

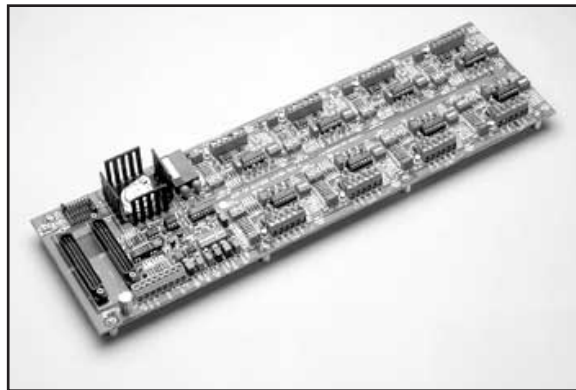
## EXP-GP

## 8-Channel Signal Conditioning Board

### Functional Description

Keithley's EXP-GP simplifies the interface of an analog input board to a wide variety of sensors. The EXP-GP is ideally suited for measurements of devices that are operated in a current excitation mode or in standard bridge configurations. These sensors include 2-, 3-, or 4-wire RTDs, thermistors, strain gages, variable potentiometer devices, and others. In addition, the EXP-GP has cold-junction compensation circuitry required for accurate thermocouple measurements. The EXP-GP is easily connected to the DAS-1600/1400/1200 and the DAS-800 Series, as well as to the DAS-16 and the DAS-8 Series.

The EXP-GP accepts up to eight sensors and multiplexes the inputs into a single A/D board input channel. The EXP-GP channel is selected by 3 digital lines controlled by the A/D board. Each EXP-GP input channel includes a differential input amplifier with switch-selectable input gain of 1, 10, 100, 1000 or 2.5, 25, 250, 2,500. Each input channel has a 1mA precision current source for current excited measurements. A 0.50, 1.00, 2.00, 4.00, or 10.00 volt (switch-selectable) precision reference voltage is provided for voltage excited sensors.



When used for bridge measurements, the EXP-GP allows the bridge completion resistors to be mounted either on or off the board. In addition, two user-installed resistors can be set to form one-half the bridge for all 8 channels. A relay and optional calibration resistor allows a simple shunt calibration.

The EXP-GP provides thermocouple cold-junction compensation circuitry that measures the input terminal temperature. The linearization software then subtracts out the cold-junction error.

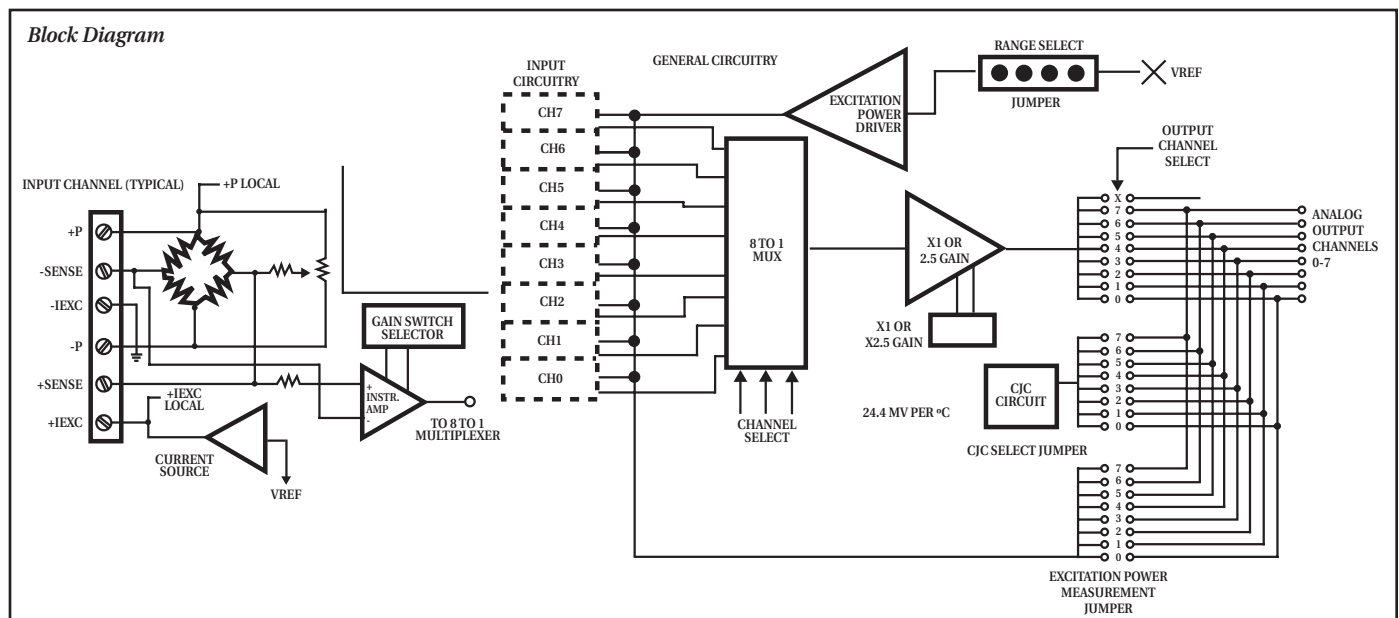
Each EXP-GP board is connected to a single input channel on the data acquisition board. This allows up to 8 EXP-GPs to be connected to a single data acquisition board. When used, the cold-junction compensation sensors also require connection to an input channel of the A/D board.

