

# OPERATION MANUAL

## PORTABLE CO METER



CE

**Model: 7702**

# INTRODUCTION

Thank you for purchasing this portable CO meter.

CO is a colorless, odorless, and tasteless gas which is slightly lighter than air. It is highly toxic to humans and animals.

Base on latest regulation, buildings with boiler and combustion gas system need to check Carbon Monoxide level regularly to ensure the safety operation.

## CO levels and its effect

ppm	Symptoms and applicable standard
0-1	Normal background levels
9	Maximum indoor air quality level: Maximum allowable concentration per ASHRAE Residential standards 62-1989 for living area.
25	Maximum limit 8 hrs of continuous exposure per California OSHA workplace standards.
35	Maximum 8 hrs average exposure level per US OSHA workplace standards.
50	Maximum concentration for continuous exposure in any 8 hrs average level per OSHA standards.
100	Remove employees from enclosed space if the CO concentration exceeds 100ppm per OSHA exposure limit.
200	Mild headache, fatigue, nausea and dizziness w/i 2-3 hrs.
400	Frontal headache, life threatening after 3hrs. Maximum concentration in flue gas per the US EPA and AGA standards.
800	Dizziness, nausea, convulsions, death w/i 2-3 hrs.
1600	Nausea w/i 20 min., death w/i 2-3 hrs

## Features:

- Big LCD display with blue backlight to use in dark area
- One touch to display CO / temperature in turns.
- Hold function freezes current readings
- Manual zeroing feature to cancel background influence
- Auto Temperature Compensation
- Programmable warning CO level Audible alarm (~80db) threshold setting
- Max, Min functions included
- 99 points manually recording
- Review 99 points manual record
- Data Printing Capability with time-stamp by optional IR printer
- Housing design surrounds with rails to help Air ventilation for quick & accurate response

## MATERIAL SUPPLIED

This package contains:

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


### Optional accessory:

- ✓ 88998 Infrared thermo-printer



## QUICK GUIDE



- \* Short press to turns on or off the meter
- \* When meter is off, long press to enter **Setup** mode
- \* When meter is off, long press with  to start in non-sleep mode



- \* Short press to exit from **Setup** mode or **Memory Recall** mode
- \* Long press for CO manual zeroing under CO measurement mode



- \* Short press to switch displayed mode
- \* Long press to enter **Memory Recall** mode



- \* Short press to freezes current readings  
Press again to cancel data hold
- \* Under **Setup** mode, to selects unit or to increases value
- \* Long press for IR printing output under Measurement or Hold or Max mode  
(Optional 88998 IR Printer is required)



- \* Short press to manually record current reading
- \* Under **Setup** mode, to select unit or to decreases value



- \* Short press to enter MIN, MAX Mode
- \* Under **Setup** mode, to saves and finishes setting

## LCD DISPLAY



### Symbols

UpperLCD	CO/Temp reading
LowerLCD	Real time display
CO <sub>2</sub>	Not available in this model
CO	Carbon monoxide reading
HOLD	Readings are freezing
MIN/MAX	Minimum/Maximum readings
STEL	Not available in this model
TWA	Not available in this model
<b>B</b>	Low battery indicator
DP	Not available in this model
TA	Air temperature
WBT	Not available in this model
%rh	Not available in this model
°C/°F	Celsius/Fahrenheit of temp
CAL	In calibration status
REC	In manual logging
RECALL	In manual records recall mode

## POWER SUPPLY

The meter is powered by 4 pieces' AA alkaline batteries.

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

When battery voltage gets low, **B** will appear on the LCD (Fig.1).

The CO sensor can't work normally under low voltage, please replace with fresh alkaline batteries.

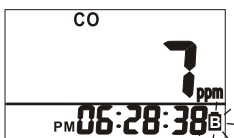


Fig.1

## OPERATION

### POWER ON/OFF

Press **ON/OFF SET** to turn the meter on and off.

At power up, it emits a short beep and performs 30 seconds countdown(Fig.2) for meter warm up, then enters normal mode with current CO and real time displayed (Fig.3). The real time display date and time in turns.



Fig.2




Fig.3

## 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 around 60 sec to respond for CO sensor.

### CO (Carbon Monoxide)

Press  to switch the mode to CO.


User can get the CO reading in ppm unit on main display.(Fig.4).

The lower display shows the real time clock.



Fig.4

### AIR Temperature



Press  to switch to temperature display.(Fig.5).

The lower display shows the real time clock.



