



Manufacturer's declaration for the connection of a type A generating installation to the low-voltage grid in Sweden that complies with all requirements according to Regulation (EU) 2016/631 and the complementary Swedish Regulation EIFS 2018:2.

SUNNY ISLAND: SI4.4M-13 | SI6.0H-13 | SI8.0H-13

The "Energimarknadsinspektionens föreskrifter om fastställande av generellt tillämpliga krav för nätslutning av generatorer" (EIFS 2018:2) directive dated 5 December 2018 describes the technical requirements for PV systems on the utility grid. Sections 1-9 of Chapter 3 define the minimum technical requirements for Type A (0.8 kW to 1.5 MW) electricity generation plants.

The requirements for configuring frequency response settings below are taken from the Energy Market Inspection Regulation EIFS 2018: 2 (valid from 2019-04-27), EU Commission Regulation 2016/631 (RFG) and current Swedish electricity standard SSEN 50549-1 (valid from 2019-05-16, replaces SS-EN 50438 2014 edition 2).

This document describes how to set the parameters for compliance with the Directive for Type A. The parameters may only be set by qualified persons.

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Protection Settings

The inverter can be configured with the settings below	Recommended value		Set value	
	Time	Level	Time	Level
Over voltage (step 2)	60s	253,0V	60 s	253,0 V
Over voltage (step 1)	0,2s	264,5V	0,2 s	264,5 V
Under voltage	0,2s	195,5V	0,2 s	195,5 V
Overfrequency	0,5s	>51,5Hz	0,1s	51,5
Underfrequency	0,5s	<47,5Hz	0,1s	47,5
Protection from unwanted island operation	0,5s	on / off	0,5 s	on

Table 1: Protection Setting

Frequency response

The following configuration requirements for frequency response settings are taken from the Swedish Energy Market Inspectorate's regulation EIFS 2018:2, Commission Regulation (EU) 2016/631 (RFG) and the applicable Swedish standard SS-EN 50549-1. All requirements are mandatory unless otherwise stated.

The inverter meets the following requirements	
	Reference
The inverter meets the requirement to remain connected within the following frequency ranges: • Not less than 30 minutes for frequency 47,5 – 49,0 Hz • Unlimited for frequency range 49,0 – 51,0 Hz • Not less than 30 minutes for frequency range 51,0 – 51,5 Hz	EIFS 2018:2 chapter 3 (1)
The inverter meets the requirement to remain connected to the network and operate with a rate of change of frequency up to 2.0 Hz/s ¹	EIFS 2018:2 chapter 3 (2)
The inverter meets the requirement to reduce its active power output when the frequency exceeds 50.5 Hz	EIFS 2018:2 chapter 3 (3)
The droop ² setting is 8%	EIFS 2018:2 chapter 3 (4)
Active power output from the inverter is reduced by a maximum of 3.0 percent per Hz at frequencies below 49.0 Hz	EIFS 2018:2 chapter 3 (7)
The inverter is automatically reconnected only within the frequency range 47.5 - 50.1 Hz: • Connection occurs only if the network frequency has been within this range continuously for at least 3 minutes	EIFS 2018:2 chapter 3 (8)
The inverter meets the requirement concerning the increase of active power output during automatic connection as follows: • < 49.9 Hz - rate of increase of active power output unlimited • 49.9-50.1 Hz - rate of increase of active power output is limited to 10 per -cent of nominal power output per minute • > 50.1 Hz - there is no increase of active power output	EIFS 2018:2 chapter 3 (9)

Table 2: Frequency response

¹ The value of the rate of change of frequency must be measured at the grid connection point and calculated over a period of 0.5 s.

² Droop means the ratio of a change of frequency to the change in power output, expressed in percentage terms. The change of frequency is expressed as a ratio between the actual frequency and the nominal frequency. The power output is expressed as a ratio between the nominal power and the power output in case of overfrequency in the network. For regulation of the power output based on overfrequency, the droop is calculated according to the installed power of the plant. According to section 6 of the EIFS 2018:2.

