

# REED



## Model SD-9901

### Air Quality Datalogger



## Instruction Manual



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## Features

- No extra software needed, just plug the SD card into the computer and it downloads directly to EXCEL
- Simultaneously records data from three probes
- Meter can switch to a Manual Datalogging
- Measures CO<sup>2</sup>, CO, O<sup>2</sup>, Humidity, and Temperature
- Non-dispersive infrared CO<sup>2</sup> sensor
- Galvanic cell CO and O<sup>2</sup> sensors
- Precision capacitance Humidity sensor
- Real time SD memory card datalogger with a built-in clock and calendar
- Sampling time set from 2 seconds to 8 hours
- Easy to read LCD with backlight
- Auto power off or manual power off
- Data hold, record max. and min. reading
- Alarm setting with beeper
- High accuracy microcomputer circuit
- Power by UM3/AA (1.5 V) x 6 batteries
- USB/RS232 Computer interface
- Separated probe for easy measurements of multiple environments

## Specifications

Circuit:	Custom microprocessor LSI circuit
Display:	52mm x 38mm LCD with backlight
Auto Sampling Time:	2 seconds to 8 hours
Memory Card:	SD memory card, 1 GB to 16 GB
Data Output:	USB/RS232 PC computer interface
Sampling Time:	Approx. 1 second
Operating Temperature:	0-50°C (0-122°F)

Operating Humidity:	Less than 85% R.H.
Power Supply:	UM3/AA (1.5 V) x 6 batteries
Weight:	350g/0.77lb
Dimensions:	Meter: 177 x 68 x 45mm; Humidity probe: 197mm long; CO probe: 150 x 38 x 38mm; CO <sup>2</sup> probe: 190 x 38 x 28mm; O <sup>2</sup> probe: 150 x 38 x 38mm
Includes:	Humidity probe, CO probe, CO <sup>2</sup> probe, O <sup>2</sup> probe, and hard carrying case
Optional accessories:	4G SD Card (SD-4GB) USB cable (USB-01) Power adapter (AP-9VA-110V) Data Acquisition Software (SW-U801-WIN) Tripod (BS-6)

Visit us at [www.reedinstruments.com](http://www.reedinstruments.com) for more information on our Optional Accessories, or e-mail us at [info@reedinstruments.com](mailto:info@reedinstruments.com)

### **CO<sup>2</sup> (Carbon Dioxide)**

Range:	0 - 4,000 ppm
Resolution:	1 ppm
Accuracy:	±40 ppm (<1,000 ppm), ±5% (>1,000 ppm)
Repeatability:	±20 ppm

### **CO (Carbon Monoxide)**

Range:	0 - 1,000 ppm
Resolution:	1 ppm
Accuracy:	±(5% + 2 ppm)
Response time:	<30 seconds
Repeatability:	<2%
Zero drift in long term:	<5 ppm
Sensitivity drift:	<5% per year

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## **O<sup>2</sup> (Oxygen)**

Range:	0 – 30% O <sup>2</sup>
Resolution:	0.1% O <sup>2</sup>
Accuracy:	±(1% + 0.2% O <sup>2</sup> )
Response time:	<15 seconds
Overload protection:	100% O <sup>2</sup>
Environment pressure range:	0.9 - 1.1 atmospheres
Expected life:	>2 years
Alarm:	<18.0% O <sup>2</sup>

## **Temperature**

Range:	0 – 50°C (32 – 122°F)
Resolution:	0.1
Accuracy:	±0.8°C (±1.5°F)

## **Humidity**

Range:	5% - 95% RH
Resolution:	0.1% RH
Accuracy:	>70%RH: ±(3% reading + 1%RH); <70%RH: ±3%RH

