Verklaring van geen bezwaar

Aanvrager: **AFORE NEW ENERGY TECHNOLOGY (SHANGHAI) Co., Ltd.**
1st & 2nd Floor, B Building, Business Building, No. 2 Building,
No. 1588, Lianhang Road, Minhang District, Shanghai,
China

Product: **Fotovoltaïsche Omvormers**

Model:

BNT005KTL	**BNT017KTL**
BNT006KTL	**BNT020KTL**
BNT008KTL	**BNT025KTL**
BNT010KTL	**BNT030KTL**
BNT015KTL	

Reglementair voorgeschreven gebruik:

Automatisch schakelstation met driefasige netwerkbewaking conform DIN V VDE V 0126-1-1:2006-02 (afwijkende grenswaarden voor Nederland op basis van EN 50438:2013, NEN-EN 50438:2013, Annex A*) voor fotovoltaïsche installaties met een driefasige parallelvoeding door middel van gelijkstroom-wisselstroommutator in het net van de openbare voorziening. Het automatische schakelstation vormt een integraal bestanddeel van de hoger vermelde transformatorloze gelijkstroom-wisselstroommutators. Deze dient als vervangmiddel voor een te allen tijde voor de distributienetexploitant (“VNB”) toegankelijk schakelstation met scheidingsfunctie.

Controlebasis:

EN 50438:2013, NEN-EN 50438:2013
Eisen voor het aansluiten van microgeneratoren op het openbare laagspanningsnet

DIN V VDE V 0126-1-1:2006-02 (Single fouttolerantie van de bescherming-interface systeem)
Automatisch schakelstation tussen een netparallelle zelfopwekinstallatie en het openbare laagspanningsnet

Een representatief testpatroon van het hoger vermelde product voldoet aan de op het moment van de uitreiking van dit attest geldende veiligheidstechnische eisen van de vermelde controlegrondbeginselen voor een reglementair voorgeschreven gebruik.

Rapportnummer: **AFR-16JA0248FTSP**
Certificaatnummer: **U16-0598**
Datum: **2016-10-18**

Certificatie-instelling

Dieter Zitzmann

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

Certificatie-instelling Bureau Veritas Consumer Products Services Germany GmbH
Geaccrediteerd volgens DIN EN ISO/IEC 17065

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Type Approval and declaration of compliance with the requirements of EN 50438.			
Manufacturer / applicant:	AFORE NEW ENERGY TECHNOLOGY (SHANGHAI) Co., Ltd. 1st & 2nd Floor, B Building, Business Building, No. 2 Building, No. 1588, Lianhang Road, Minhang District, Shanghai, China		
Micro-generator Type	Grid-tied photovoltaic inverter		
Rated values	BNT005KTL	BNT006KTL	BNT008KTL
Nominal / Maximum rated capacity	5,00kW / 5,35 kW	6,00kW / 6,45 kW	8,00kW / 8,60 kW
Rated voltage	3/N/PE, 230/400Vac, 50Hz		
Firmware version	5-10KW_SP2.1		
Rated values	BNT010KTL	BNT015KTL	BNT017KTL
Maximum rated capacity	9,5kW / 10,00 kW	15,00kW / 16,10 kW	17,00kW / 18,25 kW
Rated voltage	3/N/PE, 230/400Vac, 50Hz		
Firmware version	5-10KW_SP2.1	15-30KW_SP2.1	
Rated values	BNT020KTL	BNT025KTL	BNT030KTL
Maximum rated capacity	20,00kW / 21,45 kW	25,00kW / 25,16 kW	30,00kW / 30,20 kW
Rated voltage	3/N/PE, 230/400Vac, 50Hz		
Firmware version	15-30KW_SP2.1		
Measurement period:	2016-06-21 to 2016-08-15		

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

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 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.

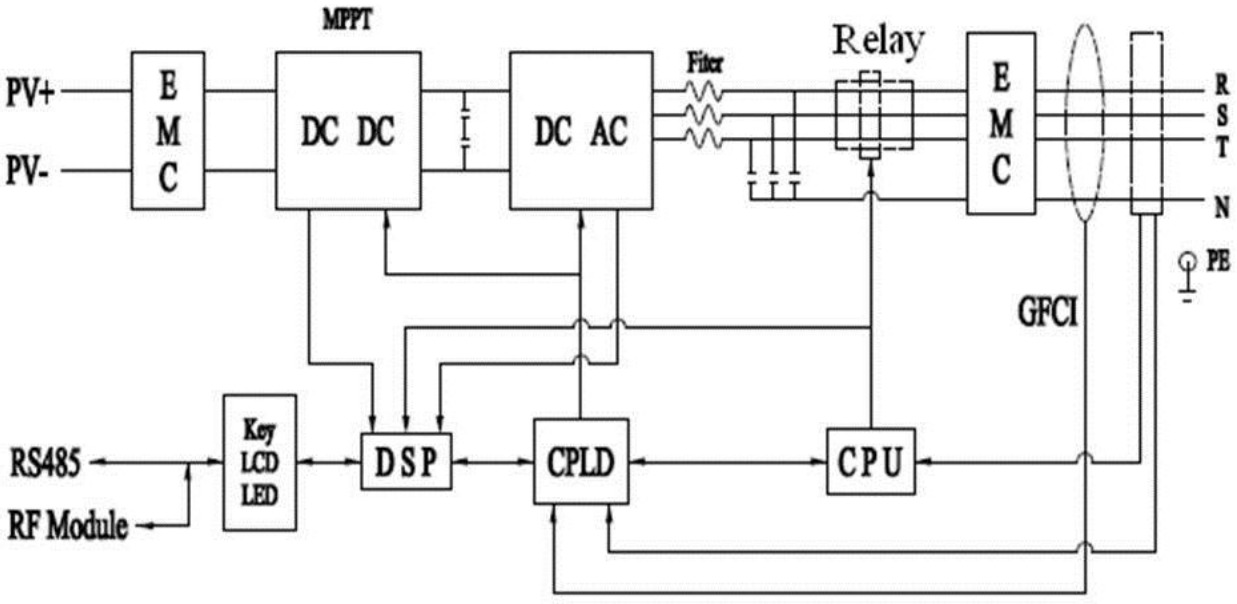


Figure 1 – Schematic structure of the power generation unit

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. AFR-16JA0248FTSP**

Type testing of the interface protection

Over-/under-voltage tests						
BNT010KTL - 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	2,0	253,0	2,0	253,5	0,181
Under-voltage stage 1	184,0	2,0	184,0	2,0	183,2	0,181
BNT010KTL - 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	2,0	253,0	2,0	254,0	0,185
Under-voltage stage 1	184,0	2,0	184,0	2,0	183,9	0,199
BNT010KTL - 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	2,0	253,0	2,0	253,0	0,184
Under-voltage stage 1	184,0	2,0	184,0	2,0	183,5	0,199

Over-/under-voltage tests						
BNT030KTL - 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	2,0	253,0	2,0	253,5	0,181
Under-voltage stage 1	184,0	2,0	184,0	2,0	183,2	0,181
BNT030KTL - 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	2,0	253,0	2,0	253,1	0,185
Under-voltage stage 1	184,0	2,0	184,0	2,0	183,6	0,182
BNT030KTL - 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	2,0	253,0	2,0	253,2	0,187
Under-voltage stage 1	184,0	2,0	184,0	2,0	183,7	0,184

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Over-/under-frequency tests						
BNT010KTL						
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	51,00	2,0	51,00	2,0	51,00	0,24
Under-frequency	48,00	2,0	48,00	2,0	48,00	0,24
BNT030KTL						
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	51,00	2,0	51,00	2,0	51,00	0,25
Under-frequency	48,00	2,0	48,00	2,0	48,00	0,25

LoM test						
BNT010KTL						
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	203 ms	183 ms	189 ms	191 ms	185 ms	182 ms
Trip time. Phase 2 fuse removed	204 ms	187 ms	196 ms	202 ms	183 ms	216 ms
Trip time. Phase 3 fuse removed	212 ms	190 ms	194 ms	206 ms	192 ms	193 ms
BNT030KTL						
Indicate additional shut down time included in above results. (Integrated interface switch)				Type of switching equipment 1: Relay with 10ms release time Type of switching equipment 2: Relay with 10ms release time		
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	203 ms	189 ms	196 ms	191 ms	188 ms	200 ms
Trip time. Phase 2 fuse removed	204 ms	193 ms	189 ms	202 ms	206 ms	195 ms
Trip time. Phase 3 fuse removed	212 ms	209 ms	208 ms	206 ms	184 ms	187 ms
Indicate additional shut down time included in above results. (Integrated interface switch)				Type of switching equipment 1: Relay with 10ms release time Type of switching equipment 2: Relay with 10ms release time		

Appendix E Type Verification Test Report	
Extract from test report according to EN 50438	Nr. AFR-16JA0248FTSP

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

BNT010KTL

Test sequence	Voltage [V]	Frequency [Hz]	Output power [W]	Cos φ [1]
1	195,5	47,5	9,48	0,995
2	253,1	51,5	9,49	0,996

BNT030KTL

Test sequence	Voltage [V]	Frequency [Hz]	Output power [W]	Cos φ [1]
1	195,5	47,5	29,02	0,999
2	253,1	51,5	29,01	0,999

Active power at under-frequency

BNT010KTL

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	49,50	47,55
Active power [kW]:	9,99	9,99	9,95
ΔP/PM [%] per 1 Hz:			0

BNT030KTL

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	49,50	47,55
Active power [kW]:	29,9	29,9	29,8
ΔP/PM [%] per 1 Hz:			0

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power response to over-frequency							
BNT010KTL							
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]:	50,00	50,25	50,70	51,15	50,70	50,25	50,00
PM [kW]:	N/A	9,80	8,00	6,20	8,00	9,80	N/A
PE60 [kW]:	9,98	9,76	7,99	6,17	8,00	9,72	9,98
∆PE60/PM [%]:	N/A	-0,40	-0,10	-0,30	-0,00	-0,80	N/A
2. Measurement a) to g): Active power output 40% and 60% after freezing > 80% Pn							
Frequency [Hz]:	50,00	50,25	50,70	50,15	50,70	50,25	50,00
PM [kW]:	N/A	4,90	4,00	3,10	4,00	4,90	N/A
PE60 [kW]:	5,00	4,79	4,03	3,16	4,01	4,79	5,00
∆PE60/PM [%]:	N/A	-2,20	-0,60	-1,20	0,20	2,20	N/A
Limit ΔP/P1min:	+ 10 % of P_M						
BNT030KTL							
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]:	50,00	50,25	50,70	51,15	50,70	50,25	50,00
PM [kW]:	N/A	29,40	24,00	18,60	24,00	29,40	N/A
PE60 [kW]:	29,85	28,93	23,70	18,46	23,71	28,94	29,71
∆PE60/PM [%]:	N/A	-1,57	-1,00	-0,47	-0,97	-1,53	N/A
2. Measurement a) to g): Active power output 40% and 60% after freezing > 80% Pn							
Frequency [Hz]:	50,00	50,25	50,70	50,15	50,70	50,25	50,00
PM [kW]:	N/A	14,70	12,00	9,30	12,00	14,70	N/A
PE60 [kW]:	15,17	14,85	12,15	9,41	12,12	14,85	15,15
∆PE60/PM [%]:	N/A	1,00	1,00	0,73	0,80	1,00	N/A
Limit ΔP/P1min:	+ 10 % of P_M						

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Reactive power			
Uncontrollable reactive power			
BNT005KTL			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9959	0,9968	0,9976
50% PN	0,9989	0,9989	0,9989
75% PN	0,9990	0,9990	0,9990
100% PN	0,9993	0,9989	0,9995
Limit	**>0,95**	**>0,95**	**>0,95**
BNT006KTL			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9895	0,9895	0,9895
50% PN	0,9989	0,9981	0,9991
75% PN	0,9989	0,9990	0,9993
100% PN	0,9995	0,9992	0,9994
Limit	**>0,95**	**>0,95**	**>0,95**
BNT008KTL			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9882	0,9763	0,9794
50% PN	0,9993	0,9984	0,9982
75% PN	0,9989	0,9993	0,9989
100% PN	0,9990	0,9982	0,9993
Limit	**>0,95**	**>0,95**	**>0,95**
BNT010KTL			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9896	0,9989	0,9893
50% PN	0,9990	0,9995	0,9997
75% PN	0,9992	0,9993	0,9994
100% PN	0,9990	0,9995	0,9996
Limit	**>0,95**	**>0,95**	**>0,95**
BNT015KTL			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9896	0,9990	0,9897
50% PN	0,9987	0,9995	0,9993
75% PN	0,9989	0,9991	0,9989
100% PN	0,9994	0,9994	0,9997
Limit	**>0,95**	**>0,95**	**>0,95**

