



**TEST REPORT  
IEC 60255-27  
Measuring relays and protection equipment –  
Part 27: Product safety requirements**

**Report Number.....:** 6041106.53

**Date of issue .....** 2019-03-22

**Total number of pages.....** 80 pages

**Name of Testing Laboratory preparing the Report.....:** DEKRA Testing and Certification (Shanghai) Ltd.

**Applicant's name .....** Shenzhen SOFAR SOLAR Co., Ltd.

**Address .....** 401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China.

**Test specification:**

**Standard.....:** IEC 60255-27:2013 (Second Edition)

**Test procedure.....:** Type test

**Non-standard test method.....:** N/A

**Test Report Form No. ....:** IEC60255\_27A

**Test Report Form(s) Originator .....** IMQ S.p.A.

**Master TRF .....** 2014-09

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|   |  |  |
|---|--|--|
| <b>Test item description</b> ..... :  | Grid-connected PV Inverter   |  |
| <b>Trade Mark</b> ..... :   |    |  |
| <b>Manufacturer</b> ..... :   | Shenzhen SOFAR SOLAR Co., Ltd.<br>401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China.   |  |
| <b>Model/Type reference</b> ..... :   | SOFAR 20000TL-G2, SOFAR 25000TL-G2,<br>SOFAR 30000TL-G2, SOFAR 33000TL-G2  |  |
| <b>Ratings</b> ..... :  | <p>SOFAR 20000TL-G2:<br/>PV input: Max.1100 Vdc, MPPT voltage range: 230-960 Vdc, max 24/24 A, Isc PV: 30/30 A<br/>Output: 400V, 3/N/PE, 50/60 Hz, nominal 20000 W, max 22000 VA, max 3x32 A</p> <p>SOFAR 25000TL-G2:<br/>PV input: Max.1100 Vdc, MPPT voltage range: 230-960 Vdc, max 28/28 A, Isc PV: 35 /35 A<br/>Output: 400V, 3/N/PE, 50/60 Hz, nominal 25000 W, max 27500 VA, max 3x40 A</p> <p>SOFAR 30000TL-G2:<br/>PV input: Max.1100 Vdc, MPPT voltage range: 230-960 Vdc, max 30/30 A, Isc PV: 37.5/37.5 A<br/>Output: 400V, 3/N/PE, 50/60 Hz, nominal 30000 W, max 33000 VA, max 3x48 A</p> <p>SOFAR 33000TL-G2:<br/>PV input: Max.1100 Vdc, MPPT voltage range: 230-960 Vdc, max 30/30 A, Isc PV: 37.5/37.5 A<br/>Output: 400V, 3/N/PE, 50/60 Hz, nominal 33000 W, max 36300 VA, max 3x53 A</p> |  |
| <b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b> |  |  |
| <input checked="" type="checkbox"/>   | <b>Testing Laboratory:</b>   | DEKRA Testing and Certification (Shanghai) Ltd.  |
|   | <b>Testing location/ address</b> ..... :   | 3F, #250 Jiangchangsan Road, Building 16, Headquarter Economy Park Shibe Hi-Tech Park, Zhabei District, Shanghai 200436, China |
| <input checked="" type="checkbox"/>   | <b>Associated Testing Laboratory:</b>  | Suzhou Longce Testing Technology Service Co., Ltd.   |
|   | <b>Testing location/ address</b> ..... :   | Building 5, No.369, Lushan Road, New District, Suzhou, China   |
|   | <b>Tested by (name, function, signature) :</b>   | Jason Guo                                 |
|   | <b>Approved by (name, function, signature) :</b>   | Allan Chen                                |
| <input type="checkbox"/>  | <b>Testing procedure: TMP/CTF Stage 1:</b>   |  |
|   | <b>Testing location/ address</b> ..... :   |  |
|   | <b>Tested by (name, function, signature) :</b>   |  |

|  |   |  |  |
|--|---|--|--|
| <b>Approved by (name, function, signature):</b>          |   |  |  |
|  |   |  |  |
| <input type="checkbox"/>                                 | <b>Testing procedure: WMT/CTF Stage 2:</b>      |  |  |
| <b>Testing location/ address..... :</b>                  |   |  |  |
| <b>Tested by (name + signature) ..... :</b>              |   |  |  |
| <b>Witnessed by (name, function, signature) ..... :</b>  |   |  |  |
| <b>Approved by (name, function, signature):</b>          |   |  |  |
|  |   |  |  |
| <input type="checkbox"/>                                 | <b>Testing procedure: SMT/CTF Stage 3 or 4:</b> |  |  |
| <b>Testing location/ address..... :</b>                  |   |  |  |
| <b>Tested by (name, function, signature) ..... :</b>     |   |  |  |
| <b>Witnessed by (name, function, signature) ..... :</b>  |   |  |  |
| <b>Approved by (name, function, signature):</b>          |   |  |  |
| <b>Supervised by (name, function, signature) ..... :</b> |   |  |  |
|  |   |  |  |

|   |   |
|---|---|
| <b>List of Attachments (including a total number of pages in each attachment):</b>  |   |
| Attachment 1: Vibration, Shock, Bump, Seismic test report (20 pages)<br>Attachment 2: Pictures (10 pages)   |   |
| <b>Summary of testing:</b>  |   |
| <b>Tests performed (name of test and test clause):</b><br>All applicable clauses test according standards IEC 60255-27:2013 were performed DEKRA Testing and Certification (Shanghai) Ltd. except below tests was performed in Suzhou Longce Testing Technology Service Co., Ltd.:<br>10.6.2.1 Vibration<br>10.6.2.2 Shock<br>10.6.2.3 Bump<br>10.6.2.4 Seismic | <b>Testing location:</b><br>DEKRA Testing and Certification (Shanghai) Ltd.<br>3F, #250 Jiangchangsan Road, Building 16,<br>Headquarter Economy Park Shibe Hi-Tech Park,<br>Zhabei District, Shanghai 200436, China<br><br>Suzhou Longce Testing Technology Service Co.,<br>Ltd.<br>Building 5, No.369, Lushan Road, New District,<br>Suzhou, China |
| <b>Summary of compliance with National Differences:</b>   |   |
| <b>List of countries addressed</b>  |   |
| N/A   |   |
| <input checked="" type="checkbox"/> <b>The product fulfils the requirements of IEC 60255-27:2013 (Second Edition)</b>   |   |

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

**SOFAR SOLAR** Solar Grid-tied Inverter

Model No. SOFAR 20000TL-G2

|                              |                         |
|------------------------------|-------------------------|
| Max.DC Input Voltage         | 1100V                   |
| Operating MPPT Voltage Range | 230V ~ 960V             |
| Max. Input Current           | 24A/24A                 |
| Max. PV Isc                  | 30A/30A                 |
| Nominal Grid Voltage         | 3/N/PE, 400Vac          |
| Max. Output Current          | 3x32A                   |
| Nominal Grid Frequency       | 50Hz/60Hz               |
| Nominal Output Power         | 20000W                  |
| Max. Output Power            | 22000VA                 |
| Power Factor                 | >0.99(adjustable+/-0.8) |
| Ingress Protection           | IP65                    |
| Operating Temperature Range  | -25~+60°C               |
| Protective Class             | Class I                 |

Manufacturer: Shenzhen SOFARSOLAR Co., Ltd.  
Address: 401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China

SAA XXXXXX  
VDE0126-1-1, VDE-AR-N4105, G59/3, IEC61727,  
IEC62116, C10/11, RD1699, UTE C15-712-1, AS4777

**SOFAR SOLAR** Solar Grid-tied Inverter

Model No. SOFAR 25000TL-G2

|                              |                         |
|------------------------------|-------------------------|
| Max.DC Input Voltage         | 1100V                   |
| Operating MPPT Voltage Range | 230V ~ 960V             |
| Max. Input Current           | 28A/28A                 |
| Max. PV Isc                  | 35A/35A                 |
| Nominal Grid Voltage         | 3/N/PE, 400Vac          |
| Max. Output Current          | 3x40A                   |
| Nominal Grid Frequency       | 50Hz/60Hz               |
| Nominal Output Power         | 25000W                  |
| Max. Output Power            | 27500VA                 |
| Power Factor                 | >0.99(adjustable+/-0.8) |
| Ingress Protection           | IP65                    |
| Operating Temperature Range  | -25~+60°C               |
| Protective Class             | Class I                 |

Manufacturer: Shenzhen SOFARSOLAR Co., Ltd.  
Address: 401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China

SAA XXXXXX  
VDE0126-1-1, VDE-AR-N4105, G59/3, IEC61727,  
IEC62116, C10/11, RD1699, UTE C15-712-1, AS4777

**SOFAR SOLAR** Solar Grid-tied Inverter

Model No. SOFAR 30000TL-G2

|                              |                         |
|------------------------------|-------------------------|
| Max.DC Input Voltage         | 1100V                   |
| Operating MPPT Voltage Range | 230V ~ 960V             |
| Max. Input Current           | 30A/30A                 |
| Max. PV Isc                  | 37.5A/37.5A             |
| Nominal Grid Voltage         | 3/N/PE, 400Vac          |
| Max. Output Current          | 3x48A                   |
| Nominal Grid Frequency       | 50Hz/60Hz               |
| Nominal Output Power         | 30000W                  |
| Max. Output Power            | 33000VA                 |
| Power Factor                 | >0.99(adjustable+/-0.8) |
| Ingress Protection           | IP65                    |
| Operating Temperature Range  | -25~+60°C               |
| Protective Class             | Class I                 |

Manufacturer: Shenzhen SOFARSOLAR Co., Ltd.  
Address: 401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China

SAA XXXXXX  
VDE0126-1-1, VDE-AR-N4105, G59/3, IEC61727,  
IEC62116, C10/11, RD1699, UTE C15-712-1, AS4777

**SOFAR SOLAR** Solar Grid-tied Inverter

Model No. SOFAR 33000TL-G2

|                              |                         |
|------------------------------|-------------------------|
| Max.DC Input Voltage         | 1100V                   |
| Operating MPPT Voltage Range | 230V ~ 960V             |
| Max. Input Current           | 30A/30A                 |
| Max. PV Isc                  | 37.5A/37.5A             |
| Nominal Grid Voltage         | 3/N/PE, 400Vac          |
| Max. Output Current          | 3x53A                   |
| Nominal Grid Frequency       | 50Hz/60Hz               |
| Nominal Output Power         | 33000W                  |
| Max. Output Power            | 36300VA                 |
| Power Factor                 | >0.99(adjustable+/-0.8) |
| Ingress Protection           | IP65                    |
| Operating Temperature Range  | -25~+60°C               |
| Protective Class             | Class I                 |

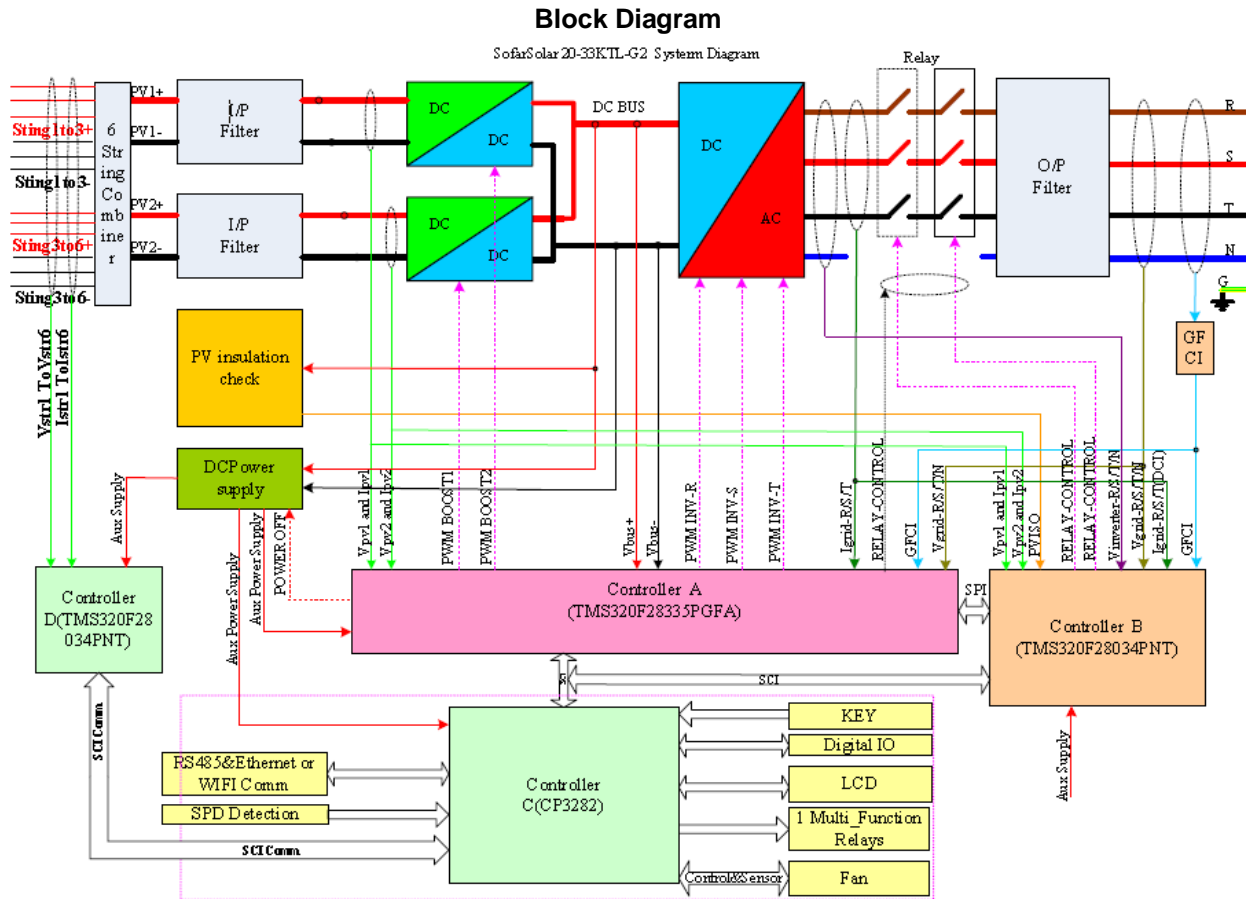
Manufacturer: Shenzhen SOFARSOLAR Co., Ltd.  
Address: 401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China

SAA XXXXXX  
VDE0126-1-1, VDE-AR-N4105, G59/3, IEC61727,  
IEC62116, C10/11, RD1699, UTE C15-712-1, AS4777

|   |   |
|---|---|
| <b>Test item particulars</b> .....  | Grid-connected PV Inverter  |
| <b>Classification of installation and use</b> .....   | Fixed   |
| <b>Supply Connection</b> .....  | Permanent connection  |
| <b>External operating temperature range</b> .....   | -25 to 60 ° C   |
| <b>Altitude during operation (m)</b> .....  | 2000m   |
| <b>Supply fluctuations</b> .....  | According to the specified supply range   |
| <b>Over voltage category (OVC) Mains</b> .....  | <input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input checked="" type="checkbox"/> OVC III <input type="checkbox"/> OVC IV<br><input type="checkbox"/> other: |
| <b>Over voltage category (OVC) PV</b> .....   | <input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV<br><input type="checkbox"/> other: |
| <b>External pollution degree (PD)</b> .....   | <input type="checkbox"/> PD 1 <input type="checkbox"/> PD 2 <input checked="" type="checkbox"/> PD 3  |
| <b>Class of equipment</b> .....   | <input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III<br><input type="checkbox"/> Not classified                   |
| <b>Possible test case verdicts:</b>   |   |
| - test case does not apply to the test object .....   | <b>N/A</b>  |
| - test object does meet the requirement.....  | <b>P (Pass)</b>   |
| - test object does not meet the requirement .....   | <b>F (Fail)</b>   |
| <b>Testing</b> .....  |   |
| <b>Date of receipt of test item</b> .....   | 2018-10-15 (samples provided by applicant)  |
| <b>Date (s) of performance of tests</b> .....   | 2018-10-15 to 2019-02-25  |
| <b>General remarks:</b>   |   |
| <p>"(See Enclosure #)" refers to additional information appended to the report.<br/> "(See appended table)" refers to a table appended to the report.<br/> The test results presented in this report relate only to the object tested.<br/> This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.<br/> This report is only for reference and is not used for legal proof function in China market.<br/> The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.<br/> Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p> |   |
| <b>Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:</b>   |   |
| <b>The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided</b> .....  | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> Not applicable  |
| <b>When differences exist; they shall be identified in the General product information section.</b>   |   |
| <b>Name and address of factory (ies)</b> .....  | Dongguan SOFAR SOLAR Co., Ltd.<br>1F - 6F, Building E, No. 1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan City, China.                           |

**General product information:**

The Solar inverter converts DC voltage into AC voltage. The Solar converter is a three-phase type. The unit is providing EMC filtering at the output toward mains. The unit does not provide galvanic separation from input to output (transformerless). The output is switched off redundant by the high power switching bridge and two relays. This assures that the opening of the output circuit will also operate in case of one error.



The internal control is redundant built. It consists of Main DSP(UC20) and slave DSP(UC73). The Main DSP(UC20) can control the relays, measures voltage, and frequency, AC current with injected DC, insulation resistance and residual current; In addition it tests the array insulation resistance and the RCMU circuit before each start up.

The slave DSP(UC73) is using for detect residual current, also can open the relays independently and communicate with Main DSP(UC20).

The unit provides two relays in series on Line conductors. When single-fault applied to one relay, alarm an error code in display panel, another redundant relay provides basic insulation maintained between the PV array and the mains. All the relays are tested before start up. Both controllers Main DSP(UC20), Slave DSP(UC73) can open the relays.

The product was tested on:

Hardware version: V1.00  
Software version: V1.40

**Model difference:**

The models SOFAR 20000TL-G2, SOFAR 25000TL-G2, SOFAR 30000TL-G2 and SOFAR 33000TL-G2 are almost identical in hardware except the shown in the following table and the output power derated by software.

| The difference in hardware |  |                  |   |
|----------------------------|--|------------------|---|
| Item                       | SOFAR 20000TL-G2   | SOFAR 25000TL-G2 | SOFAR 30000TL-G2 /<br>SOFAR 33000TL-G2                            |
| Number of PV terminal      | 2+2  | 3+3              |   |
| Number of BUS capacitance  | 8 capacitors: 550V/110 $\mu$ F<br>2 capacitors: 1100V/40 $\mu$ F |                  | 10 capacitors: 550V/110 $\mu$ F<br>4 capacitors: 1100V/40 $\mu$ F |
| INV inductance             | 785 $\mu$ H  | 735 $\mu$ H      |   |
| Combiner board             | Not the board  | Have the board   |   |
| External fan               | Not the board  | 2                | 3   |
| Relay of output board      | 6pcs T9VV1K15-12S  |                  | 3pcs AZSR250-2AE-12D  |

Unless otherwise specified, all tests were conducted on basic model of SOFAR 33000TL-G2 to represent the other models.



| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

|          |                                    |  |   |
|----------|------------------------------------|--|---|
| <b>4</b> | <b>General safety requirements</b> |  | - |
| 4.1      | General                            |  | P |
| 4.2      | Earthing requirements              |  | P |

|          |   |   |     |
|----------|---|---|-----|
| <b>5</b> | <b>Protection against electric shock</b>  |   | -   |
| 5.1      | General   |   | P   |
| 5.1.1    | Introductory remark   |   | P   |
| 5.1.2    | Protection from contact with hazardous live parts                                       |   | P   |
| 5.1.2.1  | General   |   | P   |
| 5.1.2.2  | Insulation  |   | P   |
| 5.1.2.3  | Equipment case and barriers   | IP65 enclosure and no opening in the case.  | P   |
|          | Hazardous live parts  | Hazardous live parts were separated from the accessible part.                       | P   |
|          | Top surfaces of barriers accessible in normal use...                                    | No opening of EUT and the cover only can be removed with tool by trained personnel. | P   |
|          | Protection in service access areas  |   | P   |
|          | - with rigid test finger and a force of 10 N  |   | N/A |
|          | - with jointed test finger  |   | N/A |
| 5.1.2.4  | Hazardous live terminations using stranded wire   |   | P   |
| 5.1.3    | Discharge of capacitors   |   | -   |
|          | Compliance checked by calculation   |   | P   |
|          | Measured voltage (V); time-constant (s)   |   | P   |
|          | Residual charge ( $\mu\text{C}$ )   |   | P   |
| 5.1.4    | Protective impedance  | No protective impedance used.   | -   |
|          | Requirements of 5.1.5.3.2 in normal and to level of 5.2.4.1.2 in single fault condition |   | N/A |
|          | The protective impedance consists of one or more of the following:                      |   | N/A |
|          | appropriate high-integrity single component   |   | N/A |
|          | combination of components   |   | N/A |
|          | combination of basic insulation and a current- or voltage-limiting device               |   | N/A |
|          | Voltage test for double/reinforced insulation   |   | N/A |

| IEC 60255-27 |  |  |         |
|--------------|--|--|---------|
| Clause       | Requirement + Test   | Result - Remark  | Verdict |
|              | Components and associated basic insulation checked after a single-fault condition assessment or test according to 10.6.5.5.  |  | N/A     |
|              | Clearance, creepage distance between terminations of the impedance meet requirements of double or reinforced insulation of Annex C of this standard and 6.7 of IEC 61010-1:2010: |  | N/A     |
| 5.1.5        | Accessible parts   |  | -       |
| 5.1.5.1      | General  | All accessible metal parts were earthed and separated from live parts by basic insulation. All external accessible circuit were separated from live parts by reinforce insulation. | P       |
| 5.1.5.2      | Determination of accessible parts  |  | -       |
| 5.1.5.2.1    | General  |  | P       |
|              | Normal operational use, with or without the aid of a tool which will increase the accessibility  | See 5.1.5.2.2 to 5.1.5.2.4 or test by inspection   | P       |
| 5.1.5.2.2    | General examination  | No opening of EUT and the cover only can be removed with tool by trained personnel.  | -       |
|              | Test with jointed test finger  |  | N/A     |
|              | Test with rigid test finger (force of 10 N)  |  | N/A     |
| 5.1.5.2.3    | Openings above parts, enclosed by the case, which are hazardous live   | No opening of EUT and the cover only can be removed with tool by trained personnel.  | -       |
|              | Test with test pin (100mm, Ø4mm)   |  | N/A     |
| 5.1.5.2.4    | Openings for pre-set controls  | No opening of EUT and the cover only can be removed with tool by trained personnel.  | -       |
|              | Test with test pin (100mm, Ø3mm)   |  | N/A     |
| 5.1.5.2.5    | ELV rated or live parts accessible when cover removed  |  | -       |
|              | Removing the cover without tools   | No opening of EUT and the cover only can be removed with tool by trained personnel.  | N/A     |
|              | - Symbol 14  |  | N/A     |
|              | - Symbol 12  |  | N/A     |
| 5.1.5.2.6    | Wiring terminals   |  | -       |
|              | IP1X according to 5.1 of IEC 60529   |  | P       |
|              | - Symbol 12  |  | P       |
| 5.1.1.3      | Permissible limits for accessible parts  |  | -       |

| IEC 60255-27 |   |   |         |
|--------------|---|---|---------|
| Clause       | Requirement + Test  | Result - Remark   | Verdict |
| 5.1.5.3.1    | General   |   | P       |
|              | Values of 5.1.5.3.2 in normal operational condition and nor those of 5.2.4.1.2 in single-fault condition.   |   | P       |
| 5.1.5.3.2    | Values under normal conditions  |   | -       |
|              | a) Voltage limits less than 33 V r.m.s. or 70 V d.c. :  |   | P       |
|              | for wet locations voltage limits less than 25 V r.m.s. or 37.5V d.c.  | Communication port was accessible conductive part that voltage less than 25 V r.m.s. or 37.5 V d.c. | P       |
|              | Voltages are not hazardous live the levels of   | Communication port.   | P       |
|              | b) Current less than 0,5 mA r.m.s. for sinusoidal, 0,7 mA peak non-sinusoidal or mixed frequencies or 2 mA d.c. when measured with measuring circuit A.1 or A.2 if less than 100 Hz |   | N/A     |
|              | for wet locations measuring circuit A.4 used  |   | N/A     |
|              | 70 mA r.m.s. when measured with circuit A.3 for higher frequencies :  |   | N/A     |
|              | c) Levels of capacitive charge or energy less:  |   | N/A     |
|              | 1) 45 $\mu$ C for voltages up to 15 kV peak or d.c. or line A of Figure 3 of IEC 61010-1:2010   |   | N/A     |
|              | 2) 350 mJ stored energy for voltages above 15 kV peak or d.c.   |   | N/A     |
| 5.1.6        | Bonding to the protective conductor   |   | -       |
| 5.1.6.1      | Insulation between live parts and accessible conductive parts   |   | P       |
|              | Accessible conductive parts   |   | P       |
|              | Unearthed accessible conductive parts   |   | P       |
|              | separated from by double insulation or reinforced insulation, or  |   | P       |
|              | Equipment of class I protection   |   | P       |
| 5.1.6.2      | Protective bonding  |   | P       |
|              | Accessible conductive parts bonded, or  |   | P       |
|              | EVL circuit protected in case of direct contact of 5.1.5  |   | P       |
|              | magnetic cores are used   |   | P       |
|              | parts of small dimensions separated from hazardous live parts by at least basic insulation  |   | P       |
| 5.1.6.3      | Bonding of parts connected to the protective conductor  |   | P       |
| 5.1.6.4      | Protection against corrosion  |   | P       |

| IEC 60255-27 |   |   |         |
|--------------|---|---|---------|
| Clause       | Requirement + Test  | Result - Remark   | Verdict |
| 5.1.6.5      | Interruption of protective bonding  | No such protective bonding.   | N/A     |
| 5.1.7        | Protective conductor connection   |   | P       |
|              | means of connection   |   | P       |
|              | suitable for use  |   | P       |
|              | not be used as a part of the mechanical assembly .:   |   | P       |
| 5.1.8        | High leakage current  | No touch current exceeded 3,5 mA a.c. under any operation conditions and the EUT was permanently connected equipment. | N/A     |
| 5.1.9        | Solid insulation  |   | -       |
| 5.1.9.1      | General   |   | P       |
| 5.1.9.2      | Requirements  | (see appended table 10.6.4.2/ 10.6.4.3)   | P       |
| 5.1.10       | Clearances and creepage distances   |   | -       |
| 5.1.10.1     | General   |   | P       |
| 5.1.10.2     | Clearances  |   | P       |
| 5.1.10.2.1   | General   |   | P       |
| 5.1.10.2.2   | Clearances for primary circuits   | (see appended table 10.6.3)   | P       |
| 5.1.10.2.3   | Clearances for non-primary circuits   | (see appended table 10.6.3)   | P       |
| 5.1.10.2.4   | Creepage distances:   | (see appended table 10.6.3)   | P       |
| 5.1.11       | Functional earthing:  |   | P       |
|              | Requirements:   |   | P       |
|              | Connection to protective conductor terminal permitted:  |   | P       |
|              | separated by a functional insulation:   |   | P       |
|              | separated from parts at hazardous voltage by:   |   | P       |
|              | 1) double insulation or reinforced insulation :<br>or   |   | P       |
|              | 2) a protectively earthed screen or another protectively earthed conductive part, separated from parts at hazardous voltages by at least basic insulation : |   | P       |
| 5.2          | Single-fault conditions   |   | -       |
| 5.2.1        | Testing in single-fault condition   | (see appended table 5.2)  | P       |
|              | not risk of electric shock or fire after a single-fault test:   |   | P       |
| 5.2.2        | Application of single-fault condition   |   | P       |

