SOPEMEA SAS Groupe APAVE
Laboratoire de Conformité Electrique
27 Rue de l'avenir,
FR-69740 Genas FRANCE

TECHNO INNOV
42 impasse de la Combe du Bois

01150 BLYES

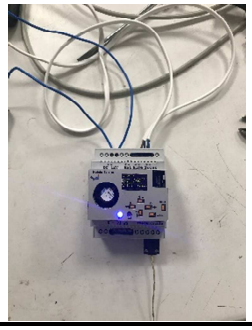
A l'attention de / *To :* M PAJANI Nathael

RAPPORT D'EVALUATION DE CONFORMITE NO /
CONFORMITY ASSESSMENT REPORT NR

1X00896-01rev1

Echantillon testé: *Test item*:	Self-consomption management system
Spécification(s) de test: *Test specification*:	EN 60730-2-11: 2020 in association with EN 60730-1 :2017 + A1: 2019
Identification / Typ-No: *Identification / Type No.*:	Module Scialys

Marque: *Trade Mark :*	Techno-Innov
Caractéristiques: *Ratings :*	11-13VDC 250mA Load 100-240VAC 50/60Hz 16A
Date des essais: *Testing period*:	21/06/2023 — 16/10/2023
Résultat de test: *Test result*:	CONFORME / PASS



Testé par / Tested by.
S MANDRAY / Ingénieur Conformité
17/10/2023

mandray

History
1X00896-01: Initial report dated 4th July 2023
1X00896-01REV1: current report.
For this report a new product has been provided. The reports include the following modification.
-Modification of marking plate and user manual. Clause 6 and 7 become Pass.
-Modification of user manual with correction of non-compliant clause
-Test of reinforced insulation become PASS.

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
All applicable test according to EN 60730-2-11: 2020 in association with EN 60730-1 :2017 + A1: 2019 has been done on Module Scialys	SOPEMEA SAS Groupe APAVE Laboratoire de Conformité Electrique 27 Rue de l'avenir, FR-69740 Genas FRANCE

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

EUROPE

•Country members of CENELEC:

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

• Country affiliates members of CENELEC:

Albania, Belarus, Bosnia and Herzegovina, Former Yugoslav Republic of Macedonia, Israel, Serbia, Lybia, Montenegro, Serbia, Tunisia, Turkey and Ukraine.

☒ **The product fulfils the requirements of** EN 60730-2-11: 2020 in association with EN 60730-1 :2017 + A1: 2019

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

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

☒ **Statement not required by the standard used for type testing**

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate:

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

Techno-Innov Module Scialys

Alimentation : 11-13V DC - 250mA

Charge : 100-240V AC - 50/60Hz - 16A max

Température ambiante maximum : 50°C

Nombre de cycles : Non applicable

Ceci n'est pas un équipement de protection

Version : 1.0

SN : 00005

Ne pas connecter ou déconnecter sous tension

Déconnecter entièrement avant manipulation

Capteurs Tore ELKOR Technologies i-Snail-VC-100 fournis uniquement

Thermocouple type J uniquement

http://www.techno-innov.fr/

http://www.scialys.fr/

Made in France

Test Item Particulars ..... :	
Classification of installation and use ..... :	Class II, intended to be mounted on rail and electrical cabinet
Supply Connection ..... :	Permanent connection
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing..... :	
Date of receipt of test item ..... :	14/10/2022
Date (s) of performance of tests..... :	See first page
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. **"(See appended table)" refers to a table appended to the report.** **This report makes reference to EMC Report and Software Report. When applicable to the evaluated control, the official IEC60730_1K (SOF) and IEC60730_1K (EMC) should be used.** **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....:	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) .....:	
General product information and other remarks: The Scialys module is a management system designed to manage the energy produced locally in photovoltaic. The module control a water heater as load. The module is mounted on rail din and intended to be fixed in an electrical installation. The module is a control device not intended for disconnection of device.	

3	GENERAL REQUIREMENTS		-
	Controls are so designed and constructed that in normal use, they function so as not to cause injury to persons or damage to surrounding property, even in the event of such carelessness as may occur in normal use		P

5	RATINGS		-
5.1	Maximum rated voltage (V) .....:	240VAC	P

6	CLASSIFICATION		-
6.1	Nature of supply .....:	AC Voltage only	—
6.2	Type of load and power factor.....:	Only one load Dedicated for heating resistance	—
6.3	Purpose .....:	6.3.15 – operation control device.	—
6.4	Features of automatic action, Type 1 or Type 2....:	Type 1	—
6.4.3	Additional Sub clauses: (IEC 60730-2-11)	N/A	—
6.4.3.101	Type 1.X and 2.X: action initiated after push or pull and where rotation is required to return to the off or rest position (IEC 60730-2-11)	N/A	—
6.4.3.102	Type 1.Z and 2.Z: action initiated only after push or pull and turn actuation (IEC 60730-2-11)	N/A	—
6.5	Degree of protection provided by enclosure per IEC 60529 and control pollution situation ..... …:	No IP rated	—
6.6	Method of connection. .....:	Terminal for wire connection (relay output and 12V power supply)	—
6.7	Ambient temperature limits of the switch ahead: T_{min}(°C).; T_{max} (°C) .....:	50°C max rated 0°C considered as Tmin	—
6.7.101	Energy regulator for use in or on cooking appliances (IEC 60730-2-11)	N/A	
6.8	Protection against electric shock.....:	Class II	—
6.9	Circuit disconnection or interruption.....:	N/A	—
6.10	Number of cycles of actuation (M) of each manual action.....:	I	—
6.11	Number of cycles of actuation (A) of each automatic action.....:	N/A Electronic regulation at each voltage period	—
6.12	Temperature limits of the mounting surface of the control (°C or K) .....:	N/A	—
6.13	Value of proof tracking index (PTI) for the insulation material used .....:	IIIb considered	—

6.14	Period of the electrical stress across insulating parts supporting live parts, and between live parts and earthed metal (short or long period).....:	Long period	—
6.15	Construction.....:	**6.15.1** –integrated controller	—
6.16	Ageing requirements (type Y) of end-product equipment .....:	N/A	—
6.17	Use of thermistor (Annex J).....:	N/A	—
6.18	Classes of control functions (Annex H).....:	Cmmand class A. No safety ensured by the contact	—

7	**INFORMATION**		-
7.2.1	Information required for controls and the appropriate method for providing this information is as indicated in Table 1		p
	1 – Manufacturer's name or trademark (Method C). .....:	Techno-Innov	P
	2 – Unique type reference (Method C) .....:	Module Scialys	P
	3 – Rated voltage or rated voltage range in volts (Method C) .....:	11-13VDC supply	P
	4 – Nature of supply (Method C) .....:	DC for supply	P
	5 – Frequency, if other than for range 50 Hz to 60 Hz inclusive (Method C) .....:	50/60Hz	P
	6 – Purpose of control (Method D or E) .....:	Automatic controller	P
	6a – Construction of control (Method X) .....:		
	7 – The type of load controlled by each circuit (Method C) .....:	100-240VAC load	P
	15 – Degree of protection by enclosure: (Method C) .....:	No IP rated	N/A
	17 – Terminals for external conductors (Method C):	All terminals marked with function	P
	18 – Terminals for external conductors which accept a wider range of conductor sizes, (Method D or E) .....:		N/A
	19 – Method of connection and disconnection for screwless terminals, if not readily identifiable (Method D) .....:	Only screwed terminal	N/A
	20 – Details of any special conductors which are intended to be connected to terminals for internal conductors (Method D or E) .....:		N/A
	21 – Maximum temperature of terminals for internal conductors, if higher than 85°C (Method X) .....:		N/A
	22 – Temperature limits of the switch head, if T_{min} lower than 0°C, or T_{max} other than 55°C (Method C):	50°C	P
	23 – Maximum temperature of mounting surface ($T_{s\ max}$) if it differs by more than 20 K from T_{max} (Method C).....:		N/A

	24 – Classification of control according to protection against electric shock (Method X) .....:	Class II	P
	25 – For Class II controls, the symbol for Class II construction (Method C) .....:	Correct symbol on product	P
	26 – Number of cycles of actuation (M) for each manual action (Method X) .....: For Canada 6000 cycles for manual action (M).	No manual action	N/A
	27 – Number of automatic cycles (A) for each automatic action (Method X) .....: For Canada 100,000 cycles for automatic action (A).	N/A Electronic regulation at each voltage period	P
	28 – Ageing period (Y) for controls with Type 1M or 2M action (Method X) .....:		N/A
	29 – Type of disconnection or interruption provided by each circuit (Method X).....:	Micro disconnection	P
	30 – PTI of materials used for insulation (Method X) .....:		N/A
	31 – Method of mounting controls (Method D) .....:	Schematic for explanation	P
	31a – Method of providing earthing of control (Method D) .....:	No earthing. Class II	N/A
	32 – Method of attachment for non-detachable cords (Method D or E) .....:	Must be checked in final installation	N/A
	33 – Intended transportation condition of control (Method X) .....:	No specific requirement	N/A
	34 – Details of any limitation of operating time (Method D or E) .....:		N/A
	35 – Period of electric stress across insulating parts (Method X) .....:		N/A
	36 – Limits of activating quality for any sensing element over which micro-disconnection is secure (Method X) .....:		N/A
	37 – Minimum and/or maximum rates of change of activating quantity, or minimum and/or maximum cycling rates for a sensing control (Method X) .....: (limits of the activating quantity is not declared for energy regulators IEC60730-2-11 note i)		N/A
	38 – Values of overshoot of activating quantity for sensing controls (Method X).....:		N/A
	39 – Type 1 or Type 2 action (Method D or E) .....:	Type 1	P
	40 – Additional features of Type 1 or Type 2 actions (Method D or E) .....:	Method D	P
	41 – Manufacturing deviation and condition of test appropriate to deviation (Method X).....:		N/A
	42 – Drift (Method X) .....:		N/A
	43 – Reset characteristics for cut-out action (Method D or E) .....:		N/A
	44 – Hand-held control or control intended for hand-held equipment (Method X) .....:		N/A

	45 – Limitation to the number or distribution of flat push-on receptacles (Method D or E) .....:		N/A
	46 – Manufacturing deviation and drift of its operating value, operating time or operating sequence is within the declared limits (Method D or E) .....:		N/A
	47 – Extent of any sensing element (Method X) .....:		N/A
	48 – Operating value(s) or operating time (Method D) .....:		N/A
	49 – Control pollution degree (Method D or E).....:		N/A
	50 – Control intended to be delivered exclusively to the equipment manufacturer (Method X).....:		N/A
	51 – Glow wire test temperatures (Method X).....:		N/A
	52 to 60 See Annex H		N/A
	61 to 65 See Annex J		N/A
	66 to 74 See Annex H		N/A
	75 – Rated impulse voltage (Method D or E) .....:	1500V Method D	P
	76 – Type of printed wiring board protection (Method X)…….:		N/A
	77 – Temperature for ball pressure test (Method X) .....:		N/A
	78 – Max declared torque on single brush mounting using thermoplastic material (Method D or E) .....:		N/A
	79 – Pollution situation in the micro-environment of the creepage or clearance if cleaner than that of the control (Method X) .....:		N/A
	80 – Rated impulse voltage for the creepage or clearance if different from that of the control (Method D or E) .....:		N/A
	81 – Values designed for tolerances of distances for which the exclusion from fault mode “short” is claimed (Method X).....:		N/A
	82 to 84 See Annex J		N/A
	85 – For Class III controls, the symbol for Class III construction (Method C) .....:		N/A
	86 – For SELV or PELV circuits, the ELV limits realized (Method X) .....:		N/A
	87 – Accessible voltage of SELV/PELV circuit, if different from 8.1.1, product standard referred to for the application of the control, in which the accessible SELV/PELV level(s) is (are) (Method X) .....:		N/A
	88 See Annex U		N/A
	89 – Emission tests and groups as declared according to CISPR 11 (Method X).....:		N/A
	90 – Immunity tests for protective controls for use according to IEC 60335 appliances (Method X).....:		N/A

	91 to 94 See Annex H		N/A
	95 – Maximum declared short-circuit current (Method X) .....:	16A	P
	96 – Overcurrent protective device external to the CONTROL (Method D or E).....:		P
	97 – For INCORPORATED CONTROLS or INTEGRATED CONTROLS, whether the overload test done at control level (Method X).....:		N/A
	98 – Maximum altitude at which the CONTROL can be used if greater than 2000m (Method X) ..... :		N/A
7.2.2	Information which is indicated as being required by marking (C) or by documentation (D, E) is provided for the testing authority ..... :	Marking plate and instruction	P
7.2.3	For controls submitted in, on or with an equipment, the requirement for Documentation (D, E) replaced with Declaration (X)		N/A
7.2.4	Marking for an INTEGRATED CONTROL within a more complex control is included in the marking of the complex control		N/A
7.2.5	Documentation (D, E) requirement is met by providing information by Marking (C)		P
7.2.5.1	Declaration (X) requirement is met by providing information by Documentation (D, E) or Marking (C)		P
7.2.6	Information for INTEGRATED CONTROL provided by Declaration (X)		P
	Incorporated control provided with marking of manufacturer's name or trademark and unique type reference when other required marking is provided by Documentation (D, E)		P
	Information for incorporated control intended for exclusive delivery to the equipment		P
7.2.7	Controls with lack of space are marked with manufacturer's name or trademark and the unique type reference, while other required marking included in Documentation (D, E)		P
7.2.8	Additional marking or information permitted if does not give rise to misunderstanding		N/A
7.2.9	Appropriate IEC symbol(s) used per 7.2.9.....:	See marking plate	P
7.3	Class II symbol		P
7.3.1	Used only for in-line cord, free-standing, and independently mounted controls		P
7.3.2	Sides of the outer square are approximately twice the length of sides of the inner square		P
7.3.2.1	Largest dimension of the control (mm) .....:	90mm	—
	The length of the side of outer square (mm) .....:	5mm	—
7.3.2.2	Controls which include terminals for earthing continuity for functional purposes are not marked with the symbol for class II		P

7.4	Additional requirements for marking		P
7.4.1	Marking placed on the main body or on non-detachable parts		P
	Required marking is legible and durable		P
7.4.2	Terminals of controls intended for the connection of supply conductors are indicated by an arrow pointing towards the terminal		N/A
7.4.3	Terminals for neutral external conductor are indicated by letter "N"		P
7.4.3.1	Earthing terminals for external earthing conductors or earthing continuity, and terminals for earthing for functional purposes are identified		N/A
	– for protective earth by the earth symbol for protective earth, IEC 60417-5019 (2006-08)		N/A
	– for functional earth by the earth symbol for functional earth, IEC 60417-5017 (2011-07)		N/A
7.4.3.2	All other terminals are suitably identified		P
	For use in Canada and the U.S.A, terminal intended for grounded supply conductor provided in white/grey colour.		N/A
	For use in Canada and the U.S.A, the wire binding screw intended for equipment earthing conductor is slotted/ hexagonal green-coloured head. Location is such that it is unlikely to be removed during servicing.		N/A
	For use in Canada and the U.S.A, the pressure wire connector intended for equipment earthing conductor is marked GROUND, GROUNDING, EARTH, or by a marking on the wiring diagram shipped with the control. Location is such that it is unlikely to be removed during servicing of control.		N/A
	Additional markings required by National Wiring Codes of Canada and U.S.A provided:		N/A
	In the United Kingdom, the letter “L” shall not be used except as indicated in 7.4.3, above.		N/A
7.4.4	Indication of the direction to increase or decrease response value for the controls intended to be set by the user or the equipment manufacturer is provided (ex. “+” and “-“)		N/A
	Controls intended to be set by the equipment manufacturer or the installer accompanied by documentation (D) indicating proper method for securing the setting		N/A
7.4.5	Replaceable parts destroyed during the normal operation marked to enable their identification from a Catalogue or similar document, even after they have operated		N/A
7.4.6	Controls intended to be connected only to SELV systems are marked with the graphic symbol IEC 60417-5180 (2003-02)		N/A

	This requirement does not apply where the means of connection to the supply is so shaped that it can only mate with a particularly designed SELV or PELV arrangement		N/A
	Controls designed as required for class III, but carry terminals for earthing continuity for functional purposes are not marked with the symbol for class III construction		N/A
7.4.7	Equipment carries a replaceable battery, and replacement by an incorrect type could result in an explosion	No batteries	N/A
	- If the battery is intended to be replaced by the user, marking close to the battery or a statement in both the instructions for use and the service instructions are provided		N/A
	- If the battery is not intended to be replaced by the user, marking close to the battery or a statement in the service instructions are provided		N/A
7.4.8	The battery compartment of controls incorporating batteries that are intended to be replaced by the user are marked with the battery voltage and the polarity of the terminals		N/A
	If colours are used, the positive terminal is identified in red and the negative terminal in black		N/A
	Colour is not used as the only indication of polarity		N/A
7.4.9	The instructions for controls incorporating batteries intended to be replaced by the user include:		N/A
	- the type reference of the battery		N/A
	- the orientation of the battery with regard to polarity		N/A
	- the method of replacing batteries		N/A
	- warning against using incorrect type batteries		N/A
	- how to deal with leaking batteries		N/A
	The instructions for controls incorporating a battery that contains hazardous to the environment materials give details on how to remove the battery:		N/A
	- the battery must be removed from the control before it is scrapped		N/A
	- the control must be disconnected from the supply mains when removing the battery		N/A
	- the battery is to be disposed of safely		N/A
7.4.10	See Annex V – Information regarding charging of batteries provided		N/A

8	**PROTECTION AGAINST ELECTRIC SHOCK**		-
8.1.1	Adequate protection provided against accidental contact with live parts in all unfavourable positions of normal use, and after all accessible detachable parts (other than lamps behind the detachable cover) have been removed	Intended to be mounted into switch board. Must be checked in final installation	P

	Protection against accidental contact with live parts of the lamp ensured to allow safe insertion and removal of the lamps	No lamp	N/A
	Accessible parts connected to SELV systems or PELV systems where voltage does not exceed SELV limits of 2.1.5 are not considered to be hazardous live parts.....:	Circuits identified: 12VDC part	P
	Accessible parts connected to a SELV system or PELV system where the voltage exceeds SELV limits of 2.1.5 or the voltage limits declared in item 87 of Table 1, current measured between the simultaneously accessible parts and between accessible parts and earth should not exceed the limits of H.8.1.10.1 under fault-free (normal) and single-fault conditions.	No part intended to be touched	N/A
8.1.1.1	SELV/PELV circuits supplied at a different voltage value considered non-hazardous .....:	~~Application:~~ ~~Product standard:~~ ~~Voltage limits:~~	N/A
	- The control is used in an application governed by another product standard with different limit values; and,		N/A
	- The manufacturer declares the application, product standard governing the application and level of voltage of the application		N/A
	ELV supplied from a safety isolating transformer at a voltage not exceeding 42,4 V peak or 30 V r.m.s. when dry, or 21,2 V peak or 15 V r.m.s. when wet contact is likely to occur are not considered to be hazardous live parts.	~~USA and Canada~~	N/A
8.1.2	Class II controls and controls for Class II equipment provided with protection against accidental contact with metal parts separated from hazardous live parts only by basic insulation		N/A
8.1.3	Lacquer, enamel, paper, cotton, oxide film on metal parts, and beads and sealing compounds not relied upon for protection against accidental contact with hazardous live parts	Thermoplastic enclosure	P
	Self-hardening sealing compounds exempted from the above requirements.		P
8.1.4	For controls connected to gas or water supply mains, any metal part conductively connected to pipes is separated from hazardous live parts by double insulation or reinforced insulation		N/A
8.1.5	For Class II controls and controls for Class II equipment intended for fixed installation, protection is not impaired by the installation of control		P
8.1.6	For integrated and incorporated controls, tests of 8.1.8 to 8.1.9.5 applied to accessible parts when control is mounted as intended with detachable parts removed		N/A

8.1.7	For in-line and free-standing controls, tests of 8.1.8 to 8.1.9.5 applied when control is fitted with flexible cord, with detachable parts removed and hinged covers which can be opened without a tool are opened; cross-sectional area of cord(mm²)..... :	N/A	—
8.1.8	For independently mounted controls, the tests made when control mounted as in normal use, fitted with cable or with a conduit, with detachable parts removed and hinged covers which can be opened without a tool are opened; cross-sectional area of cable (mm²)..... :	N/A	—
8.1.9	Tests using the standard test finger and test pin:		-
	- The standard test finger shown in Figure 2 applied without force in every possible position	Accessibility of terminal must be checked in final installation	P
	- Apertures preventing the entry of the finger further tested by means of a straight unjointed test finger of the same dimensions applied with a force of 20 N		P
	If test finger entered, the finger shown in Figure 2 pushed through the aperture.		P
	If the unjointed test finger did not enter, the increased force of 30 N applied		P
	When the guard so displaced or the aperture so distorted that the test finger in Figure 2 can be inserted without force, the test with the latter finger repeated with electrical contact indicator		P
8.1.9.2	Openings in insulating material and unearthed metal tested for accessibility of live parts by applying the test pin without force in every position		P
8.1.9.3	Hazardous live parts were not touched		P
8.1.9.4	For controls with double insulation construction, the metal parts were not accessible with the standard test finger, which are only separated from hazardous live parts by basic insulation		N/A
8.1.9.5	A part is regarded detachable if: - there is an instruction to remove a part during normal use or user maintenance; and, - there is no warning on the part that indicates “Disconnect from supply before removing .....:		N/A
8.1.11	Between Class III and main/earth circuits, insulation external to the safety isolating transformer complies with Class II insulation		N/A
8.1.12	Live parts are hazardous if they exceed the values specified in 8.1.1 and if are not separated from the source by protective impedance and are not a PEN conductor or a part of the equipotential bonding system.....:		N/A

8.1.13	Controls having battery compartments that can be opened without a tool or provided with user instructions indicating the battery may be replaced by the user, are provided with: - basic insulation between live parts and the inner surface of the battery compartment - if the control can be energized without the batteries, double or reinforced insulation is provided		N/A
8.2	Actuating members and means		N/A
8.2.1	Actuating members are not live		N/A
8.2.2	Live actuating means provided with fixed insulated actuating member		N/A
	Live actuating means not accessible when actuating member is removed		N/A
8.2.3	For controls other than Class III or for other than Class III equipment, actuating members and handles to be held in normal use are:		N/A
	- of insulating material, or		N/A
	- covered by insulating material		N/A
	If of metal, accessible parts (likely to become live in when insulation fails) separated from their actuating means or fixings by supplementary insulation		N/A
	Controls for fixed wiring or for stationary equipment, previous requirement not applicable if parts:		N/A
	- reliably connected to an earthing terminal/contact, or		N/A
	- shielded from live parts by earthed metal		N/A
	- separated from live parts by double or reinforced insulation are not regarded as likely to become live in the event of an insulation fault.		N/A
8.3	Capacitors		N/A
8.3.1	For Class II in-line cord controls and independently mounted controls, capacitors are not connected to accessible metal parts		N/A
	For controls for Class II equipment, capacitors are not connected to metal likely to be connected to accessible metal parts (control correctly mounted)		N/A
	Metal casings of capacitors separated by supplementary insulation from:		N/A
	- accessible metal parts		N/A
	- metal parts likely to be connected to accessible metal parts		N/A
8.3.2	Controls connected to the supply by means of a plug designed that there is no risk of electric shock (from capacitor) when touching the pins of the plug		N/A
8.3.2.1 – 8.3.2.4	Test method to show compliance to 8.3.2 .....:	See attached TABLE 8.3.2	N/A
8.4	Covers and uninsulated live or hazardous parts; cover fixing screws:		N/A

