SH5.0/6.0/8.0/10RT

Residential Hybrid Three Phase Inverter

FLEXIBLE APPLICATION

- 150–600V wide battery voltage range
- Supports parallel connection with master-slave controlling
- Provides 100% power to unbalance loads in backup mode

ENERGY INDEPENDENCE

- Seamless transition to backup mode for protection against power outages
- Fast charging / discharging to meet the demand of higher consumption

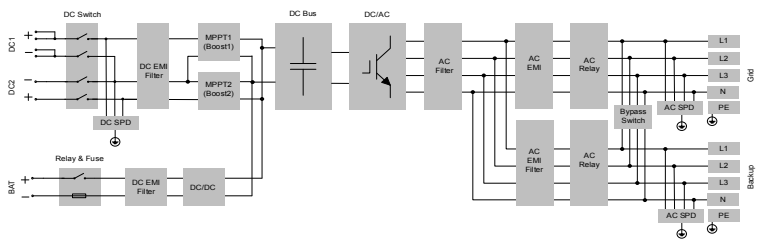
SMART MANAGEMENT

- High self-consumption with optimised built-in EMS
- Free online monitoring to enhance energy management for end user, installer and retailer
- Remote firmware update and customisable settings

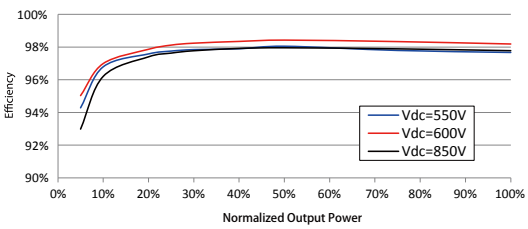
EASY INSTALLATION

- Unique push-in connectors for time-saving installation
- Touch free commissioning with smartphone
- Lightweight and compact

CIRCUIT DIAGRAM



EFFICIENCY CURVE



Iris Hellas
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SUNGROW
Clean power for all

Type designation	SH5.0RT	SH6.0RT	SH8.0RT	SH10RT
PV Input				
Max. PV input power	7500 W	9000 W	12000 W	15000 W
Max. PV input voltage	1000 V			
Startup voltage	180 V	250 V	250 V	250 V
Nominal input voltage	600 V			
MPP voltage range	150 V – 950 V	200 V – 950 V	200 V – 950 V	200 V – 950 V
MPP voltage range for nominal power	210 V – 850 V	250 V – 850 V	330 V – 850 V	280 V – 850 V
No. of MPPTs	2			
Max. number of PV strings per MPPT	1 / 1	1 / 1	1 / 1	1 / 2
Max. PV input current	25 A (12.5 A / 12.5 A)			
Max. current for input connector	16 A			
Short-circuit current of PV input	32 A (16 A / 16 A)	32 A (16 A / 16 A)	32 A (16 A / 16 A)	48 A (16 A / 32 A)
AC Input and Output				
Max. AC input power from grid	12500 W	15000 W	18600 W	20600 W
Nominal AC output power	5000 W	6000 W	8000 W	10000 W
Nominal AC ouput current	7.3 A	8.7 A	11.6 A	14.5 A
Max. AC output apparent power	5000 VA	6000 VA	8000 VA	10000 VA
Max. AC output current	7.6 A	9.1 A	12.1 A	15.2 A
Nominal AC voltage	3 / N / PE, 220 / 380 V; 230 / 400 V; 240 / 415 V			
AC voltage range	270 – 480 V			
Nominal grid frequency / Grid frequency range	50 Hz / 45 – 55 Hz, 60 Hz / 55 – 65 Hz			
THD	<3 % (of nominal power)			
DC current injection	<0.5 % In			
Power factor	>0.99 / 0.8 leading to 0.8 lagging			
Protection				
LVRT	Yes			
Anti-islanding protection	Yes			
AC short circuit protection	Yes			
Leakage current protection	Yes			
DC switch (solar)	Yes			
DC fuse (battery)	Yes			
Overvoltage category	III [MAINS], II [PV] [BATTERY]			
SPD	DC Type II / AC Type II			
Battery input reverse polarity protection	Yes			
Parallel operation on grid port / Max. No. of inverters	Master-slave mode / 5 *			
Battery Data				
Battery type	Li-ion battery			
Battery voltage	150 V – 600 V			
Max charge / discharge current	30 A ** / 30 A **			
Max charge / discharge power	7500 W / 6000 W	9000 W / 7200 W	10600 W / 10600 W	10600 W / 10600 W
System Data				
Max. efficiency	98.0 %	98.2 %	98.4 %	98.4 %
European efficiency	97.2 %	97.5 %	97.9 %	97.9 %
Isolation method (solar / battery)	Transformerless / Transformerless			
Degree of protection	IP65			
Operating ambient temperature range	-25 ℃ – 60 ℃			
Allowable relative humidity range (non-condensing)	0% – 100%			
Cooling method	Natural convection			
Max. operating altitude	4000 m (>3000 m derating)			
Noise (Typical)	30dB (A)			
Display	LED			
Communication	RS485, WLAN, Ethernet, CAN, 4×DI, 1×DO			
DC connection type	MC4 (PV) / Sunclix (Battery)			
AC connection type	Plug and play connector			
Compliance	IEC / EN 62109, IEC / EN 61000-6, EN 62477-1, IEC 61727, IEC 62116, IEC 61683, VDE-AR-N-4105, AS/NZS 4777.2, EN50549-1, NRS 097-2-1, TOR Generator Type A			
Mechanical Data				
Dimensions (W * H * D)	460 * 540 * 170 mm			
Mounting method	Wall-mounting bracket			
Weight	27 kg			
Backup Data				
Nominal voltage	3 / N / PE, 220 Vac / 230 Vac / 240 Vac			
Frequency range	50 Hz / 60 Hz			
Total hamonic factor output voltage (Linear load)	2 %			
Switch time to emergency mode	< 20ms			
Nominal output power	5000 W / 5000 VA	6000 W / 6000 VA	8000 W / 8000 VA	10000 W / 10000 VA
Peak output power ***	6000 W / 6000 VA, 5min 10000 W / 10000 VA, 10s	7200 W / 7200 VA, 5min 10000 W / 10000 VA, 10s	12000 W / 12000 VA, 5min	12000 W / 12000 VA, 5min
Rated output current for backup load during on grid mode	3 * 18.5 A			

*: Germany is available for 2 inverters parallel in maximum if no ripple control is used in system **: Depending on the connected battery
***: Can be reached only if PV and battery power is enough

Certificate for the NS protection

Manufacturer / applicant:	**SUNGROW POWER SUPPLY CO., LTD** No, 1699 Xiyou Rd, New & High Technology Industrial Development Zone, Hefei, 230088 **P.R. China**

Type of grid and plant protection:	**Integrated NS protection**
Assigned to generation unit type:	**SH10RT, SH8.0RT, SH6.0RT, SH5.0RT**

Firmware version:	**ARM_SAPPHIRE-H_V11_V01_A, MDSP_SAPPHIRE-H_V11_V01_A**
Connection rule:	**VDE-AR-N 4105:2018-11 – Power generation systems connected to the low-voltage distribution network** Technical minimum requirements for the connection to and parallel operation with low-voltage distribution networks.
Applicable standards/ directives:	**DIN VDE V 0124-100 (VDE V 0124-100):2019-09 – Grid integration of power generation systems – low voltage** Test requirements for power generation units to be connected and operated parallel with the low-voltage distribution networks

The above mentioned grid and plant protection has been tested and certified according to the test guideline VDE 0124-100. The electrical properties required in the connection rule are satisfied.

- Setting values and disconnect times
- Properly functioning functional chain "NS protection – interface switch"
- Technical requirements of the switching device
- Integrated interface switch that can also be used in conjunction with a central interface protection relay (VDE-AR-N 4105:2018-11 §6.4.1)
- Passive detection of unintended islanding
- Single-fault tolerance

The certificate contains the following information:

- Technical specifications of the NS protection and corresponding power generation types
- Setting values of the protection functions
- Trip values of the protection functions

BV project number:	**SGR-ESH-P20011901**	**Certification program:**	**NSOP-0032-DEU-ZE-V01**
Certificate number:	**U20-0322**	**Date of issue:**	**2020-05-08**

Certification body

i. V. Thomas Lammel

DAkkS Deutsche Akkreditierungsstelle D-ZE-12024-01-00

Certification body of Bureau Veritas Consumer Products Services Germany GmbH Accredited according to DIN EN ISO/IEC 17065

E.6 and E.7 Requirements for the test report for the NS protection

Extract from test report for NS protection **Nr. SGR-ESH-P20011901**
"Determination of electrical properties"

NS protection as integrated NS protection

Manufacturer / applicant:	SUNGROW POWER SUPPLY CO., LTD No, 1699 Xiyou Rd, New & High Technology Industrial Development Zone, Hefei, 230088 P.R. China
Type of grid and plant protection:	Integrated NS protection
Assigned to generation unit type:	SH10RT, SH8.0RT, SH6.0RT, SH5.0RT
Firmware version:	ARM_SAPPHIRE-H_V11_V01_A, MDSP_SAPPHIRE-H_V11_V01_A
Integrated interface switch:	Type of switching equipment 1: Relay Type of switching equipment 2: Relay
Measurement period:	2020-01-09 - 2020-04-13

Protection function	Setting value	Trip value	Disconnection time [a]
Voltage drop protection U <	184,0 V	184,1 V	3090 ms
Voltage drop protection U <<	103,5 V	103,6 V	345 ms
Rise-in-voltage protection U>	253,0 V	--	456,3 s[b]
Rise-in-voltage protection U>>	287,5 V	286,0 V	113 ms
Frequency decrease protection f<	47,50 Hz	47,50 Hz	105 ms
Frequency increase protection f>	51,50 Hz	51,50 Hz	95 ms

[a] proper time of interface switch 10 ms

[b] longest disconnection of the rise-in-voltage protection as a moving 10-minute-average, tested according clause 5.5.7 Protection devices and protection settings of VDE 0124-100

The disconnect time (sum of trip time of grid and plant protection and delay time of interface switch) must not exceed 200 ms.

A check of the overall functional chain "NS protection – interface switch" resulted in a successful disconnection.

The above mentioned grid and plant protection with the assigned power generation units has met the requirements for islanding detection with the help of the passive method (three-phase voltage monitoring).

The above mentioned NS protection meets the requirements for synchronization.

Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

EU Declaration of Conformity

Product: Grid-connected Hybrid Inverter
Model: SH5.0RT,SH6.0RT,SH8.0RT,SH10RT
Name and address of the manufacturer: Sungrow Power Supply Co., Ltd., No. 1699 Xiyou Road, Hefei, China
Name and address of authorized EU/EEA importer: Sungrow Deutschland GmbH, Balanstrasse 59, 81541 München, Germany
This declaration of conformity is issued under the sole responsibility of the manufacturer. Also this product is under manufacturer's warranty.
Object of the declaration: Hybrid inverter
SH5.0RT,SH6.0RT,SH8.0RT,SH10RT

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation: The Low Voltage Directive (LVD) 2014/35/EU and the Electromagnetic Compatibility(EMC) Directive 2014/30/EU.

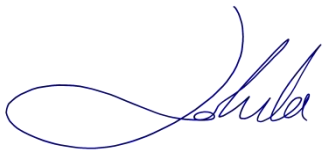
References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:

LVD:	
EN 62109-1:2010	●
EN 62109-2:2011	●
EN 62477-1:2012+A11:2014	●
EMC:	
EN 61000-6-1:2007	●
EN 61000-6-3:2007+A1:2011	●

Green and Effective

Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

Additional information: CE mark was affixed on the product since 2020.



John Lee
Standard and Certification Engineer
On behalf of Sungrow Power Supply Co., Ltd.
22th Apr. 2020
Place: Hefei, China

SBR096/128/160/192/224/256

High Voltage LFP Battery

NEW

HIGH-PERFORMANCE

- Up to 30A continuous charging and discharging current with high efficiency
- Up to 100% usable energy

SAFETY

- Lithium iron phosphate Battery
- Multi-stages protection design and extensive safety certification

FLEXIBILITY

- Extendable during lifetime
- Support 3-8 modules per unit, max. 4 units in parallel, 9–100 kWh capacity range

EASY INSTALLATION

- Compact and light, single person installation
- Plug and play, no cables needed between battery modules

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Type designation	SBR096	SBR128	SBR160	SBR192	SBR224	SBR256
Technical properties	 3 modules	 4 modules	 5 modules	 6 modules	 7 modules	 8 modules
System Data						
Battery Type	LiFePO4 Prismatic Cell					
Battery Module	3.2 kWh, 33 kg					
Nominal Capacity	9.6 kWh	12.8 kWh	16 kWh	19.2 kWh	22.4 kWh	25.6 kWh
Energy (usable) [1]	9.6 kWh	12.8 kWh	16 kWh	19.2 kWh	22.4 kWh	25.6 kWh
Nominal voltage	192 V	256 V	320 V	384 V	448 V	512 V
Operating voltage	150 – 219 V	200 – 292 V	250 – 365 V	300 – 438 V	350 – 511 V	400 – 584 V
Rated DC power	5.76 kW	7.68 kW	9.6 kW	11.52 kW	13.44 kW	15.36 kW
Max. charge / discharge power	6.57 kW	8.76 kW	10.95 kW	13.14 kW	15.33 kW	17.52 kW
Max. charging / discharging current: continuous	30 A					
Max. charging / discharging current	42 A					
Depth of Discharge	Max.100 % DOD (settable)					
Short circuit current	3500 A					
Display	SOC indicator, status indicator					
Communication interface	CAN					
Protection						
Over / under voltage protection	Yes					
Over current protection	Yes					
Over / under temperature protection	Yes					
DC breaker	Yes					
General Data						
Dimensions (W*H*D)	625*545*330 mm	625*675*330 mm	625*805*330 mm	625*935*330 mm	625*1065*330 mm	625*1195*330 mm
Weight	114 kg	147 kg	180 kg	213 kg	246 kg	279 kg
Installation Location	Indoor / Outdoor					
Mounting method	Floor stand					
Operating ambient temperature range	Charge: 0 to 50 ℃ Discharge: -20 to 50 ℃					
Degree of protection	IP55					
Allowable relative humidity range	0 % to 95 % no condensing					
Max. operating altitude	Max. 2000 m					
Cooling method	Natural convection					
Certificates	CE, CEC, IEC 62619, IEC 62040, UN38.3, VDE 2510-50					
Warranty [2]	10 Years					

1: Test conditions: 25 ℃, 100 % depth of discharge (DOD), 0.2C charge&discharge
2: Refer to battery warranty letter for conditional application

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Product Service

Attestation of Conformity

No. E8A 073342 0306 Rev. 00

Holder of Certificate: **Sungrow Power Supply Co., Ltd.**
No. 1699 Xiyou Road, New & High
Technology Industrial Development Zone,
230088 Hefei, Anhui
PEOPLE'S REPUBLIC OF CHINA

Name of Object: **Batteries**
(Rechargeable Li-ion Battery System)

Model(s): **SBR096, SBR128, SBR160,**
SBR192, SBR224, SBR256

Description of Object:
Nominal voltage: 192Vd.c., 256Vd.c., 320Vd.c., 384Vd.c., 448Vd.c., 512Vd.c.,
Rated capacity: 50Ah

Tested according to:
EN 61000-6-1:2007
EN 61000-6-3:2007/A1:2011

This Attestation of Conformity is issued on a voluntary basis according to the Directive 2014/30/EU relating to electromagnetic compatibility. It confirms that the listed apparatus complies with all essential requirements of the directive and is based on the technical specifications applicable at the time of issuance. It refers only to the particular sample submitted for testing and certification. For details see: www.tuvsud.com/ps-cert

Test report no.: 4861920212900

Date, 2020-12-16

(Jun Bao)

After preparation of the necessary technical documentation as well as the EU Declaration of conformity the required CE marking can be affixed on the product. That Declaration of conformity is issued under the sole responsibility of the manufacturer. Other relevant EU-directives have to be observed.

TÜV SÜD Product Service GmbH • Certification Body • Ridlerstraße 65 • 80339 Munich • Germany

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Product Service

C E R T I F I C A T E

No. Z2 073342 0305 Rev. 00

Holder of Certificate: **Sungrow Power Supply Co., Ltd.**
No. 1699 Xiyou Road, New & High
Technology Industrial Development Zone,
230088 Hefei, Anhui
PEOPLE'S REPUBLIC OF CHINA

Certification Mark:

Product: **Batteries**
(Rechargeable Li-ion Battery System)

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: www.tuvsud.com/ps-cert

Test report no.: 5061920004301-00

Valid until: 2025-12-03

Date, 2020-12-04

(Harry Zhang)

TÜV SÜD Product Service GmbH • Certification Body • Ridlerstraße 65 • 80339 Munich • Germany

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Product Service

C E R T I F I C A T E

No. Z2 073342 0305 Rev. 00

Model(s): **SBR096, SBR128, SBR160, SBR192, SBR224, SBR256.**

Brand Name: **SUNGROW**

SUNGROW

Parameters:

Nominal voltage:	SBR096: 192Vd.c., SBR128: 256Vd.c. SBR160: 320Vd.c., SBR192: 384Vd.c. SBR224: 448Vd.c., SBR256: 512Vd.c.
Rated capacity:	50Ah

Tested according to: IEC 62619:2017

Production Facility(ies): 073342

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TÜV®

TÜV Rheinland (Shanghai) Co., Ltd.
Member of TÜV Rheinland Group

TÜVRheinland®
Precisely Right.

Date : 4 February, 2021
Our ref. : Bowen Dong
Your ref. : Yuqiang Jin

Sungrow Power Supply Co., Ltd.

No. 1699, Xiyou Road, New & High Technology Industrial Development Zone, Hefei, Anhui 230088, P.R. CHINA

Dear Mr. Jin

We herewith notify that the product: **Rechargeable Li-ion Battery System**

Type designation: SBR096 SBR128 SBR160 SBR192 SBR224 SBR256

is under the test against the following requirement(s)

Test requirement: VDE-AR-E_2510-50
2 PfG 2698

.

To finish the project, it is essential to finish all the tests and provide the final version of the following items to our company:

( ) Rating label
( ) user manual
( ) Photo-documentation
( ) Construction drawing
( ) CDF (Constructional Data Form)
( ) Test sample for photo-documentation
( ) Declaration that provided samples for Safety & EMC are identical
( ) PAHs test report

We appreciate your valued support and would like to offer our assistance and varied services in the approval of your products in the future.

With kind regards,

TÜV Rheinland (Shanghai) Co., Ltd.

Bowen Dong (Senior Manager)
Solar & Commercial Products Greater China

DTSD1352

Three-phase Smart Energy Meter

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Type designation	DTSD1352
Electrical Parameter	
Nominal voltage	230 Vac / 400 Vac
Input voltage range	180 Vac - 268 Vac
Power consumption	<2W (10 VA)
Max. operating current	80 A
Grid frequency	50 Hz
Measurement accuracy	Class 0.5 (Active)
Interface and communication	RS485
Environmental Condition	
Ingress protection rating	IP20
Operating ambient temperature	-25 to 55 °C
Relative humidity	0 - 95 %
Mechanical Data	
Dimensions (W * H * D)	126 * 91 * 74 mm
Weight	0.35 kg
Installation	35 mm DIN-rail

EUROPE

Approved Batteries with SH Series Hybrid Inverters

EU Version V1.7.2

Hereby we make sure that the batteries listed in the following table are approved for the operation with the hybrid inverters SH3.0~6.0RS, SH5.0~10RT, SH3K6(phased out), SH4K6(phased out) of SUNGROW POWER SUPPLY CO., LTD. Please find the specific models in the following table, which are subject to change without notice.

SH3.0/3.6/4/0/5.0/6.0RS Hybrid Inverters for High Voltage Battery

Brand	Model	Firmware Version
SUNGROW	SBR096/128/160/192	≥SBRBCU-S_22011.01.05
BYD	Battery-Box Premium HVS 5.1/7.7/10.2	Battery management system (BMS) version ≥ 3.16 Battery management unit (BMU) version ≥ 3.7
	Battery-Box Premium HVM 8.3/11.0/13.8/16.6/19.3	

SH5.0~10RT Series Hybrid Inverters for High Voltage Battery

Brand	Model	Firmware Version
SUNGROW	SBR096/128/160/192/224/256[1]	≥SBRBCU-S_22011.01.05
LG Chem	RESU7H_Type_R (RS485 Communication) [2]	DC-DC converter version ≥4.8 Battery management system (BMS) version ≥1.7.0.1
	RESU10H_ Type_R (RS485 Communication) [2]	
BYD	Battery-Box HV 5.1/6.4/7.7/9.0/10.2/11.5[2] HV 5.1/6.4/7.7/9.0/10.2/11.5(AU) [2]	≥ V3.013
	Battery-Box Premium HVS 5.1/7.7/10.2/12.8	Battery management system (BMS) version ≥ 3.16 Battery management unit (BMU) version ≥ 3.7
	Battery-Box Premium HVM11.0/13.8/16.6/19.3/22.1	
PYLONTECH	Powercube-X1/X2/H1/H2[3]	≥ V4.6
	Force H1/H2[3]	≥ V1.3

Caution: In Italy, only the SBR [1] battery is valid for SH5.0~10.0RT;
And the Battery model with symbol [2] will be discontinued.

Please note that the operating voltage of PowerCube[3] and Force[3] Series must be within the Battery Voltage Range of Sungrow inverters:
For PowerCube X1&X2 series at least 4 units are recommended and for the H1&H2 series no more than 11units are recommended.
Force Series must be within the Battery Voltage Range of Sungrow inverters:
For Force H1 at least 4 units are recommended and for the H2 series 2 to 4 units are recommended.

SH3K6/4K6(phased out) Hybrid Inverters for Low Voltage Battery

Brand	Model
LG Chem	RESU6.4EX
	RESU3.3/6.5/10/13
PYLONTECH	US2000 B
	Phantom-S
GCL	E-KwBe5.6
SUNGROW	SBP4K8
BYD	Battery-Box Res: Res2.5/5.0/7.5/10.0
	Battery-Box Pro: Pro2.5/5.0/7.5/10.0
	Battery-Box: L3.5/7.0/10.5/14.0
	Battery-Box Premium LVS: LVS4.0/8.0/12.0/16.0/20.0/24.0
	Battery-Box Premium LVL 15.4
TAWAKI	MAUI Battery Pack 86 Ah

Caution: In Italy, only the LG/BYD/SBP4K8 battery are valid for SH3K6/4K6;

Sungrow may not provide technical support for installations where non-approved batteries are installed. We will keep updating this document, please contact Sungrow if there are any relevant issues.

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Technology Innovations
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3–Phase Hybrid Inverter

User Manual

SH5.0RT/SH6.0RT/SH8.0RT/SH10RT

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About This Manual

The manual mainly contains the product information, as well as guidelines for installation, operation, and maintenance. The manual does not include complete information about the photovoltaic (PV) system. Readers can get additional information at **www.sungrowpower.com** or on the webpage of the respective component manufacturer.

Validity

This manual is valid for the following model of low-power grid-connected PV string inverters:

- SH5.0RT
- SH6.0RT
- SH8.0RT
- SH10RT

It will be referred to as "inverter" hereinafter unless otherwise specified.

Target Group

This manual is intended for professional technicians who are responsible for installation, operation, and maintenance of inverters, and users who need to check inverter parameters.

The inverter must only be installed by professional technicians. The professional technician is required to meet the following requirements:

- Know electronic, electrical wiring and mechanical expertise, and be familiar with electrical and mechanical schematics.
- Have received professional training related to the installation and commissioning of electrical equipment.
- Be able to quickly respond to hazards or emergencies that occur during installation and commissioning.
- Be familiar with local standards and relevant safety regulations of electrical systems.
- Read this manual thoroughly and understand the safety instructions related to operations.

How to Use This Manual

Please read this manual carefully before using the product and keep it properly at a place for easy access.

Contents of this manual may be periodically updated or revised, and the actual product purchased shall prevail. Users can obtain the latest manual from **support.sungrowpower.com** or sales channels.

Symbols

This manual contains important safety instructions, which are highlighted with the following symbols, to ensure personal and property safety during usage, or to help optimize the product performance in an efficient way.

Please carefully understand the meaning of these warning symbols to better use the manual.

⚠ DANGER

Indicates high-risk potential hazards that, if not avoided, may lead to death or serious injury.

⚠ WARNING

Indicates moderate-risk potential hazards that, if not avoided, may lead to death or serious injury.

⚠ CAUTION

Indicates low-risk potential hazards that, if not avoided, may lead to minor or moderate injury.

NOTICE

Indicates potential risks that, if not avoided, may lead to device malfunctions or financial losses.

“NOTE” indicates additional information, emphasized contents or tips that may be helpful, e.g., to help you solve problems or save time.

Contents

1 Safety

When installing, commissioning, operating, and maintaining the product, strictly observe the labels on the product and the safety requirements in the manual. Incorrect operation or work may cause:

- Injury or death to the operator or a third party;
- Damage to the product and other properties.

- The safety instructions in this manual are only supplements and cannot cover all the precautions that should be followed. Perform operations considering actual on-site conditions.
- SUNGROW shall not be held liable for any damage caused by violation of general safety operation requirements, general safety standards, or any safety instruction in this manual.
- When installing, operating, and maintaining the product, comply with local laws and regulations. The safety precautions in this manual are only supplements to local laws and regulations.

1.1 Unpacking and Inspection

⚠ WARNING

Check all safety signs, warning labels and nameplates on devices.
Ensure that the safety signs, warning labels and nameplates must be clearly visible and cannot be removed or covered before the device is decommissioned.

NOTICE

After receiving the product, check whether the appearance and structural parts of the device are damaged, and check whether the packing list is consistent with the actual ordered product. If there are problems with the above inspection items, do not install the device and contact SUNGROW in time.

1.2 Installation Safety

⚠ DANGER

Make sure there is no electrical connection before installation.
Before drilling, avoid the water and electricity wiring in the wall.

⚠ CAUTION

Improper installation may cause personal injury!

- **If the product supports hoisting transport and is hoisted by hoisting tools, no one is allowed to stay under the product.**
- **When moving the product, be aware of the product weight and keep the balance to prevent it from tilting or falling.**

NOTICE

Before operating the product, must check and ensure that tools to be used have been maintained regularly.

1.3 Electrical Connection Safety

⚠ DANGER

Before electrical connections, please make sure that the inverter is not damaged, otherwise it may cause danger!

Before electrical connections, please make sure that the inverter switch and all switches connected to the inverter are set to "OFF", otherwise electric shock may occur!

⚠ DANGER

The PV string will generate lethal high voltage when exposed to sunlight.

- **Operators must wear proper personal protective equipment during electrical connections.**
- **Must ensure that cables are voltage-free with a measuring instrument before touching DC cables.**
- **Respect all safety instructions listed in relevant documents about PV strings.**

⚠ DANGER

Danger to life due to a high voltage inside the inverter!

- **Be sure to use special insulation tools during cable connections.**
- **Note and observe the warning labels on the product, and perform operations strictly following the safety instructions.**
- **Respect all safety instructions listed in this manual and other pertinent documents.**

DANGER

Batteries deliver electric power, resulting in burns or a fire hazard when they are short circuited, or wrongly installed.

Lethal voltages are present at the battery terminals and cables connecting to the inverter. Severe injuries or death may occur if the cables and terminals in the inverter are touched.

WARNING

Damage to the product caused by incorrect wiring is not covered by the warranty.

- **Electrical connection must be performed by professionals.**
- **All cables used in the PV generation system must be firmly attached, properly insulated, and adequately dimensioned.**

WARNING

Check the positive and negative polarity of the PV strings, and connect the PV connectors to corresponding terminals only after ensuring polarity correctness.

During the installation and operation of the inverter, please ensure that the positive or negative poles of PV strings do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in equipment damage. The damage caused by this is not covered by the warranty.

NOTICE

Comply with the safety instructions related to PV strings and the regulations related to the local grid.

1.4 Operation Safety

DANGER

- **When the inverter is running, do not touch its enclosure.**
- **When the inverter is running, it is strictly forbidden to plug and unplug any connector on the inverter.**
- **When the inverter is running, do not touch any wiring terminal of the inverter. Otherwise, electric shock may occur.**
- **When the inverter is running, do not disassemble any parts of the inverter. Otherwise, electric shock may occur.**
- **When the inverter is running, it is strictly forbidden to touch any hot parts of the inverter (such as the heat sink). Otherwise, it may cause burns.**
- **If the inverter is equipped with a DC switch, do not operate it when the inverter is running. Otherwise, device damage or personal injury may occur.**

1.5 Maintenance Safety

DANGER

Risk of inverter damage or personal injury due to incorrect service!

- **Before any service work, first disconnect the grid-side AC circuit breaker and check the inverter status. If the inverter indicator is off, please wait until night to disconnect the DC switch. If the inverter indicator is on, directly disconnect the DC switch.**
- **After the inverter is powered off for 10 minutes, measure the voltage and current with professional instrument. Only when there is no voltage nor current can operators who wear protective equipment operate and maintain the inverter.**
- **Even if the inverter is shut down, it may still be hot and cause burns. Wear protective gloves before operating the inverter after it cools down.**

DANGER

Touching the power grid or the contact points and terminals on the inverter connected to the power grid may lead to electric shock!

- **The power grid side may generate voltage. Always use a standard voltmeter to ensure that there is no voltage before touching.**

CAUTION

To prevent misuse or accidents caused by unrelated personnel: Post prominent warning signs or demarcate safety warning areas around the inverter to prevent accidents caused by misuse.

NOTICE

To avoid the risk of electric shock, do not perform any other maintenance operations beyond this manual. If necessary, contact SUNGROW for maintenance. Otherwise, the losses caused is not covered by the warranty.

NOTICE

Improper settings or maintenance can permanently damage the battery.
Incorrect inverter parameters will lead to the premature aging of battery.

1.6 Disposal Safety

WARNING

Please scrap the inverter in accordance with relevant local regulations and standards to avoid property losses or casualties.

2 Product Description

2.1 System Introduction

⚠ WARNING

- **The inverter must only be operated with PV strings with class II protection in accordance with IEC 61730, application class A. It is not allowed for the positive pole or the negative pole of the PV strings to be grounded. This can cause the inverter to be destroyed.**
- **Do not connect any local load between the inverter and the AC circuit breaker.**

NOTICE

For the TT utility grid, the N line voltage to ground must be 30 V or less.

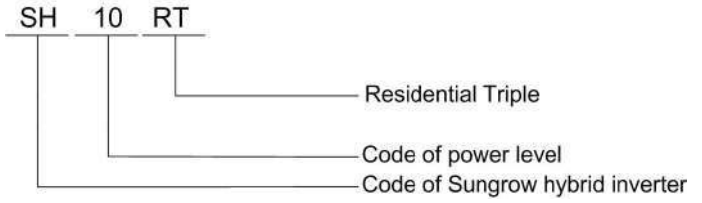
The inverter applies only to the scenarios described in this manual.

The three-phase hybrid inverters are applicable to both on-grid and off-grid PV systems. With the integrated Energy Management System (EMS), they can control and optimize the energy flow so as to increase the self-consumption of the system.

2.2 Product Introduction

Model Description

The model description is as follows (take SH10RT as an example):



Appearance

The image shown here is for reference only. The actual product received may differ.

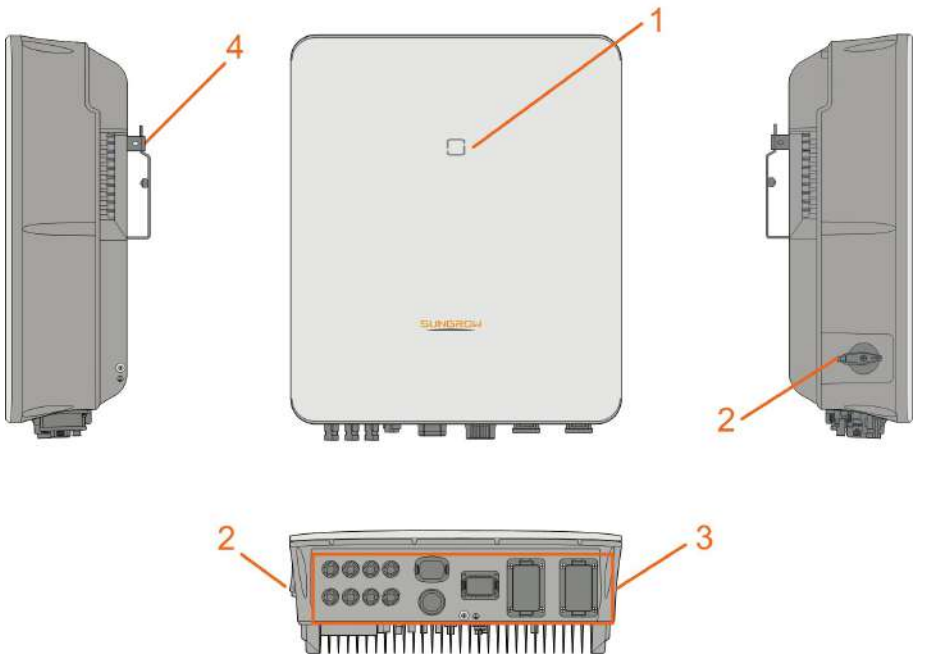


figure 2-1 Inverter Appearance

No.	Name	Description
1	LED indicator panel	Indicates the current working state of the inverter.
2	DC switch(Optional)	Used to safely disconnect the DC circuit.
3	Electrical connection area	Includes DC terminals, AC terminals, battery terminals, communication terminals and additional grounding terminal.
4	Hanger	Used to hang the inverter on the wall-mounting bracket.

Dimensions

The following figure shows the dimensions of the inverter.

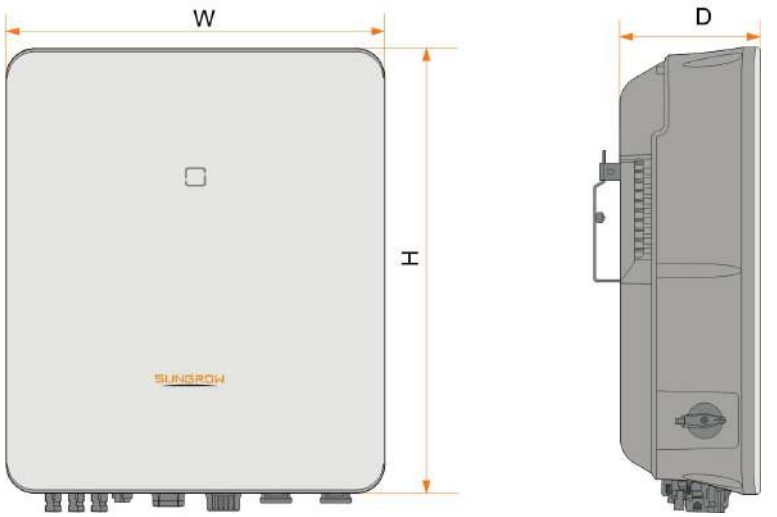
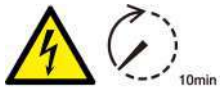


figure 2-2 Dimensions of the Inverter

W (mm)	H (mm)	D (mm)	Weight (kg)
460	540	170	27

2.3 Symbols on the Product

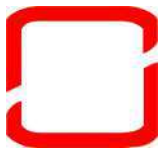
Symbol	Explanation
	RCM mark of conformity.
	TÜV mark of conformity.
	CE mark of conformity. EU/EEA Importer
	Do not dispose of the inverter together with household waste.
	The inverter does not have a transformer.
	Disconnect the inverter from all the external power sources before maintenance!
	Read the user manual before maintenance!
	Burn danger due to hot surface that may exceed 60℃.

Symbol	Explanation
	Danger to life due to high voltages! Only qualified personnel can open and service the inverter.
	Do not touch live parts for 10 minutes after disconnection from the power sources.
	Additional grounding point.

2.4 LED Indicator

The LED indicator on the front of the inverter indicates the working state of the inverter.

table 2-1 LED indicator description

LED indicator	LED state	Definition
 Blue	ON	The inverter is running in the on/off-grid mode.
	Twinkling	The inverter is at standby or startup state (without on/off-grid operation).
 Red	ON	A system fault has occurred.
 Gray	OFF	Both the AC and DC sides are powered down.

⚠ WARNING

Voltage may still be present in AC side circuits after the indicator is off. Pay attention to the electricity safety during operating.

2.5 DC Switch

The DC switch is used to safely disconnect the DC circuit whenever necessary.

The inverter operates automatically when input and output requirements are met. Rotate the DC switch to the “OFF” position to stop the inverter when a fault occurs or when you need to stop the inverter.

Turn the DC switch to the “ON” position before restarting the inverter.

2.6 PV Energy Storage System (PV ESS)

2.6.1 PV ESS Introduction

By directly connecting a battery module to the inverter, the conventional PV system can be upgraded to be an Energy Storage System (ESS).

The system is capable of operating off-grid to ensure an emergency power supply for protected loads in the event of a grid interruption or blackout, which may be caused by:

- islanding;
- under-voltage;
- under-frequency or over-frequency.

NOTICE

- **Under any connection, either grid-connection or off-grid application, please be sure that the potential voltage between N and PE line is not higher than 30V, otherwise, inverter will stop generating power.**
- **The system is not suitable for supplying life-sustaining medical devices. It cannot guarantee backup power in all circumstances.**

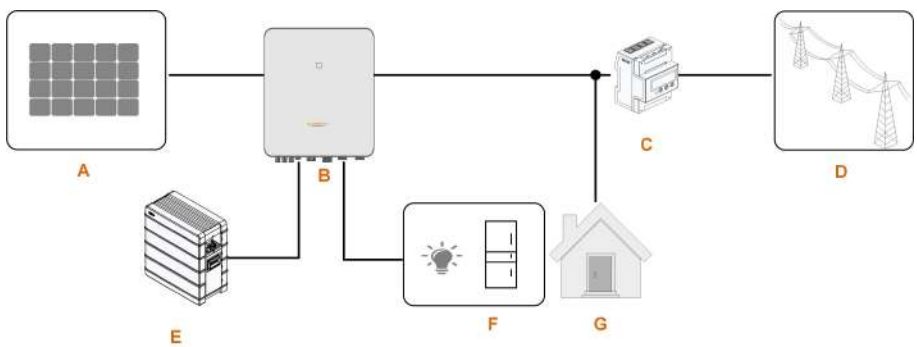


figure 2-3 PV Energy Storage System (PV ESS)

table 2-2 System Compositions

Item	Description	Remark
A	PV strings	Compatible with monocrystalline silicon, polycrystalline silicon, and thin-film without grounding.
B	Inverter	SH5.0RT / SH6.0RT / SH8.0RT / SH10RT

Item	Description	Remark
C	Three-phase Smart Energy Meter	Measures the export power and communicates with the inverter via the RS485 port.
D	Utility grid	Grid grounding system types: TT, TN
E	Battery (optional)	A Li-ion battery
F	Backup loads	Protected house loads directly connected to the inverter.
G	Normal Loads	Non protected house loads, they will disconnect in case of grid failure.

2.6.2 Declaration For Back-Up Function

The following statement involves SUNGROW general policies about the hybrid inverters described in this document.

1 For hybrid inverters, the electrical installation typically includes connection of the inverter to both PV modules and batteries. If there is no available power from batteries or PV modules in backup mode, the backup power supply will be automatically terminated. SUNGROW shall hold no liability for any consequences arising from failing to observe this instruction.

2 Normally, the Back-Up switching time is less than 20 ms. However, some external factors may cause the system to fail on Back-Up mode. Therefore, the users must be aware of conditions and follow the instructions as below:

- Do not connect loads that are dependent on a stable energy supply for a reliable operation.
- Do not connect the loads whose total capacity is greater than the maximum Back-Up capacity.
- Do not connect the loads that may cause very high start-up current surges, such as non-frequency conversion air conditioning, vacuum cleaner or half-wave loads such as hair dryer, heat gun, hammer drill. Refer to "11.2 The Compatibility for Backup under Off-grid Scenario" for recommended loads.
- Due to the condition of the battery itself, battery current might be limited by some factors, including but not limited to the temperature and weather.

Declaration For Back-Up Overload Protection

The inverter will restart in case of overload protection. The time required for restarting will increase (5 min at most) if overload protection repeats. Try to reduce Back-Up load power within maximum limitation or remove the loads which may cause very high start-up current surges.

2.6.3 Energy Management

The battery discharges to provide energy to loads. If the battery is empty or there is not enough power from the battery system, the grid shall supply power to backup loads and normal loads.

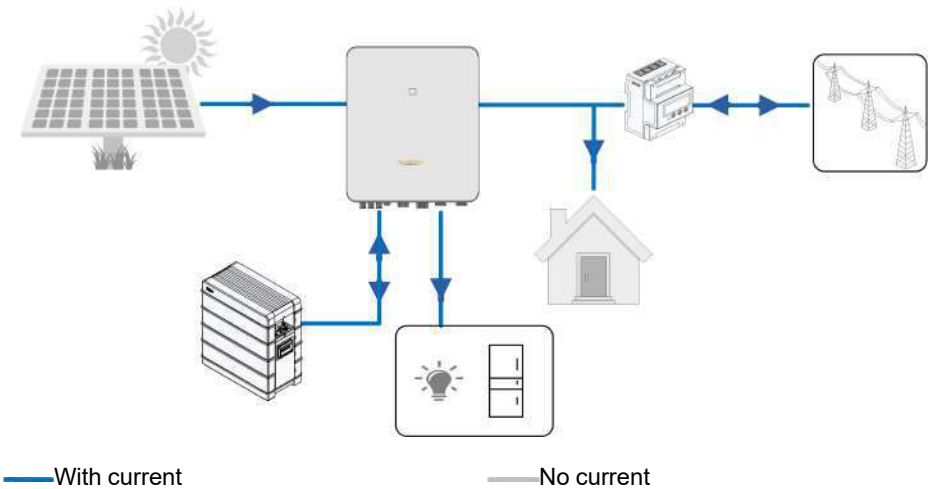
When the grid is present, the bypass function of the hybrid inverter is activated and the Backup loads will be directly connected to the grid via the bypass switch integrated in the inverter.

