REED

Model R9900

Indoor Air Quality Meter

Instruction Manual

www.reedinstruments.com

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Features

- Simultaneously monitors carbon dioxide (CO_2), relative humidity and temperature
- Instantaneous readings are displayed on a high resolution LCD with backlight
- Dew point and wet bulb temperatures can also be displayed
- Displays STEL readings (Short-Term Exposure Limit) over a 15-minute period and TWA readings (Time-Weighted Average) over a period of 8 hours
- Hold function freezes displayed reading
- Maximum, minimum and average functions
- Low drift, non-dispersive infrared CO_2 sensor
- Audible warning alarm of excessive CO_2 concentrations
- RS232 output

Specifications

Ranges:	CO_2: 0 to 5,000 ppm; Temperature: -10 to 60°C (14 to 140°F); Humidity: 0 to 99.9% RH; Dew Point: -73.4 to 60°C; Wet Bulb: -13.3 to 60°C
Resolution:	CO_2: 1 ppm; Temperature: 0.1°C/°F; Humidity: 0.1% RH
Accuracy:	CO_2: ±5% rdg. ±50 ppm; Temperature: ±0.6°C (±0.9°F); Humidity: ±3% RH @ 25°C (10 to 90% RH) ±5% RH <10% & >90%
Sensors:	CO_2: Non-Dispersive Infrared (NDIR); Humidity: Rotronic capacitor
Response Time:	30 seconds
Audible Alarm:	80dB

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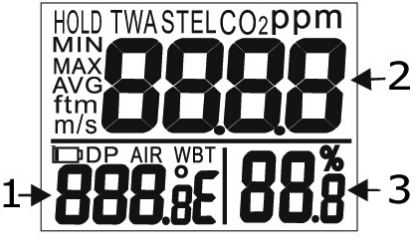
Power Supply:	4 x “AA” alkaline batteries
Battery Life:	24 hours
Includes:	4 AA batteries and a hard carrying case
Optional accessories:	33% Calibration Salt (RHA-33) 75% calibration salt (RHA-75)

Instrument Description

- Power/Set button
- Calibration/Escape button
- Hold button
- Up/Mode/Backlight button
- Down/Dew Point/WBT button
- Max/Min/Average/Enter button

LCD Display



1. Air temp/Dew Point/Wet Bulb temp in °C or °F
2. CO_2 concentration in ppm
3. Relative humidity %

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TWA	Time weighted average
STEL	Short-term exposure limit
HOLD	Readings are held on the LCD
MIN/MAX	Minimum/Maximum readings
	Low battery indicator
DP	Dew point temperature
AIR	Air temperature
WBT	Wet bulb temperature
%	Unit of relative humidity
°E (C or F)	Celsius/Fahrenheit

Operating Instructions

1. Press the “POWER” button to turn the meter on and off. When powering on, the meter will beep and commence a 30 second warm-up. The meter will then enter the normal-measuring mode, displaying the current CO_2, temperature, and humidity readings. Readings will be updated every second. Note: When the meter experiences extreme environment changes (ex. from high to low temp.), it will take 30 sec for the CO_2 sensor to respond and 30 minutes for the RH sensor.
2. Press the “DP/WBT” button to switch the temperature display from air temperature, dew point, and wet bulb.

Data Hold

To hold the readings that are currently being displayed on the LCD, press the “HOLD” button. The “HOLD” symbol on the LCD will indicate the function is activated.

Backlight

Hold down the “BACKLIGHT” button for a second to activate and to cancel the backlight function.

Max, Min, & Weighted Averages

While in the normal-measuring mode, press the “MAX/MIN” button to view the maximum, minimum, and weighted average readings. Each press of the “MAX/MIN” button will display the MIN, MAX, STEL (short term exposure limit), and TWA (time weighted average), in sequence and will then return to normal-measuring mode.

In MIN and MAX modes, the LCD will show the minimum and maximum readings of CO2 on the main display and of the readings on the lower displays.

In STEL and TWA modes, the main display will show the weighted average of CO2 readings for the past 15 minutes (STEL) or 8 hours (TWA). The lower displays will continue to measure normally.

NOTE: If the meter is turned on for less than 15 minutes, the STEL value will be the weighted average of readings taken since power on. This is the same for TWA values before 8 hours of activity.

It takes at least 5 minutes to calculate STEL and TWA. The display will show “----” during the first 5 minutes from power on. While all readings are held unchanged, STEL and TWA will keep updating every 5 minutes.

Auto Power Off

This meter turns off automatically after 20 minutes of inactivity. To override the function, turn the meter off and hold down the “SET” and “HOLD” buttons for 2 seconds to turn on the meter on. “n” will appear on the LCD if indicating Auto Power Off is deactivated. NOTE: the auto power off function will be disabled during calibration mode.

