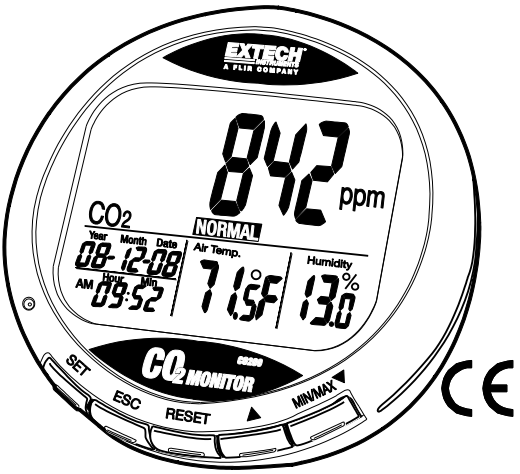
EXTECH®

USER MANUAL

CO_2 Monitor

Model CO200



Introduction

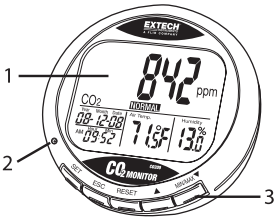
Congratulations on your purchase of the Model CO200 Carbon Dioxide Meter. The CO200 measures and displays CO_2 level, air temperature, and relative humidity. Visible and audible alarm (with alarm relay output), and real-time calendar clock, make this an ideal instrument for indoor air quality (IAQ) monitoring. The CO200 is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

Description

METER

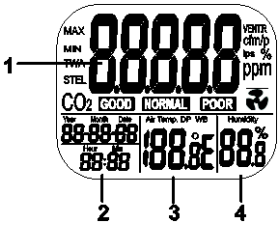
1. LCD Multifunction display
2. Power LED indicator
3. Control buttons

Power adaptor jack, alarm relay jack, and sensors on rear



LCD DISPLAY

1. CO_2 concentration in ppm
2. Calendar clock
3. Air Temperature
4. % Relative Humidity



FUNCTION INDICATORS

ppm	CO_2 measurement value
GOOD	CO_2 (good air quality level)
NORMAL	CO_2 (normal air quality level)
POOR	CO_2 (poor air quality level)
Air Temp	Air Temperature
Humidity %	Relative Humidity
°C or °F	Celsius or Fahrenheit units
MIN/MAX	Minimum or Maximum readings
	Flashes when CO_2 alarm is triggered (relay activates)

CONTROL BUTTONS

SET	Long press to enter setup mode. Saves settings.
ESC	Exits setup page/mode. Terminates CO_2 calibration.
RESET	Long press to clear the MIN/MAX memories.
▲	Select a mode or increase a value in the setup menu.
MIN/MAX ▼	Access MIN/MAX function or use as down-arrow in setup mode.
	Long press SET, MIN/MAX, and ▲to enter the CO_2 calibration mode**.**

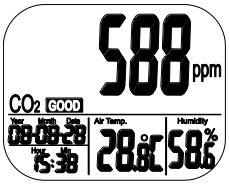
Operation

Powering the CO200

Plug the supplied power adaptor (5V/0.5A) into the power jack on the back of the meter (ensure that you connect to the power jack on the left, not the alarm relay jack on the right; see diagram in the Alarm Relay section below).

Now connect the power adaptor to an AC power source, the meter will switch ON, the front panel LED power indicator will light, and the beeper will sound. If the power source voltage is incorrect, "**bAt**" will display and the LED indicator will flash. Do not use the CO200 with an incorrect power source.

In normal operation the LCD will display CO_2, temperature, humidity, date, and time. The air quality level is also displayed (GOOD, NORMAL, POOR).



Measurements

The meter starts measuring as soon as it is powered and updates readings once per second. If the operating environment changes (from high to low temperature, for example), it will require 2 minutes for the CO_2 sensor to respond and 10 minutes for the Relative Humidity sensor to respond.

Note: Do not hold the meter close to your mouth or any other source of CO_2.

MIN/MAX Mode

In the normal mode, press the MIN/MAX button to see the minimum or the maximum CO_2, Temperature, and Humidity values. Each press of the MIN/MAX button steps through the MIN, the MAX, and then the normal display mode.

Long press the RESET button to clear the minimum and maximum values from memory.

