MM1220, MM1221 & MM1224
THERMOCOUPLE INPUT DUAL ALARMS

DESCRIPTION

The MM1220 Series modules monitor any thermocouple input signal and provide two sets of spdt, 5 A alarm relays with two independently adjustable setpoints. Each setpoint has a set of red/green LEDs to indicate alarm status. When the input is between the setpoints, the relays are normally de-energized. When the signal exceeds a particular setpoint, the relay becomes energized. To provide a fail-safe operation (loss of power resulting in alarm state), select Option R. The module can be supplied as a HI/HI, HO/LO, or LO/LO alarm (HI/LO supplied if not specified).

Standard deadband on both alarms is fixed at 0.5% of span.

Cold junction compensation is provided by a solid state temperature sensor embedded in the thermocouple terminal strip. The module includes filtering and conditioning to reduce susceptibility to transients and noisy operations.

Upscale burnout protection is provided as standard. In the event the thermocouple opens, the module behaves as though the input goes offscale high.

MODEL NUMBERS

These instructions cover the following setpoint styles:

MM1220 Thermocouple Input Dual Alarm (25-turn screwdriver adj)

MM1221 Thermocouple Input Dual Alarm (Single turn dials)

MM1224 Thermocouple Input Dual Alarm (10-turn precision dials)

OPTIONS

The following options are available for the alarms:

H/L, H/L, L/L

H =High alarm: Alarm occurs on an increasing signal.

L =Low alarm: Alarm occurs on a decreasing signal.

R The Normal condition for the relays is de-energized. They energize for alarm conditions. Option R (Reverse sense) reverses this logic (Failsafe).

D Latching alarms: Reset by momentary interruption of line power.

B Standard burnout protection is upscale (high temperature). Option B provides downscale (low temperature) indication on thermocouple burnout.

A Provides top-accessed screwdriver adjustable deadband s from 0.5 to 100%

U All circuit boards conformal coated for protection against moisture. of span.

DC Power
Inverter isolated 12 or 24 VDC power

CONTROLS

The MM1220, MM1221 and MM1224 modules contain two setpoint controls, plus zero and span adjustments. The setpoint controls in the MM1220 are 25-turn blind trimpots. The MM1221 and MM1224 contain 1-turn and 10-turn calibrated dials, respectively.

CALIBRATION

Modules are shipped with ZERO and SPAN precalibrated. The user needs only adjust the SETPOINT and DEADBAND for the desired levels.

Refer to the instrument's label to determine your instrument's supply voltage and input and output ranges. Refer to the "Block Diagram and Pin Connections" for connections.

To calibrate the module, a calibrated signal source covering the range of the input signal is required. If a thermocouple simulator is available, use it to provide the input, connecting it to the module with the appropriate pair of thermocouple wires. Otherwise, use copper wires to connect a precision DC millivolt source to the input.

When a millivolt source and copper wires are used it will be necessary to measure and correct for the temperature at the module's input connection. Using standard tables for your thermocouple, find the millivolt level corresponding to the temperature at the input terminals. Then, at each calibration temperature, subtract this voltage from the voltage given by the thermocouple table. Remember, calibration accuracy will be no better than the accuracy of this temperature measurement.

To calibrate the alarm setpoints, adjust the input to the desired alarm 1 setpoint. Adjust the SETPOINT 1 control until its LED just turns red (ccw for a high alarm, cw for low).

Change the input to the desired alarm 2 setpoint and similarly adjust the SETPOINT 2 control.

If there is a need to recalibrate ZERO and SPAN, proceed as follows:

Connect the signal to the module input and set it for the desired trip point. Turn the DEADBAND fully ccw. Adjust the SETPOINT control until the relay just trips.

Adjust the DEADBAND for the desired amount of deadband. Vary the signal up and down to check the level at which the relay trips. The setpoint will remain centered in the middle of the deadband.

If there is a need to recalibrate ZERO and SPAN, proceed as follows:

Set the input to the low end of the input range. Turn the SETPOINT 1 control fully ccw. Adjust the ZERO control until the SETPOINT 1 LED just changes color.

Change the input to the high end of the input range. Turn the SETPOINT 2 control fully cw. Adjust the SPAN control until the SETPOINT 2 LED just changes color.

Repeat until the ZERO and SPAN settings are both correct.

After adjusting the ZERO and SPAN controls, the SETPOINT controls should be reset as described above.

ALARM TYPE	HI/LO	HI/HI	LO/LO
SETPOINT 1	HI	HI	LO
SETPOINT 2	LO	HI	LO

RELAY CONTACT PROTECTION

When inductive loads such as motors, relays or transformers are switched, voltage transients may be generated which exceed the ratings of the relay contacts. The resulting arcing can quickly destroy the contacts. (Refer to the SPECIFICATIONS below for the relay contact ratings.)

Surge suppression is required across inductive loads to guard against premature relay failure. FIGURE 1 illustrates diode surge suppression for a DC load.

The diode's operating (peak inverse) voltage should exceed the load's supply voltage by at least 50% and should have a current rating of at least one ampere.

