



**BUREAU
VERITAS**

Certificate for the NS protection

**Manufacturer /
applicant:**

**Huawei Technologies Co., Ltd.
Administration Building, Headquarters of Huawei Technologies Co., Ltd.,
Bantian, Longgang District, Shenzhen, 518129,
P.R.C**

Type of grid and plant protection:	Integrated NS protection
Assigned to generation unit type:	SUN2000-100KTL-M1

Firmware version: V500R001

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):2019-09 – 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
- 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 type
- Setting values of the protection functions
- Trip values of the protection functions

BV project number: PVDE190905N026-R1

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

Certificate number: U20-0142

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Certification body



Holger Schaffer

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

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

Extract from test report for NS protection
 "Determination of electrical properties"

Nr. PVDE190905N026-R1

NS protection as integrated NS protection

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Type of grid and plant protection:	Integrated NS protection
Assigned to generation unit type:	SUN2000-100KTL-M1
Firmware version:	V500R001
Integrated interface switch:	Typ Schalteinrichtung 1: Relais Typ Schalteinrichtung 2: Relais
Measurement period:	2019-09-05 - 2019-12-03

Inverter (phase to neutral)

Protection function	Setting value	Trip value	Disconnection time ^a
Voltage drop protection U <	184,0 V	183,7 V	3085 ms
Voltage drop protection U <<	103,5 V	103,8 V	372 ms
Rise-in-voltage protection U >	253,0 V	--	513 s ^b
Rise-in-voltage protection U >>	287,5 V	287,2 V	179 ms
Frequency decrease protection f <	47,50 Hz	47,50 Hz	180 ms
Frequency increase protection f >	51,50 Hz	51,50 Hz	179 ms

Inverter (phase to phase)

Protection function	Setting value	Trip value	Disconnection time ^a
Voltage drop protection U <	318,7 V	320,5 V	3088 ms
Rise-in-voltage protection U >	179,3 V	180,5 V	394 ms
Rise-in-voltage protection U >>	438,2 V	--	513 s ^b
Frequency decrease protection f <	498,0 V	500,8 V	177 ms
Frequency increase protection f >	47,50 Hz	47,50 Hz	180 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 5.5.7 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 active method (resonant circuit test).

The above mentioned NS protection meets the requirements for synchronization.