QUINEL
QUALITY IN ELECTRONICS

TEST REPORT

EN / IEC 61010-1

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use
Part 1: General Requirements

Report Reference No:	**T2562-20a-23**
Tested by:	P. Flühler, Project Manager
Approved by:	D. Vonarburg, Project Manager
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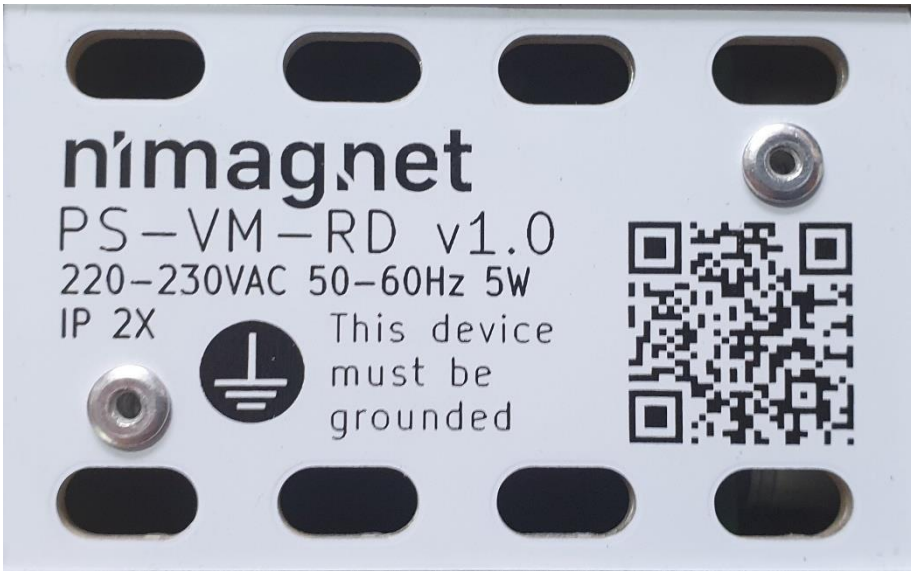
Testing Laboratory:	**QUINEL AG**
Address:	Elsihof 3, 6035 Perlen, SWITZERLAND Tel:+41 41 799 47 00
Testing Location:	Perlen
Test Laboratory accredited according to ISO 17025 by Swiss Accreditation Service SAS	Registration Number STS 0037
Applicant's Name:	**Nimag Networks Sàrl,** Mr Lukas Schärer, Mr Nicolas Désir
Address:	Rue de Sébeillon 9B, 1004 Lausanne, SWITZERLAND
Manufacturer:	**Nimag Networks Sàrl**
Address:	Rue de Sébeillon 9B, 1004 Lausanne, SWITZERLAND
Test Specification	
Standard:	EN 61010-1:2010 / A1:2019 IEC 61010-1:2010 / A1:2016 (Edition 3.0)
Test Procedure:	Type testing for Swiss and EU legal requirements
Procedure Deviation:	None
Non-standard Test Method:	None
EUT Description	**DIN-mounted power supply, voltage measure and relay drive unit**
Trademark:	nimag.net
Model and / or type Reference:	PS-VM-RD V1.0
Ratings:	220-230 VAC / 50-60 Hz / 5W
Date of receipt of the EUT:	2024-04-02
Summary of Testing:	**Pass**

Photographs:

Type Label:



Test Specimen:

General Remarks:
In this Test Report the equipment or apparatus to be tested is called EUT (Equipment under test). For the acceptance of the components see "List of components and circuits relied on for safety" This test report shall not be reproduced, except in full. The test results presented in this test report relate only to the tested EUT(s)
Test Report Form Last update: 2023-09-25

Test Verdicts:	
- test item does not apply to the test object:	N (Not applicable)
- test item does meet the requirement:	P (Pass)
- test item does not meet the requirement:	F (Fail)
- test item not checked:	--

Notes:
This test report replaces the test report issue number T2562-20-23.

EUT Particulars:	
Type / field of use:	**Measurement / Control** / Laboratory
Description of the function:	Power supply, Voltage measure and Relay drive
Installation/over voltage category:	Fixed Equipment / OVC II
Pollution degree:	PD 2
Environmental rating:	**Standard** / extended (specify):
Equipment mobility:	Portable / hand-held / floor standing / fixed / **built in**
Connection to mains supply:	**Permanent** / detachable cord set / non detachable cord set / none
Operating conditions:	**Continuous** / short-time / intermittent
Overall size of the equipment (L x W x H):	90.2 mm x 71.4 mm x 58 mm
Mass of the test equipment (kg):	0.35 kg
Marked degree of protection to IEC 60529:	IP 2X
Accessories and detachable parts included in the tests:	
Options:	

	TABLE: 2 - List of Components and Circuits relied on for Safety				
Unique component reference or location (including drawing reference if required)	Application/Function	Manufacturer (NOTE 1)	Part number	RATING (NOTE 2)	Evidence of acceptance (NOTE 3)
PCB	PS-VM-RD Mainboard	Shenzhen Jia Li Chuang Technology Development Co LTD		UL 94 V-0	cURus E479862
PCB	Voltage measure PCB for PS-VM-RD	Shenzhen Jia Li Chuang Technology Development Co LTD		UL 94 V-0	cURus E479862
Niconnector A	Power input	Nimag Networks SàRL, Switzerland		Consisting of Sullins Headers 0.100" 3A / UL 94 V-0 FR4	Tested in Device
Niconnector B	Voltage measure	Nimag Networks SàRL, Switzerland		Consisting of Sullins Headers 0.100" 3A / UL 94 V-0 FR4	Tested in Device
Fuseholder	Fuseholder for F1/F2	STELVIO KONTEK	PTF/45	250 V / 2.5W 5 x 20 mm UL 94 V-0	VDE acc. EN 60127-6 cURus acc. UL512
F1	Fuse	ESKA		250 V / 100mA Mid Slow Blow	IEC 60127
F2	Fuse	ESKA		250 V / 500mA Mid Slow Blow	IEC 60127
T1	Transformer	GERTH Transformatorenbau GmbH, Germany	421.12.2	230 V / 50-60 Hz Insulation Class B 2 x 6 V / 400 mA / 4.8 VA	VDE / ENEC10 according IEC EN 61558-2-6
K1 / K2	Relay	OMRON Corporation, Japan	G6DN-1A 5VDC	250 V / 5A UL 94 V-0	VDE Nr. 40042696 according EN 61810-1 cURus E41515
Enclosure	Enclosure for PS-VM-RD	CAMDENBOSS, UK	CNMB-4-KIT	Polycarbonate UL 94 V-0	UL

NOTE 1 - List all manufacturers concerned.
NOTE 2 - Electrical, mechanical, flammability, etc.
NOTE 3 - Licence number, file number or other documentary evidence of acceptance

Clause	Requirement + Test	Result - Remark	Verdict
4.4	Testing in SINGLE FAULT CONDITIONS		**P**
4.4.1	Fault tests	(see Form A.1 and A.2)	P
4.4.2	Application of SINGLE FAULT CONDITIONS		
4.4.2.1	SINGLE FAULT CONDITIONS not covered by 4.4.2.2 to 4.4.2.14	(see Form A.1 and A.2)	—
4.4.2.2	PROTECTIVE IMPEDANCE		P
4.4.2.3	PROTECTIVE CONDUCTOR		P
4.4.2.4	Equipment or parts for short-term or intermittent operation		N
4.4.2.5	Motors		N
4.4.2.6	Capacitors		N
4.4.2.7	MAINS transformers		P
4.4.2.7.2	Short circuit		P
4.4.2.7.3	Overload		P
4.4.2.8	Outputs		N
4.4.2.9	Equipment for more than one supply		N
4.4.2.10	Cooling		P
4.4.2.11	Heating devices		N
4.4.2.12	Insulation between circuits and parts		N
4.4.2.13	Interlocks		N
4.4.2.14	Voltage selectors		N
4.4.3	Duration of tests	(see Form A.1 and A.2)	P
4.4.4	Conformity after application of fault conditions	(see Form A.1; A.2; A.8, A.14)	P

5	**MARKING AND DOCUMENTATION**		**P**
5.1.1	General		P
	Required equipment markings are:		
	visible:		P
	From the exterior; or		P
	After removing a cover; or		N
	Opening a door		N
	After removal from a rack or panel		N
	Not put on parts which can be removed by an operator		P
	Letter symbols (IEC 60027) used		P
	Graphic symbols (IEC 61010-1: Table 1) used		P
5.1.2	Identification		
	Equipment is identified by:		P
	a) Manufacturer's or supplier's name or trademark	nimagnet	P

Clause	Requirement + Test	Result - Remark	Verdict
	b) Model number, name or other means	PS-VM-RD V1.0	P
	Manufacturing location identified		N
5.1.3	MAINS supply		
	Equipment is marked as follows:		
	a) Nature of supply:		
	1) a.c. RATED MAINS frequency or range of frequencies .....:	50-60 Hz	P
	2) d.c. with symbol 1		N
	b) RATED supply voltage(s) or range .....:	220-230 VAC	P
	c) Max. RATED power (W or VA) or input current....:	5W	P
	The marked value not less than 90 % of the maximum value	(see Form A.3)	P
	If more than one voltage range:		
	Separate values marked; or		N
	Values differ by less than 20 %	(see Form A.3)	N
	d) OPERATOR-set for different RATED supply voltages:		
	Indicates the equipment set voltage		N
	Portable equipment indication is visible from the exterior		N
	Changing the setting changes the indication		N
	e) Accessory MAINS socket-outlets accepting standard MAINS plugs are marked:		N
	With the voltage if it is different from the MAINS supply voltage .....:		N
	For use only with specific equipment		N
	If not marked for specific equipment it is marked with:		N
	The maximum rated current or power; or		N
	Symbol 14 with full details in the documentation		N
5.1.4	Fuses		P
	Operator replaceable fuse marking (see also 5.4.5) .....:	f1: 100mA/250V f2: 400mA/250V	P
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
	Push-buttons and actuators of emergency stop devices and indicators:		
	used only to indicate a warning of danger or		N

Clause	Requirement + Test	Result - Remark	Verdict
	the need for urgent action		N
	coloured red		N
	coded as specified in IEC 60073		N
	Supplementary means of coding provided, if meaning of colour relates (see IEC 60073):		N
	to safety of persons; or		N
	safety of the environment		N
5.1.5.2	TERMINALS		P
	MAINS supply TERMINAL identified	Proprietary connector with 50cm wires in corresponding colours	P
	Other TERMINAL marking:		N
	a) FUNCTIONAL EARTH TERMINALS (symbol 5 used)		N
	b) PROTECTIVE CONDUCTOR TERMINALS:		N
	Symbol 6 is placed close to or on the TERMINAL; or		N
	Part of appliance inlet		N
	c) TERMINALS of circuits (symbol 7 used)		N
	d) HAZARDOUS LIVE TERMINALS supplied from the interior		N
	Standard MAINS socket outlet; or		N
	RATINGS marked; or		N
	Symbol 14 used		N
5.1.6	Switches and circuit breakers		N
	If disconnecting device, off position clearly marked		N
	If push-button used as power supply switch:		N
	Symbol 9 and 15 used for on-position		N
	Symbol 10 and 16 used for off-position		N
	Pair of symbols 9, 15 and 10, 16 close together		N
5.1.7	Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION		N
	Protected throughout (symbol 11 used)		N
	Only partially protected (symbol 11 not used)		N
5.1.8	Field-wiring TERMINAL boxes		N
	If TERMINAL or ENCLOSURE exceeds 60 °C:	(see Form A.21A)	N
	Cable temperature RATING marked ..... :		N
	Marking visible before and during connection or beside TERMINAL		N
5.2	Warning markings	A inverted symbol 6 (IEC 60417-5019) with „This device must be grounded”	P

