



Certificate for the NS protection

Manufacturer / applicant: KACO new energy GmbH
Werner-von-Siemens Allee 1
74172 Neckarsulm
Germany

Type of grid and plant protection:	Integrated NS protection
Assigned to generation unit type:	blueplanet gs 10.0TL3 M2B1 WM ID IIGS

Firmware version: ab Controller: 4.7; Com: 4.1

Connection rule: VDE-AR-N 4105:2018-11 – 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):2020-06 – 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
- Integrated interface switch that can also be used in conjunction with a central interface protection relay (VDE-AR-N 4105:2018-11 §6.4.1) [
- Passive detection of unintended islanding
- 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

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

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

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E.6 and E.7 Requirements for the test report for the NS protection

Extract from test report for NS protection

Nr. 19TH0305-ARN4105-2018_2

"Determination of electrical properties"

NS protection as integrated NS protection

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Type of grid and plant protection:	integrated NS protection
Assigned to generation unit type:	blueplanet gs 10.0TL3 M2B1 WM ID IIGS
Firmware version:	ab Controller: 4.7; Com: 4.1
Integrated interface switch:	Type of switching equipment 1: Relay Type of switching equipment 2: Relay
Measurement period:	2019-05-15 to 2019-11-06 2021-02-22 to 2021-03-05

Inverter / direct coupled synchrone and asynchrone generators with $P_n > 50kW$

Protection function	Setting value	Trip value	Disconnection time ^a
Voltage drop protection U <	184,0 V	182,7 V	3,000 s
Voltage drop protection U <<	103,5 V	102,6 V	0,325 s
Rise-in-voltage protection U>	253,0 V	--	524 s ^b
Rise-in-voltage protection U>>	287,5 V	285,6 V	0,199 s
Frequency decrease protection f<	47,50 Hz	47,50 Hz	0,142 s
Frequency increase protection f>	51,50 Hz	51,50 Hz	0,142 s

^a proper time of interface switch 2 ms

^b longest disconnection of the rise-in-voltage protection as a moving 10-minute-average, tested according clause 5.5.7 Protection devices and protection settings 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 passive method (three-phase voltage monitoring).

The above-mentioned NS protection meet the requirements for synchronization.