

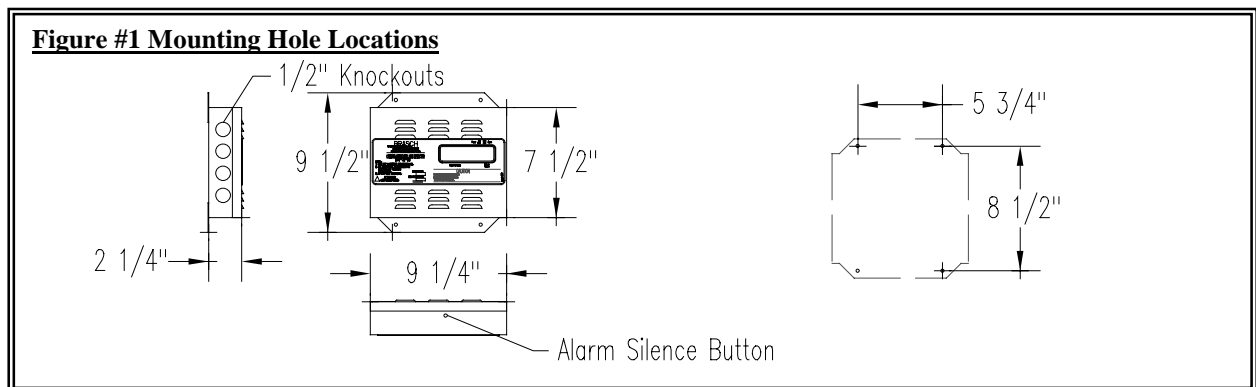
## 1.0 Installation Procedures

### 1.1 MOUNTING:

The Nitrogen Dioxide Detector must be mounted indoors and kept dry at all times. This detector should be mounted in a well-populated area, and placed so the display can be easily seen. The unit should be mounted at breathing height that is generally between 5 to 7 feet above the floor. Figure #1 shows the mounting hole locations. Mount the detector to a rigid surface using #10 hardware.

#### **CAUTION:**

**Leave a minimum of 2" clearance to other surfaces, and under no circumstances should the ventilation louvers in the cover be blocked. Be sure that metal shavings and other contaminants are removed from inside the detector.**

