

# Meeting Hawaii Utility Interconnect Requirements

## Version History

- Version 1.3 – June 2021 – Added new three phase inverter model numbers under Appendix A
- Version 1.2 – May 2019 – Added three phase inverter model numbers; and DSP2 version; and SetApp inverter requirements; removed non-installer related information
- Version 1.1 – Dec. 2018 – Updated HPUC Member Website Links
- Version 1.0 – Dec. 2018 – Initial Release

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## Introduction

This document provides instructions to commission SolarEdge systems in accordance with Rule 14H guidelines. The instructions included are outlined for inverters with SetApp configuration, and for inverters with a display (LCD). In order to provide proof of valid commissioning to the utility, take screenshots or pictures of settings as instructed under [Documentation for Verification](#).

## Checking/Upgrading Firmware & Setting Country Code

Upgrade the inverter firmware to the latest available version at the time of commissioning.

- For SetApp Enabled inverters, the firmware will be automatically upgraded upon activation of the inverter. If the inverter does not upgrade automatically, navigate to **Maintenance → Firmware Upgrade** to initiate the upgrade manually (See Chapter 5 of the Installation Guide for inverter with SetApp configuration). Make sure you have the latest SetApp version on your smart phone (You must have automatic updates enabled on SetApp).
- For inverters with a display, download the [latest firmware version](#) or contact SolarEdge Support to obtain the latest version. Follow the upgrade instructions at [https://www.solaredge.com/sites/default/files/upgrading\\_an\\_inverter\\_using\\_micro\\_sd\\_card.pdf](https://www.solaredge.com/sites/default/files/upgrading_an_inverter_using_micro_sd_card.pdf)

## Minimum Firmware Versions

DSP1 and DSP2 versions **must be equal to, or greater than** the ones listed below.

Inverter	DSP1	DSP2 <sup>1</sup>
Single Phase Inverters with HD-Wave Technology	1.0000.0440	2.0000.0140
Previous Generation Single Phase Inverters and StorEdge	1.0210.1232	2.0052.0410
Three Phase Inverters and Three Phase Inverters with Synergy Technology	1.0013.1019	2.0019.0759

The minimum CPU versions **must be equal to, or greater than** the ones listed below.

Inverter	CPU
Inverters with SetApp configuration	4.4.67
Inverters with a display	3.2252

## Verifying the current DSP1, DSP2 and CPU versions

→ **To check FW versions in inverters with SetApp configuration:**

1. From the **Commissioning** select **Information**.
2. Take a screenshot and supply to the utility as proof of valid commissioning. See example below.

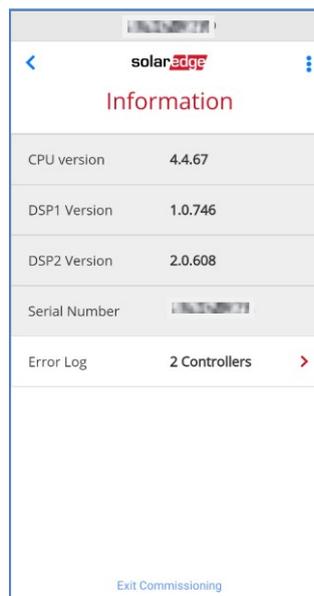


Figure 1: Information screen showing versions

<sup>1</sup> Minimum FW version (DSP2 Only) required for compliance with HECO SRD-UL-1741-SA-V1.0

→ To check FW versions in inverters with a display:

1. From the main menu select **Information** → **Versions**.



2. Verify DSP1, DSP2 and CPU are at least the minimum versions shown above. See example below.

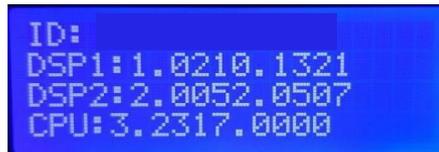


Figure 2: Example of Versions LCD screen

## Setting Country Code

Once the firmware and CPU versions meet the minimum specifications outlined above, select the appropriate Rule 14H country setting, shown in the table below, in accordance with the installation guide (Inverters with SetApp configuration: Chapter 5; Inverter with a display: Chapter 6).

Single Phase		Three Phase	
US/Hawaii AUTO	USA12	US/Hawaii 208V	USA7
US/Hawaii 208V	USA7	US/Hawaii 277V	USA11
US/Hawaii 240V	USA8		
US/Hawaii 208V No-Neutral	USA9		
US/Hawaii 240V No-Neutral	USA10		



**NOTE**

If the FW is being upgraded, select the country code **after** upgrading. If the country code is selected before the FW is upgraded, settings associated with changes in that country code will not be in effect.

→ To set the country code in inverters with SetApp configuration:

3. Navigate to **Country and Language** and select the required Country from the drop-down list.

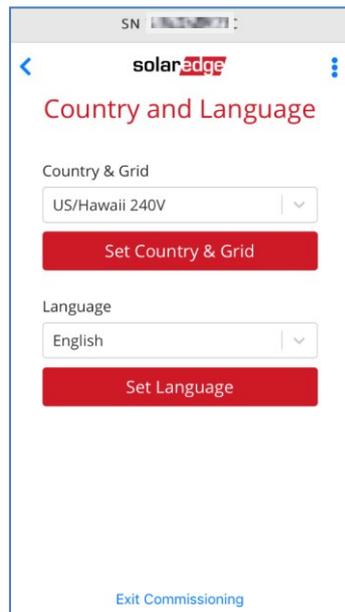


Figure 3: Country and Language screen

4. Navigate to **Status** and take a screenshot to supply to the utility as proof of valid commissioning. See example below.

