



**BUREAU
VERITAS**

Certificate of compliance

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

Product: Network and System Protection Unit

Model: UFR 1002IP

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with Engineering Recommendation G98/1 for systems with a three-phase parallel coupling via an inverter or generator in the public mains supply. This serves as a disconnection device with isolating function, which can be accessed the distribution network provider at any time.

Applied rules and standards:

Engineering Recommendation G98/1-7:2022

Requirements for the connection of Fully Type Tested Micro-generators (up to and including 16 A per phase) in parallel with public Low Voltage Distribution Networks

DIN VDE V 0124-100:2020 (5.5.2.1 Functional safety of network and system protection)

Grid integration of generator plants - Low-voltage - Test requirements for generator units to be connected to and operated in parallel with low-voltage distribution networks

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.

Report number: 22TH0358-G98-1_0

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

Certificate number: U23-0450

Date of issue: 2023-06-21

Certification body



Certification body 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

A partial representation of the certificate requires the written approval of Bureau Veritas Consumer Products Services Germany GmbH



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Annex to the G98/1 certificate of compliance No. U23-0450

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98/1

Nr. 22TH0358-G98-1_0

Type Approval and declaration of compliance with the requirements of Engineering Recommendation G98/1.

PGM Technology	Network and System Protection unit		
Manufacturer	ZIEHL industrie-elektronik GmbH & Co KG		
Address	Daimlerstraße 13 74523 Schwäbisch Hall Germany		
Tel.	+49 791 5040	Fax	--
Email	info@ziehl.de	Website	www.ziehl.de
Rated values	UFR 1002IP		
Rated supply voltage	AC/DC 24 – 270 V, DC / 45 – 65 Hz (< 5 VA)		
Measurement range of voltage			
Measurement range phase-phase	15 – 530 VAC		
Setting range phase-phase	15 – 520 VAC		
Measurement range phase-neutral	10 – 310 VAC		
Setting range phase-neutral	15 – 300 VAC		
Measurement range of frequency			
Measurement range	40 – 70 Hz		
Setting range	45 – 65 Hz		
Firmware version	12690-1400-00		

The above stated unit is tested according the requirements in the Engineering Recommendation G98/1. 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 G98/1.

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98/1

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Protection. Voltage tests.

Phase 1

Function	Setting		Trip test		No trip test	
	Voltage [V]	Time delay [s]	Voltage [V]	Time delay [s]	Voltage / time	Confirm no trip
U/V	184,0	2,50	184,5	2,502	188,0 V / 5,00 s	No trip
					180,0 V / 2,45 s	No trip
O/V stage 1	262,2	1,00	261,8	1,000	258,2 V / 5,00 s	No trip
O/V stage 2	273,7	0,50	272,7	0,500	269,7 V / 0,95 s	No trip
					277,7 V / 0,45 s	No trip

Note.

For Voltage tests the Voltage required to trip is the setting $\pm 3,45$ V. 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 $\pm 4,00$ V and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

Protection. Voltage tests.

Phase 2

Function	Setting		Trip test		No trip test	
	Voltage [V]	Time delay [s]	Voltage [V]	Time delay [s]	Voltage / time	Confirm no trip
U/V	184,0	2,50	184,3	2,507	188,0 V / 5,00 s	No trip
					180,0 V / 2,45 s	No trip
O/V stage 1	262,2	1,00	262,2	1,006	258,2 V / 5,00 s	No trip
O/V stage 2	273,7	0,50	273,1	0,507	269,7 V / 0,95 s	No trip
					277,7 V / 0,45 s	No trip

Note.

For Voltage tests the Voltage required to trip is the setting $\pm 3,45$ V. 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 $\pm 4,00$ V and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

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Extract from test report according to the Engineering Recommendation G98/1

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Protection. Voltage tests.

Phase 3

Function	Setting		Trip test		No trip test	
	Voltage [V]	Time delay [s]	Voltage [V]	Time delay [s]	Voltage / time	Confirm no trip
U/V	184,0	2,50	184,5	2,502	188,0 V / 5,00 s	No trip
					180,0 V / 2,45 s	No trip
O/V stage 1	262,2	1,00	261,8	1,003	258,2 V / 5,00 s	No trip
O/V stage 2	273,7	0,50	272,7	0,506	269,7 V / 0,95 s	No trip
					277,7 V / 0,45 s	No trip

Note.

For Voltage tests the Voltage required to trip is the setting $\pm 3,45$ V. 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 $\pm 4,00$ V and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

Protection. Frequency tests.