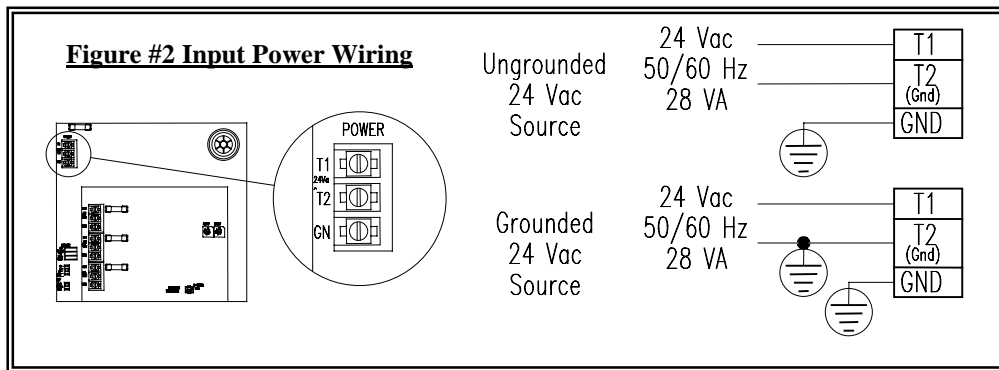


### 1.2 WIRING:

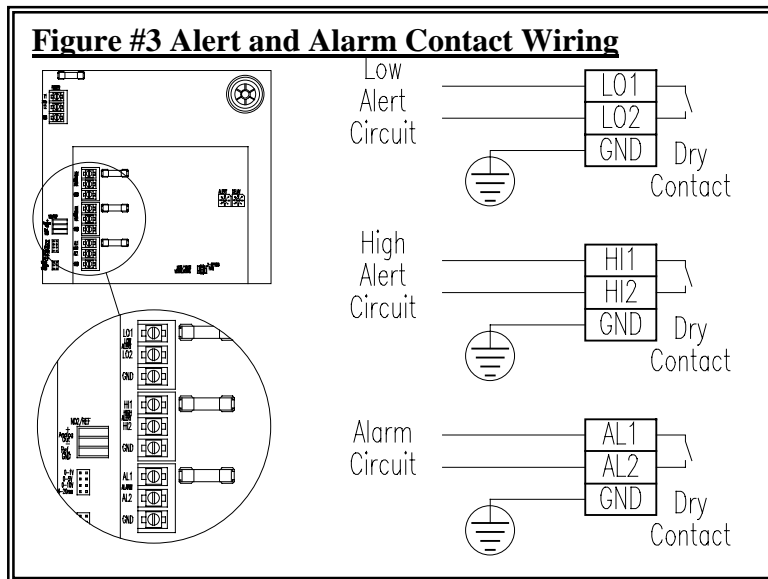
#### 1.21 Input Power Wiring

**Use only qualified personnel for the installation of this detector. All wiring should be done in accordance with local codes and the latest edition of the National Electrical Code (ANSI/NFPA 70).**

This detector requires an input voltage of 24 VAC, 50/60 Hz at a load rating of 28 VA. If a grounded 24 VAC supply voltage is supplied, then the hot line should be wired to terminal T1 and the grounded line should be wired to T2. Brasch Manufacturing Co., Inc. can provide a step-down transformer for changing 208-240 VAC or 120 VAC at 50/60 Hz to 24 VAC at 50/60 Hz. See the 6.0 Accessories Section (Page 7) for the transformer part numbers. The supply circuit must include a disconnect device or switch located close to the detector and marked as the disconnect device for the detector. This will assure continued operation without interruption from remote failures. To provide noise suppression the input power must be wired, as shown in Figure #2 (Page 2), with the ground connected. Use copper conductors only, rated for a minimum of 250 volts, 14 AWG.



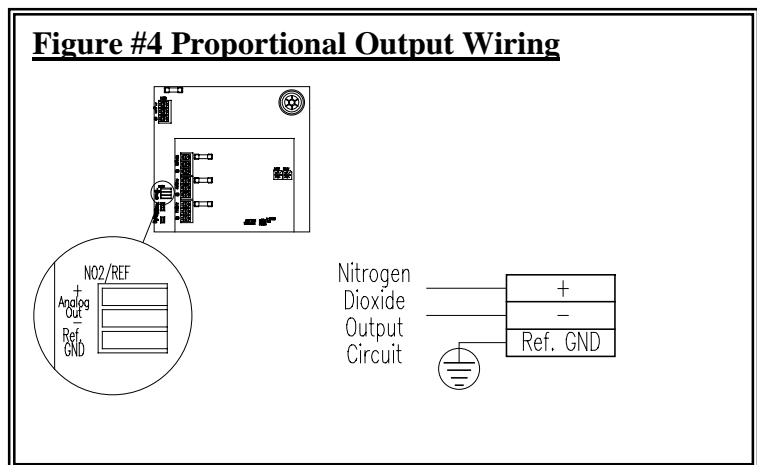
**1.22 Alert and Alarm Contact Wiring:**



See the 4.0 Specification Section (Page 6) for the ratings on the alarm and alert relay contacts. Use copper conductors only, rated for a minimum of 250 volts, 14 AWG. Figure #3 shows the wiring for the alarm and alert contacts. This detector was designed so that the low alert and alarm relay contacts close when power is lost to the detector. This will attempt to keep the zone ventilated until power is restored to the detector.

**1.23 Proportional Output Wiring**

See the 4.0 Specification Section (Page 6) for minimum/maximum loads for the proportional outputs. The wiring of the proportional output signals is done by lifting the white lever, inserting the signal wire and pressing the white lever flat. Use copper conductors only, rated for a minimum of 250 volts, with a minimum wire size of 26 AWG (22 AWG maximum). Figure #4, Proportional Output Wiring shows the wiring to a remote DDCS or BMS.



**2.0 Unit Operation**

When power is applied to the Nitrogen Dioxide Gas Detector the green power LED will illuminate. This LED will stay ON as long as power is supplied to the detector. If the power ON LED should go out, see the 5.0 Troubleshooting Section (Page 7) for help.

