DESKTOP CO2-MONITOR

GT2500

Since 1957
NIEUWKOOP BV
WWW.METEN.NL

1.Introduction

Thank you for purchasing desktop CO_2 monitor. It is used to measure CO_2 concentration,air temperature and relative humidity with visible and audible alarms. This CO_2 monitor is an ideal instrument for indoor air quality (IAQ) diagnosis and HVAC system performance verification.

Carbon dioxide (CO_2) is a gaseous component of the earth's atmosphere. The concentration of CO_2 in natural ambient air is about 0.04% or 400ppm. With each breath, humans convert oxygen (O_2) into carbon dioxide.

Although carbon dioxide is invisible and odorless, an increased CO_2-content makes is apparent because humans will notice increased fatigue and reduced concentration. In rooms with high occupancy such as conference rooms and theatres, negative effects become all the more evident.

2.Features:

1. Super large LCD simultaneously display of CO2 level, Temp., relative humidity, Date and Time.
2. Six (6) smiley icons indicate indoor air quality levels (350/450/700/1000/2500/5000ppm), easy to understand CO_2 concentration.
3. Stable NDIR sensor for CO_2 detection
4. Hi alarm threshold is selectable, easy to reset default setting by pressing one button.
5. Automatic Baseline Calibration (ABC)
6. Audible warning for high CO_2 concentration
7. Visable LED meter status.
8. Heat Index/WBGT Temp. (98131E only)

3.Material Supplied

(1) Meter
(2) Adaptor (9V+10%, >=0.5A)(Optional)
(3) Operation manual
(4) Box with color sleeve

4.Power Supply

The meter is powered by an AC adaptor (9V/0.5 A output).

5.LCD Display

Symbols:

1. ppm CO_2 unit
2. icon : 350ppm ↑~ 450ppm↓
3. icon : 450ppm ↑~ 700ppm ↓
4. icon : 700ppm ↑~ 1000ppm ↓
5. icon : 1000ppm ↑~ 2500ppm ↓
6. icon : 2500ppm ↑~ 5000ppm ↓
7. icon : 5000ppm ↑

8. Air Temp.: Air Temperature
9. TWA : Time Weighted Average (8 hours)
10. STEL: Short-Term Exposure Limit (15 minutes weighted average)
11. lps%: Liters Per Second Per Person
12. cfm/p: Cubic Feet Per Minute Per Person
13. WBGT: Wet Bulb Global Temperature(Heat Index + Wet Bulb)

6.Controls (Keypad)

1) SET : Setting function.

2) SEL./R :

Move to next digit, or short press to manually store CO_2 reading, or long press to recall stored data.

3) TRH.M▲ :

Increase value. Press and hold button to switch degree C or degree F.

4) MODE▼ :

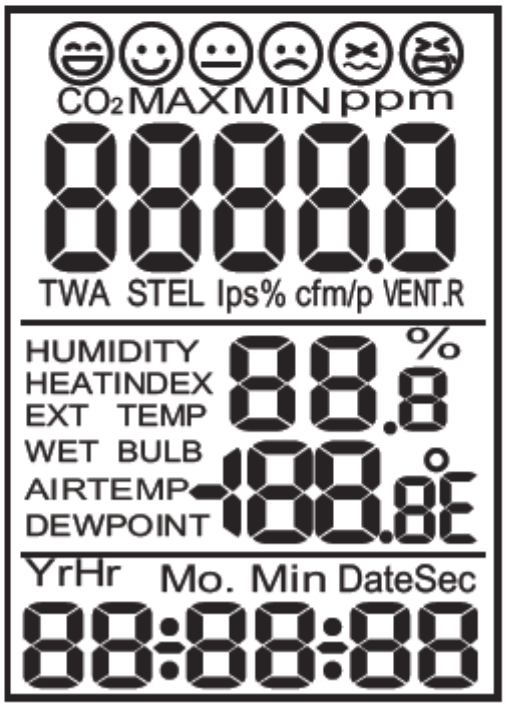
Decrease value, or review maximum reading since powered on.
Manually calibration (Press and hold about 6 seconds)

7.Operation

(1) Power On/Off

Plug in the adaptor and the meter will turn on automatically with a short beep. The LCD will display current CO_2, Humidity, Temperature, Date and Time.

