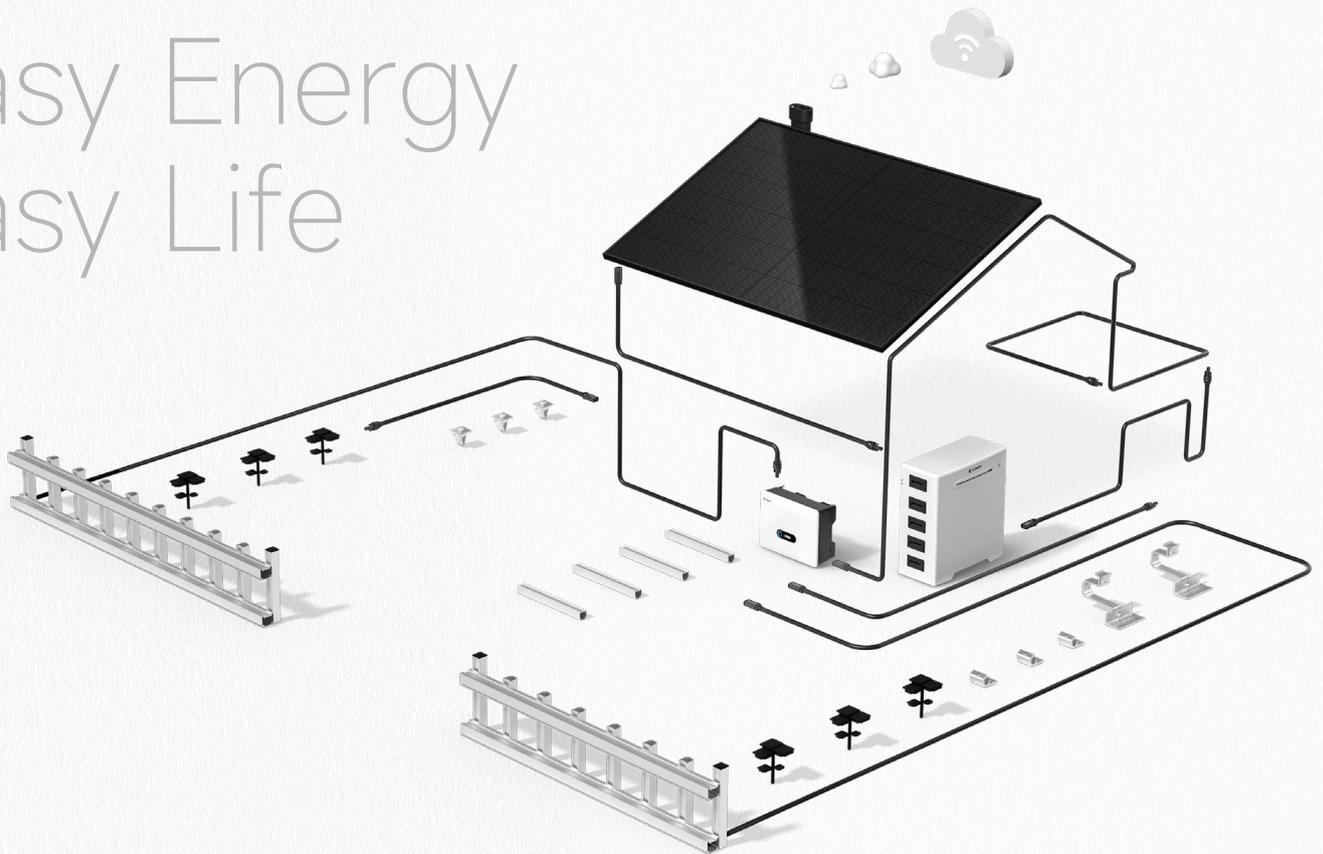


Easy Energy
Easy Life



 **Share-Home**

Smart Solar System User Manual

About This Manual

Purpose

This manual introduces the installation, electrical connection, debugging, use, maintenance and troubleshooting of Slenergy iShare-Home Smart Solar System before installation and operation, please read through this document to understand the security information and familiarize with the system functions and features.

Note

The use of energy storage function are not mentioned in the main text of this manual. This section will be optimized in later stage.

Reader

The readers of this manual are:

- System installer
- System user

This manual is applicable to electrical installers with professional qualifications and end-users, who should have the following skills:

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

Symbols

Definition of the symbols in this manual are as the following:



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



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



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



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



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



This symbol allows the operator to pay attention to the protection of personal safety against electricity prohibited matters.



If fire, switch off the breaker on DC side and stay away from battery.



The battery cannot be disposed of with household waste.



This symbol identifies the precautions or instructions that may pose a risk to the safety of the user or cause significant hardware damage if not properly operated.

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System Introduction



1.1 System schematics and wiring diagram

The system in this manual is composed of PV module, inverter, battery, iBox, mounting structure and cable sets, and can convert the DC power generated by the PV system into 380V/400V/415V 3-phase AC power via the inverter. The system is connected to the original distribution box of the user. It is a smart power generation system that meets the local grid connection needs and controls the feed to the grid. The iBox in this manual works in an iShare-home PV power generation system. The basic variant of iShare-home residential PV power generation system is composed of PV modules, inverter, iBox, mounting structure and cables, Figures 1.1-1 and 1.1-2 respectively show the schematics and wiring diagram of the basic variant of iShare-home system.

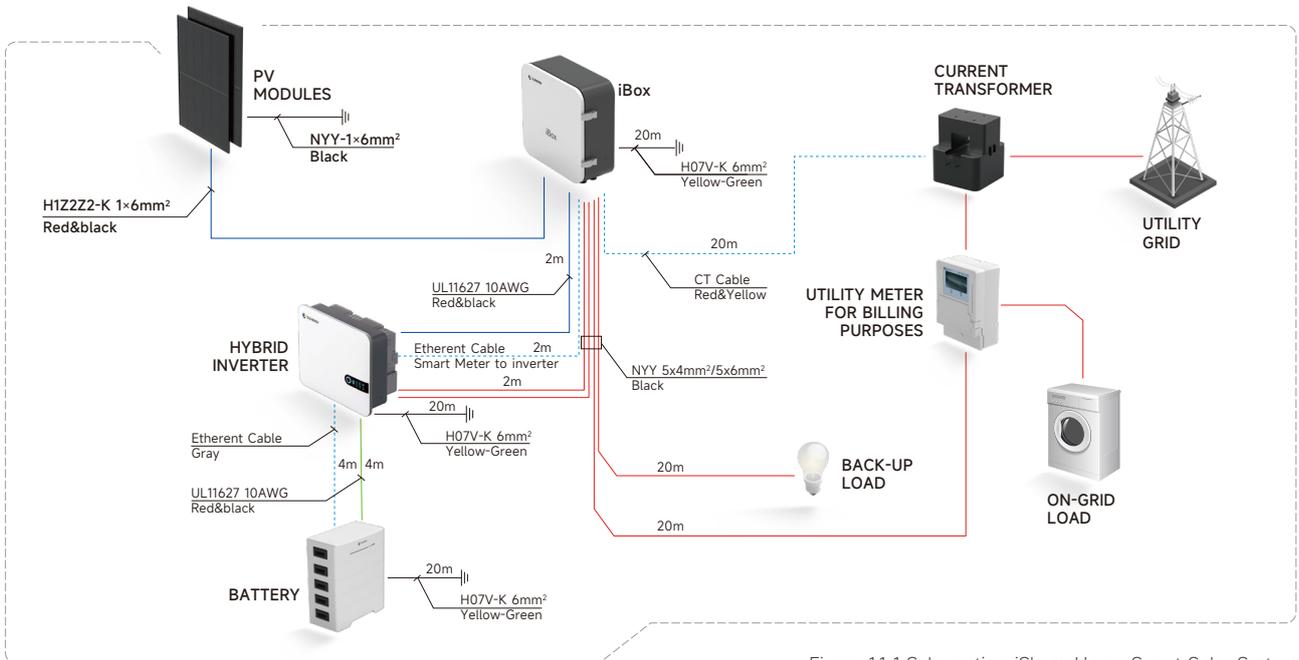


Figure 1.1-1 Schematics: iShare-Home Smart Solar System

1.2 Equipment List

System configuration is as the following:

Model	iShare-Home 4kW	iShare-Home 6kW	iShare-Home 8kW	iShare-Home 10kW	iShare-Home 12kW	iShare-Home 15kW
System capacity (kW _{ac})	4	6	8	10	12	15
No. PV modules(pcs)/425W	10/12	14/16/18	20/22/24	26/28/30	32/34/36	38/40/42/44/46
Effective Roof Area Approx.	21m ² -26m ²	30m ² -39m ²	43m ² -51m ²	56m ² -65m ²	70m ² -78m ²	82m ² -100m ²
Inverter	SL-D4KTR-H25	SL-D6KTR-H25	SL-D8KTR-H25	SL-D10KTR-H25	SL-D12KTR-H25	SL-D15KTR-H40
Battery	SL-BH-3-7 ~SL-BH-8-20					
Cable set	DC Cable:H1Z2Z2-K 1×6mm ² ; UL 11627 10AWG					
	AC Cable: NYY-J 5×4mm ² /5×6mm ²					
	Grounding Cable: H07V-K 6mm ² ; NYY 1×6mm ²					
	Communication Cable: UTP CAT5e					
	Connectors					
Mounting structure set	Rail, hook kit/hanger bolt kit, rail connector, mid-clamp, end-clamp, earthing lug and other accessories					
iBox	SL-BH12KR				SL-BH15KR	
Cloud & APP	1 set					
Power generation estimates (Italy)	15-17kWh/day 5308-4246kWh/year	20-26kWh/day 7431-9556kWh/year	29-35kWh/day 10615-12738kWh/year	38-44kWh/day 13800-15923kWh/year	47-52kWh/day 16984-19108kWh/year	55-67kWh/day 20169-24415kWh/year
Power generation estimates (Spain)	17-20kWh/day 6134-7360kWh/year	24-30kWh/day 8587-11040kWh/year	34-40kWh/day 12267-14721kWh/year	44-50kWh/day 15947-18401kWh/year	54-60kWh/day 19628-22081kWh/year	64-77kWh/day 23308-28215kWh/year

Larger capacity systems can be configured according to demand.

The power generation is calculated based on Rome, Italy. The annual peak sunshine hours are 1523h.

The power generation is calculated based on Madrid, Spain. The annual peak sunshine hours are 1760h.

Each 1kWh generated reduce 0.997kg of CO₂.

1.3 Technical data of PV module

1.3.1 Modules Identification

3 labels on the modules contain information below:

- 1 Nameplate: product type, rated power, rated current, rated voltage, open circuit voltage, short circuit current under testing conditions, certification indicator, maximum system voltage, etc.
- 2 Current classification label: Rated working current (H indicates High, M indicates Medium, L indicates Low).
- 3 Serial Number label: A unique serial number which is laminated inside the module permanently which can be found in the front of the module. There is another same serial number beside the module nameplate.

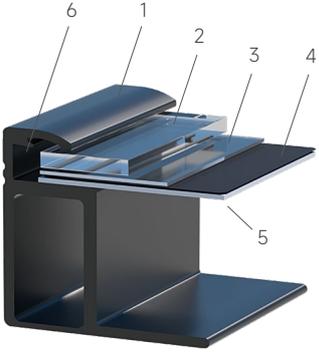
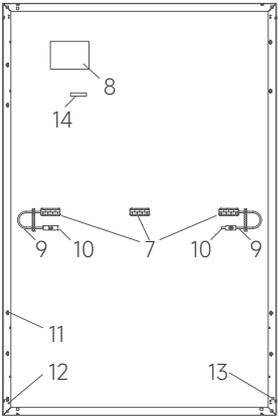


Figure 1.3.1-1 Regular modules Mechanical drawing

1 Frame	2 Glass	3 EVA	4 Solar Cell
5 Backsheet	6 Silica Gel	7 Junction Box	8 Name Plate
9 Cable	10 Connector	11 Mounting Hole	12 Grounding Hole
13 Drain Hole	14 Bar Code		

1.3.2 Technical Data of PV Module

Items	Specifications
Module Number	SL-108NA-425
Electrical Characteristics	
Maximum Power (Pmax/W)	425
Open Circuit Voltage (Voc/V)	37.83
Short Circuit Current (Isc/A)	14.05
Voltage at Maximum Power (Vmp/V)	31.94
Current at Maximum Power (Imp/A)	13.31
Module Efficiency (%)	21.76
Mechanical Parameters	
Cell Orientation	108 (6*18)
Junction Box	IP68, three diodes
Output Cable	4mm ² , 1200mm in length
Glass	Single glass, 3.2mm coated tempered glass
Frame	Anodized aluminum alloy frame
Weight (kg)	21.5
Dimension (mm)	1722*1134*30
Packaging	36pcs per pallet 216pcs per 20'GP 936pcs per 40'HQ
Operating Parameters	
Operational Temperature (°C)	-40 ~ +85
Power Output Tolerance (W)	0 ~ +5
Voc and Isc Tolerance	±3%
Maximum System Voltage (V)	DC1500 (IEC/UL)
Maximum Series Fuse Rating (A)	25
Nominal Operating Cell Temperature (°C)	45±2
Safety Protection Class	Class II
Temperature Ratings (STC)	
Temperature Coefficient of Isc	+0.050%/°C
Temperature Coefficient of Voc	-0.263%/°C
Temperature Coefficient of Pmax	-0.343%/°C
Mechanical Loading	
Front Side Maximum Static Loading (Pa)	5400
Rear Side Maximum Static Loading (Pa)	2400
Hailstone Test	25mm Hailstone at the speed of 23m/s

STC (Standard Testing Conditions) : Irradiance 1000W/m², Cell Temperature 25°C, Spectra at AM1.5

1.4 Technical data of inverter

1.4.1 Hybrid Inverter 4~12kW

	SL-D4K TR-H25	SL-D5K TR-H25	SL-D6K TR-H25	SL-D8K TR-H25	SL-D10K TR-H25	SL-D12K TR-H25
PV Input						
Max. Input Power (kW)	6.0	7.5	9.0	12.0	15.0	18.0
Start-up Voltage	135	135	135	135	135	135
Max. DC Input Voltage (V)*	1000	1000	1000	1000	1000	1000
Rated DC Input Voltage (V)	620	620	620	620	620	620
MPPT Voltage Range (V)*	120-950	120-950	120-950	200-950	200-950	200-950
No. of MPP Trackers	2	2	2	2	2	2
No. of DC Inputs per MPPT	1/1	1/1	1/1	1/1	1/1	1/1
Max. Input Current (A)	15/15	15/15	15/15	15/15	15/15	15/15
Max. Short-circuit Current (A)	20/20	20/20	20/20	20/20	20/20	20/20
Battery Side						
Battery Type	Lithium Battery (with BMS)					
Battery voltage range (V)	135-750					
Maximum charging/discharge current (A)	25/25					
Grid Side						
Rated Output Power (kW)	4.0	5.0	6.0	8.0	10.0	12.0
Max. Output Apparent Power	4.4	5.5	6.6	8.8	11.0 ¹⁾	13.2
Max. Input Apparent Power (kVA)**	8.0	10.0	12.0	16.0	16.5	16.5
Max. Charging Power of battery (kW)	4.0	5.0	6.0	8.0	10.0	12.0
Rated AC Voltage (V)	3L/N/PE; 220/380; 230/400; 240/415					
Rated AC Frequency (Hz)	50/60	50/60	50/60	50/60	50/60	50/60
Max. Output Current (A)	6.7	8.3	10.0	13.3	16.5 ²⁾	20.0
Adjustable Power Factor	0.8 leading ... 0.8 lagging					
Max. Total Harmonic Distortion	<3% @Rated output power					
DCI	<0.5%In	<0.5%In	<0.5%In	<0.5%In	<0.5%In	<0.5%In
Back-up Side						
Rated Output Power (kW)	4.0	5.0	6.0	8.0	10.0	12.0
Max. Output Apparent Power (kVA)	4.4	5.5	6.6	8.8	11.0	13.2
Max. Output Current (A)	6.7	8.3	10.0	13.3	16.5	20.0
UPS Switching Time	<10ms	<10ms	<10ms	<10ms	<10ms	<10ms
Rated Output Voltage (V)	3L/N/PE; 220/380; 230/400; 240/415					
Rated Output Frequency (Hz)	50/60	50/60	50/60	50/60	50/60	50/60
Peak Output Apparent Power (kVA)	6, 60s	7.5, 60s	9, 60s	12, 60s	15, 60s	18, 60s
Voltage Harmonic Distortion	<3% @Linear load					
Efficiency						
Max. Efficiency	98.1%	98.1%	98.1%	98.2%	98.2%	98.2%
European Efficiency	97.3%	97.3%	97.3%	97.4%	97.4%	97.4%
Compliance IEC/EN 62109, IEC/EN 61000, EN50549-1, TOR Generator Type A, VDE-AR-N-4105						

Protection	
DC Reverse Polarity Protection	Integrated
Battery Input Reverse Connection Protection	Integrated
Insulation Resistance Protection	Integrated
Surge Protection	Integrated
Over-temperature Protection	Integrated
Residual Current Protection	Integrated
Islanding Protection	Integrated
AC Over-voltage Protection	Integrated
Overload Protection	Integrated
AC Short-circuit Protection	Integrated

General Data	
Over Voltage Category	PV: II; Main: III
Dimensions (W×H×D mm)	534×418×210
Weight (kg)	26.0
Protection Degree	IP65
Standby Self-consumption (W)	<15
Topology	Transformerless
Operating Temperature Range (°C)	-30~60
Relative Humidity (%)	0~100
Operating Altitude (m)	3000 (>3000m derating)
Cooling	Natural Convection
Noise Level (dB)	<25
Display	OLED & LED
Communication	CAN, RS485, WiFi/LAN (Optional)

* PV Max. Input voltage is 950V without battery, or 850V with battery, otherwise inverter will be waiting;

** Max apparent power from the grid means the maximum power imported from the utility grid used to satisfy the backup loads and charge the battery; 1) G98: 10.5kVA; 2) G98: 16.00A

1.5 Technical data of Battery

Model	SL-BH-3-7	SL-BH-4-10	SL-BH-5-12
Electrical Parameters			
No. of series battery	3	4	5
Rated energy [kWh]	7.68	10.24	12.8
Usable energy [kWh]	6	9.2	11.52
Rated voltage [V]	153.6	204.8	256
Voltage range [V]	134.4~172.8	179.2~230.4	224~288
Rated capacity [Ah]	50		
Charge current [A]	25(Recommended)/50(MAX)		
Discharge current [A]	25(Recommended)/50(MAX)		
Cycle times	80% DOD, cycles >6000, residual capacity >70%		
Communication	RS485/RS232/CAN 2.0		
Protection function	Over voltage/Under voltage/Over temperature/Low temperature/Over current/Short circuit		
Size [WxDxH, mm]	710x320x639	710x320x776	710x320x913
Weight [kg]	118	150.8	183.6
Working Conditions			
Installation	Indoor		
Working temperature	-10°C~50°C		
Optimum working temperature	20°C~60°C		
Storage temperature	-30°C~60°C		
Protection degree	IP54		
Humidity	5%~95%		
Altitude [m]	≤2000		
Cooling	Natural Convection		
Certificate	CE, UN38.3, MSDS, CB/EMC, IP		

Model	SL-BH-6-15	SL-BH-7-17	SL-BH-8-20
Electrical Parameters			
No. of series battery	6	7	8
Rated energy [kWh]	15.36	17.92	20.48
Usable energy [kWh]	13.8	16.13	18.4
Rated voltage [V]	307.2	358.4	409.6
Voltage range [V]	268.8~345.6	313.6~403.2	358.4~460.8
Rated capacity [Ah]	50		
Charge current [A]	25(Recommended)/50(MAX)		
Discharge current [A]	25(Recommended)/50(MAX)		
Cycle times	80% DOD, cycles >6000, residual capacity >70%		
Communication	RS485/RS232/CAN 2.0		
Protection function	Over voltage/Under voltage/Over temperature/Low temperature/Over current/Short circuit		
Size [WxDxH, mm]	710x320x1050	710x320x1187	710x320x1324
Weight [kg]	216.4	249.2	282

Model	SL-BH-6-15	SL-BH-7-17	SL-BH-8-20
Working Conditions			
Installation	Indoor		
Working temperature	-10°C~50°C		
Optimum working temperature	20°C~60°C		
Storage temperature	-30°C~60°C		
Protection degree	IP54		
Humidity	5%~95%		
Altitude [m]	≤2000		
Cooling	Natural		
Certificate	CE, UN38.3, MSDS, CB/EMC, IP		
Warranty	10 years		

1.6 Technical data of mounting system

Product Name	Solar Mounting System	Design Standard	EN 1991-1-1: 2002
Building Type	Pitched Roof		UNE EN1991-1-3-2018
Tile Type	Concrete Tile, Clay Tile, Slate Tile		UNE EN 1991-1-4-2018
Tilt Angle	15-60°	Main Material	AL6005-T6(Anodized)
Wind Load	0.52KN/m ²	Fastener	SUS304 & Zinc-Nickel Alloy
Snow Load	0.6KN/m ²	Small Components	AL6005-T6(Anodized)
Applicable Solar Module	Framed	Color	Silver and black
Panel Layout	Portrait or Landscape	Certificate	TUV