Clause	Requirement + Test	Result - Remark	Verdict
	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	Symbol: 7.5 mm Text: 2.0 mm	P
	b) symbols and text moulded, stamped or engraved in material min. 2,0 mm high and		N
	0.5 mm depth or raised if not contrasting in colour		N
	If necessary marked with symbol 14		N
	Statement to isolate or disconnect if access by using a tool to HAZARDOUS LIVE parts is permitted		N
5.3	Durability of markings		P
	The required markings remain clear and legible in NORMAL USE	(see Form A.4)	P
5.4	Documentation		
5.4.1	General		
	Equipment is accompanied by documentation for safety purposes for OPERATOR or RESPONSIBLE BODY		P
	Safety documentation for service personnel authorized by the manufacturer	Legal notice to web address of valid document	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
	c) name and address of manufacturer or supplier	Nimag Networks SàRL, Rue de Sébeillon 9b, 1004 Lausanne, Switzerland.	P
	d) Information specified in 5.4.2 to 5.4.6		P
	e) information to mitigate residual RISK (see also subclause 17)		N
	f) accessories for safe operation of the equipment specified		N
	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		P
	h) instructions for lifting and carrying		N
	Warning statements and a clear explanation of warning symbols:		
	Provided in the documentation; or		P
	Information is marked on the equipment		N

Clause	Requirement + Test	Result - Remark	Verdict
5.4.2	Equipment ratings		
	Documentation includes:		
	a) Supply voltage or voltage range .....:	220-230 VAC	P
	Frequency or frequency range .....:	50-60 Hz	P
	Power or current rating.....:	100 mA	P
	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
	d) Statement of the range of environmental conditions	+5 … +50 °C 80 %rH until 31°C 50 %rH @ 40°C 2000 m AMSL	P
	e) Degree of protection (IEC 60529)	IP2X	P
	f) if impact rating less than 5 J:		N
	IK code in accordance to IEC 62262 marked or		N
	symbol 14 of table 1 marked, with		N
	RATED energy level and test method stated		N
5.4.3	Equipment installation		
	Documentation includes instructions for:		
	a) assembly, location and mounting requirements		P
	b) protective earthing		P
	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		N
	e) ventilation requirements		N
	f) special services (e. g. air, cooling liquid)		N
	g) Instructions relating to sound level		N
5.4.4	Equipment operation		
	Instructions for use include:		
	a) identification and description of operating controls		P
	b) positioning for disconnection		N
	c) instructions for interconnection		P
	d) specification of intermittent operation limits		N
	e) explanation of symbols used		N
	f) replacement of consumable materials		N
	g) cleaning and decontamination		P

Clause	Requirement + Test	Result - Remark	Verdict
	h) Listing of any poisonous or injurious gases and quantities		N
	i) RISK reduction procedures relating to flammable liquids (see 9.5)		N
	j) RISK reduction procedures relating burn from surfaces permitted to exceed limits of 10.1		N
	Additional precautions for IEC 60950 conforming equipment in regard to moistures and liquids		N
	A statement about protection impairment if used in a manner not specified by the manufacturer	Qualified personal only	N
5.4.5	Equipment maintenance		
	Instructions for RESPONSIBLE BODY include:		
	Instructions sufficient in detail permitting safe maintenance and inspection and continued safety:		P
	Instruction against the use of detachable MAINS supply cord with inadequate rating		N
	Specific battery type of user replaceable batteries		N
	Any manufacturer specified parts		N
	Rating and characteristics of fuses		P
	Instructions include following subjects permitting safe servicing and continued safety:		
	a) product specific RISKS may affect service personnel		N
	b) protective measures for these RISKS		N
	c) verification of the safe state after repair		P
5.4.6	Integration into systems or effects resulting from special conditions		N
	Aspects described in documentation		N

6	PROTECTION AGAINST ELECTRIC SHOCK		P
6.1	General	(see Form A.5)	
6.1.1	Requirements		
	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
	Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.11		P

Clause	Requirement + Test	Result - Remark	Verdict
6.1.2	Exceptions		
	Following HAZARDOUS LIVE parts may be accessible to an OPERATOR:		
	a) parts of lamps and lamp sockets after lamp removal		N
	b) parts to be replaced by operator only by the use of tool and warning marking		N
	Those parts not HAZARDOUS LIVE 10 s after interruption of supply	(see Forms A.6)	N
	Capacitance test if charge is received from internal capacitor	(see Forms A.6 and A.7)	N
6.2	Determination of accessible parts	(see Form A.6)	
6.2.1	General		
	Unless obviously determination of accessible parts as specified in 6.2.2 to 6.2.4		N
6.2.2	Examination		
	- with jointed test finger (as specified B.2)		P
	- with rigid test finger (as specified B.1) and a force of 10 N		N
6.2.3	Openings above parts that are HAZARDOUS LIVE		N
	- test pin with length of 100 mm and 4 mm in diameter applied		P
6.2.4	Openings for pre-set controls		N
	- test pin with length of 100 mm and 3 mm in diameter applied		N
6.3	Limit values for ACCESSIBLE parts		
6.3.1	Levels in NORMAL CONDITION	(see Form A.7)	
	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
	If the limits of a) are exceeded, the limits of b) and c) shall not be exceeded. In this case the voltages are not HAZARDOUS LIVE.		N
	b) Current less than 0,5 mA r.m.s. for sinusoidal, 0,7 mA peak for 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
	For wet locations measuring circuit A.4 used		N
	c) Levels of capacitive charge or energy less:		N
	1) 45 µC for voltages up to 15 kV peak or d.c. or line A of Figure 3		N
	2) 350 mJ stored energy for voltages above 15 kV peak or d.c.		N

Clause	Requirement + Test	Result - Remark	Verdict
6.3.2	Levels in SINGLE FAULT CONDITION	(see Form A.7)	
	a) Voltage limits less than 50 V r.m.s. and 70 V peak or 120 V d.c.	168.0 V AC r.m.s. if protective ground not connected → **limit exceeded**	P
	For wet locations voltage limits less than 33 V r.m.s. and 46,7 V peak or 70 V d.c.		N
	If the limits of a) are exceeded, the limits of b) and c) shall not be exceeded. In this case the voltages are not HAZARDOUS LIVE.		P
	b) Current less than 3,5 mA r.m.s. for sinusoidal, 5 mA peak non sinusoidal or mixed frequencies or 15 mA d.c. when measured with measuring circuit A.1, or A.2 if less than 100 Hz	Current via accessible parts if protective ground is not connected is max.: 0.04 mA AC r.m.s. → **not hazardous live**	P
	For wet locations measuring circuit A.4 used		N
	c) Level of capacitance less Line B of Figure 3		P
6.4	Primary means of protection		
6.4.1	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)		P
6.4.2	ENCLOSURES and PROTECTIVE BARRIERS	(see Form A.13)	
	- 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		N
6.4.3	BASIC INSULATION	(see Form A.13)	
	- meet CLEARANCE, CREEPAGE DISTANCE and solid insulation requirements of 6.7		P
6.4.4	Impedance	(see Form A.12)	P
	Impedance used as primary means of protection meets all of following requirements:		
	a) limits current or voltage to level of 6.3.2	(see Form A.7)	P
	b) RATED for maximum WORKING VOLTAGE and the amount of power it will dissipate		P
	c) CLEARANCE, CREEPAGE DISTANCE between terminations of the impedance meet requirements of BASIC INSULATION of 6.7	(see Form A.13)	P
6.5	Additional means of protection in case of SINGLE FAULT CONDITION		

Clause	Requirement + Test	Result - Remark	Verdict
6.5.1	ACCESSIBLE parts are prevented from becoming HAZARDOUS live by the primary means of protection and supplemented by one of:		N
	a) PROTECTIVE BONDING (see 6.5.2)		N
	b) SUPPLEMENTARY INSULATION (see 6.5.3)		N
	c) automatic disconnection of the supply (see 6.5.5)		N
	d) current- or voltage-limiting device (see 6.5.6)		N
	Alternatively one of the single means of protection is used:		
	e) REINFORCED INSULATION (see 6.5.3)		N
	f) PROTECTIVE IMPEDANCE (see 6.5.4)		P
6.5.2	PROTECTIVE BONDING	(see Form A.9, A.10 and A.11)	N
6.5.2.1	ACCESSIBLE conductive parts, may become HARZARDOUS LIVE in SINGLE FAULT CONDITION:		N
	Bonded to the PROTECTIVE CONDUCTOR TERMINAL; or		N
	Separated by conductive screen or barrier bonded to PROTECTIVE CONDUCTOR TERMINAL		N
6.5.2.2	Integrity of PROTECTIVE BONDING		N
	a) PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses		N
	b) Soldered connections:		N
	Independently secured against loosening		N
	Not used for other purposes		N
	c) Screw connections are secured		N
	d) PROTECTIVE BONDING not interrupted; or		N
	exempted as removable part carries MAINS SUPPLY INPUT connection		N
	e) Any moveable PROTECTIVE BONDING connection specifically designed, and meets 6.5.2.4		N
	f) No external metal braid of cables used (not regarded as PROTECTIVE BONDING)		N
	g) IF MAINS SUPPLY PASSES THROUGH:		N
	Means provided for passing protective conductor;		N
	Impedance meets 6.5.2.4		N
	h) Protective conductors bare or insulated, if insulated, green/yellow		N
	Exceptions:		
	1) earthing braids;		N
	2) internal protective conductors etc.;		N
	Green/yellow not used for other purposes		N

Clause	Requirement + Test	Result - Remark	Verdict
	TERMINAL suitable for connection of a PROTECTIVE CONDUCTOR, and meets 6.5.2.3		N
6.5.2.3	PROTECTIVE CONDUCTOR TERMINAL		
	a) Contact surfaces are metal		N
	b) Appliance inlet used		N
	c) For rewirable cords and PERMANENTLY CONNECTED EQUIPMENT, PROTECTIVE CONDUCTOR TERMINAL is close to MAINS supply TERMINALS		N
	d) If no MAINS supply is required, any PROTECTIVE CONDUCTOR TERMINAL:		N
	Is near terminals of circuit for which protective earthing is necessary		N
	External if other terminals external		N
	e) Equivalent current-carrying capacity to MAINS supply TERMINALS	(see Form A.9)	N
	f) If plug-in, makes first and breaks last		N
	g) If also used for other bonding purposes, protective conductor:		N
	Applied first;		N
	Secured independently;		N
	Unlikely to be removed by servicing		N
	h) PROTECTIVE CONDUCTOR of measuring circuit:		N
	1) Current RATING equivalent to measuring circuit TERMINAL;		N
	2) PROTECTIVE BONDING:		N
	Not interrupted; or		N
	i) FUNCTIONAL EARTH TERMINALS allow independent connection		N
	j) If a binding screw used for PROTECTIVE CONDUCTOR TERMINAL:		N
	Suitable size for bond wire		N
	Not smaller than M 4 (No. 6)		N
	At least 3 turns of screw engaged		N
	Passes tightening torque test		N
	k) Contact pressure not capable being reduced by deformation of materials		N
6.5.2.4	Impedance of PROTECTIVE BONDING of plug-connected equipment	(see Form A.10)	N
	Impedance between PROTECTIVE CONDUCTOR TERMINAL and each ACCESSIBLE part where PROTECTIVE BONDING is specified, is:		
	less than 0,1 Ohm; or		N

