

SINGLE PHASE HYBRID INVERTER

USER MANUAL

The low voltage Series storage Inverters are designed to increase energy independence for homeowners. The power range is from 1kwto 6kW, compatible with low voltage(40-60V) batteries.

Energy management is based on time-of-use and demand charge rate structures, significantly reduce the amount of energy purchasedfrom the public grid. Thanks for the UPs function (switch time < 10ms), enables the crucial loads power on during outages. Additionally, under the backupoperation mode, the inverter provides you up to 150% peak output overloading.











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1.About This Manual

1.1 Scope of Validity

This manual mainly describes the product information, guidelines for installation, operation, maintenance and troubleshooting. And this manual applies to SUNWAY Single Phase Hybrid Inverter.

SW1KLP1-EU, SW2KLP1-EU, SW3KLP1-EU SW4KLP1-EU, SW5KLP1-EU, SW6KLP1-EU

Please keep this manual available all the time in case of any emergency.

1.2 Target Group

This manual is for qualified personnel. The tasks described in this manual must only be performed by qualified personnel.

2. Safety & Symbols

2.1 Safety Precautions

- 1. All work on the inverter must be carried out by qualified electricians.
- 2. The PV panels and inverter must be connected to the ground.
- 3. Do not touch the inverter cover until 5 minutes after disconnecting both DC and AC power supply.
- 4. Do not touch the inverter enclosure when operating, keep away from materials that may be affected by high temperatures.
- 5. Please ensure that the used device and any relevant accessories are disposed of in accordance with applicable regulations.
- 6.SUNWAY inverter should be placed upwards and handled with care in delivery. Pay attention to waterproof. Do not expose the inverter directly to water, rain, snow or spray.
- 7. Alternative uses, modifications to the inverter not recommended. The warranty can become void if the inverter was tampered with or if the installation is not in accordance with the relevant installation instructions.



2.2 Explanations of Symbols

SUNWAY inverter strictly comply with relevant safety standards. Please read and follow all the instructions and cautions during installation, operation and maintenance.



Danger of electric shock

The inverter contains fatal DC and AC power. All work on the inverter must be carried out by qualified personnel only.



Beware of hot surface

The inverter's housing may reach uncomfortably hot 60°C (140°F) under high power operation. Do not touch the inverter enclosure when operation.



Residual power discharge

Do not open the inverter cover until 5 minutes after disconnection both DC and AC power supply.



Important notes

Read all instructions carefully. Failure to follow these instructions, warnings and precautions may lead to device malfunction or damage.



Do not dispose of this device with the normal domestic waste.



Refer to manual before service.



CE mark

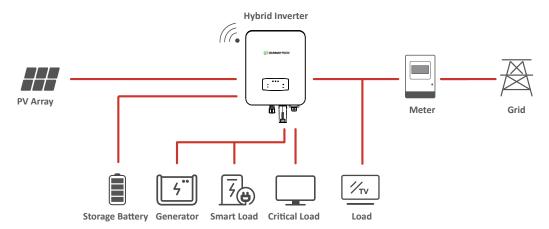
The inverter complies with the requirements of the applicable CE guidelines.



3. Introduction

3.1 Basic Instruction

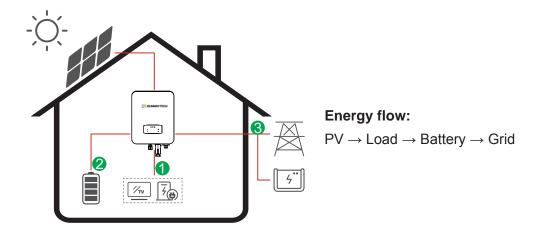
The SUNWAY hybrid inverters are designed to increase energy independence for homeowners. Energy management is based on time-of-use and demand charge rate structures, significantly reduce the amount of energy purchased from the public grid and optimize self-consumption.



3.2 Operation Modes

3.2.1 Self-Use

The Self-Use mode is for the regions with low feed-in tariff and high electricity prices. The energy produced by the PV system is used to optimize self-consumption needs. The excess energy is used to recharge the batteries, any remaining excess is then exported to the grid.



Note: Advance Setting

When select 0 W under P_Feed menu, the inverter will export zero energy to the grid.

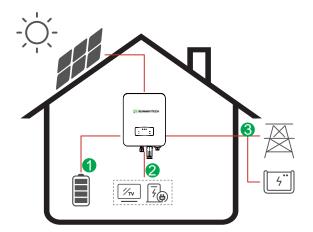
When select xx W under P_Feed menu, the inverter will export customized energy to the grid.

3.2.2 Time of Use

The Time of Use mode is designed to reward customers who do their part to reduce demand on the electric grid, particularly during peak usage periods. Use most of your electricity from PV energy and during off-peak time periods, and you could significantly lower your monthly bill.

A. Charge Setting

PV Charge Mode

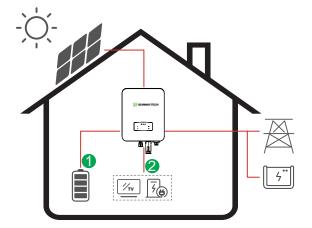


4 periods of time charge setting.

Energy flow:

 $PV \rightarrow Battery \rightarrow Load \rightarrow Grid$

AC Charge Mode



4 periods of time charge setting.

Energy flow:

PV and Grid \rightarrow Battery \rightarrow Load



Note:

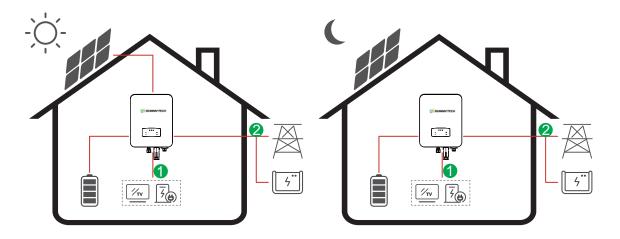
After select AC charge, when PV have no sufficient power, AC will also charge the battery.





B. Discharge

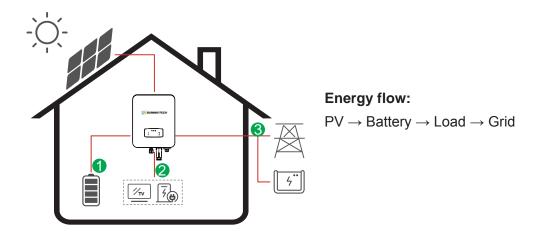
4 periods of time discharge setting



Energy flow: Battery and $PV \rightarrow Load \rightarrow Grid$

C. Forbidden Discharge

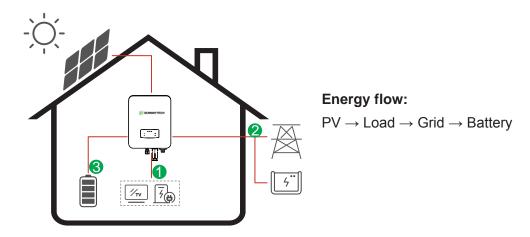
4 periods of time discharge setting, the battery will be charged firstly.





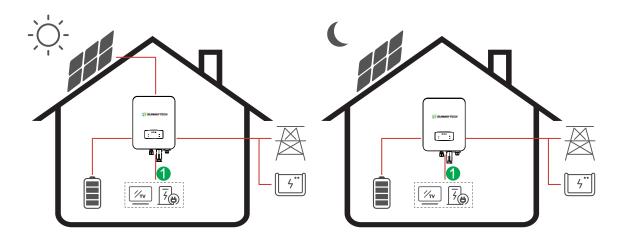
3.2.3 Selling First

The Selling First mode is suitable for the regions with high feed-in tariff.



3.2.4 Back-Up

When the grid fails, the system will automatically switch to Back-Up mode. The back-up loads can be supplied by both PV and battery energy.



Energy flow: PV and Battery \rightarrow Load





4. Installation

4.1 Pre-installation

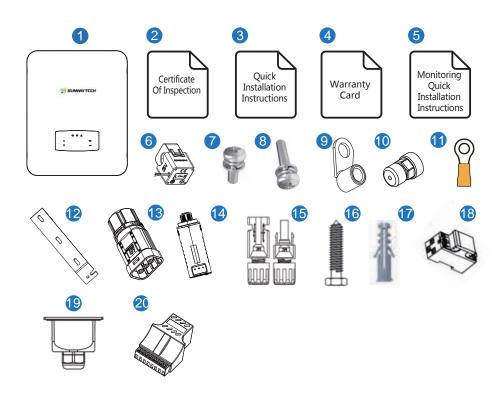
4.1.1 Unpacking & Package List

Unpacking

On receiving the inverter, please check to make sure the packing and all components are not missing or damaged. Please contact your dealer directly for supports if there is any damage or missing components.

Package List

Open the package, please check the packing list shown as below.



