

APPLICATION FOR LOW VOLTAGE DIRECTIVE

On Behalf of

INVT POWER SYSTEM (SHENZHEN) CO., LTD

Uninterruptible Power Systems

**Model(s): HR1105XL, HR1105XS, HR1106XL, HR1106XS, HR1108XL, HR1108XS,
HR1110XL, HR1110XS**

**Prepared For : INVT POWER SYSTEM (SHENZHEN) CO., LTD
5# Building, Gaofa Industrial Park, Longjing, Nanshan District,
Shenzhen 518055, China**

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| TEST REPORT IEC 62040-1 Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS | |
|--|---|
| Report Number | ES170314008S |
| Date of issue | April 18, 2017 |
| Total number of pages | 72 pages |
| Applicant's name | INVT POWER SYSTEM (SHENZHEN) CO., LTD |
| Address | 5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055 |
| Test specification: | |
| Standard | IEC 62040-1:2008 (First Edition) + Am 1:2013 |
| Test procedure | Test report |
| Non-standard test method | N/A |
| Test Report Form No. | IEC62040_1C |
| Test Report Form(s) Originator | TÜV Rheinland Japan Ltd. |
| Master TRF | Dated 2014-01 |
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| Test item description | Uninterruptible Power Systems |
| Trade Mark | INVT |
| Manufacturer | INVT Power System (Shenzhen) Co., LTD 5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055 |
| Model/Type reference | HR1105XL, HR1105XS, HR1106XL, HR1106XS, HR1108XL, HR1108XS, HR1110XL, HR1110XS |
| Ratings | See the rating label |

| | | |
|---|--|--|
| Testing procedure and testing location: | | |
| <input checked="" type="checkbox"/> | CB Testing Laboratory: | EMTEK (Shenzhen) Co., Ltd |
| Testing location/ address | | Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China |
| <input type="checkbox"/> | Associated CB Testing Laboratory: | |
| Testing location/ address | | |
| Tested by (name + signature) | | James Dan |
| Approved by (name + signature) | | William Guo |
|  | | |
| <input type="checkbox"/> | Testing procedure: TMP | |
| Testing location/ address | | |
| Tested by (name + signature) | | |
| Approved by (name + signature) | | |
| <input type="checkbox"/> | Testing procedure: WMT | |
| Testing location/ address | | |
| Tested by (name + signature) | | |
| Witnessed by (name + signature) | | |
| Approved by (name + signature) | | |
| <input type="checkbox"/> | Testing procedure: SMT | |
| Testing location/ address | | |
| Tested by (name + signature) | | |
| Approved by (name + signature) | | |
| Supervised by (name + signature) .. | | |

List of Attachments (including a total number of pages in each attachment):

- Pages 1 to 62 for IEC 62040-1 TRF (main report)
- Pages 63 to 64 for Appendix 1: European group differences and national differences
- Pages 65 to 72 for Appendix 2: Product photo

Summary of testing:

From the result of our tests on the submitted samples, we conclude they comply with the requirements of the standards IEC 62040-1:2008 (First Edition) + Am 1:2013

Tests performed (name of test and test clause):

EN 62040-1:2008+A1:2013
IEC 62040-1:2008+A1:2013

Testing location:

**EMTEK (Shenzhen) CO., LTD.
Bldg 69, Majialong Industry Zone, Nanshan
District, Shenzhen, Guangdong, China**

Summary of compliance with National Differences




List of countries addressed: Group differences and national differences for CENELEC countries were checked.

- The product fulfils the requirements of EN 62040-1: 2008+A1: 2013.

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.

1. Rating label for model HR1110XL:

| | |
|---|--|
| invt UNINTERRUPTIBLE POWER SUPPLY(UPS) | |
| MODEL: | HR1110XL |
| CAPACITY: | 10KVA |
| AC Input: | 200/208/220/230/240Vac,60Amax,1Φ+N+PE,50/60Hz |
| Batt.Input: | 192Vdc,66A |
| AC Output: | 200~240Vac,46A,1Φ+N+PE,50/60Hz,10KVA/10KW |
|  |   Made In China |




Icc<10kA
 Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD
 Address: 5th Floor,1#Building,Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055
 Importer: xxx
 Address: xxx

2. Rating label for model HR1108XL:

| | |
|---|--|
| invt UNINTERRUPTIBLE POWER SUPPLY(UPS) | |
| MODEL: | HR1108XL |
| CAPACITY: | 8KVA |
| AC Input: | 200/208/220/230/240Vac,48Amax,1Φ+N+PE,50/60Hz |
| Batt.Input: | 192Vdc,54A |
| AC Output: | 200~240Vac,37A,1Φ+N+PE,50/60Hz,8KVA/8KW |
|  |   Made In China |




Icc<10kA
 Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD
 Address: 5th Floor,1#Building,Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055
 Importer: xxx
 Address: xxx

3. Rating label for model HR1110XS:

| | |
|---|--|
| invt UNINTERRUPTIBLE POWER SUPPLY(UPS) | |
| MODEL: | HR1110XS |
| CAPACITY: | 10KVA |
| AC Input: | 200/208/220/230/240Vac,60Amax,1Φ+N+PE,50/60Hz |
| Batt.Input: | 192Vdc,66A |
| AC Output: | 200~240Vac,46A,1Φ+N+PE,50/60Hz,10KVA/10KW |
|  |   Made In China |

Icc<10kA
 Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD
 Address: 5th Floor,1#Building,Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055
 Importer: xxx
 Address: xxx




4. Rating label for model HR1108XS:

| | |
|--|---|
| invt UNINTERRUPTIBLE POWER SUPPLY(UPS) | |
| MODEL: | HR1108XS |
| CAPACITY: | 8KVA |
| AC Input: | 200/208/220/230/240Vac,48Amax,1Φ+N+PE,50/60Hz |
| Batt.Input: | 192Vdc,54A |
| AC Output: | 200~240Vac,37A,1Φ+N+PE,50/60Hz,8KVA/8KW |
|    Made In China | |

Icc<10kA

Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD
 Address: 5th Floor,1#Building,Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055
 Importer: xxx
 Address: xxx




5. Rating label for model HR1106XL:

| | |
|--|---|
| invt UNINTERRUPTIBLE POWER SUPPLY(UPS) | |
| MODEL: | HR1106XL |
| CAPACITY: | 6KVA |
| AC Input: | 200/208/220/230/240Vac,36Amax,1Φ+N+PE,50/60Hz |
| Batt.Input: | 192Vdc,40A |
| AC Output: | 200~240Vac,28A,1Φ+N+PE,50/60Hz,6KVA/6KW |
|    Made In China | |

Icc<10kA

Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD
 Address: 5th Floor,1#Building,Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055
 Importer: xxx
 Address: xxx

6. Rating label for model HR1105XL:



| | |
|--|---|
| invt UNINTERRUPTIBLE POWER SUPPLY(UPS) | |
| MODEL: | HR1105XL |
| CAPACITY: | 5KVA |
| AC Input: | 200/208/220/230/240Vac,30Amax,1Φ+N+PE,50/60Hz |
| Batt.Input: | 192Vdc,34A |
| AC Output: | 200~240Vac,23A,1Φ+N+PE,50/60Hz,5KVA/5KW |
|    Made In China | |

Icc<10kA

Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD
 Address: 5th Floor,1#Building,Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055
 Importer: xxx
 Address: xxx

7. Rating label for model HR1106XS



:

| | |
|--|---|
| invt UNINTERRUPTIBLE POWER SUPPLY(UPS) | |
| MODEL: | HR1106XS |
| CAPACITY: | 6KVA |
| AC Input: | 200/208/220/230/240Vac,36Amax,1Φ+N+PE,50/60Hz |
| Batt.Input: | 192Vdc,40A |
| AC Output: | 200~240Vac,28A,1Φ+N+PE,50/60Hz,6KVA/6KW |
|   Made In China | |

Icc<10kA

Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD
 Address: 5th Floor,1#Building,Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055
 Importer: xxx
 Address: xxx

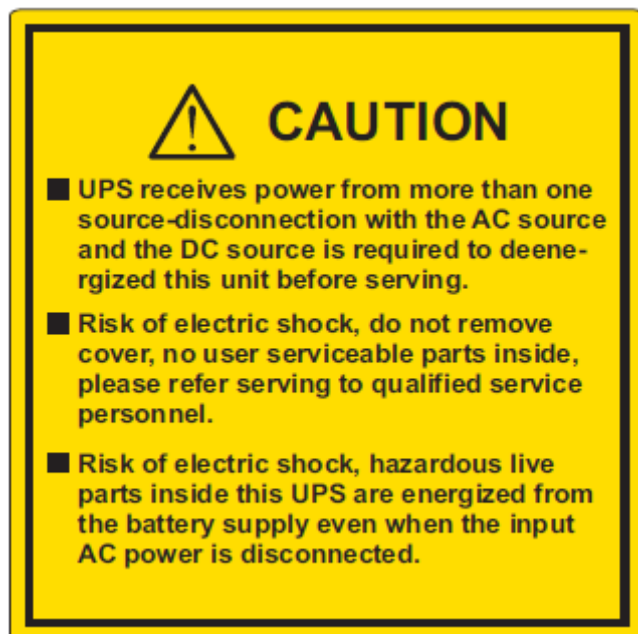
8. Rating label for model HR1105XS

| | |
|--|---|
| invt UNINTERRUPTIBLE POWER SUPPLY(UPS) | |
| MODEL: | HR1105XS |
| CAPACITY: | 5KVA |
| AC Input: | 200/208/220/230/240Vac,30Amax,1Φ+N+PE,50/60Hz |
| Batt.Input: | 192Vdc,34A |
| AC Output: | 200~240Vac,23A,1Φ+N+PE,50/60Hz,5KVA/5KW |
|   Made In China | |

Icc<10kA

Manufacturer: INVT POWER SYSTEM (SHENZHEN) CO., LTD
 Address: 5th Floor,1#Building,Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China, 518055
 Importer: xxx
 Address: xxx

9. Warning label on outer enclosures:



**SEE INSTALLATION INSTRUCTIONS BEFORE
CONNECTING TO THE SUPPLY**

Before working on this circuit

- Isolate Uninterruptible Power System(UPS)
- Then check for Hazardous Voltage between all terminals including the protective earth



Risk of Voltage Backfeed



CAUTION

- For operation read user manual including safety warnings first!
- This unit may be opened by authorized technicians only!
- Lead acid battery in the inside of the enclosure!
- The battery may present a risk of electric shock and energy hazards.
- Risk of explosion if battery replaced by an incorrect type.
For battery information, see user's manual.
- For disposal instructions of the battery, see user's manual.



R1



R1

| | |
|--|---|
| Test item particulars | |
| Equipment mobility | <input type="checkbox"/> movable <input checked="" type="checkbox"/> stationary <input type="checkbox"/> for building-in |
| Connection to the mains | <input type="checkbox"/> pluggable equipment <input checked="" type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord |
| Operating condition | <input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time: |
| Access location | <input type="checkbox"/> operator accessible <input checked="" type="checkbox"/> restricted access location |
| Over voltage category (OVC) | <input type="checkbox"/> OVC I <input checked="" type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input type="checkbox"/> other: |
| Mains supply tolerance (%) or absolute mains supply values | 200/208/220/230/240Vac |
| Tested for IT power systems | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| IT testing, phase-phase voltage (V): N/A | |
| Class of equipment | <input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Not classified |
| Considered current rating of protective device as part of the building installation (A) | 900A |
| Pollution degree (PD) | <input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3 |
| IP protection class | IP20 |
| Elevation during operation (m) | Up to 2000 |
| Elevation of test laboratory (m) | below 2000 |
| Mass of equipment (kg) | >7Kg |
| Possible test case verdicts: | |
| - test case does not apply to the test object | N/A N equal to N / A |
| - test object does meet the requirement..... | P (Pass) |
| - test object does not meet the requirement | F (Fail) |
| Testing | |
| Date of receipt of test item | April 11, 2017 |
| Date (s) of performance of tests | April 11, 2017- April 18, 2017 |
| General remarks: | |
| <p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p> | |
| Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator. | |
| Manufacturer's Declaration per sub-clause 4.2.5 of IEC60335-1: | |

| | |
|---|--|
| <p>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..... :</p> | <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable</p> |
| <p>When differences exist; they shall be identified in the General product information section.</p> | |
| <p>Name and address of factory (ies): Same as manufacturer</p> | |
| <p>General product information:</p> <p>1. This report is amended from previous report no. ES161230021S, issued date February 09, 2016, due to below amendments: - Change the Product appearance, the new report and original report have the same constructions, circuit diagram and PCB layout. Only appearance, the heating test evaluated. -Change the model to HR1105XL, HR1105XS, HR1106XL, HR1106XS, HR1108XL, HR1108XS, HR1110XL, HR1110XS, all model are identical to original model except for model name.</p> <p>2. The equipment is an on-line type of Uninterruptible Power Systems for general use with information technology equipment.</p> <p>3. Model difference description: All models are designed with same control logic, constructions, PSDR PCBs, CNTL PCB, Input EMI PCB, CHAG PCB, Output EMI PCB and Panel PCB. Unless otherwise stated, all tests were performed on model HR1110XL which means the typical model.</p> | |
| <p>Summary of testing:</p> <p>The product has been tested according to standard EN 62040-1:2008 (First Edition) + Am 1:2013</p> <ul style="list-style-type: none"> • Tests performed on the bench • Maximum ambient temperature: 40°C • Tested for moderate conditions • EUT is designed for altitudes not exceeding 2000m. | |

| IEC 62040-1 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4 | GENERAL CONDITIONS FOR TESTS | | P |
| 4.3 | Components | | P |
| 1.5.1/RD | General | | |
| | Comply with IEC 62040-1 or relevant component standard | (see appended table 4.5) | P |
| 1.5.2/RD | Evaluation and testing of components | Certified components are used in accordance with their ratings, certifications and they comply with applicable parts of this standard. Components not certified are used in accordance with their ratings and they comply with applicable parts of IEC 60950-1 and the relevant component standard. Components, for which no relevant IEC-standard exists, have been tested under the conditions occurring in the equipment, using applicable parts of IEC 60950-1. | P |
| 1.5.3/RD | Thermal controls | No thermal control. | N |
| 1.5.4/RD | Transformers | Transformers used are suitable for their intended application and comply with the relevant requirements of the standard and particularly Annex C/RD. | P |
| 1.5.5/RD | Interconnecting cables | | N |
| 1.5.6/RD | Capacitors bridging insulation | Between lines: X2 capacitor according to IEC 60384-14: 1993 with 21 days damp heat test was used. | P |
| 1.5.7/RD | Resistors bridging insulation | Refer to below: | P |
| 1.5.7.1/RD | Resistors bridging functional, basic or supplementary insulation | | P |
| 1.5.7.2/RD | Resistors bridging double or reinforced insulation between a.c. mains and other circuits | No resistors bridging double or reinforced insulation. | N |
| 1.5.7.3/RD | Resistors bridging double or reinforced insulation between a.c. mains and antenna or coaxial cable | No antenna or coaxial cable. | N |
| 1.5.8/RD | Components in equipment for IT power systems | TN power system | N |
| 4.6 | Power interface | | P |

| IEC 62040-1 | | | |
|-----------------|-------------------------------|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 1.6.1/RD | AC power distribution systems | TN power system | P |
| 1.6.2/RD | Input current | Highest normal load according to 1.2.2.1/RD for this equipment is the charging of empty battery and operation with the maximum specified output load. (see appended table 4.6) | P |
| 4.6 1.6.4/RD | Neutral conductor | Neutral is insulated from earth with basic insulation throughout the equipment. O/P neutral is not isolated from I/P neutral. | P |

| | | | |
|-------------------|---|--|---|
| 4.7 | Marking and instructions | | P |
| 4.7.1 | General | See below. | P |
| 4.7.2 1.7.1/RD | Power rating | The required marking is located on the outside surface of the equipment. | P |
| | Input rated voltage/range (V) | 200/208/220/230/240Vac | P |
| | Input rated current/range (A)..... | See rating labels | P |
| | Input symbol for nature of supply (d.c.) | Not connected to DC supply. | N |
| | Input rated frequency/range (Hz) | 50/60Hz | P |
| | Number of Input phases and neutral..... | 1 Φ +N+E | P |
| | Output rated voltage/range (V) | 200~240Vac | P |
| | Output rated current/range (A) | Not marked. | N |
| | Output rated power factor, (if less than unity, or active power and apparent power or active power and rated current) | | N |
| | Number of output phases and neutral..... | 1 Φ +N+E | P |
| | Output rated active power (W) | See rating label | P |
| | Output rated apparent power (VA) | See rating label | P |
| | Output symbol for nature of supply (d.c.) | No d.c. output. | N |
| | Output rated frequency/range (Hz) | See rating label | P |
| | Ambient operating temperature range (°C)..... | 25°C | P |
| | Rated short-time withstand current (I _{cw}) or rated conditional short-circuit current (I _{cc}) | I _{cc} <10kA | P |
| | Manufacturer's name or trademark or identification mark | See rating label | P |
| | Type/model or type reference | See rating label | P |
| | Symbol for Class II equipment only | The equipment is Class I. | N |