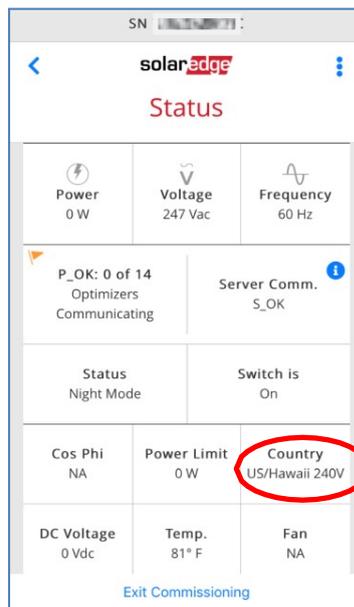
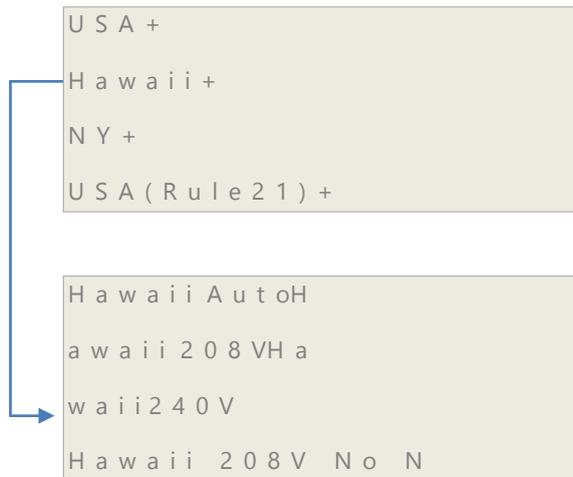


Figure 4: Status screen showing country settings

→ To set the country code in inverters with a display:

1. Navigate to **Country** → **Hawaii+** → **Hawaii XXX** (XXX being the appropriate grid voltage).



2. Exit Setup mode and verify the country by navigating to the screen containing the inverter ID, DSP1/2 versions, CPU version, and the Country setting.
3. Take a picture of the screen and supply to the utility as proof of valid commissioning. See example below.



Figure 5: Example of Status LCD screen showing country code

## Verifying Country Code Following FW Upgrade

The purpose of this step is to verify that the country code was selected **after** the FW was upgraded. The new settings require a dynamic control of reactive power known as Volt/VAR (V/VAR) where the reactive power varies with the change in grid voltage.

→ To verify the country code in inverters with SetApp configuration:

1. Navigate to Power Control → Reactive Power.
2. Under **Reactive Power Mode** screen verify that Q(U)+Q(P) is enabled.

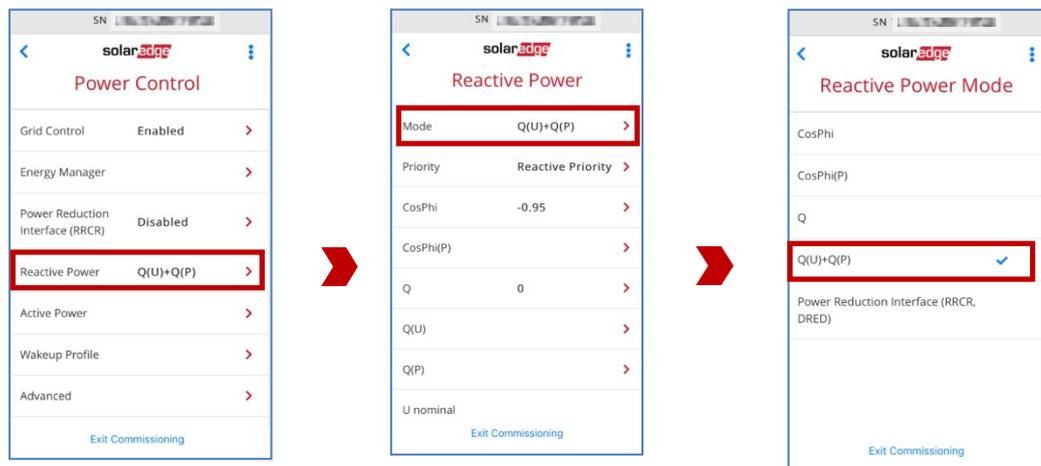


Figure 6: Power control settings



## NOTE

The settings are correct as long as the Reactive Power Mode screen has Q(U)+Q(P) enabled. The Reactive Power screen may display CosPhi but it is not in use.

- Navigate to **Status** and make sure that the country code is correct. See example below.

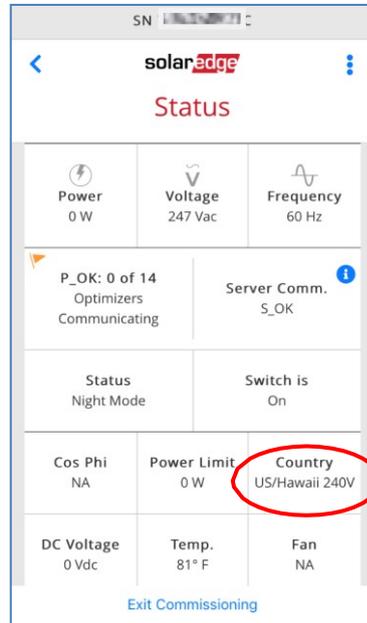


Figure 7: Status screen showing country settings

→ To verify the country code in inverters with a display:

This screen is also available in the normal display cycle viewed outside of the configuration menu tree.