Function	Setting		Trip test		No trip test	
	Frequency [Hz]	Time delay [s]	Frequency [Hz]	Time delay [s]	Frequency / time	Confirm no trip
U/F stage 1	47,5	20,00	47,50	20,000	47,7 Hz / 30,00 s	No trip
U/F stage 2	47,0	0,50	47,00	0,500	47,2 Hz / 19,50 s	No trip
					46,8 Hz / 0,45 s	No trip
O/F stage 2	52,0	0,50	52,01	0,505	51,8 Hz / 120,00 s	No trip
					52,2 Hz / 0,45 s	No trip

Note.

For Frequency Trip tests the Frequency required to trip is the setting $\pm 0,1$ Hz. 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 $\pm 0,2$ Hz and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

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Protection. Re-connection timer.

Test should prove that the reconnection sequence starts in no less than 20 seconds for restoration of voltage and frequency to within the stage 1 settings of table 2.

Over Voltage (266,2 V)

Time delay setting [s]	Measured delay [s]
20,0	20,005

Under Voltage (182,0 V)

Time delay setting [s]	Measured delay [s]
20,0	20,046

Over Frequency (52,1 Hz)

Time delay setting [s]	Measured delay [s]
20,0	20,060

Under Frequency (47,4 Hz)

Time delay setting [s]	Measured delay [s]
20,0	20,059

	Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of table 1.			
	At 266,2 V	At 180,0 V	At 47,4 Hz	At 52,1 Hz
Confirmation that the Generating Unit does not re-connect.	No reconnection	No reconnection	No reconnection	No reconnection

Appendix C Type Test Verification Report

Extract from test report according to the Engineering Recommendation G98/1

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Protection. Frequency change, Stability test.

	Start Frequency [Hz]	Change	Test Duration	Confirm no trip
Positive Vector Shift	49,0	+50 degrees		No trip
Negative Vector Shift	50,0	-50 degrees		No trip
Positive Frequency drift	49,0 to 51,0	+0,95 Hz/sec	2,1 s	No trip
Negative Frequency drift	51,0 to 49,0	-0,95 Hz/sec	2,1 s	No trip

Self-Monitoring – Solid state switching.

P

It has been verified that in the event of the solid-state switching device failing to disconnect the Generating Unit, the voltage on the output side of the switching device is reduced to a value below 50 volts within 0,5 seconds.

Note.

Unit do not provide solid state switching relays. A mechanical relay contact will open (Functional safety of the internal automatic disconnection device according to VDE 0124-100).

Cyber security

P

Confirm that the Manufacturer or Installer of the Network and System Protection Unit has provided a statement describing how the Network and System Protection Unit has been designed to comply with cyber security requirements, as detailed in 9.7.

Yes

Note.

Different levels of access, all are password protected, only certain parameters can be changed on maintenance level. Manufacturer information provided.

Logic Interface (input port) Required by paragraph 9.4.4

P

Confirm that an input port is provided and can be used to reduce the Active Power output to zero

Yes

Note.

Manufacturer information provided.

Provide high level description of logic interface, e.g. details in 9.4.4 such as AC or DC signal

Yes

• Digital inputs E1-E2:

Digital input for enable/standby, configurable as NC contact or NO contact.
When the input is active, a switch-off occurs (relays K1 and K2 drop).



6)



Enable/
Standby

Digital inputs E1–E2	
Connected cable length	max. 30 m
Connection	potential-free opener/closer contacts
Voltage / current E1 – E2	DC 15 ... 35 V / ca. 6 mA

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Recommendation G98/1

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• Digital inputs Y0-Y1 and Y0-Y2 :

Digital inputs for feedback of coupling switches, configurable as NC or NO contact.

If the feedback function is active and the switching on of K1 and K2 does not provide valid feedback to Y0-Y1 and/or Y0-Y2, a delayed switch-off occurs (relays K1 and K2 drop).



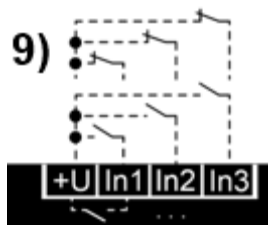
1)

Digital inputs Y0-Y1, Y0-Y2	Y0-Y1, Y0-Y2 → Contactor feedback inputs
Connected cable length	max. 30 m
Connection	potential-free opener/closer contacts
Voltage / current Y0 – Y1 and Y0 – Y2	DC 15 ... 35 V / ca. 4 mA
- Contactor response time	0,5 ... 990,0 s

• Digital inputs In1, In2 and In3:

Digital inputs (parameterizable) for rejection of feedback contacts Y1, Y2, reset enable signal and vector jump.

A switch-off can theoretically occur through these inputs if a rejected feedback contact error is enabled.



Digital inputs +U-In1, +U-In2, +U-In3	for potential-free switching contacts
Connected cable length	max. 30 m
Connection	potential-free opener/closer contacts
Voltage / current	DC 15 ... 35 V / ca. 4 mA