File E43684
Project 07NK07123

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REPORT

on

COMPONENT - TEMPERATURE-INDICATING AND
REGULATING EQUIPMENT, ELECTRICAL

Watlow Winona Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

USR, CNR Component – Operating Control (Motor Control), Series N3 Model **A007-2800, Followed by 0000 or any four alphanumeric combination.**

GENERAL CHARACTER:

This device is a motor control intended to operate a DC motor in commercial cooking appliances for raising or lowering mechanical devices.

The control receives a command signal to supply power to the motor and communicates with the master control on success of movement or failure of movement. The device is intended to operate the motor for a defined period of time, followed by a delay before operation is initiated again.

The control supplies power to the motor via a 20kHz Pulse Width Modulation (PWM) signal driving an H-Bridge ciruit consisting of four MOSFETs. One of the control's digital input is a quadrature encoder. The quadrature encoder is used to track the position of the motor, armature, and motor speed. If the motor current exceeds its current limit, the motor control will **discontinue** the PWM signal to the H-bridge until the current is below the current limit.

The current limit sensing capability of this motor control has not been investigated. Therefore, this circuitry is considered operational and non-safety. (See Condition of Acceptability no. 7)

Isolation is achieved through the use of a switch-mode power supply transformer with SELV, Limited Energy outputs. However, one secondary winding (pins 4-5) is not considered isolated since it shares the same common ground reference as the primary of the transformer.

These devices were not investigated for performing any safety/protective functions.

RATINGS:

(For more information about client declarations for these products refer to the Constructional Data Form, ILL. 1):

Electrical -

INPUTS:

Control Input Item	Input Rating	Terminals
Unit Power	100 - 240 V ac, +10%, -15% 50/60 Hz	J8, J9
Earth Ground	N/A	J12
Motor Ground	N/A	J15
Digital Event Inputs	SELV, Limited Energy	J4
Optical Encoder – Motor Feedback	Non-Isolated ELV, Limited Energy	J3

COMMUNICATION:

Type	Rating	Terminals
RS485(From master control board)	SELV, Limited Energy	J14

OUTPUTS:

Type	Rating	Terminals
Motor Drive Outputs	Max Normal Running Current 0.5 A PWM, 340 V dc (+)	J6, J7

(+) – See Conditions of Acceptability 5 and 6 for restrictions regarding the specific motor and operating time (duty cycle).

Temperature - Maximum ambient operating temperature 80°C

MODEL NOMENCLATURE:

A007-2800- 0000
I II

I A007-2800 = Basic Model Designation

II 0000 = Standard Product
Any four alphanumeric digits indicating software or cosmetic updates.

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 evaluation to UL 60730-1A, Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, Third Edition, dated January 28, 2002.

CNR indicates investigation to Canadian Standard For Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements CAN/CSA-E60730-1:02.

This control is considered INCORPORATED and was specified by the applicant for installation in a Pollution Degree II environment with an Installation Category (Overvoltage Category) II rating.

The units are for use in an extended environment: 0°C to 80°C, 5% to 95% relative humidity. They are not intended for field wiring.

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

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

2. The 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. Terminal J3 is a non-isolated, line-referenced connection. Appropriate safeguards shall be installed to provide protection against electric shock hazard in the end product.

4. This device is considered a Type 1 control. The device has not been evaluated for any safety or limiting applications to protect the motor from any abnormal conditions.

5. Motor control Model A007-2800-0000 was tested with motor Model 980.537 OL, manufactured by Leeson Electric Corp. If this control is connected to a motor other than Leeson Electric Corp., Model 980.537 OL, retesting should be considered.

6. The motor was not continuously energized throughout the duration of the Heating Test. A duty cycle of 4.06 seconds “on” and 0.4 seconds “off” was implemented. If a 100% duty cycle is implemented, repeating the Heating test shall be considered.

7. Per manufacturer’s declaration, this device was not investigated to provide any kind of motor protection (Locked Rotor, Running Overload, or Loss of Phase) for the attached motor. During the end product testing (such as the Locked Rotor Rest) the verification shall be made that electronic control does not try to interfere in the thermal motor protection provided by the internal thermal motor protectors or thermal cutoffs. In order to confirm the operation of the internal thermal motor protectors, it may be necessary to disable some of the hardware/software functions of the electronic control. If not disabled, the internal thermal motor protectors may never be actuated. If it is not feasible to disable protective functionality of the hardware/software provided by the electronic control and still be able to operate the product, consideration shall be given to conduct Hardware/Software Reliability Investigation.