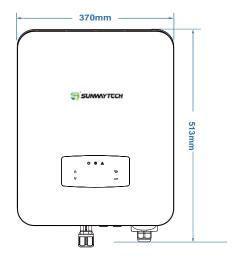


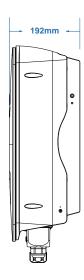
No.	Qty	Items	No.	Qty	Items
1	1	Hybrid Inverter	11	1	Grounding Terminal
2	1	Certificate Of Inspection	12	1	Wall Mounting Bracket
3	1	Quick Installation Instructions	13	1	Battery Connector
4	1	Warranty Card	14	1	Monitor Module
5	1	Monitoring Quick Installation Instructions	15	1/2	DC Connector
6	1	СТ	16	3	Mounting Bracket Screw
7	4	AC Wiring Cover Screw	17	3	Plastic Expansion Tube
8	1	Security Screw	18	1	Smart Meter (Opitional)
9	4	AC Wiring Terminal	19	1	AC Waterproof Cover
10	2	Communication Connectors	20	1	Communication Adapter

Note:

DC connectors Qty.: The AF1K-SL-1~AF3.6K-SL-1 is 1 pair of DC plug connector, the AF3K-SL \sim AF6K-SL is 2 pairs.

4.1.2 Product Overview

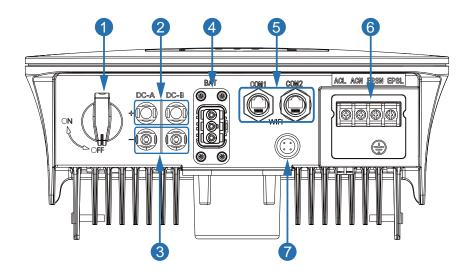








Inverter Terminals



1 DC Switch 5 Communication Port 2 DC Connectors (+) For PV Strings 6 AC Port & EPS Port 3 DC Connectors (-) For PV Strings 7 Monitor Module Port	No.	Items	No.	Items
	1	DC Switch	5	Communication Port
3 DC Connectors (–) For PV Strings 7 Monitor Module Port	2	DC Connectors (+) For PV Strings	6	AC Port & EPS Port
o Do Commodero () For F Camingo F micrimor mediano F cit	3	DC Connectors (-) For PV Strings	7	Monitor Module Port

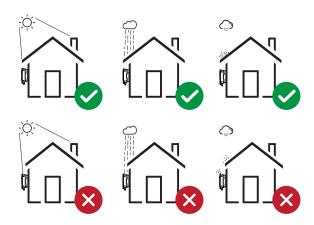
4 Battery Port

4.1.3 Mounting Location

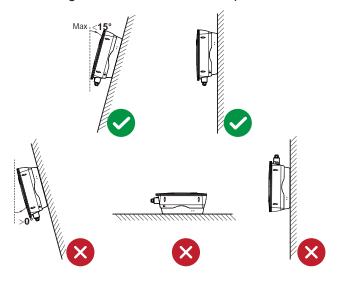
The inverters are designed for indoor and outdoor installation (IP65), to increase the safety, performance and lifespan of the inverter, please select the mounting location carefully based on the following rules:

- The inverter should be installed on a solid surface, far from flammable or corrosion materials, where is suitable for inverter's weight and dimensions.
- The installation of inverter should be protected under shelter. Do not expose the inverter to direct sunlight, water, rain, snow, spray lightning, etc.

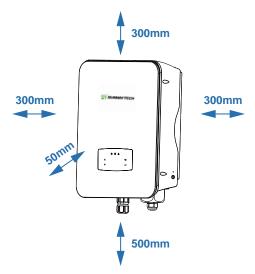




• The inverter should be installed vertically on the wall, or lean back on plane with a limited tilted angle. Please refer to below picture.



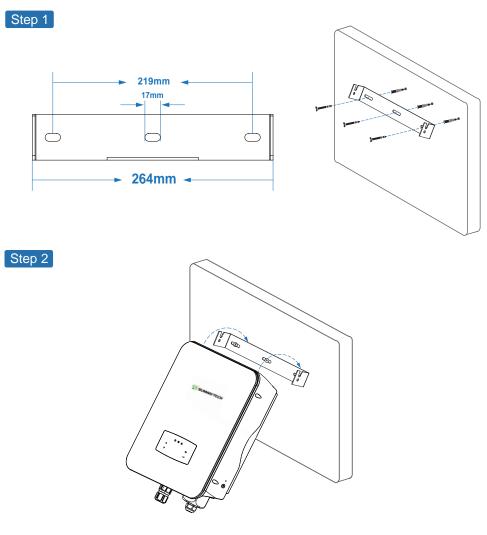
• Leave the enough space around inverter, easy for accessing to the inverter, connection points and maintenance.





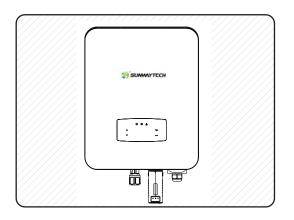


4.2 Mounting



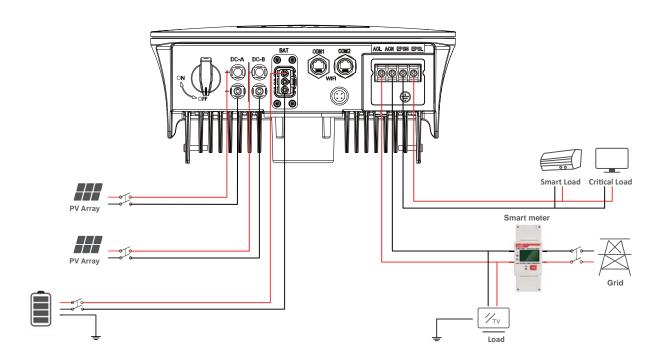








4.3 Electrical Connection



Communication Adapter pin assignment

	No.	COM1	COM2
	1	NTC+	Meter 485A
	2	NTC-	Meter 485B
	3	Dry Contact	BAT 485A
	4	Dry Contact	BAT CANH
	5	DRM	BAT CANL
12345678	6	DRM	BAT 485B
	7	485A	СТИ
	8	485B	CTN



For diesel generators or multi-machine parallel use, please contact the manufacturer, and provide installation and operation instructions separately.



4.3.1 PV Connection

The SW hybrid inverter has one/two MPPT channels, can be connected with one/ two strings of PV panels. Please make sure below requirements are followed before connecting PV panels and strings to the inverter:

- The open-circuit voltage and short-circuit current of PV string should not exceed the reasonable range of the inverters.
- The isolation resistance between PV string and ground should exceed 300 k Ω .
- The polarity of PV strings are correct.
- Use the DC plugs in the accessory.
- The lightning protector should be equipped between PV string and inverter.
- Disconnect all of the PV (DC) switch during wiring.

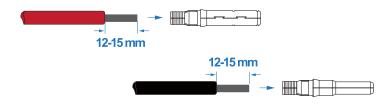


Warning:

The fatal high voltage may on the DC side, please comply with electric safety when connecting.

Please make sure the correct polarity of the cable connected with inverter, otherwise inverter could be damaged.

Step 1



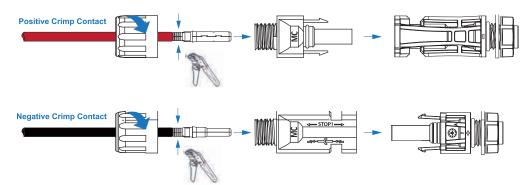


Note:

PV cable suggestion Cross-section 4mm²



Step 2





Note:

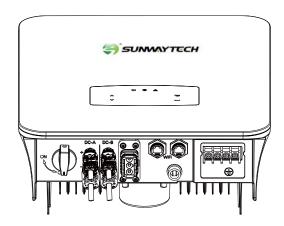
Please use PV connector crimper to pinch the point of the arrow.



Note:

You'll hear click sound when the connector assembly is correct.





4.3.2 Battery Connection

SW hybrid inverters are compatible with lithium battery. For lead acid battery or batteries with other brands, please confirm with local distributor or SUNWAY for technical support.



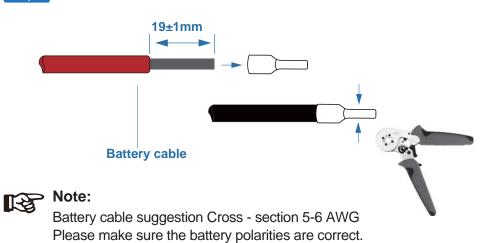
Note:

Set battery type and manufacturer, please refer to Chapter 5.3. BMS(Battery Management System)communication is needed between inverter and battery.



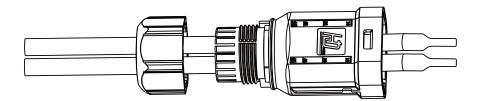






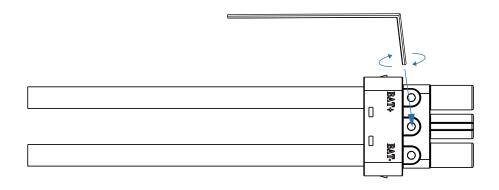
Step 2

Pass the crimped battery harness through the waterproof connector and the cover.



Step 3

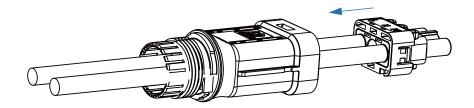
Insert the wire harness into the terminals according to "+" and "-" polarity, make the insulated terminals parallel with the terminals , the crimping screw torque is $2.0\pm0.1N.m$





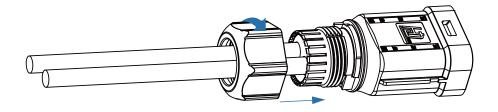
Step 4

A "click" sound will be heard when the connector assembly is correct.



