# SAFETY TEST REPORT

Issued for

Acrel Co., Ltd.

No.253, Yulv Road, Jiading District, Shanghai, China

| | |
|---|---|
| **Product Name:** | Wireless Temperature Sensor |
| **Brand Name:** | Acrel |
| **Model Name:** | ATC600-C |
| **Serial Model:** | ATE100,ATE100M,ATE100P,ATE200,ATE200P, ATE400, ATC450-C |
| **Test Standard:** | EN 61010 -1:2010+A1 :2019+AC :2019 |

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

**TEST REPORT**

**EN 61010-1**

**Safety requirements for electrical equipment for measurement, control, and laboratory use**
**Part 1: General requirements**

| | |
|---|---|
| **Report Reference No**. ..... : | FCS202105023A01 |
| Compiled by ..... : | Duke Qian |
| Approved by ..... : | Kait Chen |
| Date of issue..... : | May 27,2021 |

| | |
|---|---|
| **Testing Laboratory name** ..... : | Flux Compliance Service Laboratory |
| Address ..... : | Room 105 Floor Bao hao Technology Building 1 Gong ye,West Road Song shan lake Dongguan |
| Testing location ..... : | Same as above |

| | |
|---|---|
| **Applicant's name**..... : | Acrel Co., Ltd. |
| Address ..... : | No.253, Yulv Road, Jiading District, Shanghai, China |

**Test specification:**

| | |
|---|---|
| Standard..... : | EN 61010 -1:2010+A1 :2019+AC :2019 |
| Test procedure ..... : | LVD Approval |
| Non-standard test method..... : | N.A. |
| **Test item description**..... : | Wireless Temperature Sensor |
| Trademark..... : | Acrel |
| Model/Type reference..... : | ATC600-C<br>ATE100,ATE100M,ATE100P,ATE200,ATE200P,ATE400,<br>ATC450-C |
| Manufacturer ..... : | Acrel Co., Ltd. |
| Address ..... : | No.253, Yulv Road, Jiading District, Shanghai, China |
| Rating(s)..... : | Max. measuring voltage: AC 100-240V |

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

**Test item particulars**

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|---|---|
| Type of item tested | Measurement |
| Description of equipment function | powered unit suitable for carrying out electrical safety checks on:<br>1. Voltage<br>2. Current<br>3. Frequency<br>4. Power factor<br>5. Phase location angle<br>6. Electric energy |
| Installation/overvoltage category | NA |
| Pollution degree | 2 |
| Environmental rating | Operation temperature: 0℃~40℃<br>Storage temperature: -20℃~+70℃ |
| Equipment mobility | Fixed |
| Connection to mains supply | N.A |
| Operating conditions | Continous |
| Protection against ingress of water | No marking(IP40) |
| Accessories and detachable parts included in the evalution | N.A |
| Options | N.A. |

**Test case verdicts**

Test case does not apply to the test object.....: N(N/A)

Test item does meet the requirement.....: P(Pass)

Test item does not meet the requirement.....: F(Fail)

**Testing**

Date of receipt of test item .....: May 18-27, 2021

Date(s) of performance of test .....: May 27, 2021

**General remarks**

This test report shall not be reproduced except in full without the written approval of the testing laboratory.
The test results presented in this report relate only to the item tested.
"(see remark #)" refers to a remark appended to the report.
"(see appended table)" refers to a table appended to the report.
Throughout this report a comma is used as the decimal separator.

Attachement I : EN 61010 -2-030:2021 +A11 :2021

**Summary of test results(information/comments):**

All tests applied on the model ATC600-C, unless specified otherwise.

EUT comply with EN 61010 -1:2010+A1 :2019+AC 2019

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

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|---|---|---|
| | TABLE: 1 – Documents attached to this report | P |
| Document No. | Document description | Page Numbers |
| Appendix | Photo documentation | 52-53 |

| Object/part No. | Manufacturer/ trademark | Type/ model | Technical data | Standard | Mark(s) of conformity |
|---|---|---|---|---|---|
| PCB | SHENZHEN HUA YAN HUI HAI ELECTRONIC CO LTD | type HM | 130℃,flammability of V-0 | | E237212 |
| PCB(Alternative) | SHENZHEN BEN CHUANG ELECTRONIC CO LTD | type BC-2 | CTI 600V 94V-0 O=130℃/S=280℃ | | E257130 |
| PCB(Alternative) | JIAXIN PRINTED CIRCUIT BOARD MFR | type KS-01 | 130℃,flammability of V-0 | | E210448 |
| PCB(Alternative) | SHEN ZHEN SUN LYNN CIRCUITS CO LTD | type SL-D | 130℃,flammability of V-0 | | E234156 |
| PCB(Alternative) | Kingford Electronics Co.Ltd | type KF-D-4V0 | 120℃,flammability of V-0 | | E162585 |
| PCB(Alternative) | MeiZhou Kejie integrated circuit co.Ltd | type KJ-2 | 120℃,flammability of V-0 | | E255694 |
| Enclosure and connector | LG Chemical Ltd | AF312 | V-0, 85°CMin. thickness:1.5mm | | UL E67171 |
| Varistor SCAR_12/72V/B/C/D:RV1，RV2 | LIEN SHUN ELECTRONICS CO LTD | ZOV-07D911K | Varistor Voltage 819 ～ 1001, Withstand surge | -- | UL E236826 |

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|---|---|---|---|
| **5** | **MARKING AND DOCUMENTATION** | | —— |
| 5.1.1 | General | | P |
| | Required equipment marking are: | | P |
| | Visible: | | P |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| | From the exterior; or | CE are marked on apparatus surface. | P |
| | After removing a cover; or | | N |
| | Opening a door | | N |
| | After removal from a rack or panel | | N |
| | Not put on parts which can be removed by a OPERATOR | | P |
| | Letter symbols (IEC 60027) used | | P |
| | Graphic symbols (IEC 61010-1: Table 1) used | Refer to copy of marking plate | P |
| 5.1.2 | Identification | | P |
| | Equipment is identified by: | | P |
| 5.1.2 a) | Manufacturer' or supplier's name or trade mark | Acrel | P |
| 5.1.2 b) | Model number, name or other means | ATC600-C | P |
| | Manufacturing location identified | Single manufacturing location | N |
| 5.1.3 | Mains supply | AC 230V 50HZ | P |
| | Equipment is marked as follows: | | —— |
| 5.1.3 a) | Nature of supply: | | P |
| | 1) a.c. RATED mains frequency or range of frequencies | | N |
| | 2) d.c. with symbol 1 | ⎓ used | P |
| 5.1.3 b) | RATED supply voltage(s) or range | | N |
| 5.1.3 c) | Max. RATED power (W or VA) or input current: | | N |
| | The measured value not more than 110% | | N |
| | If more than one voltage range: | | N |
| | Separate values marked; or | | N |
| | Values differ by less than 20% | | N |
| 5.1.3 d) | OPERATOR-set for different RATED supply voltages: | | N |
| | Indicates the equipment set voltage | | N |
| | PORTABLE EQUIPMENT indication is visible from the exterior | | N |
| | Changing the setting changes the indication | | N |
| 5.1.3 e) | Accessory mains socket-outlets accepting standard mains plugs are marked: | No socket-outlets part | N |
| | With the voltage if it is different from the mains supply voltage: | | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| | For use only with specific equipment | | N |
| | If not marked for specific equipment it is marked with: | | N |
| | The maximum RATED current or power; or | | N |
| | Symbol 14 with full details in the documentation | Symbol ⚠ used. | N |
| 5.1.4 | Fuses | No such component | N |
| | OPERATOR replaceable fuse marking (see also 5.4.5): | | N |
| 5.1.5 | TERMINALS, connections and operating devices | | P |
| | Where necessary for safety, indication of purpose of TERMINALS, connectors, controls and indicators marked | | P |
| | If insufficient space, symbol 14 used | Symbol 14 marked. | P |
| 5.1.5.1 | TERMINALS | | N |
| | Mains supply TERMINAL identified | | N |
| 5.1.5.1 a) | FUNCTIONAL EARTH TERMINALS(symbol 5 used) | | N |
| 5.1.5.1 b) | PROTECTIVE CONDUCTOR TERMINALS: | | N |
| | Symbol 6 is placed close to or on the TERMINAL; OR | | N |
| | Part of appliance inlet | | N |
| 5.1.5.1 c) | TERMINALS of measuring and control circuits (symbol 7 used) | | N |
| 5.1.5.1 d) | HAZARDOUS LIVE TERMINALS supplied from the interior | | N |
| | Standard MAINS socket outlet; or | | N |
| | RATINGS marked; or | | N |
| | Symbol 14 used | | N |
| 5.1.5.1 e) | ACCESSIBLE FUNCTIONAL EARTH TERMINALS; | | N |
| | Self-evident; or | | N |
| | Indication (symbol 8 acceptable) | | N |
| 5.1.5.2 | Measuring circuit TERMINALS | | P |
| | For TERMINALS other than those permanently connected and not ACCESSIBLE: | | P |
| | RATED voltage or current marked | | P |
| | Unless clear indication that below limits: | | P |
| | Maximum RATED voltage to earth is marked; or | | P |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| | For specific connection to other equipment TERMINALS only, and means for identifying provided | | N |
| | Appropriate measurement category marked (CAT II, CAT III or CAT IV); or | | P |
| | No measurement category marked (CAT I) | | N |
| | Required markings are adjacent to TERMINALS; OR | | P |
| | If insufficient space: | | N |
| | On the RATING plate or scale plate; or | | P |
| | TERMINAL is marked with symbol 14 | | P |
| 5.1.6 | Switch and circuit-breakers | Not power supply swtich | N |
| | If disconnecting device, on or off position marked | | N |
| 5.1.7 | Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION | | P |
| | Protected throughout (symbol 11) | | P |
| | Only partially protected (symbol 11 not used) | | N |
| 5.1.8 | Field-wiring TERMINAL boxes | No such construction | N |
| | If TERMINAL or ENCLOSURE exceeds 60℃: | | N |
| | Cable temperature RATING marked | | N |
| | Marking visible or beside TERMINAL | | N |
| 5.2 | Warning markings | | P |
| | Visible when ready for NORMAL USE | Caution symbol are visible | P |
| | Are near or on applicable parts | On surface of apparatus | P |
| | Symbols and text correct dimensions and colour | | P |
| | If necessary marked with symbol 14 | | N |
| | Statement to isolate or disconnect | | N |
| 5.3 | Durability of markings | | P |
| | The required markings remain clear and legible NORMAL USE | (see appended table) | P |
| 5.4 | Documentation | | P |
| 5.4.1 | General | | P |
| | Equipment is accompanied by documentation which includes: | Refer to users' manual. | P |
| 5.4.1 a) | Intended use | | P |
| 5.4.1 b) | Technical specification | | P |
| 5.4.1 c) | Instructions for use | | P |
| 5.4.1 d) | Name and address of manufacturer or supplier | | P |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| 5.4.1 e) | Information specified in 5.4.2 to 5.4.5 | See 5.4.2 to 5.4.5 | P |
| 5.4.1 f) | If marking of TERMINALS required, definition of measurement category | | N |
| 5.4.1 g) | If CAT 1: | | N |
| | Warning | | N |
| | RATINGS | | N |
| | Warning statements and a clear explanation of warning symbols: | | N |
| | Provided in the documentation; or | | N |
| | Information is marked on the equipment | | N |
| 5.4.2 | Equipment RATINGS | | P |
| | Documentation includes: | | P |
| 5.4.2 a) | Supply voltage or voltage range | | P |
| | Frequency or frequency range | | N |
| | Power or current RATING | | N |
| 5.4.2 b) | Description of all input and output connections | | N |
| 5.4.2 c) | RATING of insulation of external circuits, when such circuits are nowhere ACCESSIBLE | No external circuit | N |
| 5.4.2 d) | Statement of the range of environmental conditions | Environmental indicated | P |
| 5.4.2 e) | Degree of protection (IEC 60529) | IP40 | P |
| 5.4.3 | Equipment installation | | N |
| | Documentation includes instruction for: | | N |
| 5.4.3 a) | Assembly, location and mounting | | N |
| 5.4.3 b) | Protective earthing | | N |
| 5.4.3 c) | Connections to the supply | Battery compartment | N |
| 5.4.3 d) | Permanently connected equipment | | N |
| | 1) Supply wiring requirements | | N |
| | 2) If external switch or circuit-breaker, requirements and location recommendation | | N |
| 5.4.3 e) | Ventilation requirements | | N |
| 5.4.3 f) | Special services (e.g. air, cooling liquid) | | N |
| 5.4.3 g) | Maximal sound power level | No sound produced | N |
| 5.4.3 h) | Instructions about sound pressure | | N |
| 5.4.3 i) | Permanently connected measuring terminals: | | N |
| | Measurement category | | N |
| | Rated maximum working voltage or current | | N |