If the Smart Energy Meter is abnormal or not equipped, the inverter will run normally, however, the battery can be charged but not allowed to discharge. In this case the feed-in power setting will be ineffective, and the DO function for optimized mode will be disabled.

Energy Management during Daytime

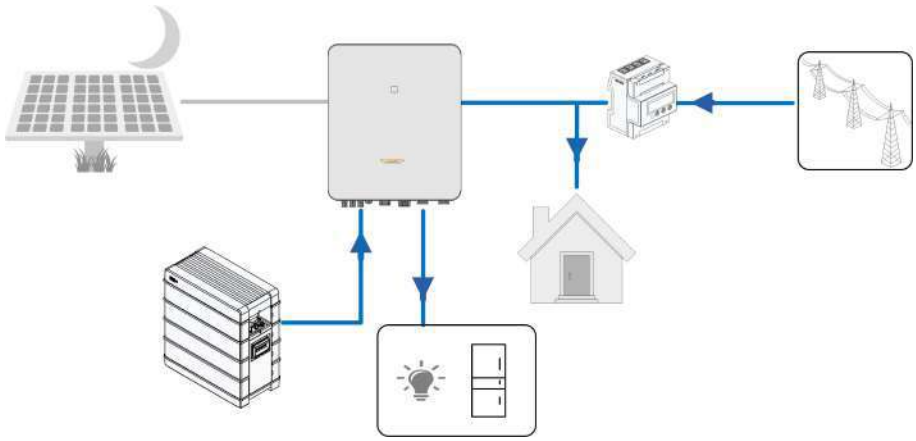
The energy management system (EMS) works in self-consumption mode by default.

- Scenario 1: PV power generation ≥ Load power consumption
  - First，PV power will go to Backup loads first, then normal loads and the battery.
  - Moreover，If the battery is fully charged, the excess will go to the grid. The feed-in power will not surpass the feed-in limitation value in initial settings.
- Scenario 2: PV power generation < Load power consumption
  - First，battery will discharge and provide the energy missing.
  - Moreover，inverter will draw power from the mains if the power from the PV and battery is less than the load power.



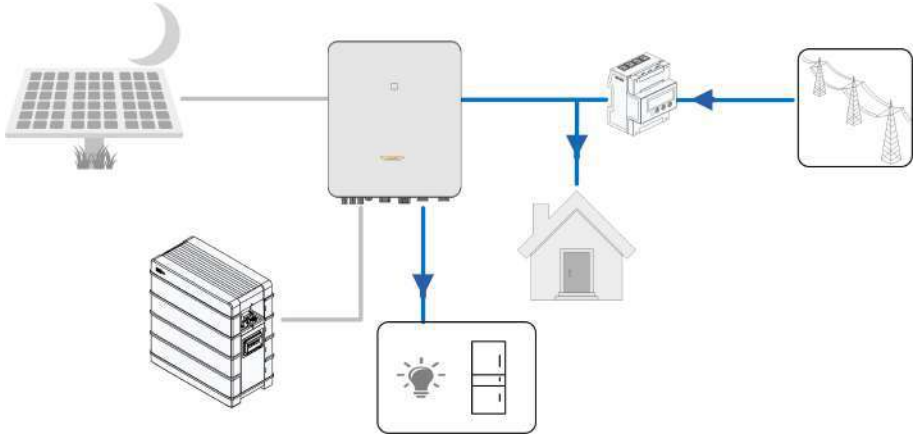
Energy Management during Night

During night, with energy available, the battery will discharge to supply power for loads. Alternatively, the grid will supply power for the loads in case the discharge power of the battery is insufficient.



With current No current

During night, when the battery is empty, it will enter into standby mode. In this case, the grid will supply all power for loads.



With current No current

2.7 Parallel System

2.7.1 Grid-connected Parallel System

Maximum five hybrid inverters with the same type can be connected in parallel in the PV ESS via RS485 communication. The system can even work under grid is black out occasionally.

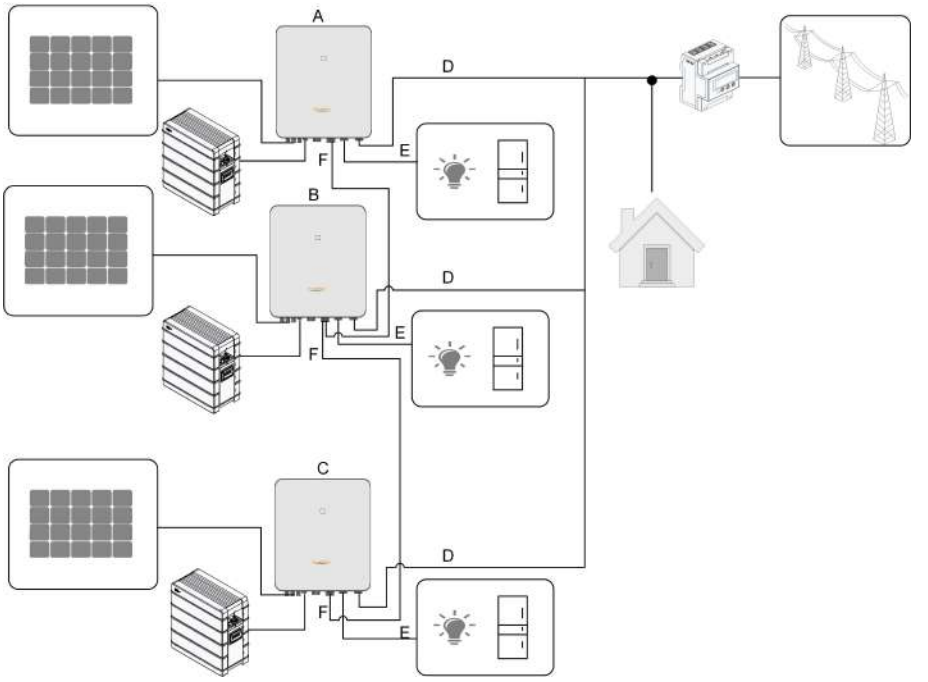


figure 2-4 Parallel PV ESS

(A) Master (B) Slave 1 (C) Slave 2

(D) GRID (E) BACK-UP (F) RS485

Only the inverter GRID terminal can be connected in parallel, the BACK-UP terminal and the battery terminal cannot be connected together, they should be connected to the backup loads, which need uninterrupted power supply, and the battery respectively. The Backup loads of each inverter should not exceed its nominal power.

Refer to "6.7.3 RS485 Connection" for the cable connection.

In an on-grid parallel system, the master inverter collects information from Smart Energy Meter and slave inverter and performs the energy management including:

- Feed-in power control.
- Battery charge / discharge
- Maximum power limitation

The following settings are required for the inverter parallel function.

- Feed-in power control. The feed-in power control function refers to "8.5.1 Feed-in Limitation". The PV installation power of the master inverter is the total installation power of the system, the slave inverters do not need to set the feed-in power.

- Ripple Control. The Ripple Control device only needs to be connected to the master inverter, which will perform unified scheduling. Refer to "6.11 DI Connection" for the cable connection. Refer to "8.10.5 Active Power Regulation" to enable it in the iSolarCloud App.
- Parallel Configuration. Refer to "8.10.13 Parallel Configuration" to configure the master and slave inverters in the iSolarCloud App.

2.7.2 Off-grid Parallel System

- This section is not applicable for Europe but only for other regions. Please contact SUNGROW for details of specific regions and models.

In off-grid parallel mode, devices are controlled by the smart switch at the grid-connected point, and relevant parameters can be set on iSolarCloud App.

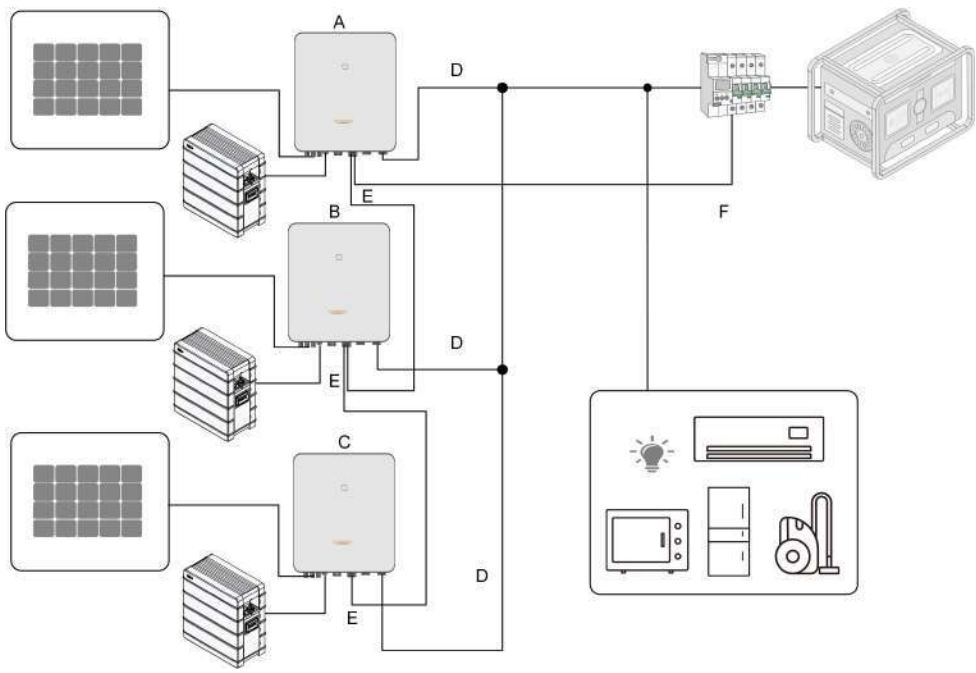


figure 2-5 Off-grid Centralized with Load

(A) Master	(B) Slave 1	(C) Slave 2
(D) GRID	(E) RS485	(F) RS485 for Smart Switch

- Batteries in parallel are temporarily not to be connected to inverters.
- Each inverter in the parallel system must be connected with batteries.
- In off-grid parallel mode, SOC equalization of batteries connected to each inverter is not supported.
- The sum of the total power of inverters and the load power shall not exceed the nominal power of the genset.

Only 2~5 inverters can be connected in parallel. If inverters of the same power are connected in parallel, the output power is the sum of the power of each inverter. If inverters of different power are connected in parallel, the output power is the product of the minimum power value of a single inverter and the number of inverters.

Eg. If five inverters of 10kW are connected in parallel, the output power is 50kW; If three inverters of 10kW and one of 8kW are connected in parallel, the output power is 4 times 8kW, that is, 32kW.

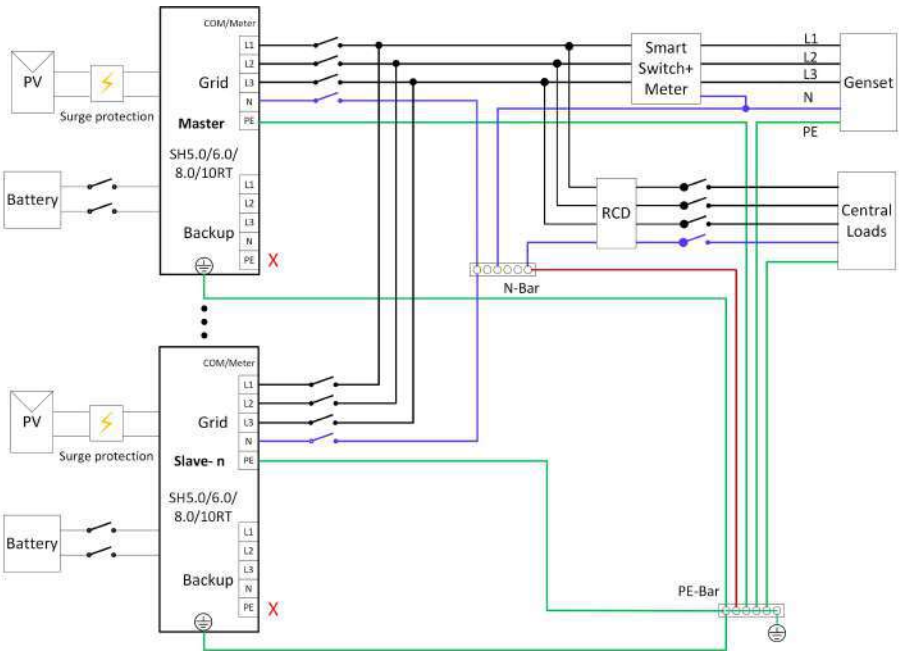


figure 2-6 Wiring diagram for Australia and New Zealand

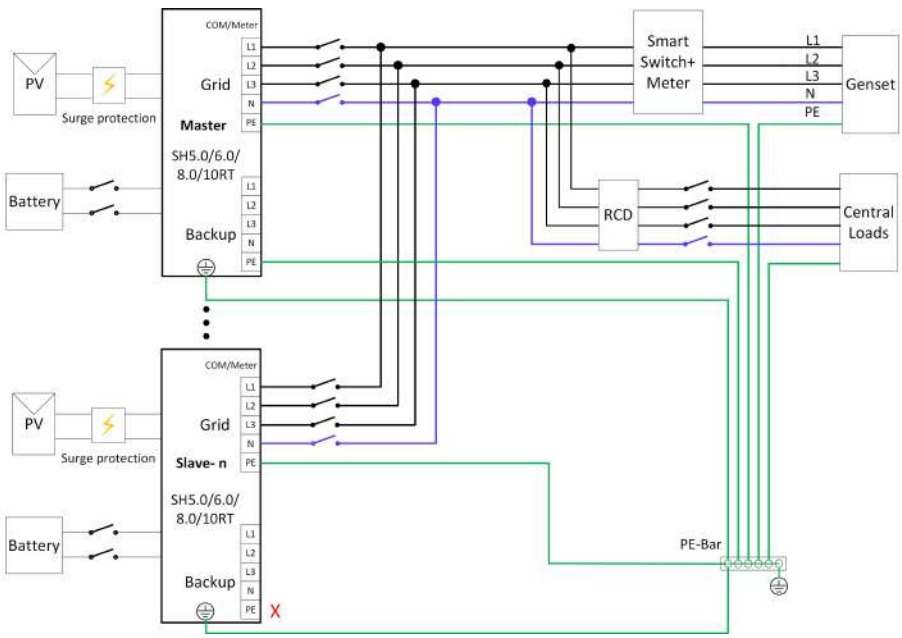


figure 2-7 Wiring diagram for other regions *

* Ensure that only the PE cable at the backup port of the master inverter is grounded in regions beyond Australia and New Zealand.

NOTICE

If there is more than one inverter in the system, the backup terminal of inverters cannot be connected to loads, nor can they be connected in parallel. If there is only one inverter in the system, the load should be connected to the backup terminal. For the wiring of other terminals, please refer to the wiring of the master inverter in the off-grid parallel system above.

- In MicroGrid mode, the grid-connected port can only be connected to the genset, not to the grid.
- In MicroGrid mode, the smart switch is necessary.
- If the number of connected inverters is different from the number set on the master inverter, the system may fail to start.

The master inverter is connected to the smart switch and the meter through RS485 communication for the system to control the smart switch. For details about cable connections. Refer to"6.7.3 RS485 Connection".

The following settings are required for the off-grid parallel connection of inverters:

- Off-grid mode enabling. Refer to "8.10.4 O_Off-grid_Parameters.dita". The off-grid mode is off by default and can be enabled first when inverters are turned on.
- Parallel configuration. Refer to "8.10.13 Parallel Configuration" to configure the master and slave inverters on iSolarCloud App.If there is only one inverter in the system, disable the parallel configuration function.
- MicroGrid mode enabling. Refer to "8.10.17 Energy Management Mode". In MicroGrid mode, select MicroGrid System Mode in DO Configuration referring to"8.10.17 DO Configuration" to control the start and stop of the genset.
- SOC control setting. Refer to "8.10.16 MicroGrid System Parameters". Select "Controlled by SOC" in iSolarCloud App and set the upper and lower limits of SOC to start/stop the genset.

The master inverter controls the start and stop of the genset according to the SOC of each battery. If the SOC of any battery is less than the lower limit for 30s, the genset starts and the system enters the MicroGrid state. If the SOC of all batteries is higher than the upper limit for 30s, the genset stops, and the system enters the off-grid state.

- When the genset is started or stopped, loads will be temporarily short of power (about two and a half minutes), please make preparations in advance.
- Due to overload, the system may fail to start in off-grid mode (black start) or shut down when loads are suddenly connected. If so, notice that the startup load or the sudden switching load power should be less than 50% of the nominal power of the parallel system, and the rest of load can be connected after the system operate normally 1min later.

2.8 Retrofitting the Existing PV System

The hybrid inverter is compatible with any three-phase PV grid-connected inverters. An existing PV system can be retrofitted to be a PV ESS with the addition of the hybrid inverter.
The power generation from the existing PV inverter will be firstly provided to the loads and then charge the battery. With the energy management function of the hybrid inverter, the self-consumption of the new system will be greatly improved.

On-grid Port to Retrofit the Existing PV System

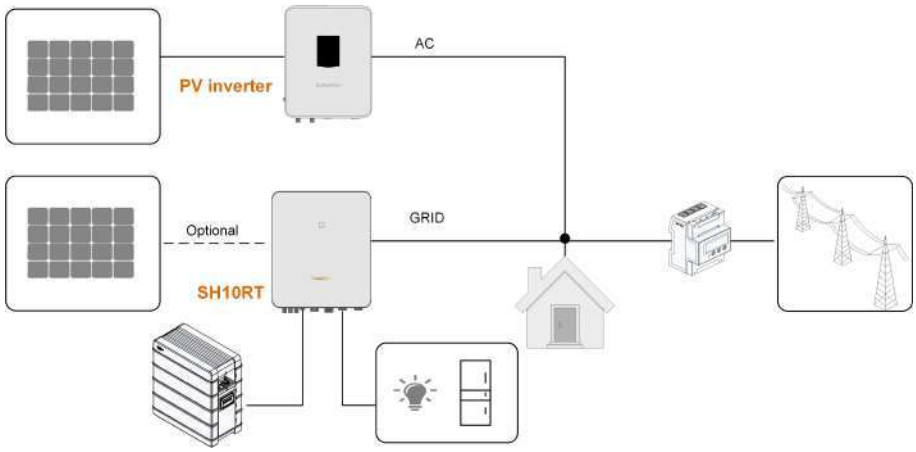


figure 2-8 On-grid Port to Retrofit the Existing PV System

The AC terminal of the PV inverter and the GRID terminal of the hybrid inverter are connected in parallel.

Backup terminal to Retrofit the Existing PV System

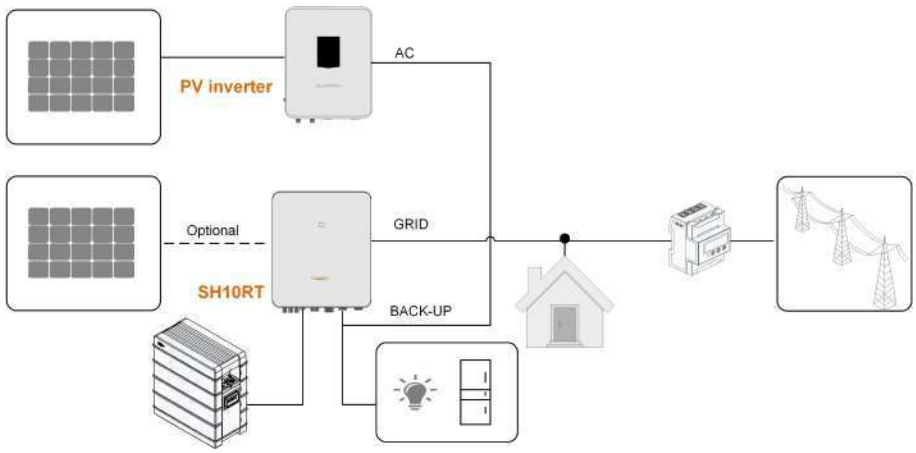


figure 2-9 Backup terminal to Retrofit the Existing PV System

The backup terminal retrofits the existing PV system in order to maximize the use of PV energy by allowing the PV inverter to work even when off-grid.

The AC terminal of the PV inverter and the BACK-UP terminal of the hybrid inverter are connected in parallel.

The PV inverter power cannot exceed the nominal power of the hybrid inverter (if it is a single-phase PV inverter, the PV inverter power cannot exceed the single-phase nominal power of the three-phase hybrid inverter).

Before retrofitting the existing PV system to an backup terminal, the "Frequency Shift Power Control" parameter needs to be enabled. For details, please refer to "8.10.14 Frequency Shift Power Control".

Note:

1 In zero-export scenario, the hybrid inverter can only ensure no power exported to grid itself but does not ensure zero export for the PV inverter. Please contact the PV inverter manufacturer for its zero-export solution.

2 PV modules for hybrid inverter are optional.

3 Function Description

3.1 Safety Function

3.1.1 Protection

Several protective functions are integrated in the inverter, including short circuit protection, grounding insulation resistance surveillance, residual current protection, anti-islanding protection, DC overvoltage / over-current protection, etc.

3.1.2 Earth Fault Alarm

The inverter has integrated a multiple-function dry-contact (DO relay), which can be used for the external alarm for earth fault. The external alarm needs to be powered by the grid.
The additional equipment required is a light indicator and/or a buzzer.
If an earth fault occurs:

- the DO dry-contact will switch on automatically to signal the earth fault alarm;
- the buzzer inside the inverter will also beep;
- the Ethernet communication port can be used for transmitting the alarm remotely.

3.2 Energy Conversion and Management

The inverter converts the DC power from the PV array or the battery to the AC power, in conformity with the grid requirements. It also transmits the DC power from the PV panel to the battery.
With the bidirectional converter integrated inside, the inverter can charge or discharge the battery.
Multiple string MPP trackers are used to maximize the power from PV strings with different orientations, tilts, or module structures.

3.2.1 Power Derating

Power derating is a way to protect the inverter from overload or potential faults. In addition, the derating function can also be activated following the requirements of the utility grid. Situations requiring inverter power derating are:

- over-temperature (including ambient temperature and module temperature)
- high input voltage
- grid under-voltage
- grid over-frequency

- power factor (when values out of the rated values)
- high altitude

3.2.2 DRM (“AU”/“NZ”)

The inverter provides a terminal block for connecting to a demand response enabling device (DRED). The DRED asserts demand response modes (DRMs). The inverter detects and initiates a response to all supported demand response commands within 2s.
The following table lists the DRMs supported by the inverter.

table 3-1 Demand Response Modes (DRMs)

Mode	Explanation
DRM0	The inverter is in the state of “Turn off”.
DRM1	The import power from the grid is 0.
DRM2	The import power from the grid is no more than 50 % of the rated power.
DRM3	The import power from the grid is no more than 75 % of the rated power.
DRM4	The import power from the grid is 100 % of the rated power, but subject to the constraints from other active DRMs.
DRM5	The feed-in power to the grid is 0.
DRM6	The feed-in power to the grid is no more than 50 % of the rated power.
DRM7	The feed-in power to the grid is no more than 75 % of the rated power.
DRM8	The feed-in power to the grid is 100 % of the rated power, but subject to the constraints from other active DRMs.

The DRED may assert more than one DRM at a time. The following shows the priority order in response to multiple DRMs.

Multiple Modes	Priority Order
DRM1…DRM4	DRM1 > DRM2 > DRM3 > DRM4
DRM5…DRM8	DRM5 > DRM6 > DRM7 > DRM8

3.2.3 Regular Operational Voltage Range

The inverters can operate within the allowable voltage range for at least the specified observation time. The setting of the conditions depends on whether the connection is due to a normal operational start-up or an automatic reconnection after tripping of the interface protection.
When the voltage level is out of the operational levels, the inverter will disconnect from the grid within the protection time. If a disturbance lasts less than the required protection time, the inverter can reconnect to the grid once the voltage level goes back to normal levels after the disturbance.

3.2.4 Regular Operational Frequency Range

The inverter can operate within its frequency range for at least the specified observation time. The setting of conditions depends on whether the connection is due to a normal operational start-up or an automatic reconnection after tripping of the interface protection.
When the frequency level is outside the operational levels, the inverter will disconnect from the grid. If a disturbance lasts less than the required protection time, the inverter can reconnect to the grid once the frequency level goes back to normal levels after the disturbance.

3.2.5 Reactive Power Regulation

The inverter is capable of operating in reactive power regulation modes for the purpose of providing support to the grid. The reactive power regulation mode can be set via the iSolarCloud App.

3.2.6 Load Control

The inverter has an integrated multiple-function dry-contact (DO relay), which can be used for load control via a contactor.
User may set the control mode according to individual demand.

- **Timing Mode:** Set the starting time and end time. The DO function will be enabled during the time interval.
- **Switch Mode:** The DO function can be enabled or disabled.
- **Intelligent Mode:** Set the starting time, end time, and the optimized power. During the interval, when the export power reaches to the optimized power, the DO function will be enabled.

3.3 Battery Management

Li-ion battery from SUNGROW, LG Chem, BYD and Pylontech are compatible with the PV ESS，further battery models will be made compatible in the furture.
The currently supported battery brands and models are shown in the following table.

Brand	Model	Firmware Version
SUNGROW	SBR096/128/160/192/224/256	≥ SBRBCU-S_22011.01.05
LG Chem	RESU7H_Type_R	DC-DC converter version ≥ 4.8 Battery management system (BMS) version ≥ 1.7.0.1
	RESU10H_Type_R	

Brand	Model	Firmware Version
BYD	Battery-Box HV 5.1, 6.4, 7.7, 9.0, 10.2, 11.5	≥ V3.013
	Battery-Box Premium HVS 5.1, 7.7, 10.2, 12.8	Battery management system (BMS) version ≥ 3.16 Battery management unit (BMU) version ≥ 3.7
	Battery-Box Premium HVM 11.0, 13.8, 16.6, 19.3, 22.1	
Pylontech	Powercube-X1/X2/H1/H2	≥ V4.6
	Force H1/H2	≥ V1.3

The table is continually updated. If the battery model is not in the table, consult SUNGROW if it is supported.

To maximize the battery life, the inverter will perform battery charge, discharge, and battery maintenance based on the battery status communicated by the BMS.

NOTICE

The recommended parameters listed in this section may be updated or revised due to product development. Please refer to the manual supplied by the battery manufacturer for the latest information.

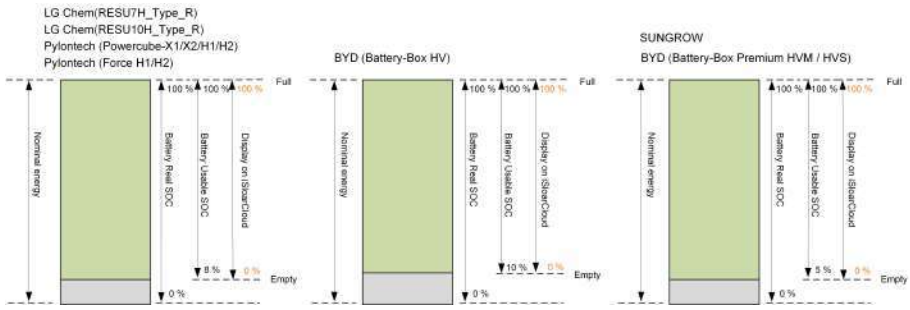
State Definition

In order to avoid overcharging or deep discharging of the battery, three battery statuses according to different voltage ranges has been defined, as shown in the following table.

table 3-2 Battery Status Definition

Type	Port Voltage / SOC		
	Empty	Normal	Full
SUNGROW (SBR096/128/160/192/224/256)	SOC < 5 %	5 %...100 % (by default)	SOC = 100 %
LG Chem(RESU7H_Type_R) LG Chem(RESU10H_Type_R)	SOC < 8 %	8 %...100 % (by default)	SOC = 100 %
BYD (Battery-Box HV)	SOC < 10 %	10 %...100 % (by default)	SOC = 100 %

Type	Port Voltage / SOC		
	Empty	Normal	Full
BYD (Battery-Box Premium HVM / HVS)	SOC < 5 %	5 %...100 %) (by default)	SOC = 100 %
Pylontech (Power-cube-X1/X2/H1/H2) Pylontech (Force H1/H2)	SOC < 8 %	8 %...100 % (by default)	SOC = 100 %



In the off-grid state, the LG Chem battery can only supply power to loads of maximum 5KW (such as RESU10H_Type_R). For the first operation of the inverter with LG Chem battery, either PV or grid needs to power the inverter to activate the LG Chem battery.

The SOC limits of Li-ion batteries can be modified via the iSolarCloud App by qualified personnel.

NOTICE

If the battery has not been used or fully charged for a long time, it is recommended to fully charge the battery manually every 15 days to ensure battery life and performance.

3.3.1 Charge Management

Backup Charge Management

The emergency charge management function is to protect the battery from the damage caused by long time excessive discharge. The inverter cannot respond to discharge command during emergency charge. The following tables describe the emergency charge conditions for different types of batteries.

table 3-3 Backup Charge Management for Li-ion Battery

Status	Conditions
Trigger	Either of the following conditions is met: • SOC ≤ (Min. SOC) – 3% (valid only when the Min. SOC is ≥ 3 %). • A battery under-voltage warning is triggered. • An emergency charge command is reported to the inverter.
Finish	All the following conditions are met: • SOC ≥ (Min. SOC) – 1% (valid only when the Min. SOC is ≥ 3 %). • The battery under-voltage warning is cleared. • The emergency charge command reported to the inverter is cleared.

table 3-4 Default SOC Conditions for Li-ion Battery Backup Charge

Type	Trigger SOC	Finishing SOC
SUNGROW	SOC ≤ 2 %	SOC ≥ 4 %
LG Chem	SOC ≤ 5 %	SOC ≥ 7 %
BYD (Battery-Box HV)	SOC ≤ 7 %	SOC ≥ 9 %
BYD (Battery-Box Premium HVM / HVS)	SOC ≤ 2 %	SOC ≥ 4 %
Pylontech	SOC ≤ 5 %	SOC ≥ 7 %

Normal Charge Management

When the battery voltage is within the normal range, the inverter can charge the battery if the PV power is higher than the load power and can ensure that the battery is never over-charged.

The maximum allowable charge current is limited to the smaller value among the following:

- the maximum charge current of the inverter (30A);
- the maximum / recommended charge current from the battery manufacturer.

For this reason, the battery charge power may not reach the nominal power.

- If the PV voltage is higher than 900 V, the battery cannot charge.
- The hybrid inverter will start to charge the battery when the export power value exceeds a pre-defined threshold value of 70 W.

3.3.2 Discharge Management

Discharge management can effectively protect the battery from deep discharging.

The maximum allowable discharge current is limited to the smaller value among the following:

- the maximum discharge current of the inverter (30A);
- the maximum / recommended discharge current from the battery manufacturer.

For this reason, the battery discharge power may not reach the nominal power.

- If the PV voltage is higher than 900 V, the battery cannot discharge.
- The hybrid system will start to discharge the battery when the import power value exceeds a threshold value of 70 W.

3.4 Communication and Configuration

The inverter provides various ports for device and system monitoring, including RS485, Ethernet, WLAN, and CAN; various parameters can be configured for optimal operation. All the inverter information is accessible through the iSolarCloud App.

4 Unpacking and Storage

4.1 Unpacking and Inspection

The product is thoroughly tested and strictly inspected before delivery. Nonetheless, damage may still occur during shipping. For this reason, please conduct a thorough inspection after receiving the product.

- Check the packing case for any visible damage.
- Check the scope of delivery for completeness according to the packing list.
- Check the inner contents for damage after unpacking.

Contact SUNGROW or the transport company in case of any damage or incompleteness, and provide photos to facilitate services.
Do not dispose of the original packing case. It is recommended to store the device in the original packing case when the product is decommissioned.

NOTICE

After receiving the product, check whether the appearance and structural parts of the product are damaged, and check whether the packing list is consistent with the actual ordered product. If there are problems with the above inspection items, do not install the device and contact SUNGROW in time.
If any tool is used for unpacking, be careful not to damage the inverter.

4.2 Scope of Delivery

figure 4-1 Scope of delivery

Item	Name	Quantity
A	Inverter	1
B	Wall-mounting bracket *	1
C	Expansion plug set	4
D	M4 screws and washers	2
E	AC/Backup connector set	2
F	Block (Optional)	1
G	Cord end terminal *	-
H	PV connectors	2 ~ 3
I	Crimp contact	2 ~ 3
J	SUNCLIX connector set	1
K	LAN connector set	1
L	COM connector set	1
M	WiNet-S module	1
N	Smart Energy Meter	1
O	RS485 cable	1
P	OT terminal *	1
Q	Documents	1

* The images shown here are for reference. The actual product and quantity are based on delivery.

4.3 Inverter Storage

Proper storage is required if the inverter is not installed immediately.

- Store the inverter in the original packing case with the desiccant inside.
- The storage temperature must be always between -30℃ and +70℃, and the storage relative humidity must be always between 0 and 95 %, non-condensing.
- In case of stacking storage, the number of stacking layers should never exceed the limit marked on the outer side of the packing case.
- The packing case should be upright.
- If the inverter needs to be transported again, pack it strictly before loading and transporting it.
- Do not store the inverter in places susceptible to direct sunlight, rain, and strong electric field.
- Do not place the inverter in places with items that may affect or damage the inverter.
- Store the inverter in a clean and dry place to prevent dust and water vapor from eroding.
- Do not store the inverter in places with corrosive substances or susceptible to rodents and insects.
- Carry out periodic inspections. Inspection shall be conducted at least once every six months. If any insect or rodent bites are found, replace the packaging materials in time.
- If the inverter has been stored for more than a year, inspection and testing by professionals are required before it can be put into operation.

NOTICE

Please store the inverter according to the storage requirements. Product damage caused by failure to meet the storage requirements is not covered by the warranty.

5 Mechanical Mounting

⚠ WARNING

Respect all local standards and requirements during mechanical installation.

5.1 Safety during Mounting

⚠ DANGER

Make sure there is no electrical connection before installation.

Before drilling, avoid the water and electricity wiring in the wall.

⚠ WARNING

Poor installation environment will affect system performance!

- **Install the inverter in a well-ventilated place.**
- **Ensure that the heat dissipation system or vent is not blocked.**
- **Do not install the inverter in an environment with flammable and explosive objects or smoke.**

⚠ CAUTION

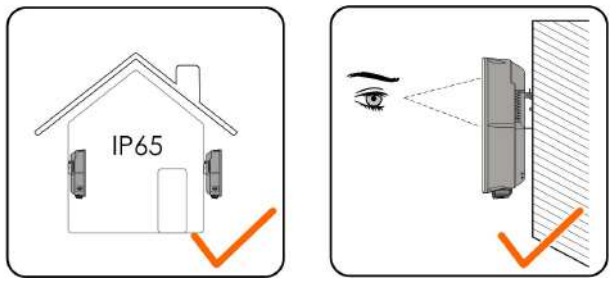
Improper handling may cause personal injury!

- **When moving the inverter, be aware of its weight and keep the balance to prevent it from tilting or falling.**
- **Wear proper protective equipment before performing operations on the inverter.**
- **The bottom terminals and interfaces of the inverter cannot directly contact the ground or other supports. The inverter cannot be directly placed on the ground.**

5.2 Location Requirements

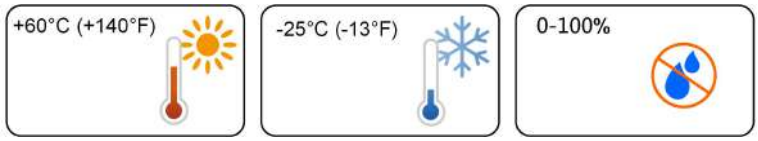
Select an optimal mounting location for safe operation, long service life and expected performance.

- The inverter with protection rating IP65 can be installed both indoors and outdoors.
- Install the inverter at a place convenient for electrical connection, operation, and maintenance.



5.2.1 Environment Requirements

- The installation environment must be free of inflammable or explosive materials.
- The location should be not accessible to children.
- The ambient temperature and relative humidity must meet the following requirements.



- Inverters free from direct sunlight, direct rain and snow have longer service life. Consider sheltered places as the installation location.
- The inverter should be well ventilated. Ensure air circulation.
- The inverter generates noise during operation and is not recommended to be installed in living areas.

5.2.2 Carrier Requirements

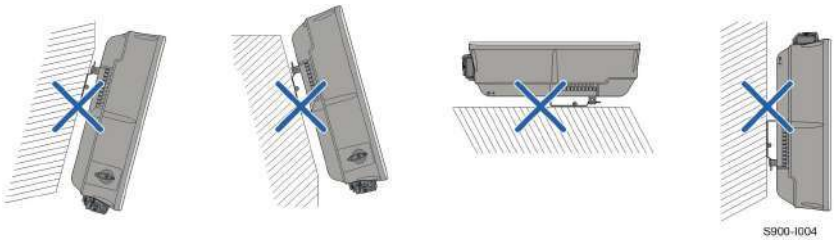
The concrete wall should be capable of withstanding a force of four times the weight of the inverter and be suitable for the dimensions of the inverter.

The installation carrier should meet the following requirements:

S900-I003

5.2.3 Angle Requirements

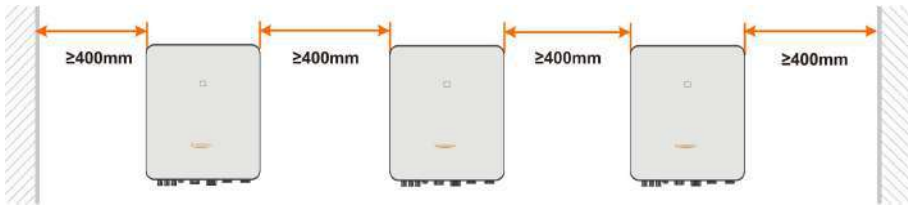
Install the inverter vertically. Never install the inverter horizontally, or at forward/backward tilted, or upside down.



5.2.4 Clearance Requirements

Reserve enough clearance around the inverter to ensure sufficient space for heat dissipation.

In case of multiple inverters, reserve specific clearance between the inverters.

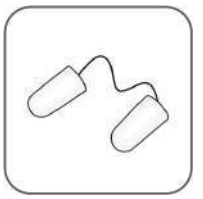


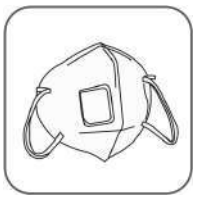
Install the inverter at an appropriate height for ease of viewing LED indicator and operating switch(es).

5.3 Installation Tools

Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site.


Goggles


Earplugs


Dust mask


Protective gloves


Insulated shoes


Utility knife


Slotted screwdriver (M4)


Phillips screwdriver (M4)


Hammer drill (φ10)


Marker


Vacuum cleaner


Rubber mallet


Wrist strap


Wire cutter


Wire stripper


Hydraulic plier


Heat gun


MC4 terminal crimping pliers 4–6mm^2


MC4 terminal wrench

Multimeter ≥ 1000V DC

Wrench

(16 mm, 46 mm)

RJ45 crimping tool

5.4 Moving the Inverter

Before installation, remove the inverter from the packing case and move it to the installation site. Follow the instructions below as you move the inverter:

- Always be aware of the weight of the inverter.
- Lift the inverter using the handles positioned on both sides of the inverter.
- Move the inverter by one or two people or by using a proper transport tool.
- Do not release the equipment unless it has been firmly secured.

⚠ CAUTION

Improper handling may cause personal injury!

- **Arrange an appropriate number of personnel to carry the inverter according to its weight, and installation personnel should wear protective equipment such as anti-impact shoes and gloves.**
- **Attention must be paid to the center of gravity of the inverter to avoid tilting during handling.**
- **Placing the inverter directly on a hard ground may cause damage to its metal enclosure. Protective materials such as sponge pad or foam cushion should be placed underneath the inverter.**
- **Move the inverter by holding the handles on it. Do not move the inverter by holding the terminals.**

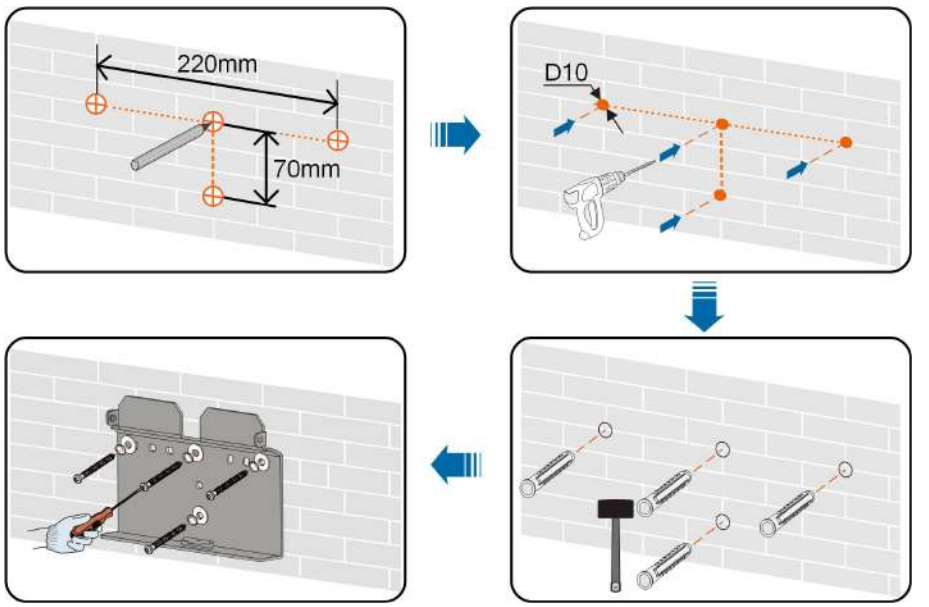
5.5 Installing the Inverter

Install the inverter on the wall using the provided wall-mounting bracket and expansion plug sets.

