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REPORT

on

COMPONENT - TEMPERATURE -INDICATING AND -REGULATING
EQUIPMENT

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Taipei, Taiwan

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DESCRIPTION

PRODUCT COVERED:

*USR, CNR Component - Temperature-Indicating and Regulating Equipment, Series T24.

GENERAL CHARACTER:

These devices are open type, bimetal actuated, SPST, nonadjustable thermostats. Devices with plastic case provided with normally open or closed contacts, however, devices with ceramic case only provided with normally closed contacts. They are intended for use in heating appliances.

RATINGS:

Series	Volt. (V)	Current (A)	Freq. (Hz)	Load Type	Max. Set Point Temp. (°C)	Endurance Cycles	Control Type
T24Axxxxxxxx -xx-PB	250	10	60	Res.	180	100K	L
	125	15			205	100K	L
T24Axxxxxxxx -xx-TB	250	10	60	Res.	180	100K	L
	125	15			205	100K	L
T24Bxxxxxxxx -xx-PB	125	15	60	Res.	205	100K	L
T24Bxxxxxxxx -xx-TB	125	15	60	Res.	205	100K	L
T24Mxxxxxxxx -xx-PB	125	15	60	Res.	205	100K	MR
T24Mxxxxxxxx -xx-TB	125	15	60	Res.	205	100K	MR
T24Axxxxxxxx -xx-CB	250	10	50/60	Res.	250	30K	R
	125	15			250	30K	R
T24Axxxxxxxx -xx-CN	250	10	50/60	Res.	250	#	S
	125	15			250	#	S
T24Axxxxxxxx -xx-CE	250	10	50/60	Res.	210	100K	C
T24Mxxxxxxxx -xx-CB	250	10	50/60	Res.	250	6K	MR
	125	15			250	6K	MR

- The device is a Single-Operation Device having a designed resetting temperature below -35 °C, therefore, there is no endurance cycle.

ABBREVIATION:

R	-	Automatic Reset Temperature-Regulating Thermostat
L	-	Automatic Reset Temperature-Limiting Thermostat
MR	-	Manual Reset Temperature-Regulating Thermostat
S	-	Single-Operation Device
C	-	Temperature-Regulating Thermostat for Use In Household Drip-Type Coffee Maker

NOMENCLATURE -

The old nomenclature was replaced by the new nomenclature depicted below.

Old Nomenclature:

T24	A	050	A	B	F	2	15
I	II	III	IV	V	VI	VII	VIII

or

T24	M	050	A	B	F	2	M5
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

040 to 205 - 40°C to 205°C

IV - Customer Code

A or B

V - Flange Type

B - Recessed (Fixed Bracket)
 C - Base mount (No bracket)
 D - Recessed with Stainless Steel
 H - Hex Stud Mount
 R - Round Head Stud Mount
 S - Loose bracket
 X - Surface type with fixed bracket

VI - Terminal Orientation

F - Terminals at 0
 R - Terminal turned vertically
 T - Terminals at 45 angle
 L - Terminals on at 90 , another one at 0

VII - Terminal Type

1 - 0.187 in. quick connect
 2 - 0.25 in. quick connect
 3 - Solder type
 4 - Dip type
 5 - Terminals with Tapped Hole
 6 - Weld type
 7 - 4.8 by 0.5 mm quick connect

VIII - Differential

10 to 65 - 10C to 65C is the difference between the tripping temperature and the resetting temperature.

M5 - Reset button is 6.0 mm diameter by 7.8 mm high

M7 - Reset button is 4.8 mm diameter by 5.4 mm high

New Nomenclature:

T24	A	250	A	C	F	1	-	15	-	P	B
I	II	III	IV	V	VI	VII		VIII		IX	X

- I - Series No.
- II - Contact Configuration
A: Normally Closed
B: Normally Opened (@)
M: Manual Reset
(@ - Thermostats with ceramic case haven't been evaluated for type B contact configuration)
- III - Operating Temperature
Three digits
- IV - Temperature Tolerance (Customer Code)
Alphanumeric
- V - Cap/Bracket Type
See ILL. 4 for details
- VI - Terminal Orientation
See ILL. 4 for details
- VII - Terminal Size
See ILL. 4 for details
- VIII - Temperature Difference or Button Size
For those types other than manual reset and Single-Operation Device: A number in two digits to denote the difference in temperature between T_{sp} and T_{reset} .
For manual reset type: Button Size, may be followed two digits of alphanumeric characters.
For Single-Operation Device: 35 denotes reset temperature below -35C
- IX - Case Material
P: PPS
T: Phenolic
C: Ceramic
- X - Intending Use
B: Standard/Normal Type
N: SOD (Single-Operation Device)
E: Temperature-Regulating Thermostat for Use In Household Drip-Type Coffee Maker

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 the Standard for Temperature-Indicating and -Regulating Equipment, UL 873.