- Press the LCD button (non-HD-Wave) or enter key (HD-Wave) until **PWR CTRL** screen is displayed, as shown below:

```

P W R   C T R L :   R E M O T E
P W R   L I M I T :   1 0 . 0 0 W
Q :           0 V A R
P o w e r   P r o d :   0 W
  
```

- Check that the 3<sup>rd</sup> line is labeled **Q**, indicating correct county code was selected after firmware upgrade.
- If the 3<sup>rd</sup> line displays **Cos Phi: -0.950**, then the old parameters are still selected and the proper Hawaii Country Code needs to be selected.
- Verify that the settings are as shown in Step 1 above.

## Volt/Watt Control (only necessary per utility request)

In certain locations, the utility may provide the option to use Volt/Watt control as an alternative to other distribution upgrades. This mode is **enabled by default in the firmware versions** listed in this document.

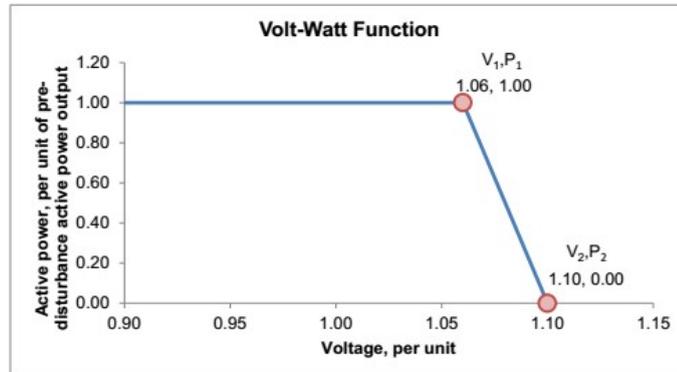


Figure 8: Volt-Watt Graph

If Volt/Watt mode is **not** required as a condition of interconnection, follow the steps below to disable it.

→ To disable Volt/Watt mode in inverters with SetApp configuration:

1. Select **Commissioning** → **Power Control** → **Active Power** → **P(V)**.
2. Tap **Edit** and manually update the table to match the set points as shown in the figure below. Tap **Save**.

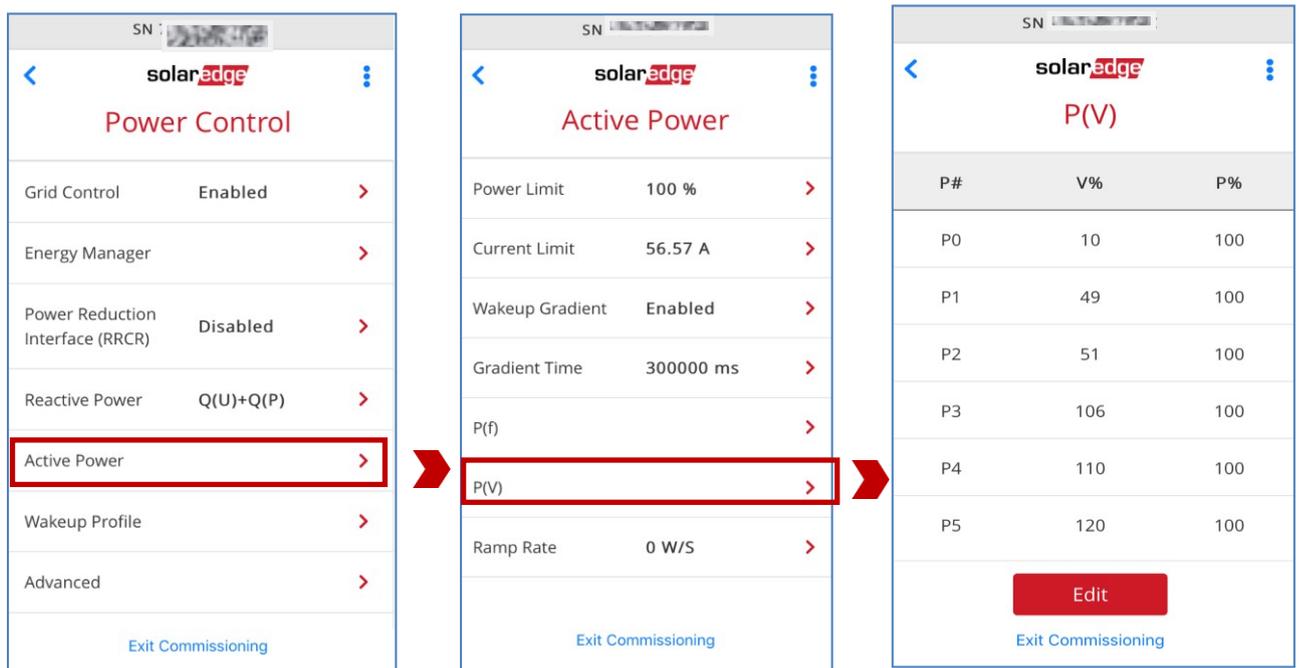


Figure 9: Disabling Volt/Watt settings

→ To disable Volt/Watt mode in inverters with a display

1. From the inverter LCD main menu, select **Power Control**.

```
Energy Manager
RRCR Conf.
Reactive Pwr Conf.
Active Pwr Conf.
Wakeup Conf.
P(f)
Advanced
RRCR Conf.
Load Defaults
```

2. Select **Active Pwr Conf.**

```
Wakeup Gradient <En>
Grad Time <50>
P(f)
P(V)
```

3. Select **P(V)** and manually update the set points as shown below:

```
P0 <0/0,100.0>
P1 <49.00,100.0>
P2 <51.00,100.0>
P3 <106.0,100.0>
P4 <110.0,100.0>
P5 <120.0,100.0>
```

## Setting Zero Export

Many systems installed in Hawaii are required to be configured to perform Zero Export functions, meaning they do not send power back to the grid when harvested PV energy exceeds the home loads. This is done by connecting an external energy meter at the import/export point of the home (usually current transformers (CTs) are connected above the main breaker in the main distribution panel) which will report to the inverter the direction of power to and from the site so the inverter can vary its output and prevent excess energy from being sent to the grid.