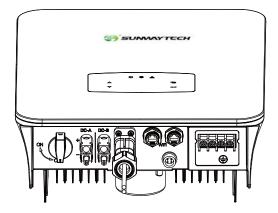
Step 5

Use an open-end wrench to tighten the waterproof lock.



Step 6

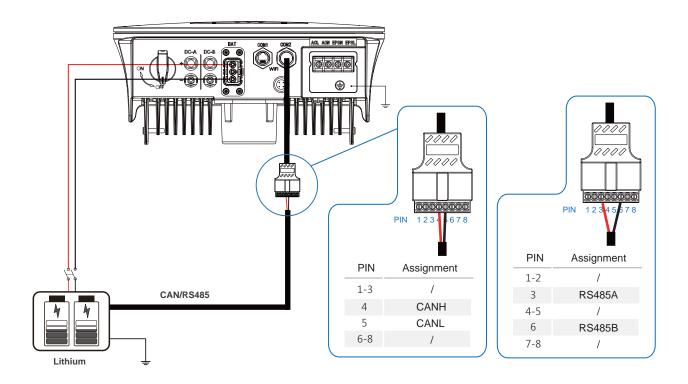
Insert the battery connector into the inverter, if hear a "click", it means the battery connection is finished.



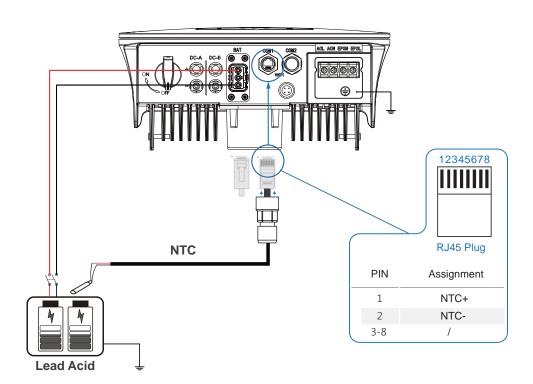




4.3.2.1 BAT-CAN/RS485

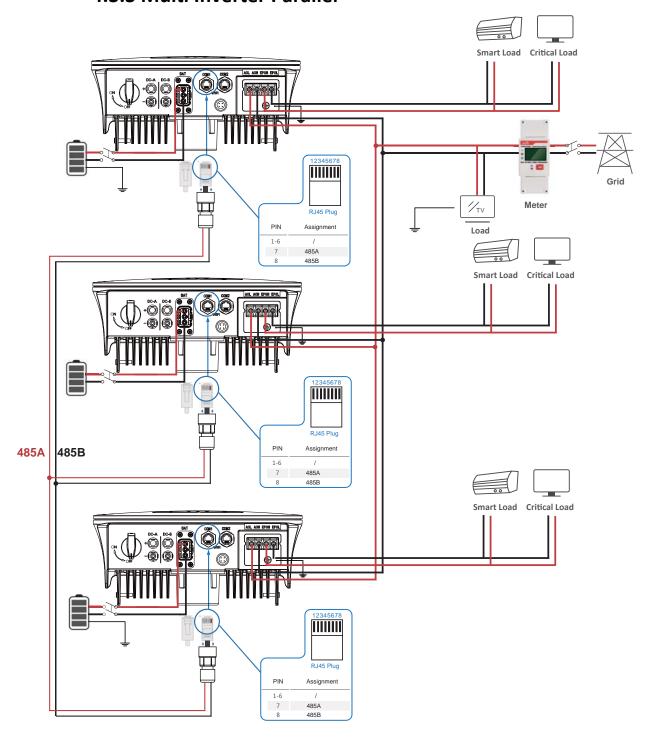


4.3.2.2 BAT-NTC





4.3.3 Multi Inverter Parallel



Note:

The meter only communicates with the host and does not communicate with the machine. Refer to chapters 4.3.5.





4.3.4 AC Connection

The AC terminal contains "GRID" and "EPS", GRID for load, and EPS for emergency load.

Before connecting, a separate AC breaker between individual inverter and AC input power is necessary. This will ensure the inverter be securely disconnected during maintenance and fully protected from current of AC input.

An extra AC breaker is needed for On-Grid connection to be isolated from grid when necessary. Below are requirements for the On-Grid AC-breaker.

Inverter Model	AC breaker specification
AF1-3.6K-SL-1	32A/200V/230V AC breaker
AF3-6K-SL	63A/200V/230V AC breaker



Note:

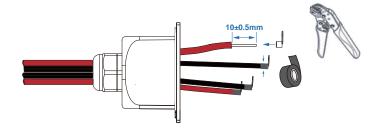
Qualified electrician will be required for the wiring.

	Model	Wire Size	Cable (mm²)	Torque value	
_	1-6kW	8-10AWG	4-6	1.2N⋅m	-

Please follow steps for AC connection

- Connect DC protector or breaker first before connecting.
- emove insulation sleeve 11mm(0.5 inch) length, unscrew the bolts, insert the AC input wires according to polarities indicated on the terminal block and tighten the terminal screws.

Step 1







Note:

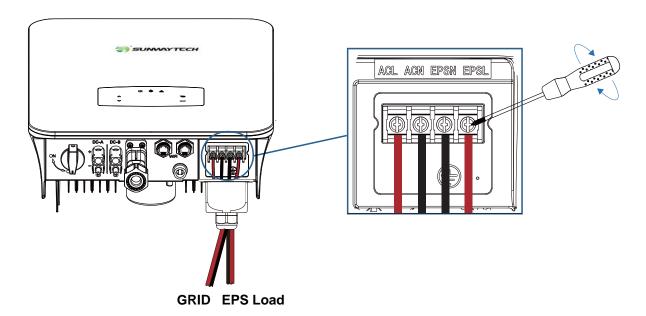
The wiring terminals should be wrapped with insulation tape, otherwise it will cause a short circuit and damage the inverter.

Note:

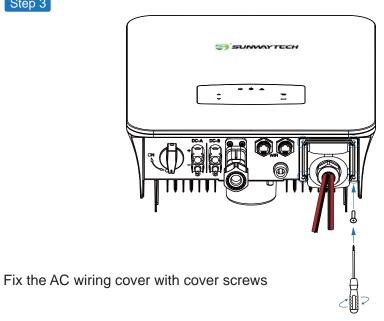


The Max. power load connects to EPS port should not exceed the inverter's EPS Max. output power range.

Step 2





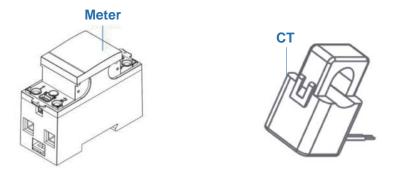


GRID EPS Load

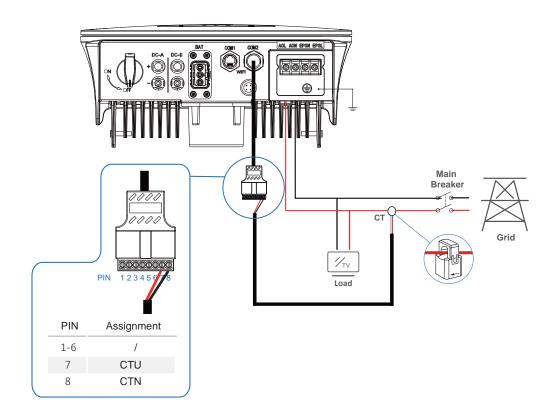


4.3.5 CT or Meter Connection

Meter and a current sensor(CT for short below) are used to detect current power direction of the local load and the grid. The output control function of the inverters will be activated based on the detected data.



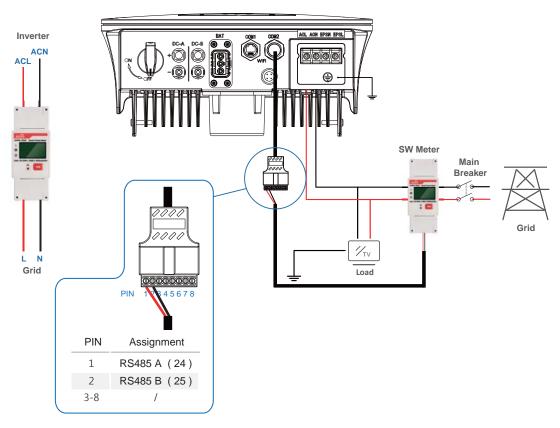
Install the CT

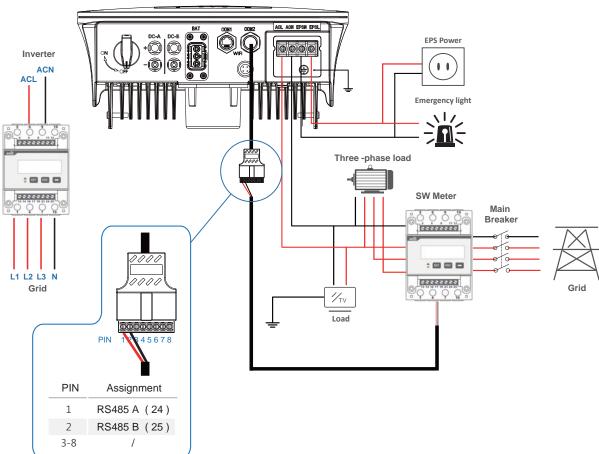






Install the Meter







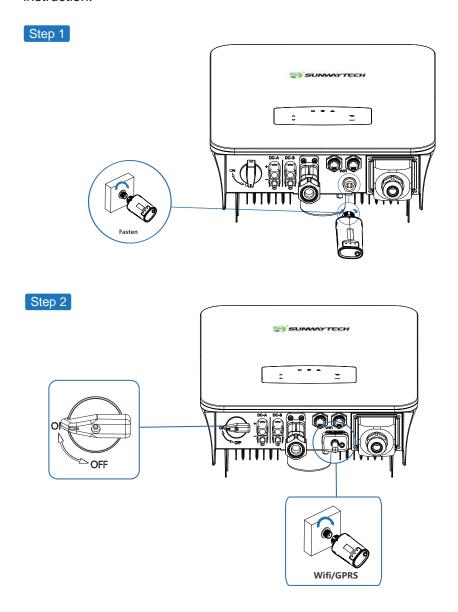


4.4 Communication Connection

The monitoring module could transmit the data to the cloud server, and display the data on the PC, tablet and smart-phone.

