Bureau Veritas
Consumer Products Services
Germany GmbH
Businesspark A96
86842 Türkheim
Germany
+ 49 (0) 40 740 41 – 0
cps-tuerkheim@de.bureauveritas.com

Certification body of BV CPS GmbH
Accredited according to EN 45011 -
ISO / IEC Guide 65

Certificate of compliance

Applicant: **ABB Oy Power Conversion**
Hiomotie 13
FI-00380 Helsinki
FINLAND

Product: **Grid-tied photovoltaic (PV) inverter**

Model: **PRO-33.0-TL-OUTD-400**
PRO-33.0-TL-OUTD-S-400
PRO-33.0-TL-OUTD-SX-400

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN 50438:2013 for photovoltaic 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.

Applied rules and standards:

EN 50438:2013
Requirements for micro-generating plants to be connected in parallel with public low-voltage distribution networks

DIN V VDE V 0126-1-1:2006-02 (Functional safety)
Automatic disconnection device between a generator and the public low-voltage grid

The generators PRO-33.0-TL-OUTD-400, PRO-33.0-TL-OUTD-S-400 and PRO-33.0-TL-OUTD-SX-400 are rated >16A per phase. However all requirements of the EN 50438:2013 are fulfilled.

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: **13TH0463-EN50438**
Certificate number: **U14-0353**
Date of issue: **2014-07-11**

Certification body

Dieter Zitzmann

Annex to the EN 50438 certificate of compliance No. U14-0353

Appendix E Type Verification Test Report	
Extract from test report according to EN 50438	**Nr. 13TH0463**

Type Approval and declaration of compliance with the requirements of EN 50438.			
Manufacturer / applicant:	**ABB Oy Power Conversion** Hiomotie 13 FI-00380 Helsinki **FINLAND**		
Micro-generator Type	**Grid-tied photovoltaic inverter**		
Rated values	**PRO-33.0-TL-OUTD-400**	**PRO-33.0-TL-OUTD-S-400**	**PRO-33.0-TL-OUTD-SX-400**
Maximum rated capacity	**33kW**		
Rated voltage	**230V**		
Firmware version	**v1.61.0.3**		
* The tests were performed with firmware version v1.61.0.3. Changes in the firmware version on position v1.6x.x.x has no effect on the required electrical properties. x = could be any number or sign			
Measurement period:	2014-06-13 to 2014-07-10		

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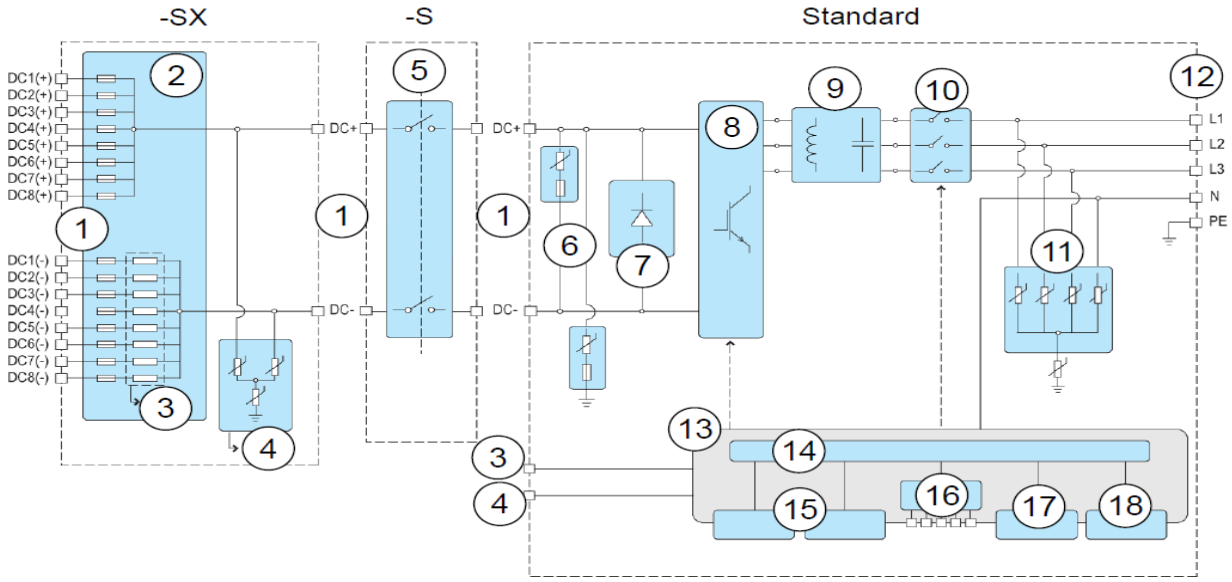
Description of the structure of the power generation unit (Figure 1):

