

Model 6031 may not be regularly available. Please see Model 6030, 6060 or 6068 for similar applications.

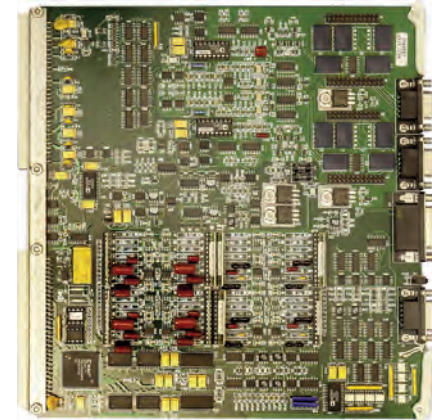
The 6031 is a two-channel, fully programmable signal conditioning amplifier, filter and digitizer. It features a plug-on signal conditioning completion card that is available for strain gage, bridge, RTD, potentiometer, voltage-mode charge, voltage and current transducers. Each channel has a programmable gain differential instrumentation amplifier, four 8-pole low-pass filters, a 16-bit digitized output and a ± 10 Volt analog output that can be selected for wideband or filtered response.

The signal conditioning in the 6031 is built around a completion card that configures it for various types of transducers. Programmable excitation provides either 0 to 10.24 Volts constant voltage with remote sensing or 0 to 50 mA constant current excitation for strain gages, bridges, RTDs, potentiometers and other transducers requiring a highly stable source of DC power. A DC supply provides up to 25 Volts of regulated DC power and doubles as the power source for current loops and integrated electronic piezoelectric (IEPE) transducers.

The bridge input is eight-wire shielded; input (2), excitation (2), sense (2) and shunt calibration (2). Automatic bridge balancing ahead of the instrumentation amplifier accommodates large unbalances without limiting gain or dynamic range. The high-impedance current source used for balancing will not cause linearity errors due to bridge loading effects.

The 6031 employs an amplifier/digitizer-per-channel architecture, which provides high bandwidth and digitizing speed with excellent channel-to-channel time correlation. It offers the highest accuracy and completely eliminates crosstalk between channels. Using Pacific's PI660 software zero and gain calibration and correction are automatic.

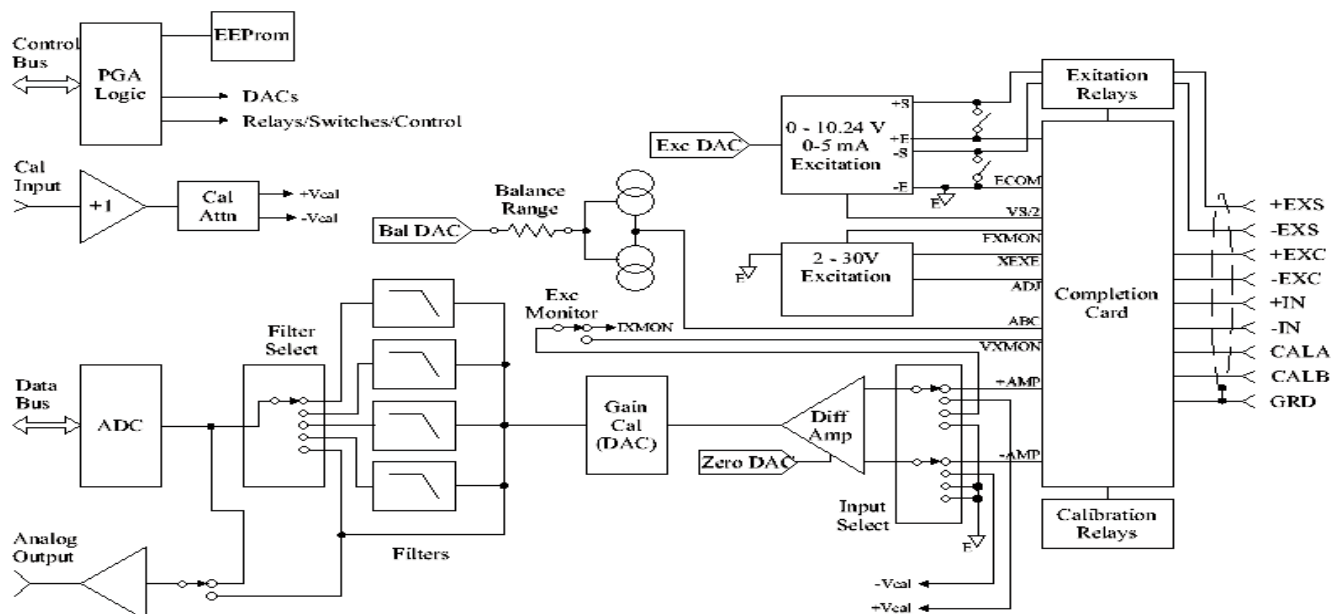
The differential instrumentation amplifier has continuous programmable gains from 1 to 5,000 with automatic zero and high common mode rejection. The standard filter is an eight-pole Bessel with four programmable bandwidths and wideband. An optional four-pole Bessel filter has continuously programmable bandwidth with resolution of 1 Hz from 4 Hz to 1 kHz and 5 Hz from 1 kHz to 20 kHz.



