

RI-ENERGYFLOW-3P-SERIES-25

RI-ENERGYFLOW

3P-SERIES-25

Solar Inverter



User Manual

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1. Introduction

1.1 Introduction

This manual describes solar inverters :










RI-ENERGYFLOW-3P-SERIES25-10KW /15KW /17KW /20KW /25KW.

These inverters are transformerless based inverter.

Please read the safety instructions in this manual first. Throughout the manual it is assumed that the reader is familiar with AC and DC installations and knows the rules and regulations for electrical equipment and for connecting it to the utility AC grid. It is especially important to be familiar with the general safety rules for working with electrical equipment.

1.2 Applied designations

Throughout the manual important information is shown at different levels depending on the character of the information, as shown here:

	Safety information important for human safety. Violation of warnings may result in injury to persons or death.
	Danger of high voltage and electric shock!
	Signals danger due to electrical shock and indicates the time (5 minutes) to allow after the inverter has been turned off and disconnected to ensure safety in any installation operation.
	Danger of hot surface!
	Product should not be disposed as normal household waste.
	CE Mark
	UK CA Mark
	Information important for the protection of property. Violation of this type of information may cause damage and loss of property.
	Useful additional information or "Tips and Tricks" on specific subjects.

1.3 Important safety information

Read this before installing, operating or maintaining the inverter.

**Before installation:**

Check for damage to inverter and packaging. If you are in doubt, please contact your supplier before installing the inverter. Check the voltages of the solar modules and make sure they are within the limits of the inverter specifications before connecting them to the inverter.

Installation:

Only trained and authorized personnel familiar with local electrical codes may install the inverter. For optimum safety, please follow the steps described in this manual. Keep in mind that the inverter has two voltage carrying sides, the PV input and the AC grid.

Disconnecting the inverter:

Always disconnect the AC line first! Afterwards disconnect the PV lines. Note that the inverter can still be charged with very high voltages at hazardous levels even when it is disconnected from grid and solar modules. Wait at least 5 min. before proceeding, after having disconnected from grid and PV panels.

Operating the inverter:

Before connecting the AC grid to the inverter, make sure that the installation cover is mounted again. The inverter must not be open during operation.

Maintenance and modification:

Only authorized personnel are allowed to repair or modify the inverter. To ensure optimum safety for user and environment, only the original spare parts available from your supplier should be used.

Functional safety parameters:

Unauthorized changes of functional safety parameters may cause injury or accidents to people or inverter. Additionally it will lead to the cancelling of all inverter operating approval certificates.

1.4 System sizing



When dimensioning a photovoltaic system, it must be ensured that the open circuit voltage of the PV string never exceeds the maximum permissible input voltage of 1100V DC. The PV string open circuit voltage during parallel string operation is 1000V. Higher voltages may result in permanent damage to the inverter.

The selection of PV string output should be based on the optimum utilization of the invested capital compared to the expected annual energy yield from the system. This optimization depends on local weather conditions and should be considered in each individual case.

The inverter incorporates an input power limiting device, which automatically keeps the power at levels that are safe for the inverter. The limitation depends mainly on internal and ambient temperatures. The limitation is calculated continuously and always allows the maximum possible amount of energy to be produced.

2. Technical description of inverters

2.1 Mechanical design

Figure 2-1 shows the outline dimensions and electrical terminals of:
RI-ENERGYFLOW-3P-SERIES-25-10KW /15KW /17KW /20KW /25KW:

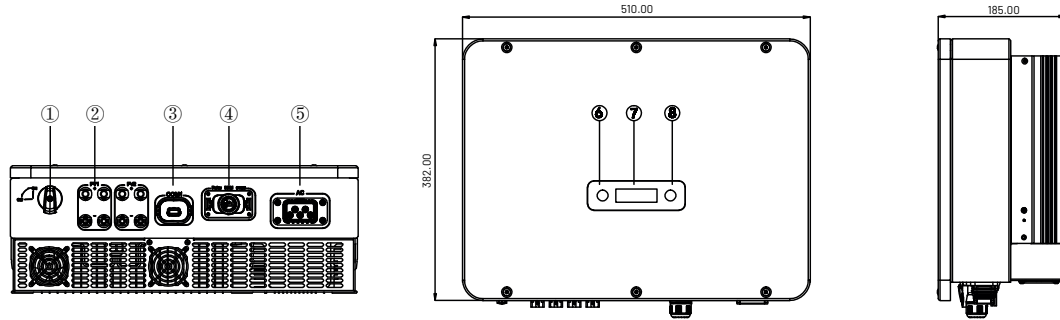


Figure 2-1 Outline dimensions

1	DC Switch	2	DC (PV terminals)
3	Communication port	4	I/O port
5	AC terminal	6	LED (Run/Fault)
7	LCD	8	Key



For safety reasons, the use of a DC switch is recommended. Between the PV modules and the power modules may be mandatory in some countries.

2.2 Electrical system design

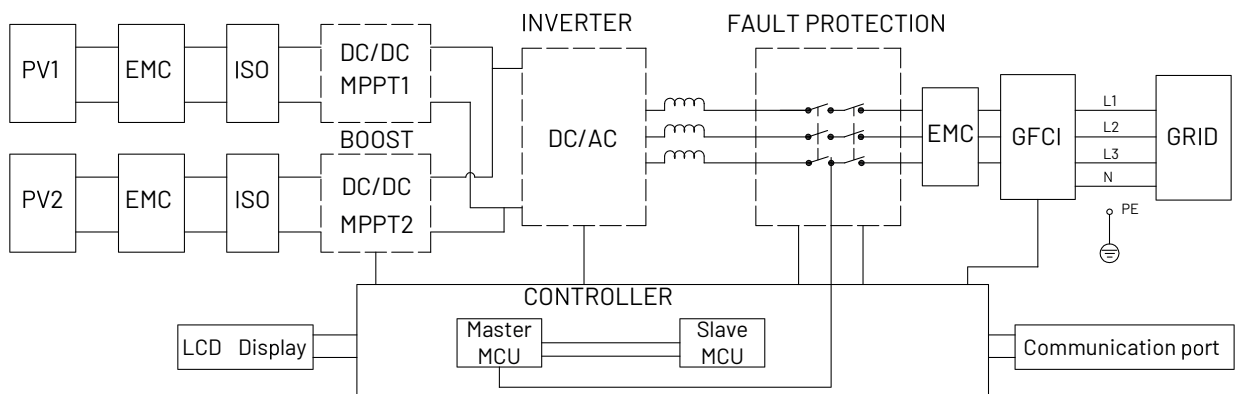


Figure 2-2 wiring diagram of the inverter system

Please refer to chapter 3 for the detail connecting and install methods.

2.3 Technical data

RI-ENERGYFLOW-3P-SERIES-25-	10KW	15KW	17KW	20KW	25KW
DC Input Data					
Max. Recommended PV Power	15000 W	22500 W	25500 W	30000 W	37500 W
Max.DC Input Voltage	1100 V				
MPPT Voltage Range	150 ~ 1000 V				
MPPT Voltage Range (full load)	300-850V	420-850V	420-850V	420-850V	480-850V
Rated Input Voltage	630V				
Start-up Voltage	165 V				
No. of MPP Trackers	2				
No. of Input Strings per Tracker	1 / 1	2 / 1	2 / 2	2 / 2	2 / 2
Max. DC Input Current	20A/20A	30A/20A	30A/30A	30A/30A	30A*/30A
DC Switch	Integrated				
AC Output Data					
Rated AC Power	10000 W	15000 W	17000 W	20000 W	25000 W
Max.Output Power	11000 VA	16500 VA	18700 VA	22000 VA	27500VA
Max. AC Current	16 A	24 A	27.1 A	31.9 A	40 A
Rated AC Voltage / Range	3/PE 380, 400;+/-20%; 3/N/PE 380, 400;+/-20%				
Grid Frequency / Range	50Hz/60Hz ; ±5Hz				
Adjustable Power Factor [cos φ]	0.8leading ~0.8lagging				
Output THDi (@Rated Output)	< 3%				
Efficiency					
Max.Efficiency	98.30%	98.30%	98.40%	98.50%	98.50%
Euro Efficiency	98.00%	98.00%	98.10%	98.20%	98.20%
MPPT Efficiency	99.90%	99.90%	99.90%	99.90%	99.90%
Protection					
DC Insulation Monitoring	Integrated				
Input Reverse Polarity Protection	Integrated				
Anti-island Protection	Integrated				
Residual Current Monitoring	Integrated				
Over-heat Protection	Integrated				
AC Overcurrent Protection	Integrated				
AC Short-circuit Protection	Integrated				



