3. Overview

3.1 Front Panel Display

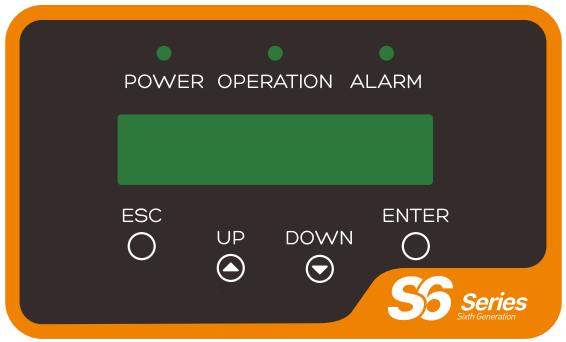


Figure 3.1 Front Panel Display

3.2 LED Status Indicator Lights

	Light	Status	Description
①	POWER	ON	The inverter can detect DC power.
		OFF	No DC power or low DC power.
②	OPERATION	ON	The inverter is operating properly.
		OFF	The inverter has stopped to supply power.
		FLASHING	The inverter is initializing.
③	ALARM	ON	Alarm or fault condition is detected.
		OFF	The inverter is operating without fault or alarm.

Table 3.1 Status Indicator Lights

3.3 Keypad

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

The two-line 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. Installation

4.1 Select a Location for the Inverter

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

WARNING: Risk of fire

Despite careful construction, electrical devices can cause fires.

- 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. Recommends inverter installed to avoid direct sunlight or raining.
- To avoid over heating ambient air temperature must be considered when choosing the inverter installation location. Recommends using a sun shade minimizing direct sunlight when the ambient air temperature around the unit exceeds 104°F/40°C.

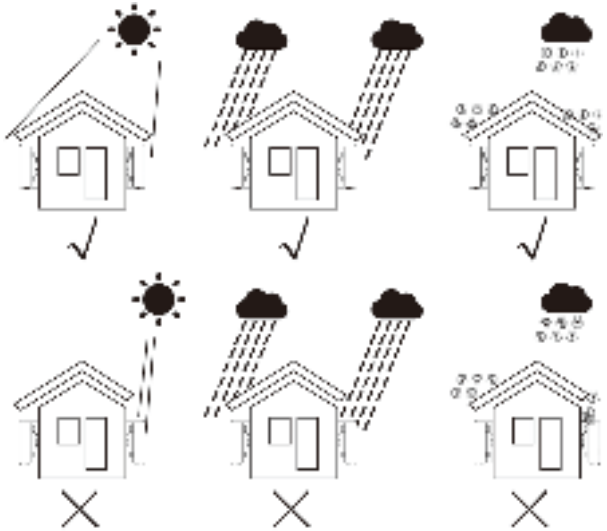


Figure 4.1 Recommended Installation locations

- Install on a wall or strong structure capable of bearing the weight.
- Install vertically with a maximum incline of +/- 5°.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.
- When 1 or more inverters are installed in one location, a minimum 12inchs clearance should be kept between each inverter or other object. The bottom of the inverter should be 20inchs clearance to the ground.

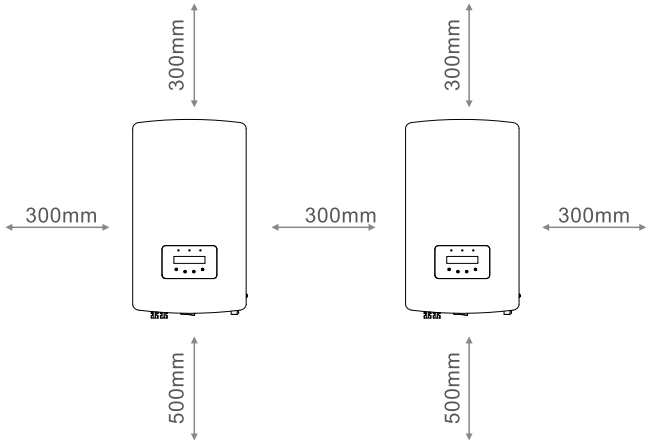


Figure 4.2 Inverter Mounting clearance

- Visibility of the LED status indicator lights and the LCD located at the front panel of the inverter should be considered.
- Adequate ventilation must be provided if the inverter is to be installed in a confined space.

NOTE:
Nothing should be stored on or placed against the inverter.