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Uncontrollable reactive power			
BNT017KTL			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9981	0,9982	0,9962
50% PN	0,9982	0,9984	0,9979
75% PN	0,9987	0,9995	0,9986
100% PN	0,9993	0,9998	0,9992
Limit	**>0,95**	**>0,95**	**>0,95**
BNT020KTL			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9939	0,9928	0,9946
50% PN	0,9979	0,9979	0,9981
75% PN	0,9989	0,9982	0,9982
100% PN	0,9993	0,9984	0,9988
Limit	**>0,95**	**>0,95**	**>0,95**
BNT025KTL			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9892	0,9896	0,9897
50% PN	0,9984	0,9981	0,9971
75% PN	0,9985	0,9980	0,9983
100% PN	0,9990	0,9989	0,9984
Limit	**>0,95**	**>0,95**	**>0,95**
BNT030KTL			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9862	0,9762	0,9794
50% PN	0,9923	0,9934	0,9942
75% PN	0,9941	0,9963	0,9979
100% PN	0,9983	0,9982	0,9983
Limit	**>0,95**	**>0,95**	**>0,95**

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Controllable reactive power

BNT010KTL

Inductive (supply reactive power)

Power-BIN	Active power [W]	Reactive power [Var]	Power factor (cos φ)	DC power [W]
0% - 10%	0,37	4,70	0,071	230,04
10% - 20%	1,31	4,70	0,263	230,13
20% - 30%	2,26	4,70	0,427	230,23
30% - 40%	3,20	4,70	0,558	230,32
40% - 50%	4,13	4,70	0,656	230,42
50% - 60%	5,06	4,70	0,729	230,49
60% - 70%	5,98	4,71	0,783	230,58
70% - 80%	6,91	4,70	0,823	230,66
80% - 90%	7,82	4,69	0,854	230,74
90% - 100%	8,74	4,70	0,878	230,83

Capacitive (supply reactive power)

Power-BIN	Active power [W]	Reactive power [Var]	Power factor (cos φ)	DC power [W]
0% - 10%	0,35	-4,69	0,078	230,00
10% - 20%	1,30	-4,70	0,270	230,11
20% - 30%	2,24	-4,69	0,436	230,19
30% - 40%	3,18	-4,71	0,563	230,29
40% - 50%	4,11	-4,70	0,662	230,38
50% - 60%	5,04	-4,70	0,735	230,48
60% - 70%	5,96	-4,71	0,798	231,54
70% - 80%	6,93	-4,71	0,821	230,68
80% - 90%	7,82	-4,71	0,860	230,68
90% - 100%	8,73	-4,71	0,883	231,78

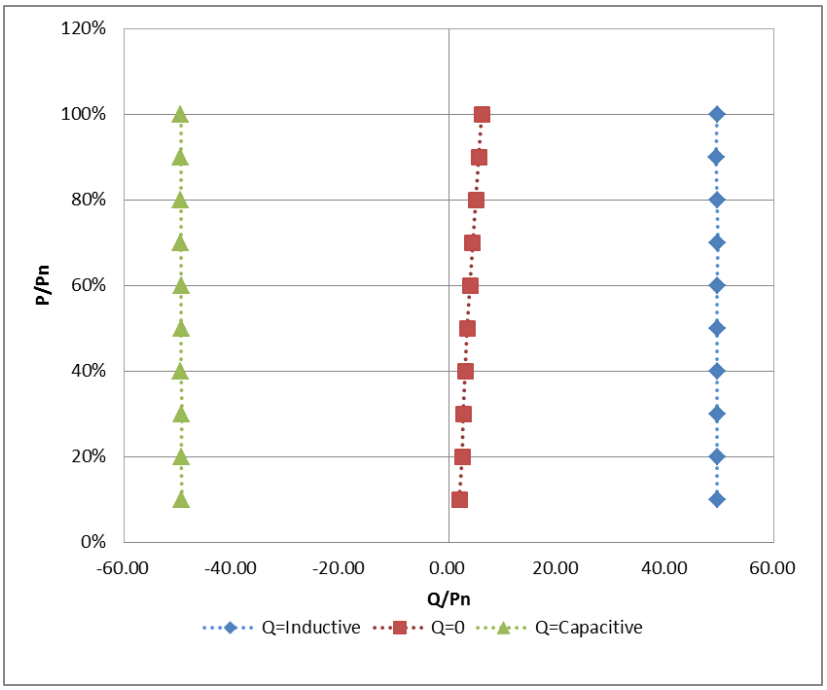
Reactive power supply with set point Q=0

Power-BIN	Active power [W]	Reactive power [Var]	Power factor (cos φ)	DC power [W]
0% - 10%	0,42	0,18	0,910	230,04
10% - 20%	1,37	0,23	0,987	230,02
20% - 30%	2,30	0,25	0,994	230,08
30% - 40%	3,24	0,28	0,996	230,20
40% - 50%	4,17	0,32	0,997	230,28
50% - 60%	5,10	0,37	0,997	230,36
60% - 70%	6,02	0,41	0,992	230,46
70% - 80%	6,94	0,47	0,997	230,53
80% - 90%	7,86	0,52	0,998	230,63
90% - 100%	8,77	0,57	0,997	230,71

Appendix E Type Verification Test Report	
Extract from test report according to EN 50438	Nr. AFR-16JA0248FTSP

Diagram of inductive reactive power absorption

BNT010KTL



Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Controllable reactive power

BNT030KTL

Inductive (supply reactive power)

Power-BIN	Active power [W]	Reactive power [Var]	Power factor (cos φ)	DC power [W]
0% - 10%	1,56	-14,71	0,111	229,52
10% - 20%	4,60	-14,72	0,305	229,82
20% - 30%	7,50	-14,68	0,459	230,10
30% - 40%	10,42	-14,68	0,581	230,38
40% - 50%	13,57	-14,68	0,681	230,67
50% - 60%	16,36	-14,67	0,747	230,91
60% - 70%	19,23	-14,67	0,797	231,17
70% - 80%	23,34	-15,30	0,839	230,79
80% - 90%	26,41	-15,31	0,867	230,97
90% - 100%	29,17	-15,28	0,888	231,12

Capacitive (supply reactive power)

Power-BIN	Active power [W]	Reactive power [Var]	Power factor (cos φ)	DC power [W]
0% - 10%	1,57	14,63	0,104	229,64
10% - 20%	4,69	14,69	0,302	229,95
20% - 30%	7,57	14,64	0,458	230,22
30% - 40%	10,45	14,71	0,579	230,50
40% - 50%	13,48	14,76	0,674	230,78
50% - 60%	16,47	14,72	0,746	231,08
60% - 70%	19,55	14,78	0,798	231,38
70% - 80%	23,26	14,66	0,714	230,94
80% - 90%	26,48	14,73	0,756	231,14
90% - 100%	29,59	14,77	0,790	231,33

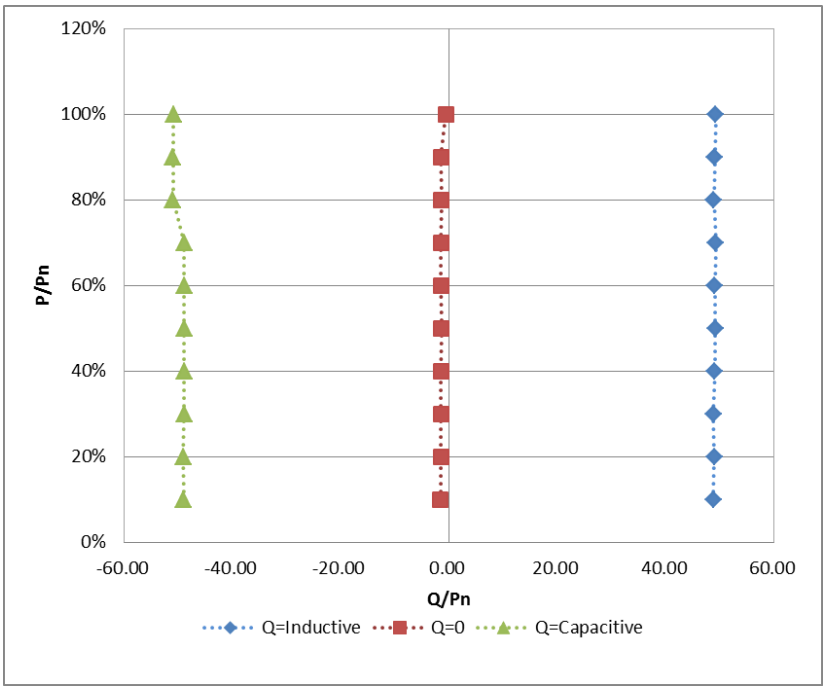
Reactive power supply with set point Q=0

Power-BIN	Active power [W]	Reactive power [Var]	Power factor (cos φ)	DC power [W]
0% - 10%	1,57	-0,49	0,954	229,94
10% - 20%	4,57	-0,46	0,995	230,21
20% - 30%	7,56	-0,44	0,998	230,48
30% - 40%	10,48	-0,45	0,999	230,49
40% - 50%	13,52	-0,42	0,999	230,32
50% - 60%	16,51	-0,44	0,999	231,08
60% - 70%	19,51	-0,46	0,999	231,04
70% - 80%	23,32	-0,43	0,999	230,93
80% - 90%	26,35	-0,44	0,999	231,11
90% - 100%	29,40	-0,17	0,999	231,28

Appendix E Type Verification Test Report	
Extract from test report according to EN 50438	Nr. AFR-16JA0248FTSP

Diagram of inductive reactive power absorption

BNT030KTL



Q adjustment

BNT010KTL

	Reactive power set point Q [Var]	Measured reactive power Q [Var]	Measured cos φ	Deviation compared to setpoint ΔQ / PN [%]
- Qmin	-5,000	-4,710	0,897	2,900
0	0	0,290	0,999	2,900
+ Qmax	5,000	4,708	0,892	2,920

BNT030KTL

	Reactive power set point Q [Var]	Measured reactive power Q [Var]	Measured cos φ	Deviation compared to setpoint ΔQ / PN [%]
- Qmin	-15,000	-14,749	0,896	0,836
0	0	0,218	1,000	0,726
+ Qmax	15,000	14,794	0,894	0,685

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Connection and starting to generate electrical power			
BNT010KTL			
Test according to EN 50438 with setting	**Min. voltage for connection to grid:**	195,5V	
	Max. voltage for connection to grid:	253,0V	
	Min. frequency for connection to grid:	48,0Hz	
	Max. frequency for connection to grid:	50,15Hz	
	Observation time (≥60s)	60s	
Test			
	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]	411	404	
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]	343	343	
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	**<47,95 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	**≥47,95 Hz within twice of setting observation time**	**≤50,15 Hz within twice of setting observation time**	
Reconnection time [s]	401	405	
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.		

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

f) In frequency range after frequency failure	**≥47,95 Hz for twice of setting observation time**	**≤50,15 Hz for twice of setting observation time**
Reconnection time [s]	379	381
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.	