AC Overvoltage Protection		Integrated			
DC Surge Protection		Type III			
AC Surge Protection		Type III (Type II optional)			
General Data					
Size(Width*Height*Depth)	506 x 386 x 185mm				
Weight	23kg				
User Interface	LCD				
Communication	RS485 (Standard), Wifi or GPRS				
Ambient Temperature Range	-25 ℃ ~ 60 ℃				
Relative Humidity	0 - 100%				
Operating Altitude	≤ 4000m				
Standby Self Consumption	< 0.2W				
Topology	Transformerless				
Cooling	Natural	Natural	Fan	Fan	Fan
Protection Grades	IP65				
Noise	< 30dB		< 45dB		
Warranty	5 / 7 / 10 years				
Certifications & Standards					
Grid Regulation	IEC61727, IEC62116, IEC60068, IEC61683				
Safety Regulation	IEC 62109-1, IEC 62109-2				
EMC	EN 61000-3-2, EN 61000-3-3, EN 61000-6-2, EN 61000-6-3, EN 61000-3-11, EN 61000-3-12,IEC61000-4-16, IEC61000-4-18, IEC61000-4-29				

*1: The maximum DC input current for RI-ENERGYFLOW-3P-SERIES-25-25KW is 37.5A

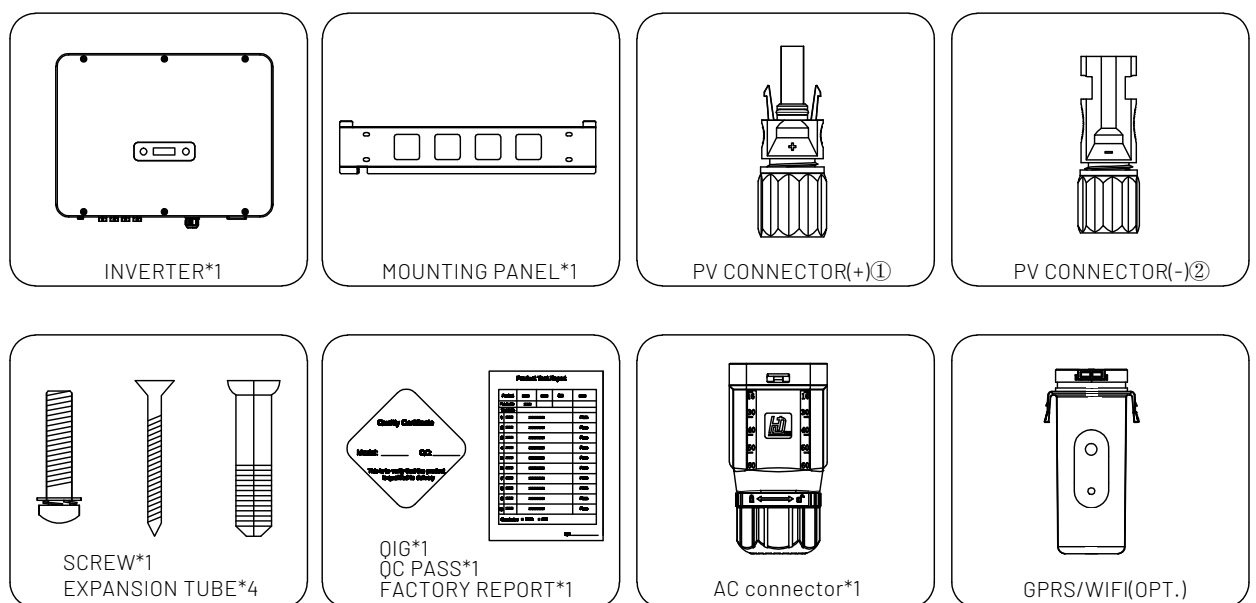
2.4 Grid codes

No.	National / Regional Grid Code	Description
1	VDE4105-DE	Germany power Grid, meet Grid standards "VDE-AR-N-4105".
2	CEI0-21	Italy power Grid.
3	AS4777	Australia power Grid.
4	RD1699	Spain power Grid.
5	EN50549-TR	Turkey power Grid.
6	EN50549-DK	Denmark power Grid.
7	Greece	Greece power Grid.
8	EN50549-NL	Netherland power Grid, meet Grid standards "EN50438".
9	C10/11	Belgium power Grid.
10	G59	UK power Grid.
11	China	China power Grid, meet Grid standards "CN-NBT".
12	VDE0126-FR	France power Grid, meet Grid standards "VDE 0126".
13	EN50549-PL	Poland power Grid.
14	BDEW-DE	Germany power Grid, meet Grid standards "BDEW-MV".
15	VDE0126-DE	Germany power Grid, meet Grid standards "VDE 0126".
16	CEI0-16	Italy power Grid, meet Grid standards "CEI 0-16".
17	G83	UK power Grid.
18	Greece Island	Greece Island power Grid.
19	EN50549-CZ	Czech Republic power Grid, meet Grid standards "EN50438Y2007-CZ".
20	IEC61727	India power Grid.
21	Korea	Korea power Grid.
22	EN50549-SW	Sweden power Grid.
23	China-W	China power Grid, Grid voltage range: 160-290V. Grid frequency range: 47-53HZ.
24	China-H	China power Grid, meet standards "CQC".
25	IEC61727-IN	India power Grid, meet Grid standards "IEC61727".
26	Brazil	Brazil power Grid, meet Grid standards "NBT 16150".
27	IEC61727-SL	Sri Lanka power Grid, meet Grid standards "IEC61727".
28	Mexico	Mexico power Grid, meet Grid standards "IEC61727 60HZ".
29	NZ4777	New Zealand power Grid.
30	Philippines	Philippines power Grid, meet Grid standards "IEC61727 60HZ spec".
31	IEC61727-SL-W	Sri Lanka power Grid, Grid voltage range: 160-290V, Grid frequency range: 47-53HZ.
32	PEA	Thailand power Grid.
33	PEA-W	Thailand power Grid, Grid voltage range: 160-290V, Grid frequency range: 47-53HZ.
34	IEC61627-VN	Vietnam power Grid.
35	IEC61627-VN-W	Vietnam power Grid, Grid voltage range: 160-290V, Grid frequency range: 47-53HZ.
36	MEA	Thailand power Grid.
37	MEA-W	Thailand power Grid, Grid voltage range: 160-290V, Grid frequency range: 47-53HZ.
38	Tunisia	Tunisia power Grid.
39	Tunisia-W	Tunisia power Grid, Grid voltage range: 160-290V, Grid frequency range: 47-53HZ.

3. Installation and startup

	<p>Warning!</p> <p>Before installation and maintenance ensure that both the AC and DC sides are fully isolated. Note that if the DC side is just disconnected the capacitors still retain charge. Wait at least 5 minutes to ensure that the capacitors have fully discharged all residual energy before proceeding with any installation or maintenance.</p>
	<p>Note!</p> <p>Inverters must be installed by a qualified electrician.</p>

3.1 Package information



① There are 2 PV+ connectors for RI-ENERGYFLOW-3P-SERIES-25-10KW, 3 PV+ connectors for /15KW and 4 PV+ connectors for /17KW /20KW /25KW

② There are 2 PV- connectors for RI-ENERGYFLOW-3P-SERIES-25-10KW, 3 PV+ connectors for /15KW and 4 PV+ connectors for /17KW /20KW /25KW

Figure 3-1 package information

3.2 Installation environment

- 1) In order to achieve optimal performance, the ambient temperature should be kept lower than 45 °C.
- 2) For the convenience of checking the LCD display and possible maintenance activities, please install the inverter at eye level.
- 3) Inverters should not be installed near inflammable or explosive items. Any strong electro-magnetic equipment should be kept away from installation site.
- 4) Product label and warning symbol shall be clear to read after installation.
- 5) Please do not install inverter under direct sunlight, rain and snow.

