Overensstemmelsescertifikat

Ansøger:	**SolaX power Co., Ltd.** No. 288 Shizhu Road, Tonglu Economic Development Zone, Dongxing District 311500, Tonglu City, Zhejiang Province, **China**
Produkt	**Automatisk frakoblingsanordning mellem en generator og det offentlige lavspændingsnet**
Model:	**X1-1.1-S-D, X1-1.1-S-N, X1-1.5-S-D, X1-1.5-S-N, X1-2.0-S-D, X1-2.0-S-N, X1-2.5-S-D, X1-2.5-S-N, X1-3.0-S-D, X1-3.0-S-N, X1-3.3-S-D, X1-3.3-S-N**

Anvendelse i overensstemmelse med gældende regler:

Automatisk frakoblingsanordning med en-faset overvågning af lysnettet til solcellesystemer med en en-faset parallelkobling via en vekselretter i det offentlige strømforsyningsnet. Den automatiske frakoblingsanordning er en integreret del af den førnævnte vekselretter. Den fungerer som en erstatning for frakoblingsanordningen med isolerende funktion, som distributionsnetværket til enhver tid har adgang til.

Gældende regler og standarder:

Teknisk forskrift TF 3.2.1:2016 for elproducerende anlæg på 11 kW eller derunder og EN 50438:2013, DS/EN 50438:2013 ”Krav til mikrogeneratorers parallelforbindelse med offentligt lavspændingsnetværk“. Anti-islanding beskyttelse (beskyttelse mod ø-drift) opfylder kravene i IEC 62116:2014, DS/EN 62116:2014 ”Nettilsluttede solcelleinvertere - Prøvningsmetoder til foranstaltninger mod ødrift“.

Sikkerhedskonceptet i det førnævnte repræsentative produkt svarer på udstedelsestidspunktet af dette certifikat til de gældende sikkerhedsspecifikationer for den angivne brug i henhold til reglerne.

Rapportnummer:	**SXP-16JY2394FTSP**
Cetifikatnummer:	**U17-0386**
Udstedelsesdato:	**2017-08-11**

certificering institut

Holger Schaffer

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

Certificering institut Bureau Veritas Consumer Products Services Germany GmbH
Akkrediteret efter DIN EN ISO/IEC 17065

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Type Approval and declaration of compliance with the requirements of EN 50438.						
Manufacturer / applicant:	SolaX power Co., Ltd. No. 288 Shizhu Road, Tonglu Economic Development Zone, Dongxing District 311500, Tonglu City, Zhejiang Province China					
Micro-generator Type:	Grid-tied photovoltaic inverter					
Rated values:	X1-1.1-S-D X1-1.1-S-N	X1-1.5-S-D X1-1.5-S-N	X1-2.0-S-D X1-2.0-S-N	X1-2.5-S-D X1-2.5-S-N	X1-3.0-S-D X1-3.0-S-N	X1-3.3-S-D X1-3.3-S-N
Maximum rated capacity:	1,1kW	1,5kW	2,0kW	2,5kW	3,0kW	3,3kW
Rated voltage:	230V					
Firmware version:	V3.08					
Measurement period:	2016-03-01 to 2017-07-13					

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.

