Technical Information



SUNNY BOY SMART ENERGY

Approved batteries and information on connecting batteries

1 Validity

This document is valid for:

- SBSE3.6-50 (Sunny Boy Smart Energy 3.6)
- SBSE4.0-50 (Sunny Boy Smart Energy 4.0)
- SBSE5.0-50 (Sunny Boy Smart Energy 5.0)
- SBSE6.0-50 (Sunny Boy Smart Energy 6.0)
- SBSE8.0-50 (Sunny Boy Smart Energy 8.0) / **Grid approval only available for Italy and Spain**
- SBSE9.9-50 (Sunny Boy Smart Energy 9.9) / **Grid approval only available for Italy and Spain**

2 Approved Batteries

You will find the batteries approved by SMA Solar Technology AG in the SMA Home Energy Solution with the Sunny Boy Smart Energy in the following table.

Firmware version of the battery

The firmware version of the SMA Home Storage and the SMA Storage M can be accessed and updated via the inverter user interface.
The firmware version of third-party batteries can be updated via the respective battery's user interface (see the manufacturer's manual).

Inverter firmware version

The firmware version of the inverter can be accessed via the user interface of the inverter.

Battery name (type) Manufacturer	Battery firmware version	Inverter firmware version
SMA Home Storage (3.2-16.4) SMA Solar Technology AG	BMS: ≥ 1.01.59.R	≥ 3.08.03.R
SMA Storage M (12.3-28.7) SMA Solar Technology AG	BMS: ≥ 1.01.01.R	≥ 3.17.xx.R
Battery-Box Premium HVM (8.3-22.1) BYD Company Limited	BMU: ≥ 3.23 BMS: ≥ 3.28	≥ 3.08.03.R
Battery-Box Premium HVS (5.1-10.2) BYD Company Limited	BMU: ≥ 3.23 BMS: ≥ 3.28	≥ 3.08.03.R
Pylontech Force H3 Pylon Technologies Co., Ltd.	BMS: ≥ 1.6	≥ 3.12.15.R

Parallel operation is not possible

The batteries listed are **not** approved for the **parallel operation** of multiple battery units in combination with the Sunny Boy Smart Energy.

3 Usable power

3.1 General information on usable power

Synchronizing the battery and hybrid inverter

All batteries listed supply a defined nominal current. Please follow the battery manufacturer's recommendations regarding appropriate battery dimensioning in order to achieve the nominal and overload currents of the systems with a Sunny Boy Smart Energy, as specified in the datasheet. Only if the dimensioning of the battery size is synchronized (battery capacity, battery currents, number of battery modules if necessary), the full functionality and power incl. overload can be guaranteed for the PV battery system with the respective hybrid inverter in use.

3.2 Usable Power with SMA Home Storage

	SMA Home Storage 3.2	SMA Home Storage 6.5	SMA Home Storage 9.8	SMA Home Storage 13.1	SMA Home Storage 16.4
Voltage range of battery	90 V to 108 V	180 V to 216 V	270 V to 324 V	360 V to 432 V	450 V to 540 V
Maximum current			30 A		
Maximum charge / discharge capacity SBSE3.6-50	3.24 kW / 3.1 kW	6.48 kW / 3.79 kW	9.72 kW / 3.79 kW	10 kW / 3.79 kW	10 kW / 3.79 kW
Maximum charge / discharge capacity SBSE4.0-50	3.24 kW / 3.1 kW	6.48 kW / 4.21 kW	9.72 kW / 4.21 kW	10 kW / 4.21 kW	10 kW / 4.21 kW
Maximum charge / discharge capacity SBSE5.0-50	3.24 kW / 3.1 kW	6.48 kW / 5.26 kW	9.72 kW / 5.26 kW	10 kW / 5.26 kW	10 kW / 5.26 kW
Maximum charge / discharge capacity SBSE6.0-50	3.24 kW / 3.1 kW	6.48 kW / 6.21 kW	9.72 kW / 6.32 kW	10 kW / 6.32 kW	10 kW / 6.32 kW
Maximum charge / discharge capacity SBSE8.0-50	3.24 kW / 3.1 kW	6.48 kW / 6.21 kW	9.72 kW / 8.42 kW	10 kW / 8.42 kW	10 kW / 8.42 kW
Maximum charge / discharge capacity SBSE9.9-50	3.24 kW / 3.1 kW	6.48 kW / 6.21 kW	9.72 kW / 9.32 kW	10 kW / 10.42 kW	10 kW / 10.42 kW