	- not accessible, or		N/A
	- earthed, or		N/A
	- separated by double or reinforced insulation, or		N/A
	- not accessible after mounting in the equipment		N/A

9	**PROVISION FOR PROTECTIVE EARTHING**		-
9.1.1	Accessible parts other than actuating members of in-line cord, free-standing and independently mounted controls of Class 0I or Class I which may become live:		N/A
	- connected to an earthing terminal, or		N/A
	- terminated within the control, or		N/A
	- connected to an earthing contact of an equipment inlet		N/A
9.1.2	Accessible parts other than actuating members of integrated and incorporated controls for Class 0I and Class I equipment which may become live:		N/A
	- have provision for earthing, or		N/A
	- earthed by the fixing means		N/A
9.1.3	Earthing terminals, terminations or contacts not electrically connected to any neutral terminal		N/A
9.2	Control of Class II or Class III:		P
	- no provision for protective earthing		P
	- interconnection terminal for earthing, if any, separated from live parts by double insulation or reinforced insulation		P
9.3	Adequacy of earth connections		N/A
9.3.1	Connection between earthing terminal and parts to be connected is of low resistance ..... :	See attached TABLE 9.3.1	N/A
9.3.2	Fixed wiring and methods X and M earthing terminals meet requirements of 10.1		N/A
9.3.3	External earthing connections not made by screwless terminals		N/A
	For attachment methods Y and Z, screwless earthing terminals complying with IEC 60998-2-2, 60998-2-3 or 60999-1		N/A
9.3.4	Size of accessible earthing terminals		N/A
	- accessible earthing terminals, range: 2.5 mm^2 to 6 mm^2		N/A
	- unable to loosen without the aid of a tool		N/A
9.3.5	Size of non-accessible earthing terminals		N/A
	- size of current -carrying terminal (mm^2) .....:		—
	- size of earthing terminal (mm^2) .....:		—
9.3.6	Earthing terminals locked against accidental loosening		N/A
9.4	Corrosion resistance		N/A

9.4.1	Material of earthing terminals, body:		N/A
	- body of earthing terminals made of brass		N/A
	- other metal not less resistant to corrosion		N/A
	- screws or nuts made of brass		N/A
	- plated steel or other resistant material		N/A
9.4.2	Precaution against risk of corrosion between copper and frames or enclosures of aluminium or its alloys		N/A
9.5.1	Detachable part with earth connection		N/A
	- placing part in position: earth contact made before current-carrying connections		N/A
	- removing part: earth contact separated after disconnection of current-carrying connections		N/A
9.5.2	Incorporated controls likely to be separated from its normal earthing means after mounting in equipment, provided with permanent earthing connection or conductor		N/A

10	**TERMINALS AND TERMINATIONS**		-
10.1	Terminals and terminations for external copper conductors		P
10.1.1	In terminals for fixed wiring and for cords using X and M attachment method connections made by screws, nuts or equally effective methods	Screwed connector	P
	Use of a special purpose tool not required		P
10.1.1.1	Terminals or terminations for cords using Y and Z attachment method comply with clause 10.2		N/A
	Need for special purpose tools		N/A
10.1.2	Screws and nuts which clamp external conductors:		P
	- metric ISO thread; size..... :		—
	- ISO equivalent; size..... :		—
	- do not serve to fix other components		P
	Exception: terminal also clamps internal conductors which are so arranged that they are not displaced when fitting the external conductor		N/A
10.1.3	Soldered, welded, crimped or similar terminations not used for non-detachable cords X and M attachments		P
10.1.4	Terminals for fixed wiring and non-detachable cords using attachment methods X or M:		P
	- terminal No. or identification ..... :	P7 (load terminal)	—
	- Current (A) carried by terminal ..... :	Until 16A	—
	- Flexible cord or fixed wiring ..... :	fixed	—
	-conductor cross-sectional area - smallest (mm^2) :	24AWG=0.205mm2	—
	-conductor cross-sectional area - largest (mm^2) .. :	10AWG=5.26mm2 4mm2 required	—

10.1.4.1	Terminal designed for wider range of conductor size declared .....:		N/A
10.1.5	Terminals for fixed wiring and non-detachable cords using attachment methods X or M securely fixed		P
10.1.5.1	10 times fastening and loosening conductor of largest cross-section:		P
	- kind of wire used.....:	HO7V-U	—
	- cross-sectional area (mm²) .....:	1.5	—
	- applied torque value (Nm).....:	0.2	—
	- terminals did not work loose		P
	- internal conductors not subjected to stress		P
	- creepage and clearances distances not reduced below values required in Cl. 20		P
10.1.6	Terminals for fixed wiring and non-detachable cords using attachment methods X or M clamp conductors between metal surfaces		P
	Screwless terminals for current ≤ 2 A with non-metallic surface		N/A
	No undue damage to the conductor after tightening or loosening (tests of 10.1.5)		P
10.1.7	Terminals for fixed wiring and non-detachable cords using attachment method X do not require special preparation of the conductor		N/A
10.1.7.1	Alternate means of connection for type X attachment		N/A
10.1.8	In terminals for fixed wiring and non-detachable cords using attachment methods X or M conductor remains secure while clamping		N/A
10.1.8.2	Terminals are fitted with conductors:		N/A
	- cross-sectional area (mm²) .....:		—
	- Flexible cord / Fixed wiring.....:		—
	- Wires of fixed wiring conductors are straightened		N/A
10.1.8.3	The wires of flexible cables and cords are twisted in one complete turn in 20 mm and conductor is inserted into the terminal		N/A
	- Torque applied on screws (Nm).....:		—
10.1.8.4	Neither the conductor nor the wire of a stranded conductor slipped out		N/A
10.1.9	Clamping reliability of the terminals	See attached TABLE 10.1.9.1	P
10.1.10	Terminals did not attain excessive temperatures during the test of Clause 14 (°C).....:	See heating test	P
10.1.11	Terminals so are located that each core contained within any fixed wiring sheath or flexible cord sheath is terminated in reasonable proximity to the other cores within the same sheath		**P**
10.1.12	Test of escaped wire for terminals with attachment methods X or M		N/A

	- An 8 mm length of insulation is removed from the end of a stranded conductor	No metallic accessible part	N/A
	- Free wire of stranded conductor makes no contact with accessible metal parts		N/A
	- Free wire of stranded conductor makes no contact with metal parts of Class II controls separated from accessible parts by supplementary insulation only		N/A
	- Free wire of a conductor connected to the earthing terminal makes no contact with live parts		N/A
	- Free wire of a conductor connected to live terminals not accessible and does not short-circuit an action providing full or micro-disconnection		N/A
10.1.13	Contact pressure not transmitted via insulating material other than ceramic		N/A
	Sufficient resiliency in the appropriate metal parts to compensate for distortion of insulating material		N/A
10.1.14	Screws and threaded parts made of metal		P
10.1.15	In pillar and mantle type terminals adequate length of the conductor can be introduced		N/A
	In pillar and mantle type terminals conductor is beyond the edge of the screw		N/A
10.1.16	In U.S.A. and Canada flying leads are used		N/A
10.2	Terminals and terminations for internal conductors		N/A
10.2.1	Connection of conductors.....:	See attached TABLE 10.2.1	N/A
10.2.2	Terminals suitable for their purpose		N/A
10.2.3	In soldered terminals, soldering is not the only means to maintain conductor in position		N/A
	In soldered terminals, barriers are provided to prevent reduction in creepage and clearance		N/A
10.2.4	Flat push-on connectors		N/A
10.2.4.1	Dimension of tabs		N/A
	- measured (mm x mm) .....:		—
	- compliance with Fig. 14, 15, 16 or IEC/EN 61210		N/A
	- other dimensions allowed (mm x mm) .....:		—
	- polarized acceptance of receptacles		N/A
10.2.4.2	Tabs forming part of a control consist of material appropriate to the maximum temperatures allowed		N/A
10.2.4.3	Tabs forming part of a control have adequate strength and allow the insertion and withdrawal of receptacles without damage to the control	See attached TABLE 10.2.4.3	N/A
10.2.4.4	Tabs forming part of a control are adequately spaced to allow the connection of the appropriate receptacles		N/A
	- no strain, no distortion to any of the tabs or adjacent parts		N/A

	- no reduction of creepage distance or clearances below values of Cl. 20		N/A
10.3	Terminals and terminations for integrated conductors		N/A

11	**CONSTRUCTION REQUIREMENTS**		-
11.1.1	Insulating materials		P
	Wood, cotton, silk, ordinary paper etc. not used as insulation unless impregnated		P
11.1.2	Current carrying parts other than threaded parts of terminals, if made of brass:		P
	- contain at least 50% copper if cast or from bar		P
	- contain at least 58% copper if from rolled sheet		P
11.1.3.1	Non-detachable cords of Class I controls provided with a green/yellow conductor insulation and properly connected		N/A
11.1.3.2	Non-detachable cords: green/yellow conductor not connected to other than earthing terminals		N/A
11.1.4	Intentionally Weak Traces		N/A
	Intentionally weak traces should be used to protect against hazards caused by failure of component included in Table H.24 of the standard.		N/A
11.2	Protection against electric shock		P
11.2.1	Double insulation		P
	- basic insulation and supplementary insulation can be tested separately, or		P
	- properties of both insulations are otherwise provided		P
11.2.2	Infringement of double or reinforced insulation in Class II controls:		N/A
	- creepage distances and clearances not reduced below values of Cl. 20 by wear		N/A
	- creepage distances and clearances not reduced to less than 50% of values of Cl. 20 by parts becoming loose (wires, screws, nuts, etc.)		N/A
11.2.3	Integrated conductors		N/A
11.2.3.1	No reduction of creepage distances and clearances below values of Cl. 20; conductors rigid, fixed or insulated		N/A
11.2.3.2	Insulation, if any, cannot be damaged during mounting or in normal use		N/A
11.2.4	Sheath of flexible cord used as supplementary insulation:		N/A
	- not subjected to undue mechanical or thermal stresses	No cord inside the product	N/A
	- insulation properties comply with IEC 60227-1 or IEC 60245-1		N/A
11.2.5	Protective impedance .....:	~~See Annex H.~~	N/A

11.2.6	Protection against electric shock by use of SELV or PELV .....:	~~See Annex T.~~	N/A
11.2.7	Adequate measures are provided to prevent the interconnection of an integrated SELV circuit to an external PELV circuit and vice versa		P
	Supply from an external SELV source is only possible by a dedicated plug and socket system which cannot be fitted or interconnected with other connecting systems		P
11.2.8	Overcurrent Protection		N/A
	Controls are to be capable of carrying current likely to flow in abnormal conditions for such periods of time if declared in requirement 96 of Table 1		N/A
11.3	Actuation and operation		-
11.3.1	Full-disconnection		N/A
	- contact separation in all poles not below values of Cl. 20 (exception: earth)		N/A
	- any subsequent action does not cause reduction of contact separation below the minimum values (Cl. 20)		N/A
	For declared all-pole disconnection contact operation in each pole substantially together		N/A
11.3.2	Micro-disconnection		P
	- one supply pole, at least, separated		P
	- separated pole meets electric strength requirements, Cl. 13		P
	- any subsequent action does not cause reduction of contact separation below value required by the Electric Strength Test		P
11.3.3	Reset buttons are so located or protected that they are not to be accidentally reset		N/A
11.3.4	Parts for setting by the manufacturer secured to prevent accidental shifting after setting		N/A
11.3.5.1	For contacts with d.c. rating > 0.1 A operated by actuation speed of approach and separation of contacts are independent of speed of actuation.	Separation by MOSFET and Optocoupler No contact	N/A
11.3.5.2	Systems of class C control functions include at least two switching elements to directly de-energize the safety relevant terminals		N/A
11.3.5.2.1	Measures to prevent common cause errors		N/A
	- Measures to protect against failure of two (or more) switching elements by an external short which prevent control from performing a safety shut-down. Acceptable methods are:		N/A
	- Overcurrent protection device,		N/A
	- Current limitation or		N/A
	- Internal fault detecting means		N/A
	Compliance (Short Circuit Test)		N/A

	- Safety related output terminals of the control connected to switch on short circuit current		N/A
	- With switch opened, control connected as in H.27.1.1.2 with outputs energized to simulate normal operation		N/A
	Controls with overcurrent protection devices:		N/A
	- Short-circuit current capability of power supply is at least 500A ..... :		N/A
	Controls with current limitation devices		N/A
	- power supply does not limit the declared short-circuit current		N/A
11.3.5.2.1.1	Short-circuit applied between safety related output terminals		N/A
	- declared short-circuit current..... :		—
	- 1h duration or until no current flow through switch		N/A
	- if overcurrent protection device is replaceable and operated during the test, device is replaced and test is repeated two more times		N/A
	- test is repeated using same or separate sample		N/A
11.3.5.2.1.2	If internal fault detecting function of the control opens the switching elements or initiates a safety shut-down, the test is repeated two more times		N/A
	After test at least one switching element of the control de-energized the safety related output terminals, or		N/A
	- non-replaceable overcurrent protection device permanently interrupted the safety related output terminal's supply		N/A
11.3.6	Contacts for full- and micro-disconnection with d.c. rating ≤0.1 A or a.c. rating, operated by actuation can rest only in closed or open position		N/A
11.3.7	Contacts which cannot (or are not intended to) be operated on load nor arc under normal use		N/A
11.3.7.2	An arc not maintained by slowly opening the contacts		N/A
11.3.8	In any rest position of the actuating member		N/A
	- contacts are open or closed as intended		N/A
	- no hazard can occur within the control		N/A
11.3.9	In pull-cord actuated control the mechanism returns when pull-cord is released to allow next movement in the cycle		N/A
	- pull force vertically downwards (N): ≤ 45 N .....:		—
	- pull force 45° to vertical (N): ≤ 70 N .....:		—
	- function after release		N/A
	-second explanatory paragraph not applicable to energy regulators Type X or Type Z. (IEC 60730-2-11)		N/A
11.4	Actions		-

11.4.1	Combined action: Control remains operative after the failure of any portion unique to the other actions		N/A
11.4.2	Type 2 action with provision for setting by the manufacturer: clearly discernible if any subsequent interference with the setting has been made		N/A
11.4.3	Type 2 action: manufacturing deviation and drift within the required limits		N/A
11.4.4	Type 1A or 2A action: operation provides full-disconnection		N/A
11.4.5	Type 1B or 2B action: operation provides micro-disconnection		N/A
11.4.6	Type 1C or 2C action: operation provides micro-interruption		P
11.4.7	Type 1D or 2D action: disconnection cannot be prevented and reset not possible while faults persist		N/A
11.4.8	Type 1E or 2E action: disconnection or opening of contacts cannot be prevented/inhibited by reset mechanism or against continuation of fault condition		N/A
11.4.9	Type 1F or 2F action: reset needs the aid of a tool		N/A
11.4.10	Type 1G or 2G action: reset possible under electrically loaded conditions		N/A
11.4.11	Type 1H or 2H action:		N/A
	- contacts cannot be prevented from opening		N/A
	- may reset automatically to “closed” if reset means is held in reset position		N/A
	- no automatic reset if reset means in normal position at any temperature above –35°C		N/A
11.4.12	Type 1J or 2J action:		N/A
	- contacts cannot be prevented from opening		N/A
	- no automatic reset if reset means is held in reset position		N/A
	- no automatic reset at any temperature above –35°C		N/A
11.4.13	Type 1K or 2K action: declared disconnection provided in the case of break in sensing element or in part between element and switch head.		N/A
11.4.14	Type 1L or 2L action: function independent of electrical supply or auxiliary energy source		N/A
11.4.15	Type 1M or 2M action: operation provided after declared ageing procedure.		N/A
11.4.16	See Annex H		N/A
11.4.17	See Annex J		N/A
11.4.101	Type 1.X or 2.X action is designed that turn action only can be accomplished after push or pull action. Only rotation required for return to the off or rest position (IEC 60730-2-11) (Compliance by test of cl 18.101)		N/A

11.4.102	Type 1.Z or 2.Z action is designed that turn action only can be accomplished after push or pull action. (IEC 60730-2-11) (Compliance by test of cl 18.101)		N/A
11.5	Openings in enclosures (drain holes)		N/A
	- minimum area (mm^2): .....:		—
	- maximum area (mm^2): .....:		—
	- minimum dimension (mm^2): .....:		—
11.6	Mounting of controls		P
11.6.1	Control mounted according to manufacturer's declaration: does not adversely affect compliance with this standard		P
11.6.2	Control mounted as declared, if movement or removal could adversely affect compliance with this standard:		N/A
	- cannot rotate or be displaced		N/A
	- cannot be removed without the aid of a tool		N/A
	- when removal (even partial) is necessary for use, requirements of clauses 8, 13, and 20 are satisfied before and after removal		N/A
	Controls, other than with rotary actuation, fixed by a nut and single bushing:		N/A
	- tightening of the nut requires a tool		N/A
	- parts have adequate mechanical strength		N/A
	Screwless fixing of an incorporated control: a tool is required before the control can be removed from the equipment		N/A
11.6.3	Mounting of independently mounted controls		N/A
11.6.3.1	Independently mounted controls (other than for panel mounting)		N/A
	- fit a standard box as declared, or		N/A
	- supplied with a conduit box (if special), or		N/A
	- suitable for surface (plane) mounting		N/A
11.6.3.2	If special conduit box required, it is delivered with the control		N/A
	- box provided with entries for conduits specified in IEC 60423		N/A
11.6.3.3	Controls for surface mounting for buried installation (concealed wiring) provided with suitable holes on the backside.		N/A
11.6.3.4	Controls for surface mounting for exposed wiring provided with entries, knock-outs or glands.		N/A
11.6.3.5	Terminals (for external conductors) of controls or sub-bases accessible and usable when control is fixed and cover or the control is removed		N/A

11.6.3.6	In controls for mounting on an outlet box, wiring terminals, live parts and sharp edged metal parts located or protected to prevent from being forced against wiring		N/A
11.6.3.7	Back wiring terminals: recessed or protected to prevent contact with wiring installed in the box		N/A
11.7	Attachment of cords		N/A
11.7.1.1	In-line and free-standing controls, flexible cords withstand flexing during normal use		N/A
	Cords with attachment method X: cord-guard (if provided) not integral with flexible cord		N/A
11.7.1.2	Flexing Test for flexible cords.....:	See attached TABLE 11.7.1.2.1	N/A
11.7.2	Cord anchorages		N/A
11.7.2.1	Controls, other than integrated or incorporated, intended to be connected by non-detachable cords provided with cord anchorage so designed that:		N/A
	- conductor relieved from strain		N/A
	- conductor relieved from twisting		N/A
	- conductors covering protected from abrasion		N/A
11.7.2.2	Cord anchorages of Class II controls		
	- made of insulating material		N/A
	- insulated from accessible metal parts by supplementary insulation		N/A
11.7.2.3	Cord anchorages of controls other than Class II:		N/A
	- made of insulating material, or		N/A
	- provided with insulating lining, if an insulation fault on the cord could make accessible metal parts live		N/A
	- provided with lining fixed to the cord anchorage (exception: bushing which forms part of a cord guard)		N/A
11.7.2.4	Cord anchorage design		N/A
	- cord cannot touch clamping screws of anchorage, if screws are accessible metal parts		N/A
	- cord not clamped by metal screws bearing directly on the cord		N/A
	- attachment method X or M: at least one part securely fixed to the control		N/A
	- attachment method X or M: replacement of cord does not require a special purpose tool		N/A
	- attachment method X: suitable for the different connectable cords		N/A
	- attachment method X: design and location make replacement of the cord easily possible		N/A
11.7.2.5	For other than attachment method Z: cord anchorage not made by make-shift methods		N/A
11.7.2.6	Attachment method X: in-line cord controls		N/A

	- glands not used as cord anchorage, unless		N/A
	- provision exists for clamping all types of cords		N/A
11.7.2.7	Screws to be operated when replacing the cord		N/A
	- not fixing other components, or		N/A
	- control is inoperable or manifestly incomplete if components are omitted or incorrectly mounted, or		N/A
	- component cannot be removed without the aid of a tool		N/A
11.7.2.9	Push test for control fitted with flexible cord(s) .....:	See attached TABLE 11.7.2.9	N/A
	Screws of cord anchorage tightened 2/3 torque of cl. 19.1(Nm) .....:		N/A
11.7.2.10	Push causes no damage		N/A
11.7.2.11	Pull test for control fitted with flexible cord(s).....:	See attached TABLE 11.7.2.11 and 11.7.2.12	N/A
	Free-standing control, weight (kg) .....:		—
	In-line cord controls (all others) .....:	~~Force: _ Pulls: _~~	N/A
	No displacement		N/A
11.7.2.12	Torque Test on cable, torque (Nm) .....:		N/A
11.7.2.13	Attachment method X		
	- test with lightest cord: smallest cross-section used in 10.1.4: diameter (mm) .....:		N/A
	- test with next heavier type with largest cross-section: diameter (mm) .....:		N/A
11.7.2.14	After test cord not damaged, and		N/A
	- measured longitudinal displacement (≤2 mm) of cord (mm).....:		N/A
	- conductors have not moved in the terminals over a distance > 1 mm		N/A
	- no appreciable strain at the connection		N/A
	- creepage distances and clearances not reduced below values of Cl. 20		N/A
11.8	Size of non-detachable cords		N/A
11.8.1	- rubber sheathed, not lighter than 60245; type .....:		N/A
	- PVC sheathed, not lighter than 60227; type .....:		N/A
	Exception: if specified in particular equipment standard or for connection to external SELV devices .....:		N/A
11.8.2	Size of conductors in non-detachable cords:		N/A
	- nominal current (A) .....:		—
	- required cross-sectional area (mm²).....:		—
	- measured cross-sectional area (mm²).....:		—
11.8.3	Space inside the control for flexible cords:		N/A

