



**BUREAU
VERITAS**

Certificate of conformity NS protection

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

Type of grid and plant protection:	Integrated NS protection
Assigned to generation unit type:	blueplanet 5.0 TL3 M2 WM OD IIG0 blueplanet 6.5 TL3 M2 WM OD IIG0 blueplanet 7.5 TL3 M2 WM OD IIG0 blueplanet 8.6 TL3 M2 WM OD IIG0 blueplanet 9.0 TL3 M2 WM OD IIG0 blueplanet 10.0 TL3 M2 WM OD IIG0

Firmware version: Pkt: V3.31

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
- Properly functioning functional chain "NS protection – interface switch"
- Technical requirements of the switching device
- Passive / 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: 14TH0348-VDE0124-100_2

Certificate number: U16-0551

Date of issue: 2016-09-23



Dieter Zitzmann



(A partial representation of the certificate requires the written permission of Bureau Veritas Consumer Products Services Germany GmbH)

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
"Determination of electrical properties"

Nr. 14TH0348

NS protection as integrated NS protection

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Firmware version:	Pkt: V3.31
Integrated interface switch:	Type of switching equipment 1: Relay Finder 45.91 Type of switching equipment 2: Relay Finder 45.91
Measurement period:	2015-02-17 bis 2015-07-08; 2016-08-29 bis 2016-09-07

Protection function	Setting value	Trip value	Disconnection time ^a
Voltage drop protection U <	184,0 V	184,8 V	190,0 ms
Rise-in-voltage protection U >	253,0 V	--	464,35 s ^b
Rise-in-voltage protection U >>	264,5 V	263,8 V	193,6 ms
Frequency decrease protection f <	47,50 Hz	47,5 Hz	174 ms
Frequency increase protection f >	51,50 Hz	51,5 Hz	185 ms

^a proper time of interface switch 12 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.