Install the WIFI / Ethernet / GPRS / RS485 Communication

WIFI / Ethernet / GPRS / RS485 communication is applicable to the inverter. Please refer to "Communication Configuration Instruction" for detailed instruction.



Turn on the DC switch and AC circuit breaker, and wait until the LED indicator on the monitoring module flashes, indicating that the monitoring module is successfully connected.

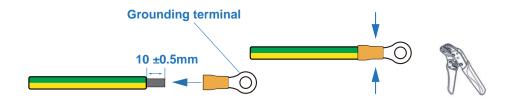
4.5 Earth Connection



Note

A second protective earth (PE) terminal should be connected to the inverter. This prevents electric shock if the original protective PE wire fails.

Step 1

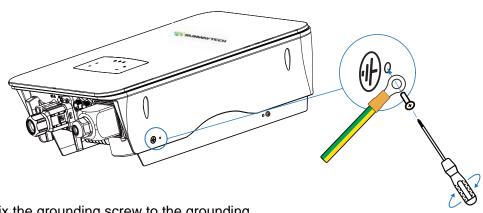




Note:

Earth cable PE suggestion: Cross-section (Copper) 4-6mm² / 10AWG

Step 2



Fix the grounding screw to the grounding connection of the machine housing.



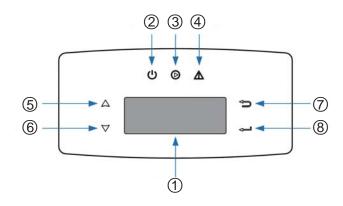
Note:

Make sure the earth cables on the inverter and solar panel frame are separately.



5. Operation

5.1 Control Panel



No.	Items	No.	Items
1	LCD Display	5	UP Touch Button
2	POWER LED Indicator	6	DOWN Touch Button
3	GRID LED Indicator	7	BACK Touch Button
4	FAULT LED Indicator	8	ENTER Touch Button

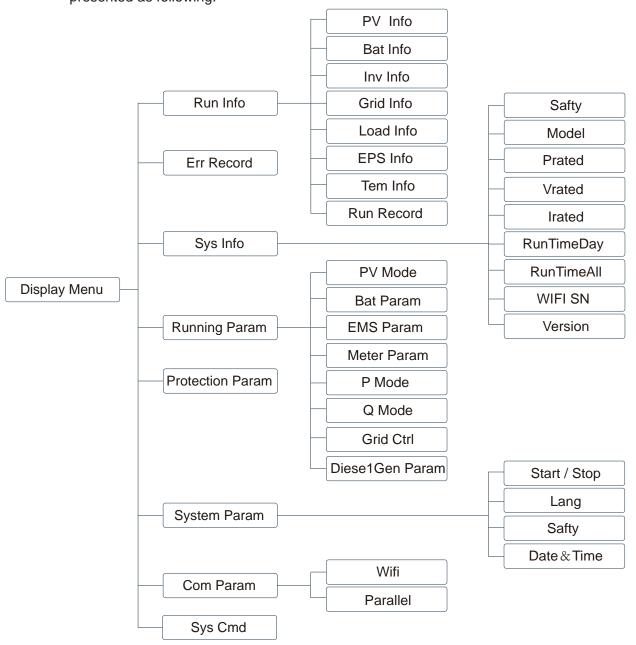
Note:
Hold UP/DOWN button can be rolling quickly.

Sign	Power	Color	Explanation
POWER	ON	Green	The inverter is stand-by
POWER	OFF		The inverter is power off
CDID	ON	Green	The inverter is feeding power
GRID	OFF		The inverter is not feeding power
FAULT	ON	Red	Fault occurred
FAULI	OFF		No fault



5.2 Menu Overview

SW hybrid inverter has a LCD for clearly operating, and menu of the LCD can be presented as following:



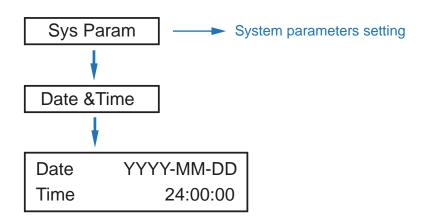
5.3 Inverter Setting

The setting is for SW Hybrid inverter. Any doubts, please contact distributor for more details.

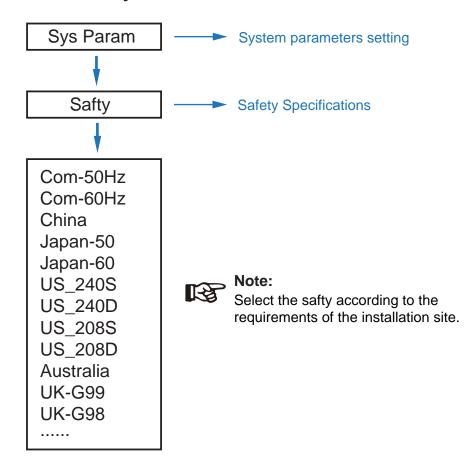




5.3.1 Time & Date

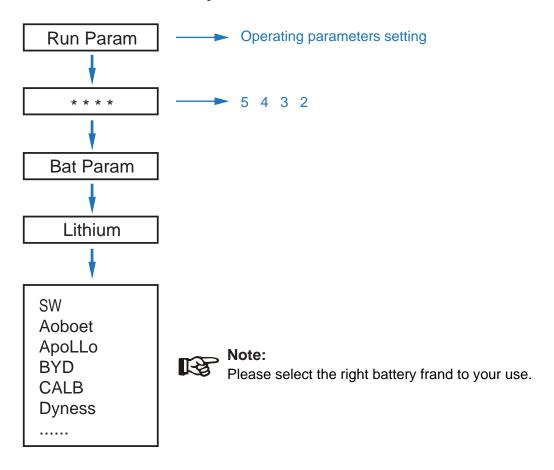


5.3.2 Safety

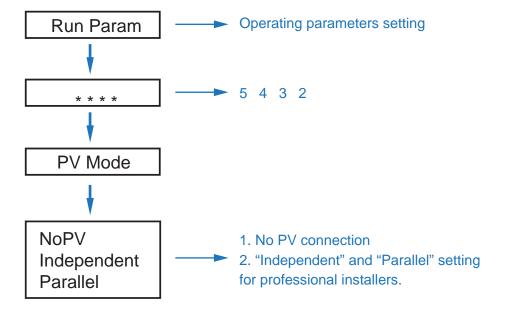




5.3.3 Lithium Battery



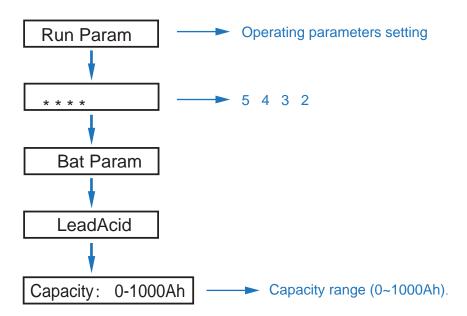
5.3.4 PV Mode



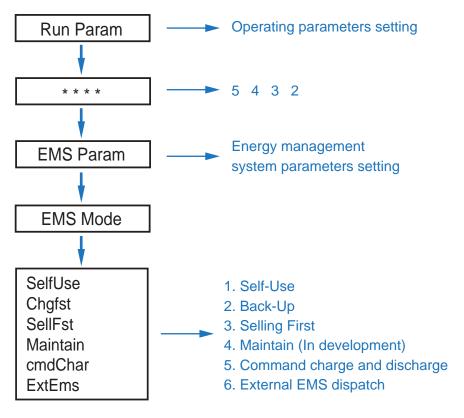




5.3.5 Lead Acid



5.3.6 Energy Management System (EMS Param)

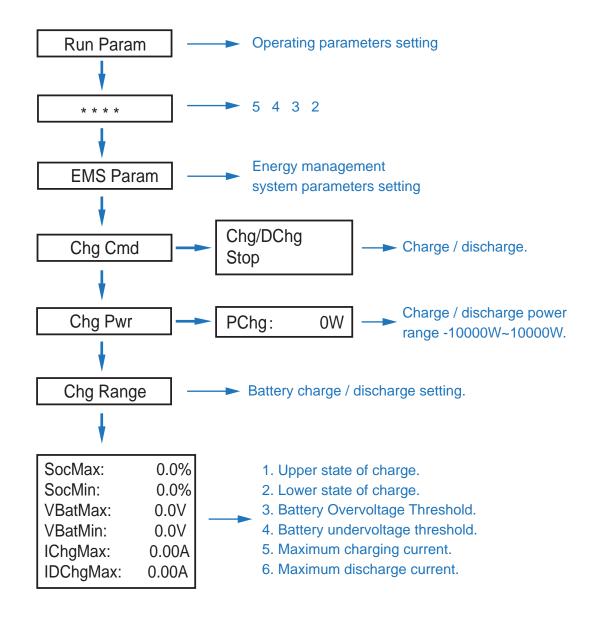


R

Note:

For detailed introduction of each mode, please refer to chapter 3.2 of the user manual.

