



ACREL CO., LTD.

**CE LVD REPORT**

|                   |  |
|-------------------|--|
| Prepared For :    | ACREL CO., LTD.<br>No.253, Yulv Road, Jiading District, Shanghai, China  |
| Product Name:     | DJSF SERIES ELECTRONIC DC MEASURING DEVICE   |
| Main Test Model:  | DJSF1352   |
| Additional Model: | DJSF1352-RN, DJSF1352-RN/K, DJSF1352-RN/K-P1,<br>DJSF1352-RN/D   |
| Prepared By :     | Shenzhen BST Technology Co., Ltd.<br>Building No.23-24, Zhiheng Industrial Park, Guankouer Road,<br>Nantou, Nanshan District, Shenzhen, Guangdong, China |
| Test Date:        | Jun. 10, 2019–Jun. 18, 2019  |
| Date of Report :  | Jun. 18, 2019  |
| Report No.:       | BST1906116974060SR   |

**TEST REPORT****EN 61010-1****Safety requirements for electrical equipment for measurement, control,  
and laboratory use****Part 1: General requirements**

|   |   |
|---|---|
| Testing Laboratory Name .....                       | Shenzhen BST Technology Co.,Ltd..   |
| Address .....                                       | Building No.23-24, Zhiheng Industrial Park, Guankouer Road,<br>Nantou,Nanshan District,Shenzhen,Guangdong,China |
| Testing location .....                              | Shenzhen BST Technology Co.,Ltd.  |
| Applicant's Name .....                              | ACREL CO., LTD.   |
| Address .....                                       | No.253, Yulv Road, Jiading District, Shanghai, China  |
| Manufacturer .....                                  | JIANGSU ACREL ELECTRIC MFG. CO., LTD.   |
| Address .....                                       | No.5, Dongmeng Road, Nanzha Street, Jiangyin City, Jiangsu<br>Province, China                                   |
| Standard .....                                      | EN 61010-1:2010   |
| Test Result .....                                   | Compliance with EN 61010-1:2010   |
| Procedure deviation .....                           | CE-LVD  |
| Non-standard test method .....                      | N/A   |
| Type of test object .....                           | See Page 1  |
| Trade name.....                                     | See Page 1  |
| Model/type reference .....                          | See Page 1  |
| Rating .....  | 220V~   |
| <b>Particulars: test item vs. test requirements</b> |   |
| Equipment mobility.....                             | Movable equipment   |
| Operating condition.....                            | Continues   |
| Mains supply tolerance .....                        | ±10%  |
| Tested for IT power systems .....                   | No  |
| IT testing, phase-phase voltage (V) .....           | N.A.  |
| Class of equipment .....                            | Class I   |
| Protection against ingress of water .....           | IP 20   |

**Possible test case verdicts :**

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

Test object does meet the requirement ..... : P(ass)

Test object does not meet the requirement ..... : F(ail)

**General remarks:**

"(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.

The test results presented in this report relate only to the object tested.

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Attached with:

A. photo documentation

**Artwork of Marking Label:**

DJSF SERIES ELECTRONIC DC  
MEASURING DEVICE  
Model: DJSF1352  
Rating: 220V~



JIANGSU ACREL ELECTRIC MFG. CO.,  
LTD.



Prepared by :

*Fade Zhan*

Engineer

Reviewer :

*Jacky Zhang*

Supervisor

Approved & Authorized Signer :



Manager



| EN 61010-1 |  |                               |         |
|------------|--|-------------------------------|---------|
| Clause     | Requirement-Test   | Result-Remark                 | Verdict |
| 4.4        | Testing in SINGLE FAULT CONDITION (SFC)  |                               | ---     |
| 4.4.1      | General  |                               | P       |
| 4.4.2      | Application of fault conditions  |                               | P       |
| 4.4.2.1    | protective impedance   | Not protective impedance used | N       |
| 4.4.2.2    | protective conductor   |                               | P       |
| 4.4.2.3    | Equipment or parts for short-term or intermittent operations   |                               | N       |
| 4.4.2.4    | Motors   |                               | P       |
| 4.4.2.5    | Capacitors   | No such capacitors            | N       |
| 4.4.2.6    | Mains transformers   |                               | P       |
| 4.4.2.6.1  | Short circuit  |                               | P       |
| 4.4.2.6.2  | Overload   |                               | P       |
| 4.4.2.7    | Outputs  |                               | P       |
| 4.4.2.8    | Equipment for more than one supply   | Only one supply               | N       |
| 4.4.2.9    | Cooling  | No cooling equipment          | N       |
| 4.4.2.10   | Heating devices  |                               | N       |
| 4.4.2.11   | Insulation between circuits and parts  |                               | P       |
| 4.4.2.12   | Interlocks   | No interlocks                 | N       |
| 4.4.3      | Duration of tests  |                               | N       |
| 4.4.3.1    | The equipment shall be operated unit further change as a result of the applied fault is unlikely         |                               | N       |
| 4.4.3.2    | A device interrupted or limited the current shall limit the temperature of parts easily touched          |                               | N       |
| 4.4.3.3    | Fuse opened and not operate within approximately 1 s, and the current through the fuse shall be measured |                               | N       |
| 4.4.4      | Conformity after application of fault conditions   |                               | P       |
| 4.4.4.1    | Protection against electric shock is checked after the application of single fault as follows:           |                               | P       |
|            | a), no accessible conductive parts become hazardous live   |                               | P       |