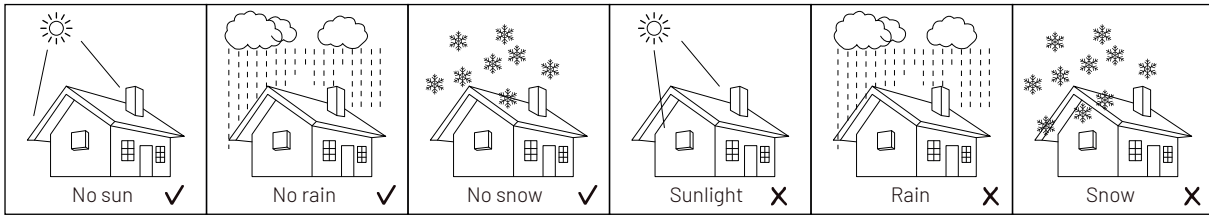


Figure 3-2 installation environment

3.3 Installation position



- 1) The installation method and mounting location must be suitable for the inverter's weight and dimensions.
- 2) Mount on a solid surface.
- 3) Select a well-ventilated place sheltered from direct sun radiation.

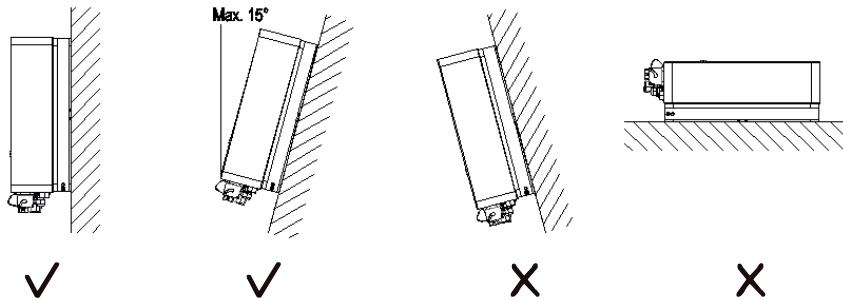


Figure 3-2 installation position

In consideration of heat dissipation and convenient dismantlement, the minimum clearances around the inverter should be no less than the following value.

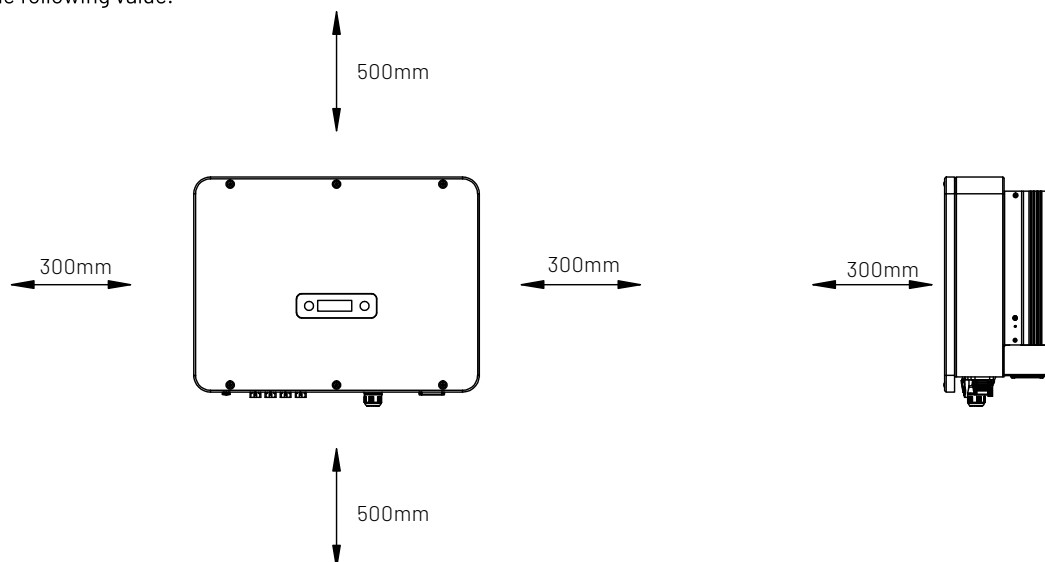


Figure 3-3 Distance required of Invertors

3.4 Mounting procedure

Step 1: Drill 4 x Ø10mm holes in the wall as dimensions below.

Step 2: Affix the mounting bracket to the wall using the 4 expansion bolts supplied in the accessories bag.

Step 3: Hang the inverter on the wall-mounted bracket and secure it in place using the fixing screws.

