solar**edge**

Energy Meter
with Modbus
Connection

Installation Guide

For Europe, APAC,& South Africa
Version 1.3

Disclaimers

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This equipment has been tested and found to comply with the limits applied by the local regulations. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this

equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

Support and Contact Information

If you have technical problems concerning SolarEdge products, please contact us:

Country	Phone	E-Mail
Australia (+61)	1800 465 567	support@solaredge.net.au
APAC (Asia Pacific) (+972)	073 240 3118	support-asia@solaredge.com
Benelux	NL (+31): 0800-7105 BE (+32): 0800-76633	support@solaredge.nl support@solaredge.be
China (+86)	21 6212 5536	support_china@solaredge.com
DACH & Rest of Europe (+49)	089 454 59730	support@solaredge.de
France (+33)	0800 917410	support@solaredge.fr
Italy (+39)	0422 053700	support@solaredge.it
Japan (+81)	03 6262 1223	support@solaredge.jp
New Zealand (+64)	0800 144 875	support@solaredge.net.au
US & Canada (+1)	510 498 3200	ussupport@solaredge.com
United Kingdom (+44)	0800 028 1183	support-uk@solaredge.com
Greece (+49)	89 454 59730	support@solaredge.com
Israel (+972)	073 240 3122	
Middle East & Africa (+972)	073 240 3118	
South Africa (+27)	0800 982 659	
Turkey (+90)	216 706 1929	
Worldwide (+972)	073 240 3118	

Before contact, make sure to have the following information at hand:

- Model and serial number of the product in question.
- The error indicated on the LCD screen or on the SolarEdge monitoring platform or by the LED, if there is such an indication.
- System configuration information, including the type and number of modules connected and the number and length of strings.
- The communication method to the SolarEdge server, if the site is connected.
- The software version as appears in the ID status screen.

Version History

- Version 1.3 (July 2018)
  - Configuration steps update
- Version 1.2 (July 2018)
  - Supported firmware version update
- Version 1.1 (May 2018)
  - Product name update
  - Model SE-WND-3Y400-MB-K2
  - Accuracy: 1% of Rated CT Current
  - Supports UK Engineering Recommendation G100 Issue 1 Amendment 1 2017
- Version 1.0 (February 2016) - Initial release

Contents

solar_edge

HANDLING AND SAFETY INSTRUCTIONS

During installation, testing and inspection, adherence to all the handling and safety instructions is mandatory. **Failure to do so may result in injury or loss of life and damage to the equipment.**

Safety Symbols Information

The following safety symbols are used in this document. Familiarize yourself with the symbols and their meaning before installing or operating the system.

WARNING!

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **injury or loss of life**. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.

CAUTION!

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **damage or destruction of the product**. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.

NOTE

Denotes additional information about the current subject.

IMPORTANT SAFETY FEATURE

Denotes information about safety issues.

Disposal requirements under the Waste Electrical and Electronic Equipment (WEEE) regulations:

NOTE

Discard this product according to local regulations or send it back to SolarEdge.

Chapter 1: Introduction

Terminology

The following terms are used in this document:

- **Export**: The power injected to the grid.
- **Import**: The power purchased from the grid.
- **Export/Import meter**: A meter that is installed at the grid connection point and reads the energy/power exported/imported to/from the grid.
- **Consumption**: The power consumed by the site.
- **Consumption meter**: A meter that is installed at the load consumption point and reads the energy/power consumed by the site.
- **Self-consumption**: The PV power consumed by the site and not fed into the grid.
- **Production**: The power produced by the PV system.
- **Production meter**: A meter that is installed at the inverter output or site AC connection, and reads the energy/power produced by the PV system or site.
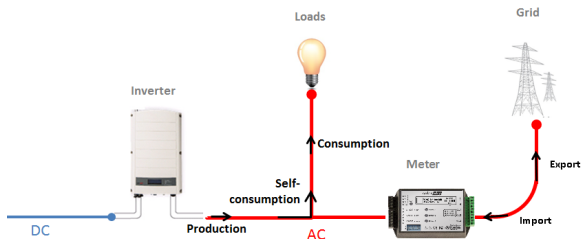
Figure 1: Terminology

The Energy meter with Modbus connection

The Energy meter with Modbus connection (also referred to as "the meter") enables measuring the power and energy of the photovoltaic (PV) system.

The meter is used by the inverter for the following applications:

- Consumption monitoring
- Export limitation
- Smart Energy on-grid applications

The SolarEdge inverter or the Commercial Gateway (CCG) reads the exported power from a meter installed at the grid connection point or reads the consumption from a meter installed at the load consumption point.

Figure 2: Typical installation with export meter
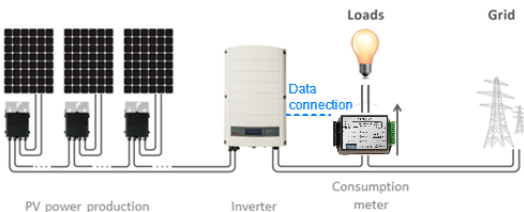
Figure 3: Typical installation with consumption meter

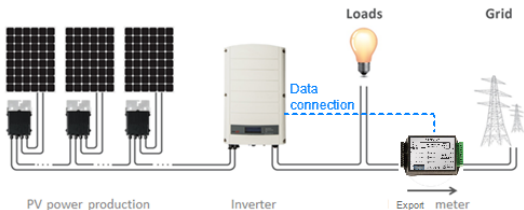# Meter Connection Options

In a *single* inverter system, the meter is connected directly to the inverter.
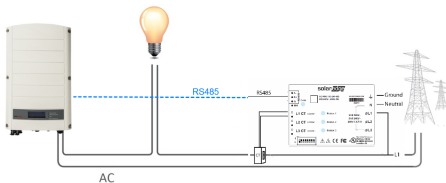
Figure 4: Single-inverter[1] connection

In a *multiple* inverter system, two options are available:

- The meter is connected to the RS485 port of one of the inverters. In this case, as the inverter's RS485 port is occupied by the meter, use an RS485 Expansion Kit (available from SolarEdge) or ZigBee communication between the inverters.