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|------------|---|---------------------------------|-------------|
| Clause     | Requirement-Test  | Result-Remark                   | Verdict     |
|            | b), performing a voltage test on double insulation or reinforced insulation   |                                 | P           |
|            | c), measuring the temperature of transformer winding  |                                 | P           |
| 4.4.4.2    | Temperature of outer surface of enclosure and of parts that can be touched is checked   | Comply with the standard        | P           |
| 4.4.4.3    | Protection against the spread of fire is checked  | Comply with the standard        | P           |
| 4.4.4.4    | Protection against other hazard is checked  | See clause 7 and 8 and 11 to 16 | P           |
| <b>5</b>   | <b>MARKING AND DOCUMENTATION</b>  |                                 | <b>----</b> |
| 5.1.2      | Identification; equipment is identified by:   |                                 | P           |
|            | The equipment shall be marked with  | See copy of marking plate       | P           |
|            | a) manufacturer' or supplier's name or trade mark   | Ditto.                          | P           |
|            | b) model number, name or other means to identify the equipment  | Ditto.                          | P           |
| 5.1.3      | Mains supply  |                                 | ---         |
| 5.1.3 a)   | Nature of supply:   |                                 | ---         |
|            | - a.c. RATED mains frequency or range of frequencies  |                                 | P           |
|            | - d.c. with symbol 1 of table 1   | Only a.c. supply                | N           |
| 5.1.3 b)   | RATED supply voltage(s) or range  | 220V                            | P           |
| 5.1.3 c)   | Maximum RATED power in W or VA, or  |                                 | P           |
|            | -More than one voltage range: separate values shall be marked, unless the maximum and minimum values do not differ by less than 20%                                     |                                 | N           |
| 5.1.3 d)   | Equipment which the OPERATOR can set for different RATED supply voltages shall be provided with means for the indication of the voltage for which the equipment is set. |                                 | N           |
| 5.1.3 e)   | Accessory mains socket-outlets accepting standard mains plugs shall be marked with voltage if it is different from the mains supply voltage.:                           | No socket-outlets               | N           |



| EN 61010-1 |  |                          |         |
|------------|--|--------------------------|---------|
| Clause     | Requirement-Test   | Result-Remark            | Verdict |
| 5.1.4      | Fuses  |                          | ---     |
|            | There shall be a marking beside the fuseholder                                       |                          | P       |
| 5.1.5      | Terminals, connections and operating devices   |                          | P       |
| 5.1.5.1    | Terminals for connection to the mains supply shall be identifiable                   | Comply with the standard | P       |
|            | a)Function earth terminals   |                          | N       |
|            | b)Protect conduct terminals  |                          | P       |
|            | c)Terminals of measuring and control circuits  |                          | P       |
|            | d)Terminals supplied from the interior of the equipment and which are HAZARDOUS LIVE |                          | P       |
|            | e)Accessible functional earth terminals connected to accessible conductive parts     |                          | P       |
| 5.1.5.2    | Measuring circuit TERMINALS  |                          | P       |
| 5.1.6      | Switch and circuit-breakers  |                          | P       |
|            | The on-position or the off-position shall be clearly marked                          |                          | P       |
| 5.1.7      | Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION                    |                          | N       |
|            | Protected throughout (symbol 11)   |                          | N       |
|            | Only partially protected (symbol 11 not used)  |                          | N       |
| 5.1.8      | Field-wiring Terminal boxes  |                          | P       |
| 5.2        | Warning markings:  |                          | ---     |
|            | - visible when ready for NORMAL USE  |                          | P       |
|            | - if necessary marked with symbol 14   |                          | P       |
|            | - are near or on applicable parts  |                          | P       |
|            | - advise how to avoid contact with HAZARDOUS live parts                              |                          | P       |
|            | - TERMINAL voltage exceeding 1 kV (symbol 12)  |                          | N       |
|            | - easily touched high temperature parts (symbol 13)                                  |                          | N       |
| 5.3        | Durability of markings; the required markings remain clear and legible (NORMAL USE)  | Perfect                  | P       |



| EN 61010-1 |  |                                  |         |
|------------|--|----------------------------------|---------|
| Clause     | Requirement-Test   | Result-Remark                    | Verdict |
| 5.4        | Documentation  |                                  | ---     |
| 5.4.1      | General; equipment is accompanied by documentation which includes:   |                                  | P       |
|            | - technical specification  |                                  | P       |
|            | - instructions for use   |                                  | P       |
|            | - name and address of manufacturer or supplier   |                                  | P       |
|            | - the information supplied in 5.4.2 to 5.4.5   |                                  | P       |
|            | Definition of INSTALLATION CATEGORY  |                                  | P       |
|            | A clear explanation of warning symbols is in the documentation, or   |                                  | P       |
|            | ... information is durable and legibly marked on the equipment (see also NOTE on instructions for handling hazardous substances) |                                  | P       |
| 5.4.2      | Equipment RATINGS; documentation includes:   |                                  | ---     |
|            | - supply voltage or voltage range  |                                  | P       |
|            | - the frequency or frequency range   |                                  | P       |
|            | - the power or current RATING  |                                  | P       |
|            | - a description of all input and output connections  |                                  | N       |
|            | - the RATING of insulation of external circuits, when such circuits are nowhere ACCESSIBLE                                       | No external circuit              | N       |
|            | - statement of the range of environmental conditions   | Max. operating temperature: 40°C | P       |
| 5.4.3      | Equipment installation; documentation includes instruction for:<br>(Stated in instruction)                                       |                                  | ---     |
|            | - assembly, location and mounting  |                                  | P       |
|            | - protective earthing  |                                  | P       |
|            | - connections to the supply  |                                  | P       |
|            | - requirements   |                                  | P       |
|            | - special services   |                                  | N       |
|            | - maximal sound power level  |                                  | P       |
|            | - instructions about sound pressure  |                                  | P       |