This can be accomplished with one inverter and meter on a single inverter system, or when one inverter or Commercial Gateway is configured as the Smart Energy Manager, one meter can be used to control the output of multiple inverters.

For instructions how to configure and establish this mode of operation refer to:

[https://www.solaredge.com/sites/default/files/export\\_limitation\\_application\\_note\\_NA.pdf](https://www.solaredge.com/sites/default/files/export_limitation_application_note_NA.pdf)

## Setting Zero Export in Inverters with SetApp Configuration

→ To set zero export in a single inverter system:



### NOTE

The instructions and example pictures shown in the section below represent energy meter installed at RS485-1. Select your RS485-1 or RS485-2 settings appropriately matching your installed system.

1. Configure and set meter protocol:
  - a. From the **Commissioning** menu, select **Communication**.
  - b. On **Communication** screen, select **RS485-1** → **Protocol** → **Modbus (Multi-Device)**.
  - c. On RS485-1 screen, select **Add Modbus Device** → **Meter**.

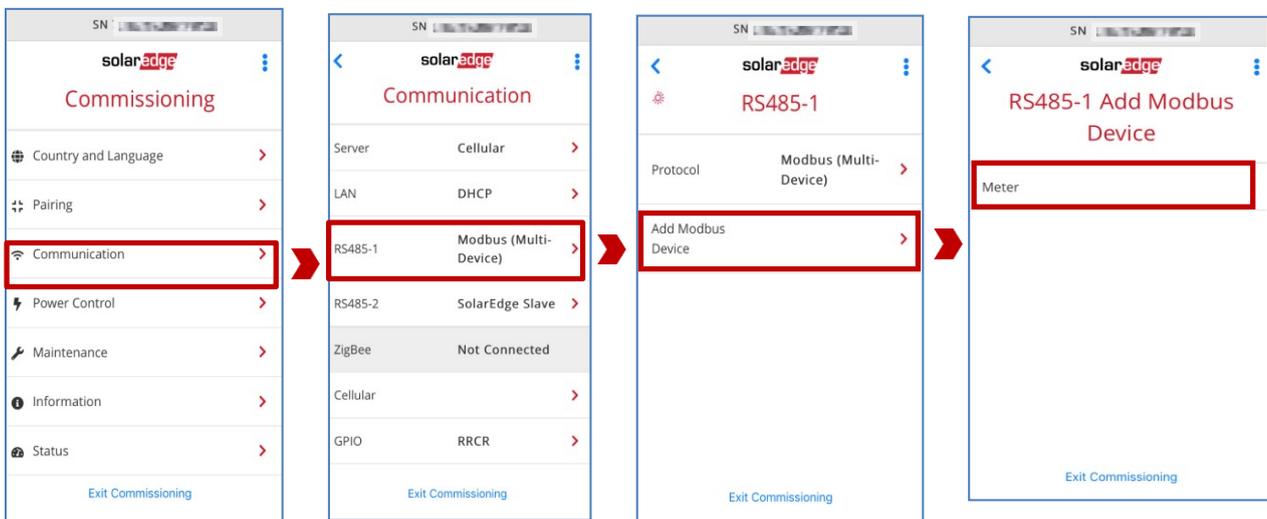


Figure 10: Setting meter protocol

2. Set the meter function: Select **Commissioning** → **Communication** → **RS485-1** → **Meter 1** → **Export+Import (E+I)**.

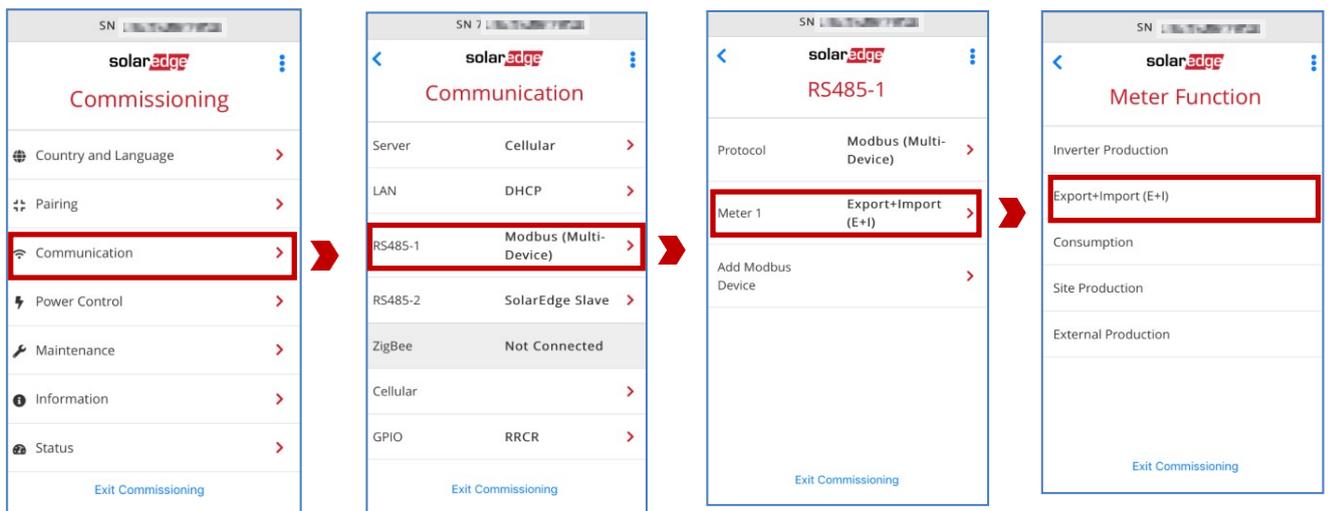


Figure 11: Setting meter function

3. Set the meter parameters: From the **Commissioning** menu, select **Communication** → **RS485-1** → **Meter 1** and configure meter parameters as described below:

- **Meter Protocol:** Select your installed meter type – **WattNode** or **SolarEdge**
- **Device ID:** Set meter's unique ID as desired, and tap Done. In the example picture below, the meter ID is set to 2.
- **CT rating:** Add the rating of your installed Current Transformer (CT), and tap Done. In the example picture below, the CT rating is 200A.
- **Grid Topology:** Select **WYE** or **Delta**, matching your grid topology.
- **PT Scaling:** Enter 1, and tap Done.

