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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: **Delta Electronics, Inc.**
39, Sec. 2, Huangdong Road
Shanhua Dist., Tainan City 74144
TAIWAN, R.O.C.

Type of grid and plant protection:	**Integrated NS protection**
Assigned to generation unit type:	**RPI H3A_12X** **RPI H3A_02X** **RPI H4A_12X** **RPI H4A_02X** **RPI H5A_12X** **RPI H5A_02X** (X=0~9,A~Z or blank; This is for marketing purpose.)

Firmware version: **DSP: V0200 / RED: 0200 / COMM: 0200**

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: **13TH0320**
Certificate number: **U14-0347**
Date of issue: **2014-07-01**

Certification body

Dieter Zitzmann
(A partial representation of the certificate requires the written permission of BV CPS GmbH)

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

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

Extract from test report for NS protection **Nr. 13TH0320**
"Determination of electrical properties"

NS protection as integrated NS protection

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Firmware version:	**DSP: V0200 / RED: 0200 / COMM: 0200**
Integrated interface switch:	**Type of switching equipment 1: Song Chuan 841-P-2A-F-C-H with 30ms** **Type of switching equipment 2: Song Chuan 841-P-2A-F-C-H with 30ms**
Measurement period:	**2013-02-27 to 2013-07-24**

Protection function	Setting value	Trip value	Disconnection time [a]
Voltage drop protection U <	**184 V**	**184,0 V**	**160 ms**
Rise-in-voltage protection U>	**253 V**	**253 V**	**499 s** [b]
Rise-in-voltage protection U>>	**264,5 V**	**264,5 V**	**165 ms**
Frequency decrease protection f<	**47,5 Hz**	**47,50 Hz**	**125 ms**
Frequency increase protection f>	**51,5 Hz**	**51,50 Hz**	**156 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 5.4.5.3.3 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.