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| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| 5.4.4 | Equipment operation | | P |
| | Instructions for use include: | | P |
| 5.4.4 a) | Identification of operating controls | | P |
| 5.4.4 b) | Positioning for disconnection | | N |
| 5.4.4 c) | Interconnection | | N |
| 5.4.4 d) | Specification of intermittent operation limits | See user's manual. | P |
| 5.4.4 e) | Explanation of symbols used | Symbols have explanation in user manual | P |
| 5.4.4 f) | Replacement of consumable materials | LR4 batteries. | P |
| 5.4.4 g) | Cleaning and decontamination (see 11.2) | See user manual | P |
| 5.4.4 h) | Listing of any poisonous or injurious gases and quantities | | N |
| 5.4.4 i) | Risk-reduction procedures relating to flammable liquids | No flammable liquids. | N |
| | A statement about protection impairment if used in a manner not specified by the manufacturer | | N |
| 5.4.5 | Equipment maintenance | | P |
| | instructions include: | | P |
| | Sufficient preventive maintenance and inspection information | | P |
| | Replacement of hoses, etc. | | N |
| | Specific battery type | | P |
| | Any manufacturer specified parts | | N |
| | RATING and characteristics of fuses | | N |
| **6** | **PROTECTION AGAINST ELECTRIC SHOCK** | | —— |
| 6.1 | General | | P |
| 6.1.1 | Requirements | | P |
| | ACCESSIBLE parts not HAZADOUS LIVE in NORMAL CONDITION and SINGLE FAULT CONDITION | All accessible parts are not hazards live | P |
| | Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.11 | | P |
| 6.1.2 | Exceptions | | N |
| | Capacitance test | Internal capacitor no risk of charge | N |
| | Parts not HAZARDOUS LIVE 10s after interruption of supply | (see Forms A.6 and A.7) | N |
| 6.2 | Determination of ACCESSIBLE parts | (See Form A.6) | P |

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| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| 6.2.1 | General examination | (See Form A.6) | P |
| 6.2.2 | Opening above parts that are HAZARDOUS LIVE | No such openings. | N |
| 6.2.3 | Opening for pre-set controls | | N |
| 6.3 | Permissible limits for ACCESSIBLE parts | | P |
| 6.3.1 | Values in NORMAL CONDITION | (See Form A.7) | P |
| 6.3.2 | Values in SINGLE FAULT CONDITION | (See Form A.8) | P |
| 6.4 | Protection in NORMAL CONDITION (see 6.2, 6.3.1, 6.7, 6.8 and 8.1) | All circuit inside the apparatus are enclosed by the enclosure by reinforced insulation. See clause 6.8 and 8.1 | P |
| 6.5 | Protection in SINGLE FAULT CONDITION | (See Form A.2) | P |
| | Additional protection is provided by: | | N |
| | One or more of 6.5.1 to 6.5.3, or | | N |
| | Automatic disconnection of the supply(6.5.4) | | N |
| 6.5.1 | Protective BONDING | | N |
| | ACCESSIBLE conductive parts: | | N |
| | Separated by DOUBLE INSULATION or REINFORCED INSULATION; or | | N |
| | Bonded to the PROTECTIVE CONDUCTOR TERMINAL; or | | N |
| | Separated by screen or BARRIER bonded to PROTECTIV CONDUCTOR TERMINAL from parts which are HAZARDOUS LIVE | | N |
| 6.5.1.1 | Integrity of PROTECTIVE BONDING | | N |
| 6.5.1.1 a) | PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses | | N |
| 6.5.1.1 b) | Soldered connections: | No subject to mechanical stress. | N |
| | Independently secured | | N |
| | Not used for other purposes | | N |
| | Screw connections are secured | | N |
| 6.5.1.1 c) | PROTECTIVE BONDING not interrupted | | N |
| 6.5.1.1 d) | Any moveable connectionspecifically designed, and meets 6.5.1.3 | | N |
| 6.5.1.1 e) | No external metal braid of cables used | | N |
| 6.5.1.1 f) | If MAINS supply passes through: | | N |
| | Means provided for passing protective conductor; | | N |

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| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| | Impedance meets 6.5.1.3 | | N |
| 6.5.1.1g) | Protective conductors bare or insulated, if insulated, green/yellow | | N |
| | Exceptions: | | N |
| | 1) earthing braids; | | N |
| | 2) internal protective conductors etc.; | | N |
| | Green/yellow not used for other purposes | | N |
| 6.5.1 h) | TERMINAL suitable, and meets 6.5.1.2 | | N |
| 6.5.1.2 | PROTECTIVE CONDUCTOR TERMINAL | | N |
| 6.5.1.2 a) | Contact surfaces are metal | | N |
| 6.5.1.2 b) | Appliance inlet used | | N |
| 6.5.1.2 c) | For rewireable cords and PERMANENTLY CONNECTED EQUIPMENT, PROTECTIVE CONDUCTOR TERMINAL is close to MAINS supply TERMINALS | | N |
| 6.5.1.2 d) | If no MAINS supply is required, any PROTECTIVE CONDUCTOR TERMINAL: | | N |
| | Is near TERMINALS of circuit for which protective earthing is necessary | | N |
| | External if other TERMINALS external | | N |
| 6.5.1.2 e) | Equivalent current-carrying capacity to MAINS supply TERMINALS | | N |
| 6.5.1.2 f) | If plug-in, makes first and breaks last | | N |
| 6.5.1.2 g) | If also used for other bonding purposes, protective conductor: | | N |
| | Applied first; | | N |
| | Secured independently; | | N |
| | Unlikely to be removed by servicing; or | | N |
| | Warning marking requires replacement of protective conductor | | N |
| 6.5.1.2h) | Protective conductor of measuring circuit: | | N |
| | 1) Current RATING; | | N |
| | 2) PROTECTIVE BONDING: | | N |
| | Not interrupted; or | | N |
| | Indirect bonding used (see 6.5.1.5) | | N |
| 6.5.1.2 i) | FUNCTIONAL EARTH TERMINALS allow independent connection | | P |
| 6.5.1.2j) | If a binding screw: | No such screw used. | N |
| | Suitable size for bond wire | | N |

