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C7364A Wall TVOC Sensor

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 TVOC wall sensor installs directly on a standard electrical box and should be mounted 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 where the detector is exposed to vibrations or rapid temperature changes.

The cover is hooked to the base at the top edge and must be removed from the bottom edge first. Use a small Phillips screwdriver to loosen the security screw. (Complete removal of this screw is not required). Use the screwdriver to carefully pry each bottom corner if necessary. Tip the cover away from the base and set it aside as shown in Figure 2.
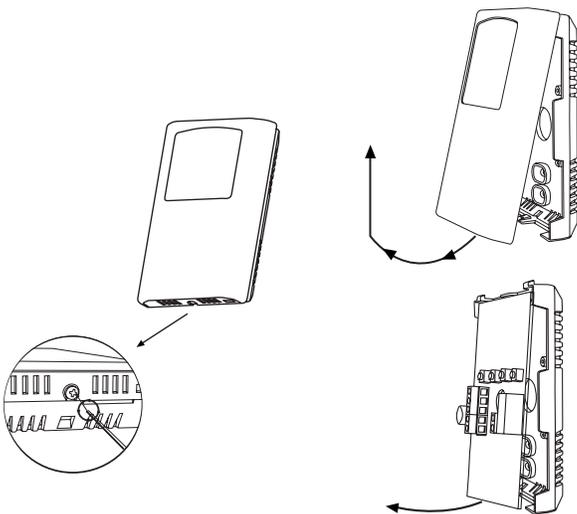
Fig. 2. Cover & PCB Removal

The PCB must be removed from the base to access the mounting holes. Follow usual anti-static procedures when handling the PCB and be careful not to touch the sensors. The PCB is removed by pressing the enclosure base to unsnap the latch near the bottom edge, then the PCB can be lifted out of the base as shown in Figure 2.

Set the PCB aside until the base is mounted on the wall. For added protection, place the PCB in the supplied anti-static bag.

Mount the base by screwing to an electrical box or directly to the wall as shown in Figure 3.

Cover   PCB   Backplate
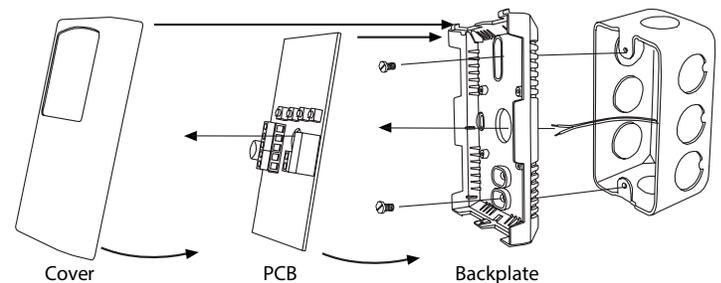
Fig. 3. Installation

After the base is screwed to an electrical box or the wall using the appropriate holes, remove the PCB from the anti-static bag, feed connection wires through center hole and place the top of PCB into the PCB holders on
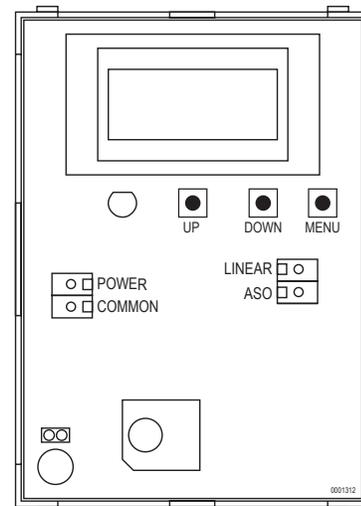
Fig. 4. Connector Layout

1

backplate and snap bottom of PCB into place as shown in Figure 3.

Make wire connections as per the Wiring Illustrations and install decorative cover by placing the top of the cover into the cover holder on the top of the backplate and snapping the bottom into place as shown in Figure 3. Tighten security screw with a Phillips screwdriver.

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 (ESD) handling procedures when installing the device or equipment damage may occur.

Use 18-22 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. Connect the cable shield to ground at the controller only. Make all connections in accordance with national and local codes.

Connector layout is shown in Figure 4.

