Operating Manual

Low Voltage Retro Series





Version: RETRO-LV-1P-EU-1.07

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1. About This Manual

1.1 Products Covered by This Manual

Retro Series Low Voltage Solar Hybrid Inverter: Retro 2000, Retro 3000, Retro 3680, Retro 4600, Retro 5000.

1.2 Target Group

This document is intended for qualified electrician. Any electrical installation and maintenance on inverter must be performed by qualified electricians, in compliance with standards, wiring rules or requirements of local grid authorities or companies.

1.3 Symbols Used

The following types of safety precautions and general information symbols are used in this manual. These important instructions should be followed during installation, operation and maintenance of the inverter.

	Indicates a hazard with a high level of	
▲ DANGER	risk that will result in death or serious	
	injury.	
	Indicates a hazard with a medium	
⚠ WARNING	level of risk that can result in death or	
	serious injury.	
	Indicates a hazard with a low level of	
⚠ CAUTION	risk that can result in minor or moderate	
	injury.	
	Indicates a situation which, if not	
NOTICE	avoided, can results in property	
	damage.	

1.4 Storage of the Manual

The manual should be stored with other documents belonging to

the inverter and must be available to people authorized to work on the installation.

This manual will be updated if necessary. Please check <u>www.soltaro.com</u> for more information.

2. Safety

2.1 Intended Use

The **Retro Series** are single phase solar hybrid inverters suitable for both on-grid and off-grid operation. With Lithium batteries, PV panels and a smart meter, the hybrid inverter is the central device to make a solar storage system for increased self-consumption.

The **Retro Series** must only be connected with a safe lithium battery approved previously by SOLTARO. Please refer to your local distributor or visit our website for the list of approved batteries.

To prevent personal injury and property damage and to ensure long-term operation of the product, please read and follow all the instructions and cautions on the inverter and this user manual during installation, operation or maintenance at all times.

2.2 Important Safety Instructions

Danger to life from electric shock.

- Before performing any work on the inverter, disconnect all DC and AC power from inverter and wait for at least 5 minutes.
- Do not touch DC conductors or any non-isolated cable ends.
- If an error occurs, contact your local distributor or qualified electricians.
- Make sure the inverter is not touchable from children.

M WARNING

Risk of burns from hot surfaces.

- The surface of the inverter might exceed 60°C, touching the surface may result in burns.
- Do not touch hot surfaces before it cools down.
- Only authorized service personnel are allowed to install the inverter or perform servicing and maintenance
- All powers, both AC and DC, should be disconnected from inverter before attempting any maintenance or cleaning or working on any circuits connected to inverter.

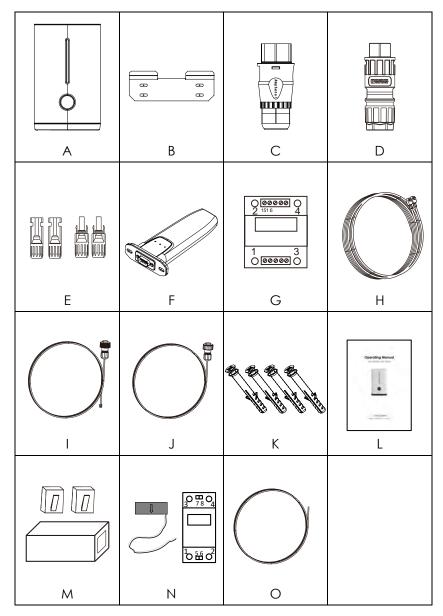
⚠ CAUTION

- The Inverter has a transformerless design on PV side. Either positive or negative terminals of PV panels should not be grounded.
- The frames of PV panels should be grounded for safety reasons.

NOTICE

- Do not open inverter cover or change any components without authorization, otherwise the warranty commitment for the inverter will be invalid.
- Appropriate methods must be adopted to protect inverter from electrostatic discharge, any damage caused by ESD is not warranted by the manufacturer.

3. Scope of Delivery



Item	QTY	Designation	
Α	1	Inverter	
В	1	Wall Mounting Bracket	
С	1	EPS Connector (Amphenol or Wieland)	
D	1	Grid Connector (Phoenix or Wieland)	
Е	2	DC Connectors for MPPT Box	
F	1	WiFi Stick	
G	1	Smart Meter (1#)	
Н	2	Battery Wires	
	1	BMS Cable	
J	1	Smart Meter Cable (1#)	
K	4	Screws for Fixing Mounting Bracket	
L	1	Manual	
М	2	RJ45 Connectors and Communication Cable	
//\		Extender	
N	1	Smart Meter (2#) with CT for PV Inverter	
0	1	Smart Meter Cable (2#)	

4. Product Description

Thank you for choosing a SOLTARO, hybrid solar inverter. Features of the SOLTARO inverter are ahead of the field.