### FEATURES

- 8-channel resistance measurement accessory board
- Up to 8 EXP-GP boards or 64 input channels monitored by a single A/D board
- Interface to RTDs, thermistors, strain gages and a wide variety of other variable resistance sensors
- Accepts 2-, 3-, and 4-wire RTD measurements
- Provides current excitation (requires external power supply)
- Voltage excitation for bridge configurations (requires external +15V power supply)
- Allows bridge resistance measurements
- Provides thermocouple cold-junction compensation circuitry
- Switch-selectable input gains of 1, 10, 100, 1,000, or 2.5, 25, 250, 2,500 (selectable per channel)
- Onboard screw terminals simplify wiring
- Includes complete user's manual and helpful example, installation and calibration software routines

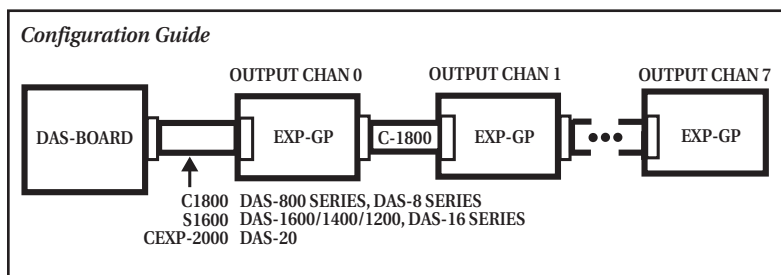
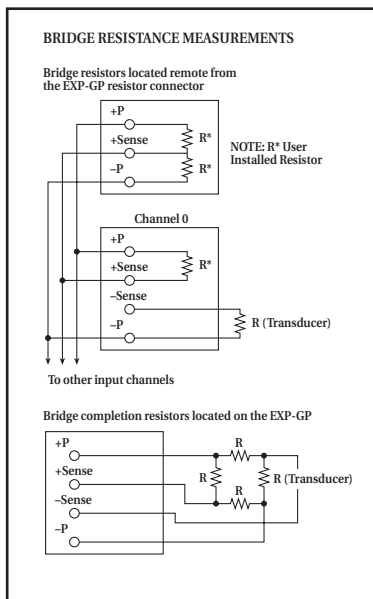
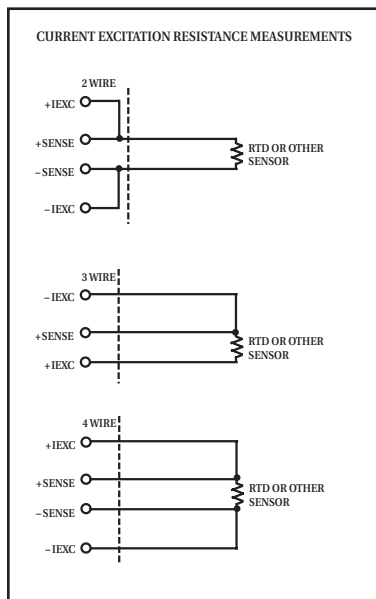
### APPLICATIONS