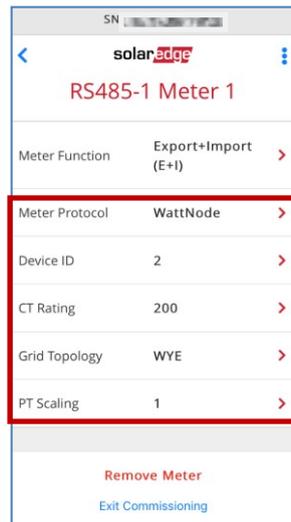


Figure 12: Setting meter parameters

4. Set Zero Export:

- a. From the Commissioning menu, select **Power Control** → **Energy Manager** → **Limit Control**.

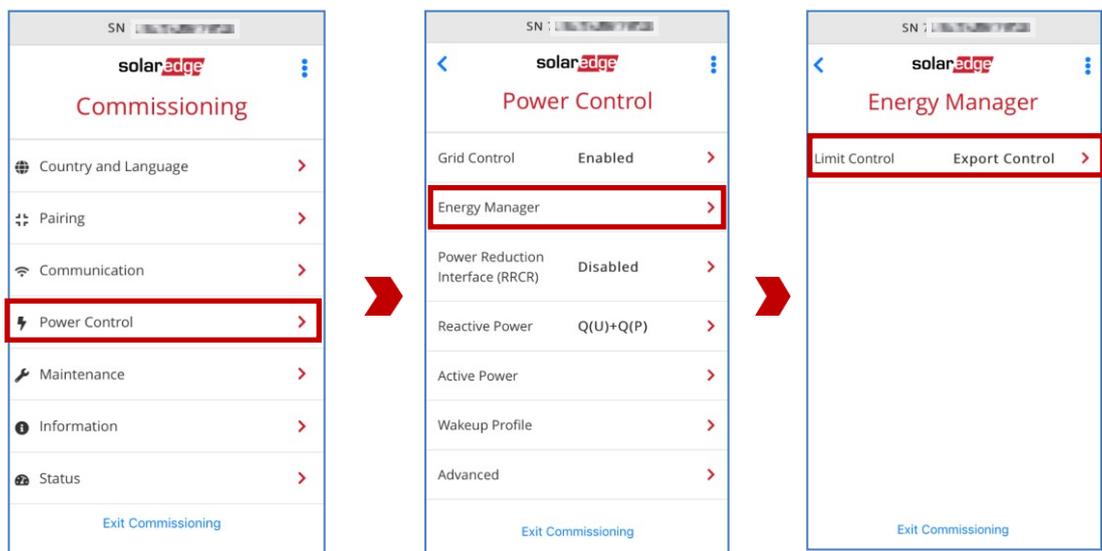


Figure 13: Setting energy management

- b. Select **Limit Control** → **Control Mode** → **Export Control**.
- c. Select **Limit Control** → **Site Limit** . Set the site Limit to **0 W**. Tap Done.

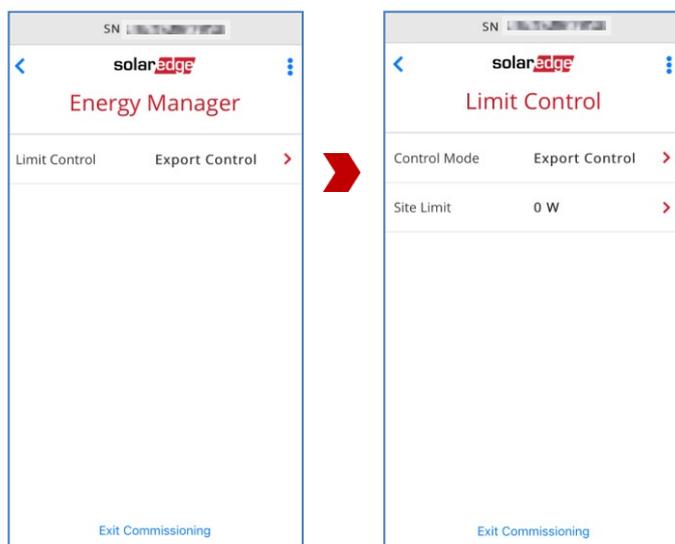


Figure 14: Setting zero export

5. From the **Commissioning** menu, select **Status**. Verify that all settings match your installed system.
6. Scroll down to the **Export Meter** section and verify that Export Power shows 0 W.
7. Take a screenshot of the **Export Meter** section, and supply to utility as proof of valid commissioning.



Figure 15: Verifying Zero Export in the Meter status screen

→ **To set zero export in a multiple inverter system:**



**NOTE**

Configure your master inverter first. Follow the steps below to set zero export on your master inverter in a multiple inverter system.



**NOTE**

The instructions and example pictures shown in the section below represent energy meter installed at RS485-1, and master inverter at RS485-2. Select your RS485-1 and RS485-2 settings appropriately matching your installed system.