4.1 View of the Inverter

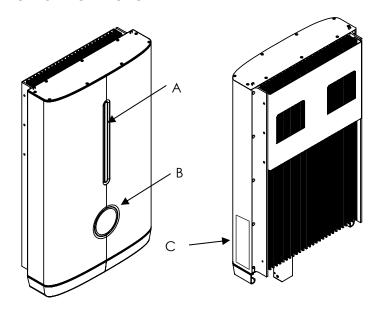


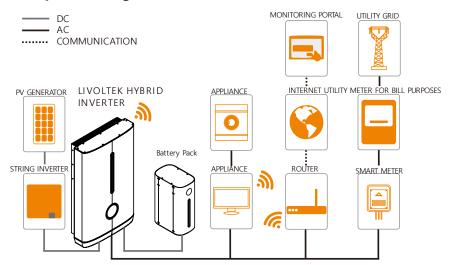
Figure 1. View of the Retro Series Hybrid Inverter

Position	Designation		
	LEDs		
Α	The LEDs indicate the operating status of the		
	inverter and SOC of the battery connected.		
B Graphical Display			
С	Label		

Symbols on the Type Label

Symbol	Explanation	
C€	CE Mark	
	Caution, Risk of Danger	
4	Caution, Risk of Electric Shock	
	Caution, Hot Surface.	
	Refer to the Operating Manual	
Smin	Danger, Risk of Electric Shock due to Stored Energy. Cut off all power and wait at least 5 minutes before any work is carried out on the inverter.	
G83 / C59	G83 or G59 Mark for UK.	
	RCM Mark for Australia and New Zealand.	
<u> </u>	WEEE Mark. This inverter should not be disposed as ordinary waste.	

4.2 System Diagram



4.3 Operating Mode Introduction

4.3.1 On Grid Self-Use Operating Mode

The on grid self-use operating mode is recommended for the system installed in area with a stable grid. The purpose is to increase self-consumption of the clean PV energy. When Inverter is set to work in this mode:

During daytime and there is sufficient PV Power,

- The PV energy is used to supply local loads with first priority and then charge the battery, excessive energy will be fed into grid*1*2.
- When battery is fully charged, PV energy is supplied to the local loads and fed into grid*1*2.

ii. During nighttime or there is not sufficient PV Power,

- Battery is discharged to supply local loads, if extra power is required, it will be imported from grid.
- When the battery SOC is below the setting value or fully discharged, the inverter will stop working and local loads will be supplied from grid.

 Thanks to the on-grid operation, the switch from battery power, PV power and grid power is automatically and seamless.

iii. When grid fails,

- When grid fails, the inverter will automatically disconnect from grid and outputs power to the EPS port.
- When battery is discharged to the SOC lower threshold, the inverter will stop working and wait for the grid to recovery or there is sufficient power from PV panels to charge the battery.
- If grid fail is not so rare in your area, please do not set the battery SOC lower threshold too low just in case.

iv. You can also:

- Make a schedule for the inverter to charge the battery using cheap off-peak grid power.
- Specify the daily working periods of self-use for inverter.
- *1: The inverter can be set not to feed power into the grid. But a small amount of energy will still inevitably be fed into grid due to unpredictable PV energy change and load on/off.
- *2: Firmware update may be required to support this function.

NOTICE

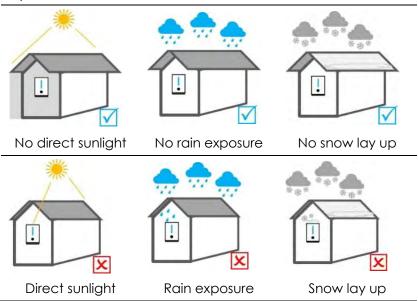
For on-grid self-use operating mode, one can set the discharge end SOC@Grid as low as the battery allows (10% or 20% for example). Please refer to your battery vendor for minimum discharging end SOC.

5. Mounting

5.1 Requirements for Mounting

NOTICE

Check to make sure the installation site does not fall into any of the following conditions: If any do, then a risk assessment will be required.



- Unsafe due to assessment of occupational health safety risks.
- The ambient temperature is outside the range of tolerable ambient temperature $(-25^{\circ}\text{C to } +60^{\circ}\text{C}, -13^{\circ}\text{F to } +140^{\circ}\text{F}).$
- Higher than the altitude of 2,000 m above sea level. Above 2000m the inverter output will be de-rated.
- Close to flammable materials or areas where flammable materials are stored.
- Prone to be damaged by sea water.
- Prone to be flooded or high levels of snow falls.
- Close to corrosive gas or liquid (for example, locations where

- chemicals are processed or stored).
- Exposed to direct sunlight or in an enclosure exposed to direct sunlight.
- Little or no air flow
- Mounted on a surface without suitable fire/heat rating.
- Mounted on a wall without suitable load holding capacity.
- High humidity.
- Sites considered unsafe because of local regulations.
- Confined space without adequate airflow.
- Area subject to sand or dust storms.
- Exposed to steam, vapor, or water.
- Near antenna and/or data cables.

