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| --- | --- | --- | --- | --- |
| **Form A2-3: Compliance Verification Report for Type A Inverter Connected Power Generating**  **Modules**  This form should be used by the **Manufacturer** to demonstrate and declare compliance with the requirements  of EREC G99. The form can be used in a variety of ways as detailed below:  1. To obtain **Fully Type Tested** status (≤ 50 kW)  The **Manufacturer** can use this form to obtain **Fully Type Tested** status for a **Power Generating Module**  by registering this completed form with the Energy Networks Association (ENA) Type Test Verification  Report Register. Tests 1 – 15 must all be completed and compliant for the **Power Generating Module** to  be classified as **Fully Type Tested**.  2. To obtain **Type Tested** status for a product  This form can be used by the **Manufacturer** to obtain **Type Tested** status for a product which is used in a  **Power Generating Module** by registering this form with the relevant parts completed with the Energy  Networks Association (ENA) Type Test Verification Report Register.  Where the **Manufacturer** is seeking to obtain **Type Tested** status for an **Interface Protection** device the  appropriate section of Form A2-4 should be used.  3. One-off Installation  This form can be used by the **Manufacturer** or **Installer** to confirm that the **Power Generating Module**  has been tested to satisfy all or part of the requirements of this EREC G99. This form shall be submitted  to the **DNO** as part of the application.  A combination of (2) and (3) can be used as required, together with Form A2-4 where compliance of the  **Interface Protection** is to be demonstrated on site.  Note:  Within this Form A2-3 the term **Power Park Module** will be used but its meaning can be interpreted within  Form A2-3 to mean **Power Park Module**, **Generating Unit or Inverter** as appropriate for the context.  However, note that compliance shall be demonstrated at the **Power Park Module** level.  If the **Power Generating Module** is **Fully Type Tested** and registered with the Energy Networks Association  (ENA) Type Test Verification Report Register, the Installation Document (Form A3-1 or A3-2) should include  the **Manufacturer’s** reference number (the system reference), and this form does not need to be submitted.  Where the **Power Generating Module** is not registered with the ENA Type Test Verification Report Register  or is not **Fully Type Tested** this form (all or in parts as applicable) needs to be completed and provided to the  **DNO**, to confirm that the **Power Generating Module** has been tested to satisfy all or part of the requirements  of this EREC G99. | | | | |
| **PGM** technology | | **GEN-LB-EU 4K** | | |
| **Manufacturer** name | | **Shenzhen Lux Power TechnologyCo.,Ltd** | | |
| Address | | 5th Floor,Building 11, Phase III, Yangbei Industrial Zone, Huangtian Community, Hangcheng Street, Baoan District, Shenzhen City，China | | |
| Tel | +86 755 8520 9056 | E-mail | | service@luxpowertek.com |
| Web site | www.luxpowertek.com | | | |
| **Registered Capacity** | | | 4 kW | |