	Item No.	Description	Material		Item No.	Description	Material
	51211786A	Rail H40	AL6005-T6		51230026R	End cap	Silica Gel
	31220174A	Rail Splice	AL6005-T6		55110091	Cable clip	SUS304
	31101261A	Universal clamp kit	AL6005-T6		31510043A	Grounding Lug	AL6005-T6
	31101262A	Tile hook	AL6005-T6		51500011F	Earthing clip	SUS304
	31101262A	Hanger Bolt	AL6005-T6				

1.7 Technical data of iBox

iBox	SL-BH12KR	SL-BH15KR
DC Side		
Max input/output voltage (V_{DC})	1000	1000
Max input current (A)	15	15
Max output current (A)	15	30
AC Side/Backup		
Rated input/output voltage (V_{AC})	415	415
Max input/output current (A)	20	25
Rated Frequency (Hz)	50/60	50/60
Working environments		
Operation Temperature ($^{\circ}C$)	-10~+50	-10~+50
Relative Humidity	98% Non condensation	98% Non condensation
Altitudes (m)	≤ 2000	≤ 2000
IP Degree	IP54	IP54
Installation methods	Indoor, Hanging	Indoor, Hanging
Standards & Certifications		
Standards	IEC61439-1	IEC61439-1
	IEC61439-2	IEC61439-2
Certifications	CE	CE
Dimensions W×H×D (mm)	475×425×175	525×425×175
Weight (kg)	18	20

1.8 Technical data of cable

1.8.1 Cable set

No.	Name	Specification	From	To	Remark	Accessory bag	Length (m)
1	PV DC Cable	H1Z2Z2-K 1×6mm ²	PV Modules	iBox PV input connector	Cable terminals are made and installed on site	MC4 Connector	40-80m*2
2	iBox to Inverter DC Cable	UL 11627 10AWG	iBox DC output	Inverter DC Input	Cable terminals are prefabricated and installed at the factory	-	2m*2
3	Inverter to Battery DC Cable	UL 11627 10AWG	Inverter Battery connector	Battery output connector	Both side terminals are prefabricated and installed at the factory	-	4m*2
4	Inverter to iBox AC Cable (On grid)	NYY 5×4mm ² /5×6mm ²	Inverter AC output connector	iBox AC input connector	Cable terminals are prefabricated and installed at the factory	-	2m
5	Inverter to iBox AC Cable (Backup)	NYY 5×4mm ² /5×6mm ²	Inverter AC Backup Backup output connector	iBox AC Backup Backup input connector	Cable terminals are prefabricated and installed at the factory	-	2m
6	iBox to Utility Distribution Box (On grid)	NYY 5×4mm ² /5×6mm ²	iBox AC Output connector	Utility Distribution Box	iBox side terminal is prefabricated and installed at the factory	-	20m
7	iBox to Utility Distribution Box (Backup)	NYY 5×4mm ² /5×6mm ²	iBox AC Backup Output connector	Utility Distribution Box	iBox side terminal is prefabricated and installed at the factory	-	20m
8	Inverter PE	H07V-K 6mm ²	Inverter grounding hole	External ground Bar	Inverter side terminals are prefabricated and installed at the factory	-	20m
9	Battery PE	H07V-K 6mm ²	Battery grounding hole	External ground Bar	Battery side terminals are prefabricated and installed at the factory	-	20m
10	iBox PE	H07V-K 6mm ²	iBox Grounding hole	External ground Bar	Cable terminals are prefabricated and installed at the factory	-	20m
11	PV Roof Grounding	NYY-1×6mm ²	PV supporting bracket	External ground Bar	Cable terminals are made and installed on site	-	40 ~ 60m
12	Communication Cable	UTP CAT5e	Inverter Multi-com Connector (COM2)	Battery Inverter COM	Both side terminals are prefabricated and installed at the factory	-	4m
13	Communication Cable	UTP CAT5e	Inverter Multi-com Connector (COM2)	iBox (RS485)	Both side terminals are prefabricated and installed at the factory	-	2m

Note: Indoor wiring connection need to use cable tray.

1.8.2 DC Cable

Type	1×6mm ² DC 1500V
Conductor	Stranded tinned copper (IEC 60228 Class 5) 84/0.285mm (mix0.277mm max0.293mm)
Stranded OD	3.01mm
Inner Insulation	Halogen free crosslinked polyolefin Color: black
Outer Insulation	Halogen free crosslinked polyolefin Color: black
Inner Diameter	4.6±0.15mm
Outer Diameter	6.3±0.15mm
Maximum resistance of conductor at 20°C	≤3.39Ω/km
Insulation resistance at 20°C	≥610 MΩ·Km
Insulation resistance at 90°C	≥0.61 MΩ·Km
Surface resistance of sheath	≥10 ⁹ Ω
DC Voltage test of insulation	900V, 240h(85°C, 3%NaCl) No break
Tensile strength of insulation	≥10.3Mpa
Rating voltage	IEC/EN: DC1500V AC 1000V
Working temperature	-40~90°C
Max. conductor temperature	120°C
Short circuit temperature	250°C 5S
Bending radius	6×D
Current rating	
Free in air	70A
On surface without opposite contact	67A
On surface with opposite contact	57A
Rating voltage	IEC/EN: DC1500V AC 1000V
Working temperature	-40~90°C
Max. conductor temperature	120°C
Short circuit temperature	250°C 5S
Bending radius	6×D

	CABLE TYPE	UL 11627 10AWG	
CONDUCTOR	Area	1×10AW	
	Material	TXR tinned copper wire	
	Size	105/0.254±0.008mm	
	O.D	3.00 mm	
	20°C max conductor resistance	3.546 Ω/k	
INSULATION	Material	PVC	Insulation: BK
	Normal thickness	0.76 mm	
	O.D.	4.80±0.20mm	
1. Rated voltage: 2000V		1. Tensile Strength: ≥10.3 Mpa	
2. Rated temperature: -15°C-105°C		2. Elongation: ≥100%	
3. Voltage withstand test: 5.0kV		3. Flame test: VW-1	
4. Reference Standards: UL758, UL1581			
5. Maximum conductor Capacity: 30A			

1.8.3 AC Cable

CABLE TYPE		5×4QMM
	STYLE	NYY 5×4QMM
CONDUCTOR	Area	5 × 4QMM
	Material	Bare copper stranded
	Size	73 / 0.25 ±0.008mm
	O.D	2.46 mm
	20°C max conductor resistance	4.95 Ω/km
INSULATION	Material	FRPVC 40P
	Normal thickness	1.00 mm
	Minimum thickness	0.80 mm
	O.D.	4.50 ±0.15mm
		Insulation BN/BK /GY/BU/YE/GN
CABLING	O.D.(ref)	12.2 mm
	Wrapping	Nonwoven tape
	Filler	PP
JACKET	Material	FRPVC
	Normal thickness	2.20 mm
	Minimum thickness	1.77 mm
	O.D.	19.1 ± 0.50mm
1. Rated voltage: 0.6/1kv		1. Tensile Strength: ≥12.5 Mpa
2. Rated temperature: -15°C-70°C		2. Elongation: ≥125%
3. Voltage withstand test: AC 4.0kV		3. Flame test: 60332-1
4. Min. Insulated resistance: ≥20.0MΩ·km		4. UV resistant: 300h, UL758
5. Character impedance: N/A		5. Fixed installation Min bending radius: 5×OD
6. Reference Standards: IEC 60502		
7. Maximum conductor temperature: 70°C		
8. Maximum short-circuit temperature: 160°C		
9. Max. conductor Capacity: 32A		



CABLE TYPE		5×6QMM
	STYLE	NY Y 5×6QMM
CONDUCTOR	Area	5 × 6QMM
	Material	Bare copper stranded
	Size	109 / 0.25 ±0.008mm
	O.D.	3.01 mm
	20°C max conductor resistance	3.3 Ω/km
INSULATION	Material	FRPVC 40P
	Normal thickness	1.20 mm
	Minimum thickness	0.98 mm
	O.D.	5.40 ±0.15mm
CABLING	O.D.(ref)	14.6 mm
	Wrapping	Nonwoven tape
	Filler	PP
JACKET	Material	FRPVC
	Normal thickness	2.20 mm
	Minimum thickness	1.77 mm
	O.D.	19.1 ± 0.50mm



Insulation
BN/BK/GY/BU/YE/GN

<ol style="list-style-type: none"> 1. Rated voltage: 0.6/1kv 2. Rated temperature: -15°C~70°C 3. Voltage withstand test: AC 4.0kV 4. Min. Insulated resistance: ≥20.0MΩ·km 5. Character impedance: N/A 6. Reference Standards: IEC 60502 7. Maximum conductor temperature: 70°C 8. Maximum short-circuit temperature: 160°C 9. Max. conductor Capacity: 40A 	<ol style="list-style-type: none"> 1. Tensile Strength: ≥12.5 Mpa 2. Elongation: ≥125% 3. Flame test: 60332-1 4. UV resistant: 300h, UL758 5. Fixed installation Min bending radius: 5×OD
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Safety



This manual contains important information about operating the system. Before operating, please read it very carefully. The system should be operated in strict accordance with the instructions in the manual, otherwise it can cause damages or loss to equipment, personnel and property. This manual should be kept carefully for maintenance and reparation.

Setting of Warning Sign for Safety

During instruction, maintenance and repair, follow the instructions below to prevent non-specialist personnel from causing misuse or accident:

- Obvious signs should be placed at front switch and rear-level switch to prevent accidents caused by false switching.
- Warning signs or tapes should be set near operating areas.
- The system must be reinstalled after maintenance or operation.

Measuring Equipment

To ensure the electrical parameters to match requirements, related measuring equipment is required when the system is being connected or tested. Ensure that the connection and use matched specification to prevent electric arcs or shocks.

Moisture Protection

It is very likely that moisture may cause damages to the system. Repair or maintaining activities in wet weather should be avoided or limited.

- 13 Do not lift the entire module by grasping the junction box or wire under any circumstances.
- 14 Do not connect the male and female connectors wrongly, check the wiring condition, and all connecting wires shall not be separated from the module.
- 15 Do not let the object directly hit the module or fall on the module directly.
- 16 Do not use sharp tools to scrub the glass of module, which will leave scratches on the module.
- 17 Do not touch the junction box or male and female head with bare hands during installation or when there is light on the module.
- 18 Do not repair the damaged module by yourself.
- 19 Do not split module or move any part of them.

Inverter

- 1 During instruction, maintenance and repair, follow the instructions below to prevent non-specialist personnel from causing misuse or accident.
- 2 Obvious signs should be placed at front switch and rear-level switch to prevent accidents caused by false switching.
- 3 Warning signs or tapes should be set near operating areas.
- 4 The system must be reinstalled after maintenance or operation.
- 5 To ensure the electrical parameters to match requirements, related measuring equipment is required when the system is being connected or tested. Ensure that the connection and use matched specification to prevent electric arcs or shocks.
- 6 It is very likely that moisture may cause damages to the system. Repair or maintaining activities in wet weather should be avoided or limited.
- 7 The battery system is part of the energy storage system which stores life-threatening high voltage even when the DC side is switched off. Touching the battery outlets is strictly prohibited. The inverter can keep a life-threatening voltage even after disconnecting it from the DC and / or AC side. Therefore, for safety reasons, it must be tested with a properly calibrated voltage tester before an installer works on the equipment.

Battery

- 1 SL-BH system installation and maintenance instructions must have high voltage electrical knowledge. Slenergy assumes no liability for injury or property damage due to repairs attempted by unqualified individuals or a failure to properly follow these instructions. These warnings and cautions must be followed when using our product.
- 2 Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage SL-BH stackable Li-HV system, potentially rendering it inoperable.

- 8 Please use the accessories designated by Slenergy for construction parts, and do not arbitrarily transform and change the products.
- 9 Please avoid hitting strongly on the profile as aluminum profile is easy to deform and scratch.
- 10 This information is related to the installation of the system. Please consider the characteristics of the stand during the construction of the foundation, components, inverter, and electrical wiring.

iBox

The iBox is used in iShare-home residential PV Systems, which is a new energy generation system that uses PV modules to generate electricity for household loads. Improper use of iBox may cause harm to life and health of personnel as well as damage to the iBox and other items. The following points must therefore be observed to comply with the intended use of the system:

- 1 Before performing operations, read through this manual and follow all the precautions to prevent accidents.
- 2 The DANGER, WARNING, CAUTION, and NOTICE statements in the document do not represent all the safety instructions. They are only supplements to the safety instructions.
- 3 Only certified electricians are allowed to install, connect cables, commission, maintain, and troubleshoot the product, and they must understand basic safety precautions to avoid hazards.
- 4 The transport and storage conditions must be observed.

2.2 Disclaimer

Slenergy shall not be liable for any consequence caused by any of the following events:

- 1 Damage during the transportation by the customer.
- 2 Transport damage (including painting scratch caused by rubbing inside packaging during shipping). A claim should be made directly to shipping or insurance company in this case as soon as the container/package is unloaded and such damage is identified.
- 3 Storage conditions that do not meet the requirements specified in this document.
- 4 Incorrect storage, installation, or use.
- 5 Installation or use by unqualified personnel.
- 6 Fail to follow any/all of the user manual, the installation guide and the maintenance regulations.
- 7 Operation in extreme environments which are not covered in this document.
- 8 Operation beyond specified ranges.
- 9 Unauthorized modifications to the product or software code or removal of the product.
- 10 Device damage due to force majeure (such as earthquake, fire, and storm).
- 11 Warranty expiration without extension of warranty service.
- 12 Installation or use in environments which are not specified in relevant international standards.
- 13 Product modified, design changed or parts replaced without authorization; Changes, repair attempts and erasing of series number or seals by non-company technician.
- 14 System design and installation are not in compliance with standards and regulations.
- 15 Fail to comply with the local safety regulations (VDE for DE, SAA for AU).
- 16 Improper use or misuse of the device; Insufficient ventilation of the device.
- 17 The maintenance procedures relating to the product have not been followed to an acceptable standard.
- 18 Force majeure (violent or stormy weather, lightning, overvoltage, fire etc.)
- 19 Damages caused by any external factors.

2.7 Grounding

2.7.1 PV module grounding

The module needs to be grounded. It has been confirmed that the module meets the safety level II and the grounding method meets the local electrical instructions and regulations.

The grounding connection shall be carried out by qualified electricians.

In design of modules, the anodized corrosion resistant aluminum alloy frame is applied for rigidity support. For safety utilization and to protect modules from lightning and static-electricity damage, the module frame must be grounded. The grounding device must be in full contact with inner side of the aluminum alloy and penetrate surface oxide film of the frame.

Do not drill additional grounding holes on module frame.

The grounding conductor or wire may be copper, copper alloy, or any other material acceptable for application as an electrical conductor per respective National Electrical Codes. The grounding conductor must then make a connection to ground with a suitable ground electrode.

Holes marked with a grounding mark on the frame can only be used for grounding but not for mounting.

Grounding methods below are permissible

A. Grounding by Earthing Clip

The PV module frame and mounting structure rail are made of aluminum alloy coated with oxidized film which is insulated. In order to make PV module frame grounded, a device called earthing clip is used in between PV module frame and mounting structure rail. The earthing clip has sharp strikes on both surfaces which can penetrate the oxidized film on aluminum alloy, conducting PV module frame and mounting structure rail. Please refer to 4.3.5 Installation of PV Modules for detail.

B. The third-party grounding devices

The third-party grounding device can be used for grounding of PV modules but such grounding shall be proved to be reliable.

Grounding device shall be operated in line with stipulations of the manufacturer.

2.7.2 Mounting system grounding

PV module is connected with mounting bracket, and then reliable grounding is completed through download. When connecting the PV module frame and mounting bracket, it is necessary to remove the oxide film on the metal surface to reduce the grounding resistance.

Please refer to the Section 4.3.6 Installation of Grounding Lug.

2.7.3 Inverter grounding

Connect the inverter and ground bar through H07V-K 6mm² wire to achieve the purpose of grounding protection. Please always remember wiring the H07V-K 6mm² wire before wiring other wires.



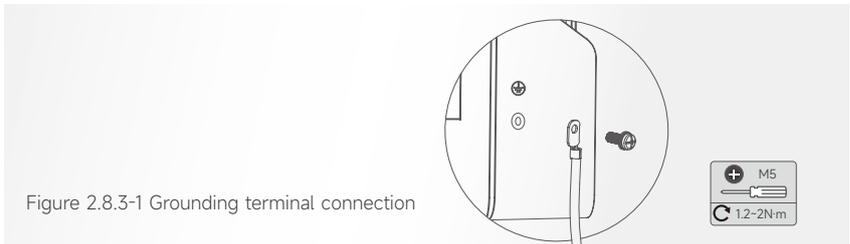
Do not connect the N-wire as a protective ground wire to the inverter casing. Otherwise, it may cause electric shock.



- Reliable grounding is good for resisting surge voltage shock and improving EMI performance.
- Inverters must be well-grounded.
- For a system with only one inverter, just ground the PE cable.
- For a multi-inverter system, all inverters PE wire need to be connected to the same grounding copper bar to ensure equipotential bonding.

Ground terminal connection steps:

- The external grounding terminal is located in on the lower right side of the inverter.
- Fix the grounding terminal to the H07V-K 6mm² wire with a proper tool and lock the grounding terminal to the grounding hole in the lower right side of the inverter.



2.7.4 Battery grounding

Please refer to 5.7.1 Cable Connection.

2.7.5 iBox grounding

After the mechanical installation is completed, check if the circuit breaker is off. Connect the grounding wire H07V-K 6mm²

3

Transportation and storage



3.2 Storage and transportation of inverter

- 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.
- The storage temperature and humidity should be in the range of -30°C and +60°C, and less than 90%, respectively.
- If a batch of inverters needs to be stored, the height of each pile should be no more than 6 levels.

3.3 Storage and transportation of Mounting system

- 1 It shall be ensured that no component is damaged during mounting system storage and transportation. Mounting system shall be stored in a dry environment where can avoid corrosion. Besides, don't stack too many boxes together, otherwise, the components at the bottom might be damaged.
- 2 Collision shall be prevented during loading and unloading, to avoid causing mounting system's permanent deformation or mechanical damage.

3.4 Storage and transportation of Battery

3.4.1 Storage requirement

- 1 Install SL- BH Battery at a height that prevents damage from flooding.
- 2 Operating or storing SL-BH Battery in temperatures outside its specified range might cause damage to SL-BH Battery.
- 3 Do not expose the SL-BH Battery to ambient temperatures above 55°C (131°F) or below -20°C (-4°F).
- 4 Ensure that no water sources are above or near Battery, including downspouts, sprinklers, or faucets.
- 5 Do not sit or put heavy things on product.
- 6 Do not drop, deform, impact, cut or spearing with a sharp object.
- 7 Do not place close to open flame or flammable material.
- 8 Do not place at a children's and pet's reach.

3.4.2 Shipping requirements

- 1 The product has UN38.3 transportation certification;
- 2 Product packaging meets sea/automobile transportation requirements;
- 3 During transit, it should be strictly installed when stacking plates when leaving the factory;
- 4 Do not open the bulk cargo for transportation, do not open the package for transportation;
- 5 The operation of the forklift during transit requires the operation of licensed professionals to avoid damage to the product or packaging;

- 6 No violent transportation (such as smashing, crushing, pedaling, etc.);
- 7 The consignee shall take photos to save the photos of the goods at the time of receipt;
- 8 Product packaging meets the requirements of sea/automobile transportation;
- 9 During transit, it should be strictly installed when stacking plates when leaving the factory;
- 10 Bulk cargo shall not be disassembled for transportation, and shall not be unpacked for transportation;
- 11 Forklift operation during transit requires licensed professionals to avoid damage to the product or packaging;
- 12 No violent transportation (such as smashing, crushing, pedaling, etc.);
- 13 The consignee shall take photos to save the photos of the goods at the time of receipt.

3.5 Transportation and storage of iBox

if the iBox does not need to be installed for the time being, the following should be noted when storing.

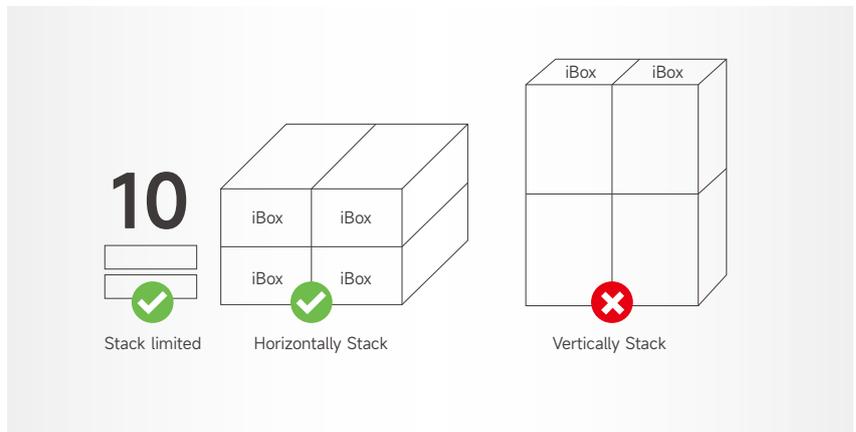
3.5.1 Storage environment

The iBox shall be stored in a cool, dry, water-free steam-free or corrosive gas-free, dust-free environment with ambient temperature not exceeding -25°C~60°C.

