

**Applicant:** TELE Haase Steuergeräte Ges.m.b.H  
Vorarlberger Allee 38,  
1230 Wien,  
Austria

**Product:** Automatic disconnection device

<b>Model:</b>	NA003
<b>Rating:</b>	Supply: 24Vdc, 100...240Vac 50/60Hz Measurement circuit: 3Ph/N ~400/230Vac 50/60Hz

**Intended use:**

An automatic disconnection device with three-phase mains surveillance in accordance with Engineering Recommendation G98 Issue 1 for systems with a three-phase parallel coupling via an inverter to the public mains supply.

**Applied standards and guidelines:**

**Engineering Recommendation G98 Issue 1 16 May 2018**

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 on or after 17 May 2019

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

**Report No:** 14PP035-14

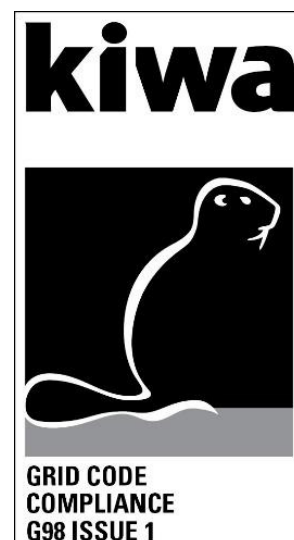
**Certificate No:** 19-047-02

**Date of issue:** 2019-11-12

CERTIFICATE

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Power Quality: Continuous voltage operation range						
Continuous frequency operation range						
Generating Unit tested to EN 50438:2013						
	U [V]		f [Hz]	Cos φ	P [kW]	Limit [%Sn]:
Test 1*	85%Un		47,50Hz	1,00	100%Sn	P≥85%Sn
Measured 90min avg	—		—	—	—	—
Test 2*	110%Un		51,50Hz	1,00	100%Sn	-
Measured 90min avg	—		—	—	—	—
Test 3*	110%Un		52,00Hz	1,00	100%Sn	-
Measured 15min avg	—		—	—	—	—
Test is not applicable for automatic disconnection device						
Power Quality: Harmonics						
Micro-Generator tested to BS EN 61000-3-2						
Micro-Generator rating per phase (rpp)			—	kW	—	
Harmonic	At 45-55% of Registered capacity		100% of Registered capacity			
—	Measured Value (MV) in Amps	—	Measured Value (MV) in Amps	—	Limit in BS EN 61000-3-2 in Amps	Higher limit for odd harmonics 21 and above
Test is not applicable for automatic disconnection device						



Power Quality: Voltage fluctuations and flicker								
	Starting			Stopping			Running	
	d <sub>max</sub>	d <sub>c</sub>	d <sub>(t)</sub>	d <sub>max</sub>	d <sub>c</sub>	d <sub>(t)</sub>	P <sub>st</sub>	P <sub>lt</sub> 2 hours
Measured Values at test impedance	—	—	—	—	—	—	—	—
Normalised to standard impedance	—	—	—	—	—	—	—	—
Normalised to required maximum impedance	N/A							
Limits set under BS EN 61000-3-11	4%	3,3%	3,3%	4%	3,3%	3,3%	1,0	0,65
Test impedance	R	—	Ω	X	—	Ω		
Standard impedance	R	0,24* 0,4^	Ω	X	0,15* 0,25^	Ω		
Maximum impedance	R	—	Ω	X	—	Ω		
Test is not applicable for automatic disconnection device								
Power Quality: DC injection								
Test power level	20%		50%		75%		100%	
Recorded value in Amps	—		—		—		—	
As % of rated AC current	—		—		—		—	
Limit	0,25%		0,25%		0,25%		0,25%	
Test is not applicable for automatic disconnection device								



Power Quality: Power factor			
	216,2V	230V	253V
20% of Registered Capacity	—	—	—
50% of Registered Capacity	—	—	—
75% of Registered Capacity	—	—	—
100% of Registered Capacity	—	—	—
Limit	>0,95	>0,95	>0,95

*Test is not applicable for automatic disconnection device*

Protection: Frequency tests						
Function	Setting		Trip test		"No trip tests"	
	Frequency	Time delay	Frequency	Time delay	Frequency / time	Confirm no trip
U/F stage 1	47,5Hz	20,0s	47,50Hz	20,08s	47,7Hz 25s	NO Trip
U/F stage 2	47,0Hz	0,5s	47,00Hz	0,58s	47,2Hz 19,98s	NO Trip
—	—	—	—	—	46,8Hz 0,48s	NO Trip
O/F	52,0Hz	0,5s	52,01Hz	0,57s	51,8Hz 89,98s	NO Trip
—	—	—	—	—	52,2Hz 0,48s	NO Trip

Protection: Voltage tests						
Function	Setting		Trip test		"No trip tests"	
	Voltage	Time delay	Voltage	Time delay	Voltage / time	Confirm no trip
U/V stage	184,0V	2,5s	183,9V	2,58s	188,0V 3,5s	NO Trip
—	—	—	—	—	180,0V 2,48s	NO Trip
O/V stage 1	262,2V	1,0s	261,7V	1,07s	258,2V 2,0s	NO Trip
O/V stage 2	273,7V	0,5s	273,0V	0,57s	269,7V 0,98s	NO Trip
—	—	—	—	—	277,7V 0,48s	NO Trip



### Protection: Loss of Mains test and single phase test

Note as an alternative, inverters can be tested to BS EN 62116. The following sub set of tests should be recorded in the following table.

