AMPROBE®

CO2-200
CO2 Meter

Users Manual
- Mode d'emploi
- Bedienungshandbuch
- Manual d'Uso
- Manual de uso

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Users Manual

English

July 2009, Rev.1

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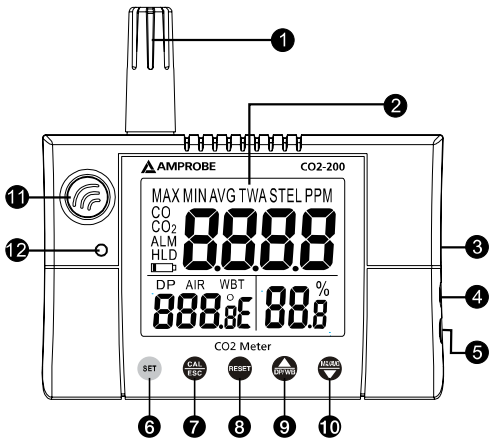
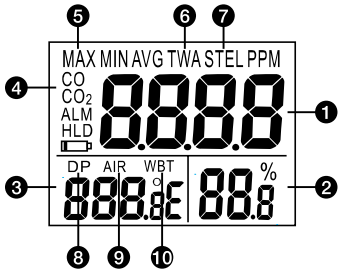


1. Humidity Sensor
2. LCD Display
3. Alarm Output
4. USB Port
5. DC Jack
6. SET Button
7. CAL/ESC Button
8. RESET Button
9. DP/WB Button
10. MNX/AV Button
11. Beeper
12. LED Light

LCD Display



1. Primary Screen Displays CO2 Concentration
2. Relative Humidity In %
3. Air, Dew Point, Wet Bulb Temperature Display
4. CO2 Measurement Mode
5. Minimum/Maximum readings
6. Time Weighted Average (8 Hours)
7. Short-Term Exposure Limit (15 Minutes Weighted Average)
8. Dew Point Temperature
9. Air temperature
10. Wet Bulb Temperature

CONTENTS

SYMBOLS

⚠	Caution! Refer to the explanation in this Manual
✓	Conforms to relevant Australian standards
CE	Complies with European Directives
	Do not dispose of this clamp meter as unsorted municipal waste. Contact a qualified recycler for disposal.

⚠Warning and Precautions

- Avoid condensation on CO2 sensor
- Do not hold the meter close to faces in case exhalation affects CO2 levels.
- Do not calibrate the meter in the air with unknown CO2 concentration. Otherwise, it will be calibrated as 400ppm by default and leads to inaccurate measurements.

UNPACKING AND INSPECTION

Your shipping carton should include:

1 CO2-200 CO2 Meter

1 Adaptor

1 User manual

1 Plain white box

If any of the items are damaged or missing, return the complete package to the place of purchase for an exchange.

INTRODUCTION

Thank you for purchasing this CO2 meter. It measures CO2 level, air temp., dew point, wet bulb temp. and humidity and is an ideal instrument for indoor air quality (IAQ) diagnosis.

Poor indoor air quality is considered unhealthy because it causes tiredness, loss of ability to concentrate, and even illness (ex. Sick Building Syndrome). IAQ monitoring and survey, especially on CO2 level and air ventilation become widely applied in public areas such as offices, classrooms, factories, hospitals and hotels. It is also suggested in regulations of industrial hygiene in some countries. (Appendix)

With NDIR (non-dispersive infrared) sensor used, this CO2 meter is stable in long term monitoring. And the built-in relay for alarm output is especially useful in ventilation control and HVAC system performance verification.

Features

- Triple displays of CO2 level, temp. and humidity.
- Stable NDIR sensor for CO2 detection.
- Statistics of weighted averages (TWA & STEL)
- Visible and audile CO2 warning alarm
- Alarm output for ventilation control
- Battery and adaptor power supply
- ABC(Automatic Baseline Calibration) and manual CO2 calibration
- USB PC connection

OPERATION

1. Plug in the adaptor and the meter turns on automatically with a short beep. It performs 30 seconds countdown (***Fig.1***) for meter warm up, then enters normal mode with current CO2, temperature, and humidity readings displayed.
2. The meter starts taking measurements when power on and updates readings every second. In the condition of operating environment change (ex. from high to low temp.), it takes 30 sec to respond for CO2 sensor and 30 minutes for RH.
3. Press "**▲/DP/WB**" to switch temperatures display. The lower left display will cycle from air temperature, dew point temp., and wet bulb temp. (***Fig. 2***)
4. Press "**MNX/AVG/▼**" to see the minimum, maximum, and weighted average readings. Each press of it displays MIN, MAX, STEL, TWA in sequence and returns to normal mode. In MIN and MAX modes, it shows the minimum and maximum readings of CO2 on main display, and of AIR/DP/WBT temperatures and humidity on the lower displays. In STEL and TWA modes, the main display shows the weighted average of CO2 readings for the past 15 minutes (STEL) and 8 hours(TWA), but the lower displays are the current AIR, DP/WB temperatures and humidity readings.
   NOTE:
   - If the meter is turned on for shorter than 15 minutes, the STEL value will be the weighted average of readings taken since power on. Same for TWA values appear before 8 hours.
   - It takes at least 5 minutes to calculate STEL and TWA. The display shows "----" during the first 5 minutes from power on (***Fig. 3***).