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| Clause       | Requirement + Test   | Result - Remark   | Verdict |
| 5.2.2.1      | General:   |   | P       |
| 5.2.2.2      | Protective impedance:  |   | N/A     |
| 5.2.2.3      | Transformers:  |   | P       |
| 5.2.2.4      | Outputs:   |   | P       |
| 5.2.2.5      | Insulation between circuits and parts:   |   | P       |
| 5.2.2.6      | Primary circuits and hazardous voltage non-primary circuits:   |   | P       |
| 5.2.2.7      | Overloads:   |   | P       |
| 5.2.2.8      | Intermittently rated resistors:  | No such resistors used.   | N/A     |
| 5.2.2.9      | DC inputs:   |   | P       |
| 5.2.3        | Duration of tests:   | (see appended table 5.2)  | P       |
| 5.2.4        | Compliance   |   | -       |
| 5.2.4.1      | Compliance with requirements for electric shock protection   |   | -       |
| 5.2.4.1.1    | General:   |   | P       |
| 5.2.4.1.2    | Values in single-fault condition   | (see appended table 5.2.4.1.2)  | P       |
|              | a) Voltage limits less than 55 V r.m.s. or 140 V d.c. :  |   | P       |
|              | For temporary voltages, limits less than 55 V r.m.s. and 78 V peak or 140 V d.c.   |   | P       |
|              | for wet locations voltage limits less than 33V r.m.s. or 70d.c.  | Communication port was accessible conductive part that voltage less than 33 V r.m.s. or 70 V d.c. | P       |
|              | b) Current less than 3,5 mA r.m.s. for sinusoidal, 5 mA peak non-sinusoidal or mixed frequencies or 15 mA d.c. when measured with measuring circuit A.1 or A.2 if less than 100 Hz<br>or<br>500mA r.m.s (Figure with $R_B = 75 \Omega$ Relates to possible burns in the frequency range 30 kHz to 500 kHz) |   | N/A     |
|              | for wet locations measuring circuit A.4 used (with $R_S = 375 \Omega$ (instead of 1 500 $\Omega$ ) :   |   | N/A     |
|              | Current less than 3,5 mA r.m.s. for sinusoidal, 5mA peak non-sinusoidal or mixed frequencies or 15 mA d.c  |   | N/A     |
|              | c) capacitance level is that defined in Figure 3. curve B in IEC 61010-1:2010:   |   | N/A     |

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| Clause       | Requirement + Test  | Result - Remark | Verdict |
| 5.2.4.2      | Compliance with requirements for temperature protection:                |                 | P       |
| 5.2.4.3      | Compliance with requirements for protection against the spread of fire: |                 | P       |
| 5.2.4.4      | Compliance with requirements for hazardous gases and chemicals:         |                 | P       |
| 5.2.4.5      | Compliance with requirements for mechanical protection                  |                 | P       |

|          |   |               |     |
|----------|---|---------------|-----|
| <b>6</b> | <b>Mechanical aspects</b>                             |               | -   |
| 6.1      | Protection against mechanical hazards                 |               | -   |
| 6.1.1    | Stability:  |               | P   |
| 6.1.2    | Moving parts:   |               | P   |
| 6.1.3    | Edges and corners:                                    |               | P   |
| 6.2      | Mechanical requirements                               |               | P   |
|          | Mechanical tests requirements of 10.6.2.1 to 10.6.2.4 |               | P   |
|          | Higher severity levels:                               |               | N/A |
| 6.3      | Mechanical security of terminations                   | (see Annex E) | P   |

|          |   |  |   |
|----------|---|--|---|
| <b>7</b> | <b>Flammability and resistance to fire</b>  |  | - |
| 7.1      | General   |  | P |
|          | reducing the risk of fire by one of the following means:  |  | - |
|          | Eliminating or reducing the sources of ignition within the equipment:   |  | P |
|          | Reducing the amount of combustible (or flammable) materials within the equipment:                                 |  | P |
|          | Containment of a fire within the equipment:   |  | P |
| 7.2      | Rationale   |  | P |
|          | Risk of fire in normal and single fault condition:  |  | P |
|          | In order for a risk of fire within the equipment to exist, all three of the following basic elements shall exist: |  | P |
|          | The equipment circuits shall have sufficient power or energy to be an ignition source                             |  | P |
|          | There shall be oxygen present (air is about 21 % oxygen) :  |  | P |

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| Clause       | Requirement + Test   | Result - Remark              | Verdict |
|              | There shall be combustible materials present to support the combustion process:                                |                              | P       |
|              | Conformity is checked by minimum one or a combination of the following (see Figure 1):                         |                              | P       |
|              | Equipment temperature limits of 7.3.1:   |                              | P       |
|              | Single Fault test of 7.11 and 10.6.5.5:  |                              | P       |
|              | Minimization of fire risk and reducing sources of ignition of 7.4 and 7.4.2:                                   |                              | P       |
|              | Containment of a fire within equipment of 7.10:  |                              | P       |
| 7.3          | General hazards from overheating and fire  |                              | -       |
| 7.3.1        | Equipment temperature limits:  |                              | P       |
|              | In normal conditions:  | (See appended table 7.3)     | P       |
|              | In single-fault condition (limits of clause 7.11) :  | (See appended table 5.2)     | P       |
|              | Symbol 13 of Table 10:   |                              | P       |
|              | Symbol 14 of Table 10:   |                              | P       |
| 7.3.2        | Hazardous gases and chemicals  | No gases and chemicals used. | -       |
|              | Manufacturer's documentation:  |                              | N/A     |
| 7.4          | Minimization of fire risk  |                              | -       |
| 7.4.1        | General  |                              | P       |
|              | Critical components of primary circuits and circuits exceeding ELV voltage limits.<br>Compliance with Annex D: |                              | P       |
| 7.4.2        | Eliminating or reducing the sources of ignition within the equipment   |                              | P       |
|              | a) Either 1) or 2)   |                              | P       |
|              | 1) Limited-energy circuit as specified in 7.12   |                              | P       |
|              | 2) Insulation between parts at different potentials, compliance with clause 7.11                               |                              | P       |
|              | b) circuits designed to produce heat in compliance with clause 5.2:  |                              | N/A     |
|              | Circuits not classified as limited-energy circuits. Method i) or ii) below shall be used.                      |                              | P       |
|              | i) Testing in the single-fault conditions in compliance with clause 5.2:                                       |                              | P       |
|              | ii) Verifying as in 7.11 that if a fire occurs it will be contained within the equipment:                      |                              | P       |
| 7.5          | Cabling and fusing   |                              | P       |
|              | Manufacturer's recommendations:  |                              | P       |

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| Clause       | Requirement + Test   | Result - Remark                    | Verdict |
|              | Connection cables: minimum cross-section and voltage rating:   |                                    | P       |
|              | Protection devices:  |                                    | P       |
| 7.6          | Flammability of materials and components   |                                    | -       |
| 7.6.1        | General:   |                                    | P       |
|              | Conformity is checked by inspection:   |                                    | P       |
|              | Tests in compliance with IEC 60695-11-10:  |                                    | P       |
| 7.6.2        | Materials for components and other parts inside fire enclosures:   |                                    | P       |
| 7.6.3        | Materials for fire enclosures:   |                                    | P       |
| 7.6.4        | Materials for components and other parts outside fire enclosures:  |                                    | P       |
| 7.7          | Fire ignition sources:   |                                    | P       |
| 7.8          | Conditions for a fire enclosure  | Metal enclosure used.              | -       |
| 7.8.1        | General:   |                                    | P       |
| 7.8.2        | Parts requiring a fire enclosure:  |                                    | P       |
| 7.8.3        | Parts not requiring a fire enclosure:  |                                    | P       |
| 7.9          | Requirements for primary circuits and circuits exceeding ELV limits:   |                                    | P       |
| 7.10         | Fire enclosures and flame barriers   |                                    | -       |
|              | Enclosure meets following requirements:  | No opening in the metal enclosure. | P       |
|              | Bottom:  |                                    | P       |
|              | no openings, or:   |                                    | P       |
|              | to the extent in Figure 3, shall be constructed with baffles as specified in Figure 2, or:                         |                                    | N/A     |
|              | be made of metal, perforated as specified in Table 6, or:  |                                    | N/A     |
|              | be a metal screen with a mesh not exceeding 2 mm x 2 mm centre to centre and a wire diameter of at least 0,45 mm : |                                    | N/A     |
|              | The sides shall have no openings within the area that is included within the inclined line C in Figure 3 or:       |                                    | N/A     |
|              | Case and baffle or flame barrier:  |                                    | N/A     |
| 7.11         | Assessment of the fire risk due to a single-fault condition  |                                    | -       |
| 7.11.1       | Guidelines for maximum acceptable temperatures when subjecting a circuit or component to a single-fault condition  |                                    | P       |



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|--------------|---|-----------------------------------|---------|
| Clause       | Requirement + Test  | Result - Remark                   | Verdict |
| 7.11.2       | Temperature of windings under a normal condition or a single-fault condition        | (See appended table 7.3 and 5.2 ) | P       |
| 7.11.3       | Compliance of equipment with requirements for protection against the spread of fire |                                   | P       |
| 7.12         | Limited-energy circuit  | Not applied.                      | N/A     |
|              | a) Potential not more than 33 r.m.s. or 70 V dc                                     |                                   | N/A     |
|              | b) Current limited by one of following means:                                       |                                   | N/A     |
|              | 3) Inherently or by impedance (see Table 8); or                                     |                                   | N/A     |
|              | 4) Overcurrent protective device (see Table 9); or                                  |                                   | N/A     |
|              | 5) A regulating network limits also in single fault condition (see Table 8)         |                                   | N/A     |
|              | c) Is separated by at least basic insulation  |                                   | N/A     |
|              | Fuse or a nonadjustable electromechanical device is used                            |                                   | N/A     |

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| <b>8</b> | <b>General and fundamental design requirements for safety</b>                 |   | -   |
| 8.1      | Climatic conditions for safety  |   | P   |
|          | Environmental ranges declared by the manufacturer:                            |   | P   |
|          | temperature, operation and storage:   |   | P   |
|          | humidity, non-condensing:   |   | P   |
|          | atmospheric pressure:   |   | P   |
| 8.2      | Electrical connections  |   | P   |
|          | electrical terminations and connection points:                                |   | P   |
|          | protective bonding:   | (See appended table 10.6.4.5)             | P   |
|          | wires and cables:   |   | P   |
|          | Conductors:   |   | P   |
|          | electrical connections:   |   | P   |
| 8.3      | Components  |   | -   |
| 8.3.1    | General   | (See appended table 8.3)                  | P   |
| 8.3.2    | High-integrity part or component  |   | P   |
| 8.4      | Connection to telecommunication networks Requirements according to IEC 62151: | Not connect to telecommunication networks | N/A |
| 8.5      | Connection to other equipment Requirements in accordance with Table A.1:      |   | P   |

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|--------------|--|----------------------|---------|
| Clause       | Requirement + Test   | Result - Remark      | Verdict |
| 8.6          | Laser sources Requirements in accordance with IEC 60825-1: | No such device.      | N/A     |
| 8.7          | Explosion  |                      | -       |
| 8.7.1        | General:   |                      | P       |
| 8.7.2        | Components at risk of explosion                            |                      | -       |
| 8.7.2.1      | General:   | (see clause 5.2.4.5) | P       |
| 8.7.2.2      | Batteries  | No battery used      | N/A     |
|              | Compliance with Annex F:                                   |                      | N/A     |
|              | Marking and warning:                                       |                      | N/A     |
|              | Rechargeable batteries:                                    |                      | N/A     |
|              | Battery compartment:                                       |                      | N/A     |
|              | Batteries intended to be replaced by the user:             |                      | N/A     |

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| <b>9</b> | <b>Marking, documentation and packaging</b>                                  |                 | -   |
| 9.1      | Marking  |                 | -   |
| 9.1.1    | General  |                 | P   |
|          | Removable parts:   |                 | P   |
|          | Symbols according to table 9:  |                 | P   |
|          | Rack or panel equipment:   |                 | P   |
|          | Voltages, currents, frequency and their tolerances according to IEC 60255-6: |                 | P   |
| 9.1.2    | Identification   |                 | -   |
|          | Equipment is identified on the equipment by:                                 |                 | P   |
|          | a) Manufacturer's or supplier's name or trademark                            |                 | P   |
|          | b) Model or type reference:  |                 | P   |
|          | Manufacturing location identified:   |                 | P   |
| 9.1.3    | Auxiliary supplies, VT, CT, I/O9   | No such device. | -   |
| 9.1.3.1  | General requirements for marking   |                 | -   |
|          | For marking the following should be taken into account:                      |                 | N/A |
|          | a) a.c. – with symbol 2 of Table 9 and rated frequency or frequency range:   |                 | N/A |
|          | b) d.c. – with symbol 1 of Table 9 :   |                 | N/A |
|          | c) symbol 3 of Table 9 on equipment for a.c. and d.c. supply:                |                 | N/A |

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| Clause       | Requirement + Test  | Result - Remark | Verdict |
|              | d) symbol 4 of Table 9 on equipment for 3 phase a.c. supply:  |                 | N/A     |
|              | e) a hyphen (-) shall be used to separate the lower and upper nominal voltages, for example, 125 V-230V:  |                 | N/A     |
|              | f) for measurands either a hyphen (-) or an ellipse (...) shall be used to separate the lower and upper voltages:                                     |                 | N/A     |
|              | g) for selectable voltage or current markings:  |                 | -       |
|              | the lower and upper selectable values shall be separated by means of a solidus, i.e. forward slash (/):   |                 | N/A     |
|              | voltages or frequencies where switching is automatic then the markings shall be according to symbol 15 of Table 9 or the word "AUTO":                 |                 | N/A     |
|              | operating voltage achieved using an external, separate device, use +EXT.R.:   |                 | N/A     |
|              | h) the burden in watts (active power) or volt-amperes (apparent power) or the rated input current, with all accessories or plug-in modules connected: |                 | N/A     |
|              | The documentation shall specify the burden:   |                 | N/A     |
|              | The measured value shall not exceed the marked value by more than 10 %:   |                 | N/A     |
|              | i) the rated supply voltage(s) or the rated supply voltage range:   |                 | N/A     |
|              | voltage range more than 20 % of the mean value:   |                 | N/A     |
|              | different rated supply voltages:  |                 | N/A     |
| 9.1.3.2      | Auxiliary supply  |                 | -       |
|              | The following information shall be provided:  |                 | -       |
|              | a) on the equipment and in the documentation:   |                 | N/A     |
|              | a.c. and/or d.c. supply:  |                 | N/A     |
|              | the rated values:   |                 | N/A     |
|              | b) in the documentation:  |                 | N/A     |
|              | the burden:   |                 | N/A     |
| 9.1.3.3      | Measurands  |                 | -       |
|              | The following information shall be provided:  |                 | N/A     |
|              | a) on the equipment and in the documentation:   |                 | N/A     |
|              | the nominal values, for example, voltage, current, frequency:   |                 | N/A     |

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| Clause       | Requirement + Test  | Result - Remark      | Verdict |
|              | b) in the documentation:  |                      | N/A     |
|              | the burden:   |                      | N/A     |
|              | the overload withstand:   |                      | N/A     |
| 9.1.3.4      | Inputs  |                      | -       |
|              | The following information shall be provided in the documentation:         |                      | N/A     |
|              | a) a.c. and/or d.c. supply:   |                      | N/A     |
|              | b) the rated values:  |                      | N/A     |
|              | c) burden on the supply input:  |                      | N/A     |
| 9.1.3.5      | Outputs   |                      | -       |
|              | The following information shall be provided in the documentation:         |                      | N/A     |
|              | a) the kind of output, for example, relay, optocoupler etc:               |                      | N/A     |
|              | b) burden on the supply input:  |                      | N/A     |
|              | c) the switching capability on/off:                                       |                      | N/A     |
|              | d) the switching voltage:   |                      | N/A     |
|              | e) the permissible current, continuous value and short time value for 1s: |                      | N/A     |
|              | f) withstand voltage across open contacts:                                |                      | N/A     |
| 9.1.4        | Fuses   | No such device used. | -       |
|              | Operator replaceable fuse marking:  |                      | N/A     |
|              | Not replaceable by the user:  |                      | N/A     |
| 9.1.5        | Measuring circuit terminals   |                      | -       |
|              | Marking shall be adjacent to the measuring terminals:                     |                      | N/A     |
|              | If insufficient space, symbol 14 used:                                    |                      | N/A     |
|              | Symbol 14 and/or 12 of Table 9:   |                      | N/A     |
|              | Voltage 33 V a.c. or 70 V d.c   |                      | N/A     |
|              | Exceptions:   |                      | N/A     |
| 9.1.6        | Terminals and operating devices   |                      | -       |
|              | Safety markings:  |                      | P       |
|              | AC or d.c. supply:  |                      | P       |
|              | Operating device markings:  |                      | P       |
|              | Functional earth terminals:   |                      | N/A     |
|              | Protective conductor terminals:   |                      | P       |

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|--------------|--|----------------------------------|---------|
| Clause       | Requirement + Test   | Result - Remark                  | Verdict |
|              | Marking place:   |                                  | P       |
|              | Plug/socket device:  |                                  | P       |
|              | Marking for accessible terminals:  |                                  | P       |
|              | Marking for lasers or high-intensity infra-red diodes of class 2 rating or higher: |                                  | N/A     |
| 9.1.7        | Equipment protected by double or reinforced insulation:                            |                                  | N/A     |
| 9.1.8        | Batteries  |                                  | -       |
| 9.1.8.1      | Replaceable batteries:   | No battery used.                 | N/A     |
|              | Battery accessible to the user:  |                                  | N/A     |
|              | Battery not accessible to the user:  |                                  | N/A     |
|              | Polarity of the battery:   |                                  | N/A     |
| 9.1.8.2      | Charging:  |                                  | N/A     |
| 9.1.9        | Test voltage marking:  |                                  | N/A     |
| 9.1.10       | Warning markings   |                                  | -       |
|              | Rack- or panel-mounted equipment:  | Wall mounted equipment.          | P       |
|              | Access in normal use:  |                                  | P       |
|              | Equipment documentation:   |                                  | P       |
|              | Batteries:   |                                  | N/A     |
|              | Warning markings size:   |                                  | N/A     |
| 9.1.11       | Marking durability:  |                                  | P       |
| 9.2          | Documentation  |                                  | -       |
| 9.2.1        | General:   |                                  | P       |
|              | Explanation of warning symbols:  |                                  | P       |
|              | Protective conductor connections:  |                                  | P       |
|              | Equipment ratings, operating instructions and installation instructions:           |                                  | P       |
|              | Information specified in 9.2.2 to 9.2.5:   |                                  | P       |
|              | Intended use:  |                                  | P       |
| 9.2.2        | Equipment ratings  | See rating label                 | -       |
| 9.2.2.1      | General  |                                  | P       |
|              | Oversvoltage category:   | OVC III for MAINS; OVC II for PV | P       |
|              | Rated voltage(s) or voltage range(s) (V) :   |                                  | P       |
|              | Rated frequency or rated frequency range (Hz) :                                    |                                  | P       |
|              | Rated power (W) rated current (mA or A) :  |                                  | P       |

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|--------------|---|--|----------|
| Clause       | Requirement + Test  | Result - Remark  | Verdict  |
|              | Nominal functional value:                                   |  | P        |
|              | Input and output connections:                               |  | P        |
| 9.2.2.2      | Fuses and external protective devices                       |  | -        |
|              | Fuse ratings:   |  | N/A      |
|              | External device:  | According to user manual the circuit breaker should use in final Installation. | P        |
| 9.2.2.3      | Environmental requirement                                   |  | -        |
|              | IP rating:  | IP65   | P        |
|              | Pollution degree:   | PD2 (Inside); PD3 (Outside)  | P        |
|              | Insulation class:   | Class I  | P        |
| 9.2.3        | Equipment installation                                      |  | -        |
|              | Safe mounting:  |  | P        |
|              | Protective earthing   |  | P        |
|              | Ventilation requirements:                                   |  | P        |
|              | Digital input circuits and output relays:                   |  | N/A      |
|              | Wire:   |  | P        |
|              | External devices:   |  | P        |
| 9.2.4        | Equipment commissioning and maintenance                     |  | -        |
|              | Fault-finding and repair:                                   |  | P        |
|              | Equipment part:   |  | P        |
|              | Safe methods for changing and disposal of:                  |  | -        |
|              | Accessible fuses:   |  | N/A      |
|              | Replaceable batteries:                                      |  | N/A      |
|              | Re-charging and/or replacement for re-chargeable batteries: |  | N/A      |
|              | Fibre-optic output devices:                                 |  | N/A      |
| 9.2.5        | Equipment operation   |  | -        |
|              | Operating instructions:                                     |  | -        |
|              | CT circuits:  |  | N/A      |
|              | Responsibility of the user:                                 |  | P        |
|              | pictures and symbols used:                                  |  | P        |
| 9.3          | Packaging   |  | P        |
| <b>10</b>    | <b>Type tests and routine tests</b>                         |  | <b>-</b> |

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| Clause       | Requirement + Test  | Result - Remark   | Verdict |
| 10.1         | General:  |   | P       |
| 10.2         | Safety type tests:  |   | P       |
| 10.3         | Routine testing or sample testing:  |   | N/A     |
| 10.4         | Conditions for testing:   | Considered.   | P       |
| 10.5         | Verification procedure:   | Considered.   | P       |
| 10.6         | Tests   |   | -       |
| 10.6.1       | Climatic environmental tests  |   | -       |
| 10.6.1.1     | Dry-heat test – operational.<br>Tests according to IEC 60255-1                  |   | P       |
| 10.6.1.2     | Cold test – operational.<br>Tests according to IEC 60255-1                      |   | P       |
| 10.6.1.3     | Dry heat test at maximum storage temperature.<br>Tests according to IEC 60255-1 |   | P       |
| 10.6.1.4     | Cold test at minimum storage temperature.<br>Tests according to IEC 60255-1     |   | P       |
| 10.6.1.5     | Damp-heat test.<br>Tests according to IEC 60255-1                               |   | P       |
| 10.6.1.6     | Cyclic temperature with humidity test.<br>Tests according to IEC 60255-1        |   | P       |
| 10.6.2       | Mechanical tests  | See attachment 1: Vibration, Shock, Bump, Seismic test report | -       |
| 10.6.2.1     | Vibration<br>Tests according to IEC 60255-21-1                                  |   | P       |
| 10.6.2.2     | Shock<br>Tests according to IEC 60255-21-2:                                     |   | P       |
| 10.6.2.3     | Bump<br>Tests according to IEC 60255-21-2:                                      |   | P       |
| 10.6.2.4     | Seismic<br>Tests according to IEC 60255-21-3:                                   |   | P       |
| 10.6.2.5     | Accessible parts test   | (See clause 5.1.5)  | P       |
| 10.6.2.6     | Dust/water ingress protection<br>Tests according to IEC 60529:                  | IP65  | P       |
| 10.6.3       | Clearances and creepage distances   |   | -       |
|              | Compliance with Annex C:  | (see appended table 10.6.3)                                   | P       |
|              | Compliance with clause 5.1.10.2.2:  | (see appended table 10.6.3)                                   | P       |

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|--------------|--|-------------------------------|---------|
| Clause       | Requirement + Test   | Result - Remark               | Verdict |
|              | Transient suppressor used to reduce the overvoltage.<br>Tests according to IEC 60255-26: |                               | N/A     |
| 10.6.4       | Safety-related electrical tests  |                               | -       |
| 10.6.4.1     | General:   |                               | P       |
| 10.6.4.2     | Impulse voltage test   |                               | -       |
| 10.6.4.2.1   | General:   |                               | P       |
| 10.6.4.2.2   | Test procedures:   |                               | P       |
| 10.6.4.2.3   | Waveform and generator characteristics:  |                               | P       |
| 10.6.4.2.4   | Selection of impulse test voltage:   |                               | P       |
| 10.6.4.2.4.1 | General:   |                               | P       |
|              | Altitudes(m) :   |                               | P       |
| 10.6.4.2.4.2 | Equipment to tested at 5 kV peak nominal   |                               | P       |
| 10.6.4.2.4.3 | Equipment to tested at 1 kV peak nominal   |                               | N/A     |
|              | auxiliary (power supply) circuits:   |                               | P       |
|              | equipment power supply:  |                               | P       |
|              | I/O circuits:  |                               | P       |
| 10.6.4.2.5   | Performing of tests  |                               | P       |
|              | test performed between the followings part:  | (see appended table 10.6.4.2) | P       |
|              | between each circuit specified for the same impulse voltage:                             |                               | P       |
|              | between independent circuits:  |                               | P       |
|              | across the terminals of a given circuit:   |                               | P       |
|              | Equipment with an insulated case:  |                               | P       |
| 10.6.4.2.6   | Test acceptance criteria   |                               | -       |
|              | During the tests:  |                               | P       |
|              | After the tests:   |                               | P       |
| 10.6.4.2.7   | Repetition of the impulse voltage test:  |                               | P       |
| 10.6.4.3     | AC or d.c. dielectric voltage test   |                               | -       |
| 10.6.4.3.1   | General:   |                               | P       |
| 10.6.4.3.2   | Performing the dielectric voltage test:  | (see appended table 10.6.4.3) | -       |
| 10.6.4.3.2.1 | Type tests   |                               | -       |
|              | test performed between the followings part:  |                               | P       |



