

MM1000-1004 DC INPUT SINGLE ALARMS



DESCRIPTION

The MM1000-1004 modules are DC input limit alarms that provide a DPDT relay closure when the input signal exceeds a preset level. The unit can be supplied to alarm on increasing or decreasing signals.

Normal operation has the relay energized and it de-energizes for an alarm condition. This provides an alarm condition for loss of power to the module. A two-color LED indicates relay status, green for normal, and red for alarm.

A deadband adjustment allows a deadband of 0.5% to 100% of span to be set into the unit. The deadband is symmetrical about the setpoint.

MODEL NUMBERS

Five styles of setpoint controls are available for the alarms. These are listed below by model number:

- MM1000** DC Single Alarm
(25 turn screwdriver adjust)
- MM1001** DC Single Alarm (Dial-Single turn)
- MM1002** DC Single Alarm
(Remote Pot Setpoint)
- MM1003** DC Single Alarm
(0 to 1 V DC Programmed)
- MM1004** DC Single Alarm
(Dial-Ten turn precision)

OPTIONS

The following options are available for the alarms:

- DC Power**
Inverter isolated 12 or 24 VDC Power.
- R** The Normal condition for the relay is energized. It de-energizes for an alarm condition (Failsafe). Option R (Reverse Sense) reverses this logic.
- S** Low input Voltage
(not available with wide range input).
- T** This option provides 0 to 1 V DC outputs for the process signal and alarm setpoint.
- U** All circuit boards conformal coated for protection against moisture.
- WR** Wide Range input.
- H/L H = High alarm**
Alarm occurs on an increasing signal
- L = Low alarm**
Alarm occurs on a decreasing signal.

CONTROLS

All MM1000-1004 alarm modules contain zero, span and deadband adjustments. MM1000, MM1001 and MM1004 alarms have built in setpoint controls. MM1002 requires an external setpoint potentiometer, while MM1003 requires a DC setpoint programming input.

CALIBRATION

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

On MM1000, MM1001, MM1002 and MM1004, connect a 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.

MM1003 has no setpoint control, and needs no setpoint calibration.

On all modules, 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 deadband.

If there is a need to recalibrate ZERO and SPAN, proceed as follows on all modules except those with Option T:

Connect a signal to the module and set it for its minimum level. Turn the DEADBAND and SETPOINT controls fully ccw. (On MM1003, set the setpoint input to zero.) Adjust the ZERO control until the relay just trips. Increase the signal to 100% of span and turn the SETPOINT control fully cw (or increase the setpoint input to 100%). Adjust the SPAN control until the relay just trips. Repeat the ZERO adjustment, the controls interact slightly.

If Option T is installed, monitor the output and adjust ZERO and SPAN for 0 V and 1 V respectively with minimum and maximum signal input.

After adjusting ZERO and SPAN, readjust the SETPOINT and DEADBAND and controls.

WIDE RANGE INPUT (OPTION WR)

The wide range (WR) input option allows a choice of several voltage or current input ranges. To change ranges unplug the module, remove the cover by unscrewing the four screws in the base and set the 10 DIP switches according to the table below. ZERO and SPAN must be recalibrated per the above instructions after changing switch settings.

WIDE RANGING INPUT (WR OPTION)			
INPUT	CLOSE SWITCH POSITION	INPUT	CLOSE SWITCH POSITION
0/50 mV	none	0/1 mA	9
0/100 mV	1	0/5 mA	10
0/500 mV	2	0/10 mA	1,10
0/1 V	3	4/20 mA	7,9
1/5 V	6	0/20 mA	3,9
0/1 V	4	10/50 mA	8,10
0/10 V	5	0/50 mA	2,10

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 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 115 VAC power a 200 volt peak rating is recommended.

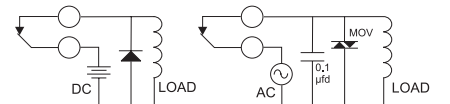


Figure 1
Surge Suppression
Inductive DC Load

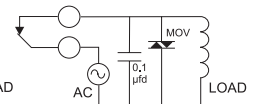
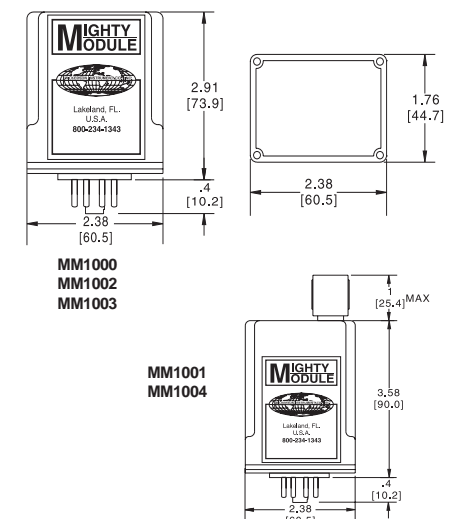


Figure 2
Surge Suppression
Inductive AC Load

CASE DIMENSIONS INCHES [mm]



SPECIFICATIONS

Input Impedance

Voltage 200 kilohms
Current (See table on block diagram)

Input Range

Voltage
select any range between ± 250 V
max* (min span 50 mV)
Current
select any range between ± 5 A max
(min span 1 mA, internal shunt)
Low Input (Option S)
select any range between ± 20 V
max (min span 10 mV)

Deadband

0.5% to 100% of Span

Setpoint

MM1000, MM1001, MM1004:
0 to 100% of Span
MM1002: External potentiometer
1 kilohm min, 10 kilohm max
MM1003: 0 to 1 VDC