	- connecting cords of largest cross-section (10.1.4) (mm^2) .....:		—
	- adequate space for easy introduction and connection		N/A
	- possibility to check the correct connection		N/A
	- cover can be fitted without risk of damage to the conductors		N/A
11.9	Inlet openings		N/A
11.9.1	Inlet openings for flexible external cords		N/A
	- designed to prevent damage of the covering of the cord when introducing connectors		N/A
	- provided with inlet bushing		N/A
11.9.1.1	Conduit entries and knock-outs of independently mounted controls designed and located that the introduction does not affect protection against electric shock or reduces distances and clearances		N/A
11.9.2	Inlet openings without inlet bushing made of insulating material		N/A
11.9.3	Inlet bushing		N/A
	- made of insulating material		N/A
	- shaped to prevent damage to the cord		N/A
	- reliably fixed		N/A
	- not removable without the aid of a tool		N/A
	- not integrated with the cord in case of attachment method X		N/A
11.9.4	Inlet bushing not made of rubber		N/A
	Exception: For attachment methods M, Y or Z, for Class 0, 0I or I controls, bushing integral with sheath of a cord of rubber		N/A
11.9.5	Enclosures of independently mounted controls (for permanent connection to fixed wiring) provided with cable/conduit entries, knock-outs or glands allowing correct connection of the appropriate cable or cord		N/A
11.10	Equipment inlets and socket-outlets		N/A
11.10.1	Engagement with connecting devices of other systems not possible		N/A
	Engagement causes no danger or damage		N/A
11.10.2	In-line cord controls with inlet or socket-outlets		N/A
	- unintended overloading of control cannot occur, rating of the control accordingly		N/A
	- protected against overload, protection means .....:		N/A
11.10.3	Controls with pins to be introduced into fixed socket-outlets comply with requirements of the socket-outlet system		N/A

	For in-line cord controls provided with a plug and a socket outlet, where the plug can be connected to a socket outlet rated for a higher load current than the control, the control provided with an incorporated fuse or a protective device to limit the current to the control's rating		N/A
	The plug and socket outlet part of the control complies with the appropriate standard for the plug and socket system		N/A
11.11	Requirements during mounting, maintenance and servicing	No cover to retire	N/A
11.11.1	Covers and their fixing		N/A
11.11.1.1	Removal of covers does not affect setting of the controls other than integrated		N/A
11.11.1.2	Covers		N/A
	- cannot be displaced or replaced incorrectly		N/A
	- fixing of covers to be removed for mounting etc., does not serve to fix any parts other than actuating members or gaskets		N/A
11.11.1.3	Covers of enclosures giving access to fuses or any overload protective devices (Canada and U.S.)		N/A
11.11.1.4	Glass covering an opening (Canada and U.S.)		N/A
11.11.1.5	Non-detachable parts which provide protection against electric shock or contact with moving parts:		N/A
	- fixed in a reliable manner		N/A
	- withstand mechanical stress		N/A
	-snap-in devices have a locked position		N/A
11.11.1.5.1	Parts likely to be removed for installation or during servicing disassembled and assembled ten times		N/A
11.11.1.5.3	Control subjected to 50 N push force test.....:		N/A
	- pull force (N) .....:		N/A
	- finger nail pull force (N) .....:		N/A
	- if cover subjected to twisting force, torque applied		N/A
11.11.1.5.4	After push / pull test, parts remain locked in position and not detached.		N/A
11.11.1.6	Cover removable with one hand, not released when subjected to squeezing and pull force.		N/A
11.11.2	Fixing screws of covers which need to be removed for mounting etc., captive		N/A
11.11.3	Actuating member		N/A
11.11.3.1	Control not damaged by mounting or removal of actuating member		N/A
11.11.3.2	For Type 2 action with max/min. setting limited by means of the actuating member, the actuating member not removable without use of a tool		N/A

11.11.3.3	Actuating member cannot be fixed in an incorrect position for Type 1 action (actuating member providing OFF position) or Type 2 action (actuating member indicating condition of the control)		N/A
11.11.4	Parts forming supplementary or reinforced insulation and which might be omitted during re-assembly:		N/A
	- fixed and cannot be removed without being damaged, or		N/A
	- if omitted, control is inoperable or manifestly incomplete		N/A
11.11.5	Sleeving as supplementary insulation on integrated conductors: retained in position by a positive means		N/A
11.11.6	Pull-cords		N/A
	- insulated from live parts		N/A
	- fitting and replacement possible without live parts becoming accessible		N/A
11.11.7	Insulating linings, barriers etc.		N/A
	- adequate mechanical strength		N/A
	- secured in a reliable manner		N/A
11.12	Controls using software .....:	See Annex H	P
11.13	Protective controls and components of protective control system		N/A
11.13.1	- protective controls designed and constructed to be reliable and suitable for their intended duty	No protective control	N/A
	- protective controls are independent of other functions		N/A
	- protective controls comply with appropriate design principles in order to obtain suitable and reliable protection		N/A
	Operating controls are not used as protective controls		N/A
11.13.2	The pressure of the limiting devices does not permanently exceed the maximum allowable pressure of the controlled application		N/A
	A short duration pressure surge of the limiting devices does not exceed 10% of the pressure surge		N/A
11.13.3	The temperature monitoring devices have an adequate response time on safety grounds, consistent with measurement function		N/A
11.13.4	Batteries		N/A
11.13.4.1	Controls containing batteries are designed to reduce the risk of fire, explosion and chemical leaks	No battery	N/A
	- under normal operation		N/A
	- under after a single fault in the control		N/A
	Controls containing user-replaceable batteries are designed to reduce likelihood of reverse polarity if results in a hazard		N/A

11.13.4.2	Battery circuits designed for total battery capacity > 1000 mAh are designed so that		N/A
	-output characteristics of battery charging circuit compatible with rechargeable battery		N/A
	- Non-chargeable batteries: discharging rate exceeding battery manufacturer's recommendation and unintentional charging are prevented.		N/A
	- Rechargeable batteries: charging/discharging rate exceeding battery manufacturer's recommendation and reverse charging are prevented.		N/A
	- Replaceable batteries:		N/A
	- Have contacts that cannot be shorted with test finger (Figure 2); or		N/A
	- Inherently protected to avoid creating a hazard		N/A
11.13.4.3	If battery capacity > 1000 mAh contains liquid or gel electrolyte, a battery tray is provided		N/A
11.13.4.3.1	If battery tray is required, tray capacity is equal to volume of electrolyte		N/A
	- for all cells of the battery, or		N/A
	- for a single cell if battery design is such that simultaneous leakage from multiple cells is unlikely		N/A
11.13.4.4.1	Unintentional charging of non-rechargeable battery		N/A
	- single component failure ..... :		N/A
	- duration: 7 h ..... :		N/A
11.13.4.4.2	Excessive discharging rate:		N/A
	- open/short circuit a current/voltage limiting component ..... :		N/A
11.13.4.4.3	See Annex V		N/A
11.13.4.4.4	Compliance after the tests of 11.13.4.4.1 and 11.13.4.4.2:		N/A
	-No chemical leaks caused by cracking, rupturing or bursting of the battery jacket		N/A
	-No spillage of liquid from any pressure relief device in the battery		N/A
	-No explosion of the battery, if such explosion could result in injury to a user		N/A
	-No emission of flame or expulsion of molten metal to the outside of the control enclosure		N/A
11.13.4.5	Electric Strength (13.2)		N/A
11.13.5	Smart Enabled Controls	No Smart Enabled Controls	N/A
11.13.5.1	So designed that external communication signals do not unintentionally override the operating parameters of a Type 2 Action Control nor interfere with any protective function		N/A

	Permitted to alter the operating parameters of a Type 2 control within defined limits so long the protective functions remain intact		N/A
11.13.5.2	Control that integrates operating and protective functions evaluated as a Protective Control		N/A
11.13.5.3	Transmitter or communication module external to control acting as the interface between control and telecommunication network comply with IEC 62151 or IEC 62368-1 and ensure protection against electric shock		N/A
11.13.5.4	Any transmitter or communication module part of the smart enabled control complies with the requirements		N/A
11.13.5.5	Compliance of 11.13.5 is checked by evaluating the control in accordance with the requirements of H.27.1 and other relevant requirements.		N/A

12	**MOISTURE AND DUST RESISTANCE**		-
12.1.1	Protection against ingress of water and dust IP Classification of the product.....:	No IP rated	—
12.1.2	Electric Strength Test of 13.2 after preparation in accordance with 12.1.3-12.1.6 followed by tests according to IEC 60529..... :		N/A
	Entered water does not impair compliance with this standard		N/A
	No reduction of creepage distances and clearances below values of Cl. 20		N/A
12.1.6	Sealing means aged suspending freely in a heating cabinet, ventilated by natural circulation		N/A
	- aging temperature (°C), 70 ± 2°C .....:		—
	- aging time (h), 240h.....:		—
12.1.6.2	Immediately after ageing, the parts were taken out of the cabinet and left at room temperature, avoiding direct daylight		N/A
	- time before reassembly (h), 16h ..... :		—
	- sealing means are then tightened with a torque equal to two-thirds of that given in Table 20		N/A
12.2	Protection against humid conditions		P
12.2.1	Controls withstood simulated, normal use humid conditions		P
12.2.3	Electric Strength Test of 13.2 is conducted immediately after the humidity treatment		N/A
12.2.4	Control shows no damage		P
12.2.5	Cable inlet openings, and drain holes are left open		N/A
12.2.6	Detachable parts are removed and tested with the main part		N/A
12.2.7	2 days (48 h) Humidity Test for IPx0 controls		P

	7 days (168 h) Humidity Test for other controls		N/A
12.2.8	Relative humidity (%): 91-95% .....:	93	—
	Temperature (°C): (20 - 30 ± 1) °C .....:	25	—
12.2.9	Tests executed immediately after the humidity treatment (after the reassembly of detached parts)		P
	- in-line, free-standing and independently mounted controls according to Insulation Resistance (13.1)		P
	- Electric Strength (13.2)		P
	- integrated and incorporated controls according to Electric Strength (13.2)		P
12.3	Leakage current test for in-line cord and free - standing controls	See attached TABLE 12.3	N/A
12.3.3	Measuring circuits used the figure number .....:		—
12.3.4	During measurement all control circuits closed except controls tested to Figs. 26, 29, 30 checked with switch S1 in the open and closed position		N/A
12.3.5	Impedance of measuring circuits (Ω).....:		—
	Time constant (μs).....:		—
12.3.6	Error and accuracy of measuring circuit ≤5% .....:		N/A

13	**ELECTRIC STRENGTH AND INSULATION RESISTANCE**		-
13.1	Insulation resistance of in-line cord, free-standing and independently mounted controls		N/A
13.1.2	Reinforced or supplementary insulation measured to non-metal parts covered with metal foil		N/A
13.1.3	Test voltage applied for 1 min (V dc) .....:		—
13.1.4	Insulation resistance measured		N/A
	- basic insulation ≥ 2 MΩ .....:		N/A
	- supplementary insulation ≥ 5 MΩ .....:		N/A
	- reinforced insulation ≥ 7 MΩ .....:		N/A
13.2	Electric Strength Test ..... :	See attached TABLE 13.2	P
13.2.2	Insulating surfaces covered with metal foil		P
13.2.3	50 or 60 Hz test voltage applied for 1 min. .....:	50Hz	P
13.3	Leakage current of in-line cord and free-standing controls after the tests of 13.1 or 13.2 for the sample that was subjected to the tests of 12.3		N/A
13.3.1	A test voltage, was applied between any live part and accessible metal parts, or		N/A
	– any live part & metal foil in contact with accessible surfaces of insulating material, connected together		N/A
	For control with a grounding pin or conductor, the grounding conductor was disconnected at the supply source		N/A
13.3.2	Test voltage (V)……..:		—

13.3.3	The leakage current was measured within 5 s after the application of the test voltage..... :	See attached TABLE 13.3.3	N/A

14	**HEATING**		-
14.1	Controls and their supporting surfaces did not exceed normal use temperatures		P
14.1.2	Temperatures recorded during Heating Test did not exceed the values in Table 13		P
14.2	Terminals fitted with external conductors of the intermediate cross-sectional area (mm^2) ..... :	$2.5mm^2$	—
14.2.1	Attachment method M, Y or Z: cords as declared or supplied (mm^2) .....:	-	—
14.2.2	Terminals for flexible and fixed conductors: appropriate flexible cord (mm^2) .....:	-	—
14.2.3	Terminals not for external conductors: conductors of minimum cross-sectional area or as declared in Clause 7.2 (mm^2) .....:		—
14.3	In-line cord controls tested on a dull, black painted plywood		N/A
14.3.1	Independently mounted controls tested as in normal use		N/A
14.4	Electrical conditions		_
	- voltage (V): most unfavourable value between 0.94 and 1.06 times UR .....:	254	—
	- voltage (V) if circuit not voltage sensitive: min. 10% of UR .....:		—
	- current (A): most unfavourable value between 0.94 and 1.06 times I R .....:		—
14.4.1	For circuits and contacts other than for external loads, load(s) as specified by the manufacturer: voltage (V); current (A) .....:	16A	—
14.4.2	Actuating members placed in most unfavourable position		N/A
14.4.3	Contacts initially closed at rated current and voltage		P
14.4.3.1	Temperature sensing controls:		N/A
	- temperature of sensing element is raised or lowered (5 ± 1) °C from operating temperature such that contacts are then in closed position		N/A
	- operating temperature (°C) .....:		—
	- temperature for heating test (°C) .....:		—
14.4.3.2	For controls other than temperature sensing, sensing element maintained as near to the point of opening as practical		N/A
14.4.3.4	The most arduous operating sequence or segment selected for other automatic controls		N/A
14.5	Controls were tested in an appropriate heating and/or refrigerating apparatus		N/A

14.5.1	Temperature of the switch head between T_{max} and (T_{max} + 5)°C, or T_{max} and 1.05 times T_{max} (whichever is greater) (°C) .....:		P
	Mounting surface of the switch head maintained between T_s max and either (T_s max+ 5)°C or 1.05 times (whichever is the greater if Ts max is higher than T_{max} by more than 20 K) (°C) .....:		N/A
14.5.2	In-line cord controls, independently mounted controls and parts of these controls accessible when control is mounted, tested at room temperature between 15 and 30 C (measured temperature corrected to a 25 °C reference value); measured temperature (°C).....:		N/A
14.6	The temperatures specified for the switch head, the mounting surfaces and sensing element were attained in approximately 1 h		N/A
14.6.1	Electrical and thermal conditions maintained for 4 h, or for 1 h after steady state (h) ..... :	Until steady condition established	P
14.6.2	For controls designed for short-time or intermittent operation, the resting time(s) declared in Table 1, requirement 34, were included in the 4 h		N/A
14.7	The temperature of the medium in which the switch head is located, and the value of the activating quantity to which the sensing element is exposed, was measured approx. 50 mm from the control		N/A
14.7.1	The temperature was determined by means of fine wire thermocouples or other equivalent means, so chosen and positioned that they have the minimum effect on the temperature of the part under test		N/A
14.7.3	Temperature on parts which are gripped in normal use other than actuating members		N/A
14.7.4	The temperature of electrical insulation is determined on the surface of the insulation.....:	See attached TABLE 14.6 & 14.7	N/A
14.101	The following clauses are applicable to energy regulators for use in or on cooking appliances: (IEC 60730-2-11)	Not for cooking appliance	N/A
14.101.1	Applicable to energy regulators as classified in 6.7.101		N/A
14.101.2	Ref to note l) of Table 13, if temperatures of insulating parts exceed the limits of Table 13, then the test of 17.16.101 conducted after conditioning of 14.102 (IEC 60730-2-11).		N/A
14.102	A previously untested sample is used for the following tests (IEC 60730-2-11):	Not for cooking appliance	N/A
	- energy regulator is conditioned in an oven for 1000h		N/A
	- at temperature between 1.02 T_1 + 20°C and 1.05 x T_1 (T_1 max measured temperature on the insulating part during tests of cl. 14)		N/A
	-energy regulator not energized during test		N/A

	If the elevated temperature is localized, such as at or near a bimetal heater,		N/A
	-energy regulator is conditioned in an oven for 1000h		N/A
	-temperature between T_{max} and 1.05 T_{max} for normal conditions		N/A
	-contacts closed, non-cycling (contacts may be forced closed to provide the most arduous temperature conditions)		N/A
	-bimetal heater across mains at 1.1 times rated voltage.		N/A
	-bimetal heater in series 1.1 times rated current		N/A

15	**MANUFACTURING DEVIATION AND DRIFT**		-
15.1	Adequate consistency of declared operating value etc. required for parts of controls providing Type 2 actions (applicable to controls where the output of the control is dynamic with respect to the activating quantity, e.g. Electromechanical thermostat)	No type 2 action	N/A
15.2	Measurement of deviation and drift ..... :		N/A

16	**ENVIRONMENTAL STRESS**		-
16.1	Control can withstand the level of stress likely to occur in transportation and storage		N/A
16.2	Environmental stress of temperature		N/A
16.2.1	Entire control (not energized) maintained for 24h at a temperature of (-10 ± 2)°C or as declared.....:		N/A
	Entire control (not energized) maintained for 4h at a temperature of (60 ± 5)°C or as declared .....:		N/A
16.2.2	The control was not energized during testing		N/A
16.2.3	Control capable of being actuated at room temperature to provide disconnection as declared (without dismantling)		N/A
	The control was held at room temperature for 8 h prior to actuation		N/A
16.2.4	For controls with type 2 actions, the appropriate test of Clause 15 were repeated		N/A

17	**ENDURANCE**		-
17.2	Electrical conditions for the tests.....:	See attached TABLE 17.2.1	P
	Type of circuit	Load terminal	P
	Rated voltage (V) ; test voltage (V) .....:	230V	—
	Rated current (A) ; test current (A) .....:	16A	—
	Rated frequency (Hz) .....:	50Hz	—
17.3	Thermal conditions for parts other than temperature sensing elements		

	Accessible parts: tested at room temperature (°C) :		—
	Mounting surface temperature: T_s max (°C) .....:		—
	Remainder of switch head, temperature: T_{max}(°C) .:		—
	If T_{min} is less than 0 °C; switch head maintained at T_{min} (°C) .....:		—
17.4	Manual and mechanical conditions for the tests	No manual operation	N/A
17.4.2	Slow speed test		N/A
	High speed test		N/A
	Accelerated speed test		N/A
17.4.4	Controls with limited movement of the actuating member		N/A
	Dwell period at each reversal of direction (s) .....:		—
	Applied torque (rotary controls) (Nm).....:		—
	Applied force (non-rotary controls) (N).....:		—
	Controls with rotary actuation, movement not limited in either direction:		N/A
	- 3/4 of cycles clockwise (number of cycles) .....:		—
	- 1/4 of cycles anti-clockwise (number of cycles) ...:		—
	Controls with rotary actuation, designed for actuation in one direction only tested in designed direction		N/A
17.4.5	Additional lubrication not applied during tests		N/A
17.5	Dielectric Strength Test ..... :	See attached TABLE 17.5.1	P
17.6	Ageing test for controls of 1M or 2M action		N/A
	- sensing element maintained at activating quantity as determined in 14		N/A
	- other parts maintained as specified in 17.3		N/A
	- electrically loaded as specified in 17.2 for breaking conditions		N/A
	- voltage (V) .....:		—
	- current (A).....:		—
	- duration (h):.....:		—
17.7	Over-voltage test of automatic action at accelerated rate. The rate adjusted to fastest natural cycling rate (IEC60730-2-11).		N/A
17.7.1	Electrical conditions: specified in 17.2		N/A
17.7.2	Thermal conditions: specified in 17.3		N/A
17.7.3	Method and rate of operation		N/A
	Control Type 1 action		N/A
	Method of operation .....:		—
	Rate of operation .....:		—
	Control Type 2 action:		N/A
	Method of operation .....:		—

	Rate of operation .....:		—
	Type 2 controls are tested at the most unfavourable operating value declared in Table 1, Item 48		N/A
17.7.4	Type 2 sensing action: overshoot at each operation between values stated in 7.2		N/A
17.7.6	Automatic cycles: the smaller of 1/10 of numbers declared in 7.2, or 200; (number of cycles) .....:		N/A
17.7.7	Actuating members placed in the most unfavourable position during test		N/A
17.8	Test of automatic action at accelerated rate. The rate adjusted to fastest natural cycling rate (IEC60730-2-11).		N/A
	Temperature required in 17.3 applied for the last 50% of each test		N/A
17.8.1	Electrical conditions: specified in 17.2		N/A
17.8.2	Thermal conditions: specified in 17.3		N/A
17.8.3	Method and rate of operation: specified in 17.7.3		N/A
17.8.4	Number of automatic cycles:		N/A
	- number declared in 7.2 .....:		—
	- number of cycles 17.8 .....:		—
17.8.4.1	For slow-make, slow-break automatic actions, number of automatic cycles: (75% of cycles in Clause 17.8.4).....:		—
17.9	Test of automatic action at slow rate is not applicable for energy regulators (IEC 60730-2-11)		—
17.9.1	Number of automatic cycles: 25% remainder (17.8.4) .....:		—
17.9.2	Electrical conditions: specified in 17.2		—
	Thermal conditions: specified in 17.3		—
17.9.3	Method of operation and monitoring		—
	- imposing change of value of activating quantity on sensing element (rate of change of activating quantity as declared in 7.2)		N/A
	- by the prime mover		N/A
	Sensing controls: overshoot between values of 7.2		N/A
17.9.4	Controls of which only the make or break is slow automatic action: rest of actions accelerated by agreement between testing authority and manufacturer		N/A
17.10	Overvoltage (overload) test of manual action at accelerated speed (applicable for IEC 60730-2-11)		N/A
17.10.1	Electrical conditions: specified in 17.2	No manual action	N/A
17.10.2	Thermal conditions: specified in 17.3		N/A
17.10.3	Method of operation: specified in 17.4 for accelerated speed		N/A

	Number of cycles: the smaller of 1/10 of number declared or 100 (see 7.2) .....:		—
	Sensing elements maintained at suitable values of activating quantity or prime movers positioned that actuation causes operation		N/A
17.11	Test of manual action at slow speed (IEC60730-2-11)		N/A
17.11.1	Electrical conditions: specified in 17.2		N/A
17.11.2	Thermal conditions: specified in 17.3		N/A
17.11.3	Method of operation: specified in 17.4 for slow speed		N/A
17.11.4	Number of cycles: 1/10 of declared number or 100 (see 7.2) .....:		—
	Actuating causes operation		N/A
17.12	Test of manual action at high speed (applies only to actions which have more than one pole and where polarity reversal occurs during the action) (IEC 60730-2-11)		N/A
	- number of poles .....:		—
	- polarity reversal occurs during action		N/A
17.12.1	Electrical conditions: specified in 17.2		N/A
17.12.2	Thermal conditions: specified in 17.3		N/A
17.12.3	Method of operation: specified in 17.4 for high speed		N/A
17.12.4	Number of cycles: 100 .....:		—
	Sensing elements maintained at suitable value of activating quantity		N/A
	Prime movers so positioned to ensure actuating causes appropriate operation		N/A
17.13	Test of manual action at accelerated speed		N/A
17.13.1	Electrical conditions: specified in 17.2		N/A
17.13.2	Thermal conditions: specified in 17.3		N/A
17.13.3	Method of operation: specified in 17.4 for accelerated speed		N/A
17.13.4	Number of cycles: number declared in 7.2, item 26 less number made during tests of 17.10, 17.11 and 17.12; (number of cycles reduced for actuating members tested during automatic action tests of 17.7 and 17.8, IEC60730-2-11); total number .....:		—
17.14	Evaluation of compliance		N/A
	Actions function in the intended and declared manner:		N/A
	- automatically	No clause applicable	N/A
	- manually		N/A
	The following requirements are still met:		N/A
	- Cl. 14, heating: terminals for external conductors: measured (°C) .....:		N/A