Clause	Requirement + Test	Result - Remark	Verdict
	less than 0,2 Ohm if equipment is provided with non detachable cord		N
6.5.2.5	Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT	(see Form A.10)	N
6.5.2.6	Transformer PROTECTIVE BONDING screen	(see Form A.11)	N
	Transformer provided with screen for protective bonding:		N
	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
	screen bonding with soldered connection (see 6.5.2.2 b) is:		N
	- Independently secured against loosening		N
	- Not used for other purposes		N
6.5.3	SUPPLEMENTARY and REINFORCED INSULATION		N
	- meet CLEARANCE, CREEPAGE DISTANCE and solid insulation requirements of 6.7		N
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.13)	P
	The protective impedance consists of one or more of the following:	(see Table 3 and Form A.12)	
	a) appropriate single component suitable for safety and reliability for protection, it is:		N
	1) RATED twice the maximum WORKING VOLTAGE		N
	2) resistor RATED for twice the power dissipation for maximum WORKING VOLTAGE		N
	b) combination of components		P
	Single electronic device not used as PROTECTIVE IMPEDANCE		P
6.5.5	Automatic disconnection of the supply		N
	a) RATED to disconnect the load within time specified in Figure 2		N
	b) RATED for the maximum load conditions of the equipment		N
6.5.6	Current- or voltage limiting devices	(see Form A.12)	N
	Device complies with all of:		N
	a) RATED to limit the current or voltage to the level of 6.3.2	(see Form A.8)	N
	b) RATED for the maximum working voltage; and		N

Clause	Requirement + Test	Result - Remark	Verdict
	RATED for the maximum operational current if applicable		N
	c) CLEARANCE, CREEPAGE DISTANCE between terminations of the impedance meet requirements of SUPPLEMENTARY INSULATION of 6.7	(see Form A.13)	N
6.6	Connections to external circuits		P
6.6.1	Connections do not cause ACCESSIBLE parts of the following to become HAZARDOUS LIVE in NORMAL CONDITION or SINGLE FAULT CONDITION:		P
	- the external circuits		N
	- the equipment		N
	Protection achieved by separation of circuits; or		P
	short circuit of separation does not cause a HAZARD		P
	Instructions or markings for each terminal include:		N
	a) RATED conditions for TERMINAL		N
	b) Required RATING of external circuit INSULATION		N
6.6.2	TERMINALS for external circuits		N
	TERMINALS which receive a charge from an internal capacitor are not HAZARDOUS LIVE after 10 s of interrupting supply connection	(see Form A.7)	N
6.6.3	Circuits with terminals which are HAZARDOUS LIVE		
	These circuits are:		
	Not connected to ACCESSIBLE conductive parts; or		N
	Connected to ACCESSIBLE conductive parts, but are not MAINS circuits and have one TERMINAL contact at earth potential		N
	No ACCESSIBLE conductive parts are HAZARDOUS LIVE		N
6.6.4	ACCESSIBLE terminals for stranded conductors		
	No RISK of accidental contact because:		
	a) Tested with max length of insulation removed according to manufacturer		N
	or		
	b) If not defined by manufacturer tested with length of insulation removed of 8mm		N
	ACCESSIBLE TERMINALS will not work loose		N
6.7	Insulation requirements	(see Form A.5)	P
6.7.1	The nature of insulation		
6.7.1.1	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		

Clause	Requirement + Test	Result - Remark	Verdict
	Required CLEARANCES reflecting factors of 6.7.1.1	(see Form A.5)	P
	Equipment rated for operating altitude greater than 2000 m correction factor of Table 3 of 61010-1 applied		N
6.7.1.3	CREEPAGE DISTANCES		
	Required CLEARANCES reflecting factors of 6.7.1.1	(see Form A.5)	P
	CTI material group reflected by requirements		P
	CTI test performed		N
6.7.1.4	Solid insulation		
	Required CLEARANCES reflecting factors of 6.7.1.1	(see Form A.5)	P
6.7.1.5	Requirements for insulation according to type of circuit	(see Form A.5)	P
	a) 6.7.2 MAINS circuits of OVERVOLTAGE CATEGORY II up to nominal supply voltage of 300 V		P
	b) 6.7.3 Secondary circuits separated from circuits defined in a) by transformer		P
	c) K.1 MAINS circuits of OVERVOLTAGE CATEGORY III and IV or OVERVOLTAGE CATEGORY II over 300 V		N
	d) K.2 Secondary circuits separated from circuits defined in a) by transformer		N
	e) K.3 Circuits having one or more of:		N
	1) maximum TRANSIENT OVERVOLTAGE is limited to known level below the level of MAINS CIRCUIT		N
	2) maximum TRANSIENT OVERVOLTAGE above the level of MAINS CIRCUIT		N
	3) WORKING VOLTAGE is the sum of more than one circuit or a mixed voltage		N
	4) WORKING VOLTAGE includes recurring peak voltage, may include non-sinusoidal or non-periodic waveform		N
	5) WORKING VOLTAGE with a frequency above 30 kHz		N
6.7.2	Insulation for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II with a nominal supply voltage up to 300 V		P
6.7.2.1	CLEARANCES and CREEPAGE DISTANCES	(see Form A.13)	P
	Values for MAINS CIRCUITS of table 4 are met		P
	Coatings to achieve reduction to POLLUTION DEGREE I comply with requirements of Annex H		N
6.7.2.2	Solid insulation		
6.7.2.2.1	Withstands electrical and mechanical stresses in normal use and all RATED environmental conditions of 1.4		P

Clause	Requirement + Test	Result - Remark	Verdict
	Equipment passed a.c. test of 6.8.3.1 or the d.c. test of 6.8.3.2 using the applicable voltage from Table 5 for 1 min.	(see Form A.14)	P
	Complies as applicable:		
	a) ENCLOSURE or PROTECTIVE BARRIER Clause 8		P
	b) moulded and potted parts requirements of 6.7.2.2.2		N
	c) inner layers of printed wiring boards requirements of 6.7.2.2.3		P
	d) thin-film insulation requirements of 6.7.2.2.4		N
6.7.2.2.2	Moulded and potted parts		N
	Conductors between same two layers are separated by at least 0,4 mm after moulding is completed		N
6.7.2.2.3	Inner insulation layers of printed wiring boards		P
	Separated by at least 0,4 mm between same two layers		N
	REINFORCED INSULATION have adequate electric strength; one of following methods used:		N
	a) thickness at least 0,4 mm		N
	b) insulation is assembled of minimum two separate layers, each RATED for test voltage of Table 5 for BASIC INSULATION		N
	c) insulation is assembled of minimum two separate layers, where the combination is rated for test voltage of Table 5 for REINFORCED INSULATION		N
6.7.2.2.4	Thin-film insulation		N
	Conductors between same two layers are separated by applicable CLEARANCES and CREEPAGE DISTANCES		N
	REINFORCED INSULATION have adequate electric strength; one of following methods used:		N
	a) thickness at least 0,4 mm		N
	b) insulation is assembled of min two separate layers, each RATED for test voltage of Table 5 for BASIC INSULATION		N
	c) Equipment passed a.c. test of 6.8.3.1 or the d.c. test of 6.8.3.2 applied to two of the three layers using the applicable voltage for REINFORCED INSULATION from Table 5 for 1 min.		N
6.7.3	Insulation for secondary circuits derived from MAINS of OVERVOLTAGE CATEGORY II up to 300 V		P
6.7.3.1	Secondary circuits where separation from MAINS CIRCUITS is achieved by a transformer providing:		
	- REINFORCED INSULATION		P
	- DOUBLE INSULATION		P

Clause	Requirement + Test	Result - Remark	Verdict
	- screen connected to the PROTECTIVE CONDUCTOR TERMINAL		N
6.7.3.2	CLEARANCES		
	a) meet the values of Table 6 for BASIC INSULATION and SUPPLEMENTARY INSULATION; or		P
	twice the values of Table 6 for REINFORCED INSULATION		N
	or		
	b) pass the voltage tests of 6.8 with values of Table 6; with following adjustments:	(see Form A.14)	P
	1) values for REINFORCED INSULATION are 1,6 times the values for BASIC INSULATION		N
	2) if operating altitude is greater than 2000 m values of CLEARANCES multiplied with factor of Table 3		N
	3) minimum CLEARANCE is 0,2 mm for POLLUTION DEGREE 2 and 0,8 mm for POLLUTION DEGREE 3		P
6.7.3.3	CREEPAGE DISTANCES		
	Based on WORKING VOLTAGE meets the values of Table 7 for BASIC and SUPPLEMENTARY INSULATION		P
	Values for REINFORCED INSULATION are twice the values of BASIC INSULATION		N
	Coatings to achieve reduction to POLLUTION DEGREE I comply with requirements of Annex H		N
6.7.3.4	Solid insulation		
6.7.3.4.1	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.14)	P
	values for REINFORCED INSULATION are 1,6 times the values of BASIC INSULATION		N
	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		N
	value for REINFORCED INSULATION are twice the WORKING VOLTAGE		N
	Complies as applicable:		N
	1) ENCLOSURE or protective barrier Clause 8		N
	2) moulded and potted parts requirements of 6.7.3.4.2		N
	3) inner layers of printed wiring boards requirements of 6.7.3.4.3		N
	4) thin-film insulation requirements of 6.7.3.4.4		N

Clause	Requirement + Test	Result - Remark	Verdict
6.7.3.4.2	Moulded and potted parts		N
	Conductors between same two layers are separated by applicable distances of Table 8		N
6.7.3.4.3	Inner insulation layers of printed wiring boards		N
	Separated by at least by applicable distances of Table 8 between same two layers		N
	REINFORCED INSULATION have adequate electric strength; one of following methods used:		N
	a) thickness at least applicable distance of Table 8		N
	b) insulation is assembled of minimum two separate layers, each RATED for test voltage of Table 6 for BASIC INSULATION		N
	c) insulation is assembled of min two separate layers, where the combination is rated for 1,6 times the test voltage of Table 6		N
6.7.3.4.4	Thin-film insulation		
	Conductors between same two layers are separated by applicable CLEARANCES and CREEPAGE DISTANCES		N
	REINFORCED INSULATION have adequate electric strength; one of following methods used:		N
	a) thickness at least applicable distance of Table 8		N
	b) insulation is assembled of min two separate layers, each RATED for test voltage of Table 6 for BASIC INSULATION		N
	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:		N
	a.c. test of 6.8.3.1; or		N
	d.c. test of 6.8.3.2 for circuits stressed only by d.c. voltages		N
6.8	Procedure for dielectric strength tests	(see Form A.5 and A.14)	P
6.9	Constructional requirements for protection against electric shock		
6.9.1	If a failure could cause a HAZARD:		
	a) Security of wiring connections		N
	b) Screws securing removable covers		N
	c) Accidental loosening		N
	d) CREEPAGE and CLEARANCES not reduced below the values of basic insulation by loosening		P
6.9.2	Material not to be used for safety relevant insulation:		
	Easily damaged materials not used		P
	Non-impregnated hydroscopic materials not used		P
6.9.3	Colour coding		

