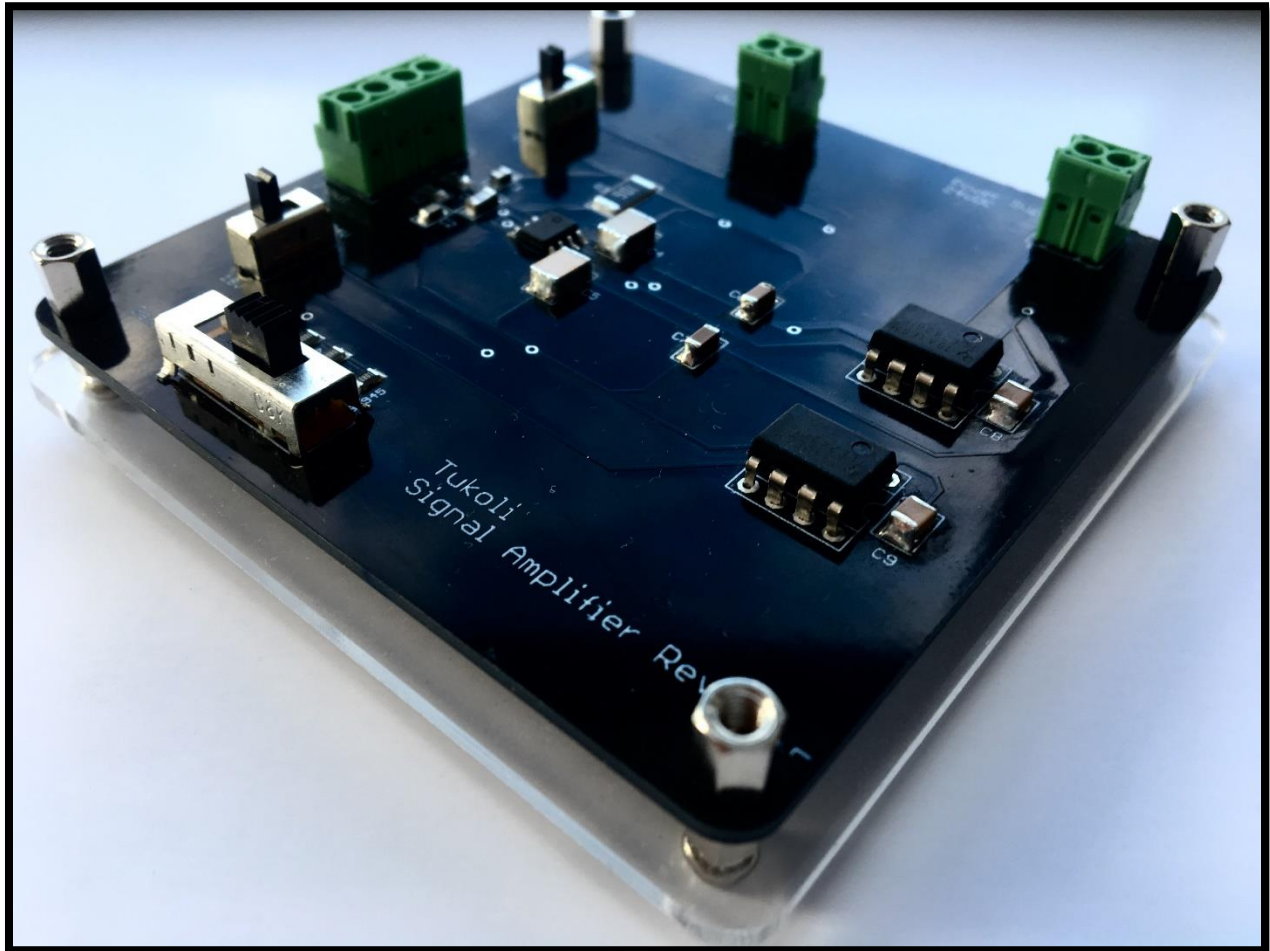


# Tukoli Sensor Amplifier

## Product Literature



### **Description:**

Tukoli Sensor Amplifier (Patent Pending) is a unique plug and play product that allows for seamless integration of low level sensors with traditional PLCs and controllers in the market.