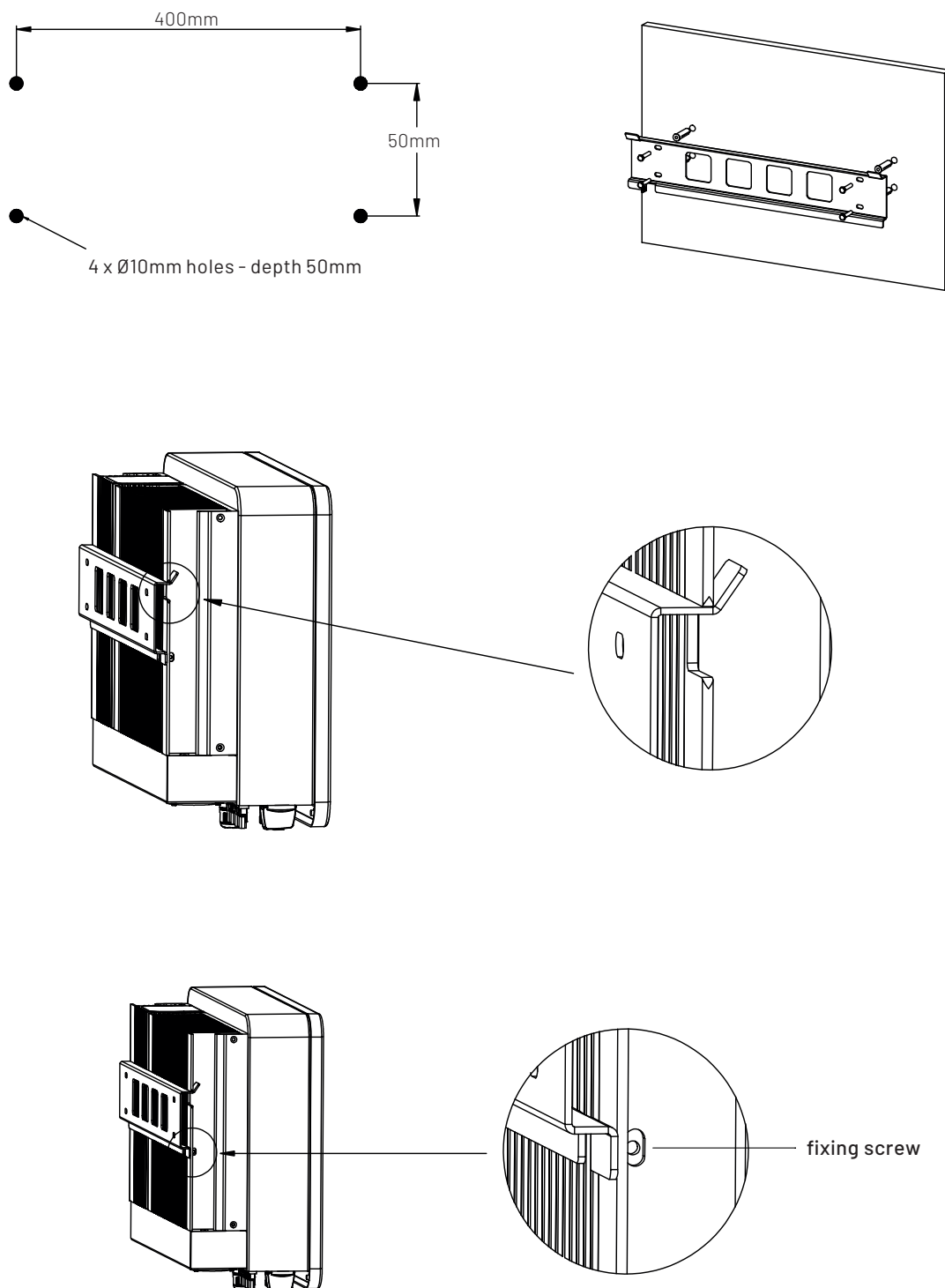


Figure 3-4 mounting the inverter

3.5 Electrical connection

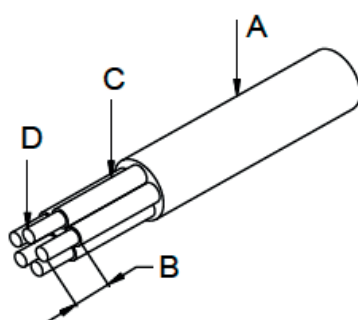
3.5.1 Connection to the grid (AC output)



- 1) Add breaker or fuse to AC side, the specification should be more than 1.25 times of rated AC output current.
- 2) The PE line of inverter should be connected to the earth, make sure the impedance of neutral wire and earth wire is less than 10ohm.
- 3) Disconnect the breaker or fuse between the inverter and the utility.
- 4) All inverters incorporate a certified internal Residual Current Device(RCD) in order to protect against possible electrocution and fire hazard in case of a malfunction in the PV array, cables or inverter. There are 2 trip thresholds for the RCD as required for certification (IEC 62109-2:2011). The default value for electrocution protection is 30mA, and for slow rising current is 300mA.

Connect the inverter to the grid :

1) Strip off PE/N/L1/L2/L3 cables as figure below:



No.	Description	Remark
A	Protective layer diameter	15-25mm
B	Length of stripped off	16mm
C	Length of insulate layer	50mm
D	Cross section of ac cables	6-15mm ²

- 2) Crimp pin contact by using a crimping pliers.
- 3) Separate the AC connector.
- 4) Pass the crimped AC wire into the AC connector

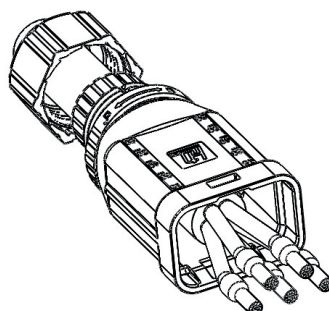


Figure 3-6

5) The cables are inserted into the terminal according to the wire sequence (L1/L2/L3/N/PE), so that the insulating terminal is flush with the surface of the terminal, and the crimping screw torque is $2.0 \pm 0.1 \text{ N}\cdot\text{m}$.

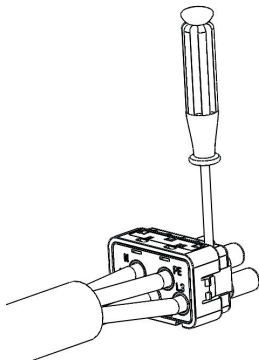


Figure 3-7

6) Insert the main part of AC connector into the terminal and hear a "click" sound.

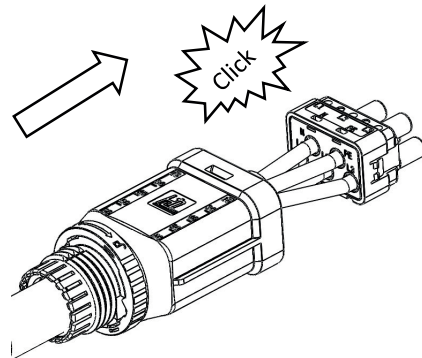


Figure 3-8

7) Use a wrench to tighten the nut until there is a 'click' sound.

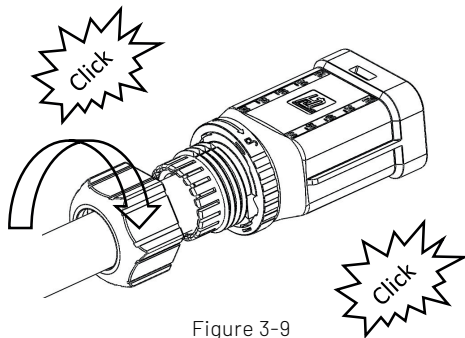


Figure 3-9

8) Press the female end of the wire onto the male end of the inverter until you hear a 'click'.

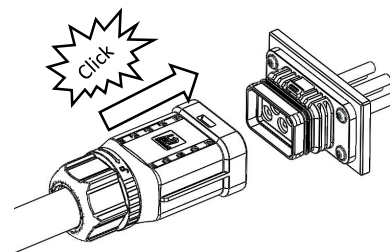


Figure 3-10

9) Complete the installation.

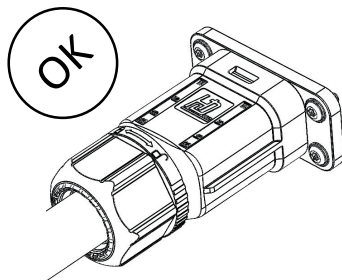


Figure 3-11

Disassembly the inverter from the Grid:

1) Use a screwdriver to press against the unlocked position and hold the wire nut and pull it back to complete the separation of the male and female ends.

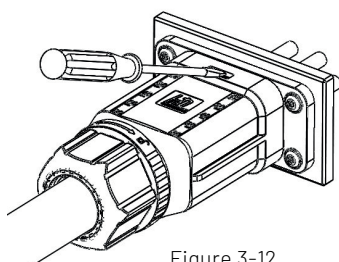


Figure 3-12

2) The female end connector is separated from the inverter end connector.

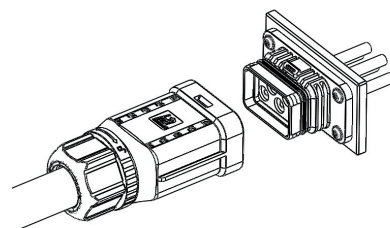


Figure 3-13

3) Hold the unlocking nut with one hand and rotate it in the direction of the mark, and turn the nut in the opposite direction.

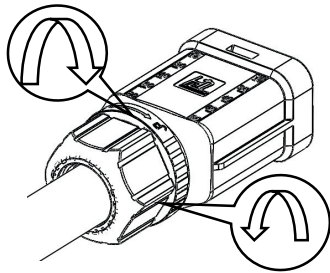


Figure 3-14

4) Use a screwdriver to peel off the positions (both sides) indicated by the red circle to complete the disassembly.

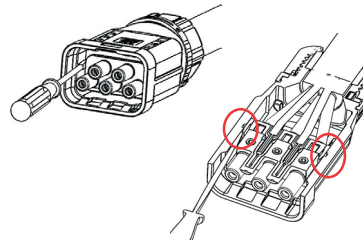


Figure 3-15

3.5.2 Connection to PV string (DC input)



- 1) Before connecting PV string, make sure DC switch is turned off .
- 2) Make sure PV string polarity confirms with DC connector, otherwise, it will cause damage to inverter.
- 3) Make sure the maximum open circuit voltage (V_{oc}) of each PV string does not exceed the inverter input voltage V_{max} under any condition.
- 4) Do not connect positive or negative pole of PV string to earth wire. Otherwise, it will cause damage to inverter.