- The meter is connected to one of the RS485 ports of a CCG. The CCG's second RS485 port can be used to create an RS485 bus for communication between the inverters. This option is illustrated in *Figure 5*.

Figure 5: Multi-inverter connection with CCG and meter

---

[1] This figure shows a single phase inverter connection. For three phase inverters, 3 CTs are required.

Chapter 2: Meter Installation

NOTE

Before installing the meter, make sure that you are installing the model SE-WND-3Y400-MB-K2 meter from SolarEdge that has a *yellow barcode sticker* on one of the side panels of the meter.

Installation Guidelines

AC wire specifications: 1.3 to 2.0 mm diameter / 16 to 12 AWG stranded wire, 600 V, type THHN, MTW, or THWN.

RS485 wiring specifications:

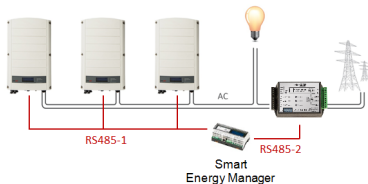- Cable type: Min. 3-wire shielded twisted pair (a 4-wire cable may be used)
- Wire cross-section area: 0.2- 1 mm² / 24-18 AWG (a CAT5 cable may be used)

NOTE

If using a cable longer than 10 m/33 ft in areas where there is a risk of induced voltage surges by lightning, it is recommend to use external surge protection devices. For details refer to *External Lightning Protection Connection* on page 49. If grounded metal conduit are used for routing the communication wires, there is no need for a lightning protection device.

- The meter is considered "permanently connected equipment" and requires a disconnect means (circuit breaker, switch, or disconnect) and overcurrent protection (fuse or circuit breaker).
- The meter draws 10-30mA, therefore the rating of any switches, disconnects, fuses, and/ or circuit breakers is determined by the wire gauge, the mains voltage, and the current interrupting rating required.
- The switch, disconnect, or circuit breaker must be located near the meter and be easily operated .
- Use circuit breakers or fuses rated for 20A or less.
- Use grouped circuit breakers when monitoring more than one line.

- The circuit breakers or fuses must protect the mains terminals labeled L1, L2, and L3. In the rare case in which neutral has overcurrent protection, the overcurrent protection device must interrupt both neutral and the ungrounded conductors simultaneously.
- The circuit protection / disconnect system must meet IEC 60947-1 and IEC 60947-3, as well as all national and local electrical codes.

Installing and Connecting the Meter

Mount the meter either directly on a flat surface, or on a DIN rail using the DIN-rail clips supplied with the meter.

▶ To mount the meter directly on a surface:

1. Carefully remove the terminal blocks on both sides of the meter.
2. Use the two mounting holes on both sides of the meter to mark the hole positions.

> **NOTE**
>
> Do not use the meter as a drilling guide; the drill may damage the screw terminals and metal shavings may fall into the connectors.

3. Use the supplied screws to mount the meter. Do not over-tighten the screws, as long-term stress on the case can cause cracking.
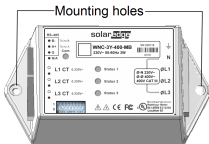
Figure 6: Meter mounting holes

► To mount on a DIN rail using clips:

The supplied kit includes two DIN-rail mounting-clips and two screws.

1. Carefully remove the terminal blocks from both sides of the meter.

2. Attach the DIN rail clips to the meter and fasten them using the supplied screws (torque 0.7 N*m / 0.4 lb*ft). Make sure that the clips are correctly oriented, as shown below.

This side up
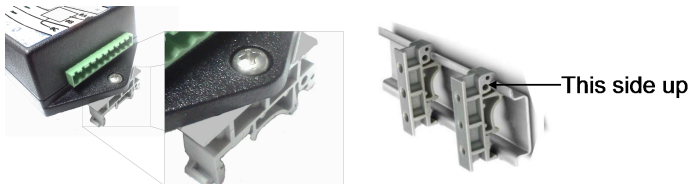
Figure 7: Mounting the meter on a DIN-rail

► To install the current transformers (CTs):

> **NOTE**
>
> If installing a high-accuracy/RGM meter, make sure that the CTs chosen are appropriate for use with the meter.

1. Turn off AC power before clamping on current transformers.

2. Install the CTs around the conductor to be measured. Split-core CTs can be opened for installation around a conductor. A nylon cable tie may be secured around the CT to prevent accidental opening.

3. Install the CTs with the arrows pointing to the grid for consumption or export measurement.

▶ To wire the meter:

The meter communicates with the inverter/CCG over an RS485 connection. Refer to the connection diagram below:

If you are connecting two meters, refer to *Installing Two Meters* on page 35.

Figure 8: Meter connections

NOTE

- Clamp the CT connected to **L1 CT** around the wire connected to **ØL1**.
- Clamp the CT connected to **L2 CT** around the wire connected to **ØL2**.
- Clamp the CT connected to **L3 CT** around the wire connected to **ØL3**.

