

The 6013 input module has eight channels, each with programmable gain instrumentation amplifier, low pass filter and sample and hold. The high level outputs are multiplexed and digitized to 16 bits then output to the 6000 data bus. A ninth reference temperature channel conditions the output of the temperature sensor in the Model 6084 thermocouple reference junction. Each channel has a wideband analog output.

The 6013 may be configured for use with voltage, thermocouple and current transducers. It provides  $\pm 12/15$  Volt power for transducers with integral electronics. Versions are available for current loop, high voltage and 28 Volt powered transducers.

Voltage substitution is provided for channel gain calibration utilizing an external voltage standard. A calibration attenuator enables the voltage standard to be used on its highest accuracy ranges and provides a post-attenuator output for calibration and verification. Using Pacific's PI660 software zero and gain calibration and correction are automatic.

The four-pole, low-pass filter uses an easily changed plug-in module to set bandwidth. Either the wideband or filtered output may be digitized and sent to the 6000 data bus. Two programmable alarms each with upper and lower limits are checked each time the outputs are digitized.

### SPECIFICATIONS

#### INPUT

Configuration .....8 channels, differential, 2 wire with shield.  
Protection ..... $\pm 50$  Volts differential,  $\pm 30$  Volts common mode.  
 $\pm 250$  Volts differential with attenuator.

#### VOLTAGE

Range..... $\pm 2$  mV to  $\pm 10$  Volts ( $\pm 200$ mV to  $\pm 100$ V with optional attenuator).  
Attenuator.....100:1,  $\pm 0.2\%$  (6013-HV).  
Impedance.....50 Megohms, shunted by 1,000 pF (1Megohm with attenuator).

#### THERMOCOUPLE

Type .....B, C, E, J, K, N, R, S, and T.  
Configuration .....Differential, 2 wire with shield.

#### CURRENT LOOP (6013-I)

Loop Power.....28 Volts, 0 to 20mA.  
Termination.....200 Ohm,  $\pm 0.1\%$

#### TRANSDUCER POWER

Voltage .....Regulated  $\pm 12$  or  $\pm 15$  Volts jumper selectable per channel (6013). 28 Volts (6013-24V)  
Current .....50 mA per channel, limited to 200 mA maximum per 8-channel module.

#### AMPLIFIER

Gain .....Programmable 1-5000, in 1, 2, 3, 5, 10 steps, with  $\pm 0.05\%$  accuracy.  
Gain Stability..... $\pm 0.01\%$ ,  $\pm 0.005\%/^{\circ}\text{C}$ .  
Bandwidth .....1 kHz (-3dB).  
Linearity ..... $\pm 0.01\%$  for gains < 1,000,  $\pm 0.02\%$  for gains 1,000 and higher.  
Common Mode.....80 dB plus gain in dB to 110 dB, DC to 60Hz.  
CM Voltage ..... $\pm 10$  Volts.  
Zero.....Automatic to  $\pm 1$   $\mu\text{V}$  RTI,  $\pm 0.5$  mV RTO.  
Zero Stability ..... $\pm 5$   $\mu\text{V}$  RTI,  $\pm 1$  mV RTO.  $\pm 1$   $\mu\text{V}/^{\circ}\text{C}$  RTI,  $\pm 0.2$  mV/ $^{\circ}\text{C}$  RTO. Short term:  $\pm 2$   $\mu\text{V}$  RTI,  $\pm 0.4$  mV RTO for 8 hours.  
Source Current..... $\pm 10$ nA,  $\pm 1$ nA/ $^{\circ}\text{C}$ .  
Noise (10 Hz).....0.1  $\mu\text{V}$  rms, RTI, 0.5 mV rms, RTO.  
Noise (1kHz) .....1.0  $\mu\text{V}$  rms, RTI, 0.5 mV rms, RTO.  
Recovery.....800  $\mu\text{s}$  to  $\pm 0.1\%$  for 10X overload to  $\pm 10$  V  
Monitor Output ..... $\pm 3.0$  Volts full scale, unfiltered.

#### FILTER

Type .....Four-pole, low-pass Butterworth.  
Frequency.....Plug-in, 4Hz to 1kHz, 10 Hz supplied. Alternate filter characteristics and frequencies are available.



### FEATURES

- Voltage, thermocouple & DC-LVDT inputs
- Optional thermocouple reference junction box
- Gains 1 to 5,000 with 0.05% accuracy
- Automatic zero & gain calibration
- Four-pole, low-pass filter
- Up to 10 kS/s per channel with 16-bit resolution
- Two alarms with programmable upper & lower limits

#### DIGITIZER

Sample.....Simultaneous sample and hold with  $\pm 50$  nS channel-to-channel. Droop is less than  $\pm 0.005\%$ .  
Resolution .....16 bits, two's complement output.  
Sample Rate.....Up to 10 kS/s per channel.  
Linearity ..... $\pm 2$  LSB ( $\pm 0.006\%$ ).  
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 voltage standard. Programmable attenuation steps of 1, 0.1, and 0.01 with  $\pm 0.02\%$  accuracy. Output of the attenuator is provided on a rear panel connector for calibration.  
Zero.....Amplifier input disconnected and shorted.

#### MECHANICAL

Mounting .....Occupies one slot in Series 6000 enclosures.  
Connectors .....Input connector is 50-pin Type D. Connectors are mounted on the front and mates are supplied.  
Temperature.....0 $^{\circ}\text{C}$  to +50 $^{\circ}\text{C}$  operating.

#### ACCESSORIES

##### THERMOCOUPLE REFERENCE JUNCTION (6084)

Junction ..... $\pm 0.4^{\circ}\text{C}$  over the range of 10 to 50 $^{\circ}\text{C}$ . Includes junction temperature sensor.  
Termination .....8 channels, screw terminals, #18 to #28 wire.  
Cable.....2 meter cable is standard, other lengths available.  
Size.....3-3/4" wide, 3-3/4" high, 2" deep.

##### SCREW TERMINAL ADAPTER (6081)

Termination.....8 channels, screw clamp terminals for inputs and outputs, #18 to #28 wire.  
Mounting .....Installs on the front of the input module behind the enclosure door.

#### ORDERING INFORMATION

6013.....8-Ch Voltage/Thermocouple,  $\pm 12$ V or  $\pm 15$ V Power.  
6013-I .....8-Ch Current Loop.  
6013-HV .....8-Ch Voltage, 100:1 Attenuator  
6013-24V.....8-Ch Voltage/Thermocouple 28V Power.  
6081.....8-Ch Screw Terminal Adapter.  
6084.....8-Ch Thermocouple Reference Junction.