Alarm Function

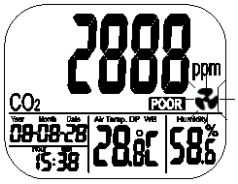
The CO200 features an audible (beeper) and visual (flashing fan icon) alarm that warn when the CO_2 concentration exceeds the programmed threshold. There are two alarm thresholds, the 'POOR' air quality threshold (that triggers the alarm), and the 'NORMAL' air quality threshold (that cancels the alarm). See the Setup mode to set these threshold settings.

The alarm output relay switches on and off as the CO_2 alarm switches on and off (see next section).

The audible alarm can be manually silenced by pressing any key, or it will automatically stop when the CO_2 reading is no longer in the alarm region (the user can subsequently press and hold the **RESET** button to re-activate the alarm, if desired).

If the beeper is manually silenced, it will sound again when readings move out of, and then back into, the alarm region.

The fan icon continues to flash even when the beeper is manually silenced. It disappears only when readings are no longer in the alarm region.



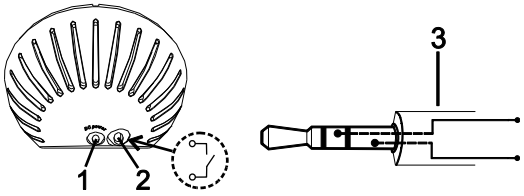
Alarm Relay Output

The CO200 includes an alarm relay output that can be connected to an external device such as an alarm light, warning sign, alarm buzzer, or controlling device (ON/OFF switch to a fan, for example).

The relay switches ON and OFF as the CO200's CO_2 alarm switches ON and OFF (see previous section for more on the alarm feature). The fan display icon flashes each time the relay closes.

The rear relay output jack requires a 2.5mm stereo phone plug. The relay is rated for 1A at 30VDC or 0.5A or 125VAC.

1. AC adaptor input (5VDC)
2. Alarm relay output
3. Phone plug wiring

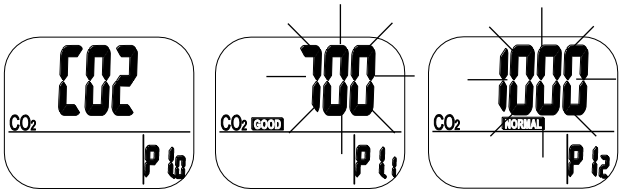


Setup Mode

Long press the SET button to enter the setup mode.

P1.1: Threshold setting for the 'GOOD' air quality display icon

When entering the setup mode, P1.0 and 'CO2' are displayed. Press the **SET** button again to access P1.1 for setting the CO_2 upper limit (threshold) for the 'GOOD' air quality display icon. The current set value will appear blinking on the display.



Press the ▲ or ▼ button to increase or decrease the value. Each press adjusts in 100 ppm increments. The range is 0 to 700 ppm (default is 700 ppm).

When the value has been set, press the **SET** button to confirm the 'GOOD' threshold and move to P1.2 for setting the 'NORMAL' display threshold. Press the **ESC** button to exit without saving.

P1.2: Threshold setting for the 'NORMAL' air quality icon and the CO_2 Alarm

P1.2 is used for setting the CO_2 high threshold for the 'NORMAL' air quality display icon. It is also the low threshold for the alarm beeper, the flashing fan alarm icon, and the output relay. The current set value will appear blinking on the display.

Press the ▲ or ▼ button to increase or decrease the value. Each press adjusts in 100 ppm increments. The range is 700 to 1000 ppm (default is 1000 ppm).

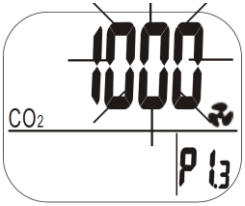
When the value has been set, press the **SET** button to confirm the 'NORMAL' limit and move to P1.3 for setting the 'POOR' display threshold. Press the **ESC** button to exit without saving.

P1.3: Threshold setting for the 'POOR' air quality icon and CO_2 Alarm

P1.3 is used for setting the high CO_2 threshold for the 'POOR' air quality display icon, alarm beeper, flashing fan icon, and output relay. The current set value will appear blinking on the display.

Press the ▲ or ▼ button to increase or decrease the threshold. Each press adjusts in 100 ppm increments. The range is 1000 to 5000 ppm (default is 1000 ppm).

When the value has been set, press the **SET** button to confirm and return to the P1.0 screen. Press **ESC** to exit without saving.



