SENSAPHONE®
REMOTE MONITORING SOLUTIONS

SENSAPHONE CARBON DIOXIDE (CO2) SENSOR • FGD-0068-20K
Quick Installation Instructions

The Sensaphone Carbon Dioxide (CO2) sensor will allow you to monitor levels of Carbon Dioxide from 0-20,000 ppm with any Sensaphone that will accept a 4-20 Input signal. The FGD-0068-20K will require a 24VDC power supply to operate (Part No: FGD-0053).

Introduction

The CO2 transmitter uses Infrared Technology to monitor CO2 levels within a range of 0 – 20,000 ppm and outputs a linear 4-20 mA signal. Features include a back-lit LCD and user menu for easy installation

Before Installation

Read these instructions carefully before installing and commissioning the CO2 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 room CO2 transmitter installs directly on a standard electrical box and should be mounted five feet from the floor of the area to be monitored. 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.

Figure 1

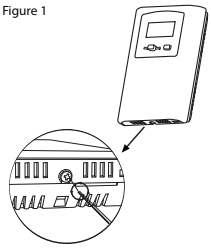


Figure 2

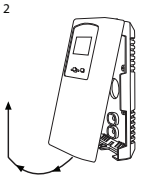
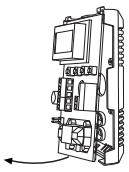


Figure 3



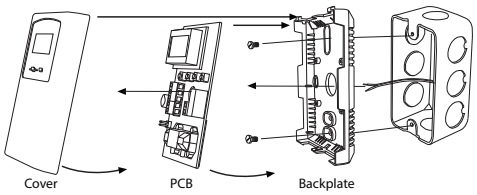
The cover is hooked to the base at the top edge and must be removed from the bottom edge first. Use a small Phillips screwdriver to loosen the security screw as shown in Figure 1. Use the screwdriver to carefully pry each bottom corner if necessary. Tip the cover away from the base and sit it aside as shown in Figure 2.

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 to not touch the sensors. The PCB is removed by pressing the enclosure base as shown in Figure 3.

Sit the PCB aside until the base is mounted on the wall. For added protection, please the PCB inside the supplied anti-static bag.

Mount the base by screwing to an electrical box or directly to the wall as shown in Figure 4.

Figure 4



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 the center hole and place the top of the PCB into the PCB holders on the backplate and snap bottom of the PCB into place as shown in Figure 4.

Wiring Instructions

Note on wiring: Use 22AWG shielded wiring for all connections (Sensaphone Part No. FGD-0010) 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.

Described below is the correct way to wire your Carbon Dioxide (CO_2) Sensor to your Sensaphone.

1. Verify the switch in the upper left corner on the sensor is in the "OUTPUT mA" position.
2. Connect the 24VDC Power Supply Positive (+) to the terminal marked PWR.
3. Connect the 24VDC Power Supply Negative (-) to the Sensaphone Zone Negative (-)
4. Connect the Sensaphone Zone Negative (-) to the terminal marked COM.
5. Connect a wire from the CO2 terminal to the Sensaphone Zone (+) positive terminal.
6. Replace the cover.
7. Program the Sensaphone zone (input) for a 4-20mA sensor type with a table range of 0-20,000.

Start Up

Verify the transmitter is properly wired and connections are tight. Ensure the output switch is set for mA. Apply power and note that the CO2 sensor chamber light flashes on and off. The LCD will indicate the software version number, the output signal type, the CO2 measurement range and then the sensor will begin reading the CO2 level, output the correct analog signal and display the value on the LCD. The sensor operates on a 4 second interval and will update the output and display every 4 seconds.

Setup Menu

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 SETUP menu step 1, pressing the <MENU> key a second time advances to step 2. Each press of the <MENU> key advances the menu item. No values are saved or changed by using the <MENU> key. The <ROLL> key is used to make changes to program variables by scrolling through the available options. When a value is changed, use the <SAVE> key to save it to memory and advance to the next menu item.

Press and release the <MENU> key to enter the SETUP menu.

1. Out High — The default CO2 range is 0-20,000 ppm. The span can be changed from 2,000 to 20,000 ppm in increments of 500 ppm. Use the <ROLL> key to change the value and <SAVE> to save. The factory default is 20,000 ppm. Press <MENU> to advance.
2. Altitude — The default is 0 feet. Change by using the <ROLL> key from 0 to 5000 feet in 500 ft increments. Change 0 Ft for CO2 local altitude correction and press <SAVE> to save a change. Press <MENU> to advance.
3. Output Type — Use the <ROLL> key to toggle the output OFF (normal operation), MIN (minimum output) or MAX Test OFF (maximum output) for testing purposes. Press either <SAVE> or <MENU> to set it back to OFF and advance to the next item. Press <MENU> to advance.
4. Output Test — Use the <ROLL> key to toggle the output OFF (normal operation) or MAX (maximum output) for testing purposes. Press either <SAVE> or <MENU> to set it back to OFF and advance to the next item.
5. Calibrat 0 PPM — This item is used for 0 ppm gas calibration and is explained in the Calibration section. Press <MENU> to advance
6. Calibrat 1,000 PPM — This item is used for 1,000 ppm gas calibration and is explained in the Calibration section. Press <MENU> to advance
7. Calibrat 20,000 PPM — This item is used for 20,000 ppm gas calibration and is explained in the Calibration section. Press <MENU> to advance
8. Restore — Press the <SAVE> key to restore all factory defaults and calibration to original factory settings. Press <MENU> to advance.
9. Menu — Press <SAVE> to exit the menu and return to normal operation or <MENU> to repeat the menu.