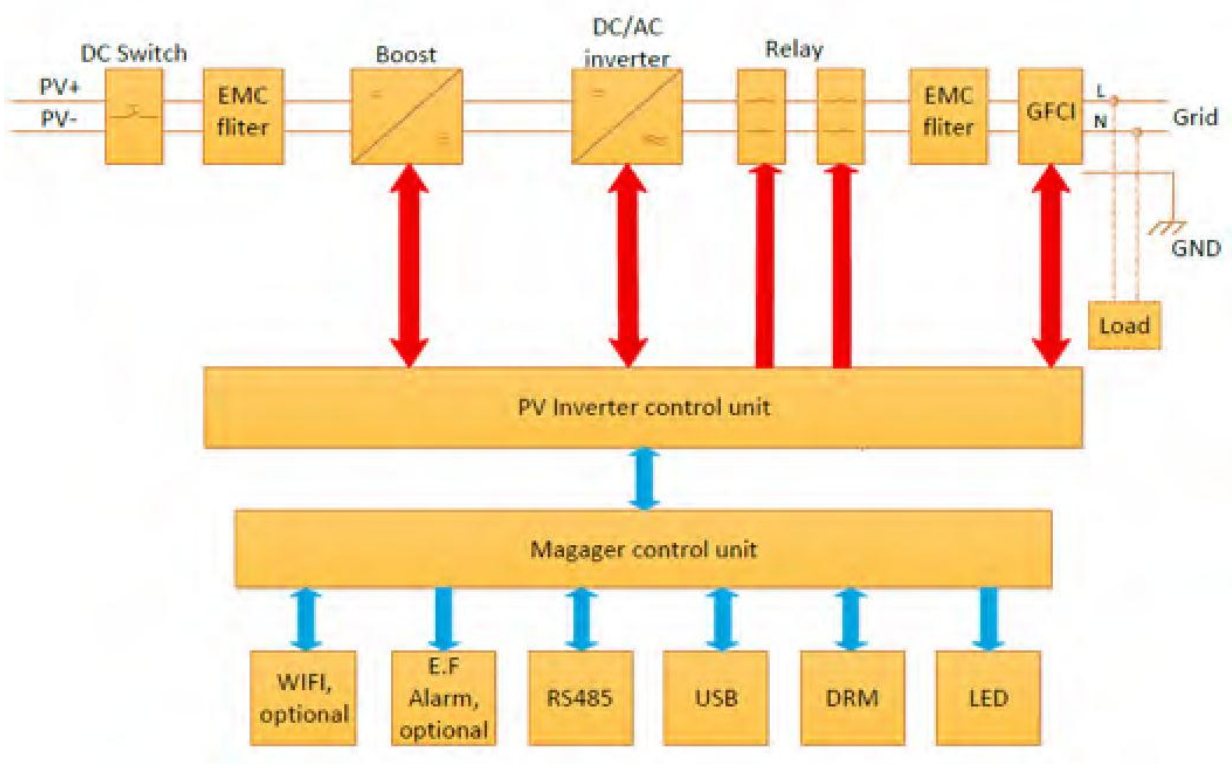

Figure 1 – Schematic structure of the power generation unit

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. SXP-16JY2394FTSP**

Type testing of the interface protection

Over-/under-voltage tests

Model: X1-3.3-S-D

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	60	253,0	60	253,0	58,1
Over-voltage stage 2	264,5	0,2	264,5	0,2	264,5	0,089
Under-voltage stage 1	195,5	50	195,5	50	195,5	48,5
Under-voltage stage 2	184	0,1	184	0,1	184,1	0,087

Model: X1-2.0-S-D

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	60	253,0	60	253,0	58,3
Over-voltage stage 2	264,5	0,2	264,5	0,2	264,5	0,087
Under-voltage stage 1	195,5	50	195,5	50	195,5	48,1
Under-voltage stage 2	184	0,1	184	0,1	184,0	0,087

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Over-/under-frequency tests						
Model: X1-3.3-S-D						
Parameter	**Protection limit**		**Actual setting**		**Trip value (test result)**	
	Frequency [Hz]	**Disconnection time [s]**	**Frequency [Hz]**	**Disconnection time [s]**	**Frequency [Hz]**	**Disconnection time [s]**
Over-frequency	52,0	0,2	52,0	0,2	47,00	0,140
Under-frequency	47,5	0,2	47,5	0,2	52,00	0,147
Model: X1-2.0-S-D						
Parameter	**Protection limit**		**Actual setting**		**Trip value (test result)**	
	Frequency [Hz]	**Disconnection time [s]**	**Frequency [Hz]**	**Disconnection time [s]**	**Frequency [Hz]**	**Disconnection time [s]**
Over-frequency	52,0	0,2	52,0	0,2	47,00	0,173
Under-frequency	47,5	0,2	47,5	0,2	52,00	0,150

LoM test				
Method used	**ROCOF (df/dt)**			
ROCOF (df/dt)	**Neg. gradient**		**Pos. gradient**	
Parameter	**Min. [Hz/s]**	**Time [ms]**	**Max. [Hz/s]**	**Time [ms]**
Protection limit (TF 3.2.1 Table 6 or EN 50438 Annex A)	-2,5	80	+2,5	80
Actual setting (as applied to interface protection)	-2,5	80	+2,5	80
Trip value of model X1-3.3-S-D (test result)	-2,5	78,2	+2,5	79,1
Trip value of model X1-2.0-S-D (test result)	-2,5	76,4	+2,5s	75,8

Voltage Changes		
Model: X1-3.3-S-D		
Switch-on for any capacity (10% PEmax)	k_i	0,120
Switch-on for nominal capacity	k_i	0,225
Worst value of all switching operations	k_i	0,225
Model: X1-2.0-S-D		
Switch-on for any capacity (10% PEmax)	k_i	0,056
Switch-on for nominal capacity	k_i	0,053
Worst value of all switching operations	k_i	0,056

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

LoM test						
Model: X1-3.3-S-D						
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 [ms]	209	208	198	170	136	158
LoM test						
Model: X1-2.0-S-D						
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 [ms]	245	277	301	181	169	229

Appendix E Type Verification Test Report	
Extract from test report according to EN 50438	Nr. SXP-16JY2394FTSP

Type testing of a micro-generator

Operating range

Model: X1-2.0-S-D

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

Test sequence	Voltage [V]	Frequency [Hz]	Output power [W]	Cos φ [1]
1	195,4	47,5	1,998	0,998
2	253,1	51,5	1,996	0,998

Model: X1-3.3-S-D

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

Test sequence	Voltage [V]	Frequency [Hz]	Output power [W]	Cos φ [1]
1	195,6	47,5	2,971	0,999
2	253,1	51,5	3,285	0,999

Active power at under-frequency

Model: X1-3.3-S-D

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]:	3,266	3,207	3,199
ΔP/PM [%] per 1 Hz:			2,03

Active power at under-frequency

Model: X1-2.0-S-D

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]:	1,985	1,979	1,977
ΔP/PM [%] per 1 Hz:			0