Connect the positive DC voltage or the hot side of the ac voltage to the terminal marked POWER. The power supply common is connected to the terminal marked COMMON as shown in Figure 6. The device is reverse voltage protected and will not operate if connected

**Typical wiring for 24 Vdc
power from controller**

**Fig. 5. Typical wiring for 24 Vac
power transformer**

backwards. This device has a half-wave type power supply so the power supply common is the same as the output signal common. Therefore, several devices may be connected to one power supply and the output signals all share the same signal common.

Use caution when grounding the secondary of an ac transformer or when wiring multiple devices to ensure that the circuit ground point is the same on all devices and the controller.

Ensure the controller Analog Input (AI) matches the TVOC voltage output signal type before power is applied. The voltage signals have a minimum load rating. Follow the ratings in the Specification section or inaccurate readings may result.

Connect the LINEAR output signal to a 0-5 or 0-10 Vdc
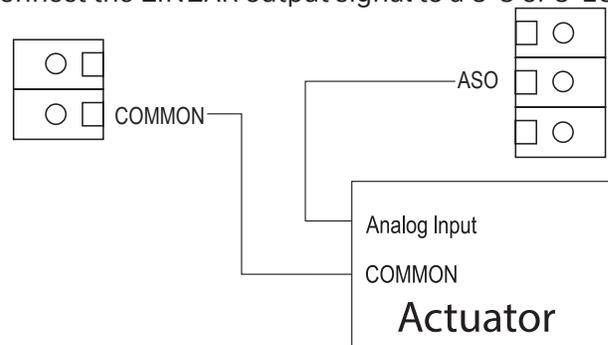
Fig. 6. ASO Wiring

analog input port on the controller as shown in Figure 5. The device is factory configured for 0-5 Vdc output signal but may be changed to 0-10 Vdc via the menu. Changing the output signal may be done during set up of the device. This linear output signal represents the 0-2000 ppm CO_2-equivalent value.

The ASO (Analog Stepped Output) output signal is a second voltage signal that represents the three air quality levels of GOOD, FAIR and POOR. Each level may be set independently via the menu to any value between 0 and 10 Vdc. The factory default is GOOD = 2.5 V, FAIR = 5.0 V and POOR = 7.5 V. This signal can also be connected to a controller analog input, or it can be connected directly to a 0-5 or 0-10 Vdc input of a damper actuator for direct ventilation control as shown in Figure 6. In this way, the Indoor Air Quality Sensor can be used as a stand-alone device. Since all steps are completely adjustable, the device can also drive a reverse acting actuator.

Set-Up

Verify that the Air Quality Sensor is properly wired and all connections are tight. Apply power to the device and note that the LCD will display the software version number for a few seconds and then the device will enter
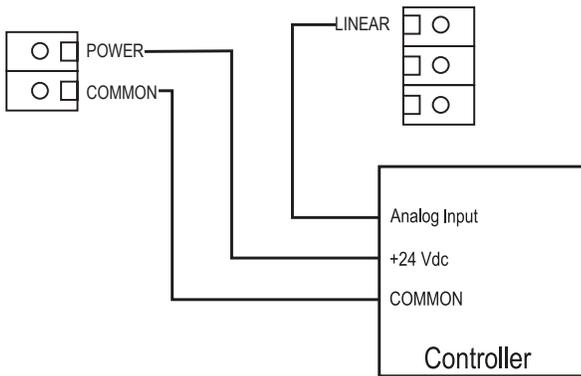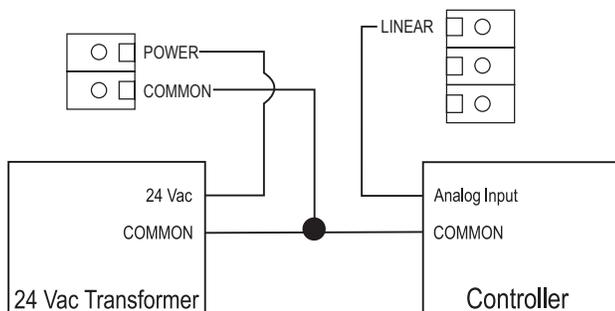
Warm Up mode. The Warm Up mode will last for five minutes and the LCD will count down the time. The status LED will cycle through three colors (green/red / blue). **Note: The LED is for start-up purposes and not visible to the end user and should be disabled at the end of the start-up process.** This time is required to allow the device and sensor to reach normal operating temperature.

