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

Report Number. .....:	SHES240300412201
Date of issue .....:	2024-04-11
Total number of pages.....:	95
Name of Testing Laboratory preparing the Report.....:	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Applicant's name .....:	Acrel Co., Ltd.
Address .....:	No.253, Yulv Road, Jiading, Shanghai, China
Test specification:	
Standard.....:	IEC 61010-1:2010, IEC 61010-1:2010/AMD1:2016
Test procedure .....:	SGS-CSTC
Non-standard test method .....:	N/A
TRF template used.....:	IECEE OD-2020-F1:2020, Ed.1.3
Test Report Form No. .....:	IEC61010_1 C
Test Report Form(s) Originator ....:	VDE Prüf- und Zertifizierungsinstitut GmbH
Master TRF.....:	2021-04-12

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Test item description..... :	Single phase Energy Meter
Trade Mark..... :	Acrel
Manufacturer ..... :	Acrel Co., Ltd.
Model/Type reference..... :	ADL200N-CT
Ratings..... :	230VAC,50/60Hz,0.1-10(100)mA,2W CT Transformation ratio:80A/26.6mA or 120A/40mA or 200A/66.6mA or 300A/100mA

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**Testing Laboratory:**	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.	
Testing location/ address ..... :		588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.	
Tested by (name, function, signature)..... :		Michelle Jiang	Michelle Jiang
Approved by (name, function, signature) .. :		Linda Nie	Linda Nie
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

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List of Attachments (including a total number of pages in each attachment)		
Document No.	Documents included / attached to this report (description)	Page No.
Attachment 1	Photo documents	7
Attachment 2	European group differences and national differences	1
Attachment 3	Test report IEC 61010-2-030	29

Documents referenced by this report (available on request):		
Document Name or No.	Documents description	Page No.
N/A		

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Summary of testing:

The sample(s) tested complies with the requirements of IEC 61010-1:2010, AMD1:2016.

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

The sample(s) was tested with this equipment for 70°C maximum ambient temperature. After the test, the equipment complied with the requirements of this standard.

K-type thermocouple used for temperature measurement.

Clause	Comment
All tests	N/A

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Test Report History:
This report may consist of more than one report and is only valid with additional or previous issued reports:

Report Ref. No.	Item
N/A	

Tests performed (name of test and test clause):

Clause 4.4.1 Fault tests
Clause 5.1.3 Main supply
Clause 5.3 Durability of markings
Clause 6.2 Determination of accessible parts
Clause 6.3 Limit values for accessible
Clause 6.4 Primary means of protection
Clause 6.7 Insulation requirements
Clause 6.8 Procedure for dielectric strength tests
Clause 7.2 Sharp edges
Clause 8.2 Enclosure rigidity tests
Clause 9.3 Containment of the fire within the equipment, should it occur
Clause 10 Equipment temperature limits and resistance to heat
Clause 14 Components and subassemblies
Clause Annex K Insulation requirements not covered by 6.7

Testing location:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.

Summary of compliance with National Differences (List of countries addressed):

EU Group Differences (EN 61010-1:2010/A1:2019)

☒ **The product fulfils the requirements of** ___ EN 61010-1:2010/A1:2019_____

Statement concerning the uncertainty of the measurement systems used for the tests
(may be required by the product standard or client)

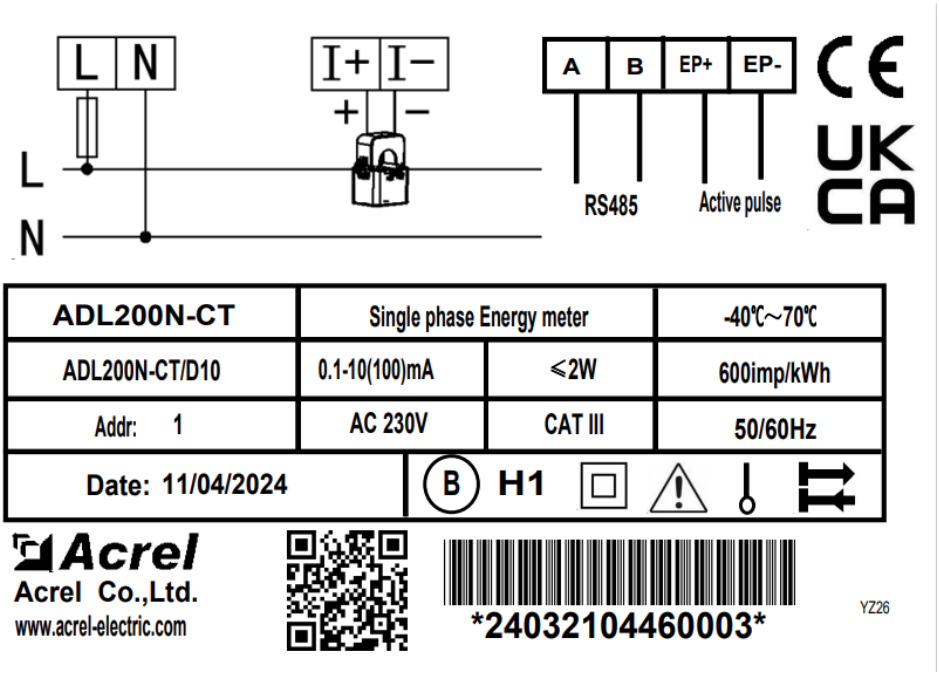
☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**
Procedure number, issue date and title:

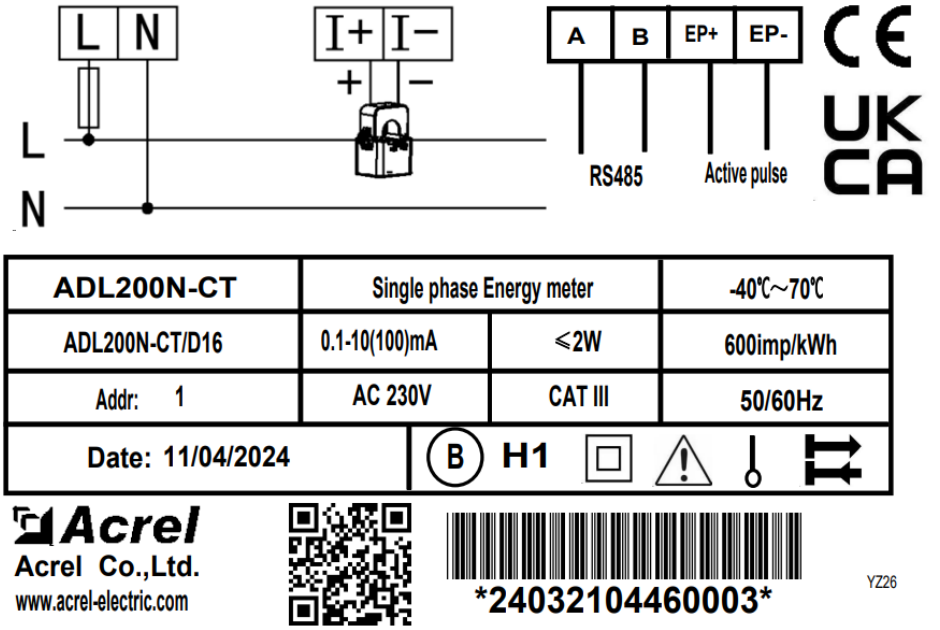
Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☐ **Statement not required by the standard used for type testing**
(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

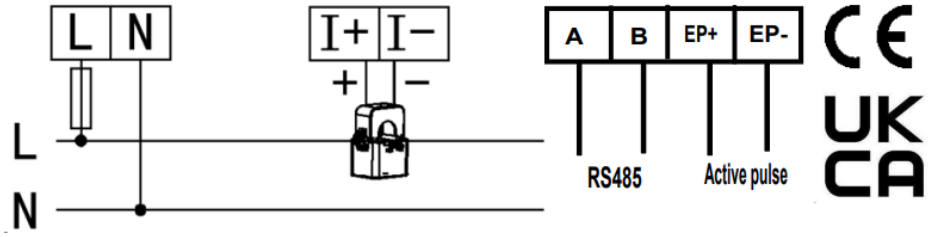
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Copy of marking plate:





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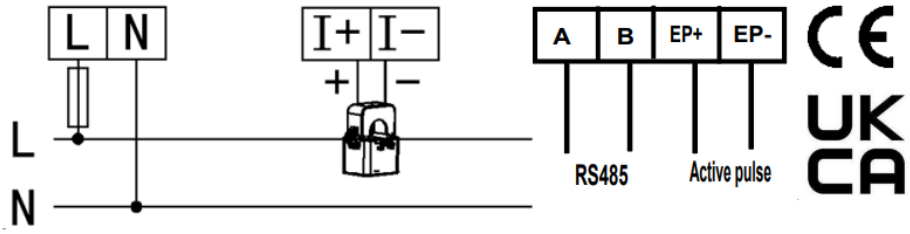


ADL200N-CT	Single phase Energy meter		-40℃~70℃
ADL200N-CT/D24	0.1-10(100)mA	⩽2W	600imp/kWh
Addr: 1	AC 230V	CAT III	50/60Hz
Date: 11/04/2024	B H1		

Acrel
Acrel Co.,Ltd.
www.acrel-electric.com

24032104460003

YZ26



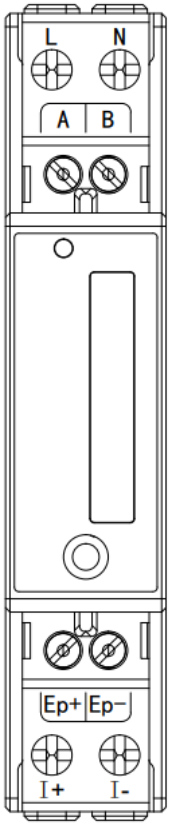
ADL200N-CT	Single phase Energy meter		-40℃~70℃
ADL200N-CT/D36	0.1-10(100)mA	⩽2W	600imp/kWh
Addr: 1	AC 230V	CAT III	50/60Hz
Date: 11/04/2024	B H1		

Acrel
Acrel Co.,Ltd.
www.acrel-electric.com

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Test item particulars:

Type of item	Measurement
Description of equipment function	Power monitoring
Connection to MAINS supply	Permanent
Overvoltage category	III
POLLUTION DEGREE	2
Means of protection	Class II
Environmental conditions	Extended (Specify): -40 ~ 70°C Humidity:95%(No condensation)
For use in wet locations	No
Equipment mobility	Fixed
Operating conditions	Continuous
Overall size of equipment (W x D x H)	18x90x65mm
Mass of equipment (kg)	0.082Kg
Marked degree of protection to IEC 60529	IP20

Possible test case verdicts:

- Test case does not apply to the test object	N/A (Not Applicable)
- Test object does meet the requirement	P (Pass)
- Test object does not meet the requirement	F (Fail)

Testing:

Date of receipt of test item	Mar. 04th, 2024
Date (s) of performance of tests	Mar. 15th, 2024 to Apr. 10th, 2024

General remarks:

The test results presented in this report relate only to the object tested.
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"(see ENCLOSURE #)" refers to additional information appended to the report.
"(see Form A.xx)" refers to a Table appended to the report.
Bottom lines for measurement Tables Forms A.xx are optional if used as record.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Manufacturer's Declaration :

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The application for obtaining a Test Certificate includes more than one factory location and a declaration from the manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the general product information section.	
Name and address of factory (ies) ..... :	Acrel Co., Ltd. No.253, Yulv Road, Jiading, Shanghai, China

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General product information and other remarks:
Description of unit:

ADL200N-CT single phase energy meter is an intelligent instrument mainly designed for new energy power generation systems. The product has the features of sampling, metering and monitoring power parameters, communicating with an inverter or an energy management system (EMS), realizing the functions of preventing reverse flow, regulating power generation, charging and discharging batteries according to real-time power and accumulated electric energy, and realizing bidirectional metering and household distributed photovoltaic energy management.

Max operating altitude: 2000m

Operating temperature: -40-70°C

Relative Humidity 95%RH, not condensation

Description of model differences:

The current transformer models in the following table are consistent except for different output ratios.

Specifications	Current transformer parameters	Number of transformers
ADL200N-CT/D10	80A/26.6mA	1
ADL200N-CT/D16	120A/40mA	1
ADL200N-CT/D24	200A/66.6mA	1
ADL200N-CT/D36	300A/100mA	1

Description of special features:
N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
4	**TESTS**		P
4.4	Testing in SINGLE FAULT CONDITIONS		P
4.4.1	Fault tests	(see Form A.1)	P
4.4.2	Application of SINGLE FAULT CONDITIONS		P
4.4.2.1	SINGLE FAULT CONDITIONS not covered by 4.4.2.2 to 4.4.2.14	(see Form A.1)	P
4.4.2.2	PROTECTIVE IMPEDANCE	No such parts	N/A
4.4.2.3	PROTECTIVE CONDUCTOR	No such conductor	N/A
4.4.2.4	Equipment or parts for short-term or intermittent operation	No such parts	N/A
4.4.2.5	Motors	No motors	—
	– stopped while fully energized		N/A
	– prevented from starting		N/A
	– one phase interrupted (multi-phase)		N/A
4.4.2.6	Capacitors	No such capacitors	N/A
4.4.2.7	MAINS transformers		P
4.4.2.7.2	Short circuit	(see Form A.39)	P
4.4.2.7.3	Overload	(see Forms A.26B and A.40)	P
4.4.2.8	Outputs		P
4.4.2.9	Equipment for more than one supply		N/A
4.4.2.10	Cooling	No such cooling	—
	– air holes closed		N/A
	– fans stopped		N/A
	– coolant stopped		N/A
	– loss of cooling liquid		N/A
4.4.2.11	Heating devices	No such devices	—
	– timer overridden		N/A
	– temperature controller overridden		N/A
4.4.2.12	Insulation between circuits and parts	No such insulation	N/A
4.4.2.13	Interlocks	No such devices	N/A
4.4.2.14	Voltage selectors	No such devices	N/A
4.4.3	Duration of tests	(see Form A.1)	—
4.4.4	Conformity after application of fault conditions	(see Forms A.1, A.6 and A.18)	P
5	**MARKING AND DOCUMENTATION**		P
5.1	**Marking**		P
5.1.1	General		P
	Required equipment markings		—

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Clause	Requirement + Test	Result - Remark	Verdict
	– Visible from the exterior; or		P
	– Visible after removing cover or opening door		N/A
	– Visible after removal from a rack or panel		P
	Not put on parts which can be removed by an operator		P
	Letter symbols (IEC 60027) used		P
	Graphic symbols of Table 1 used		P
5.1.2	Identification		P
	Equipment is identified by:		—
	a) Manufacturer's or supplier's name or trademark	Manufacturer's trademark	P
	b) Model number, name or other means	Model number	P
	Manufacturing location identified	Only one manufacturing location	N/A
5.1.3	MAINS supply		P
	Equipment is marked as follows:		—
	a) Nature of supply:		—
	1) a.c. RATED MAINS frequency or range of frequencies ..... :	50/60Hz	—
	2) d.c. with symbol 1..... :	No DC	—
	b) RATED supply voltage(s) or range ..... :	230VAC	—
	c) Max. RATED power (W or VA) or input current ..... :	2W	—
	The marked value not less than 90 % of the maximum value	(see Form A.2)	P
	If more than one voltage range:		—
	Separate values marked; or		N/A
	Values differ by less than 20 %	(see Form A.2)	N/A
	d) OPERATOR-set for different RATED supply voltages:		—
	Indicates the equipment set voltage		N/A
	PORTABLE EQUIPMENT indication is visible from the exterior		N/A
	Changing the setting changes the indication		N/A
	e) Accessory MAINS socket-outlets accepting standard MAINS plugs are marked:		—
	With the voltage if it is different from the MAINS supply voltage.....:		—
	For use only with specific equipment		N/A
	If not marked for specific equipment it is marked with:		—
	The maximum RATED current or power; or		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Symbol 14 with full details in the documentation		N/A
5.1.4	Fuses		N/A
	OPERATOR replaceable fuse marking (see also 5.4.5).....:		—
5.1.5	TERMINALS, connections and operating devices		P
5.1.5.1	General		P
	Where necessary for safety, indication of purpose of TERMINALS, connectors, controls and indicators marked		P
	If insufficient space, symbol 14 used		N/A
	Push-buttons and actuators of emergency stop devices and indicators:		—
	– used only to indicate a warning of danger; or		N/A
	– the need for urgent action		N/A
	– coloured red		N/A
	– coded as specified in IEC 60073		N/A
	Supplementary means of coding provided, if meaning of colour relates (see IEC 60073):		—
	– to safety of persons; or		N/A
	– safety of the environment		N/A
5.1.5.2	TERMINALS		—
	MAINS supply TERMINAL identified		P
	Other TERMINAL marking:		—
	a) FUNCTIONAL EARTH TERMINALS marked with symbol 5		N/A
	b) PROTECTIVE CONDUCTOR TERMINALS:		—
	Symbol 6 is placed close to or on the TERMINAL; or		N/A
	Part of appliance inlet		N/A
	c) TERMINALS of circuits (symbol 7 used)		N/A
	d) HAZARDOUS LIVE TERMINALS supplied from the interior		N/A
	Standard MAINS socket outlet used; or		N/A
	RATINGS marked; or		N/A
	Symbol 14 used		N/A
5.1.6	Switches and circuit-breakers		N/A
	If disconnecting device, off position clearly marked		N/A
	If push-button used as power supply switch:		—
	– Symbol 9 and 15 used for on-position		N/A
	– Symbol 10 and 16 used for off-position		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	– Pair of symbols 9, 15 and 10, 16 close together		N/A
5.1.7	Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION		P
	Protected throughout (symbol 11 used)		P
	Only partially protected (symbol 11 not used)		N/A
5.1.8	Field-wiring TERMINAL boxes		N/A
	If TERMINAL or ENCLOSURE exceeds 60 °C:	(see Form A.26A)	—
	Cable temperature RATING marked ..... :		—
	Marking visible before and during connection or beside TERMINAL		N/A
5.2	**Warning markings**		P
	Visible when ready for NORMAL USE		P
	Are near or on applicable parts		P
	Symbols and text correct dimensions and colour:		—
	a) Symbols min 2,75 mm and text 1,5 mm high and contrasting in colour with background		N/A
	b) Symbols and text moulded, stamped or engraved in material min. 2,0 mm high and		N/A
	0,5 mm depth or raised if not contrasting in colour		N/A
	If necessary marked with symbol 14, or		N/A
	Additional symbols such as symbol 12, 13 or 17 used to indicate the nature of HAZARD		N/A
	Statement to place equipment in a safe state before access by using a tool to HAZARDOUS parts is permitted		P
5.3	**Durability of markings**		P
	The required markings remain clear and legible in NORMAL USE	(see Form A.3)	P
5.4	**Documentation**		P
5.4.1	General		P
	Equipment is accompanied by documentation for safety purposes for OPERATOR or RESPONSIBLE BODY		P
	Safety documentation for service personnel authorized by the manufacturer		P
	Documentation necessary for safe operation is provided in printed media or		P
	in electronic media if available at any time		P
	Documentation includes:		—
	a) Intended use		P
	b) Technical specification		P

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Clause	Requirement + Test	Result - Remark	Verdict
	c) Name and address of manufacturer or supplier		P
	d) Information specified in 5.4.2 to 5.4.6		P
	e) Information to mitigate residual RISK (see also subclause 17)		N/A
	f) Accessories for safe operation of the equipment specified		N/A
	g) Guidance provided to check correct function of the equipment, if incorrect reading may cause a HAZARD from harmful or corrosive substances of HAZARDOUS live parts		N/A
	h) Instructions for lifting and carrying		N/A
	Warning statements and a clear explanation of warning symbols:		—
	– provided in the documentation; or		N/A
	– information is marked on the equipment		N/A
5.4.2	Equipment RATINGS		P
	Documentation includes:		—
	a) Supply voltage or voltage range..... :	230VAC	—
	Frequency or frequency range ..... :	50/60Hz	—
	Power or current rating..... :	2W	—
	b) Description of all input and output connections in accordance to 6.6.1 a)		P
	c) RATING of insulation of external circuits in accordance to 6.6.1 b)		N/A
	d) Statement of the range of environmental conditions (refer to 1.4):		—
	1) indoor or outdoor use,	indoor	P
	2) altitude,	≤2000m	P
	3) temperature,	-40°C~70°C	P
	4) relative humidity,	≤95%(no condensation)	P
	5) MAINS supply voltage fluctuations,		N/A
	6) OVERVOLTAGE CATEGORY,	OVC III	P
	7) WET LOCATION, if applicable,		N/A
	8) POLLUTION DEGREE of the intended environment	2	P
	e) Degree of ingress protection (IEC 60529)	IP20	P
	f) If impact rating less than 5 J:		—
	IK code in accordance to IEC 62262 marked; or		N/A
	symbol 14 of Table 1 marked, with		N/A
	RATED energy level and test method stated		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.3	Equipment installation		P
	Documentation includes instructions for:		—
	a) Assembly, location and mounting requirements		P
	b) Instructions for protective earthing		N/A
	c) Connections to supply		P
	d) PERMANENTLY CONNECTED EQUIPMENT:		—
	1) Supply wiring requirements		P
	2) If external switch or circuit-breaker, requirements and location recommendation		P
	e) Ventilation requirements		N/A
	f) Safety characteristics for special external services (e. g. maximum and minimum temperature, pressure, flow of air, cooling liquid)		N/A
	g) Instructions relating to sound level		N/A
5.4.4	Equipment operation		P
	Instructions for use include:		—
	a) Identification and description of operating controls		P
	b) Positioning for disconnection	No such disconnection	N/A
	c) Instructions for interconnection to accessories or other equipment		P
	d) Specification of intermittent operation limits		N/A
	e) Explanation of symbols used		P
	f) Replacement of consumable materials	No consumable materials	N/A
	g) Cleaning and decontamination		N/A
	h) Listing of any poisonous or injurious gases and quantities		N/A
	i) RISK reduction procedures relating to flammable liquids (see 9.5 c)		N/A
	j) RISK reduction procedures relating burn from surfaces permitted to exceed limits of 10.1		N/A
	Additional precautions for IEC 60950 conforming equipment in regard to moistures and liquids		N/A
	A statement about protection impairment if used in a manner not specified by the manufacturer		N/A
5.4.5	Equipment maintenance and service		P
	Instructions for RESPONSIBLE BODY include:		—
	Instructions sufficient in detail permitting safe maintenance and inspection and continued safety:		—
	Instruction against the use of detachable MAINS supply cord with inadequate RATING		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Specific battery type of user replaceable batteries		N/A
	Any manufacturer specified parts		N/A
	RATING and characteristics of fuses		N/A
	Instructions include following subjects permitting safe servicing and continued safety:	Return to factory for maintenance	—
	a) Product specific RISKS may affect service personnel		N/A
	b) Protective measures for these RISKS		N/A
	c) Verification of the safe state after repair		N/A
5.4.6	Integration into systems or effects resulting from special conditions		N/A
	Aspects described in documentation		N/A
6	**PROTECTION AGAINST ELECTRIC SHOCK**		P
6.1	**General**	(see Forms A.14 and A.15)	P
6.1.1	Requirements		P
	Protection against electric shock maintained in NORMAL CONDITION and SINGLE FAULT CONDITION		P
	ACCESSIBLE parts not HAZARDOUS LIVE		P
	Voltage, current, charge or energy below the limits in NORMAL CONDITION and in SINGLE FAULT CONDITION between:		—
	ACCESSIBLE parts and earth		P
	two ACCESSIBLE parts on same piece of the equipment within a distance of 1,8 m		N/A
	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/A
	Following HAZARDOUS LIVE parts may be ACCESSIBLE to an OPERATOR:		—
	a) parts of lamps and lamp sockets after lamp removal		N/A
	b) parts to be replaced by OPERATOR only by the use of tool and warning marking		N/A
	Those parts not HAZARDOUS LIVE 10 s after interruption of supply	(see Form A.5)	N/A
	Capacitance test if charge is received from internal capacitor	(see Forms A.4 and A.5)	N/A
6.2	**Determination of ACCESSIBLE parts**	(see Form A.4)	P
6.2.1	General		P
	Unless obviously determination of ACCESSIBLE parts as specified in 6.2.2 to 6.2.4		P