4.2 Mounting the Inverter

Dimensions of mounting bracket:

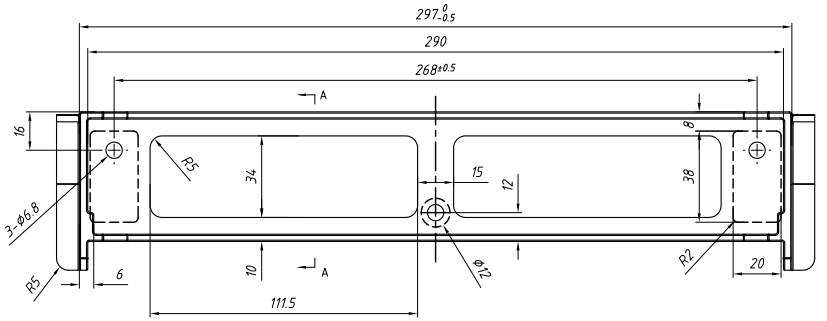


Figure 4.3 Inverter wall mounting

Please see Figure 4.4 and Figure 4.5 for instruction on mounting the inverter..
The inverter shall be mounted vertically. The steps to mount the inverter are listed below.

1. According to the figure 4.2, select the mounting height of the bracket and mark the mounting holes. For brick walls, the position of the holes should be suitable for the expansion bolts.

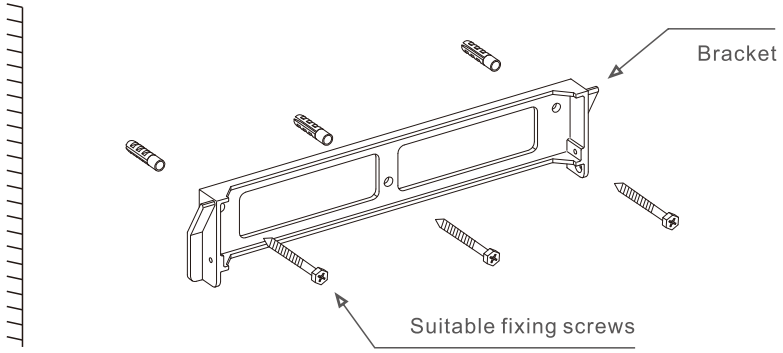


Figure 4.4 Inverter wall mounting

2. Make sure the bracket is horizontal. And the mounting holes (in Figure 4.4) are marked correctly. Drill the holes into wall at your marks.
3. Use the suitable expansion screws to fix the bracket on the wall.

WARNING:
The inverter must be mounted vertically.

4. Lift up the inverter (be careful to avoid body strain), and align the back bracket on the inverter with the convex section of the mounting bracket. Hang the inverter on the mounting bracket and make sure the inverter is secure (see Figure 4.5).

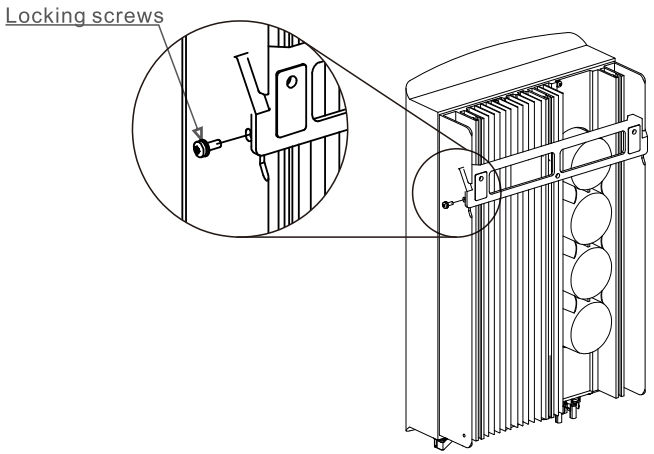


Figure 4.5 Wall Mount Bracket

5. Use M4*9 screws in accessory to lock the inverter to the mount bracket.

4.3 Electrical Connections

Inverter designs quick-connect terminal, so top cover needn't open during electrical connection. The sign meaning located the bottom of inverter, as shown below in table 4.1. All electrical connections are suit for the local or national standard.