After the five minutes has expired the device will enter normal operation and the LCD will indicate the TVOC status and ppm value.

Operation

In normal operation, the TVOC wall sensor will detect a broad range of reducing gases such as CO and VOCs and translate the measurement into a parts per million (ppm) CO_2 equivalent value. This value is displayed on the LCD in either ppm or % as set in the menu. The air quality value is also displayed as either GOOD, FAIR or POOR and these values can also be set via the menu.

The GOOD, FAIR and POOR air quality levels control the Analog Stepped Output (ASO) signal. The ASO output signal comprises of three independently set voltage levels that can be used to directly control a damper actuator for three positions. The levels are set via the menu and each level can be set anywhere from 0-10 Vdc.

Linear Output vs. IAQ ppm

IAQ ppm and ASO Operation
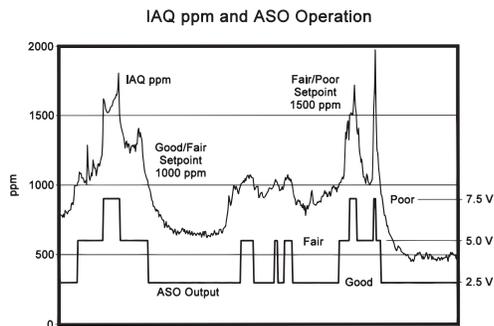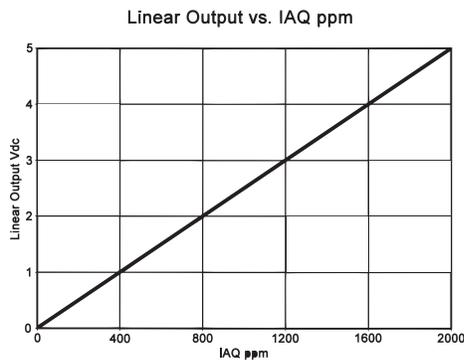
The air quality value is also sent to the LINEAR output as a 0-5 or 0-10 Vdc signal to represent the 0-2000 ppm CO_2 equivalent. This signal can interface to any voltage analog input for logging or control purposes.

The linear output scaling and ASO operation is shown below. Note that the ASO GOOD/FAIR trip level = 1000 ppm and the FAIR/POOR trip level = 1500 ppm. The ASO output levels are GOOD = 2.5 V, FAIR = 5.0 V and POOR = 7.5 V.

Other features and configuration are described in the Setup Menu section.

NOTE: The air quality sensor requires a continuous calibration time of at least 3 weeks before the sensor algorithms provide accurate measurements. During this period the product-to-product readings may show large variations. The sensor may also indicate very high PPM readings during the initial calibration phase.

The TVOC sensor is meant to provide an accurate measurements of INDOOR air quality. Diesel exhaust is not a component of indoor air quality and the sensor should not be used in such an application.

Start-Up

The menu may be accessed any time after the initial warm-up period. The menu is controlled by using the three buttons on the PCB labeled UP, DOWN and MENU. All values entered are saved in non-volatile memory and will be restored correctly in case of a power failure.

The menu has several items as shown below. To enter the menu, press and release the <MENU> key while in normal operation. This will enter the menu step 1, pressing the <MENU> key a second time advances to step 2. Each press of the <MENU> key advances the menu item. The <UP> and <DOWN> keys are used to make changes to program variables by scrolling through the available options. When a value is changed, use the <MENU> key to save it to memory and advance to the next menu item. Actual menu displays with the factory default values are shown. If no keys are pressed for 2 minutes, the menu will automatically exit.

<MENU>   Press and release to enter the SETUP menu

1. IAQ Unit

IAQ Unit ppm

The LCD displays the IAQ sensor reading from 450-2000 ppm. Use <UP> or <DOWN> to change from ppm (default) to % for 0-100 % display. 0-100% = 450-2000 ppm. This setting has no effect on the LINEAR output signal, it is always scaled 0-2000 ppm = 0-5/0-10 Vdc.

<MENU>   Press to advance to next menu item

2. IAQ G/F

```
IAQ G/F
1000 ppm
```

This sets the trip point from Good to Fair IAQ for the LED and ASO. The factory default is 1000 ppm. Use <UP> or <DOWN> to change from 700 to 1200 ppm in 25 ppm steps.