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.2.2	Examination		P
	– with jointed test finger (as specified B.2)		P
	– with rigid test finger (as specified B.1) and a force of 10 N		P
6.2.3	Openings above parts that are HAZARDOUS LIVE		N/A
	– test pin with length of 100 mm and 4 mm in diameter applied		N/A
6.2.4	Openings for pre-set controls		N/A
	– test pin with length of 100 mm and 3 mm in diameter applied		N/A
6.3	**Limit values for ACCESSIBLE parts**		P
6.3.1	Levels in NORMAL CONDITION	(see Form A.5)	P
	a) Voltage limits less than 30 V r.m.s. and 42,4 V peak or 60 V d.c.		P
	for WET LOCATIONS voltage limits less than 16 V r.m.s. and 22,6 V peak or 35 V d.c.		N/A
	Voltages are not HAZARDOUS LIVE the levels of:		—
	b) Current less than 0,5 mA r.m.s. for sinusoidal, 0,7 mA peak non-sinusoidal or mixed frequencies or 2 mA d.c. when measured with measuring circuit A.1 or A.2 if less than 100 Hz		N/A
	for WET LOCATIONS measuring circuit A.4 used		N/A
	70 mA r.m.s. when measured with circuit A.3 for higher frequencies		N/A
	c) Levels of capacitive charge or energy less:		—
	1) 45 µC for voltages up to 15 kV peak or d.c. or line A of Figure 3		N/A
	2) 350 mJ stored energy for voltages above 15 kV peak or d.c.		N/A
6.3.2	Levels in SINGLE FAULT CONDITION	(see Form A.6)	P
	a) Voltage limits less than 50 V r.m.s. and 70 V peak or 120 V d.c.		P
	for WET LOCATIONS voltage limits less than 33 V r.m.s. and 46,7 V peak or 70 V d.c.		N/A
	Voltages are not HAZARDOUS LIVE the levels of:		—
	b) Current less than 3,5 mA r.m.s. for sinusoidal, 5 mA peak non-sinusoidal or mixed frequencies or 15 mA d.c. when measured with measuring circuit A.1 or A.2 if less than 100 Hz		N/A
	for WET LOCATIONS measuring circuit A.4 used		N/A
	500 mA r.m.s. when measured with circuit A.3 for higher frequencies		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	c) Levels of capacitive charge or energy less line B of Figure 3		N/A
6.4	**Primary means of protection**		P
6.4.1	General		P
	ACCESSIBLE parts prevented from being HAZARDOUS LIVE by one or more of following means:		—
	a) ENCLOSURES or PROTECTIVE BARRIERS (see 6.4.2)		P
	b) BASIC INSULATION (see 6.4.3)		P
	c) Impedance (see 6.4.4)		N/A
6.4.2	ENCLOSURES or PROTECTIVE BARRIERS	(see Forms A.15 and A.16)	P
	– meet rigidity requirements of 8.1		P
	– meet requirements for BASIC INSULATION, if protection is provided by insulation		P
	– meet requirements of 6.7 for CREEPAGE and – CLEARANCES between ACCESSIBLE parts and – HAZARDOUS live parts, if protection is provided by – limited access		P
6.4.3	BASIC INSULATION	(see Forms A.15 and A.16)	P
	– meet CLEARANCE, CREEPAGE DISTANCE and solid insulation requirements of 6.7		P
6.4.4	Impedance	(see Forms A.12 and A.15)	N/A
	Impedance used as primary means of protection meets all the following requirements:		—
	a) limits current or voltage to level of 6.3.2	(see Form A.6)	N/A
	b) RATED for maximum WORKING VOLTAGE and the amount of power it will dissipate		N/A
	c) CLEARANCE, CREEPAGE DISTANCE between terminations of the impedance meet requirements of BASIC INSULATION of 6.7	(see Form A.15)	N/A
6.5	**Additional means of protection in case of SINGLE FAULT CONDITION**		P
6.5.1	General		P
	ACCESSIBLE parts are prevented from becoming HAZARDOUS live by the primary means of protection and supplemented by one of:		—
	a) PROTECTIVE BONDING (see 6.5.2)		N/A
	b) SUPPLEMENTARY INSULATION (see 6.5.3)		P
	c) automatic disconnection of the supply (see 6.5.5)		N/A
	d) current- or voltage-limiting device (see 6.5.6)		N/A
	Alternatively one of the single means of protection is used:		—
	e) REINFORCED INSULATION (see 6.5.3)		P

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	f) PROTECTIVE IMPEDANCE (see 6.5.4)		P
6.5.2	PROTECTIVE BONDING	(see Forms A.7, A.8, A.9, A.10 or A.11)	N/A
6.5.2.1	General		N/A
	ACCESSIBLE conductive parts, may become HAZARDOUS LIVE in SINGLE FAULT CONDITION:		—
	Bonded to the PROTECTIVE CONDUCTOR TERMINAL; or		N/A
	Separated by conductive screen or barrier bonded to PROTECTIVE CONDUCTOR TERMINAL		N/A
6.5.2.2	Integrity of PROTECTIVE BONDING		—
	a) PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses		N/A
	b) Soldered connections:		—
	Independently secured against loosening		N/A
	Not used for other purposes		N/A
	c) Screw connections are secured		N/A
	d) PROTECTIVE BONDING not interrupted; or		N/A
	except as removable part that carries MAINS SUPPLY input connection to the whole equipment		N/A
	e) Any movable PROTECTIVE BONDING connection specifically designed, and meets 6.5.2.4		N/A
	f) No external metal braid of cables used (not regarded as PROTECTIVE BONDING)		N/A
	g) IF MAINS SUPPLY passes through:		—
	Means provided for passing protective conductor;		N/A
	Impedance meets 6.5.2.4		N/A
	h) Protective conductors bare or insulated, if insulated, green/yellow		N/A
	Exceptions:		—
	1) earthing braids;		N/A
	2) internal protective conductors etc.;		N/A
	Green/yellow not used for other purposes		N/A
	TERMINAL suitable for connection of a PROTECTIVE CONDUCTOR, and meets 6.5.2.3		N/A
6.5.2.3	PROTECTIVE CONDUCTOR TERMINAL		—
	a) Contact surfaces are metal		N/A
	b) Appliance inlet used		N/A
	c) For rewirable cords and PERMANENTLY CONNECTED EQUIPMENT, PROTECTIVE CONDUCTOR TERMINAL is close to MAINS supply TERMINALS		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	d) If no MAINS supply is required, any PROTECTIVE CONDUCTOR TERMINAL:		—
	Is near terminals of circuit for which protective earthing is necessary		N/A
	External if other terminals external		N/A
	e) Equivalent current-carrying capacity to MAINS supply TERMINALS	(see Form A.7)	N/A
	f) If plug-in, makes first and breaks last		N/A
	g) If also used for other bonding purposes, PROTECTIVE CONDUCTOR:		—
	Applied first;		N/A
	Secured independently;		N/A
	Unlikely to be removed by servicing		N/A
	h) PROTECTIVE CONDUCTOR of measuring circuit:		—
	1) Current RATING equivalent to measuring circuit TERMINAL;		N/A
	2) PROTECTIVE BONDING: not interrupted by any switch or interrupting device		N/A
	i) FUNCTIONAL EARTH TERMINALS allow independent connection		N/A
	j) If a binding screw used for PROTECTIVE CONDUCTOR TERMINAL:		—
	Suitable size for bond wire		N/A
	Not smaller than M 4		N/A
	At least 3 turns of screw engaged		N/A
	Passes tightening torque test	(see Form A.8)	N/A
	k) Contact pressure not capable being reduced by deformation of materials		N/A
6.5.2.4	Impedance of PROTECTIVE BONDING of plug-connected equipment	(see Form A.9)	N/A
	Impedance between PROTECTIVE CONDUCTOR TERMINAL and each ACCESSIBLE part where PROTECTIVE BONDING is specified, is:		—
	– less than 0,1 Ohm; or		N/A
	– less than 0,2 Ohm if equipment is provided with non-detachable cord		N/A
6.5.2.5	Impedance of PROTECTIVE BONDING of PERMANENTLY CONNECTED EQUIPMENT	(see Form A.10)	N/A
6.5.2.6	Transformer PROTECTIVE BONDING screen	(see Form A.11)	N/A
	Transformer provided with screen for PROTECTIVE BONDING:		—

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	screen bonding consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses (see 6.5.2.2 a)		N/A
	screen bonding with soldered connection (see 6.5.2.2 b) is:		—
	– Independently secured against loosening		N/A
	– Not used for other purposes		N/A
6.5.3	SUPPLEMENTARY and REINFORCED INSULATION		P
	Meet CLEARANCE, CREEPAGE DISTANCE and solid insulation requirements of 6.7		P
6.5.4	PROTECTIVE IMPEDANCE	(see Form A.12)	P
	Limits current or voltage to level of 6.3.1 in NORMAL and to level of 6.3.2 in SINGLE FAULT CONDITION		P
	CLEARANCE, CREEPAGE DISTANCE between terminations of the impedance meet requirements of DOUBLE or REINFORCED INSULATION of 6.7	(see Form A.15)	P
	The PROTECTIVE IMPEDANCE consists of one or more of the following:	(see TABLE 1.A and Form A.12)	—
	a) appropriate single component suitable for safety and reliability for protection, it is:		—
	1) RATED twice the maximum WORKING VOLTAGE		P
	2) resistor RATED for twice the power dissipation for maximum WORKING VOLTAGE		N/A
	b) combination of components		N/A
	Single electronic device not used as PROTECTIVE IMPEDANCE		N/A
6.5.5	Automatic disconnection of the supply		N/A
	a) RATED to disconnect the load within time specified in Figure 2		N/A
	b) RATED for the maximum load conditions of the equipment		N/A
6.5.6	Current- or voltage-limiting devices	(see Form A.13)	N/A
	Device complies with all of:		—
	a) RATED to limit the current or voltage to the level of 6.3.2	(see Form A.6)	N/A
	b) RATED for the maximum WORKING VOLTAGE; and		N/A
	RATED for the maximum operational current if applicable		N/A
	c) CLEARANCE, CREEPAGE DISTANCE between terminations of the impedance meet requirements of SUPPLEMENTARY INSULATION of 6.7	(see Forms A.14 and A.15)	N/A
6.6	**Connections to external circuits**		P

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.6.1	General		P
	Connections do not cause ACCESSIBLE parts of the following to become HAZARDOUS LIVE in NORMAL CONDITION or SINGLE FAULT CONDITION:		—
	– the external circuits		P
	– the equipment		P
	Protection achieved by separation of circuits; or		P
	short circuit of separation does not cause a HAZARD		N/A
	Instructions or markings for each terminal include:		—
	a) RATED conditions for TERMINAL		P
	b) Required RATING of external circuit insulation		P
6.6.2	TERMINALS for external circuits		P
	TERMINALS which receive a charge from an internal capacitor are not HAZARDOUS LIVE after 10 s of interrupting supply connection	(see Form A.5)	P
6.6.3	Circuits with terminals which are HAZARDOUS LIVE		P
	These circuits are:		—
	Not connected to ACCESSIBLE conductive parts; or		P
	Connected to ACCESSIBLE conductive parts, but are not MAINS CIRCUITS and have one TERMINAL contact at earth potential		N/A
	No ACCESSIBLE conductive parts are HAZARDOUS LIVE		P
6.6.4	Terminals for stranded conductors		N/A
	No RISK of accidental contact because:		—
	– Located or shielded		N/A
	– Self-evident or marked whether or not connected to ACCESSIBLE conductive parts		N/A
	Complies as applicable:		—
	a) Manufacturer's specified maximum length of removed insulation, or		N/A
	b) 8 mm length of insulation removed		N/A
6.7	**Insulation requirements**	(see Form A.14)	P
6.7.1	The nature of insulation		P
6.7.1.1	General		P
	Insulation between ACCESSIBLE parts or between separate circuits consist of CLEARANCES, CREEPAGE DISTANCES and solid insulation if provided as protection against a HAZARD		P
6.7.1.2	CLEARANCES		P
	Required CLEARANCES reflecting factors of 6.7.1.1	(see Forms A.14 and A.15)	P

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Equipment rated for operating altitude greater than 2000 m correction factor of Table 3 of 61010-1 applied		P
6.7.1.3	CREEPAGE DISTANCES		P
	Required CREEPAGE DISTANCES reflecting factors of 6.7.1.1 a) to d)	(see Forms A.14 and A.15)	P
	CTI material group reflected by requirements		N/A
	CTI test performed		N/A
6.7.1.4	Solid insulation		P
	Required solid insulation reflecting factors of 6.7.1.1 a) to d)	(see Forms A.14 and A.15)	P
6.7.1.5	Requirements for insulation according to type of circuit	(see Forms A.14 and A.15)	N/A
	a) 6.7.2 MAINS circuits of OVERVOLTAGE CATEGORY II up to nominal supply voltage of 300 V		N/A
	b) 6.7.3 secondary circuits separated from circuits defined in a) by transformer		N/A
	c) K.1 MAINS circuits of OVERVOLTAGE CATEGORY III and IV or OVERVOLTAGE CATEGORY II over 300 V		P
	d) K.2 secondary circuits separated from circuits defined in c) by transformer		N/A
	e) K.3 circuits having one or more of:		—
	1) maximum TRANSIENT OVERVOLTAGE is limited to known level below the level of MAINS CIRCUIT		N/A
	2) maximum TRANSIENT OVERVOLTAGE above the level of MAINS CIRCUIT		N/A
	3) WORKING VOLTAGE is the sum of more than one circuit or a mixed voltage		N/A
	4) WORKING VOLTAGE includes recurring peak voltage, may include non-sinusoidal or non-periodic waveform		N/A
	5) WORKING VOLTAGE with a frequency above 30 kHz		N/A
6.7.2	Insulation for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II with a nominal supply voltage up to 300 V		N/A
6.7.2.1	CLEARANCES and CREEPAGE DISTANCES	(see Forms A.14 and A.15)	—
	Values for MAINS CIRCUITS of Table 4 are met		N/A
	Coatings to achieve reduction to POLLUTION DEGREE 1 comply with requirements of Annex H		N/A
6.7.2.2	Solid insulation		N/A
6.7.2.2.1	General		N/A

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Withstands electrical and mechanical stresses in normal use and all RATED environmental conditions of 1.4		N/A
	Equipment passed voltage tests of 6.8.3 with values of Table 5	(see Form A.18)	N/A
	Complies as applicable:		—
	a) ENCLOSURE or PROTECTIVE BARRIER of Clause 8		N/A
	b) moulded and potted parts requirements of 6.7.2.2.2		N/A
	c) inner layers of printed wiring boards requirements of 6.7.2.2.3		N/A
	d) thin-film insulation requirements of 6.7.2.2.4		N/A
6.7.2.2.2	Moulded and potted parts		—
	Conductors between same two layers are separated by at least 0,4 mm after moulding is completed		N/A
6.7.2.2.3	Inner insulating layers of printed wiring boards		—
	Separated by at least 0,4 mm between same two layers		N/A
	REINFORCED INSULATION has adequate electric strength; one of following methods used:		—
	a) thickness of insulation is at least 0,4 mm		N/A
	b) insulation is assembled of minimum two separate layers, each RATED for test voltage of Table 5 for BASIC INSULATION		N/A
	c) insulation is assembled of minimum two separate layers, where the combination is rated for test voltage of Table 5 for REINFORCED INSULATION		N/A
6.7.2.2.4	Thin-film insulation		—
	Conductors between same two layers are separated by applicable CLEARANCES and CREEPAGE DISTANCE of 6.7.2.1		N/A
	REINFORCED INSULATION have adequate electric strength; one of the following methods used:		—
	a) thickness through the insulation at least 0,4 mm		N/A
	b) insulation is assembled of min. two separate layers, each RATED for test voltage of Table 5 for BASIC INSULATION	(see Form A.18)	N/A
	c) insulation is assembled of min. three separate layers, where the combination of two layers passed voltage tests of 6.8.3 with values of Table 5 for REINFORCED INSULATION	(see Form A.18)	N/A
6.7.3	Insulation for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V		N/A
6.7.3.1	General		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Secondary circuits where separation from MAINS CIRCUITS is achieved by a transformer providing:		—
	– REINFORCED INSULATION		N/A
	– DOUBLE INSULATION		N/A
	– screen connected to the PROTECTIVE CONDUCTOR TERMINAL		N/A
6.7.3.2	CLEARANCES	(see Forms A.14 and A.15)	N/A
	a) meet the values of Table 6 for BASIC INSULATION and SUPPLEMENTARY INSULATION; or		N/A
	twice the values of Table 6 for REINFORCED INSULATION; or		N/A
	b) pass the voltage tests of 6.8 with values of Table 6;	(see Form A.18)	N/A
	with following adjustments:		—
	1) values for reinforced insulation are 1,6 times the values for basic insulation		N/A
	2) if operating altitude is greater than 2000 m values of CLEARANCES multiplied with factor of Table 3		N/A
	3) minimum CLEARANCE is 0,2 mm for POLLUTION DEGREE 2 and 0,8 mm for POLLUTION DEGREE 3		N/A
6.7.3.3	CREEPAGE DISTANCES	(see Forms A.14 and A.15)	N/A
	Based on WORKING VOLTAGE meets the values of Table 7 for BASIC and SUPPLEMENTARY INSULATION		N/A
	Values for REINFORCED INSULATION are twice the values of BASIC INSULATION		N/A
	Coatings to achieve reduction to POLLUTION DEGREE 1 comply with requirements of Annex H		N/A
6.7.3.4	Solid insulation		N/A
6.7.3.4.1	General		N/A
	Withstands electrical and mechanical stresses in normal use and all RATED environmental conditions of 1.4		—
	a) Equipment passed voltage test of 6.8.3.1 for 5 s with VALUES of Table 6 for BASIC and SUPPLEMENTARY INSULATION	(see Form A.18)	N/A
	values for REINFORCED INSULATION are 1,6 times the values of BASIC INSULATION		N/A
	b) if WORKING VOLTAGE exceeds 300 V, equipment passed voltage test of 6.8.3.1 for 1 min with a test voltage of 1,5 times working voltage for BASIC or SUPPLEMENTARY INSULATION	(see Form A.18)	N/A
	value for REINFORCED INSULATION are twice the WORKING VOLTAGE		N/A
	Complies as applicable:		—

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	1) ENCLOSURE or PROTECTIVE BARRIER of Clause 8		N/A
	2) moulded and potted parts requirements of 6.7.3.4.2		N/A
	3) inner layers of printed wiring boards requirements of 6.7.3.4.3		N/A
	4) thin-film insulation requirements of 6.7.3.4.4		N/A
6.7.3.4.2	Moulded and potted parts		—
	Conductors between same two layers are separated by applicable distances of Table 8		N/A
6.7.3.4.3	Inner insulation layers of printed wiring boards		—
	Separated by at least the applicable distances of Table 8 between same two layers		N/A
	REINFORCED INSULATION have adequate electric strength; one of following methods used:		—
	a) thickness at least applicable distance of Table 8		N/A
	b) insulation is assembled of minimum two separate layers, each RATED for test voltage of Table 6 for BASIC INSULATION	(see Form A.18)	N/A
	c) insulation is assembled of min. two separate layers, where the combination is RATED for 1,6 times the test voltage of Table 6	(see Form A.18)	N/A
6.7.3.4.4	Thin-film insulation		—
	Conductors between same two layers are separated by applicable CLEARANCES and CREEPAGE DISTANCE of 6.7.3.2 and 6.7.3.3		N/A
	REINFORCED INSULATION have adequate electric strength; one of following methods used:		—
	a) thickness at least applicable distance of Table 8		N/A
	b) insulation is assembled of min. two separate layers, each RATED for test voltage of Table 6 for BASIC INSULATION	(see Form A.18)	N/A
	c) insulation is assembled of min. three separate layers, where the combination of two layers passed voltage tests with 1,6 time values of Table 6:	(see Form A.18)	—
	a.c. test of 6.8.3.1; or		N/A
	d.c. test of 6.8.3.2 for circuits stressed only by d.c. voltages		N/A
6.8	**Procedure for voltage tests**	(see Forms A.14 and A.18)	P
6.9	**Constructional requirements for protection against electric shock**		P
6.9.1	General		P
	If a failure could cause a HAZARD:		—
	a) security of wiring connections		P

