

Manufacture Declaration for EN50438:2013 Ireland

Micro-generator Type reference	SK-TL3000E SK-TL3000E-S SK-TL3000C SK-TL3000C-S SK-TL3000R SK-TL3000R-S SK-SU3000E SK-SU3000E-S SK-SU3000C SK-SU3000C-S	SK-TL3700E SK-TL3700C SK-TL3700R SK-SU3700E SK-SU3700C	SK-TL5000E SK-TL5000C SK-TL5000R SK-SU5000E SK-SU5000C
Maximum continuous rating	3000VA	3680VA	4600VA
Manufacturer	Solax power Co., Ltd		
Address	Room 220, West Buliding A, National University Science and Technology Park of Zhejiang University 525, Xixi Rd, Hangzhou, Zhejiang Province, China, 310007		
Tel	+86(0571)-56260011		
Fax	+86(0571)-56075753		
Email	info@solaxpower.com		
Web site	www.solaxpower.com		
Reference standard No.	BS EN 50438:2013 A.13 IE-Ireland		
Signed		On behalf of	Solax power Co., Ltd
SSEG manufacturer/supplier declaration. I certify on behalf of the company named above as a manufacturer/supplier of Small Scale Embedded Generators, that all products manufactured/supplied by the company with the above SSEG Type reference number will be manufactured and tested to ensure that they perform as stated in this Type Verification Test Report, prior to shipment to site and that no site modifications are required to ensure that the product meets all the requirements of EN50438:2013 A.13 IE-Ireland			

Under/over frequency

Parameter	Under frequency		Over frequency	
	Frequency	Time	Frequency	Time
Protection limit (EN 50438 Annex A)	48Hz	0.5s	50.5Hz	0.5s
Actual Setting	48Hz	0.5s	50.5Hz	0.5s
Trip value (test result)	48.01 Hz	0.407s	50.51Hz	0.317s

Under /Over voltage

Parameter	Under Voltage		Over Voltage	
	Voltage	Time	Voltage	Time
Protection limit (EN 50438 Annex A)	230V-10%	0.5s	230V+10%	0.5s
Actual Setting	207.0V	0.5s	253.0V	0.5s
Trip value(test result)	206.9V	0.421s	253.0V	0.229s

Loss of Mains test

Method used	inverters can be tested according to BS EN 62116		
Output power level (a	Min.	Medium	Max.
Trip setting clearance time	0.5s	0.5s	0.5s
Trip value clearance time	0.474s	0.410s	0.419s

(a Indicative values are shown for minimum, medium and maximum power levels)

Operating Range

Test sequence	Voltage	Frequency	Output power	Primary power source
Test 1	195.5V	47.5Hz	4430W	DC source
Test 2	253V	51.5Hz	4500W	DC source

Active power at under-frequency

Test sequence	Output Power	Frequency	Primary power source
Test a)	4528W	50.00Hz	DC source
Test b)	4528W	49.55Hz	DC source
Test c)	4528W	47.55Hz	DC source

Power response to over-frequency

Test sequence at power level >80%	Output Power(W)	Frequency(Hz)	Primary Power source	Power gradient
Step a)	4505W	50.000	DC source	40%Pm/Hz
Step b)	4374W	50.250	DC source	40%Pm/Hz
Step c)	3560W	50.700	DC source	40%Pm/Hz
Step d)	2724W	51.150	DC source	40%Pm/Hz
Step e)	3555W	50.700	DC source	40%Pm/Hz
Step f)	4376W	50.250	DC source	40%Pm/Hz
Step g)	4503W	49.999	DC source	40%Pm/Hz

Test sequence at power level 40%-60%	Output Power(W)	Frequency(Hz)	Primary Power source	Power gradient
Step a)	2296W	50.000	DC source	40%Pm/Hz
Step b)	2263W	50.250	DC source	40%Pm/Hz
Step c)	1799W	50.699	DC source	40%Pm/Hz
Step d)	1395W	51.150	DC source	40%Pm/Hz
Step e)	1796W	50.700	DC source	40%Pm/Hz
Step f)	2211W	50.250	DC source	40%Pm/Hz
Step g)	4500W	49.999	DC source	40%Pm/Hz

