



Test Report issued under the responsibility of:



**TEST REPORT**  
**IEC 60730-1**  
**Automatic electrical controls**

**Report Number..... :** 105214442DAL-001  
**Date of issue ..... :** 2022-10-24; M1: 2023-08-15; M2: 2024-05-30; M3: 2025-02-26  
**Total number of pages ..... :** 20

**Name of Testing Laboratory preparing the Report ..... :** Intertek Testing Services NA, Inc.  
1809 10th St. Suite 400  
Plano, TX 75074  
United States of America

**Applicant's name ..... :** Rain Bird Corporation  
**Address ..... :** Controls Manufacturing Division (83857)  
9491 Ridgehaven Court, San Diego, CA 92123, USA

**Test specification:**

**Standard ..... :** IEC 60730-1:2013, AMD1:2015, AMD2:2020  
**Test procedure..... :** CB Scheme  
**Non-standard test method..... :** N/A

**TRF template used..... :** IECEE OD-2020-F1:2020, Ed.1.3  
**Test Report Form No..... :** IEC60730\_1K  
**Test Report Form(s) Originator.... :** UL(US)  
**Master TRF ..... :** 2020-08-14

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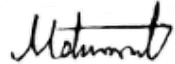
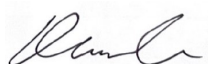
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**General disclaimer:**

The test results presented in this report relate only to the object tested.  
This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

<b>Test item description..... :</b>	Electronic Lawn Sprinkler Control	
<b>Trade Mark..... :</b>		
<b>Manufacturer..... :</b>	Rain Bird Corporation Controls Manufacturing Division (83857)	
<b>Model/Type reference..... :</b>	RC2I4-230, RC2I6-230, RC2I8-230 TM2I4-230, TM2I6-230, TM2I8-230, TM2I12-230, TRU6I-230V TM2I4-ARG, TM2I6-ARG, TM2I8-ARG, TM2I12-ARG, ARC6I-230V	
<b>Ratings..... :</b>	24 VAC, 50-60 Hz, 600 mA Class III, IPX0, Maximum elevation use: 2000m, Rated operating ambient: -10°C to 50°C Disconnection type. Type 1. Y	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/> <b>CB Testing Laboratory:</b>	Intertek Testing Services NA, Inc.	
<b>Testing location/ address..... :</b>	1809 10th Street Suite 400 Plano TX, 75074 United States of America	
<b>Tested by (name, function, signature)..... :</b>	Maryam Mahmoodi [Project handler]	
<b>Approved by (name, function, signature)..... :</b>	Dylan Karach [Reviewer]	
<input type="checkbox"/> <b>Testing procedure: CTF Stage 1:</b>	N/A	
<b>Testing location/ address..... :</b>		
<b>Tested by (name, function, signature)..... :</b>		
<b>Approved by (name, function, signature).... :</b>		
<input type="checkbox"/> <b>Testing procedure: CTF Stage 2:</b>	N/A	
<b>Testing location/ address..... :</b>		
<b>Tested by (name + signature)..... :</b>		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature).... :</b>		
<input type="checkbox"/> <b>Testing procedure: CTF Stage 3:</b>	N/A	
<input type="checkbox"/> <b>Testing procedure: CTF Stage 4:</b>	N/A	
<b>Testing location/ address..... :</b>		
<b>Tested by (name, function, signature)..... :</b>		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature).... :</b>		
<b>Supervised by (name, function, signature) :</b>		

**List of Attachments (including a total number of pages in each attachment):**

This Modification Report 105214442DAL-001, M3: 2025-03-07, to the original Report 105214442DAL-001 contains 20 Report Pages.

**Summary of testing:****Tests performed (name of test and test clause):**

Test:	Clause
Impact test	18
Ball pressure and glow wire	21

**Testing location:**

Intertek Testing Services NA, Inc.  
1809 10th St. Suite 400  
Plano, TX 75074  
United States of America

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

EN

The following countries have no published national differences to IEC 60730-1:

AU/NZ, DZ, CN, IN, ID, JO, MY, MA, NG, PK, PH, SG, ZA, LK, TH, VN, AR, BR, CL, PE, BH, EG, IQ, KW, OM, QA, SA, AE, BY, EE, GE, KZ, LV, LT, MD, RU, RS, TR, UA, AT, BE, BA, BG, HR, CY, CZ, GR, HU, IE, IL, LU, MT, ME, NL, PL, PT, RO, SI, SK, ES, CH, TN, TR.

The product fulfils the requirements of EN 60730-1:2016 + A1:2019 + A2:2022.

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

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

**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.

**RC MODELS (INDOOR USE ONLY)**

Artworks below are representative of all models.

**●LAWN SPRINKLER CONTROL**

MODEL: **RC214-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA. | Imported in EU by RAIN BIRD EUROPE, Bât. A, Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.



-01 A

DDMMYY-13

**●LAWN SPRINKLER CONTROL**

MODEL: **RC216-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA. | Imported in EU by RAIN BIRD EUROPE, Bât. A, Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.



-02 A

DDMMYY-13

**●LAWN SPRINKLER CONTROL**

MODEL: **RC218-230**

INPUT: 24V~ 50-60 Hz 0.600 A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA. | Imported in EU by RAIN BIRD EUROPE, Bât. A, Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.



-03 A

DDMMYY-13

**TM MODELS (INDOOR USE ONLY)****●LAWN SPRINKLER CONTROL**

MODEL: **TRU61-230V**

INPUT: 24V~ 50-60 Hz 0.600 A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA. | Imported in EU by RAIN BIRD EUROPE, Bât. A, Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.



-01 A

DDMMYY-13

<p>● <b>LAWN SPRINKLER CONTROL</b>  <b>MODEL: TM214-230</b>  INPUT: 24V~ 50-60 Hz 0.600A  OUTPUT: 24V~ 50-60 Hz 0.550 A  FOR INDOOR USE ONLY  MADE IN MEXICO  USE RAIN BIRD TRANSFORMER P/N 690475-01  RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA.   Imported in EU by RAIN BIRD EUROPE, Bât. A,  Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.</p>					<p>-01 A</p> <p>DDMMYY-13</p>
<p>● <b>LAWN SPRINKLER CONTROL</b>  <b>MODEL: TM216-230</b>  INPUT: 24V~ 50-60 Hz 0.600A  OUTPUT: 24V~ 50-60 Hz 0.550 A  FOR INDOOR USE ONLY  MADE IN MEXICO  USE RAIN BIRD TRANSFORMER P/N 690475-01  RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA.   Imported in EU by RAIN BIRD EUROPE, Bât. A,  Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.</p>					<p>-02 A</p> <p>DDMMYY-13</p>
<p>● <b>LAWN SPRINKLER CONTROL</b>  <b>MODEL: TM218-230</b>  INPUT: 24V~ 50-60 Hz 0.600A  OUTPUT: 24V~ 50-60 Hz 0.550 A  FOR INDOOR USE ONLY  MADE IN MEXICO  USE RAIN BIRD TRANSFORMER P/N 690475-01  RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA.   Imported in EU by RAIN BIRD EUROPE, Bât. A,  Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.</p>					<p>-03 A</p> <p>DDMMYY-13</p>
<p>● <b>LAWN SPRINKLER CONTROL</b>  <b>MODEL: TM2112-230</b>  INPUT: 24V~ 50-60 Hz 0.600A  OUTPUT: 24V~ 50-60 Hz 0.550 A  FOR INDOOR USE ONLY  MADE IN MEXICO  USE RAIN BIRD TRANSFORMER P/N 690475-01  RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA.   Imported in EU by RAIN BIRD EUROPE, Bât. A,  Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.</p>					<p>-04 A</p> <p>DDMMYY-13</p>

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

<b>Test Item Particulars .....</b> :	
<b>Classification of installation and use .....</b>	Indoor use, type 1.Y, class III, PD2, OCIII
<b>Supply Connection .....</b>	24VAC from CB certified Transformer, Type M attachment
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing .....</b>	P
<b>Date of receipt of test item .....</b>	2025-02-19
<b>Date (s) of performance of tests .....</b>	2025-02-19 to 2025-02-26
<b>General remarks:</b>	
<p>"(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.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC60730-1:</b>	
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 .....	<input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>Not applicable</b>
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies) .....</b> : Ensamblés Hyson, S.A. de C.V. Ave. Noruega D 2, Rubio, Tijuana, Baja California, 22116 MEXICO  Ensamblés Hyson, S.A. de C.V. Cda. Laguna Mainar 5501, Lago Sur, Tijuana, Baja California, 22217 MEXICO.	

**General product information and other remarks:**

The Rainbird models RC2I4-230, RC2I6-230, RC2I8-230, TM2I4-230, TM2I6-230, TM2I8-230, TM2I12-230, TRU6I-230V, TM2I4-ARG, TM2I6-ARG, TM2I8-ARG, TM2I12-ARG are programmable sprinkler controls that activates and deactivates remotely located valves that supply water to irrigation zones of the lawn. The Controller supplies a voltage of 24V~ to the solenoids of the valves. The Controller is provided with 1 master valve output and multiple zone outputs. The master valve output and only one zone output can be activated at a given time. The RC2 models are provided with Wi-Fi and Bluetooth communication capabilities for its operation and programming. The intended application is medium scale residential or commercial installations, designed for Indoor installation.

**Model numbers are as follows:**

RC2Ix-230

x: can be 4, 6, 8 for different output station number

TM2Ix-230, TM2Ix-ARG

x: can be 4, 6, 8, 12 for different output station number

**Model Differences:**

Models TM2Ix-230, TM2Ix-ARG, TRU6I-230V have same control circuits, enclosure material, and connection type. The difference in the TRU6I-230V model is an updated LCD, wire cover, and enclosure artwork.

The RC2 models are provided with Wi- Fi and Bluetooth communication capabilities for its operation and programming.

The power to the Controllers RC2Ix-230, TM2Ix-230, TRU6I-230V, is supplied by an IEC 61558-2-6 Certified Transformer- Model XY- 24000650CE (with a type C plug).

The power to the Controllers TM2Ix-ARG, is supplied by an IEC 61558-2-6 Certified Transformer- Model XY-24000650AG (with a type I plug).

**Modification 1 Report:**

The original Test Report Ref. No. 105214442DAL-001, dated 2022-10-24 was modified on 2023-08-15 to include the following:

- **In general product information and other remarks:** Added model differences and model numbers sections
- **In copy of marking plate:** Added markings for TRU6I-230V model which comes with the following LCD:

**LCD SPECIFICATIONS**

Module size: 68.00mm(L)\*39.00mm(W)\*12.57mm(H)

Viewing area: 59.50mm(MIN)(L)\*28.50mm(MIN)(W)

Weight: Approx. (18.4g)

Operating Voltage: 5.0 VDC

Operating Temperature: -10°C to 65°C

LCD component not considered as a critical component.

No testing was performed in this modification. This report is not valid without original Intertek CB report 105214442DAL-001, dated 2022-10-24.

**Modification 2 Report:**

The original Test Report Ref. No. 105214442DAL-001, dated 2022-10-24 was modified on 05-30-2024 to

add model ARC6I-230V. Model ARC6I-230V is electrically and mechanically equivalent to model RC2I6-230, which already had been evaluated under this report, except for a different faceplate artwork.

No testing was performed in this modification. This report is not valid without original Intertek CB report 105214442DAL-001, dated 2022-10-24.

**Modification 3 Report:**

The original Test Report Ref. No. 105214442DAL-001, dated 2022-10-24 was modified on 2025-03-07 to include the following changes and/or additions, which were considered technical modifications:

- Added an alternative enclosure material manufacturer SABIC INNOVATIVE PLASTICS US LLC-model (ABS) BDT5510 to the critical component list. Testing was performed for this modification.
- The temperature test (Cl. 14) was waived based on an analysis of the results from the previous temperature test, which demonstrated that the temperature did not increase significantly. Additionally, the high limit and the final recorded temperature remained substantially apart, further supporting the decision to waive the test.

This report is not valid without original Intertek CB report 105214442DAL-001, dated 2022-10-24.



IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict
<b>18</b>	<b>MECHANICAL STRENGTH</b>		P
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:		P
	- have adequate mechanical strength, or		N/A
	- are such that protection against electric shock is maintained if actuating member is broken	Button on the control panel is in SELV circuits	P
18.1.3	For integrated and incorporated controls impact resistance (18.2) tested by the equipment standard		N/A
18.1.4	Tests of 18.2 to 18.8 carried out sequentially on one sample:		P
	- tested sample: type reference .....	Refer to table 18.2.1.	—
	- Tested sample: identification No. ....	Refer to table 18.2.1.	—
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		N/A
	- 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.	No full disconnection and micro-disconnection.	N/A
	- 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	Canada and USA requirements are not considered in this report	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

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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		N/A
	enclosure material	Not a metal enclosure	—
	with supporting frame (yes / no)		—
	maximum width, maximum length		—
	thickness required; measured (mm) .....		N/A
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 $\leq 150 \text{ mm}^2$ :		N/A
	- no dimension greater than 150 mm .....		N/A
	- $\geq 2,4 \text{ mm}$ 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)	Not a free-standing control	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

IEC 60730-1			
Clause	Requirement + Test	Result - Remark	Verdict
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).....:	Not an in-line control	N/A
18.6.2	- attachment method X: flexible cord(s), smallest cross-section (Cl. 10.1.4) (mm <sup>2</sup> ), length approx. 50 mm .....		—
	- attachment M, Y or Z: cord(s) as declared or supplied, length 50 mm; cord; cross-sectional area (mm <sup>2</sup> ) .....		—
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
18.6.6	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	Not a pull cord type	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	Not a foot actuated type	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: No controls supplied with actuating member		P
	- axial pull force (N) .....	30N	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- axial push force of 30 N applied for (min) ..... :	Controls are push buttons only	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	Controls are push buttons only	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.	Controls are push buttons only	N/A

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

<b>21</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		<b>P</b>
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		N/A
21.2.1	Accessible parts (control correctly mounted):		P
	- ball-pressure test 1 (G.5.1) at temperature (°C) ...:	See attached TABLE 21 75 °C for enclosure	—
	diameter of the impression ≤ 2.0mm (mm) .....	See attached TABLE 21	P
	- glow-wire test (G2.) at 550 °C .....	Enclosure considered See attached TABLE 21	P
21.2.2	Parts retaining current-carrying parts in position (other than electrical connections):		N/A
	- ball-pressure test 2 (G.5.2) at temperature (°C) ...:		—
	diameter of the impression ≤ 2.0mm (mm) .....		N/A
	- glow-wire test (G2.) at 550°C .....		N/A
21.2.3	Parts maintaining or retaining electrical connections in position:		P
	- ball-pressure test 2 at temperature (°C).....:	125°C for terminal block	—
	diameter of the impression ≤ 2.0mm (mm) .....	See attached TABLE 21	P
	Glow-wire temperature levels according to IEC 60695-2-11		N/A
	- glow-wire test (G2.) at 650 °C .....		N/A
	- glow-wire test (G2.) at 750 °C .....		N/A
	- glow-wire test (G2.) at 850 °C .....	Pillar terminal block considered	P
21.2.4	Other parts (except small parts unlikely to be ignited):		N/A
	- glow-wire test (G2.) at 550 °C .....		N/A
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 .....		N/A
	Controls designed for operation at ELV levels were not subjected to a tracking test.		N/A
21.3	Independently mounted controls		P
21.3.1	Preconditioning		P
	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:		P

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

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

<b>18.2.1</b>	<b>TABLE: Impact resistance</b>		P
Impacts per surface	Surface tested	Impact energy (Nm)	Verdict
3	Front Panel	0.5	P
3	Bottom cover	0.5	P
3	Enclosure back	0.5	P

Supplementary information:

<b>Environmental Conditions:</b>	Humidity (%RH):	37.7
	Pressure (mbar):	987.2
	Temperature (°C):	23.4
<b>Test Equipment Asset ID#:</b>	5841; 5168;	
<b>Test Date:</b>	2025-02-26	
<b>Sample ID:</b>	DAL21761	

<b>21A</b>	<b>TABLE: Ball Pressure Test and Tracking Test</b>					P
Ball Pressure max. allowed impression diameter (mm) ..... :					2.0	—
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
Enclosure	SABIC INNOVATIVE PLASTICS US LLC- (ABS) BDT5510	75	1.05	--	--	P

Supplementary information:

<b>Environmental Conditions:</b>	Humidity (%RH):	37.6
	Pressure (mbar):	988.7
	Temperature (°C):	23.3
<b>Test Equipment Asset ID#:</b>	5841; 4444; 4444-1;5753; 5294; 1335; 3478; Re-92; 5334; 896;	
<b>Test Date:</b>	2025-02-26	
<b>Sample ID:</b>	DAL21760	

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

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		
Enclosure	SABIC INNOVATIVE PLASTICS US LLC- (ABS) BDT5510	x	N/A	N/A	N/A	N/A	N/A	P
Object/ Part No./ Material	Manufacturer/ trademark	Glow-wire flammability index (GWFI), °C				GW ignition temp. (GWIT), °C		Verdict
		550	650	750	850	675	775	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
The test specimen passed the glow wire test (GWT) with no ignition [(te – ti) ≤ 2s] (Yes/No):								Yes
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No)..... :								N/A
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)?..... :								N/A
Ignition of the specified layer placed underneath the test specimen (Yes/No)..... :								N/A
Supplementary information:								
Environmental Conditions:		Humidity (%RH):		37.3				
		Pressure (mbar):		986.2				
		Temperature (°C):		23.4				
Test Equipment Asset ID#:		5841; 5753; 5170; 5294;						
Test Date:		2025-02-26						
Sample ID:		DAL21761						