+	Positive DC input terminal
–	Negative DC input terminal
DC 1	DC input terminal
DC 2	DC input terminal
DC SWITCH	Switch of DC input terminals
COM	RJ45 and terminal block for RS485 communication port
GRID	Connecting terminal of the Grid

Table 4.1 Electrical connection symbols

4.3.1 Connect PV side of inverter

The electrical connection of the inverter must follow the steps listed below:

1. Switch the Grid Supply Main Switch (AC) OFF.
2. Switch the DC Isolator OFF.
3. Assemble PV input connector to the Inverter.

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

Maximum 550Voc for
S6-GR1P2.5K
Maximum 600Voc for
S6-GR1P3K, S6-GR1P3.6K, S6-GR1P4K,
S6-GR1P4.6K, S6-GR1P5K, S6-GR1P6K

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

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

4. Installation

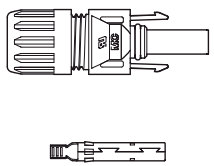


Figure 4.6 DC+ Connector

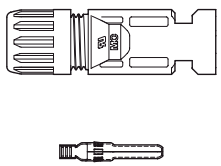


Figure 4.7 DC- Connector

Please use approved DC cable for PV system.

Cable type	Cross section（mm²）	
	Range	Recommended value
Industry generic PV cable (model:PV1-F)	4.0~6.0 (12~10AWG)	4.0（12AWG）

The steps to assemble the DC connectors are listed as follows:

1. Strip off the DC wire for about 7mm, Disassemble the connector cap nut. (see Figure 4.8)
2. Insert the wire into the connector cap nut and contact pin. (see Figure 4.9)
3. Crimp the contact pin to the wire using a proper wire crimper. (see Figure 4.10)
4. Insert the contact pin to the top part of the connector and screw up the cap nut to the top part of the connector .(see figure 4.11).
5. Then connect the DC connectors to the inverter. Small click will confirm connection. (see figure 4.12)

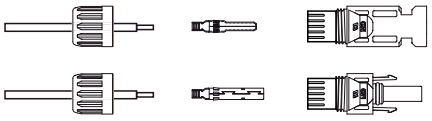


Figure 4.8
Disassemble the Connector Cap nut

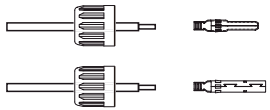


Figure 4.9 Insert the Wire into the Connector Cap nut and contact pin

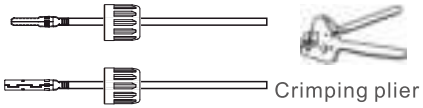


Figure 4.10
Crimp the contact pin to the wire

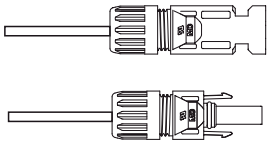


Figure 4.11
Connector with Cap nut Screwed on

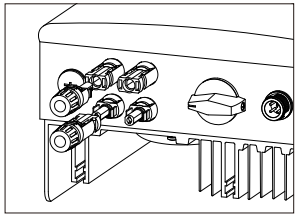


Figure 4.12 Connect the DC Connectors to the Inverter

Caution:

If DC inputs are accidently reversely connected or inverter is faulty or not working properly, it is NOT allowed to turn off the DC switch as it will damage the inverter and even leads to a fire disaster.

The correct actions are:

*Use a clip-on ammeter to measure the DC string current.

*If it is above 0.5A, please wait for the solar irradiance reduces until the current decreases to below 0.5A.

*Only after the current is below 0.5A, you are allowed to turn off the DC switches and disconnect the PV strings.

Please note that any damages due to wrong operations are not covered in the device warranty.

4. Installation

4.3.2 Connect grid side of inverter

For all AC connections, 2.5- 6mm^2 105 ℃ cable is required to be used. Please make sure the resistance of cable is lower than 1 ohm. If the wire is longer than 20m, it's recommended to use 6mm^2 cable.

There are"L","N","PE"symbols marked inside the connector, the Line wire of grid must be connected to “L” terminal, the Neutral wire of grid must be connected to "N" terminal and Earth wire must be connected to "PE".

Cable type	Cross section（mm²）	
	Range	Recommended value
Industry generic PV cable	2.5~6.0	6.0

Table 4.2 Grid cable size



Figure 4.13 AC Grid Terminal Connector Inside

Each Solis S6 Single Phase Inverter is supplied with an AC grid terminal connector.