	- Cl. 14, heating: other terminals: measured (°C) ..:		N/A
	- Cl. 14, heating: current-carrying parts: measured (°C) .....:		N/A
	- Cl. 14, heating: supporting surfaces: measured (°C) .....:		N/A
	- Cl. 8, protection against electric shock		N/A
	- 17.5, electric strength (without previous humidity treatment, test voltage 75% of values 13.2)		N/A
	- Cl. 20, distances and clearances		N/A
	- for tests 17.5 and 20, if special samples were submitted for Cl. 13: tested at appropriate condition to ensure contacts are open		N/A
	- requirements of Cl. 15 for type 2 actions still met		N/A
	- manual actions: declared circuit disconnection can be obtained		N/A
	No evidence that any transient fault has occurred between live parts and:		N/A
	- earthed metal parts		N/A
	- accessible metal parts		N/A
	- actuating members		N/A
17.16.101	Evaluation of material (energy regulator for cooking appliance (IEC 60730-2-11)		N/A
	- Tests conducted as indicated to 14.101.1		N/A
	- Conducted at ambient temperature of (20 ± 5) °C		N/A
	- Test of 17.7 for 50 operations		N/A
	-Test of 17.8 for 1,000 operations		N/A
	- Compliance with 17.5		N/A

18	**MECHANICAL STRENGTH**		-
18.1.1	Control is constructed to withstand the mechanical stress that occurs in normal use.		p
18.1.2	Actuating members of class I and class II controls and actuating members for class I and class II equipment:		N/A
	- have adequate mechanical strength, or	No actuating members	N/A
	- are such that protection against electric shock is maintained if actuating member is broken		N/A
18.1.3	For integrated and incorporated controls impact resistance (18.2) tested by the equipment standard		P
18.1.4	Tests of 18.2 to 18.8 carried out sequentially on one sample:		P
	- tested sample: type reference .....:	Module scialys	—
	- Tested sample: identification No. .....:	N/A	—
18.1.5	After the tests of Clause 18 there is:		P
	- no damage to impair compliance with this standard, in particular		P

	- Cl. 8, protection against electric shock		P
	- Cl. 13, electric strength and insulation resistance		P
	- Cl. 20, creepage distance and clearances		P
	- insulating linings, barriers and the like have not worked loose		P
	- Still possible to remove and replace detachable/external parts without these parts or insulating linings breaking.		P
	- Still possible to actuate the control to any position intended to provide full disconnection and micro-disconnection.		P
	- supplementary or reinforced insulation tested to clause 13		P
18.1.6	In Canada and the USA, threads for the connection of metal conduit tapped all the way through an enclosure wall or an equivalent construction:		N/A
	- have no sharp edges		N/A
	- have no more than 3 and no less than 5 full threads in the metal .....:		N/A
	- a suitable conduit bushing can be properly attached		N/A
18.1.6.1	In Canada and the USA, threads for the connection of metal conduit not tapped all the way through an enclosure wall, conduit hub or the like:		N/A
	- have less than 3,5 full threads in the metal with a conduit stop.....:		N/A
	- have a smooth well-rounded inlet hole with internal diameter approximately the same as that of the corresponding size of rigid metal conduit.		N/A
18.1.6.2	In the USA, at least 5 full threads for support by rigid metal conduit..... :		N/A
18.1.6.3	In Canada and the USA, a conduit hub or nipple attached to the enclosure by swaging, staking or similar means withstands:		N/A
	- direct pull of 890 N for 5 min.		N/A
	- bending force of 67,8 Nm for 5 min to the conduit at right angles to its axis and the lever arm		N/A
	- torque of 67,8 Nm applied to the conduit for 5 min in a direction tending to tighten the connection and the lever arm		N/A
18.2	Impact resistance		P
18.2.1 - 18.2.6	In-line cord controls, free-standing, independently mounted controls: test by means of impact test apparatus IEC 60068-2-75.....:	See attached TABLE 18.2.1	P
18.4	Alternate compliance – Impact resistance		P
	enclosure material		—
	with supporting frame (yes / no)		—
	maximum width, maximum length		—

	thickness required; measured (mm) .....:	Plastic enclosure between 1.3 and 1.8mm	P
18.4.1	cast metal not less than 3 mm thick, not more than 6 mm thick at threaded holes for conduit.....:		N/A
	die-cast metal other than at plain or threaded holed for conduit:		—
	- not less than 1,6 mm thick for an area ≤ 150 mm²:		N/A
	- no dimension greater than 150 mm.....:		N/A
	- ≥ 2,4 mm thick for larger areas .....:		N/A
18.5	Free-standing controls		N/A
18.5.1	Additional tests of 18.5.2 and 18.5.3 required (test apparatus Fig. 4)		N/A
18.5.2	- input terminals: 2 m of flexible, lightest cord (used in 10.1.4); cord; cross-sectional area.....:		—
	- output terminals: 2 m of flexible, lightest cord (if intended); cord; cross-sectional area.....:		—
	- pull (N), increasing value, applied on the cord (Table 9) .....:		—
	- pull and fall test (3 times)		N/A
18.5.3	After the test of 18.5.2, complies with 18.1.5		N/A
18.6	In-line cord controls		N/A
18.6.1	In-line cord control tested in tumbling barrel (Fig. 5).....:		N/A
18.6.2	- attachment method X: flexible cord(s), smallest cross-section (Cl. 10.1.4) (mm²), length approx. 50 mm .....:		—
	- attachment M, Y or Z: cord(s) as declared or supplied, length 50 mm; cord; cross-sectional area (mm²) .....:		—
18.6.3	- mass of sample (g) ; number of falls ..... :		—
18.6.4	In-line cord control with mass > 200 g complies with 18.5		N/A
18.6.5	Barrel turned at a rate of five revolutions/min; 10 falls/min		N/A
16.6.6	control complies with 18.1.5 (special attention paid to flexible cord(s))		N/A
18.7	Pull-cord actuated controls		N/A
18.7.1	Pull-cord actuated controls tested to 18.7.2 and 18.7.3		N/A
18.7.2	Control mounted as declared: forces applied to the pull-cord, each 1 min:		N/A
18.7.3	- rated current (A) .....:		—
	- force in normal direction (N).....:		—
	- force in most unfavourable direction (N) .....:		—
18.7.4	control complies with 18.1.5		N/A

18.8	Foot actuated controls		N/A
18.8.1	Foot actuated control tested in accordance with 18.8.2 to 18.8.4		N/A
18.8.2	Control subjected to a force, increased from 250 N to 750 N over 1 min, and maintained for 1 min with 50 mm diameter steel plate ..... :		N/A
18.8.3	Force applied three times to control (fitted with cords) placed in different, most unfavourable positions		N/A
18.8.4	Control complies with 18.1.5		N/A
18.9	Actuating member and actuating means		N/A
18.9.1	Controls supplied (or intended to be fitted) with actuating members, tests:		N/A
	- axial pull force (N) .....:		N/A
	- axial push force of 30 N applied for (min) .....:		N/A
18.9.2	Controls submitted without actuating member or with an easily removable actuating member: pull and push of 30 N applied to the actuating means		N/A
18.9.3	During and after the tests, control shows no damage or movement of the actuating members so as to impair compliance with this standard.		N/A
18.101	Push-and-turn or pull-and-turn actuation. Energy regulators with actions classified as type 1.X or 2.X or type 1.Z or 2.Z are subjected to tests 18.101.1 and 18.101.2 conducted on one new sample. After these tests, the energy regulator is required to comply with the requirements of 18.1.5. (IEC 60730-2-11)		N/A
18.101.1	- Axial force for type X or Z action min. 10N		N/A
	- After 140N push and pull test applied on actuating member still complies with 18.1.5		N/A
	- Knob having a grip diameter or length of 50 mm or less, prevented rotation of the shaft prior to the push or pull actuation able to withstand, without damage or effect on the energy regulator function, a torque of 4 Nm.		N/A
	Alternatively, if the means preventing the rotation of the shaft is defeated when a torque of at least 2 Nm is applied either: - the means is not damaged but overridden to close the contacts and subsequent actuation at a torque less than 2 Nm will be required for both push-and-turn or pull-and-turn to operate the contacts, or - no operation of the contacts occurs nor can be made to occur.		N/A
	The torque required to reset the energy regulator to the initial contact condition, if necessary after the application of the push or pull, is not be greater than 0,5 Nm.		N/A

	A torque of 6 Nm is applied to the setting means. Any breakage or damage to the means preventing rotation of the shaft still complies with the requirements of Clauses 8, 13 and 20.		N/A
	For energy regulators intended for use with a knob having a grip diameter or length greater than 50 mm, the values of torque are increased proportionally.		N/A
18.101.2	Energy regulators with action classified as type X or type Z (IEC 60730-2-11):		N/A
	- are actuated for declared number of manual cycles		N/A
	- After test control it complies with 18.101.1		N/A
	- If means preventing rotation is not damaged but overridden to operate contacts, first 1/6 of manual cycles conducted without pushing or pulling the actuating member		N/A
	- The remainder of the declared cycles conducted with pushing or pulling the actuating member		N/A

19	**THREADED PARTS AND CONNECTIONS**		**-**
19.1	Threaded parts to be moved during mounting or servicing		N/A
19.1.1	Treaded parts, electrical or otherwise which are likely to be operated while the control is being mounted or during servicing, withstand the mechanical stresses occurring in normal use.	No such part	N/A
19.1.2	Threaded parts: easily replaceable if completely removed		N/A
19.1.3	Thread		N/A
	- metric ISO thread or thread of equivalent effectiveness		N/A
19.1.4	Screw generating a thread:		N/A
	- thread cutting type screw not used		N/A
	- thread forming (swaging) type screws		N/A
19.1.5	Space threaded type screws: provided with means to prevent loosening		N/A
19.1.6	Threaded parts of non-metallic material not used if replacement by a dimensionally similar metal screw could impair compliance with Cl. 13 or 20:		N/A
19.1.7	Threaded parts: not of soft material or material liable to creep		N/A
19.1.8	Screws operating in a non-metallic thread: correct introduction of the screw into its counterpart ensured		N/A
19.1.9	In-line cord controls, threaded parts transmitting contact pressure:		N/A
	- diameter < 3 mm: threaded part of metal		N/A

	- diameter ≥ 3 mm: non-metallic allowed, but not used for electrical connection		N/A
19.1.10	Compliance was checked by Clauses 19.1.1 to 19.1.9 inclusive by inspection and by the test of Clauses 19.1.11 to 19.1.15		N/A
19.1.11	Threaded parts tightened and loosened:		N/A
	- one of threaded parts non-metallic material: 10 times		N/A
	- both parts of metallic material: 5 times		N/A
19.1.12	Screws in thread of non-metallic material: completely removed and reinserted each time		N/A
	Terminal screws and nuts: conductor fitted in the terminal (used in 10.1.4 or 10.2.1); cross-sectional area (mm²) .....:		—
19.1.14	Conductor moved each time the threaded part is loosened		N/A
	- no damage impairing the further use of the threaded part		N/A
	- no breakage of screws		N/A
	- no damage to the slot head or washers		N/A
19.1.15	Torque test was made by means of a suitable test screwdriver, spanner or key, applying a torque without jerks according to Table 20 .....:	See attached TABLE 19.1.15	N/A
19.2	Current-carrying connections		P
19.2.1	- Not disturbed by mounting or servicing capable of withstanding the stresses in normal use.	Connection by certified connector	P
19.2.2	- subjected to torsion in normal use locked against movement		N/A
19.2.3	Contact pressure:		P
	- not transmitted through non-metallic material, or		P
	- sufficient resilience in the metallic part		N/A
19.2.4	Space threaded screws:		N/A
	- screws clamp current-carrying parts directly in contact with each other	No such screw	N/A
	- provided with means of locking		N/A
19.2.4.1	- used to provide earthing continuity: at least two screws used for each connection		N/A
19.2.5	Thread cutting screws: screws produce a full-form standard machine screw thread	No such screw	N/A
19.2.5.1	Thread cutting screws used to provide earthing continuity: at least two screws used for each connection		N/A
19.2.6	Current-carrying connection whose parts rely on pressure for correct function: resistant to corrosion (not inferior to that of brass)		N/A

	If not plated, e.g. bimetallic blades: parts are clamped into contact with parts resistant to corrosion		N/A

20	**CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION**		-
	PCB: coating conforming requirement of IEC 60664-3 for type 2:	No coating considered for creepage distance mesuarement	N/A
	PCB: coating meets requirements of 20.3		N/A
	PCB: creepage and clearance between conductors prior to coating does not exceed permissible values in Table 1 of IEC 60664-3:2003 (see Annex Q)		N/A
	Creepage and clearance between terminals for the connection of external conductors used for factory attachment or connection to ELV circuits is not less than 2 mm		N/A
	Creepage distances, clearances and distances through solid insulation in switch mode power supplies and other high frequency switching circuits where the fundamental frequency is above 30 kHz and less than 10 MHz are dimensioned in accordance with IEC 60664-4		N/A
20.1	Clearances		-
	Clearances are not less than case A from Table 22 taking into account the pollution degree and the rated impulse voltage required to serve the overvoltage categories of Table 21 .....:	See attached Table 20	P
	Smaller distances used for basic insulation and functional insulation meet the impulse withstand requirement of Cl. 20.1.12; being rigid and construction is such that there is no likelihood of the distances being reduced by distortion or by movement of the parts; but the clearance is not less than the values for case B from Table 22		P
20.1.1	Basic Insulation - case A from Table 22 applies except as permitted in Cl. 20.1.7.....:	See attached Table 20	P
20.1.1.1	Supplied from dedicated battery which has no provision for charging an external mains supply		N/A
20.1.2	Functional Insulation - case A from Table 22 applies except as permitted in Cl. 20.1.7, or .....:	See attached Table 20	P
	For electronic controls Cl. H27.1.3 met		P
20.1.3	Methods of measurement: Annex B and Fig. 17		P
20.1.3.1	Controls with equipment inlet and/or socket-outlet with connector / plug inserted and without		N/A
20.1.3.2	Controls with terminals for external conductors: without conductors and with conductors of largest cross-sectional area (mm²) (Cl. 10.1.4) .....:		—
20.1.3.3	Controls with terminals for internal conductors: without conductors and with conductors for minimum cross-sectional area (mm²) (Cl. 10.2.1) .:		—

20.1.4	Distances through slots or openings of insulating material measured to metal foil in contact with the surface, foil pushed into corners with test finger shown in Figure 2		P
20.1.5	Standard test finger applied to apertures as specified in Cl. 8.1: distances between live parts and metal foil not reduced below required values		P
20.1.6	Force (standard test finger) applied in an endeavour to reduce distances:		P
20.1.6.1	- 2 N force applied by standard test finger to any point on bare live parts accessible before control is mounted .....:		P
	- 30 N force applied by standard test finger to accessible surfaces after control mounted .....:		P
20.1.7	For basic and functional insulation, smaller distances permitted but no less than values specified in Case B of Table 22, provided that:		N/A
	- control meets the impulse test, Clause 20.1.12 and all parts are rigid and secure		N/A
	- no likelihood of the distance being reduced by distortion, by movement of the parts, or during assembly		N/A
	Impulse voltage applied across clearance of functional insulation		N/A
20.1.7.1	Micro-disconnection and micro-interruption:		
20.1.7.2	Full disconnection – values from Table 22, case A applies to parts separated by switching element including contacts .....:	See attached Table 20	N/A
20.1.8	Clearances of supplementary insulation: not less than basic insulation, Table 22, case A .....:	See attached Table 20	N/A
20.1.9	Clearances of reinforced insulation: not less than those in Table 22, case A using the next higher step for rated impulse voltage .....:	See attached Table 20	N/A
20.1.10	Clearances of functional and basic insulation on secondary side in controls supplied from a double insulated transformer comply with Table 21 based on the secondary voltage .....:	See attached Table 20	N/A
	Clearances in controls supplied from a transformer without separate windings; rated impulse determined from Table 21 .....:	See attached Table 20	N/A
20.1.11	ELV circuits derived from supply using protective impedance, clearance of functional insulation determined from Table 21 and based on maximum working voltage in the ELV circuit .....:	See attached Table 20	N/A
20.1.12	Impulse voltage test, Cl 6.1.2.2.1 of IEC 60664-1:2007 applied between live parts and metal separated by basic or functional insulation (V).....:		N/A

20.1.13	For earthed secondary winding of a transformer, (or an earthed screen between windings) clearances on the secondary side: basic insulation > limits in Table 22 but using the next lower step for rated impulse voltage.....:	See attached Table 20	N/A
	For circuits supplied with a voltage lower than rated voltage, clearances of functional insulation are based on the working voltage .....:	See attached Table 20	N/A
20.2	Creepage distances		P
20.2.1	Creepage distances for basic insulation, per Table 23 for the rated voltage and based on material group and pollution degree		P
	- measurements.....:	See attached Table 20	P
	- 2 N force applied by standard test finger to bare conductors		P
	- 30 N force applied to accessible surfaces applied by standard test finger		P
20.2.2	Creepage distance for functional insulation, per Table 24 for working voltage and based on material group and pollution degree		P
	- measurements.....:	See attached Table 20	P
	- 2 N force applied by standard test finger to bare conductors		P
	- 30 N force applied to accessible surfaces applied by standard test finger		P
20.2.3	Creepage distance for supplementary insulation: not less than basic insulation - based on material group and pollution degree.....:	See attached Table 20	P
20.2.4	Reinforced insulation: double the value of basic insulation - based on material group and pollution degree		P
20.3	Solid Insulation		P
	Solid insulation is capable of durably withstanding electrical and mechanical stresses as well as possible thermal and environmental influences		P
20.3.2	For working voltages ≤ 300V, supplementary and reinforced insulation between metal parts		N/A
	- minimum 0.7mm thick; measured (mm) .....:		N/A
20.3.2.1	Insulation is applied in thin sheet form, other than mica or similar scaly material		N/A
	- the supplementary insulation consists of at least two layers and each layer complies with Cl. 13.2 for supplementary insulation		N/A
	- the reinforced insulation consists of at least three layers and any two layers complies with Cl. 13.2 for reinforced insulation		N/A
20.3.2.2	The supplementary insulation or reinforced insulation is inaccessible and meets one of the following:		P
	- maximum temperature measured per Cl. 27 and H.27 doesn't exceed permissible values in Table 13		P

	- conditioned insulation complies with Cl. 13.2 at the oven and room temperatures.....:	See attached TABLE 13.2	P
	For optocouplers, the conditioning procedure carried out at a temperature of 25 K in excess of the maximum temperature measured on the optocoupler during the tests of Clauses 14, 27 and H.27 while operated under the most unfavourable conditions which occur during these tests		P

21	**RESISTANCE TO HEAT, FIRE AND TRACKING**		-
21.1	All non-metallic parts of the control were resistant to heat, fire and tracking.		P
21.2	Integrated, incorporated and in-line cord controls		P
21.2.1	Accessible parts (control correctly mounted):		P
	- ball-pressure test 1 (G.5.1) at temperature (°C)...:		—
	diameter of the impression ≤ 2.0mm (mm) .....:	See attached TABLE 21	P
	- glow-wire test (G2.) at 550 °C.....:	See attached TABLE 21	P
21.2.2	Parts retaining current-carrying parts in position (other than electrical connections):		P
	- ball-pressure test 2 (G.5.2) at temperature (°C)...:		—
	diameter of the impression ≤ 2.0mm (mm) .....:	See attached TABLE 21	P
	- glow-wire test (G2.) at 550°C..... :	See attached TABLE 21	P
21.2.3	Parts maintaining or retaining electrical connections in position:		P
	- ball-pressure test 2 at temperature (°C) .....:		—
	diameter of the impression ≤ 2.0mm (mm) .....:	See attached TABLE 21	P
	Glow-wire temperature levels according to IEC 60695-2-11		P
	- glow-wire test (G2.) at 650 °C.....:	See attached TABLE 21	P
	- glow-wire test (G2.) at 750 °C.....:	See attached TABLE 21	P
	- glow-wire test (G2.) at 850 °C.....:	See attached TABLE 21	P
21.2.4	Other parts (except small parts unlikely to be ignited):		P
	- glow-wire test (G2.) at 550 °C..... :	See attached TABLE 21	P
21.2.7	Resistance to tracking:		N/A
	Test procedure, see Annex G, Cl. G4; applied voltage corresponding to the PTI value declared Table 1, requirement 30 .....:	IIIb considered	N/A
	Controls designed for operation at ELV levels were not subjected to a tracking test.		N/A
21.3	Independently-mounted controls		N/A
21.3.1	Preconditioning		N/A
	Controls without T rating:		N/A
	- circuit of switching part and driving mechanism not connected, detachable parts (covers) removed		N/A
	- temperature (°C): (80 ± 2) °C, 1 x 24 h.....:		—
	Controls with T rating up to 85°C:		N/A

	- switching circuit and driving mech.- not connected, without covers: temperature (°C): (80 ± 2)°C, 1 x 24 h .....:		—
	- switching circuit and driving mech. Connected, with covers: temperature (°C): (Tmax ± 2) K, 6 x 24 h .....:		—
	Controls with T rating higher than 85 °C:		N/A
	- switching circuit and driving mech. Connected, with covers: temperature (°C): (Tmax ± 2) K, 6 x 24 h .....:		—
21.4	Controls with mercury-tube switch, subjected to short-circuit test:		N/A
	- working voltage, ac/dc .....:		—
	- maximum power rating (VA) .....:		—
	- short-circuit current (A) .....:		—
	- fuse rating (A) .....:		—
	- no ignition of cotton placed around openings		N/A
	- no emission of flame or molten metal (except mercury from the enclosure housing the switch)		N/A
	- wiring not damaged except tube leads		N/A

22	**RESISTANCE TO CORROSION**		-
22.1.1	Ferrous parts protected against corrosion	No ferrous part	N/A
22.1.2	Test not required on temperature sensing elements and other component parts adversely affected by protective treatment		N/A
22.1.4	Control or parts stored in a humidity cabinet for 14 days:		N/A
	- temperature (°C): (40 ± 2) °C .....:		—
	- relative humidity (%): 93-97% .....:		—
22.1.5	Control or parts dried in a heating cabinet: for 10 min:		N/A
	- Temperature (°C): (100 ± 5) °C .....:		—
	After parts were dried: no evidence of corrosion on surfaces		N/A
22.1.6	Traces of rust on sharp edges and yellowish film that was removable by rubbing were ignored		N/A

