Dwyer Instruments, Inc.

1205B

Handheld Carbon Monoxide and Carbon Dioxide Gas Analyzer

Dwyer Instruments Inc
PO Box 373
Michigan City
Indiana
USA

Tel: 001 219 879 8868
Fax: 001 219 872 9057

Stock No: 18743-2 June 2010

The 1205B tests for ambient CO and ambient CO_2 concentrations.

The large display shows 2 readings at a time and all data can be printed via an optional infrared printer. The printed data can be 'live' data or 'stored' data.

The 1205B is controlled using 4 buttons and a rotary dial.

The four buttons (from left to right)

 switch the analyzer on and off,

 print actual or saved data, switch the backlight on and off,

 switch the pump on and off, change the top line data display,

 save data or temporarily hold or 'freeze' the current reading.

△ = Scroll up	▽ = Scroll down	⇦ = Enter

The buttons with △, ▽ and ⇦ also change settings such as date, time, when in menu mode.

The rotary dial changes the display's 2nd line and selects access to the menu to make changes to the date, time, fuel, etc.

The 1205B can store up to 255 sets of readings.

The 1205B is powered by internal re-chargeable NiMH batteries. The internal battery will power the analyzer for about 6 hours, from full charge.

The 1205B has a protective rubber sleeve with a magnet for "hands–free" operation.

NOTE: Fresh air is referred to in this manual. Sometimes it may be convenient to use thin flexible tubing (min ID. 3mm.) to supply fresh outside air, if a tube is used ensure that the inlet is at least 1 meter away from any possible source of CO_2 such as an open window.

Fuel combustion of any sort may cause high and fluctuating levels of CO_2 over surprisingly large areas. Exhaled breath can easily reach 10,000 to 20,000 ppm.

1. BEFORE USING THE ANALYZER FOR THE FIRST TIME:

The analyzer may be supplied with either or both of the following chargers.
To fully charge the battery, you may use a trickle charger, plugged into the base of the unit for 12-24 hours.

Avoid leaving the unit on charge and switched off for more than 1–2 days at a time or the internal battery life could be reduced.

Set the correct time, date, etc., after it is switched on and calibrated – See **USING THE ROTARY DIAL** below. These are stored when the analyzer is switched off.

2. BEFORE USING THE ANALYZER EVERY TIME:

Check the water trap is empty and the particle filter is not dirty:

- To empty the water trap, unplug its rubber stopper and re-plug once it is empty.
- To change the filter, remove protective rubber sleeve, pull out the water trap, remove the water trap's particle filter from the spigot and replace. Reconnect the water trap and rubber protective sleeve.

After switch on check that date and time are correct and battery power is sufficient.

Avoid exposing the instrument to sudden large temperature changes, and ensure that the unit reads zero for CO and approx. 400 ppm CO_2 in fresh air before use. If necessary re-zero (see: Menu Selection).

Avoid very close proximity to radio transmitting devices, otherwise readings may be affected.

This analyzer can be used to extract combustion gases that may be toxic in relatively low concentrations. These gases are exhausted from the back of the instrument. **This analyzer must only be used in well-ventilated locations by trained and competent persons after due consideration of all the potential hazards.**

3. USING THE ANALYZER AND ITS FOUR BUTTONS:

Switching ON the analyzer	Press  to switch the unit ON in <u>fresh</u> air. This allows the analyzer's sensors to be calibrated. This will set CO to zero and CO_2 may be set to 400 ppm if required. At switch on, the analyzer beeps four times and displays the model number. The bottom line counts down from typically 45. The Analyzer will then indicate AIR ZERO NO? Select NO? using the push button marked with an enter symbol, the CO_2 setting will not be altered, CO is always set to zero at this stage. Select YES only if you are in fresh air and wish to adjust the CO_2 zero offset. Use the △ / ▽ buttons to set the required value (this should be 400 ppm in fresh air), allow a few seconds after each button press for readings to settle, and then press ⇦ to confirm. After ⇦ is pressed it will take about 4 seconds before the unit is ready to respond to the controls. The sensors are now ready to use. If the analyzer will not calibrate, one or more of the sensors may need to be replaced or recalibrated by an authorized repair center. When countdown and zero is finished the display's top line shows the last selected function and the bottom line displays whatever the rotary dial is turned to.
Switching OFF the analyzer	Press  to switch the analyzer OFF. The display counts down from 30 with the pump on to allow time for the sensors to be cleaned or purged with fresh air. If the probe is connected, make sure both analyzer and probe are in fresh air. Press HOLD / ⇦ if you want to stop the count-down to off and return to making measurements.

