



Troubleshooting for SMA Home Storage

HS-BM-3.28-10

1 Information on this Document

1.1 Target Group

The tasks described in this document must only be performed by qualified persons. Qualified persons must have the following skills:

- Knowledge of how an inverter works and is operated
- Knowledge of how batteries work and are operated
- Training to deal with risks associated with installing, repairing, and using electrical devices, inverters, and batteries
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of all applicable laws, regulations, standards, and directives
- Knowledge of and compliance with all documentation related to the products including all safety information

1.2 Content and Structure of this Document

This document is intended to assist in troubleshooting common service and failure cases in connection with SMA Home Storage (HS-BM-3.28-10) regarding the following topics: undervoltage, deep discharging, inconsistent firmware, recharging, updates.

This document supplements the documents that are enclosed with each product and does not replace any locally applicable codes or standards. Read and observe all documents supplied with the product. Illustrations in this document are reduced to the essential information and may deviate from the real product.

1.3 Levels of Warning Messages

The following levels of warning messages may occur when handling the product.

 DANGER
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
 CAUTION
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE
Indicates a situation which, if not avoided, can result in property damage.

1.4 Symbols in the Document

Symbol	Explanation
	Information that is important for a specific topic or goal, but is not safety-relevant
	Indicates a requirement for meeting a specific goal
	Required result

1.5 Typographies in the document

Typography	Use	Example
bold	- Messages - Terminals - Elements on a user interface - Elements to be selected - Elements to be entered	- Connect the insulated conductors to the terminals X703:1 to X703:6. - Enter 10 in the field Minutes.
>	Connects several elements to be selected	Go to Settings > Date.
[Button] [Key]	Button or key to be selected or pressed	Select [Enter].
#	Placeholder for variable components (e.g., parameter names)	Parameter WCtHz.Hz#

1.6 Additional Information

Additional information is available at www.SMA-Solar.com.

Title and information content	Type of information
SMA HOME STORAGE - Safety Information	Technical Information
SUNNY BOY SMART ENERGY 3.6 / 4.0 / 5.0 / 6.0 / 8.0 / 9.9 Mounting, installation, commissioning, configuration, operation, troubleshooting and decommissioning	Operating manual
SUNNY BOY SMART ENERGY "Approved Batteries and Information on Battery Communication Connection"	Technical Information
SUNNY TRIPOWER 5.0 / 6.0 / 8.0 / 10.0 SMART ENERGY	Operating manual
SUNNY TRIPOWER SMART ENERGY "Approved Batteries and Information on Battery Communication Connection"	Technical Information

Title and information content	Type of information
SUNNY TRIPOWER HYBRID X 5 / 6 / 8 / 10 / 12 / 15 Mounting, installation, commissioning, configuration, operation, troubleshooting and decommissioning	Operating manual
SUNNY TRIPOWER HYBRID X 20 / 25 / 30 Mounting, installation, commissioning, configuration, operation, troubleshooting and decommissioning	Operating manual
"SUNNY TRIPOWER HYBRID X "Approved Batteries and Information on Battery Communication Connection"	Technical Information
SMA SMART HOME - The System Solution for more Independence	Planning Guidelines
SMA Home Energy Solution with Sunny Boy Smart Energy - Generate solar power, store and use it effectively	System Manual

2 Troubleshooting in case of voltage problems with a battery module

2.1 At least one battery module reports event 5156 / 9C / 9312

One or several battery modules report the event 5156 / 9C / 9312 **Undervoltage battery module** via the user interface of the inverter. You can find more information on this and other events in the manual of the inverter and battery.

Cause	CORRECTIVE MEASURES
Undervoltage of one or several battery modules	- Check the firmware version of the battery modules via the user interface of the connected inverter or via ennexOS. - Measure the battery voltage on the battery modules. To do this, the DC switch on the respective battery module must be switched on. After approx. 45 seconds, a voltage can be measured at DC+ and DC-.

Recharging conditions depending on the module voltage and the firmware version of the battery modules:

Module Voltage	Firmware version of the battery modules ≤ 1.1.40.R	Firmware version of the battery modules ≥ 1.1.51.R
Grid recharging without PV voltage	up to 81 V	up to 81 V
Grid recharging with PV voltage	75 V to 81 V	69 V to 81 V
Emergency charging procedure	60 V to 75 V	60 V to 69 V
Triggering the DC circuit breaker	< 75 V	69 V

2.2 The states of charge of the battery modules vary

The state of charge of the battery modules is not displayed correctly. The battery stops charging before the charge reaches 100% and/or the battery stops discharging before the charge reaches 0%.

Cause	CORRECTIVE MEASURES
If the battery modules are only rarely charged, e.g. in the winter months, it is possible that the internal calibration of the battery modules with each other cannot be carried out. This leads to misinterpretations when indicating the state of charge (SOC).	• Calibration takes place at a SOC of 99% to 100%. In most cases, calibration occurs automatically at the next full charge so that no manual intervention is necessary. Calibration is complete when the battery has reached an SOC of 100%. The charging process from 99% to 100% can take up to 20 minutes. • A manual calibration can be carried out if the battery is charged from the utility grid. • In systems with Sunny Home Manager, the recharging from the utility grid required for the calibration can be carried out via the function time slot control for charging the battery storage system in Sunny Portal classic or Sunny Portal powered by ennexOS.

