Integrating with SolarEdge

1. Introduction

In 2019 SolarEdge has introduced a new feature that allows AC-coupling with alternative power sources (or non-grid power sources) such as the Victron Energy Inverter/chargers range, facilitating continuous solar production during outages or in off-grid scenarios.

When a solar inverter is operating concurrently with a non-grid source, it may be subjected to voltage and frequency fluctuations that exceed trip setpoints, which are preconfigured according to regional grid connection requirements. To support simultaneous operation while powered by a non-grid energy source, SolarEdge “Alternative Power Source mode” (APS) supports extended frequency & voltage operating range and frequency-power & voltage-power “off-grid” dedicated droops.

With this feature you can now build custom size AC Coupled Hybrid single-phase and three-phase systems with the capability to enable zero feed-in to the grid when in On-Grid mode and frequency shifting power control in Off-Grid situations.

For more information:
https://www.solaredge.com/sites/default/files/se-inverter-support-of-voltage-sources.pdf

The AC coupled system sizing guideline, Factor 1.0 rule, from Victron Energy for AC coupled system must be adhered to.

Note

This APS feature is only available for 3phase and 1phase HDwave inverters.

2. How to configure APS mode

Requirements:

- For SetApp (screenless) inverters: Firmware 4.8.24 or higher (US models currently lack Frequency Control, and are therefore not compatible)
- For LCD inverters: Firmware 3.25xx or higher
- Dry-contact for sensing the grid supply. (Victron’s auxiliary Dry-Out can also be used)
- SolarEdge grid meter (required for Zero feedback)

Configuration example 1: Use of external relay and dry contact, Single-phase configuration, see figure 1