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

24.1 / 24.2	TABLE: List of critical components				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1</sup>
Controller Enclosure	LOTTE CHEMICAL CORPORATION	(ABS) "STAREX" /HP- 0500	Min thickness 2.0 mm, Color: gray, HB75	IEC 60730-1 Cl. (14, 18, 21)	Tested in appliance
	SABIC INNOVATIVE PLASTICS US LLC	(ABS) BDT5510	Min thickness 2.0 mm, Color: gray; GWT: 550 C; BP: 75 C.	IEC 60730-1 Cl. (18, 21)	Tested in appliance
Alternate Controller Enclosure	LG CHEM LTD	ABS / HI121	Min thickness 2.0 mm, Color: gray, HB75	IEC 60695-11-10	UL
	CHI MEI CORPORATION	(ABS) "POLYLAC"/ PA- 747	Min thickness 2.0 mm, Color: gray, HB75	IEC 60695-11-10	UL
Control board components RC2 Series					
Varistor LP1 (if LP3 not installed)	TDK	CT2220K30G (B72540E0300K 062)	-55 to +150 °C Clamping voltage: 35- 290V Current: 2 to 1200A, 8/20 μs waveform Voltage: 10 to 40VAC	IEC 60730-1 Cl (14, H27) IEC6100-4-5 Cl (13)	Tested in the appliance
Varistor LP3 (if LP1 not installed)	Meritek	MVR10D820K	50 V, 3500 A (8/20 μs), T 105°C Clamping voltage 130°C	UL 1449 IEC/EN 61051-1, IEC 61051-2-2	UL E326004  VDE 40013638
	TDK	S10K50 (B72210S0500K 101)	-40 to +105 °C Clamping voltage: 135V max Current: 2500A, 8/20 μs waveform Voltage: 50VAC	IEC61051-1 IEC61051-2	UL E321126  VDE
Alternate LP1, LP3	Interchangeable	Interchangeable	-40 to +105 °C Clamping voltage: min. 135V max	IEC61051-1 IEC61051-2	UL, VDE

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

24.1 / 24.2	TABLE: List of critical components				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1</sup>
Triac	Littelfuse	MAC4DHMT4G	4.0 A on state current, on voltage 1.3-1.6 V, 93°C	EN/IEC 60730-1 (cl. 12, 13, 14, 16)	Test in appliance
	Interchangeable	Interchangeable	Minimum 4.0 A on state current, minimum on voltage 1.3V, minimum 93°C	EN/IEC 60730-1	--
Voltage regulator U5	Texas Instruments	LM337KVURG3	Vi-Vo=-3 to -40 V, Io=10 mA to 1.5 A, 125°C	EN/IEC 60730-1	Tested in appliance UL
	Interchangeable	Interchangeable	Vi-Vo=-3 to -40 V, Io=10 mA to 1.5 A, 125°C	EN/IEC 60730-1	--
PWB (bare board)	Rain Bird Corp	PCB ASSY	94 V-0, 130°C Min. thickness: 1.397mm	UL 796	UL E152990
	Techigh Circuit Technology (Huizhou) Co Ltd	Model D	94 V-0, 130°C Min. thickness: 1.397 mm	UL 796	UL E202404
	Jiangsu Combo Electronic Technology Co Ltd	CB-D-1	94 V-0, 130°C Min. thickness: 1.397 mm	UL 796	UL E307203
	Interchangeable	Interchangeable	94 V-0, 130°C Min. thickness: 1.397 mm	UL 796	UL
Control board components TM2 Series					
Varistor LP1	EPCOS (TDK)	S10K50GS2R5 (B72210S0500 K2 12V87)	50 Vac, 2500 A (8/20 µs), T 105°C	IEC 61051-1/-2, IEC 61051-2-2	VDE 40027582
Varistor LP1 (alternate)	Meritek	MVR10D820K	50 V, 3500 A (8/20 µs), T 105°C	UL 1449 IEC/EN 61051-1, IEC 61051-2-2	UL E326004 VDE 40013638
	Interchangeable	Interchangeable	50 V, min. 2500 A (8/20 µs), T 105°C	IEC 61051-1/-2, IEC 61051-2-2	--
Voltage regulator U5	Texas Instruments	LM337KVURG 3	Vi-Vo=-3 to -40 V, Io=10 mA to 1.5 A, 125°C	EN/IEC 60730-1 (cl. 12, 13, 14, 16)	Test in appliance
	Interchangeable	Interchangeable	Vi-Vo=-3 to -40 V, Io=10 mA to 1.5 A, 125°C	EN/IEC 60730-1 (cl. 12, 13, 14, 16)	--

IEC 60730-1					
Clause	Requirement + Test		Result - Remark		Verdict
24.1 / 24.2	TABLE: List of critical components				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1</sup>
Triac	Littelfuse	MAC4DHMT4G	4.0 A on state current, on voltage 1.3-1.6 V, 93°C	EN/IEC 60730-1 (cl. 12, 13, 14, 16)	Test in appliance
	Interchangeable	Interchangeable	Minimum 4.0 A on state current, minimum on voltage 1.3V, minimum 93°C	EN/IEC 60730-1	--
F1 PTC	Meritek	MPTS1206L010R	60V, hold current 0.1A, trip current 0.25 A. 85°C.	ANSI/UL 60730-1 EN 60738-1	UL E223037 TUV Rh R50223766
	Interchangeable	Interchangeable	60V, hold current 0.1A, trip current 0.25 A. 85°C.	ANSI/UL 60730-1 EN 60738-1	---
PWB	Rain Bird Corp (JIANGSU COMBO ELECTRONIC TECHNOLOGY CO LTD for fabric)	PCB assy	94 V-0, 130°C	UL 796	UL E307203
Alternate PWB	Rain Bird Corp (Yan Tat Technology Ltd for fabric)	PCB assy	94 V-0, 130°C	UL 796	UL E152990
	Interchangeable	Interchangeable	Minimum 94 V- 0, Minimum 130°C	UL 796	--
Coin cell Battery	Panasonic	CR2032	Lithium coin cell battery, 3V, 230 mAh max, 60°C max	UL 1642	UL MH12210
	Interchangeable	Interchangeable	Lithium coin cell battery, 3V, 230 mAh max, 60°C max	UL 1642	UL
Output connector (black for station 9- 12)	Switchlab Inc	T32-BS11-04Z1	94 V-0, 120°C, 300V, 15A	UL 1863 EN/IEC 60730-1 (cl. 12, 13, 14, 16)	UL E167040, Tested in appliance
	Interchangeable	Interchangeable	94 V-0, 120°C, 300V, 15A	UL 1863 EN/IEC 60730-1 (cl. 12, 13, 14, 16)	--

IEC 60730-1						
Clause	Requirement + Test			Result - Remark		Verdict
24.1 / 24.2	TABLE: List of critical components					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1</sup>	
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						



Test Report issued under the responsibility of:



**TEST REPORT**  
**IEC 60730-1**  
**Automatic electrical controls**

**Report Number..... :** 105214442DAL-001  
**Date of issue ..... :** 2022-10-24; M1: 2023-08-15; M2: 2024-05-30  
**Total number of pages ..... :** 7

**Name of Testing Laboratory**  
**preparing the Report ..... :** Intertek Testing Services NA, Inc.  
1809 10th St. Suite 400  
Plano, TX 75074  
United States of America

**Applicant's name..... :** Rain Bird Corporation  
**Address ..... :** Controls Manufacturing Division (83857)  
9491 Ridgehaven Court, San Diego, CA 92123, USA

**Test specification:**

**Standard ..... :** IEC 60730-1:2013, AMD1:2015, AMD2:2020  
**Test procedure..... :** CB Scheme  
**Non-standard test method..... :** N/A

**TRF template used..... :** IECEE OD-2020-F1:2020, Ed.1.3  
**Test Report Form No..... :** IEC60730\_1K  
**Test Report Form(s) Originator.... :** UL(US)  
**Master TRF ..... :** 2020-08-14

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

**General disclaimer:**

The test results presented in this report relate only to the object tested.  
This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

<b>Test item description..... :</b>	Electronic Lawn Sprinkler Control	
<b>Trade Mark..... :</b>		
<b>Manufacturer .....</b>	Rain Bird Corporation Controls Manufacturing Division (83857)	
<b>Model/Type reference .....</b>	RC2I4-230, RC2I6-230, RC2I8-230 TM2I4-230, TM2I6-230, TM2I8-230, TM2I12-230, TRU6I-230V TM2I4-ARG, TM2I6-ARG, TM2I8-ARG, TM2I12-ARG, ARC6I-230V	
<b>Ratings .....</b>	24 VAC, 50-60 Hz, 600 mA Class III, IPX0, Maximum elevation use: 2000m, Rated operating ambient: -10°C to 50°C Disconnection type. Type 1. Y	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/> <b>CB Testing Laboratory:</b>	Intertek Testing Services NA, Inc.	
<b>Testing location/ address..... :</b>	1809 10th Street Suite 400 Plano TX, 75074 United States of America	
<b>Tested by (name, function, signature)..... :</b>	Maryam Mahmoodi [Project handler]	
<b>Approved by (name, function, signature)..... :</b>	Steven Sorrentino [Reviewer]	
<input type="checkbox"/> <b>Testing procedure: CTF Stage 1:</b>	N/A	
<b>Testing location/ address..... :</b>		
<b>Tested by (name, function, signature)..... :</b>		
<b>Approved by (name, function, signature).... :</b>		
<input type="checkbox"/> <b>Testing procedure: CTF Stage 2:</b>	N/A	
<b>Testing location/ address..... :</b>		
<b>Tested by (name + signature) .....</b>		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature).... :</b>		
<input type="checkbox"/> <b>Testing procedure: CTF Stage 3:</b>	N/A	
<input type="checkbox"/> <b>Testing procedure: CTF Stage 4:</b>	N/A	
<b>Testing location/ address..... :</b>		
<b>Tested by (name, function, signature) .....</b>		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature).... :</b>		
<b>Supervised by (name, function, signature) :</b>		

<b>List of Attachments (including a total number of pages in each attachment):</b> None.	
<b>Summary of testing:</b> No testing was performed in Modification 1.	
<b>Tests performed (name of test and test clause):</b>  No testing was performed in Modification 2.	<b>Testing location:</b>  N/A
<b>Summary of compliance with National Differences (List of countries addressed):</b> EN	
<b>Statement concerning the uncertainty of the measurement systems used for the tests</b> (May be required by the product standard or client)  <input type="checkbox"/> <b>Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:</b> <b>Procedure number, issue date and title:</b>  Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.  <input checked="" type="checkbox"/> <b>Statement not required by the standard used for type testing</b> <small>(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)</small>	

**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.

**RC MODELS (INDOOR USE ONLY)**

Artworks below are representative of all models.

**●LAWN SPRINKLER CONTROL**

MODEL: **RC214-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA. | Imported in EU by RAIN BIRD EUROPE, Bât. A, Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.



-01 A

DDMMYY-13

**●LAWN SPRINKLER CONTROL**

MODEL: **RC216-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA. | Imported in EU by RAIN BIRD EUROPE, Bât. A, Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.



-02 A

DDMMYY-13

**●LAWN SPRINKLER CONTROL**

MODEL: **RC218-230**

INPUT: 24V~ 50-60 Hz 0.600 A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA. | Imported in EU by RAIN BIRD EUROPE, Bât. A, Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.



-03 A

DDMMYY-13

**TM MODELS (INDOOR USE ONLY)****●LAWN SPRINKLER CONTROL**

MODEL: **TRU61-230V**

INPUT: 24V~ 50-60 Hz 0.600 A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA. | Imported in EU by RAIN BIRD EUROPE, Bât. A, Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.



-01 A

DDMMYY-13



<p>● <b>LAWN SPRINKLER CONTROL</b>  <b>MODEL: TM214-230</b>  INPUT: 24V~ 50-60 Hz 0.600A  OUTPUT: 24V~ 50-60 Hz 0.550 A  FOR INDOOR USE ONLY  MADE IN MEXICO  USE RAIN BIRD TRANSFORMER P/N 690475-01  RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA.   Imported in EU by RAIN BIRD EUROPE, Bât. A,  Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.</p>	    <div data-bbox="1315 241 1429 399"> -01 A    DDMMYY-13 </div>
<p>● <b>LAWN SPRINKLER CONTROL</b>  <b>MODEL: TM216-230</b>  INPUT: 24V~ 50-60 Hz 0.600A  OUTPUT: 24V~ 50-60 Hz 0.550 A  FOR INDOOR USE ONLY  MADE IN MEXICO  USE RAIN BIRD TRANSFORMER P/N 690475-01  RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA.   Imported in EU by RAIN BIRD EUROPE, Bât. A,  Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.</p>	    <div data-bbox="1315 567 1429 724"> -02 A    DDMMYY-13 </div>
<p>● <b>LAWN SPRINKLER CONTROL</b>  <b>MODEL: TM218-230</b>  INPUT: 24V~ 50-60 Hz 0.600A  OUTPUT: 24V~ 50-60 Hz 0.550 A  FOR INDOOR USE ONLY  MADE IN MEXICO  USE RAIN BIRD TRANSFORMER P/N 690475-01  RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA.   Imported in EU by RAIN BIRD EUROPE, Bât. A,  Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.</p>	    <div data-bbox="1315 892 1429 1050"> -03 A    DDMMYY-13 </div>
<p>● <b>LAWN SPRINKLER CONTROL</b>  <b>MODEL: TM2112-230</b>  INPUT: 24V~ 50-60 Hz 0.600A  OUTPUT: 24V~ 50-60 Hz 0.550 A  FOR INDOOR USE ONLY  MADE IN MEXICO  USE RAIN BIRD TRANSFORMER P/N 690475-01  RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA.   Imported in EU by RAIN BIRD EUROPE, Bât. A,  Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.</p>	    <div data-bbox="1315 1218 1429 1375"> -04 A    DDMMYY-13 </div>

<b>Test Item Particulars .....</b> :	
<b>Classification of installation and use .....</b> :	Indoor use, type 1.Y, class III, PD2, OCIII
<b>Supply Connection .....</b> :	24VAC from CB certified Transformer, Type M attachment
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing .....</b> :	
<b>Date of receipt of test item .....</b> :	N/A
<b>Date (s) of performance of tests .....</b> :	N/A
<b>General remarks:</b>	
<p>"(See Enclosure #)" refers to additional information appended to the report.</p> <p>"(See appended table)" refers to a table appended to the report.</p> <p>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.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC60730-1:</b>	
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 .....	<input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>Not applicable</b>
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies) .....</b> : Ensamblés Hyson, S.A. de C.V. Ave. Noruega D 2, Rubio, Tijuana, Baja California, 22116 MEXICO  Ensamblés Hyson, S.A. de C.V. Cda. Laguna Mainar 5501, Lago Sur, Tijuana, Baja California, 22217 MEXICO.	
<b>General product information and other remarks:</b>	
The Rainbird models RC214-230, RC216-230, RC218-230, TM214-230, TM216-230, TM218-230, TM2112-230, TRU61-230V, TM214-ARG, TM216-ARG, TM218-ARG, TM2112-ARG are programmable sprinkler controls that activates and deactivates remotely located valves that supply water to irrigation zones of the lawn. The Controller supplies a voltage of 24V~ to the solenoids of the valves. The Controller is provided with 1 master valve output and multiple zone outputs. The master valve output and only one zone output can be activated at a given time. The RC2 models are provided with Wi-Fi and Bluetooth communication capabilities for its operation and programming. The intended application is medium scale residential or	

commercial installations, designed for Indoor installation.

**Model numbers are as follows:**

RC2Ix-230

x: can be 4, 6, 8 for different output station number

TM2Ix-230, TM2Ix-ARG

x: can be 4, 6, 8, 12 for different output station number

**Model Differences:**

Models TM2Ix-230, TM2Ix-ARG, TRU6I-230V have same control circuits, enclosure material, and connection type. The difference in the TRU6I-230V model is an updated LCD, wire cover, and enclosure artwork.

The RC2 models are provided with Wi-Fi and Bluetooth communication capabilities for its operation and programming.

The power to the Controllers RC2Ix-230, TM2Ix-230, TRU6I-230V, is supplied by an IEC 61558-2-6 Certified Transformer- Model XY- 24000650CE (with a type C plug).

The power to the Controllers TM2Ix-ARG, is supplied by an IEC 61558-2-6 Certified Transformer- Model XY-24000650AG (with a type I plug).

**Modification 1 Report:**

The original Test Report Ref. No. 105214442DAL-001, dated 2022-10-24 was modified on 2023-08-15 to include the following:

- **In general product information and other remarks:** Added model differences and model numbers sections
- **In copy of marking plate:** Added markings for TRU6I-230V model which comes with the following LCD:

**LCD SPECIFICATIONS**

Module size: 68.00mm(L)\*39.00mm(W)\*12.57mm(H)

Viewing area: 59.50mm(MIN)(L)\*28.50mm(MIN)(W)

Weight: Approx. (18.4g)

Operating Voltage: 5.0 VDC

Operating Temperature: -10°C to 65°C

LCD component not considered as a critical component.

No testing was performed in this modification. This report is not valid without original Intertek CB report 105214442DAL-001, dated 2022-10-24.