Clause	Requirement + Test	Result - Remark	Verdict
	Green-and-yellow insulation shall not be used except:		
	a) protective earth conductors;		P
	b) protective bonding conductors;		P
	c) potential equilization conductors;		P
	d) functional earth conductors		N
6.10	Connection to MAINS supply source and connections between parts of equipment		
6.10.1	MAINS supply cords		
	RATED for maximum equipment current (see 5.1.3c)		N
	Cable complies with IEC 60227 or IEC 60245		N
	Heat-resistant if likely to contact hot parts		N
	Temperature RATING (cord and inlet).....:		N
	Green/yellow used only for connection to PROTECTIVE CONDUCTOR TERMINALS		P
	Detachable cords with IEC 60320 MAINS connectors:		
	Conform to IEC 60799; or		N
	Have the current RATING of the MAINS connector		N
6.10.2	Fitting of non-detachable MAINS supply cords		N
6.10.2.1	Cord entry		N
	Inlet or bushing smoothly rounded; or		N
	Insulated cord guard protruding >5D		N
6.10.2.2	Cord anchorage		N
	Protective earth conductor is the last to take the strain		N
	a) Cord is not clamped by direct pressure from a screw		N
	b) Knots are not used		N
	c) Cannot push the cord into the equipment to cause a HAZARD		N
	d) No failure of cord insulation in anchorage with metal parts		N
	e) Not to be loosened without a tool		N
	f) Cord replacement does not cause a HAZARD and method of strain relief is clear		N
	Push-pull and or torque test		N
6.10.3	Plugs and connectors		
	MAINS supply plugs, connectors etc., conform with relevant specifications		N
	If equipment supplied at voltages below 6.3.2.a) or from a sole source:		

Clause	Requirement + Test	Result - Remark	Verdict
	Plugs of supply cords do not fit MAINS sockets above rated SUPPLY voltage		N
	MAINS type plugs used only for connection to MAINS supply		N
	Plug pins which receive a charge from an internal capacitor	(see Form A.7)	N
	Accessory MAINS socket outlets:		
	a) Marking if accepts a standard MAINS plug (see 5.1.3e)		N
	b) Input has a protective earth conductor if outlet has EARTH TERMINAL CONTACT		N
6.11	Disconnection from supply source		
6.11.1	Disconnects all current carrying conductors		N
6.11.2	Exceptions		N
6.11.3	Requirements according to type of equipment		N
6.11.3.1	PERMANENTLY CONNECTED EQUIPMENT and multi-phase equipment:		P
	Employs switch or circuit-breaker		N
	If switch or circuit-breaker is not part of the equipment, documentation requires:		
	a) Switch or circuit-breaker to be included in building installation		N
	b) Suitable location easily reached		N
	c) Marking as disconnecting for the equipment		N
6.11.3.2	Single-phase cord-connected equipment		N
	Equipment is provided with one of the following:		
	a) Switch or circuit-breaker		N
	b) Appliance coupler (disconnectable without tool)		N
	c) Separable plug (without locking device)		N
6.11.4	Disconnecting devices		N
6.11.4.1	General		N
	Electrically close to the SUPPLY		N
6.11.4.2	Switches and circuit-breakers		N
	When used as disconnection device:		
	As equipment circuit-breaker meets IEC 60947-2		N
	As equipment switch meets IEC 60947-3		N
	Marked to indicate function		N
	Not incorporated in MAINS cord		N
	Does not interrupt PROTECTIVE EARTH CONDUCTOR		N
6.11.4.3	Appliance couplers and plugs		

Clause	Requirement + Test	Result - Remark	Verdict
	Where an appliance coupler or separable plug is used as the disconnecting device (see 6.11.3.2):		N
	Readily identifiable and easily reached by the operator		N
	Single-phase portable equipment cord length not more than 3 m		N
	PROTECTIVE EARTH CONDUCTOR connected first and disconnected last		N
7	**PROTECTION AGAINST MECHANICAL HAZARDS**		**P**
7.1	Equipment does not cause a mechanical HAZARD in NORMAL nor in SINGLE FAULT CONDITION		P
	Conformity is checked by 7.2 to 7.7		
7.2	Sharp edges		
	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		
7.3.1	HAZARDS from moving parts limited to a tolerable level with the conditions specified in 7.3.2, 7.3.4 and 7.3.5		N
	RISK assessment in accordance with 7.3.3 or Clause 17 carried out		N
7.3.2	Exceptions		
	Access to HAZARDOUS moving parts permitted under following circumstances:		N
	a) obviously intended to operate on parts or materials outside of the equipment		N
	inadvertent touching of moving parts minimized by equipment design (e .g. guards or handles)		N
	b) If operator access is unavoidable outside normal use following precautions have been taken:		N
	1) Access requires TOOL		N
	2) Statement about training in the instructions		N
	3) Warning markings on covers prohibiting access by untrained operators		N
	or symbol 14 with full details in documentation		N
7.3.3	RISK assessment for mechanical HAZARDS to body parts		N
	RISK is reduced to a tolerable level by protective measures as specified in Table 12		N
	Minimum protective measures:		
	A. Low level measures		N

Clause	Requirement + Test	Result - Remark	Verdict
	B. Moderate measures		N
	C. Stringent measures		N
7.3.4	Limitation of force and pressure	(see Form A.16)	N
	Following levels are met in normal and single fault condition:		N
	Continuous contact pressure below 50 N / cm² with force below 150 N		N
	Temporary force below 250 N for an area at least of 3 cm² for a maximum duration of 0,75 s		N
7.3.5	Gap limitations between moving parts	(see Form A.16)	N
7.3.5.1	Access normally allowed		N
	If levels of 7.3.4 exceeded and body part may be inserted minimum gap as specified in Table 13 assured in NORMAL and in SINGLE FAULT CONDITION		N
7.3.5.2	Access normally prevented		N
	Maximum gap as specified in Table 14 assured in NORMAL and in SINGLE FAULT CONDITION		N
7.4	Stability		
	Equipment not secured to building structure is physical stable		N
	Stability maintained after opening of drawers etc. by automatic means, or		N
	warning marking requires the application of means		N
	Compliance checked by following tests as applicable:		
	a) 10° tilt test for other than handheld equipment		N
	b) multi-directional force test for equipment exceeds height of 1 m and mass of 25 kg		N
	c) downward force test for floor-standing equipment		N
	d) overload test with 4 times maximum load for castor or support that supports greatest load		N
	e) castor or support that supports greatest load removed from equipment		N
7.5	Provisions for lifting and carrying		N
7.5.1	Equipment more than 18 kg :		
	Has means for lifting or carrying; or		N
	Directions in documentation		N
7.5.2	Handles or grips		N
	Handles or grips withstand four times weight		N
7.5.3	Lifting devices and supporting parts		N
	Rated for maximum load; or		N
	tested with four times maximum static load		N
7.6	Wall mounting		N

Clause	Requirement + Test	Result - Remark	Verdict
	Mounting brackets withstand four times weight		N
7.7	Expelled parts		
	Equipment contains or limits the energy		N
	Protection not removable without the aid of a tool		N
8	**RESISTANCE TO MECHANICAL STRESSES**		**P**
8.1	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 following criteria are met:		N
	a) lower level justified by RISK assessment of manufacturer		N
	b) equipment installed in its intended application is not easily touched		N
	c) only occasional access during NORMAL USE		N
	d) IK code in accordance to IEC 62262 marked or symbol 14 used with full information in the documentation		N
	For non-metallic ENCLOSURES rated below 2 °C ambient temperature value chosen for minimum rated temperature		N
	Impact energies between IK values, the IK code marked for nearest lower value		N
	Conformity is checked by performing following tests:		
	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 impact energy not selected to 5 J alternate method of IEC 62262 used		N
	3) drop test of 8.3.1 or 8.3.2 except for FIXED and EQUIPMENT with mass over 100 kg		P
	Equipment rated with an impact rating of IK 08 that obviously meets the criteria		N
	After the tests inspection with following results:		

Clause	Requirement + Test	Result - Remark	Verdict
	- HAZARDOUS LIVE parts above the limits of 6.3.2 not ACCESSIBLE	After the tests, the top front plate has a dent. - with the jointed test finger no contact to hazardous live parts. - with the rigid test finger and a force of 10N on the air opening the front plate can removed from entire enclosure. - with the jointed test finger no contact to hazardous live parts inside the enclosure. → The device passes the 5J impact test despite opening the front panel.	P
	- insulation pass the voltage tests of 6.8		P
	i) no leaks of corrosive and harmful substances		N
	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		N
	vi) No moving parts exposed, except permitted by 7.3		N
	vii) no damage which could cause spread of fire		N
8.2	ENCLOSURE rigidity test		P
8.2.1	Static test		P
	- 30 N with 12 mm rod to each part of ENCLOSURE		P
	- in case of doubt test conducted at maximum RATED ambient temperature		N
8.2.2	Impact test		P
	Impact applied to any part of ENCLOSURE causing a HAZARD if damaged		P
	Impact energy level and corresponding IK code ....:	5 Joule	P
	Non-metallic ENCLOSURES cooled to minimum RATED ambient temperature if below 2 °C		N
8.3	Drop test		P
8.3.1	Other than HAND-HELD and DIRECT-PLUG-IN EQUIPMENT		
	Tests conducted with a drop height or angle of .....:	30°	P
8.3.2	HAND-HELD and DIRECT-PLUG-IN EQUIPMENT		
	Non-metallic ENCLOSURES cooled to minimum RATED ambient temperature if below 2 °C		N
	Drop test conducted with an height of 1 m		N

9	**PROTECTION AGAINST THE SPREAD OF FIRE**		**P**

Clause	Requirement + Test	Result - Remark	Verdict
9.1	No spread of fire in NORMAL and SINGLE FAULT CONDITION		P
	MAINS supplied equipment meets requirements of 9.6 additionally		
	Conformity is checked by minimum one or a combination of the following (see Figure 11):	(see Form A.17)	P
	a) Fault test of 4.4; or	(see Form A.1 and Form A.2)	N
	b) Application of 9.2 (eliminating or reducing the sources of ignition); or		P
	c) Application of 9.3 (containment of fire within the equipment)		N
9.2	Eliminating or reducing the sources of ignition within the equipment		P
	a) 1) Limited-energy circuit (see 9.4); or		P
	2) BASIC INSULATION provided for parts of different potential; or	(see Form A.5 and A.14)	P
	Bridging the insulation does not cause ignition	(see Form A.2)	P
	b) Surface temperature of liquids and parts (see 9.5)		N
	c) No ignition in circuits designed to produce heat	(see Form A.2)	N
9.3	Containment of the fire within the equipment, should it occur		N
	a) Energizing of the equipment is controlled by an operator held switch		N
	or		N
	b) ENCLOSURE is conform with constructional requirements of 9.3.1; and		N
	Requirements of 9.5 are met		N
9.3.1	Constructional requirements		N
	a) Connectors and insulating material have flammability classification V-2 or better		N
	b) Insulated wires and cables are flame retardant (VW-1 or equivalent)		N
	c) ENCLOSURE meets following requirements:		N
	1) Bottom and sides in arc of 5 ° (see Figure 13) to non-limited circuits (9.4) meets:		N
	i) no openings; or		N
	ii) perforated as specified in Table 16; or		N
	iii) metal screen with a mesh; or		N
	iv) baffles as specified in Figure 12		N
	2) Material of ENCLOSURE and any baffle or flame barrier is made of:		N
	Metal (except magnesium); or		N