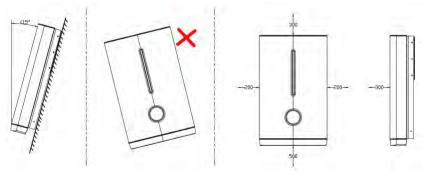
5.2 Mounting the Inverter

Procedure:

⚠ CAUTION

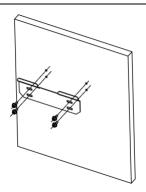
The converter must be mounted in upright position with a maximal tilt angle of 15 degree.

Minimum clearances around inverter should be applied, as the following figure shown.



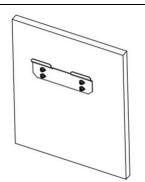
STEP 1:

 Please use the wall mounting bracket as template to drill 4 holes on walls.



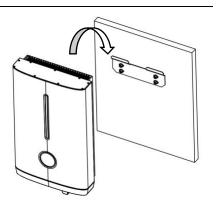
STEP 2:

 Use expansion bolts to fix the mounting bracket on the wall tightly.



STEP 3:

 Lift and hang the inverter on the bracket.



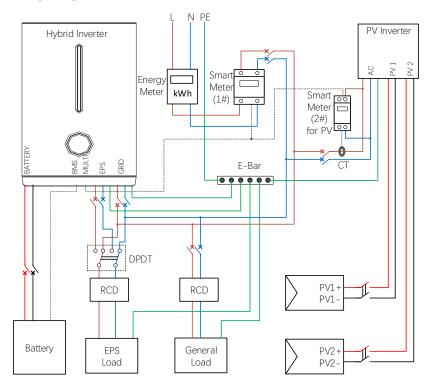
STEP 4:

• Peel off the protective film on the front surface.

6. Electrical Connection

6.1 Wiring Diagram

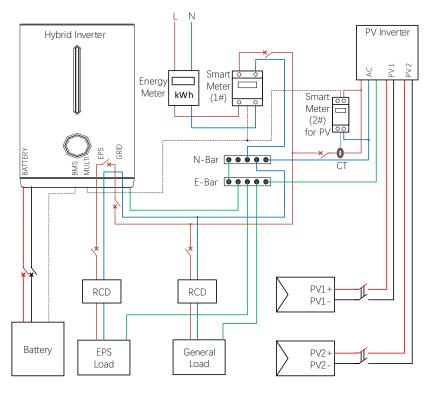
Wiring Diagram for European Countries



NOTICE

A built-in RCMU has been integrated in the inverter, which will exclude possibility of DC residual current to 6mA, thus type A RCDs can be used (≥30mA).

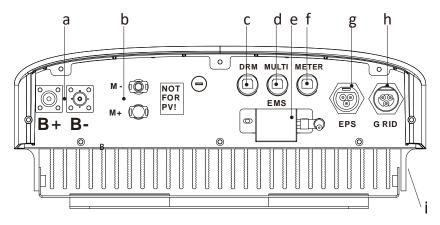
Wiring Diagram for Australia and New Zealand



⚠ WARNING

In Australia and New Zealand, electrical installation and maintenance shall be conducted by licensed electrician and shall comply with Australia/New Zealand National Wiring Rules. Because the inverter does not maintain neutral integrity, an external connection must be adopted in Australia and New Zealand.

6.2 Overview of the Connection Area



Position	Designation	
а	Battery Connectors	
b	MPPT Box Inputs	
С	DRM Port	
d	MULTI Port (for Meter & Other Communications)	
е	EMS Port (for WiFi Stick or other EMS Controllers)	
f	BMS Port	
g	EPS Output	
h	Grid Connector	
i	Additional Grounding Point	

6.3 Grid Connection

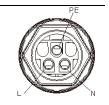
Please use the Grid connector from the accessory box for connection. Before connecting, please make sure:

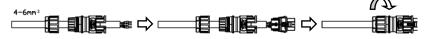
- The grid voltage and frequency must be in the permissible range.
- External AC switches (≥40A) must be used on both Grid connection to cut off the inverter from Grid when necessary.

Procedure:

STEP 1:

- Assemble the Grid connector.
- Make sure Live/Neutral/PE wire are correct, please follow the markings on the connector.





STEP 2:

 Connect the Grid plug to the inverter. If you are doing this right, there should be a "click" sound.



STEP 3:

 Connect an additional grounding wire to the heatsink and fasten the screw.



⚠ WARNING

High leakage current!

• Earth connection essential before connecting supply.

6.4 EPS Connection

If you want to use the energy storage system to power the house (as a standalone system or during Grid failure), the EPS connector should be used and the EPS function should be enabled in setup. Otherwise you could leave the EPS port un-connected.

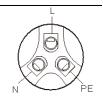
Before connecting, please make sure:

- The grid voltage and frequency must be in the permissible range.
- External AC switches must be used on EPS connection to cut off the inverter from EPS load when necessary.

