SAMIL POWER™

Expert for PV Grid-tied Inverters

SolarRiver-D PV Grid-tied Inverter

Product Manual

SP-SR-D-V1.2-EN

English

Copyright Declaration

CONTENTS

1 Notes on This Manual

This manual is an integral part of the inverter. Please read the product manual carefully before installation, operation or maintenance. Keep this product manual for future reference.

1.1 Scope of Validity

This product manual describes the assembly, installation, commissioning, maintenance of the following Samil Power SolarRiver-D series inverters.

SolarRiver 3400TL-D	SolarRiver 4000TL-D	SolarRiver 4500TL-D
SolarRiver 5000TL-D	SolarRiver 5200TL-D	SolarRiver 6000TL-D

1.2 Target Group

This manual is read by qualified electricians. The tasks described in this manual must only be performed by qualified electricians.

1.3 Important Safety Information

Before installation or operation, please read the manual, or contact the local distributor. Please visit the company website: www.samilpower.com for more information.

1.4 Symbols Used

There are some symbols in this manual in order to ensure personal and property security. Please read the following symbols carefully.

Danger!

Danger indicates a hazardous situation, if not avoided, will result in death or serious injury.

Note!

Note provides tips about the optimal operation when using the product.

1.5 Symbols on the Inverter

Symbol	Explanation
	Danger of high voltages Danger to life due to high voltages in the inverter!
	Beware of hot surface. The inverter can become hot during operation. Avoid contact during operation.
	Danger to life due to high voltages in the inverter! There is residual voltage in the inverter. The inverter requires 5 minutes to discharge. Wait 5 minutes before you open the upper lid or the DC lid.

1.6 Important Safety Instructions

When using the product, please remember the information below to avoid the fire, lightning or other personal injury:

Ensure input DC voltage ≤ Max.DC voltage .Over voltage may cause permanent damage to inverter or other losses, which will not be included in warranty! This chapter contains important safety and operating instructions. Read and keep this Operation Guide for future reference.

Authorized service personnel must disconnect both AC and DC power from the SolarRiver-D Series inverter before any maintenance or cleaning or working on any circuits.

- Before using the SolarRiver-D Series inverter, read all instructions and cautionary markings on the SolarRiver-D Series inverter, and all appropriate sections of this guide.
- Recommend the attachments sold by Samil Power, otherwise may result in a risk of fire, electric shock, or injury to persons.
- To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and wire is not undersized. Do not operate the SolarRiver-D Series inverter with damaged or substandard wire.
- Do not disassemble the SolarRiver-D Series inverter. It contains no user-serviceable parts. See warranty for instructions on obtaining service. Attempting to service the SolarRiver-D series inverter by yourself may result in a risk of electric shock or fire and will void your warranty.
- To reduce the risk of electric shock, authorized service personnel must disconnect both AC and DC power from the SolarRiver-D series inverter before any maintenance or cleaning or working on any circuits connected to the SolarRiver-D Series inverter.
- Keep away from flammable, explosive materials to avoid fire disaster.
- The product should be installed away from humid or corrosive substance.
- To avoid electric shock accident, please do not disassemble the inverter because there are high-voltage capacitances installed inside the inverter.
- To reduce the risk of short-circuits, authorized service personnel must use insulated tools when installing or working with this equipment.

2 Grid-tied System Brief Introduction

The SolarRiver-D series inverter is a PV inverter which converts the DC current of a PV generator into AC current and feeds it into the public grid.

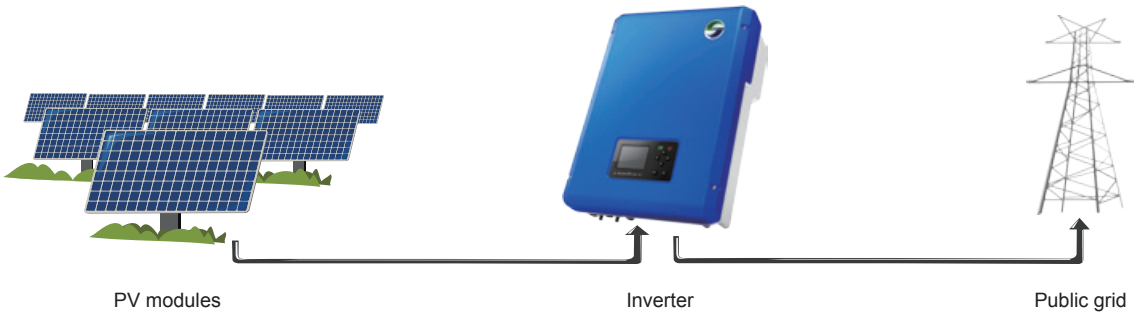


Figure 1 PV Grid-tied System

SolarRiver-D series inverter has the latest technology, and complies with safety procedures. Even so, misoperation will cause property destruction and personal injury.

The inverter must be reliably connected to utility power grid when working. The inverter is not designed for mobile application.

The inverter must not be used for any other or additional purposes. The manufacturer / supplier does not take any mis-use. The installer must strictly abide by these relevant specifications of the manual.

3 Introduction of SolarRiver-D Series Inverter

3.1 New Features

In order to meet the users' needs, the SolarRiver-D series inverter has the following new features;

- Dual MPPT can be connected in Multi-string input or independent input so the system is designed flexibly and each individual MPPT can improve the efficiency of the system.
- MPPT range is wide, so expanding the voltage range. This feature adapts to the current trend which voltage of PV is reduced, and the system is designed flexibly.
- Built-in DC Switch is optional. It can be used to cut off the DC source when in emergency. This feature improves equipment, personnel safety in operation.
- 3.5 inch TFT LCD display, so human-machine interface is more friendly and convenient! The user can see the real-time power data, operating mode, a day total generating capacity and other relevant information!
- Password protected grid codes which can be selected in the field. This feature avoids the misoperation, ensure that the grid is more reliable and safe.
- Designed without fan, cooled by cooling fin at the rear side. This feature reduces power consumption and running noise of machine.
- RS485 and WIFI are optional，and ethernet interface for networking is standard in the inverter. Users can analyse and monitor the data by Internet, Android, iPhone intelligent mobile phone.
- Built-in mass storage which stores more historical data.

3.2 Electrical Block Diagram

Electrical block diagram of SolarRiver-D series inverter is as figure2.

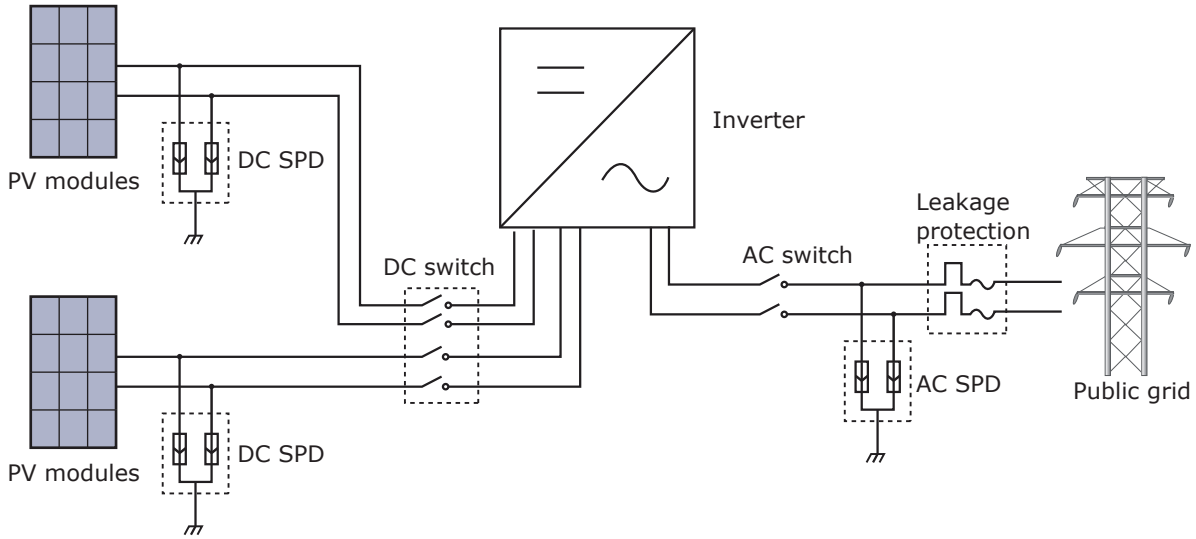


Figure 2 Electrical block diagram of SolarRiver-D series inverter

3.3 Principle Description

Principle description of SolarRiver-D series inverter is as figure3.

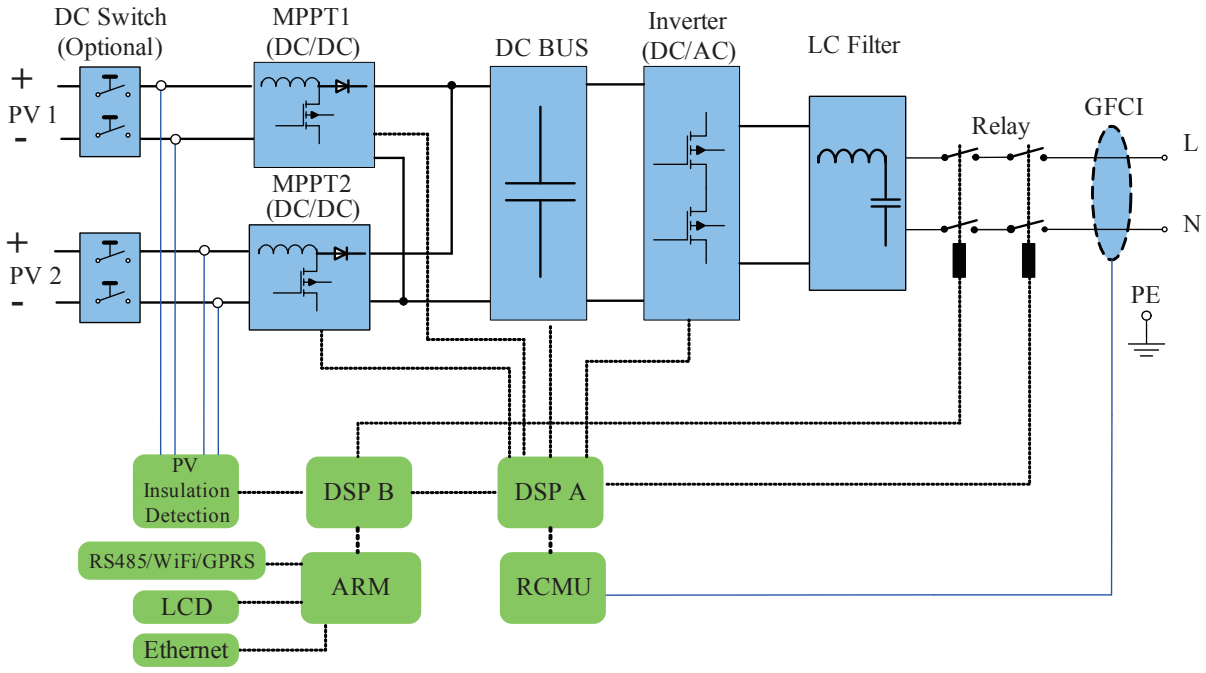


Figure 3 Principle description figure

3.4 Protection Function

【Anti-islanding protection】
When the local power grid shut down because of failure or equipment maintenance, SolarRiver-D series inverter should be physically disconnected under safety conditions, so as to protect any personnel working on the grid, in full compliance with the applicable prevailing national standards and regulations.

【Grounding fault】
SolarRiver-D series inverter is designed as floating connection with PV(positive and negative terminals are not connected to ground). When there is grounding fault, the inverter will be shut down and display grounding fault.

【More equipment protection】
SolarRiver-D series can run safely in any working condition because of the following protections:
Continuous monitoring power grid, to ensure that the voltage and frequency is in the standard range;
When the environment temperature is beyond the range, inverter will limit power automatically and so on.