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|------------|---|---------------|---------|
| Clause     | Requirement-Test  | Result-Remark | Verdict |
|            | Additional information for PERMANENTLY CONNECTED EQUIPMENT:<br>(Hand-held /Portable equipment ) |               | ---     |
|            | - supply wiring   |               | N       |
|            | - external switch or circuit-breaker and external overcurrent protection                        |               | N       |
|            | - recommendation on switch or circuit-breaker location  |               | N       |
| 5.4.4      | Equipment operation; instructions for use include:  |               | ----    |
|            | - identification of operating controls  |               | P       |
|            | - equipment positioning   |               | P       |
|            | - interconnection requirements  |               | P       |
|            | - specification of intermittent operation limits  |               | N       |
|            | - explanation of required symbols   |               | P       |
|            | - replacement of consumables  |               | N       |
|            | - cleaning and decontamination  |               | P       |
|            | - a statement against use in a manner not specified by the manufacturer                         |               | P       |
| 5.4.5      | Equipment maintenance; instructions include:  |               | ---     |
|            | - sufficient preventive maintenance and inspection information                                  |               | P       |
|            | - specific battery  |               | N       |
|            | - any manufacturer specified parts  |               | P       |
|            | - RATING and characteristics of fuses   |               | P       |

| 6     | PROTECTION AGAINST ELECTRIC SHOCK           |  | --- |
|-------|---|--|-----|
| 6.1.1 | Requirements                                |  | P   |
| 6.1.2 | Exceptions                                  |  | N   |
| 6.2   | Determination of ACCESSIBLE parts           |  | P   |
| 6.2.1 | Examination                                 |  | --- |
| 6.2.2 | Opening above parts that are hazardous live |  | N   |
| 6.2.3 | Opening for pre-set controls                |  | N   |



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|------------|--|---|---------|
| Clause     | Requirement-Test   | Result-Remark                           | Verdict |
| 6.3        | Permissible limits for ACCESSIBLE parts:   |   | ---     |
| 6.3.1      | - values in NORMAL CONDITION   | Live parts to enclosure current < 0.5mA | P       |
| 6.3.2      | - values in SINGLE FAULT CONDITION   | Live parts to enclosure current < 3.5mA | P       |
| 6.4        | Protection in NORMAL CONDITION (see 6.8 and 8.1)   | Base insulation (comply with Annex D)   | P       |
| 6.5        | Protection in SINGLE FAULT CONDITION; additional protection is provided as specified in 6.5.1 to 6.5.4, or                 |   | P       |
|            | ... by automatic disconnection of the supply   |   | N       |
| 6.5.1      | Protective earthing; ACCESSIBLE conductive parts are bonded to the PROTECTIVE CONDUCTOR TERMINAL, or                       |   | P       |
|            | ... are separated from parts which are HAZARDOUS LIVE (for indirect bonding of measurement and test equipment see 6.5.1.4) |   | N       |
| 6.5.1.1    | PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both                          |   | N       |
| 6.5.1.2    | Protective conductor terminal  |   | P       |
| 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)   |   | N       |
| 6.5.3      | A PROTECTIVE IMPEDANCE is one or more of the following:  |   | ---     |
|            | - an appropriate HIGH INTEGRITY single component (see 14.6)  |   | N       |
|            | - a combination of components  |   | N       |
|            | - a combination of BASIC INSULATION and a current or voltage limiting device   |   | N       |
|            | Components, wires and connections are RATED as required  |   | N       |



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|------------|--|------------------------|---------|
| Clause     | Requirement-Test   | Result-Remark          | Verdict |
| 6.5.4      | Automatic disconnection of the supply  |                        | ---     |
|            | -supplied with the equipment   |                        | N       |
|            | - rated to disconnect the load   |                        | N       |
|            | - rated for the maximum rated load   |                        | N       |
| 6.6        | Connections to external circuits   |                        | ---     |
| 6.6.1      | Connections to external circuits shall not   |                        | ---     |
|            | - cause Accessible parts of the external circuits to become hazardous live in normal condition |                        | N       |
|            | - Nor cause accessible parts of the equipments to become hazardous live in normal condition    |                        | N       |
| 6.6.2      | TERMINALS for external circuits  |                        | N       |
|            | TERMINALS which receive a charge from an internal capacitor; measured voltage (V); charge ...  |                        | N       |
| 6.6.3      | Circuits with TERMINALS which are HAZARDOUS LIVE   |                        | ---     |
|            | No mains circuits are connected to ACCESSIBLE conductive parts                                 |                        | N       |
|            | For other HAZARDOUS LIVE circuits with one TERMINAL contact at earth potential                 |                        | N       |
|            | Circuits designed to be operated with one ACCESSIBLE TERMINAL contact floating                 |                        | N       |
| 6.6.4      | Accessible terminals for stranded conductors   |                        | N       |
| 6.7        | CLEARANCES and CREEPAGE DISTANCES  | (See attached table 6) | ---     |
| 6.7.1      | General requirements   |                        | P       |
| 6.7.1.1    | Clearances   |                        | P       |
| 6.7.1.2    | Creepage distance  |                        | P       |
| 6.7.2      | Main circuits  | (see appended table 6) | P       |
| 6.7.3      | Circuits other than mains circuits   |                        | ---     |
| 6.7.3.2    | Clearance values where table 5 does not apply and for circuits in measurement                  |                        | N       |
| 6.7.3.3    | Creepage distance values   |                        | N       |
| 6.7.4      | Measuring circuits   |                        | P       |