1. Verify that power is OFF before making connections.
2. Connect the AC side wires (meter input) using the 10-pin terminal block:
   a. Loosen the appropriate screws on the 10-pin terminal block.
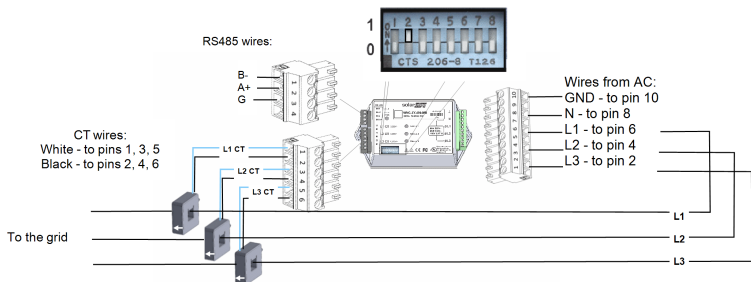   b. Connect each AC wire to the appropriate screw terminal (pins 6, 4, 2). Verify that the lines match the symbols printed on the meter front label.
   c. Connect ground to pin 10 and neutral to pin 8.
   d. Tighten the screws making sure the wires are fully inserted and cannot be pulled out easily.
   e. Insert the 10-pin terminal block into the socket on the meter making sure it is fully seated in the meter.
3. Connect the CT wires to the 6-pin terminal block:
   a. Connect the black and white wires according to the dots printed on the label: White to L1/L2/L3 white (pins 1/3/5), and black to L1/L2/L3 black (pins 2/4/6).
   b. Insert the 6-pin terminal block into the socket on the meter making sure it is fully seated in the meter
4. Connect the RS485 twisted pair cable to the 4-pin terminal block of the meter:
   a. Connect the wires to the A+ and B- terminals, and connect the shield to the G terminal.
   b. Insert the 4-pin terminal block into the socket on the meter making sure it is fully seated in the meter.

5. Set the meter's DIP switches as follows:

   a. Switches 1-6 are used to set the meter address. To set the address to '2' (the default address), set switch 2 to 1 (UP), and switches 1, 3, 4, 5, and 6 to 0 (DOWN).

   b. Switch 7: Set to 1 (UP), if 120 ohm termination is required. Otherwise, set to 0 (DOWN).

   c. Switch 8: Set to 0 (DOWN).

► To connect the meter to the inverter or CCG:

1. If connecting to an inverter, remove the seal from one of the openings in communication gland #2 at the bottom of the inverter and insert the RS485 wires from the meter through the opening.

Communication glands
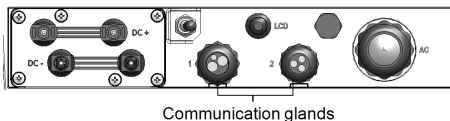
Figure 9: Communication glands

2. Prepare to connect to one of the available RS485 ports of the device, as shown below:

- Inverter RS485-1 - pull out the RS485 connector located on the communication board.

Single and Three Phase Inverter   **Inverter with HD-Wave technology**
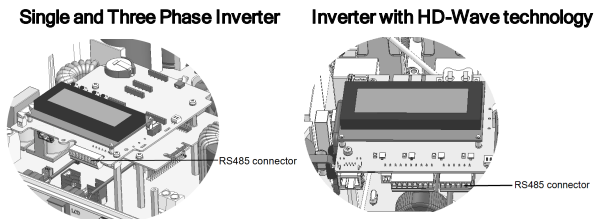
Figure 10: Inverter RS485 connectors

- Inverter RS485 Plug-in - pull out the 3-pin connector
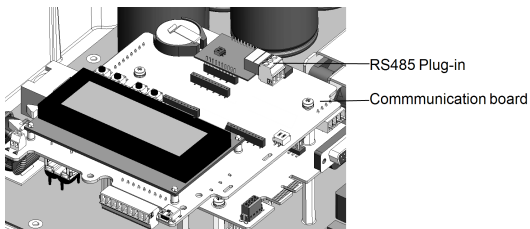
Figure 11: RS485 Plug-in on Single/Three Phase inverter
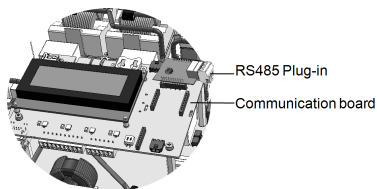
Figure 12: RS485 Expansion module on HD-Wave Inverter

- CCG - use one of the 3-pin connectors supplied with the CCG. Connect it to the RS485-2 connection on the CCG.

Figure 13: CCG RS485 connector

3. Connect the wires as shown below:
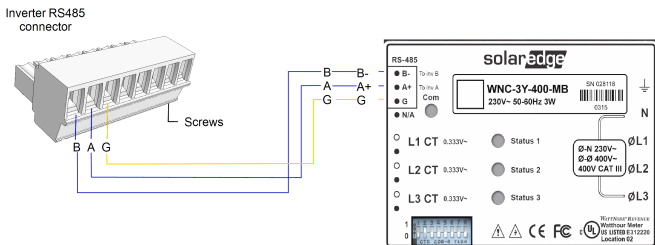
Figure 14: Meter RS485 connections

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4. If the SolarEdge device is at the end of the RS485 bus, terminate as follows:

- Inverter - Terminate by switching a termination DIP-switch inside the inverter to ON (top position). The switch is located on the communication board and is marked SW7.

- CCG - Terminate by switching the SW2 termination DIP-switch to ON.

Inverter

Use the left switch in the inverter and the right switch in SMI
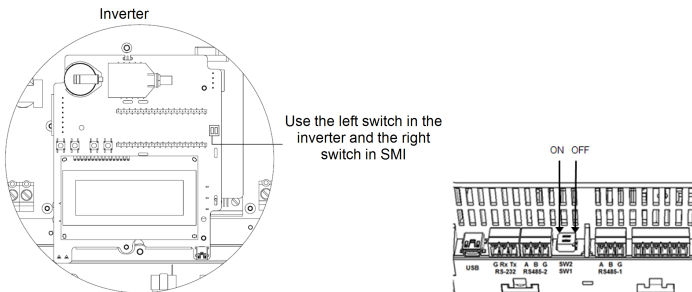
Figure 15: RS485 termination switch

Chapter 3: Configuration

SolarEdge Device Firmware Version

To ensure proper communication with the meter, make sure that the inverter communication board firmware (CPU) version is 3.22xx or 3.24xx or later (but not 3.23xx).

