



Certificate of compliance

Applicant: **Sungrow Power Supply Co., Ltd.**
No. 1699 Xiyou Rd., New & High Technology
Industrial Development Zone, Heifei, Anhui,
P. R. China

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

Model: **SG80KTL
SG80KTL-20**

Use in accordance with regulations:

Automatic disconnection device with three-phase mains surveillance in accordance with EN 50438:2013 for photovoltaic systems with a three-phase parallel coupling via an inverter in the public mains supply. The automatic disconnection device is an integral part of the aforementioned inverter.

Applied rules and standards:

EN 50438:2013

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

DIN V VDE V 0126-1-1:2006-02 (Functional safety)

Automatic disconnection device between a generator and the public low-voltage grid

The generators are rated >16A per phase. However all requirements of the EN 50438:2013 are fulfilled.

At the time of issue of this certificate, the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.

Report number: **SGR-18JY2158FCSHP**

Certificate number: **U18-0519**

Date of issue: **2018-09-25**

Certification body



Holger Schaffer

Certification body of Bureau Veritas Consumer Products Services Germany GmbH
Accredited according to DIN EN ISO/IEC 17065



Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. SGR-18JY2158FCSHP

Type Approval and declaration of compliance with the requirements of EN 50438.

Manufacturer / applicant:	Sungrow Power Supply Co., Ltd. No. 1699 Xiyou Rd., New & High Technology Industrial Development Zone, Heifei, Anhui, P. R. China
Micro-generator Type	Grid-tied photovoltaic inverter
Rated values	SG80KTL SG80KTL-20
Maximum rated capacity	80 kW
Rated voltage	3/PE AC 400V
Firmware version	DSP_SG80KTL_V11_A LCD_SG80KTL_V03_A_M
Measurement period:	2018-07-26 to 2018-09-05

Description of the structure of the power generation unit (Figure 1 and 2):

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.

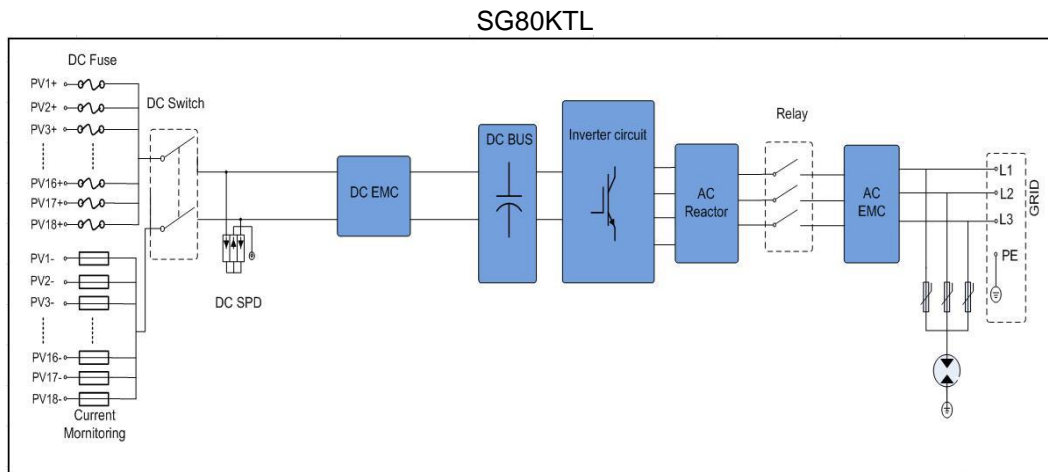


Figure 1 – Schematic structure of the power generation unit

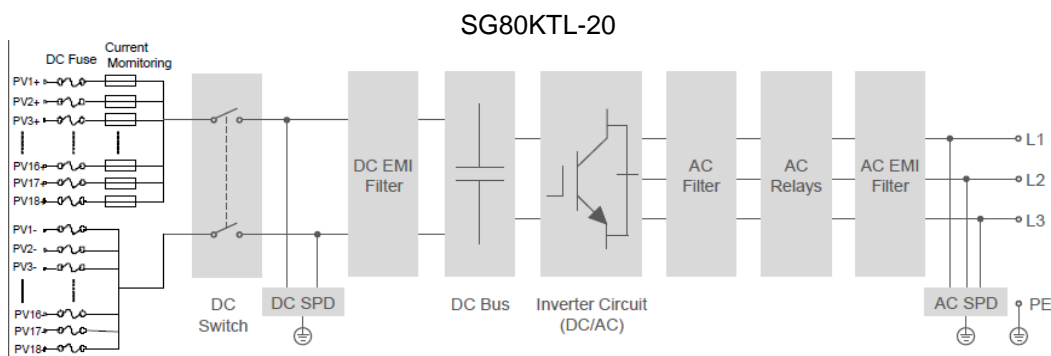


Figure 2 – Schematic structure of the power generation unit

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.