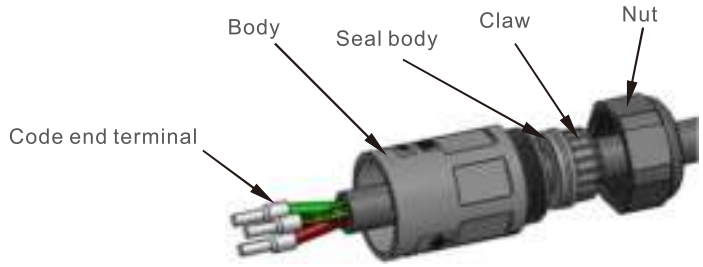


Figure 4.14 AC Grid Terminal Connector

The steps to assemble the AC grid terminal connectors are listed as follows:

1. Disassemble the AC connector. Strip the AC wires about 7mm.

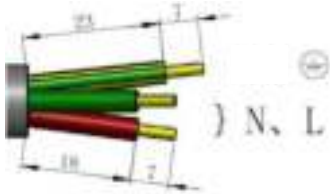


Figure 4.15 Stripped AC Wires

2. Fix the wires into the correct postion. Torque 0.8N.m
   Please try to pull out the wire to make sure the it’s well connected.

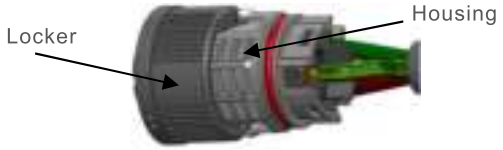


Figure 4.16 Connect Wires to the Terminal

3. Insert Seal and Clamp Finger into body ,then tighten the nut, torque 2.5+/-0.5N·m.



Figure 4.17 Tighten up the Cap on the Terminal

4. Mating plug and socket:

Push the locker onto the socket housing completely, then rotate the locker according to the direction instructed by the marks on the locker.(Warning:hold the body)

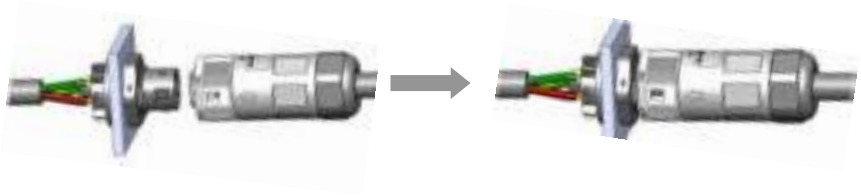


Figure 4.18 Connect the AC Connector to the Inverter

NOTE: Connection for Split phase grid.
When connect to 208/220/240V split phase, please connect L1 to “L” terminal, L2 to “N” terminal. Also connect earth to ground terminal.

4.3.3 External ground connection

An external ground connection is provided at the right side of inverter.

Prepare OT terminals: M4. Use proper tooling to crimp the lug to the terminal.

Connect the OT terminal with ground cable to the right side of inverter. The torque is 2N.m.

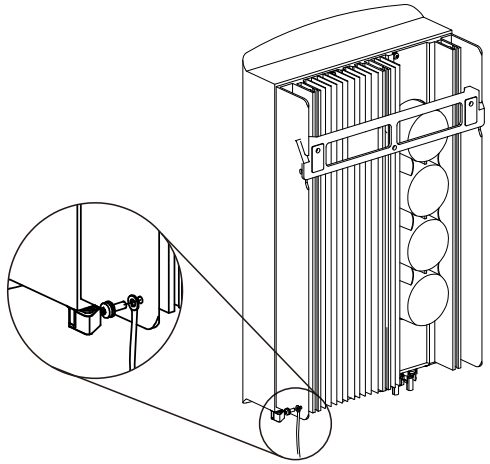


Figure 4. 19 Connect the external grounding conductor

4.3.4 Max. over current protection device (OCPD)

To protect the inverter's AC grid connection conductors, Solis recommends installing breakers that will protect against overcurrent. The following table defines OCPD ratings for the Solis S6 Single Phase Inverters.