Using △ / ▽ / ⇦ Buttons	Once the "on" countdown has been completed: Press the ▽ button for more than 1 second after the short tone or "beep" to change the display's top line, if you hold this button down there is an "auto repeat" on this function. The Rotary Dial changes the display's bottom line. The top line display options are: Time Date CO_2 CO TL (-- or Logging interval in minutes if set) BAT % For example, the analyzer will display CO_2 on the top line and CO on the bottom line if you turn the rotary dial to CO and hold down the ▽ button until CO_2 is displayed on the top line. Use the △ / ▽ / ⇦ keys to change settings (such as time and date) when the rotary dial is turned to MENU.
⇦ key to Hold or Store readings	In normal operation (not MENU) the ⇦ key is used to either HOLD the readings for printing (a short button press of about 1 second release the button on the first beep, the display flashes when held) or to save readings if memory locations are available (a long button press … wait until after the second beep). The display will flash LOG xxx (or FULL) to give the store location of the saved data or will continue to flash if held until reset by a short button press. Note: the HOLD function is inhibited while AUTOSTORE is operating.
Switching on and off the backlight	Press  for about 2 sec. and release to switch backlight on or off. Note: use of the backlight increases the drain on the battery.

Printing Data	Press  quickly for about 1 sec. to start the analyzer printing. The analyzer displays "PRINTING" until this is completed. Make sure the printer is switched on, ready to accept data and its infrared receiver is in line with the emitter on top of the analyzer.
Switching PUMP on / off	The analyzer normally operates with the pump on. Press  quickly to switch the pump off and on. When the pump is switched off, the analyzer displays "PUMP OFF" approximately every 20 seconds.
"Freezing" the display	Press  /  to freeze all readings. The display flashes and can be printed by pressing the PRINT key. Press  /  again for "live" measurements. Note: the HOLD function is inhibited while AUTOSTORE is operating.

4. USING THE ROTARY DIAL (starting from Menu):

Rotating the dial selects the display's 2nd line, unless MENU is selected.

Rotor positions are:

- Menu — the MENU options are listed below
- Count — displays time to next Autostore in minutes if set
- Gas 1 — displays CO reading in ppm
- Gas 2 — displays CO_2 reading in ppm
- Date — the date format is user defined
- Time — military time format

4.1 MENU SELECTION (auto store must be off to access menu).

MENU	Rotate the dial to MENU and use the △, ▽ and ⇦ buttons as described fully below to select and change the following functions: 1. Time – Uses "Military" time as standard: 7am = 07:00, 7pm = 19:00. 2. Date with date format selection. 3. Pump speed control: full speed or 'quiet' mode which reduces power consumption. 4. The display's contrast. 5. Language (this product is configured for English only). 6. ZERO – AIR - to set, apply fresh air then use △ or ▽ to set for about 400 ppm. ZERO -TRUE – to set use a CO_2 zero calibration module (or 'stripper'). Press ⇦ to start. Zero will run for about 45 seconds. 7. Alarm setting- user settable alarms to audibly warn of high readings. Pre-sets are 35 ppm for CO and 1000 ppm for CO_2. 8. Service – Password protected, for authorized service personnel only. 9. Memory functions.

Using △, ▽ and ⇦ keys.

When you have selected the function to change, press ⇦ to select.

Repeat this to scroll through the menu and select (using the ⇦ key) and change (using the △ / ▽ keys) the function.

The final, logical ⇦ returns you to the main menu display.