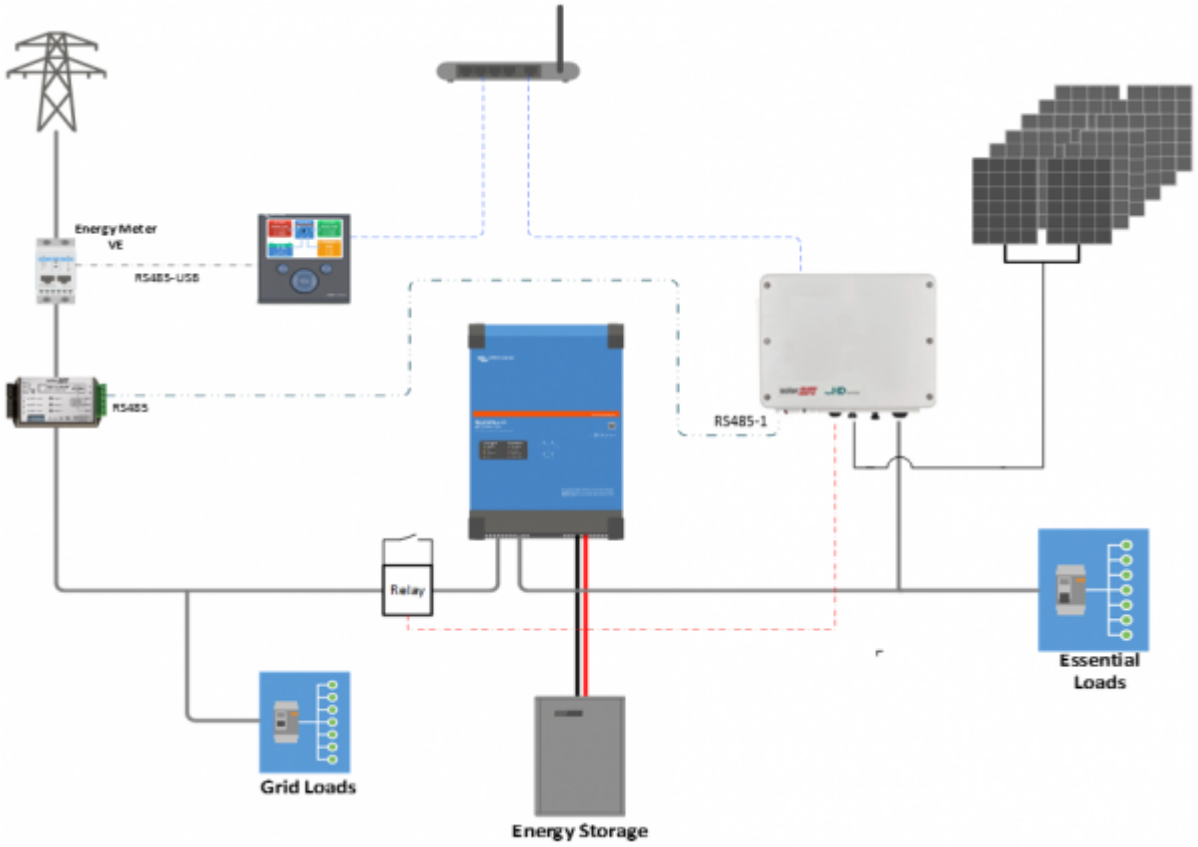


Figure 1

Three Phase configuration, Figure 2

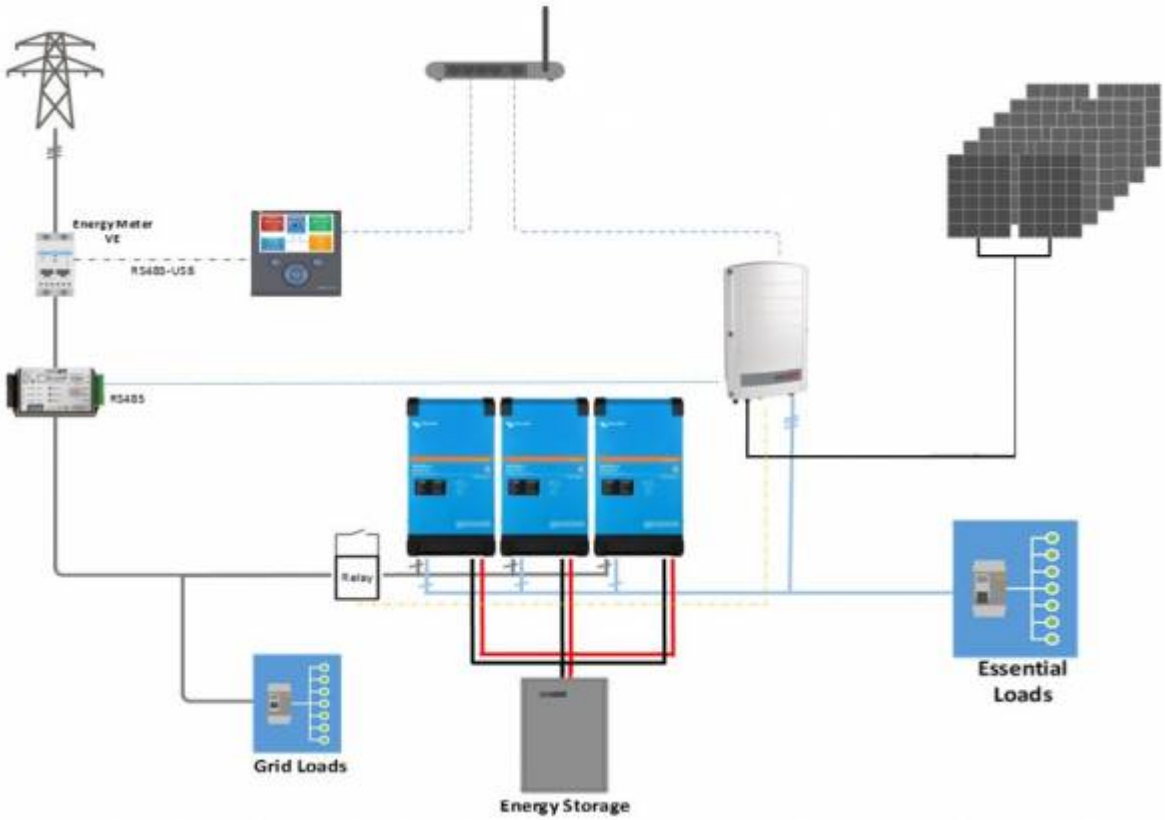


Figure 2

Configuration example 2: Use of Internal programmable relay K1,

Single-phase configuration, See Figure 3

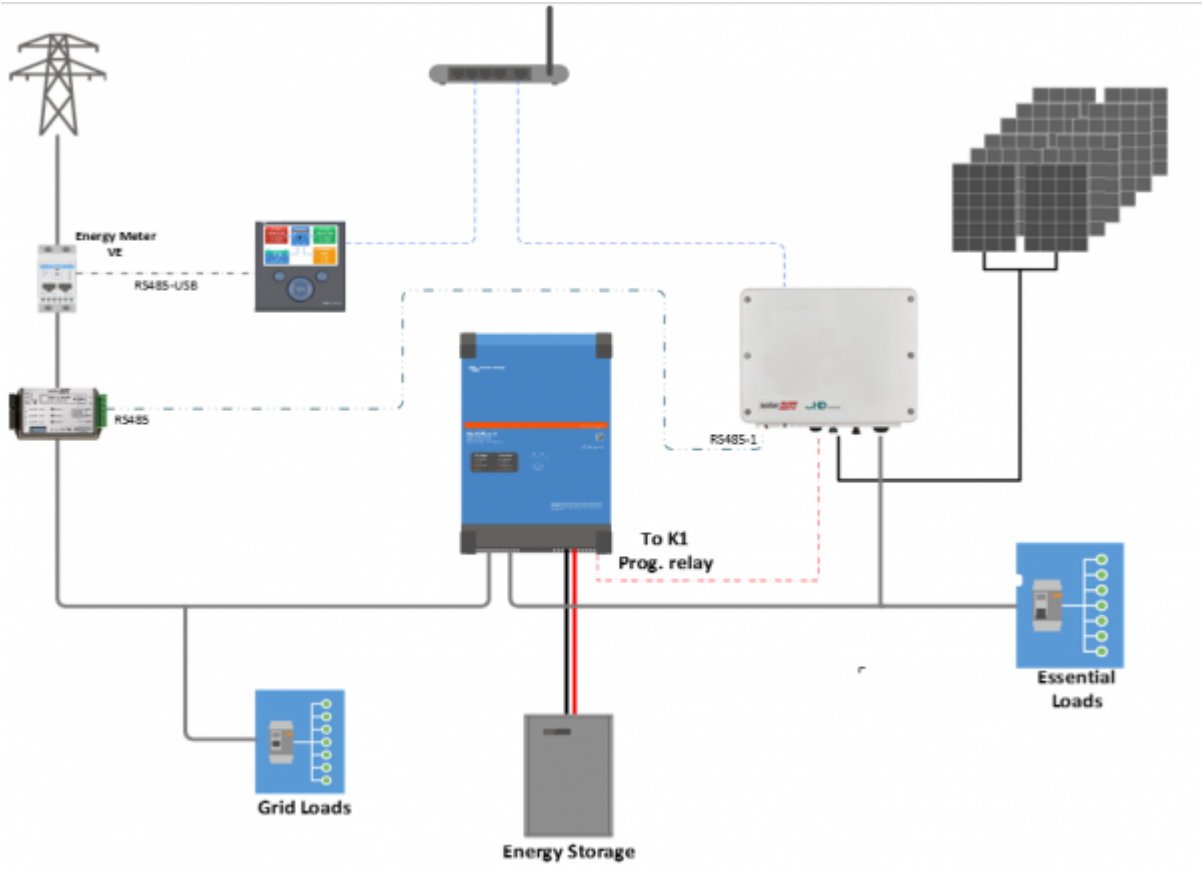


