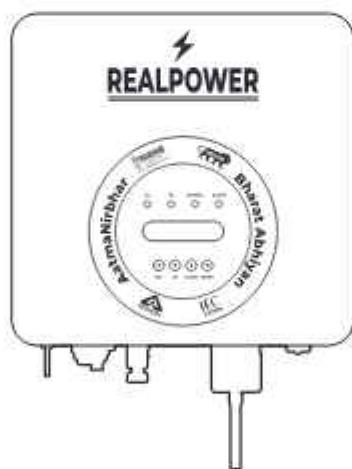


COMMITMENT OF UNINTERRUPTED POWER



USER MANUAL

Grid-Connected PV Inverter

5 KW - 15 KW

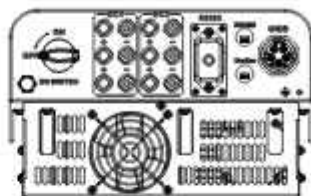
THREE PHASE

1. Introduction

On-grid Inverter can convert solar panel DC power into AC power which can directly input to the grid. Its appearance is shown below.



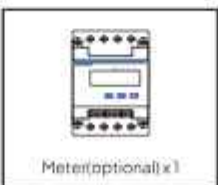
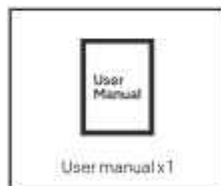
Pic 1.1 Front View



Pic 1.2 Bottom View

1.1 Part List

Please check the following table to see whether all parts are included in the package.



2. Safety warnings & instructions

Improper use may result in potential electric shock hazards or burns. This manual contains important instructions that should be followed during installation and maintenance. Please read these instructions carefully before use and keep them for future reference.

2.1 Safety signs

Safety symbols used in this manual, which highlight potential safety risks and important safety information, are listed as follows:



Warning

Warning symbol indicates important safety instructions, which if not correctly followed, could result in serious injury or death.



Shock Hazard

Caution, risk of electric shock symbol indicates important safety instructions, which if not correctly followed, could result in electric shock.



Safety Hint

Note symbol indicates important safety instructions, which if not correctly followed, could result in some damage or the destruction of the inverter.



High Temperature Hazard

Caution, hot surface symbol indicates safety instructions, which if not correctly followed, could result in burns.

2.2 Safety instructions



Warning

Electrical installation of the inverter must conform to the safety operation rules of the country or local area.



Warning

Inverter adopts non-isolated topology structure, hence must insure DC input and AC output are electrical isolated before operating the inverter.

Strictly prohibit grounding the positive and negative poles of the PV string. Otherwise it will damage the inverter.



Shock Hazard

Prohibit disassembling inverter case, there existing shock hazard, which may cause serious injury or death, please ask qualified person to repair.



Shock Hazard

When PV module is exposed to sunlight, the output will generate DC voltage. Prohibit touching to avoid shock hazard.



Shock Hazard

While disconnect the input and output of the inverter for maintenance, please waits for at least 5 mins until the inverter discharge the remnant electricity.



High Temperature Hazard

Local temperature of inverter may exceed 80°C while under operating. Please do not touch the inverter case.

2.3 Notes for using

The string power inverter is designed and tested under related safety regulations. It can ensure the personal safety of the user. But as a electric device, it may cause shock or injury by incorrect operation. Please operate the unit under below requirements:

- Inverter should be installed and maintained by qualified person under local standard regulations.
- Must disconnect the AC side first, then disconnect DC side while doing installation and maintenance, after that, please wait at least 5 mins to avoid getting shocked.
- Local temperature of the inverter may exceed 80 ℃ while under operating. Do not touch to avoid getting injured.
- All electrical installation must be in accord with local electrical standards, and after obtaining the permission of the local power supply department, the professionals can connect the inverter to the grid.
- Please take appropriate anti-static measure.
- Please install where children can not touch.
- When starting the inverters, first close the circuit breaker at the grid side, then close the DC side; when closing the inverters, first disconnect the circuit breaker at the AC side, then disconnect the DC side.
- Don't insert or remove AC and DC terminals when the inverter is in normal operation.
- The DC input voltage of the inverter must not exceed the maximum value of the model.

