

INTELLIGENT BATTERY MONITORING SYSTEM

OPERATING INSTRUCTIONS
rev. AA



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INTRODUCTION

SYSTEM COMPONENTS



Intelligent Battery Sensor (IBS)

Simple electrical and mechanical integration, the sensor accurately measures the battery voltage, current and temperature parameters and internally calculates the State Of Charge, State Of Health and Time Remaining accordingly.



Link Up gateway

Interfaces the IBS sensor with the NMEA 2000® network to make all the information available for any display. Wireless configurable, the Link Up gateway is also the access point for the configuration of the battery parameters.

BENEFITS OF THE BATTERY MONITORING SYSTEM

The Intelligent Battery Monitoring System informs you about the current energy status, allowing you to plan your energy supply making it the key element of the vessel's energy management.

In order to carefully preserve the energy of the boat battery, it is necessary to know its State of Charge, the ageing status (State Of Health) and any changes to the battery, as weak batteries are the main cause of trouble in the boat.

By using the Intelligent Battery Monitoring System, the energy management system can react quickly in case of critical battery state which influences both the consumer behavior and the alternator.

It delivers real time measurements during the charging/discharging processes, preventing phenomena like over charging or over temperature which can lead to a shortened life for your batteries.

DESIGN AND FUNCTION

The IBS is attached directly to the negative pole of the battery via its pole terminal.

Alongside the terminal, the mechanical portion of the battery sensor consists of the shunt and grounding bolt.

The shunt is attached to the vehicle's load path and is used as a measuring resistor to measure the current indirectly.

THE LINK UP GATEWAY CONCEPT

The Link Up gateway (hereinafter "Device" or "Link Up") provide an easy method to monitor your battery information to NMEA 2000®.

The data are then available for being displayed on any OceanLink, AcquaLink, or more in general on any glass cockpit NMEA 2000® display device.

Configuring your battery monitoring system is simple through the Link Up gateway, only using a mobile device and the companion LinkUp Configurator App for Android or iOS.

The Link Up has a built-in passive NFC antenna, so the parameters of the battery system are wirelessly configured on the mobile device which is then "tapped" against the LinkUp device for instant data download.



SYSTEM INSTALLATION

BEFORE THE ASSEMBLY

1. The IBS has to be mounted and handled in an ESD protected area
2. The IBS may not be contaminated with foreign particles (e.g. oil, silicon, grease, coolant, etc.)
3. The IBS may not be damaged
4. Pole clamp may only be torqued to the battery pole
5. In case of using of a stainless nut, the nut must be coated with an antiseize like GLEITMO 605 or must be tin plated

MOUNT THE GROUND CABLES TO THE IBS

Please mount at first the ground cable on the IBS M8 screw (fig.1)

Both the ground cable of the vehicle electrical system and the negative ring-type terminal of the Link Up gateway (fig.2, A) must be connected to the IBS M8 screw.

During the mounting of the screw nut, the torque (max. 17 Nm) must be completely intercepted by an appropriate device/acceptance.

The torque must be intercepted only over the shore edges shown in figure 1.

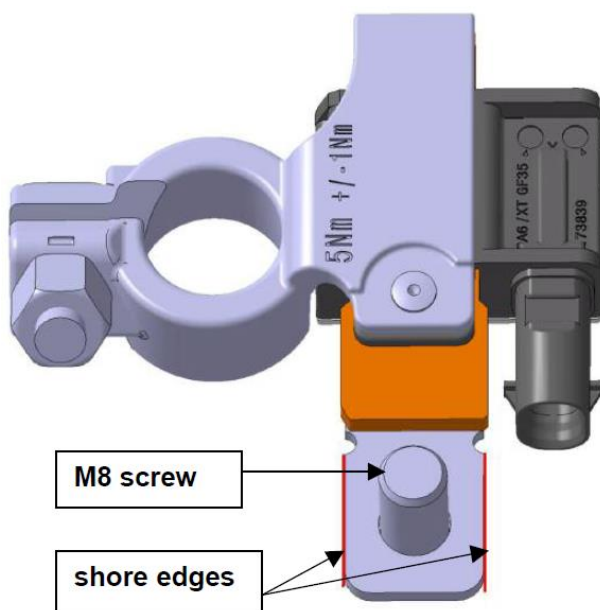


Figure 1:
Shore edges for torque absorption

CONNECT THE LINK UP GATEWAY

After the mechanical connection of the IBS is done onto the battery it is possible to proceed with the Link Up gateway installation.