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) screws securing removable covers		P
	c) accidental loosening		P
	d) CLEARANCES and CREEPAGE DISTANCES not reduced below the values of basic insulation by loosening of parts or wires		P
6.9.2	Insulating materials		P
	Material not to be used for safety relevant insulation:		—
	a) easily damaged materials not used		P
	b) non-impregnated hygroscopic materials not used		P
6.9.3	Colour coding		N/A
	Green-and-yellow insulation shall not be used except:		—
	a) protective earth conductors;		N/A
	b) PROTECTIVE BONDING conductors;		N/A
	c) potential equalization conductors;		N/A
	d) functional earth conductors		N/A
6.10	**Connection to MAINS supply source and connections between parts of equipment**		N/A
6.10.1	MAINS supply cords		N/A
	RATED for maximum equipment current (see 5.1.3 c)		N/A
	Cable complies with IEC 60227 or IEC 60245		N/A
	Heat-resistant if likely to contact hot parts		N/A
	Temperature RATING (cord and inlet) .....:		—
	Green/yellow used only for connection to PROTECTIVE CONDUCTOR TERMINALS		N/A
	Detachable cords with IEC 60320 MAINS connectors:		—
	Conform to IEC 60799; or		N/A
	Have the current RATING of the MAINS connector		N/A
6.10.2	Fitting of non-detachable MAINS supply cords		N/A
6.10.2.1	Cord entry		—
	a) inlet or bushing with a smoothly rounded opening; or		N/A
	b) insulated cord guard protruding >5 D (diameter)		N/A
6.10.2.2	Cord anchorage		—
	Protective earth conductor is the last to take the strain		N/A
	a) cord is not clamped by direct pressure from a screw		N/A
	b) knots are not used		N/A
	c) cannot push the cord into the equipment to cause a HAZARD		N/A

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	d) no failure of cord insulation in anchorage with metal parts		N/A
	e) not to be loosened without a tool		N/A
	f) cord replacement does not cause a HAZARD and method of strain relief is clear		N/A
	Push-pull and or torque test	(see Form A.19)	N/A
6.10.3	Plugs and connectors		N/A
	MAINS supply plugs, connectors etc., conform with relevant specifications		N/A
	If equipment supplied at voltages below 6.3.2.a) or from a sole source:		—
	Plugs of supply cords do not fit MAINS sockets above rated SUPPLY voltage		N/A
	MAINS type plugs used only for connection to MAINS supply		N/A
	Plug pins which receive a charge from an internal capacitor	(see Form A.5)	N/A
	Accessory MAINS socket outlets:		—
	a) marking if accepts a standard MAINS supply plug (see 5.1.3e)		N/A
	b) input has a protective earth conductor if outlet has EARTH TERMINAL CONTACT		N/A
6.11	**Disconnection from supply source**		P
6.11.1	Disconnects all current-carrying conductors		P
6.11.2	Exceptions		N/A
6.11.3	Requirements according to type of equipment		P
6.11.3.1	PERMANENTLY CONNECTED EQUIPMENT and multi-phase equipment		P
	Employs switch or circuit-breaker		N/A
	If switch or circuit-breaker is not part of the equipment, documentation requires:		—
	a) switch or circuit-breaker to be included in building installation		P
	b) suitable location easily reached		P
	c) marking as disconnecting for the equipment		P
6.11.3.2	Single-phase cord-connected equipment		N/A
	Equipment is provided with one of the following:		—
	a) switch or circuit-breaker		N/A
	b) appliance coupler (disconnectable without tool)		N/A
	c) separable plug (without locking device)		N/A
6.11.4	Disconnecting devices		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.11.4.1	General		N/A
	Disconnecting device part of equipment		N/A
	Electrically close to the SUPPLY		N/A
	Power-consuming components not electrically located between the supply source and the disconnecting device		N/A
	Except electromagnetic interference suppression circuits permitted to be located on the supply side of the disconnecting device		N/A
6.11.4.2	Switches and circuit-breakers		N/A
	When used as disconnection device:		—
	Circuit breaker meets the relevant requirements IEC 60947-2 and is suitable for the application		N/A
	Switch meets the relevant requirements IEC 60947-3 and is suitable for the application		
	Marked to indicate function.....:		—
	Not incorporated in MAINS cord		N/A
	Does not interrupt PROTECTIVE EARTH CONDUCTOR		N/A
6.11.4.3	Appliance couplers and plugs		N/A
	Where an appliance coupler or separable plug is used as the disconnecting device (see 6.11.3.2):		—
	Readily identifiable and easily reached by the operator		N/A
	Single-phase portable equipment cord length not more than 3 m		N/A
	PROTECTIVE EARTH CONDUCTOR connected first and disconnected last		N/A
7	**PROTECTION AGAINST MECHANICAL HAZARDS**		P
7.1	**General**		P
	Equipment does not cause a mechanical HAZARD in NORMAL nor in SINGLE FAULT CONDITION		P
	Conformity is checked by 7.2 to 7.7		P
7.2	**Sharp edges**		P
	Easily-touched parts are smooth and rounded		P
	Do not cause injury during NORMAL USE and		P
	Do not cause injury during SINGLE FAULT CONDITION		P
7.3	**Moving parts**		N/A
7.3.1	General		N/A
	HAZARDS from moving parts limited to a tolerable level with the conditions specified in 7.3.2 and 7.3.5		N/A

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	RISK assessment in accordance with 7.3.3 carried out		N/A
7.3.2	Exceptions		N/A
	Access to HAZARDOUS moving parts permitted under following circumstances:		—
	a) obviously intended to operate on parts or materials external of the equipment		N/A
	inadvertent touching of moving parts minimized by equipment design (e .g. guards or handles)		N/A
	b) If OPERATOR access is unavoidable outside NORMAL USE following precautions have been taken:		—
	1) access requires TOOL		N/A
	2) statement about training in the instructions		N/A
	3) warning markings on covers prohibiting access by untrained OPERATORS		N/A
	or symbol 14 with full details in documentation		N/A
7.3.3	RISK assessment for mechanical HAZARDS to body parts		N/A
	RISK is reduced to a tolerable level by protective measures as specified in Table 12		N/A
	Minimum protective measures:		—
	A. Low level measures		N/A
	B. Moderate measures		N/A
	C. Stringent measures		N/A
7.3.4	Limitation of force and pressure	(see Form A.20)	N/A
	Following levels are met in NORMAL and SINGLE FAULT CONDITION:		—
	Continuous contact pressure below 50 N / cm² with force below 150 N		N/A
	Temporary force below 250 N for an area at least of 3 cm² for a maximum duration of 0,75 s		N/A
7.3.5	Gap limitations between moving parts	(see Form A.20)	N/A
7.3.5.1	Access normally allowed		—
	If levels of 7.3.4 exceeded and a body part may be inserted minimum gap as specified in Table 13 assured in NORMAL and in SINGLE FAULT CONDITION		N/A
7.3.5.2	Access normally prevented		—
	Maximum gap as specified in Table 14 assured in NORMAL and in SINGLE FAULT CONDITION		N/A
7.4	**Stability**		N/A
	Equipment not secured to building structure is physical stable		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Stability maintained after opening of drawers etc. by automatic means, or		N/A
	warning marking requires the application of means		N/A
	Compliance checked by following tests as applicable:	(see Form A.20A)	—
	a) 10° tilt test for other than handheld equipment		N/A
	b) multi-directional force test for equipment exceeds height of 1 m and mass of 25 kg		N/A
	c) downward force test for floor-standing equipment		N/A
	d) overload test with 4 times maximum load for castor or support foot that supports greatest load, or		N/A
	e) castor or support foot that supports greatest load removed from equipment		N/A
7.5	**Provisions for lifting and carrying**		N/A
7.5.1	General		N/A
	Equipment more than 18 kg.....:		N/A
	Has means for lifting or carrying; or		N/A
	Directions are given in documentation		N/A
7.5.2	Handles and grips		N/A
	Handles or grips withstand four times weight		N/A
7.5.3	Lifting devices and supporting parts		N/A
	RATED for maximum load; or		N/A
	Tested with four times maximum static load		N/A
7.6	**Wall mounting**		N/A
	Mounting brackets withstand four times weight	(see Form A.20B)	N/A
	One fastner removed and test repeated with two times weight	(see Form A.20B)	N/A
7.7	**Expelled parts**		N/A
	Equipment contains or limits the energy		N/A
	Protection not removable without the aid of a tool		N/A

8	**RESISTANCE TO MECHANICAL STRESSES**		P
8.1	**General**		P
	Equipment does not cause a HAZARD when subjected to mechanical stresses in NORMAL USE		P
	Normal protection level is 5 J		P
	Levels below 5 J but not less than 1 J are acceptable if all of the following criteria are met:		—
	a) Lower level justified by RISK assessment of manufacturer		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) Equipment installed in its intended application is not easily touched		N/A
	c) Only occasional access during NORMAL USE		N/A
	d) IK code in accordance to IEC 62262 marked or symbol 14 used with full information in the documentation		N/A
	for non-metallic ENCLOSURES rated below 2 °C ambient temperature value chosen for minimum RATED temperature		N/A
	impact energies between IK values, the IK code marked for nearest lower value		N/A
	Conformity is checked by performing following tests:	(see Form A.16)	—
	1) Static test of 8.2.1		P
	2) Impact test of 8.2.2 with 5 J except for HAND-HELD EQUIPMENT		P
	if specified impact energy is not 5 J alternate method of IEC 62262 used		N/A
	3) Drop test of 8.3.1 or 8.3.2 except for FIXED EQUIPMENT and equipment with mass over 100 kg		N/A
	Equipment RATED with an impact rating of IK 08 that obviously meets the criteria		N/A
	After the tests inspection with following results:		—
	– HAZARDOUS LIVE parts above the limits of 6.3.2 not ACCESSIBLE		P
	– insulation pass the voltage tests of 6.8	(see Form A.30)	P
	i) No leaks of corrosive and harmful substances		P
	ii) ENCLOSURE shows no cracks resulting in a HAZARD		P
	iii) CLEARANCES not less than their permitted values		P
	iv) Insulation of internal wiring remains undamaged		P
	v) PROTECTIVE BARRIERS not damaged or loosened		P
	vi) No moving parts exposed, except permitted by 7.3		N/A
	vii) No damage which could cause spread of fire		P
8.2	**ENCLOSURE rigidity test**		P
8.2.1	Static test	(see Form A.21A)	P
	– 30 N with 12 mm rod applied to each part of ENCLOSURE		P
	– in case of doubt test conducted at maximum RATED ambient temperature		P
8.2.2	Impact test	(see Form A.21A)	P
	Impact applied to any part of ENCLOSURE causing a HAZARD if damaged		P

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Impact energy level and corresponding IK code.....:	IK08	—
	Non-metallic ENCLOSURES cooled to minimum RATED ambient temperature if below 2 °C		P
8.3	**Drop test**	(see Form A.21B)	N/A
8.3.1	Other than HAND-HELD and DIRECT-PLUG-IN EQUIPMENT		N/A
	Tests conducted with a drop height or angle of .....:		—
8.3.2	HAND-HELD and DIRECT-PLUG-IN EQUIPMENT		N/A
	Non-metallic ENCLOSURES cooled to minimum RATED ambient temperature if below 2 °C		N/A
	Drop test conducted with an height of 1 m		N/A
9	**PROTECTION AGAINST THE SPREAD OF FIRE**		P
9.1	**General**		P
	No spread of fire in NORMAL and SINGLE FAULT CONDITION		P
	MAINS supplied equipment meets requirements of 9.6 additionally		P
	Conformity is checked by minimum one or a combination of the following (see Figure 11):	(see Form A.22)	—
	a) SINGLE FAULT test of 4.4; or	(see Form A.1)	N/A
	b) Application of 9.2 (eliminating or reducing the sources of ignition); or		N/A
	c) Application of 9.3 (containment of fire within the equipment)		P
9.2	**Eliminating or reducing the sources of ignition within the equipment**		N/A
	a) 1) Limited-energy circuit (see 9.4); or		N/A
	2) BASIC INSULATION provided for parts of different potential; or	(see Forms A.14 and A.18)	N/A
	Bridging the insulation does not cause ignition	(see Form A.1)	N/A
	b) Surface temperature of liquids and parts (see 9.5)		N/A
	c) No ignition in circuits designed to produce heat	(see Form A.1)	N/A
9.3	**Containment of the fire within the equipment, should it occur**		P
9.3.1	General		P
	Spread of fire outside equipment reduced to a tolerable level if:		—
	a) Energizing of the equipment is controlled by an OPERATOR held switch		P
	b) ENCLOSURE is conform with constructional requirements of 9.3.2; and		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Requirements of 9.5 are met		N/A
9.3.2	Constructional requirements		P
	a) Connectors and insulating material have flammability classification V-2 or better	V-0	P
	b) Insulated wires and cables are flame retardant (VW-1 or equivalent)	VW-1	P
	c) ENCLOSURE meets following requirements:	(see Form A.22)	—
	1) Bottom and sides in arc of 5 ° (see Figure 13) to non-limited circuits (9.4) meets:		—
	i) no openings; or		P
	ii) perforated as specified in Table 16; or		N/A
	iii) metal screen with a mesh; or		N/A
	iv) baffles as specified in Figure 12		N/A
	2) Material of ENCLOSURE and any baffle or flame barrier is made of:		—
	Metal (except magnesium); or		N/A
	Non-metallic materials have flammability classification V-1 or better	V-0	P
	3) ENCLOSURE and any baffle or flame barrier have adequate rigidity		P
9.4	**Limited-energy circuit**	(see Form A.24)	N/A
	a) Potential not more than 30 r.m.s. and 42,4 V peak, or 60 V d.c.		N/A
	b) Current limited by one of following means:		—
	1) Inherently or by impedance (see Table 17); or		N/A
	2) Overcurrent protective device (see Table 18); or		N/A
	3) A regulating network limits also in SINGLE FAULT CONDITION (see Table 17)		N/A
	c) Is separated by at least BASIC INSULATION		N/A
	Fuse or a nonadjustable electromechanical device is used		N/A
9.5	**Requirements for equipment containing or using flammable liquids**		N/A
	Flammable liquids contained in or specified for use with equipment do not cause spread of fire	(see Form A.25)	N/A
	RISK is reduced to a tolerable level:		—
	a) The temperature of surface or parts in contact with flammable liquids is 25 °C below fire point		N/A
	b) The quantity of liquid is limited		N/A
	c) Flames are contained within the equipment		N/A

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Detailed instructions for RISK-reduction provided		N/A
9.6	**Overcurrent protection**		P
9.6.1	General		P
	MAINS supplied equipment protected		P
	BASIC INSULATION between MAINS parts of opposite polarity provided	(see Forms A.14 and A.15)	N/A
	Overcurrent protection devices not fitted in the protective conductor		N/A
	Fuses or single-pole circuit-breakers not fitted in neutral (multi-phase equipment)		N/A
9.6.2	PERMANENTLY CONNECTED EQUIPMENT		P
	Overcurrent protection device:		—
	Fitted within the equipment; or		N/A
	Specified in manufacturer's instructions		P
9.6.3	Other equipment		N/A
	Protection within the equipment		N/A
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 in NORMAL and in SINGLE FAULT CONDITION:	(see Form A.26A)	—
	– at an specified ambient temperature of 40 °C		N/A
	– for equipment rated above 40 °C ambient temperature limits not exceeded raised by the difference to 40 °C		P
	Heated surfaces necessary for functional reasons exceeding specified values:		—
	– Are recognizable as such by appearance or function; or		N/A
	– Are marked with symbol 13		N/A
	– Guards are not removable without tool		N/A
10.2	**Temperatures of windings**		P
	Limits not exceeded in:	(see Form A.26B)	—
	NORMAL CONDITION		P
	SINGLE FAULT CONDITION		P
10.3	**Other temperature measurements**		P
	Following measurements conducted if applicable:	(see Form A.26A)	—
	a) Value of 60 °C of field-wiring terminal box not exceeded		N/A

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) Surface of flammable liquids and parts in contact with this liquids		N/A
	c) Surface of non-metallic ENCLOSURES		P
	d) Parts made of insulating material supporting parts connected to MAINS supply		N/A
	e) Terminals carrying a current more than 0,5 A		P
10.4	**Conduct of temperature tests**		P
10.4.1	General		P
	Tests conducted under reference test conditions and manufacturer's instructions	(see Form A.26A)	P
	Tests alternatively conducted at the least favourable ambient temperature within the RATED ambient temperature .....:		—
10.4.2	Temperature measurement of heating equipment		N/A
	Tests conducted in test corner	(see Form A.26A)	N/A
10.4.3	Equipment intended for installation in a cabinet or wall		P
	Equipment built in as specified in installation instructions	(see Form A.26A)	P
10.5	**Resistance to heat**		P
10.5.1	Integrity of CLEARANCE and CREEPAGE DISTANCES	(see Form A.16)	P
10.5.2	Non-metallic ENCLOSURES	(see Form A.27)	P
	Within 10 min after treatment:		—
	Equipment subjected to suitable stresses of 8.2 and 8.3 complying with criteria of 8.1		P
10.5.3	Insulating material		P
	a) Parts supporting parts connected to MAINS supply		P
	b) TERMINALS carrying a current more than 0,5 A		P
	Examination of material data; or		N/A
	in case of doubt:		P
	1) Ball pressure test; or	(see Form A.28)	P
	2) Vicat softening test of ISO 306	(see Form A.29)	N/A
11	**PROTECTION AGAINST HAZARDS FROM FLUIDS AND SOLID FOREIGN OBJECTS**		N/A
11.1	**General**		N/A
	Protection to OPERATORS and surrounding area provided by EQUIPMENT		N/A
	All fluids specified by manufacturer considered		N/A
11.2	**Cleaning**	(see Form A.30)	N/A
11.3	**Spillage**	(see Form A.30)	N/A

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
11.4	**Overflow**	(see Form A.30)	N/A
11.5	**Battery electrolyte**		N/A
	Battery electrolyte leakage presents no HAZARD		N/A
11.6	**Equipment RATED with a degree of ingress protection (IP code)**	(see Form A.30)	N/A
11.6.1	General		N/A
	Equipment marked with IP code ..... :		—
	Conditions specified in the documentation		N/A
11.6.2	Conditions for testing		N/A
	Equipment in clean and new condition, all parts in place and mounted as specified by manufacturer		N/A
	Complete equipment tested, or		N/A
	representative parts tested		N/A
	HAND-HELD EQUIPMENT and PORTABLE EQUIPMENT placed in least favourable position of NORMAL use		N/A
	Other equipment positioned or installed as specified		N/A
	TERMINALS provided with protective cap or cover, are installed as specified by manufacturer		N/A
	The equipment is operating (energized) during the treatment except:		—
	a) If manufacturer specifies degrees of protection for non-operating (de-energized) equipment, or		N/A
	b) Equipment is operating or non-operating during the treatment with does not affect the test results		N/A
11.6.3	Protection against solid foreign objects (including dust)		N/A
	Applicable test of IEC 60529 for protection against solid foreign objects conducted		N/A
	Additionally inspection of equipment resulted:		—
	a) No deposit on insulation parts that could lead to a HAZARD		N/A
	b) No created accumulations that have the potential to cause spread of fire		N/A
11.6.4	Protection against water		N/A
	Applicable test of IEC 60529 for protection against water conducted		N/A
	If any water has entered, safety is not impaired, inspection of equipment resulted:		—
	a) No deposit on insulation parts that could lead to a HAZARD		N/A
	b) Water has not reached hazardous live parts or windings which are not designed to operate when wet		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	c) No accumulations near the end of cable nor enter the cable where it could cause a HAZARD		N/A
	d) No accumulations where it could lead to a HAZARD taking in consideration movement of the equipment		N/A
11.7	**Fluid pressure and leakage**		N/A
11.7.1	Maximum pressure ..... :	(see Form A.31)	—
	Maximum pressure of any part does not exceed P_{RATED}		N/A
11.7.2	Leakage and rupture at high pressure		N/A
	Fluid-containing parts checked by inspection or if a HAZARD could arise subjected to hydraulic test, if:	(see Form A.31)	—
	a) product of pressure and volume > 200 kPa·l; and		N/A
	b) pressure > 50 kPa		N/A
	Safety evidence established by calculation in acc. to national authorities (e.g. Pressure Equipment Directive 2014/68/EU)		N/A
	Parts of refrigerating systems meets pressure-related requirements of EN 378-2 or IEC 60335-2-89 as applicable		N/A
11.7.3	Leakage from low-pressure parts	(see Form A.32)	N/A
11.7.4	Overpressure safety device		N/A
	Does not operate in NORMAL USE		N/A
	a) Connected as close as possible to parts intended to be protected		N/A
	b) Easy access for inspection, maintenance and repair		N/A
	c) Adjustment only with TOOL		N/A
	d) No discharge towards person		N/A
	e) No HAZARD from deposit of discharged material		N/A
	f) Adequate discharge capacity		N/A
	No shut-off valve between overpressure safety device and protected parts		N/A
12	**PROTECTION AGAINST RADIATION, INCLUDING LASER SOURCES, AND AGAINST SONIC AND ULTRASONIC PRESSURE**		N/A
12.1	**General**		N/A
	Equipment provides protection		N/A
12.2	**Equipment producing ionizing radiation**		N/A
12.2.1	Ionizing radiation	(see Form A.33)	N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
12.2.1.1	General		N/A
	Equipment meets the following requirements:		—
	a) if intended to emit radiation meets requirements of 12.2.1.2; or		N/A
	tested, classified and marked in accordance to IEC 62598		N/A
	b) if only emits stray radiation meets requirements of 12.2.1.3		N/A
12.2.1.2	Equipment intended to emit radiation		—
	Effective dose rate of radiation measured.....:		—
	If dose rate exceeds 5 µSv/h marked with the following:		—
	a) symbol 17 (ISO 361)		N/A
	b) abbreviations of the radionuclides.....:		—
	c) with maximum dose at 1 m; or .....:		—
	with dose rate value between 1 µSv/h and 5 µSv/h in m.....:		—
12.2.1.3	Equipment not intended to emit radiation	(see Form A.34)	—
	Limit for unintended stray radiation of 1 µSv/h at any easily reached point kept .....:		N/A
12.2.2	Accelerated electrons		N/A
	Compartments opened only by the use of a TOOL		N/A
12.3	**Optical radiation**		N/A
	No unintentional HAZARDOUS escape of optical radiation as ultraviolet, visible or infrared radiation, including light emitting diodes:		—
	– Checked by inspection; and		N/A
	– Radiation sources assessed in acc. to the requirements of IEC 62471, except for sources considered to be safe (Table 22) or conditionally safe (Table 23).		N/A
	– Lamp and lamp systems assessed to Risk Groups 1, 2, or 3 of IEC 62471 are labelled in acc. to IEC 62471-2		N/A
	– If labelling impractical, lamp or lamp systems marked with symbol 14		N/A
	– Protective measures, restrictions on use, and operating instructions that may be necessary are provided, including the applicable conditions of use of Table 23.		N/A
12.4	**Microwave radiation**		N/A
	Power density does not exceed 10 W/m^2.....:		N/A
12.5	**Sonic and ultrasonic pressure**		N/A