The power generation unit is equipped with a line-side EMC filter. The unit does not provide galvanic separation from input to output (transformerless inverter).Output switch-off is performed with single-fault tolerance based on two series-connected relays in line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.

Block diagram



No.	Component	Description
1	Input terminals	DC cabling from the PV arrays with PV quick connectors (-SX) or with screw terminals (standard & -S)
2	Input board with string fuses (-SX)	Circuit board with optional string fuses for both poles (positive and negative) and string measurement functions.
3	String current monitoring (-SX)	Measures string current.
4	Monitored surge protection (-SX)	Detects overvoltage peaks caused by lightning discharge or electrostatic induction.
5	DC switch (-S & -SX)	On/Off switch which isolates the PV array from the electrical grid
6	Input varistors	Inverter overvoltage protection components. (standard & -S)
7	Reverse polarity protection diode	Protects the inverter from reverse connected inputs.
8	Inverter	DC to AC conversion and maximum power point tracker (MPPT)
9	Line filter	Three-phase output current filter.
10	AC relays	AC disconnecting relays.
11	AC output varistors	Protects the inverter from overvoltage peaks.
12	AC terminals	AC cabling connection.
13	Control board	Controls and interfaces to the inverter.
14	Control and monitoring	Control and monitoring circuits.
15	Extension modules	Extension module slots for optional modules.
16	Monitoring interface	Remote monitoring.
17	Control unit	Removable control unit.
18	Status LEDs	Inverter status LEDs on the control board.

Figure 1 – Schematic structure of the power generation unit

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Extract from test report according to EN 50438 **Nr. 13TH0463**

Differences between Micro-generator units:

The measurements were done with the inverter PRO-33.0-TL-OUTD-SX-400. If measurements were done at another inverter type of the series, a statement is given under the certain test.

The standard and -S models have screw terminals for DC connection, and they are designed to be used with external solar array junction boxes. In addition to the standard model, the -S model has an integrated DC switch, which disconnects both positive and negative DCinputs.
The -SX model has an integrated solar array junction box with comprehensive DC protection and monitoring features. It has the DC switch to disconnect both positive and negative DC inputs, monitored string fuses (16 pcs), string current monitoring with a configurable alarm limit, and monitored Type II DC overvoltage protection. It provides solar quick connectors to connect up to 8 strings.

The above stated micro-generators are tested according to the requirements in the EN 50438. 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 EN 50438.

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Type testing of the interface protection

Over-/under-voltage tests

Phase1

Parameter	Protection limit		Actual setting		Trip value (test result)	
	Voltage [V]	Disconnection time [s]	Voltage [V]	Disconnection time [s]	Voltage [V]	Disconnection time [s]
Over-voltage stage 1	253	3	253	3	253,0	2,97
Over-voltage stage 2	264,5	0,2	264,5	0,2	264,3	0,177
Under-voltage stage 1	195,5	1,5	195,5	1,5	195,4	1,48

Phase2

Parameter	Protection limit		Actual setting		Trip value (test result)	
	Voltage [V]	Disconnection time [s]	Voltage [V]	Disconnection time [s]	Voltage [V]	Disconnection time [s]
Over-voltage stage 1	253	3	253	3	253,2	2,96
Over-voltage stage 2	264,5	0,2	264,5	0,2	264,4	0,167
Under-voltage stage 1	195,5	1,5	195,5	1,5	196,1	1,48

Phase3

Parameter	Protection limit		Actual setting		Trip value (test result)	
	Voltage [V]	Disconnection time [s]	Voltage [V]	Disconnection time [s]	Voltage [V]	Disconnection time [s]
Over-voltage stage 1	253	3	253	3	253,9	2,96
Over-voltage stage 2	264,5	0,2	264,5	0,2	265,1	0,176
Under-voltage stage 1	195,5	1,5	195,5	1,5	195,7	1,48

