Technical Information

SUNNY BOY STORAGE

Approved Batteries and Information on Battery Communication Connection

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1 Approved Batteries

1.1 SBS2.5-1VL-10 / SBS3.7-10 / SBS5.0-10 / SBS6.0-10

In the tables you will find the batteries which are approved for operation with the following battery inverters of SMA Solar Technology AG (status: 2021/11):

- SBS2.5-1VL-10 (Sunny Boy Storage 2.5)
- SBS3.7-10 (Sunny Boy Storage 3.7)
- SBS5.0-10 (Sunny Boy Storage 5.0)
- SBS6.0-10 (Sunny Boy Storage 6.0)

Firmware version of the battery

The firmware version of the battery can be accessed via the user interface of the inverter. The firmware version of the BYD batteries can also be accessed via the user interface of the battery (see manufacturer's manual). With the exception of the BYD Battery-Box (H, Premium HVS and HVM), LG RESU10H Prime and LG RESU16H Prime, the battery firmware is automatically updated via the inverter.

Inverter firmware version

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

Battery type (Manufacturer)	Modules	Firmware version of battery:		Firmware version of inverter:	
		SBS2.5-1VL-10	SBS3.7-10, SBS5.0-10, SBS6.0-10	SBS2.5-1VL-10	SBS3.7-10, SBS5.0-10, SBS6.0-10
AXIstorage Li SH 7.5-15* Item no.: 42257 and 611274, both with Helios 1.5 module	3-6	Not released	≥ 0.03.07.R	Not released	≥ 3.11.10.R
AXIstorage Li SH 7.5.-15* Item no.: 616344 with Helios VE module (AXITEC)	3-6	Not released	≥ 0.03.15.R	Not released	≥ 3.12.26.R
Hyperion 7.5-15* Item no.: 41871 with Helios 1.5 module (BMZ GmbH)	3-6	Not released	≥ 0.03.07.R	Not released	≥ 3.11.10.R
Hyperion 7.5-15* Item no.: 615424 with Helios VE module (BMZ GmbH)	3-6	Not released	≥ 0.03.15.R	Not released	≥ 3.12.26.R

Battery type (Manufacturer)	Modules	Firmware version of battery:		Firmware version of inverter:	
		SBS2.5-1VL-10	SBS3.7-10, SBS5.0-10, SBS6.0-10	SBS2.5-1VL-10	SBS3.7-10, SBS5.0-10, SBS6.0-10
Battery-Box H 5.1-10.2 (BYD Company Limited)	4-8	3.00.04.R to 3.00.15.R	3.00.04.R to 3.00.15.R	≥ 2.04.23.R	≥ 1.00.20.R
Battery-Box Premium HVS 5.1-10.2** (BYD Company Limited)	2-4	BMU ≥ 3.13 BMS ≥ 3.19	BMU ≥ 3.13 BMS ≥ 3.19	≥ 3.11.06.R	≥ 3.11.10.R
Battery-Box Premium HVM 8.3-22.1 (BYD Company Limited)	3-8	Not released	BMU ≥ 3.13 BMS ≥ 3.19	Not released	≥ 3.11.03.R
era:powerbase 7.5-15* Item no.: 42256 and 611273, both with Helios 1.5 module (IBC SOLAR AG)	3-6	Not released	≥ 0.03.07.R	Not released	≥ 3.11.10.R
era:powerbase 7.5-15* Item no.: 615423 with Helios VE module (IBC SOLAR AG)	3-6	Not released	≥ 0.03.15.R	Not released	≥ 3.12.26.R
RESU7H / EH111063P3S3 Type C (LG Energy Solution)	Not modular	≥ 15.02.4.R	≥ 16.02.6 R	≥ 2.04.23.R	≥ 1.00.20.R
RESU10H / 15563P3SDLT Type C (LG Energy Solution)	Not modular	≥ 13.13.0.R	≥ 16.13.6 R	≥ 2.04.14.R	≥ 1.00.20.R

Battery type (Manufacturer)	Modules	Firmware version of battery:		Firmware version of inverter:	
		SBS2.5-1VL-10	SBS3.7-10, SBS5.0-10, SBS6.0-10	SBS2.5-1VL-10	SBS3.7-10, SBS5.0-10, SBS6.0-10
RESU10M (LG Energy Solution)	Not modular	Not released	≥ 1.01.1 R (only approved for SBS3.7-10)	Not released	≥ 3.11.03.R
RESU10H Prime (LG Energy Solution)	Not modular	Not released	≥ 23.12.0 R	Not released	≥ 3.12.23.R
RESU16H Prime (LG Energy Solution)	Not modular	Not released	≥ 23.12.0 R	Not released	≥ 3.12.23.R

* The battery type is only compatible with the mentioned item number (item no.).

** When using the BYD Battery-Box Premium HVS with the Sunny Boy Storage 2.5, you must select the Sunny Boy Storage 2.5 inverter during configuration. Observe the information on the current Sunny Boy Storage 2.5 firmware package in the readme file in the download area at www.SMA-Solar.com.

Synchronizing the battery and battery inverter

All batteries mentioned supply a defined nominal current. Please pay attention to the battery manufacturer's recommendation regarding the suitable dimensioning of the battery in order to achieve the nominal and overload currents of the systems stated in the datasheet with a Sunny Boy Storage. 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 storage system with the respective battery inverter in use.

Recommendations for the use in various systems for SBS2.5-1VL-10:

Battery type (Module configuration)	Use in systems for/with		
	Increased self-consumption	Secure power supply operation	Battery-backup operation
Battery-Box H (5.1 - 10.2)	✓	✗	✗
Battery-Box Premium HVS (5.1-10.2)	✓	✗	✗
RESU7H type C	✓	✗	✗
RESU10H type C	✓	✗	✗

✓ = Yes, ✗ = No

Recommendations for the use in various systems for SBS3.7-10 / SBS5.0-10 / SBS6.0-10:

Battery type (Module configuration)	Use in systems for/with				
	Increased self-consumption	Secure power supply operation	Battery-backup operation	Multi-battery operation with batteries	
				of the same type	of the different type
AXIstorage Li SH (7.5-15)* Item no.: 42257, 611274 and 616344	✓	✓	✓	✗ in planning	✗
era:powerbase (7.5-15)* Item no.: 42256, 611273 and 615423	✓	✓	✓	✗ in planning	✗
Hyperion (7.5-15)* Item no.: 41871 and 615424	✓	✓	✓	✗ in planning	✗
Battery-Box H (5.1 - 10.2)	✓	✓	✓	✓	✓ RESU7H und 10H, HVS, HVM
Battery-Box Premium HVS (5.1-10.2)	✓	✓	✓	✓	✓ HVM, Battery-Box H
Battery-Box Premium HVM (8.3-22.1)	✓	✓	✓	✓	✓ HVS, Battery-Box H
RESU7H Type C	✓	✓	✓**	✓	✓ RESU10H, Battery-Box H
RESU10H Type C	✓	✓	✓**	✓	✓ RESU7H, Battery-Box H
RESU10M	✓	✓	✓	✓	✗
RESU 10H Prime	✓	✓	✓	✗ in planning	✗

Battery type (Module configuration)	Use in systems for/with				
	Increased self-consumption	Secure power supply operation	Battery-backup operation	Multi-battery operation with batteries	
				of the same type	of the different type
RESU 16H Prime	✓	✓	✓	✗ in planning	✗

* The battery type is only compatible with the mentioned item number (item no.).

