

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 G59-3 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-13k-TL, Omniksol-17k-TL, Omniksol-20k-TL		
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	
	13	kW three phase (Omniksol-13k-TL)
	17	kW three phase (Omniksol-17k-TL)
	20	kW three phase (Omniksol-20k-TL)
	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 G59-3.

Signed	Zhiping.wang	On behalf of	Omnik New Energy Co.,Ltd
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Omniksol-20k -TL								
13.7.3.2 UNDER / OVER VOLTAGE TESTS								P
Parameter	Under Voltage				Over Voltage			
	L1 phase							
Parameter	Voltage	Time (sec)			Voltage	Time (sec)		
Output power level		10%	55%	100%		10%	55%	100%
G59-3 Limit: stage 1	-13%Un	2,5 s			+14%Un	1,0 s		
Actual setting	200.1	200.5	200.5	200.5	262.2	260.2	260.2	260.2
Trip value	205.5V to 195.5V	2.011	2.002	2.004	255.2V to 265.2V	0.801	0.805	0.817
		2.014	2.014	2.017		0.796	0.806	0.807
		2.000	1.992	2.024		0.820	0.800	0.811
		1.998	2.020	2.000		0.804	0.796	0.799
		2.015	2.001	2.012		0.812	0.798	0.802
G59/3 Limit: stage 2	-20%Un	0.5s			+19%Un	0.5s		
Actual setting	184.0	184.6	184.6	184.6	273.7	273.5	273.5	273.5
Trip value	205V to 179V	0.432	0.418	0.430	255V to 278V	0.412	0.426	0.432
		0.420	0.410	0.424		0.422	0.426	0.430
		0.424	0.425	0.408		0.430	0.432	0.418
		0.430	0.433	0.417		0.441	0.414	0.412
		0.428	0.428	0.426		0.424	0.435	0.444
Parameter	Under Voltage				Over Voltage			
	L2 phase							
Parameter	Voltage	Time (sec)			Voltage	Time (sec)		
Output power level		10%	55%	100%		10%	55%	100%
G59/3 Limit: stage 1	-13%Un	2,5 s			+14%Un	1,0 s		
Actual setting	200.1	200.6	200.8	200.7	262.2	260.4	260.5	260.4
Trip value	205.6V to 195.6V	2.008	2.006	2.004	255.5V to 265.5V	0.815	0.798	0.802
		1.998	1.999	2.005		0.810	0.808	0.804
		2.002	2.018	2.009		0.802	0.802	0.811
		2.015	2.016	2.014		0.824	0.799	0.808
		2.012	2.017	2.002		0.815	0.810	0.798
G59/3 Limit: stage 2	-20%Un	0.5s			+19%Un	0.5s		
Actual setting	184.0	184.7	184.8	184.7	273.7	273.2	273.1	273.2
Trip value	205V to 179V	0.424	0.416	0.410	255V to 278V	0.432	0.414	0.404
		0.420	0.420	0.430		0.423	0.413	0.408
		0.414	0.424	0.420		0.420	0.423	0.420
		0.412	0.424	0.422		0.426	0.424	0.422
		0.422	0.412	0.424		0.428	0.430	0.411
Parameter	Under Voltage				Over Voltage			
	L3 phase							
Parameter	Voltage	Time (sec)			Voltage	Time (sec)		
Output power level		10%	55%	100%		10%	55%	100%
G59/3 Limit: stage 1	-13%Un	2,5 s			+14%Un	1,0 s		
Actual setting	200.1	200.4	200.5	200.5	262.2	260.2	260.3	260.3
Trip value	205.4V to 195.5V	2.002	1.998	2.006	255.3V to 265.3V	0.818	0.802	0.804
		2.000	1.996	1.998		0.816	0.812	0.808

		2.012	2.001	2.012		0.800	0.804	0.796
		2.010	2.003	2.014		0.804	0.815	0.801
		2.016	2.015	2.010		0.792	0.801	0.803
G59/3 Limit: stage 2	-20%Un	0.5s			+19%Un	0.5s		
Actual setting	184.0	184.6	184.5	184.5	273.7	273.1	273.3	273.2
Trip value	205V to 179V	0.440	0.422	0.423	255V to 278V	0.422	0.424	0.427
		0.442	0.424	0.424		0.425	0.422	0.434
		0.432	0.414	0.418		0.431	0.416	0.434
		0.429	0.438	0.420		0.424	0.431	0.417
		0.430	0.430	0.436		0.418	0.412	0.408

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.

The test had been performed on Omniksol-20k-TL are valid for Omniksol-13k-TL and Omniksol-17k-TL since it is identical in hardware and just power derated by software.