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Type testing of the interface protection

Over-/under-voltage tests						
Model: SG80KTL						
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	3 / 600*	253,0	3 / 600*	252,8	2,068 / 598,1*
Over-voltage stage 2	264,5	0,2	264,5	0,2	264,6	0,150
Under-voltage stage 1	195,5	1,5	195,5	1,5	195,8	1,375
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	3 / 600*	253,0	3 / 600*	252,8	2,084 / 599,1*
Over-voltage stage 2	264,5	0,2	264,5	0,2	264,6	0,136
Under-voltage stage 1	195,5	1,5	195,5	1,5	195,8	1,377
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	3 / 600*	253,0	3 / 600*	252,8	2,076 / 599,1*
Over-voltage stage 2	264,5	0,2	264,5	0,2	264,6	0,145
Under-voltage stage 1	195,5	1,5	195,5	1,5	195,8	1,359
<p>Note.</p> <p>Minimum operation time according to default interface protection:</p> <p>Over-voltage stage 1 -</p> <p>Over-voltage stage 2 0,1s</p> <p>Under-voltage 1,2s</p>						
<p>* The over-voltage-stage 1 is a 10-min-mean-value according to EN 50160. The disconnection after detection of an overvoltage at the 10-min-mean-value takes place within 200ms.</p>						

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Over-/under-frequency tests						
Parameter	Protection limit		Actual setting		Trip value (test result)	
	Frequency [Hz]	Disconnection time [s]	Frequency [Hz]	Disconnection time [s]	Frequency [Hz]	Disconnection time [s]
Over-frequency	52,0	0,5	52,0	0,5	52,00	0,363
Under-frequency	47,5	0,5	47,5	0,5	47,50	0,391

Note.
Minimum operation time according to default interface protection:
Over-frequency 0,5 s
Under-frequency 0,5 s

LoM test						
Model: SG80KTL						
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]	138,5	170,0	287,5	140,5	141,0	303,5
Trip time. Phase 2 fuse removed [ms]	138,5	170,0	287,5	140,5	141,0	303,5
Trip time. Phase 3 fuse removed [ms]	138,5	170,0	287,5	140,5	141,0	303,5

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Type testing of a micro-generator

Operating range				
Model: SG80KTL				
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 [kW]	Cos φ [1]
1	198,7	47,5	69,375	0,9918
2	248,7	51,1	80,129	0,9926

Active power at under-frequency			
Model: SG80KTL			
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	49,5	47,5
Active power [kW]:	80,424	80,433	80,101
ΔP/PM [%] per 1 Hz:			0,05

Power response to over-frequency							
1-min mean value [Hz]:	a) 50,00	b) 50,25	c) 50,70	d) 51,15	e) 50,70	f) 50,25	g) 50,00
1. Measurement a) to g): Active power output > 80% P_n							
Frequency [Hz]:	50,00	50,25	50,70	51,15	50,70	50,25	50,00
PM [kW]:	N/A	78,4	64,0	49,6	64,0	78,4	N/A
PE60 [kW]:	80,07	77,46	63,30	49,32	63,31	77,40	80,08
ΔPE60/PM [%]:	N/A	1,18	0,88	0,35	0,86	1,25	N/A
2. Measurement a) to g): Active power output 40% and 60% after freezing > 80% P_n							
Frequency [Hz]:	50,00	50,25	50,70	51,15	50,70	50,25	50,00
PM [kW]:	N/A	39,2	32,0	24,8	32,0	39,2	N/A
PE60 [kW]:	39,87	37,96	31,95	24,66	31,76	37,97	39,94
ΔPE60/PM [%]:	N/A	3,10	0,13	0,35	0,60	3,08	N/A
Limit ΔP/P _{1min} :	+ 10 % of P _M						

