

**Critical Environment Technologies
Canada Inc.**

Falcon-II

**Next Generation, Air Quality Monitor
CO2 & Temperature**



OPERATION MANUAL

REV: A JUNE-2-2008

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INSTRUMENT SERIAL NUMBER:

PURCHASE DATE:

PURCHASED FROM:

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WELCOME

Thank you for purchasing the FALCON-II indoor air quality monitor. The FALCON-II is an easy to use, portable, monitoring device for monitoring trends that pertain to indoor air quality.

The FALCON-II is equipped with integral CO₂ and temperature sensors to aid in verifying readings providing an indication of air quality. Information readings are temporarily written to built-in memory. The instrument may be hand-held or will easily stand on a flat surface.

The FALCON-II instruments are manufactured to provide good value to the end user. Calibration and repair is available at our manufacturing facility and through some of our authorized and trained distributors.

If after reading through the manual, you have any questions, please do not hesitate to contact our service department for technical support.

WHAT YOU GET

*** INSTRUMENT**

*** 4 X "AA" ALKALINE BATTERIES**

*** WALL ADAPTER (NORTH AMERICAN WALL PLUG CONFIGURATION)**

OPERATION MANUAL

WHITE, FOAM-LINED CARDBOARD STORAGE—SHIPPING BOX



1.0 GENERAL

The Falcon-II is a rugged, hand-held, battery powered instrument for measuring and displaying Carbon Dioxide (CO2) and Temperature. It operates from internal alkaline batteries or it's own (supplied) wall adapter.

2.0 SPECIFICATIONS

Dimensions: 0.96" X 3.19" X 6.50" (24.3mm X 81.1mm X 165 mm)

Weight: 9.65 oz (273.6 grams) including batteries

General Operating Conditions:

Operating Temperature: 32-122 °F (0-50 °C) 0-95% RH, non-condensing
Storage Temperature: -4 to 140 °F (-20 to 60 °C))

Power: Two power supply types:
Battery type: Alkaline, AA X 4 (80 hours)
External: 6 VDC from external AC/DC adapter which is included in package (North American wall configuration only)

Power Requirement: 160 mA Peak, 15 mA average from 6V

Outputs: Normally Low, 100mA max. @ 24 VDC. Adjustable set-point, factory setting is 1000ppm, hysteresis is 50ppm.
One RJ-45 Connector

Sample Method: Diffusion or flow through (50 ~200 ml/min)

Warranty: 18-months parts & labour (when returned to factory prepaid freight)

Display: LCD: Independent CO2 & Temperature readings. Calculates & displays ventilation rates

Certifications: CE

LCD Error Messages:

ITEM	DESCRIPTION
「Err3」	Error 3 , it is displayed when the temperature being measured is outside of the measurement range.
「Err5」 「Err6」	Error 5~6 , it is necessary to reset the device. To reset it, turn the instrument off, remove the battery and wait for a minimum of one minute, reinsert the battery and turn on. If the error message remains please contact the Service Department for further assistance.

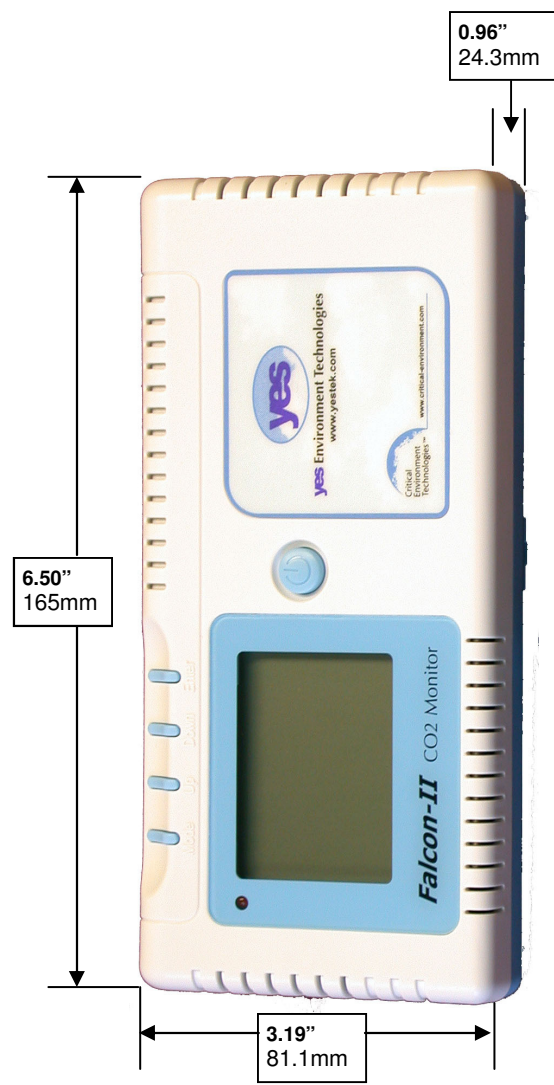
2.0 SPECIFICATIONS, CONT'D.....