2.3 Measuring the voltage on the battery module

DANGER

Danger to life due to electric shock when live components or DC cables are touched

The DC cables connected to a battery may be live. Touching live DC cables results in death or serious injury due to electric shock.

- Disconnect the product and inverter from voltage sources and make sure they cannot be reconnected before working on the device.
- Do not touch non-insulated parts or cables.
- Do not disconnect the DC connectors under load.
- Wear suitable personal protective equipment for all work on the product.

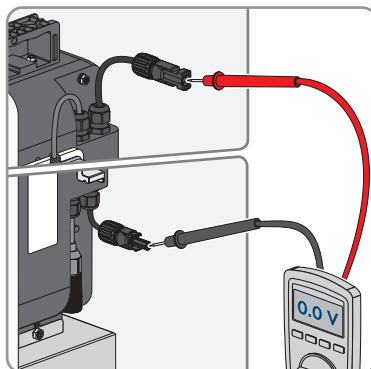
⚠ WARNING**Danger to life due to electric shock from destruction of the measuring device due to overvoltage**

Overvoltage can damage a measuring device and result in voltage being present in the enclosure of the measuring device. Touching the live enclosure of the measuring device results in death or lethal injuries due to electric shock.

- Only use measuring devices with a DC input voltage range of 1000 V or higher.

Procedure:

1. Disconnect the battery modules from voltage sources and from the inverter (see battery manual).
2. Switch on the modules disconnected from the inverter using the DC switches on the modules (see battery manual).
3. Wait 45 seconds. If the battery module switches off within the 45 seconds, carry out the emergency charging procedure (see Section 2.7, page 9).
4. Measure the voltage on the DC connectors.

**Also see:**

- System with Sunny Tripower Smart Energy: Check and update firmware version ⇒ page 7
- System with Sunny Boy Smart Energy: Check and update firmware version ⇒ page 8

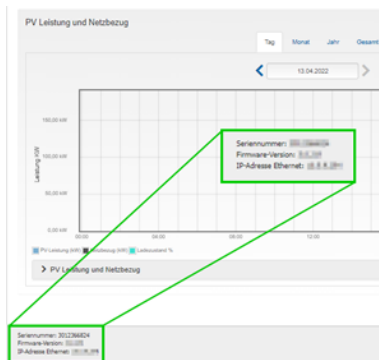
2.4 System with Sunny Tripower Smart Energy: Check and update firmware version

Requirements:

- The user interface of the inverter must be open and you must be logged in as 'Installer'.

Procedure:

1. On the home page of the user interface, in the bottom left corner, identify the firmware version and compare it with the firmware on the SMA homepage in the download area of the inverter.



2. If the firmware version is < 4.08.37.R, update the firmware to version $\geq 4.08.37.R$ (see inverter manual). In the firmware 4.08.37.R for the inverter, the firmware version 1.1.59.R for the battery is also included. This is required for faultless operation.
 - ☒ After the successful inverter update, the event message **Update completed** appears.
3. Restart inverter under **Parameter > Device > System > Initiate device restart**.

Also see:

- Carrying out the emergency charging procedure $\Rightarrow$ page 9

2.5 System with Sunny Boy Smart Energy: Check and update firmware version

- ☐ The user interface of the inverter must be open and you must be logged in as administrator.

Procedure:

1. Check the firmware version of the connected battery module (see Section 3.3, page 12).
2. If the firmware version is < 1.1.20.R, update the firmware to the current version $\geq 1.1.20.R$. To do this, download the current firmware version at <https://www.sma.de/en/service/downloads> in the **Home Storage System** category.
3. On the inverter user interface (at the inverter level), select **Configuration > Update and backup**.
4. In the **Manual update** area, click [**Select the file**] and select the update file for the battery.
 - ☒ The user interface confirms that the update file is compatible.
5. Select [**Start update**].
6. Follow the instructions in the dialog.
 - ☒ The battery is performing a restart after the firmware update.

Also see:

- System with Sunny Boy Smart Energy: check the firmware version and the serial number of a battery module ⇒ page 12

2.6 System with Sunny Tripower Smart Energy or Sunny Boy Smart Energy: Battery module replacement

In case of a battery module replacement, the firmware of the new battery module is to be checked.

- ☐ The user interface of the inverter must be open and you must be logged in as Installer.

Procedure:

1. Connect the replaced battery module to the inverter separately.
2. Check the firmware version of the connected battery module (see Section 3.2, page 11)(see Section 3.3, page 12).
3. If the firmware version of the battery module is not current, restart the inverter via **Parameter > Device > System > Trigger device restart**. This ensures that the new battery module is updated with the firmware of the battery.