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| --- | --- | --- | --- | --- |
| There are four options for Testing: (1) **Fully Type Tested** (≤ 50 kW), (2) **Type Tested product**, (3) one-off installation, (4) tested on site at time of commissioning. The  check box below indicates which tests in this Form have been completed for each of the options. With the exception of **Fully Type Tested** PGMs tests may be carried out  at the time of commissioning (Form A4). Type Testedstatus is suitable for devices > 50 kW where the power quality aspects need consideration on a site by site basis in  accordance with EREC G5 and EREC P28.  Insert reference for **Manufacturers’ Information** including the ENA Type Test Verification Report Register system reference number where applicable: | | | | |
| **Tested option:** | **1. Fully Type Tested** | **2. Partially Type Tested** | **3. One**-**off Manufacturers’. Info.** | **4. Tested on Site at time of Commissioning** |
| 0. **Fully Type Tested** - all tests detailed below completed and evidence attached to this submission | **yes** | **N/A** | **N/A** | **N/A** |
| 1. Operating Range | **N/A** |  |  |  |
| 2. PQ – Harmonics |  |  |  |
| 3. PQ – Voltage Fluctuation and Flicker |  |  |  |
| 4. PQ – DC Injection (**Power Park Module**s only) |  |  |  |
| 5. **Power Factor** (PF) |  |  |  |
| 6. Frequency protection trip and ride through tests |  |  |  |
| 7. Voltage protection trip and ride through tests |  |  |  |
| 8. Protection – Loss of Mains Test, Vector Shift and RoCoF Stability Test |  |  |  |
| 9. **LFSM-O** Test |  |  |  |
| 10. Protection – Reconnection Timer |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| There are four options for Testing: (1) **Fully Type Tested**, (2) Partially **Type Tested**, (3) one-off installation, (4) tested on site at time of commissioning. The check box below indicates which tests in this Form have been completed for each of the options. With the exception of **Fully Type Tested PGM**s tests may be carried out at the time of commissioning (Form A4).  Insert Document reference(s) for **Manufacturers’ Information** | | | | | | | |
| **Tested option:** | | | **1. Fully Type Tested** | | **2. Partially Type Tested** | **3. One**-**off Manufacturers’. Info.** | **4. Tested on Site at time of Commissioning** |
| 11. Fault Level contribution | | |  | |  |  |  |
| 12. Self-monitoring Solid State Switch | | |  |  |  |
| 13. Wiring functional tests if required by para 15.2.1 (attach relevant schedule of tests) | | |  |  |  |
| 14. Logic Interface (input port) | | |  |  |  |
| 15. Cyber security | | |  |  |  |
|  | | | | | | | |
| **Manufacturer** compliance declaration. - I certify that all products supplied by the company with the above **Type Tested Manufacturer**’s reference number will be manufactured and tested to ensure that they perform as stated in this document, prior to shipment to site and that no site **Modification**s are required to ensure that the product meets all the requirements of EREC G99. | | | | | | | |
| Signed | 签名-王进.png | On behalf of | | **Shenzhen Lux Power TechnologyCo.,Ltd** | | | |
| Note that testing can be done by the **Manufacturer** of an individual component or by an external test house.  Where parts of the testing are carried out by persons or organisations other than the **Manufacturer** then that person or organisation shall keep copies of all test records and results supplied to them to verify that the testing has been carried out by people with sufficient technical competency to carry out the tests. | | | | | | | |

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| **A2-3 Compliance Verification Report –Tests for Type A Inverter Connected**  **Power Generating Modules – test record** | |
| **1. Operating Range:** Tests should be carried with the **Power Generating Module** operating at **Registered**  **Capacity** and connected to a suitable test supply or grid simulation set. The power supplied by the primary  source shall be kept stable within ± 5 % of the apparent power value set for the entire duration of each test  sequence.  Frequency, voltage and **Active Power** measurements at the output terminals of the **Power Generating Module**  shall be recorded every second. The tests will verify that the **Power Generating Module** can operate within  the required ranges for the specified period of time.  The **Interface Protection** shall be disabled during the tests.  In case of a PV **Power Park Module** the PV primary source may be replaced by a DC source.  In case of a full converter **Power Park Module** (eg wind) the primary source and the prime mover  I**nverter**/rectifier may be replaced by a DC source.  Pass or failure of the test should be indicated in the fields below (right hand side), for example with the statement  “Pass”, “No disconnection occurs”, etc. Graphical evidence is preferred.  Note that the value of voltage stated in brackets assumes a **LV** connection. This should be adjusted for **HV** as  required. | |
| Test 1  Voltage = 85% of nominal (195.5 V), Frequency = 47 Hz,  **Power Factor** = 1, Period of test 20 s | Pass |
| Test 2  Voltage = 85% of nominal (195.5 V), Frequency = 47.5 Hz,  **Power Factor** = 1, Period of test 90 minutes | Pass |
| Test 3  Voltage = 110% of nominal (253 V)., Frequency = 51.5 Hz,  **Power Factor** = 1, Period of test 90 minutes | Pass |
| Test 4  Voltage = 110% of nominal (253 V), Frequency = 52.0 Hz,  **Power Factor** = 1, Period of test 15 minutes | Pass |
| Test 5  Voltage = 100% of nominal (230 V), Frequency = 50.0 Hz,  **Power Factor** = 1, Period of test 90 minutes | Pass |
| Test 6 RoCoF withstand  Confirm that the **Power Generating Module** is capable of staying connected to the **Distribution Network** and operate at rates of change of frequency up to 1 Hzs-1 as measured over a period of 500 ms. Note that this is not expected to be demonstrated on site. | Pass |

