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Certification body of BV CPS GmbH
Accredited according to EN 45011 -
ISO / IEC Guide 65

Certificate of conformity NS protection

Manufacturer / applicant: **ABB Oy Power Conversion**
Hiomotie 13
FI-00380 Helsinki
FINLAND

Type of grid and plant protection:	Integrated NS protection
Assigned to generation unit type:	PRO-33.0-TL-OUTD-400 PRO-33.0-TL-OUTD-S-400 PRO-33.0-TL-OUTD-SX-400

Firmware version: v1.61.0.0

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
- 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: 13TH0463

Certificate number: U14-0267

Date of issue: 2014-04-29

Certification body

Dieter Zitzmann

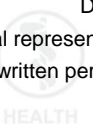
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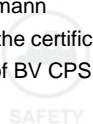
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QUALITY



HEALTH



SAFETY



ENVIRONMENT



SOCIAL
ACCOUNTABILITY

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

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

Nr. 13TH0463

NS protection as integrated NS protection

Manufacturer / applicant:	ABB Oy Power Conversion Hiomotie 13 FI-00380 Helsinki FINLAND
Type of grid and plant protection:	Integrated NS protection
Assigned to generation unit type:	PRO-33.0-TL-OUTD-400, PRO-33.0-TL-OUTD-S-400, PRO-33.0-TL-OUTD-SX-400
Firmware version:	v1.61.0.0
Integrated interface switch:	Type of switching equipment 1: Relay Type of switching equipment 2: Relay
Measurement period:	2014-01-07 to 2014-04-17

Protection function	Setting value	Trip value	Disconnection time ^a
Voltage drop protection U <	184,0 V	185,0 V	190 ms
Rise-in-voltage protection U>	253,0 V	--	352 s ^b
Rise-in-voltage protection U>>	264,5 V	265,5 V	190 ms
Frequency decrease protection f<	47,5 Hz	47,49 Hz	200 ms
Frequency increase protection f>	51,5 Hz	51,50 Hz	200 ms

^a proper time of interface switch 10 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.