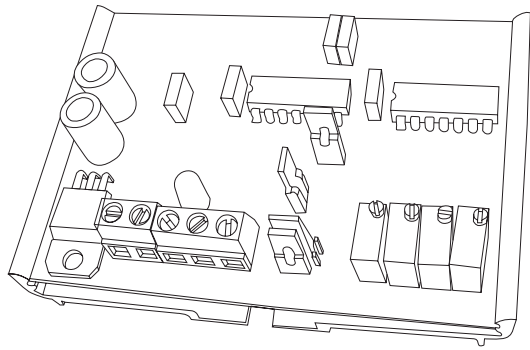


# Analog Scaling Module

## Installation Instructions



### INTRODUCTION

The analog scaling module is used for analog signal conversion or re-scaling. It will accept one DC voltage, current or resistive input signal and output a non-isolated voltage or current signal. The output signal is easily calibrated for various offsets and spans can be direct or reverse acting to provide signal inversion.

The device also includes a regulated power output that can be used to power a transducer or a resistance input. It features top-adjust trim-pots for offset, gain, input attenuation and reverse-offset calibration. There is also an LED power indicator.

The product comes with standard snap-track for easy mounting or is also available mounted in a hinged ABS enclosure

### BEFORE INSTALLATION

Read these instructions carefully before installing and commissioning the device. Failure to follow these instructions may result in product damage. Do not use in an explosive or hazardous environment, with combustible or flammable gases, as a safety or emergency stop device or in any other application where failure of the product could result in personal injury. **Take electrostatic discharge precautions during installation and do not exceed the device ratings.**

### MOUNTING

The snap-track device may be mounted in any position. Use only fingers to remove the PCB from the snap-track, do not pry on the PCB with tools. Do not flex the PCB during removal or installation. Slide the PCB out of the snap-track. See Figure 1. Ensure any metallic mounting hardware does not contact the underside of the PCB.

Avoid mounting in areas where the device is exposed to vibrations or rapid temperature changes. Mount the snap track with the PCB removed using two screws as shown in Figure 2.

Once the snap track is mounted, place one side of the PCB into the snap track and gently press the other side of the PCB with two fingers evenly placed at each corner until the PCB snaps into place, see Figure 3.

If the enclosure is present it is to be mounted on a vertical surface using the four integrated mounting holes that facilitate a #10 screw (not supplied) as shown in Figure 4.

Open the enclosure by pulling on the latch on the right side of the enclosure, at the same time pull on the cover as illustrated in Figure 4.

Make wire connections as per the "Wiring" instructions on page 2.

Swing the door closed until latched. For added security, two screws are provided that may be installed in the integrated screw tabs. See Figure 5.

Figure 1

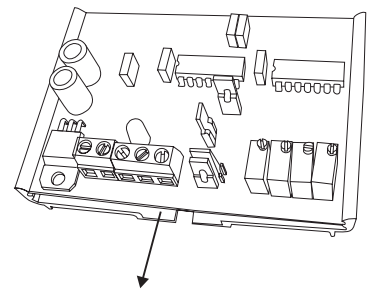


Figure 2

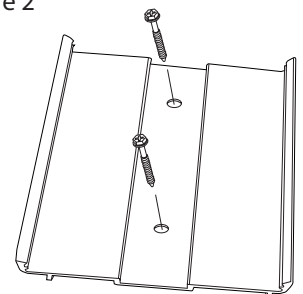


Figure 3

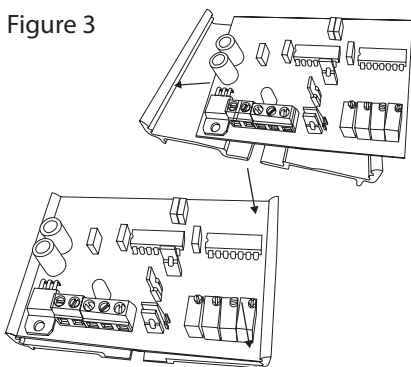


Figure 4

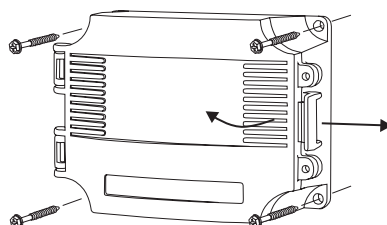
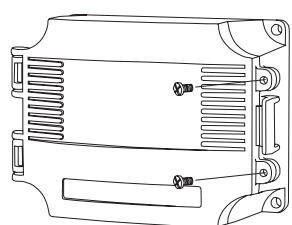