1. Configure the meter, master inverter and set protocols:

- a. From the **Commissioning** menu, select **Communication**.
- b. On Communication screen, select **RS485-1** → **Protocol** → **Modbus (Multi-Device)**.
- c. On RS485-1 screen, select **Add Modbus Device** → **Meter**.

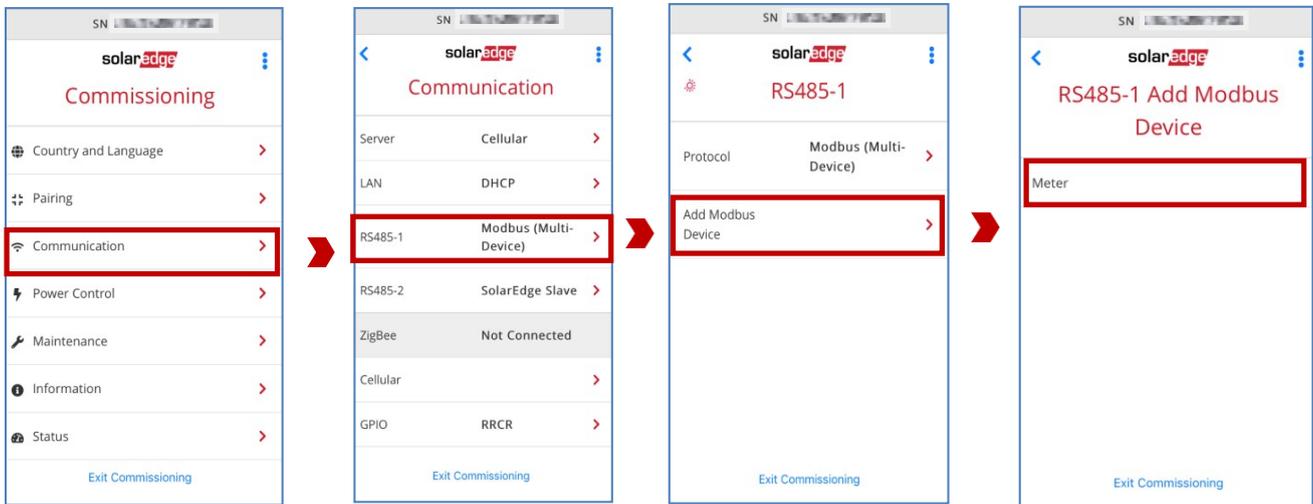


Figure 16: Setting meter protocol

- d. Set the master inverter protocol: Select **RS485-2** → **Protocol** → **Master** → **SolarEdge** → **SolarEdge Master**.

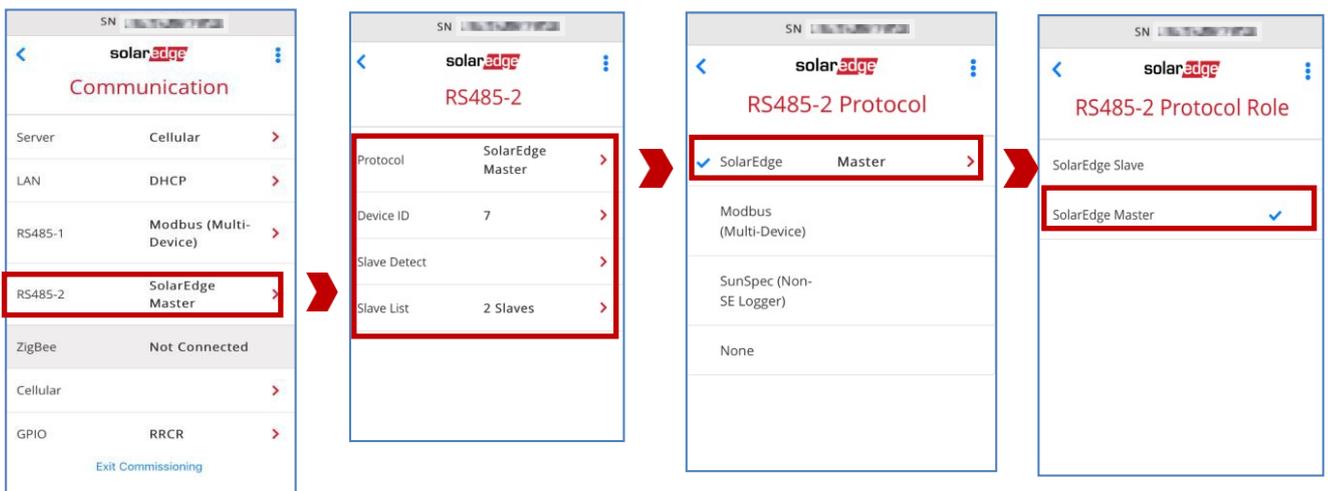


Figure 17: Setting the master inverter

- e. On the RS485-2 screen, tap **Device ID** and set the master inverter's unique ID, and tap Done. Refer to RS485-2 screen picture above.
  - f. Tap **Slave Detect** and verify that all slave inverters are detected correctly. Refer to RS485-2 screen picture above.
2. Set the meter function: Select **Commissioning** → **Communication** → **RS485-1** → **Meter 1** → **Export+Import (E+I)**.