Please connect the Hirschmann plug (B) into the IBS sensor dedicated connector.

Then install the positive battery wire (C) of the Link Up interface on the positive clamp of the battery through the dedicated M8 ring-type terminal.

The positive battery wire is provided with a water-tight 3A fuse pre-mounted.

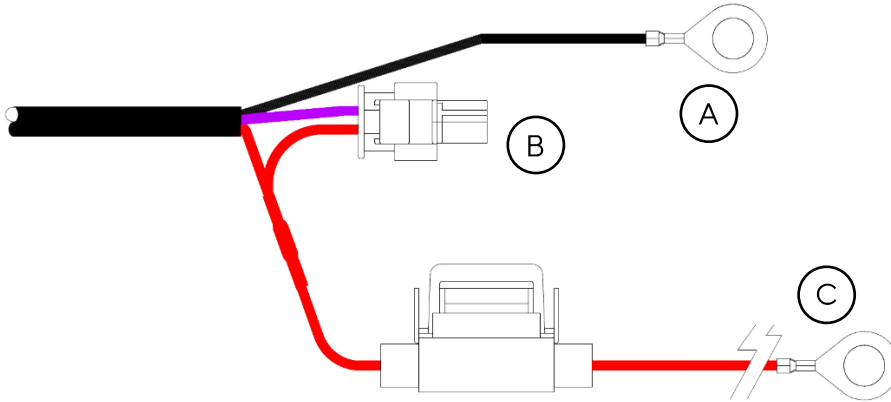


Figure 2: Link Up gateway wire harness

- A. IBS negative screw terminal
- B. IBS Hirschmann mating connector
- C. Positive pole terminal

MOUNT THE IBS ONTO THE BATTERY

Please mount as next step the Intelligent Battery Sensor onto the negative pole of the battery (screwing specification according to the battery manufacturer).

Then fasten the IBS onto the battery pole clamp with a tightening force of 5 ± 1 Nm.

Use a torque key to adjust it to 5 Nm.

