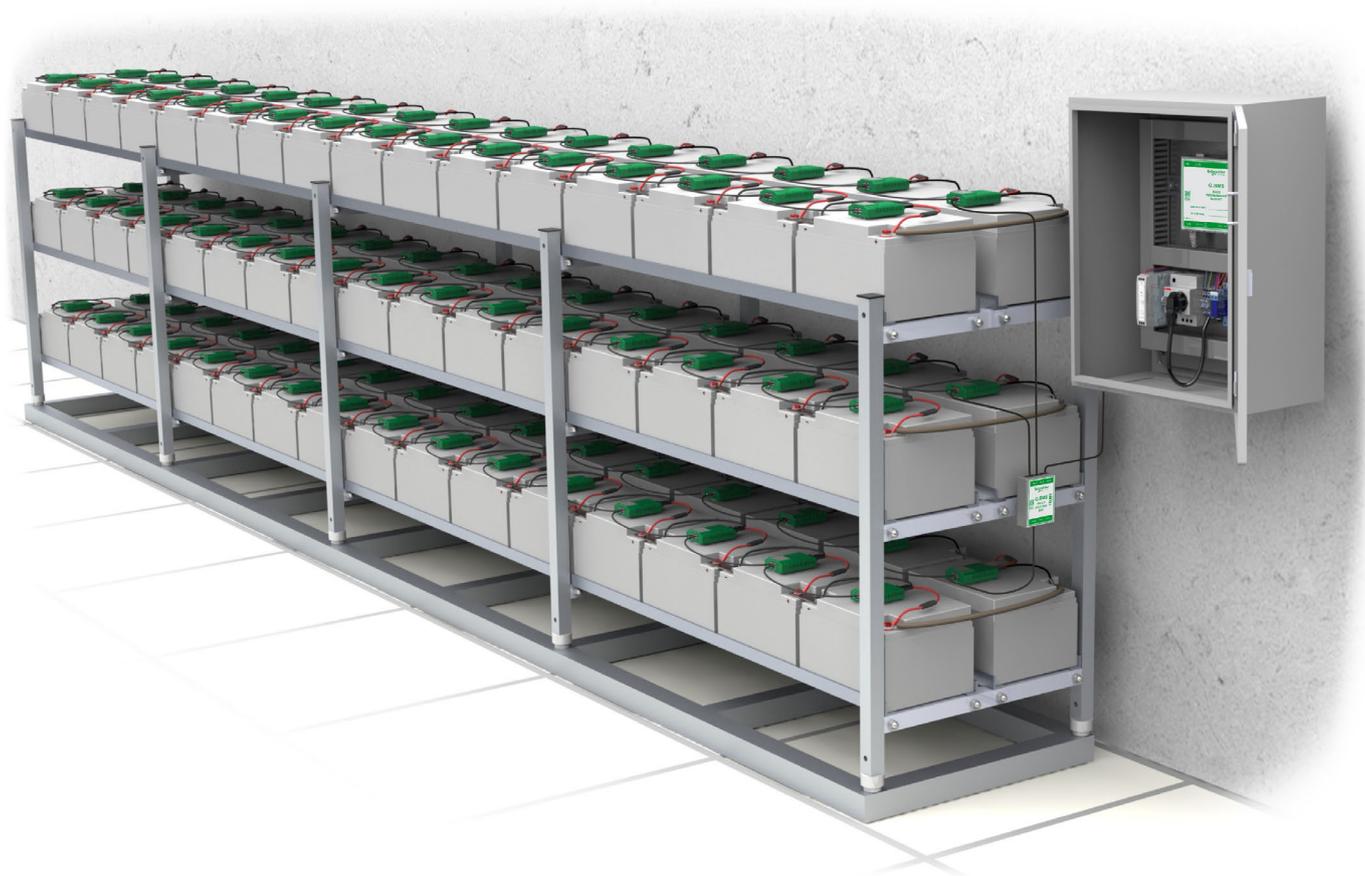


Gutor Battery Management System

G.BMS

User Guide

04/2021 Version 1



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Safety Information

Read these instructions carefully and look at the equipment to become familiar with it before trying to install, operate, service or maintain it. The following safety messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

IMPORTANT: Save the safety information for future reference.



The addition of this symbol to a “Danger” or “Warning” safety message indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages with this symbol to avoid possible injury or death.

⚠ DANGER
DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
Failure to follow these instructions will result in death or serious injury.

⚠ WARNING
WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ CAUTION
CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
Failure to follow these instructions can result in injury or equipment damage.

NOTICE
NOTICE is used to address practices not related to physical injury.
Failure to follow these instructions can result in equipment damage.

Please Note

Electrical equipment should only be installed, operated, serviced, and maintained by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

G.BMS Safety Precautions

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- All safety information in this document must be read, understood and followed.
- Only qualified personnel are allowed to install, operate and perform maintenance on the G.BMS solution and the batteries.
- Batteries and connected measuring cables are always live.
- Always disconnect the G.BMS module from the measuring cables before touching or replacing any other cables.
- Always use appropriate personal protective equipment (PPE).
- Follow safe electrical work practices. See NFPA 70E or CSA Z462.

Failure to follow these instructions will result in death or serious injury.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

When working on batteries always use:

- Eye protection
- Protective rubber gloves
- Protective rubber apron
- Protective rubber boots
- Insulated tools

When working on batteries:

- Always disconnect the charging source
- Always remove from earth if inadvertently earthed
- Always remove watches, rings, or other metal objects
- Never place tools or metal objects on top of batteries

Failure to follow these instructions will result in death or serious injury.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Always verify the polarity before connecting the measurement cables between the battery and the G.BMS module.

Failure to follow these instructions will result in death or serious injury.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Never place G.BMS modules on damaged batteries or batteries with too high internal resistances.

Always observe the battery temperature for 12 hours after discharge for potential thermal runaway or battery damage.

Failure to follow these instructions will result in death or serious injury.

⚠️⚠️ DANGER**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Never open or alter G.BMS modules.
- Never attach any objects to the battery or the G.BMS module apart from the connecting cables.

Failure to follow these instructions will result in death or serious injury.

⚠️⚠️ DANGER**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Never open, alter or damage batteries. This can release toxic electrolytes that are harmful to the skin and eyes.
- Never smoke, handle open flames or create sparks near the batteries.
- Never dispose of batteries in a fire as they can explode.

Failure to follow these instructions will result in death or serious injury.

⚠️ WARNING**INCOMPLETE INSTALLATION PROCESS**

A service technician should monitor the G.BMS modules and the initial charge during the installation. Excessive heat created by the G.BMS modules may indicate a damaged battery or incorrectly mounted cables. Do not leave the installation site before the installation of the G.BMS solution is complete and the battery has charged for 60 minutes. After that and only if the G.BMS solution shows stable voltages and normal internal resistance values is the G.BMS solution ready to be monitored remotely.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠️ WARNING**INCORRECT INSTALLATION ENVIRONMENT**

Do not install G.BMS modules in an area that:

- Is wet or dusty.
- Is unprotected from water or high humidity.
- Has a constantly high concentration of salted or oxidizing gases.
- Is close to sources of extreme heat, open flames, or sparks, or have a high variation in temperature.
- Is prone to physical vibrations.
- Has a high gas concentration or flammable materials.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠️ WARNING**TOO LATE ALARM OR WARNING SIGNAL**

Ensure that the alarm thresholds are set for time to react to the alarm or warning signal.

It is recommended that alarm signals are attend to within at least two hours.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

▲ CAUTION**INACCURATE MEASUREMENTS**

Never use G.BMS modules or bus cables of different versions in the same G. BMS solution.

Failure to follow these instructions can result in injury or equipment damage.

▲ CAUTION**MAGNETIC EMISSION**

Never place any materials or equipment sensitive to magnetic emissions near the webmanager. For example, monitors, disk drives, memory chips or magnetic tapes.

Failure to follow these instructions can result in injury or equipment damage.

▲ CAUTION**HAZARDOUS SUBSTANCE**

- Battery electrolyte solutions are highly corrosive.
- Battery electrolyte are harmful to both eyes and skin.

Failure to follow these instructions can result in injury or equipment damage.

Battery Regulations

For battery installation always follow local and national regulations that apply in your local area. For example:

- ZVEI publication "Instructions for the Safe Handling of Electrolyte for Lead-acid Accumulators."
- ZVEI publication "Safety Data Sheet on Accumulator Acid (Diluted Sulfuric Acid)."
- VDE 0510 Part 2: 2001-12, in accordance with EN 50272-2:2001: "Safety Requirements for Secondary Batteries and Battery Installations - Part 2: Stationary Batteries".
- IEEE Standard 450-2002: "Recommended Practice for Maintenance, Testing and Replacement of Vented Lead Acid Batteries for Stationary Application."
- IEEE Standard 1188-2005: "Recommended Practice for Maintenance, Testing and Replacement of Valve Regulated Lead Acid Batteries for Stationary Application."
- IEEE Standard 1375-1998: "Guide for Protection of Stationary Battery Systems"

For further information refer to the original equipment manufacturer (OEM) of the batteries for instructions on installation, maintenance, and operation of the batteries.

Standards and Certificates

Directives and Regulations

2014/30/EU Electromagnetic compatibility - directive

2011/65/EU and (EU) 2015/863 Restriction of the use of certain hazardous substances (RoHS)

2012/19/EU Waste electrical and electronic equipment (WEEE)

2006/66/EG Waste Batteries and accumulators and repealing directive

CE Conformity

EN 55024:2010

Information technology equipment - Immunity characteristics - Limits and methods of measurement

EN 55022:2003

Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement

EN 55032:2015

Electromagnetic compatibility of multimedia equipment - Emission - Limits and methods of measurement

EN 61000-4-3:2006+A1:2008+A2:2010

Electromagnetic compatibility (EMC) Part 4: Environment Section 3: Radiated, radio-frequency, electromagnetic field immunity test. Limits and methods of measurement

IEC 61010-1

General safety requirements for the following types of electrical equipment and their accessories, wherever they are intended to be used. A) Electrical test and measurement equipment B) Electrical industrial process-control equipment C) Electrical laboratory equipment

EN IEC 63000:2018

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances; European version

EN 62368-1:2014 + AC:2015

Information Technology Equipment – Safety

UL/CSA Certification

NOTE: Currently only certain devices are UL/CSA certified, for details refer to the section *Technical Data*, page 54.

UL Std. No. 60950-1 2nd Edition

Information Technology Equipment – Safety – Part 1: General Requirements (Incl. AM 1:2011 and AM 2:2014)

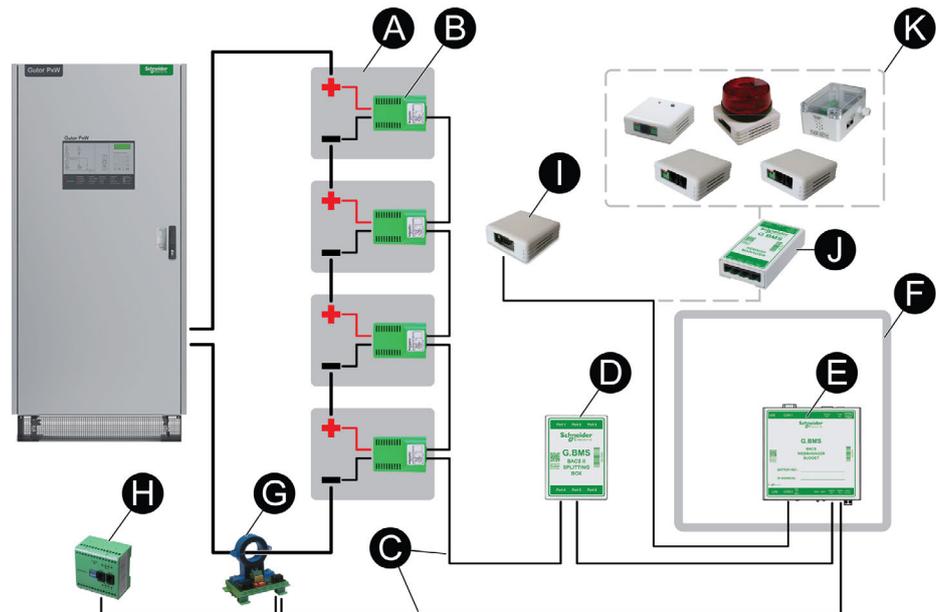
CAN/CSA-C22.2 No. 60950-1-07

Incl. Amendment 1 (2011) and Amendment 2 (2014) - Information Technology Equipment – Safety – Part 1: General Requirements

G.BMS Solution Overview

The Gutor battery management system (G.BMS) is a solution that actively balances the charge of each battery block. The G.BMS continuously monitors the voltage, impedance, temperature and as an option the electrolyte level. The measured information is used to equalize the charge of the individual blocks to help them reach their designed lifetime.

Any Gutor UPS, Gutor charger or other standard industrial UPS can use the G.BMS solution, since it is installed separately from the system. Therefore the G.BMS solution can also be installed on your already existing UPS systems.



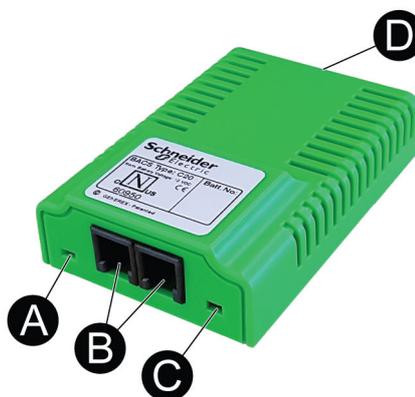
- (A) Batteries:** The G.BMS solution can be used with multiple different battery types. The maximum number of individual battery blocks in one battery bank that can be monitored with one webmanager is 512, if three splitting boxes are used.
- (B) Modules:** One module is used for each battery block in the battery bank. In one battery bank all modules are connected to the same webmanager directly or through a splitting box.
- (C) Bus cables:** Bus cables connects all the parts in the solution with each other. One webmanager is connected to one bus, additional webmanagers can be used if there are multiple battery banks for example in a redundant Gutor system. For long distances between devices, repeaters can be used to extend the bus.
- (D) Splitting Box:** Optional. With a splitting box it is possible to connect additional modules to the webmanager. A maximum number of 200 modules can be connected to one splitting box.
- (E) Webmanager:** The webmanager connects the G.BMS solution to a network. From the webmanagers web interface the solution can be monitored and configured. If no splitting box is used a maximum number of 50 modules can be connected in one string to the webmanager.
- (F) Cabinet:** Optional. With a cabinet some internal wiring is already done to reduce the on-site installation time. It also helps to protect the webmanager from environmental pollution and restricts physical access.
- (G) Current Sensor:** Battery current sensors monitor the total battery charge/ discharge current to the Gutor UPS, Gutor charger or other system. The current sensors are connected to the webmanager.
- (H) Bus Interface:** Optional. A programmable device with digital inputs and relay outputs.

- (I) **Stand-Alone Temperature and Humidity Sensor:** Optional. A stand-alone temperature and humidity sensor that can be connected directly to the webmanager.
- (J) **Sensormanager:** Optional. In case other sensors than the stand-alone temperature and humidity sensor are needed, a sensormanager can be used.
- (K) **Additional sensors:** Optional. Various additional sensors can be connected to the sensormanager to monitor or send signals to the webmanager.

Port, LED and Button Overview

Overview, details and specifications of the ports, LEDs and buttons on the main devices in the Gutor battery management system.

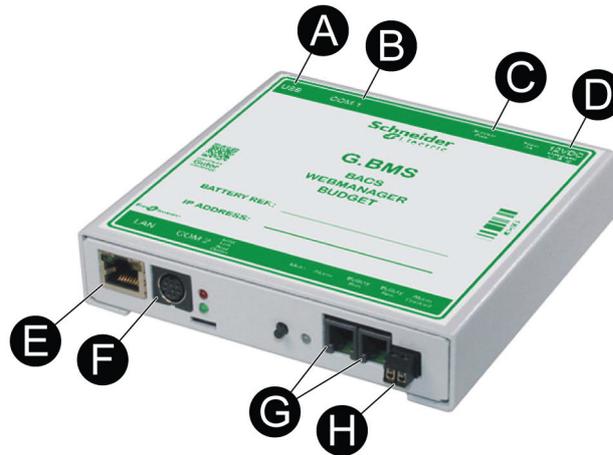
Module Ports, LEDs and Buttons



Part	Name	Description/Status
(A)	Operation mode status LED	Depending on the color and flashing speed the module is in different modes: Green: Operation mode (address is programmed and communication is active). Flashing green: Ready mode (address is programmed but communication is not active). Alternating green and red: Search mode. Red: Alarm mode (measurements are above or below the set threshold). Flashing red: Default mode (no programmed address, default delivery state or after address reset). Fast flashing red: Programming mode (address programming in progress, ready to be registered). Off: Sleep mode (connected to the measuring cable but communication is not active).
(B)	BACS bus ports	Two RJ11 ports for bus connection.
(C)	Address registration button	Used to register a module when programming the address range of the setup. Can be pressed with the special accessory pen.
(D)	Measurement cable port	One port for the battery measurement cable connection.