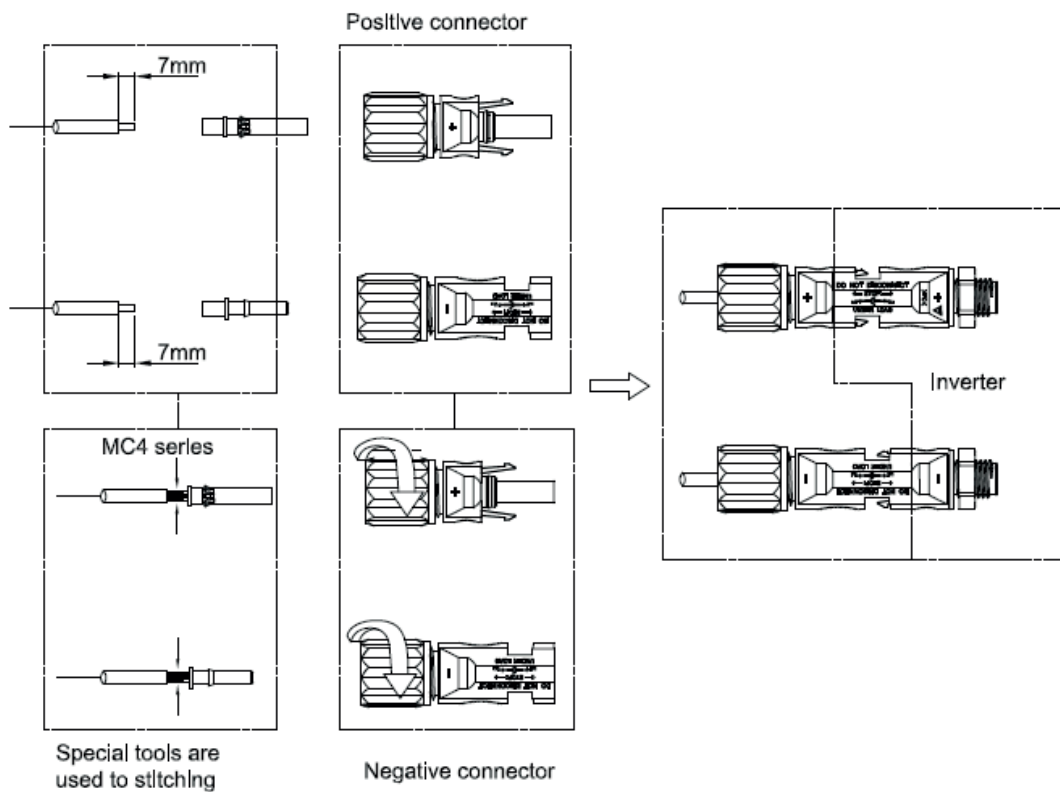


Figure 3-16 Connect the PV string

3.5.3 Communication

Overview of communication ports:

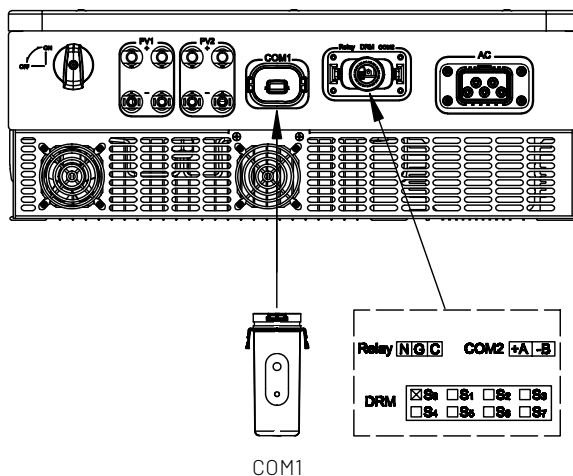


Figure 3-17

3.5.3.1 WIFI/GPRS Communication (optional)

Connect the WIFI/GPRS module produced by Rayleigh Instruments to the COM1 port of inverter. After successful connection, information such as power generation and running state of the inverter can be viewed via the App on the phone. For details please refer to the module user manual. The block diagram of the WIFI/GPRS communication system is as follows:

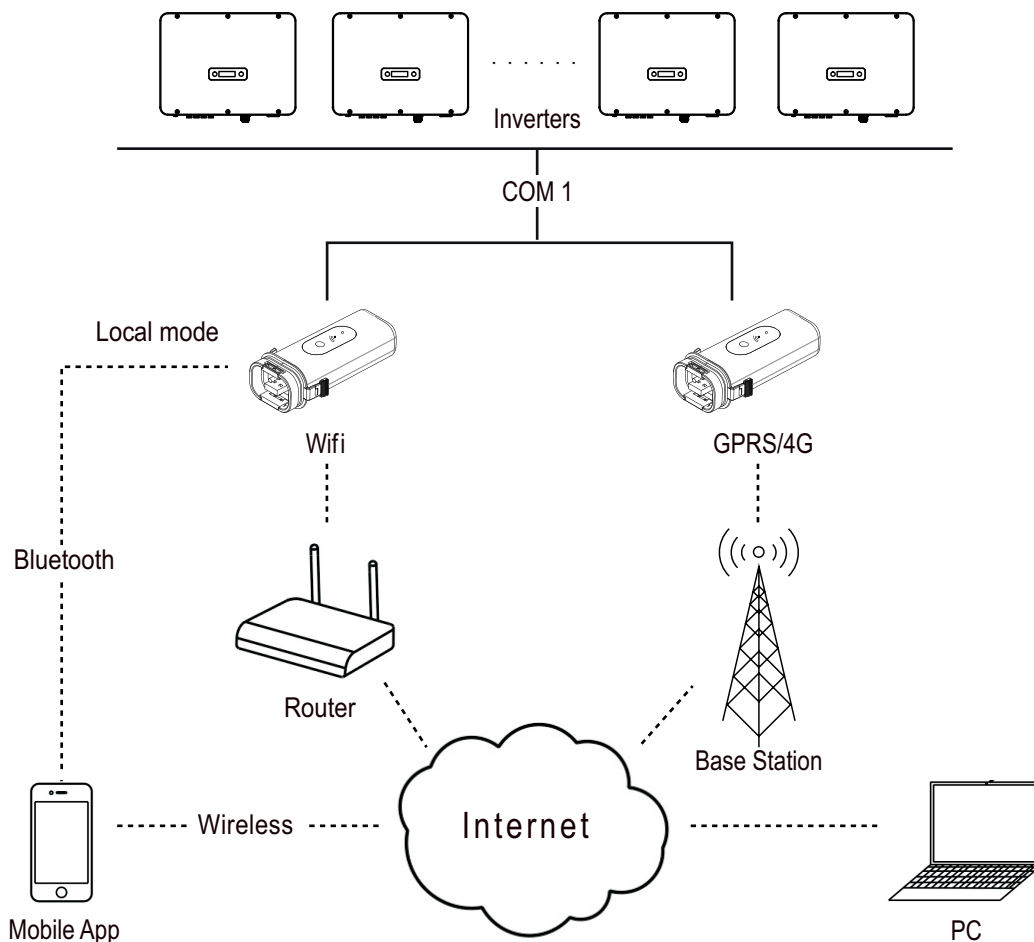


Figure 3-18

3.5.3.2 Smart Energy Meter Connection (Optional)

The inverter is equipped with the feed-in power limit function, and the communication port for smart energy meter is COM2, below is the method of connecting the smart meter in system.

