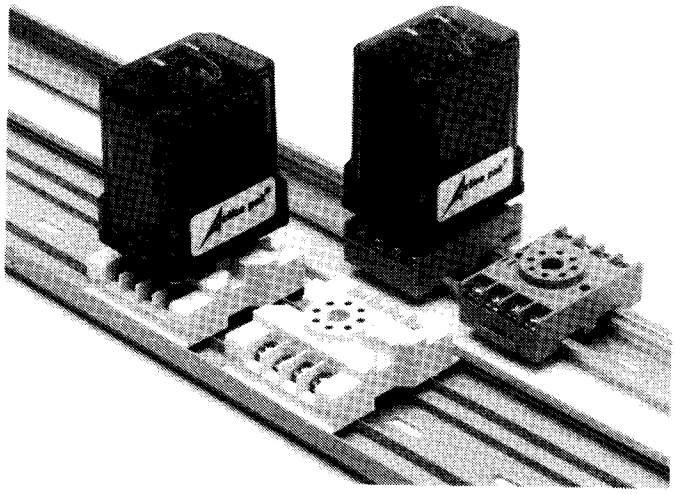
Action Pak®

RTD Input, Signal Conditioners

Models AP4001, AP4041, AP4151



Provides a DC Output in Proportion to an RTD Input

- Direct RTD Input
- Integral Lead-Length Compensation
- Temperature Control/Monitoring Applications
- Easy Plug-in Installation/Low Mean-Time-to-Repair
- AC Line Powered (DC Optional)
- Three Year Warranty

APPLICATIONS

Action Pak models AP4001, AP4041 and AP4151 are useful in any application requiring a DC output from an RTD input. Typical applications include energy management and data acquisition of process temperatures. The output of a 4000 series RTD signal conditioner can drive a digital meter for direct display, or interface with a computer for monitoring and control.

DESCRIPTION

The three models of RTD input signal conditioners provide the following input to output relationship

AP4001 Linear to resistance
AP4041(SP) Proportional to the difference of two RTD sensors
AP4151 Linear to temperature

OPERATION

The constant current RTD excitation uses the third lead of the RTD to sense and compensate for the RTD lead resistance, resulting in an accurate RTD temperature measurement. The RTD voltage is then amplified and buffered by an output stage which allows adjustment of zero and span. The AP4151 uses feedback linearization, changing the RTD excitation current to correct the temperature/resistance non-linearity. In units having a current output (e.g. 4-20mA), the output is a current source controlled by the output buffer. With voltage output units (e.g. 0-10V), the output is taken directly from the buffer. An internal transformer isolates the process from line power and ground.

OPTIONS

CS Canadian Standards Association Certification.
U Urethane coating of internal circuitry for protection from corrosive atmospheres

CALIBRATION

Top accessed screwdriver adjustments provide typical ±10% zero and span adjustability. Calibration is referred to input in that adjustments are to correct for input/sensor variations. For models AP4001 and AP4151, zero is adjusted for the specified minimum output with the RTD input at the desired minimum temperature. Span is adjusted for the specified maximum output, with the RTD input at the desired maximum temperature. Repeat adjustments for best accuracy.

To calibrate model AP4041, first set both RTDs at equal temperatures. Adjust Zero for the desired minimum output. The unit should be calibrated near the center of the normal operating temperature range to minimize errors due to RTD temperature sensitivity shift. (Ohms/°) With the RTDs differing in temperature by the specified maximum (Hi RTD at the higher temperature), adjust Span for the desired maximum output. Repeat these adjustments for maximum accuracy. Use equal length lead-wires if greater than ten feet. For best accuracy, use matched RTDs (equal resistances at ice point).

ACTION INSTRUMENTS
...the Industrial I/O Company

Factory Assistance: For additional information on calibration, operation and installation please contact Action's Technical Services Group. Call toll-free:

800-767-5726

INPUT/OUTPUT RANGES

Tables 1 and 2 lists all the available standard inputs. Tables 3 and 4 lists all the available standard outputs. For better resolution, non-standard ranges are also available within the limits shown in table 5.

