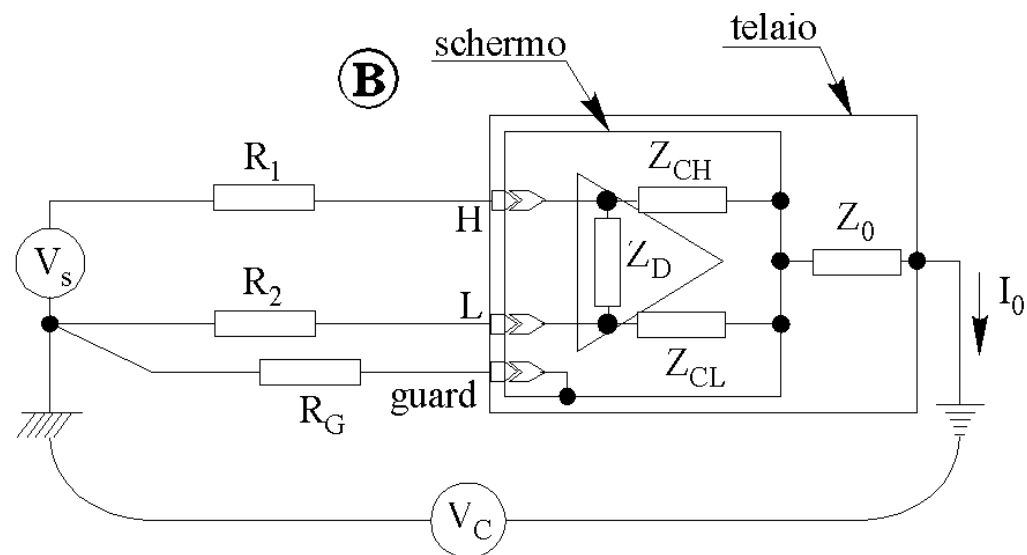
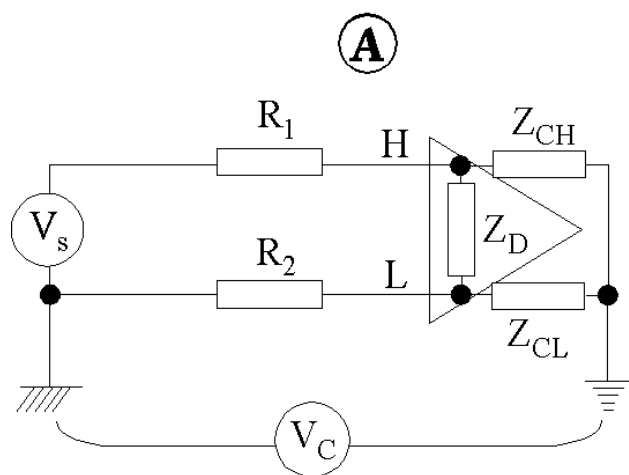


## Configurazione differenziale e tecnica di *guarding*



$$Z_{CH} = Z_{CL} = Z_C$$

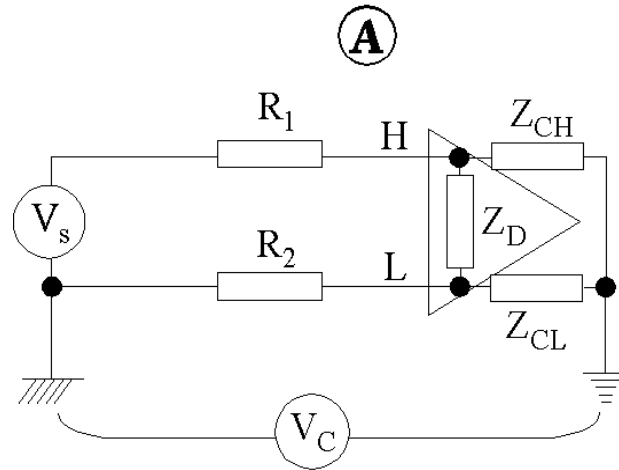
$$Z_C = Z_D = Z_0 = 100 \text{ M}\Omega$$

