

## INTRODUCTION

The Carbon Monoxide Transmitter uses an electrochemical sensor to monitor the CO level and outputs a 4-20 mA signal. The standard product features a 2 wire loop-powered output. Optionally, the device may be configured with an alarm relay and operates in a 3 wire sourcing mode.

## BEFORE INSTALLATION

Read these instructions carefully before installing and commissioning the CO transmitter. 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 transmitter should be mounted on a flat surface three to five feet from the floor of the area to be controlled. Do not mount the sensor near doors, opening windows, supply air diffusers, or other known air disturbances. Avoid areas with vibrations or rapid temperature changes.

The transmitter has two integrated mounting tabs on either side of the enclosure that facilitate a #10 size screw (not supplied). See Figure 1.

Remove the cover from the enclosure by loosening 4 Phillips screws in each corner of the enclosure as seen in Figure 2.

Complete wiring instructions on page 2. Re-install the cover and tighten the screws with a Phillips screwdriver. See Figure 3.

Figure 1

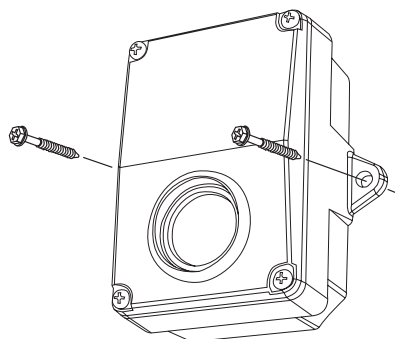


Figure 2

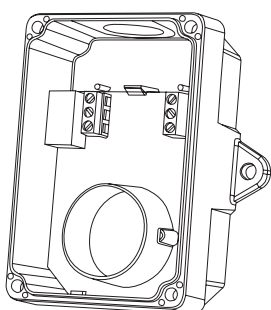
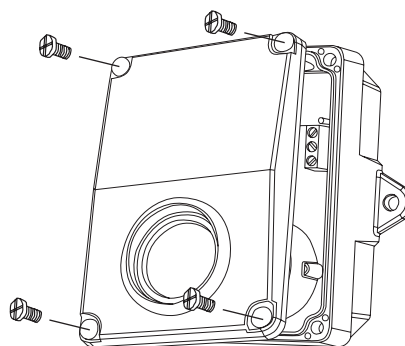


Figure 3



# WIRING

Use 22 AWG shielded wire for all connections and do not locate the device wires in the same conduit with wiring used to supply inductive loads such as motors. Disconnect the power supply before making any connections to prevent electrical shock or equipment damage. Make all connections in accordance with national and local codes.

Depending on the configuration (with or without an alarm relay), the product is either a 3-wire sourcing device or a 2-wire loop-powered device. Follow the example wiring diagrams to determine the correct wiring for the product. All models have the same terminal functions.

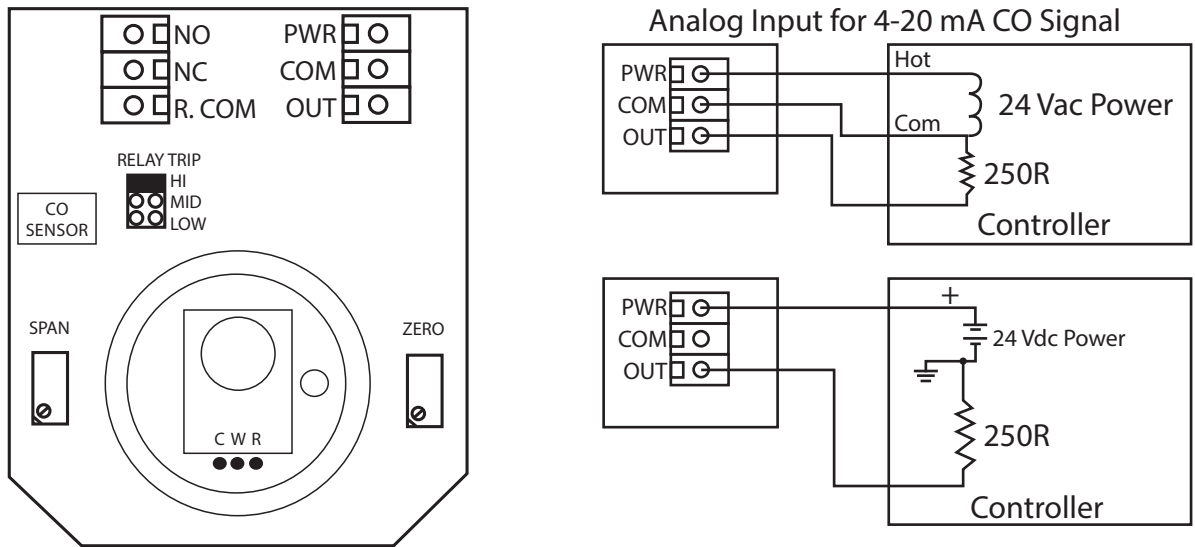
For 4-20 mA loop powered operation, only POWER and OUTPUT are required if a DC power supply is used. The COMMON terminal is only used for AC power. Connect the positive dc voltage or the hot side of the ac voltage to the terminal marked POWER. The AC power supply common is connected to the terminal marked COMMON. The device is reverse voltage protected and will not operate if connected backwards.

