

## Potentiometer Input, Wide Ranging, Field Configurable, Isolating Signal Conditioner

### Installation and Calibration Instructions

#### Mounting

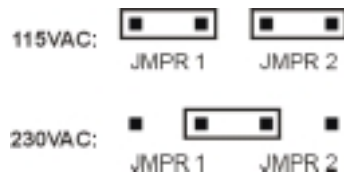
All Action Paks feature plug-in installation. The AP4003-0001 uses an 8-pin base, either the molded socket (M008) or the DIN rail socket (MD08). An optional retaining spring (M801) is available if required for the application.

#### Wiring Connections

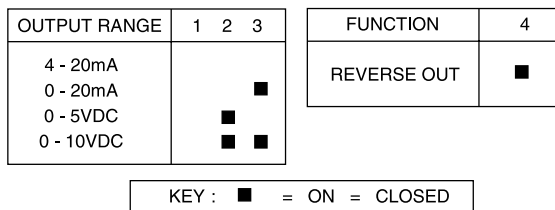
Pin	Signal
1	AC Power (Hot)
2	Shield (GND)
3	AC Power (Neutral)
4	Pot CCW / Shield
5	Pot Wiper
6	Pot CW
7	Output (+)
8	Output (-)

#### Power Connections

Power is connected according to the table above. The unit supports either 115VAC input (the default) or 230VAC input. For 230VAC input, the jumpers next to the input transformer (on the base board) need to be changed according to the diagram below.



#### Switch Settings



#### Diagnostic LEDs

Other than when executing the pushbutton calibration routine, the LEDs blink under the following conditions:

- GREEN:** 2Hz when the input is under range  
8Hz when the input is over range
- RED:** 2Hz when the output is under range  
8 Hz when the output is over range

An Under Range condition exists when the signal is lower than the operational low value minus 6.25% of the operational span. An Over Range condition exists when the signal is higher than the operational high value plus 6.25% of the operational span.

A voltage output short circuit may cause an under range condition (RED blinking at a 2Hz rate). A current output open circuit may cause an over range condition (RED blinking at an 8Hz rate). There could be two or more LEDs blinking at the same time. That means the module has more than one error condition present. Only when all error conditions have been cleared will the LEDs be back to their normal condition (Green ON, Red and Yellow OFF).