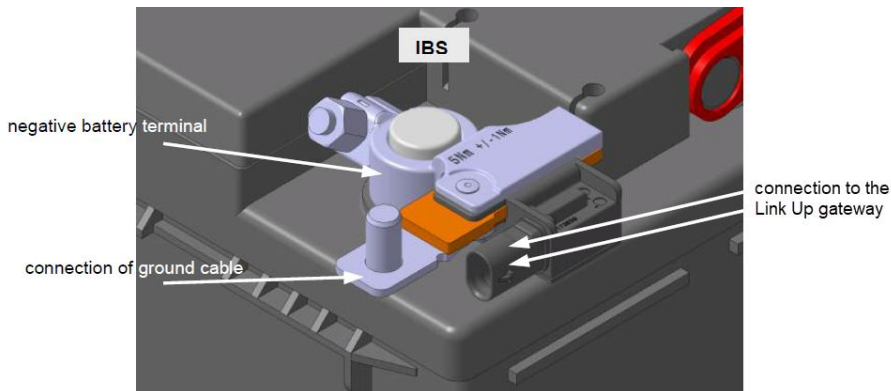


Figure 3: IBS on battery pole with 2 pin connector to the Link Up gateway

CONNECTIONS DIAGRAMS

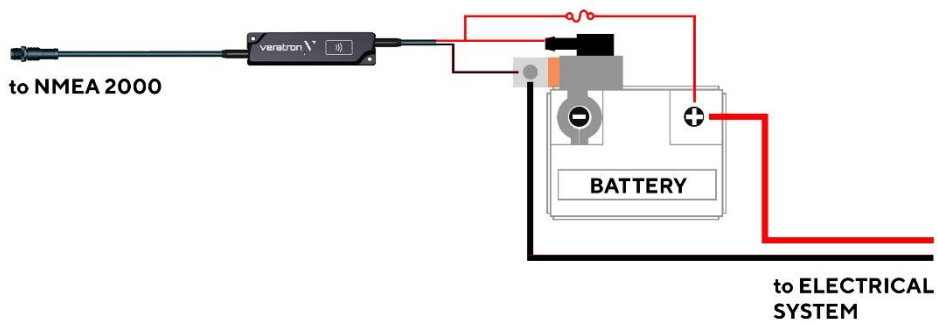


Figure 4:
Connections diagram for single
battery

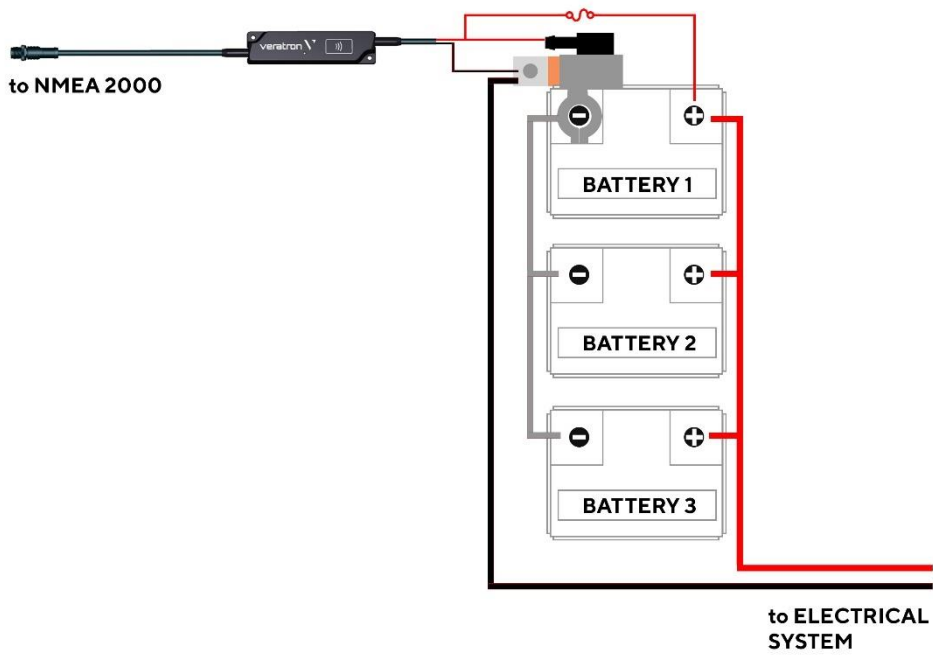


Figure 5:
Connections diagram for multiple
parallel battery connections
(battery pack)

CONNECT TO THE NMEA 2000® NETWORK

Once the sensor installation is complete it is possible to interface the Link Up gateway to the NMEA 2000® backbone through the dedicated plug.

Please ensure to tighten the M12 connector by screwing it onto its counterpart, so to preserve the water tightness.

A drop cable is not needed unless the total length of the Link Up device is not enough to reach the NMEA 2000® backbone. In this case it is possible to extend the total length by using one of the accessory drop cables.

Please note that NMEA 2000® does not allow drop cables longer than 6 meters.

Refer to the NMEA 2000® standard for a proper network design.

If power from the NMEA 2000® network is received, the green LED on the Link Up housing will start flashing (see "LED notifications").



CONFIGURATION

LINK UP CONFIGURATOR APP

To configure the sensor, some parameters must be calibrated through the Link Up gateway, like sensor type, its calibration or warning threshold.

This is possible through the “Link Up Configurator” smartphone App, which can be downloaded free of charge from the stores of both Android and iOS devices.

A simple and detailed explanation of the configuration process is also available as in-app instructions.

Thanks to the passive embedded NFC receiver, the Link Up gateway can be configured, as described below, without the need of power supply.



**LINK UP
CONFIGURATOR**



Figure 6:
Link Up Configurator App is available for both iOS and Android devices

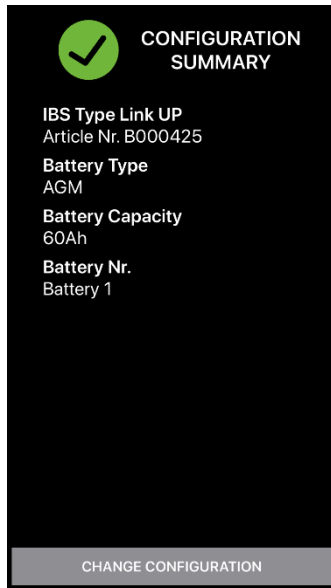
SENSOR CONFIGURATION



1. Launch the “Link Up Configurator” App and read the actual configuration of the Link Up device by “tapping” the smartphone onto the Link Up wireless area (indicated by the red arrow).