Webmanager Ports, LEDs and Buttons

Webmanager Ports



Part	Name	Description
(A)	USB	(Not used).
(B)	COM1 Port	RS-232 port. (Not used).
(C)	Service Port	RS-232 port for connecting to a PC/Laptop for readouts of the modules using specific service software.
(D)	DC input	Power supply port. Inside (-) minus, outside (+) plus. Always use a stabilized power source. The standard power supply delivers 12V/2A DC, if more than 300 modules are connected a 12V/3A DC power supply is used instead.
(E)	LAN port	Ethernet 10/100 Mbit RJ45 port with integrated LED. <ul style="list-style-type: none"> • Green: Connected to the network. • Yellow: Network activity.
(F)	COM2 Port	Mini-DIN-8 port for optional devices, sensors or networks (MODBUS, RS-232, Profibus, LONBus, etc.).
(G)	Battery bus ports (COM3) for the BACS bus	Two RJ10 ports for connections to modules, splitting boxes, current sensors or aux device.
(H)	Alarm contact	Dry contact to the common alarm signal in the webmanager.

Webmanager LEDs and Buttons



Part	Name	Description/Status
(I)	Red status LED	<p>On: Booting or a lost communication on COM1, COM2 or to one or more module on the BACS bus (battery bus/COM3)</p> <p>Flashing slowly: Update in progress</p> <p>Flashing fast: Update unsuccessful</p>
(J)	Green status LED	<p>Flashing slowly: Operating</p>
(K)	Slide switch	<p>Slide switch to set different modes for the webmanager:</p> <p>Left position: Operating mode. Configured IP address used, or default (10.10.10.10) if not yet changed.</p> <p>Middle position: Configuration mode. In this mode, after a reboot the IP address is set to default (10.10.10.10).</p> <p>Right position: DHCP is active and IP address is set automatically.</p>
(L)	Mute button	<p>Press to confirm and mute the audible common alarm. The alarm LED changes to yellow.</p>
(M)	Alarm LED	<p>LED for the common alarm in the webmanager:</p> <p>Green: OK</p> <p>Yellow: Common alarm active but confirmed/muted (mute button pressed)</p> <p>Red: Common alarm active and audible</p>

Installation of the G.BMS Solution

The installation covers preparation of the batteries, installation of the devices and connections between the devices. See the sections:

- Prepare the Batteries, page 14
- Install Battery Measuring Cables, page 15
- Install G.BMS Modules, page 18
- Install the Webmanager and any Splitting Boxes, page 26
- Install the Current Sensor, page 28
- Install Additional Options, page 28

Prepare the Batteries

Before you attach the G.BMS module fastening strips the battery surface must be clean and dry. To clean the battery surface:

1. Check what cleaning product is recommended by the battery manufacturer.
NOTE: If you are unsure or there are no recommendations available use only soapy water.
2. Clean the surface of the batteries with the recommended cleaning product.
3. Dry the surface of the batteries with an antistatic fabric.



Install Battery Measuring Cables

⚠ CAUTION
<p>INACCURATE MEASUREMENTS</p> <p>Make sure to tighten the pole screws with the correct torque value for your battery.</p> <p>Failure to follow these instructions can result in injury or equipment damage.</p>

NOTICE
<p>Always connect the measuring cable to the right pole, the red cable to the positive pole and the black cable to the negative pole. If the cable connection is reversed the integrated fuse can be damaged.</p> <p>Failure to follow these instructions can result in equipment damage.</p>

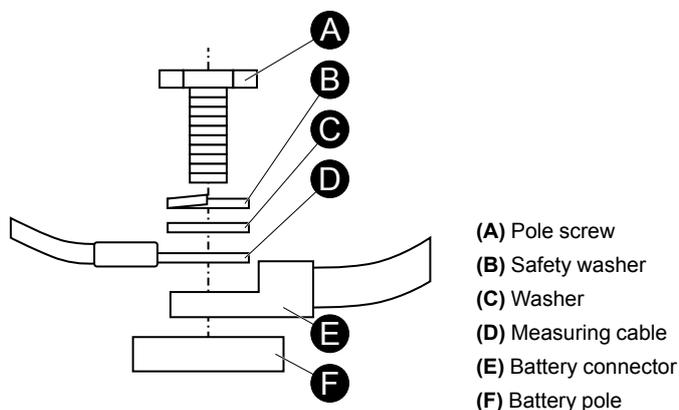
Follow the procedure to connect the measuring cable for your battery type using the right cable:

- Attach BC5xx Measuring Cable for 4–16 V Batteries, page 15
- Attach BC4Bxx Measuring Cable for 1.2–2 V Batteries with 2 Poles, page 16
- Attach BC4Bxx Measuring Cable for 1.2–2 V Batteries with 4 or More Poles, page 17

NOTE: Please refer to the battery manufacturers connection guidelines for resistance/impedance measurements.

4 V – 16 V Batteries	1.2 V - 2 V Batteries with 2 poles	1.2 V - 2 V Batteries with 4 poles or more
BC5xx measuring cable	BC4Bxx measuring cable	
		

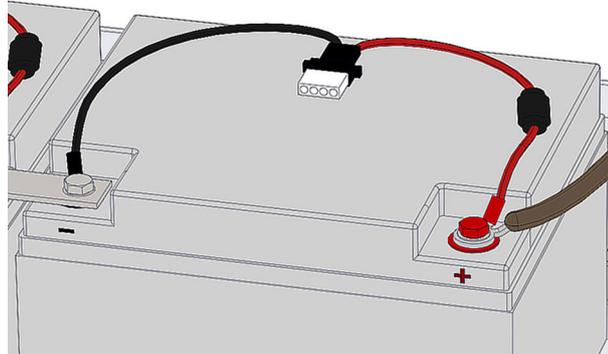
Attach BC5xx Measuring Cable for 4–16 V Batteries



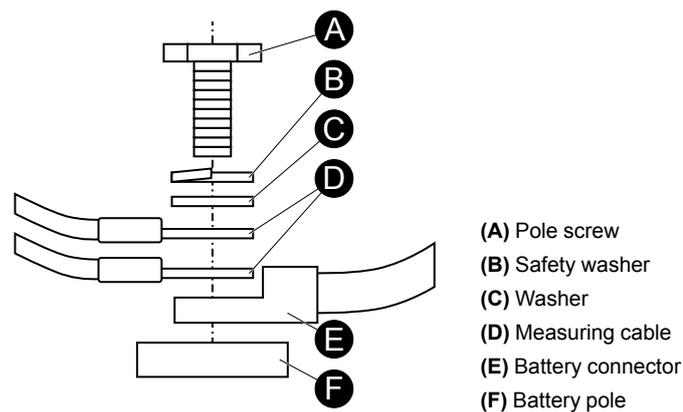
IMPORTANT: Attach the cable as close as possible to the battery poles, but above the battery connectors.

To attach the BC5xx measuring cable to the battery:

1. Connect the red cable to the positive battery pole.
2. Connect the black cable to the negative battery pole.
3. Tighten the pole bolts with the torque value recommended by the battery manufacturer.



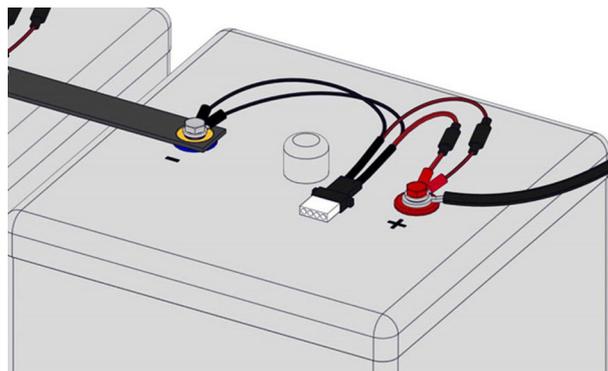
Attach BC4Bxx Measuring Cable for 1.2–2 V Batteries with 2 Poles



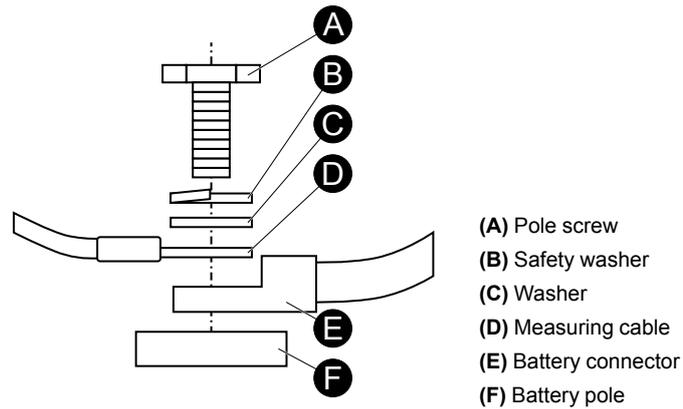
IMPORTANT: Attach the cable as close as possible to the battery poles, but above the battery connectors.

To attach the BC4Cxx measuring cable to the battery:

1. Connect the red cables to the positive battery pole.
2. Connect the black cables to the negative battery pole.
3. Tighten the pole bolts with the torque value recommended by the battery manufacturer.



Attach BC4Bxx Measuring Cable for 1.2–2 V Batteries with 4 or More Poles

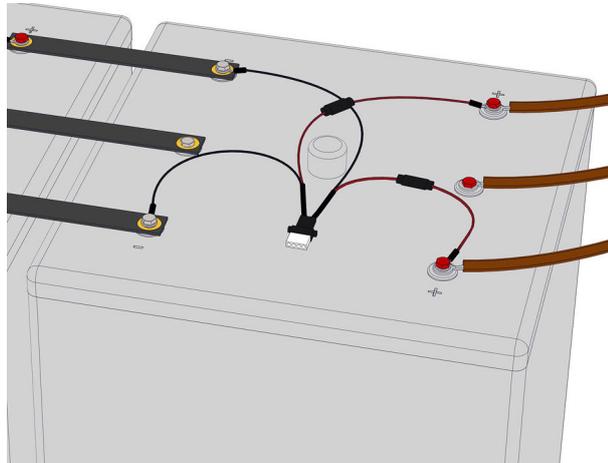


IMPORTANT: Attach the cable as close as possible to the battery poles, but above the battery connectors.

NOTE: If the battery has 4 poles connect the cable to all poles. If the battery has more than 4 poles it is sufficient to connect the measuring cable to only 4 poles. Use the same poles at each battery.

To attach the BC4Cxx measuring cable to the battery:

1. Connect the red cables to the positive battery poles.
2. Connect the black cables to the negative battery poles.
3. Tighten the pole bolts with the torque value recommended by the battery manufacturer.



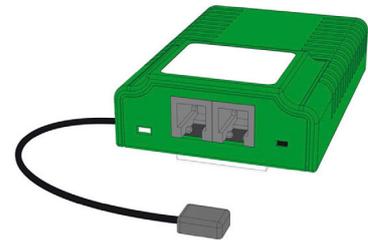
Examples of Measuring Cable Installations



Install G.BMS Modules

There are two types of G.BMS modules:

- G.BMS module with integrated temperature (standard)
- G.BMS module with external temperature sensor (option)



To install the modules see the sections:

- Place the G.BMS Modules, page 18
- Attach the G.BMS Modules, page 21
- Attach Bus Cables between Modules, page 22

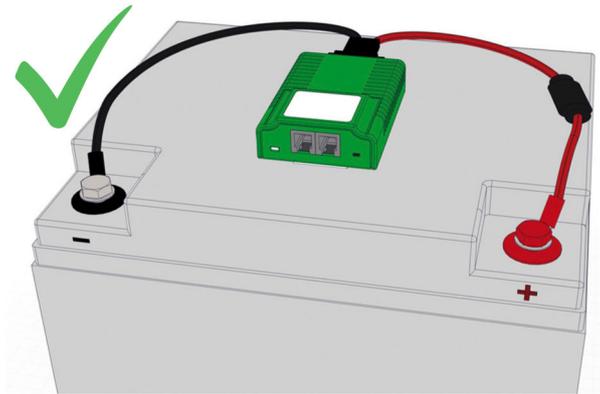
Place the G.BMS Modules

Read all the relevant positioning information before you attach any modules.

- General Placement Information, page 19
- Additional Placement Information for Batteries with Vents, page 20
- Additional Placement Information for G.BMS Modules with External Temperature Sensors, page 20

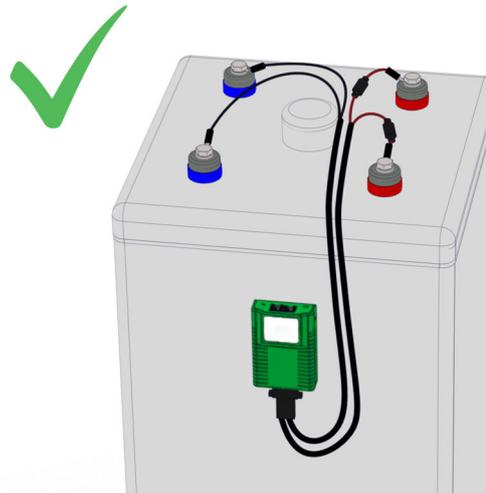
General Placement Information

The recommended placement is on top of the battery.

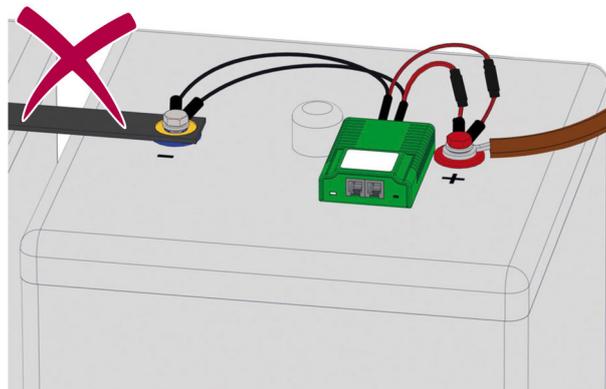


If there is not enough space on the top of the battery, place the G.BMS module on the front panel of the battery.

NOTE: It is recommended to place the modules with the measuring cables in a loop with the connection pointing down. This reduces the risk of any gas condensate dripping into the connection.

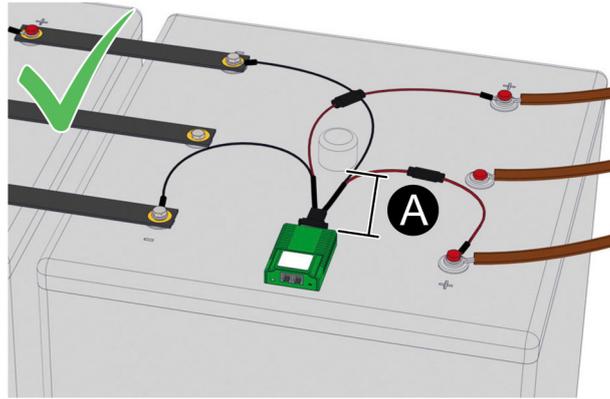


Do not place the G.BMS modules on any cooling ribs or plugs.



Additional Placement Information for Batteries with Vents

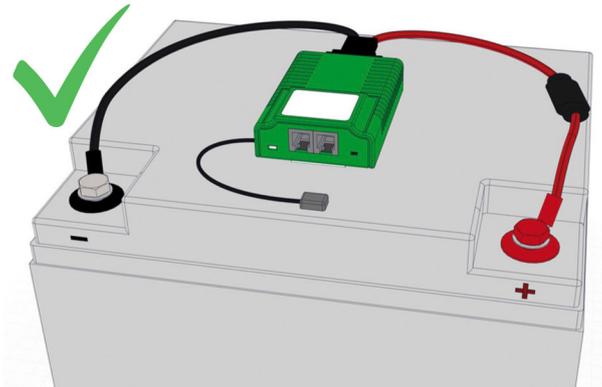
If placed on top of batteries with vents: Make sure the distance (A) between the vent and the module is at least 10 cm (4 inches).



Additional Placement Information for G.BMS Modules with External Temperature Sensors

For G.BMS modules with external temperature sensors: Make sure that the temperature sensor is placed at the same position on each battery.

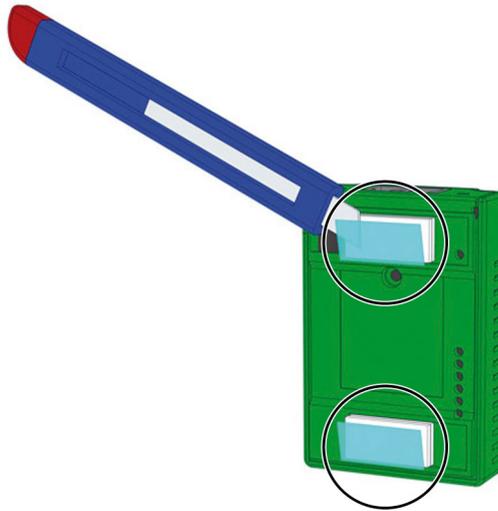
NOTE: The cable for the temperature sensor is 23 cm (9 inches) or 90 cm (35 inches) long.



