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REPORT

on

COMPONENT - AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE - TEMPERATURE-SENSING CONTROLS

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DESCRIPTION

PRODUCT COVERED:

* USR, CNR – Component – Temperature Sensing Control, TM series, Models TM followed by 1, 2, 3 or 4, followed by 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A or B, followed by 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9, followed by 0, 1, **2**, 3, **4**, **5**, **6 or 7**, may be followed by 0, 1, 2 or 3, may be followed by A0, A1, A2 or A3, may be followed by additional suffixes.

GENERAL:

These devices are non-enclosed, adjustable or nonadjustable (as differentiated by model number), snap action, oil filled capillary tube and bulb type thermostats, intended for use in household and commercial appliances. They provide Type 1B action. A Type 1B control is a control that has not been subjected to Deviation and Drift (Calibration Verification) tests. Accordingly, a Type 1B control is not suitable for safety or protective application. A Type 1B control, though, has been investigated for "microdisconnection" applications. When the adjustable version of this device is adjusted to the end-of-travel associated with the minimum temperature, the contacts remain in an open state across the declared range of temperatures. Accordingly, these devices can be used in "marked off" application.

These have NOT been investigated as safety or protective controls.

The contact arrangement is single-pole single-throw (SPST) normally closed or single-pole double-throw (SPDT).
Contacts may be secured in position by rivets or by screws to socket that is made by ceramic or plastic materials. Some models are provided with a rotary dial shaft for setting by the user purposes.

RATINGS:

Model (+)	Contact	Voltage	Current	Terminals	Load	Cycles
TM (SPST)	NC	250 Vac	16 A	P-1	Resistive	Manual Action: 3K
TM (SPDT)	NC	250 Vac	16 A	P-1	Resistive	Automatic Action: 100K (based on Applicant's Declaration)
	NO	250 Vac	6 A	P-2	Resistive	

(+) see suffix field V of the Model Nomenclature system.

All contacts have been evaluated for Type 1B action.

Temperature –

Maximum switch operating ambient temperature 90°C or 120°C, see nomenclature for details.

Maximum regulating temperature 340°C, see nomenclature for details.

See Illustration 1 for manufacturer's declarations.

MODEL DIFFERENCES

TM series models are provided with the same basic design with the following variations:

a) Capillary tube can be provided in different lengths and materials

b) The contacts configuration can be either SPST or SPDT. A packing gland (compression fitting) can be provided for mounting purposes of the bulb.

c) Capillary tube may be provided with additional sleeving intended for mechanical protection purposes. The minimum sleeving distance to the bulb is limited, refer to the CoA below for details.

d) The terminals can be provided with different angles to facilitate the connection in the end use.

MODEL NOMENCLATURE:

TM	2	3	3	0	1	1	AA
I	II	III	IV	V	VI	VII	VIII

I - Basic type designation
TM series

II - Switch-head ambient temperature, operation values
1 – 90°C, adjustable thermostat
2 – 120°C, adjustable thermostat
3 – 90°C, fixed thermostat
4 – 120°C, fixed thermostat

III - Temperature sensing range
1 or 6: Less than 50°C
A or B: 50-75°C
2 or 7: 75-100°C
3 or 8: 100-200°C
4 or 9: 200-250°C
5 or 0: 250-340°C

MODEL NOMENCLATURE (CONT'):

IV - Capillary's length and material
- 1 – Stainless steel, max. length 350mm
- 2 – Stainless steel, max. length 850mm
- 3 – Stainless steel, max. length 1500mm
- 4 – Stainless steel, max. length 2000mm
- 5 – Stainless steel, special length, not longer than 3000mm
- 6 – Cooper, max. length 350mm
- 7 – Cooper, max. length 850mm
- 8 – Cooper, max. length 1500mm
- 9 – Cooper, max. length 2000mm
- 0 – Cooper, special length, not longer than 3000mm

V - Contacts configuration, **socket material/version**

Plastic Socket
- 0 – Single pole, single throw (SPST)
- 1 – Single pole, double throw (SPDT)
- 2 – Single pole, single throw (SPST), with packing gland
- 3 – Single pole, double throw (SPDT), with packing gland

