Tekscan®

# FlexiForce®

## OEM Development Kit

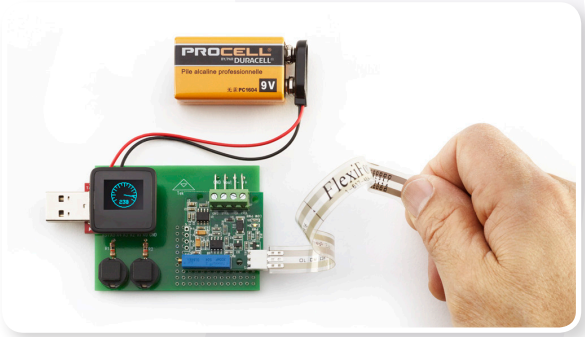

The FlexiForce® OEM Development Kit allows you to economically obtain proof-of-concept data while determining how FlexiForce force sensors will behave within your product or application environment. The kit offers real-time data viewing, recording, calibration functions, and an export capability into Excel.

## BENEFITS

- Fast and simple proof-of-concept for embedding FlexiForce sensors into your design
- Provides a cost-effective testing solution for OEMs

## FEATURES

- Tare function allows for more accurate testing
- Transmission rate of 10Hz
- Calibration (single-point or multi-point)
- Software provides ability to maintain data in CSV format
- Battery or USB-powered
- Output: 0V – 5V nominal (Vin ≥ 5V)




*Powered by battery or USB*

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## COMPONENTS

The OEM Development Kit contains:

(1) FlexiForce OEM Development Board

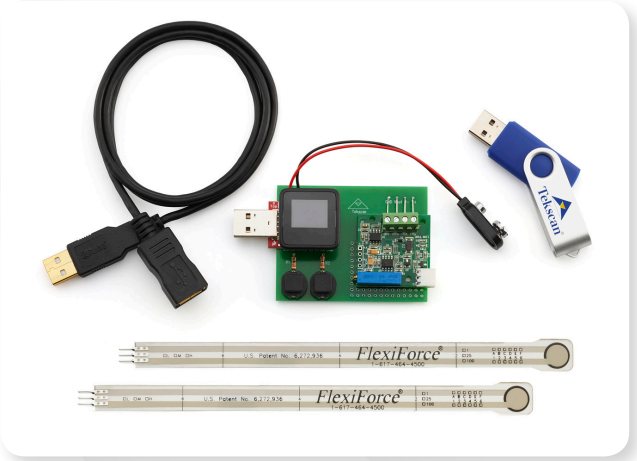
- MicroView Module/USB Programmer Interface Kit
- Quickstart Board

(2) FlexiForce A201 Sensors

- Models: A201-1, A201-25

(1) Flash Drive with Open-Source Code

(1) USB A-B Cable




*OEM Development Kit*

## ADDITIONAL SENSORS

This kit includes two FlexiForce A201 sensors, but it can test all other standard FlexiForce sensors, sold separately. Standard FlexiForce sensors are available in a variety of lengths and force ranges. Sensor customization is also available to fit your product design's needs.

