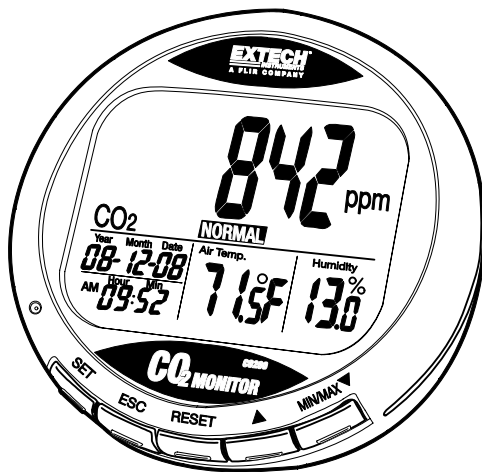**User's Guide**

EXTECH®

INSTRUMENTS

A FLIR COMPANY

CO_2 Monitor

Model CO200

Introduction

Congratulations on your purchase of this Model CO200 Carbon Dioxide Meter. This meter measures CO_2 level, air temp., humidity, date and time. With visible and audible alarms, this is an ideal instrument for indoor air quality (IAQ) diagnosis. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.
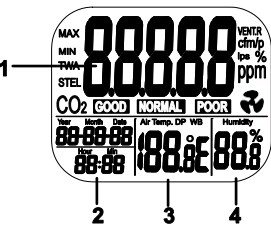
Meter Description

Meter

1. CO_2, Temp and RH sensors (rear)
2. LCD display
3. Controls
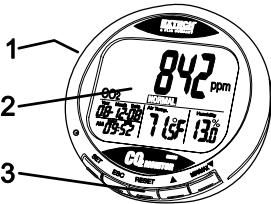
LCD Display

1. CO_2 concentration in ppm
2. Date and Time
3. Air Temperature
4. % Relative Humidity

Symbols

ppm	CO_2 value
GOOD	CO_2 air quality level
NORMAL	CO_2 l air quality level
POOR	CO_2 air quality level
Air Temp	Air Temperature
Humidity %	Relative Humidity
°C or °F	Celsius or Fahrenheit
MAX/MIN	Maximum or Minimum reading
❧	Relay activated

Controls

SET	Enters setup mode. Saves and finishes settings.
ESC	Exits setup page/mode. Terminates during CO_2 calibration.
RESET	Press to clear the MAX/MIN. - Terminates during RH calibration.
▲	Selects mode or increases value in setup
MIN/MAX▼	Activates MAX, MIN function. Enters CO_2 calibration with **SET** and **▲**

Operation

POWER ON

Plug in the adaptor and the meter turns on automatically with a short beep. If the voltage is too high or low, "**bAt**" will display on the LCD and an LED will flash.
The LCD will display current CO_2, temp., humidity, date and time. The air quality level is displayed as well
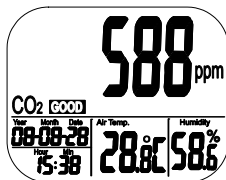
TAKING MEASUREMENT

The meter starts measurements when powered on and updates readings every second. If the operating environment changes (ex. from high to low temp.), it takes 30 sec for CO_2 sensor to respond and 30 minutes for RH.

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

MAX/MIN

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

Press and hold the RESET button for more than 1 second to clear the minimum and maximum value from memory.

ALARM & OUTPUT

The meter features an audible alarm which will give warnings when the CO_2 concentration exceeds the set limit. There are two settable limits, an upper limit that initiates the alarm and a lower limit to stop the alarm.

The meter emits beeps and displays the fan icon on the display when the CO_2 level goes over the upper limit. The audible alarm can be stopped by pressing any key or it automatically stops when CO_2 reading falls below the lower limit.

If the beeper is temporarily shut down, it will sound again when readings fall below lower limit and then go over the upper limit again or it the user presses the RESET button for more than 1 second to activate it.

The fan icon keeps flashing when beeps are manually shut down. It stops only when readings fall under the lower limit
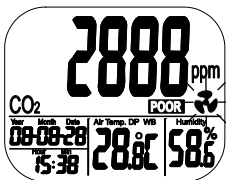
RELAY OUTPUT

The meter is designed with a relay for connection to an external indicating or controlling device. When CO_2 readings go over the upper limit the relay closes. The relay will open again when CO_2 readings fall below the lower limit. The relay output port requires a 2.5mm STEREO phone jack plug. The relay is: 1A 30VDC/0.5A 125VAC.