3.5 Terminals of Inverter

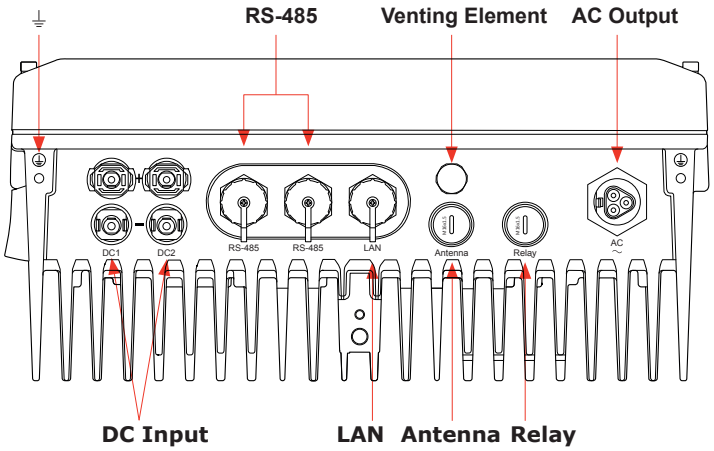


Figure 4 Terminals of PV inverter

3.6 Dimension

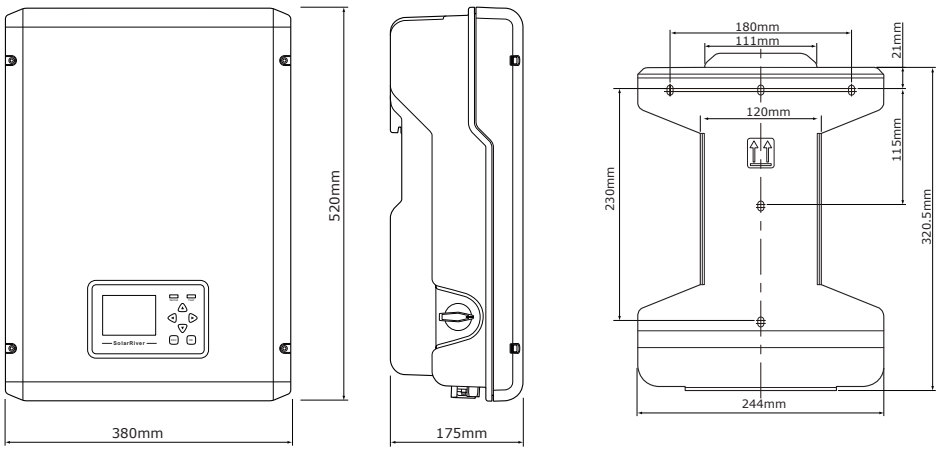


Figure 5 Dimension

3.7 Product Label

The product label provides basic information for the inverter, which is attached to the right side of the inverter. Pay special attention to the type of inverter and other specifications.

Figure 6 Product label

4 Operation Mode

【standby Mode】
The standby mode means that the inverter is ready but still not connect to the grid. In this mode, it will continue to check whether PV array has enough power to feedback into grid. When the inverter has enough power, it will change from standby mode to Checking mode.

【Checking Mode】
If inverter has passed dump load test and no error/fault occurs, it will start checking to deliver power.

【On-grid Mode】
In this mode, SolarRiver-D series inverter convert PV array's DC into AC and feedback into grid.

It is normal that the inverter decreases the output power for thermal protection, but if this occurs frequently, you need to check the air-cooling fin and the fan, or put the inverter in a place which has better air flow. If the fan is too dirty, please clean it, and if output power decreases because of electrical faults, please ask for professional supports.

【Fault Mode】
If any fault/error occurs, the inverter will stop delivering power until the fault/error is removed. Some fault/error will auto recover, and some may need manual restart.

5 Installation

5.1 Installation Process

- Ready to install（refer to 5.2、5.3、5.4、5.5）
  Complete the preparation before installation:
  √ Read the user manual carefully;
  √ Check the products and parts;
  √ Inspection installation tools;
  √ Checkthe installation environment.
- Mechanical installation（refer to 5.6）
  Work during mechanical installation:
  √ Fix the panel of inverter;
  √ Install inverter.
- Electrical connection（refer to 5.7）
  Work during electrical connection:
  √ Connect DC side;
  √ Connect AC side;
  √ Ground joint;
  √ Connect line of communication.

5.2 Packaging List

Please check the package list for all the parts. The product on the list are for installation. If anything is damage or some missing, please contact Samil Power's sales.

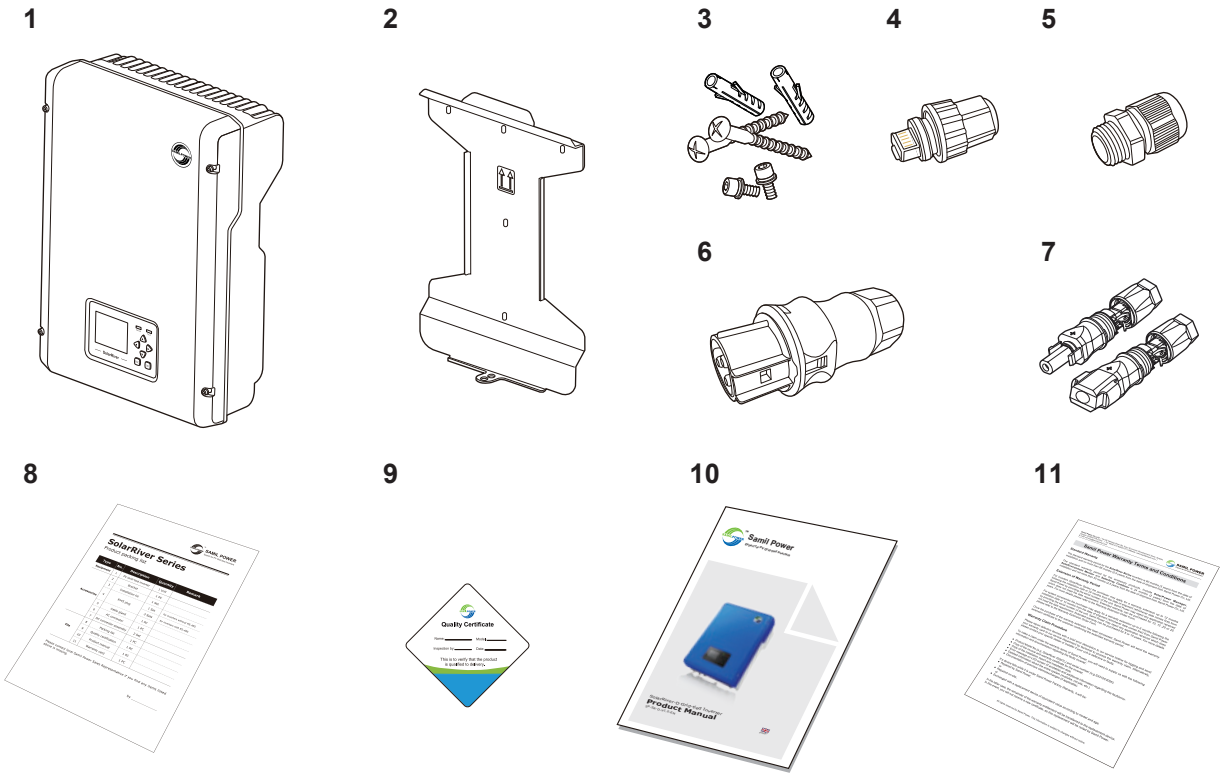


Figure 7 packing table

Table 1 packing list

Type	Project No.	Description	QTY	Remark
Equipment	1	PV Grid-tied Inverter	1 unit	
Accessories	2	Bracket	1 pc	
	3	Installation Kit	1set	
	4	RJ45 plug	1 set	for inverters without RS-485
			3 sets	for inverters with RS-485
	5	Cable gland	1 pc	
	6	AC connector	1 pc	
	7	DC connector assembly	2 sets	
Files	8	Packing list	1 pc	
	9	Quality certifcation	1 pc	
	10	Product manual	1 pc	
	11	Warranty card	1 pc	

5.3 Safety Instruction

Danger!

DC voltage can be as much as 550 V, three-phase AC voltage reaches up to 270 V. Ensure AC/DC side unplugged before installing and maintaining the inverter.

Must observe the following standard and specifications strictly when installing, operating and maintaining SolarRiver-D series inverter.

① Get the permission from the local power department to combine inverter to the grid and operate by the professional electrical engineer.
② All the electrical installation must comply with local electrical installation standard.
③ Don't touch the other parts except terminals When installing.
④ There is high electrical voltage when working. Users should cut off inverter AC/DC power and external control power and wait for at least 5 minutes before maintaining
⑤ Pay attention to surface heat of inverter. For example, the power Semiconductor Devices remain hot when switched off.

Pay attention to the rated voltage and current when design the system.
Please assess the following factors when designing PV system:
The largest input voltage of MPPT circuit in any case;
The largest input current of MPPT circuit in any case.

5.4 Installation Precaution

Checking environment where system is installed:
SamilPower suggests customer check the installation site. Do not fall into any of the following conditions:

- The ambient temperature is out the range of -20°C to +60°C.
- The altitude is 2,000 m above sea level.

- Prone to be damaged by water.
- Close to corrosive gas or liquid (for example, locations where chemicals are processed or around livestock).
- Exposed to direct sunlight.
- Prone to be flooded or covered by snow.
- Little or no air flow.
- Exposed to steam, vapor, or water.
- Exposed to direct cool air.
- Near the television antenna or antenna cable.

The inverter is needed at least 30 cm (see figure 8) clearance. The system may malfunction if not installed properly, is water damaged, or overheats.

Faults caused by any of the above conditions are not covered by the warranty.

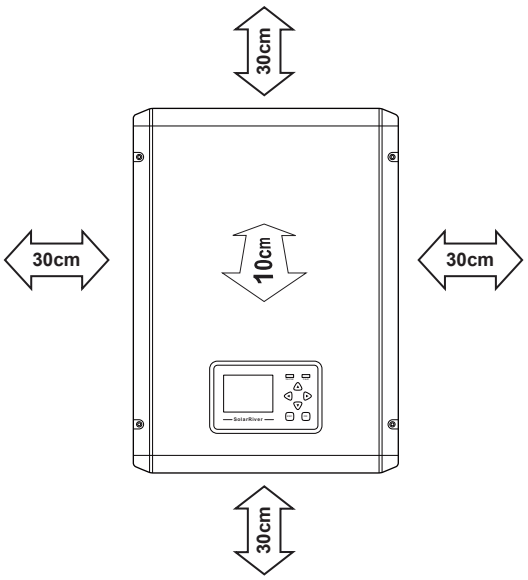


Figure 8 Space specification

Choose inverter installation position:

- Inverter must be installed on a solid surface which bears the weight of the inverter;
- Tilted degree should not exceed 15 degree, as figure 9:
- Terminals of inverter must be face down;
- Can not be installed horizontally.

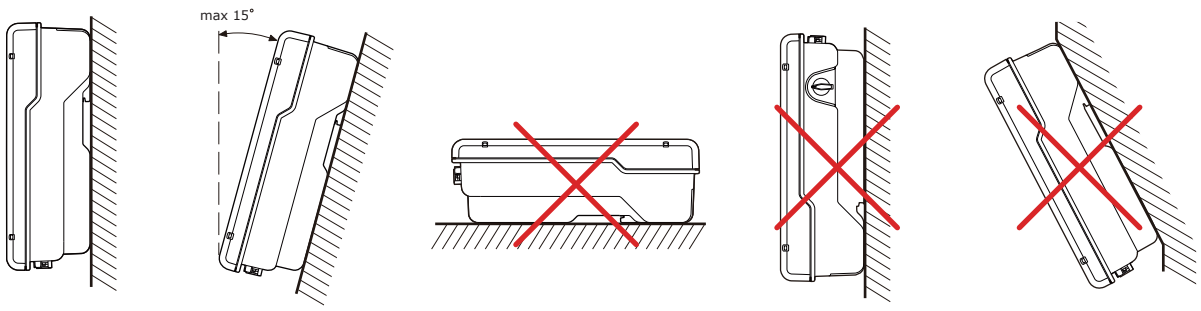


Figure 9 Incorrect installation

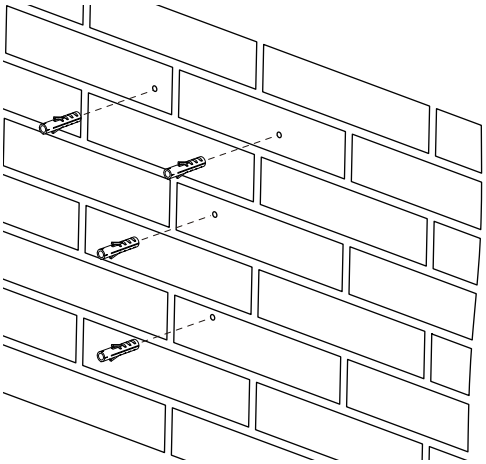
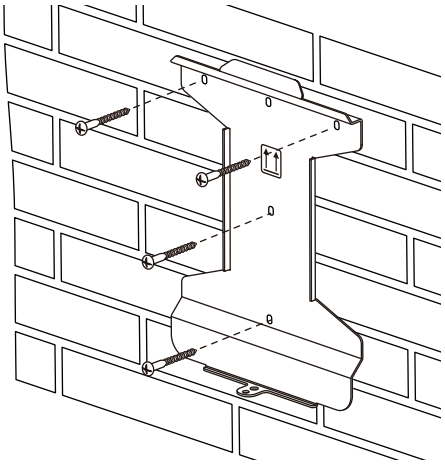
5.5 Installation Tools

The below tools are needed before installation.