Design protection grade of iBox is IP54, but before installing wiring, the inlet and outlet holes are not locked and may be in open state. At this point, if exposed to rain or water vapor, ingress of water vapor or corrosive gas into the iBox may occur, and then affect the electrical performance of the iBox and safe use.

Stacking Restrictions

The iBox should be stacked horizontally, vertical stacking is prohibited.



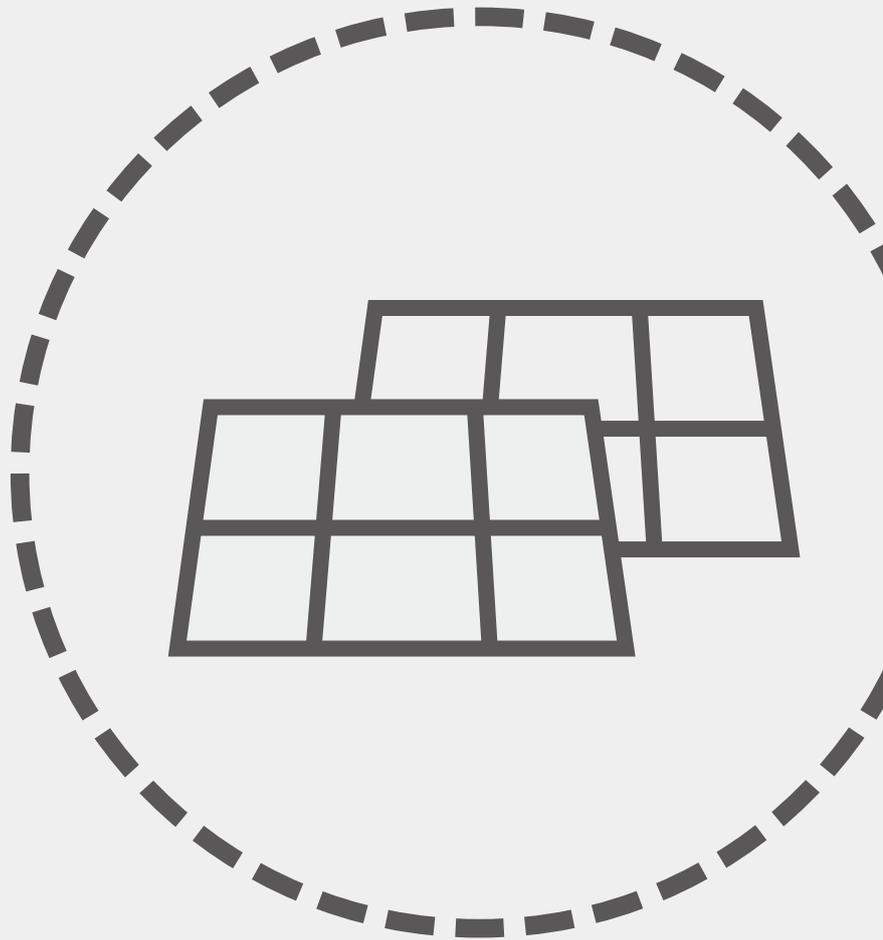
When the iBoxes are stacked horizontally, should be no more than 10 layers.

Using after long-term storage

If the iBox is stored for more than one year, the user should have it checked and tested by a professional person, or contact the manufacture.

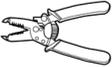
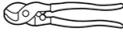
4

Equipment installation



4.1 Checking Before Installation

4.1.1 Installation tools

Type	Tools			
				
	Hammer drill: Drill bit: $\Phi 10$ mm	Socket wrench set	grinding machine	Multimeter DC voltage measurement range $\geq 1100V$ DC
				
	Torque screwdriver Phillips head: M5	Removal wrench Model: H4TW0001; manufacturer: Amphenol	Crimping tool Model: H4TC0003/ H4TC0002 manufacturer: Amphenol	Wire stripper
Installation Tools				
	Diagonal pliers	Utility knife	Cable cutter	OT terminal crimping tool
				
	Hammer	Measuring tape	Bubble or digital level	Vacuum cleaner
				
	Heat shrink tubing	Heat gun	Cable tie	Marker
PPE				
	Safety gloves	Safety goggles	Anti-dust respirator	Safety shoes

4.1.2 Check before the PV module installation

Before installing module, you should contact the relevant department to obtain information about the installation site and construction permit, and also comply with the requirements of the authorized party for installation and inspection.

- 1 When installing the module, make sure that the modules are installed on a fire-resistant roof.
- 2 If the terminal of the PV module is wet, no work can be done to avoid electric shock. It is recommended to install it immediately after unpacking.
- 3 Do not stand on the glass when working, so as to avoid damage caused by broken glass or risk of electric shock.
- 4 Don't work alone (Always keep working with a team of 2 or more people).
- 5 When fastening the PV assembly to the bracket by clamps or screws, do not damage the back panel of the PV assembly.
- 6 Take precautions during installation to prevent the module from being squeezed or impacted by external forces.

4.1.2.1 Installation condition

- **Working environment**

The recommended installation ambient temperature is between -40°C and 85°C.

Do not install the module where they may be immersed in water.

- **Installation site**

Note: The mechanical load of the module (including the pressure of wind and snow) is based on the installation method and installation location. The mechanical load must be calculated by a professional installer based on the design requirements of the system.

In general, solar modules should be installed at locations where they receive the lightest throughout the year. In the northern hemisphere, the modules are best placed south, while in the southern hemisphere, the module are best placed north. If the tilt angle of the module deviates from the positive south (or north) direction by 30 degrees, approximately 10% to 15% of the power output will be lost; If the tilt angle of the module is 60 degrees away from the true south (or north) direction, approximately 20% to 30% of the power output will be lost. When choosing a location, avoid trees, buildings, or other obstacles that create shadows on the module. Although the manufacturer has installed appropriate bypass diodes to minimize this loss, the shadows still cause a reduction in output power.

When a photovoltaic power generation system uses a battery, the battery must be installed correctly, which can protect the operation of the system and ensure the safe use of the user; Please follow the battery manufacturer's instructions for installation instructions, operation and maintenance; In general, batteries should be kept away from the main traffic routes of people and animals; While ensuring the normal operation of the battery, avoid direct sunlight, rain and snow erosion, and maintain good ventilation; Most batteries generate hydrogen when they are charged, which is prone to explosions. Do not spot fire or create sparks around the battery. If the battery is installed outdoors, it must be placed in a specially designed location with good insulation and ventilation.

Do not install module near open flames or flammable materials.

Do not install the module where they are soaked in water or where they are continuously exposed to waterwheels or fountains.

4.1.3 Checking before iBox Installation

The following cautions should be noticed before installing the iBox.



Electric shock! Installation and operation by on-professional personnel is prohibited.
Make sure the power is off during installation and maintenance/operation.

Do not operate AC IN or AC OUT/Backup IN or Backup OUT plug when load is on.

If the AC IN or AC OUT/Backup IN or Backup OUT plug needs to be disconnected, make sure both are disconnected, do not leave only one of the plugs connected to the box. After disconnecting both the plugs, wait for no less than 2 minutes to make sure no electricity is left in the iBox.

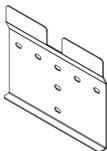


Install the iBox, the hybrid inverter and battery packs in the same room, and the distance should be less than 20m between the iBox and the original distribution box, the distance between iBox and the hybrid inverter should be less than 2m.

Packing List of iBox package

No.	Item	Specification	Qt'y	Unit	Remarks
1	iBox	SL-BH12KL\SL-BH15KL	1	Pcs	
		Mounting plate-A	1pcs		
		Mounting plate-B	1pcs		
2	Installation	Mounting plate-C	1pcs	1	Set
	Accessories	Screws M6×10	5pcs		
		Screws ST6.3×60 T30	4pcs		
		Expansion tubeφ6×60 T30	4pcs		
3	Inspection report	\	1	Pcs	
4	Feedback Form	\	1	Pcs	
5	Installation Dimensions	\	1	Pcs	
6	Quality Certificate	\	1	Pcs	

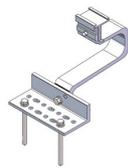
iBox Mounting Accessories

No.	Item	Picture	Quantity
1	Mounting Plate-A		1pcs
2	Mounting Plate-B		1pcs
3	Mounting Plate-C		1pcs
4	ST6.3 Screws		4pcs
5	Plastic expansion tube		4pcs
6	Screws		5pcs

4.1.4 Checking before Mounting system Installation

Slenergy tile hook/hanger bolt system is a roof photovoltaic mounting system applied to tile roofs. The hooks and bolts are designed based on various types tile roofs. In that case, each roof has its corresponding and fitting hook for installation, which greatly improves the firmness of the connection between mounting system and roof structure. Multiple high-quality components and different types of rails can be used for different types tile roof in different countries and regions, while improving the stability of the overall supports. The whole system has fewer mounting accessories, which saves the users' installation time and cost. It is an efficient solution for large-scale tile roof projects.

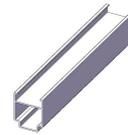
Main Components



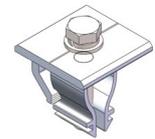
Hook



Rail



Rail Splice



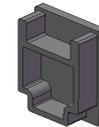
Common End Clamp



Common Mid Clamp



Grounding Lug



Rail Cap



Hanger Bolts

4.1.5 Checking before inverter Installation

4.1.5.1 Appearance

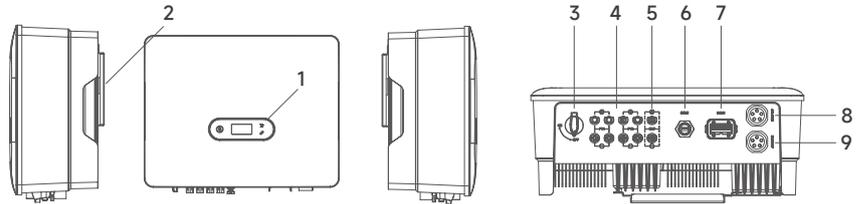


Figure 4.1.5.1-1 Inverter Appearance

Technical Parameter

Item	Terminal	Note
1	Display and LED panel	Display the operation information and working states of the inverter.
2	Hanger	Used to hang the inverter on the wall-mounting bracket.
3	DC switch	Used to safely disconnect the DC circuit
4	DC input terminal	PV connector
5	Battery input terminal	Battery connector
6	COM1 por	WiFi/LAN/4G module connector
7	COM2 por	Multi-function Connector (Meter/BMS/RS485/DRED)
8	On-grid output terminal	Used for On-grid output cable connection
9	Back-up output terminal	Used for Back-up output cable connection

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.

Contact Slenergy or the transport company in case of any damage or incompleteness, and provide photos to facilitate services.

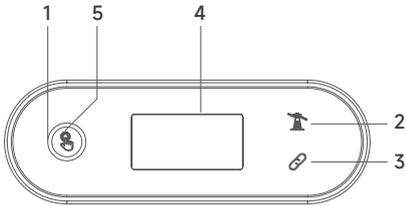


Figure 4.1.5.2-1 Inverter display interface

4.1.5.2 Indicator

Item	Indicator	Status	Description	
1	Power and Alarm Indicator	Off	No power	
		Blue	Quick flashings	Inverter entered self-test status.
			Slow flashing	Inverter entered waiting status.
			Breathe flashing	Inverter works normal.
		Orange	Breathe flashing	Low battery warning, the battery power is about to reach the SOC protection value.
Red	Always on	An alarm or fault is detected, view the fault info on the display.		
2	Grid Indicator	Off	Grid lost.	
		Slow flashing	Inverter detected grid but not running in on-grid mode.	
		Always on	Inverter works in on-grid mode.	
3	Communication Indicator	Green	Always on	The inverter communication is running normally.
		Green	Flashing	The inverter communicates with EMS or Master inverter through RS485 or CAN.
		Orange	Always on	The inverter isn't communicating with Slenergy smart meter.
		Red	Always on	The inverter isn't communicating with the BMS.
4	Display	Display off to save power, press the button to wake up the display.		
5	Button	Switch display information and set parameters by short press or long press.		

4.1.5.3 Packing List

The package of the inverter includes the following accessories. Please check whether the accessories in the packing box are complete when receiving the goods.

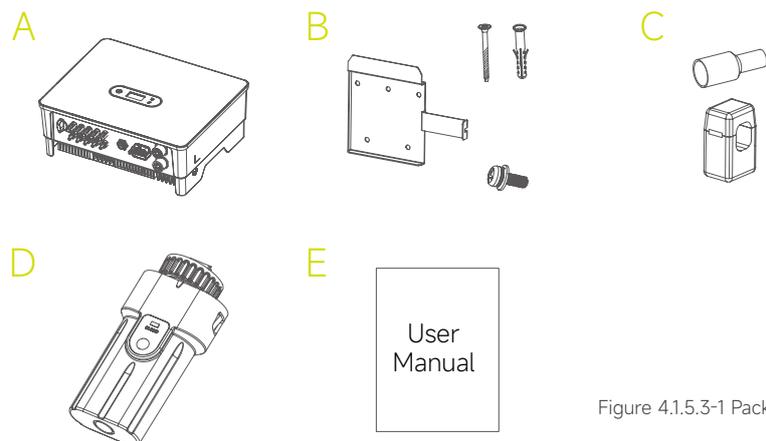


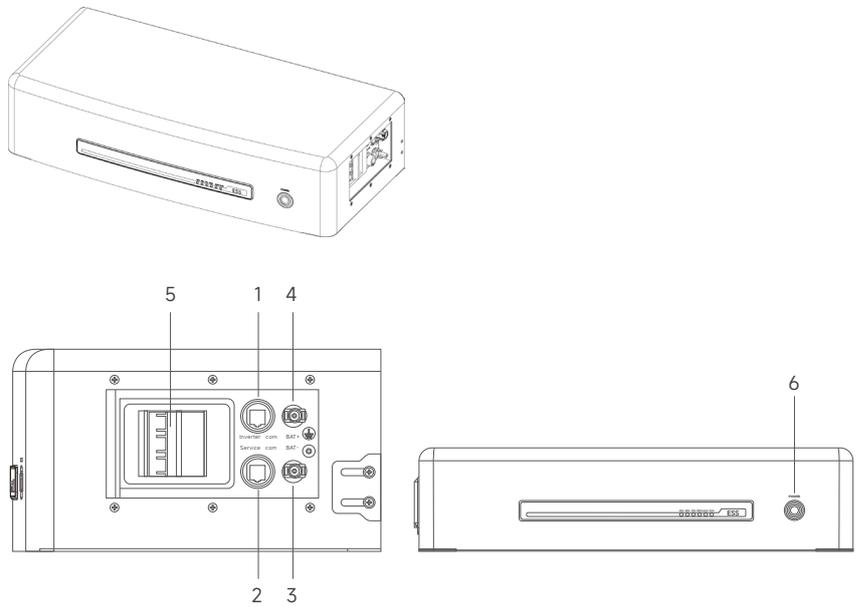
Figure 4.1.5.3-1 Packing list

A	Inverter (1pcs)
B	Wall-mounting bracket (1pcs), Expansion plug set (5pcs), M5 screws (1pcs)
C	CT (pre-installed in the iBox)
D	Monitoring device (1pcs)
E	User Manual

4.1.6 Checking before battery installation

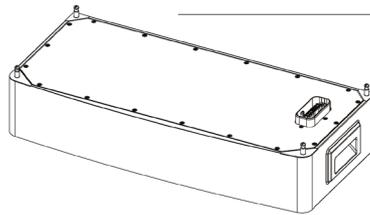
4.1.6.1 Appearance Introduction

Control Module

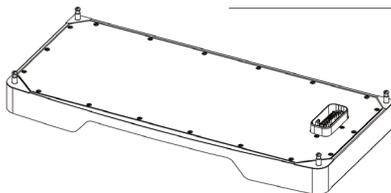


Item	Terminal	Note
1	Inverter COM	Connect to the inverter communication port
2	Service COM	Specified Debug Interface
3	Battery output -	/
4	Battery output +	/
5	Battery MCB	Control battery output
6	Power button	Turn the battery on and off

Battery Module



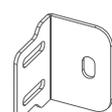
Base



4.1.6.2 Packing List

The package includes 1PCS control battery module, 1-9PCS slave battery modules, and 1PCS battery base and other installation accessories. Please check if the battery modules and accessories are complete in the package when receiving the goods, See the following figure for your reference.

Control module packing list

			
Control Module×1PCS	M5-10 installation screw×4PCS	8-60Expansion screw×2PCS	Fixed bracket×2PCS
			
Quality Certificate	User Manual×1PCS		

Battery module packing list

			
Battery Module×1PCS	Alignment pin×4PCS	Quality Certificate ×1PCS	

Battery packing list

			
Base×1PCS	Alignment pin×4PCS	Quality Certificate ×1PCS	

4.2 Installation Mounting system and PV module installation

4.2.1 Mounting angle

The tilt angle of a solar module refers to the angle between the surface of the module and the ground plane (see Figure 1 below). The power output is greatest when the module is facing the sun.

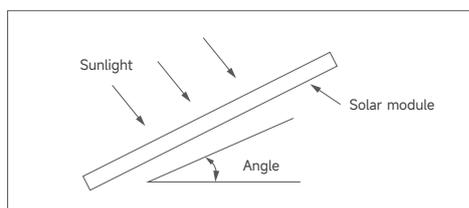


Figure 4.2.1-1 Mounting angle

4.3 Installation of mounting structure

4.3.1 Installation Precaution

Notes for the installation dimensions

The specific dimensions of all installations involved are subject to the construction drawings. This installation instruction is only for the description of the product installation method.

Notes for Stainless Steel Fasteners

Because of the good ductility for stainless steel, the fasteners have big difference with carbon steel one in nature. If use in improper way, it will result in bolt and nut being "locked", which commonly known as "seizure". Prevention from lock basically has the following ways:

- **Reduce the Friction Coefficient**

- (1) Ensure that the bolt thread surface is clean and tidy (No dust, grit, etc.);
- (2) It is recommended to use yellow wax or lubricant during installation (such as lubricating grease, 40# engine oil, which are prepared by users).

- **Correct Operation Method**

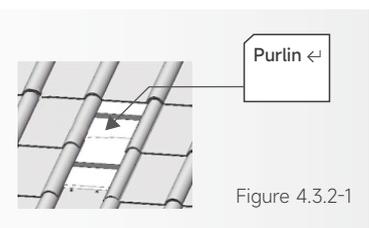
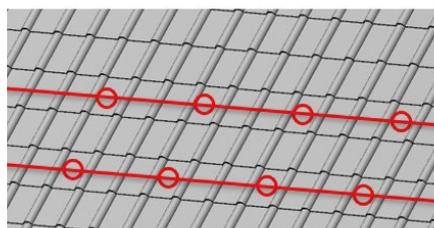
- (1) The bolt must be perpendicular to the axis of the thread, and not inclined (Do not tighten Obliquely);
- (2) In the process of tightening, the strength needs to be balanced, tightening torque shall not exceed the prescribed safety torque value;
- (3) Choose torque wrench or socket wrench as far as possible, avoid using adjustable wrench or electric wrench. Lower the rotating speed while have to use electric wrenches;
- (4) Avoid using electric wrenches etc. under high temperature conditions, do not rotate fast when using, to avoid rapid rise in temperature and cause "seizure".

4.3.2 Installation of Tile Hook/Hanger Bolt

Self-tapping screws of tile hook need to be fixed to the roof purlins. Please mark the positions of tile hook according to shop drawing and make sure all tile hooks are installed on the same horizontal line. Then install the tile hooks accordingly and fasten them to the roof purlins by self-tapping screws.

Shown as bellow:

- Mark the positions of tile hook on the roof and make sure they are on the same horizontal line.



For Spain and Italy country, two types of fixtures of mounting structure are provided. The installation guide is listed here for both. Please refer to the corresponding guide for the type you are using.

4.3.2.1 Installation of hanger bolt

Calculate the hanger bolt span in Slenergy calculation tool based on snow zone, wind zone, altitude and other parameters. The actual installed hanger bolt span has to be not more than the calculated value in Slenergy calculation tool, otherwise the mounting structure might have risk of failure when it comes to extreme condition.