Procedure:

STEP 1:

- Assemble the EPS connector.
- Make sure Live/Neutral/PE wire is correct, please follow the markings on the connector.



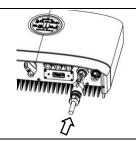






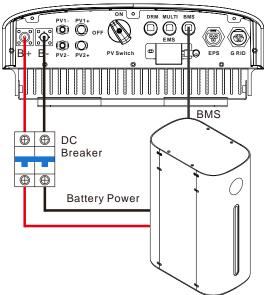
STEP 2:

 Connect the EPS plug to the inverter. If you are doing this right, there should be a "click" sound.



6.5 Battery Connection

Battery connection diagram

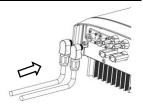


6.5.1 Battery Power Connection

Procedure:

STEP 1:

 Please use the pre-assembled battery power wire in the accessory box for connection.



STEP 2:

 The connector from wire to battery is not assembled, you need to contact with your battery vendor for detailed information.

⚠ CAUTION

A DC breaker with OCP function is compulsory to be installed between inverter and battery. The battery may have this

switch integrated. If not, an external DC switch of proper ratings should be used.

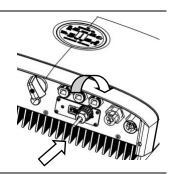
6.5.2 BMS Communication Connection

Please check whether the BMS communication cable in the accessory box is appropriate for the battery. If you are not sure for that, please confirm with your battery vendor.

Procedure:

STEP 1:

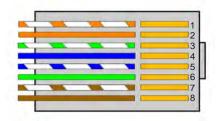
 Please insert the RJ45 connector with water-proof cap into the port marked with "BMS" on inverter and fasten the cap.



STEP 2:

 Please insert the other end of the cable in the corresponding port in battery.

BMS Connector Pin Definition:



- 1. BMS_CAN_H
- 2. BMS_CAN_L
- 3. BMS_485_A
- 4. GND
- 5. BMS_485_B
- 6. GND
- 7. NULL
- 8. NULL

6.6 Smart Meter (1#) Connection

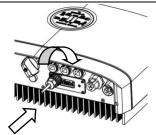
Procedure:

STEP 1:

 Normally the smart meter (1#) should be placed in or near the grid distribution box right after the billing meter.

STEP 2:

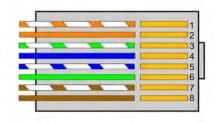
 Please use the smart meter cable (1#) in the accessory box for communication. Insert the RJ45 connector with water-proof cap into the port marked "MULTI" on inverter and fasten the cap.



STEP 3:

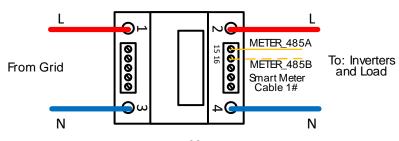
- The wires on the other end should be stripped and connected to the smart meter accordingly.
- If the cable length is not enough, please use the RJ45 extender in accessary box to extend the cable.

"MULTI" Connector Pin Definition



- METER_485B
- 2. METER 485A
- 3. GND
- 4. Reserved
- 5. Reserved
- 6. GND
- 7. Reserved
 - 8. Reserved

Smart meter type: CHINT DD\$U666-D



6.7 Smart Meter (2#) Connection

Procedure:

STEP 1:

• The smart meter (2#) with CT is for PV Inverter, and it could be placed near the PV inverter.

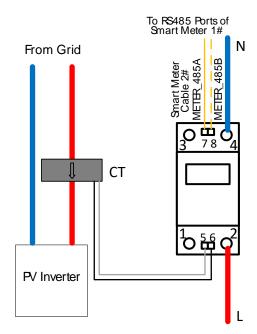
STEP 2:

- Install the CT onto the outputting Live Line (L) of the PV inverter. The arrow on CT should be pointed to PV inverter.
- Connect the sampling cable of the CT to the smart meter (2#).

STEP 3:

 Use the smart meter cable (2#) in the accessory box, to parallelly connect the RS485 terminals of the two smart meters (1# and 2#) accordingly.

Smart meter type: CHINT DDSU666-D

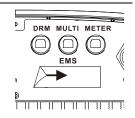


6.8 WiFi Stick Connection

Procedure:

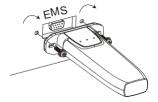
STEP 1:

 Peel off the tape that covers the EMS port.



STEP 2:

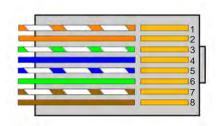
 Insert the WiFi stick to the EMS port and fasten the two screws tight.



6.9 DRM Connection

DRM is provided to support several demand response modes by certain control signals.