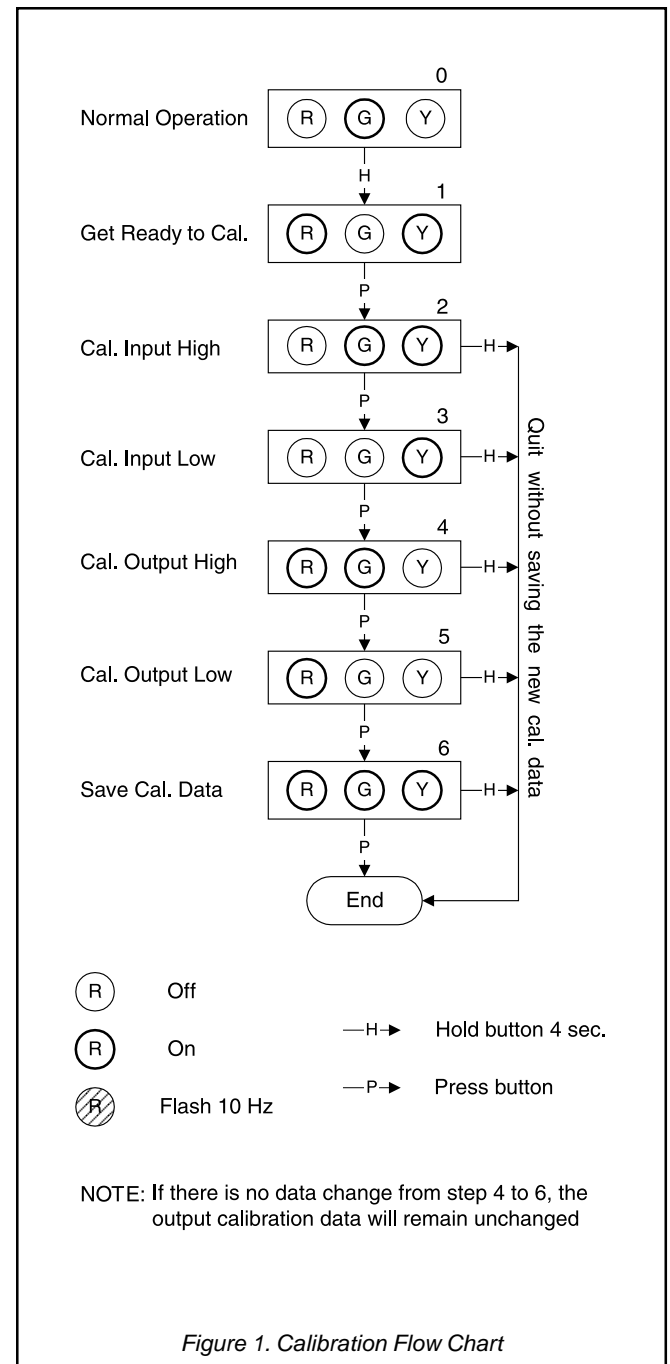


Figure 1. Calibration Flow Chart

## Calibration

For best results, calibration should be performed in the operating environment, allowing at least one hour warm-up for thermal stability of the system. If pre-calibration on a test bench is desired, then an output load equal to the input impedance of the devices connected to the AP4003-0001 output is recommended, along with the warm-up period.

Note: Many applications do not require calibrating the output levels and simply utilize the default operational ranges of the unit (0-5VDC, 0-10VDC, 0-20mA or 4-20mA). If the factory default calibration has been changed, the last saved operational output values are utilized. In those applications, the only calibration required is the operational input values. Once the maximum and minimum input values have been set, the Green and Red LEDs will be on. At this point, simply press the CAL button rapidly 3 times and you will exit the calibration routine without effecting the last saved calibration for the operational output values.

1. Connect a precision, multi-turn potentiometer of the required value to the input, with the CW lead connected to Pin 6, the Wiper lead to Pin 5 and the CCW lead to Pin 4. Connect the output to a voltage or current meter, depending on your application. Apply power and allow the system to reach thermal equilibrium.

2. Rotate the pot fully CW or to the desired maximum point and observe that the Green LED is on or flashing. Push the CAL button

and hold for more than 4 seconds. The Yellow and Red LEDs should be on. Push the CAL button momentarily and the Yellow and Green LEDs will be on. (From this point on, you can exit the calibration procedure at any step without saving new data by holding the CAL button for at least 4 seconds.)

3. With the pot at the maximum input signal level desired, push the CAL button. The Yellow LED should now be on.

4. Rotate the pot to the full CCW position, or the exact minimum input signal level desired, then push the CAL button. The Green and Red LEDs should now be on. If you do not wish to change the output calibration, press the CAL button rapidly three times to exit the calibration routine.

5. If you do wish to do a custom operational range for the output, rotate the pot CW until the output is precisely at the desired maximum level (e.g. 20.00mA), then push the CAL button. The Red LED should be on.

6. Rotate the pot CCW until the output is precisely at the desired minimum level (e.g. 4.00mA), then push the CAL button. All three LEDs should now be on.

7. To finish calibration, push the button one final time. The calibration data is now saved. The Green LED should be on if the input is within the calibrated range.

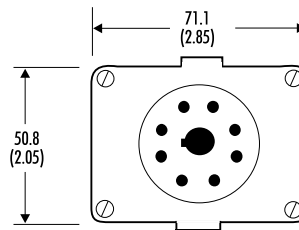
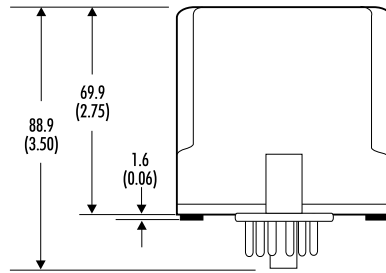
## Default Settings

