NAITEC

Electromagnetic Compatibility & Electrical Safety

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This document has 65 pages excluding the cover page

REPORT Nº: PR180762

Written for: MONSOL ELECTRONIC, S.L.

Related to: Electrical Safety Tests on

"CcM4"

INDICE: PÁG.

1. GENERAL CONDITIONS

This report refers only and exclusively to the objects and equipments that have undergone the test.

This report does not represent or prove to be the Certification of the Product. This must be expedited by the Certification Bodies or competent Authorities.

2. GUARANTIES

NAITEC guaranties professional discretion by all its personnel in relation with the accomplishment of the works it carries out. All the data regarding the testing as well as the equipment itself will be treated confidentially.

NAITEC guaranties the results and conclusions contained in this report; the data presented is the result of the tests and measurements carried out with the equipment. These tests are referred to the moment and conditions indicated in this report.

3. TEST CHARACTERISTICS

3.1. TESTS CARRIED OUT

Electrical Safety tests according to the standards:

- UNE-EN 61010-1:2001 Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements.

- UNE-EN 61010-2-030:2011 Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-030: Particular requirements for equipment having testing or measuring circuits

4. TESTING CONDITIONS

4.1. ENVIRONMENTAL CONDITIONS

The environmental conditions that apply to the tests described in this report were the ones registered in the tests laboratory of NAITEC. During the test, these conditions were included in the ranges described in the following table.

Temperature	Min=15ºC	Max=30ºC
Relative Humidity	Min= 45%	Max= 60%
Atmospheric Pressure	Min=860 mbar	Max=1060 mbar

4.2. EQUIPMENT

- SMG500+ Electrical Safety Tester (CM03/02)
- FMG501 Leakage Current Testes (CM03/01)
- Yokogawa PZ4000 Power Analyzer (EL10/04)
- Mark 10 Dynamometer (CM03/04)
- Tektronix DPO2004 Oscilloscope (CM01/58)
- Accessibility Probes Set (CM03/08)
- Fluke 179 multimeter (CM01/47)
- SPS 3PH power source (CM01/78)
- Neo Thermo TVS 700-P Thermal camera (FL01/15)
- Almemo 8590-9 Data logger (CM03/11)
- Almemo ZA9020-FS Thermocouples (CM03/11-01, CM03/11-02, CM03/11-03, CM03/11-04)
- Almemo FN-A305 Air temperature probe (CM03/11-12)
- Impact Test Ball (CM03/12)
- Flexometer (CM03/19)
- Wood stand (CM03/18)
- Climatic chamber (MO03/27)
- Oven (MO02/33)
- Stopwatch (MO02/27)

4.3. TESTING PERIOD

The tests were carried out between the days 2018/10/03 and 2018/11/15.

5. EUT IDENTIFICATION DATA

5.1. TEST PETITIONER AND DUT SUPPLIER

Name: Monsol Electronic, S.L.

Address: C/ La Gitanilla, 17 – Nave 01 Portón A

29004 Málaga (España)

Phone: 952 02 05 80

Contact person: José Luis Vilches

5.2. TESTED EQUIPMENT IDENTIFICATION

The DUT identification, as stated by the test petitioner, was as follows:

Product: CcM4

Description: AC Powered device for measurement purposes connected directly to a circuit breaker

Trade Mark: CcM

Serial number: 0418100011

Hardware version: 2.2.1

Software version: 1918

The equipments that have been tested are described in the following table:

SAMPLE A:

CONTROL NUMBER	RECEPTION DATE	TRADE MARK	TYPE	SERIAL NUMBER	DESCRIPTION
A01	2018/10/03	CcM	CcM4	0418100011	AC Powered device for measurement purposes connected directly to a circuit breaker
A02	2018/06/15	-	-	-	User's manual (DUT)

NOTE: DUT stands for Device Under Test; AUX stands for Auxiliary device (not under test)

6. TEST RESULTS

The EUT is in **COMPLIANCE** with the requirements of the visual inspections and tests carried out and that are detailed in the following table.

P: Pass; F: Fail; N/A: Not applicable; N/M: Not measured.

Clause	Requirement + Test	Result - Remark	Verdict
4	**TESTS**		
4.4	Testing in SINGLE FAULT CONDITIONS		P
4.4.1	Fault Tests	See table 4	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		-
4.4.2.2	PROTECTIVE IMPEDANCE		N/A
4.4.2.3	PROTECTIVE CONDUCTOR		N/A
4.4.2.4	Equipment or parts for short-term or intermittent operation		N/A
4.4.2.5	Motors		-
	- stopped while fully energized		N/A
	- prevent from starting		N/A
	- one phase interrupted (multi-phase)		N/A
4.4.2.6	Capacitors		N/A
4.4.2.7	MAINS transformers		N/A

4.4.2.7.2	Short circuit		N/A
4.4.2.7.3	Overload		N/A
4.4.2.8	Outputs		N/A
4.4.2.9	Equipment for more than one supply		N/A
4.4.2.10	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		N/A
	- time overriden		N/A
	- temperature controller overriden		N/A
4.4.2.12	Insulation between circuits and parts		P
4.4.2.13	Interlocks		N/A
4.4.2.14	Voltage selectors		N/A
4.4.3	Duration of tests		-
4.4.4	Conformity after application of fault conditions		P

5	**MARKING AND DOCUMENTATION**		
5.1.1	Required equipment markings		-
	- visible from the exterior; or		N/A
	- visible after removing cover or opening door		N/A

	- visible after removal from rack or panel	Electrical parameters marked on the rear surface of the equipment. Manufacturer and warning symbols placed in the front side,	P
	Not put on parts which can be removed by an operator	No removable parts	N/A
	Letter symbols (IEC 60027) used		P
	Graphic symbols (IEC 61010-1: Table 1) used	IEC 60417-5032-1 (2002-10), IEC 60417-5172 (2003-02) and electrical hazard warnings used.	P
5.1.2	Identification		P
	Equipment is identified by:		-
	a) Manufacturer's or supplier's name or trademark	Monsol Electronic	P
	b) Model number, name or other means	CCM4	P
	Manufacturing location identified		N/A
5.1.3	MAINS supply		P
	Equipment is marked as follows:		-
	a) Nature of supply		P
	1) a.c. RATED MAINS frequency or range of frequencies……...:	50/60Hz	P
	2) d.c. with symbol 1……:		N/A
	b) RATED supply voltage(s) or range……..:	3x230/400V	P
	c) Max. RATED power (W or VA) or input current….:		P
	The marked value not less than 90% of the maximum value		P

