

LINK UP GATEWAYS SERIES

LINK UP

INTELLIGENT BATTERY MONITORING SYSTEM

USER MANUAL

rev. AB



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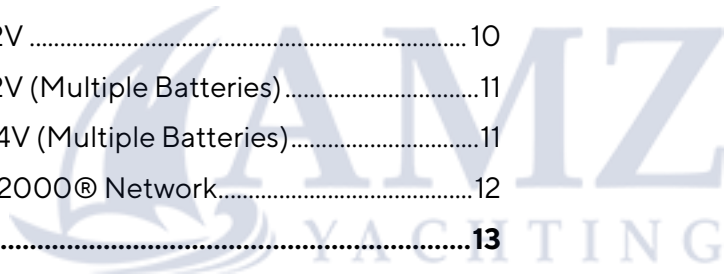
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INTRODUCTION

SYSTEM COMPONENTS



LinkUp Gateway

B000425

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.



12V - Version

Gen. 1: B00084201

Gen. 2: B00084202



24V - Version

B00072101

Intelligent Battery Sensor (IBS)

After the 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.

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 LINKUP GATEWAY CONCEPT

The LinkUp gateway (hereinafter "Device" or "LinkUp") provides 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 LinkUp gateway, only using a mobile device and the companion LinkUp Configurator App for Android or iOS.

The LinkUp 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.



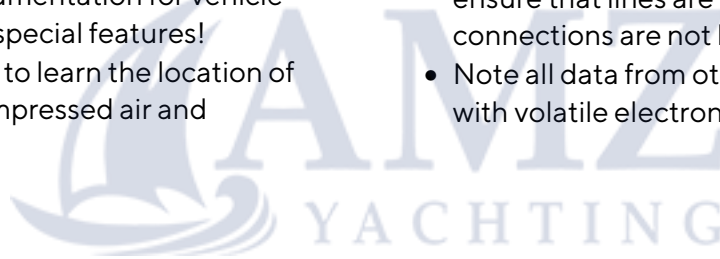
SAFETY INFORMATION



WARNING

- No smoking! No open fire or heat sources!

- The product was developed, manufactured and inspected according to the basic safety requirements of EC Guidelines and state-of-the-art technology.
- The instrument is designed for use in grounded vehicles and machines as well as in pleasure boats, including non-classified commercial shipping.
- Use our product only as intended. Use of the product for reasons other than its intended use may lead to personal injury, property damage or environmental damage. Before installation, check the vehicle documentation for vehicle type and any possible special features!
- Use the assembly plan to learn the location of the fuel/hydraulic/compressed air and electrical lines!
- Note possible modifications to the vehicle, which must be considered during installation!
- To prevent personal injury, property damage or environmental damage, basic knowledge of motor vehicle/shipbuilding electronics and mechanics is required.
- Make sure that the engine cannot start unintentionally during installation!
- Modifications or manipulations to veratron products can affect safety. Consequently, you may not modify or manipulate the product!
- When removing/installing seats, covers, etc., ensure that lines are not damaged and plug-in connections are not loosened!
- Note all data from other installed instruments with volatile electronic memories.



SAFETY DURING INSTALLATION

- During installation, ensure that the product's components do not affect or limit vehicle functions. Avoid damaging these components!
- Only install undamaged parts in a vehicle!
- During installation, ensure that the product does not impair the field of vision and that it cannot impact the driver's or passenger's head!
- A specialized technician should install the product. If you install the product yourself, wear appropriate work clothing. Do not wear loose clothing, as it may get caught in moving parts. Protect long hair with a hair net.
- When working on the on-board electronics, do not wear metallic or conductive jewelry such as necklaces, bracelets, rings, etc.
- If work on a running engine is required, exercise extreme caution. Wear only appropriate work clothing as you are at risk of personal injury, resulting from being crushed or burned.
- Before beginning, disconnect the negative terminal on the battery, otherwise you risk a short circuit. If the vehicle is supplied by auxiliary batteries, you must also disconnect the negative terminals on these batteries! Short circuits can cause fires, battery explosions and damages to other electronic systems. Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.
- If working on gasoline boat motors, let the motor compartment fan run before beginning work.
- Pay attention to how lines and cable harnesses are laid so that you do not drill or saw through them!
- Do not install the product in the mechanical and electrical airbag area!