Inverter	Rated output voltage(V)	Rated output current (A)	Current for protection device (A)
S6-GR1P2.5K	220/230	11.4/10.9	15
S6-GR1P3K	220/230	13.6/13	20
S6-GR1P3.6K	220/230	16/15.7	20
S6-GR1P4K	220/230	18.2/17.4	25
S6-GR1P4.6K	220/230	20.9/20	30
S6-GR1P5K	220/230	22.7/21.7	30
S6-GR1P6K	220/230	27.3	40

Table 4.3 Rating of grid OCPD

4.3.5 Inverter monitoring connection

The inverter can be monitored via Wi-Fi or GPRS. All Solis communication devices are optional (Figure 4.20). For connection instructions, please refer to the Solis Monitoring Device installation manuals.

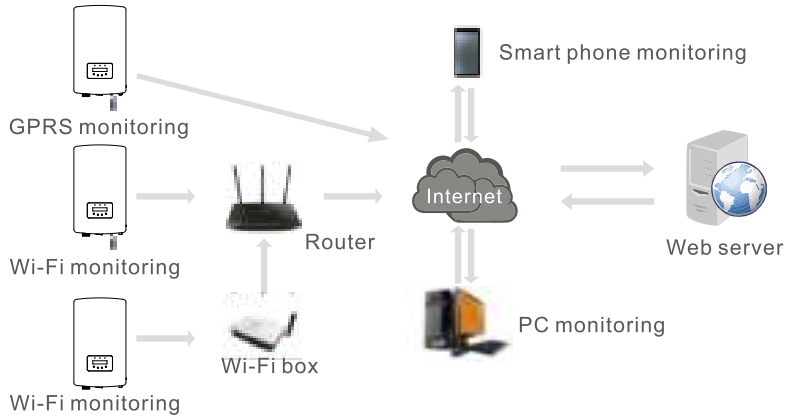


Figure 4.20 Communication function

4. Installation

4.3.6 Electrical connection diagram

Refer to figure 4.21, which is a simple guidance for installing a solar system with PV inverter.
A DC isolator is required to be installed in the system between PV panels with inverter.

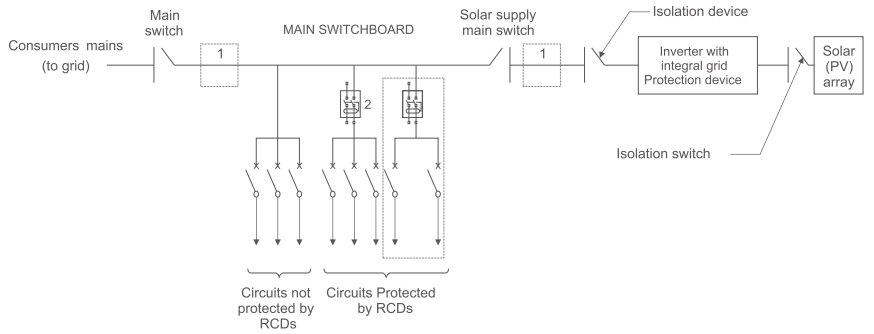


Figure 4.21 Guidance for a Simple Installation of an Inverter Solar Energy System

1. The RCD should be in parallel connection between the consumers mains and the solar supply.
2. More than one RCD may be used. Each RCD can protect one or more circuits.

4.3.7 Meter Connection(optional)

The inverter can work with a single phase smart meter to achieve Export Power Management function and/or 24hour consumption monitoring function.

NOTE:
Inverters are classified as "Meter Model" and "CT Model" due to hardware difference.
Meter Model can only connect a smart meter.
CT Model can only connect a smart sensor.
Please consult Solis Sales Rep before placing the order.

NOTE:
To achieve Export Power Management function, the smart meter can be installed on either grid side or load side. To achieve 24hour consumption monitoring function, the smart meter can only be installed on grid side.

Two types of meters are supported:
Direct Insert Type Meter - Max input current 60A (Model:DDSD1352-C)
External CT Type Meter - 120A/40mA CT is supplied (Model: ACR10RD16TE)
Customer can place the order for a suitable meter from Solis Sales Reps.
Below are the connection diagrams of different meters connecting to different locations.
Detailed settings please refer to Section 6.5.12.