## **Dew Point Temperature**

Range:	-25.3 – 48.9°C (-13.5 – 120.1°F)
Resolution:	0.1

## **Wet Bulb Temperature**

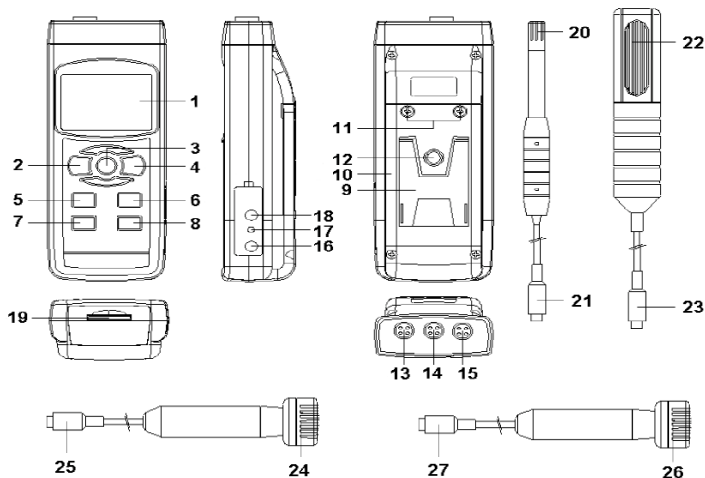
Range:	-21.6 – 50°C (-6.9 – 122.1°F)
Resolution:	0.1

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# Instrument Description



- |   |   |
|---|---|
| 1. Display                              | 15. O <sub>2</sub> /CO Probe Socket     |
| 2. Power & Backlight Button             | 16. AC/DC 9V Power Adapter Input Socket |
| 3. Hold ESC Button                      | 17. Reset Button                        |
| 4. REC & Enter Button                   | 18. USB/RS232 Output                    |
| 5. Alarm & Up Button                    | 19. SD Card Slot                        |
| 6. Function & Down Button               | 20. Humidity Sensor                     |
| 7. Time Button                          | 21. Humidity Probe Plug                 |
| 8. Logger, SET, & Sampling Check Button | 22. CO <sub>2</sub> Sensor              |
| 9. Stand                                | 23. CO <sub>2</sub> Probe Plug          |
| 10. Battery Compartment/Cover           | 24. O <sub>2</sub> Sensor               |
| 11. Battery Cover Screw                 | 25. O <sub>2</sub> Probe Plug           |
| 12. Tripod Fix Nut                      | 26. CO Sensor                           |
| 13. Humidity Probe Socket               | 27. CO Probe Plug                       |
| 14. CO <sub>2</sub> Probe Socket        |   |

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# Operating Instructions

## Function selection

This meter can have three probes plugged in at the same time: the Humidity, CO<sup>2</sup>, and either the O<sup>2</sup> or the CO Probe. The meter will datalog all three values, but will only display one at a time on the LCD screen.

- 1) Plug in the Humidity, CO<sup>2</sup>, and either the O<sup>2</sup> or the CO Probe into the meter.
- 2) Turn on the meter by pressing the Power Button. To turn the meter off, hold the Power Button for over 2 seconds.
- 3) Press the Function Button to scroll through the measuring functions:

Display	Function
rH	Humidity/Temperature
dP	Dew point Temperature
_ET	Wet bulb Temperature
CO	CO/Temperature
O2	O <sup>2</sup> /Temperature
CO2	CO <sup>2</sup> /Temperature

The selected measurement function will be saved as the default.

## Data Hold

While taking a measurement, press the Hold Button once and the measured value will hold on the screen, and a HOLD symbol will appear. Press the Hold Button once again will release the data hold function.

## Data Record (Max., Min. reading)

The data record function records the maximum and minimum readings. Press the REC Button once to start the Data Record function and a "REC" symbol will appear on the display. With the "REC" symbol on the display:

- 1) Press the REC Button once, and a "REC. MAX." symbol along with the maximum value will appear on the display.

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To delete the maximum value, press the Hold Button once and the display will show a “REC.” symbol only and execute the memory function continuously.

- 2) Press the REC Button again, and a “REC. MIN.” symbol along with the minimum value will appear on the display. To delete the minimum value, press the Hold Button once, and the display will show a “REC.” symbol only and execute the memory function continuously.
- 3) To exit the memory record function, press the REC button for 2 seconds. The display will revert to the current reading.

## *Backlight ON/OFF*

After powering the meter ON, the LCD Backlight will turn on automatically. While taking measurements, press the Backlight Button and the LCD Backlight will turn off. Press the Backlight Button once again to turn the LCD Backlight back ON.

## *Datalogger*

Preparation Before Executing the Datalogger Function:

- 1) Insert the optional SD card into the SD card socket.
- 2) Before you use an SD card with this meter for the first time, it is recommend to format the SD card. See Advanced Settings section of this manual for instructions.
- 3) If this is the first time the meter is used you need to adjust the clock. See Advanced Settings section of this manual for instructions.
- 4) Now you need to set the decimal format. The numerical data structure downloaded to the SD card is defaulted used the “.” as the decimal, for example “20.6” “1000.53”. But in certain countries the “,” is used as the decimal point, for example “20,6” “1000,53”. See Advanced Settings section of this manual for instructions on how to change the Decimal Character.