SAFETY INFORMATION

- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- When working underneath the vehicle, secure it according to the specifications from the vehicle manufacturer.
- Drill small ports; enlarge and complete them, if necessary, using taper milling tools, saber saws, keyhole saws or files. Deburr edges. Follow the safety instructions of the tool manufacturer.
- Use only insulated tools, if work is necessary on live parts.
- Use only the multimeter or diode test lamps provided, to measure voltages and currents in

the vehicle/machine or boat. Use of conventional test lamps can cause damage to control units or other electronic systems.

- The electrical indicator outputs and cables connected to them must be protected from direct contact and damage. The cables in use must have enough insulation and electric strength and the contact points must be safe from touch.
- Use appropriate measures to also protect the electrically conductive parts on the connected consumer from direct contact. Laying metallic, uninsulated cables and contacts is prohibited.

SAFETY AFTER INSTALLATION

- Connect the ground cable tightly to the negative terminal of the battery.
- Reenter/reprogram the volatile electronic memory values.

- Check all functions.
- Use only clean water to clean the components. Note the Ingress Protection (IP) ratings (IEC 60529).

ELECTRICAL CONNECTION

- Note cable cross-sectional area!
- Reducing the cable cross-sectional area leads to higher current density, which can cause the cable cross-sectional area in question to heat up!
- When installing electrical cables, use the provided cable ducts and harnesses; however, do not run cables parallel to ignition cables or to cables that lead to large electricity consumers.
- Fasten cables with cable ties or adhesive tape. Do not run cables over moving parts. Do not attach cables to the steering column!
- Ensure that cables are not subject to tensile, compressive or shearing forces.
- If cables are run through drill holes, protect them using rubber sleeves or the like.
- Use only one cable stripper to strip the cable. Adjust the stripper so that stranded wires are not damaged or separated.
- Use only a soft soldering process or commercially available crimp connector to solder new cable connections!

- Make crimp connections with cable crimping pliers only. Follow the safety instructions of the tool manufacturer.
- Insulate exposed stranded wires to prevent short circuits.
- Caution: Risk of short circuit if junctions are faulty or cables are damaged.
- Short circuits in the vehicle network can cause fires, battery explosions and damages to other electronic systems. Consequently, all power supply cable connections must be provided with weldable connectors and be sufficiently insulated.
- Ensure ground connections are sound.
- Faulty connections can cause short circuits. Only connect cables according to the electrical wiring diagram.
- If operating the instrument on power supply units, note that the power supply unit must be stabilized and it must comply with the following standard: DIN EN 61000, Parts 6-1 to 6-4.

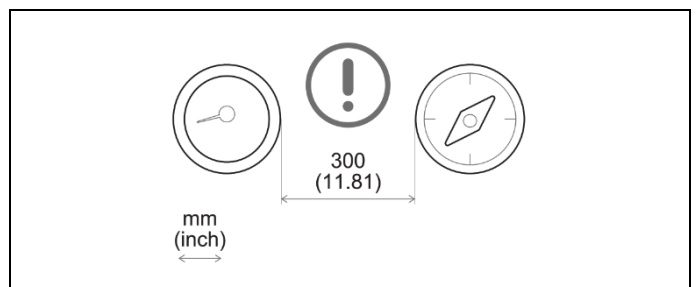
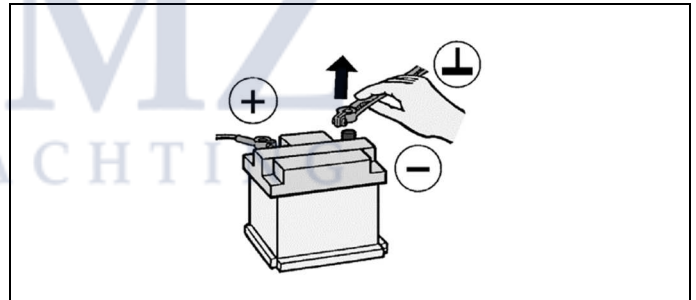
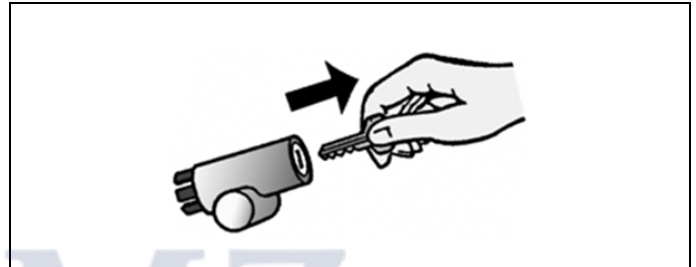
SYSTEM INSTALLATION