<MENU>   Press to advance to next menu item

3. IAQ F/P

```
IAQ F/P
1500 ppm
```

This sets the trip point from Fair to Poor IAQ for the LED and ASO. The factory default is 1500 ppm. Use <UP> or <DOWN> to change from 1300 to 1700 ppm in 25 ppm steps. Note that both IAQ trip points have a 25 ppm hysteresis built in.

<MENU>   Press to advance to next menu item

4. Analog Output

```
Analog
Out 5V
```

The LINEAR analog output signal defaults to 0-5 Vdc. It can be changed with <UP> or <DOWN> to 0-10 Vdc. The selected scale is always equal to 0-2000 ppm.

<MENU>   Press to advance to next menu item

5. ASO Good Output

```
ASO Good
2.5Vdc
```

This sets the ASO output voltage for the Good range. It can be set using <UP> or <DOWN> anywhere from 0-10 Vdc. Resolution is 0.1 Vdc. The value is shown on the LCD and the ASO output changes accordingly. If connected to a damper actuator, positioning is easy.

<MENU>   Press to advance to next menu item

6. ASO Fair Output

```
ASO Fair
5 Vdc
```

This sets the ASO output voltage for the Fair range. It can be set using <UP> or <DOWN> anywhere from 0-10 Vdc. Resolution is 0.1 Vdc and ASO out updates as above.

<MENU>   Press to advance to next menu item

7. ASO Poor Output

```
ASO Poor
7.5 Vdc
```

This sets the ASO output voltage for the Poor range. It can be set using <UP> or <DOWN> anywhere from 0-10 Vdc. Resolution is 0.1 Vdc and ASO out updates as above.

<MENU>   Press to advance to next menu item

8. Backlite On/Off

```
Backlite
On
```

The LCD backlight is normally on, it can be turned off here.

<MENU>   Press to advance to next menu item

9. IAQ Calibration

```
IAQ Cal
0 ppm
```

Use <UP> or <DOWN> to add or subtract an offset to the IAQ signal. This can change from -200 to + 200 ppm in 10 ppm increments.

<MENU>   Press to advance to next menu item

10. LED

```
LED
On
```

The LED is normally enabled (On). **The LED is for start-up purposes and not visible to the end user and should be disabled (Off)**

<MENU>   to exit the User Menu and return to normal operation

Dimensions

84mm
3.3"

29mm
1.15"

119mm
4.7"

58mm
2.3"

82.6mm
3.25"
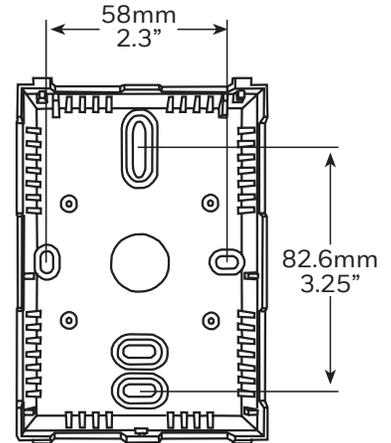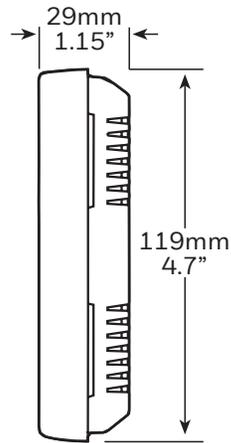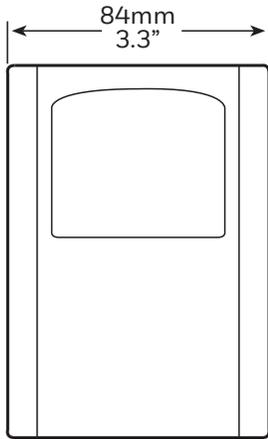
WEEE Directive 2012/19/EC Waste Electrical and Electronic Equipment directive

At the end of the product life dispose of the packaging and product in a corresponding recycling centre. Do not dispose of the unit with the usual domestic refuse. Do not burn the product.

WARNING: This product can expose you to chemicals which are known to the State of California to cause cancer/birth defects or other reproductive harm. For more information go to www. P65Warnings.ca.gov.

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