SAMIL POWER
Expert for PV Grid-tied Inverters

SolarPond

Product Manual

SP-SP-1.0-EN

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, and maintenance of the following Samil Power SolarPond.

SolarPond 240HF-US SolarPond240HF-AU

1.2 Target Group

This manual is meant for 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 Important Safety Instructions

When using the product, please remember the following instructions:

- Read all instructions and cautionary markings on the SolarPond series inverter, and all appropriate sections of this guide.
- Perform all electrical installations in accordance with all local and National Electrical Codes (NEC), like ANSI/NFPA 70.
- Only qualified personnel should install and/or replace SolarPond series inverters.
- Do not attempt to repair the SolarPond series inverters; it contains no user serviceable parts. If it fails, please return the unit to your distributor for maintenance. Tampering with or opening the SolarPond series inverters will affect the warranty.
- Connect the SolarPond series inverter to the electrical utility grid as per local regulations which may include prior written approval from the utility company.

1.5 Symbols Used

Some symbols are used in this manual in order to ensure personal and property safety. Please read and understand the following symbols carefully.

Danger!

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

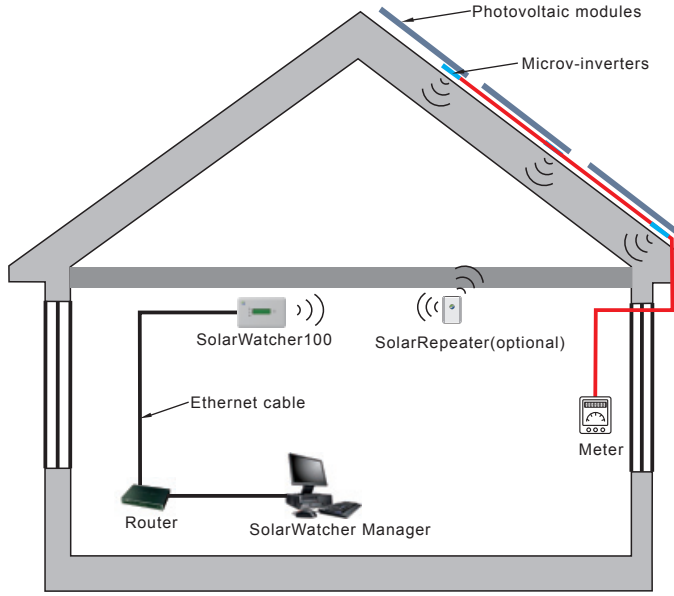
Note!

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

2 The SolarPond series Inverter System

The SolarPond series inverter is a PV micro inverter which converts the DC power of a PV generator into AC power and feeds it into the public grid. The key elements of a SolarPond series inverter based system are:

- SolarPond series inverter
- SolarWatcher100-zigbee (SW100)
- SolarWatcher Manager



This integrated system maximizes energy harvest, increases system reliability, and simplifies design, installation and management.

2.1 New Features

- Max. efficiency of 96%
- EURO Efficiency of 94.5%
- CEC efficiency of 95.5%
- MPPT efficiency of 99.5%
- HF transformer
- Advanced monitoring
- Outdoor installation&wide operate temperature
- Excellent protection
- Long life design with 25-year warranty
- Simple installation

2.2 Advantage of SolarPond MPPT

The SolarPond series inverter maximizes energy production from your photovoltaic (PV) array. Each SolarPond series inverter is individually connected to one PV module in your array. This unique configuration means that an individual Maximum Power Point Tracker (MPPT) controls each PV module. This insures that the maximum power available from each PV module is exported to the utility grid regardless of the performance of the other PV modules in the array. That is, although individual PV modules in the array may be affected by shading, soiling, orientation, or module mismatch, the SolarPond series inverter ensures top performance of each associated PV module. The result is maximum energy production from your PV system.

2.3 Protection Function

Anti-islanding protection

When the local power grid shuts down because of failure or equipment maintenance, SolarPond series inverter should be physically disconnected safely so as to protect any personnel working on the grid, in full compliance with the applicable prevailing national standards and regulations.