The expansion plug set shown below is recommended for the installation.

(1) Self-tapping screw (2) Expansion tube (3) Fender washer (4) Spring washer

step 1 Install the wall-mounting bracket.

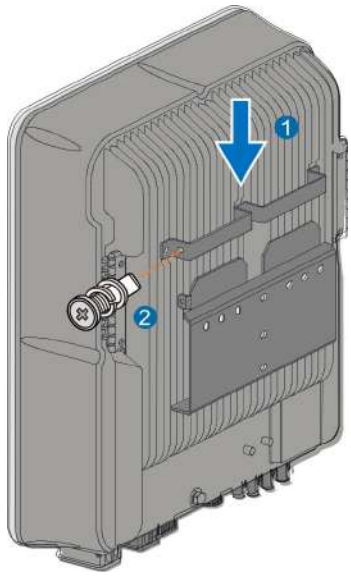


Note:

1 The depth of the holes should be about 70 mm.

2 The bubble in the bubble level on the mounting-bracket must be centered to ensure that the device will be placed horizontally.

step 2 Mount the inverter to the bracket. Secure the inverter with two M4 screws and washers. (1.5 N•m)



- - End

6 Electrical Connection

6.1 Safety Instructions

DANGER

The PV string will generate lethal high voltage when exposed to sunlight.

- **Operators must wear proper personal protective equipment during electrical connections.**
- **Must ensure that cables are voltage-free with a measuring instrument before touching DC cables.**
- **Respect all safety instructions listed in relevant documents about PV strings.**

DANGER

- **Before electrical connections, please make sure that the inverter switch and all switches connected to the inverter are set to "OFF", otherwise electric shock may occur!**
- **Ensure that the inverter is undamaged and all cables are voltage free before performing electrical work.**
- **Do not close the AC circuit breaker until the electrical connection is complete.**

DANGER

Batteries deliver electric power, resulting in burns or a fire hazard when they are short circuited, or wrongly installed.

Lethal voltages are present at the battery terminals and cables connecting to the inverter. Severe injuries or death may occur if the cables and terminals in the inverter are touched.

WARNING

Damage to the product caused by incorrect wiring is not covered by the warranty.

- **Electrical connection must be performed by professionals.**
- **Operators must wear proper personal protective equipment during electrical connections.**
- **All cables used in the PV generation system must be firmly attached, properly insulated, and adequately dimensioned.**

NOTICE

All electrical connections must comply with local and national / regional electrical standards.

- **Cables used by the user shall comply with the requirements of local laws and regulations.**
- **Only with the permission of the national / regional grid department, the inverter can be connected to the grid.**

NOTICE

All vacant terminals must be covered with waterproof covers to prevent affecting the protection rating.
When the wiring is completed, seal the gap of cable inlet and outlet holes with fire-proof / waterproof materials such as fireproof mud to prevent foreign matter or moisture from entering and affecting the long-term normal operation of the inverter.
Comply with the safety instructions related to PV strings and the regulations related to the utility grid.

The cable colors in figures in this manual are for reference only. Please select cables according to local cable standards.

6.2 Terminal Description

All electrical terminals are located at the bottom of the inverter.

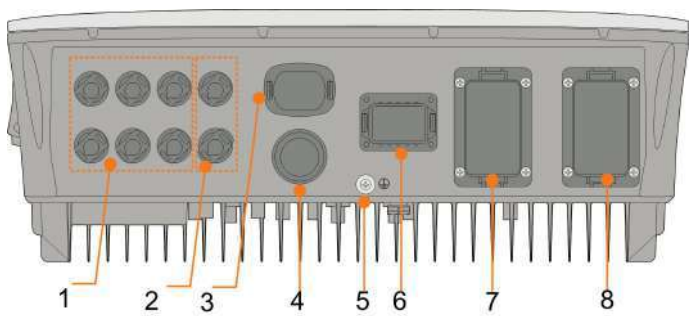


figure 6-1 Terminals at the Bottom of the Inverter

* The image shown here is for reference only. The actual product received may differ.

No.	Name	Description
1	PV terminals	Positive and negative DC input connectors Two or three pairs, depending on the inverter model
2	Battery connection	Connectors for the battery power cables
3	WLAN terminal	Connector for the WiNet—S module
4	LAN terminal	Connector for the EMS, router, and data logger
5	Additional grounding terminal	For reliable grounding
6	COM terminal	Connector for Smart Energy Meter, RS485, BMS/CAN, DRM/DI and DO
7	BACK-UP terminal	AC terminal reserved for Backup loads
8	GRID terminal	AC terminal for connection to the utility grid

table 6-1 The label of COM terminal

Meter		BMS/CAN		DI/DRM			DO
A2	B2	H	L	D1/5	D3/7	R	NO
A1	B1	EN_H	EN_G	D2/6	D4/8	C	COM
RS485		Enable					

table 6-2 The label description of COM terminal

No.	Label	Description
1	Meter (A2, B2)(1)	• Connect to the Smart Energy Meter. (If installing a single inverter or if installing the master inverter in a sring of parallel inverters.) • Enable the communication between inverters in parallel. (If installing a slave inverter in a string of parallel inverters.)
2	RS485 (A1, B1)(1)(2)	• Connect to the LG Chem Li-ion battery , use with Enable terminal • Connect to an external device to receive the command to shut down the inverter remotely (Italy only) or enable the communication between inverters in parallel. (If installing a master inverter in a string of parallel inverters.)
3	BMS/CAN	To enable the communication between the inverter and the Li-ion battery
4	Enable	Connect to the LG Chem Li-ion battery , use with RS485 terminal

No.	Label	Description
5	DI/DRM	• "AU"/"NZ": Demand response enabling device (DRED) • "IT": interface protection system (SPI) • "DE": Ripple Control Receiver (RCR)
6	DO	• Connect to an external light indicator and/or buzzer to signal an alarm. • Connect to home load (such as SG Ready Heat Pump) for power management.

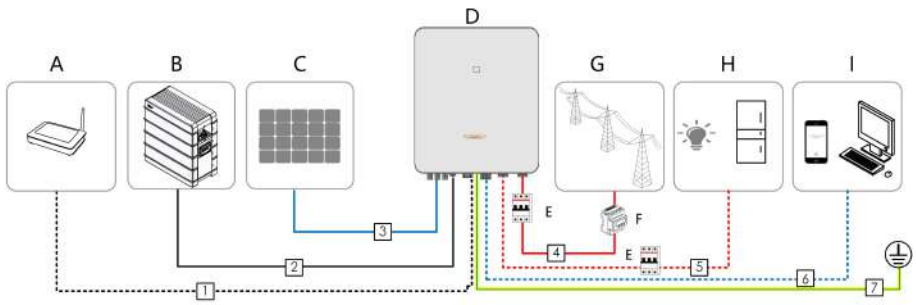
(1) When the inverter is connected to a third-party monitoring device, please confirm which communication interface is used, and whether it will cause loss of certain functions of the inverter.

(2) When RS485 (A1, B1) is used for parallel connection in the master inverter, the LG Chem battery (that uses RS485 for communication) cannot be used with the master inverter. It can still be used with the slave inverter.

6.3 Electrical Connection Overview

System Wiring Diagram

The electrical connection should be realized as follows:



(A) Router	(B) Battery	(C) PV string
(D) Inverter	(E) AC circuit breaker	(F) Smart Energy Meter
(G) Grid	(H) Backup loads	(I) Monitoring device

table 6-3 Cable requirements

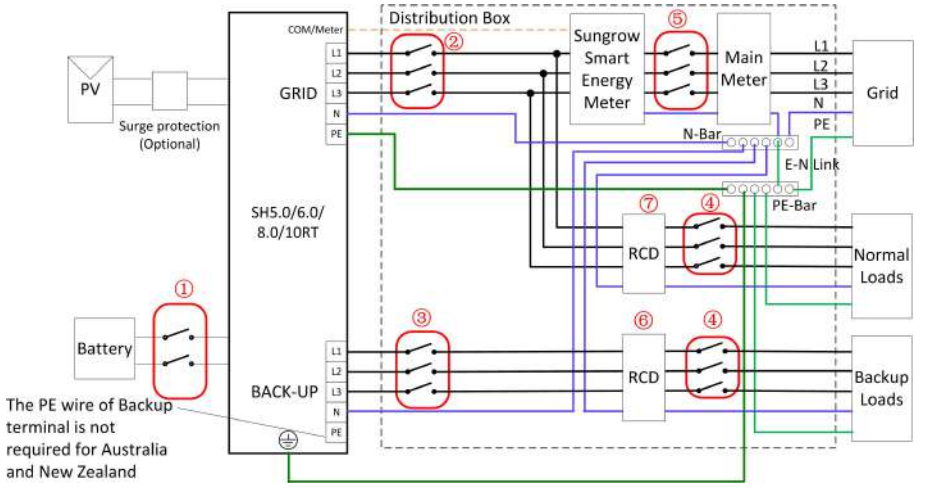
N-o.	Cable	Type	Specification	
			Outer diameter	Cross section
1	Ethernet cable	CAT 5E outdoor shielded network cable	5.3 ~ 7 mm	8 * 0.2 mm²
2	Power Cable	Complying with 1,000V and 35A standard	5.5 ~ 8 mm	4 mm²

No.	Cable	Type	Specification	
			Outer diameter	Cross section
		Complying with 1,000V and 40A standard		6 mm²
3	DC cable	Outdoor multi-core copper wire cable Complying with 1,000V and 30A standard	6 ~ 9 mm	4 ~ 6 mm²
4	AC cable *	Outdoor multi-core copper wire cable	14 ~ 25 mm	6 ~ 10 mm²
5			12 ~ 14 mm	4 ~ 6 mm²
6	Communication cable	Shielded twisted pair	5.3 ~ 7 mm	2 * (0.5 ~ 1.0) mm²
		CAT 5E outdoor shielded network cable		8 * 0.2 mm²
7	Additional Grounding cable *	Outdoor single-core copper wire cable	The same as that of the PE wire in the AC cable	

* If local regulations have other requirements for cables, set the cable specification according to the local regulations.

Backup Wiring Diagram

For Australia and New Zealand, the neutral cable of GRID side and BACK-UP side must be connected together according to the wiring rules AS/NZS_3000. Otherwise BACK-UP function will not work.



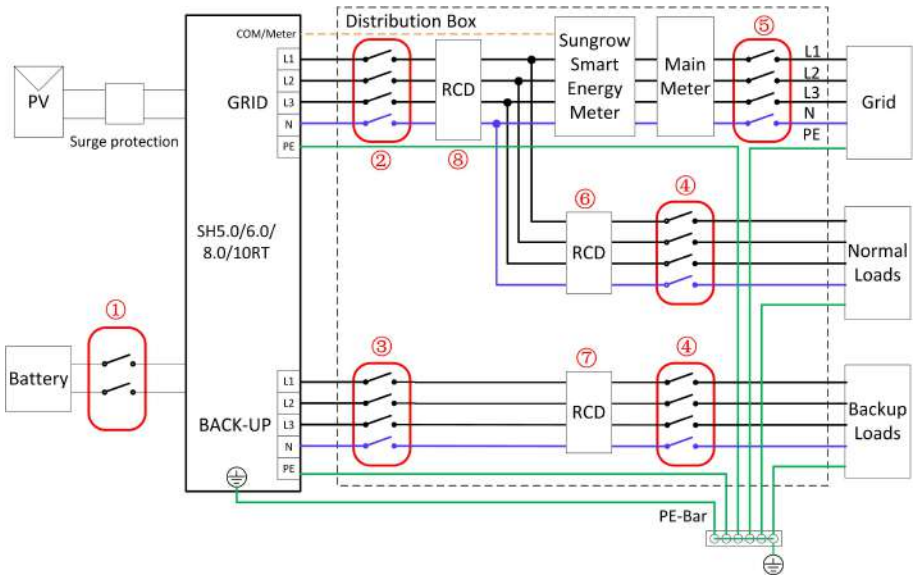
NO.	SH5.0/6.0RT	SH8.0/10RT
①	40A/600V DC breaker *	
②	25A/400V AC breaker	32A/400V AC breaker
③	25A/400V AC breaker	
④	Depends on loads	

NO.	SH5.0/6.0RT	SH8.0/10RT
⑤	Depends on household loads and inverter capacity	
⑥⑦	30mA RCD (Comply with local regulation)	

Note: * If the battery is integrated with a readily accessible internal DC breaker, no additional DC breaker is required.

Note: The values in the table are recommended values and can be set to other values according to actual conditions.

For other countries, the following diagram is an example for grid systems without special requirement on wiring connection.

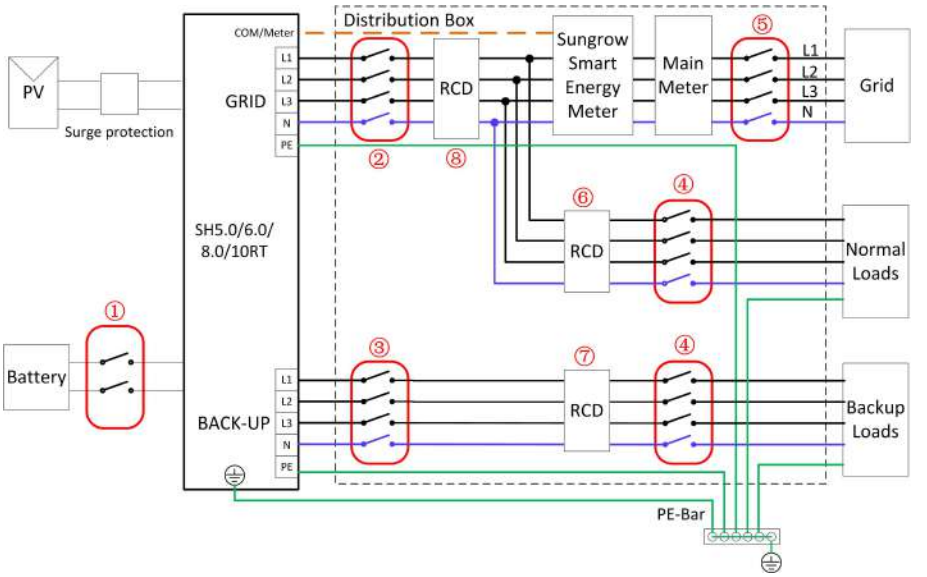


NO.	SH5.0/6.0RT	SH8.0/10RT
①	40A/600V DC breaker *	
②	25A/400V AC breaker	32A/400V AC breaker
③	25A/400V AC breaker	
④	Depends on loads	
⑤	Depends on household loads and inverter capacity (Optional)	
⑥⑦	30mA RCD (Recommended)	
⑧	300mA RCD (Recommended)	

Note: * If the battery is integrated with a readily accessible internal DC breaker, no additional DC breaker is required.

Note: The values in the table are recommended values and can be set to other values according to actual conditions.

In the TT system, the following diagram is an example for grid systems without special requirement on wiring connection.



NO.	SH5.0/6.0RT	SH8.0/10RT
①	40A/600V DC breaker *	
②	25A/400V AC breaker	32A/400V AC breaker
③	25A/400V AC breaker	
④	Depends on loads	
⑤	Depends on household loads and inverter capacity	
⑥⑦	30mA RCD (Recommended)	
⑧	300mA RCD (Recommended)	

Note: * If the battery is integrated with a readily accessible internal DC breaker, no additional DC breaker is required.

Note: The values in the table are recommended values and can be set to other values according to actual conditions.

6.4 External Grounding Connection

DANGER

Electric shock!

- **Make sure that the ground cable is connected reliably. Otherwise, it may cause electric shock.**

WARNING

- **Since the inverter is not equipped with a transformer, neither the negative electrode nor the positive electrode of the PV string can be grounded. Otherwise, the inverter will not operate normally.**
- **Connect the grounding terminal to the protective grounding point before AC cable connection, PV string connection, and communication cable connection.**
- **The ground connection of this additional grounding terminal cannot replace the connection of the PE terminal of the AC cable. Make sure those terminals are both grounded reliably. SUNGROW shall not be held liable for any damage caused by the violation.**

6.4.1 External Grounding Requirements

All non-current carrying metal parts and device enclosures in the PV power system should be grounded, for example, brackets of PV modules and inverter enclosure.

When there is only one inverter in the PV system, connect the external grounding cable to a nearby grounding point.

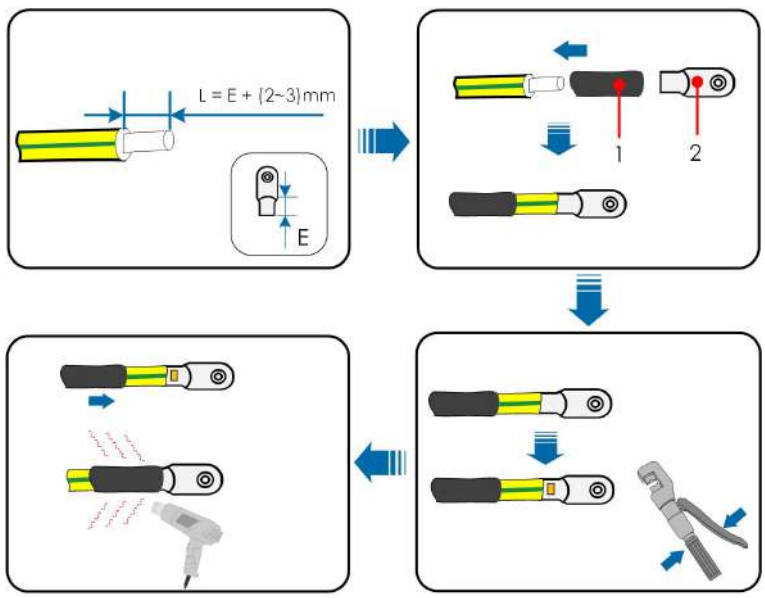
When there are multiple inverters in the PV system, connect grounding points of all inverters and the PV array frames to the equipotential cable (according to the onsite conditions) to implement an equipotential connection.

6.4.2 Connection Procedure

There are two additional grounding terminals located at the bottom and right side of the inverter. Connect either one.

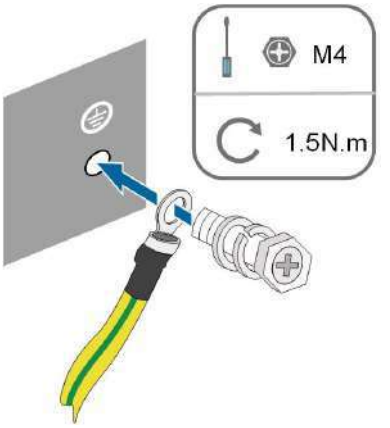
Additional grounding cable is prepared by customers.

step 1 Prepare the cable and OT/DT terminal.



(1) Heat shrink tubing (2) OT/DT terminal

step 2 Remove the screw on the grounding terminal and fasten the cable with a screwdriver.



step 3 Apply paint to the grounding terminal to ensure corrosion resistance.

- - End

6.5 AC Cable Connection

6.5.1 AC Side Requirements

Only with the permission of the local grid department, the inverter can be connected to the grid.

Before connecting the inverter to the grid, ensure the grid voltage and frequency comply with requirements, for which, refer to **"Technical Date"**. Otherwise, contact the electric power company for help.

AC Circuit Breaker

An independent three or four-pole circuit breaker must be installed on the output side of the inverter to ensure safe disconnection from the grid.

Inverter Model	Recommended Specification
SH5.0RT	25 A
SH6.0RT	
SH8.0RT	32 A
SH10RT	

⚠ WARNING

AC circuit breakers should be installed on the output side of the inverter and the grid side to ensure safe disconnection from the grid.

- **Determine whether an AC circuit breaker with greater overcurrent capacity is required based on actual conditions.**
- **Do not connect any local load between the inverter and the AC circuit breaker.**
- **Multiple inverters cannot share one AC circuit breaker.**

Residual Current Monitoring Device

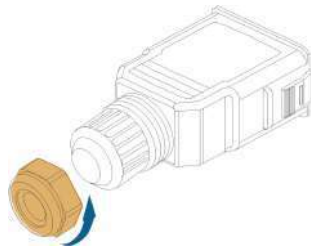
With an integrated universal current-sensitive residual current monitoring unit included, the inverter will disconnect immediately from the mains power once a fault current with a value exceeding the limit is detected.

However if an external residual current device (RCD) is mandatory, the switch must be triggered at a residual current of 300 mA (recommended), or it can be set to other values according to local regulations. For example in Australia, the inverter can use an additional 30 mA(type A)RCD in installations.

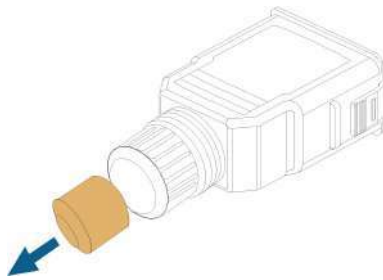
6.5.2 Assembling the AC Connector

The AC terminal block is on the bottom side of the inverter. AC connection is the three-phase-four-wire grid + PE connection (L1, L2, L3, N, and PE).

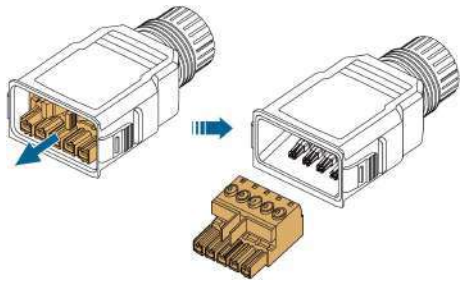
step 1 Unscrew the swivel nut of the AC connector.



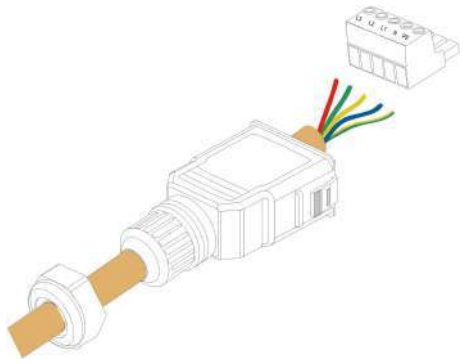
step 2 **(Optional)** Remove the inner sealing ring if the cable diameter is between 19 mm ~ 25 mm. Otherwise skip this step.



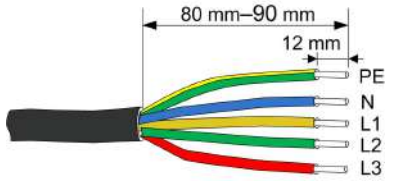
step 3 Take out the terminal plug from the housing.



step 4 Thread the AC cable of appropriate length through the swivel nut and the housing.

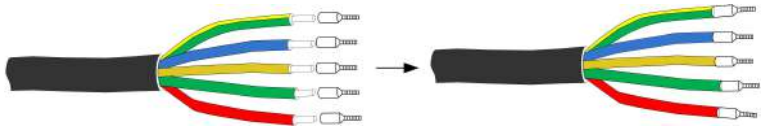


step 5 Strip 80 mm ~ 90 mm of the cable jacked and 12 mm of the wire insulation.



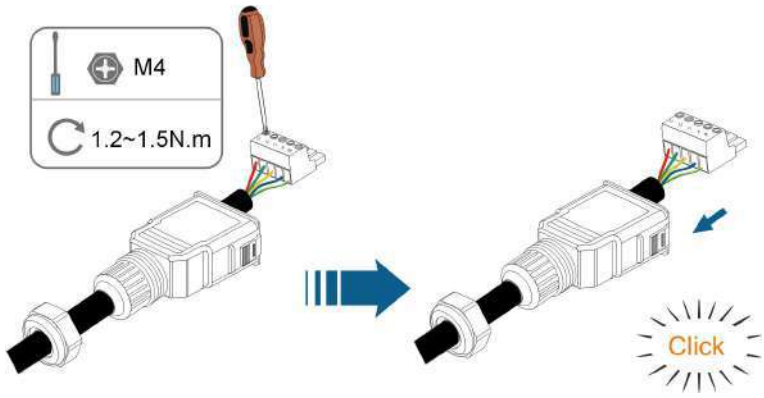
The color of the cable cores in the figure is for reference only, and cables or cable cores selected must meet local standards.

step 6 **(Optional)** When using a multi-core multi-strand copper wire cable, connect the AC wire head to the cord end terminal (hand-tight). In case of single-strand copper wire, skip this step.



Select appropriate cord end terminal according to the cable cross-section area.

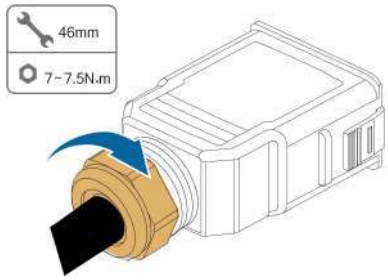
step 7 Fix all the wires to the terminal plug according to the assignment and tighten to a torque of 1.2 N•m–1.5 N•m with a screwdriver. Then push the terminal plug into the housing until there is an audible click.



NOTICE

Observe the plug assignment. Do not connect any phase line to the "PE" terminal or the PE wire to the "N" terminal. Otherwise, unrecoverable damage to the inverter may follow.

step 8 Ensure that the wires are securely in place by slightly pulling them. Tighten the swivel nut to the housing.



- - End

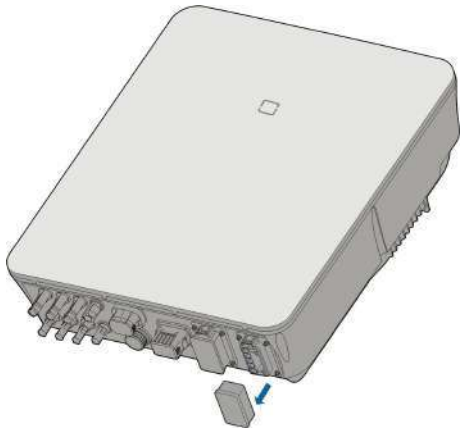
6.5.3 Installing the AC Connector

DANGER

High voltage may be present in inverter!
Ensure all cables are voltage-free before electrical connection.
Do not connect the AC circuit breaker until all inverter electrical connections are completed.

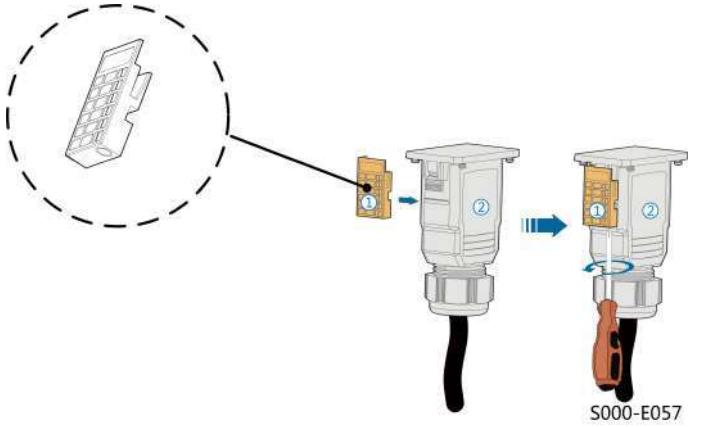
step 1 Disconnect the AC circuit breaker and secure it against reconnection.

step 2 Remove the waterproof lid from the **GRID** terminal.



step 3 Insert the AC connector into the **GRID** terminal on the bottom of the inverter until there is an audible sound.

step 4 **(Optional)** Insert the block into AC connector, as shown in the figure below.



1 Insert block ① into AC connector ② from the side.

2 Tighten the screw on the bottom of block ①.

step 5 Connect PE cable to ground.

step 6 Connect phase cable and “N” cable to AC circuit breaker.

step 7 Connect AC circuit breaker to utility grid.

step 8 Make sure all AC cables are firmly installed via the right torque tool or dragging the cables slightly.

- - End

6.6 DC Cable Connection

⚠ DANGER

The PV string will generate lethal high voltage when exposed to sunlight.

- **Respect all safety instructions listed in relevant documents about PV strings.**

⚠ WARNING

- **Make sure the PV array is well insulated to ground before connecting it to the inverter.**
- **Make sure the maximum DC voltage and the maximum short circuit current of any string never exceed inverter permitted values specified in "Technical Data".**
- **Check the positive and negative polarity of the PV strings, and connect the PV connectors to corresponding terminals only after ensuring polarity correctness.**
- **During the installation and operation of the inverter, please ensure that the positive or negative electrodes of PV strings do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in equipment damage. The damage caused by this is not covered by the warranty.**
- **Electric arc or contactor over-temperature may occur if the PV connectors are not firmly in place, and SUNGROW shall not be held liable for any damage caused.**
- **If the DC input cables are reversely connected and the DC switch has been rotated to "ON", do not operate immediately. Otherwise, the inverter may be damaged. Please turn the DC switch to "OFF" and remove the DC connector to adjust the polarity of the strings when the string current is lower than 0.5 A.**

⚠ WARNING

Before connecting the PV array to the inverter, ensure that the impedances between the positive terminals of the PV string and earth, and between the negative terminals of the PV string and earth are larger than 1 M Ohm.

NOTICE

The following requirements about PV string connection must be met. Otherwise, it may cause irreversible damage to the inverter, which is not covered by the warranty.

- **Mixed use of different brand or model of PV modules in one MPPT circuit, or PV modules of different orientation or angles in a string may not damage inverter but will cause system bad performance!**

6.6.1 PV Input Configuration

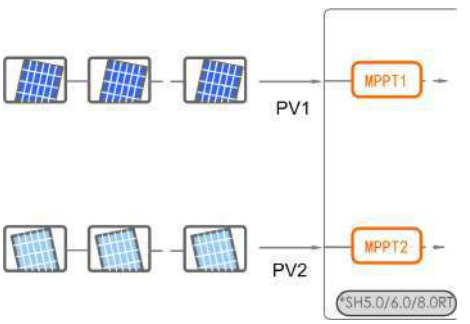
In Australia and New Zealand, ensure the DC power for any PV string never exceeds a certain level with regards to the string voltage to avoid derating:

≤ 12.5 kW if string voltage is lower than 500 V

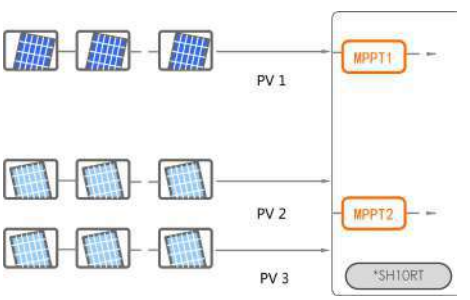
≤ 10 kW if string voltage is between 500 V and 800 V

≤ 8 kW if string voltage is between 800 V and 1000 V

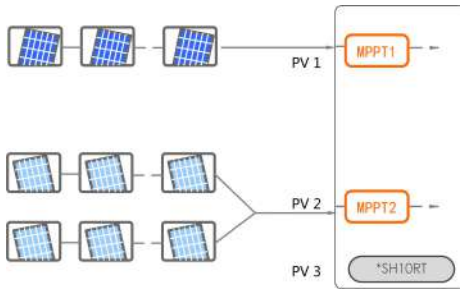
For SH5.0/6.0/8.0RT, each PV input operates independently and has its own MPPT. In this way, string structures of each PV input may differ from each other, including PV module type, number of PV modules in each string, angle of tilt, and installation orientation.



For SH10RT, each pair of PV terminals is corresponding to an independent PV string. PV input PV1 connect to MPPT1 and PV2, PV3 connect to MPPT2. For the best use of PV power, PV2 and PV3 should be the same in PV string structure, including the type, number, tilt, and orientation of the PV modules.



For SH10RT, if two PV strings are paralleled externally, the paralleled strings can be connected to PV2 or PV3 only, and the other one cannot be used to connect other PV strings.



Prior to connecting the inverter to PV inputs, the following electrical specifications must be met simultaneously:

Model	Open-circuit Voltage Limit	Max. current for Input Connector
SH5.0RT	1000 V	30 A
SH6.0RT		
SH8.0RT		
SH10RT		

6.6.2 Assembling the PV Connectors

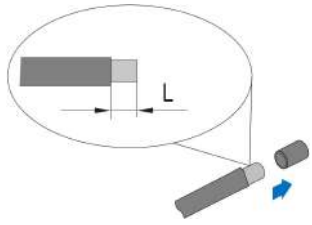
DANGER

High voltage may be present in the inverter!

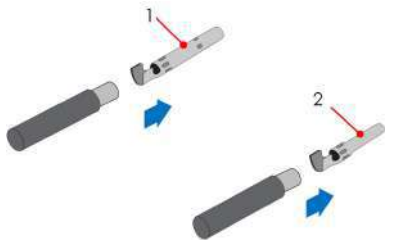
- **Ensure all cables are voltage-free before performing electrical operations.**
- **Do not connect the DC switch and AC circuit breaker before finishing electrical connection.**

To ensure IP65 protection, use only the supplied connector.

step 1 Strip the insulation from each DC cable by 7 mm–8 mm.

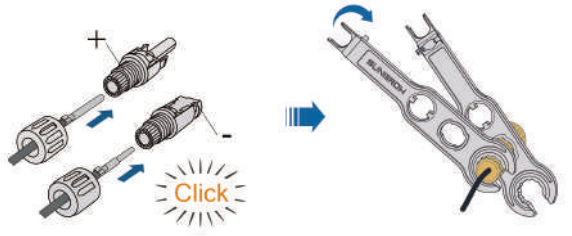


step 2 Assemble the cable ends with the crimping pliers.



1: Positive crimp contact 2: Negative crimp contact

step 3 Lead the cable through cable gland, and insert the crimp contact into the insulator until it snaps into place. Gently pull the cable backward to ensure firm connection. Tighten the cable gland and the insulator (torque 2.5 N.m to 3 N.m).



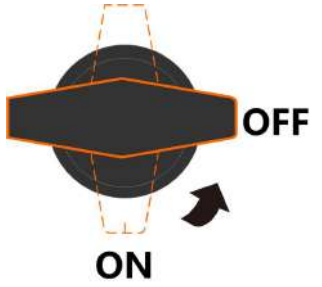
step 4 Check for polarity correctness.

NOTICE
If the PV polarity is reversed, the inverter will be in a fault or alarm state and will not operate normally.

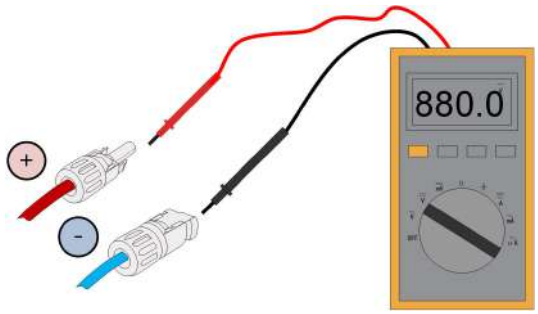
- - End

6.6.3 Installing the PV Connector

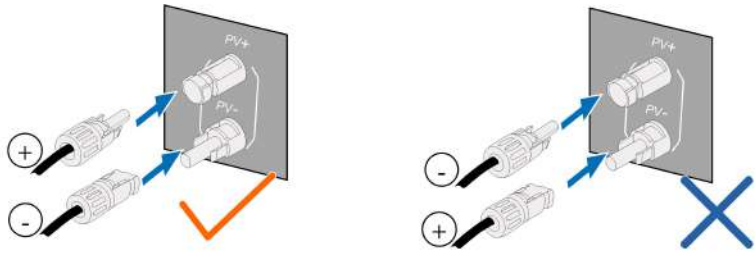
step 1 Rotate the DC switch to “OFF” position.



step 2 Check the cable connection of the PV string for polarity correctness and ensure that the open circuit voltage in any case does not exceed the inverter input limit of 1,000V.



step 3 Connect the PV connectors to corresponding terminals until there is an audible click.



step 4 Follow the foregoing steps to connect PV connectors of other PV strings.

step 5 Seal any unused PV terminal with a terminal cap.

- - End

6.7 Communication Connection

LAN function

- Through the Modbus TCP/IP protocol, the EMS or the Logger from the third party can fully control the on/off, derating, charging and discharging of the inverter.
- **(Optional)** The inverter operation information can be transferred to the iSolarCloud server via the router.

WLAN function

With the WiNet-S module installed, view corresponding information through iSolarCloud App or iSolarCloud Web.

RS485 function

The RS485 communication interfaces are used to establish communication connection with monitoring devices.

6.7.1 Ethernet Connection

The following figure shows how the Ethernet connection may work with a router.

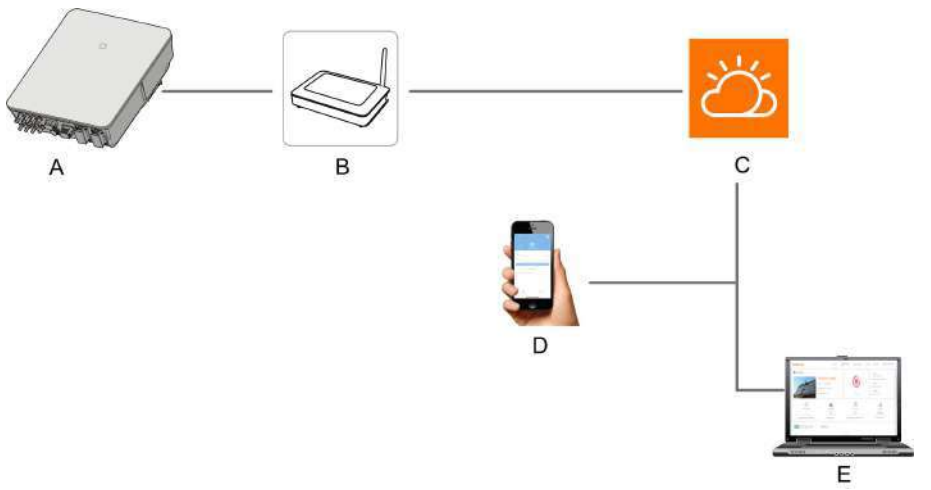


figure 6-2 Ethernet Connection with a Router

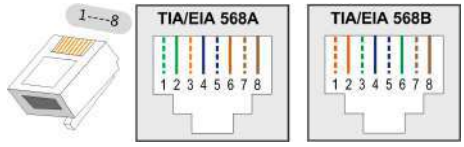
(A) Inverter (B) Router/Switch (C) iSolarCloud server

(D) iSolarCloud App (E) iSolarCloud

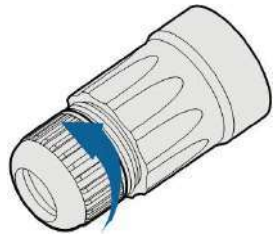
6.7.1.1 Assembling the LAN Connector

Skip step 1 if the standard network cable with RJ45 plug is prepared.

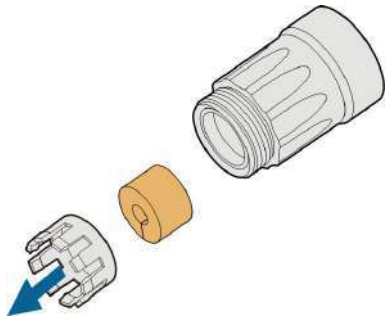
step 1 **(Optional)** Strip the insulation layer of the communication cable with an Ethernet wire stripper, and lead the corresponding signal cables out. Insert the stripped communication cable into the RJ45 plug in the correct order, and crimp it with a crimper.



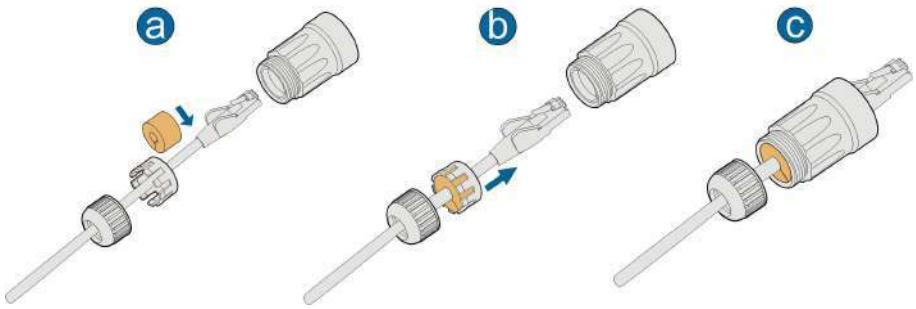
step 2 Unscrew the swivel nut from the connector.



step 3 Remove the inner rubber gasket.



step 4 Insert the RJ45 plug into the front plug connector until there is an audible click, and install the rubber gasket.



- - End

6.7.1.2 Installing the LAN Connector

step 1 Unscrew the waterproof lid from the **LAN** terminal.

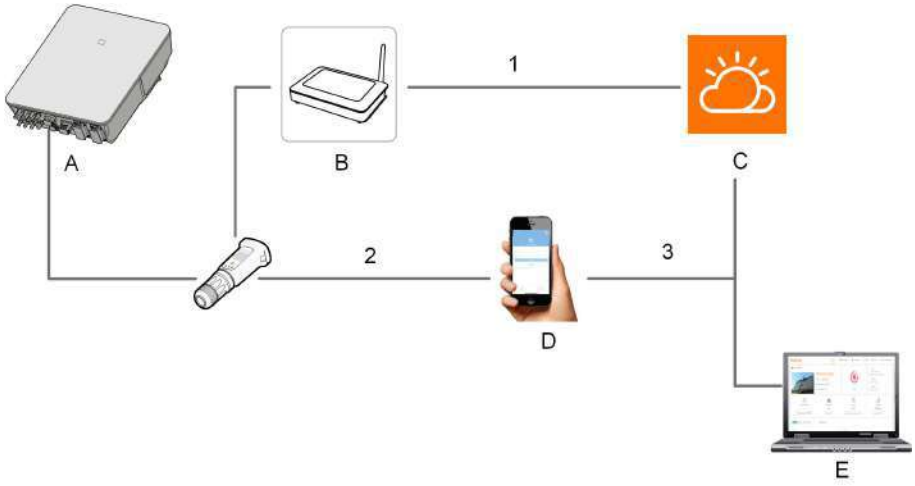
step 2 Insert the LAN connector into **LAN** terminal on the bottom of the inverter.

step 3 Pull cables outwards to confirm whether they are fastened firmly, then tighten the swivel nut with appropriate torque.