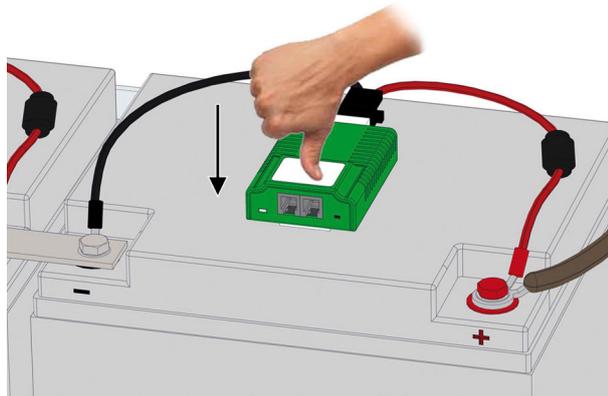
Attach the G.BMS Modules

To attach the G.BMS modules on the batteries:

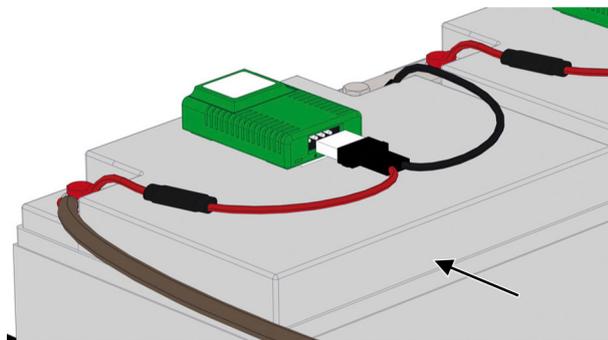
1. Remove the adhesive film from the fastening strips. Each module has two strips.



2. Position the module over the correct placement.
3. Press down and hold the module under moderate pressure for 5-10 seconds.



4. Check that the module is securely fixed on the battery.
5. Connect the measuring cable plug to the socket at the bottom of the module.



NOTE: The measuring cable is equipped with a mechanical protection against accidental polarity reversal.

Example of G.BMS Module Installation



Attach Bus Cables between Modules

⚠ CAUTION

UNINTENDED EQUIPMENT OPERATION

Only use original equipment manufacturer (OEM) BACS bus cables. If the cables are substituted the overall function of the battery monitoring system cannot be guaranteed.

Failure to follow these instructions can result in injury or equipment damage.

NOTICE

LOW SIGNAL STRENGTH

Do not use a BACS bus cable that is longer than the maximum cable length specified for the connection.

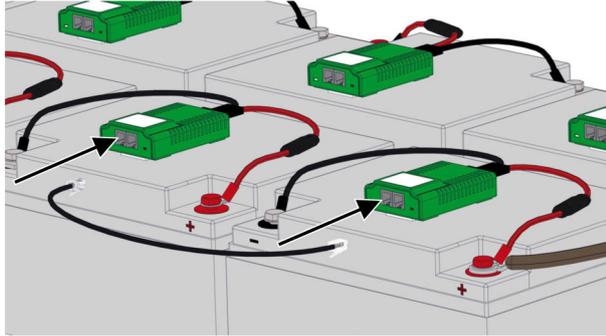
Failure to follow these instructions can result in equipment damage.

Before attaching the bus cables:

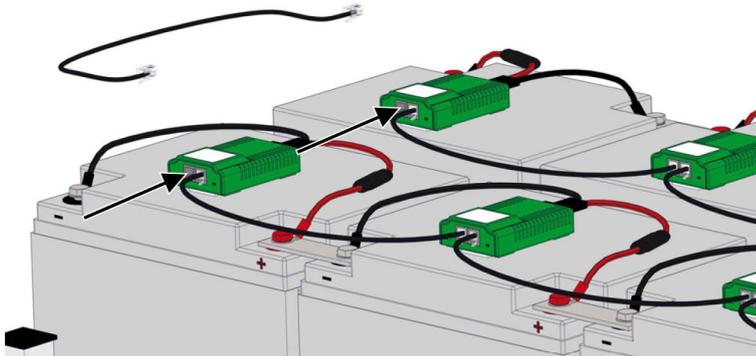
- Consider the distances between the individual battery blocks and choose the respective cable length accordingly. There are several cable lengths to choose from.
- The module that is closest to the webmanager or the splitting box should be the first one in the string. Keep one of the two bus ports free and connect later with the splitting box or the webmanager.
- Check the information and maximum distances for the bus cable installation in the chapter *Bus Cable Length and Wiring Details*, page 24.

Attach the bus cables between all modules:

1. Connect the bus cables between the modules in each row of the battery bank. The maximum number of modules in a bus string is 50.

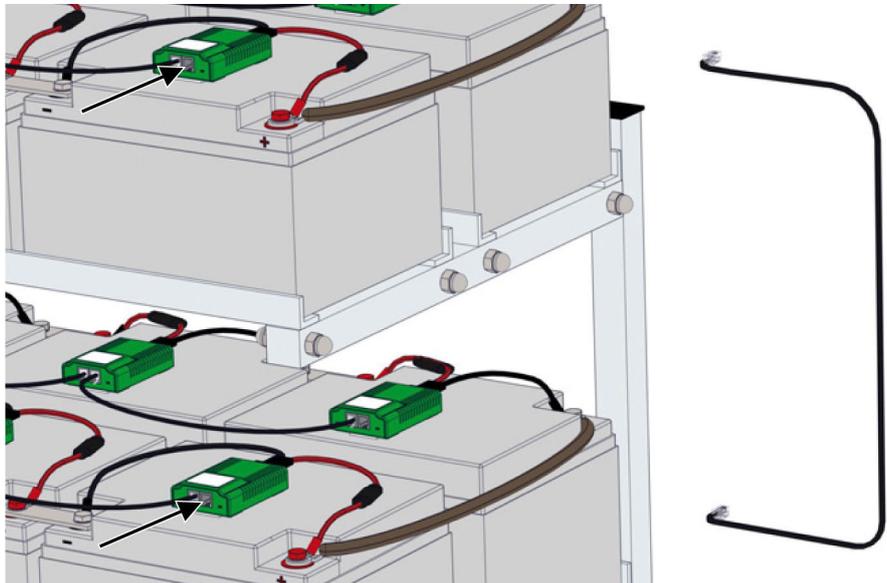


2. If applicable, connect the bus cables between the modules at the end of the rows.



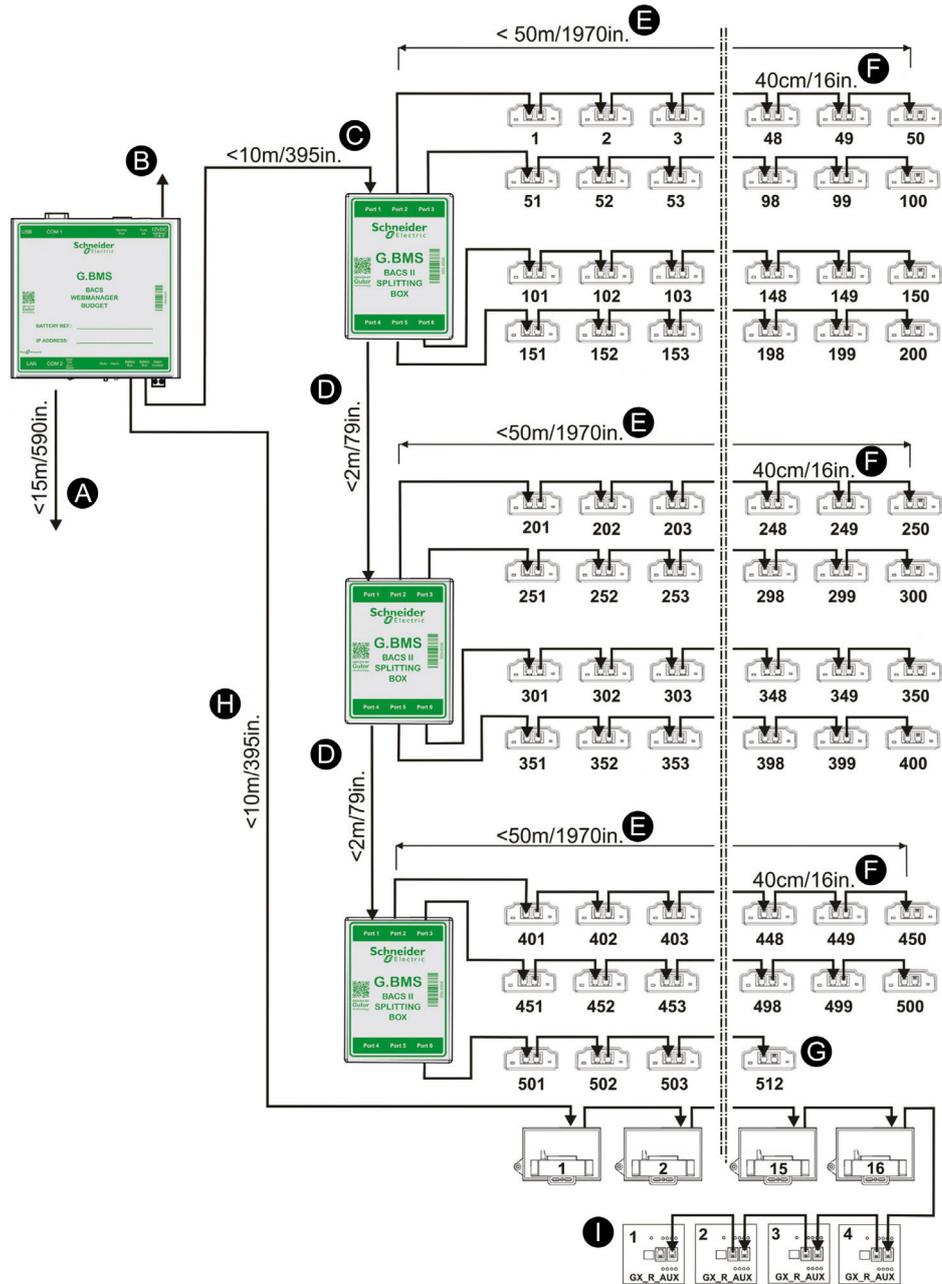
NOTE: Do not use the module closest to the webmanager or splitting box to connect the rows.

3. If applicable, connect the bus cables between the shelves in the battery bank.



4. Repeat applicable steps for each battery string.

Bus Cable Length and Wiring Details



IMPORTANT: The maximum distance between the last module or device and the webmanager is always 60 m (196 ft), $(C) + (E)$, $(C) + (D) + (E)$ or $(C) + ((D) * 2) + (E)$, depending on the number of splitting boxes. A splitting box does not increase the maximum distance.

NOTE: If the maximum distance needs to be increased a repeater can increase it up to 100 m (328 ft). A repeater can increase the distance between, for example, the webmanager and a splitting box. The maximum distances are then calculated from the repeater instead of the webmanager.

Indication	Description	Max Length
(A)	(Optional) Cable between webmanager and any external sensor connected to COM2.	15 m (49 ft)
(B)	Power supply cable. Always use a stabilized power source. The standard power supply delivers 12V/2A DC, if more than 300 modules are connected a 12V/3A DC power supply is used instead.	—
(C)	Maximum cable length between the webmanager and the splitting boxes.	10 m (32 ft)

Indication	Description	Max Length
(D)	Maximum cable length between splitting boxes. ¹	2 m (6.5 ft)
(E)	Maximum cable length between the splitting box and the last module in the line.	50 m (164 ft)
(F)	Cable length between modules in a line. The values of (C), (D) and (E) are calculated with 40 cm (16 in). The max length will depend on the number of modules and cables used between the webmanager and splitting boxes.	40 cm (16 in)
(G)	Maximum number of modules is 512.	—
(H)	Maximum distance from the webmanager to the last current sensor.	10 m (32 ft)
(I)	Maximum distance between the dry-contacts and the last GX_R_AUX.	50 m (164 ft)

1. Note that it is not possible to use the max length for both (C) and (E) if additional splitting boxes are used. The length of (C) or (E) needs to be reduced by the length of each (D).

Install the Webmanager and any Splitting Boxes

Before attaching the bus cables:

- Consider what bus cable lengths to use, the cables are available in multiple lengths to avoid unnecessary cable length.
- Check the information and maximum distances for the bus cable installation in the chapter *Bus Cable Length and Wiring Details*, page 24.
- If a repeater is needed because the maximum distance is exceeded, install the repeater less than 100 m (328 ft) from the webmanager. The maximum distances are then calculated from the repeater instead of the webmanager.

1. Mount the webmanager or the control cabinet with the webmanager inside.

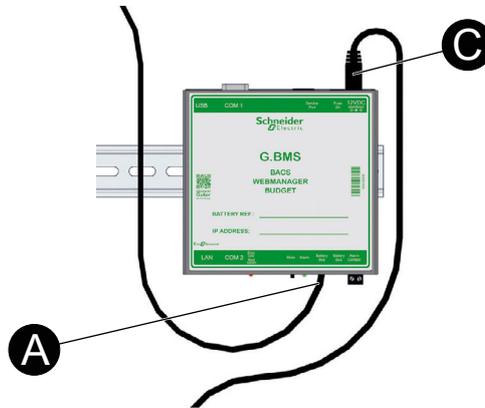
2. If applicable, mount the splitting box(es).

3. **Only for solutions without splitting box(es):**

a. Attach the bus cable (**A**) from the closest module to the webmanager.

b. Attach the power supply cable (**C**) to the webmanager.

IMPORTANT: Always use a secure power source as the power supply to the webmanager.



4. **Only for solutions with splitting box(es):**

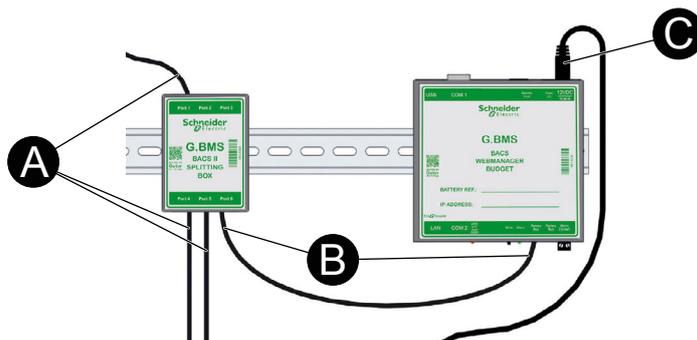
a. Attach the bus cable(s) (**A**) from the closest module(s) to the splitting box(es).

b. If applicable, attach the bus cables (**A**) between any additional splitting boxes.

c. Attach the bus cable (**B**) from the closest splitting box to the webmanager.

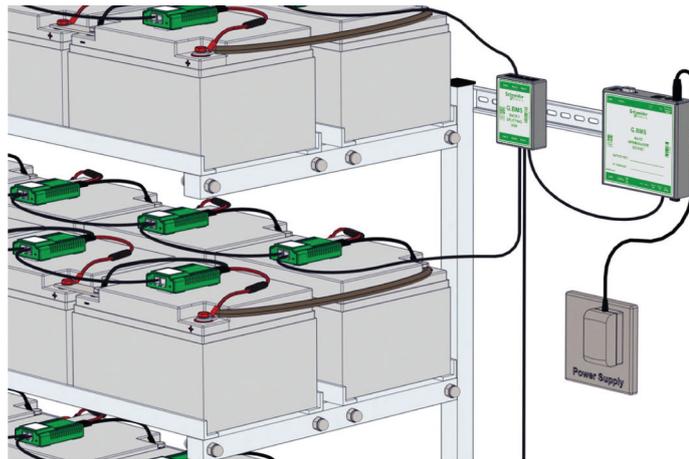
d. Attach the power supply cable (**C**) to the webmanager.

NOTE: Always use a secure power source as the power supply to the webmanager.

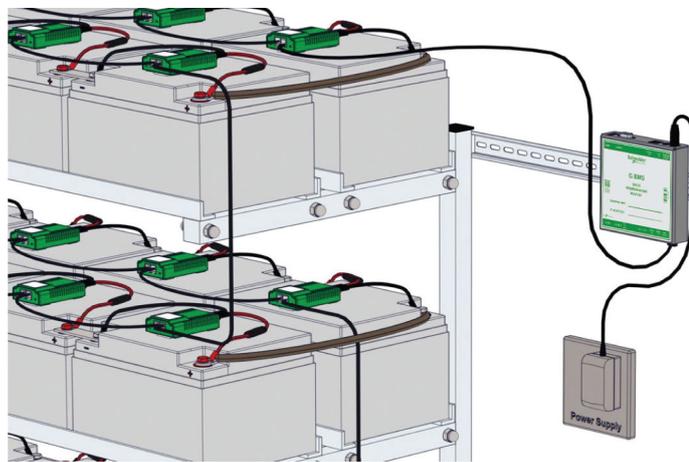


Examples of Webmanager and Splitting Box Installations

Example Installation with Splitting Box



Example Installation without Splitting Box



Example Installations with Control Cabinets



Install the Current Sensor

The current sensor should be installed at a point with the full battery current that is going to a Gutor system, unit in a redundant Gutor system or other system. The current sensor housing can be attached to a DIN rail 35 x 7.5 mm (TS35 rail).

If multiple current sensors are used, configure a unique address with the DIP switches on each current sensor connected to the same webmanager.

It is recommended to connect the current sensor to a battery bus (COM3) port on the webmanager with a BACS bus cable.

NOTE: The maximum bus cable length between the current sensor and the webmanager is 10 m (32 ft). For more information see [Bus Cable Length and Wiring Details](#), page 24.

If a sensormanager is used, it is also possible to connect the current sensor to the sensormanager with RJ12 cables.

