Certificat de conformitate

Solicitant:	**KACO new energy GmbH** Carl-Zeiss-Straße 1 74172 Neckarsulm **Germania**
Produs:	**Dispozitiv de deconectare automată între generator şi reţelele de distribuţie publică de joasă tensiune**
Model:	**blueplanet 15.0 TL3 M2 WM OD IIG0** **blueplanet 20.0 TL3 M2 WM OD IIG0**

A se utiliza în conformitate cu reglementările de mai jos:

Dispozitiv de deconectare automată a sistemului de supraveghere a curentului trifazic în conformitate cu EN 50438:2013, SR EN 50438:2013, DIN V VDE V 0126-1-1:2006-02, DIN V VDE V 0126-1-1/A1:2012-02 pentru sistemele fotovoltaice cu o branşare trifazică paralelă prin intermediul unui invertor din cadrul reţelei publice de alimentare cu energie electrică. Dispozitivul de deconectare automată este parte integrantă a invertorului menţionat anterior. Acesta serveşte drept înlocuitor al dispozitivului de deconectare cu funcţia de izolare, pe care furnizorul reţelei de distribuţie îl poate oricând accesa.

Reguli şi standarde aplicabile:

EN 50438:2013, SR EN 50438:2013
Prescripţii pentru conectarea micro-generatoarelor în paralel cu reţ elele electrice publice de distribuţie de joasă tensiune Înlocuit prin

DIN V VDE V 0126-1-1 (VDE V 0126-1-1):2006-02
Dispozitiv de deconectare automată între generator şi reţelele de distribuţie publică de joasă tensiune

DIN V VDE V 0126-1-1/A1 (VDE V 0126-1-1/A1):2012-02
Dispozitiv de deconectare automată între generator şi reţelele de distribuţie publică de joasă tensiune, amendamentul 1

Conceptul de siguranţă al produsului reprezentativ susmenţionat corespunde, la momentul emiterii prezentului certificat, specificaţiilor valide privind siguranţa pentru utilizarea specificată în conformitate cu normele.

Număr raport:	**10TH0306-EN50438_1**
Număr certificat:	**U17-0353**
Data emiterii:	**2017-07-28**

Institutul de certificare

Holger Schaffer
Institutul de certificare Bureau Veritas Consumer Products Services Germany GmbH
acreditat în funcție de DIN EN ISO/IEC 17065

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

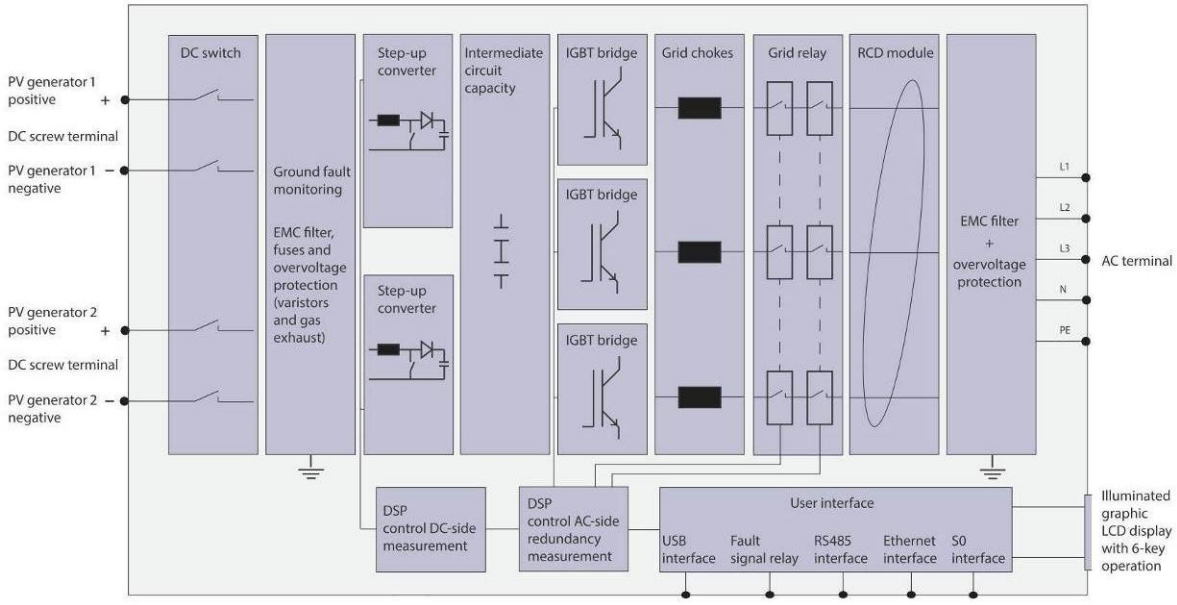
Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. 10TH0306**