**Standard Force Sensors**

**A101**

*.61 mm [.24 in.] x*
*15.8 mm [.62 in.]*


**A301**

*14 mm [.55 in.] x*
*25.4 mm [1 in.]*

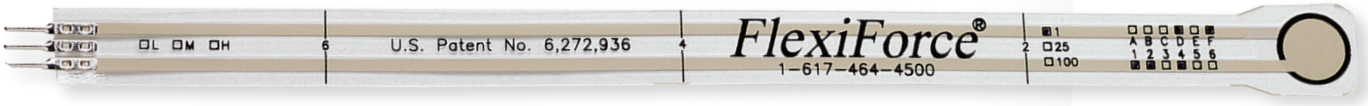

*Also available in high-temp (85°C/185°F) and humidity:* **ESS301**

**A401**

*31.8 mm [1.25 in.] x*
*56.9 mm [2.24 in.]*

**A201**

*14 mm [.55 in.]*




*Also available in high-temp (204°C/400°F):* **HT201**

*197 mm [7.75 in.], trimmable*

*Sensing area*

**VISIT OUR WEBSITE TO VIEW THE COMPLETE LINE OF STANDARD FORCE SENSORS**

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*ISO 9001 & 13485*

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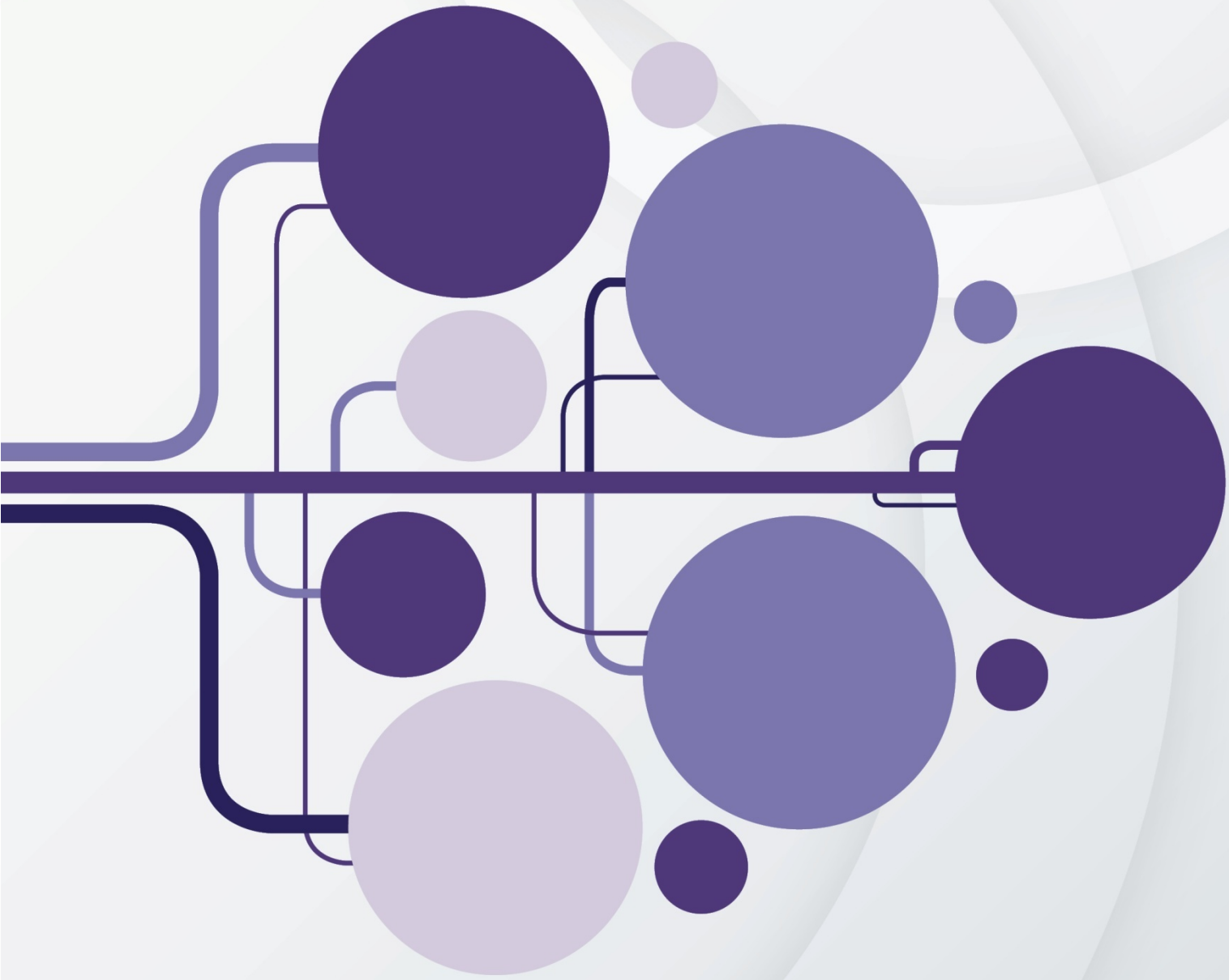
# FLEXIFORCE® QUICKSTART BOARD