| IEC 62040-1 | | | |
|-------------------|---|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Other symbols | The additional marking does not give rise to misunderstandings. | P |
| | Certification marks | CE | P |
| | Instructions for units with automatic bypass / maintenance bypass, additional input a.c. supply, or external batteries, having text "See installation instructions before connecting to the supply" | See caution label | P |
| 4.7.3 | Safety instructions | The user manual contains information for operation, installation, servicing transport, storage and technical data. | P |
| 4.7.3.1 | General | Considered | P |
| 4.7.3.2 | Installation | Installation instructions are available to the user in User's Manual. | P |
| | Location in a restricted access location only | Instruction manual provided. Not for restricted access location. | P |
| | Permanent connector UPS | Instruction manual provided. | P |
| | Pluggable type A or Pluggable type B UPS | Permanent connection equipment | N |
| 4.7.3.3 | Operation..... | The suitable information list in the user manual when professionals operate the UPS. Restricted access location | P |
| 4.7.3.4 | Maintenance..... | The instruction of maintenance is only included in the service manual. | P |
| 4.7.3.5 | Distribution related backfeed..... | Backfeed protection provided externally to the UPS. | P |
| 4.7.4 1.7.4/RD | Main voltage adjustment | No voltage selector | N |
| | Methods and means of adjustment; reference to installation instructions | No voltage selector | N |
| 4.7.5 1.7.5/RD | Power outlets..... | Relevant information provided on the marking that is affixed near the outlets. | P |
| 4.7.6 1.7.6/RD | Fuse identification (marking, special fusing characteristics, cross-reference) | | P |
| 4.7.7 1.7.7/RD | Wiring terminals | Refer below: | P |

| IEC 62040-1 | | | |
|----------------------|---|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 1.7.7.1/RD | Protective earthing and bonding terminals | The earthing terminal is marked with the standard earthing symbol (60417-2-IEC-5019) near the terminal. | P |
| 1.7.7.2/RD | Terminals for a.c. mains supply conductors | | N |
| 1.7.7.3/RD | Terminals for d.c. mains supply conductors | AC main supplied | N |
| 4.7.8 | Battery terminals : | The terminal of batteries is marked with standard symbol (IEC 60417, No. 5005 and No. 5006). | P |
| 4.7.9 1.7.8/RD | Controls and indicators | See below | P |
| 1.7.8.1/RD | Identification, location and marking : | The function of controls affecting safety is obvious without knowledge of language etc. | P |
| 1.7.8.2/RD | Colours : | For LED provided, located on the front panel | P |
| 1.7.8.3/RD | Symbols according to IEC 60417 : | The function switch is marked " " (IEC 60417-1 No. 5010). | P |
| 1.7.8.4/RD | Markings using figures : | No controls affecting safety are using figures. | N |
| 4.7.10 1.7.9/RD | Isolation of multiple power sources : | Only one external supply of hazardous voltage of energy (via appliance inlet). | N |
| 4.7.11 1.7.2.4/RD | IT power systems | TN power system. | N |
| 4.7.12 | Protection in building installation | The protection does rely upon building installation. | P |
| | Rated short-time withstand current (/cw) | | N |
| | Rated conditional short circuit current (/cc) | Icc<10kA | P |
| | a) If higher Icp stated ≤ 10 kA | | N |
| | a) If higher Icp stated > 10 kA | | N |
| 4.7.13 5.1/RD | High leakage current (mA) | Leakage current of the equipment does not exceed 3.5mA. However due to the connected load has influence on the overall earth leakage current, a corresponding statement was provided in the User's Manual. | P |
| 4.7.14 1.7.10/RD | Thermostats and other regulating devices | No thermostats or other regulating devices. | N |

| IEC 62040-1 | | | |
|---|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.7.15 1.7.2.1/RD and 1.7.8.1/RD | Language(s) | Instructions and markings shall be in a language acceptable for the country where the equipment is to be used. English user manual provided. | P |
| 4.7.16 1.7.11/RD | Durability of markings | The label was subjected to the permanence of marking test. The label was rubbed with cloth soaked with water for 15s and then again for 15s with the cloth soaked with petroleum spirit. After this test there was no damage to the label. The marking of the label did not fade. There was neither curling nor lifting of the label edge. | P |
| 4.7.17 1.7.12/RD | Removable parts | No required markings placed on removable parts. | P |
| 4.7.18 1.7.13/RD | Replaceable batteries | The battery is not placed in an operator access area. The required warning is in the safety manual. | P |
| | Language(s) | Instructions and markings are in English. | P |
| 4.7.19 1.7.2.5/RD | Operator access with a tool..... | All areas containing hazard(s) are inaccessible to the operator. | P |
| 4.7.20 | Battery | Permanent connection equipment UPS with integral batteries or with outside battery. | P |
| | Clearly legible information | Warning label attached on the outside surface of External battery pack. Information clearly legible | P |
| | Battery type | Lead-Acid | P |
| | Nominal voltage of total battery (V) | Stated on rating user's manual. | P |
| | Nominal capacity of total battery (optional) | Stated on rating user's manual. | P |
| | Warning label | Warning language with information: Caution: Lead-acid battery inside the enclosure, it may cause chemical hazard. The battery may present a risk of electric shock and energy hazards. For disposal instructions for the battery, see user's manual. | P |

| IEC 62040-1 | | | |
|----------------------|-----------------------------------|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Instructions | The sufficient information about the battery was given in the user's manual. | P |
| 2.1.1.5/RD | Protection against energy hazards | No energy hazard in operator access area. Checked by means of the test finger. | P |
| 4.7.21 1.7.2.4/RD | Installation instructions | Detailed information regarding external interfaces (TNV circuit, TVSS port) and modem / phone line connection) provided in the User's Manual. | P |

| | | | |
|-------------------|---|---|---|
| 5 | FUNDAMENTAL DESIGN REQUIREMENTS | | P |
| 5.1 | Protection against electric shock and energy hazards | | P |
| 5.1.1 2.1.1/RD | Protection for UPS intended to be used in operator access areas | Refer below: | P |
| 2.1.1.1/RD | Access to energized parts | There is adequate protection against operator contact with bare parts at ELV or hazardous voltage or parts separated from these with basic or functional insulation only (except protective earth). No hazardous voltages exceeding 1000V a.c. or 1500V d.c. Checked by test finger, test probe and test pin. | P |
| | Test by inspection : | Complies | P |
| | Test with test finger (Figure 2A) : | Complies | P |
| | Test with test pin (Figure 2B) : | Complies | P |
| | Test with test probe (Figure 2C) : | No TNV circuits | N |
| 2.1.1.2/RD | Battery compartments | Inside the battery compartment only primary circuits. | N |
| 2.1.1.3/RD | Access to ELV wiring | No internal wiring at ELV accessible to the operator. | N |
| | Working voltage (V_{peak} or V_{rms}); minimum distance through insulation (mm) | | |
| 2.1.1.4/RD | Access to hazardous voltage circuit wiring | No operator accessible hazardous voltage circuit wiring. | N |
| 2.1.1.5/RD | Energy hazards : | The user accessible TVS Sand TNV phone line ports are isolated from the hazardous energy level of the battery inside the UPS. | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.1.1.6/RD | Manual controls | Operator only has access to bare parts of SELV circuits. | P |
| 2.1.1.7/RD | Discharge of capacitors in equipment | The capacitance of the input circuits > 0.1 μF, refer to list of critical components. | P |
| | Measured voltage (V); time-constant (s) : | (See appended table 5.1.1) | -- |
| 2.1.1.8/RD | Energy hazards – d.c. mains supply | The equipment is not connected to d.c. mains supply | N |
| | a) Capacitor connected to the d.c. mains supply : | | N |
| | b) Internal battery connected to the d.c. mains supply : | | N |
| 2.1.1.9/RD | Audio amplifiers : | No such parts. | N |
| 5.1.2 2.1.1.5 c) /RD | Protection for UPS intended to be used in service access areas | Checked by inspection, unintentional contact is unlikely during service operations. | N |
| | Hazardous energy level | | N |
| 5.1.3 2.1.1.5 c) /RD | Protection for UPS intended to be used in restricted access areas | | N |
| | Hazardous energy level | | N |
| 5.1.4 | Backfeed protection | | — |
| | Shock hazard after de-energization of a.c. input for UPS | | N |
| | Measured voltage (V); time-constant (s) : | | N |
| | Description of the construction: | | N |
| | Air gap is employed for backfeed protection | | N |
| 5.1.5 | Emergency switching device | AC break used | P |
| 5.2 | Requirements for auxiliary circuits | | P |
| 5.2.1 2.2/RD | Safety extra low voltage circuit - SELV | See below: | P |
| 2.2.1/RD | General requirements | SELV limits are not exceeded under normal condition. | P |
| 2.2.2/RD | Voltages under normal conditions (V) : | Within SELV limits. (See appended table 5.2.1) | P |
| 2.2.3/RD | Voltages under fault conditions (V) : | Within SELV limits. (See appended table 5.2.1) | P |
| 2.2.4/RD | Connection of SELV circuits to other circuits .. : | SELV circuits are only connected to other SELV and protective earth. | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.2.2 2.3/RD | Telephone network voltage circuits - TNV | Refer below: | N |
| 2.3.1/RD | Limits | No TNV circuits, cl. 2.3/RD | N |
| | Type of TNV circuits : | | |
| 2.3.2/RD | Separation from other circuits and from accessible parts | | N |
| 2.3.2.1/RD | General requirements | | N |
| 2.3.2.2/RD | Protection by basic insulation | | N |
| 2.3.2.3/RD | Protection by earthing | | N |
| 2.3.2.4/RD | Protection by other constructions : | | N |
| 2.3.3/RD | Separation from hazardous voltages | | N |
| | Insulation employed : | | |
| 2.3.4/RD | Connection of TNV circuits to other circuits | | N |
| | Insulation employed : | | |
| 2.3.5/RD | Test for operating voltages generated externally | | N |
| 5.2.3 2.4/RD | Limited current circuits | No limited current circuits, cl. 2.4/RD. | N |
| 2.4.1/RD | General requirements | | N |
| 2.4.2/RD | Limit values | | |
| | Frequency (Hz) : | | |
| | Measured current (mA) : | | |
| | Measured voltage (V) : | | |
| | Measured circuit capacitance (nF or μ F) : | | |
| 2.4.3/RD | Connection of limited current circuits to other circuits | | N |
| 5.2.4 3.5/RD | External signalling circuits | | N |
| 3.5.1/RD | General requirements | Considered. | P |
| 3.5.2/RD | Types of interconnection circuits : | SELV circuits. | P |
| 3.5.3/RD | ELV circuits as interconnection circuits | No ELV interconnections. | N |
| 3.5.4/RD | Data ports for additional equipment | Data ports (TNV circuit, TVSS port) are signal port only, no test required. | P |
| 5.2.5 2.5/RD | Limited power source | No limited power source. | N |
| | a) Inherently limited output | | N |
| | b) Impedance limited output | | N |
| | c) Regulating network limited output under normal operating and single fault condition | | N |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| | d) Overcurrent protective device limited output | | N |
| | Max. output voltage (V), max. output current (A), max. apparent power (VA) | | N |
| | Current rating of overcurrent protective device (A) | | N |
| | Use of integrated circuit (IC) current limiters | | N |

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| 5.3 | Protective earthing and bonding | | P |
| 5.3.1 | General | See below. | P |
| 2.6/RD | Provisions for earthing and bonding | See below. | P |
| 2.6.1/RD | Protective earthing | Reliable connection of relevant conductive parts to the PE terminal (via green/yellow insulated wires). | P |
| 2.6.2/RD | Functional earthing | No functional earthing. | N |
| 2.6.3/RD | Protective earthing and protective bonding conductors | | P |
| 2.6.3.1/RD | General | Compliance checked. | P |
| 2.6.3.2/RD | Size of protective earthing conductors | | P |
| | Rated current (A), cross-sectional area (mm ²), AWG : | (see appended tabel 4.5) | P |
| 2.6.3.3/RD | Size of protective bonding conductors | Refer to 2.6.3.4/RD. | P |
| | Rated current (A), cross-sectional area (mm ²), AWG : | Refer to 2.6.3.4/RD. | — |
| | Protective current rating (A), cross-sectional area (mm ²), AWG : | Refer to 2.6.3.4/RD. | — |
| 2.6.3.4/RD | Resistance of earthing conductors and their terminations; resistance (Ω), voltage drop (V), test current (A), duration (min) : | (See appended table 5.3.1) | P |
| 2.6.3.5/RD | Colour of insulation : | All insulated protective earth conductors are used colored green and yellow. | P |
| 2.6.4/RD | Terminals | See below. | P |
| 2.6.4.1/RD | General | See below. | P |
| 2.6.4.2/RD | Protective earthing and bonding terminals | Adequate protective earth connection, see also Sub-clause 2.6.3.4/RD and 3.3/RD | P |
| | Rated current (A), type, nominal thread diameter (mm) : | | — |
| 2.6.4.3/RD | Separation of the protective earthing conductor from protective bonding conductors | Separate PE and protective bonding conductor used. | N |
| 2.6.5/RD | Integrity of protective earthing | See below. | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.6.5.1/RD | Interconnection of equipment | The unit has its own earthing connection. PE terminals of outlets reliably connected to PE terminal of unit | P |
| 2.6.5.2/RD | Components in protective earthing conductors and protective bonding conductors | There are no switches or overcurrent protective devices in the protective earthing / bonding conductors. | P |
| 2.6.5.3/RD | Disconnection of protective earth | It is not possible to disconnect protective earth without disconnecting mains | P |
| 2.6.5.4/RD | Parts that can be removed by an operator | No operator removable parts with protective earth connection except supply cord. | P |
| 2.6.5.5/RD | Parts removed during servicing | It is not necessary to disconnect earthing except for the removal of the earthed part itself. | P |
| 2.6.5.6/RD | Corrosion resistance | No risk of corrosion | P |
| 2.6.5.7/RD | Screws for protective bonding | No such screw | N |
| 2.6.5.8/RD | Reliance on telecommunication network or cable distribution system | Protective earthing is not rely on cable distribution system. | N |
| 5.3.2 2.6.1/RD | Protective earthing | Accessible conductive parts are reliably connected to protective earth terminal | P |
| 2.10/RD | Clearances, creepage distances and distances through insulation | See clause 5.7 | P |
| 4.2/RD | Mechanical strength | See clause 7.3 | P |
| 5.2/RD | Electric strength | See clause 8.2 | P |
| 5.3.3 | Protective bonding | Refer also to 2.6.3.4/RD | P |

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| 5.4 | AC and d.c. power isolation | | P |
| 5.4.1 | General | Only one external supply of hazardous voltage or energy | P |
| 3.4/RD | Disconnection from the mains supply | AC break used disconnect device. | P |
| 3.4.1/RD | General requirement | Considered | P |
| 3.4.2/RD | Disconnect devices | | P |
| 3.4.3/RD | Permanently connected equipment | | N |
| 3.4.4/RD | Parts which remain energized | No parts remain energized after the disconnect device is pull out. | N |
| 3.4.5/RD | Switches in flexible cords | No such construction. | N |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 3.4.6/RD | Number of poles - single-phase and d.c. equipment | | N |
| 3.4.7/RD | Number of poles - three-phase equipment | Single-phase only. | N |
| 3.4.8/RD | Switches as disconnect devices | | N |
| 3.4.9/RD | Plugs as disconnect devices | | N |
| 3.4.10/RD | Interconnected equipment | | N |
| 3.4.11/RD | Multiple power sources | | N |
| 5.4.2 | Disconnect devices | Refer to cl. 3.4.2/RD. | N |