3.3 Usable power with SMA Storage M

	SMA Storage M 12.3	SMA Storage M 16.4	SMA Storage M 20.5	SMA Storage M 24.6	SMA Storage M 28.7
Voltage range of battery	151 V to 191 V	201 V to 255 V	252 V to 319 V	302 V to 383 V	352 V to 447 V
Maximum current			30 A		
Maximum charge / discharge capacity SBSE3.6-50	5.75 kW / 3.79 kW	7.67 kW / 3.79 kW	9.59 kW / 3.79 kW	10 kW / 3.79 kW	10 kW / 3.79 kW
Maximum charge / discharge capacity SBSE4.0-50	5.75 kW / 4.21 kW	7.67 kW / 4.21 kW	9.59 kW / 4.21 kW	10 kW / 4.21 kW	10 kW / 4.21 kW
Maximum charge / discharge capacity SBSE5.0-50	5.75 kW / 5.26 kW	7.67 kW / 5.26 kW	9.59 kW / 5.26 kW	10 kW / 5.26 kW	10 kW / 5.26 kW
Maximum charge / discharge capacity SBSE6.0-50	5.75 kW / 5.75 kW	7.67 kW / 6.32 kW	9.59 kW / 6.32 kW	10 kW / 6.32 kW	10 kW / 6.32 kW
Maximum charge / discharge capacity SBSE8.0-50	5.75 kW / 5.75 kW	7.67 kW / 7.69 kW	9.59 kW / 8.42 kW	11.5 kW / 8.42 kW	12 kW / 8.42 kW
Maximum charge / discharge capacity SBSE9.9-50	5.75 kW / 5.75 kW	7.67 kW / 7.69 kW	9.59 kW / 9.59 kW	11.5 kW / 10.42 kW	12 kW / 10.42 kW

3.4 Usable Power with the Battery-Box Premium HVM

	HVM 8.3	HVM 11.0	HVM 13.8	HVM 16.6	HVM 19.3	HVM 22.1
Voltage range of battery	120 V to 177 V	160 V to 236 V	200 V to 295 V	240 V to 354 V	280 V to 413 V	320 V to 472 V
Maximum current				30 A		
Maximum charge / discharge capacity SBSE3.6-50	5.31 kW / 3.79 kW	7.08 kW / 3.79 kW	8.85 kW / 3.79 kW	10 kW / 3.79 kW	10 kW / 3.79 kW	10 kW / 3.79 kW

	HVM 8.3	HVM 11.0	HVM 13.8	HVM 16.6	HVM 19.3	HVM 22.1
Maximum charge / discharge capacity SBSE4.0-50	5.31 kW / 4.21 kW	7.08 kW / 4.21 kW	8.85 kW / 4.21 kW	10 kW / 4.21 kW	10 kW / 4.21 kW	10 kW / 4.21 kW
Maximum charge / discharge capacity SBSE5.0-50	5.31 kW / 5.26 kW	7.08 kW / 5.26 kW	8.85 kW / 5.26 kW	10 kW / 5.26 kW	10 kW / 5.26 kW	10 kW / 5.26 kW
Maximum charge / discharge capacity SBSE6.0-50	5.31 kW / 5.31 kW	7.08 kW / 6.32 kW	8.85 kW / 6.32 kW	10 kW / 6.32 kW	10 kW / 6.32 kW	10 kW / 6.32 kW
Maximum charge / discharge capacity SBSE8.0-50	5.31 kW / 5.31 kW	7.08 kW / 7.08 kW	8.85 kW / 8.42 kW	10 kW / 8.42 kW	12 kW / 8.42 kW	12 kW / 8.42 kW
Maximum charge / discharge capacity SBSE9.9-50	5.31 kW / 5.31 kW	7.08 kW / 7.08 kW	8.85 kW / 8.85 kW	10 kW / 10.42 kW	12 kW / 10.42 kW	12 kW / 10.42 kW

3.5 Usable Power with the Battery-Box Premium HVS

	HVS 5.1	HVS 7.7	HVS 10.2
Voltage range of battery	160 V to 240 V	240 V to 360 V	320 V to 480 V
Maximum current		25 A	
Maximum charge / discharge capacity SBSE3.6-50	6 kW / 3.79 kW	9 kW / 3.79 kW	10 kW / 3.79 kW
Maximum charge / discharge capacity SBSE4.0-50	6 kW / 4.21 kW	9 kW / 4.21 kW	10 kW / 4.21 kW
Maximum charge / discharge capacity SBSE5.0-50	6 kW / 5.26 kW	9 kW / 5.26 kW	10 kW / 5.26 kW
Maximum charge / discharge capacity SBSE6.0-50	6 kW / 6 kW	9 kW / 6.32 kW	10 kW / 6.32 kW

