Certificate for the NS protection

Manufacturer / applicant:	**Fronius International GmbH** **Günter Fronius Straße 1** **4600 Wels** **Austria**

Type of grid and plant protection:	**Integrated NS protection**
Assigned to generation unit type:	**ECO27.0-3-S, ECO25.0-3-S**

Firmware version:	**beginning with V1.1.4.0**
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

BV project number:	**15TH0304-VDE-0124-100:2020_0**	**Certification program:**	**NSOP-0032-DEU-ZE-V01**
Certificate number:	**U21-0400**	**Date of issue:**	**2021-05-20**

Certification body

ZERTIFIZIERUNGSSTELLE BUREAU VERITAS Bureau Veritas CPS GmbH

Thomas Lammel

DAkkS Deutsche Akkreditierungsstelle D-ZE-12024-01-00

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 **Nr. 15TH0304-VDE-0124-100:2020_0**
"Determination of electrical properties"

NS protection as integrated NS protection

Manufacturer / applicant:	Fronius International GmbH Günter Fronius Straße 1 4600 Wels Austria
Type of grid and plant protection:	Integrated NS protection
Assigned to generation unit type:	ECO27.0-3-S, ECO25.0-3-S
Firmware version:	beginning with V1.1.4.0
Integrated interface switch:	Type of switching equipment 1: Relay Type of switching equipment 2: Relay
Measurement period:	2019-10-14 – 2020-01-07

Inverter

Protection function	Setting value	Trip value	Disconnection time [a]
Voltage drop protection U <	184,0 V	183,0 V	3,050 s
Voltage drop protection U <<	103,5 V	103,6 V	0,316 s
Rise-in-voltage protection U>	253,0 V	--	507 s[b]
Rise-in-voltage protection U>>	287,5 V	288,7 V	0,115 s
Frequency decrease protection f<	47,50 Hz	47,50 Hz	0,120 s
Frequency increase protection f>	51,50 Hz	51,51 Hz	0,121 s

[a] proper time of interface switch 5 ms

[b] longest disconnection of the rise-in-voltage protection as a moving 10-minute-average, tested according clause 5.7.7 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.