**Modification 2 Report:**

The original Test Report Ref. No. 105214442DAL-001, dated 2022-10-24 was modified on 05-30-2024 to add model ARC6I-230V. Model ARC6I-230V is electrically and mechanically equivalent to model RC2I6-230, which already had been evaluated under this report, except for a different faceplate artwork.

No testing was performed in this modification. This report is not valid without original Intertek CB report 105214442DAL-001, dated 2022-10-24.



Test Report issued under the responsibility of:



**TEST REPORT**  
**IEC 60730-1**  
**Automatic electrical controls**

**Report Number..... :** 105214442DAL-001  
**Date of issue ..... :** 2022-10-24; M1: 2023-08-15  
**Total number of pages ..... :** 7

**Name of Testing Laboratory**  
**preparing the Report ..... :** Intertek Testing Services NA, Inc.  
1809 10th St. Suite 400  
Plano, TX 75074  
United States of America

**Applicant's name..... :** Rain Bird Corporation  
**Address ..... :** Controls Manufacturing Division (83857)  
9491 Ridgehaven Court, San Diego, CA 92123, USA

**Test specification:**

**Standard ..... :** IEC 60730-1:2013, AMD1:2015, AMD2:2020  
**Test procedure..... :** CB Scheme  
**Non-standard test method..... :** N/A

**TRF template used..... :** IECEE OD-2020-F1:2020, Ed.1.3  
**Test Report Form No..... :** IEC60730\_1K  
**Test Report Form(s) Originator.... :** UL(US)  
**Master TRF ..... :** 2020-08-14

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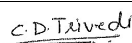
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**General disclaimer:**

The test results presented in this report relate only to the object tested.  
This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

<b>Test item description..... :</b>	Electronic Lawn Sprinkler Control	
<b>Trade Mark..... :</b>		
<b>Manufacturer .....</b>	Rain Bird Corporation Controls Manufacturing Division (83857)	
<b>Model/Type reference .....</b>	RC2I4-230, RC2I6-230, RC2I8-230 TM2I4-230, TM2I6-230, TM2I8-230, TM2I12-230, TRU6I-230V TM2I4-ARG, TM2I6-ARG, TM2I8-ARG, TM2I12-ARG	
<b>Ratings .....</b>	24 VAC, 50-60 Hz, 600 mA Class III, IPX0, Maximum elevation use: 2000m, Rated operating ambient: -10°C to 50°C Disconnection type. Type 1. Y	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/> <b>CB Testing Laboratory:</b>	Intertek Testing Services NA, Inc.	
<b>Testing location/ address..... :</b>	1809 10th Street Suite 400 Plano TX, 75074 United States of America	
<b>Tested by (name, function, signature)..... :</b>	Jason Newman [Project handler]	 
	Maryam Mahmoodi [Project handler]	
<b>Approved by (name, function, signature)..... :</b>	Chintan Trivedi [Reviewer]	
<input type="checkbox"/> <b>Testing procedure: CTF Stage 1:</b>	N/A	
<b>Testing location/ address..... :</b>		
<b>Tested by (name, function, signature)..... :</b>		
<b>Approved by (name, function, signature).... :</b>		
<input type="checkbox"/> <b>Testing procedure: CTF Stage 2:</b>	N/A	
<b>Testing location/ address..... :</b>		
<b>Tested by (name + signature) .....</b>		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature).... :</b>		
<input type="checkbox"/> <b>Testing procedure: CTF Stage 3:</b>	N/A	
<input type="checkbox"/> <b>Testing procedure: CTF Stage 4:</b>	N/A	
<b>Testing location/ address..... :</b>		
<b>Tested by (name, function, signature)..... :</b>		
<b>Witnessed by (name, function, signature) . :</b>		
<b>Approved by (name, function, signature).... :</b>		
<b>Supervised by (name, function, signature) :</b>		

**List of Attachments (including a total number of pages in each attachment):**

None.

**Summary of testing:** No testing was performed in Modification 1.

**Tests performed (name of test and test clause):**

No testing was performed in Modification 1.

**Testing location:**

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

EN

**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.

**RC MODELS (INDOOR USE ONLY)****●LAWN SPRINKLER CONTROL**MODEL: **RC214-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA. | Imported in EU by RAIN BIRD EUROPE, Bât. A, Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.



-01 A

DDMMYY-13

**●LAWN SPRINKLER CONTROL**MODEL: **RC216-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

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-02 A

DDMMYY-13

**●LAWN SPRINKLER CONTROL**MODEL: **RC218-230**

INPUT: 24V~ 50-60 Hz 0.600 A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

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-03 A

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**TM MODELS (INDOOR USE ONLY)****●LAWN SPRINKLER CONTROL**MODEL: **TRU61-230V**

INPUT: 24V~ 50-60 Hz 0.600 A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

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M1: 2023-08-15

● **LAWN SPRINKLER CONTROL**

MODEL: **TM214-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

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-01 A

DDMMYY-13

● **LAWN SPRINKLER CONTROL**

MODEL: **TM216-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

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-02 A

DDMMYY-13

● **LAWN SPRINKLER CONTROL**

MODEL: **TM218-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

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-03 A

DDMMYY-13

● **LAWN SPRINKLER CONTROL**

MODEL: **TM2112-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

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-04 A

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<b>Test Item Particulars .....</b> :	
<b>Classification of installation and use .....</b> :	Indoor use, type 1.Y, class III, PD2, OCIII
<b>Supply Connection .....</b> :	24VAC from CB certified Transformer, Type M attachment
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing .....</b> :	
<b>Date of receipt of test item .....</b> :	N/A
<b>Date (s) of performance of tests .....</b> :	N/A
<b>General remarks:</b>	
<p>“(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 <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
<b>Manufacturer’s Declaration per sub-clause 4.2.5 of IECCE 02:</b>	
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 .....	<input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>Not applicable</b>
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies) .....</b> : Ensamblés Hyson, S.A. de C.V. Ave. Noruega D 2, Rubio, Tijuana, Baja California, 22116 MEXICO  Ensamblés Hyson, S.A. de C.V. Cda. Laguna Mainar 5501, Lago Sur, Tijuana, Baja California, 22217 MEXICO.	

**General product information and other remarks:**

The Rainbird models RC2I4-230, RC2I6-230, RC2I8-230, TM2I4-230, TM2I6-230, TM2I8-230, TM2I12-230, TRU6I-230V, TM2I4-ARG, TM2I6-ARG, TM2I8-ARG, TM2I12-ARG are programmable sprinkler controls that activates and deactivates remotely located valves that supply water to irrigation zones of the lawn. The Controller supplies a voltage of 24V~ to the solenoids of the valves. The Controller is provided with 1 master valve output and multiple zone outputs. The master valve output and only one zone output can be activated at a given time. The RC2 models are provided with Wi-Fi and Bluetooth communication capabilities for its operation and programming. The intended application is medium scale residential or commercial installations, designed for Indoor installation.

**Model numbers are as follows:**

RC2Ix-230

x: can be 4, 6, 8 for different output station number

TM2Ix-230, TM2Ix-ARG

x: can be 4, 6, 8, 12 for different output station number

**Model Differences:**

Models TM2Ix-230, TM2Ix-ARG, TRU6I-230V have same control circuits, enclosure material, and connection type. The difference in the TRU6I-230V model is an updated LCD, wire cover, and enclosure artwork.

The RC2 models are provided with Wi- Fi and Bluetooth communication capabilities for its operation and programming.

The power to the Controllers RC2Ix-230, TM2Ix-230, TRU6I-230V, is supplied by an IEC 61558-2-6 Certified Transformer- Model XY- 24000650CE (with a type C plug).

The power to the Controllers TM2Ix-ARG, is supplied by an IEC 61558-2-6 Certified Transformer- Model XY-24000650AG (with a type I plug).

**Modification 1 Report:**

The original Test Report Ref. No. 105214442DAL-001, dated 2022-10-24 was modified on 2023-08-15 to include the following:

- **In general product information and other remarks:** Added model differences and model numbers sections
- **In copy of marking plate:** Added markings for TRU6I-230V model which comes with the following LCD:

**LCD SPECIFICATIONS**

Module size: 68.00mm(L)\*39.00mm(W)\*12.57mm(H)

Viewing area: 59.50mm(MIN)(L)\*28.50mm(MIN)(W)

Weight: Approx. (18.4g)

Operating Voltage: 5.0 VDC

Operating Temperature: -10°C to 65°C

LCD component not considered as a critical component.

No testing was performed in this modification. This report is not valid without original Intertek CB report 105214442DAL-001, dated 2022-10-24.



Test Report issued under the responsibility of:



**TEST REPORT**  
**IEC 60730-1**  
**Automatic electrical controls**

**Report Number..... : 105214442DAL-001**

**Date of issue ..... : 2022-10-24**

**Total number of pages ..... : 118**

**Name of Testing Laboratory**  
**preparing the Report ..... : Intertek Testing Services NA, Inc.**  
1809 10th St. Suite 400  
Plano, TX 75074  
United States of America

**Applicant's name ..... : Rain Bird Corporation**  
**Address ..... : Controls Manufacturing Division (83857)**  
**9491 Ridgehaven Court, San Diego, CA 92123, USA**

**Test specification:**

**Standard ..... : IEC 60730-1:2013, AMD1:2015, AMD2:2020**

**Test procedure..... : CB Scheme**

**Non-standard test method..... : N/A**

**TRF template used..... : IECEE OD-2020-F1:2020, Ed.1.3**

**Test Report Form No..... : IEC60730\_1K**

**Test Report Form(s) Originator.... : UL(US)**

**Master TRF ..... : 2020-08-14**

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<b>Test item description</b> .....	Electronic Lawn Sprinkler Control	
<b>Trade Mark</b> .....		
<b>Manufacturer</b> .....	Rain Bird Corporation Controls Manufacturing Division (83857)	
<b>Model/Type reference</b> .....	RC2I4-230, RC2I6-230, RC2I8-230 TM2I4-230, TM2I6-230, TM2I8-230, TM2I12-230	
<b>Ratings</b> .....	24 VAC, 50-60 Hz, 600 mA Class III, IPX0, Maximum elevation use: 2000m, Rated operating ambient: -10°C to 50°C Disconnection type. Type 1. Y	
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b>	Intertek Testing Services NA, Inc.
<b>Testing location/ address</b> .....		1809 10th Street Suite 400 Plano TX, 75074 United States of America
<b>Tested by (name, function, signature)</b> .....		Jaskaran Cheema [Project handler] Aaron Galligan [Project handler]
<b>Approved by (name, function, signature)</b> .....		Chintan Trivedi [Reviewer]
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 1:</b>	N/A
<b>Testing location/ address</b> .....		
<b>Tested by (name, function, signature)</b> .....		
<b>Approved by (name, function, signature)</b> .....		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 2:</b>	N/A
<b>Testing location/ address</b> .....		
<b>Tested by (name + signature)</b> .....		
<b>Witnessed by (name, function, signature) .:</b>		
<b>Approved by (name, function, signature)...</b>		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 3:</b>	N/A
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 4:</b>	N/A
<b>Testing location/ address</b> .....		
<b>Tested by (name, function, signature)</b> .....		
<b>Witnessed by (name, function, signature) .:</b>		
<b>Approved by (name, function, signature)...</b>		
<b>Supervised by (name, function, signature) :</b>		

**List of Attachments (including a total number of pages in each attachment):**  
**ATTACHMENT 1: EUROPEAN NATIONAL AND GROUP DIFFERENCES TO ICE 60730-1 (10 PAGES)**  
**ATTACHMENT 2: PHOTOS OF APPLIANCE (2 PAGES)**

**Summary of testing:**

**Tests performed (name of test and test clause):**

Test:	Clause
Humidity conditioning	12
Electric strength test	13
Heating test	14
Environmental stress	16
Impact test	18
Threaded part torque test	19
Ball pressure and glow wire	21
Abnormal operation	27

**Testing location:**

**Intertek Plano**

Intertek Testing Services NA, Inc.  
 1809 10th St. Suite 400  
 Plano, TX 75074  
 United States of America  
 Date: 2022-09-26 to 2022-10-17

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

EN

**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.

**RC MODELS (INDOOR USE ONLY)****●LAWN SPRINKLER CONTROL**MODEL: **RC214-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

RAIN BIRD CORPORATION, 9491 Ridgehaven Court, Suite C, San Diego, CA 92123, USA. | Imported in EU by RAIN BIRD EUROPE, Bât. A, Parc Clamar, 240 rue René Descartes - BP 40072 - 13792 Aix-en-Provence, CEDEX 3, France.



-01 A

DDMMYY-13

**●LAWN SPRINKLER CONTROL**MODEL: **RC216-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

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-02 A

DDMMYY-13

**●LAWN SPRINKLER CONTROL**MODEL: **RC218-230**

INPUT: 24V~ 50-60 Hz 0.600 A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

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-03 A

DDMMYY-13

**TM MODELS (INDOOR USE ONLY)****● LAWN SPRINKLER CONTROL****MODEL: TM214-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

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-01 A

DDMMYY-13

**● LAWN SPRINKLER CONTROL****MODEL: TM216-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

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-02 A

DDMMYY-13

**● LAWN SPRINKLER CONTROL****MODEL: TM218-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

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-03 A

DDMMYY-13

**● LAWN SPRINKLER CONTROL****MODEL: TM2112-230**

INPUT: 24V~ 50-60 Hz 0.600A

OUTPUT: 24V~ 50-60 Hz 0.550 A

FOR INDOOR USE ONLY

MADE IN MEXICO

USE RAIN BIRD TRANSFORMER P/N 690475-01

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-04 A

DDMMYY-13

<b>Test Item Particulars .....</b> :	
<b>Classification of installation and use .....</b> :	Indoor use, type 1.Y, class III, PD2, OCIII
<b>Supply Connection .....</b> :	24VAC from CB certified Transformer, Type M attachment
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing.....</b> :	
<b>Date of receipt of test item .....</b> :	2022-09-21
<b>Date (s) of performance of tests .....</b> :	2022-09-26 to 2022-10-17
<b>General remarks:</b>	
<p>"(See Enclosure #)" refers to additional information appended to the report.</p> <p>"(See appended table)" refers to a table appended to the report.</p> <p>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.</p> <p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC60730-02:</b>	
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 .....	<input checked="" type="checkbox"/> <b>Yes</b> <input type="checkbox"/> <b>Not applicable</b>
<b>When differences exist; they shall be identified in the General product information section.</b>	
<b>Name and address of factory (ies).....</b> : Ensamblés Hyson, S.A. de C.V. Ave. Noruega D 2, Rubio, Tijuana, Baja California, 22116 MEXICO  Ensamblés Hyson, S.A. de C.V. Cda. Laguna Mainar 5501, Lago Sur, Tijuana, Baja California, 22217 MEXICO.	



**General product information and other remarks:**

The Rainbird models RC2I4-230, RC2I6-230, RC2I8-230, TM2I4-230, TM2I6-230, TM2I8-230, TM2I12-230 are programmable sprinkler controls that activates and deactivates remotely located valves that supply water to irrigation zones of the lawn. The Controller supplies a voltage of 24V~ to the solenoids of the valves. The Controller is provided with 1 master valve output and multiple zone outputs. The master valve output and only one zone output can be activated at a given time. The RC2 models are provided with Wi-Fi and Bluetooth communication capabilities for its operation and programming. The intended application is medium scale residential or commercial installations, designed for Indoor installation.