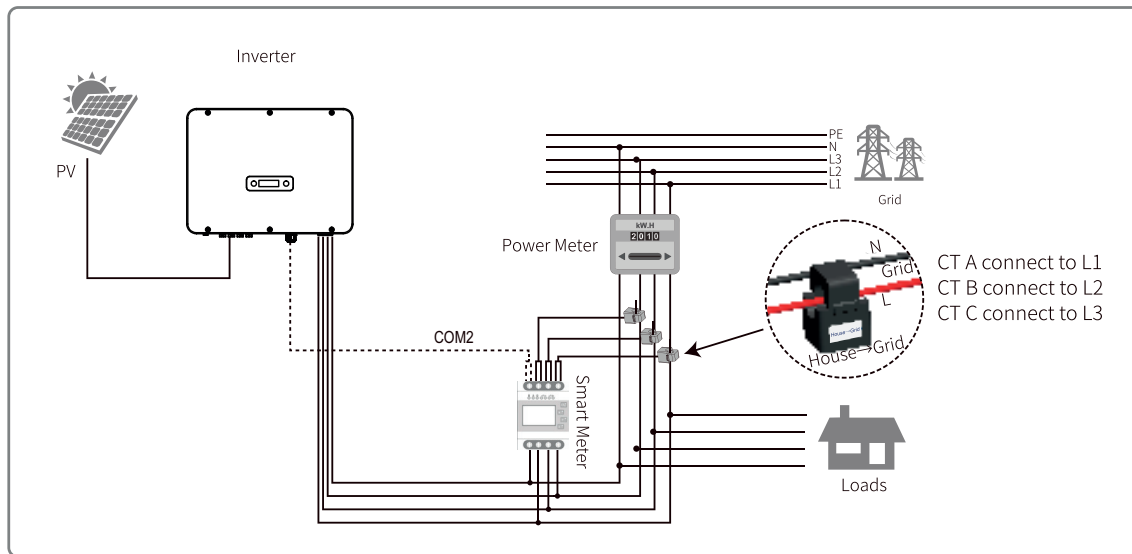


Figure 3-19

3.5.3.3 DRM connection

The inverter supports the demand response modes as specified in the standard AS/NZS4777. The inverter has integrated a terminal for connecting to a DRED. The details please refer to figure 3-17, and for CEI standard, DRM S0 is the DI port .

3.5.3.4 Relay connection

The relay can be set to fault alarm output, and user can configure it to be a normal open contact (COM & NO) or a normal close contact (COM & NC). The relay is initially at the NC terminal, and it will trip to another contact when a fault occurs. Use LED indicators or other equipment to indicate whether the inverter is in the faulty state. The following figures show the typical applications of normal open contact and normal close contact:

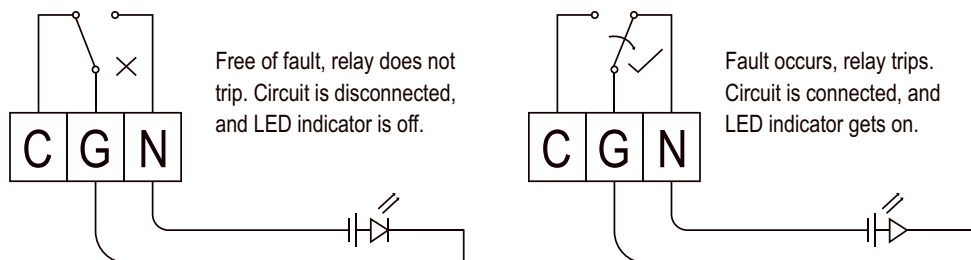


Figure 3-20 Normal open contact

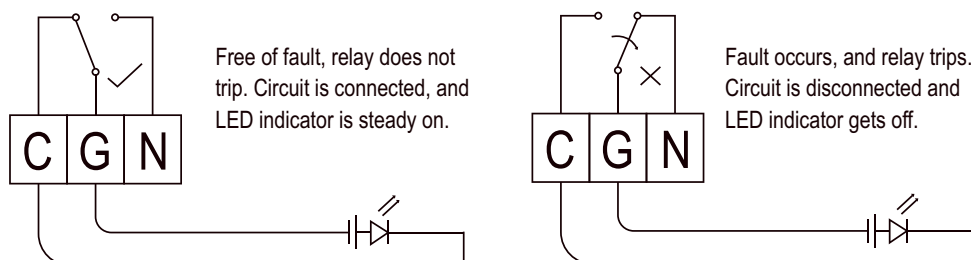


Figure 3-21 Normal close contact

3.6 Starting the Inverter

Before turning on the inverter, please confirm the following:-

- 1) The three-phase (five wires - PE/L1/L2/L3/N) cable is correctly connected to the inverter AC side through an AC circuit breaker;
- 2) The DC cable is correctly connected to the inverter DC side through a DC circuit breaker. Ensure the correct connection of the two strings and their polarity.
- 3) Any unused terminals are covered.

Starting the inverter:

- 1) Close the DC and AC circuit breakers;
- 2) If the solar panels are providing enough energy, the power module will function and the LCD panel will be lit;
- 3) If you are starting the inverter for the first time, the inverter needs to be commissioned. The process of commissioning is described on page 17, chapter 4.3.
- 4) The inverter will then enter self-check mode and the LCD panel will simultaneously display the remaining time of connection.
- 5) The inverter should then enter normal operations mode and will feed electrical energy into the grid, and the LCD panel will display the generated electrical energy.

As long as the inverter works, it will automatically track the maximum power point to absorb the maximum energy from solar. When night comes, the irradiance is not strong enough to provide energy, the inverter will power off automatically. When the next day comes, the input voltage reaches the start value, it will start again automatically.

4. User Interface

4.1 Led and key

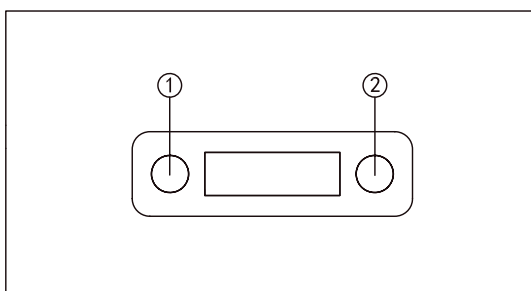
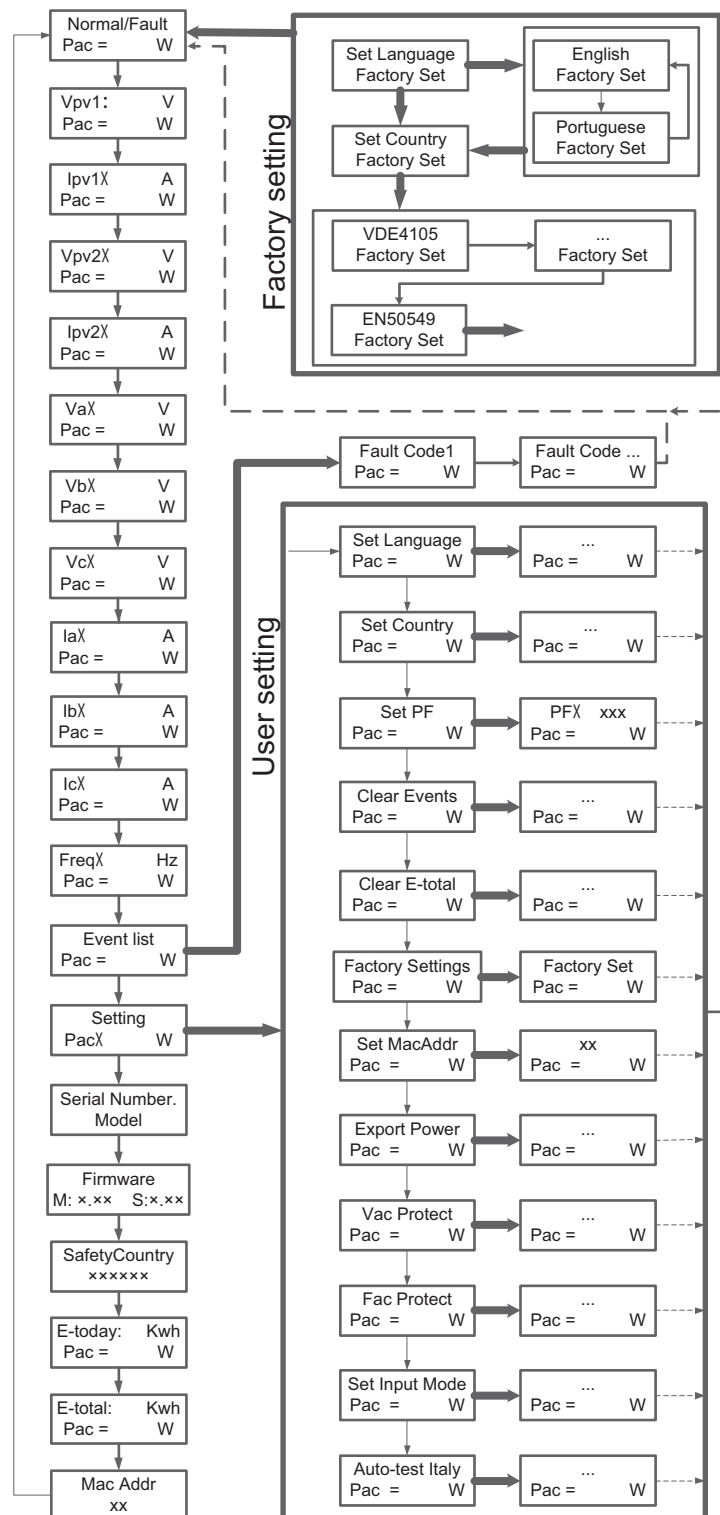