Connection and starting to generate electrical power		
BNT030KTL		
Test according to EN 50438 with setting	**Min. voltage for connection to grid:**	195,5V
	Max. voltage for connection to grid:	253,0V
	Min. frequency for connection to grid:	48,0Hz
	Max. frequency for connection to grid:	50,15Hz
	Observation time (≥60s)	60s

Test		
	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]	77	75
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]	75	74
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	**<47,95 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	

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

e) In frequency range at start-up	**≥47,95 Hz within twice of setting observation time**	**≤50,15 Hz within twice of setting observation time**
Reconnection time [s]	79	76
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	**≥47,95 Hz for twice of setting observation time**	**≤50,15 Hz for twice of setting observation time**
Reconnection time [s]	75	78
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. AFR-16JA0248FTSP**

Short-circuit current contribution					
Short-circuit current parameters					
BNT010KTL – Phase 1					
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	16,37	9,43
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	N/A	N/A
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to trip**	16,5ms	
BNT010KTL – Phase 2					
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	16,37	9,43
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	N/A	N/A
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to trip**	16,5ms	
BNT010KTL – Phase 3					
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	16,37	9,43
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	N/A	N/A
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to trip**	16,5ms	

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Short-circuit current parameters					
BNT030KTL – Phase 1					
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	169,8	10,15
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	N/A	N/A
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to trip**	0,64ms	
BNT030KTL – Phase 2					
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	110,9	6,92
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	N/A	N/A
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to trip**	0,42ms	
BNT030KTL – Phase 3					
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	165,1	10,24
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	I_k	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	i_{DC}	N/A	500ms	N/A	N/A
Reactance/Resistance Ratio of source*	X/R	N/A	**Time to trip**	4,82ms	

