# Ride the thrill, feel the power of advanced battery systems

Energy awaits inside!

-IF EMBS

Feel the Power, Ride the Freedom Electrify Your E-Bike Adventure!

## We're a part of PRETTL

### Precision of production and development capabilities

As a strong partner in many areas, we are always on site where our customers and partners need us. We are represented on all continents and in all target markets. This guarantees our customers fast and targeted support in order to meet the constantly changing requirements. This high performance demand on ourselves drives us to top performance.

# A PART OF PRETTL

### **5 INDUSTRIES**

### Automotive

Applicance solutions

### Energy

**Electronics** 

Strategic build-up

### PRETTL AT A GLANCE



### **PRETTL Group**

#### Components PRETTL provides for different industry segments

Being part of the PRETTL Group significantly broadens our capabilities at EMBS, enabling us to offer an expanded range of high-quality components and solutions. This strategic collaboration allows us to leverage PRETTL's extensive global expertise and resources, enhancing our ability to provide components for e-bike projects for our customers. By aligning with PRETTL, we are positioned to provide more comprehensive, cutting-edge solutions, meeting the evolving needs of our customers with the utmost precision and reliability. This partnership strengthens our commitment to driving technological progress and delivering exceptional value across all industry segments.



### Our global footprint

### Connecting the world, empowering progress

We are experiencing rapid growth, with an expanding presence in Europe and beyond. As we continue to broaden our reach, we have established new locations across the globe to bring our cutting-edge e-bike technology to riders in diverse markets. Our commitment to innovation and sustainability drives us to connect with more people, offering reliable and eco-friendly transportation solutions wherever they are.



### We're EMBS

### Industry leader in advanced e-bike battery systems

We're one of Europe's top designer and manufacturer of Li-Ion battery systems and have had a presence in the industry for over 25 years. Located in Gliwice, Poland, we specialize in rechargeable Li-Ion e-bike battery systems, producing a wide range of battery packs with varying specifications. We offer a complete engineering solution, along with flexible manufacturing capabilities and cost-efficient services, plus we provide full support for the entire life cycle of a project. We are committed to supporting the movement toward cleaner transportation, empowering our customers through every stage of e-bike battery development and production. By fostering environmentally conscious practices, we strive to lead the way in sustainable mobility, creating a future where innovation and responsibility go hand in hand.



### One stop shop battery provider

All core competences in one location, ensure an optimal solution for your application.



Over 25 years of experience in pioneering e-bike battery design and production.



In-house laboratories for efficient and costeffective testing - including UN 38.3 and in-house R&D department.



Produced in Europe with easy access to highquality components and close to major air and road transportation routes for fast delivery.



Rapid and agile prototyping to ensure brief compliance and enhanced speed to market.



Synergized focus within the Prettl Group companies to deliver complex system components, reducing development time, costs, and time to market.



Battery design and manufacture to meet the requirements of all external certifications.



Internal and external alternative cell tests to expedite time to market and promote savings.



Easily scalable production lines to facilitate speedy manufacture of product regardless of order size.

### How we work

The pathway to powering your application

### 1 Consulting and planning

Working carefully to understand your business needs

Before we start working, we listen carefully to your needs, taking time to understand your challenges. We're then best prepared for finding innovative solutions for your business. Our expertise and resources allow us to strategically consult, plan, and execute every project to provide cost-efficient, tailored solutions. Our team will be available to you throughout the product development process, providing technical support and guidance on the suitability and feasibility of your battery system design.

# 3 Through testing

Comprehensive testing throughout the design process

We offer through testing services to an incredibly high standard. Our in-house testing laboratory is modern and wellequipped, enabling us to carry out periodic quality assurance testing for complex products. We can perform transportation tests UN 38.3, IEC 62133, and EMC to IEC 61000-4-2, as well as several mechanical tests, including IP.



Thorough prototyping to aid effective product development

Rapid prototypes are crucial in the early stages of battery design, as they allow the quick exploration of all types of interactions and the assessment of whether a specific design suits the intended application. We can deliver highly representative functional prototypes for mechanical, plastic, metal, and electronic components in a timely manner. Our dedicated inhouse prototyping laboratory ensures confidentiality and allows us to adapt quickly and easily to your evolving prototyping and product development needs.

# 4 Cell selection

Using our expertise to identify your best fit

We can tailor the required chemistry to deliver the optimum cell type for each application. This allows for greater flexibility when looking for the best solution, without needing to compromise on quality or cost. We also have a wide supplier based and strategic relationships with worldwide cell manufacturers, further increasing our options when deciding on the perfect cell type for your specific application.



#### Producting complex solutions

We continuously invest in innovation and manufacturing capabilities, to ensure we consistently provide the bestquality products for our customers. Our production capabilities include manual, semi-automated, and automated solutions. Our experience in high-volume production allows us to design cost-effective production lines.



# **Technology excellence**

### Getting ahead through innovation and exceptional technology

During the design phase, we specify the technology and type of production line, align them with the project's unique requirements. The production process is adjusted based on the project's volume and complexity to ensure high quality. We offer three types of production lines, tailored to different needs.







Automated

Semi-automated

Manual



#### Quality assurance



### **Bespoke battery solutions**

### Powering innovation, tailored to your future

Our lithium-ion (Li-ion) battery systems provide high energy density, long lifespan, and efficient power storage for e-bikes, and can be tailored to meet customers' specific requirements.