Type Approval and declaration of compliance with the requirements of EN 50438.		
Manufacturer / applicant:	**KACO new energy GmbH** Carl-Zeiss-Straße 1 74172 Neckarsulm **Germany**	
Micro-generator Type	Grid-tied photovoltaic inverter	
Rated values	**blueplanet 15.0 TL3 M2 WM OD IIG0**	**blueplanet 20.0 TL3 M2 WM OD IIG0**
Maximum rated capacity	**15,33**	**21,00**
Rated voltage	**400 V_{AC} (P-P) / 230 V_{AC} (3/PEN), 50 Hz**	
Firmware version	**PKT: V4.10; ARM: V5.10; CFG: V6.0604; DSP-AC: V4.10, DSP-DC: V4.03**	
Measurement period:	2017-07-10 to 2017-07-26	

Description of the structure of the power generation unit:

The power generation unit is equipped with a PV and line-side EMC filter. The power generation unit has no galvanic isolation between DC input and AC output. Output switch-off is performed with single-fault tolerance thanks to the inverter bridge and two series-connected relays. This enables a safe disconnection of the power generation unit from the network in case of error.



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.

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. 10TH0306**

Type testing of the interface protection

blueplanet 20.0 TL3 M2 WM OD IIG0

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	253,0	600*	253,0	600*	253,0	431*
Over-voltage stage 2	264,5	0,2	264,5	0,2	263,7	177
Under-voltage stage 1	195,5	1,5	195,5	1,5	196,4	1477

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	253,0	600*	253,0	600*	253,0	431*
Over-voltage stage 2	264,5	0,2	264,5	0,2	264,4	181
Under-voltage stage 1	195,5	1,5	195,5	1,5	197,0	1481

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	253,0	600*	253,0	600*	253,0	431*
Over-voltage stage 2	264,5	0,2	264,5	0,2	264,6	174
Under-voltage stage 1	195,5	1,5	195,5	1,5	197,1	1474

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

*over-voltage-stage 1: 10 min-mean-value corresponding to EN 50160. The disconnection after a 10min mean value is detected takes place within 200ms.

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. 10TH0306**

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	52,00	0,5	52,00	0,5	52,01	0,467
Under-frequency	47,50	0,5	47,50	0,5	47,50	0,485

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 L1 [ms]	184	170	164	185	201	188
Trip time L2 [ms]	184	170	164	185	201	188
Trip time L3 [ms]	184	170	164	185	201	188

Indicate additional shut down time included in above results. (Integrated interface switch)	Type of switching equipment 1: Relay with 20ms Type of switching equipment 2: Relay with 20ms

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]**
blueplanet 20.0 TL3 M2 WM OD IIG0				
1	195,5	47,49	18460	0,999
2	253,0	51,50	20086	0,999

Active power at under-frequency			
blueplanet 20.0 TL3 M2 WM OD IIG0			
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	49,60	47,60
Active power [W]:	20,02	20,01	20,0
ΔP/PM [%] per 1 Hz:			0

Appendix E Type Verification Test Report	
Extract from test report according to EN 50438	**Nr. 10TH0306**