23	**ELECTROMAGNETIC COMPATIBILITY (EMC) REQUIREMENTS – EMISSION**		-
23.1	Free-standing and independently mounted controls, which cycle during normal operation, are so constructed that they do not generate excessive radio interference and were evaluated to:		N/A
	- CISPR 14-1 (in 4.2.3.3 of CISPR 14-1:2005, the value of 200 ms is replaced by 20 ms) and/or CISPR 22, class B or	Not investigated into this report	N/A
	- to clauses 23.1.1 and 23.1.2 or		N/A

	- to show minimum time between contact operations during normal operation < 10 minutes		N/A
23.1.1	Electrical and thermal conditions for EMC test as specified in 17.2 and 17.3:		N/A
	- for sensing controls: rate of change is α_1 and β_1		N/A
	- For non-sensing controls: operated at the lowest contact operating speed.		N/A
	- inductive loads – pf 0.6; resistive loads – pf 1		N/A
23.1.2	Control operated for 5 cycles		N/A
	- duration of radio interference; < 20ms.....:		N/A
23.2	Controls for ISM (Industrial, Scientific and Medical) equipment and free-standing, independently mounted and in-line cord controls for use with ISM equipment's comply with CISPR 11		N/A

24	**COMPONENTS**		-
24.1	Transformers intended to supply power to a SELV-circuit or PELV-circuit are of the safety isolating type and comply with the relevant requirements of IEC 61558-2-6		N/A
	Capacitors connected between two line conductors for between a line conductor and the neutral or between hazardous live parts and protective earth are in accordance with IEC 60384-14 and used in accordance with its rated values		P
	Fuses comply with requirements of IEC 60127-1 or IEC 60269-1		N/A
	Varistors used as surge protective devices are to withstand the impulses corresponding to installation class for which is intended to be used.		P
	Varistors connected to the supply mains, should comply with IEC 61051-1, IEC 61051-2 or IEC 61051-2-2		P
24.1.1	Controls that incorporate a transformer as the source of supply to a SELV-circuit or PELV-circuit were subjected to an output test with the primary energized at the upper limit of the rated voltage		N/A
	Switch mode power supplies or transformers used in converters comply with the requirements of IEC 61558-2-16		N/A
	Under any non-capacitive conditions of loading (from no load to the short-circuiting of any or all secondary SELV- or PELV-circuit terminals) and without disturbing internal connections, the secondary output voltage did not exceed limits specified in 2.1.5		N/A
	The secondary output power at the terminals to an isolated limited secondary circuit did not exceed 100 VA and the secondary output current did not exceed 8 A after 1 min of operation with overcurrent protection .....:	See attached TABLE 24.1	N/A

24.2	Components other than those of 24.1: checked when carrying out the tests of this standard or/and complies with appropriate safety standard .....:	See attached TABLE 24.1 / 24.2	P
24.3	Annex U is not applicable to relays used as components in a control. ..... :		N/A
24.4.1	Overload test for switch mode power supplies not covered under 24.2.1		N/A
24.4.1.1	Each output winding, or section of a tapped winding, is overloaded in turn, one at a time, while the other windings are kept loaded or unloaded, whichever load conditions of normal use is the least favourable		N/A
24.4.1.2	The overload is carried out by connecting a variable resistor (or an electronic load) across the winding or the rectified output		N/A
	The resistor is adjusted as quickly as possible and readjusted after 1 min to maintain the overload		N/A
	No further readjustments are done after that		N/A
24.4.1.3	Any protective devices such as a fuse, manual reset circuit protector, thermal protector, etc. remained in the circuit		N/A
24.4.1.4	When overcurrent protection is provided by a current-breaking device, the overload test current is the maximum current which the overcurrent protection device is just capable of passing for 1 h		N/A
24.4.1.5	When no overcurrent protection is provided, the maximum overload is the maximum power output obtainable from the power supply		N/A
24.4.1.6	In case of voltage fold-back, the overload was slowly increased to the point where the output voltage drops by 5 %. The overload is then established at the point where the output voltage recovers and held for the duration of the test ..... :	See attached TABLE 24.4.1.6	N/A
24.4.1.7	The duration of the test was 1 h or until ultimate results are reached, (h) .....:		N/A
24.4.1.8	The maximum open-circuit voltage of each winding (directly at the winding of the transformer) and the maximum load current are measured and recorded such that the maximum output power may be determined	See attached TABLE 24.4.1.8-24.4.1.10	N/A
24.4.1.9	The maximum open circuit voltage measurements was made during normal operation and under single component failure .....:	See attached TABLE 24.4.1.8-24.4.1.10	N/A
24.4.10	For SELV applications, where the maximum open circuit voltage measured directly at the secondary of the transformer exceeds the limits specified in 2.1.5, the measurement of the maximum output voltage of each winding may be made after certain protective impedances.....:	See attached TABLE 24.4.1.8-24.4.1.10	N/A
24.4.1.11	While still in heated condition, the transformer was subjected to electric strength test of 13.2		N/A

24.5	Annex J is not applicable to thermistors used in controls that are declared to be Type 1 action, SELV/PELV and low power specified in H.27.1.1.1		N/A

25	**NORMAL OPERATION**		-
	Meets requirements per annex H.....:	See annex H	P
25.2	Over-voltage and under-voltage test (for controls incorporating electro-magnets) .....:	See attached TABLE 25.2	N/A

26	**ELECTROMAGNETIC COMPATIBILITY (EMC) REQUIREMENTS – IMMUNITY**		-
	Meets requirements per Cl. H.26 .....:	See clause H.26	N/A

27	**ABNORMAL OPERATION**		-
27.2	Burnout test (for controls incorporating electro-magnets)		N/A
27.2.1	Control mechanism blocked in position when control is de-energized:		N/A
	- energized at rated frequency and rated voltage (17.2.2, 17.2.3 and 17.2.3.2)		N/A
	- duration: 7 h or until burnout .....:		N/A
27.2.2	Compliance (burnout test):		N/A
	- no emission of flame or molten metal after test		N/A
	- no evidence of damage impairing compliance with this standard		N/A
	- no evidence of dielectric breakdown (Cl. 13.2)		N/A
27.2.3	Blocked mechanical output test (abnormal temperature test)		N/A
	During blocked output test: Temperatures did not exceed indicated limits in Table 26 .....:	See attached TABLE 27.2.3	N/A
	Test not required on controls, if no protective device cycles and temperatures exceed limits in Table 13		N/A
	Test carried out at room-temperature and rated voltage (V) for 24h .....:		N/A
27.2.3.2	The average temperature was within the limits during both the second and the twenty-fourth hours of the test		N/A
27.2.3.3	During the test, power was continually supplied to the motor		N/A
27.2.3.4	Immediately upon completion of the test, the motor was capable of withstanding the electric strength test (Clause 13)		N/A
27.5	Overload tests		N/A
	Controls without protective devices and without incorporated fuses loaded for 1 h with the conventional tripping current for the fuse, anticipated during installation.....:	See attached TABLE 27.5	N/A

	Controls protected by protective devices (including fuses) loaded such that an overload current of 0.95 times the protective device rating flows through the circuit for 4 hours or until temperatures stabilize, whichever is shorter.....:	See attached TABLE 27.5	N/A
	Controls protected by incorporated fuses complying with IEC 60127-1 should have those fuses replaced by links of negligible impedance and the control is to be loaded to 2.1 times the rated current of the fuse. The temperature rise is measured after the control has been loaded for 30 min. The load value of 2,1 times can be de-rated by 0,5 %K if test is carried out at a higher temperature compared to normal room temperature.....:	See attached TABLE 27.5	N/A
	Controls protected both by incorporated fuses and by protective devices are loaded to the lowest load of either test method.....:	See attached TABLE 27.5	N/A
	Controls protected by protective devices which will short-circuit only in case of overload are tested both as controls with protective devices and as controls without protective devices .....:	See attached TABLE 27.5	N/A
27.5.2	Overload tests carried out on in-line cord controls as indicated in 11.10.2 and provided with a plug and socket outlet		N/A
27.5.3	For controls not covered by 27.5.2		N/A
27.6	Battery short-circuit test		N/A
	Batteries that can be removed without the aid of a tool and terminals that can be short-circuited by a thin straight bar are subjected to a short-circuit condition across its terminals with the battery being fully charged, for 1 h or ultimate condition exists.		N/A
27.6.1	Compliance: - no emission of flame or molten metal and no evidence of damage to the control - requirements of 13.2 met		N/A

28	**GUIDANCE ON THE USE OF ELECTRONIC DISCONNECTION**		-
	Meets requirement per annex H .....:		N/A

A	**ANNEX A – INDELIBILITY OF MARKING**		-
A.1	Classification of markings		P
A.1.1	Markings which are not mandatory		P
A.1.2	Markings which are mandatory but not accessible to the final user		P
A.1.3	Markings which are mandatory and accessible to the final user		P
A.1.4	Permanence of marking test		P
	- solvents: neutral liquid detergent or 2% deionized (distilled) water with specified solvent.....:		—

	- solvents: n-hexane .....:		—
	- solvents: deionized (distilled) water .....:		—
A2	Test of indelibility of markings classified in A1.2		P
A2.1	Drops of detergent standing on the marked surface, duration (h): 4 h .....:		—
	Drops removed by fine spray of warm water (40 ± 5 °C) or by lightly wiping .....:		—
A2.2	Allowed to dry completely at (25 ± 5) °C.....:		—
A2.3	Rubbed in the apparatus (Fig. 8) with dry lint, weight 250 g, duration (s): 15 s		P
A2.4	Rubbed in the apparatus (Fig. 8) with water-soaked lint, weight 250 g, duration (s): 15 s		P
A2.6	Marking after these tests still legible		P
A3	Test of indelibility of markings classified A.1.3		P
A3.1	Rubbed in the apparatus (Fig. 8) with dry lint, weight 750 g, duration (s): 15 s		P
A3.2	Rubbed in the apparatus (Fig. 8) with water-soaked lint, weight 750 g, duration (s): 15 s		P
A3.3	Drops of detergent standing on the marked surface: duration (h): 4 h .....:		—
	Then removed by fine spray of warm water (40 ± 5 °C) or by lightly wiping .....:		—
A3.4	After sample was dried, marking rubbed (apparatus Fig. 8) with detergent soaked lint, weight 750 g, duration (s): 15 s		P
A3.5	Marking rubbed in apparatus with petroleum spirit soaked lint, weight 750 g, duration (s): 15 s		P
A3.7	Marking after these tests still legible		P

D	**ANNEX D – HEAT, FIRE AND TRACKING**		-
	Canada and USA national difference		N/A

G	**ANNEX G – HEAT AND FIRE RESISTANCES TESTS**		-
G.2	Glow-wire test: Performed in accordance with IEC 60695-2-10 and IEC 60695-2-11.		P
G.4	Proof tracking test: Performed in accordance with IEC 60112.		P
G.5	Ball pressure test: Performed in accordance with IEC 60695-10-2.		P
G.5.1	Ball-pressure test 1		P
	Temperature during ball pressure, the higher of:		P
	- 20 °C ± 2 K in excess of the maximum temperature during test Cl. 14 (°C), or.....:	See attached TABLE 21	—
	- 75 ± 2°C, or .....:	See attached TABLE 21	—
	- as declared (°C).....:	See attached TABLE 21	—

G.5.2	Ball-pressure test 2		P
	Temperature during ball pressure test is Tb ± 2 °C where Tb is equal to the higher of:		P
	- Tb (°C): 100 °C if Tmax = 30-54 °C .....:	See attached TABLE 21	—
	- Tb (°C): 125 °C if Tmax = 55-84 °C.....:	See attached TABLE 21	—
	- Tb (°C): (Tmax + 40) °C if Tmax 〈 85 °C .....:	See attached TABLE 21	—
	- Tb (°C): 20 K in excess of the max. temperature during tests of Cl. 14 (°C), if higher.....:	See attached TABLE 21	—

H	**ANNEX H – REQUIREMENTS FOR ELECTRONIC CIRCUITS**		-
H.6	Classification, additions:		—
H.6.4.3.13	- electronic disconnection on operation (Type 1.Y - 2.Y) .....:		—
H.6.9.5	- electronic disconnection		p
H.6.18	Class of control function (A, B, C).....:		—
H.6.18.1	Energy regulators using software, functions classified as software class A (IEC 60730-2-11)		
H.7	**Information in addition to Table 1 provided**		-
	36 - Replacement: limits of activating quantity for any sensing element over which electronic or micro-disconnection is secure; clause: 11.3.2, H11.4.16, H17.14, H18.1.5, H27.1.1, H.28; (Method: X) .....:		N/A
	52 - The minimum parameters of any heat dissipater (e.g. heat sink) not provided with an electronic control but essential to its correct operation; clause: 14; (Method: D).....:		N/A
	53 - Type of output waveform if other than sinusoidal; clause: H25; (Method: X) .....:		N/A
	54 - Details of the leakage current waveform produced after failure of the basic insulation; clause: H27; (Method: X).....:		N/A
	55 - The relevant parameters of those electronic devices or other circuit components considered as unlikely to fail (see paragraph 1 of H27.1.1.4); clause: H27; (Method: X).....:		N/A
	56 - Type of output waveform(s) produced after failure of an electronic device or other circuit component (see item g) of H27.1.1.3); clause: H27; (Method: X) .....:		N/A
	57 - The effect on controlled output(s) after electronic circuit component failure if relevant (item c) of H27.1.1.3); clause: H27; (Method: X)....:		N/A

	58a - For integrated and incorporated electronic controls, if any protection against mains borne perturbations, magnetic and electro-magnetic disturbances is claimed, which of the tests of Cl. H26 must be performed and the effect on controlled output(s) and function after a failure to operate as a result of each test; clause: H26.2, H26.15; (Method: X) .....:		N/A
	58b - For other than integrated and incorporated electronic controls, the effect on controlled output(s) and function after a failure to operate as a result of the tests of Cl. H26; clause: H26.2, H26.15; (Method: X) .....:		N/A
	59 - Any component on which reliance is placed for electronic disconnection which is disconnected as required by footnote n to Table 12; clause: 13.2, H27.1; (Method: X) .....:		N/A
	60 - Category (surge immunity); clause: H26.8.2, Annex R; (Method: X).....:		N/A
	66 - Software sequence documentation; clause: H11.12.2.9; (Method: X) .....:	~~See IEC 60730-1 Software Report~~	N/A
	67 - Program documentation; clause: H11.12.2.9, H11.12.2.12; (Method: X).....:	~~See IEC 60730-1 Software Report~~	N/A
	68 - Software fault analysis; clause: H11.12, H27.1.1.4; (Method: X) .....:	~~See IEC 60730-1 Software Report~~	N/A
	69 - Software class(es) and structure; clause: H.11.12.2, H.11.12.3, H.27.1.2.2.1, H.27.1.2.3.1; (Method: D).....:	~~See IEC 60730-1 Software Report~~	N/A
	70 - Analytical measures and fault/error control techniques employed; clause: H.11.12.1.2, H.11.12.2.2, H.11.12.2.4; (Method: X).....:	~~See IEC 60730-1 Software Report~~	N/A
	71 - Software fault/error detection time(s) for controls with software Classes B or C; clause: H2.17.10, H11.12.2.6; (Method: X) .....:	~~See IEC 60730-1 Software Report~~	N/A
	72 - Control response(s) in case of detected fault/error; clause: H.11.12.2.7; (Method: X) .....:	~~See IEC 60730-1 Software Report~~	N/A
	73 - Controls subjected to a second fault analysis and declared condition as a result of the second fault; clause H.27.1.2.3; (Method: X) .....:		N/A
	74 - External load and emission control measures to be used for test purposes; clause H.23.1.1; (Method: X) .....:		N/A
	91 - Fault reaction time; cl. H.2.23.2, H.27.1.2.2.2, H.27.1.2.2.3, H.27.1.2.3.2, H.27.1.2.3.3 , H.27.1.2.4.2, H.27.1.2.4.3; (Method: X).....:		N/A
	92 - Class or classes of control function(s); clause H.6.18, H.27.1.2.2, H.27.1.2.3; (Method: X) .....:		N/A
	93 – Maximum number of reset actions within a time period; H.11.12.4.3.6, H.11.12.4.3.6; (Method: D) .....:		N/A

	94 – Number of remote reset actions; H.17.1.4.3; (Method: X) .....:		N/A
H.8	**Protection against electric shock**		-
H.8.1.10	Accessible parts separated from the supply by protective impedance; identification of circuit .....:		—
H.8.1.10.1	Maximum current between accessible parts and the protective earth conductor in normal configuration and with supply poles interchanged:		-
	- 0.7 mA (peak value) a.c.; current (mA) .....:		N/A
	- 2 mA d.c.; current (mA) .....:		N/A
	- if frequency f > 1 kHz: current (mA): 0.7 x f (kHz) < 70 mA; f (kHz) .....:		N/A
	Maximum capacitance		N/A
	- peak value (V) .....:		N/A
	- 42.4 V < V ≤ 450 V capacitance C (μF): ≤ 0.1 μF .....:		P
	- 450 V < V ≤15 kV: capacitance C (μF): C x V ≤ 45 μC; calculated C_{max} (μF) .....:		N/A
	- V > 15 kV: capacitance C (μF): C x V^2 ≤ 350 μJ; calculated C_{max} (μF) .....:		N/A
H.11	**Constructional requirements**		-
H.11.2.5	Protection against electric shock – protective impedance (chain):	No protective impedance	N/A
	- consists of at least 2 impedances in series		N/A
	- connected between live and accessible parts		N/A
	- consists of components in which the probability of a reduction in impedance during life can be ignored and the possibility of a short circuit is negligible		N/A
	- type of resistors (Table H.24 footnote c)		N/A
	- resistors comply with IEC 60065:2001, Amendment 1:2005, cl. 14.1		N/A
	- capacitors comply with IEC 60384-14, class Y		N/A
	Requirements of H.8.1.10 still met: leakage current (mA) .....:		N/A
H.11.4	Actions:		N/A
H.11.4.16	- Type 1.Y and 2.Y action provides electronic disconnection.		N/A
H.11.4.16.1	Test carried out with control:		N/A
	- connected to maximum load		—
	- supplied with rated voltage (V) .....:		—
	- at temperature T_{max} (°C) .....:		—
H.11.4.16.2	Current through electronic disconnection not exceeding the lower of:		N/A
	- 5 mA (mA) .....:		N/A
	- 10% of the rated current (mA) .....:		N/A

H.11.12	**Controls using software** .....:	See IEC 60730-1 Software Report	N/A
	The value(s) given in Table 1, item 71 can be taken from the equipment standard.		N/A
H.17	**Endurance**		N/A
H.17.1	General requirements		N/A
H.17.1.4	Electronic controls with Type 1 action: no endurance test (unless necessary for testing of associated components)		N/A
H.17.1.4.1	Electronic controls with Type 2 action: thermal cycling test (H.17.1.4.2) executed		N/A
H.17.1.4.2	Thermal cycling test: conditions forming the basis of the test:		N/A
	a) Duration (h) .....:		—
	b) Electrical conditions:		—
	- loaded, according to manufacturer's declaration .:		—
	- voltage (V): 1.1 times Vr.....:		—
	- for 30 min. of each 24 h period: voltage (V): 0.9 times Vr .....:		—
	- during each 24 h period: duration of supply switched off (s); 30 s .....:		—
	- change of voltage not synchronized with change of temperature		—
	c) Thermal conditions: temperature (ambient and/or mounting surface) varied between:		—
	- T_{max} (T_s max) (°C) .....:		—
	- T_{min} (T_s min) (°C) .....:		—
	- rate of change: 1 °C/min		—
	- extremes maintained: 1 h		—
	d) Rate of operation: cycled at the fastest rate possible, max. 6 cycles/min) (cycles/min) .....:		—
	If operational mode to be set by the user:		N/A
	- 1/3 test period: maximum setting		N/A
	- 1/3 test period: intermediate setting		N/A
	- 1/3 test period: minimum setting		N/A
	According to these requirements:		—
	- duration of heating period (h) .....:		—
	- duration of maintaining max.temperature (h) .....:		—
	- duration of cooling period (h) .....:		—
	- duration of maintaining min. temperature (h) .....:		—
	- duration of 1 complete cycle (h) .....:		—
	- total number of cycles executed .....:		—
H.17.1.4.3	Controls with remote reset actions		N/A

	Independently mounted devices: test for a minimum 1000 reset actions .....:		N/A
	Integrated/Incorporated devices: minimum reset cycles as declared by the manufacturer .....:		N/A
	After the test, the reset device can rest the system as intended		N/A
	Unintended resets did not occur.		N/A
H.17.14	Evaluation of compliance: For types 1.Y and 2.Y controls, Clause H.11.4.16 met		N/A
H.18	**Mechanical Strength**		-
H.18.1.5	For controls providing electronic disconnection (type 1.Y or 2.Y), the requirements of H.11.4.16 were met		N/A
H.20	**Creepage distances, clearances and distances through insulation**		N/A
H.20.1.15	Electronic controls		N/A
H.20.1.15.1	Spacing between live parts (supply) and accessible surfaces and parts		N/A
H.20.1.15.2	Across protective impedances: double or reinforced insulation		N/A
	Across each component: supplementary insulation		N/A
H.20.1.15.3	Providing functional insulation		N/A
H.23	**Electromagnetic compatibility (EMC) requirements – Emission**		N/A
H.23.1	Electronic controls do not emit excessive electric or electromagnetic disturbances		N/A
H.23.1.1	Low frequency emission, disturbances in supply systems: controls other than integrated or incorporated that directly control an external load except pilot duty: comply with IEC 61000-3-2 and IEC 61000-3-3.		N/A
H.23.1.2	Radio frequency emission: free-standing, independently mounted and in-line cord controls using software, oscillating circuits etc comply with CISPR 14-1 and/or CISPR 22, Class B, as indicated in Table H.12. Integrated and incorporated energy regulators are not subjected to the test unless for certain conditions as declared by the manufacturer (tested in the equipment) IEC 60730-2-11		N/A
	Free-standing, independently mounted and in-line cord controls for use with ISM equipment comply with CISPR 11		N/A
H.25	**Normal operation**		-
H.25.1	The output waveform of electronic controls was as declared		N/A
	The output waveform of the control was examined under all normal operating conditions and was either sinusoidal or as declared in Table 1, requirement 53		N/A
H.26	**Electromagnetic compatibility (EMC) requirements – Immunity**		N/A