### *Auto Datalogger (Set sampling time $\geq 1$ second)*

- 1) Start Datalogging; press the REC Button, and the “REC” symbol will appear on the LCD screen, then press the Logger Button, the “REC” symbol will flash while the measuring data and time information is being saved in memory. To set the sampling time, and to toggle the beeper sound on or off, refer to the Advanced Settings section of this manual.
- 2) Pause the Datalogging; while Datalogging, if press the Logger Button once. While paused, the “REC” symbol will stop flashing. Press the Logger Button again to resume Datalogging, and the “REC” symbol will begin to flash again.
- 3) Stop Datalogging; while the Datalogger function is paused, press the REC Button for 2 seconds. The “REC” symbol will disappear indicating the Datalogging function has stopped.

### *Manual Datalogger (Set sampling time = 0 seconds)*

- 1) Set sampling time is to 0 second; Press the REC Button, and the “REC” symbol will appear on the LCD screen. Press the Logger Button, and the “REC” symbol will flash once and one Beep will sound, at the same time the measuring data along the time information will be saved in memory. The lower Display will show the Position (record) number, which is saved as well.
- 2) To Change the Position Number; press the Down Button and the lower position number will flash on the display. Press the Up or Down Buttons to set the Position Number (1 to 99) to help identify the measurement location. The lower Display will show P x (x = 1 to 99). After the position number is selected, press the Enter Button to confirm.
- 3) Stop Datalogging; press the REC Button for 2 seconds, and the “REC” symbol will disappear indicating the Datalogging function has stopped.

## *Checking the Time*

During normal functions (not Datalogging), press the Time Check Button and the lower LCD display will show the Year, Month/Date, Hour/Minute.

## *Check Sampling Time Information*

During normal functions (not Datalogging), press the Sampling Button and the lower LCD display will show the Sampling Time Information.

## *SD Card Data Structure*

- 1) The first time the SD card is used in the meter, the SD card will generate a folder: AQA01
- 2) The first time you use the Datalogger, in the folder AQA01, a new file name AQA01001.XLS will be created. The Datalogger will use this file until the Data has reached to 30,000 rows. The meter will then will generate a new file with a subsequent number, for example AQA01002.XLS.
- 3) The folder AQA01 can hold 99.XLS files. When that number has been reached, the meter will then will generate a new folder with a subsequent number, for example AQA02. Max number of AQA--folders is 10.

## *Data Transfer from SD card to Computer (EXCEL Software)*

- 1) After Datalogging, remove the SD card from the SD card slot.
- 2) Plug in the SD card into the Computer's SD card slot or insert the SD card into the optional SD card adapter and connect to your Computer. Turn your computer on and a folder will appear on your desktop representing you SD card.
- 3) Open "Microsoft EXCEL". Download the EXCEL files from the SD Card to the computer by opening up the SD folder and selecting the desired EXCEL files, and drag-and-drop them onto your Computer. Open the files with EXCEL (File – Open).

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- 4) The EXCEL file will have the following column headers in this order: Place (Position Number), Date (Year/Month/Day), Time (in 24h clock), Value, and Unit.

## Advanced Settings

During normal functions (not Datalogging), press and hold the SET Button for 2 seconds to enter the “Advanced Setting” mode. Press the Next Button scroll through eight main functions, shown on the lower display:

- Sd F** SD memory card Format
- dAtE** Set clock time (Year/Month/Date, Hour/Minute/Second)
- SP-t** Set sampling time (Hour/Minute/Second)
- PoFF** Auto power OFF management
- bEEP** Set beeper sound ON/OFF
- dEC** Set SD card Decimal character
- t-CF** Select the temperature unit to °C or °F
- AL** Set Alarm value
- ESC** Exit Advanced Settings
- Hlgh-** Set CO<sup>2</sup> height compensation value in Meters
- Hlghf** Set CO<sup>2</sup> height compensation value in Feet

While in the “Advanced Setting” function, press the Esc Button to exit and to return to normal functioning.

