

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 | Eversol TL3000-20 Eversol TL2000-20 Eversol TL1500-20 | | |
| Type | Photovoltaic Inverter | | |
| Manufacturer: | Jiangsu Zeversolar New Energy CO., LTD. | | |
| Address | No. 198 Xiangyang Road, Suzhou, 215011 China | | |
| Tel | +86 512 6937 0998 | Fax | +86 512 6937 0630 |
| E:mail | service.china@zeversolar.com | Web site | www.zeversolar.com |

| | | | |
|---------------------|-------------------------------------------------------------------|--|--|
| Test house details: | Jiangsu Zeversolar New Energy CO., LTD. R&D Department, Suzhou | | |
|---------------------|-------------------------------------------------------------------|--|--|

| Type reference | Nominal AC power | Max.AC power |
|-------------------|------------------|--------------|
| Eversol TL3000-20 | 3.0kW | 3.0kW |
| Eversol TL2000-20 | 2.0kW | 2.0kW |
| Eversol TL1500-20 | 1.5kW | 1.65kW |

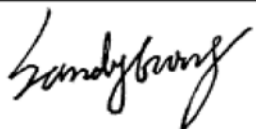
Jiangsu Zeversolar New Energy CO., LTD hereby declares that the inverter listed above meet the requirement of the client customized inverter on connection of photovoltaic installations to the low voltage network in Philippines.

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.

The model TL1500-20 and TL2000-20 is same as TL3000-20 on hardware except that the output power and the size of the heat sink.

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

POWER QUALITY

| Harmonic current emissions as per IEC 61727 | | | |
|---------------------------------------------|--------------------|-----------|-------|
| Harmonic | Test Value in Amps | % of fund | Limit |
| 2 | 0.033 | 0.238 | 1.0% |
| 3 | 0.107 | 0.773 | 4.0% |
| 4 | 0.016 | 0.114 | 1.0% |
| 5 | 0.056 | 0.405 | 4.0% |
| 6 | 0.011 | 0.079 | 1.0% |
| 7 | 0.045 | 0.328 | 4.0% |
| 8 | 0.007 | 0.049 | 1.0% |
| 9 | 0.042 | 0.302 | 4.0% |
| 10 | 0.012 | 0.086 | 0.5% |
| 11 | 0.053 | 0.385 | 2.0% |
| 12 | 0.011 | 0.079 | 0.5% |
| 13 | 0.050 | 0.362 | 2.0% |
| 14 | 0.007 | 0.053 | 0.5% |
| 15 | 0.020 | 0.144 | 2.0% |
| 16 | 0.003 | 0.025 | 0.5% |
| 17 | 0.039 | 0.280 | 1.5% |
| 18 | 0.003 | 0.020 | 0.5% |
| 19 | 0.015 | 0.111 | 1.5% |
| 20 | 0.003 | 0.025 | 0.5% |
| 21 | 0.041 | 0.299 | 1.5% |
| 22 | 0.008 | 0.056 | 0.5% |
| 23 | 0.030 | 0.214 | 0.6% |
| 24 | 0.009 | 0.063 | 0.5% |
| 25 | 0.027 | 0.199 | 0.6% |
| 26 | 0.004 | 0.028 | 0.5% |
| 27 | 0.026 | 0.190 | 0.6% |
| 28 | 0.004 | 0.027 | 0.5% |
| 29 | 0.025 | 0.182 | 0.6% |
| 30 | 0.001 | 0.011 | 0.5% |
| 31 | 0.024 | 0.176 | 0.6% |
| 32 | 0.002 | 0.013 | 0.5% |
| 33 | 0.022 | 0.161 | 0.6% |
| THD | N/A | 1.35 | 5.0% |

| Voltage Fluctuations and Flicker as per IEC 61000-3-3 | | | | | | | | |
|-------------------------------------------------------|----------|-------|---------------|---------------|-------|---------------|----------|-------------|
| | Starting | | | Stopping | | | Running | |
| | dmax | dc | d(t) | dmax | dc | d(t) | Pst | Plt 2 hours |
| Measured Values | 0.00% | 0.84% | 0.14% | 0.58% | 0.90% | 0.22% | 0.162 | 0.148 |
| Limits set under IEC 61000-3-3 | 4% | 3.3% | 3.3% 500ms | 4% | 3.3% | 3.3% 500ms | 1.0 | 0.65 |
| Test start date | 2013.2.1 | | | Test end date | | | 2013.2.1 | |

| | |
|---------------|-----------------------------------------------|
| 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 | 0.9964 | 0.9943 | 0.9936 |
| Measured value at 100%Pn | 0.9985 | 0.9988 | 0.9988 |
| Limit | >0.90 | >0.90 | >0.90 |

