NIEUWKOOP

USER MANUAL

GT1050

CO$_2$/TEMP
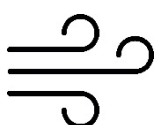
TO MEASURE = TO KNOW

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INTRODUCTION

Thank you for purchasing this portable CO$_2$ meter. The meter measures CO$_2$ level, air temp., dew point, wet bulb temp. and humidity(DP, WB, RH are for model GT1060-RH) 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 CO$_2$ 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).

The portable CO$_2$ meter uses NDIR (non-dispersive infrared) technology to ensure the reliability and long term stability. It's useful in verifying HVAC system performance and air ventilation control.

Features:

- Triple displays of CO$_2$ level, temp. and humidity (GT1060 RH).
- Stable NDIR sensor for CO$_2$ detection
- Statistics of weighted averages
    TWA (8 hours weighted average)
    STEL (15 minutes weighted average)
- Backlight for working in dark area
- Audile CO$_2$ warning alarm
- Battery and adaptor power supply
- Easy manual calibration on CO$_2$ and humidity (RH for GT1060 RH only)

MATERIAL SUPPLIED

- ✓ Instrument
- ✓ 4pcs AA batteries
- ✓ Operation manual
- ✓ Hard carrying case

POWER SUPPLY

The meter is powered by either 4 AA batteries or a DC adaptor(9V/1A output).

Install the batteries into the battery compartment on the rear and make sure they are in correct polarity and good contact. When an adaptor is used, it will cut off the power supply from batteries. The adaptor can't be used as a battery charger.

When battery voltage gets low, 🔋 and "Lob" will appear on the LCD (Fig.1). And beeper sounds. The CO$_2$ sensor can't work under low voltage, so it beeps to indicate failed CO$_2$ measurement (press any key but ⓪SET to stop the beeps) and the readings won't be displayed. Please replace with fresh batteries or connect with an adaptor.

Fig.1

GT1050   GT1060

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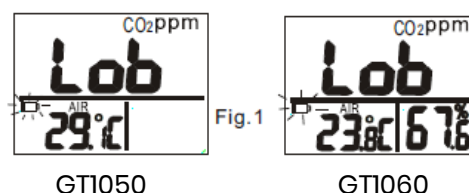
LCD DISPLAY
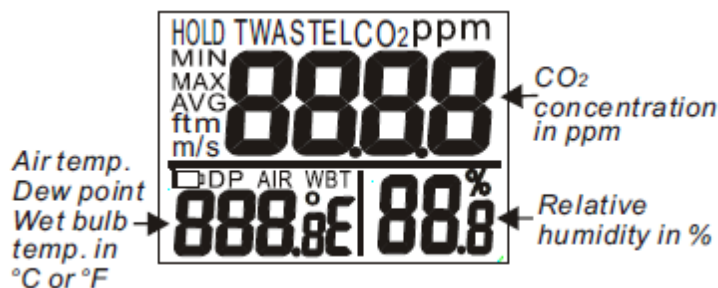
Symbols:

TWA	Time weighted average(8 hours)
STEL	Short-term exposure limit (15 minutes weighted average)
HOLD	Readings are freezed unchanged
MIN/MAX	Minimum/Maximum readings
🔋	Low battery indicator
DP	Dew point temperature(GT1060 RH)
AIR	Air temperature
WBT	Wet bulb temperature(GT1060 RH)
%	Unit of relative humidity
°E (C/F)	Celsius/Fahrenheit

KEYPAD

Ⓞ/SET Turns on and off the meter. Enters setup mode. Sets as non-sleep mode with **HOLD**

CAL/Esc Exits setup page/mode.
Enters CO2 calibration with **MODE☀**
Enters RH calibration with **DP/WBT**

HOLD Freezes the current readings. Cancels data hold function.

MODE☀ Activates or cancels the backlight. Selects unit or increases value in setup.

DP/WBT Selects AIR, DP, WBT temps display. (GT1060 RH only)
Selects unit or decreases value in setup.

MN/AV Activates MIN,MAX,STEL,TWA function. Saves and finishes settings.