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| 5.5 | Overcurrent and earth fault protection | | P |
| 5.5.1 | General | See below. | P |
| 2.7.3/RD | Short-circuit backup protection | Permanent connection equipment. Building installation is considered as providing short circuit backup protection. | P |
| 2.7.4/RD | Number and location of protective devices | Over current protection by one built-in input fuse. Protection devices in the building installation considered as providing sufficient protection against earth faults. | P |
| 2.7.5/RD | Protection by several devices | Only one protective device provided. | P |
| 2.7.6/RD | Warning to service personnel : | No Hazard present in the equipment after the input circuit breaker opens. However, as it is considered that the ac break to the mains will be disconnected during service work. No markings were needed. | N |
| 5.5.2 | Basic requirements | Equipment relies on circuit breaker of the wall outlet installation protection of the building installation in regard to L, N short circuit and for L to PE earth fault. Over current protection is provided by the built-in device breaker. | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.5.3 | Battery circuit protection | Ungrounded battery inside the UPS. Required fuses against - overcurrent: 1 - earth fault: 1 Protection against overcurrent by DC fuses in the positive pole of the battery. However earth faults will be covered by devices in the building installation. | P |
| 5.5.3.1 | Overcurrent and earth fault protection | See below. | P |
| 5.5.3.2 | Location of protective device | The fuses are directly located behind the supply wire of the battery. The charger circuit is located in the battery circuit before the fuses. For the charger circuit there are no hazardous conditions under any simulated fault conditions. See appended table. | P |
| 5.5.3.3 | Rating of protective device | The rating of the fuses inside the UPS provides adequate safety protection during abnormal and/or fault conditions. | P |
| 5.3.1/RD | Protection against overload and abnormal operation | (see appended table 8.3) | P |
| 5.5.4 | Short-time withstand current | $I_{cc} < 10kA$ | P |
| 5.5.4.1 | General | | N |
| 5.5.4.2 | Modes of operation | | N |
| 5.5.4.3 | Test procedure | | N |
| 5.5.4.3.1 | General application | | N |
| | Rated UPS output current/(r.m.s) (A) | See product specification | N |
| | Prospective test current/(r.m.s) (A) | See product specification | N |
| | Typical power factor | See product specification | N |
| | Initial asymmetric peak current ration (I_{pk} / I_{cw}) . : | | N |
| | Minimum duration of prospective test current (cycles 50/60 Hz) | | N |
| 5.5.4.3.2 | Exemption from testing | | P |
| 5.6 | Protection of personnel – Safety interlocks <i>(No safety interlock provided for operator protection since there are no liable hazards capable of harming the operator during operation).</i> | | P |
| 5.6.1 | Operator protection | See below | N |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.8/RD | Safety interlocks | No safety interlocks. | N |
| 2.8.1/RD | General principles | | N |
| 2.8.2/RD | Protection requirements | | N |
| 2.8.3/RD | Inadvertent reactivation | | N |
| 2.8.4/RD | Fail-safe operation | | N |
| 2.8.5/RD | Moving parts | | N |
| 2.8.6/RD | Overriding | | N |
| 2.8.7/RD | Switches and relays | | N |
| 2.8.7.1/RD | Contact gaps (mm) : | | N |
| 2.8.7.2/RD | Overload test | | N |
| 2.8.7.3/RD | Endurance test | | N |
| 2.8.7.4/RD | Electric strength test | (see appended table 8.2) | N |
| 2.8.8/RD | Mechanical actuators | | N |
| 5.6.2 | Service person protection | See below. | P |
| 5.6.2.1 | Introduction | Considered | P |
| 5.6.2.2 | Covers | It is unlikely that during the removal of any covers service personnel may touch hazardous voltage or energy. | P |
| 5.6.2.3 | Location and guarding of parts | Only the exchange of the battery is considered as possible servicing. A risk of injury is unlikely for the service personnel. | P |
| 5.6.2.4 | Parts on doors | The UPS is designed with only screwed enclosure parts. | P |
| 5.6.2.5 | Component access | No component access during operation mode necessary. | N |
| 2.8.3/RD | Inadvertent reactivation | No servicing in operation mode necessary. | N |
| 5.6.2.6 | Moving parts | No hazardous moving parts. | N |
| 5.6.2.7 | Capacitor banks | The capacitors provided can produce energy level way below 20 joules. | P |
| 5.6.2.8 | Internal batteries | The terminals of the battery connections are isolated and covered so that it is unlikely to bridge the terminals of the battery during servicing or its replacement. | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.7 2.10/RD | Clearances, creepage distances and distances through insulation | | P |
| 2.10.1/RD | General | See below. | P |
| 2.10.1.1/RD | Frequency | Considered. | P |
| 2.10.1.2/RD | Pollution degrees | II | P |
| 2.10.1.3/RD | Reduced values for functional insulation | The functional insulations comply with 5.3.4/RD a) and c) | N |
| 2.10.1.4/RD | Intervening unconnected conductive parts | Considered. | N |
| 2.10.1.5/RD | Insulation with varying dimensions | No such transformer used. | N |
| 2.10.1.6/RD | Special separation requirements | No TNV | N |
| 2.10.1.7/RD | Insulation in circuits generating starting pulses | No such circuit generating starting pulses. | N |
| 2.10.2/RD | Determination of working voltage | (See appended table 5.7) | P |
| 2.10.2.1/RD | General | See below. | P |
| 2.10.2.2/RD | RMS working voltage | (See appended table 5.7) | P |
| 2.10.2.3/RD | Peak working voltage | (See appended table 5.7) | P |
| 2.10.3/RD | Clearances | See below. | P |
| 2.10.3.1/RD | General | See below. | P |
| 2.10.3.2/RD | Mains transient voltages | See below. | P |
| | a) AC mains supply | Equipment is Overvoltage Category II. | P |
| | b) Earthed d.c. mains supplies | Not intended for d.c. mains supplies | N |
| | c) Unearthed d.c. mains supplies : | Not intended for d.c. mains supplies | N |
| | d) Battery operation : | Dedicated battery used. | P |
| 2.10.3.3/RD | Clearances in primary circuits | (see appended table 5.7) | P |
| 2.10.3.4/RD | Clearances in secondary circuits | (see appended table 5.7) | P |
| 2.10.3.5/RD | Clearances in circuits having starting pulses | No such circuit generating starting pulses. | N |
| 2.10.3.6/RD | Transients from a.c. mains supply : | Considered. | P |
| 2.10.3.7/RD | Transients from d.c. mains supply : | Not connected to d.c. mains supply. | N |
| 2.10.3.8/RD | Transients from telecommunication networks and cable distribution systems : | No TNV circuits | N |
| 2.10.3.9/RD | Measurement of transient voltage levels | Measurement not relevant | N |
| | a) Transients from a mains supply | | N |
| | For an a.c. mains supply : | | N |
| | For a d.c. mains supply : | | N |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| | b) Transients from a telecommunication network : | | N |
| 2.10.4/RD | Creepage distances | (see appended table 5.7) | P |
| 2.10.4.1/RD | General | See below. | P |
| 2.10.4.2/RD | Material group and comparative tracking index | Material IIIb is used. | P |
| | CTI tests | CTI rating for all material of min. 100. | |
| 2.10.4.3/RD | Minimum creepage distances | (see appended table 5.7) | P |
| 2.10.5 /RD | Solid insulation | Considered. | P |
| 2.10.5.1/RD | General | See below. | P |
| 2.10.5.2/RD | Distances through insulation | (see appended table 5.8) | P |
| 2.10.5.3/RD | Insulating compound as solid insulation | Approved opto-couplers, see appended table 4.5 | P |
| 2.10.5.4/RD | Semiconductor devices | No semiconductor devices. | N |
| 2.10.5.5/RD | Cemented joints | No cemented joint. | N |
| 2.10.5.6/RD | Thin sheet material – General | | N |
| 2.10.5.7/RD | Separable thin sheet material | See below. | P |
| | Number of layers (pcs). | | — |
| 2.10.5.8/RD | Non-separable thin sheet material | Not used. | N |
| 2.10.5.9/RD | Thin sheet material – standard test procedure | | N |
| 2.10.5.10 /RD | Thin sheet material – (Alternative) test procedure | | — |
| | Electric strength test | | N |
| 2.10.5.11 /RD | Insulation in wound components | See cl. 2.10.5.12/RD | P |
| 2.10.5.12 /RD | Wire in wound components | Triple insulated wiring is not used for supplementary or reinforced insulation. | N |
| | Working voltage : | No wound components. | N |
| | a) Basic insulation not under stress : | | — |
| | b) Basic, supplementary, reinforced insulation : | | N |
| | c) Compliance with Annex U : | | N |
| | Two wires in contact inside wound component; angle between 45° and 90° : | | N |
| 2.10.5.13 /RD | Wire with solvent-based enamel in wound components | | N |
| | Electric strength test | No wire with solvent-based enamel in wound components. | N |
| | Routine test | (see appended table 8.2) | — |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 2.10.5.14/RD | Additional insulation in wound components | | N |
| | Working voltage : | No additional insulation used. | N |
| | - Basic insulation not under stress : | | — |
| | - Supplementary, reinforced insulation : | | N |
| 2.10.6/RD | Construction of printed boards | See below. | P |
| 2.10.6.1/RD | Uncoated printed boards | (see appended table 5.7) | P |
| 2.10.6.2/RD | Coated printed boards | No such part. | N |
| 2.10.6.3/RD | Insulation between conductors on the same inner surface of a printed board | No such part. | N |
| 2.10.6.4/RD | Insulation between conductors on different layers of a printed board | No such part. | N |
| | Distance through insulation | PCB layout does not serve as insulation barrier. | N |
| | Number of insulation layers (pcs) : | | N |
| 2.10.7/RD | Component external terminations | No such part. | N |
| 2.10.8/RD | Tests on coated printed boards and coated components | No such part. | N |
| 2.10.8.1/RD | Sample preparation and preliminary inspection | No such part. | N |
| 2.10.8.2/RD | Thermal conditioning | | N |
| 2.10.8.3/RD | Electric strength test | | N |
| 2.10.8.4/RD | Abrasion resistance test | | — |
| 2.10.9/RD | Thermal cycling | | N |
| 2.10.10/RD | Test for Pollution Degree 1 environment and insulating compound | Approved opto-couplers, see appended table 4.5 | P |
| 2.10.11/RD | Tests for semiconductor devices and cemented joints | No such device used. | N |
| 2.10.12/RD | Enclosed and sealed parts | Approved opto-couplers, see appended table 4.5 | P |
| 6 | Wiring, connections and supply | | P |
| 6.1 | General | Considered. | P |
| 6.1.1 | Introduction | Considered. | P |
| 3.1/RD | General | See below. | P |
| 3.1.1/RD | Current rating and overcurrent protection | Adequate cross sectional areas on internal wiring and interconnecting cables. | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 3.1.2/RD | Protection against mechanical damage | Wireways are smooth and free from edges. Wires are adequately fixed to prevent excessive strain on wire and terminals and avoiding damage to the insulation of the conductors. | P |
| 3.1.3/RD | Securing of internal wiring | Internal wiring is secured against excessive strain, loosening of terminals and damage to the conductor insulation. | P |
| 3.1.4/RD | Insulation of conductors | Insulation on internal conductors is considered to be of adequate quality and suitable for the application and the working voltage involved. | P |
| 3.1.5/RD | Beads and ceramic insulators | No beads or similar ceramic insulators on conductors. | N |
| 3.1.6/RD | Screws for electrical contact pressure | Electrical and earthing connections screwed two or more complete threads into metal. No screws of insulating material for electrical and earthing connections, or where supplementary or reinforced insulation could be impaired by a metal replacement. | P |
| 3.1.7/RD | Insulating materials in electrical connections | All current carrying and safety earthing connections are metal to metal. | P |
| 3.1.8/RD | Self-tapping and spaced thread screws | Self-tapping screws provided in inverter circuit and earthing bonding. | P |
| 3.1.9/RD | Termination of conductors | All conductors are reliably secured by the use of solder pins or glue or other mechanical fixing means. No risk of stranded conductors coming loose. | P |
| | 10 N pull test | Considered | P |
| 3.1.10/RD | Sleeving on wiring | Sleeves can only be removed by breaking or cutting. | P |
| 6.1.2 | Dimensions and rating of busbars and insulated conductors | | N |
| 6.2 | Connection to power | | P |
| 6.2.1 | General provisions for connection to power | | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 3.2.2/RD | Multiple supply connections | | N |
| 3.2.3/RD | Permanently connected equipment | Permanent connection equipment | P |
| | Number of conductors, diameter of cable and conduits (mm) | | — |
| 3.2.4/RD | Appliance inlets | The appliance inlet complies with IEC 60320-1 or other national standards. The power cord can be inserted without difficulties and does not support the unit. | P |
| 3.2.5/RD | Power supply cords | See below. | P |
| 3.2.5.1/RD | AC power supply cords | Permanent connection equipment | P |
| | Type | PVC insulated power cord type H05VV-F or IEC 60227 (designation 60227 IEC 53) | — |
| | Rated current (A), cross-sectional area (mm ²), AWG | | — |
| 3.2.5.2/RD | DC power supply cords | Not used. | N |
| 3.2.6/RD | Cord anchorages and strain relief | | N |
| | Mass of equipment (kg), pull (N) | | — |
| | Longitudinal displacement (mm) | | — |
| 3.2.7/RD | Protection against mechanical damage | | N |
| 3.2.8/RD | Cord guards | | N |
| | Diameter or minor dimension D (mm); test mass (g) | | — |
| | Radius of curvature of cord (mm)..... | | — |
| 6.2.2 | Means of connection : | Permanent connection equipment | P |
| | More than one supply connection : | AC mains and internal battery used. | P |

| | | | |
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| 6.3 | Wiring terminals for external power conductors <i>(No wiring terminals for external power conductors)</i> | | N |
| 3.3/RD | Wiring terminals for connection of external conductors | | N |
| 3.3.1/RD | Wiring terminals | | N |
| 3.3.2/RD | Connection of non-detachable power supply cords | | N |
| 3.3.3/RD | Screw terminals | | N |
| 3.3.4/RD | Conductor sizes to be connected | | N |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Rated current (A), cord/cable type, cross-sectional area (mm ²) | | N |
| 3.3.5/RD | Wiring terminal sizes | | N |
| | Rated current (A), type, nominal thread diameter (mm) | | — |
| 3.3.6/RD | Wiring terminal design | | N |
| 3.3.7/RD | Grouping of wiring terminals | | N |
| 3.3.8/RD | Stranded wire | | N |
| 7 | Physical requirements | | P |
| 7.1 | Enclosure | Adequate protection against risk of fire, electric shock, injury to persons and hazardous energy level. | P |
| 7.2 4.1/RD | Stability | | P |
| | Angle of 10 | All models of the UPS do not overbalance when tilted to an angle of 10 degree. | P |
| | Test force (N) : | 250N | P |
| 7.3 4.2/RD | Mechanical strength | | P |
| 4.2.1/RD | General | Tests performed and passed. Results see below. After the tests, unit complied with the requirements of sub-clauses 2.1.1/RD, 2.6.1/RD, 2.10/RD and 4.4.1/RD. | P |
| 4.2.2/RD | Steady force test, 10 N | 10 N applied to components. | P |
| 4.2.3/RD | Steady force test, 30 N | 30 N applied to parts inside the UPS. | P |
| 4.2.4/RD | Steady force test, 250 N | No hazard. The test is performed on all sides of enclosure. | P |
| 4.2.5/RD | Impact test | See below. | P |
| | Fall test | No hazard as result from the steel sphere fall test. | P |
| | Swing test | No hazard as result from the steel sphere swing test. | P |
| 4.2.6/RD | Drop test; height (mm): | Drop test not applicable | N |

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|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.2.7/RD | Stress relief test | Test is carried out at 70°C / 7h. No risk of shrinkage or distortion on enclosures due to release of internal stresses. | P |
| 4.2.8/RD | Cathode ray tubes | CRT(s) not used in the equipment. | N |
| | Picture tube separately certified : | | — |
| 4.2.9/RD | High pressure lamps | No high pressure lamps in the equipment. | N |
| 4.2.10/RD | Wall or ceiling mounted equipment; force (N) : | No wall or ceiling mounted equipment | N |

| | | | |
|------------|---|--|---|
| 7.4 | Construction details | | P |
| 7.4.1 | Introduction | Considered. | P |
| 4.3.1/RD | Edges and corners | All edges and corners are rounded and/or smoothed. | P |
| 4.3.2/RD | Handles and manual controls; force (N) : | No handles | N |
| 4.3.3/RD | Adjustable controls | No adjustable controls. | N |
| 4.3.4/RD | Securing of parts | No loosening of parts impairing creepage distances or clearances is likely to occur. | P |
| 4.3.5/RD | Connection by plugs and sockets | No mismatch of connectors, plugs or sockets possible. | P |
| 4.3.7/RD | Heating elements in earthed equipment | No heating elements provided. | N |
| 4.3.11/RD | Containers for liquids or gases | The equipment does not contain flammable liquids or gases. | N |
| 4.4/RD | Protection against hazardous moving parts | | P |
| 4.4.1/RD | General | DC fan located at secondary circuit. The enclosure of the unit provide as fan guard. Test finger applied to openings. No fan blade accessible. | P |
| 4.4.2/RD | Protection in operator access areas : | See 4.4.1 | P |
| 4.4.3/RD | Protection in restricted access locations : | Not for restricted access locations. | P |
| 4.4.4/RD | Protection in service access areas | See 4.4.1 | P |
| 4.4.5/RD | Protection against moving fan blades | Considered | P |
| 4.4.5.1/RD | General | See below. | P |
| | Not considered to cause pain or injury. a) : | | N |
| | Is considered to cause pain, not injury. b) : | | N |
| | Considered to cause injury. c) : | | N |
| 4.4.5.2 | Protection for users | (See appended table 7.7) | P |

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|-------------|-------------------------------------|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Use of symbol or warning | | N |
| 4.4.5.3 | Protection for service persons | | N |
| | Use of symbol or warning | | N |
| 4.5/RD | Thermal requirements | Considered | P |
| 4.5.1/RD | General | See below. | P |
| 4.5.2/RD | Temperature tests | (See appended table 7.7) | P |
| | Normal load condition per Annex L : | | |
| 4.5.3/RD | Temperature limits for materials | (See appended table 7.7) | P |
| 4.5.4/RD | Touch temperature limits | (See appended table 7.7) | P |
| 4.5.5/RD | Resistance to abnormal heat : | | P |
| 7.4.2 | Openings | (See appended table 7.4.2) | P |
| 7.4.3 | Gas Concentration | The ventilation by openings exceeds the required airflow. Refer to Annex M. | P |
| 7.4.4 | Equipment movement | | P |

| | | | |
|---------------|--|---|---|
| 7.5 4.7/RD | Resistance to fire | | P |
| 4.7.1/RD | Reducing the risk of ignition and spread of flame | Use of materials with the required flammability classes | P |
| | Method 1, selection and application of components wiring and materials | Method 1 is used. No excessive temperatures. No easily burning materials employed. Safety relevant components used within their specified temperature limits. | P |
| | Method 2, application of all of simulated fault condition tests | | N |
| 4.7.2/RD | Conditions for a fire enclosure | See below. | P |
| 4.7.2.1/RD | Parts requiring a fire enclosure | With having the following components: - Components in primary circuits - Insulated wiring - Semiconductor devices, transistors, diodes, integrated circuits - Resistors, capacitors, inductors The fire enclosure is required. | P |
| 4.7.2.2/RD | Parts not requiring a fire enclosure | The fire enclosure is required to cover all parts. | N |

