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File E43684
Project 05NK13596

March 14, 2006

REPORT

on

TEMPERATURE-INDICATING AND REGULATING EQUIPMENT, ELECTRICAL

Watlow Winona Inc.
Winona, MN

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DESCRIPTION

PRODUCT COVERED:

USL, CNL – Electronic Thermal-Cutout, Models EHG2-CNTL, EHG2-EXTR, **and EHG2-AAAA** followed by any alpha-numeric character between 0-9 and A-Z.

GENERAL CHARACTER:

The EHG2-CNTL-xxxx, EHG2-EXTR-xxxx **and EHG2-AAAA-xxxx** are In-Line Cord, combination action controls intended to be used with I/O cable, part # A002089.

*These controls are temperature regulating/limit devices with a thermal cutout feature. They are primarily intended to be used in the semiconductor manufacturing industry but also could be used in other temperature limiting applications. They monitor temperature by virtue of two thermocouple inputs. One thermocouple is used for the operating control functionality (PID algorithim) and the other is used for the temperature limiting functionality.

*These controls were investigated as a Type 2 (safety) action device with Software Class B.

*These controls may be assembled with the optional user interface module, communications module, or combination user interface module with communications. The user interface will display the settings, allow the user to change temperature limits, display error messages, etc. The changes that could be made by the user are controlled and limited by the boundary parameters set by the software. The communication function allows remote programming via RJ45 connectors.

*These controls incorporate two microprocessors in a dual channel homogenous architecture. The system is set up in a master/slave configuration where U8 is the master microprocessor.

The temperature limit thermocouple signal is fed into the ADC of processor U8 and the process control thermocouple signal is fed into the ADC of processor U2 via independent linearization circuits. The ADC of both processors is fed a fixed reference voltage with a 1% tolerance to monitor the proper operation of the A/D converter.

The temperature limit thermocouple signal is compared against the process control thermocouple signal. If the Actual Process value is greater than the Process Comparison Value (configurable between 5°C and 30°C for EHG2-CNTL-XXXX and between 5°C and 50°C for EHG2-EXTR-XXXX **and EHG2-AAAA-XXXX**), the control will initiate a Safety Limit Shutdown. The comparison will activate after initial valid A/D input readings.

The operating relay is control by processor U2. The operating relay is switched in parallel with a triac to prevent arcing across the relay contacts. The operating relay contacts are operated in a first on last off sequence to maximize the life of the contacts. The operating relay and the triac are both controlled by static logic signals.

The safety limit relay is controlled by both processors (U2 and U8). In order for the limit relay to be energized both processors need to have the same logic value and satisfy a logic "AND" configuration of two transistors. Processor U8 controls transistor Q4 via pin 2 and processor U2 controls transistor Q9 via pin 27. Both processors need to have the same logic value to energize the safety relay but each processor can independently de-energize the limit relay.

The unit is powered by a Switch Mode Power Supply, which provides the rest of the circuitry with SELV, Limited Energy signal.

RATINGS (for more information about client declarations for these products refer to the Constructional Data Form, ILL. 1 and ILL. 7):

Electrical -

INPUTS:

Control Input	Input Rating	Terminals
Power supply	100-240 V ac, 50/60 Hz	J1 - 1/5 (L2) to 2/6(L1)
Process Thermocouple	SELV, Limited Energy (Class 2)	J3 – 3 to 7
Temperature Limit Thermocouple	SELV, Limited Energy (Class 2)	J3 – 4 to 8

COMMUNICAITON:

Type	Rating	Terminal
Connection to the user interface and RS 485	SELV, Limited Energy (Class 2)	J2

OUTPUTS:

Type	Rating	Terminal
Alarm Relay*****	2 A, 30 V ac/dc	J1 – 4 to 8
Heater Relay	10 A, 100-240 V ac, 50/60 Hz	J3 – 1 to 5

Temperature - Maximum ambient operating temperature 70°C

*** Alarm relay not populated on EHG2-AAAA-XXXX models.**

The declared drift values for each protective/safety function are noted below:
1. Thermal-Cutout has a ±3°C Deviation & Drift for EHG2-CNTL-XXXX and ±6°C Deviation and Drift for EHG2-EXTR-XXXX **and EHG2-AAAA-XXXX.** Time to trip is controlled by the software and set at 3 seconds.

MODEL NOMENCLATURE FOR BASE MODULE:

EHG2 - CNTL - xxxx
I II III

I – Basic model

II –
* CNTL – 0 - 200°C range
EXTR – 0 - 438°C range
AAAA – 0 – 438°C range without alarm relay.

III – xxxx
1 - 0000 basic control (base module)
2 - DISP with display module
3 - COMS with communications module
4 - DSCM with display & communications module

Other combinations possible indicating custom screening on dust cover for customer name only.

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.

* USL indicates evaluation to **the USA standards as indicated in the Test Record.**

* CNL indicates investigation to Canadian **Standards as indicated in the Test Record.**

Per the manufacturer’s declaration, this control was evaluated for installation in a Pollution Degree II environment with an Installation Category (Overvoltage Category) III rating.

The units are for use in an extended environment: 0°C to 70°C, 0% to 95% relative humidity. They are intended for field wiring and provided with a specialized wiring harness.

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