Install Additional Options

Depending on the sensor or device different fastening options exists, for example DIN rail 35 x 7.5 mm (TS35 rail), wall mounted or adhesive. For more information see the respective section in [Technical Data](#), page 54.

Install Bus Interface (GX_R_AUX)

The GX_R_AUX is connected to the BACS bus with a BACS bus cable. It can be connected at various locations of the BACS bus that uses the COM3 port on the webmanager, for example, to a current sensor, a splitting box, repeater or a module.

If multiple GX_R_AUX devices are used, configure a unique address with the DIP switches on each GX_R_AUX device connected to the same webmanager.

NOTE: The maximum bus cable length depends where it is connected. For more information see [Bus Cable Length and Wiring Details](#), page 24.

Install Stand-Alone Temperature and Humidity Sensor

A stand-alone temperature and humidity sensor needs to be connected directly to the COM2 port on the webmanager with the included mini-DIN-8/DB-9 cable. The maximum cable length for connections to COM2 is 15 m (49 ft).

NOTE: There is only one COM2 port so it is only possible to connect one stand-alone temperature and humidity sensor to a webmanager.

Install Sensormanager and Additional Sensors

If more sensors are needed, a sensormanager can be used instead of the stand-alone temperature and humidity sensor.

Connect Sensormanager

The sensormanager needs to be connected directly to the COM2 port on the webmanager with the included mini-DIN-8/DB-9 cable. The maximum cable length for connections to COM2 is 15 m (49 ft).

NOTE: There is only one COM2 port, so it is only possible to connect one sensormanager to a webmanager.

Connect Additional Sensors and Devices

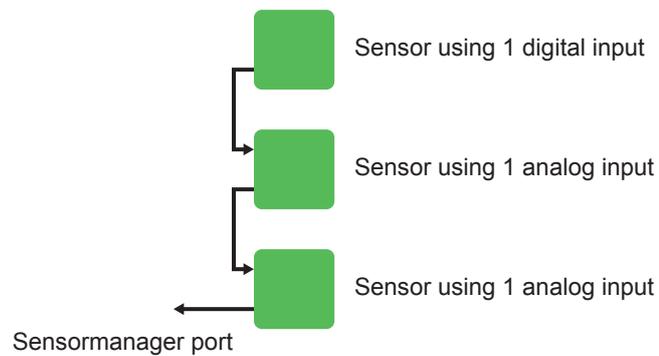
Additional sensors can be connected with RJ12 cables to the sensormanager.

Each port on the sensormanager provides 2 analog input channels, 1 digital input channel and 1 digital output channel. The number of sensors or devices that can be connected to a port depends on the types of sensors and devices. Different sensors and devices require different channels.

NOTE: The hydrogen sensor requires two ports (2 digital input channel).

Sensor / Device	Required Channel
Temperature sensor	1 analog input channel
Temperature and humidity sensor	2 analog input channels
Current sensor	1 analog input channel
Hydrogen sensor	2 digital input channels
Buzzer	1 digital input channel
Flashlight	1 digital input channel

Example of possible sensor connection to one sensormanager port



Configure the Webmanager

The webmanager needs to be configured for the specific battery setup. The webmanager interface is accessed locally or remotely through a connected network. From the webmanager interface the modules must be programmed with a unique address for each module on the bus.

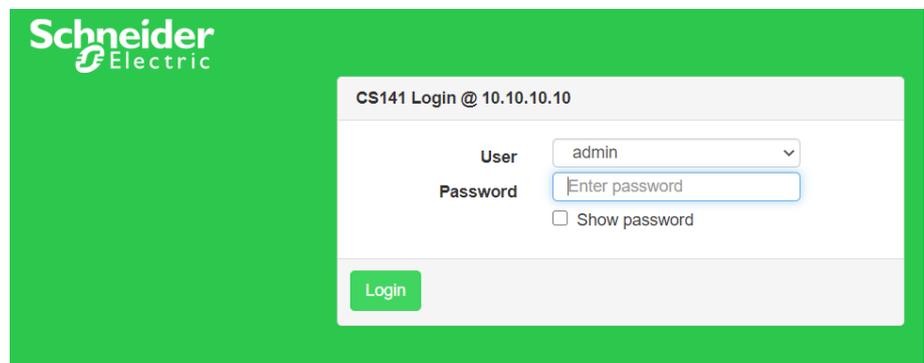
Initial Local Connection to the Webmanager

First login with default IP address:

1. Check that the webmanager slide switch is in the left position.
2. Connect your workstation to the webmanagers LAN port with an Ethernet cable, directly or through a switch.



3. On your workstation run **Command Prompt** as administrator.
4. In the **Command Prompt** window type `route add 10.10.10.10 xxx.xxx.xxx.xxx`, where `xxx.xxx.xxx.xxx` is the local IP of your workstation.
5. Press **Enter**. A success confirmation will be shown in the **Command Prompt** window.
6. Open a web browser from your workstation.
7. Enter `https://10.10.10.10` in the browser address field. A login window will open.



8. In the login window enter:

User: admin

Password: cs141-snmp

NOTE: After the first log in the user is prompted and required to set a new password.

9. The first login will run the **System Setup Wizard** that will help you setup the basic configurations of the webmanager.

NOTE: If the **System Setup Wizard** does not start automatically on the first login you can launch it by clicking **System > Wizard**

Webmanager Interface Overview

- (A) The page header contains a quick status overview. The quick status overview is visible from any page.
- (B) The side menu navigation bar. Here you can navigate to dashboards and other pages for settings and information.
- (C) The landing page of the web interface will show the module dashboard.

String UPS A

No.	Volt. [V]	Temp. [°C]	Ri. [mΩ]	Equalize	Status
1	12.94	27.5	4.52		
2	12.94	27.5	4.69		
3	12.94	27.5	4.69		
4	12.94	29.5	5.39		
5	12.94	27.0	4.58		
6	12.94	27.0	4.64		
7	12.94	28.5	5.11		
8	12.94	27.0	4.58		
9	12.94	27.6	4.62		

Σ Voltage 116.47 V
12.94 [V] Target Voltage
0 [A] DC Current 0.00 [KW] Real Power
0 [A] AC Current

String UPS B

No.	Volt. [V]	Temp. [°C]	Ri. [mΩ]	Equalize	Status
1	12.94	26.5	4.60		
2	12.94	27.1	4.71		
3	12.94	27.5	4.79		
4	12.94	27.8	4.62		
5	12.94	26.5	4.71		
6	12.94	27.5	4.58		
7	12.94	27.0	4.66		
8	12.94	27.2	4.77		
9	12.94	27.5	4.58		

Σ Voltage 116.46 V
12.94 [V] Target Voltage
0 [A] DC Current 0.00 [KW] Real Power
0 [A] AC Current

Module info	Battery info	Contact info	Level Info	Miscellaneous
Module type C20	Manufacturer FIAMM	Contact Person	Voltage Low/High 12 V/14.7 V	Firmware Version CS141-SNMP V1.92.34 200520
Hardware Version 03.02	Type 12SLA50L	Phone Number	Temperature Low/High 5°C/35°C	Discharge Counter 84
Software Version 03.04.00	Capacity(C10) 50 Ah	IP Address 10.10.10.10	Resistance Min/Max 1.1 mΩ/50 mΩ	Ripple Voltage 0 mV
Number of Blocks 18	Installation Date 01.06.2020	Mac Address 00-30-d6-20-83-80	Equalizing Range Min/Max 12.495 V/14.7 V	Equalizing paused no
Number of Strings 2	Location Training Center Wettingen			Page generated 20.03.2000 04:34:41

Check Battery Setup Settings

To check the battery setup settings:

1. Navigate to **Devices > BACS > Setup** from the side menu.
2. Here it is possible to view the battery/module setup.
3. Make sure that the settings are correct, or if necessary make any changes.

Configure Modules from the Programmer

NOTICE

To program the modules the slider on the programmer page needs to be toggled to **On**. This activates programmer mode and stops the bus polling. After the module addresses have been programmed toggle the slider to **Off** to deactivate programmer mode and go to operation mode.

The integrated programmer is used to configure the modules. Navigate to **Devices > BACS > Programmer** from the side menu to access the programmer page.

From the programmer page it is possible to:

- Set Initial Module Address, page 32
- Find a Module with a Specific Address, page 33
- Program a Single Module, page 33

Sensor: ● OK BACS: ● OK

<> Devices > BACS > Programmer

Regular BACS Operation must be interrupted during programming of modules. Enable this page to halt bus polling and disable this page again when done, to restart BACS Operation. Audible Confirmation

Off

Addressing

Range

Reset

Start

End

Start Stop

Help

Single

Connect only one Module to the bus to avoid undetermined behaviour of the system.

Old

New

Set

Query

Module

Find all modules with the address to search. You will recognize them at the LED blinking red/green slowly.

Address

Show

Address

Retrieve the currently set address in the only attached module. This does not work, if more than one module are connected.

Search

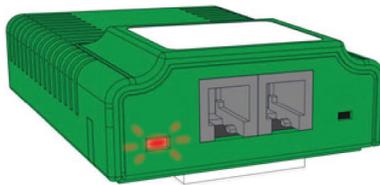
Set Initial Module Address

NOTE: Before you begin, consider which address range to use. The number of addresses in the range needs to be equal to the number of modules. For example, the start address 1 and the end address 35 will program 35 modules with the address range 1-35. Another example, the start address 76 and the end address 89 will program 14 modules with the address range 76-89.

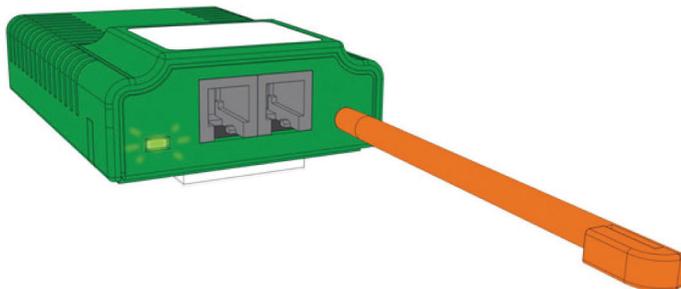
From the programmer page:

1. Under the **Range** section, in the **Start** field enter the start address of the range.
2. In the **End** field enter the end address of the range.

- Click **Start** to begin. The LED flashes red on all connected modules, this indicates that they are ready to get addresses assigned.



- Press the button with the special pen to assign an address to the module. The LED flashes green after the address was successfully assigned.



- Repeat Step 4, page 33 for each module. A progress bar is shown in the programmer page.

After all modules are successfully addressed the status of the progress bar will change to **succeeded**.

The address programming can be manually stopped. For example if the specified range was larger than the number of modules. To stop the address programming click **Stop** on the programmer page.

NOTE: After the address programming succeeded or stopped, the status LEDs are green or flashing green.

If the status LEDs are not green or not flashing green the registration process did not finalize and the module addresses must be reset. To reset the address of all modules to factory default check the reset box and click **Start**. Then wait until the reset process finishes before starting to register the addresses again.

Find a Module with a Specific Address

NOTE: The programmer mode in the programmer page must be toggled **On** to find the address of a single module or to program a single module.

From the programmer page:

- Under the **Module** section, in the **Address** field enter the module address you want to find.
- Click **Show**.
- The status LED on the module with the entered address will start to flash red and green.

NOTE: The LED will continue to flash until the module button is pressed with the pen.

Program a Single Module

IMPORTANT: Make sure only a single module is connected to the webmanager.

NOTE: The programmer mode in the programmer page must be toggled **On** to find the address of a single module or to program a single module.

Check the Currently Programed Address of a Single Module

From the programmer page:

1. Under the **Address** section click **Search**
2. A progress bar will appear and after a short while the address of the single connected module will be shown.

Change the Currently Programed Address of a Single Module

From the programmer page:

1. Under the **Single** section, in the **Old** field enter the current module address.
2. In the **New** field enter the new target address for the module.
3. Click **Set** to confirm the new address for the module.

Add Sensors and Devices

Any sensor or other device used in the G.BMS needs to be added before it can be configured from the web interface.

To add a sensor or device:

1. Check that the sensor or device is correctly connected to the webmanager, either to COM2 or via the BACS bus to a battery bus (COM3) port. This depends on the type of sensor or device and the cable needed.
2. If multiple current sensors or GX_R_AUX devices are connected to the same webmanager check that they have unique addresses configured with the DIP switches.
3. Navigate to **Devices > Setup**.
4. Under COM2 or COM3 use the drop-down menu(s) to select the connected sensor or device.
5. Click **Apply** to add the sensor or device.
6. A new setup menu or submenu under **Devices** is added for that sensor or device. From this new menu the sensor or device can be configured as needed.

Configure and Change Settings from the Web Interface

The initial startup defined some basic settings in the **System Setup Wizard**. It is possible to change these settings and to change additional settings from the web interface.

Language Settings

To change the language viewed in the web interface:

1. Navigate to **System > General** from the side menu.
2. Under the **Region** section it is possible to change the displayed language and temperature format.
3. Click **Apply** to confirm the change.

NOTE: A new login might be required for the update to take effect.

Date and Time Settings

To change the date and time setting:

1. Navigate to **System > Date & Time** from the side menu.
2. Here it is possible to synchronize to specific time servers, change time zone or set a system time manually.
3. Click **Apply** to confirm any changes.

NOTE: A new login might be required for the update to take effect.

Alarm Thresholds

⚠ CAUTION

INCORRECT ALARM SETTINGS

Do not change the alarm or warning thresholds unless the battery setup changes. The alarm thresholds are set during the design and configuration for each specific battery setup.

Failure to follow these instructions can result in injury or equipment damage.

To change the alarm threshold values:

1. Navigate to **Devices > BACS > Alarm Thresholds** from the side menu.
2. Here it is possible to change the different alarm thresholds and other settings for each type of alarm/warning:
 - Impedance
 - Voltage

NOTE: It is possible to set a delay for the voltage alarm.

 - Temperature
3. Click **Apply** to confirm any changes.

NOTE: A new login might be required for the update to take effect.

Network Settings

IMPORTANT: Make sure that the network settings confirm to your cyber security policy.

To change the network settings:

1. Navigate to **System > Network** from the side menu.
2. Here it is possible to specify a static IP address and network settings for the webmanager. It also shows the MAC address and the current active network settings.
3. Click **Apply** to confirm any changes.

NOTE: A new login might be required for the update to take effect.

Configuration Backup

To save a backup of the current webmanager configuration:

1. Navigate to **Systems > Backup**.
2. In the section **Save Configuration** click **Backup**.
3. Enter the user credentials in the prompt. The download will start in the browser.

NOTE: Be careful with renaming the backup. It is not possible to restore the configuration from a backup file with an incorrect name.

The downloaded zip file has the name format `backup-XXXX.tar.gz`. If you need to rename the backup file, only change the `XXXX`. The backup file must start with `backup-` and end with `.tar.gz`. Do not use any spaces or special characters in the backup file name.

IMPORTANT: Do not change anything in the backup file. It is not possible to restore the configuration from a modified backup file.

To load a backup in the connected webmanager:

1. Navigate to **Systems > Backup**.
2. In the section **Configuration file** drag the backup file to the box, or click to select the backup file.
3. Do not check the box for **Restore network settings** if you want to keep the current IP settings. Only check if you want to use the IP settings from the backup file.
4. Click **Restore** to start the restoration process of the configuration backup.
5. You will automatically be logged out. Enter the user credentials again to log in.
6. Check that the configuration was restored correctly.

Firmware Update

It is recommended to use the latest firmware update available for the webmanager. To update the firmware:

1. Download the latest firmware from the [product webpage](#).
2. Log in to the web interface.
3. Navigate to **System > Update**.
4. Drag the firmware file to the box or click to select the firmware file. It is not necessary to unpack the file.

NOTE: Make sure that none of the boxes for **Reset to factory settings** or **Reset network to factory settings** are checked. If they are checked, the configurations will be lost and cannot be retrieved unless a backup of the settings was made.

5. Click **Start**.
6. The update manager will start and guide you through the update.
7. When prompted, restart the webmanager.
8. After the restart navigate to **System > About** to verify that the firmware update was successful.

Communication

From the webmanager it is possible to receive different events and alarms via Modbus and SNMP.

To change the Modbus or SNMP settings:

1. Make sure the network settings are correctly configured for your network, see [Network Settings](#), page 36.
2. Navigate to **Services > Modbus** or **Services > SNMP Agent** from the side menu.
3. Make necessary settings and changes for your network setup.

IMPORTANT: Make sure that the Modbus or SNMP settings confirm to your cyber security policy.

4. Click **Apply** to confirm any changes.

For the mapping lists see:

- [Modbus Read Registers \(Function Calls 03/04\)](#), page 38
- [SNMP OID List](#), page 43

EcoStruxure and Digital Integration

The webmanagers Modbus or SNMP settings can be configured for integration with EcoStruxure Grid (Modbus), EcoStruxure Power (Modbus), EcoStruxure IT (SNMP), AVEVA or other third-party solutions. For the setup refer to the documentation for the respective solution.

Modbus Read Registers (Function Calls 03/04)

The read holding register contains analog information, the measured values of several parameters.

The data is stored as 16-bit signed or unsigned integer, with the hexadecimal format FFFF of 4 digits.

General Modbus Registers

These registers are in 0 base and are unsigned.

