

Application Note - Three Phase Inverters for 3-Wire Grids (Europe & APAC)

Version History

- Version 1.10, June 2023:
 - Fixed links to data sheets
- Version 1.9, February 2023:
 - Added S1000 Commercial Optimizer
- Version 1.8, January 2022:
 - Updated PV system design table
 - Included “Five Optimizer Difference” rule for commercial optimizers
- Version 1.7, July 2022: Added commercial S-Series optimizers.
- Version 1.6, July 2021: Updated PV system design table

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Introduction

In some countries, the SolarEdge three phase inverters can be connected to 220/230 L-L 3-wire grids (inverter CPU version V3.2171 and above is required).



NOTE

If the 3-wire ratings need to appear on the inverter certification label, use inverters with Belgian part numbers: SExxK-**BE**xxlxxxx.

Prior to system installation, refer to the Supported Countries application note to confirm compatibility:

http://www.solaredge.com/sites/default/files/se_inverters_supported_countries.pdf

Installing without confirmation may void the inverter warranty.

SolarEdge three phase inverters* are equipped with two fuse holders and a fuse; the Three Phase Inverter with synergy technology has two fuse holders and a fuse in each of its units.

The position of the fuse configures the AC grid connection: 4-wire (3 Lines/PE/N) or 3-wire (3 Lines/ PE) grid connection. By default, the fuse is located in the 4-wire fuse holder of the inverter, and in the 3-wire fuse holder there is a plastic dummy fuse.

To set the inverter for 3-wire grid connection, you must move the fuse from the 4-wire fuse holder, marked as Y GRID, to the 3-wire fuse holder, marked as Δ GRID (see Figure 2).



CAUTION!

The only supported 3-wire grids are the 3 Lines / PE. Corner grounding is not supported. Connecting the inverter to other 3-wire grids may damage the inverter and will void the warranty.

Design Rules

Inverters connected to the delta grid will operate with a reduced AC power rating, due to the lower L-L grid voltage; for full specifications refer to the inverter datasheets:

- [SE7K-SE10K](#)
- [SE12.5K-SE17K](#)
- [SE25K-SE33.3K](#)
- [SE50K, SE55K, SE82.8K](#)
- [SE50K-SE100K](#)

* Part numbers: SExxK-Xxxx0xxxx, SExxK-Xxxx8xxxx

The following tables provide PV system design details for 3-wire grids. Footnotes appear on the following page.

PV System Design Using a SolarEdge Inverter ⁽¹⁾		SE6K-SE17K	SE17.5K-SE33.3K*		
Compatible Power Optimizers		P370, P500, S440, S500	P404, P405, P485, P505, P601, S500B	P370, P500, S440, S500	P404, P405, P485, P505, P601, S500B
Minimum String Length	Power Optimizers	10	8	10	8
	PV Modules				
Maximum String Length	Power Optimizers	25			
	PV Modules				
Maximum Continuous Power per String		6,000W			
Maximum Allowed Connected Power per String ⁽²⁾		7,200W			
		2 strings or more - 7800W		3 strings or more - 7800W	
Parallel Strings of Different Lengths or Orientations		Yes			

PV System Design Using a SolarEdge Inverter ⁽³⁾⁽⁴⁾⁽⁵⁾		SE25K (14.5KW), SE30K (17.3KW), SE27.6K*(16KW), SE33.3K* (19.2KW)	SE25K (14.5KW), SE27.6K*(16KW), SE30K (17.3KW), SE33.3K* (19.2KW)	
Compatible Power Optimizers		P605	P650, P701, P730, P801	P800p, P850, P860, P950, P960, P1100, S1000
Minimum String Length	Power Optimizers	8		
	PV Modules	8	15	15
Maximum String Length	Power Optimizers	30		
	PV Modules	30	60	60
Maximum Continuous Power per String		6,000W		7,200W
Maximum Allowed Connected Power per String ⁽²⁾		7,200W		8,400W
		3 strings or more - 7800W	4 strings or more - 7800W	3 strings or more - 9000W
Parallel Strings of Different Lengths or Orientations		Yes		
Maximum Difference in Number of Power Optimizers Allowed Between the Shortest and Longest String Connected to the Same Inverter Unit		5		

PV System Design Using a SolarEdge Inverter ⁽³⁾⁽⁴⁾⁽⁵⁾⁽⁶⁾		SE25K (14.5KW)	SE27.6K*(16KW), SE30K (17.3KW), 33.3K* (19.2KW),
Compatible Power Optimizers		S1200	
Minimum String Length	Power Optimizers	8	
	PV Modules	15	
Maximum String Length	Power Optimizers	30	
	PV Modules	60	
Maximum Continuous Power per String		8,000W	
Maximum Allowed Connected Power per String ⁽²⁾		1 String – 9,200W	1 or 2 Strings 9,200W
		2 Strings or more – 9,800W	3 Strings or more – 9,800W
Parallel Strings of Different Lengths or Orientations		Yes	
Maximum Difference in Number of Power Optimizers Allowed Between the Shortest and Longest String Connected to the Same Inverter Unit		5	

* The same rules apply for Synergy units of equivalent power ratings that are part of the modular Three Phase Inverter with Synergy Technology.

⁽¹⁾ It is not permitted to mix P404/P485/P505/P601/S500B with P370/P401/P500/S440/S500 in the same string.

⁽²⁾ To connect more STC power per string, design your project using the SolarEdge Designer.

⁽³⁾ P650/P701/P730/P801 can be mixed in one string only with P650/P701/P730/P801. P605 cannot be used together with any other Power Optimizer models in the same string.