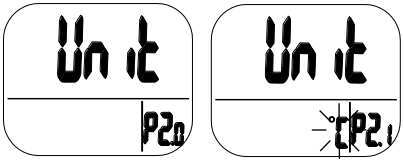
Caution: Set the alarm value within the specified range of the CO200 where accuracy is assured. Out of specification readings are for reference only.

P2.0 Temperature Units

Press the ▲ button in P1.0 mode to access P2.0 for setting the temperature display units.

Press the **SET** button to access the P2.1 setting mode. The °C or °F will blink (default is °C).

Press the ▲ button to change the units. Press the **SET** button to confirm the setting or press the **ESC** button to exit without saving and return to P1.0.

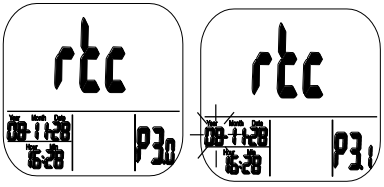


P3.0 Real-Time Clock

Press the ▲ button in P1.0 twice to access P3.0 for setting the real-time calendar clock. Press the SET button and the meter will access P3.1, showing the blinking YEAR on the lower left. To change the year, press the ▲ or ▼ button. Press the **SET** button to save the setting and to enter P3.2 (or press the **ESC** button to return to P3.0 without saving the setting).

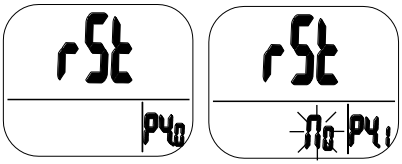
Press the ▲ button from P3.1 to access P3.2. The current MONTH setting will blink. To change the month, press the ▲ or ▼ button. Press the **SET** button to save the setting and to enter P3.3 (or press the **ESC** button to return to P3.0 without saving the setting).

Repeat as above to finish setting the P3.3 (DATE), P3.4 (HOUR) and P3.5 (MINUTE)



P4.0: Factory Default Reset

Press the ▲ button in P1.0 three times to access P4.0 where you can reset the meter to its default settings. Press **SET** and the meter will access P4.1 with a blinking “No”. Press the ▲ to switch the status to ‘Yes’ and then press either the **SET** button to confirm and continue or the **ESC** button to abort the process.



Calibration

The meter is calibrated to a 400ppm CO_2 concentration at the factory. If the accuracy becomes a concern, or after one year of use, return the meter to Extech for calibration or continue below.

ABC (Automatic Baseline CO_2 Calibration)

ABC (Automatic Baseline Calibration) establishes a baseline calibration to eliminate the zero drift of the infrared sensor. The ABC function is always “ON” when the meter is powered.

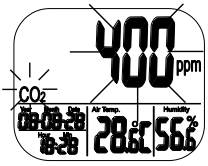
ABC is designed to calibrate the meter at the minimum CO_2 reading detected over 7.5 days of continuous monitoring (power on). It assumes that the area being tested receives fresh air with a CO_2 level of approximately 400ppm at some point during the monitoring period. Note that It is not suitable to use the CO200 in closed areas with consistently high CO_2 levels 24 hours a day.

Manual CO_2 Calibration

Manual calibration is suggested to be done outdoors on a clear day with good ventilation and fresh air where the CO_2 level is approximately 400 ppm. Do not calibrate on a rainy day because high humidity will affect the CO_2 level in air.

CAUTION: Do not calibrate the meter in an atmosphere of unknown CO_2 concentration. Do not calibrate in places crowded with people, pets, plants, or where high CO_2 concentrations may exist such as near ventilation ducts or fireplaces.

Place the meter in the calibration area and switch it on. Press and hold the **SET**, ▲, and ▼ buttons simultaneously for > 1 second to enter CO_2 calibration mode. “400ppm” and “CO_2” will blink while the calibration is in process.



The calibration will require approximately five (5) minutes. When the calibration is complete, the blinking stops and the meter returns to the normal operating mode. Press **ESC** to abort a calibration session (not recommended).

