

The 6053 input module has four channels of high performance signal-conditioning amplifier-digitizers for strain gages and bridge transducers. Each channel has programmable excitation with remote sensing, voltage calibration, local or remote shunt calibration, programmable gain instrumentation amplifier and six-pole low pass programmable filter. The high level outputs are multiplexed and digitized to 16 bits then output to the 6000 data bus. In addition to the digitized output, each channel provides two continuous, calibrated analog outputs.

The input and excitation are 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 6053 is used with quarter, half and full bridge transducers, potentiometers and low-level voltage signals in demanding applications such as load control. The filter is a six-pole programmable filter with cutoff frequency from 10 Hz to 20 kHz.

Voltage substitution using an external voltage standard is provided for traceable gain calibration. Internal or external shunt calibration is provided for transducer calibration. Transducer balance, zero, and gain calibration are automatic. Two programmable alarms with upper and lower limits are checked for each digitized output. The high-level analog outputs provide a means to independently monitor or record each channel.

SPECIFICATIONS

INPUT

Configuration4 channels, 2 to 8 wire with guard shield. Bridge configuration is programmable for 1/4, 1/2, and full bridge. 120 Ohm and 350 Ohm.
BalanceAutomatic 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, 2 mV/V (for 350 Ohms) installed.
Impedance44 Megohms, shunted by 500 pF.
Protection ± 50 Volts, differential or ± 350 Volts common mode without damage.

EXCITATION / TRANSDUCER POWER

VoltageProgrammable from 0-12 Volts in 1 Volt $\pm 0.1\%$ steps, with 3.3 mV resolution adjustment.
Current50 mA limited to 70 mA.
RegulationAccuracy $\pm 0.01\%$ 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 applies excitation voltage to amplifier input.

AMPLIFIER

GainProgrammable from 1 to 5000 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 Mode78 dB plus gain in dB to 120 dB for balanced input and 110 dB for a 350 Ohm source unbalanced, ± 300 Volts, DC to 60Hz.
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.
Source Current ± 25 nA, ± 0.01 nA/ $^{\circ}\text{C}$.
Noise (10 Hz)0.1 μV RMS RTI plus 0.5 mV RMS RTO.
Noise (wideband)2 μV RMS RTI plus 0.5 mV RMS RTO.
Bandwidth25 kHz (-3dB) or better.



FEATURES

- Isolated excitation & input with 300 Volts common mode
- Programmable input configuration 1/4, 1/2 & full bridge
- Programmable excitation with remote sensing
- Shunt & voltage calibration
- Automatic zero & balance
- Gains 1 to 5,000 with 0.05% accuracy
- Up to 40 kS/s per channel with 16-bit resolution
- Two buffered 10 Volt analog outputs per channel
- Two alarms with programmable upper and lower limits

Slew Rate5 V/ μS .
Recovery800 μS to $\pm 0.1\%$ for 10X overload to ± 10 V.
Analog OutputTwo ± 10 Volt full scale, wideband or filtered outputs. Accuracy is $\pm 0.05\%$. Outputs are independently buffered and either may be shorted indefinitely without affecting the other.

FILTER

TypeSix pole, programmable, low pass Butterworth.
FrequencyContinuously programmable 10Hz to 20kHz, 1.25Hz resolution, 3% accuracy.
Noise0.5 mV RMS RTO
OtherOther filter characteristics and cut offs available.

DIGITIZER (6053)

Resolution16 bits, two's complement output.
Sample Rate0 to 40 kS/s per channel.
Linearity ± 2 LSB ($\pm 0.006\%$)
ContinuityMonotonic to 15 bits.
AlarmsTwo alarms each with programmable upper and lower limits and persistence checked on each ADC sample.

CALIBRATION

ShuntTwo steps shunt, internal or external connection, 174k Ohm 0.1% and 357k Ohm 0.1%.
Voltage Subst.Alternate input for external calibration source. Programmable attenuator with steps of 1, 0.1 and 0.01, $\pm 0.02\%$ accuracy. Output of the attenuator is provided for calibration.
ZeroAmplifier input disconnected and shorted.

MECHANICAL

MountingOccupies one slot in Series 6000 enclosures.
ConnectorsInput is 50-pin Type D output is 9-pin Type D.
IndicatorsLED indicators are provided on the card and on the Series 6000 enclosure for status indication of the channels.
Temperature0 $^{\circ}\text{C}$ to +50 $^{\circ}\text{C}$ operating.

ORDERING INFORMATION

6053-PF4/5K-BU64-Ch Strain-Bridge, PF 10Hz-20kHz 6-Pole Butterworth.