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REPORT

on

COMPONENT - TEMPERATURE - INDICATING AND -REGULATING
EQUIPMENT

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DESCRIPTION

PRODUCT COVERED:

USR, CNR Component - Appliance Temperature Limiting and Regulating Thermostats, Type T23, followed by A, B or M, followed by 050 through 220, followed by A or B, followed by A, B, C, D, H, P, R, S, X, L, K, V, F, E, U, M, G, N, or O, followed by F, K, R, T, or L, followed by 1, 2, 3, 5, 6, 7, 8, or 9, followed by 10 through 30, M5, M6, or M7.

GENERAL CHARACTER:

These devices are open type, bi-metal actuated, SPST, nonadjustable, snap action thermostats. Series T23A and T23B are automatic reset and provided with normally closed and normally opened contacts respectively, while T23M is manual reset and provided with only normally closed contacts. They are intended for use in heating appliances.

RATINGS:

Series	Volt. (V ac)	Freq. (Hz)	Amp. (A)	Load Type	Range of set-point temp. (°C)	Cycles
T23A, T23B	120	60	15	Res.	50~205	100K
T23M	120	60	15	Res.	50~220	6K
	250	60	16	Res.	50~150	6K

*

NOMENCLATURE -

<u>T23</u>	<u>A</u>	<u>050</u>	<u>A</u>	<u>S</u>	<u>F</u>	<u>2</u>	<u>15</u>
I	II	III	IV	V	VI	VII	VIII

or

<u>T23</u>	<u>M</u>	<u>050</u>	<u>A</u>	<u>S</u>	<u>F</u>	<u>2</u>	<u>M5</u>
I	II	III	IV	V	VI	VII	VIII

- I - Basic Type No.
- II - Contact Type
A - Normally closed (opens at setpoint)
B - Normally open (closes at setpoint)
M - Manual reset
- III - Operating Temperature
ex. 050 denotes 50 °C
- IV - Customer Code
A or B
- V - Flange Type
See ILL. 2 for various configuration in detail.
- VI - Terminal Orientation
See ILL. 2 for various configuration in detail.
- VII - Terminal Type
See ILL. 2 for various configuration in detail.
- VIII - Differential
10 to 30 - 10°C to 30°C is the difference between the tripping temperature and the resetting temperature.
M5 - Reset button is 6.0 mm diameter by 7.8 mm high
M6 - Without reset button
M7 - Reset button is 4.8 mm diameter by 5.4 mm high

*

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

Use - For use only in products where the acceptability of the combination is determined by Underwriters Laboratories Inc.

USR indicates investigation to UL 873.

* CNR indicates investigation to Canadian Standard C22.2 No. 24.

Conditions of Acceptability - When installed in the final use equipment, the following are among the considerations to be made:

1. The device shall be installed in compliance with the enclosure, mounting, spacing, and segregation requirements of the ultimate application.
2. The acceptability of the terminals and connections to these terminals shall be determined in the ultimate application.
- *3. Series T23M is a manual reset regulating control tested to meet the performance requirements of a limiting control, except for items 1 to 3 of the four prescribed trip-free features itemized **below, since the reset means was declared not accessible to the user in end-use application by the manufacturer.** The unit is not-trip free. Holding in the reset means will keep the contacts closed. The suitability and acceptability for use as limiting control shall be determined in end-use applications.
 - 1) Verification I - Automatic tripping shall be independent of the manipulation or position of the reset button.
 - 2) Verification II - Control shall not reset or be resettable manually before the safe operating condition is restored.
 - 3) Verification III - Control designated Manually Reset 1 or M1, the control shall automatically reset to the closed position after normal operating conditions have been restored if the reset means is held in the reset position.
 - 4) Verification IV - Control shall not reset automatically as a result of changes in environmental temperature above -35 °C.

4. The following table identifies models that have been evaluated for Limiting and/or Regulating applications with the applicable number of cycles completed.