Ceramic Socket
- **4 – Single pole, single throw (SPST)**
- **5 – Single pole, double throw (SPDT)**
- **6 – Single pole, single throw (SPST), with packing gland**
- **7 – Single pole, double throw (SPDT), with packing gland**

VI - Capillary's sleeving
- Blank – No sleeving
- 0 – PVC
- 1 – Silicone
- 2 – Silicone & Fiberglass
- 3 – PTFE

VII - Terminal angle (Optional)
- **A0** – 90°
- **A1** – 180°
- **A2** – 270°
- **A3** – 135°

VIII - Manufacturer internal references

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

USR indicates evaluation to UL 60730-1, Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, and UL 60730-2-9, Particular Requirements for Temperature Sensing Controls.

CNR indicates evaluation to CAN/CSA E60730-1:02, Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, and CAN/CSA E60730-2-9, Particular Requirements for Temperature Sensing Controls.

Conditions of Acceptability –

For use only in (or with) complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

1. The control shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.

2. The spacings, ratings, etc., recorded herein shall be judged in the ultimate application.

3. The quick-connect tabs terminals were not evaluated for field wiring connections. The suitability of connections to these terminals, including temperature and secureness, shall be determined in the ultimate application.

4. No part of the control has been investigated to form part of the ultimate enclosure in the application. Therefore, the control assembly shall be fully enclosed when installed in the end product.

5. Per manufacturer's declaration, this device was investigated as a type 1, non-safety, non-protective device (UL873 equivalent designation: temperature-regulating thermostat). Manufacturing deviation and drift were not declared. The disconnection provided by these devices is classified as Micro-disconnection for contact P-2.

6. The Actuating member (Strength of Adjustment Stop) test of clause 18.9.4DV.3 and 18.9.4DV.4 was performed with a torque value of 1.6 N.m for commercial applications with an adjustment knob grip diameter of 4 cm or for household applications with an adjustment knob grip diameter of 5 cm.

7. The mounting means of the device shall be evaluated in the end-use application.

8. These devices have been evaluated for Pollution Degree 2 microenvironments (only non-conductive POLLUTION occurs except that occasionally a temporary conductivity caused by condensation is to be expected), and Overvoltage Category III (permanently connected equipment) installations.

9. The sleeving used (optionally) in the capillary tube has been evaluated for a minimum distance of 50 mm to the bulb. The sleeving is intended for mechanical protection. This sleeving has not been investigated for thermal or electrical insulation. The composition/material of the sleeving may vary. If relied upon for mechanical protection, the presence of the sleeving should be described in the end-use application.

10. The Metal Cover of these devices is provided with an integral terminal for bonding connection purposes. Acceptability of the bonding/grounding connection shall be considered and evaluated in the end-use application.

CONSTRUCTION DETAILS:

These devices are constructed in accordance with the Section General unless specified in this report. For details of construction refer to the following figures and illustrations.

Tolerances - Unless specified otherwise, all indicated dimensions are nominal.

Corrosion Protection - All ferrous metal parts, except bearings, laminations, and screws, are protected from corrosion by painting, plating, enameling, galvanizing, or equivalent.

Mechanical Assembly – Unless otherwise stated, all enclosure parts and component mounting assemblies are secured by welding, rivets, thread forming screws or machine screws or bolts provided with nuts and lock washers.

All markings are permanently ink-stamped, silk-screened, molded or provided on a Marking and Labeling System (PGDQ2 or PGJI2) suitable for application to the surface involved, rated 120°C minimum.

The following markings are provided:

A. Recognized Company's name or trademark,
B. Model number,
C. Terminals identification. (Optional)
D. Date code.
E. Electrical ratings (Optional)
F. Switch-head operation temperature (Optional)
G. Manufacturing location ID code, when more that one manufacturing location is present

All other markings, such as wiring connection, should be recorded on the technical documentation.

All models in this section are eligible to bear the UL-Canadian Recognition Mark. The use of this Mark indicates compliance with the requirements in the CAN/CSA-E60730-1:02 Standard. The Mark should be placed on the product and/or smallest shipping package.