** Depending on the state of charge in terms of battery and PV generation, it can happen that the battery-backup grid is interrupted for a few seconds in battery-backup operation mode during load changes and then restarts again. To prevent this behavior, SMA Solar Technology AG recommends to set the parameters **Output power limitation of PV inverter**, **Permanently derated** and **Upper limit for the charging state for derating of the PV inverters** to **0**. If this setting is enabled, the battery can no longer be charged by the PV system during battery-backup operation.

✓ = Yes, ✗ = No

Battery-backup operation with RESU 10H/16H Prime

The RESU 10H/16H Prime can be used in battery-backup systems. Due to the integrated DC-to-DC controller in the battery, restrictions can occur with very large load jumps depending on the state of charge. In this case, the system restarts automatically after a short interruption of the battery-backup grid of 1 to 2 seconds.

Recommendations for use for SBS3.7-10 / SBS5.0-10 / SBS6.0-10:

Type	Module configuration		SBS3.7-10	SBS5.0-10	SBS6.0-10
	Capacity (kWh)	Modules			
Hyperion era:powerbase AXIstorage Li SH	7.5	3	✓	(✓)	(✓)
	10	4	✓	✓	✓
	12.5	5	✓	✓	✓
	15	6	✓	✓	✓
Battery-Box H	5.1	4	✓	(✓)	(✓)
	6.4	5	✓	✓	(✓)
	7.7	6	✓	✓	✓
	9.0	7	✓	✓	✓
	10.2	8	✓	✓	✓
Battery-Box Premium HVS	5.1	2	✓	(✓)	(✓)
	7.7	3	✓	✓	✓
	10.2	4	✓	✓	✓

Type	Module configuration		SBS3.7-10	SBS5.0-10	SBS6.0-10
	Capacity (kWh)	Modules			
Battery-Box Premium HVM	8.3	3	✓	(✓)	(✓)
	11.0	4	✓	✓	(✓)
	13.8	5	✓	✓	✓
	16.6	6	✓	✓	✓
	19.3	7	✓	✓	✓
	22.1	8	✓	✓	✓
RESU7H type C	Not modular		✓	✓	✓
RESU10H type C	Not modular		✓	✓	✓
RESU10M	Not modular		✓	✗	✗
RESU 10H Prime	Not modular		✓	✓	✓
RESU 16H Prime	Not modular		✓	✓	✓

✓ = Yes, (✓) = Limited approval, ✗ = No

Background information on the limited approval of some inverter/battery combinations
Example: In the worst-case scenario, the BYD Battery-Box Premium HVM 8.3 can only provide a maximum output power of 3700 W, depending on the SOC. For this application, the SBS3.7 is completely sufficient. Operation with the SBS5.0/6.0 is technically possible, but does not make economic sense due to oversizing.

1.2 SBS3.8-US-10 / SBS5.0-US-10 / SBS6.0-US-10

In the tables you will find the batteries which are approved for operation with the following battery inverters of SMA Solar Technology AG (status: 2021/11):

- SBS3.8-US-10 (Sunny Boy Storage 3.8-US)
- SBS5.0-US-10 (Sunny Boy Storage 5.0-US)
- SBS6.0-US-10 (Sunny Boy Storage 6.0-US)

Firmware version of the battery

The firmware version of the battery can be accessed via the user interface of the inverter. The firmware version of the BYD batteries can also be accessed via the user interface of the battery (see manufacturer's manual). With the exception of the BYD Battery-Box (H, Premium HVL) and LG RESU16H Prime, the battery firmware is automatically updated via the inverter.

Inverter firmware version

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

The batteries are UL 9540 certified.

These batteries are certified for the operation with the Sunny Boy Storage in SMA Energy Storage systems according to UL 9540. The batteries are listed in accordance with UL 9540.

Type (Manufacturer)	Firmware version of battery:	Firmware version of inverter:
Battery-Box H (5.0-10.0) (BYD Company Limited)	≥ 3.00.04R	≥ 1.00.20.R
Battery-Box Premium HVL (12.0-32.0) (BYD Company Limited)	≥ BMU 3.15.R ≥ BMS 3.22.R	≥ 3.12.23.R
RESU10H / R15563P3SDLT (LG Energy Solution)	≥ 16.13.6 R*	≥ 1.00.20.R
RESU16H Prime (LG Energy Solution)	≥ 23.12.0 R	≥ 3.12.23.R

* The firmware version of the battery can be updated via the user interface of the inverter.

Synchronizing the battery and battery inverter

All batteries mentioned supply a defined nominal current. Please pay attention to the battery manufacturer's recommendation regarding the suitable dimensioning of the battery in order to achieve the nominal and overload currents of the systems stated in the datasheet with a Sunny Boy Storage. 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 storage system with the respective battery inverter in use.

Recommendations for the use in various systems for SBS3.8-US-10 / SBS5.0-US-10 / SBS6.0-US-10:

i Battery-backup operation with RESU 16H Prime

The RESU 16H Prime can be used in battery-backup systems. Due to the integrated DC-to-DC controller in the battery, depending on the state of charge and the PV inverter used, restrictions may occur with very large load jumps (approx. 3 kW when used with the Sunny Boy-US). In this case, the system restarts automatically after a short interruption of the battery-backup grid of 1 to 2 seconds.

