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 including VG1200**

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with Engineering Recommendation G99/1 for systems with a three-phase parallel coupling via an inverter 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, which can be accessed the distribution network provider at any time.

Applied rules and standards:

Engineering Recommendation G99/1-9:2022
Requirements for the connection of generation equipment in parallel with public distribution networks
Annex A – Type A Power Generating Modules
Annex B – Type B Power Generating Modules
Annex C – Type C Power Generating Modules
Annex D – Type D Power Generating Modules
(the unit is intended only for measurement on low voltage sides)

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-G99-1_1**	**Certification program:**	**NSOP-0032-DEU-ZE-V10**
Certificate number:	**U24-0987**	**Date of issue:**	**2024-10-11**

Certification body

Domenik Koll
Head of Energy Systems

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

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

Compliance Verification Report for Inverter Connected Power Generating Modules	
Extract from test report according to the Engineering Recommendation G99	**Nr. 22TH0358-G99-1_1**

Type Approval and declaration of compliance with the requirements of Engineering Recommendation G99.			
PGM Technology	Network and System Protection unit		
Manufacturer / applicant	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 12690-1420-02		
Rated values	UFR 1002IP with VG1200		
Rated supply voltage	AC/DC 24 – 270 V, DC / 45 – 65 Hz (< 5 VA)		
Measurement range of voltage			
Measurement range phase-phase	440 - 1200 VAC		
Setting range phase-phase	440 - 1200 VAC		
Measurement range phase-neutral	250 - 690 VAC		
Setting range phase-neutral	250 - 690 VAC		
Measurement range of frequency			
Measurement range	45 – 65 Hz		
Setting range	45 – 65 Hz		
Firmware version	12690-1400-00 12690-1420-02		

Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 22TH0358-G99-1_1**

The above stated Network and System Protection unit is tested according the requirements in the Engineering Recommendation G99/1. 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 G99/1.

The network monitoring and disconnection unit UFR 1002IP is password protected settable to all values requested in A2-1, A2-2 and A2-3 of the G99. Therefore the network monitoring and disconnection unit UFR 1002IP fulfil all requirements according to

- A2-1 Synchronous Power Generating Modules up to and including 50 kW
- A2-2 Synchronous Power Generating Modules > 50 kW and also for Synchronous Power Generating Modules ≤ 50 kW
- A2-3 Inverter Connected Power Generating Modules

of the G99/1-3.

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	184,3	2,500	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	269,7 V / 0,95 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 ± 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 ± 4,00 V and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 22TH0358-G99-1_1**

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 ± 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 ± 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 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 ± 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 ± 4,00 V and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 22TH0358-G99-1_1**

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	20,00	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 ± 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 ± 0,2 Hz and for the relevant times as shown in the table above to ensure that the protection will not trip in error.

Protection. Re-connection timer.	
Test should prove that the reconnection sequence starts in no less than 20 s for restoration of voltage and frequency to within the stage 1 settings of table 10.1.	
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

Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 22TH0358-G99-1_1**

Protection. Frequency change, Stability test.				
	Start Frequency [Hz]	**Change**	**Test Duration**	**Confirm no trip**
Positive Vector Shift	49,5	+50 degrees		No trip
Negative Vector Shift	50,5	-50 degrees		No trip
Positive Frequency drift	49,0 to 51,0	+0,95 Hz/s	2,1 s	No trip
Negative Frequency drift	51,0 to 49,0	-0,95 Hz/s	2,1 s	No trip

Self-Monitoring – Solid state switching.	**N/A**
It has been verified that in the event of the solid-state switching device failing to disconnect the Power Park Module, the voltage on the output side of the switching device is reduced to a value below 50 V within 0,5 s.	N/A
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, see test report.	

Wiring functional tests if required by para. 15.2.1	**N/A**
Confirm that the relevant test schedule is attached (tests to be undertaken at time of commissioning).	N/A
Note. Type test of components wired correct together on site is part of the commissioning test. The Network and System Protection Unit was tested in a test laboratory. The correct wiring functional test in the field has to be done by the responsible person for the installation of the plant.	

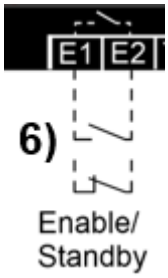
Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 22TH0358-G99-1_1**

Logic Interface (input port) Required by paragraph 11.1.3.1	**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. A Modbus signal can be used to cease Active Power output within 5 s. See test report.	
Provide high level description of logic interface, e.g. details in 11.1.3.1 such as AC or DC signal	Yes

- **Digital inputs E1-E2:**

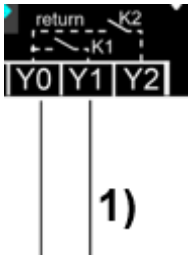
Digital input for enable/standby, configurable as NC contact or NO contact.
When the input is active, a switch-off occurs (relays K1 and K2 drop).



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

- **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 a valid feedback to Y0-Y1 and/or Y0-Y2, a delayed switch-off occurs (relays K1 and K2 drop).



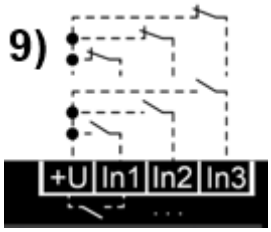
Digital inputs Y0-Y1, Y0-Y2	Y0-Y1, Y0-Y2 → Contactor feedback inputs
Connected cable length	max. 30 m
Connection	potential-free opener/closer contacts
Voltage / current Y0 – Y1 and Y0 – Y2	DC 15 … 35 V / ca. 4 mA
- Contactor response time	0,5 … 990,0 s

Compliance Verification Report for Inverter Connected Power Generating Modules

Extract from test report according to the Engineering Recommendation G99 **Nr. 22TH0358-G99-1_1**

- **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

Additional comments

Voltage and Frequency Relay UFR 1002IP Grid- and Plant Protection NA-Box IP interface and LCD-Display

Coupling Device for Voltage Type VG1200 Measuring of voltages up to 1.200V with NA-Box UFR 1200IP