

Certificate UK-G83 issue 2

The results of the G83/2 tests are summarized in this certificate.
 Omnik New Energy Co., Ltd declares that the units installed in UK market and set for G83/2 operations are characterized by the following features:

- The internal specification and parameters are set to be compliant with: Engineering Recommendation G83 issue 2, 2014.
- All units have internal parameters setting.
- These parameters cannot be changed by user, an installer or by any person other than the manufacturer.
- All units are tested before shipping according to: Engineering Recommendation G83 issue 2, 2014.

SSEG Type reference number		PHOTO-VOLTAIC Inverter		
SSEG Type		Omniksol-3k-TL2 Omniksol-4k-TL2		
System Supplier name		Omnik New Energy Co.,Ltd.		
Address		CN-215213 Suzhou China Xinghu Road No. 218 Biobay Park A4-314		
Tel	+86 512 6956 8216	Fax	+86 512 6295 6682	
E:mail	service@omnik-solar.com	Web site	www.omnik-solar.com	
Maximum rated capacity	Connection Option			
	3	kW single phase (Omniksol-3k-TL2)		
	4	kW single phase (Omniksol-4k-TL2)		
	NA	kW three phase		
	NA	kW two phases in three phase system		
	NA	kW two phases split phase system		
	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 G83/2.			
Signed	2014-10-13	On behalf of	Omnik New Energy Co.,Ltd	

UK-G83 issue 2 TEST RESULT DETAILS – TYPE VERIFICATION TEST SHEET

Omniksol-3k-TL2

Power Quality. Harmonics

SSEG rating per phase (rpp)		3		kW		NV=MV*3.68/rpp	
Harmonic	At 45-55% of rated output		100% of rated output		Limit in BS EN 61000-3-2 in Amps	Higher limit for odd harmonics 21 and above	
	Measured Value (MV) in Amps	Normalised Value (NV) in Amps	Measured Value (MV) in Amps	Normalised Value (NV) in Amps			
2	0.095	0.1165	0.064	0.0785	1.080		
3	0.039	0.0478	0.034	0.0417	2.300		
4	0.020	0.0245	0.020	0.0245	0.430		
5	0.024	0.0294	0.012	0.0147	1.140		
6	0.006	0.0073	0.010	0.0123	0.300		
7	0.014	0.0172	0.019	0.0233	0.770		
8	0.016	0.0196	0.009	0.0110	0.230		
9	0.004	0.0049	0.012	0.0147	0.400		
10	0.012	0.0147	0.006	0.0074	0.184		
11	0.012	0.0147	0.011	0.0135	0.330		
12	0.008	0.0098	0.006	0.0073	0.153		
13	0.007	0.0086	0.017	0.0209	0.210		
14	0.010	0.0123	0.005	0.0061	0.131		
15	0.018	0.0220	0.018	0.0220	0.150		
16	0.006	0.0073	0.013	0.0159	0.115		
17	0.005	0.0061	0.009	0.0110	0.132		
18	0.006	0.0074	0.004	0.0049	0.102		
19	0.007	0.0086	0.024	0.0294	0.118		
20	0.006	0.0074	0.008	0.0098	0.092		
21	0.011	0.0135	0.021	0.0258	0.107	0.160	
22	0.013	0.0159	0.006	0.0074	0.084		
23	0.009	0.0110	0.018	0.0221	0.098	0.147	
24	0.010	0.0123	0.004	0.0049	0.077		
25	0.007	0.0086	0.008	0.0098	0.090	0.135	
26	0.011	0.0135	0.007	0.0086	0.071		
27	0.027	0.0331	0.009	0.0110	0.083	0.124	
28	0.006	0.0074	0.010	0.0123	0.066		
29	0.019	0.0233	0.011	0.0135	0.078	0.117	
30	0.009	0.0110	0.014	0.0172	0.061		
31	0.020	0.0245	0.017	0.0209	0.073	0.109	
32	0.011	0.0135	0.010	0.0123	0.058		
33	0.016	0.0196	0.013	0.0159	0.068	0.102	
34	0.005	0.0061	0.015	0.0184	0.054		
35	0.005	0.0061	0.020	0.0245	0.064	0.096	
36	0.012	0.0147	0.004	0.0049	0.051		
37	0.005	0.0061	0.013	0.0159	0.061	0.091	
38	0.007	0.0086	0.009	0.0110	0.048		
39	0.040	0.0490	0.039	0.0478	0.058	0.087	
40	0.007	0.0086	0.016	0.0196	0.046		

