



Certificate of compliance

Applicant: **Kostal Industrie Elektrik GmbH**
Lange Eck 11
58099 Hagen
Germany

Product: **Grid-tied photovoltaic (PV) inverter**

Model:

PLENTICORE 3.0	PIKO IQ 3.0
PLENTICORE 4.2	PIKO IQ 4.2
PLENTICORE 5.5	PIKO IQ 5.5
PLENTICORE 7.0	PIKO IQ 7.0
PLENTICORE 8.5	PIKO IQ 8.5
PLENTICORE 10.0	PIKO IQ 10.0

Use in accordance with regulations:

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

DANSK ENERGI:2019

Technical requirements for connection of power-generating plants to the low-voltage grid ($\leq 1\text{kV}$)
Type A

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

Report number: 19TH0374-DK1/DK2_1

Certification Program: NSOP-0032-DEU-ZE-V01

Certificate number: U19-0598

Date of issue:

2019-11-26

Certification body



Holger Schaffer

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

Type Verification Test Report

Extract from test report according to DANKS ENERGI

Nr. 19TH0374-DK1/DK2_1

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

Manufacturer / applicant:	Kostal Industrie Elektrik GmbH Lange Eck 11 58099 Hagen Germany			
Micro-generator Type	Grid-tied photovoltaic inverter			
	PLENTICORE 3.0	PLENTICORE 4.2	PLENTICORE 5.5	PLENTICORE 7.0
MPP DC voltage range [V]	180 - 720	180 - 720	225 - 720	290 - 720
Input DC voltage range [V]	180 - 1000	180 - 1000	225 - 1000	290 - 1000
Input DC current [A]	20			
Output AC voltage [V]	3N~, 400V, 50Hz			
Output AC current [A]	4,33	6,74	8,82	11,23
Output power [VA]	3000	4200	5500	7000
	PLENTICORE 8.5	PLENTICORE 10.0		
MPP DC voltage range [V]	345 - 720	405 - 720		
Input DC voltage range [V]	345 - 1000	405 - 1000		
Input DC current [A]	13,0			
Output AC voltage [V]	3N~, 400V, 50Hz			
Output AC current [A]	13,63	16,04		
Output power [VA]	8500	10000		
	PIKO IQ 3.0	PIKO IQ 4.2,	PIKO IQ 5.5	PIKO IQ 7.0
MPP DC voltage range [V]	180 - 720	180 - 720	225 - 720	290 - 720
Input DC voltage range [V]	180 - 1000	180 - 1000	225 - 1000	290 - 1000
Input DC current [A]	2x 13,0			3x 13,0
Output AC voltage [V]	3N~, 400V, 50Hz			
Output AC current [A]	4,33	6,74	8,82	11,23
Output power [VA]	3000	4200	5500	7000
	PIKO IQ 8.5	PIKO IQ 10.0		
MPP DC voltage range [V]	345 - 720	405 - 720		
Input DC voltage range [V]	345 - 1000	405 - 1000		
Input DC current [A]	13,0			
Output AC voltage [V]	3N~, 400V, 50Hz			
Output AC current [A]	13,63	16,04		
Output power [VA]	8500	10000		
Firmware version	FW = 01.40 / PAR = 03.19			
Measurement period:	2019-07-30 to 2019-09-15			

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.

Type Verification Test Report

Extract from test report according to DANSK ENERGI

Nr. 19TH0374-DK1/DK2_1

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 Pn]	5% (40% Pn/Hz)	4% (50% Pn/Hz)
Intentional Delay	500ms	500ms
	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

Type Verification Test Report

Extract from test report according to DANSK ENERGI

Nr. 19TH0374-DK1/DK2_1

	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) Lockin [% of U_n]	105	105
Cos ϕ (P) Lockout [% of U_n]	100	100
	Connection and Reconnection	
Gradient [% of P_n /min]	20	20
Observation time [seconds]	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 10.0 passed the criteria for a Connection Point with a SCR ≥ 120

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