



**BUREAU  
VERITAS**

# Verklaring van geen bezwaar

**Aanvrager:** Omnik New Energy Co., Ltd.  
Xinghu Road No.218 bioBAY Park A4-314  
215123 Suzhou  
China

**Product:** Fotovoltaïsche Omvormers

**Model:** Omniksol-1.5k-TL2-M  
Omniksol-1k-TL2-M

## Reglementair voorgeschreven gebruik:

Automatisch schakelstation met enkelfasige netwerkbewaking conform EN 50438:2013, NEN-EN 50438:2013, Annex A\*) voor fotovoltaïsche installaties met een enkelfasige parallelvoeding door middel van gelijkstroom-wisselstroommutator in het net van de openbare voorziening. Het automatische schakelstation vormt een integraal bestanddeel van de hoger vermelde transformatorloze gelijkstroom-wisselstroommutators. Deze dient als vervangmiddel voor een te allen tijde voor de distributienetexploitant ("VNB") toegankelijk schakelstation met scheidingsfunctie.

## Controlebasis:

**EN 50438:2013, NEN-EN 50438:2013**

Eisen voor het aansluiten van microgeneratoren op het openbare laagspanningsnet

**DIN V VDE V 0126-1-1:2006-02 (Single fouttolerantie van de bescherming-interface systeem)**

Automatisch schakelstation tussen een netparallele zelfopwekinstallatie en het openbare laagspanningsnet

Een representatief testpatroon van het hoger vermelde product voldoet aan de op het moment van de uitreiking van dit attest geldende veiligheidstechnische eisen van de vermelde controlegrondbeginselen voor een reglementair voorgeschreven gebruik.

**Rapportnummer:** OMK-16MY2499FTSP

**Certificaatnummer:** U17-0002

**Datum:** 2017-01-11

**Certificatie-instelling**

Dieter Zitzmann



Certificatie-instelling Bureau Veritas Consumer Products Services Germany GmbH  
Geaccrediteerd volgens DIN-EN ISO/IEC 17065

**Appendix E Type Verification Test Report**

Extract from test report according to EN 50438

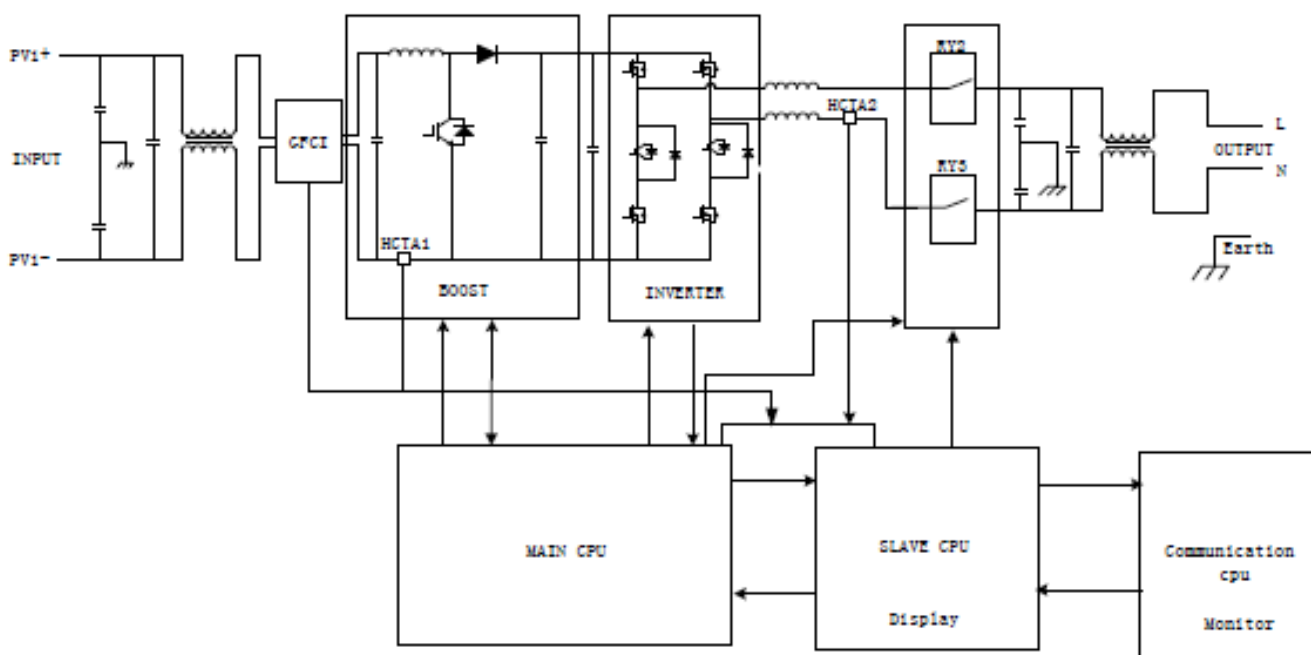
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**Type Approval and declaration of compliance with the requirements of EN 50438.**

