



AP4081-0000

# Action PAK® AP4081

## Bridge Input, Field Configurable Isolator

Provides an Isolated, DC Output in Proportion to a Bridge/Strain-Gauge Input



- Adjustable Bridge Excitation 1 to 10V with up to 120mA drive
- 11 Field Configurable Input Ranges: 10mV to  $\pm 200\text{mV}$  ( $0.5\text{mV/V}$  to  $> 50\text{mV/V}$ )
- 4 Field Configurable Output Ranges: 0-5V, 0-10V, 0-1mA, and 4-20mA
- Plug-in Installation
- Selectable 120/240VAC Input Power

### Description

The Action Pak AP4081 is a bridge or strain-gauge input signal conditioner with 1500VDC isolation between input, output and power. The field configurable input and output offer flexible, wide ranging capability for bridge or strain-gauge input applications from  $0.5\text{mV/V}$  to over  $50\text{mV/V}$ .

Wide-ranging, precision zero and span pots allow 50% adjustability of offset and gain within each of the 11 switch selectable input ranges. The output can be set for either 0-5V, 0-10V, 0-1mA or 4-20mA. This flexibility, combined with an adjustable (1 to 10VDC) bridge excitation source, provides the user a reliable, accurate instrument to isolate and condition virtually any bridge or strain-gauge input.

### Application

The Action Pak AP4081 field configurable, bridge input signal conditioner is useful in isolating ground loops and interfacing bridge sensors to data acquisition and control systems.

Three way isolation completely eliminates ground loops from any source. Isolation protects expensive SCADA systems from ground faults and provides filtering for noise reduction, which can be a significant problem with small millivolt bridge signals.

Wide ranging flexibility allows the user to easily zero out dead-loads in weighing systems or configure bipolar input ranges for expansion-compression or vacuum-pressure bridge applications.

The convenient Action Pak is easy to install, using sockets suitable for surface mount, DIN rail mount or snap track mount. Trouble-shooting is easy since no wires need to be removed when swapping units. The wide ranging power supply accepts either 120 or 240VAC power.

### Diagnostic LED

The AP4081 is equipped with a dual function LED signal monitor. The green, top mounted LED indicates both line power and input signal status. Active line power is indicated by an illuminated LED. If the input signal is more than 110% of the full-scale range, the LED will flash at 8Hz (or 4Hz when input  $< 0\%$ ).

### Configuration

A major advantage of the AP4081 is its wide ranging capabilities and ease of configuration. The AP4081 has 11 input range switch settings. Trim potentiometers allow 50% input zero and span adjustability within each of the 11 full-scale, input ranges.

For example, the 200mV switch setting in Table 1 configures the input for a 0 to 200mV range. The span can be contracted by 50% which enables an input span of 100mV. This 100mV span can be positioned anywhere within the 0-200mV range. The zero offset can be as large as 50% of the full scale range (e.g. 100 to 200mV range), which can be useful to tare out a dead load in weighing applications.

Unless otherwise specified, the factory presets the Model AP4081 as follows:

Input Setting:	0 to 50mV
Adjusted Range:	0 to 30mV ( $3\text{mV/V}$ )
Excitation:	10V
Operation:	Direct
Output:	4 to 20mA
Power:	120VAC

For other I/O ranges refer to Tables 1 through 4 and reconfigure switches SW1 and SW2 for the desired input range, function, excitation and output range.

*Warning: Do not attempt to change any switch settings with power applied. Severe damage will result!*

**Calibration**

1. Connect the input to a calibrated millivolt source, load the excitation supply with the bridge or an equivalent load and apply power. Wait at least 15 minutes for thermal stability before monitoring the voltage/current.
2. Adjust excitation to the desired level.
3. Set the calibrator to the desired minimum input and adjust the zero potentiometer for minimum output.
4. Set the calibrator to the desired maximum input and adjust the span potentiometer for maximum output.
5. Repeat steps 3 and 4, as necessary for best accuracy.