► To check the inverter CPU version:

1. Verify that the inverter has been activated using the activation card supplied with the inverter.

2. To check the firmware version of the CPUshort press the LCD light button on the inverter until the screen below is displayed:

```
C P U : 0 0 0 3 . 1 9 x x
C o u n t r y : E S P
```

3. To upgrade inverters with earlier firmware versions, refer to

   https://www.solaredge.com/sites/default/files/upgradi ng_an_inverter_using_micro_sd_card.pdf.

SolarEdge Device Configuration

This section describes basic configuration of SolarEdge devices (inverter/CCG) for using a meter. In addition, configuration specific to the application being used is required in some cases. Refer to the following documents:

- Export Limitation - http://www.solaredge.com/sites/default/files/feed-in_limitation_application_note.pdf

- StorEdge Smart Energy Management on-grid applications -
  https://www.solaredge.com/sites/default/files/storedge_interface_
  installation_guide.pdf

For configuring two connected meters refer to *Installing Two Meters* on page
35.

▶ **To configure the SolarEdge device:**

Use the four user buttons to control the LCD panel menus:

- **Esc**: Goes to the beginning of the currently entered parameter or to the
  previous menu.
- **Up** (1) and **Down** (2): Moves the cursor (>) to the relevant menu option.
- **Enter** (3): Used to select an option

1. Verify that the device ON/OFF switch is OFF.
2. Turn ON the AC switch of the main circuit board.

> **WARNING!**
> ELECTRICAL SHOCK HAZARD. Do not touch uninsulated wires
> when the cover is removed.

3. Press the Enter (3) button for at least five seconds. The following message
   is displayed:

```
Please enter
 Password
* * * * * * * *
```

4. Use the three right most buttons (Up-1, Down-2 and Enter-3) to type in
   the following default password: **12312312**.

5. Scroll to the **Communication** menu and select **RS485-X Conf** (X represents the actual RS485 port to which the electricity meter is connected: 1 or E for the inverter; 1 or 2 or E for the CCG). The following screen is displayed:

```
Device Type <SE>
Protocol <M>
Device ID <1>
Slave Detect <#>
Cluster SLV Detect
Long Slave Detect <#>
Slave List <#>
Multi-Inv. Set
```

6. Select **Device Type**. A screen similar to the following is displayed:

```
SolarEdge <M>
Non-SE Logger <S>
Multi Devices <M>
None
```

7. Select **Multi Devices**. A screen similar to the following is displayed:

```
Device Type <MLT>
Meter 1 <SE, 1>
Meter 2 <--->
Meter 3 <--->
```

8. Select **Meter 2** > **Device Type** > **Revenue Meter**. A screen similar to the following is displayed:

```
Device Type <MTR>
Protocol <SE>
Device ID <2>
CT Rating <200>
Meter Func. <E+I>
Topology <Wye>
PT Scaling <1>
```

9. Configure the meter parameters as follows:

    - Select **Protocol ➔SE**.

    - Select **Device ID: 2**

    - Set the CT rating to the value that appears on the CT: **CT Rating➔ <xxxxA>**. The default is 5 Amperes. If the displayed rating is 0 or you cannot change the value, there is no communication with the meter. Check that the AC power to the meter is on.

    - Select **Meter Func.** and select one of the functionality options, according to the installed meter specifications and location.

    ```
    Export + Import
    Export
    Consumption
    Production
    Ext.  Production
    Import
    None
    ```

    ○ **Export+Import**: The meter is installed at the grid connection point and reads pulses from both directions - export and import energy.

    ○ **Export**: The meter is installed at the grid connection point and reads the export energy.

    ○ **Consumption**: The meter is installed at the load consumption point and reads the energy consumed by the site.

    ○ **Production**: The meter is installed at the inverter output and reads the energy produced by the inverter.

    ○ **Ext. Production**: The meter is used for export limitation with 3rd party generators and for AC coupling with non-SolarEdge inverters.

- ○ **Import**: The meter is installed at the grid connection point and reads the import energy.

- ○ **None**: No reading

    The selected option is displayed in the RS485 Conf screen as <E+I>, <E>, <Cons>, <Prod>, <I>, <None>.

- • **Topology**: Select Wye or Delta

- • **PT Scaling** : Set the Potential Transformer ratio

10. Exit Setup mode.

> **NOTE**
>
> Calculated meter readings, such as self-consumption, are calculated using the data measured by the meter and the inverters. Calculated meters are only sent when Energy Manager is enabled (for details refer to http://www.solaredge.com/files/pdfs/products/feed-in_limitation_application_note.pdf).

▶ To verify meter connection:

1. Short-press the LCD light button (on the inverter) or the Enter button (inside the inverter) until the Communication status screen is displayed as shown below. This screen shows the number of external devices that communicate on each port, the device type, and the protocol to which each port was configured.

2. Verify that the setting of the relevant RS485 port is correct and that the port is communicating with the meter.
   For example, if the meter is connected to the RS485-1 port, the Communication status screen should display the following:

```
          Dev  Prot  ##
RS485-1<MTR><WN><  1 >
RS485-2<--->< -->< -->
ZigBee  <--->< -->< -->
```

   Dev: the type of device configured to this port. **MTR** indicates a meter.

   Prot: the communication protocol

   ## = 1: Indicates that the connection to the meter is successful.

3. Continue pressing the Enter button or the LIGHT button using short presses until reaching the meter status screen showing the **Energy [Wh]** total. If there is more than one meter/ function, there is a status screen for each one. The following is an example of an Export meter:

```
Export  Meter
Status:     <OK/Error#>
Power[W]:      xxxxx.x
Energy[Wh]:    XXXXX.X
```

   Status: Displays OK if the meter is communicating with the inverter.

   <Error message>: If an internal meter error occurs, it will be displayed here. Refer to *Troubleshooting Meter Connection* on page 28.

   Energy [Wh]: Displays the accumulated lifetime energy of the meter.

   If the SolarEdge device is connected to the monitoring platform, this value will also be displayed in the monitoring platform.