Figure 5



# WIRING

- Deactivate the 24 Vac/dc power supply until all connections are made to the device to prevent electrical shock or equipment damage. Follow proper electrostatic discharge handling procedures when installing the device or equipment damage may occur.
- Use 22 AWG shielded wiring for all connections and do not locate the device wires in the same conduit with wiring used to supply inductive loads such as motors. Make all connections in accordance with national and local codes.
- Connect the plus DC or the AC voltage hot side to the PWR terminal. The supply common is connected to the COM terminal. The device is reverse voltage protected and will not operate if connected backward. It has a half-wave power supply so the supply common is the same as the input signal common.
- Several devices may be connected to one power supply and the input signals all share the same common.
- Ensure the supplied power is within the device ratings. Power supply voltages outside the ratings may cause over-heating, device damage or unreliable operation.
- The analog input signal is connected to the IN terminal and the analog output signal is connected to the OUT terminal. Both the input and output signals are referenced to the COM terminal.
- The 20V terminal is a regulated power supply output which provides a 20 Vdc power supply at 30 mA maximum that can be used to operate an external sensor.

Figure 6

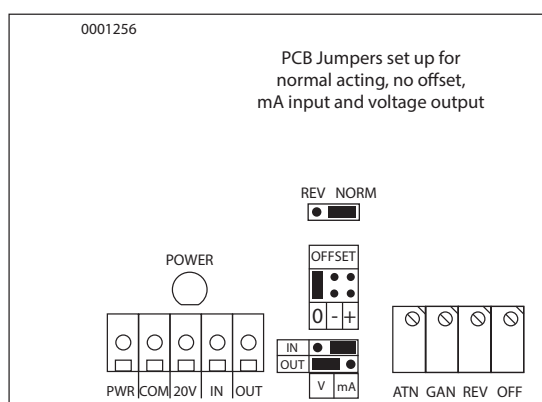
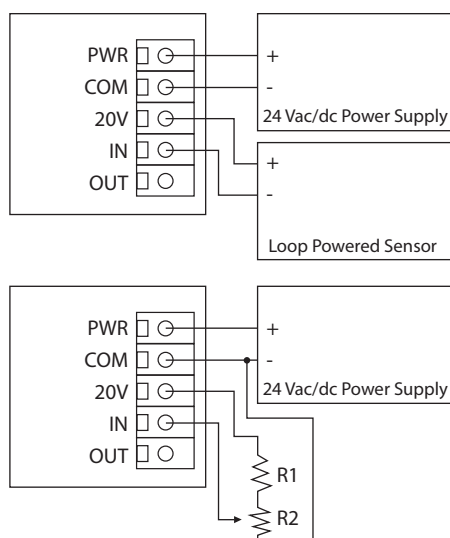


Figure 7



## CALIBRATION AND SET-UP

The device is typically calibrated with a voltage type input signal to simplify the procedure. If the actual input signal will be a current type, then convert the required current signal to voltage first and apply the voltage signal for this procedure.

$$\text{Calibration Voltage} = \text{Input Current Signal (Amps)} \times 250$$

For example, if the input signal will be 4-20 mA, then use a 1-5 Vdc calibration voltage.

## EQUIPMENT

The following equipment will be required to change the calibration of the device:

- 24 Vdc power supply
- Digital voltage/current meter
- Voltage input signal simulator

If a signal simulator is not available, use a 10-20K trim pot to generate the input voltage. Connect one end of the pot to the 20V terminal, the other end to the COM terminal and the pot wiper to the IN terminal. Then measure the IN voltage and set the pot to achieve the desired input voltage.

## STEP 1

Set the trim pots to fully CCW

The 4 pots on the PCB are multi-turn pots of about 20 turns. They are all factory set to fully counter-clockwise. If they have been adjusted previously, rotate them at least 20 turns counter-clockwise to their initial positions.

## STEP 2

Set the PCB jumpers

Set the Normal/Reverse jumper to the NORM position. If a reverse acting signal is required, it will be set later in the procedure.

Set the OFFSET jumper to the 0 position. If an offset is required, it will be set later in the procedure.