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OPERATION

POWER ON/OFF

Press ⓪SET to turn the instrument on and off. At power up, it emits a short beep and performs 30 seconds countdown (Fig.2) for instrument warm up, then enters normal mode with current CO_2 , temperatures, and humidity (GT1060 RH) readings displayed (Fig.3).
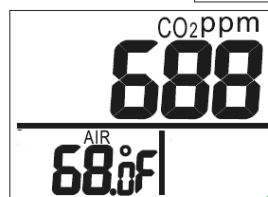
30
SEc   Fig. 2

CO_2ppm
688
AIR
68.0F   Fig 3
MODEL GT1050

CO_2ppm
483
AIR
18.3C **63.7%**   Fig 4
MODEL GT1060

TAKING MEASUREMENT

The meter starts measurement when power on and update readings every second. In the condition of operating environment change (ex. from high to low temp.), it takes 30 sec to respond for CO_2 sensor and 30 minutes for RH.

NOTE: Do not hold the meter close to faces in case exhalation affects CO_2 levels.

AIR (all models), DP, WBT (GT1060 RH)

Press DP/WBT to switch temperatures display. The lower left display will cycle from air temperature, dew point. (Fig. 5), and wet bulb temp. (Fig. 6)
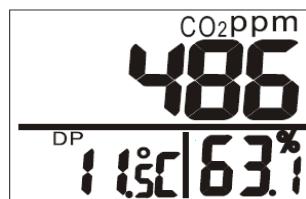
CO_2ppm
486
DP
11.5C **63.7%**
Fig. 5

CO_2ppm
478
WBT
14.5C **63.5%**
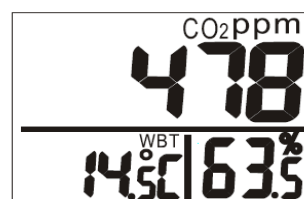Fig. 6

DATA HOLD

Press HOLD to freeze the readings, "HOLD" icon is displayed on the left top of LCD (Fig. 7). All current readings are kept unchanged, except STEL and TWA. Press HOLD again to cancel the hold function.
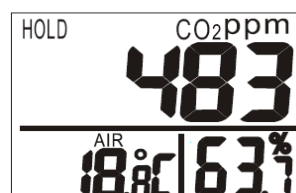
HOLD CO_2ppm
483
AIR
18.8C **63.7%**   Fig. 7

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BACKLIGHT

Hold down (MODE) for more than 1 second to activate and cancel backlight function.

MIN, MAX, STEL, TWA

Under normal mode press (Mx/AV) to see the minimum, maximum, and weighted average readings. Each press of (Mx/AV) 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 CO_2 on main display and of AIR or Dp or WB temperatures and humidity (GT1060 RH) on the lower displays. (Fig. 8)
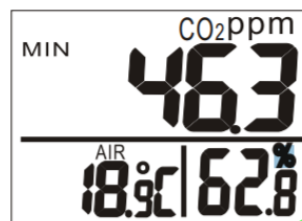

Fig. 8

In STEL and TWA modes, the main display shows the weighted average of CO_2 readings for the past 15 minutes (STEL) and 8 hours(TWA). The lower displays are the current AIR, DP/WB temperatures and humidity (GT1060 RH). (Fig. 9)

Fig. 9

NOTE:
1. 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.
2. It takes at least 5 minutes to calculate STEL and TWA. The display shows "----" (Fig. 10) during the first 5 minutes from power on.
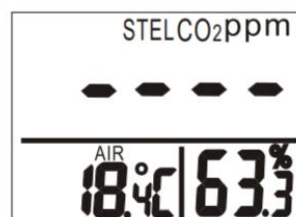

Fig. 10

3. While all readings are held unchanged, STEL and TWA will keep updating every 5 minutes.

ALARM

The meter features audible alarm to give warnings when CO_2 concentration exceeds the limit. (See P1.0 in setup for setting alarm threshold). It emits beeps(Abt.80dB)when CO_2 level goes over the set value and stops when any key (but (OSET)) was pressed or readings fall below the set value. It beeps again when value goes over the limit. Restart the meter if beeper can't be stopped.