Figure 4-1 LED display

No.	Object	Description
1	Run (Green LED)	On = Normal operation
		Flashing = Waiting, checking or starting up
1	Fault (Red LED)	On = Failure,
		Flashing = Temporary failure
2	Pushbutton	Pressing < 1 s: Next
		Pressing > 2 s: Enter

4.2 LCD display

Menu structure:



4.3 Factory setting

- 1) Press pushbutton long in order to enter the "Factory setting" menu.
- 2) Press pushbutton long to enter the "language setting" menu.
- 3) Press pushbutton less than 1 sec. to the language menu you want and Press pushbutton long to select.
- 4) Press pushbutton less than 1 sec. to the country menu you want and Press pushbutton long to select.

4.4 Setting language

- 1) Press pushbutton less than 1 sec. several times until you reach the "Setting" menu.
- 2) Press pushbutton long in order to enter the "setting" menu.
- 3) Press pushbutton less than 1 sec. several times until you reach the "language setting" menu.
- 4) Press pushbutton less than 1 sec. to the language menu you want and Press pushbutton long to select.

4.5 Setting modbus address

- 1) Press pushbutton less than 1 sec. several times until you reach the "Setting" menu.
- 2) Press pushbutton long in order to enter the "setting" menu.
- 3) Press pushbutton less than 1 sec. several times until you reach the "module add" menu.
- 4) Press pushbutton less than 1 sec. to the modbus address number you want and Press pushbutton long to set.

4.6 Self-Test in accordance with CEI 0-21 (Applies to Italy only)

The self-test is only required for inverters, which are commissioned in Italy. The Italian standard requires that all inverters feeding into the utility grid are equipped with a self-test function in accordance with CEI 0-21. During the self-test, the inverter will consecutively check the protection reaction times and values for overvoltage, under voltage, over frequency and underfrequency.

Self-test function is available at any time. It also allows end user get test reports shown on LCD display.

There are two ways to execute the self-test:

Auto-Test from screen:

- 1) Press pushbutton less than 1 sec. several times until you reach the "Setting" menu.
- 2) Press pushbutton long in order to enter the "setting" menu.
- 3) Press pushbutton less than 1 sec. several times until you reach the "AutoTest-Italy" menu (You need to set the inverter country to CEI 0-21 before testing).

SafetyCountry CEI 0-21	AutoTest-Italy Pac= 10000W
----------------------------------	--------------------------------------

- 4) Press pushbutton long to execute the auto-test.
- 5) The inverter will automatically run the test until the screen shows "Test end", if the test passes, it will show "test ok", if the test is failed, it will show "test failed".

59.S1 testing 253.0V/251.1V	59.S1 Test ok 223.3V/1993ms
59.S1 testing 253.0V/243.9V	59.S1 Test ok 223.3V/1993ms
59.S2 testing 264.5V/232.6V	59.S2 Test ok 223.8V/187ms
27.S1 testing 195.5V/213.0V	27.S1 Test ok 223.5V/1485ms
27.S2 testing 34.5V/36.2V	27.S2 test ok 226.4V/190ms
81 > .S1 testing 50.20Hz/49.88Hz	81 > .S1 Test ok 49.98Hz/95ms
81 < .S1 testing 49.80Hz/49.88Hz	81 < .S1 Test ok 50.03Hz/88ms
81 > .S2 testing 51.50Hz/51.39Hz	81 > .S2 Test ok 50.04Hz/93ms
81 < .S2 testing 47.50Hz/48.01Hz	81 < .S2 Test ok 50.01Hz/91ms

Auto-Test from Solar Admin:

- 1) Download and install "Solar Admin" on laptop.
- 2) Connect inverter to laptop via RS485 port.
- 3) When the inverter and "solar admin" are successfully connected. Click "Sys.setting"--"Other"--"AUTOTEST" enter into "Auto-Test" interface.
- 4) Click "Execute" to start the test.
- 5) The inverter will automatically run the test until the screen shows "Test end".
- 6) Click "Read" to read the test value, and click "Export" to export the test report.
- 7) After click "Read" button, interface will show the test results, if the test passes, it will show "PASS", if the test is failed, it will show "FAIL".

Solar Admin

Inverter 8700831201211006 Number of devices: 1
 COM ON COM1 v

Overview

History info

Sys.setting

Protection

Active Power

Reactive Power

other

Reset (factory set)

LVRT settings

Grid over vol. derating

Extension Settings

Basic data settings

Update (1~3.7K-SS)

Update (4~8K-DS)

Update (4~15K-DT)

Update (10~33K-DT)

CEI

AUTOTEST

Italy Autotest Execute test

U > (59.S1)		U >> (59.S2)		U < (27.S1)	
Vmax	Reading	Vmax	Reading	Vmin	Reading
253.0	224.0	264.5	230.5	195.5	230.2
Trip	1987	Trip	199	Trip	1486
Pass		Pass		Pass	

U << (27.S2)		F > (81.S1)		F < (81.S1)	
Vmin	Reading	Fmax	Reading	Fmin	Reading
34.5	225.0	50.2	50.01	49.8	49.94
Trip	186	Trip	92	Trip	92
Pass		Pass		Pass	

F >> (81.S2)		F << (81.S2)	
Fmax	Reading	Fmin	Reading
51.5	51.02	47.50	50.03
Trip	98	Trip	89
Pass		Pass	

Read
Export

5. Warranty

Once the product has been installed and operational, it is paramount to register the product to initiate the Warranty cover, without this, your product would not be covered under our warranty scheme. Please follow this web link for the full procedure <https://www.rayleigh.com/warranties/>

5.1 Warranty claim procedure

Please report defective device with a brief error description and SN code to our service mail or service hotline for registration.

Alternatively, please contact your specific dealer or installer if your unit is defective or faulty.

To claim the warranty under the warranty terms of factory, you need to supply us with the following information and documentation regarding the faulty unit:

- 1) Product Model No (RI-ENERGYFLOW-3P-SERIES-25-25KW) and the serial Number (e.g. 8802531210102005).
- 2) Copy of the invoice and warranty certificate for the inverter.
- 3) Error message on LCD screen and additional information regarding the fault/error.
- 4) Detailed information about the entire system (modules, circuits, etc.).
- 5) Documentation of previous claim/exchanges (if applicable).

In the case of an exchange, the remainder of the warranty entitlement will be transferred to the replacement device. In this event, you will not receive a new certificate, as this replacement will be noted by factory.

5.2 Service after warranty expiration

For products which are out of warranty, factory charges an on-site service fee, parts, labor cost and logistic fee to end-user which can be any/all of:

- 1) On-site attendance fee: Cost of travel and time for the technician in attending on-site;
- 2) Parts: Cost of replacement parts (including any shipping/admin fee that may apply);
- 3) Labor: Labor time fee charged for the technician, who is repairing, maintaining, and installing (hardware or software) and debugging the faulty product;
- 4) Logistic fee: Cost of delivery, tariff and other derived expense when defective products are sent from user to factory or/and repaired products are sent from factory to user.