1. AC adaptor input (5VDC)
2. Alarm Relay output
3. Phone plug wiring
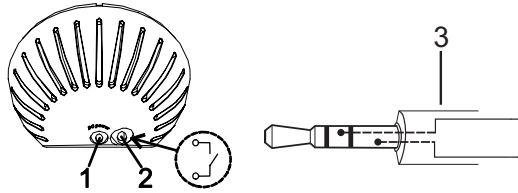
SETUP (Alarm level, Temperature scale, Real Time clock)

Hold the SET button, in the normal mode, for more than 1 second to enter the setup mode.

P1.1 CO2 ALARM: GOOD LEVEL

When entering the setup mode, P1.0 and "CO2" are displayed on the LCD. Press the SET button again to go into P1.1 for setting the CO_2 upper limit for the GOOD level. The current set value will be blinking on the display.
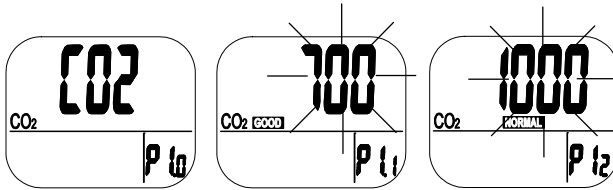
Press the ▲ or MIN/MAX▼ button to increase or decrease the value. Each press adjusts in 100ppm increments. The alarm range is 0 to 700ppm.

When the value has been set, press the SET button to confirm the GOOD limit and to proceed to P1.2 for setting the upper NORMAL limit. Press the ESC button to exit without saving the setting.

P1.2 CO2 ALARM: NORMAL LEVEL

P1.2 is used for setting the CO_2 upper limit for the NORMAL level. The current set value will be blinking on the display.

Press the ▲ or MIN/MAX▼ button to increase or decrease the value. Each press adjusts in 100ppm increments. The alarm range is 700 to 1000ppm.

When the value has been set, press the SET button to confirm the NORMAL limit and to proceed to P1.3 for setting the upper POOR limit. Press the ESC button to exit without saving the setting.

P1.3 CO2 ALARM: BEEP ALARM

P1.3 is used for setting the CO_2 upper limit for the BEEPER ALARM level. The current set value will be blinking on the display.

Press the ▲or MIN/MAX▼ button to increase or decrease the value. Each press adjusts in 100ppm increments. The alarm range is 1000 to 5000ppm.

When the value has been set, press the SET button to confirm the limit and to proceed to P1.0. Press the ESC button to exit without saving the setting.
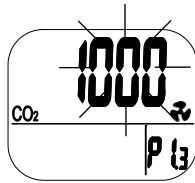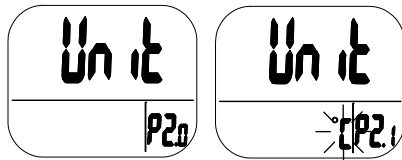

P2.0 TEMPERATURE SCALE

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

Press the SET button to go into the P2.1setting mode. The °C or °F will blink.

Press the ▲button to change the units. Press the SET button to confirm theton.etting or press the ESC button to exit without saving and return to P2.0.


P3.0 REAL TIME CLOCK

Press the ▲ button in P1.0 twice to access P3.0 for setting up real time clock. Press the SET button and the meter goes into P3.1 with blinking year in the lower left display. To change the year, press the ▲ button or the MIN/MAX▼ button. Press the SET button to save the setting and then enter P3.2 or press the ESC button return to P3.0 without saving the setting.

Press the ▲ button P3.1 to access P3.2. The current month setting will blink. To change the month, press the ▲ button or the MIN/MAX▼ button. Press the SET button to save the setting and then enter P3.3 or press the ESC button return to P3.0 without saving the setting.