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|--------------|---|-------------------------------|---------|
| Clause       | Requirement + Test  | Result - Remark               | Verdict |
|              | between each circuit and the accessible conductive parts:             |                               | P       |
|              | between independent circuits:   |                               | P       |
|              | dielectric voltage withstand, for open metallic contacts:             |                               | P       |
| 10.6.4.3.2.2 | Routine tests:  |                               | N/A     |
| 10.6.4.3.2.3 | Routine tests by sampling:  |                               | N/A     |
| 10.6.4.3.3   | Value of the dielectric test voltage:                                 |                               | P       |
| 10.6.4.3.4   | Test voltage source:  |                               | P       |
| 10.6.4.3.5   | Test method:  |                               | P       |
| 10.6.4.3.6   | Test acceptance criteria:   |                               | P       |
| 10.6.4.3.7   | Repetition of the dielectric voltage test:                            |                               | P       |
| 10.6.4.4     | Insulation resistance:  | (See appended table 10.6.4.4) | P       |
| 10.6.4.5     | Protective bonding tests  | (See appended table 10.6.4.5) | P       |
| 10.6.5       | Electrical environment and flammability                               |                               | -       |
| 10.6.5.1     | Maximum temperature of parts and materials:                           |                               | P       |
| 10.6.5.2     | Flammability of insulating materials, components and fire enclosures: |                               | N/A     |
| 10.6.5.3     | Thermal short-time test   |                               | -       |
|              | Overvoltage:  |                               | N/A     |
|              | Overcurrent:  |                               | N/A     |
| 10.6.5.4     | Output relay parameters<br>Parametres in according to IEC 60255-26:   |                               | N/A     |
| 10.6.5.5     | Single-fault condition:   |                               | N/A     |
| 10.6.6       | Reverse polarity and slow ramp test:                                  | (See appended table 5.2)      | P       |

|          |  |          |
|----------|--|----------|
| <b>A</b> | <b>ANNEX A, ISOLATION CLASS REQUIREMENTS AND EXAMPLE DIAGRAMS (NORMATIVE) (see 5.1.2; 5.1.6.2; 5.1.10)</b>   | <b>P</b> |
| <b>B</b> | <b>ANNEX B, RATED IMPULSE VOLTAGES (NORMATIVE) (see 5.1.2.2)</b>   | <b>P</b> |
| <b>C</b> | <b>ANNEX C, GUIDANCE FOR THE DETERMINATION OF CLEARANCE, CREEPAGE DISTANCE AND WITHSTAND VOLTAGES (NORMATIVE) (see 5.1.2.2; 5.1.4; 5.1.10; 10.6.3)</b> | <b>P</b> |
| <b>D</b> | <b>ANNEX D, COMPONENTS (INFORMATIVE) (see 7.4.1; 8.3; 8.7.1)</b>   | <b>P</b> |
| <b>E</b> | <b>ANNEX E, EXTERNAL WIRING TERMINATIONS (NORMATIVE) (see 6.3)</b>   | <b>-</b> |

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|--------------|---|-----------------|------------|
| Clause       | Requirement + Test  | Result - Remark | Verdict    |
| E.1          | General   |                 | P          |
| E.2          | Permanently connected equipment   |                 | P          |
|              | a) a set of terminals; or   |                 | P          |
|              | b) a non-detachable power supply cable.   |                 | N/A        |
|              | terminals:  |                 | P          |
|              | screws and nuts:  |                 | P          |
|              | power supply cables:  |                 | N/A        |
|              | a) two independent fixings:   |                 | N/A        |
|              | b) mechanical fixing of the cables:   |                 | N/A        |
| E.3          | Conductors  |                 | N/A        |
|              | Connection of conductors in compliance with Table E1. :   |                 | N/A        |
| E.4          | Terminals   |                 | P          |
|              | Contact pressure size in compliance with Table E2. :  |                 | P          |
|              | Terminals contact pressure:   |                 | P          |
|              | Slipping of the conductor:  |                 | P          |
|              | Terminals shall be so fixed that when the means of clamping the conductor is tightened or loosened: |                 | P          |
|              | a) the terminal itself does not work loose:   |                 | P          |
|              | b) internal wiring is not subjected to stress:  |                 | P          |
|              | Ordinary non-detachable power supply cables:  |                 | N/A        |
|              | c) creepage distances and clearances are not reduced below the values specified in Annex C. :       |                 | P          |
| <b>F</b>     | <b>ANNEX F, EXAMPLES OF BATTERY PROTECTION (INFORMATIVE) (see 8.7.2.2)</b>                          |                 | <b>N/A</b> |

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|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

| 5.2                        | TABLE: Fault condition tests |                    |           |        |                  |  | P |
|----------------------------|------------------------------|--------------------|-----------|--------|------------------|--|---|
| Component No.              | Fault                        | Supply voltage (V) | Test time | Fuse # | Fuse current (A) | Comments/ Observation                              |   |
| UC73 Pin 56 to 57          | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| XLC2 Pin2 to 3             | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| UF1 Pin 5 to 6             | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| UF1 Pin 12 to 13           | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF84                       | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF90                       | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF85                       | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF93                       | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF95                       | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| Between RF101 and UF5 pin3 | open                         | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| UF5 Pin 12 to 13           | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF7                        | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF96                       | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF82                       | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF87                       | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| Between RF91 and UF5 pin2  | Open                         | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| UF5 Pin 2 to 3             | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF92                       | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |
| RF88                       | Short                        | DC 850V            | 10min     | --     | --               | Inverter operated normally. No damaged. No hazard. |   |

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|-----------------------------------|--------------------|------------|-------|----|-----------------|--|---------|
| Clause                            | Requirement + Test |            |       |    | Result - Remark |  | Verdict |
| RF87                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| Between<br>RF86 and<br>RF88       | Open               | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF97                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF99                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| Between<br>RF33 and<br>UF5 pin6   | Open               | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| UF5 Pin5 to<br>6                  | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF14                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF136                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| Between<br>RF143 and<br>UF8 pin13 | Open               | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| UF8 Pin12<br>to 13                | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF146                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF147                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF149                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| Between<br>RF151 and<br>UF8 pin9  | Open               | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| UF8 Pin9 to<br>10                 | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF12                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF138                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF140                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| Between<br>RF144 and<br>UF8 pin2  | Open               | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| UF8 Pin2 to<br>3                  | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |

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| Clause                            | Requirement + Test |            |       |    | Result - Remark |  | Verdict |
| RF145                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF61                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF63                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| Between<br>RF67 and<br>UF11 pin2  | Open               | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| UF11 Pin2<br>to 3                 | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF69                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF65                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF62                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF64                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| Between<br>RF68 and<br>UF11 pin13 | Open               | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF70                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF66                              | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF106                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF109                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| Between<br>RF114 and<br>UF11 pin9 | Open               | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| UF11 Pin9<br>to 10                | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF115                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF110                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF105                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| RF107                             | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |
| Between<br>RF112 and<br>UF11 pin6 | Open               | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard. |         |

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| Clause         | Requirement + Test |         |       |    | Result - Remark |  | Verdict |
| UF11 Pin5 to 6 | Short              | DC 850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.   |         |
| RF113          | Short              | DC 850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.   |         |
| RF108          | Short              | DC 850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.   |         |
| RB137          | Open               | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard. |         |
| RB 139         | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard. |         |
| RB 131         | Open               | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard. |         |
| RB 128         | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard. |         |
| RB 122         | Open               | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard. |         |
| RB 120         | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard. |         |
| RB 112         | Open               | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard. |         |
| RB 110         | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard. |         |
| RB 40          | Open               | DC 850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.   |         |
| RB 102         | Short              | DC 850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.   |         |
| RB 58          | Open               | DC 850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.   |         |
| RB 78          | Short              | DC 850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.   |         |
| RB 88          | Open               | DC 850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.   |         |

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|-----------------|--------------------|------------|-------|----|-----------------|---|---------|
| Clause          | Requirement + Test |            |       |    | Result - Remark |   | Verdict |
| RB 90           | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.  |         |
| RB 92           | Open               | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.  |         |
| RB 94           | Short              | DC<br>850V | 10min | -- | --              | Inverter operated normally. No damaged. No hazard.  |         |
| RB 96           | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| RB 11           | Open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| RB 8            | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| UB1 PIN5 to 6   | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| QB1 PIN2 to 3   | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| QB3 PIN2 to 3   | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| UB2 PIN5 to 7   | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| RB23            | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| CB17            | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| UB2 PIN12 to 14 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| RB25            | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| UB2 PIN10 to 8  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "GFCI error". No damaged. No hazard.                    |         |
| UA6 PIN2 to 3   | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The input current is too high". No damaged. No hazard. |         |
| UA6 PIN5 to 6   | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The input current is too high". No damaged. No hazard. |         |

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| Clause        | Requirement + Test |         |       |    | Result - Remark |   | Verdict |
| UA3 PIN2 to 3 | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The input current is too high". No damaged. No hazard. |         |
| UA3 PIN5 to 6 | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The input current is too high". No damaged. No hazard. |         |
| RA13          | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The input voltage is too high". No damaged. No hazard. |         |
| RA14          | open               | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The input voltage is too high". No damaged. No hazard. |         |
| RA17          | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The input voltage is too high". No damaged. No hazard. |         |
| RA20          | open               | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The input voltage is too high". No damaged. No hazard. |         |
| UV1 PIN6 to 7 | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. MOS VQ1 broken. No hazard  |         |
| QV1 DG        | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. MOS VQ1 broken. No hazard  |         |
| QV1 DS        | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. RV11 and RV12 broken. No hazard.                                       |         |
| TV1 PIN5 to 7 | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. MOS VQ1 broken. No hazard  |         |
| TV1 PIN8 to 7 | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. MOS VQ1 broken. No hazard  |         |
| TV1 PIN1,PIN2 | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard.           |         |
| TV1 PIN3,PIN4 | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard.  |         |
| DV2           | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard.           |         |
| DV3           | Short              | DC 850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard.  |         |



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|---------------|--------------------|------------|-------|----|-----------------|--|---------|
| Clause        | Requirement + Test |            |       |    | Result - Remark |  | Verdict |
| ECV3          | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard.          |         |
| ECV7          | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| UV2 PIN2 to 3 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| UV2 PIN7 to 8 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| UV2 PIN5 to 6 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| UV3 PIN2 to 3 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard.          |         |
| UV3 PIN7 to 8 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard.          |         |
| UV3 PIN5 to 6 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| RD2           | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| RD4           | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| RD7           | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| RD9           | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| RD12          | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| RD14          | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |

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|----------------|--------------------|------------|-------|----|-----------------|--|---------|
| Clause         | Requirement + Test |            |       |    | Result - Remark |  | Verdict |
| RD17           | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| RD19           | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage not balanced". No damaged. No hazard. |         |
| QD2 PIN5 to 8  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD2 PIN5 to 17 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD2 PIN5 to 7  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD2 PIN13 to 8 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD2 PIN12 to 8 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD2 PIN5 to 6  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD2 PIN1 to 2  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard.          |         |
| QD2 PIN3 to 8  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD3 PIN5 to 8  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD3 PIN5 to 17 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD3 PIN5 to 7  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD3 PIN13 to 8 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD3 PIN12 to 8 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD3 PIN5 to 6  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QD3 PIN1 to 2  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard.          |         |

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|------------------|--------------------|---------|-------|----|----|---|---------|
| Clause           | Requirement + Test |         |       |    |    | Result - Remark   | Verdict |
| QD3 PIN3 to 8    | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| QD1 PIN5 to 8    | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| QD1 PIN5 to 17   | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| QD1 PIN5 to 7    | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| QD1 PIN13 to 8   | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| QD1 PIN12 to 8   | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| QD1 PIN5 to 6    | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| QD1 PIN1 to 2    | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard. |         |
| QD1 PIN3 to 8    | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| DA1 8 PIN1 to 2  | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| DA1 9 PIN1 to 3  | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| QA20 G to C      | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. BOOST MOS broken. No hazard.                                 |         |
| QA20 C to E      | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. BOOST MOS broken. No hazard.                                 |         |
| QA19 G to C      | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. BOOST MOS broken. No hazard.                                 |         |
| QA19 C to E      | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. BOOST MOS broken. No hazard.                                 |         |
| DA23 PIN1 to 2   | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |
| DA24 PIN1,2 to 3 | Short              | DC 850V | 10min | -- | -- | Inverter disconnected from grid immediately. INV model broken. No hazard.                                 |         |

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|---------------------|--------------------|------------|-------|----|-----------------|--|---------|
| Clause              | Requirement + Test |            |       |    | Result - Remark |  | Verdict |
| DA25<br>PIN1,2 to 3 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. INV model broken. No hazard.  |         |
| QA28 G to<br>C      | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. BOOST MOS broken. No hazard.  |         |
| QA28 C to<br>E      | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. BOOST MOS broken. No hazard.  |         |
| QA29 G to<br>C      | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. BOOST MOS broken. No hazard.  |         |
| QA29 C to<br>E      | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. BOOST MOS broken. No hazard.  |         |
| UA19 PIN6<br>to 7   | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. QA30 broken. No hazard.   |         |
| QA30 G to<br>D      | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. QA30 broken. No hazard.   |         |
| QA30 D to<br>S      | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. RA269, RA270 broken. No hazard.   |         |
| TA2 PIN5 to<br>7    | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. QA30 broken. No hazard.   |         |
| TA2 PIN7 to<br>8    | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. QA30 broken. No hazard.   |         |
| XLC2 PIN1<br>to 2   | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The communication error". No damaged. No hazard.        |         |
| QC5 D to S          | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. QC5 broken. No hazard.  |         |
| TC1 PIN4 to<br>8    | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. QC5 broken. No hazard.  |         |
| DC57                | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. The LED not work. No damaged. No hazard.                                |         |
| DC71                | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The communication error". No damaged. No hazard.        |         |
| U13 PIN2 to<br>3    | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The communication error". No damaged. No hazard.        |         |
| RC103               | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage is not balance". No damaged. No hazard. |         |

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|--------------------|--------------------|------------|-------|----|-----------------|--|---------|
| Clause             | Requirement + Test |            |       |    | Result - Remark |  | Verdict |
| RC104              | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage is not balance". No damaged. No hazard. |         |
| RC118              | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage is not balance". No damaged. No hazard. |         |
| RC126              | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage is not balance". No damaged. No hazard. |         |
| UC625<br>PIN2 to 3 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage is not balance". No damaged. No hazard. |         |
| CC65               | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message "The BUS voltage is not balance". No damaged. No hazard.  |         |
| RC142              | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage is not balance". No damaged. No hazard. |         |
| RC145              | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage is not balance". No damaged. No hazard. |         |
| RC151              | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage is not balance". No damaged. No hazard. |         |
| RC152              | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The BUS voltage is not balance". No damaged. No hazard. |         |
| RC6                | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message:"The gird voltage error". No damaged. No hazard.          |         |
| RC19               | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The gird voltage error". No damaged. No hazard.         |         |
| UC627<br>PIN2 to 3 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The gird voltage error". No damaged. No hazard.         |         |
| UC627<br>PIN5 to 7 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The gird voltage error". No damaged. No hazard.         |         |

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|---------------------|--------------------|------------|-------|----|-----------------|---|---------|
| Clause              | Requirement + Test |            |       |    | Result - Remark |   | Verdict |
| UC627<br>PIN8 to 10 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard.            |         |
| RC73                | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard.            |         |
| UC629<br>PIN2 to 3  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard.            |         |
| RC70                | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard.            |         |
| UC629<br>PIN8 to 10 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard.            |         |
| UC629<br>PIN5 to 7  | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The grid voltage error". No damaged. No hazard.            |         |
| RC31                | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |         |
| RC24                | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |         |
| RC42                | open               | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |         |
| UC632 PIN<br>5 to 6 | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |         |
| RC37                | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |         |
| RC22                | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |         |
| CC14                | Short              | DC<br>850V | 10min | -- | --              | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |         |

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|----------------------|--------------------------|------------|-------|-----------------|----|---|
| Clause               | Requirement + Test       |            |       | Result - Remark |    | Verdict   |
| RC13                 | open                     | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |
| RC12                 | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |
| RC138                | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard.               |
| RC131                | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard.               |
| RC26                 | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |
| RC23                 | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |
| RC34                 | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |
| UC635 PIN<br>5,6     | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |
| RC35                 | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The output current is not balance". No damaged. No hazard. |
| RC58                 | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The DCI overcurrent". No damaged. No hazard.               |
| UC637<br>PIN9 to 10  | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The GFCI error". No damaged. No hazard.                    |
| UC637<br>PIN8 to 10  | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The GFCI error". No damaged. No hazard.                    |
| UC637<br>PIN12 to 13 | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The GFCI error". No damaged. No hazard.                    |
| UC637<br>PIN12 to 14 | Short                    | DC<br>850V | 10min | --              | -- | Inverter disconnected from grid immediately. Error message: "The GFCI error". No damaged. No hazard.                    |
| RC167                | Short before<br>start-up | DC<br>850V | 10min | --              | -- | Inverter did not start-up. Error message: "The ISO error", No damage. No hazard.  |

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|----------------------------|-----------------------|---------|-------|----|----|---|---------|
| Clause                     | Requirement + Test    |         |       |    |    | Result - Remark   | Verdict |
| RC98                       | Short before start-up | DC 850V | 10min | -- | -- | Inverter did not start-up. Error message: "The ISO error" No damage. No hazard. |         |
| RC113                      | Short before start-up | DC 850V | 10min | -- | -- | Inverter did not start-up. Error message: "The ISO error" No damage. No hazard. |         |
| RC116                      | Short before start-up | DC 850V | 10min | -- | -- | Inverter did not start-up. Error message: "The ISO error" No damage. No hazard. |         |
| UC634 PIN6 to 7            | Short before start-up | DC 850V | 10min | -- | -- | Inverter did not start-up. Error message: "The ISO error" No damage. No hazard. |         |
| XLC1 PIN1 to 2             | Short                 | DC 850V | 10min | -- | -- | Inverter did not start-up. Error message: "The SPI error" No damage. No hazard. |         |
| Supplementary information: |                       |         |       |    |    |   |         |

| 7.3                              | TABLE: Heating Test             |        |        |        | P                            |   |
|----------------------------------|---------------------------------|--------|--------|--------|------------------------------|---|
|                                  | Test voltage (V) .....          |        |        |        | -                            | — |
|                                  | Ambient (°C) .....              |        |        |        | -                            | — |
| Thermocouple Locations           | Max. temperature measured, (°C) |        |        |        | Max. temperature limit, (°C) |   |
| Test Voltage                     | 520VDC                          | 850VDC | 520VDC | 850VDC | --                           |   |
| Ambient                          | 45.2                            | 45.7   | 60.7   | 60.5   | --                           |   |
| PV input connector               | 67.8                            | 67.6   | 73.6   | 74.1   | 90                           |   |
| DC switch handle                 | 48.7                            | 49.9   | 63.2   | 61.6   | 75                           |   |
| DC switch body                   | 69.6                            | 71.5   | 74.6   | 74.2   | 85                           |   |
| AC terminals                     | 51.4                            | 51.9   | 65.2   | 62.9   | 85                           |   |
| Heat Sink                        | 61.2                            | 63.7   | 71.6   | 71.2   | 100*                         |   |
| Input board line                 | 69.7                            | 70.8   | 75.1   | 73.0   | 105                          |   |
| BUS capacitor cd1                | 78.5                            | 80.8   | 81.6   | 81.1   | 105                          |   |
| PV input line                    | 67.1                            | 68.8   | 74.7   | 72.7   | 105                          |   |
| PV1 winding of boost transformer | 81.2                            | 68.0   | 83.2   | 73.4   | 130                          |   |
| PV2 winding of boost transformer | 82.4                            | 70.2   | 83.8   | 74.8   | 130                          |   |
| T phase INV Inductor             | 102.1                           | 117.4  | 93.2   | 104.0  | 130                          |   |
| S phase INV Inductor             | 96.9                            | 112.4  | 90.3   | 101.1  | 130                          |   |
| CA129                            | 77.6                            | 77.2   | 80.9   | 78.7   | 105                          |   |
| PCB of power board               | 96.5                            | 82.5   | 90.3   | 81.9   | 130                          |   |



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|-------------------------------|--------------------|------|------|-----------------|-----|---------|
| Clause                        | Requirement + Test |      |      | Result - Remark |     | Verdict |
| T11 winding of Transformer    | 75.9               | 79.4 | 80.7 | 80.5            | 130 |         |
| T11 bobbin of Transformer     | 76.4               | 79.1 | 81.0 | 80.7            | 130 |         |
| UV2                           | 81.5               | 85.1 | 86.2 | 85.7            | 125 |         |
| S phase INV Inductor line     | 76.3               | 80.3 | 78.4 | 79.6            | 105 |         |
| PV1 line of boost transformer | 77.1               | 73.2 | 79.7 | 76.0            | 105 |         |
| IGBT module of S phase        | 98.3               | 96.6 | 87.4 | 92.7            | 130 |         |
| IGBT module of T phase        | 100.9              | 96.5 | 88.8 | 92.5            | 130 |         |
| DA23                          | 74.2               | 77.8 | 80.5 | 81.9            | 130 |         |
| DA24                          | 98.2               | 66.8 | 91.7 | 73.6            | 130 |         |
| DA25                          | 103.7              | 65.3 | 95.1 | 72.5            | 130 |         |
| QA29                          | 93.6               | 62.9 | 94.5 | 70.9            | 130 |         |
| QA28                          | 94.3               | 61.9 | 95.8 | 70.3            | 130 |         |
| DA18                          | 76.9               | 86.0 | 82.0 | 87.5            | 130 |         |
| DA19                          | 106.9              | 73.6 | 96.1 | 78.1            | 130 |         |
| DA20                          | 103.8              | 72.7 | 95.6 | 77.5            | 130 |         |
| QA19                          | 91.1               | 69.8 | 92.6 | 75.8            | 130 |         |
| QA20                          | 89.7               | 68.6 | 91.9 | 74.9            | 130 |         |
| UA15 od power board           | 79.1               | 80.1 | 83.4 | 82.0            | 105 |         |
| UF17                          | 80.5               | 77.5 | 82.9 | 79.9            | 105 |         |
| EMI Inductor                  | 83.3               | 84.8 | 81.9 | 82.4            | 130 |         |
| Relay RYA1                    | 73.1               | 75.1 | 77.3 | 76.7            | 85  |         |
| Current sensor UA1            | 78.2               | 76.9 | 79.6 | 77.8            | 85  |         |
| CA23                          | 70.3               | 71.9 | 75.6 | 74.5            | 105 |         |
| TXA2 winding of Transformer   | 82.8               | 79.1 | 80.8 | 78.9            | 130 |         |
| TXA2 core of Transformer      | 80.0               | 76.9 | 79.7 | 77.6            | 130 |         |
| CA21                          | 75.3               | 74.1 | 77.7 | 76.0            | 105 |         |
| MOVA3                         | 74.2               | 73.7 | 77.3 | 75.7            | 85  |         |
| GASA2                         | 74.6               | 73.8 | 77.7 | 76.0            | 125 |         |
| TC1 winding of Transformer    | 80.2               | 82.8 | 85.7 | 85.6            | 130 |         |