Table 1: AP4001/AP4151 Standard Inputs*

0 to 200°F	0 to 300°F	0 to 400°F	0 to 500°F	0 to1000°F
0 to 100°C	0 to 150°C	0 to 200°C	0 to 250°C	0 to 500°C

*100ohm Pt RTD, 0.00385 Ω/Ω/°C [DIN Standard]

Table 2: AP4041 Standard Inputs*

±10°F	0 to 20°F	±20°F	0 to 40°F
±5°C	0 to 10°C	±10°C	0 to 20°C

Table 3: AP4001/AP4151 Standard Outputs

0-1V	0-5V	1-5V
0-10V	4-20mA	10-50mA

Table 4: AP4041 Standard Outputs

0-1V	1-5V	±1V	±5V
0-5V	0-10V	±2V	4-20mA

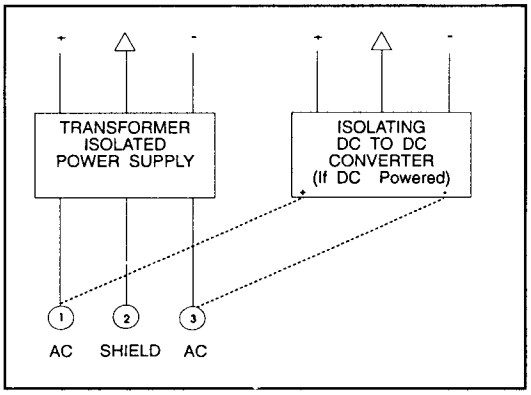
Table 5: AP4001/AP4041/AP4151 Input Limits

RTD	Useable Range	Minimum Span
100ΩPt	-328 to 1600°F (-200 to 870°C)	5°F(3°C)
200ΩPt	-328 to 1600°F (-200 to 870°C)	4°F(2°C)
500ΩPt	-328 to 1600°F (-200 to 870°C)	2°F(1°C)
100ΩNi	-148 to 590°F (-100 to 310°C)	4°F(2°C)
120ΩNi	-112 to 608°F (-80 to 320°C)	4°F(2°C)
10ΩCu	-328 to 500°F (-200 to 260°C)	18°F(10°C)

Table 6: AP4001/AP4041/AP4151 Output Limits

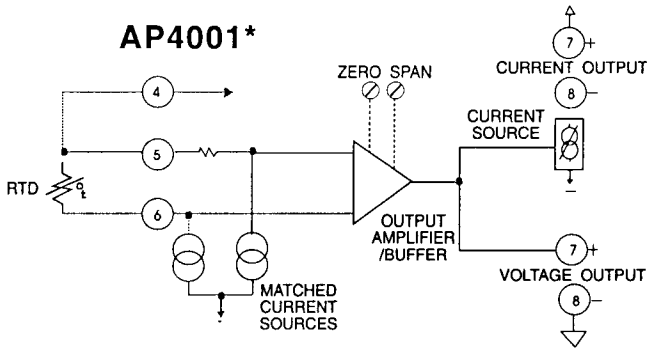
Minimum Span		Maximum Span	
Voltage 100mV	Current 1mA	Voltage 10V	Current 50mA

Functional Diagrams/Pin Connections



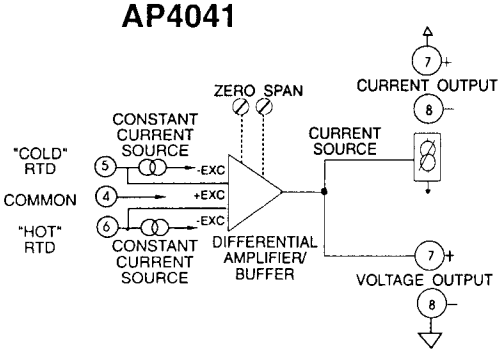
Power Supply (all models)
**If DC powered: Pin 1(+), Pin 3(-), Pin 2 No Connection.*

AP4001*

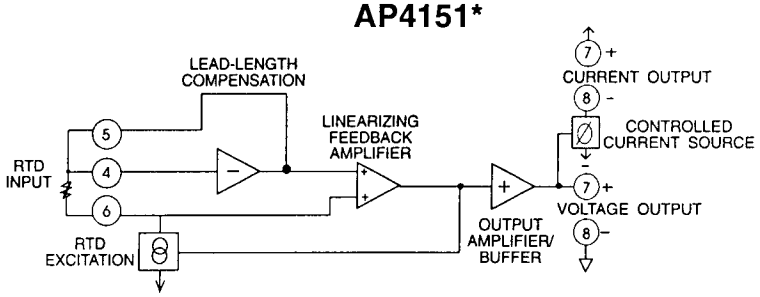


*NOTE: FOR 2-WIRE RTD, LINK PINS 4 AND 5
FOR 4-WIRE RTD, CUT FOURTH WIRE

AP4041



AP4151*



SPECIFICATIONS

RTD Excitation Current
1 to 10mA, depending on RTD type

Leadwire Resistance (Maximum Ohms/Lead)
100 Ohm RTD: 40
120 Ohm RTD: 40
500 Ohm RTD: 100
10 Ohm RTD: 30