Fig.5

## DATA HOLD

In normal display mode, press  to freeze the readings, "HOLD" icon will flashing on the left top of LCD(Fig.6). All current readings are kept unchanged. Press  again to cancel the hold function.

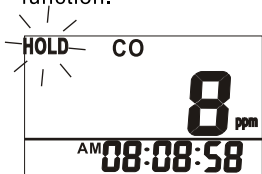



Fig.6

### NOTE:

THE HOLD FUNCTION IS DISABLE IN MIN/MAX MODE

## MANUAL ZEROING

When taking CO measuring, if user want to located the leakage source.

Long press  for manual zeroing, to cancel the interference of background concentrations.

The reading will flash and turns into "0" (Fig.7) after manual zeroing complete.

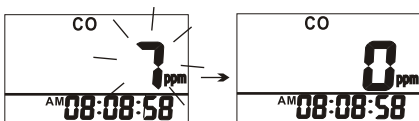



Fig.7


## MANUALLY RECORDING

The meter features 99 point memories. In normal or Hold mode, Press  key to record, **REC** icon and main display flash for about 3 seconds. The main display shows the memory serial number, at most 99 points.( Fig. 8)

Each memory contains all parameters (CO and TA), not only the parameter you choose to see on main display.




Fig.8

If the reading changes quickly, you can press  to freeze the reading before manually recording the data.

The manually recording function is disabled in MIN/MAX mode.

### 99 MEMORIES RECALL

The meter features 99 point memories review function.

In normal or hold mode, press  key for more than 2 seconds until the **Recall** icon flashes.



Press  or  to scroll the memories. The memory serial number displays on main LCD first and reading comes after. (Fig. 9 & 10)



Fig.9

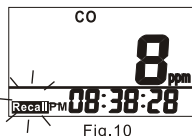


Fig.10



Press  key to switch the display parameter. (Fig.11)







Fig.11

The time displayed in memory recall mode is the recording time of this memory.

To escape the memory recall mode, press  key to leave and return to normal display.


### MIN, MAX CURRENT REVIEW

This meter allows you to check the minimum, maximum and current value from the moment you press the  key. Under normal mode, press  to see the minimum, maximum, and current value in turns. Each press of , it displays MIN, MAX, current value in sequence. (Fig.12~14).

To return to normal mode, press  key to escape (Fig.15)

In this MIN/MAX modes, it shows the corresponding readings on main display and the **accumulated time** of how long you are in this mode. (Fig12~14).

In this mode, press  to switch the displayed parameters. (Fig 16).

The display sequence in this mode is Min → Max → Current → Min → Max..... Press  key can immediately leave this mode and return to normal.

Distinguishing the normal display and current review by checking the time display format.

In **normal** display, the **date & time** displayed in turns.

In Max/Min modes, the time display is the **accumulated time** of how long you are in MIN/MAX mode.

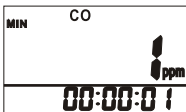


Fig.12

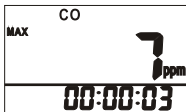


Fig.13



Fig.14

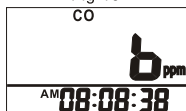


Fig.15




Fig.16

**NOTE:**

“HOLD” & “MANUALLY RECORD” & “RECALL” FUNCTION ARE DISABLE IN MIN/MAX MODE.

**IR Printing Output**

Under normal mode / Hold-mode or MAX-mode, press “” for more than 3 seconds to print the measurement data with date & time by the optional accessory 88998 IR printer.

Before start IR printing output, face the emitter of CO meter to the receiver of 88998 IR printer, applicable receiving angle is 0°.

Ensure there are no obstructions between them, and do not move the CO meter or the IR printer during printing process to prevent interruption.

Ensure receiving angle is 0°



IR printer receiver

CO meter emitter

### ALARM

The meter features audible alarm to give warnings when CO concentration exceeds the limit. (See P20 in setup for setting alarm threshold). It emits beeps (Abt. 80dB) when CO level goes over the set value and stops when the readings fall below the set value, or press any key to stop alarm for 5 minutes. It beeps again when value goes over the limit.

### BACKLIGHT

The backlight will be activated for 10 seconds by pressing any key.

## AUTO POWER OFF

The meter turns off automatically after 20 minutes of inactivity. To override the function, hold down **ON/OFF SET** and **HOLD** for 2 seconds to turn on the meter until "n" appears. (Fig.17)

### NOTE:

**AUTO SLEEP FUNCTION WILL BE DISABLED DURING CALIBRATION MODE.**

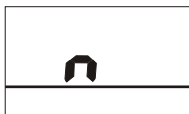





Fig.17

## SETUP

When the meter is off, hold down  for more than 1 sec to enter setup mode. To exit setup, press  in P10 ~ P60 and it returns to normal mode. (Fig.4)

### P10: 99 MEMORIES CLEAR

When entering setup mode, P10 and "CLr" (Fig.18) are displayed on the LCD. Press  to go into P11 and decide to clear or keep all the manual records. The current set will be blinking on LCD (Fig.19).




