

# Application Note – Metering Overview for the Single Phase Energy Hub Inverter with Prism Technology for Australia

## Version History

- Version 1.1, November 2021: Support for Energy Hub Inverter with Prism Technology
- Version 1.0, July 2020: First version

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## Introduction

The SolarEdge Single Phase Energy Hub Inverter with Prism Technology includes a **built-in Smart Energy Meter** that supports export/import metering using an external CT. This application note describes how to prepare the inverter for export/import metering using the built-in meter.

## Installation Prerequisites

The following conditions are required for the built-in meter to support the smart energy metering option:

- The electrical grid is single phase. For three phase Wye grids, see the section *Installing an External Meter* on page 4.
- The distance between the inverter and the electrical cabinet is up to 100 meters.
- The inverter must have the following part number:

SExxxxH-AUSxxxxxx	Single Phase Energy Hub Inverter with Prism Technology
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## Required Equipment

- Split-Core Current Transformer (CT), purchased separately, available from SolarEdge. For a list of applicable CTs, see the section *Current Transformer Information* on page 10.
- Shielded CT Extension cable, to be purchased separately. The shielded extension cable connects the CT to the inverter via the AC conduit. The required cable length depends on the distance between the inverter and the electrical cabinet. Cable requirements are as follows:
  - Shielded cable
  - Maximum cable length: 100 meters
  - Voltage Rating: 300V or higher for single phase grid installation
  - Minimum gauge: 0.20 mm<sup>2</sup>
  - Maximum gauge: 2.1 mm<sup>2</sup>

## Current Transformer (CT) Installation

A shielded extension cable is used to connect the CT twisted pair to the meter. The extension cable is routed via the AC conduit, together with the AC wiring.

Wire the meter in accordance with the connection diagram in the scenario: Export/Import Energy Metering in a Single Phase Grid Installation.

## Export/Import Energy Metering in a Single Phase Grid Installation

In the single phase grid example in the figure below, one CT is installed for Export/Import metering.

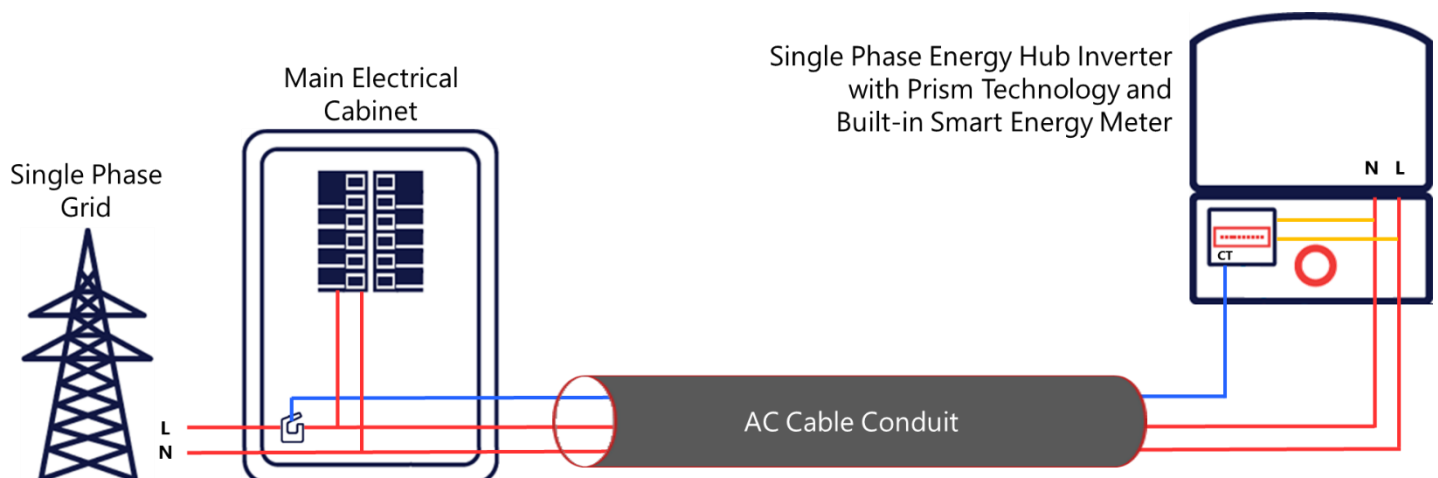


Figure 1: Export/Import Energy Metering in a Single Phase Grid Installation

## Metering at a Three Phase Grid Site

Perform the following procedure when connecting the meter to at a three phase grid site.