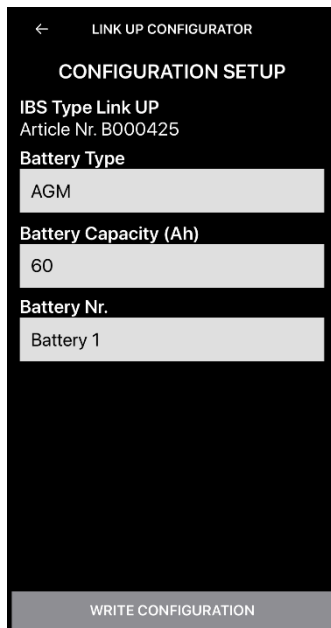
NOTE: The antenna position on the smartphone depends on the model. Please refer to the smartphone manufacturer manual.

CONFIGURATION



2. After the readout, the App will show the "Configuration Summary", which displays all the current settings of the battery monitoring system.

To modify the configuration, press the "Change Configuration" button.



3. Select the battery type between Starter (Lead acid), Gel or AGM.

Then type in the battery capacity in Ah and its instance (e.g. Battery 2) so that the Link Up gateway will correctly transmit the value over NMEA 2000®.

For the battery specifications please refer to the battery manufacturer datasheet.

Once the settings are completed, press the "Write Configuration" button to prepare the download.



4. To download the configuration, simply "tap" the smartphone again onto the Link Up wireless area, as described on step 1.

The configuration is instantaneously transferred to the device, and the new "Configuration Summary" is displayed.

TIME FOR VALID SOC AND SOH

The State Of Charge (SOC) and State Of Health (SOH) values are to be considered valid after power on of the system, 3.5 hours of “quiescent” time and valid battery parameters.

“Quiescent” time means that the current consumption of the vehicle electrical system has to be for the whole recalibration time (3.5 hours) between -100mA and 0mA.

If there is a discharge peak during this time (e.g. radio turned on, etc.) the time for SOC recalibration will be longer than 3.5 hours.

If there is an additional power on of the IBS sensor (e.g. IBS disconnected from the battery, or from the Link Up gateway) then the recalibration time of 3.5 hours starts again.

EXTERNAL CHARGING OF THE BATTERY

If the battery is charged by an external power supply, it is important that the connection of the external charger is done properly.

If the connection is performed incorrectly, the IBS will not be able to measure the charge current and it will not calculate the SOC correctly.

Please connect the positive clamp of the charger to the battery pole and the negative clamp of the charger device to the IBS ground connection (where the vehicle ground is connected), and not directly to the negative pole of the battery.

The charging current must flow through the IBS which can correctly determine the charge balance.

LED NOTIFICATION

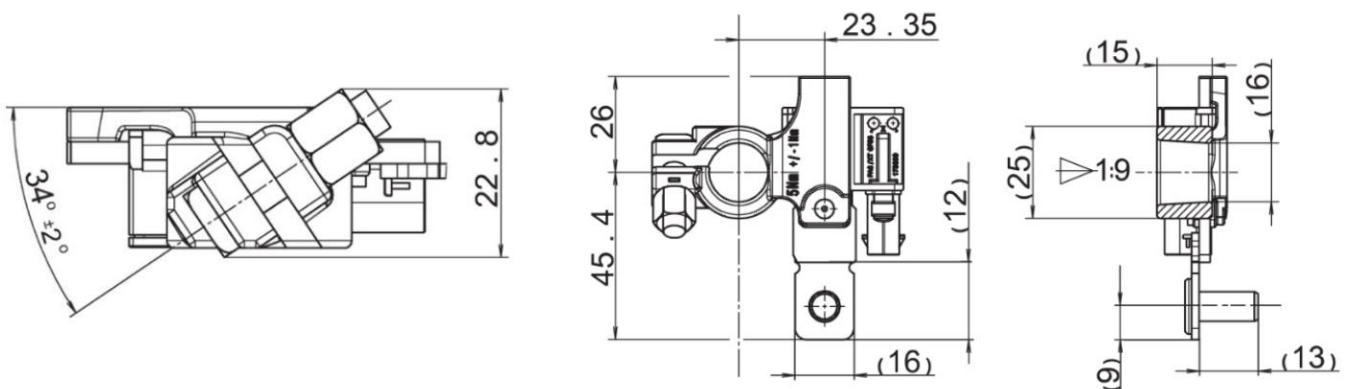
LED behavior	Description
OFF	Device not powered.
ON	Device configured and in operation.
Slow blink (1Hz)	Device in operation with invalid or empty configuration. Waiting for configuration by the user (factory setting). NMEA 2000® messages are NOT transmitted.
Fast blink (5Hz)	Analogue value from the sensor out of range. NMEA 2000® messages are being set as “invalid”.
Very fast blink (10Hz)	Device reconfiguration in progress after wireless download.