Alarm Output

The meter features visible and audible alarm to give warnings when CO2 concentration exceeds the limit. Users can set up 2 limits: An upper limit for alarm threshold that requires air conditioning and a lower limit to stop the alarm. (See P1.0 in setup for setting alarm limits).

It emits beeps(Abt.80dB) with blinking LED when CO2 level goes over the upper limit. Beeps can be stopped by pressing any key or automatically stops when CO2 reading falls below lower limit. If the beeper is temporarily shut, it will sound again when readings fall below lower limit and then go over the upper limit again, or users press "**RESET**" for more than 1 second to activate it. LED alarm keeps blinking when beeps are manually shut. It stops only when readings fall under the lower limit.

The meter is designed with a relay  to send output for further connection. When CO2 readings go over the upper limit and cause alarming. The relay picks up automatically and sends output. It can be connected to a ventilation system or activator for conditioning the air quality. The relay will drop out when CO2 readings fall under the lower limit.

Setup

The advanced setup mode lets you customize your meter. 3 types parameters are available.
P1.0: CO2 Alarm
P3.0: Temperature unit
P4.0: ABC selection

P1.0 CO2 alarm: upper & lower limits

Hold down "**SET**" under normal mode for more than 1 sec to enter set up mode. To exit setup, press "**CAL/ESC**" in P1.0, P3.0, or P4.0.

When entering setup mode, P1.0 and "AL" are displayed on the LCD (***Fig. 4***). Press "**SET**" again to go into P1.1 for setting CO2 upper limit. The current set value will be blinking on LCD (***Fig.5***). Press "**▲/DP/WB**" to increase the value or "**MNX/AVG/▼**"to decrease. Each press tunes 100 ppm and the alarm range is from 100 to 9900ppm. When the preferred value is set, press "**SET**" to go into P1.2 for lower limit setting. After both settings are done, press "**SET**" to save or "**CAL/ESC**" without saving and return to P1.0.

P3.0: Temperature scale

Press "**▲/DP/WB**" in P1.0 to access P3.0 for setting up temperature scale. Press "**SET**" and it goes into P3.1 with blinking °C or °F current set on the lower left display. To switch °C or °F, press "**▲/DP/WB** "or "**MNX/AVG/▼**". Then press "**SET**" to save the setting or "**CAL/ESC**" without saving and return to P3.0.

P4.0: ABC selection

Press "**▲/DP/WB**" in P3.0 or "**MNX/AVG/▼**" in P1.0 to access P4.0 for selecting ABC function. Press "**SET**" and it goes into P4.1 with blinking "**dis**" default (***Fig. 6***) on the lower left display. To enable the ABC function, press "**▲/DP/WB**" or "**MNX/AVG/▼**" and "**En**" blinks for choice. After the preferred selection is done, press "**SET**" to save the setting or "**CAL/ESC**" without saving and return to P4.0.

Calibration Mode

CO2 calibration

ABC (Automatic Baseline Calibration)

ABC is to implement baseline calibration to eliminate the zero drift of the NDIR sensor. It calibrates the meter at the minimum CO2 reading detected during 7 days continuous monitoring (power on). It's not suitable to implement ABC in close area with higher CO2 level all the time. The ABC default is off. To enable the function, please refer to SETUP P4.0.

Manual calibration

The manual calibration is suggested to be done in outdoor area with ventilating fresh air where CO2 level is around 400 ppm. Do not calibrate in places crowded with people or close to where with high CO2 concentration such as ventilating outlets or fireplaces.

1. Place the meter in the calibration site. Turn on the meter and hold down "**CAL/ESC**" and "**▲/DP/WB**" simultaneously to enter CO2 calibration mode. 400ppm and "**CAL**" are blinking on the LCD while performing calibration. (***Fig. 7***)
2. Wait about 5 minutes until it stops blinking and the calibration completes and back to normal mode.
3. To abort the calibration, turn "**RESET**" over a second.

