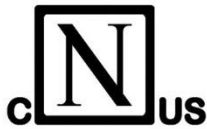




BACS_CSHXXXXF Current Sensor





General Safety Precautions



Improper use of the products described in this manual may lead to personal injury and/or property damage. GENEREX is not liable for injuries or damages that result from improper handling of these products.

Risks associated with improper use include explosion, fire, and short circuits. Attention!

Battery terminals are always live, so never place metal objects or tools on top of the batteries. Battery electrolyte solutions are highly corrosive. Should you observe leaks of electrolyte from a battery, be aware that these fluids are harmful to both eyes and skin.

Installation, maintenance, and repair of batteries and battery equipment should be performed only by trained specialists (or personnel authorized by battery manufacturers to perform such services). Persons who have not been trained in battery safety or the proper handling of batteries (or who have not been authorized to work on them) must not handle batteries.

Observe the following regulations (IEEE standards USA only):

- 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 1375-1998: "Guide for Protection of Stationary Battery Systems"

Observe also the following safety rules:

1. Ensure that all electrical loads and power supplies/charging devices (including separators, fuses, and switches) are switched off. This must be carried out by qualified personnel.
2. Remove all wristwatches, rings, chains, jewelry, and other metal objects before working with batteries.
3. Use insulated tools only.
4. Wear insulating rubber gloves and rubber shoes.
5. Never place tools or metal components on top of the batteries.
6. Make sure that the battery or batteries are not mistakenly grounded. (The consequences of an accidental or incorrect connection can be mitigated and reduced by terminating the ground connection.) If the system is grounded, terminate the connection. Touching a grounded battery by mistake can result in severe electric shock.
7. Before establishing connections, make sure to verify polarity. (Better one too many times than one too few.)
8. Filled lead-acid batteries contain highly explosive gas (hydrogen/air mixture). Never smoke, handle open flames or create sparks near the batteries. Always avoid electrostatic discharge: wear cotton clothing and ground yourself if necessary.
9. Wear the appropriate safety clothing and equipment.

Cleaning and Decontamination Instructions

To ensure the longevity and proper functioning of your device, please follow these cleaning and decontamination guidelines:





1. **Power Off and Unplug:** Before cleaning or decontaminating, always power off the device and unplug it from any electrical outlets or disconnect it from its power source to avoid the risk of electric shock or damage.



2. Use Approved Cleaning Agents:

- Only use soft, lint-free cloths or microfiber cloths to clean the surface of the device.
- For general cleaning use a dry cloth. Avoid using alcohol, ammonia, or solvents that can damage the surface.
- For decontamination, if required, use a solution recommended by the manufacturer that is safe for electronics. Ensure that the solution is applied to the cloth rather than directly onto the device.

Warning and Safety Indication

Attention		
	INSTALLATION BY QUALIFIED PERSONNEL ONLY!	The BACS® installation should only be installed by qualified personnel. BACS® is installed on batteries where high voltages could cause injuries or even death if not handled properly! The BACS® connection cables (temperature cable, bus cable, measuring cable) could be live! To avoid short circuits, do not touch, replace, or cut BACS® cables before disconnecting the charger from the batteries!
	Service BY GENEREX PERSONNEL ONLY!	The BACS® Current sensor can only be serviced by the manufacturer. Do not open the BACS® Current Sensor. Do not attach any kind of objects to the battery or the BACS® Current Sensor apart from the connecting cables!
	PROTECTION STATEMENT!	If the unit is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
	ENVIROMENTAL CONDITIONS!	Indoor Use: The equipment is intended for indoor environments, where it will not be directly exposed to outdoor weather conditions such as rain, snow, or extreme temperatures.