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
12.5.1	Sound level	(see Form A.35)	N/A
	No HAZARDOUS sound emission		N/A
	Maximum sound pressure level measured and calculated for maximum sound power level as specified in ISO 3746 or ISO 9614-1		N/A
	Instruction describes measures for protection		N/A
12.5.2	Ultrasonic pressure	(see Form A.36)	N/A
	Equipment not intended to emit ultrasound does not exceed limit of 110 dB between 20 kHz and 100 kHz		N/A
	Equipment intended to emit ultrasound:		N/A
	Outside useful beam does not exceed limit of 110 dB between 20 kHz and 100 kHz		N/A
	If inside useful beam above values exceeded:		—
	Marked with Symbol 14 of Table 1		N/A
	and following information in the documentation:		—
	a) dimensions of useful beam		N/A
	b) area where ultrasonic pressure exceed 110 dB		N/A
	c) maximum sound pressure inside beam area		N/A
12.6	**Laser sources**		N/A
	Equipment meets requirements of IEC 60825-1		N/A
13	**PROTECTION AGAINST LIBERATED GASES AND SUBSTANCES, EXPLOSION AND IMPLOSION**		N/A
13.1	**Poisonous and injurious gases and substances**		N/A
	No hazardous substances liberated in NORMAL CONDITION and in SINGLE FAULT CONDITION		N/A
	If potentially-hazardous substances are liberated:		—
	Operator is not directly exposed to a quantity of the substance that could cause harm		N/A
	Requirements to discharge of hazardous substances during NORMAL operation in accordance to manufacturer's instructions not considered as liberation		N/A
	Attached data/test reports demonstrate conformity		N/A
13.2	**Explosion and implosion**		N/A
13.2.1	Components		N/A
	Components liable to explode:		—
	Pressure release device provided; or		N/A
	Apparatus incorporates operator protection (see also 7.7)		N/A
	Pressure release device:		—

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Discharge without danger		N/A
	Cannot be obstructed		N/A
13.2.2	Batteries and battery charging	(see Form A.37)	N/A
	If explosion or fire HAZARD could occur:		—
	Protection incorporated in the equipment; or		N/A
	Instructions specify batteries with built-in protection		N/A
	In case of wrong type of battery used:		—
	No HAZARD; or		N/A
	Warning by marking and within instructions		N/A
	Equipment with means to charge rechargeable batteries:		—
	Warning against the charging of non-rechargeable batteries; and		N/A
	Type of rechargeable battery indicated; or		N/A
	Symbol 14 used		N/A
	Battery compartment design		N/A
	Single component failure		N/A
	Polarity reversal test		N/A
13.2.3	Implosion of cathode ray tubes		N/A
	If maximum face dimensions > 160 mm.....:		—
	Intrinsically protected and correctly mounted; or		N/A
	ENCLOSURE provides protection:		N/A
	If non-intrinsically protected:		—
	Screen not removable without TOOL		N/A
	If glass screen, not in contact with surface of tube		N/A
14	**COMPONENTS AND SUBASSEMBLIES**		P
14.1	**General**		P
	Where safety is involved, components and subassemblies meet relevant requirements	(see TABLE 1.A)	P
14.2	**Motors**	No such devices	N/A
14.2.1	Motor temperatures		N/A
	Does not present a HAZARD when stopped or prevented from starting; or		N/A
	Protected by over-temperature or thermal protection device conform with 14.3		N/A
14.2.2	Series excitation motors		N/A
	Connected direct to device, if overspeeding causes a HAZARD		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
14.3	**Overtemperature protection devices**	No such devices	N/A
	Devices operating in a SINGLE FAULT CONDITION		N/A
	a) Reliable function is ensured		N/A
	b) RATED to interrupt maximum current and voltage		N/A
	c) Does not operate in NORMAL USE		N/A
	If self-resetting device used to prevent a HAZARD, protected part requires intervention before restarting		N/A
14.4	**Fuse holders**	No such devices	N/A
	No access to HAZARDOUS LIVE parts		N/A
14.5	**MAINS voltage selecting devices**	No such devices	N/A
	Accidental change not possible		N/A
14.6	**MAINS transformers tested outside equipment**	(see Forms A.39 and A.40)	N/A
14.7	**Printed wiring boards**		P
	Data shows conformity with V-1 of IEC 60695-11-10 or better; or		P
	Test shows conformity with V-1 of IEC 60695-11-10 or better	(see Form A.23)	N/A
	Not applicable for printed wiring boards with limited-energy circuits (9.4)		N/A
14.8	**Circuits used to limit TRANSIENT OVERVOLTAGES**		N/A
	Test conducted between each pair of MAINS SUPPLY TERMINALS	(see Form A.41)	N/A
	No ignition or overheating of other materials :		—
	– no ignition		N/A
	– no heat to other parts above the self-ignition points		N/A
	Safely suppressing and properly functional after applied tests		N/A
15	**PROTECTION BY INTERLOCKS**		N/A
15.1	**General**		N/A
	Interlocks are designed to remove a HAZARD before OPERATOR exposed		N/A
15.2	**Prevention of reactivation**		N/A
15.3	**Reliability**		N/A
	Single fault unlikely to occur; or		N/A
	Cannot cause a HAZARD		N/A
16	**HAZARDS RESULTING FROM APPLICATION**		N/A
16.1	**REASONABLY FORESEEABLE MISUSE**		N/A

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	No HAZARDS arising from settings not intended and not described in the instructions		N/A
	Other cases of REASONABLY FORESEEABLE MISUSE addressed by RISK assessment		N/A
16.2	**Ergonomic aspects**		N/A
	Factors giving rise to a HAZARD the RISK assessment is reflecting those aspects:		—
	a) limitation of body dimensions		N/A
	b) displays and indicators		N/A
	c) accessibility and conventions of controls		N/A
	d) arrangement of TERMINALS		N/A
17	**RISK ASSESSMENT**		P
	RISK assessment conducted, if HAZARD might arise and not covered by Clauses 6 to 16	The client state no risk	P
	TOLERABLE RISK achieved by iterative documented process covering the following:		—
	a) RISK analysis		N/A
	Identifies HAZARDS and estimates RISK		N/A
	b) RISK evaluation		N/A
	Plan to judge acceptability of resulting RISK level based on the estimated severity and likelihood of a RISK		N/A
	c) RISK reduction		N/A
	Initial RISK reduced by counter measures;		N/A
	Repeated RISK evaluation without new RISKS introduced		N/A
	RISKS remaining after RISK assessment addressed in instructions to RESPONSIBLE BODY:		—
	Information contained how to mitigate these RISKS		N/A
	Following principles in methods of RISK reduction applied by manufacturer in given order:		—
	1) RISKS eliminated or reduced as far as possible		N/A
	2) Protective measures taken for RISKS that cannot be eliminated		N/A
	3) User information about residual RISK due to any defect of the protective measures		N/A
	Indication of particular training is required		N/A
	Specification of the need for personal protective equipment		N/A
	Conformity checked by evaluation of the RISK assessment documentation		P

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IEC 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX F	**ROUTINE TESTS**		N/A
	Manufacturer ´s declaration		N/A

ANNEX H	**QUALIFICATION OF CONFORMAL COATINGS FOR PROTECTION AGAINST POLLUTION**		N/A
H.1	**General**		N/A
	Conformal coatings meet the requirements of Clause H.2 and H.3.		N/A
H.2	**Technical properties**		N/A
	Technical properties of conformal coatings are suitable for the intended application. In particular:		—
	a) Manufacturer indicate that it is a coating for PWBs;		N/A
	b) RATED operating temperature include the temperature range of the indicated application;		N/A
	c) CTI, insulation resistance and dielectric strength are suitable for the intended application;		N/A
	d) Coating have adequate UV resistance, if it is exposed to sunlight;		N/A
	e) Flammability RATING of the coating is at least the required flammability RATING of the applied PWB.		N/A
H.3	**Qualification of coatings**	(see Form A.42)	N/A
	Coating complies with the conformity requirements.		N/A

ANNEX K	**INSULATION REQUIREMENTS NOT COVERED BY CLAUSE 6.7**	(see Forms A.15 and A.18)	P

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

4.4	**TABLE: Testing in SINGLE FAULT CONDITION – Results**			**Form A.1**	P
Test subclause	Fault No.	Fault description	Td 4.4.3 (NOTE)	How was test terminated Comments	Meets 4.4.4
4.4.2.7.2	1	Short circuit of T2 Pin6,7	1h	Tested at 230V 50Hz. The meter work normally, no hazard.	P
4.4.2.7.2	2	Short circuit of T2 Pin9,10	1h	Tested at 230V 50Hz. The meter shut down, power consumption increased to 0.88W, no hazard. Temperature rise data are given in Form A.26A. no hazard.	P
4.4.2.1	3	Short circuit of IC6 pin2,4	1h	Test at 230V 50Hz. The meter shut down, power consumption increased to 1.19W, no hazard. Temperature rise data are given in Form A.26A.	P
4.4.2.7.3	4	Overload of C46	1h	Tested at 230V 50Hz. When the output current rose to 1.85A, the meter was working normally, but the input power became 14.01W, no hazard.Temperature rise data are given in Form A.26A.	P
4.4.2.7.3	5	Overload of C60	1h	Tested at 230V 50Hz. When the output current rose to 1.12A, the meter was working normally, but the input power became 9.01W, no hazard.	P
4.4.2.1	6	Short circuit of U4 Pin3,4	1h	Tested at 230V 50Hz. The meter shut down, no hazard.	P
4.4.2.1	7	Open circuit of U4 Pin3,4	1h	Tested at 230V 50Hz. The meter shut down, no hazard.	P
4.4.2.2	8	Short circuit of RTV1 Pin2,3	1h	Tested at 230V 50Hz. The meter shut down, no hazard.	P
4.4.2.8	9	Short circuit of RS485 A,B	1h	Tested at 230V 50Hz. The meter working normally, no hazard.	P
4.4.2.8	10	Short circuit of Pulse Ep+,Ep-	1h	Tested at 230V 50Hz. The meter working normally, no hazard.	P

NOTE Td = Test duration in hh:mm:ss
Record dielectric strength test on Form A.18 and temperature tests on Forms A.26A and / or A.26B.
Record in the comments column for each test whether carried out during or after SINGLE FAULT CONDITION.

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

4.4	**TABLE: Testing in SINGLE FAULT CONDITION – Results**			**Form A.1**	P
Test subclause	Fault No.	Fault description	Td 4.4.3 (NOTE)	How was test terminated Comments	Meets 4.4.4
Supplementary information:					

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

5.1.3c)	**TABLE: MAINS supply**		**Form A.2**	P
	Marked rating ..... :	230	V	—
	Phase ..... :	1P2W		—
	Frequency ..... :	50/60	Hz	—
	Current ..... :	--	A	—
	Power ..... :	2	W	—
	Power ..... :	--	VA	—

Test No.	Voltage [V]	Frequency [Hz]	Current [A]	Power [W]	Power [VA]	Comments
1	207	50	11.10mA	0.43	2.30	
2	230	50	11.95 mA	0.46	2.74	
3	253	50	12.81 mA	0.48	3.24	
4	207	60	12.89 mA	0.44	2.67	
5	230	60	13.93 mA	0.47	3.20	
6	253	60	14.98 mA	0.48	3.79	

NOTE – Measurements are only required for marked ratings. Initial inrush currents are not regarded.

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

5.3	TABLE: Durability of markings	Form A.3	P

Marking method (see NOTE)	Agent
1) Adhesive label	A Water
2) Ink printed	B Isopropyl alcohol 70%
3) Laser marked	C (specify agent)
4) Film-coated (plastic foil control panel)	D (specify agent)
5) Imprinted on plastic (moulded in)	E (specify agent)

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)	1)
Fuses (5.1.4)	N/A
Terminals and operating devices (5.1.5.2)	5)
Switches and circuit breakers (5.1.6)	N/A
Double/reinforced equipment (5.1.7)	1)
Field wiring Terminal boxes (5.1.8)	N/A
Warning marking (5.2)	1)
Battery charging (13.2.2)	N/A

Method	Test agent	Remains legible	Label loose	Curled edges	Comments
		Verdict	Verdict	Verdict	
1)	A, B	P	P	P	--
5)	A, B	P	--	--	--

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.2	**TABLE: List of ACCESSIBLE parts** **Form A.4**	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	V,R,J	
2	Button	V,R,J	
3	RS485 A,B	V,R,J	
4	Ep+,Ep-	V,R,J	

NOTE 1 – Test fingers and pins are to be applied without force unless a force is specified (see 6.2.2)
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 6.4).
NOTE 4 – Capacitance test may be required (see Form A.5).
NOTE 5 – The determination methods are:
V = visual; R = rigid test finger; J = jointed test finger; P3 = pin 3 mm diameter; P4 = pin 4 mm diameter.

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6	**TABLE: Values in NORMAL CONDITION**	**Form A.5**	P
6.1.2	Exceptions	11.2 Cleaning and decontamination	—
6.3.1	Values 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.4)	Voltage			Current				Capacitance		10 s / 5 s test (NOTE)			Comments
	V r.m.s.	V peak	V d.c.	Test circuit A1/A2/A3	mA r.m.s.	mA peak	mA d.c.	μC	mJ	V	μC	mJ	
1	1.3	2.4	0	--	--	--	--	--	--	--	--	--	
2	1.2	2.3	0	--	--	--	--	--	--	--	--	--	
3	136	188	4.79	A1	0.08	0.11	--	--	--	--	--	--	
4	1.89	4.08	0	--	--	--	--	--	--	--	--	--	

NOTE – A 10 s test is specified in 6.1.2 a) b). A. 5 s test is specified in 6.10.3. The capacitance level versus voltage below the limits given from figure 3 of IEC 61010-1.

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.3.2	**TABLE: Values in SINGLE FAULT CONDITION**										**Form A.6**	P
Item	Subclause and	Voltage			Transient (see NOTE)		Current				Capacitance	Comments
(see Form A.4)	fault No. (see Form A.1)	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.	µF (see NOTE)	
1	1	1.2	2.3	0	--	--	--	--	--	--	--	
2	1	1.2	2.4	0	--	--	--	--	--	--	--	
3	1	136	188	4.73	--	--	A1	0.08	0.11	--	--	
4	1	1.23	2.64	0	--	--	--	--	--	--	--	
1	2	1.3	2.4	0	--	--	--	--	--	--	--	
2	2	1.2	2.4	0	--	--	--	--	--	--	--	
3	2	133	188	0	--	--	A1	0.08	0.11	--	--	
4	2	1.04	2.16	0	--	--	--	--	--	--	--	
1	3	1.3	2.4	0	--	--	--	--	--	--	--	
2	3	1.2	2.3	0	--	--	--	--	--	--	--	
3	3	137	188	4.72	--	--	A1	0.08	0.11	--	--	
4	3	1.34	2.84	0	--	--	--	--	--	--	--	
1	4	1.2	2.3	0	--	--	--	--	--	--	--	
2	4	1.2	2.3	0	--	--	--	--	--	--	--	
3	4	133	194	4.69	--	--	A1	0.08	0.10	--	--	
4	4	1.60	4.32	0	--	--	--	--	--	--	--	
1	5	1.3	2.4	0	--	--	--	--	--	--	--	
2	5	1.3	2.3	0	--	--	--	--	--	--	--	
3	5	8.24	13.2	3.45	--	--	--	--	--	--	--	
4	5	1.56	4.08	0	--	--	--	--	--	--	--	

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.3.2	**TABLE: Values in SINGLE FAULT CONDITION**										**Form A.6**	P
Item	Subclause and	Voltage			Transient (see NOTE)		Current				Capacitance	Comments
(see Form A.4)	fault No. (see Form A.1)	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.	µF (see NOTE)	
1	6	1.2	2.3	0	--	--	--	--	--	--	--	
2	6	1.2	2.4	0	--	--	--	--	--	--	--	
3	6	137	188	0	--	--	A1	0.09	0.12	--	--	
4	6	1.22	2.56	0	--	--	--	--	--	--	--	
1	7	1.2	2.4	0	--	--	--	--	--	--	--	
2	7	1.3	2.4	0	--	--	--	--	--	--	--	
3	7	134	188	0	--	--	A1	0.08	0.12	--	--	
4	7	1.24	2.47	0	--	--	--	--	--	--	--	
1	8	0	0	0	--	--	--	--	--	--	--	
2	8	0	0	0	--	--	--	--	--	--	--	
3	8	0	0	0	--	--	--	--	--	--	--	
4	8	0	0	0	--	--	--	--	--	--	--	
1	9	1.3	2.4	0	--	--	--	--	--	--	--	
2	9	1.2	2.3	0	--	--	--	--	--	--	--	
3	9	136	188	0	--	--	A1	0.08	0.12	--	--	
4	9	1.90	4.24	0	--	--	--	--	--	--	--	
1	10	1.2	2.3	0	--	--	--	--	--	--	--	
2	10	1.3	2.4	0	--	--	--	--	--	--	--	
3	10	136	188	0	--	--	A1	0.08	0.12	--	--	
4	10	1.98	4.16	0	--	--	--	--	--	--	--	

NOTE – Transient voltages must be below the limits given from Figure 2 and the capacitance below the limits from figure 3 of IEC 61010-1.

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.3.2	**TABLE: Values in SINGLE FAULT CONDITION**										**Form A.6**	P
Item	Subclause and	Voltage			Transient (see NOTE)		Current				Capacitance	Comments
(see Form A.4)	fault No. (see Form A.1)	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.	µF (see NOTE)	
Supplementary information:												

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.5.2.2	**TABLE: Cross-sectional area of bonding conductors**	**Form A.7**	N/A

Conductor location	CROSS-SECTIONAL AREA [mm²]	Verdict

Supplementary information:

6.5.2.3	**TABLE: Tightening torque test**	**Form A.8**	N/A

Conductor location	Size of screw	Tightening torque [Nm]	Verdict

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.5.2.4	**TABLE: BONDING impedance of plug-connected equipment** **Form A.9**				N/A
ACCESSIBLE part under test		Test current [A]	Voltage attained after 1 min [V]	Calculated resistance (Maximum 0,1 or 0,2 Ω) [Ω] (NOTE 1)	Verdict

NOTE 1 – For none-detachable power cord the impedance between protective conductor plug pin of MAINS cord and each ACCESSIBLE part shall not exceed 0,2 Ohm.

Supplementary information:

6.5.2.5	**TABLE: BONDING impedance of PERMANENTLY CONNECTED EQUIPMENT** **Form A.10**			N/A
ACCESSIBLE part under test		Test current [A]	Voltage attained after 1 min (maximum 10 V) [V]	Verdict

Supplementary information:

6.5.2.6	**TABLE: Transformer PROTECIVE BONDING screen** **Form A.11**				N/A
ACCESSIBLE part under test		Test current (see NOTE) [A]	Voltage attained after 1 min (maximum 10 V) [V]	Calculated resistance (maximum 0,1 Ω) [Ω]	Verdict

NOTE – Test current must be twice the value of the overcurrent protection means of the winding. Test is specified in 6.5.2.6 a) or b).

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.5.4	**TABLE: PROTECTIVE IMPEDANCE**	**Form A.12**	P

A single component

Component	Location	Measured		Calculated	Rated		Verdict	Comments
		Working voltage [V]	Current [A]	Power dissipation [W]	Working voltage [V]	Power dissipation [W]		
Y CAP	C2	96.1	--	--	400	--	P	

A combination of components

Component	Location	Comments

NOTE – A PROTECTIVE IMPEDANCE shall not be a single electronic device that employs electron conduction in a vacuum, gas or semiconductor.