	Use in systems for/with				
Type (module configuration)	Increased self-consumption	Secure power supply operation	Battery-backup operation	Multi-battery operation with batteries	
				of the same type	of the different type
Battery-Box H (5.0) (BYD Company Limited)	✓	✓	✓	✓	✓ RESU10H
Battery-Box H (7.5) (BYD Company Limited)	✓	✓	✓	✓	✓ RESU10H

Type (module configuration)	Use in systems for/with				
	Increased self-consumption	Secure power supply operation	Battery-backup operation	Multi-battery operation with batteries	
				of the same type	of the different type
Battery-Box H (10.0) (BYD Company Limited)	✓	✓	✓	✓	✓ RESU10H
Battery-Box Premium HVL (12.0-32.0)* (BYD Company Limited)	✓	✓	✓	✓	✓ Battery-Box HV
RESU10H type C (LG Energy Solution)	✓	✓	✓**	✓	✓ Battery-Box H
RESU16H Prime (LG Energy Solution)	✓	✓	✓	✗	✗

* The Battery-Box Premium HVL 12.0 is recommended only with the SBS3.8-US-10 or SBS5.0-US-10 due to limited charging and discharging power. When used with the SBS6.0-US-10, the inverter's nominal power of 6 kW is not reached.

** The use in battery-backup systems is only possible to a limited extent (see "Technical Statement - LG Energy Solution RESU10H when used in AC-Coupled Battery Backup Systems" at http://www.SMA-Solar.com)..

✓ = Yes, ✗ = No

2 Battery Communication Connection

2.1 Cable Requirements

2.1.1 SBS2.5-1VL-10

- Twisted pair conductors
- Cable category: minimum CAT5e
- Cable with shielding: Yes
- Conductor cross-section: 0.25 mm² to 0.34 mm² (24 AWG to 16 AWG)
- Recommended number of conductor pairs: 4
- Maximum cable length: 10 m (33 ft)
- The cable has to be insulated for 600 V.
- UV-resistant for outdoor use. SMA Solar Technology AG recommends the cable "UC900 SS23 Cat.7 PE"
- Comply with the requirements of the battery manufacturer.

2.1.2 SBS3.7-10 / SBS5.0-10 / SBS6.0-10

- Twisted pair conductors
- Cable category: minimum CAT5e
- Cable with shielding: Yes
- Conductor cross-section: 0.25 mm² to 0.34 mm² (24 AWG to 16 AWG)
- External diameter: 6 mm to 8.5 mm (0.24 in to 0.33 in)
- Recommended number of conductor pairs: 4
- Maximum cable length between battery and inverter and, in battery-backup systems, between automatic transfer switch and inverter: 10 m (33 ft)
- The cable has to be insulated for 600 V.
- UV-resistant for outdoor use.
- Comply with the requirements of the battery manufacturer.

2.1.3 SBS3.8-US-10 / SBS5.0-US-10 / SBS6.0-US-10

- Twisted pair conductors
- Cable category: minimum CAT5e
- Cable with shielding: Yes
- Conductor cross-section: 0.25 mm² to 0.34 mm² (24 AWG to 16 AWG)
- External diameter: 6 mm to 8.5 mm (0.24 in to 0.33 in)
- Recommended number of conductor pairs: 4
- Maximum cable length between battery and inverter and, in battery-backup systems, between automatic transfer switch and inverter: 10 m (33 ft)
- If the cables are routed together with the DC conductors in a conduit, each cable has to be insulated for 600 V.
- UV-resistant for outdoor use.
- Comply with the requirements of the battery manufacturer.

2.2 Cabling Plan

2.2.1 SBS2.5-1VL-10

Sunny Boy Storage with LG Energy Solution RESU7H / RESU10H

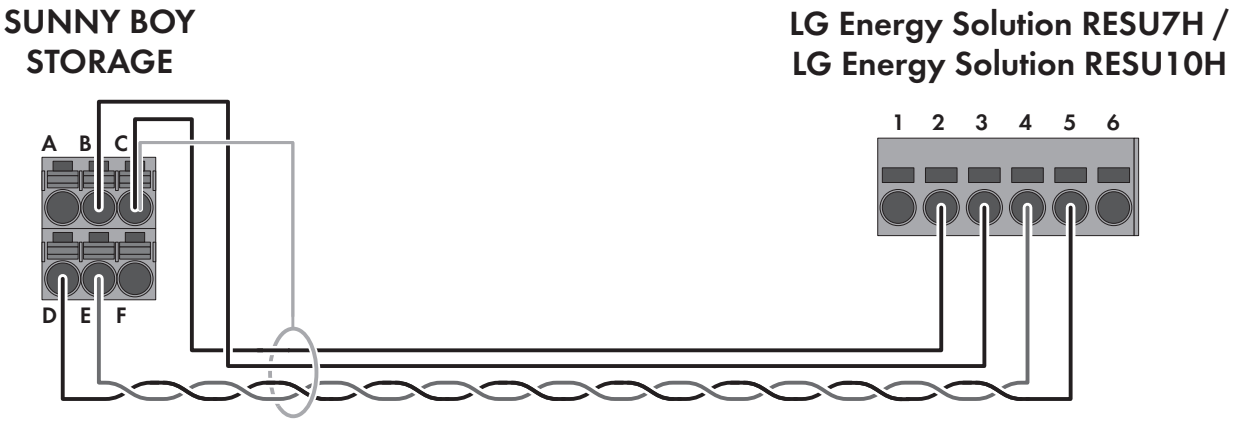


Figure 1: Cabling plan SBS2.5-1VL-10 with RESU7H / RESU10H

Clamping position	Assignment	Clamping position
A	Not used	–
B	Enable	3
C	GND and shielding	2
D	CAN L (twisted pair conductors, at least CAT5e)	5
E	CAN H (twisted pair conductors, at least CAT5e)	4
F	Not used	–

Sunny Boy Storage with BYD Battery-Box H

Figure 2: Cabling plan SBS2.5-1VL-10 with Battery-Box H

Clamping position	Assignment	Clamping position
A	Not used	–
B	Enable 11 V+	2
C	GND and shielding	4
D	CAN L (twisted pair conductors, at least CAT5e)	8
E	CAN H (twisted pair conductors, at least CAT5e)	6
F	Not used	–