Reactive power			
Uncontrollable reactive power			
Model: SG80KTL			
Test Voltage	211,6V	230V	248,4V
Output power			
25% P _N	0,9853	0,9792	0,9726
50% P _N	0,9962	0,9943	0,9924
75% P _N	0,9982	0,9976	0,9969
100% P _N	0,9988	0,9987	0,9983
Limit	>0,95	>0,95	>0,95

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Controllable reactive power

Inductive (supply reactive power)

Model: SG80KTL

Power-BIN	Active power [kW]	Reactive power [kVar]	Power factor (cos φ)	AC voltage [V]
0% - 10%	3,826	-4,505	0,6464	230,48
10% - 20%	11,776	-7,279	0,8505	230,48
20% - 30%	20,091	-10,254	0,8907	230,65
30% - 40%	28,295	-14,339	0,8920	230,54
40% - 50%	36,259	-18,335	0,8924	230,70
50% - 60%	44,025	-22,232	0,8926	230,64
60% - 70%	51,975	-26,021	0,8942	230,62
70% - 80%	59,924	-29,824	0,8952	230,69
80% - 90%	67,939	-33,665	0,8960	230,67
90% - 100%	71,988	-35,611	0,8963	230,70

Capacitive (supply reactive power)

Power-BIN	Active power [kW]	Reactive power [kVar]	Power factor (cos φ)	AC voltage [V]
0% - 10%	3,836	4,345	0,6609	230,57
10% - 20%	11,785	7,239	0,8519	230,55
20% - 30%	20,120	10,274	0,8906	230,65
30% - 40%	28,358	14,392	0,8917	230,67
40% - 50%	36,310	18,393	0,8921	230,76
50% - 60%	43,902	22,219	0,8922	230,76
60% - 70%	51,813	26,030	0,8936	230,75
70% - 80%	59,766	29,879	0,8944	230,84
80% - 90%	67,844	33,808	0,8950	230,86
90% - 100%	72,115	35,885	0,8953	230,89

Reactive power supply with set point Q=0

Power-BIN	Active power [kW]	Reactive power [kVar]	Power factor (cos φ)	AC voltage [V]
0% - 10%	3,837	3,740	0,7140	230,56
10% - 20%	11,729	3,751	0,9516	230,46
20% - 30%	19,854	2,817	0,9901	230,64
30% - 40%	27,969	3,735	0,9912	230,56
40% - 50%	35,984	4,009	0,9934	230,64
50% - 60%	43,764	4,151	0,9954	230,67
60% - 70%	51,951	4,179	0,9967	230,69
70% - 80%	59,882	2,920	0,9975	230,73
80% - 90%	67,873	4,196	0,9981	230,75
90% - 100%	75,730	4,160	0,9985	230,78

Q adjustment

Model: SG80KTL

	Reactive power set point Q [kVar]	Measured reactive power Q [kVar]	Measured cos φ	Deviation compared to setpoint ΔQ / PN [%]
- Qmin	-38,744	-39,028	0,8737	0,355
0	0	3,109	0,9987	3,886
+ Qmax	38,744	39,055	0,8749	0,389