The power to the Controller is supplied by an IEC 61558-2-6 Certified Transformer- Model XY-24000650CE

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


<b>3</b>	<b>GENERAL REQUIREMENTS</b>		
	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

<b>5</b>	<b>RATINGS</b>		
5.1	Maximum rated voltage (V).....:	24VAC from certified transformer	P

<b>6</b>	<b>CLASSIFICATION</b>		
6.1	Nature of supply .....	24VAC	—
6.2	Type of load and power factor.....:	24VAC Solenoid load Power factor >0.95	—
6.3	Purpose .....	Sprinkler system irrigation control	—
6.4	Features of automatic action, Type 1 or Type 2 ...:	Type 1	—
6.5	Degree of protection provided by enclosure per IEC 60529 and control pollution situation .....	IPX0	—
6.6	Method of connection.....:	Terminals to connect 24VAC, CB certified Transformer	—
6.7	Ambient temperature limits of the switch ahead: $T_{min}(^{\circ}\text{C})$ ; $T_{max}(^{\circ}\text{C})$ .....	-10 to 50°C	—
6.8	Protection against electric shock .....	Class III	—
6.9	Circuit disconnection or interruption .....	Electronic disconnection	—
6.10	Number of cycles of actuation (M) of each manual action .....	10,000 cycles	—
6.11	Number of cycles of actuation (A) of each automatic action .....	10,000 cycles	—
6.12	Temperature limits of the mounting surface of the control ( $^{\circ}\text{C}$ or K).....:	-10 to 50°C	—
6.13	Value of proof tracking index (PTI) for the insulation material used .....	Material group IIIb with a PTI of 100	—
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.....:	Independently mounted control for: surface mounting;	—
6.16	Ageing requirements (type Y) of end-product equipment .....	No aging requirement	—

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Clause	Requirement + Test	Result - Remark	Verdict

6.17	Use of thermistor (Annex J) .....	Not used for control	—
6.18	Classes of control functions (Annex H) .....	Class A	—

<b>7</b>	<b>INFORMATION</b>		<b>P</b>
7.2.1	Information required for controls and the appropriate method for providing this information is as indicated in Table 1		<b>P</b>
	1 – Manufacturer's name or trademark (Method C).....		<b>P</b>
	2 – Unique type reference (Method C).....	See page 2	<b>P</b>
	3 – Rated voltage or rated voltage range in volts (Method C).....	24 VAC,	<b>P</b>
	4 – Nature of supply (Method C).....	AC, Provided on Rating label	<b>P</b>
	5 – Frequency, if other than for range 50 Hz to 60 Hz inclusive (Method C).....	50-60 Hz, on Rating label	<b>P</b>
	6 – Purpose of control (Method D or E).....	Provided by Documentation	<b>P</b>
	6a – Construction of control (Method X).....	Independently mounted control for wall or surface mounting	<b>P</b>
	7 – The type of load controlled by each circuit (Method C).....	Solenoid as load, output rating provided on the label	<b>P</b>
	15 – Degree of protection by enclosure: (Method C).....	IPX0	<b>P</b>
	17 – Terminals for external conductors (Method C):	Provided on Control itself	<b>P</b>
	18 – Terminals for external conductors which accept a wider range of conductor sizes, (Method D or E).....	Input terminal block is intended to be used only with Rainbird CB approved power supply conductors (22 AWG)	<b>N/A</b>
	19 – Method of connection and disconnection for screwless terminals, if not readily identifiable (Method D).....	No screwless terminals	<b>N/A</b>
	20 – Details of any special conductors which are intended to be connected to terminals for internal conductors (Method D or E).....	No special conductors	<b>N/A</b>
	21 – Maximum temperature of terminals for internal conductors, if higher than 85°C (Method X) .....	Not higher than 85°C	<b>N/A</b>
	22 – Temperature limits of the switch head, if $T_{min}$ lower than 0°C, or $T_{max}$ other than 55°C (Method C):	Operating temperature -10 to 50°C	<b>N/A</b>
	23 – Maximum temperature of mounting surface ( $T_s$ max) if it differs by more than 20 K from $T_{max}$ (Method C) .....	Mounting surface temperature rating does not differ by 20K from $T_{max}$	<b>N/A</b>

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Clause	Requirement + Test	Result - Remark	Verdict
	24 – Classification of control according to protection against electric shock (Method X).....:	Class III	P
	25 – For Class II controls, the symbol for Class II construction (Method C).....:	Not a Class II control	N/A
	26 – Number of cycles of actuation (M) for each manual action (Method X).....:	10,000 cycles	P
	27 – Number of automatic cycles (A) for each automatic action (Method X).....:	10,000 cycles	P
	28 – Ageing period (Y) for controls with Type 1M or 2M action (Method X).....:	Not type 1M or 2M action	N/A
	29 – Type of disconnection or interruption provided by each circuit (Method X).....:	Type 1.Y, see annex H	P
	30 – PTI of materials used for insulation (Method X).....:	Material group IIIb with a PTI of 100	P
	31 – Method of mounting controls (Method D).....:	Provided in the manual	P
	31a – Method of providing earthing of control (Method D).....:	Class III control	N/A
	32 – Method of attachment for non-detachable cords (Method D or E).....:	Provided in the manual	P
	33 – Intended transportation condition of control (Method X).....:	-25°C and 60°C environment stress test considered	P
	34 – Details of any limitation of operating time (Method D or E).....:		N/A
	35 – Period of electric stress across insulating parts (Method X).....:	Long period	P
	36 – Limits of activating quantity for any sensing element over which micro-disconnection is secure (Method X).....:	No such sensing elements	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).....:	No sensing control	N/A
	38 – Values of overshoot of activating quantity for sensing controls (Method X).....:	No sensing control	N/A
	39 – Type 1 or Type 2 action (Method D or E).....:	Type 1.Y	P
	40 – Additional features of Type 1 or Type 2 actions (Method D or E).....:	Type 1 action only	P
	41 – Manufacturing deviation and condition of test appropriate to deviation (Method X).....:	Type 1 action only	N/A
	42 – Drift (Method X).....:	Type 1 action only	N/A
	43 – Reset characteristics for cut-out action (Method D or E).....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	44 – Hand-held control or control intended for hand-held equipment (Method X).....:	Not a hand-held equipment	N/A
	45 – Limitation to the number or distribution of flat push-on receptacles (Method D or E).....:	No push on receptacles used	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).....:	No type 2 actions	N/A
	47 – Extent of any sensing element (Method X).....:	No such sensing elements	N/A
	48 – Operating value(s) or operating time (Method D).....:	No fixed timings	N/A
	49 – Control pollution degree (Method D or E).....:	Pollution Degree II	P
	50 – Control intended to be delivered exclusively to the equipment manufacturer (Method X).....:		N/A
	51 – Glow wire test temperatures (Method X).....:	See table 21.1	P
	52 to 60 See Annex H	Considered	P
	61 to 65 See Annex J	No thermistor used	N/A
	66 to 74 See Annex H	Software class A	N/A
	75 – Rated impulse voltage (Method D or E).....:	2500V	P
	76 – Type of printed wiring board protection (Method X).....:		N/A
	77 – Temperature for ball pressure test (Method X).....:	Test performed based on the heating test result in cl 14 See cl 21	P
	78 – Max declared torque on single brush mounting using thermoplastic material (Method D or E).....:	Hanging type mounting	N/A
	79 – Pollution situation in the micro-environment of the creepage or clearance if cleaner than that of the control (Method X).....:	Pollution Degree II	P
	80 – Rated impulse voltage for the creepage or clearance if different from that of the control (Method D or E).....:	500V Declared	P
	81 – Values designed for tolerances of distances for which the exclusion from fault mode “short” is claimed (Method X).....:	Reasonable short conditions are considered	P
	82 to 84 See Annex J		N/A
	85 – For Class III controls, the symbol for Class III construction (Method C).....:	Class III	P
	86 – For SELV or PELV circuits, the ELV limits realized (Method X).....:	24VAC Input & Output, On label and in manual	P

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Clause	Requirement + Test	Result - Remark	Verdict

	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	No such relays	N/A
	89 – Emission tests and groups as declared according to CISPR 11 (Method X) .....	Not declared	N/A
	90 – Immunity tests for protective controls for use according to IEC 60335 appliances (Method X) .....	No such protective control	N/A
	91 to 94 See Annex H	Function control only	N/A
	95 – Maximum declared short-circuit current (Method X) .....		N/A
	96 – Overcurrent protective device external to the CONTROL (Method D or E) .....	No external overcurrent protection	N/A
	97 – For INCORPORATED CONTROLS or INTEGRATED CONTROLS, whether the overload test done at control level (Method X) .....	Not an incorporated control	N/A
	98 – Maximum altitude at which the CONTROL can be used if greater than 2000m (Method X) .....	2000m considered	P
7.2.2	Information which is indicated as being required by marking (C) or by documentation (D, E) is provided for the testing authority .....	Information provided	P
7.2.3	For controls submitted in, on or with an equipment, the requirement for Documentation (D, E) replaced with Declaration (X)	Not submitted in, on or with an equipment. Only solenoids are submitted as loads for testing purpose	P
7.2.4	Marking for an INTEGRATED CONTROL within a more complex control is included in the marking of the complex control	Not an integrated control	N/A
7.2.5	Documentation (D, E) requirement is met by providing information by Marking (C)	Considered	P
7.2.5.1	Declaration (X) requirement is met by providing information by Documentation (D, E) or Marking (C)	Considered	P
7.2.6	Information for INTEGRATED CONTROL provided by Declaration (X)	Not an integrated control	N/A
	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)	Not an incorporated control	N/A
	Information for incorporated control intended for exclusive delivery to the equipment		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

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		P
7.2.9	Appropriate IEC symbol(s) used per 7.2.9 ..... :	V, A, Hz	P
7.3	Class II symbol		N/A
7.3.1	Used only for in-line cord, free-standing, and independently mounted controls	Class III	N/A
7.3.2	Sides of the outer square are approximately twice the length of sides of the inner square		N/A
7.3.2.1	Largest dimension of the control (mm)..... :		—
	The length of the side of outer square (mm) ..... :		—
7.3.2.2	Controls which include terminals for earthing continuity for functional purposes are not marked with the symbol for class II		N/A
7.4	Additional requirements for marking		P
7.4.1	Marking placed on the main body or on non-detachable parts	On Main body	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	Terminal block used to connect external 24VAC Transformer	P
7.4.3	Terminals for neutral external conductor are indicated by letter "N"	24VAC marked	P
7.4.3.1	Earthing terminals for external earthing conductors or earthing continuity, and terminals for earthing for functional purposes are identified	No earthing	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	Output terminals for solenoid valves are identified on the unit	P
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 "-")	"+", "-" and "►" and "◄" on the front panel	P
	Controls intended to be set by the equipment manufacturer or the installer accompanied by documentation (D) indicating proper method for securing the setting	Provided in manual	P

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Clause	Requirement + Test	Result - Remark	Verdict

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	No such parts	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)	Supplied 24VAC through an external CB approved transformer and AC Low voltage output terminals are marked	P
	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	Intended to used only with Rainbird approved power supply	P
	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	No such earthing continuity used as functional earthing	N/A
7.4.7	Equipment carries a replaceable battery, and replacement by an incorrect type could result in an explosion	No battery intended to replace by the user.	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	No battery intended to replace by the user.	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	No battery intended to replace by the user.	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



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Clause	Requirement + Test	Result - Remark	Verdict

	- 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	No such battery	N/A

<b>8</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		
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	SELV not accessible, cover with snap fit locks preventing access to AC SELV terminals.	P
	Protection against accidental contact with live parts of the lamp ensured to allow safe insertion and removal of the lamps	No lamps on the products	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 .....	No parts giving access to 24 VAC	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 voltage exceeding SELV	N/A
8.1.1.1	SELV/PELV circuits supplied at a different voltage value considered non-hazardous .....	Not higher than 24VAC	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
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	Not a class II controller, No such parts	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	Not used	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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	Not a class II 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 (mm <sup>2</sup> ).....:	Not in line or free-standing control	—
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 (mm <sup>2</sup> ).....:	Requirements considered	—
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	Only SELV	N/A
	- 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		N/A
	If test finger entered, the finger shown in Figure 2 pushed through the aperture.		N/A
	If the unjointed test finger did not enter, the increased force of 30 N applied		N/A
	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		N/A
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	No such openings to access live parts	N/A
8.1.9.3	Hazardous live parts were not touched	All parts are SELV, Also covered with cover for terminals	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	All parts are SELV	P

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Clause	Requirement + Test	Result - Remark	Verdict
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.....":		P
8.1.11	Between Class III and main/earth circuits, insulation external to the safety isolating transformer complies with Class II insulation		P
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.....:	No earth circuits	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	No battery compartments	N/A
8.2	Actuating members and means		P
8.2.1	Actuating members are not live	Control setting on control panel are not live	P
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:		P
	- of insulating material, or	Class II construction, plastic enclosure, no handles	P
	- covered by insulating material	All covers are made of insulating materials	P
	If of metal, accessible parts (likely to become live in when insulation fails) separated from their actuating means or fixings by supplementary insulation	No metal on the enclosure	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
8.3	Capacitors		

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.1	For Class II in-line cord controls and independently mounted controls, capacitors are not connected to accessible metal parts	Not Class II in-line cord controls	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	No accessible metal	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	CB certified adaptor used	P
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	No uninsulated live or hazardous parts	N/A
	- earthed, or		N/A
	- separated by double or reinforced insulation, or		N/A
	- not accessible after mounting in the equipment		N/A

<b>9</b>	<b>PROVISION FOR PROTECTIVE EARTHING</b>		N/A
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	No accessible metal part, No voltage above SELV.	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	Independently mounted control	N/A
	- earthed by the fixing means		N/A
9.1.3	Earthing terminals, terminations or contacts not electrically connected to any neutral terminal	No earthing terminals. Only 24VAC terminals used to connect adaptor.	N/A
9.2	Control of Class II or Class III:		N/A
	- no provision for protective earthing		N/A
9.3	Adequacy of earth connections		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

9.3.1	Connection between earthing terminal and parts to be connected is of low resistance .....		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	No earthing terminal	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 <sup>2</sup> to 6 mm <sup>2</sup>	No earthing terminal	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 <sup>2</sup> ) .....		—
	- size of earthing terminal (mm <sup>2</sup> ) .....		—
9.3.6	Earthing terminals locked against accidental loosening	No earthing terminal	N/A
9.4	Corrosion resistance		N/A
9.4.1	Material of earthing terminals, body:	No earthing terminal	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	No aluminum 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	No detachable parts with ground terminals	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

<b>10</b>	<b>TERMINALS AND TERMINATIONS</b>	<b>P</b>
10.1	Terminals and terminations for external copper conductors	P

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Clause	Requirement + Test	Result - Remark	Verdict
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	Using pillar terminal block	P
	Use of a special purpose tool not required		N/A
10.1.1.1	Terminals or terminations for cords using Y and Z attachment method comply with clause 10.2		P
	Need for special purpose tools	Must use screwdriver to disconnect	P
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	No such terminals	N/A
10.1.4	Terminals for fixed wiring and non-detachable cords using attachment methods X or M:		P
	- terminal No. or identification .....	Pillar type terminal block	—
	- Current (A) carried by terminal .....	20A per specification	—
	- Flexible cord or fixed wiring .....	Fixed wiring of adaptor	—
	-conductor cross-sectional area - smallest (mm <sup>2</sup> ) :	0.34 mm <sup>2</sup>	—
	-conductor cross-sectional area - largest (mm <sup>2</sup> ) . :	0.34 mm <sup>2</sup>	—
10.1.4.1	Terminal designed for wider range of conductor size declared .....	Not designed for wider range	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 .....	Wire is part of CB approved Adaptor	—
	- cross-sectional area (mm <sup>2</sup> ) .....	0.34 mm <sup>2</sup>	—
	- applied torque value (Nm) .....		—
	- 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

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Clause	Requirement + Test	Result - Remark	Verdict

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 $\leq 2$ 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	No special preparation is needed	P
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		P
10.1.8.2	Terminals are fitted with conductors:		P
	- cross-sectional area (mm <sup>2</sup> ) .....	Manual has instructions to attach adaptor connections	—
	- Flexible cord / Fixed wiring .....		—
	- Wires of fixed wiring conductors are straightened		P
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	Manual has instructions to attach adaptor connections	P
			—
10.1.8.4	Neither the conductor nor the wire of a stranded conductor slipped out		P
10.1.9	Clamping reliability of the terminals		P
10.1.10	Terminals did not attain excessive temperatures during the test of Clause 14 (°C) .....	See heating Test cl 14	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		P
	- An 8 mm length of insulation is removed from the end of a stranded conductor		P
	- Free wire of stranded conductor makes no contact with accessible metal parts	No 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

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	- 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	Manual has instructions to attach adaptor connections	P
	In pillar and mantle type terminals conductor is beyond the edge of the screw		P
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 .....	Input current less than 3A	N/A
10.2.2	Terminals suitable for their purpose	Terminal block used for connection	N/A
10.2.3	In soldered terminals, soldering is not the only means to maintain conductor in position	No soldered terminals	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		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



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

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11.2.6	Protection against electric shock by use of SELV or PELV .....	See Annex T.	P
11.2.7	Adequate measures are provided to prevent the interconnection of an integrated SELV circuit to an external PELV circuit and vice versa	Only internal SELV used	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		P
	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	PTC used in the output control circuit (F1) in TM models only	P
11.3	Actuation and operation		P
11.3.1	Full disconnection		N/A
	- contact separation in all poles not below values of Cl. 20 (exception: earth)	No full disconnection	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		N/A
	- one supply pole, at least, separated	No Micro-disconnection	N/A
	- separated pole meets electric strength requirements, Cl. 13		N/A
	- any subsequent action does not cause reduction of contact separation below value required by the Electric Strength Test		N/A
11.3.3	Reset buttons are so located or protected that they are not to be accidentally reset	Recessed reset button	P
11.3.4	Parts for setting by the manufacturer secured to prevent accidental shifting after setting		P
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.		P
11.3.5.2	Systems of class C control functions include at least two switching elements to directly de-energize the safety relevant terminals	Not a class C control	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,	No such safety shutdown	N/A

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	- 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	Certified transformer to be used certified to IEC 61558-2-6	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 $\leq 0.1$ 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		P
	- contacts are open or closed as intended	Adjusting knob and press buttons	P
	- no hazard can occur within the control		P

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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): $\leq 45 \text{ N}$ .....:	Not a pull-cord actuated control.	—
	- pull force 45° to vertical (N): $\leq 70 \text{ N}$ .....:		—
	- function after release		N/A
11.4	Actions		P
11.4.1	Combined action: Control remains operative after the failure of any portion unique to the other actions		P
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	Not type 2 action	N/A
11.4.3	Type 2 action: manufacturing deviation and drift within the required limits	Not type 2 action	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		N/A
11.4.7	Type 1D or 2D action: disconnection cannot be prevented and reset not possible while faults persists		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 $-35^{\circ}\text{C}$		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 $-35^{\circ}\text{C}$		N/A

