

EN

BATTERY MONITORING SOLUTION installation guide



GemOne®

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General information

Industrial batteries can be expensive and difficult to manage. The increased electrification of heavy equipment means that consistent battery management has become more important than ever.

Our battery monitoring solution helps you avoid the unnecessary wear of your batteries, prevent the downtime of your battery powered machines, and maximize your battery charge cycles.

Our solution works with machines that use both lead acid and lithium ion batteries across a wide range of voltages to keep you up to the minute on a wide range of operational parameters.



Technical specs

Power

Working voltage: 8~95 VDC
Working temperature: -20°C ~ 70°C

Measuring range

Voltage: 8-95 VDC / 50-150 VDC, Accuracy ± 0.1 VDC
Current: ± 300 A(Default) / ± 800 A(Accuracy ± 0.5 A (Hall) / ± 0.1 A(Shunt)
Temperature: -20°C to 110°C Accuracy ± 1 °C

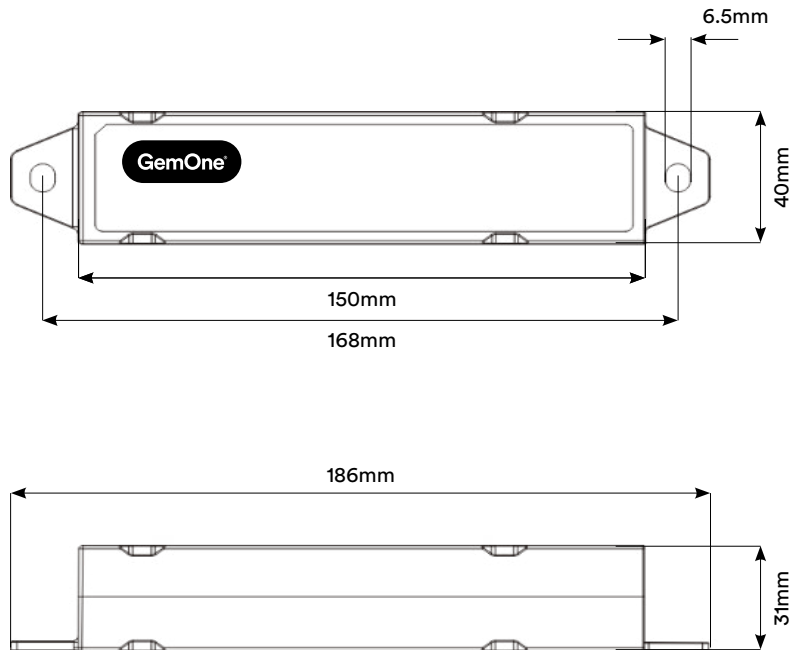
Power consumption

Max. 3W when all functions are on and transmitting data, 0.5 to 2W normally.
<0.3W in sleep mode
0W when hardware protected under low voltage

Communication

Global coverage, support main operators in different regions
Support GPS, GLONASS and Beidou positioning
Support CANBUS 2.0A and 2.0B, SAE J1939 and CANOpen protocol
Support Bluetooth BLE version 4.2/5.0
Support RS485 modbus

Dimensions



Important instructions

When installing and operating this unit, the following instructions in the installation manual must be followed exactly and the use of the unit within its technical specifications (see installation manual) must be strictly observed.

Failure to do so may result in damage to the unit and possible personal injury and/or property damage. Failure to observe the installation instructions or operation of the unit outside its technical specifications will result in the loss of any claims for compensation against the supplier or manufacturer of this unit.

Safety instructions

In order to make a warranty claim, proof must be provided that the product complained about has been installed in accordance with the installation instructions, including the accessories and tools mentioned, and that it has been operated within the scope of the specification. We reserve the right to inspect the product complained about. Any liability for consequential damage attributed to a defective product is excluded and not subject to this warranty provision.

The unit is designed for installation on lead-acid batteries (wet or VRLA) used in sealed enclosures. **Avoid prolonged exposure to acidic liquids.**

The user must ensure that these enclosures are closed during operation and protected from unauthorised access.

