File E43684
Project 03NK12886

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REPORT

on

COMPONENT - TEMPERATURE-INDICATING AND REGULATING EQUIPMENT

*

Watlow Winona Inc.
Winona, MN

DESCRIPTION

PRODUCT COVERED:

USR, CNR Component –

Appliance temperature-regulating control, Model LF followed by C, E or G; followed by 1, 2, 3, **4**, 5, 6, 7, A or C; followed by any alphanumeric character; followed by U, W, Y or Z; followed by any four numbers; followed by additional alphanumeric characters.

Appliance temperature-regulating control, Model CF followed by B, C, D, E, F or G; followed by 1, 2, 3, 4, 5, 6, 7, 8, A or C; followed by any alphanumeric character; followed by C or H; followed by any four numbers; followed by additional alphanumeric characters.

Appliance temperature-regulating control, Model LV followed by C, E or G; followed by 1, 2, 5, 6, A, B, C, or D; followed by any alphanumeric character; followed by U, W, Y or Z; followed by any four numbers; followed by any four numbers; may be followed by additional alphanumeric characters.

Appliance temperature-regulating control, Model CV followed by B, C, D, E, F or G; followed by 1, 2, 5 6, A, B, C or D; followed by any alphanumeric character; followed by C or H; followed by any four numbers; followed by any 4 numbers; may be followed by additional alphanumeric characters.

Appliance temperature-indicator; Model TM followed by B, D or F; followed by 1, 2, 5, 6, A or C; followed by any alphanumeric character; followed by additional alphanumeric characters.

USR - Indicates investigation to United States Standard UL 873, Temperature Indicating.

CNR - Indicates investigation to Canadian Standard C22.2 No. 24 Temperature Indicating and Regulating Equipment.

GENERAL:

These devices are adjustable or non-adjustable electronic temperature controllers intended for use in commercial cooking appliances with a relay or switched DC signal controlling an external load. Units have a single sensor input either thermocouple or RTD. This sensor is considered a class 2 circuit.

These devices come in several package options including panel mount 1/8 DIN square, DIN rail sub-panel mount, open board sub-panel mount, and a potted sub-panel mount configuration.

* All models were judged to be equivalent to 100,000 cycle temperature regulating with calibration verification and recalibration.

These manual reset devices (see designation) are type M1 manual reset.

Relay outputs were tested to ANSI Z21.23 Gas appliance thermostat tests.

The front face and gasket were evaluated per the requirements of UL 50, the Standard for Enclosures for Electrical Equipment, and rated Type 4X for indoor applications. In addition, the front face and gasket were also tested to EN 60529 IP65 Dust tight. This applies to Models XXX(A or C) only.

RATINGS:

Classification –

Class A	Temperature controls	A control function that is not intended to be relied upon for the safety of the equipment; the loss of functionality in the application does not cause any hazards.

Input – Terminals L1 and L2 – 10 VA, 24 or 100-/120 or 200/240 V ac, 50/60 Hz.
- Terminals TC+ and TC- or S1 and S2 – Class 2 sensor input.

Outputs – Mechanical relay models (N.O.contacts) – 8 A Resistive 100/120/240 V ac or 30 V dc. 250 VA pilot duty at 120/240 V ac, 100,000 cycles; PD 208VA 100/200Vac,100K cycles
N.C. contacts:Resistive 1A,120/240Vac,100K cycles; Resistive 1A,30 Vdc,100K cycles
- Switched DC models – non-isolated (class 2) output.

Temperature – Maximum operating ambient of 70°C (158°F).