"DRM" Connector Pin Definition



- 1. DRM1/5
- 2. DRM2/6
- 3. DRM3/7
- 4. DRM4/8
- 5. 3.3V
- 6. DRM0
- 7. 3.3V
- 8. GND

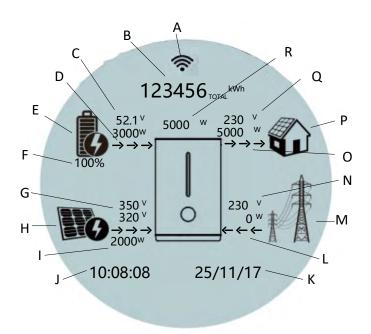
7. Operating of the Inverter

7.1 LEDs and Graphical Display

The LEDs indicate the operating state of the inverter and also battery SOC.

LED	Status	Explanation	
Green LED	Glowing	The inverter has been powered up.	
Red LED	Glowing	An Error has occurred.	
	Full Length	SOC > 75%	
	3 Bars	75% > SOC > 50%	
Blue LEDs	2 Bars	50% > SOC > 25%	
	1 Bar	25% > SOC > 10%	
	No Light	SOC < 10% or BMS not Connected	

The graphical display shows the detailed information of the inverter.



Position	Designation		
Α	EMS port communication status.		
В	Total energy the inverter has produced.		
С	Battery parameters, voltage and current are		
	displayed alternatively.		
D	Direction of the battery energy.		
Е	BMS Status.		
	if this label is not shown, BMS Connections should		
	be checked.		
F	SOC of the Battery.		
G	PV panels parameters, voltage and current are		
	displayed alternatively.		
Н	PV panels status.		
	If there's no PV voltage, this label will not be shown.		
	Total PV power generation		
J	Default as current time, when an error occurred,		

	fault code will be displayed alternatively.		
K	Default as current date, when an error occurred,		
	fault code will be displayed alternatively.		
L	Direction of the grid power.		
M	Grid status. If there's no grid, this label will not be		
	shown.		
N	Grid parameters, voltage and current are		
	displayed alternatively.		
0	Direction of the load power. If PV Inverter is		
	installed, it could feed power back into the grid.		
Р	Indicating local load.		
Q	Load parameters, voltage and current are		
	displayed alternatively.		
R	Current power of the inverter.		

7.2 Commission

Before commissioning the inverter, make sure:

- The country mark on the box is in accordance with the installation site;
- The inverter is correctly and firmly mounted;
- The Circuit breaker and RCD are correctly connected and are all in "off" position;
- All cables are connected according to chapter 6;
- Unused inputs must be sealed using the corresponding connectors or sealing plugs.

Procedure:

STEP 1: Power on the grid

 Wait for a while, the green led should be glowing and the graphical display should start displaying. Item "L", "M", "N", should appear on the screen. If not, please power off and check for the connections of grid power line and smart meter.

STEP 2: Power on the battery

 The battery icon and its parameters should be shown on the screen. If the SOC of the battery is greater than 5%, the blue LEDs should also be turned on to indicate the SOC.

STEP 3: Switch on the loads

The load parameters should show.

STEP 4: Configure the WiFi stick

 Configure the WiFi stick for remote monitoring. Please follow the instructions manual in the WiFi stick's box.

STEP 5: Self-test in accordance with CEI 0-21 (Italy Only)

- The self-test is only required for inverters to be commissioned in Italy. During the self-test, the inverter will consecutively check the reaction times for: overvoltage, undervoltage, maximum frequency and minimum frequency.
- Please use the SOLTARO APP to initiate the self-test procedure and get the test results. Refer to SOLTARO APP Operation Instructions for details.

7.3 Decommission

STEP 1: Turn off the load;

STEP 2: Turn off battery;

STEP 3: Turn off the main grid switch;

STEP 4: Wait for at least 5 minutes after the LED and graphical display black out for the internal circuits to discharges energy;

STEP 5: Disconnect all the power cable;

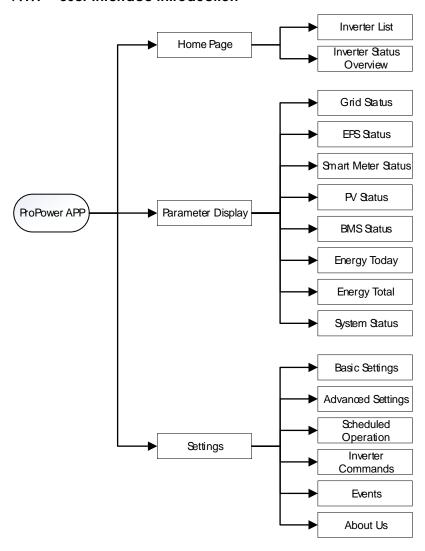
STEP 6: Disconnect all the communication cable, Remove the WiFi stick;

STEP 7: Remove the inverter from the wall, also remove the bracket if necessary;

STEP 8: Pack the inverter with the original carton, and store it.

