



**BUREAU
VERITAS**

Certificate for the NS protection

Manufacturer / applicant: Hoymiles Power Electronics Inc.
No 18 Kangjing Road HangZhou,
Zhejiang Province
China

Type of grid and plant protection:	Integrated NS protection
Assigned to generation unit type:	HM-800, HM-800T, HM-800SL HM-700, HM-700T, HM-700SL HM-600, HM-600T HM-500, HM-500T

Firmware version: Beginning with V01.01.00

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)
- Active 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: BMH-ESH-P200410697-2-R2

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

Certificate number: U22-0345

Date of issue: 2022-07-01



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

Testing laboratory accredited according to DIN EN ISO/IEC 17025

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E.6 and E.7 Requirements for the test report for the NS protection

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

Nr. BMH-ESH-P200410697-2-R2

NS protection as integrated NS protection

Manufacturer / applicant:	Hoymiles Power Electronics Inc. No 18 Kangjing Road HangZhou, Zhejiang Province China
Type of grid and plant protection:	integrated NS protection
Assigned to generation unit type:	HM-800T, HM-800, HM-800SL HM-700, HM-700T, HM-700SL HM-600, HM-600T HM-500, HM-500T
Firmware version:	Beginning with V01.01.00
Integrated interface switch:	Type of switching equipment 1: galvanic separation AC Transformer Type of switching equipment 2: Relay
Measurement period:	2021-03-10 to 2021-04-21 reissue No.2022-05-08 to 2022-06-16

Protection function	Setting value	Trip value	Disconnection time ^a
Voltage drop protection U <	184,0 V	183,6 V	3,060 s
Voltage drop protection U <<	103,5 V	102,8 V	0,346 s
Rise-in-voltage protection U >	253,0 V	--	500 s ^b
Rise-in-voltage protection U >>	287,5 V	288,4 V	0,191 s
Frequency decrease protection f <	47,50 Hz	47,50 Hz	0,195 s
Frequency increase protection f >	51,50 Hz	51,50 Hz	0,191 s

^a proper time of interface switch 6 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 meet the requirements for synchronization.