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|------------|--|---------------|---------|
| Clause     | Requirement-Test   | Result-Remark | Verdict |
| 6.7.4.1    | Clearance values   |               | P       |
| 6.7.4.2    | Creepage distance values   |               | P       |
| 6.8        | Procedure for dielectric strength tests  |               | ---     |
| 6.8.1      | Reference test earth   |               | N       |
| 6.8.2      | Humidity preconditioning   | 40°C, 96%RH   | P       |
| 6.8.3      | Conduct of tests   |               | P       |
| 6.8.4      | Voltage tests  |               | P       |
| 6.8.4.1    | Altitude correction of test voltages for checking clearances in homogeneous construction   |               | P       |
| 6.9        | Constructional requirements for protection against electric shock  |               | ---     |
| 6.9.1      | General;   |               | ---     |
|            | - security of wiring connections   |               | P       |
|            | - screws securing removable covers   |               | P       |
|            | - accidental loosening   |               | P       |
| 6.9.2      | ENCLOSURES of equipment with DOUBLE INSULATION or REINFORCED INSULATION  |               | ---     |
|            | ENCLOSURE surrounds all metal parts  |               | N       |
| 6.9.3      | Over-range indication  |               | ---     |
| 6.9.3 a)   | Analogue meters with stops at the exact ends of the range  |               | N       |
| 6.9.3 b)   | Digital meters which show a low value when the true value is above the maximum   |               | N       |
| 6.9.3 c)   | Chart recorders which print a trace at the edge of the chart   |               | N       |
| 6.10       | Connection to mains supply source and connections between parts of equipment   |               | ---     |
| 6.10.1     | Mains supply cords   |               | N       |
| 6.10.1 a)  | This cords shall be rated for the max current and meet the requirement IEC60 227 or IEC 60245 or certified or approved by a recognized testing authority |               | N       |



| EN 61010-1 |  |                   |         |
|------------|--|-------------------|---------|
| Clause     | Requirement-Test   | Result-Remark     | Verdict |
| 6.10.1.b)  | If a cord is likely to contact hot external parts ,it shall be made of suitably heat-resistant material  |                   | N       |
| 6.10.1.c)  | Required temperature RATING  |                   | N       |
| 6.10.1.d)  | Green/yellow covered conductors are used only for connection to PROTECTIVE CONDUCTOR TERMINALS   |                   | N       |
| 6.10.2     | Fitting of non-detachable mains supply cords   |                   | ---     |
|            | The cord enters the equipment:   |                   | ---     |
|            | - inlet or bushing with a smoothly rounded opening   |                   | N       |
|            | - insulated cord guard with specified projection 5 D   |                   | N       |
|            | cord anchorage:  |                   | ---     |
|            | - the cord shall not be clamped  |                   | N       |
|            | - knots in the cord are not be used  |                   | N       |
|            | - cannot push the cord into the equipment to an extent which could cause a hazard  |                   | N       |
|            | - failure of the cord insulation in a cord anchorage which has metal parts shall not cause accessible conductive parts to become hazardous live          |                   | N       |
|            | -Generally compression bushing shall not be used as a cord anchorage   |                   | N       |
|            | -the cord anchorage shall be designed so that cord replacement does not causes a hazard and it shall be clear how the relief from strain is provided     |                   | N       |
| 6.10.3     | Plugs and connectors   |                   | ---     |
| 6.10.3 a)  | Plugs, connectors and appliance couplers, comply with the relevant specifications  |                   | N       |
| 6.10.3 b)  | mains type plugs and sockets are not used incorrectly  |                   | N       |
| 6.10.3 c)  | Plug pins of cord-connected equipment receive a charge from an internal capacitor; the pins shall be hazardous live 5s after disconnection of the supply | No such equipment | N       |
| 6.10.3 d)  | Equipment with accessory mains socket-outlets:   |                   | ---     |
|            | - if outlets can accepts a standard mains plug there is a marking according to 5.1.3 e)  |                   | N       |



| EN 61010-1  |   |   |         |
|-------------|---|---|---------|
| Clause      | Requirement-Test  | Result-Remark                                 | Verdict |
|             | - if the outlets with a PROTECTIVE EARTH TERMINAL the input mains supply shall include one                                      |   | N       |
| 6.11        | Disconnection from supply source  |   | ----    |
| 6.11.1      | Equipment shall be provided with a means for disconnecting it from each operating energy supply sources                         |   | P       |
| 6.11.1.1a)  | Intended for supply only from a low energy source such as a small battery   |   | N       |
| 6.11.1.1 b) | Intended only for connection to an impedance protected supply   |   | N       |
| 6.11.1.1 c) | Which constitutes an impedance protected load   |   | N       |
| 6.11.2      | Requirements according to type of equipment   |   | ---     |
| 6.11.2.1    | Permanently connected equipment and multi-phase equipment   |   | N       |
|             | Permanently connected equipment and multi-phase equipment shall employ a switch or circuit-break as the means for disconnection |   | N       |
|             | If a switch is not part of the equipment ,following shall be specified:   |   | ----    |
| 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       |
| 6.11.2.3    | Hazards arising from function   |   | N       |
| 6.11.3      | Disconnecting devices   |   | P       |
| 6.11.3.1    | Switches and circuit-breakers   |   | P       |
| 6.11.3.2    | Appliance couplers and plugs  |   | N       |
| <b>7</b>    | <b>PROTECTION AGAINST MECHANICAL HAZARDS</b>  |   | ----    |
| 7.1         | Operation shall not lead to a mechanical hazard in normal condition or single fault condition                                   | Operation can not lead to a mechanical hazard | P       |