NOMENCLATURE:

LF	X	X	X	X	XXXX	AAAA	X
I	II	III	IV	V	VI	VII	VIII

I – LF – Limit Fixed setpoint

II – Power Supply
C = 100/120 V ac 50/60 Hz, Mechanical Relay output
E = 200/240 V ac 50/60 Hz, Mechanical Relay output
G = 24 V ac 50/60 Hz, Mechanical Relay output

III – Package Type, Terminal Options
1 = Panel mount 1/8 DIN Square (Regulating control), Terminal 1
2 = DIN Rail sub-panel mount (Regulating control), Terminal 1
3 = Open board sub-panel mount (Regulating control), Terminal 1
4 = **Potted sub-panel mount (Regulating control), Terminal 1**
5 = Panel mount 1/8 DIN Square (Regulating control), Terminal 2
6 = DIN Rail sub-panel mount (Regulating control), Terminal 2
7 = Open board sub-panel mount (Regulating control), Terminal 2
8 = reserved for future use
A = Panel mount 1/8 DIN Square, Terminal 1, NEMA 4X, IP65 Approved
C = Panel mount 1/8 DIN Square, Terminal 2, NEMA 4X, IP65 Approved

Terminal 1 = ¼ in. Quick Connect Appliance Terminals
Terminal 2 = Pluggable Terminal Block Connector

IV – Sensor Type and Scale
H = Type J °F: -346 to 1900°F range
J = Type J °C: -210 to 1038°C range
K = Type K °F: -454 to 2500°F range
L = Type K °C: -270 to 1371°C range
M = Type T °F: -454 to 750°F range
N = Type T °C: -270 to 399°C range
P = 100 ohm Platinum RTD °F 385 curve: -328 to 1472°F range
R = 100 ohm Platinum RTD °C 385 curve: -200 to 800°C range
S = Type E °F: -328 to 1470°F range
T = Type E °C: -200 to 799°C range

V – reserved for future use

VI – Fixed setpoint value
Four digit number indicating temperature setpoint including negative temperature indicated with (-) in first of four digits.

VII – Place Holder for model numbers.
AAAA = Standard Product

VIII – Custom Overlay/software = may be any alphanumeric characters

NOMENCLATURE:

CF	X	X	X	X	XXXX	AAAA	X
I	II	III	IV	V	VI	VII	VIII

I – CF – ON/OFF Temperature Control Fixed setpoint

II – Power Supply
B = **100/120** V ac 50/60 Hz, Switched DC output
C = **100/120** V ac 50/60 Hz, Mechanical Relay output
D = **200/240** V ac 50/60 Hz, Switched DC output
E = **200/240** V ac 50/60 Hz, Mechanical Relay output
F = 24 V ac 50/60 Hz, Switched DC output
G = 24 V ac 50/60 Hz, Mechanical Relay output

III – Package Type, Terminal Options.
1 = Panel mount 1/8 DIN Square, Terminal 1
2 = DIN Rail sub-panel mount, Terminal 1
3 = Open board sub-panel mount, Terminal 1
4 = Potted sub-panel mount, Terminal 1
5 = Panel Mount 1/8 DIN Square, Terminal 2
6 = DIN Rail sub-panel mount, Terminal 2
7 = Open board sub-panel mount, Terminal 2
8 = Potted sub-panel mount, Terminal 2
A = Panel mount 1/8 DIN Square, Terminal 1, NEMA 4X, IP65 Approved
C = Panel mount 1/8 DIN Square, Terminal 2, NEMA 4X, IP65 Approved

Terminal 1 = ¼ in. Quick Connect Appliance Terminal
Terminal 2 = Pluggable Terminal Block Connector

IV – Sensor Type and Scale
H = Type J °F: -346 to 1900°F range
J = Type J °C: -210 to 1038°C range
K = Type K °F: -454 to 2500°F range
L = Type K °C: -270 to 1371°C range
M = Type T °F: -454 to 750°F range
N = Type T °C: -270 to 399°C range
P = 100 ohm Platinum RTD °F 385 curve: -328 to 1472°F range
R = 100 ohm Platinum RTD °C 385 curve: -200 to 800°C range
S = Type E °F: -328 to 1470°F range
T = Type E °C: -200 to 799°C range

V – Control Type
C = Cooling
H = Heating

VI – Fixed setpoint value
Four digit number indicating temperature setpoint including negative temperature indicated with (-) in first of four digits.