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT005KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	7,454	--	Phase 1	-
2nd	0,025	0,330	Phase 1	1,080
3rd	0,020	0,271	Phase 1	2,300
4th	0,029	0,383	Phase 1	0,430
5th	0,057	0,764	Phase 1	1,140
6th	0,058	0,777	Phase 1	0,300
7th	0,074	0,986	Phase 1	0,770
8th	0,023	0,305	Phase 1	0,230
9th	0,011	0,150	Phase 1	0,400
10th	0,025	0,337	Phase 1	0,184
11th	0,031	0,418	Phase 1	0,330
12th	0,040	0,538	Phase 1	0,153
13th	0,021	0,279	Phase 1	0,210
14th	0,014	0,191	Phase 1	0,131
15th	0,015	0,206	Phase 1	0,150
16th	0,018	0,243	Phase 1	0,115
17th	0,026	0,343	Phase 1	0,132
18th	0,023	0,313	Phase 1	0,102
19th	0,027	0,356	Phase 1	0,118
20th	0,014	0,190	Phase 1	0,092
21th	0,013	0,176	Phase 1	0,107
22th	0,015	0,198	Phase 1	0,084
23th	0,027	0,358	Phase 1	0,098
24th	0,021	0,281	Phase 1	0,077
25th	0,016	0,221	Phase 1	0,090
26th	0,010	0,140	Phase 1	0,071
27th	0,007	0,093	Phase 1	0,083
28th	0,008	0,106	Phase 1	0,066
29th	0,020	0,273	Phase 1	0,078
30th	0,019	0,248	Phase 1	0,061
31th	0,014	0,192	Phase 1	0,073
32th	0,006	0,082	Phase 1	0,058
33th	0,006	0,084	Phase 1	0,068
34th	0,006	0,082	Phase 1	0,054
35th	0,012	0,166	Phase 1	0,064
36th	0,012	0,163	Phase 1	0,051
37th	0,009	0,126	Phase 1	0,061
38th	0,005	0,065	Phase 1	0,048
39th	0,004	0,055	Phase 1	0,058
40th	0,005	0,073	Phase 1	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT005KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	7,530	--	Phase 2	-
2nd	0,032	0,422	Phase 2	1,080
3rd	0,029	0,386	Phase 2	2,300
4th	0,015	0,194	Phase 2	0,430
5th	0,059	0,785	Phase 2	1,140
6th	0,032	0,419	Phase 2	0,300
7th	0,062	0,826	Phase 2	0,770
8th	0,010	0,138	Phase 2	0,230
9th	0,011	0,146	Phase 2	0,400
10th	0,026	0,343	Phase 2	0,184
11th	0,029	0,384	Phase 2	0,330
12th	0,028	0,371	Phase 2	0,153
13th	0,036	0,477	Phase 2	0,210
14th	0,011	0,152	Phase 2	0,131
15th	0,009	0,117	Phase 2	0,150
16th	0,011	0,141	Phase 2	0,115
17th	0,035	0,462	Phase 2	0,132
18th	0,011	0,151	Phase 2	0,102
19th	0,030	0,403	Phase 2	0,118
20th	0,013	0,167	Phase 2	0,092
21th	0,006	0,076	Phase 2	0,107
22th	0,008	0,101	Phase 2	0,084
23th	0,023	0,309	Phase 2	0,098
24th	0,008	0,103	Phase 2	0,077
25th	0,024	0,321	Phase 2	0,090
26th	0,008	0,110	Phase 2	0,071
27th	0,004	0,050	Phase 2	0,083
28th	0,004	0,054	Phase 2	0,066
29th	0,016	0,213	Phase 2	0,078
30th	0,005	0,062	Phase 2	0,061
31th	0,018	0,236	Phase 2	0,073
32th	0,005	0,069	Phase 2	0,058
33th	0,004	0,047	Phase 2	0,068
34th	0,003	0,042	Phase 2	0,054
35th	0,013	0,166	Phase 2	0,064
36th	0,004	0,047	Phase 2	0,051
37th	0,012	0,153	Phase 2	0,061
38th	0,004	0,054	Phase 2	0,048
39th	0,003	0,045	Phase 2	0,058
40th	0,003	0,037	Phase 2	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT005KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	7,394	--	Phase 3	-
2nd	0,031	0,416	Phase 3	1,080
3rd	0,018	0,246	Phase 3	2,300
4th	0,018	0,242	Phase 3	0,430
5th	0,053	0,721	Phase 3	1,140
6th	0,032	0,429	Phase 3	0,300
7th	0,053	0,711	Phase 3	0,770
8th	0,026	0,351	Phase 3	0,230
9th	0,010	0,140	Phase 3	0,400
10th	0,013	0,173	Phase 3	0,184
11th	0,033	0,443	Phase 3	0,330
12th	0,030	0,412	Phase 3	0,153
13th	0,037	0,495	Phase 3	0,210
14th	0,016	0,210	Phase 3	0,131
15th	0,014	0,188	Phase 3	0,150
16th	0,013	0,175	Phase 3	0,115
17th	0,031	0,423	Phase 3	0,132
18th	0,031	0,422	Phase 3	0,102
19th	0,034	0,456	Phase 3	0,118
20th	0,010	0,131	Phase 3	0,092
21th	0,010	0,139	Phase 3	0,107
22th	0,010	0,141	Phase 3	0,084
23th	0,026	0,355	Phase 3	0,098
24th	0,025	0,339	Phase 3	0,077
25th	0,020	0,270	Phase 3	0,090
26th	0,006	0,085	Phase 3	0,071
27th	0,007	0,097	Phase 3	0,083
28th	0,006	0,088	Phase 3	0,066
29th	0,021	0,277	Phase 3	0,078
30th	0,017	0,231	Phase 3	0,061
31th	0,020	0,270	Phase 3	0,073
32th	0,003	0,047	Phase 3	0,058
33th	0,004	0,048	Phase 3	0,068
34th	0,005	0,064	Phase 3	0,054
35th	0,015	0,205	Phase 3	0,064
36th	0,014	0,191	Phase 3	0,051
37th	0,010	0,129	Phase 3	0,061
38th	0,003	0,043	Phase 3	0,048
39th	0,004	0,057	Phase 3	0,058
40th	0,005	0,062	Phase 3	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT006KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	8,949	--	Phase 1	-
2nd	0,038	0,423	Phase 1	1,080
3rd	0,030	0,333	Phase 1	2,300
4th	0,018	0,206	Phase 1	0,430
5th	0,085	0,953	Phase 1	1,140
6th	0,030	0,330	Phase 1	0,300
7th	0,083	0,925	Phase 1	0,770
8th	0,013	0,147	Phase 1	0,230
9th	0,015	0,173	Phase 1	0,400
10th	0,032	0,363	Phase 1	0,184
11th	0,035	0,388	Phase 1	0,330
12th	0,032	0,359	Phase 1	0,153
13th	0,053	0,590	Phase 1	0,210
14th	0,017	0,189	Phase 1	0,131
15th	0,013	0,147	Phase 1	0,150
16th	0,012	0,138	Phase 1	0,115
17th	0,025	0,280	Phase 1	0,132
18th	0,026	0,291	Phase 1	0,102
19th	0,030	0,330	Phase 1	0,118
20th	0,017	0,187	Phase 1	0,092
21th	0,008	0,085	Phase 1	0,107
22th	0,008	0,093	Phase 1	0,084
23th	0,013	0,142	Phase 1	0,098
24th	0,010	0,113	Phase 1	0,077
25th	0,025	0,277	Phase 1	0,090
26th	0,011	0,119	Phase 1	0,071
27th	0,005	0,059	Phase 1	0,083
28th	0,005	0,053	Phase 1	0,066
29th	0,014	0,159	Phase 1	0,078
30th	0,005	0,058	Phase 1	0,061
31th	0,012	0,131	Phase 1	0,073
32th	0,007	0,081	Phase 1	0,058
33th	0,005	0,059	Phase 1	0,068
34th	0,003	0,037	Phase 1	0,054
35th	0,005	0,059	Phase 1	0,064
36th	0,004	0,041	Phase 1	0,051
37th	0,012	0,139	Phase 1	0,061
38th	0,005	0,056	Phase 1	0,048
39th	0,004	0,045	Phase 1	0,058
40th	0,003	0,028	Phase 1	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT006KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	8,863	--	Phase 2	-
2nd	0,027	0,301	Phase 2	1,080
3rd	0,022	0,245	Phase 2	2,300
4th	0,037	0,414	Phase 2	0,430
5th	0,077	0,866	Phase 2	1,140
6th	0,053	0,598	Phase 2	0,300
7th	0,104	1,169	Phase 2	0,770
8th	0,027	0,302	Phase 2	0,230
9th	0,012	0,135	Phase 2	0,400
10th	0,029	0,325	Phase 2	0,184
11th	0,032	0,356	Phase 2	0,330
12th	0,033	0,378	Phase 2	0,153
13th	0,040	0,452	Phase 2	0,210
14th	0,017	0,194	Phase 2	0,131
15th	0,014	0,162	Phase 2	0,150
16th	0,020	0,231	Phase 2	0,115
17th	0,020	0,221	Phase 2	0,132
18th	0,057	0,645	Phase 2	0,102
19th	0,019	0,217	Phase 2	0,118
20th	0,017	0,192	Phase 2	0,092
21th	0,013	0,147	Phase 2	0,107
22th	0,017	0,194	Phase 2	0,084
23th	0,014	0,159	Phase 2	0,098
24th	0,040	0,455	Phase 2	0,077
25th	0,019	0,212	Phase 2	0,090
26th	0,011	0,122	Phase 2	0,071
27th	0,010	0,108	Phase 2	0,083
28th	0,010	0,109	Phase 2	0,066
29th	0,019	0,213	Phase 2	0,078
30th	0,020	0,226	Phase 2	0,061
31th	0,006	0,070	Phase 2	0,073
32th	0,007	0,081	Phase 2	0,058
33th	0,008	0,086	Phase 2	0,068
34th	0,007	0,076	Phase 2	0,054
35th	0,010	0,113	Phase 2	0,064
36th	0,019	0,214	Phase 2	0,051
37th	0,009	0,098	Phase 2	0,061
38th	0,005	0,059	Phase 2	0,048
39th	0,006	0,064	Phase 2	0,058
40th	0,007	0,075	Phase 2	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT006KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	8,803	--	Phase 3	-
2nd	0,042	0,472	Phase 3	1,080
3rd	0,023	0,262	Phase 3	2,300
4th	0,021	0,236	Phase 3	0,430
5th	0,075	0,846	Phase 3	1,140
6th	0,033	0,372	Phase 3	0,300
7th	0,082	0,926	Phase 3	0,770
8th	0,029	0,325	Phase 3	0,230
9th	0,011	0,129	Phase 3	0,400
10th	0,015	0,176	Phase 3	0,184
11th	0,037	0,421	Phase 3	0,330
12th	0,024	0,277	Phase 3	0,153
13th	0,037	0,422	Phase 3	0,210
14th	0,019	0,219	Phase 3	0,131
15th	0,015	0,172	Phase 3	0,150
16th	0,015	0,170	Phase 3	0,115
17th	0,031	0,351	Phase 3	0,132
18th	0,025	0,286	Phase 3	0,102
19th	0,027	0,307	Phase 3	0,118
20th	0,011	0,127	Phase 3	0,092
21th	0,011	0,126	Phase 3	0,107
22th	0,015	0,168	Phase 3	0,084
23th	0,014	0,159	Phase 3	0,098
24th	0,034	0,385	Phase 3	0,077
25th	0,018	0,206	Phase 3	0,090
26th	0,006	0,072	Phase 3	0,071
27th	0,007	0,085	Phase 3	0,083
28th	0,009	0,101	Phase 3	0,066
29th	0,017	0,196	Phase 3	0,078
30th	0,016	0,186	Phase 3	0,061
31th	0,011	0,125	Phase 3	0,073
32th	0,004	0,046	Phase 3	0,058
33th	0,005	0,056	Phase 3	0,068
34th	0,005	0,059	Phase 3	0,054
35th	0,010	0,114	Phase 3	0,064
36th	0,017	0,189	Phase 3	0,051
37th	0,009	0,107	Phase 3	0,061
38th	0,003	0,037	Phase 3	0,048
39th	0,005	0,061	Phase 3	0,058
40th	0,005	0,059	Phase 3	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT008KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	11,646	--	Phase 1	-
2nd	0,021	0,184	Phase 1	1,080
3rd	0,024	0,206	Phase 1	2,300
4th	0,046	0,397	Phase 1	0,430
5th	0,106	0,913	Phase 1	1,140
6th	0,050	0,432	Phase 1	0,300
7th	0,114	0,976	Phase 1	0,770
8th	0,025	0,213	Phase 1	0,230
9th	0,012	0,104	Phase 1	0,400
10th	0,028	0,244	Phase 1	0,184
11th	0,050	0,432	Phase 1	0,330
12th	0,050	0,432	Phase 1	0,153
13th	0,057	0,486	Phase 1	0,210
14th	0,019	0,163	Phase 1	0,131
15th	0,016	0,134	Phase 1	0,150
16th	0,022	0,193	Phase 1	0,115
17th	0,036	0,313	Phase 1	0,132
18th	0,052	0,443	Phase 1	0,102
19th	0,029	0,250	Phase 1	0,118
20th	0,019	0,165	Phase 1	0,092
21th	0,013	0,110	Phase 1	0,107
22th	0,015	0,133	Phase 1	0,084
23th	0,021	0,178	Phase 1	0,098
24th	0,046	0,396	Phase 1	0,077
25th	0,027	0,232	Phase 1	0,090
26th	0,011	0,092	Phase 1	0,071
27th	0,010	0,090	Phase 1	0,083
28th	0,010	0,082	Phase 1	0,066
29th	0,013	0,113	Phase 1	0,078
30th	0,025	0,215	Phase 1	0,061
31th	0,016	0,135	Phase 1	0,073
32th	0,008	0,073	Phase 1	0,058
33th	0,009	0,075	Phase 1	0,068
34th	0,007	0,062	Phase 1	0,054
35th	0,012	0,103	Phase 1	0,064
36th	0,018	0,153	Phase 1	0,051
37th	0,011	0,097	Phase 1	0,061
38th	0,007	0,057	Phase 1	0,048
39th	0,008	0,065	Phase 1	0,058
40th	0,006	0,055	Phase 1	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT008KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	11,744	--	Phase 2	-
2nd	0,054	0,458	Phase 2	1,080
3rd	0,029	0,246	Phase 2	2,300