	If more than one voltage range:		P
	Separate values marked; or		N/A
	Values differ by less than 20%		P
	d) OPERATOR-set for different RATED suppply voltages		-
	Indicates the equipment set voltage		N/A
	Portable equipment indicatio 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:		N/A
	With the voltage if it is different from the MAINS supply voltage……..:		N/A
	For use only with specific equipment		N/A
	If not marked for specific equipment it is marked with:		N/A
	The maximum rated current or power; or		N/A
	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)……:		N/A
5.1.5	TERMINALS, connections and operating devices		P
5.1.5.1	General		-
	Where necessary for safety, indication of purpose of TERMINALS, connectors, controls and indicators		N/A

	marked		
	If insufficient space, symbol 14 used		P
	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
	- colored red		N/A
	- coded as specified in IEC 60073		N/A
	Supplementary means of coding provided, if meaning of color relates (IEC 60073)		-
	- to safety of persons; or		N/A
	- safety of the environment		N/A
5.1.5.2	TERMINALS		P
	MAINS supply TERMINAL identified		P
	Other TERMINAL marking:		-
	a) FUNTIONAL EARTH TERMINALS (symbol 5 used)		N/A
	b) PROTECTIVE CONDUCTOR TERMINALS:		N/A
	Symbol 6 is placed close to or on TERMINAL; or		N/A
	Part of an apliance inlet		N/A
	c) TERMINALS of control circuits (symbol 7 used)		N/A
	d) HAZARDOUS LIVE TERMINALS supplied from the interior		N/A
	Standard MAINS socket outlet; 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
	- 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 60ºC:		-
	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:		P
	a) symbols min 2.75mm and text 1.5mm high and contrasting in color with background	3mm high. Black symbols on green. See Annex I.	P
	b) symbols and text molded, stamped or engraved		N/A

	in material min. 2,0mm high and		
	0,5mm depth or raised if not contrasting in color		N/A
	If necessary marked with symbol 14		P
	Statement to isolate or disconnect if access by using a tool to HAZARDOUS LIVE parts is permitted		N/A
5.3	Durability of markings		P
	The requiered markings remain clear and legible in NORMAL USE	After the test marking remains clearly readable.	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 files	Printed instructions provided	P
	In electronic media if available at any time		N/A
	Documentation includes		-
	a) intended use		P
	b) technical specification		P
	c) name and address of manufacturer or supplier		P
	d) information specified in 5.4.2 to 5.4.6	Se 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 or HAZARDOUS live parts	User's manual states that voltage must be verified before accessing to HV parts	P
	h) instructions for lifting and carrying		N/A
	Warning statements and a clear explanation of warning symbols:		-
	- provided in the documentation; or		P
	- information is marked on the equipment		N/A
5.4.2	Equipment ratings		P
	Documentation includes		-
	a) supply voltage or voltage range……:	300VRMS	P
	Frequency or frequency range……:	50Hz, 60Hz	P
	Power or current rating……:	63A	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/A
	d) Statement of the range of environmental conditions (see 1.4)	a) lo indica en el punto 3.6	P
	e) Degree of protection (IEC 60529)	IP20	P
	f) If impact rating is less than 5 j:	ND	N/A
	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
5.4.3	Equipment installation		P
	Documentation includes instructions for:		P
	a) assembly, location and mounting requirements	Internal location and inside an IP55 enclosure.	P
	b) protective earthing		N/A
	c) connections to supply		P
	d) PERMANENTLY CONNECTED EQUIPMENT:		P
	1) Supply requirements	Direct connection	P
	2) If external switch or circuit- breaker, requirements and location recommendation		P
	e) ventilation requirements		N/A
	f) special services (e.g. air, cooling liquid)		N/A
	g) instructions relating to sound level		N/A
5.4.4	Equipment operation		P
	Instructions for use include:		P
	a) identification and description of operating controls		N/A
	b) positioning for disconnection		N/A
	c) instructions for interconnection		P
	d) specification of intermittent operation limits		N/A
	e) explanation of symbols used		P
	f) replacement of 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)		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 liquid		N/A
	A statement about protection impairment if used in a manner not specified by the manufacturer		P
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:		P
	Instruction against the use of detachable MAINS supply cord with inadequate rating		N/A
	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 subject permitting safe servicing and continued safety:		P
	a) product specific RISK may affect service personal		P
	b) protective measures for these RISKS		P
	c) verification of the safe state after repair		P
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**		
6.1	General		P
6.1.1	Requirements		P
	Protection against electric shock maintained in NORMAL CONDITION and SINGLE FAULT CONDITION		P
	ACCESSIBLE parts nor HAZARDOUS LIVE		P
	Voltage, current, charge or energy below the limits in NORMAL CONDITION and in SINGLE FAULT CONDITION between:		P
	ACCESIBLE parts and earth		P
	Two ACCESIBLE parts on same piece of the equipment within a distance of 1,8m		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		N/A
	a) parts for lamps and lamp sockets after lamp removal		N/A
	b) parts to be replaced by an OPERATOR only by the use of tool and warning marking		N/A
	Those parts not HAZARDOUS LIVE 10s after interruption of supply		N/A
	Capacitance test if charge is received from internal		N/A

	capacitor		
6.2	Determination of ACCESIBLE parts		P
6.2.1	General	Equipment installed following manufacturer instructions.	P
	Unless obvious determination of ACCESSIBLE parts as specified in 6.2.2 to 6.2.4		P
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 10N		N/A
6.2.3	Openings above parts that are HAZARDOUS LIVE		N/A
	- test pin with length of 100mm and 4mm in diameter applied		N/A
6.2.4	Openings for pre-set controls		N/A
	- test pin with length of 100mm and 3mm in diameter applied		N/A
6.3	Limit values for ACCESSIBLE parts		P
6.3.1	Levels in NORMAL CONDITION		-
	a) Voltage limits less than 33 Vr.m.s. and 46,7 V peak or 70 V d.c.	RS-485 and accessible parts in compliance	P
	For WET LOCATIONS voltage limits less than 16 V r.m.s. and 22,6 V peak or 36 Vd.c		N/A
	Voltage are not HAZARDOUS LIVE the levels of:		-
	b) Current less than 0,5mA r.m.s for sinusoidal, 0.7mA peak non-sinusoidal or mixed frequencies or 2mA d.c. when measured with measuring circuit A.1 or A.2 if less tha 100Hz		P

