Tekscan

FLEXIFORCE™ QUICKSTART BOARD

FlexiForce Sensor Integration Made Easy

(Rev D)

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FLEXIFORCE QUICKSTART BOARD OVERVIEW

ISO

Tekscan, Inc. commits to establishing and maintaining a quality system that meets or exceeds the requirements of ISO 13485 (2016) and applicable regulatory requirements for its medical products. Tekscan remains committed to administering a quality system that is structured around the requirements of ISO 9001 (2008) and applicable regulatory requirements for all other products.

Description

The FlexiForce™ Quickstart Board is an analog circuit intended to act as an interface between the FlexiForce sensors and a circuit or data acquisition system.

Component Checklist

	Part Description	Part Image
1	**FlexiForce Quickstart Board**	
2	**FlexiForce A201 Sensors**	
1	**9V Battery Clip (battery not included)**	

Specifications

- Input: 5.0V – 9V (for a constant power supply)
  - 9V battery recommended to keep a constant reference voltage
- Output: 0.5V – 5V nominal (Vin ≥ 5V)
- Power: Green LED
- Low Power (Vin < 4.9V) = Yellow LED
  - Low power LED turns on when power source drops below 4.9V, as the supply voltage decreases, the maximum output voltage will decrease
- R9 (potentiometer): 15 turn, 500kΩ — adjusts gain and output range
- Vin- and GND are tied together in board

Signal Conditioning Circuit

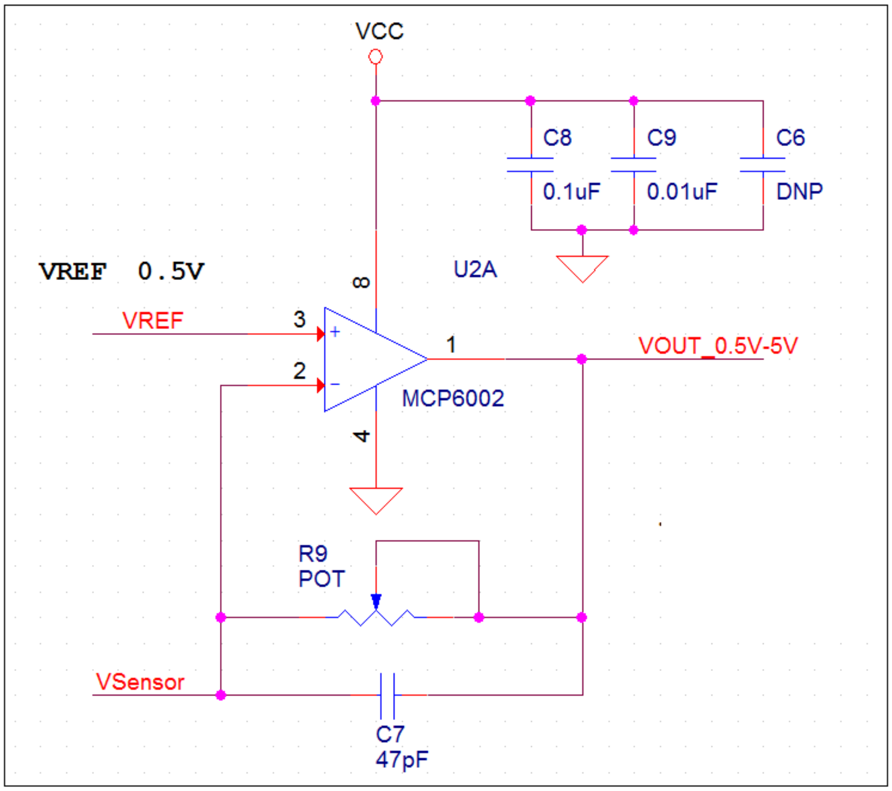


Figure 1 – Signal Conditioning Circuit

The MCP6002 op amps are specified at VDD – VSS 1.8V – 6V. The output equation is:

