ECE 207 **Lab Work 9** **Due October 11th**

Names _____

Objectives:

Construct and calibrate a strain gage-based force measurement system.

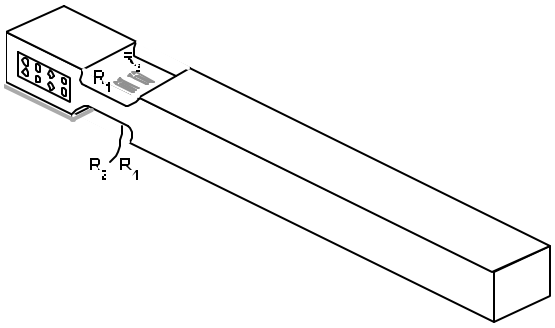
Deliverables

Completed procedure.

Procedure

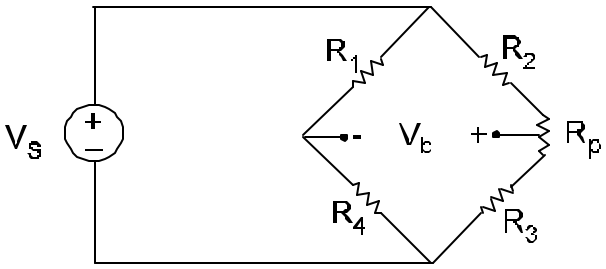
1. Carefully clamp the cantilever load cell to table. As you do this ensure no wires are damaged and that the clamp does not touch any exposed metal of the electrical system.

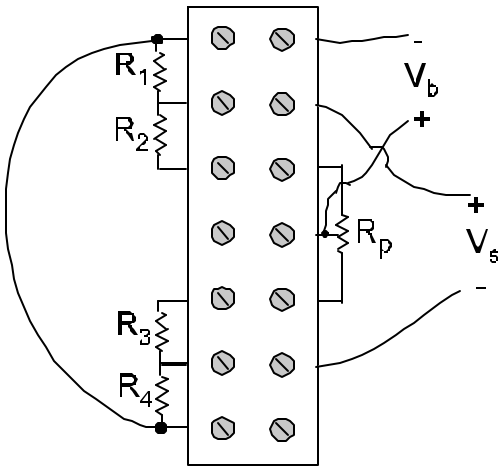
CANTILEVER LOAD CELL



2. Bring V_s = 6V (power supply should be off at this stage) to the four-active arm Wheatstone bridge.

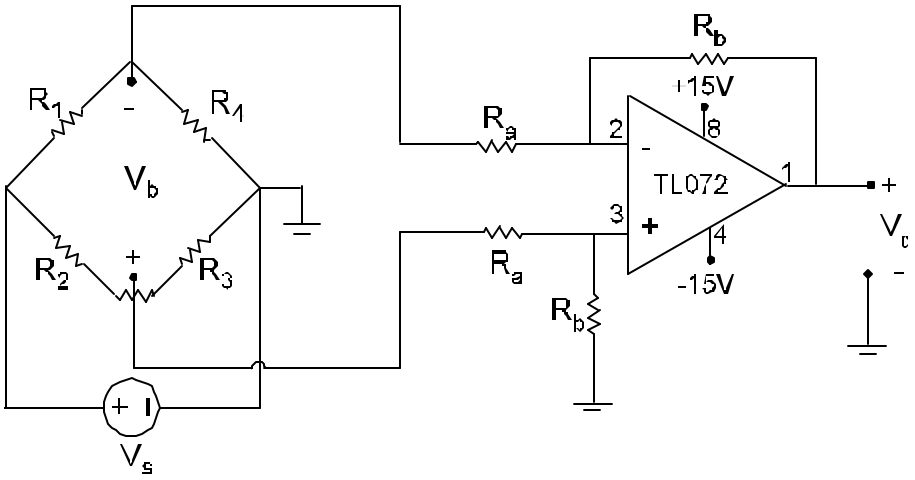
WHEATSTONE BRIDGE





3. Turn 6V supply on. Null the bridge (adjust the potentiometer so that $V_b \cong 0V$).
4. Turn 6V supply off.
5. Connect V_b to differential amplifier (gain≅10 with R_a = 10 kΩ and R_b =100 kΩ)
   As always, turn power supplies OFF when connecting circuit.

ELECTRICAL CIRCUIT



6. Enable circuit by turning on 6V and ±15V supplies. Null the brigde again (this time so that $V_o \cong 0V$).
7. Calibrate system.

   That is, determine the transfer characteristic between the input (the weight connected to the cantilever beam) and the output (V_0).

   Assuming the transfer characteristic is linear, two points are sufficient to calibrate the instrument.

   One point is the origin (0,0)—the system has been nulled or zeroed.

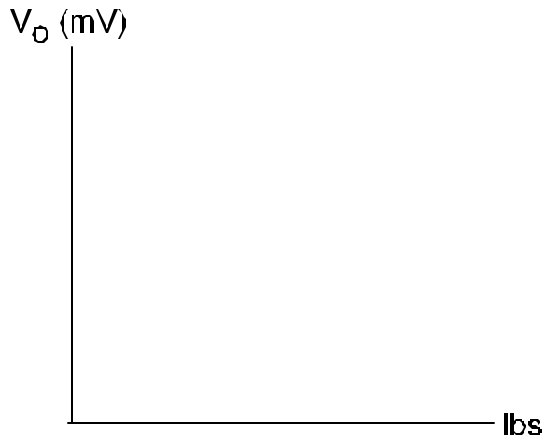
   Using the properly nulled instrument as one point (0,0), obtain the transfer characteristic by attaching a weight ≅ 4.5lbs (use two of the larger weights).

   Connect the weights and the attach them to the beam via the tapped screw hole on the underside of the beam.

W_{cal} = _____ V_o = _____

8. Show the transfer characteristic.

TRANSFER CHARACTERISTIC



Equation of transfer characteristic _____

9. Measure V_o for three other weight combinations. Compare to prediction from transfer characteristic.

	w_1 =	**w_2 =**	**w_3 =**
calculated V_b			
measured V_b			
% difference			

10. Demonstrate instrument to the instructor. **Instructor Initials _____.**