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| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| | Not smaller than M 4 (No. 6) | | N |
| | At least 3 turns of screw engaged | | N |
| | Contact pressure not capable of reduction by deformation of materials | | N |
| | Passes tightening torque test | | N |
| 6.5.1.3 | Impedance of plug-connected equipment | | N |
| 6.5.1.4 | Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT | | N |
| 6.5.1.5 | Indirect bonding for measurement and test equipment | | N |
| 6.5.2 | DOUBLE INSULATION and REINFORCED INSULATION (see 6.7, 6.8 and 6.9.2) | Enclosure is reinforced insulation. | P |
| 6.5.3 | PROTECTIVE IMPEDANCE | No such components | N |
| 6.5.3 a) | HIGH INTEGRITY single component (see 14.6); or | | N |
| 6.5.3 b) | A combination of components used; or | | N |
| 6.5.3 c) | A combination of BASIC INSULATION and current- or voltage-limiting device used | | N |
| | Components, wires and connections are RATED as required | | N |
| 6.5.4 | Automatic disconnection of the supply | | N |
| | If used, it meets: | | N |
| 6.5.4 a) | Supplied with the equipment; or | | N |
| | Specified by installation instruction | | N |
| 6.5.4 b) | RATED disconnecting time within limit specified | | N |
| 6.5.4 c) | RATED for maximum RATED LOAD | | N |
| 6.6 | Connections to external circuits | Not need connected to external circuits | N |
| 6.6.1 | General | | N |
| 6.6.1 a) | The external circuits | | N |
| 6.6.1 b) | The equipment | | N |
| | Separation of circuits provided; or | | N |
| | Short circuit of separation does not cause a Hazard | | N |
| | Instructions or markings include: | | N |
| | 1) RATED conditions for TERMINAL | | N |
| | 2) Required RATING of external circuit insulation | | N |
| 6.6.2 | TERMINALS for external circuits | | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| | TERMINALS which receive a charge from an internal capacitor; measured voltage (V); charge : | | N |
| | High voltage TERMINALS energized from the interior are: | | N |
| | Not ACCESSIBLE if connected; or | | N |
| | Unmated HAZARDOUS LIVE TERMINALS not ACCESSIBLE ; or | | N |
| | marked with symbol 12 | | N |
| 6.6.3 | Circuits with TERMINALS which are HAZARDOUS LIVE | | N |
| | Not connected to ACCESSIBLE conductive parts; or | | N |
| | Connected to ACCESSIBLE conductive parts, but are not MAINS CIRCUITS and have one TERMINAL contact at earth potential | | N |
| | No ACCESSIBLE conductive parts are HAZARDOUS LIVE | | N |
| 6.6.4 | Accessible terminals for stranded conductors | No terminals for stranded conductors connection. | N |
| 6.6.4 a) | No risk of accidental contact because: | | N |
| | Located or shielded | | N |
| | Self-evident or marked whether connected to ACCESSIBLE conductive parts | | N |
| 6.6.4 b) | ACCESSIBLE TERMINALS will not work loose | | N |
| 6.7 | CLEARANCES and CREEPAGE DISTANCES | (See Form A.5 and A.13) | P |
| 6.8 | Procedure for dielectric strength tests | (See Form A.5 and A.14) | P |
| 6.9 | Constructional requirements for protection against electric shock | | P |
| 6.9.1 | General; | | P |
| | If a failure could cause a HAZARD: | | P |
| 6.9.1 a) | Security of wiring connections | No hazard. | P |
| 6.9.1 b) | Screws securing removable covers | No hazard. | P |
| 6.9.1 c) | Accidental loosening | No hazard. | P |
| | Easily damaged materials not used | | P |
| | Non-impregnated hydroscopic materials not used | | P |
| 6.9.2 | ENCLOSURES of equipment with DOUBLE INSULATION or REINFORCED INSULATION | Enclosure is reinforced insulation. | P |
| | ENCLOSURE surrounds all metal parts except for small metal parts which are separated | All electronic circuits surrounded by enclosure. | P |
| | ENCLOSURES or parts made of insulating material | Enclosure is insulating | P |
| | Protection for metal ENCLOSURES or parts by: | | N |