Output

The CO2 output is scaled such that 4-20mA equals 0 to Out_High as set in the Setup Menu. The factory default is 0-20,000 ppm. Out_High can be changed from 2,000 to 20,000 ppm and the output signal is scaled accordingly.

Calibration

Calibration with gas requires a field calibration kit with pressure regulator, necessary tubing and appropriate bottles of CO2 gas.

0 PPM Calibration

Turn the regulator knob on and attach it to the Nitrogen gas bottle and hand tighten. Remove the cover of the unit to be calibrated to expose the gas sensor chamber. The tubing from the gas bottle can be connected to either port on the chamber after the plastic cap is removed. Gently remove one cap and connect the tubing, note that strong shock or vibration can affect calibration.

Ensure the device has been operating normally for at least five minutes before applying gas. Turn the valve knob on the regulator to start the gas flow. The regulator will restrict the flow rate to the specified 100 ml/min. After a brief period the gas will flow into the chamber. Wait 1 to 2 minutes until the CO2 stabilizes.

Enter the Setup menu and use the <MENU> key to advance to Calibrat 0 PPM. Press and hold the <SAVE> key for 2 seconds and the display will change to Waiting Calibrat then to Waiting 5 minute to indicate that the process of setting the internal calibration is taking place.

This takes about 5 minutes while the LCD counts down. Do not disturb the unit or the gas flow. When complete the unit will display the ppm value and Cal Done. Press the <SAVE> key to return to normal operation and shut the gas off.

1000 PPM Calibration

Connect the 1000 ppm CO2 gas bottle and apply the gas as before. The CO2 reading on the LCD will begin to approach 1000 ppm. Wait 1 to 2 minutes until the CO2 reading stabilizes.

Enter the Setup menu and use the <MENU> key to advance to Calibrat 1000 PPM. Press and hold the <SAVE> key for 2 seconds and the display will change to Waiting Calibrat then to Waiting 5 minute to indicate that the device is calibrating.

Again, this process takes about 5 minutes. When calibration is complete the unit will display the ppm and Cal Done. Press the <SAVE> key to return to normal operation and shut the gas off.

20,000 PPM Calibration

Connect the 20,000 ppm CO2 and apply the gas as before. The LCD will begin to approach 20,000 ppm. Wait 1 to 2 minutes until the CO2 reading stabilizes.

Enter the Setup menu and use the <MENU> key to advance to Calibrat 20,000 PPM. Press and hold the <SAVE> key for 2

seconds and the display will change to Waiting Calibrat then to Waiting 5 minute.

Again, wait 5 minutes and when calibration is complete the unit will display the ppm and Cal Done. Press the <SAVE> key to return to normal operation and shut the gas off.

Disconnect the tubing and replace the cap on the sensor chamber as calibration is complete.

General Specifications

Range: 0 - 20,000 ppm standard, programmable span from 2000 to 20,000 ppm

Accuracy: ±75 PPM or 10% of reading (whichever is greater)

Sensor: Dual Channel Non-Dispersive Infrared (NDIR), diusion sampling

Sensor Coverage Area: 100 m^2 (1000 ft^2) typical

Temp. Dependence: 0.2% FS per °C

Stability: < 5 % FS over life of sensor

Sensor Life Span: 15 years typical

Press. Dependence: 0.13% of reading per mm Hg

Altitude Correction: Programmable from 0-5000 ft via keypad

Response Time: <2 minutes for 90% step change typical

Warm-up Time: <2 minutes

Power Supply: 20-28 Vac/dc(non-isolated half-wave rectified)

Output Signals: 4-20 mA active (sourcing), 0-5 Vdc or 0-10 Vdc (field selectable)

Consumption: Heated: 1.0 A max @ 24 Vdc, 1.1 A max @ 24 Vac

Consumption: Unheated: 100 mA max @ 24 Vdc, 185 mA max @ 24 Vac

Output Drive Capability: Current: 550 ohms max

Voltage: 10 Kohm min

Output Resolution: 10 bit PWM

Protection Circuitry: Reverse voltage & over-voltage protected

Operation Conditions: Heated: -40°- 50°C (-40°-122°F)

Operation Conditions: Unheated: 0°- 50°C (32°-122°F)

0-95% RH non-condensing

Wiring Connections: Screw terminal block (14 to 22 AWG)

External Dimensions: 84mm W x 119mm H x 29mm D (3.3” x 4.7” x 1.15”)

Enclosure Ratings: IP30 (NEMA 1)

Concealed LCD Display (Used for setting parameters):

Resolution: 1 ppm CO2

Size: 1.4” w x 0.6” h (35 mm x 15 mm)

Alpha-numeric 2 line x 8 character