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Power response to over-frequency							
Model: X1-3.3-S-D							
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	3,234	2,640	2,046	2,640	3,234	N/A
PE60 [kW]:	3,214	3,145	2,551	1,961	2,541	3,145	3,214
∆PE60/PM [%]:	N/A	-2,69	-2,70	-2,58	-3,00	-2,70	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	1,617	1,320	1,023	1,320	1,617	N/A
PE60 [kW]:	1,623	1,558	1,295	1,003	1,285	1,524	1,623
∆PE60/PM [%]:	N/A	-3,58	+1,52	+1,21	-2,12	-5,64	N/A
Limit ΔP/P1min:	+ 10 % of P_M						
Power response to over-frequency							
Model: X1-2.0-S-D							
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	1,960	1,600	1,240	1,600	1,960	N/A
PE60 [kW]:	2,018	1,971	1,563	1,219	1,564	1,910	2,008
∆PE60/PM [%]:	N/A	+0,56	-2,31	-1,69	-2,25	-2,55	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	0,980	0,800	0,620	0,800	0,980	N/A
PE60 [kW]:	1,013	0,950	0,806	0,633	0,779	0,952	1,013
∆PE60/PM [%]:	N/A	-3,00	+0,60	+1,30	-0,10	-2,8	N/A
Limit ΔP/P1min:	+ 10 % of P_M						

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 | **Nr. SXP-16JY2394FTSP**

Reactive power			
Uncontrollable reactive power			
Model: X1-1.1-S-D			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9764	0,9762	0,9764
50% PN	0,9953	0,9944	0,9942
75% PN	0,9971	0,9973	0,9970
100% PN	0,9983	0,9980	0,9985
Limit	**>0,95**	**>0,95**	**>0,95**
Model: X1-1.5-S-D			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9897	0,9896	0,9897
50% PN	0,9973	0,9972	0,9973
75% PN	0,9985	0,9980	0,9986
100% PN	0,9989	0,9988	0,9984
Limit	**>0,95**	**>0,95**	**>0,95**
Model: X1-2.0-S-D			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9939	0,9928	0,9920
50% PN	0,9979	0,9976	0,9976
75% PN	0,9986	0,9982	0,9986
100% PN	0,9987	0,9984	0,9988
Limit	**>0,95**	**>0,95**	**>0,95**
Model: X1-2.0-S-D			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9939	0,9928	0,9920
50% PN	0,9979	0,9976	0,9976
75% PN	0,9986	0,9982	0,9986
100% PN	0,9987	0,9984	0,9988
Limit	**>0,95**	**>0,95**	**>0,95**
Model: X1-2.0-S-D			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9939	0,9928	0,9920
50% PN	0,9979	0,9976	0,9976
75% PN	0,9986	0,9982	0,9986
100% PN	0,9987	0,9984	0,9988
Limit	**>0,95**	**>0,95**	**>0,95**
Model: X1-2.0-S-D			
Test Voltage / Output power	**211,6V**	**230V**	**248,4V**
25% PN	0,9939	0,9928	0,9920
50% PN	0,9979	0,9976	0,9976
75% PN	0,9986	0,9982	0,9986
100% PN	0,9987	0,9984	0,9988
Limit	**>0,95**	**>0,95**	**>0,95**

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Controllable reactive power				
Model: X1-3.3-S-D				
Inductive (supply reactive power)				
Power-BIN	**Active power [W]**	**Reactive power [Var]**	**Power factor (cos φ)**	**AC voltage [V]**
0% - 10%	0,292	-1,680	0,171	229,75
10% - 20%	0,628	-1,676	0,351	229,79
20% - 30%	0,961	-1,672	0,498	229,95
30% - 40%	1,294	-1,669	0,613	230,11
40% - 50%	1,625	-1,665	0,699	230,25
50% - 60%	1,955	-1,663	0,762	230,40
60% - 70%	2,288	-1,658	0,810	230,54
70% - 80%	2,610	-1,655	0,845	230,69
80% - 90%	2,927	-1,653	0,871	230,84
90% - 100%	3,202	-1,655	0,873	231,02
Capacitive (supply reactive power)				
Power-BIN	**Active power [W]**	**Reactive power [Var]**	**Power factor (cos φ)**	**AC voltage [V]**
0% - 10%	0,296	1,667	0,175	229,83
10% - 20%	0,635	1,670	0,355	229,88
20% - 30%	0,971	1,673	0,502	230,06
30% - 40%	1,300	1,677	0,613	230,21
40% - 50%	1,629	1,680	0,696	230,41
50% - 60%	1,961	1,684	0,759	230,57
60% - 70%	2,283	1,686	0,804	230,70
70% - 80%	2,616	1,684	0,805	230,86
80% - 90%	2,910	1,685	0,805	230,86
90% - 100%	3,217	1,685	0,876	230,86
Reactive power supply with set point Q=0				
Power-BIN	**Active power [W]**	**Reactive power [Var]**	**Power factor (cos φ)**	**AC voltage [V]**
0% - 10%	0,296	1,667	0,175	229,83
10% - 20%	0,635	1,670	0,355	229,88
20% - 30%	0,971	1,673	0,502	230,06
30% - 40%	1,300	1,677	0,613	230,21
40% - 50%	1,629	1,680	0,696	230,41
50% - 60%	1,961	1,684	0,759	230,57
60% - 70%	2,283	1,686	0,804	230,70
70% - 80%	2,616	1,684	0,805	230,86
80% - 90%	2,910	1,685	0,805	230,86
90% - 100%	3,217	1,685	0,876	230,86