Omniksol-4k-TL2						
Power Quality. Harmonics						
SSEG rating per phase (rpp)			3.68	kW	NV=MV*3.68/rpp	
Harmonic	At 45-55% of rated output		100% of rated output			
	Measured Value (MV) in Amps	Normalised Value (NV) in Amps	Measured Value (MV) in Amps	Normalised Value (NV) in Amps	Limit in BS EN 61000-3-2 in Amps	Higher limit for odd harmonics 21 and above
2	0.076	0.0760	0.066	0.0656	1.080	
3	0.019	0.0195	0.043	0.0431	2.300	
4	0.024	0.0237	0.009	0.0086	0.430	
5	0.026	0.0256	0.010	0.0098	1.140	
6	0.005	0.0048	0.008	0.0084	0.300	
7	0.027	0.0271	0.019	0.0186	0.770	
8	0.011	0.0107	0.009	0.0087	0.230	
9	0.010	0.0100	0.009	0.0094	0.400	
10	0.012	0.0122	0.005	0.0048	0.184	
11	0.007	0.0072	0.014	0.0139	0.330	
12	0.010	0.0103	0.008	0.0080	0.153	
13	0.008	0.0076	0.020	0.0197	0.210	
14	0.014	0.0136	0.020	0.0203	0.131	
15	0.018	0.0179	0.021	0.0211	0.150	
16	0.012	0.0124	0.005	0.0052	0.115	
17	0.010	0.0105	0.020	0.0198	0.132	
18	0.004	0.0043	0.032	0.0318	0.102	
19	0.008	0.0076	0.013	0.0133	0.118	
20	0.005	0.0053	0.011	0.0110	0.092	
21	0.007	0.0070	0.032	0.0320	0.107	0.160
22	0.006	0.0060	0.008	0.0082	0.084	
23	0.007	0.0070	0.016	0.0161	0.098	0.147
24	0.008	0.0079	0.007	0.0069	0.077	
25	0.006	0.0064	0.012	0.0123	0.090	0.135
26	0.012	0.0116	0.009	0.0091	0.071	
27	0.007	0.0068	0.017	0.0167	0.083	0.124
28	0.018	0.0178	0.007	0.0068	0.066	
29	0.010	0.0098	0.015	0.0151	0.078	0.117
30	0.008	0.0079	0.004	0.0039	0.061	
31	0.023	0.0225	0.019	0.0185	0.073	0.109
32	0.023	0.0227	0.006	0.0057	0.058	
33	0.004	0.0042	0.021	0.0206	0.068	0.102
34	0.004	0.0040	0.005	0.0046	0.054	
35	0.008	0.0076	0.028	0.0275	0.064	0.096
36	0.008	0.0080	0.028	0.0278	0.051	
37	0.020	0.0199	0.041	0.0409	0.061	0.091
38	0.006	0.0065	0.026	0.0257	0.048	
39	0.026	0.0255	0.030	0.0304	0.058	0.087
40	0.023	0.0230	0.008	0.0082	0.046	

Omniksol-3k-TL2								
Power Quality. Voltage fluctuations and Flicker.								
	Starting			Stopping			Running	
	d_{max}	d_c	$d_{(t)}$	d_{max}	d_c	$d_{(t)}$	P_{st}	P_{It} 2 hours
Measured Values	1.83	0.13	0.0	1.83	0.13	0.0	0.315	0.221
Normalised to standard impedance and 3.68kW for multiple units	2.24	0.16	0.0	2.24	0.159	0.0	0.386	0.271
Limits set under BS EN 61000-3-2	4%	3.3%	3.3% 500ms	4%	3.3%	3.3% 500ms	1.0	0.65
Test start date		2014-10-10			Test end date		2014-10-12	
Test location		Omnik New Energy Co.,Ltd, CN-215213 Suzhou China Xinghu Road No.218 Biobay Park A4-314						

Omniksol-4k-TL2								
Power Quality. Voltage fluctuations and Flicker.								
	Starting			Stopping			Running	
	d_{max}	d_c	$d_{(t)}$	d_{max}	d_c	$d_{(t)}$	P_{st}	P_{It} 2 hours
Measured Values	0.74	0.26	0.0	0.74	0.26	0.0	0.082	0.039
Normalised to standard impedance and 3.68kW for multiple units	0.74	0.26	0.0	0.74	0.26	0.0	0.082	0.039
Limits set under BS EN 61000-3-2	4%	3.3%	3.3% 500ms	4%	3.3%	3.3% 500ms	1.0	0.65
Test start date		2014-10-10			Test end date		2014-10-12	
Test location		Omnik New Energy Co.,Ltd, CN-215213 Suzhou China Xinghu Road No.218 Biobay Park A4-314						

Omniksol-3k-TL2			
Power quality. DC injection.			
Test power level	10%	55%	100%
Recorded value	0.01221	0.01522	0.01617
as % of rated AC current	0.094%	0.117%	0.124%
Limit	0.25%	0.25%	0.25%

Omniksol-4k-TL2			
Power quality. DC injection.			
Test power level	10%	55%	100%
Recorded value	0.01516	0.01674	0.03375
as % of rated AC current	0.095%	0.105%	0.211%
Limit	0.25%	0.25%	0.25%

Omniksol-3k-TL2			
Power Quality. Power factor.			
	216.2V	230V	253V
Measured value	0.9990	0.9988	0.9982
Limit	>0.95	>0.95	>0.95

Measured at three voltage levels and at full output. Voltage to be maintained within $\pm 1.5\%$ of the stated level during the test.