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|--|--------------------------|--------------------------|---------------|--------------------|-------------------------|
| Clause   | Requirement + Test       |                          |               | Result - Remark    | Verdict                 |
| TC1 bobbin of Transformer  | 76.3                     | 78.1                     | 82.0          | 81.0               | 130                     |
| Relay RY3  | 69.9                     | 71.3                     | 74.9          | 73.9               | 85                      |
| CB54   | 68.7                     | 70.3                     | 74.6          | 73.5               | 105                     |
| AC side EMI inductor LB1   | 72.9                     | 75.4                     | 76.6          | 76.2               | 130                     |
| AC side EMI inductor LB1 core  | 73.7                     | 75.8                     | 77.1          | 76.5               | 130                     |
| GFCI LB7   | 77.9                     | 78.7                     | 77.7          | 77.8               | 130                     |
| Varistor MOV B2  | 77.8                     | 78.9                     | 77.8          | 77.9               | 85                      |
| CB24   | 72.2                     | 74.4                     | 75.9          | 75.4               | 85                      |
| CB32   | 71.1                     | 73.3                     | 75.5          | 74.9               | 85                      |
| AC side current sensor HCTB2   | 70.9                     | 72.7                     | 75.8          | 75.1               | 85                      |
| Output line of S phase   | 69.9                     | 72.0                     | 75.2          | 74.5               | 105                     |
| QC5 of auxiliary supply  | 78.8                     | 84.6                     | 84.1          | 87.2               | 130                     |
| QC62 of auxiliary supply   | 71.6                     | 66.2                     | 84.4          | 70.6               | 130                     |
| PCB of output board  | 88.9                     | 91.2                     | 83.3          | 85.5               | 130                     |
| PCB of input board   | 76.8                     | 78.4                     | 80.3          | 78.5               | 130                     |
| Plastic enclosure outside near panel   | 69.5                     | 68.5                     | 73.6          | 72.6               | 75                      |
| Enclosure surface  | 59.5                     | 59.3                     | 67.6          | 65.7               | 100*                    |
| Button   | 53.0                     | 52.7                     | 63.8          | 61.2               | 75                      |
| Mounting bracket   | 49.4                     | 48.3                     | 65.2          | 61.1               | 90                      |
| Enclosure side   | 65.4                     | 65.3                     | 71.8          | 70.4               | 100*                    |
| Heat Sink top  | 67.9                     | 59.5                     | 75.3          | 68.7               | 100*                    |
| Supplementary information:<br>45.2°C Input 520Vdc/59.65A, Output 230Vac/50Hz/43.49A 30.13kW.<br>45.7°C Input 850Vdc/36.35A, Output 230Vac/50Hz/43.36A 30.01kW.<br>60.7°C Input 520Vdc/41.5A, Output 230Vac/50Hz/30.67A 21.16kW (derating)<br>60.5°C Input 850Vdc/27.9A, Output 230Vac/50Hz/33.68A 23.24kW (derating)<br>*Symbol 14 of IEC62109 annex C used. |                          |                          |               |                    |                         |
| <b>Temperature rise of winding</b>   | <b>R<sub>1</sub> (Ω)</b> | <b>R<sub>2</sub> (Ω)</b> | <b>ΔT (K)</b> | <b>Max. dT (K)</b> | <b>Insulation class</b> |
| --   | --                       | --                       | --            | --                 | --                      |

| IEC 60255-27               |                    |  |  |                 |         |
|----------------------------|--------------------|--|--|-----------------|---------|
| Clause                     | Requirement + Test |  |  | Result - Remark | Verdict |
|                            |                    |  |  |                 |         |
| Supplementary information: |                    |  |  |                 |         |

| 7.6                        | TABLE: Flammability of materials and components |   |                                    |                              |          | N/A |
|----------------------------|---|---|------------------------------------|------------------------------|----------|-----|
| Object/ Part No./ Material | Manufacturer/ trademark                         | Duration of application of test flame (ta); (s) | Ignition of specified layer Yes/No | Duration of burning (tb) (s) | Verdict  |     |
| --                         | --  | --  | --                                 | --                           | --       |     |
|                            |   |   |                                    |                              |          |     |
| Supplementary information: |   |   |                                    |                              |          |     |
| Part                       | Manufacturer of material                        | Type of material                                | Thickness (mm)                     | Flammability class           | Evidence |     |
| --                         | --  | --  | --                                 | --                           | --       |     |
|                            |   |   |                                    |                              |          |     |
| Supplementary information: |   |   |                                    |                              |          |     |

| 8.3                           | TABLE: Critical components information |                     |                                     |                  |                                     | P |
|-------------------------------|--|---------------------|-------------------------------------|------------------|-------------------------------------|---|
| Object / part No.             | Manufacturer/ trademark                | Type / model        | Technical data                      | Standard         | Mark(s) of conformity <sup>1)</sup> |   |
| Metal Enclosure               | All                                    | All accepted        | Min.thickness:1.5m<br>m             | IEC 60255-27     | Test with<br>appliance              |   |
| Plastic cover<br>(LCD screen) | MACDERMID<br>AUTOTYPE LTD              | Autotex XE(f2)      | 105°C, V-0, min.<br>0.2mm thickness | UL 94<br>UL 746C | UL E165805                          |   |
| DC connector                  | Stäubli Electrical<br>Connectors Ltd.  | MC4 Series          | 1500Vdc, 30A, Max.<br>90°C, IP68    | EN 50521         | TUV<br>R60028286<br>R60087448       |   |
|                               | Amphenol<br>Industrial<br>operations   | Helios H4<br>Series | 1500Vdc, 30A, Max.<br>90°C, IP68    | DIN EN 50521     | TUV<br>R50157783                    |   |
| Internal wiring<br>(DC-in)    | All                                    | All accepted        | Min. 12AWG,<br>600V, 105°C, VW-1    | UL 758           | UL                                  |   |
| Internal wiring<br>(AC-out)   | All                                    | All accepted        | Min. 10AWG,<br>600V, 105°C, VW-1    | UL 758           | UL                                  |   |
| Earthing wire                 | All                                    | All accepted        | Min. 10AWG,<br>600V, 105°C, VW-1    | UL 758           | UL                                  |   |

| IEC 60255-27   |   |                    |                              |                                 |                     |
|--|---|--------------------|------------------------------|---------------------------------|---------------------|
| Clause   | Requirement + Test  |                    |                              | Result - Remark                 | Verdict             |
| DC Switch (Optional)                                   | Santon Switchgear Ltd   | XBHP3410/2/D       | 1100/10A, 500V/45A, Max.85°C | EN 60947-3:2009/A2:2015         | DEKRA 2174396.01    |
| Or   | Santon Switchgear Ltd   | XBHP+3410/2 / D    | 1200/20A, 600V/50A, Max.85°C | EN 60947-3:2009/A2:2015         | DEKRA 71-103683     |
| Boost inductor   | Huizhou baohui electro-tech ltd<br>HEFEI ECRIEE-TAMURA ELECTRIC CO.,LTD | NPS250060          | 614μH                        | IEC 60255-27                    | Test with appliance |
| winding  | All   | All accepted       | 10AWG, 600V, 105°C, VW-1     | UL 758                          | UL E214423          |
| DC Fans (internal)                                     | Minebea Electronics & Hi-Tech Components(Shanghai) Ltd.                 | 08025SA-12P-AL-01  | 12V, 0.3A                    | UL 507<br>IEC 60950-1           | VDE 1507300         |
| DC Fans (External)                                     | Minebea Electronics & Hi-Tech Components(Shanghai) Ltd.                 | 08025KA-12N- GT-01 | 12V,0.3A                     | IEC 60950-1                     | VDE 1507300         |
| Heat shrinkable tube                                   | SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD                           | RSFR-H             | 125°C, VW-1, 600V            | UL 224                          | UL E203950          |
| AC output terminal Block                               | SHENZHEN CONNECTION ELECTRONIC CO LTD                                   | DSTB22             | 600V, 75A,                   | UL 508,<br>UL 508C              | UL E 304128         |
| Plastic material of LCD cover                          | COVESTRO DEUTSCHLAND AG   | 6557 + (z)(f1)     | V-0, 3.0 mm thickness, 115°C | UL 94,<br>UL 746C               | UL E41613           |
| All PCB  | All   | All accepted       | Min.130°C, min. V-0, CTI≥175 | UL 796                          | UL                  |
| Y-Cap (CA12, CA16, CA18, CA25, CA10, CA17, CA19, CA26) | Shangdong hongming electronic ltd                                       | SDE2G472M15 BW1    | Y1, 4.7nF, 400VAC, 125°C     | IEC 60384-14 :2013, 4rd edition | VDE 40015805        |
| Gas tube (GASA1, GASA2)                                | Bencent electronics ltd   | B8G1500M           | 380V, 10kA, Max.: 125°C      | UL 1449                         | UL E337906          |

| IEC 60255-27                           |  |                                   |   |   |                        |
|--|--|-----------------------------------|---|---|------------------------|
| Clause                                 | Requirement + Test                             |                                   |   | Result - Remark   | Verdict                |
| Varistor (MOVA1, MOVA2, MOVA3, MOVA4,) | Dongguan weiqin electronics ltd                | TVR20182KS<br>K 4Y                | 1000VAC, I <sub>max</sub> :<br>6.5kA, Max.:<br>85°C                     | IEC 60151-1<br>IEC 60151-2<br>IEC 60151-<br>2/AMD1<br>IEC 61051-2-2 | VDE 5944               |
| Or                                     | Littelfuse, Inc.                               | V1000LA160B<br>P                  | 1000VAC, I <sub>max</sub> :<br>6.5kA, Max.:<br>85°C                     | IEC 60151-1<br>IEC 60151-2<br>IEC 60151-<br>2/AMD1<br>IEC 61051-2-2 | VDE 116895             |
| Line filter (TXA1, TXA2)               | Huizhou baohui electro-tech ltd                | T42*26*18C(<br>M1 2K)             | 1.1mH, 100°C  | IEC 60255-27  | Test with<br>appliance |
|  | HEFEI ECRIEEE-TAMURA ELECTRIC CO.,LTD          | T42*26*18C(<br>M1 2K)             | 1.1mH, 100°C  | IEC 60255-27  | Test with<br>appliance |
| Electronics capacitor(CA13, CA23)      | Xiamen fara ELECTRIC CO.,LTD                   | C3D1M306KM<br>0 AC00              | 30µF, 1100Vdc,<br>105°C   | IEC 60255-27  | Test with<br>appliance |
| Or                                     | Wuxi CRE New Energy Technology CO.,Ltd         | DMJ-<br>PS40UF1100<br>V           | 40µF, 1100Vdc,<br>105°C   | IEC 60255-27  | Test with<br>appliance |
| Or                                     | EPCOS AG                                       | B32778G0406<br>K 000              | 40µF, 1100Vdc,<br>105°C   | IEC 60255-27  | Test with<br>appliance |
| Or                                     | Hua Jung Components Co., Ltd                   | EPB-<br>406J0900DB1<br>5<br>2B-FF | 40µF, 1100Vdc,<br>105°C   | IEC 60255-27  | Test with<br>appliance |
| Current sensor (UA1,UA2)               | LEM  | HLSR 32-P                         | IPN: 32A; V <sub>c</sub> : 5V.<br>I <sub>cc</sub> : 25mA Max.:<br>105°C | IEC 60255-27  | Test with<br>appliance |
| Or                                     | Ning Bo Sinomags Electronic Technology Co.,Ltd | STK-32PL                          | IPN: 32A; V <sub>cc</sub> : 5V.<br>I <sub>c</sub> : 5mA Max.: 85°C      | IEC 60255-27  | Test with<br>appliance |
| Relay (RYA1, RYA2)                     | Xiamen Hongfa Electroacoustic Co., Ltd.        | HFD3/5                            | 2A, 250Vac,<br>5Vdc, 85°C   | IEC 61810-1<br>VDE 0435   | VDE<br>40018867        |
| Current sensor (HCTB1, HCTB2, HCTB3)   | LEM  | CASR 50-NP                        | IPN: 50A; V <sub>c</sub> : 5V.<br>I <sub>cc</sub> : 75mA<br>Max.: 85°C  | IEC 60255-27  | Test with<br>appliance |
| Or                                     | tamura   | F02P050S05L                       | IPN: 50A; V <sub>cc</sub> : 5V.<br>I <sub>c</sub> : 58mA<br>Max.: 85°C  | IEC 60255-27  | Test with<br>appliance |
| Line filter(LB1)                       | Huizhou baohui electro-tech ltd                | T68*44.3*13.5<br>C R10K           | 1.3mH, 110°C  | IEC 60255-27  | Test with<br>appliance |
| - Winding                              | All  | All accepted                      | 180°C   | UL 1446   | UL                     |

| IEC 60255-27  |  |                         |  |   |                            |
|---|--|-------------------------|--|---|----------------------------|
| Clause  | Requirement + Test   |                         |  | Result - Remark   | Verdict                    |
| -Tape   | JINGJIANG<br>YAHUA<br>PRESSURE<br>SENSITIVE<br>GLUE CO LTD | CT-                     | 130°C  | UL 510  | UL E165111                 |
| E-Cap<br>(CB32,CB31,CB<br>30,CB24,CB38,<br>CB39,                        | Xiamen fara<br>ELECTRIC<br>CO.,LTD                         | C6AQ1335JB<br>00 550    | 3.3μF, 300Vac,<br>85°C   | IEC 60255-27  | Test with<br>appliance     |
| Relay<br>(RYB1,RYB2,R<br>YB3,RYB4,RYB<br>5,RYB6)                        | TYCO<br>ELECTRONICS<br>(SHENZHEN)<br>CO LTD                | T9VV1K15-<br>12S        | 40A, 250Vac,<br>12Vdc, 85°C  | IEC 61810-1<br>VDE 0435   | VDE<br>40030974            |
| Current sensor<br>(LB7)   | Huizhou baohui<br>electro-tech ltd                         | 30KWGFCI<br>transformer | Class B (130°C)  | IEC 60255-27  | Test with<br>appliance     |
| - Winding   | All  | All accepted            | 130°C  | UL 1446   | UL                         |
| Y-Cap<br>(CYB1,CYB3,C<br>YB6,CYB9,CYB<br>2,CYB8,CYB5)                   | Xiamen fara<br>ELECTRIC<br>CO.,LTD                         | MKP63                   | 10nF, Y2,<br>300Vac, 110°C   | EN 60384-<br>14:2013  | ENEC:<br>SE/0366- 2C       |
| Y-Cap<br>(CYB2,CYB8,C<br>YB5)   | SAMWHA<br>CAPACITOR<br>CO.,L TD                            | SD                      | 100pF, Y2,<br>400Vac, 85°C   | IEC 60384-14  | VDE<br>40015804            |
| Gas tube<br>(GASB1)   | Bencent<br>electronics ltd                                 | B8G1500M                | 380V, 10kA,<br>Max.: 125°C   | UL 1449   | UL E337906                 |
| Varistotr<br>(RV1,RV2,RV3,<br>RV4)                                      | THINKING<br>ELECTRONIC<br>INDUSTRIAL CO<br>LTD             | TVR20621KS<br>Y         | 395VAC,<br>510Vdc, I <sub>max</sub> : 8kA,<br>Max.: 85°C   | IEC 60151-1<br>IEC 60151-2<br>IEC 60151-<br>2/AMD1<br>IEC 61051-2-2 | VDE 5944                   |
| Or  | THINKING<br>ELECTRONIC<br>INDUSTRIAL CO<br>LTD             | TVR20821KS<br>Y         | 510VAC,<br>670Vdc, I <sub>max</sub> : 8kA,<br>Max.: 85°C   | IEC 60151-1<br>IEC 60151-2<br>IEC 60151-<br>2/AMD1<br>IEC 61051-2-2 | VDE 5944                   |
| Current sensor<br>(UF15,UF16,UF<br>17,UF18,UF19,<br>UF20,UF21,UF<br>22) | Allegro Micro<br>Systems, LLC                              | ACS724KMAT<br>R-20AB-T  | V-0, Max.: 130°C   | UL 60950-<br>1:2007/A2:201<br>4 EN 60950-<br>1:2006/A2:201<br>3     | TUV U8V 16<br>03 54214 040 |
| Opt coupler<br>(UF4,UF6,UF7)  | Liteon<br>optoelectronics                                  | LTV816S2TP<br>B- V      | D <sub>i</sub> ≥0.4mm Internall<br>d <sub>i</sub> ≥ 7.0mm<br><br>External d <sub>i</sub> ≥7.62mm,<br>AC 8000V,<br>reinforced Insulation<br>115°C | DIN EN<br>60747-5-2   | VDE<br>40015248            |

| IEC 60255-27   |  |                         |  |                  |                     |
|--|--|-------------------------|--|------------------|---------------------|
| Clause   | Requirement + Test                     |                         |  | Result - Remark  | Verdict             |
| Y-Cap (CF113, CF124, CF134, CF144, CF24, CF102, CF20, CF101, CF103, CF22, CF25, CF104, CF143, CF133, CF123, CF114) | Samwha Capacitor Co., Ltd.             | SD                      | 4.7pF, Y1, 400Vac, 85°C  | IEC 60384-14     | VDE 40015804        |
| Diode (DF17, DF18)   | Wuxi dongrui electronics CO., LTD      | MDA75A2000 V            | 2000V, 75A, 150°C  | IEC 60255-27     | Test with appliance |
| E-Cpa (CC313)  | Xiamen fara ELECTRIC CO.,LTD           | C323C104K90 C 450       | 0.1uF, 1600Vdc, 105°C  | IEC 60255-27     | Test with appliance |
| Transformer (TC1)  | Huizhou baohui electro-tech ltd        | SH-T002                 | Class B (130°C)  | IEC 60255-27     | Test with appliance |
| - Winding  | All                                    | All accepted            | 130°C  | UL 1446          | UL                  |
| - Bobbin   | SUMITOMO BAKELITE CO LTD               | PM-9820, PM-9030        | V-0, min. thickness: 0.75mm, 150°C   | UL 94            | UL E41429           |
| Opt coupler (UC67, UC68, UC71, UC63, UC64, UC70, UC11, UC12)   | Lite-on optoelectronics                | LTV816S2TP B-V          | Di≥0.4mm Internall<br>di≥ 7.0mm<br>External di≥7.62mm, AC 8000V, reinforced Insulation 115°C | DIN EN 60747-5-2 | VDE 40015248        |
| Y-Cpa (CC85)   | Samwha Capacitor Co., Ltd.             | SD                      | 4.7pF, Y1, 400Vac, 85°C  | IEC 60384-14     | VDE 40015804        |
| E-Cap (CA145, CA129, CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD39, CD40)   | Xiamen fara ELECTRIC CO.,LTD           | C3D1M306KM 0 AC00       | 30μF, 1100Vdc, 105°C   | IEC 60255-27     | Test with appliance |
| Or   | Wuxi CRE New Energy Technology CO.,Ltd | DMJ-PS40UF1100 V        | 40μF, 1100Vdc, 105°C   | IEC 60255-27     | Test with appliance |
| Or   | EPCOS AG                               | B32778G0406 K 000       | 40μF, 1100Vdc, 105°C   | IEC 60255-27     | Test with appliance |
| Or   | Hua Jung Components Co., Ltd           | EPB-406J0900DB1 5 2B-FF | 40μF, 1100Vdc, 105°C   | IEC 60255-27     | Test with appliance |
| Capacitor (CD1, CD2, CD3, CD4, CD5, CD6, CD7, CD8, CD39, CD40)   | Kemet                                  | C4AELBW611 0 A3NK       | 110μF, 500Vac, 85°C  | IEC 60255-27     | Test with appliance |

| IEC 60255-27   |  |                                  |   |                     |                        |
|--|--|----------------------------------|---|---------------------|------------------------|
| Clause   | Requirement + Test                               |                                  |   | Result - Remark     | Verdict                |
| Or   | panasonic  | EZPE55117M<br>TA                 | 110µF, 550Vac,<br>70°C  | IEC 60255-27        | Test with<br>appliance |
| Or   | Wuxi CRE New<br>Energy<br>Technology CO.,<br>Ltd | DMJ-<br>PS110UF550<br>V          | 110µF, 550Vac,<br>85°C  | IEC 60255-27        | Test with<br>appliance |
| Diode(DA23,DA<br>24,DA25, DA18,<br>DA19,DA20)  | IXYS   | DSI45-12A                        | 1200V, 45A,<br>175°C  | IEC 60255-27        | Test with<br>appliance |
| Or   | CREE   | C4D10120D                        | 1200V, 18A,<br>175°C  | IEC 60255-27        | Test with<br>appliance |
| Transformer<br>(TA2, TV1)  | Huizhou baohui<br>electro-tech ltd               | SH-T001                          | Class 130(B)  | IEC 60255-27        | Test with<br>appliance |
| - Winding  | All  | All accepted                     | 130°C   | UL 1446             | UL                     |
| - Bobbin   | SUMITOMO<br>BAKELITE CO<br>LTD                   | PM-9820, PM-<br>9030             | V-0, min. thickness:<br>0.75mm, 150°C                           | UL 94               | UL E41429              |
| IGBT (QD1,<br>QD2, QD3)  | VINCOTECH  | 10-<br>FZ12NMA080<br>S H01-M260F | 1200V,<br>80A, 175°C  | IEC 60255-27        | Test with<br>appliance |
| Opt coupler<br>(UV2, UV3)  | TOSHIBA  | TLP352(TP1,F<br>)                | Di≥0.4mm Internall<br>di≥ 7.0mm<br>External di≥ 7.0mm,<br>125°C | DIN EN<br>60747-5-2 | VDE<br>40009302        |
| Supplementary information:<br>1) Provided evidence ensures the agreed level of compliance. |  |                                  |   |                     |                        |

| 10.6.3   | TABLE: Clearance And Creepage Distance Measurements |                 |                     |            |                      |             | P |
|--|---|-----------------|---------------------|------------|----------------------|-------------|---|
| clearance cl and creepage<br>distance dcr at/of:   | Up<br>(V)   | U r.m.s.<br>(V) | Required cl<br>(mm) | cl<br>(mm) | required dcr<br>(mm) | dcr<br>(mm) |   |
| <b>Conflux board</b>   |   |                 |                     |            |                      |             |   |
| Y-Cap (CF113, CF124,<br>CF134, CF144, CF24,<br>CF102, CF20, CF101,<br>CF103, CF22, CF25, CF104,<br>CF143, CF133, CF123,<br>CF114) to earthing on PCB<br>(Conflux board) (BI) | 1100  | 1100            | 4.0                 | 6.90       | 5.6                  | 6.90        |   |
| Opocoupler primary pin to<br>secondary pin (UF15, UF16,<br>UF17, UF18, UF19, UF20,<br>UF21, UF22) on PCB<br>(Conflux board) (BI)   | 1100  | 1100            | 4.0                 | 5.61       | 5.6                  | 5.61        |   |
| Opocoupler primary pin to<br>secondary pin(UF4,UF6,UF7)<br>on PCB (Conflux board) (BI)   | 1100  | 1100            | 4.0                 | 6.5        | 5.6                  | 10.3        |   |



| IEC 60255-27   |                    |      |     |                 |     |         |
|--|--------------------|------|-----|-----------------|-----|---------|
| Clause   | Requirement + Test |      |     | Result - Remark |     | Verdict |
| Primary circuits to earthing on PCB(Conflux board) (BI)  | 1100               | 1100 | 4.0 | 7.60            | 5.6 | 7.60    |
| Primary circuits to metal based on PCB(Conflux board) (BI)   | 1100               | 1100 | 4.0 | 20.00           | 5.6 | 20.00   |
| <b>Control board</b>   |                    |      |     |                 |     |         |
| Y cap (CC85) to earthing on PCB(control board) (BI)  | 1100               | 1100 | 4.0 | 5.61            | 4.0 | 5.61    |
| Opocoupler primary pin to secondary pin (UC67, UC68, UC71, UC63, C64, UC70) on PCB(control board) (BI) | 1100               | 1100 | 4.0 | 6.50            | 4.0 | 10.30   |
| Transformer(TC1) primary to core (control board)(BI)   | 1100               | 1100 | 4.0 | 14.00           | 4.0 | 14.00   |
| Transformer(TC1) secondary to core (control board)(BI)   | 1100               | 1100 | 4.0 | 14.00           | 4.0 | 14.00   |
| Opocoupler primary pin to secondary pin on PCB(control board) (RI)                                     | 1100               | 1100 | 4.0 | 6.30            | 4.0 | 6.30    |
| Primary circuits to metal based on PCB(control board) (BI)   | 1100               | 1100 | 4.0 | 8.20            | 4.0 | 8.20    |
| Primary circuits to Secondarycircuits on PCB(control board board) (RI)                                 | 1100               | 1100 | 4.0 | 6.20            | 4.0 | 6.20    |
| <b>DC input board</b>  |                    |      |     |                 |     |         |
| Y cap (CA11, CA16) to earthing on PCB(DC input board) (BI)   | 1100               | 1100 | 4.0 | 5.61            | 5.6 | 5.61    |
| Y cap (CA18, CA25) to earthing on PCB(DC input board) (BI)   | 1100               | 1100 | 4.0 | 5.61            | 5.6 | 5.61    |
| Y cap (CA10, CA17, CA19, CA26) to earthing on PCB(DC input board) (BI) (BI)                            | 1100               | 1100 | 4.0 | 5.61            | 5.6 | 5.61    |
| Primary circuits to metal based on PCB(DC input board) (BI)  | 1100               | 1100 | 4.0 | 8.20            | 5.6 | 8.20    |
| <b>AC output board</b>   |                    |      |     |                 |     |         |
| Relay (RYB1, RYB2, RYB3, RYB4,RYB5, RYB6) two polarity on PCB(AC output board) (BI)                    | 1100               | 1100 | 4.0 | 6.60            | 4.0 | 6.60    |
| Y cap (CYB1, CYB3, CYB6, CYB9) to earthing on PCB (AC output board) (BI)                               | 1100               | 1100 | 4.0 | 5.50            | 4.0 | 5.50    |
| Y cap (CYB2, CYB8) to earthing on PCB (AC output board) (BI)   | 1100               | 1100 | 4.0 | 5.50            | 4.0 | 5.50    |

| IEC 60255-27   |                    |      |     |                 |     |         |
|--|--------------------|------|-----|-----------------|-----|---------|
| Clause   | Requirement + Test |      |     | Result - Remark |     | Verdict |
| Primary circuits to earthing on PCB (AC output board) (BI)   | 1100               | 1100 | 4.0 | 5.50            | 4.0 | 5.50    |
| Primary circuits to metal based on PCB(DC input board) (BI)  | 1100               | 1100 | 4.0 | 8.20            | 4.0 | 8.20    |
| Opocoupler (U4) Primary pin to Secondary pin on PCB(Communication board) (RI)  | 1100               | 1100 | 4.0 | 6.30            | 4.0 | 6.30    |
| Supplementary information:<br>RI: Reinforced insulation, DI: double insulation, BI: basic insulation, SI: supplementary insulation The double side PCB layout is considered and evaluated. |                    |      |     |                 |     |         |

| 10.6.4.2/<br>10.6.4.3                    | TABLE: Impulse voltage test/Dielectric Strength  |                    |                                | P |
|--|--|--------------------|--------------------------------|---|
| Test voltage applied between:            | impulse withstand voltage (kV)<br>1.2/50 $\mu$ s | Test voltage (Vdc) | Breakdown / flashover (Yes/No) |   |
| DC input terminal to earthed enclosure   | 6.0  | 2120               | No                             |   |
| AC output terminal to earthed enclosure  | 6.0  | 2120               | No                             |   |
| DC input terminal to communication port  | 8.0  | 4240               | No                             |   |
| AC output terminal to communication port | 8.0  | 4240               | No                             |   |
| DC input terminal to LCD screen cover    | 8.0  | 4240               | No                             |   |
| AC output terminal to LCD screen cover   | 8.0  | 4240               | No                             |   |
| Supplementary information:               |  |                    |                                |   |

| 10.6.4.4   | TABLE: insulation resistance measurements |                          | P |
|--|---|--------------------------|---|
| Insulation resistance R between:                             | R (M $\Omega$ )                           | Required R (M $\Omega$ ) |   |
| Between mains poles (primary fuse disconnected)              | >100                                      | 10                       |   |
| Between parts separated by basic or supplementary insulation | >100                                      | 10                       |   |
| Between parts separated by double or reinforced insulation   | >100                                      | 10                       |   |
| Supplementary information:                                   |   |                          |   |

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

**Attachment 1: Vibration, Shock, Bump, Seismic test report**



LCJC-JL-708-02 A/0

Report No.: LCJC201902005YW002

Date Issued: Feb. 25, 2019

## 苏州龙测检测技术服务有限公司

Suzhou Longce Testing Technology Service Co., Ltd.