7.1 Settings on the LIVOLTEK APP

7.1.1 User Interface Introduction



7.1.2 Install the APP and Connect to the Inverter

Procedure:

STEP 1: Install LIVOLTEK APP

 Download the app on iOS APP Store and/or Google Play, and install it on the mobile phone or pad.

STEP 2: Connect to the inverter

- Connect the mobile phone or pad to the same wireless network (WiFi) of the inverter;
- Open the APP, click the arrow on the upper right corner of home page;
- Search the inverter ID, and connect to target inverter;
- If it is successfully connected, the home page will show the general status of the inverter. One can also check the detailed status in the Parameter interface.







7.1.3 Check the Country

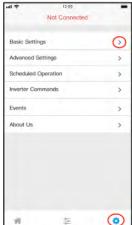
Procedure:

STEP 1: Enter the Setting interface

- Turn to Settings interface, click the "Basic Settings";
- Write in the password, to enter the setting interface.

STEP 2: Set the country

- Check the "Country", make sure it is your current location;
- If it is not your current location, please choose the right country, and click "Apply" to save the setting.







7.1.4 Time Synchronization

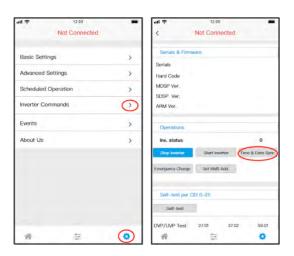
Procedure:

STEP 1: Enter the Setting interface

• Turn to Settings interface, click the "Inverter Commands".

STEP 2: Time Synchronization

• Click the "Time & Date Sync.".



7.1.5 Self-test (for Italy only)

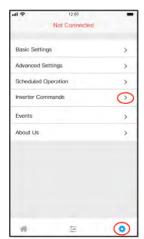
Procedure:

STEP 1: Enter the Setting interface

Turn to Settings interface, click the "Inverter Commands".

STEP 2: Self-test

- Click the "Self-test";
- The self-test will be finished within several minutes; Normally the test results should be all "pass";
- If there are "fails" in the test results, please do the self-test again; If still fail, please contact the distributor or manufacturer for more information.







7.1.6 Battery Parallel Connection Setting

If there are more than one battery connected parallelly in the system, one should do the following settings.

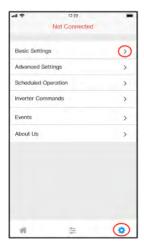
Procedure:

STEP 1: Enter the Setting interface

• Turn to Settings interface, click the "Basic Settings".

STEP 2: Set the number of paralleled batteries

- Click the "Battery BMS";
- Write in the number of paralleled batteries;
- Click "Apply", to save the settings.





7.1.7 Scheduled Operation (optional)

Procedure:

STEP 1: Enter the Setting interface

Turn to Settings interface, click the "Schedule Operation".

STEP 2: Set the Operation Periods and Parameter

- Enable the Scheduled Operation;
- Set the daily/weekly mode, according to your situation;
- Set the operation period and parameters, according to your requirement;
- One can also set the discharge period for the EPS mode, if necessary.
- Click "Apply" to save the setting.

NOTICE

If the scheduled periods conflict, the priority of period 1 is higher than period 2, which is higher than period 3, and so on.







7.1.8 Other Settings (optional)

One may do the following settings, according to the situations and/or local regulations.

Settings other than the following, may also be available, but should be under the suggestions or assistance of distributors/manufacturer.

Procedure:

STEP 1: Enter the Setting interface

Turn to Settings interface, click the "Basic Settings".

STEP 2: Max. Charge/Discharge Current

- Click the "Battery BMS";
- Set the max. charge/discharge current according to requirement, which should not exceed the limitation of battery;
- Click "Apply", to save the settings.

STEP 2: Inverter Power Limitation

- Click "Inverter";
- Set the power limitation, according to your situation and/or local regulations;
- Click "Apply", to save the settings.







8. Troubleshooting

Error Code

F1:00000001

This chapter is a guide for troubleshooting problems that may arise in the installation and operation of Retro series inverters. In the event that more than one error is generated at the same time, the hexadecimal error corresponding to each alarm are added together. That is to say, if error code 0006H is displayed, errors 0002H and 0004H are being produced simultaneously.