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AUTO POWER OFF

The meter turns off automatically after 20 minutes of inactivity. To override the function, hold down ⓄSET and HOLD for 2 seconds to turn on the meter until **"n"** appears.

NOTE: Auto sleep function will be disabled during calibration mode.

SETUP

Hold down ⓄSET under normal mode for more than 1 sec to enter setup mode. To exit setup, press CAL/Esc in P1.0 or P3.0 and it returns to normal mode.

Note: P2.0 is not applicable in these models but for future model with CO and CO$_2$ measurement.

P1.0 CO$_2$ ALARM

When entering setup mode, P1.0 and "AL" (Fig.11) are displayed on the LCD.
Press M$_X^N$/AV to go into P1.1 for setting CO$_2$ alarm threshold. The current set value will be blinking on LCD (Fig. 12).
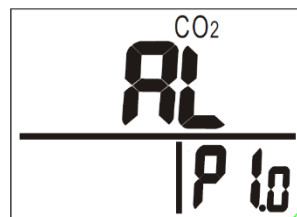

Fig. 11   Fig. 12

Press MODE to increase the value or DP/WBT to decrease. Each press tunes 100 ppm and the alarm range is from 100 to 9900ppm. When the preferred alarm value is set, press M$_X^N$/AV to save the setting or CAL/Esc without saving and return to P1.0.

P3.0 TEMPERATURE SCALE

Press MODE or DP/WBT in P1.0 to access P3.0 for setting up temperature scale (Fig. 13).
Press M$_X^N$/AV and it goes into P3.1 with blinking °C or °F current set (Fig. 14) on the lower left display.
To switch °C or °F, press MODE to save the setting or CAL/Esc without saving and return to P3.0.

Fig. 13   Fig. 14

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CO_2 CALIBRATION

The meter defaults to be calibrated manually in the ambient air where CO_2 concentration is around 400ppm.

CAUTION:

Do not calibrate the meter in the air with unknown CO_2 concentration. Otherwise, it will be calibrated as 400ppm by default and leads to inaccurate measurements.

CALIBRATION SITE

It is suggested to calibrate the CO_2 sensor in fresh outdoor air that is well ventilated and better in sunny weather. Do not calibrate the meter in places crowded with people or close to where with high CO_2 concentration such as ventilating outlets or fireplaces.

PROCEDURE

Place the meter in the calibration site. Turn on the meter and hold down (CAL Esc) and (MODE) simultaneously to enter CO_2 calibration mode (Fig. 15). 400ppm and "CAL" are blinking on the LCD while performing calibration.
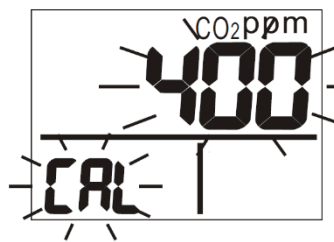
Fig. 15

Wait about 10 minutes until the blinking stops and the calibration is completed automatically and back to normal 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 (GT1060 RH)

The meter defaults to be calibrated the humidity with 33% and 75% salt solution. The ambient condition is recommended to be at 25 C and stable humidity (better to be close to the calibrating value). To abort calibration, just turn off the meter.

CAUTION:

Do not calibrate the humidity without the default calibration salt. Otherwise, it will cause permanent damage. Contact the dealer for calibration salt or services.

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33% CALIBRATION

Plug the sensor probe into 33% salt bottle.
Hold down (CAL Esc) and (DP/WBT) under normal mode to enter 33% calibration (Fig. 16). "CAL" and calibrating value (32.7% if at 25 C) are blinking on the LCD with current temperature at the left.

Instrument is now calibrating, and will finish in about 60 minutes when "CAL" and humidity stop blinking. (Fig. 17)

Fig. 16   Fig. 17

75% CALIBRATION

After 33% calibration, plug the sensor probe into 75% salt bottle, then press (Mx/AV) to enter 75% calibration (Fig. 18).