	HVS 5.1	HVS 7.7	HVS 10.2
Maximum charge / discharge capacity SBSE8.0-50	6 kW / 6 kW	9 kW / 8.42 kW	10 kW / 8.42 kW
Maximum charge / discharge capacity SBSE9.9-50	6 kW / 6 kW	9 kW / 9 kW	10 kW / 10 kW

3.6 Usable Power with the Pylontech Force H3

Modules	2	3	4
Voltage range of battery	185 V to 230 V	278 V to 345 V	371 V to 480 V
Maximum current		30 A	
Maximum charge / discharge capacity SBSE3.6-50	6.9 kW / 3.79 kW	10 kW / 3.79 kW	10 kW / 3.79 kW
Maximum charge / discharge capacity SBSE4.0-50	6.9 kW / 4.21 kW	10 kW / 4.21 kW	10 kW / 4.21 kW
Maximum charge / discharge capacity SBSE5.0-50	6.9 kW / 5.26 kW	10 kW / 5.26 kW	10 kW / 5.26 kW
Maximum charge / discharge capacity SBSE6.0-50	6.9 kW / 6.32 kW	10 kW / 6.32 kW	10 kW / 6.32 kW
Maximum charge / discharge capacity SBSE8.0-50	6.9 kW / 6.9 kW	10 kW / 8.42 kW	10 kW / 8.42 kW
Maximum charge / discharge capacity SBSE9.9-50	6.9 kW / 6.9 kW	10 kW / 10.35 kW	10 kW / 10.42 kW

4 Battery Communication Connection

4.1 Cable Requirements

4.1.1 Battery Communication Cable Requirements

The cable length and quality affect the quality of the signal. Observe the following cable requirements:

- ☐ Cable type: Ethernet patch cable or data cable
- ☐ Ethernet standard: 100BaseTx
- ☐ Cable category: At least CAT5e
- ☐ Connector type: RJ45 of category CAT5e or higher
- ☐ Maximum cable length within the inverter: 260 millimeters
- ☐ Shielding: At least S/FTP
- ☐ Number of wire pairs and wire cross-section (data cable): At least = 2 x 2 x 0.34 mm² (AWG24)
- ☐ Maximum cable length between inverter and battery when using patch cable and installation cable: 10 m
- ☐ UV-resistant for installation in outdoor areas.

4.1.2 Requirements for the Battery Power Cables

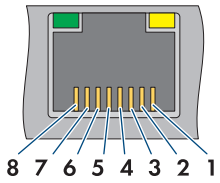
- ☐ Conductor type: copper wire
- ☐ Maximum cable length within the inverter: 180 mm
- ☐ Conductor cross-section: 6 mm² to 8 mm²
- ☐ Insulation stripping length: 12 mm
- ☐ Cables can be used with or without bootlace ferrules
- ☐ Maximum permissible cable length between the inverter and the battery: 10 m
- ☐ The cables must be rated for a minimum voltage of 600 V.

i Observe manufacturer's specifications for battery power cables

When crimping battery power cables, the appropriate tool, correct cable cross-section, proper insulation stripping length, and a firm but non-damaging crimp are essential for a safe and conductive connection. Make sure not to damage the stranded wires and to insert and tighten all components correctly, especially the strain relief, to ensure a durable, moisture-proof, and abrasion-resistant connection.

4.2 Cabling plan with SMA Home Storage

4.2.1 Pin assignment of RJ45 plug connector for battery communication via CAN bus

RJ45 connector	Pin	Signal
	1	-
	2	-
	3	RS485 D+
	4	CAN_H
	5	CAN_L
	6	RS485 D-
	7	-
	8	-

4.2.2 Cabling plan with SMA Home Storage

To connect the inverter to the SMA Home Storage, you must use an RJ45 adapter for the plug connection. The adapter is included in the scope of delivery of the battery. Make sure that the RJ45 termination plug is plugged in on the bottom battery communication cable of the last battery module.