Sunny Boy Storage with BYD Battery-Box Premium HVS

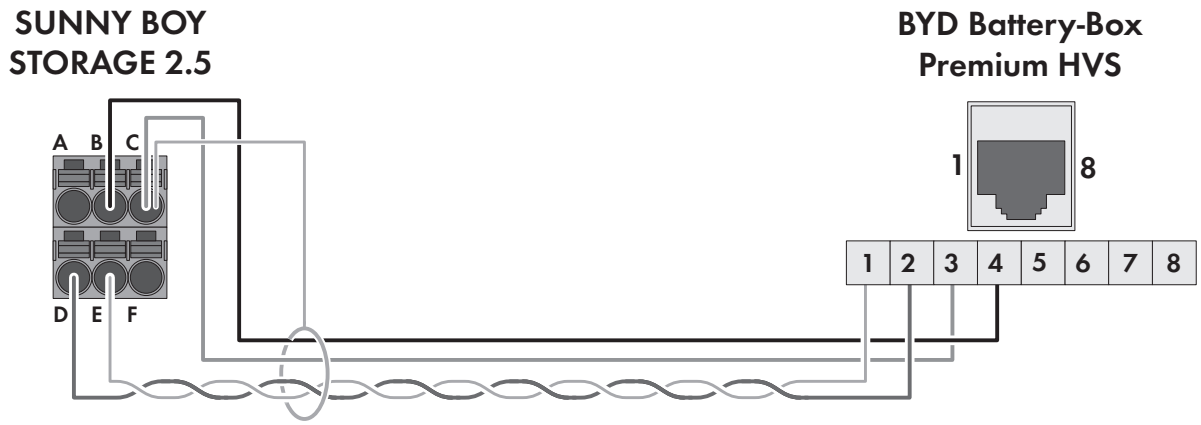


Figure 3: Cabling plan SBS2.5-1VL-10 with Battery-Box Premium HVS

Clamping position	Assignment	Pin
A	Not used	-
B	Enable	4

Clamping position	Assignment	Pin
C	GND and shielding	3
D	CAN L (twisted pair conductors, at least CAT5e)	2
E	CAN H (twisted pair conductors, at least CAT5e)	1
F	+12V supply for automatic transfer switching device	-

2.2.2 SBS3.7-10 / SBS5.0-10 / SBS6.0-10

Sunny Boy Storage with LG Energy Solution RESU7H / RESU10H

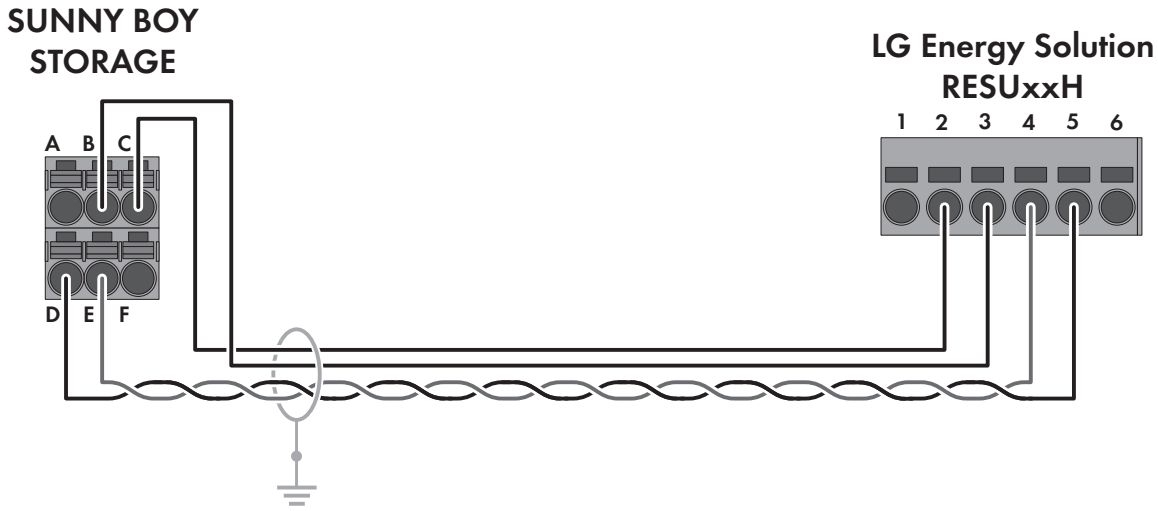


Figure 4: Cabling plan SBS3.7-10 / SBS5.0-10 / SBS6.0-10 with RESU7H / RESU10H

Clamping position	Assignment	Clamping position
A	Not used	–
B	Enable	3
C	GND	2
D	CAN L (twisted pair conductors, at least CAT5e)	5
E	CAN H (twisted pair conductors, at least CAT5e)	4
F	Not used	–

Sunny Boy Storage 3.7 with LG Energy Solution RESU10M

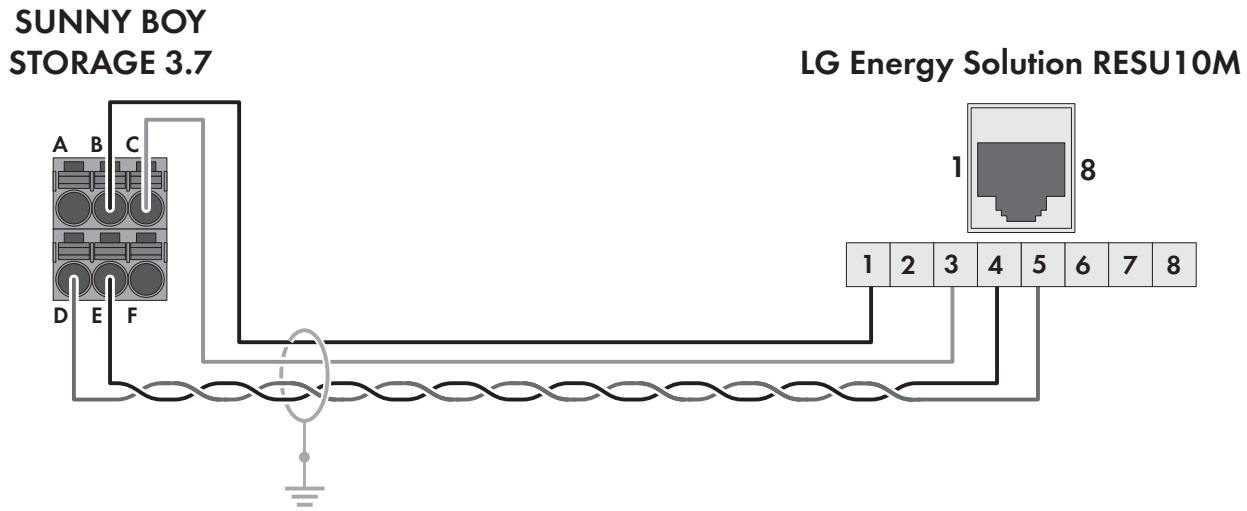


Figure 5: Cabling plan SBS3.7-10 with RESU10M

Clamping position	Assignment	Pin
A	Not used	–
B	Enable	1
C	GND	3
D	CAN L (twisted pair conductors, at least CAT5e)	5
E	CAN H (twisted pair conductors, at least CAT5e)	4
F	Not used	–