Note.
Minimum operation time according to default interface protection:
Over-voltage stage 1 -
Over-voltage stage 2 0,1s
Under-voltage 1,2s

Appendix E Type Verification Test Report

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Over-/under-frequency tests						
Parameter	**Protection limit**		**Actual setting**		**Trip value (test result)**	
	Frequency [Hz]	**Disconnection time [s]**	**Frequency [Hz]**	**Disconnection time [s]**	**Frequency [Hz]**	**Disconnection time [s]**
Over-frequency	52,0	0,5s	52,0	0,5s	52,0	0,49
Under-frequency	47,5	0,5s	47,5	0,5s	47,5	0,48
Note. Minimum operation time according to default interface protection: Over-frequency 0,5 s Under-frequency 0,5 s						

LoM test						
Method used	**EN 62116**					
Balancing load on islanded network	**33% of -5% Q Test 22**	**66% of -5% Q Test 12**	**100% of -5% P Test 5**	**33% of +5% Q Test 31**	**66% of +5% Q Test 21**	**100% of +5% P Test 10**
Trip time. Phase 1 fuse removed	47,0ms	171ms	164ms	67,0ms	149ms	192ms
Trip time. Phase 2 fuse removed	47,0ms	171ms	164ms	67,0ms	149ms	192ms
Trip time. Phase 3 fuse removed	47,0ms	171ms	164ms	67,0ms	149ms	192ms
Indicate additional shut down time included in above results. (Integrated interface switch)				Type of switching equipment 1: Relay RS50 with 40ms Type of switching equipment 2: Relay AZSR250 with 40ms		

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Extract from test report according to EN 50438	**Nr. 13TH0463**

Type testing of a micro-generator

Operating range

Test 1: U = 195,5 V; f = 47,5 Hz; P = 1,00 Sn; cosφ = 1
Test 2: U = 253,0 V; f = 51,5 Hz; P = 1,00 Sn; cosφ = 1

Test sequence	Voltage [V]	Frequency [Hz]	Output power [W]	Cos φ [1]
1	195,8	47,49	29558	0,9999
2	253,8	51,49	33293	0,9999

Active power at under-frequency			
5-min mean value (each)	**a) 50 ± 0,01 [Hz]**	**b) - 0,4 to – 0,5 [Hz]**	**c) - 2,4 to - 2,5 [Hz]**
Frequency [Hz]:	50,00	49,49	47,60
Active power [kW]:	33,13	33,13	33,14
ΔP/PM [%] per 1 Hz:			0

Power response to over-frequency							
1-min mean value [Hz]:	**a) 50,00**	**b) 50,25**	**c) 50,70**	**d) 51,15**	**e) 50,70**	**f) 50,25**	**g) 50,00**
1. Measurement a) to g): Active power output > 80% Pn							
Frequency [Hz]:	50,06	50,24	50,69	51,13	50,69	50,24	49,98
PM [kW]:	N/A	32,40	26,50	20,62	26,51	32,40	N/A
PE60 [kW]:	32,91	32,54	26,69	20,82	26,63	32,49	33,04
ΔPE60/PM [%]:	N/A	0,43	0,58	0,62	0,37	0,27	N/A
2. Measurement a) to g): Active power output 40% and 60% after freezing > 80% Pn							
Frequency [Hz]:	50,09	50,24	50,69	51,13	50,69	50,24	49,98
PM [kW]:	N/A	16,22	13,27	10,32	13,27	16,22	N/A
PE60 [kW]:	16,47	16,32	13,38	10,45	13,30	16,26	18,23
ΔPE60/PM [%]:	N/A	0,32	0,33	0,39	0,10	0,12	N/A
Limit ΔP/P1min:	+ 10 % of P_M						

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Reactive power

Controllable reactive power

Inductive (supply reactive power)

Power-BIN	Active power [W]	Reactive power [Var]	Power factor (cos φ)	DC power [W]
0% - 10%	1059,09	-14611,22	-0,07	1398,33
10% - 20%	3704,06	-14587,47	-0,25	4058,88
20% - 30%	6653,66	-14561,27	-0,42	7038,17
30% - 40%	9588,00	-14535,52	-0,55	10009,30
40% - 50%	12845,79	-14505,49	-0,66	13319,13
50% - 60%	15766,56	-14479,57	-0,74	16293,25
60% - 70%	18680,81	-14452,69	-0,79	19277,59
70% - 80%	21577,25	-14422,84	-0,83	22243,12
80% - 90%	24472,40	-14396,48	-0,86	25226,61
90% - 100%	29594,85	-14475,28	-0,90	30500,83