The hanger bolts need to be fixed on the rafter underneath tile, plan the location where hanger bolt kit will be installed on rooftop first, then use alignment line to ensure the subsequent hanger bolt are installed on the same line, make a mark on the wave crest of tile, and then use electrical drill to drill a $\Phi 10$ hole at the marked position. Finally, pass the hanger bolt through the predrilled hole and fix it on the rafter. the installation step is also shown in the figure below:

- The installation diagram of hanger bolt, L feet and rail clamp:

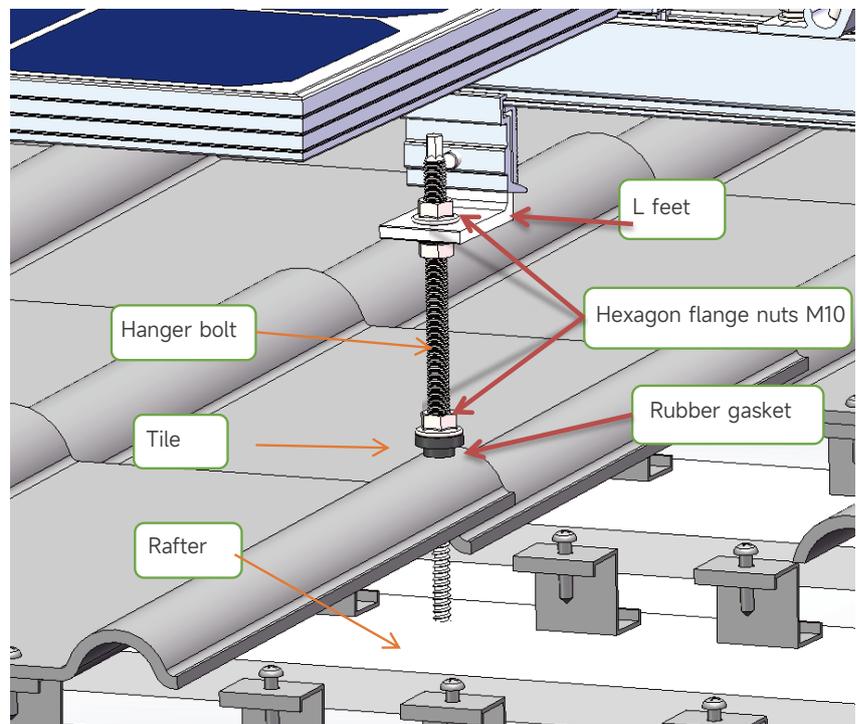


Figure 4.3.2.1-1

- The hanger bolt kits are installed on tile as shown figure below:

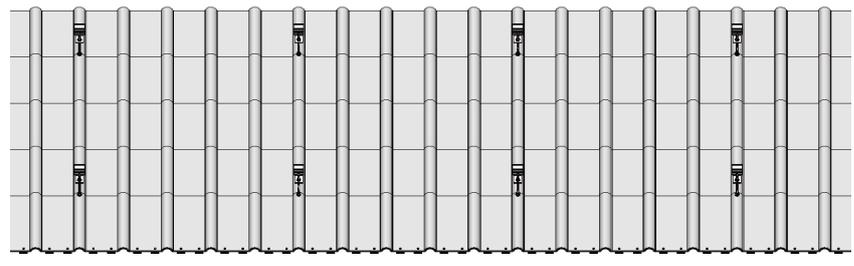


Figure 4.3.2.1-2

4.3.2.2 Installation of tile hook

Calculate the hook span in Slenergy calculation tool based on snow zone, wind zone, altitude and other parameters. The actual installed hook span has to be not more than the calculated value in Slenergy calculation tool, otherwise the mounting structure might have risk of failure when it comes to extreme condition.

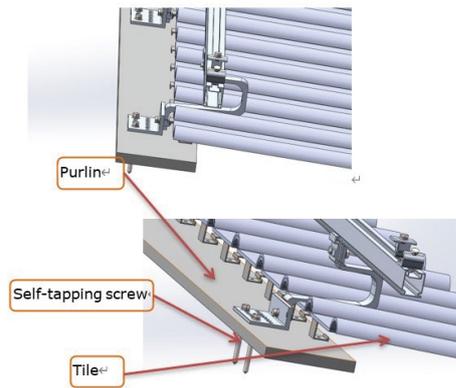


Figure 4.3.2.2-1

- Install all hooks to the tile roof.

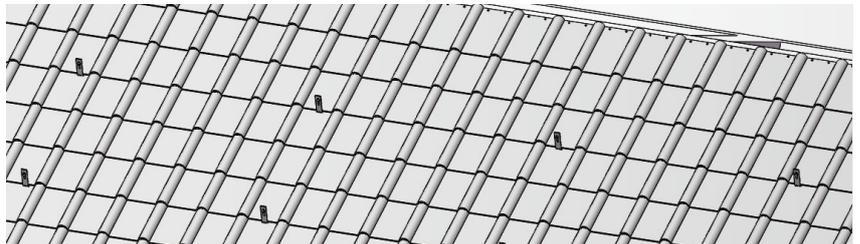


Figure 4.3.2.2-2

4.3.3 Installation of Rail

Fix rails to tile hooks after adjusting the length and height and tighten them by bolts.

After fixing the hook, adjust the height of the rail, loosen the bolt on the upper end of the hook to separate the key A and key B for a certain distance, first align the protrusion of key B with the groove of the rail, and then rotate the rail until the concave on the other side is aligned with the protrusion of key A and locked. The length of rail shall be selected according to the corresponding drawings.

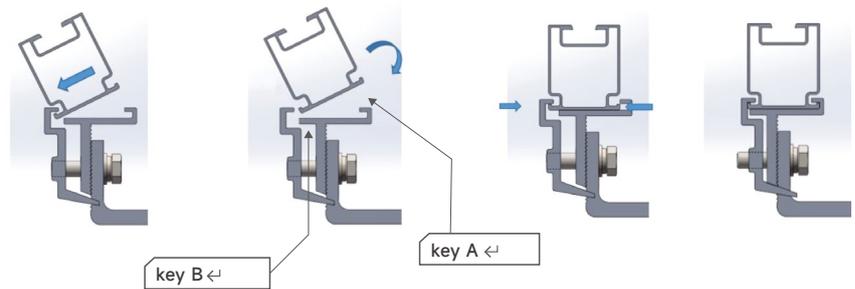


Figure 4.3.3-1

- Connect and fix the remaining rails to the hook according to the previous step.

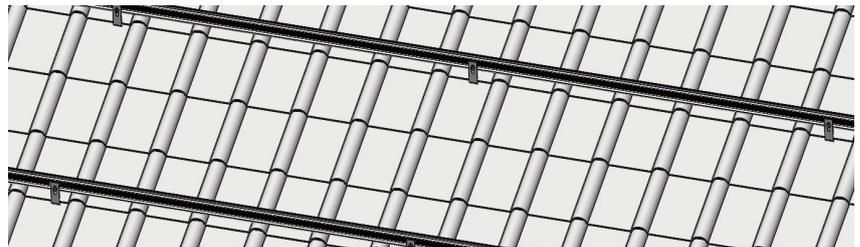


Figure 4.3.3-2 Hook type

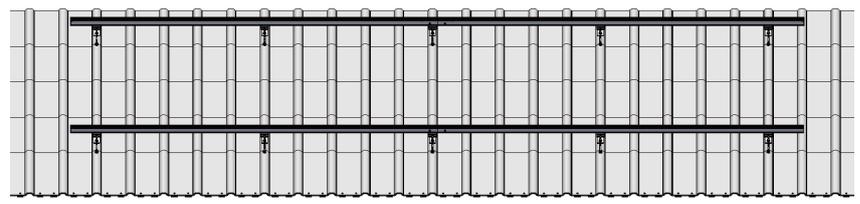


Figure 4.3.3-3 Hanger bolt type

4.3.4 Installation of Rail Splice

Rails should be connected by rail splice if needed, as shown below:

Slide half of the rail splice into the first rail, adjust the fixed position, and tighten the bolts. Then slide the second rail into the rail splice, tighten them by bolts when leveled.

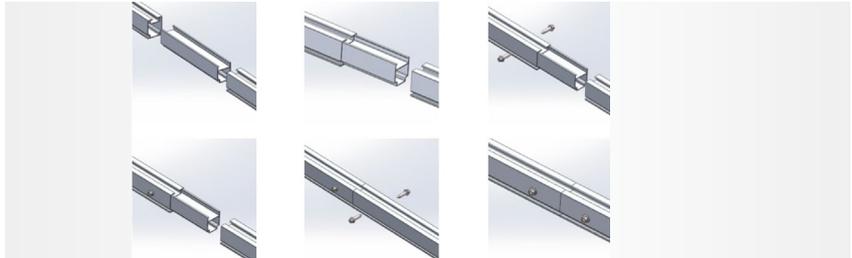


Figure 4.3.4-1

- Completed installation is as the picture shown below

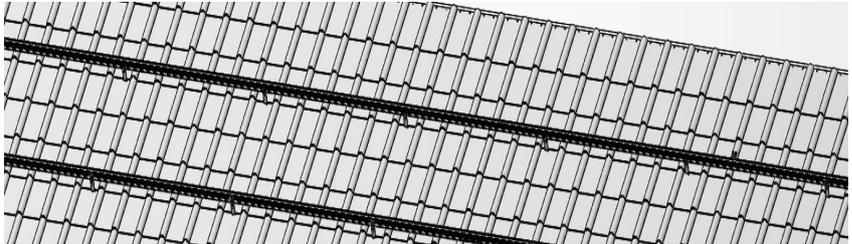


Figure 4.3.4-2 Hook type completed installation

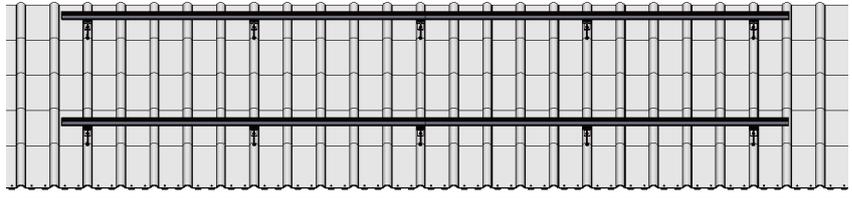


Figure 4.3.4-3 hanger bolt type completed installation

4.3.5 Installation of PV Modules

According to the installation dimension of the drawing, place the PV modules on the rail, and press and fix it with the common end/mid clamp. Note that when the clamps are installed, as shown in the figure below, the mounting surface of the common mid clamp is different, and it needs to be rotated by 90 degrees.

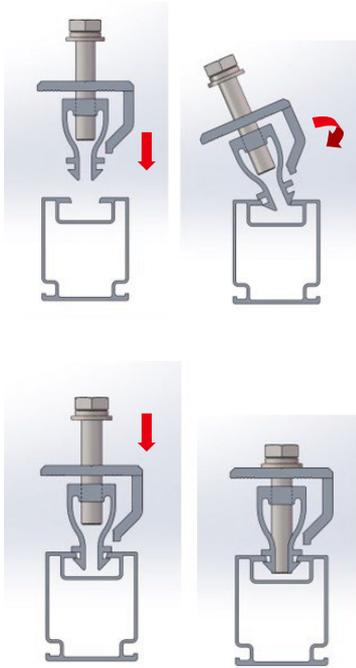


Figure 4.3.5-1

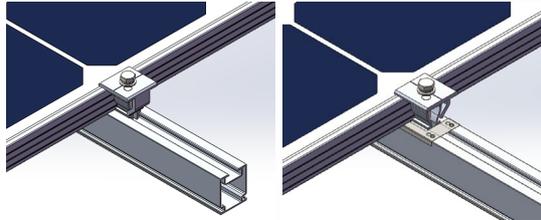


Figure 4.3.5-2

Place the PV module on the rail and adjust the position according to the drawing.

Then fix the end clamp into the rail channel, and tighten the bolts.

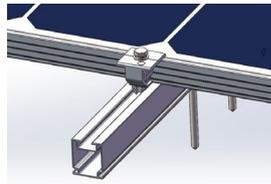


Figure 4.3.5-3

After fixing the end clamp of first PV module, please put the second PV module on the rail at proper position.

Connecting firmly the first PV module and the second one with mid clamp and fasten the bolts. If there are earthing clips needed, place them between the PV modules and rails while installing the mid clamps. Adjusting the position to ensure the sharp spikes on earthing clips are pressed by both PV modules. Then tighten the mid clamps by bolts.

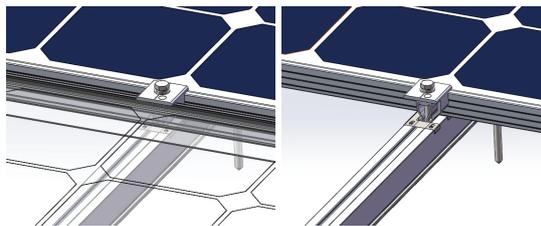


Figure 4.3.5-4

Repeat the steps above. When it comes to the last PV module, fix it with the end clamp and tighten with bolts.

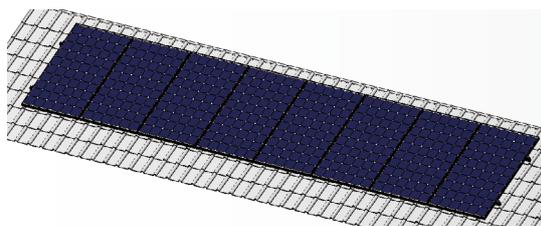
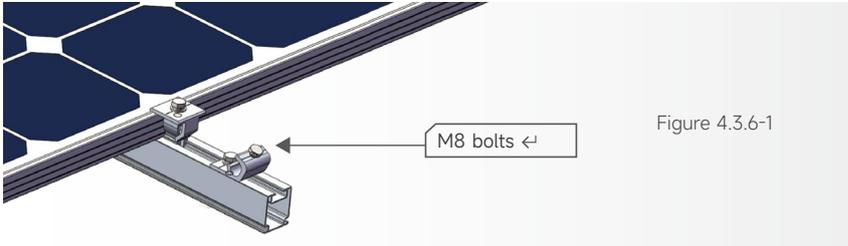


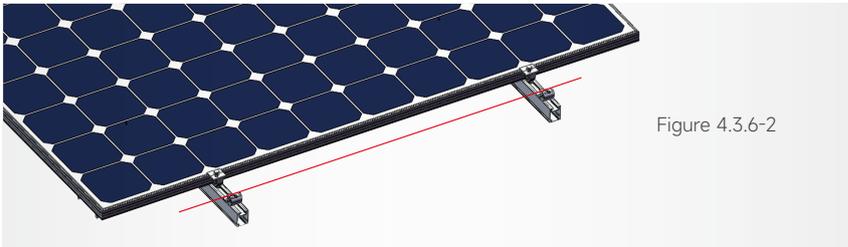
Figure 4.3.5-5

4.3.6 Installation of Grounding Lug

Install grounding lug at the end of the rail as the picture shown below and fix it with bolts.



At the edge of the layout, connect each grounding lug with NYY 1*6mm² ground cable, use knife to cut a small notch at the position where grounding cable sit on the grounding lug, and then fix the ground cable with M8 bolts, and conduct the end of the ground cable to the grounding point.



4.3.7 Installation of Rail Cap

Align the rail cap with the end of the rail and buckle it in.

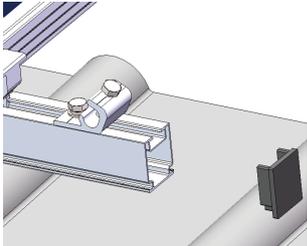


Figure 4.3.7-1

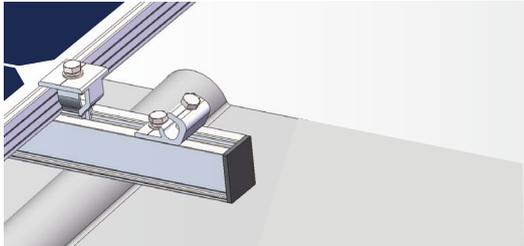


Figure 4.3.7-2

4.3.8 Installation Diagram

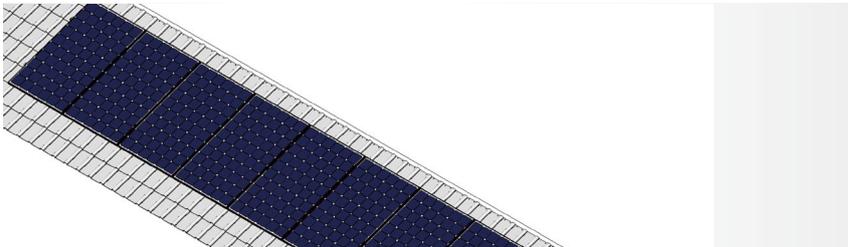
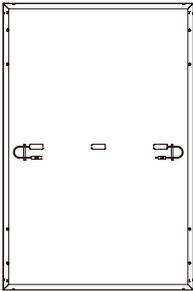
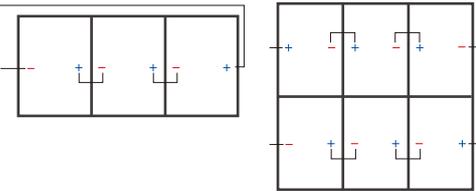
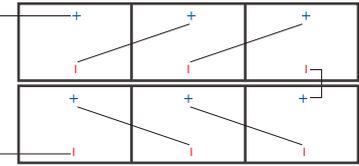


Figure 4.3.8-1 Axonometric drawing

4.3.9 Electrical Connections of PV Modules

4.3.9.1 Recommended Wiring Method

Junction Box Location Icon	Recommended Wiring Method
 <p data-bbox="635 1070 767 1122">Standard cable length: 1.2m</p>	<p data-bbox="847 510 1366 584">Vertical Installation: Standard Cable length (Note: An extension cord is required at the rotor head of the double row assembly and at the end of the single row.)</p>  <hr/> <p data-bbox="847 864 1374 938">Horizontal Installation: It is not recommended to install PV modules horizontally. If it is necessary to install PV modules horizontally, an extension line should be added.</p> 

The electrical performance parameters of the module were tested under standard test conditions, i.e., light intensity of 1000 W/m², AM 1.5, and ambient temperature of 25°C. In some cases, module may produce higher or lower voltage or current values than the rating. When the other modules of the PV system are rated voltage, conductor rated current, fuse size, and the specifications of the control module connected to the output of the solar module, the short-circuit current and open-circuit voltage values marked on the module are multiplied by a factor of 1.25.

All wiring should be performed by qualified installers in accordance with local regulations and procedures.



Please be aware that the number of PV modules in one string might be between 6 – 12.

4.4 Inverter installation

4.4.1 Determining the Installation Position

The Slenergy SL-D4-20KTR series inverters are designed with IP65 protection enclosure for in-door and outdoor installations. When selecting an inverter installation location, the following factors should be considered:

- The wall on which the inverters mounted must be able to withstand the weight of the inverter.
- The inverter needs to be installed in a well-ventilated environment.
- Do not expose the inverter directly to strong sunlight to prevent excessive temperature operation. The inverter should be installed in a place with shelter to prevent direct exposure to sunlight and rain.
- Install the inverter at eye level for easy inspection of screen data and further maintenance.
- The ambient temperature of the inverter installation location should be between -30°C and 60°C .
- The surface temperature of the inverter may reach up to 75°C . To avoid risk of burns, do not touch the inverter while it's operating and inverter must be installed out of reaching of children.

4.4.1.1 Installation location

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.



Figure 4-1 Recommended installation location

WARNING

Install the inverter in the same room of the original distribution box of the user, and the distance should be less than 10m between the inverter and the original distribution box.

Do not put flammable and explosive articles around the inverter.

Installation Angle Requirements

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

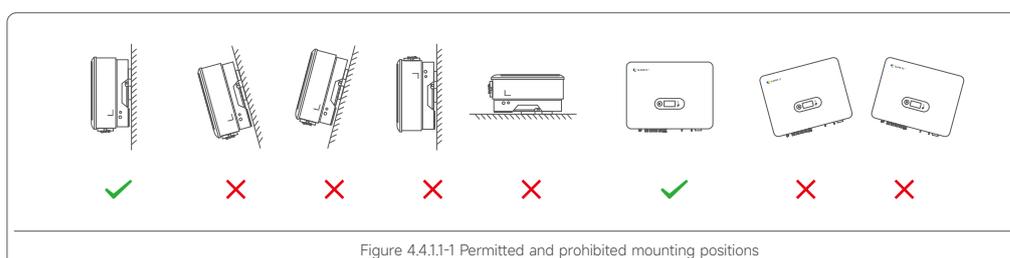


Figure 4.4.1.1-1 Permitted and prohibited mounting positions

4.4.2 Mounting the Inverter

4.4.2.1 Wall Bracket Installation

Dimensions of wall bracket (mm)

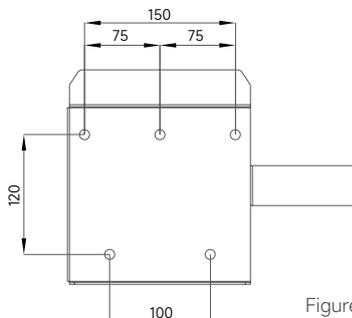


Figure 4.4.2.1-1 Dimensions of wall bracket

- Use the wall bracket as the template to mark the position of 5 holes on the wall.

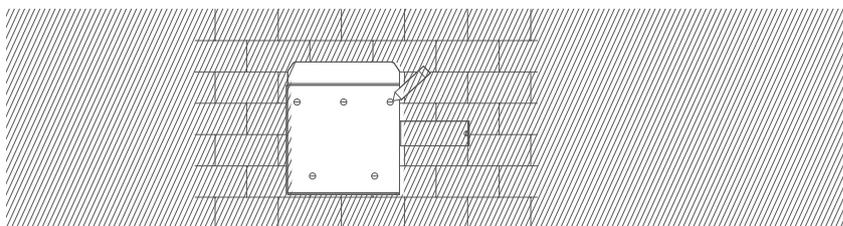


Figure 4.4.2.1-2 Marking hole position using installation bracket

- Use an electrical driller with 10mm diameter bit to drill 5 holes in the wall with 80mm depth.