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| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| 6.9.2.a) | An insulating coating or BARRIER on the inside; or | | N |
| 6.9.2 b) | CLEARANCES and CREEPAGE DISTANCES cannot be reduced by loosening of parts or wires | | P |
| 6.9.3 | Over-range indication | | P |
| | Unambiguous | | P |
| 6.10 | Connection to MAINS supply source and connections between parts of equipment | | N |
| 6.10.1 | MAINS supply cords | Not a mains supply equipment | N |
| 6.10.1 a) | RATED for maximum equipment current (see 5.1.3c) | | N |
| | Cable complies with IEC60227 or IEC 60245 | | N |
| 6.10.1 b) | Heat-resistant if likely to contact hot parts | | N |
| 6.10.1 c) | Temperature RATING (cord and inlet) | | N |
| 6.10.1 d) | Green/yellow used only for connection to PROTECTIVE CONDUCTOR TERMINALS | | N |
| | Detachable cords with IEC 60320 MAINS connectors: | | N |
| | Conform to IEC 60799; or | | N |
| | Have the current RATING of the MAINS connector | | N |
| 6.10.2 | Fitting of non-detachable MAINS supply cords | | N |
| | Non-detachable cord protection: | | N |
| 6.10.2 a) | Inlet or bushing smoothly rounded; or | | N |
| 6.10.2 b) | Insulated cord guard projection ≥5 D | | N |
| | The protective earth conductor is the last to take the strain | | N |
| 6.10.2 c) | Cord anchorage: | | N |
| | -cord is not clamped by direct pressure from a screw | No anchorage. | N |
| | - knots are not be used | | N |
| | - cannot push the cord into the equipment to cause a hazard | | N |
| | - no failure of the cord insulation in anchorage with metal parts | | N |
| | -compression bushing, clamps all types and sizes of MAINS cords is suitable | | N |
| | -for connection to TERMINALS provided or for screened MAINS cord | | N |
| | -cord replacement does not cause a HAZARD; push-pull test | (see Form A.15) | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| 6.10.3 | Plugs and connectors | | N |
| 6.10.3 a) | MAINS supply plugs, connectors etc., comform with relevant specifications | | N |
| 6.10.3 b) | If equipment supplied at voltages below 6.3.2.a) or from a sole source: | | N |
| | Plugs of supply cords do not fit MAINS sockets above RATED supply voltage | | N |
| | MAINS-type plugs used only for connection to MAINS supply | | N |
| 6.10.3 c) | Plug pins which receive a charge from an internal capacitor | No such capacitor | N |
| 6.10.3 d) | Accessory MAINS socket-outlets: | | N |
| | 1) Marking if accepts a standard MAINS plug(see 5.1.3 e) | No mains socket-outlets | N |
| | 2) Input has a protective earth conductor if outlet has earth TERMINAL contact | | N |
| 6.11 | Disconnection from supply source | | N |
| 6.11.1 | General | See § 6.11.1.1 | N |
| | Disconnecting all current carrying conductors | | N |
| 6.11.1.1 | Exceptions | | N |
| 6.11.1.1 a) | Equipment supplied by low energy source; or | Powered by battery. | N |
| 6.11.1.1 b) | Equipment connected to impedance protected supply; or | | N |
| 6.11.1.1 c) | Equipment constitutes an impedance protected load | | N |
| 6.11.2 | Requirements according to type of equipment | | N |
| 6.11.2.1 | PERMANENTLY CONNECTED EQUIPMENT and multi-phase equipment | Portable | N |
| | Employs switch or circuit-break | | N |
| | If switch or circuit-breaker is not part of the equipment, documentation specifies: | | N |
| 6.11.2.1 a) | A switch or circuit-breaker shall be included in the building installation | | N |
| 6.11.2.1 b) | It shall be in close proximity to the equipment and within easy reach of the OPERATOR | | N |
| 6.11.2.1 c) | It shall be marked as the disconnecting device for the equipment | | N |
| 6.11.2.2 | Single-phase cord-connected equipment | | N |
| | Equipment is provided with: | | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| 6.11.2.2 a) | Switch or circuit-breaker; or | | N |
| 6.11.2.2 b) | Appliance coupler (disconnectable without TOOL); or | | N |
| 6.11.2.2 c) | Separable plug (without locking device) | | N |
| 6.11.2.3 | Hazards arising from function | | N |
| | Emergency switch | | N |
| | Emergency switch ≤ 1 m from the moving part | | N |
| 6.11.3 | Disconnecting devices | | N |
| | Electrically close to the supply | | N |
| 6.11.3.1 | Switches and circuit-breakers | | N |
| 6.11.3.2 | Appliance couplers and plugs | | N |
| **7** | **PROTECTION AGAINST MECHANICAL HAZARDS** | | —— |
| 7.1 | General | | P |
| | Conformity is checked by 7.2 to 7.6 | | P |
| 7.2 | Moving parts | No moving part | N |
| | Moving parts not able to crush, etc. (see also 6.12.32.3) | | N |
| | If OPERATOR access permitted: | | N |
| 7.2a) | Access requires TOOL | | N |
| 7.2b) | Statement about training | | N |
| 7.2c) | Warning markings or symbol 14 | | N |
| 7.3 | Stability | Hand-hold equipment | N |
| | Marking of non-automatic means | | N |
| | Conformity tests: | | —— |
| 7.3a) | 10° tilt test | | N |
| 7.3b) | multi-directional force test | | N |
| 7.3c) | downward force test | Not floor-standing unit. | N |
| 7.4 | Provisions for lifting and carrying. | | N |
| | Handles or grips withstand four times weight | No handle. | N |
| | Equipment ＞18 kg | <18 kg | N |
| | Has means for lifting or carrying;or | | N |
| | Directions in documentation | | N |
| 7.5 | Wall mounting | | N |
| | Mounting bracket withstand a force of four times the weight of the equipment | | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| 7.6 | Expelled parts | | P |
| | Equipment contains or limits the energy | See 16.2 | P |
| | Protection not removable without the aid of a TOOL | Enclosure contains energy | P |
| **8** | **MECHANICAL RESISTANCE TO SHOCK AND IMPACT** | | —— |
| | After the tests of 8.1 to 8.2: | | P |
| | Voltage tests | See Form A.14 | P |
| | Inspections | | P |
| 8a) | HAZARDOUS LIVE parts not accessible | No hazardous live parts accessible. | P |
| 8b) | ENCLOSURE shows no cracks (hazard) | | P |
| 8c) | CLEARANCES not less than their permitted value | (see Form A.13) | P |
| 8d) | BARRIERS not damaged or loosened | | P |
| 8e) | No moving parts exposed, except permitted by 7.2 | | N |
| 8f) | No damage which could cause spread of fire | | P |
| **9** | **PROTECTION AGAINST THE SPREAD OF FIRE** | | —— |
| | Conformity for each source of HAZARD or area of the equipment is checked by one of the following: | (See Form A.16) | P |
| 9a) | Fault test of 4.4; or | (See Forms A.1 and A.2) | P |
| 9b) | Application of 9.1 (eliminating or reducing the sources of ignition); or | | N |
| 9c) | Application of 9.2 (containment of fire within the equipment) | | P |
| 9.1 | Eliminating or reducing the sources of ignition within the equipment | | N |
| 9.1a) | 1) Limited-energy circuit (see 9.3); or | | N |
| | 2) Insulation meets the requirements for BASIC INSULATION; OR | (see Form A.5 and A.14) | N |
| | Bridging the insulation does not cause ignition | (see Form A.2) | N |
| 9.1b) | Surface temperature of liquids and parts (see 9.4.a) | No flammable liquid inside. | N |
| 9.1c) | No ignition in circuits designed to produce heat | | N |
| 9.2 | Containment of the fire within the equipment, should it occur | | P |
| 9.2a) | Energizing of the equipment is controlled by an OPERATOR held switch | | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| 9.2b) | Enclosure is conform with constructional requirements of 9.2.1; and | | P |
| | Requirements of 9.4b) or c) are met | | P |
| 9.2.1 | Constructional requirements | | P |
| 9.2.1a) | Insulated wire shall have a flammability classification FV-1 or better | | P |
| | Connectors and insulating material have flammability classification FV2 or better | | P |
| 9.2.1b) | The enclosure is constructed as follows : | | P |
| | 1) Bottom constructed with: | | P |
| | No openings; or | | P |
| | Extent as specified in figure 7; or | | N |
| | Baffles as specified in figure 6; or | | N |
| | Perforated as specified in Table 12; or | | N |
| | Metal screen with a mesh | | N |
| | 2) Sides have no openings as specified in figure 7 | | N |
| | 3) Material of ENCLOSURE and any baffle or flame barrier is made of: | | N |
| | Metal (except magnesium); or | | N |
| | Non metallic materials have flammability classification FV1 or better | | N |
| | 4) ENCLOSURE and any baffle or flame barrier have adequate rigidit | | N |
| 9.3 | Limited-energy circuit | | N |
| 9.3a) | Potential not more than 30 r.m.s. and 42.4 V peak,or 60 V dc | | N |
| 9.3b) | Current limited by one of following means: | | N |
| | 1) Inherently or by impedance; or | | N |
| | 2) Overcurrent protective device; or | | N |
| | 3) A regulating network limits also in SINGLE FAULT CONDITION | | N |
| 9.3c) | Is separated by at least BASIC INSULATION | | N |
| | If overcurrent protective device used: | | N |
| | Fuse or a non adjustable electromechanical device | | N |
| 9.4 | Requirements for equipment containing or using flammable liquids | No flammable liquid inside. | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| | Flammable liquids contained in or specified for use with equipment do not cause spread of fire | | N |
| | Risk is reduced to a tolerable level: | | N |
| 9.4a) | The temperature of surface or parts in contact with flammable liquids is 25 °C below fire point | | N |
| 9.4b) | The quantity of liquid is limited | | N |
| 9.4c) | Flames are contained within the equipment | | N |
| | Detailed instructions for risk-reduction provided | | N |
| 9.5 | Overcurrent protection | | N |
| | Devices not in the protective conductor | | N |
| | Fuses or single-pole circuit-breakers not fitted in neutral (multi-phase) | | N |
| 9.5.1 | PERMANENTLY CONNECTED EQUIPMENT | | N |
| | Overcurrent device: | | N |
| | Fitted within the equipment; or | | N |
| | Specified in manufacturer's instructions | | N |
| 9.5.2 | Other equipment | | N |
| | Protection within the equipment | | N |
| **10** | **EQUIPMENT TEMPERATURE LIMITS AND RESISTANCE TO HEAT** | | —— |
| 10 | EQUIPMENT TEMPERATURE LIMITS AND RESISTANCE TO HEAT | | P |
| 10.1 | Surface temperature limits for protection against burns | | P |
| | Easily touched surfaces within the limits | (see Form A.20A) | P |
| | Heated surfaces necessary for functional reasons exceeding specified values: | | N |
| | Are recognizable as such by appearance or function; or | | N |
| | Are marked with symbol 13 | | N |
| | Guards are not removable without TOOL | No guards. | N |
| 10.2 | Temperatures of windings | (see Form A.20B) | N |
| | Limits not exceeded in: | | N |
| | NORMAL CONDITION | | N |
| | SINGLE FAULT CONDITION | | N |
| 10.3 | Other temperature measurements | (see Form A.20B) | P |
| | Following measurements conducted if applicable: | | P |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| 10.3a) | Value of 60 °C of field-wiring TERMINAL box not exceeded | | N |
| 10.3b) | Surface of flammable liquids and parts in contact with this liquids | | N |
| 10.3c) | Surface of non-metallic ENCLOSURES | | P |
| 10.3d) | Parts made of insulating material supporting parts connected to MAINS supply | | N |
| 10.3e) | TERMINALS carrying a current more than 0.5 A | | N |
| 10.4 | Conduct of temperature tests | (See Form A20) | P |
| 10.5 | Resistance to heat | | P |
| 10.5.1 | Integrity of CLEARANCES and CREEPAGE DISTANCES | | P |
| 10.5.2 | Non-metallic ENCLOSURES | Checked by non-operative treatment: 7hours at temperature of 70 °C (See Forms A.21) | P |
| | After treatment: | The equipment is no hazard and pass the test of 8.1.1 and 8.1.2 | P |
| | No HAZARDOUS LIVE parts ACCESSIBLE; | No hazardous live part accessible, except test probe (refer to clause 6.1.2) | P |
| | Tests of 8.1 and 8.2 | (See Form A.13) | P |
| | In case of doubt, tests of 6.8 (without humidity preconditioning) | | P |
| 10.5.3 | Insulating material | Plastic for enclosure. | P |
| 10.5.3a) | Parts supporting parts connected to MAINS supply | | N |
| 10.5.3b) | TERMINALS carrying a current more than 0.5 A | | N |
| | Examination of material data; or | | P |
| | in case of doubt: | | N |
| | 1) Ball pressure test; or | | N |
| | 2) Vicat softening testof ISO 306 | | N |

| | | | |
|---|---|---|---|
| **11** | **PROTECTION AGAINST HAZARDS FROM FLUIDS** | | —— |
| 11.1 | General | | N |
| 11.2 | Cleaning | | N |
| 11.3 | Spillage | | N |
| 11.4 | Overflow | | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| 11.5 | Battery electrolyte | Batteries mouted on battery compartment,and enclosured by cover fixed by screws. | P |
| | Battery electrolyte leakage presents no hazard | | P |
| 11.6 | Specially protected equipment | No specially protected equipment. (See Form A.23) | N |
| 11.7 | Fluid pressure and leakage | No fluids inside the appliance | N |
| 11.7.1 | Maximum pressure | | N |
| | Maximum pressure of any part does not exceed $P_{RATED}$ | | N |
| 11.7.2 | Leakage and rupture at high pressure | No fluids inside the appliance. (See Form A.24) | N |
| | Test to IEC 60335 (refrigeration only) | | N |
| 11.7.3 | Leakage from low-pressure parts | | N |
| 11.7.4 | Overpressure safety device: | | N |
| | Does not operate in NORMAL USE | | N |
| | Meets ISO 4126-1; and | | N |
| | It is conform with: | | N |
| 11.7.4a) | Connected as close as possible to parts intended to be protected | | N |
| 11.7.4b) | Easy access for inspection, maintenance and repair | | N |
| 11.7.4c) | Adjustment only with TOOL | | N |
| 11.7.4d) | No discharge towards person | | N |
| 11.7.4e) | No HAZARD from deposit of discharged material | | N |
| 11.7.4f) | Adequate discharge capacity | | N |
| 11.7.4g) | No shut-off valve between overpressure safety device and protected parts | | N |