4th	0,029	0,244	Phase 2	0,430
5th	0,120	1,020	Phase 2	1,140
6th	0,026	0,222	Phase 2	0,300
7th	0,088	0,753	Phase 2	0,770
8th	0,013	0,114	Phase 2	0,230
9th	0,009	0,078	Phase 2	0,400
10th	0,026	0,224	Phase 2	0,184
11th	0,050	0,423	Phase 2	0,330
12th	0,027	0,230	Phase 2	0,153
13th	0,059	0,499	Phase 2	0,210
14th	0,017	0,148	Phase 2	0,131
15th	0,010	0,082	Phase 2	0,150
16th	0,021	0,176	Phase 2	0,115
17th	0,020	0,174	Phase 2	0,132
18th	0,024	0,208	Phase 2	0,102
19th	0,035	0,299	Phase 2	0,118
20th	0,018	0,157	Phase 2	0,092
21th	0,009	0,075	Phase 2	0,107
22th	0,012	0,105	Phase 2	0,084
23th	0,015	0,128	Phase 2	0,098
24th	0,011	0,094	Phase 2	0,077
25th	0,025	0,209	Phase 2	0,090
26th	0,010	0,083	Phase 2	0,071
27th	0,006	0,052	Phase 2	0,083
28th	0,006	0,054	Phase 2	0,066
29th	0,014	0,120	Phase 2	0,078
30th	0,006	0,051	Phase 2	0,061
31th	0,017	0,144	Phase 2	0,073
32th	0,006	0,048	Phase 2	0,058
33th	0,004	0,036	Phase 2	0,068
34th	0,005	0,040	Phase 2	0,054
35th	0,009	0,072	Phase 2	0,064
36th	0,005	0,040	Phase 2	0,051
37th	0,015	0,129	Phase 2	0,061
38th	0,004	0,034	Phase 2	0,048
39th	0,003	0,029	Phase 2	0,058
40th	0,004	0,036	Phase 2	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT008KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	11,586	--	Phase 3	-
2nd	0,060	0,515	Phase 3	1,080
3rd	0,036	0,312	Phase 3	2,300
4th	0,031	0,264	Phase 3	0,430
5th	0,104	0,897	Phase 3	1,140
6th	0,033	0,281	Phase 3	0,300
7th	0,099	0,858	Phase 3	0,770
8th	0,019	0,160	Phase 3	0,230
9th	0,010	0,088	Phase 3	0,400
10th	0,015	0,131	Phase 3	0,184
11th	0,055	0,476	Phase 3	0,330
12th	0,048	0,412	Phase 3	0,153
13th	0,052	0,448	Phase 3	0,210
14th	0,019	0,160	Phase 3	0,131
15th	0,013	0,109	Phase 3	0,150
16th	0,016	0,137	Phase 3	0,115
17th	0,045	0,387	Phase 3	0,132
18th	0,031	0,265	Phase 3	0,102
19th	0,035	0,301	Phase 3	0,118
20th	0,016	0,135	Phase 3	0,092
21th	0,009	0,082	Phase 3	0,107
22th	0,013	0,113	Phase 3	0,084
23th	0,024	0,204	Phase 3	0,098
24th	0,027	0,237	Phase 3	0,077
25th	0,026	0,228	Phase 3	0,090
26th	0,009	0,079	Phase 3	0,071
27th	0,008	0,071	Phase 3	0,083
28th	0,008	0,068	Phase 3	0,066
29th	0,016	0,136	Phase 3	0,078
30th	0,021	0,182	Phase 3	0,061
31th	0,012	0,101	Phase 3	0,073
32th	0,006	0,051	Phase 3	0,058
33th	0,009	0,074	Phase 3	0,068
34th	0,005	0,040	Phase 3	0,054
35th	0,012	0,101	Phase 3	0,064
36th	0,015	0,131	Phase 3	0,051
37th	0,013	0,116	Phase 3	0,061
38th	0,005	0,041	Phase 3	0,048
39th	0,004	0,039	Phase 3	0,058
40th	0,004	0,035	Phase 3	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT010KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	14,558	--	Phase 1	-
2nd	0,021	0,147	Phase 1	1,080
3rd	0,024	0,167	Phase 1	2,300
4th	0,055	0,380	Phase 1	0,430
5th	0,150	1,028	Phase 1	1,140
6th	0,041	0,283	Phase 1	0,300
7th	0,125	0,858	Phase 1	0,770
8th	0,027	0,188	Phase 1	0,230
9th	0,020	0,139	Phase 1	0,400
10th	0,026	0,182	Phase 1	0,184
11th	0,053	0,362	Phase 1	0,330
12th	0,051	0,353	Phase 1	0,153
13th	0,053	0,365	Phase 1	0,210
14th	0,027	0,184	Phase 1	0,131
15th	0,017	0,116	Phase 1	0,150
16th	0,021	0,143	Phase 1	0,115
17th	0,044	0,305	Phase 1	0,132
18th	0,053	0,364	Phase 1	0,102
19th	0,035	0,240	Phase 1	0,118
20th	0,019	0,131	Phase 1	0,092
21th	0,011	0,078	Phase 1	0,107
22th	0,017	0,114	Phase 1	0,084
23th	0,033	0,224	Phase 1	0,098
24th	0,039	0,267	Phase 1	0,077
25th	0,022	0,153	Phase 1	0,090
26th	0,011	0,078	Phase 1	0,071
27th	0,010	0,066	Phase 1	0,083
28th	0,010	0,066	Phase 1	0,066
29th	0,016	0,110	Phase 1	0,078
30th	0,026	0,181	Phase 1	0,061
31th	0,018	0,124	Phase 1	0,073
32th	0,008	0,056	Phase 1	0,058
33th	0,007	0,045	Phase 1	0,068
34th	0,008	0,053	Phase 1	0,054
35th	0,016	0,108	Phase 1	0,064
36th	0,016	0,110	Phase 1	0,051
37th	0,011	0,073	Phase 1	0,061
38th	0,006	0,042	Phase 1	0,048
39th	0,006	0,038	Phase 1	0,058
40th	0,005	0,037	Phase 1	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT010KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	14,665	--	Phase 2	-
2nd	0,083	0,567	Phase 2	1,080
3rd	0,035	0,238	Phase 2	2,300
4th	0,036	0,243	Phase 2	0,430
5th	0,179	1,218	Phase 2	1,140
6th	0,026	0,177	Phase 2	0,300
7th	0,108	0,735	Phase 2	0,770
8th	0,017	0,117	Phase 2	0,230
9th	0,018	0,122	Phase 2	0,400
10th	0,023	0,158	Phase 2	0,184
11th	0,066	0,452	Phase 2	0,330
12th	0,027	0,185	Phase 2	0,153
13th	0,059	0,400	Phase 2	0,210
14th	0,027	0,182	Phase 2	0,131
15th	0,015	0,104	Phase 2	0,150
16th	0,023	0,153	Phase 2	0,115
17th	0,035	0,236	Phase 2	0,132
18th	0,020	0,140	Phase 2	0,102
19th	0,042	0,287	Phase 2	0,118
20th	0,020	0,137	Phase 2	0,092
21th	0,012	0,083	Phase 2	0,107
22th	0,015	0,103	Phase 2	0,084
23th	0,032	0,218	Phase 2	0,098
24th	0,012	0,078	Phase 2	0,077
25th	0,019	0,128	Phase 2	0,090
26th	0,011	0,077	Phase 2	0,071
27th	0,009	0,061	Phase 2	0,083
28th	0,009	0,058	Phase 2	0,066
29th	0,017	0,116	Phase 2	0,078
30th	0,007	0,045	Phase 2	0,061
31th	0,020	0,134	Phase 2	0,073
32th	0,006	0,042	Phase 2	0,058
33th	0,006	0,041	Phase 2	0,068
34th	0,006	0,040	Phase 2	0,054
35th	0,015	0,105	Phase 2	0,064
36th	0,005	0,034	Phase 2	0,051
37th	0,012	0,080	Phase 2	0,061
38th	0,004	0,026	Phase 2	0,048
39th	0,005	0,037	Phase 2	0,058
40th	0,004	0,030	Phase 2	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission				
micro-generator		BNT010KTL		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	14,504	--	Phase 3	-
2nd	0,092	0,636	Phase 3	1,080
3rd	0,047	0,321	Phase 3	2,300
4th	0,037	0,255	Phase 3	0,430
5th	0,152	1,044	Phase 3	1,140
6th	0,025	0,173	Phase 3	0,300
7th	0,123	0,848	Phase 3	0,770
8th	0,017	0,120	Phase 3	0,230
9th	0,014	0,095	Phase 3	0,400
10th	0,019	0,132	Phase 3	0,184
11th	0,067	0,463	Phase 3	0,330
12th	0,042	0,288	Phase 3	0,153
13th	0,061	0,421	Phase 3	0,210
14th	0,026	0,181	Phase 3	0,131
15th	0,016	0,112	Phase 3	0,150
16th	0,017	0,114	Phase 3	0,115
17th	0,050	0,347	Phase 3	0,132
18th	0,042	0,292	Phase 3	0,102
19th	0,044	0,305	Phase 3	0,118
20th	0,018	0,122	Phase 3	0,092
21th	0,012	0,082	Phase 3	0,107
22th	0,014	0,099	Phase 3	0,084
23th	0,033	0,230	Phase 3	0,098
24th	0,034	0,234	Phase 3	0,077
25th	0,026	0,180	Phase 3	0,090
26th	0,011	0,073	Phase 3	0,071
27th	0,009	0,061	Phase 3	0,083
28th	0,009	0,059	Phase 3	0,066
29th	0,018	0,121	Phase 3	0,078
30th	0,023	0,156	Phase 3	0,061
31th	0,019	0,134	Phase 3	0,073
32th	0,007	0,050	Phase 3	0,058
33th	0,007	0,049	Phase 3	0,068
34th	0,006	0,040	Phase 3	0,054
35th	0,016	0,112	Phase 3	0,064
36th	0,014	0,093	Phase 3	0,051
37th	0,014	0,094	Phase 3	0,061
38th	0,005	0,035	Phase 3	0,048
39th	0,005	0,037	Phase 3	0,058
40th	0,004	0,028	Phase 3	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT015KTL			
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	21,618	--	Phase 1	-	-
2nd	0,039	0,179	Phase 1	8	8
3rd	0,048	0,224	Phase 1	21,6	N/A
4th	0,045	0,207	Phase 1	4	4
5th	0,079	0,367	Phase 1	10,7	10,7
6th	0,028	0,132	Phase 1	2,67	2,67
7th	0,067	0,308	Phase 1	7,2	7,2
8th	0,021	0,098	Phase 1	2	2
9th	0,023	0,108	Phase 1	3,8	N/A
10th	0,036	0,165	Phase 1	1,6	1,6
11th	0,070	0,325	Phase 1	3,1	3,1
12th	0,026	0,122	Phase 1	1,33	1,33
13th	0,055	0,256	Phase 1	2	2
14th	0,024	0,111	Phase 1	N/A	N/A
15th	0,026	0,121	Phase 1	N/A	N/A
16th	0,029	0,136	Phase 1	N/A	N/A
17th	0,042	0,194	Phase 1	N/A	N/A
18th	0,036	0,165	Phase 1	N/A	N/A
19th	0,067	0,312	Phase 1	N/A	N/A
20th	0,026	0,123	Phase 1	N/A	N/A
21th	0,028	0,128	Phase 1	N/A	N/A
22th	0,026	0,122	Phase 1	N/A	N/A
23th	0,043	0,199	Phase 1	N/A	N/A
24th	0,028	0,127	Phase 1	N/A	N/A
25th	0,034	0,159	Phase 1	N/A	N/A
26th	0,020	0,094	Phase 1	N/A	N/A
27th	0,020	0,091	Phase 1	N/A	N/A
28th	0,019	0,087	Phase 1	N/A	N/A
29th	0,023	0,105	Phase 1	N/A	N/A
30th	0,017	0,077	Phase 1	N/A	N/A
31th	0,025	0,118	Phase 1	N/A	N/A
32th	0,013	0,060	Phase 1	N/A	N/A
33th	0,014	0,064	Phase 1	N/A	N/A
34th	0,012	0,056	Phase 1	N/A	N/A
35th	0,021	0,095	Phase 1	N/A	N/A
36th	0,010	0,047	Phase 1	N/A	N/A
37th	0,016	0,073	Phase 1	N/A	N/A
38th	0,009	0,042	Phase 1	N/A	N/A
39th	0,009	0,042	Phase 1	N/A	N/A
40th	0,009	0,041	Phase 1	N/A	N/A
THD_{40}	-	1,14	Phase 1	13	13
PWHD	-	3,05	Phase 1	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT015KTL			
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	21,542	--	Phase 2	-	-
2nd	0,063	0,294	Phase 2	8	8
3rd	0,035	0,161	Phase 2	21,6	N/A
4th	0,059	0,272	Phase 2	4	4
5th	0,065	0,300	Phase 2	10,7	10,7
6th	0,029	0,134	Phase 2	2,67	2,67
7th	0,084	0,389	Phase 2	7,2	7,2
8th	0,030	0,139	Phase 2	2	2
9th	0,030	0,138	Phase 2	3,8	N/A
10th	0,037	0,174	Phase 2	1,6	1,6
11th	0,063	0,291	Phase 2	3,1	3,1
12th	0,020	0,094	Phase 2	1,33	1,33
13th	0,053	0,248	Phase 2	2	2
14th	0,021	0,097	Phase 2	N/A	N/A
15th	0,029	0,136	Phase 2	N/A	N/A
16th	0,022	0,100	Phase 2	N/A	N/A
17th	0,055	0,257	Phase 2	N/A	N/A
18th	0,027	0,123	Phase 2	N/A	N/A
19th	0,062	0,287	Phase 2	N/A	N/A
20th	0,027	0,123	Phase 2	N/A	N/A
21th	0,029	0,136	Phase 2	N/A	N/A
22th	0,026	0,121	Phase 2	N/A	N/A
23th	0,038	0,177	Phase 2	N/A	N/A
24th	0,024	0,112	Phase 2	N/A	N/A
25th	0,038	0,175	Phase 2	N/A	N/A
26th	0,019	0,090	Phase 2	N/A	N/A
27th	0,020	0,092	Phase 2	N/A	N/A
28th	0,017	0,077	Phase 2	N/A	N/A
29th	0,030	0,137	Phase 2	N/A	N/A
30th	0,019	0,089	Phase 2	N/A	N/A
31th	0,018	0,085	Phase 2	N/A	N/A
32th	0,015	0,069	Phase 2	N/A	N/A
33th	0,014	0,066	Phase 2	N/A	N/A
34th	0,011	0,052	Phase 2	N/A	N/A
35th	0,021	0,097	Phase 2	N/A	N/A
36th	0,010	0,047	Phase 2	N/A	N/A
37th	0,018	0,086	Phase 2	N/A	N/A
38th	0,010	0,045	Phase 2	N/A	N/A
39th	0,009	0,042	Phase 2	N/A	N/A
40th	0,007	0,034	Phase 2	N/A	N/A
THD_{40}	-	1,14	Phase 2	13	13
PWHD	-	3,03	Phase 2	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT015KTL			