This Nitrogen Dioxide Gas Detector has eight modes of operation (Normal, Pre-Low Alert, Low Alert, Post-Low Alert, Pre-High Alert, High Alert, Post-High Alert and Alarm).

When power is applied to the detector, the green power LED illuminates and it enters the Normal mode.

In the Normal mode the detector monitors the concentration of nitrogen dioxide (NO<sub>2</sub>), generates the proportional output signal and displays the concentration in Parts Per Million (PPM). If the concentration of NO<sub>2</sub> remains below the adjustable low alert level, output relays will remain off. If the concentration of NO<sub>2</sub> exceeds the adjustable low alert level, the detector will enter the Pre-Low Alert mode. If the concentration of NO<sub>2</sub> exceeds 1.0 PPM, the detector will enter the Pre-High Alert mode.

In the Pre-Low Alert mode the red low alert LED will flash on and off being off for a longer time than on. If the concentration of NO<sub>2</sub> stays between the adjustable low alert level and 1.0 PPM for the adjustable time delay, the detector will enter the Low Alert mode.

In the Low Alert mode the red low alert LED will turn on and the low alert output relay contacts will close. If the concentration of NO<sub>2</sub> decreases below the low alert level, the detector will enter the Post-Low Alert mode. If the concentration of NO<sub>2</sub> increases and exceeds 1.0 PPM the detector will enter the High Alert mode.

In the Post-Low Alert mode the red low alert LED will flash on and off being off for a shorter time than on. If the concentration of NO<sub>2</sub> stays below the low alert level for the adjustable time delay, the detector will enter the Normal mode.

In the Pre-High Alert mode the red high alert LED will flash on and off being off for a longer time than on. If the concentration of NO<sub>2</sub> stays above 1.0 PPM for the adjustable time delay, the detector will enter the High Alert mode. The selected time delay for the High alert mode is identical to the selected time delay for the Low alert mode.

In the High Alert mode the red high alert LED will turn on and the high alert output relay contacts will close. If the concentration of NO<sub>2</sub> decreases to below the adjustable low alert level, the detector will enter the Post-High Alert mode. If the concentration of NO<sub>2</sub> decreases to between the adjustable low alert level and 1.0 PPM, the detector will enter the Low Alert mode. If the concentration of NO<sub>2</sub> remains above 1.0 PPM for a fixed 15 minutes, the detector will enter the Alarm mode.

In the Post-High Alert mode the red high alert LED will flash on and off being off for a shorter time than on. If the concentration of NO<sub>2</sub> stays below the low alert level for the adjustable time delay, the detector will enter the Normal mode.

In the Alarm mode the red high alert LED and the red alarm LED will be on, the internal audible alarm will sound and the alarm relay contacts will close. Pressing the alarm silence switch located on the bottom of the unit will silence the internal audible alarm. The detector will remain in the Alarm mode until the level of NO<sub>2</sub> falls below 1.0 PPM. The internal audible alarm circuit will be activated as soon as the NO<sub>2</sub> level drops below 1.0 PPM. Brasch Manufacturing Company, Inc. can supply the optional external alarm. See the 6.0 Accessories Section (Page 7) for associated part numbers.

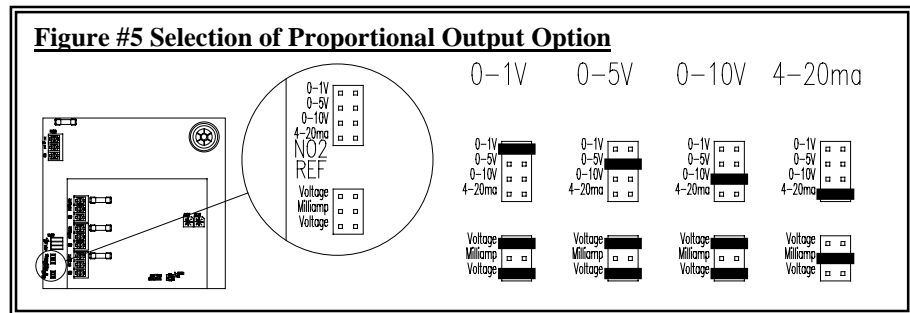
## 3.0 Operational Settings

### **3.1 PROPORTIONAL OUTPUT OPTIONS**

The gas detector has four different proportional output options that are selectable on the transmitter board. The four options are 4 – 20 maDC current loop, 0 – 1 VDC voltage output, 0 – 5 VDC voltage output and 0 – 10 VDC voltage output. Any of the four options can be connected to a Direct Digital Control System (DDCS) or Building Management System (BMS). See 4.0 the Specification Section (Page 6) for the input impedance for each of the proportional outputs.