The six smiley icons indicate the indoor air quality level will also appear on the top of first layer display.



(Fig1)

(2) Taking Measurement

The meter starts the measurements when powered on and updates reading every 6 seconds.

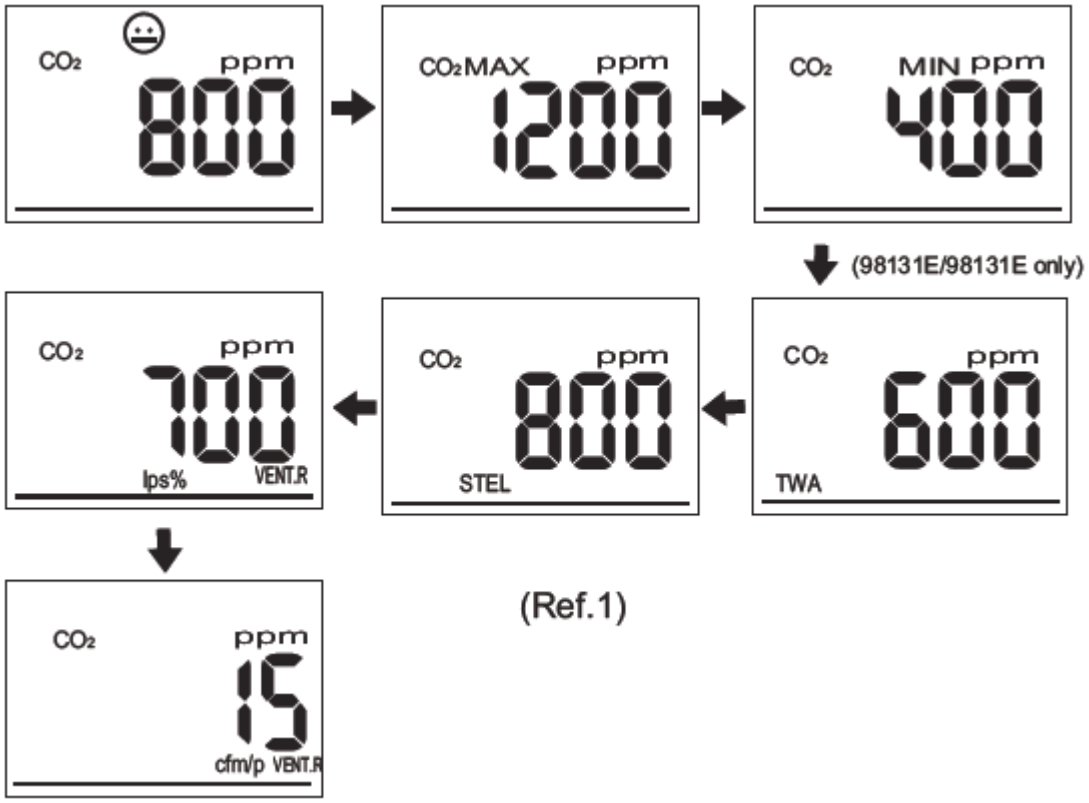
Respond time is 10 sec. for CO_2, 2 Sec. for RH.

If the operation environment changes (ex. From high to low Temp.), it takes approx. 30 sec. for CO_2 sensor to respond and approx. 30 minutes for RH into stable measurement.

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

(3) CO_2 Mode

In the CO_2 Mode, press MODE▾ button to switch CO_2 display. The top layer of display will cycle from CO_2, Maximum, Minimum, TWA, STEL, lps% and cfm/p. (Ref. 1)



(Ref.1)

Note:
(a) TWA: “TWA” is Time Weighted Average (8 hours), and the meter will keep updating the reading every minute. If the meter has been powered on for less than 8 hours, the TWA value will be the weighted average of reading taken since power on.