For use on other battery technologies (NiCad, Lithium. etc.), the installation and safety instructions of the respective battery manufacturers must be observed.

Lead-acid batteries contain highly reactive and aggressive components and should therefore be handled with the utmost care. Use protective goggles and clothing during installation of the unit.

Only by installing and operating the unit as intended, can the intended operation of the unit be guaranteed and injury to persons and damage to the unit and / or property be avoided. The operating personnel must be authorised and qualified to work with the unit. Ensure that all operational staff have the necessary personal protective equipment.

With regard to the use of the PC software, reference is made to the end user licence agreement, which must be confirmed when the software is installed. The installation and operating instructions are part of the unit and must be kept carefully by the owner of the unit, as they must be available to the specialist in the event of any repairs.

When installing the unit, be sure to follow the instructions shown. The unit is protected against polarity reversal. If the polarity is reversed or the connection is faulty, check the built-in fuses. The unit must then be connected with the correct polarity and correctly.

The unit must be handled with care. Protect moving cables and plugs from being pinched or damaged in any way. When installing the supply and measuring lines, make sure that they do not cross and are not in direct contact with heat-generating parts (e.g. battery terminal). Make sure that the unit's cables are properly fixed to the cell connectors using cable ties.

Pulling on moving cables can loosen or disconnect the electrical connections. Damaged units, even if they still function, must not be used further (danger to persons/property). Any mechanical damage to the unit must be repaired immediately by qualified personnel. An externally damaged unit must not be installed. If the unit should fall down or otherwise be exposed to external force before or during installation, we do not assume any warranty for proper function and operational safety. In this case, the unit must be returned to the seller for inspection.

When installing the unit, **it is essential to observe the rated voltage indicated** on the unit. Connecting to a different nominal voltage (higher or lower than specified) may result in incorrect measured values. If the units are connected above the maximum permissible value of the operating voltage, the unit may be

damaged. If the unit is connected below the minimum permissible operating voltage, the unit will not operate as intended. In particular, data loss may occur.

The unit will only function properly in the specified temperature range, altitude range and humidity. To avoid damage, the plastic materials used in particular must not be exposed to influences outside the specification. If the unit is operated outside the specification, proper function is not guaranteed.

The housing of the unit is designed for operation on lead-acid batteries and can therefore be used in acidic environments. Nevertheless, it must be ensured that the battery is regularly cleaned of acid residues in order to avoid permanent contact of the unit with the acid.

Attention:

If the unit and the cable connections are permanently exposed to acidic liquid, damage may occur in and/or on the unit and cabling. When cleaning, the relevant safety instructions must be observed. The unit is programmed at the factory. Changing various setting values is explained in the software operating instructions. In case of a change of the parameters that have not been released, we do not assume any warranty about the proper function of the unit.