For 3-wire operation of the relay model, connect either an AC or DC power supply to POWER and COMMON and the 4-20 mA signal is available on the OUTPUT terminal with respect to COMMON. The current output operates in the Active mode and does not require a loop power supply. This means the signal current is generated by the transmitter and must not be connected to a powered input or device damage will result. This is the typical operating mode of a "three-wire device". Check the controller Analog Input to determine the proper connection before applying power.

Ensure the controller Analog Input (AI) matches the transmitter output signal type before power is applied. The current signal has a maximum load that it will drive. Follow the ratings in the Specification section or inaccurate readings may result.

If equipped, the relay output is available on the NO, NC and R.COM terminals. The relay R.COM terminal is NOT connected to the signal or power supply COMMON terminal. The relay output is completely isolated and has both Normally Open (NO) and Normally Closed (NC) signals. These signals can be used to directly control alarms, ventilation fans or may be connected to digital inputs of the B.A.S. for status monitoring.

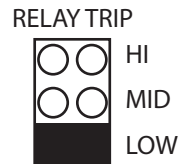
Figure 4



# OPERATION

In normal operation the sensor will measure the CO level in the surrounding air and output a proportional value on the 4-20 mA output. The CO measurement range is 0 to 300 ppm. An optional relay can be used to indicate an alarm condition. The trip point for the relay can be programmed to three different settings with an on-board jumper. If the CO level exceeds the trip point then the relay is activated. The relay will remain activated until the CO level drops below the (trip level - hysteresis) where hysteresis is 3% or 9 ppm.

Figure 5



# START-UP

Verify that the Carbon Monoxide Transmitter is properly wired according to the wiring diagrams and all connections are tight. Apply power to the device and the sensor will begin reading the CO level and output the analog signal.

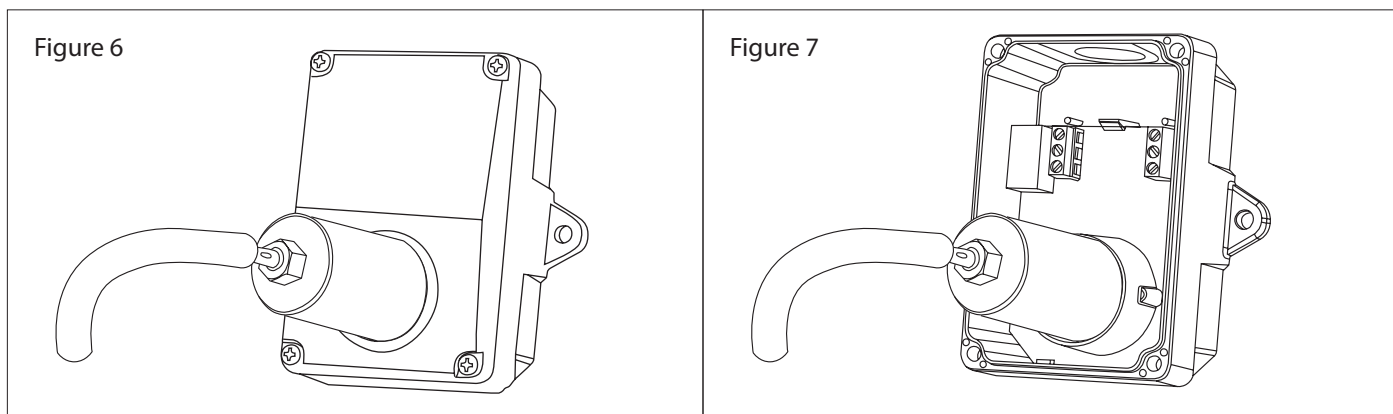
## VERIFICATIONS/CALIBRATION

The transmitter features a simple snap-mount sensor PCB that is pre-calibrated. This means that the entire sensor PCB can simply be replaced with a new calibrated PCB if desired without having to remove the enclosure. This sensor swap requires no tools and can be completed in seconds. Simply disconnect the device wiring, remove the old sensor PCB, snap in the new PCB and reconnect the device power. There is no need to make any adjustments or apply gas to the transmitter using the sensor swap method.

