

# Certificate          Philippines

Manufacturer declaration and Type testing of compliance with the requirement of the client customized inverter on connection of photovoltaic installations to the low voltage network in Philippines.

Type reference number	<i>Evershine TL5000-10</i>		
Type	<i>Photovoltaic Inverter</i>		
Manufacturer:	<i>Jiangsu Zeversolar New Energy CO., LTD.</i>		
Address	<i>No. 198 Xiangyang Road, Suzhou, 215011 China</i>		
Tel	<i>+86 512 6937 0998</i>	Fax	<i>+86 512 6937 0630</i>
E:mail	<a href="mailto:service.china@zeversolar.com"><i>service.china@zeversolar.com</i></a>	Web site	<a href="http://www.zeversolar.com"><i>www.zeversolar.com</i></a>

Test house details:	<i>Jiangsu Zeversolar New Energy CO., LTD. R&amp;D Department, Suzhou</i>
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Type reference	Nominal AC power	Max. AC power
<i>Evershine TL5000-10</i>	<i>5.0kW</i>	<i>5.0kW</i>

Jiangsu Zeversolar New Energy CO., LTD hereby declares that the inverter listed above meet the requirement of the client customized inverter on connection of photovoltaic installations to the low voltage network in Philippines..

The inverters conforming to the regulations of the Philippines are characterized, along with the specification in the datasheet and the CE declaration, by the following features:

- There are two certificates of the grid standard VDE 0126-1-1/A1:2012 and VDE 0126-1-1:2013 issued by an accredited institute. And there is one certificate of the safety standard IEC 62109-1 and IEC 62109-2 issued by an accredited institute. Those certificates can be downloaded from the website <http://www.zeversolar.com/>.
- The automatic disconnection devices integrated within the inverters meet the requirements of IEC 61727 with the deviation of client requirement.
- These parameters can't be changed by user, an installer or by any person other than Zeversolar (password protected).

The results of IEC 61727 and the deviation of client requirement tests are summarized in this certificate. Complete documentation on test details is available at Zeversolar on demand.

Name of signatory and title	<i>Sandy Gong Manager of Safety Dept</i>	Date and Place	<i>2015.01.06 Suzhou</i>
Signed		On behalf of	<i>Jiangsu Zeversolar New Energy CO., LTD.</i>

## POWER QUALITY

Harmonic current emissions as per IEC 61727			
Harmonic	Test Value in Amps	% of fund	Limit
2	0.033	0.151	1.0%
3	0.190	0.862	4.0%
4	0.025	0.114	1.0%
5	0.127	0.574	4.0%
6	0.034	0.155	1.0%
7	0.109	0.496	4.0%
8	0.020	0.088	1.0%
9	0.123	0.557	4.0%
10	0.039	0.177	0.5%
11	0.095	0.429	2.0%
12	0.010	0.043	0.5%
13	0.099	0.447	2.0%
14	0.014	0.063	0.5%
15	0.065	0.294	2.0%
16	0.006	0.027	0.5%
17	0.060	0.274	1.5%
18	0.012	0.052	0.5%
19	0.020	0.091	1.5%
20	0.008	0.038	0.5%
21	0.035	0.159	1.5%
22	0.006	0.028	0.5%
23	0.022	0.097	0.6%
24	0.005	0.023	0.5%
25	0.023	0.105	0.6%
26	0.006	0.028	0.5%
27	0.006	0.028	0.6%
28	0.005	0.025	0.5%
29	0.015	0.069	0.6%
30	0.008	0.037	0.5%
31	0.014	0.062	0.6%
32	0.005	0.025	0.5%
33	0.010	0.043	0.6%
THD	N/A	1.537	5.0%

Voltage Fluctuations and Flicker as per IEC 61000-3-11								
	Starting			Stopping			Running	
	dmax	dc	d(t)	dmax	dc	d(t)	Pst	Plt 2 hours
Measured Values	1.72%	0.00%	0.00%	1.22%	1.08%	0.00%	0.311	0.274
Limits set under IEC 61000-3-11	4%	3.3%	3.3% 500ms	4%	3.3%	3.3% 500ms	1.0	0.65
Test Impedance	R		0.40Ω	XI		0.25Ω		

Test start date	2014.1.24	Test end date	2014.1.24
Test location	Audix Technology (Wujiang) Co., Ltd. EMC Dept		

## Power factor as per IEC 61727\*

Test Voltage level	198 V	220 V	242 V
Measured value at 50%Pn	0.9967	0.9953	0.9932
Measured value at 100%Pn	0.9988	0.9989	0.9989
Limit	>0.90	>0.90	>0.90

\* Measured at three voltage levels. The voltage maintained within  $\pm 1.5\%$  of the stated level during the test.