	Electromagnetic compatibility (EMC) requirements	See Immunity Test Report	N/A
H.26.2	The tests of H.26.4 to H.26.14 are performed at highest, lowest and OFF settings, if provided.		N/A
H.26.6	Test of influence of voltage unbalance		—
H.26.8	Surge immunity test		N/A
H.26.8.3.101	Two pulses each are performed at the high and low settings and one is performed at the OFF setting.		N/A
H.26.9	Electrical fast transient/burst immunity test		N/A
H.26.9.3.101	Two tests each are performed at the high and low settings, and one is performed at the OFF setting		N/A
H.26.12	Radio-frequency electromagnetic field immunity		N/A
H.26.12.2	Immunity to conducted disturbances		N/A
H.26.12.2.2	Subjected to three sweeps of the frequency range from minimum to maximum at the indicated severity level. One sweep each is applied at the high, low and OFF settings.		N/A
H.26.12.3	Immunity to radiated disturbances		N/A
H.26.12.3.2	Subjected to three sweeps of the frequency range from minimum to maximum at the indicated severity level. One sweep each is applied at the high, low and OFF settings.		N/A
H.26.13	Test of influence of supply frequency variations		N/A
H.26.13.3	The test is performed three times each, at the high, low and OFF settings.		N/A
H.26.15	Evaluation of compliance		N/A
H.26.15.1	The sample subjected to multiple tests as allowed in H.26.3, the requirements of Clauses 8, 20 and 17.5 are applied once at the conclusion of tests H.26.4 through H.26.14.		N/A
H.26.15.4	After the tests, if sample is operational, it continues to operate as intended without loss of protective function and the protective function is verified by the requirements of Clause 15 and if it is not operational, there is no energy at the output.		N/A
H.27	**Abnormal operation**		-
H.27.1	Electronic controls – assessment against internal faults		P
H.27.1.1.1	Fault conditions in H.27.1.1.5 not applied if:		P
	- electronic circuit is a low-power circuit and		P
	- protection against electric shock, fire hazard or dangerous malfunction does not rely on the correct functioning of the electronic circuit		P
	- measurement of low-power circuit according to Cl. H.27.1.1.1 ..... :	See attached TABLE H.27.1.1.1	P
	- circuit under evaluation .....:		—
	- max. power consumed by the variable resistor (W): ≤ 15 W, 5 s .....:		—

	Electronic circuits operating to ensure compliance with Cl. H.27: relevant test to be repeated with a single fault simulated as indicated in H.27.1.4, items 1) to 5)		P
H.27.1.1.2	Operating conditions:		p
	a) at most unfavourable voltage (V): range: 0.9-1.1 times VR .....:		—
	b) load producing the most onerous effect: kind of load; significant values .....:		—
	c) ambient temperature (°C): (20 ± 5) °C or other .:		—
	d) supply fuse rating (A) such that test result not influenced by operation of the fuse .....:		—
	e) actuating member in the most unfavourable position .....:		—
	f) supply to the control is to have the capability of supplying a short-circuit current of at least 500A..:		—
	g) energy regulator tested at the high, low and OFF settings		P
H.27.1.1.3	Requirements, evaluation of compliance:		P
	a) no emission of flames or hot metal or hot plastics		P
	b) temperature of supplementary and reinforced insulation:		P
	- not exceeding 1.5 times value specified in Cl. 14		P
	- exception: thermoplastic material		P
	c) change in the output as declared in Table 1, requirement 57		P
	d) control continuous to comply with requirements of Cl. 8 and Cl. 13.2 for basic insulation		P
	e) no deterioration of parts that would result in failure to comply with requirements of Cl. 20		P
	f) no rupture of fuse use supply, or		P
	- rupture with operation of an internal protecting device		P
	Internal protecting device not required since sample, after replacement of the fuse in the supply, complied:		P
	- with a), b) and d) of H.27.1.1.3		P
	- with requirements of Cl. 20 for accessible distances from active parts to accessible surfaces (control mounted as for its intended use)		P
	g) output waveform as declared in Table 1, requirement 56		P
H.27.1.1.5	Electronic circuit fault conditions per table H.24.....:	See attached TABLE H27.1	P
H.27.1.1.6	Motor load, if failure or malfunction causes change in the supply waveform to the controlled motor:		P
	1) load (normal waveform) adjusted to 6 times rated load, or		P

	- locked rotor rating declared		P
	2) fault conditions introduced		P
	3) test conditions per H.27.1.2		P
	a) unfavourable voltage (V) .....:		—
	c) ambient temperature (°C) .....:		—
	d) fuse rating (A) .....:		—
	e) actuating member .....:		—
	evaluation of compliance per H.27.1.3 a) to e)		P
H.27.1.1.7	Test terminated by functioning of another component other than an overcurrent protective device, are to meet the following criteria, in addition to H.27.1.1.3:		P
	To ensure consistency and repeatability, the test is to be repeated on two additional samples resulting in the same component terminating the test.		P
	To ensure the disconnection is reliable, an electric strength potential corresponding to functional insulation, are to be applied across the “functioned” component.		P
H.27.1.1.8	Test is terminated by the functioning of an intentionally weak trace, an analysis should be conducted on the open trace and the control is to comply with the criteria of items a), c) and d) of H.27.1.1.3. The analysis of the opening trace is to consist of at least the following:		P
	a) upon functioning, an electric strength potential based on the value fo functional insulation across the two ends of the opened trace.		P
	b) test repeated on two additional samples with complying results.		P
	To ensure reproducibility of test results, the following information is recorded: -Dimensions of weak trace (width, length, thickness, shape)…….: -Material of PCB…..: -Other relevant technical information….:		P
H.27.1.2	Protection against internal faults to ensure functional safety		P
H.27.1.2.1	Design and construction requirements		P
H.27.1.2.1.1	Fault avoidance and fault tolerance		N/A
	Controls incorporating control functions of class B or C are designed according to H.27.1.2 taking into account the failure modes of Table H.24 and H.11.12 for software, if applicable		N/A
	The system configuration is either: • inherently failsafe or		N/A
	• components with direct safety-critical functions are guarded by safeguards in accordance to H.11.12 software class B or C		N/A

	- safeguards are built into hardware and can be supplemented by software		N/A
	- safeguards can cause a completely independent safety-shut-down		N/A
	Time slot monitoring is sensitive to both an upper and a lower limit of the time interval.		N/A
	In a class C control function if a single fault in a primary safeguard can render the safeguard inoperative, a secondary safeguard is provided		N/A
	The reaction time of the secondary safeguard is in accordance with Clause H.27.1.2.3.		N/A
	Components are dimensioned on the basis of the worst-case conditions which can arise in the control, as stated by the manufacturer		N/A
H.27.1.2.1.2	Documentation		N/A
	The documentation is based on H.11.12.3.2		N/A
	The functional analysis of the control and the safety related programs under its control are documented in a clear hierarchical way in accordance with the safety philosophy and the program requirements		N/A
	Minimum documentation provided for assessment:		N/A
	• A description of the system philosophy, the control flow, data flow and timings.		N/A
	• A clear description of the safety philosophy of the system with all safeguards and safety functions clearly indicated. Sufficient design information is provided to enable the safety functions or safeguards to be assessed		N/A
	• Documentation for any software within the system		N/A
	Programming documentation is supplied in a programming design language declared by the manufacturer.....:		N/A
	Safety related data and safety related segments of the operating sequence are identified and classified according to H.11.12.3.2		N/A
	There is a clear relationship between the various parts of the documentation		N/A
H.27.1.2.2	Class B control function		N/A
H.27.1.2.2.1	Design and construction requirements		N/A
	A class B control function is designed such that under single fault conditions it remains in or proceeds to the defined state.		N/A
	Software complies with software class B		N/A
	The assessment is performed according to H.27.1.2.2.2 and H.27.1.2.2.3 and under the test conditions and criteria of H.27.1.2.5		N/A
H.27.1.2.2.2	First fault		N/A

	Any first fault (see Table H.24) in any one component or any one fault together with any other fault arising from that first fault results in either:		N/A
	a) the control becomes inoperative with all safety related output terminals de-energized or assumes a status in which they ensure a safe situation; or		N/A
	b) the control reacts within the fault reaction time (see Table 1, requirement 91) by proceeding to a defined state, provided that subsequent reset from the defined state under the same fault condition results in the system returning to the same defined state; or		N/A
	c) the control continuous to operate, the fault is identified during the next start-up sequence, the result is a) or b); or.....:		N/A
	d) the control remains operational in accordance with the safety related functional requirements of the relevant part 2		N/A
	e) The fault reaction time is declared by the manufacturer referenced to Table 1, item 91.		N/A
H.27.1.2.2.3	Fault introduced during defined state		N/A
	Any first fault (together with any other fault arising from that fault) in any one component (see Table H.24), induced while the control stays in the defined state, results in either:		N/A
	a) The control remains in defined state, safety related output terminals remaining de-energized; or		N/A
	b) The control becomes inoperative with all safety related output terminals remaining de-energized; or		N/A
	c) the control comes again in operation resulting in a) or b) as mentioned in this clause under the condition that the safety related output terminals are energized not longer than the fault reaction time (see Table 1, requirement 91)		N/A
	If the cause of the original defined state condition no longer remains and the control comes in operation again, it operates in accordance with the safety related functional requirements of the relevant part 2		N/A
	e) The fault reaction time is declared by the manufacturer referenced to Table 1, item 91.		N/A
H.27.1.2.3	Class C control function		N/A
H.27.1.2.3.1	Design and construction requirements		N/A
	A class C control function is designed such that under first and second fault conditions it remains in or proceeds to the defined state.		N/A
	Software complies with software class C		N/A
	The assessment is performed according to H.27.1.2.3.2, H.27.1.2.3.3 and H.27.1.2.4 and under the test conditions and criteria of H.27.1.2.5.		N/A

H.27.1.2.3.2	First fault		N/A
	Any first fault (see Table H.24) in any one component or any one fault together with any other fault arising from that first fault results in either:		N/A
	a) the control becomes inoperative with all safety related output terminals de-energized or assumes a status in which they ensure a safe situation;		N/A
	b) the control reacts within the fault reaction time (see Table 1, requirement 91) by proceeding to a defined state, providing that subsequent reset from the defined state condition under the same fault condition results in the system returning to the defined state;		N/A
	c) the control continuous to operate, the fault is identified during the next start-up sequence, the result is a) or b); .....:		N/A
	d) the control remains operational in accordance with the safety related functional requirements of the relevant part 2		N/A
	e) The fault reaction time is declared by the manufacturer referenced to Table 1, item 91.		N/A
H.27.1.2.3.3	Second fault		N/A
	Any further independent fault considered together with the first fault results in either H.27.1.2.3.2 a), b), c) or d). During assessment, the second fault has only to be considered to occur:		N/A
	a) Either when a start-up sequence has been performed between the first and the second fault, or		N/A
	b) 24 h after the first fault.		N/A
	The relevant part 2 specifies the applicability of a) or b) and the fault reaction time (see Table 1, requirement 91) .....:		N/A
H.27.1.2.4	Faults during defined state		N/A
H.27.1.2.4.2	First fault introduced during defined state		N/A
	Any first fault (together with any other fault arising from that fault) in any one component (see Table H.24), induced while the control is staying in the safety-shut-down position, results in either:		N/A
	a) The control remaining in a defined state, safety related output terminals remaining de-energized or in a status in which they ensure a safe situation;		N/A
	b) The control becoming inoperative with all safety related output terminals remaining de-energized or assuming a status in which they ensure a safe situation;		N/A
	c) The control comes again in operation resulting in a) or b) under the condition that the safety related output terminals are energized no longer than the fault reaction time (see Table 1, requirement 91)		N/A

	If the cause of the original safety shut-down condition no longer remained and the control came again in operation, it operated according to the safety related functional requirements of relevant Part 2 and the second fault assessment was carried out in accordance with H.27.1.2.3.3.		N/A
H.27.1.2.4.3	Second fault introduced during defined state		N/A
	Any second fault (together with any other fault arising from that fault) in any one component (see Table H.24), induced while the control is staying in the defined state, results in either H.27.1.2.4.2 a), b) or c) .....:		N/A
	Fault reaction time specified in relevant part 2 .....:		N/A
	It may specify a different time span in which the second fault does not occur, if different from 24 h .:		N/A
H.27.1.2.5	Circuit and construction evaluation		N/A
H.27.1.2.5.1	Test conditions		N/A
	The fault is considered to have occurred at any stage in the control program sequence.		N/A
	The control is operated or considered to operate under the following conditions:		N/A
	a) at the most unfavourable voltage in the range 85 % to 110 % of the rated supply voltage (V) .....:		—
	b) loaded with the most unfavourable load declared by the manufacturer.....:		—
	c) in an ambient temperature of (20 ± 5) °C, unless there are significant reasons for conducting the test at another temperature within the manufacturer's declared range; (°C) .....:		—
	d) with any actuating member placed in the most unfavourable position;		**N/A**
	e) with tissue paper placed on the supporting surface(s) of the control;		**N/A**
	f) with sparks of about 3 mm in length and having an energy of not less than 0,5 J applied to those components which are likely to liberate flammable gases during the test		**N/A**
H.27.1.2.5.2	Test criteria		N/A
	During the appraisal, it is verified that under the conditions described above, the following criteria are satisfied.		N/A
	a) The control does not emit flames, hot metal or hot plastics, the tissue paper does not ignite, no explosion results from the liberation of flammable gases and any flame produced does not continue to burn for more than 10 s after switching off the spark generator		N/A
	When a control is incorporated with any appliance, any enclosure afforded by the appliance is taken into consideration		N/A

	b) If the control continues to function, it complies with Clauses 8 and 13 or Clauses 8 and 13 of the relevant part 2.		N/A
	If it ceases to function, it still continues to comply with Clause 8 or Clause 8 of the relevant part 2		N/A
	c) There is no loss of protective function		N/A
	After tests there is no deterioration of the various parts of the control that result in failure to comply with Clause 20 or Clause 20 of the relevant part 2.		N/A
H.27.1.2.5.3	Assessment		N/A
	A thorough appraisal of the circuit is carried out to determine its performance under the specified fault conditions. (This appraisal includes theoretical analysis and a component failure simulation test)		N/A
	Fault simulations may also be carried out to simulate faults within complex devices, e. g. EPROM emulation tests.		N/A
	Only the safety related software (software class B and C) as identified according to H.27.1.2.1.2 are subjected to further assessment. (For class identification a fault tree analysis may be used)		N/A
H.27.4	Electronic disconnection: withstands abnormal overvoltage conditions		N/A
H.27.4.1	- control loaded as indicated in Cl. 17.2; rated voltage (V) .....:		—
	- control subjected to 1,15 x VR for 5 s during electronic disconnection; test voltage (V) .....:		—
H.27.4.2	- control provides electronic disconnection as determined by the test of H.11.4.16.2		N/A

J	**ANNEX J – REQUIREMENTS FOR CONTROLS USING THERMISTORS**		N/A
J.4.2.5	Unless otherwise specified, representative samples as indicated in Table J.3 are subjected to the tests specified in J.17.8.		N/A
	New samples are used for all tests other than the overload and endurance test.		N/A
J.4.3.2	The rated voltage (Vr) of a thermistor is the input voltage of a thermistor as declared by the manufacturer.		N/A
J.4.3.2.11	The electrical and thermal ratings of a thermistor are in accordance with Table J.4 and based on its intended application.		N/A
J.4.3.5.4.	Type 1 controls using thermistors as temperature sensing devices where self-heating is negligible are not subjected to the tests for thermistors.		N/A

J.4.3.5.4.1	Thermistors used in type 1 action controls that comply with IEC 60738 or IEC 60539 are subjected to the thermal runaway test of J.17.18.5 only provided that it complies with the applicable declaration (e.g. number of cycles) of the control.		N/A
	Compliance to IEC 60738-1 or IEC 60539 not required if thermistors comply with requirements of Annex J		N/A
J.6.4.3.3	According to features of automatic action provide the equivalent of electronic disconnection and are classified as type 1.YJ or 2.YJ action.		N/A
J.6.15	According to construction, addition:		N/A
J.6.15.6	- control using NTC or PTC thermistors		N/A
J.6.15.7	Ceramic element		N/A
J.6.15.8	Polymer element		N/A
J.6.17	According to use of the thermistor, addition:		
J.6.17.1	- thermistor control element		N/A
J.6.17.1.1	PTC current limiter		N/A
J.6.17.1.2	PTC motor starter		N/A
J.6.17.1.3	PTC degausser		N/A
J.6.17.1.4	NTC inrush current limiter		N/A
J.6.17.2	- self-controlled heater		N/A
J.6.17.3	- thermistor sensing element		N/A
J.6.17.3.1	PTC sensor		N/A
J.6.17.3.2	NTC sensor		N/A
J.7	Information, addition to Table 1		
	J61 - according to the use of a thermistor; clause: J6.7; (Method: X) .....:		N/A
	J62 - resistance/temperature characteristics; clauses: J15.7, J17.17.1, J12.2.1; (Method: X) .....:		N/A
	J63 - resistance/temperature characteristics drift; clause: J17.18.2; (Method: X) .....:		N/A
	J64 - Number of cycles; clause: J17.18.2; (Method: X) .....:		N/A
	J65 - Method of resistance/temperature measurements; clauses: J15.7, J17.18.1; (Method: X) .....:		N/A
	J82 – PTC current limiters where the maximum current is reduced to less than or equal to 8 A in less than or equal to 5 s; clauses: J15.7.6.1.1; (Method: X) .....:		N/A
J.11.3.10	Thermistors used in controls to provide functional safety or as controls to provide functional safety for a controlled application provide type 2 action (type 2.YJ), or		N/A
	- for other applications at least type 1.YJ		N/A

J.11.4.17	Type 1.YJ or 2.YJ action: operation provides an inherent change in resistance……...:	Type of action:	—
J.15.7	Calibration tests for PTC thermistors		N/A
J.15.7.1	Sequence of calibration tests of J.15.7.4 to J.15.7.8		N/A
	-ceramic thermistors (J.15.7.4 to J.15.7.8)		N/A
	-polymeric thermistors (J.15.7.5, J.15.7.6, J.15.7.7, J.15.7.8 and J.15.7.4)		N/A
J.15.7.2	In the “as-received” condition, each PTC thermistor		N/A
	- subjected to the tests specified in Table J.6		N/A
	- Compliance to Table J.6		N/A
J.15.7.3	Following the tests described in J.17.17 a), the same PTC samples:		N/A
	-subjected to the tests in table J.6		N/A
	-compliance to Table J.6 for each test		N/A
	For PTC sensors: -compliance with table J.7 for each test		N/A
J.15.7.4	R/T measurement for PTC thermistors.....:	See attached data	N/A
J.15.7.5	Hold current test for PTC current limiters .....:	See attached data	N/A
J.15.7.6	Time-to-trip test for PTC current limiters.....:	See attached data	N/A
J.15.7.6.1	Thermistor with multiple trip current and times		N/A
	-tested at the maximum current		N/A
	-tested at the minimum current		N/A
	-current not to exceed the maximum current point on the time-to-trip versus current curve		N/A
J.15.7.6.1.1	Thermistor declared in item 82 of Table J.5 tripped at the declared trip current and corresponding rated voltage within the specified time-to-trip		N/A
J.15.7.7	Surface temperature of PTC thermistors other than current limiters		N/A
	- temperature measured at maximum voltage and steady-state current.....:		N/A
J.15.7.7.1	Surface temperature of current limiting thermistor:		N/A
	a) operating condition in hold state at rated maximum voltage and hold current.....:	See attached data	N/A
	b) operating condition in tripped state at rated maximum voltage and steady-state current.....:	See attached data	N/A
J.15.7.8	Inrush current measurement		N/A
J.15.7.8.1	PTC thermistors used as self-controlled heaters, motor starters and degaussers, inrush current of thermistor measured by oscilloscope at maximum voltage under rated load.....:	See attached data	N/A
J.15.8	Calibration tests for NTC thermistors		N/A
J.15.8.1	In the “as-received” condition, each NTC thermistor		N/A
	- subjected to the tests specified in Table J.8		N/A

	- Compliance to Table J.8		N/A
J.15.8.2	Following the tests described in J.17.17 b), the same NTC samples:		N/A
	-subjected to the tests in table J.8		N/A
	-compliance to Table J.8 for each test.		N/A
	For NTC sensors:		N/A
	-compliance with table J.9 for each test.		N/A
J.15.8.3	R/T measurement for NTC thermistors.....:	See attached data	N/A
J.15.8.4	Surface temperature test (Inrush current limiting)		N/A
J.15.8.4.1	Surface temperature measured while thermistor		N/A
	-operating at maximum voltage and current with rated capacitance in parallel with the load		N/A
	-temperature within manufacturer's specified limits		N/A
J.15.8.5	Inrush current measurement (inrush-current limiting)		N/A
J.15.8.5.1	Inrush-current of thermistor measured using oscilloscope at max. voltage and current with the rated capacitance value in parallel with the load.....:	See attached data	N/A
J.15.8.6	Resistance and beta value for NTC thermistors		N/A
J.15.8.6.1	Beta value within limits specified by the manufacturer		N/A
	-Resistance at 25 degree C……:	See attached data – (multiple models)	N/A
	-Resistance at R_1 @ T_1.....:	See attached data – (multiple models)	N/A
	-Resistance at R_2 @ T_2……..…:	See attached data – (multiple models)	N/A
J.17.17	Endurance		N/A
	a) sequence of tests for PTC thermistors		N/A
	b) sequence of tests for NTC thermistors		N/A
J.17.17.1	After the tests of J.17.18.1 to J.17.8.4, the performance of the control is checked by the tests of J.15.7 or J.15.8		N/A
J.17.17.2	After the appropriate tests of J.17.18		N/A
	-the control complies with clauses 8 and 13		N/A
	-no emission of flames or expulsion of particles		N/A
J.17.18	Conditioning tests		N/A
J.17.18.1	Heat-cold-humidity		N/A
	Following the conditioning specified in J.17.18.1.1, thermistor complies with tables J.6, J.7. J.8 or J.9		N/A
J.17.18.1.1	Indoor temperature use:		N/A
	1) 24 h at measured surface temperature or max declared operating temperature but not less than 70 deg C.....:		N/A