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	21,554	--	Phase 3	-	-
2nd	0,085	0,396	Phase 3	8	8
3rd	0,045	0,208	Phase 3	21,6	N/A
4th	0,075	0,348	Phase 3	4	4
5th	0,084	0,388	Phase 3	10,7	10,7
6th	0,037	0,173	Phase 3	2,67	2,67
7th	0,090	0,416	Phase 3	7,2	7,2
8th	0,035	0,163	Phase 3	2	2
9th	0,029	0,134	Phase 3	3,8	N/A
10th	0,049	0,226	Phase 3	1,6	1,6
11th	0,053	0,245	Phase 3	3,1	3,1
12th	0,035	0,160	Phase 3	1,33	1,33
13th	0,070	0,326	Phase 3	2	2
14th	0,030	0,138	Phase 3	N/A	N/A
15th	0,037	0,171	Phase 3	N/A	N/A
16th	0,036	0,167	Phase 3	N/A	N/A
17th	0,060	0,278	Phase 3	N/A	N/A
18th	0,035	0,162	Phase 3	N/A	N/A
19th	0,069	0,320	Phase 3	N/A	N/A
20th	0,036	0,166	Phase 3	N/A	N/A
21th	0,034	0,155	Phase 3	N/A	N/A
22th	0,033	0,151	Phase 3	N/A	N/A
23th	0,055	0,253	Phase 3	N/A	N/A
24th	0,031	0,145	Phase 3	N/A	N/A
25th	0,042	0,196	Phase 3	N/A	N/A
26th	0,025	0,118	Phase 3	N/A	N/A
27th	0,025	0,115	Phase 3	N/A	N/A
28th	0,024	0,111	Phase 3	N/A	N/A
29th	0,032	0,148	Phase 3	N/A	N/A
30th	0,020	0,094	Phase 3	N/A	N/A
31th	0,026	0,121	Phase 3	N/A	N/A
32th	0,019	0,086	Phase 3	N/A	N/A
33th	0,018	0,084	Phase 3	N/A	N/A
34th	0,017	0,078	Phase 3	N/A	N/A
35th	0,022	0,101	Phase 3	N/A	N/A
36th	0,014	0,063	Phase 3	N/A	N/A
37th	0,020	0,092	Phase 3	N/A	N/A
38th	0,013	0,060	Phase 3	N/A	N/A
39th	0,010	0,048	Phase 3	N/A	N/A
40th	0,010	0,045	Phase 3	N/A	N/A
THD_{40}	-	1,37	Phase 3	13	13
PWHD	-	3,69	Phase 3	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT017KTL			
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	24,312	--	Phase 1	-	-
2nd	0,036	0,150	Phase 1	8	8
3rd	0,049	0,200	Phase 1	21,6	N/A
4th	0,051	0,209	Phase 1	4	4
5th	0,097	0,400	Phase 1	10,7	10,7
6th	0,027	0,110	Phase 1	2,67	2,67
7th	0,076	0,314	Phase 1	7,2	7,2
8th	0,021	0,087	Phase 1	2	2
9th	0,036	0,148	Phase 1	3,8	N/A
10th	0,040	0,162	Phase 1	1,6	1,6
11th	0,086	0,352	Phase 1	3,1	3,1
12th	0,025	0,105	Phase 1	1,33	1,33
13th	0,070	0,287	Phase 1	2	2
14th	0,024	0,097	Phase 1	N/A	N/A
15th	0,030	0,123	Phase 1	N/A	N/A
16th	0,024	0,099	Phase 1	N/A	N/A
17th	0,054	0,221	Phase 1	N/A	N/A
18th	0,033	0,137	Phase 1	N/A	N/A
19th	0,083	0,340	Phase 1	N/A	N/A
20th	0,025	0,102	Phase 1	N/A	N/A
21th	0,030	0,124	Phase 1	N/A	N/A
22th	0,027	0,111	Phase 1	N/A	N/A
23th	0,057	0,233	Phase 1	N/A	N/A
24th	0,029	0,121	Phase 1	N/A	N/A
25th	0,041	0,167	Phase 1	N/A	N/A
26th	0,021	0,087	Phase 1	N/A	N/A
27th	0,024	0,098	Phase 1	N/A	N/A
28th	0,019	0,079	Phase 1	N/A	N/A
29th	0,030	0,125	Phase 1	N/A	N/A
30th	0,018	0,073	Phase 1	N/A	N/A
31th	0,034	0,139	Phase 1	N/A	N/A
32th	0,013	0,054	Phase 1	N/A	N/A
33th	0,015	0,064	Phase 1	N/A	N/A
34th	0,012	0,048	Phase 1	N/A	N/A
35th	0,027	0,112	Phase 1	N/A	N/A
36th	0,011	0,046	Phase 1	N/A	N/A
37th	0,022	0,089	Phase 1	N/A	N/A
38th	0,009	0,035	Phase 1	N/A	N/A
39th	0,011	0,044	Phase 1	N/A	N/A
40th	0,008	0,035	Phase 1	N/A	N/A
THD_{40}	-	1,16	Phase 1	13	13
PWHD	-	3,18	Phase 1	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT017KTL			
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	24,235	--	Phase 2	-	-
2nd	0,067	0,275	Phase 2	8	8
3rd	0,038	0,157	Phase 2	21,6	N/A
4th	0,062	0,256	Phase 2	4	4
5th	0,079	0,324	Phase 2	10,7	10,7
6th	0,030	0,126	Phase 2	2,67	2,67
7th	0,091	0,377	Phase 2	7,2	7,2
8th	0,033	0,135	Phase 2	2	2
9th	0,037	0,154	Phase 2	3,8	N/A
10th	0,041	0,168	Phase 2	1,6	1,6
11th	0,082	0,337	Phase 2	3,1	3,1
12th	0,019	0,078	Phase 2	1,33	1,33
13th	0,063	0,261	Phase 2	2	2
14th	0,019	0,078	Phase 2	N/A	N/A
15th	0,033	0,135	Phase 2	N/A	N/A
16th	0,022	0,093	Phase 2	N/A	N/A
17th	0,062	0,254	Phase 2	N/A	N/A
18th	0,024	0,099	Phase 2	N/A	N/A
19th	0,072	0,296	Phase 2	N/A	N/A
20th	0,024	0,100	Phase 2	N/A	N/A
21th	0,034	0,141	Phase 2	N/A	N/A
22th	0,027	0,111	Phase 2	N/A	N/A
23th	0,045	0,187	Phase 2	N/A	N/A
24th	0,024	0,099	Phase 2	N/A	N/A
25th	0,042	0,175	Phase 2	N/A	N/A
26th	0,020	0,082	Phase 2	N/A	N/A
27th	0,023	0,093	Phase 2	N/A	N/A
28th	0,018	0,075	Phase 2	N/A	N/A
29th	0,034	0,141	Phase 2	N/A	N/A
30th	0,018	0,073	Phase 2	N/A	N/A
31th	0,028	0,115	Phase 2	N/A	N/A
32th	0,015	0,062	Phase 2	N/A	N/A
33th	0,016	0,067	Phase 2	N/A	N/A
34th	0,011	0,046	Phase 2	N/A	N/A
35th	0,028	0,115	Phase 2	N/A	N/A
36th	0,011	0,044	Phase 2	N/A	N/A
37th	0,023	0,093	Phase 2	N/A	N/A
38th	0,008	0,035	Phase 2	N/A	N/A
39th	0,011	0,045	Phase 2	N/A	N/A
40th	0,008	0,031	Phase 2	N/A	N/A
THD_{40}	-	1,15	Phase 2	13	13
PWHD	-	3,03	Phase 2	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT017KTL			
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	24,248	--	Phase 3	-	-
2nd	0,084	0,347	Phase 3	8	8
3rd	0,049	0,202	Phase 3	21,6	N/A
4th	0,081	0,336	Phase 3	4	4
5th	0,098	0,402	Phase 3	10,7	10,7
6th	0,037	0,151	Phase 3	2,67	2,67
7th	0,093	0,383	Phase 3	7,2	7,2
8th	0,040	0,165	Phase 3	2	2
9th	0,038	0,158	Phase 3	3,8	N/A
10th	0,052	0,216	Phase 3	1,6	1,6
11th	0,060	0,247	Phase 3	3,1	3,1
12th	0,035	0,143	Phase 3	1,33	1,33
13th	0,076	0,315	Phase 3	2	2
14th	0,031	0,128	Phase 3	N/A	N/A
15th	0,040	0,167	Phase 3	N/A	N/A
16th	0,032	0,132	Phase 3	N/A	N/A
17th	0,066	0,270	Phase 3	N/A	N/A
18th	0,032	0,133	Phase 3	N/A	N/A
19th	0,078	0,320	Phase 3	N/A	N/A
20th	0,031	0,126	Phase 3	N/A	N/A
21th	0,038	0,156	Phase 3	N/A	N/A
22th	0,034	0,138	Phase 3	N/A	N/A
23th	0,060	0,249	Phase 3	N/A	N/A
24th	0,032	0,130	Phase 3	N/A	N/A
25th	0,040	0,164	Phase 3	N/A	N/A
26th	0,025	0,104	Phase 3	N/A	N/A
27th	0,029	0,118	Phase 3	N/A	N/A
28th	0,024	0,097	Phase 3	N/A	N/A
29th	0,034	0,141	Phase 3	N/A	N/A
30th	0,020	0,083	Phase 3	N/A	N/A
31th	0,032	0,134	Phase 3	N/A	N/A
32th	0,018	0,072	Phase 3	N/A	N/A
33th	0,019	0,079	Phase 3	N/A	N/A
34th	0,015	0,064	Phase 3	N/A	N/A
35th	0,027	0,109	Phase 3	N/A	N/A
36th	0,013	0,054	Phase 3	N/A	N/A
37th	0,021	0,086	Phase 3	N/A	N/A
38th	0,011	0,045	Phase 3	N/A	N/A
39th	0,011	0,047	Phase 3	N/A	N/A
40th	0,010	0,039	Phase 3	N/A	N/A
THD_{40}	-	1,31	Phase 3	13	13
PWHD	-	3,46	Phase 3	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT020KTL			
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	27,975	--	Phase 1	-	-
2nd	0,044	0,158	Phase 1	8	8
3rd	0,050	0,178	Phase 1	21,6	N/A
4th	0,060	0,216	Phase 1	4	4
5th	0,117	0,420	Phase 1	10,7	10,7
6th	0,023	0,082	Phase 1	2,67	2,67
7th	0,085	0,302	Phase 1	7,2	7,2
8th	0,016	0,058	Phase 1	2	2
9th	0,021	0,074	Phase 1	3,8	N/A
10th	0,040	0,142	Phase 1	1,6	1,6
11th	0,093	0,331	Phase 1	3,1	3,1
12th	0,027	0,095	Phase 1	1,33	1,33
13th	0,081	0,290	Phase 1	2	2
14th	0,023	0,084	Phase 1	N/A	N/A
15th	0,024	0,088	Phase 1	N/A	N/A
16th	0,031	0,109	Phase 1	N/A	N/A
17th	0,067	0,239	Phase 1	N/A	N/A
18th	0,036	0,128	Phase 1	N/A	N/A
19th	0,111	0,397	Phase 1	N/A	N/A
20th	0,026	0,092	Phase 1	N/A	N/A
21th	0,030	0,108	Phase 1	N/A	N/A
22th	0,030	0,106	Phase 1	N/A	N/A
23th	0,059	0,212	Phase 1	N/A	N/A
24th	0,033	0,118	Phase 1	N/A	N/A
25th	0,048	0,171	Phase 1	N/A	N/A
26th	0,025	0,090	Phase 1	N/A	N/A
27th	0,027	0,098	Phase 1	N/A	N/A
28th	0,024	0,085	Phase 1	N/A	N/A
29th	0,037	0,131	Phase 1	N/A	N/A
30th	0,022	0,080	Phase 1	N/A	N/A
31th	0,045	0,162	Phase 1	N/A	N/A
32th	0,015	0,054	Phase 1	N/A	N/A
33th	0,016	0,059	Phase 1	N/A	N/A
34th	0,015	0,053	Phase 1	N/A	N/A
35th	0,033	0,118	Phase 1	N/A	N/A
36th	0,012	0,044	Phase 1	N/A	N/A
37th	0,029	0,103	Phase 1	N/A	N/A
38th	0,010	0,037	Phase 1	N/A	N/A
39th	0,011	0,039	Phase 1	N/A	N/A
40th	0,011	0,038	Phase 1	N/A	N/A
THD_{40}	-	1,17	Phase 1	13	13
PWHD	-	3,32	Phase 1	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT020KTL			
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	27,889	--	Phase 2	-	-
2nd	0,077	0,276	Phase 2	8	8
3rd	0,035	0,127	Phase 2	21,6	N/A
4th	0,068	0,243	Phase 2	4	4
5th	0,095	0,342	Phase 2	10,7	10,7
6th	0,027	0,097	Phase 2	2,67	2,67
7th	0,102	0,365	Phase 2	7,2	7,2
8th	0,036	0,129	Phase 2	2	2
9th	0,029	0,104	Phase 2	3,8	N/A
10th	0,044	0,159	Phase 2	1,6	1,6
11th	0,086	0,309	Phase 2	3,1	3,1
12th	0,021	0,077	Phase 2	1,33	1,33
13th	0,075	0,268	Phase 2	2	2
14th	0,019	0,068	Phase 2	N/A	N/A
15th	0,025	0,089	Phase 2	N/A	N/A
16th	0,027	0,095	Phase 2	N/A	N/A
17th	0,072	0,259	Phase 2	N/A	N/A
18th	0,025	0,089	Phase 2	N/A	N/A
19th	0,093	0,334	Phase 2	N/A	N/A
20th	0,028	0,101	Phase 2	N/A	N/A
21th	0,030	0,108	Phase 2	N/A	N/A
22th	0,030	0,108	Phase 2	N/A	N/A
23th	0,050	0,180	Phase 2	N/A	N/A
24th	0,033	0,120	Phase 2	N/A	N/A
25th	0,049	0,176	Phase 2	N/A	N/A
26th	0,025	0,091	Phase 2	N/A	N/A
27th	0,024	0,087	Phase 2	N/A	N/A
28th	0,024	0,087	Phase 2	N/A	N/A
29th	0,046	0,164	Phase 2	N/A	N/A
30th	0,026	0,093	Phase 2	N/A	N/A
31th	0,035	0,124	Phase 2	N/A	N/A
32th	0,017	0,062	Phase 2	N/A	N/A
33th	0,016	0,057	Phase 2	N/A	N/A
34th	0,013	0,048	Phase 2	N/A	N/A
35th	0,038	0,135	Phase 2	N/A	N/A
36th	0,012	0,044	Phase 2	N/A	N/A
37th	0,027	0,095	Phase 2	N/A	N/A
38th	0,010	0,037	Phase 2	N/A	N/A
39th	0,010	0,037	Phase 2	N/A	N/A
40th	0,009	0,033	Phase 2	N/A	N/A
THD_{40}	-	1,14	Phase 2	13	13
PWHD	-	3,15	Phase 2	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT020KTL			
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	27,903	--	Phase 3	-	-
2nd	0,085	0,305	Phase 3	8	8
3rd	0,049	0,175	Phase 3	21,6	N/A
4th	0,097	0,346	Phase 3	4	4
5th	0,120	0,430	Phase 3	10,7	10,7
6th	0,043	0,154	Phase 3	2,67	2,67
7th	0,107	0,383	Phase 3	7,2	7,2
8th	0,041	0,148	Phase 3	2	2
9th	0,029	0,105	Phase 3	3,8	N/A
10th	0,049	0,176	Phase 3	1,6	1,6
11th	0,070	0,249	Phase 3	3,1	3,1
12th	0,032	0,115	Phase 3	1,33	1,33
13th	0,091	0,327	Phase 3	2	2
14th	0,028	0,102	Phase 3	N/A	N/A
15th	0,036	0,128	Phase 3	N/A	N/A
16th	0,041	0,147	Phase 3	N/A	N/A
17th	0,087	0,310	Phase 3	N/A	N/A
18th	0,041	0,145	Phase 3	N/A	N/A
19th	0,113	0,405	Phase 3	N/A	N/A
20th	0,039	0,141	Phase 3	N/A	N/A
21th	0,039	0,140	Phase 3	N/A	N/A
22th	0,038	0,136	Phase 3	N/A	N/A