## FlexiForce Sensor Integration Made Easy

## (Rev B)



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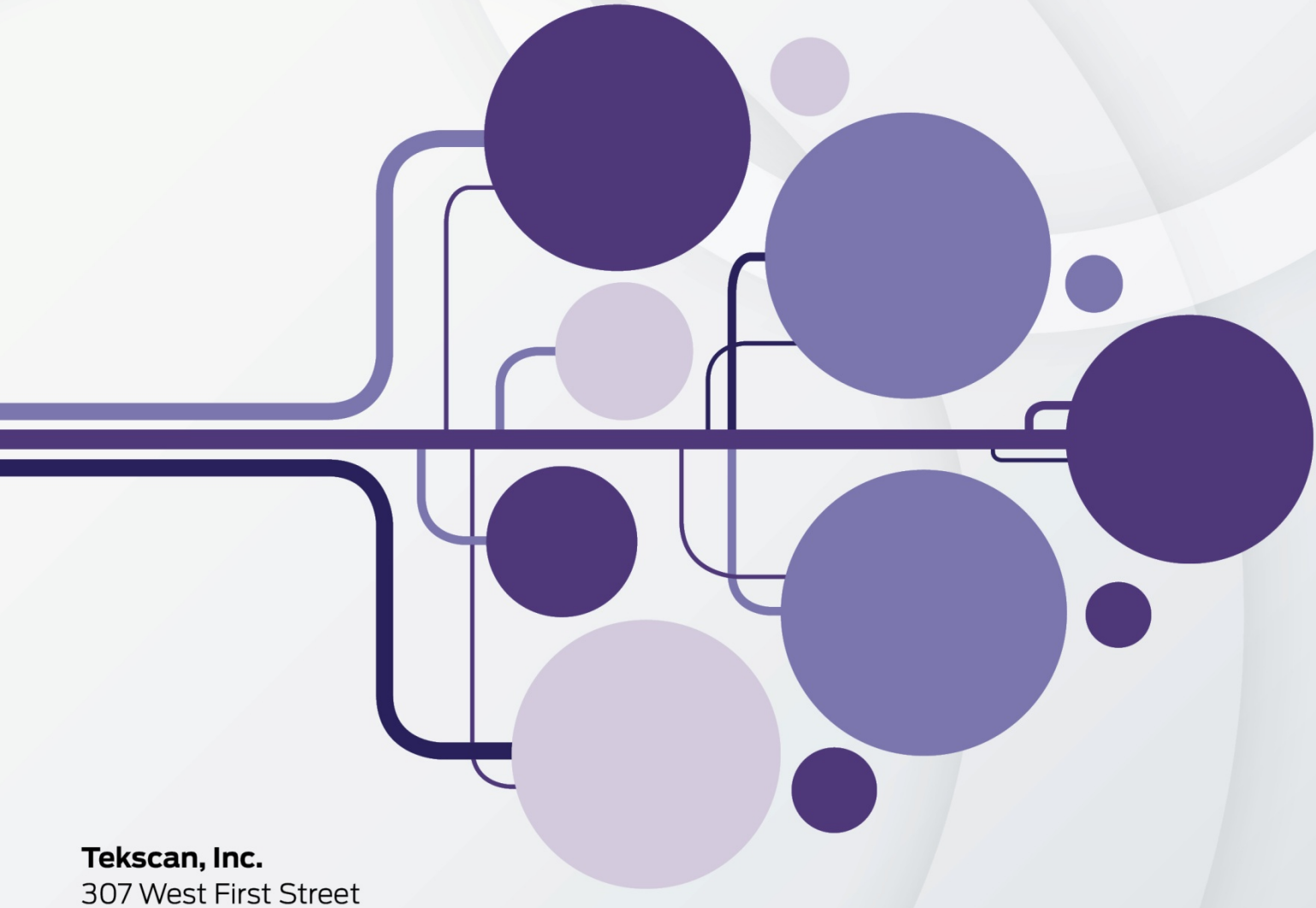
# FLEXIFORCE QUICKSTART BOARD

## FlexiForce Sensor Integration Made Easy

## (Rev B)



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# FLEXIFORCE QUICKSTART BOARD OVERVIEW

## 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: 3.3V – 9V (for a constant power supply)
  - 9V battery recommended to keep a constant reference voltage
- Output: 0V – 5V nominal (Vin ≥ 5V)
- Power: Green LED
- Low Power (Vin < 4.8V) = Yellow LED
  - Low power LED turns on when power source drops below 4.8V, 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