→ To prepare the installation for use at a three phase grid site:

1. Remove the meter's AC terminal access cover.

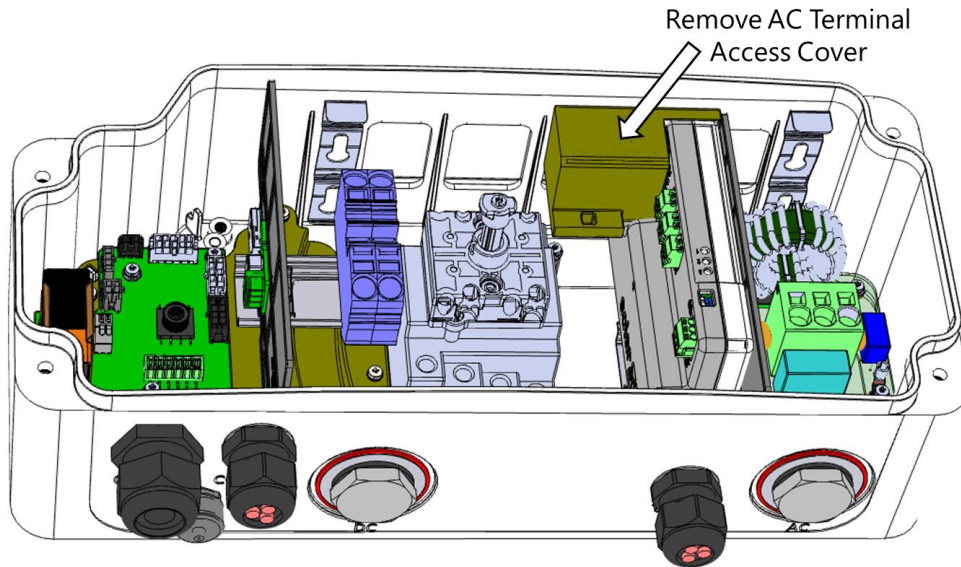


Figure 2: Removing the AC Terminal Access Cover

2. Connect the L2 and L3 AC lines from the AC supply.

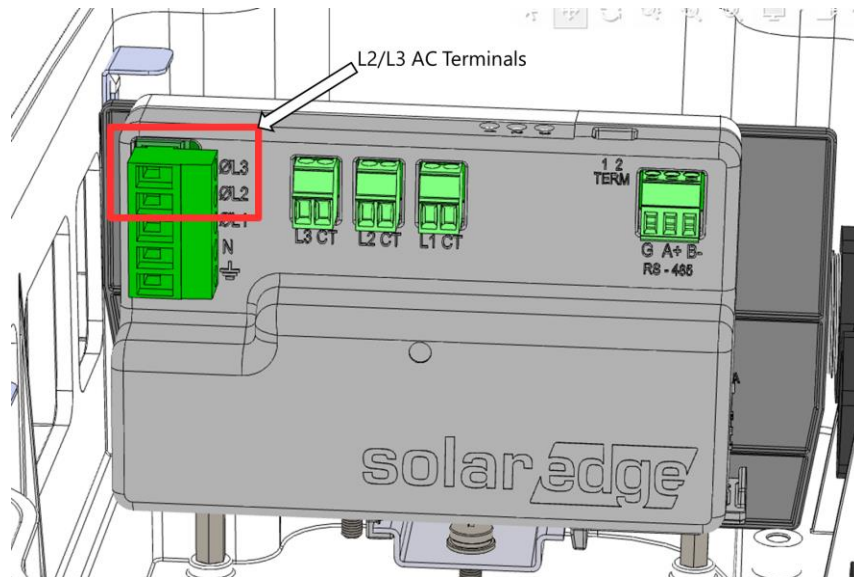


Figure 3: L2 and L3 AC Terminals

3. Replace AC terminal cover.
4. Fit two additional current transformers for L2 and L3.

## Installing an External Meter

If the Single Phase Energy Hub Inverter with Prism Technology requires external metering, it shall be performed using one of the following external meters:

- SE-MTR-3Y-400V-A for the Modbus meter
- MTR-240-3PC1-D-A-MW for the Inline meter

There are 2 communication options to connect the external meter:

### → To install an external Modbus inline energy meter using RS485:

1. Connect the external meter using the RS485 extension cable to the Energy Hub DCD terminal block designated as “2nd Inv” port (this is a serial connection location for the RS485-1 communication channel).
2. Using SetApp, disable the built-in meter by setting its function to “None”.
3. Set the external energy meter’s function to “E/I” (or any other function).