To exit the Menu function at any time, rotate the dial to another position - Unless the final logical ⇦ is pressed, no changes are made.

Note: in AIR ZERO this mode will continue until terminated by the pressing of ⇦.

You can choose from the menu, fresh air zeroing which allows CO_2 to be set to a user defined value (normally 400 ppm in fresh air) and CO to 0 ppm. Allow a few seconds after each button press for readings to settle, and then press ⇦ to confirm.

Alternatively, you can make a menu selection, and use a TRUE zero calibration module (if available), which is used to set CO_2 to 0 ppm (and also CO to 0 ppm).

This mode will take about 40 seconds to operate.

4.2 MEMORY Functions

With the rotor pointing to MENU use the △ /▽ keys to select MEMORY and press  .

The △ /▽ keys can then be use to select:

VIEW	
AUTO STO	(Auto store)
PRINT	(Summary print of stored readings)
CLEAR	

Press  to choose.

VIEW

The top line displays VIEW.

The bottom line displays LOG 0000.

Use △ /▽ to select next view number (within the range of data stored up to 255 maximum).

In view mode, only stored readings "wrap round" so that using the up key you pass from maximum reading back to the first reading or using the ▽key directly from the first reading to maximum.

Press  to select.

The top line displays for example: V 01.

The bottom line displays the stored information as selected on the rotary dial.

Use △ /▽ to scroll to later or earlier data.

Hold down the print button to print one set of stored data (example shown as Manually logged print).

Press  to exit back to start.

AUTOSTORE

Hold will be inhibited during auto store. If you push  during auto store AUTO STO will be indicated on the top line. It is recommended that you select ZERO via the menu and perform a zero before starting a series of Auto stored readings.

Memory is always cleared before a new autostore sequence is initiated. Be sure to print out your previous results before starting a new sequence.

When store intervals greater than one minute are set and the pump is switched off it will power up automatically one minute before a reading is due to be stored. The pump will run whatever speed (high or low) was previously set. Where the store interval is set to 1 minute the pump momentarily switches off every minute.

You can maximize the number of stored readings by switching the pump to low speed (QUIET) and after initiating store switch the pump off. Typically if the batteries are fully charged you will be able to store 255 readings at up to 3 minute intervals.
To store for longer periods above 12 hours you should connect the trickle charger.

The top line displays AUTO STO
Use the △ /▽ keys to select from OFF or ON
Press  to select

The display will show:

AUTO STO
TIME 01
Use the △ / ▽ keys to set any store interval
between 1 and 10 minutes.

The display top line will then revert to MENU.
Select any required position on the rotary dial.

Every time readings are stored the top line will flash LOG and the STORE number until the memory is full or until the autostore is switched off. There will also be a beep for every store with a maximum of 255 sets of readings.

You can only exit AUTOSTORE by returning to MENU mode and setting AUTOSTO to OFF.

SUMMARY PRINT

The bottom line displays PRINT.
Press  to select and EXIT.
Maximum, minimum and average readings are shown.

CLEAR

The top line will display CLEAR.
The bottom line will display NO.
Use the △ / ▽ keys to toggle between NO and YES.
Press  to select and exit.

4.3 CHANGING THE PUMP SPEED

The pump speed is toggled using the △ or ▽key.
The choices are Full Speed or Quiet.
Press  to select and exit.

4.4 MANUAL ZEROING

From the MENU function you can choose to re-zero at any time except when auto storing.
The zeroing options are fresh air zero or true zero.
Use the △ or ▽button to chose and  to select. Once zeroing has commenced it will continue until you are completed with the rotary dial. Fresh air zero should be completed by pressing  . The normal value of 400 for fresh air may be adjusted using the △ or ▽ keys. (The value first displayed when entering this mode is the analyzers current measured value).

4.5 ALARMS

Select ALARMS from the menu and use the △ or ▽ buttons and  to alter the alarm points, if different alarm positions are required besides the preset alarms. The instrument will store new alarm settings. The last CO_2 alarm point set will be recalled at switch on. As a safety measure the CO alarm will be set to 35 ppm at switch on unless a lower level is set.