Vout = (1 + Rpot / Rsensor) * Vref

GETTING STARTED WITH THE FLEXIFORCE QUICKSTART BOARD

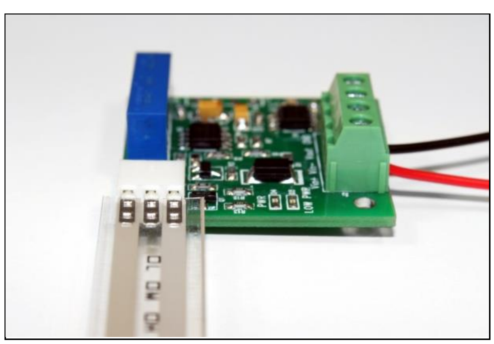


Figure 2 – Sensor Configuration

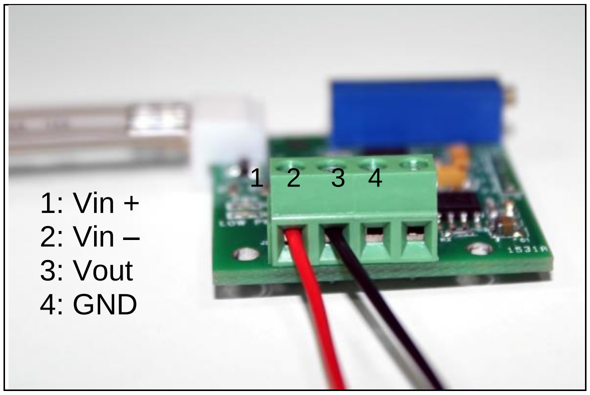


Figure 3 – Power connection can either be Vin+ and Vin- or Vin+ and GND

Sensitivity (Force Range) Adjustment

Changing the value of the feedback resistor adjusts the full scale of the force range. As the value of the feedback resistor increases, the maximum measurable force before the output saturates decreases. The opposite is also true, as the feedback resistor decreases the maximum measurable force that increases.

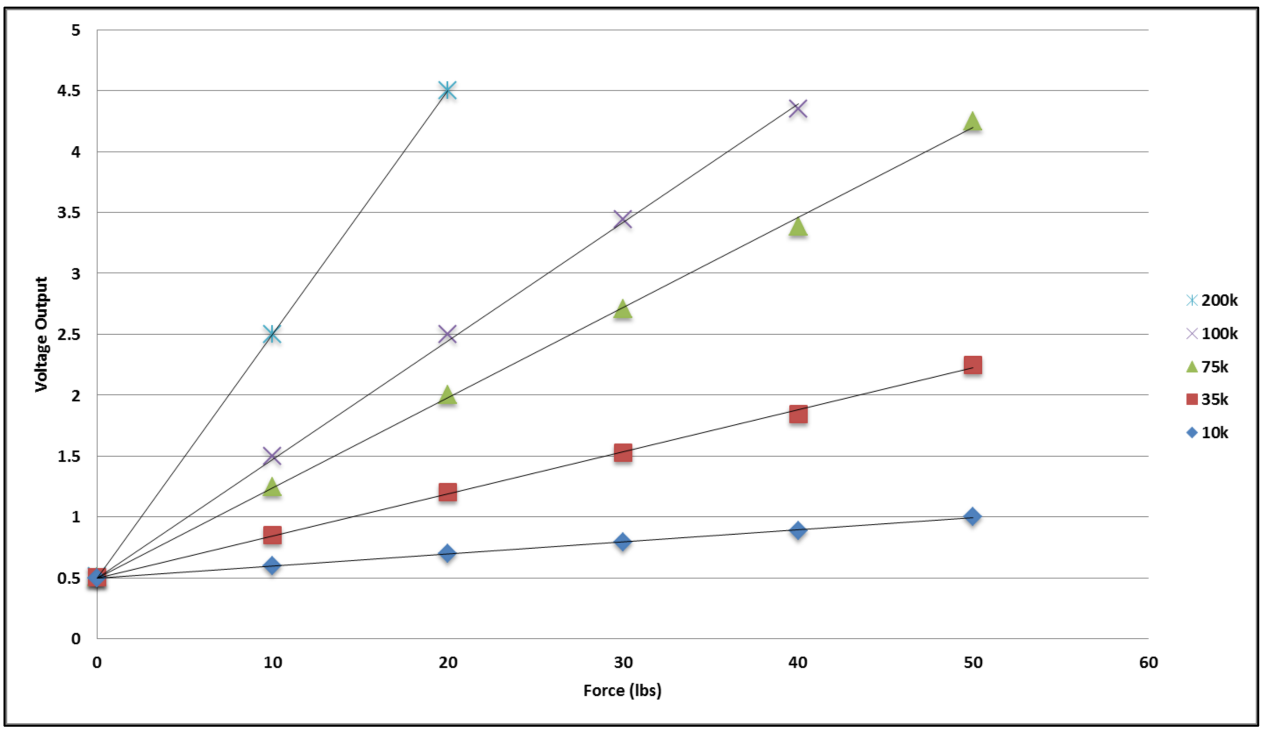


Figure 4 – Voltage vs. Force: Varying Feedback Resistor with the Same Sensor

Conditioning

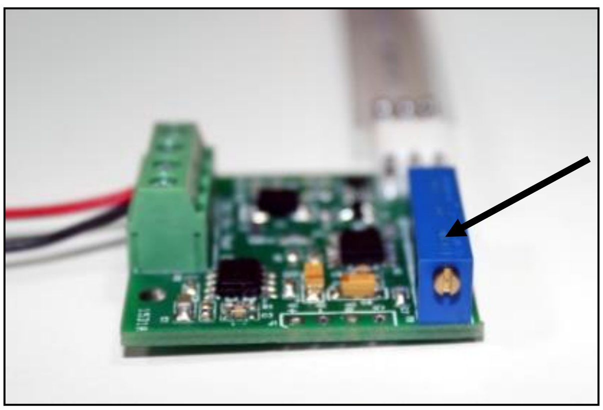
For best results, we recommend conditioning the sensors before each use and before calibration. This process “breaks in” the sensor.