| | | | |
|---|---|---|---|
| **12** | **PROTECTION AGAINST RADIATION, INCLUDING LASER SOURCES, AND AGAINST SONIC AND ULTRASONIC PRESSURE** | | ____ |
| 12.1 | General | No any radiation will emit from appliance. | N |
| | Equipment provides protection | | N |
| 12.2 | Equipment producing ionizing radiation | | N |
| 12.2.1 | Ionizing radiation | | N |
| 12.2.2 | Accelerated electrons | | N |
| 12.3 | Ultra-violet (UV) radiation | | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| | No unintentional and HAZARDOUS escape of UV radiation | | N |
| 12.4 | Micro-wave radiation | | N |
| | Power density does not exceed 10 W/m$^2$. | | N |
| 12.5 | Sonic and ultrasonic pressure | | N |
| 12.5.1 | Sound level | | N |
| 12.5.2 | Ultrasonic pressure | | N |
| 12.6 | Laser sources (IEC 60825-1) | | N |
| **13** | **PROTECTION AGAINST LIBERATED GASES, EXPLOSION AND IMPLOSION** | | P |
| 13.1 | Poisonous and injurious gases | | N |
| | Attached data/test reports demonstrate conformity | | N |
| 13.2 | Explosion and implosion | | N |
| 13.2.1 | Components l | | N |
| | Components liable to explode: | | N |
| | Pressure release device provided; or | | N |
| | Apparatus incorporates protection (see also 7.6) | | N |
| | Pressure release device: | | N |
| | Discharge without danger | | N |
| | Cannot be obstructed | | N |
| 13.2.2 | Batteries and battery charging | | P |
| | If explosion or fire hazard could occur: | | P |
| | Protection incorporated in the equipment; or | | N |
| | Instructions specify batteries with built-in protection: | Specific type LR4 declared in instructions. | N |
| | In case of wrong type of battery used | | P |
| | No HAZARD; or | | N |
| | Warning by marking and within instructions | | P |
| | Equipment with means to charge rechargeable batteries: | No rechargeable batteries. | N |
| | Warning against the charging of non-rechargeable batteries; and | | P |
| | Type of rechargeable battery indicated; or | | N |
| | Symbol 14 used | ⚠ | P |
| | Battery compartment design | | P |
| | Single component failure | | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| | Polarity reversal test | | P |
| 13.2.3 | Implosion of cathode ray tubes | No such item in appliance | N |
| | If maximum face dimensions > 160 mm.....: | | N |
| | Intrinsically protected and correctly mounted; or | | N |
| | ENCLOSURE provides protection: | | N |
| | If non-intrinsically protected: | | N |
| | Screen not removable without TOOL | | N |
| | If glass screen, not in contact with surface of tube | | N |
| 13.2.4 | Equipment RATED for high pressure (See 11.7) | | N |
| **14** | **COMPONENTS** | | —— |
| 14.1 | General | see appended table 14.1 | P |
| | Where safety is involved, components meet relevant requirements | | P |
| 14.2 | Motors | | N |
| 14.2.1 | Motor temperatures | (See appended form A.20B) | N |
| | Does not present a HAZARD when stopped or prevented form starting; or | | N |
| | Protected by overtemperature or thermal protection device conform with 14.3 | | N |
| 14.2.2 | Series excitation motors | | N |
| | Connected direct to device, if overspeeding causes a HAZARD | | N |
| 14.3 | Overtemperature protection devices | | N |
| | Devices operating in a SINGLE FAULT CONDITION | | N |
| 14.3a) | Reliable function is ensured | | N |
| 14.3b) | RATED to interrupt maximum current and voltage | | N |
| 14.3c) | Does not operate in NORMAL USE | | N |
| 14.4 | Fuse holders | | N |
| | No access to HAZARDOUS LIVE parts | | N |
| 14.5 | Mains voltage selecting devices | | N |
| | Accidental change not possible | | N |
| 14.6 | HIGH INTEGRITY components | No such components | N |

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|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |
| | Used in applicable positions (see Table 3) | | N |
| | Conforms with IEC publications | No such hazard generated | N |
| | Single electronic device not used | | N |
| 14.7 | Mains transformers tested outside equipment | | N |
| 14.8 | Printed circuit boards | | P |
| | Data shows conformity with FV-1 of IEC 60707 or better; or | PCB is V-0, UL approved. | P |
| | Test shows conformity with FV-1 of IEC 60707 or better; or | | N |
| | Thin film flexible PCB with limited-energy circuit used | | N |
| 14.9 | Circuit or component used as transient overvoltage limiting devices | | N |
| | After test, no sign of overload or degradation | | N |
| **15** | **PROTECTION BY INTERLOCKS** | | —— |
| 15.1 | General | No interlocks | N |
| | Interlocks are designed to remove a hazard before OPERATOR exposed | | N |
| 15.2 | Prevention of reactivation | | N |
| 15.3 | Reliability | | N |
| | Single fault unlikely to occur; or | | N |
| | Cannot cause a HAZARD | | N |
| **16** | **TESTS AND MEASUREMENT EQUIPMENT** | | —— |
| 16.1 | Current measuring circuits | Not intended to current measurment | N |
| 16.2 | Multifunction meters and similar equipment | | N |
| | No HAZARD from: | | N |
| | RATED input voltage combinations | | N |
| | Settings of functions | See also clause 16.1 | N |
| | Settings of range controls | | N |
| **ANNEX F** | **ROUTINE TESTS** | | —— |
| | Manufacturer's declaration | | N |

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

| **4.4.2** | **TABLE: Summary of SINGLE FAULT CONDITIONS** | | **Form A.1** | **P** |
|---|---|---|---|---|
| Subclause | Title | Does not apply | Carried out | Comments |
| 4.4.2.1 | PROTECTIVE IMPEDANCE | X | | |
| 4.4.2.2 | Protective conductor | X | | |
| 4.4.2.3 | Equipment or parts for short-term or intermittent operation | X | | |
| 4.4.2.4 | Motors | X | | |
| 4.4.2.5 | Capacitors | X | | |
| 4.4.2.6 | Mains transformers<br>Attach drawing of MAINS Txs showing all protective devices<br>(see Forms A.29 and A.30) | X | | |
| 4.4.2.7 | Outputs | X | | |
| 4.4.2.8 | Equipment for more than one supply | X | | |
| 4.4.2.9 | Cooling<br>– air holes closed<br>– fans stopped<br>– coolant stopped | X | | |
| 4.4.2.10 | Heating devices<br>– timer overridden<br>– temperature controller overridden<br>– loss of cooling liquid<br>– overfilled or empty or both | X | | |
| 4.4.2.11 | Insulation between circuits and parts | | X | |
| 4.4.2.12 | Interlocks | X | | |
| List below all SINGLE FAULT CONDITIONS not covered by 4.4.2.1 to 4.4.2.12: | | | | |
| Supplementary information:<br>(see Form A.2 for details of tests) | | | | |

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

| 4.4 | TABLE: Testing in single FAULT CONDITION – Results | | | FormA.2 | P |
|---|---|---|---|---|---|
| Test subclause | Fault No. | Fault description | Td 4.4.3 (NOTE) | How was test terminated comments | Meets 4.4.4 |
| 4.4.2.11 | 1 | Short U14(pin8-9) during AC 300V measuring | 1:00:00 | Appliance display abnormally. No safety hazard | Yes |
| 4.4.2.11 | 2 | Short R14 during test on Current | 1:00:00 | Appliance can't work normally. No safety hazard | Yes |
| 4.4.2.11 | 3 | Short C13 during test on Frequency | 1:00:00 | As normal. No safety hazard | Yes |
| | | | | | |

NOTE Td = Test duration in h:min:s
Record dielectric strength test on Form A.14 and temperature tests on Form A.20.
Record in the comments column for each test whether carried out during or after

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

| | | | |
|---|---|---|---|
| 5.3 | TABLE: Durability of markings | Form A.4 | P |

| Marking method (see NOTE) | Agent |
|---|---|
| 1) print method | A Water |
| 2) label material | B Isopropyl alcohol |
| 3) engraved on enclosure | C (specify cleanser) |
| | |

NOTE – Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.

| Marking location | Marking method (see above) |
|---|---|
| Identification (5.1.2) | 1) |
| Mains supply (5.1.3) | N/A |
| Fuses (5.1.4) | 2) |
| TERMINALS and operating devices (5.1.5.1) | N/A |
| Measuring circuit TERMINALS (5.1.5.2) | 1) |
| Switches and cricuit breakers (5.1.6) | N/A |
| DOUBLE/REINFORCED equipment (5.1.7) | 2) |
| Field wiring TERMINAL boxes (5.1.8) | N/A |
| Warning marking (5.2) | 2) |
| Battery charging (13.2.2) | N/A |
| | |

| Method | Test agent | Remains legible Verdict | Label loose Verdict | Curled edges Verdict | Comments |
|---|---|---|---|---|---|
| 1 | A | YES | NO | NO | PASS |
| 2 | B | YES | NO | NO | PASS |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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

| | | |
|---|---|---|
| 6 | **TABLE: Protection against electric shock - Block diagram of system Form A.5** | **N** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollution degree.....: 2 | | | Installation category (overvoltage category).....: II | | | | | | |
| Location or description | Insulation type (NOTE 1) | Maximum working Voltage (NOTE 2) | CREEPAGE DISTANCE (NOTE 3) PWB mm | CTI | Other mm | CTI | Clearance (NOTE 3) mm | Test voltage (NOTE2) V | Comments |
| | | | | | | | | | |
| | | | | | | | | | |
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|---|---|---|
| NOTE 1 – Type of insulation:<br>BI = BASIC INSULATION<br>DI = DOUBLE INSULATION<br>PI = PROTECTIVE IMPEDANCE<br>RI = Reinforced INSULATION<br>SI = Supplementary INSULATION | NOTE 2 - Types of voltage Peak impulse test voltage (pulse)<br>r.m.s.<br>d.c.<br>peak | NOTE 3 - INSTALLATION CATEGORIES (OVERVOLTAGE CATEGORIES) or POLLUTION DEGREES which differ from these should be shown under "Comments". |

Supplementary Information: the insulation outside stand-by switch and holding button provided supplementary insulation

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

| | | | |
|---|---|---|---|
| **6.2** | **TABLE: List of ACCESSIBLE parts A.6** | **Form** | **P** |
| 6.1.2 | Exceptions | | — |
| 6.2 | Determination of accessible parts | | — |

| Item | Description | Determination method (NOTE 5) | Exception under 6.1.2 (NOTE 4) |
|---|---|---|---|
| 1 | Enclosure | By test finger | --- |
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NOTE 1 – Test fingers and pins are to be applied without force unless a force is specified (see 6.2.1)
NOTE 2 – Special consideration should be given to inadequate insulation and high voltage parts (see 6.2)
NOTE 3 – Parts are considered to be ACCESSIBLE if they could be touched in the absence of any covering which is not considered to provide suitable insulation (see note to paragraph 1 of 6.4).
NOTE 4 – Capacitor test may be required (see Form A.7).
NOTE 5 – The determination methods are: visual; rigid test finger; jointed test finger; pin 3 mm diameter; pin 4 mm diameter.

Supplementary information: for probe see separate report pls.