- - End

6.7.2 WiNet-S Connection

The WiNet-S module supports Ethernet communication and WLAN communication. It is not recommended to use both communication methods at the same time.



(A) Inverter (B) Router/Switch (C) iSolarCloud server

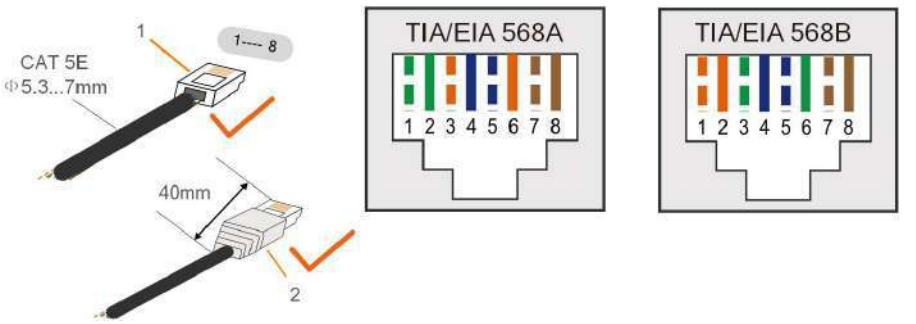
(D) iSolarCloud App (E) iSolarCloud

(1) Internet (2) Local access (3) Remote

For details, see the quick guide for the WiNet-S module. Scan the following QR code for the quick guide.

6.7.2.1 Ethernet Communication

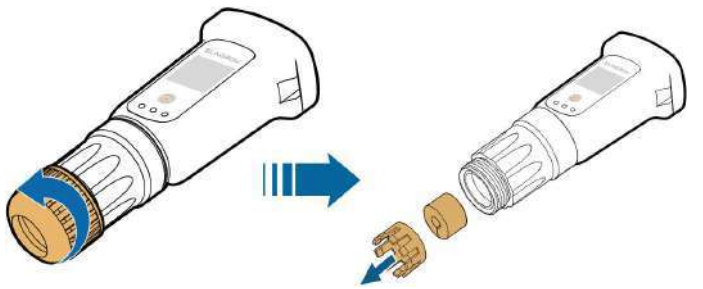
step 1 **(Optional)** Strip the insulation layer of the communication cable with an Ethernet wire stripper, and lead the corresponding signal cables out. Insert the stripped communication cable into the RJ45 plug in the correct order, and crimp it with a crimper.



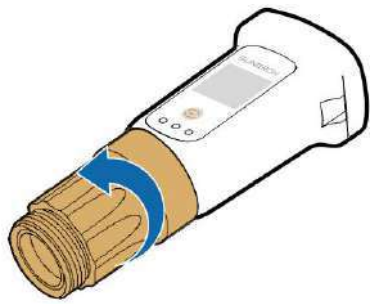
1: RJ45 plug 2：Protective cap

Skip this step if a standard network cable with RJ45 plug is prepared.

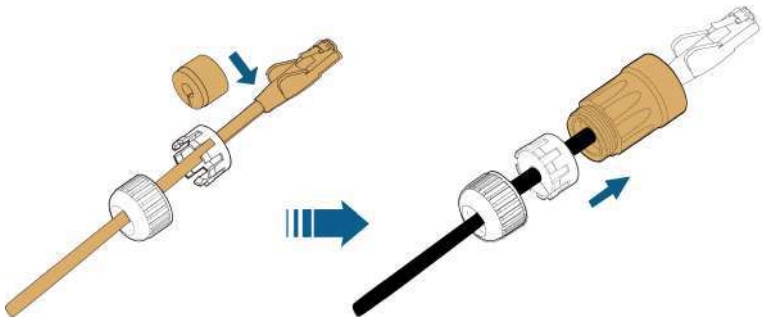
step 2 Unscrew the swivel nut from the communication module and take out the inner sealing ring.



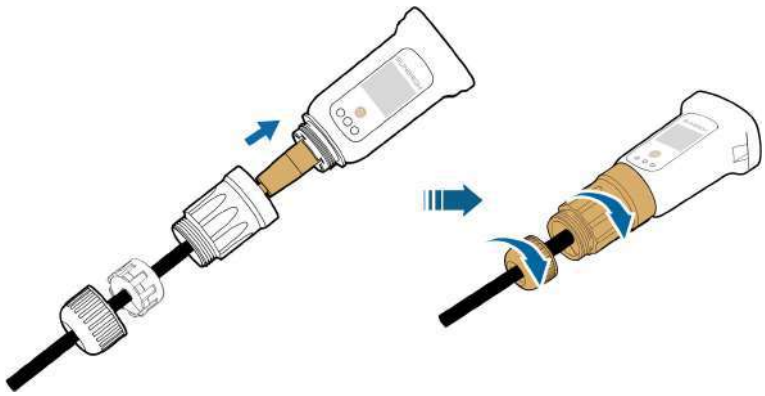
step 3 Unscrew the housing from the communication module.



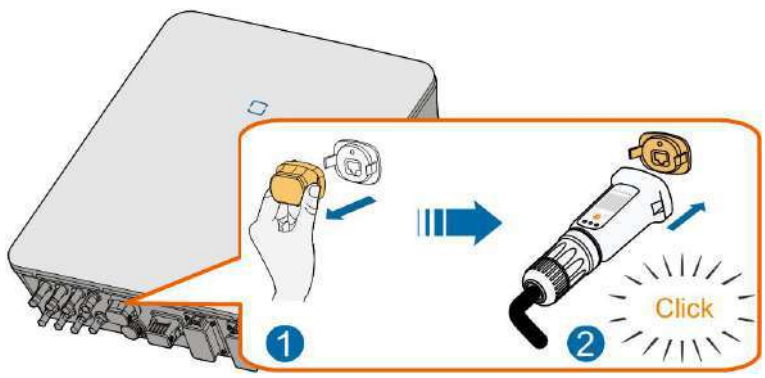
step 4 Thread the network cable through the swivel nut and gasket. Afterwards, route the cable into the opening of the sealing. Finally, insert the cable through the housing.



step 5 Insert the RJ45 plug into the front plug connector until there is an audible click and tighten the housing. Install the gasket and fasten the swivel nut.



step 6 Remove the waterproof lid from the **WLAN**terminal and install WiNet-S.



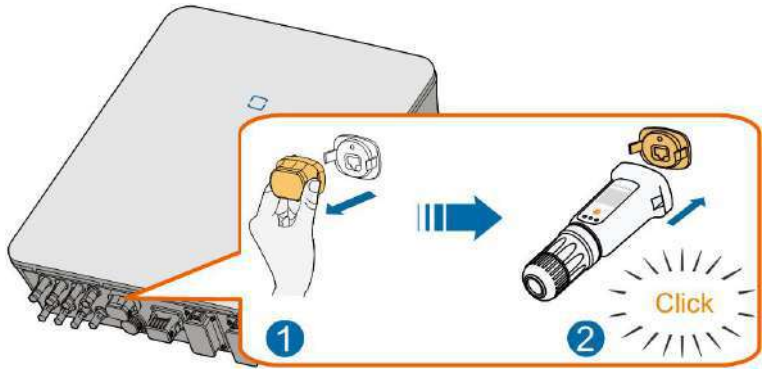
step 7 Slightly shake it by hand to determine whether it is installed firmly.

- - End

6.7.2.2 WLAN Communication

step 1 Remove the waterproof lid from the **WLAN** terminal.

step 2 Install the module. Slightly shake it by hand to determine whether it is installed firmly, as shown below.



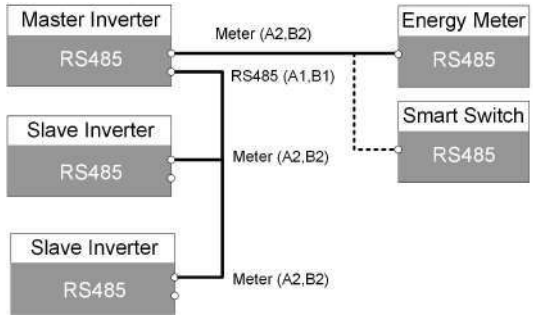
step 3 Refer to the guide delivered with the module for the set-up.

- - End

6.7.3 RS485 Connection

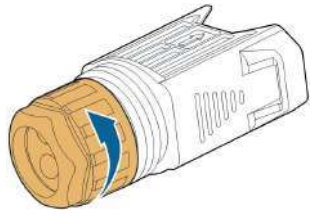
Where there is only one inverter, the RS485 can be connected to an external device for the communication.

Where there are two or more inverters in parallel, the RS485 connection enables the communication between master inverter and slave inverter, as shown in the following figure.

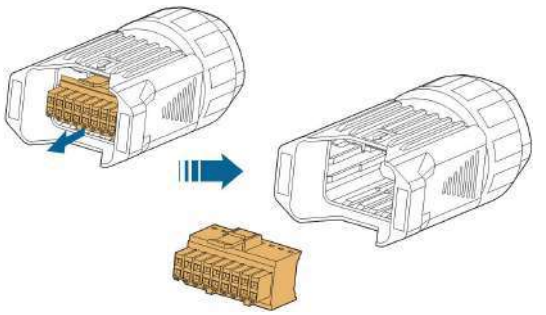


6.7.3.1 Assembling the COM Connector

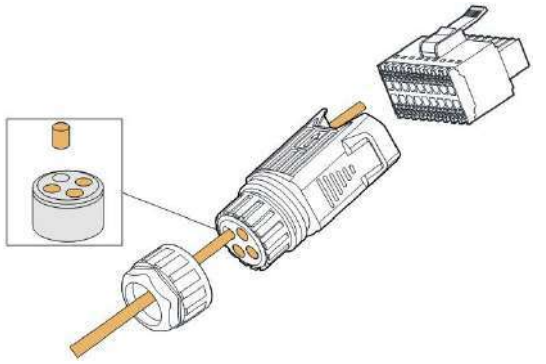
step 1 Unscrew the swivel nut from the connector.



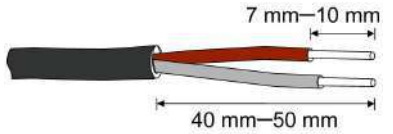
step 2 Take out the terminal block.



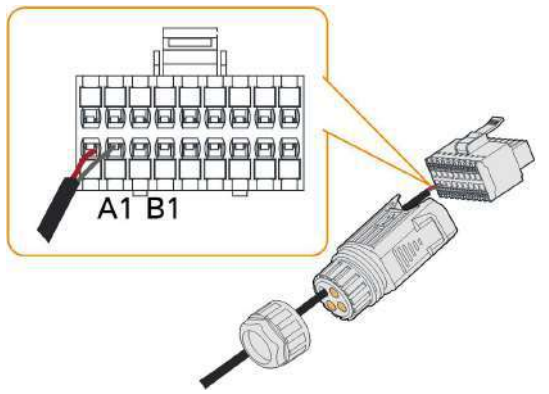
step 3 Remove the seal and lead the cable through the cable gland.



step 4 Remove the cable jacket and strip the wire insulation.

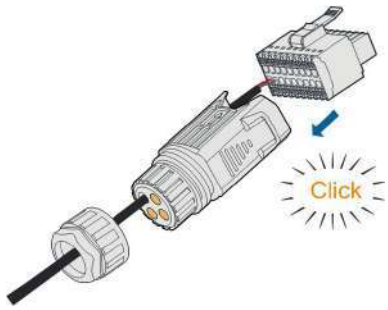


step 5 Plug the wires into the **RS485** terminal according the labels on the bottom of the inverter.

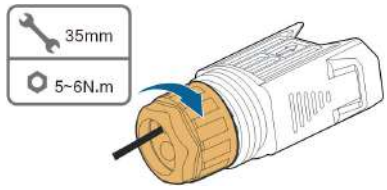


step 6 Pull the wires outward to check whether they are firmly installed.

step 7 Insert the terminal block into the connector until it snaps into place with an audible click.



step 8 Fasten the swivel nut.



- - End

6.7.3.2 Installing the COM Connector

step 1 Remove the waterproof lid from the **COM** terminal.

step 2 Insert the COM connector into **COM** terminal on the bottom of the inverter until there is an audible click.

- - End

6.8 Smart Energy Meter Connection

The inverter is equipped with the feed-in power limit function, so as to meet the requirements of some national standards or grid standards for the output power at the grid connection point. For the setting of feed-in power limit, refer to the section "8.5.1 Feed-in Limitation".

Contact SUNGROW to ensure that the Smart Energy Meter model is available locally.

This section mainly describes the cable connections on the inverter side. Refer to the quick guide delivered with the Smart Energy Meter for the connections on the meter side.

Procedure

For detailed connection description of the Smart Energy Meter cable, refer to the section "6.7.3 RS485 Connection". Plug the wires into the **Meter** terminal according the labels on the bottom of the inverter.

6.9 Battery Connection

This section mainly describes the cable connections on the inverter side. Refer to the instructions supplied by the battery manufacturer for the connections on the battery side and configuration.

⚠ WARNING

Only use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, use electrical tape to cover the entire exposed metal surfaces of the available tools except their tips.

⚠ WARNING

The plug connector must be connected only by trained electricians.

⚠ WARNING

Do not disconnect under load!

Battery connectors must not be disconnected while under load. They can be placed in a no load state by shutting down the inverter completely.

WARNING

During the installation and operation of the inverter, please ensure that the positive or negative polarities of batteries do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in equipment damage. The damage caused by this is not covered by the warranty.

The hybrid inverter is not connected to a battery and does not support off-grid operation functions.

6.9.1 Connecting the Power Cable

A fuse with the specification of 700 V / 50 A is integrated to the **BAT-** terminal.

NOTICE

A two-pole DC circuit breaker with over-current protection (voltage rating not less than 600 V and current rating not less than 40 A) should be installed between the inverter and the battery.
If the battery is integrated with a readily accessible internal DC breaker, no additional DC breaker is required.

All power cables are equipped with water-proof direct plug-in connectors, which match the battery terminals at the bottom of the inverter.

6.9.1.1 Assembling the SUNCLIX Connector

NOTICE

During assembly, be careful not to contaminate, pull out, or shift, the seal in the cable gland. A contaminated or shifted seal impairs strain relief and leak tightness.

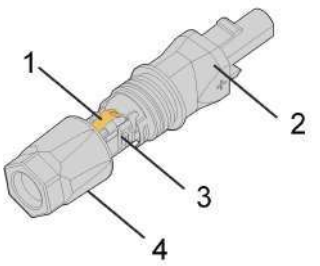
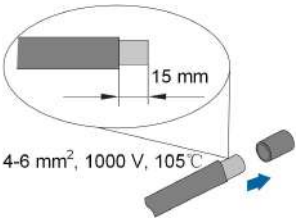


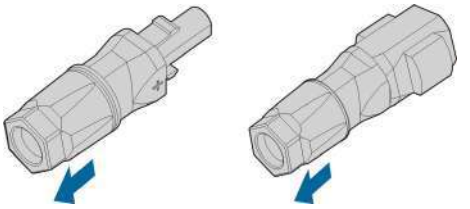
figure 6-3 SUNCLIX Connector Components

1: Spring 2: Sleeve 3: Insert 4: Cable gland

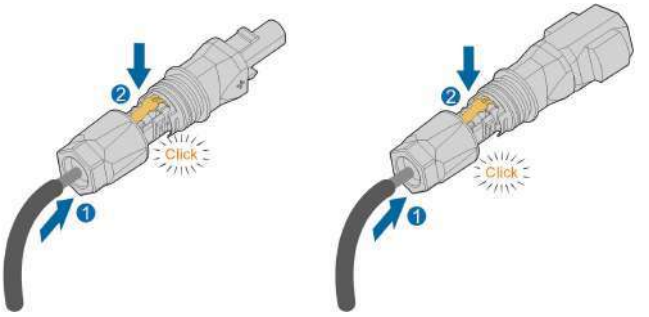
step 1 Strip the insulation from the cable by 15 mm.



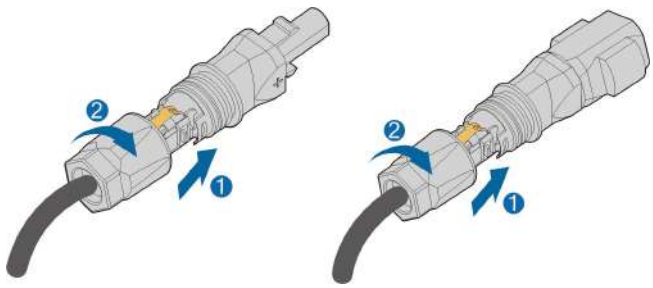
step 2 Pry the connection open and pull the sleeve and the insert apart.



step 3 Insert the stripped cable into the cable gland up to the stop. The stranded wire can be seen inside the spring. Press the spring down until it audibly snaps into place.



step 4 Push the insert into the sleeve and tighten the cable gland (torque 2 N·m).



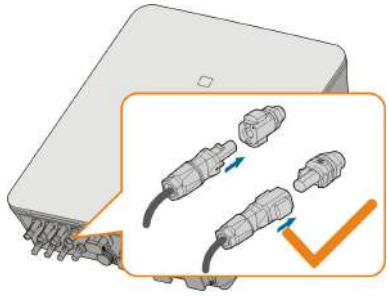
- - End

6.9.1.2 Installing the SUNCLIX Connector

NOTICE

Only connect these connectors with other SUNCLIX connectors. When making the connections, always observe the specifications regarding nominal voltage and nominal current. The smallest common value is permissible.

step 1 Plug the connectors into **BAT+** and **BAT-** terminals.



step 2 Ensure that the connectors are securely in place.

- - End

6.9.2 Connecting the CAN Cable

The CAN cable enables the communication between the inverter and the Li-ion battery from SUNGROW, BYD and Pylontech.

Procedure

For detailed connection description of the CAN cable, refer to the section "6.7.3 RS485 Connection". Plug the wires into the **BMS/CAN** terminal according the labels on the bottom of the inverter.

6.9.3 Connecting the Enable Cable

The Enable cable along with the RS485 cable, are used for communication between the inverter and the Li-ion battery from LG Chem.

Procedure

For detailed connection description of the RS485 cable, refer to the section "6.7.3 RS485 Connection".

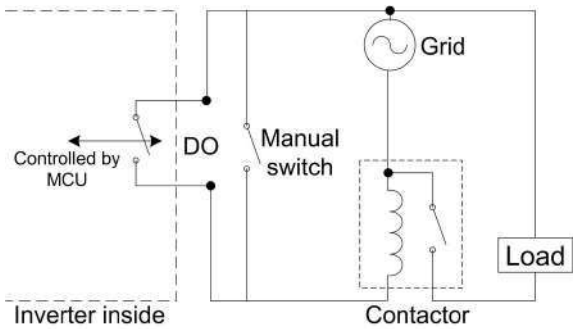
For detailed connection description of the Enable cable, refer to the section "6.7.3 RS485 Connection". Plug the wires into the **Enable** terminal according the labels on the bottom of the inverter.

6.10 DO Connection

The inverter has one DO relay with multiple functions as follows:

- Consumer load control. In this case the DO relay will control a contactor that will open or close in certain condition. Please choose the appropriate contactor according to the load power, e.g. the contactor types of the 3TF30 series from SIEMENS (3TF30 01- 0X).
- Earth fault alarm. In this case, the additional equipment required is a light indicator and/ or a buzzer.

Relay	Trigger condition	Description
Consumer load control	The load control mode has been set via the iSolarCloud App.	The relay is activated once the conditions of the control mode are satisfied. See "8.10.9 Load Control".
Earth fault alarm	The earth fault occurs.	Once the inverter receives the earth fault signal, the relay closes the contact. The relay remains triggered until the fault is removed. See "8.10.12 Grounding Detection".



NOTICE

- **An AC contactor must be installed between the inverter and appliances. It is forbidden to connect the load directly to the DO port.**
- **The current of the DO dry contact should not be larger than 3 A.**
- **The DO node is not controlled once the inverter is powered off. Connect the AC contactor by the manual switch, so as to control the loads.**

Procedure

For detailed connection description of the DO cable, refer to the section "6.7.3 RS485 Connection". Plug the wires into the **DO** terminal according the labels on the bottom of the inverter.

6.11 DI Connection

DRM and Ripple Control support only one function at the same time.

DRM

The inverter supports the demand response modes as specified in the standard AS/NZS 4777. The inverter has integrated a terminal block for connecting to a DRED.

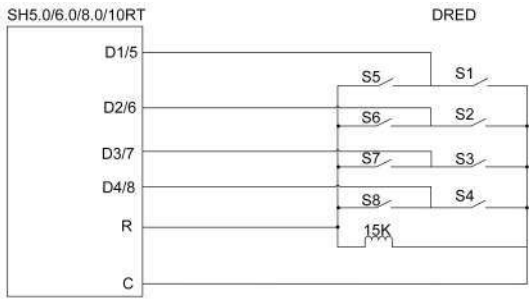
After the connection, the DRED assert DRMs by shorting together terminals as specified in the table below.

table 6-4 Method of Asserting DRMs

Mode	Asserted by Shorting Terminals
DRM0	R & C
DRM1	D1/5 & C
DRM2	D2/6 & C
DRM3	D3/7 & C
DRM4	D4/8 & C
DRM5	D1/5 & R
DRM6	D2/6 & R
DRM7	D3/7 & R
DRM8	D4/8 & R

The modes from DRM0 to DRM8 are supported by the inverter and the information is marked on the label located in the top of COM terminal.

Wiring between the inverter and the DRED is as follows.



The switches that need to be closed in the state of DRM0 ~ DRM8 are shown in the table below.

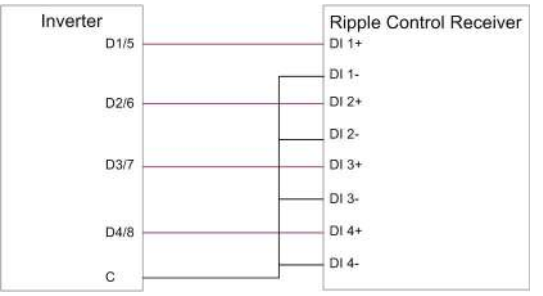
Demand Response Mode	Operational Instruction	Switch state
DRM0	OI0	Close S1 and S5
DRM1	OI1	Close S1

Demand Response Mode	Operational Instruction	Switch state
DRM2	OI2	Close S2
DRM3	OI3	Close S3
DRM4	OI4	Close S4
DRM5	OI5	Close S5
DRM6	OI6	Close S6
DRM7	OI7	Close S7
DRM8	OI8	Close S8

Ripple Control

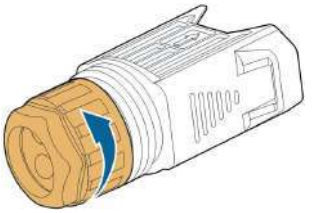
In Germany, the grid company uses the Ripple Control Receiver to convert the grid dispatching signal and send it as a dry contact signal.

Wiring of the ripple control receiver dry contact cables is shown in the figure below:

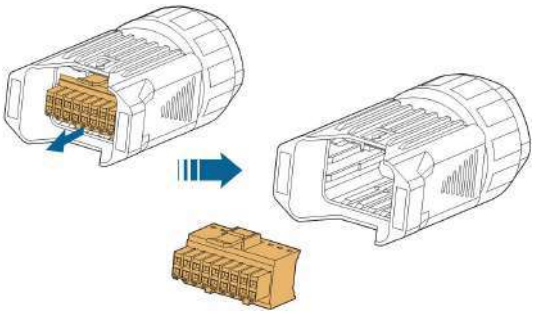


6.11.1 Assembling the COM Connector

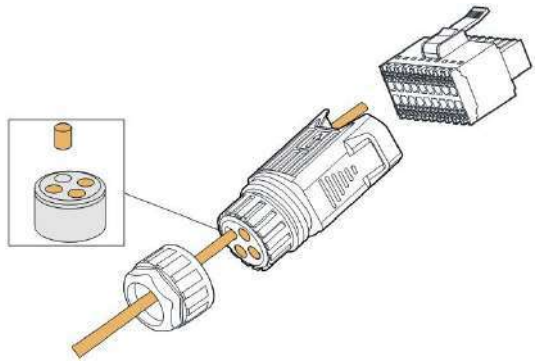
step 1 Unscrew the swivel nut from the connector.



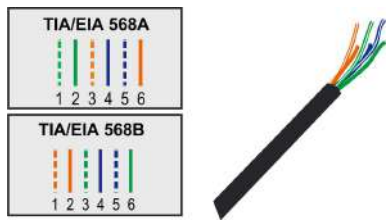
step 2 Take out the terminal block.



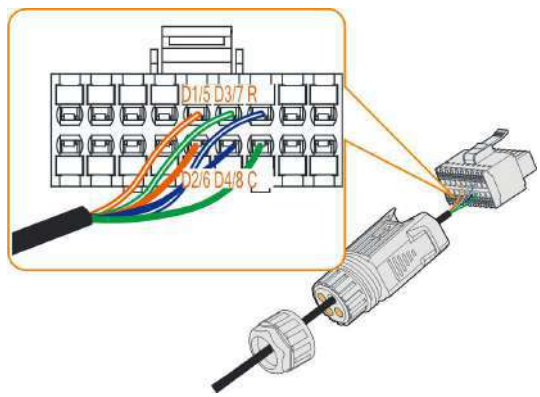
step 3 Remove the seal and lead the cable through the cable gland.



step 4 Remove the cable jacket by 7 mm–10 mm.

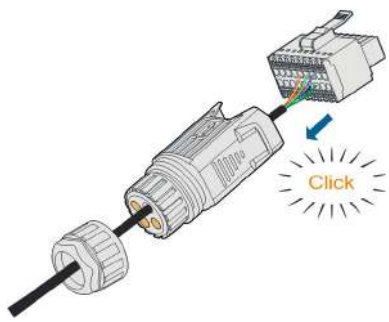


step 5 Plug the wires into the corresponding terminal according the labels on the bottom of the inverter.

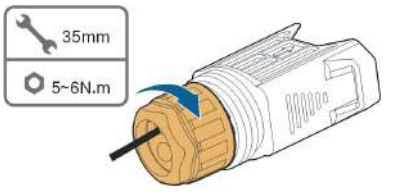


step 6 Pull the wires outward to check whether they are firmly installed.

step 7 Insert the terminal block into the connector until it snaps into place with an audible click.



step 8 Fasten the swivel nut.



- - End

6.11.2 Installing the COM Connector

step 1 Remove the waterproof lid from the **COM** terminal.

step 2 Insert the COM connector into **COM** terminal on the bottom of the inverter until there is an audible click.

step 3 Pull cables outwards to confirm whether they are fastened firmly.

step 4 Connect the other end to the DRED / Ripple Control Receiver device.

- - End

6.12 Backup Connection

step 1 Assembling the BACK-UP Connector. Specifically, refer to "6.5.2 Assembling the AC Connector".

The PE wire of Backup terminal is not required for Australia and New Zealand.

step 2 Remove the waterproof lid from the **BACK-UP** terminal.

step 3 Align the Backup connector and the **BACK-UP** terminal and mate them together by hand until a “Click” is heard or felt.

step 4 Pull all the lines outward to check whether they are firmly installed.

- - End

7 Commissioning

7.1 Inspection before Commissioning

Check the following items before starting the inverter:

- All equipment has been reliably installed.
- DC switch(es) and AC circuit breaker are in the "OFF" position.
- The ground cable is properly and reliably connected.
- The AC cable is properly and reliably connected.
- The DC cable is properly and reliably connected.
- The communication cable is properly and reliably connected.
- The vacant terminals are sealed.
- No foreign items, such as tools, are left on the top of the machine or in the junction box (if there is).
- The AC circuit breaker is selected in accordance with the requirements of this manual and local standards.
- All warning signs & labels are intact and legible.

7.2 Commissioning Procedure

If all of the items mentioned above meet the requirements, proceed as follows to start up the inverter for the first time.

step 1 Connect the AC circuit breaker.

step 2 **(Optional)** Connect the external DC circuit breaker between the inverter and the battery pack if a battery is equipped.

step 3 **(Optional)** Power on the battery pack manually if a battery is equipped.

step 4 Rotate the DC switch to “ON”. The DC switch may be integrated in the inverter or installed by the customer, wait for at least 5 minutes.

step 5 If the irradiation and grid conditions meet requirements, the inverter will normally operate. The connection time for inverter to gird may take some minutes or even to more according to different country code chosen in the initial settings and the real site grid condition.

step 6 Observe the LED indicator to ensure that the inverter operates normally. (Refer to "2.4 LED Indicator").

- - End

7.3 App Preparation

step 1 Install the iSolarCloud App with latest version. Refer to "8.2 Installing the App".

step 2 Register an account. Refer to "8.3 Account Registration". If you have got the account and password from the distributor/installer or SUNGROW, skip this step.

step 3 Download the firmware package to the mobile device in advance. Refer to “Firmware Upadate”. This is to avoid download failure due to poor on-site network signal.

- - End

7.4 Creating a Plant

Screenshots of creating a plant are for reference only. For details, refer to the actual screen.

step 1 Open the App, tap  at the upper right corner and tap **Select Server**. Choose the same server as when registering.

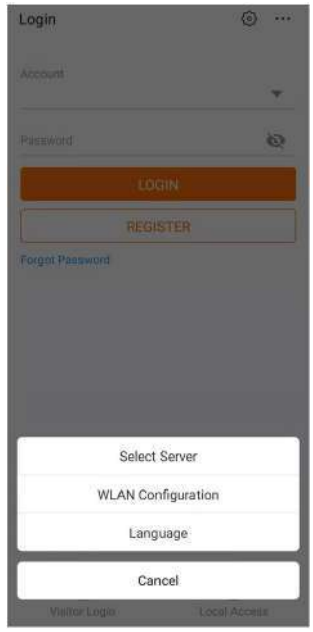


figure 7-1 Selecting the Server

step 2 Enter the account and password on the login screen and tap **Login** to enter the App home screen.

step 3 Tap the icon  at the upper right corner to enter the creating screen.

figure 7-2 Creating Power Plant

step 4 Select plant type to **RESIDENTIAL** and inverter type to **HYBRID**.

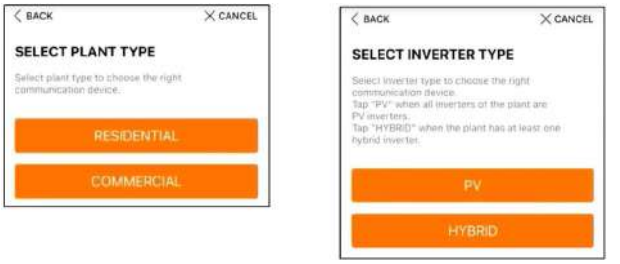


figure 7-3 Selecting Plant/Inverter Type

step 5 Scan the QR code on the communication device or manually enter the serial number of the communication device. Tap **Next** after the QR code is identified or the serial number entered is correct and then tap **CONFIRM**. Your mobile device is thus connected to the WiNet-S successfully.

figure 7-4 Connecting Mobile Device to WiNet-S

step 6 Select the Internet access mode to **WLAN** or **ETHERNET** according to actual connection. The following description is for WLAN access mode.

figure 7-5 Selecting Internet Access Mode

step 7 The **EASYCONNECT INSTRUCTION** screen will prompt. Press the multi-function button on the WiNet-S module once to turn on EasyConnect mode. The WLAN indicator on WiNet-S blinks quickly when this mode is turned on. Return to the App and the screen displays successful connection to the inverter WLAN. Tap **NEXT**.

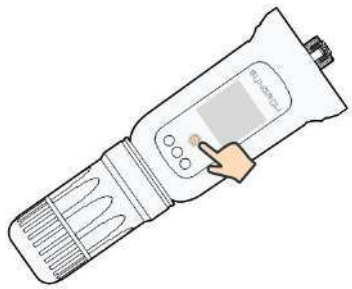


figure 7-6 Turn on EasyConnect Mode

NOTICE

The EasyConnect mode can be used only when the router is 2.4 GHz.
If the EasyConnect mode fails, refer to the WiNet-S quick guide for the instructions of other modes.

step 8 Connect the inverter to router network. Enter network name and password. Tap **NEXT** and the screen display prompt information of successful connection to the router network.

figure 7-7 Connecting Inverter to Router Network

- - End

7.5 Initializing the Device

The inverter is successfully connected to the router.

If there is no latest equipment upgrade package, skip steps 1 and 2.

The actual initializing procedure may differ due to different countries. Please follow the actual App guidance.

step 1 If a latest equipment upgrade package is available, the following prompt window pops up. Tap **UPDATE NOW** to download the latest update package.

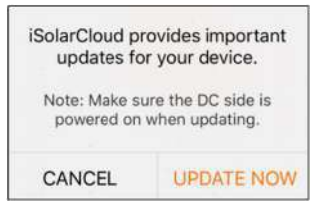


figure 7-8 Upgrade Reminder

step 2 After download, it would take around 15 minutes to update. After successful upgrade, the screen will show the version numbers before and after the upgrade as well as the upgrade time. Tap **NEXT**.

figure 7-9 Upgrading Inverter

NOTICE

If the communication equipment is upgraded, after successful upgrade, check and confirm that the phone is connected to the inverter WLAN.

step 3 Tap **Country/Region** and select the country where the inverter is installed at.

NOTICE

The parameter Country/Region must be set to the country (region) where the inverter is installed at. Otherwise, the inverter may report errors.

step 4 When the country is set to Australia, additionally set the applicable network service provider and then the grid type.

The image shown here is for reference only. Refer to the actual interface for the supported network service providers.

table 7-1 Description of Network Service Provider and Grid Type

Network Service Provider	Grid Type
AS/NZS 4777.2:2015	/
AS/NZS 4777.2:2020 Australia A	/
AS/NZS 4777.2:2020 Australia B	/
AS/NZS 4777.2:2020 Australia C	/
ENERGEX & Ergon Energy	• STNW1170: single-phase < 10 kVA & three-phase < 30 kVA • STNW1174: 30 kVA < P_n ≤ 1500 kVA
Jemena	• ≤ 10 kVA per phase (or 30 kVA per three phase) • ELE GU 0014: 30 kVA–200 kVA
Endeavour Energy	MDI 0043
Ausgrid	NS194
CitiPower & Powercor	• ≤ 5 kVA for single-phase & 30 kVA for three-phase • > 30 kVA three-phase

Network Service Provider	Grid Type
United Energy	• UE-ST-2008.1: ≤ 10 kVA for single-phase & 30 kVA for three-phase • UE-ST-2008.2: > 30 kVA three-phase
PowerWater	Embedded Generation Notice Photovoltaic Systems:2020
SA Power Networks	• TS129-2019: < 10 kW for single-phase & 30 kW for three-phase • TS130-2017: > 30 kW & ≤ 200 kW • TS131-2018: > 200 kW
Horizon Power	• HPC-9DJ-13-0001-2019: ≤ 10kVA for single-phase & 30 kVA for three-phase • HPC-9DJ-13-0002-2019: > 30kVA & ≤1MVA
westernpower	EDM # 33612889-2019
AusNet Services	Basic Micro Embedded Generation: 2020

* For compliance with AS/NZS 4777.2:2020, please select from Australia A/B/C. Please contact your electricity grid operator for which region to use.

step 5 Initialize parameters according to local grid requirements, including grid type, reactive power regulation mode, etc. The screen displays that the inverter is successfully configured.

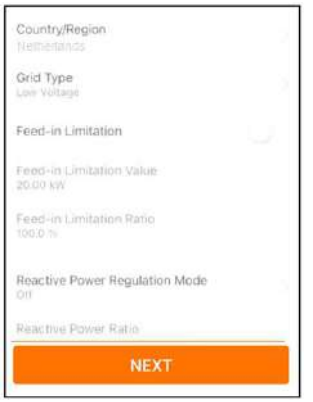


figure 7-10 Initializing Parameters

- - End

7.6 Configuring the Plant

The inverter is successfully added to the plant and initialized. Refer to the guidance in previous sections.

The distributor/installer who creates a plant for the end user needs to get the end user's e-mail address. In configuring a plant, the e-mail address is required, and each e-mail address can be registered only once.

step 1 The App screen will display the added inverter. Tap **NEXT** to configure the plant.

figure 7-11 Display the Added Inverter

step 2 Fill in the plant information. The fields marked with * must be filled in.

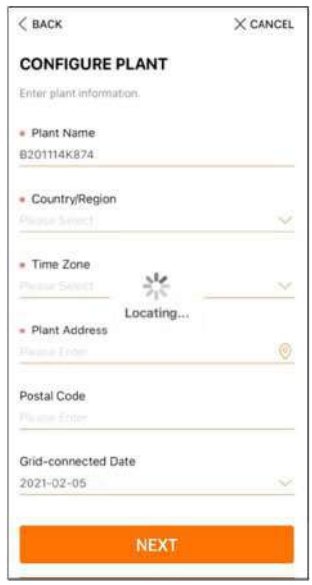


figure 7-12 Entering Plant Information

step 3 **(Optional)** Fill in the tariff information. The electricity price can be set to a specific value or Time-of-Use tariff.

figure 7-13 Entering Tariff Information

step 4 Fill in the end user's e-mail address. The first time you fill in the end user's e-mail address, the system will create an account for the end user and send an email to the end user. The end user can activate the account via the email.

The Distributor/installer creates plants for the end user and can manage the plants by default.

figure 7-14 Entering Owner's e-mail

step 5 Tap **NEXT** to wait for the inverter to connect to the iSolarCloud.

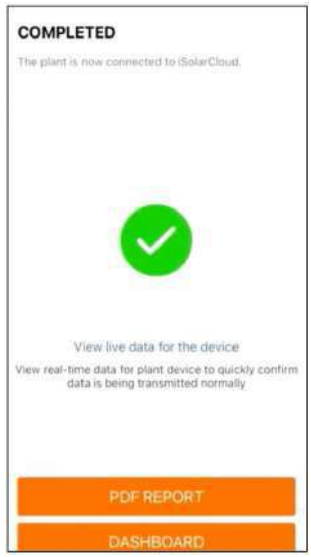


figure 7-15 Configuration Completed

step 6 **(Optional)** Tab **View live data for the device**, tick **Inverter** or **Total Plant Devices** and tab **ALL PLANTS OPEN**. The clock symble indicates that the live data view function is successfully enabled. Tab the inverter to view the live data about voltage, current, power or curve.

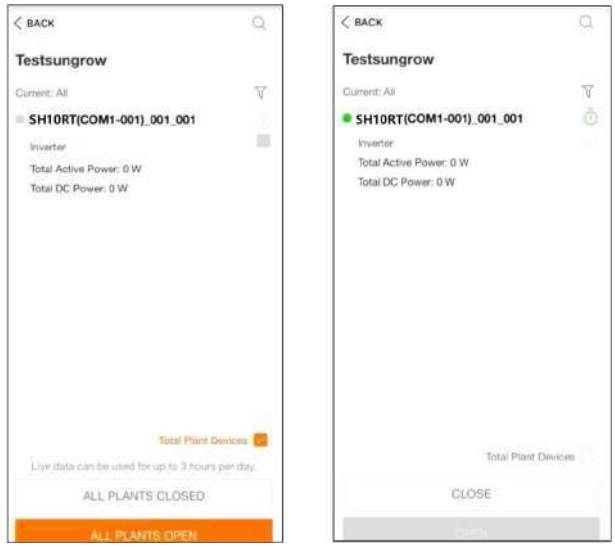


figure 7-16 Live Data View Function Setting

Contact Sungrow service to enable live data function of devices. Once enabled, live data function is available for 3 hours per day by default. To make it available for 24 hours, contact SUNGROW.

step 7 Tab **BACK** to the **COMPLETED** screen. Tab **PDF REPORT** to export the plant configuration report.

step 8 Tab **BACK** to the **COMPLETED** screen. Tab **DASHBOARD** to return and manually refresh the page until the newly created plant is displayed with status commissioned.

- - End

8 iSolarCloud App

8.1 Brief Introduction

The iSolarCloud App can establish communication connection to the inverter via the WLAN, providing remote monitoring, data logging and near-end maintenance on the inverter. Users can also view inverter information and set parameters through the App.

* To achieve direct login via WLAN, the wireless communication module developed and manufactured by SUNGROW is required. The iSolarCloud App can also establish communication connection to the inverter via Ethernet connection.

- This manual describes only how to achieve near-end maintenance via WLAN direct connection.
- Screenshots in this manual are based on the V2.1.6 App for Android system, and the actual interfaces may differ.

8.2 Installing the App

Method 1

Download and install the App through the following application stores:

- MyApp (Android, mainland China users)
- Google Play (Android, users other than mainland China ones)
- App Store (iOS)

Method 2

Scan the following QR code to download and install the App according to the prompt information.

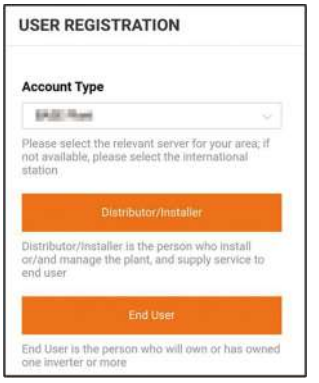
The App icon appears on the home screen after installation.

8.3 Account Registration

The account distinguishes two user groups, end user and distributor/installer.