### → Installing an external inline energy meter (P/N: MTR-240-3PC1-D-A-MW):



#### NOTE

The external inline meter uses the SolarEdge Energy Net wireless protocol to communicate with the inverter.

1. Install a SolarEdge Energy Net module (P/N: ENET-HBNP-01) to enable Energy Net communications between the inverter and the meter.
2. Using SetApp, disable the built-in meter by setting its function to “None”.
3. Set the external inline energy meter’s function to “E/I” (or any other function).

## Installing the CT

**WARNING!**

ELECTRICAL SHOCK HAZARD. Risk of electric shock from energy stored in the capacitor. Do not remove the inverter's cover until 5 minutes after disconnecting all power sources.

→ **To install the CT:**

1. Power off the inverter and disconnect its main circuit breaker.
2. Attach the CT to the relevant AC wire, in accordance with the connection diagram in the scenario: Export/Import Energy Metering in a Single Phase Grid Installation.

**NOTE**

When attaching the CT to the conductor to be measured, the arrow on the CT should point in the direction of the current source.

3. Cut the CT's black-and-white twisted wire pair to the required length (leaving some additional spare length), and connect the pair to the shielded CT extension cable, splicing them using a crimping tool, as shown in the figure below.

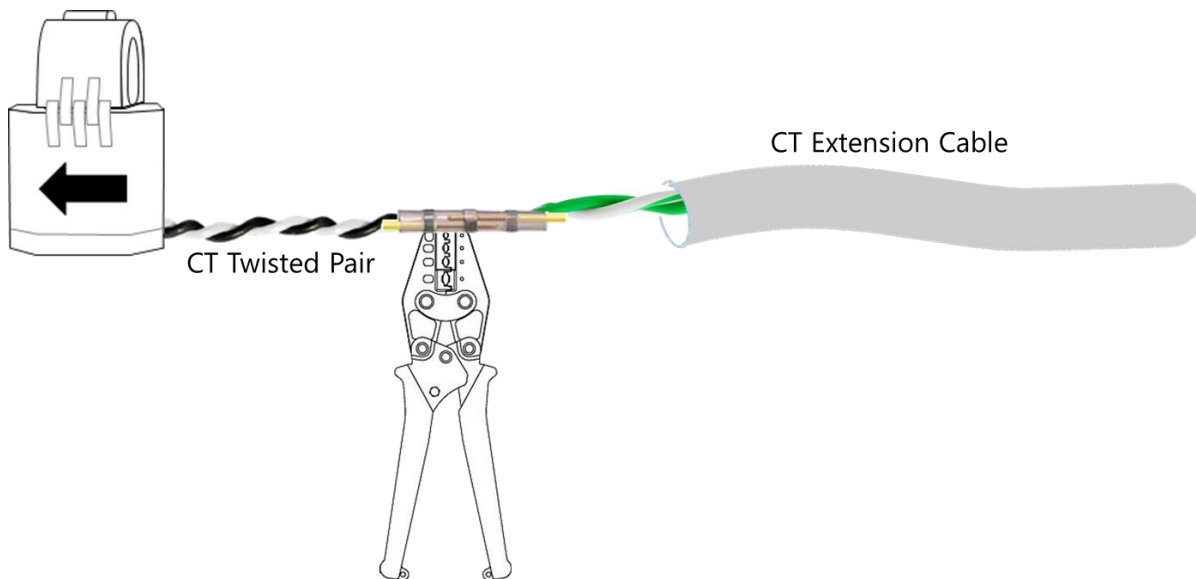


Figure 4: Connecting the CT wire to the shielded CT extension cable

**NOTE**

Do not use the method of twisting the wires and taping them together. This type of connection is not reliable and the wires may eventually disconnect from each other.

4. Connect the grid AC wiring – L and N – to the designated terminal blocks.

5. Run the shielded extension CT cable into the AC conduit and through the gland of the DC Safety Unit. Connect the CT twisted pair to the meter's CT terminal block (marked CT L1).

**NOTE**

The unshielded CT's twisted pair should *not* run via the AC conduit, as this will affect the accuracy of the measurements. Only shielded cable rated at 300V or above should be used as an extension for the CT twisted pair cable.