5.3.7 Time of Use



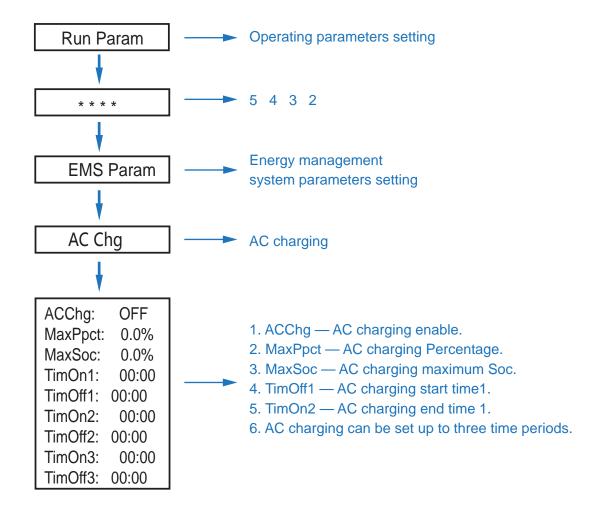


Note:

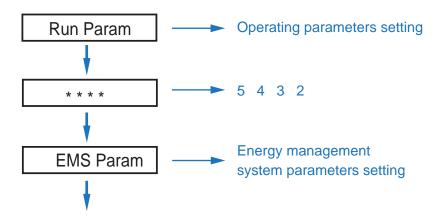
Timed charge and discharge need to complete the three settings of "Chg Cmd", "Chg Pwr" and "Chg Range", otherwise it will not work properly.



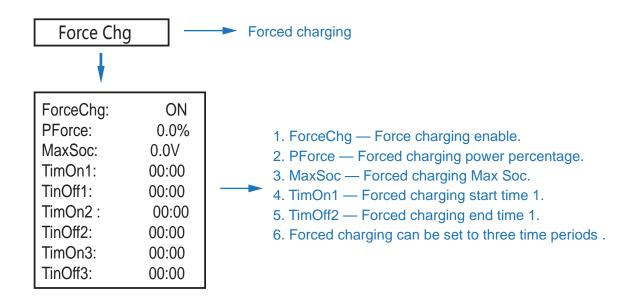
5.3.8 AC Charging



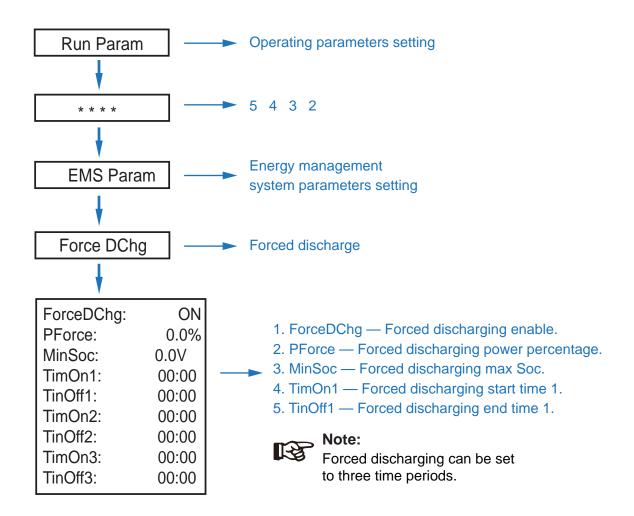
5.3.9 Forced Charging







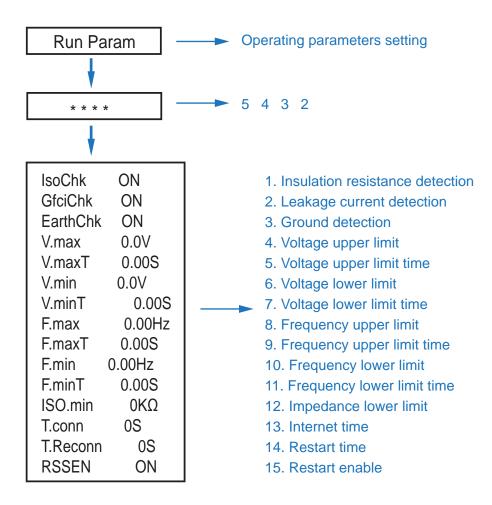
5.3.10 Forced Discharging







5.3.11 Protection Parameters



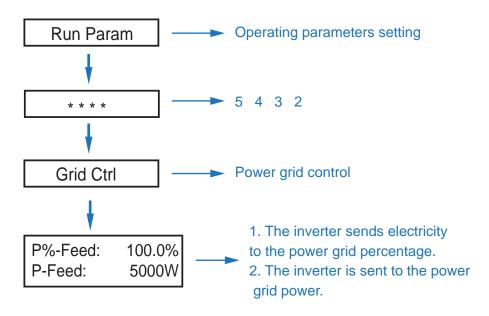


Note:

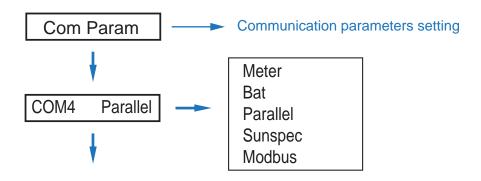
When modifying parameters, you need to pay attention to the unit.



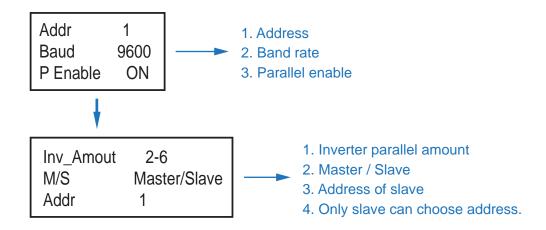
5.3.12 Power grid control



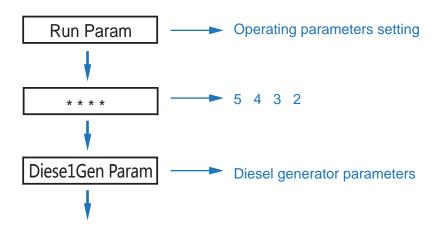
5.3.13 Multi-machine in Parallel







5.3.14 Diesel Generator Setting (Diese1 Gen Param)







Diese1Gen GenEr	n ON
TimeCtr1Em	ON
TimeDelay	0S
StarSoc	20.0%
EndSoc	80.0%
TimOn1	00:00
TimOff1	00:00
TimOn2	00:00
TimOff2	00:00
TimOn3	00:00
TimOff3	00:00

- 1. Diese1Gen GenEn Diesel generator enable.
- 2. TimeCtr1Em Time control enable.
- 3. TimeDelay Delay time of diesel generator start working.
- 4. StarSoc Battery power percentage when diesel generator start charging the battery.
- 5. EndSoc Battery power percentage when diesel generator stop charging the battery.
- 6. TimOn1 Diesel generator start time 1.
- 7. TimOff1 Diesel generator off time 2.



Note:

Diesel generator enable and time control enabled must be on, other wise the diesel generator can not be started.

6. Power ON/OFF

Please check the following requirements before testing:

- Installation location is suitable according to Chapter 4.1.3.
- All electrical wires are connected tightly, including PV modules, battery and AC side(Such as the grid side, EPS side, Gen side).
- Earth line and Smart meter/CT line are connected.
- SW hybrid inverters should be set according to the required local grid standard.
- More information please contact with SW or distributors.



6.1 Power ON

- Turn on DC switch.
- After LCD lighting, hybrid inverter should be set following Chapter 5.3 at the first time.
- When inverter running under normal mode, Running indicator will light up(Ref. to Chapter 5.1).

6.2 Power OFF

• Turn off DC switch (in hybrid inverter) and all extra-breaker.



Note

Hybrid inverter should be restarted after 5 minutes.

6.3 Restart

Restart Hybrid inverter, please follow steps as below:

- Shutdown the inverter Ref. to Chapter6.2.
- Start the inverter Ref. to Chapter 6.1.

7. Maintenance & Trouble Shooting

7.1 Maintenance

Periodically maintenance are necessary, please follow steps as below.

- PV connection: twice a year
- AC connection(Grid and EPS): twice a year
- · Battery connection: twice a year
- Earth connection: twice a year
- · Heat sink: clean with dry towel once a year

7.2 Trouble Shooting

The fault messages are displayed when fault occurs, please check trouble shooting table and find related solutions.