3. Operation Interface

3.1 Interface View



3.2 Status Indicator

There are four LED status indicator lights in the front panel of the inverter. Please see table for details.

| Indicator | Status | Explanation |
|-----------|--------|----------------------------------|
| ● DC | ON | Inverter detects DC input |
| | OFF | Low DC input voltage |
| ● AC | ON | Grid Connected |
| | OFF | Grid Unavailable |
| ● Normal | ON | Under normal operating |
| | OFF | Stop operating |
| ● Alarm | ON | Detected faults or report faults |
| | OFF | Under normal operating |

3.3 Buttons

There are four keys in the front panel of the Inverter (from left to right): Esc, Up, Down and Enter keys. The keypad is used for:

- Scrolling through the displayed options (the Up and Down keys);
- Access to modify the adjustable settings (the Esc and Enter keys).



3.4 LCD Display

The Liquid Crystal Display (LCD) is located on the front panel of the Inverter, which shows the following information:

- Inverter operation status and data;
- Service messages for operator;
- Alarm messages and fault indications.

4. Product Installation

4.1 Select installation location

To select a location for the Inverter, the following criteria should be considered:

WARNING: Risk of fire

- Do not install the inverter in areas containing highly flammable materials or gases.
- Do not install the inverter in potentially explosive atmospheres.
- Do not install in small closed spaces where air can not circulate freely. To avoid overheating, always make sure the flow of air around the inverter is not blocked.
- Exposure to direct sunlight will increase the operational temperature of the inverter and may cause output power limiting. It is recommended that inverter installed to avoid direct sunlight or raining.
- To avoid overheating ambient air temperature must be considered when choosing the inverter installation location. It is recommended that using a sun shade minimizing direct sunlight when the ambient air temperature around the unit exceeds 100°F/40°C.



- Install on a wall or strong structure capable of bearing the weight.
- Install vertically with a maximum incline of $\pm 15^\circ$. If the mounted inverter is tilted to an angle greater than the maximum noted, heat dissipation can be inhibited, and may result in less than expected output power.
- If install more than one inverter, must leave at least 500mm gap between each inverter. And each inverter must be at least 500mm above and below. And must install the inverter at the place where children cannot touch. Please see picture.

- Consider whether the installation environment is helpful to see the inverter LCD display and indicator status clearly.
- Must offer a ventilate environment if inverter installed in the tight house.



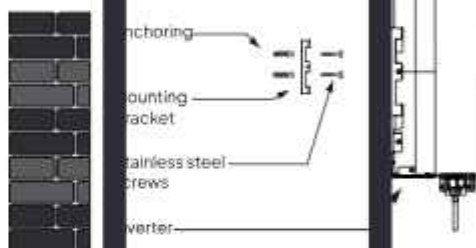
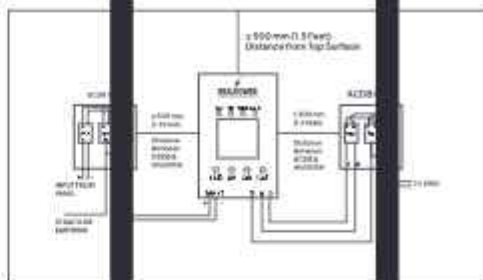
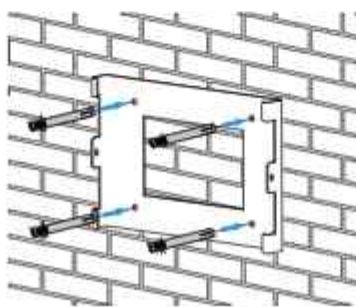
- **Safety Hint:** Do not place or store any items next to the inverter.

4.2 Inverter Installation

The inverter is designed according to the wall mounted type installation, please use the wall mounted (the brick wall of the expansion bolt) when installing.

Procedure shows below:

- Locate on the appropriate wall according to the bolt position on the mounting bracket, then mark the hole. On the brick wall, the installation must be suitable for the expansion bolt installation.
- Ensure that the position of the installation holes on the wall is in accordance with the mounting plate, and the mounting rack is horizontally placed.
- Hang the inverter to the top of the mounting rack and then use the M4 screw in the accessory to lock inverter heat sink to the hanging plate, to ensure that the inverter will not move.