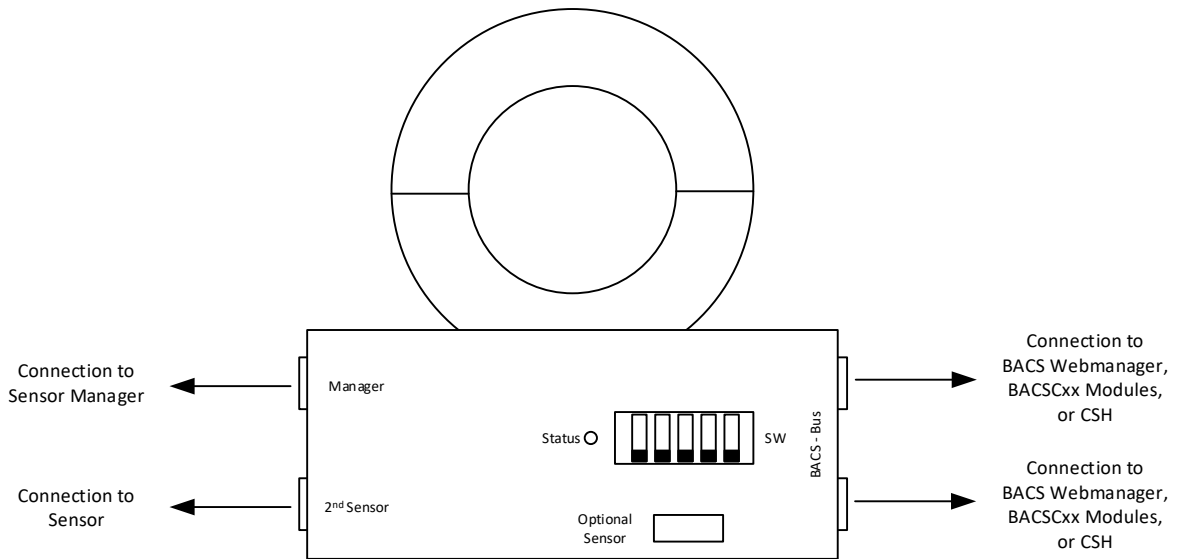


Manufacturer Contact Information

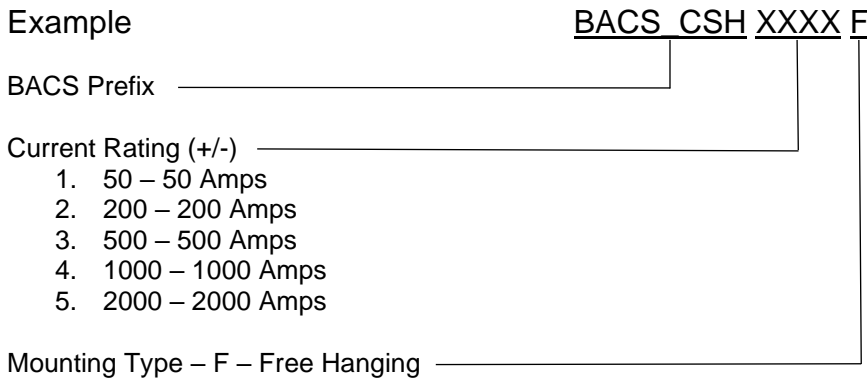
Germany:
 GENEREX SYSTEMS GmbH
 Brunnenkoppel 3
 22041 Hamburg

United States of America:
 GENEREX SYSTEMS Inc.
 18610 Starcreek Dr, Suite D
 Cornelius, North Carolina 28037

Connection Diagram



Part Number Example



Description & Functions

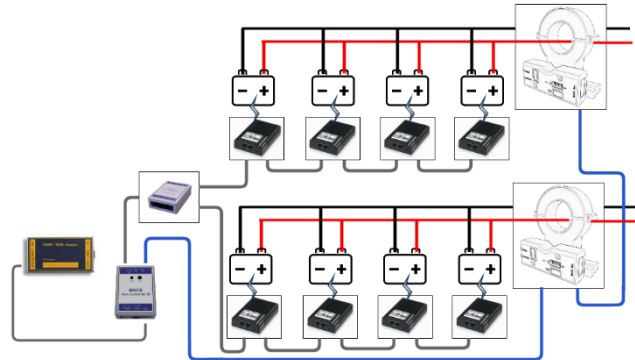
The BACS_CSHxxxxF Current Sensor is a measuring unit for the integration into the BACS bus system. This unit measures the string current in the negative or rather positive range of a battery circuit and displays the data in Amps. The active measuring value will be displayed via the web interface, and the BACS Webmanager will show the "BACS Status "of the string. The measuring values will be stored sequentially in the history files, and this data can then be used later for system analysis and performance interpretation by using the BACS Viewer software.

Assembling:

The BACS Current Sensor is designed for DIN Rail mounting.

BACS - Wiring: General Bus Connection (CSHxxx F)

To connect a single BACS current sensor, use a single BACS Bus port. Do not mix up BACS Bus modules with the current sensor. Since the sensor is powered by the BACS Bus, no additional power source is required.