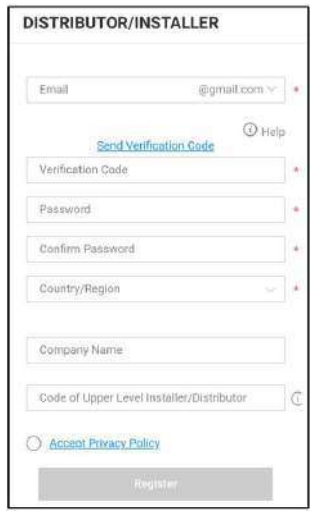
- The end user can view plant information, create plants, set parameters, share plants, etc.
- The distributor/installer can help the end user to create plants, manage, install, or maintain plants, and manage users and organizations.

step 1 Tap **REGISTER** to enter the registration screen.



step 2 Select the relevant server for your area.

step 3 Select **End user** or **Distributor/Installer** to enter the corresponding screen.



step 4 Fill in the registration information, including email, verification code, password and affirmance and country (region). The distributor/installer has the permission to fill in the company name and the code of upper level distributor/installer.

The code of upper level distributor/installer can be obtained from the upper level distributor/installer. Only when your organization belongs to the upper level distributor/installer organization, can you fill in the corresponding code.

step 5 Tick **Accept privacy protocol** and tap **Register** to finish the registration operation.

- - End

8.4 Login

8.4.1 Requirements

The following requirements should be met:

- The AC and DC sides or the AC side of the inverter is powered-on.
- The WLAN function of the mobile phone is enabled.
- The mobile phone is within the coverage of the wireless network produced by the communication module.

8.4.2 Login Procedure

step 1 For the WiNet-S module, press the multi-function button 3 times to enable the WLAN hotspot. No password is required and the valid time is 30 minutes.

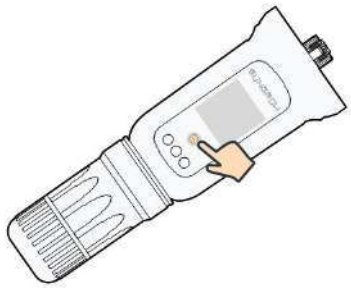


figure 8-1 Enabling the WLAN Hotspot

step 2 Connect the mobile phone to the WLAN network named as "SG-xxxxxxxxxxx" (xxxxxxxxxxx is the serial number indicated on the side of the communication module).

step 3 Open the App to enter the login screen. Tap **Local Access** to enter the next screen.

step 4 Select **WLAN** and select the device (SN), then enter the password and tap **LOGIN**.

- If the WiFi signal, serial number or inverter related data information cannot be found, unplug and reinsert the Winet-S or press the multi-function button of the Winet-S three times.
- The default account is "user" and the initial password is "pw1111" which should be changed for the consideration of account security. Tap "More" at the lower right corner on home page and choose "Change Password".

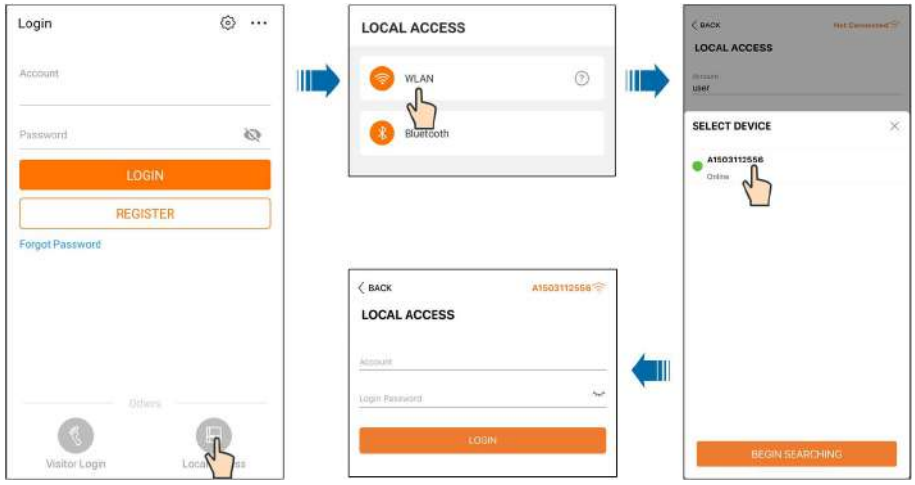


figure 8-2 WLAN Local Access

step 5 If the inverter is not initialized, navigate to the quick setting screen to initialize the protection parameters. For details, please refer to **"Initial Settings"**.

NOTICE

The "Country/Region" must be set to the country where the inverter is installed at. Otherwise, the inverter may report errors.

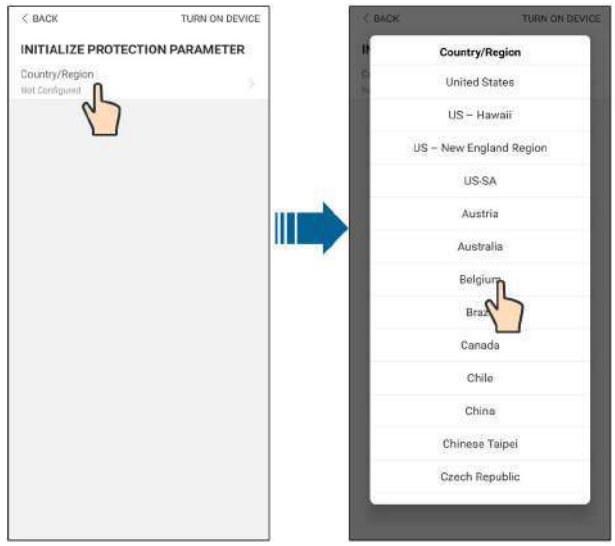


figure 8-3 WLAN Local Access

step 6 After finishing the settings, tap **TUNR ON DEVICE** at the upper right corner and the device will be initialized. The App will send start instructions and the device will start and operate.

step 7 After initialization settings, the App will return automatically to the home page.

- - End

8.5 Initial Settings

8.5.1 Feed-in Limitation

The function of the feed-in limitation is to control the amount of power injected in the grid by the plant. In some situations , this function is also called as **Export limitation** or **Zero export**. The feed-in limitation function requires the using of Smart Energy Meter. Without the Smart Energy Meter, the feed-in limitation function will be unavailable.

table 8-1 Description of feed-in limitation parameters

Parameter	Default value		Range	
	Germany	Others	Germany	Others
PV Installation Power	Rated power	-	Rated power ~ 300.00	-
Feed-in Limitation	On	Off	On / Off	

Parameter	Default value		Range	
	Germany	Others	Germany	Others
Feed-in Limitation Value	PV Installation Power×70% *	Rated power	0 ~ PV Installation Power	0 ~ Rated power
Feed-in Limitation Ratio	70.0%*	100.0%	0 ~ 100%	
Rated Power of Original Power Generation Systems	Depends on inverter power of other companies			

*If power control is regulated by a third party logger, please enable the power limitation to 100% in default.

8.5.2 Backup Mode

The backup mode is off by default, the user can set an amount of **Reserved Battery SOC for Off-Grid**. It is the minimum battery level in the on-grid state and will be supplied to the Backup loads in case of grid blackout.

8.5.3 Reactive Power Regulation Mode

The inverter provides a reactive power regulation function. Use the **Reactive Power Regulation Mode** parameter to activate this function and select proper regulation mode.

table 8-2 Descriptions of reactive power regulation mode:

Mode	Descriptions
Off	The PF is fixed at +1.000.
PF	The reactive power can be regulated by the parameter PF (Power Factor).
Qt	The reactive power can be regulated by the parameter Q-Var limits (in %).
Q(P)	The PF changes with the output power of the inverter.
Q(U)	The reactive power changes with the grid voltage.

"Off" Mode

The reactive power regulation function is disabled. The PF is limited to +1.000.

"PF" Mode

The power factor is fixed and reactive power setpoint is calculated according to the current power. The PF ranges from 0.8 leading to 0.8 lagging.

Leading: the inverter is sourcing reactive power to the grid.

Lagging: the inverter is injecting reactive power into the grid.

"Qt" Mode

In the Qt mode, system rated reactive power is fixed, and the system injects reactive power according to the delivered reactive power ratio. The **Reactive Power Ratio** is set through the App.

The setting range of the reactive power ratio is 0~100% or 0~-100%, corresponding to the ranges of inductive and capacitive reactive power regulation respectively.

"Q(P)" Mode

The PF of the inverter output varies in response to the output power of the inverter.

table 8-3 "Q(P)" Mode Parameter Descriptions:

Parameter	Explanation	Default		Range
		DE	AU	
Q(P) Curve	Select corresponding curve according to local regulations	A		A, B, C*
QP_P1	Output power at P1 on the Q(P) mode curve (in percentage)	20%	25%	10% ~ 100%
QP_P2	Output power at P2 on the Q(P) mode curve (in percentage)	50%		20% ~ 100%
QP_P3	Output power at P3 on the Q(P) mode curve (in percentage)	100%		20% ~ 100%
QP_K1	Power factor at P1 on the Q(P) mode curve	1		Curve A/C: 0.8 ~ 1 Curve B: - 0.6 ~ 0.6
QP_K2	Power factor at P2 on the Q(P) mode curve	1		
QP_K3	Power factor at P3 on the Q(P) mode curve	0.95	0.90	
QP_EnterVoltage	Voltage percentage for Q(P) function activation	105%		100% ~ 110%
QP_ ExitVoltage	Voltage percentage for Q(P) function deactivation	100%		90% ~ 100%
QP_ ExitPower	Power percentage for Q(P) function deactivation	20%		1% ~ 20%
QP_ EnableMode	Unconditional activation/deactivation of Q(P) function	Yes		Yes / No

* Curve C is reserved and consistent with Curve A currently.

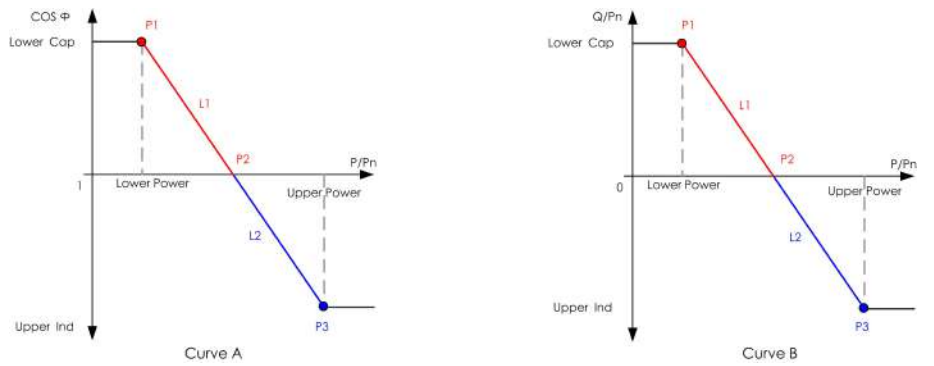


figure 8-4 Q(P) Curve

"Q(U)" Mode

The reactive power output of the inverter will vary in response to the grid voltage.

table 8-4 "Q(U)" Mode Parameter Descriptions:

Parameter	Explanation	Default		Range
		DE	AU	
Q(U) curve	Select corresponding curve according to local regulations	A		A, B, C*
Hysteresis Ratio	Voltage hysteresis ratio on the Q(U) mode curve	0		0 ~ 5%
QU_V1	Grid voltage limit at P1 on the Q(U) mode curve	93%	90%	80% ~ 100%
QU_Q1	Value of Q/Sn at P1 on the Q (U) mode curve	-60%	-30%	-60% ~ 0
QU_V2	Grid voltage limit at P2 on the Q(U) mode curve	97%	95.6%	80% ~ 110%
QU_Q2	Value of Q/Sn at P2 on the Q (U) mode curve	0		-60% ~ 60%
QU_V3	Grid voltage limit at P3 on the Q(U) mode curve	103%	AU: 108.7% NZ: 108.6%	100% ~ 120%
QU_Q3	Value of Q/Sn at P3 on the Q (U) mode curve	0		-60% ~ 60%
QU_V4	Grid voltage limit at P4 on the Q(U) mode curve	107%	AU: 115.2% NZ: 110.8%	100% ~ 120%
QU_Q4	Value of Q/Sn at P4 on the Q (U) mode curve	60%	30%	0 ~ 60%
QU_ EnterPower	Active power for Q(U) function activation	80%		20% ~ 100%

Parameter	Explanation	Default		Range
		DE	AU	
QU_ExitPower	Active power for Q(U) function deactivation		10%	1% ~ 20%
QU_ EnableMode	Unconditional activation/deactivation of Q(U) function		Yes	Yes / No / Yes, Limited by PF

* Curve C is reserved and consistent with Curve A currently.

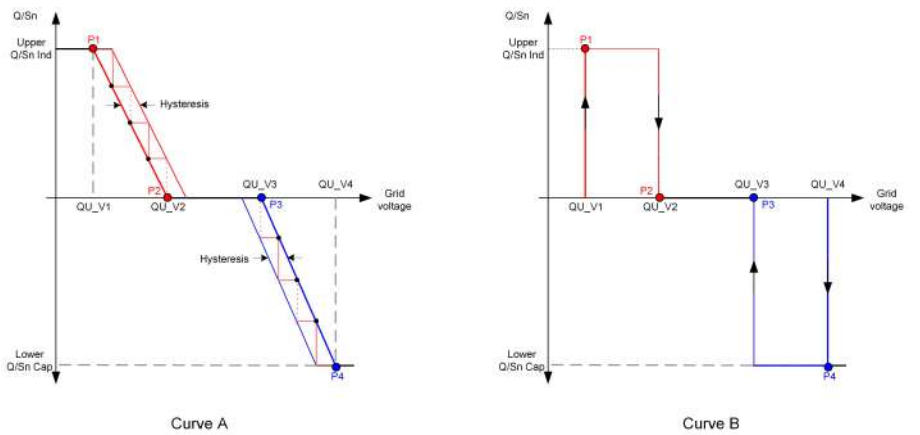


figure 8-5 Q(U) Curve

8.6 Function Overview

The App provides parameter viewing and setting functions, as shown in the following figure.

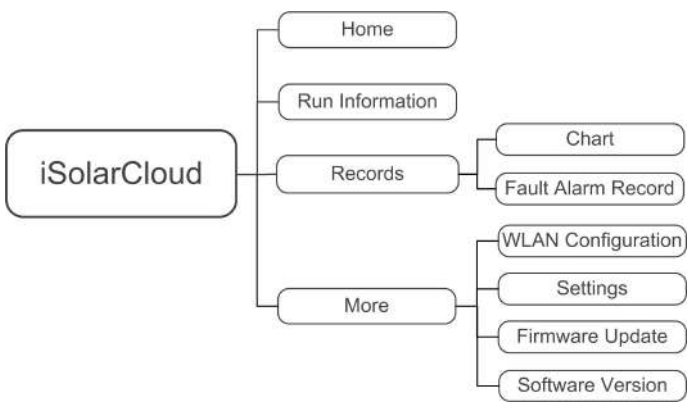


figure 8-6 App Function Tree Map

8.7 Home

Home page of the App is shown in the following figure.

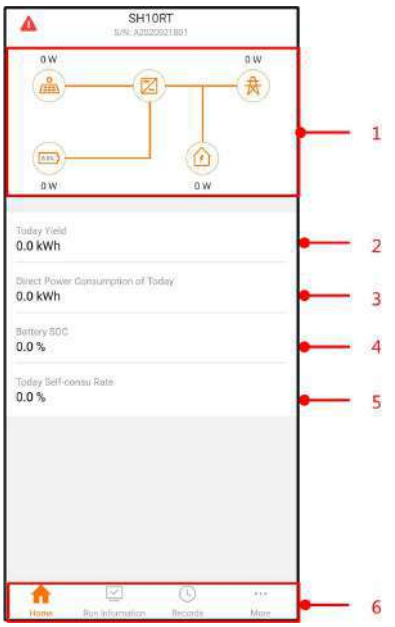


figure 8-7 Home

table 8-5 Home page description

No.	Name	Description
1	Load flow chart	Shows the PV power generation power, feed-in power, etc. The line with an arrow indicates energy flow between connected devices, and the arrow pointing indicates energy flow direction.
2	**Today yield**	Shows today power generation of the inverter
3	**Direct Power Consumption of Today**	Shows electricity directly consumed by loads today
4	**Battery SOC**	Indicates remaining battery capacity
5	**Today Self-consu Rate**	Indicates today self-consumption rate of the PV system
6	Navigation bar	Includes menus of **Home**, **Run Information**, **Records**, and **More**.

If the inverter runs abnormally, the fault icon appears on the upper left corner of the screen. Users can tap the icon to view detailed fault information and corrective measures.

8.8 Run Information

Tap **Run Information** on the navigation bar to enter the corresponding screen, as shown in the following figure.

figure 8-8 Run Information

The run information includes the PV information, inverter information, input, output, grid information, load information, and battery information.

8.9 Records

Tap **Records** on the navigation bar to enter the screen, as shown in the following figure.

figure 8-9 Records

On **Records** screen, users can view chart and check fault alarm record.

8.9.1 Chart

Tap **Chart** to enter the screen showing daily power generation, as shown in the following figure.

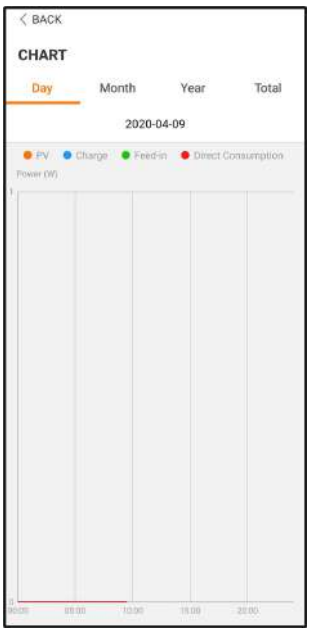


figure 8-10 Power Curve

The App displays power generation records in a variety of forms, including daily power generation graph, monthly power generation histogram, annual power generation histogram, and total power generation histogram.

table 8-6 Description of power generation records

Item	Description
Daily power generation graph	Indicates today power generation, charging, feed-in power, and direct consumption power
Monthly power generation histogram	Indicates monthly power generation, charging, feed-in power, and direct consumption power
Annual power generation histogram	Indicates annual power generation, charging, feed-in power, and direct consumption power
Total power generation histogram	Indicates total power generation, charging, feed-in power, and direct consumption power

8.9.2 Fault Alarm Record

Tap **Fault Alarm Record** to enter the screen, as shown in the following figure.

figure 8-11 Fault Alarm Record

Click " " to select a time segment and view corresponding records.

Select one of the records in the list and click the record, to view the detailed fault info as shown in following figure.

figure 8-12 Detailed fault alarm info

8.10 More

Tap **More** on the navigation bar to enter the screen, as shown in the following figure.

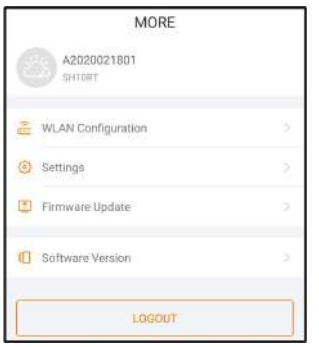
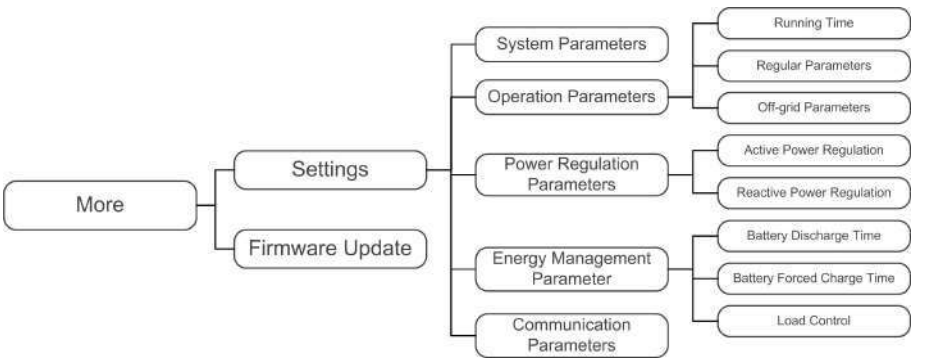


figure 8-13 More



The **More** screen supports the following operations:

- Set parameters including inverter system parameters and energy management parameter.
- Upgrade inverter firmware (ARM/DSP/PVD/CPLD).

8.10.1 System Parameters

Tap **Settings→System Parameters** to enter the corresponding screen, as shown in the following figure.

figure 8-14 System Parameters

* The image shown here is for reference only.

Boot/Shutdown

Tap **Boot/Shutdown** to send the boot/shutdown instruction to the inverter.

For Australia and New Zealand, when the DRM state is DRM0, the "Boot" option will be prohibited.

Date Setting/Time Setting

The correct system time is very important. Wrong system time will directly affect the data logging and power generation value. The clock is in 24-hour format.

Software Version

Version information of the current firmware.

8.10.2 Running Time

Tap **Settings→Operation Parameters→Running Time** to enter the corresponding screen, on which you can set **Connecting Time** and **Reconnecting Time**.

figure 8-15 Running Time

table 8-7 Description of running time parameters

Parameter	Explanation	Default	Range
Connecting Time	The time that the inverter takes to enter into the running mode from the standby mode in fault-free state	60s	10s ~ 900s
Reconnecting Time	The time that the inverter takes to recover from the fault state to normal state (the inverter is not running)	60s	0s ~ 3600s

8.10.3 Regular Parameters

Tap **Settings→Operation Parameters→Regular Parameters** to enter the screen, as shown in the following figure.

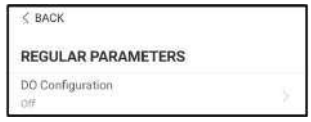


figure 8-16 Regular Parameters

After connecting the load to the DO terminals, a relay control signal will be transmitted. Users can flexibly set the control mode of DO configuration according to individual demand.

table 8-8 The control mode of DO configuration

Mode	Setting description
Off	-
Load Control Mode	See "8.10.9 Load Control"
Grounding Detection	See "8.10.12 Grounding Detection"

8.10.4 Off-grid Parameters

Tap **Settings→Operation Parameters→Off-grid Parameters** to enter the screen, as shown in the following figure.

figure 8-17 Off-grid Parameters

Refer to the description in "8.5.2 Backup Mode" .

8.10.5 Active Power Regulation

Tap **Settings→Power Regulation Parameters→Active Power Regulation** to enter the screen, as shown in the following figure.

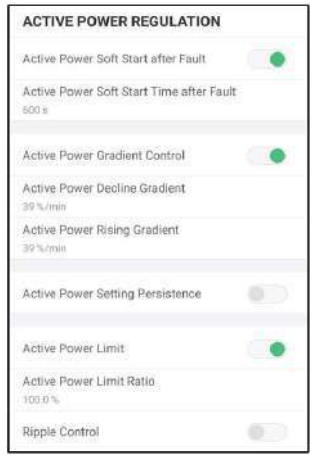


figure 8-18 Active Power Regulation

table 8-9 Description of active power regulation

Parameter	Description	Default	Range
Active Power Soft Start after Fault	Switch for activating/deactivating the function of active power soft start after a fault occurs	On	On/Off
Active Power Soft Start Time after Fault	The soft start time required for raising active power from 0 to rated value after a fault occurs	600s	1s ~ 1200s
Active Power Gradient Control	Set whether to enable active power gradient control	On	On/Off
Active Power Decline Gradient	Decline gradient of inverter active power per minute	39%/min	3%/min ~ 6000%/min
Active Power Rising Gradient	Rising gradient of inverter active power per minute		
Active Power Setting Persistence	Switch for activating/deactivating the function of active power setting persistence	Off	On/Off
Active Power Limit	Switch for limiting active power	On	On/Off
Active Power Limit Ratio	The ratio of active power limit to rated power in percentage	100.0%	0 ~ 100%
Ripple Control	Switch for Ripple Control	Off	On/Off

8.10.6 Reactive Power Regulation

Tap **Settings→Power Regulation Parameters→Reactive Power Regulation**to enter the screen, as shown in the following figure.

figure 8-19 Reactive Power Regulation

table 8-10 Description of reactive power regulation

Parameter	Description	Default	Range
Reactive Power Setting Persistence	Switch for activating/deactivating the function of reactive power setting persistence	On	On / Off
Reactive Power Regulation Mode	See "8.5.3 Reactive Power Regulation Mode"	Off	Off / PF / Qt / Q(P) / Q(U)

8.10.7 Battery Discharge Time

Tap **Settings→Energy Management Parameter→Battery Discharge Time** to enter the corresponding screen, as shown in the following figure.

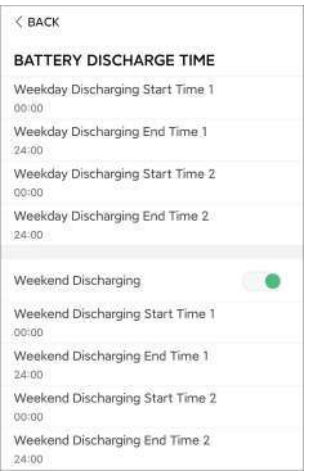


figure 8-20 Battery Discharge Time

8.10.8 Battery Forced Charge Time

Tap **Settings→Energy Management Parameter→Battery Forced Charge Time** to enter the corresponding screen.

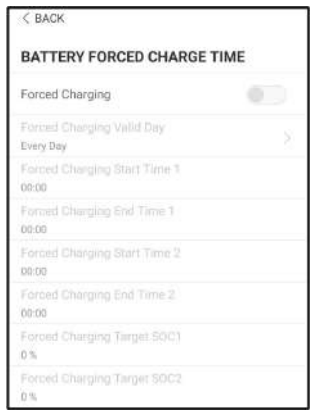


figure 8-21 Battery Forced Charge Time

When there is no PV power, the power imported from the grid charges the energy system during the time period until the target SOC is reached.

It is recommended to set the time period in off-peak tariff time. The time period 1 is in priority to the time period 2 if two periods overlap. The charging energy comes from the excess PV energy in priority and then from the grid. The inverter will take charging power from the grid in the case of PV energy shortage.

8.10.9 Load Control

Tap **Settings→Energy Management Parameter→Load Control** to enter the corresponding screen, on which you can set **Load Control Mode**. Load Control Mode includes **Timing Mode**, **Switch Mode**, and **Intelligent Mode**.

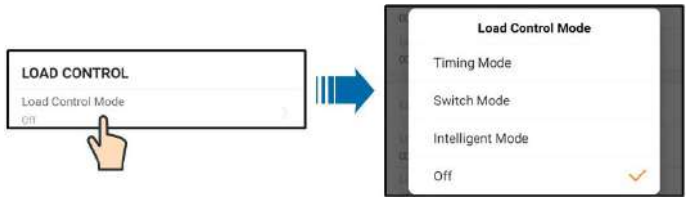


figure 8-22 Load Control

Timing Mode

In this mode, set the **Load Timing Start Time 1** and **Load Timing End Time 1**, the system will control the load operation during the interval. Take 09:00 am–09:30 am as an example.

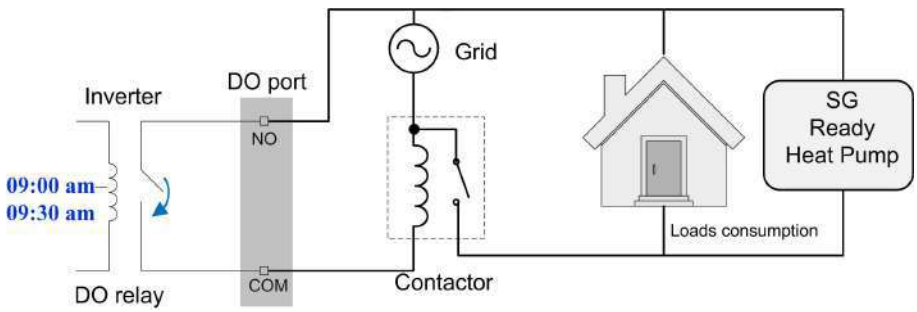


figure 8-23 DO Operation in Timing Mode

Switch Mode

In this mode, the system will control the load operation according to the setting. In the following example, the switch is set to OFF.

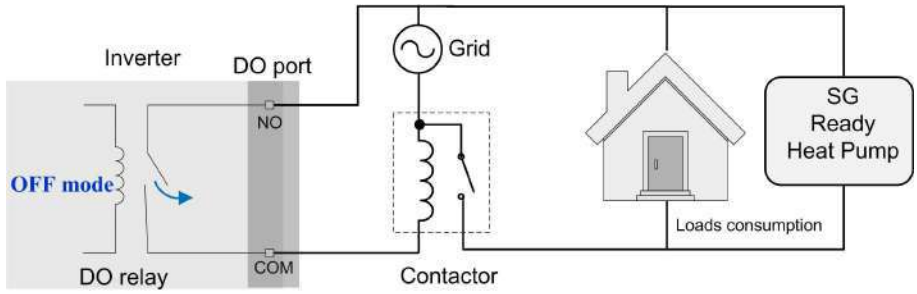


figure 8-24 DO Operation in Switch Mode

Intelligent Mode

The system will control the load operation according to the power optimization algorithm of energy management.

During the setting interval, the DO function will be enabled to power on the load if the excess PV energy exceeds the optimized power value.

Notice:

The intelligent mode is disabled in an off-grid system.

- When the inverter is installed to retrofit an exisiting PV system, the upper limit of optimized power is the sum of the rated power of the hybrid inverter and the rated power of the existing PV inverter.
- Once the intelligent mode is enabled, the DO relay will remain connected for 20 minutes after the DO connection.

Take 09:00 am–09:30 am and the optimized power of 1000 W as an example.

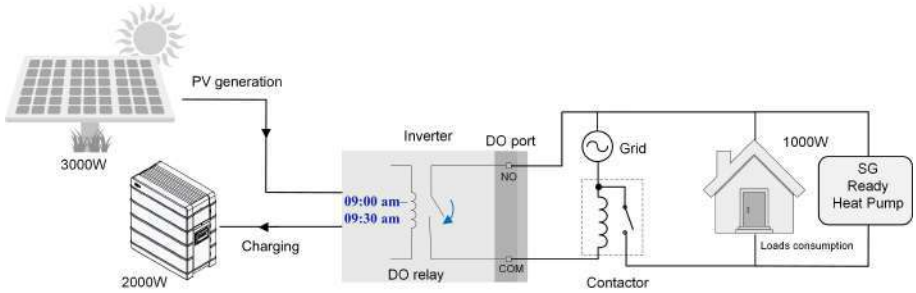


figure 8-25 DO Operation in Intelligent Mode

8.10.10 Communication Parameters

Tap **Settings→Communication Parameters** to enter the screen, as shown in the following figure.

figure 8-26 Communication Parameters

- The device address ranges from 1 to 246.
- The IP adress, gateway, subnet mask, preferred DNS server and alternate DNS server can be modified only when the DHCP is set to Off.
- Acquire the IP adress, gateway, subnet mask, preferred DNS server and alternate DNS server from the network professional.

8.10.11 Firmware Update

To avoid download failure due to poor on-site network signal, it is recommended to download the firmware package to the mobile device in advance.

step 1 Enable the "Mobile data" of the mobile device.

step 2 Open the App, enter the account and password on the login screen. Tap **Login** to enter the home screen.

step 3 Tap **More→Firmware Download** to enter corresponding screen on which you can view the device list.

step 4 Select the device model before downloading the firmware. Tap the device name in the device list to enter the firmware upgrade package detail interface, and tap behind the firmware upgrade package to download it.

step 5 Return to the **Firmware Download** screen, tap in the upper right corner of the screen to view the downloaded firmware upgrade package.

step 6 Login the App via local access mode. Refer to "8.4 Login".

step 7 Tap **More** on the App home screen and then tap **Firmware Update**.

step 8 Tap the upgrade package file, a prompt box will pop up asking you to upgrade the firmware with the file, tap **CONFIRM** to perform the firmware upgrade.

step 9 Wait for the file to be uploaded. When the upgrade is finished, the interface will inform you of the upgrade completion. Tap **Complete** to end the upgrade.

- - End

8.10.12 Grounding Detection

Contact SUNGROW to obtain the advanced account and corresponding password before setting the earth detection parameters.

Unauthorized personnel are not allowed to log in with this account. Otherwise, SUNGROW shall not be held liable for any damages caused.

Tap **More→Settings→Operation Parameters→Grounding Detection** to enter the corresponding screen.

figure 8-27 Grounding Detection

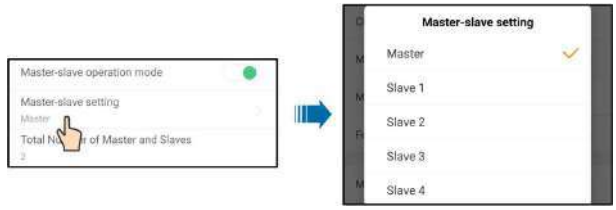
If the grounding detection is enabled, the DO relay will switch on automatically to signal the external alarm if the value exceeds the grounding detection alarm value. The buzzer inside the inverter will beep.

The PV insulation resistance fault (fault sub-code 039) will trigger the DO relay to signal the external alarm.

8.10.13 Parallel Configuration

When two or more inverters are connected in parallel, the inverter needs to be set as the master or slave.

Tap **More→Settings→Power Regulation Parameters→Feed-in Limitation** to enter the corresponding screen.



Parameter	Default value	Range
Master-slave operation mode	ON	ON / OFF
Master-slave setting	Master	Master / Slave 1 / Slave 2 / Slave 3 / Slave 4
Total Number of Master and Slaves	2	2 ~ 5

8.10.14 Frequency Shift Power Control

Tap **More→Settings→Operation Parameters→Other Parameters** to enter the corresponding screen.

Parameter	Default value	Range
Frequency Shift Power Control	OFF	ON / OFF
Frequency Shift Test	OFF	ON / OFF
Set Test Frequency	50.00 Hz	50.00 ~ 55.00 Hz

If PV inverters are connected on the AC side during battery-backup operation, the hybrid inverter must be able to limit their output power. This limitation becomes necessary when, for example, the hybrid inverter's battery is fully charged and the power available from the PV system exceeds the power requirement of the connected loads.

To prevent excess energy from overcharging the battery, the hybrid inverter automatically detects the problem and changes the frequency at the AC output. This frequency adjustment is analyzed by the PV inverter. As soon as the power frequency of the battery-backup grid increases beyond the value specified in **Set Test Frequency**, the PV inverter limits its output power accordingly.

Before retrofitting the existing PV system to an off-grid port, the **Frequency Shift Power Control** parameter needs to be enabled. It must be ensured that the connected PV inverters limit their power at the AC output via the hybrid inverter due to changes in frequency. The frequency-dependent active power limitation PF must be set in the PV inverter.

When the battery SOC is greater than 85%, the Hybrid inverter will standby before starting when switching off-grid, and does not support seamless switching.

8.10.15 Energy Management Mode

Tap **Settings→Energy Management Parameters→General Parameters→Energy Management Mode** to enter the screen, as shown in the following figure.

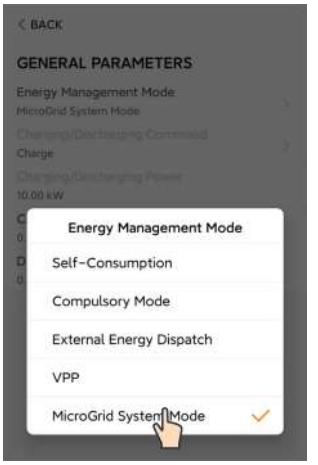


figure 8-28 Energy Management Mode

8.10.16 MicroGrid System Parameters

Tap **Settings→Energy Management Parameters→MicroGrid System Parameters** to enter the screen, as shown in the following figure.

figure 8-29 MicroGrid System Parameters

table 8-11 Description of microgrid system parameters

Parameter	Description	Default	Range
Genset Start/ Stop Control	Select how to start and stop the genset	Controlled by SOC	Forced Stop / Forced Start / Controlled by SOC
Max. Permitted Charging Power from AC	The allowable maximum charging power of batteries from AC side	30 kW	0 kW ~ 500 kW

Parameter	Description	Default	Range
Nominal Power of Genset	Nominal power of the genset, which is limited to less than 50 kW. The sum of the inverter power and the load power shall not be higher than the nominal power of the genset. Removed non-critical loads if necessary.	50 kW *	0 kW ~ 500 kW
Lower Limit of SOC to Start Genset	When the SOC reaches the lower limit, the genset is started to supply power to loads and charge batteries. It is only displayed when the genset on/off is controlled by SOC.	20%	0 ~ 100%
Upper Limit of SOC to Stop Genset	When the SOC reaches the upper limit, the genset is stopped and the inverter supplies power to loads. It is only displayed when the genset on/off is controlled by SOC.	90%	0 ~ 100%

* Set this parameter based on the actual maximum power of the genset. The recommended maximum power of the genset is twice the rated power of the inverter parallel system.

8.10.17 DO Configuration

Tap **Settings→Operation Parameters→Regular Parameters→DO Configuration** to enter the screen, as shown in the following figure.

figure 8-30 DO Configuration

9 System Decommissioning

9.1 Decommissioning the Inverter

9.1.1 Disconnecting the Inverter

⚠ CAUTION

Danger of burns!

Even if the inverter is shut down, it may still be hot and cause burns. Wear protective gloves before operating the inverter after it cools down.

For maintenance or other service work, the inverter must be switched off.

Proceed as follows to disconnect the inverter from the AC and DC power sources. Lethal voltages or damage to the inverter will follow if otherwise.

step 1 Stop the inverter via the iSolarCloud App. For details, see "8.10.1 System Parameters".

step 2 Disconnect the external AC circuit breaker and secure it against reconnection.

step 3 Rotate the DC switch to the "OFF" position for disconnecting all of the PV string inputs.

step 4 Disconnect the DC circuit breaker between the battery and the inverter.

NOTICE

Do not power on the system again for 1 minute after the disconnection.

step 5 Wait about 10 minutes until the capacitors inside the inverter completely discharge.

step 6 Ensure that the DC cable is current-free via a current clamp.

- - End

9.1.2 Dismantling the Inverter

⚠ CAUTION

Risk of burn injuries and electric shock!

After the inverter is powered off for 10 minutes, measure the voltage and current with professional instrument. Only when there is no voltage nor current can operators who wear protective equipment operate and maintain the inverter.

Before dismantling the inverter, disconnect both AC and DC connections.

If there are more than two layers of inverter DC terminals, dismantle the outer DC connectors before dismantling the inner ones.

step 1 Refer to "6 Electrical Connection" for the inverter disconnection of all cables in reverse steps.

step 2 Dismantle the inverter referring to "5 Mechanical Mounting" in reverse steps.

step 3 If necessary, remove the wall-mounting bracket from the wall.

step 4 If the inverter will be reinstalled in the future, please refer to "4.3 Inverter Storage" for a proper conservation.

- - End

9.1.3 Disposal of the Inverter

Users take the responsibility for the disposal of the inverter.

WARNING

Please scrap the inverter in accordance with relevant local regulations and standards to avoid property losses or casualties.

NOTICE

Some parts of the inverter may cause environmental pollution. Please dispose of them in accordance with the disposal regulations for electronic waste applicable at the installation site.

9.2 Decommissioning the Battery

Decommission the battery in the system after the inverter is decommissioned. Proceed as follows to decommission a Li-ion battery.

step 1 Disconnect the DC circuit breaker between the battery and the inverter.

step 2 Disconnect the communication cable between the battery and the inverter.

step 3 **(Optional)** Turn off the switch on LG Chem Li-ion battery or BYD Li-ion battery, if applicable.

step 4 Wait for about 1 minute and then use the multimeter to measure the port voltage of the battery.

step 5 If the battery port voltage is zero, disconnect the power cables from the battery module.

- - End

SUNGROW is not liable for disposal of the battery.

10 Troubleshooting and Maintenance

10.1 Troubleshooting

When an alarm occurs, the alarm information can be viewed through the App.
Alarm ID and corrective measures are as follows:

Alarm ID	Alarm Name	Corrective Measures
002, 003, 014, 015	Grid overvoltage	Generally, the inverter will be reconnected to the grid after the grid recovers. If the alarm occurs frequently: 1. Measure the grid voltage, and contact the local utility grid company for solutions if the grid voltage exceeds the specified value. 2. Check, through the App, whether the protection parameters are appropriately set. 3. Check whether the cross-sectional area of the AC cable meets the requirement. 4. If the alarm persists, contact SUNGROW.
004, 005	Grid undervoltage	Generally, the inverter will be reconnected to the grid after the grid recovers. If the alarm occurs frequently: 1. Measure the grid voltage, and contact the local utility grid company for solutions if the grid voltage is below the specified value. 2. Check, through the App, whether the protection parameters are appropriately set. 3. Check whether the AC cable is firmly in place. 4. If the alarm persists, contact SUNGROW.
008	Grid overfrequency	Generally, the inverter will be reconnected to the grid after the grid recovers. If the alarm occurs frequently: 1. Measure the grid frequency, and contact the local utility grid company for solutions if the grid frequency is beyond the specified range. 2. Check, through the App, whether the protection parameters are appropriately set. 3. If the alarm persists, contact SUNGROW.
009	Grid underfrequency	

Alarm ID	Alarm Name	Corrective Measures
010	Grid Power Outage	Generally, the inverter will be reconnected to the grid after the grid recovers. If the alarm occurs frequently: 1. Check whether the grid supplies power reliably. 2. Check whether the AC cable is firmly in place. 3. Check whether the AC cable is correctly connected (whether the live wire and the N wire are in correct place). 4. Check whether the AC switch or circuit breaker is disconnected. 5. If the alarm persists, contact SUNGROW.
012	Excessive leakage current	1. The alarm can be caused by poor sunlight or damp environment, and the inverter will be reconnected to the grid after the environment is improved. 2. If the environment is normal, check whether the AC and DC cables are well insulated. 3. If the alarm persists, contact SUNGROW.
013	Grid abnormal	Generally, the inverter will be reconnected to the grid after the grid recovers. If the alarm occurs frequently: 1. Measure the grid frequency, and contact the local utility grid company for solutions if the grid frequency exceeds the specified value. 2. If the alarm persists, contact SUNGROW.
017	Grid voltage unbalance	Generally, the inverter will be reconnected to the grid after the grid recovers. If the alarm occurs frequently: 1. Measure the grid voltage. If grid phase voltage differs greatly, contact the utility grid company for solutions. 2. If the voltage difference between the three phases is within the permissible range of the local utility grid company, modify the parameter setting through the App. 3. If the alarm persists, contact SUNGROW.