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.5.6	**TABLE: Current- or voltage-limiting device**	**Form A.13**	N/A

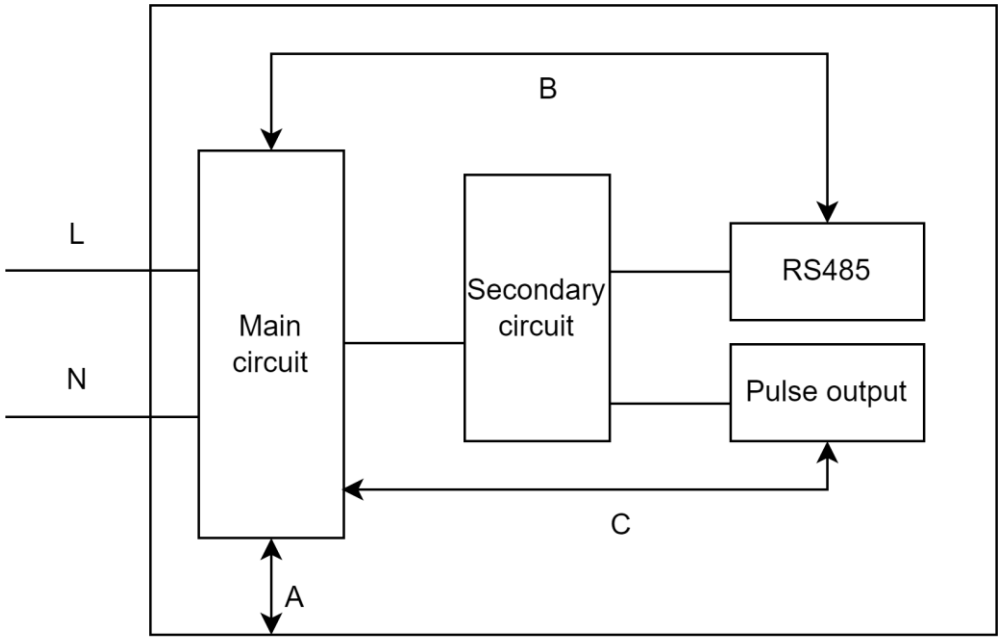
Component	Location	Measured		Rated		Verdict	Comments
		Working voltage [V]	Current [A]	Working voltage [V]	Current [A]		

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.7	**TABLE: Insulation requirements - Block diagram of system -** **Form A.14**	P



Pollution degree .....: 2 | Overvoltage category .....: III

Area	Location	Insulation type (NOTE 1)	WORKING VOLTAGE			CLEARANCE (NOTE 3)	CREEPAGE DISTANCE (NOTE 3)				Test voltage (NOTE 2)	Comments (NOTE 3)
			RMS [V]	Peak [V]	Freq. [kHz]	[mm]	PWB [mm]	CTI	Other [mm]	CTI	[V]	
A	Mains circuit – enclosure	RI	230	-	-	>14	-	-	>14	III	3000	-
B	Mains circuit – RS485	RI	230	-	-	6.4	6.4	III	-	-	3000	-
C	Mains circuit – Pulse	RI	230	-	-	7.5	7.5	III	-	-	3000	-

NOTE 1 – Type of insulation:
BI = BASIC INSULATION
DI = DOUBLE INSULATION
PI = PROTECTIVE IMPEDANCE
RI = Reinforced INSULATION
SI = Supplementary INSULATION
see also Form A.15 for further details

NOTE 2 - Types of voltage
Peak impulse test voltage (pulse)
r.m.s.
d.c.
peak

NOTE 3 - OVERVOLTAGE CATEGORIES or POLLUTION DEGREES which differ should be shown under "Comments"

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.7	**TABLE: Insulation requirements - CLEARANCES and CREEPAGES**		**Form A.15**	P
6.2.2	Examination	6.5.4	Protective impedance	—
6.4.2	ENCLOSURES and protective barriers	6.5.6	Current- or voltage-limiting device	—
6.4.4	Impedance	9.6.1	BASIC INSULATION between opposite polarity	—

Area	Location (See Form A.14)	Insulation type (NOTE 1)	WORKING VOLTAGE (NOTE 2)			CLEARANCE		CREEPAGE DISTANCE		CTI	Verdict	Comments
			RMS [V]	Peak [V]	Frequency [kHz]	Required [mm]	Measured [mm]	Required [mm]	Measured [mm]			
A	Mains circuit –enclosure	RI	230	-	-	6	>14	6	>14	III	P	-
B	Mains circuit –RS485	RI	230	-	-	6	6.4	6	6.4	III	P	-
C	Mains circuit –Pulse	RI	230	-	-	6	7.5	6	7.5	III	P	-

NOTE 1 – refer to Form A.14 for type of insulation shown in the insulation diagram NOTE 2 - to be used for definition of required insulation (see Form A.14)

Input supply voltage…….:	230	V	50	Hz

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.7	**TABLE: Insulation requirements - CLEARANCES and CREEPAGES**		**Form A.16**	P
6.4.2	ENCLOSURES or PROTECTIVE BARRIERS	9.6.1	Overcurrent protection basic insulation between MAINS parts	—
8	Mechanical resistance to shock and impact	10.5.1	Integrity of CLEARANCES and CREEPAGE DISTANCES	—

Area	Location (See Form A.14)	Insulation type	Mechanical tests (NOTE)					Test at max.	Measured after test (if required)		Verdict	Comments
			Applied force	Rigidity (8.2)		Drop (8.3)		RATED ambient	CLEARANCE	CREEPAGE DISTANCE		
			[N]	Static (8.2.1)	Impact (8.2.2)	Normal (8.3.1)	Hand-held/ Plug-in	(10.5.1)	[mm]	[mm]		
A	Mains circuit – enclosure	RI	30	Yes	Yes	-	-	70	>14	>14	P	-
B	Mains circuit – RS485	RI	30	Yes	Yes	-	-	70	6.4	6.4	P	-
C	Mains circuit – Pulse	RI	30	Yes	Yes	-	-	70	7.5	7.5	P	-

NOTE – Refer to Form A.18 for dielectric strength tests following the above tests.

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IEC 61010-1			
Clause	Requirement – Test	Result — Remark	Verdict

6.7.2.2.2	**TABLE: Reliability of potted components** **Form A.17 (optional)**	N/A
14.1 b)	**Components and subassemblies**	N/A

Temperature Cycling Test	
Manufacturer .....:	
Type.....:	
Construction .....:	
Potting compound .....:	
CREEPAGE DISTANCES measured .....:	
CLEARANCES measured .....:	
Thickness through insulation.....:	
Adhesive test Pass/Fail .....:	
Test temperature T °C.....:	

Cycles at U= AC 500 V				Leakage current (at AC 500 V) mA			
Number of cycles	Date			68 h / 125 °C	1 h / 25 °C	2 h / 0 °C	1 h / 25 °C
1. Cycle from		to					
2. Cycle from		to					
3. Cycle from		to					
4. Cycle from		to					
5. Cycle from		to					
6. Cycle from		to					
7. Cycle from		to					
8. Cycle from		to					
9. Cycle from		to					
10. Cycle from		to					

After Cycling Test :		
Humidity conditioning	48 h	
Requirements for dielectric strength (s. insulation diagram)	Test voltage V r.m.s.	Verdict
Basic insulation _____ V r.m.s.		
Supplementary insulation _____ V r.m.s.		
Reinforced insulation _____ V r.m.s.		

NOTE - to be used for evaluation of components containing insulation through solid insulation, when the component standard require thermal cycling test. Ref Clause 14.1 and Figure 15, option b)

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.8	**TABLE: Dielectric strength tests**	**Form A.18**	P
4.4.4.1 b)	Conformity after application of SINGLE FAULT CONDITIONS[1]		P
6.4	Primary means of protection[2]		P
6.6	Connections to external circuits		P
6.7	Insulation requirements[2] (see Annex K)		P
6.10.2	Fitting of non-detachable MAINS supply cords[1]		N/A
9.2 a) 2)	Eliminating or reducing the sources of ignition within the equipment		N/A
9.4 c)	Limited-energy circuit		N/A
9.6.1	Overcurrent protection basic insulation between MAINS - parts		N/A
	Test site altitude .....:	m	—
	Test voltage correction factor (see table 10) .....:		—

Location or references from Forms A.1 and A.14	Clause or sub-clause	Humidity	Working voltage	Test voltage	Comments (NOTE)	Verdict
		Yes/No	[r.m.s./d.c.]	[r.m.s./peak/d.c.]		
Mains circuit – enclosure	4.4.4.1 b),6.4,6.6	No	230Vr.m.s.	3000Vr.m.s.	1min AC voltage	P
Mains circuit – RS485	4.4.4.1 b),6.4,6.6	No	230Vr.m.s.	3000Vr.m.s.	1min AC voltage	P
Mains circuit – Pulse	4.4.4.1 b),6.4,6.6	No	230Vr.m.s.	3000Vr.m.s.	1min AC voltage	P
Mains circuit – enclosure	6.7	Yes	230Vr.m.s.	3000Vr.m.s.	1min AC voltage	P
Mains circuit – RS485	6.7	Yes	230Vr.m.s.	3000Vr.m.s.	1min AC voltage	P
Mains circuit – Pulse	6.7	Yes	230Vr.m.s.	3000Vr.m.s.	1min AC voltage	P
Mains circuit – enclosure	6.7	Yes	230Vr.m.s.	3510Vr.m.s.	5s AC voltage	P
Mains circuit – RS485	6.7	Yes	230Vr.m.s.	3510Vr.m.s.	5s AC voltage	P
Mains circuit – Pulse	6.7	Yes	230Vr.m.s.	3510Vr.m.s.	5s AC voltage	P

[1] Record the fault, test or treatment applied before the dielectric strength test. [2] Humidity preconditioning required.
NOTE: Test duration may be recorded.

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.10.2	**TABLE: Cord anchorage**				**Form A.19**	N/A
Location	Mass [kg]	Pull [N]	Verdict	Torque [Nm]	Verdict	Comment

IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

7.	**TABLE: Protection against mechanical HAZARDS** **Form A.20**	N/A
7.3.4	Limitation of force and pressure	—
7.3.5	Gap limitations between moving parts	—

Part / Location	Clause 7.3.4		Clause 7.3.5.1								Clause 7.3.5.2			Verdict	Comments
	Continuous	Temporary	Minimum gaps [mm]								Maximum gaps [mm]				
	Contact pressure max. 50 N /cm² @ max. 150 N	max. 250 N / 3 cm² @ max. 0,75 s	Torso 500	Head 300	Leg 180	Foot 120	Toes 50	Arm 120	Hand 100	Finger 25	Head 120	Foot 35	Finger 4		

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IEC 61010-1			
Clause	Requirement – Test	Result - Remark	Verdict
7.4	**TABLE: Stability**	**Form A.20A**	N/A
	Equipment height / mass ..... :	mm / kg	—
	Equipment (Containers) loaded ..... :	[yes / no]	—
	Castors at unfavourable position ..... :	[yes / no]	—
	Doors, drawers and movable arms closed ..... :	[yes / no]	—
	Doors and drawers at unfavourable position ..... :	[yes / no]	—

Location	Tilt angle	Applied force				Comments	Verdict
	10°	250 N	20% [N]	800 N	4 times load [N]		
Front side				—			
Left side				—			
Rear side				—			
Right side				—			
Top side	—						
Working surface	—	—	—				
Ledge	—	—	—				
Castor / support foot							
Castor / support foot removed							

Supplementary information:

7.6	**TABLE: Wall mounting**	**Form A.20B**	N/A
	Equipment weight ..... :	kg	—
	Equipment mounted as specified by manufacturer .. :	[yes / no]	—
	Equipment mounted at plasterboard (drywall) ..... :	[yes / no]	—
	More than one fastener used ..... :	[yes / no]	—
	Test maintained (after 5 s to 10 s to full load) ..... :	1 min	—

Location	Applied weight		Comments	Verdict
	4 times weight [kg]	2 times weight [kg]		
Mounting brackets				

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IEC 61010-1				
Clause	Requirement – Test	Result - Remark		Verdict
8.2	**TABLE: ENCLOSURE rigidity test**		**Form A.21A**	P
8.2.1	Static test			P
	Material of enclosure .....:	non-metallic		—
	Preparation for the test:			—
	Operated at ambient temperature .....:	70 °C	2 h	—
Location		Comments		Verdict
All sides of enclosure		No visible damage, no hazard		P
Supplementary information:				
8.2.2	**TABLE: Impact test**			P
	Material of enclosure .....:	non-metallic		—
	Corresponding IK-code.....:	IK08		—
	Preparation for the test:			—
	Cooled to (temperature) .....:	-40 °C		—
Location		Comments		Verdict
Window		No Visible damage, no hazard		P
Buttons		No visible damage, no hazard		P
The front of the enclosure		No visible damage, no hazard		P
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IEC 61010-1			
Clause	Requirement – Test	Result - Remark	Verdict
8.3	**TABLE: Drop test**	**Form A.21B**	N/A
8.3.1	Other equipment		N/A

Location	Raised up to		Comments	—
	[mm]	30 °		
1)				
2)				
3)				
4)				

Supplementary information:

8.3.2	HAND-HELD EQUIPMENT and DIRECT PLUG-IN EQUIPMENT		N/A
	Material of enclosure .....:	Metal / non-metallic	—
	Preparation for the test:		—
	Cooled to (temperature) .....:	°C	—

Location	Comments	Verdict
1) Side		
2) Edge		
3) Corner		

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

9	**TABLE: Protection against the spread of fire**		**Form A.22**	P
Item	Source of HAZARD or area of the equipment considered (circuit, component, liquid etc.)	Protection Method (9.1 a, b or c)	Protection details	Verdict
1	All circuits inside of EUT	9.1 c	V-0 rated printed wiring boards and V-0 rated non-metallic enclosure provided.	P
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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

9.3.2	**TABLE: Constructional requirements**	**Form A.23**	N/A
14.7	Printed wiring boards		N/A

Material tested ..... :		—
Generic name ..... :		—
Material manufacturer..... :		—
Type..... :		—
Colour ..... :		—
Conditioning details ..... :		—

		Sample					
		1	2	3	4	5	6
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						

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

9.4	**TABLE: Limited-energy circuit**					**Form A.24**	N/A
Item or Location (see Form A.22)	9.4 a)	9.4 b) Current limitation (NOTE)		9.4 c)	Decision	Comments	
	Maximum potential in circuit voltage r.m.s./d.c. [V]	Maximum available current [A]	Overload protection after 120 s [A]	Circuit separation	Yes/No		

NOTE – Maximum values see Tables 17 and 18 of IEC 61010-1

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

9.5	**TABLE: Requirements for equipment containing or using flammable liquids**	**Form A.25**	N/A

Type of liquid	9.5 Flammable liquids		Verdict
	b) Quantity	c) Containment	

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.	**TABLE: Temperature Measurements** **Form A.26A**	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:	The voltage measuring circuits applied for 230V, and the current measuring circuits applied for 100mA		
Frequency..... :	60 Hz	Test room ambient temperature (ta)... :	22.36 °C
Voltage..... :	230 V	Test duration..... :	1 h 31 min

Part / Location	t_m [°C]	t_c [°C]	t_{max} [°C]	Verdict	Comments
1. X capacitor C2	28.51	76.5	Ref.	P	
2. Inductance L2	30.83	78.82	Ref.	P	
3. RTV1	28.21	76.2	Ref.	P	
4. C55	31.52	79.51	Ref.	P	
5. C46	30.66	78.65	Ref.	P	
6. Inductance L1	30.87	78.86	Ref.	P	
7. Winding of Transformer T2	32.75	80.74	130	P	
8. PCB near T2	35.38	83.37	Ref.	P	
9. Y capacitor C42	32.75	80.74	Ref.	P	
10. IC1	31.11	79.1	Ref.	P	
11. Optocoupler U1	31.30	79.29	Ref.	P	
12. Optocoupler U2	31.88	79.87	Ref.	P	
13. Optocoupler U3	30.77	78.76	Ref.	P	
14. Optocoupler U4	32.57	80.56	Ref.	P	
15. Optocoupler U6	29.44	77.43	Ref.	P	
16. IC6	40.24	88.23	Ref.	P	
17. Y capacitor C2	27.52	75.51	Ref.	P	
18. C60	31.50	79.49	Ref.	P	
19. Enclosure	24.46	72.45	85	P	
20. Screen	25.16	73.15	85	P	
21. Button	24.84	72.83	70	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.26B for details of winding temperature measurements

Supplementary information:

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.	**TABLE: Temperature Measurements** **Form A.26A**	P
10.1	Surface temperature limits – SINGLE FAULT CONDITION	P
10.2	Temperature of windings – SINGLE FAULT CONDITION	P
10.3	Other temperature measurements	P

Operating conditions:	Short circuit of T2 Pin9,10		
Frequency..... :	60 Hz	Test room ambient temperature (ta)... :	22.36 °C
Voltage..... :	230 V	Test duration..... :	1 h 34 min

Part / Location	t_m [°C]	t_c [°C]	t_{max} [°C]	Verdict	Comments
1. Winding of Transformer T2	60.37	108.01	175	P	
2. Enclosure	28.84	76.48	105	P	
3. Screen	29.93	77.57	105	P	
4. Button	29.53	77.17	105	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.26B for details of winding temperature measurements

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.	**TABLE: Temperature Measurements** **Form A.26A**	P
10.1	Surface temperature limits – SINGLE FAULT CONDITION	P
10.2	Temperature of windings – SINGLE FAULT CONDITION	P
10.3	Other temperature measurements	P

Operating conditions:	Short circuit of IC6 pin2,4		
Frequency..... :	60 Hz	Test room ambient temperature (ta)... :	23.39 °C
Voltage..... :	230 V	Test duration..... :	2 h 0 min

Part / Location	t_m [°C]	t_c [°C]	t_{max} [°C]	Verdict	Comments
1. Winding of Transformer T2	53.87	100.48	175	P	
2. Enclosure	26.86	73.47	105	P	
3. Screen	29.98	76.59	105	P	
4. Button	28.31	74.92	105	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.26B for details of winding temperature measurements

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.	**TABLE: Temperature Measurements** **Form A.26A**	P
10.1	Surface temperature limits – SINGLE FAULT CONDITION	P
10.2	Temperature of windings – SINGLE FAULT CONDITION	P
10.3	Other temperature measurements	P

Operating conditions:	Overload of C46		
Frequency..... :	60 Hz	Test room ambient temperature (ta)... :	22.55 °C
Voltage..... :	230 V	Test duration..... :	1 h 26 min

Part / Location	t_m [°C]	t_c [°C]	t_{max} [°C]	Verdict	Comments
1. Winding of Transformer T2	104.81	152.26	175	P	
2. Enclosure	36.51	83.96	105	P	
3. Screen	37.46	84.91	105	P	
4. Button	36.95	84.4	105	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.26B for details of winding temperature measurements

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.2	**TABLE: Temperature of windings** **Form A.26B** **Resistance method Temperature Measurements**	N/A
4.4.2.7	MAINS transformers	N/A
14.2.1	Motor temperatures	N/A

Operating conditions..:			
Frequency.....:	Hz	Test room ambient temperature (ta1/ta2)..:	/ °C (initial / final)
Voltage.....:	V	Test duration.....:	h min

Part / Designation	Rcold [Ω]	Rwarm [Ω]	Current [A]	t_r [K]	t_c [°C]	t_{max} [°C]	Verdict	Comments

NOTE 1- R_{cold} = initial resistance R_{warm} = final resistance
t_r = temperature rise t_c = t_r corrected (t_c= t_r + [40 °C or max RATED ambient])
t_{max} = maximum permitted temperature
NOTE 2 - Indicate insulation class (IEC 60085) under comments (optional)
NOTE 3 - Record values for NORMAL CONDITION and / or SINGLE FAULT CONDITION in this Form use additional form if necessary

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.5.2	**TABLE: Resistance to heat of non-metallic ENCLOSURES**	**Form A.27**	P
	Test method used:		—
	Non-operative treatment ..... :	[Yes]	
	Empty ENCLOSURE ..... :	[No]	
	Operative treatment ..... :	[No]	
	Temperature during tests ..... :	70℃	—

Description	Material	Comments	Verdict
Enclosure	Non-metallic	No damaged	P

Dielectric strength test (6.8) ..... :	-	V	[r.m.s./peak/d.c.]	-

NOTE – Within 10 minutes of the end of treatment suitable tests in acc. to 8.2 and 8.3 must be conducted and pass criteria of 8.1.

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.5.3	**TABLE: Insulating material**	**Form A.28**	P
10.5.3 1)	Ball-pressure test		P
	Max. allowed impression diameter ..... :	2 mm	—

Part	Test temperature [°C]	Impression diameter [mm]	Verdict
Enclosure	125	1.17	P

Supplementary information:

10.5.3 2)	**Vicat softening test (ISO 306)**	**Form A.29**	N/A

Part	Vicat softening temperature [°C]	Thickness of sample [mm]	Verdict

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

8	**TABLE: Mechanical resistance to shock and impact** **Form A.30**	N/A
11	**Protection against HAZARDS from fluids and solid foreign objects**	N/A

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.

Location (see Form A.14)	Clause 8 tests				Clause 11 tests				Working voltage [r.m.s./d.c.]	Test voltage [r.m.s./peak/d.c.]	Verdict	Comments
	Static (8.2.1) 30 N	Impact (8.2.2)	Normal (8.3.1)	Handheld Plug-in (8.3.2)	Cleaning (11.2)	Spillage (11.3)	Overflow (11.4)	IEC 60529 (11.6)				

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

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

11.7.2	**TABLE: Leakage and rupture at high pressure**	**Form A.31**	N/A

Part	Maximum permissible working pressure [MPa]	Test pressure [MPa]	Leakage Yes / No	Deformation Yes / No	Burst Yes / No	Comments

NOTE – see also Annex G with requirements for USA and Canada.

Supplementary information:

11.7.3	**TABLE: Leakage from low-pressure parts**	**Form A.32**	N/A

Part	Test pressure [MPa]	Leakage Yes / No	Comments

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

12.2.1	**TABLE: Ionizing radiation**	**Form A.33**	N/A
12.2.1.2	Equipment intended to emit radiation		N/A

Locations tested	Measured values [µSv/h]	Verdict	Comments

Supplementary information:

12.2.1.3	**Equipment not intended to emit radiation**	**Form A.34**	N/A
	Max. allowed effective dose rate at 100 mm……:	1 µSv/h	—

Locations tested	Measured values [µSv/h]	Verdict	Comments

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

12.5.1	**TABLE: Sound level**	**Form A.35**	N/A

Locations tested	Measured maximum sound pressure level dB(A)	Calculated maximum sound power level
At operator's normal position and at bystanders' positions		
a)		
b)		
c)		
d)		
e)		
f)		

Supplementary information:

12.5.2	**TABLE: Ultrasonic pressure**	**Form A.36**	N/A

Locations tested	Measured values		Comments
	[dB]	[kHz]	
At operator's normal position			
At 1 m from the ENCLOSURE			
a)			
b)			
c)			
d)			
e)			

NOTE – No limit is specified at present, but a limit of 110 dB above the reference pressure value of 20 μPa is under consideration for applicable frequencies between 20 kHz and 100 kHz.