	For WET LOCATIONS measuring circuit A.4 used		N/A
	70mA r.m.s. when measured with circuit A.3 for higher frequencies		N/A
	or		N/A
	c) Levels of capacitive charge or energy less:		N/A
	1) 45µC for voltages up to 15kV peak or d.c. or line A of figure 3		N/A
	2) 350mJ stored energy for voltages above 15kV peak or d.c.		N/A
6.2.3	Levels in SINGLE FAULT CONDITION		-
	a) Voltage limits less than 55 Vr.m.s. and 78 V peak or 140 V d.c.		P
	For WET LOCATIONS voltage limits less than 33 V r.m.s. and 46,7 V peak or 70 Vd.c		N/A
	Voltage are not HAZARDOUS LIVE the levels of:		-
	b) Current less than 3,5mA r.m.s for sinusoidal, 05mA peak non-sinusoidal or mixed frequencies or 15mA d.c. when measured with measuring circuit A.1 or A.2 if less tha 100Hz		P
	For WET LOCATIONS measuring circuit A.4 used		N/A
	500mA r.m.s. when measured with circuit A.3 for higher frequencies		N/A
	or		-
	c) Levels of capacitive charge or energy less line B of figure 3		N/A
6.4	Primary means of protection		N/A
6.4.1	ACCESSIBLE parts prevented from being HAZARDOUS LIVE by one or more of following	Protection provided by reinforced	N/A

	means:	insulation	
	a) ENCLOSURES or PROTECTIVE BARRIERS (see 6.4.2)		N/A
	b) BASIC INSULATION (see 6.4.3)		N/A
	c) Impedance (see 6.4.4)		N/A
6.4.2	ENCLOSURES AND PROTECTIVE BARRIERS		N/A
	- meet rigidity requirements of 8.1		N/A
	- meet requirements for BASIC INSULATION, if protection is provided by insulation		N/A
	- meet requirements of 6.7 for CREEPAGE and - CLEARANCES between ACCESSIBLE parts and - HAZARDOUS live parts, if protection is provided by - limited access		N/A
6.4.3	BASIC INSULATION		N/A
	- meet CLEARANCE, CREEPAGE DISTANCE and solid - insulation requirements of 6.7		N/A
6.4.4	Impedance		N/A
	Impedance used as primary means of protection meets all of following requirements:		N/A
	a) limits current or voltage to level of 6.3.2		N/A
	b) RATED for maximum WORKIN VOLTAGE and the amount of power it will dissipate		N/A
	c) CLEARANCE, CREEPAGE DISTANCE between terminations of the impedance meet requirements of		N/A

	basic insulation of 6.7		
6.5	Additional means of protection in case of SINGLE FAULT CONDITION		P
6.5.1	ACCESSIBLE parts are prevented from becoming HAZARDOUS live by the primary means of protection and supplemented by one of:		P
	a) PROTECTIVE BONDING (see 6.5.2)		N/A
	b) SUPPLEMENTARY INSULATION (see 6.5.3)		N/A
	c) Automatic disconnection of the supply (see 6.5.6)		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)	Protection against access to hazardous live parts provided by reinforced insulation	P
	f) PROTECTIVE IMPEDANCE (see 6.5.4)		N/A
6.5.2	PROTECTIVE BONDING		N/A
6.5.2.1	ACCESSIBLE conductive parts, may become HAZARDOUS LIVE in SINGLE FAULT CONDITION:		N/A
	Bonded to the PROTECTIVE CONDUCTOR TERMINAL; or		N/A
6.5.2.2	Integrity of PROTECTIVE BONDING		N/A
	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:		N/A

	Independently secured against loosening		N/A
	Not used for other purpopses		N/A
	c) Screw connections are secured		N/A
	D) PROTECTIVE BONDING not interrupted; or		N/A
	Exempted as removable part carries MAINS SUPPLY input connection		N/A
	e) Any movable PROTECTIVE BONDING connection sepcifically 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:		N/A
	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:		N/A
	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		N/A
	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
	d) If no MAINS supply is required, any PROTECTIVE CONDUCTOR TERMINAL		N/A
	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		N/A
	f) If plug-in, makes first and breaks last		N/A
	g) Is also used for other bonding purposes, PROTECTIVE CONDUCTOR:		N/A
	Applied first;		N/A
	Secured independently;		N/A
	Unlike to be removed by servicing		N/A
	h) PROTECTIVE CONDUCTOR of measuring circuit		N/A
	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 bindinf screw used for PROTECTIVE CONDUCTOR TERMINAL:		N/A
	Suitable size for bond wire		N/A