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]:	49,98	50,24	50,68	51,13	50,68	50,23	49,98
PM [kW]:	N/A	14,82	12,13	9,44	12,13	14,81	N/A
PE60 [kW]:	15,04	14,88	12,48	9,86	12,37	14,80	15,05
ΔPE60/PM [%]:	N/A	0,37	2,32	2,78	1,57	-0,07	N/A
2. Measurement a) to g): Active power output 40% and 60% after freezing > 80% Pn							
Frequency [Hz]:	49,98	50,24	50,68	51,13	50,68	50,23	49,98
PM [kW]:	N/A	7,49	6,13	4,77	6,13	7,48	N/A
PE60 [kW]:	7,60	7,11	5,85	4,55	5,77	7,04	8,30
ΔPE60/PM [%]:	N/A	-2,48	-1,87	-1,44	-2,38	-2,91	N/A
Limit ΔP/P1min:	+ 10 % of P_M						

Reactive power			
Uncontrollable reactive power			
blueplanet 20.0 TL3 M2 WM OD IIG0			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,999	0,999	0,998
50% PN	0,999	0,999	0,999
75% PN	0,999	0,999	0,999
100% PN	0,999	0,999	0,999
Limit	**>0,95**	**>0,95**	**>0,95**

Appendix E Type Verification Test Report

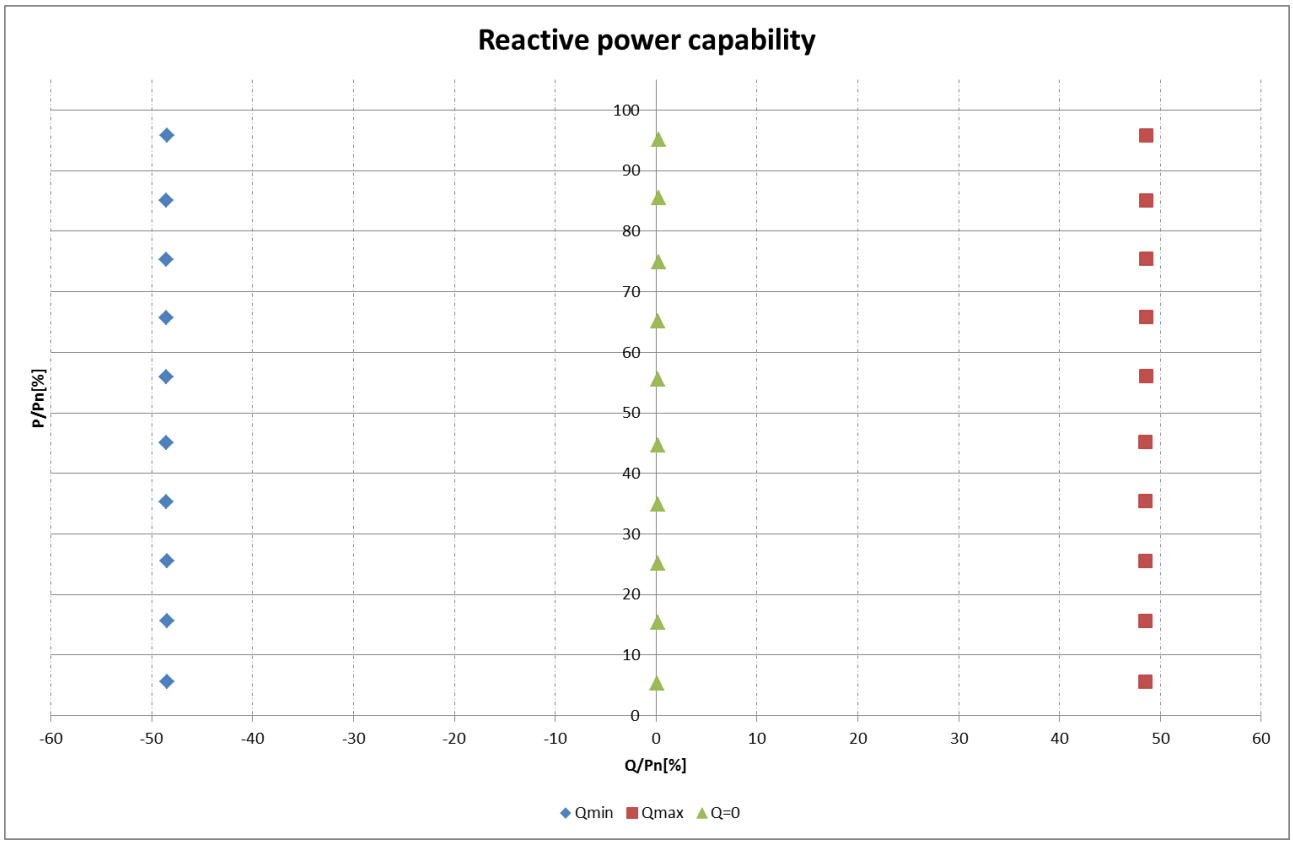
Extract from test report according to EN 50438 **Nr. 10TH0306**