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| **2. Power Quality – Harmonics**:  For **Power Generating Module**s of **Registered Capacity** of less than 75 A per phase (ie 50 kW) the test requirements are specified in Annex A.7.1.5**.** These tests should be carried out as specified in BS EN 61000- 3-12 The results need to comply with the limits of Table 2 of BS EN 61000-3-12 for single phase equipment and Table 3 of BS EN 610000-3-12 for three phase equipment.  For **Power Generating Module**s of **Registered Capacity** of greater than 75 A per phase (ie 50 kW) the installation shall be designed in accordance with EREC G5. | | | | | | |
| **Power Generating Module** tested to BS EN 61000-3-12 | | | | | | |
| **Power Generating Module** rating per phase (rpp) | | | 4 | kVA | Harmonic % = Measured Value (A) x 23/rating per phase (kVA) | |
| Harmonic | At 45-55% of  **Registered Capacity** | | 100% of **Registered Capacity** | | Limit in BS EN 61000-3-12 | |
|  | Measured Value MV in Amps | % | Measured Value MV in Amps | % | 1 phase | 3 phase |
| 2 | 0.195 | 1.12 | 0.0452 | 0.26 | 8% | 8% |
| 3 | 0.0512 | 0.29 | 0.1255 | 0.72 | 21.6% | Not stated |
| 4 | 0.028 | 0.16 | 0.0534 | 0.31 | 4% | 4% |
| 5 | 0.0178 | 0.10 | 0.0316 | 0.18 | 10.7% | 10.7% |
| 6 | 0.0513 | 0.29 | 0.0803 | 0.46 | 2.67% | 2.67% |
| 7 | 0.0475 | 0.27 | 0.0218 | 0.13 | 7.2% | 7.2% |
| 8 | 0.0401 | 0.23 | 0.0424 | 0.24 | 2% | 2% |
| 9 | 0.0432 | 0.25 | 0.031 | 0.18 | 3.8% | Not stated |
| 10 | 0.0428 | 0.25 | 0.0431 | 0.25 | 1.6% | 1.6% |
| 11 | 0.0409 | 0.24 | 0.0464 | 0.27 | 3.1% | 3.1% |
| 12 | 0.0427 | 0.25 | 0.0523 | 0.30 | 1.33% | 1.33% |
| 13 | 0.063 | 0.36 | 0.0552 | 0.32 | 2% | 2% |
| THD17 | -- | 3.8 | -- | 3.6 | 23% | 13% |
| PWHD18 | -- | 1.304 | -- | 1.059 | 23% | 22% |

