



**BUREAU
VERITAS**

Certificate of compliance

Applicant: Solarmax Produktions GmbH
Zur Schönhalde 10
89352 Ellzee
Germany

Product: SOLAR (PV) Grid INVERTER

Model: 17SHT, 20SHT, 22SHT, 25SHT, 28SHT, 30SHT

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN 50549-1:2019 for photovoltaic systems with a three-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Applied rules and standards:

EN 50549-1:2019

Requirements for parallel connection of installations with distribution networks - Part 1: Connection to an LV distribution network - Production of installations up to and including Type B

- 4.4 Normal operating range
- 4.5 Immunity to disturbances
- 4.6 Active response to frequency deviation
- 4.7 Power response to voltage variations and voltage changes
- 4.8 EMC and power quality
- 4.9 Interface protection
- 4.10 Connection and starting to generate electrical power
- 4.11 Ceasing and reduction of active power on set point
- 4.13 Requirements regarding single fault tolerance of interface protection system and interface switch

EN 50438:2013

Requirements for micro-generating plants to be connected in parallel with public low-voltage distribution networks

At the time of issue of this certificate the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.

Report number: PV200228N028 **Certification Program:** NSOP-0032-DEU-ZE-V01
Certificate number: U20-0552 **Date of issue:** 2020-07-07

Certification body



Thomas Lammel



Certification body Bureau Veritas Consumer Products Services Germany GmbH accreditation to DIN EN ISO/IEC 17065

A partial representation of the certificate requires the written approval of Bureau Veritas Consumer Products Services Germany GmbH

Appendix

Extract from test report according to EN 50549-1 Nr. PV200228N028

Type Approval and declaration of compliance with the requirements of EN 50549-1.

Manufacturer / applicant:	Solarmax Produktions GmbH Zur Schönhalde 10 89352 Ellzee Germany
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Micro-generator Type	SOLAR (PV) Grid INVERTER			
	17SHT	20SHT	22SHT	25SHT
MPP DC voltage range [V]	180-960			
Input DC voltage range [V]	Max.1000			
Input DC current [A]	50 (2*25)			75 (2*37.5)
Output AC voltage [V]	380V/400V/415Vac,3W+N+PE, 50Hz/60Hz			
Output AC current [A]	Max. 28,3	Max. 33,5	Max. 35	Max. 40
Output power [kVA]	18,7	22,0	24,2	27,5

	28 SHT	30SHT		
MPP DC voltage range [V]	180-960			
Input DC voltage range [V]	Max.1000			
Input DC current [A]	75 (2*37.5)			
Output AC voltage [V]	380V/400V/415Vac,3W+N+PE, 50Hz/60Hz			
Output AC current [A]	Max. 45	Max. 48		
Output power [kVA]	30,8	33,0		

Firmware version	3001
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Measurement period:	2020-02-28 - 2020-05-20
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Description of the structure of the power generation unit:
 The power generation unit is equipped with a PV and line-side EMC filter. The power generation unit has no galvanic isolation between DC input and AC output. Output switch-off is performed with single-fault tolerance based on two series-connected relays in each line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.

Appendix

Extract from test report according to EN 50549-1

Nr. PV200228N028

Setting of the interface protection:

Parameter	Max. disconnection time	Min. operate time	Trip value
Over voltage (stage 1) ^a	3s	-	230V +10% (253V)
Over voltage (stage 2)	0,2s	0,1s	230V +15% (264,5V)
Under voltage	1,5s	1,2s	230V -15% (195,5V)
Over frequency	0,5s	0,3s	50Hz +4% (52Hz)
Under frequency	0,5s	0,3s	50Hz -5% (47,5Hz)
Reconnection settings for voltage (normal operational startup)	$0,85V_n (195,5V) \leq V \leq 1,10V_n (253V)$		
Reconnection settings for frequency (normal operational startup)	$49,5Hz \leq f \leq 50,2Hz$		
Reconnection time (normal operational startup)	$\geq 60s$		
Reconnection settings for voltage (automatic reconnection after tripping)	$0,85V_n (195,5V) \leq V \leq 1,10V_n (253V)$		
Reconnection settings for frequency (automatic reconnection after tripping)	$49,5Hz \leq f \leq 50,2Hz$		
Reconnection time (automatic reconnection after tripping)	$\geq 60s$		
Active power gradient after reconnection	10% $P_{E_{max}}$ / per minute		
Active power delivery at under frequency	electronic inverter, no active power reduction		
Power response to over frequency (frequency / droop s)	50,2Hz / 5%		
Permanent DC-injection	0,5% of rated inverter output current or 20mA		
Rate of change of frequency (ROCOF)	2Hz/s		
Loss of mains according EN 62116 (LoM)	2,0s		

Note:

^a Over voltage – stage1: 10 min-mean-value corresponding to EN 50160.

Default interface setting according to EN 50438:2013 are used.

The settings of the interface protection are password protected adjustable.

In case the above stated generators are used with an external protection device, the protection settings of the inverters are to be adjusted according to the manufacturer's declaration.

The above stated generators are tested according to the requirements in the EN 50549-1:2019. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements of the EN 50549-1:2019.