### 检测报告

Test Report

Test Items: Vibration ,Shock, Bump, Seismic test  
 Sample Name: PV Inverter  
 Consigner: DEKRA Testing and Certification (Shanghai) Ltd.  
 Test Type: Entrust Test

Prepared By: Yao Jun Checked By: Zhang baikuo Approve By: Lu Jitian

Authorized signatory

Suzhou Longce Testing Technology Service Co., Ltd.  
<http://www.szlcjc.com>

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



LC-JC-JL-708-02 A/0

### 1. GENERAL INFORMATION

|  |  |
|--|--|
| Equipment Under Test (EUT)               | PV Inverter  |
| Model                                    | SOFAR 20000TL-G2, SOFAR 25000TL-G2,<br>SOFAR 30000TL-G2, SOFAR 33000TL-G2  |
| Quantity of Tested Samples               | 1 PCS  |
| Samples Code                             | LCJC2019021400202  |
| Entrust unit name                        | DEKRA Testing and Certification (Shanghai) Ltd.  |
| Entrust unit address                     | 3F, #250 Jiangchangsan Road, Building 16, Headquarter Economy Park<br>Shibei Hi-Tech Park, Zhabei District, Shanghai 200436, China   |
| Manufacture unit name                    | Shenzhen SOFAR SOLAR Co., Ltd.   |
| Manufacture unit address                 | 401, Building 4, AnTongDa Industrial Park, District 68, XingDong<br>Community, XinAn Street, BaoAn District, Shenzhen, China.  |
| Sample delivery personnel<br>information | Stone.Wang@dekra.com   |
| Sample status                            | Conform to the requirements of the test  |
| Received the sample date                 | Feb. 14, 2019  |
| Test date                                | Feb. 18, 2019~Feb. 20, 2019  |
| Test standard                            | IEC 60255-27:2013 Measuring relays and protection equipment -<br>Part 27: Product safety requirements;<br>IEC60255-21-1:1988 Vibration, shock, bump and seismic tests on<br>measuring relays and protection equipment. Section 1 : Vibration tests<br>(sinusoidal) ;<br>IEC60255-21-2:1988 Vibration, shock, bump and seismic tests on<br>measuring relays and protection equipment. Section 2: Shock and<br>bump tests;<br>IEC60255-21-3:1993 Vibration, shock, bump and seismic tests on<br>measuring relays and protection equipment. Section 3: Seismic tests. |
| Test engineer                            | Yao Jun  |
| Temperature                              | 25±5℃  |
| Humidity                                 | <70%RH   |

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



LCJC-JL-708-02 A/0

## 2. TEST ITEMS AND RESULT

| No. | Test Item                | Test Information   | Test Result                              | Verdict |
|-----|--------------------------|--|--|---------|
| 1   | Vibration response test  | 1.Frequency: 10~150Hz;<br>2.Cross-over Frequency: 58~60Hz;<br>3.Peak Displacement: 0.035mm;<br>4.Acceleration: 0.5g;<br>5.Cycle Time: 8min /axis;<br>6.Direction: X, Y, Z axis.  | The appearance of the sample was normal. | Pass    |
|     | Vibration endurance test | 1.Frequency: 10~150Hz;<br>2.Acceleration: 1g;<br>3.Cycle Time: 8min /axis, total 20 cycles/axis;<br>4.Direction: X, Y, Z axis.   | The appearance of the sample was normal. | Pass    |
| 2   | Shock response test      | 1.Acceleration: 5g;<br>2.Duration: 11ms;<br>3.Times: 3times/direction, total 18times.<br>4.Direction: ±X, ±Y, ±Z axis.   | The appearance of the sample was normal. | Pass    |
|     | Shock withstand test     | 1.Acceleration: 15g;<br>2.Duration: 11ms;<br>3.Times: 3times/direction, total 18times.<br>4.Direction: ±X, ±Y, ±Z axis.  | The appearance of the sample was normal. | Pass    |
| 3   | Bump test                | 1.Acceleration: 10g;<br>2.Duration: 16ms;<br>3.Number: 1000 times/direction;<br>4.Direction: ±X, ±Y, ±Z axis.  | The appearance of the sample was normal. | Pass    |
| 4   | Seismic test             | 1.Frequency: 1~35Hz;<br>2.Cross-over Frequency: 8~9Hz;<br>3.Horizontal (X, Y) :<br>Peak Displacement: 3.5mm, Acceleration: 1.0g;<br>4.Vertical (Z) :<br>Peak Displacement: 1.5mm, Acceleration:0.5g;<br>5.Cycle Time: 10min /axis;<br>6.Direction: X, Y, Z axis. | The appearance of the sample was normal. | Pass    |

### Remark:

The tests were performed on model SOFAR33000TL-G2 and the test result are also applicable for all other models stated in this report due to they have same hardware and construction enclosure.

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



LCJC-JL-708-02 A/0

**3. TEST SAMPLE PICTURES**

Sample Picture before test



Test picture of Z-axis

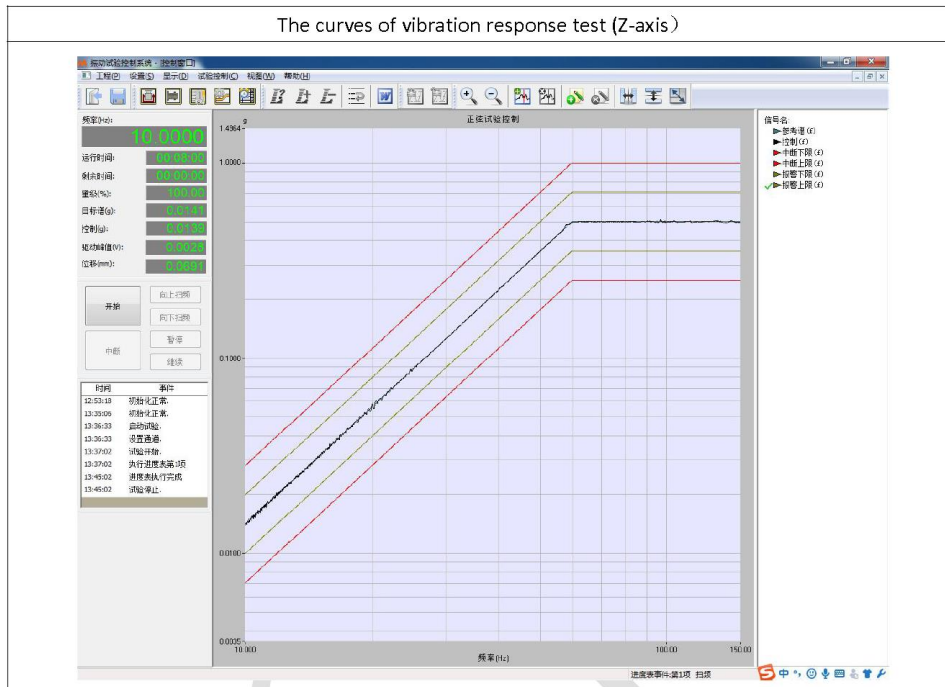


| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

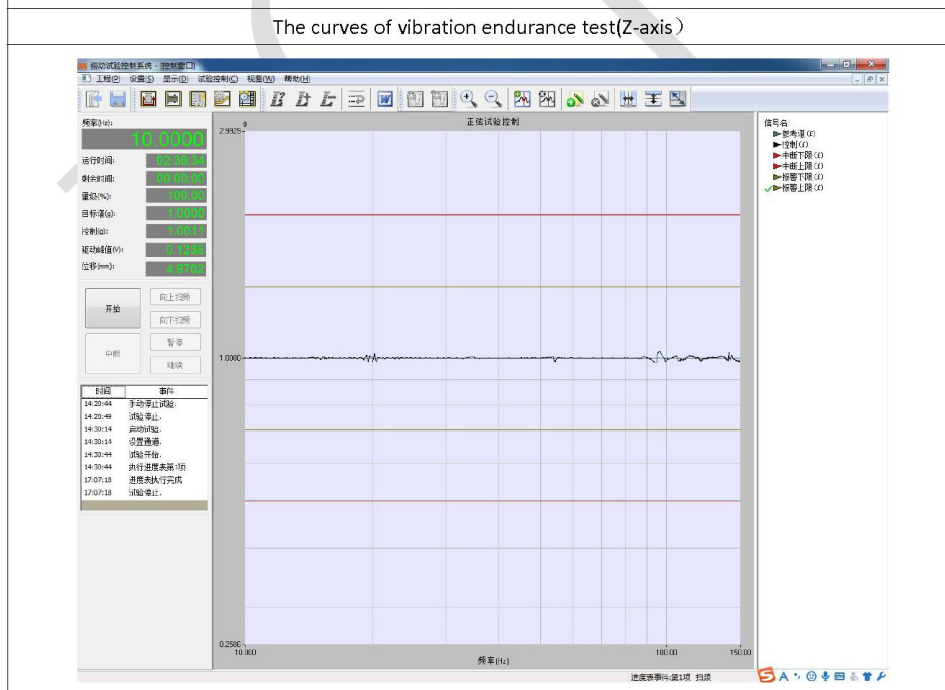


LQJC-JL-708-02 A/0

The curves of vibration response test (Z-axis)



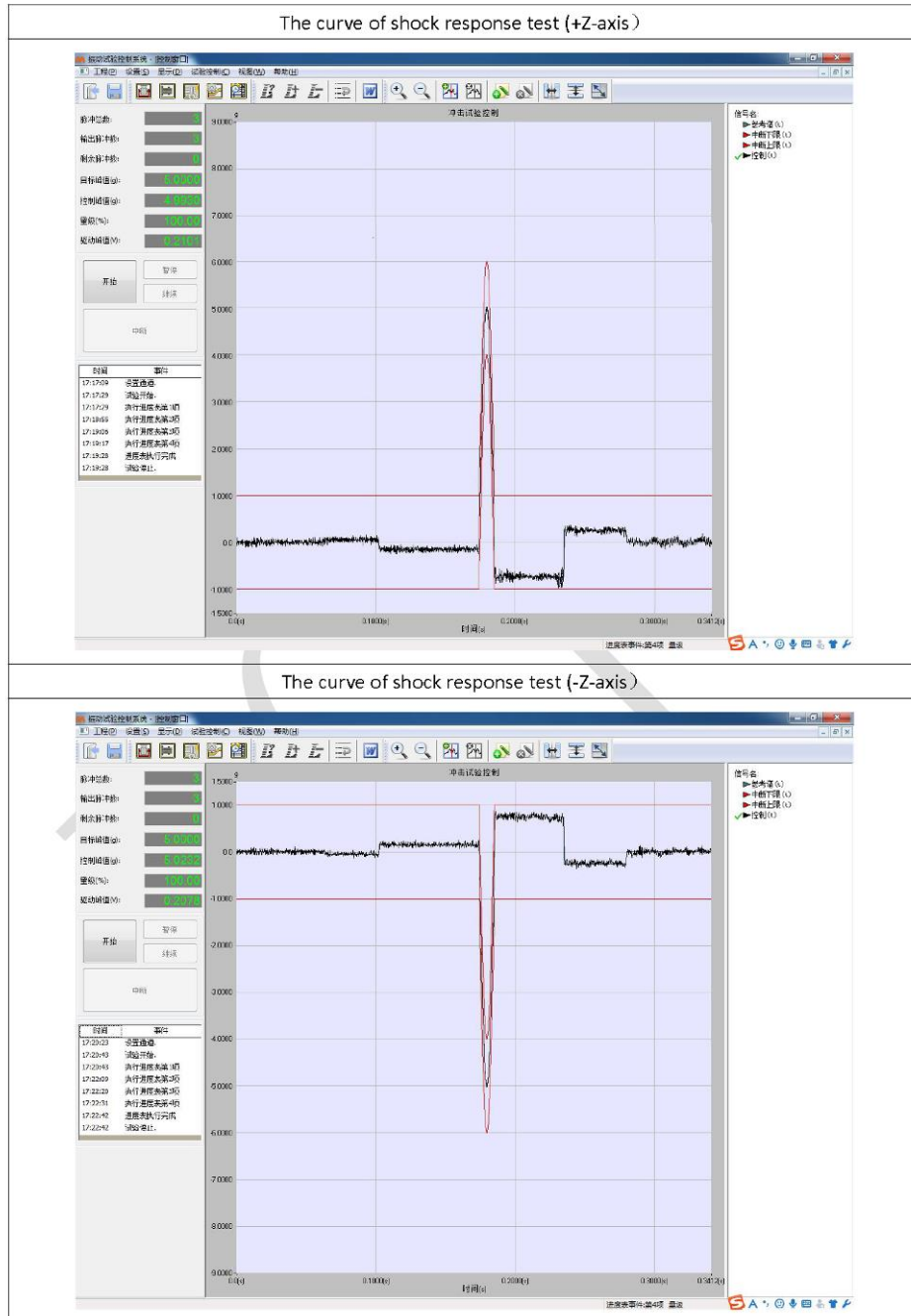
The curves of vibration endurance test (Z-axis)



| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



LCJC-JL-708-02 A/0



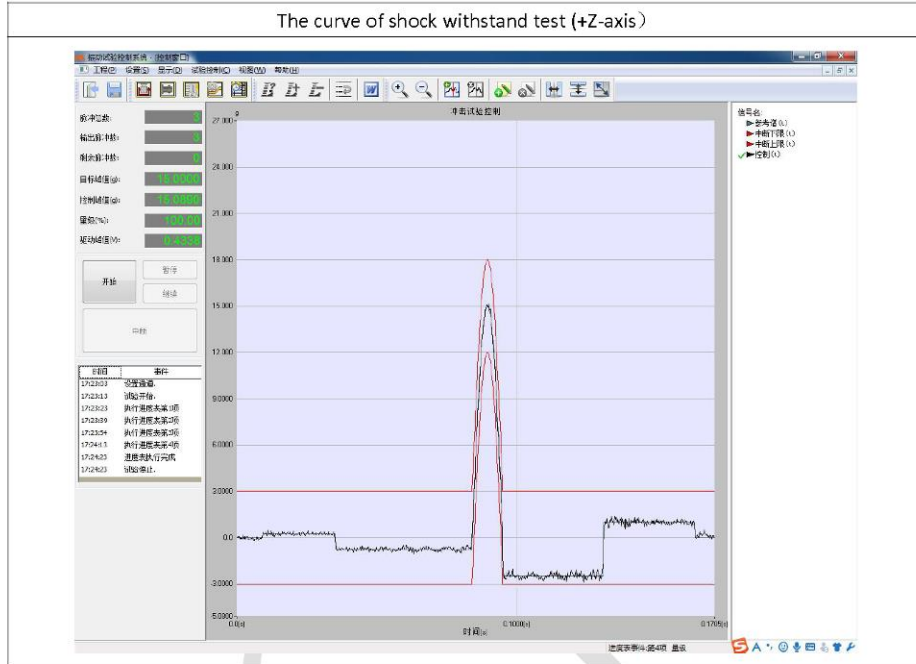


| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

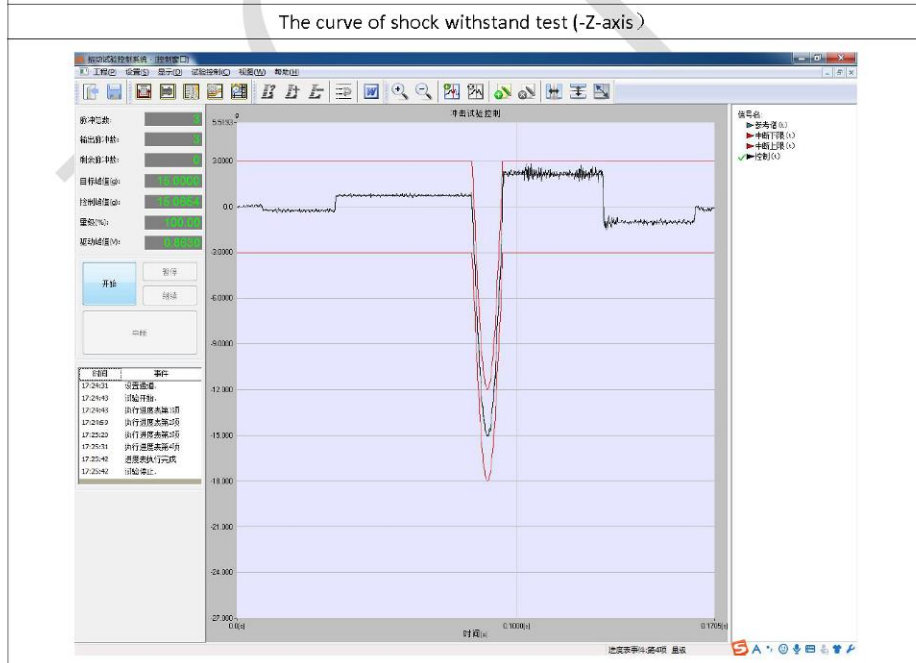


LCJC-JL-708-02 A/0

The curve of shock withstand test (+Z-axis)



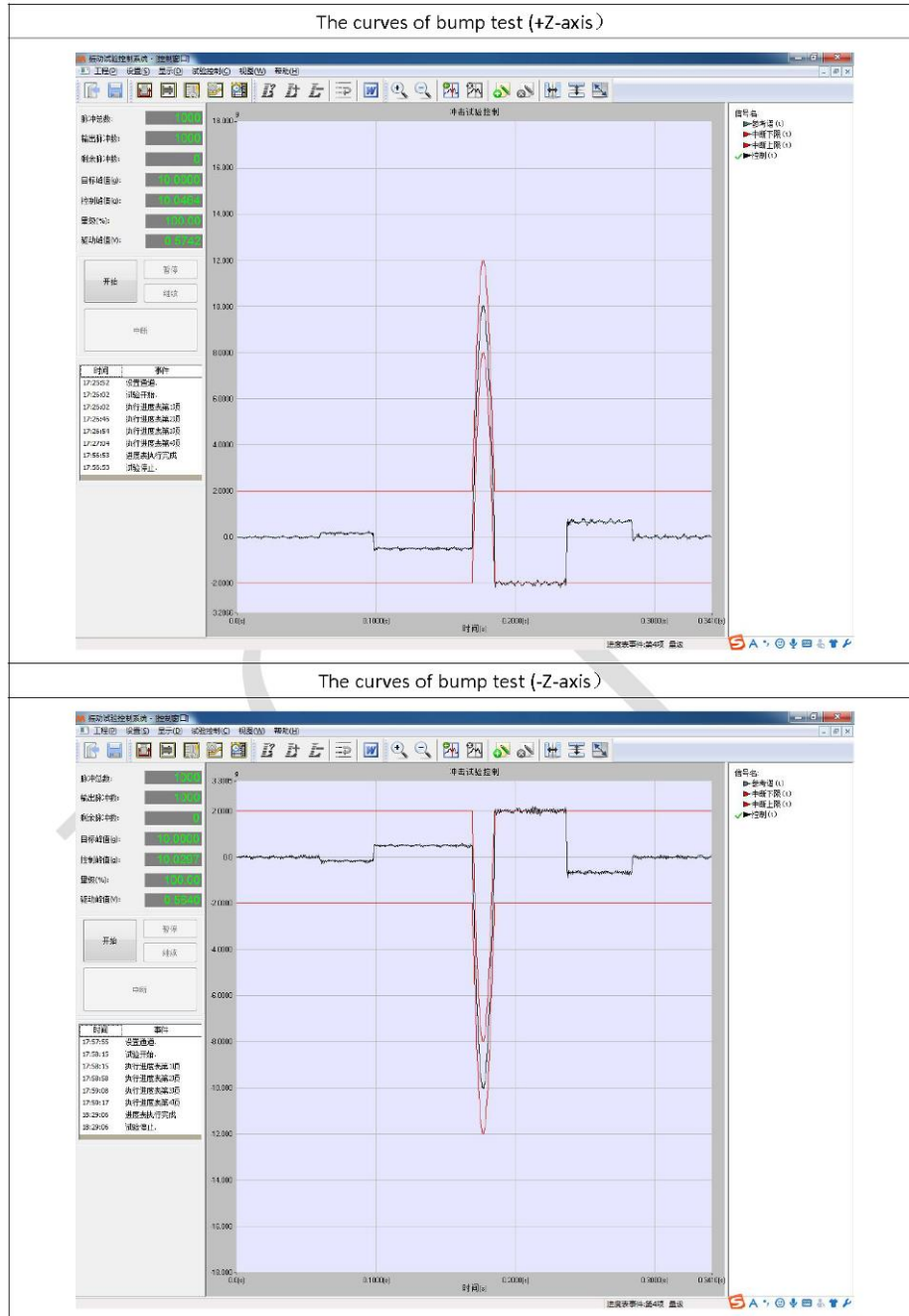
The curve of shock withstand test (-Z-axis)



| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



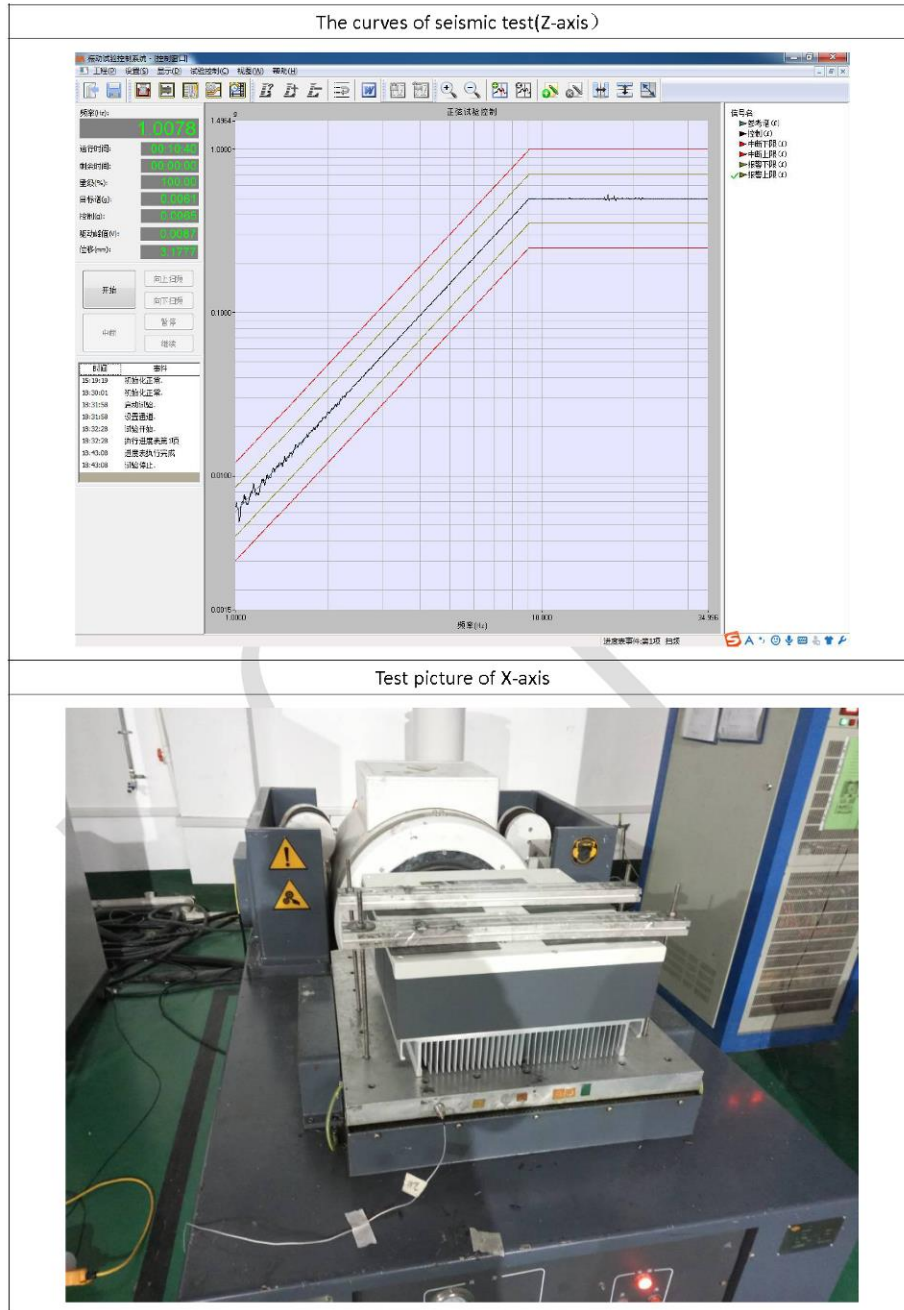
LCJC-JL-708-02 A/0



| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



LCJC-JL-708-02 A/0

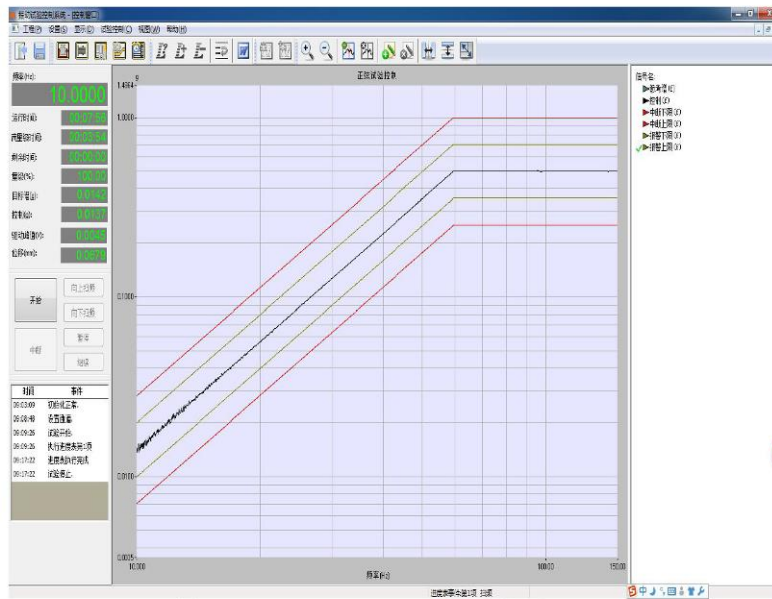


| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

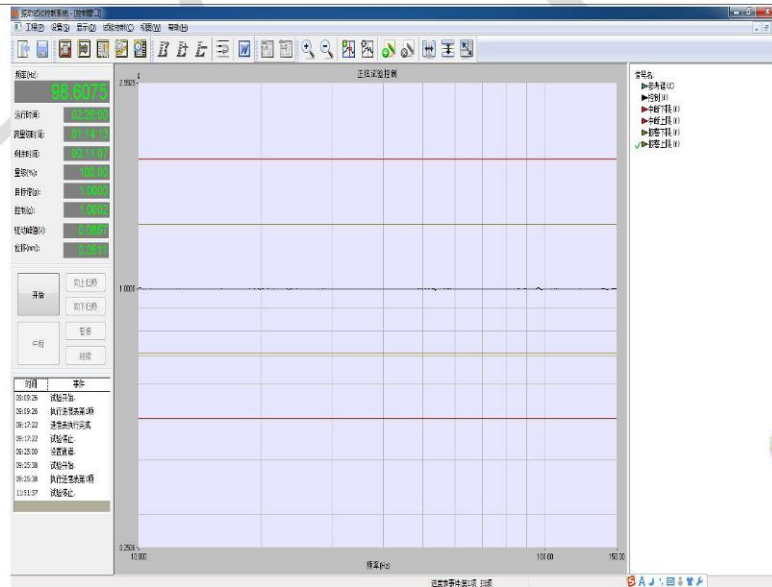


LCJC-JL-708-02 A/0

The curve of vibration response test (X-axis)