—————————

1. THD = Total Harmonic Distortion
2. PWHD = Partial Weighted Harmonic Distortion

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **3. Power Quality – Voltage fluctuations and Flicker**:  For **Power Generating Module**s of **Registered Capacity** of less than 75 A per phase (ie 50 kW) these tests  should be undertaken in accordance with Annex A.7.1.4.3. Results should be normalised to a standard source  impedance, or if this results in figures above the limits set in BS EN 61000-3-11 to a suitable Maximum Impedance.  For **Power Generating Module**s of **Registered Capacity** of greater than 75 A per phase (ie 50 kW) the installation shall be designed in accordance with EREC P28.  The standard test impedance is 0.4 Ω for a single phase **Power Generating Module** (and for a two phase unit  in a three phase system) and 0.24 Ω for a three phase **Power Generating Module** (and for a two phase unit  in a split phase system). Please ensure that both test and standard impedance are completed on this form. If  the test impedance (or the measured impedance) is different to the standard impedance, it must be normalised  to the standard impedance as follows (where the **Power Factor** of the generation output is 0.98 or above):  d max normalised value = (Standard impedance / Measured impedance) x Measured value.  Where the **Power Factor** of the output is under 0.98 then the X to R ratio of the test impedance should be close  to that of the standard impedance.  The stopping test should be a trip from full load operation.  The duration of these tests needs to comply with the particular requirements set out in the testing notes for the  technology under test.  The test date and location must be declared. | | | | | | | | | | | |
| Test start date | 3 rd of April 2023 | | | | Test end date | | | | 4th of April 2023 | | |
| Test location | Luxpower Testing laboratory &Intertek Testing Services Shenzhen Ltd. Guangzhou Branch | | | | | | | | | | |
|  | Starting | | | | Stopping | | | | Running | | |
|  | d max | d c | d(t) | | d max | d c | | d(t) | P st | P lt 2 hours | |
| Measured Values at test impedance | 0.22% | 0.15% | 0 | | 0.22% | 0.9% | | 0 | 0.13 | 0.25 | |
| Normalised to standard impedance | 0.22% | 0.15% | 0 | | 0.22% | 0.9% | | 0 | 0.13 | 0.25 | |
| Normalised to required maximum impedance | NA | NA | NA | | NA | NA | | NA | NA | NA | |
| Limits set under BS EN 61000-3-  11 | 4% | 3.3% | 3.3% | | 4% | 3.3% | | 3.3% | 1.0 | 0.65 | |
|  | | | | | | | | | | | |
| Test Impedance | R | 0.4 | | Ω | | Xl | 0.25 | | | | Ω |
| Standard Impedance | R | 0.4 ^ | | Ω | | Xl | 0.25 ^ | | | | Ω |
| Maximum Impedance | R | NA | | Ω | | Xl | NA | | | | Ω |
| \* Applies to three phase and split single phase **Power Generating Modules**. Delete as appropriate.  ^ Applies to single phase **Power Generating Module and Power Generating Module**s using two phases on  a three phase system. Delete as appropriate. | | | | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **4. Power quality – DC injection:** The tests should be carried out on a single **Generating Unit**. Tests are to be carried out at three defined power levels ±5%. At 230 V a 50 kW three phase **Inverter** has a current output of 217 A so DC limit is 543 mA. These tests should be undertaken in accordance with Annex A.7.1.4.4. | | | | | | | | |
| Test power level | | | 10% | | | 55% | | 100% |
| Recorded value in Amps | | | 0.0020A | | | 0.0115A | | 0.020A |
| as % of rated AC current | | | 0.115% | | | 0.066% | | 0.115% |
| Limit | | | 0.25% | | | 0.25% | | 0.25% |
| **5. Power Factor**: The tests should be carried out on a single **Power Generating Module**. Tests are to be carried out at three voltage levels and at **Registered Capacity**. Voltage to be maintained within ±1.5% of the stated level during the test. These tests should be undertaken in accordance with Annex A.7.1.4.2. | | | | | | | | |
| Voltage | | | 0.94 pu (216.2 V) | | | 1 pu (230 V) | | 1.1 pu (253 V) |
| Measured value | | | 0.9992 | | | 0.9995 | | 0.9992 |
| **Power Factor** Limit | | | >0.95 | | | >0.95 | | >0.95 |
| **6. Protection – Frequency tests:** These tests should be carried out in accordance with the Annex A.7.1.2.3. | | | | | | | | |
| Function | Setting | | | Trip test | | | “No trip tests” | |
|  | Frequency | Time delay | | Frequency | Time  delay | | Frequency /time | Confirm no trip |
| U/F stage 1 | 47.5 Hz | 20 s | | 47.49 Hz | 20.08 s | | 47.7 Hz 30 s | No trip |
| U/F stage 2 | 47 Hz | 0.5 s | | 46.99 Hz | 0.509 s | | 47.2 Hz  19.5 s | No trip |
|  |  |  | |  |  | | 46.8 Hz  0.45 s | No trip |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| O/F | 52 Hz | | | | 0.5 s | 52.01Hz | | 0.549 s | | 51.8 Hz  120.0 s | | No trip | |
|  |  | | | |  |  | |  | | 52.2 Hz  0.45 s | | No trip | |
| Note. For frequency trip tests the frequency required to trip is the setting ± 0.1 Hz. In order to measure the time delay a larger deviation than the minimum required to operate the projection can be used. The “No trip tests” need to be carried out at the setting ± 0.2 Hz and for the relevant times as shown in the table above to ensure that the protection will not trip in error. | | | | | | | | | | | | | |
| **7. Protection – Voltage tests:** These tests should be carried out in accordance with Annex A.7.1.2.2. | | | | | | | | | | | | | |
| Function | | Setting | | | | Trip test | | | | “No trip tests” | | | |
|  | | Voltage | | | Time delay | Voltage | | | Time delay | Voltage /time | | Confirm no trip | |
| U/V | | 0.8 pu (184 V) | | | 2.5 s | 183.4 V | | | 2.59 s | 188 V  5.0 s | | No trip | |
|  | |  | | |  |  | | |  | 180 V  2.45 s | | No trip | |
| O/V stage 1 | | 1.14 pu (262.2 V) | | | 1.0 s | 262.7V | | | 1.05 s | 258.2 V  5.0 s | | No trip | |
| O/V stage 2 | | 1.19 pu (273.7 V) | | | 0.5 s | 274.1V | | | 0.53 s | 269.7 V  0.95 s | | No trip | |
|  | |  | | |  |  | | |  | 277.7 V  0.45 s | | No trip | |
| Note for Voltage tests the Voltage required to trip is the setting ±3.45 V. The time delay can be measured at a larger deviation than the minimum required to operate the protection. The No trip tests need to be carried out at the setting ±4 V and for the relevant times as shown in the table above to ensure that the protection will not trip in error. | | | | | | | | | | | | | |
| **8.Protection – Loss of Mains test:** These tests should be carried out in accordance with BS EN 62116. Annex A.7.1.2.4. | | | | | | | | | | | | | |
| The following sub set of tests should be recorded in the following table. | | | | | | | | | | | | | |
| Test Power and imbalance | | | 33%  -5% Q  Test 22 | 66%  -5% Q  Test 12 | | 100%  -5% P  Test 5 | 33%  +5% Q  Test 31 | | | | 66%  +5% Q  Test 21 | | 100%  +5% P  Test 10 |
| Trip time. Limit is 0.5s | | | 0.217s | 0.245s | | 0.262s | 0.246s | | | | 0.311s | | 0.24s |
| **Loss of Mains Protection, Vector Shift Stability test.** This test should be carried out in accordance with Annex A.7.1.2.6. | | | | | | | | | | | | | |
|  | | | Start Frequency | | Change | | Confirm no trip | | | | | | |