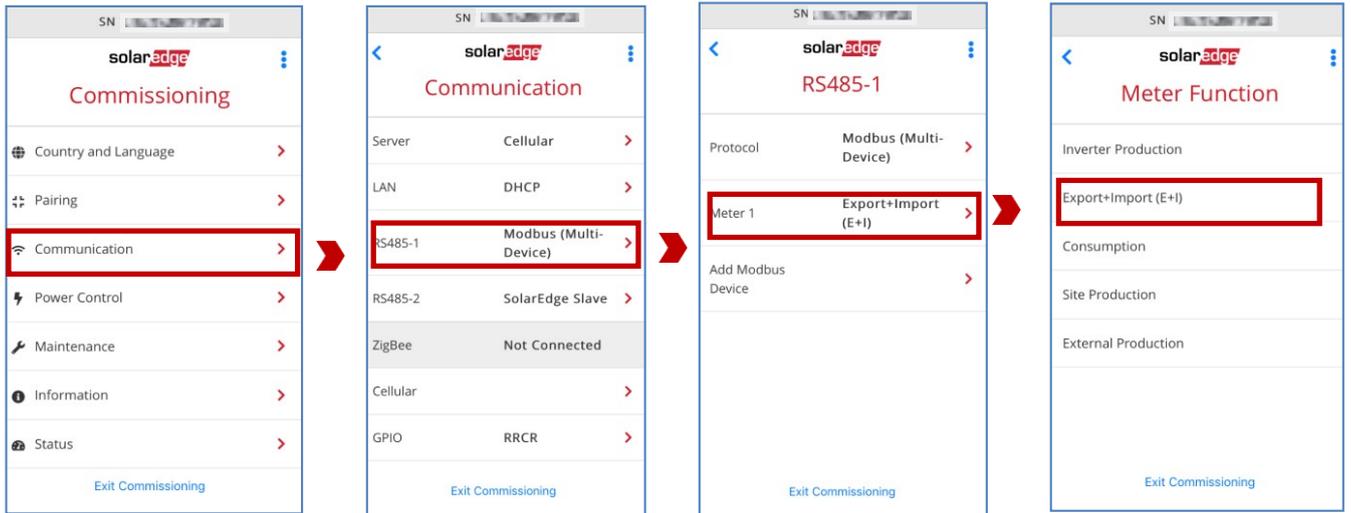


Figure 18: Setting meter function

3. Set the meter parameters: From the **Commissioning** menu, select **Communication** → **RS485-1** → **Meter 1** and configure meter parameters as described below:

- **Meter Protocol:** Select your installed meter type – **WattNode** or **SolarEdge**
- **Device ID:** Set meter's unique ID as desired, and tap Done. In the example picture below, the meter ID is set to 2.
- **CT rating:** Add the rating of your installed Current Transformer (CT), and tap Done. In the example picture below, the CT rating is 200A.
- **Grid Topology:** Select **WYE** or **Delta**, matching your grid topology.
- **PT Scaling:** Enter 1, and tap Done.

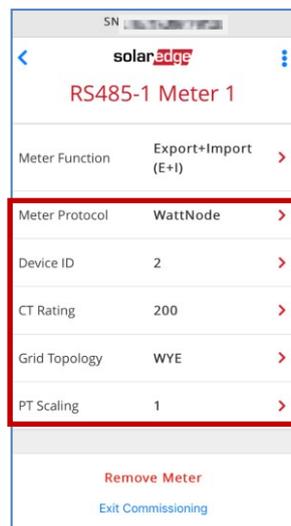


Figure 19: Setting meter parameters

## 4. Set Zero Export:

- a. From the Commissioning menu, select **Power Control** → **Energy Manager** → **Limit Control**.

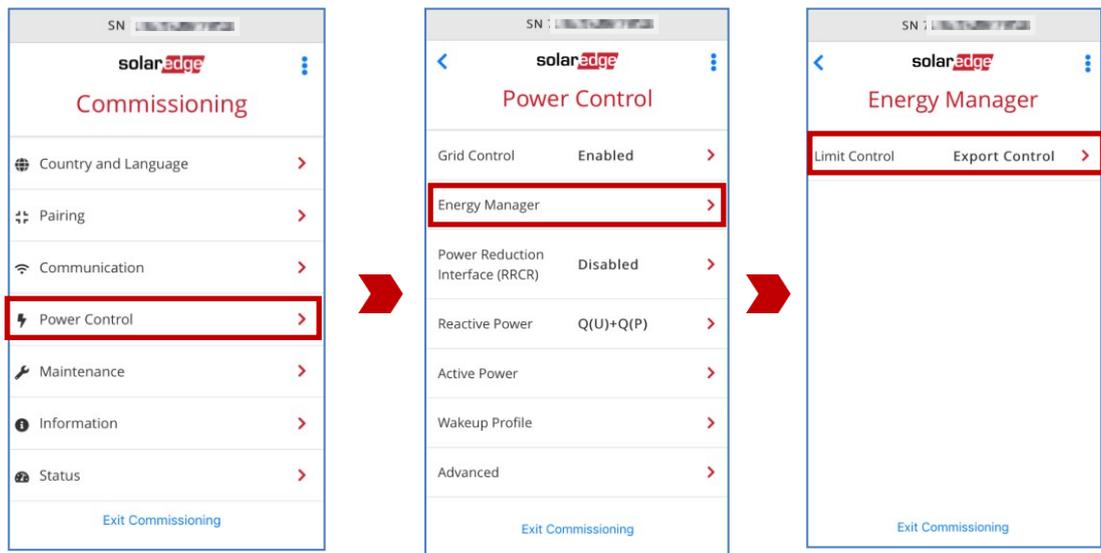


Figure 20: Setting energy management

- b. Select **Limit Control** → **Control Mode** → **Export Control**.
- c. Select **Limit Control** → **Site Limit**. Set the site Limit to **0 W**. Tap Done.