Grounding fault

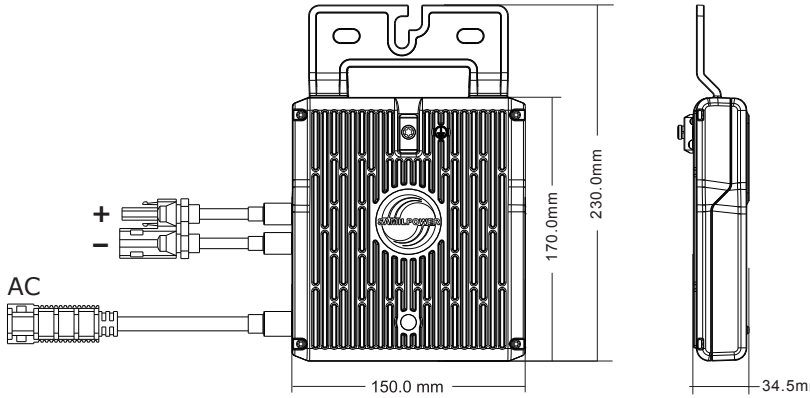
Inverters with direct inputs from a grounded photovoltaic array or arrays need to be provided with a ground-fault detector/interrupter (GFDI). The GFDI is capable of detecting ground fault, providing an indication of the fault, interrupting the flow of fault current, and either isolating the faulty array section or disabling the inverter to cease export of power. The GFDI is used only in the SolarPond 240HF-US.

More equipment protection

SolarPond series inverter can run safely in any working condition because of the following protections:

When the ambient temperature is beyond the design operating range, inverter will limit power automatically; Continuous monitoring of power grid to ensure that the voltage and frequency are in the standard range; short-circuit protection, and over/low voltage protection .

2.4 Dimensions



2.5 Product Label

Product label attached to the back of the inverter provides basic information of the unit. Do pay special attention to the type of inverter and other specifications.

SAMILPOWER
PV Grid-tied Inverter

Model:SolarPond-US

MPPT range at full load:	27~40V
Maximum input voltage:	48V
Max. DC current:	>9.5A
Nominal frequency:	60HZ
Operating frequency range:	59.3-60.5Hz
Output power factor:	0.95min
AC output Voltage:	240V/208V
AC output voltage range:	211-264V/183-229V
AC max. cont. output power:	240W
Ambient temperature range:	-40℃ to +65℃

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C US

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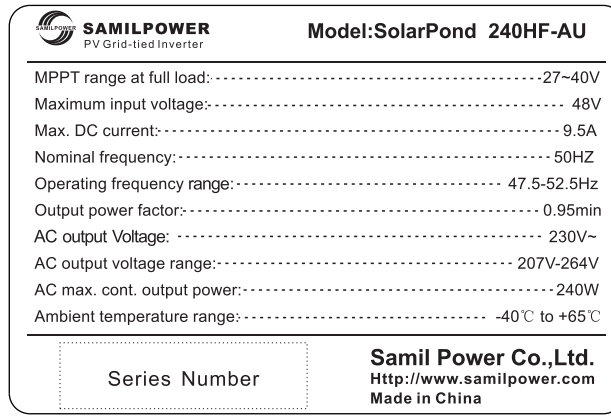
Http://www.samilpower.com
Made in China



3 Installation

3.1 Installation Process

- Pre install checks
  Ensure the following before installation:
  √ Read the user manual carefully;
  √ Check products and parts;
  √ Inspection installation tools;
  √ Check the installation environment.
- Electrical connection
  Work involved in the electrical connection:
  √ Connect DC side;
  √ Connect AC side;
  √ Ground joint.

3.2 Packaging List

Please check the package against the following list to make sure that all the items are in place. If any part is found damaged or missing, please contact your supplier immediately.

Item	Value	Comments
Inverter	1	Up to UL1741 and AS standard
Set of screw	1	
Packing list	1	
Manual	1	
Warranty card	1	
Certification	1	

3.3 Safety Instruction

SolarPond series inverter is easy to install. Each inverter can be quickly mounted on the PV racking, directly beneath each PV module. DC cables connecting the PV modules to inverters carry low DC voltage thereby making this system safer than conventional PV systems having much higher voltages.