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Controllable reactive power				
Model: X1-2.0-S-D				
Inductive (supply reactive power)				
Power-BIN	**Active power [W]**	**Reactive power [Var]**	**Power factor (cos φ)**	**AC voltage [V]**
0% - 10%	0,176	-1,038	0,167	230,16
10% - 20%	0,383	-1,037	0,346	230,09
20% - 30%	0,594	-1,036	0,497	230,35
30% - 40%	0,793	-1,034	0,609	230,09
40% - 50%	0,997	-1,033	0,694	230,39
50% - 60%	1,208	-1,033	0,760	230,42
60% - 70%	1,403	-1,031	0,806	230,57
70% - 80%	1,595	-1,033	0,840	230,61
80% - 90%	1,805	-1,038	0,867	230,77
90% - 100%	1,934	-1,056	0,878	230,85
Capacitive (supply reactive power)				
Power-BIN	**Active power [W]**	**Reactive power [Var]**	**Power factor (cos φ)**	**AC voltage [V]**
0% - 10%	0,179	1,039	0,169	230,01
10% - 20%	0,390	1,040	0,351	230,28
20% - 30%	0,596	1,042	0,496	230,37
30% - 40%	0,804	1,045	0,610	230,24
40% - 50%	1,006	1,046	0,693	230,48
50% - 60%	1,206	1,047	0,755	230,31
60% - 70%	1,411	1,052	0,802	230,73
70% - 80%	1,593	1,054	0,834	230,51
80% - 90%	1,806	1,055	0,863	230,57
90% - 100%	2,009	1,061	0,884	230,87
Reactive power supply with set point Q=0				
Power-BIN	**Active power [W]**	**Reactive power [Var]**	**Power factor (cos φ)**	**AC voltage [V]**
0% - 10%	0,194	0,000	0,999	230,02
10% - 20%	0,400	0,003	0,999	230,12
20% - 30%	0,604	0,005	0,999	230,24
30% - 40%	0,809	0,006	0,999	230,35
40% - 50%	1,010	0,008	0,999	230,32
50% - 60%	1,216	0,010	0,999	230,39
60% - 70%	1,419	0,013	0,999	230,52
70% - 80%	1,618	0,014	0,999	230,71
80% - 90%	1,820	0,016	0,999	230,82
90% - 100%	2,016	0,017	0,999	230,92

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Q adjustment				
Model: X1-3.3-S-D				
	Reactive power set point Q [Var]	**Measured reactive power Q [Var]**	**Measured cos φ**	**Deviation compared to setpoint ΔQ / PN [%]**
- Qmin	-1,650	-1,657	0,873	0,21
0	0	-0,055	0,999	1,67
+ Qmax	1,650	1,684	0,877	1,03
Model: X1-2.0-S-D				
	Reactive power set point Q [Var]	**Measured reactive power Q [Var]**	**Measured cos φ**	**Deviation compared to setpoint ΔQ / PN [%]**
- Qmin	-1,000	-1,059	0,879	2,95
0	0	0,017	1,000	0,85
+ Qmax	1,000	1,061	0,884	3,05

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Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Qmin reactive power in accordance to standard characteristic curve Q=f(V)						
Model: X1-3.3-S-D						
P/Pn	Vac [V] Set point	P/Pn [%]	Vac [V] measured	Q [Var] measured	Q [Var] expected	ΔQ [%]
< 20%	1,07Vn	9,70	246,12	59,20	≈0(<±2.5%Pn)	1,79
< 20%	1,09Vn	9,66	250,60	58,95	≈0(<±2.5%Pn)	1,79
< 20%-30%	1,09Vn	29,56	250,59	832,50	-0,5 Qmin	0,53
40%	1,09Vn	39,60	250,61	797,70	-0,5 Qmin	1,58
50%	1,09Vn	49,46	250,60	823,00	-0,5 Qmin	0,82
60%	1,09Vn	59,37	250,60	828,95	-0,5 Qmin	0,64
70%	1,09Vn	69,25	250,60	807,45	-0,5 Qmin	1,29
80%	1,09Vn	78,89	250,59	815,45	-0,5 Qmin	1,05
90%	1,09Vn	88,73	250,61	774,00	-0,5 Qmin	2,30
100%	1,09Vn	98,53	250,60	817,70	-0,5 Qmin	0,98
100%	1,1Vn	98,67	253,01	1663,20	-Qmin	1,12
100%-10%	1,1Vn	8,82	253,02	1627,95	-Qmin	2,18
10%→ ≤5%	1,1Vn	2,56	253,01	64,75	≈0(<±2.5%Pn)	1,96
Qmax reactive power in accordance to standard characteristic curve Q=f(V)						
Model: X1-3.3-S-D						
P/Pn	Vac [V] Set point	P/Pn [%]	Vac [V] measured	Q [Var] measured	Q [Var] expected	ΔQ [%]
< 20%	0,93Vn	9,69	213,86	50,45	≈0(<±2.5%Pn)	1,53
< 20%	0,91Vn	9,78	209,16	51,45	≈0(<±2.5%Pn)	1,56
< 20%-30%	0,91Vn	29,70	209,17	917,10	-0,5 Qmin	2,03
40%	0,91Vn	39,67	209,17	931,20	-0,5 Qmin	2,46
50%	0,91Vn	49,49	209,17	927,65	-0,5 Qmin	2,35
60%	0,91Vn	59,36	209,16	926,15	-0,5 Qmin	2,31
70%	0,91Vn	69,08	209,17	876,95	-0,5 Qmin	0,82
80%	0,91Vn	79,09	209,17	872,50	-0,5 Qmin	0,68
90%	0,91Vn	88,81	209,17	845,00	-0,5 Qmin	-0,15
100%	0,91Vn	89,90	209,17	902,55	-0,5 Qmin	1,59
100%	0,90Vn	79,86	207,04	1673,30	-Qmin	-1,06
100%-10%	0,90Vn	9,02	207,03	1662,25	-Qmin	-1,14
10%→ ≤5%	0,90Vn	2,50	207,04	55,65	≈0(<±2.5%Pn)	-1,69

