MODEL 6039C

8-Channel Strain/Bridge Transducer Amplifier-Filter-Digitizer

The 6039C 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 6039C is used with ¼ (120 and 350 Ohm s/w selectable), ½ 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 or 28 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

- **Programmable input configuration, ¼, ½ & full bridge**
- **Programmable voltage excitation with remote sensing**
- **Additional ±12 or ±15 or 28 Volt transducer power**
- **Two-step shunt & voltage substitution calibration**
- **Gains 1 to 5,000 with 0.05% accuracy**
- **Programmable 4, 6 or 8 pole low-pass filter**
- **Up to 20ks/s per channel with 16-bit resolution**
- **Two alarms with programmable upper & lower limits**

SPECIFICATIONS

INPUT

Configuration .....8 channels, 2 to 8 wire with guard shield. Bridge config is programmable for ¼, ½ and full bridge. 120 and 350 Ohm completion resistor standard, alternate value may be specified.

Balance.....Automatic by program control. Balance accuracy ±0.05% of range, ±1 mV RTO. Stability ±0.02% for 8 hours, ±0.005%/°C. Coarse and fine balance are jumper selectable..

Impedance .....50 Megohms shunted by 500 pF.

Protection.....±50 Volts differential, ±50 Volts common mode.

EXCITATION / TRANSDUCER POWER

VOLTAGE EXCITATION

Voltage .....Programmable per channel from 0-12 Volts in 1 Volt ±0.1% steps, or adjustable with 3.3 mV resolution.

Current.....50 mA limited to 70 mA.

Regulation .....±0.01% for ±10% line and no-load to full-load using remote sensing.

Stability.....±0.01%, ±0.005%/°C.

Noise .....200 µV peak to peak.

Monitor .....Calibration mode measures excitation voltage with ±0.2% accuracy.

TRANSDUCER POWER

Voltage .....±12 or ±15 Volts or 28V jumper selectable per card.

Current.....50 mA per channel, limited to 200 mA maximum per card.

Configuration .....Transducer power available on separate pins from voltage excitation.

AMPLIFIER

Gain.....Programmable from 1 to 5,000 in 1, 2, 3, 5 steps with ±0.05% accuracy

Gain Stability.....±0.01%, ±0.004%/°C.

Linearity .....±0.01% for gains <1,000, ±0.02% for gains 1,000 and higher.

Common Mode .....80 dB plus gain in dB up to 110 dB, DC to 60Hz for ±10 Volts.

Zero .....Automatic to ±1 µV RTI, ±0.5 mV RTO.

Zero Stability.....±5 µV RTI, ±1 mV RTO, ±1 µV/°C RTI, ±0.2 mV/°C RTO. Short term: ±2 µV RTI, ±0.4 mV RTO for 8 hours.

Source Current .....±10 nA, ±1 nA/°C

Noise (10 Hz) .....0.1 uV rms RTI, 0.5 mV rms RTO.

Noise (1 kHz).....1.0 uV 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/uS.

Recovery.....120 µS to ±0.1% for 10X overload to ±10 V.

FILTER

Type .....4-freq. 4-pole (standard), 2-freq. 8-pole Butterworth with wideband.

Frequency.....4-pole: 4 Hz, 10 Hz, 100 Hz and 1 kHz. 8-pole: 10 Hz and 1 kHz.

Noise .....0.5 mV rms, RTO.

Other .....Other filter characteristics and cut offs available.

DIGITIZER

Sample.....Simultaneous, within ±50 nS channel-to-channel. Droop is less than ±0.005%.

Resolution .....16 bits, two's complement.

Sample Rate.....Up to 20 ks/s per channel.

Linearity .....3 LSB (0.01%).

Continuity .....Monotonic to 15 bits.

Alarms .....Two alarms each with programmable upper and lower limits and persistence checked on each ADC sample.

CALIBRATION

Shunt .....Two step Bipolar shunt, 0.5024 mV/V and 0.245 mV/V for 350 Ohm bridge, ±0.1%. For a 120 Ohm bridge, steps are 0.17235 mV/V and 0.08402 mV/V, ±0.1%.

Voltage Subst. .....Attenuator accuracy is 0.02% for 1 and 0.01% for 0.1 and 0.01.

Zero .....Amplifier input disconnected and shorted.

MECHANICAL

Mounting.....Occupies one slot in Series 6000 enclosure.

Connectors .....Inputs use two 50-pin Type D connectors. Mating connectors supplied

Temperature .....0°C to +50°C operating.

ORDERING INFORMATION

6039C-PF4-BU4 ..8-Ch Strain-Bridge-Position, 4-Freq, 4-Pole Butterworth Filter

6039C-PF2-BU8 ..8-Ch Strain-Bridge-Position, 2-Freq, 8-Pole Butterworth Filter

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