The curve of vibration endurance test(X-axis)

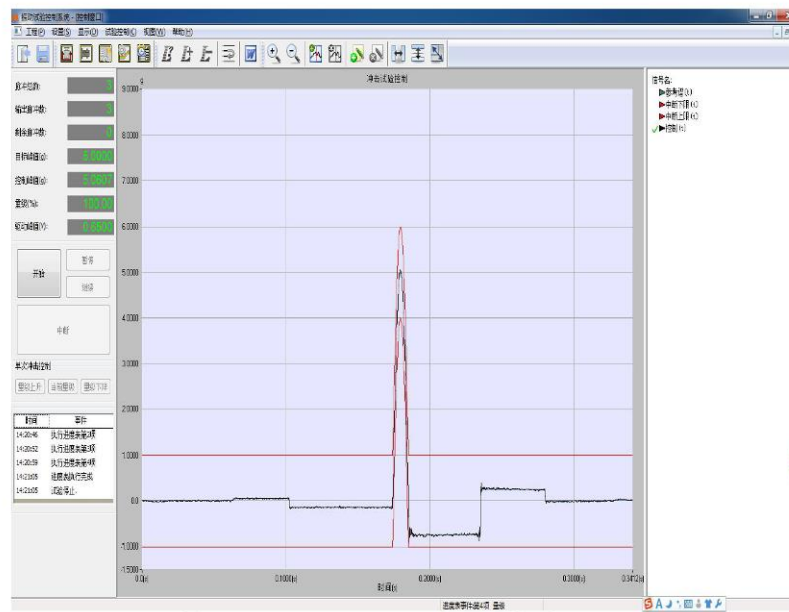


| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

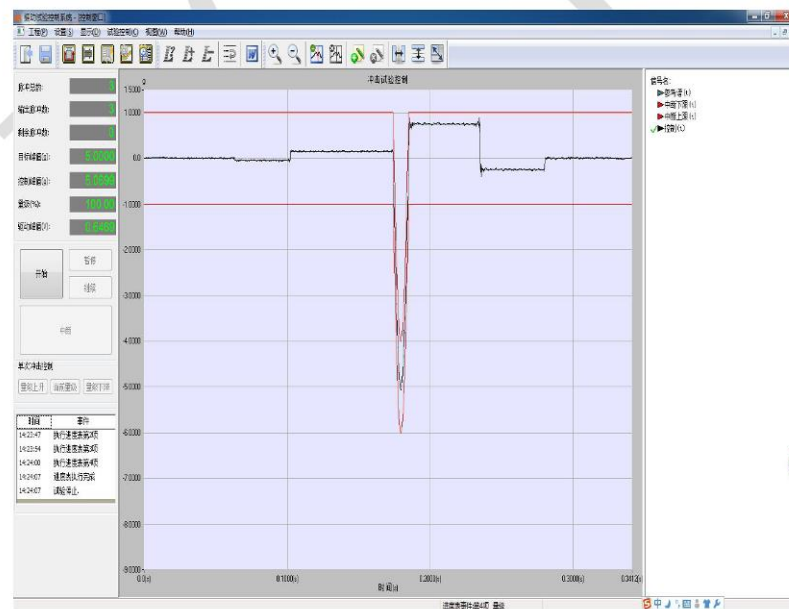


LCJC-JL-708-02 A/0

The curve of shock response test (+X-axis)



The curve of shock response test (-X-axis)

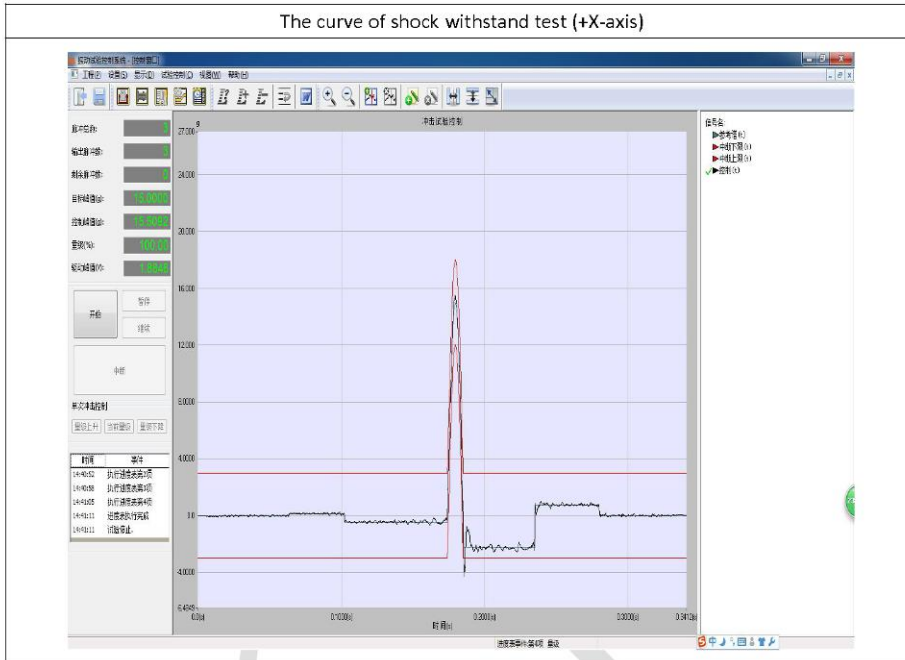


| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

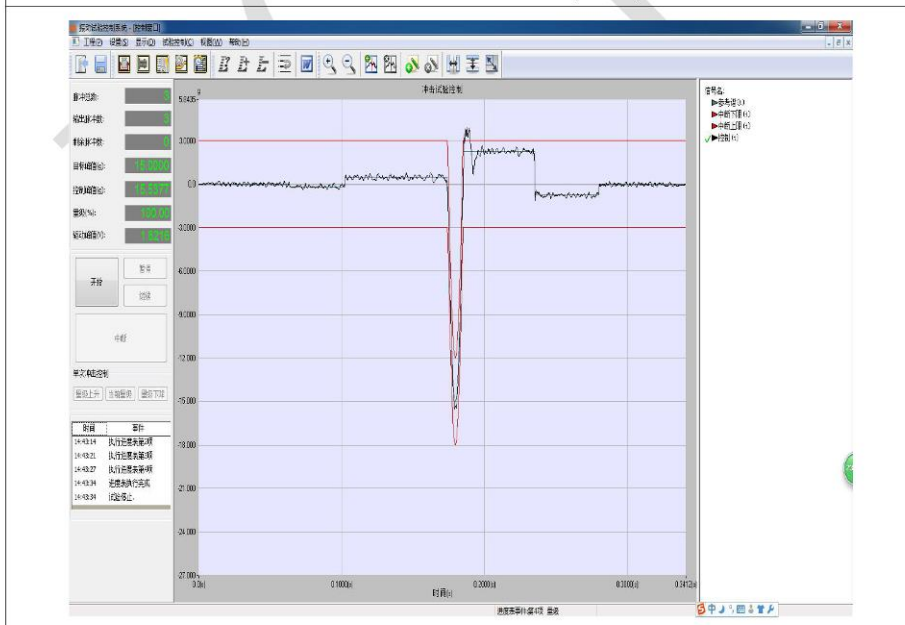


LCJC-JL-708-02 A/0

The curve of shock withstand test (+X-axis)



The curve of shock withstand test (-X-axis)

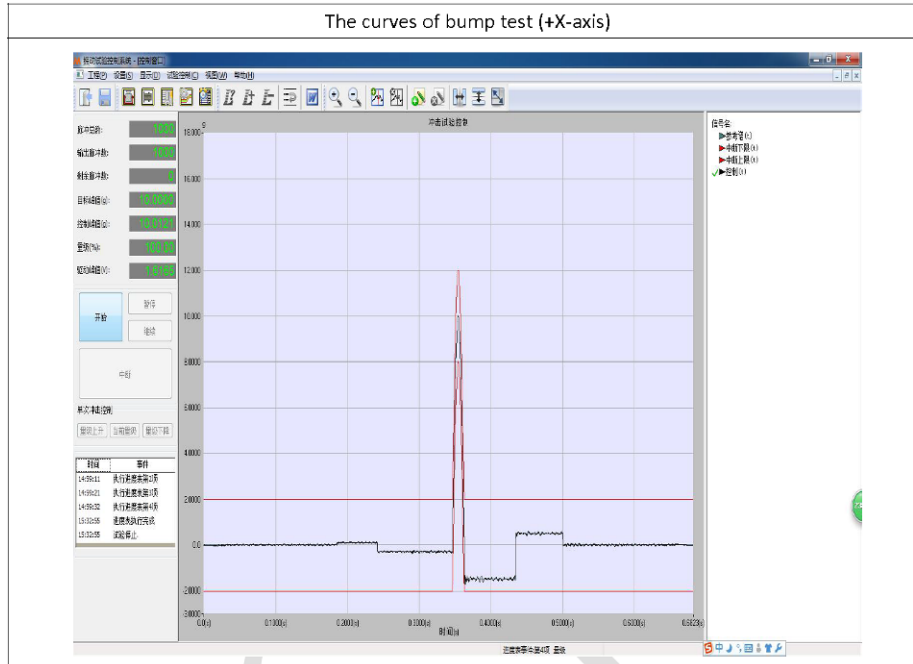


| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

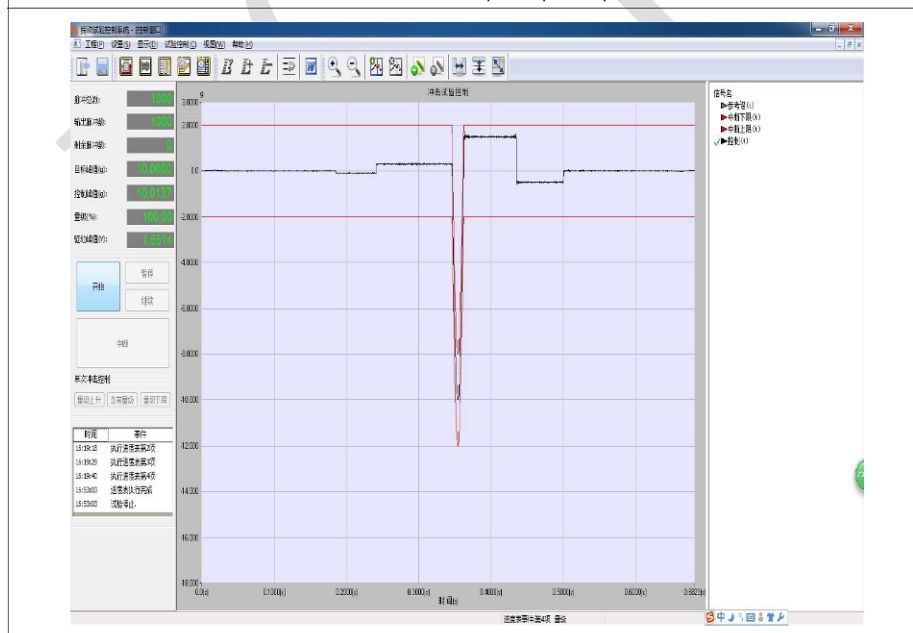


LCJC-JL-708-02 A/0

The curves of bump test (+X-axis)



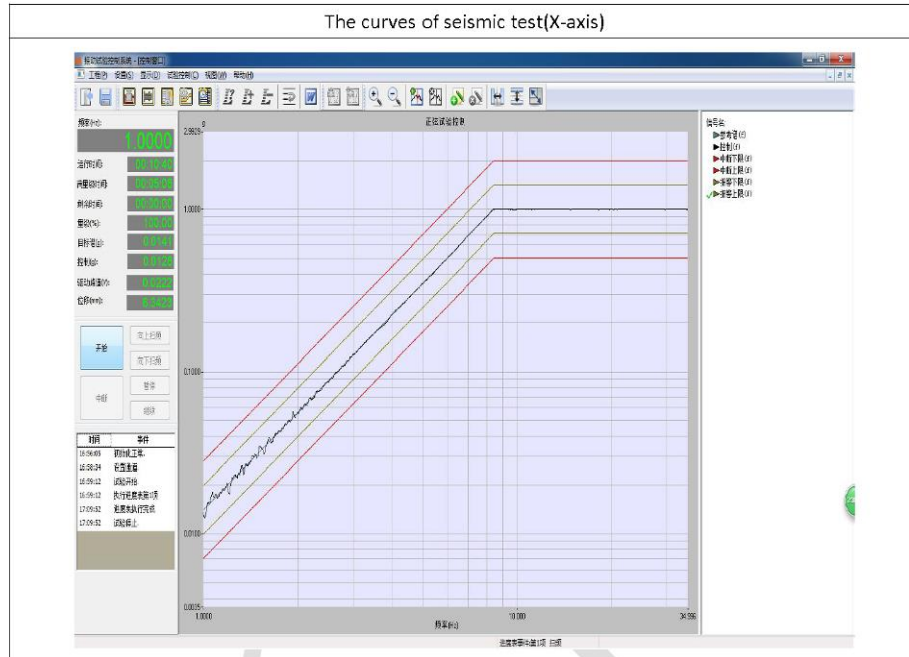
The curves of bump test (-X-axis)



| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



LCJC-JL-708-02 A/0

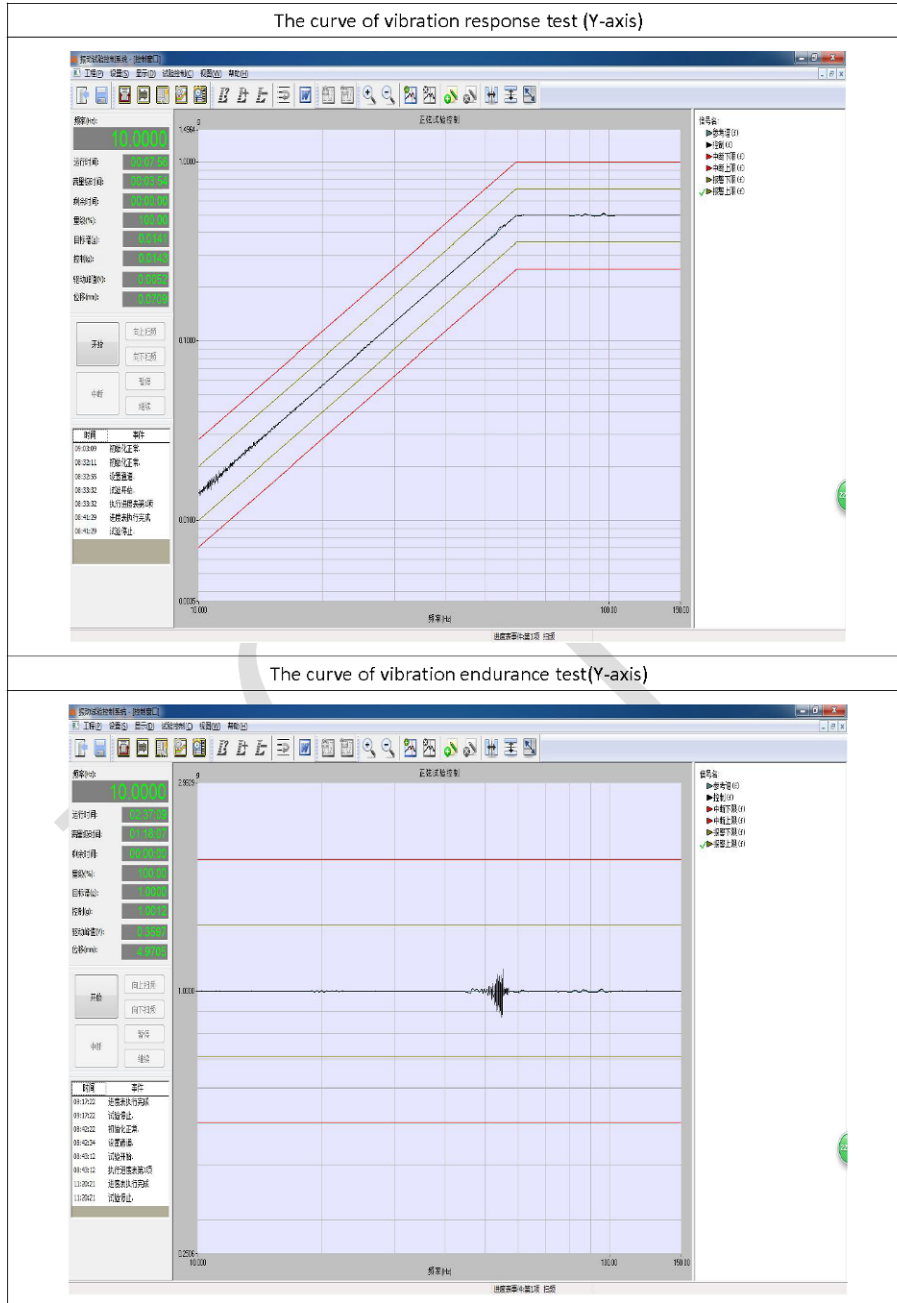




| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



LCJC-JL-708-02 A/0

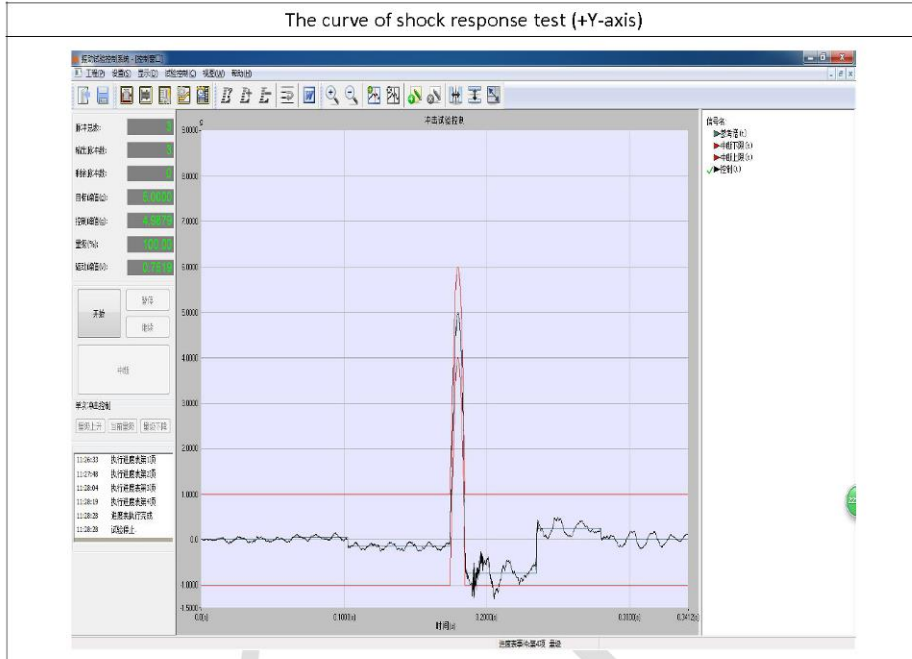


| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



LCJC-JL-708-02 A/0

The curve of shock response test (+Y-axis)



The curve of shock response test (-Y-axis)

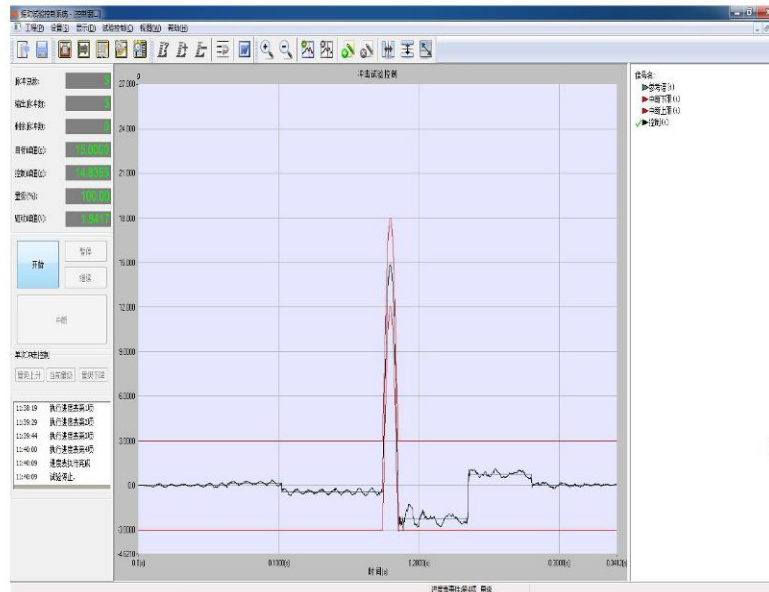


| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

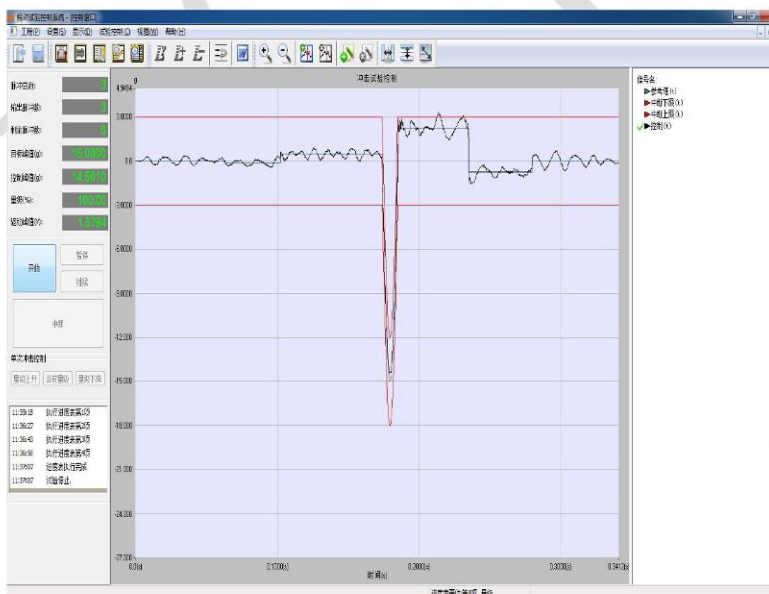


LCJC-JL-708-02 A/0

The curve of shock withstand test (+Y-axis)



The curve of shock withstand test (-Y-axis)

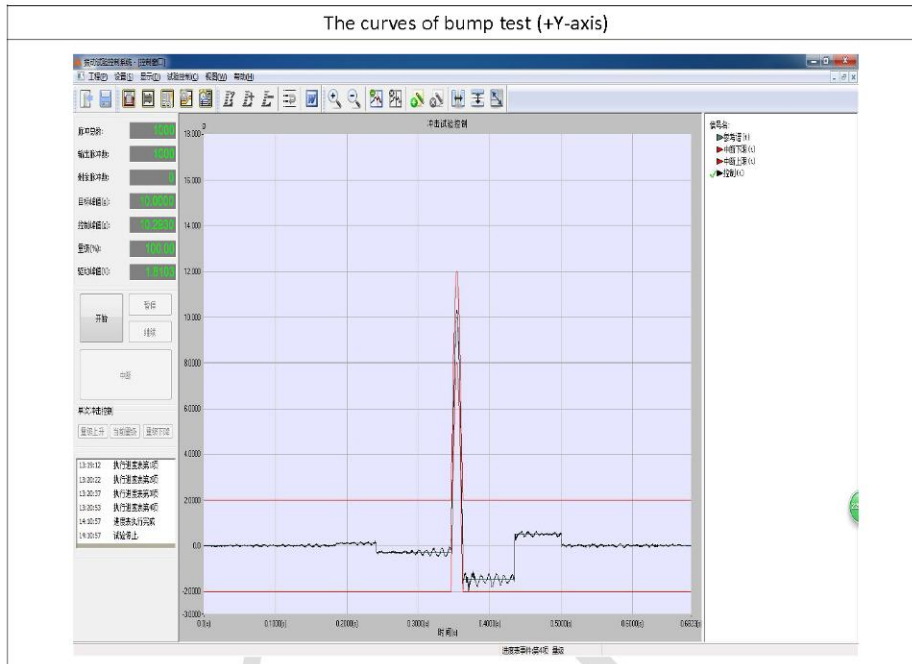


| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

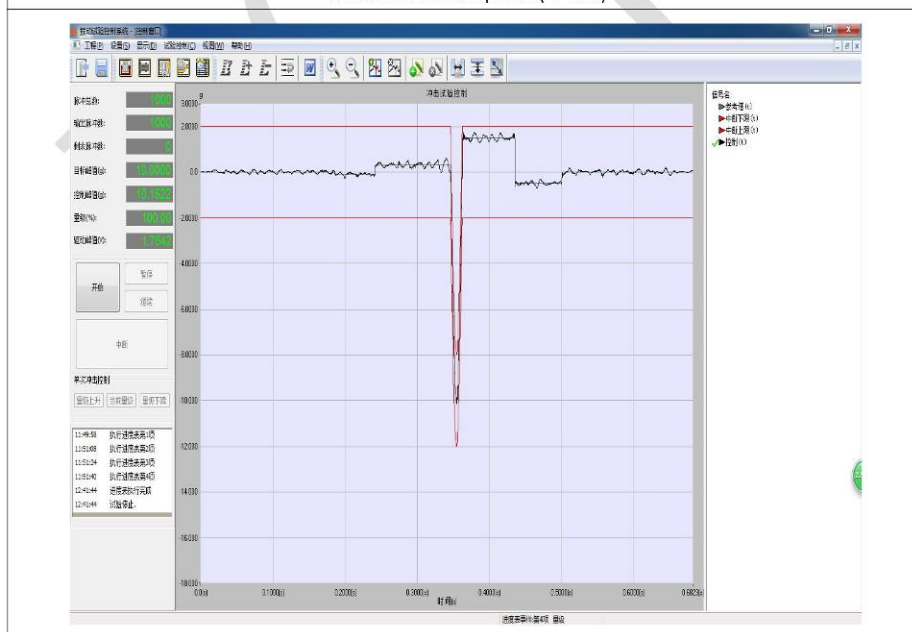


LCJC-JL-708-02 A/0

The curves of bump test (+Y-axis)