Sunny Boy Storage with LG Energy Solution RESU 10H Prime / RESU 16H Prime

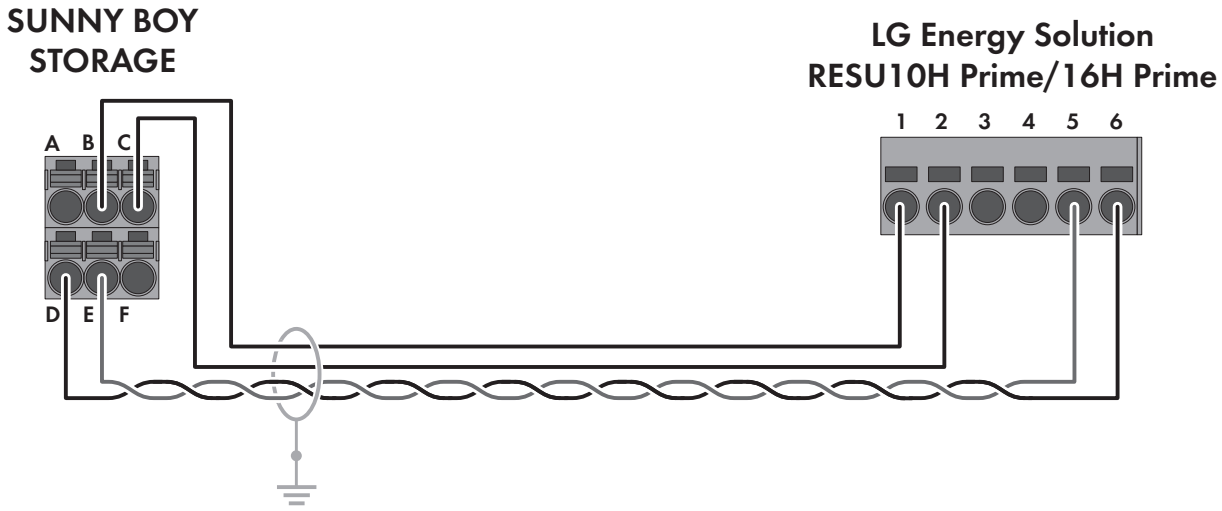


Figure 6: Cabling plan SBS3.7-10 / SBS5.0-10 / SBS6.0-10 with RESU 10H Prime / 16H Prime

Clamping position	Assignment	Clamping position
A	Not used	–
B	Enable	1

Clamping position	Assignment	Clamping position
C	GND	2
D	CAN L (twisted pair conductors, at least CAT5e)	6
E	CAN H (twisted pair conductors, at least CAT5e)	5
F	Not used	–

Sunny Boy Storage with BYD Battery-Box H

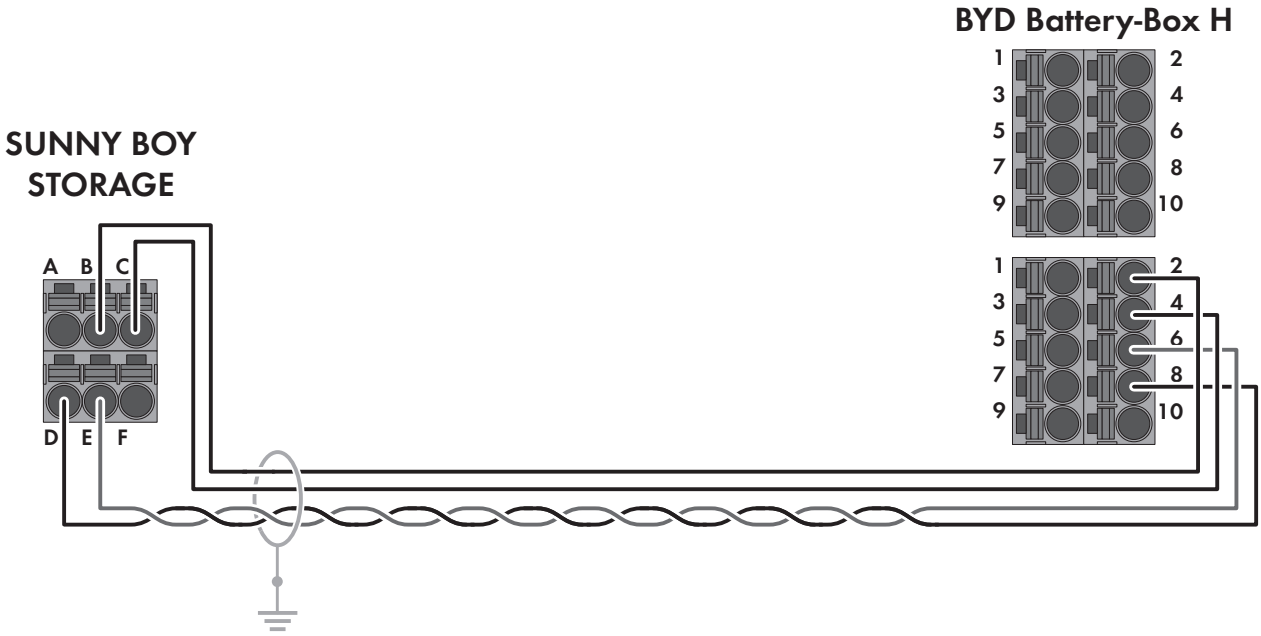


Figure 7: Cabling plan SBS3.7-10 / SBS5.0-10 / SBS6.0-10 with Battery-Box H

Clamping position	Assignment	Clamping position
A	Not used	–
B	Enable 11 V+	2
C	GND	4
D	CAN L (twisted pair conductors, at least CAT5e)	8
E	CAN H (twisted pair conductors, at least CAT5e)	6
F	+12V supply for automatic transfer switching device	–