Register	Name	Description
1000	BACS_ALARM	This register contains multiple flags. For information about the flags see General Status Flags Description , page 50.
1001	BACS_ALARM	This register contains multiple flags. For information about the flags see Battery Status Flags Description , page 51.
1002	BACS_ALARM	This register contains multiple flags. For information about the flags see Alarm Flags Description , page 51.
1003	BACS_NUMSTRINGS	The number of strings in the setup.
1004	BACS_NUMMODULES	The total number of modules in the setup.

Battery String Modbus Registers

There are five registers for each battery string. There are two register sections reserved for the strings.

NOTE: The fifth register for each string is reserved and not used.

The main section is reserved for strings 1-10. Both current and voltage measurements are registered.

These registers are in 0 base and are signed.

Main Register Section for Strings

Register	Name	Description [Unit of measure]
1010	STRING_01_CUR	The DC current in string 1 [A]
1011	BACS_StrSumVolt	The total voltage in string 1 [V]
1012	BACS_StrAvgVolt	The average voltage in string 1 [V]
1013	BACS_Str_CurrAC	The AC current (RMS value) in string 1 [A]
1015	STRING_02_CUR	The DC current in string 2 [A]
1016	BACS_StrSumVolt	The total voltage in string 2 [V]
1017	BACS_StrAvgVolt	The average voltage in string 2 [V]
1018	BACS_Str_CurrAC	The AC current (RMS value) in string 2 [A]
.....
1055	STRING_10_CUR	The DC current in string 10 [A]
1056	BACS_StrSumVolt	The total voltage in string 10 [V]
1057	BACS_StrAvgVolt	The average voltage in string 10 [V]
1058	BACS_Str_CurrAC	The AC current (RMS value) in string 10 [A]

The second section is reserved for strings 11-16. For these strings only the current measurements are registered.

NOTE: For strings 11–16, the second, third and fifth register for each string is reserved and not used.

These registers are in 0 base and are signed.

Secondary Register Section for Strings

Register	Name	Description [Unit of measurement]
2710	STRING_11_CUR	The DC current in string 11 [A]
2713	BACS_Str_CurrAC	The AC current (RMS value) in string 11 [A]
2715	STRING_12_CUR	The DC current in string 12 [A]
2718	BACS_Str_CurrAC	The AC current (RMS value) in string 12 [A]
.....
2735	STRING_16_CUR	The DC current in string 16 [A]
2738	BACS_Str_CurrAC	The AC current (RMS value) in string 16 [A]

Module Modbus Registers

There are five registers for each module. There are two register sections reserved for the modules.

The temperature is shifted to allow for negative values. To calculate the temperature in Celsius for the read value use the formula $T = (x - 78) / 2$. For example, the decimal reading 127 corresponds to the temperature $(127 - 78) / 2 = 24.5^{\circ}\text{C}$.

The voltage is measured in V and has a factor of 1000. For example, the reading 12825 corresponds to a voltage of $12825 / 1000 = 12.825 \text{ V}$.

The impedance is measured in $\text{m}\Omega$ has a factor of 100. For example, the reading 4372 corresponds to an impedance of $4372 / 100 = 43.72 \text{ m}\Omega$.

The percentage of the equalizing that is active. The total is either the maximum possible for one module or depends on the battery size. The method used for the equalizing is passive.

The main section is reserved for modules 1-330. These registers are in 0 base. The ALARM registers are unsigned and all others are signed, see description.

Main Register Section for Modules

Register	Name	Description [Unit of measure, formula and/or factor]
1060	MODULE_001_TEMP	The battery temperature measured by module 1 (signed) [T($^{\circ}\text{C}$) = (x - 78) / 2]
1061	MODULE_001_VOLT	The battery voltage measured by module 1 (signed) [V, factor 1000]
1062	MODULE_001_IMPC	The battery impedance measured by module 1 (signed) [m Ω , factor 100]
1063	MODULE_001_ALARM	Alarms and status for module 1 (unsigned). This register contains multiple flags. For information about the flags see Alarm Flags Description, page 51.
1064	Module_001_ModByPVoltPc	How much of the equalizing is active for module 1 (signed) [%]
1065	MODULE_002_TEMP	The battery temperature measured by module 2 (signed) [T($^{\circ}\text{C}$) = (x - 78) / 2]
1066	MODULE_002_VOLT	The battery voltage measured by module 2 (signed) [V, factor 1000]
1067	MODULE_002_IMPC	The battery impedance measured by module 2 (signed) [m Ω , factor 100]
1068	MODULE_002_ALARM	Alarms and status for module 2 (unsigned). This register contains multiple flags. For information about the flags see Alarm Flags Description, page 51.
1069	Module_002_ModByPVoltPc	How much of the equalizing is active for module 2 (signed) [%]
.....
2705	MODULE_330_TEMP	The battery temperature measured by module 330 (signed) [T($^{\circ}\text{C}$) = (x - 78) / 2]
2706	MODULE_330_VOLT	The battery voltage measured by module 330 (signed) [V, factor 1000]
2707	MODULE_330_IMPC	The battery impedance measured by module 330 (signed) [m Ω , factor 100]

Main Register Section for Modules (Continued)

Register	Name	Description [Unit of measure, formula and/or factor]
2708	MODULE_330_ALARM	Alarms and status for module 330 (unsigned). This register contains multiple flags. For information about the flags see <i>Alarm Flags Description</i> , page 51.
2709	Module_330_ModBypVoltPc	How much of the equalizing is active for module 330 (signed) [%]

The second section is reserved for modules 331-520.

These registers are in 0 base. The ALARM registers are unsigned and all others are signed, see description.

Secondary Register Section for Modules

Register	Name	Description [Unit of measurement, formula and/or factor]
2740	MODULE_331_TEMP	The battery temperature measured by module 331 (signed) [T(°C) = (x - 78) / 2]
2741	MODULE_331_VOLT	The battery voltage measured by module 331 (signed) [V, factor 1000]
2742	MODULE_331_IMPC	The battery impedance measured by module 331 (signed) [mΩ, factor 100]
2743	MODULE_331_ALARM	Alarms and status for module 331 (unsigned). This register contains multiple flags. For information about the flags see <i>Alarm Flags Description</i> , page 51.
2744	Module_331_ModBypVoltPc	How much of the equalizing is active for module 331 (signed) [%]
2745	MODULE_332_TEMP	The battery temperature measured by module 332 (signed) [T(°C) = (x - 78) / 2]
2746	MODULE_332_VOLT	The battery voltage measured by module 332 (signed) [V, factor 1000]
2747	MODULE_332_IMPC	The battery impedance measured by module 332 (signed) [mΩ, factor 100]
2748	MODULE_332_ALARM	Alarms and status for module 332 (unsigned). This register contains multiple flags. For information about the flags see <i>Alarm Flags Description</i> , page 51.
2749	Module_332_ModBypVoltPc	How much of the equalizing is active for module 332 (signed) [%]
.....
3645	MODULE_520_TEMP	The battery temperature measured by module 520 (signed) [T(°C) = (x - 78) / 2]
3646	MODULE_520_VOLT	The battery voltage measured by module 520 (signed) [V, factor 1000]
3647	MODULE_520_IMPC	The battery impedance measured by module 520 (signed) [mΩ, factor 100]

Secondary Register Section for Modules (Continued)

Register	Name	Description [Unit of measurement, formula and/or factor]
3648	MODULE_520_ALARM	Alarms and status for module 520 (unsigned). This register contains multiple flags. For information about the flags see Alarm Flags Description, page 51.
3649	Module_520_ModByPVoltPc	How much of the equalizing is active for module 520 (signed) [%]

GXR_AUX Alarm Modbus Registers

These registers are in 0 base and are signed.

Register	Name	Description
3650	BACSGXRAuxAlarm(0)	Status of input 1 on GX_R_AUX 1.
3651	BACSGXRAuxAlarm(1)	Status of input 2 on GX_R_AUX 1.
3652	BACSGXRAuxAlarm(2)	Status of input 3 on GX_R_AUX 1.
3653	BACSGXRAuxAlarm(3)	Status of input 4 on GX_R_AUX 1.
3654	BACSGXRAuxAlarm(4)	Status of input 1 on GX_R_AUX 2.
3655	BACSGXRAuxAlarm(5)	Status of input 2 on GX_R_AUX 2.
3656	BACSGXRAuxAlarm(6)	Status of input 3 on GX_R_AUX 2.
3657	BACSGXRAuxAlarm(7)	Status of input 4 on GX_R_AUX 2.
3658	BACSGXRAuxAlarm(8)	Status of input 1 on GX_R_AUX 3.
3659	BACSGXRAuxAlarm(9)	Status of input 2 on GX_R_AUX 3.
3660	BACSGXRAuxAlarm(10)	Status of input 3 on GX_R_AUX 3.
3661	BACSGXRAuxAlarm(11)	Status of input 4 on GX_R_AUX 3.
3662	BACSGXRAuxAlarm(12)	Status of input 1 on GX_R_AUX 4.
3663	BACSGXRAuxAlarm(13)	Status of input 2 on GX_R_AUX 4.
3664	BACSGXRAuxAlarm(14)	Status of input 3 on GX_R_AUX 4.
3665	BACSGXRAuxAlarm(15)	Status of input 4 on GX_R_AUX 4.

GXR_AUX Output Modbus Registers

These registers are in 0 base and are signed.

Register	Name	Description [Unit of measure]
3666	BACSGXRAuxOutputStatus(0)	Status of output 1 on GX_R_AUX 1.
3667	BACSGXRAuxOutputStatus(1)	Status of output 2 on GX_R_AUX 1.
3668	BACSGXRAuxOutputStatus(2)	Status of output 3 on GX_R_AUX 1.
3669	BACSGXRAuxOutputStatus(3)	Status of output 4 on GX_R_AUX 1.
3670	BACSGXRAuxOutputStatus(4)	Status of output 1 on GX_R_AUX 2.
3671	BACSGXRAuxOutputStatus(5)	Status of output 2 on GX_R_AUX 2.
3672	BACSGXRAuxOutputStatus(6)	Status of output 3 on GX_R_AUX 2.
3673	BACSGXRAuxOutputStatus(7)	Status of output 4 on GX_R_AUX 2.
3674	BACSGXRAuxOutputStatus(8)	Status of output 1 on GX_R_AUX 3.
3675	BACSGXRAuxOutputStatus(9)	Status of output 2 on GX_R_AUX 3.
3676	BACSGXRAuxOutputStatus (10)	Status of output 3 on GX_R_AUX 3.
3677	BACSGXRAuxOutputStatus (11)	Status of output 4 on GX_R_AUX 3.
3678	BACSGXRAuxOutputStatus (12)	Status of output 1 on GX_R_AUX 4.
3679	BACSGXRAuxOutputStatus (13)	Status of output 2 on GX_R_AUX 4.
3680	BACSGXRAuxOutputStatus (14)	Status of output 3 on GX_R_AUX 4.
3681	BACSGXRAuxOutputStatus (15)	Status of output 4 on GX_R_AUX 4.

SNMP OID List

There are several object identifiers (OID) available from the G.BMS webmanager via SNMP. The webmanager SNMP access needs to be configured. To view and change the SNMP settings from the web interface navigate to **Services > SNMP Agent**.

The MIB file can be downloaded from: <https://www.se.com/ww/en/product-range-presentation/51172807-gutor-battery-management-system/?parent-subcategory-id=88016>.

NOTE: Some read values have a scale factor. The read value needs to be multiplied with the scale facture to get the correct value for the unit of measure.

Settings OIDs

NOTE: The bacSettings shows configured settings and alarm thresholds for the setup. The table bacSettings lists a mix of read only and read-write OIDs. All other tables only contain read only OIDs.

OID Address: 1.3.6.1.2.1.33.5.1 / OID Name: bacsSettings

OID Address	OID Name	Description (read only / read-write)	Scale [Unit]	Example of Read Value ²
1.3.6.1.2.1.33.5.1.1	bacsModuleType	Module Type. 0 = C20, 1 = C21, 10 = C30, 20 = C40, 20 = C41. (read only)	1	c20(0) -> Module type C20
1.3.6.1.2.1.33.5.1.2	bacsNumStrings	Number of battery strings. (read only)	1	2
1.3.6.1.2.1.33.5.1.3	bacsNumBatteries	Total number of batteries. (read only)	1	18
1.3.6.1.2.1.33.5.1.4	bacsBattCap	Capacity of installed batteries. (read only)	1 [Ah]	50
1.3.6.1.2.1.33.5.1.5	bacsLogRate1	The configured period between log recordings during normal operation. Period between log recordings. (read only)	1 [s]	1200 -> 1200 seconds (20 minutes) ³
1.3.6.1.2.1.33.5.1.6	bacsLogRate2	The configured period between log recordings during charge or discharge. (read only)	1 [s]	(The readings are done as soon as possible.) ³
1.3.6.1.2.1.33.5.1.7	bacsImpcPollRate	The configured period between internal impedance polls. (read-write)	1 [min]	720 -> 720 minutes (12 hours) ³
1.3.6.1.2.1.33.5.1.8	bacsImpcLowAlarm	Impedance low alarm level. (read-write)	0.01 [mΩ]	110 -> 1.1 mΩ
1.3.6.1.2.1.33.5.1.9	bacsImpcHighAlarm	Impedance high alarm level. (read-write)	1	5000 -> 50 mΩ
1.3.6.1.2.1.33.5.1.10	bacsTemperatureLowAlarm	Temperature alarm below this level. (read-write)	0.1 [C° or F°] ⁴	50 -> 5 C°
1.3.6.1.2.1.33.5.1.11	bacsTemperatureHighAlarm	Temperature alarm above this level. (read-write)	0.1 [C° or F°] ⁴	350 -> 35C°
1.3.6.1.2.1.33.5.1.12	bacsVoltageLowAlarm	Voltage alarm below this level. (read-write)	0.01 [V]	1200 -> 12 V
1.3.6.1.2.1.33.5.1.13	bacsVoltageHighAlarm	Voltage alarm above this level. (read-write)	0.01 [V]	1550 -> 15.5 V
1.3.6.1.2.1.33.5.1.14	bacsImpcLowWarn	Impedance low warning level. (read-write)	0.01 [mΩ]	120 -> 1.2 mΩ
1.3.6.1.2.1.33.5.1.15	bacsImpcHighWarn	Impedance high warning level. (read-write)	0.01 [mΩ]	4000 -> 40 mΩ
1.3.6.1.2.1.33.5.1.16	bacsTemperatureLowWarn	Temperature warning below this level. (read-write)	0.1 [C° or F°] ⁴	100 -> 10 C°
1.3.6.1.2.1.33.5.1.17	bacsTemperatureHighWarn	Temperature warning above this level. (read-write)	0.1 [C° or F°] ⁴	300 -> 30 C°
1.3.6.1.2.1.33.5.1.18	bacsVoltageLowWarn	Voltage warning below this level. (read-write)	0.01 [V]	1200 -> 12 V
1.3.6.1.2.1.33.5.1.19	bacsVoltageHighWarn	Voltage warning above this level. (read-write)	0.01 [V]	1410 -> 14.1 V
1.3.6.1.2.1.33.5.1.20	bacsTemperatureUnit	Temperature unit currently in use. 0 = Celsius, 1 = Fahrenheit. (read-write)	1	Celsius(0)
1.3.6.1.2.1.33.5.1.21	bacsStringVoltageLowAlarm	The configured alarm threshold for the battery string voltage low alarm. (read-write)	0.01 [V]	10500 -> 105 V
1.3.6.1.2.1.33.5.1.22	bacsStringVoltageHighAlarm	The configured alarm threshold for the battery string voltage high alarm. (read-write)	0.01 [V]	13500 -> 135 V

2. The example values are only intended to show how to read them. They do not indicate any recommended or suggested values. Actual values will depend on settings and readings for the specific setup.
3. OID reading will be available in a future firmware update.
4. Depends on setting of bacsTemperatureUnit.