Most PLC and Data Acquisition systems work with the



legendary 4-20mA, 0-5VDC or 0-10VDC as their analog inputs. Such devices often cannot read signals as low as 10, 20 or 30mV as those signals will be treated as noise. Yet there are signals and sensors in the industry (e.g. Honeywell unamplified pressure sensors used in HVAC) that output signals as low as 10mV that often are required to connect to controllers. Tukoli Sensor Amplifier can take care of this problem while having the following distinct advantages:

**One power source needed for both amplification and energizing your sensor:**

Tukoli Sensor Amplifier eliminates the need of using separate power sources for excitation of the sensor and amplification of its signal. Power range required for sensor excitation (often 5 or 6VDC) is often different from power required for amplification (10-12VDC for amplifying signals up to 10VDC). However, Tukoli Sensor Amplifier's design allows for using a single power source for both excitation and amplification. By toggling a switch, it provides user selectable excitation ranges so that a variety of analog sensor with different power/excitation requirements can be used.



By toggling a switch Tookli Sensor Amplifier also provides **user selectable amplification ranges** so that a variety of analog sensor outputs can be amplified to 0-10VDC or other commonly used signals.

**A very accurate amplifier IC** allows for accurate integration of low level signals with controllers.

**Symmetrical amplification** means both negative and positive signals can be amplified.

**Noise removal and analog filtering** provides linear and precise amplification.



## **Specifications:**

### **Noise**

3.2 nV/Hz maximum input voltage noise at 1kHz

200 fA/Hz current noise at 1 kHz

### **AC Specification**

2 MHz bandwidth (G=100)

80 dB CMRR at 20 kHz (G=1)

35 v/us slew rate

0.6 us settling time to 0.001% (G=10)

### **DC Specification**

94 dB CMRR minimum (G=1)

0.2 uV/°C maximum input offset voltage drift

1 ppm/°C maximum gain drift (G=1)

500 pA maximum input bias current



## **Maximum allowable voltage and amperage:**

Maximum Supply Current Draw: 2.3mA

Maximum Supply Voltage: 24VDC (Do not exceed!)

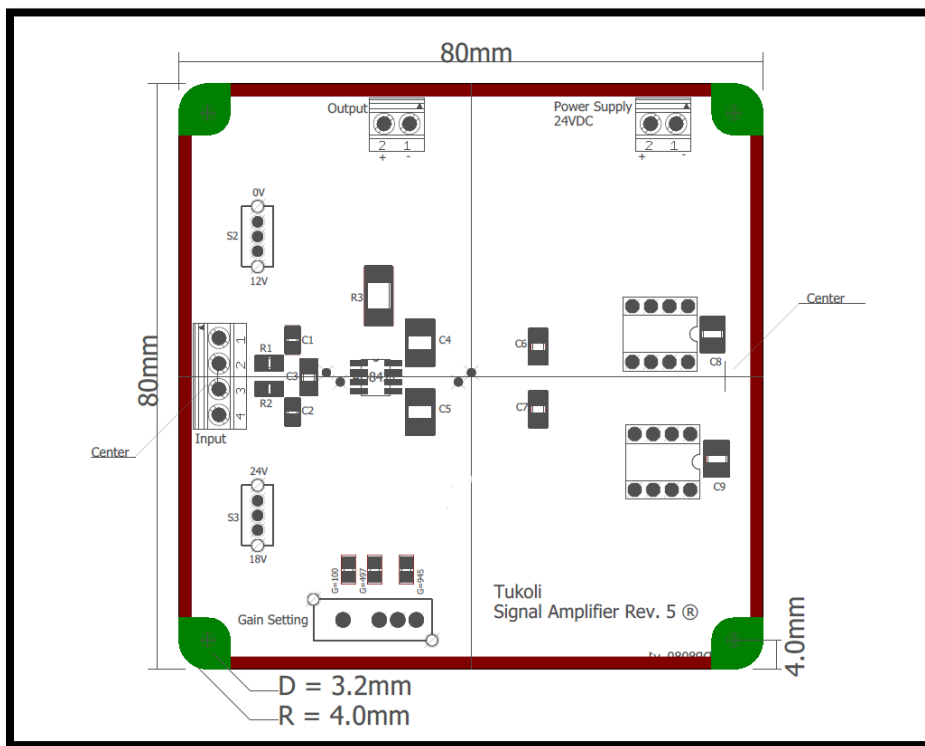
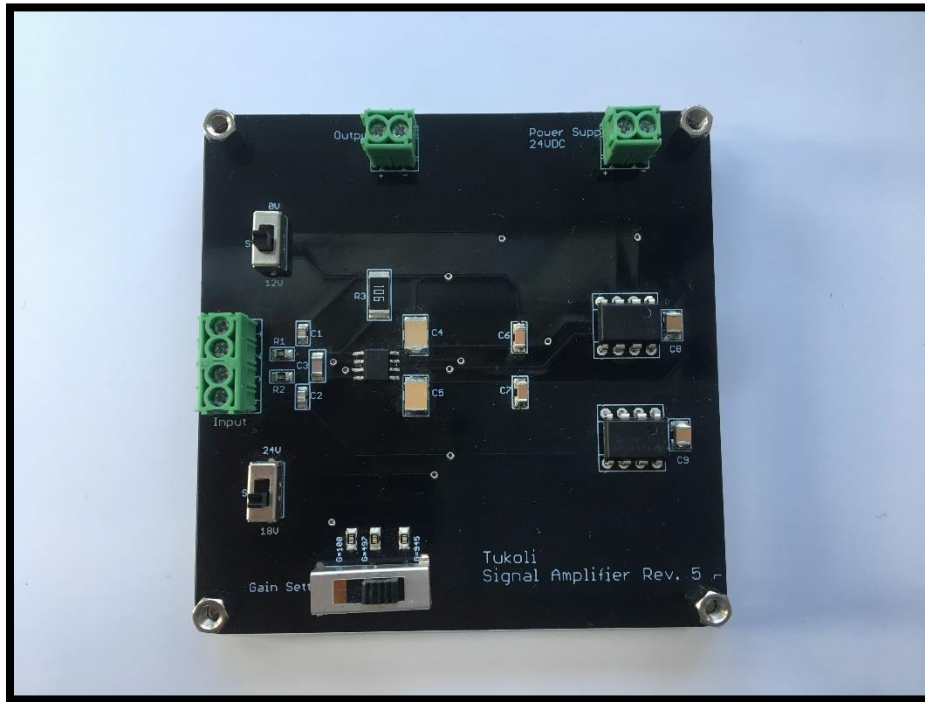
Maximum Signal Input Voltage: +/- 110mV (with G=100)