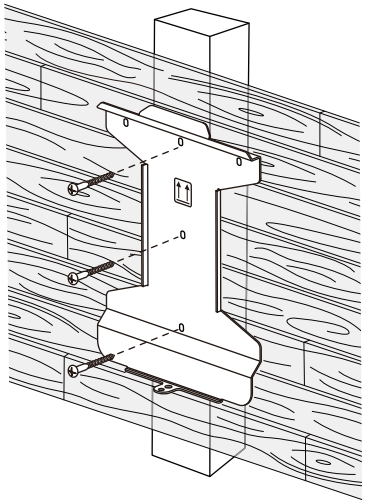



5.6 Installation Steps

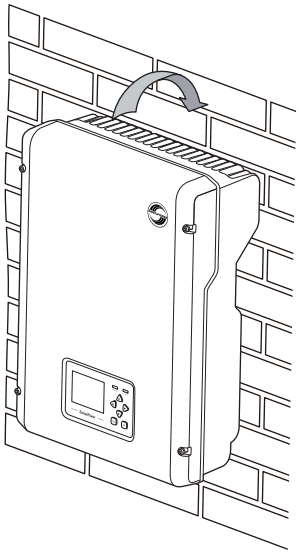
Step1: Drill holes in the wall with diameter 6mm drill according to the size of bracket. Keep drilling perpendicular to the wall, and don't shake when drilling to avoid damage to the wall. Then put expansion pipe into the hole, use rubber hammer to tap the pipe into the wall completely. Put the bracket into expansion pipes and then use expansion screws to fasten bracket.

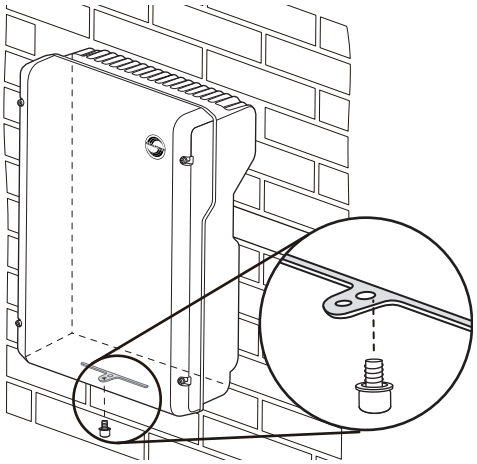
Mounting bracket on the wooden wall is as the following picture.



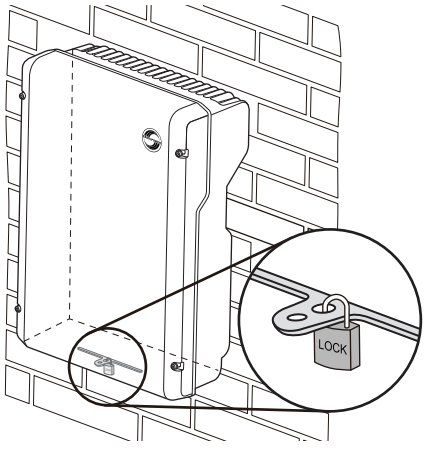
Step 2: Put the inverter onto the bracket.



Step 3: Use M5 hex key nut to fix the bottom of the inverter.



Step 4: Lock the inverter and the bracket with lock for safety. (This is optional for users. User can select the lock according to your requirements).



5.7 Connections of the PV Power System

5.7.1 Announcements

Ensure that the DC side is not charged before installation and maintenance. But after DC side is disconnected, the capacitor is still charged, so need to wait for 5 minutes to ensure that the capacitor is fully discharged.

Before the electrical connection, make sure to use opaque material to cover the PV battery or disconnected the breaker of DC side. Exposure to the sun, PV array will produce a dangerous voltage after sun exposure.

Ensure that not connect each PV module to the DC/DC power optimizer, or the inverter would not function normally.

5.7.2 PV array Connection Types

PV array connection types: There are 2 independent MPP trackers in inverter. You can choose common -string input connection and multi-strings input connection. We recommend that choose multi-strings to harvest max. PV power.

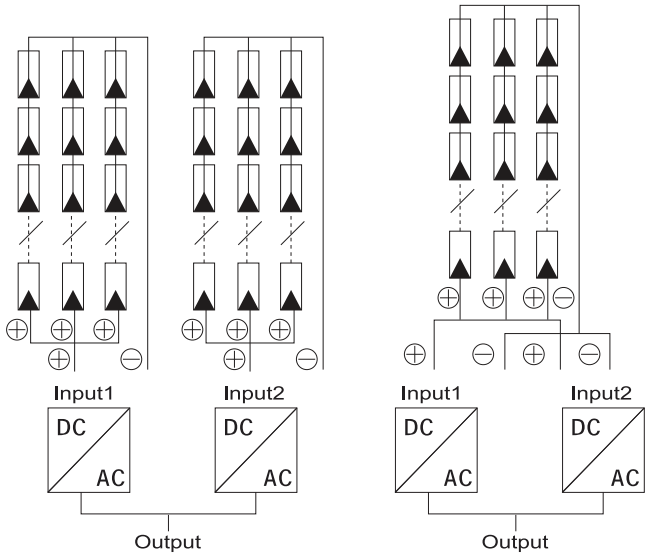


Figure 10 Multi-string input connection (Left) and common-string input connection (Right)

Please select excellent function and reliable quality PV arrays. Open-circuit voltage of PV arrays should be<Max. input DC input voltage. Operating voltage should be conformed to MPPT voltage range.

Table 2 DC Voltage Limitation

Model	SolarRiver 3400TL-D	SolarRiver 4000TL-D	SolarRiver 4500TL-D	SolarRiver 5000TL-D	SolarRiver 5200TL-D	SolarRiver 6000TL-D
MPPT voltage range	160~500V	165~500V	165~500V	175~500V	175~500V	210~500V
Max. DC voltage	550 Vdc					

Please use PV cable to connect arrays to inverter. From junction box to inverter, voltage drop is about 1-2%. So we suggest the inverter be installed near PV arrays, in order to save cable and reduce DC loss.

Note!
Please don't connect the PV positive or negative to ground.

5.7.3 Connection Steps of DC Connector

• Assembly steps of DC connector

Step 1: Inserting the stripped conductor, Cross-sections 2.5 to 6 mm2, Outside diameter 5.0 to 8 mm, Stripping length 15 mm.
Step 2: Close spring with the thumb or using combination pliers. Please ensure that the spring is closed. (see figure 11)
Step 3: Push connectors together (see figure11). Screw cable gland tight. Screw in the nut until it reaches the O-ring and then tighten it with at least 2 Nm using a suitable tool. Finished.

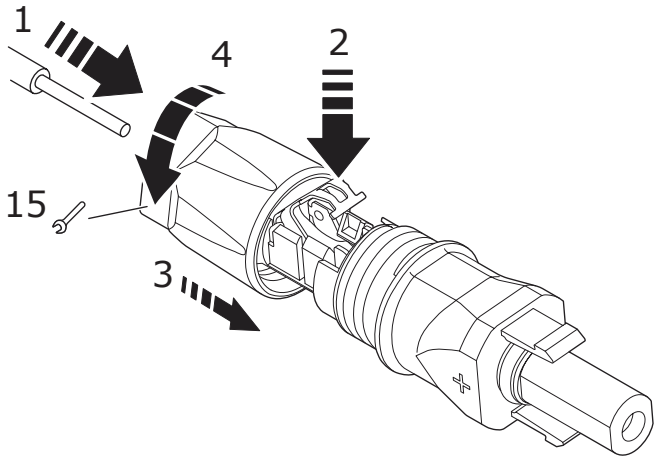


Figure 11 Connection of the connector

• Electrical connections of DC side

Step 1: Install the breaker or SolarArray Combiner in the DC side.
Step 2: Disconnect the breaker or SolarArray Combiner with SolarRiver-D inverter.
Step 3: Ensure open-circuit voltage of PV arrays is<1000V.
Step 4: Put the positive and negative connector into the terminals on the bottom of inverter.

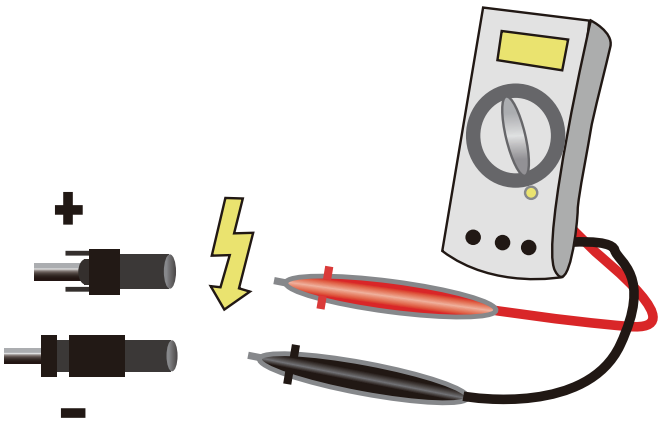


Figure 12 Use multimeter to measure PV array voltage

5.7.4 Assembly Steps of AC Connector

SolarRiver series inverters are designed for single phase grid. Technical data should comply with the rule of local public grid.

Table 3 Cable and Micro-breaker rule

Model	SolarRiver 3400TL-D	SolarRiver 4000TL-D	SolarRiver 4500TL-D	SolarRiver 5000TL-D	SolarRiver 5200TL-D	SolarRiver 6000TL-D
Cable (Cu)	4mm²	4mm²	4mm²	6mm²	6mm²	6mm²
Micro-Breaker	20A	20A	25A	32A	32A	32A

Micro-breaker should be installed between inverter and grid, and the residual current is 30 mA≤Ifn≤300 mA. Any load should not be connected with inverter directly.

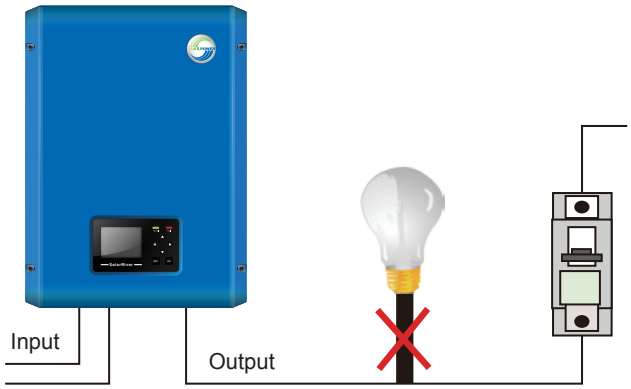


Figure 13 Incorrect Connections between Load and Inverter

Impedance of SolarRiver-D inverter AC connector should be less than 2Ω. To ensure anti-islanding function reliable, wire loss power of PV cable should ＜1% of normal power. Length between inverter AC side and grid connecting dot should be less than 150m. Relationship between cable and cable loss is as following：

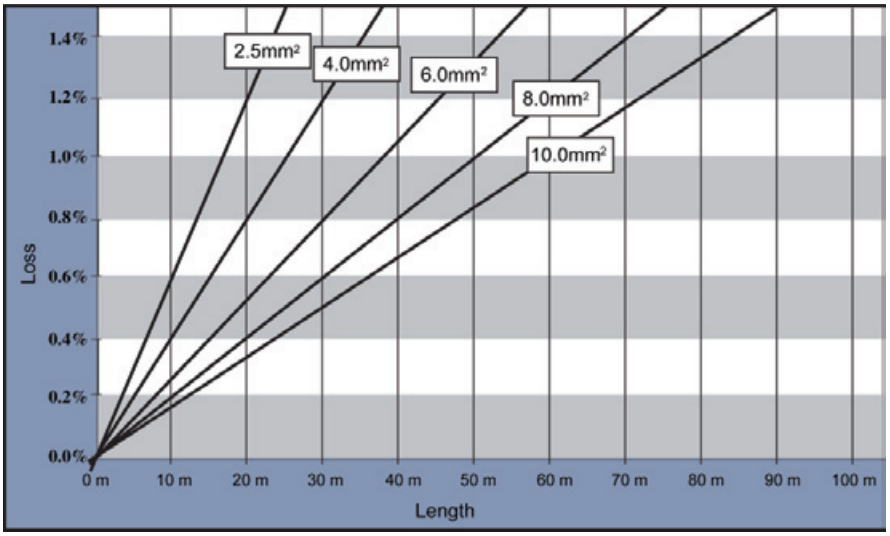


Figure 14 AC Cable Loss

This product is equipped with IP66 AC connector. You can connect inverter AC side by yourself. Please see figure 15 for AC connector disassembling guide.