FIGURE 2 shows surge suppression for an AC load, using an MOV (Metal Oxide Varistor) and a capacitor. The breakdown voltage ratings of both the MOV and the capacitor must exceed the peak AC voltage.

With normal sine-wave power, PEAK = 1.414 x RMS voltage. For 115V AC power a 200 volt peak rating is recommended.

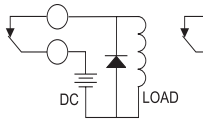


Figure 1
Surge Supression
Inductive DC Load

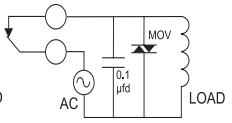


Figure 2
Surge Supression
Inductive AC Load

SPECIFICATIONS

INPUT RANGE
select any type thermocouple
(min span 4 mV)

SETPOINT
each alarm 0 to 100% of span

DEADBAND
Standard
fixed 0.5% of span
Option A
0.5% to 100% of span
Option D
Latching, interrupt power to reset

ACCURACY
±0.1% of span

COMMON MODE REJECTION
120 dB, DC to 60 Hz

RELAY CONTACTS (spdt)
Resistive Load:
5 A max, 150 W max,
220 VAC max, 30 VDC max
Inductive Load:
1/8 HP max at 120/240 VAC

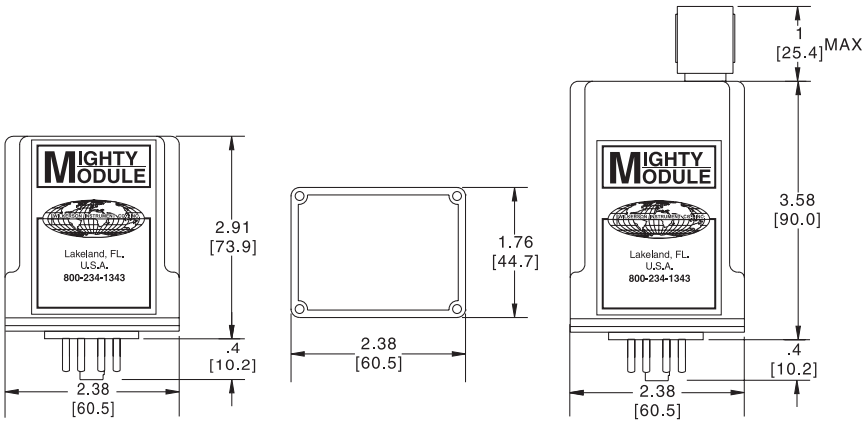
OPERATING TEMPERATURE
14°F to 140°F/-10°C to 60°C

TEMPERATURE STABILITY
±(0.02% of span + 1.3 µV)/°C max

POWER (2.5 W max)
115 VAC ±10%, 50/60 Hz (2.5 W max)
230 VAC ±10%, 50/60 Hz (2.5 W max)
(DC Power Option)
24 VDC (limits 21 VDC to 32 VDC)
(2.5 W max)

Isolation, DC power supply to input common: 10 megohms

CASE DIMENSIONS INCHES [mm]



MM1220 **MM1221 & MM1224**

MOUNTING

The module is designed to plug into a standard 11-pin relay socket. (MP011) is a molded plastic socket suitable for mounting on a flat surface or snap into a 2¾ inch wide PVC track (TRK48). Spring hold-down clips are available for installation where vibration may be a problem. Use (CLP1) for MM1220, (CLP2) for MM1221 and MM1224.

A DIN rail mounted socket (DMP011) is available for 35mm symmetrical DIN rail.

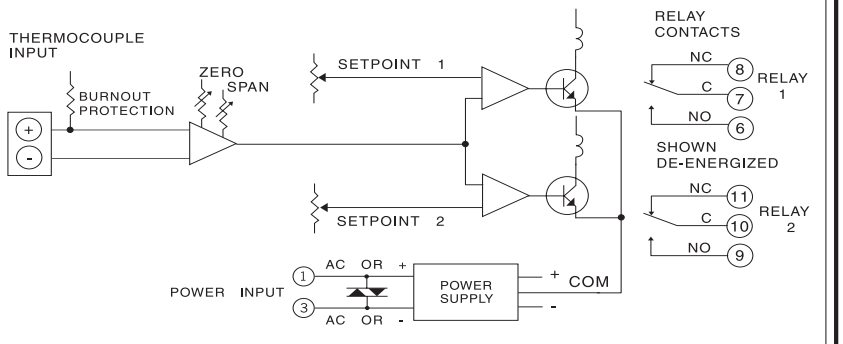
A Killark HK Series explosion-proof housing with dome and 11 pin socket is available (HKB-HK2D-11).

WARRANTY

The Mighty Module Series of products carry a limited warranty of 10 + 5 years. In the event of a failure due to defective material or workmanship, during the 10 year period, the unit will be repaired or replaced at no charge. For a period of 5 years after the initial 10 year warranty, the unit will be repaired, if possible, for a cost of 10 % of the original purchase price.

Relays are not covered by the warranty.

BLOCK DIAGRAM AND PIN CONNECTIONS



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