



**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 G99-1 for systems with a three-phase parallel coupling to the public mains supply.

**Applied standards and guidelines:**

**Engineering Recommendation G99 Issue 1 16 May 2018**

Requirements for the connection of generation equipment in parallel with public 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.

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**Certificate No:** 19-048-02

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**Kiwa Primara GmbH**  
Gewerbestraße 28  
87600 Kaufbeuren  
Germany  
Tel. +49 8341 99726-0  
info@primara.net  
www.kiwa.de

**Raphael Rader**  
Certification Engineer





## Over and Under Voltage Protection Tests LV

### Calibration and Accuracy tests

Pha- se	Setting	Time Dela y	Pickup Voltage				Relay Operating Time – step from 230V to test value				
Stage 1 Over Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1-N	262,2V 230 V system	1,0s	258,75	261,7V	265,65	Pass	266, 2	1,0s	1,08s	1,1s	Pass
L1-N				261,7V		Pass			1,08s		Pass
L2-N				261,7V		Pass			1,08s		Pass
L2-N				261,7V		Pass			1,08s		Pass
L3-N				261,6V		Pass			1,08s		Pass
L3-N				261,6V		Pass			1,08s		Pass
Stage 2 Over Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1-N	273,7V 230 V system	0,5s	270,25	273.1V	277,15	Pass	277, 7	0,5s	0,57s	0,6s	Pass
L1-N				273.1V		Pass			0,57s		Pass
L2-N				273.1V		Pass			0,57s		Pass
L2-N				273.1V		Pass			0,57s		Pass
L3-N				273.0V		Pass			0,57s		Pass
L3-N				273.0V		Pass			0,57s		Pass
Under Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Measured Value	Upper Limit	Result
L1-N	184,0V 230 V system	2,5s	180,55	183,7V	187,45	Pass	180	2,5s	2,59s	2,6s	Pass
L1-N				183,7V		Pass			2,59s		Pass
L2-N				183,7V		Pass			2,59s		Pass
L2-N				183,7V		Pass			2,59s		Pass
L3-N				183,6V		Pass			2,59s		Pass
L3-N				183,6V		Pass			2,59s		Pass



## Over and Under Voltage Protection Tests LV

### Stability Tests

Test Description	Setting	Time Delay	Test Condition (3-Phase Value)	Test Voltage all phases phase	Test Duration	Confirm No Trip	Result
Inside Normal band	—	—	< OV Stage 1	258,2V	5,00s	NO Trip	Pass
<b>Stage 1 Over Voltage</b>	<b>262,2V</b>	<b>1,0s</b>	> OV Stage 1	269,7V	0,95s	NO Trip	Pass
<b>Stage 2 Over Voltage</b>	<b>273,7V</b>	<b>0,5s</b>	> OV Stage 2	277,7V	0,45s	NO Trip	Pass
Inside Normal band	—	—	> UV	188V	5,00s	NO Trip	Pass
Under Voltage	184,0V	2,5s	< UV	180V	2,45s	NO Trip	Pass

Overvoltage test - Voltage shall be stepped from 258 V to the test voltage and held for the test duration and then stepped back to 258 V.

Undervoltage test – Voltage shall be stepped from 188 V to the test voltage and held for the test duration and then stepped back to 188 V

### Additional Comments / Observations

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## Over and Under Voltage Protection HV

### Calibration and Accuracy tests

Phase	Setting	Time Delay	Pickup Voltage				Relay Operating Time measured value ±2V				
Stage 1 Over Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Mea- sured Value	Upper Limit	Result
L1-L2	121V 110 V VT se- conda- ry	1,0s	119,35	121,0V	122,65	Pass	Mea- sured value plus 2V	1,0s	1,08s	1,1s	Pass
L1-L2				121,0V		Pass			1,08s		Pass
L2-L3				121,0V		Pass			1,08s		Pass
L2-L3				121,0V		Pass			1,08s		Pass
L3-L1				121,1V		Pass			1,08s		Pass
L3-L1				121,1V		Pass			1,08s		Pass
Stage 2 Over Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Mea- sured Value	Upper Limit	Result
L1-L2	124,3V 110 V VT se- conda- ry	0,5s	122,65	124,3V	125,95	Pass	Mea- sured value plus 2V	0,5s	0,57s	0,6s	Pass
L1-L2				124,3V		Pass			0,57s		Pass
L2-L3				124,4V		Pass			0,57s		Pass
L2-L3				124,4V		Pass			0,57s		Pass
L3-L1				124,3V		Pass			0,57s		Pass
L3-L1				124,3V		Pass			0,57s		Pass
Under Voltage			Lower Limit	Measured Value	Upper Limit	Result	Test Value	Lower Limit	Mea- sured Value	Upper Limit	Result
L1-L2	88,0V 110 V VT se- conda- ry	2,5s	86,35	88,0V	89,65	Pass	Mea- sured value minus 2V	2,5s	2,56s	2,6s	Pass
L1-L2				88,0V		Pass			2,56s		Pass
L2-L3				87,9V		Pass			2,56s		Pass
L2-L3				87,9V		Pass			2,56s		Pass
L3-L1				88,0V		Pass			2,56s		Pass
L3-L1				88,0V		Pass			2,56s		Pass