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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	Type 1.Y	P
11.4.17	See Annex J		N/A
11.5	Openings in enclosures (drain holes)	No drain holes	N/A
	- minimum area (mm <sup>2</sup> ): .....		—
	- maximum area (mm <sup>2</sup> ): .....		—
	- minimum dimension (mm <sup>2</sup> ): .....		—
11.6	Mounting of controls		P
11.6.1	Control mounted according to manufacturer's declaration: does not adversely affect compliance with this standard	Control is mounted as in manual as wall mount does not interfere with compliance requirements	P
11.6.2	Control mounted as declared, if movement or removal could adversely affect compliance with this standard:		P
	- cannot rotate or be displaced		P
	- cannot be removed without the aid of a tool		P
	- when removal (even partial) is necessary for use, requirements of clauses 8, 13, and 20 are satisfied before and after removal		P
	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		P
11.6.3.1	Independently mounted controls (other than for panel mounting)	Considered	P
	- fit a standard box as declared, or		N/A
	- supplied with a conduit box (if special), or		N/A
	- suitable for surface (plane) mounting	Surface mounting on the wall	P

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11.6.3.2	If special conduit box required, it is delivered with the control	No special conduit requirements, need to comply with national and local electrical code	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, knockouts or glands.	Conduit entry on the bottom of the enclosure	P
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		P
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	No back wiring terminals	N/A
11.7	Attachment of cords		P
11.7.1.1	In-line and free-standing controls, flexible cords withstand flexing during normal use	Wall mounted control	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 ..... :	<del>See attached TABLE 11.7.1.2.4</del>	N/A
11.7.2	Cord anchorages		
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:	For permanently connect models, the installation shall meet the national and local electrical code, permanently mounted conduit is required for the permeant wiring connection	P
	- 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		N/A
	- made of insulating material	Not a class II control	N/A
	- insulated from accessible metal parts by supplementary insulation		N/A
11.7.2.3	Cord anchorages of controls other than Class II:		P

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	- made of insulating material, or	For permanently connect models, the installation shall meet the national and local electrical code, permanently mounted conduit is required for the permeant wiring connection	P
	- 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	No Z attachment cords	N/A
11.7.2.6	Attachment method X: in-line cord controls		N/A
	- glands not used as cord anchorage, unless	Not an in-line control	N/A
	- provision exists for clamping all types of cords		N/A
11.7.2.7	Screws to be operated when replacing the cord	Pillar type terminal block screws.	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)..... :		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

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	Free-standing control, weight (kg) .....		—
	In-line cord controls (all others).....		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		N/A
	- 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 ( $\leq 2$ 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:		P
	- nominal current (A) .....	600 mA	—
	- required cross-sectional area (mm <sup>2</sup> ) .....	0.5 mm <sup>2</sup> min	—
	- measured cross-sectional area (mm <sup>2</sup> ) .....	0.34 mm <sup>2</sup>	—
11.8.3	Space inside the control for flexible cords:		P
	- connecting cords of largest cross-section (10.1.4) (mm <sup>2</sup> ) .....		—
	- adequate space for easy introduction and connection		P
	- possibility to check the correct connection		P
	- cover can be fitted without risk of damage to the conductors		P
11.9	Inlet openings		P
11.9.1	Inlet openings for flexible external cords		N/A
	- designed to prevent damage of the covering of the cord when introducing connectors	Intended to be installed in conduit	P



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	- provided with inlet bushing		P
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		P
11.9.2	Inlet openings without inlet bushing made of insulating material	All made of plastic	P
11.9.3	Inlet bushing		N/A
	- made of insulating material	No inlet bushing	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		P
11.10	Equipment inlets and socket-outlets		N/A
11.10.1	Engagement with connecting devices of other systems not possible	No inlets/socket outlets	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

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11.11	Requirements during mounting, maintenance and servicing		P
11.11.1	Covers and their fixing		P
11.11.1.1	Removal of covers does not affect setting of the controls other than integrated	Removal of output connector cover does not affect any setting	P
11.11.1.2	Covers		P
	- cannot be displaced or replaced incorrectly		P
	- fixing of covers to be removed for mounting etc., does not serve to fix any parts other than actuating members or gaskets		P
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:	Removable cover gets reliably locked	P
	- fixed in a reliable manner		P
	- withstand mechanical stress		P
	-snap-in devices have a locked position		P
11.11.1.5.1	Parts likely to be removed for installation or during servicing disassembled and assembled ten times		P
11.11.1.5.3	Control subjected to 50 N push force test .....	Fixed wiring	N/A
	- pull force (N).....		N/A
	- finger nail pull force (N).....		P
	- 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	No need to open screws for mounting	N/A
11.11.3	Actuating member		P
11.11.3.1	Control not damaged by mounting or removal of actuating member		P
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	Control is type 1 action	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)	Incorrect position is not possible	P

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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 Class A	P
11.13	Protective controls and components of protective control system		
11.13.1	- protective controls designed and constructed to be reliable and suitable for their intended duty	Lawn sprinkler controller not considered protective controller	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	No pressure limiting devices	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	No temperature monitoring device	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	Cell type battery only, non-user replaceable	P

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	- under normal operation		P
	- under after a single fault in the control		P
	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

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	-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		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	No type 2 action	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	Not 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	No direct connection to communication network. No overvoltage occurs thru the Wi-Fi connection.	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

<b>12</b>	<b>MOISTURE AND DUST RESISTANCE</b>		P
12.1.1	Protection against ingress of water and dust IP Classification of the product .....	IPX0	—
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.....	Conducted and Passed with no breakdowns	P
	Entered water does not impair compliance with this standard		P
	No reduction of creepage distances and clearances below values of Cl. 20		P
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 .....		—

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	- 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	Considered	P
12.2.1	Controls withstood simulated, normal use humid conditions	Passed the 48hr Humidity conditioning test	P
12.2.3	Electric Strength Test of 13.2 is conducted immediately after the humidity treatment		P
12.2.4	Control shows no damage		P
12.2.5	Cable inlet openings, and drain holes are left open		P
12.2.6	Detachable parts are removed and tested with the main part		P
12.2.7	2 days (48 h) Humidity Test for IPx0 controls	Set of three samples were Conditioned for 48 Hrs at 25°C, 93.0%RH. Date: 2022-09-23 to 2022-09-26 Ambient: 25.0°C, 93.0%RH, 998.2mBar Humidity Chamber ID#: 5356 Samples: DAL7986, DAL8012, DAL8013, DAL7994, DAL7993, DAL7995	P
	7 days (168 h) Humidity Test for other controls	IPX0 only	N/A
12.2.8	Relative humidity (%): 91-95% .....	93.0%RH	—
	Temperature (°C): (20 - 30 ± 1) °C .....	25.0°C	—
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)	See table 13.1	P
	- Electric Strength (13.2)	See table 13.2	P
	- integrated and incorporated controls according to Electric Strength (13.2)	Independently mounted control	N/A
12.3	Leakage current test for in-line cord and free - standing controls	Independently mounted control	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

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<b>13</b>	<b>ELECTRIC STRENGTH AND INSULATION RESISTANCE</b>		P
13.1	Insulation resistance of in-line cord, free-standing and independently mounted controls		P
13.1.2	Reinforced or supplementary insulation measured to non-metal parts covered with metal foil	Basic insulation	P
13.1.3	Test voltage applied for 1 min (V).....:	500V	—
13.1.4	Insulation resistance measured		P
	- basic insulation $\geq 2 \text{ M}\Omega$ .....	>50GHz	P
	- supplementary insulation $\geq 5 \text{ M}\Omega$ .....		N/A
	- reinforced insulation $\geq 7 \text{ M}\Omega$ .....		P
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. ....:	60 Hz	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 .....		N/A
<b>14</b>	<b>HEATING</b>		P
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 <sup>2</sup> ).....:	Considered, provided power cord is used	—
14.2.1	Attachment method M, Y or Z: cords as declared or supplied (mm <sup>2</sup> ).....:	Type M.	—
14.2.2	Terminals for flexible and fixed conductors: appropriate flexible cord (mm <sup>2</sup> ).....:		—
14.2.3	Terminals not for external conductors: conductors of minimum cross-sectional area or as declared in Clause 7.2 (mm <sup>2</sup> ).....:		—

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14.3	In-line cord controls tested on a dull, black painted plywood	Independently mounted control.	N/A
14.3.1	Independently mounted controls tested as in normal use		P
14.4	Electrical conditions		P
	- voltage (V): most unfavourable value between 0.94- and 1.06-times UR .....	Tested at 253V, 50Hz, 60Hz.	—
	- 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) .....		—
14.4.2	Actuating members placed in most unfavourable position		P
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 ( $5 \pm 1$ ) °C from operating temperature such that contacts are then in closed position	Not a temperature sensing control	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	Terminals for rain sensor connection. Shorted during heating test to simulate the worst-case scenario (no rain/freeze)	N/A
14.4.3.4	The most arduous operating sequence or segment selected for other automatic controls	Most arduous operation condition considered; the sprinklers continuous on until heating stabilization Operated at 55°C ambient, maximum load for intended operation.	P
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) .....	Considered, $T_{max} = 55^\circ\text{C}$	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 $T_s$ max is higher than $T_{max}$ by more than 20 K) (°C) .....	Considered, $T_{max} = 55^\circ\text{C}$	P



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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) .....	Also tested per clause requirements	P
14.6	The temperatures specified for the switch head, the mounting surfaces and sensing element were attained in approximately 1 h	Until reach stability	P
14.6.1	Electrical and thermal conditions maintained for 4 h, or for 1 h after steady state (h).....	Until reach stability	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		P
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		P
14.7.3	Temperature on parts which are gripped in normal use other than actuating members	Considered	P
14.7.4	The temperature of electrical insulation is determined on the surface of the insulation .....	See attached TABLE 14.6 & 14.7	P

<b>15</b>	<b>MANUFACTURING DEVIATION AND DRIFT</b>		N/A
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.....	<del>See attached TABLE 15.2 a) and 15.2 b)</del>	N/A

<b>16</b>	<b>ENVIRONMENTAL STRESS</b>		P
16.1	Control can withstand the level of stress likely to occur in transportation and storage		P
16.2	Environmental stress of temperature		P
16.2.1	Entire control (not energized) maintained for 24h at a temperature of ( -10 ± 2)°C or as declared.....	-25°C consider Finland, Norway and Sweden deviation for 24h	P
	Entire control (not energized) maintained for 4h at a temperature of (60 ± 5)°C or as declared.....	60°C for 4h	P

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16.2.2	The control was not energized during testing		P
16.2.3	Control capable of being actuated at room temperature to provide disconnection as declared (without dismantling)	Set of three samples: Conditions: -25.0°C and 60 °C	P
	The control was held at room temperature for 8 h prior to actuation	Function tested after 8 hours and complies	P
16.2.4	For controls with type 2 actions, the appropriate test of Clause 15 were repeated	No type 2 action	N/A

<b>17</b>	<b>ENDURANCE</b>		N/A
17.2	Electrical conditions for the tests .....	<del>See attached TABLE 17.2.1</del> Type 1 action with controlled valves. No Sensing elements considered. No declared values. Endurance testing not required per H17.1.4	N/A
	Type of circuit		N/A
	Rated voltage (V) ; test voltage (V) .....		—
	Rated current (A) ; test current (A) .....		—
	Rated frequency (Hz) .....		—
17.3	Thermal conditions for parts other than temperature sensing elements		N/A
	Accessible parts: tested at room temperature (°C) :		—
	Mounting surface temperature: T <sub>s</sub> max (°C) .....		—
	Remainder of switch head, temperature: T <sub>max</sub> (°C) ..		—
	If T <sub>min</sub> is less than 0 °C; switch head maintained at T <sub>min</sub> (°C) .....		—
17.4	Manual and mechanical conditions for the tests		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) ...		—

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	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	N/A
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		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		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

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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		N/A
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		N/A
17.10.1	Electrical conditions: specified in 17.2		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		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

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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)		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; total number .....		—
17.14	Evaluation of compliance		N/A
	Actions function in the intended and declared manner:		N/A
	- automatically		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

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	- 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

<b>18</b>	<b>MECHANICAL STRENGTH</b>		P
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:		P
	- have adequate mechanical strength, or		N/A
	- are such that protection against electric shock is maintained if actuating member is broken	Button on the control panel is in SELV circuits	P
18.1.3	For integrated and incorporated controls impact resistance (18.2) tested by the equipment standard		N/A
18.1.4	Tests of 18.2 to 18.8 carried out sequentially on one sample:		P
	- tested sample: type reference .....		—
	- Tested sample: identification No. ....		—
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		N/A
	- 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.	No full disconnection and micro-disconnection.	N/A
	- supplementary or reinforced insulation tested to clause 13		P

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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	Canada and USA requirements are not considered in this report	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		N/A
	enclosure material	Not a metal enclosure	—
	with supporting frame (yes / no)		—
	maximum width, maximum length		—
	thickness required; measured (mm).....:		N/A
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 $\leq 150 \text{ mm}^2$ :		N/A
	- no dimension greater than 150 mm .....		N/A

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	- $\geq 2,4$ 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)	Not a free standing control	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)..... :	Not an in-line control	N/A
18.6.2	- attachment method X: flexible cord(s), smallest cross-section (Cl. 10.1.4) (mm <sup>2</sup> ), length approx. 50 mm .....		—
	- attachment M, Y or Z: cord(s) as declared or supplied, length 50 mm; cord; cross-sectional area (mm <sup>2</sup> ) .....		—
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
18.6.6	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	Not a pull cord type	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	Not a foot actuated type	N/A



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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: No controls supplied with actuating member		P
	- axial pull force (N) .....	30N	P
	- axial push force of 30 N applied for (min) .....	Controls are push buttons only	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	Controls are push buttons only	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.	Controls are push buttons only	N/A

<b>19</b>	<b>THREADED PARTS AND CONNECTIONS</b>		P
19.1	Threaded parts to be moved during mounting or servicing		P
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.	Input/output terminals	P
19.1.2	Threaded parts: easily replaceable if completely removed		P
19.1.3	Thread		P
	- metric ISO thread or thread of equivalent effectiveness	Input/Output connection screws	P
19.1.4	Screw generating a thread:		P
	- thread cutting type screw not used	Not used	N/A
	- thread forming (swaging) type screws		N/A
19.1.5	Space threaded type screws: provided with means to prevent loosening		P
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:	Used in metal material	P
19.1.7	Threaded parts: not of soft material or material liable to creep	Steel screws	P

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Clause	Requirement + Test	Result - Remark	Verdict

19.1.8	Screws operating in a non-metallic thread: correct introduction of the screw into its counterpart ensured	Metallic thread	P
19.1.9	In-line cord controls, threaded parts transmitting contact pressure:		N/A
	- diameter < 3 mm: threaded part of metal	Not in-line cord control	N/A
	- diameter ≥ 3 mm: non-metallic allowed, but not used for electrical connection	Not in-line cord control	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		P
19.1.11	Threaded parts tightened and loosened:		P
	- one of threaded parts non-metallic material: 10 times	Input/Output connection screws	P
	- both parts of metallic material: 5 times	Input/Output connection screws	P
19.1.12	Screws in thread of non-metallic material: completely removed and reinserted each time	Screw in metallic material	N/A
	Terminal screws and nuts: conductor fitted in the terminal (used in 10.1.4 or 10.2.1); cross-sectional area (mm <sup>2</sup> ) .....		—
19.1.14	Conductor moved each time the threaded part is loosened		P
	- no damage impairing the further use of the threaded part		P
	- no breakage of screws		P
	- no damage to the slot head or washers		P
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	P
19.2	Current-carrying connections		P
19.2.1	- Not disturbed by mounting or servicing capable of withstanding the stresses in normal use.		P
19.2.2	- subjected to torsion in normal use locked against movement		P
19.2.3	Contact pressure:		P
	- not transmitted through non-metallic material, or		P
	- sufficient resilience in the metallic part		P
19.2.4	Space threaded screws:		N/A
	- screws clamp current-carrying parts directly in contact with each other	Not using space threaded screws for this purpose	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

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

<b>20</b>	<b>CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION</b>		P
	PCB: coating conforming requirement of IEC 60664-3 for type 2:	Not type 2	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)	Considered	P
	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	2mm along with insulating barriers in between terminals	P
	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		P
	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		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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	No inlet/socket-outlet	N/A
20.1.3.2	Controls with terminals for external conductors: without conductors and with conductors of largest cross-sectional area (mm <sup>2</sup> ) (Cl. 10.1.4) .....	Considered, 0.5 mm <sup>2</sup> min for terminals.	—
20.1.3.3	Controls with terminals for internal conductors: without conductors and with conductors for minimum cross-sectional area (mm <sup>2</sup> ) (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		N/A
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		N/A
20.1.6	Force (standard test finger) applied in an endeavour to reduce distances:		N/A
20.1.6.1	- 2 N force applied by standard test finger to any point on bare live parts accessible before control is mounted .....		N/A
	- 30 N force applied by standard test finger to accessible surfaces after control mounted .....		N/A
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:	No micro-disconnection	N/A
			N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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	P
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	P
	Clearances in controls supplied from a transformer without separate windings; rated impulse determined from Table 21 .....	See attached Table 20	P
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 No protective impedance	N/A
20.1.12	Impulse voltage test, CI 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	No bare conductors	N/A
	- 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

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Clause	Requirement + Test	Result - Remark	Verdict

	- 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	N/A
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 $\leq 300V$ , supplementary and reinforced insulation between metal parts		P
	- minimum 0.7mm thick; measured (mm).....	Junction box enclosure 2 mm	P
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:		N/A
	- maximum temperature measured per Cl. 27 and H.27 doesn't exceed permissible values in Table 13		N/A
	- conditioned insulation complies with Cl. 13.2 at the oven and room temperatures.....	See attached TABLE 13.2	N/A
	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		N/A