Clause	Requirement + Test	Result - Remark	Verdict
	Non-metallic materials have flammability classification V-1 or better		P
	3) ENCLOSURE and any baffle or flame barrier have adequate rigidity		N
9.4	Limited-energy circuit	(see Form A.19)	P
	a) Potential not more than 30 r.m.s. and 42.4 V peak, or 60 V dc	Secondary side: max. ± 12V	P
	b) Current limited by one of following means:		P
	1) Inherently or by impedance (see Table 17); or	Each measure path: 253 V / 4 MΩ = 63 µA	N
	2) Over current protective device (see Table 18); or	Supply and Relay max. 100mA	P
	3) A regulating network limits also in SINGLE FAULT CONDITION (see Table 17)		N
	c) Is separated by at least BASIC INSULATION		P
	Fuse or a nonadjustable electromechanical device is used		P
9.5	Requirements for equipment containing or using flammable liquids		N
	Flammable liquids contained in or specified for use with equipment do not cause spread of fire		N
	RISK is reduced to a tolerable level :		N
	a) The temperature of surface or parts in contact with flammable liquids is 25 °C below fire point		N
	b) The quantity of liquid is limited		N
	c) Flames are contained within the equipment		N
	Detailed instructions for RISK-reduction provided		N
9.6	Overcurrent protection		P
9.6.1	MAINS supplied equipment protected		P
	BASIC INSULATION between MAINS parts of opposite polarity provided	(see Form A.14)	P
	Devices not in the protective conductor		P
	Fuses or single-pole circuit-breakers not fitted in neutral (multi-phase)		P
9.6.2	PERMANENTLY CONNECTED EQUIPMENT		P
	Overcurrent device:		N
	Fitted within the equipment; or		N
	Specified in manufacturer's instructions		N
9.6.3	Other equipment		N
	Protection within the equipment		N

Clause	Requirement + Test	Result - Remark	Verdict
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.21A)	P
	- at an specified ambient temperature of 40 °C		P
	- for equipment rated above 40 °C ambient temperature limits not exceeded raised by the difference to 40 °C		N
	Heated surfaces necessary for functional reasons exceeding specified values:		N
	Are recognizable as such by appearance or function; or		N
	Are marked with symbol 13		N
	Guards are not removable without tool		N
10.2	Temperatures of windings		N
	Limits not exceeded in:	(see Form A.21B)	N
	NORMAL CONDITION		N
	SINGLE FAULT CONDITION		N
10.3	Other temperature measurements		
	Following measurements conducted if applicable:	(see Form A.21A)	
	a) Value of 60 °C of field-wiring terminal box not exceeded		N
	b) Surface of flammable liquids and parts in contact with this liquids		N
	c) Surface of non-metallic ENCLOSURES		P
	d) Parts made of insulating material supporting parts connected to MAINS supply		P
	e) Terminals carrying a current more than 0,5 A		N
10.4	Conduct of temperature test		P
10.4.1	Tests conducted under reference test conditions and manufacturer's instructions	(see Form A.21A)	P
10.4.2	Temperature measurement of heating equipment		N
	Tests conducted in test corner	(see Form A.21A)	N
10.4.3	Equipment intended for installation in a cabinet or wall		N
	Equipment built in as specified in installation instructions	(see Form A.21A)	N
10.5	Resistance to heat		P
10.5.1	Integrity of CLEARANCE and CREEPAGE DISTANCES	(see Form A.13)	P
10.5.2	Non-metallic ENCLOSURES	(see Form A.22)	P

Clause	Requirement + Test	Result - Remark	Verdict
	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		
	a) Parts supporting parts connected to MAINS supply		P
	b) TERMINALS carrying a current more than 0.5 A		N
	Examination of material data; or		N
	in case of doubt:		N
	1) Ball pressure test; or		N
	2) Vicat softening test of ISO 306		N

11	**PROTECTION AGAINST HAZARDS FROM FLUIDS**		**N**
11.1	Protection to OPERATORS and surrounding area provided by EQUIPMENT		N
	All fluids specified by manufacturer considered		N
11.2	Cleaning		N
11.3	Spillage		N
11.4	Overflow		N
11.5	Battery electrolyte		N
	Battery electrolyte leakage presents no HAZARD		N
11.6	Equipment RATED with a degree of ingress protection (IP code)		N
11.7	Fluid pressure and leakage		N
11.7.1	Maximum pressure ..... :		N
	Maximum pressure of any part does not exceed P_{RATED}		N
11.7.2	Leakage and rupture at high pressure		N
	Fluid containing parts subjected to hydraulic test if if a HAZARD could arise		N
	Parts of refrigerating systems meets pressure-related requirements of EN 378-2 or IEC 60335-2-89		N
11.7.3	Leakage from low-pressure parts		N
11.7.4	Overpressure safety device		N
	Does not operate in NORMAL USE		N
	a) Connected as close as possible to parts intended to be protected		N
	b) Easy access for inspection, maintenance and repair		N
	c) Adjustment only with TOOL		N

Clause	Requirement + Test	Result - Remark	Verdict
	d) No discharge towards person		N
	e) No HAZARD from deposit of discharged material		N
	f) Adequate discharge capacity		N
	No shut-off valve between overpressure safety device and protected parts		N
12	**PROTECTION AGAINST RADIATION, INCLUDING LASER SOURCES, AND AGAINST SONIC AND ULTRASONIC PRESSURE**		**N**
12.1	Equipment provides protection		N
12.2	Equipment producing ionizing radiation		N
12.2.1	Ionizing radiation	No voltage inside enough high to generate ionizing radiation and no inonizing material inside the device	N
12.2.1.1	Equipment meets the following requirements:		N
	a) if intended to emit radiation meets requirements of 12.2.1.2; or		N
	tested, classified and marked in accordance to IEC 60405		N
	b) if only emits stray radiation meets requirements of 12.2.1.3		N
12.2.1.2	Equipment intended to emit radiation		N
	Effective dose rate of radiation measured .....:		N
	If dose rate exceeds 5 µSv/h marked with the following:		N
	a) Symbol 17 (ISO 361)		N
	b) Abbreviations of the radionuclides.....:		N
	c) With maximum dose at 1 m; or.....:		N
	with dose rate value between 1 µSv/h and 5 µSv/h in m.....:		N
12.2.1.3	Equipment not intended to emit radiation		N
	Limit for unintended stray radiation of 1 µSv/h at any easily reached point kept .....:		N
12.2.2	Accelerated electrons	No accelerated electrons inside and from the device	N
	Compartments opened only by the use of a TOOL		N
12.3	Optical radiation		P
	No unintentional HAZARDOUS escape of radiation:		
	Checked by inspection, and if necessary, by measurement of the optical radiation to determine no hazard exists.	Only four status LEDs in the device	P
12.4	Micro-wave radiation	No micro-wave radiation inside and from the device	N

Clause	Requirement + Test	Result - Remark	Verdict
	Power density does not exceed 10 W/m^2 ..... :		N
12.5	Sonic and ultrasonic pressure	No sonic or ultrasonic source inside and from the device	N
12.5.1	Sound level		N
	No HAZARDOUS sound emission		N
	Maximum sound pressure level measured and calculated for maximum sound power level as specified in ISO 3746 or ISO 9614-1		N
	Instruction describes measures for protection		N
12.5.2	Ultrasonic pressure		N
	Equipment not intended to emit ultrasound does not exceed limit of 110 dB between 20 kHz and 100 kHz		N
	Equipment intended to emit ultrasound:		N
	Outside useful beam does not exceed limit of 110 dB between 20 kHz and 100 kHz		N
	If inside useful beam above values exceeded:		N
	Marked with Symbol 14 of Table 1		N
	and following information in the documentation:		N
	a) dimensions of useful beam		N
	b) area where ultrasonic pressure exceed 110 dB		N
	c) maximum sound pressure inside beam area		N
12.6	Laser sources	No laser source inside and from the device	N
	Equipment meets requirements of IEC 60825-1		N

13	**PROTECTION AGAINST LIBERATED GASES AND SUBSTANCES, EXPLOSION AND IMPLOSION**		**N**
13.1	Poisonous and injurious gases		N
	No poisonous or injurious gases or substances liberated in NORMAL CONDITION		N
	Manufacturer documentation about potentially liberated gases or substances		N
13.2	Explosion and implosion		N
13.2.1	Components		N
	Components liable to explode:		
	Pressure release device provided; or		N
	Apparatus incorporates operator protection (see also 7.7)		N
	Pressure release device:		
	Discharge without danger		N
	Cannot be obstructed		N

Clause	Requirement + Test	Result - Remark	Verdict
13.2.2	Batteries and battery charging		N
	If explosion or fire HAZARD could occur:		
	Protection incorporated in the equipment; or		N
	Instructions specify batteries with built-in protection		N
	In case of wrong type of battery used:		
	No HAZARD; or		N
	Warning by marking and within instructions		N
	Equipment with means to charge rechargeable batteries:		
	Warning against the charging of non-rechargeable batteries; and		N
	Type of rechargeable battery indicated; or		N
	Symbol 14 used		N
	Battery compartment design		N
	Single component failure		N
	Polarity reversal test		N
13.2.3	Implosion of cathode ray tubes		N
	If maximum face dimensions > 160 mm .....:		
	Intrinsically protected and correctly mounted; or		N
	ENCLOSURE provides protection:		N
	If non-intrinsically protected:		
	Screen not removable without TOOL		N
	If glass screen, not in contact with surface of tube		N

14	COMPONENTS AND SUBASSEMBLIES		P
14.1	Where safety is involved, components and subassemblies meet relevant requirements	(see Table 2)	P
14.2	Motors		
14.2.1	Motor temperatures		N
	Does not present a HAZARD when stopped or prevented form starting; or		N
	Protected by over-temperature or thermal protection device conform with 14.3		N
14.2.2	Series excitation motors		N
	Connected direct to device, if over-speeding causes a HAZARD		N
14.3	Overtemperature protection devices		N
	Devices operating in a SINGLE FAULT CONDITION		N
	a) Reliable function is ensured		N

Clause	Requirement + Test	Result - Remark	Verdict
	b) RATED to interrupt maximum current and voltage		N
	c) Does not operate in NORMAL USE		N
	If self-resetting device used to prevent a HAZARD, protected part requires intervention before restarting		N
14.4	Fuse holders		P
	No access to HAZARDOUS LIVE parts	Jointed Testfinger	P
14.5	MAINS voltage selecting devices		N
	Accidental change not possible		N
14.6	MAINS transformers tested outside equipment		N
14.7	Printed circuit boards		
	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		N
	Not applicable for printed wiring boards with limited-energy circuits (9.4)		N
14.8	Circuits used to limit TRANSIENT OVERVOLTAGES		N
	Test conducted between each pair of MAINS SUPPLY TERMINALS	(see Form A.32)	N
	No HAZARD resulting from rupture or overheating of the component:		N
	- no bridging of safety relevant insulation		N
	- no heat to other parts above the self-ignition points		N

15	**PROTECTION BY INTERLOCKS**		**N**
15.1	Interlocks are designed to remove a HAZARD before OPERATOR exposed		N
15.2	Prevention of reactivation		N
15.3	Reliability		N
	Single fault unlikely to occur; or		N
	Cannot cause a HAZARD		N

16	**HAZARDS RESULTING FROM APPLICATION**		**P**
16.1	REASONABLY FORESEEABLE MISUSE		
	No HAZARDS arising from settings not intended and not described in the instructions		P
	Other cases of REASONABLY FORESEEABLE MISUSE addressed by RISK assessment		N
16.2	Ergonomic aspects		