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|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.7.3/RD | Materials | See below. | P |
| 4.7.3.1/RD | General | PCB rated V-0. See appended table. | P |
| 4.7.3.2/RD | Materials for fire enclosures | Metal enclosure. (See appended table 4.3) | P |
| 4.7.3.3/RD | Materials for components and other parts outside fire enclosures | No parts outside the fire enclosure. | N |
| 4.7.3.4/RD | Materials for components and other parts inside fire enclosures | Internal components except small parts are V-2, HF-2 or better. | P |
| 4.7.3.5/RD | Materials for air filter assemblies | No air filters in the equipment. | N |
| 4.7.3.6/RD | Materials used in high-voltage components | No parts exceeding 4kV. | N |
| 7.6 | Battery location | | P |
| 7.6.1 | Battery location and installation | Batteries are located inside the UPS enclosure. | P |
| 7.6.2 | Accessibility and maintainability | Maintenance free battery. The battery is connected by quick connect terminals (no necessary tightening). | P |
| 7.6.3 | Distance | The temperature of the electrolyte and the gas emission are within the limits of this standard. | P |
| 7.6.4 | Case insulation | No Ni-Cd battery used inside. | N |
| 7.6.5 | Wiring | The protection of connecting wiring complies with sub clause 6, details see there. | P |
| 7.6.6 | Electrolyte spillage | Sealed maintenance free battery, the emission of electrolyte is unlikely. | P |
| 7.6.7 | Ventilation | Comply with Annex M.2 | P |
| 7.6.8 | Charging voltage | Protective circuit to prevent excessive charging voltages occurring under any single fault condition. See sub-clause 8.3 | P |
| 7.7 | Temperature rise | | P |
| 4.5/RD | Thermal requirements | Considered | P |
| 4.5.1/RD | General | See below. | P |
| 4.5.2/RD | Temperature tests | (See appended table 7.7) | P |
| | Normal load condition per Annex L : | | — |

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|---------------|---|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.5.3/RD | Temperature limits for materials | (See appended table 7.7) | P |
| 4.5.4/RD | Touch temperature limits | (See appended table 7.7) | P |
| 4.5.5/RD | Resistance to abnormal heat : | (See appended table 7.4) | P |
| 8 | Electrical requirements and simulated abnormal conditions | | P |
| 8.1 | General provisions for earth leakage | | P |
| 5.1.1/RD | General | Test conducted in accordance with Sub-clause 8.1 | P |
| 5.1.7/RD | Equipment with touch current exceeding 3,5 mA | | P |
| 8.2 5.2/RD | Electric strength | | P |
| 5.2.1/RD | General | (see appended table 8.2) | P |
| 5.2.2/RD | Test procedure | (see appended table 8.2) | P |
| 8.3 | Abnormal operating and fault conditions | | P |
| 8.3.1 | General | Considered. | P |
| 5.3.1/RD | Protection against overload and abnormal operation | (See appended table 8.3) | P |
| 5.3.2/RD | Motors | No motors | N |
| 5.3.3/RD | Transformers | (See appended Annex C) | P |
| 5.3.4/RD | Functional insulation : | Complies with a) and c). | P |
| 5.3.5/RD | Electromechanical components | No electromechanical components in secondary circuits. | N |
| 5.3.9/RD | Compliance criteria for abnormal operating and fault conditions | No fire or molten metal occurred and no deformation of enclosure during the tests. No reduction of clearance and creepage distances. Electric strength test is made on basic, supplementary and reinforced insulation. | P |
| 5.3.9.1/RD | During the tests | | P |
| 5.3.9.2/RD | After the tests | | P |
| 8.3.2 | Simulation of faults | (See appended table 8.3) | P |
| 8.3.3 | Conditions for tests | (See appended table 8.3) | P |
| 9 6/RD | Connection to telecommunication networks | | P |

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|-------------|---|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 6.1/RD | Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment | | P |
| 6.1.1/RD | Protection from hazardous voltages | | P |
| 6.1.2/RD | Separation of the telecommunication network from earth | | P |
| 6.1.2.1/RD | Requirements | No bridging components between TNV circuit and earth, only creepage and clearance distance applied. | P |
| | Supply voltage (V) | | |
| | Current in the test circuit (mA) | | |
| 6.1.2.2/RD | Exclusions | | N |
| 6.2/RD | Protection of equipment users from overvoltages on telecommunication networks | | P |
| 6.2.1/RD | Separation requirements | Basic insulation between TNV-3 circuit and accessible parts and SELV interfaces and earthing. | P |
| 6.2.2/RD | Electric strength test procedure | See subclause 6.2.2.2/RD | P |
| 6.2.2.1/RD | Impulse test | | N |
| 6.2.2.2/RD | Steady-state test | For details see sub-clause 6.1.2.1/RD | P |
| 6.2.2.3/RD | Compliance criteria | Complied for test of subclause 6.2.2.2/RD | P |
| 6.3/RD | Protection of the telecommunication wiring system from overheating | | N |
| | Max. output current (A) | | |
| 3.5/RD | Interconnection of equipment | | N |
| 3.5.1/RD | General requirements | | N |
| 3.5.2/RD | Types of interconnection circuits | | N |
| 3.5.3/RD | ELV circuits as interconnection circuits | | N |
| 3.5.4/RD | Data ports for additional equipment | | N |
| 2.1.3/RD | Protection in restricted access locations | | N |
| 2.3.1/RD | Limits | | N |
| | Type of TNV circuits | | |
| 2.3.2/RD | Separation from other circuits and from accessible parts | | N |
| 2.3.2.1/RD | General requirements | | N |
| 2.3.2.2/RD | Protection by basic insulation | | N |
| 2.3.2.3/RD | Protection by earthing | | N |
| 2.3.2.4/RD | Protection by other constructions | | N |
| 2.3.3/RD | Separation from hazardous voltages | | N |

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|-------------|--|--------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Insulation employed | | |
| 2.3.4/RD | Connection of TNV circuits to other circuits | | N |
| | Insulation employed | | |
| 2.3.5/RD | Test for operating voltages generated externally | | N |
| 2.6.5.8/RD | Reliance on telecommunication network or cable distribution system | | N |
| 2.10.3.3/RD | Clearances in primary circuits | (see appended table 5.7) | N |
| 2.10.3.4/RD | Clearances in secondary circuits | (see appended table 5.7) | N |
| 2.10.4/RD | Creepage distances | | N |
| 2.10.4.1/RD | General | | N |
| 2.10.4.2/RD | Material group and comparative tracking index | | N |
| | CTI tests | | |
| 2.10.4.3/RD | Minimum creepage distances | | N |
| M/RD | ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1/RD) | | N |
| M.1/RD | Introduction | | N |
| M.2 /RD | Method A | | N |
| M.3/RD | Method B | | N |
| M.3.1/RD | Ringling signal | | N |
| M.3.1.1/RD | Frequency (Hz) | | |
| M.3.1.2/RD | Voltage (V) | | |
| M.3.1.3/RD | Cadence; time (s), voltage (V) | | |
| M.3.1.4/RD | Single fault current (mA) | | |
| M.3.2/RD | Tripping device and monitoring voltage | | N |
| M.3.2.1/RD | Conditions for use of a tripping device or a monitoring voltage | | |
| M.3.2.2/RD | Tripping device | | N |
| M.3.2.3/RD | Monitoring voltage (V) | | N |
| A/RD | Annex A, Tests for resistance to heat and fire | | N |
| A.1/RD | Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2/RD) | | N |
| A.1.1/RD | Samples | | |
| | Wall thickness (mm)..... | | |
| A.1.2/RD | Conditioning of samples; temperature (°C) | | N |
| A.1.3/RD | Mounting of samples | | N |
| A.1.4/RD | Test flame (see IEC 60695-11-3) | | N |
| | Flame A, B, C or D | | |

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|-------------|--|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| A.1.5/RD | Test procedure | | N |
| A.1.6/RD | Compliance criteria | | N |
| | Sample 1 burning time (s) | | |
| | Sample 2 burning time (s) | | |
| | Sample 3 burning time (s) | | |
| A.2/RD | Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2/RD and 4.7.3.4/RD) | | N |
| A.2.1/RD | Samples, material..... | | |
| | Wall thickness (mm)..... | | |
| A.2.2/RD | Conditioning of samples; temperature (°C) | | N |
| A.2.3/RD | Mounting of samples | | N |
| A.2.4/RD | Test flame (see IEC 60695-11-4) | | N |
| | Flame A, B or C | | |
| A.2.5/RD | Test procedure | | N |
| A.2.6/RD | Compliance criteria | | N |
| | Sample 1 burning time (s) | | |
| | Sample 2 burning time (s) | | |
| | Sample 3 burning time (s) | | |
| A.2.7/RD | (Alternative) test acc. to IEC 60695-11-5, cl. 5 and 9 | | N |
| | Sample 1 burning time (s) | | |
| | Sample 2 burning time (s) | | |
| | Sample 3 burning time (s) | | |
| A.3/RD | Hot flaming oil test (see 4.6.2/RD) | | N |
| A.3.1/RD | Mounting of samples | | N |
| A.3.2/RD | Test procedure | | N |
| A.3.3/RD | Compliance criterion | | N |

| | | | |
|--------|--|-----------|---|
| B/RD | Annex B, Motor tests under abnormal conditions (see 4.7.2.2/RD and 5.3.2/RD) | | N |
| B.1/RD | General requirements | No motors | N |
| | Position | | N |
| | Manufacturer | | N |
| | Type | | N |
| | Rated values | | N |
| B.2/RD | Test conditions | | N |
| B.3/RD | Maximum temperatures | | N |

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|-------------|---|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| B.4/RD | Running overload test | | N |
| B.5/RD | Locked-rotor overload test | | N |
| | Test duration (days) | | N |
| | Electric strength test: test voltage (V) | | N |
| B.6/RD | Running overload test for d.c. motors in secondary circuits | | N |
| B.6.1/RD | General | | N |
| B.6.2/RD | Test procedure | | N |
| B.6.3/RD | (Alternative) test procedure | | N |
| B.6.4/RD | Electric strength test; test voltage (V) | | N |
| B.7/RD | Locked-rotor overload test for d.c. motors in secondary circuits | | N |
| B.7.1/RD | General | | N |
| B.7.2/RD | Test procedure | | N |
| B.7.3/RD | (Alternative) test procedure | | N |
| B.7.4/RD | Electric strength test; test voltage (V) | | N |
| B.8/RD | Test for motors with capacitors | | N |
| B.9/RD | Test for three-phase motors | | N |
| B.10/RD | Test for series motors | | N |
| | Operating voltage (V) | | N |
| C/RD | Annex C, Transformers (see 1.5.4/RD and 5.3.3/RD) | | N |
| | Position | | — |
| | Manufacturer | | — |
| | Type | | — |
| | Rated values | | — |
| | Method of protection | | — |
| C.1/RD | Overload test | | N |
| C.2/RD | Insulation | | N |
| | Protection from displacement of windings | | N |
| D/RD | Annex D, Measuring instruments for touch current tests (see 5.1.4/RD) | | P |
| D.1/RD | Measuring instrument | | P |
| D.2/RD | (Alternative) measuring instrument | | N |
| E/RD | Annex E, Temperature rise of a winding (see 1.4.13/RD) | | N |

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|-------------|--|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| F/RD | Annex F, Measurements of clearances and creepage distance (see 2.10/RD and Annex G/RD) | | P |

| | | | |
|----------|--|--|---|
| G/RD | Annex G, (Alternative) method for determining minimum clearances | | N |
| G.1/RD | Clearances | | N |
| G.1.1/RD | General | | N |
| G.1.2/RD | Summary of the procedure for determining minimum clearances | | N |
| G.2/RD | Determination of mains transient voltage (V) | | N |
| G.2.1/RD | AC mains supply | | N |
| G.2.2/RD | Earthed d.c. mains supplies | | N |
| G.2.3/RD | Unearthed d.c. mains supplies | | N |
| G.2.4/RD | Battery operation | | N |
| G.3/RD | Determination of telecommunication network transient voltage (V) | | N |
| G.4/RD | Determination of required withstand voltage (V) | | N |
| G.4.1/RD | Mains transients and internal repetitive peaks : | | N |
| G.4.2/RD | Transients from telecommunication networks . : | | N |
| G.4.3/RD | Combination of transients | | N |
| G.4.4/RD | Transients from cable distribution systems | | N |
| G.5/RD | Measurement of transient voltages (V) | | N |
| | a) Transients from a mains supply | | N |
| | For an a.c. mains supply | | N |
| | For a d.c. mains supply | | N |
| | b) Transients from a telecommunication network | | N |
| G.6/RD | Determination of minimum clearances | | N |

| | | | |
|---|--|--|---|
| H | Annex H, Guidance on protection against ingress of water and foreign objects (see IEC 60529) | | N |
|---|--|--|---|

| | | | |
|-----|---|--------------------------|---|
| I | Annex I, Backfeed protection test | | P |
| I.1 | General | | P |
| I.2 | Test for pluggable UPS | Backfeed relay provided. | P |
| I.3 | Test for permanently connected UPS | | N |
| I.4 | Load-induced change of reference potential | | N |
| I.5 | Solid-state backfeed protection (see clause 7.1-7.5 of IEC 62040-2 and clause 7.1-7.2 of IEC 62040-3) | | N |

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

| | | | |
|------|---|--|---|
| J/RD | Annex J, Table of electrochemical potentials (see 2.6.5.6/RD) | | P |
| | Metal(s) used | Copper plated with tin and soldering lead. | |

| | | | |
|---------|--|--|---|
| K/RD | Annex K, Thermal controls (see 1.5.3/RD and 5.3.8/RD) | | N |
| K.1/RD | Making and breaking capacity | | N |
| K.2 /RD | Thermostat reliability; operating voltage (V) ... : | | N |
| K.3/RD | Thermostat endurance test; operating voltage (V) | | N |
| K.4/RD | Temperature limiter endurance; operating voltage (V) | | N |
| K.5/RD | Thermal cut-out reliability | | N |
| K.6/RD | Stability of operation | | N |

| | | | |
|-------|---|---|---|
| L | Annex L, Reference loads | | P |
| L.1 | General | | P |
| L.2 | Reference resistive load | | N |
| L.3 | Reference inductive-resistive load | | N |
| L.4 | Reference capacitive-resistive loads | Worst case power factors as specified by the manufacturer maintained during the relevant tests. | P |
| L.5 | Reference non-linear load | | N |
| L.5.1 | Test method | | N |
| L.5.2 | Connection of the non-linear reference load | | N |
| L.5.3 | Connection of the non-linear reference load | | N |

| | | | |
|-----|--|--|---|
| M | Annex M, Ventilation of battery compartments | | P |
| M.1 | General | Sufficient openings and a suitable arrangement of components (relays) are provided in such a way that a local concentration of hydrogen and oxygen is not possible. No requirement regarding the separation of operational arcing parts from battery vents/valves. | P |
| M.2 | Normal conditions | See M.1 above. | P |
| M.3 | Blocked conditions | See appended table 8.3. | P |

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|-------------|--|--------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| M.4 | Overcharge conditions | | N |
| N | Annex N, Minimum and maximum cross-sections of copper conductors suitable for connection (see 6.3) | | N |
| U/RD | Annex U, Insulated winding wires for use without interleaved insulation (see 2.10.5.4/RD) | | N |
| | | | |
| V/RD | Annex V, AC POWER DISTRIBUTION SYSTEMS (see 1.6.1/RD) | | P |
| V.1/RD | Introduction | | P |
| V.2/RD | TN power distribution systems | See sub-clause 1.6.1/RD. | P |
| V.3/RD | TT power distribution systems | | P |
| V.4/RD | IT power distribution systems | | P |