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Qmin reactive power in accordance to standard characteristic curve Q=f(V)						
P/Pn	Vac [V] Set point	P/Pn [%]	Vac [V] measured	Q [kVar] measured	Q [Var] expected	ΔQ [%]
< 20%	1,07Vn	9,55	247,28	-1,819	≈0(<±2.5%Pn)	2,27
< 20%	1,09Vn	9,63	250,69	-1,863	≈0(<±2.5%Pn)	2,33
< 20%-30%	1,09Vn	29,68	250,61	-20,235	-0,5 Qmin	1,07
40%	1,09Vn	40,03	250,83	-20,176	-0,5 Qmin	1,00
50%	1,09Vn	49,91	250,67	-20,351	-0,5 Qmin	1,22
60%	1,09Vn	59,90	250,77	-20,260	-0,5 Qmin	1,11
70%	1,09Vn	69,93	250,78	-20,249	-0,5 Qmin	1,09
80%	1,09Vn	79,88	250,75	-20,286	-0,5 Qmin	1,14
90%	1,09Vn	89,78	250,82	-20,253	-0,5 Qmin	1,10
100%	1,09Vn	98,19	250,79	-20,311	-0,5 Qmin	1,17
100%	1,1Vn	89,08	253,26	-40,317	-Qmin	1,97
100%-10%	1,1Vn	9,51	253,94	-40,036	-Qmin	1,62
10%→ ≤5%	1,1Vn	1,33	254,18	-1,866	≈0(<±2.5%Pn)	2,33
Qmax reactive power in accordance to standard characteristic curve Q=f(V)						
P/Pn	Vac [V] Set point	P/Pn [%]	Vac [V] measured	Q [kVar] measured	Q [Var] expected	ΔQ [%]
< 20%	0,93Vn	10,15	214,05	1,433	≈0(<±2,5%Pn)	1,79
< 20%	0,91Vn	10,17	209,55	1,375	≈0(<±2,5%Pn)	1,72
< 20%-30%	0,91Vn	30,03	209,62	20,077	0,5 Qmax	0,88
40%	0,91Vn	40,15	209,71	20,143	0,5 Qmax	0,96
50%	0,91Vn	50,11	209,70	20,194	0,5 Qmax	1,02
60%	0,91Vn	60,11	209,66	20,301	0,5 Qmax	1,13
70%	0,91Vn	70,00	209,73	20,175	0,5 Qmax	1,00
80%	0,91Vn	80,11	209,68	20,227	0,5 Qmax	1,06
90%	0,91Vn	88,13	209,72	20,245	0,5 Qmax	1,10
100%	0,91Vn	87,98	209,84	20,279	0,5 Qmax	1,12
100%	0,90Vn	86,99	207,11	40,112	Qmax	1,71
100%-10%	0,90Vn	9,61	206,87	40,009	Qmax	1,58
10%→ ≤5%	0,90Vn	1,67	206,76	1,542	≈0(<±2,5%Pn)	1,93

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

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Connection and starting to generate electrical power		
Model: SG80KTL		
Test according EN 50438 with standard setting	Min. voltage for connection to grid:	193,2V
	Max. voltage for connection to grid:	255,3V
	Min. frequency for connection to grid:	47,45Hz
	Max. frequency for connection to grid:	50,15Hz
	Observation time ($\geq 60s$)	60
Test		
Voltage conditions		
a) Start up for voltage range	<84% U_n for twice of observation time	>111% U_n for twice of observation time
Connection:	No connection	No connection
Limit:	No connection allowed	
b) In voltage range at start-up	$\geq 84\% U_n$ within twice setting observation time	$\leq 111\% U_n$ within twice setting observation time
Reconnection time [s]	124,0	124,0
Limit:	Connected after setting observation time ($\geq 60s$)	
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.	
c) In voltage range after voltage failure	$\geq 84\% U_n$ for twice of setting observation time	$\leq 111\% U_n$ for twice of setting observation time
Reconnection time [s]	124,0	124,0
Limit:	Reconnection after setting observation time ($\geq 60s$)	
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.	
Frequency conditions		
d) Start up for frequency range	<47,45 Hz for twice of setting observation time	>50,15 Hz for twice of setting observation time
Connection:	No connection	No connection
Limit:	No connection allowed	
e) In frequency range at start-up	$\geq 47,45$ Hz within twice of setting observation time	$\leq 50,15$ Hz within twice of setting observation time
Reconnection time [s]	122,5	133,0
Limit:	Connected after setting delay time ($\geq 60s$)	
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.	
f) In frequency range after frequency failure	$\geq 47,45$ Hz for twice of setting observation time	$\leq 50,15$ Hz for twice of setting observation time
Reconnection time [s]	123,0	123,0
Limit:	Reconnection after setting observation time ($\geq 60s$)	
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.	

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Short-circuit current contribution					
Short-circuit current parameters					
Model: SG80KTL 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	48,79V	119,3A
Initial Value of aperiodic current	A	N/A	100ms	29,61V	89,70A
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	64,0ms	In seconds
Model: SG80KTL 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	59,76V	118,7A
Initial Value of aperiodic current	A	N/A	100ms	31,43V	73,71A
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	54,4ms	In seconds
Model: SG80KTL 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	63,79V	118,7A
Initial Value of aperiodic current	A	N/A	100ms	30,18V	88,80A
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	64,4ms	In seconds