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| | | | |
|---|---|---|---|
| 6 | **TABLE: Values in NORMAL CONDITION** | **Form A.7** | **P** |
| 6.1.1 | Exceptions | 11.2 Cleaning and decontamination | — |
| 6.3.1 | In NORMAL CONDITION(see NOTE 1) | 11.3 Spillage | — |
| 6.6.2 | Terminals for external circuit | 11.4 Overflow | — |
| 6.10.3 | Plugs and connections | | — |

| Item (see Form A.6) | Voltage | | | Current | | | | Capacitance | | 10 s test (NOTE 2) | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | V r.m.s. | V peak | V d.c. | Test circuit A1/A2/A3 | mA r.m.s. | mA peak | mA d.c. | µ C | mJ | V | µ C | mJ | |
| 1 | - | - | 9.0 | -- | - | - | - | - | - | - | - | - | Limit:46.7Vpeak |
| | | | | | | | | | | | | | |
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NOTE 1 – The requirements of 6.3.1 include drying out (if specified). For permanently connected equipment, the current values are 1,5 times the specified values.
NOTE 2 – A 5 s test is specified in 6.10.3c).

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| **6.3.2** | **TABLE: Values in SINGLE FAULT CONDITION** | | | | | | **Form A.8** | | | | | **P** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Item (SeeForm A.6) | Subclause and fault No. (see FormA.2) | Voltage | | | Transient (see NOTE) | | Current | | | | Capacitance µ F (NOTE) | Comments |
| | | V r.m.s | V peak | V d.c. | V | S | Test circuit A1/A2/A3 | mA r.m.s. | mA peak | mA d.c. | | |
| 1 | 4.4 | - | - | 9 | - | - | - | - | - | - | - | Limit:78Vpeak |
| | | | | | | | | | | | | |
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NOTE – Transient voltages must be below the limits given from Figure 1 and the capacitance below the limits from figure 2 of IEC 61010-1.

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| | | | |
|---|---|---|---|
| **6.7** | **TABLE: CLEARANCES and CREEPAGE DISTANCES** | **Form A.13** | **P** |
| 8 | Mechanical resistance to shock and impact | | P |
| 10.5.1 | Integrity of CLEARANCES and CREEPAGE DISTANCES | | P |

| Location (see Form A.5) | Measured (initial – 6.7) | | Verdict | Mechanical tests (note) | | | | | Test at max. RATED ambient (10.5.1) | Measured after test (if required) | | Verdict | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Creepage Distance mm | Clearance mm | | Applied force (6.7)N | Rigidity (8.1) | | Drop | | | Creepage Distance mm | Clearance mm | | |
| | | | | | Static | Dynamic | Normal | Hand-held/plug-in | | | | | |
| Between live and accessi-ble enclosure [Fu] | >0.1mm | >0.1mm | Pass | 30N | × | × | Corner drop test | --- | 40℃ | >0.1mm | >0.1mm | Pass | Cl:0.1mm; Cr:0.04 mm required (material group $III_b$ assumed) |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

NOTE-Refer to Form A.12 for dielectric strength tests following the above tests.

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| | | |
|---|---|---|
| **6.8** | **TABLE: Dielectric strength tests** **Form A.14** | **P** |
| 4.4.4.1 b) | **Conformity after application of fault conditions** | P |
| 6.4 | Protection in NORMAL CONDITION | P |
| 6.5.2 | DOUBLE INSULATION and REINFORCED INSULATION | P |
| 6.6.1 | Connections to external circuits | P |
| 6.7.3.1 c) | CLEARANCE values – General: reduced CLEARANCES for homogeneous construction | N |
| 6.10.2.5 | Fitting of non-detachable MAINS SUPPLY cords[1] | N |
| 8 | Mechanical resistance to shock and impact | P |
| 9.1 a) 2) | Eliminating or reducing the sources of ignition within the equipment | N |
| 9.3 c) | Limited-energy circuit | N |
| 11.2 | Cleaning | N |
| 11.3 | Spillage | N |
| 11.4 | Overflow | N |
| 11.6 | Specially protected equipment[1] | N |

1 Record the fault, test or treatment applied before the dielectric strength test

| | | | |
|---|---|---|---|
| | Test site altitude .....: | 1-500 m | --- |
| | Test voltage correction factor (see Table 10)....: | N/A | --- |

| Location or references from Forms A.2 and A.5 | Clause or sub-clause | Humidity Yes/No | Working voltage V | Test voltage r.m.s./peak/ d.c V | Comments | Verdict |
|---|---|---|---|---|---|---|
| Between live and accessible enclosure with metal foil | 6.8 | Yes | 9V | 300V r.m.s. | No insulation breakdown | P |
| Between live and accessible enclosure with metal foil | 8 | No | 9V | 300V r.m.s. | No insulation breakdown | P |
| Between live and accessible enclosure with metal foil | 4.4.4.1 b) | No | 9V | 300V r.m.s. | No insulation breakdown | P |
| | | | | | | |

Supplementary information:

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| **9** | **TABLE: Protection against the spread of fire** **A.16** | | | **Form** | **P** |
|---|---|---|---|---|---|
| Item | Source of HAZARD or area of the equipment considered (circuit, component, liquid etc.) | Protection Method (9a, 9b or 9c) | Protection details | | Verdict |
| 1. | Internal circuits | 9a and 9c | Fault condition tested. Enclosure and PCB are min. V-0 and UL approved. | | Pass |
| | | | | | |
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| Supplementary information: | | | | | |

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| | | | |
|---|---|---|---|
| **9.2.1** | **TABLE: Constructional requirements** | **Form A.17** | **N** |
| 14.8 | Printed circuit boards | | N |
| UL approved min. V-0 PCB and enclosure provided. | | | |
| Material tested ..... : | | | ____ |
| Generic name ..... : | | | ____ |
| Material manufacturer ..... : | | | ____ |
| | | | |
| Type ..... : | | | ____ |
| Colour..... : | | | ____ |
| Conditioning details..... : | | | ____ |

| | | Sample 1 | Sample 2 | Sample 3 |
|---|---|---|---|---|
| Thickness of specimen | mm | | | |
| Duration of flaming after first Application | S | | | |
| Duration of flaming plus glowing After second application | S | | | |
| Specimen burns to holding clamp | Yes/No | | | |
| Cotton ignited | Yes/No | | | |
| Sample result | Pass/Fail | | | |

Supplementary information:

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| | | | |
|---|---|---|---|
| **9.3** | **TABLE: Limited-energy circuit**<br>**A.18** | **Form** | **N** |

| Item | 9.3 a) | 9.3 b) Current and power limitation | | | 9.3 c) | Decision | |
|---|---|---|---|---|---|---|---|
| or Location (see Form A.16) | Maximum potential in circuit voltage r.m.s./d.c. V | Maximum available current A | Maximum available power VA | Overload protection after 120s A | Circuit separation | Yes/No | Comments |
| | | | | | | | |
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Supplementary information:

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| | | |
|---|---|---|
| **10** | **TABLE: Temperature Measurements A.20A** **Form** | **P** |
| 10.1 | Surface temperature limits - NORMAL CONDITION | P |
| 10.2 | Temperature of windings- NORMAL CONDITION | P |
| 10.3 | Other temperature measurements | P |

| | | | |
|---|---|---|---|
| Operating conditions: | See below comments. | | |
| Frequency ..... : | -- | Test room ambient temperature ($t_a$)..: | 25.0 ℃ |
| Voltage ..... : | -- | Test duration .....: | See below comments. |

| Part/Location | $t_m$ | tc | Tmax ℃ | Verdict | Comments |
|---|---|---|---|---|---|
| Battery compartment | 26.3 | 41.3 | 80 | P | Operating mode: checking mains outlet with 300V for 2h. |
| Enclosure | 25.8 | 40.8 | 80 | P | |
| Inner wire | 27.1 | 42.1 | 80 | P | |
| PCB | 28.4 | 43.4 | 120 | P | |

NOTE 1 - $t_m$= measured temperature
$t_c$ = $t_m$ corrected ($t_m$–$t_a$+ 40 °C or max. RATED ambient)
$t_{max}$ = maximum permitted temperature
NOTE 2 - See also 14.1 with reference to component operating conditions
NOTE 3 - Record values for NORMAL CONDITION and / or SINGLE FAULT CONDITION in this Form use additional form if necessary
NOTE 4 - See Form A.20B for details of winding temperature measurements

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| | | |
|---|---|---|
| **10.2** | **TABLE: Temperature of windings** **Form A.20B**<br>**Resistance method Temperature Measurements** | **N** |
| 4.4.2.6 | MAINS Transformers | **N** |
| 14.2.1 | Motor temperatures | **N** |

| | | | |
|---|---|---|---|
| Operating conditions: | -- | | |
| Frequency ..... : | -- | Test room ambient temperature ($t_a$)..: | (initial / final) |
| Voltage ..... : | -- | Test duration .....: | h min |

| Part/Location | Rcold Ω | RmaxΩ | Current A | Tr K | Tc ℃ | Tmax ℃ | Verdict | Comments |
|---|---|---|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | | | | | | | | |
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NOTE 1 - *Rcold*= initial resistance Rwarm= final resistance

*tr* = temperature rise $t_c = t_r$ corrected ($t_c = t_r - \{t_{a2} - t_{a1}\} + [40\ °C$ or max RATED ambient])

*t*max = maximum permitted temperature

NOTE 2 - Indicate insulation class (IEC 85) under comments (optional)

NOTE 3 - - Record values for NORMAL CONDITION and / or SINGLE FAULT CONDITION in this Form use additional form if necessary

Supplementary information:

The euipment powered by battery, transformer is not mains transformer.