Alarm ID	Alarm Name	Corrective Measures
028, 029	PV reverse connection fault	1. Check whether the corresponding string is of reverse polarity. If so, disconnect the DC switch and adjust the polarity when the solar radiation is low and the string current drops below 0.5A. 2. Check whether PV strings connected to the same MPPT have the same number of PV modules. If not, take corrective measures. 3. If the alarm persists, contact SUNGROW.
037	High ambient temperature	1. Check whether the inverter is directly exposed to sunlight. If so, take some shading measures. 2. Check and clean the air ducts. 3. Check whether the sub-alarm ID 070 (fan alarm) occurs through the App. If so, replace the faulty fan. 4. If the alarm persists, contact SUNGROW.
039	Low ISO resistance	Wait for the inverter to recover. If the fault occurs frequently: 1. Check whether the insulation resistance protection value is extremely large through the App, and ensure that it complies with the local regulations. 2. Check the resistance to ground from the PV module/cable. Take corrective measures in case of leading to short circuit or damaged insulation layer. 3. If the cable is normal and the alarm occurs on rainy days, check it again when the weather turns fine. 4. If the fault occurs on a cloudy day without rain but there is stagnant water or vegetation on site, clear the water and vegetation. If the fault persists, check it again when the weather turns fine. 5. If the alarm persists, contact SUNGROW.
106	Grounding cable fault	1. Check whether the AC cable is correctly connected. 2. Check whether the grounding cable and wire cores are wrongly insulated. 3. If the alarm persists, contact SUNGROW.
051	Off-grid load overpower	1. Reduce the power of loads connected at the off-grid port, or remove some loads. 2. If the alarm persists, contact SUNGROW.

Alarm ID	Alarm Name	Corrective Measures
714	BMS communication error	1. Check whether the communication cable and corresponding wiring terminal are abnormal. If so, take corrective measures to ensure reliable connection. 2. Reinstall the Smart Energy Meter communication cable. 3. If the alarm persists, contact SUNGROW.
932–935, 937, 939	Battery alarm	Generally, the battery can automatically recover. In case the alarm persist for a long time: 1. If the alarm is caused by ambient temperature, such as over temperature alarm or low temperature alarm, take measures to change the ambient temperature, such as improving heat dissipation conditions. 2. If the fault persists, contact battery manufacturer.
703, 711, 712, 715, 732–736, 739, 832–833, 835–837	Battery abnormal	1. In case of abnormal battery voltage, check whether the battery power cable connection is abnormal (reverse connection, loose, etc.). If so, connect the battery power cable correctly. 2. Check whether the battery real-time voltage is abnormal if the battery power cable is correctly connected. If so, contact the battery manufacturer. If not, contact SUNGROW. 3. In case of abnormal battery temperature, take measures to change the ambient temperature, such as improving heat dissipation conditions. 4. If the fault persists, contact battery manufacturer.

Alarm ID	Alarm Name	Corrective Measures
502-504, 507, 508, 510, 513, 516–518	System alarm	The inverter can operate normally. 1. Check whether the related cable connection and terminals are abnormal, and check whether the ambient environment is abnormal. If so, take corrective measures. 2. If the alarm persists, contact SUNGROW.
006, 007, 011, 019，021，025, 038, 040–042, 048–050, 052–054, 056，064–067, 100–102, 105, 107, 113, 117, 200–205, 300，303–305, 308–316，320, 600，601, 605, 608, 612, 616, 620, 624	System fault	1. Wait for the inverter to recover. 2. Disconnect the AC and DC switches or circuit breakers, and connect them again after 15 minutes. 3. If the alarm persists, contact SUNGROW.

10.2 Maintenance

10.2.1 Maintenance Notices

DANGER

Risk of inverter damage or personal injury due to incorrect service!

- **Be sure to use special insulation tools when perform high-voltage operations.**
- **Before any service work, first disconnect the grid-side AC circuit breaker and check the inverter status. If the inverter indicator is off, please wait until night to disconnect the DC switch. If the inverter indicator is on, directly disconnect the DC switch.**
- **After the inverter is powered off for 10 minutes, measure the voltage and current with professional instrument. Only when there is no voltage nor current can operators who wear protective equipment operate and maintain the inverter**
- **Even if the inverter is shut down, it may still be hot and cause burns. Wear protective gloves before operating the inverter after it cools down.**

CAUTION

To prevent misuse or accidents caused by unrelated personnel: Post prominent warning signs or demarcate safety warning areas around the inverter to prevent accidents caused by misuse.

NOTICE

Restart the inverter only after removing the fault that impairs safety performance.
As the inverter contains no component parts that can be maintained, never open the enclosure, or replace any internal components.
To avoid the risk of electric shock, do not perform any other maintenance operations beyond this manual. If necessary, contact SUNGROW for maintenance. Otherwise, the losses caused is not covered by the warranty.

NOTICE

Touching the PCB or other static sensitive components may cause damage to the device.

- **Do not touch the circuit board unnecessarily.**
- **Observe the regulations to protect against electrostatic and wear an anti-static wrist strap.**

10.2.2 Routine Maintenance

Item	Method	Period
General status of the system	• Visual check for any damage or deformation of the inverter. • Check any abnormal noise during the operation. • Check each operation parameter. • Be sure that nothing covers the heat sink of the inverter.	Every 6 months
Electrical connection	Check whether there is damage to the cables, especially the surface in contact with metal.	6 months after commissioning and then once or twice a year.

10.2.3 Replacing the Button Cell

⚠ DANGER

Disconnect the inverter from the grid first, then the PV strings and the battery before any maintenance work.
Lethal voltage still exists in the inverter. Please wait at least 10 minutes and then perform maintenance work.

There is a button cell on the inner PCB board. Contact SUNGROW for replacement when the relevant fault alarm occurs.
Check the fastener, appearance, voltage, and resistance quarterly and annually.

11 Appendix

11.1 Technical Data

Parameters	SH5.0RT	SH6.0RT
PV Input		
Recommended max. PV input power	7500 W	9000 W
Max. PV input voltage	1000 V	1000 V
Startup voltage	180 V	250 V
Rated input voltage	600 V	600 V
MPP voltage range	150 V - 950 V	200 V - 950 V
MPP voltage range for rated power	210 V - 850 V	250 V - 850 V
No. of MPPTs	2	
Max. number of PV strings per MPPT	1 / 1	
Max. PV input current	25 A (12.5 A / 12.5 A)	
Max. current for input connector	30 A	
Short-circuit current of PV input	32 A (16 A / 16 A)	
Battery Data		
Battery type	Li-ion battery	
Battery voltage	150 V - 600 V	
Max. charge / discharge current	30 A */ 30 A *	
Max. charge / discharge power	7500 W / 6000 W	9000 W / 7200 W
AC Input and Output Data		
Rated AC output power	5000 W	6000 W
Rated AC output current	7.3 A	8.7 A
Max. AC input power from grid	12500 W	15000 W
Max. AC output power	5000 VA	6000 VA
Rated AC output apparent power	5000 VA	6000 VA

Parameters	SH5.0RT	SH6.0RT
Max. AC output current	7.6 A	9.1 A
Rated AC voltage	3 / N / PE, 220 / 380 V; 230 / 400 V; 240 / 415 V	
AC voltage range	270 - 480 Vac	
Rated grid frequency/Grid frequency range	50Hz / 45 - 55Hz, 60Hz / 55 - 65Hz	
THD	< 3 % (of rated power)	
DC current injection	< 0.5 % In	
Power factor	> 0.99 / 0.8 leading to 0.8 lagging	
Protection&Function		
LVRT	Yes	
Anti-islanding protection	Yes	
AC short circuit protection	Yes	
Leakage current protection	Yes	
DC switch (solar)	Optional **	
DC fuse (battery)	Yes	
Over-voltage category	III [Mains], II [PV] [Battery]	
SPD	DC Type II / AC Type II	
Battery input reverse polarity protection	Yes	
Parallel operation on grid port / Max. No. of inverters	Master-slave mode / 5 *** (need same inverters type)	
System Data		
Max. efficiency	98.0 %	98.2 %
European efficiency	97.2 %	97.5 %
Isolation method (solar / battery)	Transformerless / Transformerless	
Degree of protection	IP65	
Operating ambient temperature range	-25 ℃ - 60 ℃	
Allowable relative humidity range (Non-condensing)	0 - 100 %	
Cooling method	Natural convection	
Max. operating altitude	4000 m (> 3000 m derating)	
Noise (Typical)	30 dB(A)	
Display	LED	
Communication	RS485, WLAN, Ethernet, CAN, 4 × DI, 1 × DO	
DC connection type	MC4 (PV) / Sunclix (Battery)	

Parameters	SH5.0RT	SH6.0RT
AC connection type	Plug and play connector	
Country of manufacture	China	
Mechanical Data		
Dimensions (W x H x D)	460 mm x 540 mm x 170 mm	
Mounting method	Wall-mounting bracket	
Weight	27 kg	
Backup Data		
Rated voltage	3 / N / PE, 220 Vac / 230 Vac / 240 Vac	
Frequency range	50 Hz / 60 Hz	
Total hamonic factor output voltage（Linear load）	2%	
Switch time to emergency mode	< 20 ms	
Rated output power	5000 W / 5000 VA	6000 W / 6000 VA
Peak output power ****	6000 W / 6000 VA，5min 10000 W / 10000 VA，10 s	7200 W / 7200 VA，5min 10000 W / 10000 VA，10 s
Rated output current for backup load during on grid mode	3 x 18.5 A	

* Depending on the connected battery.

** This function is only available for non-AU versions.

*** Germany is available for 2 inverters parallel in maximum if no ripple control is used in system.

**** Can be reached only if PV and battery power is sufficient.

Parameters	SH8.0RT	SH10RT
PV Input		
Recommended max. PV input power	12000 W	15000 W
Max. PV input voltage	1000 V	
Startup voltage	250 V	
Rated input voltage	600 V	
MPP voltage range	200 V - 950 V	
MPP voltage range for rated power	330 V - 850 V	280 V - 850 V
No. of MPPTs	2	
Max. number of PV strings per MPPT	1 / 1	1 / 2

Parameters	SH8.0RT	SH10RT
Max. PV input current	25 A (12.5 A / 12.5 A)	37.5 A (12.5 A / 25 A)
Max. current for input connector	30 A	
Short-circuit current of PV input	32 A (16 A / 16 A)	48 A (16 A / 32 A)
Battery Data		
Battery type	Li-ion battery	
Battery voltage	150 V - 600 V	
Max. charge / discharge current	30 A * / 30 A *	
Max. charge / discharge power	10600 W / 10600 W	
AC Input and Output Data		
Rated AC output power	8000 W	10000 W
Rated AC output current	11.6 A	14.5 A
Max.AC input power from grid	18600 W	20600 W
Max. AC output power	8000VA	10000VA
Rated AC output apparent power	8000 VA	10000 VA
Max. AC output current	12.1 A	15.2 A
Rated AC voltage	3 / N / PE, 220 / 380 V; 230 / 400 V; 240 / 415 V	
AC voltage range	270 - 480 Vac	
Rated grid frequency/Grid frequency range	50Hz / 45 - 55Hz, 60Hz / 55 - 65Hz	
THD	< 3 % (of rated power)	
DC current injection	< 0.5 % In	
Power factor	> 0.99 / 0.8 leading to 0.8 lagging	
Protection&Function		
LVRT	Yes	
Anti-islanding protection	Yes	
AC short circuit protection	Yes	
Leakage current protection	Yes	
DC switch (solar)	Optional **	
DC fuse (battery)	Yes	
Over-voltage category	III [Mains], II [PV] [Battery]	
SPD	DC Type II / AC Type II	

Parameters	SH8.0RT	SH10RT
Battery input reverse polarity protection	Yes	
Parallel operation on grid port / Max. No. of inverters	Master-slave mode / 5 *** (need same inverters type)	
System Data		
Max. efficiency	98.4 %	98.4 %
European efficiency	97.9 %	97.9 %
Isolation method (solar / battery)	Transformerless / Transformerless	
Degree of protection	IP65	
Operating ambient temperature range	-25 ℃ - 60 ℃	
Allowable relative humidity range (non-condensing)	0 - 100 %	
Cooling method	Natural convection	
Max. operating altitude	4000 m (> 3000 m derating)	
Noise (Typical)	30 dB(A)	
Display	LED	
Communication	RS485, WLAN, Ethernet, CAN, 4 × DI, 1 × DO	
DC connection type	MC4 (PV) / Sunclix (Battery)	
AC connection type	Plug and play connector	
Country of manufacture	China	
Mechanical Data		
Dimensions (W x H x D)	460 mm x 540 mm x 170 mm	
Mounting method	Wall-mounting bracket	
Weight	27 kg	
Backup Data		
Rated voltage	3 / N / PE, 220 Vac / 230 Vac / 240 Vac	
Frequency range	50 Hz / 60 Hz	
Total hamonic factor output voltage（Linear load）	2%	
Switch time to emergency mode	< 20 ms	
Rated output power	8000 W / 8000 VA	10000 W / 10000 VA
Peak output power ****	12000 W / 12000 VA，5min	
Rated output current for backup load during on grid mode	3 x 18.5 A	

* Depending on the connected battery.

** This function is only available for non-AU versions.

*** Germany is available for 2 inverters parallel in maximum if no ripple control is used in system.

**** Can be reached only if PV and battery power is sufficient.

11.2 The Compatibility for Backup under Off-grid Scenario

The information below is about the compatibility for backup of SUNGROW SH5.0RT / SH6.0RT / SH8.0RT / SH10RT inverter under off-grid scenario. Please refer to this information before you use the back-up model of the four inverters under off-grid situation.

Main electrical panel

Type	Load Power			
	SH5.0RT	SH6.0RT	SH8.0RT	SH10RT
Dust collector	1 kW	1 kW	1 kW	1.3 kW
Water heater / Kettle / Iron / Oven / Toaster / Geothermal blanket / Rice cooker	1.5 kW	1.8 kW	2.4 kW	3 kW (2.5 kW with SBR096)
Microwave oven	1 kW	1 kW	1.3 kW	1.5 kW
Refrigerator	1 kW	1 kW	1 kW	1 kW
TV / Computer	1 kW	1 kW	1 kW	1 kW
Bath heater	1 kW	1.5 kW	2 kW	2.5 kW
Fluorescent / LED lights	1 kW	1 kW	1 kW	1.3 kW
Electric fan / Ceiling fan	1 kW	1.2 kW	1.6 kW	2 kW

Additional large appliances

Type	SH5.0RT	SH6.0RT	SH8.0RT	SH10RT
Conditioner (Frequency conversion)	1P	1P	1P	1.5P

The data of the compatibility for backup of SH5.0RT / SH6.0RT / SH8.0RT / SH10RT are based on the test with SUNGROW SBR096/128/160/192/224/256 batteries (-20 ~ 53 ℃, 5~100% SOC). For the actual application, please refer to the maximum output capacity of the battery used.

For those loads that not covered in this document, please contact SUNGROW to make sure the compatibility of the specific loads under off-grid scenario. SUNGROW will not be held

responsible for the usage of any load without confirmation. We will keep updating this document, please contact SUNGROW if there are any relevant issues.

11.3 Quality Assurance

When product faults occur during the warranty period, SUNGROW will provide free service or replace the product with a new one.

Evidence

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be undamaged and legible. Otherwise, SUNGROW has the right to refuse to honor the quality guarantee.

Conditions

- After replacement, unqualified products shall be processed by SUNGROW.
- The customer shall give SUNGROW a reasonable period to repair the faulty device.

Exclusion of Liability

In the following circumstances, SUNGROW has the right to refuse to honor the quality guarantee:

- The free warranty period for the whole machine/components has expired.
- The device is damaged during transport.
- The device is incorrectly installed, refitted, or used.
- The device operates in harsh conditions beyond those described in this manual.
- The fault or damage is caused by installation, repairs, modification, or disassembly performed by a service provider or personnel not from SUNGROW.
- The fault or damage is caused by the use of non-standard or non-SUNGROW components or software.
- The installation and use range are beyond stipulations of relevant international standards.
- The damage is caused by unexpected natural factors.

For faulty products in any of above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of SUNGROW.

11.4 Contact Information

In case of questions about this product, please contact us.

We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device
- Fault code/name

- Brief description of the problem

For detailed contact information, please visit: **https://en.sungrowpower.com/contactUS**.

SUNGROW
Clean power for all

Iris Hellas
Technology Innovations
www.irishellas.com

High Voltage LFP Battery
Quick Installation Guide

SBR096 / SBR128 / SBR160
SBR192 / SBR224 / SBR256

EN

1. Contents may be periodically updated or revised due to product development. The information in this guide is subject to change without notice. In no case shall this guide substitute for the user manual or related notes on the device.
2. Make sure to read over, fully understand and strictly follow the detailed instructions of the user manual and other related regulations before installing the equipment. The user manual can be downloaded by visiting the website at http://support.sungrowpower.com/; or it can be obtained by scanning the QR code on the side of the equipment or the back cover of this guide.
3. All operations can be performed only by qualified personnel, that must be trained for installation and commissioning of electrical system, as well as dealing with hazards, have knowledge of the manual and of the local regulations and directives.
4. Before installation, check that the package contents are intact and complete compared to the packing list. Contact SUNGROW or the distributor in case of any damaged or missing components.
5. The cable used must be intact and well insulated. Operation personnel must wear proper personal protective equipment (PPE) all the time.
6. Any violation could result in personal death or injury or device damage, and will void the warranty.

Safety

The battery has been designed and tested strictly according to international safety regulations. Read all safety instructions carefully prior to any work and observe them at all times when working on or with the battery. Incorrect operation or work may cause:

- injury or death to the operator or a third party;
- damage to the battery or other properties.

The warning label on the battery body are as follows.

	Pay attention to the danger. Do not operate this product in the live status!
	Read the manual before any operation of this product.
	Do not dispose in trash. Compacting a lithium ion battery is dangerous as it can explode.
	No open flames Do not expose to flame, incinerate, puncture, or impact
	Electric shock hazard Serviced by qualified personnel only. Out of reach from children.
	Please recycle battery. Do not discard.
	This is a protective grounding terminal, which should be grounded securely to protect the safety of operators.
	TÜV mark of conformity.
	CE mark of conformity.

⚠ DANGER

Risk of explosion

- Do not subject the battery to any strong force.
- Do not mechanically damage the battery (pierce, deform, strip down, etc.)
- Do not heat the battery or dispose of the battery in a fire.
- Do not install the battery in potentially explosive environments.
- Do not soak the battery in water or expose it to moisture or liquids.

⚠ DANGER

Risk of fire

- Do not expose the battery to temperatures in excess of 60°C.
- Do not place the battery near a heat source, such as direct sunlight, a fireplace, a thermally uninsulated wall exposed to sunlight, hot water, or a heater.
- Keep sources of ignition such as sparks, flames, and smoking materials away from the battery.

⚠ DANGER

Risk of electric shock

- Do not disassemble the battery.
- Do not handle a wet battery or use wet tools.
- Do not soak the battery in water or expose it to moisture or liquids.
- Keep the battery away from children and animals.
- Wear suitable clothing, guards and gloves to prevent you from direct contact with the DC voltage.
- Use insulated tools during working with battery.
- Set aside metal jewelry before working on the DC circuit.

⚠ NOTICE

Comply with local standards for use with the battery.

DE

1. Die Inhalte können aufgrund der Produktweiterentwicklung regelmäßig aktualisiert oder überarbeitet werden. Die Informationen in diesem Handbuch können ohne vorherige Ankündigung geändert werden. In keinem Fall ersetzt diese Anleitung das Benutzerhandbuch oder zugehörige Hinweise auf dem Gerät.
2. Stellen Sie sicher, dass Sie alle Anweisungen des Benutzerhandbuchs und andere damit zusammenhängende Vorschriften gelesen und vollständig verstanden haben und diese genau befolgen, bevor Sie das Gerät installieren. Das Benutzerhandbuch kann von der Website unter http://support.sungrowpower.com/ heruntergeladen werden. Alternativ können Sie den QR-Code an der Seite des Geräts oder auf der Rückseite dieses Handbuchs scannen.
3. Alle Arbeiten dürfen nur von qualifiziertem Personal ausgeführt werden, das für die Installation und Inbetriebnahme elektrischer Anlagen sowie den Umgang mit Gefahren geschult ist, das Handbuch kennt und mit den örtlichen Vorschriften und Richtlinien vertraut ist.
4. Vergewissern Sie sich vor der Installation, dass der Paketinhalt gemäß der Packliste vollständig und funktionsfähig ist. Kontaktieren Sie SUNGROW oder Ihren Händler im Falle von beschädigten oder fehlenden Bauteilen.
5. Das verwendete Kabel muss intakt und gut isoliert sein. Das Fachpersonal muss stets geeignete Schutzausrüstung (PSA) tragen.
6. Das Nichteinhalten von Anweisungen kann zu Tod oder Verletzungen von Menschen oder zu Schäden am Gerät führen und hat ein Erlöschen der Garantie zur Folge.

Sicherheit

Die Batterie wurde streng nach internationalen Sicherheitsvorschriften entworfen, gefertigt und getestet. Studieren Sie vor der Durchführung jeglicher Arbeiten an oder mit der Batterie die Sicherheitshinweise und beachten Sie diese strengstens. Falsche Bedienung oder Betrieb können:

- zu Verletzungen oder zum Tod des Betreibers oder eines Dritten führen
- Beschädigung der Batterie oder anderen Eigentums verursachen

Die Warnhinweise auf dem Batteriegehäuse lauten wie folgt.

	Beachten Sie das Gefahrenpotential. Betreiben Sie dieses Produkt nicht im spannungsführenden Zustand!
	Lesen Sie das Handbuch, bevor Sie dieses Produkt in Betrieb nehmen.
	Nicht über den Hausmüll entsorgen. Das Komprimieren einer Lithium-Ionen-Batterie birgt die Gefahr einer Explosion.
	Keine offenen Flammen Nicht in Flammen setzen, verbrennen, durchstechen oder stoßen
	Gefahr durch Stromschlag Die Wartung darf nur von qualifiziertem Personal durchgeführt werden. Außer Reichweite von Kindern halten.
	Bitte recyceln Sie die Batterie. Nicht entsorgen.
	Dies ist eine schützende Erdungsklemme. Diese muss sicher geerdet werden, um die Sicherheit der Bediener zu gewährleisten.
	Das TÜV-Prüfzeichen.
	CE-Prüfzeichen.

⚠ GEFAHR

Explosionsgefahr

- Setzen Sie die Batterie keinen starken Kräften aus.
- Beschädigen Sie die Batterie nicht mechanisch (durchstechen, verformen, abisolieren usw.).
- Erhitzen Sie die Batterie nicht und entsorgen Sie sie nicht im Feuer.
- Installieren Sie die Batterie nicht in explosionsgefährdeten Umgebungen.
- Tauchen Sie die Batterie nicht in Wasser ein und setzen Sie sie keiner Feuchtigkeit oder Flüssigkeit aus.

⚠ GEFAHR

Brandgefahr

- Setzen Sie die Batterie keinen Temperaturen über 60 °C aus.
- Stellen Sie die Batterie nicht in der Nähe einer Wärmequelle auf, wie z. B. direktem Sonnenlicht, einem Kamin, einer thermisch nicht isolierten Wand, die Sonnenlicht ausgesetzt ist, heißem Wasser oder einer Heizung.
- Halten Sie Zündquellen wie Funken, Flammen und rauchende Materialien von der Batterie fern.

⚠ GEFAHR

Gefahr eines elektrischen Schlages

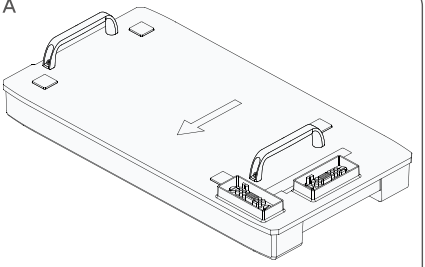
- Nehmen Sie die Batterie nicht auseinander.
- Hantieren Sie nicht mit einer nassen Batterie und verwenden Sie keine nassen Werkzeuge.
- Tauchen Sie die Batterie nicht in Wasser ein und setzen Sie sie keiner Feuchtigkeit oder Flüssigkeit aus.
- Halten Sie die Batterie von Kindern und Tieren fern.
- Tragen Sie geeignete Kleidung, Schutzausrüstung und Handschuhe, um sich vor direktem Kontakt mit der Gleichspannung zu schützen.
- Verwenden Sie bei Arbeiten an der Batterie isolierte Werkzeuge.
- Legen Sie jeglichen Metallschmuck ab, bevor Sie am Gleichstromkreis arbeiten.

⚠ HINWEIS

Halten Sie die örtlichen Normen für die Verwendung mit der Batterie ein.

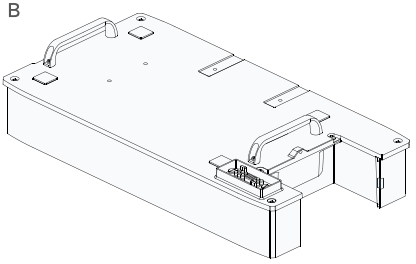
Scope of Delivery

A



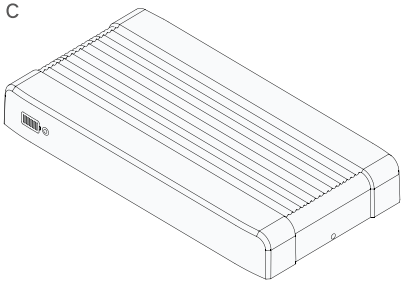
Base

B



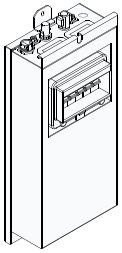
Battery module x (3~8)

C



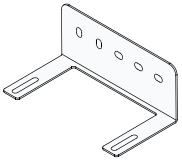
Top cover

D



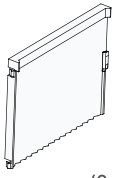
Switch gear

E



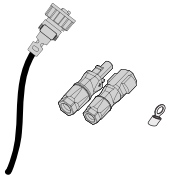
Bracket

F



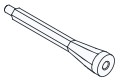
Side cover x (0~5)

G



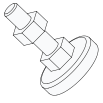
Cable/Connector

H



Stud

I

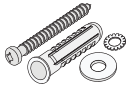


Foot (optional) x 4

J

M5 screw x (8~18)

K



Expansion plug set x 2

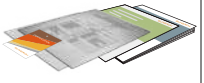
L

M5 screw sets x (3~4)

M

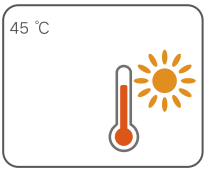
M6 fender washer x 2

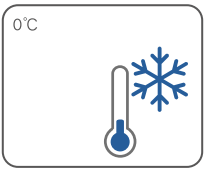
N

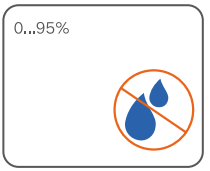


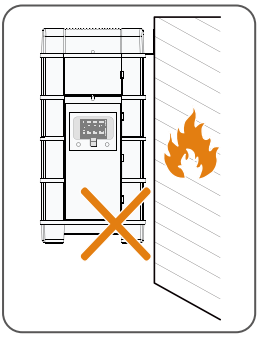
Documents

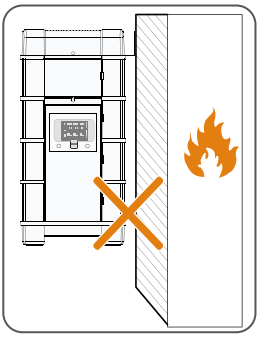
Mounting location

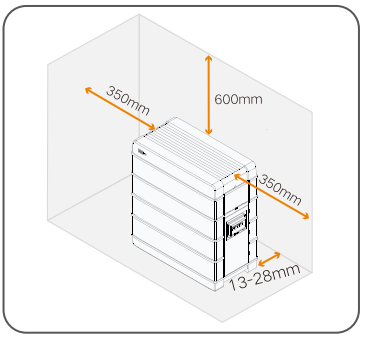


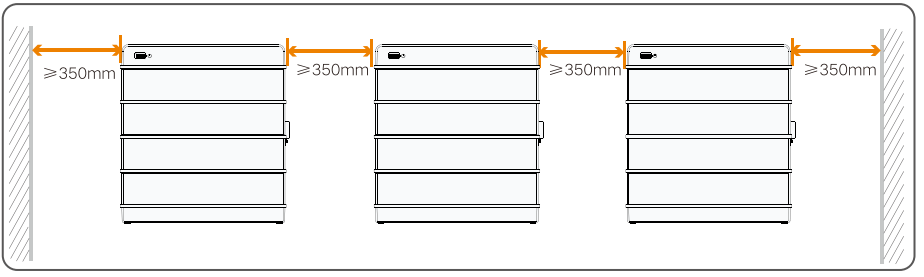


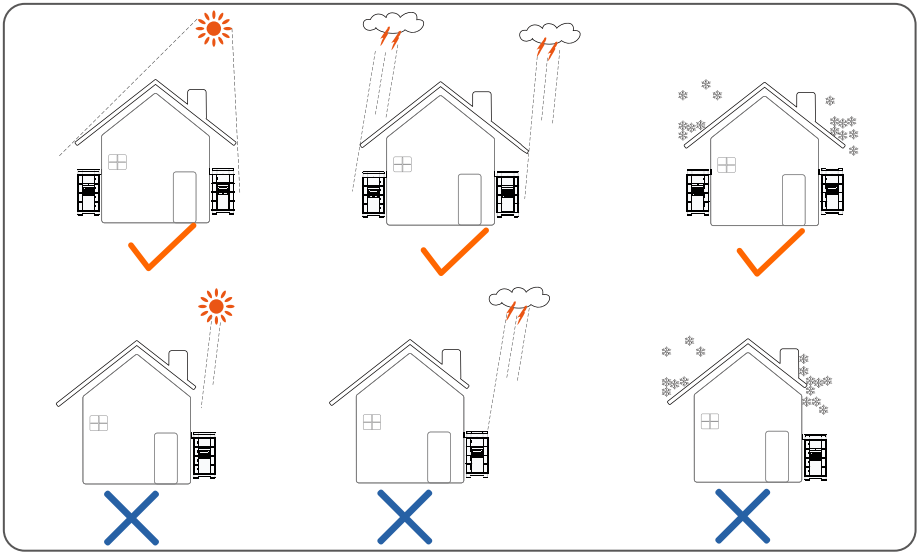




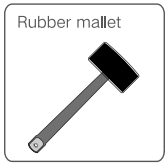


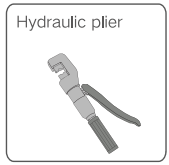




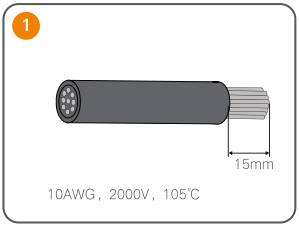


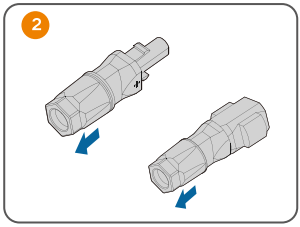
Installation tools

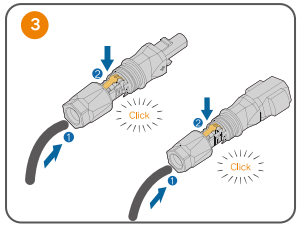


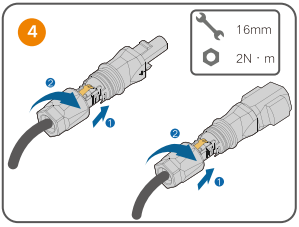


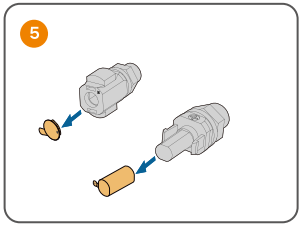
Battery (Power)

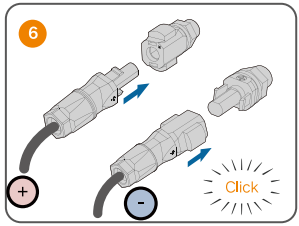




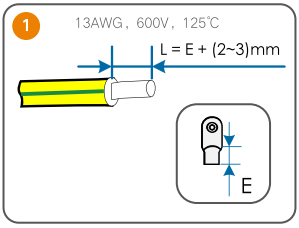


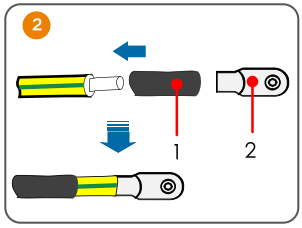


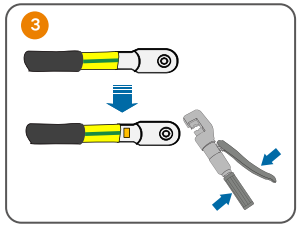


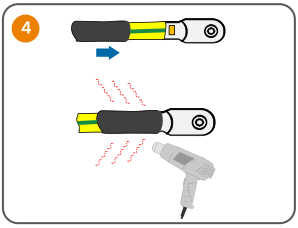


PE





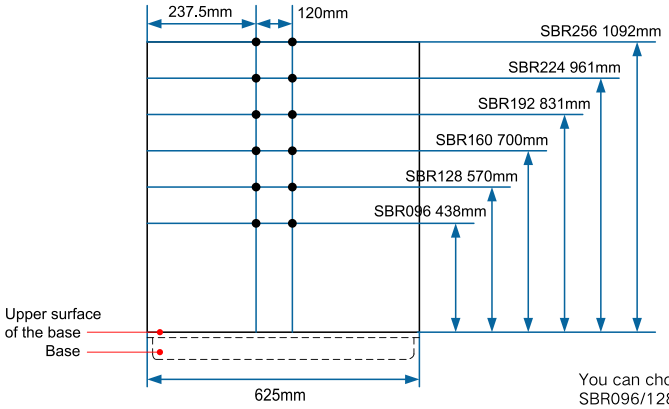




Mounting

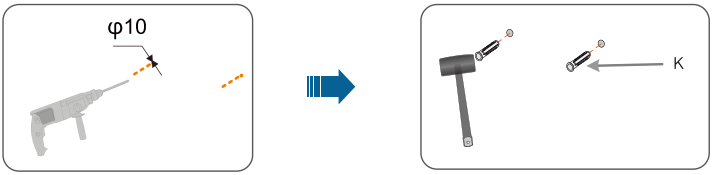
- The SBR128 mounting will be used as an example.

1 Align the base with the wall, and keep a distance of 13 mm to 28 mm between the base and the wall.
Mark the hole positions of the mounting bracket with a marker according to the required layout of holes.

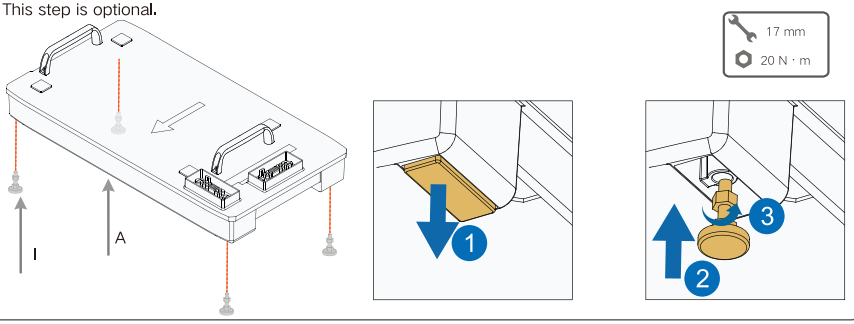


You can choose not to mount SBR096/128 on the wall.

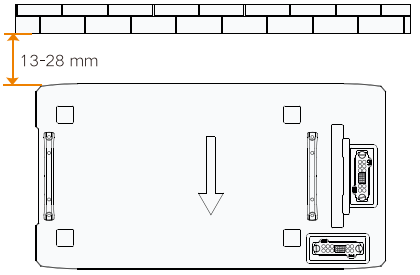
2



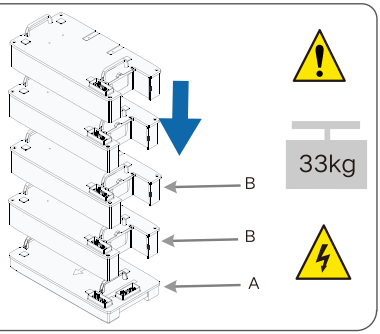
3 This step is optional.



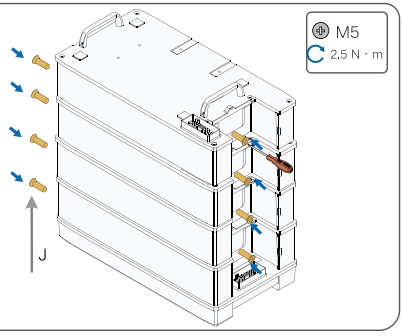
4



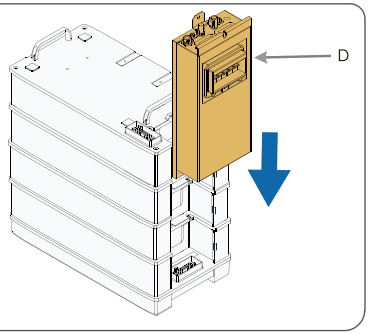
5



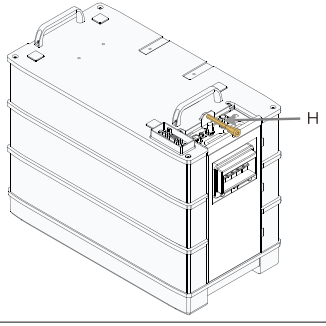
6

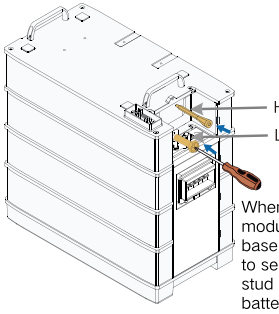


7



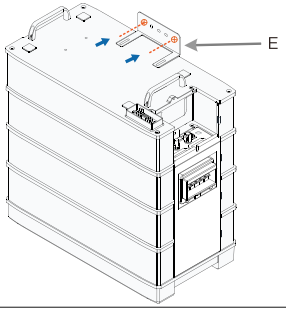
8

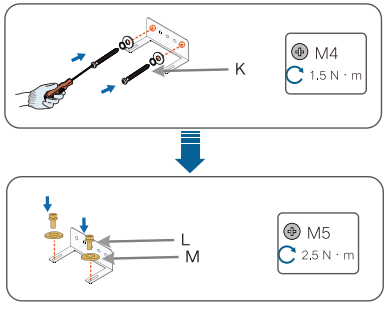




When 4 or more than 4 battery modules are installed in one base, M5 screw set is required to secure the switch gear. The stud is mounted on the top of battery module.

9 The bracket is mounted on the top battery module.





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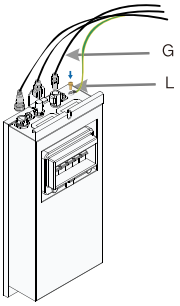
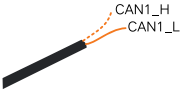


M5
2.5 N · m

For communication between the battery and the inverter. Connect the communication cable from the "COMM" terminal of the battery to the inverter.



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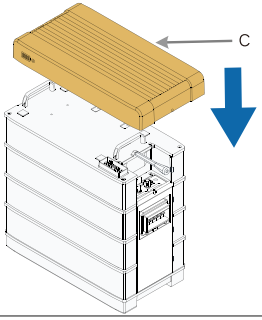
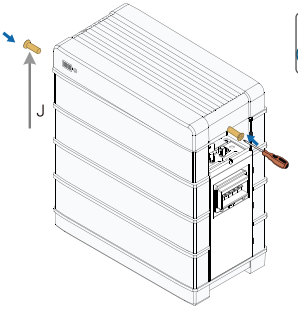
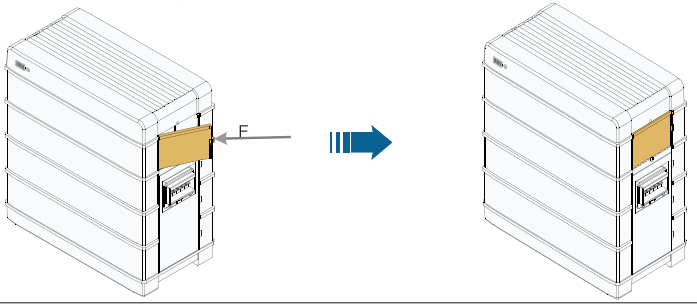


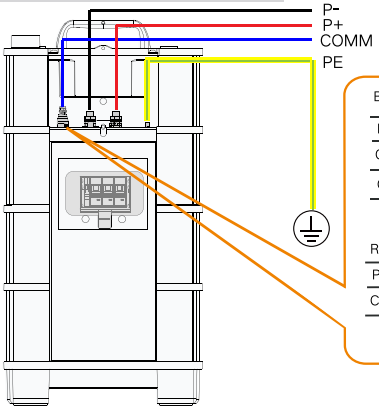


M5
2.5 N · m

12 When 4 or more than 4 battery modules are installed in one base, side covers are required.

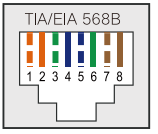


Connection Diagram



Battery to PCS communication

PIN	1	2
CAN	CAN1_H	CAN1_L
Color	White-orange	Orange



RJ45 PIN Map

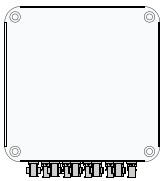
PIN	1	2	3	4	5	6	7	8
CAN	CAN1_H	CAN1_L	NO	COM	CAN2_H	CAN2_L	RS485B	RS485A

Parallel System（Optional）

The battery can be expanded to 4 units in parallel at most. Available in Q3, 2021.

