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Clause	Requirement + Test	Result - Remark	Verdict
24	**COMPONENTS**		N/A
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		N/A
	Fuses comply with requirements of IEC 60127-1 or IEC 60269-1		N/A
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~~	N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
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..... :		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.....		N/A
24.4.1.9	The maximum open circuit voltage measurements was made during normal operation and under single component failure .....:		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 .....:		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**		N/A
	Meets requirements per annex H .....:	See annex H	N/A
25.2	Over-voltage and under-voltage test (for controls incorporating electro-magnets) .....:		N/A
26	**ELECTROMAGNETIC COMPATIBILITY (EMC) REQUIREMENTS – IMMUNITY**		N/A
	Meets requirements per Cl. H.26.....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
27	**ABNORMAL OPERATION**		P
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 .....:		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.....:		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.....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Controls protected by incorporated fuses -fuses shunted by links of negligible impedance -control loaded to 2.1 times the rated current of the fuse - temperature rise measured after the control has been loaded for 30 min. - values 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.....:		N/A
	Controls protected both by incorporated fuses and by protective devices loaded to the lowest load (most onerous) of either test method.....:		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.....:		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**		N/A
	Meets requirement per annex H .....:		N/A

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

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Clause	Requirement + Test	Result - Remark	Verdict
	- solvents: n-hexane .....:		—
	- solvents: deionized (distilled) water .....:		—
A2	Test of indelibility of markings classified in A1.2		N/A
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		N/A
A2.4	Rubbed in the apparatus (Fig. 8) with water-soaked lint, weight 250 g, duration (s): 15 s		N/A
A2.6	Marking after these tests still legible		N/A
A3	Test of indelibility of markings classified A.1.3		N/A
A3.1	Rubbed in the apparatus (Fig. 8) with dry lint, weight 750 g, duration (s): 15 s		N/A
A3.2	Rubbed in the apparatus (Fig. 8) with water-soaked lint, weight 750 g, duration (s): 15 s		N/A
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		N/A
A3.5	Marking rubbed in apparatus with petroleum spirit soaked lint, weight 750 g, duration (s): 15 s		N/A
A3.7	Marking after these tests still legible		N/A

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

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

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Clause	Requirement + Test	Result - Remark	Verdict
	- 75 ± 2°C, or .....:		—
	- as declared (°C) .....:		—
G.5.2	Ball-pressure test 2		N/A
	Temperature during ball pressure test is Tb ± 2 °C where Tb is equal to the higher of:		N/A
	- Tb (°C): 100 °C if Tmax = 30-54 °C .....:		—
	- Tb (°C): 125 °C if Tmax = 55-84 °C.....:		—
	- Tb (°C): (Tmax + 40) °C if Tmax 〈 85 °C .....:		—
	- Tb (°C): 20 K in excess of the max. temperature during tests of Cl. 14 (°C), if higher.....:		—
H	**ANNEX H – REQUIREMENTS FOR ELECTRONIC CIRCUITS**		P
H.6	Classification, additions:		—
H.6.4.3.13	- electronic disconnection on operation (Type 1.Y - 2.Y) .....:		—
H.6.9.5	- electronic disconnection		N/A
H.6.18	Class of control function (A, B, C).....:	Class B	—
H.7	**Information in addition to Table 1 provided**		P
	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) .....:	See Attachment 2 for Information provided, considered suitable for IEC60335-1 applications.	P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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) ..... :		N/A
	67 - Program documentation; clause: H11.12.2.9, H11.12.2.12; (Method: X) ..... :		N/A
	68 - Software fault analysis; clause: H11.12, H27.1.1.4; (Method: X) ..... :		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) ..... :		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) ..... :		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) ..... :		N/A
	72 - Control response(s) in case of detected fault/error; clause: H.11.12.2.7; (Method: X) ..... :		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

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Clause	Requirement + Test	Result - Remark	Verdict
	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**		N/A
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:		N/A
	- 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 ..... :		N/A
	- 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**		N/A
H.11.2.5	Protection against electric shock – protective impedance (chain):		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:		P
H.11.4.16	- Type 1.Y and 2.Y action provides electronic disconnection.	2.Y; decleration only	P
H.11.4.16.1	Test carried out with control:		P
	- connected to maximum load		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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**.....:		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) .....:		—