Figure 3

Three-phase configuration, See Figure 4

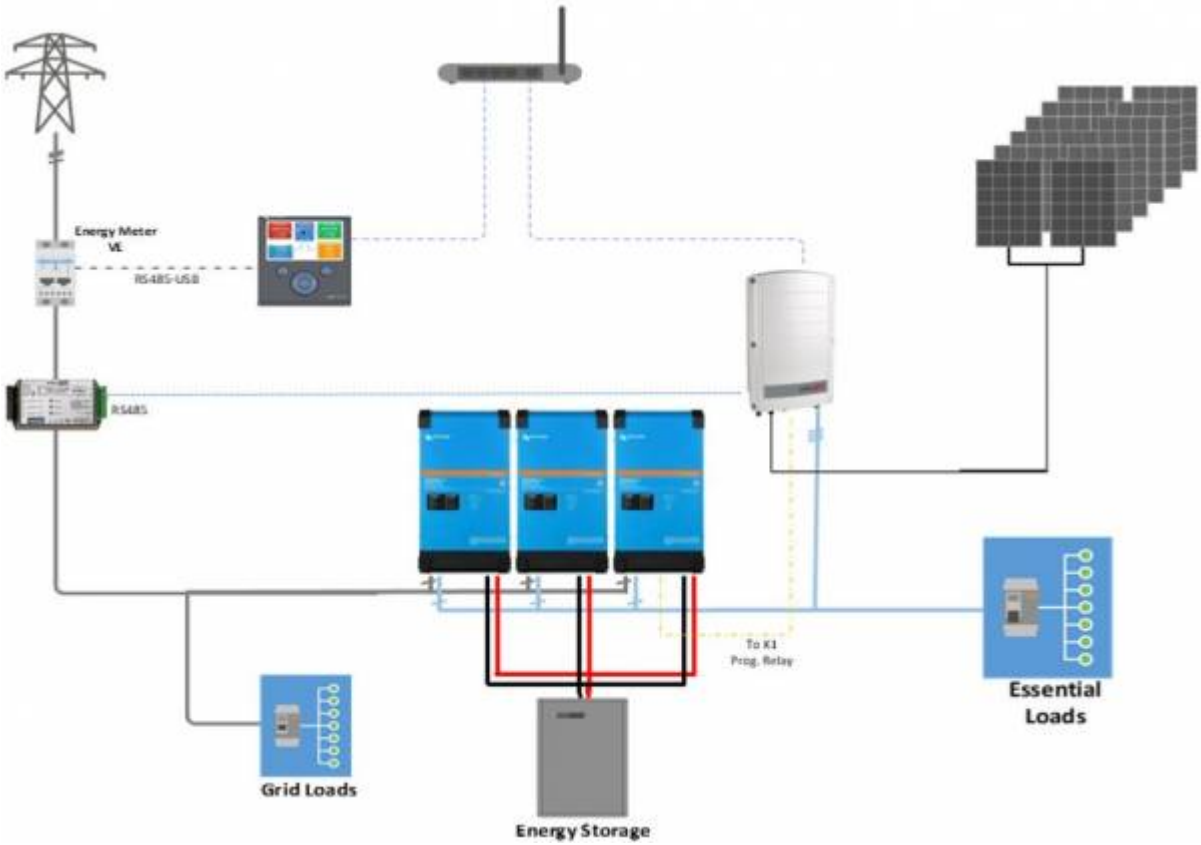


Figure 4

Programmable Aux relay Set up, single-phase configuration, See Figure 5

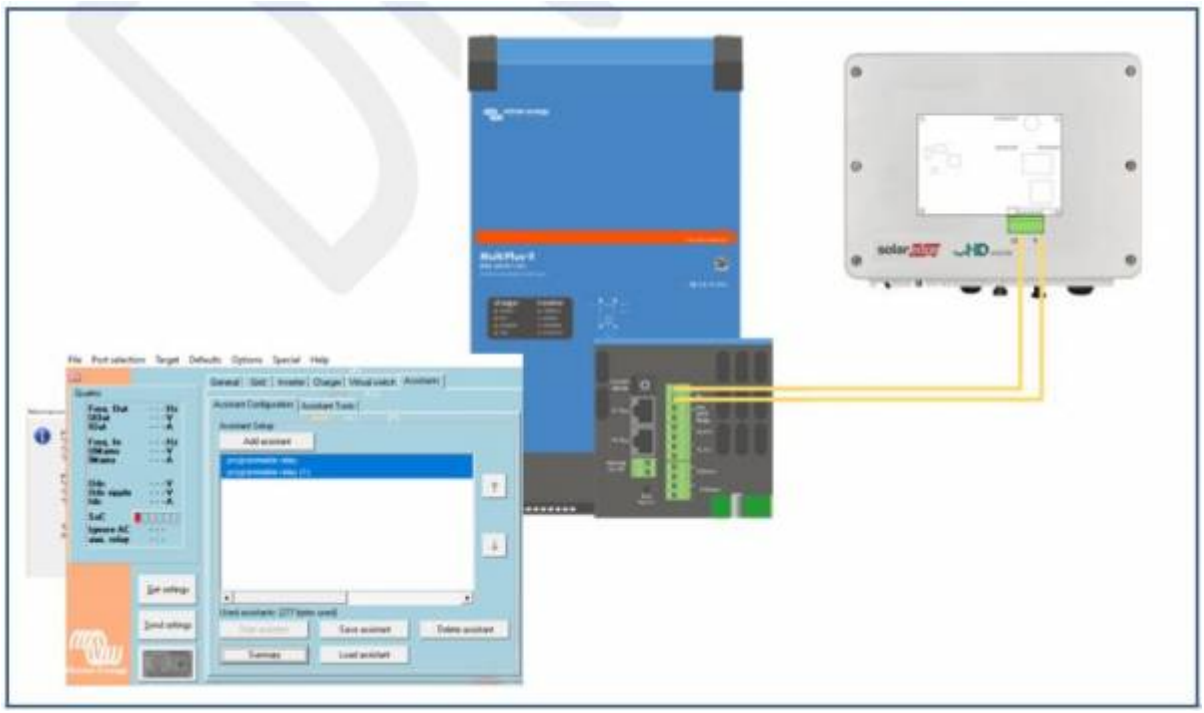


Figure 5

Programmable Aux relay Set up, three-phase configuration, See Figure 6