Humidity calibration

1. Plug the sensor probe into 33% salt bottle. Hold down "**CAL/ESC**" and "**MNX/AVG/▼**" under normal mode to enter 33% calibration. "**CAL**" and calibrating value (32.7% if at 25°C) are blinking on the LCD with current temperature at the left. Meter is now calibrating, and will finish in about 60 minutes when "**CAL**" and humidity value stop blinking.
2. After 33% calibration, plug the sensor probe into 75% salt bottle, then press "**SET**" to enter 75% calibration. "**CAL**" and calibrating value (75.2% if at 25°C) are blinking on the LCD with current temperature at the left. Meter is now calibrating. Wait about 60 minutes until blinking stops, then calibration is completed and it returns to normal mode.

3. Users can also calibrate either point. To calibrate 33% only, press "**CAL/ESC**" to exit when 33% calibration is completed. To calibrate 75% only, press "**▲/DP/WB**" or "**MNX/AVG/▼**" within 5 minutes while initializing 33% calibration. And it skips 33% and enters 75% calibration.

USB Interface Capabilities

The USB cable and software (optional kit) are required to transfer data to a PC. Install the USB driver in the software first before connection**.** And the connecting protocol is 9600 bps, 8 data bits, no parity.

SPECIFICATIONS

CO2	
Range	0~9999ppm (2001~9999 out of accuracy scale range)
Resolution	1 ppm
Accuracy	±50ppm±5%rdg (0~2000) (Not specified for out of scale)
Pressure	+1.6% reading per kPa deviation from normal pressure
Dependence	100kPa
Temperature	
Range	-10.0~60.0°C (14~140°F)
Resolution	0.1°C /0.1°F
Accuracy	±0.6°C / ±0.9°F
Humidity	
Range	0.0~95%
Resolution	0.1%
Accuracy	±3%(10~90% at 25°C) ; ±5%(others)
Operating environment	0~50°C, 0~95%RH (avoid condensation)
Storag environment	-20~60°C, 0~99%RH (avoid condensation)
Power supply	12V adaptor

CE - **EMC:** Conforms to EN61326-1. This product complies with requirements of the following European Community Directives: 89/ 336/ EEC (Electromagnetic Compatibility) and 73/ 23/ EEC (Low Voltage) as amended by 93/ 68/ EEC (CE Marking). However, electrical noise or intense electromagnetic fields in the vicinity of the equipment may disturb the measurement circuit. Measuring instruments will also respond to unwanted signals that may be present within the measurement circuit. Users should exercise care and take appropriate precautions to avoid misleading results when making measurements in the presence of electronic interference.

MAINTENANCE

Instrument service personnel. The front panel and case can be cleaned with a mild solution of detergent and water. Apply sparingly with a soft cloth and allow to dry completely before using. Do not use aromatic hydrocarbons or chlorinated solvents for cleaning.

TROUBLE SHOOTING

Can't power on

- Check whether the adaptor is well plugged.

Slow response

- Check whether air flow channels on the rear were blocked.

Error code

E01: CO2 sensor damaged.

E02: The value is under range.

E03: The value is over range.

E04: The original data error results in this error (RH, DP, WB)

E07: Too low voltage to measure CO2. Check if the adaptor output is 12V.

E11: Retry humidity calibration.

E17: Retry CO2 calibration.

E31: Temperature sensor damaged.

E34: Humidity sensor damaged.

APPENDIX - CO2 LEVELS AND GUIDELINES

NIOSH recommendations
250-350 ppm: normal outdoor ambient concentrations
600 ppm: minimal air quality complaints
600-1000 ppm: less clearly interpreted
1000 ppm: indicates inadequate ventilation; complaints such as headaches, fatigue, and eye/throat irritation will be more widespread. 1000 ppm should be used as an upper limit for indoor levels.

ASHRAE Standard 62-1989: 1000ppm
CO2 concentration in occupied building should not exceed 1000ppm.

Building bulletin 101 (BB101): 1500ppm
UK standards for schools say that CO2 at averaged over the whole day(i.e. 9am to 3.30pm) should not exceed 1500ppm.

OSHA: 5000ppm
Time weighted average over five 8-hour work days should not exceed 5000ppm.

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

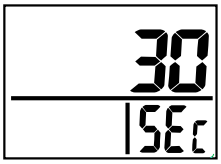


Fig. 1

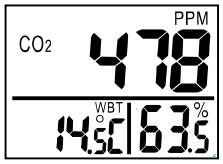


Fig. 2

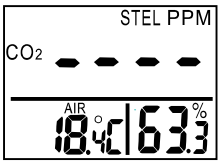


Fig. 3

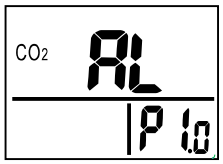


Fig. 4

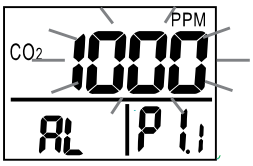


Fig. 5

Fig. 6

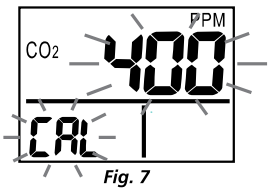


Fig. 7