

# Application Note – Single Phase Energy Hub Inverter with Prism Technology and Built-In Smart Energy Meter for Australia

## Version History

- Version 1.0, March 2021 – first version

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## Introduction

The SolarEdge Single Phase Inverter with Prism Technology and **built-in Smart Energy Meter** provides an internal, built-in energy meter that enables export/import metering using an external CT. This application note describes how to prepare the inverter for energy metering using the built-in meter.

## Installation Prerequisites

The following conditions are required for the inverter to support the smart energy metering option:

- The electrical grid is either single phase or 3 phase Wye.
- The distance between the inverter and the electrical cabinets is up to 100 meters.
- The inverter must have one of the following part numbers:
  - SExxxxH-AUS3MBX14: Single phase inverter with Prism technology and built-in smart energy meter

## Required Equipment

- Split-Core Current Transformers (CTs), purchased separately, available from SolarEdge:
  - SE-CTML-0350-070
  - SE-ACT-0750-100
  - SE-ACT-0750-250-C6
- 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 containing three twisted pairs (one per CT)
  - Maximum cable length: 100 meters
  - Voltage Rating: 300V or higher for single phase grid installation, 600V or higher for 3 phase grid installation
  - Minimum gauge: 0.20 mm<sup>2</sup>
  - Maximum gauge: 2.1 mm<sup>2</sup>

## CT Installation

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

Wire the meter in accordance with the connection diagram below:

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

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

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

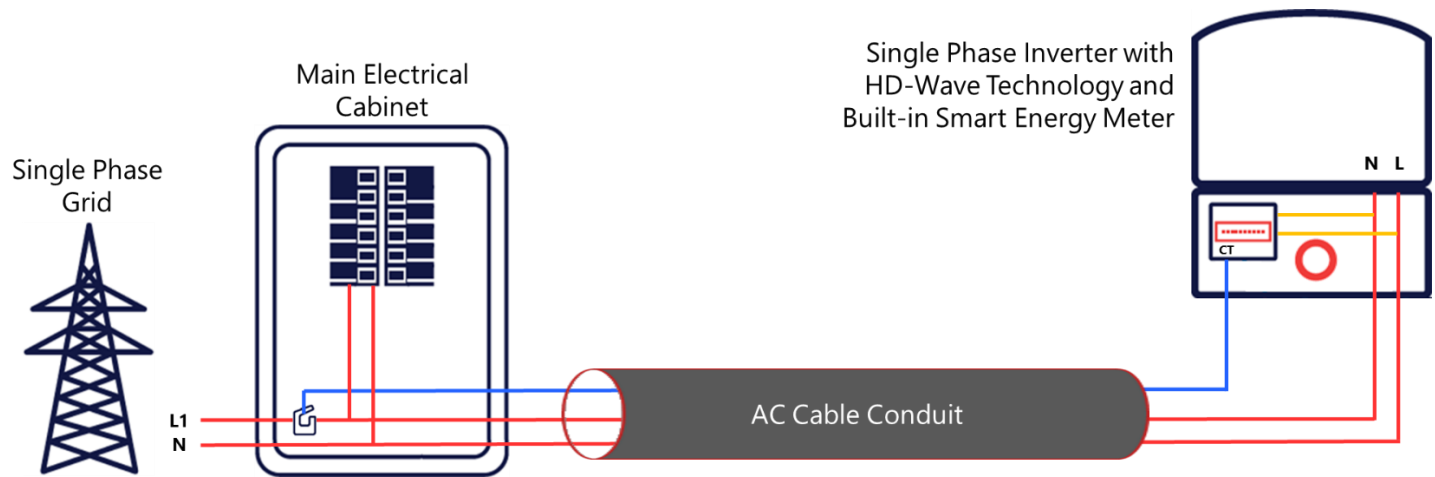


Figure 1: Export/Import Energy Metering in a Single Phase Grid Installation

## Installing the CT



### WARNING!

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

### → To install the CT:

1. Power off the inverter and disconnect its main circuit breaker.
2. Attach the CT to the relevant AC wires, as shown in the diagrams above.