Sensors: CO2 (Carbon Dioxide): NDIR (Non-Dispersive Infrared)
 Temperature:

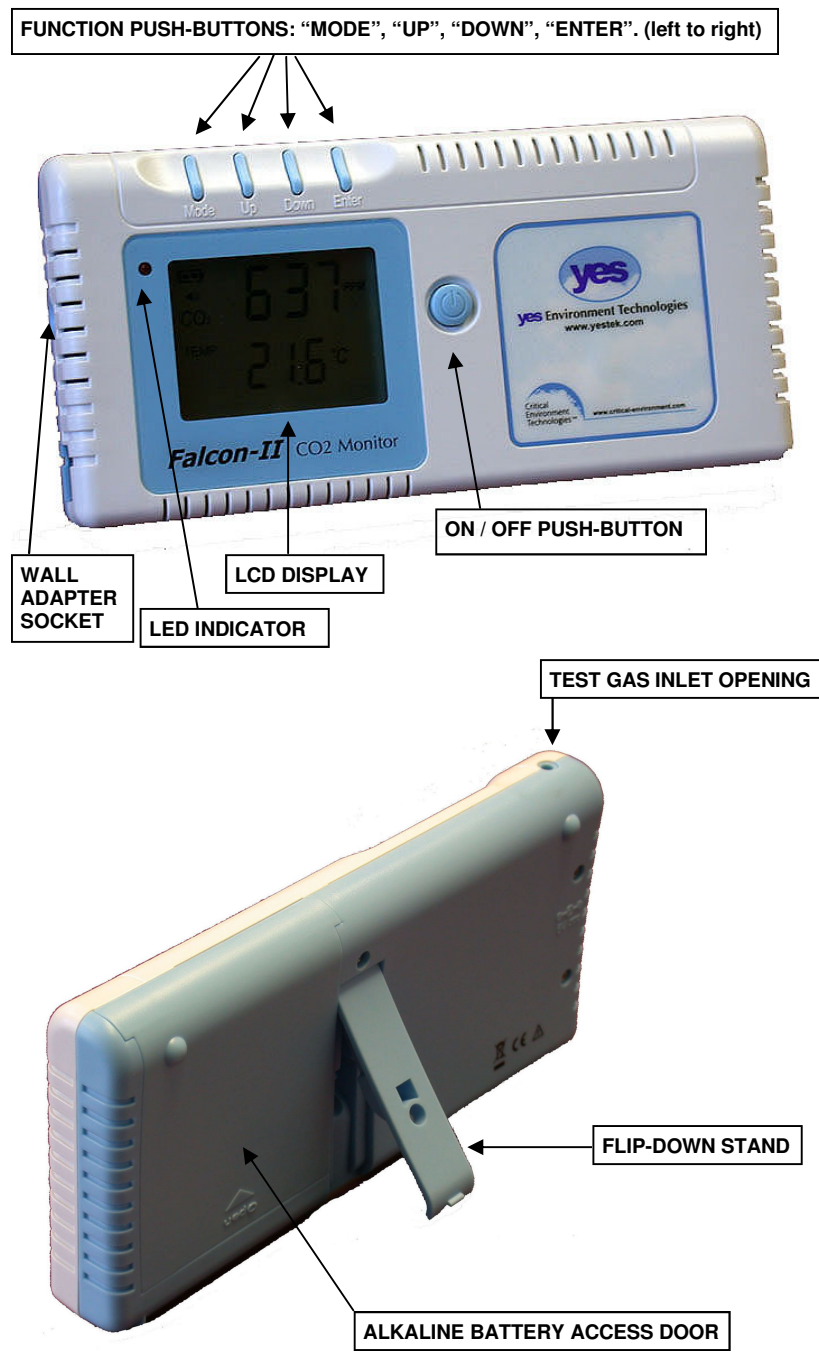
CO2 SENSOR - NDIR	DESCRIPTION
Measurement Range	0 - 10,000 ppm
Display Resolution	1ppm at 0~1,000ppm; 5ppm at 1,000~2,000ppm; 10ppm at 2,000~4,000ppm, 20ppm at 4,000~6,000ppm, 40ppm at 6,000~10,000ppm
Accuracy	±50 ppm or ±5% of reading
Repeatability	±20 ppm
Temperature Dependence	±0.1% of reading per °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 altitude)
Response Time	<2min for 63% 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