23th	0,070	0,251	Phase 3	N/A	N/A
24th	0,043	0,155	Phase 3	N/A	N/A
25th	0,052	0,187	Phase 3	N/A	N/A
26th	0,032	0,116	Phase 3	N/A	N/A
27th	0,033	0,117	Phase 3	N/A	N/A
28th	0,031	0,112	Phase 3	N/A	N/A
29th	0,044	0,159	Phase 3	N/A	N/A
30th	0,024	0,087	Phase 3	N/A	N/A
31th	0,047	0,169	Phase 3	N/A	N/A
32th	0,022	0,078	Phase 3	N/A	N/A
33th	0,020	0,073	Phase 3	N/A	N/A
34th	0,019	0,070	Phase 3	N/A	N/A
35th	0,036	0,131	Phase 3	N/A	N/A
36th	0,016	0,057	Phase 3	N/A	N/A
37th	0,027	0,096	Phase 3	N/A	N/A
38th	0,013	0,048	Phase 3	N/A	N/A
39th	0,011	0,038	Phase 3	N/A	N/A
40th	0,012	0,042	Phase 3	N/A	N/A
THD_{40}	-	1,34	Phase 3	13	13
PWHD	-	3,84	Phase 3	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT025KTL			
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	35,504	--	Phase 1	-	-
2nd	0,085	0,240	Phase 1	8	8
3rd	0,047	0,132	Phase 1	21,6	N/A
4th	0,100	0,280	Phase 1	4	4
5th	0,123	0,346	Phase 1	10,7	10,7
6th	0,041	0,117	Phase 1	2,67	2,67
7th	0,108	0,304	Phase 1	7,2	7,2
8th	0,040	0,112	Phase 1	2	2
9th	0,027	0,076	Phase 1	3,8	N/A
10th	0,050	0,140	Phase 1	1,6	1,6
11th	0,068	0,192	Phase 1	3,1	3,1
12th	0,031	0,087	Phase 1	1,33	1,33
13th	0,097	0,272	Phase 1	2	2
14th	0,029	0,081	Phase 1	N/A	N/A
15th	0,033	0,094	Phase 1	N/A	N/A
16th	0,041	0,116	Phase 1	N/A	N/A
17th	0,093	0,262	Phase 1	N/A	N/A
18th	0,038	0,107	Phase 1	N/A	N/A
19th	0,083	0,234	Phase 1	N/A	N/A
20th	0,038	0,107	Phase 1	N/A	N/A
21th	0,035	0,100	Phase 1	N/A	N/A
22th	0,036	0,103	Phase 1	N/A	N/A
23th	0,070	0,198	Phase 1	N/A	N/A
24th	0,038	0,107	Phase 1	N/A	N/A
25th	0,055	0,154	Phase 1	N/A	N/A
26th	0,029	0,082	Phase 1	N/A	N/A
27th	0,029	0,082	Phase 1	N/A	N/A
28th	0,029	0,081	Phase 1	N/A	N/A
29th	0,047	0,132	Phase 1	N/A	N/A
30th	0,021	0,059	Phase 1	N/A	N/A
31th	0,046	0,131	Phase 1	N/A	N/A
32th	0,020	0,056	Phase 1	N/A	N/A
33th	0,019	0,053	Phase 1	N/A	N/A
34th	0,019	0,053	Phase 1	N/A	N/A
35th	0,037	0,103	Phase 1	N/A	N/A
36th	0,014	0,041	Phase 1	N/A	N/A
37th	0,029	0,081	Phase 1	N/A	N/A
38th	0,013	0,035	Phase 1	N/A	N/A
39th	0,011	0,030	Phase 1	N/A	N/A
40th	0,011	0,032	Phase 1	N/A	N/A
THD_{40}	-	1,32	Phase 1	13	13
PWHD	-	2,84	Phase 1	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT025KTL			
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	35,481	--	Phase 2	-	-
2nd	0,079	0,221	Phase 2	8	8
3rd	0,035	0,100	Phase 2	21,6	N/A
4th	0,070	0,198	Phase 2	4	4
5th	0,098	0,275	Phase 2	10,7	10,7
6th	0,029	0,082	Phase 2	2,67	2,67
7th	0,102	0,286	Phase 2	7,2	7,2
8th	0,034	0,095	Phase 2	2	2
9th	0,027	0,076	Phase 2	3,8	N/A
10th	0,044	0,123	Phase 2	1,6	1,6
11th	0,086	0,242	Phase 2	3,1	3,1
12th	0,021	0,058	Phase 2	1,33	1,33
13th	0,078	0,220	Phase 2	2	2
14th	0,019	0,052	Phase 2	N/A	N/A
15th	0,024	0,067	Phase 2	N/A	N/A
16th	0,024	0,068	Phase 2	N/A	N/A
17th	0,078	0,219	Phase 2	N/A	N/A
18th	0,020	0,057	Phase 2	N/A	N/A
19th	0,078	0,220	Phase 2	N/A	N/A
20th	0,028	0,079	Phase 2	N/A	N/A
21th	0,029	0,083	Phase 2	N/A	N/A
22th	0,028	0,079	Phase 2	N/A	N/A
23th	0,061	0,171	Phase 2	N/A	N/A
24th	0,029	0,082	Phase 2	N/A	N/A
25th	0,052	0,147	Phase 2	N/A	N/A
26th	0,023	0,065	Phase 2	N/A	N/A
27th	0,023	0,065	Phase 2	N/A	N/A
28th	0,023	0,064	Phase 2	N/A	N/A
29th	0,048	0,136	Phase 2	N/A	N/A
30th	0,023	0,064	Phase 2	N/A	N/A
31th	0,037	0,104	Phase 2	N/A	N/A
32th	0,016	0,046	Phase 2	N/A	N/A
33th	0,015	0,043	Phase 2	N/A	N/A
34th	0,012	0,034	Phase 2	N/A	N/A
35th	0,038	0,108	Phase 2	N/A	N/A
36th	0,011	0,031	Phase 2	N/A	N/A
37th	0,027	0,076	Phase 2	N/A	N/A
38th	0,010	0,028	Phase 2	N/A	N/A
39th	0,011	0,030	Phase 2	N/A	N/A
40th	0,009	0,026	Phase 2	N/A	N/A
THD_{40}	-	1,13	Phase 2	13	13
PWHD	-	2,45	Phase 2	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT025KTL			
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	35,593	--	Phase 3	-	-
2nd	0,043	0,120	Phase 3	8	8
3rd	0,050	0,141	Phase 3	21,6	N/A
4th	0,063	0,177	Phase 3	4	4
5th	0,119	0,334	Phase 3	10,7	10,7
6th	0,030	0,083	Phase 3	2,67	2,67
7th	0,084	0,237	Phase 3	7,2	7,2
8th	0,016	0,044	Phase 3	2	2
9th	0,018	0,050	Phase 3	3,8	N/A
10th	0,040	0,112	Phase 3	1,6	1,6
11th	0,095	0,267	Phase 3	3,1	3,1
12th	0,023	0,063	Phase 3	1,33	1,33
13th	0,087	0,245	Phase 3	2	2
14th	0,023	0,063	Phase 3	N/A	N/A
15th	0,023	0,063	Phase 3	N/A	N/A
16th	0,030	0,083	Phase 3	N/A	N/A
17th	0,074	0,209	Phase 3	N/A	N/A
18th	0,034	0,096	Phase 3	N/A	N/A
19th	0,083	0,233	Phase 3	N/A	N/A
20th	0,026	0,073	Phase 3	N/A	N/A
21th	0,028	0,078	Phase 3	N/A	N/A
22th	0,028	0,078	Phase 3	N/A	N/A
23th	0,029	0,081	Phase 3	N/A	N/A
24th	0,057	0,161	Phase 3	N/A	N/A
25th	0,030	0,084	Phase 3	N/A	N/A
26th	0,052	0,147	Phase 3	N/A	N/A
27th	0,024	0,068	Phase 3	N/A	N/A
28th	0,025	0,069	Phase 3	N/A	N/A
29th	0,022	0,062	Phase 3	N/A	N/A
30th	0,042	0,118	Phase 3	N/A	N/A
31th	0,019	0,054	Phase 3	N/A	N/A
32th	0,047	0,133	Phase 3	N/A	N/A
33th	0,014	0,039	Phase 3	N/A	N/A
34th	0,015	0,042	Phase 3	N/A	N/A
35th	0,015	0,041	Phase 3	N/A	N/A
36th	0,034	0,097	Phase 3	N/A	N/A
37th	0,012	0,034	Phase 3	N/A	N/A
38th	0,030	0,085	Phase 3	N/A	N/A
39th	0,009	0,026	Phase 3	N/A	N/A
40th	0,011	0,030	Phase 3	N/A	N/A
THD_{40}	-	1,15	Phase 3	13	13
PWHD	-	2,53	Phase 3	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT030KTL			
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	43,589	--	Phase 1	-	-
2nd	0,047	0,107	Phase 1	8	8
3rd	0,054	0,124	Phase 1	21,6	N/A
4th	0,064	0,146	Phase 1	4	4
5th	0,125	0,286	Phase 1	10,7	10,7
6th	0,036	0,083	Phase 1	2,67	2,67
7th	0,089	0,204	Phase 1	7,2	7,2
8th	0,018	0,041	Phase 1	2	2
9th	0,021	0,049	Phase 1	3,8	N/A
10th	0,045	0,103	Phase 1	1,6	1,6
11th	0,099	0,226	Phase 1	3,1	3,1
12th	0,026	0,060	Phase 1	1,33	1,33
13th	0,089	0,205	Phase 1	2	2
14th	0,024	0,056	Phase 1	N/A	N/A
15th	0,027	0,061	Phase 1	N/A	N/A
16th	0,029	0,067	Phase 1	N/A	N/A
17th	0,059	0,135	Phase 1	N/A	N/A
18th	0,039	0,090	Phase 1	N/A	N/A
19th	0,084	0,193	Phase 1	N/A	N/A
20th	0,027	0,061	Phase 1	N/A	N/A
21th	0,035	0,081	Phase 1	N/A	N/A
22th	0,034	0,077	Phase 1	N/A	N/A
23th	0,051	0,117	Phase 1	N/A	N/A
24th	0,038	0,086	Phase 1	N/A	N/A
25th	0,059	0,135	Phase 1	N/A	N/A
26th	0,030	0,070	Phase 1	N/A	N/A
27th	0,029	0,067	Phase 1	N/A	N/A
28th	0,026	0,060	Phase 1	N/A	N/A
29th	0,045	0,104	Phase 1	N/A	N/A
30th	0,023	0,054	Phase 1	N/A	N/A
31th	0,050	0,114	Phase 1	N/A	N/A
32th	0,018	0,041	Phase 1	N/A	N/A
33th	0,018	0,041	Phase 1	N/A	N/A
34th	0,015	0,034	Phase 1	N/A	N/A
35th	0,037	0,085	Phase 1	N/A	N/A
36th	0,015	0,034	Phase 1	N/A	N/A
37th	0,032	0,073	Phase 1	N/A	N/A
38th	0,010	0,023	Phase 1	N/A	N/A
39th	0,011	0,026	Phase 1	N/A	N/A
40th	0,011	0,024	Phase 1	N/A	N/A
THD_{40}	-	1,22	Phase 1	13	13
PWHD	-	2,12	Phase 1	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT030KTL			
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	43,452	--	Phase 2	-	-
2nd	0,083	0,190	Phase 2	8	8
3rd	0,039	0,089	Phase 2	21,6	N/A
4th	0,075	0,173	Phase 2	4	4
5th	0,104	0,239	Phase 2	10,7	10,7
6th	0,036	0,083	Phase 2	2,67	2,67
7th	0,108	0,248	Phase 2	7,2	7,2
8th	0,034	0,078	Phase 2	2	2
9th	0,033	0,075	Phase 2	3,8	N/A
10th	0,045	0,103	Phase 2	1,6	1,6
11th	0,089	0,204	Phase 2	3,1	3,1
12th	0,029	0,066	Phase 2	1,33	1,33
13th	0,081	0,187	Phase 2	2	2
14th	0,019	0,045	Phase 2	N/A	N/A
15th	0,028	0,064	Phase 2	N/A	N/A
16th	0,025	0,057	Phase 2	N/A	N/A
17th	0,062	0,142	Phase 2	N/A	N/A
18th	0,027	0,062	Phase 2	N/A	N/A
19th	0,082	0,189	Phase 2	N/A	N/A
20th	0,029	0,067	Phase 2	N/A	N/A
21th	0,035	0,080	Phase 2	N/A	N/A
22th	0,029	0,068	Phase 2	N/A	N/A
23th	0,066	0,152	Phase 2	N/A	N/A
24th	0,036	0,083	Phase 2	N/A	N/A
25th	0,058	0,134	Phase 2	N/A	N/A
26th	0,027	0,063	Phase 2	N/A	N/A
27th	0,030	0,068	Phase 2	N/A	N/A
28th	0,026	0,059	Phase 2	N/A	N/A
29th	0,054	0,124	Phase 2	N/A	N/A
30th	0,026	0,061	Phase 2	N/A	N/A
31th	0,041	0,093	Phase 2	N/A	N/A
32th	0,019	0,044	Phase 2	N/A	N/A
33th	0,019	0,043	Phase 2	N/A	N/A
34th	0,014	0,033	Phase 2	N/A	N/A
35th	0,041	0,095	Phase 2	N/A	N/A
36th	0,012	0,029	Phase 2	N/A	N/A
37th	0,029	0,067	Phase 2	N/A	N/A
38th	0,010	0,024	Phase 2	N/A	N/A
39th	0,012	0,028	Phase 2	N/A	N/A
40th	0,010	0,022	Phase 2	N/A	N/A
THD_{40}	-	1,19	Phase 2	13	13
PWHD	-	2,14	Phase 2	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Power Quality. Harmonic current emission					
micro-generator		BNT030KTL			
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	43,482	--	Phase 3	-	-
2nd	0,085	0,195	Phase 3	8	8
3rd	0,051	0,116	Phase 3	21,6	N/A
4th	0,100	0,231	Phase 3	4	4
5th	0,130	0,298	Phase 3	10,7	10,7
6th	0,045	0,103	Phase 3	2,67	2,67
7th	0,112	0,258	Phase 3	7,2	7,2
8th	0,040	0,091	Phase 3	2	2
9th	0,031	0,072	Phase 3	3,8	N/A
10th	0,054	0,124	Phase 3	1,6	1,6
11th	0,073	0,168	Phase 3	3,1	3,1
12th	0,040	0,092	Phase 3	1,33	1,33
13th	0,100	0,229	Phase 3	2	2
14th	0,032	0,073	Phase 3	N/A	N/A
15th	0,038	0,087	Phase 3	N/A	N/A
16th	0,037	0,085	Phase 3	N/A	N/A
17th	0,070	0,161	Phase 3	N/A	N/A
18th	0,041	0,093	Phase 3	N/A	N/A
19th	0,085	0,195	Phase 3	N/A	N/A
20th	0,038	0,087	Phase 3	N/A	N/A
21th	0,044	0,102	Phase 3	N/A	N/A
22th	0,038	0,087	Phase 3	N/A	N/A
23th	0,075	0,172	Phase 3	N/A	N/A
24th	0,048	0,110	Phase 3	N/A	N/A
25th	0,064	0,148	Phase 3	N/A	N/A
26th	0,032	0,074	Phase 3	N/A	N/A
27th	0,037	0,084	Phase 3	N/A	N/A
28th	0,030	0,069	Phase 3	N/A	N/A
29th	0,051	0,117	Phase 3	N/A	N/A
30th	0,030	0,069	Phase 3	N/A	N/A
31th	0,053	0,122	Phase 3	N/A	N/A
32th	0,023	0,052	Phase 3	N/A	N/A
33th	0,023	0,053	Phase 3	N/A	N/A
34th	0,019	0,044	Phase 3	N/A	N/A
35th	0,039	0,091	Phase 3	N/A	N/A
36th	0,017	0,039	Phase 3	N/A	N/A
37th	0,030	0,069	Phase 3	N/A	N/A
38th	0,013	0,029	Phase 3	N/A	N/A
39th	0,012	0,027	Phase 3	N/A	N/A
40th	0,012	0,027	Phase 3	N/A	N/A
THD_{40}	-	1,39	Phase 3	13	13
PWHD	-	2,45	Phase 3	22	22

