Instructions for Prototype board

1) **Connect Power, Output, and LED**
   - **a)** Connect the +5.00v supply to the terminals marked “+5v” and “gnd”. Sensor is calibrated for a 5.00v supply, but will also operate at 3.30v.
   - **b)** Connect a wire for sensor output to the terminal marked “v out”.
   - **c)** Connect the “+an” and “–cath” terminals to the red LED used to illuminate the sensor.
2) **Test the sensor**
   - **a)** The sensor has two measurement modes, a ratio-metric mode (steady LED) or an absolute voltage mode (blinking LED). Pressing the calibration button briefly will switch modes. Last setting is saved in Flash.
   - **b)** Apply power to the sensor. The sensor is calibrated for a 5.00v supply and will provide a voltage output of 1mm/1volt when the supply is exactly 5.00v in ratio-metric mode. In absolute mode, supply voltage does not impact the measurement.
   - **c)** A precise calibration wire can be used for calibration, which has a dimension of 1/16 in, 1.57mm. You can use drill rod or a drill bit. Carefully place this in the sensor and it should read close to 1.57 volts, or 31.4% of the actual supply voltage (in ratio-metric mode).
   - **d)** The calibration button can be used to calibrate the sensor on the calibration wire. This will be needed for first time use or if the sensor is modified (different housing, LED, etc). Press the calibration button while the calibration wire is inside the sensor to calibrate. Hold the button for roughly 3 seconds, until the LED lights or flashes again. The sensor is then calibrated and settings will be saved in the flash. If you press calibration without a calibration wire, you will get false readings.
3) **Use the sensor – some options**
   - **a)** Sensor could be wired to a suitable digital panel meter to show real-time caliper. (use the absolute mode – flashing LED)
   - **b)** Sensor output could be wired to the extruder control to influence extrusion rate. In this case it is best to supply the sensor from the same 5.0v supply as the control board so that the Sensor output and the A/D input have exactly the same input range and use the ratiometric mode (steady LED).
4) **Cleaning the sensor**
   - a) This is an optical sensor and so dust or debris can cause false or changing readings. Clean dust by blowing on the sensor or gently using a cotton swab to clean the sensor.

Instructions for Prototype board

1) **Connect Power, Output, and LED**
   - **a)** Connect the +5.00v supply to the terminals marked “+5v” and “gnd”. Sensor is calibrated for a 5.00v supply, but will also operate at 3.30v.
   - **b)** Connect a wire for sensor output to the terminal marked “v out”.
   - **c)** Connect the “+an” and “–cath” terminals to the red LED used to illuminate the sensor.
2) **Test the sensor**
   - **a)** The sensor has two measurement modes, a ratio-metric mode (steady LED) or an absolute voltage mode (blinking LED). Pressing the calibration button briefly will switch modes. Last setting is saved in Flash.
   - **b)** Apply power to the sensor. The sensor is calibrated for a 5.00v supply and will provide a voltage output of 1mm/1volt when the supply is exactly 5.00v in ratio-metric mode. In absolute mode, supply voltage does not impact the measurement.
   - **c)** A precise calibration wire can be used for calibration, which has a dimension of 1/16 in, 1.57mm. You can use drill rod or a drill bit. Carefully place this in the sensor and it should read close to 1.57 volts, or 31.4% of the actual supply voltage (in ratio-metric mode).
   - **d)** The calibration button can be used to calibrate the sensor on the calibration wire. This will be needed for first time use or if the sensor is modified (different housing, LED, etc). Press the calibration button while the calibration wire is inside the sensor to calibrate. Hold the button for roughly 3 seconds, until the LED lights or flashes again. The sensor is then calibrated and settings will be saved in the flash. If you press calibration without a calibration wire, you will get false readings.
3) **Use the sensor – some options**
   - **a)** Sensor could be wired to a suitable digital panel meter to show real-time caliper. (use the absolute mode – flashing LED)
   - **b)** Sensor output could be wired to the extruder control to influence extrusion rate. In this case it is best to supply the sensor from the same 5.0v supply as the control board so that the Sensor output and the A/D input have exactly the same input range and use the ratiometric mode (steady LED).
4) **Cleaning the sensor**
   - a) This is an optical sensor and so dust or debris can cause false or changing readings. Clean dust by blowing on the sensor or gently using a cotton swab to clean the sensor.