Series	Volt. (V)	Current (A)	Endurance Cycles	Control Type
T23Axxxxxxxxxx	120	15	100K	L
T23Bxxxxxxxxxx	120	15	100K	L
T23Mxxxxxxxxxx	120	15	6K	MR
	250	16	6K	MR

- * L - Temperature-Limiting Thermostat, the Calibration/Recalibration Tests have been conducted before and after Endurance Test in accordance with par. 44 of UL 873 and par. 6.6 of CSA C22.2 No. 24.

MR - Manual Reset Temperature-Regulating Thermostat, the Calibration/Recalibration Tests have been conducted before and after Endurance Test in accordance with par. 44 of UL 873 and par. 6.6 of CSA C22.2 No. 24.

5. These components have been judged on the basis of the required spacings in the Standard for Temperature-Indicating and Regulating Equipment (UL 873), Table 32.1, Column F, which covers the end-use products for which this component was designed.
6. Terminals may be set at any angle as long as spacings are met. Terminal orientation should be described in the end-use product Report to maintain spacings, if critical.
- *7. Manual reset regulating thermostat, Series T23M has been additionally subjected to the Calibration/Recalibration tests before and after Overload/Endurance to confirm compliance with the prescribed limits for a limiting control in accordance with par. 44 of UL 873 and par 6.6 of CSA C22.2 No. 24. The suitability and acceptability of the device for use as limiting control shall be determined in end-use applications.
- *8. Manual reset regulating thermostat, Series T23M has been additionally evaluated to confirm compliance with the spacing requirements for a limiting control. The suitability and acceptability of the device for use as limiting control shall be determined in end-use applications.
9. The travel distance of the reset means of T23M series shall not be greater than 0.9 mm, which needs to be verified in end-use applications.

CONSTRUCTION DETAILS:

Spacings -

Line-voltage - Spacings are provided between (a) bare live parts and grounded or exposed dead-metal parts, (b) bare live parts of opposite polarity or of separate circuits, and (c) bare line- and low-voltage parts:

Component or Circuit	V	Spacings, in. (mm)		
		Through Air (T.A.)	Over Surface (O.S.)	To Enclosure, T.A, O.S.
(Appliance)	0-300	1/16 (1.6)	1/16 (1.6)	1/4 (6.4)

Same Polarity - Spacings provided between live-metal parts on opposing sides of a switching mechanism, except at contacts/switching element:

Application	Location	T.A. in. (mm)	O.S. in. (mm)
Regulating	Except at terminals	1/32 (0.8)	3/64 (1.2)
Limiting&	Except at terminals	1/32 (0.8)	1/16 (1.6)

& Series T23Mxxxxxxxxx is a regulating device that has been additionally evaluated to comply with limiting requirements. Use of the device as a regulating or limiting device should be considered in the end-use application.

Markings - All markings are either permanently ink-stamped, silk-screened, or provided on a Recognized Component Marking and Labeling System (PGDQ2) suitable for application to the surface involved, and the temperature rating of the device.

The following markings are provided:

Recognized Company's **name, UL file number**, or tradename "HW" or "LC" and catalog designation according to the Nomenclature section shall be marked on the thermostat's housing or the smallest package. Electrical ratings are optional. Ink or machine stamped into thermostat body.

Date Code - The quarter and year of manufacturer, as a minimum. Date coding, serial numbers, or the equivalent means may be used.

TYPE T23B THERMOSTAT - FIG. 1 (R9805822)

* General - Represents T23A, with differences as shown and noted below. See **ILL.** 1 for details.

1. Sensing Cup - See ILL. 2 for various configurations and dimensions in detail.
2. Actuating Pin - Ceramic, 1.7 mm OD, by 5.06~5.30 mm length.
- *3. Retainer - R/C (QMFZ2), manufactured by Ryton Business, Unit of Chevron Phillips Chemical Co. L P, (E233198), PPS, type R-10-7006A(f1), rated V-0, 220 °C, minimum 1.4 mm. For details see **ILL.** 3.