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

13.2.2	**TABLE: Batteries and battery charging** **Form A.37**		N/A
	Battery load and charging circuit diagram:		
	Battery type..... :		—
	Battery manufacturer/model/catalogue No. ..... :		—
	Battery ratings..... :		—
	Reverse polarity instalment test		N/A

Single component failures	Verdict	
Component	Open circuit	Short circuit

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

14.3	**TABLE: Overtemperature protection devices**	**Form A.38**	N/A

Reliability test

Component	Type (NOTE)	Verdict	Comments

NOTE:
NSR = non-self-resetting (10 times)
NR = non-resetting (1 time)
SR = self-resetting (200 times)

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

4.4.2.7	**TABLE: MAINS transformer**				**Form A.39**	P
4.4.2.7.2	Short circuit					P
14.6	MAINS transformers tested outside equipment					N/A
Type ..... :						—
Manufacturer ..... :						—
Test in equipment						
Test on bench						
Test repeated inside equipment (see 14.6)						
Optional – Insulation class (IEC 60085) of the lowest rated winding ..... :						—
Winding identification						
Type of Protector for winding (NOTE 1)						
Elapsed time						
Current, A primary						
secondary						
Winding temperature, °C primary						
(see NOTE 2) secondary						
Tissue paper / cheesecloth OK ? (Pass / Fail)						
Voltage tests (see NOTE 3)						
Primary to secondary	_____ V ____					
Primary to core	_____ V ____					
Secondary to secondary	_____ V ____					
Secondary to core	_____ V ____					
Verdict						

NOTE 1: Primary fuse - PF / ( ) A
Secondary fuse - SF / ( ) A
Overtemperature protection - OP / ( ) °C
Impedance protection - Z

NOTE 2: Indicate method of measurement
- TC = with thermocouple
- R = resistance method

If resistance method is used, record resistance in cold and warm condition in Form A.26B.

NOTE 3: Record the voltage applied and the type of voltage (r.m.s. / d.c. / peak) and for results use NB = no breakdown or B = breakdown

Supplementary information:

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

4.4.2.7	**TABLE: MAINS transformer**				**Form A.40**	P
4.4.2.7.3	Overload tests (for MAINS transformers)					P
14.6	MAINS transformers tested outside equipment					N/A
Type..... :						—
Manufacturer ..... :						—
Test in equipment						
Test on bench						
Test repeated inside equipment (see 14.6)						
Optional – Insulation class (IEC 60085) of the lowest rated winding .....:						—
Winding identification						
Type of Protector for winding (NOTE 1)						
Elapsed time						
Current, A primary						
secondary						
Winding temperature, °C primary						
(see NOTE 2) secondary						
Tissue paper / cheesecloth OK ? (Pass / Fail)						
Voltage tests (see NOTE 3)						
Primary to secondary	_____ V ____					
Primary to core	_____ V ____					
Secondary to secondary	_____ V ____					
Secondary to core	_____ V ____					
Verdict						

NOTE 1: Primary fuse - PF / ( ) A
Secondary fuse - SF / ( ) A
Overtemperature protection - OP / ( ) °C
Impedance protection - Z

NOTE 2: Indicate method of measurement TC = with thermocouple
R = resistance method
If resistance method is used, record resistance in cold and warm condition in Form A.26B.

NOTE 3: Record the voltage applied and the type of voltage (r.m.s. / d.c. / peak) and for results use NB = no breakdown or B = breakdown

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

14.8	**TABLE: Circuits used to limit TRANSIENT OVERVOLTAGES**	**Form A.41**	N/A

Circuit / Designation	Overvoltage Category	MAINS voltage [V r.m.s.]	Test voltage [V]	t_m [°C]	t_c [°C]	t_{max} [°C]	Ignited Yes / No	Safely suppressed Yes / No	Properly functional Yes / No	Verdict	Comments

Test room ambient temperature: °C

NOTE - t_m = measured temperature

t_c = t_m corrected (t_m–t_a+ **40 °C** or max. RATED ambient)

t_{max} = maximum permitted temperature

Conformity is checked by applying 5 positive and 5 negative impulses with the applicable impulse withstand voltage, spaced up to 1 min apart, from a hybrid impulse generator (see IEC 61180-1).

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IEC 61010-1			
Clause	Requirement – Test	Result — Remark	Verdict

Annex H	**TABLE: Qualification of conformal coating for protection against pollution**	**Form A.42**	N/A

Technical properties		
Manufacturer		—
Type		—
Meet requirements of ANSI / UL 746E	[yes / no]	
Manufacturer declaration of coating material	[yes / no]	
Operating temperature of coating	[ ] °C	
Comparative tracking index (CTI)	[ ]	
Insulation resistance	[ ] MΩ	
Dielectric strength	[ ] V	
UV resistance (if required)	[yes / no]	
Flammability rating		
Preparation of the test specimens conducted	[yes / no]	

Item	Test conditioning	Parameter	Td	Samples						Verdict	Comments
			h	1	2	3	4	5	6		
1	Cold		24								
2	Dry heat		48								
3	Rapid temp. change										
4	Damp heat		24								
5	Adhesion of coating	5 N									
	Visual inspection										
6	Humidity		48								
7	Insulation resistance	≥ 100 MΩ									
	Visual inspection										

NOTE Td = Test duration time

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IEC 61010-1			
Clause	Requirement – Test	Result — Remark	Verdict

	TABLE: Additional or special tests conducted	**Form A.43**	N/A
Clause and name of test	Test type and condition	Observed results	—

IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

	TABLE 1.A: List of components and circuits relied on for safety	P

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
Front panel （Transparent）	Electrical isolation	SABIC INNOVATIVE PLASTICS US L L C	LUX7630C(f1)(gg*)	V-0, Min 1mm, 125 ºC	ANSI/UL 94, UL 746B	UL E121562
Housing	Electrical isolation	ZHEN JIANG CHI MEI CHEMICAL CO LTD	PC-6610(f1)(a)	V-0, Min 1.5mm, 125 ºC	ANSI/UL 94, UL 746B	UL E194560
Terminal Block(J1 Grey)	Electrical Connector	PHOENIX CONTACT GMBH & CO KG	BC-500X10- 2	300V,10A,V-0	UL 1059 CAN/CSA C22.2 No. 158-10	UL E60425
Material of PCB	Support components	Palwonn Electronics (Shenzhen) Co Ltd	D5	V-0,130°C	UL 796	UL E230435
- Alternative	Support components	KUNSHAN WANZHENG PRINTED CIRCUIT BOARD CO LTD	WZ-1	V-0,130°C	UL 796	UL E211670
- Alternative	Support components	Kunshan Guangqian Electronics Co Ltd	D	V-0,130°C	UL 796	UL E335082
Y1 CAP (C42)	Safety Capacitor	JYH HSU (JEC) ELECTRONICS LTD	JD	Capacitance：2.2nF, Rated Voltage：310V	IEC 60384-14:2013	VDE 40038642
Y1 CAP (C2)	Safety Capacitor	Sichuan Teruixiang Technology International Co Ltd	TRX	Capacitance：2.2nF, Rated Voltage：310V	CAN/CSA-E60384-1	UL E315719

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

	TABLE 1.A: List of components and circuits relied on for safety	P

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
X CAP（C2）	Safety Capacitor	QI RONG ELECTRONIC TECHNOLOGY CO LTD	MKP	Capacitance：0.15F, Rated Voltage：310V	UL 60384-14	UL E492807
AC-DC（U1）	Electrical isolation	Power Integrations, Inc.	TNY286DG-TL	725V Rated MOSFET, -40~150°C	IEC 61010-1 EN 61010-1	Test with applicant
Transformer （T1）	Electrical isolation	GuangDong Misun Technology CO.,LTD	EPC13	Class B,-25 to125℃	IEC 61010-1 EN 61010-1	Test with applicant
-Insulation system	Electrical isolation	GuangDong Misun Technology CO.,LTD	FPE- 130	Class B, table IX	UL 1446	UL E497320
-Bobbin	Support components	CHANG CHUN PLASTICS CO LTD	T200HF	V-0,150℃	UL 94, UL 746B	UL E59481
- Alternative	Support components	SUMITOMO BAKELITE CO LTD.	PM-9820	V-0,150℃	UL 94 UL 746B	UL E41429
- Triple insulated wire (winding between pin F1-F2, 9-10)	Electrical Connector	SHENZHEN KAIZHONG HEDONG NEW MATERIALS CO LTD	TIW-B	130℃	ANSI/UL 2353	UL E357240
- Alternative	Electrical Connector	HEYUAN KOSHEN INSULATOR CO LTD	TIW-B1	130℃	ANSI/UL 2353	UL E365580
-Wire (winding between pin 2-4)	Electrical Connector	PACIFIC ELECTRIC WIRE & CABLE CO LTD	UEF1/U	155℃	ANSI/UL 1446	UL E201757

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

	TABLE 1.A: List of components and circuits relied on for safety	P

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
- Alternative	Electrical Connector	SUNTEK WIRE (TAISHAN) CO LTD	xUEW155	MW 79-C,155℃	ANSI/UL 1446	UL E234867
- Alternative	Electrical Connector	BO LUO DIAN XING METAL WIRE CO LTD (Interchangeable)	xFSW	MW 79-C,155℃	ANSI/UL 1446	UL E511777
-Tube	Electrical isolation	CHANGYUAN ELECTRONICS GROUP CO, LTD	CB-TT-L	Max V rms 150V, Max Oper Temp 200℃, VW-1	UL 224	UL E180908
- Alternative	Electrical isolation	GREAT HOLDING INDUSTRIAL CO LTD	TFL	Max V rms 150V, Max Oper Temp 200℃, VW-1	UL 224	UL E156256
-Tape	Electrical isolation	DONGGUAN SHIN YAHUA ELECTRONIC MATERIAL CO LTD	CT280	130℃	CAN/UL 510A	UL E324093
- Alternative	Electrical isolation	SHEN ZHEN XINHUAHUI ELECTRONIC MATERIALS CO LTD	HMT803	130℃	CAN/UL 510A	UL E328315
-Varnish	Electrical isolation	YUEYANG GREEN TECHNOLOGY CO LTD	JX-1150	MW 28-C,155 ºC	UL 1446	UL E303754
Optocoupler (U1, U2, U3)	Electrical isolation	LITE-ON TECHNOLOGY CORP	LTV-816	5300 VAC,115 ºC	UL 1577	UL E113898

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IEC 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

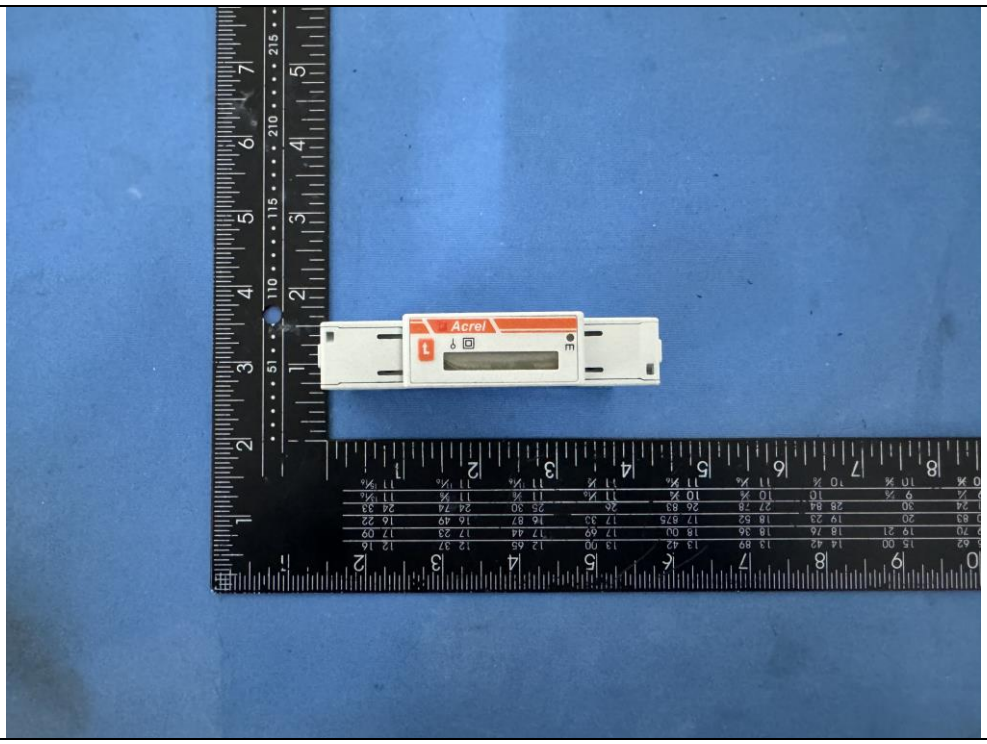
	TABLE 1.A: List of components and circuits relied on for safety					P
Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
Optocoupler (U4,U6)	Electrical isolation	EVERLIGHT ELECTRONICS CO LTD	EL1019	5000 VAC,110 ºC	UL 1577	UL E214129
Inductance(L3)	Electrical Connector	GUANG JIE ELECTRONICS CO LTD	NL10KT101	100uH ,40mA ,1210	IEC 61010-1 EN 61010-1	Test with applicant
Connectors(J1、J5)	Electrical Connector	MITSUI CHEMICALS INC	E630N(e1)(r5)	V-0,120 ºC	UL 94 UL 746B	UL E52579
Connectors(J8)	Electrical Connector	CHANG CHUN PLASTICS CO LTD	4830	V-0, 120 ºC	UL 94 UL 746B	UL E59481
Varistor(RTV1)	SURGE PROTECTIVE	HUNAN JINYANG ELECTRIC CO LTD	MZ11-06D150-500RM/7D471	265VAC,4KV	ANSI/UL 1449	UL E481249

NOTE → 1 List all different manufacturers of the above components → 4 asterisk indicates mark assuring agreed level of surveillance
→ 2 May include electrical, mechanical values
→ 3 List licence no or method of acceptance

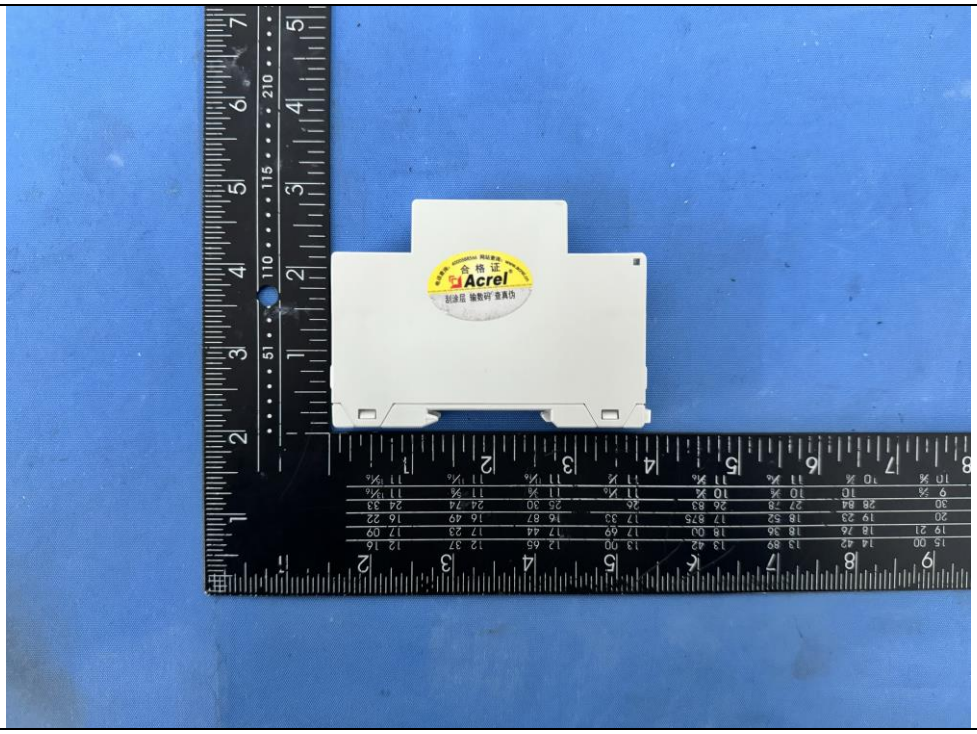
---End of Report---

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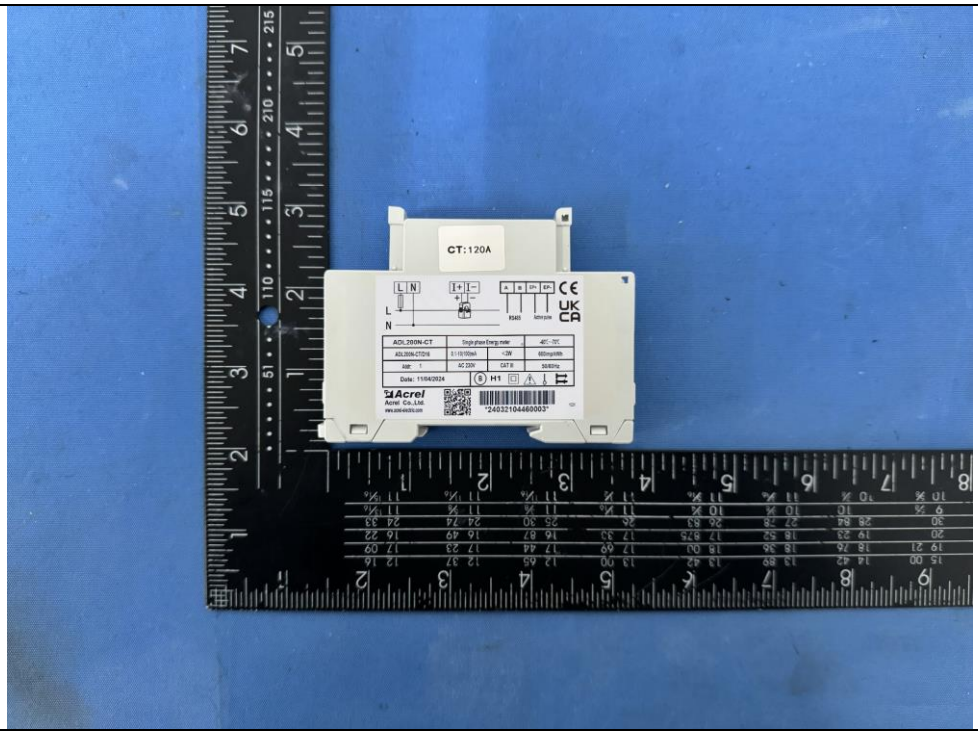
Details of: General View