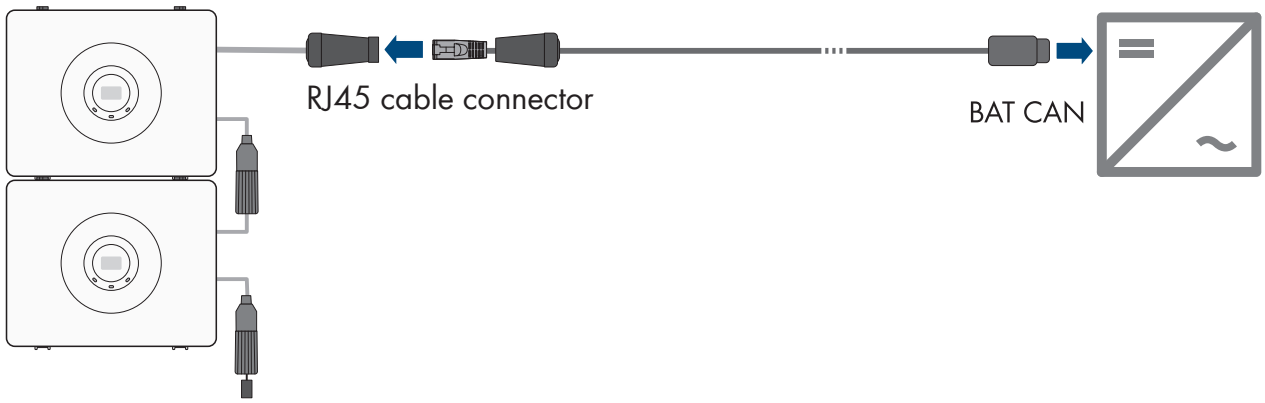


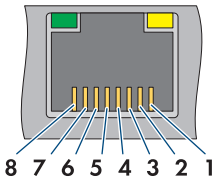
Figure 1: Cabling plan of Sunny Boy Smart Energy with SMA Home Storage

Also see:

- Battery Communication Cable Requirements ⇒ page 8

4.3 Cabling Plan with SMA Storage M

4.3.1 Pin assignment of RJ45 plug connector for battery communication via CAN bus

RJ45 connector	Pin	Signal
	1	-
	2	EN_GND
	3	-
	4	CAN_H
	5	CAN_L
	6	-
	7	Enable
	8	-

4.3.2 Cabling Plan with SMA Storage M

To connect the inverter to the SMA Storage M, you must use an RJ45 adapter for the plug connection. The adapter is included in the scope of delivery of the battery.

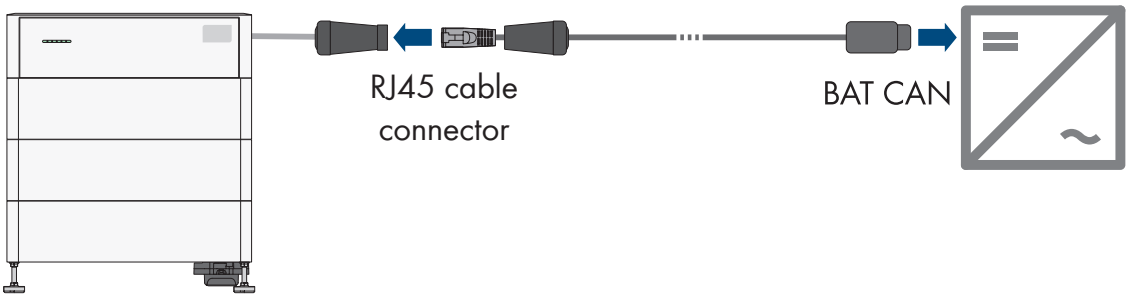


Figure 2: Cabling plan with Sunny Boy Smart Energy and SMA Storage M

4.4 Cabling Plan with Battery-Box Premium HVS/HVM and BCU 1.0

The bridge at the GSI terminal must be inserted during operation.

Upon delivery of the Sunny Boy Smart Energy, there is a jumper wire on the **GSI** terminal block. This jumper wire must be removed when a switch for the fast stop is connected. Once the jumper wire has been removed and no switch is connected, operation with a battery is no longer possible.