	Not smaller than M4		N/A
	At least 3 turns of screw engaged		N/A
	Passes tightening torque test		N/A
	k) Contact pressure not capable being reduced by deformation of materials		N/A
6.5.2.4	Impedance between PROTECTIVE CONDUCTOR TERMINAL and each ACCESSIBLE part where PROTECTIVE BONDING is specified, is:		N/A
	- 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	Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT		N/A
6.5.2.6	Transformer PROTECTIVE BONDING screen		N/A
	Transformer provided with screen for PROTECTIVE BONDING:		N/A
	Screen bonding consists of directly connected structural parts or discrete coductors 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:		N/A
	- 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		N/A
	Limits current or voltage to level of 6.3.1 in NORMAL and to level of 6.3.2 in SINGLE FAULT CONDITION		N/A
	CLEARANCE, CREEPAGE DISTANCE between terminations of the impedance meet requirements of DOUBLE or REINFORCED INSULATION of 6.7		N/A
	The PROTECTIVE IMPEDANCE consists of one or more of the following:		N/A
	a) appropriate single component suitable for safety and reliability for protection, it is:		N/A
	1) RATED twice the maximum WORKING VOLTAGE		N/A
	2) resistor RATED for twice the power dissipation for maximum WORKING VOLTAGE		N/A
	b) combination of components		N/A
	Single electronic device nor 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		N/A
	Device complies with all of:		N/A
	a) RATED to limit the current or voltage to the level of 6.3.2		N/A
	b) RATED for the maximum WORKING VOLTAGE;		N/A

	and		
	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		N/A
6.6	Connections to external circuits		P
6.6.1	Connections don not cause ACCESSIBLE parts of the following to become HAZARDOUS LIVE in NORMAL CONDITION or SINGLE FAULT CONDITION		P
	- 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:		N/A
	A) RATED conditions for terminal		N/A
	B) Required RATING of external circuit insulation		N/A
6.6.2	TERMINALS for external circuits		N/A
	TERMINALS which receive a charge from an internal capacitor are nor HAZARDOUS LIVE 10s of interrupting supply connection		N/A
6.6.3	Circuits with terminals which are HAZARDOUS LIVE		N/A
	These circuits are:		N/A
	Not connected to ACCESSIBLE conductive parts; or		N/A

	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		N/A
6.6.4	ACCESSIBLE terminals for stranded conductors		P
	No RISK of accidental contact because:		P
	- Located or shielded		P
	- Self-evident or marked whether or not connected to ACCESSIBLE conductive parts		P
	ACCESSIBLE TERMINALS will not work loose		P
6.7	Insulation requirements		P
6.7.1	The nature of insulation		P
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		P
	Required CLEARANCES reflecting factors of 6.7.1.1		P
	Equipment rated for operating altitude greater than 2000m correction factor of Table 3 of 61010-1 applied		N/A
6.7.1.3	CREEPAGE DISTANCES		P
	Required CREEPAGE DISTANCES reflecting factors of 6.7.1.1 a) to d)		P
	CTI material group reflected by requirements	IIIa/IIIb	P
	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)		P
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 300V		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 300V	EUT intended for use on OVERVOLTAGE CATEGORY III mains network.	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:		N/A
	1) Maximum TRANSIENT OVERVOLTAGE is limited to know level below the level of MAINS CIRCUIT		N/A
	2) maximum TRANSIENTE 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 30kHz		N/A
6.7.2	Insulation for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II with a nominal supply voltage up to		N/A

	300V		
6.7.2.1	CLEARANCES AND CREEPAGE DISTANCES		N/A
	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
	Withstands electrical and mechanical stresses in normal use and allRATED environmental conditions of 1.4		N/A
	Equipment passed voltage tests of 6.8.3 with values of Table 5		N/A
	Complies as applicable:		N/A
	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 or 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		N/A
	Conductors between same two layers are separated by at least 0.4 mm after moulding is completes		N/A
6.7.2.2.3	Inner insulating layers of printed wiring boards		N/A
	Separated by at least 0,4mm between same tqo layers		N/A
	REINFORCED INSULATION have adequate electric strength; one of the following methods used:		N/A

	a) thickness of insulation is at least 0,4mm		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		N/A
	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		N/A
	a) thickness through the insulation at least 0,4mm		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 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		N/A
6.7.3	Insulation for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300V		N/A
6.7.3.2	CLEARANCES		-
	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		N/A

	or		N/A
	b) pass the voltage tests of 6.8 with values of Table 6;		N/A
	With following adjustements:		N/A
	1) values for reinforced insulation are 1,6 times the values for basic insulation		N/A
	2) if operating altitude is greater than 2000m values of CLEARANCES multiplied with a factor of Table 3		N/A
	3) minimum CLEARANCE is 0,2mm for POLLUTION DEGREE 2 and 0,8mm for POLLUTION DEGREE 3		N/A
6.7.3.3	CREEPAGE DISTANCES		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	Withstands electrical and mechanical stresses in normal use and all RATED environmental conditions of 1.4		N/A
	a) Equipment passed voltage test of 6.8.3.1 for 5s with values of Table 6 for BASIC and SUPPLEMENTARY INSULATION		N/A
	Values for REINFORCED INSULATION are 1,6 times the values of BASIC INSULATION		N/A

	b) if WORKING VOLTAGE exceeds 300V, 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/A
	Value for REINFORCED INSULATION qre twice que WORKING VOLTAGE		N/A
	Complies as applicable		-
	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 6		N/A
6.7.3.4.3	Inner insulation layers of printed wiring boards		-
	Separated by at least by applicable distances of Table 8 between two layers		N/A
	REINFORCED INSULATION have adequate electric strength; one of the following methods used:		-
	a) thickness at least applicable distance of Table 8		N/A
	b) insulation is assembled of minimum two separate layers, eacg RATED for test voltage of Table 6 for BASIC INSULATION		N/A
	c) Insulation is assembled of min two separate layer, where the combination is RATED for 1,6 times the		N/A

	test voltage of Table 6		
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 the following methods used:		-
	a) thickness at least applicable distance of Table 8		N/A
	b) insulation is assembled on min two separate layers, each RATED for test voltage of Table 6 for BASIC INSULATION		N/A
	c) insulation is assembled of min three separate layers, where the combination of two layers passed voltage test with 1,6 time values of Table 6:		-
	a.c. test of 6.8.3.1; or		N/A
	d.c. terst of 6.8.3.2 for circuits stressed only by d.c. voltages		N/A
6.8	Procedure for dielectric strength test		P
6.9	Constructional requirements for protection against electric shock		P
6.9.1	If a failure could cause a HAZARD		P
	a) security of wiring connections		N/A
	b) screws securing removable covers		N/A
	c) accidental loosening		N/A
	d) CLEARANCES and CREEPAGE DISTANCES not reduced below the values of basic insulation by loosening of parts or wires		P