Fault Code and Trouble Shooting

Type of Fault	Code	Name	Description	Recommend Solution	
	A01	PvConnectFault	PV connection type different from setup	Check PV modules connection Check PV Mode setup Ref. Chapter 5.3.	
	A02	IsoFault	ISO check among PV panels/ wires and ground is abnormal.	 Check PV modules wires, those wires are soaked or damaged, and then carry out rectification. if the fault occurs continuously and frequently, please ask help for local distributors. 	
	A03	PvAfciFault	PV current arcing	Check PV modules wires and connectors broken or loose connect, and then carry out rectification. If the fault occurs continuously and frequently, please ask help for local distributors.	
	A04	Pv1OverVoltFault			
	A05	Pv2OverVoltFault			
	A06	Pv3OverVoltFault			
	A07	Pv4OverVoltFault			
PV Fault	A08	Pv5OverVoltFault	PV Voltage over		
	A09	Pv6OverVoltFault		Reconfiguration of PV strings, reduction the PV number of a PV string to reducing the PV string the PV string to reducing the PV string to reducing the PV string the PV st	
	A10	Pv7OverVoltFault		inverter PV input voltage. • Suggestion that contacting with local	
	A11	Pv8OverVoltFault		distributors.	
	A12	Pv9OverVoltFault			
	A13	Pv10OverVoltFault			
	A14	Pv11OverVoltFault			
	A15	Pv12OverVoltFault			
	A16	PV1ReverseFault			
	A17	PV2ReverseFault		Check PV(+) and PV(-) Connect	
	A18	PV3ReverseFault	PV(+) and PV(-) reversed	whether reversed or not. • If reversed, make correction.	
	A19	PV4ReverseFault	Connection		
	A20	PV5ReverseFault			
	A21	PV6ReverseFault			



Type of Fault	Code	Name	Description	Recommend Solution	
	A22	PV7ReverseFault			
	A23	PV8ReverseFault			
	A24	PV9ReverseFault			
	A25	PV10ReverseFault			
	A26	PV11ReverseFault			
	A27	PV12ReverseFault			
	A33	Pv1AbnormalFault			
	A34	Pv2AbnormalFault			
	A35	Pv3AbnormalFault			
	A36	Pv4AbnormalFault			
	A37	Pv5AbnormalFault			
	A38	Pv6AbnormalFault			
	A39	Pv7AbnormalFault			
	A40	Pv8AbnormalFault			
PV Fault	A41	Pv9AbnormalFault			
	A42	Pv10AbnormalFault			
	A43	Pv11AbnormalFault		Check PV modules partial occlusion or cells damaged.	
	A44	Pv12AbnormalFault	PV(+) and PV(-) reversed Connection	Check PV module wires and connectors broken or loose connect,	
	A45	Pv13AbnormalFault		then repair it.	
	A46	Pv14AbnormalFault			
	A47	Pv15AbnormalFault			
	A48	Pv16AbnormalFault			
	A49	Pv17AbnormalFault			
	A50	Pv18AbnormalFault			
	A51	Pv19AbnormalFault			
	A52	Pv20AbnormalFault			
	A53	Pv21AbnormalFault			
	A54	Pv22AbnormalFault			
	A55	Pv23AbnormalFault			
	A56	Pv24AbnormalFault			



Type of Fault	Code	Name	Description	Recommend Solution
	B01	PcsBatOverVoltFault		Check inverters connected battery lines
	B02	PcsBatUnderVoltFault	Battery voltage over or under	 and connectors broken or loose connect. Carry out rectification if broken or loose. Checking battery voltage is abnormal
	B03	PcsBatInsOverVoltFaul		or not, then maintenance or change new battery.
	B04	PcsBatReversedFault	Bat. (+) and Bat. (-) are reversed.	Check Bat.(+) and Bat.(-)connect reversed or not. Make correction If reversed.
	B05	PcsBatConnectFault	Battery wires loose	Check battery wires and connectors damage or loose connect. Carry out rectification if break.
	B06	PcsBatComFault	Battery communication abnormal	 Check battery side communication wires damage or loose connect, and then carry out rectification. Check battery is off or other abnormal, then Mastertenance battery or change new battery.
	B07	PcsBatTempSensorOpen	Battery temperature	Check battery temperature sensor and connected wires damage or not , then
	B08	PcsBatTempSensorShort	sensor abnormal	rectification or change new one.
Battery Fault	B09	BmsBatSystemFault		
	B10	BmsBatVolOverFault		
	B11	BmsBatVolUnderFault		
	B12	BmsCellVolOverFault		
	B13	BmsCellVolUnderFault		
	B14	BmsCellVolUnbanceFau		
	B15	BatChgCurOverFault		If specific fault high temperature or low temperature, then should change battery
	B16	BatDChgCurOverFault	All these faults will be	installed environment temperature. • Restart battery, maybe can working as
	B17	BatTemperatureOverFa	detected or reported by battery BMS.	normal. • If this fault occurs continuously and
	B18	BatTemperatureUnderF		frequently, please ask help for local distributors.
_	B19	CelTemperatureOverFa		
	B20	CelTemperatureUnderF		
	B21	BatlsoFault		
	B22	BatSocLowFault		
	B23	BmsInterComFault		
	B24	BatRelayFault		



Type of Fault	Code	Name	Description	Recommend Solution		
	B25	BatPreChaFault				
	B26	BmsBatChgMosFault				
	B27	BmsBatDChgMosFault				
	B28	BMSVolOVFault				
	B29	BMSVolLFault				
	B30	VolLockOpenFault				
	B31	VolLockShortFault				
	B32	ChgRefOVFault				
	C01	GridLossFault	Grid lost (islanding)	Inverter will restart automatically when the grid return to normal. Check inverter connected with grid connectors and cable normal or not.		
	C02	GridUnbalanVoltFault	Grid Voltage unbalanced.	The inverter will restart automatically when the grid three phase return to normal. Check inverter connected with the grid connectors and wires normal or not.connectors and cable normal or not.		
Battery Fault	C03	GridInstOverVoltFault	Grid instantaneous voltage over	 The inverter will restart automatically when the grid three phase return to normal. Contact with local distributor or required grid company adjust protection parameters. 		
	C04	Grid10MinOverVoltFault	Grid voltage Over by 10 Minutes	The inverter will restart automatically when the grid three phase return to normal. Contact with local distributor or required grid company adjust 10 minutes protection voltage parameters.		
	C05	GridOverVoltFault	Grid voltage over			
	C06	GridUnderVoltFault	Grid voltage under	The inverter will restart automatically when the grid three phase return to normal.		
	C07	GridLineOverVoltFault	Grid line voltage over	Contact with local distributor or required grid company adjust voltage protection parameters.		
	C08	GridLineUnderVoltFault	Grid line voltage under			
	C09	GridOverFreqFault	Grid Frequency over	The inverter will restart automatically when the grid three phase return to normal.		
	C10	GridUnderFreqFault	Grid Frequency under	Contact with local distributor or required grid company adjust frequency protection parameters.		



Type of Fault	Code	Name	Description	Recommend Solution	
	D01	UpsOverPowerFault	Off-grid load over	 Reduce loads. If sometimes overload, it can be ignored, when generation power enough can be recovery. If those faults occurs continuously and frequently, please ask help for local distributors. 	
Off-grid Fault	D02	GridConflictFault	Grid connected to Back-up terminal	Check the off-grid port connection correct, disconnect both off-grid and grid ports.	
	D03	GenOverVoltFault	GenOverVoltFault	Adjust generator running parameters,	
	D04	GenUnderVoltFault	GenUnderVoltFault	make the output voltage, frequency in allowed range.	
	D05	GenOverFreqFault	GenOverFreqFault	If this fault occurs continuously and frequently, please ask help for local	
	D06	GenUnderFreqFault	GenUnderFreqFault	distributors.	
	E01	Pv1HwOverCurrFault			
	E02	Pv2HwOverCurrFault			
	E03	Pv3HwOverCurrFault			
	E04	Pv4HwOverCurrFault		Device off their restort (Def. Obserted)	
	E05	Pv5HwOverCurrFault			
	E06	Pv6HwOverCurrFault	PV current over, triggered by hardware protection	Power off, then restart (Ref. Chapter8). If those faults occurs continuously and	
	E07	Pv7HwOverCurrFault	circuit	frequently, please ask help for local distributors.	
	E08	Pv8HwOverCurrFault			
	E09	Pv9HwOverCurrFault			
DC Fault	E10	Pv10HwOverCurrFault			
Do raun	E11	Pv11HwOverCurrFault			
	E12	Pv12HwOverCurrFault			
	E13	Pv1SwOverCurrFault			
	E14	Pv2SwOverCurrFault			
	E15	Pv3SwOverCurrFault			
	E16	Pv4SwOverCurrFault	PV current over, triggered	Power off, power on then restart. If these foults accure continuously and	
	E17	Pv5SwOverCurrFault	by Software logic.	If those faults occurs continuously and frequently, please ask help for local distributors.	
	E18	Pv6SwOverCurrFault		นเรนาเมนเบาร.	
	E19	Pv7SwOverCurrFault			
	E20	Pv8SwOverCurrFault			