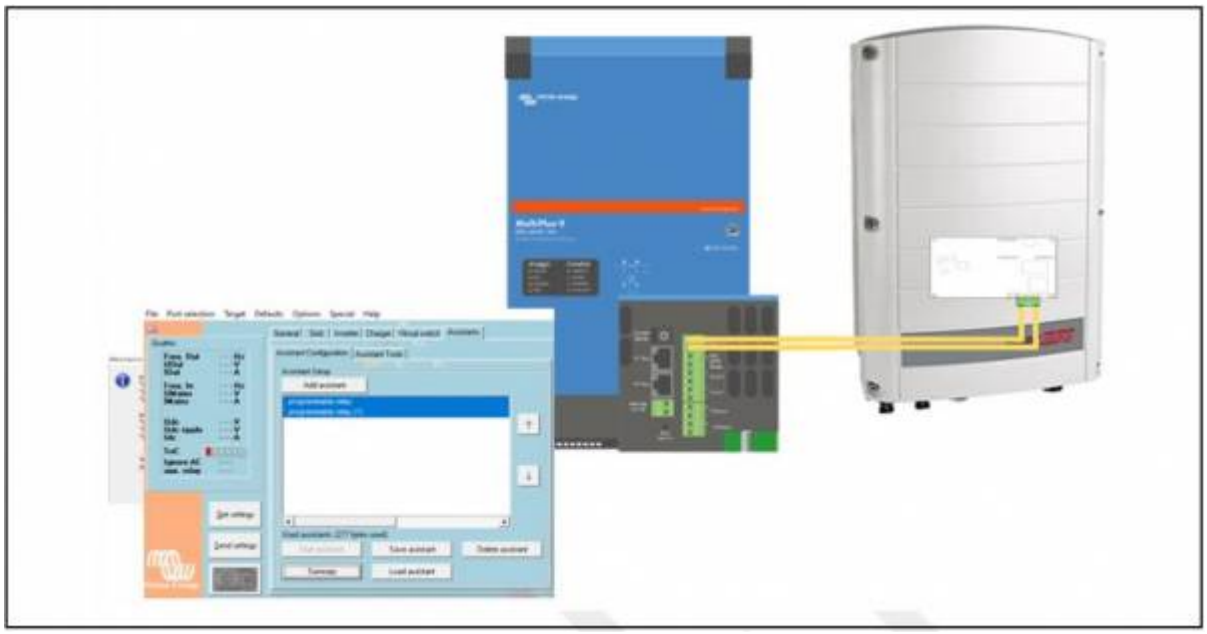


Figure 6

1. Dry contact installation

Install a dry contact, sensing the grid availability. Connect twisted pair wires from the dry contact terminals to the L1 and V terminals of the Communication Board inside the inverter, see figure 4.

