

## 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, 2012.
- 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, 2012.

<b>SSEG Type reference number</b>		PHOTO-VOLTAIC Inverter	
<b>SSEG Type</b>		Omniksol-1k-TL2-M , Omniksol-1.5k-TL2-M	
<b>System Supplier name</b>		Omnik New Energy Co.,Ltd.	
<b>Address</b>		No.63 Weixin Road , SIP , Suzhou , China 215122	
<b>Tel</b>	+86 512 6956 8216	<b>Fax</b>	+86 512 6295 6682
<b>E:mail</b>	<a href="mailto:service@omnik-solar.com">service@omnik-solar.com</a>	<b>Web site</b>	<a href="http://www.omnik-solar.com">www.omnik-solar.com</a>

<b>Maximum rated capacity</b>	<b>Connection Option</b>	
	1	kW single phase (Omniksol-1k-TL2-M)
	1.5	kW single phase (Omniksol-1.5k-TL2-M)
	NA	kW three phase
	NA	kW two phases in three phase system
	NA	kW two phases split phase system
	NA	
	NA	

### 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.

<b>Signed</b>	2017-9-27	<b>On behalf of</b>	Omnik New Energy Co.,Ltd
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**UK-G83 issue 2 TEST RESULT DETAILS – TYPE VERIFICATION TEST SHEET**

**Omniksol-1k-TL2-M**

**Power Quality. Harmonics**

SSEG rating per phase (rpp)		1	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	0.004	0.015	0.002	0.007	1.080	
3	0.038	0.140	0.046	0.169	2.300	
4	0.006	0.022	0.002	0.007	0.430	
5	0.023	0.085	0.016	0.059	1.140	
6	0.004	0.015	0.002	0.007	0.300	
7	0.026	0.096	0.033	0.121	0.770	
8	0.004	0.015	0.003	0.011	0.230	
9	0.005	0.018	0.005	0.018	0.400	
10	0.004	0.015	0.003	0.011	0.184	
11	0.015	0.055	0.023	0.085	0.330	
12	0.006	0.022	0.004	0.015	0.153	
13	0.011	0.040	0.006	0.022	0.210	
14	0.005	0.018	0.004	0.015	0.131	
15	0.008	0.029	0.013	0.048	0.150	
16	0.011	0.040	0.003	0.011	0.115	
17	0.015	0.055	0.012	0.044	0.132	
18	0.013	0.048	0.003	0.011	0.102	
19	0.011	0.040	0.007	0.026	0.118	
20	0.014	0.052	0.003	0.011	0.092	
21	0.008	0.029	0.008	0.029	0.107	0.160
22	0.014	0.052	0.002	0.007	0.084	
23	0.009	0.033	0.003	0.011	0.098	0.147
24	0.014	0.052	0.004	0.015	0.077	
25	0.010	0.037	0.011	0.040	0.090	0.135
26	0.009	0.033	0.005	0.018	0.071	
27	0.008	0.029	0.007	0.026	0.083	0.124
28	0.007	0.026	0.005	0.018	0.066	
29	0.004	0.015	0.007	0.026	0.078	0.117
30	0.005	0.018	0.004	0.015	0.061	
31	0.006	0.022	0.002	0.007	0.073	0.109
32	0.003	0.011	0.006	0.022	0.058	
33	0.003	0.011	0.005	0.018	0.068	0.102
34	0.002	0.007	0.006	0.022	0.054	
35	0.005	0.018	0.003	0.011	0.064	0.096
36	0.002	0.007	0.005	0.018	0.051	
37	0.003	0.011	0.005	0.018	0.061	0.091
38	0.002	0.007	0.004	0.015	0.048	
39	0.002	0.007	0.002	0.007	0.058	0.087
40	0.003	0.011	0.005	0.018	0.046	

