



**BUREAU
VERITAS**

Type test certificate

Applicant: ZIEHL industrie-elektronik GmbH+Co KG
Daimlerstraße 13
74523 Schwäbisch Hall
Germany

Product: Automatic disconnection device between a generator and the public low-voltage grid

Model: UFR1001E

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with Engineering Recommendation G83/2 for generation systems with a parallel coupling in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter. This serves as a replacement for the disconnection device with isolating function that can access the distribution network provider at any time.

Applied rules and standards:

Engineering Recommendation G83/2:2012

Recommendations for the Connection of Type Tested Small-scale Embedded Generators (Up to 16A per Phase) in Parallel with Low-Voltage Distribution Systems

DIN V VDE V 0126-1-1:2006-02 (Functional safety)

Automatic disconnection device between a generator and the public low-voltage grid

At the time of issue of this certificate the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.

The aforementioned product does not provide direct current injection monitoring and residual current monitoring. Therefore these protection functions need to be installed externally if required.

Report number: 11TH0501-G83/2_1
Certificate number: U16-0664
Date of issue: 2016-12-08



Certification body

Dieter Zitzmann



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

Appendix 4 Type Verification Test Report
 Extract from test report according the Engineering Recommendation G83/2 11TH0501-G83/2_1

Type Approval and declaration of compliance with the requirements of Engineering Recommendation G83/2.

| | |
|--|--|
| Manufacturer / applicant: | ZIEHL industrie-elektronik GmbH+Co KG Daimlerstraße 13 74523 Schwäbisch Hall Germany |
| SSEG Type | Automatic disconnection device between a generator and the public low-voltage grid |
| Rated values | UFR1001E |
| Supply voltage range [V] | 24...270 DC/AC |
| Supply frequency range [Hz] | 0/40...70 |
| Monitoring voltage range [V] | 15...520 |
| Monitoring frequency range [Hz] | 45...65 |
| Firmware version | 0-04* |

* The tests were performed with Firmwareversion 0-04. Changes in the Firmwareversion on position 0-0x has no effect on the required electrical properties.
 x = could be any number or sign

| | |
|----------------------------|---------------------------------|
| Measurement period: | 2013-12-19 to 2014-02-03 |
|----------------------------|---------------------------------|

Description of the structure of the power generation unit (Figure 1):

The device serves as disconnection facility for illegitimate frequency and voltage limits. The output is switched off by two relays in series which are controlled by the external NS-protection device. This assures that the opening of the output circuit will also operate in case of one error.