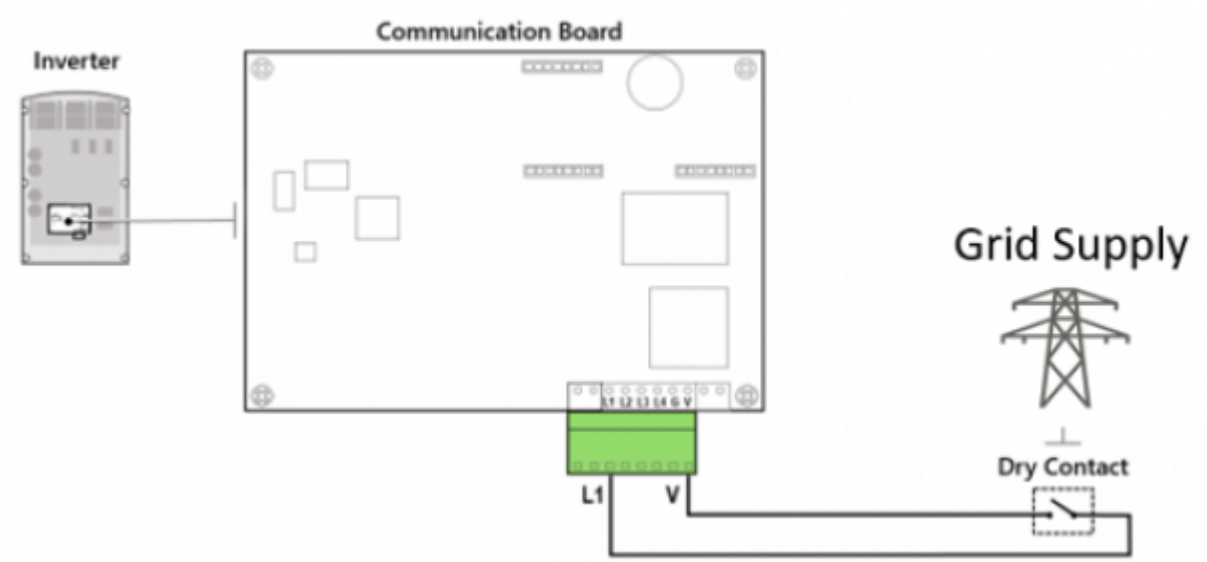


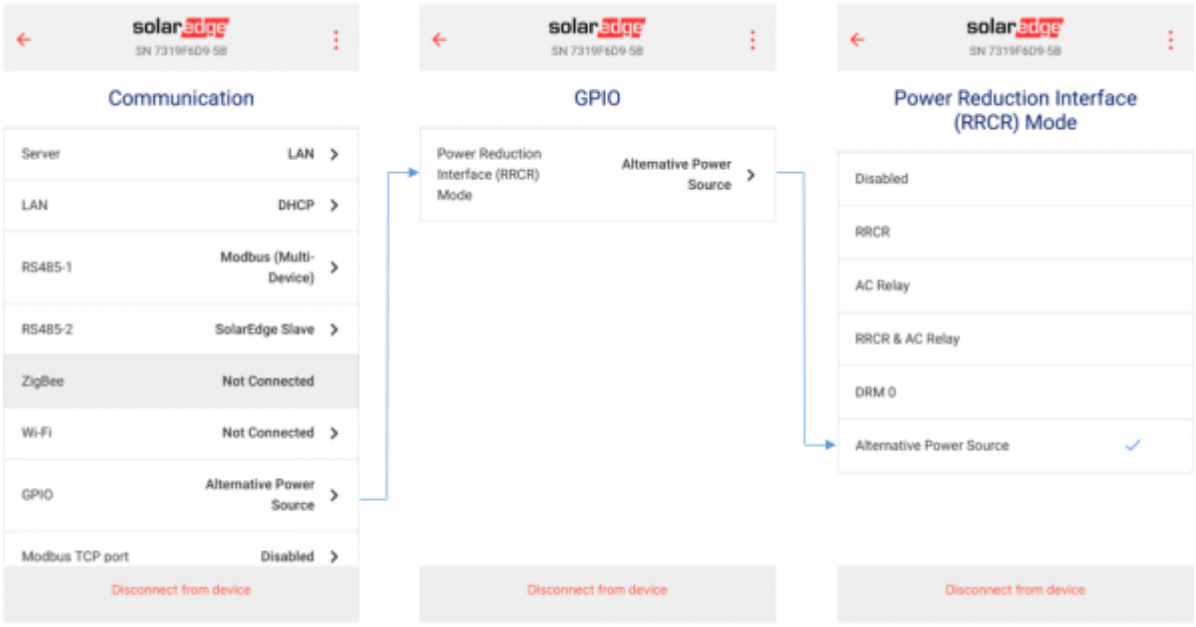
Figure 4

2. Alternative Power Source mode

Alternative Power Source mode should be configured on the master inverter. Once configured, the master inverter automatically sets all detected slave inverters to Alternative Power Source mode.

To Configure Alternative Power Source mode:

- Commissioning → Communication → GPIO → Power Reduction Interface (RRCR) Mode → Alternative Power Source.



