

The 6165 is a two-channel instrumentation amplifier module. Each channel has isolated input, 100 kHz bandwidth and two outputs that can be filtered or wideband.

The input is two-wire shielded and is isolated from the outputs, power and control interface. This gives the user complete freedom to ground the input without creating ground loops that introduce noise and offset errors. The isolation provides for operation with up to ± 300 Volts of common mode applied to the input.

The differential instrumentation amplifier has programmable gains from 1 to 5,000 and automatic zero. The standard filter is a six-pole Bessel with four programmable bandwidths and wideband. An optional four-pole Bessel filter has continuously programmable bandwidth with 1 Hz resolution below 1 kHz and 5 Hz above 1 kHz. Each channel has two buffered, ± 10 Volt outputs. The output can be digitally monitored using any of the supported interfaces.

Voltage substitution calibration, employing an external standard, is provided for gain calibration. Automatic zero and gain calibration are implemented in PI660 software.

SPECIFICATIONS

INPUT

Configuration.....2 channels, differential 2 wire plus shield
Range..... ± 2 mV to ± 10 Volts full scale.
Impedance.....50 Megohms, shunted by 500 pF.
Protection..... ± 50 Volts, differential and ± 350 Volts common mode.

AMPLIFIER

Gain.....Programmable 1 to 5000, in 1, 2, 3, 5 steps, with $\pm 0.05\%$ accuracy.
Gain Stability..... $\pm 0.01\%$ for 30 days, $0.004\%/^{\circ}\text{C}$.
Gain Linearity..... $\pm 0.01\%$ for gain <1000, $\pm 0.02\%$ for Gain 1000 and higher
Common Mode80 dB plus gain in dB to 120 dB for balance input and 110 dB for a 350 Ohm source unbalanced, ± 300 Volts, DC to 60Hz.
CM Voltage..... ± 300 Volts operating.
Zero.....Automatic zero to ± 2 μV RTI or ± 1.0 mV RTO whichever is greater.
Zero Stability..... ± 1 $\mu\text{V}/^{\circ}\text{C}$ RTI, ± 0.2 mV/ $^{\circ}\text{C}$ RTO or (± 1 μV RTI, ± 0.2 mV RTO) / $^{\circ}\text{C}$.
Source Current..... ± 25 nA, ± 0.05 nA/ $^{\circ}\text{C}$.
Noise (10 kHz).....2.0 μV RTI plus 0.3 mV RTO, RMS.
Bandwidth.....50 kHz (-3 dB) for gains 1 to 1,000, 20kHz (-3 dB) for gains above 1,000.
Bandwidth (HF).....100 kHz (-3 dB) for gains 1 to 1,000, 50 kHz (-3 dB) for gains above 1,000.
Slew Rate.....5 V/ μs .
Overload Recovery...120 μs to within $\pm 0.1\%$ for a 10 times overload to ± 10 Volts.
Monitor.....Output is read by a program instruction. Resolution is $\pm 0.003\%$.
Output.....Two ± 10 Volt full scale buffered outputs. Each may be program selected for filtered or wideband response.

FILTER

Type.....4 Frequency Six-pole, low-pass Bessel or continuously programmable 4-pole Bessel.
Standard Filter.....6165: 4-Frequency 6-Pole Bessel with 150 Hz, 625 Hz, 2.5 kHz, 10 kHz and wideband..
6165HF: 4-Frequency 6-Pole Bessel with 300 Hz, 1.25 kHz, 5 kHz, 20 kHz and wideband.



FEATURES

- Isolated input with 300 Volts common mode
- Automatic zero
- Voltage Substitution Calibration
- Gains 1 to 5,000 with 50 kHz or 100 kHz bandwidth
- Programmable low-pass filters
- Dual buffered 10 Volt analog outputs

Programmable Filter ..6165: 4-Pole Bessel, continuously programmable 4 Hz to 10 kHz..
6165HF: 4-Pole Bessel, continuously programmable 10 Hz to 20 kHz.
OtherOther filter characteristics and cut offs are available.

DIGITIZER (6065)

See Model 6065 for the following Digitizing Capabilities:
Sample..... ± 50 nS channel-to-channel time correlation.
Resolution.....16 bits, two's complement output.
Rate.....Programmable up to 200 kS/s per channel.
Linearity..... $\pm 1\frac{1}{2}$ LSB ($\pm 0.004\%$).
Continuity.....Monotonic to 15 bits.
Alarms.....Two alarms each with upper and lower limits that are programmable from negative to positive full scale. Limits checked on each ADC sample.

CALIBRATION

Voltage Subst.....Alternate 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 external monitoring.
Zero.....Amplifier input disconnected and shorted for zero calibration.

MECHANICAL

Mounting.....Occupies one slot in Series 6000 enclosures.
Connectors.....Inputs are 15-pin and outputs are 9-pin Type D
Temperature..... 0°C to $+50^{\circ}\text{C}$ operating.

ACCESSORIES

6087..... Input Test Fixture

ORDERING INFORMATION

6165HF-PF4-BE6.....2-Ch Instrumentation Amp, 100kHz, 4-Freq 6-Pole Bessel
6165HF-PF10/20K-BE4.....2-Ch Instrumentation Amp, 100kHz, PF 10Hz-20kHz 4-Pole Bessel