- Process control
- Data logging
- Laboratory automation
- Temperature control
- Input channel expansion



## EXP-GP

The EXP-GP is shipped with a comprehensive manual and a utility software package that provides helpful installation and set-up guides, and example and calibration programs. Connections to the EXP-GP are made through easy-to-use screw terminals installed on the board. The board can be used in the open (e.g., on a table top), mounted in a 19-inch rack (with a Keithley RMT-02 or equivalent), or mounted in a custom enclosure.



| ORDER   | DESCRIPTION                                  |
|---------|--|
| EXP-GP  | 8-Channel Signal Conditioning Board          |
| OPTIONS |  |
| C1800   | EXP-GP to DAS-800 or DAS-8 or EXP-GP Cable   |
| S1600   | EXP-GP to DAS-1600/1400/1200 or DAS-16 Cable |

### SPECIFICATIONS

#### INSTRUMENTATION AMPLIFIER GAINS

Switch-selectable gains of 1, 10, 100, and 1,000 or 2.5, 25, 250, and 2,500.

| GAIN       | INPUT OFFSET DRIFT               | COMMON MODE REJECTION | GAIN NON-LINEARITY |
|------------|----------------------------------|-----------------------|--------------------|
| 1000, 2500 | 5.1 $\mu\text{V}/^\circ\text{C}$ | 100 dB                | 0.15%              |
| 100, 250   | 5.1 $\mu\text{V}/^\circ\text{C}$ | 100 dB                | 0.075%             |
| 10, 25     | 6 $\mu\text{V}/^\circ\text{C}$   | 100 dB                | 0.045%             |
| 1, 2.5     | 15 $\mu\text{V}/^\circ\text{C}$  | 94 dB                 | 0.045%             |

#### GAIN ERROR (%)

| GAIN       | TYP   | MAX   |
|------------|-------|-------|
| 1, 2.5     | 0.01% | 0.15% |
| 10, 25     | 0.02% | 0.35% |
| 100, 250   | 0.05% | 0.40% |
| 1000, 2500 | 0.2%  | 0.90% |

#### GAIN TEMPERATURE COEFFICIENT

20ppm @ G = 1000, 15ppm @ G = 100, 10ppm @ G = 1.

#### OTHER SPECIFICATIONS

ACCEPTS THERMOCOUPLE TYPES: J, K, T, E, S, R, B.  
 COLD-JUNCTION COMPENSATION: +24.4mV/ $^\circ\text{C}$  (.1 $^\circ\text{C}$ /bit).  
 MAX SETTling TIME: 4 $\mu\text{s}$ .  
 COMMON MODE VOLTAGE:  $\pm 50\text{V}$  continuous.  
 OUTPUT VOLTAGE:  $\pm 5\text{V}$ .  
 MAX ANALOG OUTPUT CURRENT: 10mA max.

#### MEASUREMENT EXCITATION CURRENT SOURCES

NUMBER: 8.  
 EXCITATION CURRENT COMPLIANCE: 1mA, 0 to 2V.

#### MEASUREMENT VOLTAGE EXCITATION

(Requires external power supply).  
 VOLTAGE: 0.5, 1.0, 2.0, 4.0 and 10.0V (trimmable).  
 CURRENT: 350 mA (total all channels).

#### POWER REQUIREMENTS

+5VDC @ 380mA max.  
 +15V if bridge excitation is required.

#### PHYSICAL

DIMENSIONS: 16in  $\times$  4.75in (40.63cm  $\times$  12.06cm).  
 SCREW TERMINALS: Accept wire sizes 12–22 AWG.

#### ENVIRONMENTAL

OPERATING TEMPERATURE RANGE: 0 to 60 $^\circ\text{C}$ .  
 STORAGE TEMPERATURE RANGE: -40 to +100 $^\circ\text{C}$ .  
 HUMIDITY: 0 to 90% non-condensing.  
 EMC: Conforms to European Union Directive 89/336/EEC.  
 SAFETY: Meets EN61010-1/IEC 1010.

#### QUESTIONS?

1-800-552-1115 (U.S. only)

Call toll free for technical assistance, product support or ordering information, or visit our website at [www.keithley.com](http://www.keithley.com).