## Over and Under Voltage Protection HV

### Stability Tests

Test Description	Setting	Time Delay	Test Condition (3-Phase Value)	Test Voltage all phases ph-ph	Test Duration	Confirm No Trip	Result
Inside Normal band	—	—	< OV Stage 1	119V	5,00s	NO Trip	Pass
<b>Stage 1 Over Voltage</b>	<b>121V</b>	<b>1,0s</b>	> OV Stage 1	122,3V	0,95s	NO Trip	Pass
<b>Stage 2 Over Voltage</b>	<b>124,3V</b>	<b>0,5s</b>	> OV Stage 2	126,3V	0,45s	NO Trip	Pass
Inside Normal band	—	—	> UV	90V	5,00s	NO Trip	Pass
<b>Under Voltage</b>	<b>88,0V</b>	<b>2,5s</b>	< UV	86V	2,45s	NO Trip	Pass

### Additional Comments / Observations



## Over and Under Frequency Protection

### Calibration and Accuracy tests

Setting	Time Delay	Pickup Frequency				Relay Operating Time				
Over Frequency		Lower Limit	Measured Value	Upper Limit	Result	Freq step	Lower Limit	Measured Value	Upper Limit	Result
52 Hz	0,5s	51,90	52,01 Hz	52,10	Pass	51,7 – 52,3 Hz	0,50s	0,55s	0,60s	Pass
			52,01 Hz		Pass			0,55s		Pass
Stage 1 Under Frequency		Lower Limit	Measured Value	Upper Limit	Result	Freq step	Lower Limit	Measured Value	Upper Limit	Result
47,5 Hz	20s	47,40	47,39 Hz	47,60	Pass	47,8 – 47,2 Hz	20,0s	20,08s	20,2s	Pass
			47,39 Hz		Pass			20,08s		Pass
Stage 2 Under Frequency		Lower Limit	Measured Value	Upper Limit	Result	Freq step	Lower Limit	Measured Value	Upper Limit	Result
47 Hz	0,5s	46,90	47,07 Hz	47,10	Pass	47,3 – 46,7 Hz	0,50s	0,57s	0,60s	Pass
			47,07 Hz		Pass			0,57s		Pass

### Stability Tests

Test Description	Setting	Time Delay	Test Condition	Test Voltage Frequency	Test Duration	Confirm No Trip	Result
Inside Normal band	—	—	< OF	51,8Hz	120s	NO Trip	Pass
<b>Over Frequency</b>	52 Hz	0,5s	> OF	52,2Hz	0,45s	NO Trip	Pass
Inside Normal band	—	—	> UF Stage 1	47,7Hz	30s	NO Trip	Pass
<b>Stage 1 Under Frequency</b>	47,5 Hz	20s	< UF Stage 1	47,2Hz	19,5s	NO Trip	Pass
<b>Stage 2 Under Frequency</b>	47 Hz	0,5s	< UF Stage 2	46,8Hz	0,45s	NO Trip	Pass

Over frequency test - Frequency shall be stepped from 51,8 Hz to the test frequency and held for the test duration and then stepped back to 51,8 Hz.

Under frequency test - Frequency shall be stepped from 47,7 Hz to the test frequency and held for the test duration and then stepped back to 47,7 Hz.

### Additional Comments / Observations



### Details of Loss of Mains Protection

Manufacturer	Manufacturer's type	Date of Installation	Settings	Other information
<b>TELE Haase Steuergeräte Ges.m.b.H</b>	NA003	—	Hardware version: 00010001  Software version: 01.xx.01x	—

### Loss-of-Mains (LOM) Protection Tests

#### Calibration and Accuracy Tests

Ramp in range 49,0-51,0Hz	Time Delay	Pickup (+/- 0,025Hzs <sup>-1</sup> )			Relay Operating Time RoCoF = $\pm 0,05 / 0,10$ Hzs <sup>-1</sup> above setting				
Setting = 0,5 / 1,0Hz/s	Lower Limit	Measured Value	Upper Limit	Result	Test Condition	Lower Limit	Measured Value	Upper Limit	Result
Increasing Frequency	0,475 0,975	0,500 1,000	0,525 1,025	Pass	0,55Hz/s 1,10Hz/s	>0,5s	0,64s 0,63s	<1,0s	Pass
Reducing Fre- quency	0,475 0,975	0,500 1,000	0,525 1,025	Pass	0,55Hz/s 1,10Hz/s	>0,5s	0,64s 0,63s	<1,0s	Pass

#### Stability Tests

Ramp in range 49,0- 51Hz	Test condition	Test frequency ramp	Test Du- ration	Confirm No Trip	Result
Inside Normal band	<RoCoF (increasing f)	0,45Hz/s 0,95Hz/s	4,4s	NO Trip	Pass
Inside Normal band	<RoCoF (reducing f)		2,1s	NO Trip	Pass

#### Additional Comments / Observations:

### LoM Protection – 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

### Wiring functional tests

If required by para 15.2.1, confirm that wiring functional tests have been carried out in accordance with the instructions below	N/A