**NOTE**

The CT extension cable's shielding wire should be left unconnected at both ends.

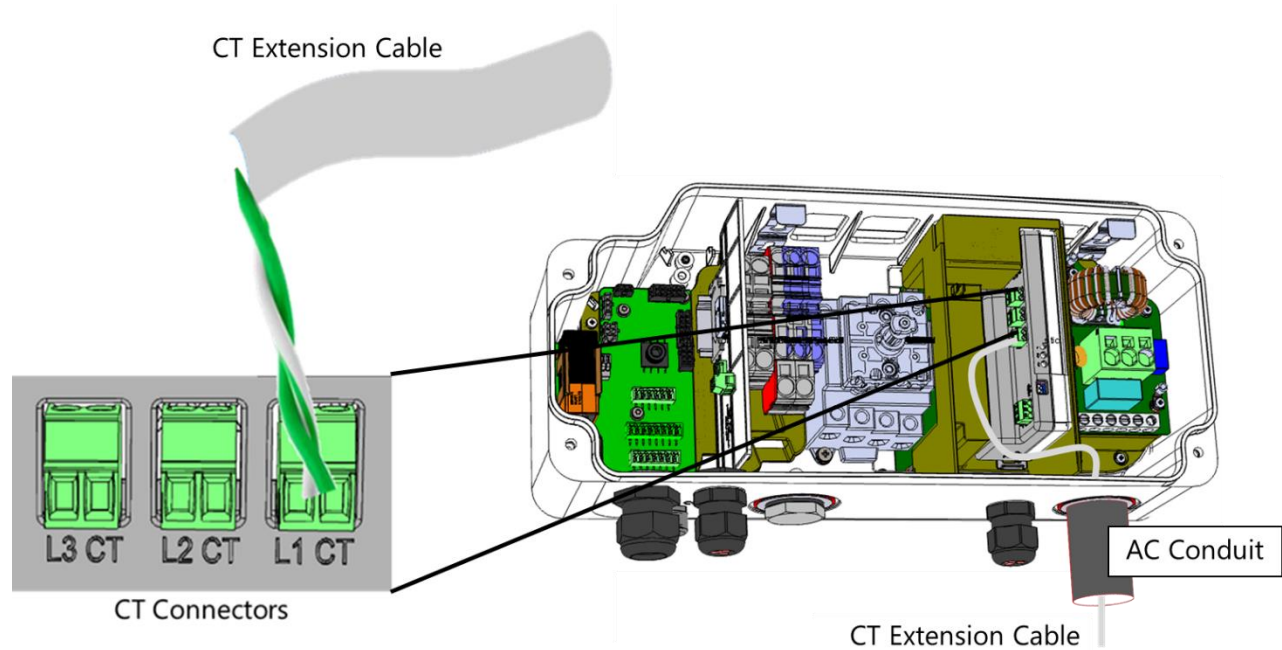


Figure 5: Connecting the CT extension cable in the inverter

**NOTE**

The above figure shows only the wiring that is to be connected by the installer. Factory pre-wired meter cabling does not appear in the diagram.

## Configuration

### → To configure the meter for export/import metering using SetApp:

1. Make sure that the **Meter Function** is set to **Inverter Export/Import** (default factory setting).
2. Configure the current transformer's rating in amperes (default is 0). The export/import metering function becomes operational once CT rating is changed to a non-zero value.

**NOTE**

Auto-activation is supported only when the meter's function is set to **Export/Import**.

3. Select **Commissioning** → **RS485-1** → **Meter 1** (the meter number), and configure the following settings.
  - **AC Cable Cross-Sectional Area:** 1-13 mm<sup>2</sup> (default is 8 mm<sup>2</sup>)
  - **AC Conduit Length:** 0-100 meters (default is 6 meters)

### → To deactivate the export/import metering function using SetApp:

1. To stop export/import metering, the user should set the **Meter Function** to **None**.

**NOTE**

Deactivate the built-in meter when an external meter is being used as an Export/Import meter – for example, when the inverter is installed in a three phase grid.