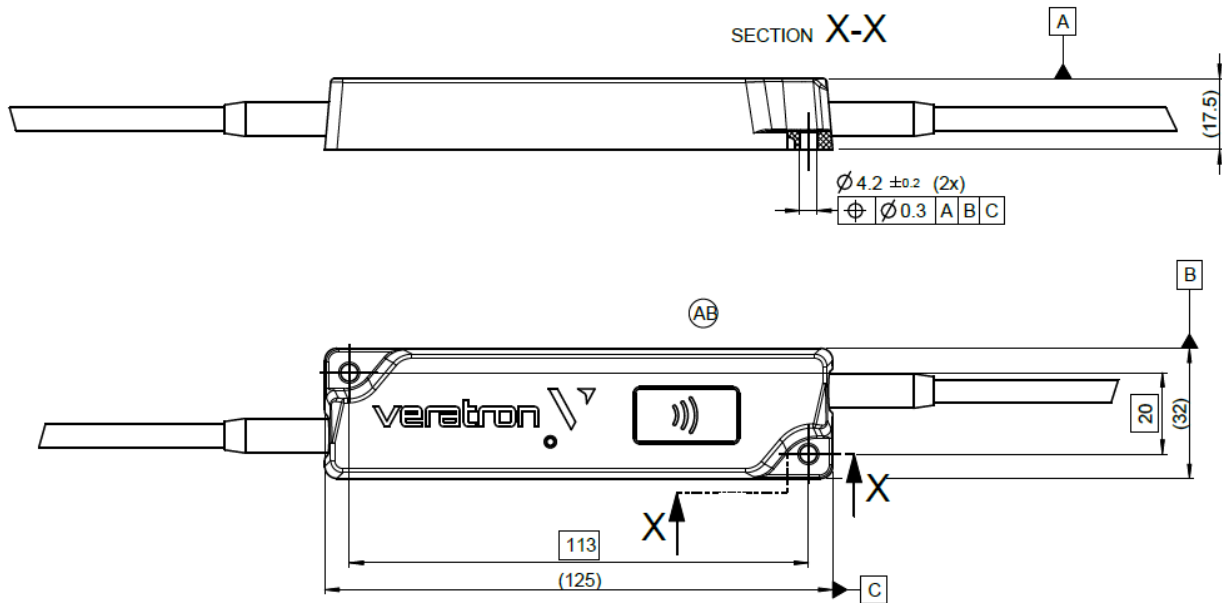
TECHNICAL DATA

IBS TECHNICAL DATA

Operating voltage	6 - 16.5 V
Operating current (permanent)	± 155 A
Maximum current	± 1500 A (500 ms)
Protection class	IP 6K7
Power consumption	≤ 15 mA (normal mode) ≤ 120 µA (sleep mode)
Max battery capacity	249 Ah
Supported battery types	Gel, AGM, Flooded (Lead)
Operating temperature	-40°C to 115°C
Link Up plug	Hirschmann
Grounding bolt	M8

DIMENSIONS





PINOUT

Pin No.	Description
1	Shield
2	NET-S (V+)
3	NET-C (V-)
4	NET-H (CAN H)
5	NET-L (CAN L)

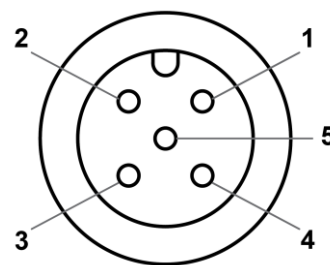


Figure 7:
Micro-C M12 5 poles plug
Male, product side view

Pin No.	Description
1	+12 V Power supply
2	LIN bus

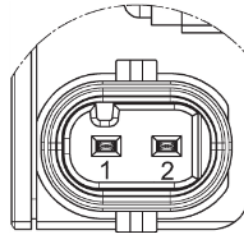


Figure 8:
Hirschmann IBS plug
Male, IBS side view

SUPPORTED NMEA 2000® PGNs

Description	PGN
ISO Address Claim	60928
ISO Request	59904
ISO Transport Protocol, Data Transfer	60160
ISO Transport Protocol, Connection Management	60416
ISO Acknowledgment	59392
NMEA - Request group function	126208
Heartbeat	126993
Configuration Information	126998
Product Information	126996
PGN List - Received PGNs group function	126464
DC Detailed Status	127506
Battery Status	127508
Battery Configuration	127513



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