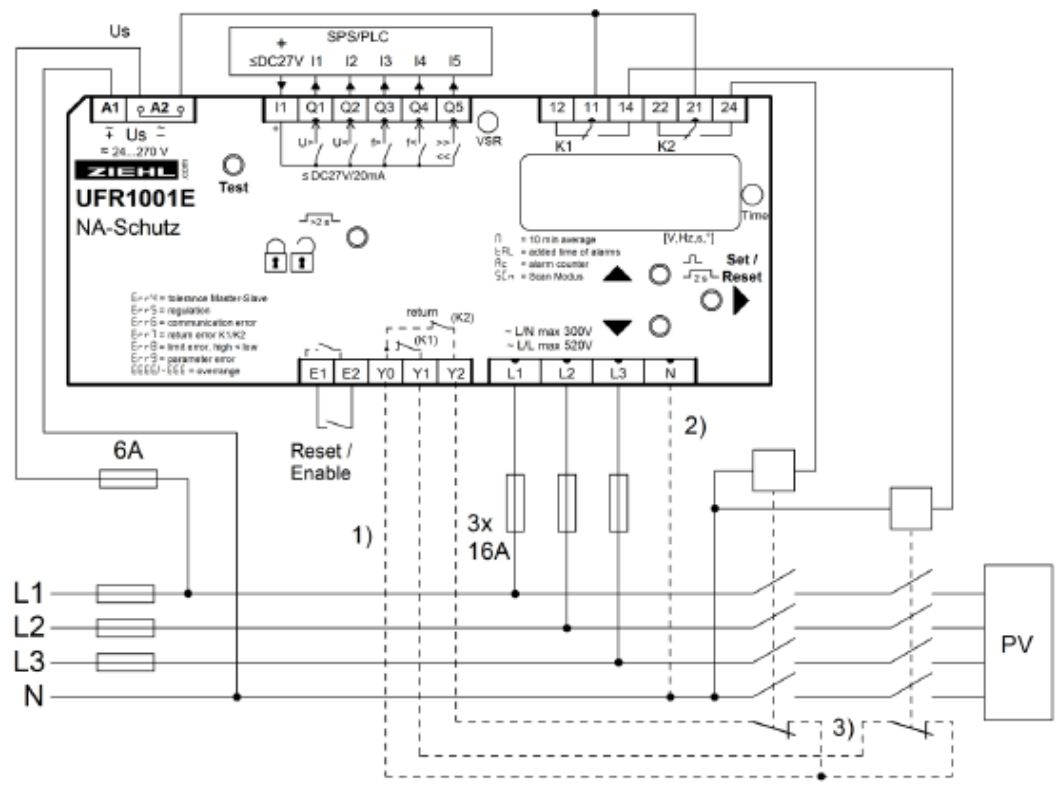


Figure 1 – Schematic structure of the power generation unit

The above stated automatic disconnection device is tested according the requirements in the Engineering Recommendation G83/2. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements of the Engineering Recommendation G83/2.

Appendix 4 Type Verification Test Report

Extract from test report according the Engineering Recommendation G83/2

11TH0501-G83/2_1

| Protection. Voltage tests. | | | | | | |
|---|---------|------------|-----------|------------|------------------|-----------------|
| The requirement is specified in section 5.3.1, test procedure in Annex A or B 1.3.2 | | | | | | |
| Function | Setting | | Trip test | | No trip test | |
| L1 | | | | | | |
| | Voltage | Time delay | Voltage | Time delay | Voltage / time | Confirm no trip |
| U/V stage 1 | 200,1V | 2,5s | 199,9V | 2,550s | 204,1V / 3,5s | No trip |
| U/V stage 2 | 184V | 0,5s | 184,1V | 0,550s | 188V / 2,48s | No trip |
| | | | | | 180V / 0,48s | No trip |
| O/V stage 1 | 262,2V | 1,0s | 262,4V | 1,050s | 258.2V 2,0s | No trip |
| O/V stage 2 | 273,7V | 0,5s | 273,1V | 0,560s | 269,7V 0,98s | No trip |
| | | | | | 277,7V 0,48s | No trip |

| Function | Setting | | Trip test | | No trip test | |
|--------------------|---------|------------|-----------|------------|------------------|-----------------|
| L2 | | | | | | |
| | Voltage | Time delay | Voltage | Time delay | Voltage / time | Confirm no trip |
| U/V stage 1 | 200,1V | 2,5s | 200,0V | 2,550s | 204,1V / 3,5s | No trip |
| U/V stage 2 | 184V | 0,5s | 184,1V | 0,550s | 188V / 2,48s | No trip |
| | | | | | 180V / 0,48s | No trip |
| O/V stage 1 | 262,2V | 1,0s | 262,5V | 1,050s | 258.2V 2,0s | No trip |
| O/V stage 2 | 273,7V | 0,5s | 273,2V | 0,552s | 269,7V 0,98s | No trip |
| | | | | | 277,7V 0,48s | No trip |