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

**Omniksol-1.5k-TL2-M**

**Power Quality. Harmonics**

SSEG rating per phase (rpp)		1.5	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	0.004	0.010	0.015	0.037	1.080	
3	0.044	0.108	0.081	0.199	2.300	
4	0.005	0.012	0.01	0.025	0.430	
5	0.020	0.049	0.033	0.081	1.140	
6	0.006	0.015	0.002	0.005	0.300	
7	0.035	0.086	0.029	0.071	0.770	
8	0.005	0.012	0.003	0.007	0.230	
9	0.010	0.025	0.004	0.010	0.400	
10	0.006	0.015	0.005	0.012	0.184	
11	0.025	0.061	0.036	0.088	0.330	
12	0.005	0.012	0.005	0.012	0.153	
13	0.007	0.017	0.05	0.123	0.210	
14	0.006	0.015	0.003	0.007	0.131	
15	0.013	0.032	0.027	0.066	0.150	
16	0.005	0.012	0.004	0.010	0.115	
17	0.015	0.037	0.015	0.037	0.132	
18	0.004	0.010	0.005	0.012	0.102	
19	0.009	0.022	0.014	0.034	0.118	
20	0.003	0.007	0.003	0.007	0.092	
21	0.010	0.025	0.01	0.025	0.107	0.160
22	0.003	0.007	0.003	0.007	0.084	
23	0.006	0.015	0.005	0.012	0.098	0.147
24	0.006	0.015	0.003	0.007	0.077	
25	0.012	0.029	0.011	0.027	0.090	0.135
26	0.005	0.012	0.003	0.007	0.071	
27	0.007	0.017	0.006	0.015	0.083	0.124
28	0.006	0.015	0.003	0.007	0.066	
29	0.006	0.015	0.008	0.020	0.078	0.117
30	0.009	0.022	0.003	0.007	0.061	
31	0.006	0.015	0.006	0.015	0.073	0.109
32	0.007	0.017	0.003	0.007	0.058	
33	0.004	0.010	0.006	0.015	0.068	0.102
34	0.008	0.020	0.003	0.007	0.054	
35	0.005	0.012	0.005	0.012	0.064	0.096
36	0.006	0.015	0.004	0.010	0.051	
37	0.002	0.005	0.005	0.012	0.061	0.091
38	0.006	0.015	0.003	0.007	0.048	
39	0.003	0.007	0.004	0.010	0.058	0.087
40	0.005	0.012	0.003	0.007	0.046	

Omniksol-1k-TL2-M								
Power Quality. Voltage fluctuations and Flicker.								
	Starting			Stopping			Running	
	$d_{max}$	$d_c$	$d_{(t)}$	$d_{max}$	$d_c$	$d_{(t)}$	$P_{st}$	$P_{It} 2 \text{ hours}$
Measured Values	0.43	0.39	0.0	0.43	0.39	0.0	0.15	0.15
Normalised to standard impedance and 3.68kW for multiple units	1.05	0.96	0	1.05	0.96	0	0.368	0.368
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		2017-9-27			Test end date		2017-9-27	
Test location		Omnik New Energy Co.,Ltd No.63 Weixin Road , SIP , Suzhou , China 215122 ;						

Omniksol-1.5k-TL2-M								
Power Quality. Voltage fluctuations and Flicker.								
	Starting			Stopping			Running	
	$d_{max}$	$d_c$	$d_{(t)}$	$d_{max}$	$d_c$	$d_{(t)}$	$P_{st}$	$P_{It} 2 \text{ hours}$
Measured Values	0.43	0.39	0.0	0.43	0.39	0.0	0.15	0.15
Normalised to standard impedance and 3.68kW for multiple units	1.05	0.96	0	1.05	0.96	0	0.368	0.368
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		2017-9-27			Test end date		2017-9-27	
Test location		Omnik New Energy Co.,Ltd No.63 Weixin Road , SIP , Suzhou , China 215122 ;						

Omniksol-1k-TL2-M			
<b>Power quality. DC injection.</b>			
<b>Test power level</b>	<b>10%</b>	<b>55%</b>	<b>100%</b>
<b>Recorded value</b>	9.8mA	4.2mA	12.6mA
<b>as % of rated AC current</b>	0.20%	0.08%	0.25%
<b>Limit</b>	<b>0.25%</b>	<b>0.25%</b>	<b>0.25%</b>