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Power Quality. Harmonic current emission					
micro-generator		Model: SG80KTL			
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	115,72	99,96	Phase 1	-	-
2nd	0,07	0,06	Phase 1	8	8
3rd	0,27	0,24	Phase 1	21,6	N/A
4th	0,05	0,04	Phase 1	4	4
5th	2,40	2,08	Phase 1	10,7	10,7
6th	0,04	0,03	Phase 1	2,67	2,67
7th	1,67	1,44	Phase 1	7,2	7,2
8th	0,07	0,06	Phase 1	2	2
9th	0,10	0,08	Phase 1	3,8	N/A
10th	0,04	0,04	Phase 1	1,6	1,6
11th	0,91	0,79	Phase 1	3,1	3,1
12th	0,03	0,03	Phase 1	1,33	1,33
13th	0,74	0,64	Phase 1	2	2
14th	0,04	0,03	Phase 1	N/A	N/A
15th	0,05	0,05	Phase 1	N/A	N/A
16th	0,01	0,01	Phase 1	N/A	N/A
17th	0,38	0,33	Phase 1	N/A	N/A
18th	0,03	0,03	Phase 1	N/A	N/A
19th	0,32	0,28	Phase 1	N/A	N/A
20th	0,02	0,02	Phase 1	N/A	N/A
21th	0,04	0,04	Phase 1	N/A	N/A
22th	0,02	0,02	Phase 1	N/A	N/A
23th	0,17	0,15	Phase 1	N/A	N/A
24th	0,00	0,00	Phase 1	N/A	N/A
25th	0,15	0,13	Phase 1	N/A	N/A
26th	0,03	0,02	Phase 1	N/A	N/A
27th	0,01	0,01	Phase 1	N/A	N/A
28th	0,02	0,02	Phase 1	N/A	N/A
29th	0,10	0,08	Phase 1	N/A	N/A
30th	0,01	0,01	Phase 1	N/A	N/A
31th	0,09	0,08	Phase 1	N/A	N/A
32th	0,01	0,01	Phase 1	N/A	N/A
33th	0,01	0,01	Phase 1	N/A	N/A
34th	0,01	0,01	Phase 1	N/A	N/A
35th	0,10	0,08	Phase 1	N/A	N/A
36th	0,01	0,01	Phase 1	N/A	N/A
37th	0,09	0,07	Phase 1	N/A	N/A
38th	0,01	0,01	Phase 1	N/A	N/A
39th	0,01	0,01	Phase 1	N/A	N/A
40th	0,01	0,01	Phase 1	N/A	N/A
THD ₄₀	-	2,784	Phase 1	13	13

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Power Quality. Harmonic current emission					
micro-generator		Model: SG80KTL			
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	115,75	99,96	Phase 2	-	-
2nd	0,12	0,10	Phase 2	8	8
3rd	0,15	0,13	Phase 2	21,6	N/A
4th	0,07	0,06	Phase 2	4	4
5th	2,29	1,98	Phase 2	10,7	10,7
6th	0,08	0,07	Phase 2	2,67	2,67
7th	1,63	1,41	Phase 2	7,2	7,2
8th	0,07	0,06	Phase 2	2	2
9th	0,02	0,02	Phase 2	3,8	N/A
10th	0,05	0,04	Phase 2	1,6	1,6
11th	0,86	0,74	Phase 2	3,1	3,1
12th	0,03	0,03	Phase 2	1,33	1,33
13th	0,72	0,62	Phase 2	2	2
14th	0,04	0,04	Phase 2	N/A	N/A
15th	0,03	0,03	Phase 2	N/A	N/A
16th	0,04	0,03	Phase 2	N/A	N/A
17th	0,42	0,36	Phase 2	N/A	N/A
18th	0,02	0,02	Phase 2	N/A	N/A
19th	0,32	0,28	Phase 2	N/A	N/A
20th	0,04	0,04	Phase 2	N/A	N/A
21th	0,02	0,02	Phase 2	N/A	N/A
22th	0,05	0,05	Phase 2	N/A	N/A
23th	0,19	0,16	Phase 2	N/A	N/A
24th	0,03	0,03	Phase 2	N/A	N/A
25th	0,12	0,10	Phase 2	N/A	N/A
26th	0,03	0,02	Phase 2	N/A	N/A
27th	0,01	0,01	Phase 2	N/A	N/A
28th	0,02	0,02	Phase 2	N/A	N/A
29th	0,11	0,09	Phase 2	N/A	N/A
30th	0,00	0,00	Phase 2	N/A	N/A
31th	0,10	0,08	Phase 2	N/A	N/A
32th	0,00	0,00	Phase 2	N/A	N/A
33th	0,02	0,02	Phase 2	N/A	N/A
34th	0,01	0,01	Phase 2	N/A	N/A
35th	0,11	0,10	Phase 2	N/A	N/A
36th	0,01	0,01	Phase 2	N/A	N/A
37th	0,09	0,08	Phase 2	N/A	N/A
38th	0,01	0,01	Phase 2	N/A	N/A
39th	0,01	0,01	Phase 2	N/A	N/A
40th	0,02	0,02	Phase 2	N/A	N/A
THD ₄₀	-	2,681	Phase 2	13	13