Capacitive (supply reactive power)

Power-BIN	Active power [W]	Reactive power [Var]	Power factor (cos φ)	DC power [W]
0% - 10%	993,78	14392,72	0,07	1396,69
10% - 20%	3634,91	14404,02	0,24	4042,44
20% - 30%	6599,61	14412,58	0,42	7044,10
30% - 40%	9543,13	14439,76	0,55	10022,14
40% - 50%	12791,71	14472,54	0,66	13318,04
50% - 60%	15705,87	14492,85	0,73	16289,96
60% - 70%	18620,67	14518,72	0,79	19269,91
70% - 80%	21517,29	14545,52	0,83	22244,85
80% - 90%	24425,37	14567,29	0,86	25231,65
90% - 100%	29535,08	14612,09	0,90	30522,63

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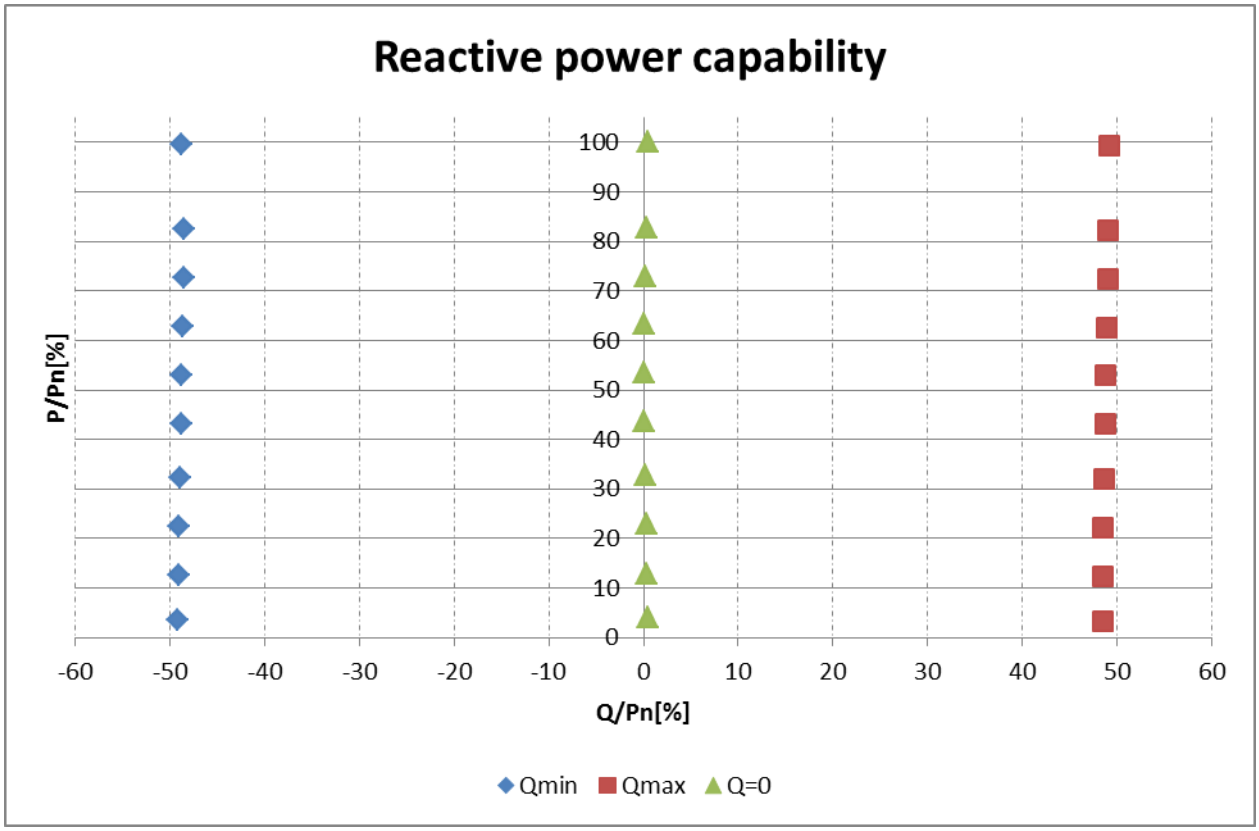
Reactive power supply with set point Q=0