5. MEASURING GASES

After the countdown is finished and the analyzer is correctly set up sampling can take place either by using a sampling tube/probe to reach into ducts or flues or simply by taking a direct ambient air measurement without a probe or hose connected.

CAUTION: Just by breathing you are emitting a relatively high level of CO_2 in the local area and this can affect the measurements. We recommend that a probe or flexible hose is used so that the point where the ambient air is being sampled is at least 1 meter away from where anyone is breathing.

Make sure you do not exceed the operating specifications. In particular:

- Do not exceed the probe's maximum temperature (any plastic parts must not contact hot flues).
- Do not exceed the temperature operating range.
- Do not put the analyzer on a hot surface.
- Do not exceed the water trap's levels.
- Do not let the particle filter become dirty and blocked.
- Ensure that the magnetic boot is free from metallic particles and any surfaces used when attaching the analyzer are appropriate.

View data and rotate the dial to see changes as you make adjustments.

Press  first to hold or 'freeze' the readings before printing. Press  to print the results.

Before starting a test sequence it is recommended to check that the value for CO reads zero and CO_2 reads about 400 ppm in fresh air, if required you can "re-zero" the sensors by using the ZERO functions in MENU.

6. EXAMPLE PRINTOUT IN AMBIENT AIR

The standard printouts are:

Instant print press  .

```
DWYER 1205B
CO & CO2 MONITOR

DATE:              01-02-09
TIME:              14:27:09

.....

CO2        ppm         950
CO         ppm          12
```

Manually logged print via VIEW stored data.

```
DWYER 1205B
CO & CO2 MONITOR

DATE:              01-02-09
TIME:              16:27:09

LOG NUMBER 123
.....

CO2        ppm         950
CO         ppm          12
```

Summary Print of autolog via MEMORY.

DWYER 1205B
CO & CO2 MONITOR

AUTOLOG REPORT

DATE		01-02-09
TIME		18:27:09
Start Time		01-02-09 14:00:00
Stop Time		01-02-09 17:59:00
No of readings		255
Max CO2	ppm	950 01-02-09 14:10:00
Av CO2	ppm	650
Max CO	ppm	12 01-02-09 15:30:00
Av CO	ppm	06

7. WHEN YOU FINISH USING THE ANALYZER

Always try to switch the analyzer off in fresh air.

The analyzer counts down from 30 before switch off with the pump running to self clean its sensors. If the measured CO level is more than 30 ppm do not switch off the analyzer. It will need to sample fresh air until the CO level falls below 30 ppm. This extends the sensor's life and helps to eliminate any unwanted offset on next start-up.

8. PROBLEM SOLVING

If any problems are not solved with these solutions, contact us or an authorized repair center.

Fault symptom	Causes / Solutions
• Batteries not holding charge.	• Batteries exhausted. • AC charger not giving correct output. • Fuse blown in charger plug.
• Analyzer does not respond to gas.	• Particle filter blocked. • Probe or tubing blocked. • Pump not working or damaged with contaminants. • Water Trap Bung not fitting tightly. • Sensor fault.

TROUBLE SHOOTING

I have set the analyzer to AUTOLOG but it has stopped logging:

- Memory might be full.
  - Menu
  - Memory
  - View ..... displayed number is last log number. 255 is full.
- PUMP is OFF.
- Analyzer is PRINTING.

Display is totally clear or totally dark:

- Set the rotary dial to MENU switch on and leave unit for five minutes.
  - Press △ **three** times (listen for three beeps) then press  .
  - Press and hold down △ until the display becomes visible again (this can take up to 20 seconds). Use △ and ▽ to adjust the display's contrast.
  - Press ENTER to exit.

The analyzer continually beeps and the display has frozen:

- You have exited a menu function without completing the required sequence.
  - Rotate the dial back to MENU.
  - Press  until MENU appears on the top line.
    - (NB You may be changing settings when you do this).
  - Rotate the dial to the required display position.

The unit will not turn off:

- Do not hold down the  button.
  - Try connecting the charger.