WARNING

Before beginning, disconnect the negative terminal on the battery, otherwise you risk a short circuit. If the vehicle is supplied by auxiliary batteries, you must also disconnect the negative terminals on these batteries! Short circuits can cause fires, battery explosions and damages to other electronic systems. Please note that when you disconnect the battery, all volatile electronic memories lose their input values and must be reprogrammed.

BEFORE THE ASSEMBLY

1. Before beginning, turn off the ignition and remove the ignition key. If necessary, remove the main circuit switch
2. Disconnect the negative terminal on the battery. Make sure the battery cannot unintentionally restart.
3. Install the devices at least 300 mm away from any magnetic compass.



⚠ WARNING

- The IBS has to be mounted and handled in an ESD protected area
- The IBS may not be contaminated with foreign particles (e.g. oil, silicon, grease, coolant, etc.)
- The IBS may not be damaged
- The pole clamp may only be torqued to the battery pole

Remove the ground cable and its clamp from the batteries negative pole.



Mount at first the wire harness' ground cable on the IBS ground bolt.

Use the battery pole adapter to fasten the dedicated ring-type connector.

Make sure not to damage the sensor while tightening the screw. (Check the note further below.)

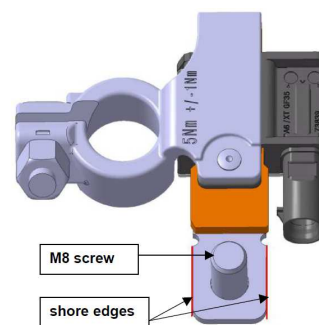


Now mount the vessels ground cable (the one that has been attached directly to the battery before) onto the battery pole adapter on the IBS.



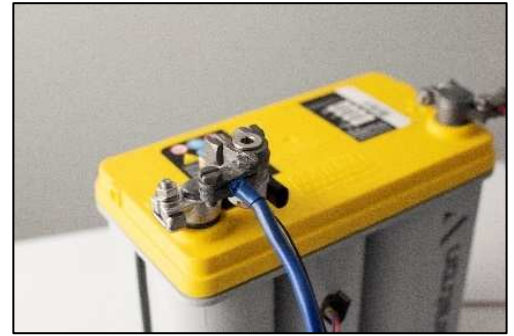
Note: During the mounting of the screw nut, the torque (max. 17 Nm) must be completely intercepted by an appropriate device/acceptance.

The torque must be intercepted only over the shore edges shown in the picture to the right.

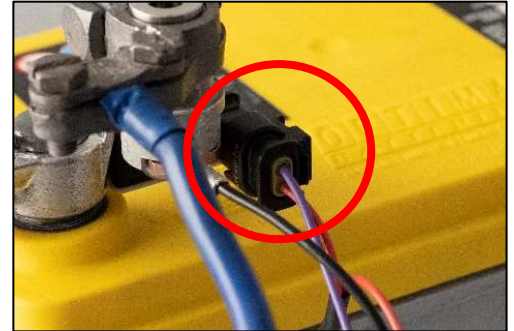


SYSTEM INSTALLATION

Mount as next step the Intelligent Battery Sensor onto the negative pole of the battery.
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.