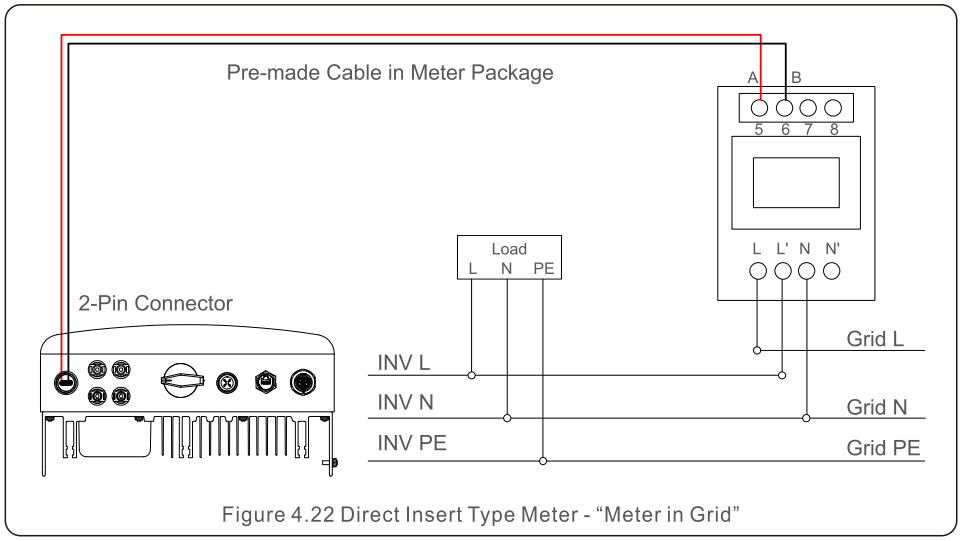


Figure 4.22 Direct Insert Type Meter - “Meter in Grid”

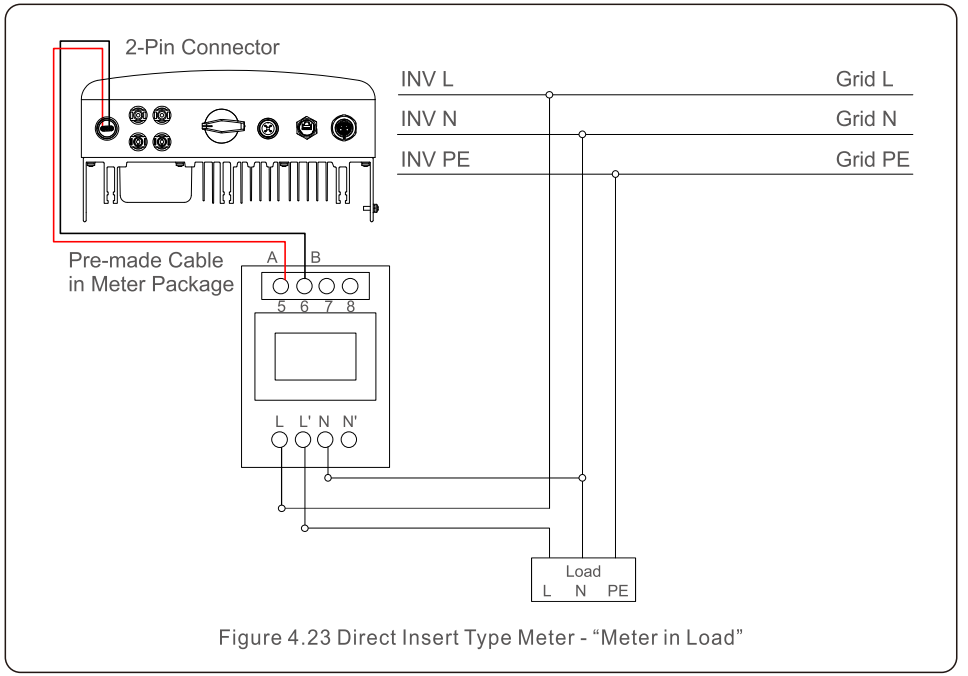


Figure 4.23 Direct Insert Type Meter - “Meter in Load”