<b>Manufacturer / applicant:</b>	Omnik New Energy Co., Ltd. Xinghu Road No.218 bioBAY Park A4-314 215123 Suzhou China	
<b>Micro-generator Type</b>	Grid-tied photovoltaic inverter	
<b>Rated values</b>	Omniksol-1.5k-TL2-M	Omniksol-1k-TL2-M
<b>Maximum rated capacity</b>	1500 W	1000 W
<b>Rated voltage</b>	230 Vac, 50Hz	
<b>Firmware version</b>	2016-05-30 to 2016-06-15	
<b>Measurement period:</b>	Master CPU: V3.00 Build65_All_D1k1.5k_Master.hex Slave CPU: V3.00 Build115_All_D1k1.5k_Slave.hex	

**Description of the structure of the power generation unit (Figure 1):**

The power generation unit is equipped with a PV and line-side EMC filter. The power generation unit has no galvanic isolation between DC input and AC output. Output switch-off is performed with single-fault tolerance based on two series-connected relays in line and neutral. This enables a safe disconnection of the power generation unit from the network in case of error.



**Figure 1 – Schematic structure of the power generation unit**

The above stated micro-generators are tested according to the requirements in the EN 50438. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements of the EN 50438.

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**Type testing of the interface protection**

Over-/under-voltage tests						
Parameter	Protection limit		Actual setting		Trip value (test result)	
	Voltage [V]	Disconnection time [s]	Voltage [V]	Disconnection time [s]	Voltage [V]	Disconnection time [s]
Over-voltage stage 1	253,0	2,0	253,0	2,0	251,6	1,107
Under-voltage stage 1	184,0	2,0	184,0	2,0	182,0	1,105

Over-/under-frequency tests						
Parameter	Protection limit		Actual setting		Trip value (test result)	
	Frequency [Hz]	Disconnection time [s]	Frequency [Hz]	Disconnection time [s]	Frequency [Hz]	Disconnection time [s]
Over-frequency	51,00	2,0	51,00	2,0	51,00	1,080
Under-frequency	48,00	2,0	48,00	2,0	47,99	1,088

LoM test						
Method used	EN 62116					
Balancing load on islanded network	33% of -5% Q Test 22	66% of -5% Q Test 12	100% of -5% P Test 5	33% of +5% Q Test 31	66% of +5% Q Test 21	100% of +5% P Test 10
Trip time. Phase 1 fuse removed [ms]	106,7	137,0	83,2	92,4	113,2	85,2

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**Type testing of a micro-generator**

**Operating range**

Test 1: U = 195,5 V; f = 47,5 Hz; P = 1,00 Sn; cosφ = 1

Test 2: U = 253,0 V; f = 51,5 Hz; P = 1,00 Sn; cosφ = 1

Test sequence	Voltage [V]	Frequency [Hz]	Output power [W]	Cos φ [1]
1	195,4	47,5	1505	0,998
2	253,1	51,5	1498	0,998

**Active power at under-frequency**

5-min mean value (each)	a) 50 ± 0,01 [Hz]	b) - 0,4 to - 0,5 [Hz]	c) - 2,4 to - 2,5 [Hz]
Frequency [Hz]:	50,00	49,50	47,55
Active power [kW]:	1499	1499	1498
ΔP/PM [%] per 1 Hz:			0

**Power response to over-frequency**

1-min mean value [Hz]:	a) 50,00	b) 50,25	c) 50,70	d) 51,15	e) 50,70	f) 50,25	g) 50,00
<b>1. Measurement a) to g): Active power output &gt; 80% P<sub>n</sub></b>							
Frequency [Hz]:	50,00	50,25	50,70	51,15	50,70	50,25	50,00
PM [kW]:	N/A	1,498	1,228	0,959	1,228	1,498	N/A
PE60 [kW]:	1,502	1,498	1,238	0,960	1,237	1,496	1,500
ΔPE60/PM [%]:	N/A	0	0,60	0,10	0,61	-0,10	N/A
<b>2. Measurement a) to g): Active power output 40% and 60% after freezing &gt; 80% P<sub>n</sub></b>							
Frequency [Hz]:	50,00	50,25	50,70	50,15	50,70	50,25	50,00
PM [kW]:	N/A	0,745	0,611	0,476	0,611	0,745	N/A
PE60 [kW]:	0,751	0,745	0,611	0,467	0,612	0,744	7507
ΔPE60/PM [%]:	N/A	0	0,09	-1,22	0,16	0,05	N/A
Limit ΔP/P <sub>1min</sub> :	+ 10 % of P <sub>M</sub>						