| EN 61010-1 |   |                          |         |
|------------|---|--------------------------|---------|
| Clause     | Requirement-Test  | Result-Remark            | Verdict |
| 7.2        | Moving parts not able to crush, etc. (see also 6.12.32.3)   |                          | P       |
| 7.3        | Stability   | Secured before operation | ---     |
|            | - tilted in each direction to an angle of 10° from its normal position  |                          | N       |
|            | -force test applied in all directions except upward   |                          | N       |
|            | -force test applied to downwards  |                          | N       |
| 7.4        | Provisions for lifting and carrying.  |                          | ---     |
|            | Handles or grips withstand 4 times the weight of the equipment  |                          | N       |
|            | Equipment 18 kg has means for lifting or carrying,  |                          | N       |
| 7.5        | Wall mounting   |                          | ---     |
|            | Mounting bracket withstand a force of four times the weight of the equipment  |                          | N       |
|            | No damage to the bracket or the mounting surface after the test   |                          | N       |
| 7.6        | Expelled parts  |                          | ---     |
|            | Equipment contains or limits the energy of parts which could cause a hazard if expelled in the event of a fault   | No such parts            | N       |
| 8          | <b>MECHANICAL RESISTANCE TO SHOCK AND IMPACT</b>  |                          | ---     |
|            | Equipment shall not cause a hazard when subjected to shock and impact likely to occur in normal use.  |                          | ---     |
| 8.1        | Enclosure rigidity test   |                          | P       |
| 8.1.1      | Static test   |                          | ---     |
|            | The equipment is held firmly against a rigid support and subjected to a force of 30N applied by the hemispherical end of a hard rod of 12 mm diameter         |                          | P       |
| 8.1.2      | Dynamic test  |                          | ---     |
|            | Bases, covers, etc., intended to be removed and replaced by the operator have their fixing screws tightened using a torque likely to be applied in normal use |                          | P       |



| EN 61010-1 |  |                 |            |
|------------|--|-----------------|------------|
| Clause     | Requirement-Test   | Result-Remark   | Verdict    |
| 8.2        | Drop test  | < 20Kg, 100mm   | P          |
| <b>9</b>   | <b>PROTECTION AGAINST THE SPREAD OF FIRE</b>   |                 | <b>---</b> |
|            | There shall be no spread of fire outside the equipment in normal use or in single fault condition ,  |                 | P          |
| 9.1        | Eliminating or reducing the sources of ignition within the equipment   |                 | ---        |
| 9.1a)      | The voltage ,current, power is limited as specified in 9.3 or Insulation between parts at different potentials did not cause ignition                                  |                 | P          |
| 9.1b)      | Ignition hazard related to flammable liquids is reduced to a tolerance level as specified in 9.4   |                 | P          |
| 9.1c)      | In circuits designed to produce heat, no ignition occurs when tested in any single fault condition which could cause ignition  |                 | P          |
| 9.2        | Containment of fire within the equipment, should it occur  |                 | ---        |
|            | The risk of the spread of fire outside the equipment is considered to be reduced to a tolerable level  |                 | P          |
| 9.2.1      | Constructional requirements  |                 | ---        |
| 9.2.1a)    | Insulated wire shall have a flammability classification FV-1 or better   |                 | P          |
| 9.2.1b)    | The enclosure shall meet the following requirement :   | Metal enclosure | ---        |
|            | -The bottom shall have no opening or, constructed with baffles or, be made of metal or, be a metal screen with a mesh  |                 | N          |
|            | -the sides shall have no openings within the area that is included within the inclined line C in figure 7  |                 | N          |
|            | -the enclosure ,and any baffle or flame barrier ,shall be made of metal of non-metallic materials having a flammability classification of FV-1 or better, of IEC 60707 |                 | N          |
|            | -the enclosure ,and any baffle or flame barrier ,shall have adequate rigidity  |                 | N          |
| 9.3        | Limited-energy circuit   |                 | ---        |
|            | Limits of maximum available current  |                 | P          |
| 9.4        | Requirements for equipment containing or using flammable liquids   |                 | P          |