### 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.

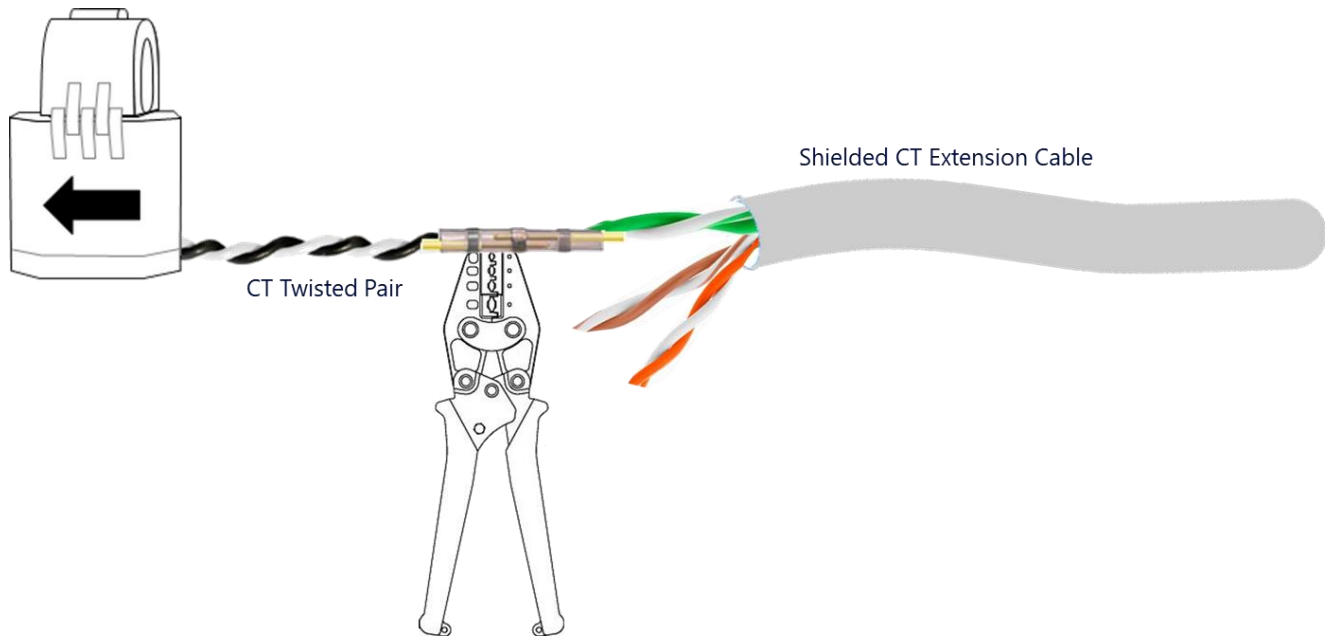


Figure 5: Connecting the CT wires to the shielded CT extension cable



### 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 – L1 and N – to the designated terminal blocks.

5. Run the shielded extension CT cable in the AC conduit and through the gland of the DC Safety Unit. Connect the CT pair to the L1 CT connector (see the figure below).

**NOTE**

The unshielded CT's twisted pair should *not* be 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 should be left unconnected at both ends

