



AP4390-0000 (ChA = I or V out; ChB = I or V out)
 AP4391-2000 (ChA = I or V out; ChB = ±V out)
 AP4392-2000 (ChA = ±V out; ChB = ±V out)

Action PAK®

AP4390/AP4391/AP4392

DC Input, Dual Channel Isolators

Provides Two Independent, Fully Isolated DC Outputs in Proportion to Two DC Inputs



- High Density 2-Channel Package
- Eliminates Ground Loops with 1500V Isolation
- Six Configurable Output Ranges: 0-5V, 0-10V, 0-1mA, 4-20mA, -5 to 5V and -10 to 10V
- Plug-in Installation
- Selectable 120/240VAC Input Power

Description

The field configurable AP4390 series dual channel isolators offer wide ranging input and output capability for scaling and transmitting analog DC signals. The AP4390 series will accept input voltage spans from 10mV up to 100 volts, as well as input current spans from 1mA to 100mA. For a full scale output range, the input zero and span potentiometers enable 50% input zero and span adjustability. For example, the 0-10V input range can be elevated to 5-10V or compressed to 0-5V.

The AP4390 series offers 6 popular output ranges which are either positive voltages and currents (e.g. 0-5V, 0-10V, 0-1mA and 4-20mA) or bipolar voltages (-5 to 5V and -10 to 10V). The model number defines the output channel ranges as shown in Table 1.

The 4-20mA compliance is a powerful 20VDC per channel. All models in the AP4390 series accept bipolar inputs and each I/O channel offers selectable normal or reverse acting operation (e.g. 4-20mA or 20-4mA).

Each Action Pak in the AP4390 series is a dual, three-port, industrial isolator -- both output channels are optically isolated from their respective input channels up to 1500 VDC. The two ASIC-based I/O channels are independently transformer isolated from the selectable 120/240VAC power supply.

Table 1: AP4390 Series Output Ranges
 (**Bold** indicates factory preset ranges)

Model	Channel	Output Selections
AP4390	A	0-5V, 0-10V, 0-1mA, 4-20mA
	B	0-5V, 0-10V, 0-1mA, 4-20mA
AP4391	A	0-5V, 0-10V, 0-1mA, 4-20mA
	B	-5 to 5V, -10 to 10V
AP4392	A	-5 to 5V, -10 to 10V
	B	-5 to 5V, -10 to 10V

Application

The Action Pak AP4390 series of field configurable isolators is useful in eliminating ground loops, converting signal levels and providing signal drive. The AP4390 series' dual channel design conserves installation space in high density applications and offers superior cost-benefit value over single channel isolators. The wide ranging capability of the AP4390s provides universal spare part coverage.

Diagnostic LED

The AP4390 series is equipped with dual function LED signal monitors. The green, top-mounted LED indicates line power and input signal status. Active line power is indicated by an illuminated LED. If the input signal is 10% above the full scale range, the LED will flash at 8Hz. Below 0%, the flash rate is 4Hz.

Option

- U** Urethane coating of internal circuitry for protection from corrosive atmospheres.

Configuration

Each channel of the AP4390 series can be independently set for a wide variety of input and output ranges.

Factory Presets

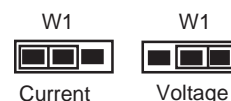
The factory presets all inputs for 4-20mA. The preset for positive based output channels is 4-20mA and -10 to 10VDC for bipolar voltage output channels (as shown in Table 1 and Figures 1 and 2). The supply power is configured for 120 VAC operation. For other I/O ranges, remove the four base screws and case to access the I/O cards.

Refer to figures 1 & 2 for configuration and program the I/O channels as desired.

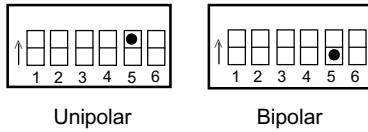
Replace the cover before applying power.

Input

1. Position input jumper "W1" for Current (I) or Voltage (V) input.

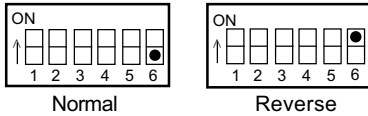


2. Set position 5 of the Input Range Selector for Unipolar or Bipolar input operation.



Note: A bipolar range selection will double any range from Table 2 (e.g. 10V span = ±10V bipolar span)

3. Set position 6 of the Input Range Selector for Normal or Reverse operation. Reverse acting produces a decreasing output with an increasing input.



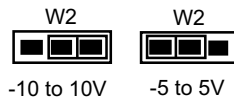
4. Using Table 2, configure positions 1 through 4 of the Input Range Selector for the desired maximum input. Round the desired maximum input value to the next highest range (e.g., 0-70V = 100V range).