▶ **To display the meter serial number:**

1. Enter Setup mode and select **Information**. The following screen is displayed:

```
Versions
Error Log
Warning log
Hardware IDs
```

2. Select **Hardware IDs**. The following is displayed showing the ID of the inverter and any meter connected to it:

```
ID 5000FFFF4E
RGM:12345678
```

Appendix A: Troubleshooting Meter Connection

This section describes how to troubleshoot meter-related installation and performance errors.

For troubleshooting dual-meter connection, refer to *Installing Two Meters* on page 35.

Communication Status Screen Troubleshooting

The communication status screen should display the following:

```
              Dev  Prot  # #
R S 4 8 5 - 1 < M T R > < W N > <  1 >
R S 4 8 5 - 2 < - - - > < - - > < - - >
  Z i g B e e  < - - - > < - - > < - - >
```

Device Type or Protocol are configured incorrectly

If **MTR** (meter) is not displayed as the device type (DEV), or **WN** (WattNode) is not displayed as the Prot (protocol), configure the meter as follows.:

1. Select **Communication ➔ RS485-x Conf ➔ Device Type ➔ Revenue Meter**.
2. Select **Communication ➔ RS485-x Conf ➔ Protocol ➔ WattNode**.
3. Check that the Device ID under **Communication ➔ RS485-x Conf ➔ Device ID** is set to 2.
4. Select **Revenue Meter ➔ Meter Func. ➔ Export+Import** / **Export** / **Import** / **Consumption / Site Production / Inv. Production**.

Number of devices is not displayed

If **<-->** is displayed under the ## column in the Communication status screen, the meter is not communicating with the inverter. Check the following:

- Check the meter's DIP switch settings. The switches should be set as follows:

    a. Check that switches 1-6 correctly specify the meter address. To set the address to '2' (the default address) , set switch 2 to 1 (UP), and switches 1, 3, 4, 5, and 6 to 0 (DOWN).

    b. Switch 7: Set to 1 (UP), if 120 ohm termination is required. Otherwise, set to 0 (DOWN)

    c. Switch 8: Set to 0 (DOWN)

- The meter configuration is as described in the previous section.
- There are no loose connections at the inverter connectors and at the meter, specifically the RS485 wiring.
- The wiring between the meter and the RS485 terminal block on the communication board is correct.
- Use a Voltmeter to measure the voltage on the meter 10-pin's terminal block . The L1 – L2 line to line voltage should be 400 Vac ± 20% for three-phase; 240 Vac from L to N +/- 20% for single-phase.

Meter Status Screen Troubleshooting

```
Export Meter
Status:        <OK/Error#>
Power[W]:        xxxxx.x
Energy[Wh]:     XXXXX.X
```

<OK> is not displayed

If **<OK>** is not displayed in the Status line of the status screen shown above, the meter is not communicating with the inverter. Check the following:

- There are no loose connections at the inverter communication board and at the meter.
- The wiring between the black 4-pin terminal block on the meter and the RS485 terminal block on the communication board is correct.

An error message is displayed

- If **Comm. Error** is displayed in the meter status screen, verify proper connection of:
  - The RS485 cables and connectors
  - The AC connection of the meter
- If **Error 185 Meter Comm. Error** message is displayed, contact SolarEdge support.

Total [Wh] value is not advancing

If the Total [Wh] value displays a steady value although the the site is consuming power, check the following:

- There are no loose connections at the inverter connectors and at the meter, specifically the AC wiring on the meter 10-pin connector.
- The CT black and white cables are correctly connected to the 6-pin connector on the meter:
  - White CT wire is connected to the L1/L2 white dot.
  - Black CT wire is connected to the L1/L2 black dot.

Arrow points to the grid
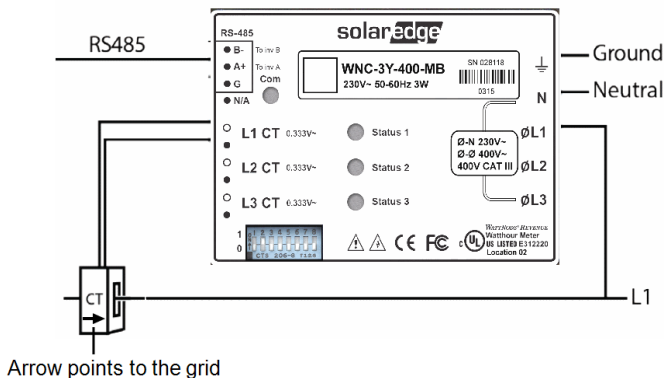
Figure 16: Meter Connection diagram

Meter Status LEDs

Power Status LEDs

The three status LEDs on the front of the meter can help indicate correct measurements and operation.

- Normal operation indications:
  - At normal startup - when power is first applied, all the LEDs light up sequentially for 1 sec.
  - The following table describes LED indications during normal operation:

LED color	Function	Indication
Red	Flashing ON/OFF	Appears only when the meter is connected at the grid connection point (CT directed towards the grid). Indicates export power measurement.
Yellow	Flashing	Communication OK
Green	Flashing ON/OFF	○When the meter is connected at the grid connection point it indicates import power measurement (CT directed towards the grid). ○When the meter is connected at the load connection point it indicates consumption power measurement (CT directed towards the grid). ○When the meter is used for production it indicates production power measurement (CT directed toward the inverter).
	ON for >3 sec	No current flow (zero current)

- Abnormal operation indications:
  - If all LEDs are off – the meter is not operating. Perform all troubleshooting steps starting with checking the physical connections.
  - The following table describes additional LED indications that require troubleshooting and repair.