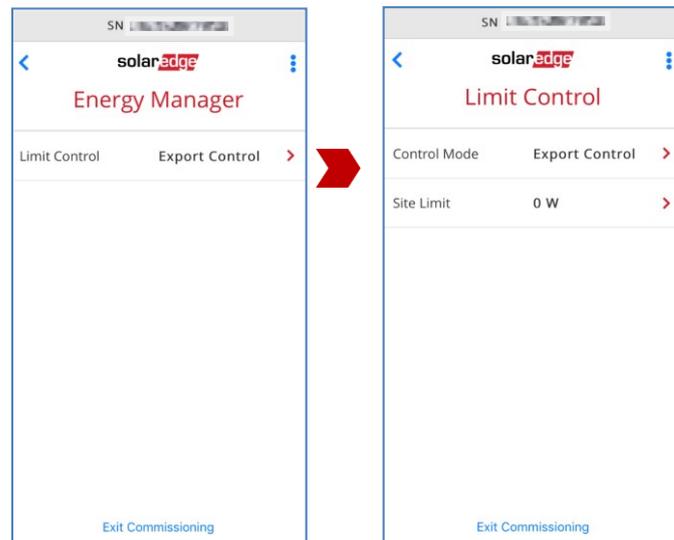


Figure 21: Setting zero export

5. From the **Commissioning** menu, select **Status**. Verify that all settings match your installed system.
6. Scroll down to the **Export Meter** section and verify that Export Power shows 0 W.
7. Take a screenshot of the **Export Meter** section, and supply to utility as proof of valid commissioning.

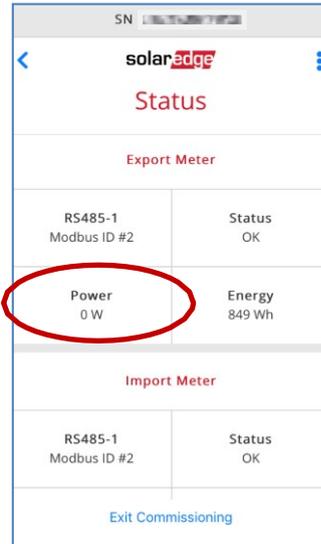


Figure 22: Verifying Zero Export in the Meter status screen

## Checking or Setting Zero Export in Inverters with a Display

### → To check zero export in single inverter system:

This check is done by taking a picture of a single screen in the normal display cycle (status screens). If the inverter is properly configured to limit power by measuring exported power, the site export limit will be displayed on the Smart Energy Manager (SEM) status screen.

1. Press the LCD button (non-HD-Wave) or the Enter key (HD-Wave) until the Site status screen is displayed, as shown below:

```
Site Limit:      0.0 kW
Site Prod:      10.0 kW
Site Export:     0.0 kW
Self-consume:   5.0 kW
```

2. Check that the 3<sup>rd</sup> line reads "Site Export" and that the value here is set to 0.0 kW.
3. Take a picture of this screen as shown in the sample picture below and provide to the utility as proof of valid commissioning.



Figure 23: Example of site status LCD screen

### → To check zero export in multiple inverter system:

All indications here are checked on the SEM inverter.

1. On the SEM inverter, follow the check in the section above to verify that **Site Export** is set to 0.0kW.
2. Verify that the inverter or Commercial Gateway is correctly configured as the SEM of the other inverters on site: Enter Setup mode and select **Communication** → **RS485-1 Conf <M>** → **Slave List <#>** ("#" is the number of inverters

connected to it). A list of all the inverter serial numbers controlled by that master device is displayed. Scroll down to see the full list if there are more than 4.

3. Take picture(s) of this screen as shown below and provide to the utility as proof of valid commissioning.

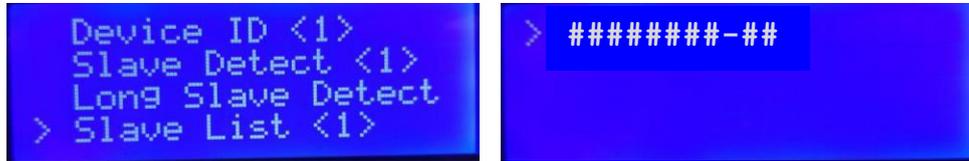


Figure 24: Example of slave list LCD screen

## Documentation for Verification

Be sure to supply screenshots with all of the following information to the utility. The figures referenced below are provided in the document in above sections.

Screenshot	Reference picture for inverters with SetApp configuration	Reference picture for inverters with a display
DSP1, DSP2, CPU	Figure 1: Information screen	Figure 2: Example of Versions LCD screen
Country Code	Figure 4: Status screen	Figure 5: Example of Status LCD screen showing country code
Zero Export Settings (if applicable)	Figure 15: Verifying Zero Export in the Meter status screen (Single Inverter); Or Figure 22: Verifying Zero Export in the Meter status screen (Multiple Inverters)	Figure 23: Example of site status LCD screen(Single Inverter); Or Figure 24: Example of slave list LCD screen (Multiple Inverters)

## Appendix A – Applicable Inverter Models

This document applies to the following inverter models. Note that any characters appended to the end of the model numbers do not represent a model number. These characters are used to describe various options and configurations included within an inverter model and are referred to as ordering part numbers. For example, in the ordering part number SE7600A-US*S02MNG2* the inverter model number is only SE7600A-US.

Single phase inverters		Three Phase Inverters
Non-HD-Wave inverters	Inverters with HD-Wave technology	
SE3000A-US	SE3000H-US	SE9KUS
SE3800A-US	SE3800H-US	SE10KUS
SE5000A-US	SE5000H-US	SE14.4KUS
SE6000A-US	SE6000H-US	SE17.3KUS
SE7600A-US	SE7600H-US	SE20KUS
SE10000A-US	SE10000H-US	SE30KUS
SE11400A-US	SE11400H-US	SE33.3KUS
		SE40KUS
		SE43.2KUS
		SE50KUS
		SE66.6KUS
		SE80KUS
		SE100KUS
		SE120KUS