The output option is selected using a jumper and pin combination. See Figure #5 for location on the transmitter board. To change the setting, **turn off the power to the unit** and remove the cover. Place jumpers in the proper locations for the desired proportional output. Replace the cover and restore power to the detector.

The proportional output is controlled by the concentration of nitrogen dioxide (See Table #1). If at any time a value of 0 maDC or 0 VDC is measured at the output, the gas detector has had a power or sensing failure (See 5.0 Troubleshooting, Page 7).

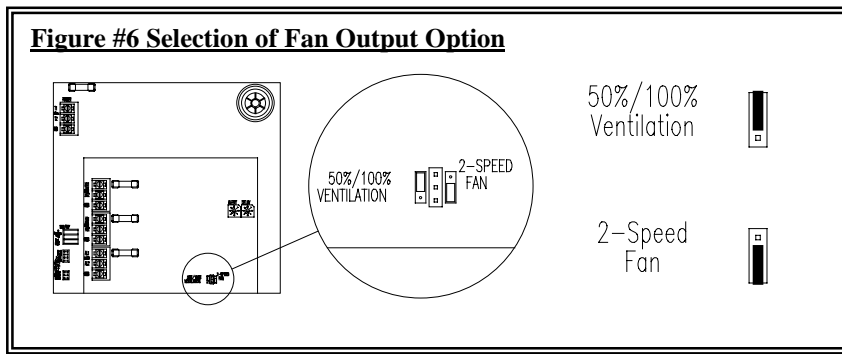


**TABLE #1 Proportional Output Values**

Nitrogen Dioxide PPM	4 – 20 maDC Output Level	0 – 1 VDC Output Level	0 – 5 VDC Output Level	0 – 10 VDC Output Level
0	4.0	0.20	1.0	2.0
0.2	5.6	0.28	1.4	2.8
0.4	7.2	0.36	1.8	3.6
0.6	8.8	0.44	2.2	4.4
0.8	10.4	0.52	2.6	5.2
1.0	12.0	0.60	3.0	6.0
1.2	13.6	0.68	3.4	6.8
1.4	15.2	0.76	3.8	7.6
1.6	16.8	0.84	4.2	8.4
1.8	18.4	0.92	4.6	9.2
2.0	20.0	1.00	5.0	10.0

### **3.2 FAN OUTPUT OPTIONS**

The gas detector can be configured to operate a 2 speed fan or 50%/100% ventilation equipment. The 50%/100% system is intended to be used in a ventilation system that employs more than one fan. On low alert the gas detector will turn on ½ the fans and when in the high alert mode all fans will come on. Either one of the options can be field selected on the output board.



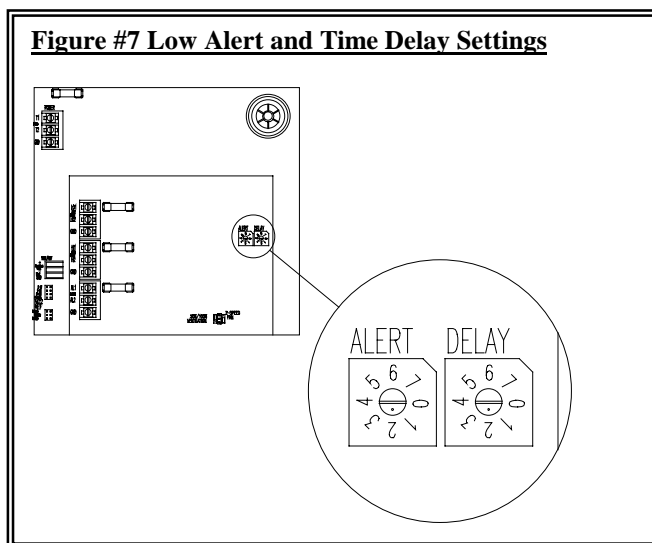
The output option is selected using a jumper and pin combination. See Figure #6 for location on the output board. To change the setting, **turn off the power to the unit** and remove the cover. Place jumpers in the proper locations for the desired fan output option. Replace the cover and restore power to the detector.