| EN 61010-1 |   |                      |         |
|------------|---|----------------------|---------|
| Clause     | Requirement-Test  | Result-Remark        | Verdict |
| 9.5        | Overcurrent protection  |                      | ---     |
|            | Equipment intended to be energized from, or connected to, a mains supply shall be protected by fuses, circuit-breaker, thermal cut-outs, impedance limiting circuits or similar means | Fuses                | P       |
| 9.5.1      | PERMANENTLY CONNECTED EQUIPMENT   |                      | ---     |
|            | Overcurrent protection device fitted with the equipment, or specified in manufacturer's instructions  |                      | P       |
| 9.5.2      | Other equipment   |                      | N       |
| 10         | EQUIPMENT TEMPERATURE LIMITS AND RESISTANCE TO HEAT   |                      | ---     |
| 10.1       | Surface temperature limits for protection against burns, see table 15   | (see appended table) | P       |
| 10.2       | Temperatures of windings  | (see appended table) | N       |
| 10.3       | Other temperature measurements  | (see appended table) | P       |
| 10.4       | Conduct of temperature tests  |                      | P       |
| 10.4.1     | Temperature measurement of heating equipment  |                      | P       |
| 10.5       | Resistance to heat  |                      | P       |
| 10.5.1     | Integrity of CLEARANCES and CREEPAGE DISTANCES  |                      | P       |
| 10.5.2     | Resistance to heat of non-metallic ENCLOSURES   | Metallic ENCLOSURES  | N       |
| 10.5.3     | Resistance to heat of insulating material; supporting parts connected to:   |                      | ---     |
|            | - mains supply  | (see appended table) | N       |
|            | - supporting TERMINALS  |                      | N       |
| 11         | PROTECTION AGAINST HAZARDS FROM FLUIDS  |                      | ---     |
| 11.2       | Cleaning  |                      | P       |
| 11.3       | Spillage  |                      | P       |
| 11.4       | Overflow  |                      | P       |
| 11.5       | Battery electrolyte leakage presents no hazard  |                      | N       |
| 11.6       | Specially protected equipment; test to IEC 529  |                      | P       |



| EN 61010-1 |   |               |         |
|------------|---|---------------|---------|
| Clause     | Requirement-Test  | Result-Remark | Verdict |
| 11.7       | Fluid pressure and leakage  |               | ---     |
| 11.7.1     | Maximum pressure not exceeded   |               | P       |
| 11.7.2     | Leakage and rupture at high pressure  |               | P       |
|            | Test to IEC 335 (refrigeration only)  |               | N       |
| 11.7.3     | Leakage from low-pressure parts   |               | P       |
| 11.7.4     | Overpressure safety device:   |               | ---     |
|            | - no operation in NORMAL USE  |               | N       |
|            | - position  |               | N       |
|            | - access  |               | N       |
|            | - adjustment  |               | N       |
|            | - no discharge towards person   |               | N       |
|            | - no hazard from discharge  |               | N       |
|            | - discharge capacity  |               | N       |
|            | - no shut-off valve   |               | N       |
| 12         | <b>PROTECTION AGAINST RADIATION, INCLUDING LASER SOURCES, AND AGAINST SONIC AND ULTRASONIC PRESSURE</b> |               | ---     |
| 12.1       | Tests are carried out if the equipment is likely to cause ultraviolet ,ionizing, microwave etc. hazards |               | ---     |
| 12.2       | Equipment producing ionizing radiation  |               | N       |
| 12.2.1     | Ionizing radiation  |               | N       |
| 12.2.2     | Accelerated electrons   |               | N       |
| 12.3       | Ultra-violet radiation (under consideration)  |               | N       |
| 12.4       | Micro-wave radiation (under consideration)  |               | N       |
| 12.5       | Sonic and ultrasonic pressure   |               | ---     |
| 12.5.1     | Sound level   |               | N       |
| 12.5.2     | Ultrasonic pressure   |               | N       |
| 12.6       | Laser sources (IEC 825)   |               | N       |



| EN 61010-1 |   |                           |         |
|------------|---|---------------------------|---------|
| Clause     | Requirement-Test  | Result-Remark             | Verdict |
| <b>13</b>  | <b>PROTECTION AGAINST LIBERATED GASES, EXPLOSION AND IMPLOSION</b>  |                           | ---     |
| 13.1       | Poisonous and injurious gases   |                           | P       |
| 13.2       | Explosion and implosion   |                           | P       |
| 13.2.1     | Components liable to explode have pressure release devices, or  |                           | N       |
|            | ... the apparatus incorporates OPERATOR protection (see also 7.5)   |                           | N       |
| 13.2.2     | Batteries and battery charging  |                           | N       |
|            | Explosion/fire hazard   |                           | N       |
|            | Protection is incorporated in the equipment, or   |                           | N       |
|            | ... instructions specify the batteries to be used   |                           | N       |
|            | Warning marking or symbol 14  |                           | N       |
|            | Battery compartment design  |                           | N       |
| 13.2.3     | Implosion of cathode ray tubes  | No such tubes             | N       |
| 13.2.4     | Equipment RATED for high pressure   |                           | N       |
| <b>14</b>  | <b>COMPONENTS</b>   |                           | ---     |
| 14.1       | Safety components comply with applicable safety requirements in relevant IEC standards  | (see appended table 14.1) | P       |
| 14.2       | Motors  |                           | ---     |
| 14.2.1     | Motor temperatures  |                           | P       |
| 14.2.2     | Series excitation motors  |                           | N       |
| 14.3       | Overtemperature protection devices; devices operating in a SINGLE FAULT CONDITION:<br>(no overtemperature protection devices) |                           | ---     |
|            | - be constructed so that reliable function is ensured   |                           | N       |
|            | - be rated to interrupt the maximum voltage and current of the circuit in which they are employed                             |                           | N       |
|            | - not operate in normal use   |                           | N       |
| 14.4       | Fuse holders  |                           | P       |
| 14.5       | Mains voltage selecting devices   | No such devices           | N       |