VII – Place Holder for model numbers.
AAAA = Standard Product

VIII – Custom Overlay/software = may be any alphanumeric characters

NOMENCLATURE:

LV	X	X	X	X	XXXX	XXXX	X
I	II	III	IV	V	VI	VII	VIII

I – LV – Temperature Regulator Control Variable Setpoint

II – Power Supply
C = **100/120** V ac 50/60 Hz, Mechanical Relay output
E = **200/240** V ac 50/60 Hz, Mechanical Relay output
G = 24 V ac 50/60 Hz, Mechanical Relay output

III – Package Type, Terminal Options, User Interface Options
1 = Panel mount 1/8 DIN Square, Terminal 1, Optical Encoder
2 = DIN Rail sub-panel mount, Terminal 1, Optical Encoder
5 = Panel mount 1/8 DIN Square, Terminal 2, Optical Encoder
6 = DIN Rail sub-panel mount, Terminal 2, Optical Encoder
A = Panel mount 1/8 DIN Square, Terminal 1, Tactile Keys, NEMA 4X, IP65 Approved
B = DIN Rail sub-panel mount, Terminal 1, Tactile Keys
C = Panel mount 1/8 DIN Square, Terminal 2, Tactile Keys, NEMA 4X, IP65 Approved
D = DIN Rail sub-panel mount, Terminal 2, Tactile Keys

Terminal 1 = ¼ in. Quick Connect Appliance Terminal
Terminal 2 = Pluggable Terminal Block Connector

IV – Sensor Type and Scale
H = Type J °F: -346 to 1900°F range
J = Type J °C: -210 to 1038°C range
K = Type K °F: -454 to 2500°F range
L = Type K °C: -270 to 1371°C range
M = Type T °F: -454 to 750°F range
N = Type T °C: -270 to 399°C range
P = 100 ohm Platinum RTD °F 385 curve: -328 to 1472°F range
R = 100 ohm Platinum RTD °C 385 curve: -200 to 800°C range
S = Type E °F: -328 to 1470°F range
T = Type E °C: -200 to 799°C range

V – Limit action
U = High Limit Manual Reset
W = High Limit Auto Reset on power loss
Y = Low Limit manual Reset
Z = Low Limit Auto Reset on power loss

VI – Setpoint range – Minimum Setpoint temperature
Four digit number indicating temperature setpoint including negative temperature indicated with (-) in first of four digits.

VII – Setpoint range – Maximum setpoint temperature
Four digit number indicating temperature setpoint including negative temperature indicated with (-) in first of four digits.

VIII – Custom part number options – (Class 2 options)
May be any alphanumeric characters

NOMENCLATURE:

CV	X	X	X	X	XXXX	XXXX	X
I	II	III	IV	V	VI	VII	VIII

I – CV – ON/OFF Temperature Control Variable setpoint

II – Power Supply
B = **100/120** V ac 50/60 Hz, Switched DC output
C = **100/120** V ac 50/60 Hz, Mechanical Relay output
D = **200/240** V ac 50/60 Hz, Switched DC output
E = **200/240** V ac 50/60 Hz, Mechanical Relay output
F = 24 V ac 50/60 Hz, Switched DC output
G = 24 V ac 50/60 Hz, Mechanical Relay output

III – Package Type. Terminal Options, User Interface Options
1 = Panel mount 1/8 DIN Square, Terminal 1, Optional Encoder
2 = DIN Rail sub-panel mount, Terminal 1, Optional Encoder
5 = Panel mount 1/8 DIN Square, Terminal 2, Optional Encoder
6 = DIN Rail sub-panel mount, Terminal 2, Optional Encoder
A = Panel mount 1/8 DIN Square, Terminal 1, Tactile Keys, NEMA 4X, IP65 Approved
B = DIN Rail sub-panel mount, Terminal 1, Tactile Keys
C = Panel mount 1/8 DIN Square, Terminal 2, Tactile Keys, NEMA 4X, IP65 Approved
D = DIN Rail sub-panel mount, Terminal 2, Tactile Keys
Terminal 1 = ¼ in. Quick Connect Appliance Terminal
Terminal 2 = Pluggable Terminal Block Connector