LED color	Function	Indication	Troubleshooting
Red	ON for >3 sec.	Internal error	Contact SolarEdge Support.
	Flashing ON/OFF	Negative power for the phase	If the meter is connected at the load connection point or if the meter is used for production metering, check for reversed CTs, swapped CT wires, or CTs not matched with the lines.
	Flashing with green LED	Voltage is too high for this model	Disconnect power immediately! Check the line voltages and the meter ratings.
	Flashing with yellow LED	The line voltage is out of range (Vac ±20%). Specifically, the voltage is too low for the meter to operate correctly and the meter reboots repeatedly.	Verify that the voltage on the Vac screw terminals is within the range of ±20% of the nominal operating voltages printed in the white rectangle on the front label.
Yellow	ON for >3sec.	Power line frequency is below 45 Hz or above 70 Hz.	Check for the presence of high noise, for example, the meter is too close to an unfiltered variable frequency drive.
	Flashing with red LED	Voltage is too high for this model	Disconnect power immediately! Check the line voltages and the meter ratings.

Modbus Communication LEDs

The communication LED is located at the upper left corner. The following are indications of the LED light:

LED color	Function	Indication	Troubleshooting
Red	Flashing	An invalid packet: bad baud rate, bad CRC, noise, bad parity, etc.	Check that the communication wires are connected correctly.
	ON	The address is set to zero: an invalid choice	Check that the Device ID is set to 2 in the RS485 Conf screen.
	Flashing with yellow LED	A possible address conflict (two devices with the same DIP switch address).	Check that the DIP-switches are set correctly. Check that the Device ID is set to 2 in the RS485 Conf screen.
Yellow	Flashing	Valid packets addressed to different devices.	N/A
Green	Flashing	A valid packet addressed to this device	N/A

Appendix B: Installing Two Meters

You can connect up to two meters on the same bus.

To connect two meters, install two wires into each screw terminal by twisting the wires together, inserting them into terminal, and securely tightening. RS485 wiring is daisy-chained between meters, as described in the following figure:
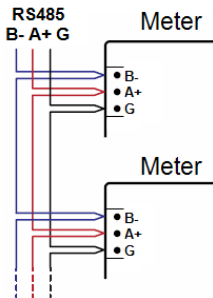
Figure 17: RS485 chain of meters

Connecting Two Meters

1. Connect the twisted pair of wires to the meters as shown in *Figure 18*.

2. Connect the meters to the inverter or CCG RS485 connector as illustrated below.
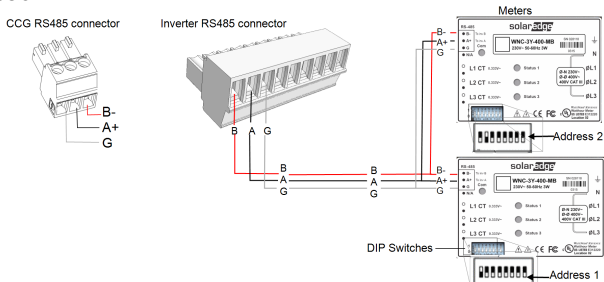
Figure 18: Connecting the meters to the inverter or CCG RS485 connector

3. Set one of the meter's DIP switches to address '2':

   a. Set switch 2 to 1 (UP), and switches 1, 3, 4, 5, and 6 to 0 (DOWN).

   b. Switch 7: Set to 1 (UP), if 120 ohm termination is required. Otherwise, set to 0 (DOWN)

   c. Switch 8: Set to 0 (DOWN)

4. Set the other meter's DIP switches to address '1':

   a. Set switch 1 to 1 (UP), and switches 2, 3, 4, 5, and 6 to 0 (DOWN).

   b. Switch 7: Set to 1 (UP), if 120 ohm termination is required. Otherwise, set to 0 (DOWN)

   c. Switch 8: Set to 0 (DOWN)

5. Terminate the SolarEdge device as described in *Installing and Connecting the Meter* on page 13.

Configuring Dual-meter Connection

1. Enter Setup mode, scroll to the **Communication** menu and select
   Communication ➔ RS485-x Conf.

   The following screen is displayed:

   ```
   D e v i c e   T y p e   < S E >
   P r o t o c o l   < M >
   D e v i c e   I D   < 1 >
   S l a v e   D e t e c t   < # >
   C l u s t e r   S L V   D e t e c t
   L o n g   S l a v e   D e t e c t   < # >
   S l a v e   L i s t   < # >
   M u l t i - I n v .   S e t
   ```

2. Select **Device Type**. the following screen is displayed:

   ```
   S o l a r E d g e   < M >
   N o n - S E   L o g g e r   < S >
   R e v e n u e   M e t e r   < M >
   M u l t i   D e v i c e s   < M >
   N o n e
   ```

3. Select **Multi Devices**. The following screen is displayed:

   ```
   D e v i c e   T y p e   < M L T >
   M e t e r   1   < W N , 1 >
   M e t e r   2   < - - - >
   M e t e r   3   < - - - >
   ```

4. Configure the parameters of the two meters as follows. Make sure that the meter addresses (set in the previous section) correspond with the device IDs and meter functions in the setting below.

   The settings provided herein are an example of a Consumption meter set to address 1 and an Export+Import meter set to address 2.

   - Select **Meter 1**. The following is displayed:

   ```
   D e v i c e   T y p e   < M T R >
   P r o t o c o l   < W N >
   D e v i c e   I D   < 2 >
   C T   R a t i n g   < 0 >
   S e c o n d a r y   C T   < 5 >
   V T   R a t i n g   < 1 1 0 0 0 >
   S e c o n d a r y   V T   < 1 1 0 >
   M e t e r   F u n c .   < N o n e >
   M e t e r   C o m m i s s i o n
   T o p o l o g y   < W y e >
   P T   S c a l i n g   < 1 >
   ```

     ○ Select **Device Type ➔ Revenue Meter**.
     ○ Select **Protocol ➔ WattNode**.
     ○ Set **Device ID➔ 1**.
     ○ Set the CT rating to the value that appears on the CT: **CT Rating ➔ <xxxxA>**. The default is 5 Amperes. If the displayed rating is 0 or you cannot change the value, there is no communication with the meter. Check that the AC power to the meter is on.
     ○ Select **Meter Func.➔** Consumption.
   - Select **Meter 2** and configure its settings:
     ○ Select **Device Type ➔ Revenue Meter**
     ○ Select **Protocol ➔ WattNode**
     ○ Verify that **Device ID: 2**