Alternate - R/C (QMFZ2), PPS, Type R-7-120NA(f2), R-7-121NA or BR-7-120NA, Ryton Business, Unit of Chevron Phillips Chemical Co. L P, (E233198), rated V-0, 220 °C.
- *4. Stationary Arm - Plated brass, riveted and soldered to terminal. See **ILL.** 4 and 5 for details.
- *5. Movable Arm - Brass, riveted and soldered to terminal. See **ILL.** 6 for details.
- *6. Body - R/C (QMFZ2), manufactured by Ryton Business, Unit of Chevron Phillips Chemical Co. L P, (E233198), PPS, type R-10-7006A(f1), rated V-0, 220 °C, 0.85 mm minimum thickness. See **ILL.** 7 for additional dimensions.
- * Alternate - Same as above except shaped with four post. Highest point is 11.9 mm. See **ILL.** 8 for dimension in detail.

Alternate - R/C (QMFZ2), PPS, Type R-7-120NA(f2), R-7-121NA or BR-7-120NA, Ryton Business, Unit of Chevron Phillips Chemical Co. L P, (E233198), rated V-0, 220 °C.
7. Terminal - Two, plated brass. Secured to the moveable and stationary arm by rivet and solder. See ILL. 2 for various configurations and dimensions in detail.
8. Bimetal Disc -

Cat. No.	Manufacturer	Range of set-point temp.	diameter	thickness
BR-1	Hitachi Metals Neomaterial, Ltd.	50°C~125°C	12.9 mm	0.18 mm
P675R	Engineered Materials Solutions Inc.	50°C~125°C	12.9 mm	0.2 mm
BH-2	Hitachi Metals Neomaterial, Ltd.	120°C~205°C	12.9 mm	0.2 mm
E3	Engineered Materials Solutions Inc.	120°C~205°C	12.9 mm	0.18 mm

9. Moveable Contact - Silver alloy (Ag:90%; Ni:10%), 3 mm diameter, 0.3 mm thick face on a 0.3 mm thick copper base, secured to moveable arm by rivet.
- *10. Stationary Contact - same as Item 9 except secured to the stationary arm.

SERIES T23M - FIG. 2

General - T23M is identical to T23B, except for the items specifically described below.

- *6. Body - R/C (QMFZ2), manufactured by Ryton Business, Unit of Chevron Phillips Chemical Co. L P, (E233198), PPS, type R-10-7006A(f1), rated V-0, 220 °C, 0.85 mm minimum thickness. See **ILL. 9** and **ILL. 12** for dimensions in detail.

Alternate - R/C (QMFZ2), PPS, Type R-7-120NA(f2), R-7-121NA or BR-7-120NA, Ryton Business, Unit of Chevron Phillips Chemical Co. L P, (E233198), rated V-0, 220 °C.

8. Bimetal Disc - Cat. No. BR-1 for set point ranges from 50~130 °C; Cat. No. BH-2 for set point ranges from 131~180 °C; Cat. No. BH-3 for set point ranges from 181~220 °C, all of them are manufactured by Hitachi Metals Neomaterial, Ltd., measured 12.7 mm OD by 0.12 mm thick.

11. Reset means - Nickel plated iron, overall 3.1 mm OD at head, 2 mm OD at shaft, 7 mm long. Only applicable for maximum set-point temperature not greater than 205 °C.

Alternate - Ceramic, overall 2.7 mm OD at head, 2 mm OD at shaft, 7.6~8.7 mm long.

- *12. Reset Button - R/C (QMFZ2), PPS, Type R-10-7006A(f1), Ryton Business, Unit of Chevron Phillips Chemical Co. L P, (E233198), rated V-0, 240 °C, 1.5 mm thick. See **ILL.10** and **ILL.11** for dimensions in detail.

Alternate - R/C (QMFZ2), PPS, Type R-7-120NA(f2), R-7-121NA or BR-7-120NA, Ryton Business, Unit of Chevron Phillips Chemical Co. L P, (E233198), rated V-0, 240 °C.