## *SD memory card Format*

**Please Note:** Formatting the SD card erases all data from that SD card.

- 1) When the lower display shows “Sd F”, use the Up or Down Buttons to select “yES” (format the SD card) or “no” (do not format the SD card).
- 2) To format your SD card, select “yES” and press the Enter Button. The Display will show “yES Enter”, to confirm. Press the Enter Button to confirm.

## *Set Clock Time*

- 1) When the lower display shows “dAtE”, press the Enter Button. Use the Up and Down Buttons to adjust the Year. After the desired value is set, press the Enter Button to adjust the Month, Date, Hour, Minute, and Second values.
- 2) After all the time values have been set the screen will jump to “SD card Decimal character” setting screen. To exit “Advanced Settings”, press the Esc Button.

**Note:** After the time value is set, the internal clock will run even when the power is off, if the battery is under normal conditions.

## *Set sampling time*

- 1) When the lower display shows “SP-t”, use the Up or Down Buttons to adjust the sampling time value.
- 2) After the Sampling value is selected, press the press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

## *Auto power OFF management*

- 1) When the lower display shows “PoFF”, use the Up or Down Buttons to select the value “yES” (Enable Auto Power Off) or “no” (Disable Auto Power Off).
- 2) After selecting “yES” or “no”, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

## *Set Beeper Sound ON/OFF*

- 1) When the lower display shows “bEEP”, use the Up or Down Buttons to select “yES” (Beeper Sound is ON) or “no” (Beeper Sound is OFF).
- 2) After selecting “yES” or “no”, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

## *Setting the Decimal point on the SD Card*

- 1) When the lower display shows “dEC”, use the Up or Down Buttons to toggle between “bASIC” (“.” Decimal Point) or “Euro” (“,” Decimal Point).
- 2) After the Decimal point character has been selected, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

## *Select the Temperature unit to °C or °F*

- 1) When the lower display shows “t-CF”, use the Up or Down Buttons to select “C” (for °C) or “F” (for °F).
- 2) After selecting “C” or “F”, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

## *Set Alarm value*

- 1) When the lower display shows “AL”, use the Up or Down Buttons to adjust the Alarm value.
- 2) After the Alarm value is selected, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

## *ESC*

When the lower display shows “ESC”, press the Enter Button to finish the Advanced Settings procedures and return to the normal measuring screen.

## *Setting the CO<sup>2</sup> Height Compensation Value in Meters*

- 1) When the lower display shows “High-”, use the Up or Down Buttons to adjust the CO<sup>2</sup> Height Compensation Value in Meters.
- 2) After the value is selected, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

## *Setting the CO<sup>2</sup> Height Compensation Value in Feet*

- 1) When the lower display shows “Highf”, use the Up or Down Buttons to adjust the CO<sup>2</sup> Height Compensation Value in Feet.
- 2) After the value is selected, press the Enter Button to save the setting as the default. To exit “Advanced Settings”, press the Esc Button.

## PC Serial Interface

The instrument features an PC output via 3.5 mm terminal. The connector output is a 16 digit data stream which can be utilized to the user's specific application. An USB RS232 lead with the following connection will be required to link the instrument with the PC serial input.

Meter (3.5mm Jack Plug)	PC (9W "D" Connector)
Center Pin	Pin 2
Ground/Shield	Pin 5


The 16 digit data stream will be displayed in the following format:  
D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

D0	End Word
D1 to D4	Upper Display reading, D1= LSD, D4= MSB
D5 to D8	D5=? D6=? D7=? D8=?
D9	Decimal Point ( DP) for display 0 = No DP, 1 = 1 DP, 2 = 2 DP, 3 = 3 DP
D10	D10 = 0
D11	D11 = 0
D12	D12 = 0
D13	D13 = 0
D14	D14 = 0
D15	Start Word

## System Reset

If an error occurs, press the Reset Button with a Pin. If the Reset Button does not fix the error, please send in the unit to our Calibration Lab for repair. E-mail [info@reedinstruments.com](mailto:info@reedinstruments.com) for more information.

## Battery Replacement

- 1) When the left corner of LCD display shows , it is necessary to replace the battery
- 2) Loosen the screws of the Battery Cover and remove
- 3) Remove the batteries and replace with Six DC 1.5 V batteries (UM3, AA, Alkaline/heavy duty)
- 4) Make sure the battery cover is properly secured after changing the battery

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## Notes

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