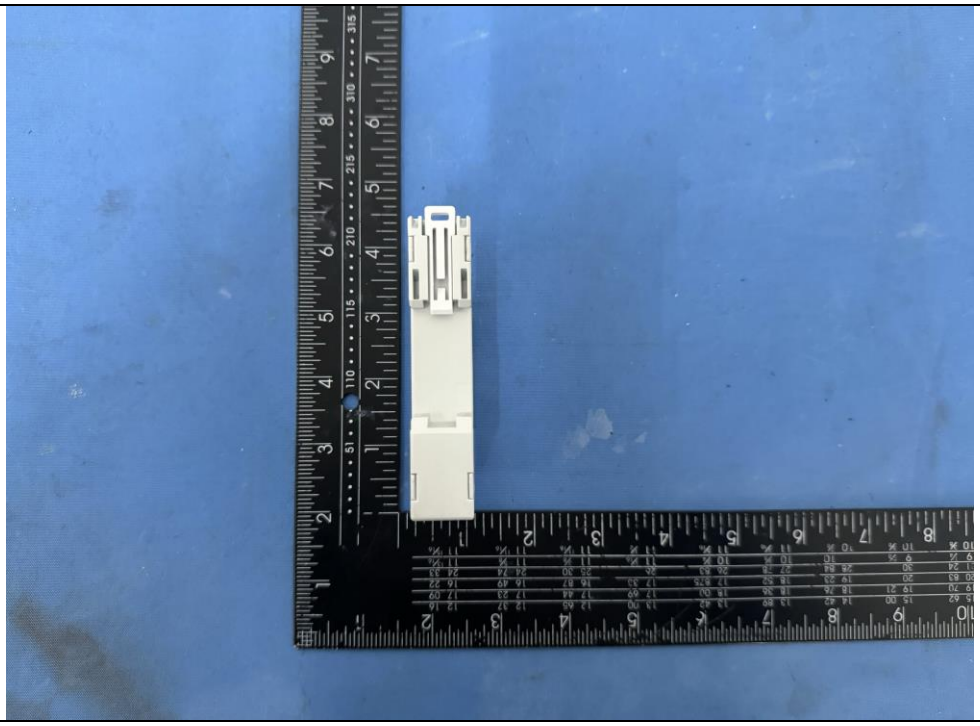
Details of: Side View



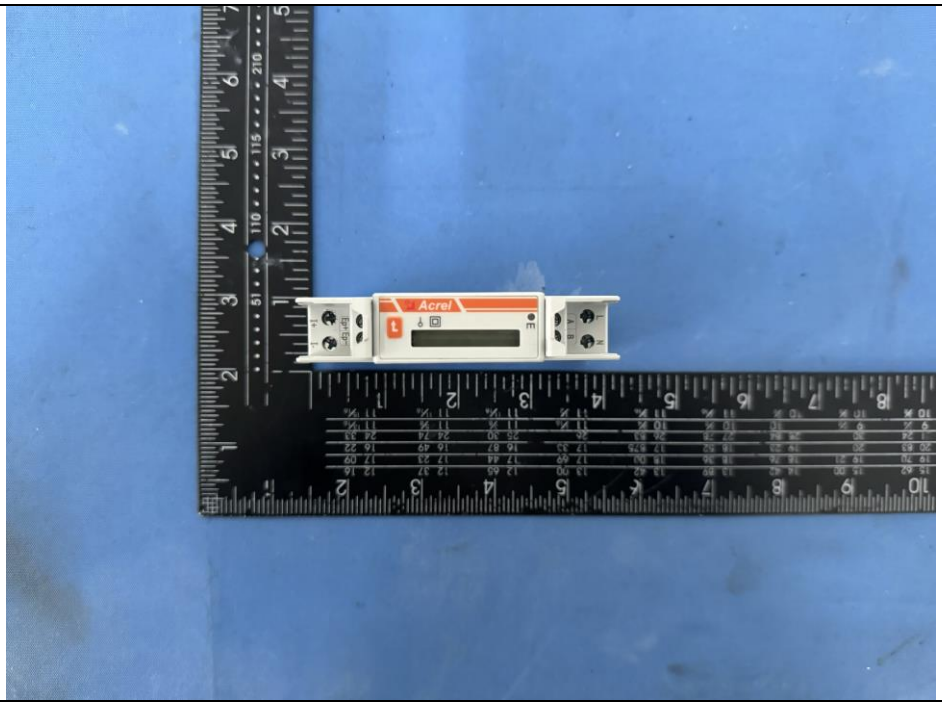
Details of: Side View



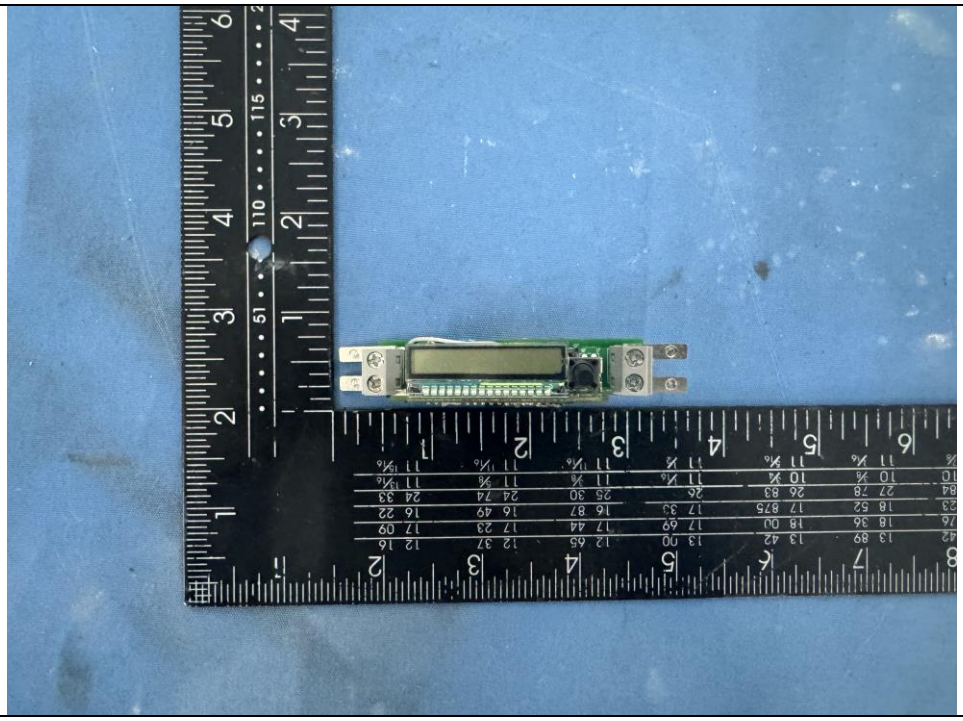
Details of: Back View



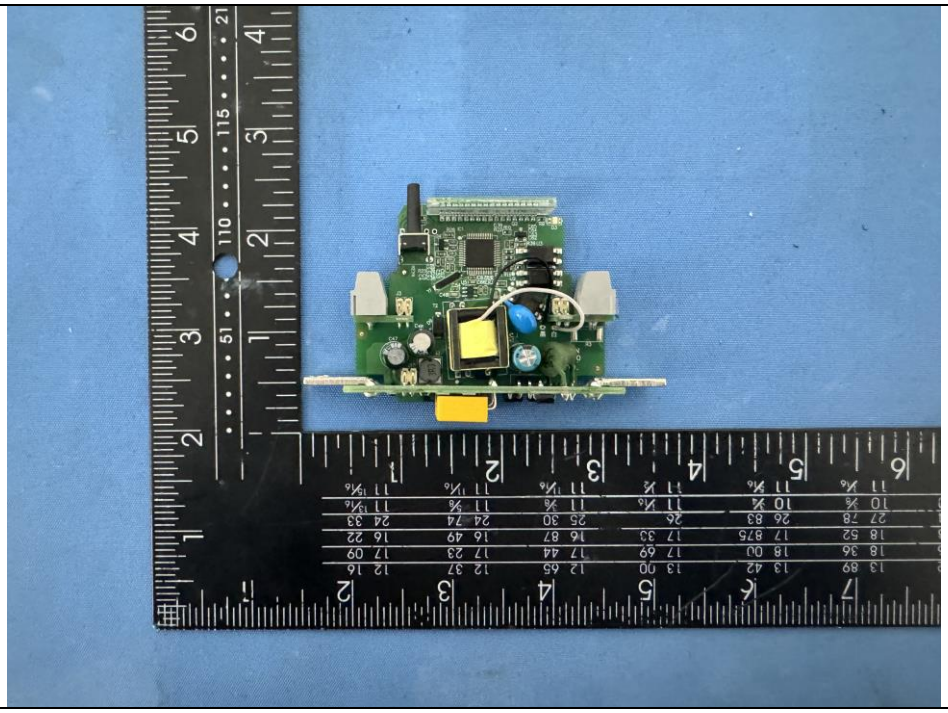
Details of: Wiring terminals View



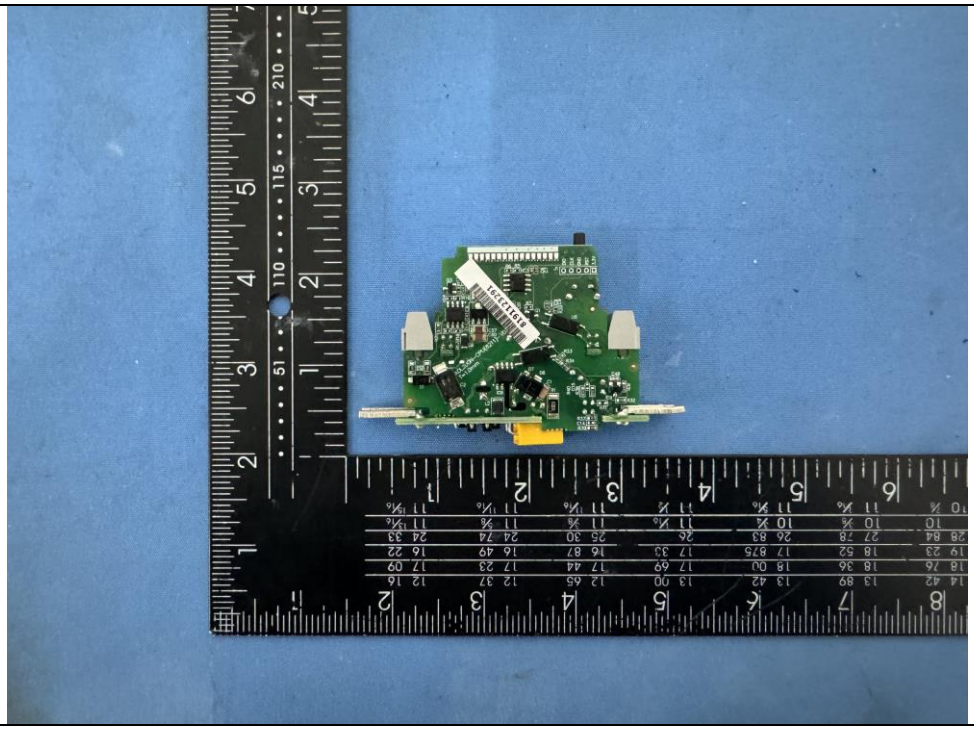
Details of: Inside View



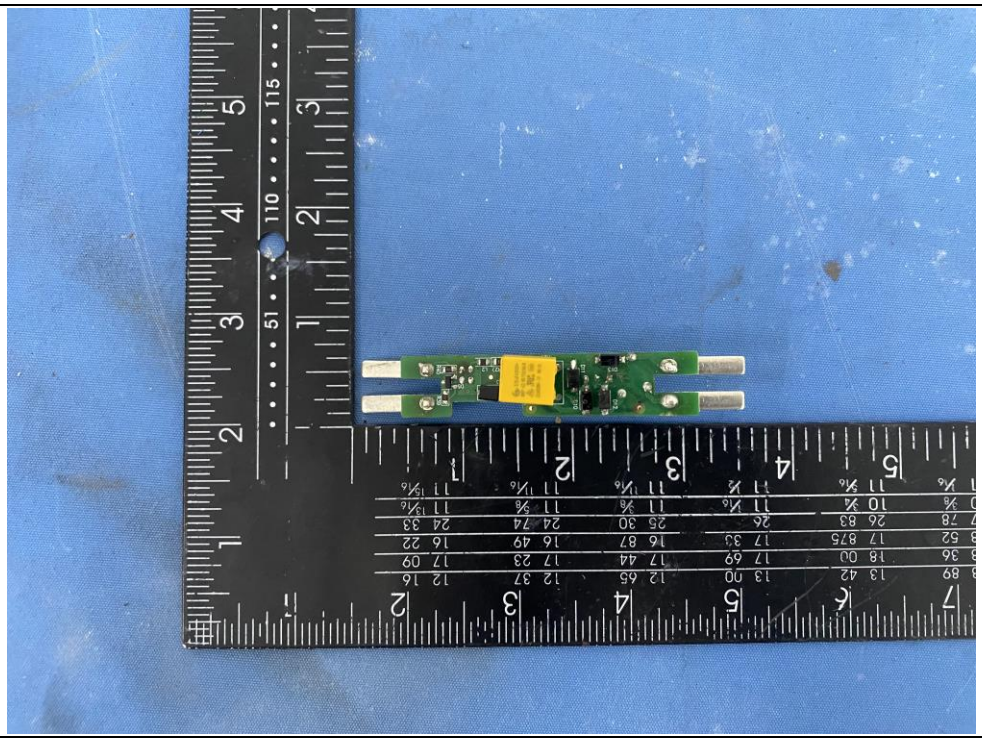
Details of: Front View of PCBA-1



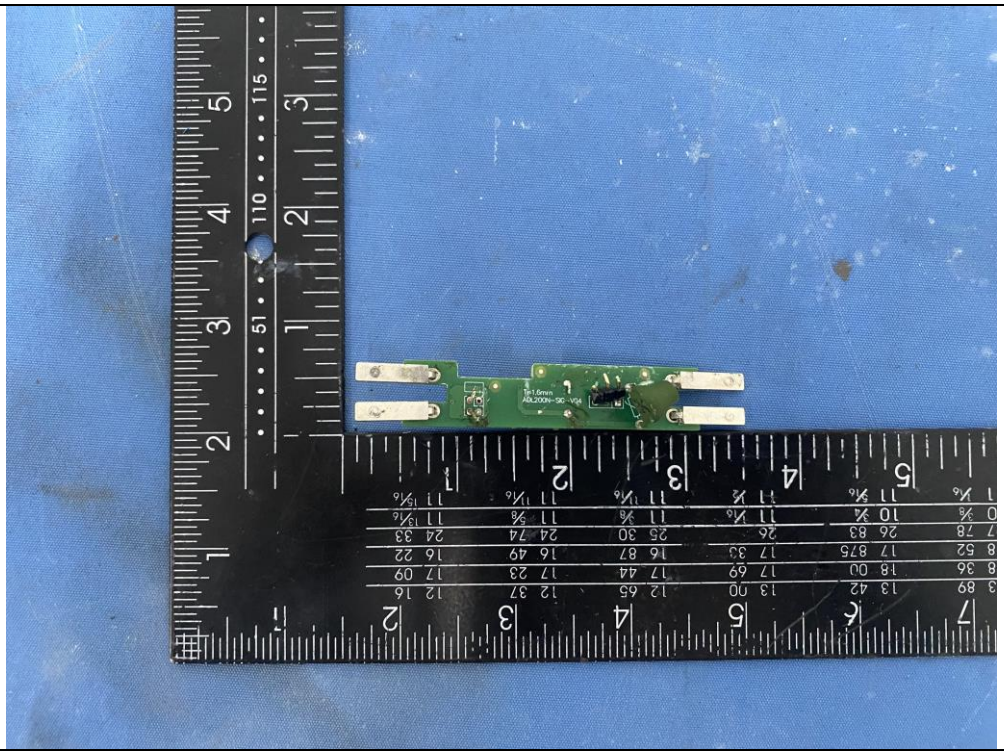
Details of: Back View of PCBA-1



Details of: Front View of PCBA-2



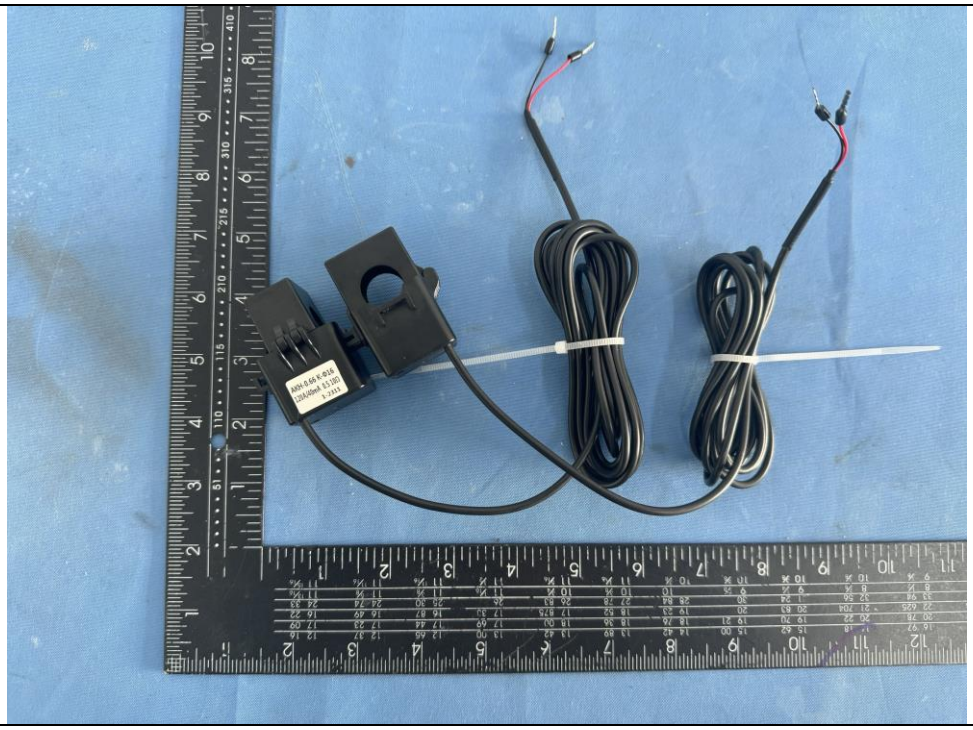
Details of: Back View of PCBA-2



Details of: Current transformer D10



Details of: Current transformer D16



Details of: Current transformer D24



Details of: Current transformer D36



End of Attachment 1****

IEC61010_1P ATTACHMENT 2			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT **IEC 61010-1** **EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES** (Electrical Equipment For Measurement, Control, and Laboratory Use; Part1: General Requirements)			
Differences according to ..... : EN 61010-1:2010/A1			
Attachment Form No. ..... : EU_GD_IEC61010_1P **Attachment Originator .....** : TÜV Rheinland LGA Products GmbH **Master Attachment**..... : Date 2021-04-12			
Copyright © 2021 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.			
	CENELEC COMMON MODIFICATIONS (EN)		P
	Procedure for voltage tests		P
6.8.3.1	**The a.c. voltage test** *Replace the first sentence by the following sentence:* The voltage tester shall be capable of maintaining the test voltage throughout the test within +/- 5 % of the specified value.		P
Annex ZA (normative)	The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.		P
Annex ZZ (informative)	Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered		P

---End of Attachment 2---

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TEST REPORT
IEC 61010-2-030
Safety requirements for electrical equipment for measurement, control, and laboratory use
Part 2-030: Particular requirements for equipment having testing or measurement circuits

Report Number..... :	SHES240300412201 Attachment3
Date of issue ..... :	2024-04-11
Total number of pages ..... :	29
Name of Testing Laboratory preparing the Report ..... :	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Applicant's name ..... :	Acrel Co., Ltd.
Address..... :	No.253, Yulv Road, Jiading, Shanghai, China
Test specification:	
Standard ..... :	IEC 61010-2-030:2017 for use in conjunction with IEC 61010-1:2010, AMD1:2016
Test procedure..... :	
Non-standard test method..... :	N/A
TRF template used..... :	IECEE OD-2020-F1:2020, Ed.1.3
Test Report Form No. ..... :	IEC61010_2_030C
Test Report Form(s) Originator .... :	TÜV SÜD Product Service GmbH
Master TRF ..... :	Dated 2020-08-28

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This report is not valid as a CB Test Report unless signed by an approved IECEE Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description ..... :	Single phase Energy Meter
Trade Mark ..... :	Acrel
Manufacturer ..... :	Acrel Co., Ltd.
Model/Type reference ..... :	ADL200N-CT
Ratings ..... :	230VAC,50/60Hz,2W,CT Transformation ratio:80A/26.6mA or 120A/40mA or 200A/66.6mA or 300A/100mA

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.	
Testing location/ address.....:		588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.	
Tested by (name, function, signature).....:		Michelle Jiang	Michelle Jiang
Approved by (name, function, signature)...:		Linda Nie	Linda Nie
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):
See IEC 61010-1 test report

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Summary of testing:	
Tests performed (name of test and test clause): **See IEC 61010-1 test report**	**Testing location:** **See IEC 61010-1 test report**
Summary of compliance with National Differences (List of countries addressed): ☒ **The product fulfils the requirements of** __ EN IEC 61010-2-030:2021/A11:2021_____	
Statement concerning the uncertainty of the measurement systems used for the tests (may be required by the product standard or client) ☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:** **Procedure number, issue date and title:** Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing. ☐ **Statement not required by the standard used for type testing** (Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)	

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Copy of marking plate:

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

See IEC 61010-1 test report.

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Test item particulars.....:	
Type of item tested.....:	Measurement
Description of equipment function .....:	Power monitoring
Installation/overvoltage category.....:	OVC III
Measurement category .....:	CAT III
Protection class .....:	Class II
Pollution degree.....:	2
Environmental rating.....:	Extended (Specify): -40 ~ 70°C Humidity:95%(No condensation)
Equipment mobility .....:	Fixed
Connection to mains supply.....:	Permanent
Operating conditions .....:	Continuous
Overall size of the equipment (W x D x H).....:	18x90x65mm
Mass of the equipment (kg).....:	0.082Kg
Marked degree of protection to IEC 60529.....:	IP20
Accessories and detachable parts included in the evaluation .....:	N/A
Options.....:	N/A
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	Mar. 04th, 2024
Date (s) of performance of tests.....:	Mar. 15th, 2024 to Apr. 10th, 2024
General remarks:3	

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"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

This Test Report Form is intended for the investigation of testing and measurement circuits in accordance with IEC 61010-1:2010. It can only be used together with the Part 1 TRF for the appropriate edition of IEC 61010-1.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

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Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) ..... :	Acrel Co., Ltd. No.253, Yulv Road, Jiading, Shanghai, China

General product information and other remarks:

ADL200N-CT single phase energy meter is an intelligent instrument mainly designed for new energy power generation systems. The product has the features of sampling, metering and monitoring power parameters, communicating with an inverter or an energy management system (EMS), realizing the functions of preventing reverse flow, regulating power generation, charging and discharging batteries according to real-time power and accumulated electric energy, and realizing bidirectional metering and household distributed photovoltaic energy management.