Before drilling, make sure to avoid any buried water tube and electric wires in the wall.

- Insert the expansion tubes into the holes and tighten them, then fix the bracket onto the wall with expansion screws by using a cross screwdriver.

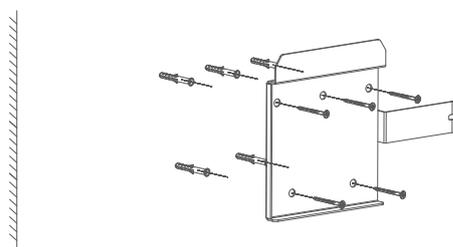


Figure 4.4.2.1-3 Fixing the wall bracket

4.4.2.2 Mounting the Inverter

Lift the inverter, hang the back rail on the fixed wall bracket carefully. Secure the inverter with M5 screws.

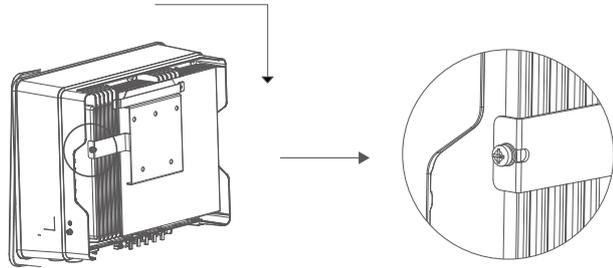


Figure 4.4.2.2-1 Mounting the inverter

4.4.3 External Ground Connection

Connect the inverter and ground bar through PE wire to achieve the purpose of grounding protection. Please always remember wiring the PE wire before wiring other wires.



Reliable grounding is good for resisting surge voltage shock and improving EMI performance. Inverters must be well-grounded.

For a system with only one inverter, just ground the PE cable. For a multi-inverter system, all inverters PE wire need to be connected to the same grounding copper bar to ensure equipotential bonding.

Ground terminal connection steps:

- The external grounding terminal is located in on the lower right side of the inverter.
- Fix the grounding terminal to the PE wire with a proper tool and lock the grounding terminal to the grounding hole in the lower right side of the inverter.

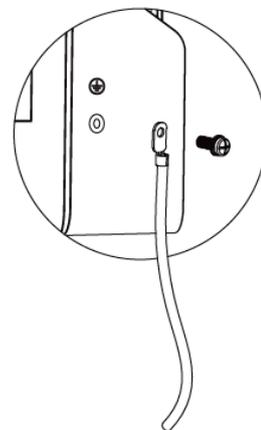
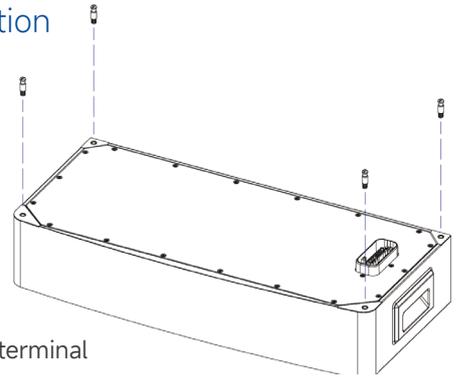


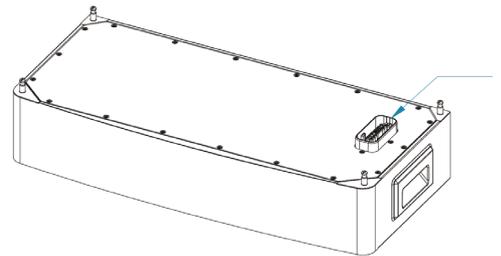
Figure 4.4.3-1 Grounding terminal connection

4.5.3 Slave Battery Installation

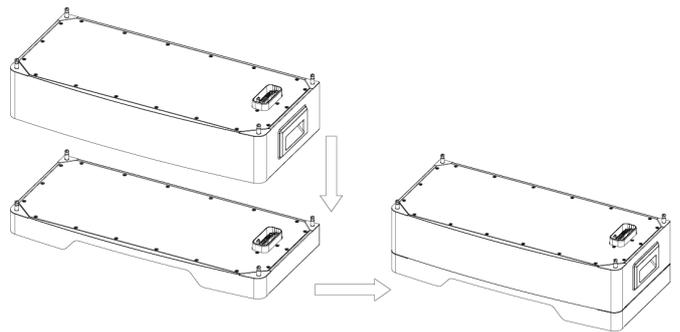
Install guide pins



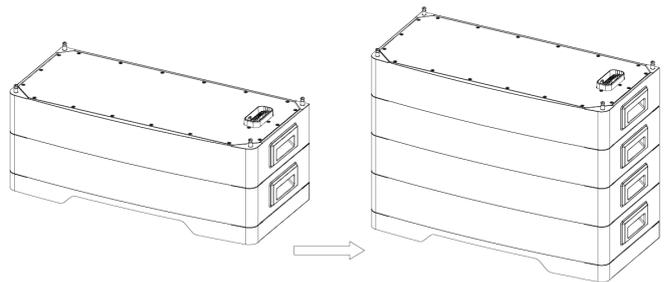
Peel off the protective film on the terminal



Align the battery box with the base as shown in the figure and install it, pay attention to the level and put it down slowly

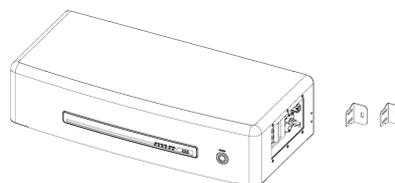


Follow the previous steps to install the slave batteries

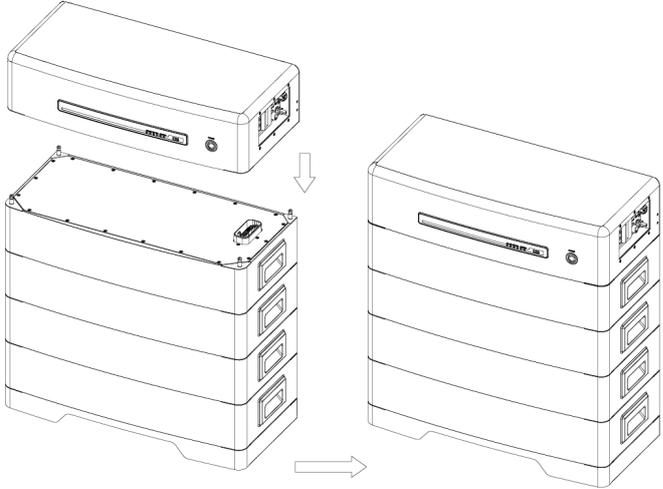


4.5.4 Install the Battery Control Box

Prepare the main control box and the required fixing parts for installation



As shown in the figure, align and install to the slave module horizontally and slowly.



4.5.5 Fix the Product

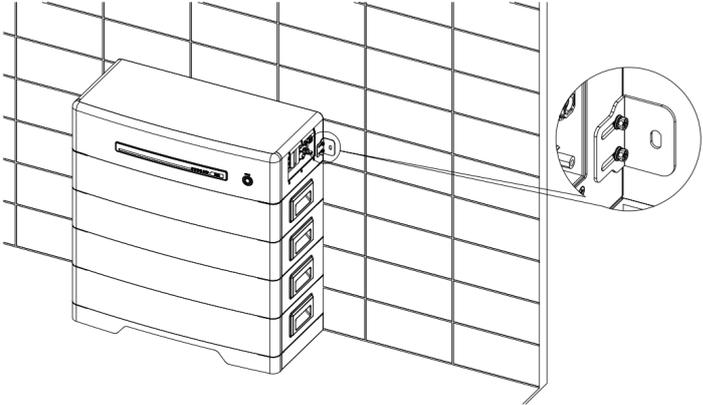
Prepare the fixing parts as shown in the picture.



First use the fixing parts to lean against the battery where there are screw holes, and mark on the wall.

Take off the fixing part, use a hole drill to punch holes on the wall according to the mark.

Install the fixing parts, as shown below.

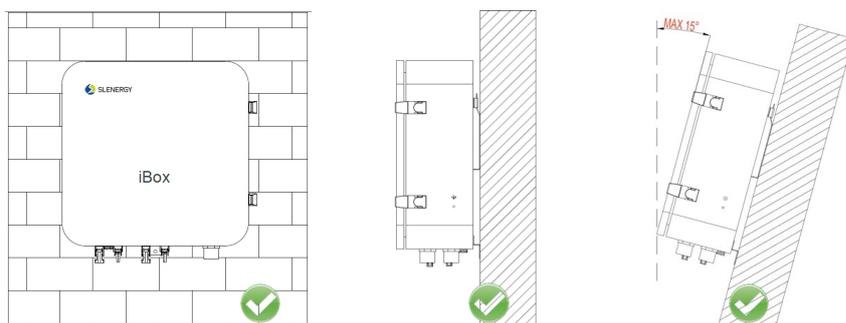


4.6 iBox installation

4.6.1 iBox installation



The iBox can only be installed indoor, far from heat sources.
The iBox should be bolted on the wall with a right angel like bellow.
The iBox should be installed under the following Installation tilts.



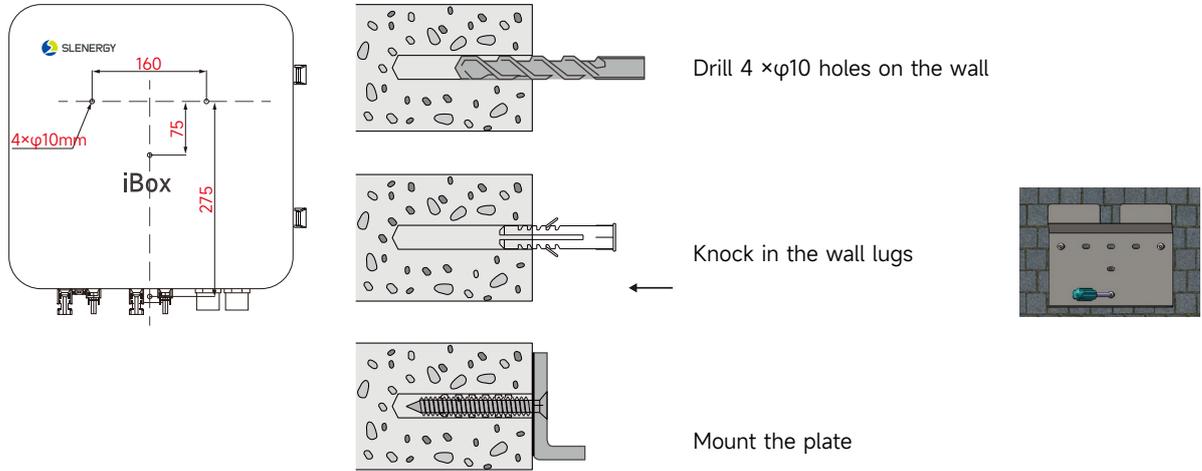
Right installation tilts



Wrong installation tilts

Figure 4.6.1-1 Installation tilts of the iBox

Step 1 Determine the installation positions for drilling holes, and mark the positions using a marker. Drill installation holes on the wall, knock in the wall lugs, mount the Mounting Plate-A. Four installation holes are needed, the distance between holes is like bellow:



Mark the position of 4 holes with Mounting Plate-A
 Figure 4.6.1-2 Drill holes on the wall and mount the Mounting Plate-A

Step 2 Install the Mounting Plate B&C onto the iBox enclosure.



Figure 4.6.1-3 Install mounting plate on the iBox

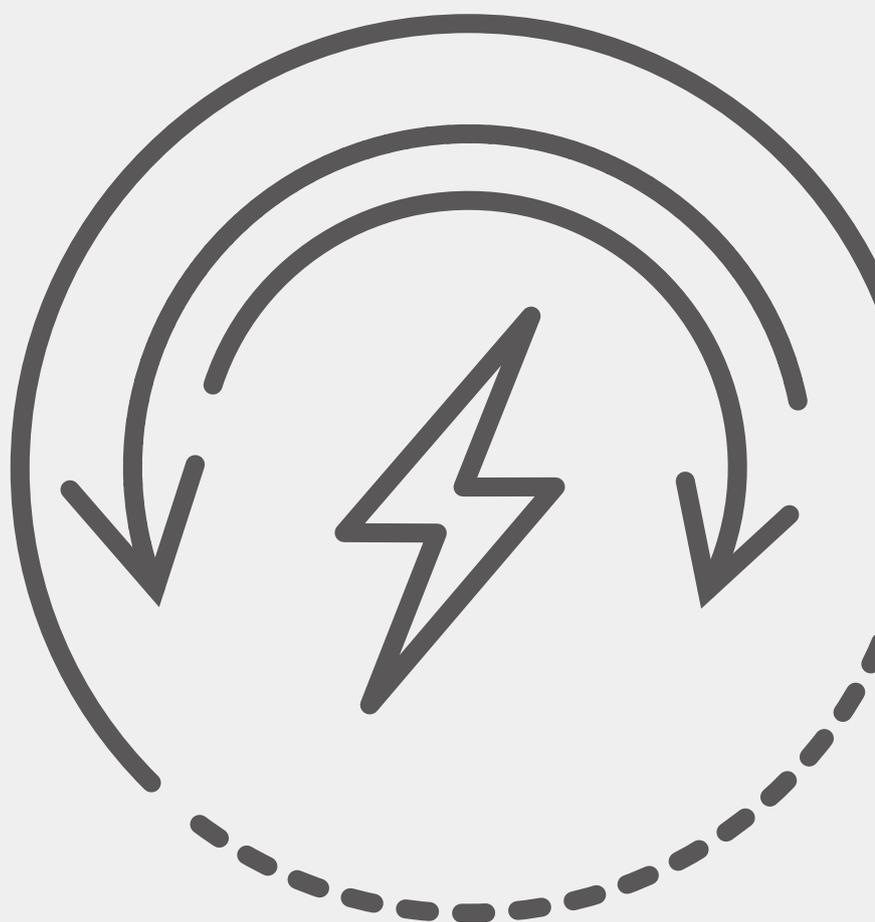
Step 3 Hung the iBox onto the back plate, and fasten the plate on the bottom.



Figure 4.6.1-4 Installed iBox, fasten the bottom ears

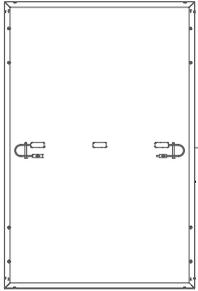
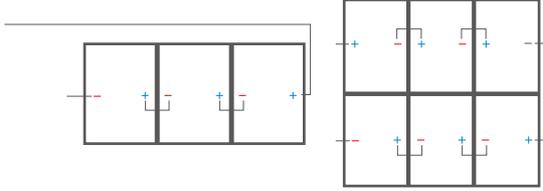
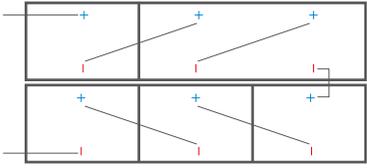
5

Electrical Connections



5.1 DC Electrical Connection

5.1.1 Electrical connections of PV modules

Junction Box Location Icon	Recommended Wiring Method
 <p data-bbox="612 1043 746 1099">Standard cable length: 1.2m</p>	<p data-bbox="847 483 1374 555">Vertical Installation: Standard Cable length (Note: An extension cord is required at the rotor head of the double row assembly and at the end of the single row.)</p>  <hr/> <p data-bbox="847 835 1374 907">Horizontal Installation: It is not recommended to install PV modules horizontally. If it is necessary to install PV modules horizontally, an extension line should be added.</p> 

The electrical performance parameters of the module were tested under standard test conditions, i.e., light intensity of 1000 W/m², AM 1.5, and ambient temperature of 25°C. In some cases, module may produce higher or lower voltage or current values than the rating. When the other modules of the PV system are rated voltage, conductor rated current, fuse size, and the specifications of the control module connected to the output of the solar module, the short-circuit current and open-circuit voltage values marked on the module are multiplied by a factor of 1.25. All wiring should be performed by qualified installers in accordance with local regulations and procedures.



3-6kW inverter: Please be aware that the number of PV modules in one string might be between 4 – 26

8kW: Please be aware that the number of PV modules in one string might be between 8– 26.

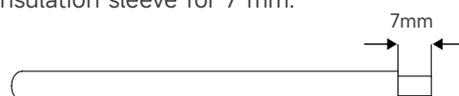
The optimal number of PV modules in one string is 18-20.

5.1.2.2 DC Connector

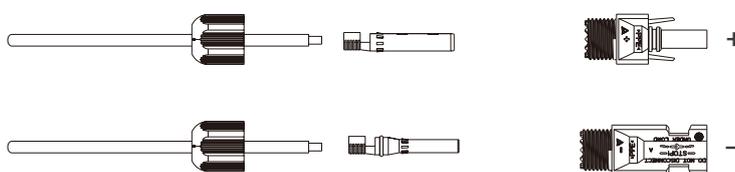


Before assembling the DC connector, make sure that the cable polarity is correct.

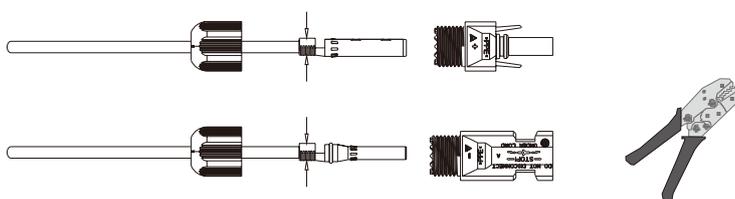
1 Peel off the DC cable insulation sleeve for 7 mm.



2 Disassemble the connector in the accessory bag.

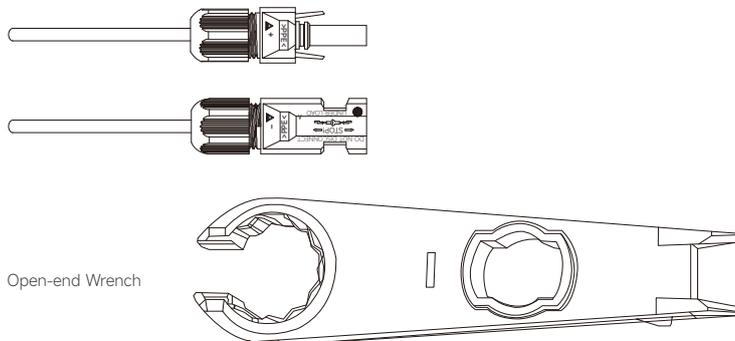


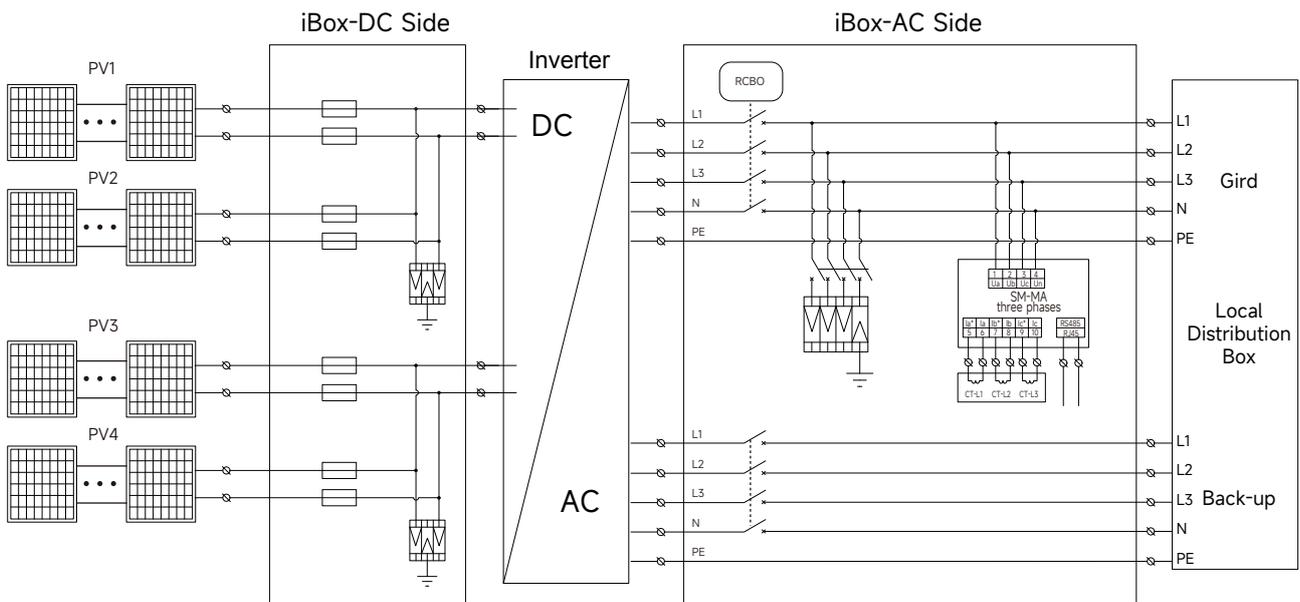
3 Insert the DC cable through the DC connector nut into the metal terminal and press the terminal with a professional crimping plier (pull back the cable with some power to check if the terminal is well connected to the cable).