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| | | | |
|---|---|---|---|
| **10.5.2** | **TABLE: Resistance to heat of non-metallic enclosures** **Form A.21** | | **P** |
| | Test method used: | | -- |
| | Non operative treatment.....: | **[×]** | P |
| | Empty ENCLOSURE .....: | **[×]** | P |
| | Operative treatment.....: | **[ ]** | N |
| | Temperature during tests .....: | 70℃ | -- |
| | ENCLOSURE samples tested were.....: | Comply with standard | -- |

| Description | Material | Comments | Verdict |
|---|---|---|---|
| Enclosure | See part list | 70℃ | P |
| | | | |
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|---|---|---|---|
| | Dielectric strength test (6.8) .....: | 300V r.m.s. | P |

Supplementary information:

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| | | | |
|---|---|---|---|
| **10.5.3** | **TABLE: Insulating Materials A.22** | **Form** | **N** |
| 10.5.3 a) | Ball pressure test | | N |
| | Max. allowed impression diameter.....: | 2mm | -- |

| Part | Test temperature ℃ | Impression Diameter (mm) | Verdict |
|---|---|---|---|
| | | | N |
| | | | |
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Supplementary information:

| | | | |
|---|---|---|---|
| 10.5.3 b) | Vicat softening test (ISO 306) | | -- |

| Part | Test temperature ℃ | Impression Diameter (mm) | Verdict |
|---|---|---|---|
| | | | |
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Supplementary information:

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

| | | | |
|---|---|---|---|
| **8** | **TABLE: Mechanical resistance to shock and impact A.23** | **Form** | **P** |
| **11** | **Protection against hazards from fluids** | | **N** |

Voltage tests can be carried out once after performing the tests of clause 8 and clause 11. However, if voltage tests are carried out separately after each set of tests, two forms can be used.

| | Clsuse 8 tests | | | | Clause 11 tests | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location (see form A.5) | Static | Dynamic | Normal | Handheld Plug-in | Cleaning (11.2) | Spillage (11.3) | Overflow (11.4) | IEC 60529 (11.6) | Working voltage V | Test vlotage V | Verdict | Comments |
| Enclosure | Tested | Tested | -- | Tested | -- | -- | -- | -- | 9V | 300V r.m.s. | Pass | |
| | | | | | | | | | | | | |
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| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement +Test** | **Result-Remark** | **Verdict** |

NOTE – Use r.m.s., d.c. or peak to indicate the used test voltage.

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement + Test** | **Result - Remark** | **Verdict** |

| | | | |
|---|---|---|---|
| **13.2.2** | **TABLE: Batteries**<br>**A.27** | **Form** | **P** |
| | Battery load and charging circuit diagram: | Non-rechargeable battery | N |
| | Battery type .....: | Size6F22 | -- |
| | Battery manufacturer/model/catalogue No.....: | | --- |
| | Battery ratings .....: | 9 V d.c. | --- |
| | Reverse polarity instalment test | Appliance can't operate.<br>No hazardous. | P |

| Single component failures | Verdict | |
|---|---|---|
| Component | Open circuit | Short circuit |
| | --- | |
| | | |
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Supplementary information:

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement + Test** | **Result - Remark** | **Verdict** |

| **16.1** | **TABLE: Current measuring circuits** | **Form A.31** | **N** |
|---|---|---|---|

These tests are performed with all types and models of current transformers without internal protection, and which are specified by the manufacturer for use with the equipment

a) Current transformers

No current transformers.

| ````````` | RATED current A | Test current A | Interrupt Yes / No | Verdict | Comments |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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Supplementary information:

b) Range changing switches

Tested.

| Type/Model | RATED current A | Test current A | Interrupt Yes / No | Verdict | Comments |
|---|---|---|---|---|---|
| | | | | | |
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Supplementary information:

| EN 61010-1 | | | |
|---|---|---|---|
| **Clause** | **Requirement + Test** | **Result - Remark** | **Verdict** |

| | | | |
|---|---|---|---|
| **16.2** | **TABLE: Multifunctional meters and similar equipment A.32** | **Form** | **N** |
| | Operating conditions ..... : | | --- |
| | Maximum RATED voltage applied (V) .....: | | --- |
| | Measurement category.....: | | --- |
| | Test source limit (KVA).....: | | --- |

| Function | Range | Verdict |
|---|---|---|
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Supplementary information: two terminals only and no range changing switch.

| EN 61010-2-030(ANNEX I) | | | |
|---|---|---|---|
| **Clause** | **Requirement + Test** | **Result - Remark** | **Verdict** |
| 5 | Marking and documentation | | P |
| 5.1.5 | Terminals, connections and operating devices | | P |
| 5.1.5.101 | Measuring circuit terminals | | P |
| 5.1.5.101.1 | General | | P |
| | a) the rated voltage to earth of measuring circuit terminals | 600V max. | P |
| | b) the rated voltage or the rated current of each pair or set of measuring circuit terminals | 1000A | P |
| | c) the pertinent measurement category for each pair or set of measuring circuit terminal or symbol 14 | CAT III 600V | P |
| 5.1.5.101.2 | Measuring circuit terminals rated for measurement categoried II, III or IV | | P |
| | The MEASUREMENT CATEGORY markings shall be “CAT II”, “CAT III” or “CAT IV” | | P |
| 5.1.5.101.3 | Measuring circuit TERMINALS RATED for connection to voltages above the level of 6.3.1 | | P |
| | Symbol 14 of Table 1 shall be marked for measuring circuit TERMINALS RATED for connection to voltages above the levels of 6.3.1 | | P |
| | But that are not RATED for measurements within MEASUREMENT CATEGORIES II, III or IV | | N |
| 5.1.5.101.4 | Low voltage, permanently connected, or dedicated measuring circuit TERMINALS | | N |
| | Measuring circuit TERMINALS do not need to be marked if | | N |
| | a) they are intended to be permanently connected and not ACCESSIBLE, or | | N |
| | b) they are dedicated only for connection to specific TERMINALS of other equipment, or; | | N |
| | c) it is obvious from other indications that the RATED voltage is below the levels of 6.3.1. | | N |
| 5.4.1 | General | | P |
| | aa) information about each relevant MEASUREMENT CATEGORY if the measuring circuit has a RATING for MEASUREMENT CATEGORY II, III or IV; | | P |
| | bb) for measuring circuits that do not have a RATING for MEASUREMENT CATEGORY II, III or IV, but could be misused by connection to such | | N |

| EN 61010-2-030(ANNEX I) | | | |
|---|---|---|---|
| **Clause** | **Requirement + Test** | **Result - Remark** | **Verdict** |
| | circuits | | |
| 5.4.3 | Equipment installation | | N |
| | aa) for permanently connected measuring circuit TERMINALS RATED for MEASUREMENT CATEGORIES II, III or IV | | N |
| | bb) for permanently connected measuring circuit TERMINALS that are not RATED for MEASUREMENT CATEGORIES II, III or IV | | N |
| 6 | Protection against electric shock | | P |
| 6.1.2 | Exceptions | | N |
| | aa) locking or screw-held type measuring TERMINALS, including TERMINALS which do not require the use of a TOOL. | | N |
| 6.5.2.3 | h) 2) the PROTECTIVE BONDING shall not be interrupted by any switching or interrupting device. | | N |
| 6.5.2.101 | Indirect bonding for testing and measuring circuits | | N |
| | Indirect bonding establishes a connection between the PROTECTIVE CONDUCTOR TERMINAL and ACCESSIBLE conductive parts if these become HAZARDOUS LIVE as a result of a fault. Devices to establish indirect bonding are: | | N |
| | a) voltage limiting devices which become conductive when the voltage across them exceeds the relevant levels of 6.3.2 a), with overcurrent protection to prevent breakdown of the device; | | N |
| | b) voltage-sensitive tripping devices which interrupt all poles of the MAINS supply, and connect the ACCESSIBLE conductive parts to the PROTECTIVE CONDUCTOR TERMINAL whenever the voltage across them reaches the relevant levels of 6.3.2 a). | | N |
| 6.6 | Connections to external circuits | | P |
| 6.6.101 | Measuring circuit TERMINALS | | P |
| | Conductive parts of each unmated measuring circuit TERMINAL which could become HAZARDOUS LIVE when the maximum RATED voltage is applied to other measuring circuit TERMINALS on the equipment shall be separated by at least the CLEARANCE and CREEPAGE DISTANCE of Table 101 from the closest approach of the test finger touching the external parts of the TERMINAL in the least favourable position. | | P |

| EN 61010-2-030(ANNEX I) | | | |
|---|---|---|---|
| **Clause** | **Requirement + Test** | **Result - Remark** | **Verdict** |
| 6.6.102 | Specialized measuring circuit TERMINALS | | P |
| | Components, sensors, and devices intended to be connected to specialized measuring circuit TERMINALS shall not be both ACCESSIBLE and HAZARDOUS LIVE | | P |
| | a) maximum RATED a.c. voltage at any RATED MAINS frequency; | | P |
| | b) maximum RATED d.c. voltage; | | N |
| | c) maximum RATED a.c. voltage at the maximum RATED measurement frequency. | | P |
| 6.9 | Constructional requirements for protection against electric shock | | P |
| 6.9.101 | Over-range indication | | P |
| | If a HAZARD could arise from an OPERATOR'S reliance on the value displayed by the equipment, the display shall give an unambiguous indication | | P |
| 14 | Components and subassemblies | | N |
| 14.101 | Circuits or components used as TRANSIENT OVERVOLTAGE limiting devices in measuring circuits used to measure MAINS | | N |
| | If control of TRANSIENT OVERVOLTAGE is employed in a measuring circuit used to measure MAINS, any overvoltage limiting component or circuit shall have adequate strength to limit likely TRANSIENT OVERVOLTAGES. | | N |
| 17 | RISK assessment | | P |
| 101 | Measuring circuits | | P |
| 101.1 | General | | P |
| | The equipment shall provide protection against HAZARDS resulting from NORMAL USE and REASONABLY FORESEEABLE MISUSE of measuring circuits, as specified below. | | P |
| | a) If a HAZARD could result, a current measuring circuit shall not interrupt the circuit being measured during range changing, or during the use of current transformers without internal protection | | P |
| | b) An electrical quantity that is within specification for any TERMINAL shall not cause a HAZARD when it is applied to that TERMINAL or any other compatible TERMINAL, with the range and function settings set in any possible manner | | P |