Controllable reactive power				
blueplanet 20.0 TL3 M2 WM OD IIG0				
Inductive (supply reactive power)				
Power-BIN	**Active power [W]**	**Reactive power [Var]**	**Power factor (cos φ)**	**DC power [W]**
0% - 10%	1004,01	-8723,41	-0,11	1256,62
10% - 20%	2805,75	-8722,23	-0,31	3077,73
20% - 30%	4589,45	-8730,20	-0,47	4893,12
30% - 40%	6361,63	-8734,69	-0,59	6701,83
40% - 50%	8115,89	-8736,93	-0,68	8498,54
50% - 60%	10075,03	-8737,87	-0,76	10515,25
60% - 70%	11825,64	-8738,86	-0,80	12322,06
70% - 80%	13566,18	-8738,36	-0,84	14124,77
80% - 90%	15303,04	-8735,30	-0,87	15932,06
90% - 100%	17236,08	-8729,50	-0,89	17948,10
Capacitive (supply reactive power)				
Power-BIN	**Active power [W]**	**Reactive power [Var]**	**Power factor (cos φ)**	**DC power [W]**
0% - 10%	1013,26	8732,09	0,12	1247,56
10% - 20%	2814,76	8733,87	0,31	3067,26
20% - 30%	4603,47	8735,24	0,47	4885,63
30% - 40%	6377,62	8735,96	0,59	6696,12
40% - 50%	8132,24	8737,49	0,68	8494,89
50% - 60%	10091,17	8739,78	0,76	10508,49
60% - 70%	11841,03	8742,13	0,80	12316,39
70% - 80%	13582,34	8744,89	0,84	14123,94
80% - 90%	15319,83	8747,07	0,87	15928,07
90% - 100%	17245,45	8752,38	0,89	17940,75
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%	962,18	25,79	0,97	1060,43
10% - 20%	2754,84	29,64	0,99	2888,08
20% - 30%	4521,66	32,07	1,00	4694,71
30% - 40%	6287,98	33,55	1,00	6507,71
40% - 50%	8030,21	36,07	1,00	8298,33
50% - 60%	9981,73	38,57	1,00	10311,42
60% - 70%	11727,07	40,44	1,00	12120,94
70% - 80%	13470,27	44,48	1,00	13930,14
80% - 90%	15399,02	45,41	1,00	15939,91
90% - 100%	17132,19	52,29	1,00	17751,27

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. 10TH0306**

Diagram of inductive reactive power absorption



Q adjustment

	Reactive power set point Q [kVar]	Measured reactive power Q [kVar]	Measured cos φ	Deviation compared to setpoint ΔQ / PN [%]
- Qmin	-48,43%	-48,51%	0,724	-0,08%
0	0,00%	0,18%	0,999	0,18%
+ Qmax	+48,43%	48,54%	0,719	0,11%

Appendix E Type Verification Test Report	
Extract from test report according to EN 50438	**Nr. 10TH0306**

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]	117	118
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]	108	108
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]	114	116
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]	114	116
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.	

