

Start up

Battery Operation- For portable use, the monitor will operate up to 70 hours on 4 AA industrial alkaline batteries. The batteries can be installed by removing the battery cover and following the diagram imprinted on the back plastic cover.

LOW BATT flashes when there is less than 30 minutes of battery life. At this point the batteries should be replaced or the AC adapter should be used as a substitute. If operation continues, the unit will become inoperable and only the **LOW BATT** will blink on the LCD display.

AC Power Operation - The sensor is shipped with a 6V DC 500mA AC/DC adapter. To use the adapter, connect the plug into the back of the unit and plug the transformer into any standard wall outlet.

NOTE Use the supplied adapter. The wrong adapter may cause damage to the unit. Battery operation will not function as a back up during a power loss.

Power-Up

1. Press the Power Button and a 2 second delay will occur before the display becomes visible.
2. 10 seconds will elapse before displaying current CO₂ readings
3. **WARM-UP** will display for approximately 1 minute. During this time, adjustments can not be made to the sensor.

Display Features and Modes

WARM-UP - indicates a 1 minute warm-up

ON LINE - Displays when a PC is communicating to the sensor via RJ45 port.

Normal Operating Mode - After warm-up the sensor will stabilize and display current conditions.

Adjustment Modes

Pressing the **mode** button scrolls through the adjustment modes. Once the desired mode is displayed, press Enter to make adjustments. Press Enter again to save and leave the adjustment mode.

ELEVATION - Used to compensate for elevation changes.

CALIBRATION - Used when calibrating.

TEMPERATURE - For Temperature calibration

OUTSIDE - To Manually input CO₂ levels for the CFM ventilation rate

CALIBRATION IN PROGRESS - Displays during calibration

Display Features

CO₂ Readings (Upper Display) - Remain visible at all times.

Temperature and Ventilation Rates (Lower Display)

The Up/Down arrows allow you to toggle through the Temperature and Ventilation modes. When pressing the up arrow, the display will go through the following sequence:

Temp°C > Temp°F > Vent Rate l/p/s > Vent Rate cfm/p > Blank

US Standard to Metric Conversion

The Temperature, Ventilation rates and Elevation Readings can be viewed in US Standard or Metric readings. The Temperature is converted from Fahrenheit (°F) to Celsius (°C), the Ventilation Rates are converted from Cubic Feet Per Minute Per Person (cfm/p) to Liters Per Second (l/p/s) and the Feet (ft) to Meters (m).

Operation

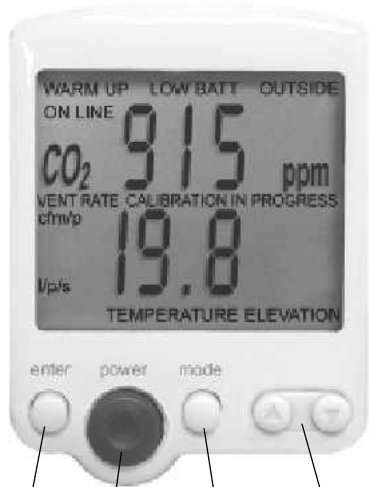
Elevation Correction - The sensor, like any other gas measuring device is affected by altitude changes. The sensor is shipped with the elevation setting set at "zero" or sea level. If you are at an altitude greater than 500 feet, an adjustment should be made to assure maximum sensor accuracy. Once the elevation correction is set it will be stored and saved in the monitor memory. To change the default setting follow the steps below.

1. Press the **Mode** button until **ELEVATION** begins to blink.
2. Press **Enter**.
3. Press **Mode** to toggle the elevation reading between feet(ft) & meters(m).
4. Use the **Up/Down** button to adjust the altitude in increments of 500(ft) or 100(m). Once the correct altitude is set, press **Enter** to save the setting and return to normal mode.

Temperature or CFM/Person - The lower display will cycle through the following units when the **Up/Down** button is pressed: Temp°F, Temp°C, CFM, turn lower display off.

Stand-alone Monitoring - Once Elevation correction has been made (as described in the steps above), the sensor will begin to accurately display current room conditions.

Using an External Datalogger - Voltage outputs for both CO₂ and temperature are available via an RJ-45 jack on the rear of the unit.



This drawing is for reference to identify the location of the different modes and adjustment features. The display won't display all features simultaneously (as shown).