Inverters with LCD

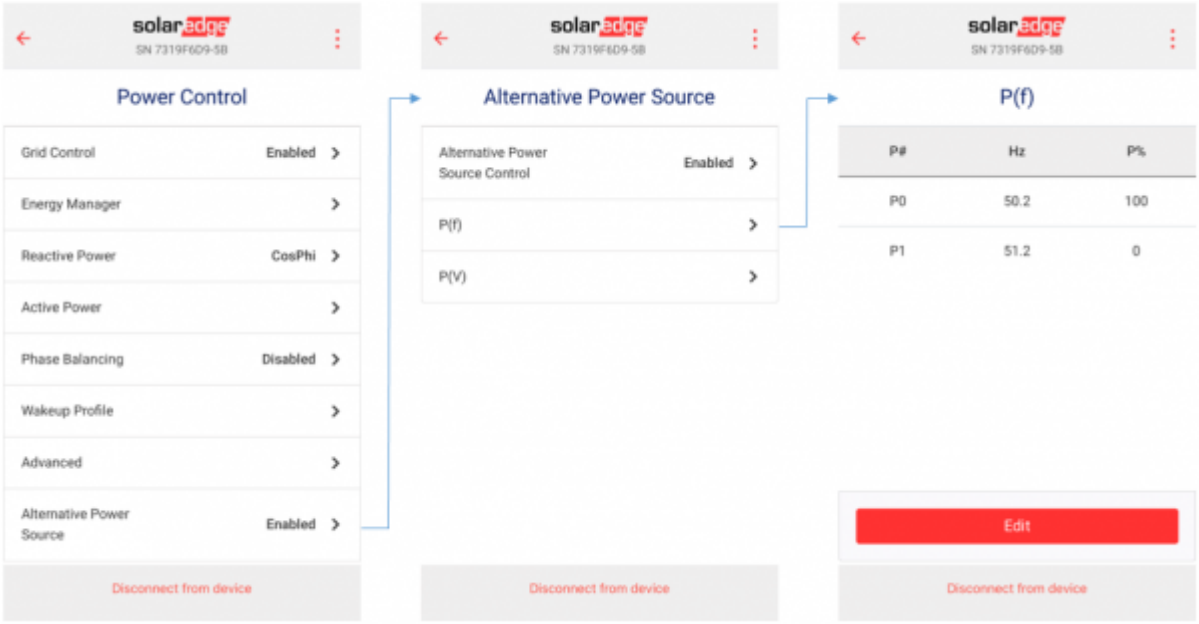
- Enter the inverter's setup menu using the SolarEdge Password.
- Communication → GPIO Conf → Device Type → Alternative Power Src.

3. How to configure Frequency Shifting

Important note: Please ensure the SolarEdge inverter and your VE.Bus Config is set up for the same frequency bandwidth.

1. Configure P(f) for APS

- Power Control → Alternative Power Source → P(f)
- Edit P0: 50.2Hz, 100% Power
- and P1: 51.2Hz, 0% Power



Inverters with LCD

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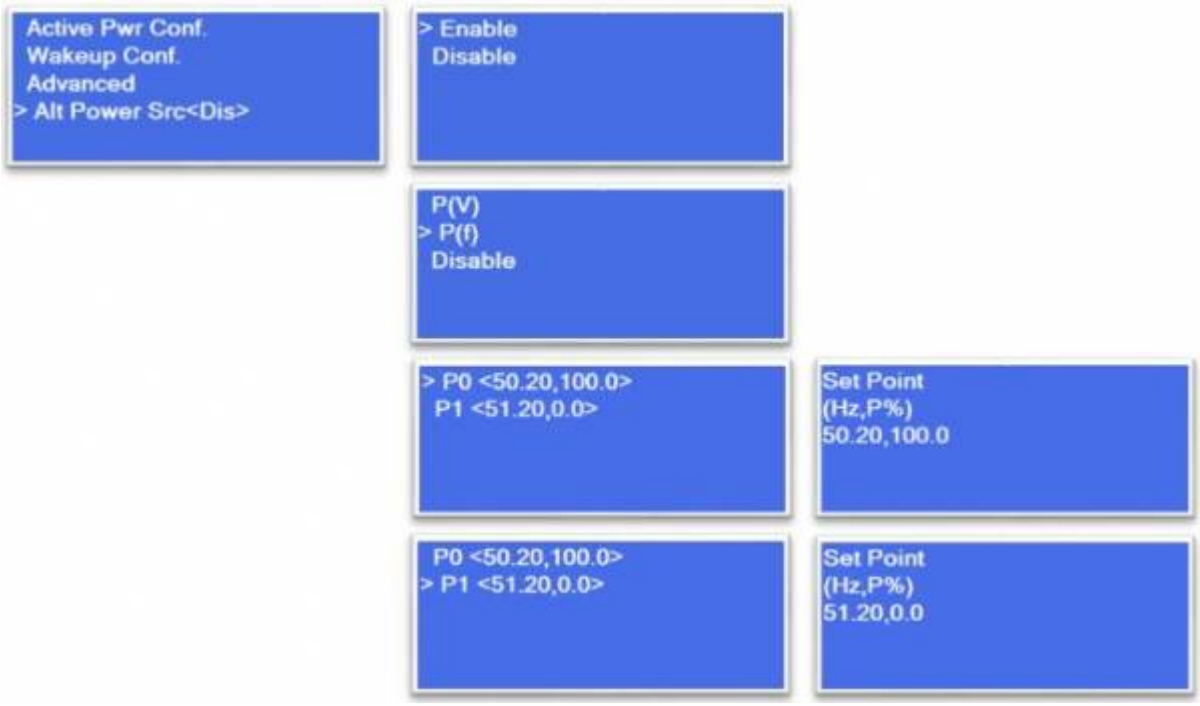


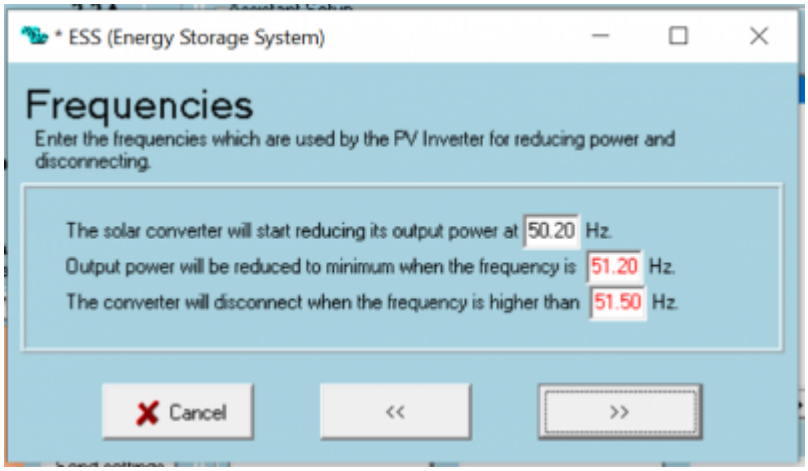
Note: In addition to the settings above it is important to contact SolarEdge Support to change a parameter in the backend to allow the frequency shifting with APS mode.