Fig. 18

"CAL" and calibrating value (75.2% if at 25 °C) are blinking on the LCD with current temperature at the left. Instrument is now calibrating. Wait about 60 minutes until blinking stops, then calibration is completed and it returns to normal mode.

NOTE:
Users can also calibrate either point. To calibrate 33% only, press (CAL Esc) and exit when 33% calibration is completed.
To calibrate 75% only, press (MODE) or (DP/WBT) within the 5 minutes while initializing 33% calibration.

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TROUBLESHOOTING

Can't power on
Press (⏻$_{SET}$) for more than 0.3 seconds and try again. Check whether batteries are in good contact and correct polarity, or the adaptor is well plugged.

Fixed readings
Check whether data hold function was activated. (HOLD icon at the left top)

Slow response
Check whether the air flow channels on the rear were blocked.

Error messages
E01:   CO$_2$ sensor damaged.
E02:   The value is under range.
E03:   The value is over range.
E04:   The original data error results in this error (DP, WB)
E07:   Too low voltage to measure CO$_2$. Replace batteries or use an adaptor.
E11:   Retry humidity calibration.
E17:   Retry CO$_2$ calibration.
E31:   Temperature sensor damaged.
E34:   Humidity sensor damaged.

PC CONNECTION

The meter can do PC link for on-line logging and data analysis via RS232 interface and software. The protocol is as follows:

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

B. B.Format (ASCII)
Model GT1050
Cxxxxppm:Txxx.xC(F) LRC CRLF
Description: $CO2:Air LRC CRLF

Model GT1060
Cxxxxppm:Txxx.xC(F):Hxx.x%:
dxxx.xC(F):wxxx.xC(F) LRC CRLF
Description: CO_2$:Air:RH:DP:WBT LRC CRLF

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SPECIFICATION

	GT1050	GT1060
CO$_2$		
Range	0~9999ppm	0~9999 ppm
Resolution	1 ppm	1 ppm
Accuracy	±50ppm ±5%rdg (0~2000)	±50ppm ±5%rdg (0~2000)
Temp.		
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	N/A	0.1~99.9%
Resolution		0.1%
Accuracy		±3% (10~90%) ±5% (others)
Warm up	30 seconds	
Operating	0~50°C, 0~95%RH (avoid condensation)	
Storage	−20~60°C,0~99%RH (avoid condensation)	
Power	4 pcs AA batteries, DC adaptor	
Battery life	24 hours (Alkaline)	

CO2 LEVELS AND GUIDELINES

The following are excerpts from **ANSI/ASHRAE** addendum standard 62.1-2004:

Enforceable and/or regulatory levels:
OSHA –5000ppm
The Occupational Safety and Health Administration

MAK –5000ppm or 10000ppm(1h) German institution

Non-Enforced Guidelines and Reference levels:
Canadian – 3500ppm (Long-term)

NIOSH–5000ppm or 30000ppm(15 min)
The U.S. National Institutes of Health

ACGIH–5000ppm or 30000ppm(15min)
The American Conference of Governmental Industrial Hygienists (ACGIH)

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NOTES :

TWA (Time Weighted Average) value stands for the average carbon dioxide level exposure during 8 hours (working day) is 5000ppm/5 days.

STEL (Short-Term Exposure Limit) value shows the last 15 minutes CO$_2$ concentration is 30,000ppm.

ASHARE Standard 62–1989,Sec.6.1.3 :Comfort (odor) criteria are likely to be satisfied if the ventilation rate is set so that 1,000 ppm of CO$_2$ is not exceeded.

WARRANTY

The instrument is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase. This warranty covers normal operation and does not cover misuse, abuse, alteration, neglect, improper maintenance, or damage resulting from leaking batteries. Proof of purchase is required for warranty repairs. Warranty is void if the instrument has been opened.

RETURN AUTHORIZATION

Authorization must be obtained from the supplier before returning items for any reason. When requiring a RA (Return Authorization), please include data regarding the defective reason, the meters are to be returned along with good packing to prevent any damage in delivery and insured against possible damage or loss.

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