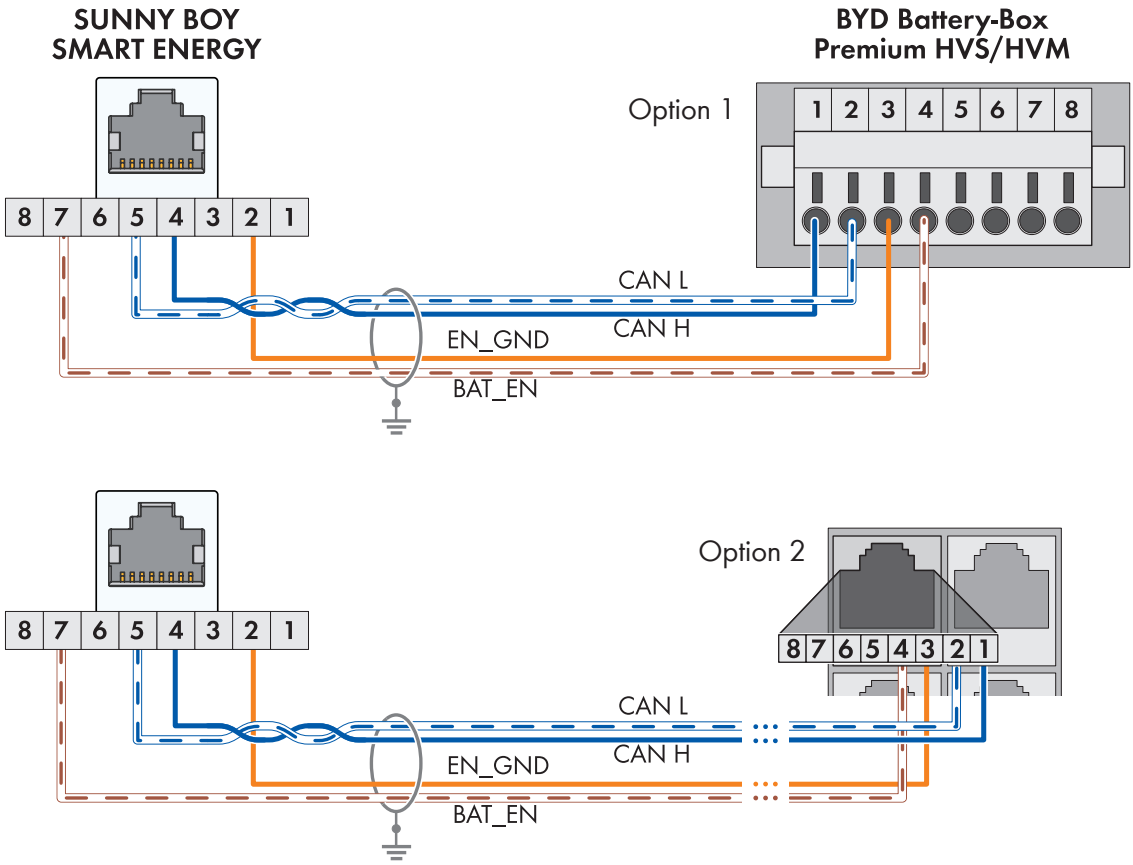


Figure 3: Cabling plan Sunny Boy Smart Energy with Battery-Box Premium HVS/HVM and BCU 1.0

Pin at the RJ45 connector on the inverter	Signal	Terminal point or RJ45 connector on the battery
1	-	-
2	EN_GND	3
3	-	-
4	CAN_H	1
5	CAN_L	2
6	-	-
7	BAT_EN	4
8	-	-

4.5 Cabling Plan with Battery-Box Premium HVS/HVM and BCU 2.0

The bridge at the GSI terminal must be inserted during operation.

Upon delivery of the Sunny Boy Smart Energy, there is a jumper wire on the **GSI** terminal block. This jumper wire must be removed when a switch for the fast stop is connected. Once the jumper wire has been removed and no switch is connected, operation with a battery is no longer possible.