4. Set ESS assistance

The same bandwidth needs to be configured on VE.Bus Config for Victron

Start ESS assistance and set:

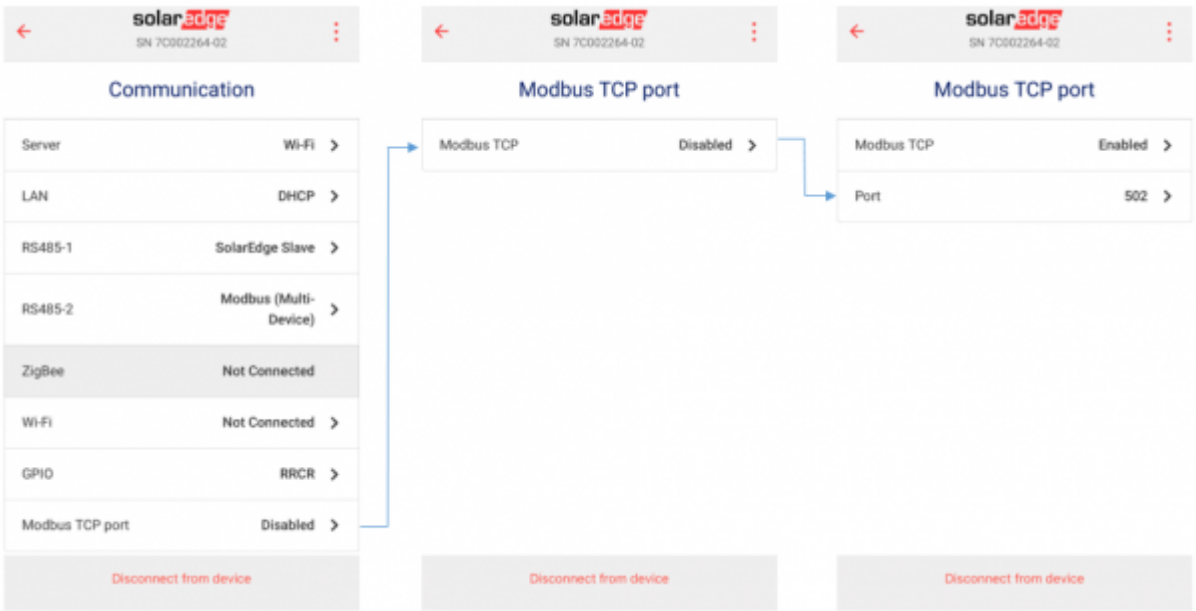
1. The solar converter will start reducing its output power at 50.2Hz
2. Output power will be reduced to a minimum when the frequency is 51.2Hz
3. The converter will disconnect when the frequency is higher than 51.5Hz



5 How to configure Sunspec to allow inverter monitoring via Victron GX device

1. Ensure that the GX Device and the SolarEdge system are both on the same LAN or WiFi network.
2. Enable ModbusTCP

- Communication → Modbus TCP port → Modbus TCP → Edit port to 502.