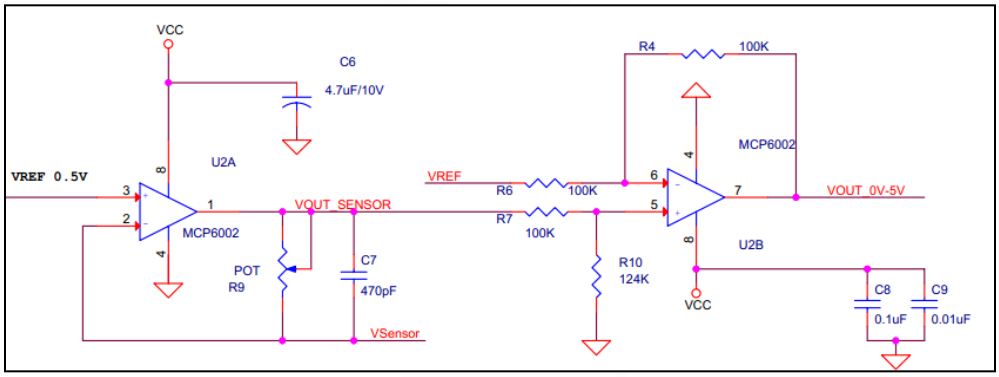


***Figure 1 – Signal Conditioning Circuit***

The MCP6002 op amps are specified at VDD – VSS 1.8V – 6V. The transfer function of the first stage is:

***Vout1 = (1 + Rpot / Rsensor) * VRef***

Vref is fixed at 0.5V. From the above equation, the output from an unloaded sensor is ~ 0.5V. The second op amp stage subtracts the 0.5V offset and adds gain to adjust the output to 0V – 5V:

***Vout2 = (1.107 * Vout1) – VRef***

# GETTING STARTED WITH THE FLEXIFORCE QUICKSTART BOARD

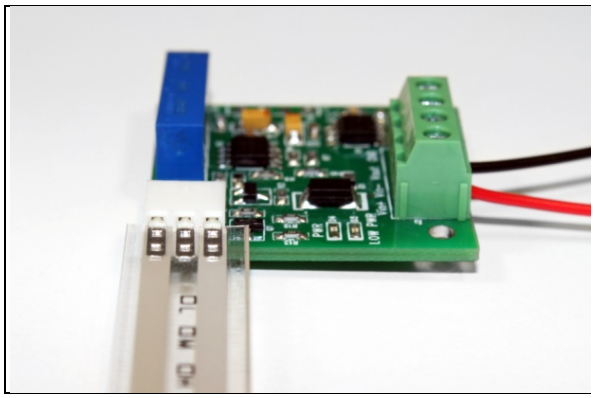

***Figure 2 – Sensor Configuration***

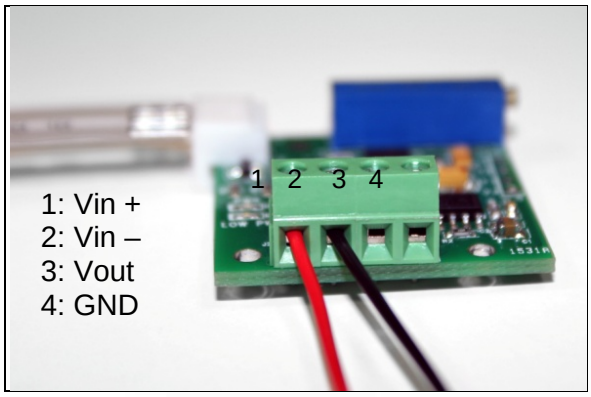


***Figure 3 – Power connection can either be Vin+ and Vin- or Vin+ and GND***

## 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.

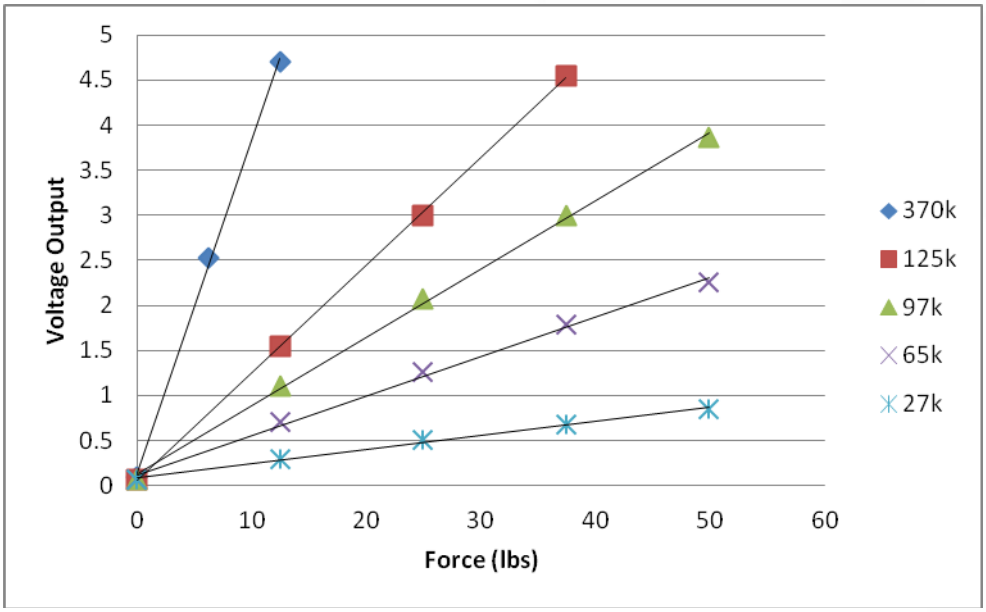


***Figure 4 – Voltage vs. Force: Varying Feedback Resistor with the Same Sensor***

## 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 10 pounds, place 11 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 0V 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.

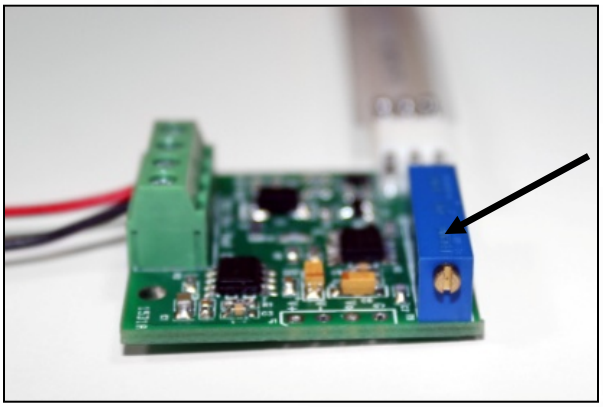


***Figure 5 – Feedback Resistor (500kΩ, 15-Turn Potentiometer)***

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.

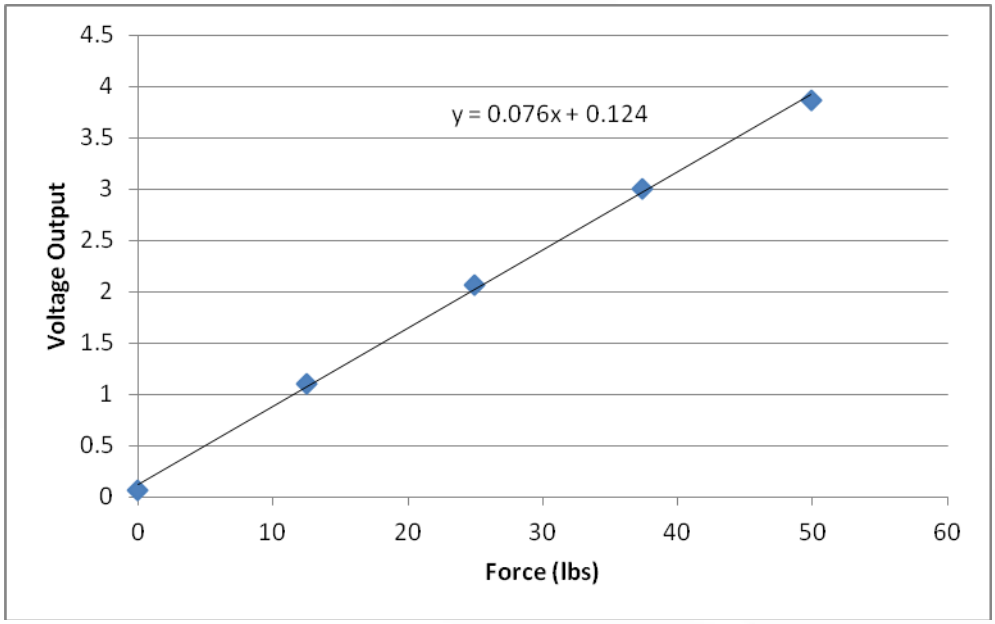


***Figure 6 - Example of 4-Point Calibration***

## 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.

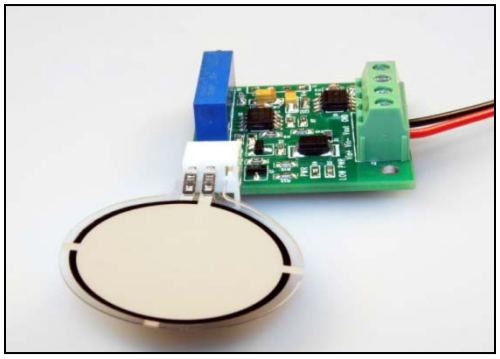

***Figure 6 - Example of Using a Two Pin Sensor***

## 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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