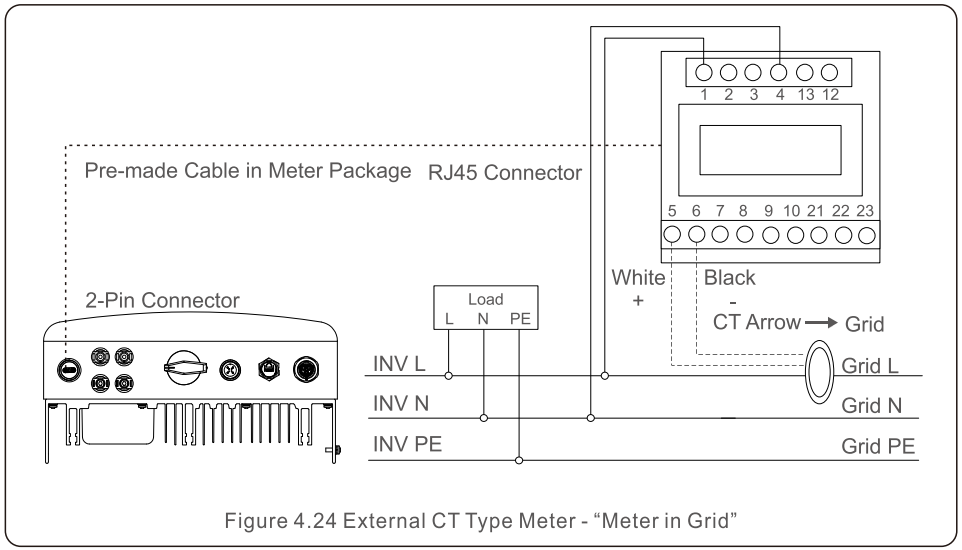


Figure 4.24 External CT Type Meter - “Meter in Grid”

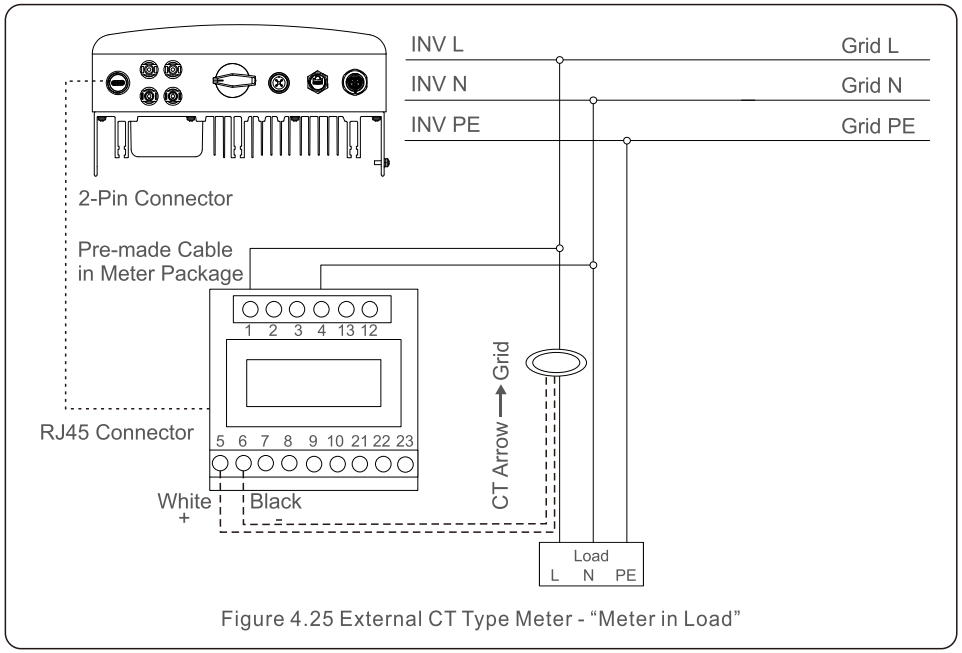


Figure 4.25 External CT Type Meter - “Meter in Load”

4.3.8 CT connections(optional)

The inverter can work with a smart sensor to achieve Export Power Management function.

NOTE:
Inverters are classified as "Meter Model" and "CT Model" due to hardware difference.
Meter Model can only connect a smart meter.
CT Model can only connect a smart sensor.
Please consult Solis Sales Rep before placing the order.

NOTE:
To achieve Export Power Management function, the smart sensor must be installed on the grid side.

Below is the connection diagram of the smart sensor.
Detailed settings please refer to Section 6.5.12.