Leadwire Effect
Less than 1% of span error

AP4001/AP4041 Linearity (Best Straight Line and Linear Input)
0.1% of span typical (referred to resistance input)

AP4151 Accuracy
±0.1% of span typical (referred to temperature input)

Output Impedance
Voltage Output
Less than 10 Ohms
Current Output
>100K Ohms

Output Drive
Voltage Output
10mA, max.
Current Output
15V compliance @ 20mA

Maximum Output
Voltage Output
10V swing
Current Output
50mA, max.
Open Circuit Voltage
30V, max.

Stability
±0.05% of span/°C typical

Response Time
100 mSec typical

Output Ripple
0.2% of max. span or 5mV rms, whichever is greater
24VDC power: 0.5% of max. span or 10mV rms, whichever is greater

Common Mode Rejection
60 Hz: > 120dB
DC: > 100dB

Common Mode Voltage
500V DC or peak AC, max.

Temperature Range
Operating: 0 to 60°C (32 to 140°F)
Storage:-20 to 85°C (-4 to 185°F)

Power
Consumption: 3W typical, 5W max.
Standard: 120VAC (±10%, 50 to 400Hz)
Available: 100, 220, 240VAC, (±10%, 50 to 400Hz)
Optional: 24VDC, ±8V, inverter-isolated, (Mark II Case)

MOUNTING

All Action Paks feature plug-in installation using either molded socket M008 or DIN socket MD08. Models AP4001, AP4151, AP4041 use 8-pin bases.

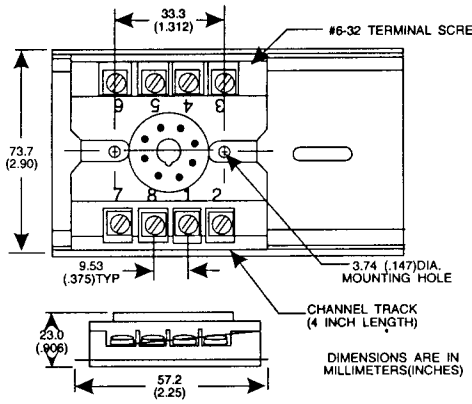
ORDERING INFORMATION

Specify:
1. Model(s): AP4001, AP4041(SP), AP4151
2. Input Range (see tables 1,2,5)
3. Output Range (see tables 3,4,6)
4. Options: CS, U (see text)
5. Line Power (see specifications)

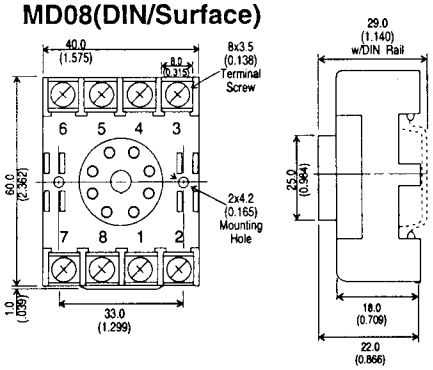
(All power supplies are transformer-isolated from the internal circuitry.)

(SP) Indicates supplemental product status. Consult factory for price and availability.

M008(Track/Surface)



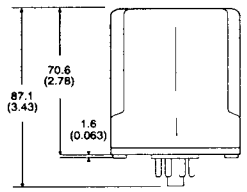
MD08(DIN/Surface)



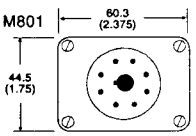
DIMENSIONS

Dimensions are in Millimeters (Inches)

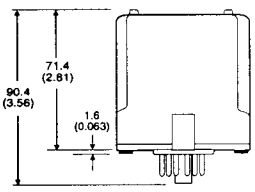
Mark I (Standard)

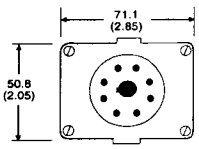


Retaining Spring Available: Model M801



Mark II (24VDC)





All Prices and Specifications subject to change without notice

For order entry, applications or customer service assistance, call toll-free 800-767-5726

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