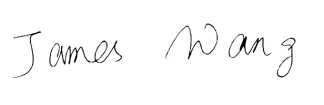
|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Positive Vector Shift | 49.5 H z | +50 degrees | | No trip | | | |
| Negative Vector Shift | 50.5 H z | - 50 degrees | | No trip | | | |
| **Loss of Mains Protection, RoCoF Stability test:** This test should be carried out in accordance with Annex A.7.1.2.6. | | | | | | | |
| Ramp range | Test frequency ramp: | | | Test Duration | | | Confirm no trip |
| 49.0 Hz to  51.0 Hz | +0.95 Hzs-1 | | | 2.1 s | | | No trip |
| 51.0 Hz to  49.0 Hz | -0.95 Hzs-1 | | | 2.1 s | | | No trip |
| **9. Limited Frequency Sensitive Mode – Over frequency test:** The test should be carried out using the specific threshold frequency of 50.4 Hz and **Droop** of 10%.  This test should be carried out in accordance with Annex A.7.1.3 which also contains the measurement  tolerances | | | | | | | |
| **Active Power** response to rising frequency/time plots are attached if frequency injection tests are undertaken in accordance with Annex A.7.2.4. | | | | | | **Yes** | |
| Alternatively, test results should be noted below: | | | | | | | |
| Test sequence at **Registered Capacity** >80% | Measured **Active Power** Output | | Frequency | | Primary Power Source | | **Active Power**  Gradient |
| Step a) 50.00Hz  ±0.01Hz | 3911 W | | 50.00Hz | | 3998 W | | - |
| Step b) 50.45Hz  ±0.05Hz | 3958 W | | 50.45Hz | | - |
| Step c) 50.70Hz  ±0.10Hz | 3908 W | | 50.70Hz | | - |
| Step d) 51.15Hz  ±0.05Hz | 3858 W | | 51.15Hz | | - |
| Step e) 50.70Hz  ±0.10Hz | 3782 W | | 50.70Hz | | - |
| Step f) 50.45Hz  ±0.05Hz | 3979 W | | 50.45Hz | | - |
| Step g) 50.00Hz  ±0.01Hz | 3910 W | | 50.00Hz | |  |
| Test sequence at **Registered Capacity** 40% -  60% | Measured **Active Power** Output | | Frequency | | Primary Power Source | | **Active Power**  Gradient |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Step a) 50.00Hz  ±0.01Hz | | 2108 W | | 50.00Hz | | | 2038 W | | - |
| Step b) 50.45Hz  ±0.05Hz | | 2047 W | | 50.45Hz | | | - |
| Step c) 50.70Hz  ±0.10Hz | | 2002 W | | 50.70Hz | | | - |
| Step d) 51.15Hz  ±0.05Hz | | 1845 W | | 51.15Hz | | | - |
| Step e) 50.70Hz  ±0.10Hz | | 1998 W | | 50.70Hz | | | - |
| Step f) 50.45Hz  ±0.05Hz | | 1645 W | | 50.45Hz | | |  |
| Step g) 50.00Hz  ±0.01Hz | | 2032 W | | 50.00Hz | | |  |
| **10. Protection – Re-connection timer**. | | | | | | | | | |
| Test should prove that the reconnection sequence starts after a minimum delay of 20 s for restoration of voltage and frequency to within the stage 1 settings of Table 10.1. Both the time delay setting and the measured delay should be provided in this form; both should be greater than 20 s to pass. Confirmation should be provided that the Power Generating Module does not reconnect at the voltage and frequency settings below; a statement of “no reconnection” can be made. | | | | | | | | | |
| Time delay setting | Measured delay | | Checks on no reconnection when voltage or frequency is brought to just outside stage 1 limits of Table 10.1. | | | | | | |
| 25s | 30s | | At 1.16 pu (266.2 V LV connection, 127.6 V HV connection assuming 110 V ph-ph VT) | | | At 0.78 pu (180.0 V LV connection, 85.8 V HV connection assuming 110 V ph-ph VT) | | At 47.4 Hz | At 52.1 Hz |
| Confirmation that the **Power Generating Module** does not re- connect. | | | No reconnection | | | No reconnection | | No reconnection | No reconnection |
| **11. Fault level contribution**: These tests shall be carried out in accordance with EREC G99 Annex A.7.1.5. | | | | | | | | | |
| For **Inverter** output | | | | | | | | | |
| Time after fault | | | Volts | | Amps | | | | |
| 20ms | | | 102 | | 22.2 | | | | |
| 100ms | | | 89.8 | | 11 | | | | |
| 250ms | | | 59.3 | | 0.8 | | | | |
| 500ms | | | 0 | | 0 | | | | |
| Time to trip | | | 0.219 | | In seconds | | | | |