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

| 4.5 | TABLE: list of critical components | | | | P |
|-------------------------|--|---------------------------|--------------------------------------|----------|---|
| object/part No. | manufacturer/ trademark | type/model | technical data | standard | mark(s) of conformity ¹⁾ |
| Material of Front panel | Chi-Mei | PA-757(+), | HB, 80°C, Min Thickness 1.5 mm | -- | UL: E56070 |
| All PCB | Various | Various | V-0, 130°C | -- | UL |
| DC FAN | NMB-MAT | 3110KL-05W- B89-B00 | 24V, 0.18A | -- | UL: E89936; VDE: 1507300 |
| DC FAN | NMB-MAT | 3110KL-05W- B89-B01 | 24V, 0.18A | -- | UL:E89936\ VDE:1507300 |
| DC FAN | ADDA | AD0824VB- A72GP | 24V, 0.38A | -- | TUV:R50068602 CE, UL |
| DC FAN | BAIKE | DBA08025B24 S1 | 24V, 0.30A | -- | UL E464754 |
| CONNECTOR | OULU | TR60-05-7P- BK-T2-T(f) | AC600V,65A | -- | UL:E332956; CE:LBT1006C- 196S |
| CONNECTOR | Connection | DRTB16-07- RST BK | AC600V,65A | -- | UL:E304128 |
| CONNECTOR | OULU | TP381P-00- 2P-T2 | AC300V,8A | -- | UL:E332956; CE:LBT1006C- 196S |
| Circuit Breaker | Nader | NDM1-63 | AC230/400V,63 A | -- | TUV:15031180 004 |
| Circuit Breaker | DELIXI | CDBKN1C63 | AC230/400V,63 A | -- | TUV:R5030331 9 |
| On PS1509_EM1 | | | | | |
| Varistor | CENTRA SCIENCE CORP | 20D821K | AC510V;DC670 V | -- | UL: E316325 VDE: 40008220 |
| X2 Capacitor | XIAMEN FARATRONIC CO LTD | MKP62 | 275Vac/305Vac | -- | UL:E186600 VDE:40000358 |
| X2 Capacitor | SHENZHEN SURONG CAPACITORS CO LTD | MP2225K3F2 G0 | 280Vac | -- | UL:E314875 VDE:5001984- 4670-0001 |
| Y2 Capacitor | XIAMEN FARATRONIC CO LTD | MKP63 | 300Vac;10nF | -- | UL:E186600 |
| Y2 Capacitor | EPCOS | B32021 | 300Vac;10nF | -- | UL:E97863 UL:E301966 |

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|---------------------|--------------------------------------|--------------------|---------------------|----|---------------------------------------|
| Clause | Requirement + Test | Result - Remark | Verdict | | |
| Y2 Capacitor | TDK | XB9-1102-431C(00) | 400VAC; 2200pF | -- | UL:E37861 VDE:122006 |
| Y1 Capacitor | MURATA | DE1E3KX472 M | 250VAC; 4700pF | -- | UL:E37921; VDE:40002831 |
| FUSE | TAMURA | T3F | AC250V, 2A,115°C | -- | VDE:2183900; UL:E73591 |
| FUSE | AUPO ELECTRONICS LTD | P2-F | AC250V, 2A,115°C | -- | VDE:1951300 UL: E140847 |
| CONNECTOR | OULU | AO-15/4J-N2 | 80A | -- | UL:E332956 CE:LBT1006C-196S |
| CONNECTOR | SHENZHEN SHINNING ELECTRONIC CO LTD | 1343-041-020-1 | 3A | -- | UL: E241307 |
| On PS1509_DR2 | | | | | |
| X2 Capacitor | XIAMEN FARATRONIC CO LTD | MKP62 | 275Vac/305Vac | | UL: E186600 VDE: 40000358; |
| X2 Capacitor | SHENZHEN SURONG CAPACITORS CO LTD | MP2225K3F2 G0 | 280Vac | | UL: E314875 VDE: 5001984-4670-0001 |
| Y1 Capacitor | MURATA | DE1E3KX472 M | 250VAC;4700pF | | UL: E37921; VDE: 40002831 |
| OPTOCOUP LERS | LITE-ON | LTV-816S | 5000Vrms | | UL: E113898 VDE:40015248; |
| OPTOCOUP LERS | SHARP | PC123X5YI | 5000Vrms | | UL:E64380 VDE:40008087 |
| OPTOCOUP LERS | NEC | PS2561L-1-V-F3-A-L | 5000Vrms | | UL: E72422 VDE: 40008862 |
| OPTOCOUP LERS | AVAGO | ACPL-C790-500E | 5000 Vrms/1min | | UL:E55261 |
| OPTOCOUP LERS | TI | AMC1301DW VR | 5000 Vrms/1min | | UL;VDE |
| RELAY | TYCO | T92SD12-24 | 277VAC,30A | | UL:E22575 VDE:5386 |
| RELAY | XIAMEN HONGFA ELECTROACOUSTIC CO LTD | HF92F-024D-2A12F | 277VAC,30A | | UL:E134517 VDE:40016109 |
| CURRENT TRANSFORMER | INVT | USS11CT1 | Class B | | Test with appliance |
| CURRENT TRANSFORMER | INVT | UMX33CT1 | Class B | | Test with appliance |

| IEC 62040-1 | | | | | |
|---------------------|-------------------------------------|-------------------|----------------|----|----------------------------------|
| Clause | Requirement + Test | Result - Remark | Verdict | | |
| CURRENT TRANSFORMER | INVT | HTX11L1 | Class F | | Test with appliance |
| CONNECTOR | OULU | AO-15/4J-N2 | 80A | -- | UL: E332956 CE: LBT1006C-196S |
| CONNECTOR | OULU | AO-08,4J-19 | 25A | -- | UL: E332956 CE: LBT1006C-196S |
| CONNECTOR | OULU | A0-08/2J-13 | 10A | -- | UL:E332956 CE: LBT1006C-196S |
| CONNECTOR | CVILUX | CI2202P1VK0 | 250V3A | -- | UL:E159616 |
| CONNECTOR | SHENZHEN SHINNING ELECTRONIC CO LTD | 1343-021-010-1 | 250V3A | -- | UL: E241307 |
| CONNECTOR | SHENZHEN SHINNING ELECTRONIC CO LTD | 1343-031-010-1 | 250V3A | -- | UL: E241307 |
| CONNECTOR | CVILUX CORP | CI2203P1VK0 | 250V3A | -- | UL: E159616 |
| CONNECTOR | SHENZHEN SHINNING ELECTRONIC CO LTD | 1343-XX1-020-1 | 250V3A | -- | UL: E241307 |
| CONNECTOR | SHENZHEN SHINNING ELECTRONIC CO LTD | 1344-061-110-2 | 250V7A | -- | UL: E241307 |
| On PS1509_PW3 | | | | | |
| Y1 Capacitor | MURATA | DE1E3KX472M | 250VAC, 4700pF | -- | UL: E37921 VDE: 40002831 |
| OPTOCOUP LERS | AVAGO | ACPL-W340 | 5000Vrms | -- | UL;CSA |
| RELAY | TE | OJE-SS-112HMF | 30VDC, 250VAC | -- | VDE:40007630; UL:E82292 |
| FUSE | HOLLY | 30N-050H1/H2/L | 5A | -- | UL:E156471; |
| CURRENT TRANSFORMER | INVT | HTX11CT1 | CLASS B | -- | Test with appliance |
| INDUCTOR | Fot | UMX3315L3 | CLASS F | -- | Test with appliance |
| CONNECTOR | SHENZHEN SHINNING ELECTRONIC CO LTD | 1344-041-110-2 | 7A,250V | -- | UL: E241307 |
| On PS1509_PW1 | | | | | |
| Y2 CAPACITOR | TDK CORPORATIO N | XB9-1102-431C(00) | 400VAC;2200p F | -- | UL: E37861 VDE:122006 |

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|---|---|------------------------|-------------------|----|--------------------------------------|
| Clause | Requirement + Test | Result - Remark | Verdict | | |
| OPTOCOUP LERS | LITE-ON TECHNOLOGY CORP | LTV-816S | 5000Vrms | -- | UL: E113898 VDE: 40015248 |
| OPTOCOUP LERS | SHARP CORP ELECTRONIC COMPONENTS AND DEVICES BU | PC123X5YI | 5000Vrms | -- | UL: E64380 VDE: 40008087 |
| OPTOCOUP LERS | RENESAS ELECTRONICS CORPORATIO N | PS2561L-1-V- F3-A-L | 5000Vrms | -- | UL: E72422 VDE: 40008862 |
| FUSE | HOLLYLAND CO LTD | 30N- 100H1/H2/L | 10A | -- | UL: E156471; |
| FUSE | HOLLYLAND CO LTD | 30TS025H1/H 2/L | 2.5A | -- | UL: E156471; |
| On PS1509_PW1 | | | | | |
| OPTOCOUP LERS | LITE-ON TECHNOLOGY CORP | LTV-816S | 5000Vrms | -- | UL: E113898 VDE: 40015248 |
| OPTOCOUP LERS | SHARP CORP ELECTRONIC COMPONENTS AND DEVICES BU | PC123X5YI | 5000Vrms | -- | UL: E64380 VDE: 40008087 |
| OPTOCOUP LERS | RENESAS ELECTRONICS CORPORATIO N | PS2561L-1-V- F3-A-L | 5000Vrms | -- | UL: E72422 VDE: 40008862 |
| On PS1509_PW2 | | | | | |
| Y2 CAPACITOR | TDK CORPORATIO N | XB9-1102- 431C(00) | 400VAC; 2200pF | -- | UL: E37861 VDE:122006 |
| OPTOCOUP LERS | AVAGO | ACPL-W340 | 5000Vrms | -- | UL |
| FUSE | HOLLYLAND CO LTD | 30N- 020H1/H2/L | 2A | -- | UL: E156471; |
| CURRENT TRANSFORM ER | INVT | HTX11CT1 | CLASS B | -- | Test with appliance |
| INDUCTOR | INVT | HTX11L4 | CLASS F | -- | Test with appliance |
| On PS1509_TF2 | | | | | |
| CONNECTOR | SCED ELECTRONICS CO LTD | AO-15/4J-N2 | 80A | -- | UL: E332956 CE: LBT1006C- 196S |
| 1) an asterisk indicates a mark which assures the agreed level of surveillance. | | | | | |

| IEC 62040-1 | | | | | | |
|--------------------------|--|----------|-------|-------|-----------------|--|
| Clause | Requirement + Test | | | | Result - Remark | Verdict |
| 4.6, 1.6.2/RD | TABLE: Electrical Data (in normal conditions) | | | | | P |
| fuse # | I rated (A) | U (V) | P (W) | I (A) | I fuse (A) | condition/status |
| Model: HR1110XL | | | | | | |
| Circuit breaker | -- | 180/50Hz | 11839 | 65.77 | 65.77 | Charging of empty batteries and rated output load. |
| Circuit breaker | -- | 180/60Hz | 11821 | 65.67 | 65.67 | Ditto |
| Circuit breaker | 60A | 200/50Hz | 11827 | 59.13 | 59.13 | Ditto |
| Circuit breaker | 60A | 200/60Hz | 11802 | 59.01 | 59.01 | Ditto |
| Circuit breaker | 60A | 208/50Hz | 11814 | 56.80 | 56.80 | Ditto |
| Circuit breaker | 60A | 208/60Hz | 11789 | 56.68 | 56.68 | Ditto |
| Circuit breaker | 60A | 220/50Hz | 11777 | 53.53 | 53.53 | Ditto |
| Circuit breaker | 60A | 220/60Hz | 11765 | 53.48 | 53.48 | Ditto |
| Circuit breaker | 60A | 230/50Hz | 11752 | 51.10 | 51.10 | Ditto |
| Circuit breaker | 60A | 230/60Hz | 11728 | 50.99 | 50.99 | Ditto |
| Circuit breaker | 60A | 240/50Hz | 11740 | 48.92 | 48.92 | Ditto |
| Circuit breaker | 60A | 240/60Hz | 11715 | 48.81 | 48.81 | Ditto |
| Circuit breaker | -- | 264/50Hz | 11691 | 44.28 | 44.28 | Ditto |
| Circuit breaker | -- | 264/60Hz | 11667 | 44.19 | 44.19 | Ditto |
| Model: HR1110XS | | | | | | |

| IEC 62040-1 | | | | | | |
|-----------------|--------------------|----------|-------|-------|-----------------|--|
| Clause | Requirement + Test | | | | Result - Remark | Verdict |
| Circuit breaker | -- | 180/50Hz | 10888 | 60.49 | 60.49 | Charging of empty batteries and rated output load. |
| Circuit breaker | -- | 180/60Hz | 10871 | 60.39 | 60.39 | Ditto |
| Circuit breaker | 60A | 200/50Hz | 10876 | 54.38 | 54.38 | Ditto |
| Circuit breaker | 60A | 200/60Hz | 10854 | 54.27 | 54.27 | Ditto |
| Circuit breaker | 60A | 208/50Hz | 10865 | 52.24 | 52.24 | Ditto |
| Circuit breaker | 60A | 208/60Hz | 10842 | 52.13 | 52.13 | Ditto |
| Circuit breaker | 60A | 220/50Hz | 10831 | 49.23 | 49.23 | Ditto |
| Circuit breaker | 60A | 220/60Hz | 10819 | 49.18 | 49.18 | Ditto |
| Circuit breaker | 60A | 230/50Hz | 10808 | 46.99 | 46.99 | Ditto |
| Circuit breaker | 60A | 230/60Hz | 10785 | 46.89 | 46.89 | Ditto |
| Circuit breaker | 60A | 240/50Hz | 10797 | 44.99 | 44.99 | Ditto |
| Circuit breaker | 60A | 240/60Hz | 10774 | 44.89 | 44.89 | Ditto |
| Circuit breaker | -- | 264/50Hz | 10752 | 40.73 | 40.73 | Ditto |
| Circuit breaker | -- | 264/60Hz | 10729 | 40.64 | 40.64 | Ditto |
| Model: HR1108XL | | | | | | |

| IEC 62040-1 | | | | | | |
|-----------------|--------------------|----------|------|-------|-----------------|--|
| Clause | Requirement + Test | | | | Result - Remark | Verdict |
| Circuit breaker | -- | 180/50Hz | 9720 | 54.00 | 54.00 | Charging of empty batteries and rated output load. |
| Circuit breaker | -- | 180/60Hz | 9705 | 53.91 | 53.91 | Ditto |
| Circuit breaker | 48A | 200/50Hz | 9710 | 48.55 | 48.55 | Ditto |
| Circuit breaker | 48A | 200/60Hz | 9689 | 48.45 | 48.45 | Ditto |
| Circuit breaker | 48A | 208/50Hz | 9700 | 46.63 | 46.63 | Ditto |
| Circuit breaker | 48A | 208/60Hz | 9679 | 46.53 | 46.53 | Ditto |
| Circuit breaker | 48A | 220/50Hz | 9669 | 43.95 | 43.95 | Ditto |
| Circuit breaker | 48A | 220/60Hz | 9659 | 43.90 | 43.90 | Ditto |
| Circuit breaker | 48A | 230/50Hz | 9649 | 41.95 | 41.95 | Ditto |
| Circuit breaker | 48A | 230/60Hz | 9628 | 41.86 | 41.86 | Ditto |
| Circuit breaker | 48A | 240/50Hz | 9639 | 40.16 | 40.16 | Ditto |
| Circuit breaker | 48A | 240/60Hz | 9618 | 40.08 | 40.08 | Ditto |
| Circuit breaker | -- | 264/50Hz | 9598 | 36.36 | 36.36 | Ditto |
| Circuit breaker | -- | 264/60Hz | 9578 | 36.28 | 36.28 | Ditto |
| Model: HR1108XS | | | | | | |

| IEC 62040-1 | | | | | | |
|-----------------|--------------------|----------|------|-------|-----------------|--|
| Clause | Requirement + Test | | | | Result - Remark | Verdict |
| Circuit breaker | -- | 180/50Hz | 8765 | 48.69 | 48.69 | Charging of empty batteries and rated output load. |
| Circuit breaker | -- | 180/60Hz | 8751 | 48.61 | 48.61 | Ditto |
| Circuit breaker | 48A | 200/50Hz | 8755 | 43.78 | 43.78 | Ditto |
| Circuit breaker | 48A | 200/60Hz | 8737 | 43.68 | 43.68 | Ditto |
| Circuit breaker | 48A | 208/50Hz | 8746 | 42.05 | 42.05 | Ditto |
| Circuit breaker | 48A | 208/60Hz | 8728 | 41.96 | 41.96 | Ditto |
| Circuit breaker | 48A | 220/50Hz | 8718 | 39.63 | 39.63 | Ditto |
| Circuit breaker | 48A | 220/60Hz | 8709 | 39.59 | 39.59 | Ditto |
| Circuit breaker | 48A | 230/50Hz | 8700 | 37.83 | 37.83 | Ditto |
| Circuit breaker | 48A | 230/60Hz | 8682 | 37.75 | 37.75 | Ditto |
| Circuit breaker | 48A | 240/50Hz | 8691 | 36.21 | 36.21 | Ditto |
| Circuit breaker | 48A | 240/60Hz | 8673 | 36.14 | 36.14 | Ditto |
| Circuit breaker | -- | 264/50Hz | 8655 | 32.78 | 32.78 | Ditto |
| Circuit breaker | -- | 264/60Hz | 8637 | 32.72 | 32.72 | Ditto |
| Model: HR1106XL | | | | | | |