Press  or  to choose NO or YES and press  to confirm.



Fig.18




Fig.19

Press  to escape and return to P10.

### P20: CO ALARM

When entering setup mode, P20 and "ALAr" (Fig.20) are displayed on LCD.

Press  to go into P21 for setting CO alarm threshold. The current set value will be blinking on LCD (Fig.21).





Press  to increase the value or  to decrease. The selectable alarm limits are 15~200ppm, each press tunes 5ppm. When the preferred alarm value is set, press  to save the setting or  without saving and return to P20.



Fig.20

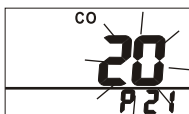



Fig.21

## P30 TEMPERATURE UNIT

When entering setup mode, P30 and "unit" (Fig.22) are displayed on the LCD. Press  to go into P31 and decide the temperature unit.

The current set will display on LCD (Fig.23).

Press  or  to choose °C or °F and press  to confirm.



Fig.22






Fig.23

Press  to escape and return to P30.

## P40:REAL TIME CLOCK

Go into P40 for setting the real time clock of this meter.

Press  and it goes into P41 to set the time format as 12hour or 24 hour.

The current set will flash on LCD. Press  or  to change the format and press  to confirm and entering real time clock setting.(Fig.24)




The blinking Year digits on the lower display. To change the digit, press  or  to adjust. Press  to confirm and enter Month setting. Repeat above steps to complete the month/date/hour/minute/second setting.(Fig.25)



Fig.24



Fig.25

### **NOTE:**

The setup date and time will be printed while using the optional accessory AZ88998 for IR printing output.




## CO CALIBRATION



When the accuracy becomes a concern after a long time usage, return to dealers for standard calibration. It is necessary to have standard CO gas for calibration.


### **CAUTION:**

Do not calibrate the meter in the air with unknown CO concentration. Otherwise, it will be calibrated as 0 or 100 or 400ppm by default and leads to inaccurate measurements.

Place the meter in the calibration site.

First press  + , then also  simultaneously for 3 seconds to turn on the meter and enter calibration mode (Fig.26).

Press  or  to select the CO 0ppm or 100ppm or 400ppm calibration, “**CAL**” icon are blinking on the LCD.

Press  to start calibration. (Fig.26~28)

Wait about 10 minutes until the blinking stops and the calibration is completed automatically. To abort the calibration, turn off the meter at any time.

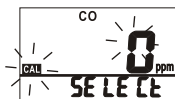


Fig.26

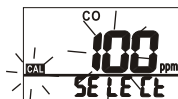


Fig.27

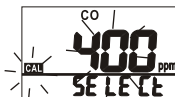


Fig.28

**NOTE:** It is allowed to adjust the CO calibration point from  
85~115 (100±15ppm)  
385~415ppm (400±15ppm)

## SPECIFICATION

### Measuring range

CO	0~1000 ppm,
Temperature	-20~60°C (-5~140°F)
Resolution	1ppm , 0.1°C/°F

### Accuracy

CO	+/-3 ppm ≤ 20 ppm, +/-5ppm≤ 100 ppm +/-10% of reading for 101~500 ppm +/-20% of reading for 501ppm and above
Temperature	±0.6°C/±0.9°F
Warm-up time	30 seconds

### Response time

CO	<60 seconds(90% step change)
Tair	<2 mins (90% step change)

LCD / Meter size (mm) 26(H)x44(L), 175(L)x70(W)x56(H)

Operating condition 0 to 50 °C (CO sensor)  
(avoid condensation) -20 to 60 °C (for the rest parameters)

Storage condition -20~ 60°C, 10~90%RH(avoid condensation)

Power supply AA batteries x 4pcs


Battery life > 100 hours (Alkaline battery)

Weight 150g

Standard package Meter, manual ,AA bat. , carry case

## TROUBLESHOOTING

### ? Can't power on

- Press  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.
- You may also take off the batteries for 10 mins and then put back again.

### ? 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

E02: The value is under range.

E03: The value is over range.

E16: Retry CO calibration.

E31: Temperature sensor or AD damaged.

## **WARRANTY**

The meter 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 meter 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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