### 3.3 LOW ALERT SETTING:

The factory setting for the low alert is set at 0.4 PPM of nitrogen dioxide and can be adjusted from 0.1 to 0.8 PPM in increments of 0.1 PPM. Table #2 presents the switch settings and the detection level (PPM) of nitrogen dioxide. The alert rotary switch is located on the output board (see Figure #7). To change the setting, **turn off the power to the unit** and remove the cover. Rotate the alert rotary switch to the required low alert level PPM per Table #2. Replace the cover and restore power to the detector.

**TABLE #2 Low Alert Setting**

Alert Rotary Switch Setting	Low Alert PPM Setting
0	0.1
1	0.2
2	0.3
3	0.4
4	0.5
5	0.6
6	0.7
7	0.8



Factory default setting is rotary switch setting 3, 0.4 PPM.

### 3.4 ALERT TIME DELAY SETTING:

The time delay between the detector sensing nitrogen dioxide and turning on or off an alert relay is adjustable from 0 to 7 minutes in increments of 1 minute. The delay rotary switch is located on the output board (see Figure #7). Use Table #3 (page 6) to determine the switch setting for the desired time delay. This time delay is used in both the low alert mode and high alert mode of operation. To change the setting, **turn off the power to the unit** and remove the cover. Rotate the delay rotary switch to

the required time delay per Table #3 (Page 6). Replace the cover and restore power to the detector.



Fuse Rating: Main Supply: 5x20MM, Time-Lag, 1.25 Amps  
Switching Relays: 5x20MM, Time-Lag, 5.0 Amps

## **5.0 Troubleshooting**

### **CAUTION:**

**Only qualified personnel should attempt to service this equipment. All power sources must be disconnected before removing the cover of this detector.**

1. Power LED not on:
  - A. Check for 20.4-26.4 VAC at terminals T1 & T2 (see Figure #2, Page 2).
  - B. Check circuit board fuse for continuity. If the fuse needs to be replaced use only the rated fuse listed in the 4.0 Specifications Section (Page 6).
  - C. Consult the factory.
  
2. 0 volts prop. output:
  - A. Remove sensor and reinstall.
  - B. Replace transmitter board (includes sensor and calibration).
  - C. Consult the factory.
  
3. Unit calls for Low alert, High alert or Alarm but remotely connected devices don't respond.
  - A. Check all remote wiring and remote power sources for correctness.
  - B. Check the Relay fuses located next to Output and Alarm terminals for continuity. If the fuse needs to be replaced use only the rated fuse listed in the 4.0 Specifications Section (Page 6).
  - C. Consult the factory.
  
4. For any other situation please consult the factory.

## **6.0 Accessories**

### **Transformers:\***

120 VAC to 24 VAC @ 36VA	36T120N1
120 VAC to 24 VAC @ 75VA	75T120N1
208-240 VAC to 24 VAC @ 36VA	36T240N1
208-240 VAC to 24 VAC @ 75VA	75T240N1

Other voltage levels are available upon request.

\* Transformers supplied in a NEMA 1 enclosure intended for indoor use.

### **External Alarms:**

4" x 4" Electro-mechanical vibrating horn. Rated for at least 94 Decibels at 10 feet. The alarms are available in different input voltages, and are listed below.

24 VAC @ 0.9 amps	AL350F24AC
120 VAC @ 0.2 amps	AL350F120AC

**Sensor Re-calibration:** Factory re-calibration of the transmitter board including new sensor.

Contact the factory for complete information and pricing.

### **Limited Warranty**

Brasch Manufacturing Co., Inc warrants gas transmitters, gas detectors, gas detector control panels and accessories for a period of one year from the date of shipment against defects in material or workmanship. Should any evidence of defects in material or workmanship occur during the warranty period, Brasch Manufacturing Co., Inc will repair or replace at its own discretion, without charge. The company shall not be held responsible for any charges in connection with removal or replacement of allegedly defective equipment, nor for incidental or consequential damages.

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