<b>21</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		P
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		N/A
21.2.1	Accessible parts (control correctly mounted):		N/A
	- ball-pressure test 1 (G.5.1) at temperature (°C) ...	Test was conducted See attached TABLE 21 75 °C for enclosure	—

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Clause	Requirement + Test	Result - Remark	Verdict

	diameter of the impression $\leq 2.0\text{mm}$ (mm) .....	See attached TABLE 21	P
	- glow-wire test (G2.) at 550 °C .....	Enclosure considered See attached TABLE 21	P
21.2.2	Parts retaining current-carrying parts in position (other than electrical connections):		N/A
	- ball-pressure test 2 (G.5.2) at temperature (°C) ..:		—
	diameter of the impression $\leq 2.0\text{mm}$ (mm) .....	See attached TABLE 21	N/A
	- glow-wire test (G2.) at 550°C .....	See attached TABLE 21	N/A
21.2.3	Parts maintaining or retaining electrical connections in position:		P
	- ball-pressure test 2 at temperature (°C).....:	125°C for terminal block	—
	diameter of the impression $\leq 2.0\text{mm}$ (mm) .....	See attached TABLE 21	P
	Glow-wire temperature levels according to IEC 60695-2-11		N/A
	- glow-wire test (G2.) at 650 °C .....		N/A
	- glow-wire test (G2.) at 750 °C .....		N/A
	- glow-wire test (G2.) at 850 °C .....	Pillar terminal block considered	P
21.2.4	Other parts (except small parts unlikely to be ignited):		N/A
	- glow-wire test (G2.) at 550 °C .....	See attached TABLE 21	N/A
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 .....	See attached TABLE 21	N/A
	Controls designed for operation at ELV levels were not subjected to a tracking test.		N/A
21.3	Independently mounted controls		P
21.3.1	Preconditioning		P
	Controls without T rating:		N/A
	- circuit of switching part and driving mechanism not connected, detachable parts (covers) removed		N/A
	- temperature (°C): $(80 \pm 2)$ °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): $(80 \pm 2)$ °C, 1 x 24 h .....		—
	- switching circuit and driving mech. Connected, with covers: temperature (°C): $(T_{\text{max}} \pm 2)$ K, 6 x 24 h .....		—
	Controls with T rating higher than 85 °C:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	- 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

<b>22</b>	<b>RESISTANCE TO CORROSION</b>		P
22.1.1	Ferrous parts protected against corrosion	All metal parts are painted or tined, provide protection from corrosion. Plastic enclosure and outer parts.	P
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

<b>23</b>	<b>ELECTROMAGNETIC COMPATIBILITY (EMC) REQUIREMENTS – EMISSION</b>		N/A
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	Type 1 control not declared.	N/A



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	- to clauses 23.1.1 and 23.1.2 or	Discontinuous disturbance test is not required due to lower-than-average limit peak result	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 $\alpha_1$ and $\beta_1$	Not sensing control	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	Not an ISM type controller	N/A

<b>24</b>	<b>COMPONENTS</b>		<b>P</b>
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	External CB certified Transformer used	P
	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	No fuses used	N/A
	Varistors used as surge protective devices are to withstand the impulses corresponding to installation class for which is intended to be used.	Varistors used are evaluated to IEC IEC 61051-1, IEC 61051-2-2 see component list table 24.1	P
	Varistors connected to the supply mains, should comply with IEC 61051-1, IEC 61051-2 or IEC 61051-2-2	Varistors used are evaluated to IEC IEC 61051-1, IEC 61051-2-2 see component list table 24.1	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	CB approved external Transformer is intended to use as power source	P
	Switch mode power supplies or transformers used in converters comply with the requirements of IEC 61558-2-16		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	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	Meet requirements	P
	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 .....	Output loaded to 600Ma, <15W rated	P
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. ....	No relays used	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	Switch mode power supply is not used	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	No such protection devices	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	No overcurrent protectors	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	No overcurrent protectors	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.....	<del>See attached TABLE 24.4.1.6</del>	N/A
24.4.1.7	The duration of the test was 1 h or until ultimate results are reached, (h) .....		N/A

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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.....	<del>See attached TABLE 24.4.1.8-24.4.1.10</del>	N/A
24.4.1.9	The maximum open circuit voltage measurements was made during normal operation and under single component failure .....	<del>See attached TABLE 24.4.1.8-24.4.1.10</del>	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 .....	<del>See attached TABLE 24.4.1.8-24.4.1.10</del>	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

<b>25</b>	<b>NORMAL OPERATION</b>		P
	Meets requirements per annex H .....	See annex H	P
25.2	Over-voltage and under-voltage test (for controls incorporating electro-magnets) .....	No electro-magnets, valve is only used for testing purpose, not part of this evaluation. See attached TABLE 25.2	N/A

<b>26</b>	<b>ELECTROMAGNETIC COMPATIBILITY (EMC) REQUIREMENTS – IMMUNITY</b>		P
	Meets requirements per Cl. H.26 .....	See clause H.26 See Intertek EMC report 105214472LAX-002, 105214472LAX-009	P

<b>27</b>	<b>ABNORMAL OPERATION</b>		N/A
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)	No electro-magnets	N/A
	- duration: 7 h or until burnout .....		N/A

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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-four 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.....	Not in-line cord control 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

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	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.	No such battery	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

<b>28</b>	<b>GUIDANCE ON THE USE OF ELECTRONIC DISCONNECTION</b>		P
	Meets requirement per annex H ..... :		P

<b>A</b>	<b>ANNEX A – INDELIBILITY OF MARKING</b>		P
A.1	Classification of markings		P
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		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		N/A
A2.1	Drops of detergent standing on the marked surface, duration (h): 4 h ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict

	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		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

<b>D</b>	<b>ANNEX D – HEAT, FIRE AND TRACKING</b>		N/A
	Canada and USA national difference	Not for Canada and USA	N/A

<b>G</b>	<b>ANNEX G – HEAT AND FIRE RESISTANCES TESTS</b>		P
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.		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict

	Temperature during ball pressure test is $T_b \pm 2^\circ\text{C}$ where $T_b$ is equal to the higher of:		P
	- $T_b$ ( $^\circ\text{C}$ ): $100^\circ\text{C}$ if $T_{\text{max}} = 30\text{-}54^\circ\text{C}$ .....	See attached TABLE 21	—
	- $T_b$ ( $^\circ\text{C}$ ): $125^\circ\text{C}$ if $T_{\text{max}} = 55\text{-}84^\circ\text{C}$ .....	See attached TABLE 21	—
	- $T_b$ ( $^\circ\text{C}$ ): $(T_{\text{max}} + 40)^\circ\text{C}$ if $T_{\text{max}} < 85^\circ\text{C}$ .....	See attached TABLE 21	—
	- $T_b$ ( $^\circ\text{C}$ ): 20 K in excess of the max. temperature during tests of Cl. 14 ( $^\circ\text{C}$ ), if higher.....	See attached TABLE 21	—

<b>H</b>	<b>ANNEX H – REQUIREMENTS FOR ELECTRONIC CIRCUITS</b>		P
H.6	Classification, additions:		—
H.6.4.3.13	- electronic disconnection on operation (Type 1.Y - 2.Y) .....	Type 1.Y	—
H.6.9.5	- electronic disconnection		P
H.6.18	Class of control function (A, B, C).....	Class A	—
<b>H.7</b>	<b>Information in addition to Table 1 provided</b>		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).....	No sensing element	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).....	Sinusoidal wave form, 24VAC	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) .....	Considered, fault conditions applied	P
	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).....	No output under fault condition	P
	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)....		P

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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)..... :		P
	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)..... :	Considered	P
	60 - Category (surge immunity); clause: H26.8.2, Annex R; (Method: X)..... :	See Intertek EMC report 105214472LAX-002, 105214472LAX-009	P
	66 - Software sequence documentation; clause: H11.12.2.9; (Method: X)..... :	Software class A	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) ..... :	Not Class C Control function	N/A
	74 - External load and emission control measures to be used for test purposes; clause H.23.1.1; (Method: X)..... :	No load directly connected to mains	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) ..... :	Class A control	N/A



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Clause	Requirement + Test	Result - Remark	Verdict

	92 - Class or classes of control function(s); clause H.6.18, H.27.1.2.2, H.27.1.2.3; (Method: X)..... :	Class A control	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)..... :	Class A control	N/A
	94 – Number of remote reset actions; H.17.1.4.3; (Method: X)..... :	Type 1 action	N/A
<b>H.8</b>	<b>Protection against electric shock</b>		
H.8.1.10	Accessible parts separated from the supply by protective impedance; identification of circuit..... :	No protective impedance is used	—
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): $0.7 \times f$ (kHz) < 70 mA; $f$ (kHz) .....		N/A
	Maximum capacitance		N/A
	- peak value (V) .....		N/A
	- $42.4 \text{ V} < V \leq 450 \text{ V}$ capacitance $C$ ( $\mu\text{F}$ ): $\leq 0.1 \mu\text{F}$ .....		N/A
	- $450 \text{ V} < V \leq 15 \text{ kV}$ : capacitance $C$ ( $\mu\text{F}$ ): $C \times V \leq 45 \mu\text{C}$ ; calculated $C_{\text{max}}$ ( $\mu\text{F}$ ) .....		N/A
	- $V > 15 \text{ kV}$ : capacitance $C$ ( $\mu\text{F}$ ): $C \times V^2 \leq 350 \mu\text{J}$ ; calculated $C_{\text{max}}$ ( $\mu\text{F}$ ) .....		N/A
<b>H.11</b>	<b>Constructional requirements</b>		P
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:		P

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Clause	Requirement + Test	Result - Remark	Verdict

H.11.4.16	- Type 1.Y and 2.Y action provides electronic disconnection.	Type 1.Y action	P
H.11.4.16.1	Test carried out with control:		
	- connected to maximum load	Connected to the solenoid valves	—
	- supplied with rated voltage (V) .....	24VAC	—
	- at temperature T <sub>max</sub> (°C) .....	50°C	—
H.11.4.16.2	Current through electronic disconnection not exceeding the lower of:		
	- 5 mA (mA) .....	No current detected	P
	- 10% of the rated current (mA) .....		P
H.11.12	Controls using software .....	Software Class A only	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)	Type 1 action electronic control, no endurance test is required	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 <sub>max</sub> (T <sub>s</sub> max) (°C) .....		—
	- T <sub>min</sub> (T <sub>s</sub> 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

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Clause	Requirement + Test	Result - Remark	Verdict

	- 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	No remote reset action	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 reset 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
<b>H.18</b>	<b>Mechanical Strength</b>		P
H.18.1.5	For controls providing electronic disconnection (type 1.Y or 2.Y), the requirements of H.11.4.16 were met		P
<b>H.20</b>	<b>Creepage distances, clearances and distances through insulation</b>		P
H.20.1.15	Electronic controls		P
H.20.1.15.1	Spacing between live parts (supply) and accessible surfaces and parts		P
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
<b>H.23</b>	<b>Electromagnetic compatibility (EMC) requirements – Emission</b>		P
H.23.1	Electronic controls do not emit excessive electric or electromagnetic disturbances	EMC testing was not part of the Evaluation for this report.  See Intertek EMC report 105214472LAX-002, 105214472LAX-009	P

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Clause	Requirement + Test	Result - Remark	Verdict

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.		P
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		P
	Free-standing, independently mounted and in-line cord controls for use with ISM equipment comply with CISPR 11		N/A
<b>H.25</b>	<b>Normal operation</b>		P
H.25.1	The output waveform of electronic controls was as declared		P
	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		P
<b>H.26</b>	<b>Electromagnetic compatibility (EMC) requirements – Immunity</b>		P
	Electromagnetic compatibility (EMC) requirements	EMC testing was not part of the Evaluation for this report. See Immunity Test Report 105214472LAX-002, 105214472LAX-009	P
<b>H.27</b>	<b>Abnormal operation</b>		P
H.27.1	Electronic controls – assessment against internal faults		N/A
H.27.1.1.1	Fault conditions in H.27.1.1.5 not applied if:	Fault conditions considered	N/A
	- electronic circuit is a low-power circuit and		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): $\leq 15$ 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)	All considered	P
H.27.1.1.2	Operating conditions:		P

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Clause	Requirement + Test	Result - Remark	Verdict

	a) at most unfavourable voltage (V): range: 0.9-1.1 times VR .....	253 V considered	—
	b) load producing the most onerous effect: kind of load; significant values .....	Considered	—
	c) ambient temperature (°C): (20 ± 5) °C or other ..	25°C	—
	d) supply fuse rating (A) such that test result not influenced by operation of the fuse .....	Considered	—
	e) actuating member in the most unfavourable position .....	Considered	—
	f) supply to the control is to have the capability of supplying a short-circuit current of at least 500A...		—
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	See appended table H27.1	P
	- exception: thermoplastic material		P
	c) change in the output as declared in Table 1, requirement 57	Either no change or no output	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	No external fuse rupture	N/A
	- 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:		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	P
H.27.1.1.6	Motor load, if failure or malfunction causes change in the supply waveform to the controlled motor:		N/A
	1) load (normal waveform) adjusted to 6 times rated load, or	No motor loads. Solenoid valves are loads for the controller	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	- locked rotor rating declared		N/A
	2) fault conditions introduced		N/A
	3) test conditions per H.27.1.2		N/A
	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)		N/A
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:		N/A
	To ensure consistency and repeatability, the test is to be repeated on two additional samples resulting in the same component terminating the test.		N/A
	To ensure the disconnection is reliable, an electric strength potential corresponding to functional insulation, are to be applied across the “functioned” component.		N/A
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:		N/A
	a) upon functioning, an electric strength potential based on the value fo functional insulation across the two ends of the opened trace.		N/A
	b) test repeated on two additional samples with complying results.		N/A
	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.....:		N/A
H.27.1.2	Protection against internal faults to ensure functional safety		N/A
H.27.1.2.1	Design and construction requirements		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict

	The system configuration is either:		N/A
	<ul style="list-style-type: none"> <li>inherently failsafe or</li> </ul>		
	<ul style="list-style-type: none"> <li>components with direct safety-critical functions are guarded by safeguards in accordance to H.11.12 software class B or C</li> </ul>		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
	<ul style="list-style-type: none"> <li>A description of the system philosophy, the control flow, data flow and timings.</li> </ul>		N/A
	<ul style="list-style-type: none"> <li>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</li> </ul>		N/A
	<ul style="list-style-type: none"> <li>Documentation for any software within the system</li> </ul>		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

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Clause	Requirement + Test	Result - Remark	Verdict

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
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



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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

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Clause	Requirement + Test	Result - Remark	Verdict

	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).....:		—

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	b) loaded with the most unfavourable load declared by the manufacturer .....		—
	c) in an ambient temperature of $(20 \pm 5) ^\circ\text{C}$ , unless there are significant reasons for conducting the test at another temperature within the manufacturer's declared range; ( $^\circ\text{C}$ ).....		—
	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

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	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

<b>J</b>	<b>ANNEX J – REQUIREMENTS FOR CONTROLS USING THERMISTORS</b>		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.	No thermistor used	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:		N/A

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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		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

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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 .....		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 .....	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

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Clause	Requirement + Test	Result - Remark	Verdict

	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 .....	<del>See attached data</del>	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.....	<del>See attached data</del>	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 <sub>1</sub> @ T <sub>1</sub> .....		N/A
	-Resistance at R <sub>2</sub> @ T <sub>2</sub> .....		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

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Clause	Requirement + Test	Result - Remark	Verdict

	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 $I_{max}$ .....		N/A
	Number of cycles .....		N/A
	b) control – $V_{max}$ and the following currents .....		N/A
	1) Current limiter – $\geq I_t$ or $I_{fun}$ .....		N/A
	Number of cycles .....		N/A
	2) Degausser – $I_{max}$ .....		N/A
	Number of cycles .....		N/A
	3) Motor Starter – $I_{max}$ .....		N/A
	Number of cycles .....		N/A
	c) sensing – between 25 deg C to maximum operating temperature .....		N/A



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Clause	Requirement + Test	Result - Remark	Verdict

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		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

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Clause	Requirement + Test	Result - Remark	Verdict
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 $25^{\circ}\text{C} \pm 5\text{K}$ 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 $25^{\circ}\text{C} \pm 5\text{K}$ 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 $0^{\circ}\text{C}$ 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

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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
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

<b>L</b>	<b>ANNEX L (NORMATIVE) – OVERVOLTAGE CATEGORIES</b>	<b>P</b>
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<b>N</b>	<b>ANNEX N (NORMATIVE) – POLLUTION DEGREES</b>	<b>P</b>
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<b>P</b>	<b>ANNEX P (NORMATIVE) – PRINTED CIRCUIT BOARD (PCB) COATING PERFORMANCE TEST</b>	<b>N/A</b>
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

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	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

<b>Q</b>	<b>ANNEX Q (NORMATIVE) – PRINTED CIRCUIT BOARD COATING PERFORMANCE TEST</b>		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

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Clause	Requirement + Test	Result - Remark	Verdict

<b>T</b>	<b>ANNEX T (NORMATIVE) - REQUIREMENTS FOR SELV AND PELV</b>		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	SELV maintained by external CB approved adaptor	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:		N/A
	– 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		P