$$R_1 = 1000 \text{ }\Omega$$

$$R_2 = 10 \text{ }\Omega$$

$$R_G = 10 \text{ }\Omega$$

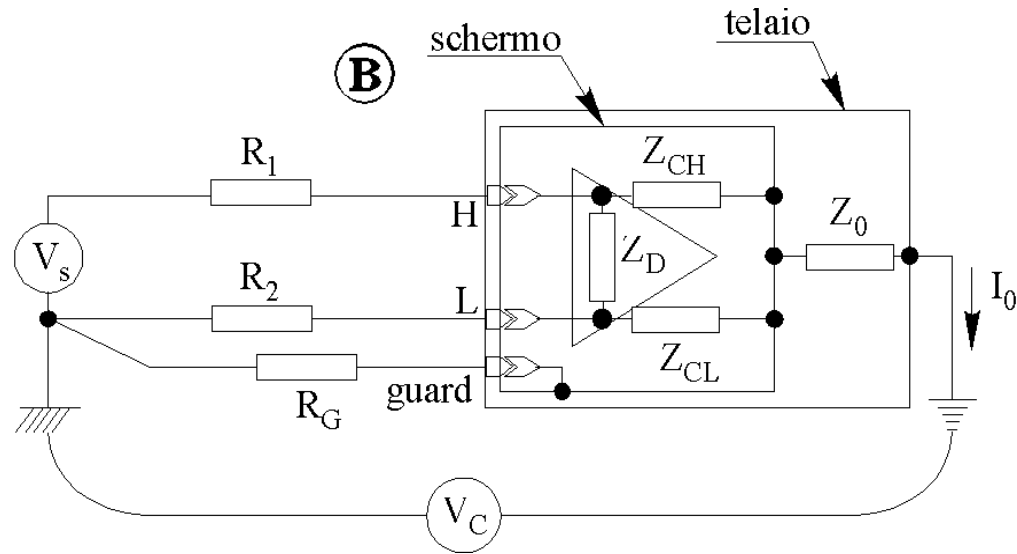
## Caso A



$$V_{H,L} = V_C \left[ \frac{Z_{CH}}{R_1 + Z_{CH}} - \frac{Z_{CL}}{R_2 + Z_{CL}} \right]$$

$$V_{H,L} = V_C Z_C \frac{R_2 - R_1}{(Z_C + R_1)(Z_C + R_2)} \cong V_C \frac{\Delta R}{Z_C} \cong V_C \frac{1000}{100 \cdot 10^6} = V_C \cdot 10^{-5}$$

