

# smokerlyzer<sup>®</sup>



## Micro 4 Smokerlyzer<sup>®</sup>

Breath Carbon Monoxide (CO) Monitor

### Operating Manual

	<b>Page</b>
Introduction	1
Quick Start Guide	2
Pack Contents List	3
Instrument Layout	4
Warnings & Maintenance	5
Operation	6
Calibration	9
Specification	11
Troubleshooting	12
Spares & Warranty	13

## Intended Use

The Micro 4 Smokerlyzer® is a Breath Carbon Monoxide (CO) Monitor for use in quit smoking programmes. It shows the dangers of smoking and tracks progress of people who are trying to stop.

Carbon Monoxide is a toxic, odourless, colourless, tasteless gas. It is formed from incomplete combustion of organic material at high temperatures with an insufficient Oxygen supply. When inhaled, CO competes successfully with Oxygen in the bloodstream to form carboxyhaemoglobin (COHb). This starves the body tissues of the Oxygen vital to repair, regeneration and general living. CO can remain in the bloodstream for up to 24 hours, depending on a range of factors including physical activity, gender and inhalation intensity. The half-life is about 5 hours.

## CO (ppm)/Carboxyhaemoglobin (%COHb) Correlation

Breath Carbon Monoxide is measured in parts per million (ppm) and blood Carboxyhaemoglobin in percentages (%COHb).

In fact the two are compatible and convertible, CO relating to lung/breath and COHb to blood gas. The monitor displays both CO ppm and %COHb.

Clinical research has demonstrated that a useful relationship between Carbon Monoxide and Carboxyhaemoglobin is obtained after a short period of breath holding by the person. CO readings demonstrate the levels inhaled of poisonous CO, while the COHb reading shows the percentage of vital Oxygen that has been replaced in the bloodstream.

Many government bodies stipulate a maximum CO exposure in industrial environments as 35ppm CO for no more than eight hours time-weighted average.

1. Switch on the unit (The ON/OFF switch is located on the side of the monitor). Wait for the display to show the ready message "O.K. Micro 4"
2. Press and release the GO button and initiate a 15 second countdown.
3. Ask the user to hold their breath throughout the countdown.
4. When the countdown has finished ask the user to exhale slowly but gently into the mouthpiece. Aim to empty the lungs as far as possible.
5. The Micro 4 displays the current peak gas reading on the LCD and one or more of the "Traffic Light" LEDs will be on as follows:

Traffic Light LEDs

GO &amp; ON/OFF Switches

LCD Reading (ppm CO)	Green LED	Amber LED	Red LED
0-10 (non-smoker)	Flashes	Off	Off
11-20 (light smoker)	On	Flashes	Off
>20 (heavy smoker)	On	On	Flashes

6. After a few seconds the display only responds to gas values higher than it has already acquired (peak hold).
7. The display will be held indefinitely (until the monitor is switched off), and the unit can now perform another test if the GO button is pressed again.
8. A new mouthpiece should be used for each person being tested.
9. The T-Piece/ mouthpiece assembly should be removed between tests and the air around the sample vent stirred to ensure none of the previous sample remains in the sensor.

**Note:** It is not necessary to press the zero button between each reading.

### 3 Pack Contents List

#### Key

1. Micro 4 Smokerlyzer® monitor
2. T-piece sampling system
3. Cardboard disposable mouthpieces (x3)
4. Calibration screwdriver
5. Battery
6. Operating manual
7. Carrying case



The monitor is a compact unit designed for portable use. The front panel offers a gas sample port, an LCD display, switches, buttons and three "Traffic Light" LEDs. The Green, Amber and Red "Traffic Light" LEDs give an immediate indication of the user's smoking habit.

The case is made of rugged plastic (ABS) for wipe-clean use. The various operations of the unit are displayed on the LCD and controlled using the push buttons. The unit has no user-adjustable parts apart from the span preset control for calibration.

A 2.5mm audio jack connector provides RS232 communications to an external computer. A simple command set enables the device to be fully controlled by a suitable PC program.

## Key

1. 2-Line LCD message display
2. Traffic Light LEDs
3. T-piece sampling system
4. Disposable cardboard mouthpiece
5. ON/OFF Switch
6. ZERO button
7. GO button
8. Battery Compartment
9. Span adjustment
10. Socket for PC lead
11. Alternative one-way valve single use mouthpiece



## 5 Warnings & Maintenance

---

### Routine Maintenance

- Calibrate the monitor using Bedfont 50 ppm CO in air calibration gas every month (see Page 9). Once calibration has been carried out, the date should be recorded and the next calibration date diarised.
- Replace batteries when indicated.
- Replace T-piece sampling system every month or if visibly soiled or contaminated. It cannot be cleaned or sterilised. Record every time this is done and diarise the replacement date.