Sunny Boy Storage 3.7 / 5.0 / 6.0 with BYD Battery-Box Premium HVS and HVM

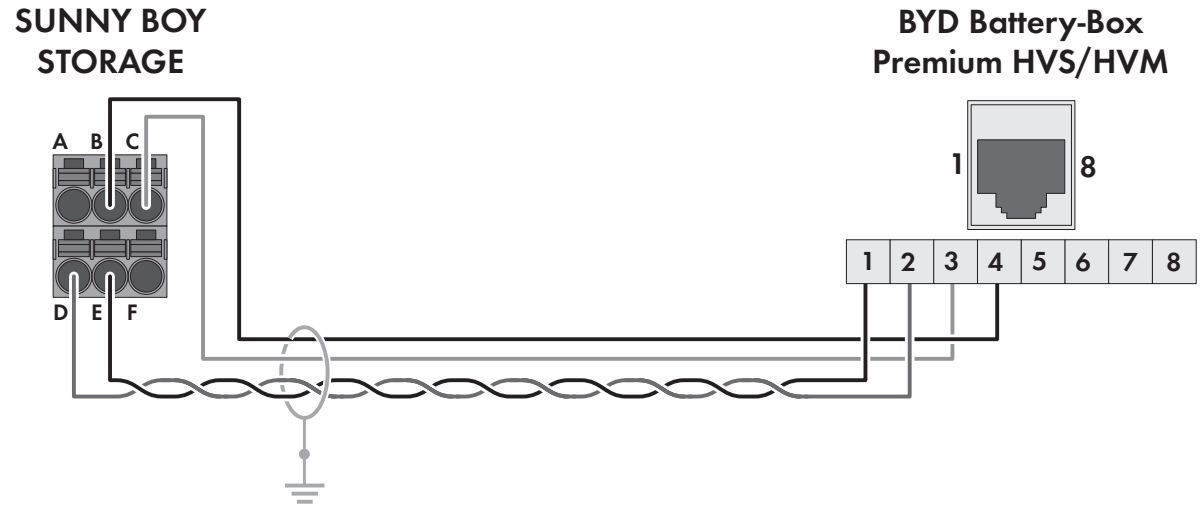


Figure 8: Cabling plan SBS3.7-10 / SBS5.0-10 / SBS6.0-10 with Battery-Box Premium HVS and HVM

Clamping position	Assignment	Pin
A	Not used	-
B	Enable	4
C	GND	3
D	CAN L (twisted pair conductors, at least CAT5e)	2
E	CAN H (twisted pair conductors, at least CAT5e)	1
F	Not used	-

Sunny Boy Storage 3.7 / 5.0 / 6.0 with BMZ Hyperion, IBC SOLAR era:powerbase and Axitec AXIstorage Li SH

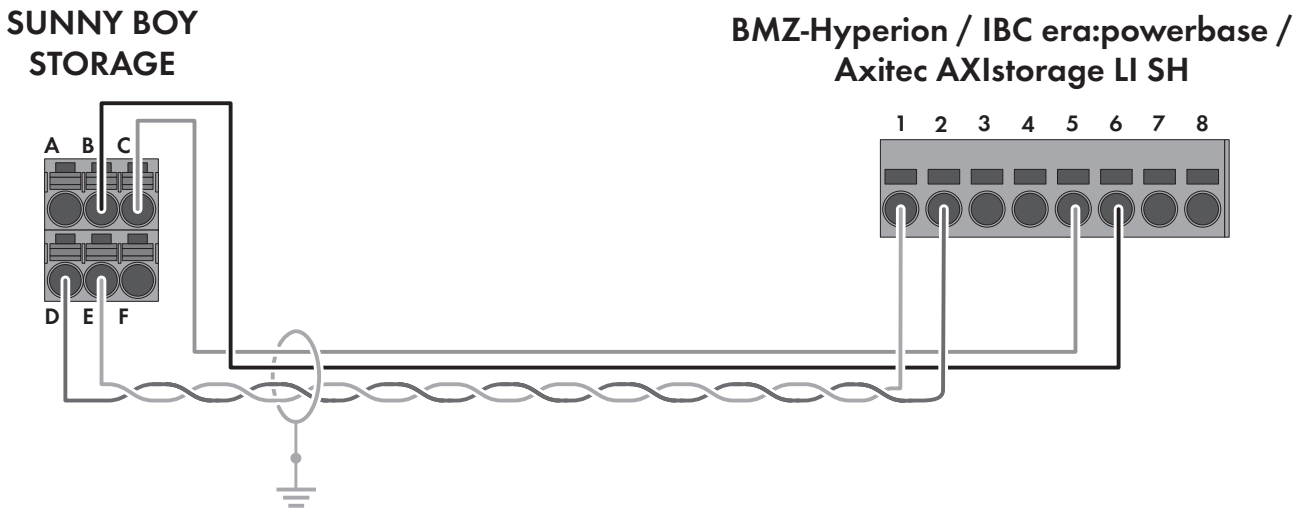


Figure 9: Cabling plan SBS3.7-10 / SBS5.0-10 / SBS6.0-10 with BMZ Hyperion, IBC era:powerbase and Axitec AXIstorage Li SH

Clamping position	Assignment	Clamping position
A	Not used	-

Clamping position	Assignment	Clamping position
B	Enable	6 (orange)
C	GND	5 (blue)
D	CAN L (twisted pair conductors, at least CAT5e)	2 (white)
E	CAN H (twisted pair conductors, at least CAT5e)	1 (yellow)
F	Not used	-

2.2.3 SBS3.8-US-10 / SBS5.0-US-10 / SBS6.0-US-10

Sunny Boy Storage with LG Energy Solution RESU7H / RESU10H

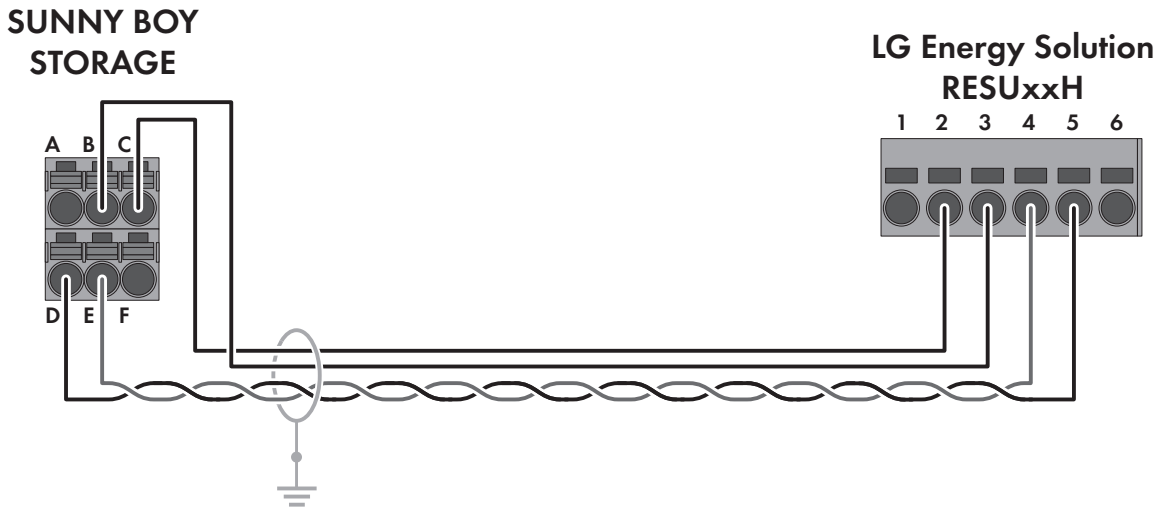


Figure 10: Cablin plan SBS3.8-US-10 / SBS5.0-US-10 / SBS6.0-US-10 with RESU7H / RESU10H