FEATURES

- Plug-in channel configuration & calibration card
- Voltage & current excitation including remote sense
- Gains 1 to 5,000 with 0.05% resolution
- 50 kHz or 100 kHz bandwidth
- Automatic zero & balance
- Programmable low pass filters
- Voltage substitution gain calibration
- Digitized & analog outputs
- Up to 250k/s per channel with 16-bit resolution
- Dual buffered 10 Volt analog outputs

The 6031 with the 6031-CC6 completion card provides two-step, bipolar, resistive shunt calibration that may be applied to internal or external bridge arms. Other completion cards have resistance substitution and series resistance calibration. Voltage substitution is usable with all completion cards and employs an external, traceable standard for gain calibration. Automatic zero and gain calibration are implemented in software.



SPECIFICATIONS

INPUT

BRIDGE INPUT

Connection2 to 8 wires with shield.
 ConfigurationPlug-in completion card configures the channel for specific transducer and calibration types. Completion card type is read by software.
 Bridge BalanceAutomatic using program control. Balance accuracy $\pm 0.04\%$ of range, ± 1 mV RTO.
 Stability $\pm 0.02\%$ for 24 hours, $\pm 0.005\%/^{\circ}\text{C}$. Bridge balance may be turned off without changing the balance setting.
 Impedance50 Megohms, shunted by 500 pF.
 Protection ± 50 Volts differential, ± 30 Volts common mode without damage.

RTD INPUT

RTDTwo substitution resistors $\pm 0.1\%$, 10 ppm/ $^{\circ}\text{C}$.
 CurrentCurrent loop calibration resistor, $\pm 0.1\%$, 10 ppm/ $^{\circ}\text{C}$

EXCITATION / TRANSDUCER POWER

AuxiliaryResistor settable +5 to +25 Volts is available on certain completion cards. Regulation is $\pm 1\%$.
 Monitor (digital)Excitation voltage, 0.5V/V $\pm 0.05\%$ (0.1V/V $\pm 2\%$ for Auxiliary) or current, 0.1 V/mA $\pm 0.1\%$.
 Monitor (analog)Test points for excitation and sense
 Excitation OffRemoves excitation from the transducer without changing the setting.
 IEPE (6031-CC1)Nominal 6 mA, 24 Volt compliance. User settable from 1 to 20 mA.

CONSTANT VOLTAGE

VoltageProgrammable from 0 to 10.24 Volts with 2.5mV resolution.
 Current50 mA limited to 70 mA maximum. No damage for continuous short.
 Rmt SensingFull excitation at the transducer with up to 1 Volt line loss.
 RegulationEach channel individually regulated, $\pm 0.01\%$ for $\pm 10\%$ line voltage change and no-load to full load.
 Stability $\pm 0.01\%$ for 30 days. Temperature coefficient less than $\pm 0.005\%/^{\circ}\text{C}$.
 Noise100 μV RMS, DC to 100 kHz.

CONSTANT CURRENT

Output RangeProgrammable 0.1mA to 50 mA with 12 μA resolution.
 Compliance0.1 to 10 Volts.
 Regulation $\pm 0.01\%$ or ± 0.1 μA for $\pm 10\%$ line voltage change.
 Noise2 μA or 100 μV RMS, DC to 20 kHz.
 Stability $\pm 0.01\%$ or ± 2 μA for 30 days. Temperature coefficient is less than $\pm 0.005\%$ or ± 1 $\mu\text{A}/^{\circ}\text{C}$.