WARNING: Do not change switch settings with power applied. Severe damage will result.

Output

1. For the AP4390 channels A and B, and the AP4391 channel B, use Table 3 to configure the output selector switches for one of the four(4) standard output ranges.

2. For the AP4392 channels A and B, and the AP4391 channel B, position output jumper "W2" for -5 to 5V or -10 to 10V.



Power

1. Configure the AC jumpers for either 120 or 240 VAC operation. See Figure 3.

Calibration

1. Connect the input to a calibrated DC voltage or current source and apply power. Refer to PIN CONNECTIONS. Wait 1 hour for thermal stability before monitoring the voltage/current output.

2. Set the calibrator to the desired minimum input and adjust the Zero potentiometer for the desired minimum output.

3. Set the calibrator to the desired maximum input and adjust the Span potentiometer for the desired maximum output.

4. Repeat steps 2 and 3 for best accuracy.

Table 2: AP4390 Series Input Ranges

Voltage*	Current*	Input Range Selector (SW1)
20mV	2mA	
50mV	5mA	
100mV	10mA	
200mV	20mA	
500mV	50mA	
1V	100mA	
2V		
5V		
10V		
25V		
50V		
100V		

*Use jumper (W1) to configure either voltage or current input. All unipolar ranges are zero based.

Table 3: AP4390 and AP4391 Output Ranges

Range	Output Range Selector (SW2)
0 to 10V	
0 to 5V	
0 to 1mA	
4 to 20mA	

I/O Card Configuration

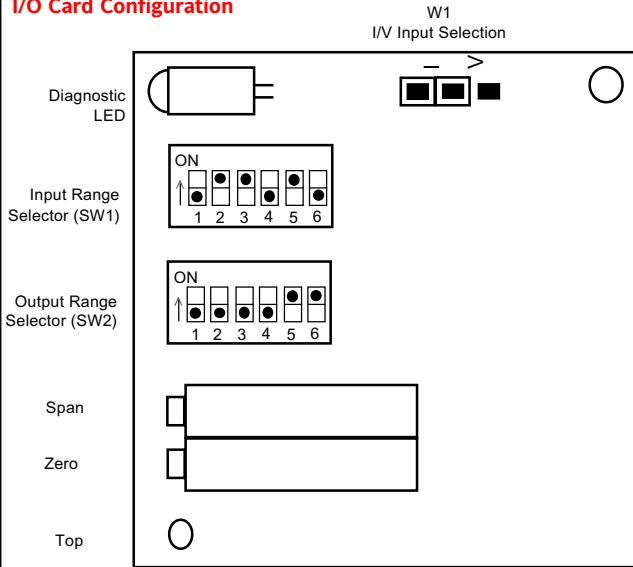


Figure 1: AP4390 and AP4391(A) I/O card factory calibration:
4-20mA input and 4-20mA output

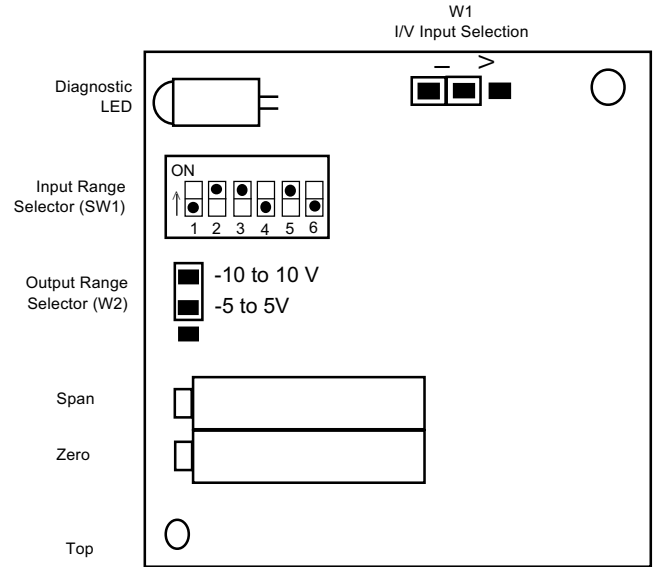
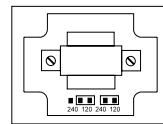
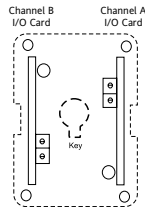


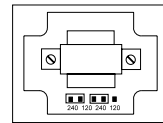
Figure 2: AP4391(B) and AP4392 I/O card factory calibration:
4-20mA input, -10 to 10V output

Warning: Do not change switch settings with power applied. Severe damage will result!
Warning: Applying voltage to the input with W2 in current (I) position will result in damage to the unit.