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. 10TH0306**

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	64,82 V	24,77 A
Initial Value of aperiodic current	A	N/A	100ms	61,49 V	26,76 A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	61,20 V	27,66 A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	61,12 V	28,24 A
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to trip**	0,570 s	In seconds

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. 10TH0306**

Power Quality. Harmonic current emission

EUT		blueplanet 20.0 TL3 M2 WM OD IIG0			
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	28,167	100,000	Phase 1	-	-
2nd	0,052	0,184	Phase 1	8	8
3rd	0,017	0,060	Phase 1	21,6	N/A
4th	0,069	0,246	Phase 1	4	4
5th	0,016	0,056	Phase 1	10,7	10,7
6th	0,009	0,033	Phase 1	2,67	2,67
7th	0,013	0,044	Phase 1	7,2	7,2
8th	0,011	0,038	Phase 1	2	2
9th	0,012	0,043	Phase 1	3,8	N/A
10th	0,009	0,032	Phase 1	1,6	1,6
11th	0,029	0,104	Phase 1	3,1	3,1
12th	0,010	0,034	Phase 1	1,33	1,33
13th	0,028	0,099	Phase 1	2	2
14th	0,011	0,037	Phase 1	N/A	N/A
15th	0,011	0,038	Phase 1	N/A	N/A
16th	0,009	0,032	Phase 1	N/A	N/A
17th	0,026	0,093	Phase 1	N/A	N/A
18th	0,011	0,040	Phase 1	N/A	N/A
19th	0,025	0,087	Phase 1	N/A	N/A
20th	0,012	0,042	Phase 1	N/A	N/A
21th	0,009	0,033	Phase 1	N/A	N/A
22th	0,010	0,035	Phase 1	N/A	N/A
23th	0,022	0,078	Phase 1	N/A	N/A
24th	0,011	0,041	Phase 1	N/A	N/A
25th	0,020	0,071	Phase 1	N/A	N/A
26th	0,013	0,045	Phase 1	N/A	N/A
27th	0,008	0,029	Phase 1	N/A	N/A
28th	0,011	0,038	Phase 1	N/A	N/A
29th	0,017	0,061	Phase 1	N/A	N/A
30th	0,011	0,039	Phase 1	N/A	N/A
31th	0,016	0,056	Phase 1	N/A	N/A
32th	0,012	0,043	Phase 1	N/A	N/A
33th	0,007	0,026	Phase 1	N/A	N/A
34th	0,010	0,036	Phase 1	N/A	N/A
35th	0,014	0,050	Phase 1	N/A	N/A
36th	0,011	0,038	Phase 1	N/A	N/A
37th	0,014	0,049	Phase 1	N/A	N/A
38th	0,012	0,041	Phase 1	N/A	N/A
39th	0,008	0,027	Phase 1	N/A	N/A
40th	0,010	0,035	Phase 1	N/A	N/A
THD_{40}	-	0,44	Phase 1	13	13

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. 10TH0306**

Power Quality. Harmonic current emission

EUT		blueplanet 20.0 TL3 M2 WM OD IIG0			
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	28,153	100,000	Phase 2	-	-
2nd	0,049	0,174	Phase 2	8	8
3rd	0,036	0,128	Phase 2	21,6	N/A
4th	0,070	0,249	Phase 2	4	4
5th	0,019	0,067	Phase 2	10,7	10,7
6th	0,011	0,040	Phase 2	2,67	2,67
7th	0,031	0,110	Phase 2	7,2	7,2
8th	0,012	0,042	Phase 2	2	2
9th	0,022	0,077	Phase 2	3,8	N/A
10th	0,010	0,037	Phase 2	1,6	1,6
11th	0,031	0,110	Phase 2	3,1	3,1
12th	0,011	0,037	Phase 2	1,33	1,33
13th	0,040	0,140	Phase 2	2	2
14th	0,011	0,039	Phase 2	N/A	N/A
15th	0,017	0,059	Phase 2	N/A	N/A
16th	0,010	0,036	Phase 2	N/A	N/A
17th	0,031	0,110	Phase 2	N/A	N/A
18th	0,010	0,036	Phase 2	N/A	N/A
19th	0,022	0,077	Phase 2	N/A	N/A
20th	0,013	0,047	Phase 2	N/A	N/A
21th	0,011	0,039	Phase 2	N/A	N/A
22th	0,011	0,038	Phase 2	N/A	N/A
23th	0,021	0,074	Phase 2	N/A	N/A
24th	0,011	0,040	Phase 2	N/A	N/A
25th	0,020	0,071	Phase 2	N/A	N/A
26th	0,012	0,042	Phase 2	N/A	N/A
27th	0,009	0,032	Phase 2	N/A	N/A
28th	0,011	0,038	Phase 2	N/A	N/A
29th	0,016	0,055	Phase 2	N/A	N/A
30th	0,011	0,038	Phase 2	N/A	N/A
31th	0,019	0,066	Phase 2	N/A	N/A
32th	0,012	0,043	Phase 2	N/A	N/A
33th	0,008	0,028	Phase 2	N/A	N/A
34th	0,010	0,035	Phase 2	N/A	N/A
35th	0,015	0,054	Phase 2	N/A	N/A
36th	0,009	0,034	Phase 2	N/A	N/A
37th	0,014	0,048	Phase 2	N/A	N/A
38th	0,011	0,040	Phase 2	N/A	N/A
39th	0,008	0,028	Phase 2	N/A	N/A
40th	0,010	0,036	Phase 2	N/A	N/A
THD_{40}	-	0,49	Phase 2	13	13