| IEC 62040-1 | | | | | | |
|-----------------|--------------------|----------|------|-------|-----------------|--|
| Clause | Requirement + Test | | | | Result - Remark | Verdict |
| Circuit breaker | -- | 180/50Hz | 7692 | 42.74 | 42.74 | Charging of empty batteries and rated output load. |
| Circuit breaker | -- | 180/60Hz | 7680 | 42.67 | 42.67 | Ditto |
| Circuit breaker | 36A | 200/50Hz | 7684 | 38.42 | 38.42 | Ditto |
| Circuit breaker | 36A | 200/60Hz | 7676 | 38.38 | 38.38 | Ditto |
| Circuit breaker | 36A | 208/50Hz | 7668 | 36.86 | 36.86 | Ditto |
| Circuit breaker | 36A | 208/60Hz | 7660 | 36.82 | 36.82 | Ditto |
| Circuit breaker | 36A | 220/50Hz | 7651 | 34.78 | 34.78 | Ditto |
| Circuit breaker | 36A | 220/60Hz | 7643 | 34.74 | 34.74 | Ditto |
| Circuit breaker | 36A | 230/50Hz | 7635 | 33.20 | 33.20 | Ditto |
| Circuit breaker | 36A | 230/60Hz | 7627 | 33.16 | 33.16 | Ditto |
| Circuit breaker | 36A | 240/50Hz | 7619 | 31.75 | 31.75 | Ditto |
| Circuit breaker | 36A | 240/60Hz | 7611 | 31.71 | 31.71 | Ditto |
| Circuit breaker | -- | 264/50Hz | 7595 | 28.77 | 28.77 | Ditto |
| Circuit breaker | -- | 264/60Hz | 7579 | 28.71 | 28.71 | Ditto |
| Model: HR1106XS | | | | | | |

| IEC 62040-1 | | | | | | |
|-----------------|--------------------|----------|------|-------|-----------------|--|
| Clause | Requirement + Test | | | | Result - Remark | Verdict |
| Circuit breaker | -- | 180/50Hz | 6731 | 37.39 | 37.39 | Charging of empty batteries and rated output load. |
| Circuit breaker | -- | 180/60Hz | 6720 | 37.33 | 37.33 | Ditto |
| Circuit breaker | 36A | 200/50Hz | 6724 | 33.62 | 33.62 | Ditto |
| Circuit breaker | 36A | 200/60Hz | 6716 | 33.58 | 33.58 | Ditto |
| Circuit breaker | 36A | 208/50Hz | 6709 | 32.26 | 32.26 | Ditto |
| Circuit breaker | 36A | 208/60Hz | 6702 | 32.22 | 32.22 | Ditto |
| Circuit breaker | 36A | 220/50Hz | 6695 | 30.43 | 30.43 | Ditto |
| Circuit breaker | 36A | 220/60Hz | 6688 | 30.40 | 30.40 | Ditto |
| Circuit breaker | 36A | 230/50Hz | 6681 | 29.05 | 29.05 | Ditto |
| Circuit breaker | 36A | 230/60Hz | 6674 | 29.02 | 29.02 | Ditto |
| Circuit breaker | 36A | 240/50Hz | 6667 | 27.78 | 27.78 | Ditto |
| Circuit breaker | 36A | 240/60Hz | 6660 | 27.75 | 27.75 | Ditto |
| Circuit breaker | -- | 264/50Hz | 6646 | 25.17 | 25.17 | Ditto |
| Circuit breaker | -- | 264/60Hz | 6632 | 25.12 | 25.12 | Ditto |
| Model: HR1105XL | | | | | | |

| IEC 62040-1 | | | | | | |
|-----------------|--------------------|----------|------|-------|-----------------|--|
| Clause | Requirement + Test | | | | Result - Remark | Verdict |
| Circuit breaker | -- | 180/50Hz | 6617 | 36.76 | 36.76 | Charging of empty batteries and rated output load. |
| Circuit breaker | -- | 180/60Hz | 6606 | 36.70 | 36.70 | Ditto |
| Circuit breaker | 30A | 200/50Hz | 6610 | 33.05 | 33.05 | Ditto |
| Circuit breaker | 30A | 200/60Hz | 6603 | 33.01 | 33.01 | Ditto |
| Circuit breaker | 30A | 208/50Hz | 6596 | 31.71 | 31.71 | Ditto |
| Circuit breaker | 30A | 208/60Hz | 6589 | 31.68 | 31.68 | Ditto |
| Circuit breaker | 30A | 220/50Hz | 6582 | 29.92 | 29.92 | Ditto |
| Circuit breaker | 30A | 220/60Hz | 6575 | 29.89 | 29.89 | Ditto |
| Circuit breaker | 30A | 230/50Hz | 6568 | 28.56 | 28.56 | Ditto |
| Circuit breaker | 30A | 230/60Hz | 6561 | 28.53 | 28.53 | Ditto |
| Circuit breaker | 30A | 240/50Hz | 6554 | 27.31 | 27.31 | Ditto |
| Circuit breaker | 30A | 240/60Hz | 6547 | 27.28 | 27.28 | Ditto |
| Circuit breaker | -- | 264/50Hz | 6533 | 24.75 | 24.75 | Ditto |
| Circuit breaker | -- | 264/60Hz | 6519 | 24.69 | 24.69 | Ditto |
| Model: HR1105XS | | | | | | |

| IEC 62040-1 | | | | | | |
|-----------------------------------|--------------------|----------|------|-------|-----------------|--|
| Clause | Requirement + Test | | | | Result - Remark | Verdict |
| Circuit breaker | -- | 180/50Hz | 5656 | 31.42 | 31.42 | Charging of empty batteries and rated output load. |
| Circuit breaker | -- | 180/60Hz | 5647 | 31.37 | 31.37 | Ditto |
| Circuit breaker | 30A | 200/50Hz | 5650 | 28.25 | 28.25 | Ditto |
| Circuit breaker | 30A | 200/60Hz | 5644 | 28.22 | 28.22 | Ditto |
| Circuit breaker | 30A | 208/50Hz | 5638 | 27.11 | 27.11 | Ditto |
| Circuit breaker | 30A | 208/60Hz | 5632 | 27.08 | 27.08 | Ditto |
| Circuit breaker | 30A | 220/50Hz | 5626 | 25.57 | 25.57 | Ditto |
| Circuit breaker | 30A | 220/60Hz | 5620 | 25.55 | 25.55 | Ditto |
| Circuit breaker | 30A | 230/50Hz | 5614 | 24.41 | 24.41 | Ditto |
| Circuit breaker | 30A | 230/60Hz | 5608 | 24.38 | 24.38 | Ditto |
| Circuit breaker | 30A | 240/50Hz | 5603 | 23.34 | 23.34 | Ditto |
| Circuit breaker | 30A | 240/60Hz | 5597 | 23.32 | 23.32 | Ditto |
| Circuit breaker | -- | 264/50Hz | 5585 | 21.15 | 21.15 | Ditto |
| Circuit breaker | -- | 264/60Hz | 5573 | 21.11 | 21.11 | Ditto |
| Supplementary information: | | | | | | |

| 5.1.1 2.1.1.7/ RD | TABLE: discharge of capacitors in the primary circuit | | | | P |
|-----------------------------------|---|---------------------|-------------|---|---|
| Condition | τ calculated (s) | τ measured (s) | t u→ 0V (s) | Comments | |
| Power switch on (L-N) | -- | 0.82 | 1.32 | Vi=388V, 37% of Vi=143.56V, No load applied | |
| Power switch off (L-N) | -- | 0.82 | 1.32 | Ditto | |
| Supplementary information: | | | | | |

| | | | |
|-------------|--------------------|-----------------|---------|
| IEC 62040-1 | | | |
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | |
|--|--|--------|--|
| 5.2.1 2.2/RD | TABLE: Evaluation Of Voltage Limiting Components In SELV Circuits | | N/A |
| Component (measured between) | max. voltage (V) (normal operation) | | Voltage Limiting Components |
| | V peak | V d.c. | |
| | | | |
| Fault test performed on voltage limiting components | Voltage measured (V) in SELV circuits (V peak or V d.c.) | | |
| | | | |
| Supplementary information: | | | |

| | | | |
|--|-------------------------------------|----------------|---|
| 5.2.5 2.5/RD | TABLE: Limited Power Sources | | N/A |
| Circuit output tested: | | | |
| Note: Measured Uoc (V) with all load circuits disconnected: | | | |
| Components | Sample No. | Uoc (V) | Isc (A) |
| | | | VA |
| | | | Meas. Limit Meas. Limit |
| | | | |
| Supplementary information: Sc=Short circuit, Oc=Open circuit | | | |

| | | | | |
|------------------|---|-------------------------|-----------------|----------|
| 5.7 2.10.2/RD | Table: Working Voltage Measurement | | | P |
| Location | RMS voltage (V) | Peak voltage (V) | Comments | |
| T1 pin8-4 | 23.2 | 32.8 | | |
| T1 pin8-3 | 10.4 | 21.6 | | |
| T1 pin8-2 | 69.9 | 130 | | |
| T1 pin8-1 | 25.3 | 56.0 | | |
| T1 pin9-4 | 10.1 | 16.0 | | |
| T1 pin9-3 | 10.3 | 15.9 | | |
| T1 pin9-2 | 66.5 | 108 | | |
| T1 pin9-1 | 72.6 | 113 | | |
| T1 pin10-4 | 10.4 | 24.8 | | |
| T1 pin10-3 | 22.8 | 41.2 | | |
| T1 pin10-2 | 65.6 | 109 | | |
| T1 pin10-1 | 73.5 | 131 | | |
| U16 pin1-4 | 26.6 | 45.6 | | |

| IEC 62040-1 | | | |
|-----------------------------------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| U16 pin1-3 | 24.4 | 46.0 | |
| U16 pin2-4 | 3.30 | 4.55 | |
| U16 pin2-3 | 0 | 0 | |
| U17 pin4-1 | 5.46 | 7.26 | |
| U17 pin4-2 | 6.65 | 8.52 | |
| U17 pin3-1 | 1.15 | 1.88 | |
| U17 pin3-2 | 0 | 0 | |
| U18 pin1-4 | 26.1 | -45.2 | |
| U18 pin1-3 | 23.8 | -45.2 | |
| U18 pin2-3 | 0 | 0 | |
| U18 pin2-4 | 3.30 | 4.48 | |
| U19 pin1-4 | 11.5 | 15.6 | |
| U19 pin1-3 | 14.8 | 15.6 | |
| U19 pin2-3 | 14.8 | 15.2 | |
| U19 pin2-4 | 11.6 | 15.7 | |
| U20 pin4-1 | 5.66 | 7.27 | |
| U20 pin4-2 | 7.17 | 9.30 | |
| U20 pin3-1 | 1.17 | 1.56 | |
| U20 pin3-2 | 0 | 0 | |
| supplementary information: | | | |
| | | | |

| 5.7 and 2.10.4/RD | TABLE: clearance and creepage distance measurements | | | | | P |
|---|---|--------------|------------------|----------|--------------------|----------|
| clearance cl and creepage distance dcr at/of: | Up (V) | U r.m.s. (V) | required cl (mm) | cl (m m) | required dcr(mm) | dcr (mm) |
| Whole unit for case models | | | | | | |

| IEC 62040-1 | | | | | | |
|--|--------------------|-----------------|-----|------|---------|------|
| Clause | Requirement + Test | Result - Remark | | | Verdict | |
| Metal enclosure to bare pin of battery terminal | <420 | <250V | 2.0 | >10 | 2.5 | >10 |
| Primary trace to earthed metal plate on DR2 board PCB | <420 | <250V | 2.0 | >5 | 2.5 | >5 |
| Primary pin to earthed metal plate on DR2 board PCB | <420 | <250V | 2.0 | >5 | 2.5 | >5 |
| Primary pin to earthed metal plate on Input EMI board PCB | <420 | <250V | 2.0 | >5 | 2.5 | >5 |
| Whole unit for Rack case models | | | | | | |
| Primary trace to earthed metal plate on DR2 board PCB | <420 | <250V | 2.0 | 4.7 | 2.5 | >4.7 |
| Primary pin to earthed metal plate on DR2 board PCB | <420 | <250V | 2.0 | >5.0 | 2.5 | >5.0 |
| Primary pin to earthed metal plate on Input EMI board PCB | <420 | <250V | 2.0 | >5.0 | 2.5 | >5.0 |
| DR2 board PCB | | | | | | |
| Primary trace to earthed traces | <420 | <250V | 2.0 | >2.6 | 2.5 | >2.6 |
| Input EMI board PCB | | | | | | |
| Primary traces to earthed traces | <420 | <250 | 2.0 | 2.6 | 2.5 | 2.6 |
| Primary traces to earthed traces under Y2-cap | <420 | <250 | 2.0 | 2.6 | 2.5 | 2.6 |
| Line traces to neutral under X2-cap | <420 | <250 | 2.0 | 3.5 | 2.5 | 3.5 |
| CNTL PCB | | | | | | |
| Primary pin to secondary pin under (U17, U19, U20, U18, U16) | <420 | <250 | 4.0 | 6.2 | 5.0 | 6.2 |
| Primary trace to secondary trace under T1 | <420 | <250 | 4.0 | 8.4 | 5.0 | 8.4 |
| Primary winding to secondary winding of T1 | <420 | <250 | 4.0 | >5.0 | 5.0 | >5.0 |
| Primary winding to core of T1 | <420 | <250 | 2.0 | >2.5 | 2.5 | >2.5 |
| Secondary winding to core of T1 | <420 | <250 | 2.0 | >2.5 | 2.5 | >2.5 |
| External battery pack | | | | | | |
| Metal enclosure to bare pin of battery terminal | <420 | <250V | 2.0 | >5.0 | 2.5 | >5.0 |
| Note(s): | | | | | | |

| | | |
|----------------------|---|----------|
| 5.3.1 and 2.6.3.4/RD | TABLE: provisions for protective earthing | P |
| Location | Resistance measured(mΩ) / voltage drop(V) | Comments |

| | | | |
|-------------|--------------------|-----------------|---------|
| IEC 62040-1 | | | |
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | |
|--|----|------------------------------|
| I/P earth (ac connector)→metal enclosure | 20 | Test current of 32A for 120s |
| Note: | | |

| | | |
|-------------|--|-----------------------------|
| 5.5 and 8.3 | TABLE: Abnormal operating and fault conditions | P |
| | ambient temperature (°C) | See below |
| | model/type of power supply | Integral part of equipment. |
| | manufacturer of power supply | See below |
| | rated markings of power supply | See page 4 |

| No. | component No. | fault | test voltage (V) | test time | fuse no. | fuse current (A) | Result |
|--------------|---------------|-------|------------------|-----------|----------|------------------|--|
| On DR2 board | | | | | | | |
| 1 | Q58(PIN1-2) | S-C | 288V | 1s | | 0 | UPS shutdown immediately. Fuse opened. No hazards. |
| 2 | Q58(PIN2-3) | S-C | 288V | 1s | | 0 | UPS shutdown immediately. Fuse opened. No hazards. |
| 3 | Q58(PIN1-3) | S-C | 288V | 1s | | 0 | UPS shutdown immediately. No hazards. |
| 4 | Q5(PIN1-2) | S-C | 288V | 1s | | 0 | UPS shutdown immediately. Fuse opened. No hazards. |
| 5 | Q5(PIN2-3) | S-C | 288V | 1s | | 0 | UPS shutdown immediately. Fuse opened. No hazards. |
| 6 | Q5(PIN1-3) | S-C | 288V | 1s | | 0 | UPS shutdown immediately. No hazards. |
| 7 | C1 | S-C | 288V | 1s | | 0 | UPS shutdown immediately. Fuse opened. No hazards. |
| 8 | C3 | S-C | 288V | 1s | | 0 | UPS shutdown immediately. Fuse opened. No hazards. |
| On PW1 board | | | | | | | |
| 9 | U13 pin 1-2 | S-C | 288V | 10mins | | 0.52 | UPS shutdown immediately. No hazards. |
| 10 | U13 pin 3-4 | S-C | 288V | 10mins | | 0.47 | UPS shutdown immediately. No hazards. |
| 11 | U13 pin 1 | O-C | 288V | 10mins | | 0.59 | UPS shutdown immediately. No hazards. |
| 12 | U13 pin 3 | O-C | 288V | 10mins | | 0.57 | UPS shutdown immediately. No hazards. |
| 13 | T3 pin 1-2 | S-C | 288V | 10mins | | 0.57 | UPS shutdown immediately. No hazards. |
| 14 | T3 pin 4-5 | S-C | 288V | 10mins | | 0.57 | UPS shutdown immediately. No hazards. |
| 15 | T3 pin 6-8 | S-C | 288V | 10mins | | 1.03 | UPS shutdown immediately. No hazards. |

| IEC 62040-1 | | | |
|-------------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| No. | component No. | fault | test voltage (V) | test time | fuse no. | fuse current (A) | Result |
|--------------|---------------|-------|------------------|-----------|----------|------------------|---|
| 16 | D80 | S-C | 288V | 10mins | | 1.03 | UPS shutdown immediately. No hazards. |
| 17 | U14 pin1-6 | S-C | 288V | 1s | | 0 | UPS shutdown immediately. U14 damage, No hazards. |
| 18 | U19 pin 1-2 | S-C | 288V | 10mins | | 0.52 | UPS shutdown immediately. No hazards. |
| 19 | U19 pin 3-4 | S-C | 288V | 10mins | | 0.47 | UPS shutdown immediately. No hazards. |
| 20 | U19 pin 1 | O-C | 288V | 10mins | | 0.59 | UPS shutdown immediately. No hazards. |
| 21 | U19 pin 3 | O-C | 288V | 10mins | | 0.57 | UPS shutdown immediately. No hazards. |
| On PW2 board | | | | | | | |
| 22 | T2(PIN1-2) | S-C | 288V | 10mins | | 0.57 | UPS shutdown immediately. No hazards. |
| 23 | T2(PIN3-4) | S-C | 288V | 10mins | | 0.57 | UPS shutdown immediately. No hazards. |
| 24 | D22 | S-C | 288V | 10mins | | 0.57 | UPS shutdown immediately. No hazards. |
| On PW3 board | | | | | | | |
| 25 | T5(PIN(2-4) | S-C | 288V | 10mins | | 1.05 | UPS shutdown immediately. No hazards. |
| 26 | T5(PIN6-7) | S-C | 288V | 10mins | | 1.12 | UPS shutdown immediately. No hazards. |
| 27 | T5(PIN9-10) | S-C | 288V | 10mins | | 1.23 | UPS shutdown immediately. No hazards. |
| 28 | D39 | S-C | 288V | 10mins | | 1.03 | UPS shutdown immediately. No hazards. |
| 29 | C26 | S-C | 288V | 10mins | | 1.13 | UPS shutdown immediately. No hazards. |
| 30 | C27 | S-C | 288V | 10mins | | 1.03 | UPS shutdown immediately. No hazards. |
| On CT1 board | | | | | | | |
| 31 | T1(PIN(1-2) | S-C | 288V | 10mins | | 1.05 | UPS shutdown immediately. No hazards. |
| 32 | T1(PIN3-4) | S-C | 288V | 10mins | | 1.12 | UPS shutdown immediately. No hazards. |
| 33 | T1(PIN9-10) | S-C | 288V | 10mins | | 1.23 | UPS shutdown immediately. No hazards. |
| 34 | T1(PIN8-9) | S-C | 288V | 10mins | | 1.23 | UPS shutdown immediately. No hazards. |
| 35 | U16 pin 1-2 | S-C | 288V | 10mins | | 1.23 | UPS shutdown immediately. No hazards. |
| 36 | U16 pin 3-4 | S-C | 288V | 10mins | | 1.23 | UPS shutdown immediately. No hazards. |
| 37 | U16 pin 1 | O-C | 288V | 10mins | | 1.23 | UPS shutdown immediately. No hazards. |
| 38 | U16 pin 3 | O-C | 288V | 10mins | | 1.23 | UPS shutdown immediately. No hazards. |

| IEC 62040-1 | | | |
|-------------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| No. | component No. | fault | test voltage (V) | test time | fuse no. | fuse current (A) | Result |
|-----|---------------|---------|------------------|-----------|----------|------------------|---------------------------------------|
| 39 | FAN | Locked | 288V | 10mins | | 1.23 | UPS shutdown immediately. No hazards. |
| 40 | Opening | Blocked | 288V | 10mins | | 40.5 | Normal working, No hazards. |