2.7 Carrying out the emergency charging procedure

DANGER

Danger to life due to electric shock when live components or DC cables are touched

The DC cables connected to a battery may be live. Touching live DC cables results in death or serious injury due to electric shock.

- Disconnect the product and inverter from voltage sources and make sure they cannot be reconnected before working on the device.
- Do not touch non-insulated parts or cables.
- Do not disconnect the DC connectors under load.
- Wear suitable personal protective equipment for all work on the product.

WARNING

Danger to life due to electric shock from destruction of the measuring device due to overvoltage

Overvoltage can damage a measuring device and result in voltage being present in the enclosure of the measuring device. Touching the live enclosure of the measuring device results in death or lethal injuries due to electric shock.

- Only use measuring devices with a DC input voltage range of 1,000 V or higher.

Requirements:

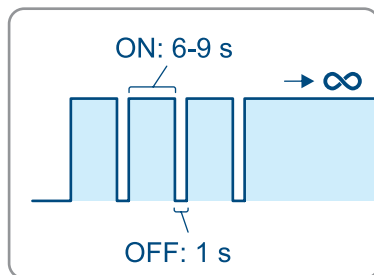
- ☐ The battery is connected correctly to the inverter.

Procedure:

1. Switch off all battery modules via the DC switch. The following steps can be carried out on all battery modules simultaneously or individually on each battery module.



2. Switch on the DC switches on all battery modules and switch them off again after 6-9 seconds. Then switch on again after 1 second. Perform this process a total of three times on each battery module.



3. Leave the battery modules switched on.
 - ☑ The blue LEDs on the battery modules are flashing continuously.
 - ☑ On the user interface of the Sunny Tripower Smart Energy, the battery status displays a yellow exclamation mark and the message **Emergency charge**.
4. If emergency charging does not work, check the value **Maximum charging current**. If the displayed value is between 3 A and 4 A, restart the inverter via the parameter **Initiate device restart**. If the displayed value is 0 A and the previous steps were carried out simultaneously for all battery modules, connect the modules individually and repeat the steps for each module separately.
5. With Sunny Boy Smart Energy: If the battery still does not start charging, check the parameter **Lowest measured cell voltage**. If the value is below 2 V, the battery module must be replaced.
6. If emergency charging still is not working, contact Service.

3 Troubleshooting in case of problems with system integration

3.1 Battery module cannot be integrated into the system

Following a firmware update, the replacement of a battery module or retrofitting (e.g. expanding the battery capacity), at least one battery module can no longer be integrated into the overall system or the expected battery capacity is incorrectly shown on the user interface.

Cause	Remedy
Firmware of the battery is outdated.	Restart the battery and the inverter (see product manuals). The restart might result in a firmware update of the battery modules.
The firmware of the inverter is outdated.	- For Sunny Tripower Smart Energy systems: check the firmware version and perform an update (see Section 2.4, page 7). - For systems with Sunny Boy Smart Energy: check the firmware version and perform an update (see Section 2.5, page 8).
The serial number of the battery module is not correctly recorded.	- For Sunny Tripower Smart Energy systems: check the serial number of the battery module (see Section 3.2, page 11). - For systems with Sunny Boy Smart Energy: check the serial number of the battery module (see Section 3.3, page 12).

3.2 System with Sunny Tripower Smart Energy: check the firmware version and the serial number of a battery module

Requirements:

- The battery module to be checked is connected to the inverter separately.
- The user interface of the inverter must be open and you must be logged in as 'Installer'.

Procedure:

- On the inverter user interface select **Device parameters > Device components > Battery management system**.
- Read the firmware version of the battery module at **Software-Version**. If the firmware version $\geq 4.08.37.R$ is installed on the inverter, the connected battery module contains at least firmware version 1.1.59.R. An individual battery module is automatically updated as soon as it is connected.
- If the battery module is not updated automatically, restart the battery and inverter via the inverter user interface using the parameter **Trigger device restart**.

4. Read the serial number of the battery module at **Serial number** and compare it with the information on the type label of the battery module. If the serial numbers do not match, contact Service.
5. Repeat the process with another battery module if necessary.

Also see:

- [System with Sunny Tripower Smart Energy: Check and update firmware version ⇒ page 7](#)

3.3 System with Sunny Boy Smart Energy: check the firmware version and the serial number of a battery module

Requirements:

- The battery module to be checked is connected to the inverter separately.
- The user interface of the inverter must be open and you must be logged in as administrator.

Procedure:

1. On the inverter user interface (at the inverter level), select **Configuration > Parameter**.
2. Identify the firmware version of the battery via the value of parameter **BMS firmware version**.
3. If the firmware version is < 1.1.59.R, update the firmware to the current version ≥ 1.1.59.R (see Section 2.5, page 8).
4. Read the serial number of the battery module at **BMS serial number** and compare it with the information on the type label of the battery module. If the serial numbers do not match, contact Service.
5. Repeat the process with another battery module if necessary.

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