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Voltage fluctuation and Flicker.					
BNT010KTL	Maximum permissible flicker and voltage fluctuation as per EN 61000-3-3				
Value	**Pst**	**Plt 2 hours**	**d(t) 500ms**	**dc**	**dmax**
Limit	1,0	0,65	3,3%	3,3%	4%

Test value

Phase 1

10kW Flicker

Date : Feb. 25, 2016
Comment :
Regulation : IEC61000-3-3 Ed1.1
Model : YOKOGAWA WT3000

Element : 1
Volt. Range : 600.00V
Un U2 : 230.83V
Set Freq : 50Hz
Frequency U2 : 50Hz
Interval : 10m0s

<Limit>
dc : 3.30%
dmax : 4.00%
d(t) : 500ms 3.30%
Pst : 1.00
Plt : 0.65 N: 12
<Result>
Element Judgement : **Pass**

Total Judgement : **Pass**

(Element 1 2 3)

Data List

No.	dc[%]		dmax[%]		d(t)[ms]		Pst	
1	0.34	Pass	0.38	Pass	0	Pass	0.08	Pass
2	0.33	Pass	0.58	Pass	0	Pass	0.08	Pass
3	0.37	Pass	0.55	Pass	0	Pass	0.08	Pass
4	0.30	Pass	0.39	Pass	0	Pass	0.08	Pass
5	0.45	Pass	0.61	Pass	0	Pass	0.08	Pass
6	0.30	Pass	0.71	Pass	0	Pass	0.08	Pass
7	0.13	Pass	0.65	Pass	0	Pass	0.08	Pass
8	0.13	Pass	0.76	Pass	0	Pass	0.08	Pass
9	0.03	Pass	0.75	Pass	0	Pass	0.08	Pass
10	0.04	Pass	0.69	Pass	0	Pass	0.08	Pass
11	0.00	Pass	0.71	Pass	0	Pass	0.08	Pass
12	0.05	Pass	0.76	Pass	0	Pass	0.08	Pass

Plt
0.09 Pass

Phase 2

10kW Flicker

Date : Feb. 25, 2016
Comment :
Regulation : IEC61000-3-3 Ed1.1
Model : YOKOGAWA WT3000

Element : 2
Volt. Range : 600.00V
Un U2 : 230.83V
Set Freq : 50Hz
Frequency U2 : 50Hz
Interval : 10m0s

<Limit>
dc : 3.30%
dmax : 4.00%
d(t) : 500ms 3.30%
Pst : 1.00
Plt : 0.65 N: 12
<Result>
Element Judgement : **Pass**

Total Judgement : **Pass**

(Element 1 2 3)

Data List

No.	dc[%]		dmax[%]		d(t)[ms]		Pst	
1	0.44	Pass	0.47	Pass	0	Pass	0.09	Pass
2	0.41	Pass	0.47	Pass	0	Pass	0.09	Pass
3	0.40	Pass	0.46	Pass	0	Pass	0.09	Pass
4	0.42	Pass	0.49	Pass	0	Pass	0.09	Pass
5	0.38	Pass	0.48	Pass	0	Pass	0.09	Pass
6	0.47	Pass	0.65	Pass	0	Pass	0.09	Pass
7	0.45	Pass	0.53	Pass	0	Pass	0.09	Pass
8	0.18	Pass	0.69	Pass	0	Pass	0.09	Pass
9	0.14	Pass	0.71	Pass	0	Pass	0.09	Pass
10	0.07	Pass	0.60	Pass	0	Pass	0.09	Pass
11	0.06	Pass	0.67	Pass	0	Pass	0.09	Pass
12	0.06	Pass	0.60	Pass	0	Pass	0.09	Pass

Plt
0.09 Pass

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Test value

Phase 3

10kW Flicker

Date : Feb. 25, 2016
Comment :
Regulation : IEC61000-3-3 Ed1.1
Model : YOKOGAWA WT3000

Element : 3
Volt. Range : 600.00V
Un U3 : 230.70V
Set Freq : 50Hz
Frequency U3 : 50Hz
Interval : 10m0s

<Limit>
dc : 3.30%
dmax : 4.00%
d(t) : 500ms 3.30%
Pst : 1.00
Plt : 0.65 N: 12
<Result>
Element Judgement : **Pass**

Total Judgement : **Pass**

(Element 1 2 3)

Data List

No.	dc[%]		dmax[%]		d(t)[ms]		Pst	
1	0.39	Pass	0.45	Pass	0	Pass	0.08	Pass
2	0.39	Pass	0.43	Pass	0	Pass	0.08	Pass
3	0.33	Pass	0.37	Pass	0	Pass	0.08	Pass
4	0.35	Pass	0.43	Pass	0	Pass	0.08	Pass
5	0.39	Pass	0.47	Pass	0	Pass	0.08	Pass
6	0.44	Pass	0.44	Pass	0	Pass	0.08	Pass
7	0.46	Pass	0.56	Pass	0	Pass	0.08	Pass
8	0.27	Pass	0.48	Pass	0	Pass	0.08	Pass
9	0.39	Pass	0.49	Pass	0	Pass	0.08	Pass
10	0.11	Pass	0.60	Pass	0	Pass	0.08	Pass
11	0.09	Pass	0.61	Pass	0	Pass	0.08	Pass
12	0.07	Pass	0.61	Pass	0	Pass	0.08	Pass

Plt
0.08 Pass

Voltage fluctuation and Flicker.

BNT010KTL	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

Phase 1

30KW Flicker

AnalysisDate(MeasureDate) : Mon Aug 01 13:08:10 2016 (Mon Aug 01 13:05:11 2016)
Comment : AFORE

Regulation : IEC61000-3-11 Ed1.0
Interval : 10Min0Sec
Model : YOKOGAWA WT3000
Wiring : three-phase 4wire
Voltage Range : 300.00V
Voltage U1 : 231.14V
Set Frequency : 50Hz
Frequency U1 : 49.999Hz
Element : 1

PASS

Compatibility Condition : Compliance with IEC61000-3-11
Element : Pass
Total Element : Pass
dc (3.30%) : Pass
dmax (4.00%) : Pass
d(t) (500ms) : Pass
Pst (1.00%) : Pass
Plt (0.65) : Pass

No.	dc[%]	dmax[%]	d(t)[ms]	Pst
1	0.72 Pass	0.74 Pass	0.00 Pass	0.11 Pass
2	0.67 Pass	0.69 Pass	0.00 Pass	0.11 Pass
3	0.68 Pass	0.71 Pass	0.00 Pass	0.11 Pass
4	0.66 Pass	0.69 Pass	0.00 Pass	0.11 Pass
5	0.69 Pass	0.69 Pass	0.00 Pass	0.11 Pass
6	0.67 Pass	0.71 Pass	0.00 Pass	0.11 Pass
7	0.68 Pass	0.73 Pass	0.00 Pass	0.11 Pass
8	0.67 Pass	0.68 Pass	0.00 Pass	0.11 Pass
9	0.68 Pass	0.70 Pass	0.00 Pass	0.11 Pass
10	0.68 Pass	0.72 Pass	0.00 Pass	0.11 Pass
11	0.70 Pass	0.72 Pass	0.00 Pass	0.15 Pass
12	0.69 Pass	0.70 Pass	0.00 Pass	0.12 Pass

Plt
0.12 Pass

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

Test value

Phase 2

30KW Flicker

AnalysisDate(MeasureDate) : Mon Aug 01 13:08:10 2016 (Mon Aug 01 13:05:11 2016)
Comment : AFORE

Regulation : IEC61000-3-11 Ed1.0
Interval : 10Min0Sec
Model : YOKOGAWA WT3000
Wiring : three-phase 4wire
Voltage Range : 300.00V
Voltage U1 : 230.12V
Set Frequency : 50Hz
Frequency U1 : 49.999Hz
Element : 2

PASS

Compatibility Condition : Compliance with IEC61000-3-11
Element : Pass
Total Element : Pass
dc (3.30%) : Pass
dmax (4.00%) : Pass
d(t) (500ms) : Pass
Pst (1.00%) : Pass
Plt (0.65) : Pass

No.	dc[%]	dmax[%]	d(t)[ms]	Pst
1	0.71 Pass	0.73 Pass	0.00 Pass	0.11 Pass
2	0.67 Pass	0.69 Pass	0.00 Pass	0.11 Pass
3	0.67 Pass	0.70 Pass	0.00 Pass	0.11 Pass
4	0.66 Pass	0.69 Pass	0.00 Pass	0.11 Pass
5	0.68 Pass	0.69 Pass	0.00 Pass	0.11 Pass
6	0.67 Pass	0.70 Pass	0.00 Pass	0.11 Pass
7	0.67 Pass	0.73 Pass	0.00 Pass	0.11 Pass
8	0.67 Pass	0.68 Pass	0.00 Pass	0.11 Pass
9	0.65 Pass	0.70 Pass	0.00 Pass	0.11 Pass
10	0.68 Pass	0.71 Pass	0.00 Pass	0.11 Pass
11	0.69 Pass	0.72 Pass	0.00 Pass	0.13 Pass
12	0.69 Pass	0.70 Pass	0.00 Pass	0.11 Pass

Plt
0.11 Pass

Phase 3

30KW Flicker

AnalysisDate(MeasureDate) : Mon Aug 01 13:08:10 2016 (Mon Aug 01 13:05:11 2016)
Comment : AFORE

Regulation : IEC61000-3-11 Ed1.0
Interval : 10Min0Sec
Model : YOKOGAWA WT3000
Wiring : three-phase 4wire
Voltage Range : 300.00V
Voltage U1 : 230.10V
Set Frequency : 50Hz
Frequency U1 : 49.999Hz
Element : 3

PASS

Compatibility Condition : Compliance with IEC61000-3-11
Element : Pass
Total Element : Pass
dc (3.30%) : Pass
dmax (4.00%) : Pass
d(t) (500ms) : Pass
Pst (1.00%) : Pass
Plt (0.65) : Pass

No.	dc[%]	dmax[%]	d(t)[ms]	Pst
1	0.71 Pass	0.71 Pass	0.00 Pass	0.11 Pass
2	0.66 Pass	0.69 Pass	0.00 Pass	0.11 Pass
3	0.67 Pass	0.71 Pass	0.00 Pass	0.11 Pass
4	0.66 Pass	0.69 Pass	0.00 Pass	0.11 Pass
5	0.67 Pass	0.69 Pass	0.00 Pass	0.11 Pass
6	0.67 Pass	0.71 Pass	0.00 Pass	0.11 Pass
7	0.67 Pass	0.72 Pass	0.00 Pass	0.11 Pass
8	0.65 Pass	0.68 Pass	0.00 Pass	0.11 Pass
9	0.65 Pass	0.71 Pass	0.00 Pass	0.11 Pass
10	0.68 Pass	0.71 Pass	0.00 Pass	0.11 Pass
11	0.68 Pass	0.72 Pass	0.00 Pass	0.11 Pass
12	0.69 Pass	0.70 Pass	0.00 Pass	0.11 Pass

Plt
0.11 Pass

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

DC-Injection.				
BNT005KTL				
Protection limit	Tested at four power levels, limit 0,5% of IAC_{nom} (36,2mA)			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	25,2	26,8	-28,6	24,00
Max. test value (phase L2) [mA]	-25,2	-22,4	20,0	-19,5
Max. test value (phase L3) [mA]	-24,6	26,2	20,3	-20,2
BNT006KTL				
Protection limit	Tested at four power levels, limit 0,5% of IAC_{nom} (43,5mA)			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	22,2	29,0	34,5	30,4
Max. test value (phase L2) [mA]	25,0	-23,7	26,9	-25,4
Max. test value (phase L3) [mA]	23,4	29,6	28,4	24,6
BNT008KTL				
Protection limit	Tested at four power levels, limit 0,5% of IAC_{nom} (58mA)			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	31,6	29,6	26,0	-27,9
Max. test value (phase L2) [mA]	-16,2	21,8	21,3	26,2
Max. test value (phase L3) [mA]	27,9	26,7	30,3	-30,9
BNT010KTL				
Protection limit	Tested at four power levels, limit 0,5% of IAC_{nom} (72,5mA)			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	26,3	35,6	-29,9	-32,2
Max. test value (phase L2) [mA]	-21,6	-21,6	-29,6	25,1
Max. test value (phase L3) [mA]	24,8	27,4	21,8	27,3
BNT015KTL				
Protection limit	Tested at four power levels, limit 0,5% of IAC_{nom} (108,7mA)			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	56,5	76,9	-63,4	86,5
Max. test value (phase L2) [mA]	-71,7	-85,7	-105,4	-83,2
Max. test value (phase L3) [mA]	52,7	-59,9	95,9	97,6
BNT017KTL				
Protection limit	Tested at four power levels, limit 0,5% of IAC_{nom} (123,3mA)			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	71,5	101,1	78,9	81,3
Max. test value (phase L2) [mA]	-60,3	-112,3	-70,4	72,5
Max. test value (phase L3) [mA]	-53,8	-103,1	-96,1	-109,1

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. AFR-16JA0248FTSP**

BNT020KTL				
Protection limit	Tested at four power levels, limit 0,5% of IAC_{nom} (145mA)			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	-85,5	-83,7	-41,8	-81,4
Max. test value (phase L2) [mA]	108,9	93,5	114,4	106,2
Max. test value (phase L3) [mA]	-57,9	-71,4	-121,2	76,4
BNT025KTL				
Protection limit	Tested at four power levels, limit 0,5% of IAC_{nom} (181,5mA)			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	-40,8	-33,2	-46,4	-63,1
Max. test value (phase L2) [mA]	-39,0	68,7	104,3	117,4
Max. test value (phase L3) [mA]	64,5	-74,7	-99,9	-107,4
BNT030KTL				
Protection limit	Tested at four power levels, limit 0,5% of IAC_{nom} (217,4mA)			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	94,8	104,6	55,2	-33,3
Max. test value (phase L2) [mA]	52,3	-117,5	27,9	69,5
Max. test value (phase L3) [mA]	-126,5	-114,9	125,1	-84,0