Note(s):
S-c means short circuit. O-l means overload. O-c means open circuit.

| | | |
|--|---|--------------------|
| 5.8, 2.1.1.3/R Dand 2.10.5.1 /RD | TABLE: electric strength tests, impulse tests and voltage surge tests | P |
| test voltage applied between: | | test voltage (V) |
| | | Breakdown Yes / No |
| ALL MODELS | | |
| Primary to Secondary (mains ac connector conductor to RS232 port) | | 3000Va.c. No |
| TNV circuits and RS232 port | | 1500Va.c. No |
| Primary to earth (mains ac connector conductor to earth) | | 1500Va.c. No |
| Primary winding to secondary winding of transformer T1 on CNTL PCB | | 3000Va.c. No |
| Primary winding to core of transformer T1 on CNTL PCB | | 1500Va.c. No |
| Secondary winding to core of transformer T1 on CNTL PCB | | 1500Va.c. No |
| 1 layer insulation tape used in transformer T1 on CNTL PCB | | 3000Va.c. No |
| Supplementary information: All model | | |

| | | |
|------------------|--|--------------------------|
| 7.4, 4.5.5/RD | TABLE: Ball pressure test of thermoplastic parts | N |
| | Allowed impression diameter (mm): ≤ 2 mm | — |
| Part | Test temperature (°C) | Impression diameter (mm) |
| -- | -- | -- |
| Note(s): | | |

| IEC 62040-1 | | | | |
|--|---------------------------|------------------|----------------|--------------------|
| Clause | Requirement + Test | Result - Remark | Verdict | |
| 7.5 | TABLE: resistance to fire | | | P |
| Part | Manufacturer of material | Type of material | Thickness (mm) | Flammability class |
| Front panel | Chi-Mei | PA-757 | HB, 80°C | -- |
| Supplementary information: see table 4.5 | | | | |

| | | | |
|-----|------------------------------------|------------|----|
| 7.7 | TABLE A: maximum temperature rises | | P |
| | test voltage (V) : | See below. | -- |
| | T1 (°C) : | -- | -- |
| | T2 (°C) : | -- | -- |

| Temperature rise T of part/at: | T(°C) : | | | required T |
|-----------------------------------|----------|--------------|--------------|------------|
| | 99V/50Hz | 316.8V/50 Hz | Battery mode | |
| Input wire | 48.0 | 44.8 | 49.9 | 105 |
| DC fan | 65.1 | 61.9 | 72.2 | 85 |
| Input break | 67.6 | 66.2 | 45.2 | 85 |
| Plastic panel | 43.7 | 43.8 | 42.9 | 95 |
| Steel panel | 59.4 | 57.5 | 62.7 | 70 |
| Output wire | 48.0 | 47.1 | 46.8 | 105 |
| Battery body | 37.1 | 38.8 | 42.0 | 70 |
| Battery wire | 33.7 | 35.1 | 65.6 | 105 |
| Input&output EMI board PS1509_EM1 | | | | |
| Xcap C5 | 61.8 | 58.7 | 47.7 | 85 |
| Ycap C17 | 51.4 | 50.9 | 45.0 | 85 |
| Ycap C8 | 50.9 | 51.9 | 48.6 | 85 |
| Xcap C14 | 51.8 | 52.7 | 48.8 | 85 |
| 5A Charger board PS1509_PW3 | | | | |
| L1 | 72.4 | 100.3 | 46.1 | 130 |
| T5 | 52.4 | 60.4 | 44.2 | 110 |
| RLY2 | 67.7 | 74.5 | 44.3 | 105 |
| SPS board PS1509_CT1 | | | | |
| T3 core | 64.2 | 61.7 | 66.3 | 110 |
| T3 coil | 63.3 | 61.4 | 64.5 | 110 |
| T2 core | 71.1 | 69.2 | 73.6 | 110 |
| T2 coil | 82.6 | 81.7 | 84.3 | 110 |

| | | | |
|-------------|--------------------|-----------------|---------|
| IEC 62040-1 | | | |
| Clause | Requirement + Test | Result - Remark | Verdict |

| Temperature rise T of part/at: | T(°C) : | | | required T | | | |
|---|----------|--------------|--------------|------------|--------|-------------------|------------------|
| | 99V/50Hz | 316.8V/50 Hz | Battery mode | | | | |
| Power board PS1509_DR2 | | | | | | | |
| T9 coil | 70.8 | 70.7 | 72.7 | 110 | | | |
| L2 coil | 82.6 | 71.7 | 109.2 | 130 | | | |
| L3 coil | 82.3 | 72.1 | 104.8 | 130 | | | |
| L4 coil | 102.1 | 109.0 | 105.1 | 130 | | | |
| T3 coil | 66.2 | 61.7 | 74.4 | 110 | | | |
| T2 coil | 70.3 | 64.5 | 80.3 | 110 | | | |
| C1 body | 69.6 | 63.7 | 70.5 | 85 | | | |
| C2 body | 68.8 | 65.0 | 70.1 | 85 | | | |
| C3 body | 66.8 | 62.9 | 67.5 | 85 | | | |
| C4 body | 68.0 | 65.3 | 68.2 | 85 | | | |
| C156 body | 72.9 | 72.2 | 73.3 | 105 | | | |
| Heatsink | 82.0 | 83.7 | 90.0 | 130 | | | |
| PCB board near heatsink | 86.7 | 78.1 | 104.8 | 130 | | | |
| PCB near Q10 | 58.0 | 52.3 | 62.2 | 130 | | | |
| PCB near Q1 | 82.0 | 77.1 | 91.8 | 130 | | | |
| PCB near Q7 | 77.7 | 75.8 | 104.1 | 130 | | | |
| PCB near Q60 | 59.9 | 57.7 | 73.0 | 130 | | | |
| Battery wire(+) | 49.1 | 50.3 | 89.2 | 105 | | | |
| Control board PS1509_CT1 | | | | | | | |
| T1 | 57.5 | 58.0 | 56.1 | 110 | | | |
| U17 | 59.3 | 59.7 | 57.9 | 85 | | | |
| ambient | 40.0 | 40.0 | 40.0 | -- | | | |
| Supplementary information: | | | | | | | |
| Temperature T of winding: | t1 (°C) | R1 (Ω) | t2 (°C) | R2 ((Ω) | T (°C) | Allowed Tmax (°C) | Insulation class |
| -- | -- | -- | -- | -- | -- | -- | -- |
| Supplementary information: | | | | | | | |
| The temperatures were measured under worst case normal mode defined in 1.2.2.1/RD and as described in sub-clause 1.6.2/RD and at voltages as described above. | | | | | | | |

| | | | |
|-------------|--------------------|-----------------|---------|
| IEC 62040-1 | | | |
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | | | |
|------------------------------------|----------------------------------|--------------|------------|------------|-----------------------------------|
| 8.1, 5.1.1/RD | TABLE: Touch current measurement | | | | P |
| Condition | L→terminal A | N→terminal A | Freq. (Hz) | Limit (mA) | Comments |
| Unit on | 2.6 | 2.6 | -- | 3.5 | Switch "e" open, L to PE, no load |
| Unit on | 0.005 | 0.005 | -- | 0.25 | Switch "e" open, N to PE, no load |
| Unit on | 0.005 | 0.005 | -- | 0.25 | Switch "e" close, L to RS232 port |
| Note(s) : Supply with 316.8V/60Hz. | | | | | |

| | | | | | |
|--|------------------------------|-------------|--|----------------------|---|
| C.2 | Safety isolation transformer | | | | P |
| Construction details: | | | | | |
| Transformer part name: T1 on Communication board | | | | | |
| Manufacturer: See appended table 1.5.1 | | | | | |
| Type: See appended table 1.5.1 | | | | | |
| | | | | | |
| Recurring peak voltage | | | | 420V _{peak} | |
| Required clearance for reinforced insulation (from table 2H and 2J) | | | | 4.0mm | |
| | | | | | |
| Effective voltage rms | | | | 250V _{rms} | |
| Required creepage distance for reinforced insulation (from table 2L) | | | | 5.0mm | |
| | | | | | |
| Measured min. creepage distance | | | | | |
| Location | | inside (mm) | | outside (mm) | |
| Primary winding/pin to secondary winding/pin | | 5.2 | | 5.2 | |
| Primary winding/pin to core | | 2.6 | | 2.7 | |
| Secondary winding/pin to core | | 2.6 | | 2.7 | |
| Measured min. clearances | | | | | |
| Location | | inside (mm) | | outside (mm) | |
| Primary winding/pin to secondary winding/pin | | 4.6 | | 4.7 | |
| Primary winding/pin to core | | 2.6 | | 2.7 | |
| Secondary winding/pin to core | | 2.6 | | 2.7 | |
| Construction: | | | | | |

| IEC 62040-1 | | | |
|--|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| Concentrically wound transformer design, core size EE-16. N1, N2 are primary winding which is wound around the internal side of the bobbin. 3 layers of mylar tapes are used to separate primary and secondary windings. N3, N4, N5 are secondary windings on outer side of bobbin. Margin tape with width of 2.8mm is used on both side of bobbin and each winding layer. Tubing is used on every winding exits to the bare pins on bobbin. | | | |
| Pin numbers | | | |
| Prim. | | Pin 1-2, 3-4 | |
| Sec. | | Pin 8-9, 9-10 | |
| Bobbin | | | |
| Material | | Phenolic | |
| Thickness | | 0.71 | |
| Electric strength test | | | |
| With 3000Vdc. after humidity treatment | | | |
| Result | | | |

| M | Ventilation of battery compartments | P |
|---|--|---|
| | The required dimension for the ventilation will be calculated with the following formula: | |
| | $A > K1 * Q$ with $Q = (0.054 \text{ m}^3/\text{Ah}) * n * I * C$ where: K1 : constant factor of $28 \text{ h} * \text{cm}^2/\text{m}^3$ Q : airflow in m^3/h n : number of battery cells I : constant factor (0.2A/100Ah for valve regulated lead acid batteries) C : nominal capacity of the battery | |
| | Model: n : C : $A > 28 * \text{cm}^2/\text{m}^3 * (0.054\text{m}^3/\text{Ah}) * 16 * (0.2 \text{ A}/100\text{Ah}) * 9\text{Ah} = 0.13 \text{ cm}^2$ for model HR1110XL, HR1110XS $A > 28 * \text{cm}^2/\text{m}^3 * (0.054\text{m}^3/\text{Ah}) * 16 * (0.2 \text{ A}/100\text{Ah}) * 7\text{Ah} = 0.10 \text{ cm}^2$ for model HR1106XL, HR1106XS | |
| | $A > 0.13\text{cm}^2$ for model HR1110XL, HR1110XS $A > 0.13\text{cm}^2$ for model HR1106XL, HR1106XS | |
| | Verdict | |

| IEC 62040-1 | | | |
|-------------|--|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The size of the ventilation openings exceeds the required airflow by far (as well as the UPS). | | |