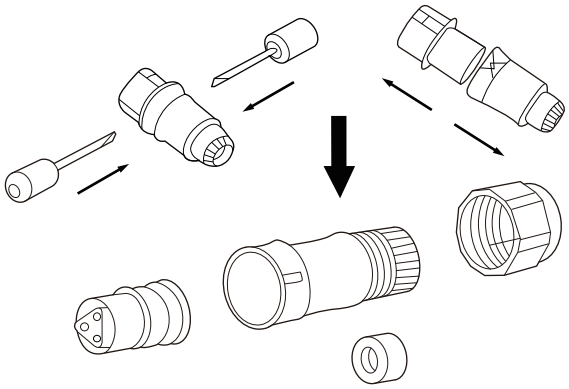
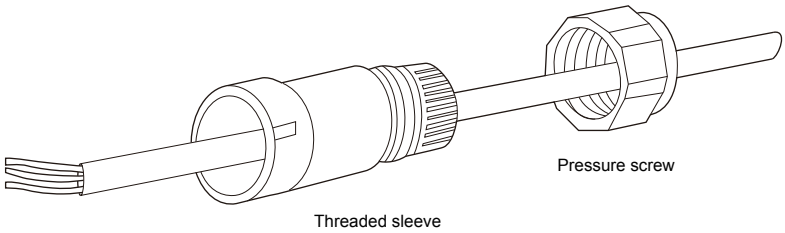


Figure 15 AC connector disassembling guide

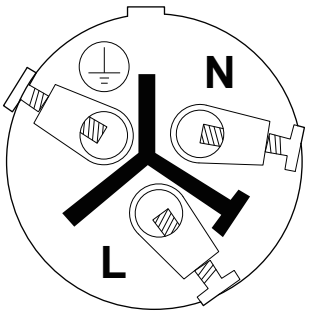
Assembly steps of AC connector are as following：

Step 1: Put the AC wire through the threaded sleeve and pressure screw.

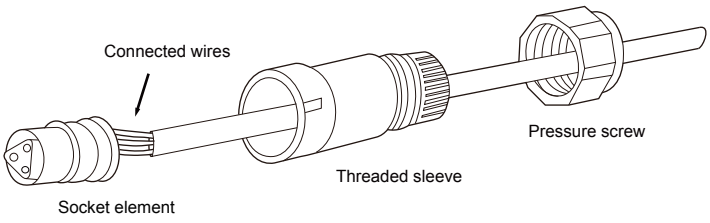


Step 2: Wire the AC side refer to following instructions.

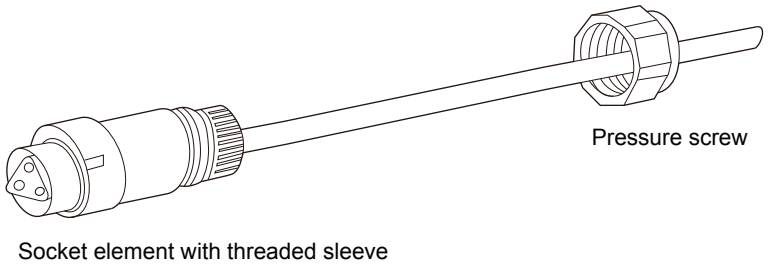
- Screw the green-yellow wire to the ground terminator in the AC Connector.
- Screw the N wire (blue wire) to the N(Neutral) terminator in the AC Connector.
- Screw the L wire (brown or black wire) to the L(Line) terminator in the AC Connector.



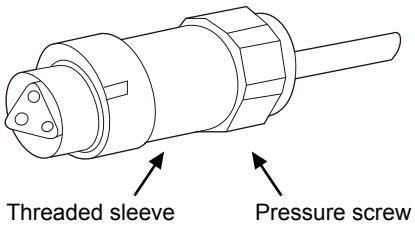
Step 3: Confirm all the wires should be screwed down.



Step 4: Screw down the threaded sleeve.



Step 5: Screw down the pressure screw.



Step 6: Connect AC connector to inverter.

5.7.5 Grounding

Neither positive nor negative could grounding because of no transformer, or it will break down.

In the system, all non-current-carrying metal parts (such as shell of combiner, distribution and inverter) should be connected to the earth.

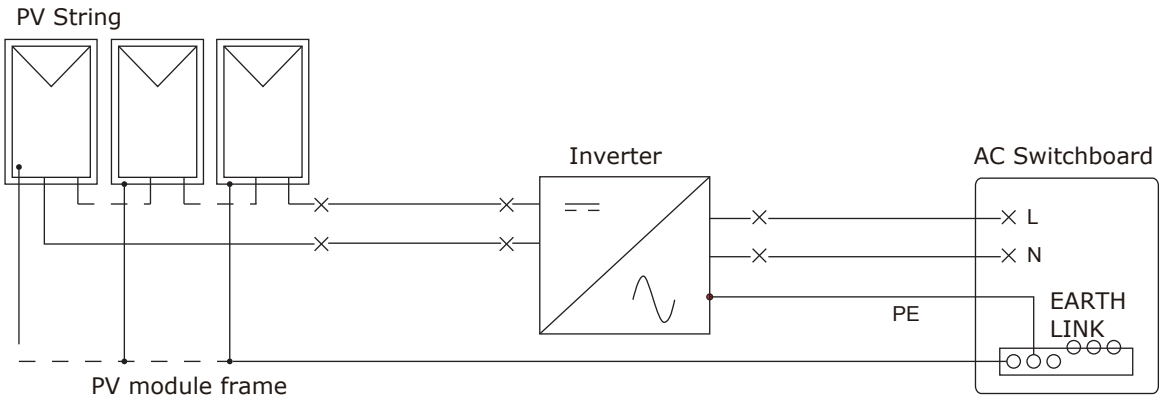


Figure 16 grounding of system

5.7.6 Connection of Communication

Please refer to part 8.2.2.

6 Run the Inverter

6.1 Safety Inspection

PV array
Inspect the PV array to determine whether each PV array opening voltage meets the standard before operating the inverter.
- Open-circuit voltage of PV arrays should be<Max. input DC input voltage;
- ensure positive and negative polarity correct.

Collection of inverter DC side
Confirm DC side no voltages and currents by multimeter.
Check the wiring of DC side whether the wiring of polarity is consistent with PV array. Measure each DC input voltage (open). Ensure that polarity is correct. Check voltage bias (in stable weather), if the bias is more than 3%, PV array may has the problem.

Collection of inverter AC side
Ensure that the breaker of inverter AC side is "OFF". Measure THD (total harmonic distortion) possibly, then check the curve. If it is distorted seriously, the inverter can not run.

6.2 Start Inverter

Steps of Start inverter are as following:

Step 1: Turn on DC switch.
Step 2: If it's the first time starting the inverter, please set accords to part 6.3.
Step 3: Turn on AC breaker.

If the inverter shows other fault, please refer to part 9--error table.

Note!
If the inverter fail, please refer to part 9--error table.

6.3 Interface Setting

Enter start-up interface after starting inverter, shown as figure17.

Figure 17 start-up interface

Press "OK", will enter language setting interface automatically.

Step 1: language setting

Move the cursor to select language, press "OK" to select and press "OK" to confirm.

Note: Language setting is independent to Grid-tied country setting.

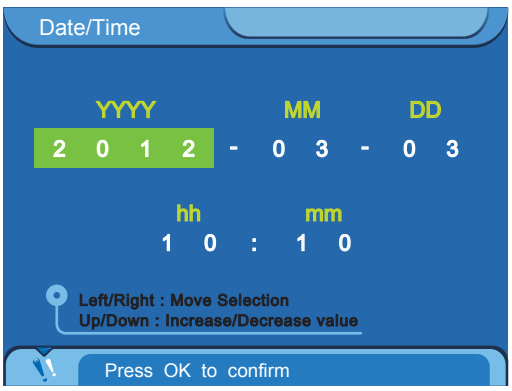
Step 2: Grid-tied country setting

Next interface is grid-tied country setting interface. Different countries have different grid safety rules. Move the cursor to select country, and then press "OK"to confirm. Then, press "OK" key to enter the next step.

Step 3: Date and time settings

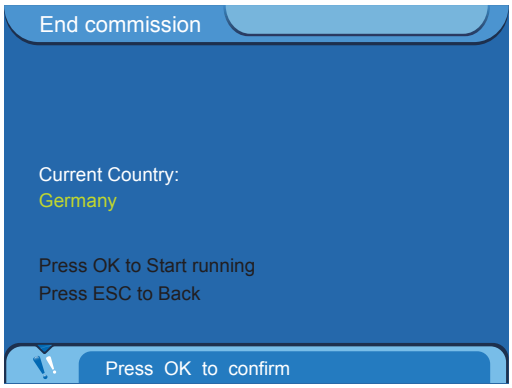
Set according to the local date and time. Press left or right arrow key to move the cursor, press the up or down arrow keys to change value, then press "OK" to confirm. LCD will display time in the upper right corner. Then, press "OK" key to enter the next step.

Note: Inverter will check whether the setting is legitimate when changing the time automatically, and prevent illegal time value. If unable to modify time, please check whether it is legitimate.



Step 4: Check settings information

LCD will display the settings information. Please check the settings information. If setting is wrong, please press the "ESC" to reset. If all the information is correct, please press "OK" to confirm, the inverter will save all the settings.



7 Operation

7.1 Control and Display Panel

Control and Display Panel of SolarRiver inverter is shown as figure 18.

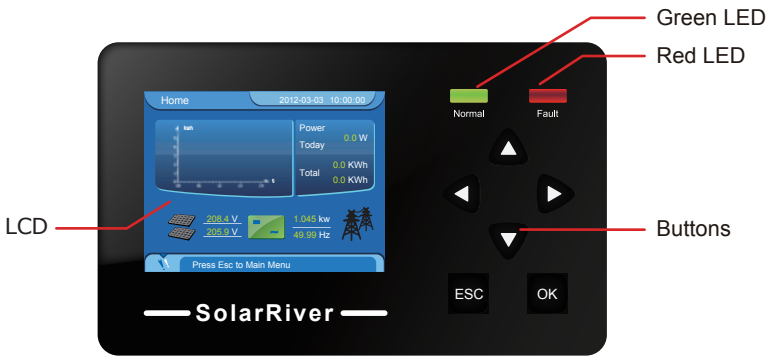


Figure 18 HMI interface

There are 6 buttons: **OK, ESC, UP, DOWN, RIGHT, LEFT.**

OK button: confirm the selection.
ESC button: exit current screen or selection
Up button: move cursor to up selection or increase the values
DOWN button: move cursor to down or decrease the values.
RIGHT button: move cursor to right side or increase the backlight.
LEFT button: move cursor to left side or decrease the backlight.

There are two LEDS on the panel. Different LED status means inverter different working statutes.

Table 4 LED statutes

LED	Flash	Light
green	Wait state	Normal state
red	Fault state	Permanent state

Wait: Inverter is checking in this state. If finds fault or error, will enter Fault or Permanent state.
normal: Inverter feeds AC current into grid. If any error or fault occurs, inverter will go to Fault State or Permanent State.
fault: Inverter has checked some recoverable error. It can recover if the error disappears. If in Fault State continually, you should check the inverter according to table 5.
permanent: Inverter has checked some unrecoverable error. You should take some measure or ask for help.
When the inverter operates normally, user touch any button, then the backlight will be on, and inverter will display home interface. If none key touched for 60 seconds, the backlight will be off. In next 10 seconds if still no operation the screen will back to home interface, otherwise the backlight will be illuminated.
Note: After starting inverter and restoring the factory settings, LCD backlight will not shut down automatically.

7.2 Interface Setting

7.2.1 Home Interface

Enter home interface automatically after startup (If not the home interface, press "ESC" return to the home interface), as shown in figure19.

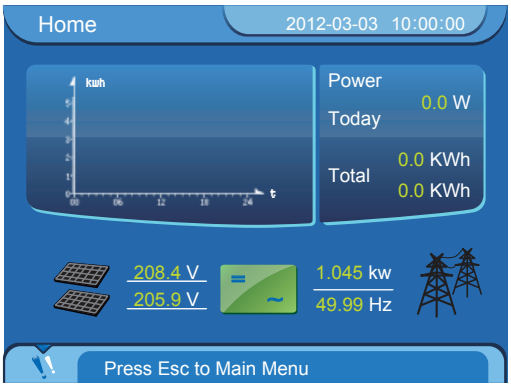


Figure 19 home interface

7.2.2 Main Menu

In the home interface press "ESC" then enter the main menu, as shown in figure 20.

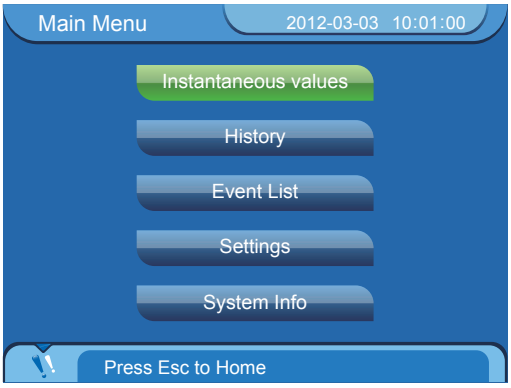


Figure 20 main menu

7.2.3 Instantaneous Data

Move the cursor to the" Instantaneous" and then press "OK", the user will see the input, output voltage, current, power, temperature and other real-time information.

7.2.4 Historical Data

Move the cursor to the" History" and then press “OK”, the user will see the power amount histogram of every hour. The user press the left or right arrow key to see daily electricenergy production histogram in the current month, mensal electricenergy production histogram in the current in the current year.

7.2.5 Event List

Move the cursor to the" Event List" and then press “OK”, the user will see the list of events of inverter. Record 100 event information at most. Press the right or left keys to select events.

