



**BUREAU
VERITAS**

Certificate of conformity NS protection

Manufacturer / applicant: KACO new energy GmbH
Carl-Zeiss-Str. 1
74172 Neckarsulm
Deutschland

Type of grid and plant protection:	Integrated NS protection
Assigned to generation unit type:	Powador 30.0 TL3, Powador 33.0 TL3, Powador 36.0 TL3, Powador 37.5 TL3, Powador 39.0 TL3, Powador 40.0 TL3, Powador 48.0 TL3 Park <i>See annex for more Information about the units</i>

Firmware version: PKT: v. 3.25 ARM: v. 3.78.2780 Rev. 10240
CFG: v. 5.1700 DSP-AC: v. 2.18 4CBA Rev. 3574
DSP-DC: v. 2.04 7740 Rev. 785

Connection rule: VDE-AR-N 4105:2011-08 – Power generation systems connected to the low-voltage distribution network
Technical minimum requirements for the connection to and parallel operation with low-voltage distribution networks.

Applicable standards / directives: DIN VDE V 0124-100 (VDE V 0124-100): 2012-07 – Grid integration of power generation systems – low voltage
Test requirements for power generation units to be connected and operated parallel with the low-voltage distribution networks

The above mentioned grid and plant protection has been tested and certified according to the test guideline VDE 0124-100. The electrical properties required in the connection rule are satisfied.

- Setting values and disconnect times
- Technical requirements of the switching device
- Active detection of stand-alone power systems
- Single-fault tolerance

The certificate contains the following information:

- Technical specifications of the NS protection and corresponding power generation types
- Setting values of the protection functions
- Trip values of the protection functions

BV project number: 10TH0307
Certificate number: U16-0307
Date of issue: 2016-06-10



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

F.4 Requirements for the test report for the NS protection

Extract from test report for NS protection

Nr. 10TH0307

“Determination of electrical properties”

NS protection as integrated NS protection

Manufacturer / applicant:	KACO new energy GmbH Carl-Zeiss-Str. 1 74172 Neckarsulm Deutschland		
Type of grid and plant protection:	Integrated NS protection		
Assigned to generation unit type:	Powador 30.0 TL3 - M - INT Powador 30.0 TL3 - XL - INT Powador 30.0 TL3 - XL - INT - SPD 1+2 Powador 30.0 TL3 - XL - F - INT Powador 30.0 TL3 - XL - F - SPD 1+2 Powador 33.0 TL3 - M - INT Powador 33.0 TL3 - XL - INT Powador 33.0 TL3 - XL - INT - SPD 1+2 Powador 33.0 TL3 - XL - F - INT Powador 33.0 TL3 - XL - F - SPD 1+2 Powador 36.0 TL3 - M - INT Powador 36.0 TL3 - M1 Powador 36.0 TL3 - XL - INT Powador 36.0 TL3 - XL - INT - SPD 1+2 Powador 36.0 TL3 - XL - F - INT Powador 36.0 TL3 - XL - F - SPD 1+2 Powador 39.0 TL3 - M - INT Powador 39.0 TL3 - M1 Powador 39.0 TL3 - XL - INT Powador 39.0 TL3 - XL - INT - SPD 1+2 Powador 39.0 TL3 - XL - F - INT Powador 39.0 TL3 - XL - F - SPD 1+2 Powador 39.0 TL3 - M - ZA Powador 40.0 TL3 - M - INT Powador 40.0 TL3 - XL - INT Powador 40.0 TL3 - XL - INT - SPD 1+2 Powador 40.0 TL3 - XL - F - INT Powador 40.0 TL3 - XL - F - SPD 1+2 Powador 48.0 TL3 - M - INT - Park Powador 48.0 TL3 - XL - INT - Park Powador 48.0 TL3 - XL - INT - SPD 1+2 Powador 48.0 TL3 - XL - F - INT - Park Powador 48.0 TL3 - XL - F - SPD 1+2 - Park		
Firmware version:	PKT:	v. 3.25	ARM: v. 3.78.2780 Rev. 10240
	CFG:	v. 5.1700	DSP-AC: v. 2.18 4CBA Rev. 3574
	DSP-DC:	v. 2.04 7740 Rev. 785	
Integrated interface switch:	Type of switching equipment 1: Relay 30ms Type of switching equipment 2: Relay 30ms		
Measurement period:	2016-04-06 bis 2016-05-27		

F.4 Requirements for the test report for the NS protection

Extract from test report for NS protection

Nr. 10TH0307

“Determination of electrical properties”

Protection function	Setting value	Trip value	Disconnection time ^a
Voltage drop protection U <	184,0 V	184,0 V	188 ms
Rise-in-voltage protection U>	253,0 V	N/A	468 s ^b
Rise-in-voltage protection U>>	264,5 V	262,9 V	188 ms
Frequency decrease protection f<	47,50 Hz	47,50 Hz	172 ms
Frequency increase protection f>	51,50 Hz	51,50 Hz	183 ms

^a proper time of interface switch 30 ms

^b longest disconnection of the rise-in-voltage protection as a moving 10-minute-average, tested according clause 5.4.5.3.3 measurement a) of VDE 0124-100

The disconnect time (sum of trip time of grid and plant protection and delay time of interface switch) must not exceed 200 ms.

A check of the overall functional chain "NS protection – interface switch" resulted in a successful disconnection.

The above mentioned grid and plant protection with the assigned power generation units has met the requirements for islanding detection with the help of the active method (resonant circuit test).

The above mentioned NS protection meets the requirements for synchronization.