Check the configuration of

Description

PV1 OVP

F1:00000001	PVIOVP	Check the configuration of
F1:00000002	PV1 OCPs	connected PV Panels.
F1:0000004	PV2 OVP	
F1:00000008	PV2 OCPs	
F1:0000010	PV1 OCPh	
F1:00000020	PV2 OCPh	
F1:00000100	Grid Voltage Abnormal	Check if grid fails.
F1:00000200	Grid Frequency	
	Abnormal	
F1:00000400	DC Bus OVP	These errors will reset itself. If it
F1:00000800	AC OCPs	keeps coming and finally the
F1:00001000	DC Component of AC	Inverter is latched up, please
	Current Abnormal	contact with your local
F1:00002000	Leakage Current	distributor.
	Protection	
F1:00004000	AC OCPh	
F1:00010000	EPS Voltage Abnormal	Check the EPS load. Unplug
F1:00020000	EPS OCP	some to see if too much loads
F1:00040000	EPS Over Power	are connected.
F1:00080000	EPS SCP	
Error Code	Description	Solution
F1:00100000	Over Heat P1	Wait for the Inverter cools
F1:00200000	Over Heat P2	down. Check if the
F1:00400000	Over Heat P3	installation place is too hot.
F1:00800000	Bat. OTP	These errors will reset itself. If it
F1:01000000	Bat. Voltage Protection	keeps coming and finally the
F1:02000000	Bat. OCP1	Inverter is latched up, please
F1:04000000	Bat. OCP2	contact with your local
F1:08000000	Bat. OCP3	distributor.
F1:10000000	Bat. OCP4	
F1:20000000	Internal OVP1	
F1:40000000	Internal OVP2	
F1:80000000	Internal OVP3	1
F2:0000001	Grid Grounding Fault	Check the grounding wire.
F2:00000002	L/N Reversely	Check the L/N wire.
	Connected	
	Connected	

F2:00000004 Insulation Fault		Check the insulation of PV panels.
F2:00000008	RCMU Fault	Check the PV Panels.
F2:0000010	Grid Relay Fault	These errors will reset itself. If it
F2:00000020	EPS Relay Fault	keeps coming and finally the
F2:0000040	Bypass Relay Fault	Inverter is latched up, please
F2:00000080	EEPROM1 Error	contact with your local
F2:00000100	Single Faults	distributor.
F2:00000200	Internal Comm. F1	
F2:00000400	Internal Comm. F2	
F2:00000800	Internal Comm. F3	

Error Code	Description	Solution	
F3:0000001	BMS External Fault	Check the battery for	
F3:00000002	BMS Internal Fault	parameter settings. Contact	
F3:0000004	BMS OVP	with your local battery's	
F3:00000008	BMS UVP	distributor.	
F3:0000010	BMS Charge OCP	Check the battery for	
F3:00000020	BMS Discharge OCP	parameter settings. Contact	
F3:0000040	BMS OTP	with your local battery's	
F3:00000080	BMS UTP	distributor.	
F3:00000100	Cell Imbalance		
F3:00000400	Meter Comm. Fault	Please check the communication cable for smart meter. If the length > 10m, a 120-ohm resistor should be connected to the meter.	
F3:00000800	Internal Comm. F5	These errors will reset itself. If it	
F3:00001000	Internal Comm. F6	keeps coming and finally the	
F3:00002000	EEPROM2 Error	 Inverter is latched up, please contact with your local distributor. 	

9. Technical Data

9.1 Retro 2000/3000

AC Ratings	Retro 2000	Retro 3000	
Rated AC Power	2000VA	3000VA	
Rated AC Voltage	230V a.c.		
AC Voltage Range	180V~264V a.c.		
Rated AC Frequency	50Hz/60Hz		
Max. AC Current to Grid	9.74.00	13A a.c.	
(Feed Back Current)	8.7A a.c.	TSA G.C.	
Max. AC Current from Grid (Bypass + Grid Charge)	17.4A a.c.	26A a.c.	
Max. Output Overcurrent	054 = =	20 4	
Protection	25A a.c.	32A a.c.	
Power Factor Range	***	~+0.8	
Total Harmonic Distortions (i)	<3%		
Inrush Current (Peak/Duration)	120A/32us		
Max. Output Fault Current (Peak/Duration)	200A/10ms		
EPS Ratings	Retro 2000	Retro 3000	
EPS Rated Power	2000VA	3000VA	
Overload Capacity	1.1 x Pnom, 10 sec;	: 1.5 x Pnom, 100 ms	
EPS Rated Voltage	230V a.c.		
EPS Rated Frequency	50Hz / 60Hz		
EPS Rated Current	8.7A	13A	
Changeover Time	<2s in EPS Mode, 10~20ms in UPS Mode		
Total Harmonic Distortion (V)	<	3%	
Parallel Operation	No		
Battery Ratings	Retro 2000	Retro 3000	
Battery Type	Lithium		
Rated Battery Voltage	48V d.c.		
Battery Voltage Range	40~60V d.c.		
Max. Charge Current	40A d.c.	60A d.c.	
Max. Discharge Current	40A d.c.	60A d.c.	
PS Max. (per CEI 0-21)	1900W	2800W	
PC Max. (per CEI 0-21)	2000W	3000W	
Galvanic Isolation for Battery	YES		
Communication Interfaces	CAN/RS485		
Efficiencies	Retro 2000	Retro 3000	
MPPT Efficiency	99.9%	99.9%	
Euro Efficiency	97.0%	97.0%	