| European group differences and national differences of EN 62040-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|-------------------------------|------------------------------------|-------|------|----------------|-----------------|---|---|---|-----------|-----------|--|---|---|-----------|-----------------|--|----------------------|----------------------------|-----------|--------|--|----------|--------|--------------|-----------------|---|---|---|-------------------|------|--|------------|------|---------------|-----------------|---|--------------|--------------------|-------------------|-----------------|--|------------------|----------------------------|-------------------|-----------------|---|-------------------------------|------------------------------------|-------------|------|--|-----------------------------|--------------|-------------------|------|--|------------|------|--|---|
| Clause | Requirement + Test | Result - Remark | Verdict | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EN 62040-1, GROUP DIFFERENCES (CENELEC common modifications EN) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clause | Requirement + Test | Result - Remark | Verdict | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contents | Add the following annexes: Annex ZA (normative) Normative references to international publications with their corresponding European publications Annex ZB (normative) Special national conditions | | P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ZA | <p>NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS</p> <p>The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.</p> <p>Note: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD Applies.</p> <table border="1"> <thead> <tr> <th>Publication</th> <th>Year</th> <th>Title</th> <th>EN/HD</th> <th>Year</th> </tr> </thead> <tbody> <tr> <td>IEC 60364-4-42</td> <td>-¹⁾</td> <td>Electrical installations of buildings - Part 4-42: Protection for safety - Protection against thermal effects</td> <td>-</td> <td>-</td> </tr> <tr> <td>IEC 60417</td> <td>Data-base</td> <td>Graphical symbols for use on equipment</td> <td>-</td> <td>-</td> </tr> <tr> <td>IEC 60529</td> <td>-¹⁾</td> <td>Degrees of protection provided by enclosures (IP Code)</td> <td>EN 60529 + corr. May</td> <td>1991²⁾ 1993</td> </tr> <tr> <td>IEC 60664</td> <td>Series</td> <td>Insulation coordination for equipment within low-voltage systems</td> <td>EN 60664</td> <td>Series</td> </tr> <tr> <td>IEC/TR 60755</td> <td>-¹⁾</td> <td>General requirements for residual current operated protective devices</td> <td>-</td> <td>-</td> </tr> <tr> <td>IEC 60950-1 (mod)</td> <td>2005</td> <td>Information technology equipment - Safety - Part 1: General requirements</td> <td>EN 60950-1</td> <td>2006</td> </tr> <tr> <td>IEC 61000-2-2</td> <td>-¹⁾</td> <td>Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems</td> <td>EN 61000-2-2</td> <td>2002²⁾</td> </tr> <tr> <td>IEC 61008-1 (mod)</td> <td>-¹⁾</td> <td>Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 1: General rules</td> <td>EN 61008-1 + A11</td> <td>2004²⁾ 2007</td> </tr> <tr> <td>IEC 61009-1 (mod)</td> <td>-¹⁾</td> <td>Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 1: General rules</td> <td>EN 61009-1 + corr. July + A11</td> <td>2004²⁾ 2006 2008</td> </tr> <tr> <td>IEC 62040-2</td> <td>2005</td> <td>Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements</td> <td>EN 62040-2 + corr. November</td> <td>2006 2006</td> </tr> <tr> <td>IEC 62040-3 (mod)</td> <td>1999</td> <td>Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements</td> <td>EN 62040-3</td> <td>2001</td> </tr> </tbody> </table> <p>¹⁾ Undated reference. ²⁾ Valid edition at date of issue.</p> | Publication | Year | Title | EN/HD | Year | IEC 60364-4-42 | - ¹⁾ | Electrical installations of buildings - Part 4-42: Protection for safety - Protection against thermal effects | - | - | IEC 60417 | Data-base | Graphical symbols for use on equipment | - | - | IEC 60529 | - ¹⁾ | Degrees of protection provided by enclosures (IP Code) | EN 60529 + corr. May | 1991 ²⁾ 1993 | IEC 60664 | Series | Insulation coordination for equipment within low-voltage systems | EN 60664 | Series | IEC/TR 60755 | - ¹⁾ | General requirements for residual current operated protective devices | - | - | IEC 60950-1 (mod) | 2005 | Information technology equipment - Safety - Part 1: General requirements | EN 60950-1 | 2006 | IEC 61000-2-2 | - ¹⁾ | Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems | EN 61000-2-2 | 2002 ²⁾ | IEC 61008-1 (mod) | - ¹⁾ | Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 1: General rules | EN 61008-1 + A11 | 2004 ²⁾ 2007 | IEC 61009-1 (mod) | - ¹⁾ | Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 1: General rules | EN 61009-1 + corr. July + A11 | 2004 ²⁾ 2006 2008 | IEC 62040-2 | 2005 | Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements | EN 62040-2 + corr. November | 2006 2006 | IEC 62040-3 (mod) | 1999 | Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements | EN 62040-3 | 2001 | | — |
| Publication | Year | Title | EN/HD | Year | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC 60364-4-42 | - ¹⁾ | Electrical installations of buildings - Part 4-42: Protection for safety - Protection against thermal effects | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC 60417 | Data-base | Graphical symbols for use on equipment | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC 60529 | - ¹⁾ | Degrees of protection provided by enclosures (IP Code) | EN 60529 + corr. May | 1991 ²⁾ 1993 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC 60664 | Series | Insulation coordination for equipment within low-voltage systems | EN 60664 | Series | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC/TR 60755 | - ¹⁾ | General requirements for residual current operated protective devices | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC 60950-1 (mod) | 2005 | Information technology equipment - Safety - Part 1: General requirements | EN 60950-1 | 2006 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC 61000-2-2 | - ¹⁾ | Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems | EN 61000-2-2 | 2002 ²⁾ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC 61008-1 (mod) | - ¹⁾ | Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 1: General rules | EN 61008-1 + A11 | 2004 ²⁾ 2007 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC 61009-1 (mod) | - ¹⁾ | Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 1: General rules | EN 61009-1 + corr. July + A11 | 2004 ²⁾ 2006 2008 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC 62040-2 | 2005 | Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements | EN 62040-2 + corr. November | 2006 2006 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEC 62040-3 (mod) | 1999 | Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements | EN 62040-3 | 2001 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| European group differences and national differences of EN 62040-1 | | | |
|--|---|--------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| ZB ANNEX (normative) | | | |
| SPECIAL NATIONAL CONDITIONS (EN) | | | |
| <p>The FI, NO and SE - SNCs originate from IEC 60950-1 2nd Edition, which is the reference document (RD) for IEC 62040-1. The national requirements are included in IEC 62040-1 through the following statement in the scope of the standard: <i>"National requirements additional to those in IEC 60950-1 apply and are found as notes under relevant clauses of the RD."</i></p> <p>The national requirements have not been specifically listed in the EN 62040-1:2008. If demanded, CLC/TC 22X will be requested to take proper measures to complete EN 62040-1 with Annexes ZB containing the SNCs as presented below.</p> <p>EN 62040-1:2008 supersedes EN 62040-1-1:2003. As a reference, see also SNCs for Finland, Norway and Sweden as included in the earlier EN 62040-1-1:2003</p> | | | |
| Clause | Requirement + Test | Result - Remark | Verdict |
| 4.7.3 | <p>In Finland, Norway and Sweden, when safety relies upon connection to the safety earth (see 5.3), a pluggable equipment type A UPS shall have a marking on the equipment, stating that the UPS must be connected to an earthed mains socket-outlet.</p> <p>The marking text in the applicable countries shall be as follows:</p> <p>In Finland: "Laite on liitettävä suojakoskettimilla varustettuun pistorasiaan"</p> <p>In Norway: "Apparatet må tilkoples jordet stikkontakt"</p> <p>In Sweden: "Apparaten skall anslutas till jordat uttag"</p> | Permanent connection equipment | N |
| 4.7.11 | <p>In Norway, because of a widely used IT power system, equipment shall be designed or modified for connection to such a system and shall be marked by a label with the following wording in Norwegian: "Apparatet er egnet for tilkøpling til et IT forsyningsnett"</p> | | P |
| 9 | <p>In Finland, Norway and Sweden requirements of 6.1.2.1 and 6.1.2.2 in Annex ZB of EN 60950-1:2001 apply.</p> | | P |

Pictures



Fig. 1 – Overview (1) of model HR1110XS



Fig. 2 – Overview (2) of model HR1110XS

Pictures



Fig. 3 –Overview (1) of model HR1110XL



Fig. 4 –Overview (2) of model HR1110XL

Pictures



Fig. 5 –Inside view of model HR1110XS



Fig. 6 –Inside view of model HR1110XL

Pictures



Fig. 07 –Control board view of model HR1110XS



Fig. 08 –Control board view of model HR1110XL

Pictures



Fig. 09 –CV1 board view of model HR1110XL

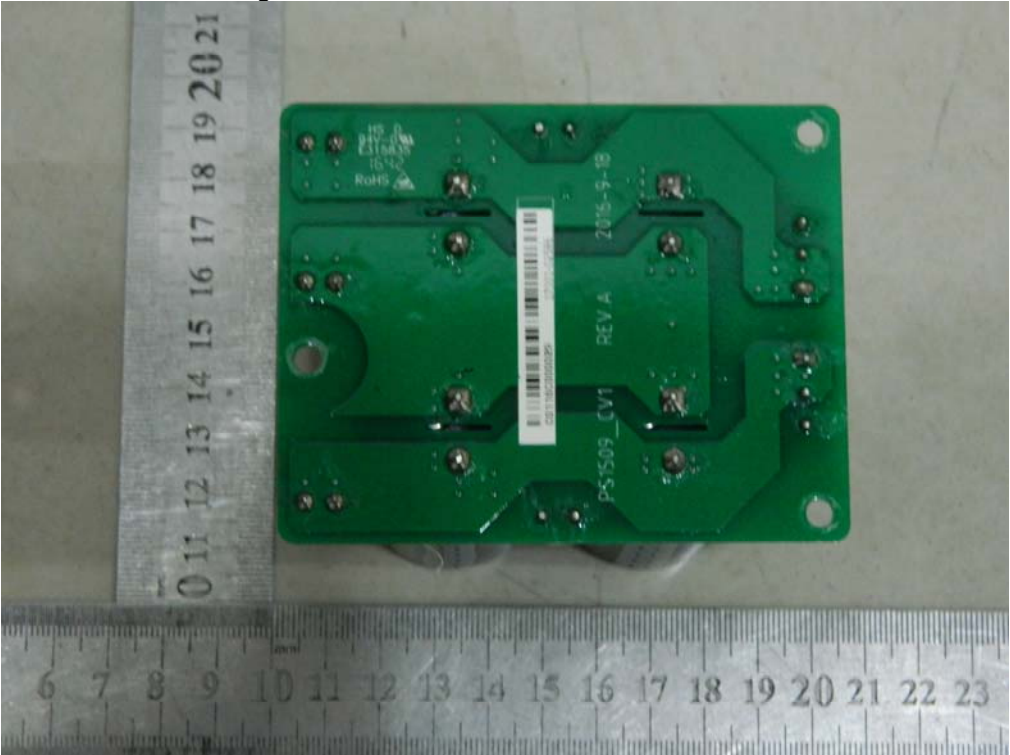


Fig. 10 –CV1 board view of model HR1110XL

Pictures

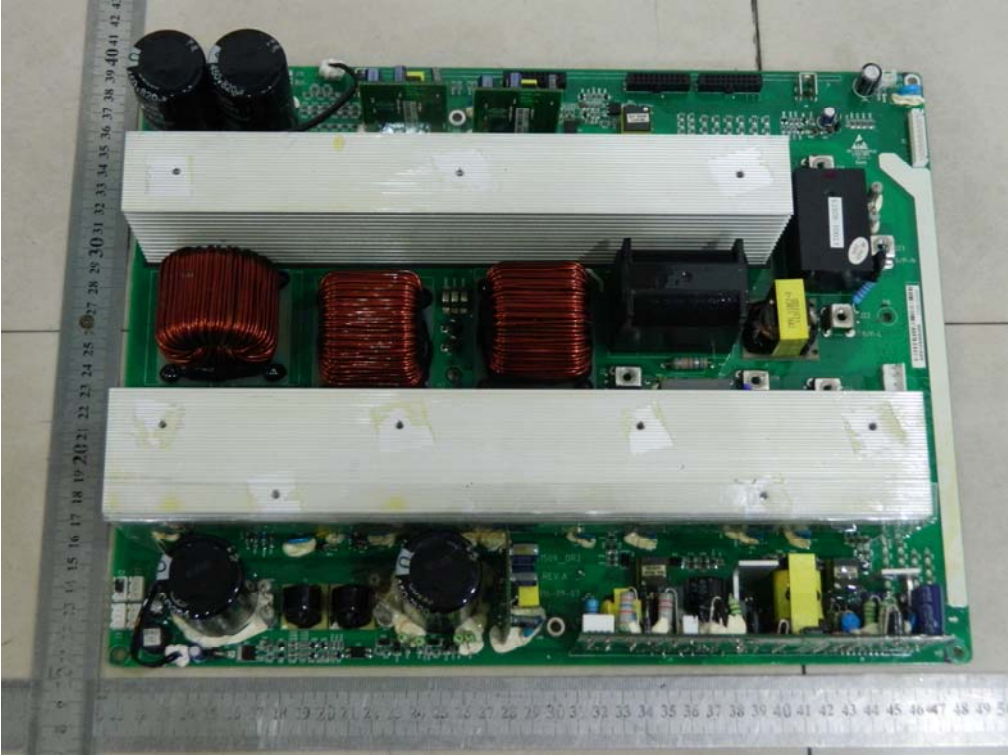


Fig. 11 –DR2 board view of model HR1110XL

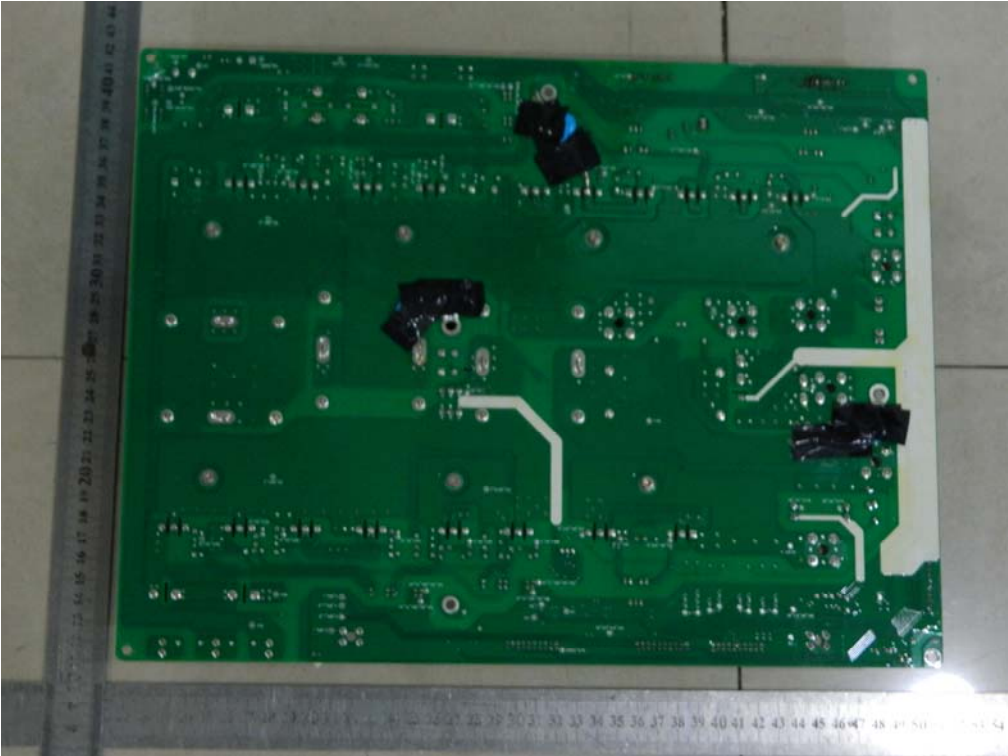


Fig. 12 –DR2 board view of model HR1110XL

Pictures



Fig. 13 –PW2 board view of model HR1110XL

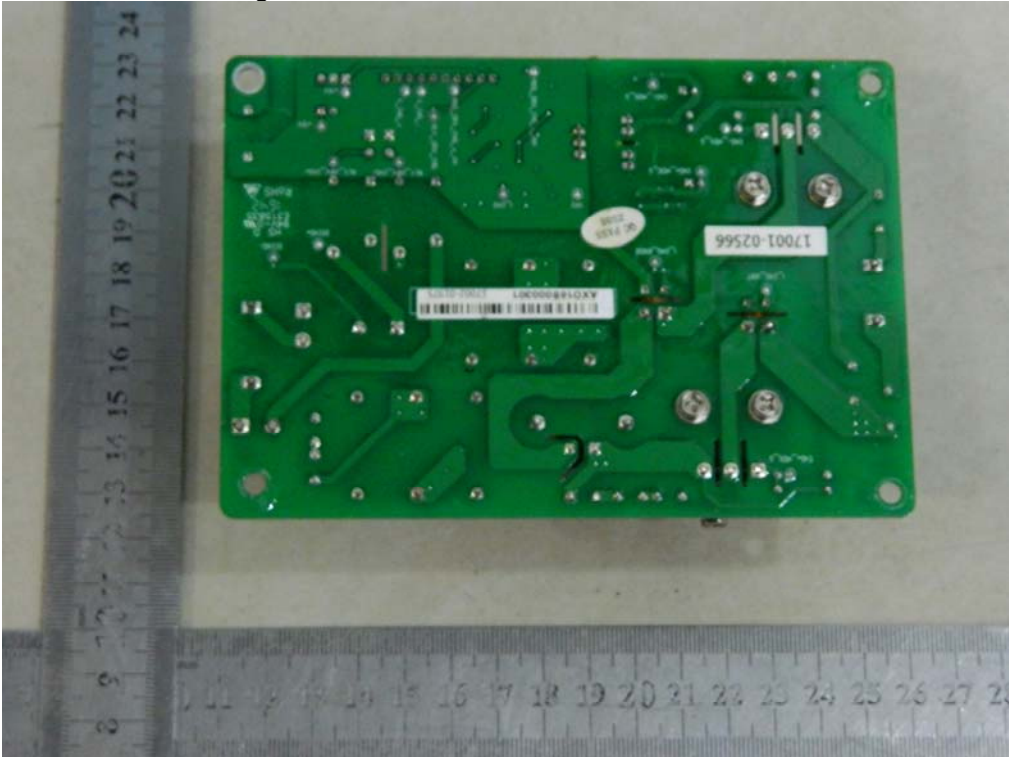


Fig. 14 –PW2 board view of model HR1110XL

Pictures



Fig. 15 –PW3 board view of model HR1110XL

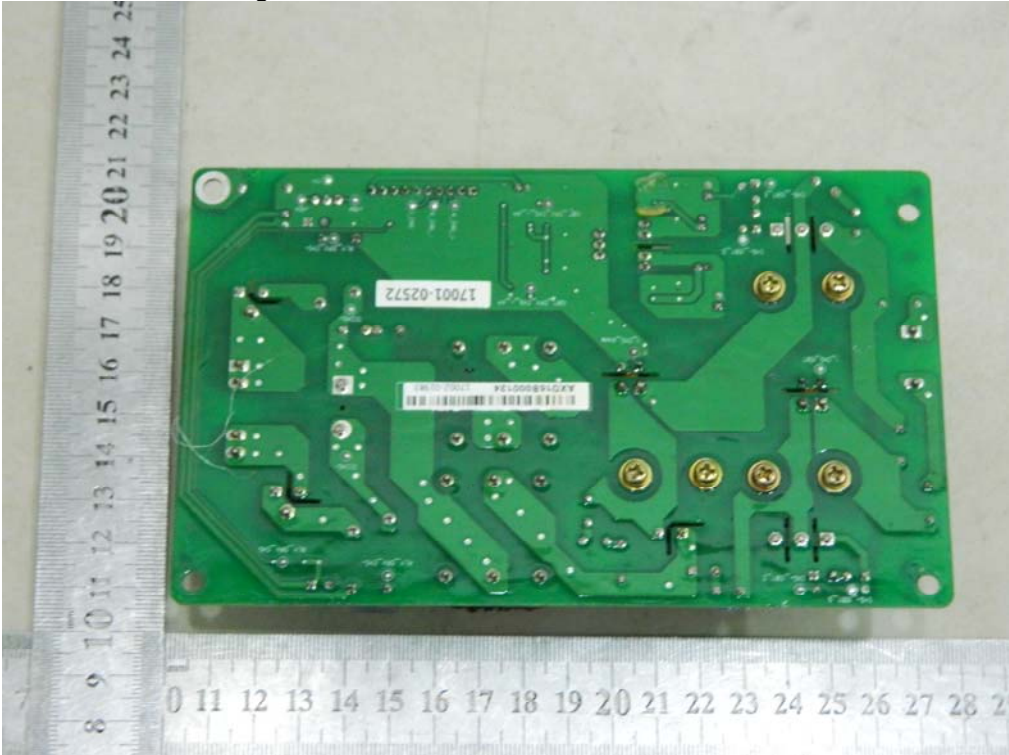


Fig. 16 –PW3 board view of model HR1110XL