## **Operating and storage temperature**

-40°C to +125°C



# Operation:



## **Input:**

Tukoli Sensor Amplifier is a plug and play device, simply connect your signal wires to the 4-position terminal block located on the left edge of the device labeled “Input”, the pinout is as follows:

1. - Power Supply
2. - Input Signal
3. + Input Signal
4. + Power Signal

## **Sensor Excitation Switches S2 and S3:**

Pinout number 1 and 4 provide excitation for your sensor. The magnitude of this power can be adjusted by toggling two switches labeled S2 and S3 on the device. Toggling the S3 switch determines the positive excitation voltage, 18V or 24V. Toggling the S2 switch determines the negative excitation voltage, 0V or 12V. The excitation voltage available for your sensor will simply be the difference between the two switches. If S3 is set to 18V and S2 to 12V, 6VDC will be available between terminals 1 and 4 of the “Input” terminal block. If no excitation is necessary for your sensor signal, simply leave terminal 1 and 4 disconnected.

## **Power Supply:**

Connect a 24VDC power supply to the terminal block located on the top right edge of the device labeled “Power Supply 24VDC”.

1. -24VDC Power Supply
2. +24VDC Power Supply



## Gain Setting Switch

Toggling the gain switch provides three options for amplifying your signal.  $G=100$ ,  $G=497$ ,  $G=945$ , simply toggle the switch labeled “Gain Setting” on the bottom edge of the device to the desired amount of gain. Gain of 945 will amplify your signal’s voltage 945-fold. That is if your sensor’s output signal is 10mV, setting the Gain Setting switch to  $G=945$  will increase your signal to 9.45V.

## Output

At this point the amplified signal, in the example above, 9.45V will be available at the terminal block located at the left edge of the device labeled “Output”.

1. -Amplified Output Signal
2. +Amplified Output Signal

Note that Tukoli Sensor Amplifier can amplify your signal symmetrically, that is if your sensor’s output signal turns negative, for example -10mV, the amplified signal on the output terminal block with  $G=945$  will be  $-9.45V$ .





## Applications:

Manufacturing

Industrial Automation

HVAC

IIOT

Medical instrumentation

Precision Data acquisition

Mechatronics