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. SGR-18JY2158FCSHP

Power Quality. Harmonic current emission					
micro-generator		Model: SG80KTL			
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	115,76	99,97	Phase 3	-	-
2nd	0,11	0,10	Phase 3	8	8
3rd	0,18	0,15	Phase 3	21,6	N/A
4th	0,02	0,02	Phase 3	4	4
5th	2,24	1,93	Phase 3	10,7	10,7
6th	0,03	0,03	Phase 3	2,67	2,67
7th	1,60	1,38	Phase 3	7,2	7,2
8th	0,04	0,04	Phase 3	2	2
9th	0,08	0,07	Phase 3	3,8	N/A
10th	0,01	0,01	Phase 3	1,6	1,6
11th	0,91	0,79	Phase 3	3,1	3,1
12th	0,04	0,04	Phase 3	1,33	1,33
13th	0,69	0,60	Phase 3	2	2
14th	0,05	0,04	Phase 3	N/A	N/A
15th	0,07	0,06	Phase 3	N/A	N/A
16th	0,03	0,02	Phase 3	N/A	N/A
17th	0,42	0,36	Phase 3	N/A	N/A
18th	0,00	0,00	Phase 3	N/A	N/A
19th	0,35	0,30	Phase 3	N/A	N/A
20th	0,02	0,02	Phase 3	N/A	N/A
21th	0,02	0,02	Phase 3	N/A	N/A
22th	0,02	0,02	Phase 3	N/A	N/A
23th	0,20	0,17	Phase 3	N/A	N/A
24th	0,01	0,01	Phase 3	N/A	N/A
25th	0,14	0,12	Phase 3	N/A	N/A
26th	0,03	0,03	Phase 3	N/A	N/A
27th	0,03	0,02	Phase 3	N/A	N/A
28th	0,02	0,02	Phase 3	N/A	N/A
29th	0,12	0,10	Phase 3	N/A	N/A
30th	0,00	0,00	Phase 3	N/A	N/A
31th	0,09	0,08	Phase 3	N/A	N/A
32th	0,02	0,01	Phase 3	N/A	N/A
33th	0,03	0,02	Phase 3	N/A	N/A
34th	0,01	0,01	Phase 3	N/A	N/A
35th	0,10	0,09	Phase 3	N/A	N/A
36th	0,00	0,00	Phase 3	N/A	N/A
37th	0,08	0,07	Phase 3	N/A	N/A
38th	0,01	0,01	Phase 3	N/A	N/A
39th	0,00	0,00	Phase 3	N/A	N/A
40th	0,01	0,01	Phase 3	N/A	N/A
THD ₄₀	-	2,642	Phase 3	13	13

Appendix E Type Verification Test Report

Extract from test report according to EN 50438

Nr. SGR-18JY2158FCSHP

Voltage fluctuation and Flicker.					
Model: SG80KTL	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	0,71	0,54	0,00%	0,35%	0,65%
Test value – Phase 2	0,29	0,18	0,00%	0,38%	0,53%
Test value – Phase 3	0,33	0,26	0,00%	0,38%	0,64%

DC-Injection.				
Model: SG80KTL	Tested at four power levels, limit 0,5% of IAC _{nom} (57,97mA)			
Protection limit	~20%	~50%	75%	~100%
Output power				
Max. test value (phase L1) [mA]	38	56	50	89
Max. test value (phase L2) [mA]	28	82	73	109
Max. test value (phase L3) [mA]	20	121	74	84