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Qmin reactive power in accordance to standard characteristic curve Q=f(V)						
Model: X1-2.0-S-D						
P/Pn	Vac [V] Set point	P/Pn [%]	Vac [V] measured	Q [Var] measured	Q [Var] expected	ΔQ [%]
< 20%	1,07Vn	9,62	246,19	-0,15	≈0(<±2.5%Pn)	0,01
< 20%	1,09Vn	9,58	250,74	-0,35	≈0(<±2.5%Pn)	0,02
< 20%-30%	1,09Vn	29,97	250,73	-467,85	-0,5 Qmin	1,61
40%	1,09Vn	40,30	250,72	-478,75	-0,5 Qmin	1,06
50%	1,09Vn	50,44	250,74	-505,80	-0,5 Qmin	0,29
60%	1,09Vn	60,65	250,73	-475,65	-0,5 Qmin	1,22
70%	1,09Vn	70,69	250,71	-485,85	-0,5 Qmin	0,71
80%	1,09Vn	80,74	250,71	-501,45	-0,5 Qmin	0,07
90%	1,09Vn	90,83	250,72	-468,90	-0,5 Qmin	1,56
100%	1,09Vn	100,86	250,73	-502,90	-0,5 Qmin	0,15
100%	1,1Vn	100,51	253,04	-977,65	-Qmin	1,12
100%-10%	1,1Vn	8,86	253,04	-959,05	-Qmin	2,05
10%→ ≤5%	1,1Vn	2,40	252,98	-1,40	≈0(<±2.5%Pn)	0,07
Qmax reactive power in accordance to standard characteristic curve Q=f(V)						
Model: X1-2.0-S-D						
P/Pn	Vac [V] Set point	P/Pn [%]	Vac [V] measured	Q [Var] measured	Q [Var] expected	ΔQ [%]
< 20%	0,93Vn	9,66	213,92	-0,15	≈0(<±2.5%Pn)	0,01
< 20%	0,91Vn	9,71	209,34	0,20	≈0(<±2.5%Pn)	0,01
< 20%-30%	0,91Vn	30,19	209,48	525,20	-0,5 Qmin	1,26
40%	0,91Vn	40,30	209,35	530,80	-0,5 Qmin	1,54
50%	0,91Vn	50,40	209,36	530,80	-0,5 Qmin	1,54
60%	0,91Vn	60,41	209,37	530,50	-0,5 Qmin	1,53
70%	0,91Vn	70,51	209,38	529,75	-0,5 Qmin	1,49
80%	0,91Vn	80,42	209,28	536,50	-0,5 Qmin	1,83
90%	0,91Vn	90,55	209,26	540,75	-0,5 Qmin	2,04
100%	0,91Vn	97,83	209,36	537,95	-0,5 Qmin	1,90
100%	0,90Vn	87,23	207,07	1042,70	-Qmin	2,14
100%-10%	0,90Vn	8,87	207,02	1026,65	-Qmin	1,33
10%→ ≤5%	0,90Vn	2,43	207,02	-0,55	≈0(<±2.5%Pn)	0,03

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Connection and starting to generate electrical power			
Model:X1-3.3-S-D			
Test according EN 50438 with standard setting	**Min. voltage for connection to grid:**		195,5
	Max. voltage for connection to grid:		253,0
	Min. frequency for connection to grid:		48,0
	Max. frequency for connection to grid:		50,15
	Observation time (≥60s)		60
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]	86	83	
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]	85	86	
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]	85	80	
Limit:	Connected after setting delay time(≥60s)		
Gradient:	For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. For recorded gradient see diagram below.		

Appendix E Type Verification Test Report	
Extract from test report according to EN 50438	**Nr. SXP-16JY2394FTSP**

f) In frequency range after frequency failure	**≥47,95 Hz for twice of setting observation time**	**≤51015 Hz for twice of setting observation time**
Reconnection time [s]	85	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.	