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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**		N/A
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		N/A
	Free-standing, independently mounted and in-line cord controls for use with ISM equipment comply with CISPR 11		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
H.25	**Normal operation**		N/A
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		N/A
H.27	**Abnormal operation**		P
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:		N/A
	- electronic circuit is a low-power circuit and	Not low-power	N/A
	- protection against electric shock, fire hazard or dangerous malfunction does not rely on the correct functioning of the electronic circuit		N/A
	- measurement of low-power circuit according to Cl. H.27.1.1.1 ..... :		N/A
	- 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)		N/A
H.27.1.1.2	Operating conditions:		N/A
	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) fuse (supply), rating (A) such that test result not influenced by operation of the fuse .....:		—
	e) actuating member in the most unfavourable position .....:		—
H.27.1.1.3	Requirements, evaluation of compliance:		N/A
	a) no emission of flames or hot metal or hot plastics		N/A
	b) temperature of supplementary and reinforced insulation:		N/A
	- not exceeding 1.5 times value specified in Cl. 14		N/A
	- exception: thermoplastic material		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	c) change in the output as declared in Table 1, requirement 57		N/A
	d) control continuous to comply with requirements of Cl. 8 and Cl. 13.2 for basic insulation		N/A
	e) no deterioration of parts that would result in failure to comply with requirements of Cl. 20		N/A
	f) no rupture of fuse use supply, or		N/A
	- rupture with operation of an internal protecting device		N/A
	Internal protecting device not required since sample, after replacement of the fuse in the supply, complied:		N/A
	- with a), b) and d) of H.27.1.1.3		N/A
	- with requirements of Cl. 20 for accessible distances from active parts to accessible surfaces (control mounted as for its intended use)		N/A
	g) output waveform as declared in Table 1, requirement 56		N/A
H.27.1.1.5	Electronic circuit fault conditions per table H.24.....:	See attached TABLE H27.1; See Attachment 3	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		N/A
	- locked rotor rating declared	See details in Main Test Report, Clause 19.7.	P
	2) fault conditions introduced	See Attachments 2 and 3	P
	3) test conditions per H.27.1.2	See Attachments 2 and 3	P
	a) unfavourable voltage (V) .....:		—
	c) ambient temperature (°C) .....:		—
	d) fuse rating (A) .....:		—
	e) actuating member .....:		—
	evaluation of compliance per H.27.1.1.3 a) to e)		N/A
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		P
	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	Failure modes of Table H.24 taken into account per Attachments 2 and 3; only pin level faults considered	P
	The system configuration is either: • inherently failsafe or		P

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Clause	Requirement + Test	Result - Remark	Verdict
	• 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		P
	The documentation is based on H.11.12.3.2	See Attachment 2 for example of Documentation	P
	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		P
	Minimum documentation provided for assessment:		P
	• A description of the system philosophy, the control flow, data flow and timings.		P
	• 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		P
	• 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		P
H.27.1.2.2.1	Design and construction requirements		P

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Clause	Requirement + Test	Result - Remark	Verdict
	A class B control function is designed such that under single fault conditions it remains in or proceeds to the defined state.	Single fault does not allow motor operation without the overcurrent protective control; see Attachment 3 for additional details; only pin level faults considered	P
	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		P
H.27.1.2.2.2	First fault		P
	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:	Single fault does not allow motor operation without the overcurrent protective control; see Attachment 3 for additional details	P
	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	See above	P
	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	See above	P
	c) the control continuous to operate, the fault is identified during the next start-up sequence, the result is a) or b); or .....:	See above	P
	d) the control remains operational in accordance with the safety related functional requirements of the relevant part 2	Functional requirements of IEC60335-1 for motor protection considered	P
H.27.1.2.2.3	Fault introduced during defined state		P
	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:	Single fault does not allow motor operation without the overcurrent protective control; see Attachment 3 for additional details	P
	a) The control remains in defined state, safety related output terminals remaining de-energized; or	Single fault does not allow motor operation without the overcurrent protective control; see Attachment 3 for additional details	P
	b) The control becomes inoperative with all safety related output terminals remaining de-energized; or	Single fault does not allow motor operation without the overcurrent protective control; see Attachment 3 for additional details	P
	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)		P

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Clause	Requirement + Test	Result - Remark	Verdict
	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
	The relevant part 2 specifies the fault reaction time as well as the applicability of c).....:		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
	The relevant part 2 specifies the fault reaction time as well as the applicability of c).....:		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

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Clause	Requirement + Test	Result - Remark	Verdict
	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		P
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.....:		—

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Clause	Requirement + Test	Result - Remark	Verdict
	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		P
	During the appraisal, it is verified that under the conditions described above, the following criteria are satisfied.		P
	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	See Attachment 2 and 3 for details	P
	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	N/A
H.27.1.2.5.3	Assessment		P
	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)	See Attachment 2 and 3 for details; only pin level faults considered	P
	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

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Clause	Requirement + Test	Result - Remark	Verdict
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.		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:		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
	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

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Clause	Requirement + Test	Result - Remark	Verdict
J.15.7.4	R/T measurement for PTC thermistors.....:		N/A
J.15.7.5	Hold current test for PTC current limiters .....:		N/A
J.15.7.6	Time-to-trip test for PTC current limiters.....:		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.....:		N/A
	b)operating condition in tripped state at rated maximum voltage and steady-state current .....:		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.....:		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 .....:		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

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Clause	Requirement + Test	Result - Remark	Verdict
	-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.....:		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……:		N/A
	-Resistance at R_1 @ T_1.....:		N/A
	-Resistance at R_2 @ T_2……..…:		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

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Clause	Requirement + Test	Result - Remark	Verdict
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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		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