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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.		P
T.3.2	Protective separation between a SELV/PELV-circuit and other live circuits is achieved by means of:	No PELV circuit	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		P
	– through a safety isolating transformer, or	SELV maintained by external CB approved adaptor	P
	– 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.	IPX0 Control	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

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	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	SELV to earth, max voltage 24V considered	P
	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.	No component connected between the circuits	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

<b>U</b>	<b>ANNEX U - REQUIREMENTS FOR RELAYS WHEN USED AS CONTROLS IN IEC 60335 APPLIANCES</b>		N/A
U.6	Classification	No relay is used in controller	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
	$U_{Coil} \times 0,9$ + contacts loaded or $I_{Coil} \times 0,9$ + contacts loaded		N/A

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	$U_{Coil} \times 1,1$ + contacts loaded or $I_{Coil} \times 1,1$ + 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



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<b>V</b>	<b>ANNEX Q (NORMATIVE) – REQUIREMENTS FOR CONTROLS POWERED BY SECONDARY BATTERIES (RECHARGEABLE)</b>		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	No batteries are used on the Controller	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

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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

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Clause	Requirement + Test	Result - Remark	Verdict

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

<b>9.3.1</b>	<b>TABLE: Connection between earthing terminal and parts is of low resistance</b>		N/A
	Rated current, $I_r$ (A) .....		—
	No-load voltage (V) .....		—
	Test current, $1.5 \cdot I_r$ , but not $<25A$ (A) .....		—
terminal No.	Duration, until steady conditions (min)	Measured potential drop (V)	calculated resistance ( $\Omega$ ): $\leq 0.1 \Omega$
Supplementary information:			

<b>10.1.9.1</b>	<b>TABLE: Clamping reliability of the terminals</b>			N/A
	Applied torque, 2/3 of values in Table 20 (Nm).....			—
	Pull force (N) .....			—
terminal No.	fixed wiring		flexible conductor	
	smallest (mm)	largest (mm)	smallest (mm)	largest (mm)
Supplementary information:				

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Clause	Requirement + Test	Result - Remark	Verdict

10.2.1	TABLE: Connection of conductors		N/A
terminal No.	nominal current (A)	cross-sectional area (mm²)	
Supplementary information:			

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

<b>11.7.1.2.1</b>	<b>TABLE: Flexing test</b>					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 (mm²)	Torque applied on terminals (Nm)	Comments	
Supplementary information:				

11.7.2.11+1 1.7.2.12	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

<b>12.3</b>	<b>TABLE: Leakage current test (for in-line cord and free -standing controls)</b>			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:				

<b>13.2</b>	<b>TABLE: Electric strength test</b>					P
Test location/circuit	Type of insulation	Type/model	Working voltage, (V)	Test voltage (V)	Flashover/breakdown (Yes/No)	
Live to Enclosure	Basic	RC2I8-230	24	500	NO	
Live to Enclosure	Basic	TM2I12-230	24	500	NO	
Supplementary information:						
Date: 2022-09-26						
Ambient: 25.6C, 34%, 988.10mbar						
Equipment ID#: 4854, 5102, 1271						
Sample ID: DAL 7986, DAL 8013						

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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:				

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Clause	Requirement + Test	Result - Remark	Verdict

14.6 + 14.7-1	TABLE: Heating test			P
	Test voltage (V).....:	253VAC ( Adaptor Input)		-
	Ambient (°C).....:	55		-
thermocouple locations		max. temperature measured, (°C)	temperature limit, (°C)	Verdict
RC2 MODEL - 50 Hz Temperature test				
ENCLOSURE FRONT	54		85	P
ENCLOSURE BACK	56.38		85	P
Bluetooth module	66.43		REF	P
Varister LP1	69.48		85	P
Varister LP2	69.64		85	P
TRIAC Q1	67.83		110	P
TRIAC Q2	68.96		110	P
TRIAC Q3	59.88		110	P
PCB Surface	61.53		85	P
Input Terminal 24AC	60.08		85	P
Ambient	54.69		REF	--
RC2 MODEL - 60 Hz Temperature test				
ENCLOSURE FRONT	54.05		85	P
ENCLOSURE BACK	56.79		85	P
Bluetooth module	66.22		REF	P
Varister LP1	64.46		85	P
Varister LP2	66.27		85	P
TRIAC Q1	66.2		110	P
TRIAC Q2	67.62		110	P
TRIAC Q3	59.04		110	P

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Clause	Requirement + Test	Result - Remark	Verdict

PCB Surface	60.27	85	P
Input Terminal 24AC	59.15	85	P
Ambient	57.63	REF	--
<b>TM2 MODEL - 50 Hz Temperature test</b>			
ENCLOSURE FRONT	55.86	85	P
ENCLOSURE BACK	65	85	P
TRIAC Q1	54.52	110	P
TRIAC Q12	54.53	110	P
TRIAC Q13	53.72	110	P
PCB Surface	62.74	85	P
Input Terminal 24AC	63.28	85	P
Ambient	54.69	REF	--
<b>TM2 MODEL - 60 Hz Temperature test</b>			
ENCLOSURE FRONT	55.91	85	P
ENCLOSURE BACK	64.69	85	P
TRIAC Q1	54.52	110	P
TRIAC Q12	54.5	110	P
TRIAC Q13	53.98	110	P
PCB Surface	62.45	85	P
Input Terminal 24AC	62.81	85	P
Ambient	57.63	REF	--
Supplementary information: Date: 2022-10-08 Ambient: 55C, RH% 29, Barometric pressure: 988.2 Equipment ID#: 5356, 5150, 4523, RE-96, 4854 Sample ID: DAL7996, DAL8008			



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Clause	Requirement + Test	Result - Remark	Verdict

<b>15.2 a)</b>	<b>TABLE: Manufacturing deviation</b>				N/A
Condition	Sample Nos.	Declared values		Measured values	
		open	close	open	close
Supplementary information:					

<b>15.2 b)</b>	<b>TABLE: Manufacturing drift</b>				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 <sub>max</sub> )					
After Endurance test (T <sub>min</sub> )					
Supplementary information:					

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17.2.1	TABLE: Circuits loaded according to declared ratings					N/A
circuits		a.c./d.c.	Voltage U <sub>R</sub> (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:						

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:					

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18.2.1	TABLE: Impact resistance			P
Impacts per surface		Surface tested	Impact energy (Nm)	Verdict
3		Front Panel	0.5	P
3		Bottom cover	0.5	P
3		Enclosure back	0.5	P
Supplementary information: Date: 2022-10-06 Ambient (°C) 24.13, RH% 36, Barometric Pressure 995.50 Equipment ID#: 4854, 5168 Sample ID: DAL 8008, DAL 7996				

<b>19.1.15</b>	<b>TABLE: Threaded part torque test</b>			P
Threaded part identification	Diameter of thread (mm)	Column number ( I, II, or III)	Torque (Nm)	Verdict
Input/Output connection screws	3.4	II	0.8	P
Supplementary information: Date: 2022-10-06 Ambient (°C) 24.13 RH% 36 Barometric Pressure 995.2 Equipment ID#: 4854, 1200, 4964 Sample ID: DAL 8008, DAL 7996				

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Clause	Requirement + Test	Result - Remark	Verdict

<b>20</b>	<b>TABLE: Creepage distance and clearance measurements</b>						Verdict
	Requirements creepage distance and clearance met						P
	Supply working voltage (V) .....				24		—
	Overvoltage category .....				II		—
	Rated impulse voltage according to table 20.1(V) .....				2500 (Rated considered)		—
	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)
Input terminals block		24	2	1.2	5.2	1.5	2
24 V Outputs to the solenoid valve (terminal)		24	2	1.2	5.2	1.5	2
electronic disconnection Triac Q1		24	2	1.2	4	1.5	4
Supplementary information: Date: 2022-10-06 Ambient: 24C, RH 26.4%, 995.2mbar Equipment ID#: 1200, 4854 Sample ID: DAL 8008							

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Clause	Requirement + Test	Result - Remark	Verdict

<b>21A</b>	<b>TABLE: Ball Pressure Test and Tracking Test</b>					<b>P</b>
Ball Pressure max. allowed impression diameter (mm) ..... :					2.0	—
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
Enclosure	Rain bird	75	1.05	--	--	P
Input pillar terminal block	WECO	125	1.41	--	--	P
Supplementary information: Date: 2022-10-07 Ambient: 25.13C, RH 33%, 999.1mbar Equipment ID#: 4854, 5102, 5356, 4444 Sample ID: 8008, DAL 7996						

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		
Enclosure	Rain bird	x						P
Input pillar terminal block	WECO						x	P
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 [(te – ti) ≤ 2s] (Yes/No):								Yes
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No)..... :								N/A
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)?..... :								N/A
Ignition of the specified layer placed underneath the test specimen (Yes/No)..... :								N/A
Supplementary information:								
Date: 2022-10-07								
Ambient: 25.13C, RH 33%, 999.1mbar								
Equipment ID#:4854, 5102, 5170								
Sample ID: 8008, DAL 7996								

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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: Not supplying external SELV.				

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Clause	Requirement + Test	Result - Remark	Verdict

24.1 / 24.2	TABLE: List of critical components					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1</sup>	
Controller Enclosure	LOTTE CHEMICAL CORPORATION	(ABS) "STAREX" /HP- 0500	Min thickness 2.0 mm, Color: gray, HB75	IEC 60730-1 Cl. (14, 21)	Tested in appliance	
Alternate Controller Enclosure	LG CHEM LTD	ABS / HI121	Min thickness 2.0 mm, Color: gray, HB75	IEC 60695-11-10	UL	
	CHI MEI CORPORATION	(ABS) "POLYLAC"/ PA- 747	Min thickness 2.0 mm, Color: gray, HB75	IEC 60695-11-10	UL	
Control board components RC2 Series						
Varistor LP1 (if LP3 not installed)	TDK	CT2220K30G (B72540E0300K 062)	-55 to +150 °C Clamping voltage: 35- 290V Current: 2 to 1200A, 8/20 µs waveform Voltage: 10 to 40VAC	IEC 60730-1 Cl (14, H27) IEC6100-4-5 Cl (13)	Tested in the appliance	
Varistor LP3 (if LP1 not installed)	Meritek	MVR10D820K	50 V, 3500 A (8/20 µs), T 105°C Clamping voltage 130°C	UL 1449 IEC/EN 61051-1, IEC 61051-2-2	UL E326004  VDE 40013638	
	TDK	S10K50 (B72210S0500K 101)	-40 to +105 °C Clamping voltage: 135V max Current: 2500A, 8/20 µs waveform Voltage: 50VAC	IEC61051-1 IEC61051-2	UL E321126  VDE	
Alternate LP1, LP3	Interchangeable	Interchangeable	-40 to +105 °C Clamping voltage: min. 135V max	IEC61051-1 IEC61051-2	UL, VDE	
Triac	Littelfuse	MAC4DHMT4G	4.0 A on state current, on voltage 1.3-1.6 V, 93°C	EN/IEC 60730-1 (cl. 12, 13, 14, 16)	Test in appliance	

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Clause	Requirement + Test	Result - Remark	Verdict

24.1 / 24.2	TABLE: List of critical components					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1</sup>	
	Interchangeable	Interchangeable	Minimum 4.0 A on state current, minimum on voltage 1.3V, minimum 93°C	EN/IEC 60730-1	--	
Voltage regulator U5	Texas Instruments	LM337KVURG3	Vi-Vo=-3 to -40 V, Io=10 mA to 1.5 A, 125°C	EN/IEC 60730-1	Tested in appliance UL	
	Interchangeable	Interchangeable	Vi-Vo=-3 to -40 V, Io=10 mA to 1.5 A, 125°C	EN/IEC 60730-1	--	
PWB (bare board)	Rain Bird Corp	PCB ASSY	94 V-0, 130°C Min. thickness: 1.397mm	UL 796	UL E152990	
	Techigh Circuit Technology (Huizhou) Co Ltd	Model D	94 V-0, 130°C Min. thickness: 1.397 mm	UL 796	UL E202404	
	Jiangsu Combo Electronic Technology Co Ltd	CB-D-1	94 V-0, 130°C Min. thickness: 1.397 mm	UL 796	UL E307203	
	Interchangeable	Interchangeable	94 V-0, 130°C Min. thickness: 1.397 mm	UL 796	UL	
Control board components TM2 Series						
Varistor LP1	EPCOS (TDK)	S10K50GS2R5 (B72210S0500 K2 12V87)	50 Vac, 2500 A (8/20 µs), T 105°C	IEC 61051-1/-2, IEC 61051-2-2	VDE 40027582	
Varistor LP1 (alternate)	Meritek	MVR10D820K	50 V, 3500 A (8/20 µs), T 105°C	UL 1449 IEC/EN 61051-1, IEC 61051- 2-2	UL E326004 VDE 40013638	
	Interchangeable	Interchangeable	50 V, min. 2500 A (8/20 µs), T 105°C	IEC 61051-1/-2, IEC 61051-2-2	--	
Voltage regulator U5	Texas Instruments	LM337KVURG 3	Vi-Vo=-3 to -40 V, Io=10 mA to 1.5 A, 125°C	EN/IEC 60730-1 (cl. 12, 13, 14, 16)	Test in appliance	
	Interchangeable	Interchangeable	Vi-Vo=-3 to -40 V, Io=10 mA to 1.5 A, 125°C	EN/IEC 60730-1 (cl. 12, 13, 14, 16)	--	
Triac	Littelfuse	MAC4DHMT4G	4.0 A on state current, on voltage 1.3-1.6 V, 93°C	EN/IEC 60730-1 (cl. 12, 13, 14, 16)	Test in appliance	



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Clause	Requirement + Test	Result - Remark	Verdict

24.1 / 24.2	TABLE: List of critical components					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity <sup>1</sup>	
	Interchangeable	Interchangeable	Minimum 4.0 A on state current, minimum on voltage 1.3V, minimum 93°C	EN/IEC 60730-1	--	
F1 PTC	Meritek	MPTS1206L010R	60V, hold current 0.1A, trip current 0.25 A. 85°C.	ANSI/UL 60730-1 EN 60738-1	UL E223037 TUV Rh R50223766	
	Interchangeable	Interchangeable	60V, hold current 0.1A, trip current 0.25 A. 85°C.	ANSI/UL 60730-1 EN 60738-1	---	
PWB	Rain Bird Corp (JIANGSU COMBO ELECTRONIC TECHNOLOGY CO LTD for fabric)	PCB assy	94 V-0, 130°C	UL 796	UL E307203	
Alternate PWB	Rain Bird Corp (Yan Tat Technology Ltd for fabric)	PCB assy	94 V-0, 130°C	UL 796	UL E152990	
	Interchangeable	Interchangeable	Minimum 94 V- 0, Minimum 130°C	UL 796	--	
Coin cell Battery	Panasonic	CR2032	Lithium coin cell battery, 3V, 230 mAh max, 60°C max	UL 1642	UL MH12210	
	Interchangeable	Interchangeable	Lithium coin cell battery, 3V, 230 mAh max, 60°C max	UL 1642	UL	
Output connector (black for station 9- 12)	Switchlab Inc	T32-BS11-04Z1	94 V-0, 120°C, 300V, 15A	UL 1863 EN/IEC 60730-1 (cl. 12, 13, 14, 16)	UL E167040, Tested in appliance	
	Interchangeable	Interchangeable	94 V-0, 120°C, 300V, 15A	UL 1863 EN/IEC 60730-1 (cl. 12, 13, 14, 16)	--	
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						

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

<b>24.4.1.6</b>	<b>TABLE: Switch mode power supply overload test</b>									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 <sub>max</sub>					
Under-voltage transformer	T <sub>max</sub>					
Over-voltage valve	T <sub>min</sub>					
Under-voltage valve	T <sub>min</sub>					
Supplementary information:						

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

<b>27.2.3</b>	<b>TABLE: Blocked output test</b>			N/A
Thermocouple locations	Max. temperature measured, (°C)		Temperature limit (°C)	Verdict
	2 <sup>nd</sup> hour	24 <sup>th</sup> 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:			

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
Voltage regulator U4 (RC2), U1 (TM2) Shorted pins 1 and 2	X	–	X	X	–	X	X	X	–	X	–	Fault rendered product in operable. No controller output. No deformation of enclosure, no emit flame
Triac Q1 (Both Models) shorted pins 1 and 3	X	–	X	X	--	X	X	X	–	X	–	Lost control of external solenoid valve, the load was kept on. Same as worst case normal heating test. No deformation of enclosure, no emit flame
Supplementary information: Date: 2022-10-17 Ambient: 23.6C, 36.9%, 998mbar Equipment ID#: 1575, 4854, 574 Sample ID: DAL7994, DAL8112												