Max. Efficiency	97.5%	97.5%	
Max. PV to Bat. Efficiency	95%	95%	
Max. PV to AC Efficiency	94%	94%	
Protections	Retro 2000	Retro 3000	
OVP/UVP	YES	YES	
OCP/OLP	YES	YES	
PV Insulation Protection	YES	YES	
Grounding Fault Monitoring	YES	YES	
Grid Protection	YES	YES	
DC Injection Protection	YES	YES	
Back Feed Current Monitoring	YES	YES	
Residual Current Detection	YES	YES	
Anti-islanding Protection	YES	YES	
General	Retro 2000	Retro 3000	
Dimensions (LxHxD)	415*560*145mm		
Weight	28kg 28kg		
Mounting Type	Wall Mount		
Operating Temperature	-20~+60 Degree C		
Storage Temperature	-20~+60 Degree C		
Humidity	4%~100%, Condensing		
Ingress Protection	IP65 (outdoor)		
Protective Class	l		
Over Voltage Category	III (mains), II(PV)		
Pollution Degree	III		
Cooling Method	Natural		
Noise Level	<40dB		

9.2 Retro 3680/4600/5000

AC Ratings	Retro 3680	Retro 4600	Retro 5000	
Rated AC Power	3680VA	4600VA	5000VA	
Rated AC Voltage		230V a.c.		
AC Voltage Range	180V~264V a.c.			
Rated AC Frequency	50Hz/60Hz			
Max. AC Current to Grid (Feed Back Current)	16A a.c.	20A a.c.	21.7A a.c.	
Max. AC Current from Grid (Bypass + Grid Charge)	30A a.c.	30A a.c.	30A a.c.	
Max. Output Overcurrent Protection	40A a.c.	40A a.c.	40A a.c.	
Power Factor Range		-0.8~+0.8		
Total Harmonic Distortions (i)		<3%		
Inrush Current (Peak/Duration)	120A/32us			
Max. Output Fault Current (Peak/Duration)	200A/10ms			
EPS Ratings	Retro 3680	Retro 4600	Retro 5000	
EPS Rated Power	4000VA	5000VA	5000VA	
Overload Capacity	1.1 x Pnom	, 10 sec; 1.5 x Pno	om, 100 ms	
EPS Rated Voltage		230V a.c.		
EPS Rated Frequency		50Hz/60Hz		
EPS Rated Current	17.4A	21.7A	21.7A	
Changeover Time	2s in EPS	Mode, 10ms in U	PS Mode	
Total Harmonic Distortion (V)		< 3%		
Parallel Operation		No		
Battery Ratings	Retro 3680	Retro 4600	Retro 5000	
Battery Type	Lithium			
Rated Battery Voltage	48V d.c.			
Battery Voltage Range	40~60V d.c.			
Max. Charge Current	60A d.c.	100A d.c.	100A d.c.	
Max. Discharge Current	60A d.c.	100A d.c.	100A d.c.	
PS Max. (per CEI 0-21)	2800W	4600W	4700W	
PC Max. (per CEI 0-21)	3600W	4600W	5000W	
Galvanic Isolation for Battery		YES		
Communication Interfaces		CAN/R\$485		
Efficiencies	Retro 3680	Retro 4600	Retro 5000	
MPPT Efficiency	99.9%	99.9%	99.9%	
Euro Efficiency	97.0%	97.0%	97.0%	
Max. Efficiency	97.5%	97.5%	97.5%	
Max. PV to Bat. Efficiency	95%	95%	95%	
Max. PV to AC Efficiency	94%	94%	94%	

Protections	Retro 3680	Retro 4600	Retro 5000	
OVP/UVP	YES	YES	YES	
OCP/OLP	YES	YES	YES	
PV Insulation Protection	YES	YES	YES	
Grounding Fault Monitoring	YES	YES	YES	
Grid Protection	YES	YES	YES	
DC Injection Protection	YES	YES	YES	
Back Feed Current Monitoring	YES	YES	YES	
Residual Current Detection	YES	YES	YES	
Anti-islanding Protection	YES	YES	YES	
General	Retro 3680	Retro 4600	Retro 5000	
Dimensions (LxHxD)	415*675*145mm			
Weight	33kg	35kg	35kg	
Mounting Type	Wall Mount			
Operating Temperature		-20~+60 Degree C		
Storage Temperature	-20~+60 Degree C			
Humidity	4%~100%, Condensing			
Ingress Protection	IP65 (outdoor)			
Protective Class	I			
Over Voltage Category	III (mains), II(PV)			
Pollution Degree	III			
Cooling Method	Natural			
Noise Level	<40dB			

9.3 Certificates and Grid Regulations

• EMC:

EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4, EN61000-4-16, EN61000-4-18, EN61000-4-29

Safety:

IEC/EN62109-1 & -2,

IEC62040-1

• Grid Regulations:

G83/2, G59/3;

AS/NZS4777.2;

C10/11;

CEI 0-21;

RD1699;

C 15-712-1;

VDE-AR-N 4105;

EN50438/NL;

EN50438/IE.

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