### Cleaning

Wipe the instrument and external T-piece surfaces with a product specifically developed for this purpose. Bedfont provides an '**Instrument Cleansing Wipe**'

**NEVER** use alcohol or cleaning agents containing alcohol or other organic solvents as these vapours will damage the CO sensor inside.

Under no circumstances should the instrument be immersed in liquid or splashed with liquid.

### Batteries

Batteries should be removed if the instrument is not likely to be used for some time.

Additional technical information can be made available on request; please contact Bedfont or its distributor.

Ensure the PP3 battery is correctly located in battery compartment.

Attach T piece sampling system, with the mouthpiece attached, to the monitor. Check all connections are pushed firmly together.

Switch the ON/OFF switch to ON. The unit displays a sign-on message:

```
Bedfont
Micro4
```



It will then display the following:

```
*ZEROING*
-----
-----
```

This shows that the sensor input is either higher or lower than its zero set point as it settles.

Then it displays

```
SENSOR O.K.
-----
-----
```

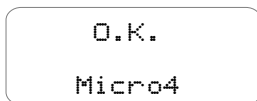
while it automatically initialises and zeros itself, it then goes to a 'normal' operation mode, at which point the display will show:

```
*ZEROING*
-----
-----
```



## 7 Operation Continued

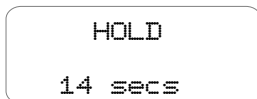
The display then changes to a “ready” screen:



O.K.  
Micro4

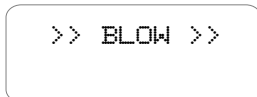
In this mode it is ready to start a test. To take a reading, press and release the “GO” button. At the same time ask the user to hold their breath

A 15 second (breath hold) countdown is displayed:



HOLD  
14 secs

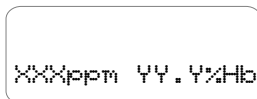
When the countdown reaches zero the following is displayed:



>> BLOW >>

The user then exhales slowly and gently into the mouthpiece. The aim is to empty the lungs as far as possible.

The display shows a bargraph on the top line and:



XXXXXXXXXX  
XXXppm YY.Y%HB

on the lower display line (where XXX is the ppm value and YY.Y is the converted COHb value).

In addition one or more of the “Traffic Light” LEDs will be on.

See the Step by Step guide opposite for more details.

## Taking a Reading - Step by Step

- Press and release the GO button and initiate a 15 second countdown.
- Ask the user to hold their breath throughout the countdown.
- When the countdown has finished exhale slowly but gently into the mouthpiece. Aim to empty the lungs as far as possible.
- The Micro 4 displays the current peak gas reading on the LCD and one or more of the "Traffic Light" LEDs will be on as follows:

LCD Reading (ppm CO)	Green LED	Amber LED	Red LED
0-10 (non-smoker)	Flashes	Off	Off
11-20 (light smoker)	On	Flashes	Off
>20 (heavy smoker)	On	On	Flashes

- After a few seconds the display only responds to gas values higher than it has already acquired (peak hold).
- The display will be held indefinitely (until the monitor is switched off), and the unit can now perform another test if the GO button is pressed again.
- A new mouthpiece should be used for each person being tested.
- The T-Piece/ mouthpiece assembly should be removed between tests and the air around the sample vent stirred to enable the sensor to 'see' a zero reading.

## 9 Calibration

The Micro 4 should be calibrated at 6 monthly intervals. This can be accomplished by returning the unit to Bedfont Scientific or your distributor or by using a Bedfont calibration kit. The kit comprises of a calibration adaptor, gas can (filled with 50ppm CO in air mixture), fine control valve and flow indicator and plastic tubing.

### Connecting the Micro 4 to the calibration kit

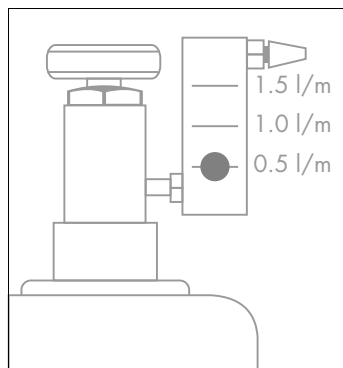
Ensuring that the valve is in the OFF position (turn the valve knob clockwise), screw the fine control valve and flow indicator assembly to the gas can. This is best done by screwing the gas can into the valve.

