

Functional test of the CAN interface
SUNNY BOY STORAGE 3.7-10 / 5.0-10 / 6.0-10

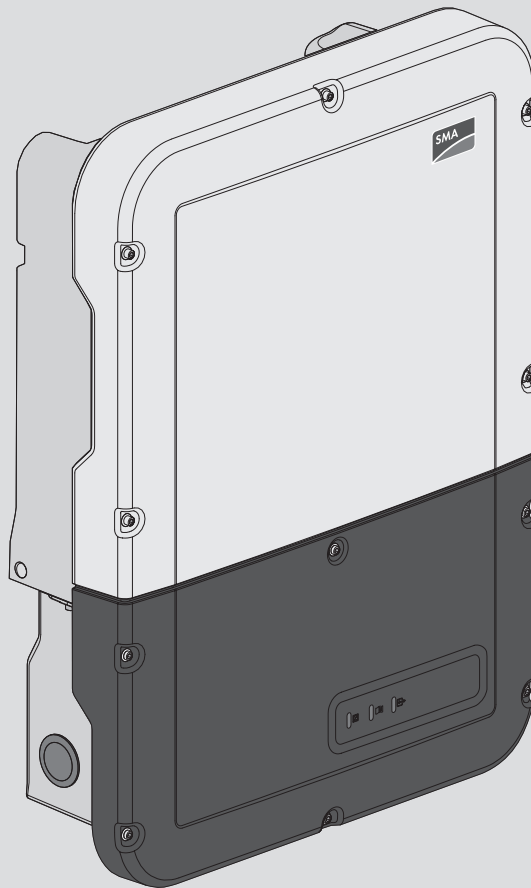


Table of Contents

1	Information on this Document	3
1.1	Validity	3
1.2	Target Group	3
1.3	Content and Structure of this Document.....	3
2	IMPORTANT SAFETY INSTRUCTIONS	4
3	Background Information	7
4	CAN bus functional test	8
4.1	Assembling the test cable.....	8
4.2	Performing the functional test.....	8
5	Contact	11

1 Information on this Document

1.1 Validity

This document is valid for:

- SBS3.7-10 (Sunny Boy Storage 3.7)
- SBS5.0-10 (Sunny Boy Storage 5.0)
- SBS6.0-10 (Sunny Boy Storage 6.0)

1.2 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 to safely disconnect SMA inverters
- Knowledge of how batteries work and are operated
- Training in how to deal with the dangers and risks associated with installing, repairing and using electrical devices, batteries and installations
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of all applicable laws, standards and directives
- Knowledge of and compliance with this document and all safety information
- Knowledge of and compliance with the documents of the battery manufacturer with all safety information

1.3 Content and Structure of this Document

This document describes how to check the battery communication interface.

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.

2 IMPORTANT SAFETY INSTRUCTIONS

Keep the manual for future reference.

This section contains safety information that must be observed at all times when working.

DANGER

Danger to life due to electric shock when live components or cables of the inverter are touched

High voltages are present in the conductive components or cables of the inverter. Touching live parts and cables of the inverter results in death or lethal injuries due to electric shock.

- Disconnect the product and battery from voltage sources and make sure it cannot be reconnected before working on the device.
- Wear suitable personal protective equipment for all work on the product.
- Do not touch non-insulated parts or cables.

DANGER

Danger to life due to electric shock in case of overvoltages and if surge protection is missing

Overvoltages (e. g. in the event of a flash of lightning) can be further conducted into the building and to other connected devices in the same network via the network cables or other data cables if there is no surge protection. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Ensure that all devices in the same network and the battery are integrated into the existing surge protection.
- When laying the network cables or other data cables outdoors, it must be ensured that a suitable surge protection device is provided at the transition point of the cable from the product or the battery outdoors to the inside of a building.
- The Ethernet interface of the product is classified as "TNV-1" and offers protection against overvoltages of up to 1.5 kV.

WARNING

Danger to life due to fire or explosion

In rare cases, an explosive gas mixture can be generated inside the product under fault conditions. In this state, switching operations can cause a fire inside the product or explosion. Death or lethal injuries due to hot or flying debris can result.

- In the event of a fault, do not perform any direct actions on the product.
- Ensure that unauthorized persons have no access to the product.
- Disconnect the battery from the product via an external disconnection device.
- Disconnect the AC circuit breaker, or keep it disconnected in case it has already tripped, and secure it against reconnection.
- Only perform work on the product (e.g., troubleshooting, repair work) when wearing personal protective equipment for handling of hazardous substances (e.g., safety gloves, eye and face protection, respiratory protection).

⚠ WARNING**Danger to life due to fire or explosion when batteries are fully discharged**

A fire may occur due to incorrect charging of fully discharged batteries. This can result in death or serious injury.