7.2.6 Settings

Move the cursor to the" Settings" and then press “OK”, the user will enter the setting interface, as shown in figure 21.

Figure 21 settings interface

Some settings need to input password. There are 3 kinds of password: user password, installation password and factory password. You can enter "Clear data", "Clear events", "Network" and "Reset password" interface after inputting password.

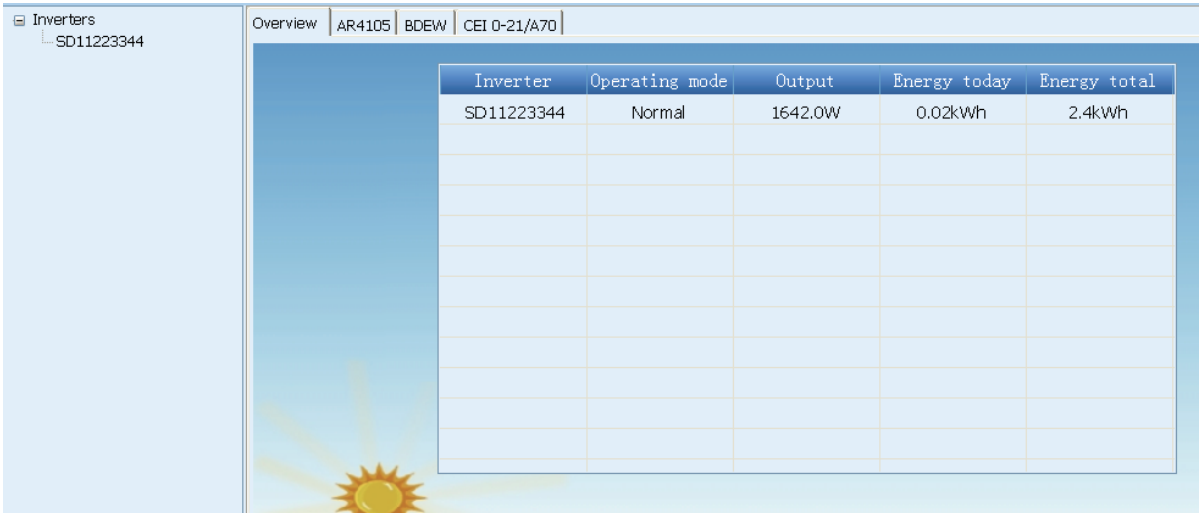
1. Initial user password: 111111.
2. Password is composed of 6 figures.
3. If forget password, please contact installation contractor.

7.3 CEI 0-21 Settings

Steps of the settings are as followings:

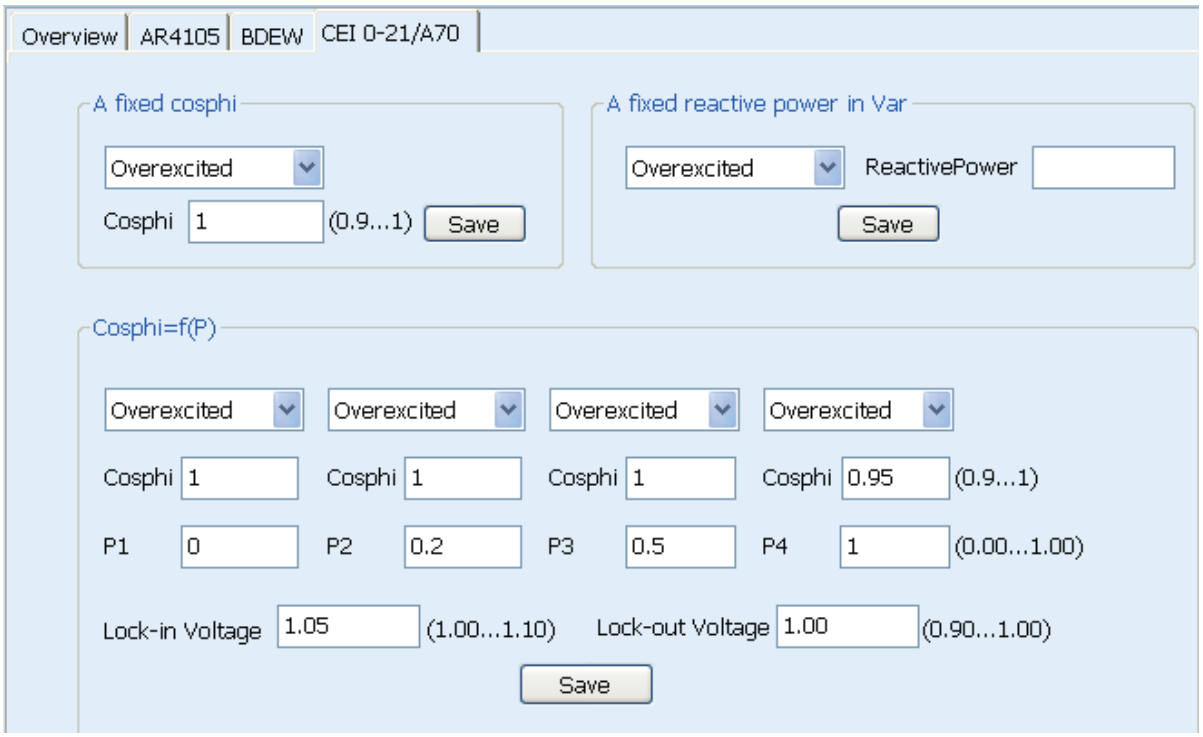
Step 1: Connect your laptop to the Ethernet port of inverter with an Ethernet cable and run Solar Power Browser (V2.10.0.0 or higher). If the connection is successful, the serial number of the inverter will be displayed in the left navigation bar.

A: When clicking on “Inverters”, the interface is shown as the following image. You can set the parameters conforming to CEI 0-21 to all the inverters which are connected to Solar Power Browser. For detailed settings please refer to step 2.



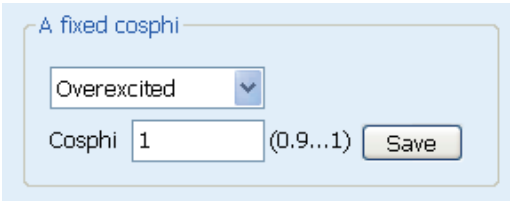
B: By clicking on the serial number, the Solar Power Browser interface shows as the figure below. For detailed settings please refer to step 3.

Step 2: Click on "CEI 0-21/A70" on the top of navigation bar, to configure parameters conform to CEI 0-21 standard.



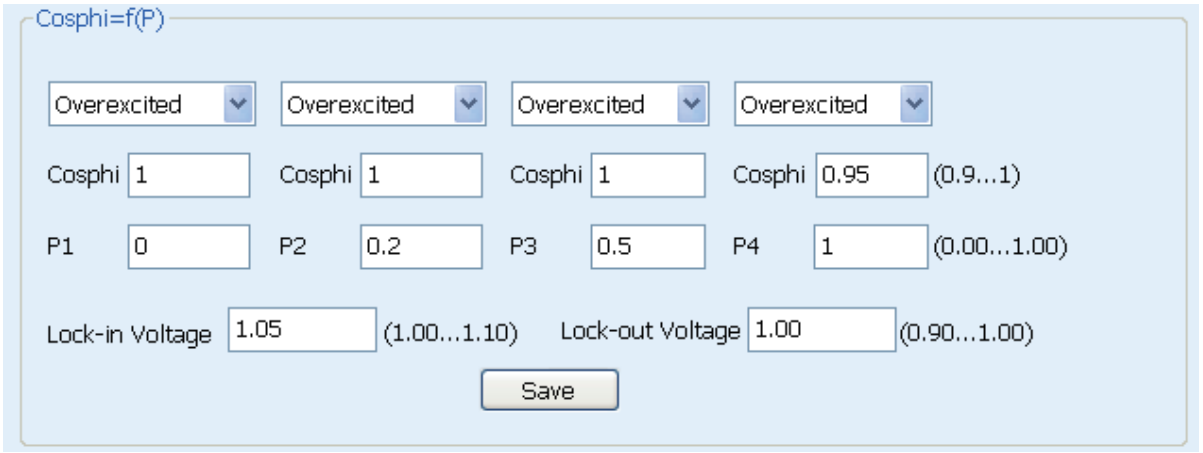
A. Fixed cosphi setting, as per the following figure.

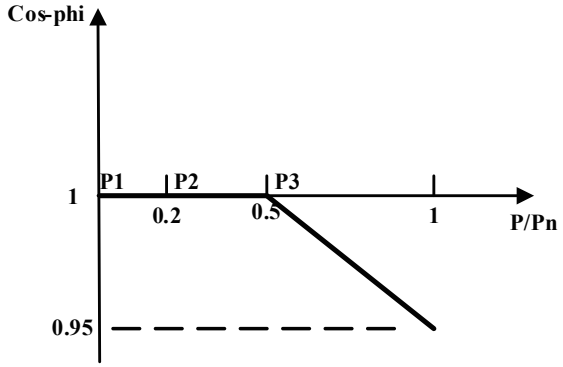
Click on the drop-down menu, select Overexcited or Underexcited, fill in the cosphi value which range from 0.9 to 1. You can check whether the cosphi is right or not in the menu of 'Instantaneous' value on the LCD.



B. Cosphi=f(P), as per the following figure.

Click on the drop-down menu, select Overexcited or Underexcited, fill in cosphi value, ratio of P and Pn, Lock-in Voltage, Lock-out Voltage corresponding to the voltage value of the reactive power production or not.

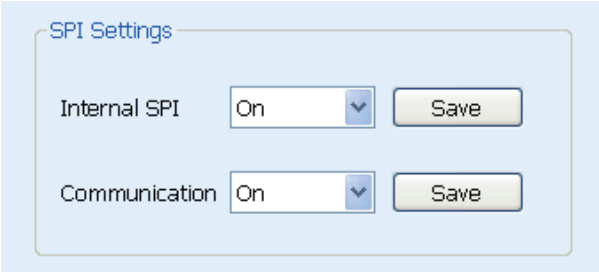




C. SPI (Interface Protection System) setting, as shown in the following figure, it can be enabled or disabled, and it is on as default.

If Communication is on , the inverter runs in local command mode, the tripping time (time between the instant the fault begins and the protection intervention) is 0.1s~5s with frequency tripping range between 47.5Hz and 51.5Hz;

If Communication is off, the inverter runs in remote control mode, please see remote control mode for details.



Remote control mode:

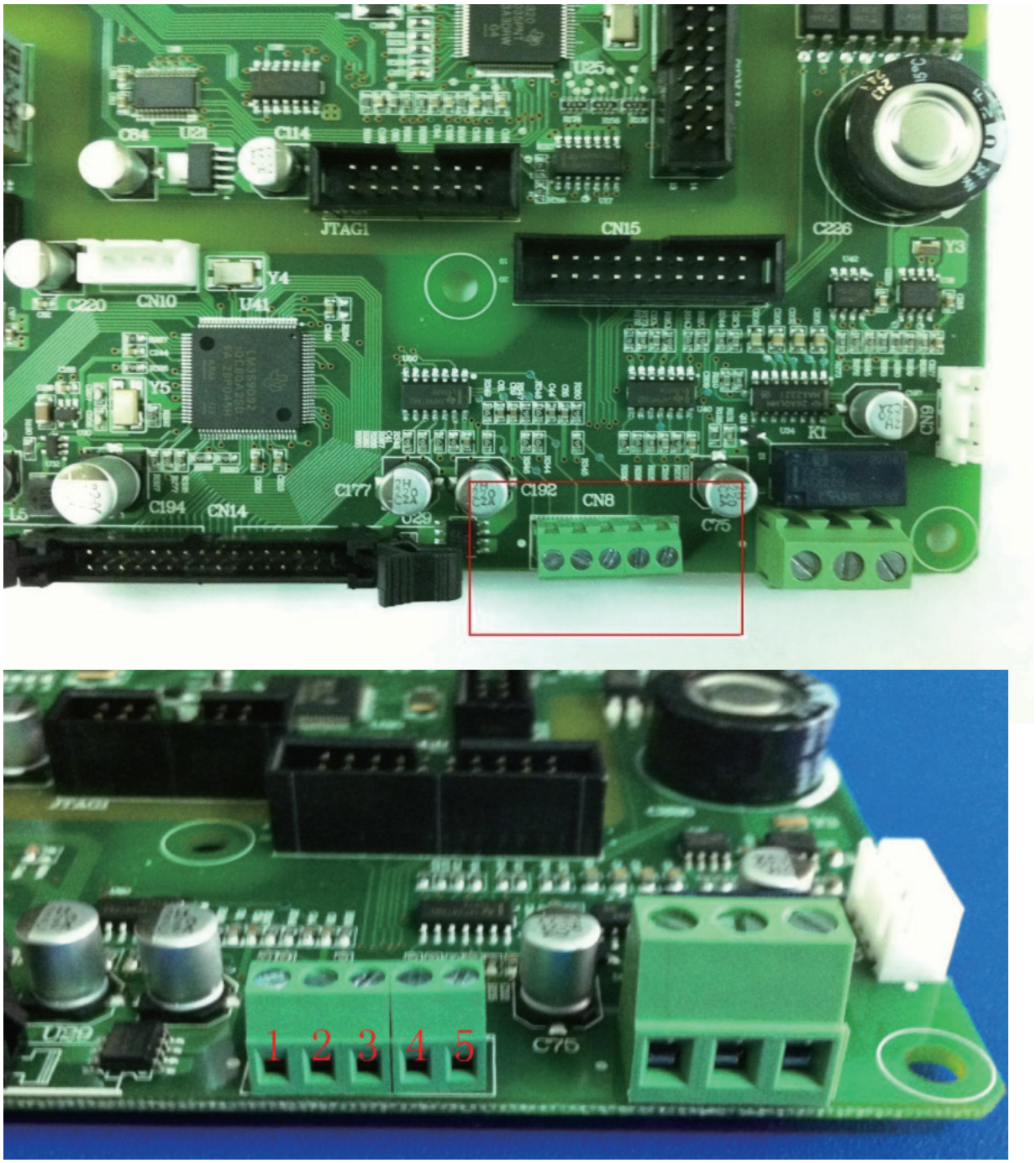
As shown in the following photo, on the inverter control board there is a connector which allows to wire an external signal input.