Input Range: 0 to 100%

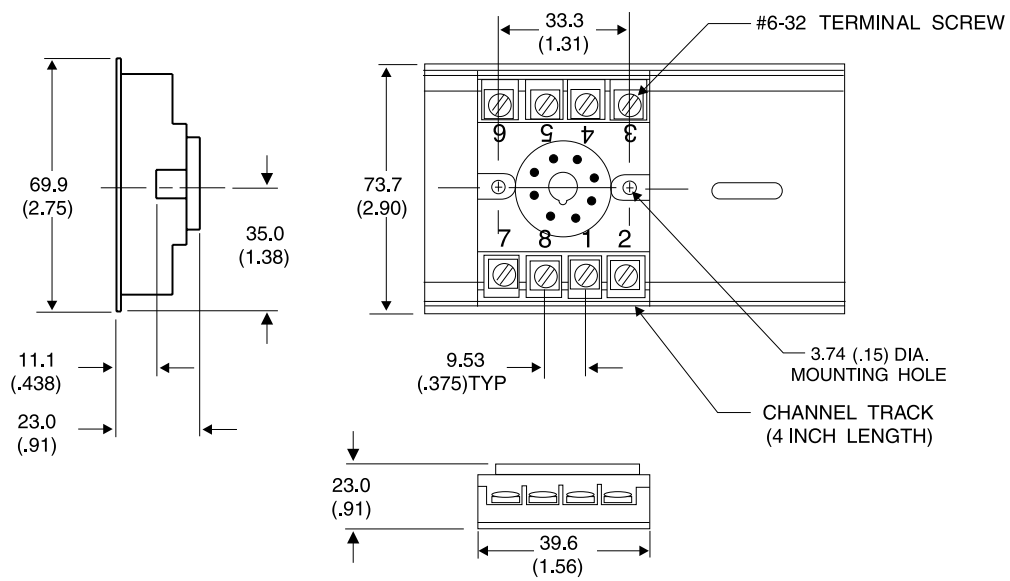
Output Range: 4 to 20mA

## Dimensions

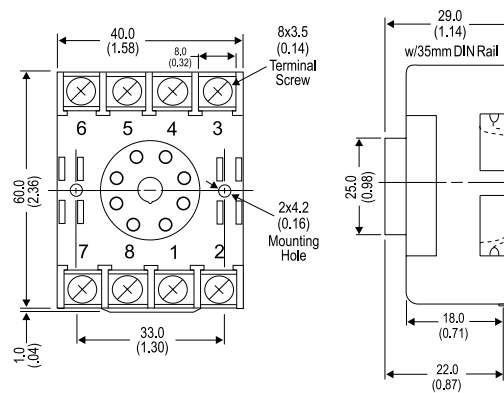
Dimensions are in millimeters (inches)



**Mark III Case**



**M008 (Track/Surface)**



**MD08 (DIN/Surface)**

## Specifications

### Input Impedance

>1M $\Omega$

### Linearity

$\pm$ 0.1% of span, typical

### Excitation

300mV, nominal

### Potentiometer Resistance (end to end)

100 $\Omega$  (min) to 100k $\Omega$  (max)

### Input Range

Any portion of the potentiometer from 10% to 100% using pushbutton calibration

### Turn-Up/Turn-Down

75% (90% of span @ 0.5% linearity, 80% @ 0.15%)

### Common Mode Rejection

60Hz: >100dB

DC: >120dB

### Output Ranges

0-5VDC, 0-10VDC (higher voltage to 15V @ 3mA drive)

0-20mA, 4-20mA

### Response Time

100mSec typical

### Stability

$\pm$ 100ppm ( $\pm$ 0.01%) of span / $^{\circ}$ C, typical

### Output Ripple

0.2% of span, or 5mVrms, whichever is greater

### Output Impedance

Voltage Output: < 10 $\Omega$

Current Output: >100k $\Omega$

### Output Drive

Voltage Output: 10mA, max

Current Output: 20V compliance @ 20mA

### LED Indication

RUN (Green):

On when unit is powered

Flashes at 2Hz when input is below operational low minus 6.25% of operational span

Flashes at 8Hz when input is above operational high plus 6.25% of operational span

INPUT (Yellow):

On while calibrating the input level

OUTPUT (Red):

On while calibrating the output level

Flashes at 2Hz when output is below operational low minus 6.25% of operational span

Flashes at 8Hz when output is above operational high plus 6.25% of operational span

### Temperature Range

Operating: 0 $^{\circ}$  to 60 $^{\circ}$ C (32 to 140 $^{\circ}$ F)

Storage: -20 $^{\circ}$  to 85 $^{\circ}$ C (-4 to 185 $^{\circ}$ F)

### Humidity

Operating: 15% to 95% relative humidity, non-condensing

Non-Operating: 90% RH @ 65 $^{\circ}$ C for 24hrs.

### Power

Consumption: 3W typical, 5W max

Standard: 115/230VAC  $\pm$ 10%

### Isolation

Input to Output to Power: 1500VDC

### Agency Approvals

UL508 and UL recognized product



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### FACTORY ASSISTANCE

For additional information on calibration, operation and installation contact our Technical Services Group:

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