Clause	Requirement + Test	Result - Remark	Verdict
	Factors giving rise to a HAZARD the RISK assessment is reflecting those aspects:		
	a) limitation of body dimensions		N
	b) displays and indicators		N
	c) accessibility and conventions of controls		N
	d) arrangement of TERMINALS		N
17	**RISK Assessment**		**N**
	RISK assessment conducted, if HAZARD might arise and not covered by Clauses 6 to 16		N
	TOLERABLE RISK achieved by iterative documented process covering the following:		N
	a) RISK analysis		N
	Identifies HAZARDS and estimates RISK		N
	b) RISK evaluation		N
	Plan to judge acceptability of resulting RISK level based on the estimated severity and likelihood of a RISK		N
	c) RISK reduction		N
	Initial RISK reduced by counter measures;		N
	Repeated RISK evaluation without new RISKS introduced		N
	RISKS remaining after RISK assessment addressed in instructions to RESPONSIBLE BODY:		N
	Information contained how to mitigate these RISKS		N
	Following principles in methods of RISK reduction applied by manufacturer in given order:		N
	1) RISKS eliminated or reduced as far as possible		N
	2) Protective measures taken for RISKS that cannot be eliminated		N
	3) User information about residual RISK due to any defect of the protective measures		N
	Indication of particular training is required		N
	Specification of the need for personal protective equipment		N
	Conformity checked by evaluation of the RISK assessment documentation		N
ANNEX F	**ROUTINE TESTS**		**N**
	Manufacturer´s declaration		N

Clause	Requirement — Test	Result — Remark	Verdict

4.4.2	**TABLE: Summary of SINGLE FAULT CONDITIONS**			**Form A.1**	**P**
Subclause	Title	Does not apply	Carried out	Comments	
4.4.2.1	SINGLE FAULT CONDITIONS not covered by 4.4.2.2 to 4.4.2.14	X		see Form A.2	
4.4.2.2	PROTECTIVE IMPEDANCE		X		
4.4.2.3	PROTECTIVE CONDUCTOR		X	see Form A.8	
4.4.2.4	Equipment or parts for short-term or intermittent operation	X			
4.4.2.5	Motors	X			
	– stopped while fully energized	X			
	– prevented from starting	X			
	– one phase interrupted (multi-phase)	X			
4.4.2.6	Capacitors	X			
4.4.2.7	MAINS transformers Attach drawing of MAINS transformers showing all protective devices (see Forms A.30 and A.31)		X		
4.4.2.8	Outputs	X			
4.4.2.9	Equipment for more than one supply	X			
4.4.2.10	Cooling – air holes closed – fans stopped – coolant stopped – loss of cooling liquid	X X X X	X X		
4.4.2.11	Heating devices – timer overridden – temperature controller overridden	 X			
4.4.2.12	Insulation between circuits and parts	X			
4.4.2.13	Interlocks	X			
4.4.2.14	Voltage selectors	X			
List below all SINGLE FAULT CONDITIONS not covered by 4.4.2.2 to 4.4.2.14:					
Supplementary Information: (See Form A.2 for details of tests)					

Clause	Requirement — Test	Result — Remark	Verdict

4.4	**TABLE: Testing in SINGLE FAULT CONDITION – Results**			**Form A.2**	**P**
Test subclause	Fault No.	Fault description	Td 4.4.3 (NOTE)	How was test terminated Comments	Meets 4.4.4
4.4.2.2	1	Short-circuit of one of four mdivh (1 MΩ) resistor	00:01:00	The voltage at the end of protective impedance is only higher for the connected cpu (not real connected). No accessible part with hazardous voltage	Yes
4.4.2.3	2	Protective conductor is opened	00:05:00	Grounded Parts have a voltage up to 168.0 V AC r.m.s. but the touch current is max. 0.04 mA AC r.m.s.	Yes
4.4.2.7	3	Output of transformer short circuited	00:00:01	Fuse F2 is opened immediately	Yes
4.4.2.7	4	Output of tansformer overloaded (1.5 x Ir (fuse) = 0.75 A)	03:00:00	Temperatures are higher (see Form A.21)	Yes
4.4.2.10	5	Air holes for cooling closed	04:00:00	No higher temperatures measured	Yes

NOTE Td = Test duration in hh:mm:ss
Record dielectric strength test on Form A.14 and temperature tests on Form A.21.
Record in the comments column for each test whether carried out during or after SINGLE FAULT CONDITION.

Clause	Requirement — Test	Result — Remark	Verdict

5.1.3c)	TABLE: MAINS Supply			Form A.3	P
	Marked rating..... :	220-230	V		—
	Phase..... :				—
	Frequency ..... :	50-60	Hz		—
	Current ..... :		A		—
	Power ..... :	5	W		—
	Power ..... :		VA		—

Test No.	Voltage V	Frequency Hz	Current A	Power in W	Power in VA	Comments	
1	230	50		2.42	4.13	with no relays activated	P

Note – Measurements are only required for marked ratings.

Supplementary Information:

Clause	Requirement — Test	Result — Remark	Verdict

5.3	**TABLE: Durability of Markings**	**Form A.4**	**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) Filmcoated (plastic foil control panel)	D Water, Hexan
5) Imprinted on plastic (moulded in)	

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

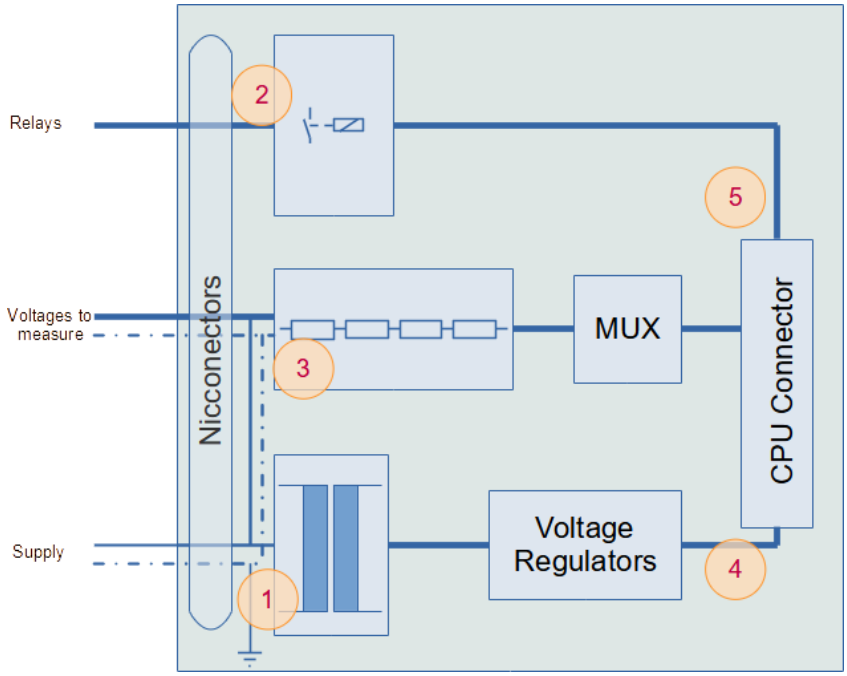
Marking location	Marking method (see above)
Identification (5.1.2)	2
MAINS supply (5.1.3)	-
Fuses (5.1.4)	2
terminals and operating devices (5.1.5.2)	-
Switches and circuit breakers (5.1.6)	-
Double/reinforced equipment (5.1.7)	-
Field wiring Terminal boxes (5.1.8)	-
Warning marking (5.2)	2
Battery charging (13.2.2)	-

Method	Test agent	Remains legible	Label loose	Curled edges	Comments
		Verdict	Verdict	Verdict	
2	A	P	N	N	
2	B	P	N	N	
2	D	P	N	N	

Supplementary Information:

Clause	Requirement — Test	Result — Remark	Verdict

6	**TABLE: Protection against Electric Shock - Block Diagram of System Form A.5**	**P**



Pollution degree..... : II	Overvoltage category.....: II

Location or	Insulation type	Maximum working voltage	CREEPAGE Distance (NOTE 3)				CLEARANCE (NOTE 3)	Test voltage	Comments
description	(NOTE 1)	(NOTE 2) V	PWB mm	CTI	Other mm	CTI	mm	(NOTE 2) V	
1 Mains supply	BI	253	1.5	IIIa	1.5	IIIa	1.5	1500	
2 Relay Output	BI	253	1.5	IIIa	1.5	IIIa	1.5	1500	
3 Signal Measures	PI	253	3.0	IIIa	3.0	IIIa	1.5	1500	
4 Power Out	BI	12	0.025	IIIa	0.42	IIIa	0.5	1100	
5 MUX Data	BI	5	0.025	IIIa	0.4	IIIa	0.5	1100	

NOTE 1 – Type of insulation:
BI = BASIC INSULATION
DI = DOUBLE INSULATION
PI = PROTECTIVE IMPEDANCE
RI = Reinforced INSULATION
SI = Supplementary INSULATION

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

NOTE 3 - INSTALLATION CATEGORIES (OVERVOLTAGE CATEGORIES) or POLLUTION DEGREES which differ from these should be shown under "Comments".

Supplementary Information:

Clause	Requirement — Test	Result — Remark	Verdict

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

Item	Description	Determination method (NOTE 5)	Exception under 6.1.2 (NOTE 4)
A	Niconnector (6) & (7)	V & R	
B	Frontplate with press-in rivets	V	
C	CPU Connector	V	
D	Fuseholders	V	

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 – Capacitor test may be required (see Form A.7).

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.

Supplementary Information:

Clause	Requirement — Test	Result — Remark	Verdict

6	**TABLE: Values in NORMAL CONDITION**												**Form A.7**	**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	Voltage			Current				Capacitance		10 s / 5 s test (NOTE)			Comments
(see Form A.6)	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	
A	0.8		0.0	-	-	-	-	-	-	-	-	-	
B	-		-	-	-	-	-	-	-	-	-	-	
C	0.8		+- 12	-	-	-	-	-	-	-	-	-	
D	-		-	-	-	-	-	-	-	-	-	-	
PE				60 µA									
L-PE				0.18 mA									
N-PE				0.06 mA									

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.

Supplementary Information:

Clause	Requirement — Test	Result — Remark	Verdict

6.3.2	**TABLE: Values in SINGLE FAULT CONDITION**											**Form A.8**	**P**
Item	Subclause and	Voltage			Transient (see NOTE)		Current				Capacitance		
(see Form A.6)	fault No. (see Form A.2)	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)	Comments	
A	2	168.0		0.0	-	-	-	0.04	-	-	-	The current is below the limit of 3.5 mA AC r.m.s. of 6.3.2 and therefore not hazardous live.	
B	2	168.0		0.0	-	-	-	0.04	-	-	-	The current is below the limit of 3.5 mA AC r.m.s. of 6.3.2 and therefore not hazardous live.	
C	2	3.0		± 12	-	-	-	-	-	-	-		
D	2	3.0		0.0	-	-	-	-	-	-	-		

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.