When the local mode is active, the external signal is ignored.
To set the remote control mode, the external signal input pin1 is low (short pin1 and pin5), this will disconnect the inverter from grid;

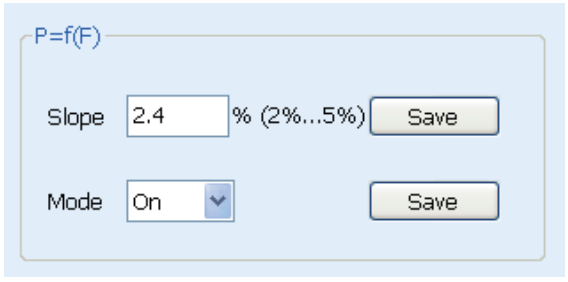
when the external signal input pin2 is low (short pin2 and pin5), the inverter runs in a narrow frequency range (49.5Hz--50.5Hz); if the external signal pin2 is high (pin2 and pin5 opened), the inverter runs in the wide frequency range (47.5Hz---51.5Hz).

Pin1: external trip signal
Pin2: wide/narrow scope frequency range
Pin3: reserved
Pin4: reserved
Pin5: Gnd

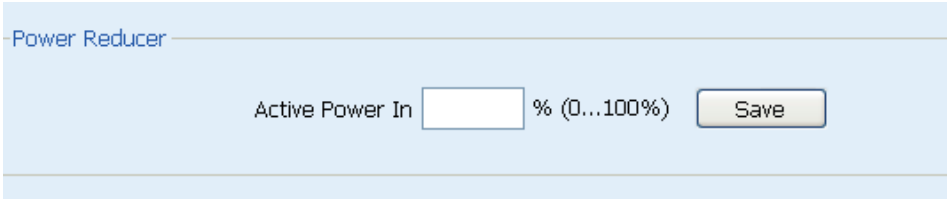
Communication	Control mode	Pin1	Pin2	Frequency range	Status
On	Local	-	-	47.5-51.5 Hz	normal
Off	Remote	high	high	47.5-51.5 Hz	normal
		low	high	47.5-51.5 Hz	Waiting(reconnecting)
		high	low	49.5-50.5 Hz	high
		low	low	49.5-50.5 Hz	Waiting(reconnecting)

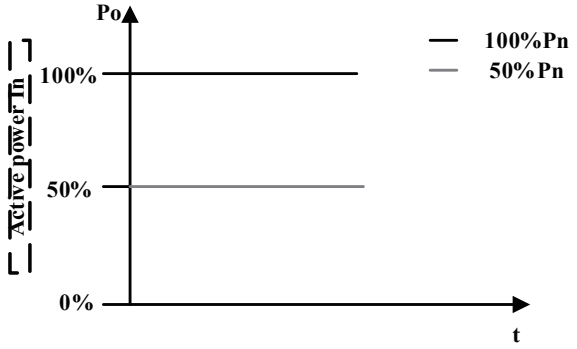


D. Active power derating set, as per the following screenshot. Insert the ratio of the active power and rated active power, the range is 0%-100%, and the default is 100%.

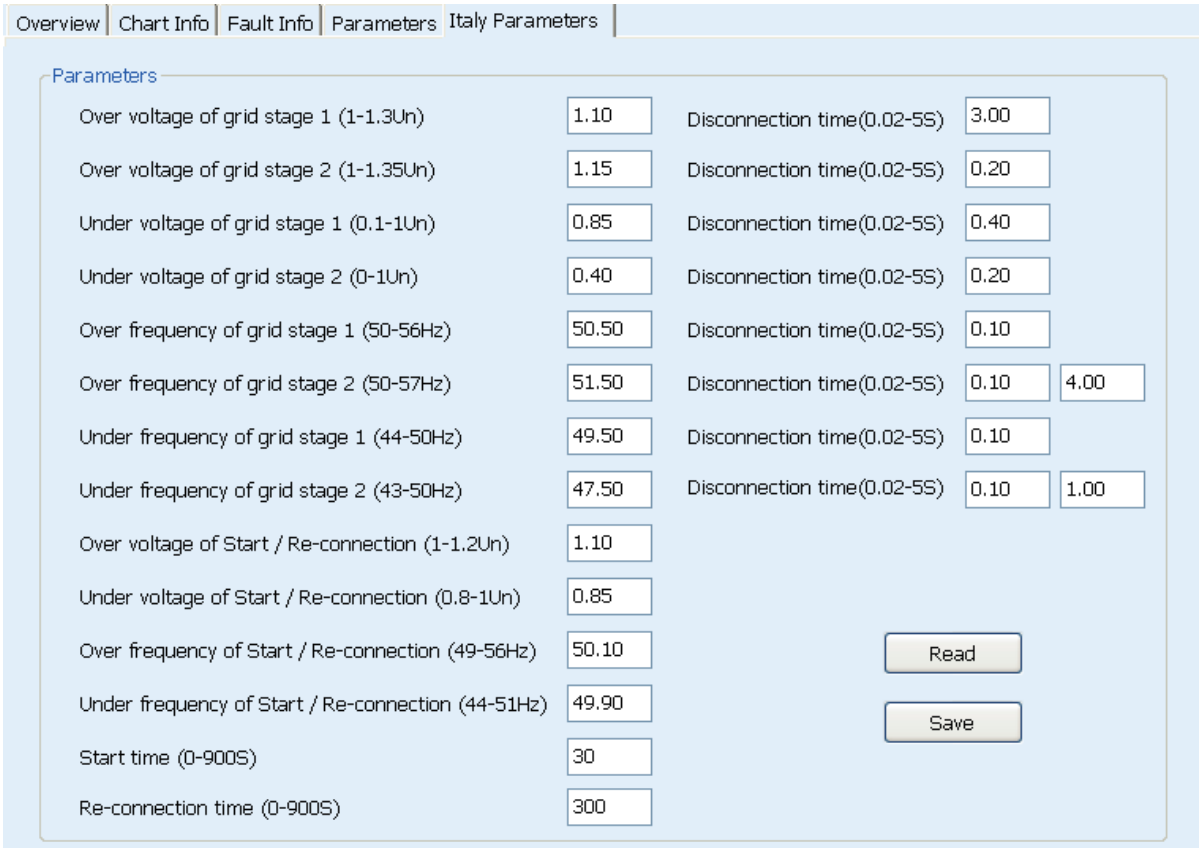


E. Active power derating settings, as the following picture. Fill in the ratio of the active power and rated active power, the range is 0%-100%, and the default is 100%.





Step 3: Inverter safety parameters setting, as the following picture. Before setting, click 'Read' Data to refresh current data then set parameters, click 'save' at last. The following picture shows default parameters of CEI 0-21.



8 Communication and Monitoring

8.1 Communication Interface

Standard configuration:

1. Ethernet: Transmit the inverter working state such as output voltage, current, frequency, fault information to the PC machine or other monitoring system. Ethernet can achieve multi-inverter wired network at the same time.

Optional configuration:

WIFI: Wireless connect to route. Transmit the inverter working state such as output voltage, current, frequency, fault information to the PC machine or other monitoring system. WIFI can achieve multi-inverter wireless network at the same time.

RS485: Achieve multi-inverter network to monitor the inverter working state such as output voltage, current, frequency, fault information.

Note!

Only choose one optional configuration when inverter is working.

8.2 Communication Mode

When user want to know the information of the power system and monitor power system. We offer following communications.

8.2.1 Ethernet Communication

You can connect inverter to Internet by router (the router is not special for inverters, you can get any brand in the market). Then you can see the inverter's data in any place of the world.

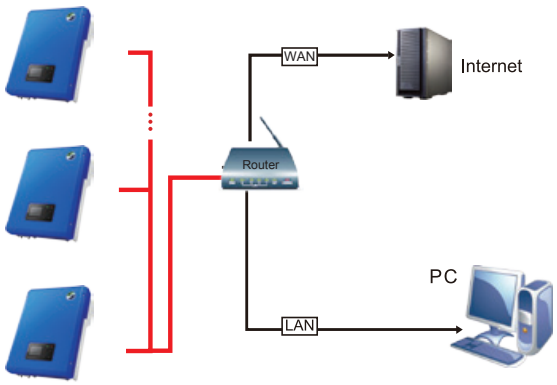
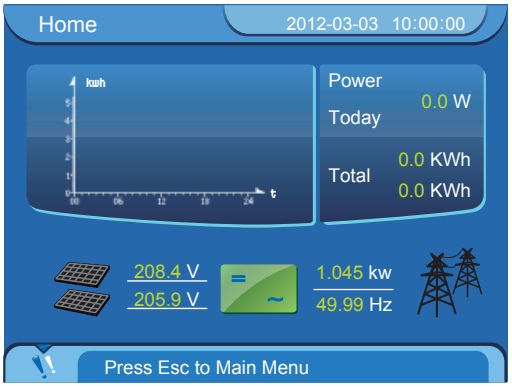


Figure 22 Ethernet communication

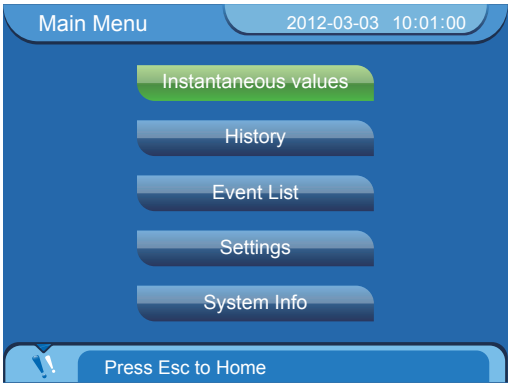
Hardware Requirements: computer which support windows(including xp,vista,win7), router, netting twine, inverter(LAN mode).
Monitor mode: LAN and WAN.
LAN: Install SolarPower Browser in PC which can monitor inverters .In this mode, you can use a router or nonuse.
If you use a router, you can monitor 254 inverters.

Parameter setting when using router:

Step 1: Enter home interface automatically after startup (If not the home interface, press "ESC" return to the home interface).

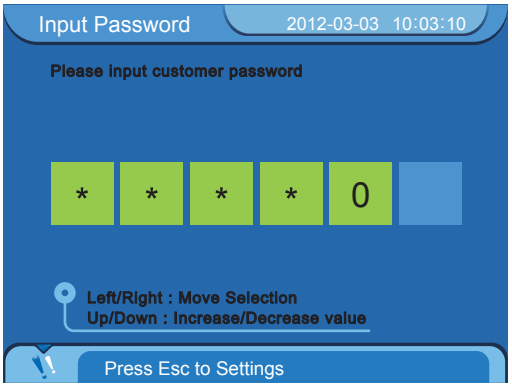


Step 2: Press "ESC" in home interface then enter the main menu.

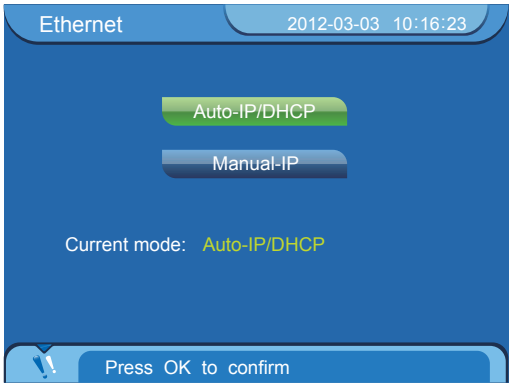


Step 3: Move the cursor to "settings" and then press "OK", will enter settings interface.