|  |  |
| --- | --- |
| **12. Self-Monitoring solid state switching:** No specified test requirements. Refer to Annex A.7.1.7. | |
| It has been verified that in the event of the solid state switching device failing to disconnect the **Power Park Module**, the voltage on the output side of the switching device is reduced to a value below 50 volts within 0.5 s. | NA |
| **13. Wiring functional tests:** If required by para 15.2.1. | |
| Confirm that the relevant test schedule is attached (tests to be undertaken at time of commissioning) | NA |
| **14. Logic interface (input port).** | |
| Confirm that an input port is provided and can be used to shut down the module. | Yes |
| Provide high level description of logic interface, e.g. details in 11.1.3.1 such as AC or DC signal (the additional comments box below can be used) | Yes |
| **15. Cyber security** | |
| Confirm that the **Power Generating Module** has been designed to comply with cyber security  requirements, as detailed in 9.1.8. | Yes |
| Please see the attached Cyber security statement document . |  |
| Additional comments. | |
| This equipment is equipped with RJ45 terminal and WifFi dongle connection for logic interface that being received the signal from the DNO, the connection should be installed per installation manual, and the signal should be a simple binary output that captured by RJ45 terminal( PIN 1 and 2 for detecting the signal). Once the signal actived, the inverter will reduce its active power to zero within 5s, or shut down the module with 1s.  企业微信截图_17044192271140 | |