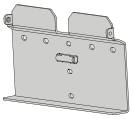
- Scope of Delivery

A



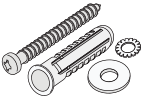
Junction box

B



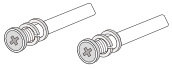
Bracket

C



Expansion plug set x 3

D

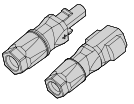


M4 screw set x 2

E

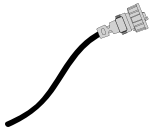
COMM IN connector

F



SUNCLIX connector x 5

G



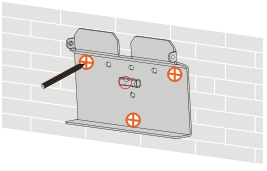
COMM OUT communication cable

H

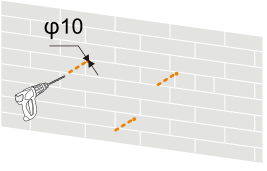
OT terminal

- Mounting

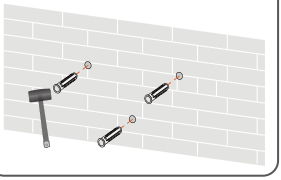
1



2



3



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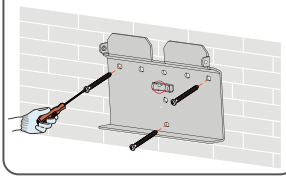

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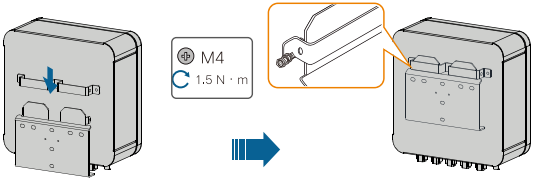
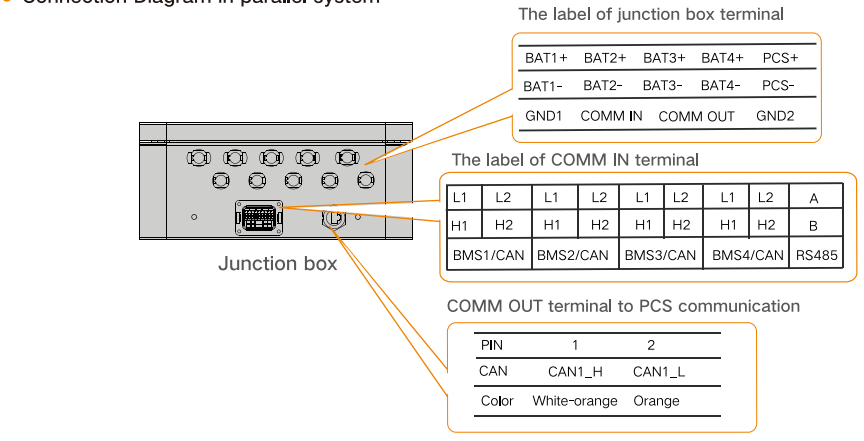
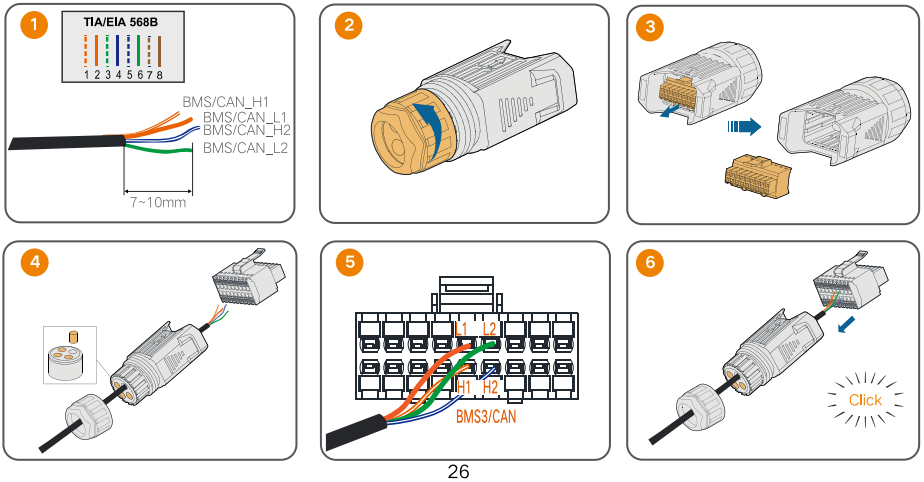


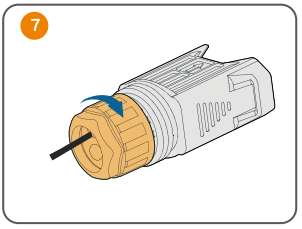
- Connection Diagram in parallel system

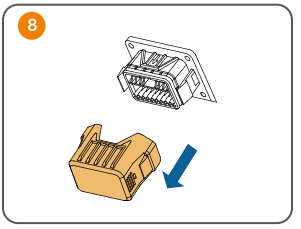


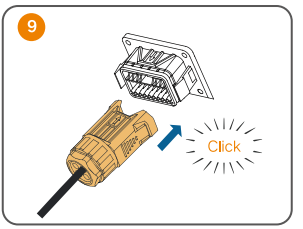
Battery (Communication)

- Take battery 3 connection as an example.

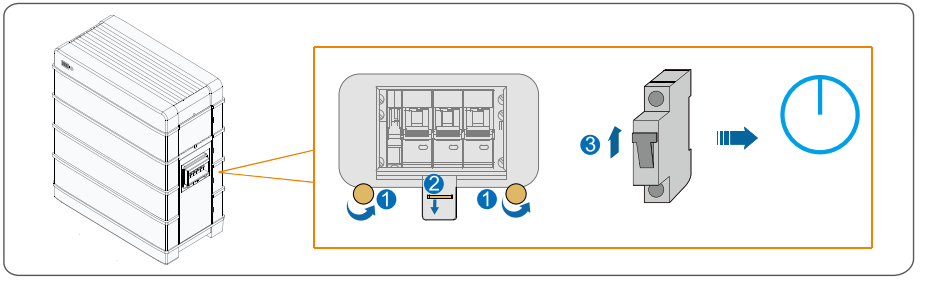








Power on

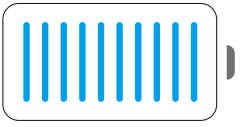


LED Indicator

LED indicators include the SOC indicator and the status indicator.

- SOC Indicator

The SOC indicator indicates the current SOC value of the battery. One bar indicates the SOC value of 10%.



- Status Indicator

The Status indicator indicates the current state of the battery.

LED color	LED indicator	LED state	Definition
	Blue	ON	Normal operation (without fault)
		Slow blink (Period: 2 s)	The battery is at power-on or standby state (without fault).
		Fast blink (Period: 0.5 s)	The battery is at firmware update state.
	Red	ON	A system fault has occured.
		Blink	The battery is at power-on or standby state (with primary fault).

The status indicator can be used to power on or off the battery.

Operation	Definition
Press and hold for less than 2 seconds	To power on the battery
Press and hold for more than 4 seconds	To power off the battery

Sungrow Power Supply Co., Ltd.
EU/EEA Importer: Sungrow Deutschland GmbH
Web: www.sungrowpower.com
Add: Balanstrasse 59, 81541 München, Germany

QIEN M-H-00212400-06

More information in the QR code or at http://support.sungrowpower.com/

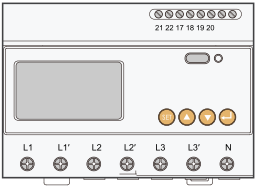
SUNGROW

Specifications are subject to changes without advance notice.

Quick Installation Guide

DTSD1352-C

Three-phase Energy Meter



DTSD1352-C-QIMUL-Ver12-201904 Version: 1.2

EN

Iris Hellas
Technology Innovations
www.irishellas.com

Applicability

This manual is applicable to three-phase Energy Meter.

- DTSD1352-C/10(80)A
- DTSD1352-C/1(6)A

Keep the manual in a convenient place for future reference. The latest manual can be obtained at www.sungrowpower.com.

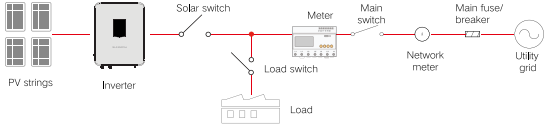
Target Group

Only qualified personnel with the following skills are allowed to perform the work described in this document:

- Training in the installation and commissioning of the electrical system;
- Capable of coping with the dangerous and emergency situations during the installation and commissioning;
- Familiar with the country/regional standards and specifications;
- Knowledge of and compliance with this manual and other related documents.

Intended Use

- The Energy Meter is designed for indoor use only. It is a measuring device detecting the electrical values at the grid-connected point. It cannot be used for billing purposes. The data collected by the Energy Meter on the PV power generation may differ from the data of the main energy meter.
- Any use other than those described in this document does not qualify as appropriate usage and is prohibited. Do not make any modifications to the product.
- Damage or destruction may be caused to the Energy Meter due to inappropriate usage. The Energy Meter must not be operated beyond the values specified in the technical data.
- In case the phase current at the grid-connected point is ⩽80A , DTSD1352-C/10(80)A is recommended; and if the phase current is > 80A, DTSD1352-C/1(6)A is recommended.
- The following figure shows an application example of the Energy Meter DTSD1352-C/10(80)A in the PV system. The inverter figure is for your reference only.



- The application of DTSD1352-C/1(6)A in the PV system requires the current transformer.

⚠ DANGER

Lethal voltages and danger to life due to electric shock!

- Only use the Energy Meter in a dry environment and keep it away from liquids.
- Install the Energy Meter in the switch cabinet only and ensure that the connection areas for the line and neutral conductors are behind an insulting cover or have contact protection.
- Install an external disconnect switch between the Energy Meter and the grid-connected point. The external disconnector must be close to the Energy Meter and easily accessible.
- Disconnect the Energy Meter from voltage sources before cleaning. The Energy Meter must be cleaned with a dry cloth only.

⚠ WARNING

Fire hazard!

- If a fuse is missing or incorrect, a fire may be caused when a fault occurs. This can result in death or serious injury.
- Protect the line conductors of the Energy Meter with a fuse or a main/selective circuit breaker switch, max. 80A.

Technical Data

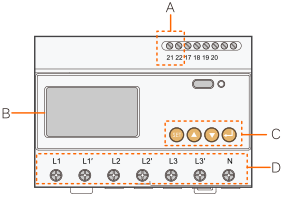
Parameters	DTSD1352-C/10(80)A	DTSD1352-C/1(6)A
Nominal voltage	3 × 230/400V	
Voltage measurement range	3 × 180/311V ... 3 × 268/464V	
Input current	3 × 10(80)A	3 × 1(6)A (via CTs)
Grid frequency	50Hz	
Relative temperature	-25℃ ... +55℃	
Relative humidity	≤95%(No condensation)	
Dimensions (W x H x D)	127 x 70 x 89 (mm)	

1 Delivery Contents

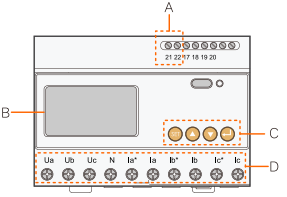
Related components in the scope of delivery:

- Energy Meter
- Quick installation guide

Three-phase energy meter and its terminals:



DTSD1352-C/10(80)A

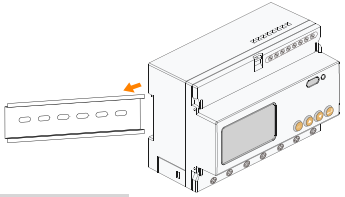


DTSD1352-C/1(6)A

Designation		Description
A	21、22	Communication terminals
B	LCD display	Displays active energy and reactive energy, etc.
C	Key	Includes set key, up key, down key, enter key
D	Voltage and current terminals	-

2 Installation

Mount the Energy Meter to the 35 mm DIN rail. Hook it into the top edge of the rail and press down until it snaps into place.



3 Cable Connection

Prepare the RS485 communication cable and three appropriate current transformers before connecting the energy meter DTSD1352-C/1(6)A. Connecting the DTSD1352-C/10(80)A does not require the current transformer.The communication cable is included in the delivery scope of some inverter or energy meter, for which consult the specific dealer.
The measurement range (primary current) of the current transformer should be selected according to actual maximum current at the grid-connected point, and the maximum secondary current of the current transformer should be 5A.

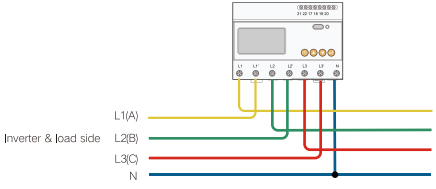
⚠ NOTICE

RS485 communication cables should be:

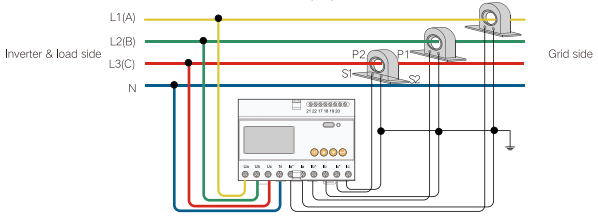
- Shielded twisted pair or Shielded Ethernet cables.
- Applicable to outdoor installation.

Step 1 Turn off solar switch, load switch, main switch and other power switches, and secure them against reconnection.

Step 2 Strip the insulation from the power cables by 10 mm, and then connect the cables to the terminals on the Energy Meter. (Cross-section: 10 mm^2 to 25 mm^2)



DTSD1352-C/10(80)A direct connect



DTSD1352-C/1(6)A connect via CT

During connecting to the current transformers, note that:

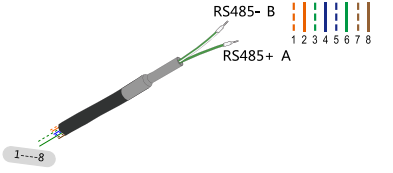
- P1 side is connected to the grid, and P2 side is connected to the load.
- S1 terminals of the three current transformers are connected to Ia*, Ib*, and Ic* of the energy meter respectively; and S2 terminals are connected to Ia, Ib, and Ic respectively.
- S2 terminals of the three current transformers are connected together and then single-point grounded, for example, connected to the PE cable of the switch cabinet.

NOTICE

- Pay attention to the direction marks on the current transformer and avoid incorrect connection.
- The three-phase voltage sequence is consistent with the three-phase voltage sequence of the inverter. Ua, Ub, and Uc are corresponding to L1, L2, and L3 of the inverter respectively. Ensure correct cable connection.
- During routine maintenance, particularly pay attention to the connection terminals of the energy meter to prevent loose cable connection or open circuit. Otherwise, lethal high voltage will be generated on the secondary side of the current transformer.
- Just connect the line conductor L1/Ua and the neutral conductor, then the three-phase Energy Meter can be used as a single-phase meter.

Step 3 Strip the insulation layer of the communication cable with a wire stripper, and lead the corresponding RS485A/B signal cable out. Insert cord end terminals into signal cable RS485+ A and signal cable RS485- B, and crimp them with a crimper. Cut off the redundant signal cable and warp it with a heat-shrink tubing.

If the communication cable is Shielded Ethernet cable, white-green cable 3 is defined as RS485- B cable and the green cable 6 as RS485+ A cable.



Corresponding Relationship Between Cables and Color :

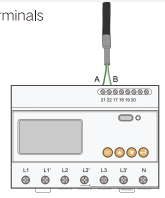
Cable 1: White-orange; Cable 2: Orange;
Cable 3: White-green; Cable 4: Blue;
Cable 5: White-blue; Cable 6: Green;
Cable 7: White-brown; Cable 8: Brown.

Cable 3 and Cable 6 are used for communication
- Cable 3 to RS485- B
- Cable 6 to RS485+ A

NOTE

- Skip performing step 3 when the communication cable is included in the scope of delivery.

Step 4 Connect the plugs RS485+ A and RS485- B to terminals 21 and 22 on the Energy Meter.



Step 5 Connect the other end of the communication cable to the inverter, and reference can be made to the inverter user manual.

Step 6 Cover the Energy Meter with the insulating cover or contact protection of the switch cabinet. Switch on the solar switch, load switch, main switch and other power switches.

SUNGROW
Clean power for all

High Voltage LFP Battery
User Manual

SBR096 / SBR128 / SBR160
SBR192 / SBR224 / SBR256

Iris Hellas
Technology Innovations
www.irishellas.com

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About This Manual

The manual mainly describes the product information, guidelines for installation, operation and maintenance. The manual cannot include complete information the system (i. e. the inverter), just the battery. The reader can get additional information about other devices at **www.sungrowpower.com** or on the webpage of the respective component manufacturer.

Validity

This manual is valid for the following battery models:

- SBR096
- SBR128
- SBR160
- SBR192
- SBR224
- SBR256

They will be referred to as "battery" hereinafter unless otherwise specified.

Target Group

This manual is intended for battery owners who will have the ability to interact with the battery and qualified personnel who are responsible for the installation and commissioning of the battery. Qualified personnel should have the following skills:

- Training for installation and commissioning of electrical system, as well as dealing with hazards
- Knowledge of the manual and other related documents
- Knowledge of the local regulations and directives

How to Use This Manual

Read the manual and other related documents before performing any work on the battery. Documents must be stored carefully and be available at all times.

Contents may be periodically updated or revised due to the product development. It is probably that there are changes of manual in the subsequent battery edition. The latest manual can be acquired via visiting the website at **support.sungrowpower.com**.

Symbols

Important instructions contained in this manual should be followed during installation, operation and maintenance of the inverter. They will be highlighted by the following symbols.

DANGER

Indicates a hazard with a high level of risk that, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazard with a medium level of risk that, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazard with a low level of risk that, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates a situation that, if not avoided, could result in equipment or property damage.

Indicates additional information, emphasized contents or tips that may be helpful, e.g. to help you solve problems or save time.

Abbreviation

BMS: Battery Management System
BMU: Battery Management Unit
CAN: Controller Area Network
CMU: Battery Cluster Management Unit
LFP: Lithium iron phosphate
PCS: Power Conversion System
SOC: State of Charge

Contents

1 Safety

The device has been designed and tested strictly according to international safety regulations. Read all safety instructions carefully prior to any work and observe them at all times when working on or with the device.
Incorrect operation or work may cause:

- Injury or death to the operator or a third party;
- Damage to the device and other properties.

All detailed work-related safety warnings and notes are specified at critical points in this manual.

The safety instructions in this manual cannot cover all the precautions that should be followed. Perform operations considering actual onsite conditions.
SUNGROW shall not be held liable for any damage caused by violation of the safety instructions in this manual.

1.1 Notices for Safe Use

Read all safety instructions carefully prior to any work and observe them at all times when working on or with the battery. Failure to observe the precautions described in this section can cause serious injury to persons or damage to property.

DANGER

Risk of explosion

- **Do not subject the battery to any strong force.**
- **Do not mechanically damage the battery (pierce, deform, strip down, etc.)**
- **Do not heat the battery or dispose of the battery in a fire.**
- **Do not install the battery in potentially explosive environments.**

DANGER

Risk of fire

- Do not expose the battery to temperatures in excess of 60 ° C.
- Do not place the battery near a heat source, such as direct sunlight, a fireplace, a thermally uninsulated wall exposed to sunlight, hot water, or a heater.
- Keep sources of ignition such as sparks, flames, and smoking materials away from the battery.

DANGER

Risk of electric shock

- Do not disassemble the battery.
- Do not handle a wet battery or use wet tools.
- Do not soak the battery in water or expose it to moisture or liquids.
- Keep the battery away from children and animals.
- Wear suitable clothing, guards and gloves to prevent you from direct contact with the DC voltage.
- Use insulated tools during working with battery.
- Set aside metal jewelry before working on the DC circuit.

1.2 Battery Handling Information

NOTICE

Comply with local standards for use with the battery.

Any man-made damage will void the limited warranty for the battery. Handle the battery with care to protect it from damage.

- Use the battery only as intended and designed.
- The battery must only be installed at a suitable location.
- Make sure the battery is well connected to ground before use.
- Do not use the battery if it is defective, appears cracked, broken or damaged, or fails to operate.
- Do not use the battery together with other types of batteries.
- Do not pull, drag or step on the battery.
- Do not leave any foreign objects inside the battery.

- Do not repair or modify the battery. It is not user serviceable.
- Do not pull out any cables when the battery is powered on.
- Do not damage the sheath of cables, wire harness and connectors.
- While the battery is charged, used and stored, keep it away from materials that are prone to electric discharge, including static discharge.
- Keep the battery away from babies and children to avoid any accidents.
- Cover terminals with insulating tape before proper disposal.

1.3 Emergency Situations

1.3.1 Leaking Batteries

Abuse/misuse/damage of the battery may cause increasing of internal pressure in the battery cells. It may result in the electrolyte venting. In the event that battery electrolyte is released:

- Do not enter the room under any circumstance.
- Avoid contact with the leaking liquid or gas.
- Call the Local Emergency number or Fire Brigade if necessary.

If one is exposed to the leaking substance, follow the suggestions below to minimize the chance of injury:

- Inhalation: Evacuate the contaminated area, and seek medical aid.
- Eye contact: Rinse eyes with copious amounts of water for at least 15 minutes, and seek medical aid immediately.
- Skin contact: Wash the affected area thoroughly with plenty of water for at least 15 minutes. If possible, remove or saturate contaminated clothing with water. Seek medical aid if the patient is distressed.
- Ingestion: Induce vomiting, and seek medical aid immediately.

Wipe out the contacted area with a sponge or cloth that is soaked in water until you obtain medical aid. These materials can damage skin and eyes, causing blindness.

1.3.2 Fire

Fire may occur with the battery despite its careful design. Likewise, a fire near the battery can cause it to catch fire.

Protective equipment

A respirator is not required during normal operations.

In the event of a fire, hazardous fumes including carbon monoxide, carbon dioxide, and/or various hydrocarbons may be emitted. To comply with the Personal Protective Equipment Directive (89/686/EEC), use a full-face self-contained breathing apparatus (SCBA) with full protective gear during fire fighting.

Fire fighting

NOTICE

In the event of a fire, only qualified firefighters with appropriate protective equipment are permitted to enter the room where the battery is located. Battery fires can take up to 24 hours to fully extinguish. Consider allowing the system to burn. Smoke indicates that the battery is still burning. Always note that there is a risk of the battery re-igniting.

Proceed as follows for firefighting.

1 Shut off any connected power system or electronics such as the battery, battery isolator, PV DC isolator(s), AC isolator, solar supply main switch and normal supply main switch.

2 Perform an adequate knock down on the fire before entering the incident's hot zone.

3 If the battery catches on fire, use firefighting sand or CO_2 extinguisher to extinguish fire.

4 If the battery becomes involved in fire or is bent, damaged or breached in any way, or if you suspect that the battery is heating, use large amounts of water to cool the battery. Do not try to extinguish the fire with a small amount of water. Always obtain an additional water supply.

5 If the fire is not from the battery and has not spread to it yet, use an ABC fire extinguisher to extinguish the fire. Remove batteries and other ignition sources from the scene of a fire.

1.3.3 Wet Batteries

If the battery is submerged in water, do not let people access it, and then contact Sungrow or an authorized service partner for technical support.

If a battery is submerged in water or flooded, first, switch off all circuit breakers in the system to cut off the power supply to the battery. Wait until floodwaters subside and do not approach near battery. If someone needs to go into the flooded water, wear insulated full length rubber boots and gloves.

Do not use a flooded battery again.

1.3.4 Damaged Batteries

The battery consists of lithium-ion cells. These are considered dry cell batteries. If the battery is damaged, only a small amount of battery fluid can leak.

A damaged battery can cause rapid heating of the battery cells. If you notice smoke coming from the battery area, assume that the battery is burning and take appropriate action as described in "1.3.2 Fire".

Damaged batteries are dangerous and must be handled with extreme caution. They are not fit for use and may pose a danger to people or property. If a battery seems to be damaged:

1 Pack it in its original container.

2 Store it in a separated room like the installation place.

3 Contact SUNGROW.

⚠ DANGER

A damaged battery may release dangerous material and a flammable gas mixture. Never try to repair the battery even if you are a qualified electrician.

2 Product Description

2.1 Product Introduction

Brief Introduction

The battery is designed for residential energy storage systems. The inbuilt battery management system monitors its operation and prevents the battery from operating beyond the specified limitations.

This product is a high-voltage battery system with an operating voltage range between 168 V ~ 584 V. A battery system consist of 3 to 8 individual battery modules connected in series.

The battery can be expanded to 4 units in parallel at most. Available in Q3, 2021.

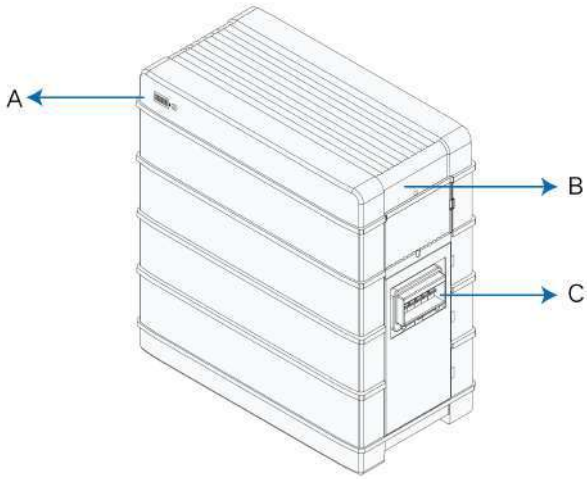
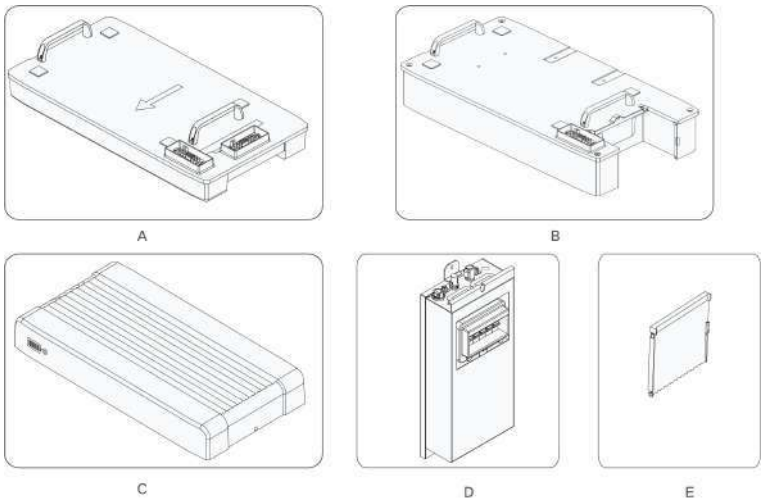


figure 2-1 Product overview

table 2-1 Design of the product

Position	Designation
A	LED Indicator LED indicator include the SOC indicator and the status indicator. The status indicator is also used as the power button. LED indicator indicates the SOC value and status of the battery.
B	Nameplate The nameplate clearly indentifies the product. The nameplate must remain permanently attached to the product. You will find the following information on the nameplate: • SUNGROW logo and product model • Technical data • Product symbol
C	DC circuit breaker

Major Components



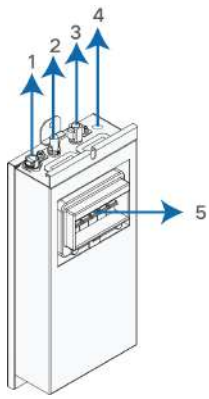
Name	Designation
A	Base
B	Battery module
C	Top cover
D	Switch gear
E	Side cover

Configuration Table

No.	Model	Base	Battery module	Top cover	Switch gear	Side cover
1	SBR096	1	3	1	1	0
2	SBR128	1	4	1	1	1
3	SBR160	1	5	1	1	2
4	SBR192	1	6	1	1	3
5	SBR224	1	7	1	1	4
6	SBR256	1	8	1	1	5

2.2 Terminal Description

All electrical terminals are located at the switch gear.



No.	Label	Description
1	COMM	• To enable the communication between the inverter and the battery • For battery daisy chain
2	P-	The system negative terminal, connected to the inverter negative terminal
3	P+	The system positive terminal, connected to the inverter positive terminal
4	⏚	Grounding terminal, connected to the ground
5	DC circuit breaker	To connect/disconnect the DC circuit, for power-on, power-off, and short-circuit protection

2.3 Symbols on the Product

Symblo	Explanation
	Pay attention to the danger. Do not operate this product in the live status!
	No open flames Do not expose to flame, incinerate, puncture, or impact.
	Electric shock hazard Serviced by qualified personnel only. Out of reach from children.
	TÜV mark of conformity
	TÜV mark of conformity
	CE mark of conformity

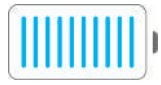
Symblo	Explanation
	Do not dispose in trash. Compacting a lithium ion battery is dangerous as it can explode.
	Please recycle this lithium ion battery. Do not discard.
	Read the user manual before maintenance!
	This is a protective grounding terminal, which should be grounded securely to protect the safety of operators.

2.4 LED Indicator

LED indicators include the SOC indicator and the status indicator. The status indicator is also used as the power button.

SOC Indicator

The SOC indicator indicates the current SOC value of the battery. One bar indicates the SOC value of 10%.



Status Indicator

The Status indicator indicates the current state of the battery.

LED color	LED indicator	LED state	Definition
	Blue	ON	Normal operation (without fault)
		Slow blink Period: 2 s	The battery is at power-on or standby state (without fault).
		Fast blink Period: 0.5 s	The battery is at firmware update state.
	Red	ON	A system fault has occured.
		Blink	The battery is at power-on or standby state (with primary fault).

The status indicator can be used to power on or off the battery.

Operation	Definition
Press and hold for less than 2 seconds	To power on the battery
Press and hold for more than 4 seconds	To power off the battery

3 Unpacking and Storage

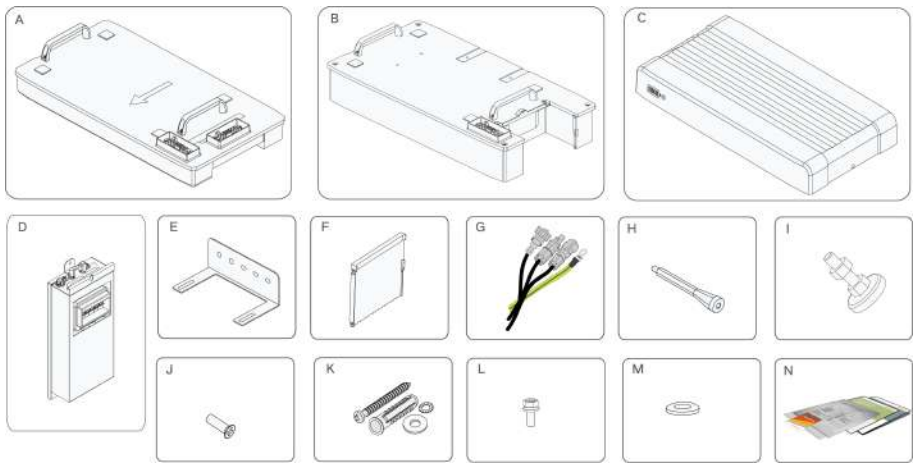
3.1 Unpacking and Inspection

The device is thoroughly tested and strictly inspected before delivery. Nonetheless, damage may still occur during shipping. For this reason, please conduct a thorough inspection after receiving the device.

- Check the packing case for any visible damage.
- Check the scope of delivery for completeness according to the packing list.
- Check the inner contents for damage after unpacking.

Contact SUNGROW or the transport company in case of any damage or incompleteness, and provide photos to facilitate services.
Do not dispose of the original packing case. It is recommended to store the device in the original packing case when the device is decommissioned.

3.2 Scope of Delivery



Item	Name	Quantity
A	Base	1
B	Battery module	3 ~ 8
C	Top cover	1
D	Switch gear	1
E	Bracket	1
F	Side cover	0 ~ 5
G	Harness	1

Item	Name	Quantity
H	Stud	1
I	Foot (optional)	4
J	M5 screw	8 ~ 18
K	Expansion plug set	2
L	M5 screw sets	3 ~ 4
M	M6 fender washer	2
N	Documents	1

3.3 Storage

Proper storage is required if the battery is not installed immediately.

- Store the battery in the original packing case with the desiccant inside.
- Preferably, keep the temperature in the range of 15 ° C to 25 ° C. Store the battery within the temperature range of -10 ° C to 35 ° C for no more than 6 months.
- The storage relative humidity must be always between 0 and 95 %, non-condensing.
- Store the battery in a clean and dry place, without exposure to sunlight and rain. The storage location must be free of harmful gases, flammable/explosive products and corrosive chemicals. The battery should be prevented from mechanical impact, high pressure, high-intensity magnetic field and direct exposure to sunlight.
- Pay attention to the harsh environment, such as sudden cooling/heating and collision, to avoid damage to the battery.
- The number of stacking layers of battery modules with package must not exceed 6. It is strictly forbidden to directly stack batteries without package.
- Regularly inspect the package for damage and insect bites. If any damage is found, the product should be replaced immediately.
- The packing should be upright.
- If stored for more than 6 months under the specified conditions, the battery needs to be charged once, until the system SOC is 50% to 80%. Preferably, use an inverter for forced charging.

4 Mounting

4.1 Safety during Mounting

⚠ WARNING

This product or system must be operated by professionals!
Failure to follow the safety instructions in this manual or operation of this product or system by non-professionals may cause severe personal injury or major property damage.

⚠ WARNING

Strictly follow local relevant standards and requirements in the whole process of installation.

4.2 Location Requirements

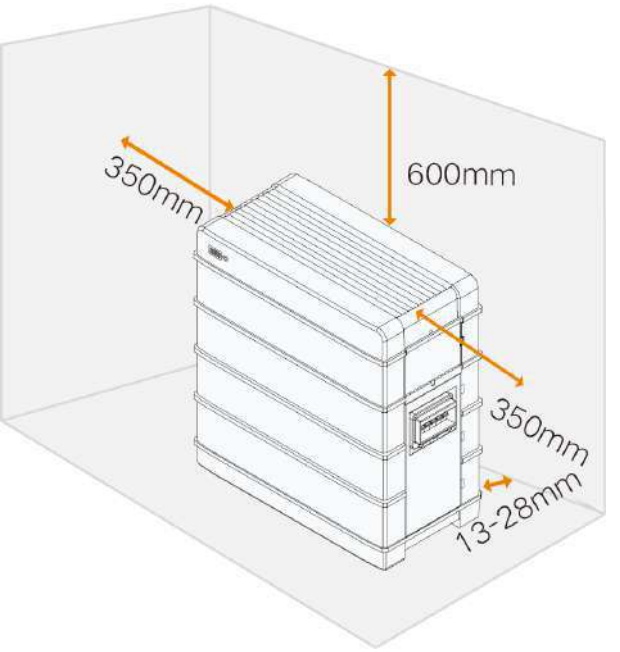
Select an optimal mounting location for safe operation, long service life and expected performance.
The battery with IP55 can be installed both indoors and outdoors.
Install the battery in a place convenient for electrical connection, operation, and maintenance.

4.3 Installation Environment Requirements

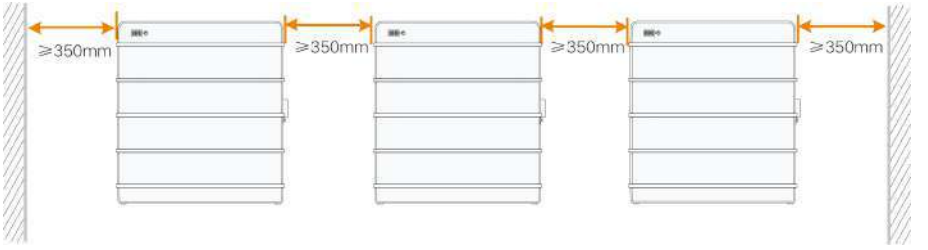
- The installation environment must be free of inflammable or explosive materials.
- The location should be not accessible to children.
- The ambient temperature must be always between 0 ℃ and 45 ℃.
- The relative humidity must be always between 0 and 95 %, non-condensing.
- Avoid direct exposure to sun, rain and snow.
- The battery should be well ventilated. Ensure air circulation.

4.4 Installation Clearance Requirements

- Reserve enough clearance around the battery to ensure sufficient space for heat dissipation.



- In case of multiple batteries, reserve specific clearance between the batteries.

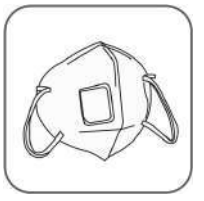


4.5 Installation Tools

Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site.

table 4-1 Tool specification


Goggles


Dust mask


Protective gloves


Insulated shoes


Utility knife


Marker


Rubber mallet


Measuring tape


Level


Hammer drill (φ10)

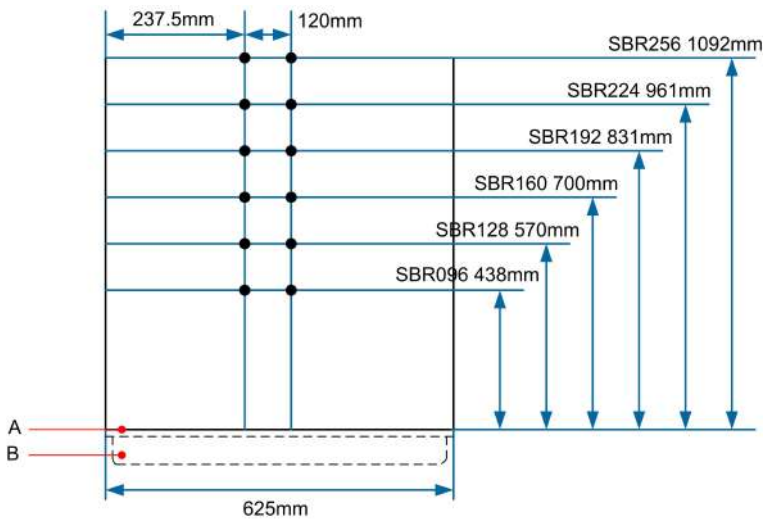

Phillips screwdriver (M5)


Wrench (16 mm, 17mm)

4.6 Installing the Battery

The SBR128 mounting will be used as an example.

step 1 Align the base with the wall, and keep a distance of 13 mm to 28 mm between the base and the wall. Mark the hole positions of the mounting bracket with a marker according to the required layout of holes.

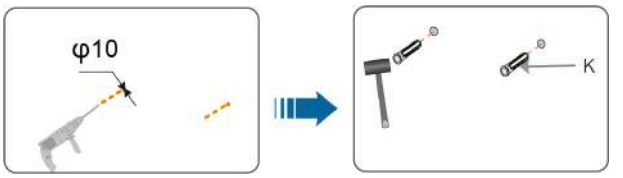


A: Upper surface of the base B: Base

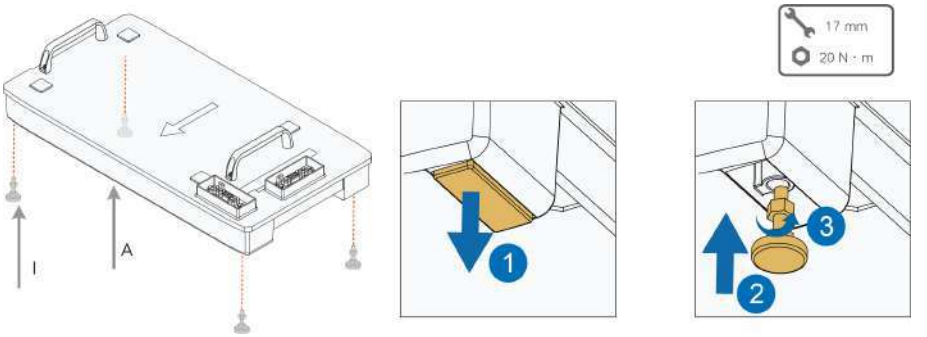
figure 4-1 Layout of holes with the base as reference

You can choose not to mount SBR096/128 on the wall.

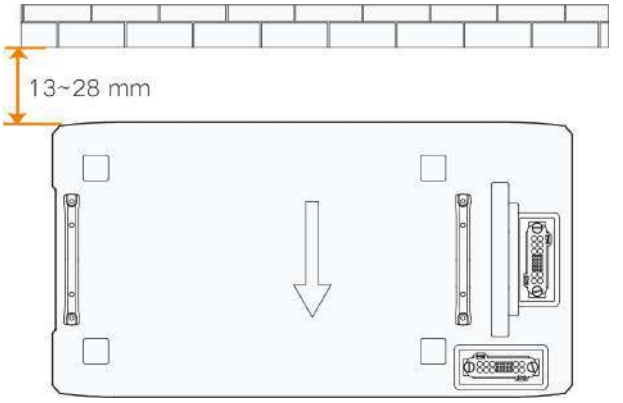
step 2 Drill the holes according to the marked positions, and install the expansion sleeves.