5. Electrical Connection

5.1 DC input terminal connection

- Switch the Grid Supply Main Switch(AC)OFF.
- Switch the DC Isolator OFF.
- Assemble PV Input connector to the inverter.



Safety Hint

Please don't connect PV array positive or negative pole to the ground, it could cause serious damages to the inverter.



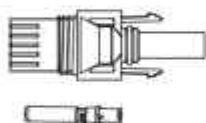
Safety Hint

Before connection, please make sure the polarity of the output voltage of PV array matches the "DC+" and "DC-" symbols.

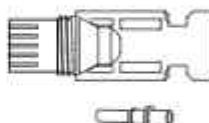


Safety Hint

Before connecting inverter, please make sure the PV array open circuit voltage is within the 550V of the inverter.



DC + Male Connector (MC4)



DC - Female Connector (MC4)



Safety Hint

Please use approved DC cable for PV system.

| Cable Type | Cross section (mm ²) | |
|--|----------------------------------|-------------------|
| | Range | Recommended Value |
| Industry generic PV cable (model: PV1-F) | 4.0-6.0 (12-10AWG) | 4.0(12AWG) |

5.2 AC input terminal connection

Do not close the DC switch after the DC terminal is connected. Connect the AC terminal to the AC side of the inverter, the AC side is equipped with Three phase AC terminals that can be conveniently connected. Flexible cords are recommended for easy installation. Specifications as shown in Table.



Warning

Prohibit using a single circuit breaker for multiple inverters, prohibit the connection of load between inverter circuit breakers.

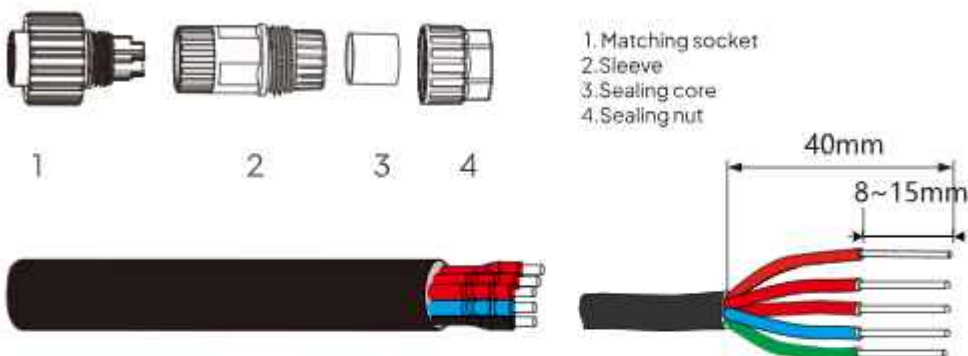
| Cable CSA | Cable Outer Dia | AWG | Breaker | Max Cable Length |
|-------------------|-----------------|-----|------------|----------------------------|
| 4 mm ² | 15-18 mm | 10 | 20A / 400V | Outside Cable (3+N+PE) 20m |

The AC output connector is divided into three parts: matching socket, sleeve and sealing sleeve, as shown in picture below. the steps are as follows:

Step 1: Remove the cable sealing ring and sleeve in sequence from the AC connector.

Step 2: Use strippers to strip the protective sheath and insulation layer of the AC cable to the right length

Step 3: Insert the cable (L1, L2, L3, N, PE) into the sealing sleeve.



Warning

Be careful to distinguish the L1, L2, L3, N and PE of the AC cables

Step 4: Use the hexagon screwdriver, loosen the bolts of the socket in turn, and insert each cable core into the corresponding jack, and set each screw. The connection hole of AC connection terminal labeling

6. Error Codes

If there is any failure, the LCD screen will display an alarm message. In this case, the inverter may stop feeding energy into the grid. The alarm description and their corresponding alarm messages are listed Below:

| Error Codes | Description | Ongrid - Single Phase |
|-------------|---|---|
| F01 | DC input polarity reverse fault | Check the PV input polarity. |
| F02 | DC insulation impedance permanent fault | Check the grounding cable of inverter. |
| F03 | DC leakage current fault | Hardly appear the code, Never ever happened so far. |
| F04 | Ground fault GFDI | Check the solar panel output connection. |