(b) STEL: “STEL” is Short-Term Exposure Limit (15

minutes weighted average),and the meter will keep

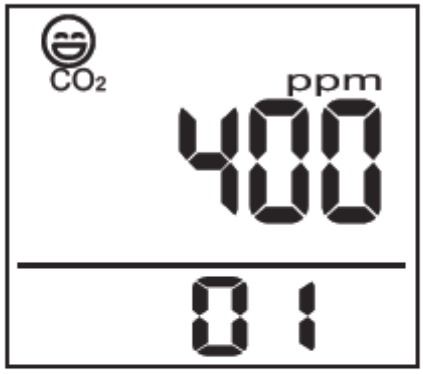
updating the reading every minute.
If the meter has been powered on for less than 15 minutes, the STEL value will be the weighted average of reading taken since power on.
(c) lps% :Liters Per Second Per Person.
(d) Cfm/p: Cubic Feet Per Minute Per Person.

Reference:
CO_2-based demand-controlled ventilation” refers to the practice of using carbon dioxide concentrations as an indicator for the per-person ventilation rate. In this context, CO_2 is monitored as a byproduct of respiration rather than as an indoor contaminant. The rate at which people produce CO_2 varies with diet and health, as well as with the duration and intensity of their physical activity. The more exertion an activity entails, the more carbon dioxide

(4) 99 Points memory (Models 98130E / 98131E only)
The meter can store 99 points of CO_2 reading, press SEL./R button to store the CO_2 reading with a short beep sound and green LED will momentarily flash.

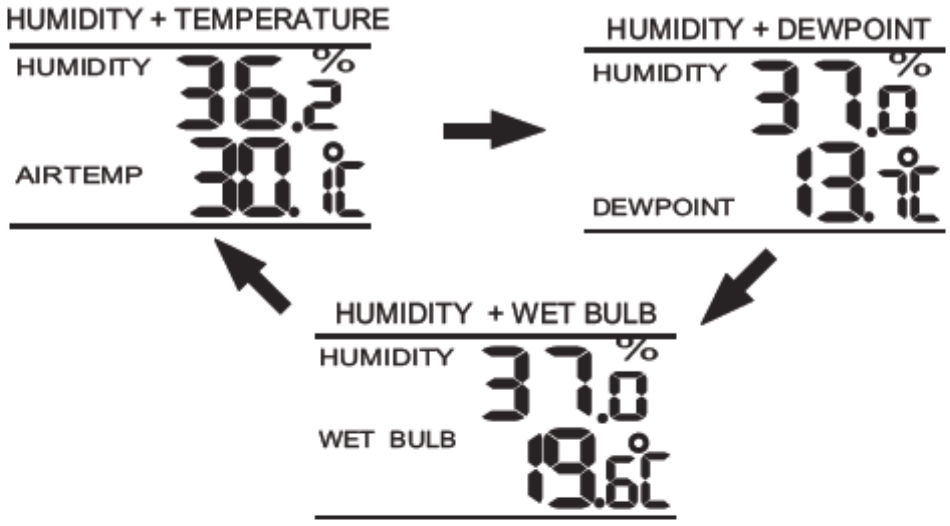
Meter will overwrite the oldest data stored in memory once the memory becomes full.

To recall the data, long press SEL./R button, the meter will display CO_2 data with 01~99 icons on the LCD.To scroll other stored readings by pressing TRH.M▲ button or MODE▼button.
Long press SEL./R button, the meter will return to normal measurement.
Long press SET to clean all memory.



(5) TRH Mode
In the TRH Mode, the meter displays both Related Humidity and Air Temperature simultaneously.
Press TRH.M▲ button, the second layer of display will cycle from HUMIDITY + AIRTEMP , HUMIDITY + DEW POINT, HUMIDITY + WET BULB. (Ref. 2)

(Ref.2)



Reference:
WBGT: Wet Bulb Global Temperature (98131E only)
WBGT: 0.7Tw + 0.3Tg; Tw: Wet-bulb temperature,
Tg: Globe thermometer temperature, Assume Tg=Td, indoor.

(6) SETTING

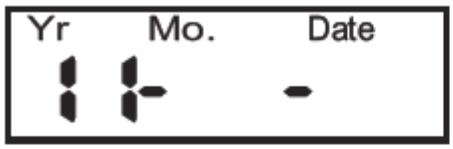
(a) Real time and date

The meter shows Yr/Mo./Date and Hr/Min/Sec on the third layer of display, and each cycle is 16 seconds.