TEMPERATURE SENSOR	DESCRIPTION
Temperature Range	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 Up / Down button
Accuracy	±2 °F (±1 °C)
Response Time	20-30 minutes (case must equilibrate with environment)

3.0 DIMENSIONS



4.0 INSTRUMENT FEATURES



4.0 INSTRUMENT FEATURES, CONT'D.....







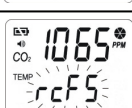
Changing Alkaline Batteries:



5.0 OPERATION

The Falcon-II is a rugged, hand-held, battery powered instrument for measuring and displaying Carbon Dioxide (CO₂) and Temperature. It operates from internal alkaline batteries or it's own (supplied) wall adapter.

5.1 OPERATING MODES

MODE	DESCRIPTION	LCD DISPLAY
ALTI	Compensate for the effect of pressure changes by inputting the appropriate altitude of the location where the instrument is being used.	
ALARM	Alarm when CO ₂ concentration exceeds one threshold alarm. Alarm level can be changed through the keypad / menu. The audible alarm can be switched on/off through the keypad / menu when the speaker icon flashes	
OUTSIDE	Modify the concentration of outside CO ₂ for defining the ventilation rate	
CALI	Calibrate the sensor when the reading deviates from the actual CO ₂ concentration	
DATA LOGGER	Show CO ₂ and temperature records in the past 24-hours	
MAX-MIN	Show the Max and Min readings before being cleared off or before switching off	
rcFS	Recover the factory Settings, if the device cannot show accurate readings	

5.2 DETAILED OPERATING INSTRUCTIONS

PowerOn

Press the Power button (①) to turn on the device after placing 4 AA batteries into the battery holder or AC adapter plug into the DC socket . Once instrument has been powered up, the CO2 reading will show after 15 seconds of warm up.

WarmUp

It takes approximately 1-minute before "WARM-UP" disappears from the LCD. All the functions will not respond during the warm up period.

UserMode

After warm up, the device will stabilize and display the normal CO2 reading in the upper part of the LCD) and remain visible at all times. Temperature and Ventilation Rates will be shown in the lower portion of the LCD. The Up/Down button (④/③) allows you to scroll through the Temperature and Ventilation Modes. When pressing the Up button, the lower display will go through the following sequence: "Temp°C -> Temp°F -> Vent Rate lps -> Vent Rate cfm/p".

NOTE: "lps" refers to Liter Per Second Per Person; "cfm/p" refers to Cubic Feet Per Minute Per Person

5.22 OPERATION - MODE ADJUSTMENT

1.0 ALTI Mode

- 1.1. Press the Mode Button (⑤), "ALTI" flashes
- 1.2. Press Mode (⑤) to alter between "m" (meters) and "ft" (feet).
- 1.3. Press Up/Down (④/③) to adjust the altitude (Step=100m/500ft)
- 1.4. Press the Enter Button (②), save or leave the ALTI Mode, and return to User Mode.