9. ANNUAL RECALIBRATION AND SERVICE

Although sensor life is typically more than two years the analyzer should be re-calibrated and serviced annually to stop any long-term sensor or electronics drift or accidental damage.

Local regulations may require more frequent re-calibration.

SERVICE MODE

This mode can be selected from MENU and gives password protected access to certain functions **WARNING: entering inappropriate codes may corrupt the calibration of this instrument.**

The User level pass code to view software issue is 1111.

10. SPECIFICATIONS

Parameter	Resolution	Accuracy*1	Specified Range	Over Range
Gas Measurement				
Carbon Monoxide	1 ppm	+/-5 ppm <100 ppm +/-5% > 100 ppm +/-10% >1000 ppm	1000 ppm	2000 ppm
Carbon Dioxide	1 ppm	+/-20 ppm <400 ppm +/-5% < 4000 ppm +/-10% >4000 ppm	200 to 4000 ppm	9999 ppm
Dimensions Weight Handset		1 kg / 2.2 lb 200 mm / 7.9 " x 45 mm / 1.8 " x 90 mm / 3.5 "		
Ambient Operating Range		0-45°C / 32-104°F 10% to 90% RH non-condensing		
Battery Life		6 hours from full charge and with pump on		
Battery Charger (standard type trickle charger)		Input: 100 - 240 VAC 50 - 60 Hz Output: 12 VDC. @ 800 mA Max.		

*1 Using dry gases at STP with the instrument not subjected to sudden changes of temperature, position or severe vibration.

11. ELECTROMAGNETIC COMPATIBILITY

European Council Directive 89/336/EEC requires electronic equipment not to generate electromagnetic disturbances exceeding defined levels and have adequate immunity levels for normal operation. Specific standards applicable to this analyzer are stated below.

As there are electrical products in use pre-dating this Directive, and radio transmitting devices which may not be covered by this Directive, they may emit excess electromagnetic radiation levels and, occasionally, it may be appropriate to check the analyzer before use by:

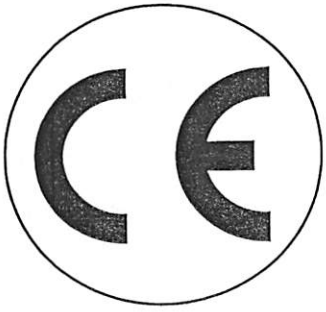
Use the normal start up sequence in the location where the analyzer will be used.

Switch on all localized electrical equipment capable of causing interference.

Check all readings are as expected. A level of disturbance is acceptable.

If not acceptable, adjust the position to minimize interference or switch off, if possible, the offending equipment during your test.

At the time of writing this manual (February 2009) we are not aware of any field based situation where such interference has occurred and this advice is only given to satisfy the requirements of the Directive.



This product has been tested for compliance with the following generic standards:

EN 61000-6-3
EN 61000-6-1

and is certified to be compliant

Specification EC/EMC/KI/KANE 100 details the specific test configuration, performance and conditions of use.

APPENDIX

Carbon Monoxide:

Current World Health Organisation recommended maximum exposure levels to Carbon Monoxide:

15 minutes	89 ppm	≡	100 mg/m^3
30 minutes	53 ppm	≡	60 mg/m^3
60 minutes	27 ppm	≡	30 mg/m^3
8 hours	9 ppm	≡	10 mg/m^3

Carbon Dioxide:

ASHRAE (62/99) recommends a maximum level of 1000 ppm.

UK Health & Safety Executive Regulation EH40 sets the maximum occupational exposure limit at 5000 ppm.

British Standards BS6896, BS6230 and BS5990 confirm CO_2 concentration should not exceed 2800 ppm where people are working.

BSRIA recommend a maximum of 800 ppm over an eight hour time weighted average.

Data on ambient CO_2:

NOAA observatory
(US. National Oceanic and Atmospheric Administration)
http://www.cmdl.noaa.gov/ccgg/insitu.html
http://www.cmdl.noaa.gov/ccgg/iadv/