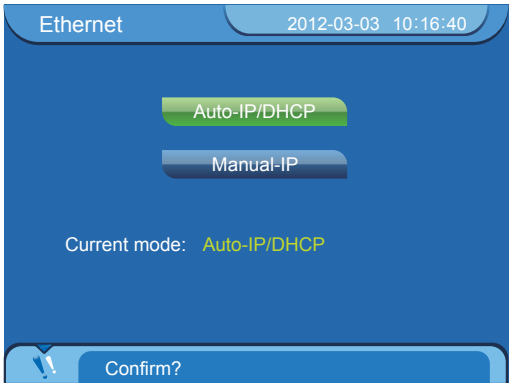
Step 4: Move the cursor to "network", press "OK" and then enter "Input Password" interface.



Step 5: Press "right" or "left" key to move the cursor to select the figure which need to be modified. Press "up" or "down" key to modify figure. If the password is correct will enter 'Ethernet" interface.



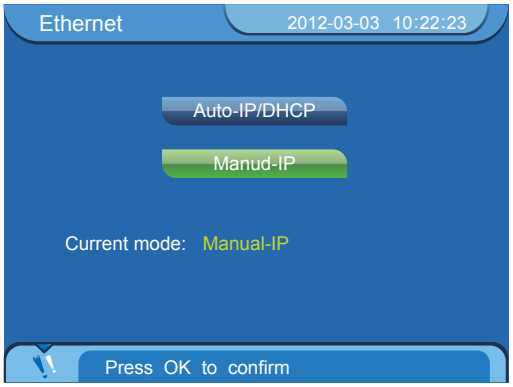
Step 6: Move the cursor to "Auto-IP/DHCP", press "OK" twice. LCD interface will Reboot and then enter into home interface automatically.

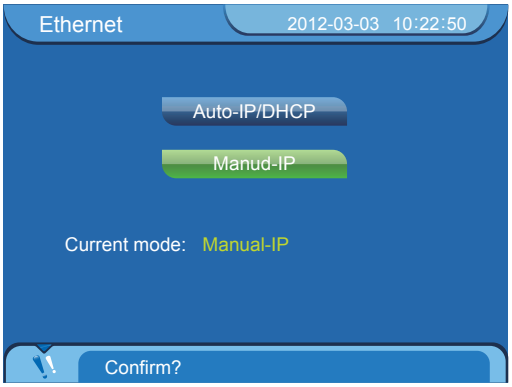


If you don’t use a router, you can only monitor 1 inverter. You will need to use cable to connect inverter with PC.

Parameter setting when not using router:

Refer to settings when using router:Main Menu->Settings->Network->Ethernet. In "Ethernet" interface move the cursor to "Manual-IP", press "OK" twice(one press to confirm).





Press "OK" twice then will enter "Manual-IP" interface. Press "right" or "left" key to move the cursor to select the figure which need to be modified. Press "up" or "down" key to modify figure(IP Address: 192.168.000.002. Subnet Mask：255.255.255.000, others are 0). Press "OK" after modifying. LCD will display the setting parameter and press "OK" again, now setting is over. LCD interface will Reboot and then enter to home interface automatically.

Parameter set for PC:

Set IP address as 192.168.000.001,
Set Subnet mask as 255.255.255.000.

① Need to install SolarRiver-D inverter monitoring software in the PC when using WIFI, Ethernet communication.

② Can't using RS485 and Ethernet communication mode for a PC at the same time.

③ The default set is "Auto IP". If use router, LAN or WAN monitor is available without any parameter setting.

④ In WAN mode, must use router and recommend to select auto IP mode.

8.2.2 RS485 Communication

RS485 is generally for a maximum of 32 inverters communication at the same time. But the length of communication wire should be≤1200m. You can read and analyse data by PC if the system is equipped with Solar-Log200/500/1000. Please refer to Solar-Log200/500/1000 manual for more information.

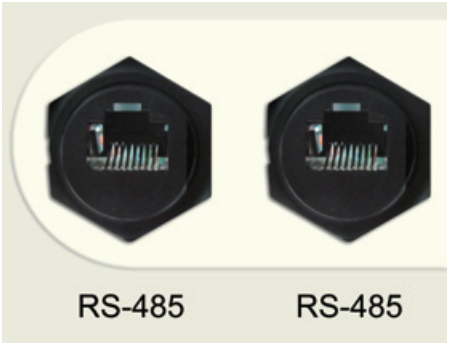


Figure 23 RS-485 jack

Two types of cable must be prepared before using Solar-Log to monitor mult-inverters.

The communication cable between inverter and inverter:

1. Prepare two 8-PIN RJ45 modular plug, hold the RJ45 modular plug with the 'clip' on the bottom, the 'opening' (where you insert the cable) facing you, the order number is 1 to 8 from left to right, as figure 24.

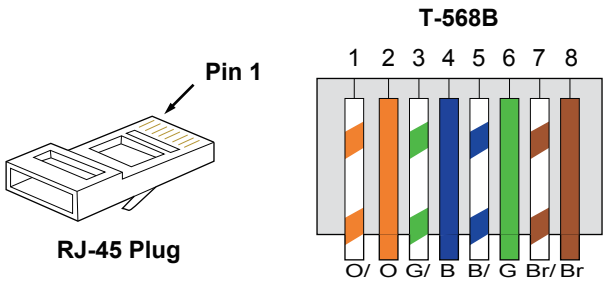


Figure 24

2. Use a length of communication cable, then push the 8 color wires into the modular plug follow the same order as below.

1	orange white
2	orange
3	green white
4	blue
5	blue white
6	green
7	brown white
8	brown

3. Then put the both ends of communication cable into the communication ports of inverter respectively. If there are N inverters, need N-1 this communication cable.

The communication cable between inverter and Solar-Log:

1. One side of cable is the same as cable between inverter and inverter, the other side remains 4 colour wires: green white, green, orange white, orange, as shown in figure 25.

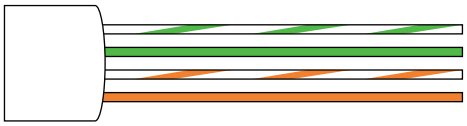


Figure 25

2. Connect 4 colour wires to 1,4,5,6 port of Solar-Log.

1	green white
2	reserve
3	reserve
4	green
5	orange white
6	orange

8.2.3 WIFI Communication

You can connect inverter to Internet by router. Then you can see the inverter's data in any place where internet is available.

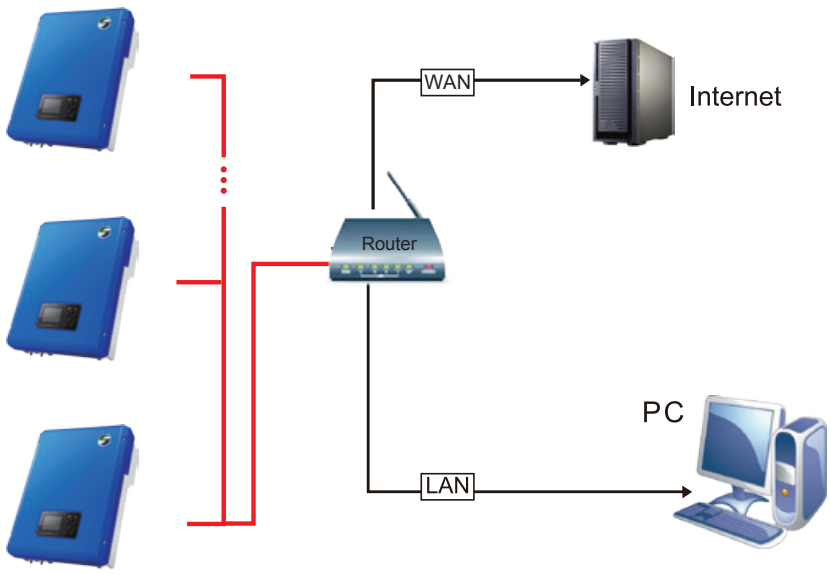
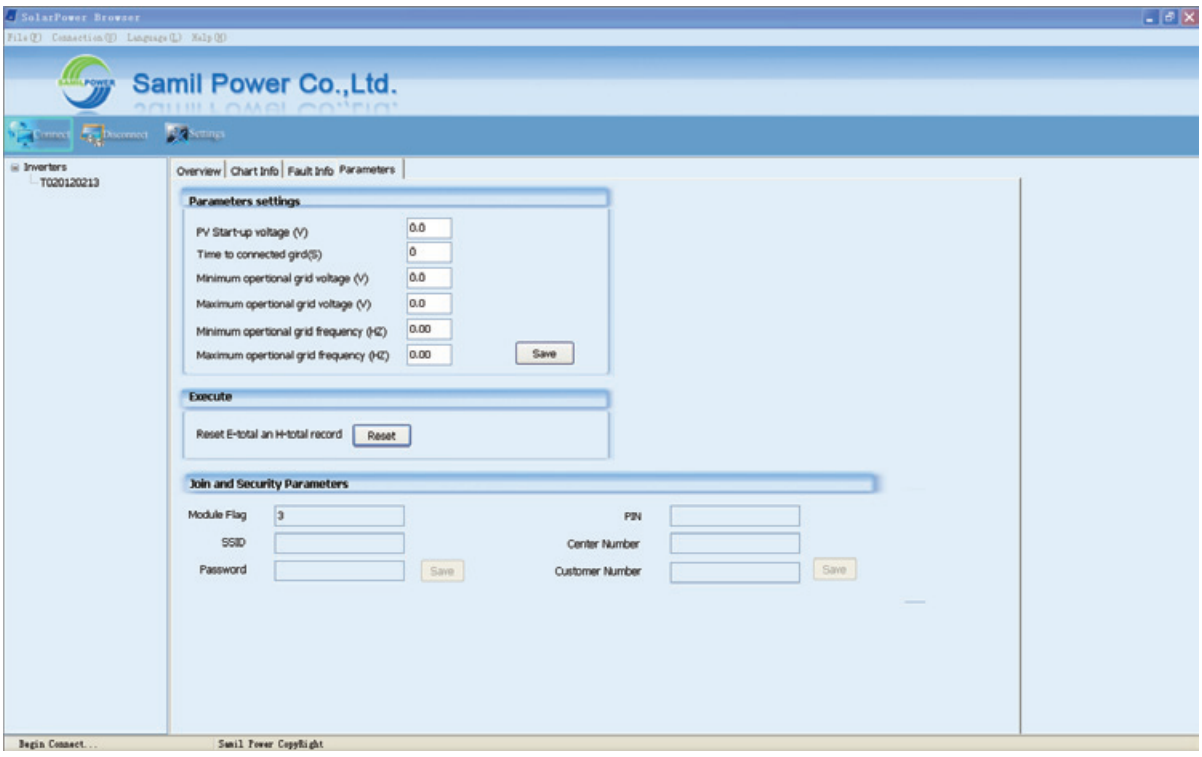


Figure 26 WIFI communication

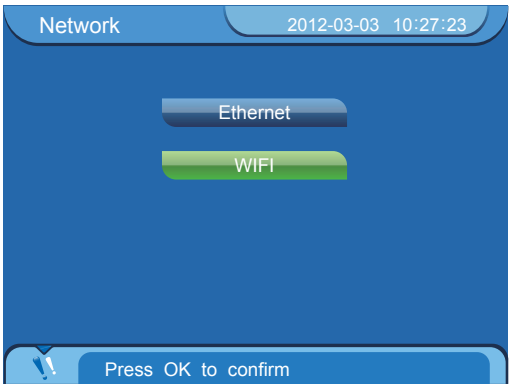
OS: win xp, Vista, Win7;
Network: Lan or Wan;
Wifi: 802.11g.

WIFI settings:
Note: Appendix is WIFI route list.
Step 1: Connect a cable following the steps of Ethernet before opening "SolarPower Browser".

Step 2: Double-click name of inverter to enter detail information page. Set the SSID and the password of router which WIFI is going to be connected to, then you will be request to input another password (samilpower88), please save these information.



Step 3: If success,The inverter will reboot automatically and please disconnect netting twine connection.
Step 4: Check WIFI information:
Enter the interface successively: Main Menu->Settings->Network, move the cursor to "WIFI" and press "OK".



The GUI bellow tells the WIFI hasn't been set yet.

If WIFI has been set, it will be shown as such.

Hardware Requirements: router, inverter equipped with WIFI, PC (with SolarPower Browser software)

9 Troubleshooting and Maintenance

9.1 Troubleshooting

This section illustrates possible faults of an inverter and solving methods and provides users with troubleshooting tips to help them identify and solve common problems. Please read the following troubleshooting steps:

1. Check the warning, fault messages or fault codes displayed on LCD. If a message is displayed, record it before doing anything further.
2. Attempt the solution according to table 5.
3. If no fault message is displayed on LCD, check the following list whether the installation meet the requirements.

— Is the inverter installed in a clean, dry, adequately ventilated place?
— Have the DC input switch been opened?
— Do section area and length of cable meet requirements?
— Are the input and output connections and wiring in good condition?
— Are the configuration settings correct for user particular installation?

Steps of checking the warning and fault information displayed on LCD:
Move the cursor to the "Event list" and then press "OK" in main menu interface, then enter "Event list" interface.