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Type of Fault	Code	Name	Description	Recommend Solution
	E21	Pv9SwOverCurrFault		
	E22	Pv10SwOverCurrFault		
	E23	Pv11SwOverCurrFault		
	E24	Pv12SwOverCurrFault		
	E33	Boost1SelfCheck(boost)Fault		
	E34	Boost2SelfCheck(boost)Fault		
	E35	Boost3SelfCheck(boost)Fault		
	E36	Boost4SelfCheck(boost)Fault		
	E37	Boost5SelfCheck(boost)Fault		
	E38	Boost6SelfCheck(boost)Fault	PV boost circuit abnormal	Power off, then restart (Ref. Chapter8).If those faults continuously and
	E39	Boost7SelfCheck(boost)Fault	when self checking	frequently, please ask help for local distributors.
	E40	Boost8SelfCheck(boost)Fault		
	E41	Boost9SelfCheck(boost)Fault		
	E42	Boost10SelfCheck(boost)Fault		
DC Fault	E43	Boost11SelfCheck(boost)Fault		
	E44	Boost12SelfCheck(boost)Fault		
	E45	BusHwOverVoltFault		
	E46	BusHwOverHalfVoltFault	D Kanana ayan	
	E47	BusSwOverVoltFault	Bus voltage over	Power off, then restart (Ref. Chapter8).If those faults continuously and
	E48	BusSwOverHalfVoltFault		frequently, please ask help for local distributors.
	E49	BusSwUnderVoltFault	Bus voltage under as running	
	E50	BusUnbalancedFault	DC Bus voltage unbalanced	
	E51	BusBalBridgeHwOver- CurFault	D 0	
	E52	BusBalBridgeSwOver- CurFault	Bus Controller current over	Power off, then restart (Ref. Chapter8). If those faults continuously and frequently, please ask help for local
	E53	BusBalBridgeSelf- CheckFault	Bus Controller abnormal when self checking	distributors.
	E54	BDCHwOverCurrFault	PiDC current cycr	
	E55	BDCSwOverCurrFault	BiDC current over	Power off, then restart (Ref. Chapter8).
	E56	BDCSelfCheckFault	BiDC abnormal as self checking	If those faults continuously and frequently, please ask help for local
	E57	BDCSwOverVoltFault	BiDC voltage over	distributors.
	E58	TransHwOverCurrFault	BiDC current over	



Type of Fault	Code	Name	Description	Recommend Solution
	E59	BDCFuseFault	BiDC fuse broken	Change fuse.
	E60	BDCRelayFault	BiDC relay abnormal	 Power off, then restart (Ref. Chapter8). If those faults continuously and frequently, please ask help for local distributors.
	F01	HwOverFault	All over current/ voltage by protection hardware	
	F02	InvHwOverCurrFault	Ac over current by protection hardware	
<u> </u>	F03	InvROverCurrFault	R phase current over	Power off, then restart (Ref. Chapter8).If those faults occurs continuously and
	F04	InvSOverCurrFault	S phase current over	frequently, please ask help for local distributors.
	F05	InvTOverCurrFault	T phase current over	
	F06	GridUnbalanCurrFault	On-grid current unbalanced	
	F07	DcInjOverCurrFault	DC injection current over	
AC Fault	F08	AcOverLeakCurrFault	Ac side leakage current over	 Check AC insulation and ground wires connect ground is well or not, then repair it. Power off, then restart (Ref. Chapter8) If those fault occurs continuously and frequently, please ask help for local distributors.
	F09	PLLFault	PLL abnormal	
	F10	GridRelayFault	Grid relay abnormal	Power off, then restart (Ref. Chapter8).
	F11	UpsRelayFault	Ups relay abnormal	• If those fault occurs continuously and frequently, please ask help for local
	F12	GenRelayFault	Generator relay abnormal	distributors.
	F13	Relay4Fault	Relay4 abnormal	
	F14	UpsROverCurrFault		When off-grid the load start impulse current is over, reduce the start impulse
	F15	UpsSOverCurrFault	Off-grid output current over	current load. • Power off, then restart (Ref. Chapter8). • If those fault occurs continuously and
	F16	UpsTOverCurrFault		frequently, please ask help for local distributors.
	F17	GenROverCurrFault		
	F18	GenSOverCurrFault	Generator current over	Check generator output voltage, frequency is stability, and adjust
	F19	GenTOverCurrFault		generator. • Power off, then restart(Ref. Chapter8). • If those fault occurs continuously and
	F20	GenReversePowerFault	Active power injected to generator	frequently, please ask help for local distributors.



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Type of Fault	Code	Name	Description	Recommend Solution	
	F21	UpsOverVoltFault	Off-grid output voltage over		
	F22	UpsUnderVoltFault	or under	Power off, then restart (Ref. Chapter8).	
AC Fault	F23	UpsOverFreqFault	Off-grid output frequency	If those faults occurs continuously and frequently, please ask help for local	
	F24	UpsUnderFreqFault	over or under	distributors.	
	F25	DclnjOverVoltFault	Off-grid DC injection voltage over		
	G01	PV1CurAdChanFault			
	G02	PV2CurAdChanFault			
	G03	PV3CurAdChanFault			
	G04	PV4CurAdChanFault			
	G05	PV5CurAdChanFault			
	G06	PV6CurAdChanFault			
	G07	PV7CurAdChanFault			
	G08	PV8CurAdChanFault			
	G09	PV9CurAdChanFault			
	G10	PV10CurAdChanFault			
	G11	PV11CurAdChanFault			
System Fault	G12	PV12CurAdChanFault	Sampling hardware	Power off, then restart (Ref. Chapter8).If those faults occurs continuously and	
System r ddik	G13	BDCCurrAdChanFault	abnormal	frequently, please ask help for local distributors.	
	G14	TransCurAdChanFault			
	G15	BalBrigCurAdChanFault			
	G16	RInvCurAdChanFault			
	G17	SInvCurAdChanFault			
	G18	TInvCurAdChanFault			
	G19	RInvDciAdChanFault			
	G20	SInvDciAdChanFault			
	G21	TInvDciAdChanFault			
	G22	LeakCurAdChanFault			
	G23	VoltRefAdChanFault			
	G24	UpsRCurAdChanFault			



Type of Fault	Code	Name	Description	Recommend Solution		
	G25	UpsSCurAdChanFault				
	G26	UpsTCurAdChanFault				
	G27	GenRCurAdChanFault				
	G28	GenSCurAdChanFault				
	G29	GenTCurAdChanFault				
	G30	UpsRDcvAdChanFault				
	G31	UpsSDcvAdChanFault				
	G32	UpsTDcvAdChanFault				
	G37	TempAdChanFault	All temperature sensors abnormal			
	G38	VoltAdConflictFault	The sample value of PV, battery and BUS voltage inconsistent	Power off, then restart (Ref. Chapter8). If those faults occurs continuously and		
System Fault	G39	CPUAdConflictFault	The sample value between master CPU and slaver CPU inconsistent	frequently, please ask help for local distributors.		
	G40	PowerCalcConflictFault	Power value between PV, battery and AC output inconsistent			
	G41	EnvirOverTempFault	Installation environment			
	G42	EnvirLowTempFault	temperature over or low			
	G43	CoolingOverTempFault	Cooling temperature over	Change or improve the installation environment temperature, make running		
	G44	CoolingLowTempFault	or low	temperature suitable. • Power off, then restart (Ref. Chapter8).		
	G45	OverTemp3Fault		If those faults occurs continuously and frequently, please ask help for local distributors		
	G46	LowTemp3Fault	Temperature3 over or low	distributors.		
	G47	CpuOverTempFault	CPU temperature over			
	G48	ModelConflictFault	Version conflict with inverter	 Power off, then restart (Ref. Chapter8). If those faults occurs continuously and frequently, please ask help for local distributors. 		
	l01	InterFanWarning		Pomovo foreign matter legged in fore		
Inner Warnning	102	ExterFanWarning	Fan abnormal	Remove foreign matter logged in fan. If those faults occurs continuously and frequently, please ask help for local		
	103	Fan3Warning		distributors.		



Type of Fault	Code	Name	Description	Recommend Solution	
	104	EnvirTempAdChan- Warning		The warnings are not matter influence.	
	105	CoolingTempAdChan- Warning	Some temperature sensors abnormal	Power off, then restart (Ref. Chapter8). If those faults occurs continuously and frequently, please ask help for local	
	106	Temp3AdChanWarning		distributors.	
	107	ExtFlashComWarning	Flash abnormal		
Inner Warnning	108	EepromComWarning	Eeprom abnormal		
	109	SlaveComWarning	Communication between slaver CPU and master CPU abnormal	 Power off, then restart (Ref. Chapter8). If this those faults continuously and frequently, please ask help for local distributors. 	
	l10	HmiComWarning	HMI abnormal		
	l11	FreqCalcConflictWarning	Frequency value abnormal		
	l12	UnsetModel	Running model is not initial	Contact with local distributor.	
	J01	MeterComWarning	Meter/CT abnormal	Check the smart meter model, connection or connectors are correct, any loose. if abnormal, repair or change. Power off, then restart (Ref. Chapter8). If those faults occurs continuously and frequently, please ask help for local distributors.	
	J02	MeterConnectWarning	Wires connecting type of meter wrong	Check Meter/CT connection, installed place, and installed direction. if abnormal, re-installation. Power off, then restart (Ref. Chapter8). If this those faults continuously and frequently, please ask help for local distributors.	
Outside Warnning	J03	SohWarning	Battery SOH low	Contact with Battery manufacturer.	
	J04	GndAbnormalWarning	Earth impedance over by cable loose and so on	Check earth line connection or earth connecting impedance. if abnormal, then adjust it. Power off, then restart (Ref. Chapter8). If this those faults continuously and frequently, please ask help for local distributors.	
	J05	ParallelComWarning	Communication between master inverter and slaver ones abnormal in parallel mode	Check parallel connect communication wires damage, connectors loose, connect port correct or not. if not, then adjust it. Power off, then restart (Ref. Chapter8). If this those faults continuously and frequently, please ask help for local distributors.	