| Error Codes | Description | Ongrid – Single Phase |
|-------------|--|--|
| F05 | Read the memory error | Failure in reading memory (EEPROM). Restart the inverter if the fault still exists, contact your installer or Real Power service support. |
| F06 | Write the memory error | Failure in writing memory (EEPROM). Restart the inverter if the fault still exists, contact your installer or Real Power service support. |
| F07 | GFDI blown fuse | Hardly appear the code. Never ever happened so far. |
| F08 | GFDI grounding touch failure | Hardly appear the code. Never ever happened so far. |
| F09 | IGBT damaged by excessive drop voltage | Hardly appear the code. Never ever happened so far. |
| F10 | Auxiliary switch power supply failure | Hardly appear the code. Never ever happened so far. |
| F11 | Ac main contactor errors | Hardly appear the code. Never ever happened so far. |
| F12 | AC auxiliary contactor errors | Hardly appear the code. Never ever happened so far. |
| F13 | Working mode changed/ Grid mode changed | Hardly appear the code. Never ever happened so far. |
| F14 | DC firmware over current | Hardly appear the code. Never ever happened so far. |
| F15 | AC firmware over current | <ol style="list-style-type: none"> 1. The internal AC sensor or detection circuit on control board or connection wire may loose. 2. Restart the inverter, if the error still exists, please contact your installer or Real Power service support. |
| F16 | GFCI(RCD)Ac leakage-current fault | <ol style="list-style-type: none"> 1. This fault means the average leakage current is over 300mA. Check whether DC power supply or solar panels is ok, then check Test data -> 'dIL' value is about 120. Then check the leakage current sensor or circuit (the following picture). Checking test data needs using big LCD. 2. Restart the inverter, if the error still exists, please contact your installer or Real Power service support. |
| F17 | Three phase current, over-current fault | Hardly appear the code. Never ever happened so far. |

| Error Codes | Description | Ongrid – Single Phase |
|-------------|--|--|
| F18 | AC overcurrent fault of hardware | <ol style="list-style-type: none"> 1. Check AC sensor or detection circuit on control board or connection wire. 2. Restart the inverter or factory reset, if the error still exists, please contact your installer or Real Power service support. |
| F19 | All hardware failure synthesis | <ol style="list-style-type: none"> 1. When inverter is running, wifi plug plugin, will occur F19. 2. Restart the inverter or factory reset, if the error still exists, please contact your installer or Real Power service support. |
| F20 | DC over current fault of the hardware | Not available. |
| F21 | DC leakage flow fault | Hardly appear the code. Never ever happened so far. |
| F22 | Crash stop (if there is a stop button) | Contact your installer for help. |
| F23 | AC leakage current is transient over current | <ol style="list-style-type: none"> 1. This fault means the leakage current is above 30mA suddenly. Check whether DC power supply or solar panels is ok, then check Test data'-> 'dil' value is about 120; Then check the leakage current sensor or circuit. Check test data needs using big LCD. 2. Restart the inverter, if the fault still exists, contact your installer or Real Power service support. |
| F24 | DC insulation impedance failure | <ol style="list-style-type: none"> 1. Check Vpe resistance on main board or detection on control board. Check PV panels is OK. Many times this issue is the PV problem. 2. Check whether the PV panel (aluminum frame) is grounded well and inverter is grounded well. Open the cover of inverter and then check the inside ground cable is fixed well on the shell. 3. Check if the AC/DC cable, terminal block are shorted to ground or the insulation is damaged. 4. Restart the inverter, if the fault still exists, contact your installer or Real Power service support. |

| Error Codes | Description | Ongrid – Single Phase |
|-------------|-----------------------------|--|
| F25 | DC feedback fault | Hardly appear the code. Never ever happened so far. |
| F26 | The DC busbar is unbalanced | Hardly appear the code. Never ever happened so far. |
| F27 | DC end insulation error | Hardly appear the code. Never ever happened so far. |
| F28 | Inverter 1 DC high fault | Hardly appear the code. Never ever happened so far. |
| F29 | AC load switch failure | Hardly appear the code. Never ever happened so far. |
| F30 | AC main contactor failure | <ol style="list-style-type: none"> 1. Check relays and AC voltage of relays. 2. Check relays driver circuit. 3. Check if the software is not suitable for this inverter. (Old inverter not have relays detection function) 4. restart the inverter. If the fault still exists, contact your installer or Real Power service support. |
| F31 | Dc boost soft start | Not available. |
| F32 | Inverter 2 dc high fault | Hardly appear the code. Never ever happened so far. |
| F33 | AC over current | AC current sensor or its circuit have issue. Check if the inverter type is not right. |
| F34 | AC current over load | Hardly appear the code. Never ever happened so far. |
| F35 | No AC grid | <ol style="list-style-type: none"> 1. Check AC grid voltage. Check AC voltage detection circuit. Check if the AC connector in good condition. Check whether the AC grid is normal in voltage. 2. Restart the inverter, if the fault still exists, contact your installer or Real Power service support. |