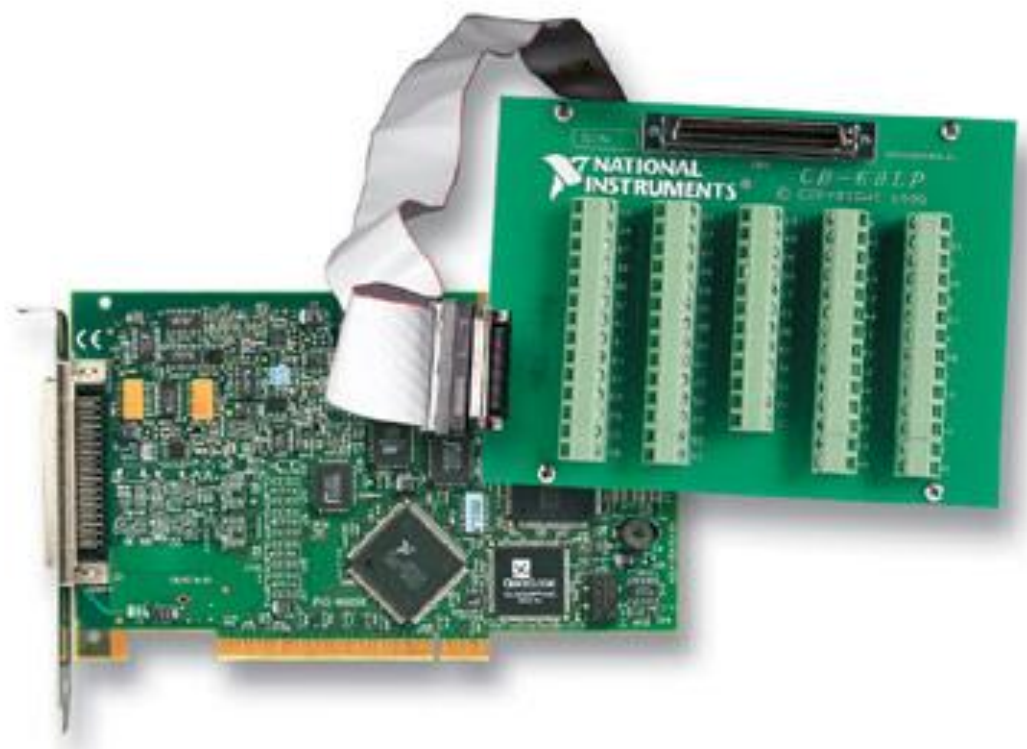
## Caso B



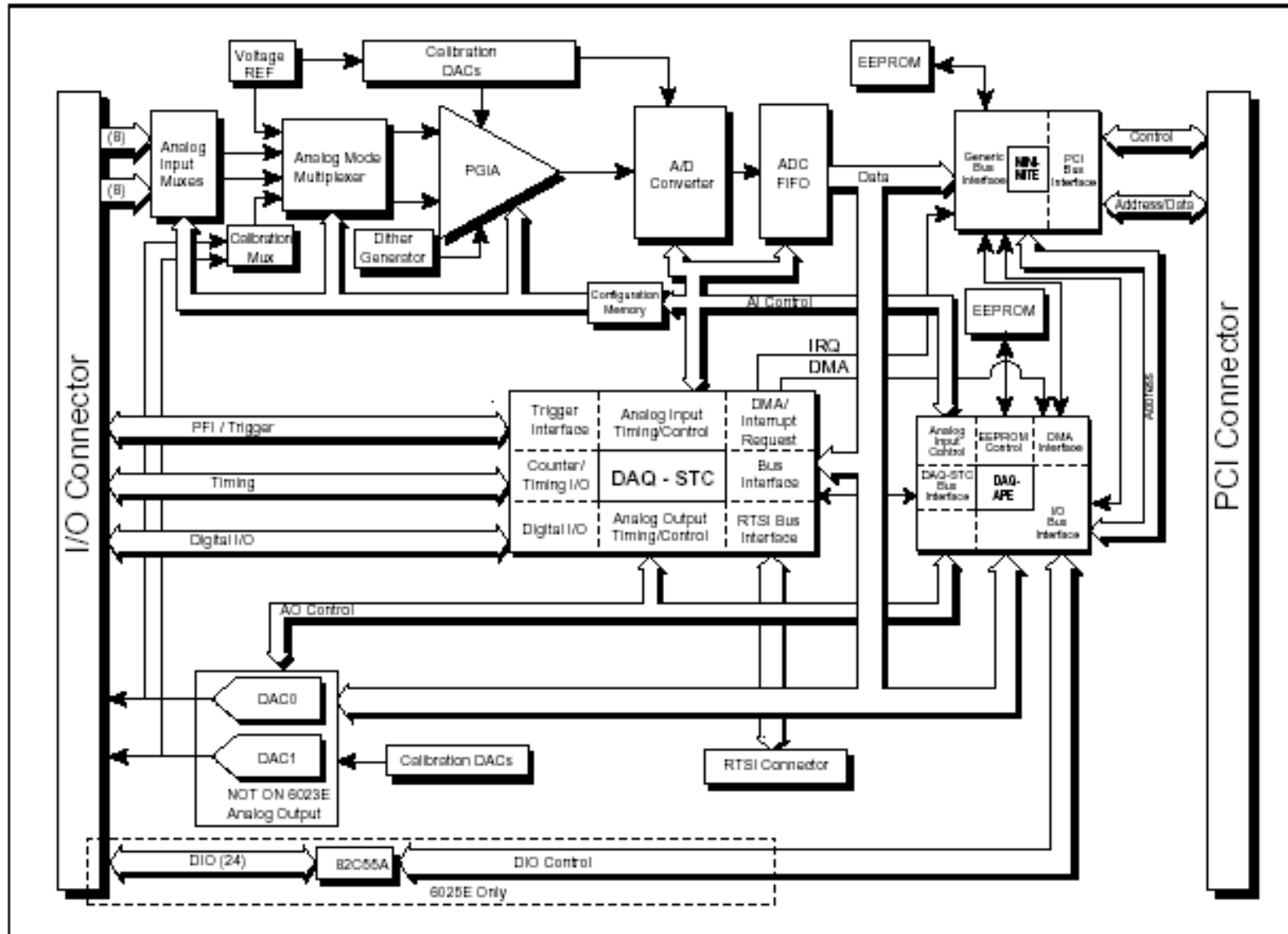
$$V_{RG} = V_C \frac{R_G}{R_G + Z_0} \cong V_C \cdot 10^{-7}$$