### → To verify that the meter is configured for export/import metering, using SetApp:

1. From the main menu, select **Communication**, and verify that Meter1 is connected to RS485-1.
2. Verify that the following settings are configured:
  - **RS485 Protocol:** **Modbus (Multi-Device)**.
  - **Function:** **Inverter Export/Import**.
  - **Meter Protocol:** **SolarEdge**.
  - **Device ID:** 1. Note: ID DIP switch settings on the meter are factory-set to address 1.
  - **CT Rating** should be set to the current transformer's rating in amperes.
3. All other settings mentioned above, including: AC cable gauge and AC conduit length, should be properly configured.
4. To complete the configuration, select **View Status** to view the meter status details.

## Meter Indications

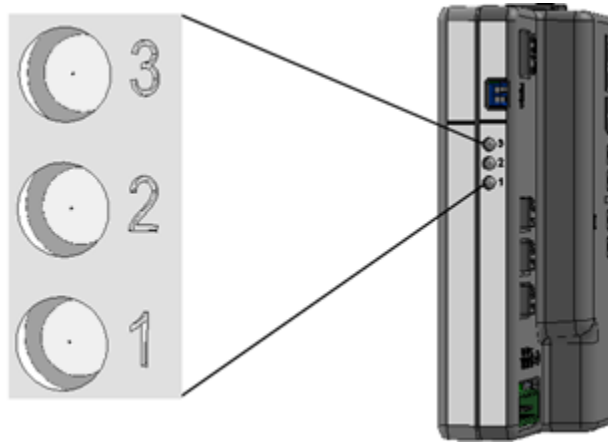
### LEDS

The meter utilizes the LEDs on the top of the unit in order to indicate current status.



#### NOTE

The LEDs can be viewed only when the DC Safety Unit is open.



LED #	Color	Function	Indication
1	Green	Operational status	<ul style="list-style-type: none"> <li>Blinking: normal operation</li> <li>OFF: no power</li> </ul>
2	Yellow	RS485 Modbus communication	<ul style="list-style-type: none"> <li>ON; communication OK</li> <li>OFF: no communication</li> </ul>
3	Yellow	Energy management	<ul style="list-style-type: none"> <li>ON or Blinking; energy reading</li> <li>OFF: no energy reading</li> </ul>



## Meter Specification

Meter type	Inverter built-in	
<b>Electrical Characteristics</b>		
Nominal voltage range	230 to 400 (line-to-line) 120 to 277 (line-to-neutral)	Vac
AC Frequency	45 to 65	Hz
Grid supported	Single phase, 2 wire grid: L / N Three phase, 4 wire Wye grid: L1 / L2 / L3 / N	
Power consumption	< 3W	W
Over-voltage protection	CAT III @ 600V	
Accuracy (SECT-SPL-100A-A and SECT-SPL-250A-A CTs)		%
<ul style="list-style-type: none"> <li>From 1% of CT current rating to 10A</li> <li>From 10A to 100% of CT current rating</li> </ul>	±2 ±1.25 <sup>1</sup>	
Nominal Input at Rated Current (CT1/CT2/CT3)	0.333	Vac RMS
<b>Communication</b>		
Physical port	3 wire terminal block	
Interface	RS485 half-duplex, 3 wires (A, B, Gnd)	
Protocol	MODBUS RTU	
Register update resolution	Power register < 200	ms
	All other registers < 4	Sec
<b>Mechanical</b>		
Meter mounting	Inverter DIN rail, built-in	
Connectors	Euroblock-style pluggable terminal blocks	
<b>Wire AWG/cross section range</b>		
AC voltage Terminal Block	up to 12 / 2.5	AWG/mm <sup>2</sup>
Communication Terminal Block	24 / 0.2 to 14 / 2	AWG/mm <sup>2</sup>
Current Transformer Terminal Block	24 / 0.2 to 14 / 2	AWG/mm <sup>2</sup>
Operating Temperature Range	-40 to +140 / -40 to +60	°F/°C
<b>Certifications</b>		
Safety	IEC 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1-04	
Immunity	EN 61326: 2000, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6	
Emissions	EN 55022 Class B	

<sup>1</sup> ±1% for SE-ACT-0750-100  
±0.5% for SE-ACT-0750-250-C6 CT

## Current Transformer Information

Current Transformer Model	Rated RMS Current (A)	Dimensions Internal / External
SECT-SPL-100A-A	100	16 x 16 mm / 44 x 31 mm
SECT-SPL-250A-A	250	24 x 25 mm / 46.2 x 65.4 mm
SE-ACT-0750-100	100	20 x 20 mm / 61 x 60.4 mm
SE-ACT-0750-250-C6	250	