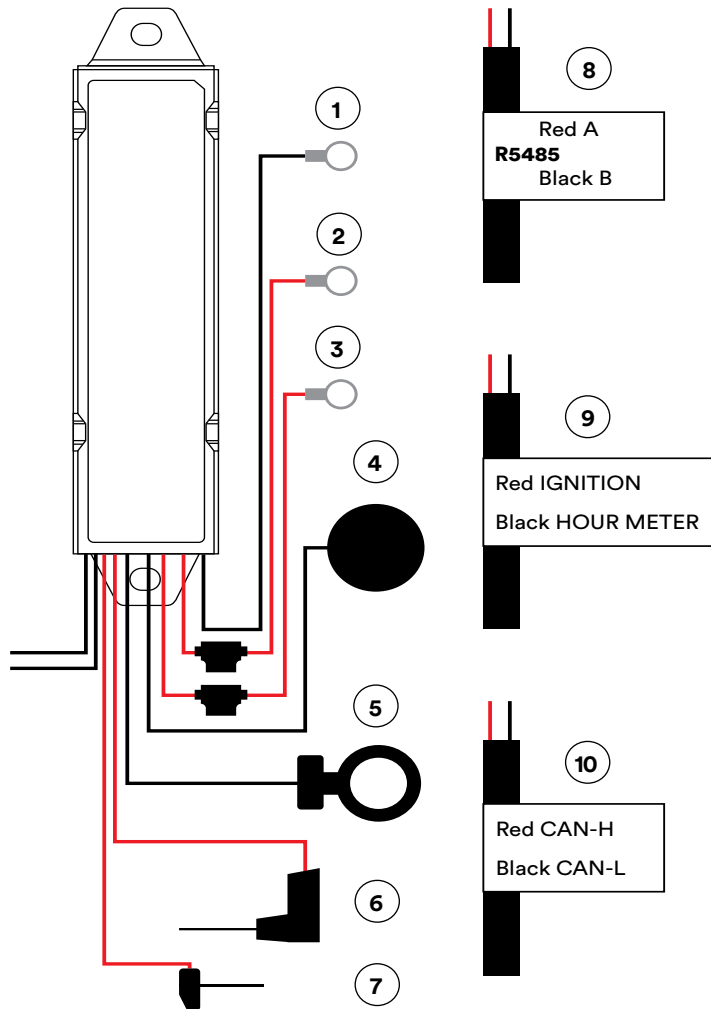
Before Installation:

Make sure the rated nominal battery voltage is suitable for the BMS version (low or high voltage).

Make sure the max. charge or discharge current fits in the range of the hall sensor (max. 300 or 800A)

Connections

You can find the wiring scheme of the basic installation below.



NR.	FUNCTION	SPECIFICATION
	Supply voltage	Low voltage Version: 8-95VDC (max. 60VDC nominal batteries) High voltage Version: 48-150VDC (max. 96VDC nominal batteries)
1	Negative terminal	M10 with 2A fuse
2	Positive terminal	M10, optional with internal temperature sensor
3	Half voltage	Voltage Range: Low voltage Version: 8-95 VDC (24-60 VDC nominal batteries) High voltage Version: 50-150VDC (60-96 VDC nominal batteries)
4	External antenna	GSM + 4G Frequency 824-960MHz 1710-2700MHz (Global) GPS + GLONASS Frequency 1575-1602MHz
5	Current sensor (hall)	Hall type range $\pm 300A$ accuracy 1%. Shunt type range $\pm 300A$ accuracy 0.1%
6	Level sensor	Contact probe with 2A fuse
7	Temperature sensor	Install the temperature sensor between the two batteries
8	RS485	RJ11 male
9	CANBUS	RED = CANN; BLACK = CANL
10	Ignition control Engine run time	Red: (+) ignition; Black: (+) Hour Meter

LEDs

Status LED inside the body



Status LED

RED	GREEN	STATUS
On	Off	Power up
Off	Flash	Network connected
Flash	Flash	Firmware updating

Electrical and working parameters

Working voltage	8-95VDC (Low voltage) 48-150VDC (high voltage)
Power consumption	Max 2W (with all function on and transmitting data). On average 0.5-2W depending on functions. <0.3W in power save mode under low voltage. OW when hardware protected under absolute low voltage
Current measure	Support shunt type or hall type sensors Support different range such as 300A (default) and 800A
Voltage resolution	+0.01V
Current resolution	+0.1A
Temperature resolution	+1°C
Working temperature	-20°C to 70°C
Absolute low protection voltage	17V for 24VDC nominal system 34V for 48VDC nominal system 56V for 80VDC nominal system 68V for 96VDC nominal system
CAN Bus	Support CAN Bus 2.0A and 2.0B. as SAE J1939, CANOpen. Support different protocols such SAE J1939, CANOpen
Network	Global cellular network Support worldwide coverage. Support most of the carriers in different countries Global positioning (GPS)
Communication Interface	Bluetooth Low Energy 4.2. and 5.0 RS485 with MODBUS protocol

