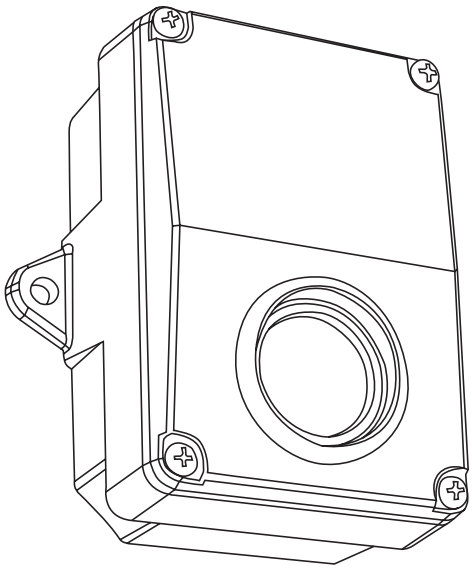
Nitrogen Dioxide Transmitter

NDD5B1100 Series - Installation Instructions



INTRODUCTION

The nitrogen dioxide transmitter uses an electrochemical sensor to monitor the NO_2 level and outputs a 4-20 mA signal. It features a 3 wire analog output and an alarm relay.

BEFORE INSTALLATION

Read these instructions carefully before installing and commissioning the NO_2 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

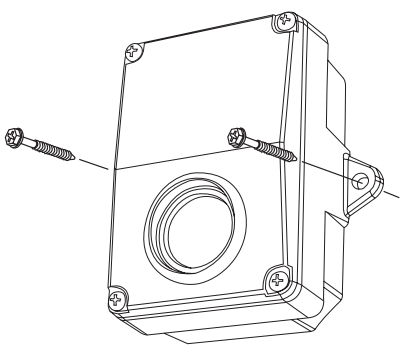


Figure 2

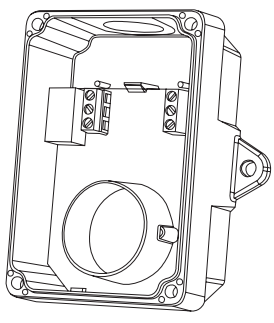
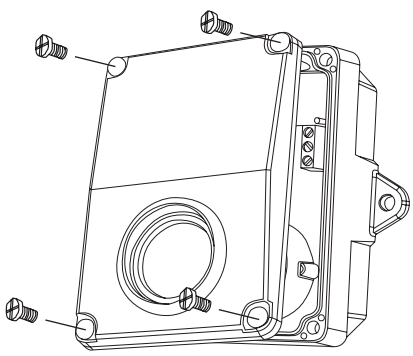


Figure 3



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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.

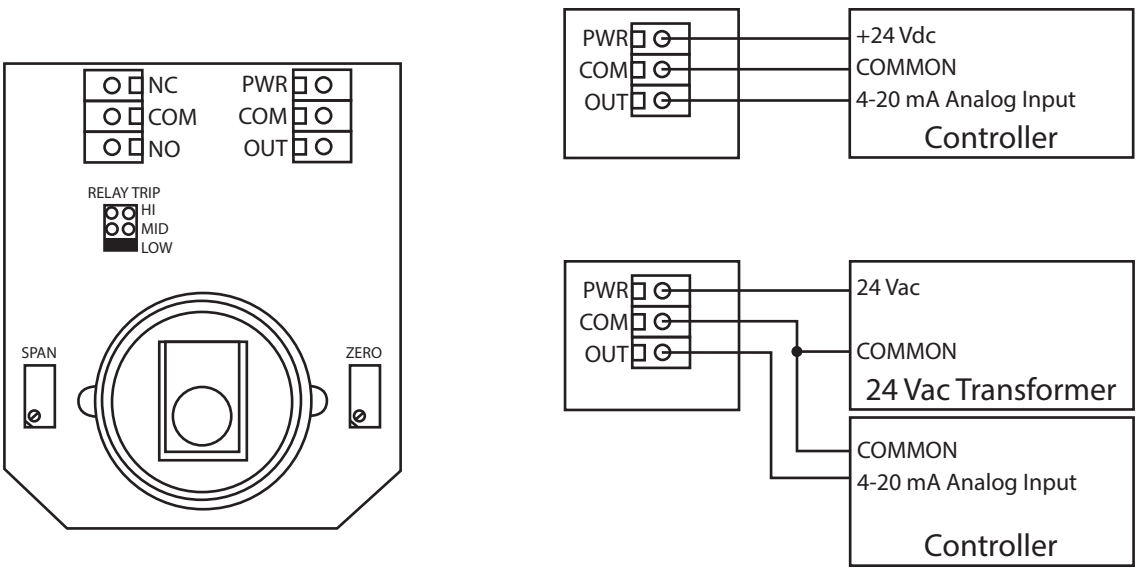
The product is a 3-wire sourcing. Follow the example wiring diagrams to determine the correct wiring for the product. All models have the same terminal functions.

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.

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.

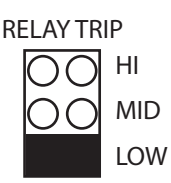
Figure 6



OPERATION

In normal operation the sensor will measure the NO_2 level in the surrounding air and output a proportional value on the 4-20 mA output. The NO_2 measurement range is 0 to 10ppm. The 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 NO_2 level exceeds the trip point then the relay is activated. The relay will remain activated until the NO_2 level drops below the (trip level = hysteresis) where hysteresis is 3%.