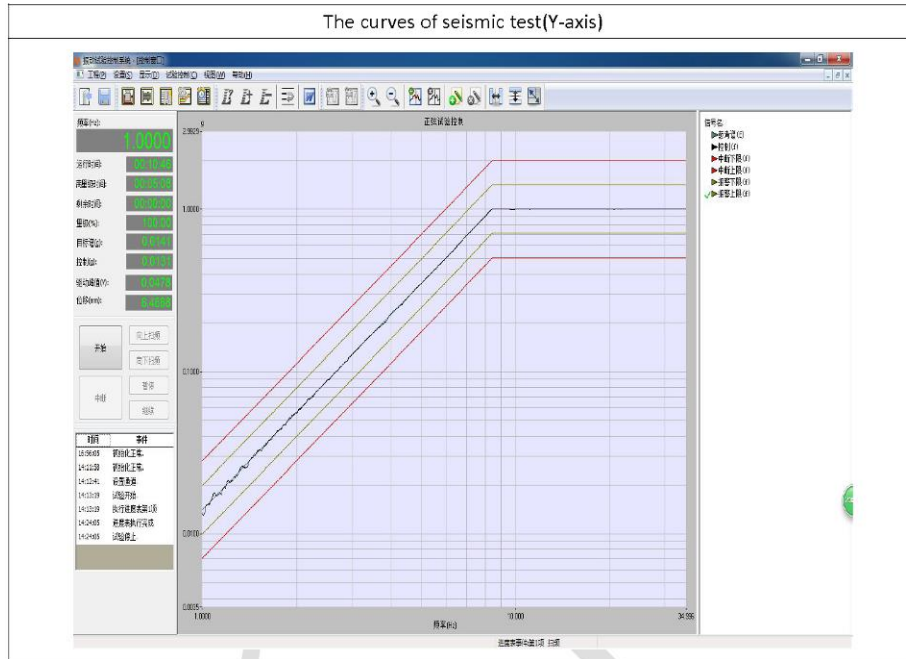
The curves of bump test (-Y-axis)



| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



LCJC-JL-708-02 A/0



**4、TEST EQUIPMENT**

| No. | Equipment Name           | Model     | Calibration Due Date |
|-----|--------------------------|-----------|----------------------|
| 1   | Vibration test equipment | ES-20-320 | Mar. 19, 2019        |

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



LCJC-JL-708-02 A/0

## Declaration

- 1、 The LAB have meet the required of CNAS-CL01:2018(Same as ISO/IEC 17025:2017), and have get the authorize from CNAS, CNAS Number: CNAS L8212, Also get the authorize from ISTA, ISTA ID: 10764;
- 2、 The LAB is responsible for the impartiality of all test data and the confidentiality of client information except the customer disclosure;
- 3、 The LAB is only responsible for the test items entrusted by the client;
- 4、 This report is valid in the condition of having sign of approver, special seal of laboratory testing and Connective seal, The report shall not be partial duplicated without written approval from the LAB except fully copy.
- 5、 The Samples were provided by the client, and the authenticity also is borne by the client, the LAB is only responsible for the test data of the sample;
- 6、 If have any objection to the report, please submit it to the LAB in writing within 15 days after receiving the report;
- 7、 The samples must be take back within 3 months,and the LAB will dipose it after the deadline.
- 8、 Subcontractor and Details: NA;
- 9、 The visual inspection used in this test is visual observation, except for non-visual observation.
- 10、 Conclusion language description:
  - (1) Pass : the samples conform to the requirements of the standard;
  - (2) Fail: the samples do not conform to the requirements of the standard ;
  - (3) / : don't judge or no test standard.
- 11、 Disclaimer: The Verdict of the report is only responsible for the appearance, and LAB shall not bear any risk responsibility for the performance data or function data which were provide by client, such as test data, test result and judgment requirements and so on.

**LAB:** Suzhou Longce Testing Technology Service Co., Ltd.

**ADD:** ( Building 5, National Environmental New & Hi-tech Industrial Park) No.369, Lushan Road,New District, Suzhou, China