2.0 ALARM Mode

- 2.1. Adjust the alarm level
 - 2.1.1. Press the Mode button (⑤), until ALARM flashes
 - 2.1.2. Press the Enter Button (②), "CO2" icon flashes.
 - 2.1.3. Press Up/Down (④/③) to adjust the alarm level ($\geq 1,000$ ppm, interval is ± 100 ppm; $< 1,000$ ppm, interval is ± 50 ppm)
 - 2.1.4. Press the Enter (②), save the setting and return to the User Mode.
- 2.2. Turn ON/OFF the ALARM
 - 2.2.1. Press the Mode button (⑤), until "Speaker Icon" flashes
 - 2.2.2. Press Enter Button (②)
 - 2.2.3. Press Up/Down (④/③) to turn the ALARM on or off
 - 2.2.4. Press the Enter (②), save the setting and return to the User Mode.

5.2 DETAILED OPERATING INSTRUCTIONS, CONT'D.....

5.22 OPERATION - MODE ADJUSTMENT, CONT'D.....

3.0 OUTSIDE Mode

NOTE: Ventilation Rate

Ventilate rate represents how much air is introduced into the indoor space from the outside. Low values indicate low ventilation rates and potentially poor air quality. High levels indicate excessive ventilation and potential excessive energy usage.

To obtain an accurate measurement, readings should be taken 2~3 hours after occupancy has stabilized in a space or at a peak in daily CO2 concentrations.

With indoor air quality control, CO2 value is an indicator of ventilation rate. **400 ppm (Parts Per Million) is the default CO2 concentration outside** (according to ASHRAE: American Society of Heating, Refrigeration and Air conditioning Engineers).

- 3.1. Press the Mode button (Ⓢ), until OUTSIDE flashes.
- 3.2. Press Enter (Ⓜ), to show OUTSIDE CO2 and PPM flashes. Press Up/Down (Ⓞ/Ⓟ) to adjust the reading.
- 3.3. Press the Enter (Ⓜ), save the setting and return to the User Mode. After modification, the VENT Rate will change.

4.0 CALI Mode

The CO2 monitor has been calibrated at the factory and should be recalibrated every 12-months with a specified concentration of CO2. Sensor drift usually occurs in linearity. To perform calibration, follow the steps below.

- 4.1. If battery icon shows low power, replace batteries before attempting to calibrate or use AC adapter.
- 4.2. Press the Mode button (Ⓢ), until CALI flashes.
- 4.3. Press Enter (Ⓜ), "CALI" is shown on the display
- 4.4. Adjust the lower display to ambient CO2 value by pressing the Up/Down (Ⓞ/Ⓟ) Button.
- 4.5. Press Mode button (Ⓢ) for more than 10 seconds. "CALIBRATING" flashes. Calibration will be finished after 5-minutes and the LCD will indicate "PASS". If LCD indicates "FAIL", repeat the calibration.
- 4.6. Press Enter (Ⓜ), and return to the User Mode

5.2 DETAILED OPERATING INSTRUCTIONS, CONT'D.....

5.0 DATA LOGGER Mode

The Falcon-OO has a built-in data logger, which can provide users with CO2 and temperature readings within the past 24 hours.

- 5.1. Press the Mode button(Ⓢ), until DATALOGGER flashes
- 5.2. Press Enter(Ⓜ), CO2 and Temperature shows up
Press Up/Down(Ⓞ/Ⓝ) to page up/down the reading .
- 5.3. Press the Enter(Ⓜ), return to User Mode

6.0 MaxMin Mode

The Falcon-II has a built-in Max-Min mode, which can provide users with the Maximum and Minimum CO2 readings since the instrument was last switched on.

- 6.1. Press the Mode button(Ⓢ), until MAX MIN flashes.
- 6.2. Press Enter button(Ⓜ), MAX and MIN CO2 reading shows alternating.
- 6.3. "CLR" will flash if press Up/Down(Ⓞ/Ⓝ).
Press Enter(Ⓜ), to CLEAR the MAX and MIN record .
- 6.4. Press Mode or Enter(Ⓢ), return to the User Mode.

7.0 rcFS Mode:

If the user sets or calibrates the sensor wrong, you can recover the factory setting.

- 7.1. Press the Mode button(Ⓢ), until rcFS flashes on the lower display
- 7.2. Press Enter(Ⓜ), "no" shows on the upper display
- 7.3. Press Up/Dow(Ⓞ/Ⓝ), "no" change to "yes", Press Enter(Ⓜ), Factory Setting will reload, return to the User Mode;
- 7.4. Press Mode(Ⓢ), leave rcFS Mode, return to the User Mode

