

Certificate UK-G59-3

The results of the G59-3 tests are summarized in this certificate.
 Omnik New Energy Co., Ltd declares that the units installed in UK market and set for G59 operations are characterized by the following features:

- The internal specification and parameters are set to be compliant with: Engineering Recommendation G59-3, 2015.
- 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 G59-3, 2015.

SSEG Type reference number	PHOTO-VOLTAIC Inverter		
SSEG Type	Omniksol-4k-TL2,Omniksol-5k-TL2		
System Supplier name	Omnik New Energy Co.,Ltd.		
Address	CN-215213 2ed Floor NO 80 XinZe Road Suzhou China		
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	
	4	kW single phase (Omniksol-4k-TL2)
	5	kW single phase (Omniksol-5k-TL2)
	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 G59-3.

Signed	2015-7-22	On behalf of	Omnik New Energy Co.,Ltd
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Omniksol-4k&5k-TL2								
13.7.3.2 UNDER / OVER VOLTAGE TESTS								P
	Under Voltage				Over Voltage			
Parameter	Voltage	Time (sec)			Voltage	Time (sec)		
Output power level	200.1	10%	55%	100%	262.2	10%	55%	100%
G59/2 Limit: stage 1	-13%Un	2,5 s			+14%Un	1,0 s		
Actual setting								
Trip value	205V to 195V	2.48	2.50	2.48	257V to 267V	1.00	1.01	0.98
		2.46	2.48	2.48		0.98	1.00	1.00
		2.46	2.47	2.50		1.01	0.99	1.00
		2.48	2.46	2.48		1.00	1.02	1.01
		2.48	2.50	2.48		0.97	1.02	0.97
G59/2 Limit: stage 2	-20%Un	1.2 s			+19%Un	1.2 s		
Actual setting	184.0				273.7			
Trip value	230V to 184V	1.20	1.20	1.21	230V to 273.7V	1.00	1.01	1.00
		1.21	1.21	1.23		1.02	1.03	1.01
		1.20	1.21	1.22		1.03	1.04	1.02
		1.18	1.18	1.20		1.02	1.05	1.03
		1.21	1.18	1.18		1.02	1.02	1.01

Note:
 The Interface Protection should operate within the specified trip times of Table 10.5.7.1 when the voltage is at or within 1.5% of the trip setting of the inverter. For example, an inverter with a stated accuracy of $\pm 1.5\%$ could be set with an overvoltage setting of +17.5% on the basis that the overvoltage protection should operate when the terminal voltage is in the range of 16-19% ($17.5 \pm 1.5\%$). The test voltage should be applied in steps of $\pm 0.5\%$ of setting for a duration that is longer than the trip time delay, for example 3s in the case of a delay setting of 2.5s. It will be necessary to carry out five tests for each trip setting. The longest trip time is to be recorded as the certificated trip time. The test voltage at which this trip occurred is to be recorded as the certificated trip voltage.
 The measurement shall take place at nominal frequency, 10%, 55% and 100% power.

Omniksol-4k&5k-TL2				
13.7.3.3 UNDER / OVER FREQUENCY TESTS				P
	Under frequency		Over frequency	
	Load condition:			
	1) Full rating for an inverter of up to 5kW rating 2) No less than 10% of the rating for larger inverters up to 50KW.			
Parameter	Frequency	Time	Frequency	Time
Output power level	47.60		51.41	
G59/2 Limit: stage 1	>=47,6 Hz	>20 s	<=51.4 Hz	>90 s
Actual setting				
Trip value	48.1Hz to 47.1Hz	20	50.91Hz to 51.91Hz	90.12
		20		90.20
		20		90.08
		20		90.15
		20		90.12
G59/2 Limit: stage 2	>=47,0 Hz	1.2s	<=52,0 Hz	1.2s
Actual setting				
Trip value	48Hz to 47Hz	1.20	51.01Hz to 52.01Hz	1.22
		1.19		1.23
		1.22		1.22
		1.20		1.23
		1.21		1.23
<p>Note: Operation of the under/over frequency protection will be demonstrated for an increase or decrease of frequency within $\pm 0.5\%$ of the trip settings, e.g. for an Over Frequency setting of 50.5 Hz the permissible operating range is 50.5 ± 0.2525 Hz. The test frequency should be applied in steps of $\pm 0.5\%$ of setting for a duration that is longer than the trip time delay, for example 1 second in the case of a delay setting of 0.5 second.</p>				

Omniksol-4k-TL2			
C3.4 LOSS OF MAINS TEST			p
Test conditions:	Frequency: 50+/-0,2Hz $U_N=230\pm 3V_{ac}$ RLC consumes inverter real power within +/- 5% Quality > 0,5		
Output power level:	10%	55%	100%
G83/1 Limit:	5s		
Actual setting (sec):			
Trip value (sec):	0.264	0.241	0.201
	0.225	0.254	0.212
	0.237	0.218	0.198
	0.216	0.222	0.192
	0.243	0.232	0.187
Parameter	L=0.994kVA	L=3.60kVA	L=8.30kVA
	R=0.355kW	R=1.821kW	R=3.716kW
	C=1.09kvar	C=5.27kvar	C=8.27kvar
Udc	361.2 V	359.8V	361.5V
Idc	1.18A	5.62A	11.16A
Uac	230.1V	230.4V	231.5V
Pac	0.406kW	2.008kW	4.015kW
Note: Inverter connected to a network combining a resonant circuit with a Q factor = 2 (at 55% output power and the values of L and C are fixed for 10% and 100% tests) and a variable load; the value of the load is to match the inverter output to within +/-5%. A switch is placed between inverter/load and distribution system.			