- Before installing the SolarPond series inverter, read all instructions and cautionary markings in the user manual, on the SolarPond series inverter, and on the photovoltaic array.
- Perform all electrical installations in accordance with all local electrical codes like National Electrical Code (NEC),and ANSI/NFPA 70.
- Connect the inverter to the electrical utility grid as per local regulations which may include prior approval from the utility company.
- Only qualified personnel should connect the inverter to the electrical utility grid.
- Be aware that installation of this equipment includes risk of electric shock. Normally grounded conductors may become un-grounded and energized when a ground fault is indicated.

3.4 Installation Tools

Following tools and parts are needed for installation.

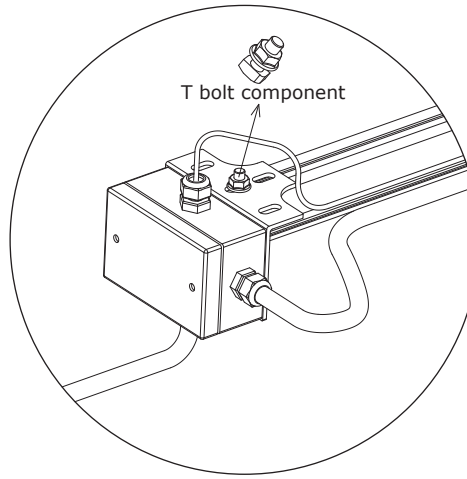
- Junction box
- Grounding cable
- Screwdriver
- 1/2 and 9/16 inch socket wrenches
- Wire cutters
- Wire strippers

3.5 Installation

Installing the SolarPond series inverter System involves five key steps:

A. Installing the junction box
B. Attaching the SolarPond series inverter to the racking
C. Grounding the system
D. Connecting AC side
E. Connecting to the PV modules

A. Installing the junction box
Step 1: Mount the junction box at the end of rack, ensure that the hole on the junction box match the corresponding hole on the rack.
Step 2: Insert the T-headed bolt through junction box and rack holes and tighten the flange nut.

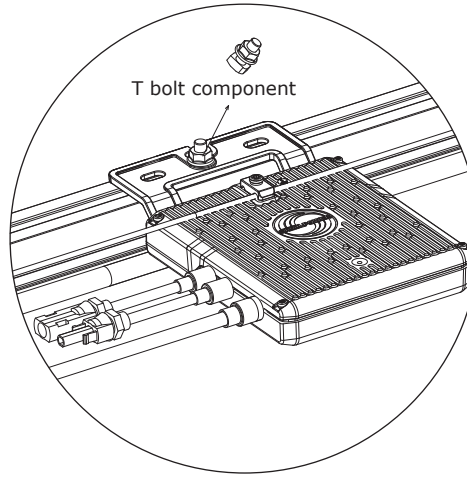


B. Attaching the SolarPond series inverter to the racking

Step 1: Mount the SolarPond series inverter at the appropriate location of the rack.

Step 2: Insert the T-headed bolt through junction box and rack holes and tighten flange nut.

Step 3: Insert the T-headed bolt with grounding clamp through junction box and rack holes, and tighten flange nut.



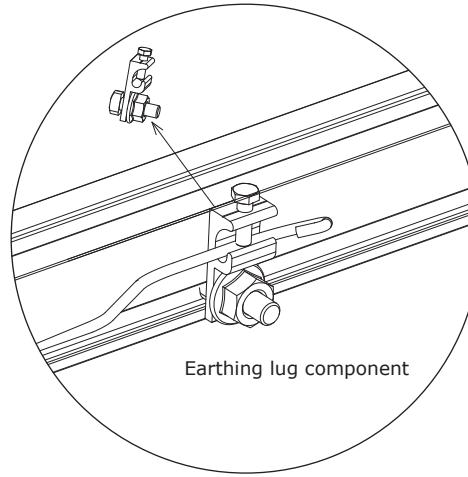
Note!