6.9.2	Insulating material		P
	Material not be used for safety relevant insulation:		P
	a) easily damaged materials nor used		P
	b) non-impregnated hygroscopic materials not used	Pass dielectric strength test after humidity conditioning	P
6.9.3	Colour coding		P
	Green-and-yellow insulation shall not be used except	Not used	P
	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		P
6.10.1	MAINS supply cords		N/A
	RATED for maximum equipment current (see 5.1.3c)		N/A
	Cable complies with IEC 60227 or IEC 60245		N/A
	Heat-resistant if likely to contact hot parts		N/A
	Temperature RATIONG (cord and inlet)		N/A
	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 os the MAINS connector		N/A
6.10.2	Fitting of non-detachable MAINS supply cords		N/A
6.10.2.1	Cord entry		N/A
	a) inlet or bushing with a smoothy rounded opening; or		N/A
	b) insulated cord guard protruding <5D (diameter)		N/A
6.10.2.2	Cord anchorage		N/A
	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
	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
	Puch-pull and torque test		N/A
6.10.3	Plugs and connectors		P
	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:		N/A
	Plugs of supply cords do not fit MAINS sockets		N/A

	above rated SUPPLY voltage		
	MAINS type plugs used only for connection to MAINS supply		N/A
	Plug pins which receive a charge from an internal capacitor		N/A
	Accessory MAINS socket outlets:		N/A
	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 CONTAT		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		-
6.11.3.1	PERMANENTLY CONNECTED EQUIPMENT and multi-phase equipment		P
	Employs switch or circuit-breaker		P
	If switch or circuit-breaker is not part of the equipment, documentation requires:		P
	a) switch or circuit-breaker to be included in building installation	Equipment intended to be installed in joint with a circuit breaker	P
	b) suitable location easily reached		P
	c) marking as disconnecting for the equipment		N/A
6.11.3.2	Single-phase cord-connected equipment		N/A
	Equipment is provided with one of the following:		N/A

	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
6.11.4.1	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 circui-breakers		N/A
	When used as disconnection device:		N/A
	Meets IEC 60947-1 and 60947-3		N/A
	Marked to indicate function……..:		N/A
	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):		N/A
	Readily identifiable and easily reached by the operator		N/A
	Single-phase portable equipment cord length not more than 3m		N/A

	PROTECTIVE EARTH CONDUCTOR connected first and disconnected last		N/A

7	**PROTECTION AGAINST MECHANICAL HAZARDS**		
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		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	HAZARDS from moving parts limited to a tolerable level with the conditions specified in 7.3.2 and 7.3.5		N/A
	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:		N/A
	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:		N/A

	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 HAZARD 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:		N/A
	A. Low level measures		N/A
	B. Moderate measures		N/A
	C. Stringent measures		N/A
7.3.4	Limitation of force and pressure		N/A
	Following levels are met in NORMAL and SINGLE FAULT CONDITION		-
	Continuous contact pressure below 50N/cm^2 with force below 150N		N/A
	Temporary force below 250N for an area al least of 3cm^2 for a maximum duration of 0,75s		N/A
7.3.5	Gap limitations between moving parts		N/A
7.3.5.1	Access normally allowed		-
	If levels of 7.4.3 exceeded any 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
	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:		N/A
	a) 10º tilt test for other than handheld equipment		N/A
	b) multi-directional force test for equipment exceeds height of 1m and mass if 25kg		N/A
	c) downward force test for floor-standing equipment		N/A
	d) overload test with 4 tomes maximum load for castor or support that supports greatest load		N/A
	e) castor or support that supports greatest load removed from equipment		N/A
7.5	Provisions for lifting and carrying		N/A
7.5.1	Equipment more tha 18kg:		N/A
	Has means for lifting or carrying; or		N/A
	Directions 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		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		
8.1	Equipment dos not cause a HAZARD when subjected to mechanical stresses in NORMAL USE		P
	Normal protection level is 5J		P
	Levels below 5J but not less than 1J are acceptable if all of following criteria are met:		N/A
	a) lower level justified by RISK assessment of manufacturer		N/A
	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 62260 marked or symbol 14 used with full information in the documentation		N/A
	For non-metallic ENCLOSURES rated below 2ºC ambient temperature value chosen for minimum RATED temperature		N/A

	Impact energies between IK values, the IK conde marked for nearest lower value		N/A
	Conformity is checked by performing following test		P
	1) static test of 8.2.1		P
	2) impact test of 8.2.2 with 5J except for HAND-HELD EQUIPMENT	Impact test carried out before 2h at -20ºC	P
	If impact energy not selected to 5J 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 100kg		N/A
	Equipment RATED with an impact rating of IK 08 that obviously meets the criteria		N/A
	After the test inspection with following results:		P
	- HAZARDOUS LIVE parts above the limits of 6.3.2 not ACCESSIBLE		P
	- insulation pass the voltage tests of 6.8		P
	i) no leaks of corrosive and harmfull substances		N/A
	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		N/A
	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		P
	- 30N with 12mm rod to each part of enclosure		P
	- in case of doubt test conducted at maximum RATED ambient temperature		P
8.2.2	Impact test		P
	Impact applied to any part of ENCLOSURE causing a HAZARD is damaged		P
	Impact energy level and corresponding IK code		N/A
	Non-metallic ENCLOSURES cooles to mimimum RATED ambient temperature if bellow 2ºC	Test carried out after -20ºC conditioning	P
8.3	Drop test		N/A
8.3.1	Other than HAND-HELD and DIRECT-PLUG-IN EQUIPMENT		N/A
	Test conducted with a drop height or angle of……..:		N/A
	HAND-HELD and DIRECT-PLUG-IN-EQUIPMENT		N/A
	Non-metallic ENCLOSURES cooled to minimum RATED ambient temperature if bellow 2ºC		N/A
	Drop test conducted with a height of 1m		N/A