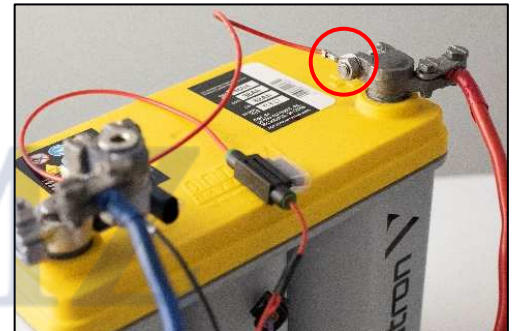
Connect the Hirschmann plug next to the black ring-type connector (2 poles for 12V-Variant/ 3 poles for 24V) to the battery sensor.



Now connect the red ring-type connector to the positive pole of the 12 V battery.

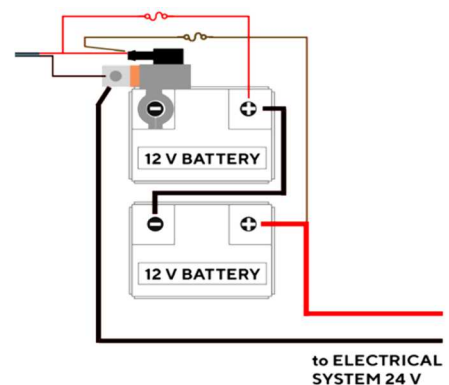
For this just clamp the ring under the screw nut, that's used to tighten the vehicles power cable to the batteries positive pole.

Note that it will take some time, until the sensor can deliver accurate data for state of charge and state of health.
(See chapter "Time for valid SOC and SOH")

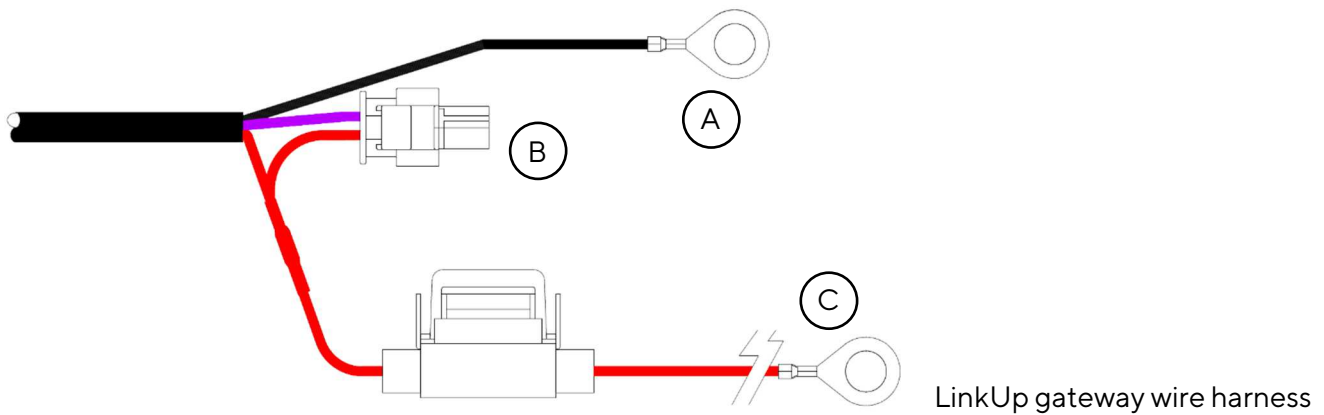


In addition for the 24V variant:

There is a brown wire with a ring-type connector next to the red one. Attach this to the positive pole of the second battery. Make sure that the wiring fits the schematic, shown on the right.