IV – Sensor Type and Scale
H = Type J °F: -346 to 1900°F range
J = Type J °C: -210 to 1038°C range
K = Type K °F: -454 to 2500°F range
L = Type K °C: -270 to 1371°C range
M = Type T °F: -454 to 750°F range
N = Type T °C: -270 to 399°C range
P = 100 ohm Platinum RTD °F 385 curve: -328 to 1472°F range
R = 100 ohm Platinum RTD °C 385 curve: -200 to 800°C range
S = Type E °F: -328 to 1470°F range
T = Type E °C: -200 to 799°C range

V - Control type
C = Cooling
H = Heating

VI - Setpoint range – Minimum Setpoint temperature
Four digit number indicating temperature setpoint including negative temperature indicated with (-) in first of four digits.

VII - Setpoint range – Maximum setpoint temperature
Four digit number indicating temperature setpoint including negative temperature indicated with (-) in first of four digits.

VIII - Custom part number options – (Class 2 options)
May be any alphanumeric characters

NOMENCLATURE:

TM	X	X	X	A	AAAA	AAAA	X
I	II	III	IV	V	VI	VII	VIII

I - TM - Indicator Only

II - Power Supply
B = 100-120 V ac 50/60 Hz - no output
D = 200-240 V ac 50/60 Hz - no output
F = 24 V ac 50/60 Hz - no output

III - Package Type, Terminal Options
1 = Panel mount 1/8 DIN Square, Terminal 1
2 = DIN Rail sub-panel mount, Terminal 1
5 = Panel mount 1/8 DIN Square, Terminal 2
6 = DIN Rail sub-panel mount, Terminal 2
A = Panel mount 1/8 DIN Square, Terminal 1, NEMA 4X, IP65 Approved
C = Panel mount 1/8 DIN Square, Terminal 2, NEMA 4X, IP65 Approved

Terminal 1 = ¼ in. Quick Connect Appliance Terminal
Terminal 2 = Pluggable Terminal Block Connector

IV - Sensor Type and Scale
H = Type J °F
J = Type J °C
K = Type K °F
L = Type K °C
M = Type T °F
N = Type T °C
P = 100 ohm Platinum RTD °F 385 curve
R = 100 ohm Platinum RTD °C 385 curve
S = Type E °F
T = Type E °C

V - Model number place holder
A = Standard Model

VI - Model number place holder
AAAA = Standard product

VII - Model number place holder
AAAA = Standard product

VIII - Custom part number options - (Class 2 options)
May be any alphanumeric characters

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

USR indicates investigation to UL Standard for Temperature-Indicating and -Regulating Equipment, UL 873.

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

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

Conditions of Acceptability -

1. The terminals are not acceptable for field connection. The acceptability of the connections to these terminals, including temperature and secureness, shall be determined in the ultimate application.

* 2. This component has been judged on the basis of the required spacings in the Standard for Temperature-Indicating and -Regulating Equipment, Table 32.1, Column F (0-300 V), dated December 22, 1994, and CSA C22.2 No. 24, Table 3, Column F.

3. When panel mounted the front panel of the device is considered to be acceptable as an enclosure.

4. These devices were investigated for indoor use only.

5. These devices are not provided with sensors. The acceptability of the sensor including calibration, shall be determined in the ultimate application.

6. The transformer core is not grounded. Testing of transformer illustrated that the coil is unlikely to become energized from an internal fault. All wiring should be reliably maintained away from this transformer in the end-use application.

7. These devices shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of the ultimate application.