ATTACHMENT TO TEST REPORT			
IEC 60730-1:2013 Automatic electrical controls - Part 1: General requirements EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Differences according to.....: EN 60730-1:2016			
Attachment Form No.....: EU_GD_IEC60730_1H			
Attachment Originator .....: UL(Demko)			
Master Attachment .....: Date 2017-11-28			
Copyright © 2017 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.			
	CENELEC COMMON MODIFICATIONS (EN)		Result
5.	RATING		P
5.1	Controls with terminals for direct connection to supply mains: single phase usage at 230 V / multiphase usage at 400 V covered	Product is rated 24VAC and intended to be used with 230VAC Input/ 24VAC output CB certified Transformer.	N/A
7.	INFORMATION		P
7.2.1	Methods of information:		P
	Replace 7 – The type of load and rated current (Method C) .....		P
	23 – Temperature limits of mounting surfaces (Ts) if more than 20 K above Tmax (Method C).....		P
	After requirements 95, add Z1 – EMC standard / test method 23.1 (Method X) .....	Considered, Not declared	N/A
	After requirements 95, add Z2 – declared voltage and current for emission test 23.1.1 (Method D) .....		P
7.4.3	Replace the NOTE by: see Annex ZB		—
7.4.3.2	Replace NOTE 1 to NOTE 4 by: See Annex ZB		—
8.	PROTECTION AGAINST ELECTRIC SHOCK		P
8.1.1.1	Delete the NOTE .....		—
8.4	Delete NOTE 1 and NOTE 2.....		—
9.	PROVISION FOR PROTECTIVE EARTHING		P
9.1	Add “See annex ZB” after 1st paragraph.....	Noted	P

9.2	Add "See annex ZB" after 1 st paragraph.....:	Noted	P
9.3.2	Delete NOTE 1, NOTE 2 and Table 2.....:	Noted	—
9.3.4	Delete the NOTE.....:	Noted	—
9.5.2	Delete the entire subclause.....:	Noted	—
<b>10.</b>	<b>TERMINALS AND TERMINATIONS</b>		<b>P</b>
10.1.4.1	Delete NOTE 1 and NOTE 2		—
10.1.14	Delete the NOTE		—
10.1.16	Delete subclause		—
10.2	Terminals and terminations for internal conductors		N/A
10.2.1	Connectable conductors:		—
	- no terminals required if conductor permanently connected by manufacturer		N/A
<b>11</b>	<b>CONSTRUCTIONAL REQUIREMENTS</b>		<b>P</b>
11.2.1.1	Delete the NOTE	Noted	—
11.3.2	Delete "or" in the sixth line.	Noted	—
11.5	Delete NOTE 3	Noted	—
11.8	Size of cords – non-detachable		P
11.8.1	Non-detachable cords:		P
11.3.2	Delete "or" in the sixth line.	Noted	—
11.5	Delete NOTE 3	Noted	—
11.8	Size of cords – non-detachable		P
11.8.1	Non-detachable cords:		—
	Replace: "60245 IEC 53" by "EN 50525-2-21"	Noted	—
	Replace: "60227 IEC 53" by "EN 50525-2-11"	See table 24.1	P
11.9.4	Add "See annex ZB" at the end of the first sentence:	Noted	P
11.10.3	Delete the NOTE		—
11.11	Requirements during mounting, maintenance and servicing		P
11.11.1	Covers and their fixing	Noted	P
11.11.1.2	Delete NOTE 1 and NOTE 2	Noted	—
11.11.1.3	Replace the text of the NOTE by "Void".	Noted	—
11.11.1.4	Replace the text of the NOTE by "Void".	Noted	—

12.	MOISTURE AND DUST RESISTANCE		P
12.1	Protection against ingress of water and dust		
12.1.6	Delete the NOTE	Noted	12.1.6
12.3	Sub-clause deleted		—
13.	ELECTRIC STRENGTH AND INSULATION RESISTANCE		P
13.2.3	Consult the table 12 for differences in test voltages		P
13.3	Sub-clause deleted:		—
14.	HEATING		P
14.4	Electrical conditions:		P
	- voltage (V): most unfavourable value between 0.9 and 1.1 times UR .....	253VAC used	P
	- voltage (V) if circuit not voltage sensitive: min. 10% of UR .....		P
	- current (A): most unfavourable value between 0.9 and 1.1 times IR .....	Noted	P
14.Z1	If TMeas ≥ TMax specified in 14.1, 6 samples were subjected to the following tests:		N/A
	Moving parts, if any, were locked and a current was passed individually through each winding to reach TMax measured under the conditions of test 14.1		N/A
	Current is increased to reach TMax + TIncrease (TIncrease chosen in table Z1) and held constant for the first period of the corresponding TimeTotal		N/A
	TimeTotal (corresponding to chosen TIncrease) is divided in 4 equal periods each followed by humidity treatment acc. 12.2 (deviation: electric strength at level 50 % of 13.2)		N/A
	Failure of only one of the six samples during the first of the four periods of the test is ignored.		N/A
	If 1 of the 6 samples fails during the 2nd, 3rd or 4th period of the test, the remaining five samples are subjected to an additional fifth test cycle		N/A
	Failure of any of the remaining five controls will entail a rejection.		N/A
	The controls are then subjected to the test of 17.8, but only for half the number of cycles specified in that subclause.		N/A
	All controls withstand an electric strength test as specified before.		N/A

<b>15.</b>	<b>MANUFACTURING DEVIATION AND DRIFT</b>		<b>N/A</b>
15.1	Delete the NOTE		—
<b>16.</b>	<b>ENVIRONMENTAL STRESS</b>		<b>P</b>
16.2.1	Add “See annex ZB” at the end of the dashed paragraph.		P
	Delete the NOTE		—
<b>17.</b>	<b>Endurance</b>		<b>N/A</b>
17.1.3	Add the following NOTE: For tests sequence and conditions of non-resettable thermal cut-outs, see 17.16		—
17.1.3.1	Delete text in brackets in second and fifth dashed paragraph		N/A
17.2.2	Electrical loads according to Table 14, at rated voltage VR increased to 1.15VR (V) for the overvoltage test of 17.7 and 17.10.		N/A
17.2.3	Sub-clause deleted		—
17.3.1	Replace last sentence of third dashed paragraph: If Tmin < 0°C additional test carried out with switch head maintained between Tmin and (Tmin -5) °C		N/A
	Controls for Type 1 action: Clause 16 and 17		N/A
	Controls for Type 2 action: clause 15, 16 and 17		N/A
	Three additional samples required.		N/A
17.5.1	Delete the NOTE		—
17.7.1	Delete the words in brackets		—
17.7.7	Delete the NOTE		—
17.8.4.1	Delete the NOTE		—
17.10	Delete the words in brackets		—
17.10.1	Delete the words in brackets		—
17.10.4	Delete		—
17.12.5	Delete		—
<b>18.</b>	<b>MECHANICAL STRENGTH</b>		<b>P</b>
18.1	General requirements		—



18.1.6	Sub-clause deleted		—
18.2.1	Delete the words “except as provided by 18.4”		
18.4	Sub-clause deleted		—
<b>19.</b>	<b>THREADED PARTS AND CONNECTIONS</b>		
19.1	Threaded parts moved during mounting or servicing		—
19.7	Replace “screws” by “threaded parts”.	Noted	P
19.2.4.1	Delete the NOTE		—
19.2.5.1	Delete NOTE		—
<b>20.</b>	<b>CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION</b>		<b>P</b>
20.1	In NOTE 2 Replace “impulse withstand test” by “impulse voltage test”		—
20.1.7	In the NOTE Replace “impulse test” by “impulse voltage test”		—
<b>21.</b>	<b>RESISTANCE TO HEAT, FIRE AND TRACKING</b>		<b>P</b>
21.1	Delete the NOTE		—
21.2.7	Compliance checked by the tests of Clause G.4, carried out at a voltage corresponding to the PTI value declared for Table 1, requirement 30.		P
21.3	Test sequence 21.2.1 – 21.2.7 applies, preceded by preconditioning of 21.3.1		P
	For parts which maintain or retain in position electrical connections the glow-wire shall be carried out at 850°C		P
21.4	Sub-clause deleted, including Table 25		—
<b>23.</b>	<b>ELECTROMAGNETIC COMPATIBILITY (EMC) REQUIREMENTS - EMISSION</b>		<b>N/A</b>
23.1	Compliance checked by method declared by manufacture, see Z1 in Table 1 and Table H.10		—
23.1.1	Add before first dashed paragraph: Test conducted at lowest declared voltage and lowest declared current, see Z2 in Table 1		N/A
23.1.2	Duration of radio interference is measured by oscilloscope, or measuring equipment according to EN 55016-1-1		N/A

<b>24</b>	<b>COMPONENTS</b>		<b>P</b>
24.1.1	In the 1st paragraph, delete ", 17.2.3.1 and 17.2.3.2".	Noted	P
<b>27.</b>	<b>ABNORMAL OPERATION</b>		<b>N/A</b>
27.2	Replace "Burnout test" by "locked mechanism test"		—
	Locked mechanism test (for controls incorporating Electro-magnets)	Type 1 action	N/A
27.2.1	In 1:st paragraph, delete 17.2.3.1 and 17.2.3.2		—
27.2.3.1	Delete the NOTE	Noted	—
<b>C</b>	<b>ANNEX C – COTTON USED FOR MERCURY SWITCH TEST</b>		<b>N/A</b>
	Replace the text by 'Void'.		—
<b>D</b>	<b>ANNEX D – HEAT, FIRE AND TRACKING</b>		
	Replace the text by 'Void'.		—
<b>H</b>	<b>ANNEX H – REQUIREMENTS FOR ELECTRONIC CIRCUITS</b>		<b>P</b>
H7.	Information, addition to Table 1:		P
	H36 – replacement: limits of activating quantity for any sensing element over which micro-disconnection or electronic disconnection is secure. After clause: 11.3.2, add H2.4.6; method: X	No sensing element	N/A
H26.	EMC REQUIREMENTS IMMUNITY. Operation with mains borne perturbations, magnetic, and electromagnetic disturbances	See Intertek EMC report 105214472LAX-002, 105214472LAX-009	P
H26.1	For controls of Type 1 action, intended for "free standing controls, independently mounted and/ or in-line controls", the tests of Annex ZD apply instead of clause H26.	Considered	P
H26.7	Influence of d.c. in a.c. networks (sub-clause deleted)		—
H26.10	Sub-clause deleted		—
<b>J</b>	<b>ANNEX J – REQUIREMENTS FOR CONTROLS USING THERMISTORS</b>		<b>N/A</b>
J17.17 a)	- thermal runaway by increased voltage		N/A

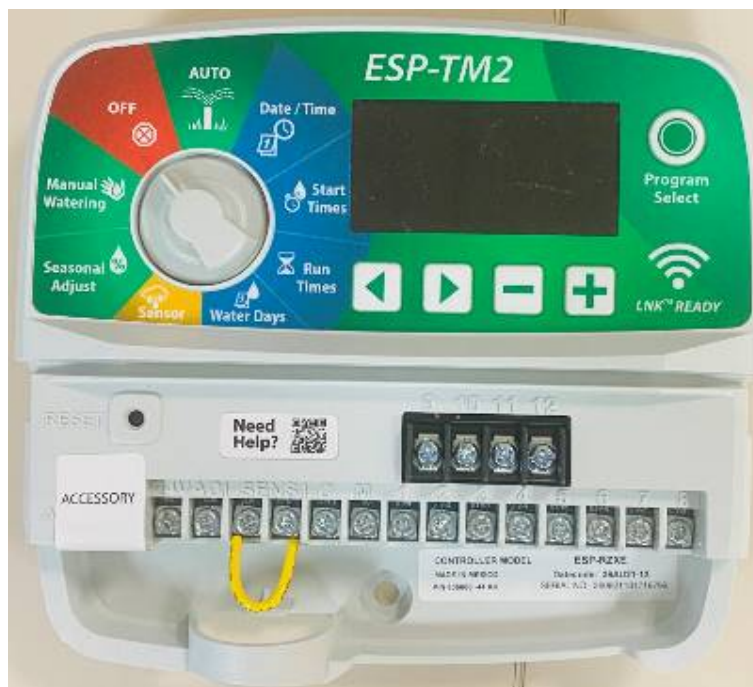
J.17.18.5	- thermal runaway by increased voltage.		N/A
<b>ZB</b>	<b>ANNEX ZB OF EN 60 730-1, SPECIAL NATIONAL CONDITIONS</b>		<b>P</b>
	AUSTRIA, BELGIUM, DENMARK, FRANCE, GERMANY, ITALY, NORWAY, UNITED KINGDOM		N/A
ZB 2.7.2	Class 0 controls are not allowed		N/A
ZB 2.7.3	Class 01 controls are not allowed		N/A
ZB 2.7.5.3	Class 01 controls are not allowed		N/A
ZB 4.3.3.1	Class 0 and class 01 01 controls are not allowed		N/A
ZB 4.3.3.3	Class 0 and class 01 01 controls are not allowed		N/A
ZB 6.8.2.1	Class 0 controls are not allowed		N/A
ZB 6.8.2.2	Class 01 controls are not allowed		N/A
ZB 6.8.3.1	Class 0 controls are not allowed		N/A
ZB 6.8.3.2	Class 01 controls are not allowed		N/A
	UNITED KINGDOM		N/A
ZB 7.4.3	Terminals exclusively for live external conductor: indicated: "L"		N/A
ZB 7.4.3.2	Letter "L" must not be used in another way		N/A
	AUSTRIA, BELGIUM, DENMARK, FRANCE, GERMANY, ITALY, NORWAY, UNITED KINGDOM		N/A
ZB 9.1.1	Class 01 controls are not allowed		N/A
ZB 9.1.2	Class 01 controls are not allowed		N/A
ZB 11.9.4	Class 01 controls are not allowed		N/A
	FINLAND , NORWAY AND SWEDEN		N/A
ZB 16.2.1	- replace "-10±2 °C" by "-25±2 °C" (control must be stored 24h at -25±2 °C)	-25±2 °C considered	P
<b>ZC</b>	<b>ANNEX ZC (informative) A-DEVIATIONS</b>		
ZC 11.1.2	(SWEDEN) (Ordinance 1991:1290) Mercury not allowed in switches and controls, such as level switches, thermostats and relays	No mercury used	N/A
ZC 11.1.3	(UNITED KINGDOM) (Statutory Instrument 1768:1994) Add to requirement: These regulations apply to all plugs for domestic use at a voltage of not less than 200 V and in General allow only plugs to BS 1363 to be fitted		N/A
<b>ZD</b>	<b>ANNEX ZD (normative) EMC immunity for controls</b>		<b>P</b>

ZD.2	Classification of the control:	Residential / Industrial	P
ZD.3	Information		P
	Z3 According to the electromagnetic environment of one of the two EMC levels (Method X)		P
	Z4 EUT was tested without primary protection (Method X)		P
	Z5 Cable length $\leq 30$ m (Method X)		P
	Z6 Data line length $< 10$ m (Method X)		P
	Z7 Test level (= protection level when upstream protection is not in place) (Method X)		P
	Z8 Data line length $\leq 3$ m (Method X)		P
	Z9 Applicable of test and frequency (Method X)		P
	Installation and environmental condition		P
	ESD: ..... : Contact discharge Air discharge		—
	Radiated EMF field: Level; Frequency range ..... :		—
	Burst: Level ..... :		—
	Surge: Installation Class ..... :		—
	Conducted disturbance: Level..... :		—
	Power magnetic field: Level ..... :		—
	Voltage dips & interruption Level ..... :		—
ZD-4	Evaluation of compliance	A / B / C	P
ZD.5	Surge immunity test	See Intertek EMC report 105214472LAX-002, 105214472LAX-009	P
	The control is mounted as specified in 4.1.1, supplied at rated voltage and operated at representative		P
	Operating conditions. It is tested in accordance with EN 61000-4-5.		P
	AC power supply and AC I/O directly connected to mains network		N/A
	AC power supply and AC I/O not directly connected to mains network	Connected via Adaptor	P
	DC power supply and DC I/O directly connected thereto		N/A
	Unsymmetrical operated circuits/lines		P
	Symmetrical operated circuits/lines		P

	Shielded I/O and shielded communication lines		N/A
ZD.6	Electrical fast transient/burst immunity test	See Intertek EMC report 105214472LAX-002, 105214472LAX-009	P
	AC power supply and control output for direct connection to the supply	Connected via Adaptor	P
	DC power supply and control outputs for direct connection to the supply		N/A
	Data lines		P
ZD.7	Radio-frequency electromagnetic field immunity		P
ZD.7.1	Immunity to conducted disturbances Test levels for conducted disturbances on,		P
	Mains		P
	I/O lines		P
	DC power lines		N/A
ZD.7.2	Electrostatic discharge Test voltage and application .....		P
ZD.8	Immunity to radiated electromagnetic fields Control declaration	Residential / Industrial	P
	80 MHz to 1 GHz Field strength .....		P
	1,4 GHz to 2 GHz Field strength .....		N/A
	2,0 GHz to 2,7 GHz Field strength .....		N/A
ZD.9	Immunity to power-frequency magnetic fields		N/A
	Power ..... A/m ..... Frequency .....		—
ZD.10	Test of the influence of voltage dips and voltage interruption in the power supply network		P
	During the test, the control was initially operated at its rated voltage. The control was operated at representative operating conditions.		P
	Voltage dips (50 Hz / 60 Hz)		P
	Duration in periods 50 Hz/60 Hz	50Hz/60Hz considered	P
	Compliance criteria		P
	Voltage interruption (50 Hz/60 Hz)		P
	Duration in periods 50 Hz/60 Hz		P
	Compliance criteria		P

**Photo 1:** External view of RC2I8-230 - Front view of the Product**Photo 2:** External view of RC2I8-230 - Front view with Cover removed

**Photo 3:** Interior of RC2I8-230 – Control board**Photo 4:** External view of TM2I12-230 - Front view of the Product**Photo 5:** External view of TM2I12-230 - Front view with Cover removed



**Photo 6:** Interior of TM2I12-230 – Control board