#### S-tube



#### **B-tube**

Parameters	Eco	Light	Standard	Ultra	Eco	Light	Standard	Ultra
Nominal voltage	36 V	36.5 V	36 V	36.5 V	46.8 V	46.7 V	46.8 V	46.7 V
Cell configuration	10S3P	10S3P	10S4P	10S4P	13S3P	13S3P	13S4P	13S4P
Nominal capacity	9.6 Ah	10.5 Ah	12.8 Ah	14 Ah	13.5 Ah	17.1 Ah	18 Ah	22.8 Ah
Nominal energy	346 Wh	384 Wh	461 Wh	511 Wh	630 Wh	798 Wh	842 Wh	1064 Wh
Nominal charge current	2 A				4 A			
Maximum charge current	6 A				8 A			
Minimum continuous discharge current	4 A				10 A			
Maximum continuous discharge current	16 A				20 A			
Charge operating temperature	045°C				045°C			
Discharge operating temperature	-560°C				-2045°C			
Storage	1 month: -2060°C 3 month: -1045°C 1 year: 020°C				1 month: 060°C 3 month: 045°C 1 year: 020°C			
Weight	~2.4 kg	~2.5 kg	~2.8 kg	~2.8 kg	~4.3 kg	~4.4 kg	~5.1 kg	~5.2 kg
Communication		CAN			CAN			
Connector	A&C Z624C male + female - or optional different type (customizable)				Customizable			
Additional features	5 V, 12 V output - optional				5 V, 12 V output - optional, Soc LED display - optional			
Housing	IP54, IPX4 - higher on request, Aluminium tube + plastic covers				Option for IP67, IPX4, Aluminium tube + plastic covers			
Compliance	Global certification possible				Global certification possible			
Dimensions (L x W x H)	524 x 83.3 x 48 mm			490 x 99 x 74 mm				

### Boosting performance in cargo e-bike

Advanced solutions for superior power and efficiency



Cargo e-bike batteries are redefining the future of urban logistics combining sustainability, efficiency, and innovation. At EMB, we're equipped with the technical knowhow and production capabilities to deliver reliable, high-capacity battery systems engineered for demanding cargo applications. From intelligent Battery Management Systems (BMS) to modular, scalable design, our solutions are built for performance and adaptability.

The presented concept serves as a flexible platform - engineered to be adapted to your customers' specific requirements, including voltage range, energy capacity, cell configuration, form factor, and system integration. With our development expertise and production capabilities, we're ready to co-engineer the next generation of high-performance power solutions for cargo e-mobility.

#### Parameters

Voltage	48 V
Capacity	34 Ah
Energy	1600 Wh
Topology	13S6P
SoC	Yes
Connector	Customized
Technologies	NMC
Weight	< 8 kg
Housing	Plastic
Communication	CAN
Dimensions (L x W x H)	450 x 220 x 85 mm



### Safer, reliable, and longer-lasting batteries

#### Advanced BMS technology for optimal battery performance

At the core of our business is cutting-edge technology designed to drive innovation, safety, and reliability. Our advanced Battery Management Systems (BMS) provide robust electronic protection, ensuring seamless operation across applications – so your devices run longer, safer, and more efficiently. As an essential component of multi-cell battery packs, our BMS continuously monitors and regulates key parameters, maximizing battery performance and safety. With our solutions, you get power you can trust—reliable, long-lasting, and built for your needs.



Our BMS, featuring our patented battery management electronics, is engineered to fulfill four main objectives:

- protecting cells and battery against damage,
- extending the battery life,
- keeping the battery in a condition where it can meet the requirements of the application,
- providing an interface with the main application.

# Driving innovation with advanced battery technology

Innovation and technology are at the heart of our competitive advantage.

Our state-of-the-art modular BMS platform supports multiple batteries across a voltage range of 7.2V to 55V (2S-13(15)S), making it adaptable to a wide range of market applications and seamlessly integrating with customer systems.

We design and manufacture our BMS in-house, ensuring full project support while collaborating with leading European scientific institutions and top global electronic component manufacturers. This commitment keeps us ahead of the curve, allowing us to respond swiftly to evolving market demands.

#### Key features of our Battery Management Systems

01	Cell balancing
02	Safety protection
03	Individual cell monitoring
04	Charging/cycle life
05	Communications
06	Modular BMS architecture

### Tested for excellence, designed for safety

#### Thoroughly in-house tested for precision, engineered for maximum safety and reliability

We carry out full risk assessments of all high-voltage products, managing them jointly with customers. What's more, we cooperate with customers who are leaders in their industries and therefore require products of the highest quality. This demand has ensured our processes are focussed on delivering consistently high-quality components. Many factors guarantee the highest quality manufacturing, including effective supplier selection, strict compliance with legal requirements, our measuring laboratory for verifying incoming components, production line validation, PFMEA, inline testing, and periodical tests.



# Our range of battery systems test encompasses the following:

UN	UN 38.3 testing to ensure safety of Li-Ion and lithium metal batteries during transportation.
IEC	IEC 62133 testing, an important standard for the global exportation of Li-Ion batteries.
	Periodic tests for quality control.
Q.	Mechanical tests, including IP, life performance temperature, and drop and drum testing.
	Cell tests.

Safety is our top priority. Our batteries are meticulously designed and rigorously tested to meet the latest market standards, including national regulations, EU directives, UN 38.3, IEC, and UL. With dedicated mechanical and electronic engineering teams, our R&D department ensures the highest level of safety, reliability, and innovation.

#### Mechanical

Robust external housing is used, plus all internal structural elements are optimized for low cost and mass production, but are still solid enough to ensure the battery will be resistant to vibrations and other environmental hazards.

#### Electrical

Safety is provided via a properly designed BMS, which we can develop in-house, plus other elements, including main fuse, SCP, smart CAN communication, and other dedicated solutions.



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Leading the way for bespoke lithium-ion battery systems

EMBS Sp. z o.o. ul. Alberta Einsteina 36 44-109 Gliwice, Poland +48 32 330 2650 sales@embatterysystems.com www.embatterysystems.com