4 Insert the positive and negative cables into the corresponding positive and negative connectors, pull back the DC cable to ensure that the terminal is tightly attached in the connector.

5 Use an open-end wrench to screw the nut to the end to ensure that the terminal is well sealed.

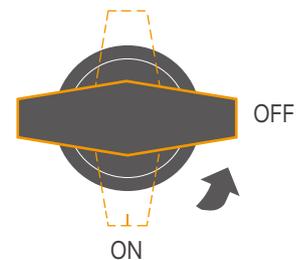




5.1.2.3 DC Connection

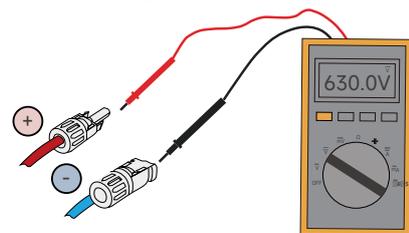
Rotate the DC switch to "OFF" position.

①



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.PV Max. Input voltage is 950V without battery, or 850V with battery, otherwise inverter will be waiting.

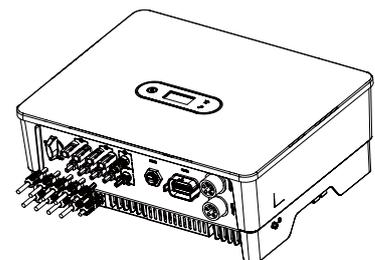
②



3) Insert the positive and negative connectors of H1Z2Z2-K 1×6mm² into the iBox PV input terminals respectively, a click sound should be heard if the terminals are well connected.

③

④



4) Insert the positive and negative connectors of UL11627 10AWG respectively from iBox PV output to inverter PV input.

④ Seal the unused PV terminals with the terminal caps.

5.2 AC Electrical Connections



A high voltage in the conductive part of the inverter may cause an electric shock. When installing the inverter, make sure that the AC and DC sides of the inverter are completely de-energized.

Do not connect the N-wire as a protective ground wire to the inverter casing. Otherwise, it may cause electric shock.



Do not ground the positive or negative pole of the PV string, otherwise it will cause serious damage to the inverter

Static may cause damage to the electronic components of the inverter. Anti-static measures should be taken during installation and maintenance.

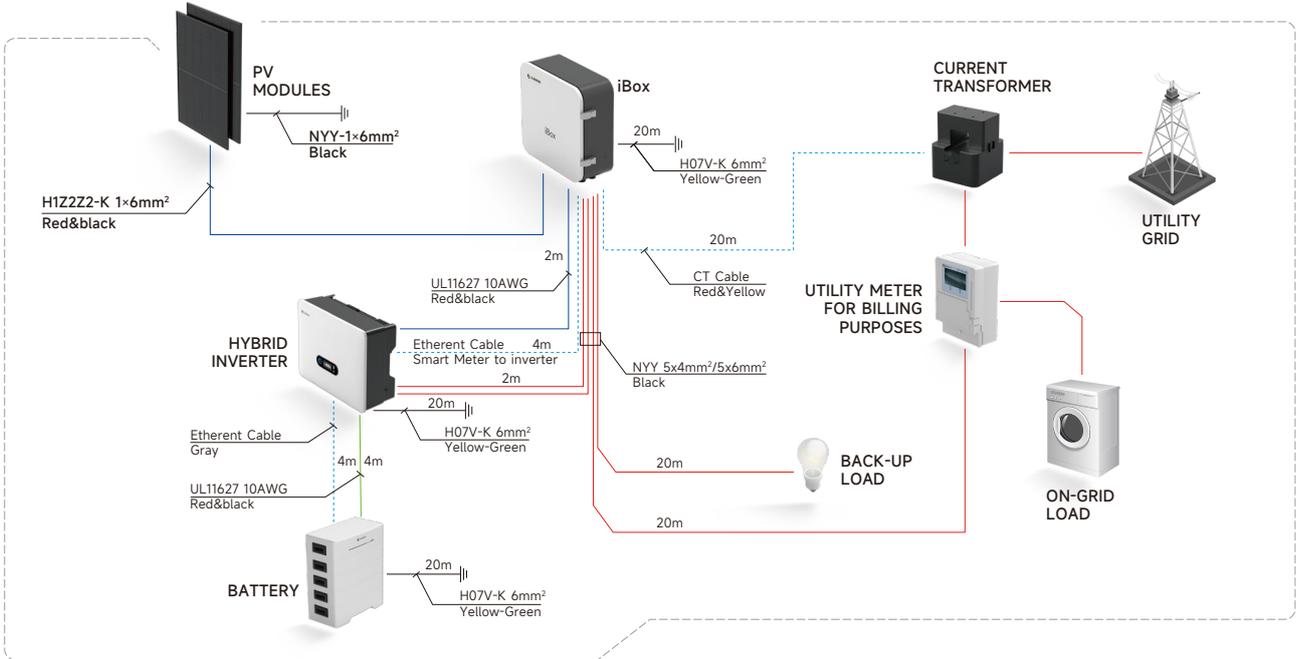


Do not use other brands or other types of terminals other than the terminals in the accessory package. Slenergy has the right to refuse all damages caused by the mixed-use of terminals.

Moisture and dust can damage the inverter, ensure the cable gland is securely tightened during installation. The warranty claim will be invalidated if the inverter is damaged as a result of a poorly connected cable connector.

5.2.1 Electrical Wiring Diagram

This diagram shows iShare SL-D4-20KTR series hybrid inverter wiring structure and composition, concerning the real project, the installation and wiring have to be in line with the local standards.



5.2.3 Monitoring Device Installation

Slenergy SL-D4~20KTR series hybrid inverter supports WIFI, LAN, and 4G communication. Plug the WIFI, LAN, or 4G module into the COM1 port in the bottom of inverter. A slight "click" sound during the installation represents that the assembly is in place.

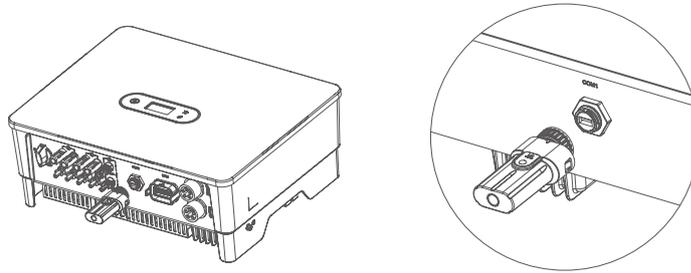


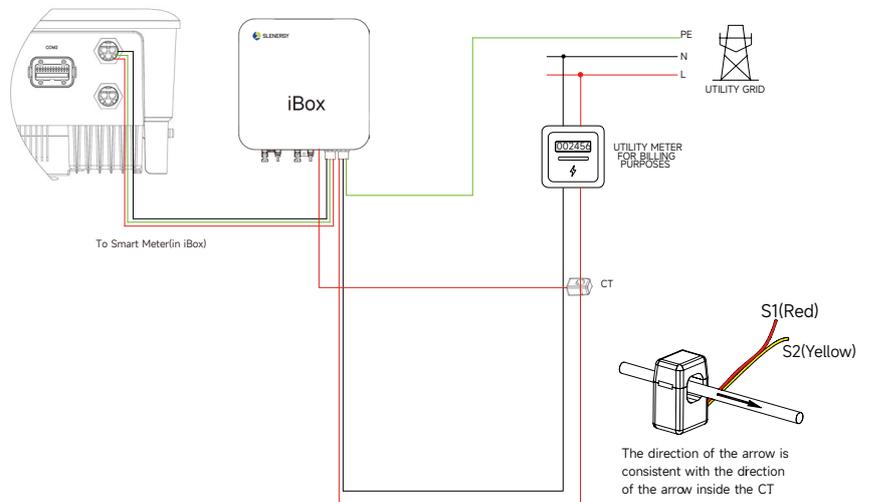
Figure 5.2.3-1 Monitoring device installation

5.3 Communication Connection

5.3.1 Meter and CT Connection

The current Transformer, also called CT, is usually installed on the L wires between the house loads and the power grid.

The Meter is installed in the iBox. CT cable with length of 20m, it can't be extended. Please follow the wiring diagram in the Meter to connect CT.



CT installation direction should strictly follow the instruction in the user manual, otherwise, the inverter may not be working normally. The CT has to be corresponding with the port in the meter, and the connection between CT and Meter needs to be reliable, otherwise, the CT measurement accuracy may be affected.

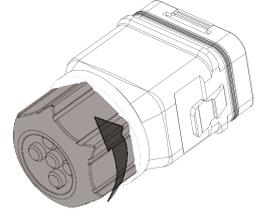
Meter terminals definition as shown in table below:

No.	Definition	Function
1	L	
2	/	L/N connect to grid to detect power grid voltage.
3	/	
4	N	
5	L-S1	
6	L-S2	
7	/	To detect the CT current and direction.
8	/	
9	/	
10	/	
11	PE	Ground Connection
	RS485-1	/
	RS485-2	Communicate with hybrid inverter

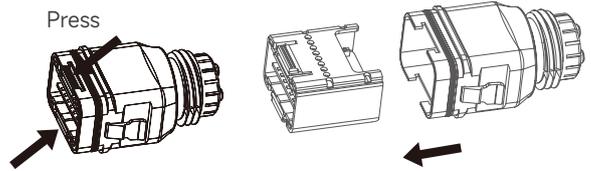
5.3.2 Inverter Communication Connection

5.3.2.1 Assembling the Multi-com Connector

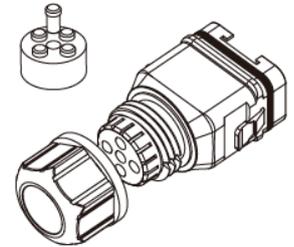
1. Unscrew the swivel nut from the connector.



2. Take out the terminal block.



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

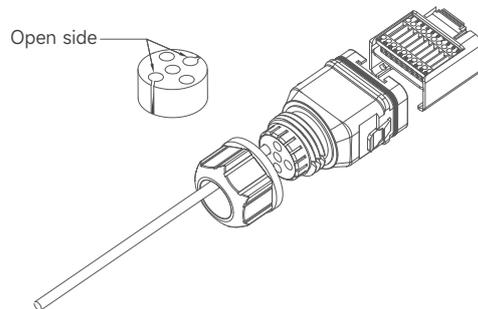


5.3.2.2 Connect the Meter And BMS Communication Cables

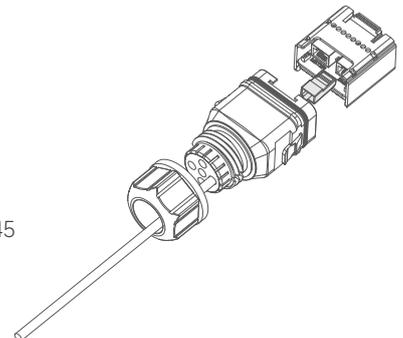


The communication between meter/BMS and inverter is RJ45 interface cable.

1. Thread the RJ45 plug of appropriate length through the swivel nut, and insert it into the open side of the rubber gasket.



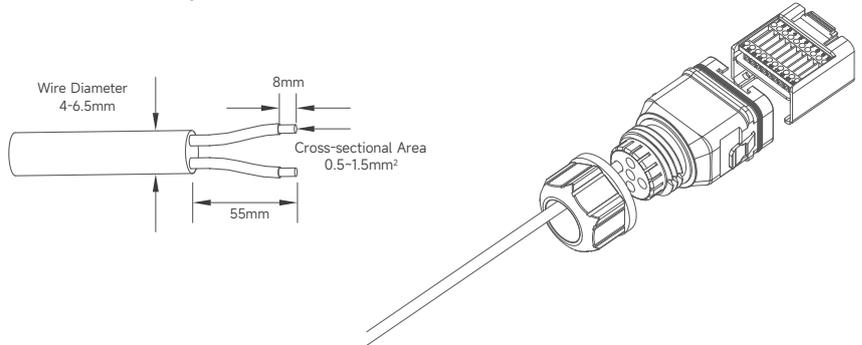
2. Insert one side of the RJ45 plug into the RJ45 port of terminal block.



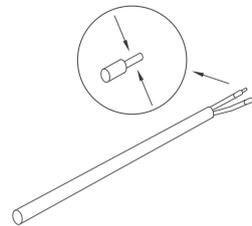
3. Insert another side of the communication cable into the meter RS485 port or BMS CAN port.

5.3.2.3 Connect Other Cables

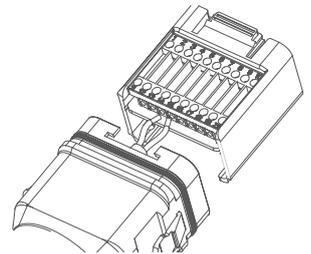
Thread the cable of appropriate length through the swivel nut and the housing. Remove the cable jacket and strip the wire insulation.



(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.

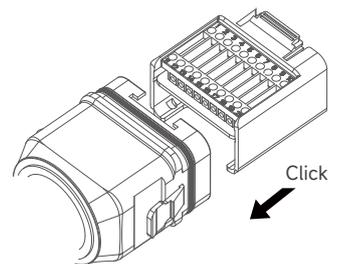


Fix all the wires to the terminal plug according to the assignment and tighten to a torque of $1.2 \pm 0.1 \text{ N} \cdot \text{m}$ with a screwdriver.



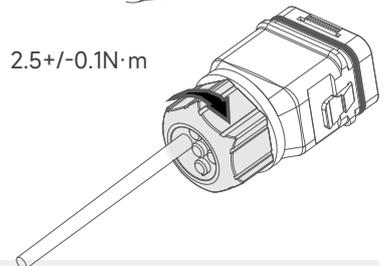
Pull the wires outward to check whether they are firmly installed.

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



Fasten the swivel nut.

$2.5 \pm 0.1 \text{ N} \cdot \text{m}$



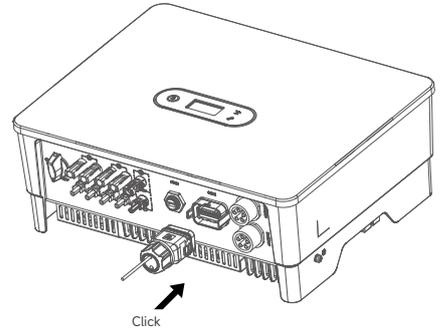


NOTICE

Connect Inverter COM2 Meter port to iBox RS485 port.

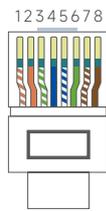
5.3.2.4 Installing the COM Connector

- Remove the waterproof lid from the COM terminal.
- Insert the COM connector into COM terminal on the bottom of the inverter until there is an audible click.



5.3.2.5 Meter and BMS Communication

RJ45 terminal connection sequence and definition as below.



No.	Color	Meter Side	Battery Side
1	Orange & White	/	RS485_A3
2	Orange	/	RS485_B3
3	Green & White	RS485_B2	/
4	Blue	/	CANH_B
5	Blue & White	/	CANL_B
6	Green	RS485_A2	/
7	Brown & White	RS485_B2	/
8	Brown	RS485_A2	/

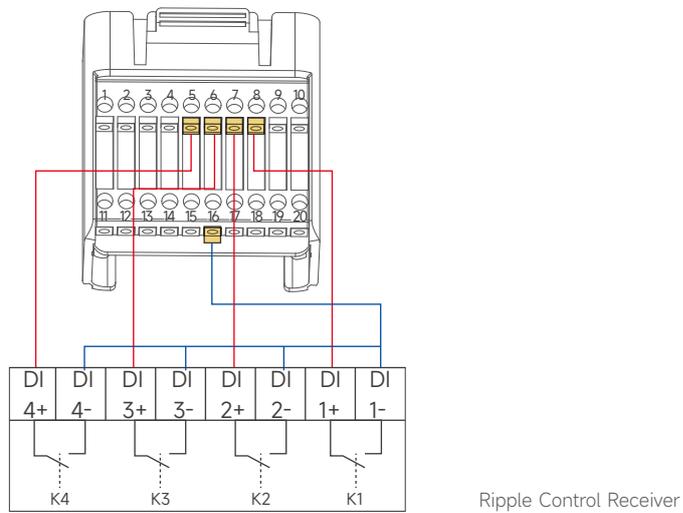
RJ45 terminal connection sequence and definition

RCR

RCR (Ripple Control Receiver) interface is special reserved for Germany and some other Europe-an country according to their safety regulation, and Slenergy doesn't provide the RCR device for the customer.

In Germany and some European areas, a ripple control receiver is used to convert a power grid dispatching signal to a dry contact signal. The dry contact is required for receiving the power grid dispatching signal.

RCR wiring diagram (hybrid inverter) as below:



RCR operation mode as shown in table below:

Switch mode (External RCR device)	Feed-in output power (in % of the Rated AC output power)
K1 turn on	100%
K2 turn on	60%
K3 turn on	30%
K4 turn on	0%
RCR priority: K1<K2<K3<K4	

5.3.2.7 Multifunction Relay

The inverter is equipped with a multifunction dry contact relay, which helps turn the loads on or off when an extra contactor is connected, or startup the diesel generator when the diesel generator startup signal is connected.

 **NOTICE** Maximum voltage and current at DO dry contact port: 230VAC 1A/ 30VDC 1A.

 **NOTE** For more installation and setup information, please contact Slenergy.

Load Control

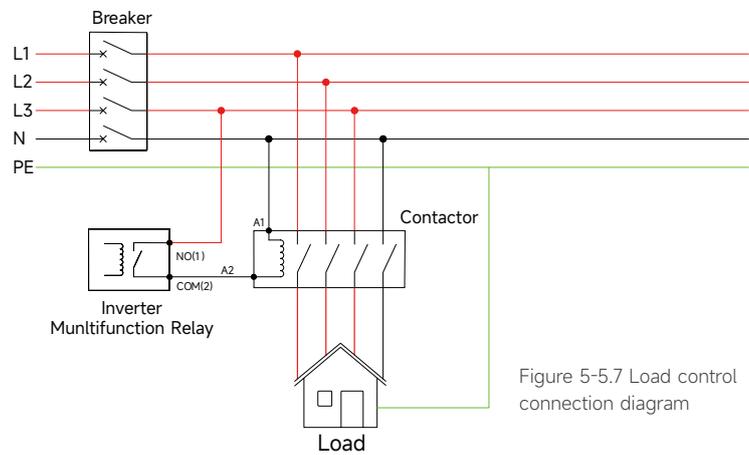


Figure 5-5.7 Load control connection diagram

 **NOTE** The AC contactor should be placed between the inverter and the loads. Do not connect the load to DO port directly. The contactor is not supplied by the Slenergy. Connect the load to the DO port of the inverter directly if the load is designed with a DI port. When the controlled load is connected to ONGRID, the contactor coil must also be connected to ONGRID. When the controlled load is connected to BACKUP, the contactor coil must also be connected to BACKUP.

Generator Control

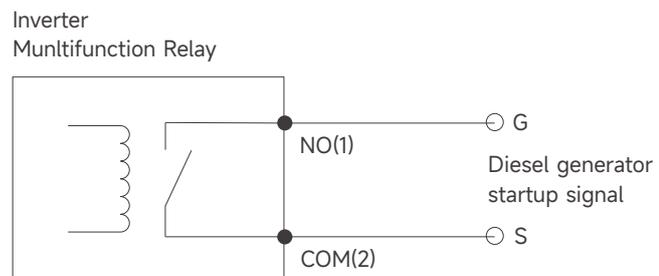
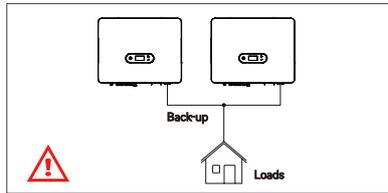


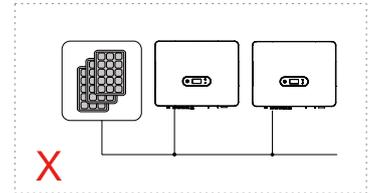
Figure 5-26 Generator Control connection diagram

When the "GEN signal" is active, the open contact (GS) will switch on (no voltage output).

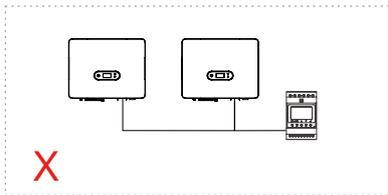
5.3.2.8 Parallel System



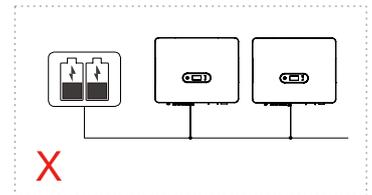
For the general version, back-up cannot connect in parallel. For advanced applications, please contact our after-sales department.



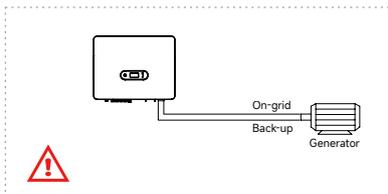
Single PV string cannot connect to multiple inverters.