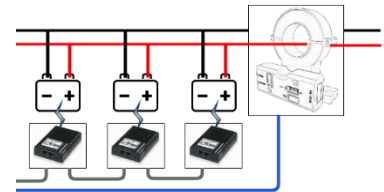
BACS - Daisychain for up to 16 sensors (CSHxxx F)

Use a daisy chain to connect other current sensors. The BACS Webmanager, according to the number of configured battery strings:

Each BACS Webmanager can therefore hold up to 16 current sensors. For structured wiring, the current sensors can also be used with a BACS Bus Splitter in combination with a daisy chain.

BACS - Circuit wiring and current direction (CSHxxx F)

Open the hall sensor and place the power cable in the sensor ring. The current sensor is polarity sensitive, so be aware of the sensor's measuring direction to avoid wrong measurements. A small arrow on the top of the hall sensor shows the correct current flow. We recommend using the + cable only.



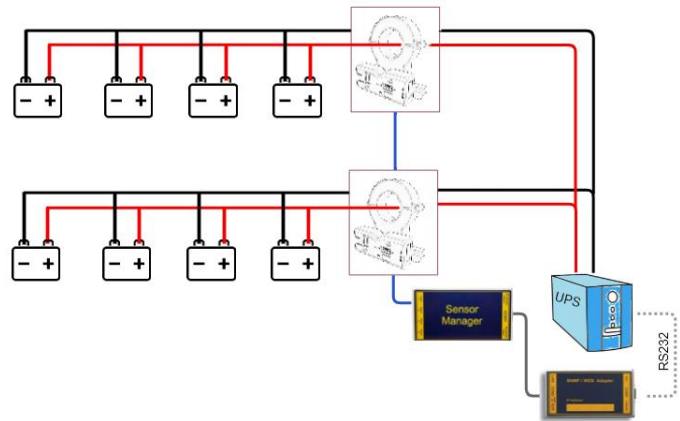
SENSORMANAGER / SITEMANAGER

Analog wiring

Use the RJ12 – cable to connect the sensor with a Sensormanager or the analog ports of a SITEMANAGER 6

Analog Daisy Chain (2 devices per port)

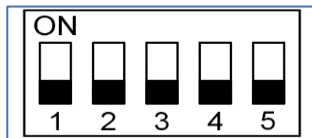
Connect the second sensor to the first sensor to use a daisy chain. Please note that only two devices can be connected.



Addressing

The BACS_CSHxxxxF Current Sensor can be addressed via the DIP-Switch:

Address table for the string numbers:



String No.:	BACS_CSHxxxxF					Analog AC / DC
	SW 1	SW 2	SW 3	SW 4	SW 5	
1	off	off	off	off	-	
2	on	off	off	off	-	
3	off	on	off	off	-	
4	on	on	off	off	-	
5	off	off	on	off	-	
6	on	off	on	off	-	
7	off	on	on	off	-	
8	on	on	on	off	-	
9	off	off	off	on	-	
10	on	off	off	on	-	
11	off	on	off	on	-	
12	on	on	off	on	-	
13	off	off	on	on	-	
14	on	off	on	on	-	
15	off	on	on	on	-	
16	on	on	on	on	-	
-	-	-	-	-	off	DC
-	-	-	-	-	on	AC



The physical address of the sensor is hard-coded and can be changed by setting up the dip switches. To activate the new settings, remove the BACS Bus cable and connect the sensor again. After restart, the new address is assigned and ready to use. To avoid wrong measuring, please check your BACS string setup after changing the sensor address.

Status LED :

When the green LED on the BACS_CSHxxx Current Sensor flashes, it indicates that power is available. The green LED is constantly on if the device is detected by the BACS Webmanager and measuring values are transferred (normal operation). If the communication with the BACS Webmanager is interrupted, the LED will start flashing after 180 seconds to indicate that there is a communication problem.

Setting up SENSORMANAGER / SITEMANAGER

AC / DC measuring selector

Switch SW5 provides the option to select the type of current measurement (AC or DC).