Power-BIN	Active power [W]	Reactive power [Var]	Power factor (cos φ)	DC power [W]
0% - 10%	1210,57	131,04	0,99	1405,71
10% - 20%	3849,34	109,70	1,00	4057,36
20% - 30%	6793,51	79,07	1,00	7043,49
30% - 40%	9721,25	51,60	1,00	10021,18
40% - 50%	12960,21	23,10	1,00	13322,02
50% - 60%	15880,69	8,16	1,00	16308,35
60% - 70%	18786,17	31,29	1,00	19284,77
70% - 80%	21683,23	57,00	1,00	22261,92
80% - 90%	24577,66	85,90	1,00	25243,19
90% - 100%	29698,04	131,22	1,00	30532,36

Diagram of inductive reactive power absorption



Q adjustment

	Reactive power set point Q [Var]	Measured reactive power Q [Var]	Measured cos φ	Deviation compared to setpoint ΔQ / PN [%]
- Qmin	-48.43	-48,77%	-0,34%	-48.43
0	0	-0,02%	-0,02%	0
+ Qmax	+48,43	48,77%	0,34%	+48,43

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Connection and starting to generate electrical power		
	Voltage conditions	
a) Start up for voltage range	**<84% Un for twice of observation time**	**>111% Un for twice of observation time**
Connection:	No connection	No connection
Limit:	No connection allowed	
b) In voltage range at start-up	**≥84% Un within twice setting observation time**	**≤111% Un within twice setting observation time**
Reconnection time [s]	93	90
Limit:	Connected after setting observation time (≥60s)	
Gradient:	For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. For recorded gradient see diagram below.	
c) In voltage range after voltage failure	**≥84% Un for twice of setting observation time**	**≤111% Un for twice of setting observation time**
Reconnection time [s]	89	94
Limit:	Reconnection after setting observation time (≥60s)	
Gradient:	For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. For recorded gradient see diagram below.	
	Frequency conditions	
d) Start up for frequency range	**<47,45 Hz for twice of setting observation time**	**>50,15 Hz for twice of setting observation time**
Connection:	No connection	No connection
Limit	No connection allowed	
e) In frequency range at start-up	**≥47,45 Hz within twice of setting observation time**	**≤51,15 Hz within twice of setting observation time**
Reconnection time [s]	91	80
Limit:	Connected after setting delay time(≥60s)	
Gradient:	For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. For recorded gradient see diagram below.	
f) In frequency range after frequency failure	**≥47,45 Hz for twice of setting observation time**	**≤51,15 Hz for twice of setting observation time**
Reconnection time [s]	89	97
Limit:	Reconnection after setting observation time (≥60s)	
Gradient:	For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. For recorded gradient see diagram below.	

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Short-circuit current contribution					
Short-circuit current parameters					
For a directly coupled micro-generator			**For a Inverter micro-generator**		
Parameter	**Symbol**	**Value**	**Time after fault**	**Volts**	**Amps**
Peak Short Circuit current	I_p	N/A	20ms	86,5	56,3
Initial Value of aperiodic current	A	N/A	100ms	58,5	51,9
Initial symmetrical short-circuit current*	I_k	N/A	250ms	53,7	33,9
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	52,1	24,0
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to trip**	0,119	In seconds