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Reactive power			
Uncontrollable reactive power			
Omniksol-1k-TL2-M			
Test Voltage	211,6V	230V	248,4V
Output power			
25% PN	0,9663	0,9981	0,9978
50% PN	0,9994	0,9988	0,9991
75% PN	0,9997	0,9998	0,9995
100% PN	0,9998	0,9996	0,9998
Limit	>0,95	>0,95	>0,95
Omniksol-1.5k-TL2-M			
Test Voltage	211,6V	230V	248,4V
Output power			
25% PN	0,9533	0,9975	0,9974
50% PN	0,9993	0,9993	0,9993
75% PN	0,9996	0,9995	0,9995
100% PN	0,9997	0,9996	0,9996
Limit	>0,95	>0,95	>0,95

Controllable reactive power
<b>Note:</b> Inverter did not provide controllable reactive power function.

Q adjustment
<b>Note:</b> Inverter did not provide Q adjustment function.

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Connection and starting to generate electrical power		
Test according to EN 50438 with setting	Min. voltage for connection to grid:	195,5
	Max. voltage for connection to grid:	253,0
	Min. frequency for connection to grid:	48,0
	Max. frequency for connection to grid:	50,15
	Observation time ( $\geq 60s$ )	60s
<b>Test</b>		
<b>Voltage conditions</b>		
a) Start up for voltage range	<84% $U_n$ for twice of observation time	>111% $U_n$ for twice of observation time
Connection:	No connection	No connection
Limit:	No connection allowed	
b) In voltage range at start-up	$\geq 84\% U_n$ within twice setting observation time	$\leq 111\% U_n$ within twice setting observation time
Reconnection time [s]	69,5	91,5
Limit:	Connected after setting observation time ( $\geq 60s$ )	
Gradient:	For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10% $P_n$ /min. For recorded gradient see diagram below.	
c) In voltage range after voltage failure	$\geq 84\% U_n$ for twice of setting observation time	$\leq 111\% U_n$ for twice of setting observation time
Reconnection time [s]	103,0	172,9
Limit:	Reconnection after setting observation time ( $\geq 60s$ )	
Gradient:	For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10% $P_n$ /min. For recorded gradient see diagram below.	
<b>Frequency conditions</b>		
d) Start up for frequency range	<47,95 Hz for twice of setting observation time	>50,15 Hz for twice of setting observation time
Connection:	No connection	No connection
Limit:	No connection allowed	
e) In frequency range at start-up	$\geq 47,95$ Hz within twice of setting observation time	$\leq 50,15$ Hz within twice of setting observation time
Reconnection time [s]	71,5	68
Limit:	Connected after setting delay time ( $\geq 60s$ )	
Gradient:	For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10% $P_n$ /min. For recorded gradient see diagram below.	

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f) In frequency range after frequency failure	≥47,95 Hz for twice of setting observation time	≤50,15 Hz for twice of setting observation time
Reconnection time [s]	142	69
Limit:	Reconnection after setting observation time (≥60s)	
Gradient:	For adjustable micro generators the maximum occurring active power gradient after connection respectively start generating electrical power is less than the configured maximum active power per minute Max gradient: 10%Pn/min. For recorded gradient see diagram below.	

Short-circuit current contribution					
Short-circuit current parameters					
For a directly coupled micro-generator			For a Inverter micro-generator		
Parameter	Symbol	Value	Time after fault	Volts	Amps
Peak Short Circuit current	$I_p$	N/A	20ms	185,85	5,1207
Initial Value of aperiodic current	A	N/A	100ms	N/A	N/A
Initial symmetrical short-circuit current*	$I_k$	N/A	250ms	N/A	N/A
Decaying (aperiodic) component of short circuit current*	$i_{DC}$	N/A	500ms	N/A	N/A
Reactance/Resistance Ratio of source*	X/R	N/A	Time to trip	7,65 ms	