Uncontrollable reactive power

Limit	Power factor		
	+ 0,95 - 0,95 at three voltage levels and four power levels		
	210V	230V	250V
20%of nominal active power	0.99049	0.98781	0.99047
50%of nominal active power	0.99763	0.99887	0.99852
75%of nominal active power	0.99898	0.99889	0.99944
100%of nominal active power	0.9996	0.99961	0.99956

Controllable reactive power

Test sequence start of generation	Output power[W]	Set reactive power[Var]	Measured reactive power[Var]	Tolerance[Var]
10%	389	-50%Pn	-2239	61
20%	860	-50%Pn	-2234	66
30%	1332	-50%Pn	-2227	73
40%	1802	-50%Pn	-2220	80
50%	2264	-50%Pn	-2213	87
60%	2670	-50%Pn	-2204	96
70%	3150	-50%Pn	-2197	103
80%	3608	-50%Pn	-2188	112
90%	3965	-50%Pn	-2182	118
100%	4476	-50%Pn	-2172	128

Test sequence start of generation	Output power[W]	Set reactive power[Var]	Measured reactive power[Var]	Tolerance[Var]
10%	391	50%Pn	2202	98
20%	872	50%Pn	2212	88
30%	1338	50%Pn	2222	78
40%	1808	50%Pn	2229	71
50%	2271	50%Pn	2238	62
60%	2732	50%Pn	2244	56
70%	3192	50%Pn	2251	49
80%	3644	50%Pn	2258	42
90%	4060	50%Pn	2265	35
100%	4491	50%Pn	2271	29

Test sequence start of generation	Output power[W]	Set reactive power[Var]	Measured reactive power[Var]	Tolerance[Var]
10%	411	0	123	123
20%	879	0	102	102
30%	1348	0	94	94
40%	1812	0	92	92
50%	2274	0	86	86
60%	2733	0	13	13
70%	3192	0	-73	-73
80%	3659	0	-100	-100
90%	4119	0	-105	-105
100%	4543	0	-115	-115

Connection and starting to generate electrical power

Test sequence start of generation	connection	connection allowed	Primary power source	Power gradient after connection
Step a)	47.95Hz	No	DC source	
Step b)	48.05Hz	Yes	DC source	10%Pn/min
Step c)	50.55 Hz	No	DC source	
Step d)	50.10 Hz	Yes	DC source	10%Pn/min
Step e)	205V	No	DC source	
Step f)	208V	Yes	DC source	10%Pn/min
Step g)	256V	No	DC source	
Step h)	253V	Yes	DC source	10%Pn/min

Connection after trip of interface protection

Test sequence start of generation	connection	connection allowed	Primary power source	Power gradient after connection
Step a)	47.95Hz	No	DC source	
Step b)	48.05Hz	Yes	DC source	10%Pn/min
Step c)	50.55 Hz	No	DC source	
Step d)	50.10 Hz	Yes	DC source	10%Pn/min
Step e)	205V	No	DC source	
Step f)	208V	Yes	DC source	10%Pn/min
Step g)	256V	No	DC source	
Step h)	253V	Yes	DC source	10%Pn/min

Short-circuit current parameters

Parameter	Symbol	Value	Time after fault	Volts	Amps
Peak Short Circuit current	i_p	NA	20ms	182 V	12.7 A
Initial Value of aperiodic current	A	NA	100ms	NA	NA
Initial symmetrical short-circuit current*	I_k	NA	250ms	NA	NA
Decaying (aperiodic) component of short circuit current*	i_{DC}	NA	500ms	NA	NA
Reactance/Resistance Ratio of source*	X/R	NA	Time to trip	0.38ms	In seconds

Harmonic current emission

Maximum permissible harmonic current as per EN 61000-3-2, Class A											
	Odd							Even harmonics			
Harmonic order n	3	5	7	9	11	13	15 ≤ n ≤ 39	2	4	6	8 ≤ n ≤ 40
Limit	2,30	1,14	0,77	0,40	0,33	0,21	0,15 (15/n)	1,08	0,43	0,30	0,23 (8/n)
Test value	0.169	0.021	0.038	0.023	0.044	0.027	0.039	0.089	0.041	0.012	0.011

Voltage fluctuations and flicker

Maximum permissible flicker and voltage fluctuation as per EN61000-3-3					
Value	P_{st}	P_{lt}	d(t) –500ms	d_c	d_{maxX}
Limit	1,0	0,65	3,3%	3,3%	4%
Test value	0.24	0.33	0	1.41	1.68

Additional comments