Set the IN jumper to the V position. If a current input signal is required, it will be set later in the procedure.

Set the OUT jumper to the V position. If a current output signal is required, it will be set later in the procedure.

## STEP 3

Make the wiring connections

Ensure the power supply is turned off when making connections.

Connect 24 Vdc to the PWR terminal.

Connect the power supply common, the voltmeter common (-) and the input signal common to the COM terminal.

Connect the + of the input voltage signal to the IN terminal.

Connect the + of the voltmeter to the OUT terminal.

## STEP 4

Apply power

Turn on the 24 Vdc power supply and the POWER LED should light.

## STEP 5

Input/Output signal calculation

Calculate the required INPUT voltage signal span.

$$V_{in\_span} = V_{in\_max} - V_{in\_min}$$

Examples, 0-5 V input = 5 volt span, 3-12 V = 9 volt span

If the input is to be 4-20 mA, use the equivalent calibration voltage calculated previously, 4-20 mA = 1 - 5 V = 4 V span.

Calculate the required OUTPUT voltage signal span.

$$V_{out\ span} = V_{out\ max} - V_{out\ min}$$

Examine, 3-15 V output = 12 volt span

## STEP 6

Apply the input voltage span result to the IN terminal. For example, if the calculated input span is 9 volts, apply 9 volts to the IN terminal.

Compare the output meter reading to the output voltage span number calculated previously. If the meter reads higher, then adjust the ATTN pot until the meter equals the output span value. If the meter equals the output span value.

During this adjustment, the input signal should be as stable as possible and the output adjustment should be as precise as possible to obtain the best results.

## STEP 7

Offset adjustment

The offset adjustment shifts the output signal up or down. For example, a 1-5 volt output signal has a 1 volt of offset.

Apply the minimum input voltage signal and note the output signal on the meter. If the output reading is correct, leave the OFFSET jumper in the 0 position and continue to the next step.

If the output reading must be increased to the desired value, then move the OFFSET jumper to the + position and adjust the OFF pot to obtain the correct minimum output on the meter.

If the output reading must be decreased to the desired value, then move the OFFSET jumper to the - position and adjust the OFF pot to obtain the correct minimum output on the meter.

Remember that increasing or decreasing the offset value will also increase or decrease the maximum output by the same amount.

## STEP 8

Reverse action adjustment

If a reverse acting output signal is required (5-1 V for example), then move the REV/NORM jumper to the REV position. If this is not required then proceed to the next step.

Apply the minimum voltage input signal and adjust the REV pot for the maximum required output signal.

## STEP 9

Make final jumper settings

If jumper settings are to be changed, first disconnect the power and input/output connections.

If a current input signal is required, then move the IN jumper to the mA position.

If a current output signal is required, then move the OUT jumper to the mA position.

Check the operation of the device with the correct signal types for proper signal rescaling and operation.

## SPECIFICATIONS

### POWER OUTPUT

Regulated Power Output..... 20 Vdc  $\pm$  10% @ 30 mA maximum (use to power an external sensor)

### INPUT SIGNAL

Voltage Range ..... 0 to 17.5 Vdc

Voltage Impedance ..... >100 K $\Omega$

Current Range..... 0 to 30 mA

Current Impedance..... 250  $\Omega$

### OUTPUT SIGNAL

Voltage Range ..... 0 to 17.5 Vdc

Voltage Impedance ..... 3K  $\Omega$  @ 17.5 Vdc

Current Range..... 0 to 30 mA

Current Impedance..... 650  $\Omega$  at 20 mA

Accuracy .....  $\pm$ 1%

### GENERAL

Power Supply ..... 23 to 28 Vdc, 22 to 26 Vac (half-wave rectified)

Consumption ..... 100 mA maximum

Protection Circuitry..... Reverse voltage protected, overvoltage protected

Operating Conditions ..... 0 to 50°C (32 to 122°F), 5 to 95 %RH non-condensing

Storage Conditions ..... -30 to 70°C (-22 to 158°F), 5 to 95 %RH non-condensing

Wiring Connections..... Screw terminal block (14 to 2 2AWG)

Enclosure ..... Snap track mounting standard, 59.7mm L x 82.5mm W (2.35" x 3.25")

Country of Origin.....Canada

# DIMENSIONS