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

C. Grounding the system

Step 1: Fix the copper wire into grounding clamp.

Step 2: Tighten the bolt of grounding clamp to fix the copper wire.

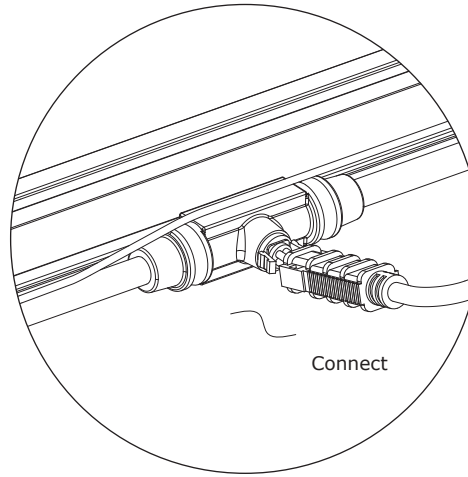


D. Connecting AC side

Step 1: Connect the first inverter to the first junction box (closest to junction box).

Step 2: Repeat for each the inverter.

Step 3: Cover the last connector to protect it.



One junction box connects up to 24 inverters in a 208V AC mode and 17 inverters in 240V AC mode. Please ensure that the Copper wire used can operate at the maximum current.

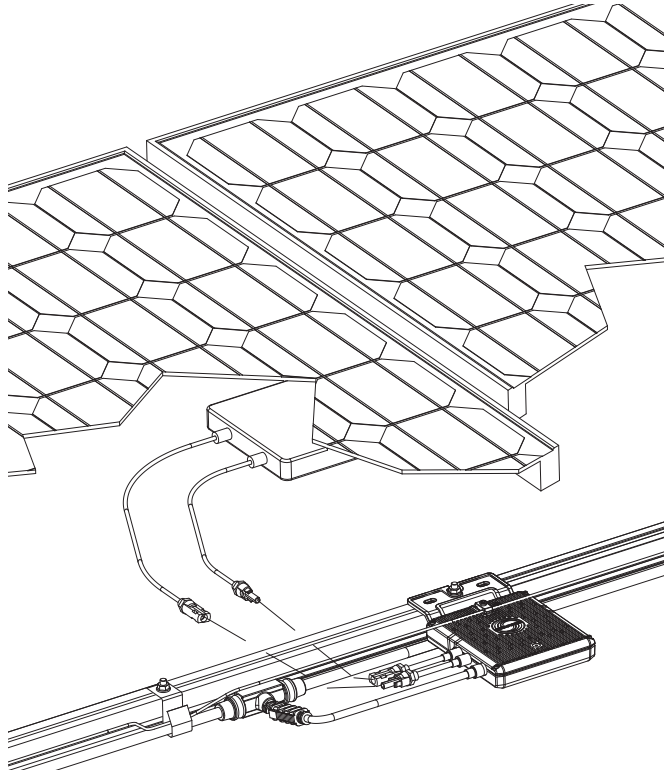
The minimum-bending radius of AC wire is 40mm.

E. Connecting to the PV modules

Step 1: Connect the positive cable of PV modules to the negative cable of the inverter.

Step 2: Connect the negative cable of PV modules to the positive cable of the inverter.

Step 3: Then install the PV module.



If the wire is too long, please fasten it to the rack by strapping.

The minimum-bending radius of DC wire is 32.5mm.

4 Commissioning

Connect the inverter to the electrical utility grid as per local regulations which may include prior approval from the utility company.

Be aware that only qualified personnel must connect the inverter to the electrical utility grid.

Ensure that all AC and DC wiring is correct. Ensure that none of the AC and DC wires are pinched or damaged. Ensure that all junction boxes are properly closed.

To commission the inverter PV system:

1. Turn ON the AC switch on each AC circuit junction box.
2. Turn ON the main utility-grid AC circuit breaker. Your system will start producing power after a five-minute wait time.
3. Verify operation and production by reading the display on the LCD panel of the SW100. Please refer to the SW100 Installation and Operation Manual for information on the SW100.