Clamping position	Assignment	Clamping position
A	Not used	–
B	Enable	3
C	GND	2
D	CAN L (twisted pair conductors, at least CAT5e)	5
E	CAN H (twisted pair conductors, at least CAT5e)	4
F	Not used	–

Sunny Boy Storage with BYD Battery-Box H

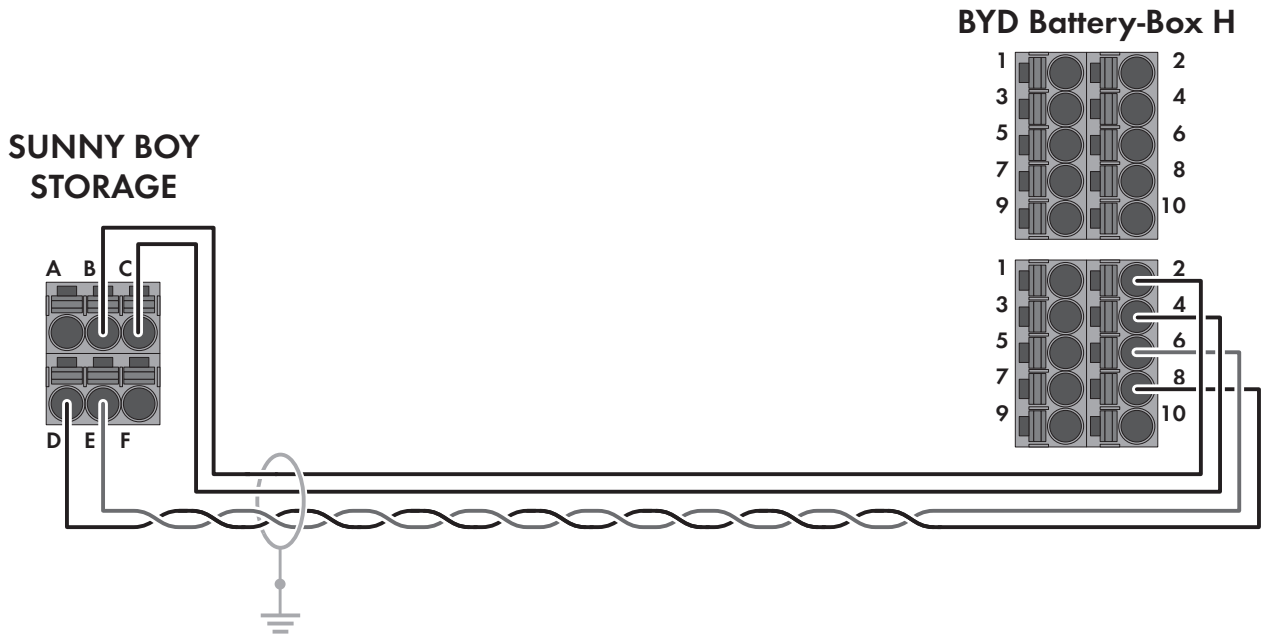
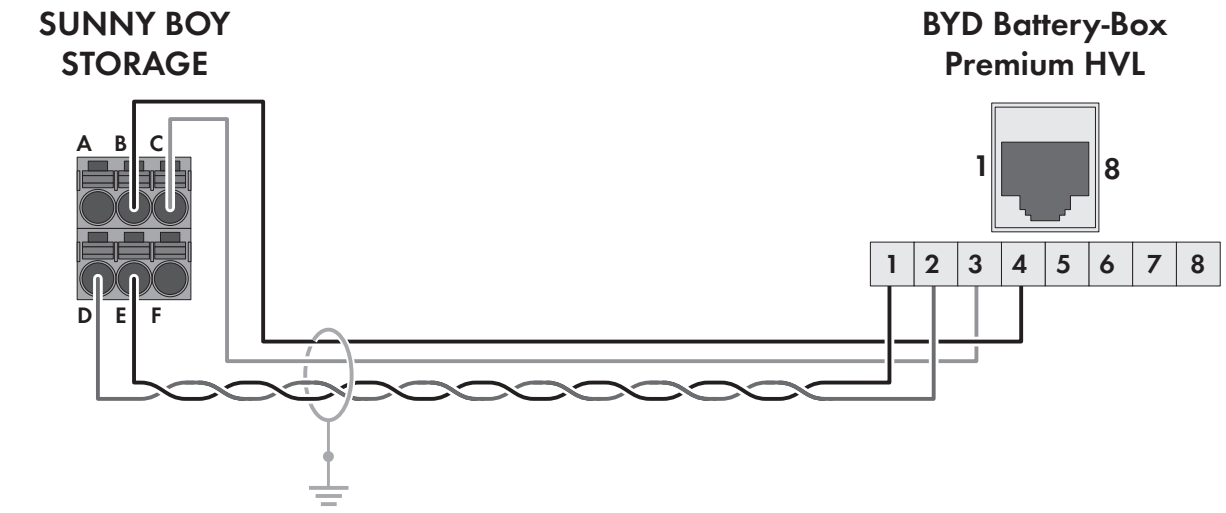


Figure 11: Cabling plan SBS3.8-US-10 / SBS5.0-US-10 / SBS6.0-US-10 with BYD Battery-Box H

Clamping position	Assignment	Clamping position
A	Not used	–
B	Enable 11 V+	2
C	GND	4
D	CAN L (twisted pair conductors, at least CAT5e)	8
E	CAN H (twisted pair conductors, at least CAT5e)	6
F	+12V supply for automatic transfer switching device	–



Clamping position	Assignment	Pin
A	Not used	-

Clamping position	Assignment	Pin
B	Enable	4
C	GND	3
D	CAN L (twisted pair conductors, at least CAT5e)	2
E	CAN H (twisted pair conductors, at least CAT5e)	1
F	Not used	-