Connection and starting to generate electrical power		
Model:X1-2.0-S-D		
Test according EN 50438 with standard setting	**Min. voltage for connection to grid:**	195,5
	Max. voltage for connection to grid:	253,0
	Min. frequency for connection to grid:	48,0
	Max. frequency for connection to grid:	50,15
	Observation time (≥60s)	60
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]	80	80
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]	81	81
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. SXP-16JY2394FTSP**

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]	85	80
Limit:	Connected after setting delay time(≥60s)	
Gradient:	For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. For recorded gradient see diagram below.	
f) In frequency range after frequency failure	**≥47,95 Hz for twice of setting observation time**	**≤51015 Hz for twice of setting observation time**
Reconnection time [s]	85	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.	

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	165	9,81
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**	0,000038	In seconds
Short-circuit current parameters					
Model:X1-2.0-S-D					
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	159	3,02
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**	0,0087	In seconds

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Power Quality. Harmonic current emission				
micro-generator		X1-1.1-S-D		
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	4,380	--	Phase 1	-
2nd	0,028	0,639	Phase 1	1,080
3rd	0,026	0,595	Phase 1	2,300
4th	0,003	0,068	Phase 1	0,430
5th	0,012	0,269	Phase 1	1,140
6th	0,001	0,030	Phase 1	0,300
7th	0,012	0,282	Phase 1	0,770
8th	0,001	0,026	Phase 1	0,230
9th	0,012	0,279	Phase 1	0,400
10th	0,001	0,024	Phase 1	0,184
11th	0,009	0,214	Phase 1	0,330
12th	0,002	0,036	Phase 1	0,153
13th	0,010	0,223	Phase 1	0,210
14th	0,001	0,020	Phase 1	0,131
15th	0,010	0,230	Phase 1	0,150
16th	0,001	0,023	Phase 1	0,115
17th	0,012	0,273	Phase 1	0,132
18th	0,002	0,036	Phase 1	0,102
19th	0,011	0,254	Phase 1	0,118
20th	0,001	0,022	Phase 1	0,092
21th	0,010	0,238	Phase 1	0,107
22th	0,001	0,023	Phase 1	0,084
23th	0,008	0,176	Phase 1	0,098
24th	0,001	0,028	Phase 1	0,077
25th	0,008	0,192	Phase 1	0,090
26th	0,001	0,019	Phase 1	0,071
27th	0,006	0,140	Phase 1	0,083
28th	0,000	0,011	Phase 1	0,066
29th	0,005	0,121	Phase 1	0,078
30th	0,000	0,008	Phase 1	0,061
31th	0,005	0,108	Phase 1	0,073
32th	0,000	0,007	Phase 1	0,058
33th	0,004	0,087	Phase 1	0,068
34th	0,000	0,009	Phase 1	0,054
35th	0,004	0,088	Phase 1	0,064
36th	0,000	0,007	Phase 1	0,051
37th	0,003	0,071	Phase 1	0,061
38th	0,000	0,011	Phase 1	0,048
39th	0,003	0,064	Phase 1	0,058
40th	0,001	0,014	Phase 1	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Power Quality. Harmonic current emission				
micro-generator		X1-1.5-S-D		
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	6,482	--	Phase 1	-
2nd	0,037	0,574	Phase 1	1,080
3rd	0,053	0,814	Phase 1	2,300
4th	0,005	0,070	Phase 1	0,430
5th	0,020	0,311	Phase 1	1,140
6th	0,001	0,021	Phase 1	0,300
7th	0,011	0,165	Phase 1	0,770
8th	0,001	0,016	Phase 1	0,230
9th	0,007	0,110	Phase 1	0,400
10th	0,001	0,014	Phase 1	0,184
11th	0,005	0,078	Phase 1	0,330
12th	0,002	0,025	Phase 1	0,153
13th	0,006	0,096	Phase 1	0,210
14th	0,001	0,012	Phase 1	0,131
15th	0,008	0,127	Phase 1	0,150
16th	0,001	0,011	Phase 1	0,115
17th	0,007	0,113	Phase 1	0,132
18th	0,002	0,034	Phase 1	0,102
19th	0,006	0,100	Phase 1	0,118
20th	0,001	0,016	Phase 1	0,092
21th	0,006	0,089	Phase 1	0,107
22th	0,002	0,028	Phase 1	0,084
23th	0,008	0,122	Phase 1	0,098
24th	0,001	0,022	Phase 1	0,077
25th	0,005	0,074	Phase 1	0,090
26th	0,002	0,023	Phase 1	0,071
27th	0,003	0,051	Phase 1	0,083
28th	0,001	0,012	Phase 1	0,066
29th	0,004	0,065	Phase 1	0,078
30th	0,001	0,009	Phase 1	0,061
31th	0,002	0,038	Phase 1	0,073
32th	0,000	0,007	Phase 1	0,058
33th	0,003	0,049	Phase 1	0,068
34th	0,000	0,007	Phase 1	0,054
35th	0,002	0,036	Phase 1	0,064
36th	0,001	0,011	Phase 1	0,051
37th	0,003	0,043	Phase 1	0,061
38th	0,001	0,009	Phase 1	0,048
39th	0,001	0,021	Phase 1	0,058
40th	0,001	0,014	Phase 1	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Power Quality. Harmonic current emission				
micro-generator		X1-2.0-S-D		
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	8,156	--	Phase 1	-
2nd	0,117	1,430	Phase 1	1,080
3rd	0,119	1,463	Phase 1	2,300
4th	0,009	0,112	Phase 1	0,430
5th	0,029	0,353	Phase 1	1,140
6th	0,002	0,025	Phase 1	0,300
7th	0,018	0,217	Phase 1	0,770
8th	0,003	0,031	Phase 1	0,230
9th	0,009	0,107	Phase 1	0,400
10th	0,003	0,032	Phase 1	0,184
11th	0,008	0,094	Phase 1	0,330
12th	0,003	0,034	Phase 1	0,153
13th	0,008	0,097	Phase 1	0,210
14th	0,003	0,031	Phase 1	0,131
15th	0,012	0,153	Phase 1	0,150
16th	0,002	0,021	Phase 1	0,115
17th	0,009	0,113	Phase 1	0,132
18th	0,004	0,044	Phase 1	0,102
19th	0,012	0,151	Phase 1	0,118