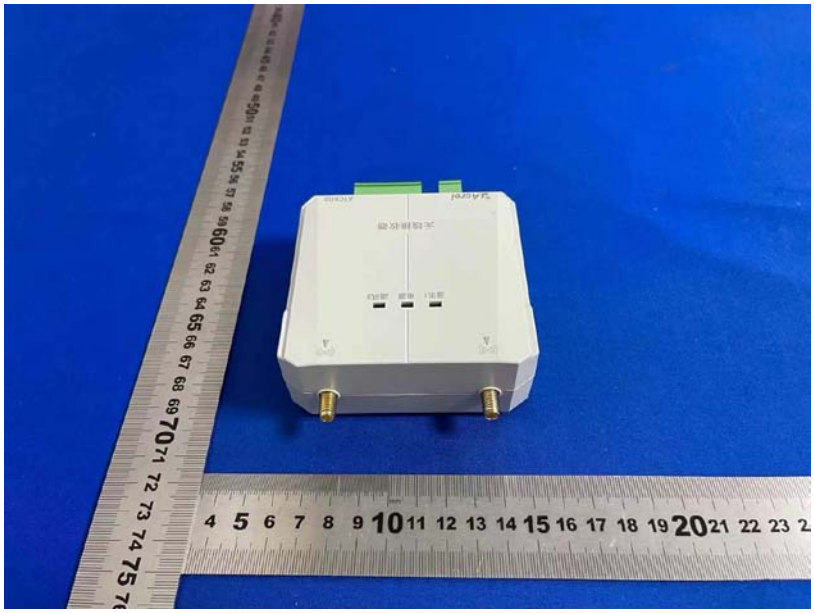
| EN 61010-2-030(ANNEX I) | | | |
|---|---|---|---|
| **Clause** | **Requirement + Test** | **Result - Remark** | **Verdict** |
| | c) Any interconnection between the equipment and other devices or accessories shall not cause a HAZARD even if the documentation or markings prohibit the interconnection while the equipment is used for measurement purposes | | N |
| | d) For measuring circuits that include one or more FUNCTIONAL EARTH TERMINALS, a RISK assessment shall address the HAZARDS that may result if the equipment is operated with a disconnected PROTECTIVE CONDUCTOR TERMINAL and if the operator unintentionally connects a FUNCTIONAL EARTH TERMINAL to any RATED voltage for any other TERMINAL. | | P |
| | e) Other HAZARDS that could result from REASONABLY FORESEEABLE MISUSE shall be addressed by RISK assessment | | P |
| 101.2 | Current measuring circuits | | P |
| | Current measuring circuits shall be so designed that, when range changing takes place, there shall be no interruption which could cause a HAZARD. | | P |
| | Current measuring circuits intended for connection to current transformers without internal protection shall be adequately protected to prevent a HAZARD arising from interruption of these circuits during operation. | | P |
| 101.3 | Protection against mismatches of inputs and ranges | | P |
| 101.3.1 | General | | P |
| | In NORMAL CONDITION and in cases of REASONABLY FORESEEABLE MISUSE, no HAZARD shall arise when the maximum RATED voltage or current of a measuring TERMINAL is applied to any other compatible TERMINAL, with any combination of function and range settings. | | P |
| | The equipment shall provide protection against these HAZARDS. One of these techniques shall be used. | | P |
| | a) Use of a certified overcurrent protection device to interrupt short-circuit currents before a HAZARD arises. | | P |
| | b) Use an uncertified current limitation device, an impedance, or a combination of both to prevent the HAZARD from arising. In this case | | N |
| 101.3.2 | Protection by a certified overcurrent protection device | | P |

| EN 61010-2-030(ANNEX I) | | | |
|---|---|---|---|
| **Clause** | **Requirement + Test** | **Result - Remark** | **Verdict** |
| | An overcurrent protection device is considered suitable if it is certified by an independent laboratory to meet all of the following requirements. | | P |
| | a) The a.c. and d.c. RATED voltages of the overcurrent protection device shall be at least as high as the highest a.c. and d.c. RATED voltages of any measuring TERMINAL on the equipment. | | P |
| | b) The RATED time-current characteristic (speed) of the overcurrent protection device shall be such that no HAZARD will result from any possible combination of RATED input voltages, TERMINALS, and range selection. | | N |
| | c) The a.c. and d.c. RATED breaking capacities of the overcurrent protection device shall exceed, respectively, the possible a.c. and d.c. short-circuit currents. | | N |
| 101.3.3 | Protection by uncertified current limitation devices or by impedances | | N |
| | Devices used for current limitation shall be capable of safely withstanding, dissipating, or interrupting the energy that will be applied as a result of short-circuit current in the case of REASONABLY FORESEEABLE MISUSE. | | N |
| | An impedance used for limitation of current shall be one or more of the following: | | N |
| | a) An appropriate single component which is constructed, selected, and tested so that safety and reliability for protection against electric shock is assured. In particular, the component shall: | | N |
| | 1) be RATED for the maximum voltage that may be present during the REASONABLY FORESEEABLE MISUSE event; | | N |
| | 2) if a resistor, be RATED for twice the power dissipation that may result from the REASONABLY FORESEEABLE MISUSE event; | | N |
| | 3) meet the applicable CLEARANCE requirements of Annex K for REINFORCED INSULATION between its terminations. | | N |
| | b) A combination of components which shall | | N |
| | 1) withstand the maximum voltage that may be present during the REASONABLY FORESEEABLE MISUSE event, | | N |

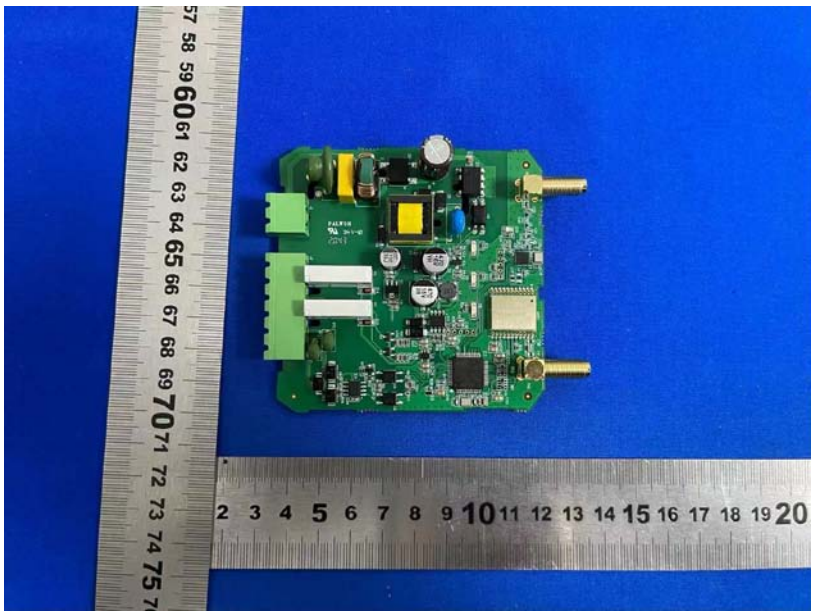
| EN 61010-2-030(ANNEX I) | | | |
|---|---|---|---|
| **Clause** | **Requirement + Test** | **Result - Remark** | **Verdict** |
| | 2) be able to dissipate the power that may result from the REASONABLY FORESEEABLE MISUSE event, | | N |
| | 3) meet the applicable CLEARANCE requirements of Annex K for REINFORCED INSULATION between the terminations of each component. | | N |
| 101.3.4 | Test leads for the tests of 101.3.2 and 101.3.3 | | P |
| | Test leads for the tests of 101.3.2 and 101.3.3 shall meet the following specifications: | | P |
| | a) length = 1 m; | | P |
| | b) cross section of the conductor = 1,5 mm², stranded copper wire; | | P |
| | c) equipment connector compatible with the measuring circuit TERMINALS; | | P |
| | d) connection to the test voltage source via bare wire into suitable screw TERMINALS or thimble connectors (twist-on wire connectors) or equivalent means of providing a lowimpedance connection; | | P |
| | e) arranged as straight as possible. | | P |

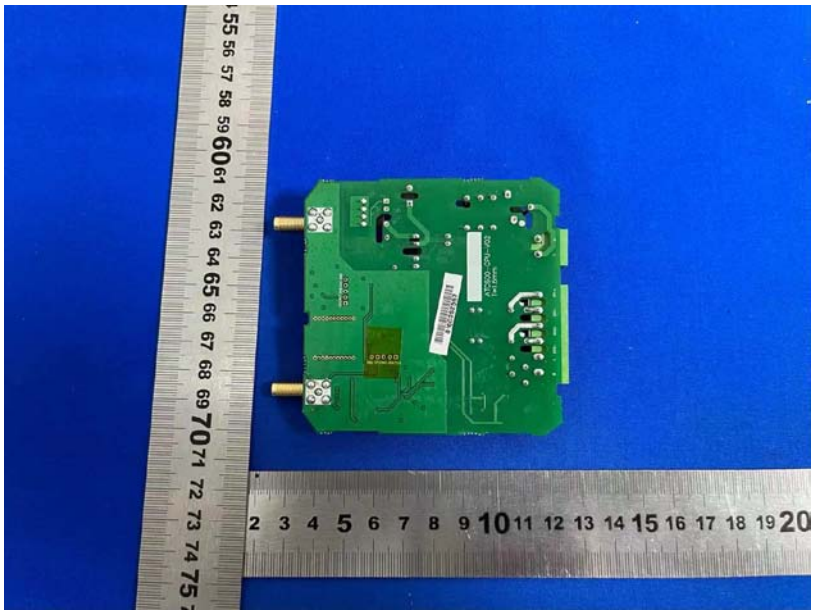
**Appendix**
**Photo documentation**

External photos

Internal photos





**********END OF THIS REPORT**********