Place 110% (or more) of the maximum test load on the sensor for approximately 3 seconds. For example, if the maximum test load is 50 pounds, place 55 pounds onto the sensor. Remove the load from the sensor. Repeat 4-5 times. When finished, proceed to “Calibration.”

Calibration

We recommend a 3-5 point calibration, excluding the origin (no load) point. The board will output approximately 0.5V at no load.

1. Place the full test weight on the sensor, and adjust the feedback resistor until your output voltage is at the desired level. We recommend between 80% and 90% of the full output range.



Potentiometer

Figure 5 – Feedback Resistor (500kΩ, 15-Turn Potentiometer)

2. Place 1/3 of the test weight on the sensor. Leave the weight on the sensor the same amount of time (before recording the output) you would in your experiment. This helps minimize the drift error. Record the output, and then remove the weight from the sensor.

3. Place 2/3 of the test weight on the sensor, again waiting the approximate amount of time you would in your experiment. Record the output. Remove weight from the sensor.

4. Place the full test weight on the sensor. Again, wait the approximate amount of time you would in your experiment. Record the output. Remove the weight from the sensor.

5. Gather each set of data (Output Voltage vs. Force applied) and plot the data on a graph. This shows a linear plot. You can then draw a line of best fit, or calculate one with MS Excel.

6. Use the equation for the line of best fit and the sensor output to determine the force of unknown loads on the sensor during the experiment.

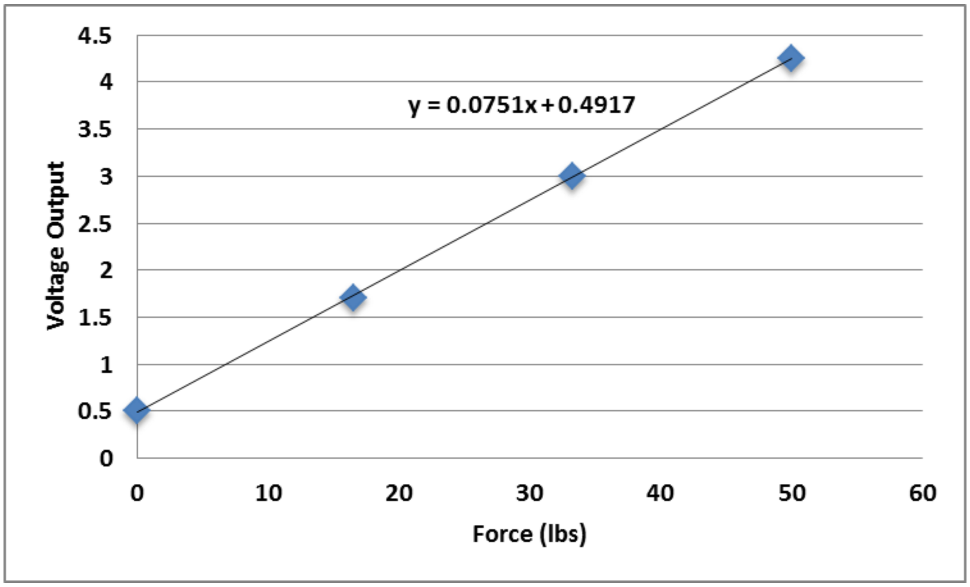


Figure 6 - Example of 3-Point Calibration

Using a Sensor with Two Pins

When using the Quickstart Board with a two pin sensor, such as the A401 (not included) the center pin and the outer pin should be used as shown below.

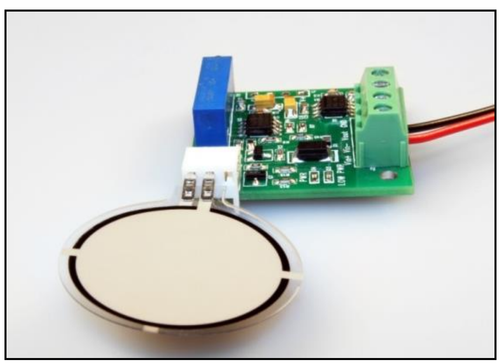


Figure 6 - Example of Using a Two Pin Sensor

SUPPORT

Write, call, or fax us with any concerns or questions. Our knowledgeable support staff are happy to help you. Comments and suggestions are always welcome.

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