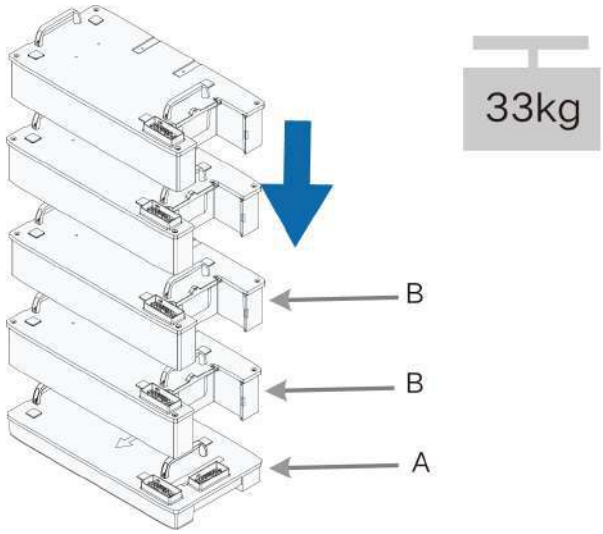
step 3 (Optional) Install the feet of the battery.



step 4 Position the base maintaining the required distance from the wall.

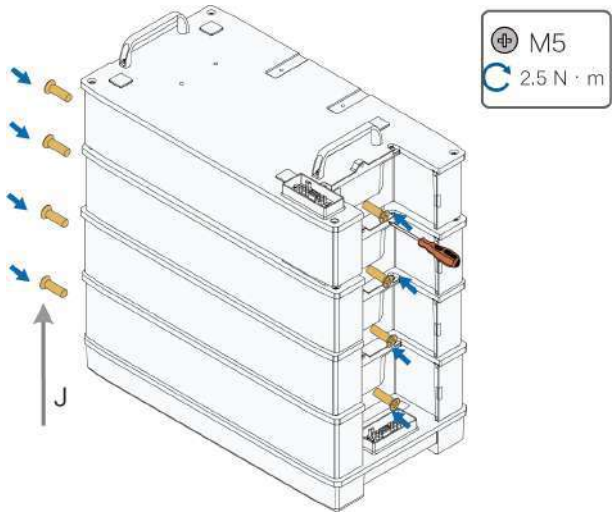


step 5 Place each battery module on top of the base.

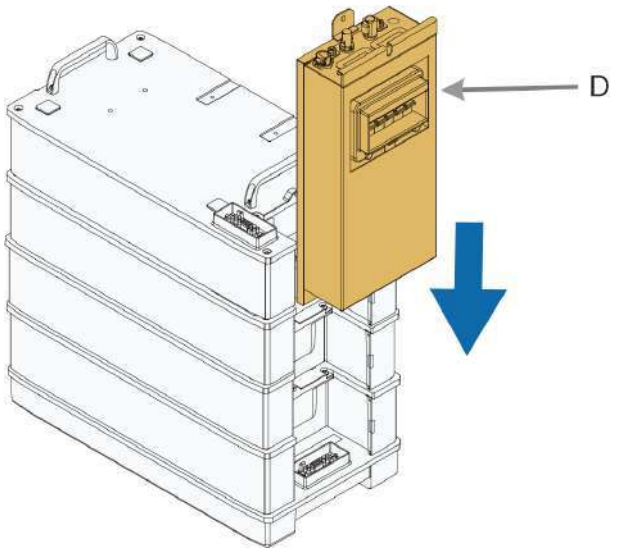


When carrying the battery module, always be aware of its weight of 33 kg.

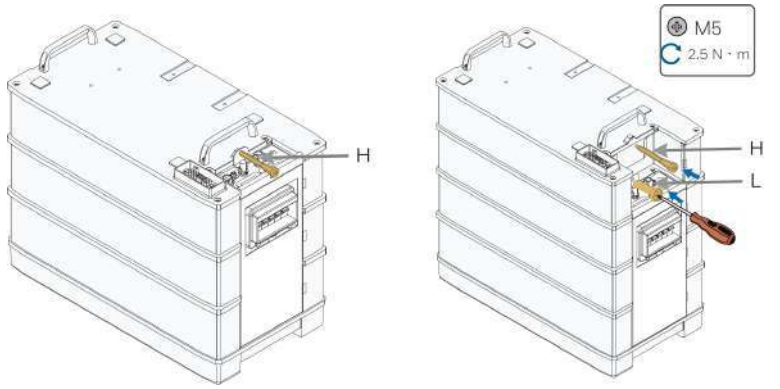
step 6 Fix the battery modules with the included screws.



step 7 Connect the switch gear to the base.

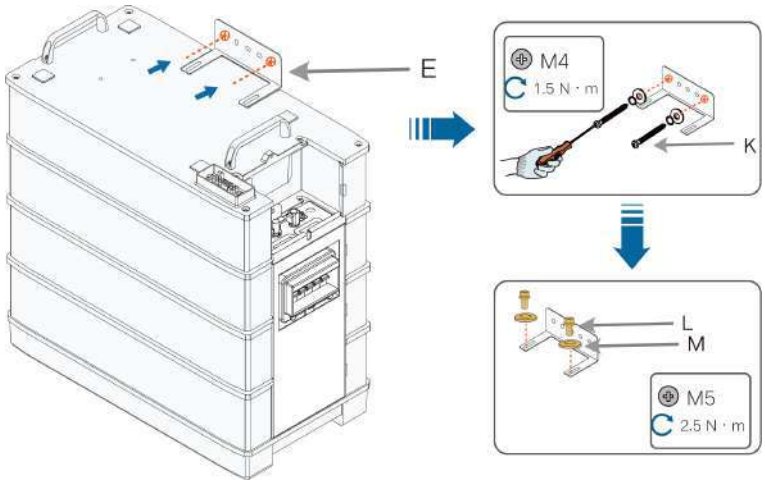


step 8 Fix the switch gear with the provided stud.



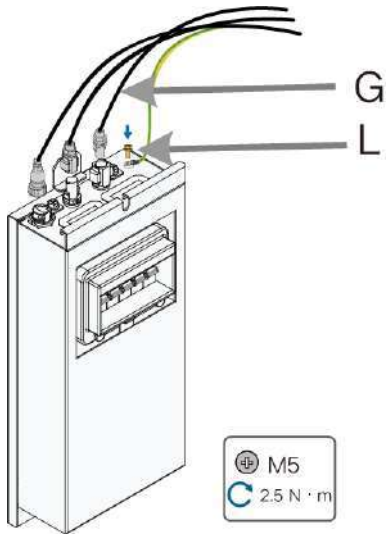
When 4 or more than 4 battery modules are installed in one base, M5 screw set is required to secure the switch gear. The stud is mounted on the top of battery module.

step 9 Fix the battery to the wall.

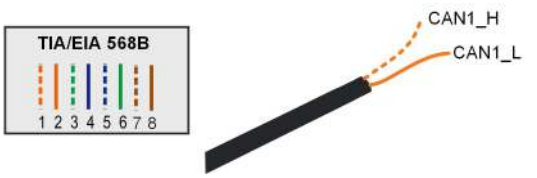


The bracket is mounted on the top battery module.

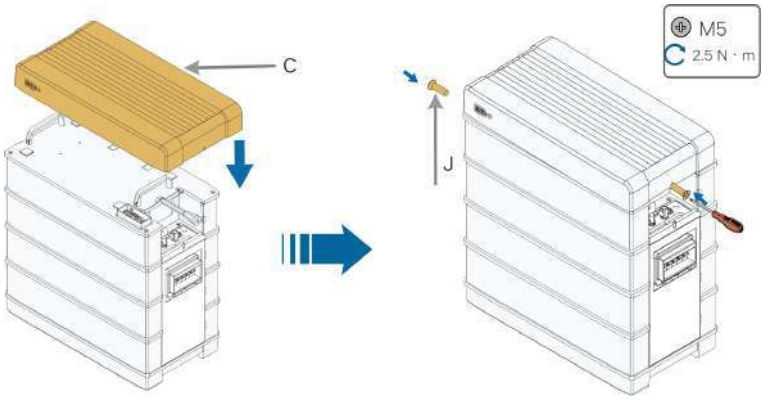
step 10 Connect the harness.



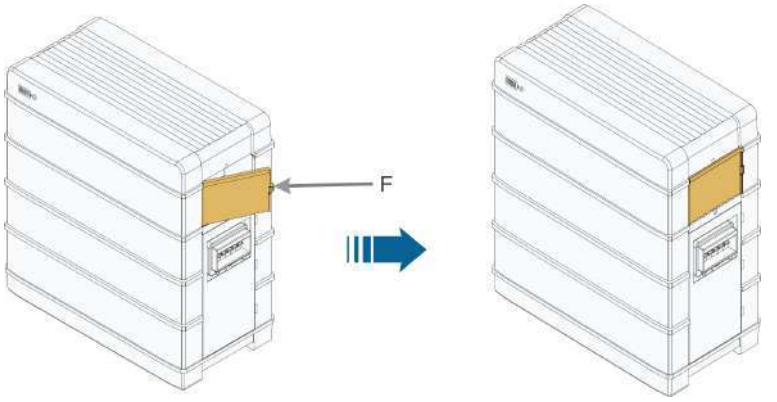
For communication between the battery and the inverter. Connect the communication cable from the "COMM" terminal of the battery to the inverter. Strip the insulation layer of the communication cable with a wire stripper, and lead the corresponding CAN1_H/CAN1_L signal cable out. Cut off the redundant signal cable and warp it with a heat-shrink tubing. Signal cable 1 white and orange cable is used as CAN1_H; and signal cable 2 orange cable is used as CAN1_L.



step 11 Place the top cover and fix it with the screw provided.



step 12 (Optional) Install the side covers.



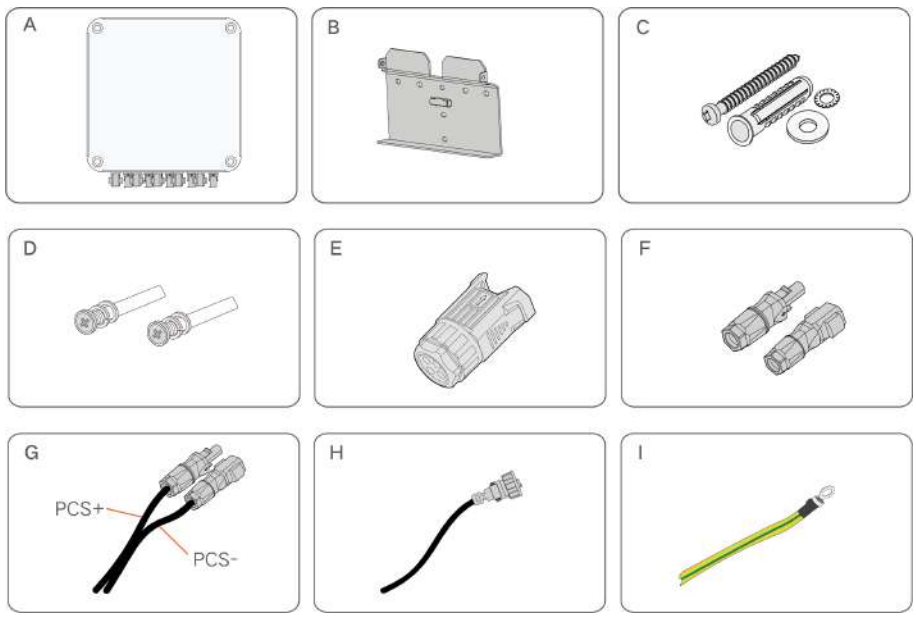
When 4 or more than 4 battery modules are installed in one base, side covers are required.

- - End

5 Parallel System（Optional）

The battery can be expanded to 4 units in parallel at most. Available in Q3, 2021.

5.1 Scope of Delivery



Item	Name	Quantity
A	Junction box	1
B	Bracket	1
C	Expansion plug set	3
D	M4 screw set	2
E	COMM IN connector	1
F	SUNCLIX connector	4
G	SUNCLIX power cables	1
H	COMM OUT communication cable	1
I	Grounding cable	1

5.2 Mounting the Junction Box

step 1 Install the wall-mounting bracket and mount the junction box to the bracket.

- - End

5.3 Terminal Description (Junction Box)

All electrical terminals are located at the bottom of the junction box.

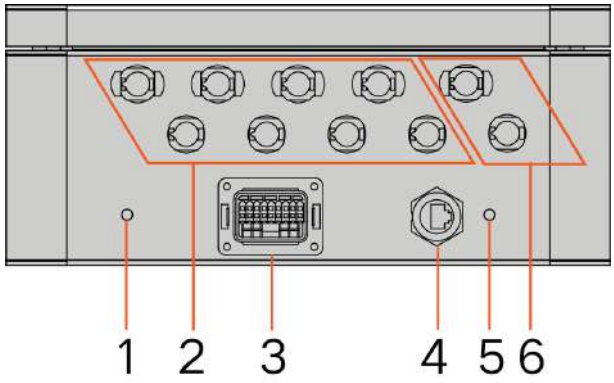


figure 5-1 Terminals at the Bottom of the Junction Box

* The image shown here is for reference only. The actual product received may differ.

table 5-1 The label description of Junction Box terminal

No.	Label	Description
1	GND	Connected to the battery grounding terminal
2	BAT1+, BAT1 – BAT2+, BAT2 – BAT3+, BAT3 – BAT4+, BAT4 –	BAT+ terminals, connected to the battery P+ terminal BAT – terminals, connected to the battery P – terminal
3	COMM IN	Communication terminal, connected to the battery COMM terminal
4	COMM OUT	Communication terminal, connected to the inverter communication terminal

No.	Label	Description
5	GND	Connected to the ground
6	PCS+, PCS-	PCS+ terminal, connected to the inverter positive terminal PCS − terminal, connected to the inverter negative terminal

table 5-2 The label of COMM IN terminal

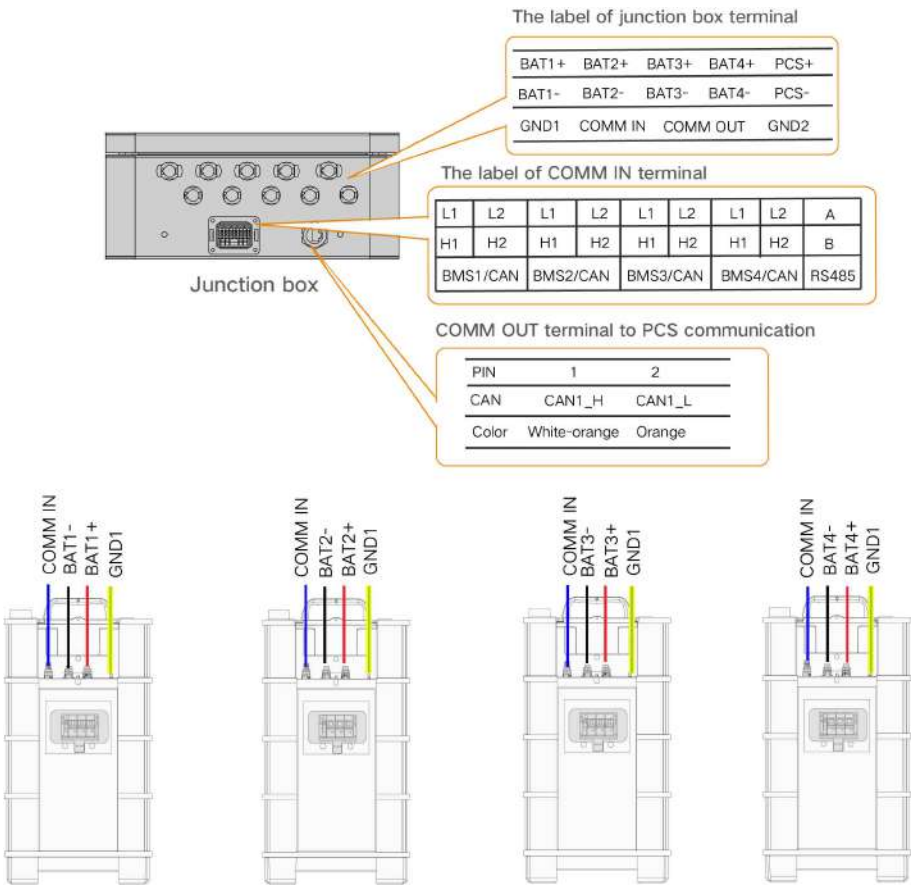
L1	L2	L1	L2	L1	L2	L1	L2	A
H1	H2	H1	H2	H1	H2	H1	H2	B
BMS1/CAN		BMS2/CAN		BMS3/CAN		BMS4/CAN		RS485

table 5-3 The label description of COM terminal

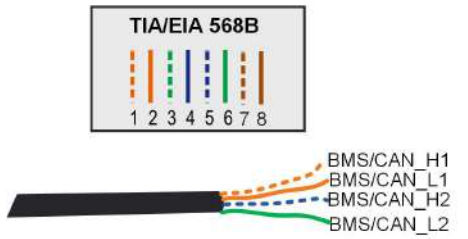
No.	Label	Description
1	BMS1/CAN (L1, L2, H1, H2) BMS2/CAN (L1, L2, H1, H2) BMS3/CAN (L1, L2, H1, H2) BMS4/CAN (L1, L2, H1, H2)	Connected to the battery COMM terminal.
2	RS485 (A, B)	Connected to the BMS, functionally reserved.

5.4 Connection Diagram in Parallel System

Maximum four batteries can be connected in parallel.



- The COMM terminal of the battery is connected to the COMM IN terminal of the junction box.Signal cable 1 white and orange cable is used as BMS/CAN_H1; signal cable 2 orange cable is used as BMS/CAN_L1; signal cable 5 white and blue cable is used as BMS/CAN_H2; and signal cable 6 green cable is used as BMS/CAN_L2.



- The grounding terminal of the battery is connected to the grounding terminal on the left side of the junction box.
- The COMM OUT terminal of the junction box is connected to the inverter.Signal cable 1 white and orange cable is used as CAN1_H; and signal cable 2 orange cable is used as CAN1_L.

5.5 Installing the SUNCLIX Connector

This section mainly describes the cable connections on the junction box side. For the cable connections on the battery side, refer to the section "Installing the battery".

NOTICE

During assembly, be careful not to contaminate, pull out, or shift, the seal in the cable gland. A contaminated or shifted seal impairs strain relief and leak tightness.

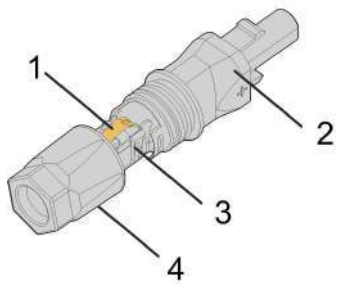
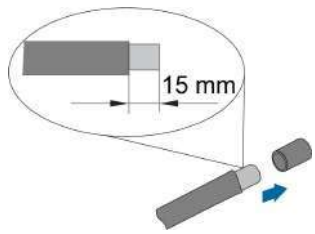


figure 5-2 SUNCLIX Connector Components

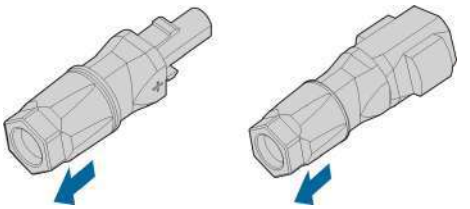
1：Spring 2: Sleeve 3: Insert 4: Cable gland

The BAT3+ and BAT3- terminals are used as examples for description.

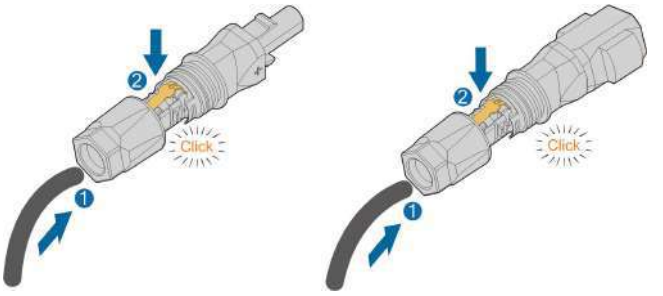
step 1 Strip the insulation from the cable by 15 mm.



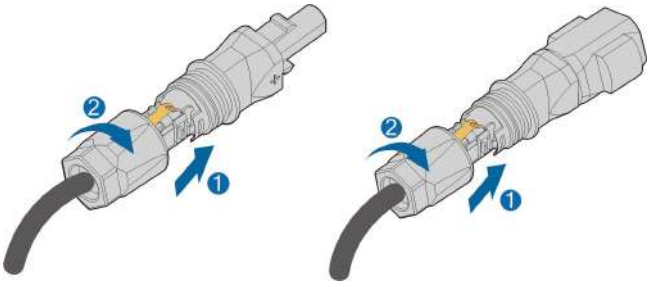
step 2 Pry the connection open and pull the sleeve and the insert apart.



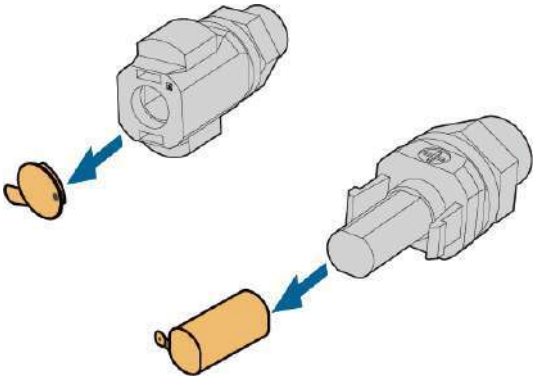
step 3 Insert the stripped cable into the cable gland up to the stop. The stranded wire can be seen inside the spring. Press the spring down until it audibly snaps into place.



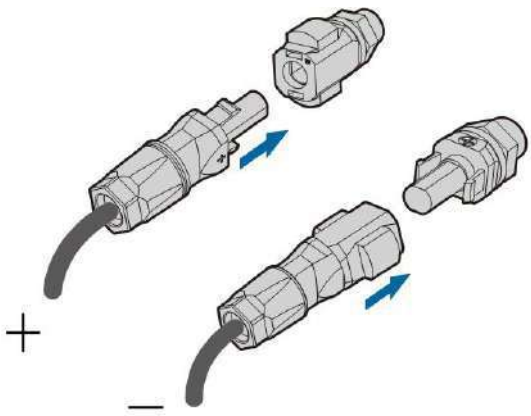
step 4 Push the insert into the sleeve and tighten the cable gland (torque 2 N · m).



step 5 Remove the waterproof lid from **BAT3+** and **BAT3 −** the terminal.



step 6 Plug the connectors into **BAT3+** and **BAT3 −** terminals.



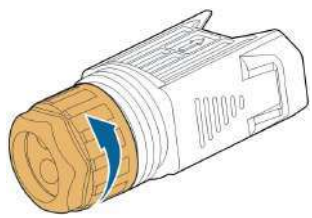
step 7 Ensure that the connectors are securely in place.

- - End

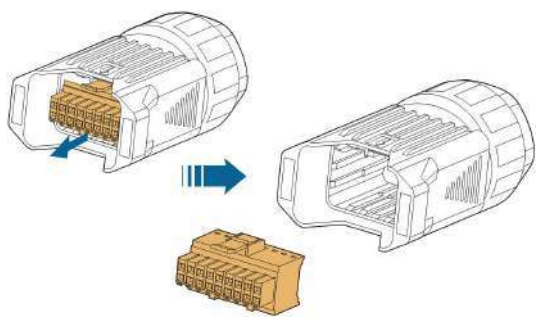
5.6 Installing the COMM IN Connector

This section mainly describes the cable connections on the junction box side. For the cable connections on the battery side, refer to the section "Installing the battery".
The BMS3/CAN terminal is used as an example for description.

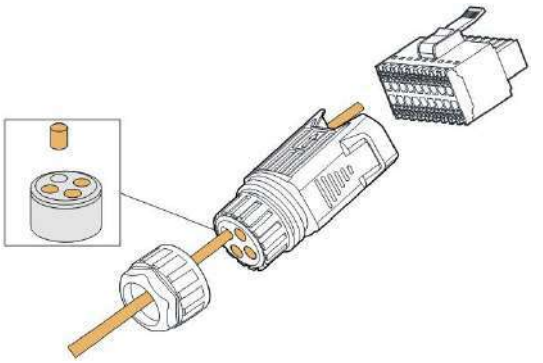
step 1 Unscrew the swivel nut from the connector.



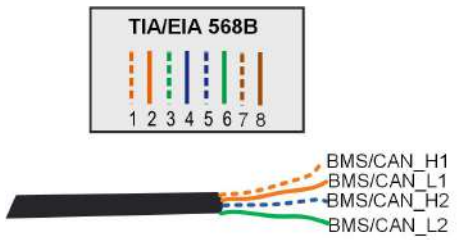
step 2 Take out the terminal block.



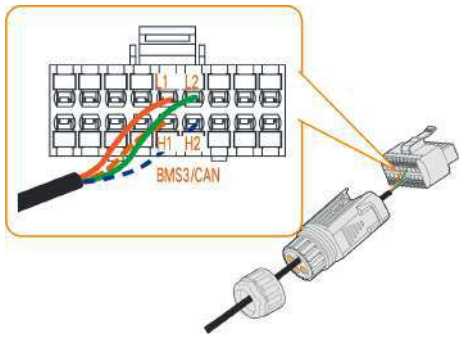
step 3 Remove the seal and lead the cable through the cable gland.



step 4 Remove the cable jacket by 7 mm to 10 mm from the cable that is led out from the battery.

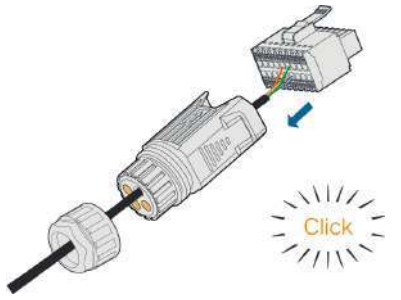


step 5 Plug the wires into the corresponding terminal according the labels on the bottom of the device.

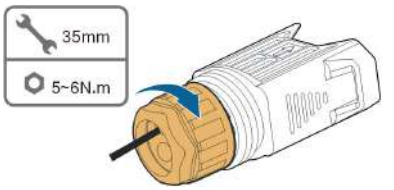


step 6 Pull the wires outward to check whether they are firmly installed.

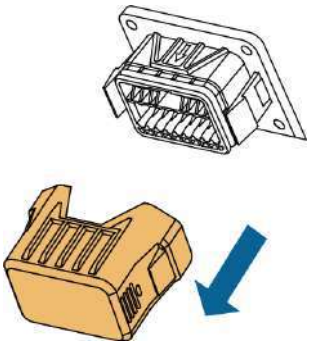
step 7 Insert the terminal block into the connector until it snaps into place with an audible click.



step 8 Fasten the swivel nut.



step 9 Remove the waterproof lid from the **COMM IN** terminal.



step 10 Insert the COMM IN connector into **COMM IN** terminal on the bottom of the junction box until there is an audible click.

step 11 Pull cables outwards to confirm whether they are fastened firmly.

- - End

6 Commissioning

6.1 Inspection before Commissioning

Check the following items before starting the battery:

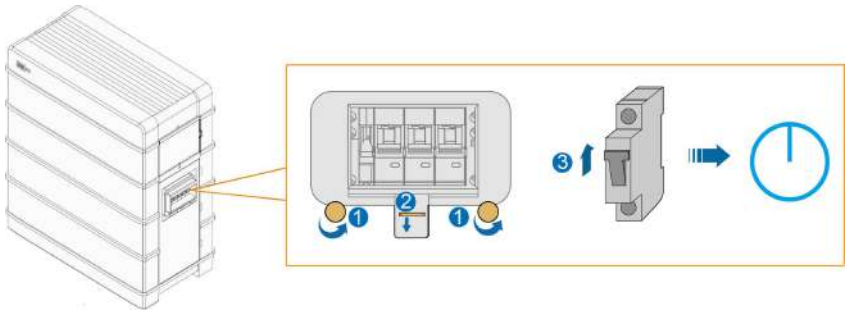
- Check that the battery system has been installed completely.
- Check that the appearance of the battery system is intact.
- Check that the battery system output wiring harness is correctly connected to the positive and negative terminals of the battery and inverter to avoid misconnection and reverse connection.

6.2 Commissioning Procedure

If all of the items mentioned above meet the requirements, proceed as follows to start up the battery for the first time.

step 1 Connect all the switches on the AC and DC sides of the PCS.

step 2 Manually connect the DC breaker on the right side of the battery so that the BMS enters the self-test state. The status indicator blinks in blue. Ten seconds later, press and hold the status indicator for less than 2 seconds. Wait until the indicator is steady on in blue, which indicates that the battery system is powered on and runs normally.



- - End

⚠ WARNING

During commissioning, if there is a short-circuit fault in the battery system, disconnect the power cable between the switch gear and the inverter, check the battery system wiring, and eliminate the short-circuit fault point. Execute step 2, check whether there is a fault in the battery (the indicator light is red), and obtain fault information through iSolarCloud to contact SUNGROW to repair the battery system.

7 Decommissioning the Battery

Decommission the battery in the system after the inverter is decommissioned. Proceed as follows to decommission the battery.

step 1 Press and hold the power button for 5 seconds until the DC breaker on the right side of the battery is disconnected.

step 2 One minute after the DC breaker is disconnected, disconnect all cables between the battery and other devices.

- - End

Contact SUNGROW to dispose of the battery.

8 Troubleshooting and Maintenance

8.1 Troubleshooting

No.	Alarm Name	Common Cause	Corrective Measures
1	Overtemperature alarm	The temperature inside the module is too high. The operating ambient temperature is too high.	Generally, the battery module will recover and resume operation after its temperature becomes normal. If the fault repeatedly occurs: 1. Check whether the ambient temperature of the battery module is too high. 2. Check whether the battery module is placed in a well-ventilated place. 3. Check whether the battery module is exposed to direct sunlight. Shield the battery module if it is under direct sunlight. 4. Check whether the fan is running properly. Replace the fan if it is not working properly. 5. Contact SUNGROW if the preceding causes are ruled out and the fault persists.
2	Low temperature alarm	It is detected that the ambient temperature is lower than the threshold.	Shut down and disconnect the lithium-ion battery system. Restart the battery system only after the ambient temperature rises to the normal operating temperature range.
3	Overvoltage alarm	The alarm is generated due to a minor exception of the battery itself, operating environment, or operations on the battery.	Generally, the battery can recover automatically. If the alarm persists for a long time: 1. The overvoltage alarm is related to the system operating status. If this alarm is generated, check whether the system is being charged. If yes, shut down the system. 2. If the fault persists or repeatedly occurs, contact SUNGROW.

No.	Alarm Name	Common Cause	Corrective Measures
4	Undervoltage alarm	The alarm is generated due to a battery fault caused by the battery itself, operating environment, or operations on the battery.	Generally, the battery can recover automatically. If the alarm persists for a long time: 1. The undervoltage alarm is related to the system operating status. If this alarm is generated, check whether the system is being discharged. If yes, shut down the system. 2. If the fault persists or repeatedly occurs, contact SUNGROW.
5	Charge/discharge overcurrent alarm		Generally, the battery can recover automatically. If the alarm persists for a long time: 1. The charge/discharge overcurrent alarm is related to the system operating status. If this alarm is generated, start the App to check whether the system operating current is beyond the rated value. If yes, shut down the system. 2. If the fault persists or repeatedly occurs, contact SUNGROW.
6	Battery voltage imbalance		Generally, the battery can recover automatically. If the alarm persists for a long time: 1 . Disconnect the AC output switch and DC input switch of the inverter, as well as the circuit breaker of the battery system. 2. Check whether the power cable of the system is properly connected. 3. Contact SUNGROW if the preceding causes are ruled out and the fault persists.

No.	Alarm Name	Common Cause	Corrective Measures
7	BMS internal alarm	The communication cable between the battery and the inverter is disconnected, or the communication terminal of the battery or the inverter is in poor contact.	1. Disconnect the AC output switch and DC input switch of the inverter, as well as the circuit breaker of the battery system. 2. Check whether the communication cable and its terminals are faulty. If yes, rectify the fault to ensure its reliable connection. 3. Check whether the battery system is powered on normally. If yes, the power indicator should be on in blue. 4. Contact SUNGROW if the preceding causes are ruled out and the fault persists.
8	Overtemperature protection	The alarm is generated due to a battery fault caused by the battery itself, operating environment, or operations on the battery.	Generally, if the battery system is faulty, the battery management system will actively disconnect the internal contactor to avoid escalation of the fault. 1. If the battery temperature is too high, take measures such as improving heat dissipation to lower the temperature. After the temperature drops to the normal operating temperature range of the system, restart the battery system. 2. If the fault causes tripping of the external circuit breaker, wait until the temperature drops to the normal operating temperature range of the system, and then connect the circuit breaker. 3. If the fault persists, contact SUNGROW.
9	Low temperature protection		Shut down and disconnect the lithium-ion battery system. Restart the battery system only after the ambient temperature rises to the normal operating temperature range.

No.	Alarm Name	Common Cause	Corrective Measures
10	Charge/ discharge overcurre-nt protection		Generally, if the battery system is faulty, the battery management system will actively disconnect the internal contactor to avoid escalation of the fault. 1. If the fault is rectified, restart the system and check the operating status of the system. 2. If the fault causes tripping of the external circuit breaker and such tripping occurs for the first time, connect the circuit breaker. 3. If the fault persists, contact SUNGROW.
11	Battery internal hardware failure	The alarm is generated due to a battery fault caused by the battery itself, operating environment, or operations on the battery. Such as short circuiting of the battery system due to misuse.	Generally, if the battery system is faulty, the battery management system will actively disconnect the internal contactor to avoid escalation of the fault. 1. Disconnect the AC output switch and DC input switch of the inverter, as well as the circuit breaker of the battery system. 2. If the battery system is short-circuited by mistake, you should check whether the total voltage of the battery stack is normal and whether the system reports the fault. The common failure device for this fault is the internal contactor, which needs to be replaced by contacting SUNGROW. 3. Contact SUNGROW.
12	Overvolta-ge protection	The alarm is generated due to a battery fault caused by the battery itself, operating environment, or operations on the battery.	Generally, if the battery system is faulty, the battery management system will actively disconnect the internal contactor to avoid escalation of the fault. 1. Disconnect the AC output switch and DC input switch of the inverter, as well as the circuit breaker of the battery system. 2. Contact SUNGROW.
13	Low voltage protection		

8.2 Maintenance

Below is the recommended maintenance cycle. The actual maintenance cycle should be adjusted according to the specific installation environment of this product.
The power station scale, installation location and on-site environment affect the maintenance cycle of this product. In sandy or dusty environments, it is necessary to shorten the maintenance cycle and increase the frequency of maintenance.

Maintenance performed once a year

Inspection item	Inspection method
Battery module status and cleanliness	Check the following items. In case of nonconformity, take corrective actions immediately: • Check the battery module and internal devices for damage or deformation. • Check the internal devices for abnormal noise during operation. • Check whether the temperature inside the battery cluster is too high. • Check whether the internal humidity and dust of the battery module are within the normal ranges. If necessary, clean the battery module.
Warning sign	Check whether the warning sign and label are legible and dirty. If necessary, clean them.
Wire and cable	Check whether the switch gear and PCS are connected correctly .
Corrosion	Check the battery module for internal oxidation or rust.

Maintenance performed once every six months

Inspection item	Inspection method
Switch gear and battery module	Check the following items. In case of nonconformity, take corrective actions immediately: • Check whether there are flammable objects around the battery module. • Check whether the battery module is reliably fixed on the wall, and whether any fixing point is corroded. • Check the switch gear and battery module for damage, paint peeling, oxidation, etc.
Wire and cable layout	The inspection must not be carried out until all internal devices of the battery module are powered off! In case of nonconformity found in inspection, take corrective actions immediately: • Check the cable layout for short circuit and compliance with the specifications. If case of any abnormality, take corrective actions immediately. • Check the battery module for internal seepage of water. • Check whether the cables are loose, and tighten them according to the aforesaid torque.
Grounding	Check whether the grounding is correct.
Function inspection	Check whether the current, voltage and temperature in the operation record of the battery module are within the operating ranges.

Note: The battery has the function of automatic capacity calibration, which is supported only by the Sungrow PCS system.

9 Appendix

9.1 Technical Data

Parameters	SBR096	SBR128	SBR160
System Data			
Battery Type		LiFePO4 Prismatic Cell	
Battery Module		3.2 kWh, 33 kg	
Nominal Capacity	9.6 kWh	12.8 kWh	16 kWh
Energy (-usable) [1]	9.6 kWh	12.8 kWh	16 kWh
Nominal voltage	192 V	256 V	320 V
Operating voltage	150 V – 219 V	200 V – 292 V	250 V – 365 V
Rated DC power	5.76 kW	7.68 kW	9.6 kW
Max. charge/ discharge power	6.57 kW	8.76 kW	10.95 kW
Max. charging / discharging current: continuous		30 A	
Max. charging / discharging current: 10s pulse		42 A	
Depth of Discharge		100%	
Short circuit current		1700 A	
Display		SOC indicator,Status indicator	
Communicati-on interface		CAN	
Protection			

Parameters	SBR096	SBR128	SBR160
Over / under voltage protection		Yes	
Over current protection		Yes	
Over / under temperature protection		Yes	
DC breaker		Yes	
General Data			
Dimensions (W*H*D)	625 * 545 * 330 mm	625 * 675 * 330 mm	625 * 805 * 330 mm
Weight	114 kg	147 kg	180 kg
Installation location		Indoor / Outdoor	
Mounting method		Floor stand	
Operating temperature		Charge: 0 to 50 ℃ Discharge: -30 to 50 ℃	
Degree of protection		IP55	
Allowable relative humidity range		0 – 95% (non-condensing)	
Max. operating altitude		2000 m	
Cooling method		Natural convection	
Warranty[2]		10 Years	
Expansion adaptation[3]		Up to 4 units in parallel（need extra Junction box）	

1: Test conditions: 25℃,100% depth of discharge (DOD), 0.2C charge and discharg

2: Refer to battery warranty card for conditional application.

3: Available in Q3, 2021

Parameters	SBR192	SBR224	SBR256
System Data			
Battery Type		LiFePO4 Prismatic Cell	
Battery Module		3.2 kWh, 33 kg	
Nominal Capacity	19.2 kWh	22.4 kWh	25.6 kWh
Energy (usable)[1]	19.2 kWh	22.4 kWh	25.6 kWh

Parameters	SBR192	SBR224	SBR256
Nominal voltage	384 V	448 V	512 V
Operating voltage	300 V – 438 V	350 V – 511 V	400 V – 584 V
Rated DC power	11.52 kW	13.44 kW	15.36 kW
Max. charge/ discharge power	13.14 kW	15.33 kW	17.52 kW
Max. charging / discharging current: continuous	30 A		
Max. charging / discharging current: 10s pulse	42 A		
Depth of Discharge	100%		
Short circuit current	1700 A		
Display	SOC indicator,Status indicator		
Communication interface	CAN		
Protection			
Over / under voltage protection	Yes		
Over current protection	Yes		
Over / under temperature protection	Yes		
DC breaker	Yes		
General Data			
Dimensions (W*H*D)	625 * 935 * 330 mm	625 * 1065 * 330 mm	625 * 1195 * 330 mm
Weight	213 kg	246 kg	279 kg
Installation location	Indoor / Outdoor		
Mounting method	Floor stand		
Operating temperature	Charge: 0 to 50 ℃ Discharge: -30 to 50 ℃		
Degree of protection	IP55		
Allowable relative humidity range	0 – 95% (non-condensing)		
Max. operating altitude	2000 m		
Cooling method	Natural convection		

Parameters	SBR192	SBR224	SBR256
Warranty[2]		10 Years	
Expansion adaptation[3]	Up to 4 units in parallel（need extra Junction box）		

1: Test conditions: 25℃,100% depth of discharge (DOD), 0.2C charge and discharg

2: Refer to battery warranty card for conditional application.

3: Available in Q3, 2021

9.2 Quality Assurance

When product faults occur during the warranty period, SUNGROW will provide free service or replace the product with a new one.

Evidence

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be undamaged and legible. Otherwise, SUNGROW has the right to refuse to honor the quality guarantee.

Conditions

- After replacement, unqualified products shall be processed by SUNGROW.
- The customer shall give SUNGROW a reasonable period to repair the faulty device.

Exclusion of Liability

In the following circumstances, SUNGROW has the right to refuse to honor the quality guarantee:

- The free warranty period for the whole machine/components has expired.
- The device is damaged during transport.
- The device is incorrectly installed, refitted, or used.
- The device operates in harsh conditions beyond those described in this manual.
- The fault or damage is caused by installation, repairs, modification, or disassembly performed by a service provider or personnel not from SUNGROW.
- The fault or damage is caused by the use of non-standard or non-SUNGROW components or software.
- The installation and use range are beyond stipulations of relevant international standards.
- The damage is caused by unexpected natural factors.

For faulty products in any of above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of SUNGROW.

9.3 Contact Information

Should you have any question about this product, please contact us.
We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device
- Fault code/name
- Brief description of the problem

China (HQ)	**Australia**
Sungrow Power Supply Co., Ltd	Sungrow Australia Group Pty. Ltd.
Hefei	Sydney
+86 551 65327834	+61 2 9922 1522
service@sungrowpower.com	service@sungrowpower.com.au
Brazil	**France**
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Sao Paulo	Lyon
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UK Sungrow Power UK Ltd. Milton Keynes +44 (0) 01908 414127 service@sungrow-emea.com	**U.S.A, Mexico** Sungrow USA Corporation Phoenix +1 833 747 6937 techsupport@sungrow-na.com
Vietnam Sungrow Vietnam Hanoi +84 918 402 140 service@vn.sungrowpower.com	**Belgium, Netherlands and Luxembourg (Benelus)** +31 08000227012 (only for Netherlands) service@sungrow-emea.com
Poland +48 221530484 service@sungrow-emea.com	-