- ○ Set **CT Rating**➔ <**xxxxA**>
- ○ Select **Meter Func.**➔ **Export+Import**

Verifying Meter Connection

1. Press the Enter button or the LCD external button until the
   Communication status screen is displayed as shown below. When two
   meters are connected, a screen similar to the following should appear:

```
            Dev  Prot  ##
R S 4 8 5 - 1 < M L T > < 0 2 > < 0 2 >
R S 4 8 5 - 2 < - - - > < - - > < - - >
  Z i g B e e  < - - - > < - - > < - - >
```

Dev: The type of device configured to this port. **MLT** indicates multiple
meters.

Prot: The number of configured meters.

: The number of communicating meters. For dual meters it should
display 2. If not, refer to *Troubleshooting* below.

2. Press the Enter button or the LCD external button until reaching the Meter status screen showing the total energy [Wh]. There is a status screen for each meter function. For example, for an export+import meter and a production meter, there will be three status screens: for export, import and production. The following is an example of an export meter:

```
Export Meter
Status: <OK>
<Error Message>
Total[Wh]:XXXXXXX
```

Status: Displays OK if the meter is communicating with the communication board.

<Error message>: If an internal meter error occurs, it will be displayed here. Refer to *Troubleshooting Meter Connection* on page 28.

Total [Wh]: The amount of Watts per hour of the designated meter.

If the SolarEdge device is connected to the SolarEdge server, this value will also be displayed in the monitoring platform.

Troubleshooting Dual-meter Connection

Communication Status Screen Troubleshooting

When two meters are connected on the same RS485 bus, the following should appear in the Communication status screen:

```
        Dev Prot ##
RS485-1<MLT><02><02>
RS485-2<---><--><-->
ZigBee <---><--><-->
```

Device Type or Protocol are configured incorrectly

If **MLT** (Multi) is not displayed as the device type (DEV), or **2** is not displayed as the number of meters under Prot (protocol), configure the meters as follows:

1. Select **Communication ➔ RS485-x Conf ➔ Device Type ➔ Multi Devices**. Select **Device 1** or **Device 2**.
2. Select **Communication ➔ RS485-x Conf ➔ Protocol ➔ WattNode**.
3. Select **Revenue Meter ➔ Meter Func. ➔ Inv. Production, Site Production**, **Consumption**, **Export**, **Import**, or **Export+Import**.
4. Check that the Device ID under **Communication ➔ RS485-x Conf ➔ Device ID** is set to 1 or 2.

Number of devices is lower than configured or not displayed

If **<-->** or **<01>** is displayed under the ## column in the Communication status screen shown above, at least one of the meters is not communicating with the inverter. Check the following:

- Check the RS485 Modbus address DIP switch settings, as specified in "Connecting Two Meters" on page 36.
- The meter configuration is as described above.
- There are no loose connections at the inverter connectors and at the meters, specifically the RS485 wiring.

Meter Status Screen Troubleshooting

Refer to *Meter Status Screen Troubleshooting* on page 29.

Appendix C: Meter Information Displayed in the Monitoring Platform

If your device is connected to the SolarEdge server, you can view the meter's readings in the monitoring platform. Verify that the meter type is set correctly in the Admin page > Logical Layout > Meter details:
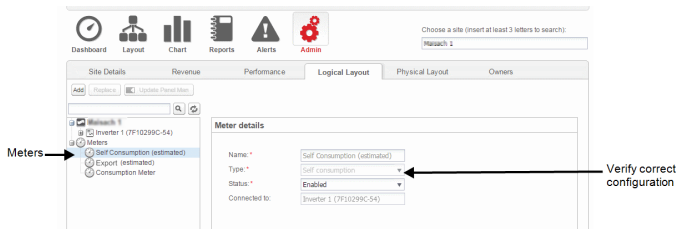

Figure 19: Setting the Meter details in the monitoring platform

Calculated meter readings (also referred to as "virtual meters"), such as self-consumption, are calculated using the data measured by the meter and the inverters.

The data from the inverters and from installed meters is displayed in the Dashboard and Charts tabs of the monitoring platform. The displayed data depends on the meter(s) location: grid connection point (export), or load consumption point (consumption). The following tables detail the displayed information per meter location.

No meter installed:

Data	Displayed in Monitoring Dashboard	Displayed in Monitoring Charts
Production (inverter/site)	✔	✔
Consumption	X	X
Self-consumption	X	X
Export	X	X
Import	X	X

Export meter:

Data	RS485 Meter		S0 Meter[1]	
	Displayed in Monitoring Dashboard	Displayed in Monitoring Charts	Displayed in Monitoring Dashboard	Displayed in Monitoring Charts
Production (inverter/site)	✔	✔	✔	✔
Consumption	✔ (calculated)[2]	✔ (calculated)[2]	X	X
Self-consumption	✔ (calculated)	✔ (calculated)	✔ (calculated)	✔ (calculated)
Export	X	✔	X	✔
Import	X	✔	X	X

---

[1]When installing an S0 meter at the grid connection point, make sure that it counts the total positive energy, that is, the energy fed into the grid.