I-7001

Carbon Dioxide and Temperature Monitor

INTEC
CONTROLS



Features

- | | |
|-----------------------|-----------------------------|
| 1. Display | 6. Adapter Connection |
| 2. Enter Button | 7. RJ-45 Connection |
| 3. Power Button | 8. Cal Button (under cover) |
| 4. Up/Down Button | 9. Gas Connection |
| 5. Batter Compartment | 10. Kickstand |

The I-7001 is an easy-to-use hand-held CO₂/Temperature monitor. The unit provides stable, highly accurate readings due to our patented dual beam NDIR technology. Equipped with a 0-4V output, the unit is perfect for long-term monitoring/recording.

INTEC Controls, 9730 Distribution Ave., San Diego, CA 92121
Ph: (858) 578-7887, Fx: (858) 578-4633, info@inteccontrols.com

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Ventilation Rate (cfm/p)

Overview - Press the **up/down** button until cfm/p is displayed. This value represents how much outside air is being introduced on a CFM per person basis. The reading is derived from calculating the outside air ventilation rate to a space based on the inside/outside CO₂ differential readings. Current codes/standards generally require 15 to 20 CFM/Person to be delivered to most spaces to ensure acceptable air quality. Low values indicate low ventilation rates and potentially poor air quality. High levels can indicate excessive ventilation and potential excessive energy usage. To obtain accurate measurements, readings should be taken 2 to 3 hours after occupancy has stabilized in a space or at a peak in daily CO₂ concentrations.

Adjusting the Outside CO₂ Concentration

The sensor is factory set to assume an outside level of 400 ppm, which should be close to the outside concentration in most areas. The outside level of CO₂ can also be changed by measuring outside levels or by manually adjusting the monitor.

1. Power up outside and wait for CO₂ levels to stabilize (approx 5 min).
2. Save the reading by holding the **Enter** button on the sensor for 5 secs.
3. This value is used to calculate the ventilation rate based on the differential of the measured outside value and into measured inside concentration.

Manual Input of Outside Concentration

The monitor is factory set at 400 PPM. To adjust the factory setting (for the cfm/person calculation) or to verify the current setting follow steps below:

1. Press the mode button until **CO₂** and **ppm** flash.
2. Press the enter button and the current outside value will display.
3. Use the **Up/Down** button to increase/decrease the CO₂ value.
4. Press enter to save and store the value in the monitor.

Calibration (CO₂)

IMPORTANT - The sensor has been factory calibrated and should need calibration once every 12 months using either a zero concentration gas or a gas with a specified concentration of CO₂. For the most accurate field calibration we recommend purchasing a the calibration kit (P/N 2075).

Sensor drift usually occurs at the zero reference point. The manual calibration process allows the user to perform a one point calibration based on ambient levels or by flowing a gas of a known concentration through the sensor. This process will adjust the zero offset of the sensor and will provide an accurate calibration. If a two point calibration is required the Calibration kit should be used. For manual calibration, follow the steps below.

1. The calibration procedure will last approximately 15 minutes. Before performing the calibration procedure, remove the battery cover to

access the calibration activation switch. Connect the supplied AC adapter to the back of the sensor or ensure new batteries are installed.

2. Power up the sensor and wait for the Warm-up to end.
3. Next verify the Elevation correction has been set. Refer to the steps in Elevation Correction for procedure.
4. If you are calibrating to ambient conditions make sure the sensor is displaying a stable reading - avoid breathing in the area of the monitor. If you are flowing gas to the calibration port of the sensor, allow the gas to flow for at least 10 minutes before initiating calibration.
5. Press the **Mode** button twice. The Calibration mode will begin blinking.
5. Press **Enter**.
6. Use the **Up/Down** button to adjust reading to the current ambient conditions or concentration of the gas being used. Pressing the button once will change the readings in increments of 10 ppm. To increase the speed, press and hold the button.

NOTE - For best accuracy, a reference or known concentration of CO₂ should be used when adjusting the reading. Bottled nitrogen can be used to provide a zero concentration gas.

7. Next, on the backside of the unit locate the push button switch (under the battery cover, in the small round hole to the right of the connector jack), use a small pointed object to depress and hold the switch for 5 seconds. **CALIBRATION** will begin to blink.
8. Press Enter.
9. **Calibration In Progress** will begin to blink. At this point the unit will program itself based on the CO₂ value that was input in Step 6. The calibration process will take approximately 5 minutes.

When Calibration is complete, the display will return to the steady **Calibration** mode. Press **Enter** to return to the normal operation mode.

