

DAYTRONIC

QUALITY, TRUSTED PRODUCTS SINCE 1954



MODEL 4077

DC STRAIN GAGE PANEL INSTRUMENT
[4000 SERIES]



STAND ALONE “INTELLIGENT” PANEL METER - COMBINES SENSOR SIGNAL CONDITIONER, USER DISPLAY & INTERFACE, AND A PROGRAMMABLE LOGIC CONTROLLER FOR APPLICATION SPECIFIC CONFIGURATIONS INVOLVING DC STRAIN GAGE TRANSDUCERS

The Model **4077** Single-Channel DC Strain Gage Conditioner/ Indicator/Controller is a versatile general-purpose instrument for input of pressure, force, torque, weight, and other variables measured by DC-excited strain gage transducers. Unlike the other 4000 Series “Standard Input Models,” it provides two special analog channels (described below) for real-time capture of of positive and negative peak input values. The **4077** accepts a single input from any DC-excited load cell, pressure sensor, or other conventional 4-arm strain gage bridge, nominal 120 Ohm or higher, with a full-scale range of 1.5 or 3.0 mV/V. Advanced circuit design overcomes many of the errors traditionally afflicting the strain gage measurement process, resulting in rocksolid digital indication and noise free analog output. Other important **4077** features include:

- **selectable bridge excitation** (nominal 5 or 10 V-DC)
- **real-time math processing** (including constants and digital Max/Min)
- **remote sensing and regulation of bridge excitation**—eliminates errors from temperature effects on cable resistance and yields consistently stable ratiometric measurement, unaffected by possible power-supply drift
- **input impedance in excess of 100 megohms** preserves the validity of factory calibration, prevents conversion of commonmode to normal-mode signals, and eliminates remaining errors attributable to cable resistance. Allowable cable length has virtually no practical limits.
- **active low-pass filtering** and user-selectable digital smoothing eliminate dynamic components arising from vibration, power impulses, etc., that might prevent stable digital conversion or control action

Superior Signal Conditioning, a 4000 instrument's internal scan cycle typically produces 1000 finished engineering-unit answers per second (this includes linearization, “ $y = mx + b$ ” scaling, limit comparison, cross-channel calculations, and other numeric processes). 16-bit A/D resolution with multipole per-channel analog filtering and selectable per-channel digital filtering yields rocksolid stability and a typical overall accuracy of 0.02%, following calibration by the user

Real-Time Analog Peak Capture, the **4077**'s “+PEAK” channel detects and stores in capacitor memory the most positive value experienced by the input since it was last reset by an appropriate “+PEAK TRACK” command. The “-PEAK” channel detects and stores the most negative value since the last “-PEAK TRACK” command. Each peak value will remain in memory—though subject to analog decay*—until reapplication of the respective “TRACK” command, or until occurrence of a subsequent more positive or more negative signal excursion (thus permitting the capture of successively higher maxima or successively lower minima.

MODEL 4077

DC STRAIN GAGE PANEL INSTRUMENT

[4000 SERIES]

SPECIFICATIONS

Number of Inputs: One

Input Type: Conventional 4-arm strain gage bridge, nominal 120 Ohms or higher

Input Range (full-scale): 1.5 or 3.00 mV/V

Dimensions: 2.84" W x 5.68" W x 9.50" D

Operating Temperature Range: 0° C to +50°C (+32° F to +122° F)

Storage Temperature Range: -40°C to +80°C (-40° F to +176° F)

Operating Humidity Range: 10 to 95% max., noncondensing

Instrument Weight: 3.5 lb (1.6 kg), approximate

Power

Voltage: 90-135 or 180-279 V-AC, selectable by rearpanel switch; optional 11-18 V-DC ("V" Option)

Frequency: 47-63 Hz

Consumption: 35 W max. (30 W max. for "V" Option)

A/D Conversion: 16-bit (± 32000 count); 1000 finished engineering-unit answers per second, typical

Digital Filtering: Per-channel quieting factor selectable from front panel or by computer-port command

Internal 15-Segment Linearization: Programmable from front panel or by computer-port command

Excitation Supplied: Selectable 5 or 10 V-DC, nominal; ± 80 mA max.

Normal-Mode Range: ± 50 mV peak operating; ± 8 V without instrument damage

Common-Mode Range: ± 0.25 V peak operating; ± 8 V without instrument damage

Common-Mode Rejection Ratio: -90 dB at DC; -120 dB at 60 Hz, 1 kHz, and 3 kHz

Input Impedance (Differential and Common-Mode): Greater than 100 M Ohms

Offset: Initial: $\pm 0.02\%$ of full scale; vs. Temperature: ± 20 ppm/°C; vs. Time: ± 10 ppm/month

Gain Accuracy: $\pm 0.02\%$ of full scale ± 1 count LSD, typical, following calibration

Gain Stability: Vs. Temperature: ± 50 ppm/°C; vs. Time: ± 20 ppm/month

Analog Filtering: 3-pole modified Butterworth filter; -3 dB at 20 Hz; -60 dB at 220 Hz

Step Response Settling Time (Full-Scale Output)

To 1% of final value 60 ms

To 0.1% of final value 80 ms

To 0.02% of final value 125 ms

Analog Peak Memory Decay Rate: Does not exceed 0.4% of full scale/second (e.g., with full scale of 20000 counts, decay rate will not exceed 8 counts/100 msec)

Analog Output

Any scanned channel may be represented by the 4000 instrument's single analog output; however, for certain models, the analog output will not be assigned to any specific channel under the instrument's "Standard Configuration" Full-Scale Range: ± 10 V, microprocessor driven and scaled

Resolution: ± 1 mV

Allowable Loading: 5 mA, maximum

Accuracy: 0.05% of current voltage reading ± 2 mV

Bandwidth: 40 Hz maximum

Configuration: Single-ended, return to System Common

Communications

Serial: 9-pin RS232 standard; RS485 optional with "N" Option; standard baud rates from 300 through 153.6K for both RS232 and RS485; RS485 configuration allows operation as an individual datacollection "node" within a computer-controlled network