

## Introduction

The Wattius wBMS-HX is a high-performance BMS solution for high-voltage large-scale battery energy storage. The system has been designed for applications up to **1.500 V** and provides **reinforced isolation** for all external interfaces according to IEC60664.

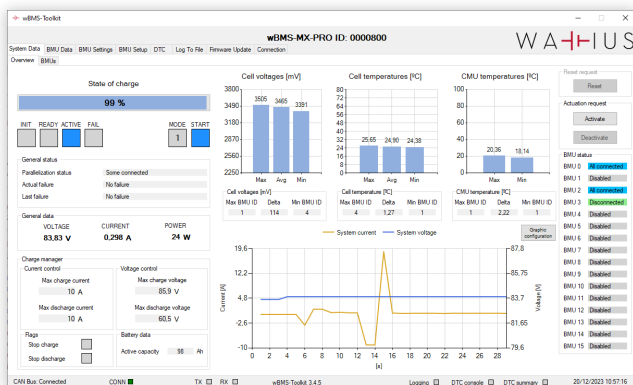
The wBMS-HX products features direct compliance with **IEC62619** and is pre-certified for **Functional Safety**, with a Compliance Report for IEC62061 **SIL2** and ISO13849-1 **Performance Level D** issued by a certified third-party testing entity.

This BMS solution features an **Ethernet** interface with support for **Modbus TCP** for local device control (i.e. PLC, EMS, inverter). It also supports **encrypted cloud connectivity**, with integration with **MQTT** brokers and complete compatibility of the wBMS-Toolkit over internet.

Each BMU supports **up to 48 CMUs**. Multiple BMUs can be connected in **parallel** without additional hardware. The system automatically handles smart string connection / disconnection and provides a single control interface with EMS / Inverter.

The wBMS-HX BMU V4 features multiple isolated and non-isolated interfaces, including two CAN bus, USB, Ethernet and analog and digital I/O, and even Bluetooth.

## wBMS-Toolkit



## Connectivity

- Ethernet, 2x CAN bus, USB and Bluetooth.
- Modbus TCP.
- Encrypted Cloud connectivity. MQTT broker compatibility and remote wBMS-Toolkit.

## Performance

- Up to 48 CMUs per BMU.
- Multiple battery string in each BMU.
- Up to 16 BMU automatic parallelization.
- High-precision SoC algorithm.
- Multiple isolated and non-isolated I/O.
- Included 1.500V voltage sensor.
- Support for dual-range hall and CAN bus current sensors.

## Safety

- IEC62061 SIL2
- ISO13849:1 Performance Level D
- Reinforced isolation up to 1.500V (IEC60664)
- Internal diagnostics and safety-critical redundant systems.
- Cell and relay open-wire detection.

The wBMS-HX is compatible with the **wBMS-Toolkit**, our Windows software provided free of charge:

- Monitor all **BMS data** in real time.
- Configure **hundreds of configuration parameters**.
- Data logging, diagnostics and flags.
- Firmware update through USB, CAN bus and Ethernet.

## Technical Specifications

<b>Power supply</b>	15 – 32 Vdc. Independent input for contactor supply.
<b>Consumption</b>	< 3,5 W (@ 24 Vdc).
<b>Isolation</b>	1.500 V reinforced isolation (IEC60664).
<b>Supported CMUs</b>	Two CMU links. Up to 48 CMUs. Compatible with all wBMS-MX and wBMS-HX CMU models.
<b>Current sensing</b>	Up to 4 external 0 – 5 Vdc hall current sensor. Accuracy $\pm 0,1$ mV. Support for dual-range, differential or redundant single-ended hall current sensors. Support for external CAN bus current sensors.
<b>CAN Interface</b>	2x Isolated CAN bus 2.0 A/B (Up to 1Mbps). Configurable termination resistor with switch.
<b>Ethernet</b>	Up to 100Mbps. Compatible with Modbus TCP for local device control (i.e. PLC, EMS, Inverter).
<b>Cloud connectivity</b>	Cloud connectivity, with direct integration to encrypted MQTT broker. Configuration of per-device customer certificates. Remote management and monitoring. Complete compatibility of wBMS-Toolkit over Internet.
<b>Isolated I/O</b>	3x dry-contact inputs. 1x 12V input. 1x external NTC temperature sensor. 3x 12V output (~ 1W each).
<b>Non-Isolated I/O</b>	3x external NTC temperature sensor. 3x analog inputs. 0 - 32 Vdc. 5x dry-contact inputs. 8x low-side switch. 1,5 A nominal, 2,5 A peak. Extended diagnostics and redundant high-side disconnection. 2x high-side outputs. Open load detection and overload protection.
<b>Other interfaces</b>	Isolated USB 2.0. Bluetooth Low-Energy (BLE).
<b>High-voltage measurement</b>	Included 1.500 Vdc voltage measurement. Direct support with wBMS-VIC. Support for third-party external CAN bus.
<b>Isolation measurement</b>	Direct support with wBMS-VIC. Support for third-party external CAN bus.
<b>Memory</b>	Integrated redundant non-volatile memory: system configuration, maximeter and flags. MicroSD support (up to 32 GB).
<b>Parallelization</b>	Up to 16 BMUs in parallel. Smart parallelization management without additional hardware. Multiple battery string management in each BMU.
<b>Dimensions</b>	L180 x W125 x H18 mm. 5x M4 mounting holes.
<b>Operating temperature range</b>	-40 to +85 °C.
<b>Connectors</b>	Molex MicroFit & RJ45
<b>Compliance</b>	Functional Safety IEC62061 SIL2 and ISO13849-1 Performance Level D (Compliance Report from certified third-party available). Fully compatible with IEC62619, including 2023/1542/EU. EMC: 2024/30/EU RoHS: 2011/65/EU

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