

# MM1000A DC INPUT SINGLE ALARM FIXED RANGE DPDT RELAY



## DESCRIPTION

The MM1000A is a lower-cost alternative to the MM1000 DC limit alarm for standard applications. The MM1000A monitors a DC input and trips a dpdt, 5 A relay when the input exceeds the desired level. The alarm has a green LED to indicate relay status.

Setpoint adjustment is provided by a 25-turn trimpot, adjustable from below 0% to above 100% of span. Deadband, also a 25-turn trimpot, is adjustable from below 1% to above 100% of span. A user-changeable jumper may be changed to provide high or low-trip.

The module includes filtering and conditioning to reduce susceptibility to transients and noisy operations.

For options or input ranges not provided by MM1000A, refer to MM1000.

## OPTIONS

These instructions cover the following options on the MM1000A.

**H= High alarm.**  
Relay de-energizes on an increasing signal.

**L= Low alarm.**  
Relay de-energizes on a decreasing signal.

## CONTROLS

The MM1000A contains setpoint and deadband adjustments, both accessible from the top of the module. A user-changeable jumper on the circuit board may be changed to provide high or low trip. The MM1000A has no zero or span adjustment.

## CALIBRATION

To change the SETPOINT or DEADBAND settings proceed as follows.

To calibrate the alarm setpoint, set the input to the desired setpoint and turn the DEADBAND control fully ccw. Adjust the SETPOINT control until the LED turns off (ccw for a high alarm, cw for low).

Adjust the DEADBAND control for the desired amount of deadband. Vary the input up and down to check the level at which the alarm trips and resets. The setpoint will remain approximately centered in the middle of the deadband.

## RELAY SETUP

To change the relay setup, unscrew the four screws holding the cover in place. Remove the cover to access the relay setup jumper on the PC board.

Caution: For safety, do not apply power while the cover is removed.

**Caution: The MM1000A's circuitry is precise, sensitive and closely spaced. Circuit board contamination can lead to errors and instability, especially at high humidities. Handle the circuit board by its edge only, or wear clean gloves, to avoid contamination.**

Refer to the relay setup label on the side of the module's cover (Figure 1). In the "HI NORM; LO REV" position the relay will be off (de-energized) on high inputs. In the "LO NORM; HI REV" position the relay will be off (de-energized) on low inputs. In either position the LED will be on whenever the relay is energized.

After changing the jumper position recalibrate as described above.

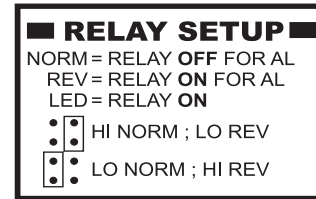


Figure 1  
Jumper Positions for Relay Setup

## 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 2 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 3 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 115 V AC power a 200 volt peak rating is recommended.

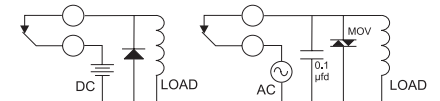
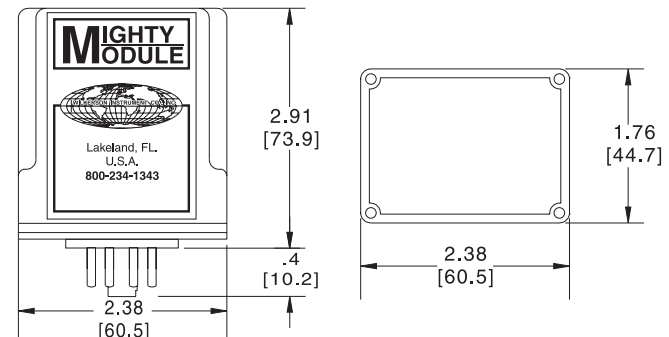


Figure 2  
Surge Suppression  
Inductive DC Load

Figure 3  
Surge Suppression  
Inductive AC Load

## CASE DIMENSIONS INCHES [mm]



## SPECIFICATIONS

### INPUT RANGE

Select any input range within the following limits

#### Voltage

Min span 1 V, Max input 250 V

Offset 0 V min, +100% of span max (example, +10/+20 V)

For negative offsets, use MM1000

#### Current

Min span 1 mA, Max input 100 mA

Offset 0 mA min, 100% of span max (example, +50/+100 mA)

For negative offsets, use MM1000.