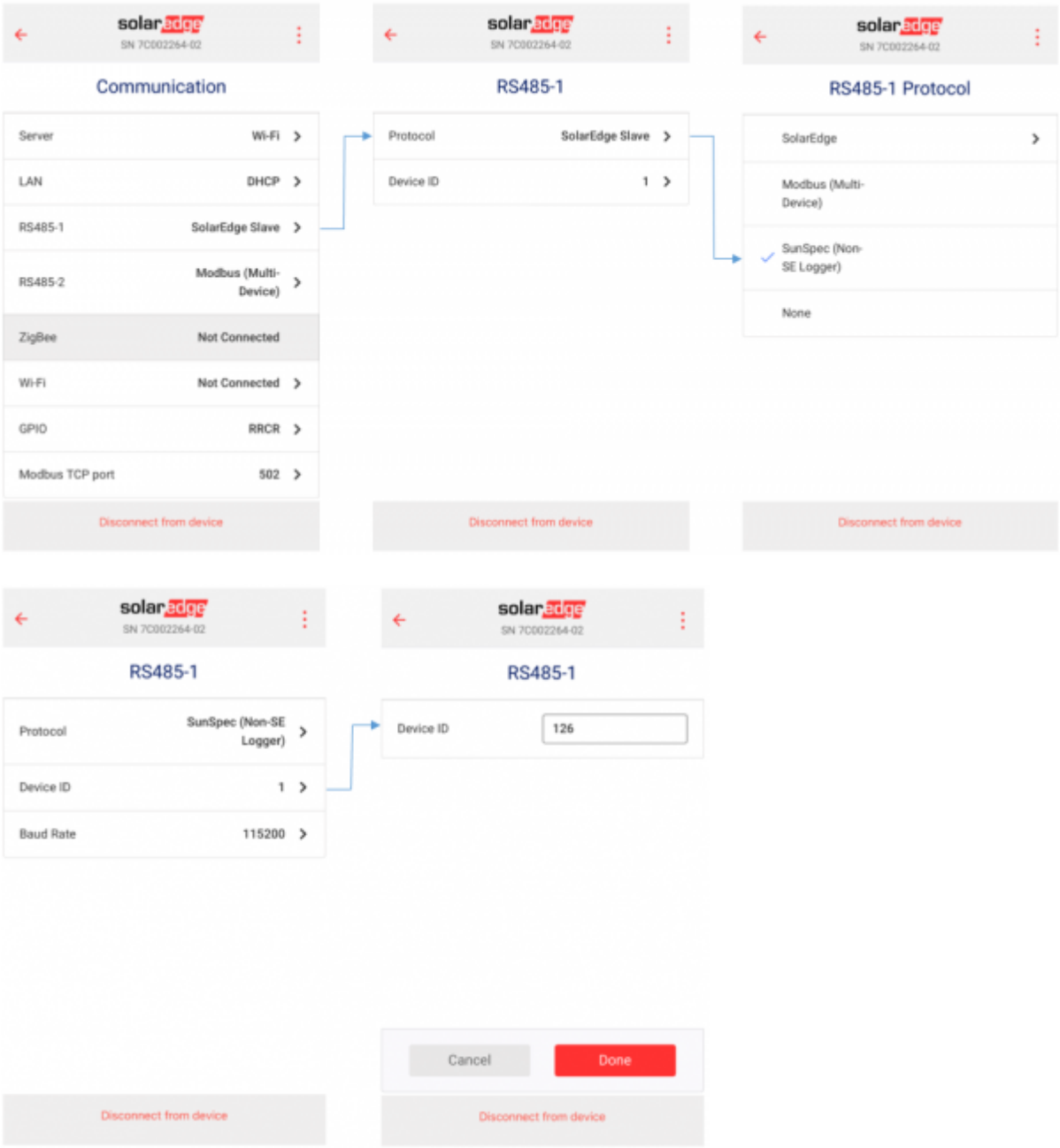


Inverters with LCD

- Communication → LAN Conf → Modbus TCP → TCP Port → Edit port to 502

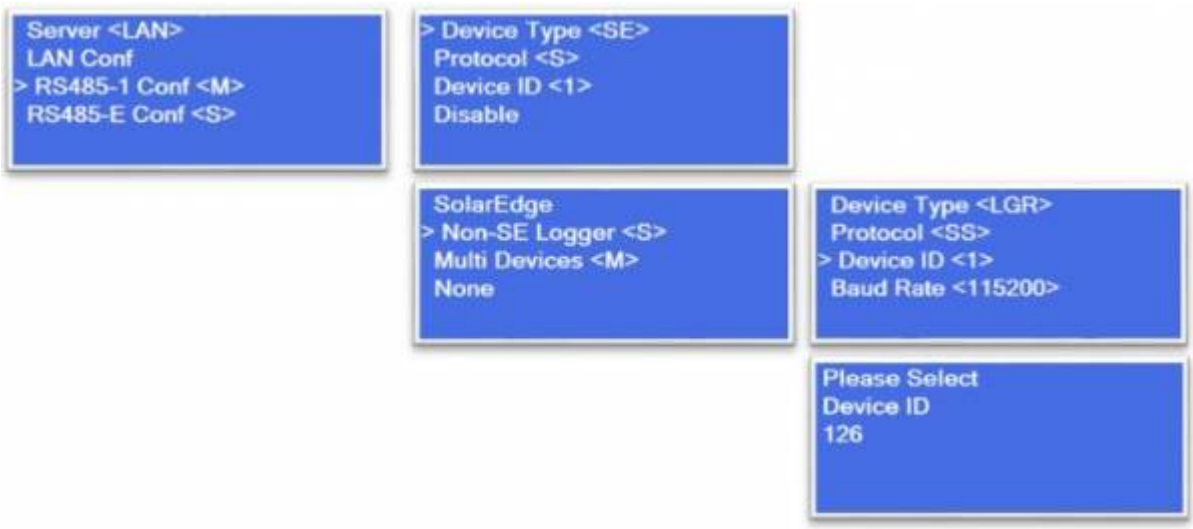
3. Enable SunSpec

- Communication → RS481 → Protocol → SunSpec (Non-SE Logger) → Device ID → Edit to 126



Inverters with LCD

- Communication → RS481 → Device Type → Non-SE Logger → Device ID → Edit to 126



Once you are done with the SunSpec setup you can re-configure RS485-1 for your SolarEdge Grid meter. The SolarEdge meter is still required for a zero export setup. The SunSpec setting will remain in the memory of the SolarEdge.

Note: It also advised editing the SolarEdge inverter's IP address to a static IP by disabling DHCP edit the desired IP address for your SolarEdge inverter and the search for the IP address on your DX Device. The SolarEdge inverter will appear on you GX devices screen

6 For multiple SolarEdge inverter integration

1. The SolarEdge inverter needs to be interconnected via RS485-1, with a Leader, follower configuration.
2. Only the Leader SolarEdge inverter requires the dry-relay contact connection. (section 1)
3. Only the Leader SolarEdge inverter requires the GPIO setting to Alternative Power Source configuration. (section 2)
4. Enable Grid Control for all the SolarEdge inverters on site. (Power control → Grid Control → Enable)
5. Setup the frequency shifting bandwidth for all the SolarEdge inverters on site. (section 3)
6. Each inverter requires its own TCP connection and IP address with the same SunSpec setting for each inverter. (Section 5)