Response Time

20 ms typical, WR£200 ms
(range dependent)

Accuracy

$\pm 0.1\%$ of span

Linearity

(Option T) $\pm 0.01\%$ of span

Common Mode Rejection

120 dB, DC to 60 Hz

Operating Temperature

-10°C to 60°C (14°F to 140°F)

Temperature Stability

$\pm(0.02\%$ of span + $30 \mu\text{V})/^{\circ}\text{C}$ max
Low Input (Option S)
 $\pm(0.02\%$ of span + $1.3 \mu\text{V})/^{\circ}\text{C}$ max

Relay Contacts (DPDT)

Resistive Load: 5 A max, 150 W max,
220 VAC max, 30 VDC max
Inductive Load: (power factor ≈ 0.4):
2.5 a max, 75 W max,
220 VAC max, 30 VDC max

Option T

output 0 to 1 V, 2 mA max

Power (2.5 W max)

115 VAC $\pm 10\%$, 50 or 60 Hz
230 VAC $\pm 10\%$, 50 or 60 Hz
(DC Power Option) (2.5 W max)
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.

* For MM10X2, MM10X3 and any unit with
Options T or V, maximum input range is
 ± 10 V. For input values greater than ± 10
V use MM4300 DC isolating transmitter.

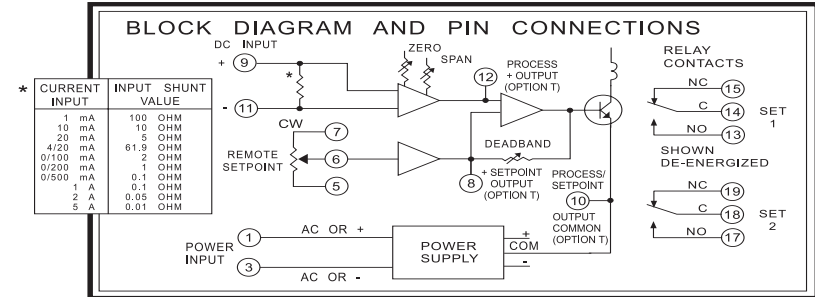
MOUNTING

MM1000, MM1001 and MM1004 are designed
to plug into a standard 11-pin relay socket.
MM1002 and MM1003, and all modules with
T option, require a 20-pin socket. MP011 is an
11-pin socket suitable for mounting on a flat
surface or in a piece of PVC track. MP020 is
a 20-pin socket suitable for mounting on a flat
surface.

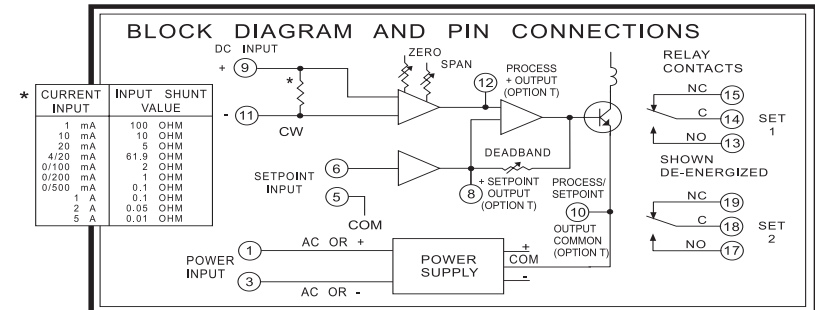
WARRANTY

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.

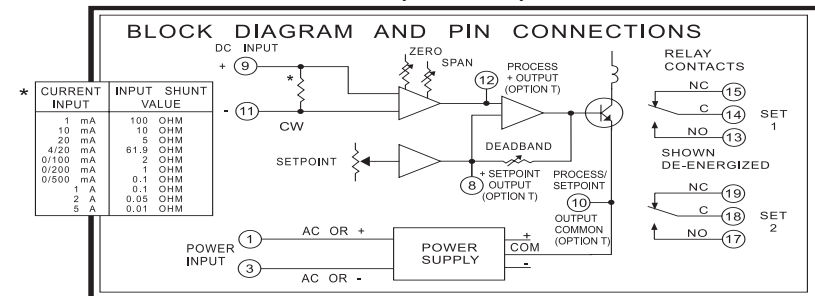
MM1002



MM1003



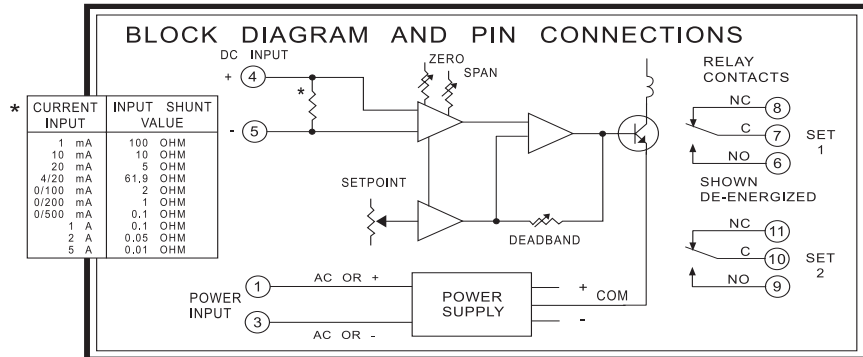
MM1000, MM1001, MM1004 (OPTION T)



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MM1000, MM1001, MM1004



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