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Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
J.20.1.14	Clearance		N/A
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		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
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		N/A
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		N/A
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**		N/A
N	**ANNEX N (NORMATIVE) – POLLUTION DEGREES**		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
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 wiring board conforming to requirements for type 1 coating (IEC 60664-3): complies with creepage requirements of Cl. 20, pollution degree 1		N/A
Q.2	Printed wiring board conforming to requirements for type 2 coating (IEC 60664-3): complies with requirements for solid insulation, Cl. 20.3		N/A
Q.3	Samples: production printed boards or standard test boards (figs. Q.1 and Q.2) used:		N/A
	- Thirteen (13) samples for type 1		N/A
	- Seventeen (17) samples for type 2		N/A
Q.4 + Q5	Compliance for type 1 or 2 coating: checked by tests of IEC 60664-3:2003, Amendment 1:2010, Cl. 5 with test levels or conditions specified in Cl. Q.5		N/A
T	**ANNEX T (NORMATIVE) - REQUIREMENTS FOR SELV AND PELV**		N/A
T.2	Protection against electric shock by SELV or PELV		N/A
T.2.1	SELV - Protection against electric shock is provided by the following measures:		N/A
	– limitation of voltage, ELV according to T.3.1 in a circuit (the SELV-system), and		N/A
	– protective-separation, according to T.3.2, of the SELV-system from all circuits other than SELV and PELV, and		N/A
	– simple-separation, according to T.3.3, of the SELV-system from other SELV-systems, from PELV-systems and from earth		N/A
	Intentional connection of exposed-conductive-parts of the control to a protective conductor or to an earth-conductor is not permitted		N/A
	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:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	– 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		N/A
	– 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 provides that the voltage between simultaneously accessible parts does not exceed relevant ELV limits as specified in 2.1.4 and as specified in 8.1.1.		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

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Clause	Requirement + Test	Result - Remark	Verdict
	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

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Clause	Requirement + Test	Result - Remark	Verdict
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

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Clause	Requirement + Test	Result - Remark	Verdict
	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

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Clause	Requirement + Test	Result - Remark	Verdict

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:				

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

10.1.9.1	**TABLE: Clamping reliability of the terminals**		N/A
	Applied torque, 2/3 of values in Table 20 (Nm)..... :		—
	Pull force (N) ..... :		—

terminal No.	fixed wiring		flexible conductor		Conductor movement
	smallest (mm)	largest (mm)	smallest (mm)	largest (mm)	

Supplementary information:

10.2.1	**TABLE: Connection of conductors**	N/A
terminal No.	nominal current (A)	cross-sectional area (mm^2)

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:

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

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:				

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Clause	Requirement + Test	Result - Remark	Verdict

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**				N/A
Test location/circuit	Type of insulation	Type/model	Working voltage, (V)	Test voltage (V)	Flashover/breakdown (Yes/No)
Supplementary information:					

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

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**			N/A
thermocouple locations	max. temperature measured, (°C)	temperature limit, (°C)	Verdict	

Supplementary information:

15.2 a)	**TABLE: Manufacturing deviation**				N/A
Condition	Sample Nos.	Declared values		Measured values	
		open	close	open	close

Supplementary information:

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

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**				N/A
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					
resistive or inductive (6.2.2), making					
resistive or inductive (6.2.2), breaking					
declared specific load (6.2.3), making					
declared specific load (6.2.3), breaking					
20 mA load (6.2.4), making & breaking					
declared motor load (6.2.5), making					
declared motor load (6.2.5), breaking					
pilot duty load (6.2.6), making					
pilot duty load (6.2.6), breaking					
Supplementary information:					

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

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:			

18.2.1	**TABLE: Impact resistance**		N/A
Impacts per surface	Surface tested	Impact energy (Nm)	Verdict
Supplementary information:			

19.1.15	**TABLE: Threaded part torque test**			N/A
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Torque (Nm)	Verdict
Supplementary information:				

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

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

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)
full disconnection						
micro-disconnection						
electronic disconnection						

Supplementary information:
Abbreviations for types of insulation: F - functional, B - basic, S – supplementary, R – reinforced
See Main Test Report for additional details.

21A	**TABLE: Ball Pressure Test and Tracking Test**					P
Ball Pressure max. allowed impression diameter (mm) ..... :				2		—
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
Molding material, epoxy, Type CEL-8240HF (10GK)	Hitachi Chemical	184	0.3	600	>600	P

Supplementary information:
PTI results are from VDE testing of material with report kept on file.

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

21A	**TABLE: Resistance to heat and fire - Glow wire tests**								**N/A**
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**		
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:				

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

24.1 / 24.2	**TABLE: List of critical components**				N/A
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1]
See Main Test Report					

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:

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

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:				

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

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:		

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict

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
See Attachment 3												

Supplementary information:
See Attachments 2 and 3 for details.

List of test equipment used:

A completed list of used test equipment shall be provided in the Test Reports when a Customer's Testing Facility according to CTF stage 1 or CTF stage 2 procedure has been used.
Note: This page may be removed when CTF stage 1 or CTF stage 2 are not used. See also clause 4.8 in OD 2020 for more details.

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
N/A; Informative Report/ Testing	N/A; Informative Report/Testing	N/A; Informative Report/Testing	N/A; Informative Report/Testing	N/A; Informative Report/Testing	N/A; Informative Report/Testing