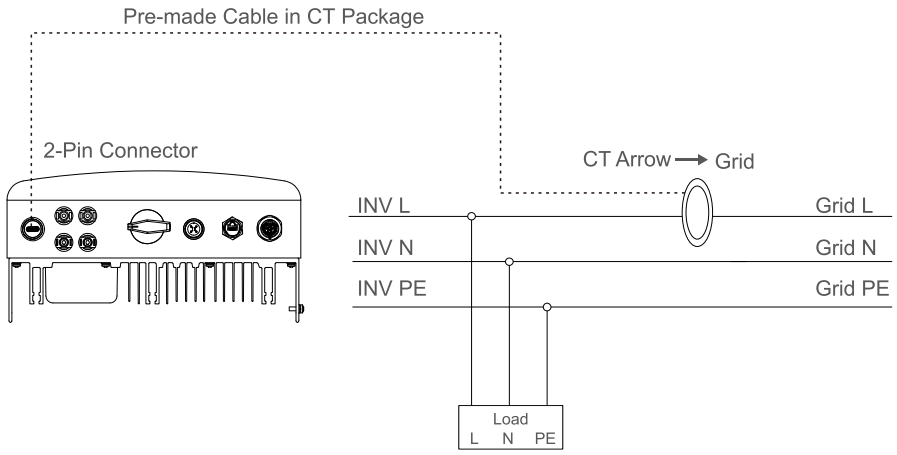


Figure 4.26 Smart Sensor

4.3.9 Logic interface connection

Logic interface is required by some local regulations that can be operated by a simple switch or contactor(Not available in South Africa).
When the switch is closed the inverter can operated normally. When the switch is opened, the inverter will reduce it's output power to zero within 5s.
Pin5 and Pin6 of RJ45 terminal is used for the logic interface connection.

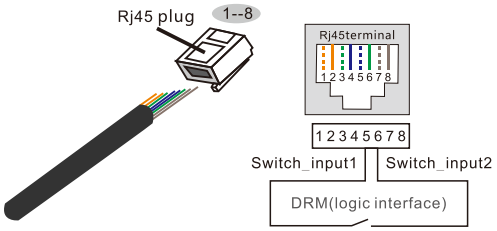
Please follow below steps to assemble RJ45 connector.

1.Insert the network cable into the communication connection terminal of RJ45.



Figure 4.27 RJ45 communication connection terminals

2.Use the network wire stripper to strip the insulation layer of the communication cable. According to the standard line sequence of figure 4.28 connect the wire to the plug of RJ45, and then use a network cable crimping tool to make it tight.



Correspondence between the cables and the stitches of plug, Pin5 and Pin6 of RJ45 terminal is used for the logic interface, other Pins are reserved.
Pin 1: Reserved; Pin 2: Reserved
Pin 3: Reserved; Pin 4: Reserved
Pin 5: Switch_input1; Pin 6: Switch_input2
Pin 7: Reserved; Pin 8: Reserved

Figure 4.28 Strip the insulation layer and connect to RJ45 plug

3.Connect RJ45 to DRM (logic interface) .

After wire connection, please refer chapter 6.5.9.1 to enable the logic interface function.

5.1 Start the Inverter

To start up the Inverter, it is important that the following steps are strictly followed:

1. Switch the grid supply main Switch (AC) ON first.
2. Switch the DC switch ON. If the voltage of PV arrays are higher than start up voltage, the inverter will turn on. The red LED power will light.
3. When both the DC and the AC sides supply to the inverter, it will be ready to generate power. Initially, the inverter will check both its internal parameters and the parameters of the AC grid, to ensure that they are within the acceptable limits. At the same time, the green LED will flash and the LCD displays the information of INITIALIZING.
4. After 30-300 seconds (depending on local requirement), the inverter will start to generate power. The green LED will be on continually and the LCD displays GENERATING.

WARNING:
Do not touch the surface when the inverter is operating. It may be hot and cause burns.

5.2 Stop the Inverter

To stop the inverter, it is mandatory that the steps below are followed in the exact order outlined.

1. Select "Grid Off" in the Advanced Setting of Inverter LCD.
2. Turn off the AC Switch between Solis inverter and Grid.
3. Wait approximately 30 seconds (during this time, the AC side capacitors are dissipating energy). If the inverter has DC voltage above the start-up threshold, the red POWER LED will be lit. Switch the DC switch OFF.
4. Confirm all LED's switch OFF (~one (1) minute).

CAUTION
Although the inverter DC disconnect switch is in the OFF position and all the LED's are OFF, operators must wait five (5) minutes after the DC power source has been disconnected before opening the inverter cabinet. DC side capacitors can take up to five (5) minutes to dissipate all stored energy.