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





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 \rightarrow Communication \rightarrow GPIO \rightarrow Power Reduction Interface (RRCR) Mode \rightarrow Alternative Power Source.

÷	SN 7319F6D9-58	:		÷	SN 7310FE	dge 09-58	÷		÷	Solar <mark>Buge</mark> SN 7319F6D9-58
с	ommunication				GPI	0			F	ower Reduction Interface (RRCR) Mode
Server	LAN	>	-	Power Reduction Interface (RRCR)	n)	Alternative Power	,	_	Dirabla	4
LAN	DHCP	>		Mode		Source	lource		Character	
00405.1	Modbus (Multi-								RRCR	
HS485-1	Device)	`							AC Rela	у
RS485-2	SolarEdge Slave	>							RRCR &	AC Relay
ZigBee	Not Connected								DRM 0	
Wi-Fi	Not Connected	>						4	Alternat	live Power Source 🗸
GPI0	Alternative Power Source	>								
Modbus TCP po	t Disabled	>								
Disconnect from device				D	isconnect fri	am device				Disconnect from device

- Enter the inverter's setup menu using the SolarEdge Password.
- Communication \rightarrow GPIO Conf \rightarrow Device Type \rightarrow 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 \rightarrow Alternative Power Source \rightarrow P(f)
- Edit P0: 50.2Hz, 100% Power
- and P1: 51.2Hz, 0% Power

÷	SN 7319F609-58	÷		÷	SN 7319F6D9-58		1	÷	SN 7319F6D9-58	1
	Power Control		-	Altern	ative Power S	ource			P(f)	
Grid Control	Enable	ed ≯		Alternative Pow Source Control	er	Enabled	>	P#	Hz	P%
Energy Man	ager	>		P(f)			>	P0	50.2	100
Reactive Por	wer CosP	hi >		800				P1	51.2	0
Active Powe	r	>		(1)			·			
Phase Balan	ncing Disable	d >								
Wakeup Pro	file	>								
Advanced		>								
Alternative F Source	Power Enable	d >							Edit	
	Disconnect from device			C	lisconnect from device	•			Disconnect from device	

- Power Control \rightarrow Alt Power Src \rightarrow P(f)
- Edit P0: 50.2Hz, 100% Power
- and P1: 51.2Hz, 0% Power

Active Pwr Conf. Wakeup Conf. Advanced > Alt Power Src <dis></dis>	> Enable Disable	
	P(V) > P(f) Disable	
	> P0 <50.20,100.0> P1 <51.20,0.0>	Set Point (Hz,P%) 50.20,100.0
	P0 <50.20,100.0> > P1 <51.20,0.0>	Set Point (Hz,P%) 51.20,0.0

<u>Note:</u> 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

🌤 * ESS (Energy Storage System)	-		×
Frequencies Enter the frequencies which are used by the PV Inverter for reduced disconnecting.	cing power	and	
The solar converter will start reducing its output power at 50. Output power will be reduced to minimum when the frequency The converter will disconnect when the frequency is higher th	20 Hz. vis 51.20 han 51.50	Hz. Hz.	
X Cancel <<	>>		

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 \rightarrow Modbus TCP port \rightarrow Modbus TCP \rightarrow Edit port to 502.

÷	solar.edge sn 70002264-02	÷	÷	solar<mark>edge</mark> sn 70002264-02		÷		÷	solar <mark>edge</mark> SN 70002264-02	
с	ommunication		,	Modbus TCP po	rt			N	lodbus TCP por	t
Server	Wi-Fi	>	Modbus TCP		Disabled	>		Modbus TCP		Enabled
LAN	DHCP	>					4	Port		502
RS485-1	SolarEdge Slave	>								
RS485-2	Modbus (Multi- Device)	>								
ZigBee	Not Connected									
Wi-Fi	Not Connected	>								
GPIO	RRCR	>								
Modbus TCP por	rt Disabled	>								
D	isconnect from device			Disconnect from devic	•				Disconnect from device	

• Communication \rightarrow LAN Conf \rightarrow Modbus TCP \rightarrow TCP Port \rightarrow Edit port to 502

Server <lan> > LAN Conf RS485-1 Conf <m> RS485-E Conf <s></s></m></lan>			
Set DNS Set Server Addr Set Server Port > Modbus TCP <dis></dis>	> TCP Port <dis> Disable</dis>	TCP Port 502	

3. Enable SunSpec

• Communication \rightarrow RS481 \rightarrow Protocol \rightarrow SunSpec (Non-SE Logger) \rightarrow Device ID \rightarrow Edit to 126

÷	solar<mark>.8000</mark> SN 70002264-02	8		÷	SN 70002264-02	÷		÷	solar<mark>adge</mark> sn 7002264-02	1
	Communication				RS485-1				RS485-1 Protocol	
Server	Wi-Fi	>		Protocol	SolarEdge Sl	we >	7		SolarEdge	>
LAN	DHCP	>		Device ID		1 >			Modbus (Multi- Device)	
RS485-1	SolarEdge Slave	>							SunSpec (Non-	
RS485-2	Modbus (Multi- Device)	>					-	Ĭ	SE Logger)	
ZigBee	Not Connected								nune	
Wi-Fi	Not Connected	>								
GPIO	RRCR	>								
Modbus TCP p	oort 502	>								
	Disconnect from device				Disconnect from device				Disconnect from device	
÷	solar.8096 sn 7000266-02 RS485-1	:		÷	solar <u>sogr</u> sw 70002264-02 RS485-1	:				
Protocol	SunSpec (Non-SE Logger)	>		Device ID	126					
Device ID	1	>	2							
Baud Rate	115200	>								
				С	ancel Done					
	Disconnect from device				Disconnect from device					

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• Communication \rightarrow RS481 \rightarrow Device Type \rightarrow Non-SE Logger \rightarrow Device ID \rightarrow 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)
- 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)

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