*Table 1: Input Range Selector-Switch settings*

	SW1				
	1	2	3	4	5
0 to 10mV	■	■	■	■	■
0 to 20mV	■	■	■	■	■
0 to 50mV	■	■	■	■	■
0 to 100mV	■				■
0 to 200mV	■			■	■
-5 to 5mV	■	■			
-10 to 10mV	■	■	■		■
-20 to 20mV	■	■	■	■	
-50 to 50mV	■	■	■	■	
-100 to 100mV	■				■
-200 to 200mV	■				■

KEY ■ = ON

*Table 2: Direct or Reverse Operation Setting*

	SW1
	6
DIRECT	
REVERSE	■

KEY ■ = ON

*Table 3: Bridge Excitation Selector-Switch Settings*

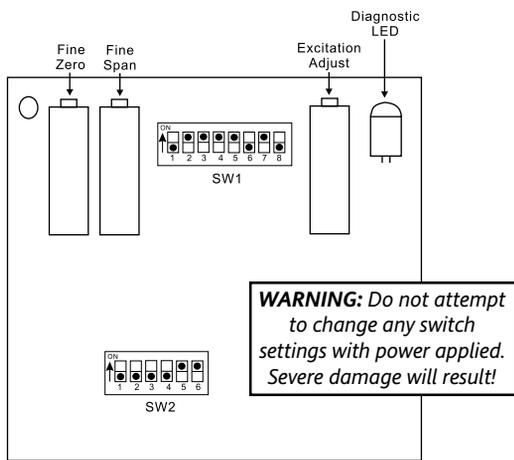
	SW1
	7 8
9.8 to 10.1V	■
4.8 to 5.2V	■
0 to 10V	■ ■
0 to 2.5V	■

KEY ■ = ON

*Table 4: Output Range Selector-Switch Settings*

	SW 2					
	1	2	3	4	5	6
0 to 5V	■	■	■	■	■	■
0 to 10V	■	■	■	■	■	■
0 to 1mA	■	■	■	■	■	■
4 to 20mA					■	■

KEY ■ = ON



**WARNING: Do not attempt to change any switch settings with power applied. Severe damage will result!**

Figure 1: Factory Calibration; 0 to 50mV (calibrated to 0-30mV), 10V excitation, Direct, 4-20mA.

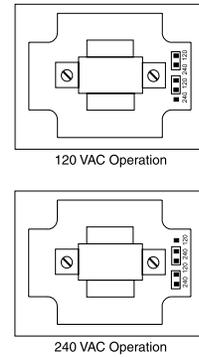


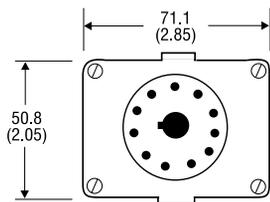
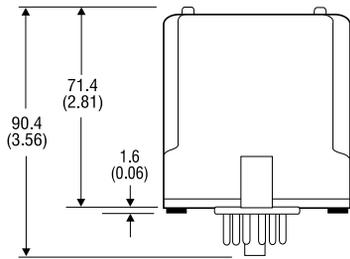
Figure 2: 120/240 VAC Selection

**Mounting**

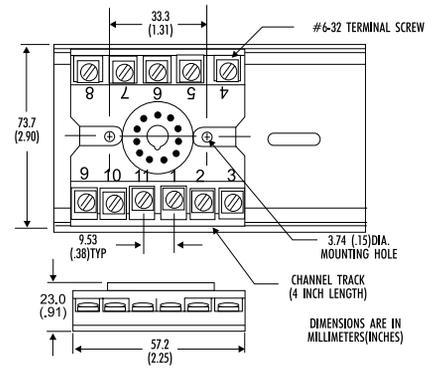
All Action Paks feature plug-in installation. Model AP4081 uses an 11-pin base, either molded socket (M011) or DIN rail socket (MD11).