Appendix 4 Type Verification Test Report

Extract from test report according the Engineering Recommendation G83/2

11TH0501-G83/2_1

| Function | Setting | | Trip test | | No trip test | |
|--|----------------|-------------------|----------------|-------------------|-----------------------|------------------------|
| L3 | | | | | | |
| | Voltage | Time delay | Voltage | Time delay | Voltage / time | Confirm no trip |
| U/V stage 1 | 200,1V | 2,5s | 199,8V | 2,550s | 204,1V / 3,5s | No trip |
| U/V stage 2 | 184V | 0,5s | 184,1V | 0,562s | 188V / 2,48s | No trip |
| | | | | | 180V / 0,48s | No trip |
| O/V stage 1 | 262,2V | 1,0s | 262,4V | 1,050s | 258.2V 2,0s | No trip |
| O/V stage 2 | 273,7V | 0,5s | 273,2V | 0,550s | 269,7V 0,98s | No trip |
| | | | | | 277,7V 0,48s | No trip |
| <p>Note for Voltage tests the Voltage required to trip is the setting $\pm 3,45V$. The time delay can be measured at a larger deviation than the minimum required to operate the protection. The No trip tests need to be carried out at the setting $\pm 4V$ and for the relevant times as shown in the table above to ensure that the protection will not trip in error.</p> | | | | | | |

| Proteccion. Frequency tests. | | | | | | |
|---|------------------|-------------------|------------------|-------------------|-------------------------|------------------------|
| The requirement is specified in section 5.3.1, test procedure in Annex A or B 1.3.3 | | | | | | |
| Function | Setting | | Trip test | | No trip test | |
| | Frequency | Time delay | Frequency | Time delay | Frequency / time | Confirm no trip |
| U/F stage 1 | 47,5Hz | 20s | 47,49Hz | 20,072s | 47,7Hz / 25s | No trip |
| U/F stage 2 | 47Hz | 0,5s | 47,00Hz | 0,539s | 47,2Hz / 19,98s | No trip |
| | | | | | 46.8Hz / 0,48s | No trip |
| O/F stage 1 | 51,5Hz | 90s | 51,51Hz | 90,096s | 51,3Hz / 95s | No trip |
| O/F stage 2 | 52Hz | 0,5s | 52,00Hz | 0,548s | 51,8Hz / 89,98s | No trip |
| | | | | | 52,2Hz / 0,48s | No trip |
| <p>Note for Frequency Trip tests the Frequency required to trip is the setting $\pm 0,1Hz$. In order to measure the time delay a larger deviation than the minimum required to operate the projection can be used. The "No-trip tests" need to be carried out at the setting $\pm 0,2Hz$ and for the relevant times as shown in the table above to ensure that the protection will not trip in error.</p> | | | | | | |

Appendix 4 Type Verification Test Report

Extract from test report according the Engineering Recommendation G83/2

11TH0501-G83/2_1

| Protection. Re-connection timer. | | | | | |
|---|-----------------|---|-----------------|-----------------|-----------|
| The requirement is specified in section 5.3.4 Automatic Reconnection, test procedure in Annex A or B 1.3.5 | | | | | |
| Test should prove that the reconnection sequence starts after a minimum delay of 20 seconds for restoration of voltage and frequency to within the stage 1 settings of table 1. | | | | | |
| Voltage | | | | | |
| Time delay setting | | Measured delay | | | |
| 20s | | 20,1s | | | |
| Frequency | | | | | |
| Time delay setting | | Measured delay | | | |
| 20s | | 20,9s | | | |
| | | Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of table 1. | | | |
| | | At 266,2V | At 196,1V | At 47,4Hz | At 51,6Hz |
| Confirmation that the SSEG does not re-connect. | No reconnection | No reconnection | No reconnection | No reconnection | |

| Protection. Frequency change, Stability test. | | | | |
|--|------------------------|---------------|----------------------|------------------------|
| The requirement is specified in section 5.3.3, test procedure in Annex A or B 1.3.6 | | | | |
| | Start Frequency | Change | End Frequency | Confirm no trip |
| Positive Vector Shift | 49,5Hz | +9 degrees | | No trip |
| Negative Vector Shift | 50,5Hz | - 9 degrees | | No trip |
| Positive Frequency drift | 49,5Hz | +0,19Hz/sec | 51,5Hz | No trip |
| Negative Frequency drift | 50,5Hz | -0,19Hz/sec | 47,5Hz | No trip |