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

| DC Injection as per IEC61727 * | | | |
|--------------------------------|-------|-------|--------|
| Test power level | 10%Pn | 55%Pn | 100%Pn |
| Measured value in Amps | 0.011 | 0.012 | 0.008 |
| As % of rated AC current | 0.08% | 0.08% | 0.06% |
| 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 | 58.80 | 597 |
| U/F Stage 2 | 58.0 | 5.0 | 58.0 | 4.68 | 58.00 | 4.675 |
| U/F Stage 3 | 57.5 | 0.1 | 57.5 | 0.06 | 57.50 | 0.080 |
| O/F Stage 1 | 61.2 | 600 | 61.2 | 600 | 61.21 | 596 |
| O/F Stage 2 | 62.0 | 5.0 | 62.0 | 4.68 | 62.02 | 4.686 |
| O/F Stage 3 | 62.5 | 0.1 | 62.5 | 0.06 | 62.52 | 0.076 |

* 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 | 186.2 | 598 |
| U/V Stage 2 | 110.0 | 0.1 | 110.0 | 0.06 | 109.0 | 0.087 |
| O/V Stage 1 | 264 | 600 | 264 | 600 | 265.5 | 599 |
| O/V Stage 2 | 297.0 | 0.1 | 297.0 | 0.06 | 298.5 | 0.019 |

* The limit is defined by client.

LOSS OF MAINS TEST

| Method used | Active frequency drift method | | |
|--------------------|-------------------------------|------------|-------------|
| Output power level | 25% Prated | 50% Prated | 100% Prated |

| Limit time | 2s | 2s | 2s |
|-------------------|--------|--------|--------|
| Trip time (L:+5%) | 0.362s | 0.338s | 0.352s |
| Trip time (L:+4%) | 0.374s | 0.342s | 0.444s |
| Trip time (L:+3%) | 0.380s | 0.332s | 0.408s |
| Trip time (L:+2%) | 0.364s | 0.342s | 0.384s |
| Trip time (L:+1%) | 0.376s | 0.334s | 0.370s |
| Trip time (L:+0%) | 0.392s | 0.352s | 0.427s |
| Trip time (L:-1%) | 0.378s | 0.344s | 0.402s |
| Trip time (L:-2%) | 0.378s | 0.360s | 0.376s |
| Trip time (L:-3%) | 0.356s | 0.334s | 0.351s |
| Trip time (L:-4%) | 0.376s | 0.334s | 0.352s |
| Trip time (L:-5%) | 0.376s | 0.338s | 0.368s |

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 | 125s | 126s |

* The minimum value of the 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 | 1.0 | 200 | 0.94 | 170.5 |
| Negative DC current | 1.0 | 200 | 0.96 | 163.5 |

RESIDUAL CURRENT MONITORING

Test for correct triggering in event of steadily rising residual current as per IEC 62109-2

| PV connection | Limit | | Trip test | |
|---------------|--------------------|-----------|-------------------|-----------|
| | Fault current [mA] | Time [ms] | Test Current [mA] | Time [ms] |
| PV+ | 300 | 300 | 112 | 126 |
| PV- | 300 | 300 | 109 | 110 |

Test for correct triggering in event of steadily rising residual current as per IEC 62109-2

| | Limit | Trip test |
|--|-------|-----------|
|--|-------|-----------|

| PV connection | Fault current [mA] | Time [ms] | Test Current [mA] | Time [ms] |
|---------------|--------------------|-----------|-------------------|-----------|
| PV+ | 30 | 300 | 30.0 | 144.0 |
| PV+ | 60 | 150 | 59.5 | 98.5 |
| PV+ | 150 | 40 | 147.9 | 18.2 |
| PV- | 30 | 300 | 28.9 | 150.0 |
| PV- | 60 | 150 | 59.5 | 95.5 |
| PV- | 150 | 40 | 148.2 | 18.0 |

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 |