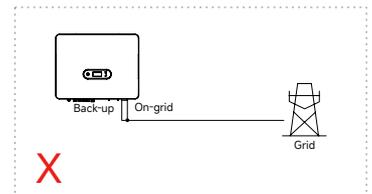
One meter cannot be connected to multiple inverters. Different CTs cannot connect to the same line cable.



One battery bank cannot be connected to multiple inverters.



The on-grid and back-up side cannot be connected to and generator directly. For advanced applications, please contact our after-sales department.



The back-up side cannot be connected on-grid side or grid.

 **NOTE** For more installation and setup information about parallel system, please contact Slenergy.

5.3.2.9 Fast stop

Slenergy SL-D4-20KTR hybrid inverter comes standard with fast stop function, and you can use this function by connecting an external switch into the fast stop interface if it requires in the installation place. The external switch doesn't include in our accessory box.

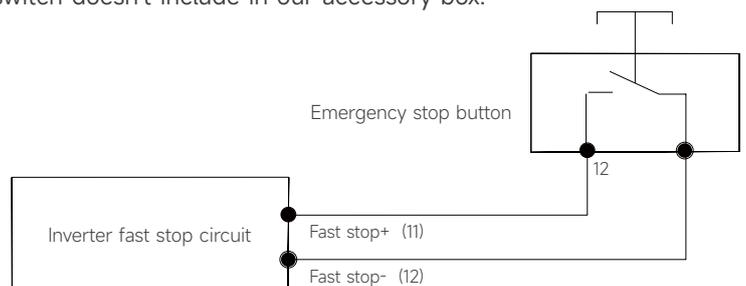


Figure 5-28 Fast stop connection diagram

5.3.3 EMS Communication

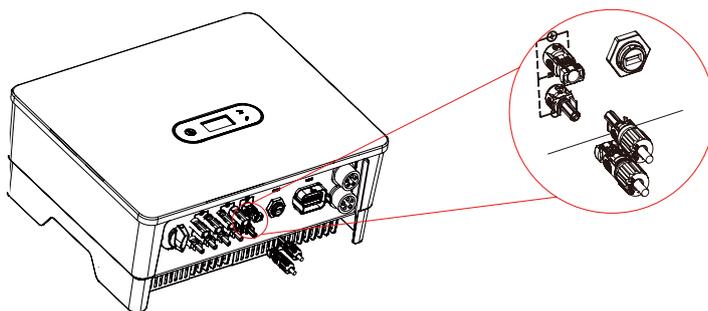
An EMS communication cable needs to be connected when to control the operation of a hybrid inverter through the EMS, and communication between EMS and inverter is RS485.

5.4 Power Cable of the Battery Connection

5.4.1 The following principles must be considered when making battery connection:

- 1 Disconnect the AC breaker on the grid side.
- 2 Disconnect the breaker on the battery side.
- 3 Turn the inverter DC switch to the "OFF" position.
- 4 Make sure the maximum input voltage of battery is within the inverter limitation.

Insert the positive and negative connector into the inverter battery terminals respectively, and a "click" sound represents the assembly in place.



6

Commissioning



6.1 Check Before Power-On

Table 6.1-1 Installation checklist



Please check the installation again before turning on the system.

No.	Check Item	Acceptance Criteria
1	Cable layout	Cables are routed properly as required by the customer.
2	Cable tie	Cable ties are secured evenly, and no burr exists.
3	Grounding	The grounding cable is connected correctly, securely, and reliably.
4	Turn off the switches	The DC SWITCH and all the switches connected to the inverter are set to OFF.
5	Cable connections	The AC output power cable and DC input power cable are connected correctly, securely, and reliably.
6	Unused terminals and ports	Unused terminals and ports are locked by watertight caps.
7	Installation environment	The installation space is proper, and the installation environment is clean and tidy, without foreign matter.

6.2 App Preparation

- 1 Install the Local configuration App and Cloud monitoring App with latest version. Refer to "8.1.2 Cloud monitoring App and 8.1.3 Local configuration App".
- 2 Register an account on the Cloud monitoring App. If you have got the account and password from the distributor/installer or Slenergy, skip this step.

6.3 Inspection Before Commissioning

Check the following items before starting the inverter:

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

6.4 Commissioning Procedure

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

- 1 Turn on the AC breaker.
- 2 Turn on the lithium battery switch. Power on the battery pack manually if a battery is equipped.
- 3 Turn on the DC switch, the DC switch may be integrated in the inverter or installed by the customer.
- 4 The inverter will work properly after turning on the DC and AC breakers on the condition the weather and grid meet requirements. The time for entering the operating mode may vary according to the chosen safety code.
- 5 Observe the LED indicator to ensure that the inverter operates normally.
- 6 After the inverter is started, please refer to the [QUICK USE GUIDE] which is attached to the access to configure the inverter.



NOTE

- If the inverter does not work properly, check the country code and battery ID Settings.
- Select the safety code suitable for the country (region) where the inverter is installed at.
- Select the battery ID suitable for the battery is installed.

CT AUTO TEST FUNCTION

SL hybrid inverter has the function of detecting the installation direction and phase sequence of CT. The system is installed, this function can be enabled on the APP for detection.



NOTICE

SOC RESET FUNCTION

When the inverter is turned on for the first time, the battery will be automatically charged to calibrate the battery SOC. After the battery is charged, this function will be turned off automatically (If you confirm that it is not necessary, you can manually turn off the function. We recommend to enable this function.)

If you need to calibrate the SOC during system use, you can manually enable the function to calibrate the battery SOC on app or inverter screen. After the battery is fully charged, the function is automatically disabled again.

6.5 Stop the Inverter

When turning off the inverter, please follow the steps below:

- 1 Shut down the inverter through the APP or the button on the display first.
- 2 Disconnect the breakers on the grid and load side.
- 3 Turn off the battery switch, and disconnect the DC breaker on the battery side (if any).
- 4 Wait 30 seconds and then turn the inverter DC switch to the "OFF" position. At this time, there is remaining power in the inverter capacitor. Wait for 10 minutes until the inverter is completely de-energized before operating.
- 5 Disconnect the AC and DC cables.

7

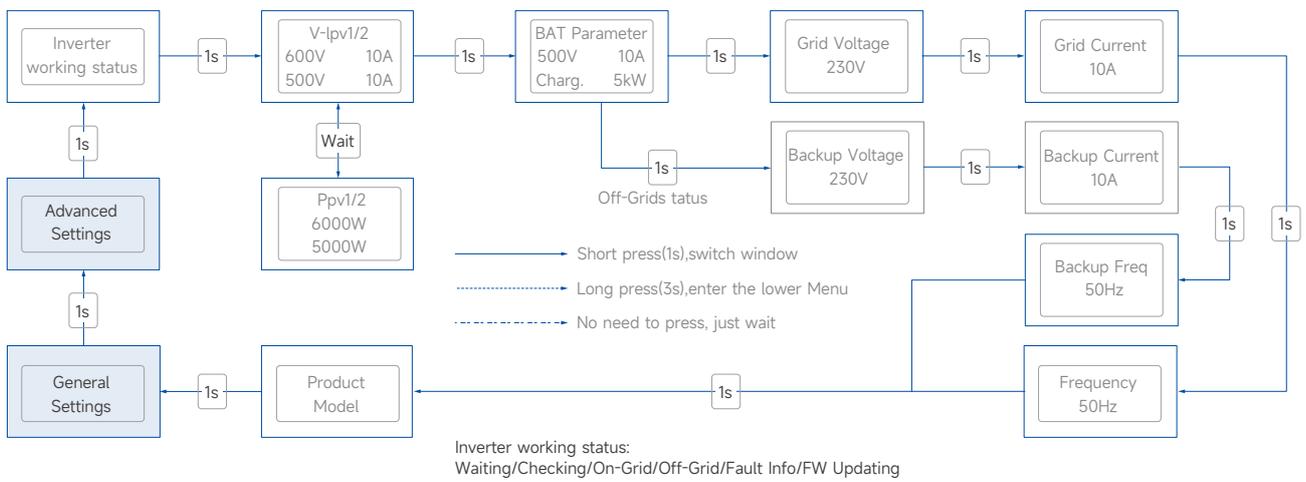
Operation



When the inverter is turned on, the following interfaces will be displayed on the OLED display, and the OLED display allows the user to check various operation information and to modify the settings of the inverter.

NOTE If the parameter is a number short press to change the number, long press to confirm the number and jump to the next number. Please wait for 10 seconds and the inverter will automatically save your settings or modifications.

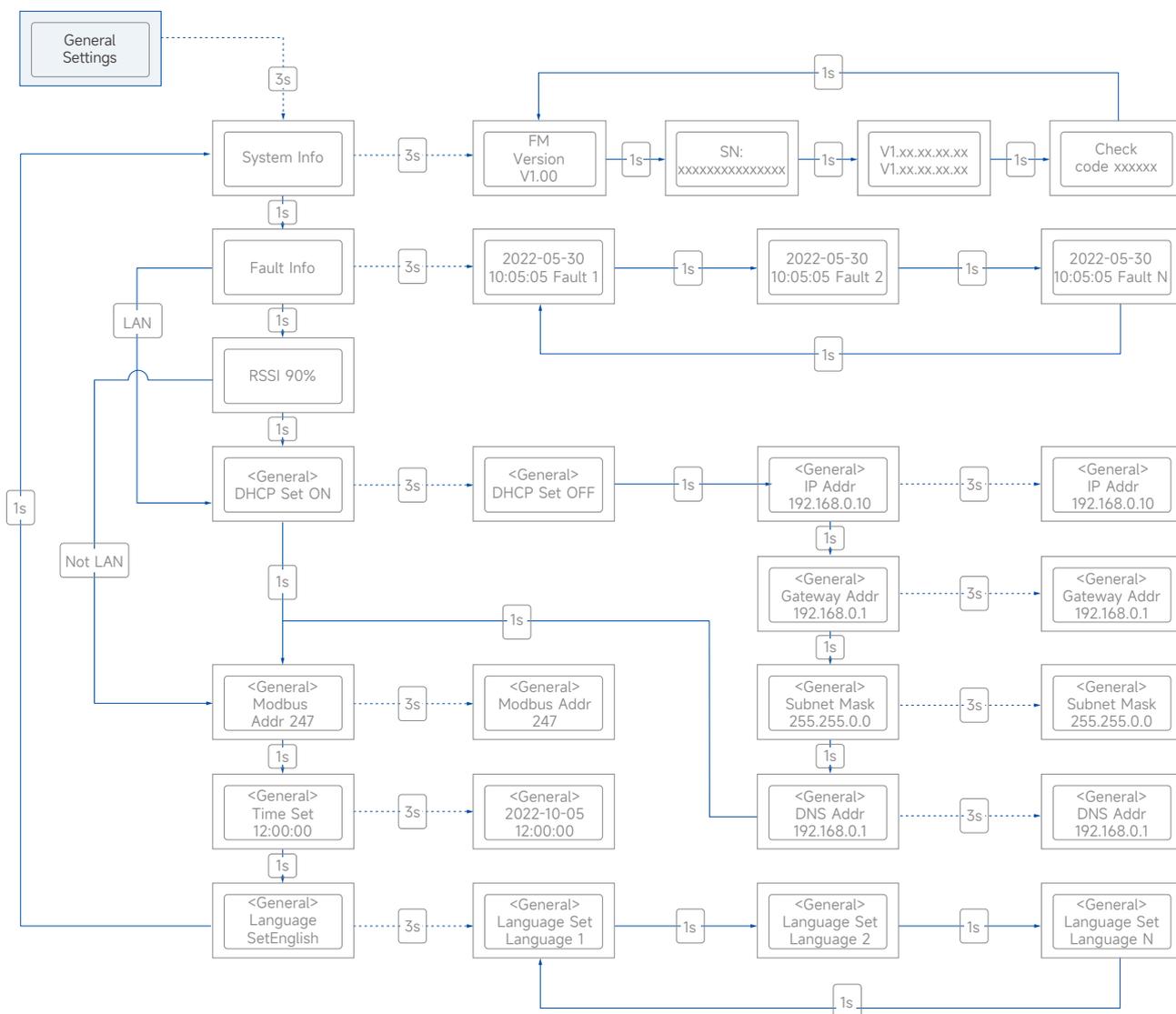
7.1 Main Window



Inverter Display Abbreviation and Complete Name Reference Table

Abbreviation	Complete Name
V-lpv1/2	PV input voltage and current of each MPPT
Ppv1/2	PV input power of each MPPT
BAT Parameter	Battery Parameter
Charg.	Charge
Dischg.	Discharge
Backup Freq	Inverter output Frequency (Off-Grid status)
FW Updating	Firmware Updating

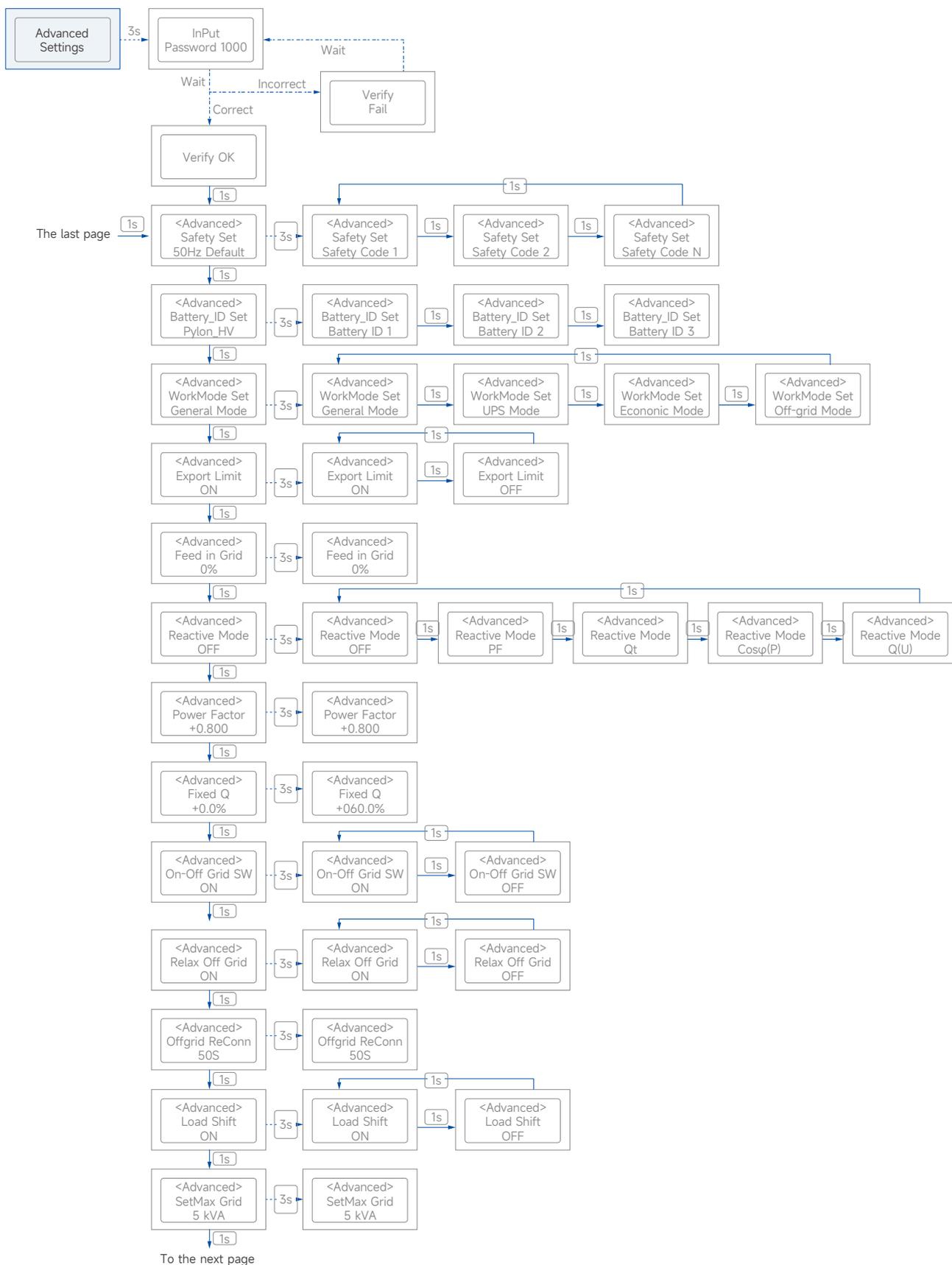
7.2 General Setting



Inverter Display Abbreviation and Complete Name Reference Table

Abbreviation	Complete Name
System Info	System information
FM Version	Firmware version
SN	Series number
Fault Info	Fault information
RSSI	Received signal strength indicator
DHCP Set	Enable or disable DHCP functionality
IP Addr	If DHCP is turned off, set the static IP address
Gateway Addr	If DHCP is turned off, set the Gateway IP address
Subnet Mask	If DHCP is turned off, set the subnet mask
DNS Addr	If DHCP is turned off, set the domain name server address
Modbus Addr	Modbus address

7.3 Advanced Setting





Inverter Display Abbreviation and Complete Name Reference Table

Abbreviation	Complete Name
Safety Set	Select the code that meet local regulatory requirements
Battery_ID Set	Select the battery model
Work Mode	Current work mode / work mode setting
Export Limit	On-grid export limit function switch
Feed in Grid	Set the percentage of the power that is allowed to feed to the grid
Reactive Modes	Reactive Power Mode
PF	"Under ""Reactive Mode" "The reactive power can be regulated by the parameter PF (Power Factor)."
Qt	"Under ""Reactive Mode" "The reactive power can be regulated by the parameter Q-Var limits (in %)."
Cosp(P)	"Under ""Reactive Mode" "The PF changes with the output power of the inverter."
Q(U)	"Under ""Reactive Mode" "The reactive power changes with the grid voltage"
Fixed Q	The reactive power ratio when the "Reactive Mode" is Qt.
On-Off Grid SW	Off-grid function switch (If turn it on, the inverter will automatically switch to off-grid mode to ensure the back-up side power supply when the grid is abnormal or off, otherwise, there is no output on the back-up side)
Relax OffGrid	Reduce the switching sensitivity of the On/Off-grid (applied to the places where the grid is unstable or inverter always entered off-grid mode for some reasons)
Offgrid ReConn.	When inverter is operating without grid, it will stop backup output after overload protection, and restart within the set time.
Load Shifting	Peakload shifting function switch
SetMaxGrid	Set max allowed power from grid (under the condition of Peakload Shifting is on)
OnGrid SocProt.	On-grid battery SOC (State of Charge) Protection
OnGrid EndSOC	End-of-discharge SOC of on-grid
OffGrid SocProt.	Off-grid SOC Protection
OffGrid EndSOC	End-of-discharge SOC of off-grid
Unbalan. Output	3-Phase Unbalanced Output Switch when inverter work on On-grid state



Abbreviation	Complete Name
System Maint.	System maintenance, includes inverter stop and run, system restart
Multi-INV Role	In the multi-inverter parallel system, set the role of one inverter as the master and the other inverter as the slave.
SOC Reset	If turned it on, the battery will be automatically charged to calibrate the battery SOC. After the battery is charged, this function will be turned off automatically
MPPT Parallel	If MPPT is connected in parallel, enable this function.
Max Output Set	Select the maximum AC output power. Rated, Max. output power=Rated output power on the datasheet. Overload, Max. output power= Max. output power on the datasheet. Limit, Max. output power < Rated output power on the datasheet.
Export Control	In the power export limit on mode, when the communication between the inverter and meter or the inverter and datalogger is interrupted, select the inverter operation mode from one of the follows: Hard, inverter stops; Soft, inverter generates power as the "Feed in Grid" value set on the screen
N-PE Check	The N and PE shorting function on the BACK-UP side in the off-grid operation status.
CommsWatchDog	When the function is turned on, the inverter stops working when communication with the master is lost.

7.4 Country Code (Safety Code) Setting

Please set "Country code (Safety code)" under the menu "Safety Set" in "Advanced Settings". Refer to "7.3 Advanced Setting" for more information.

7.5 Auto-Test

This function is disabled by default, and will be only functional in the safety code of Italy. Short press the button several times until "Auto Test CEI 0-21" displays on the screen, press and hold the button 3 seconds to activate "Auto Test". After the auto test is finished, short press the button several times until the screen displays "Auto Test Record", and hold the button 3 seconds to check the test results.

The auto test will start when the correct test item is selected, and the test result will be displayed on the screen when it finished. If the test was successful, it will display "Test Pass", otherwise will display "Test Fail". After each item tested, the inverter will reconnect to the grid and automatically start the next test according to the requirements of CEI 0-21.

