

The 6039 input module has eight channels of high performance signal-conditioning amplifier-digitizers for strain gages and bridge transducers. Each channel has programmable excitation with remote sensing, voltage and shunt calibration, programmable gain instrumentation amplifier, low pass filter and sample and hold. Outputs of the sample & hold are digitized to 16 bits then provided to the 6000 data bus. The filter is programmable providing four low-pass frequencies and wideband.

The 6039 is used with $\frac{1}{4}$, $\frac{1}{2}$ and full bridge transducers, potentiometers and low-level voltage signals in demanding, dynamic measurement applications. It is particularly suited to strain gages and bridge transducers. A shielded eight-wire input provides independent excitation, sense, calibration and signal connections to the transducer. Excitation is programmable from 0 to 12 Volts with remote sensing providing regulated excitation at the transducer. The input connector also provides access to ± 12 or ± 15 Volt DC power.

Gain calibration may be done by voltage substitution using an external voltage standard. A calibration attenuator enables the voltage standard to be used on its highest accuracy ranges and has a post-attenuator output for accuracy verification. Two steps of bipolar resistive shunt calibration are provided for transducer calibration. Calibration and gain and zero correction can be automated using software such as Pacific's PI660. Two alarms with programmable upper and lower limits are provided.



FEATURES

- Eight-wire input provides highest accuracy
- Programmable voltage excitation with remote sensing
- Programmable input configuration, $\frac{1}{4}$, $\frac{1}{2}$ and full bridge
- Two-step shunt and voltage substitution calibration
- Gains 1 to 5,000 with 0.05% accuracy
- Programmable, four-pole low-pass filter
- 10K Samples per second with 16-bit resolution
- Programmable alarms

SPECIFICATIONS

VOLTAGE EXCITATION

Output.....Programmable from 0-12 Volts in 1 Volt $\pm 0.1\%$ steps, or adjustable with 3.3 mV resolution.
 Current.....50 mA limited to 70 mA.
 Regulation..... $\pm 0.01\%$ for $\pm 10\%$ line and no-load to full-load using remote sensing.
 Stability..... $\pm 0.01\%$, $\pm 0.005\%/^{\circ}\text{C}$.
 Noise200 μV peak to peak.
 MonitorCalibration mode measures excitation voltage with $\pm 0.05\%$ accuracy.

INPUT

Configuration2 to 8 wire with guard shield. Bridge configuration is programmable for $\frac{1}{4}$, $\frac{1}{2}$ and full bridge. 350 Ohm completion resistor standard, alternate value may be specified.
 Balance.....Automatic by program control. Balance accuracy $\pm 0.05\%$ of range, ± 1 mV RTO. Stability $\pm 0.02\%$ for 8 hours, $\pm 0.005\%/^{\circ}\text{C}$. Range set by resistor up to 10 mV/V, 0.5 mV/V.
 Impedance50 Megohms shunted by 500 pF.
 Protection..... ± 50 Volts differential, ± 50 Volts common mode.
 Transducer Power.. ± 12 or ± 15 Volts DC is provided on the input connector for DC-LVDT and similar transducers.

CALIBRATION

ShuntTwo step Bipolar shunt, 0.502 mV/V and 0.245 mV/v for 350 Ohm bridge, $\pm 0.1\%$..
 VoltageAlternate input for external calibration source. Programmable attenuator with steps of 1, 0.1 and 0.01, $\pm 0.01\%$ accuracy. Output of the attenuator is provided for verification.
 ZeroAmplifier input disconnected and shorted.

AMPLIFIER

Gain.....Programmable from 1 to 5,000 in 1, 2, 3, 5 steps with $\pm 0.05\%$ accuracy
 Gain Stability..... $\pm 0.01\%$, $\pm 0.004\%/^{\circ}\text{C}$.
 Linearity..... $\pm 0.01\%$ for gains $< 1,000$, $\pm 0.02\%$ for gains 1,000 and higher.

Common Mode60 dB plus gain in dB up to 106 dB, DC to 60Hz for ± 10 Volts.
 ZeroAutomatic to ± 1 μV RTI, ± 0.5 mV RTO.
 Zero Stability..... ± 5 μV RTI, ± 1 mV RTO, ± 1 $\mu\text{V}/^{\circ}\text{C}$ RTI, ± 0.2 mV/ $^{\circ}\text{C}$ RTO. Short term: ± 2 μV RTI, ± 0.4 mV RTO for 8 hours.
 Source Current ± 25 nA, ± 0.05 nA/ $^{\circ}\text{C}$
 Noise (10 Hz)0.1 μV rms RTI, 0.5 mV rms RTO.
 Noise (1 kHz).....0.5 μV rms RTI, 0.5 mV rms RTO.
 Bandwidth.....5 kHz for gains $< 1,000$ and 1 kHz for gains 1,000 and higher.
 Slew Rate.....3.2 V/ μs .
 Recovery.....120 μs to $\pm 0.1\%$ for 10X overload to ± 10 V.

FILTER

Type.....Programmable four pole, low pass Butterworth with with bypass.
 Frequencies4 Hz, 10 Hz, 100 Hz and 1 kHz.

SAMPLE & HOLD, ADC

Sample.....Simultaneous, within ± 50 nS channel-to-channel. Droop is less than $\pm 0.005\%$.
 Resolution16 bits, two's complement.
 Sample Rate.....Up to 10 kS/s per channel.
 Linearity2 LSB (0.006%).
 Continuity.....Monotonic to 15 bits.
 AlarmsTwo alarms each with programmable upper and lower limits and persistence checked on each ADC sample.

GENERAL

Mounting.....Occupies one slot in Series 6000 enclosure.
 ConnectorsInputs use two 50-pin Type D connectors.
 Temperature0 $^{\circ}\text{C}$ to +50 $^{\circ}\text{C}$ operating.

ORDERING INFORMATION

6039Eight-channel transducer amplifier-digitizer with programmable filter.