Omniksol-4k-TL2			
Power Quality. Power factor.			
	216.2V	230V	253V
Measured value	0.9992	0.9992	0.9991
Limit	>0.95	>0.95	>0.95

Measured at three voltage levels and at full output. Voltage to be maintained within $\pm 1.5\%$ of the stated level during the test.

Omniksol-3k-TL and Omniksol-4k-TL2						
Protection. Frequency tests.						
Function	Setting		Trip test		"No trip tests"	
	Frequency	Time delay	Frequency	Time delay	Frequency/time	Confirm no trip
U/F stage 1	47.5Hz	20s	47.49Hz	19.96s	47.7Hz/ 25s	No trip
U/F stage 2	47Hz	0.5s	47.00Hz	0.510s	47.2Hz/ 19.98s	No trip
					46.8Hz/ 0.48s	No trip
O/F stage 1	51.5Hz	90s	51.49Hz	90.60s	51.3Hz/ 95s	No trip
O/F stage 2	52Hz	0.5s	52.00Hz	0.501s	51.8Hz/ 89.98s	No trip
					52.2Hz/ 0.48s	No trip

Omniksol-3k-TL and Omniksol-4k-TL2						
Protection. Voltage tests.						
Function	Setting		Trip test		"No trip tests"	
	Voltage	Time delay	Voltage	Time delay	Voltage/ time	Confirm no trip
U/V stage 1	200.1V	2.5s	200.2V	2.51s	204.1V/ 3.5s	No trip
U/V stage 2	184V	0.5s	182.0V	0.505s	188V/ 2.48s	No trip
					180V/ 0.48s	No trip
O/V stage 1	262.2V	1.0s	261.8V	1.01s	258.2V/ 2.0s	No trip
O/V stage 2	273.7V	0.5s	273.3V	0.490s	269.7V/ 0.98s	No trip
					277.7V/ 0.48s	No trip

Omniksol-3k-TL2						
Protection. Loss of Mains test.						
Note: Inverter tested according to BS EN 62116.						
Test Power and imbalance	33% -5% Q Test 22	66% -5% Q Test 12	100% -5% P Test 5	33% +5% Q Test 31	66% +5% Q Test 21	100% +5% P Test 10
Trip time. Limit is 0.5s	199ms	201ms	338ms	363ms	391ms	390ms

Omniksol-4k-TL2						
Protection. Loss of Mains test.						
Note: Inverter tested according to BS EN 62116.						
Test Power and imbalance	33% -5% Q Test 22	66% -5% Q Test 12	100% -5% P Test 5	33% +5% Q Test 31	66% +5% Q Test 21	100% +5% P Test 10
Trip time. Limit is 0.5s	185ms	182ms	370ms	350ms	369ms	410ms

Omniksol-3k-TL2 and Omniksol-4k-TL2				
Protection. Frequency change, Stability test.				
	Start Frequency	Change	End Frequency	Confirm no trip
Positive Vector Shift	49.5Hz	+9 degrees		No trip
Negative Vector Shift	50.5Hz	- 9 degrees		No trip
Positive Frequency drift	49.5Hz	+0.19Hz/sec	51.5Hz	No trip
Negative Frequency drift	50.5Hz	-0.19Hz/sec	47.5Hz	No trip

Fault level contribution.					
Omniksol-3k-TL2			Omniksol-4k-TL2		
For a Inverter SSEG			For a Inverter SSEG		
Time after fault	Volts	Amps	Time after fault	Volts	Amps
20ms	40.0	0.0246	20ms	40.1	0.0250
100ms	39.7	0.0235	100ms	39.8	0.0250
250ms	39.8	0.0235	250ms	39.8	0.0247
500ms	39.8	0.0234	500ms	39.8	0.0247
Time to trip	0.492	In seconds	Time to trip	0.493	In seconds

Omniksol-3k-TL2 and Omniksol-4k-TL2					
Protection. Re-connection timer.					
Test proves that the reconnection sequence starts after a minimum delay of 20 seconds for restoration of voltage and frequency to within the stage 1 settings of table 1 of the subject normative.					
Time delay setting	Measured delay	No reconnection when voltage or frequency is brought to just outside stage 1 limits of table 1.			
20s	31s	At 266.2V	At 196.1V	At 47.4Hz	At 51.6Hz
Confirmation that the SSEG does not re-connect.		No reconnection	No reconnection	No reconnection	No reconnection

Omniksol-3k-TL2 and Omniksol-4k-TL2
Self-Monitoring solid state switching.
It has been verified that in the event of the solid state switching device failing to disconnect the SSEG, the voltage on the output side of the switching device is reduced to a value below 50 volts within 0.5 seconds.

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