CNR indicated investigation to the Standard for Temperature-Indicating and -Regulating Equipment, CSA C22.2 No. 24-93.

Conditions of Acceptability - When installed in or with the end-use equipment, the following are among the considerations to be made.

1. These devices shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the end application.
2. The quick-connect style terminals are not acceptable for field connection. The acceptability of connections to these terminals, including temperature and secureness, shall be determined in the ultimate application.
3. 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.
4. 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.
5. The acceptability of the mounting shall be determined in the final application.
6. Series T24Axxxxxxx-xx-CE, Temperature-Regulating Thermostat for Use In Household Drip-Type Coffe Maker has been evaluated with a Maximum Normal Use Temperature (Tmax) of 250° C and a Maximum Dry Operation Temperature (Tdry) of 250° C.
7. Series T24Mxxxxxxx-xx-PB, T24Mxxxxxxx-xx-TB and T24Mxxxxxxx-xx-CB are manual reset controls that are not trip-free. Holding in the reset means will keep the contacts closed. This type of operation is not acceptable in a temperature or pressure limiting control. Another use is to be judged in the final equipment.

*

8. 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
T24Axxxxxxxx-xx-PB	250	10	100K	L
	125	15	100K	L
T24Axxxxxxxx-xx-TB	250	10	100K	L
	125	15	100K	L
T24Bxxxxxxxx-xx-PB	125	15	100K	L
T24Bxxxxxxxx-xx-TB	125	15	100K	L
T24Mxxxxxxxx-xx-PB	125	15	100K	MR
T24Mxxxxxxxx-xx-TB	125	15	100K	MR
T24Axxxxxxxx-xx-CB	250	10	30K	R
	125	15	30K	R
T24Axxxxxxxx-xx-CN	250	10	#	S
	125	15	#	S
T24Axxxxxxxx-xx-CE	250	10	100K	C
	125	10	100K	C
T24Mxxxxxxxx-xx-CB	250	10	6K	MR
	125	15	6K	MR

R - Regulating Type Thermostat, the Calibration/Recalibration Tests have been conducted before and after Endurance Test in accordance with par. 6.6 of CSA C22.2 No. 24 only and have not been conducted in accordance with par. 44 of UL 873.

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. 24-93.

C - Temperature-Regulating Thermostat for Use In Household Drip-Type Coffee Maker, the Calibration/Recalibration Tests have been conducted before and after Endurance Test in accordance with par. 84.4.1 and 84.4.4 of UL 873 and par. 6.6 of CSA C22.2 No. 24-93.

S - Single-Operation Device, the Calibration Test has been conducted in accordance with par. 81.5.2~81.5.4 of UL 873 and par. 6.6 of CSA C22.2 No. 24-93.

MR - Manual Reset Temperature-Regulating Thermostat, the Calibration/Recalibration Tests have been conducted before and after Endurance Test in accordance with par. 6.6 of CSA C22.2 No. 24 only and have not been conducted in accordance with par. 44 of UL 873.

CONSTRUCTION DETAILS:

The product shall be constructed in accordance with the following description.

* 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)
R or MR types	Except at terminals	1/32 (0.8)	3/64 (1.2)
L, C, or S types	Except at terminals	1/32 (0.8)	1/16 (1.6)

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:

* Manufacturer's name 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 T24 THERMOSTAT WITH PLASTIC CASE - FIG. 1 (R96-8621) and FIG. 2 (R98-4781)

General - Represents all types covered by this Report, with differences as shown and noted below. See Ill. 1 for details.