Packing list

Standard

- Positive Voltage wire / MAIN (+): 1 meter with M10 terminal, 2A fuse
- Negative Voltage wire / MAIN (GRND): 1 meter with M10 terminal
- Half Voltage wire / AUX (+): 1 meter with M10 terminal, 2A fuse
- Temperature sensor with probe Hall-Sensor: 1 meter, half open clamp
- External Antenna: 1 meter, 4G +GPS, with magnetic at the back

Optional

- Level sensor: used for lead acid battery, bayonet or drill
- Interlock relay: External remote control relay 20A@5V
- Digital communication: CANBUS, RS485,
General purpose input support up to rated voltage
- Others: Ignition, Hourmeter, partial or auxiliary voltage
and current input, shunt type current sensor



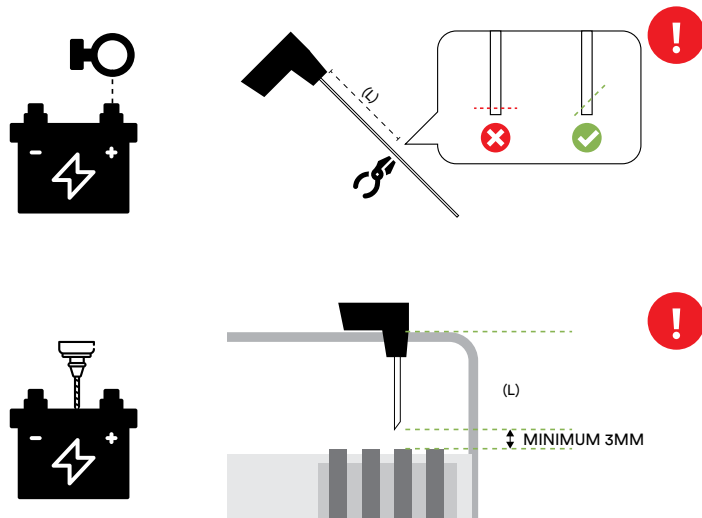
Installation

Connect power supply (1), (2), (3)

- Connect the **Main-Input (+)** cable (1) with a fuse to most positive terminal
- Connect the **Main-Input (-)** cable (2) to most negative terminal
- Connect **AUX-Input (+)** cable (3) to positive terminal of half voltage.

Install Level Sensor (4), temperature sensor (6)

- Cut the Level sensor such it is 3 mm above the electrode plates
- Strip the heat shrink of the level sensor by approx. 5mm
- Install minimum in the 3rd cell, counting from negative pole or 6V battery
- Insert temperature sensor between cells/ batteries in the center of the battery pack



Install Y-Hall (5)

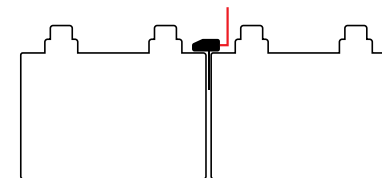
The Current Sensor **must** be placed **ONLY** around the main battery cable of the most negative or positive battery pole. An installation around the inner cell connectors can produce wrong measurements. Tighten the Current Sensor with a **cable tie** to the main battery cable, so it can not move.

- Open the Y-Hall and put the charging and loading cable through it
- Close the Y-Hall
- Make sure the ARRO is pointing to-ward the pos. terminal
- Adjust the Y-Hall with a cable tie to the cable, so it can not move



Temperature sensor (7)