Connect the AC cable, auto test will start after the inverter connected to the grid, see the operation steps below:

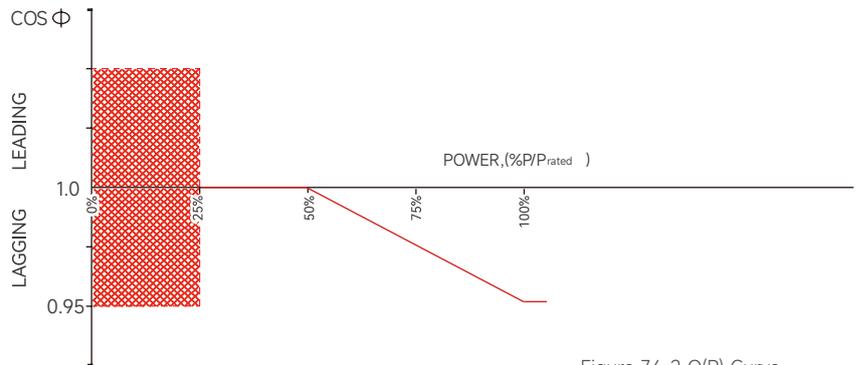


Figure 7.6-2 Q(P) Curve

Q(U) - Mode

The reactive power output of the inverter will vary in response to the grid voltage. “Q(U)” Mode Parameter Descriptions :

Parameter	Explanation	Range
Hysteresis Ratio	Voltage hysteresis ratio on the Q(U) mode curve	0 ~ 5%
QU_V1	Grid voltage limit at P1 on the Q(U) mode curve	80% ~ 100%
QU_Q1	Value of Q/Sn at P1 on the Q (U) mode curve	-60% ~ 0
QU_V2	Grid voltage limit at P2 on the Q(U) mode curve	80% ~ 110%
QU_Q2	Value of Q/Sn at P2 on the Q (U) mode curve	-60% ~ 60%
QU_V3	Grid voltage limit at P3 on the Q(U) mode curve	100% ~120%
QU_Q3	Value of Q/Sn at P3 on the Q (U) mode curve	-60% ~ 60%
QU_V4	Grid voltage limit at P4 on the Q(U) mode curve	100% ~120%
QU_Q4	Value of Q/Sn at P4 on the Q(U) mode curve	0 ~ 60%
QU_Enter-Power	Active power for Q(U) function activation	20% ~ 100%
QU_Exit-Power	Active power for Q(U) function deactivation	1% ~ 20%
QU_Enable-Mode	Unconditional activation/deactivation of Q(U) function	Yes/No/Yes, Limited by PF

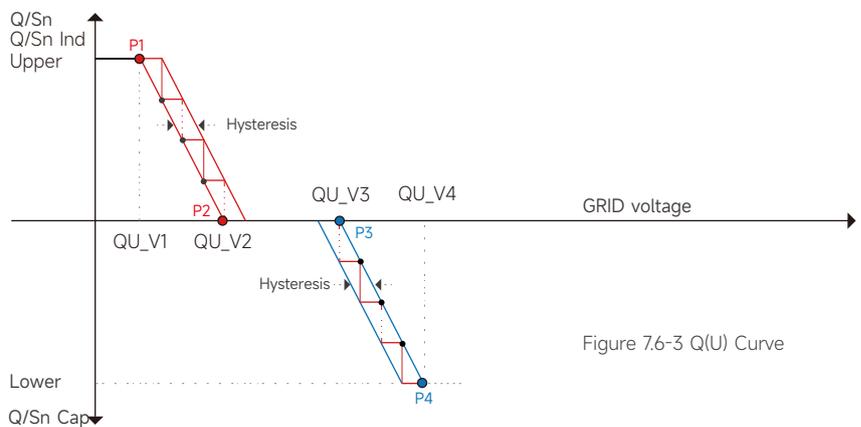
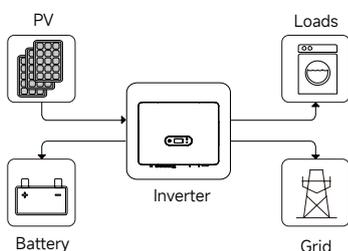


Figure 7.6-3 Q(U) Curve

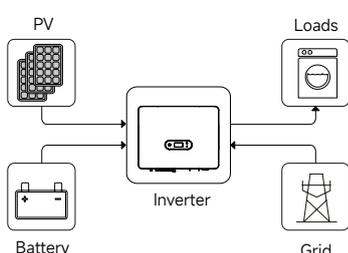
7.7 Operation mode

General Mode



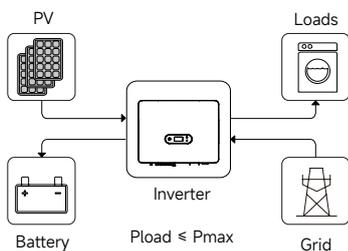
In this working mode, when the power from the PV array is sufficient, PV power will supply the loads, battery, and grid in the order of loads first, battery second, and grid last.

(You can set the power to the grid to 0W when the local grid doesn't allow inverter power to feed to the grid).



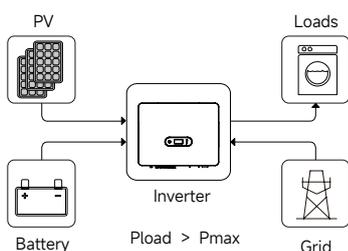
When the PV power is insufficient, the battery will discharge to supply loads, and the grid will join in if the battery is not enough to supply loads.

Peak load Shifting (Load Shifting)



Set the maximum power Pmax (kVA) contracted with the grid.

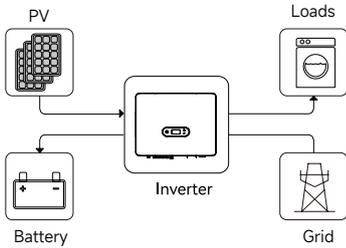
When the load consumption is less than the Pmax, the PV will charge the battery first, and the grid supplies the load. When the battery is full, PV will supply the load together with the grid, but the battery doesn't.



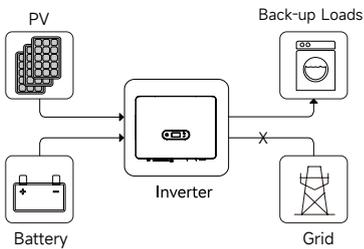
When the load consumption exceeds the Pmax, the inverter will take power from the battery and PV to supply power to the load to compensate for the power that exceeds the Pmax.

*To realize the "Peak load Shifting" function, the load power that exceeded Pmax has to be within the inverter max output power, otherwise, the inverter will only output the max power which allowed.

Economic Mode

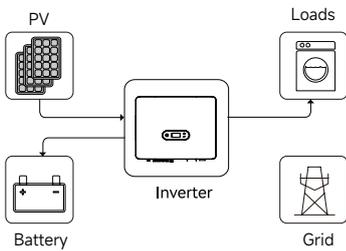


In this working mode, you can set charge/discharge power and time in the App, inverter will use the power from PV or grid (whether to use can be set in the App) to charge the battery in the predetermined period.

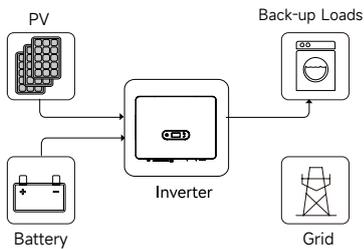


Inverter will use power from PV and battery to supply loads in the predetermined period and the insufficient part will be supplied by the grid.

Off-grid Mode



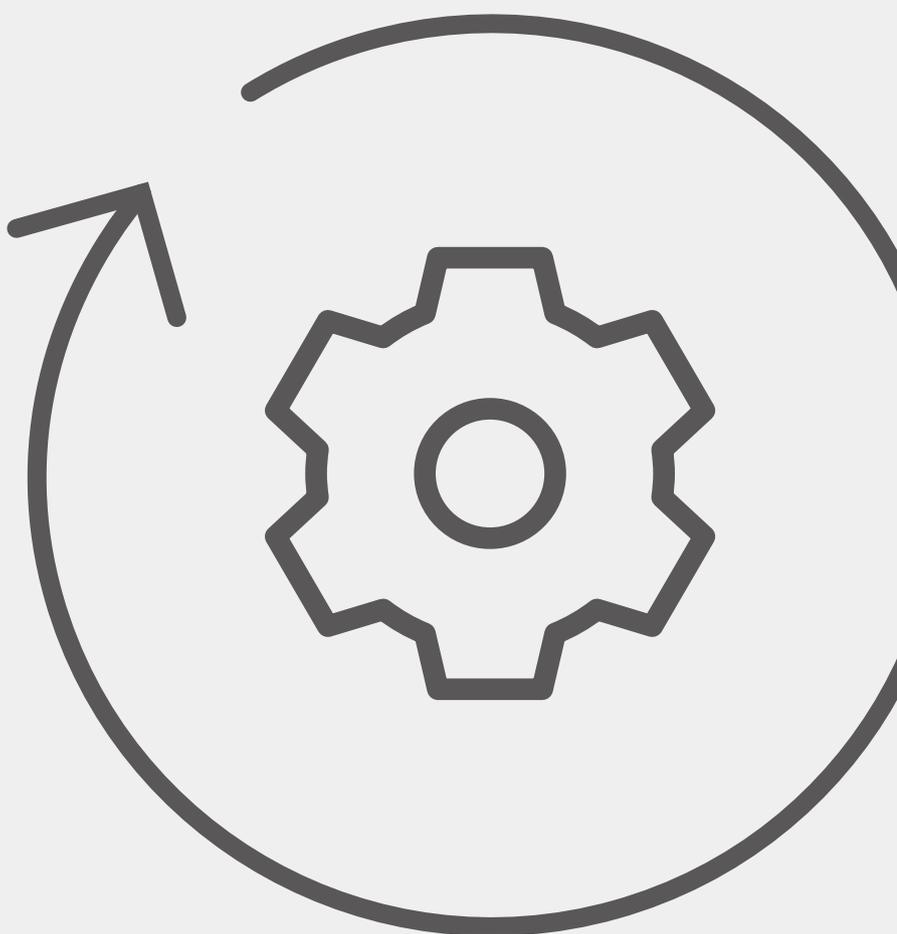
In the purely off-grid mode, power from PV will supply the back-up loads first and then charge the battery if there's surplus power.



When the power from PV isn't enough, the battery will discharge to supply back-up loads together with PV.

8

Monitoring



8.1 Inverter Monitoring

8.1.1 Monitoring Device

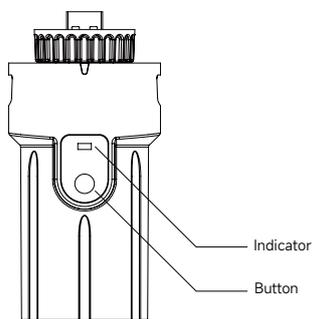


Figure 8.1.1-1
Monitoring device display interface

Indicator Status	Description
Off	Connection abnormal
Always On	Communicate with the server normally
Slow flashing	The monitoring device is not connected to the router or is not connected to the base station.
Quick flashing	The monitoring device is connected to the router or connected to the base station but not connected to the server.

Button	Description
Press 1 second	Reset device, the indicator goes off for 2 seconds, then flashes normally.
Press 5 seconds	Restore factory default settings, the indicator goes off for 2 seconds, then flashes once every 2 seconds, until the factory restore is completed.

NOTE The WiFi module needs to be configured to the router for the first installation. If the router name or password are changed, the WiFi devices will need to be reconfigured. For details, please refer to the [QUICK USE GUIDE] which is attached to the accessory bag.

If DHCP is enabled on the router, the LAN version module does not need to be configured. Otherwise, please refer to the [QUICK USE GUIDE] which is attached to the accessory bag.

8.1.2 Cloud monitoring App

Slenergy inverter provides a monitoring port that can collect and transmit data from the inverter to Slenergy monitoring platform via an external monitoring device. Please refer to the product nameplate on side of enclosure to get the monitoring application. If download issues exist, contact your dealer or Slenergy technical support.

8.1.3 Local configuration App

Local configuration App is designed for quick configuration of Slenergy hybrid inverters, offering features such as safety code, battery brand and type, work modes, and off-grid application settings through WiFi direct connection, etc.

Please refer to the product nameplate on side of enclosure to get the application. If download issues exist, contact your dealer or Slenergy technical support.

8.2 Battery LED indication

LED status

Battery Status	Protection, alarm normal	LED status		Capacity				Description
		RUN	ALM	●	●	●	●	
Off		Off	Off	Off	Off	Off	Off	ALL OFF
On	Normal	Flash 1	Off	Based on capacity				No charging or discharging
	Warning	Flash 1	Flash 3					PACK low voltage
Charge	Normal	ON	Off	Based on capacity, the highest level LED flashes (flash 2), the other SOC lights is on all the times.				
	Warning	ON	Flash 3					
	Over Charge	On	Off	On	On	On	On	Stop charging
	Over Temp/Current Failure	Off	ON	Off	Off	Off	Off	
Discharge	Normal	Off	Flash 3	Based on capacity, the highest-level LED flashes, the other SOC lights is on all the times.				
	Warning	Flash 3	Flash 3					
	Over Discharge	Off	Off	Off	Off	Off	Off	Stop discharging
	Over Temp/Current Failure	Off	On	Off	Off	Off	Off	
Failure		Off	On	Off	Off	Off	Off	Stop charging and discharging

SOC status

Status	Charge				Discharge				
	L1	L2	L3	L4	L1	L2	L3	L4	
Capacity	0~25%	Flash 2	Off	Off	Off	On	Off	Off	Off
	25%-50%	On	Flash 2	Off	Off	On	On	Off	Off
	50%-75%	On	On	Flash 2	Off	On	On	On	Off
	75%-100%	On	On	On	Flash 2	On	On	On	On
Run	On					Flash 3			

Flash description: Flash 1: 0.25s on/3.75s off

Flash 2: 0.5s on/0.5s off Flash 3: 0.5s on/1.5s off

9

Maintenance & Troubleshooting



9.1 Maintenance and troubleshooting of PV modules

Module need to be inspected and maintained on a regular basis, especially during the warranty period. The following maintenance measures are recommended to ensure optimal performance of the module:

9.1.1 Visual inspection

- It is recommended to perform a preventive inspection for 6 months without replacing the module of the module. If electrical or mechanical performance inspection or maintenance is required, it is recommended that qualified personnel perform the operation to avoid electric shock or personal injury.
- The borderless single glass corner protector is used as the transportation protection part, and the appearance control is not performed. The customer chooses to disassemble or retain it.
- Check if the module glass is damaged.
- Confirm if there is a sharp object touching the surface of the module.
- Check if the module is blocked by obstacles or foreign objects.
- Check if the module terminals are disconnected.
- Confirm the rupture caused by unmanned surface of the module.
- Check the fixing screws between the module and the bracket for looseness or damage, and adjust or repair them in time.

9.1.2 Connector and cable inspection

- It is recommended to perform a preventive check every 6 months and check all cables to verify that they are securely connected; Avoid directing the cable from direct sunlight and away from the water. Keep the connector dry and clean. Make sure the connector's nut is tightened before connecting. Do not connect the connector while the connector is wet, dirty, or otherwise.
- Check the sealant at the junction box for cracks, gaps, and signs of aging of the PV modules. This includes possible rodent damage, weathering, and the tightness and corrosion of all connectors. Check that the modules are well grounded
- It is recommended that the torque of the terminal bolts and all aspects of the wiring be checked at least once a year. Also, check that the installed hardware is securely in place. Loose connections can cause arcing and electric shocks that can damage the array.

9.1.3 Cleaning

The accumulation of dust in the air on the glass surface of the assembly reduces its power output and performs cleaning as often as possible (as for the frequency of cleaning, depending on the conditions at the installation site). Wipe the PV module with a dry or damp soft and clean cloth when cleaning. Do not use corrosive solvents or wipe the PV module with a hard object.

- Under no circumstances should the surface be cleaned with a rough surface.
- The back of the assembly usually does not need to be cleaned. However, when it is deemed necessary to clean it, avoid using any sharp objects that may cause damage or penetrate the substrate material.
- Do not attempt to clean PV modules that have broken glass or exposed wires, which pose a risk of electric shock.
6.3.1 Water quality requirements PH: 5~7; Chloride or salt content: 0~3,000 mg/L Turbidity: 0~30 NTU Conductivity: 1500~3000 $\mu\text{s}/\text{cm}$ Total dissolved solids: ≤ 1000 mg/L Water hardness: 0~40 mg/L Non-alkaline water must be used, and demineralized water is used when conditions are met. 6.3.2 Component inspection after cleaning.
- The overall appearance of the visual components is clean, bright and free of stains. Sampling checks for the presence of ash on the surface of the component. There are no obvious scratch marks on the surface of the component. There is no rupture caused by the surface of the component.
- Whether the component bracket is tilted or bent after cleaning. Whether the component terminals are disconnected or the like.
- After the PV modules are cleaned, the PV module cleaning records are completed.

9.1.4 Troubleshooting

If it does not work properly after installation, please notify the installer immediately.

9.2 Maintenance and troubleshooting of inverter

9.2.1 Maintenance of inverter



Incorrect operation does cause the risk of inverter damage or personal injury. Please strictly follow the steps below.

- Select ' stop' option on inverter screen or monitoring app to shut down inverter.
- Turn off the AC breaker on utility grid side.
- Turn off inverter DC switch.
- Turn off the battery switch, and disconnect the DC breaker on the battery side (if any).
- Wait for 10 minutes to ensure the energy of capacitor is fully dissipated.
- Confirm all the indicator lights are off.



Keep unprofessional person away.

A temporary alarm sign or barrier must be posted to keep unprofessional person away while performing electrical connection and maintenance.



Any Arbitrary replacement of internal components is forbidden. Please seek help from installer or Slenergy for maintenance support. Otherwise, we will not take any responsibility.



Please remember not to do the self-maintenance before being familiar with the proper instruction of the whole process.

Items	Methods	Period
System clean	Check dust or foreign matter on the heat-sink, air inlet and outlet.	Once 6-12 months
Electrical connection	Check whether the cables are in good connection.	
Sealing	Check whether all the terminals and ports are properly sealed. Reseal the cable hole if it is aging or not sealed.	Once a year

9.3 Maintenance and troubleshooting of Battery

9.3.1 Maintenance of electrical components

Item	Project	Checkpoint	Methods	Repair condition	
1	Electrical	Check whether the voltage output is normal.	Multi-meter	The battery voltage exceeds the preset range	Contact the dealer or manufacturer.
2	Failure to check	Check whether the light is normal.		Warning	
3	Cable	Insulation, terminal	Visual inspection	Insulation crack, aging, the terminal is peeling or corroded.	Replace the cable, replace the terminal board.

9.3.2 Battery Maintenance

Installation and maintenance of batteries should be performed or supervised with professional knowledge about batteries.



- Do not dispose battery in fire, or it may explode.
- Do not dismantle or break the battery. The electrolyte inside would be harmful to your body.

The battery has risk of electrical shock, the following scenario should be noticed during the operation:

- Remove metal items from your body.
- Use insulated tools.
- Remove metal items from battery.
- Turn off the DC breaker of the battery before assembling or disassembling battery terminals.
- There is a risk of electrical shock if battery is unexpectedly grounded. Remove the grounding cable to avoid the electrical shock.



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

Keep non-qualified persons away!

Restart the battery only after removing the fault that impairs safety performance. Never arbitrarily replace any internal components. For any maintenance support, please contact Slenergy. Otherwise, Slenergy shall not be held liable for any damage caused.

Servicing of the device in accordance with the manual should never be undertaken in the absence of proper tools, test equipment or the latest revision of the manual which has been clearly and thoroughly understood.

Item	Frequency	Project	Solution
1		Working environment	Keep away from heat sources and direct sunlight.
2	Every month	Visual inspection	If there is damage, leakage or deformation, isolate the faulty battery pack, take photos and replace the battery.
3		Visual inspection	Clean appearance with cotton cloth. Be careful when cleaning.
4	Every quarter	Connection status	Check whether the wiring is tight, check the temperature of the wire.
5	Half a year	Measure and record voltage	Collect discharge data at least once every six months in the first year. In the second year, discharge data were collected every three months. Check the historical records through the RS232 port. If the alarm information shows that the battery is frequently overcharged, the battery has reached the charging and discharging protection points. This may lead to insufficient time for power preparation. It is recommended to replace the battery immediately.

9.4 Maintenance and troubleshooting of Mounting structure

In order to ensure the reliable operation of the solar mounting structure and improve the safety of the equipment, a daily patrolling inspection system should be established in the daily operation and maintenance work. Patrolling inspection should be conducted at least once every month. The purpose of inspection work is to discover hidden troubles in time, prevent them before occurrence, and effectively improve the reliability of solar mounting structure.

Please take note that after severe conditions such as strong winds above level 6, tropical storms, heavy snow weather and earthquakes etc., maintenance and repair personnel should be organized to conduct a thorough inspection of the solar mounting structure and write down corresponding inspection records. If the solar mounting structure is found to be damaged, it should be reported immediately for the handling of issues.

Check whether there is rubbish or debris on the surface; check whether the entire structure of the solar mounting system is corroded, or any part is missing or falling off; pay attention to the sealing tightness of places where they have been sealed, and repair if necessary.

When the height of solar mounting structure exceeds 2.5m, the dressing of the climber shall meet the climbing requirements. They should be equipped with safety belts before installation. All on-site maintenance and inspection personnel must wear safety helmets and other protective equipment. Maintenance and inspection work are prohibited when there are strong winds above grade 4, there is rain and snow weather or there are no night-time construction lighting facilities in the evening. Maintenance and inspection personnel are strictly prohibited from smoking and drinking during installation time.



**Easy Energy
Easy Life**