- Before commissioning the system, verify that the battery is not fully discharged.
- Do not commission the system if the battery is fully discharged.
- If the battery is fully discharged, contact the battery manufacturer for further proceedings.
- Only charge fully discharged batteries as instructed by the battery manufacturer.

⚠ WARNING**Danger to life due to burns caused by electric arcs through short-circuit currents**

Short-circuit currents in the battery can cause heat build-up and electric arcs. Heat build-up and electric arcs may result in lethal injuries due to burns.

- Disconnect the battery from all voltage sources prior to performing any work on the battery.
- Observe all safety information of the battery manufacturer.

⚠ 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 600 V or higher.

⚠ WARNING**Risk of injury due to toxic substances, gases and dusts.**

In rare cases, damages to electronic components can result in the formation of toxic substances, gases or dusts inside the product. Touching toxic substances and inhaling toxic gases and dusts can cause skin irritation, burns or poisoning, trouble breathing and nausea.

- Only perform work on the product (e.g., troubleshooting, repair work) when wearing personal protective equipment for handling of hazardous substances (e.g., safety gloves, eye and face protection, respiratory protection).
- Ensure that unauthorized persons have no access to the product.

NOTICE**Damage to the product due to sand, dust and moisture ingress**

Sand, dust and moisture penetration can damage the product and impair its functionality.

- Only open the product if the humidity is within the thresholds and the environment is free of sand and dust.
- Do not open the product during a dust storm or precipitation.

NOTICE**Damage to the enclosure seal in subfreezing conditions**

If you open the product or disconnect the Power Unit and Connection Unit when temperatures are below freezing, the enclosure seals can be damaged. Moisture can penetrate the product and damage it.

- Only open the product if the ambient temperature is not below 0°C.
- If a layer of ice has formed on the enclosure seal when temperatures are below freezing, remove it prior to opening the product (e.g. by melting the ice with warm air).
- Do not disassemble the Power Unit and Connection Unit unless the ambient temperature is at least 0°C and conditions are frost-free.
- Do not disassemble the Power Unit unless the ambient temperature is at least 0°C and conditions are frost-free.

3 Background Information

Sometimes, during commissioning of the Sunny Boy Storage, the CAN interface of the Sunny Boy Storage fails to detect the connected batteries or the backup box (depending on the system configuration).

Possible causes:

- The termination of the communication cable between the battery and inverter is faulty.
- The cabling between battery and inverter is not correct.
- The communication cable used to connect the CAN interfaces on the battery interface module in the inverter with the battery is not suitable (see requirements in the manual of the inverter).
- The inverter has not been grounded correctly.
- The software version of the inverter is not up to date.
- There is a defect in the inverter.

The functional test described here was developed to exclude a defect of the CAN interface on the battery interface (BIM) of the Sunny Boy Storage.

The function test does not require a connection between the inverter and the battery.

i **The only purpose of the function test is to exclude a device defect at the Sunny Boy Storage with reasonable certainty. It does not constitute a full check of the CAN bus.**

4 CAN bus functional test

4.1 Assembling the test cable

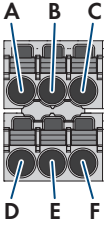
SMA recommends creating a test cable from new components, as described below.

For one-time use, the plugs already present at the inverter and the existing communication cable can be used.

Required materials

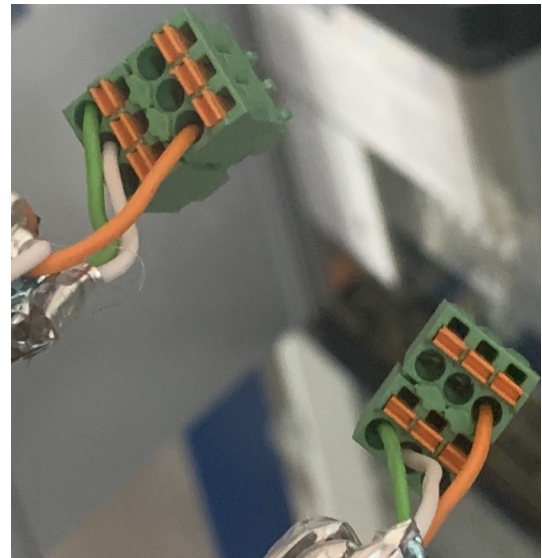
- One battery communication cable for the communication between inverter and battery
The CAN communication cable has to fulfill the requirements described in the operating manual of the inverter.
- Two 6-pole terminal blocks

Assignment of the terminal block

Terminal block	Position	Assignment
	A	Not assigned
	B	Not assigned
	C	GND
	D	CAN L
	E	CAN H
	F	Not assigned

Procedure:

- On both terminal blocks, wire position **CAN L** (green), **Can H** (white) and **GND** (orange). CAN L and CAN H have to consist of a wire pair (see the inverter manual).



4.2 Performing the functional test

i Prior to performing any work on the inverter, always disconnect the inverter from voltage sources as described in the inverter manual. Always adhere to the prescribed sequence.