| EN 61010-1 |   |                             |         |
|------------|---|-----------------------------|---------|
| Clause     | Requirement-Test  | Result-Remark               | Verdict |
| 14.6       | HIGH INTEGRITY components   | No such components          | N       |
|            | In single fault condition ,if a short circuit or an open circuit of a component could cause a hazard ,high-integrity components shall be used | No such hazard generated    | N       |
| 14.7       | Mains transformers tested outside equipment   |                             | ---     |
|            | Short-circuit tests;  |                             | P       |
|            | Overload test;  |                             | P       |
| 14.8       | Printed circuit boards  |                             | P       |
| 14.9       | Circuit or component used as transient overvoltage limiting devices   | No such type equipment used | N       |
| 15         | <b>PROTECTION BY INTERLOCKS</b><br><i>(No interlocks)</i>   |                             | ---     |
| 15.1       | General; interlocks are designed to remove a hazard before OPERATOR exposed   |                             | N       |
| 15.2       | Prevention of reactivation  |                             | N       |
| 15.3       | Reliability   |                             | N       |
| 16         | <b>TESTS AND MEASUREMENT EQUIPMENT</b>  |                             | ---     |
| 16.1       | Current measuring circuits  |                             | N       |
| 16.2       | Multifunction meters and similar equipment  |                             | N       |

**Appendix****Tables of Testing Data**

| 4.4   |               | TABLE: fault condition tests         |                  |           |          |           |  | P |
|---|---------------|--------------------------------------|------------------|-----------|----------|-----------|--|---|
|   |               | ambient temperature (°C) .....       |                  |           |          |           | --   | — |
|   |               | model/type of power supply .....     |                  |           |          |           | --   | — |
|   |               | rated markings of power supply ..... |                  |           |          |           | See making plate for details                         | — |
| No.   | component No. | fault                                | test voltage (V) | test time | fuse No. | power (w) | result   |   |
| 1   | Transformer   | s-c                                  | 230              | 10 mins   | --       | --        | Max. temperature: 137°C, limits: 175°C. No hazardous |   |
| Remark:   |               |                                      |                  |           |          |           |  |   |
| after each fault condition, a electric strength test is followed, the unit not breakdown. |               |                                      |                  |           |          |           |  |   |
| s-c: short circuit;   |               |                                      |                  |           |          |           |  |   |

| 5.1.3  | TABLE: mains supply |       |       | N                |
|--|---------------------|-------|-------|------------------|
| Test No.   | U (V)               | P (W) | I (A) | condition/status |
| --   | --                  | --    | --    | ---              |
| Remark: <i>the measured value not exceed the marked value by more than 10%</i> |                     |       |       |                  |

| 5.3  |                  | TABLE: durability of markings |                           |  | P |
|--|------------------|-------------------------------|---------------------------|--|---|
| Location                                     | Checked by       | Time                          | Result                    |  |   |
| All markings in accordance with 5.1.2 to 5.2 | Water            | 15s                           | Remain clear and legible. |  |   |
| All markings in accordance with 5.1.2 to 5.2 | Petroleum spirit | 15s                           | Remain clear and legible. |  |   |

| 6   |  | TABLE: protection against electric shock |              |                  |         |                   | P        |
|---|--|--|--------------|------------------|---------|-------------------|----------|
| clearance cl and creepage distance dcr at/of: |  | Up (V)                                   | U r.m.s. (V) | required cl (mm) | cl (mm) | required dcr (mm) | dcr (mm) |
| Pri. winding to Sec. winding of transformer   |  | 246                                      | 241          | 3                | > 3     | 3                 | > 3      |

| 6.8.2           |  | TABLE: humidity test |                   |          |                         | P |
|-----------------|--|----------------------|-------------------|----------|-------------------------|---|
| Test condition: |  | Temperature          | Relative Humidity | Duration | Become hazards (Yes/No) |   |



| EN 61010-1   |                  |       |               |         |
|--|------------------|-------|---------------|---------|
| Clause   | Requirement-Test |       | Result-Remark | Verdict |
|  | 40°C             | 95%RH | 48 hours      | No      |
| Remark: After humidity test, electric strength test specified in clause 5.2.2 Should be applied. |                  |       |               |         |

|                               |  |  |                    |                    |
|-------------------------------|--|--|--------------------|--------------------|
| 6.8.4                         | TABLE: electric strength tests and impulse tests |  |                    | P                  |
| test voltage applied between: |  |  | test voltage (Vac) | Breakdown (Yes/No) |
| Live parts and Enclosure      |  |  | 1500               | No                 |
| Remark:                       |  |  |                    |                    |

|            |                                     |       |                                 |   |
|------------|-------------------------------------|-------|---------------------------------|---|
| 6.10       | TABLE: physical test on power cords |       |                                 | N |
| Pull force | Duration                            | Times | Displaced ( $\leq 2\text{mm}$ ) |   |
|            |                                     |       |                                 |   |

|   |                    |                           |   |
|---|--------------------|---------------------------|---|
| 8.1.1   | TABLE: static test |                           | P |
| Test part   | Pull force(N)      | Result                    |   |
| Enclosure   | 30                 | No distortion, No hazards |   |
| Bottom  | 30                 | No distortion, No hazards |   |
| Remark: <i>The equipment is disconnected from the supply source before the test is performed.</i> |                    |                           |   |

|           |                     |            |  |   |
|-----------|---------------------|------------|--|---|
| 8.1.2     | TABLE: impact test  |            |  | P |
| Test part | Method              | Result     |  |   |
| Enclosure | 0.5J striking force | No hazards |  |   |

|           |                  |            |  |   |
|-----------|------------------|------------|--|---|
| 8.2       | TABLE: drop test |            |  | P |
| Test part | Method           | Result     |  |   |
| equipment | Height: 100 cm   | No hazards |  |   |