1. Sensing Cup - See ILL. 4 for various configurations and dimensions in detail.
2. Actuating Pin - Ceramic, 1.7 by 5.06~5.30 mm.
3. Retainer -
For device rated up to 150 °C: R/C (QMFZ2), PMC, Type T375J, Chang Chun Plastics Co., Ltd., (E59481), rated V-0, 150 °C;

For device rated up to 205 °C: R/C (QMFZ2), PPS, Type G-10(c), Tosoh Corp Polymers Div, (E102861), rated V-0, 220 °C; Type R-10-7006A(f1) or R-10-5002C(f1), Chevron Phillips Chemical Co., L., P., (E54700), rated V-0, 220 °C; **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.**

1.0 mm thick, overall 15 mm OD by 4.4 mm high. Provided with a 1.9 mm ID opening for passing through Actuating Pin.
4. Stationary Arm - Silver plated brass, see Ill. 2 for dimensions.
5. Movable Arm - Copper alloy, see Ill. 3 for dimensions.
6. Case - Same material as Item 3, 14.7 mm diameter, 10.0 mm high, 1.2 mm wall thickness.
7. Long Rivet - Copper or nickel plated steel, 3.1 mm OD by 0.8 mm thick at head, 2.0 mm OD by 8.2 mm long at shaft.
8. Short Rivet - Copper or nickel plated steel, 3.1 mm OD by 0.8 mm thick at head, 2.0 mm OD by 5.3 mm long at shaft.
9. Terminals - Plated brass or nickel plated steel, See ILL. 4 for various dimensions.
10. Bimetal Disc -

Manual Reset: Type P675R, manufactured by Engineered Materials Solutions Inc. Overall 12.8 mm OD by 0.2 mm thick.

Other than Manual Reset: Type BR-1, manufactured by Neomax Materials Co., Ltd. Overall 12.8 mm OD by 0.18 mm thick.
11. Stationary Contact - AgNi10 (Ag: 90%, Ni: 10%) shingled copper base. 3.0 mm OD by 0.6 mm thick at flat head, 1.5 mm OD by 1.4 mm long at shaft.

12. Movable Contact - AgNi10 (Ag: 90%, Ni: 10%) shingled copper base. 3.0 mm OD by 0.6 mm thick at arched head, 1.5 mm OD by 1.3 mm long at shaft.
13. Reset Button (For manual reset type only) - Measured min. 1.5 mm thick.

For device rated up to 150 °C: R/C (QMFZ2), PMC, Type T375J, Chang Chun Plastics Co., Ltd., (E59481), rated V-0, 150 °C;

For device rated up to 205 °C: R/C (QMFZ2), PPS, Type G-10(c), Tosoh Corp Polymers Div, (E102861), rated V-0, 220 °C; Type R-10-7006A(f1) or R-10-5002C(f1), Chevron Phillips Chemical Co., L., P., (E54700), rated V-0, 220 °C; **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.**

14. Reset Stick - Nickel plated steel, 2.5 mm OD by 0.8 mm thick at head, 2.0 mm OD at shaft, total 9.5 mm long.

SERIES T24 WITH CERAMIC CASE

General - Series T24 with ceramic case is identical to series T24 with plastic case except for the items specifically described below.

2. Actuating Pin - Ceramic, 1.7 mm OD by 5.06~5.30 mm long.
3. Retainer - Ceramic, 15 mm OD by 4.4 mm high. Provided with a 1.9 mm ID opening for passing through Actuating Pin.
4. Stationary Arm - Nickel plated steel, 0.6 mm thick, see ILL. 5 for dimensions in detail.
5. Movable Arm - Beryllium copper, 0.15 mm thick, see ILL. 6 for dimensions in detail.
6. Case - Ceramic
Manual Reset: See ILL. 7 for dimensions in detail.
Other than Manual Reset: See ILL. 8 for dimensions in detail.
Alternate for other than manual reset: See ILL. 9 for dimensions in detail.
10. Bimetal Disc -
Manual Reset and Single-Operation: Type BH-2, manufactured by Neomax Materials Co., Ltd. Overall 12.8 mm OD by 0.2 mm thick.
Other than Manual Reset and Single-Operation: Type E3, manufactured by Engineered Materials Solutions Inc. Overall 12.8 mm OD by 0.18 mm thick.
13. Reset Button (For manual reset type only) - Ceramic, overall 4.8 mm OD by 5.3 mm high, 4.8 mm OD by 2.8 mm high, or 6 mm OD by 7.9 mm high.
14. Reset Stick - Nickel plated steel, 2.5 mm OD by 0.8 mm thick at head, 2.0 mm OD at shaft, total 9.35 mm long.