Top View Diagrams



120 VAC Operation



240 VAC Operation

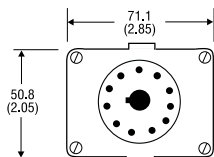
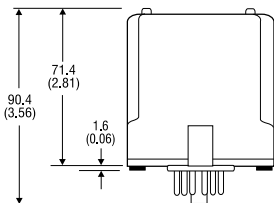
Warning:
Do not change with power connected!

Mounting

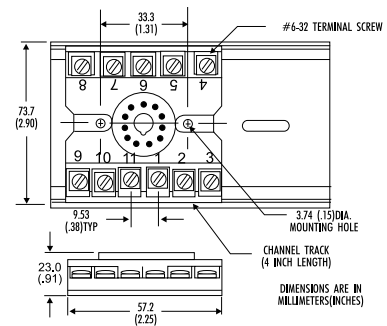
All Action Paks feature plug-in installation. Models AP4390, AP4391 and AP4392 use an 11-pin base and either molded socket M011 or DIN socket MD11 for mounting.

Dimensions

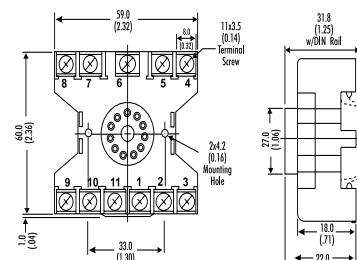
Dimensions are in millimeters (inches)



Mark II



M011 (Track/Surface)



MD11 (DIN Rail)

Specifications

Input:

Voltage Input (field configurable):
Full Scale Range: 10mV to 100V
Impedance: >100K Ohms
Overvoltage:
400 Vrms, max(Intermittent);
264 Vrms, max (Continuous)
Current Input (field configurable):
Full Scale Range: 1mA to 100mA
Impedance: 20 Ohms, typical
Overcurrent: 170mA rms, max
Overvoltage: 60VDC
Common Mode (Input to Ground):
1500VDC, max

Zero Turn-Up:

50% of full scale range

Span Turn-Down:

50% of full scale range

Output:

Voltage Output:
Output: 0-5V, 0-10V, -5 to 5V, -10 to 10V
Drive: 10mA, max. (1K Ohms min. load @10V)
Current Output:
Output: 0-1mA, 4-20mA
Compliance:
0-1mA: 10V, max (10K Ohms max load)
4-20mA: 20V, max (1K Ohms max load)

LED Indication (green):

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

Accuracy (Including Linearity, Hysteresis):

<20mV, <2mA: $\pm 0.35\%$ of full scale,
typical, 0.5%, max
>20mV, >2mA: $\pm 0.1\%$ of full scale, typical,
0.2%, max

Response Time:

(10-90%) 200 mSec., typical

Stability (Temperature):

$\pm 0.025\%$ of full scale/ $^{\circ}\text{C}$, typical,
 $\pm 0.05\%/^{\circ}\text{C}$, max.

Common Mode Rejection:

DC to 60Hz: 120dB

Isolation (Input to Output):

1500 VDC between channels, input,
output and power

ESD Susceptibility:

Level 2 (4KV)

Humidity (Non-Condensing):

Operating: 15 to 95% (@ 45 $^{\circ}\text{C}$)
Soak: 90% for 24 hours (@ 65 $^{\circ}\text{C}$)

Temperature Range:

Operating: -15 to 60 $^{\circ}\text{C}$ (5 to 140 $^{\circ}\text{F}$)
Storage: -25 to 70 $^{\circ}\text{C}$ (-13 to 158 $^{\circ}\text{F}$)

Power:

Consumption:
4W typical, 6W max
Standard:
selectable 120/240VAC, $\pm 10\%$, 50-60Hz

Weight:

AP4390: 0.66lbs
AP4391: 0.68lbs
AP4392: 0.68lbs

Approvals:

CSA certified per standard C22.2 No. M1982
(File No. LR42272).
UL recognized per standard UL508
(File No. E150323/E99775).

Ordering Information

Specify:

- Model: **AP4390-0000** (ChA = I or V out; ChB = I or V out)
AP4391-2000 (ChA = I or V out; ChB = $\pm V$ out)
AP4392-2000 (ChA = $\pm V$ out; ChB = $\pm V$ out)
- Option: U, see text
- Line Power: 120/240VAC
- Optional Factory Calibration (C620): specify input range, output range and power. (All power supplies are transformer-isolated from the internal circuitry.)

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

- Power (Hot)
- Spare Termination
- Power (Neu)
- Output B (+)
- Input A (+)
- Input A (-)
- Output A (+)
- Output A (-)
- Output B (-)
- Input B (+)
- Input B (-)

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