OID Address: 1.3.6.1.2.1.33.5.1 / OID Name: bacsSettings (Continued)

OID Address	OID Name	Description (read only / read-write)	Scale [Unit]	Example of Read Value ⁵
1.3.6.1.2.1.33.5.1.23	bacsStringVoltage-LowWarn	The configured alarm threshold for the battery string voltage low warning. (read-write)	0.01 [V]	11000 -> 110 V
1.3.6.1.2.1.33.5.1.24	bacsStringVoltage-HighWarn	The configured alarm threshold for the battery string voltage high warning. (read-write)	0.01 [V]	12500 -> 125 V
1.3.6.1.2.1.33.5.1.25	bacsStringCurrent-DeviationDischargeAlarm	The configured alarm threshold for the current difference between the battery strings alarm. (read-write)	0.01 [A]	1000 -> 10 A
1.3.6.1.2.1.33.5.1.26	bacsStringCurrent-DeviationChargeAlarm	The configured alarm threshold for the charge current difference between the battery strings alarm. (read-write)	0.01 [A]	1000 -> 10 A
1.3.6.1.2.1.33.5.1.27	bacsStringCurrent-DeviationDischargeWarn	The configured warning threshold for the charge current difference between the battery strings warning. (read-write)	0.01 [A]	500 -> 5 A
1.3.6.1.2.1.33.5.1.28	bacsStringCurrent-DeviationChargeWarn	The configured warning threshold for the charge current difference between the battery warning. (read-write)	0.01 [A]	500 -> 5 A

Objects OIDs**OID Address: 1.3.6.1.2.1.33.5.2 / OID Name: bacsObjects**

OID Address	OID Name	Description	Scale [Unit]	Example of Read Value
1.3.6.1.2.1.33.5.2.1	bacsStatus	G.BMS system status flags. For information about the flags see <i>General Status Flags Description</i> , page 50.	(Decimal format)	65 -> 0x0041
1.3.6.1.2.1.33.5.2.2	bacsAvModuleVolt	Average module voltage.	0.01 [V]	1287 -> 12.87 V
1.3.6.1.2.1.33.5.2.3	bacsTotalVolt	Total voltage of all modules.	0.01 [V]	23176 -> 231.76 V
1.3.6.1.2.1.33.5.2.4	bacsNumModules	The number of installed battery modules.	1	18
1.3.6.1.2.1.33.5.2.5	bacsModuleTable	The list of battery table entries.	N/A	N/A
1.3.6.1.2.1.33.5.2.5.1	bacsModuleEntry	An entry containing information applicable to a particular battery.	N/A	N/A
1.3.6.1.2.1.33.5.2.5.1.1	bacsModuleIndex	The module identifier.	1	bacsModuleIndex.1: 0 bacsModuleIndex.2: 1
1.3.6.1.2.1.33.5.2.5.1.2	bacsModuleVoltage	Ordered list of the measured battery voltage by each module.	0.01 [V]	bacsModuleVoltage.1: 1290 bacsModuleVoltage.2: 1288
1.3.6.1.2.1.33.5.2.5.1.3	bacsModuleTemperature	Ordered list of the temperature measured by each module.	0.1 [C° or F°] ⁶	bacsModuleTemperature.1: 270 bacsModuleTemperature.2: 270

5. The example values are only intended to show how to read them. They do not indicate any recommended or suggested values. Actual values will depend on settings and readings for the specific setup.
6. Depends on setting of bacsTemperatureUnit.

OID Address: 1.3.6.1.2.1.33.5.2 / OID Name: bacsObjects (Continued)

OID Address	OID Name	Description	Scale [Unit]	Example of Read Value
1.3.6.1.2.1.33.5.2.5.1.4	bacsModuleBypass	Ordered list of the module bypass measured by each module.	0.1 [%]	bacsModuleBypass.1: 0 bacsModuleBypass.2: 0
1.3.6.1.2.1.33.5.2.5.1.5	bacsModuleResistance	Ordered list of the measured module impedance in each module.	0.01 [mΩ]	bacsModuleResistance.1: 468 bacsModuleResistance.2: 471
1.3.6.1.2.1.33.5.2.5.1.6	bacsModuleState	The general module alarm flags. For information about the flags see Alarm Flags Description, page 51.	(Decimal format)	bacsModuleState.1: 0 bacsModuleState.2: 0 (0 -> 0x0000)
1.3.6.1.2.1.33.5.2.6	bacsNumStrings	The number of installed battery strings.	1	2
1.3.6.1.2.1.33.5.2.7	bacsStringTable	The list of stringy table entries.	N/A	N/A
1.3.6.1.2.1.33.5.2.7.1	bacsStringEntry	An entry that contains information about a specific string of batteries.	N/A	N/A
1.3.6.1.2.1.33.5.2.7.1.1	bacsStringIndex	The string identifier.	1	bacsStringIndex.1: 0 bacsStringIndex.2: 1
1.3.6.1.2.1.33.5.2.7.1.2	bacsStringCurrent	The string current.	0.01 [A]	bacsStringCurrent.1: 0 bacsStringCurrent.2: 0
1.3.6.1.2.1.33.5.2.7.1.3	bacsStringTotalVolt	The string total voltage.	0.01 [V]	bacsStringTotalVolt.1: 11497 bacsStringTotalVolt.2: 11438
1.3.6.1.2.1.33.5.2.7.1.4	bacsStringAverageVol	The string average voltage per battery.	0.01 [V]	bacsStringAverageVol.1: 1277 bacsStringAverageVol.2: 1270
1.3.6.1.2.1.33.5.2.7.1.5	bacsStringCurrentAC	The string AC current.	0.01 [A]	bacsStringCurrentAC.1: 0 bacsStringCurrentAC.2: 0
1.3.6.1.2.1.33.5.2.7.1.6	bacsStringAlarm	The general string alarm flags. For information about the flags see Alarm Flags Description, page 51.	(Decimal format)	bacsStringAlarm.1: 0 bacsStringAlarm.2: 0 (0 -> 0x0000)
1.3.6.1.2.1.33.5.2.7.1.7	bacsStringAlarm2	The string alarm flags. For information about the flags see Battery String Alarm Flags Description, page 52.	(Decimal format)	bacsStringAlarm2.1: 0 bacsStringAlarm2.2: 0 (0 -> 0x0000)

Alarm OIDs

OID Address: 1.3.6.1.2.1.33.5.3 / OID Name: bacsAlarms

OID Address	OID Name	Description
1.3.6.1.2.1.33.5.3.1	bacsAlarmsPresent	The present number of active alarm conditions.
1.3.6.1.2.1.33.5.3.2	bacsAlarmTable	A list of alarm entries.
1.3.6.1.2.1.33.5.3.2.1	bacsAlarmEntry	An entry containing information applicable to a particular alarm.
1.3.6.1.2.1.33.5.3.2.1.1	bacsAlarmId	A unique identifier for an alarm condition. This value must remain constant.
1.3.6.1.2.1.33.5.3.2.1.2	bacsAlarmDescr	A reference to an alarm description object. The object referenced should not be accessible, but rather be used to provide a unique description of the alarm condition.
1.3.6.1.2.1.33.5.3.2.1.3	bacsAlarmTime	The value of sysUpTime when the alarm condition was detected. If the alarm condition was detected during the webmanager startup and presumably existed before the webmanager startup, then dcAlarmTime = 0.
1.3.6.1.2.1.33.5.3.3	bacsWellKnownAlarms	A list of traps, see Alarm Trap List, page 47.
1.3.6.1.2.1.33.5.3.4	bacsModuleAlarmsPresent	The number of G.BMS modules currently in an alarm state.
1.3.6.1.2.1.33.5.3.5	bacsModuleWarningsPresent	The number of G.BMS modules currently in a warning state.

Alarm Trap List

NOTE: Make sure a trap receiver is correctly configured to receive notification when the trap is active.

OID Address (SNMP Traps): 1.3.6.1.2.1.33.5.3.3 / OID Name: bacsWellKnownAlarms

OID Address	OID Name	Description
1.3.6.1.2.1.33.5.3.3.1	bacsAlarmSystemError	This object indicates a communication problem from the webmanager to one or more of the battery modules.
1.3.6.1.2.1.33.5.3.3.2	bacsAlarmResistWarn	This object indicates that the internal resistance of one or more batteries is above the warning level.
1.3.6.1.2.1.33.5.3.3.3	bacsAlarmResistAlarm	This object indicates that the internal resistance of one or more batteries is above the alarm level.
1.3.6.1.2.1.33.5.3.3.4	bacsAlarmVoltage	This object indicates that the voltage of one or more batteries is outside the defined range.
1.3.6.1.2.1.33.5.3.3.5	bacsAlarmTemperature	This object indicates that the temperature of one or more batteries is outside the defined range.
1.3.6.1.2.1.33.5.3.3.6	bacsAlarmVoltageHigh	This object indicates that the voltage of one or more batteries is higher than the defined range.
1.3.6.1.2.1.33.5.3.3.7	bacsAlarmVoltageLow	This object indicates that the voltage of one or more batteries is lower than the defined range.
1.3.6.1.2.1.33.5.3.3.8	bacsAlarmTemperatureHigh	This object indicates that the temperature of one or more batteries is higher than the defined range.
1.3.6.1.2.1.33.5.3.3.9	bacsAlarmTemperatureLow	This object indicates that the temperature of one or more batteries is lower than the defined range.
1.3.6.1.2.1.33.5.3.3.10	bacsAlarmResistAlarmHigh	This object indicates that the internal resistance of one or more batteries is above the alarm level.
1.3.6.1.2.1.33.5.3.3.11	bacsAlarmResistAlarmLow	This object indicates that the internal resistance of one or more batteries is below the alarm level.
1.3.6.1.2.1.33.5.3.3.12	bacsAlarmEqualizing	This object indicates that the equalizing is not operating correctly.
1.3.6.1.2.1.33.5.3.3.13	bacsAlarmVoltageWarnHigh	This object indicates that the voltage of one or more batteries is higher than the defined warning range.
1.3.6.1.2.1.33.5.3.3.14	bacsAlarmVoltageWarnLow	This object indicates that the voltage of one or more batteries is lower than the defined warning range.

OID Address (SNMP Traps): 1.3.6.1.2.1.33.5.3.3 / OID Name: bacsWellKnownAlarms (Continued)

OID Address	OID Name	Description
1.3.6.1.2.1.33.5.3.3.15	bacsAlarmTemperatureWarnHigh	This object indicates that the temperature of one or more batteries is higher than the defined warning range.
1.3.6.1.2.1.33.5.3.3.16	bacsAlarmTemperatureWarnLow	This object indicates that the temperature of one or more batteries is lower than the defined warning range.
1.3.6.1.2.1.33.5.3.3.17	bacsAlarmResistWarnHigh	This object indicates that the internal resistance of one or more batteries is higher than the defined warning range.
1.3.6.1.2.1.33.5.3.3.18	bacsAlarmResistWarnLow	This object indicates that the internal resistance of one or more batteries is lower than the defined warning range.
1.3.6.1.2.1.33.5.3.3.19	bacsAlarmInitializing	The webmanager is initializing.
1.3.6.1.2.1.33.5.3.3.20	bacsAlarmCommunicationLost	BACS bus communication is lost.
1.3.6.1.2.1.33.5.3.3.21	bacsAlarmBatteryBreakerOpen	Battery breaker is open.
1.3.6.1.2.1.33.5.3.3.22	bacsAlarmThermalRunaway	Thermal runaway detected.
1.3.6.1.2.1.33.5.3.3.23	bacsAlarmSensorCommunicationLost	Sensor communication is lost.
1.3.6.1.2.1.33.5.3.3.24	bacsAlarmDischarging	Batteries are being discharged.
1.3.6.1.2.1.33.5.3.3.25	bacsAlarmDischargingStopped	Batteries are no longer being discharged.
1.3.6.1.2.1.33.5.3.3.26	bacsAlarmMaxVoltageDiff	The voltage difference is too high.
1.3.6.1.2.1.33.5.3.3.27	bacsAlarmStringVoltHigh	The battery string voltage is above the configured alarm threshold.
1.3.6.1.2.1.33.5.3.3.28	bacsAlarmStringVoltLow	The battery string voltage is below the configured alarm threshold.
1.3.6.1.2.1.33.5.3.3.29	bacsAlarmStringVoltHighWarn	The battery string voltage is above the configured warning threshold.
1.3.6.1.2.1.33.5.3.3.30	bacsAlarmStringVoltLowWarn	The battery string voltage is below the configured warning threshold.
1.3.6.1.2.1.33.5.3.3.31	bacsAlarmStringCurrentHigh	The battery string current is above the configured alarm threshold.
1.3.6.1.2.1.33.5.3.3.32	bacsAlarmStringCurrentLow	The battery string current is below the configured alarm threshold.
1.3.6.1.2.1.33.5.3.3.33	bacsAlarmStringCurrentHighWarn	The battery string current is above the configured warning threshold.
1.3.6.1.2.1.33.5.3.3.34	bacsAlarmStringCurrentLowWarn	The battery string current is below the configured warning threshold.
1.3.6.1.2.1.33.5.3.3.35	bacsAlarmStringEqualizingDisabled	The battery string equalizing is disabled.
1.3.6.1.2.1.33.5.3.3.36	bacsAlarmStringCurrDeviationCharge	The charge current difference between the battery strings is above the configured alarm threshold.
1.3.6.1.2.1.33.5.3.3.37	bacsAlarmStringCurrDeviationDischarge	The discharge current difference between the battery strings is above the configured alarm threshold.
1.3.6.1.2.1.33.5.3.3.38	bacsAlarmStringCurrDeviationChargeWarn	The charge current difference between the battery strings is above the configured warning threshold.
1.3.6.1.2.1.33.5.3.3.39	bacsAlarmStringCurrDeviationDischargeWarn	The discharge current difference between the battery strings is above the configured warning threshold.

Traps OIDs

NOTE: Make sure a trap receiver is correctly configured to receive notification when the trap is active.

OID Address (SNMP Traps): 1.3.6.1.2.1.33.5.4 / OID Name: bacstraps

OID Address	OID Name	Description
1.3.6.1.2.1.33.5.4.1	bacsTrapAlarmEntryAdded	Sent when an alarm in the system appears.
1.3.6.1.2.1.33.5.4.2	bacsTrapAlarmEntryRemoved	Sent when an alarm in the system disappears.

GX_R_AUX OIDs

NOTE: In gxRAUX the input OIDs can have the status normal or alarm. The output OIDs can have the status on or off.

OID Address: 1.3.6.1.2.1.33.5.5 / OID Name: gxRAUX

OID Address	OID Name	Description	Example of Read Value
1.3.6.1.2.1.33.5.5.1	gxRAUX1Input1	Status of input 1 on GX_R_AUX 1.	normal (1)
1.3.6.1.2.1.33.5.5.2	gxRAUX1Input2	Status of input 2 on GX_R_AUX 1.	normal (1)
1.3.6.1.2.1.33.5.5.3	gxRAUX1Input3	Status of input 3 on GX_R_AUX 1.	normal (1)
1.3.6.1.2.1.33.5.5.4	gxRAUX1Input4	Status of input 4 on GX_R_AUX 1.	normal (1)
1.3.6.1.2.1.33.5.5.5	gxRAUX1Output1	Status of output 1 on GX_R_AUX 1.	off (0)
1.3.6.1.2.1.33.5.5.6	gxRAUX1Output2	Status of output 2 on GX_R_AUX 1.	off (0)
1.3.6.1.2.1.33.5.5.7	gxRAUX1Output3	Status of output 3 on GX_R_AUX 1.	off (0)
1.3.6.1.2.1.33.5.5.8	gxRAUX1Output4	Status of output 4 on GX_R_AUX 1.	off (0)
1.3.6.1.2.1.33.5.5.9	gxRAUX2Input1	Status of input 1 on GX_R_AUX 2.	normal (1)
1.3.6.1.2.1.33.5.5.10	gxRAUX2Input2	Status of input 2 on GX_R_AUX 2.	normal (1)
1.3.6.1.2.1.33.5.5.11	gxRAUX2Input3	Status of input 3 on GX_R_AUX 2.	normal (1)
1.3.6.1.2.1.33.5.5.12	gxRAUX2Input4	Status of input 4 on GX_R_AUX 2.	normal (1)
1.3.6.1.2.1.33.5.5.13	gxRAUX2Output1	Status of output 1 on GX_R_AUX 2.	off (0)
1.3.6.1.2.1.33.5.5.14	gxRAUX2Output2	Status of output 2 on GX_R_AUX 2.	off (0)
1.3.6.1.2.1.33.5.5.15	gxRAUX2Output3	Status of output 3 on GX_R_AUX 2.	off (0)
1.3.6.1.2.1.33.5.5.16	gxRAUX2Output4	Status of output 4 on GX_R_AUX 2.	off (0)
1.3.6.1.2.1.33.5.5.17	gxRAUX3Input1	Status of input 1 on GX_R_AUX 3.	normal (1)
1.3.6.1.2.1.33.5.5.18	gxRAUX3Input2	Status of input 2 on GX_R_AUX 3.	normal (1)
1.3.6.1.2.1.33.5.5.19	gxRAUX3Input3	Status of input 3 on GX_R_AUX 3.	normal (1)
1.3.6.1.2.1.33.5.5.20	gxRAUX3Input4	Status of input 4 on GX_R_AUX 3.	normal (1)
1.3.6.1.2.1.33.5.5.21	gxRAUX3Output1	Status of output 1 on GX_R_AUX 3.	off (0)
1.3.6.1.2.1.33.5.5.22	gxRAUX3Output2	Status of output 2 on GX_R_AUX 3.	off (0)
1.3.6.1.2.1.33.5.5.23	gxRAUX3Output3	Status of output 3 on GX_R_AUX 3.	off (0)
1.3.6.1.2.1.33.5.5.24	gxRAUX3Output4	Status of output 4 on GX_R_AUX 3.	off (0)
1.3.6.1.2.1.33.5.5.25	gxRAUX4Input1	Status of input 1 on GX_R_AUX 4.	normal (1)
1.3.6.1.2.1.33.5.5.26	gxRAUX4Input2	Status of input 2 on GX_R_AUX 4.	normal (1)
1.3.6.1.2.1.33.5.5.27	gxRAUX4Input3	Status of input 3 on GX_R_AUX 4.	normal (1)

OID Address: 1.3.6.1.2.1.33.5.5 / OID Name: gxRAUX (Continued)

OID Address	OID Name	Description	Example of Read Value
1.3.6.1.2.1.33.5.5.28	gxRAUX4Input4	Status of input 4 on GX_R_AUX 4.	normal (1)
1.3.6.1.2.1.33.5.5.29	gxRAUX4Output1	Status of output 1 on GX_R_AUX 4.	off (0)
1.3.6.1.2.1.33.5.5.30	gxRAUX4Output2	Status of output 2 on GX_R_AUX 4.	off (0)
1.3.6.1.2.1.33.5.5.31	gxRAUX4Output3	Status of output 3 on GX_R_AUX 4.	off (0)
1.3.6.1.2.1.33.5.5.32	gxRAUX4Output4	Status of output 4 on GX_R_AUX 4.	off (0)

Alarm Flag Descriptions

For example, the hexadecimal reading of 0x0041 for a general status flag means that the G.BMS is running as intended (0x0001) and the batteries are charging in float charge (0x0040).