Alarm

This meter features an audible alarm when CO2 concentrations exceed a set limit. To set-up the alarm, press and hold the “SET” button for two seconds. “AL” and P1.0 will appear on the LCD. Press the “ENTER” button to modify the alarm setting.

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The current alarm value will appear on the LCD. Press the “UP” and “DOWN” buttons to modify the ppm value by increments of 100. The alarm ranges from 100 to 9900ppm. When the desired alarm value is displayed, press the “ENTER” button to save, or press the “ESC” button to cancel.

When measured CO_2 values are above the set limit the meter will start to beep. Press any button (except for the “POWER” button) to stop the beeping, or move the meter to a location where the ppm value is below the alarm limit. If the beeping does not stop, restart the meter.

Temperature Unit

To change the temperature scale from °C to °F, press and hold the “SET” button for 2 seconds. Press the “DOWN” button and “Unit” and P3.0 will appear on the LCD. Press the “ENTER” button, and modify the temperature unit by pressing the “UP” or “DOWN” buttons. Press the “ENTER” button to save the setting, or press the “ESC” button to cancel.

CO_2 Calibration

This meter is calibrated at a standard 400ppm CO_2 concentration. It’s suggested to perform manual calibration regularly to maintain good accuracy. For a more thorough calibration and for maintenance for this product, please contact REED Instruments at info@reedinstruments.com.

Do not calibrate this meter in an environment with unknown CO_2 concentrations. Manual calibration should be done in fresh outdoor air that is well ventilated and in sunny weather. Turn on the meter and hold down the “CAL” and “MODE” buttons simultaneously. “400ppm” and “CAL” will blink on the LCD indicating you have activated manual calibration, and will blink for approximately 5 minutes. When the blinking stops, CO_2 calibration is complete, and the meter will automatically switch back to normal-measuring mode. To abort the calibration, turn off the meter at any time.

NOTE: Ensure the batteries are with full voltage during the calibration to prevent from interruption or failed calibration.

RH Calibration

The humidity sensor can be manually calibrated with the optional 33% and 75% salt solutions. It is recommended that the ambient condition to be at 25°C and at an stable humidity for the highest accuracy. To abort the calibration at any time, turn the meter off. Do not calibrate the humidity without the specified calibration salt otherwise it will cause permanent damage. Contact REED Instruments at info@reedinstruments for calibration salt or for service.

Turn the meter on and plug the sensor probe into the 33% salt bottle. Hold down the “CAL” and “DP/WBT” button to initiate RH Calibration. “CAL” and the calibrating value of 33% (32.7% if at 25°C) will blink on the LCD along with the current temperature at the left. The meter is now calibrating and will finish when “CAL” and humidity stop blinking, which is about 60 minutes.

After the 33% calibration is complete, plug the sensor probe into the 75% salt bottle. Press the “ENTER” button to initiate 75% calibration. “CAL” and the calibrating value of 75% (75.2% if at 25°C) will blink on the LCD along with the current temperature at the left. The meter is now calibrating and will finish when “CAL” and humidity stop blinking, which is about 60 minutes.

To calibrate 33% only, press the “ESC” button when calibration is complete. To calibrate 75% only, press the “UP” or “DOWN” button after you press the “CAL” and “DP/WBT” buttons.

Software

This meter can link to a PC for logging and data analysis via the optional RS232 interface and software. The protocol is as follows:

A. 9600 bps, 8 data bits, no parity.

B. Cxxxxppm:Txxx.xC(F):Hxx.x%:dxxx.xC(F):wxxx.xC(F) LRC CRLF
   Description: $CO2:Air:RH:DP:WBT LRC CRLF

Troubleshooting

Won't power on

Press and hold the "POWER" button for more than 1 second and try again. Check that the batteries are in good contact and correct polarity. Change the batteries if necessary.

Fixed readings

Check if the data hold function is activated.

Slow response

Check to see if the airflow channels on the rear are blocked.

Error messages

E01: CO_2 sensor damaged
E02: The value is under range
E03: The value is over range
E04: The data error results in DP/WB readings
E07: Too low voltage to measure CO_2
E11: Retry the humidity calibration
E17: Retry CO_2 the calibration
E31: Temperature sensor damaged
E34: Humidity sensor damaged

For service (repairs or calibration) on this or any other REED product or information on other REED products, contact REED Instruments at info@reedinstruments.com

Battery Replacement

The low battery symbol and “Lob” will appear on the LCD when the battery needs to be replaced. When the battery power is low, the meter will beep to indicate failed measurements. Press any button but the power button to turn off the beeping.

Install the batteries in the battery compartment on the rear and make sure they are correct polarity and in good contact.

Notes