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Omniksol-20k -TL				
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				
G59/3 Limit: stage 1	>=47,5 Hz	>20 s	<=51.5 Hz	>90 s
Actual setting	47.53	47.53	51.47	51.47
Trip value	48.0Hz to 47.0Hz	30.00	51.0Hz to 52.0Hz	100.15
		29.97		99.15
		29.96		100.15
		29.98		99.15
		30.04		100.15
G59/3 Limit: stage 2	>=47,0 Hz	0.5s	<=52,0 Hz	0.5s
Actual setting	47.03	47.03	51.97	51.97
Trip value	47.5Hz to 46.5Hz	0.421	51.5Hz to 52.5Hz	0.398
		0.412		0.418
		0.396		0.413
		0.420		0.402
		0.393		0.395
<p>Note:</p> <p>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> <p>The test had been performed on Omniksol-20k-TL are valid for Omniksol-13k-TL and Omniksol-17k-TL since it is identical in hardware and just power derated by software.</p>				

Omniksol-20k -TL									
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):	1.0s			1.0s			1.0s		
Trip value (sec):	L1 phase	L2 phase	L3 phase	L1 phase	L2 phase	L3 phase	L1 phase	L2 phase	L3 phase
	0.539	0.253	2.184	0.546	0.424	0.558	0.728	0.132	0.954
	0.529	0.225	2.132	0.497	0.185	0.495	0.358	0.127	0.632
	0.544	0.243	2.204	0.539	0.210	0.978	0.453	0.123	0.990
	0.533	0.238	2.176	0.170	0.208	0.930	0.295	0.141	0.862
	0.485	0.419	2.156	0.139	0.127	1.096	0.200	0.120	1.084
Parameter	L=mH	20.81	20.81	20.81	20.81	20.81	20.81	20.81	20.81
	R= Ω	82.66	82.65	82.65	15.03	15.03	15.03	8.27	8.27
	C= μF	487	487	487	487	487	487	487	487
<p>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.</p> <p>The test had been performed on Omniksol-20k-TL are valid for Omniksol-13k-TL and Omniksol-17k-TL since it is identical in hardware and just power derated by software.</p>									

Omniksol-20k -TL			
C3.5 RECONNECTION TIMES			p
Reconnection Time	Under/Over voltage	Under/over frequency	Loss of mains
Minimum value	180 seconds		
Actual settings (sec)	180	180	180
Recorded value (sec)	193	193	193
Note: The test had been performed on Omniksol-20k-TL are valid for Omniksol-13k-TL and Omniksol-17k-TL since it is identical in hardware and just power derated by software.			

Omniksol-20k-TL								
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	1.702	2.276	1.730	0.000	0.746	0.425	1.778	5.946
Note: Maximum permissible harmonics current as per EN61000-3-12. Measurement taken at rated load The test had been performed on Omniksol-20k-TL are valid for Omniksol-13k-TL and Omniksol-17k-TL since it is identical in hardware and just power derated by software.								

Omniksol-13k&20k-TL			
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 : Omniksol-20k-TL	0.9996	0.9997	0.9994
Test Value: Omniksol-13k-TL	0.9993	0.9992	0.9991
Note: The power factor test shall be such that the inverter supplies full load to the DNO system. The test had been performed on Omniksol-20k-TL are valid for Omniksol-13k-TL and Omniksol-17k-TL since it is identical in hardware and just power derated by software.			

Omniksol-20k-TL					
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})	0.111	0.088	0.0	0.196	0.364
<p>Note: Maximum permissible voltage fluctuation (expressed as a percentage of nominal voltage at 100% power) and flicker. As per BS EN 61000-3-11</p>					

Omniksol-20k-TL			
13.7.6.4 DC injection			P
G 59/3 Limit	20mA till 2kW,0.25% for inverter over 2kW(70mA for Ominksol-20k-TL)		
Output power:	10%	55%	100%
Test Value :L1 phase	66mA	68mA	61mA
Test Value :L2 phase	67mA	67mA	65mA
Test Value :L2 phase	45mA	47mA	36mA
<p>Note: The level of dc injection may be measured during tests C3.2, C3.3, C3.4 and C4.2.</p>			

Omniksol-13k-TL			
13.7.6.4 DC injection			P
G 59/3 Limit	20mA till 2kW,0.25% for inverter over 2kW(70mA for Ominksol-20k-TL)		
Output power:	10%	55%	100%
Test Value :L1 phase	45mA	43mA	43mA
Test Value :L2 phase	44mA	45mA	45mA
Test Value :L2 phase	43mA	42mA	42mA
<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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