Data and measured values: SI4.4M-13

Type designation/Model number		SI4.4M-13		
Rated power (at 230 V, 50 Hz)		3.300W		
Firmware (version number)		V3.20.08.R and higher		
Energysource		Battery		
Connection	Singlephase	Three phase	Power factor (cos φ)	0,8... 1 ... 0,8 overexited underexited
Can be combined with battery storage	yes	The inverter can be used for backup power (island operation)		yes
Information about flicker and harmonics emissions				
The inverter meets the requirements below			yes	
Electricity quality data		Value		
Flicker values	Pst	0,07	≤ 16 A Calculated according to SS-EN 61000-3-3	
	Plt	0,07	16 – 75 A Calculated according to SS-EN 61000-3-11 > 75 A Calculated according to SS-EN 61400-21	
Harmonics max 16 A	Meets SS-EN 61000-3-2			
Harmonics 16-75 A	Meets SS-EN 61000-3-12			
Harmonics > 75 A	Interharmonics and individual current harmonics must be reported separately in Appendix 1			
Requirement regarding logic interface according to EU Commission Regulation 2016/631 article 13.6				
The inverter is equipped with a logic interface that allows remote control			yes	no
CE-marking				
The inverter is CE-marked			yes	no
Frequency response				
the lowest active power output (in kW) to which the inverter can be down- regulated in case of overfrequency:				0kW

Table 3: Values SI4.4M-13

Data and measured values: SI6.0H-13

Type designation/Model number		SI6.0H-13		
Rated power (at 230 V, 50 Hz)		4.600W		
Firmware (version number)		V3.20.08.R and higher		
Energysource		Battery		
Connection	Singlephase	Three phase	Power factor (cos φ)	0,8... 1 ... 0,8 overexited underexited
Can be combined with battery storage	yes	The inverter can be used for backup power (island operation)		yes
Information about flicker and harmonics emissions				
The inverter meets the requirements below			yes	
Electricity quality data		Value		
Flicker values	Pst	0,107	≤ 16 A Calculated according to SS-EN 61000-3-3	
	Plt	0,107	<u>16 – 75 A Calculated according to SS-EN 61000-3-11</u> > 75 A Calculated according to SS-EN 61400-21	
Harmonics max 16 A	Meets SS-EN 61000-3-2			
Harmonics 16-75 A	Meets SS-EN 61000-3-12			
Harmonics > 75 A	Interharmonics and individual current harmonics must be reported separately in Appendix 1			
Requirement regarding logic interface according to EU Commission Regulation 2016/631 article 13.6				
The inverter is equipped with a logic interface that allows remote control			yes	no
CE-marking				
The inverter is CE-marked			yes	no
Frequency response				
the lowest active power output (in kW) to which the inverter can be down- regulated in case of overfrequency:				0kW

Table 4: Values SI6.0H-13

Data and measured values: SI8.0H-13

Type designation/Model number		SI8.0H-13		
Rated power (at 230 V, 50 Hz)		6.000W		
Firmware (version number)		V3.20.08.R and higher		
Energysource		Battery		
Connection	Singlephase	Threephase	Power factor (cos φ)	0,8... 1 ... 0,8 overexcited underexcited
Can be combined with battery storage	yes	The inverter can be used for backup power (island operation)		yes
Information about flicker and harmonics emissions				
The inverter meets the requirements below			yes	
Electricity quality data		Value		
Flicker values	Pst	0,147	≤ 16 A Calculated according to SS-EN 61000-3-3	
	Plt	0,133	<u>16 – 75 A Calculated according to SS-EN 61000-3-11</u> > 75 A Calculated according to SS-EN 61400-21	
Harmonics max 16 A	Meets SS-EN 61000-3-2			
Harmonics 16-75 A	Meets SS-EN 61000-3-12			
Harmonics > 75 A	Interharmonics and individual current harmonics must be reported separately in Appendix 1			
Requirement regarding logic interface according to EU Commission Regulation 2016/631 article 13.6				
The inverter is equipped with a logic interface that allows remote control			yes	no
CE-marking				
The inverter is CE-marked			yes	no
Frequency response				
the lowest active power output (in kW) to which the inverter can be down- regulated in case of overfrequency:				0kW

Table 5: Values SI8.0H-13

Hereby it is certified that the above information is correct and that technical documentation that support the stated information, values and settings can be presented upon request.

Niestetal, 2022-06-22
SMA Solar Technology AG

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