Test power and imbalance	33% -5% Q Tests 22	66% -5% Q Test 12	100% -5% P Test 5	33% +5% Q Test 31	66% +5% Q Test 21	100% +5% P Test 10
Trip time. Limit is 0.5s	—	—	—	—	—	—

Single phase test for multi phase **Generating Units**. Confirm that when generating in parallel with a network operating at around 50Hz with no network disturbance, that the removal of a single phase connection to the **Generating Unit**, with the remaining phases connected causes a disconnection of the generating unit within a maximum of 1s.

Ph 1 removed	—	Ph 2 removed	—	Ph 3 removed	—
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*Test is not applicable for automatic disconnection device*

### Protection: Frequency change, Vector Shift Stability test

	Start Frequency	Change	Confirm no trip
Positive vector shift	49,5Hz	+50 degrees	NO Trip
Negative vector shift	50,5Hz	-50 degrees	NO Trip

### Protection: Frequency Change, RoCoF Stability Test

Ramp range	Test frequency ramp	Test duration	Confirm no Trip
49,0 Hz to 51,0 Hz	+0,95Hz/s	2,1 s	NO Trip
51,0 Hz to 49,0 Hz	-0,95Hz/s	2,1 s	NO Trip



Protection: Limited Frequency Sensitive Mode – Overfrequency test				
Test sequence at Registered Capacity >80%	Measured Active Power Output	Frequency	Primary Power Source	Active Power Gradient
Step a) 50,00 Hz± 0,01Hz	—	—	—	—
Step b) 50,45 Hz± 0,05Hz	—	—		—
Step c) 50,70 Hz± 0,10Hz	—	—		—
Step d) 51,15 Hz± 0,05Hz	—	—		—
Step e) 50,70 Hz± 0,10Hz	—	—		—
Step f) 50,45 Hz± 0,05Hz	—	—		—
Step g) 50,00 Hz± 0,01Hz	—	—		—
Test sequence at Registered Capacity 40% - 60%	Measured Active Power Output	Frequency	Primary Power Source	Active Power Gradient
Step a) 50,00 Hz± 0,01Hz	—	—	—	—
Step b) 50,45 Hz± 0,05Hz	—	—		—
Step c) 50,70 Hz± 0,10Hz	—	—		—
Step d) 51,15 Hz± 0,05Hz	—	—		—
Step e) 50,70 Hz± 0,10Hz	—	—		—
Step f) 50,45 Hz± 0,05Hz	—	—		—
Step g) 50,00 Hz± 0,01Hz	—	—		—
Test is not applicable for automatic disconnection device				
Protection: Power output with falling frequency test				
Test sequence	Measured Active Power output	Frequency	Primary power source	
Test a) 50 Hz ± 0,01 Hz	—	—	—	
Test b) Point between 49,5 Hz and 49,6 Hz	—	—	—	
Test c) Point between 47,5 Hz and 47,6 Hz	—	—	—	
Test is not applicable for automatic disconnection device				



Protection: Re-connection timer					
Time delay settings (s)	Measured delay (s)	Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of table 10.5.7.1			
20	20,8	At 266,2V	At 180,0 V	At 47,40Hz	At 52,10Hz
Confirmation that the <b>Micro-generator</b> does not re-connect		Not reconnect	Not reconnect	Not reconnect	Not reconnect
Fault Level contribution					
For machines with electro-magnetic output			For inverter output		
Parameter	Symbol	Value	Time after fault	Volts	Amps
Peak Short Circuit current	$i_p$	—	20ms	—	—
Initial Value of aperiodic current	A	—	100ms	—	—
Initial symmetrical short-circuit current	$I_k$	—	250ms	—	—
Decaying (aperiodic) component of short-circuit current	$i_{DC}$	—	500ms	—	—
Reactance/Resistance Ratio of source	X/R	—	Time to trip	—	In seconds
Test is not applicable for automatic disconnection device					
Self Monitoring solid state switching					
It has been verified that in the event of the solid state switching device failing to disconnect the Micro-Generator, the voltage on the output side of the switching device is reduced to a value below 50 volt within 0,5s.					—
Test is not applicable, automatic disconnection device provide mechanical relais					