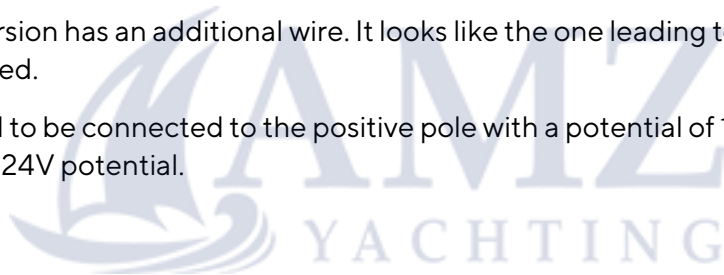
IBS CONNECTORS



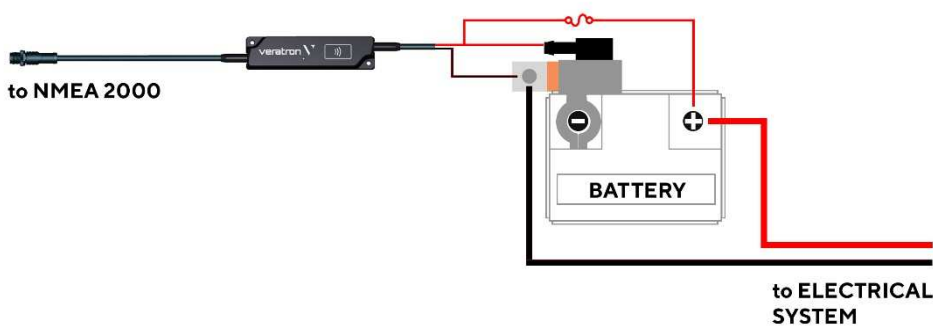
- A: IBS negative screw terminal
- B: IBS Hirschmann mating connector
- C: Positive pole terminal

The cable for the 24V-Version has an additional wire. It looks like the one leading to connector "C" but the color is brown instead of red.

The red cable is supposed to be connected to the positive pole with a potential of 12V the brown one to the positive battery pole with 24V potential.