**TEL:** 0512-68326317, 89990816

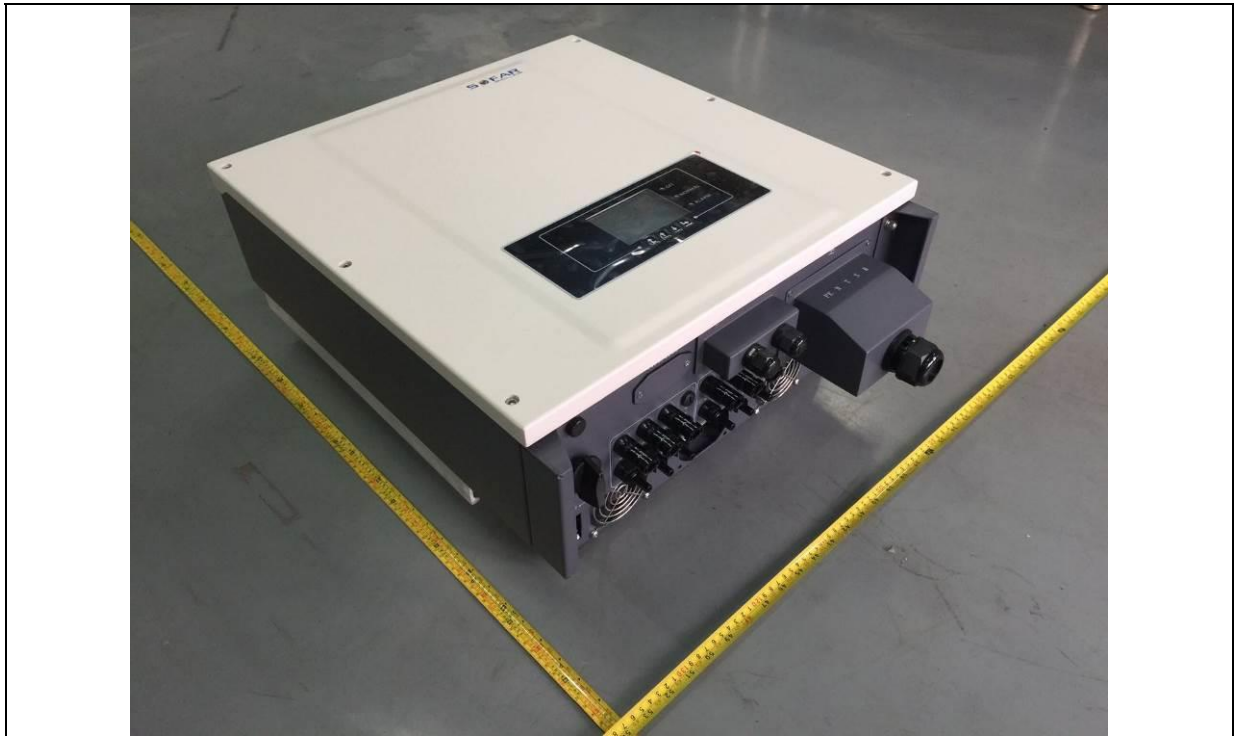
**FAX:** 0512-69200365

**E-mail:** lcjc@szlcjc.com

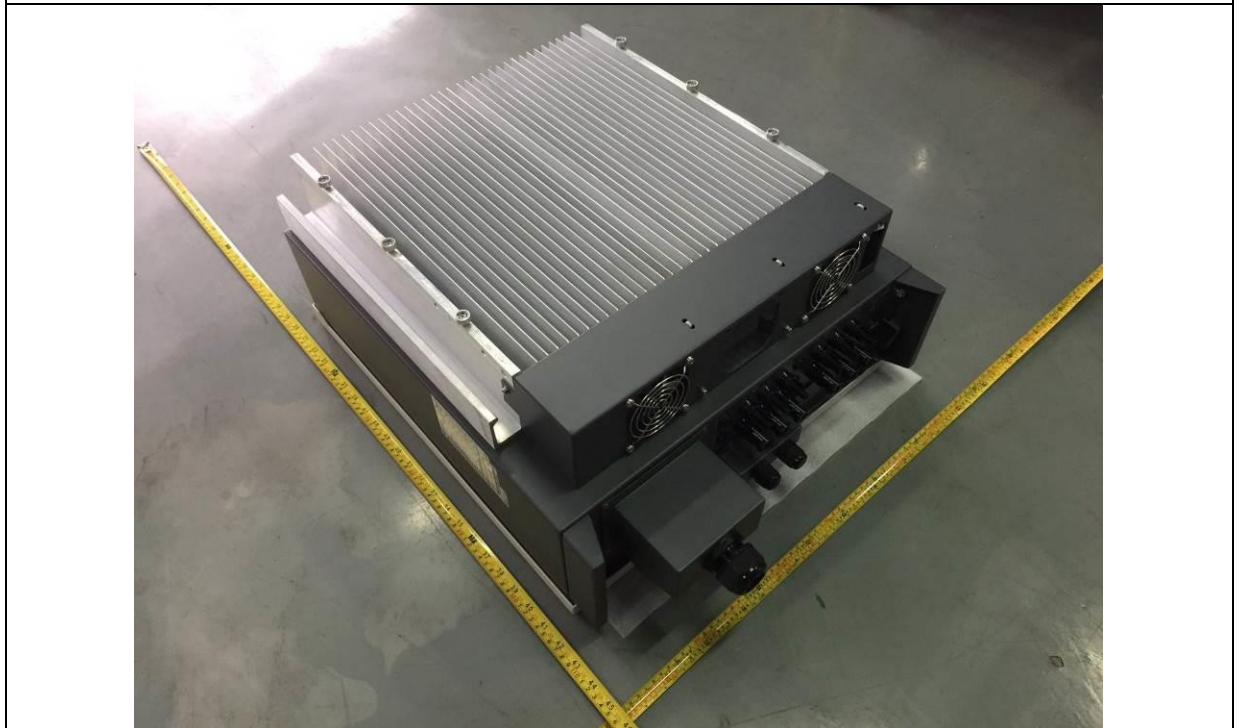
**\*\*\*End of the report\*\*\***

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

**Attachment 2: Pictures**



Enclosure – Front View



Enclosure – Rear View

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



Enclosure – Bottom View



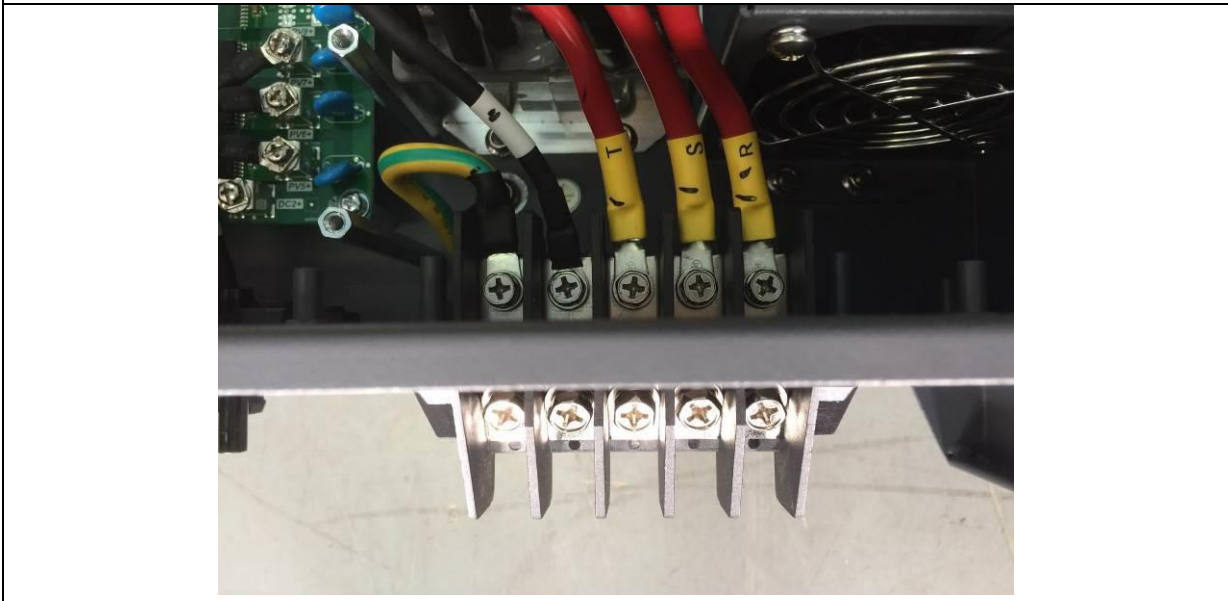
Enclosure – Side View



| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

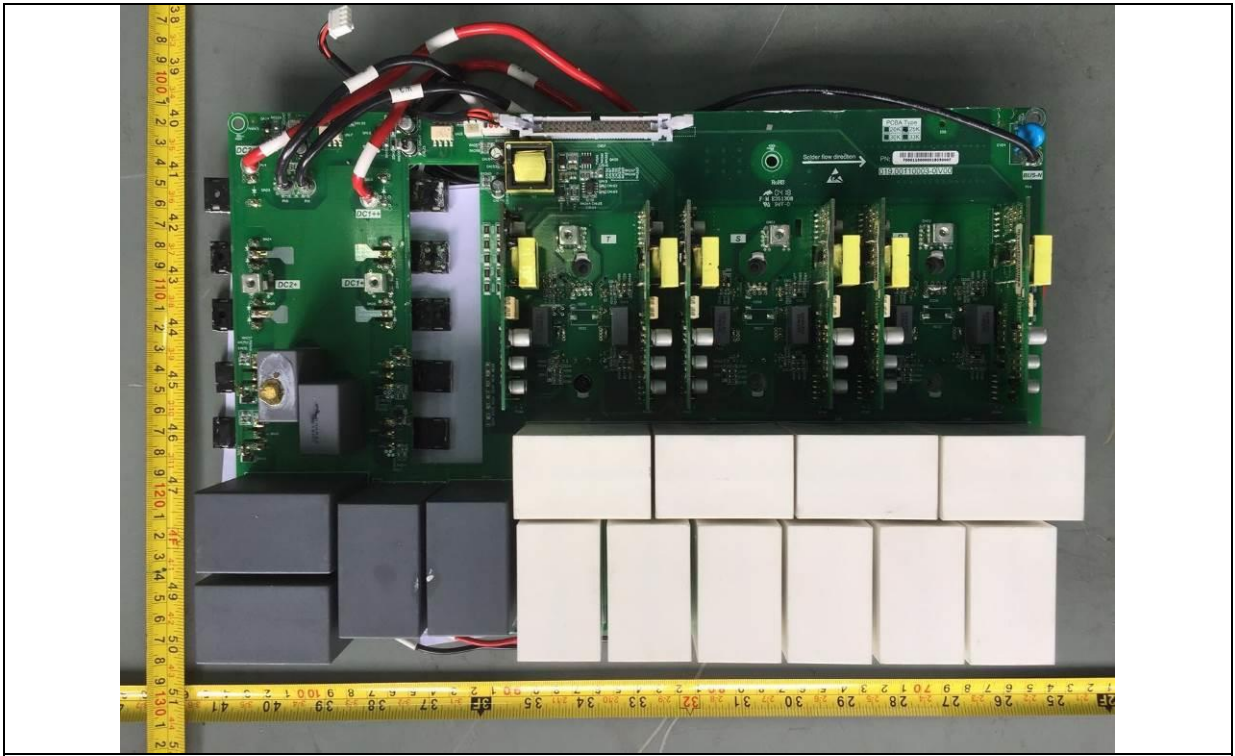


Internal View

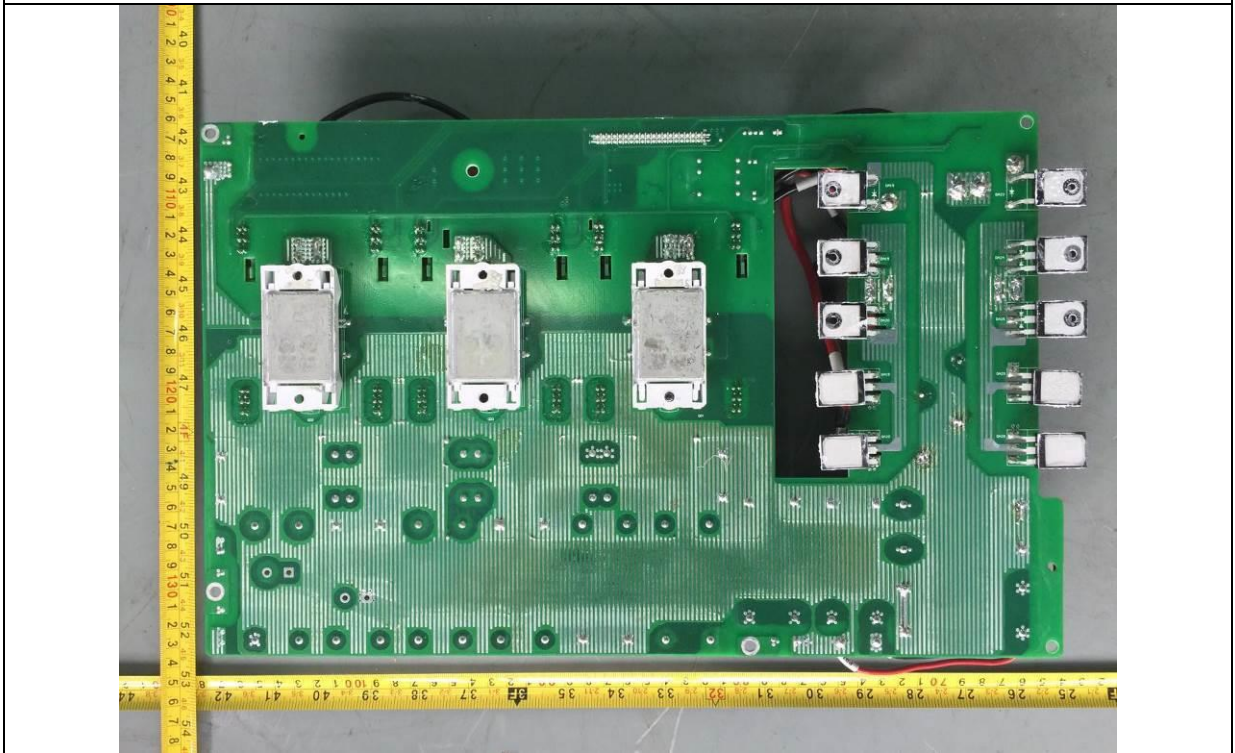


AC Output Terminal Blocks

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

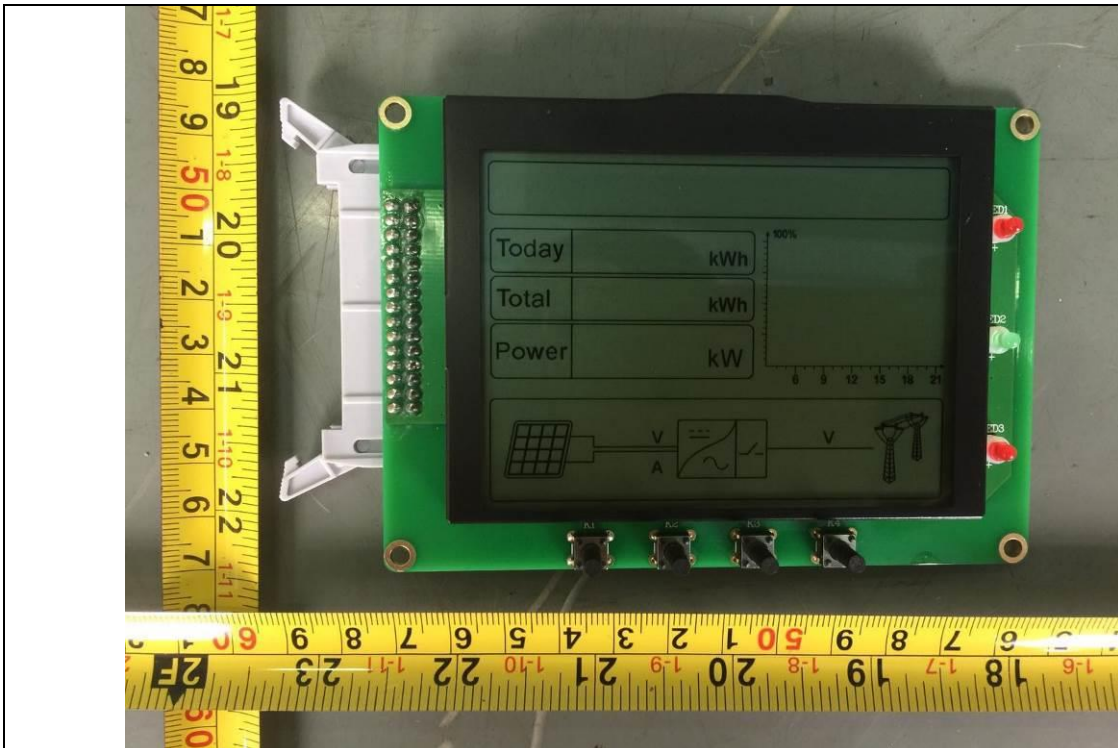


Main Board – Component Side

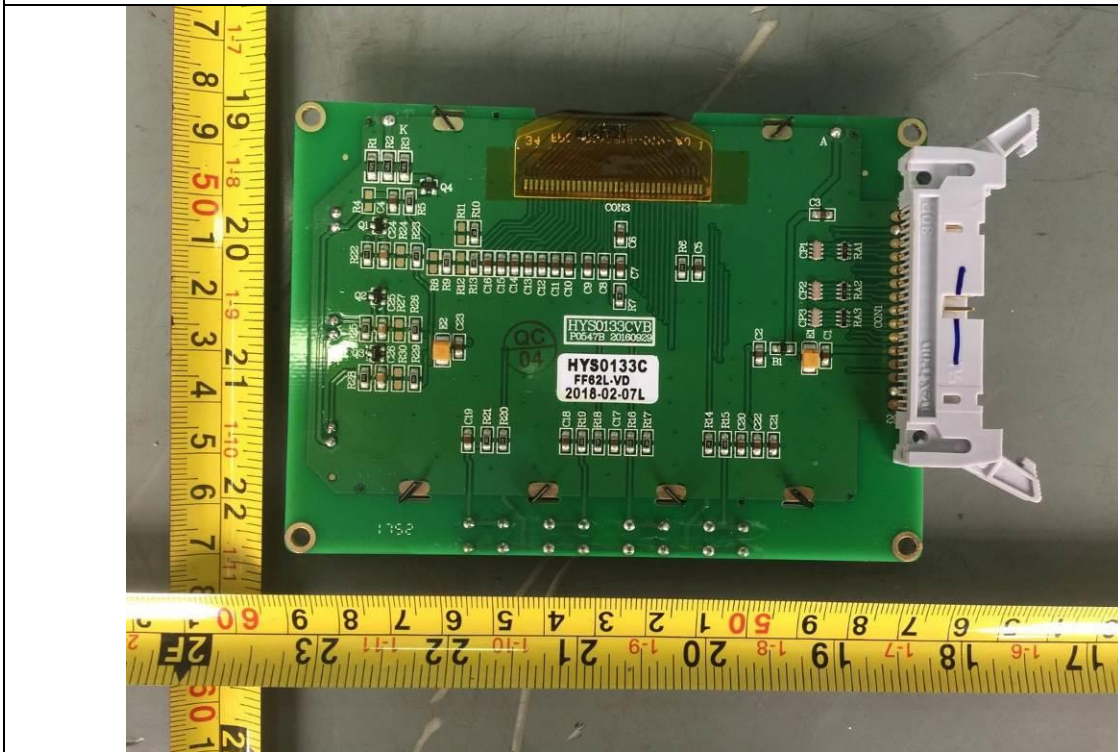


Main Board – Solder Side

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

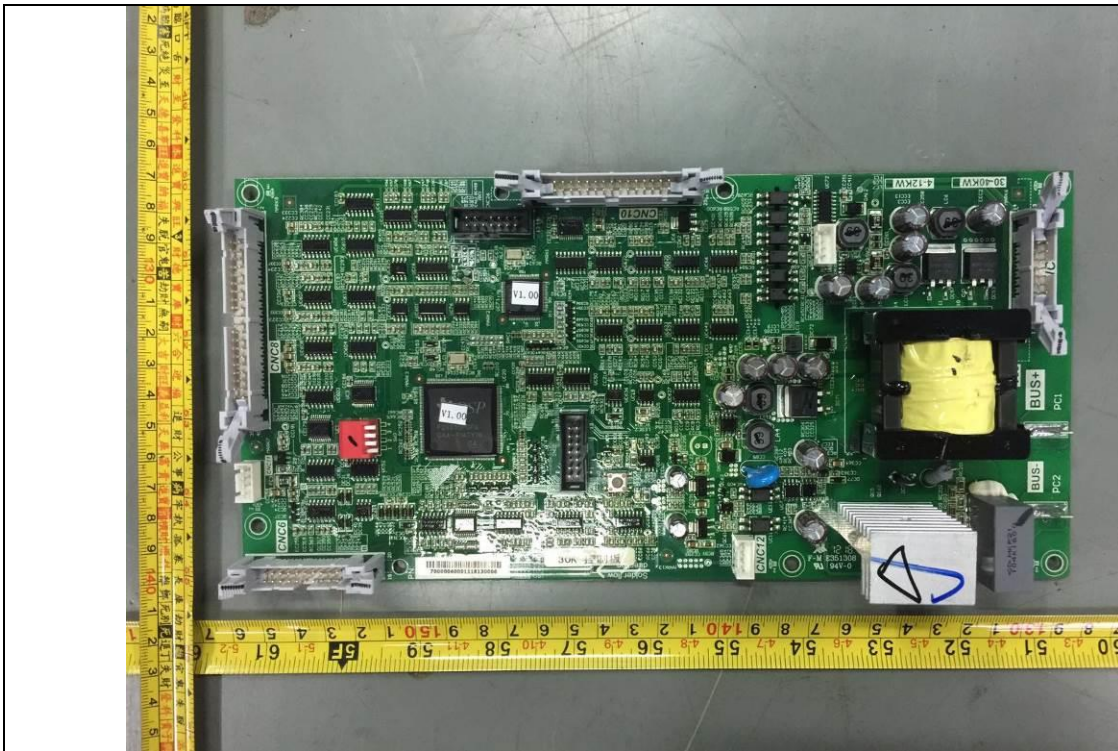


LCD Board – Component Side

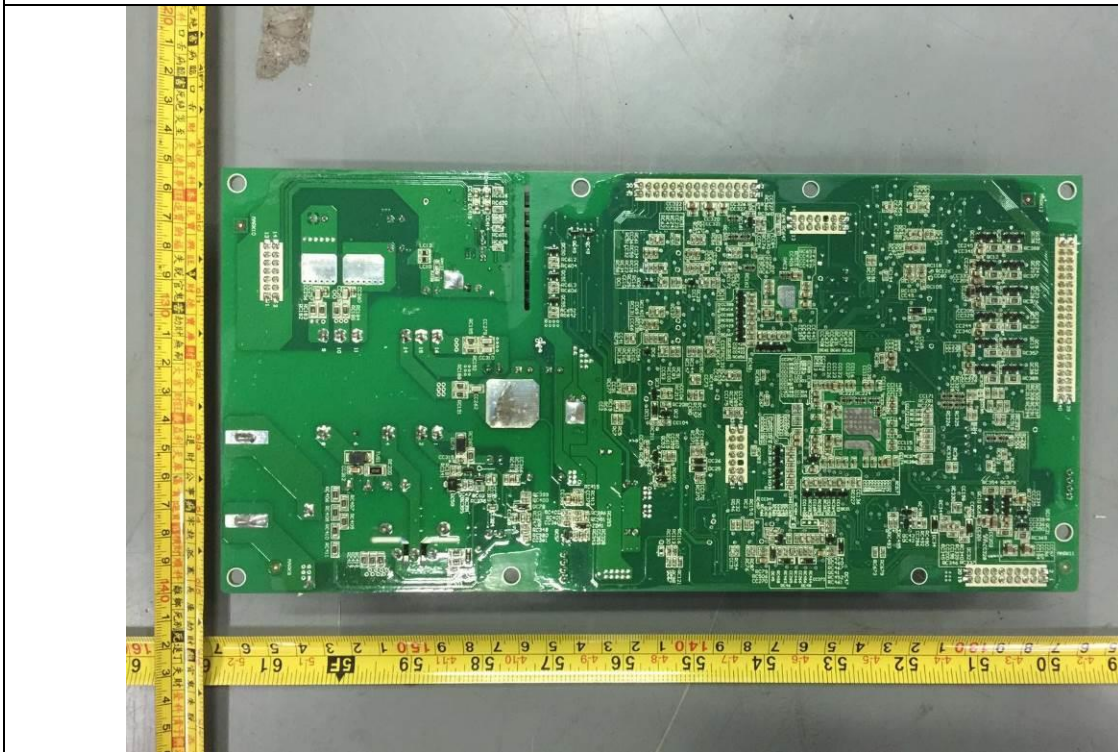


LCD Board – Solder Side

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

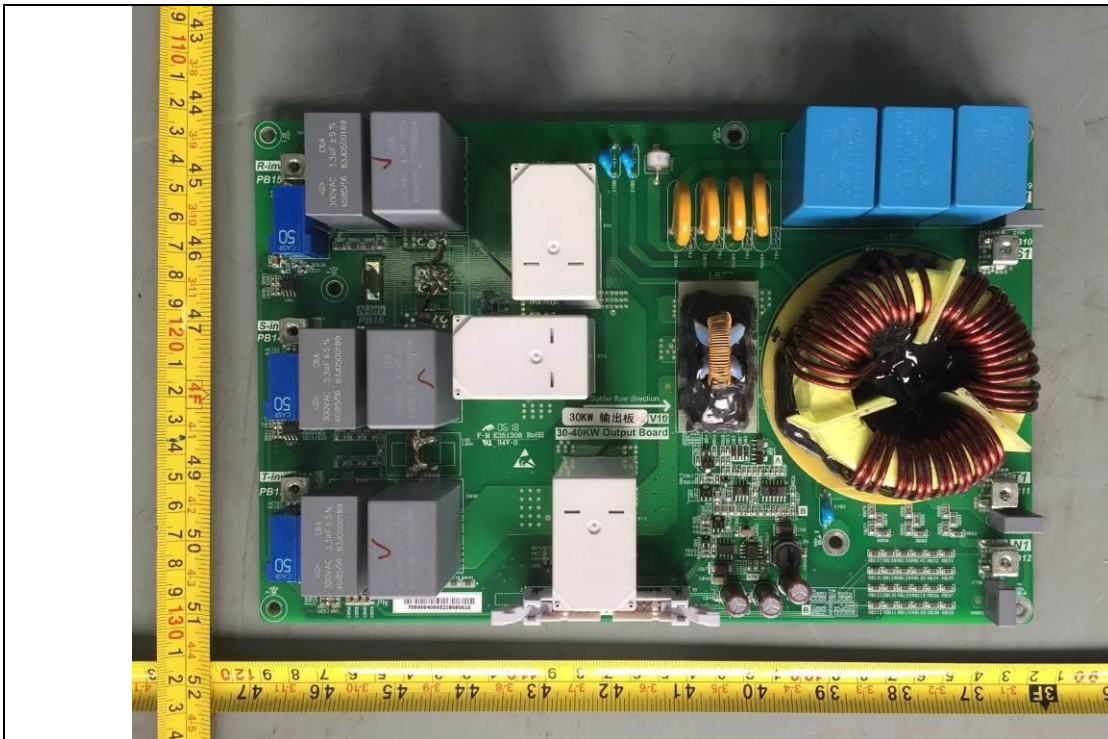


Control Board – Component Side

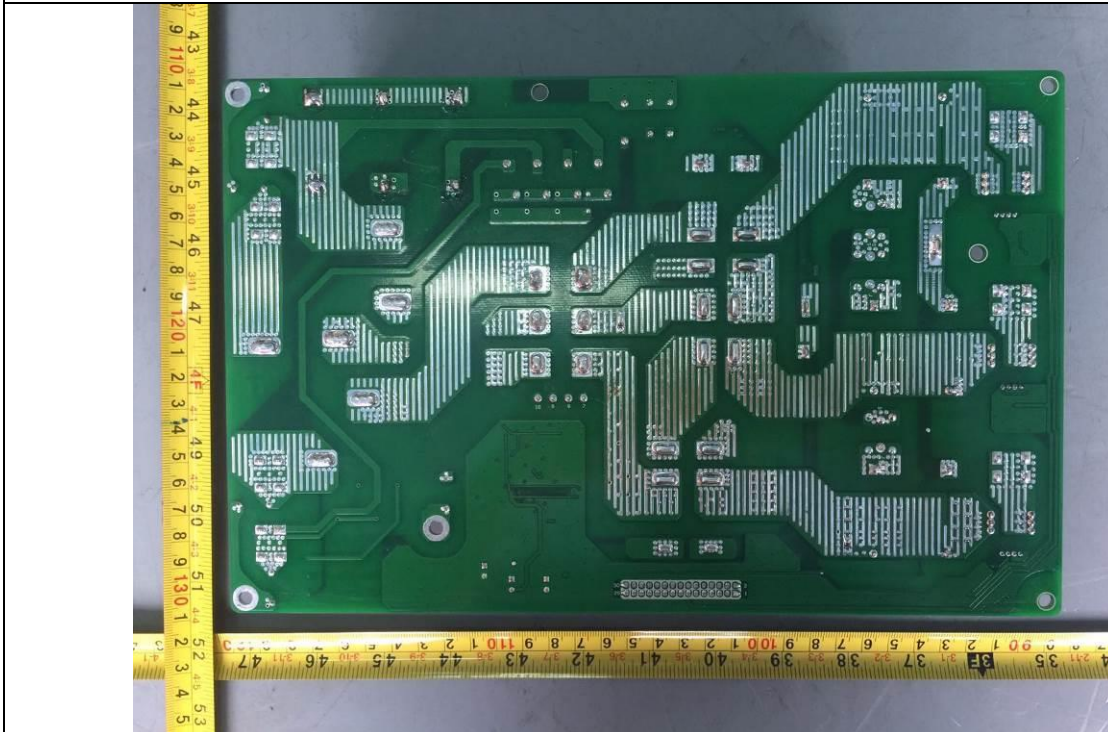


Control Board – Solder Side

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

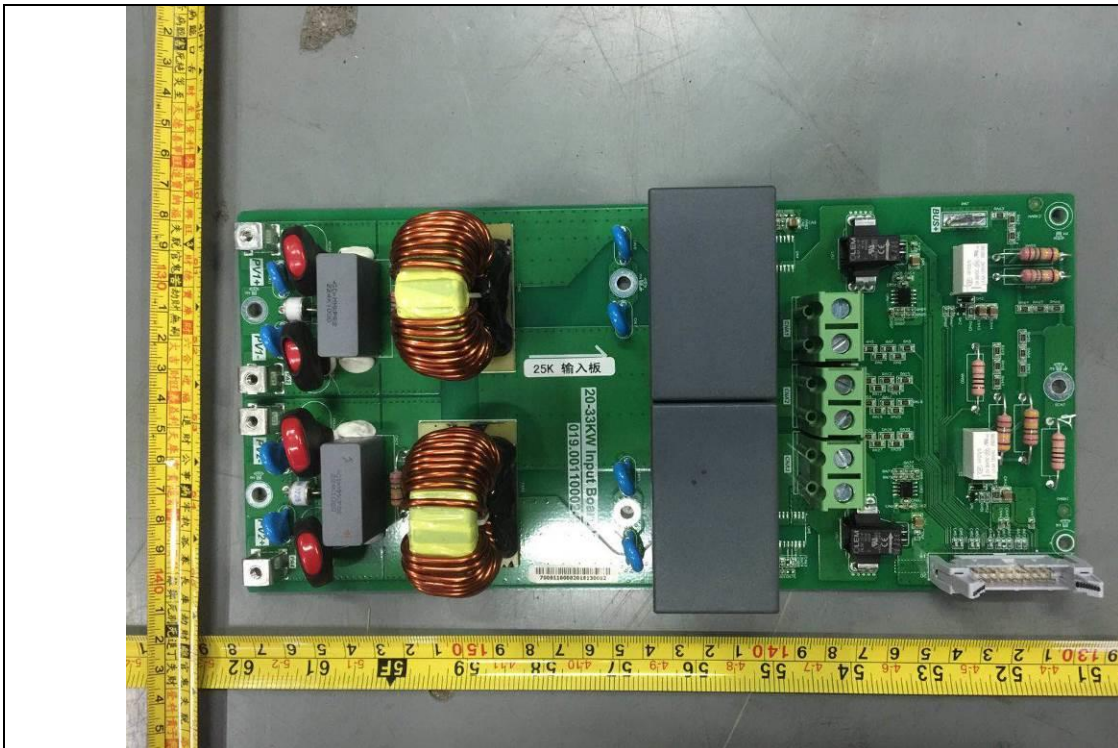


AC Output Board – Component Side

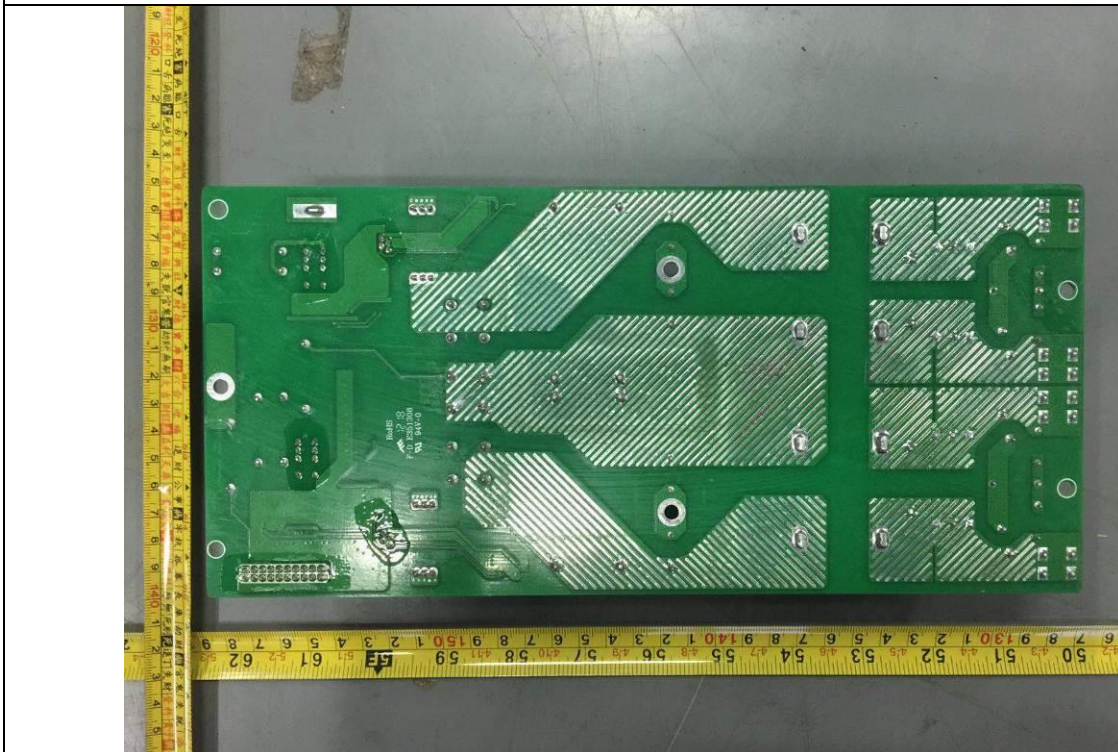


AC Output Board – Solder Side

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

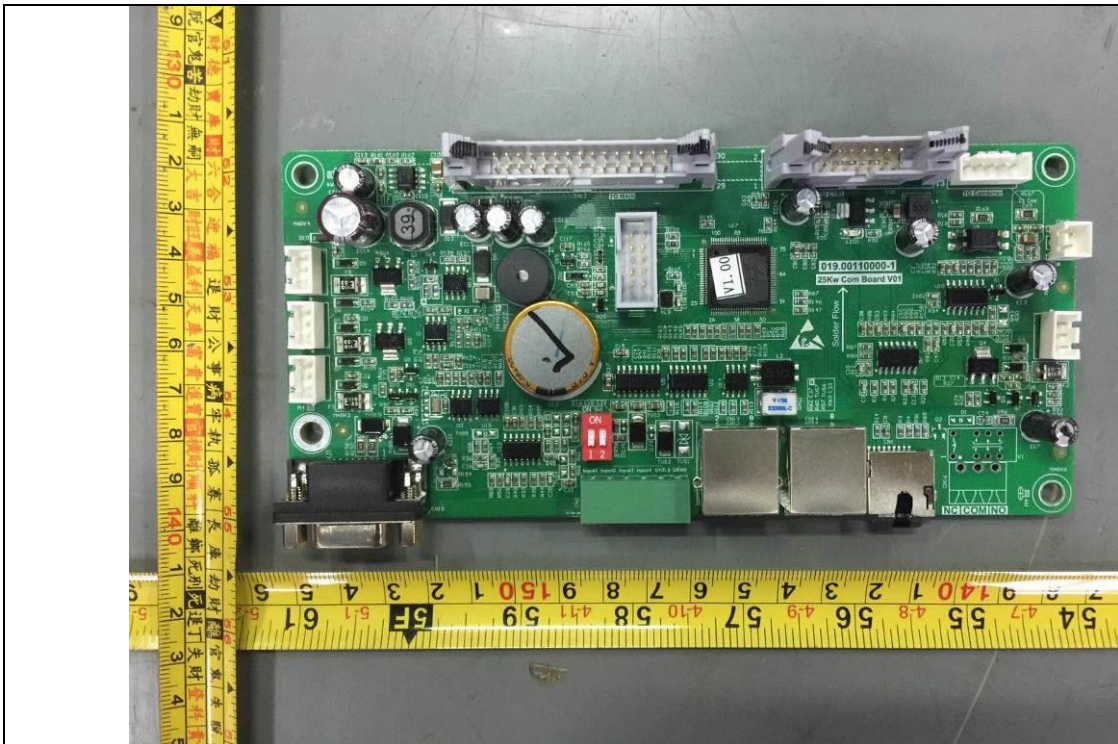


PV Input Board – Component Side

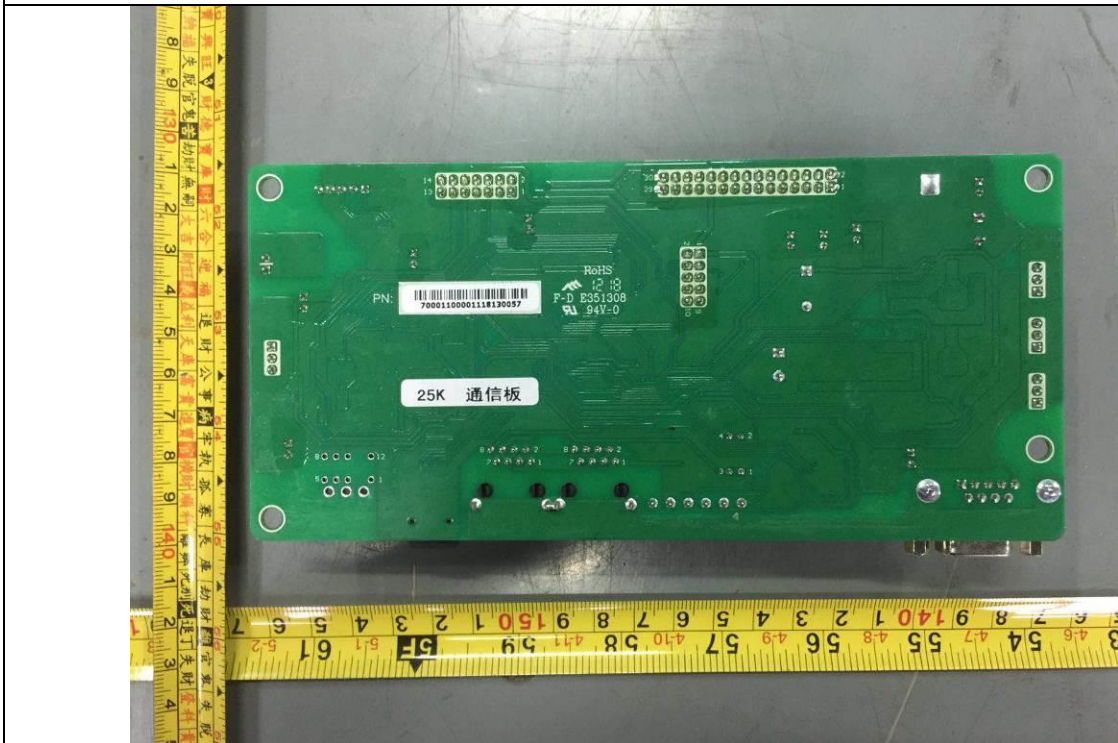


PV Input Board – Solder Side

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |

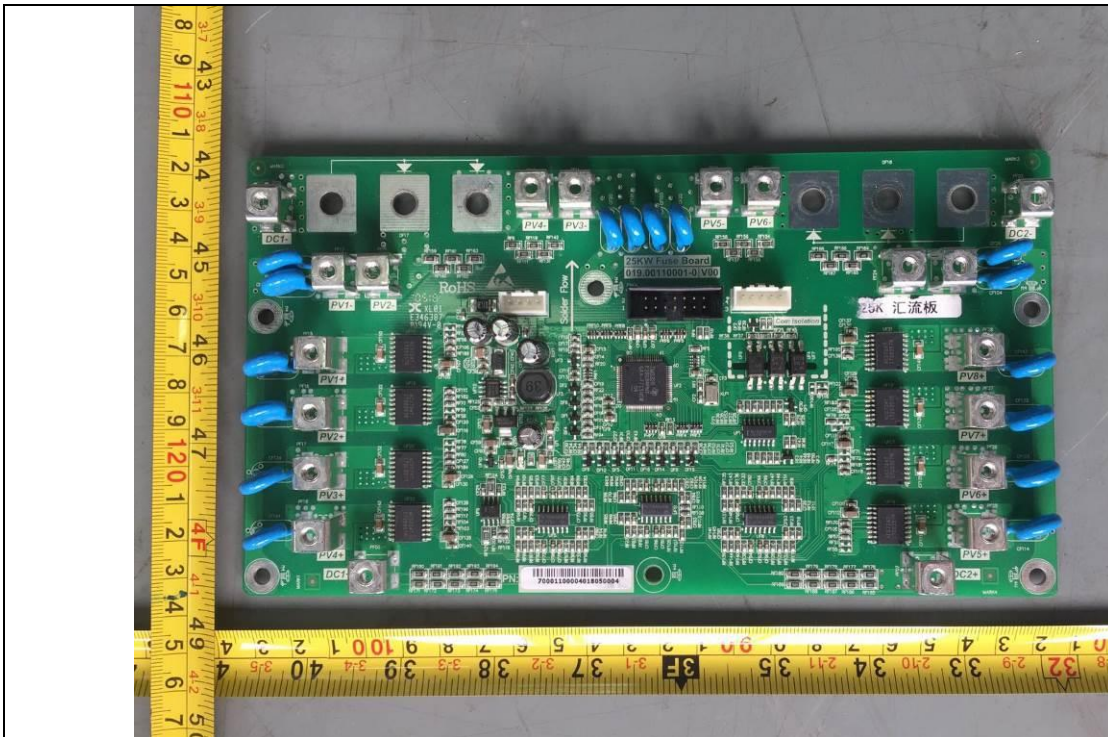


Communication Board – Component Side

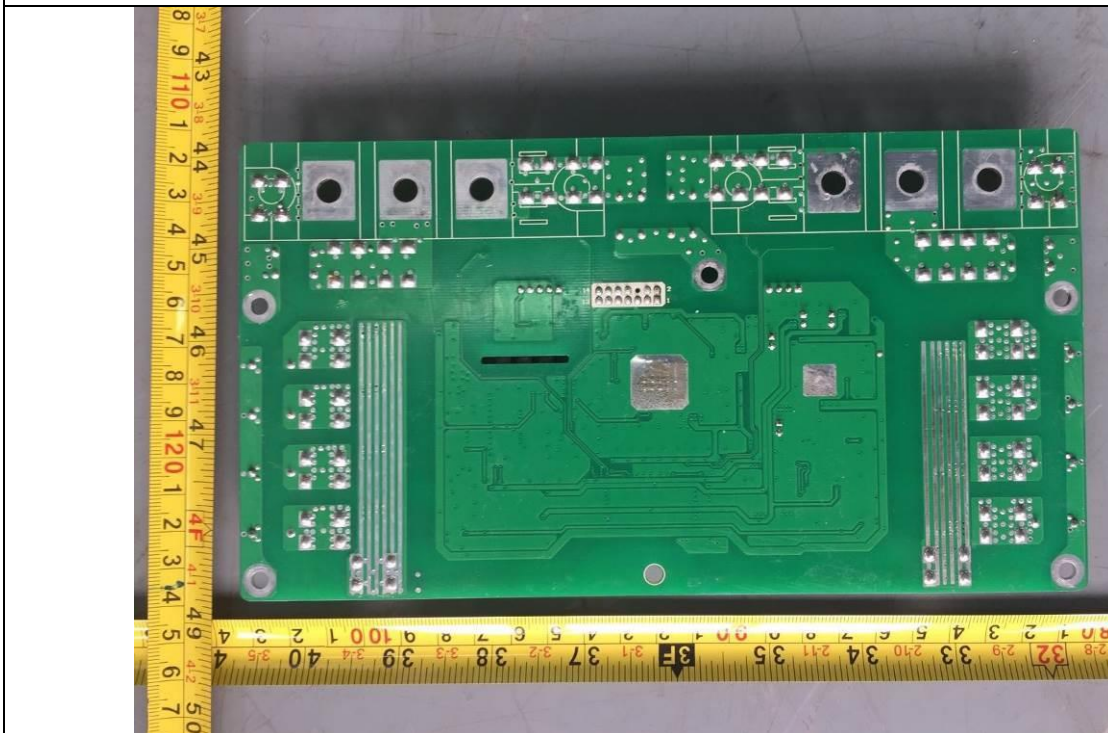


Communication Board – Solder Side

| IEC 60255-27 |                    |                 |         |
|--------------|--------------------|-----------------|---------|
| Clause       | Requirement + Test | Result - Remark | Verdict |



Junction Board – Component Side



Junction Board – Solder Side

-----END-----