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 hybrid BSS 10.0**

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

Report number: **19TH0305-ARN4105-2018_2**
Certification program: **NSOP-0032-DEU-ZE-V01**
Certificate number: **U21-0316**
Date of issue: **2021-04-08**

Certification body

Thomas Lammel

DAkkS Deutsche Akkreditierungsstelle D-ZE-12024-01-00

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

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

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 hybrid BSS 10.0
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.

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

The inverter listed above may be installed with the following batteries:		
Manufacturer:	Energy Depot	BYD
Accumulator Model / Battery Model:	DOMUS 3.6 / DOMUS 4.1	Battery-Box H 5.1 / H 6.4 / H 7.7 / H 9.0 / H 10.2 / H 11.5
Capacity of each battery module (kWh):	3,6 – 28,4 / 4,1 – 32,8	5,12 / 6,40 / 7,68 / 8,96 / 10,24 / 11,52
Number(s) of battery modules recommended by the manufacturer:	1 – 8	4 / 5 / 6 / 7 8 / 9
Note: The batteries are not integrated into the inverter and must be installed according to the local regulations.		
The inverter listed above may be installed with the following accessories:		
Manufacturer:	KACO new energy GmbH	
Type:	blueplanet 1.0 EMAS	