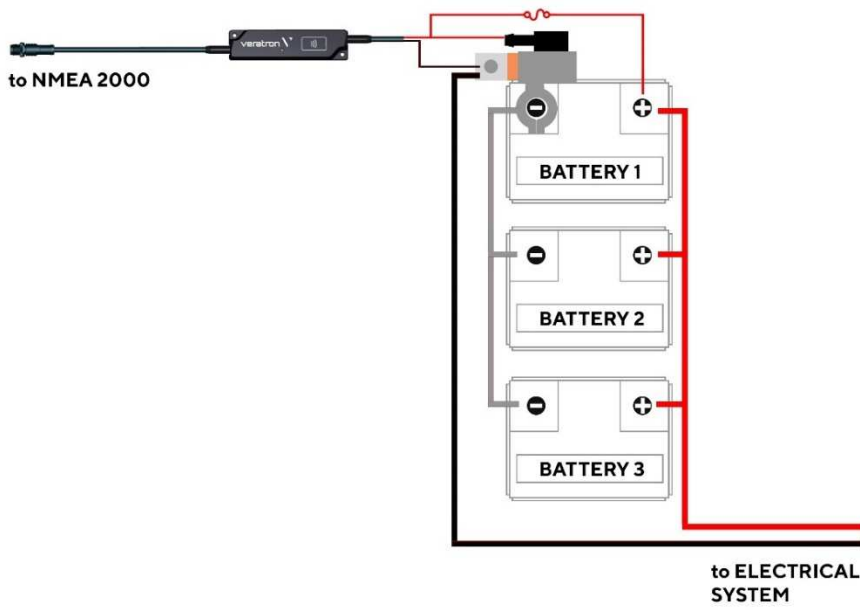


CONNECTION DIAGRAM 12V



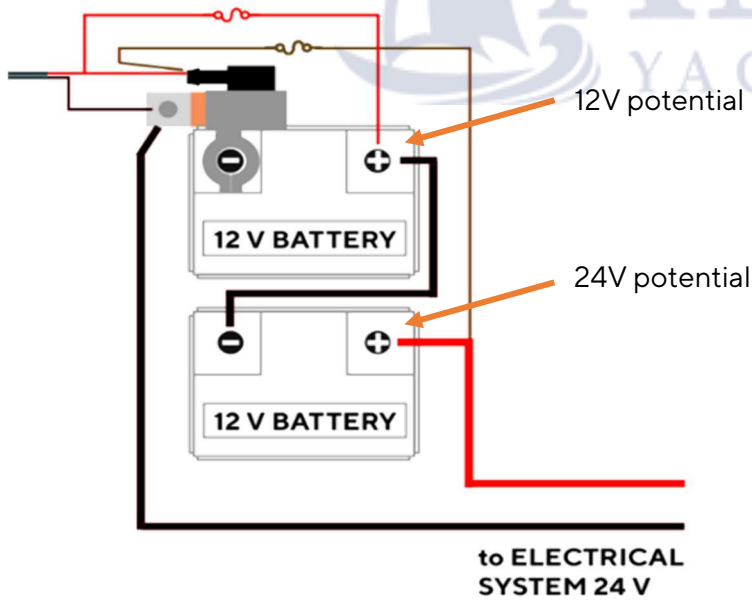
Connections diagram for single battery

CONNECTION DIAGRAM 12V (MULTIPLE BATTERIES)



Connections diagram for multiple parallel battery connections (battery pack)

CONNECTION DIAGRAM 24V (MULTIPLE BATTERIES)



Connections diagram for two serial batteries. Leading to a 24V system (battery pack)

CONNECT TO THE NMEA 2000® NETWORK

Once the sensor installation is complete it is possible to interface the LinkUp 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 LinkUp 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 LinkUp housing will start flashing (see "LED notifications").



CONFIGURATION

LINKUP CONFIGURATOR APP

To configure the sensor, some parameters, like the sensor- and battery type or the system's capacity, must be calibrated through the LinkUp.

This is possible with the "LinkUp 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 LinkUp gateway can be configured, as described below, without the need of a power supply.



LINK UP CONFIGURATOR



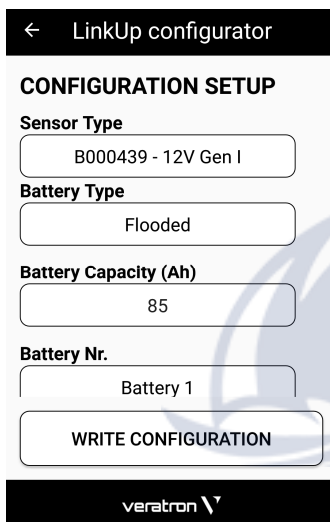
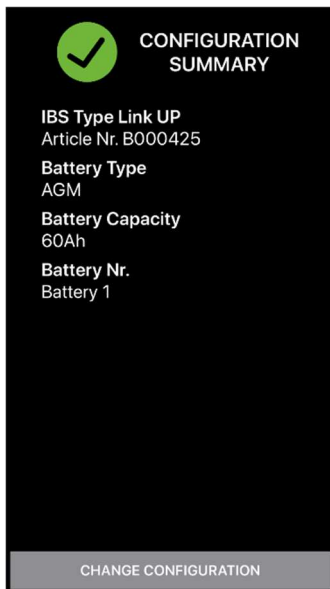
SENSOR CONFIGURATION



1. Launch the "Link Up Configurator" app and read the current configuration of the LinkUp device by "tapping" the smartphone onto the LinkUp 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.
3. To modify the configuration, press the “Change Configuration” button.
4. Select what type of IBS do you have. Refer to the part number for this.
5. Choose your battery type between Starter (Lead acid), Gel or AGM.
6. Type in the battery capacity in ampere hours and its instance (e.g. Battery 2) so that the LinkUp gateway will correctly transmit the values over NMEA 2000®.
7. For the battery specifications please refer to the battery manufacturer datasheet.
8. Once the settings are completed, press the “Write Configuration” button to prepare the download.
9. To download the configuration, simply “tap” the smartphone again onto the LinkUp wireless area, as described in 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 LinkUp gateway) then the recalibration time of 3.5 hours starts again.