General Status Flags Description

Flag Name	Hexadecimal / (Decimal)	Description
BACS_STATE_NONE	0x0000 / (0)	The internal communication in the webmanager is interrupted.
BACS_STATE_RUNNING	0x0001 / (1)	The webmanager is running as intended.
BACS_STATE_CONNECTED	0x0002 / (2)	The webmanager is connecting and starting up.
BACS_STATE_MODULE_LOST	0x0004 / (4)	Communication between the modules and the webmanager is lost.
BACS_STATE_DISCHARGING	0x0008 / (8)	The batteries are being discharged, detected by the modules.
BACS_STATE_CHARGING	0x0010 / (16)	The batteries are being charged, detected by the modules.
BACS_STATE_DISCHARGING_STOPPED	0x0020 / (32)	The batteries are no longer being discharged, detected by the modules.
BACS_STATE_FLOAT_CHARGING	0x0040 / (64)	The batteries are in float charge, detected by the modules.
BACS_STATE_EQUALISATION	0x0080 / (128)	One or more battery cell charges are being equalized.
BACS_STATE_SYSTEM_FAILURE	0x0100 / (256)	One or more parts in the G.BMS are inoperable.
BACS_STATE_VOLTAGE_OUTOFRANGE	0x0200 / (512)	A battery voltage level is out of range, measured by the module. The voltage range is defined in the webmanager settings.
BACS_STATE_TEMPERATURE_OUTOFRANGE	0x0400 / (1024)	A battery temperature is out of range, measured by the module. The temperature range is defined in the webmanager settings.
BACS_STATE_RESISTOR_OUTOFRANGE	0x0800 / (2048)	A battery impedance is out of range, measured by the module. The impedance range and measurement interval is defined in the webmanager settings.
BACS_STATE_MODULE_ADDRESSING	0x1000 / (4096)	Modules on the BACS bus are being addressed.
BACS_STATE_MODULE_SEARCHING	0x2000 / (8192)	Searching for a specific module address on the BACS bus.

General Status Flags Description (Continued)

Flag Name	Hexadecimal / (Decimal)	Description
BACS_STATE_MODULE-INITIALIZING	0x4000 / (16384)	Modules are initializing and starting up. Checking that all connected modules on the BACS bus are compatible (same type and revision).
BACS_STATE_MODULE-POLLING	0x8000 / (32768)	A Modbus poll is active.

Battery Status Flags Description

Flag Name	Hexadecimal / (Decimal)	Description
BACS_STATE-GENERAL-ALARM	0x0001 / (1)	The general alarm is active. The audible alarm also activates.
BACS_STATE-VOLTAGE-DIFF-HIGH	0x0002 / (2)	The measured voltage for one or more batteries are further from the target average voltage than the set maximum difference. Can only be active if the option Max. Voltage Difference is enabled and defined in the web interface.
BACS_STATE-BATTERY-BREAKER-OPEN	0x0004 / (4)	A battery breaker was opened by the GX_R_AUX. Optional, only if the battery breaker control is wired to the GX_R_AUX.
BACS_STATE_THERMAL_RUNAWAY	0x0008 / (8)	Thermal runaway detected. How the signal triggers depends on how it is configured in Devices > BACS > Thermal Runaway . As an option, it can also trigger other actions.

Alarm Flags Description

Alarm Flag Name	Hexadecimal / (Decimal)	Description
BACS_ALARM_NONE	0x0000 / (0)	No alarm of this type is active.
BACS_ALARM_GENERAL_ALARM	0x0001 / (1)	The general alarm is active. The audible alarm also activates.
BACS_ALARM_COMMUNICATION_LOST	0x0002 / (2)	Communication between the modules and the webmanager is lost.
BACS_ALARM_VOLTAGE_HIGH	0x0004 / (4)	One or more batteries are above the configured high voltage alarm threshold.
BACS_ALARM_VOLTAGE_LOW	0x0008 / (8)	One or more batteries are below the configured low voltage alarm threshold.
BACS_ALARM_TEMPERATURE_HIGH	0x0010 / (16)	One or more batteries are above the configured high temperature alarm threshold.
BACS_ALARM_TEMPERATURE_LOW	0x0020 / (32)	One or more batteries are below the configured low temperature alarm threshold.
BACS_ALARM_RESISTOR_HIGH	0x0040 / (64)	One or more batteries are above the configured high impedance alarm threshold.
BACS_ALARM_RESISTOR_LOW	0x0080 / (128)	One or more batteries are below the configured low impedance alarm threshold.

Battery String Alarm Flags Description

Alarm Flag Name	Hexadecimal / (Decimal)	Description
No Alarm	0x0000 / (0)	No alarm of this type is active.
Current Sensor High	0x0001 / (1)	One or more strings are above the configured high current alarm threshold.
Current Sensor Low	0x0002 / (2)	One or more strings are below the configured low current alarm threshold.
Current Sensor High Warning	0x0004 / (4)	One or more strings are above the configured high current warning threshold.
Current Sensor Low Warning	0x0008 / (8)	One or more strings are below the configured low current warning threshold.
Equalizing Cut Off	0x0010 / (16)	The equalizing is no longer operable in one or more strings.
Current Deviation Discharge	0x0020 / (32)	One or more strings are above the configured current deviation discharge alarm threshold.
Current Deviation Charge	0x0040 / (64)	One or more strings are below the configured current deviation charge alarm threshold.
Current Deviation Discharge Warning	0x0080 / (128)	One or more strings are above the configured current deviation discharge warning threshold.
Current Deviation Charge Warning	0x1000 / (4096)	One or more strings are below the configured current deviation charge warning threshold.

Troubleshooting

Problem	Check
Webmanager power supply LED (s) not illuminated	<p>Check the status and connection of the power supply.</p> <p>Check that a correct power supply is used, for more details see <i>Webmanager Ports</i>, page 12.</p>
No local connection to the webmanager	<p>Check the slide switch position. If the slide switch is in the left position the default set IP address will be used. If the IP address was changed, you can set the IP address to the hard coded address (10.10.10.10) if you set the slide switch in the center position and restart the webmanager. For more details see <i>Webmanager LEDs and Buttons</i>, page 13 and <i>Initial Local Connection to the Webmanager</i>, page 30.</p>
No or weak BACS bus communication	<p>Check the connections between the webmanager and modules, and any splitting boxes, repeaters, converters, sensors or other devices.</p> <p>Check that the maximum bus cable lengths are not exceeded, for details see <i>Bus Cable Length and Wiring Details</i>, page 24.</p> <p>Check that the modules and cables are compatible (correct type and revision). For additional support please contact your local <i>Gutor Service Center</i>.</p>
No or incorrect measurement from modules	<p>Check that the measurement cables are correctly placed on the battery poles and tightened according to the original equipment manufacturer (OEM) for the batteries. For more details see <i>Install Battery Measuring Cables</i>, page 15.</p> <p>Check the module placement and if applicable the placement of the external temperature sensor. For more details see <i>Place the G.BMS Modules</i>, page 18.</p> <p>Check if the fuse on the measuring cable might be damaged, try to connect the module to another measuring cable to check if the modules is functioning correctly.</p>
No Modbus or SNMP communication from the webmanager	<p>Check the IP address settings from the webmanager web interface.</p> <p>Check that the Modbus or SNMP settings are correctly configured in the webmanager web interface.</p>
Incorrect values displayed in the webmanager web interface.	<p>Delete the web browser cache. Previously stored data in the cache can cause incorrect information to be displayed. This can especially occur if connections are made to multiple webmanagers from the same web browser.</p>

Technical Data

Technical information and specifications about the devices and parts. Also lists part numbers, name and details for each part.

- Module Technical Data and Parts, page 54
- Control Cabinets Technical Data and Parts, page 55
- Webmanager Technical Data and Parts, page 56
- Splitting Box Technical Data and Parts, page 56
- Current Sensor Technical Data and Parts, page 57
- BACS Measuring Cables Technical Data and Parts, page 57
- BACS Bus Communication Cable Technical Data and Parts, page 60
- Additional Options Technical Data and Parts, page 61
- Sensormanager and Additional Sensors Technical Data and Parts, page 63

Module Technical Data and Parts



Dimension (W x L x H)	56 x 79 x 22 mm (2.2 x 3.1 x 0.87 in)
Protection rating	IP 42
Operating condition	Between 0°C – 60°C (32°F – 140°F) with a maximum humidity of 90% (not condensing)
Current consumption from battery	Normal operation: <ul style="list-style-type: none"> • C20, C23, C30: 15–20 mA • C40, C41: 35–40 mA “Sleep Mode”: < 1mA
Measuring accuracy	<ul style="list-style-type: none"> • Internal resistance C2x, C30: < 5% • Internal resistance C4x: < 10% • Voltage: < 0.5% • Temperature: < 15%
Measuring resolution	<ul style="list-style-type: none"> • Internal resistance: 0.5 mΩ • Voltage: 0.1 V • Temperature: 0.1°
Battery types	Lead, NiCad, NiMH or lithium batteries
Fastening	Velcro if mounted on the battery, or if using an external battery sensor it can be mounted on a DIN rails with an additional clip, see DIN Clip for Modules with External Temperature Sensors Add-on, page 55.
Certifications	UL, CSA and CE

Module Parts

Part Number	Part Name	BACS Type	Voltage range	Resistance range	Equalization power	Battery Size
950-6500	BMS MODULE 2V 7-5000AH 1.25-3.2V	C40	1.25–3.2 V	0.02–6 mΩ	0.9A (at 2.27 V)	2 V DC, 7–9000Ah
950-6501	BMS MODULE 4VDC 7-900AH 2.4-5.0V	C41	2.4–5.0 V	0.5–30 mΩ	0.3 A	4 V DC, 7–900Ah
950-6502	BMS MODULE 6VDC 7-900AH 4.8-8.0V	C30	4.8–8.0 V	0.5–60 mΩ	0.3 A	6 V DC, 7–900Ah
950-6503	BMS MODULE 12VDC 7-600AH 9.7-17V	C20	9.7–17 V	0.5–60 mΩ	0.15 A	12 V DC, 7–600Ah
950-6504	BMS MODULE 16VDC 7-600AH 9.7-21V	C23	9.7–21 V	0.5–60 mΩ	0.12 A	16 V DC, 7–600Ah

Add-ons for Modules

These parts can be added to a module. The module will then have these parts already installed on the module.

External Temperature Sensor Add-on

Part Number	Part Name	Description	Cable Length
950-6514	BACS EXTERNAL TEMPERATURE SENSOR 23CM	For any BACS module type. Sensor is attached on top of the battery.	23 cm (0.75 ft)
950-6515	BACS EXTERNAL TEMPERATURE SENSOR 90CM	For any BACS module type. Sensor is attached on top of the battery.	90 cm (2.95 ft)
950-6516	BACS EXT. TEMP. SENSOR 23CM WITH FASTON	For any BACS module type. Sensor is attached with Faston at a battery terminal.	23 cm (0.75 ft)
950-6517	BACS EXT. TEMP. SENSOR 90CM WITH FASTON	For any BACS module type. Sensor is attached with Faston at a battery terminal.	90 cm (2.95 ft)

DIN Clip for Modules with External Temperature Sensors Add-on

Part Number	Part Name	Description
950-6540	BMS BACS MOUNT CLIP INCL. INSTALLATION	A module with an external temperature sensor can be mounted on a DIN rail 35 x 7.5 mm (TS35 rail) with this additional clip.

Control Cabinets Technical Data and Parts



Front panel indications	The front panel have two LEDs for each webmanager inside: Power (green): The power supply to the webmanager is ok if illuminated. Alarm (red): An alarm is active if illuminated.
Cabinet protection rating	IP 56
Operating condition	Between 0°C – 60°C (32°F – 140°F) with a maximum humidity of 90% (not condensing)
Power consumption	30 W depending on the number of webmanagers
Certification	Depends on part number see respective parts table Control Cabinets Parts (UL, CSA and CE Certified), page 55 or Control Cabinets Parts (CE Certified), page 55.

Control Cabinets Parts (UL, CSA and CE Certified)

Part Number	Part Name	Webmanagers Included	Width	Height	Depth	Weight
950-6528	BMS CONTROL CABINET 1 406X508X223MM UL	1	406 mm (16 in)	508 mm (20 in)	223 mm (9 in)	17 Kg (37.5 lb)
950-6529	BMS CONTROL CABINET 2 406X508X223MM UL	2	406 mm (16 in)	508 mm (20 in)	223 mm (9 in)	21 Kg (46.3 lb)

Control Cabinets Parts (CE Certified)

Part Number	Part Name	Webmanagers Included	Width	Height	Depth	Weight
950-6518	BMS CONTROL CABINET 1 400X500X210MM	1	400 mm (15.7 in)	500 mm (19.7 in)	210 mm (8.27 in)	17 Kg (37.5 lb)
950-6519	BMS CONTROL CABINET 2 500X500X210MM	2	500 mm (19.7 in)	500 mm (19.7 in)	210 mm (8.27 in)	21 Kg (46.3 lb)

Control Cabinets Parts (CE Certified) (Continued)

Part Number	Part Name	Webmanagers Included	Width	Height	Depth	Weight
950-6530	BMS CONTROL CABINET 3 500X500X210MM	3	500 mm (19.7 in)	500 mm (19.7 in)	210 mm (8.27 in)	23 Kg (50.7 lb)
950-6531	BMS CONTROL CABINET 4 600X760X210MM	4	600 mm (23.6 in)	760 mm (29.9 in)	210 mm (8.27 in)	39 Kg (86 lb)
950-6532	BMS CONTROL CABINET 5 760X760X210MM	5	760 mm (29.9 in)	760 mm (29.9 in)	210 mm (8.27 in)	49 Kg (108 lb)
950-6533	BMS CONTROL CABINET 6 760X760X210MM	6	760 mm (29.9 in)	760 mm (29.9 in)	210 mm (8.27 in)	56 Kg (124 lb)
950-6534	BMS CONTROL CABINET 7 1000X800X210MM	7	1000 mm (39.4 in)	800 mm (31.5 in)	223 mm (8.78 in)	66 Kg (146 lb)
950-6535	BMS CONTROL CABINET 8 1000X800X210MM	8	1000 mm (39.4 in)	800 mm (31.5 in)	223 mm (8.78 in)	67 Kg (148 lb)

Webmanager Technical Data and Parts

Dimension (W x L x H)	130 x 125 x 30 mm (5.12 x 4.92 x 1.2 in)
Protection rating	IP 40
Operating condition	Between 0°C – 60°C (32°F – 140°F) with a maximum humidity of 90% (not condensing)
Power supply	Always use a stabilized power source. The standard power supply delivers 12V/2A DC, if more than 300 modules are connected a 12V/3A DC power supply is used instead.
Power consumption	At 12 V approximately 150 mA
Fastening	Wall mounted
Certifications	UL, CSA and CE

Webmanager Parts

Part Number	Part Name	Description
950-6508	BMS BACS WEBSERVER BUDGET T4	Control cabinet not included.

Splitting Box Technical Data and Parts

Dimension (L x W x H)	92 x 67 x 25 mm (3.6 x 2.6 x 0.98 in)
Protection rating	IP 40
Fastening	With an additional mounting clip it can be attached to a DIN rail, see Mounting Clip, page 62.
Certifications	UL, CSA and CE

Splitting Box Parts

Part Number	Part Name	Description
950-6506	BMS BACS PASSIVE SPLITTING BOX	Passive device, does not need any power supply.

Current Sensor Technical Data and Parts



Ports	2 RJ10 ports for the BACS bus, and 2 RJ12 ports for an alternative connection to the sensormanager. Only one set of the ports should be used.
AC (Ripple) voltage measurements	Range: 0.1 - 5 V RMS (string) Resolution: 0.1 V Accuracy: 10% Max Freq: 200 Hz (no attenuation)
Dimension (L x W x H)	110 x 82 x 125 mm (4.33 x 3.22 x 4.92 in)
Fastening	The housing can be attached to a DIN rail 35 x 7.5 mm (TS35 rail)
Certifications	CE

Current Sensor Parts

Part Number	Part Name	Inner Diameter	Description
950-6509	BACS DC CURRENT SENSOR 50ADC D_ 21MM	21 mm (0.827 in)	For measuring charging/discharging currents of ± 50 A. Includes a 3 m (9.8 ft) BACS bus cable.
950-6510	BACS DC CURRENT SENSOR 200ADC D_ 40MM	40 mm (1.57 in)	For measuring charging/discharging currents of ± 200 A. Includes a 3 m (9.8 ft) BACS bus cable.
950-6511	BACS DC CURRENT SENSOR 400ADC D_ 40MM	40 mm (1.57 in)	For measuring charging/discharging currents of ± 400 A. Includes a 3 m (9.8 ft) BACS bus cable.
950-6512	BACS DC CURRENT SENSOR 1000ADC D_ 40MM	40 mm (1.57 in)	For measuring charging/discharging currents of ± 1000 A. Includes a 3 m (9.8 ft) BACS bus cable.
950-6513	BACS DC CURRENT SENSOR 2000ADC D_ 40MM	40 mm (1.57 in)	For measuring charging/discharging currents of ± 2000 A. Includes a 3 m (9.8 ft) BACS bus cable.