Specifications

Function	Range	Resolution	Accuracy
CO_2	0 to 9999ppm	1ppm	± (5%rdg + 50ppm)
Temperature	-10 to 60°C (14 to 140°F)	0.1°	± 0.6°C (0.9°F)
Humidity	0.1 to 99.9%	0.1%	± 3% (10 to 90%) ± 5% (< 10% or > 90%)

Display	Multi-function LCD
Sensor Type	CO_2: NDIR (non-dispersive infrared) technology
	Humidity: Capacitance sensor
	Temperature (air): Thermistor
Response	CO_2: < 2min for 90% step change
	Air temperature: < 2min for 90% step change
	RH: < 10min for 90% step change
Alarm relay output	Rated: 1A 30VDC or 0.5A 125VAC Relay opens/closes as the CO_2 alarm switches ON/OFF
Operating Conditions	14 to 140°F (-10 to 60°C); < 90% RH non-condensing
Storage Conditions	-4 to 140°F (-20 to 60°C); <99% RH non-condensing
Power Supply	5VDC (±10%), ≥ 500mA (supplied adaptor)
Dimensions	4.6 x 4 x 4” (117 x 102 x 102 mm)
Weight	7.2 oz (204 g)

Maintenance

Cleaning and storage

1. The meter should be cleaned with a damp cloth and mild detergent when necessary. Do not use solvents or abrasives.
2. Store the meter in an area with moderate temperature and humidity.

Troubleshooting

No power	Check that the AC adaptor is properly connected.
Slow response	Check that rear air flow vents are not blocked.
"BAt" and green LED flash	The adaptor output voltage is too high or too low.

Error Display Codes

CO2 Display Code		
E01	CO_2 sensor malfunction.	Return for repair.
E02	CO_2 reading out of range (low).	Re-calibrate the meter. If problems persist, return for repair.
E03	CO_2 reading out of range (high).	Place the meter in fresh air and allow 5 minutes. If problem persists, re-calibrate the meter. Return for service if necessary.
E17	CO_2 senor failure.	Return for repair.

Temperature Display Code		
E02	Air temperature out of range (low).	Place the meter at room temperature for 30 minutes. If problem persists, return for repair.
E03	Air temperature out of range (high).	Same as EO2.
E31	Sensor malfunction.	Return for repair.

Humidity Display Code		
E04	Temperature display shows error.	Refer to temperature error codes.
E11	RH calibration failure.	Please return for repair.
E34	RH sensor circuit failure.	Please return for repair.

CO_2 Level Guidelines

Important: The public information provided below is offered for reference only. FLIR Systems, Inc. is not liable for injury to persons or property through the use or misuse of this device. It is the responsibility of the user to ensure proper air quality in the residential or commercial spaces where this device is to be used.

Non-enforced reference levels:

- 250 - 350 ppm: Normal background outdoor levels.
- 350- 1,000 ppm: Typical level found in occupied spaces with good air exchange.
- 1,000 – 2,000 ppm: Level associated with complaints of drowsiness and poor air.
- 2,000 – 5,000 ppm: Level associated with headaches, sleepiness, and stagnant, stale, or stuffy air. Poor concentration, loss of attention, increased heart rate and slight nausea may also be present.
- >5,000 ppm: Exposure may lead to serious oxygen deprivation resulting in permanent brain damage, coma, and death.

Regulatory exposure limits:

- ASHRAE Standard 62-1989 (1000ppm): CO_2 concentration in occupied building should not exceed 1000ppm.
- OSHA (5000ppm): Time weighted average over five 8-hour workdays should not exceed 5000ppm.
- Building bulletin 101 (Bb101) 1500ppm: UK standards for schools indicate that CO_2, averaged over an entire day (i.e. 9am to 3:30 pm), should not exceed 1500ppm.
- Germany, Japan, Australia, UK (5000ppm): 8-hour weighted average occupational exposure limit is 5000ppm.

Two-year Warranty

FLIR Systems, Inc. warrants this Extech brand instrument *to be free of defects in parts and workmanship for* ***two years*** *from date of shipment (a six-month limited warranty applies to sensors and cables). To view the full warranty text please visit: http://www.extech.com/support/warranties.*

Calibration and Repair Services

FLIR Systems, Inc. offers calibration and repair services for the Extech brand products we sell. We offer NIST traceable calibration for most of our products. Contact us for information on calibration and repair availability, refer to the contact information below. Annual calibrations should be performed to verify meter performance and accuracy. Product specifications are subject to change without notice. Please visit our website for the most up-to-date product information: www.extech.com.

Contact Customer Support

Customer Support Telephone List: https://support.flir.com/contact

Calibration, Repair, and Returns: repair@extech.com

Technical Support: https://support.flir.com

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