9	PROTECTION AGAINS THE SPREAD OF FIRE		
9.1	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		
	a) SINGLE FAULT test of 4.4; or		P
	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
	b) 2) BASIC INSULATION provided for parts of different potential; or		N/A
	Bridging the insulation does not cause ignition		N/A
	c) Surface temperature of liquids and parts (see 9.5)		N/A
	d) No ignition in circuits designed to produce heat		N/A
9.3	Containment of the fire within the equipment, should it occur		P
9.3.1	Spread of the fire outside equipment is reduced to a tolerable level if:		N/A
	a) energizing of the equipment is controlled by an OPERATOR held switch		N/A
	b) ENCLOSURE is conform with constructional requirements of 9.3.2.; and		P
	Requirements of 9.5 are met		N/A
9.3.2	Constructional requirements		P
	a) connectors and insulating materials have flammability classification V-2 or better	See table 1	P

	b) insulated wires and cables are flame retardant (VW-1 or equivalent)	El equipo no incluye cables	N/A
	c) ENCLOSURE meets following requirements:		P
	1) Bottom and sides in arc of 5º (see Figure 13) to non-limited circuits (9.4) meets		P
	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		P
	Metal (except magnesium); or		N/A
	Non-metallic materials have flammability classification V-1 or better	Material de relleno V0	P
	3) ENCLOSURE and any baffle or flame barrier have adequate rigidity		P
9.4	Limited-energy circuit		N/A
	a) Potential not more than 30V r.m.s. and 42.4V peal, or 60V d.c.		N/A
	b) current limited by one of the following means:		N/A
	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 non-adjustable 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		N/A
	RISK is reduced to a tolerable level:		N/A
	a) the temperature of surface or parts in contact with flammable liquids is 25ºC below fire point		N/A
	b) The quantity of liquid is limited		N/A
	c) Flames are contained within the equipment		N/A
	Detailed instructions for RISK-reduction provided		N/A
9.6	Overcurrent protection		P
9.6.1	MAINS supplied equipment protected		N/A
	BASIC INSULATION between MAINS parts of opposite polarity provided		N/A
	Devices not in the protective conductor		N/A
	Fuses or single-pole circuit-breakers not fitted in neutral (multi-phase)		N/A
9.6.2	PERMANENTLY CONNECTED EQUIPMENT		P
	Overcurrent protection device:		N/A
	Fitted within the equipment; or		-
	Specified in manufacturer's instructions		P
9.6.63	Other equipment		-
	Protection within the equipment		N/A

10	EQUIPMENT TEMPERATURE LIMITS AND RESISTANCE TO HEAT		
10.1	Surface temperature limits for protection against burns		P
	Easily touched surfaces within the limits in NORMAL and in SINGLE FAULT CONDITION:		P
	- at an specified ambient temperature or 40ºC		N/A
	- for equipment rated above 40ºC ambient temperature limits nor exceeded raised by the difference to 40ºC		P
	Heated surfaces necessary for functional reasons exceeding specified values:		N/A
	- 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		N/A
	Limits not exceeded in:		N/A
	NORMAL CONDITION		N/A
	SINGLE FAULT CONDITION		N/A
10.3	Other temperature measurements		P
	Following measurements conducted if applicable:		P
	a) Value of 60ºC of field-wiring terminal box not exceeded		N/A
	b) Surface of flammable liquids and parts in contact with liquids		N/A

	c) surface of non-metallic enclosures		P
	d) parts made of insulating materials supporting parts connected to MAINS supply		P
	e) Terminals carrying a current more than 0,5A		P
10.4	Conduct of temperature tests		P
10.4.1	Tests conducted under reference test conditions and manufacturer's instructions		P
10.4.2	Temperature measurement of heating equipment		N/A
	Test conducted in test corner		N/A
10.4.3	Equipment intended for installation in a cabinet or wall		P
	Equipment built in as specified in installation instructions		P
10.5	Resistance to heat		P
10.5.1	Integrity of CLEARANCE and CREEPAGE DISTANCES		P
10.5.2	Non-metallic ENCLOSURES		P
	Within 10 min after treatment		P
	Equipment subjected to suitable stresses of 8.2 and 8.3 complying with criteria of 8.1	Tests carried out after 70ºC treatment	P
10.5.3	Insulating materials		N/A
	a) Parts supporting parts connected to MAINS supply		P
	b) TERMINALS carrying a current more than 0,5 A		N/A
	Examination of material data; or		P

	In case of doubt:		N/A
	1) Ball pressure test		N/A
	2) Vicat softening test of ISO 306		N/A

11	PROTECTION AGAINST HAZARDS FROM FLUIDS		
11.1	Protection to OPERATORS and surrounding area provided by equipment		N/A
	All fluids specified by manufacturer considered		N/A
11.2	Cleanings		N/A
11.3	Spillage		N/A
11.4	Overflow		N/A
11.5	Battery electrolyte		N/A
	Battery electrolyte leakage presents no HAZARD		N/A
11.6	Specially protected equipment		N/A
11.7	Maximum pressure		N/A
11.7.1	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 subjected to hydraulic test if:		N/A
	a) product of pressure and volume > 200kPal; and		N/A
	b) pressure < 50kPa		N/A
	Parts of refrigerating systems meets pressure-related requirements of IEC 60335-2-24 or IEC 60335-2-89		N/A

11.7.3	Leakage from low-pressure parts		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**		
12.1	Equipment provides protection		N/A
12.2	Equipment producing ionizing radiation		N/A
12.2.1	Ionizing radiation		N/A
12.2.1.1	Equipment meets the following requirements		N/A
	a) if intended to emit radiation meets requirements of 12.2.1.2; or		N/A
	Tested, classified and marked in accordance to IEC 60405		N/A
	b) if only emits stray radiation meets requirements of		N/A

	12.2.1.3		
12.2.1.2	Equipment intended to emit radiation		N/A
	Effective dose rate of radiation measured……..:		N/A
	If dose rate exceeds 5µSv/h marked with the following:		N/A
	a) symbol 17 (ISO 361)		N/A
	b) abbreviations of the radionuclides……..:		N/A
	c) with maximum dose at 1m; or……...:		N/A
	With dose rate value between 1µSv/h and 5µSv/h in m……:		N/A
12.2.1.3	Equipment not intended to emit radiation		N/A
	Limit for unintended stray radiation of 1µSv/h at any easily reached point kept……...:		N/A
12.2.2	Accelerate electrons		N/A
	Compartments opened only by the use of a TOOL		N/A
12.3	Ultraviolet (UV) radiation		N/A
	No unintentional HAZARDOUS escape of UV radiation:		N/A
	- checked by inspection; and		N/A
	- evaluation of RISK assessment documentation		N/A
12.4	Microwave radiation		N/A
	Power density does not exceed 10W/m^2 ……:		N/A
12.5	Sonic and ultrasonic pressure		N/A
12.5.1	Sound level		N/A