20th	0,002	0,030	Phase 1	0,092
21th	0,009	0,107	Phase 1	0,107
22th	0,003	0,042	Phase 1	0,084
23th	0,005	0,067	Phase 1	0,098
24th	0,002	0,024	Phase 1	0,077
25th	0,004	0,048	Phase 1	0,090
26th	0,002	0,024	Phase 1	0,071
27th	0,004	0,048	Phase 1	0,083
28th	0,002	0,030	Phase 1	0,066
29th	0,004	0,048	Phase 1	0,078
30th	0,001	0,010	Phase 1	0,061
31th	0,003	0,040	Phase 1	0,073
32th	0,001	0,015	Phase 1	0,058
33th	0,003	0,043	Phase 1	0,068
34th	0,001	0,011	Phase 1	0,054
35th	0,002	0,026	Phase 1	0,064
36th	0,001	0,013	Phase 1	0,051
37th	0,003	0,033	Phase 1	0,061
38th	0,001	0,015	Phase 1	0,048
39th	0,002	0,022	Phase 1	0,058
40th	0,002	0,020	Phase 1	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Power Quality. Harmonic current emission				
micro-generator		X1-2.5-S-D		
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	10,707	--	Phase 1	-
2nd	0,006	0,055	Phase 1	1,080
3rd	0,019	0,178	Phase 1	2,300
4th	0,003	0,025	Phase 1	0,430
5th	0,014	0,131	Phase 1	1,140
6th	0,001	0,009	Phase 1	0,300
7th	0,007	0,062	Phase 1	0,770
8th	0,002	0,015	Phase 1	0,230
9th	0,003	0,028	Phase 1	0,400
10th	0,001	0,013	Phase 1	0,184
11th	0,001	0,009	Phase 1	0,330
12th	0,002	0,018	Phase 1	0,153
13th	0,005	0,045	Phase 1	0,210
14th	0,001	0,010	Phase 1	0,131
15th	0,007	0,062	Phase 1	0,150
16th	0,001	0,013	Phase 1	0,115
17th	0,010	0,098	Phase 1	0,132
18th	0,003	0,027	Phase 1	0,102
19th	0,004	0,035	Phase 1	0,118
20th	0,001	0,012	Phase 1	0,092
21th	0,004	0,039	Phase 1	0,107
22th	0,002	0,021	Phase 1	0,084
23th	0,006	0,053	Phase 1	0,098
24th	0,001	0,013	Phase 1	0,077
25th	0,004	0,040	Phase 1	0,090
26th	0,002	0,020	Phase 1	0,071
27th	0,004	0,039	Phase 1	0,083
28th	0,002	0,023	Phase 1	0,066
29th	0,005	0,047	Phase 1	0,078
30th	0,003	0,025	Phase 1	0,061
31th	0,004	0,036	Phase 1	0,073
32th	0,001	0,011	Phase 1	0,058
33th	0,004	0,042	Phase 1	0,068
34th	0,001	0,011	Phase 1	0,054
35th	0,003	0,031	Phase 1	0,064
36th	0,001	0,009	Phase 1	0,051
37th	0,004	0,038	Phase 1	0,061
38th	0,001	0,009	Phase 1	0,048
39th	0,003	0,030	Phase 1	0,058
40th	0,001	0,009	Phase 1	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Power Quality. Harmonic current emission				
micro-generator		X1-3.0-S-D		
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	12,838	--	Phase 1	-
2nd	0,007	0,051	Phase 1	1,080
3rd	0,028	0,218	Phase 1	2,300
4th	0,006	0,043	Phase 1	0,430
5th	0,019	0,146	Phase 1	1,140
6th	0,001	0,011	Phase 1	0,300
7th	0,006	0,048	Phase 1	0,770
8th	0,002	0,015	Phase 1	0,230
9th	0,001	0,010	Phase 1	0,400
10th	0,002	0,014	Phase 1	0,184
11th	0,004	0,029	Phase 1	0,330
12th	0,002	0,016	Phase 1	0,153
13th	0,003	0,025	Phase 1	0,210
14th	0,001	0,009	Phase 1	0,131
15th	0,002	0,018	Phase 1	0,150
16th	0,001	0,010	Phase 1	0,115
17th	0,005	0,042	Phase 1	0,132
18th	0,002	0,017	Phase 1	0,102
19th	0,006	0,048	Phase 1	0,118
20th	0,001	0,010	Phase 1	0,092
21th	0,006	0,047	Phase 1	0,107
22th	0,002	0,019	Phase 1	0,084
23th	0,007	0,057	Phase 1	0,098
24th	0,002	0,012	Phase 1	0,077
25th	0,006	0,044	Phase 1	0,090
26th	0,002	0,017	Phase 1	0,071
27th	0,006	0,043	Phase 1	0,083
28th	0,004	0,029	Phase 1	0,066
29th	0,006	0,044	Phase 1	0,078
30th	0,003	0,020	Phase 1	0,061
31th	0,005	0,040	Phase 1	0,073
32th	0,002	0,013	Phase 1	0,058
33th	0,005	0,039	Phase 1	0,068
34th	0,002	0,013	Phase 1	0,054
35th	0,003	0,027	Phase 1	0,064
36th	0,001	0,011	Phase 1	0,051
37th	0,005	0,036	Phase 1	0,061
38th	0,001	0,010	Phase 1	0,048
39th	0,003	0,027	Phase 1	0,058
40th	0,001	0,010	Phase 1	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Power Quality. Harmonic current emission				
micro-generator		X1-3.3-S-D		
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	13,883	--	Phase 1	-
2nd	0,006	0,046	Phase 1	1,080
3rd	0,040	0,288	Phase 1	2,300
4th	0,007	0,051	Phase 1	0,430
5th	0,017	0,123	Phase 1	1,140
6th	0,001	0,010	Phase 1	0,300
7th	0,005	0,034	Phase 1	0,770
8th	0,002	0,016	Phase 1	0,230
9th	0,001	0,009	Phase 1	0,400
10th	0,002	0,014	Phase 1	0,184
11th	0,004	0,031	Phase 1	0,330
12th	0,002	0,013	Phase 1	0,153
13th	0,004	0,030	Phase 1	0,210
14th	0,001	0,008	Phase 1	0,131
15th	0,004	0,026	Phase 1	0,150
16th	0,001	0,010	Phase 1	0,115
17th	0,006	0,043	Phase 1	0,132
18th	0,002	0,018	Phase 1	0,102
19th	0,006	0,046	Phase 1	0,118
20th	0,001	0,009	Phase 1	0,092
21th	0,007	0,053	Phase 1	0,107
22th	0,002	0,014	Phase 1	0,084
23th	0,008	0,059	Phase 1	0,098
24th	0,002	0,012	Phase 1	0,077
25th	0,007	0,051	Phase 1	0,090
26th	0,002	0,014	Phase 1	0,071
27th	0,007	0,049	Phase 1	0,083
28th	0,005	0,035	Phase 1	0,066
29th	0,005	0,036	Phase 1	0,078
30th	0,002	0,017	Phase 1	0,061
31th	0,006	0,047	Phase 1	0,073
32th	0,002	0,014	Phase 1	0,058
33th	0,006	0,042	Phase 1	0,068
34th	0,003	0,023	Phase 1	0,054
35th	0,006	0,043	Phase 1	0,064
36th	0,004	0,025	Phase 1	0,051
37th	0,004	0,029	Phase 1	0,061
38th	0,003	0,019	Phase 1	0,048
39th	0,004	0,030	Phase 1	0,058
40th	0,001	0,010	Phase 1	0,046