PV Input	SW1KLP1-EU	SW1.5KLP1-EU	SW2KLP1-EU	SW2.5KLP1-EU	SW3KLP1-EU	SW3.6KLP1-EU
Max. Input Power (kW)	1.5	2.3	3.0	3.8	4.5	5.4
Max. PV Voltage (V)			5	550		
MPPT Range (V)				- 500		
Full MPPT Range (V)	80 - 500	90 - 500	120 - 500	150 - 500	170 - 500	210 - 500
Normal Voltage (V)	100000000000000000000000000000000000000	H STATE OF THE		160	III 471,5455,555	PR7:00000
Startup Voltage (V)				100		
Max. Input Current (A)			18	5 x 1		
Max. Short Current (A)				5 x 1		
No. of MPP Tracker / No. of PV String				/1		
Battery Port				7.4		
Max. Charge/Discharge Power (kW)	1.0	1.5	2.0	2.5	3.0	3,6
Max. Charge/Discharge Current (A)	25	40	50	63	80	80
Battery Normal Voltage (V)	25	40		1.2	80	80
Battery Voltage Range (V)				- 60		
Battery Type			Li-ion / Le	ad-acid etc.		
AC Grid		7.0	10.0	120	110	47.0
Max Continuous Current (A)	5.0	7.0	10.0	12.0	14.0	17.0
Max Continuous Power (kVA)	1.0	1.5	2.0	2.5	3.0	3.6
Nominal Grid Current(A)	4.6 / 4.4	6.9 / 6.6	9.1 / 8.7	11.4 / 10.9	13.7 / 13.1	16.4 / 15.7
Nominal Grid Voltage (V)				/ 207 to 253 @ 230		
Nominal Grid Frequency (Hz)			50	/ 60		
Power Factor		0.999 (Ad	justable from 0.8 o	verexcited to 0.8 und	lerexcited)	
Current THD (%)				< 3		
AC Load Output						
Max Continuous Current (A)	5.0	7.0	10.0	12.0	14.0	17.0
Max Continuous Power (kVA)	1.0	1.5	2.0	2.5	3.0	3.6
Max Peak Current (A) (10min)	6.9 / 6.6	10.5 / 10.0	13.7 / 13.1	17.3 / 16.6	20.5 / 19.6	24.6 / 23.5
Max Peak Power (kVA) (10min)	1.5	2.3	3.0	3.8	4.5	5.4
Nominal AC Current (A)	4.6 / 4.4	6.9 / 6.6	9.1 / 8.7	11.4 / 10.9	13.7 / 13.1	16.4 / 15.7
Nominal AC Voltage L-N (V)	2004.224	3.57		/ 230		
Nominal AC Frequency (Hz)				/ 60		
Switching Time (s)				mless		
Voltage THD (%)				< 3		
Efficiency						
CEC Efficiency (%)			9	7.0		
Max. Efficiency (%)				7.6		
PV to Bat. Efficiency (%)				8.1		
Bat. between AC Efficiency (%)				6.8		
Protection			,	0.0		
PV Reverse Polarity Protection			-	res	-	1
Over Current/Voltage Protection				res res		
Anti-Islanding Protection				res res		
AC Short Circuit Protection				res (es		
Residual Current Detection						
				/es		
Ground Fault Monitoring				/es		
Insulation Resister Detection		Yes				
PV Arc Detection	Yes					
Enclosure Protect Level			IP65 /	NEMA4X		
General Data						
Dimensions (W x H x D, mm)				13 x 192		
Weight (kg)				17		
Topology				ormerless		
Cooling				gent Fan		
Relatively Humidity				100 %		
Operating Temperature Range (°C)				to 60		
Operating Altitude (m)		< 4000				
Noise Emission (dB)			<	25		
Standby Consumption (W)			<	10		
Mounting			Wall	Bracket		
Communication with RSD			SUN	VSPEC		
Display & Communication Interfaces			LCD, LED, RS485, 0	AN, WI-FI, GPRS, 4G		
Certification & Approvals	NRS097	, G98, EN50549-1, G		/DE-AR-N4105, VDE01	26, IEC62109-1, IE	C62109-2
EMC				2, EN61000-6-3		

PV Input	SW3KLP1-EU	SW3 .6KLP1-EU	SW4KLP1-EU	SW4.6KLP1-EU	W5KLP1-EU	SWS.5KLP1-EU	SW6KLP1-EU
Max. Input Power (kW)	4.5	5.4	6.0	6.9	7.5	8.3	9.0
Max. PV Voltage (V)				550			
MPPT Range (V)				80 - 500			
Full MPPT Range (V)	90 - 500	110 - 500	120 - 500	130 - 500	150 - 500	160 - 500	170 - 500
Normal Voltage (V)				360			
Startup Voltage (V)				100			
Max. Input Current (A)				18.5 x 2			
Max. Short Current (A)				26 x 2			
No. of MPP Tracker / No. of PV String				2/2			
Battery Port							
Max. Charge/Discharge Power (kW)	3.0	3.6	4.0	4.6	4.8	4.8	4.8
Max. Charge/Discharge Current (A)				80			
Battery Normal Voltage (V)				51.2			
Battery Voltage Range (V)				40 - 60			
Battery Type	Li-ion / Lead-acid etc.						
AC Grid							
Max Continuous Current (A)	14.0	17.0	19.0	22.0	23.0	26.0	28.0
Max Continuous Power (kVA)	3.0	3.6	4.0	4.6	5.0	5.5	6.0
Nominal Grid Current(A)	13.7 / 13.1	16.4 / 15.7	18.2 / 17.4	21.0 / 20.0	22.8 / 21.8	25.0 / 24.0	27.3 / 26.1
Nominal Grid Voltage (V)	,	,					,
Nominal Grid Frequency (Hz)	198 to 242 @ 220 / 207 to 253 @ 230 50 / 60						
Power Factor	CANCELLA CONTRACTOR DE LA CONTRACTOR DE						
Current THD (%)	0.999 (Adjustable from 0.8 overexcited to 0.8 underexcited) < 3						
AC Load Output				,,		1 20	
Max Continuous Current (A)	14.0	17.0	19.0	22.0	23.0	26.0	28.0
Max Continuous Power (kVA)	3.0	3.6	4.0	4.6	5.0	5.5	6.0
Max Peak Current (A) (10min)	20.5 / 19.6	24.6 / 23.5	27.3 / 26.1	31.4/30	34.1 / 32.7	37.8 / 36.1	41.0 / 39.2
Max Peak Power (kVA) (10min)							
Nominal AC Current (A)	4,5	5.4	6.0	6.9	7.5	8.3	9.0
Nominal AC Voltage L-N (V)	13.7 / 13.1	16.4 / 15.7	18.2 / 17.4	21.0 / 20.0	22.8 / 21.8	25.0 / 24.0	27.3 / 26.1
Nominal AC Frequency (Hz)				220 / 230			
	50 / 60 Samples						
Switching Time (s)	Seamless						
Voltage THD (%)				< 3			
Efficiency (IV)				97.0			
CEC Efficiency (%)				97.6			
Max. Efficiency (%) PV to Bat. Efficiency (%)				98.1			
				96.8			
Bat. between AC Efficiency (%)				90.0			
Protection PV Reverse Polarity Protection				Yes			
Over Current/Voltage Protection				Yes			
Anti-Islanding Protection				Yes			
AC Short Circuit Protection				Yes			
Residual Current Detection				Yes			
Ground Fault Monitoring				Yes			
Insulation Resister Detection				Yes			
PV Arc Detection				Yes			
Enclosure Protect Level				IP65 / NEMA4X			
General Data				IF 05 / NEW MARK		10 11	E.
Dimensions (W x H x D, mm)				370 x 513 x 192			
Weight (kg)				17			
Topology				Transformerless			
Cooling				Intelligent Fan			
Relatively Humidity				0 - 100 %			
				- 25 to 60			
Operating Temperature Kange (11)				< 4000			
Operating Temperature Range ("C) Operating Altitude (m)							
Operating Altitude (m)							
Operating Altitude (m) Noise Emission (dB)				< 25 < 10			
Operating Altitude (m) Noise Emission (dB) Standby Consumption (W)				< 10			
Operating Altitude (m) Noise Emission (dB) Standby Consumption (W) Mounting				< 10 Wall Bracket			
Operating Altitude (m) Noise Emission (dB) Standby Consumption (W) Mounting Communication with RSD			ICD IED	< 10 Wall Bracket SUNSPEC	GPRS AG		
Operating Altitude (m) Noise Emission (dB) Standby Consumption (W) Mounting	NBCNO	G98/G00 ENEA		< 10 Wall Bracket		IEC62109-1 IEC6	2109-2