(b) Yr/Mo./Date and Hr/Min/Sec

Press SET button for more than 2 seconds to enter the real date and time setting. The time default is in 24-hours format.

Setting Year

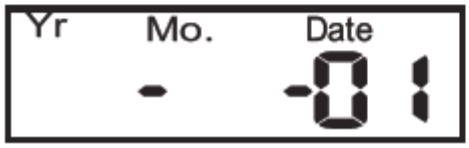


When the number appear on the LCD,Press TRH.M▲ button to increase or MODE▼to decrease. Press SEL/R button to save and move to next setting.

Setting Month

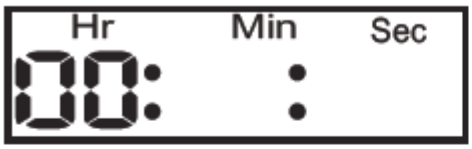
When the number appear on the LCD,Press TRH.M▲ button to increase or MODE▼to decrease. Press SEL/R button to save and move to next setting.

Setting Date



When the number appear on the LCD,Press TRH.M▲ button to increase or MODE▼to decrease. Press SET button to save and move to time setting.

Setting hour

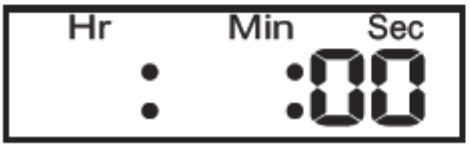


When the number appear on the LCD,Press TRH.M▲ button to increase Hr(01-24).Press SEL/R to save and move to next setting.

Setting Minute

When the number appear on the LCD,Press TRH.M▲ button to increase or MODE▼to decrease. Press SEL/R button to save and move to next setting.

Setting Second



When the number appear on the LCD,Press TRH.M▲ button to increase or MODE▼to decrease. Press SET button to save and move to alarm setting.

(c) Alarm Setting

Turn on/off alarm function :

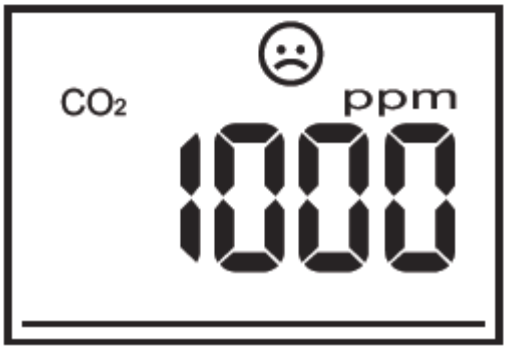
Long press SET button to enter setting mode and long press again to switch date and time setting, then enter the Alarm ON or OFF setting , LCD shows default “A-on”,Press SEL/R button if you require Alarm off, now LCD shows“A-oFF” on screen as the picture below.

(d) CO_2 Alarm Level Setting

After setting alarm on, press SET button to enter alarm threshold setting, 1000ppm is the default value, “0” is flashing for change.

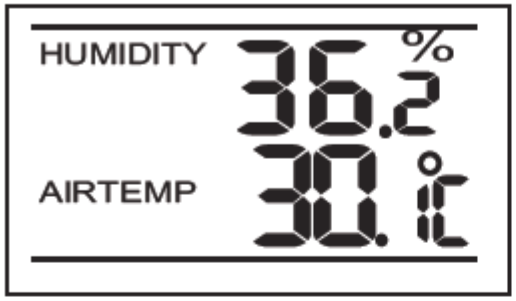
Press TRH.M▲ button to increase value , press MODE▼ button to decrease value, press SEL/R button to move and set digit, 4 digits (maximum 9999pm).

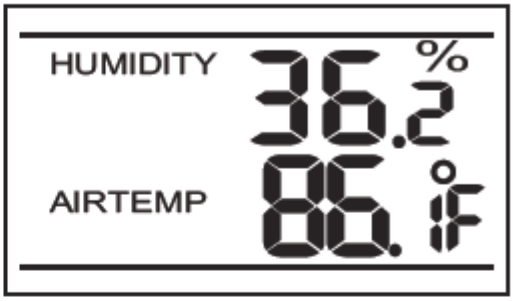
Long press SET button to save and return to normal measurement mode.