$$V_{H,L} = V_{RG} \left[ \frac{Z_{CH}}{R_1 + Z_{CH}} - \frac{Z_{CL}}{R_2 + Z_{CL}} \right] \cong V_C \frac{R_G}{R_G + Z_0} \cdot \frac{\Delta R}{Z_C} \cong V_C \cdot 10^{-5} \cdot 10^{-7} = V_C \cdot 10^{-12}$$

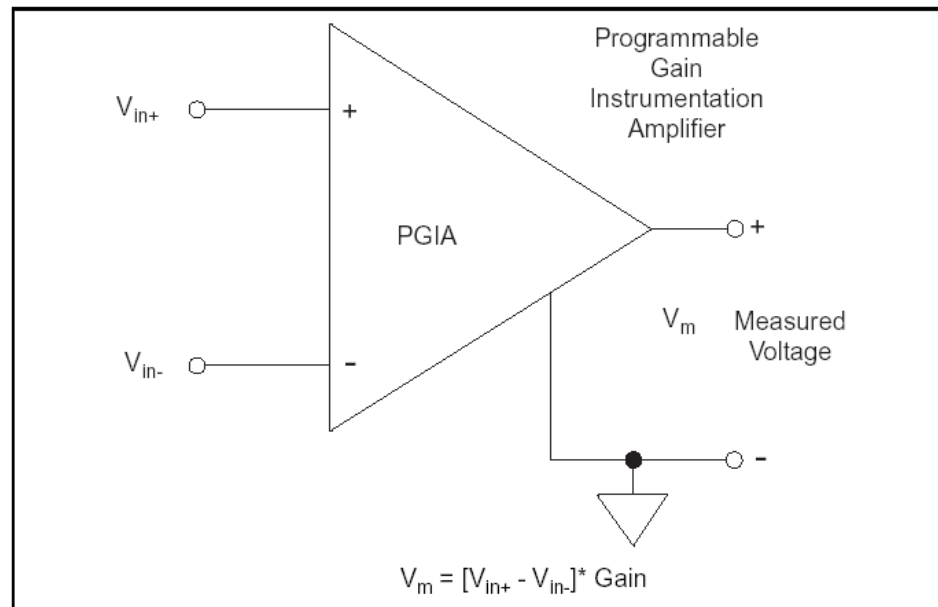
# *DAQ board*



## DAQ board



## Amplificatore per strumentazione



**Figure 4-3.** Programmable Gain Instrumentation Amplifier (PGIA)

## Guadagno dell'amplificatore e risoluzione

Table 3-2. Measurement Precision

Gain	Input Range	Precision *
0.5	-10 to +10V	4.88 mV
1.0	-5 to +5V	2.44 mV
10.0	-500 to +500 mV	244.14 $\mu$ V
100.0	-50 to +50 mV	24.41 $\mu$ V

\*The value of 1 LSB of the 12-bit ADC; that is, the voltage increment corresponding to a change of one count in the ADC 12-bit count.