5 Troubleshooting

Do not attempt to repair the inverter; it contains no user-serviceable parts. If it fails, please return the unit to your distributor for maintenance.

Be aware that only qualified personnel should troubleshoot the PV array or the inverter.

The inverters are powered both by AC power from the utility grid and DC power from the PV modules. Make sure you disconnect both the AC and the DC connections and reconnect either AC or DC power to hear the six start-up beeps.

Always disconnect AC power before disconnecting the PV module wires from the inverter. The AC connector of the first inverter in a branch circuit is suitable as a disconnecting means once the AC branch circuit breaker in the load center has been opened.

5.1 Troubleshooting

To troubleshoot in case of a faulty inverter, follow the steps in the order shown:

1. Check the connection to the utility grid. Verify the grid voltage and frequency to ensure that these are within allowable ranges shown in the Technical Data section. Verify utility power is present at the inverter in question by removing AC, then DC power. Never disconnect the DC wires while the inverter is producing power. Re-connect the AC power conductor and listen for six short beeps.
2. Check the AC branch circuit interconnection between all the inverters. Verify each inverter is energized by the utility grid as described in the previous step.
3. Make sure that all the AC switches in the junction boxes are functioning properly and are closed.
4. Verify the PV module DC voltage is within the allowable range shown in the Technical Data section.
5. Check the DC connections between the inverter and the PV module.
6. If the problem persists, please call customer support at SamilPower.

5.2 Disconnecting the Inverter from the PV Module

To ensure that the inverter is not disconnected from the PV modules

under load, adhere to the following disconnection steps in the order shown:

1. Turn off the AC disconnect on the AC branch circuit junction box.
2. Turn off the utility-grid AC circuit breaker.
3. Disconnect the AC branch circuit connector(s).
4. Using a DC current probe, verify there is no current flowing in the DC wires between the PV module and the inverter.
5. If there is measurable DC current, cover the PV module connected to the inverter with an opaque material.
6. Disconnect the PV module DC wire connectors from the inverter.
7. Remove the inverter from the PV array racking.

5.3 Troubleshooting Tips

Alarm message	Alarm code	Causes and solutions
AC Frequency Out of Range	E001	The grid frequency is too high or too low, beyond normal working range. In this situation, no action is normally needed as the inverter will be connected to the grid automatically when the grid frequency returns to normal range. If fault continues even after grid supply is resitred, please contact Samil customer service hotline or customer service mailbox.
AC Voltage Out of Range	E002	The grid voltage is too high or too low, beyond normal working range. In this situation, no action is normally needed as the inverter will be connected to the grid automatically when the grid voltage returns to normal range. If fault continues even after grid supply is resitred, please contact Samil customer service hotline or customer service mailbox.
DC Over Voltage	E003	DC voltage of photovoltaic panels is too high. (1) Photovoltaic panels and inverter are not compatible. Please check the technical parameters of photovoltaic panels and inverter. (2) Reflection from snow. When light level

Continued:

		returns to normal, inverter will be connected to the grid automatically. (3) If fault continues, please contact Samil customer service hotline or customer service mailbox.
DC Under Voltage	E004	DC voltage of photovoltaic panels is too low. (1) Photovoltaic panels and inverter are not compatible. Please check the technical parameters of photovoltaic panels and inverter. (2) Poor sunlight. When light returns to normal inverter will be connected to the grid automatically. (3) Photovoltaic panels may be shaded. Please prevent shading. (4) If fault continues, please contact Samil customer service hotline or customer service mailbox.
GFDI Fault	E005	If GFDI is more than 1A, inverter will stop generating power. (1) The photovoltaic panels are covered with snow or inverter is operating in damp weather. Please Take necessary action to address the problem. (2) Please contact PV technician to test ground impedance of photovoltaic panels. If the ground impedance is more than 1k ohm, photovoltaic panels may need to be changed. (3) If fault continues, please contact Samil customer service hotline or customer service mailbox.
Grid supply failure	E006	Grid supply is lost No action is normally required as the inverter will restart when the grid voltage returns to normal range.