**Dimensions**

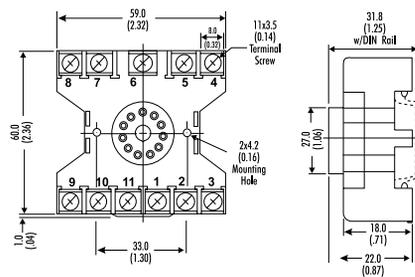
Dimensions are in millimeters (inches)



Mark II



M011 (Track/Surface)



MD11 (DIN Rail)

## Specifications

### Input:

Voltage Input:  
Full Scale Range: 10mV to  $\pm 200$ mV  
(see Table 1)  
Impedance: >1M ohms  
Overvoltage:  
400Vrms, max (Intermittent);  
264 Vrms, max (Continuous)  
Common Mode (Input to Ground):  
1500VDC, max  
Zero Turn-Up:  
50% of full scale range  
Span Turn-Down:  
50% of full scale range  
Operation:  
direct or reverse acting

### Output:

Voltage Output:  
Output: 0-5V, 0-10V  
Impedance: <10 ohms  
Drive: 10mA, max (1K ohms min. @ 10V)  
Current Output:  
Output: 0-1mA, 4-20mA  
Impedance: >100K ohms  
Compliance:  
0-1mA; 10V, max (10K ohms max)  
4-20mA; 15V, max (750 ohms max)

### Bridge Excitation:

1 to 10VDC, 120mA max (84 ohms min)

### Accuracy (Including Linearity, Hysteresis):

$\pm 0.1\%$  typical,  $\pm 0.2\%$  maximum of  
selected range at 25°C.

### Stability:

$\pm 0.025\%/^{\circ}\text{C}$  typical,  $0.05\%/^{\circ}\text{C}$  maximum,  
of selected range.

### Output Noise (maximum):

0.1% of span, rms, or 10mV whichever is greater.

### Response Time (10 to 90%):

<200mSec., typical.

### Common Mode Rejection:

DC to 60Hz: >120dB,  
>100dB on 0-1mA output range

### Isolation:

1500VDC between input, output and power.

### ESD & Transient Susceptibility:

Meets IEC 801-2, Level 2 (4KV)  
and IEC 801-4, Level 3

### LED Indication (green):

Input Range  
>110% input: 8Hz flash  
<-10% input: 4Hz flash

### Humidity:

Operating: 15 to 95%  
non-condensing @ 45°C  
Soak: non-condensing 90%  
for 24 hrs @ 65°C

### Temperature Range:

Operating: 0 to 60°C (32 to 140°F)  
Storage: -25 to 70°C (-13 to 158°F)

### Power:

Consumption: 3W typical, 6.5W max.  
Standard: selectable 120/240VAC,  $\pm 10\%$ ,  
50-60Hz

### Weight:

0.80lbs

### Agency Approvals:

CSA certified per standard C22.2  
(File No. LR42272-64)

UL recognized per standard UL508  
(File No. E99775)

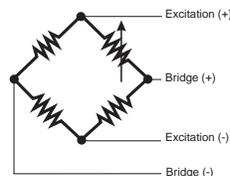


Figure 3: Bridge Reference Designations

## Ordering Information

### Specify:

1. Model: **AP4081**
2. Options: U, (see text)
3. Line Power (see specs.)(All power supplies are transformer-isolated from the internal circuitry.)
4. C620 Custom Calibration? (see Options)

### Accessories:

M801-0000 Retaining Spring  
M011-A 11 pin Track Mount Socket  
M004-0000 4 ft Long Channel Track  
MD11-0000 11 pin DIN Mount Socket

## Pin Connections

- 1 AC Power (Hot)
- 2 No Connection\*
- 3 AC Power (Neu)
- 4 Bridge (+)
- 5 Bridge (-)
- 6 No Connection\*
- 7 Excitation (+)
- 8 Excitation (-)
- 9 Output (+)
- 10 Output (-)
- 11 No Connection\*

\*Pins 2, 6 and 11 should NOT be used as terminations for other wires. Connections at these terminals will decrease isolation levels.

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## Factory Assistance

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

**703-724-7314**

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721-0544-00-L 09/06 Copyright© Eurotherm, Inc 2006