(e) Temperature Unit °C or °Fselection

Long press TRH.M▲ buttons to change the temperature.





(f) LED status

There is one LED at the middle of the front of the meter, it is a triple color LED. For normal condition, LED is not activated.

Green LED:

Press SEL/R button to record current reading and time with green LED flash for a second.(Only for 98130E and 98131E memory record up to 99 points, or other model with on line or off ling datalogging)

Red LED:

When current reading exceeds alarm threshold setting, red LED flashes with beep sound. Press SET +MODE to turn off. If beep alarm is set OFF , only red LED flashes.the beeper, LED keeps flash if the reading is still over thershold setting.

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 14 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. If the area is 24 hours over 400ppm, please follow the step to turn off the ABC function.

Long press SET enter setting mode and short press SET to pass through date,time,alarm till "Abcon" shows on display. Short press SEL/R to turn off the ABC, "Abcof" shows and long press SET to save and back to normal measurement.

Manual CO_2 Calibration

The unit can be manually calibrated however it is not recommended unless the unit can be kept in a known 400ppm CO_2 environment for 60 seconds.

- Set the instrument to be calibrated in an area where no people, plants, or other source of CO_2 is present. The ambient conditions should be stable.
- Connect the AC power adapter to the instrument and an appropriate power source.
- When the reading appears,hold the MODE▾ button down for approximately 6 seconds->3 times beep sound->CAL will flash on the LCD->2 times beep sound->CAL60 shows meter count down for 60 seconds, then the meter will return to normal operating mode automatically.

8. Specifications

	98128E	98130E	98131E
Meas. Range	0-9999 ppm.(2001 up out of spec)		
TWA/STEL	N/A	YES	
cfm/p,lps%	N/A	YES	
Temp. range/Accuracy	-10~60℃ , ±0.6°C		
Resolution	1ppm, 0.1° C/° F		
Accuracy	±50ppm + 5% of rdg (CO_2) 0~2000ppm, others unspecified		
RH% Range	0.0~99.9%		
RH% resolution	0.10%		
RH Accuracy	±5%RH~7%RH	±3%RH (at 25 ℃ 10 ~90%), others 5%	
Dew Point.Wet bulb	YES		
Heat Index	N/A		YES
WBGT Temp.	N/A		YES
Memory	N/A	99 points memory recall	
Operation Temp.RH%	0-50° C, 5~80%		
Store Temp. RH%	-20-50° C, 5~90%		
Meter Size	150 * 87 * 81.5mm		

9. Maintenance

CLEANING AND STORAGE

1. The meter should be cleaned with a damp cloth and mild detergent when necessary.
2. Store the meter in an area with moderate temperature and humidity.

9. Trouble Shooting

(1) When meter appears break character, please find out if meter ever dropped to the floor. If “yes”, please contact with local distributor for technical service.

(2) Error Codes:

E-1	CO_2 Sensor is failed.
E-2	Humidity Sensor is failed.
E-3	Temperature Sensor is failed.
E-4	Operation Temperature is too high.
E-5	Operation Temperature is too low.
E-6	Some hardware are failed.

Note: If above error codes appear on the display, please contact with local distributor for technical service.

10. Warranty

This instrument is warranted for two years from the date of purchase against material or production defects, in accordance with our general sales conditions. During the warranty period the manufacturer reserves the right to decide either to repair or replace the product.
The warranty doesn't apply to:

- Accessories and batteries (not covered by warranty).
- Repairs made necessary by improper use (including adaptation to particular applications not foreseen in the instructions manual) or improper combination with incompatible accessories or equipment.
- Repairs made necessary by improper shipping material causing damages in transit.
- Repairs made necessary by previous attempts for repair carried out by non skilled or unauthorized personnel.
- Instruments for whatever reason modified by the customer himself without explicit authorization of our Technical Dept.

11.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 in occupational exposure limit is 5000ppm.