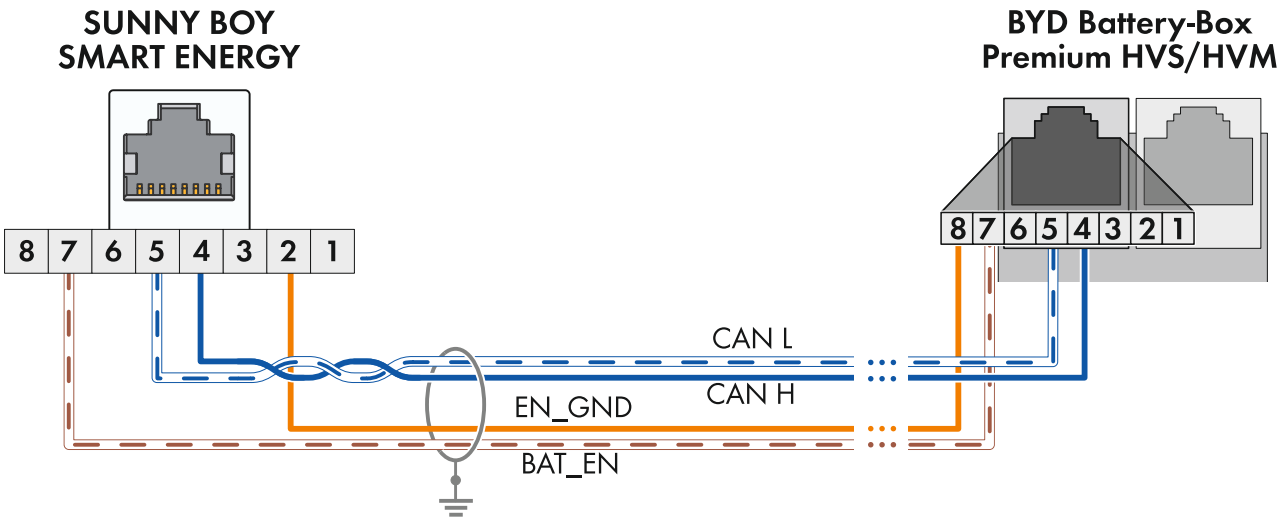


Figure 4: Cabling plan Sunny Boy Smart Energy with Battery-Box Premium HVS/HVM and BCU 2.0

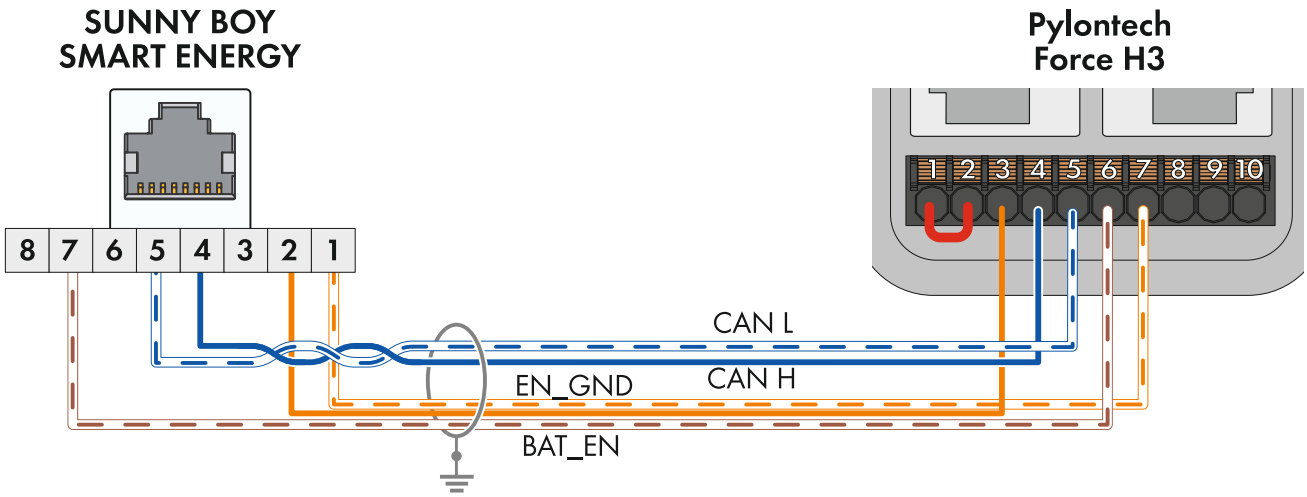
Pin at the RJ45 connector on the inverter	Signal	RJ45 connector on the battery
1	-	-
2	EN_GND	8
3	-	-
4	CAN_H	4
5	CAN_L	5
6	-	-
7	BAT_EN	7
8	-	-

4.6 Cabling plan with Pylontech Force H3

The bridge at the GSI terminal must be inserted during operation.

Upon delivery of the Sunny Boy Smart Energy, there is a jumper wire on the **GSI** terminal block. This jumper wire must be removed when a switch for the fast stop is connected. Once the jumper wire has been removed and no switch is connected, operation with a battery is no longer possible.

Pins 1 and 2 at the battery terminal point must be bridged.



Pin at the RJ45 connector on the inverter	Signal	Terminal point at battery
1	EN_GND	7
2	EN_GND	3
3	-	-
4	CAN_H	4
5	CAN_L	5
6	-	-
7	BAT_EN	6
8	-	-

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