



**BUREAU
VERITAS**

Certificate of compliance

Applicant: KOSTAL Solar Electric GmbH
Hanferstraße 6
79108 Freiburg im Breisgau
Germany

Product: Grid-tied photovoltaic (PV) inverter

Model: PLENTICORE 3.0 G2
PLENTICORE 4.2 G2
PLENTICORE 5.5 G2
PLENTICORE 7.0 G2
PLENTICORE 8.5 G2
PLENTICORE 10 G2

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with DANSK ENERGI:2021 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:

DANSK ENERGI:2019

Technical requirements for connection of power-generating plants to the low-voltage grid (≤ 1 kV) Type A

- 4.1 Tolerance of Frequency and voltage deviations
- 4.2 Start-up and reconnection of a power-generating plant
- 4.3 Active power control
- 4.4 Reactive power control
- 4.5 Protection
- 4.6 Power Quality

DIN V VDE V 0126-1-1:2006-02 (4.1 Functional safety)

Automatic disconnection device between a generator and the public low-voltage grid

At the time of issue of this certificate, the representative product listed above corresponds to the stated rules and standards.

Report number: 19TH0374_Hybrid-G2-DK1/DK2_0 **Certification Program:** NSOP-0032-DEU-ZE-V01
Certificate number: U22-0598 **Date of issue:** 2022-10-05

Certification body



Zertifizierungsstelle der Bureau Veritas Consumer Products Services Germany GmbH akkreditiert nach DIN EN ISO/IEC 17065

Prüflabor akkreditiert nach DIN EN ISO/IEC 17025

Eine auszugsweise Darstellung des Zertifikats bedarf der schriftlichen Genehmigung der Bureau Veritas Consumer Products Services Germany GmbH

Type Verification Test Report

Extract from test report according to DANKS ENERGI

Nr. 19TH0374_Hybrid-G2-DK1/DK2_0

Type Approval and declaration of compliance with the requirements of DANKS ENERGI:2019

Manufacturer / applicant:	KOSTAL Industrie Elektrik GmbH Lange Eck 11 58099 Hagen Germany			
Micro-generator Type	Grid-tied photovoltaic inverter			
Rated values	PLENTICORE plus 3.0 G2	PLENTICORE plus 4.2 G2	PLENTICORE plus 5.5 G2	PLENTICORE plus 7.0 G2
MPP DC voltage range [V]	180 - 720	180 - 720	225 - 720	290 - 720
Input DC voltage range [V]	120 - 1000	120 - 1000	120 - 1000	120 - 1000
Input DC current [A]	3x 13,0	3x 13,0	3x 13,0	3x 13,0
Output AC voltage [V]	3N~, 400V, 50Hz	3N~, 400V, 50Hz	3N~, 400V, 50Hz	3N~, 400V, 50Hz
Output AC current [A]	4,81	6,74	8,82	11,23
Output power [VA]	3000	4200	5500	7000
Rated values	PLENTICORE plus 8.5 G2	PLENTICORE plus 10 G2	--	--
MPP DC voltage range [V]	345 - 720	405 - 720	--	--
Input DC voltage range [V]	120 - 1000	120 - 1000	--	--
Input DC current [A]	3x 13,0	3x 13,0	--	--
Output AC voltage [V]	3N~, 400V, 50Hz	3N~, 400V, 50Hz	--	--
Output AC current [A]	13,63	16,04	--	--
Output power [VA]	8500	10000	--	--
Firmware version	02.04			
Measurement period:	2019-05-31 to 2019-09-14, 2022-05-25 to 2022-06-09			

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 line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.

Setting of the parameter values for DK1 and DK2:

	Settings for DK1	Setting for DK2
	LFSM-O	
Threshold frequency [Hz]	50,2	50,5
Droop [% of P _n]	5 % (40 % P _n / Hz)	4 % (50 % P _n / Hz)
Intentional Delay	500 ms	500 ms
	Reactive Power	
	Q fix	Q fix
Active/disabled [On/Off]	On	On
Q setpoint [VAr]	0	0
	cos φ fix	
Active/disabled [On/Off]	Off	Off
PF setpoint [PF]	1	1

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	Settings for DK1	Setting for DK2
	cos ϕ (P)	
Active/disabled [On / Off]	Off	Off
cos ϕ (P) P1 [% of P_n]	0	0
cos ϕ (P) PF1 [PF]	1	1
cos ϕ (P) P2 [% of P_n]	50	50
cos ϕ (P) PF2 [PF]	1	1
cos ϕ (P) P3 [% of P_n]	100	100
cos ϕ (P) PF3 [PF]	0,9 inductive	0,9 inductive
cos ϕ (P) Lock _{in} [% of U_n]	105	105
cos ϕ (P) Lock _{out} [% of U_n]	100	100
	Connection and Reconnection	
Gradient [% of P_n / min]	20	20
Observation time [s]	180	180
U_{min} [% of U_n]	85	85
U_{max} [% of U_n]	110	110
f_{min} [Hz]	47,5	47,5
f_{max} [Hz]	50,2	50,5
	System Protection	
$f >$ [s]	0,2	0,2
$f >$ [Hz]	51,5	51,5
$f <$ [s]	0,2	0,2
$f <$ [Hz]	47,5	47,5
$U >$ [s]	60	60
$U >$ [% of U_n]	110	110
$U >>$ [s]	0,2	0,2
$U >>$ [% of U_n]	115	115
$U <$ [s]	50	50
$U <$ [% of U_n]	85	85
	Loss of Mains Detection	
$U <<$ [s]*	0,2	0,2
$U <<$ [% of U_n]*	80	80

Note:

Loss of Mains Detection: Under voltage stage 2 used for the Loss of Mains Detection

B1.2.8.5 Harmonics:

Unit PLENTICORE 5.5 G2 passed the criteria for a Connection Point with a SCR ≥ 120

Unit PLENTICORE 10 G2 passed the criteria for a Connection Point with a SCR ≥ 120