Max operating altitude: 2000m

Operating temperature: -40-70°C

Relative Humidity 95%RH, not condensation

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IEC 61010-2-030			
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 value of the RATED voltage to earth of measuring circuit TERMINALS is marked		N/A
	b) the value of the RATED voltage or the RATED current, as applicable, for each pair or set of measuring circuit TERMINALS that are intended to be used together are marked		P
	c) the pertinent MEASUREMENT CATEGORY for each individual pair or set of measuring circuit TERMINALS or symbol 14 of Table 1 of Part 1 are marked		P
	Measuring circuit TERMINALS are usually supplied in pairs or sets. Each pair or set of TERMINALS may have a RATED voltage or a RATED current, or both, within that set, and each individual TERMINAL may have a RATED voltage to earth.		P
	For some equipment, the RATED voltage between TERMINALS may be different from the RATED voltage to earth. Markings shall be clear to avoid misunderstanding		N/A
	Symbol 14 of Table 1 is marked if current measuring TERMINALS are not intended for connection to current transformers without internal protection (see 101.2).		N/A
	Markings are placed adjacent to the TERMINALS, however, if there is insufficient space, the marking may be on the RATING plate or scale plate, or the TERMINAL may be marked with symbol 14 of Table 1.		N/A
	For any set of measuring circuit TERMINALS, symbol 14 of Table 1 does not need to be marked more than once, if it is close to the TERMINALS.		N/A
5.1.5.101.2	The relevant MEASUREMENT CATEGORY is marked for measuring circuit TERMINALS. The CATEGORY markings are “CAT II”, “CAT III” or “CAT IV” as applicable.		P
	Marking more than one type of MEASUREMENT CATEGORY and its RATED voltage to earth is permissible		N/A
5.1.5.101.3	Measuring circuit TERMINALS RATED for connection to voltages above the level of 6.3.1 are marked with Symbol 14 of Table 1, if not RATED for measurements within MEASUREMENT CATEGORIES II, III or IV		N/A
5.1.5.101.4	Low voltage, permanently connected, or dedicated measuring circuit TERMINALS do not need to be marked if a), b), c) below apply		P

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
	a) they are intended to be permanently connected and not ACCESSIBLE (see 5.4.3 aa) and bb), or		N/A
	b) they are dedicated only for connection to specific TERMINALS of other equipment, or		N/A
	c) It is obvious from other indications that the RATED voltage is below the levels of 6.3.1.		P
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 (see 5.1.5.101.2).	MEASUREMENT CATEGORY III	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 circuits, a warning not to use the equipment for measurements on MAINS, and a detailed RATING including TRANSIENT OVERVOLTAGES (see AA.2.4)		N/A
5.4.3	Equipment installation		P
	aa) for measuring circuit TERMINALS intended for permanent connection and that are RATED for MEASUREMENT CATEGORIES II, III or IV, information regarding the MEASUREMENT CATEGORY, RATED VOLTAGE, and RATED current, as applicable (see 5.1.5.101.2);	MEASUREMENT CATEGORY III	P
	bb) for measuring circuit TERMINALS intended for permanent connection and that are not RATED for MEASUREMENT CATEGORIES II, III or IV, information regarding the RATED VOLTAGE, RATED current, and RATED TRANSIENT OVERVOLTAGES as applicable (see 5.1.5.101.4).		N/A
6	**Protection against electric shock**		P
6.1.2	Exceptions: aa) locking or screw-held type measuring TERMINALS, including TERMINALS which do not require the use of a TOOL.		P
6.5.2.3	Protective conductor terminal		N/A
	h) 2) the PROTECTIVE BONDING is not be interrupted by any switching or interrupting device. Devices used for indirect bonding in test and measurement circuits (see 6.5.2.101) are permitted to be part of the PROTECTIVE BONDING.		N/A
6.5.2.101	Indirect bonding for testing and measuring circuits		N/A

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
	Indirect bonding establishes a connection between the PROTECTIVE CONDUCTOR TERMINAL and ACCESSIBLE conductive parts if these become HAZARDUS LIVE as a result of fault. Devices to establish indirect bonding are:		N/A
	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/A
	The duration versus the current shall not exceed the levels of Figure 101.		N/A
	The current between the ACCESSIBLE conductive parts and the PROTECTIVE CONDUCTOR TERMINAL is measured with the circuit of Figure A.1	(See appended Table 6.5.2.101)	N/A
	b) voltage-sensitive tripping devices which interrupt all poles of the MAINS supply or the hazardous LIVE voltage source, 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/A
	The tripping duration versus the current shall not exceed the levels of Figure 101		N/A
	The current between the ACCESSIBLE conductive parts and the PROTECTIVE CONDUCTOR TERMINAL is measured with the circuit of Figure A.1.	(See appended Table 6.5.2.101)	N/A
	Voltage limiting devices or voltage-sensitive tripping devices as defined in a) and b), shall have at least the voltage and current RATINGS of the measuring TERMINALS.		N/A
6.6	Connections to external circuits		P
6.6.101	Conductive parts of each unmated measuring circuit TERMINAL which could become HAZARDOUS LIVE when the highest RATED voltage is applied to other measuring circuit TERMINALS on the equipment shall be separated by at least:		--
	a) for TERMINALS with voltage RATING up to 1 000 V a.c. or 1 500 V d.c., the applicable 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
	b) for TERMINALS with voltage RATING exceeding 1 000 V a.c. or 1 500 V d.c., 2,8 mm for the CLEARANCE and CREEPAGE DISTANCE from the closest approach of the test finger touching the external parts of the TERMINAL in the least favourable position.		N/A

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
	Additionally, TERMINALS with voltage RATING exceeding 1 000 V a.c. or 1 500 V d.c. shall withstand the voltage test of 6.8 with a test voltage equal to the RATED voltage of the TERMINAL multiplied by 1,25 applied between the closest approach of the test finger touching the external parts of the TERMINAL in the least favourable position and the other measuring circuit TERMINALS.		N/A
	For WET LOCATIONS, there are no CLEARANCE and CREEPAGE DISTANCE requirements for voltages between 16 V a.c. r.m.s. and 30 V a.c. r.m.s., or between 35 V d.c. and 60 V d.c., but conductive parts of unmated measuring circuit TERMINAL shall not be ACCESSIBLE.		N/A
6.6.102	Components, sensors, and devices intended to be connected to specialized measuring circuit TERMINALS are not both ACCESSIBLE and HAZARDOUS LIVE, in either NORMAL CONDITION or SINGLE-FAULT CONDITION, even when the highest RATED voltage is applied to any other measuring circuit TERMINAL		N/A
	a) highest RATED a.c. voltage at any RATED MAINS frequency;		N/A
	b) highest RATED d.c. voltage;		N/A
	c) highest RATED a.c. voltage at the related maximum RATED measurement frequency.		N/A
6.7.1.3	CREEPAGE DISTANCES		P
	For HAND-HELD EQUIPMENT not powered from the MAINS or the measuring circuit, CREEPAGE DISTANCES are allowed to be according to material group I for all insulating materials.		N/A
6.7.1.5	Requirements for insulation according to type of circuit		P
	a) 6.7.2 mains circuits of overvoltage category II up to nominal supply voltage of 300 V		N/A
	b) 6.7.3 secondary circuits separated from circuits defined in a) only by means of a transformer		N/A
	c) K.1 mains circuits of overvoltage category III and IV or overvoltage category II over 300 V		P
	d) K.2 secondary circuits separated from circuits defined in c) only by means of a transformer		N/A
	e) K.3 circuits having one or more of:		N/A
	1) maximum TRANSIENT OVERVOLTAGE is limited to known level below the level of MAINS CIRCUIT		N/A
	2) maximum TRANSIENT OVERVOLTAGE above the level of MAINS CIRCUIT		N/A
	3) WORKING VOLTAGE is the sum of more than one circuit or a mixed voltage		N/A

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
	4) WORKING VOLTAGE includes recurring peak voltage, may include non-sinusoidal or non-periodic waveform		N/A
	5) Working voltage with a frequency above 30 kHz		N/A
	6) circuit is a measuring circuit where MEASUREMENT CATEGORIES do not apply;		N/A
	f) in Clause K.101 for measuring circuits of MEASUREMENT CATEGORIES II, III and IV.		P
14	**Components and subassemblies**		P
14.101	Circuits used to limit TRANSIENT OVERVOLTAGE in measuring circuits are used to measure MAINS		N/A
	If control of TRANSIENT OVERVOLTAGE is employed in a measuring circuit used to measure MAINS, the overvoltage limiting component or circuit has adequate strength to limit TRANSIENT OVERVOLTAGES	(See appended Table 14.101)	N/A
14.102	Probe assemblies and accessories		N/A
	Probe assemblies and accessories within the scope of IEC 61010-031, and current sensors within the scope of IEC 61010-2-032 shall meet the requirements thereof.		N/A
101	**Measuring circuits**		P
101.1	The equipment provides protection of HAZARD resulting from NORMAL USE and REASONABLY FORSEEABLE MISUSE of measuring circuits as specified below:		P
	a) If a HAZARD could result, a current measuring circuit does not interrupt the circuit being measured during range changing, or during the use of current transformers without internal protection (see 101.2)	No range changing	P
	b) An electrical quantity that is within specification for any TERMINAL does 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 (see 101.3)		P
	c) Any interconnection between the equipment and other devices or accessories intended to be used with the equipment shall not cause a HAZARD even if the documentation or markings prohibit the interconnection while the equipment is used for measurement purposes (see 6.6).		P

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
	d) For measuring circuits that include one or more FUNCTIONAL EARTH TERMINALS, a RISK assessment (see Clauses 16 and 17) addresses 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.		N/A
	e) A TEMPORARY OVERVOLTAGE or a TRANSIENT OVERVOLTAGE applied on the measuring circuits TERMINALS in voltage measurement function shall not cause a HAZARD		P
	f) Other HAZARDS that could result from REASONABLY FORESEEABLE MISUSE is addressed by RISK assessment (see Clauses 16 and 17).		N/A
101.2	Current measuring circuits		P
	Current measuring circuits are so designed that, when range changing takes place, there is no interruption which could cause a HAZARD.	No range changing	N/A
	Current measuring circuits intended for connection to current transformers without internal protection are adequately protected to prevent a HAZARD arising from interruption of these circuits during operation.	(See appended Table 101.2)	N/A
101.3	Protection against mismatches of inputs and ranges		N/A
101.3.1	In NORMAL CONDITION and in cases of REASONABLY FORESEEABLE MISUSE, no HAZARD arises when the highest RATED voltage or current of a measuring circuit TERMINAL is applied to that TERMINAL or any other compatible TERMINAL, with any combination of function and range settings		N/A
	The equipment provides protection against these HAZARDS; one of the following techniques is used.		N/A
	TERMINALS that are clearly not of similar types and that will not retain the connectors of the probe or accessory do not need to be tested. TERMINALS that can only be accessed by use of a TOOL do not need to be tested		N/A
	a) Use of a certified overcurrent protection device to interrupt short-circuit currents before a HAZARD arises; requirements of Clause 101.3.2 apply, or		N/A
	b) Use an uncertified current limitation device, an impedance, or a combination of both to prevent the HAZARD from arising; requirements of 101.3.3 apply		N/A
101.3.2	Protection by a certified overcurrent protection device	(See appended Table 101.3.2)	N/A

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
	Overcurrent protection device certified by an independent laboratory meet all of the specified requirements		N/A
	a) The a.c. and d.c. RATED voltages of the overcurrent protection device is at least as high as, respectively, the highest a.c. and d.c. RATED voltages of any measuring circuit TERMINAL on the equipment.		N/A
	b) The RATED time-current characteristic (speed) of the overcurrent protection device is such that no HAZARD will result from any possible combination of RATED input voltages, TERMINALS, and range selection		N/A
	c) The a.c. and d.c. RATED breaking capacities of the overcurrent protection device exceeds the possible a.c. and d.c. short-circuit currents.		N/A
	The possible a.c. and d.c. short-circuit currents shall be calculated as the highest RATED voltages for any TERMINAL divided by the impedance of the overcurrent-protected measuring circuit, taking the impedance of the test leads specified in 101.3.4 into account.		N/A
	For MEASUREMENT CATEGORIES II and III, the possible a.c. short-circuit current does not need to exceed the applicable value of Table AA.1.		N/A
	Additionally, spacings surrounding the overcurrent protection device in the equipment and following the protection device in the measuring circuit is sufficiently large to prevent arcing after the protection device opens.		N/A
101.3.3	Protection by uncertified current limitation devices or by impedances	(See appended Table 101.3.3)	N/A
	Devices used for current limitation are capable of safely withstanding, dissipating, or interrupting the energy that will result from the application of the maximum RATED voltage of any compatible TERMINAL in NORMAL CONDITION and in the case of REASONABLY FORESEEABLE MISUSE.		N/A
	An impedance used for limitation of current is one or more of the following:		N/A
	a) An appropriate single component which is constructed, selected, and tested so that safety and reliability for protection against relevant HAZARDS is assured.		N/A
	1) the component RATED for the max voltage that may be present in NORMAL CONDITION or during the REASONABLY FORESEEABLE MISUSE event;		N/A
	2) if a resistor, be RATED for twice the power or energy dissipation that may result in NORMAL CONDITION or from the REASONABLY FORESEEABLE MISUSE event;		N/A

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
	3) meets the applicable CLEARANCE and CREEPAGE distance requirements of Annex K for BASIC INSULATION between its terminations of the combination of components.		N/A
	b) A combination of components		N/A
	1) which can withstand the maximum voltage that may be present in NORMAL CONDITION or during the REASONABLY FORESEEABLE MISUSE event,		N/A
	2) be able to dissipate the power or energy that may result in NORMAL CONDITION or from the REASONABLY FORESEEABLE MISUSE event,		N/A
	3) meet the applicable CLEARANCE and CREEPAGE distance requirements of Annex K for BASIC INSULATION between the terminations of each component.		N/A
101.3.4	Test leads for the tests of 101.3.2 and 101.3.3 shall		N/A
	be performed with all test leads that are included with or supplied by the manufacturer for use with the equipment,		N/A
	and if the manufacturer hasn't specified the test leads, the tests shall be performed with test leads that meet the following specifications:		N/A
	a) length = 1 m;		N/A
	b) cross section of the conductor = 1,5 mm², stranded copper wire;		N/A
	c) equipment connector compatible with the measuring circuit TERMINALS;		N/A
	d) connection to the test voltage source into suitable screw TERMINALS or thimble connectors (twist-on wire connectors) or equivalent means of providing a low impedance connection;		N/A
	e) arranged as straight as possible.		N/A
	If the manufacturer-supplied test leads are permanently connected to the equipment, then the attached test leads supplied by the manufacturer were used without modification		N/A
101.4	Protection against MAINS overvoltages		P
	To ensure protection against arc flash or fire, measuring circuits RATED for measuring MAINS voltages shall have minimum CLEARANCE and CREEPAGE DISTANCE equivalent to BASIC INSULATION between MAINS-connected conductive parts of opposite polarity.		P

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
	The measuring circuit TERMINALS of a voltage measuring circuit that is RATED for MEASUREMENT CATEGORIES III or IV shall withstand the applicable TRANSIENT OVERVOLTAGE of Table K.106 with the voltage measurement function selectors set for the proper function and range, without damage which could cause a HAZARD.		P
101.5	Over-range indication		N/A
	If a HAZARD could arise from an OPERATOR'S reliance on the value (for example, voltage) displayed by the equipment, the display shall give an unambiguous indication whenever the value is above the maximum positive value or below the minimum negative value of the range to which the equipment is set.		N/A
Annex K.3	**Insulation in circuits not addressed in 6.7, K.1 or K.2, and in measuring circuits where MEASUREMENTS CATEGORIES do not apply**		N/A
K.3.1	General		N/A
	These circuits have one or more of the following characteristics:		N/A
	a) the maximum possible TRANSIENT OVERVOLTAGE is limited by the supply source or within the equipment (see Clause K.4.) to a known level below the level assumed for the MAINS CIRCUIT;		N/A
	b) the maximum possible TRANSIENT OVERVOLTAGE is above the level assumed for the MAINS CIRCUIT;		N/A
	c) the WORKING VOLTAGE is the sum of voltages from more than one circuit, or is a mixed voltage;		N/A
	d) the WORKING VOLTAGE includes a recurring peak voltage that may include a periodic non-sinusoidal waveform or a non-periodic waveform that occurs with some regularity;		N/A
	e) the WORKING VOLTAGE has a frequency above 30 kHz;		N/A
	f) the circuit is a measuring circuit where MEASUREMENT CATEGORIES do not apply.		N/A
	In cases a) to c) and f), CLEARANCES for BASIC INSULATION and SUPPLEMENTARY INSULATION are determined according to K.3.2.		N/A
	In cases d) and e) CLEARANCES are determined according to K.3.3.		N/A
	In all cases K.3.4 addresses CREEPAGE DISTANCE and K.3.5 solid insulation.		N/A
K.101	**Insulation requirements for measuring circuits of MEASUREMENT CATEGORIES II, III, IV**		P

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
K.101.1	General		P
K.101.2	CLEARANCES		P
	For equipment intended to be powered from the circuit being measured, CLEARANCES of the MAINS CIRCUIT are designed according to the requirements of the RATED MEASUREMENT CATEGORIES		N/A
	Overvoltage limiting devices may be used to reduce the transient Overvoltages to a level consistent with a lower MEASUREMENT CATEGORIES (see K.102)		N/A
	Additional marking requirements in 5.1.5.2 and 5.1.5.101		P
	CLEARANCES for measuring circuits of MEASUREMENT CATEGORIES II, III, IV meet Table K.101		P
	Equipment rated to operate at an altitude greater than 2000 m, correction factor of Table K.1 of 61010-1 applied		N/A
	Voltage tests of 6.8.3.1 or 6.8.3.3 of 61010-1		N/A
K.101.3	CREEPAGE DISTANCES		P
	The requirements of K.2.3 of 61010-1 applied		P
K.101.4	Solid insulation		P
K.101.4.1	General		P
	Solid insulation withstands the electrical and mechanical stresses that may occur in NORMAL USE in all RATED environmental conditions (see 1.4) during the intended life of the equipment		P
	The manufacturer should take the expected life of the equipment into account when selecting insulating materials.		P
	Solid insulation also meets the following requirements as applicable		P
	a) solid insulation used as an ENCLOSURE or PROTECTIVE BARRIER, the requirements of Clause 8		P
	b) moulded and potted parts, the requirements of K.101.4.2		N/A
	c) insulating layers of printed wiring boards, the requirements of K.101.4.3		N/A
	d) thin-film insulations, the requirements of K.101.4.4		N/A
K.101.4.2	Moulded and potted parts		N/A
	Conductors located between same two layers moulded together are separated by at least the applicable minimum distance of Table K.9 of 61010-1		N/A

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
K.101.4.3	Insulating layers of printed wiring boards		N/A
	For BASIC INSULATION, SUPPLEMENTARY INSULATION and REINFORCED INSULATION, conductors located between the same two layers shall be separated by at least the applicable minimum distance of Table K.9.		N/A
	REINFORCED INSULATION have adequate electric strength; one of the following methods are used:		N/A
	a) thickness at least the applicable value of Table K.9 of 61010-1		N/A
	b) insulation is assembled from at least two separate layers, each RATED for test voltage of Table K.102 to K.104 for BASIC INSULATION		N/A
	c) insulation is assembled from at least two separate layers, where the combination is RATED for test voltage of Table K.102 to K.104 for REINFORCED INSULATION		N/A
K.101.4.4	Thin-film insulation		N/A
	Conductors between same layers are separated by at least the applicable CLEARANCES and CREEPAGE DISTANCE of K.101.2 and K.101.3		N/A
	REINFORECD INSULATION have adequate electric strength; one of the following methods are used:		N/A
	a) thickness at least the applicable value of Table K.9 of 61010-1		N/A
	b) insulation consists of at least two separate layers, each RATED for test voltage of Table K.102 to Table K.104 for BASIC INSULATION		N/A
	c) insulation consists of at least three separate layers, where the combination of two layers passed voltage tests of Table K.102 to K.104 for REINFORCED INSULATION		N/A
	a.c. Voltage tests of 6.8.3.1 of 61010-1		N/A
K.102	**Reduction of TRANSIEN OVERVOLTAGES by the use of overvoltage limiting devices**		N/A
	If the overvoltage limiting device or circuit is intended to reduce TRANSIENT OVERVOLTAGES, a RISK ASSESSMENT (see Clause 17) is performed taking into account both of the followings		N/A
	a) Even under SINGLE FAULT CONDITIONS, the circuit shall reduce TRANSIENT OVERVOLTAGES to a lower voltage value which depends on the design		N/A
	SINGLE FAULT CONDITION includes a short and open circuit of MOV (metal oxide varistor)		N/A

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict
	a) the circuit operates as intended even after withstanding repeated TRANSIENT OVERVOLTAGES		N/A

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict

6.5.2.101	**TABLE: Indirect bonding for test and measuring circuits**		N/A
a) Voltage limiting device			
ACCESSIBLE part under test	Voltage attained (V)	Time for voltage to drop to allowable levels (s)	ACCESSIBLE part under test
b) Voltage-sensitive tripping device			
ACCESSIBLE part under test	Voltage applied (V)	Time for device to trip (s)	ACCESSIBLE part under test
Supplementary Information:			

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict

6.6.101	TABLE: CLEARANCES and CREEPAGE distances for measuring circuit terminals with HAZADUS LIVE conductive parts				P
Location/ Terminal/Rated Voltage (ac or dc)	Required		Measured		Location/ Terminal CLEARANCE mm
	CREEPAGE DISTANCE mm	CLEARANCE mm	CREEPAGE DISTANCE mm	CLEARANCE mm	
Between Termianl of CT1-L and Termianl of CT2-N/230Vac	0.8	0.8	7.0	4.1	Between Termianl of CT1-L and Termianl of CT2-N/ 4.1mm
Between Termianl of L and Termianl of N/230Vac	0.8	0.8	7.0	4.1	Between Termianl of L and Termianl of N/ 4.1mm
Supplementary information:					

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict

6.6.101	**TABLE: CLEARANCES and CREEPAGE distances for measuring circuit terminals with HAZADUS LIVE conductive parts**				N/A
Accessible parts	Voltage r.m.s./peak/d.c. (V)	Current (mA)		Capacitance	Comments
Supplementary information:					

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict

6.6.102 (6.3.2)	**TABLE: Values in SINGLE FAULT CONDITION**								N/A
Accessible parts	Subclause/ Fault No.	Voltage r.m.s./ peak/d.c (V).	Transient		Current; (mA)		Capacitance (μF)	Comments	
			(V)	(s)	Test circuit A1/A2/A3	r.m.s. or peak or d.c.			
NOTE - Required values are determined by calculation for Reinforce Insulation. Transients are not taken into account.									
Supplementary information: Transient voltages must be below the limits given from Figure 2 and the capacitance below the limits from figure 3 of IEC 61010-1.									

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict

6.9.101	**TABLE: Over range indication test**			N/A
Measuring Terminal	Applied Voltage (V)	Contents of Display	Verdict	Comments
Supplementary information:				

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IEC 61010-2-030			
Clause	Requirement + Test	Result - Remark	Verdict

14.101	**TABLE: Transient overvoltage limiting devices**								N/A
Component / Designation	Overvoltage Category	MAINS voltage V rms	Test voltage V	t_m °C	t_c °C	t_{max} °C	Rupture Yes / No	Circuit breaker tripped	Comments
Test room ambient temperature ….:		°C							

NOTE - t_m = measured temperature

t_c = t_m corrected (t_m–t_a+ 40 **°C** or max. RATED ambient)

t_{max} = maximum permitted temperature

Conformity is checked by applying 5 positive and 5 negative impulses with the applicable impulse withstand voltage, spaced up to 1 min apart, from a hybrid impulse generator (see IEC 61180-1).

Supplementary information:

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101.2	TABLE: Current measuring circuits - Current transformers			N/A
Type/Model	RATED current (A)	Test current (A)	Interrupt Yes / No	Result / Comments
NOTE - 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				
Supplementary information:				

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101.2	TABLE: Current measuring circuits - Range changing switches		N/A
Type / Model	Switch maximum rated current (A)	Cycling test Result	Comments
Supplementary Information:			

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101.3.2	TABLE: Certified overcurrent protection device test					N/A
Type / Model / Terminal	Max. rated Voltage (V)	Test Voltage (V)	Test leads		Verdict	Comments
			Mfr.	Std.		
NOTE 1: Test voltage = 2 times max. rated Voltage for 1 min. NOTE 2: Mfr – Manufacturer supplied leads Std. – Leads as described in 101.3.4						
Supplementary Information:						

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101.3.3	TABLE: Uncertified overcurrent protection device test					N/A
Type / Model / Terminal	Max. rated Voltage (V)	Test Voltage (V)	Test leads		Verdict	Comments
			Mfr.	Std.		

NOTE 1 - Test was conducted 3 times.
NOTE 2 - Any damage to a device used for current limitation was ignored when other parts of the equipment were not affected during the test.
NOTE 3 - Mfr – Manufacturer supplied leads
Std. – Leads as described in 101.3.4
NOTE 4 - Note current limit devices manufacture, type and ratings.

Supplementary Information:

--End of Report---

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