	2)168 h in a non-condensing atmosphere having a relative humidity of 90% to 95% at 40 deg C.....:		N/A
	3)8 h at 0 deg C or manufacturer's specified ambient temperature, whichever is lower .....:		N/A
	Outdoor temperature use:		N/A
	1) 4 h immersed in water at 25 deg C		N/A
	2) 8 h, at minus 35 deg C or at the manufacturer's specified ambient temperature, whichever is lower:		N/A
	3) 24 h, at measured surface temperature or max declared operating temperature but not less than 70 deg C.....:		N/A
	4) 168 h, in a non-condensing atmosphere, having a relative humidity of 90% to 95% at 40 deg C .....:		N/A
J.17.18.2	Extended cycling (PTC)		N/A
J.17.18.2.1	Overload		N/A
J.17.18.2.1.1	Following the tests specified in J.17.18.2.1.2, J.17.18.2.1.3 or J.17.18.2.1.4 and J.17.18.2.2.1, a thermistor complied with Table J.6 or Table J.7, as appropriate		N/A
J.17.18.2.1.2	For self-controlled heater, 50 cycles at:		N/A
	-120% of maximum voltage.....:		N/A
J.17.18.2.1.3	For a control thermistor, 50 cycles at:		N/A
	a)120% of rated maximum current (I_{max}).....:		N/A
	b)120% of rated short-circuit current (I_{sc}).....:		N/A
J.17.18.2.1.4	For a sensing thermistor, 50 cycles at:		N/A
	-120% of maximum sensing temperature.....:		N/A
J.17.18.2.2	Endurance		N/A
J.17.18.2.2.1	Following the overload test, the three samples were operated at the conditions specified in a), b) or c) for the number of cycles in Table J.10		N/A
	a)self-controlled heater @V_{max} or I_{max} .....: Number of cycles .....:		N/A
	b)control – V_{max} and the following currents.....:		N/A
	1) Current limiter - ≥I_t or I_{fun}.....: Number of cycles .....:		N/A
	2) Degausser - I_{max}.....: Number of cycles .....:		N/A
	3) Motor Starter – I_{max} .....: Number of cycles .....:		N/A
	c) sensing – between 25 deg C to maximum operating temperature .....:		N/A
J.17.18.3	Thermal conditioning		N/A

J.17.18.3.1	Passive ageing		N/A
	Following the conditioning specified in J.17.18.3.1.1 and J.17.18.3.2.1, the thermistors complied with Tables J.6, J.7, J.8 or J.9 as appropriate.		N/A
J.17.18.3.1.1	For all types except sensors:		N/A
	Test temperature – 30K above T_s but not less than 70 deg C; Duration – 1000 hours.....:		N/A
	For sensors:		N/A
	Test temperature – 30K above the maximum sensing temperature, Duration – 1000 hours .....:		N/A
J.17.18.3.2	Active ageing		N/A
	In addition to J.17.18.3.1.1, a current limiter is energized in its tripped state at maximum voltage and carrying steady-state current for 1000 hours	Max voltage: Steady-state current:	N/A
J.17.18.4	Cold operational cycling (PTC)		N/A
J.17.18.4.1	Following the test specified in J.17.18.4.2, the thermistor complied with Table J.6		N/A
J.17.18.4.2	3 samples of a thermistor are subjected to 1000 cycles of operation at an ambient temperature of 0°C or at the manufacturer's specified ambient, whichever is lower (°C).....:		N/A
	Self-controlled heater – specified in J.17.18.2.2.1 a)		N/A
	Control thermistor – as specified in J.17.18.2.2.1 b)		N/A
J.17.18.5	Thermal runaway		N/A
	Thermistors are energized and operated under maximum rated conditions, initially		N/A
	Voltage increased until breakdown occurs or		N/A
	Test voltage is 2 x working voltage .....:		N/A
J.17.18.6	Cold thermal cycling		N/A
J.17.18.6.1	After the cycling specified in J.17.18.6.1.1, the thermistors complied with tables J.7 or J.9, as appropriate.		N/A
J.17.18.6.1.1	Sensing thermistors subjected to:		N/A
	-1000 cycles of cold thermal cycling		N/A
	-each cycle starts at 0°C or at the manufacturer's specified ambient, whichever is lower to the maximum sensing temperature.		N/A
	Test range.....:		N/A
J.17.18.7	Extended cycling (NTC)		N/A
J.17.18.7.1	Overload		N/A
J.17.18.7.1.1	Following the tests specified in J.17.18.7.1.2 or J.17.18.7.1.3 and J.17.18.7.2.1, thermistors are checked for compliance with table J.8		N/A

J.17.18.7.1.2	For an inrush current limiter:		N/A
	-50 cycles of operation at V_{max} and 120% I_{max}		N/A
J.17.18.7.1.3	For a sensing thermistor:		N/A
	-50 cycles of operation starting at 25°C ± 5K and increasing the temperature to 120% of maximum sensing temperature.....:		N/A
J.17.18.7.2	Endurance		N/A
J.17.18.7.2.1	Samples subjected to overload test, J.17.18.7.1 are operated at the conditions specified in a) or b) for the number of cycles specified in Table J.12		N/A
	a)inrush-current limiting – tested at V_{max} and I_{max} with rated capacitance value in parallel with the load		N/A
	V_{max} .....:		N/A
	I_{max} .....:		N/A
	Number of cycles.....:		N/A
	b) Sensing – cycled between 25°C ± 5K and the maximum operating temperature.		N/A
	Maximum sensing temperature.....:		N/A
	Number of cycles.....:		N/A
J.17.18.8	Cold operational cycling (for inrush current-limiting NTC thermistors)		N/A
J.17.18.8.1	Following the cycling specified in J.17.18.8.2, thermistors checked for compliance with Table J.8		N/A
J.17.18.8.2	Three samples subjected to 1000 cycles of operation at V_{max} conducting I_{max} of current, at an ambient temperature of 0°C or at manufacturer's specified temperature, whichever is lower.....:		N/A
	Each cycle covered that portion of the R/T curve from the starting temperature to steady-state conditions		N/A
J.20	Creepage distances, clearances and distances through insulation		
J.20.1.14	Clearance		
J.20.1.14.1	Clearance between live parts connected electrically to the mains supply and accessible surfaces or parts in compliance with requirements of 20.1		N/A
J.20.1.14.2	Clearance between live parts providing functional insulation in compliance with requirements of 20.1		N/A
J.20.2.5	Creepage distance		
J.20.2.5.1	Creepage distance between live parts connected electrically to the mains supply and accessible surfaces or parts were in compliance with the requirements of 20.2		N/A
J.20.2.5.2	Creepage distance between live parts providing functional insulation was in compliance with the requirements of 20.2.		N/A

J.24	Components		
J.24.2.1	Subclause J.24.2.1 was applicable to thermistors previously tested under IEC 60738-1, IEC 60738-1-1 or IEC 60539.		N/A
J.27	Abnormal operation		
J.27.1	Consideration of fault modes made in accordance with Table H.24 for thermistors used in protective controls		N/A

L	**ANNEX L (NORMATIVE) – OVERVOLTAGE CATEGORIES**	P

N	**ANNEX N (NORMATIVE) – POLLUTION DEGREES**	P

P	**ANNEX P (NORMATIVE) – PRINTED CIRCUIT BOARD (PCB) COATING PERFORMANCE TEST**		N/A
P.2	PCB base material complies with IEC 61249 series		N/A
P.3	Electric strength of coating		N/A
	- test conducted after conditioning - Clauses P.3.3 and P.3.4		N/A
	- based on functional insulation		N/A
	- test voltage per table 12.....:		—
P.3.2	Ageing test:		N/A
	- five samples subjected to 130° C ± 2°C .....:		—
	- duration: 1000 hours		N/A
P.3.3	Humidity Conditioning:		N/A
	- performed on same samples used in Cl. P.3.2		N/A
	- conditioned in humidity chamber at a temperature of (35 ± 1)° C and (90 ± 5)% relative humidity		N/A
	- duration: 48 hours		N/A
	After conditioning, each sample was subjected to the electric strength test with complying test results.		N/A
P.3.4	Environmental cycle conditioning:		N/A
	- five samples subjected to three complete cycles of conditioning per table P.1		N/A
	After conditioning, each sample was subjected to the electric strength test with complying test results.		N/A
P.3.5	After conditioning, each sample wrapped in aluminium foil was subjected to the electric strength test, Cl. P.3.1 between:		N/A
P3.6	- leads A, B, and C individually and common lead (figure P.1)		N/A
	- no evidence of flashover or breakdown		N/A

Q	**ANNEX Q (NORMATIVE) – PRINTED CIRCUIT BOARD COATING PERFORMANCE TEST**		N/A
Q.1	Printed circuit boards conforming to all requirements for type 1 protection (as per IEC 60664-3:2016) is to comply with minimum creepage distance requirements of Cl. 20 of this document, pollution degree 1		N/A
Q.2	Printed circuit board conforming to requirements for type 2 protection (as per IEC 60664-3:2016) is to comply with the minimum requirements for solid insulation, Cl. 20.3 of this document.		N/A
Q.3	Six Samples of production printed boards are required. Testing of the protection:		N/A
	- test specimens according to IEC 60664-3:2016, Annex C, which specifically applies for printed circuit boards; the specimen used for testing should have the same minimum distances as those from production; or		N/A
	- specimens from production; or		N/A
	- any printed circuit board, as long as the test specimens are representative of those from production;		N/A
	Testing of mouldings and potting materials		N/A
	- production specimens are to be used, or they are to be representative of those from production.		N/A
Q.4 + Q5	Compliance for type 1 or 2 protection: checked by tests of IEC 60664-3:2016, Cl. 5 test levels or conditions specified in Table Q.1 apply		N/A

T	**ANNEX T (NORMATIVE) - REQUIREMENTS FOR SELV AND PELV**		P
T.2	Protection against electric shock by SELV or PELV		P
T.2.1	SELV - Protection against electric shock is provided by the following measures:		P
	– limitation of voltage, ELV according to T.3.1 in a circuit (the SELV-system), and		P
	– protective-separation, according to T.3.2, of the SELV-system from all circuits other than SELV and PELV, and		P
	– simple-separation, according to T.3.3, of the SELV-system from other SELV-systems, from PELV-systems and from earth		P
	Intentional connection of exposed-conductive-parts of the control to a protective conductor or to an earth-conductor is not permitted		P
	In special locations where SELV is required and where protective screening according to T.3.2.1 is applied,		N/A
	Separation between protective screen and every circuit by basic insulation rated for the highest voltage present.		N/A
	Requirements for the elements of SELV are given in Clause T.3.		N/A

T.2.2	PELV - Protection against electric shock is provided by the following measures:		-
	– limitation of voltage, ELV according to T.3.1 in a circuit which may be earthed and/or the exposed-conductive-parts of which may be earthed (the PELV-system), and		P
	– protective separation according to T.3.2 of the PELV-system from all circuits other than SELV and PELV		N/A
	It is not necessary to provide basic insulation between the protective screen and the PELV-system.		N/A
	Where live parts of the PELV-system are accessible (touchable) simultaneously with conductive parts which, in case of a fault, could assume the potential of the primary circuit, protection against electric shock depends on protective-equipotential-bonding (T.3.4) of all such conductive parts. Such parts are bonded to the protective earthing terminal or termination of the control		N/A
	Requirements for the elements of PELV are given in Clause T.3.		N/A
T.3	ELV, protective separation, simple separation, protective bonding as elements of SELV and PELV		N/A
T.3.1	Limitation of voltage in circuits connected to a SELV system or a PELV system is to provide a voltage between accessible parts or between accessible parts and earth that fulfils the requirements in 8.1.1 according to the SELV limits of 2.1.5 or as declared according to Item 87 of Table 1.		N/A
T.3.2	Protective separation between a SELV/PELV-circuit and other live circuits is achieved by means of:		N/A
	– basic insulation and supplementary insulation, each rated for the highest voltage present, i.e. double insulation, or		N/A
	– reinforced insulation rated for the highest voltage present, or		N/A
	– protective screening according to T.3.2.1 with the protective screen being separated from		N/A
	each adjacent circuit by basic insulation rated for the highest adjacent circuit voltage (see also T.2.1, last paragraph), or		N/A
	– a combination of these provisions		N/A
	If conductors of different circuits are contained in a multi-conductor cable or other conductors grouping, they are insulated for the highest voltage present to achieve double insulation or reinforced insulation		N/A
	If any component is connected between the separated circuits, that component complies with the requirements for protective impedance.		N/A
	When the supply of SELV or PELV circuits is obtained from supply mains of higher voltages, it is either		N/A

	– through a safety isolating transformer, or		N/A
	– a converter with separate windings providing equivalent insulation, and		N/A
	Control declared IPX7 subjected to second fault analysis (item 73 of Table 1) for the circuits and insulation between windings of the converter; as result of second fault the ELV value of 0 V was not exceeded. The current between the poles of the output complied with H.8.1.10.		N/A
	Compliance is checked by inspection, measurement and when performing the appropriate test(s) in the order of this standard.		N/A
T.3.2.1	Protective screening consists of a conductive screen interposed between hazardous-live-parts of the control, installation, or system and the protected part (e.g. a SELV-circuit or a PELV circuit).		N/A
	The protective screen permanently connected to the protective earthing and the connection complies with Clause 9; and		N/A
	– itself complies with the requirements of Clause 9		N/A
T.3.3	Basic insulation is required between SELV- / PELV-circuits and other SELV-/ PELV-systems or earth and is rated for the highest voltage present		N/A
	Component connected between the separated circuits withstands the electric stresses specified for the insulation which it bridges and its impedance limits the prospective current flow through the component to the steady-state current indicated in H.8.1.10 and H.11.2.5 for protective impedance.		N/A
T.3.4	Protective bonding		N/A
	The requirements for protective bonding - see clause 9 of this standard		N/A
	For the installation of controls which consist of parts of the fixed electrical installation of a building, the requirements for protective bonding in IEC standards for installation of buildings apply.		N/A

U	**ANNEX U - REQUIREMENTS FOR RELAYS WHEN USED AS CONTROLS IN IEC 60335 APPLIANCES**		N/A
U.6	Classification		N/A
U.6.3	According to their purpose		N/A
U.6.6	According to method of connection		N/A
U.6.8	According to protection against electric shock		N/A
U.6.8.5	For a relay: insulation between coil and contact circuits:		N/A
U.6.8.6	For a relay: insulation between live parts and test function, manual action actuating member		N/A

U.7	INFORMATION		N/A
	3 - Rated voltage for both coil and contacts (method C) .....:		N/A
	4 - Nature of supply for both coil and contacts (method C) .....:		N/A
	88 – Max. intended click rate U.23 (method D) .....:		N/A
U.14	HEATING		N/A
	Replacement of sub-clause:		N/A
U.14.4	Tests conducted under the following conditions:		N/A
	U_{Coil} × 0,9 + contacts loaded or I_{Coil} × 0,9 + contacts loaded		N/A
	U_{Coil} × 1,1 + contacts loaded or I_{Coil} × 1,1 + contacts loaded		N/A
	I_{Coil} =0 + contacts loaded (N.C. contacts).		N/A
	Relays were mounted as specified		N/A
	– PWB connected relays were mounted to PWB if submitted with relays to be tested.		N/A
	If not, relays were mounted to plain PWB material; conductors per Table 6 soldered to PWB pins		N/A
U.17	Endurance		N/A
U.17.14	Evaluation of compliance		N/A
	Replace the second list item as follows:		N/A
	– The requirements of Cl. 14, under the conditions stated by U.14.4, for terminals, current carrying parts, and supporting surfaces are met		N/A
U.17.16	Test for particular purpose controls		N/A
	Relays were endurance tested according to the following schedule:		N/A
	Ageing test of 17.6		N/A
	Over-voltage test of automatic action of 17.7		N/A
	Test of automatic action at accelerated rate of 17.8		N/A
	Test of automatic action at slow rate of 17.9		N/A
	Overcurrent test of manual action at accelerated speed of 7.10		N/A
	Test of manual action at slow speed of 7.11		N/A
	Test of manual action at high speed of 17.12		N/A
	Test of manual action at accelerated speed of 17.13		N/A
U.20	CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SOLID INSULATION		N/A
	Assessment was conducted with relay energized, de-energized, and manually operated		N/A

U.23	ELECTROMAGNETIC COMPATIBILITY (EMC) REQUIREMENTS – EMISSION		N/A
	Consideration must be given as to whether EMC requirements are applicable to relays.		N/A
U.24	COMPONENTS		N/A
	Relays incorporating electronic components were assessed according to Annex H.		N/A

V	**ANNEX Q (NORMATIVE) – REQUIREMENTS FOR CONTROLS POWERED BY SECONDARY BATTERIES (RECHARGEABLE)**		N/A
	For controls powered by batteries that can be recharged in the control the following modifications were applied		N/A
V.4.3.2.11	Operation of the control		N/A
	– the control, supplied by its fully charged battery, is operated as specified in this standard or the relevant part 2 .....:		N/A
	– the charged battery initially discharged to such an extent that the control cannot operate		N/A
	– if possible, the control is supplied from the supply mains through its battery charger, the battery being initially discharged to such an extent that the control cannot operate. The control is operated as specified in the relevant part 2		N/A
	– if the control incorporates inductive coupling between two parts that are detachable from each other, the control is supplied from the supply mains with the detachable part removed.		N/A
V.7.4	Additional requirements for marking		N/A
V.7.4.10	The instructions give information regarding charging of batteries		N/A
V.8.5	Battery operated controls so designed that at a user accessible external point of disconnection of a d.c. mains supply, the maximum accessible voltage is less than or equal to the limits of a SELV/PELV circuit, and		N/A
	– the available power is less than 15 W at the end of 5 s.		N/A
V.8.5.1	Verification test		N/A
	- conducted with the d.c. mains supply disconnected from a fully charged battery control		N/A
	- the control operated from its internal battery		N/A
	The max. power recorded at the end of 5 s after the variable load was adjusted so that the maximum power was drawn through the circuit.....:		—
	The voltage and the power recorded were within the limits specified in V.8.5		N/A

V.11.13.4.4.3	A fully charged rechargeable battery was used as provided with, or recommended by the manufacturer for use with, the equipment.		N/A
V.11.13.4.4.3.1	For overcharging of a rechargeable battery, the battery is charged under each of the following conditions in turn		N/A
V.11.13.4.4.3.1.1	The battery charging circuit adjusted with the battery disconnected to give 106 % of the rated output voltage of the charger, or max. charging voltage available from the charger, whichever is the higher, and the battery is then charged for 7 h.		N/A
V.11.13.4.4.3.1.2	After battery charging circuit adjusted to 100 % of the rated output voltage of the charger, the battery was charged while subjected to any single component failure that is likely to occur in the charging circuit and result in overcharging of the battery. The battery then charged for a single period of 7 h with that simulated failure in place.		N/A
V.11.13.4.4.3.2	The battery is reverse-charged while subjected to any single component failure that is likely to occur in the charging circuit and that would result in reverse charging of the battery. The battery is then reverse-charged for a single period of 7 h with that simulated failure in place.		N/A
V.11.13.4.4.3.3	The battery is subjected to rapid discharge by open-circuiting or short-circuiting any current-limiting or voltage-limiting components in the load circuit of the battery under test.		N/A
V.11.13.4.4.3.4	Compliance checked in accordance with clauses 11.13.4.4.4 and 11.13.4.5.		N/A

8.3.2	**TABLE: Risk of electric shock test**		N/A
	Total (V_{TOTAL}) (V) ..... :		—
	Average (V_{TOTAL}/10) ..... :		—
	Capacitance (µF) >0.1µF ..... :		—
test #	Measured voltage between pins (V_{RMS})	Average voltage (V): < 34 V	
Supplementary information:			

9.3.1	**TABLE: Connection between earthing terminal and parts is of low resistance**		N/A
	Rated current, Ir (A) ..... :		—
	No-load voltage (V) ..... :		—
	Test current, 1.5* Ir, but not <25A (A) ..... :		—
terminal No.	Duration, until steady conditions (min)	Measured potential drop (V)	calculated resistance (Ω): ≤0.1 Ω
Supplementary information:			

10.1.9.1	**TABLE: Clamping reliability of the terminals**					P
	Applied torque, 2/3 of values in Table 20 (Nm) .....:				0.2	—
	Pull force (N) .....:				20	—
terminal No.	fixed wiring		flexible conductor		Conductor movement	
	smallest (mm)	largest (mm)	smallest (mm)	largest (mm)		
Load terminal	1mm2	2.5mm2			No movement Still fixed	
12VDC terminal	0.5mm2	1mm2			No movement Still fixed	
Supplementary information:						

10.2.1	**TABLE: Connection of conductors**	P
terminal No.	nominal current (A)	cross-sectional area (mm^2)
DC 12V	250mA	N/A
230V load	16A	1.5
Ext home solar	Sensor input no power	N/A
Supplementary information:		

10.2.4.3	**TABLE: Axial push and pull test**			N/A
Tab identification	size (mm x mm)	axial push (N)	axial pull (N)	result code
Supplementary information:				

11.7.1.2.1	TABLE: Flexing test					N/A
flexible cords used in product	No. of conductors in cord	rated current (A)	rated voltage (V)	No. of flexings	rate of flexings per min.	% broken
Supplementary information:						

11.7.2.9	TABLE: Push test (option –T /-TP)		N/A
Cord identification	Cross-sectional area (mm^2)	Torque applied on terminals (Nm)	Comments
Supplementary information:			

11.7.2.11+11.7.2.12	TABLE: Pull test				N/A
Control type	Pull (N)	No. of pulls applied	Torque (Nm)	Comments	
Supplementary information:					

12.3	**TABLE: Leakage current test (for in-line cord and free -standing controls)**		N/A
	Supply voltage; 1.06 Vr (V) ..... :		—
	Max. rated current (A) ..... :		—
	Max. declared ambient temperature, °C ..... :		—
	Max. leakage current from 13.3.4 (mA) ..... :		—

Circuit identification	Position of switch S1	Class of control	Measured leakage current, (mA)

Supplementary information:

13.2	**TABLE: Electric strength test**				P
Test location/circuit	Type of insulation	Type/model	Working voltage, (V)	Test voltage (V)	Flashover/breakdown (Yes/No)
Load connector/enclosure	Reinforced	-	230V	3000VAC 1min	No
Connector 12V / Load connector	Reinforced	-	230V	3000VAC 1min	No

Supplementary information:

13.3.3	TABLE: Leakage current test (for in-line cord and free -standing controls)		N/A
	Supply voltage; 1.06 Vr (V) .....:		—
	Max. leakage current from 13.3.4 (mA).....:		—

Circuit identification	Position of switch S1	Class of control	Measured leakage current, (mA)

Supplementary information:

14.6 + 14.7	TABLE: Heating test		P
	Test voltage (V)……:	**230V**	-
	Ambient (°C)……:	**24.2**	-

thermocouple locations	max. temperature measured, (°C)	temperature limit, (°C)	Verdict
Pcb mosfet	32.5	130	P
Thermoplastic enclosure	29.0	85	P
Load connector	60.2	105	P
PCB UC	31.4	130	P
SCREEN	36.2	80	P
Fan	38.8	70	P
MOSFET	42.0	For Info	P
Connector 12V	35.2	105	P
Front face	36.2	79	P

Supplementary information:

14.101.2	TABLE: Conditioning test of insulating parts exceeding limits given in Table 13, as specified in note l).	
Sample/insulating part	Conditioning hours	conditioning temperature
	1,000	

15.2 a)	TABLE: Manufacturing deviation	N/A

Condition	Sample Nos.	Declared values		Measured values	
		open	close	open	close
Supplementary information:					

15.2 b)	TABLE: Manufacturing drift	N/A

Condition	Sample No.	Measured values (deviation) from as received condition		Measured values (drift)	
		open	close	open	close
After Environmental Stress test					
After Endurance test (T_{max})					
After Endurance test (T_{min})					
Supplementary information:					