Supplementary Information:

Clause	Requirement — Test	Result — Remark	Verdict

6.5.2.2	**TABLE: Cross-Sectional Area of Bonding Conductors**	**Form A.9**	**P**
CONDUCTOR LOCATION		CROSS-SECTIONAL AREA mm²	
GND Connection on Niconnector (6) & (7)		0.75	P
Supplementary Information:			

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			

A combination of components		
Component	Location	Comments
mdivh: 1 MΩ / 0.25 W	4 of it serial of each 12 “channel” of protective impedance of (input N,L1,L2,L3 / relay A output N,L1,L2,L3 / relay B output N,L1,L2,L3)	

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

Supplementary Information:

6.5.6	TABLE: Current- or voltage-limiting device							P
Component	Location	Measured		Rated		Verdict	Comments	
		Working voltage V	Current A	Working voltage V	Current A			
F1	Supply for transformer and relays	230	0.036	250	0.1	P		
F2	Secondary side fuse	8	0.43	250	0.5	P		

Supplementary Information:

Clause	Requirement — Test	Result — Remark	Verdict

6.7	**TABLE: CLEARANCES and CREEPAGE Distances**											**Form A.13**	**P**
6.4.2	ENCLOSURES and protective barriers				8	Mechanical resistance to shock and impact							—
6.4.4	Impedance				9.6.1	Overcurrent protection basic insulation between MAINS parts							—
6.5.4	Protective impedance				10.5.1	Integrity of CLEARANCES and CREEPAGE distances							—
6.5.6	Current- or voltage-limiting device												—

Location	Measured (initial – 6.7)		Verdict	Mechanical tests (note)					Test at max.	Measured after test (if required)		Verdict	Comments
(see Form A.5)	CREEPAGE DISTANCE	CLEARANCE		Applied force	Rigidity (8.2)		Drop (8.3)		RATED ambient	CREEPAGE DISTANCE	CLEARANCE		
	mm	mm		N	Static (8.2.1)	Impact (8.2.2)	Normal (8.3.1)	Hand-held/ Plug-in	(10.5.1)	mm	mm		
1 (L)	2.46	2.46	P	30	P							P	
1 (N)	4.63	4.63	P	30	P							P	
2 (L)	2.46	2.46	P	30	P							P	
2 (L')	1.12	1.12	P(01)	30	P							P	
3 (to GND)	5.63	5.63	P	30	P							P	
3 (PI)	4 x 1.5	-	P	30	P							P	
4	0.5	0.5	P	30	P							P	
5	0.5	0.5	P	30	P							P	
Device						P	P		40	-	-	P	

NOTE – Refer to Form A.14 for dielectric strength tests following the above tests.

Supplementary Information:

01 with ac.voltage test of 1500 V during 1 min.

Clause	Requirement — Test	Result — Remark	Verdict

6.8	**TABLE: Dielectric strength tests**	**Form A.14**	**P**
4.4.4.1 b)	Conformity after application of SINGLE FAULT CONDITIONS[1]		
6.4	Primary means of protection[2]		
6.6	Connections to external circuits		
6.7.	Insulation requirements[2] (see Annex K)		
6.10.2	Fitting of non-detachable MAINS supply cords[1]		
9.2 a) 2)	Eliminating or reducing the sources of ignition within the equipment		
9.4 c)	Limited-energy circuit		
9.6.1	Overcurrent protection basic insulation between MAINS - parts		

[1] Record the fault, test or treatment applied before the dielectric strength test. [2] Humidity preconditioning required.

	Test site altitude ..... :	500m	—
	Test voltage correction factor (see Table 10)..... :		—

Location or references from Forms A.2 and A.5	Clause or sub-clause	Humidity Yes/No	Working voltage V	Test voltage r.m.s./peak/d.cV	Comments	Verdict
L1/L2/L3/N – PE	6.4	N	253	1500	1.5 mA	P
L1/L2/L3/N – Foil over Frontplate	6.4	N	253	1500	1.5 mA	P
GND – Relay K1 Out	6.7	N	253	1500	Due to only 1.12 mm gap in inner layer	P
L1/L2/L3/N – PE	6.4	Y	253	1500	1.5 mA	P

Supplementary Information:

Clause	Requirement — Test	Result — Remark	Verdict

9.3.2	**TABLE: Constructional Requirements** **Form A.18**	**P**
14.7	Printed circuit boards	

Material tested .....:	PCB	—
Generic name.....:	JLC-1	—
Material manufacturer .....:	Shenzhen Jia Li Chuang Technology Development Co LTD	—

Type .....:		—
Colour.....:		—
Conditioning details.....:		—

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

Supplementary Information:

PCB Manufacturer is tested by UL with the File number E479892. The PCB is complying with UL 94 V-0.

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Wiring, Printed - Component E479892

Guide Information

Shenzhen Jia Li Chuang Technology Development Co LTD

27F Olympic building Commercial daily Rd 2 Futian district, Shenzhen Guangdong Sheng 518000 CN

Type dsg: JLC-1

Multilayer printed wiring boards

Cond Width Min (mm)	Cond Width Edge (mm)	Cond Thk Min (mic)	Cond Thk Max Int (mic)	Cond Thk Max Ext (mic)	SS/ DS/ DSO	Max Area Diam (mm)	Report Date After 2022-01-01	Surface Mount Technology	Assembly Solder Process Temp(°C)	Assembly Solder Process Cycles	Solder Limits Temp (°C)	Solder Limits Time (sec)	Max Oper Temp (°C)	Flame Class	Meets UL796 DSR	CTI
0.1	0.3	17	102	102	DS	25.4	No	-	-	-	288	30	130	V-0	All	*

* - CTI rating may be marked on individual boards.

Report Date: 2016-02-04

Last Revised: 2021-08-26

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Clause	Requirement — Test	Result — Remark	Verdict

9.4	**TABLE: Limited-Energy Circuit**					**Form A.19**	**P**
Item	9.4 a)	9.4 b) Current and power limitation			9.4 c)	Decision	
or Location (see Form A.17)	Maximum potential in circuit voltage r.m.s./d.c. V	Maximum available current A	Maximum available power VA	Overload protection after 120 s A	Circuit separation	Yes/No	Comments
Primary side: supply and relay		0.1		0.25		Yes	
Primary side: Protective impedance for measuring			12 “channel” with 63.25 µA @ 253 V = 0.192 VA			Yes	
Secondary side: Supply for MUX and CPU Port	± 12 V , 40 mA + 5 V , 500 mA					Yes	

Supplementary Information:

Clause	Requirement — Test	Result — Remark	Verdict

10.	**TABLE : Temperature Measurements**	**Form A.21A**	**P**
10.1	Surface temperature limits - NORMAL CONDITION and / or SINGLE FAULT CONDITION		
10.2	Temperature of windings- NORMAL CONDITION and / or SINGLE FAULT CONDITION		
10.3	Other temperature measurements		

Operating conditions:	Normal Operation, both relays active		
Frequency ..... :	50 Hz	Test room ambient temperature (ta)....:	24.9 °C
Voltage ..... :	253 V	Test duration.....:	4 h 00 min

Part / Location	t_m °C	t_c °C	t_{max} °C	Verdict	Comments
PowerInput Niconnector (7)	36.6	61.7	105	P	
MeasureInput Niconnector (6)	40.5	65.6	105	P	
CPU Connector	39.3	64.5	85	P	
Relay ControlRelays	53.3	78.4	90	P	
Transformer	57.6	82.8	130	P	
Resistor PI	48.1	73.2	85	P	
PCB Temperature	54.2	79.4	130	P	
Front Plate	38.1	63.2	80	P	

Operating conditions:	Abnormal Operation (Transformer Overload), both relays active		
Frequency ..... :	50 Hz	Test room ambient temperature (ta)....:	25.2 °C
Voltage ..... :	230 V	Test duration.....:	3 h 00 min

Part / Location	t_m °C	t_c °C	t_{max} °C	Verdict	Comments
PowerInput Niconnector (7)	41.0	65.8	105	P	
MeasureInput Niconnector (6)	47.6	72.5	105	P	
CPU Connector	44.9	69.8	85	P	
Relay ControlRelays	64.9	89.7	90	P	
Transformer	84.7	109.5	130	P	
Resistor PI	59.9	84.8	85	P	
PCB Temperature	67.7	92.6	130	P	
Front Plate	47.0	71.9	80	P	

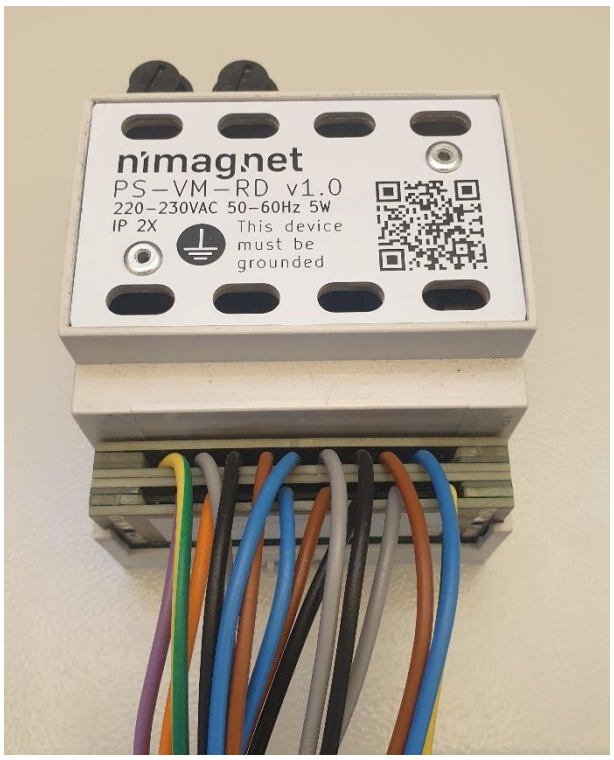
NOTE 1 - t_m = measured temperature
t_c = t_m corrected (t_m–t_a+ **40 °C** or max. RATED ambient)
t_{max} = maximum permitted temperature
NOTE 2 - see also 14.1 with reference to component operating conditions
NOTE 3 - Record values for NORMAL CONDITION and / or SINGLE FAULT CONDITION in this Form use additional form if necessary
NOTE 4 - see Form A.21B for details of winding temperature measurements

Supplementary Information:

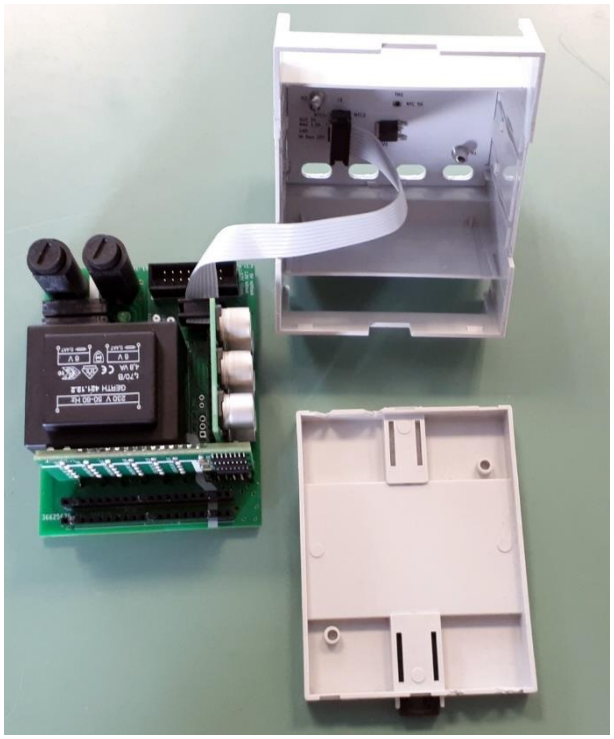
Applied Test Equipment

Test Equipment	Manufacturer Type	QUINEL Inventory No	Used	Last calibration	Next calibration
Multi-meter	Fluke 77	L&G 21095		10/2023	10/2024
Multi-meter	Fluke 87	QNL 450 003		02/2024	02/2025
Multi-meter	Fluke 87	327 659	Yes	10/2023	10/2024
Multi-meter	Fluke 157	QNL 500 361	Yes	11/2023	11/2024
Current Clamp	Fluke 337	QNL 500 166		11/2022	11/2024
Power Analyzer	Valhalla Scientific 2101	QNL 500 155		02/2024	02/2025
Power & Harmonics Analyzer	TTi HA1600	QNL 500 054	Yes	01/2024	01/2026
Power-meter (3phase Transformer)	EMU 30.X7	QNL 500 038			
Power-meter (3phase)	EMU Professional 3/75	QNL 500 208		07/2023	07/2025
DSO	Tektronix TBS 1072B-EDU	QNL 500 258		10/2022	10/2024
Data Logger	Keysight DAQ970A	QNL 500 357	Yes	10/2023	10/2025
Data Logger	HP 34970A & HP 34901A	QNL 500 043		03/2024	03/2026
Data Logger	HP 34970A & HP 34901A	QNL 500 106		01/2024	01/2026
Circuit for leakage current Measurement	Elabo 90-2G	97077	Yes	10/2022	10/2024
Circuit for leakage current Measurement	Quinel	QNL 500 013		01/2023	01/2025
High Voltage Generator	ETL UX36	327 569	Yes	10/2022	10/2024
Test equipment for Earthing test	PTL Dr. Grabenhorst M09.26	QNL 500 025		02/2024	02/2026
Impulse Tester	Haefely PU12	L&G 321 222		03/2022	03/2024
Climatic chamber	ESPEC PL-3J	QNL 500 236		09/2023	09/2025
Climatic chamber	ESPEC ARS-0390	QNL 500 248	Yes	09/2023	09/2025
Climatic chamber	Weiss Technik WK600/5	QNL 500 283		01/2022	01/2024
Heating chamber	Heraeus UT6060	3748		10/2022	10/2024
Temperature Meter	TES 1300 Thermometer	QNL 500 150		10/2023	10/2024
Ball pressure apparatus	PTL Dr. Grabenhorst T10.02	SN: 9606213.8		07/2022	07/2027
Slide gauge	Sylvac	10344-25	Yes	12/2023	12/2025
Glow-Wire apparatus	PTL Dr. Grabenhorst T03.14	QNL 500 271		02/2023	02/2026
Impact hammer	PTL Dr. Grabenhorst F22.50	23 646		09/2021	09/2025
Test pin (Probe 13)	PTL Dr. Grabenhorst P10.11	QNL 500 183		09/2022	09/2027
Test finger (Probe B)	PTL Dr. Grabenhorst P10.14	SN: 9606213.3	Yes	09/2022	09/2027
Test finger (Probe 18)	PTL Dr. Grabenhorst P10.xx	QNL 500 203		09/2022	09/2027
Test finger (Probe 19)	PTL Dr. Grabenhorst P10.xx	QNL 500 182		09/2022	09/2027
Straight unjointed Test finger	PTL Dr. Grabenhorst P10.15	SN: 9606213.4	Yes	09/2022	09/2027
Test probe	PTL Dr. Grabenhorst P10.18	SN: 9606213.5		09/2022	09/2027
Test probe IP3X (2.5 mm)	Quinel	QNL 500 185		09/2022	09/2027
Test probe IP4X (1.0 mm)	Quinel	QNL 500 185		09/2022	09/2027
Impact weight 1.7 kg (5J acc. IEC 60068-2-75)	PegoGroup (HK) Co. LTD	QNL 500 308		10/2021	10/2025
Downpipe / vertical impact (Ø 72mm)	Quinel	QNL 500 080		06/2022	06/2026
Steel ball (Ø 50mm / 0.511Kg)	Quinel	QNL 500 165	Yes	10/2021	10/2025
Downpipe / vertical impact (Ø 52mm)	Quinel	QNL 500 081	Yes	10/2021	10/2025
Force Meter 0 – 50 N	PTL Dr. Grabenhorst P10.35	QNL 500 121	Yes	09/2022	09/2026
Force Meter 0 – 250 N	PTL Dr. Grabenhorst P10.37	QNL 500 122		09/2022	09/2026
Torque screwdriver	Gedore 6FS026551 QS6	QNL 500 178		09/2022	09/2026
Torque screwdriver	I2RTD	QNL 500 226		09/2022	09/2026
Device for spilling testing	QUINEL	QNL 500 265			
Scale PC4400	Mettler	20041	Yes	04/2023	04/2025
Vibrations-apparatus with amplifier TW6000	Ling Dynamic systems LDS 712	500051		12/2023	12/2025
Impulse sound level meter	CEL-228	506002/00			

Photographs of device

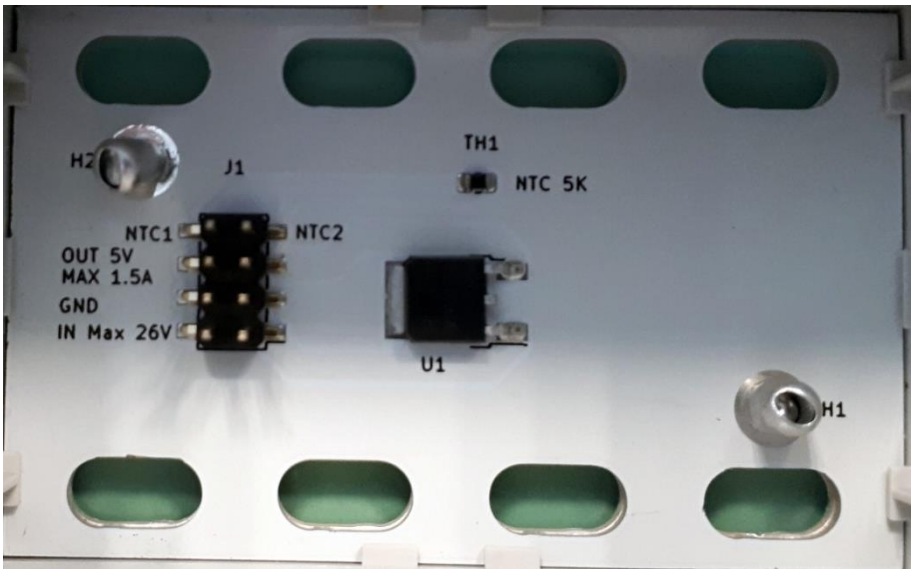


Device with connected Niconnector for supply and voltage measure

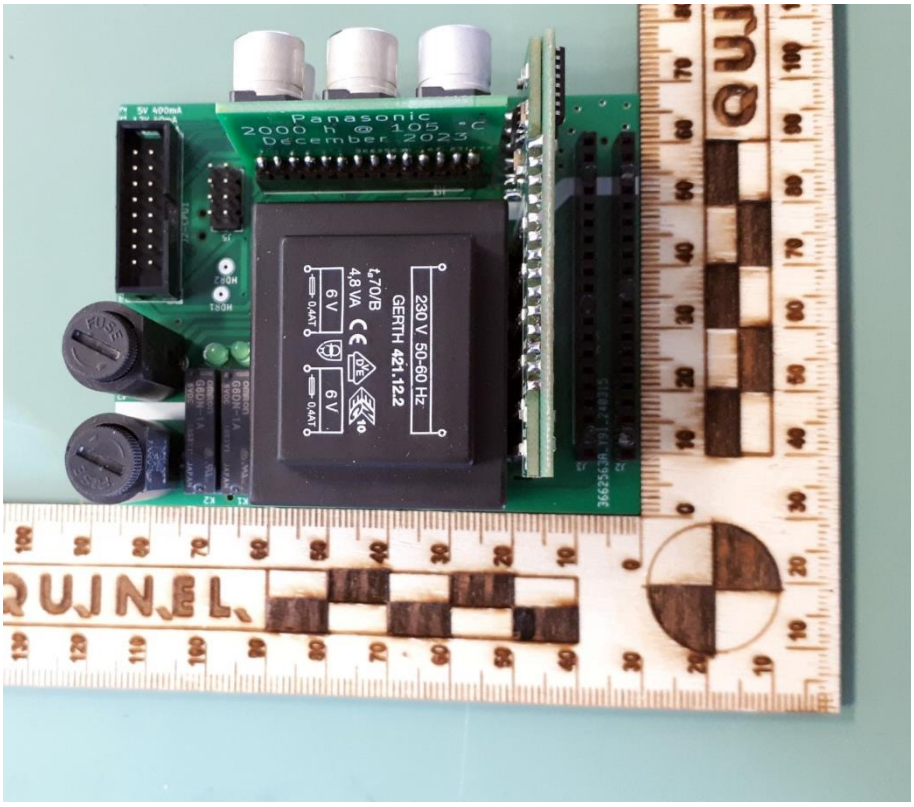


Open Device

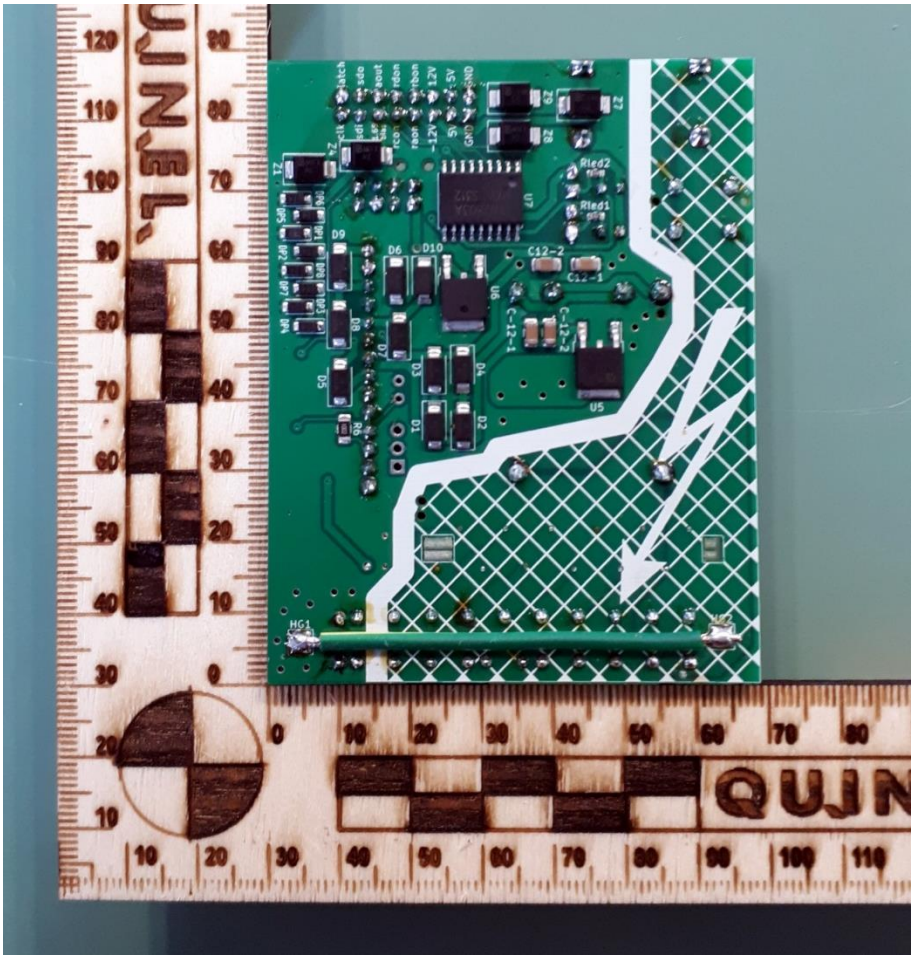
Inside view of upper part of enclosure with 5V regulation section



Inside view of Top plate



Assembled Mainboard PCB with voltage measure PCB



Bottom view from assembled Mainboard