6. Troubleshooting and Maintenance

6.1 Troubleshooting

Once a fault occurs in the inverter, the fault information can be displayed on screen or the App interface. Fault codes and check methods are as follows:

Fault	LCD display	Possible actions
Clearable Fault	Isolation Fault Isolation Fault 2	1. Check whether the inverter is earthed and test impedance between PV (+) & (-) and the impedance must exceed 3MΩ; 2. Check whether the AC-side has contacts with earth.
	Grid Faults: Fault OVR Fault UVR Fault OFR Fault UFR	1. Wait for 5 minutes, if the grid returns to normal, PV inverter automatically restarts. 2. Make sure grid voltage and frequency meet the local specifications.
	No Utility	1. Grid is not connected. 2. Check grid connection cables. 3. Check grid usability. 4. If grid is ok and the problem exists still, maybe the fuse in the inverter is open, please call service.
	OverTemp	1. The internal temperature of inverter is higher than specified normal value. 2. Find a way to reduce the ambient temperature.Or move the inverter to a cooler environment.
	PV0VFault PV20VFault	1. Check the open PV DC voltage, and see if it is greater than or too close to 950VDC 2. If PV DC voltage is less than 950VDC, and the problem still occurs, please call local service.

Fault	LCD display	Remark
Permanent Fault	Consistent Faults:	1. Disconnect all PV (+) or PV (-) from solar panels. 2. Wait for a few seconds. 3. After the LCD switches off, reconnect and check again. 4. If the problem remains, please call local service.
	ConsistentVGrid	
	ConsistentVFreq	
	ConsistentVGFCI	
	ConsistentVDCI	
	RelayFail	
	BusUnbalance	
	IacUnbalance	
	EEPROM_W Fail	
	EEPROM_R Fail	
	IpvUnbalance	
	GFCIFault	
	AuxPowerFault	
	DCI out range	
	OCPV	
	OCPV2	
	OCIGrid	
	SciCommLose	
	SpiCommLose	
	BusFault	
	CPU ADFault	
	IGridDevice	
	PLLFault	
	AutoTestFail	
	PVConfigFault	
	FanError	

6.2 Maintenance

	<p>Risk of inverter damage or personal injury due to incorrect service!</p> <ul style="list-style-type: none"> • Always keep in mind that the inverter is powered by dual sources: PV strings and utility grid. Before any service work, observe the following procedure. • Disconnect the AC circuit breaker and then set the DC load-break switch of the inverter to OFF. • Wait at least 5 minutes for inner capacitors to discharge completely. • Verify that there is no voltage or current before pulling any connector.
	<p>NOTICE</p> <p>Restart the inverter only after removing the fault that impairs safety performance. As the inverter contains no component parts that can be maintained, never arbitrarily replace any internal components. For any maintenance need, please contact Rayleigh Instruments. Otherwise, Rayleigh Instruments shall not be held liable for any damage caused.</p>

6.2.1 Routine Maintenance

Item	Method	Period
System clean	Check the temperature and dust of the inverter. Clean the inverter enclosure if necessary. Check if the air inlet and outlet are normal. Clean the air inlet and outlet, if necessary.	Six months to a year (- depend on the dust contents in air.)
Fans	Check whether there is any abnormal noise when the fan is turning. Clean or replace the fans if necessary (see the following section).	Once a year
Cable entry	Check whether the cable entry is insufficiently sealed or the gap is excessively large, and reseal the entry when necessary.	Once a year
Electrical Connection	Check whether all cable are firmly in place. Check whether a cable is damaged, especially the part contacting the metal enclosure.	Six months to a year

Maintenance Instruction

Cleaning Air Inlet and Outlet

A huge amount of heat is generated in the process of running the inverter. The inverter adopts a controlled forced-air cooling method. In order to maintain good ventilation, please check to make sure the air inlet and outlet are not blocked. Clean the air inlet and outlet with soft brush or vacuum cleaner if necessary.

Fan Maintenance



- Stop the inverter and disconnect it from all power supplies before maintenance.
- Lethal voltage still exists in the inverter. Please wait for at least 5 minutes and then perform maintenance work.
- Only qualified electricians can maintain the fans.

Fans inside the inverter are used to cool the inverter during operation. If the fans do not operate normally, the inverter may not be cooled down and inverter efficiency may decrease. Therefore, it is necessary to clean the dirty fans and replace the broken fans in time.

The operation procedure is as follows:

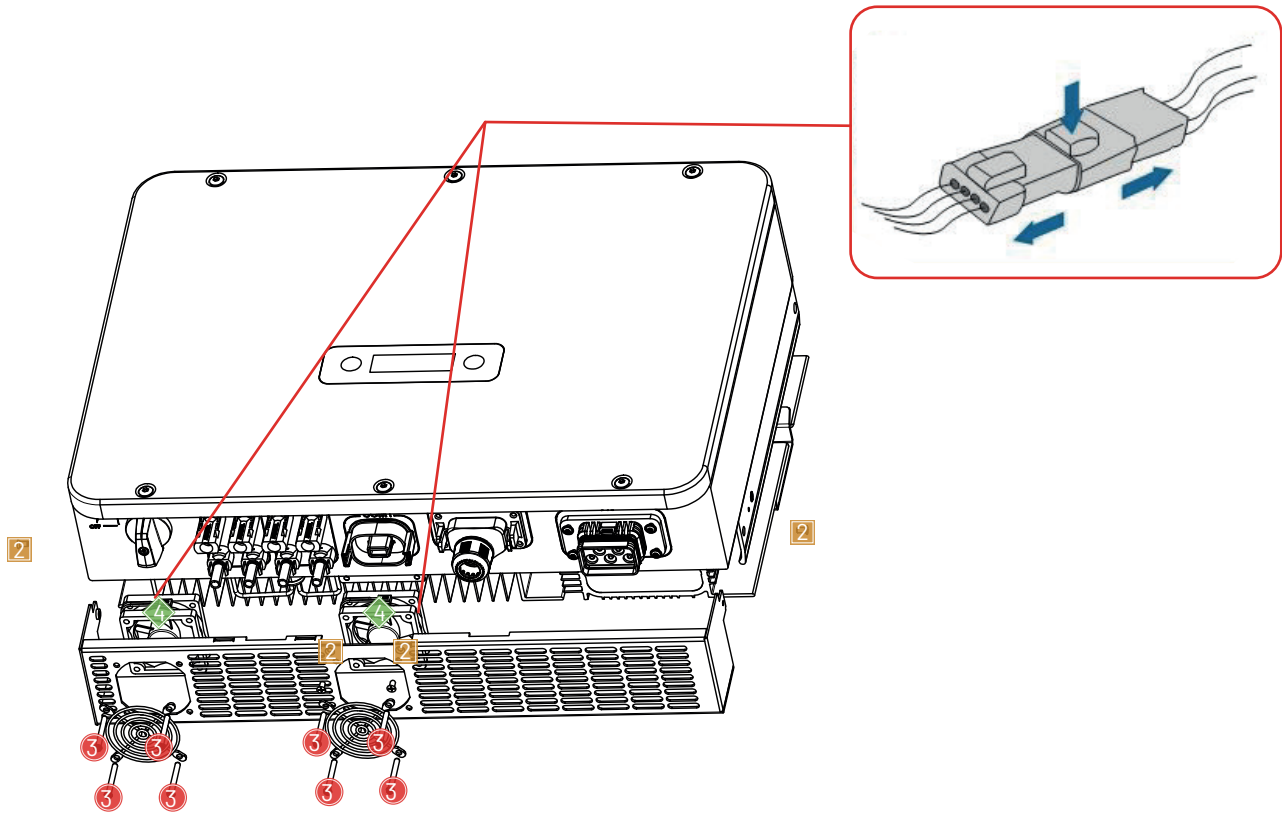
Step 1 Stop the inverter (turns off DC and AC both for inverter, wait for at least 5 minutes).

Step 2 Loosen the 4 screws on the side of the fan metal plate.

Step ③ Pull out the fan metal plate, loosen the 4 screws for each fan module.

Step ④ Disconnect the fan cables and take out the fans, clean the them with soft brush or vacuum cleaner, and replace them when necessary.

Step 5 Reinstall the fan back to the inverter in reverse order and restart the inverter.



If you have any further technical questions about our product
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