[2]Available from CPU version 2.10xx/3.14xx

Consumption meter:

Data	RS485 Meter		S0 Meter	
	Displayed in Monitoring Dashboard	**Displayed in Monitoring Charts**	**Displayed in Monitoring Dashboard**	**Displayed in Monitoring Charts**
Production (inverter/site)	✔	✔	✔	✔
Consumption	✔	✔	✔	✔
Self-consumption	✔ (calculated)	✔ (calculated)	✔ (calculated)	✔ (calculated)
Export	X	✔ (calculated)	X	✔ (calculated)
Import	X	✔ (calculated)	X	X

Appendix D: Meter Technical Specifications

|	SE-WND-3Y400-MB-K2	
ELECTRICAL SERVICE		
Operating Voltage Range - Line to Neutral / Line to Line	Nominal: 230/400 184-264.5 / 320-460	Vac
AC Frequency	50/60	Hz
Grids Supported - Single Phase ; Three Phase[1]	Single Phase: L / N / PE Three Phase: L1 / L 2 / L3 / N / PE	
Power Consumption (typ.)	1.8	W
COMMUNICATION		
Supported Communication Interfaces	Modbus/ RS485	
Response time	≤1[2]	sec
Default Device ID (Modbus)	2	
ACCURACY (@ 25°C, PF:0.7- 1)[3]		
1% - 100% of Rated CT Current	±1.0	%
Hi-Accuracy / Revenue Generation	ANSI C12.20 Class .5	

---

[1]PE (Protective Earth) connection is not required for meter operation

[2]When the meter is connected at the grid connection point, and when RS485 is used for multiple inverters

[3]Using ACT-0750 CT models

| STANDARD COMPLIANCE		
Safety	IEC 61010-1	
Immunity	EN 61326, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-11	
Emissions	EN 55022 Class B	
Export Limitation Schemes	Engineering Recommendation G100 Issue 1 Amendment 1 2017 by ENA London UK	
INSTALLATION SPECIFICATIONS		
Dimensions (HxWxD)	85 x 153 × 38	mm
Weight	310	gm
Enclosure type	High impact, ABS and/or ABS/PC plastic UL 94V-0, IEC FV-0	
Operating Temperature Range	-30 to + 55	°C
Relative Humidity (noncondensing)	5 - 90	%
Protection Rating	Indoor (Outdoor when installed in an outdoor enclosure)	
Mounting Type	DIN rail / Surface mount	
Pollution degree	>2 (normally non-conductive; temporary conductivity due to condensation)	

Mechanical specifications:
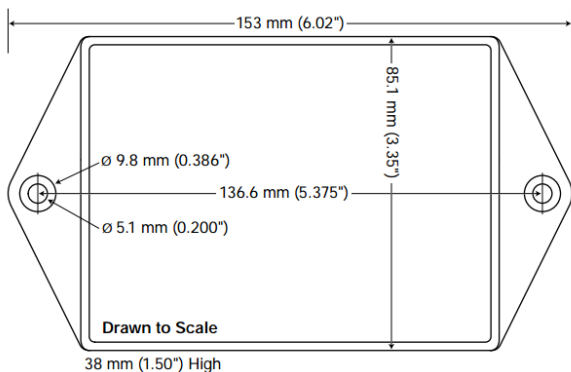
Current Transformers:

CURRENT TRANSFORMER MODEL[1]	RATED RMS CURRENT (A)	DIMENSIONS (INTERNAL/ EXTERNAL) (mm)
SE-ACT-0750-50	50	20 x 20 / 61 x 60.4
SE-ACT-0750-100	100	
SE-ACT-0750-250	250	
SE-CTS-2000-1000	1000	50.8 x 50.8 / 121 x 127

Mechanical specifications:
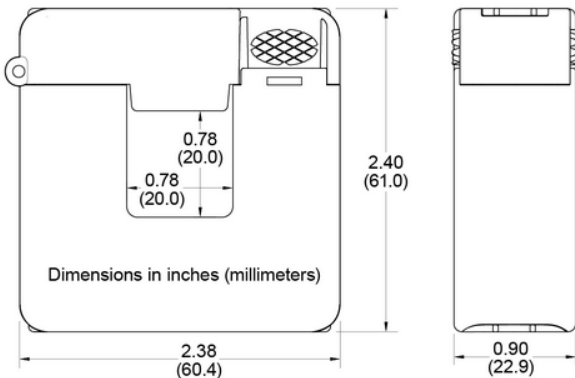
[1]One current transformer per phase; for other ratings contact SolarEdge.

Appendix E: External Lightning Protection Connection

Protection devices are most often installed from each data line to the local earth ground, and should be selected to begin conducting current at a voltage as close to the system's normal communication level as possible, but never lower. For RS485 communication lines, the selected voltage rating is typically 6-8 V. Transient suppressors should be installed as close as possible to the port that is being protected, and the user must provide an extremely low impedance connection to the local earth ground of the SolarEdge device. This ground connection is crucial for proper suppression device operation. The ground connection should be made using a heavy gauge wire and kept as short as possible. If the cable between the SolarEdge device and the protection device must be longer than 1m/3.3 ft., a copper strap or a braided cable intended for grounding purposes must be used for the protection device to be effective. In addition to the high frequency nature of transients, extremely high current may flow.

A protective device with surge discharge ratings of **In**: 10kA 8/20µs and **Imax**: 20kA 8/20µs is recommended.

Various lightning protection devices are available for RS485 communication lines.

The diagram below shows a connection example using the Raycap *RayDat RS 485* data protocol protection device. A detailed specification can be found at: http://www.raycap.com/wp-content/uploads/2016/06/Signal-Catalog-2016-Final-rev.pdf, pages 76-77.
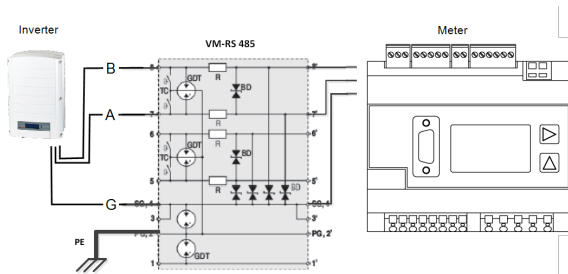
Figure 20: Protection connection

If you have technical queries concerning our products, please contact our support through SolarEdge service portal: http://www.solaredge.com/service/support

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