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. 10TH0306**

Power Quality. Harmonic current emission

EUT		blueplanet 20.0 TL3 M2 WM OD IIG0			
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	28,142	100,000	Phase 3	-	-
2nd	0,056	0,199	Phase 3	8	8
3rd	0,019	0,068	Phase 3	21,6	N/A
4th	0,069	0,244	Phase 3	4	4
5th	0,017	0,059	Phase 3	10,7	10,7
6th	0,011	0,041	Phase 3	2,67	2,67
7th	0,017	0,059	Phase 3	7,2	7,2
8th	0,012	0,042	Phase 3	2	2
9th	0,014	0,049	Phase 3	3,8	N/A
10th	0,011	0,038	Phase 3	1,6	1,6
11th	0,024	0,087	Phase 3	3,1	3,1
12th	0,011	0,039	Phase 3	1,33	1,33
13th	0,028	0,100	Phase 3	2	2
14th	0,012	0,042	Phase 3	N/A	N/A
15th	0,012	0,043	Phase 3	N/A	N/A
16th	0,011	0,041	Phase 3	N/A	N/A
17th	0,024	0,086	Phase 3	N/A	N/A
18th	0,013	0,046	Phase 3	N/A	N/A
19th	0,024	0,086	Phase 3	N/A	N/A
20th	0,014	0,050	Phase 3	N/A	N/A
21th	0,010	0,036	Phase 3	N/A	N/A
22th	0,011	0,040	Phase 3	N/A	N/A
23th	0,021	0,075	Phase 3	N/A	N/A
24th	0,012	0,044	Phase 3	N/A	N/A
25th	0,020	0,070	Phase 3	N/A	N/A
26th	0,011	0,040	Phase 3	N/A	N/A
27th	0,009	0,031	Phase 3	N/A	N/A
28th	0,012	0,043	Phase 3	N/A	N/A
29th	0,017	0,060	Phase 3	N/A	N/A
30th	0,011	0,040	Phase 3	N/A	N/A
31th	0,016	0,055	Phase 3	N/A	N/A
32th	0,013	0,044	Phase 3	N/A	N/A
33th	0,008	0,027	Phase 3	N/A	N/A
34th	0,011	0,040	Phase 3	N/A	N/A
35th	0,014	0,049	Phase 3	N/A	N/A
36th	0,011	0,040	Phase 3	N/A	N/A
37th	0,013	0,047	Phase 3	N/A	N/A
38th	0,011	0,039	Phase 3	N/A	N/A
39th	0,007	0,027	Phase 3	N/A	N/A
40th	0,011	0,039	Phase 3	N/A	N/A
THD_{40}	-	0,39	Phase 3	13	13

Appendix E Type Verification Test Report	
Extract from test report according to EN 50438	**Nr. 10TH0306**

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	0,079	0,079	3,03%	3,03%	0,30%

DC-Injection.				
Protection limit	Tested at four power levels, limit 0,5% of IAC_{nom}= 145 mA			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	38,30	33,30	37,61	32,98
Max. test value (phase L2) [mA]	57,70	57,40	54,04	47,20
Max. test value (phase L3) [mA]	13,74	10,16	14,67	8,71