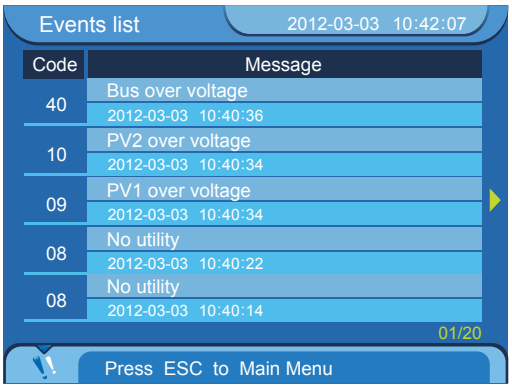


Figure 27 Event list interface

When SolarRiver-D inverter is at fault, the fault information is composed of code, occurring time and fault description.

Please contact Samil Power Co.,Ltd for further technical assistance. Please provide detailed installation information and inverter model, serial number and fault information.

Table 5 Troubleshooting list

Faults	Diagnosis and Solutions
Grid volt / freq over / underrating	- Wait grid go back to normal working state. - Mak sure that grid voltage and frequency complies with standards. - Or, please ask for help
No Utility	- Check grid-connection - Or, please ask for help.
PV1/PV2 over voltage	- Check the PV open-circuit voltage whether it is >Max.DC voltage. - Or, please ask for help.
DCI out range	- Wait for one minute. - Or, please ask for help.

Contiuned:

No Utility	- Check grid-connection - Or, please ask for help.
PV1/PV2 over voltage	- Check the PV open-circuit voltage whether it is >Max.DC voltage. - Or, please ask for help.
DCI out range	- Wait for one minute. - Or, please ask for help.
SCI/ SPI communication fault	- Disconnect DC and AC side, and connect them again. - Or, please ask for help.
PV1/ PV2 isolation fault	- Check the impedance among PV (+)、PV (-) and grounding whether they are>600Kohm. - Or, please ask for help.
Consistent Fault	- Disconnect DC and AC side, and connect them again. - Or, please ask for help.
Relay Failure	- Disconnect DC and AC side, and connect them again. - Or, please ask for help.
GFCI over 30mA /60mA / 150mA /300mA fault	- Check whether leakage current is too high. - Disconnect DC and AC side, check the surrounding equipment on the AC side. - Reconnect the input side and check inverter after troubleshooting. - Or, please ask for help.
EEPROM read/ write failure	- Disconnect DC and AC side, and connect them again. - Or, please ask for help.
Bus over voltage	- Disconnect DC side, and connect them again. - Check L line and N line whether it has connection faults. - Or, please ask for help.
GFCI device failure	- Disconnect DC and AC side, and connect them again. - Or, please ask for help.
Input/ output current high	- Disconnect DC and AC side, and connect them again. - Or, please ask for help.

9.2 Daily Maintenance

Inverters generally do not need any maintenance or calibration, but ensure air-cooling fin not be covered by any dust or dirties.

• Inverter cleaning

Please use electric drier, soft dry cloth or brush to clean inverters. Water, corrosive chemical substance or intense cleaning agent are not allowed to clean the inverter.

• Cooling fin cleaning

To ensure inverter good performance and long-period usage, cooling fin needs to be left with adequate space. Please use electric drier, soft cloth or brush to clean cooling fin. Water, corrosive chemical substance or intense cleaning agent is not allowed.

10 Decommissioning

10.1 Decommissioning Steps

1. Switch off the AC grid;
2. Switch Off the DC switch;
3. Wait 5 minutes;
4. Release the DC connectors;
5. Release the AC connectors.

Now inverters can be demounted safely.

10.2 Package

Please pack the inverter with the original package as far as possible. If original package is not available, use an equivalent carton that meets the following requirements:
1. Load more than 50 kg;
2. With handle;
3. Can be fully sealed off.

10.3 Storage

Store the inverter in dry place where temperatures are between -25 °C - +70 °C.

10.4 Disposal

Please deliver inverters and packing materials to a suitable space where should meet disposal regulations for electronic scrap at the end of its service.

11 Technical Data

11.1 Input (DC)

Model	SolarRiver 3400TL-D	SolarRiver 4000TL-D	SolarRiver 4500TL-D	SolarRiver 5000TL-D	SolarRiver 5200TL-D	SolarRiver 6000TL-D
Max.PV power[W]	3400	4000	4500	5000	5200	6000
Max.DC voltage[V]	550					
Max.input current[A]	10.5/10.5	12/12	13.5/13.5	15/15	15/15	15/15
Number of MPP trackers/strings per MPP tracker	2/1					
Max power of Track1 /Track2[W]	2200/2200	2500/2500	2750/2750	3000/3000	3100/3100	3500/3500
MPP voltage range (at rated power)[V]	160~500	165~500	165~500	175~500	175~500	210~500
DC Switch	optional					
Shutdown voltge/ Start voltage[V]	60/100					

11.2 Output (AC)

Model	SolarRiver 3400TL-D	SolarRiver 4000TL-D	SolarRiver 4500TL-D	SolarRiver 5000TL-D	SolarRiver 5200TL-D	SolarRiver 6000TL-D
AC nominal power [W]	3000	3680	4000	4600	4600	5750
Max. AC power [W]	3200	3680	4300	4600	5000	5750
Max. AC current [A]	16	16	22	23	24	25
Nominal AC voltage / range [V]	230 / 180~270					
AC grid frequency / range [Hz]	50 / 47~52					
Power factor (cosφ)	0.8 lagging ~ 0.8 leading					
Total harmonic distortion (THDi) (at nominal power)	<3%					

11.3 Efficiency

Model	SolarRiver 3400TL-D	SolarRiver 4000TL-D	SolarRiver 4500TL-D	SolarRiver 5000TL-D	SolarRiver 5200TL-D	SolarRiver 6000TL-D
Max. efficiency	97.4%	97.6%	97.6%	97.6%	97.6%	97.2%
Euro efficiency	96.5%	97.1%	97.1%	97.1%	97.1%	96.5%
MPPT efficiency	99.9%					

11.4 General Data

Model	SolarRiver 3400TL-D	SolarRiver 4000TL-D	SolarRiver 4500TL-D	SolarRiver 5000TL-D	SolarRiver 5200TL-D	SolarRiver 6000TL-D
Dimensions(W/H/D) [mm]	520 / 380/ 175					
Weight [kg]	23	25				
Operating temperature range [°C]	-20～+60					
Ingress protection	IP65					
Topology	transformerless					
Internal consumption (night) [W]	<3					
Cooling concept	Convection					
Noise (typical) [dB]	< 30					
LCD display	3.5 inch TFT LCD					
Communication	Ethernet(standard) / optional for RS485 / WiFi					
Standard warranty [year]	5					

12 Guarantees

Samil Power Co., Ltd offers 5 years warranty service for SolarRiver-D inverter. Warranty period is from the date of installation. But the longest period don't exceed 66 months from the date of delivering goods. During the warranty period, Samil Power Co., Ltd guarantees normal function of the SolarRiver-D inverter. If there are faults within our responsibility, we will provide maintenance free of charge. During the warranty period, if inverter appears malfunction or fault, please contact your dealer or installation contractor.

The followings are not included in the scope of warranty:

√ Use SolarRiver-D inverter for other purpose;
√ Install incorrectly or not conform to the rule;
√ Improper operation
√ Useunqualified protection when working;
√ Modify the equipment without authority;
√ Damage because of external factors or the majeure force(such as lightning, over-voltage, bad weather, and fire, earthquake, tsunami and so on);
√ Poor ventilation;
√ Don't comply with the relevant safety regulations;
√ Transportation damage.

Appendix:

Apple	AirPort Express with 802.11n	A1264
	AirPort Extreme Simultaneous dual-band 802.11n	A1301
	AirPort Extreme Simultaneous dual-band 802.11n (Late 2009)	A1354
	Apple	A1143
Corega	CG-WLR300NNH	CG-WLR300NNH
	CG-WLR300NM	CG-WLR300NM
	IEEE802.11b/g/n Wireless Broadband AP/Router	CG-WLR300GNE
Belkin	N Wireless Router	F5D8236-4 v2
	N+ Wireless Router	F5D8235-4 v2
	Enhanced Wireless Router	F6D4230-4 v2
	Belkin N Wireless Router	F5D8236-4 v3000
	N+ Wireless Router	F5D8235-4 v3
	N Wireless Modem Router	F5D8636-4 v2
	Belkin Router	F7D3302 v1
	Belkin Router	F7D4302 v1
	Belkin Router	F7D4301 v1
	Belkin Wireless Modem Router	F7D1401 v1
	Belkin Wireless Modem Router	F7D2401 v1, F7D2401-B v1
	Belkin Modem Router	F7D3402 v1
	Surf Wireless Router	F7D2301
	Share Max Wireless Router	F7D3301
	Surf N300 Wireless N Router	F7D2301 V3000
	Surf N300 Wireless N Router	F7D6301 V3000

Continued:

Belkin	Connect N150 Wireless Router	F7D5301 V3000
	Connect N150 Wireless Router	F7D1301 V3000
Buffalo	BUFFALO Nfiniti Router WHR-HP-G300N	WHR-HP-G300N
	BUFFALO AirStation WHR-HP-GN	WHR-HP-GN
	BUFFALO Nfiniti Router WHR-G301N	WHR-G301N
	BUFFALO Nfiniti Accesspoint WLAE-AG300N	WLAE-AG300N
	BUFFALO Nfiniti Router WZR-HP-AG300H	WZR-HP-AG300H
	BUFFALO Nfiniti Router WZR-HP-G302H	WZR-HP-G302H
	BUFFALO-WZR-AMPG144NH	WZR-AMPG144NH
Cisco Linksys	Wireless-N Gigabit Router	WRT310Nv2
	Wireless-N Home Router	WRT120N
	Wireless-N Access Point with Dual-Band	WAP610N
	Dual-Band Wireless-N Gigabit Router	E2000
	Wireless-N Broadband Router	E1000
	Wireless-N Broadband Router	M10
	Wireless-N Gigabit Router	M20
	Wireless-N Broadband Router	E1000(v2.1)
	Wireless-N Gigabit Router	M20
	Dual-Band Wireless-N Gigabit Router	E2000
	Wireless-N Broadband Router	E1000(v2)
	Wireless-N Broadband Router	M10(v2)
	Linksys	WRT54G v8
	Cisco AIR-AP1231G-A-K9	AIR-AP1231G-A-K9
	Linksys WRT54	WRT54 G2 v1
	Cisco Aironet	Aironet 1200
	Cisco Controller AP	1130G
	Cisco Controller	1242AG
D-Link	IEEE 802.11 b/g/N Wireless Router / DIR-605	DIR-605
	D-Link DIR-615 Wireless N Router	DIR-615E3/E4
	IEEE 802.11 b/g/N Wireless Router /DIR-605.B2	DIR-605.B2
	WIRELESS N 150 HOME ROUTER / DIR-600 V.B4	DIR-600 V.B4
	DIR-815 Wireless N Dual Band Router / DIR-815 v1.00	DIR-815 v1.00
	Wireless N 8 port router	DIR-632
	IEEE 802.11 Wireless N 150 Home Router / DIR-501	DIR-501
	IEEE 802.11 Wireless N Router / DIR-515	DIR-515
	IEEE 802.11a/b/g/n wireless Access Point / DAP-2690	DAP-2690
	IEEE 802.11 b/g Mobile Wireless Router / DIR-412	DIR-412
	Dlink G730AP v2	G730AP v2

Continued:

IO Data	I-O DATA WN-G54/DCR	WN-G54/DCR
Motorola	Symbol AP-5131	AP5131
NEC	Aterm WR4100N	WR4100N
	NEC PA-WR8170N-HP	PA-WR8170N-HP
	NEC PA-WR8700N-HP	PA-WR8700N-HP
Netgear	Wireless-N 300 Router	JWNR2000
	Wireless-N 150 Router	WNR1000v2
	Wireless-N 300 Router	WNR2000v2
	Wireless-N 150 Router	WNR612v2
	N150 Wireless Router	WNR1000v3
	N150 Wireless Router	WGR614v10
	Powerline AV 200 Wireless-N Extender XAVN2001	XAVN2001
	N300 Wireless Router with USB	WNR2200
	ProSafe Dual Band Wireless-N Access Point	WNDAP350
	ProSafe Wireless-N Access Point	WNAP320
	WGR614 v9	WGR614 v9
Proxim	Orinoco AP-700	Orinoco AP-700
	Proxim ORiNOCO	AP-600
TP-Link	150Mbps Wireless Lite N Router	TL-WR740N
	150Mbps Wireless Lite-N Router	TL-WR741ND
	300Mbps Wireless N Router	TL-WR841N
	TP-LINK Wireless N Access Point	TL-WA901ND
	TP-LINK 300Mbps Wireless N Access Point	TL-WA801ND
Planex	Planex-MZK-MF300N	MZK-MF300N

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