The device may also be calibrated or verified with CO gas if required. This requires a field calibration kit consisting of a bottle of gas (250 ppm CO in air for example), a tank pressure regulator with flow restrictor and the necessary tubing with a calibration cap to cover to the sensor. Calibration can be done at 20 to 27°C (68 to 81°F).

## VERIFICATION

Verification with gas can be done without removing the device cover. See Figure 6. Simply apply gas using the calibration cap attached directly to the port on the cover and monitor the output signal.



## CALIBRATION

The device cover must be removed to perform an actual calibration. In this case, the gas calibration cap attaches to the sensor fixture inside the enclosure. See Figure 7.

The sensor must be continuously powered for at least 1/2 hour prior to calibration.

For local display, an ammeter can be placed in series of the output. Disconnect the signal wire from the OUT terminal of the CO sensor. Connect the + lead of the ammeter to the OUT terminal of the CO sensor and connect the COM lead of the ammeter to removed signal wire. Set ammeter to proper setting to read a 20 mA signal.

Calibrate the sensor first in clean air with no CO gas present. Simply adjust the ZERO pot on the sensor board until a 4 mA output is obtained.

Then attach the gas supply. Turn the regulator on/off knob fully off and attach it to the 250 ppm gas bottle and firmly tighten it by hand. Moisten the sponge and squeeze out any excess water. Place the sponge in the cap so that it will not touch the sensor but does not plug the hole in the side of the cap. Attach the cap to the fixture over the sensor. Slowly turn the valve knob on the regulator to let the gas begin flowing.

The regulator will restrict the flow rate to the specified 200 ml/min and the sponge will ensure the gas is in the right humidity range. Wait for 5 minute and then adjust the SPAN pot on the sensor board until the meter reads 17.33mA. If using a different ppm gas then adjust the output mA to match the ppm value. Close the valve on the tank and take the cap off from the sensor. Calibration is complete.

If the gas cap is too loose on the fixtures, simply place a wrap of electrical tape around the cap to tighten.

Once calibration is complete, remove ammeter and reconnect signal wire to OUT terminal of the CO sensor.

# SPECIFICATIONS

## GENERAL

Measurement.....	Electrochemical
Sample Method .....	Diffusion
Measurement Range.....	0 to 300 ppm
Accuracy .....	±5 ppm or ±5% of reading (whichever is greater) 0 to 50°C (32 to 122°F), 15 to 90 %RH
Agency Approvals .....	Sensor is UL recognized for ANSI/UL-2034 and UL-2075, E240671
Operating Conditions .....	-20 to 50°C (-4 to 122°F), 15 to 90 %RH, 0.9 - 1.1 atm
Stability .....	<5% signal loss/year
Response Time .....	<35 seconds for 90% step change
Typical Area Coverage .....	700 m <sup>2</sup> (7500 ft <sup>2</sup> ) or 15m (50ft) radius
Wiring Connections.....	Screw terminal block (14 to 22 AWG)
Enclosure.....	71mm W x 104mm H x 48mm D (2.8" x 4.1" x 1.9")
Country of Origin.....	Canada

## 2 WIRE LOOP-POWERED MODEL

Power Supply .....	24 Vdc ±20%. 24Vdc only used with loop power application
Consumption .....	20 mA max
Output Signal.....	4-20 mA loop-powered
Output Drive Capability .....	550 Ω max @ 24 Vac/dc

## 3 WIRE RELAY MODEL

Power Supply .....	24 Vdc ±20% or 24 Vac ±10% (non-isolated half-wave rectified)
Consumption .....	50 mA max
Output Signal.....	4-20 mA sourcing
Output Drive Capability .....	550 Ω max @ 24 Vac/dc
Relay Contacts .....	Form C contacts (N.O. and N.C.), 5 Amps @ 250 Vac, 5 Amps @ 30 Vdc
Relay Trip Point.....	25, 60 or 150 ppm jumper selectable
Relay Hysteresis.....	3% or 9 ppm

# DIMENSIONS