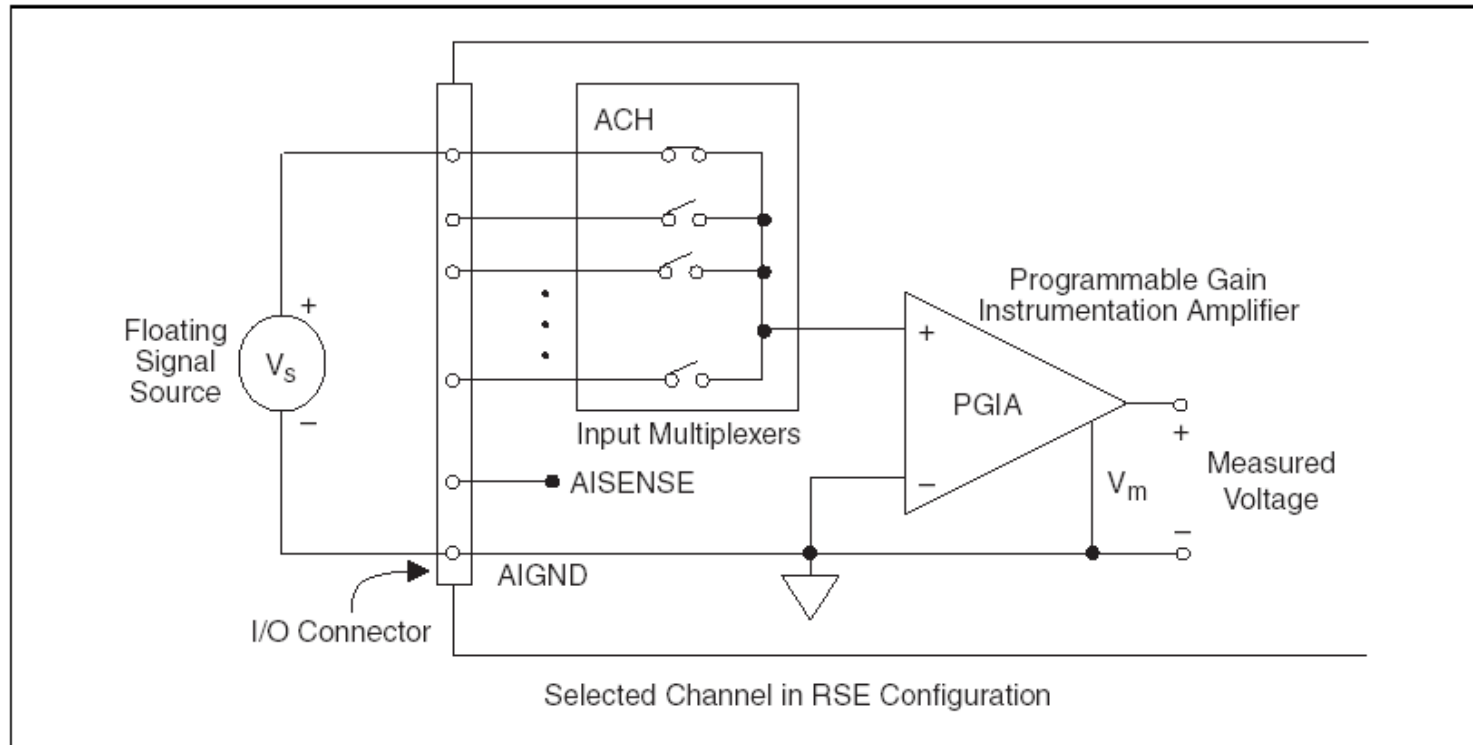
**Note:** See Appendix A, *Specifications*, for absolute maximum ratings.

## Configurazioni di ingresso

**Table 3-1.** Available Input Configurations

<b>Configuration</b>	<b>Description</b>
DIFF	A channel configured in DIFF mode uses two analog input lines. One line connects to the positive input of the board's programmable gain instrumentation amplifier (PGIA), and the other connects to the negative input of the PGIA.
RSE	A channel configured in RSE mode uses one analog input line, which connects to the positive input of the PGIA. The negative input of the PGIA is internally tied to analog input ground (AIGND).

