Pressure and Force Sensors

Bridge Amplifiers for 20/170PC and FS Series – Note #2

INTRODUCTION
Two circuits are shown here which can be used to amplify the millivolt output of the 20/170PC and FS Series. **Only high input impedance amplifiers should be used with MICRO SWITCH pressure and force sensors.**

Figure 1
This circuit employs one amplifier with a low input current offset (such as an LM108) permitting large value input resistors. To change gain, R_3 and R_4 are adjusted while maintaining impedance matching.

Figure 2
Placing all of the gain in the first stage (three amplifiers) makes this circuit less susceptible to common mode errors. The second stage (one amplifier) should be used as a unity gain summing amplifier.

NOTE: MICRO SWITCH recommends that amplification does not exceed 250 times. Reverse pins 2 and 4 when using an absolute sensor.

Figure 1
$V_o = (V_2 - V_4)\ R_3/R_1$ for $R_3/R_1 = R_4/R_2$

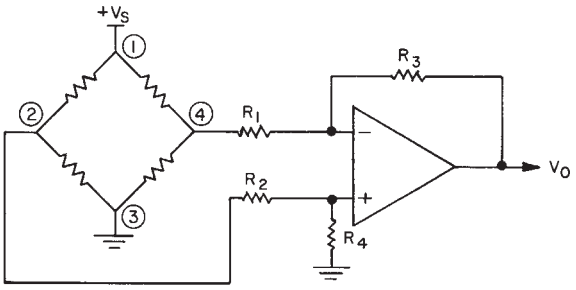

Figure 2
$V_o = (V_2 - V_4)\ (1 + 2R_1/R_2) + V_n$, Note: $R_1 = R_3$