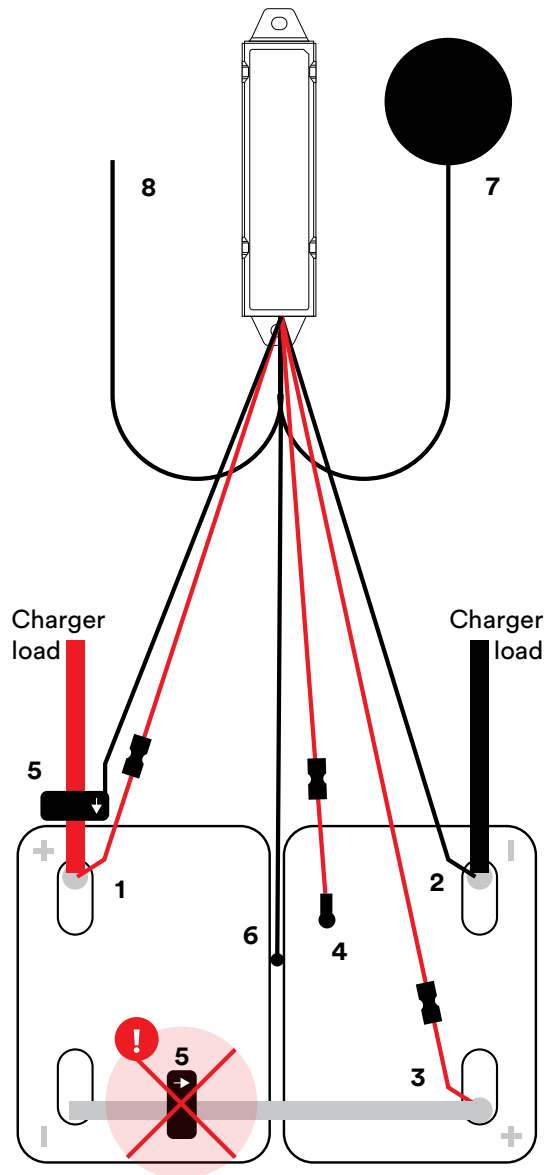
Install the temperature sensor between the two batteries.



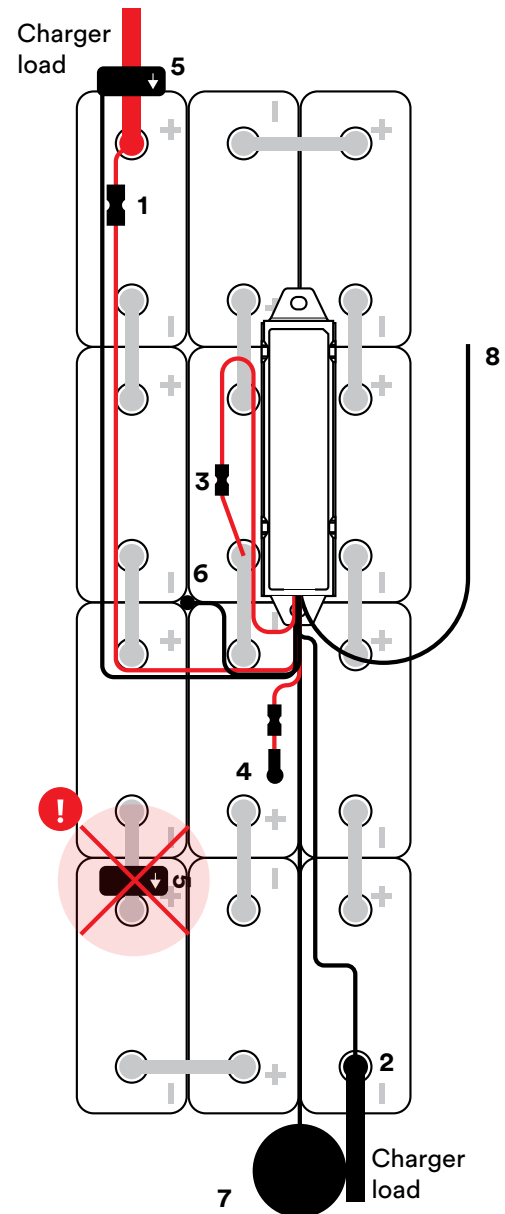
Fuse

2A for Main-Input (+) (1), AUX-Input (+) (2) and Level Sensor (4)

Installation block type battery with half voltage



Installation cell type battery with half voltage



Support

In case of issues, questions or feedback, feel free to contact our support team.

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Save time with our connectors

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