## DAQ Input



**Figure 4-7.** Single-Ended Input Connections for Nonreferenced or Floating Signals

## DAQ Input

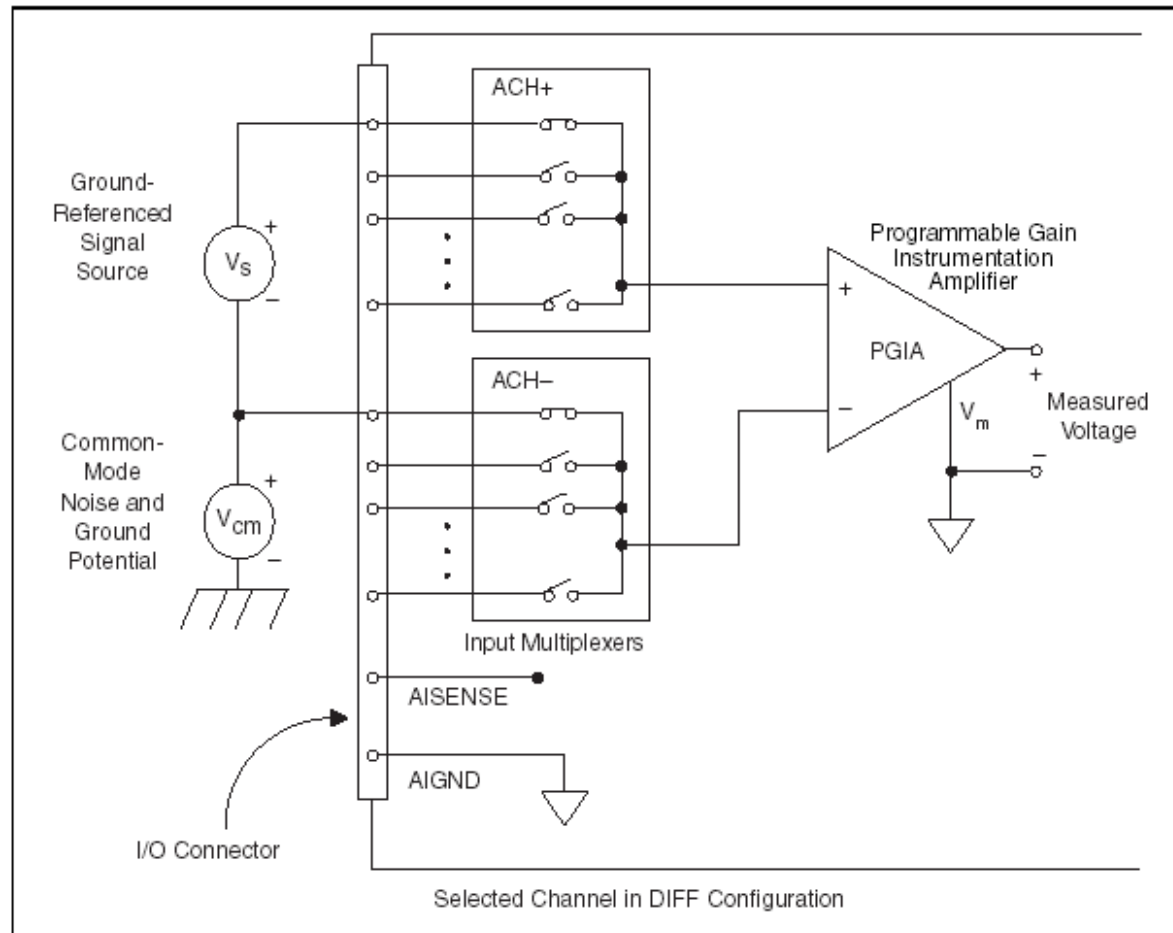


Figure 4-5. Differential Input Connections for Ground-Referenced Signals

**Connessioni di ingresso**

	Signal Source Type	
	Floating Signal Source (Not Connected to Building Ground)	Grounded Signal Source
Input	<p>Examples</p> <ul style="list-style-type: none"> <li>• Ungrounded Thermocouples</li> <li>• Signal conditioning with isolated outputs</li> <li>• Battery devices</li> </ul>	<p>Examples</p> <ul style="list-style-type: none"> <li>• Plug-in instruments with nonisolated outputs</li> </ul>
Differential (DIFF)	<p>See text for information on bias resistors.</p>	
Single-Ended — Ground Referenced (RSE)		<p><b>NOT RECOMMENDED</b></p> <p>Ground-loop losses, <math>V_g</math>, are added to measured signal</p>