### INPUT IMPEDANCE

Voltage 200 kilohms

Current see table in block diagram

### SETPPOINT

0 to 100% of span, min.

### DEADBAND

1% to 100 % of span, min.

### RESPONSE TIME

20 ms typical

### ACCURACY

±0.1% of span

### COMMON MODE REJECTION

120 dB, DC to 60 Hz

### RELAY CONTACTS

(dpdt)

Resistive Load:

5 A max, 150 W max, 220 VAC max,  
30 VDC max

Inductive Load:

(Power factor <sup>3</sup> 0.4):

2.5 A max, 75 W max, 220 VAC max,  
30 VDC max

### OPERATING TEMPERATURE

14°F to 140°F/-10°C to 60°C

### TEMPERATURE STABILITY

±0.02% of span/°C max

### POWER (2.5 W max)

115 VAC ±10%, 50 or 60 Hz

230 VAC ±10%, 50 or 60 Hz

(DC Power Option)

12 VDC (limits 10 VDC to 15 VDC)

24 VDC (limits 21 VDC to 32 VDC)

Isolation, DC power supply  
to input common: 10 megohms

## 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 2 3/4 inch wide PVC track (TRK48).

A hold-down clip (CLP1) is available for installation where vibration may be a problem.

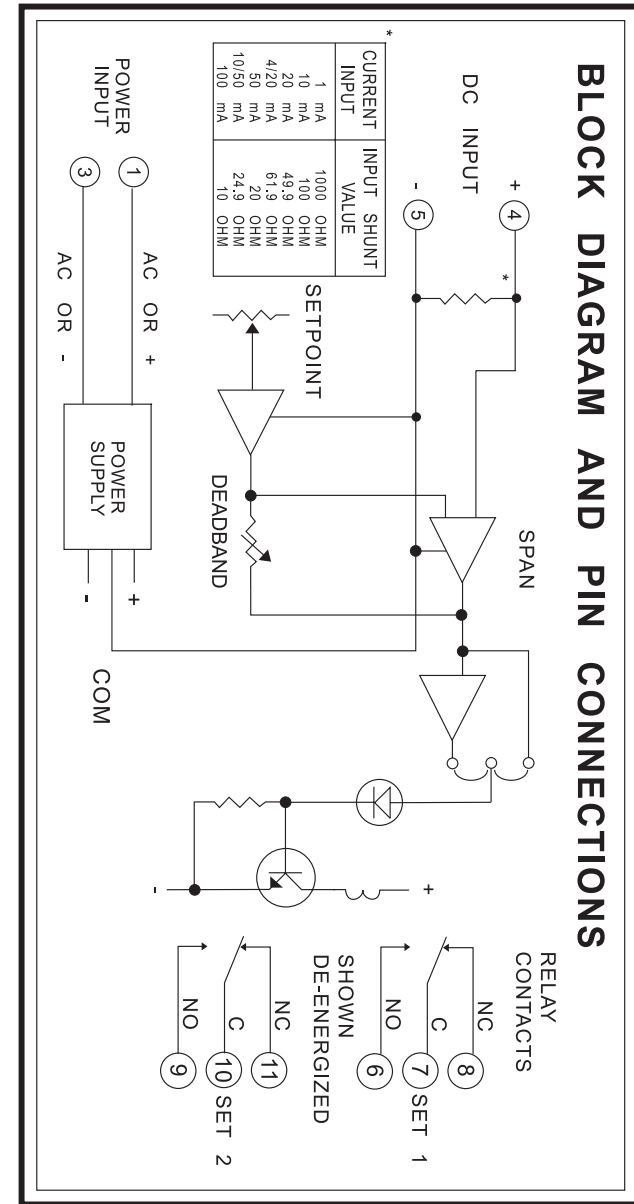
A DIN rail mounted socket (DMP011) is available for 35mm symmetrical DIN rail.

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.



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2915 Parkway Street  
Lakeland, FL 33811-1391 · USA

800-234-1343

Tel: 863-647-2000 · Fax: 863-644-5318  
www.wici.com · E-mail: sales@wici.com