	No HAZARDOUS sound emission		N/A
	Maximum sound pressure level measured and calculated for maximum sound level as specified in ISO 3746 or ISO 9614-1		N/A
	Instruction describes measures for protection		N/A
12.5.2	Ultrasonic pressure		N/A
	Equipment not intended to emit ultrsound does not exceed limit of 110dB netween 20kHz and 100kHz		N/A
	Equipment intended to emit ultrasound		N/A
	Outside useful beam does not exceed limit of 110dB between 20kHz and 100kHz		N/A
	If inside useful beam avobe values exceeded:		N/A
	Marked with Symbol 14 of table 1		N/A
	And following information in the documentation:		N/A
	a) dimensions of useful beam		N/A
	b) area where ultrasonic pressure exceed 110dB		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**		
13.1	Poisonous and injurious gases and substances		N/A
	No poisonous and injurious gases and substances liberated in NORMAL CONDITION		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:		N/A
	Pressure release device provided; or		N/A
	Apparatus incorporates operator protection (see also 7.7)		N/A
	Pressure release device:		N/A
	Discharge without danger		N/A
	Cannot be obstructed		N/A
13.2.2	Batteries and battery charging		N/A
	If explosion or fire HAZARD could occur:		N/A
	Protection incorporated in the equipment; or		N/A
	Instructions specify batterires with built-in protection		N/A
	In case of wrong type of battery used:		N/A
	No HAZARD; or		N/A
	Warning by marking and within instructions		N/A
	Equipment eith means to charge rechargeable batteries:		N/A
	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 < 160mm……..:		N/A
	Intrinsically protected and correctly mounted; or		N/A
	ENCLOSURE provides protection:		N/A
	In non-intrinsically protected:		N/A
	Screen not removable without TOOL		N/A
	If glass screen, not in contact with surface of tube		N/A

14	**COMPONENTS AND SUBASEMBLIES**		
14.1	Where the safety is involved, components and subassemblies meet relevant requirements		P
14.2	Motors		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 therman 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
14.3	Overtemperature protection 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
14.4	Fuse holders		N/A
	No access to HAZARDOUS LIVE parts		N/A
14.5	MAINS voltage selecting devices		N/A
	Accidental change not possible		N/A
14.6	MAINS transformers tested outside equipment		N/A
14.7	Printed circuit boards		P
	Data shows conformity with V-1 of IEC 60695-11-10 or better; or	V0, see table 1	P
	Test shows conformity with V-1 of IEC 60695-11-10 or better		N/A
	Not applicable for printed wiring boards with limited-energy circuits (9.4)		N/A
14.8	Circuits or components used as transient OVERVOLTAGE limiting devices		P
	Test conducted between each pair of MAINS SUPPLY TERMINALS		P
	No HAZARD resulting from rupture or overheating of the component		P
	- no bridging of safety relevant insulation		P
	- no heat to other parts above the self-ignition points		P
14.101	OVERVOLTAGE limiting devices	Five pulses of 4kV (OVCIII) were applied between L1-N, L2-N and L3-N	P

15	**PROTECTION BY INTERLOCKS**		
15.1	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 APPPLICATION**		
16.1	REASONABLY FORESEEABLE MISUSE		N/A
	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:		N/A
	a) limitation of body dimensions		N/A
	b) displays and indicators		N/A
	c) accessibility and conventions of controls		N/A
	d) arrangement of TEMINALS		N/A

17	**RISK ASSESSMENT**	

	RISK assessment conducted, if Hazard might arise and not covered by Clause 6 to 16		N/A
	TOLERABLE RISK achieved by iterative documented process covering the following		N/A
	a) RISK analisis		N/A
	Identifies HAZARD and estimates RISK		N/A
	b) RISK evaluation		N/A
	Plan to judge acceptability of resulting RISK level based on the estimated severity and likelyhood of RISK		N/A
	c) RISK reduction		N/A
	Initial RISK reduced by counter measures;		N/A
	Repeated RISK evaluation without new RISK introduced		N/A
	RISKS remaining after RISK assessment addressed in instructions to RESPONSIBLE BODY:		N/A
	Information contained how to mitigate these RISKS		N/A
	Following principles in methods of RISK reduction applied by manufacturer in given order:		N/A
	1) RISKS eliminated or reduced as far as possible		N/A
	2) Protective measures taken for RISK 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.		N/A

101	**MEASURING CIRCUITS**		
101.1	General		P
	The device must provide protection against HAZARDS in NORMAL and SINGLE FAULT CONDITION		P
101.2	Current measuring circuits		N/A
101.3	Protection against mismatches of Inputs and ranges		N/A

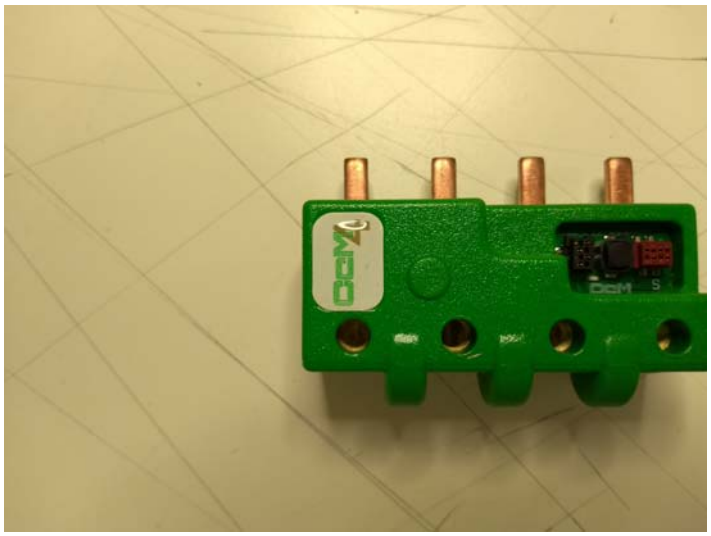
ANNEX F	**ROUTINE TESTS**		
H.1	Manufacturer declaration		N/A