Repeat as above to finish the setting of P3.3 (Date), P3.4 (Hour) and P3.5 (Minute)

CO200-EU-EN-V1.1-11/11
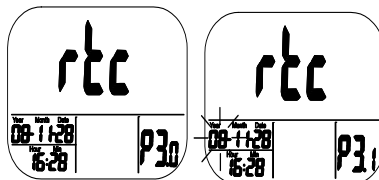
P4.0 RESET

Press the ▲ button in P1.$_0$ three times to access P4.$_0$ to reset the meter to default settings. Press the SET and the meter will go to P4.$_1$ with a blinking "No". Press the ▲ to switch the status then press either the ▲ button to save the settings or the ESC button to exit without saving the settings.
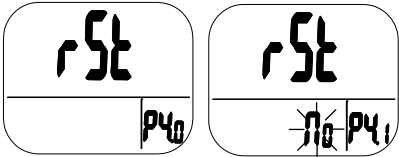
Default settings:

Parameter	Default
P1.$_1$	700ppm
P1.$_2$	1000ppm
P1.$_3$	1000ppm
P2.$_1$	°C
P4.$_1$	No

Calibration

CO_2 CALIBRATION

The meter is calibrated to a standard 400ppm CO_2 concentration at the factory

NOTE: When the accuracy becomes a concern or after a year of use, return the meter to Extech for a standard calibration.

CAUTION: Do not calibrate the meter in an atmosphere of unknown CO_2 concentration.

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

Manual Calibration

Manual calibration is suggested to be done outdoors on a sunny 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.

Do not calibrate in places crowded with people or close to where high CO_2 concentrations may exist such as ventilating outlets or fireplaces.

Place the meter in the calibration site. Turn on the meter and hold down the **SET**, ▲ and MIN/MAX▼ buttons simultaneously more than 1 second to enter CO_2 calibration mode. "400ppm" and "CO_2" will blink while the calibration is in process.
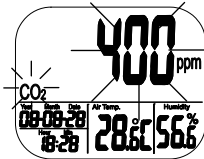
The calibration will take about 30 minutes. When the calibration is complete, the blinking stops and the meter returns to normal operation. To abort the calibration, press the RESET button for more than 1 second.

Note: Keep away from any animal, human or plant which might affect the CO_2 concentration during the calibration.

Specifications

Function	Range	Resolution	Accuracy
CO2	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	LCD
Sensor Type	CO2: NDIR (non-dispersive infrared) technology Humidity: Capacitance sensor; Temperature (air): Thermistor
Response	CO2: <2min for 90% step change Temp: <2min for 90% step change %RH: <10min for 90% step change
Relay	1A 30VDC/0.5A 125VAC
Operating Conditions	-10 to 60°C (14 to 140°F); < 90% RH non-condensing
Storage Conditions	-20 to 60°C (-4 to 140°F); <99% RH non-condensing
Power Supply	5VDC (±10%), ≥ 500mA
Dimensions / Weight	117x102x102mm (4.6x4x4"); 204g (7.2 oz.)

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

Can't power on:	Check whether the adaptor is properly plugged in.
Slow response:	Check whether the air flow channels on the rear of the meter are blocked.
"BAt" and green LED keep flashing:	The adaptor output voltage is too high or too low. Please use the adaptor with correct output.

Error Codes:

CO_2 Display		
E01	CO_2 sensor is damaged	Send back for repair
E02	CO_2 reading is under the lower limit	Re-calibrate the meter, if it still appears, return for repair
E03	CO_2 reading is above the upper limit	Put the meter in fresh air and wait for 5minutes, if it still appear, re-calibrate the meter. If above two methods faile, return for repair
E17	ABC mode of CO_2 senor has failed and might cause wrong CO_2 readings	Send back for repair

Temp Display		
E02	Air temp. measurement is under the lower limit	Put the meter in regular room temperature for 30 minutes, if it still appears, return for repair
E03	Air temp. measurement is over the upper limit	Put the meter in regular room temperature for 30 minutes, if it still appears, return for repair
E31	Temp. sensor or measuring circuit is damaged	Return for repair

Humidity Display		
E04	Air temp. measurement has error code	Refer to temperature error code for problem solving
E11	The RH calibration has failed	Please return for repair
E34	RH sensor or measuring circuit has failed	Return for repair

CO$_2$ Levels and Guidelines

Non-Enforced Reference levels:

- 250 - 350 ppm – background (normal) outdoor air level
- 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, 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 even 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 work days should not exceed 5000ppm

Building bulletin 101 (Bb101): 1500ppm. UK standards for schools say that CO$_2$ at averaged over the whole day (i.e. 9am to 3.30 pm) should not exceed 1500ppm.

Germany, Japan, Australia, UK: 5000ppm, 8 hours weighted average occupational exposure limit is 5000ppm.