Temperature Adjustment

Use this procedure to adjust the temperature output when you wish to have the temperature output match a reference sensor. The accuracy of a field adjustment is dependent upon the stability of the environment in which the procedure is performed, and upon the accuracy of the reference sensor.

1. Connect the supplied AC adapter to the back of the sensor. If you do not have the AC adapter, new batteries should be used.
2. Power up the sensor and place in a stable environment, free of drafts or temperature changes. Wait 30 minutes for the unit to fully equilibrate with the environment. Do not hold the unit in your hand during this period. Press the mode button until the blinking word **TEMPERATURE** appears.
4. Press **Enter**. Both the word **TEMPERATURE** and the numeric temperature display will begin blinking in unison.
5. Use the **Up/Down** button to adjust the temperature reading to match the reference.
6. Press **Enter**. The temperature offset is immediately adjusted, the blinking stops, and the unit is now in normal operating mode.

Accessories

CO₂View™ Real-Time Graphing/Calibration Software 2080

Allows the I-7001 to log directly to a Windows™ compatible PC and graph concentrations in real time (includes RS232 cable). Includes an interface that allows the user to perform a zero and span calibration on the sensor.

Hobo® Data-Logger Kit CO₂ – Temp & RH 2077

Small data-logger that mounts to the back of the I-7001. Records CO₂, Temp, and Relative Humidity. Stores over 7900 data points and samples at a user adjustable time interval. Graphing software included.

2070 Datalogging Cable

Connects the I-7001 to 3rd party devices. Includes two leads for the CO₂ and temperature outputs.

Calibration Kit 2075

Comes with necessary equipment to perform zero calibration.

Specifications

Method

Dual Beam Absorption Infrared™

Display - LCD

Independent CO₂ and Temperature readings. Calculates and Displays Ventilation Rates

Sample Method

Diffusion or flow through (50 - 100 ml/min)

Performance - CO₂ Channel

Measurement Range

0-10,000 ppm display

0-4,000 ppm voltage output

Display Resolution

± 1 ppm

Accuracy

±50 ppm or ±5% of reading up to 5,000 PPM (Above 5,000 PPM not specified)

Repeatability

±20 ppm

Temperature Dependence

±0.1% of reading per °C or ±2 ppm per °C, whichever is greater, referenced to 25°C

Pressure Dependence:

0.13% of reading per mm Hg (Corrected via user input for elevation)

Response Time

<60 seconds for 90% of step change

Warm-Up Time

<60 seconds at 22°C

Calibration Interval

12 months, offset adjustment using single gas at 0-1000 ppm CO₂. Full factory calibration available

Performance - Temperature Channel

Temperature Range

Voltage output 32 to 104°F (0 to 40°C)

Display 32 to 122°F (0 to 50°C)

Display Resolution

0.1°F (0.1°C)

Display Options

°F, °C, or Off. Set with panel button.

Accuracy

±2°F (±1°C)

Response Time

20-30 minutes (case must equilibrate with environment)

Calibration Interval

12 months, offset adjustment using temperature standard at 50 to 86°F (10 to 30°C). Full factory calibration available

Outputs

(Analog) CO₂

0-4 VDC, 1mV/ppm (4,000 ppm max)

Temperature

0-4 VDC linear, 32-104°F (0-40°C)

Output Impedance

100 Ohms

(Digital)

RS232 for use with the CO₂View™ Graphing Software

(Wiring Connection)

One RJ-45 Connector

Dual Analog output plus digital output

Power Supply

Battery Type

Four AA batteries, not included

Battery Operation

80 hours (alkaline)

External

6 VDC from external AC/DC adapter, included

Power Requirements

100 mA Peak, 20 mA average from 6V

General

Operating Conditions

32-122°F (0-50°C)

0-95% RH, non-condensing

Storage Temperatures

-4 to 140°F (-20 to 60°C)

Certifications

FCC Class 15 Part B

CE

This product is covered by one or more of the following patents:

5,650,624 / 5,721,430 / 5,444,249 / 5,747,808 / 5,834,777 / 5,163,332 / 5,340,986 / 5,502,308 / 6,344,798 / 6,023,069 / 5,370,114 / 5,601,079 / 5,691,704 / 5,767,776 / 5,966,077 / 6,107,925 / 5,798,700 / 5,945,924 / 5,592,147 / 6,255,653 / 6,250,133 / 6,285,290