Continued:

		If fault continues, please contact Samil customer service hotline or customer service mailbox.
Grid Instability	E007	Grid voltage is instable . The followings could cause grid voltage instability (1) Grid voltage out of range. (2) Grid frequency out of range. (3) Grid supply failure (4) Serious grid voltage distortion . No action is normally necessary as the inverter will be connected to the grid automatically when the grid supply returns to normal. If the fault continues please contact Samil customer service hotline or customer service mailbox.
Over Temperature	E008	Working temperature is too high. (1) The ambient temperature is very high. If possible shift inverter to a cooler location. (2) Inverter output too high. (3) No action necessary as the inverter will work normal when the conditions returns to normal. If the fault continues please contact Samil customer service hotline or customer service mailbox.

6 Technical Data

You must match the DC operating voltage range of the PV module with the allowable input voltage range of the inverter. The maximum open circuit voltage of the PV module must not exceed the specified maximum input voltage of the inverter.

6.1 DC Parameters

Inverter Model	SolarPond 240HF-US	SolarPond 240HF-AU
Max DC power[W]	250	250
MPPT Voltage Range at Full Load[V]	27~40	27~40
Operating voltage Range[V]	21~48	21~48
Maximum input voltage[V]	48	48
Turn On Voltage Range[V]	25~48	26~48
Max DC Input Current (RMS)[A]	9.5	9.5
Max Short Circuit Current[A]	15	15
Ground fault protection[mA]	1000	
Maximum input source back-feed current to input source[A]	0	0

6.2 AC Parameters

Inverter Model	SolarPond 240HF-US	SolarPond 240HF-AU
Max AC output power(-40 to 65℃)[W]	240	240
Output Power Factor[%]	>95%	>95%
Nominal Voltage Range at 240V nominal[V]	AC 211~264	230 (Nominal Voltage)
Nominal Voltage Range at 208V nominal[V]	AC 183~229	
Extended Voltage Range at 240V nominal[V]	AC 206~269	207~264 (Nominal Voltage Range)
Extended Voltage Range at 208V nominal[V]	AC 179~232	
Maximum AC Output current at 240V nominal[A]	1.14	1.16 (Maximum AC Output current)
Maximum AC Output current at 208V nominal[A]	1.3	
Nominal Frequency[Hz]	60	50

Continued:

Nominal Frequency Range[Hz]	59.3~60.5	47.5~52.5(Nominal Frequency Range)
Extended Frequency Range[Hz]	59.2~60.6	
Maximum AC output over current protection[A]	20	20
Maximum AC output fault current & duration[A]	1.4Arms over 3 cycles, 32.8Apeak 1.74ms duration	1.5Arms over 3 cycles, 37.8Apeak 1.74ms duration
High AC Voltage trip limit accuracy[%]	±2.5%	±2.5%
Low AC Voltage trip limit accuracy[%]	±2.5%	±2.5%
Frequency trip limit accuracy[Hz]	±0.05	±0.05
Trip time accuracy[ms]	±16.7	±20
Maximum inverters per 20amp AC branch circuit at 240V nominal	17	17 (at 230V nominal)
Maximum inverters per 20amp AC branch circuit at 208V nominal	24	
Total Harmonic Distortion of current on input (THDI)	<5%	<5%
Power consumption at night[mW]	50	50