| Error Codes | Description | Ongrid - Single Phase |
|-------------|--|--|
| F36 | AC grid phase error | Hardly appear the code. Never ever happened so far. |
| F37 | AC three-phase voltage unbalance failure | Hardly appear the code. Never ever happened so far. |
| F38 | AC three-phase current unbalance failure | Hardly appear the code. Never ever happened so far. |
| F39 | AC over current (one cycle) | <ol style="list-style-type: none"> 1. Check AC current sensor and its circuit. 2. Restart the inverter, if the fault still exists, contact your installer or Real Power service support. |
| F40 | DC over current | Hardly appear the code. Never ever happened so far. |
| F41 | AC Line W,U over voltage | Check the AC voltage protection setting, & Check if the AC cable is too thin. Check the voltage difference between LCD & meter. |
| F42 | AC Line W,U low voltage | Check the AC voltage protection setting. Check the voltage difference between LCD and meter. Also need to check whether AC cables are all firmly and correctly connected. |
| F43 | AC Line V,W over voltage | Not available. |
| F44 | AC Line V,W low voltage | Not available. |
| F45 | AC Line U,V over voltage | Not available. |
| F46 | AC Line U,V low voltage | Not available. |
| F47 | AC over frequency | Check the frequency protection setting. |

| Error Codes | Description | Ongrid – Single Phase |
|-------------|--|---|
| F48 | AC lower frequency | Check the frequency protection setting. |
| F49 | U phase grid current DC component over current | Hardly appear the code. Never ever happened so far. |
| F50 | V phase grid current DC component over current | Hardly appear the code. Never ever happened so far. |
| F51 | W phase grid current DC component over current | Hardly appear the code. Never ever happened so far. |
| F52 | AC inductor A, phase current DC current high | Hardly appear the code. Never ever happened so far. |
| F53 | AC inductor B, phase current DC current high | Hardly appear the code. Never ever happened so far. |
| F54 | AC inductor C, phase current DC current high | Hardly appear the code. Never ever happened so far. |
| F55 | DC busbar voltage is too high | <ol style="list-style-type: none"> 1. Check PV voltage and Ubus voltage and its detection circuit. If the PV input voltage exceeds the limit, please reduce the number of solar panels in series. 2. For Ubus voltage, please check the LCD display. |
| F56 | DC busbar voltage is too low | <ol style="list-style-type: none"> 1. It tells the PV input voltage is low & it always happens in the early morning. 2. Check PV voltage & Ubus voltage. When inverter is running, then showing F56, maybe Loss of driver or need update firmware. 3. Restart the inverter, if the fault still exists, contact your installer or Real Power service support. |

| Error Codes | Description | Ongrid - Single Phase |
|-------------|---------------------------------|---|
| F57 | AC reverse irrigation | AC reverse irrigation |
| F58 | AC grid U over current | Hardly appear the code. Never ever happened so far. |
| F59 | AC grid V over current | Hardly appear the code. Never ever happened so far. |
| F60 | AC grid W over current | Hardly appear the code. Never ever happened so far. |
| F61 | Reactor A phase over current | Hardly appear the code. Never ever happened so far. |
| F62 | Reactor B phase over current | Hardly appear the code. Never ever happened so far. |
| F63 | ARC fault | <ol style="list-style-type: none"> 1. Check PV module cable connection and clear the fault. 2. Seek help from us, if can not go back to normal state. |
| F64 | IGBT heat sink high temperature | <ol style="list-style-type: none"> 1. Check temperature sensor. Check if firmware is suitable for the hardware. Check if the inverter is its right model. 2. Restart the inverter, if the fault still exists, contact your installer or Real Power service support. |

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