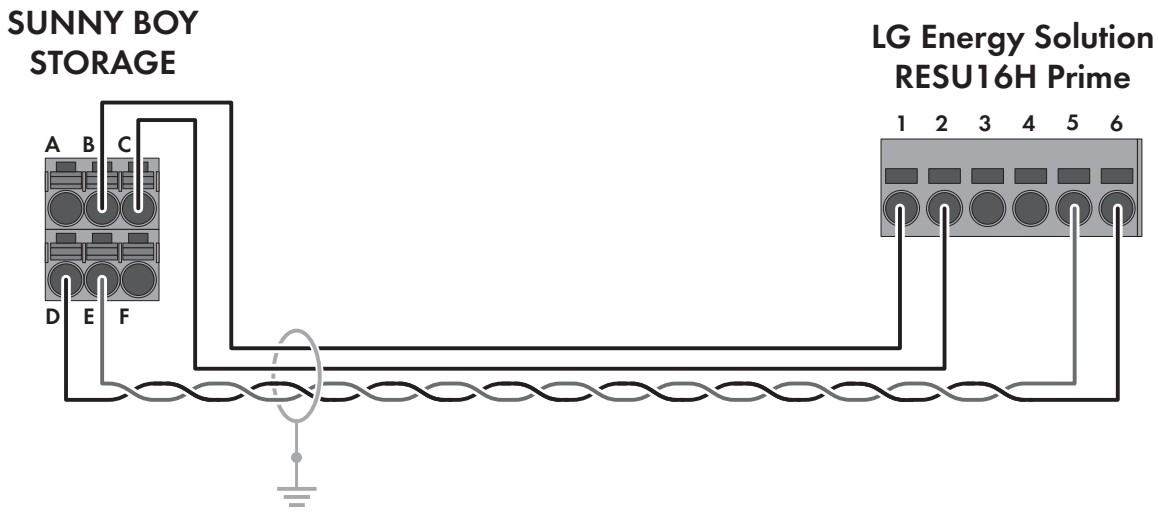


Figure 12: Cabling plan SBS3.8-US-10 / SBS5.0-US-10 / SBS6.0-US-10 with RESU16H Prime

Clamping position	Assignment	Clamping position
A	Not used	–
B	Enable	1
C	GND	2
D	CAN L (twisted pair conductors, at least CAT5e)	6
E	CAN H (twisted pair conductors, at least CAT5e)	5
F	Not used	–

3 Information about the electrical connection

Connection of batteries with a charging/discharging current limit of 20 A

This connection is recommended for the following batteries:

- LG RESU7H
- LG RESU10H

Procedure:

The DC terminals A and B must be switched parallelly using the jumpers provided.

The battery must be connected to the terminal blocks **A+** and **A-**.

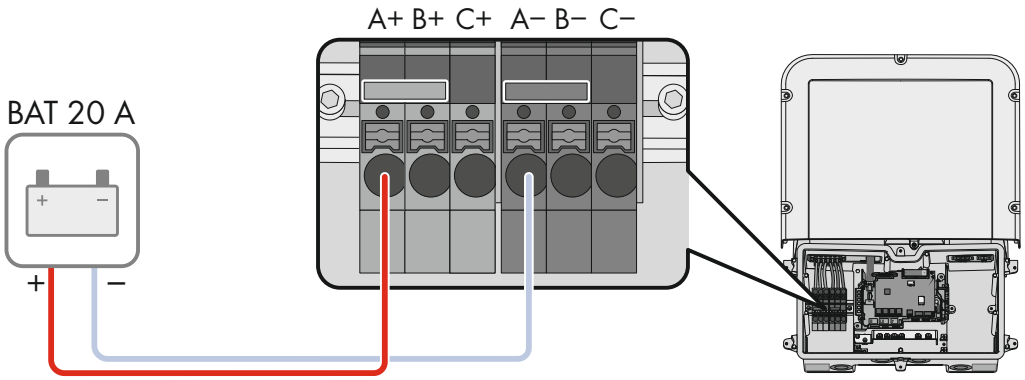


Figure 13: Overview for connection of a battery with a charging/discharging current limit of 20 A

Connection of a battery with a charging/discharging current higher than 20 A

This connection is recommended for the following batteries:

- LG RESU 10M
- LG RESU 10H Prime
- LG RESU 16H Prime
- BYD Battery-Box H 5.1-10.2
- BYD Battery-Box Premium HVS 5.1-10.2
- BYD Battery-Box Premium HVM 8.3-22.1
- BYD Battery-Box Premium HVL 12.0-32.0
- BMZ Hyperion
- IBC SOLAR era:powerbase
- Axitec AXIstorage Li SH

Procedure:

All DC terminals must be switched parallelly with the jumpers provided.

The battery must be connected to the terminal blocks **A+** and **A-**.

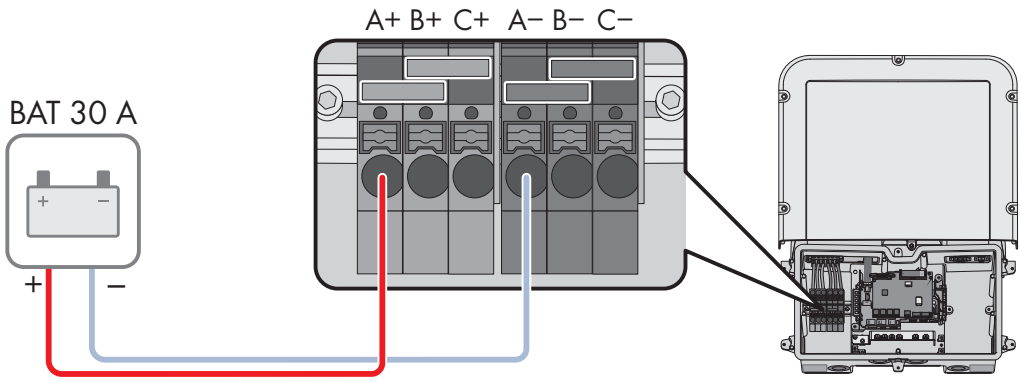


Figure 14: Overview for connection of one battery with a charging/discharging current higher than 20 A.

Information:
From Sunny Boy Storage firmware version 3.11.03.R, the DC input current of the inverter is additionally monitored. If the limit of 40 A is exceeded, the battery is automatically switched off for protection. This results in a permanent operation inhibition. It is therefore not necessary to install an external fuse between battery and Sunny Boy Storage for all listed batteries, even those with output currents greater than 40 A.
This document does not replace any regional, state, provincial, federal or national laws, regulations or standards that apply to the installation, electrical safety and use of the product. Always observe the local regulations as well.

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