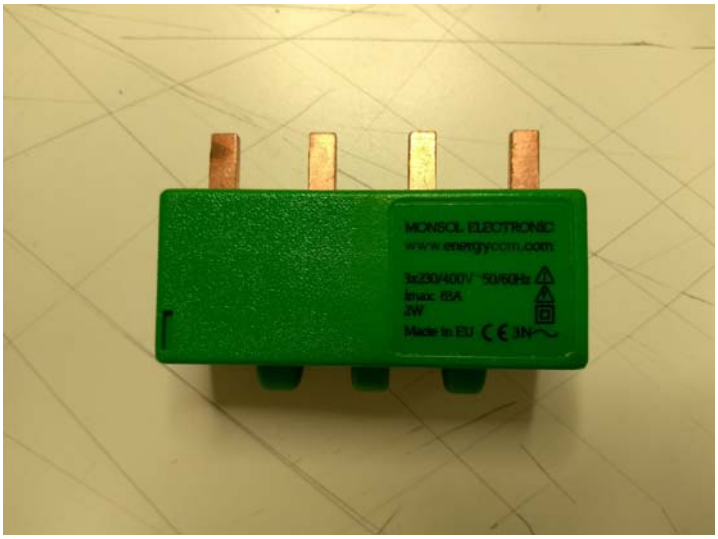
ANNEX H	**QUALIFICATION OF CONFORMAL COATINGS FOR PROTECTION AGAINST POLLUTION**		
H.1	General		N/A
	Conformal coatings meet the requirements of Clause H.2 and H.3		N/A
H.2	Technical properties		N/A
	Technical properties of conformal coatings are suitable for the intended application. In particular:		N/A
	a) Manufacturer indicate that it is a coating for PWBs		N/A
	b) RATED operating temperature include the		N/A

	temperature range of the indicated application;		
	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		N/A
	Coating complies with the conformity requirements		N/A

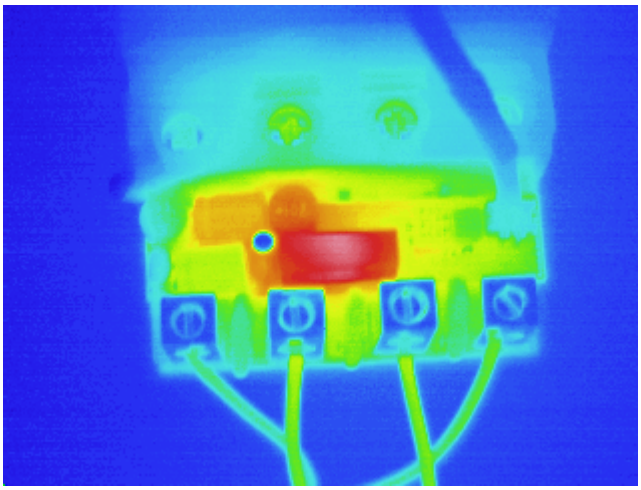
ANNEX K	**INSULATION REQUIREMENTS NOT COVERED BY CLAUSE 6.7**	N/A

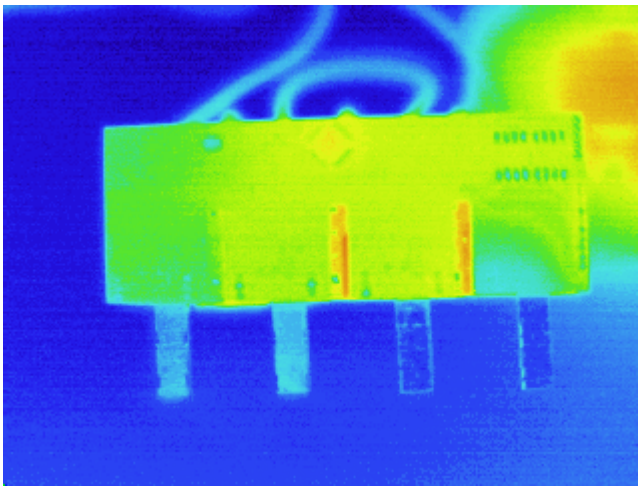
ANNEX I: MARKING





ANNEX II: THERMAL IMAGES





ANNEX III: TABLES

TABLE 1- Critical components

Type	Model	Situation	Conformity marks
Material de relleno	Henkel Technomelt PA2035	-	IEC 60695-11-10 – V0 (E182771)
PCB	Kingboard laminates Holdings LTD. KB-6160A	-	UL94-V0 (E123995)
DC/DC	Aimtec AM2D-1212SH52Z	Primary - Secondary	CE
PTC	Littlefuse PolySwitch LVR005NK	Primary	TUV – UL
Chipset	ADE79XX	Primary	VDE – UL
Varistor	Wurth Electronics 820443211	Primary	VDE – UL

TABLE 2- Maximum temperatures

Maximum rated temperature: 50ºC		
Part	ΔT (ºC)	ΔTmax (ºC)
1- DC/DC	16,3	45
2- MOV (L2)	8,0	75
3- Chipset (L1)	5,8	85
4- Enclosure	12,5	35

TABLE 3- Electrical strength tests

Test applied between	Test voltage (kV)		
	5s test	60s test	Result
1- Active parts – Accessible parts	3,51ac	3,00ac	P
2- Active parts – RS-485	3,51ac	3,00ac	P

TABLE 4- Abnormal conditions

Component	Condition	U (V)	Time	Result
C15	SC	230	4h	P
DC output	SC	230	4h	P

Development date: Noain, February, 15rd 2019

Developed by: Víctor Ostíbar (EMC and ES Technician)

Approved by: Ana Resano (EMC and ES Responsible)