



**BUREAU
VERITAS**

Certificate for the NS protection

Manufacturer / applicant: SMA Solar Technology AG
Sonnenallee 1
34266 Niestetal
Germany

Type of grid and plant protection:	integrated NS protection			
Assigned to generation unit type:	SB3.0-1AV-41	SB3.6-1AV-41	SB4.0-1AV-41	SB5.0-1AV-41

Firmware version: Beginning with 1.01.30.S

Connection rule: VDE-AR-N 4105:2018-08 – 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) – Grid integration of power generation systems – low voltage^{(1) Note}
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: 16TH0348-ARN-4105-2018_0

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

Certificate number: U19-0442

Date of issue: 2019-11-08

Certification body



Holger Schaffer

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

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



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

Extract from test report for NS protection
 “Determination of electrical properties”

Nr. 16TH0348-ARN-4105-2018_0

NS protection as integrated NS protection

Manufacturer / applicant:	SMA Solar Technology AG Sonnenallee 1 34266 Niestetal Deutschland
Type of grid and plant protection:	integrated NS protection
Assigned to generation unit type:	SB3.0-1AV-41 SB3.6-1AV-41 SB4.0-1AV-41 SB5.0-1AV-41
Firmware version:	Beginning with 1.01.30.S
Integrated interface switch:	Type of switching equipment 1: Relay Type of switching equipment 2: Relay
Measurement period:	2018-11-08 to 2019-04-01

Inverter

Protection function	Setting value	Trip value	Disconnection time ^a
Voltage drop protection U <	184,0 V	183,4 V	2963 ms
Voltage drop protection U <<	103,5 V	102,5 V	268ms
Rise-in-voltage protection U>	253,0 V	--	492 s ^b
Rise-in-voltage protection U>>	287,5 V	287,7 V	167 ms
Frequency decrease protection f<	47,50 Hz	47,50 Hz	143 ms
Frequency increase protection f>	51,50 Hz	51,50 Hz	165 ms

^a proper time of interface switch 20 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.

(1) Note:

Since there is no test guideline DIN VDE V 0124-100 (VDE V 0124-100) for the VDE AR-N 4105: 2018-11 at the time of the test, the test guidelines according to DIN VDE V 0124-100 (VDE V 0124- 100): 2012 and 2013 and the TR3 Revision 25 used where applicable in accordance with VDE AR-N 4105: 2018-11.