**Manufacturer's Statement in accordance with the**

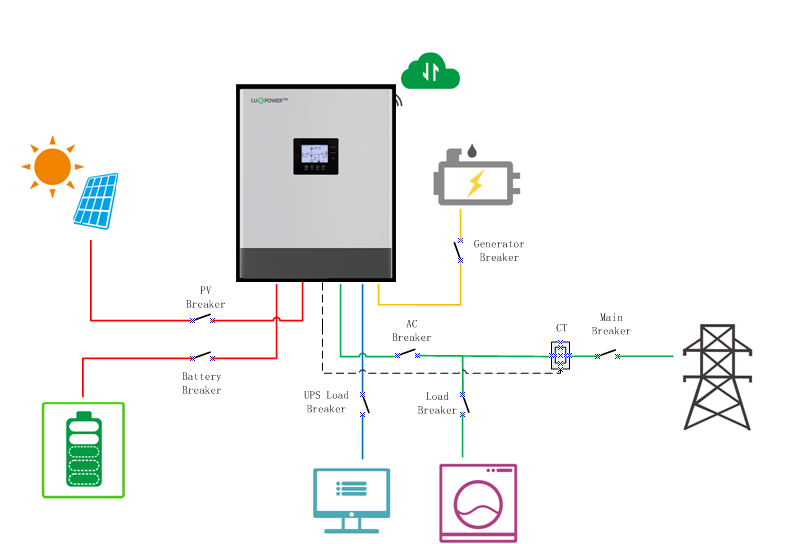
**requirements of G98-Amd. 7 standard Sec.s 9.7 , and G99-Amd. 9 standard Sec.s 9.1.8 regarding "Cyber Security"**

Signature : 

Position : CEO

Shenzhen Lux Power Technology Co.,Ltd hereby declares the following:

1)The Shenzhen Lux Power Technology Co.,Ltd company’s inverters include a system of internal and external logic communications as summarized in the following scheme:



where the main components involved and their main functions are explained in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Meaning | Function | Location |
| PMS | Power  Management  System | monitoring and management of  power fluxes through the inverter,execution of local logic functions depending on grid parameters values | Inverter |
| Monitoring | WIFI/GPRS | Monitoring device to realize remote monitoring function | Monitoring device |
| Router | Router device | transmission of data to cloud server,reception of commands/settings from external stakeholder | Third-party device |
| Meter | External Power  Meter | meter at the AC input site, and Possible meter at AC port of third party inverter, for power measures | Third-party device |

and the subjects/parties involved in communications with the Luxpowertek inverters are listed in the following table, together with the purposes of the respective communications:

|  |  |  |
| --- | --- | --- |
| Subject | Meaning | Operations |
| End-user | mobile device(App),  PC ( web portal) | monitoring of historical data, settings for special functions |
| Service | PC (via web portal) | remote diagnosis, system behaviour monitoring, remote updates, remote settings |

2) All communications between internal components of the inverter, and supplied External Power Meter(s), take place via appropriate serial lines (RS485, CANBUS) .

3) The only communication port between the inverter and the outside is constituted by the monitoring device on the system; the communication between inverter and the outside world can take place via an Ethernet line, WiFi or GPRS router according to the customer's request.

4) All communications between the Web server and the subjects/parties are Cyber-security by SSL technology.

5) The cyber-security assessment of the Luxpowertek was performed according to the ETSI EN 303 645 standard, and it is reported according to the Table B.1 form of the same standard:

|  |  |  |  |
| --- | --- | --- | --- |
| **EN 303 645 v2.1.1 (2020-06) Table B.1: Implementation of provisions for consumer IoT security** | | | |
| **Clause number and title** | | | |
| Reference | Status | Support | Detail |
| **5.1 No universal default passwords** | | | |
| Provision 5.1-1 | M C (1) | N/A | There is no default passwords for end users |
| Provision 5.1-2 | M C (1) | N/A |
| Provision 5.1-3 | M | N/A |
| Provision 5.1-4 | M C (8) | N/A |
| Provision 5.1-5 | M C (5) | N/A |
| **5.2 Implement a means to manage reports of vulnerabilities** | | | |
| Provision 5.2-1 | M | Y |  |
| Provision 5.2-2 | R | Y |  |
| Provision 5.2-3 | R | Y |  |
| **5.3 Keep software updated** | | | |
| Provision 5.3-1 | R | Y |  |
| Provision 5.3-2 | MC (5) | Y |  |
| Provision 5.3-3 | MC (12) | N/A |  |
| Provision 5.3-4 | RC (12) | Y | The manufacturer manages the updates of the systems by means of remote automatic, selectively by type of machine or by activating special functions at the request of the user |
| Provision 5.3-5 | RC (12) | N | Check note at 5.3-4 |
| Provision 5.3-6 | RC (9,12) | N | Check note at 5.3-4 |
| Provision 5.3-7 | M C (12) | Y |  |
| Provision 5.3-8 | M C (12) | N | Check note at 5.3-4 |
| Provision 5.3-9 | R C (12) | N |  |
| Provision 5.3-10 | M (11,12) | Y |  |
| Provision 5.3-11 | RC (12) | N |  |
| Provision 5.3-12 | RC (12) | N |  |
| Provision 5.3-13 | M | Y |  |
| Provision 5.3-14 | R C (3,4) | N/A |  |
| Provision 5.3-15 | R C (3,4) | N/A |  |
| Provision 5.3-16 | M | Y |  |
| **5.4 Securely store sensitive security parameters** | | | |
| Provision 5.4-1 | M | Y |  |
| Provision 5.4-2 | M(10) | Y |  |
| Provision 5.4-3 | M | N/A | hard-coded identity not used in source |
| Provision 5.4-4 | M | Y |  |
| **5.5 Communicate securely** | | | |
| Provision 5.5-1 | M | Y |  |
| Provision 5.5-2 | R | Y |  |
| Provision 5.5-3 | R | Y |  |
| Provision 5.5-4 | R | N |  |
| Provision 5.5-5 | M | Y |  |
| Provision 5.5-6 | R | Y |  |
| Provision 5.5-7 | M | Y |  |
| Provision 5.5-8 | M | Y |  |
| **5.6 Minimize exposed attack surfaces** | | | |
| Provision 5.6-1 | M | Y |  |
| Provision 5.6-2 | M | Y |  |
| Provision 5.6-3 | R | Y |  |
| Provision 5.6-4 | MC(13) | N/A |  |
| Provision 5.6-5 | R | Y |  |
| Provision 5.6-6 | R | Y |  |
| Provision 5.6-7 | R | Y |  |
| Provision 5.6-8 | R | N |  |
| Provision 5.6-9 | R | Y |  |
| **5.7 Ensure software integrity** | | | |
| Provision 5.7-1 | R | N |  |
| Provision 5.7-2 | R | N |  |
| **5.8 Ensure that personal data is secure** | | | |
| Provision 5.8-1 | R | N/A |  |
| Provision 5.8-2 | M | Y | applicable to server/cloud services and to the customer App for mobile devices |
| Provision 5.8-3 | M | Y |  |
| **5.9 Make systems resilient to outages** | | | |
| Provision 5.9-1 | R | Y |  |
| Provision 5.9-2 | R | Y |  |
| Provision 5.9-3 | R | Y |  |
| **5.10 Examine system telemetry data** | | | |
| Provision 5.10-1 | RC (6) | N |  |
| **5.11 Make it easy for users to delete user data** | | | |
| Provision 5.11-1 | M | N/A |  |
| Provision 5.11-2 | R | N/A |  |
| Provision 5.11-3 | R | N/A |  |
| Provision 5.11-4 | R | N/A |  |
| **5.12 Make installation and maintenance of devices easy** | | | |
| Provision 5.12-1 | R | N/A | no installation /maintenance operations are available to the end user |
| Provision 5.12-2 | R | N/A | no installation /maintenance operations are available to the end user |
| Provision 5.12-3 | R | N/A | check note at 5.3-4 |
| **5.13 Validate input data** | | | |
| Provision 5.13-1 | M | Y |  |
| **6 Data protection provisions for consumer IoT** | | | |
| Provision 6.1 | M | Y | it only applies to the server/cloud side of the service |
| Provision 6.2 | MC (7) | Y | it only applies to the server/cloud side of the service |
| Provision 6.3 | M | Y | it only applies to the server/cloud side of the service |
| Provision 6.4 | RC (6) | Y |  |
| Provision 6.5 | MC(6) | Y |  |
| Conditions: | | | |
| 1. passwords are used; 2. pre-installed passwords are used; 3. software components are not updateable; 4. the device is constrained; 5. the device is not constrained; 6. telemetry data being collected; 7. personal data is processed on the basis of consumers' consent; 8. the device allowing user authentication; 9. the device supports automatic updates and/or update notifications; 10. a hard-coded unique per device identity is used for security purposes; 11. updates are delivered over a network interface; 12. an update mechanism is implemented; 13. a debug interface is physically accessible. | | | |
| Status' Column:  M: Mandatory provision  R: Recommended provision  M C: Mandatory and conditional provision  R C: Recommended and conditional provision | | | |
| Support' Column:  Y: Implemented  N: Not implemented  N/A: Not applicable | | | |