

# Pressure and Force Sensors

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

### INTRODUCTION

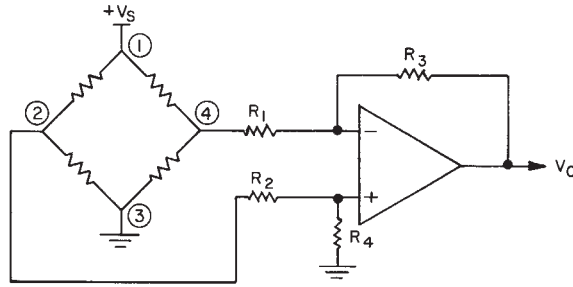
Two circuits are shown here which can be used to amplify the millivolt output of the 20/170PC and FS Series. **Only high input impedance amplifiers should be used with MICRO SWITCH pressure and force sensors.**

#### 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 1**

$$V_o = (V_2 - V_4) R_3/R_1 \text{ for } R_3/R_1 = R_4/R_2$$



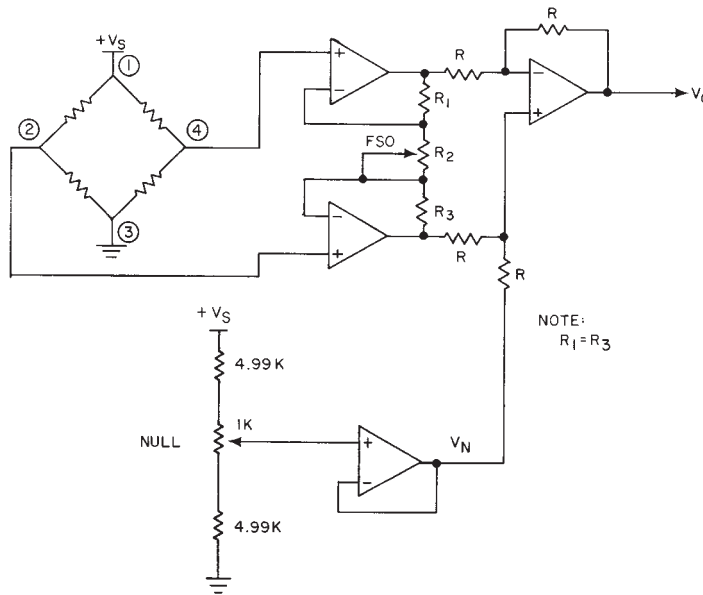
#### Figure 2

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 2**

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



NOTE:  
 $R_1 = R_3$