⁽⁴⁾ For each string, a Power Optimizer may be connected to a single PV module if either one of the conditions below are met:

- Each Power Optimizer is connected to a single PV module.
- It is the only Power Optimizer connected to a single PV module in the string.

⁽⁵⁾ For SE16K and above, the minimum STC DC connected power should be 11 KW.

⁽⁶⁾ The S1200 cannot be used together with any other Power Optimizer models in the same string.

Installation Guidelines

- In a case of an odd number of PV modules in one string it is allowed to install one P650-P1100 Power Optimizer connected to one PV module.
- Power optimizers intended for use with two PV modules each (2:1 connection), can be used with a single PV module (1:1 connection), as long as the entire string uses 1:1 connections.
- You can create and/or verify your PV system design using the Designer tool, by selecting the 3-wire grid option in the project info page:

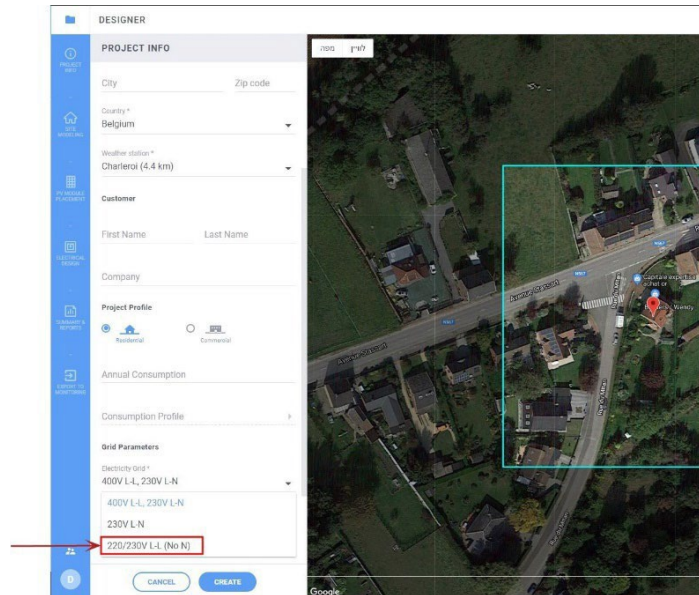


Figure 1: Selecting the 3-wire grid option in the Designer

Setting the Inverter to Support 3-Wire Grids

→ To set the inverter for 3-wire grid connection:



NOTE

This procedure is relevant for the following inverter models:

- 3 phase commercial inverter, part numbers SEXXK-XXXX0/8BXX4

This procedure is **not** relevant for inverters with the following part numbers:

- SEXXK-XXXXIBXX4



NOTE

For 3 phase inverters with Synergy technology, move the fuse in all inverter units.

1. Remove the inverter cover: Open the inverter cover's six Allen screws and carefully pull the cover horizontally before lowering it.
2. Identify the fuse locations and the markings as described in Figure 2.

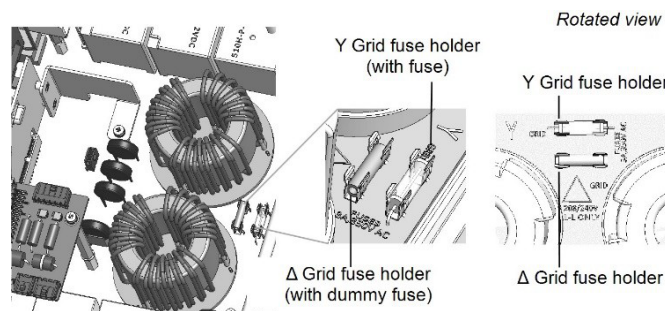


Figure 2: Fuse locations and markings

3. Remove the dummy fuse from the 3-wire grid fuse holder and set it aside.
4. Move the fuse from the 4-wire grid fuse holder to the 3-wire grid fuse holder.
5. Place the dummy fuse in the 4-wire grid fuse holder.
6. During system setup, set the country to the appropriate 3-wire grid option.



CAUTION!

Using the non-3-wire setting may result incorrect system operation

→ To set country, grid and language:

1. From the **Commissioning** screen select **Country & Grid**.
2. From the **Country & Grid** drop-down list, select the required option and tap **Set Country & Grid**.
3. From the **Language** drop-down list, select your language and tap **Set Language**.



CAUTION!

If the fuse was moved to support one of the grid types, do not connect the inverter to the other grid type without switching the fuse back to the correct holder. Connecting the inverter to grids when the fuse is incorrectly located may damage the inverter and void the warranty.

Safety Symbols Information

The following safety symbols are used in this document. Familiarize yourself with the symbols and their meaning before installing or operating the system.



WARNING

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **injury or loss of life**. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.



CAUTION!

Denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in **damage or destruction of the product**. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.



NOTE

Denotes additional information about the current subject.



IMPORTANT SAFETY FEATURE

Denotes information about safety issues.

Disposal requirements under the Waste Electrical and Electronic Equipment (WEEE) regulations:



NOTE

Discard this product according to local regulations or send it back to SolarEdge.

Support Contact Information

If you have technical problems concerning SolarEdge products, please contact us:



<https://www.solaredge.com/service/support>

Before contact, make sure to have the following information at hand:

- Model and serial number of the product in question.
- The error indicated on the product SetApp mobile application LCD screen or on the monitoring platform or by the LEDs, if there is such an indication.
- System configuration information, including the type and number of modules connected and the number and length of strings.
- The communication method to the SolarEdge server, if the site is connected.
- The product's software version as it appears in the ID status screen.