Procedure:

1. Disconnect and isolate the inverter from the AC and DC power (see inverter manual).
2. Remove the black cover of the inverter.
3. Remove all terminal blocks from inputs **BAT1**, **BAT2**, **BAT3** and **BAT4**.

4. Check battery interfaces BAT1 and BAT2:

- Connect inputs **BAT1** and **BAT2** on the battery interface module with the pre-assembled test cable.



- Close the cover of the inverter.
- Switch on the AC fuse.
- Log in to the interface of the inverter as **Installer**.
- Check the firmware version and update if necessary. The product must have at least firmware version 3.11.49.R.

You can find information on the firmware version at the bottom left in the status bar of the user interface of the inverter. You can find the current firmware versions at <https://www.sma.de/service/downloads.html>. Please read the accompanying Readme files before updating.

- In the **Device parameters** menu, at **Edit parameters**, select the **Battery**. At **Operation > CAN test mode**, enter the value **12**.

▼ Operation

Can test mode (0 ... 255)

DC input configuration reset

Discard all

Unsaved changes (1)

Parameter name	Old value	New value
Battery - Operation - Can test mode	0	12

9220 Test mode battery interface module 12, success rate: 100

10100 Parameter "Can test mode" set successfully. 0 to 12

- Confirm the entry with **Save all**.

- To check the result, open the **Events** menu:

☑ If CAN interfaces **BAT1** and **BAT2** are fault free, the **Events** menu shows **success rate: 100**. Because the communication cable to the battery has been removed for the functional test, the list of events might show various error messages relating to battery communication, although the CAN interface is working perfectly.

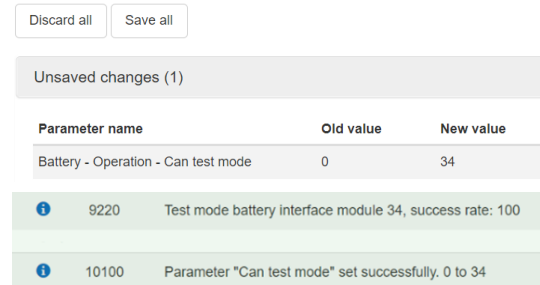
☑ The check for battery interfaces **BAT1** and **BAT2** is complete.

5. Disconnect the inverter from voltage sources (see inverter manual).

6. Remove the cover of the inverter and remove the test cable from battery interfaces **BAT1** and **BAT2**.

7. **Check battery interfaces BAT3 and BAT4:**

- Now use the test cable to connect **BAT3** and **BAT4** on the battery interface module.
- Close the cover of the inverter.
- Switch on the AC fuse.
- Log in to the interface of the inverter as **Installer**.
- In the **Device parameters** menu, at **Edit parameters**, select **Battery**. Under **Operation > Can test mode**, enter **34** as value and confirm with **Save all**.

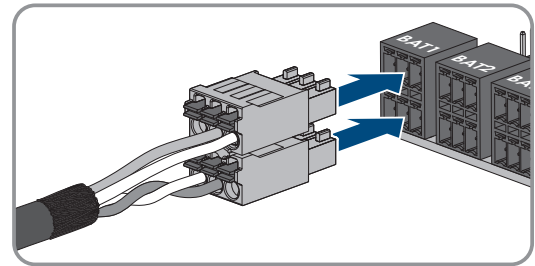



- If the CAN interfaces **BAT3** and **BAT4** are fault free, the **Events** menu shows **success rate: 100**.

Because the communication cable to the battery has been removed for the functional test, the list of events might show various error messages relating to battery communication, although the CAN interface is working perfectly.

- The CAN interface check is complete. No further settings are required.

8. Disconnect the inverter from the voltage sources again (see inverter manual).
9. Remove the cover of the inverter and remove the test cable from battery interfaces **BAT3** and **BAT4**.
10. Insert the terminal blocks with the communication cable to the battery or backup box into the respective **BATx** input again.



11. Use the AC circuit breaker to switch on the inverter.
 12. Switch on the battery or the load-break switch of the battery (see documentation of the battery manufacturer).
 13. Log in to the interface of the inverter as **Installer**.
 14. At the top right of the user interface, click on the  symbol.
 15. In the drop-down menu, select the option **Starting the Installation Assistant** and follow the instructions of the installation assistant.
- After the installation assistant has been completed successfully, the configured system is available again and is ready for operation.

If the communication error persists, the inverter can be excluded as cause. The origin of the communication error is in a different area of the installation.

Detecting a defective CAN input

- If, when CAN interfaces **BAT1/BAT2** or **BAT3/BAT4** are being tested and the value mentioned above has been entered and confirmed, the **Events** menu shows **"success rate: 0"** instead of 100, one of the CAN inputs are defective.

In the event of a defective CAN input, a service request has to be submitted and the battery interface module has to be replaced.

5 Contact



<https://go.sma.de/service>