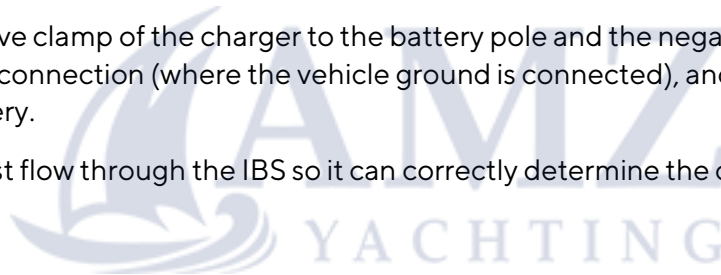
EXTERNAL CHARGING OF THE BATTERY

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 so it can correctly determine the charge balance



LED NOTIFICATION

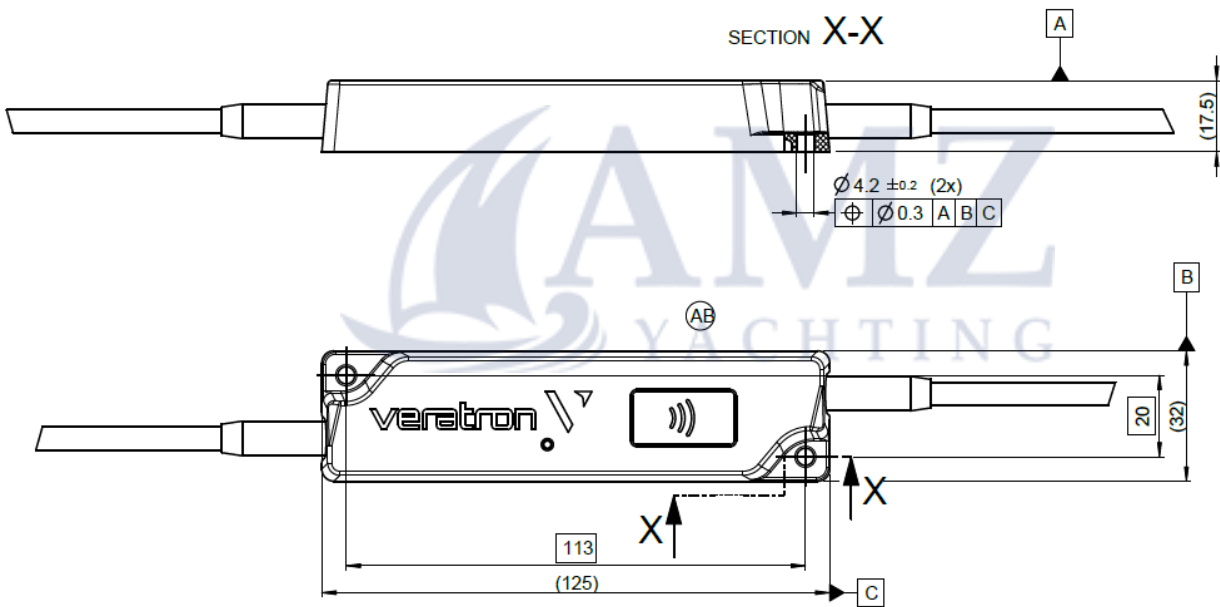
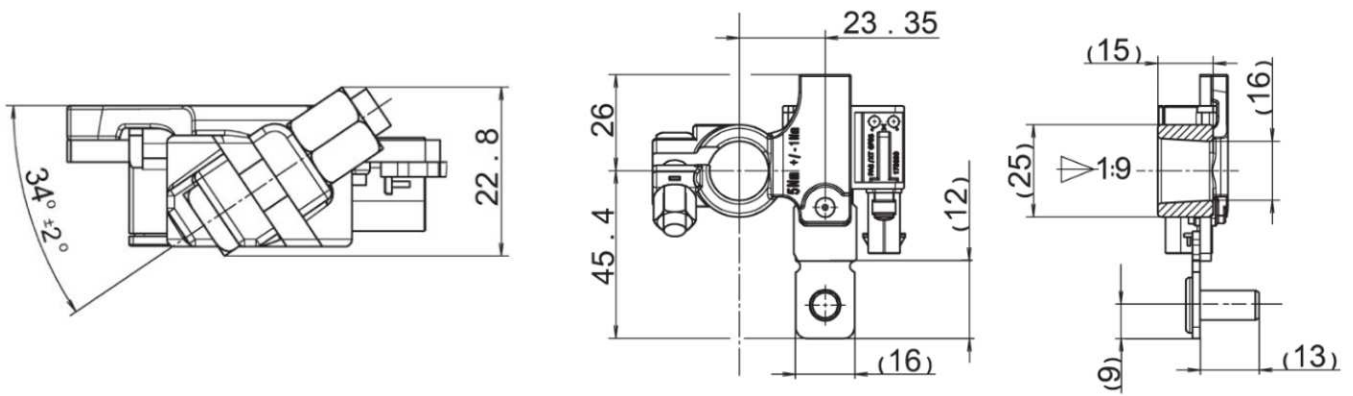
LED behavior	Description
OFF	Device not powered.
ON	Device configured and in operation.
Slow blink (1Hz)	Device in operation with invalid or empty configuration. Waiting for configuration by the user (factory setting). NMEA 2000® messages are NOT transmitted.
Fast blink (2Hz)	Analogue value from the 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