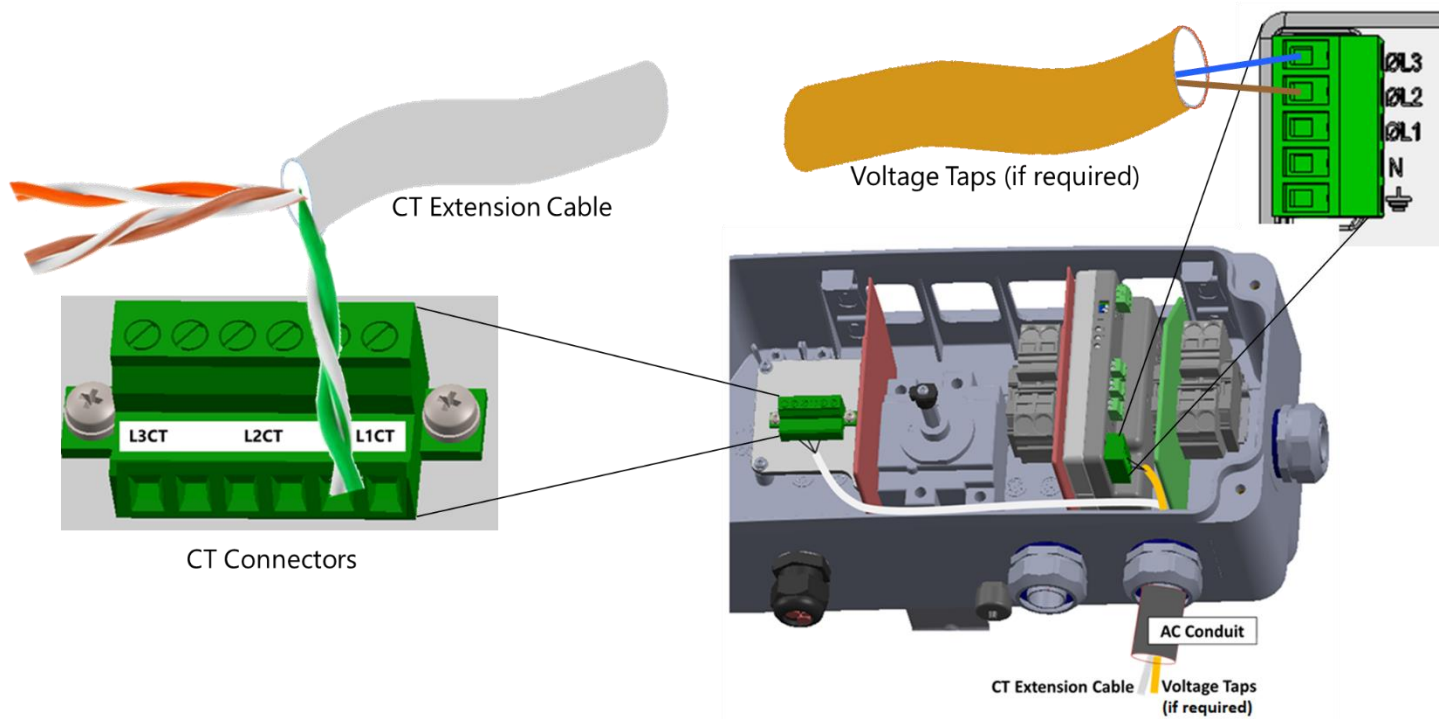


Figure 6: Location of CT Connectors in the Inverter

**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

The meter's factory default function setting is **Inverter Export/Import**.

→ **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. Select **CT Rating** for the meter and enter the current transformer's rating in amperes (default is 0A). The export/import metering function becomes operational once the default setting is changed to a non-zero value.
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**

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


→ **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.

Meter Indications

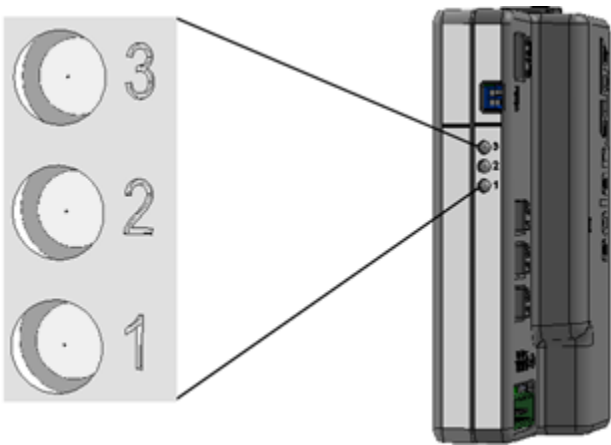
LEDS

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: L1 / N Three phase, 4 wire Wye grid: L1 / L2 / L3 / N	
Power consumption	< 3W	W
Over-voltage protection	CAT III @ 600V	
Accuracy (for SE-ACT-0750-100 CT) <ul style="list-style-type: none"> <li>From 1% of CT current rating to 10A</li> <li>From 10A to 120% of CT current rating</li> </ul>	±2 ±1 <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> ±1.25% from 10A to 100% of rated current for SE-CTML-0350-070 CT  
±0.5% from 10A to 100% of rated current for SE-ACT-0750-250-C6 CT



## Current Transformer Information

Current Transformer Model	Rated RMS Current (A)	Dimensions Internal / External
SE-CTML-0350-070	70	10 x 10 / 25.4 x 39
SE-ACT-0750-100	100	20 x 20 mm / 61 x 60.4 mm
SE-ACT-0750-250-C6	250	