Sensor configuration

The current sensor supplies an analog voltage of 0 - 10V as a measurement result, which must be defined accordingly in the sensor settings.:

Devices > Sensors > Setup											
Sensor Inputs	Name	Sensortype	Unit	Low PreAlarm	Low Alarm	High PreAlarm	High Alarm	Sensor Range		Offset	
1	Current	Custom 0-10V	A	2	1	8	9	-1000	-1000	28	
	Channel 2	Custom 0-10V		2	1	8	9	0	-10		

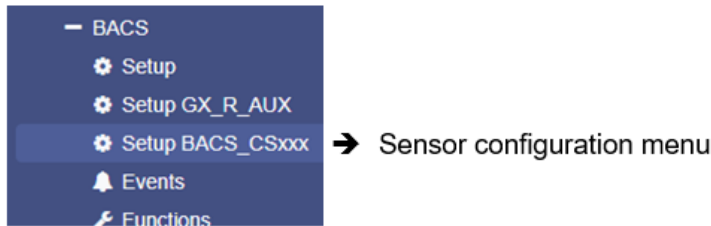
At "Name", assign a unique name of the sensor. This name is then displayed in the sensor monitoring screen.

Offset Settings

Use the Offset Settings to define the sensor output at 0 amps under the condition that the sensor does not measure any current flow.

If the sensor shows a deviation at the 0 position, define an offset from the **measured value X - 1**. The sensor should then display 0 in the sensor monitoring screen.

BACS Configuration



Check the box at "BACS CS Current Sensor Connected" to enable the sensor.

<p>BACS CS Current Sensor Connected <input checked="" type="checkbox"/></p> <p>Only One Current Sensor For All Strings <input checked="" type="checkbox"/></p> <p>Reverse Current Direction <input type="checkbox"/></p> <p>Ampere Multiplier <input type="text" value="1"/></p>	<p>Thresholds</p> <p>Discharge <input type="text" value="-1"/> A</p> <p>Charge <input type="text" value="1"/> A</p>
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Defining the number of installed sensors

In case of one current sensor only, enable "Only One Current Sensor For All Strings ". If not selected, BACS will assume that the number of strings is the finally the number of current sensors.

Thresholds

Define current must be detected before the sensor reports a charge/discharge cycle in progress.

Defining the threshold levels:

Warning Levels		
	Min	Max
Enable Current Thresholds	<input checked="" type="checkbox"/>	
String Current	<input type="text" value="-10"/> A	<input type="text" value="10"/> A
Alarm Levels		
	Min	Max
Enable Current Thresholds	<input checked="" type="checkbox"/>	
String Current	<input type="text" value="-11"/> A	<input type="text" value="11"/> A
<input type="button" value="Apply"/>	<input type="button" value="Cancel"/>	

To enable the threshold function, select the check box accordingly. Jobs for these thresholds can be added to the BACS event handling menu.

Please ensure that the warning level values are always lower than the alarm level values.



Technical Data and Specifications: BACS CSHxxxxF Current Sensor

Module-Version	Current Sensor	Revision 5.x
Power supply	Volt	12 VDC
Power supply	Cable	via bus wiring
Current Range	ADC	BACS_CSH50: +/- 50 ADC BACS_CSH200: +/- 200 ADC BACS_CSH500: +/- 500 ADC BACS_CSH1000: +/- 1000 ADC BACS_CSH2000: +/- 2000 ADC
Measuring accuracy	Resolution	16 Bit, ±1A, ±2%
Current consumption	mA	90mA
Control element	DIP SW	DIP-Switch for the addressing
Indicator	Optical	LED for status display
Interface	Serial	Optical, isolated 4-pole connection
Bus protocol	BACS	Proprietary GENEREX bus protocol, 9600 baud
Analog Output range	SM	0V – 10V → 5V = 0A
Temperature	Operation	-10 ... +60°C
Temperature	Storing	-25 ... +85°C
Humidity	Rel. %	0 - 95% not condensated
Max. Cable diameter (incl. cable sheath) of the current circuit you want to measure	mm	BACS_CSH50: 20mm BACS_CSH200 – BACS_CSH2000: 40mm
Dimensions CSHxxxxF	W x H x D	CSH 50F 85 x 73 x 70 mm CSH 200 – 2000F 100 x 106 x 70 mm
Weight	gr	360g
Environmental Conditions		Indoor Use and altitudes <2000m
Pollution Degree		Pollution Degree 2
Protection class	IP	IP 20
Housing	Material	ABS UL94-V0
Certifications	Norm	DIN EN 50178, RoHS, UL 61010