AMPLIFIER

Input Range ± 2 mV to ± 10 Volts.
 GainProgrammable 1 to 5000, in 1, 2, 3, 5 steps, with $\pm 0.05\%$ accuracy.
 Gain Stability $\pm 0.02\%$ for 30 days, $\pm 0.005\%/^{\circ}\text{C}$.
 Linearity $\pm 0.01\%$ for gains to 1,000, $\pm 0.02\%$ for gains above 1,000.
 Common Mode60 dB plus gain in dB to 120 dB for balanced input and 100 dB for a 1,000 Ohm source unbalance, DC to 60Hz.
 CM Voltage ± 10 Volts.
 ZeroAutomatic zero to ± 2 μV RTI or ± 1.0 mV RTO whichever is greater.
 Zero Stability ± 5 μV RTI, ± 1 mV RTO at constant temperature, ± 1 μV RTI/ $^{\circ}\text{C}$, ± 0.2 mV RTO/ $^{\circ}\text{C}$. Short term: ± 2 μV RTI, ± 0.4 mV RTO for 8 hours.
 Source Current ± 5 nA, ± 0.05 nA/ $^{\circ}\text{C}$.
 Noise (10 kHz)2.0 μV RTI plus 0.3 mV RTO, RMS.
 Bandwidth50 kHz (6031), 100 kHz (6031HF) (-3dB) for gains to 1,000.
 Slew Rate5 V/ μs .
 OverloadRecovery time is 120 μs to within $\pm 0.1\%$ for a 10 times overload to ± 10 Volts.

Analog OutputTwo outputs, one calibrated and one monitor. ± 10 Volt full scale either filtered or wideband.

FILTER

STANDARD FILTER

TypeEight pole, low-pass Bessel (48 dB/octave).
 Frequency4 programmable filter bandwidths, 10 Hz, 500 Hz, 5 kHz, 10 kHz and wideband. Other filter frequencies are available on request.

OPTIONAL PROGRAMMABLE FILTER

TypeFour-pole, low-pass Bessel (24 dB/octave)
 Frequency (PF)4 Hz to 1 kHz, 1 Hz resolution, 1 kHz to 10 kHz, 5 Hz resolution, $\pm 2\%$ accuracy.
 Frequency (PHF)10 Hz to 1 kHz, 1 Hz resolution, 1 kHz to 20 kHz, 5 Hz resolution, $\pm 2\%$ accuracy.

DIGITIZER

Sample ± 50 nS channel-to-channel time correlation.
 Resolution16 bits, two's complement output.
 RateProgrammable up to 100 kS/s (6031), 200 kS/s (6031HF).
 Linearity $\pm 1\frac{1}{2}$ LSB ($\pm 0.004\%$)
 ContinuityMonotonic to 15 bits.
 AlarmsTwo alarms each with upper and lower limits that are programmable from negative to positive full scale. Limits checked on each ADC sample.

CALIBRATION

Voltage SubstAlternate input for external calibration source. Programmable 1, 0.1 and 0.01, attenuation with $\pm 0.02\%$ accuracy. Attenuator output may be connected to bus for calibration.
 Bridge (Series)Series calibration resistors, $\pm 0.1\%$, 10 ppm/ $^{\circ}\text{C}$.
 Bridge (Shunt)Two steps of bipolar shunt $\pm 0.1\%$, 10 ppm/ $^{\circ}\text{C}$.
 ZeroAmplifier input disconnected and shorted for zero calibration.

MECHANICAL

MountingOccupies one slot in Series 6100 enclosures.
 Temperature0 $^{\circ}\text{C}$ to +50 $^{\circ}\text{C}$ operating.
 ConnectorsInput connectors are 9-pin Type D. Outputs are a 9-pin Type D. All mates supplied.

ACCESSORIES

TEST FIXTURE (6087-6031)

6087-6031Input/Output Monitor. Fixture with test jacks for transducer inputs, amplifier inputs, excitation, sense, shunt calibration and outputs.

ORDERING INFORMATION

CHANNEL MODULES

60312-Ch Transducer Amp, 100kS/s 4-Freq, 8-Pole Bessel.
 6031HF2-Ch Transducer Amp, 200kS/s, 4-Freq, 8-Pole Bessel.
 6031-PF2-Ch 6031 PF 4 Hz to 10 kHz..
 6031-PHF2-Ch 6031 PF 10 Hz to 20 kHz.

PLUG-ON COMPLETION CARDS

Specifications are available for individual completion cards.

6031-CC1IEPE Comp Card, AC coupled, 2-20 mA.
 6031-CC2Bridge Comp Card w/ series calibration.
 6031-CC3Voltage Comp Card w/ Auxiliary (5-25 Volt) excitation output.
 6031-CC4Current (4-20 mA) Comp Card.
 6031-CC5RTD, Potentiometer Comp Card.
 6031-CC6Bridge or strain gage Comp card with shunt cal.
 6031-CC7Strain gage Comp card with series calibration.