Omniksol-5k-TL2			
C3.4 LOSS OF MAINS TEST			p
Test conditions:	Frequency: 50+/-0,2Hz $U_N=230\pm 3V_{ac}$ RLC consumes inverter real power within +/- 5% Quality > 0,5		
Output power level:	10%	55%	100%
G83/1 Limit:	5s		
Actual setting (sec):			
Trip value (sec):	0.212	0.221	0.203
	0.230	0.232	0.218
	0.208	0.224	0.185
	0.198	0.202	0.224
	0.230	0.192	0.236
Parameter	L=1.247kVA	L=6.479kVA	L=9.54kVA
	R=0.447kW	R=2.264kW	R=4.26kW
	C=1.352kvar	C=6.57kvar	C=9.52kvar
Udc	362.0V	360.2V	360.7V
Idc	1.48A	7.03A	12.84A
Uac	230.4V	230.1V	231.0V
Pac	0.526kW	2.452kW	4.622kW
Note: Inverter connected to a network combining a resonant circuit with a Q factor = 2 (at 55% output power and the values of L and C are fixed for 10% and 100% tests) and a variable load; the value of the load is to match the inverter output to within +/-5%. A switch is placed between inverter/load and distribution system.			

Omniksol-4k&5k-TL2			
C3.5 RECONNECTION TIMES			p
Reconnection Time	Under/Over voltage	Under/over frequency	Loss of mains
Minimum value	180 seconds		
Actual settings (sec)			
Recorded value (sec)	197	198	197

Omniksol-4k-TL2								
13.7.6.1 Harmonic Current Emissions								p
Harmonics	3rd	5th	7th	9th	11th	13th	THD	PWHD
Limit	21,6	10,7	7,2	3,8	3,1	2,0	13	22
Test Value	0.325	1.108	0.154	0.093	0.166	0.073	1.224	2.352
<p>Note: Maximum permissible harmonics current as per EN61000-3-12. Measurement taken at rated load</p>								

Omniksol-5k-TL2								
13.7.6.1 Harmonic Current Emissions								p
Harmonics	3rd	5th	7th	9th	11th	13th	THD	PWHD
Limit	21,6	10,7	7,2	3,8	3,1	2,0	13	22
Test Value	0.199	1.112	0.116	0.125	0.081	0.084	1.168	2.236
<p>Note: Maximum permissible harmonics current as per EN61000-3-12. Measurement taken at rated load</p>								

Omniksol-4k-TL2			
13.7.6.2 Power factor			P
G 59 Limit	0.95 lag-0.95 lead		
Output Voltage:	212V (U _N -8%)	230V	248V (U _N +12.7%)
Test Value	0.9982	0.9990	0.9990
<p>Note: The power factor test shall be such that the inverter supplies full load to the DNO system.</p>			

Omniksol-5k-TL2			
13.7.6.2 Power factor			P
G 59 Limit	0.95 lag-0.95 lead		
Output Voltage:	212V ($U_N-8\%$)	230V	248V ($U_N+12.7\%$)
Test Value	0.9984	0.9990	0.9990
<p>Note: The power factor test shall be such that the inverter supplies full load to the DNO system.</p>			

Omniksol-4k-TL2					
13.7.6.3 Voltage Flicker (maybe covered by EMC Report)					p
$U_N=230V$					
Output power: 100%					
Running					
Limit (at Z_{ref})	Pst = 1.0	Plt = 0.65	d(t)%= 3.3	$d_c\%=3.3$	$d_{max}\%$
Test value (at Z_{ref})	0.319	0.139	0.0	0.47	0.53
<p>Note: Maximum permissible voltage fluctuation (expressed as a percentage of nominal voltage at 100% power) and flicker. As per BS EN 61000-3-3</p>					

Omniksol-5k-TL2					
13.7.6.3 Voltage Flicker (maybe covered by EMC Report)					p
$U_N=230V$					
Output power: 100%					
Running					
Limit (at Z_{ref})	Pst = 1.0	Plt = 0.65	d(t)%= 3.3	$d_c\%=3.3$	$d_{max}\%$
Test value (at Z_{ref})	0.319	0.139	0.0	0.47	0.53
<p>Note: Maximum permissible voltage fluctuation (expressed as a percentage of nominal voltage at 100% power) and flicker. As per BS EN 61000-3-3</p>					

Omniksol-4k-TL2			
13.7.6.4 DC injection			P
G 59 Limit	20 mA		
Output power:	10%	55%	100%
Test Value	12mA	9mA	5mA
<p>Note: The level of dc injection may be measured during tests C3.2, C3.3, C3.4 and C4.2.</p>			

Omniksol-5k-TL2			
13.7.6.4 DC injection			P
G 59 Limit	20 mA		
Output power:	10%	55%	100%
Test Value	10mA	8mA	5mA
<p>Note: The level of dc injection may be measured during tests C3.2, C3.3, C3.4 and C4.2.</p>			

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Report Date: 2015-7-22	www.omnik-solar.com	Page 8 of 8
File: Omniksol_4k&5k-TL2_G59_3_Certificate		
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