BACS Measuring Cables Technical Data and Parts

Depending on the module type there are different measuring cables available:

- **For C40 modules:**
 - **UL, CSA and CE certified:** BC4B Measuring Cables, page 57
 - **CE certified:** BC4B Measuring Cables, page 58
- **For C20, C23, C30, C41 modules:**
 - **UL, CSA and CE certified:** BC5 Measuring Cables, page 59
 - **CE certified:** BC5 Measuring Cables, page 59

BC4B Measuring Cables



For module type	C40 on 1.2 V - 2 V batteries
Cable cross section	2 x 1.50 mm ² (16 AWG)
Nominal voltage (U ₀ / U)	300 V / 500 V
Fuses	1000 V / 10 A and 1000 V / 1 A
Temperature range	-25°C – 70°C (-13°F – 158°F)
Certifications	UL, CSA and CE

BC4B Parts

Part Number	Part Name	Lug Type and Size	Length
0W49723	BACS H.P.CABLE SET 25CM 2X1.5MM2 RING M5	Ring, M5	25 cm (0.82 ft)
0W49724	BACS H.P.CABLE SET 25CM 2X1.5MM2 RING M6	Ring, M6	25 cm (0.82 ft)
0W49725	BACS H.P.CABLE SET 25CM 2X1.5MM2 RING M8	Ring, M8	25 cm (0.82 ft)
0W49726	BACS H.P.CABLE SET 40CM 2X1.5MM2 RING M5	Ring, M5	40 cm (1.3 ft)
0W49727	BACS H.P.CABLE SET 40CM 2X1.5MM2 RING M6	Ring, M6	40 cm (1.3 ft)
0W49728	BACS H.P.CABLE SET 40CM 2X1.5MM2 RING M8	Ring, M8	40 cm (1.3 ft)
0W49729	BACS H.P.CABLE SET 40CM 2X1.5MM2 RINGM10	Ring, M10	40 cm (1.3 ft)
0W49730	BACS H.P.CABLE SET 40CM 2X1.5MM2 RINGM12	Ring, M12	40 cm (1.3 ft)
0W49731	BACS H.P.CABLE SET 25CM 2X1.5MM2 FASTON	Faston	25 cm (0.82 ft)
0W49732	BACS H.P.CABLE SET 40CM 2X1.5MM2 FASTON	Faston	40 cm (1.3 ft)

BC4B Measuring Cables

For module type	C40 on 1.2 V - 2 V batteries
Cable cross section	2 x 1.50 mm ² (16 AWG)
Nominal voltage (U ₀ / U)	300 V / 500 V
Fuses	1000 V / 10 A and 1000 V / 1 A
Temperature range	-15°C – 70°C (5°F – 158°F)
Certifications	CE

BC4B Parts

Part Number	Part Name	Lug Type and Size	Length
0W49751	BACS H.P.CABLE SET 25CM 2X1.5MM2 M5 RING	Ring, M5	25 cm (0.82 ft)
0W49752	BACS H.P.CABLE SET 25CM 2X1.5MM2 M6 RING	Ring, M6	25 cm (0.82 ft)
0W49753	BACS H.P.CABLE SET 25CM 2X1.5MM2 M8 RING	Ring, M8	25 cm (0.82 ft)
0W49754	BACS H.P.CABLE SET 40CM 2X1.5MM2 M5 RING	Ring, M5	40 cm (1.3 ft)
0W49755	BACS H.P.CABLE SET 40CM 2X1.5MM2 M6 RING	Ring, M8	40 cm (1.3 ft)
0W49756	BACS H.P.CABLE SET 40CM 2X1.5MM2 M8 RING	Ring, M8	40 cm (1.3 ft)
0W49757	BACS H.P.CABLE SET 40CM 2X1.5MM2 M10RING	Ring, M10	40 cm (1.3 ft)
0W49758	BACS H.P.CABLE SET 40CM 2X1.5MM2 M12RING	Ring, M12	40 cm (1.3 ft)

BC5 Measuring Cables



For module type	C20, C23, C30, C41 on 4 V - 16 V batteries
Cable cross section	2 x 0.75 mm ² (20 AWG)
Nominal voltage (U ₀ / U)	300 V / 500 V
Fuses	1000 V / 10 A and 1000 V / 1 A
Temperature range	-25°C – 70°C (-13°F – 158°F)
Certifications	UL, CSA and CE

BC5 Parts

Part Number	Part Name	Lug Type and Size	Length
0W49740	BACS M.CABLE SET 15CM 2X0.75MM2 M5 RING	Ring, M5	15 cm (0.49 ft)
0W49741	BACS M.CABLE SET 15CM 2X0.75MM2 M6 RING	Ring, M6	15 cm (0.49 ft)
0W49742	BACS M.CABLE SET 15CM 2X0.75MM2 M8 RING	Ring, M8	15 cm (0.49 ft)
0W49743	BACS M.CABLE SET 25CM 2X0.75MM2 M5 RING	Ring, M5	25 cm (0.82 ft)
0W49744	BACS M.CABLE SET 25CM 2X0.75MM2 M6 RING	Ring, M6	25 cm (0.82 ft)
0W49745	BACS M.CABLE SET 25CM 2X0.75MM2 M8 RING	Ring, M8	25 cm (0.82 ft)
0W49746	BACS M.CABLE SET 40CM 2X0.75MM2 M5 RING	Ring, M5	40 cm (1.3 ft)
0W49747	BACS M.CABLE SET 40CM 2X0.75MM2 M6 RING	Ring, M6	40 cm (1.3 ft)
0W49748	BACS M.CABLE SET 40CM 2X0.75MM2 M8 RING	Ring, M8	40 cm (1.3 ft)
0W49749	BACS M.CABLE SET 40CM 2X0.75MM2 M10 RING	Ring, M10	40 cm (1.3 ft)
0W49750	BACS M.CABLE SET 40CM 2X0.75MM2 M12 RING	Ring, M12	40 cm (1.3 ft)
0W49721	BACS M.CABLE SET 25CM 2X0.75MM2 FASTON	Faston	25 cm (0.82 ft)
0W49722	BACS M.CABLE SET 25CM 2X0.75MM2 2XFASTON	2 Faston	25 cm (0.82 ft)

BC5 Measuring Cables



For module type	C20, C23, C30, C41 on 4 V - 16 V batteries
Cable cross section	2 x 0.75 mm ² (20 AWG)
Nominal voltage (U ₀ / U)	300 V / 500 V
Fuses	1000 V / 10 A and 1000 V / 1 A
Temperature range	-15°C – 70°C (5°F – 158°F)
Certifications	CE

BC5 Parts

Part Number	Part Name	Lug Type and Size	Length
0W49710	BACS M.CABLE SET 15CM 2X0.75MM2 RING M5	Ring, M5	15 cm (0.49 ft)
0W49711	BACS M.CABLE SET 15CM 2X0.75MM2 RING M6	Ring, M6	15 cm (0.49 ft)

BC5 Parts (Continued)

Part Number	Part Name	Lug Type and Size	Length
0W49712	BACS M.CABLE SET 15CM 2X0.75MM2 RING M8	Ring, M8	15 cm (0.49 ft)
0W49713	BACS M.CABLE SET 25CM 2X0.75MM2 RING M5	Ring, M5	25 cm (0.82 ft)
0W49714	BACS M.CABLE SET 25CM 2X0.75MM2 RING M6	Ring, M6	25 cm (0.82 ft)
0W49715	BACS M.CABLE SET 25CM 2X0.75MM2 RING M8	Ring, M8	25 cm (0.82 ft)
0W49716	BACS M.CABLE SET 40CM 2X0.75MM2 RING M5	Ring, M5	40 cm (1.3 ft)
0W49717	BACS M.CABLE SET 40CM 2X0.75MM2 RING M6	Ring, M6	40 cm (1.3 ft)
0W49718	BACS M.CABLE SET 40CM 2X0.75MM2 RING M8	Ring, M8	40 cm (1.3 ft)
0W49719	BACS M.CABLE SET 40CM 2X0.75MM2 RING M10	Ring, M10	40 cm (1.3 ft)
0W49720	BACS M.CABLE SET 40CM 2X0.75MM2 RING M12	Ring, M12	40 cm (1.3 ft)

BACS Bus Communication Cable Technical Data and Parts

Contacts	Twisted pair RJ10
Certifications	UL, CSA and CE

BACS Bus Communication Cable Parts

Part Number	Part Name	Length
0W49701	BACS COMM. BUS CABLE RJ10 0.25M	0.25 m (0.82 ft)
0W49702	BACS COMM. BUS CABLE RJ10 0.4M	0.4 m (1.3 ft)
0W49703	BACS COMM. BUS CABLE RJ10 0.7M	0.7 m (2.3 ft)
0W49704	BACS COMM. BUS CABLE RJ10 1M	1 m (3.3 ft)
0W49705	BACS COMM. BUS CABLE RJ10 1.5M	1.5 m (4.9 ft)
0W49706	BACS COMM. BUS CABLE RJ10 3M	3 m (9.8 ft)
0W49707	BACS COMM. BUS CABLE RJ10 5M	5 m (16 ft)
0W49708	BACS COMM. BUS CABLE RJ10 10M	10 m (32.8 ft)
0W49709	BACS COMM. BUS CABLE RJ10 20M	20 m (65.6 ft)

Additional Options Technical Data and Parts

BACS Bus Interface (GX_R_AUX)



Ports	2 RJ10 ports for the BACS bus, 28 screw terminals (4 digital inputs, 4 relay outputs)
Maximum relay contact load:	AC: 30 V, 2 A DC: 30 V, 1 A
Dimension (W x H x D)	75 x 75 x 45 mm (3 x 3 x 1.8 in)
Protection rating	IP 20
Fastening	The housing can be attached to a DIN rail 35 x 7.5 mm (TS35 rail)
Certifications	UL, CSA and CE

BACS Bus Interface Parts

Part Number	Part Name	Description
950-6520	BACS BUS INTERFACE 4 DI 4 RELAY	Includes a 3 m (9.8 ft) BACS bus cable.

Stand-Alone Temperature and Humidity Sensor



Temperature measurement range:	-25°C – 100°C (-13°F – 212°F)
Humidity measurement range:	0% – 100% relative humidity
Dimension (L x W x H)	71 x 71 x 29 mm (2.8 x 2.8 x 1.1 in)
Protection rating	IP 22
Fastening	Wall mounted / Adhesive
Certifications	CE

Stand-Alone Temperature and Humidity Sensor Parts

Part Number	Part Name	Description
950-6541	BMS IP22 COMBISENSOR TEMP HUMIDITY 1.8M	Includes a connection cable (mini-DIN-8/DB-9) 1.8 m (70 in)

Bus Converter



General description	For galvanic isolation of the modules and conversion of the Ethernet BACS bus to RS232. One alarm contact, one alarm buzzer, one alarm LED and an internal real time clock. Can also be used as a programmer tool.
Dimension (L x W x H)	92 x 67 x 25 mm (3.6 x 2.6 x 0.98 in)
Protection rating	IP 40
Power supply	Stabilized 12V DC / 2A
Fastening	With an additional mounting clip it can be attached to a DIN rail, see Mounting Clip, page 62.
Certifications	UL, CSA and CE

Bus Converter Parts

Part Number	Part Name	Description
950-6505	BMS BUS CONVERTER V ETHERNET-RS232	Includes a serial cable (mini-DIN-8/DB-9) for a connection with windows programmer software, BACS bus cable and a standard power supply.

Repeater

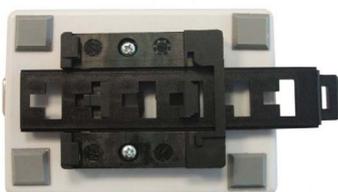


General description	Active line repeater for the BACS communication bus. Can extend the range between some devices in the BACS bus with up to 100 m (328 ft).
Dimension (L x W x H)	90 x 66 x 30 mm (3.54 x 2.6 x 1.18 in)
Protection rating	IP 40
Power supply	Stabilized 12V DC / 2A
Fastening	With an additional mounting clip it can be attached to a DIN rail, see Mounting Clip, page 62.
Certifications	UL, CSA and CE

Repeater Parts

Part Number	Part Name	Description
950-6507	BMS BACS COMM. BUS REPEATER	Includes power supply and a BACS bus cable.

Mounting Clip



General description	DIN rail 35 x 7.5 mm (TS35 rail) mounting clip for splitting boxes, converters and repeaters.
Dimension (L x W x H)	108 x 45 x 9 mm (4.2 x 1.8 x 0.35 in)

Mounting Clip Parts

Part Number	Part Name	Description
950-6539	BMS DIN MOUNT CLIP FOR CONV_SPLIT_REP	Includes 4 screws.

Sensormanager and Additional Sensors Technical Data and Parts

Sensormanager



General description	Can be used to connect multiple sensors to the webmanager. 4 RJ12 ports with 8 analog inputs, 4 digital inputs, 4 digital outputs.
Dimension (L x W x H)	69 x 129 x 31 mm (2.7 x 5.1 x 1.22 in)
Protection rating	IP 40
Power supply	Secure, wide range 9-24 V DC
Fastening	Wall mounted
Certifications	CE

Sensormanager Parts

Part Number	Part Name	Description
950-6550	BMS SENSOR MNGR 9-24VDC 12IN 4OUT	Includes a COM2 connection cable (mini-DIN-8/DB-9) 1.8 m (70 in), a temperature sensor and a RJ12 connection cable.
0W49737	BMS CS141 SENSOR CONNECTION CABLE	COM2 connection cable (mini-DIN-8/DB-9).

Temperature Sensor



Temperature measurement range:	-25°C – 100°C (-13°F – 212°F)
Dimension (L x W x H)	71 x 71 x 27 mm (2.8 x 2.8 x 1.1 in)
Protection rating	IP 22
Fastening	Wall mounted / Adhesive
Certifications	CE

Temperature Sensor Parts

Part Number	Part Name	Description
950-6542	BMS TEMP SENSOR 5M IP22	Includes a 5 m (16.4 ft) RJ12 connection cable.

Temperature and Humidity Sensor



Temperature measurement range:	-25°C – 100°C (-13°F – 212°F)
Humidity measurement range:	0% – 100% relative humidity
Dimension (L x W x H)	71 x 71 x 27 mm (2.8 x 2.8 x 1.1 in)
Protection rating	IP 22
Fastening	Wall mounted / Adhesive
Certifications	CE

Temperature and Humidity Sensor Parts

Part Number	Part Name	Description
950-6543	BMS COMBISENSOR TEMP HUMIDITY 5M IP22	Includes a 5 m (16.4 ft) RJ12 connection cable.

Hydrogen Sensor



Alarm thresholds	20% and 40% lower explosive limit (LEL)
Dimension (L x W x H)	120 x 80 x 60 mm (4.7 x 3.1 x 2.4 in)
Protection rating	IP20 (optionally: IP52/Ex-i/ATEX approved)
Fastening	Wall mounted / Adhesive
Certifications	CE

Hydrogen Sensor Parts

Part Number	Part Name	Description
950-6538	BMS HYDROGEN SENSOR	Includes power supply and a RJ12 connection cable 6.5 m (21 ft)

Alarm Buzzer



Sound level	60dB
Dimension (L x W x H)	71 x 71 x 29 mm (2.8 x 2.8 x 1.1 in)
Protection rating	IP 22
Fastening	Wall mounted / Adhesive
Certifications	CE

Alarm Buzzer Parts

Part Number	Part Name	Description
950-6536	BMS ALARM BUZZER W. NC_NO RELAY IP22	Includes a 5 m (16.4 ft) RJ12 connection cable.

Flashlight



Dimension (L x W x H)	70 x 70 x 67 mm (2.8 x 2.8 x 2.4 in)
Protection rating	IP 22
Fastening	Wall mounted / Adhesive
Certifications	CE

Flashlight Parts

Part Number	Part Name	Description
950-6537	BMS FLASHLIGHT STROBE IP22	Includes a 5 m (16.4 ft) RJ12 connection cable.

RJ12 Sensormanager Communication Cables



Contacts	RJ12
Certifications	CE

RJ12 Sensormanager Communication Cable Parts

Part Number	Part Name	Length
0W49760	BMS SENSOR MNGR CONN CABLE 0.4M	0.4 m (1.3 ft)
0W49761	BMS SENSOR MNGR CONN CABLE 1M	1 m (3.3 ft)
0W49762	BMS SENSOR MNGR CONN CABLE 5M	5 m (16 ft)
0W49763	BMS SENSOR MNGR CONN CABLE 10M	10 m (33 ft)
0W49764	BMS SENSOR MNGR CONN CABLE 15M	15 m (49 ft)

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