Appendix E Type Verification Test Report

Extract from test report according to EN 50438 **Nr. SXP-16JY2394FTSP**

Voltage fluctuation and Flicker.					
X1-2.0-S-D	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	0,08	0,08	0,00%	0,43%	0,48%
Voltage fluctuation and Flicker.					
X1-3.3-S-D	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	0,18	0,16	0,00%	0,88%	0,89%

DC-Injection.				
X1-1.1-S-D				
Protection limit	Tested at four power levels limit 0,5% of IAC_{nom}			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	14,3	20,4	20,2	12,2
X1-1.5-S-D				
Protection limit	Tested at four power levels limit 0,5% of IAC_{nom}			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	12,3	11,1	8,5	6,5
X1-2.0-S-D				
Protection limit	Tested at four power levels limit 0,5% of IAC_{nom}			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	6,6	8,6	-3,0	15,7
X1-2.5-S-D				
Protection limit	Tested at four power levels limit 0,5% of IAC_{nom}			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	16,5	11,8	-5,5	-14,0
X1-3.0-S-D				
Protection limit	Tested at four power levels limit 0,5% of IAC_{nom}			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	16,4	11,7	-9,2	-17,1
X1-3.3-S-D				
Protection limit	Tested at four power levels limit 0,5% of IAC_{nom}			
Output power	**~20%**	**~50%**	**75%**	**~100%**
Max. test value (phase L1) [mA]	14,8	7,7	-10,4	3,7