## DC Injection as per IEC 61727\*

Test power level	10%Pn	50%Pn	100%Pn
Measured value in Amps	0.014	0.016	0.022
As % of rated AC current	0.06%	0.07%	0.10%
Limit	1%	1%	1%

\* Measured at three output power levels. The power maintained within  $\pm 2.5\%$  of the stated level during the test.

## UNDER / OVER FREQUENCY PROTECTION

Function	Limit*		Actual setting		Trip test	
	Frequency[Hz]	Time[s]	Frequency[Hz]	Time[s]	Frequency[Hz]	Time[s]
U/F Stage 1	58.8	600	58.8	600	58.79	596
U/F Stage 2	58.0	5.0	58.0	4.68	57.99	4.681
U/F Stage 3	57.5	0.1	57.5	0.06	57.50	0.089
O/F Stage 1	61.2	600	61.2	600	61.22	596
O/F Stage 2	62.0	5.0	62.0	4.68	62.02	4.667
O/F Stage 3	62.5	0.1	62.5	0.06	62.52	0.068

\* The limit is defined by client.

## UNDER / OVER VOLTAGE PROTECTION

Function	Limit*		Actual setting		Trip test	
	Voltage [V]	Time [s]	Voltage [V]	Time [s]	Voltage [V]	Time [s]
U/V Stage 1	187.0	600	187.0	600	186.1	598
U/V Stage 2	110.0	0.1	110.0	0.06	109.4	0.08
O/V Stage 1	264	600	264	600	264.2	599
O/V Stage 2	297.0	0.1	297.0	0.06	297.9	0.02

\* The limit is defined by client.

## LOSS OF MAINS TEST

Method used	Frequency shift		
Output power level	25% Prated	50% Prated	100% Prated

Limit time	2s	2s	2s
Trip time (L:+5%)	0.344s	0.296s	0.376s
Trip time (L:+4%)	0.351s	0.316s	0.372s
Trip time (L:+3%)	0.356s	0.400s	0.372s
Trip time (L:+2%)	0.346s	0.364s	0.366s
Trip time (L:+1%)	0.346s	0.372s	0.370s
Trip time (L:+0%)	0.344s	0.402s	0.370s
Trip time (L:-1%)	0.337s	0.338s	0.370s
Trip time (L:-2%)	0.318s	0.234s	0.347s
Trip time (L:-3%)	0.310s	0.256s	0.376s
Trip time (L:-4%)	0.344s	0.288s	0.376s
Trip time (L:-5%)	0.348s	0.234s	0.272s

Note: The limit time is 2 second according to IEC 62116.

## RECONNECTION TIME MEASUREMENT

Reconnection time	Under/over Voltage	Under / over Frequency	Loss of Mains
Minimum value*	120s	120s	120s
Actual setting	120s	120s	120s
Recorded value	125s	126s	125s

\* The minimum value of reconnection time is defined by client.

## DC CURRENT MONITORING

A direct current feed to the low voltage grid over 1A must lead to a disconnection within 0.2 s according to VDE 0126-1-1.

Function	Limit		Trip test	
	DC current [A]	Time [ms]	DC current [A]	Time [ms]
Positive DC current	1	200	0.98	72
Negative DC current	1	200	0.97	70

## RESIDUAL CURRENT MONITORING

Test for correct triggering in event of steadily rising residual current according to IEC62109-2

PV connection	Limit		Trip test	
	Fault current [mA]	Time [ms]	Test Current [mA]	Time [ms]
PV+	300	300	105	230
PV-	300	300	103	276

Test for correct triggering in event of steadily rising residual current according to IEC62109-2

PV connection	Limit		Trip test	
	Fault current [mA]	Time [ms]	Test Current [mA]	Time [ms]
PV+	30	300	29.6	143.0

PV+	60	150	58.5	99.5
PV+	150	40	148.7	29.8
PV-	30	300	28.9	127.0
PV-	60	150	59.3	97.5
PV-	150	40	146.2	20.6

## ARRAY INSULATION RESISTANCE DETECTION

The value of the total resistance, including the intentional resistance for array functional grounding, the expected insulation resistance of the array to ground, and the resistance of any other networks connected to ground (for example measurement networks) must not be lower than  $R = (V_{MAX} PV/30 \text{ mA})$  ohms. (according to EN 62109-2)

PV connector	Test resistance value	Activation(Yes/No)	Display
PV+	500KΩ	Yes	Isolation Fault
PV-	500KΩ	Yes	Isolation Fault