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Power Quality. Harmonic current emission				
micro-generator		Omniksol-1.5k-TL2-M		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	6,376	--	Phase 1	-
2nd	0,015	0,240	Phase 1	1,080
3rd	0,081	1,270	Phase 1	2,300
4th	0,010	0,153	Phase 1	0,430
5th	0,033	0,518	Phase 1	1,140
6th	0,002	0,029	Phase 1	0,300
7th	0,029	0,461	Phase 1	0,770
8th	0,003	0,047	Phase 1	0,230
9th	0,004	0,060	Phase 1	0,400
10th	0,005	0,073	Phase 1	0,184
11th	0,036	0,557	Phase 1	0,330
12th	0,005	0,078	Phase 1	0,153
13th	0,010	0,164	Phase 1	0,210
14th	0,003	0,053	Phase 1	0,131
15th	0,027	0,423	Phase 1	0,150
16th	0,004	0,059	Phase 1	0,115
17th	0,015	0,241	Phase 1	0,132
18th	0,005	0,077	Phase 1	0,102
19th	0,014	0,217	Phase 1	0,118
20th	0,003	0,049	Phase 1	0,092
21th	0,010	0,160	Phase 1	0,107
22th	0,003	0,052	Phase 1	0,084
23th	0,005	0,075	Phase 1	0,098
24th	0,003	0,049	Phase 1	0,077
25th	0,011	0,177	Phase 1	0,090
26th	0,003	0,047	Phase 1	0,071
27th	0,006	0,089	Phase 1	0,083
28th	0,003	0,042	Phase 1	0,066
29th	0,008	0,122	Phase 1	0,078
30th	0,003	0,044	Phase 1	0,061
31th	0,006	0,088	Phase 1	0,073
32th	0,003	0,044	Phase 1	0,058
33th	0,006	0,092	Phase 1	0,068
34th	0,003	0,054	Phase 1	0,054
35th	0,005	0,076	Phase 1	0,064
36th	0,004	0,057	Phase 1	0,051
37th	0,005	0,071	Phase 1	0,061
38th	0,003	0,048	Phase 1	0,048
39th	0,004	0,063	Phase 1	0,058
40th	0,003	0,053	Phase 1	0,046



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Power Quality. Harmonic current emission				
micro-generator		Omniksol-1k-TL2-M		
Harmonic order n	Current Magnitude [A] at 100% rated output power	% of Fundamental	Phase	Harmonic current limit EN 61000-3-2, Class A [A]
1st	4,430	--	Phase 1	-
2nd	0,002	0,056	Phase 1	1,080
3rd	0,046	1,027	Phase 1	2,300
4th	0,002	0,038	Phase 1	0,430
5th	0,016	0,360	Phase 1	1,140
6th	0,002	0,044	Phase 1	0,300
7th	0,033	0,752	Phase 1	0,770
8th	0,003	0,073	Phase 1	0,230
9th	0,005	0,122	Phase 1	0,400
10th	0,003	0,062	Phase 1	0,184
11th	0,023	0,518	Phase 1	0,330
12th	0,004	0,081	Phase 1	0,153
13th	0,006	0,132	Phase 1	0,210
14th	0,004	0,098	Phase 1	0,131
15th	0,013	0,285	Phase 1	0,150
16th	0,003	0,062	Phase 1	0,115
17th	0,012	0,260	Phase 1	0,132
18th	0,003	0,072	Phase 1	0,102
19th	0,007	0,167	Phase 1	0,118
20th	0,003	0,078	Phase 1	0,092
21th	0,008	0,175	Phase 1	0,107
22th	0,002	0,052	Phase 1	0,084
23th	0,003	0,076	Phase 1	0,098
24th	0,004	0,087	Phase 1	0,077
25th	0,011	0,247	Phase 1	0,090
26th	0,005	0,113	Phase 1	0,071
27th	0,007	0,160	Phase 1	0,083
28th	0,005	0,108	Phase 1	0,066
29th	0,007	0,161	Phase 1	0,078
30th	0,004	0,099	Phase 1	0,061
31th	0,002	0,053	Phase 1	0,073
32th	0,006	0,134	Phase 1	0,058
33th	0,005	0,104	Phase 1	0,068
34th	0,006	0,130	Phase 1	0,054
35th	0,003	0,059	Phase 1	0,064
36th	0,005	0,119	Phase 1	0,051
37th	0,005	0,106	Phase 1	0,061
38th	0,004	0,100	Phase 1	0,048
39th	0,002	0,043	Phase 1	0,058
40th	0,005	0,103	Phase 1	0,046

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Voltage fluctuation and Flicker.					
Omniksol-1.5k-TL2-M	Maximum permissible flicker and voltage fluctuation as per EN 61000-3-3				
Value	Pst	Plt 2 hours	d(t) <sub>500ms</sub>	dc	dmax
Limit	1,0	0,65	3,3%	3,3%	4%
Test value	0,17	0,15	0%	0,38%	0,42%

DC-Injection. Omniksol-1k-TL2-M				
Protection limit	Tested at four power levels, limit 0,5% of IAC <sub>nom</sub> (22mA)			
Output power	~20%	~50%	75%	~100%
Max. test value (phase L1) [mA]	18,1	21,8	14,2	8,4

DC-Injection. Omniksol-1.5k-TL2-M				
Protection limit	Tested at four power levels, limit 0,5% of IAC <sub>nom</sub> (33mA)			
Output power	~20%	~50%	75%	~100%
Max. test value (phase L1) [mA]	11,3	12,2	19,8	31,7