle life LFP at (1C/1C)	>80% of initial capacity at 6.000cycles

ENVIRONMENTAL CONDTIONS

Charge temp	0C to +45C
Discharge temp	-20C to +60C
Storage temp	1 Year at 23C, >85%
Self discharge	les than 10%/ month
Humidity storage & operating	>85%
IP rating	IP21

FEATURES

- Easily connected to 25 modules in parallel for higher capacities
- Battery can be used in 19“ standard systems, mounting features for 19“. 4u high
- No external battery management needed. Automatic master-slave status established
- Zero maintenance, zero emissions.
- Limited 2 year warranty.

CERTIFICATIONS

- The cell used is a UL recognized component to UL1642
- The battery is certified to UN 38.3

VARTA

Samples available

Next Generation Easy Pro

51,2V; 100Ah; 5,1Kwh

GENERAL

Size (l x w x h) in mm	447 x 174 x 531 (Redflag 19Inch)
General	Li – Iron- Phosphate (Cell flexibility)
Communication	CAN Bus (CanOpen), RS 485 ,RS232, Mod Bus Bluetooth, LTE, Wifi, CiA protocol and Analog output controller
Weight	Approx 50Kg

ELECTRICAL SPECIFICATION

Power connection	Dual M6/M8 - tbd
Nominal voltage	51,2V
Nominal capacity	100Ah
Nominal energy	5,1Kwh
Max. charge current	100A
Max. continues discharge	200A
Max. peak current	-
Exp. Cycle life LFP at (1C/1C)	>80% of initial capacity at 6.000cycles

ENVIRONMENTAL CONDTIONS

Charge temp	0C to +45C
Discharge temp	-20C to +60C
Storage temp	1 Year at 23C, >85%
Self discharge	les than 10%/ month
Humidity storage & operating	>85%
IP rating	IP31 (Outdoor modul possible)

FEATURES

- Easily connected to 10 modules in parallel for higher capacities
- Battery can be used in 19“ standard systems, mounting features for 19“. 3u high
- No external battery management needed. Automatic master-slave status established
- Zero maintenance, zero emissions.
- 10 year warranty.

CERTIFICATIONS

- The cell used is a UL recognized component to UL1642
- The battery is certified to UN 38.3, IEC 62133 and UL 1973
- Mobile Base Station Security classes

VARTA

Preliminary NMC version in planning

VARTA Storage GmbH

CELLPAC LITE

Easy Packs

Easy Pack S

660 mAh

VKB: 56455 701 099

Easy Pack L

1,200 mAh

VKB: 56456 701 099

Easy Pack XL

2,400 mAh

VKB: 56456 702 099

Easy Pack PLUS

5,200 mAh

VKB: 56653 702 099

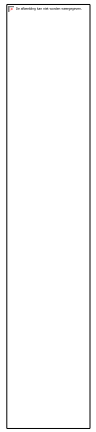
UN38.3
UL 2054
IEC 62133 edition 2: 2012

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Cylindrical 18650

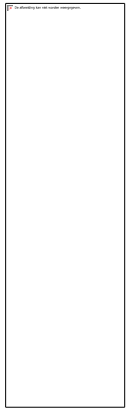
1/LIC 18650-26 SKE



2,600 mAh

VKB: 56653 201 012

2S/LIC 18650-26 SKE

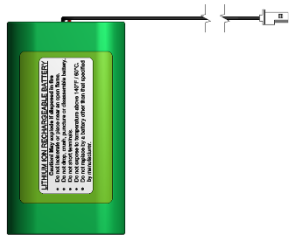


2,600 mAh

VKB: 56653 502 012

UN38.3
IEC 62133 edition 2: 2012
IEC 62133-2:2017

2P/LIC 18650-26 SKE



5,200 mAh

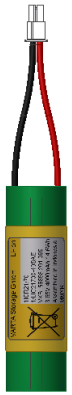
VKB: 56653 502 013

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Cylindrical 21700

1/LIC 21700-40 SAE

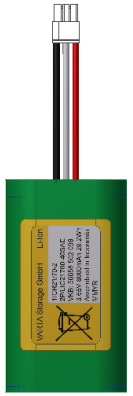


4000mAh

2S/LIC 21700-40 SAE

4000mAh, 7.3V

2P/LIC 21700-40 SAE



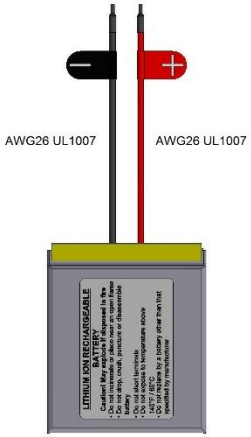
8000mAh

UN38.3
IEC62133-2:2017

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Polymer Pouch

1/LPP 443441 S

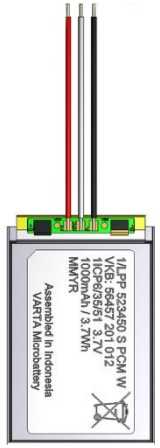


660 mAh

VKB: 56455 201 012

UN38.3
IEC 62133 edition 2: 2012

1/LPP 523450 S

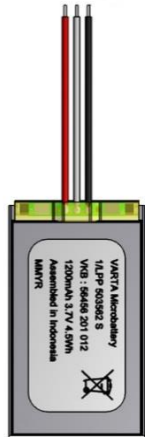


1,000 mAh

VKB: 56457 201 012

UN38.3
IEC 62133 edition 2: 2012
IEC 62133-2:2017

1/LPP 423566 BE



1,100 mAh

VKB: 56437 201 012

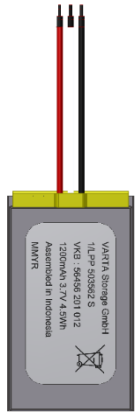
UN38.3
IEC 62133-2:2017

VARTA

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Polymer Pouch Cont.

1/LPP 503562 S

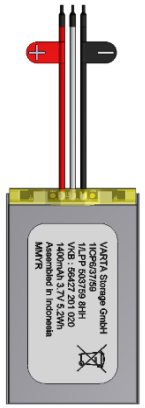


1,200 mAh

VKB: 56456 201 012

UN38.3

1/LPP 503759 S



1,400 mAh

VKB: 56427 201 022

UN38.3

IEC 62133 edition 2: 2012

IEC 62133-2:2017

Power Electronics & Energy Storage event
POWER ELECTRONICS 2022
ENERGY STORAGE EVENT 2022
14 juni 2022 | 1931 Congrescentrum 's-Hertogenbosch

Contact Details

VARTA Storage GmbH

Thomas Müller
Distribution Channel Manager

Phone: + 49 9081 24086 6421
Mobile: + 49 162 286 4763
Email: thomas.mueller@varta-storage.com

VARTA Storage GmbH

Christian Gaugler
Field Application Engineer

Phone: +49 9081 24086 6074
Mobile: +49 174 373 2947
Email: christian.gaugler@varta-storage.com