17.2.1	TABLE: Circuits loaded according to declared ratings				P
circuits	a.c./d.c.	Voltage U_R (V)	Current (A)	Time constant (ms) / power factor (cos phi)	Verdict
substantially resistive (6.2.1), making and breaking	AC	230	16	Power factor 1 (Water heater)	P
resistive or inductive (6.2.2), making					N/A
resistive or inductive (6.2.2), breaking					N/A
declared specific load (6.2.3), making					N/A
declared specific load (6.2.3), breaking					N/A
20 mA load (6.2.4), making & breaking					N/A
declared motor load (6.2.5), making					N/A
declared motor load (6.2.5), breaking					N/A
pilot duty load (6.2.6), making					N/A
pilot duty load (6.2.6), breaking					N/A
Supplementary information:					

17.5.1	TABLE: Dielectric strength		N/A
Insulation or disconnection tested	Test potential applied between the following circuits	Test voltage applied (V)	Flashover/ breakdown
Supplementary information:			

17.16.101	Table: Evaluation of Materials.					
Sample (conditioned in cl 14.101.2)	Required cycles	a.c./d.c	Voltage U_R (V)	Current (A)	Time constant (ms) / power factor (cos phi)	No. cycles completed
Overload/ overvoltage, cl 17.7	50					
Endurance automatic action, cl 17.8	1,000					
Tests 17.7 and 17.8 are conducted at an ambient temperature of (20 ± 5) °C						

18.2.1	TABLE: Impact resistance		P
Impacts per surface	Surface tested	Impact energy (Nm)	Verdict
3	Front face	1	P
3	Back face	1	P
3	Left side	1	P
3	Right side	1	P
Supplementary information:			

18.101.1	Push-and-turn or pull-and-turn actuation for Type X or Type Z		N/A
Applicable test	Required	Measured	Verdict
Axial force required to push or pull the actuating member	Min 10N		
Axial push or pull force applied to actuating member	140N		
Compliance to cl 18.1.5 after test	Cl 8,13 & 20		

Electric strength cl 13	……..V for one minute		
Energy regulator provided with knob (dia or length < 50mm), torque applied against the means of rotation prior to push or pull actuation	Min 4Nm		
Electric strength cl 13	…….. V for one minute		
Torque required to reset to initial contact position	≤ 0.5 Nm		
Electric strength cl 13	…….. V for one minute		
Torque applied to the setting means	6 Nm		
Compliance to cl 18.1.5 after test	Cl 8,13 & 20		
Electric strength cl 13	…….. V for one minute		

18.101.2	**Push-and-turn or pull-and-turn actuation for Type X or Type Z**		**N/A**
Applicable test	Required	Conducted	Verdict
Manual endurance	…….. (declared manual cycles)		
After endurance compliance to cl. 18.101.1			
For the case where means preventing rotation is not damaged but overridden to operate contacts	……. cycles (declared 1/6 of cycles) without push or pull action ……cycles (remainder of the declared cycles, with push or pull action)		

19.1.15	TABLE: Threaded part torque test			P
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Torque (Nm)	Verdict
12V connector	1.5mm	II	0.2	P
230V load connector	1.5mm	II	0.2	P
Fan fixation	2,7mm	II	0,4	P
Supplementary information:				

20	TABLE: Creepage distance and clearance measurements		P
	Requirements creepage distance and clearance met		
	Supply working voltage (V) ..... :	230V	—
	Overvoltage category ..... :	2	—
	Rated impulse voltage according to table 20.1(V) ..... :	1500	—
	Requirements for case B (20.1.7, 20.1.12) met (cl 20.1 Note 2)... :		

Creepage distance Cd and clearance Cl across (type of insulation)	Nominal Volt, (V)	Pollution degree	Required Cd, (mm)	Cd measured (mm)	Required Cl (mm)	Cl measured (mm)
F Between poles of load connector	230	2	1.8	2.4	0.5	2.4
R 230V track/ 12Vtrack	230	2	3.6	4.1	1.5	4.1
R 230V track/ 12Vtrack Near blue terminal	230	2	3.6	4.8	1.5	4.8
F Between MOSFET	230	2	1.8	2.6	1.5	2.6
Supplementary information: Abbreviations for types of insulation: F - functional, B - basic, S – supplementary, R - reinforced						

21A	TABLE: Ball Pressure Test and Tracking Test						N/A
Ball Pressure max. allowed impression diameter (mm) .....:							—
Test sample description		Ball Pressure test		Tracking test			
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	Proof tracking index (PTI)	Voltage, (V)	Result	
Supplementary information:							

21A	TABLE: Resistance to heat and fire - Glow wire tests	P

Object/ Part No./ Material	Manufacturer/ trademark	Glow wire test (GWT); (°C)						Verdict
		550	650		750		850	
			te	ti	te	ti		

Object/ Part No./ Material	Manufacturer/ trademark	Glow-wire flammability index (GWFI), °C				GW ignition temp. (GWIT), °C		Verdict
		550	650	750	850	675	775	
Enclosure	CAMDENBOS							P
Front face	Ultrafuse PC/ABS FR		x					P

The test specimen passed the glow wire test (GWT) with no ignition [($t_e - t_i$) ≤ 2s] (Yes/No) :	
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No) .....:	
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)? .....:	
Ignition of the specified layer placed underneath the test specimen (Yes/No) .....:	

Supplementary information:

550 °C GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF
The GWIT pre-selection option, the 850 °C GWFI pre-selection option, and the 850 °C GWT are not relevant (or applicable) for attended appliances.

24.1	TABLE: Transformers supplying external SELV circuit	N/A

secondary winding tested	maximum output voltage (V)	maximum output current (A)	maximum power (VA)

Supplementary information:

24.1 / 24.2	TABLE: List of critical components				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1]
- Description[2] :	Enclosure				
Thermoplastic enclosure	CAMDENBOSS	DIN RAIL BOXES CNMB	UL 94 V-0 85°C	UL 94	Datasheet
Front face	BASF	Ultrafuse PC/ABS FR	UL 94 V-0 GWEPT 725°C	IEC/EN 60695-11-10:2013	EMITECH REPORT RS-21-B664 Ed.0
Fan	EBMPAPST	252N	axial, 12 VDC, 25x25x8mm, 15dBA, 3,2m3/h 70°C	-	Datasheet
Current sensor	ELKOR	I-Snail-VC-100	0-100A AC -> 0-5V DC	-	Datasheet
- Description[2] :	PCB				
PCB MOSFET	Seed studio	Kb160fr4 87mm x 50mm, 2 couches 70um, vernis, sérigraphie	V-0 135°C	UL94	Datasheet
PCB display	Seed studio	Kb160fr4 42mm x 49mm, 2 couches, vernis, sérigraphie	V-0 135°C	UL94	Datasheet
PCB UC	Seed studio	Kb160fr4 60mm x 30mm, 2 couches, vernis, sérigraphie	V-0 135°C	UL94	Datasheet
- Description[2] :	On PCB MOSFET				
Terminal 12V	MULTICOMP	MC24366 2pts	-40-105°C 300V 16A	-	Technical doc
Load terminal	de On Shore Technology Inc.	OSTT7020150	-33 to 120°C 10-24AWG 300VAC 25A	-	Technical doc
Polyswitch	LITTELFUSE	MINISMDC050F-2	24VDC 500mA 85°C	IEC 60730-1	Datasheet TUV UL
MOSFET Q1 Q2	INFINEON	IPW60R037P7XKSA1	77.5 A, 600 V	-	-

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.

2) Description line content is optional. Main line description needs to clearly detail the component used for testing

24.4.1.6	**TABLE: Switch mode power supply overload test**	N/A

Winding	Winding T, (°C)	Overload (Measured) values			a) No flames	b) 1.5 x max temp. of Cl. 14	c) as declared (T1,57)	d) Clause 8 and 13.2 for BI	e) creepage and clearance	f) no rupture of ext. fuse
		Max Voltage (V) peak	Max overload current	Max Power (W)						

Supplementary information:

24.4.1.8-24.4.1.10	**TABLE: SELV output measurement test**	N/A

Winding	Max. Voltage (V peak/DC)		Protective impedance	SELV measurement (V)
	Normal Operation	Single component fault		

Supplementary information:

25.2	TABLE: Over-voltage and under-voltage test	N/A

test	operating condition	rated voltage (V)	test voltage 85/110% (V)	temperature (°C)	Observation
Over-voltage transformer	T_{max}				
Under-voltage transformer	T_{max}				
Over-voltage valve	T_{min}				
Under-voltage valve	T_{min}				
Supplementary information:					

27.2.3	TABLE: Blocked output test	N/A

Thermocouple locations	Max. temperature measured, (°C)		Temperature limit (°C)	Verdict
	2nd hour	24th hour		
Supplementary information:				

27.5	TABLE: Overload Heating test	N/A

thermocouple locations	Max. temperature measured, (°C)	Temperature limit, (°C)	Verdict
Supplementary information:			

H.27.1.1.1	TABLE: Low power point determination	N/A

Component or Circuit Under Evaluation	Measured Wattage (W)

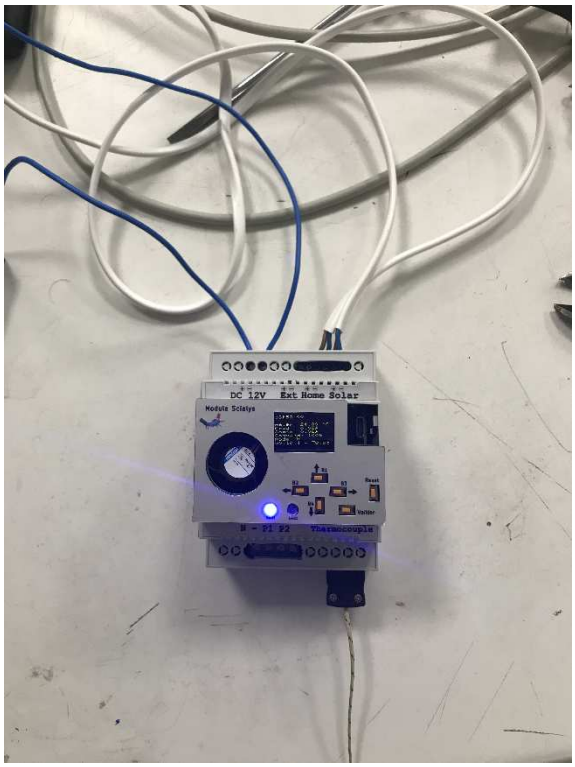
Supplementary information:

H27.1	TABLE: Electrical / electronic component fault modes	P

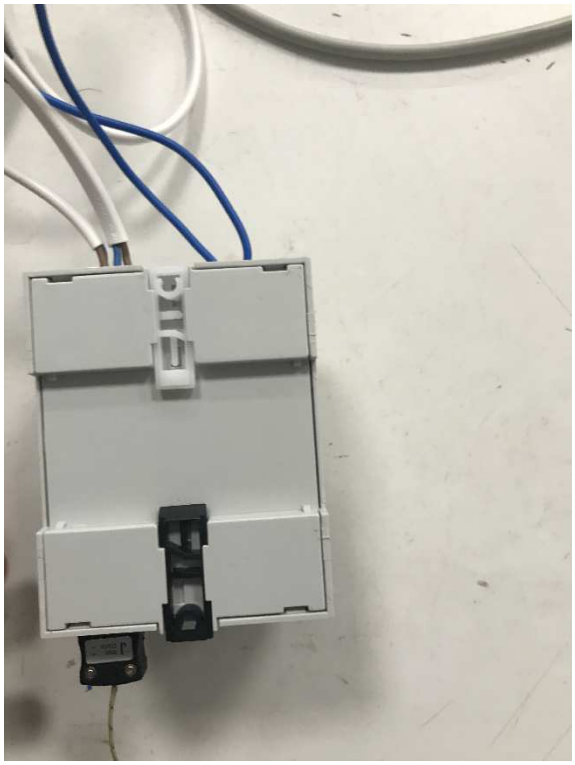
Component	short circuiting	open circuit	a) No flames	b) 1.5 x max temp. of Cl. 14	c) as declared (H57)	d) protect. against el. shock	d) electric strength, basic insulation	e) creepage and clearance	f) no rupture of ext. fuses or	f) complies with a), b) and d)	g) as declared in H58	Observations
C5	X		P	P	P	P	P	P	P	P	P	Protection by power supply Immediate action
VDR2	X		P	P	P	P	P	P	P	P	P	Continuous heating
Q6	X											Protection By TS1
Fan locked	X											No overheating

Supplementary information:

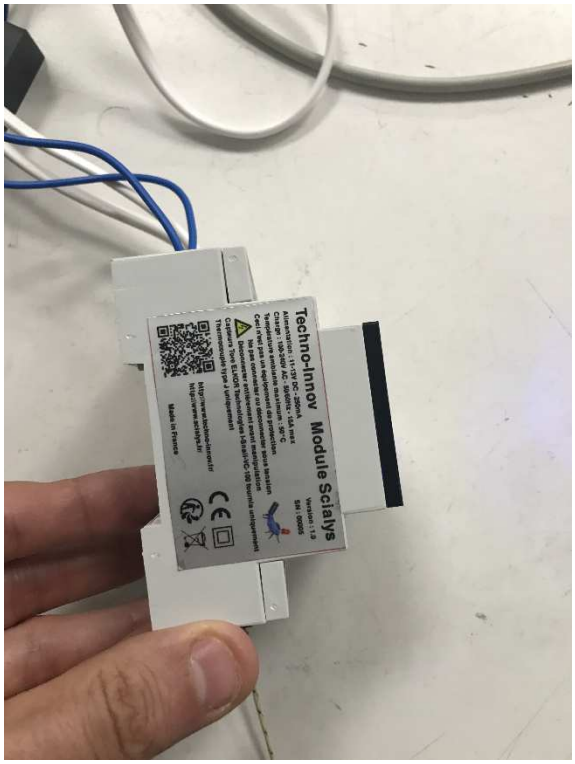
Photo documentation



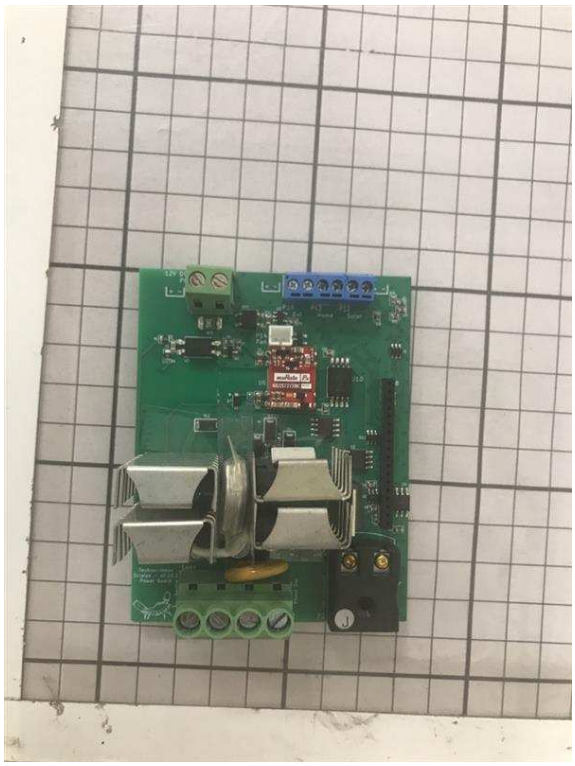
General view of the product



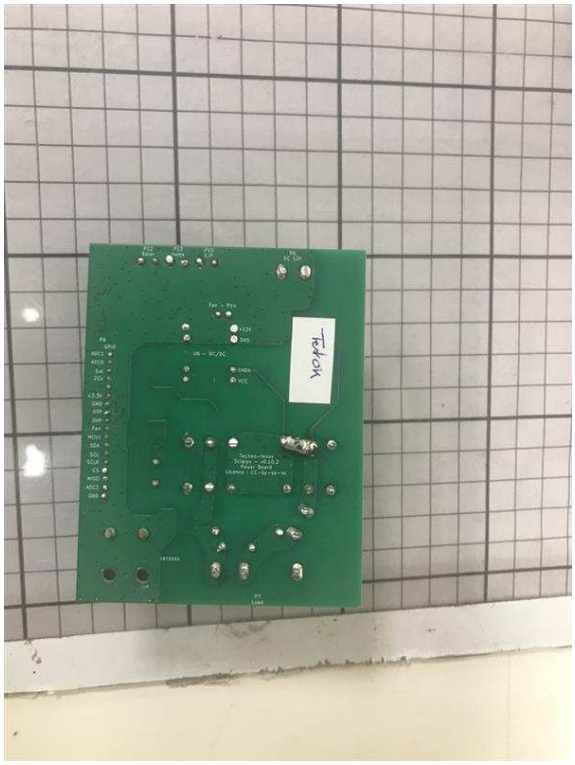
Back face



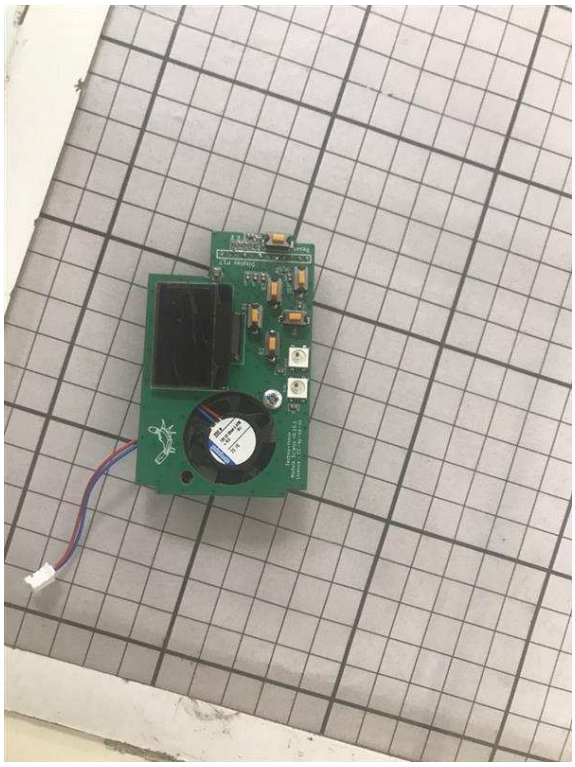
Side face (not definitive marking)



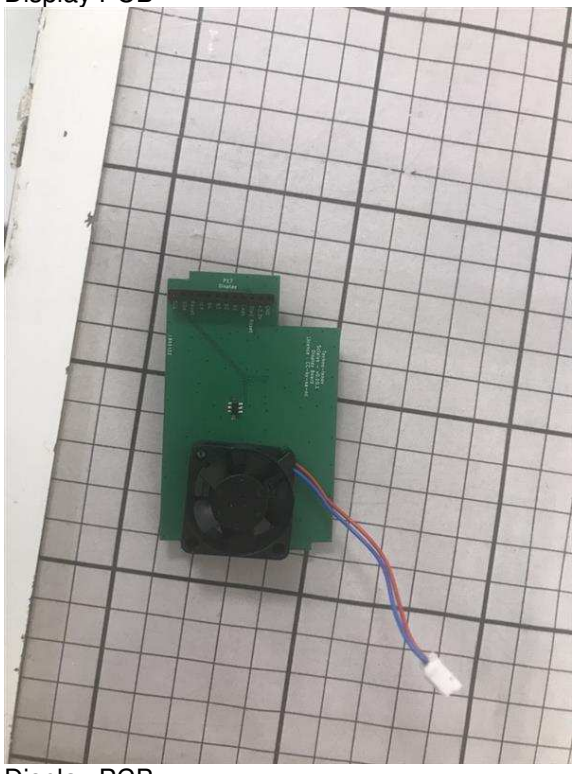
Mosfet PCB



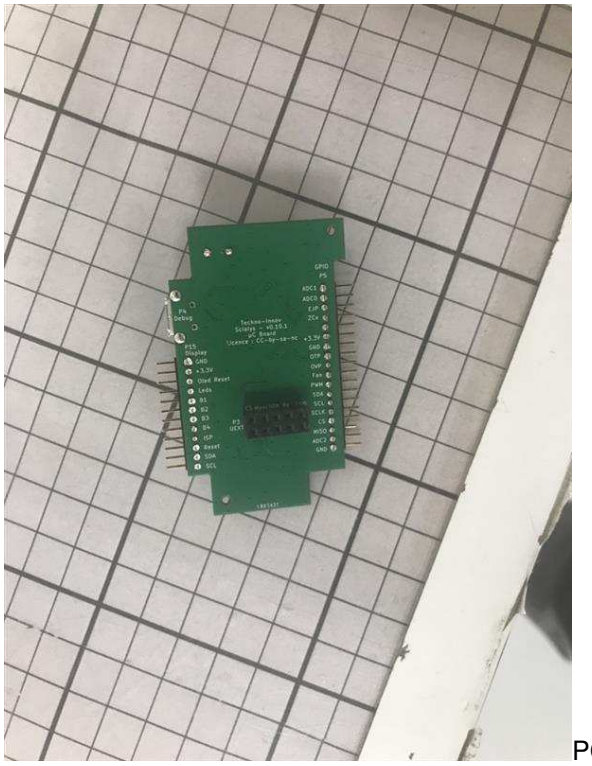
Mosfet PCB



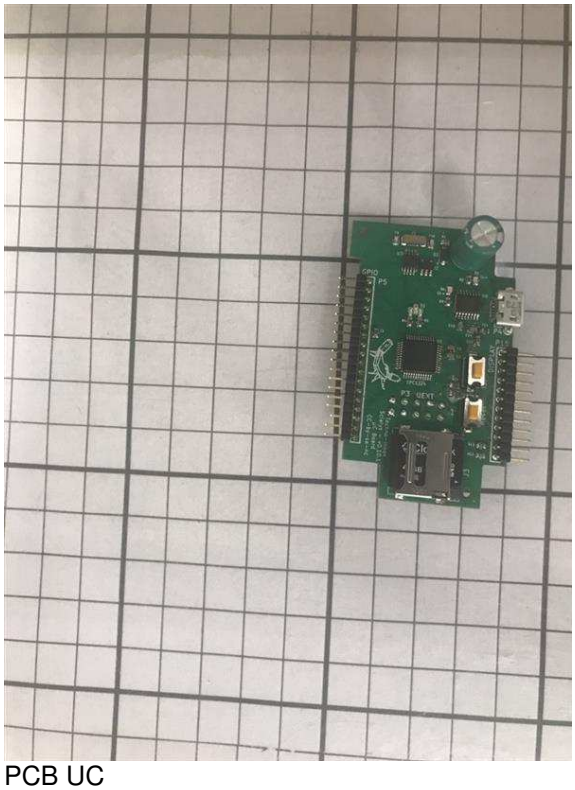
Display PCB



Display PCB



PCB UC



PCB UC