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. 13TH0463**

Power Quality. Harmonic current emission					
micro-generator		PRO-33.0-TL-OUTD-400	PRO-33.0-TL-OUTD-S-400	PRO-33.0-TL-OUTD-SX-400	
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN61000-3-12 [%]	
				1 phase	3 phase
1st	49,626	100,000	Phase 1	-	-
2nd	0,105	0,212	Phase 1	8	8
3rd	0,063	0,128	Phase 1	21,6	N/A
4th	0,079	0,158	Phase 1	4	4
5th	1,563	3,149	Phase 1	10,7	10,7
6th	0,034	0,068	Phase 1	2,67	2,67
7th	0,429	0,864	Phase 1	7,2	7,2
8th	0,034	0,069	Phase 1	2	2
9th	0,016	0,033	Phase 1	3,8	N/A
10th	0,012	0,025	Phase 1	1,6	1,6
11th	0,105	0,211	Phase 1	3,1	3,1
12th	0,005	0,011	Phase 1	1,33	1,33
13th	0,162	0,326	Phase 1	2	2
14th	0,005	0,011	Phase 1	N/A	N/A
15th	0,012	0,023	Phase 1	N/A	N/A
16th	0,005	0,011	Phase 1	N/A	N/A
17th	0,076	0,154	Phase 1	N/A	N/A
18th	0,003	0,007	Phase 1	N/A	N/A
19th	0,059	0,119	Phase 1	N/A	N/A
20th	0,005	0,010	Phase 1	N/A	N/A
21th	0,012	0,024	Phase 1	N/A	N/A
22th	0,003	0,007	Phase 1	N/A	N/A
23th	0,062	0,126	Phase 1	N/A	N/A
24th	0,003	0,006	Phase 1	N/A	N/A
25th	0,047	0,094	Phase 1	N/A	N/A
26th	0,002	0,004	Phase 1	N/A	N/A
27th	0,003	0,005	Phase 1	N/A	N/A
28th	0,002	0,004	Phase 1	N/A	N/A
29th	0,032	0,065	Phase 1	N/A	N/A
30th	0,002	0,004	Phase 1	N/A	N/A
31th	0,019	0,039	Phase 1	N/A	N/A
32th	0,002	0,004	Phase 1	N/A	N/A
33th	0,002	0,003	Phase 1	N/A	N/A
34th	0,002	0,004	Phase 1	N/A	N/A
35th	0,012	0,025	Phase 1	N/A	N/A
36th	0,003	0,005	Phase 1	N/A	N/A
37th	0,011	0,022	Phase 1	N/A	N/A
38th	0,012	0,025	Phase 1	N/A	N/A
39th	0,003	0,006	Phase 1	N/A	N/A
40th	0,012	0,024	Phase 1	N/A	N/A
THD_{40}	3,31%		Phase 1	13	13
PWHD	0,147%		Phase 1	22	22

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Power Quality. Harmonic current emission					
micro-generator		PRO-33.0-TL-OUTD-400	PRO-33.0-TL-OUTD-S-400	PRO-33.0-TL-OUTD-SX-400	
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN61000-3-12 [%]	
				1 phase	3 phase
1st	49,464	100,000	Phase 2	-	-
2nd	0,040	0,081	Phase 2	8	8
3rd	0,072	0,146	Phase 2	21,6	N/A
4th	0,032	0,064	Phase 2	4	4
5th	1,562	3,159	Phase 2	10,7	10,7
6th	0,065	0,132	Phase 2	2,67	2,67
7th	0,423	0,856	Phase 2	7,2	7,2
8th	0,013	0,026	Phase 2	2	2
9th	0,012	0,025	Phase 2	3,8	N/A
10th	0,010	0,021	Phase 2	1,6	1,6
11th	0,098	0,199	Phase 2	3,1	3,1
12th	0,007	0,014	Phase 2	1,33	1,33
13th	0,171	0,346	Phase 2	2	2
14th	0,004	0,008	Phase 2	N/A	N/A
15th	0,009	0,018	Phase 2	N/A	N/A
16th	0,006	0,012	Phase 2	N/A	N/A
17th	0,061	0,123	Phase 2	N/A	N/A
18th	0,004	0,008	Phase 2	N/A	N/A
19th	0,052	0,105	Phase 2	N/A	N/A
20th	0,002	0,005	Phase 2	N/A	N/A
21th	0,003	0,006	Phase 2	N/A	N/A
22th	0,003	0,007	Phase 2	N/A	N/A
23th	0,052	0,106	Phase 2	N/A	N/A
24th	0,002	0,004	Phase 2	N/A	N/A
25th	0,043	0,088	Phase 2	N/A	N/A
26th	0,002	0,004	Phase 2	N/A	N/A
27th	0,003	0,006	Phase 2	N/A	N/A
28th	0,002	0,004	Phase 2	N/A	N/A
29th	0,029	0,058	Phase 2	N/A	N/A
30th	0,002	0,003	Phase 2	N/A	N/A
31th	0,020	0,040	Phase 2	N/A	N/A
32th	0,001	0,003	Phase 2	N/A	N/A
33th	0,002	0,005	Phase 2	N/A	N/A
34th	0,002	0,004	Phase 2	N/A	N/A
35th	0,011	0,023	Phase 2	N/A	N/A
36th	0,002	0,004	Phase 2	N/A	N/A
37th	0,011	0,021	Phase 2	N/A	N/A
38th	0,011	0,022	Phase 2	N/A	N/A
39th	0,003	0,007	Phase 2	N/A	N/A
40th	0,009	0,019	Phase 2	N/A	N/A
THD_{40}	3,31%		Phase 2	13	13
PWHD	0,105%		Phase 2	22	22