DATASHEET

IBS – Version:	12V Gen. 1	12V Gen. 2	24V
Operating voltage	6 – 16.5 V	6 – 18 V	7.5 – 32 V
Operating current (permanent)	± 155 A	± 200 A	± 200 A
Maximum current	± 1500 A (500 ms)	± 1500 A (500 ms)	± 2000 A (500 ms)
Power consumption	≤ 15 mA (normal mode) ≤ 120 µA (sleep mode)	≤ 10 mA (normal mode) ≤ 200 µA (sleep mode)	≤ 16 mA (normal mode) ≤ 230 µA (sleep mode)
Max battery capacity	249 Ah	500 Ah	255 Ah
Operating temperature	-40°C to 115°C	-40°C to 115°C	-40°C to 115°C
Grounding bolt	M8	M6	M8
Protection class	IP 6K7		
Flammability	UL94		
Supported battery types	Gel, AGM, Flooded (Lead)		
LinkUp plug	DeviceNet M12 5 pins		
IBS plug	Hirschmann 872-857-565		

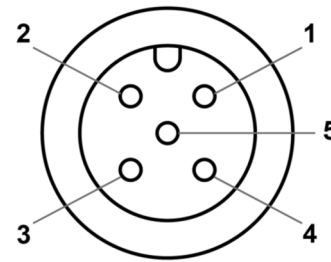
DIMENSIONS



PINOOTS

NMEA 2000® Connection

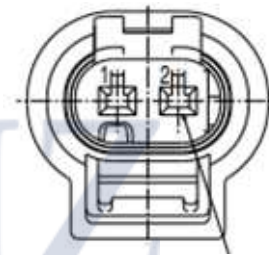
Pin No.	Description
1	Shield
2	NET-S (V+)
3	NET-C (V-)
4	NET-H (CAN H)
5	NET-L (CAN L)



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

12V IBS-Connection

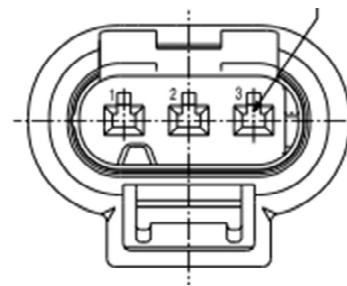
Pin No.	Description
1	+12 V Power supply
2	LIN bus



Hirschmann IBS plug 2 poles
Male, IBS side view

24V IBS-Connection

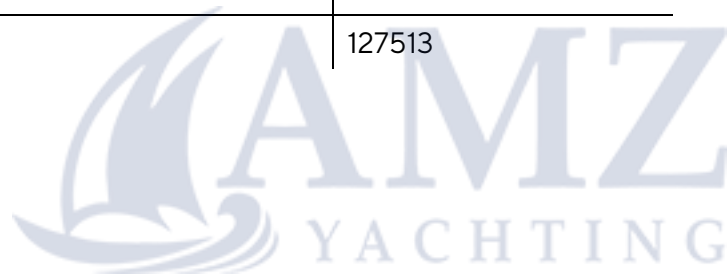
Pin No.	Description
1	+12 V Power supply
2	LIN bus
3	+24 V Power supply



Hirschmann IBS plug 3 pole
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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