|    |                                   |        |  |   |
|----|-----------------------------------|--------|--|---|
| 10 | TABLE: temperature tests          |        |  | P |
|    | Frequency (Hz) .....              | 60Hz   |  |   |
|    | Duration (h, min) .....           | 3h     |  |   |
|    | Voltage (V) .....                 | 240Vac |  |   |
|    | Ambient temperature Ta (°C) ..... | 40     |  |   |



| EN 61010-1         |   |                                   |                                      |               |              |
|--------------------|---|-----------------------------------|--------------------------------------|---------------|--------------|
| Clause             | Requirement-Test  |                                   |                                      | Result-Remark | Verdict      |
|                    | Measurements: 1 - part; 2 - measured temperature Tm (°C); 3 - corrected maximum temperature Tm + 40 - Ta (°C); 4 - maximum allowed temperature (°C); 5 - result; 6 - comments |                                   |                                      |               |              |
| 1 - part;          | 2 - measured temperature Tm (°C)  | 3 - corrected maximum temperature | 4 - maximum allowed temperature (°C) | 5 - result;   | 6 - comments |
| Enclosure, outside | 40  | 55.8                              | 70                                   | P             | ---          |
| PCB                | 40  | 72.3                              | 130                                  | P             | ---          |
| Internal wire      | 40  | 74.5                              | 105                                  | P             | ---          |
| Pri. winding       | 40  | 81.7                              | 110                                  | P             | ---          |
| Sec. winding       | 40  | 80.6                              | 110                                  | P             |              |

| 10.5.2           | TABLE: stress relief test |   | N |
|------------------|---------------------------|---|---|
| Temperature (°C) | Duration                  | Result                                      |   |
|                  |                           | No dangerous moving parts become accessible |   |

| 10.5.3    | TABLE: ball pressure test of thermoplastics |        | P                        |
|-----------|---|--------|--------------------------|
|           | required impression diameter (mm) .....     | ≤ 2 mm | ----                     |
| part      | test temperature (°C)                       |        | impression diameter (mm) |
| Bobbin    | 125   |        | 0.83                     |
| AC Insert | 125   |        | 0.81                     |

| 11 | TABLE: protection against hazards from fluids  |   |   |   |   |   |   | N |
|----|--|---|---|---|---|---|---|---|
|    | Measurements: 1 - location; 2 - cleaning; 3 - spillage; 4 - overflow; 5 - equipment plus liquid; 6 - working voltage (V); 7 - test voltage (V); 8 - result; 9 - comments |   |   |   |   |   |   |   |
| 1  | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|    |  |   |   |   |   |   |   |   |

| 11.7.2 | TABLE: leakage and rupture at high pressure   |  | N |
|--------|---|--|---|
|        | Measurements: 1 - part; 2 - maximum permissible working pressure (Pa); 3 - factor; 4 - test pressure (Pa); 5 - leakage test; 6 - burst test; 7 - comments |  |   |



| EN 61010-1 |                  |   |   |               |   |         |
|------------|------------------|---|---|---------------|---|---------|
| Clause     | Requirement-Test |   |   | Result-Remark |   | Verdict |
| 1          | 2                | 3 | 4 | 5             | 6 | 7       |
|            |                  |   |   |               |   |         |
|            |                  |   |   |               |   |         |

|        |  |   |   |   |  |   |
|--------|--|---|---|---|--|---|
| 11.7.3 | TABLE: leakage from low-pressure parts                                   |   |   |   |  | N |
|        | Measurements: 1 - part; 2 - test pressure (Pa); 3 - result; 4 - comments |   |   |   |  |   |
|        | 1  | 2 | 3 | 4 |  |   |
|        |  |   |   |   |  |   |
|        |  |   |   |   |  |   |

|        |   |   |   |   |  |   |
|--------|---|---|---|---|--|---|
| 12.2.1 | TABLE: ionizing radiation   |   |   |   |  | N |
|        | Measurements: 1 - location; 2 - radiation ( Sv/h); 3 - result; 4 - comments |   |   |   |  |   |
|        | 1   | 2 | 3 | 4 |  |   |
|        |   |   |   |   |  |   |
|        |   |   |   |   |  |   |

|        |   |   |   |   |  |   |
|--------|---|---|---|---|--|---|
| 12.5.2 | TABLE: ultrasonic pressure measurements                                     |   |   |   |  | N |
|        | Measurements: 1 - location; 2 - value (dB); 3 - frequency (kHz); 4 - result |   |   |   |  |   |
|        | 1   | 2 | 3 | 4 |  |   |
|        |   |   |   |   |  |   |
|        |   |   |   |   |  |   |

|                 |                         |            |                |          |                       |   |
|-----------------|-------------------------|------------|----------------|----------|-----------------------|---|
| 14.1            | TABLE: components       |            |                |          |                       | N |
| object/part No. | manufac-turer/trademark | type/model | technical data | standard | mark(s) of conformity |   |
|                 |                         |            |                |          |                       |   |





| 16.1 | TABLE: current measuring circuits (current changing switches)                                      |   |   | N |
|------|--|---|---|---|
|      | Measurements: 1 - type/model; 2 - maximum RATED current of switch (A); 3 - result;<br>4 - comments |   |   |   |
|      | 1  | 2 | 3 | 4 |
|      |  |   |   |   |

## ANNE I:

### Photo-documentation