6.3 Efficiency

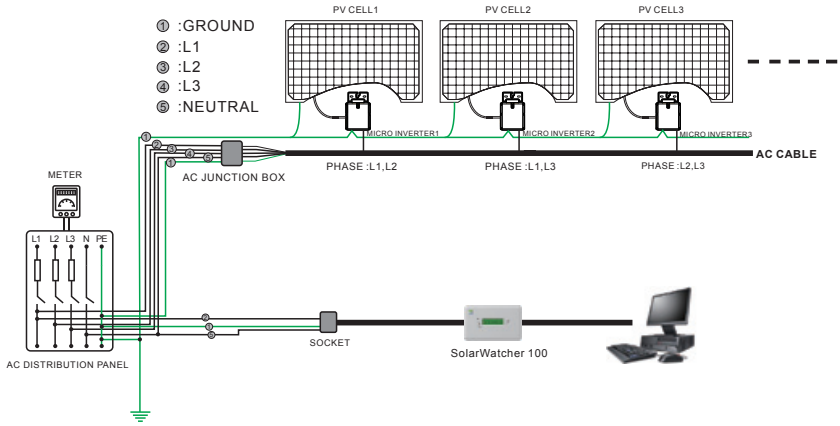
Inverter Model	SolarPond 240HF-US	SolarPond 240HF-AU
MAX Efficiency[%]	96.0	96.0
EURO Efficiency[%]	95.0	95.0
CEC Efficiency[%]	95.5	95.5
MPPT Efficiency[%]	>99.5	>99.5

6.4 General Data

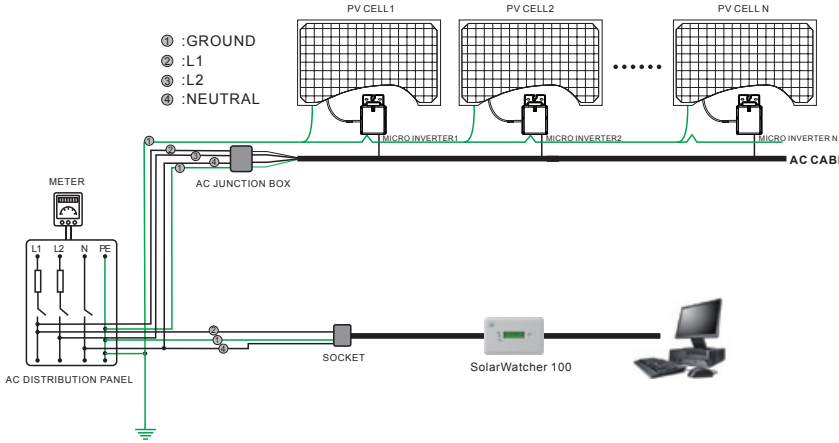
Inverter Model	SolarPond 240HF-US	SolarPond 240HF-AU
Ambient Temperature Range[℃]	-40 to +65℃	-40 to +65℃
Ambient Temperature Range at Full Load[℃]	-40 to +65℃	-40 to +65℃
Operating Temperature Range (internal) [℃]	-40 to +85℃	-40 to +85℃
Storage Temperature Range[℃]	-40 to +65℃	-40 to +65℃
Maximum Operating Altitude without Derating[m]	2000m 3000m with derating	2000m 3000m with derating
Noise[dB]	<30dB	<30dB

7 Appendix

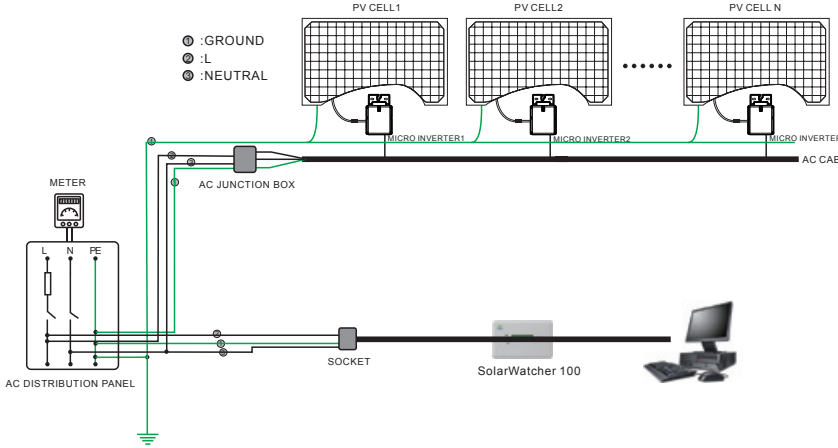
208 V mode system wiring diagram



240V mode system wiring diagram



230V mode system wiring diagram(Australia)



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