Figure 7



START-UP

Verify that the NO_2 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 NO_2 level and output the analog signal.

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 method.
The device may also be calibrated or verified with NO_2 gas if required. This requires a field calibration kit consisting of ZERO and SPAN of gases, calibration adapter, tubing with a calibration cap to cover to the sensor, a miniature screwdriver and a digital multi-meter.

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

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. The sensor must be continuously powered for at least 1/2 hour prior to calibration. Calibrate the sensor either in clean air or by applying ZERO gas with a flow rate of 0.5 to 1 liters per minute. Wait 2 minutes and adjust the ZERO pot on the sensor board until 4 mA output is obtained.

Then attach the SPAN gas supply. Attach the cap to the fixture over the sensor. Slowly turn the valve knob on the regulator to let the gas begin flowing. Calibrate the sensor either by applying SPAN gas with a flow rate of 0.5 to 1 liter per minute. Wait 2 minutes and adjust the SPAN pot on the sensor board until a 20 mA output obtained. The SPAN gas need not be the full scale concentration, but could be a fraction of this. A half scaled concentration, accordingly, should provide a 12 mA signal.

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

Figure 8

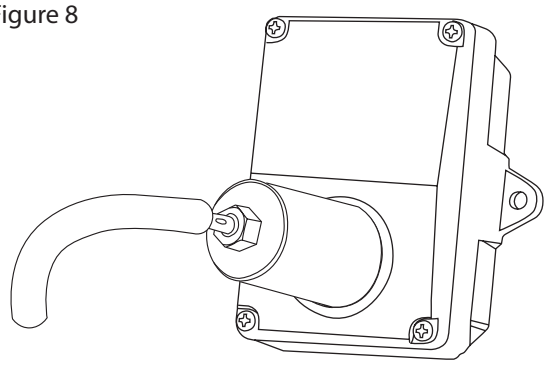
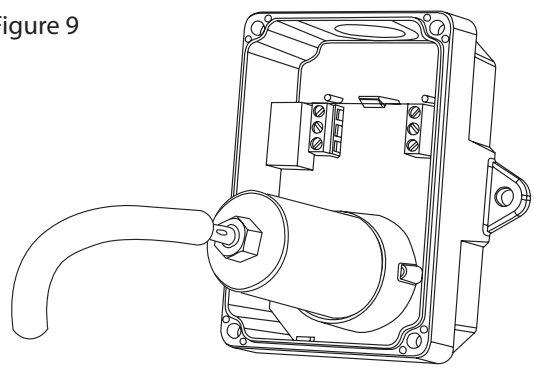


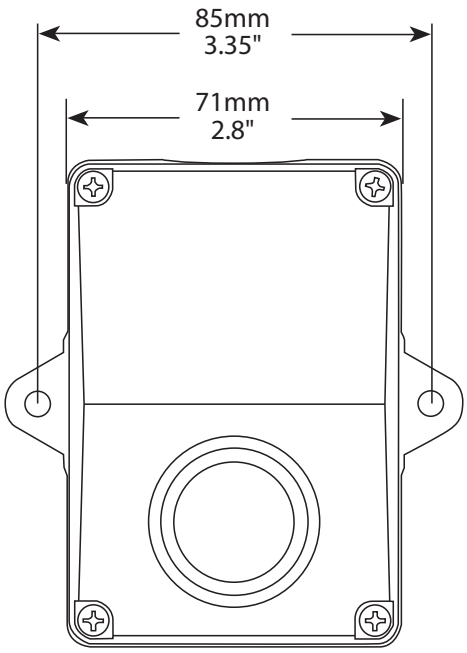
Figure 9

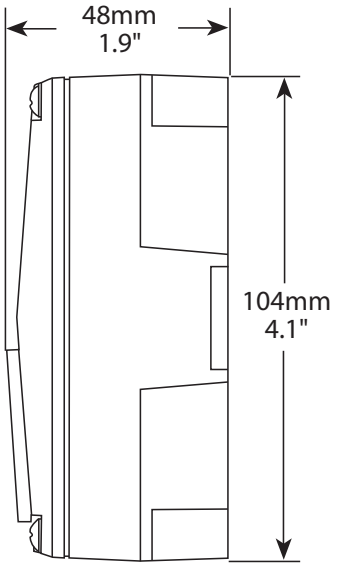


SPECIFICATIONS

Measurement	Electrochemical
Sample Method	Diffusion
Measurement Range	0-10 ppm
Accuracy	±0.2 ppm or ±5% of reading (whichever is greater)
Sensor Life Expectancy	>2 years
Operating Temperature	-20 to 50°C (-4 to 122°F)
Operating Humidity	15 to 90 %RH (0 to 99% intermittent)
Pressure	Atmospheric ±10%
Typical Area Coverage	700 m^2 (7500 ft^2) or 15 m (50 ft)
Calibration Adjustments	Zero and Span pots
Wiring Connections	Screw terminal block (14 to 22 AWG)
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	SPDT, Form C contacts (N.O. and N.C.), 5 Amps @ 30 Vdc
Relay Trip Point	**Low:** 1ppm **Mid:** 3ppm **High:** 5ppm (jumper selectable)
Relay Hysteresis	3%
Enclosure	ABS, UL94-5VB, IP65 (NEMA 4X) 71mm W x 104mm H x 48mm D (2.8" x 4.1" x 1.9")
Country of Origin	Canada

DIMENSIONS





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