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Extract from test report according to EN 50438 **Nr. 13TH0463**

Power Quality. Harmonic current emission					
micro-generator		PRO-33.0-TL-OUTD-400	PRO-33.0-TL-OUTD-S-400	PRO-33.0-TL-OUTD-SX-400	
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN61000-3-12 [%]	
				1 phase	3 phase
1st	49,518	100,000	Phase 3	-	-
2nd	0,124	0,251	Phase 3	8	8
3rd	0,110	0,223	Phase 3	21,6	N/A
4th	0,090	0,182	Phase 3	4	4
5th	1,584	3,198	Phase 3	10,7	10,7
6th	0,046	0,094	Phase 3	2,67	2,67
7th	0,409	0,827	Phase 3	7,2	7,2
8th	0,029	0,059	Phase 3	2	2
9th	0,015	0,030	Phase 3	3,8	N/A
10th	0,010	0,020	Phase 3	1,6	1,6
11th	0,092	0,187	Phase 3	3,1	3,1
12th	0,006	0,013	Phase 3	1,33	1,33
13th	0,180	0,364	Phase 3	2	2
14th	0,005	0,009	Phase 3	N/A	N/A
15th	0,011	0,022	Phase 3	N/A	N/A
16th	0,004	0,009	Phase 3	N/A	N/A
17th	0,060	0,121	Phase 3	N/A	N/A
18th	0,003	0,006	Phase 3	N/A	N/A
19th	0,067	0,135	Phase 3	N/A	N/A
20th	0,005	0,010	Phase 3	N/A	N/A
21th	0,012	0,023	Phase 3	N/A	N/A
22th	0,003	0,005	Phase 3	N/A	N/A
23th	0,052	0,106	Phase 3	N/A	N/A
24th	0,002	0,004	Phase 3	N/A	N/A
25th	0,051	0,102	Phase 3	N/A	N/A
26th	0,002	0,004	Phase 3	N/A	N/A
27th	0,003	0,006	Phase 3	N/A	N/A
28th	0,002	0,005	Phase 3	N/A	N/A
29th	0,028	0,057	Phase 3	N/A	N/A
30th	0,002	0,003	Phase 3	N/A	N/A
31th	0,023	0,046	Phase 3	N/A	N/A
32th	0,002	0,004	Phase 3	N/A	N/A
33th	0,002	0,004	Phase 3	N/A	N/A
34th	0,002	0,003	Phase 3	N/A	N/A
35th	0,010	0,020	Phase 3	N/A	N/A
36th	0,002	0,004	Phase 3	N/A	N/A
37th	0,011	0,022	Phase 3	N/A	N/A
38th	0,011	0,022	Phase 3	N/A	N/A
39th	0,003	0,006	Phase 3	N/A	N/A
40th	0,021	0,042	Phase 3	N/A	N/A
THD_{40}	3,36%		Phase 3	13	13
PWHD	0,127%		Phase 3	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. 13TH0463**

Voltage fluctuation and Flicker.					
	Maximum permissible flicker and voltage fluctuation as per EN 61000-3-11				
Value	**Pst**	**Plt 2 hours**	**d(t) $_{500ms}$**	**dc**	**dmax**
Limit	1,0	0,65	3,3%	3,3%	4%
Test value	0,086	0,086	3,3%	3,3%	0,33%

DC-Injection.				
Protection limit	**Tested at four power levels limit 0,5% of IAC_{nom}**			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	8,91	49,70	48,08	27,15
Max. test value (phase L2) [mA]	74,81	43,39	102,72	32,90
Max. test value (phase L3) [mA]	37,33	16,62	29,62	47,66