Omniksol-1.5k-TL2-M			
<b>Power quality. DC injection.</b>			
<b>Test power level</b>	<b>10%</b>	<b>55%</b>	<b>100%</b>
<b>Recorded value</b>	15mA	18.8mA	15.6mA
<b>as % of rated AC current</b>	0.21%	0.24%	0.21%
<b>Limit</b>	<b>0.25%</b>	<b>0.25%</b>	<b>0.25%</b>

Omniksol-1k-TL-M				
<b>Power Quality. Power factor.</b>				
	<b>216.2V</b>	<b>230V</b>	<b>253V</b>	Measured at three voltage levels and at full output. Voltage to be maintained within $\pm 1.5\%$ of the stated level during the test.
<b>Measured value</b>	0.9927	0.9946	0.9920	
<b>Limit</b>	<b>&gt;0.95</b>	<b>&gt;0.95</b>	<b>&gt;0.95</b>	

Omniksol-1.5k-TL2-M				
<b>Power Quality. Power factor.</b>				
	<b>216.2V</b>	<b>230V</b>	<b>253V</b>	Measured at three voltage levels and at full output. Voltage to be maintained within $\pm 1.5\%$ of the stated level during the test.
<b>Measured value</b>	0.9933	0.9954	0.9921	
<b>Limit</b>	<b>&gt;0.95</b>	<b>&gt;0.95</b>	<b>&gt;0.95</b>	

Omniksol-1k&1.5k-TL2-M						
<b>Protection. Frequency tests.</b>						
Function	Setting		Trip test		"No trip tests"	
	Frequency	Time delay	Frequency	Time delay	Frequency/time	Confirm no trip
<b>U/F stage 1</b>	<b>47.5Hz</b>	<b>20s</b>	47.53Hz	20.01s	<b>47.7Hz/ 25s</b>	No trip
<b>U/F stage 2</b>	<b>47Hz</b>	<b>0.5s</b>	47.03Hz	0.502s	<b>47.2Hz/ 19.88s</b>	No trip
					<b>46.8Hz/ 0.48s</b>	No trip
<b>O/F stage 1</b>	<b>51.5Hz</b>	<b>90s</b>	51.48Hz	90.06s	<b>51.3Hz/ 95s</b>	No trip
<b>O/F stage 2</b>	<b>52Hz</b>	<b>0.5s</b>	51.98Hz	0.504s	<b>51.8Hz/ 89.88s</b>	No trip
					<b>52.2Hz/ 0.48s</b>	No trip

Omniksol-1k&1.5k-TL2-M						
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	202V	2.507s	204.1V/ 3.5s	No trip
U/V stage 2	184V	0.5s	186V	0.503s	188V/ 2.48s	No trip
					180V/ 0.48s	No trip
O/V stage 1	262.2V	1.0s	260V	1.009s	258.2V/ 2.0s	No trip
O/V stage 2	273.7V	0.5s	271.5V	0.504s	269.7V/ 0.98s	No trip
					277.7V/ 0.48s	No trip

Omniksol-1k-TL2-M						
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	121.4ms	133ms	73.2ms	69.4ms	93.2ms	72.2ms

Omniksol-1.5k-TL2-M						
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	106.7ms	137ms	83.2ms	92.4ms	113.2ms	85.2ms

Omniksol-1k&1.5k-TL2-M				
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-1k-TL2-M			Omniksol-1.5k-TL2-M		
For a Inverter SSEG			For a Inverter SSEG		
Time after fault	Volts	Amps	Time after fault	Volts	Amps
20ms	195.73V	3.72A	20ms	185.85V	5.27A
100ms	30.4	0.195	100ms	30.9	0.198
250ms	30.1	0.195	250ms	30.1	0.198
500ms	30.2	0.195	500ms	30.0	0.198
Time to trip	13.65ms	In seconds	Time to trip	7.65ms	In seconds

Omniksol-1k&1.5k-TL2-M					
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
<b>Confirmation that the SSEG does not re-connect.</b>		No reconnection	No reconnection	No reconnection	No reconnection

Omniksol-1k&1.5k-TL2-M	
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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