With the tubing, connect the calibration adaptor and the flow indicator. Warming the end of the tubing using a hair dryer or lighter will assist connection.

Insert the calibration adaptor into the T-piece sampling system in place of the mouthpiece.

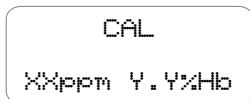
Insert the T-piece sampling system into the Micro 4 sensor housing, ensuring that all connections and sampling system are firmly pushed in place to prevent leakage of the calibration gas (see photograph opposite).

Open the fine control valve and allow the gas to flow at 0.5 litres/minute. To maintain this, adjust the flow so the ball in the Flow Indicator remains at the lower line (see diagram opposite).



## Calibration Procedure

To start the calibration process press the ZERO button during the first few seconds of the breath-hold countdown. The display changes to:



Where XXX is the real-time ppm reading of the applied calibration gas, not the peak held value as with a normal reading. YY.Y is the converted COHb value. Calibration mode may be exited at any time by pressing the GO button briefly.

Allow gas to flow through the instrument for 1½ minutes to ensure accurate calibration, again monitoring the rate of flow.

If after 1½ minutes, the ppm reading does not show between 48 and 52ppm, using the screwdriver, adjust the SPAN control on the underside of the instrument, until a reading of between 48 and 52ppm is displayed. Turning clockwise will increase the reading and turning anti-clockwise will decrease it.

When complete press the GO button to exit the Calibration mode.

Turn off the gas flow, remove T-piece sampling system and disconnect the calibration adaptor. Unscrew the fine control valve and flow indicator from the gas can and store safely. If valve is left in the can, the gas could escape.

## 11 Specification

---


Concentration Range:	0-250 ppm Carbon Monoxide
Display:	2 row alphanumeric LCD
Resolution:	+/-2 ppm
Power:	+9VDC (PP3 battery or equivalent)
Power Consumption:	Approx. 90mW MAX.
Sensor:	Electrochemical Cell
Response Time:	Approx. 40 seconds
Linearity:	Intrinsically Linear
Weight:	Approx. 220g including battery
Operating Temperature Range:	Standard room conditions
Construction:	Case - ABS, T-piece - Polypropylene
Dimensions:	65 (D) x 90 (W) x 145 (H) mm



Meets the essential requirements of the Medical Device Directive 93/42/EEC Annex V. Certificate No. CE:01469.

If the display fails to respond with a known smoker being tested then a fault has occurred with the sensor and the user should contact Bedfont Scientific or their local representative.

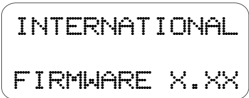
If the display shows:



! V BATT V !

This indicates that the batteries are low and should be replaced immediately to prevent damage to the unit. If problems still occur, the unit should be returned to Bedfont or their local representative for checking.

It is possible to display the firmware version and language setting of the unit. Switch on the monitor with the Zero button held in and the unit will display:



INTERNATIONAL

FIRMWARE X.XX

The LEDs will also slowly flash in sequence to indicate they are working. Release the Zero button and the unit will continue to start up normally.

## 13 Spares & Warranty

---

### Warranty

Bedfont Scientific Limited warrants the Micro 4 Smokerlyzer (batteries excepted) to be free of defects in materials and workmanship for a period of one year from the date of shipment. Bedfont's sole obligation under this warranty is limited to repairing or replacing, at its choice, any item covered under this warranty when such an item is returned intact, prepaid, to Bedfont Scientific Limited or the local representative.

**Note:** Sensors are guaranteed for a period of six months from the date of shipment from Bedfont.

These warranties are automatically invalidated if the products are repaired, altered or otherwise tampered with by unauthorised personnel, or have been subject to misuse, neglect or accident.



At the end of the product's life, do not dispose of any electronic instrument in the domestic waste, but contact Bedfont or its distributor for disposal instructions.

30 Washington Avenue  
Suite B  
Haddonfield, NJ 08033  
Tel: (800) 707-5751  
Fax: (800) 721-2377  
Email: [info@covita.net](mailto:info@covita.net)  
[www.covita.net](http://www.covita.net)

**bedfont**  
scientific contributions to health







# smokerlyzer®



**coVita**

30 Washington Avenue  
Suite B  
Haddonfield, NJ 08033  
Tel: (800) 707-5751  
Fax: (800) 721-2377  
Email: [info@covita.net](mailto:info@covita.net)

[www.covita.net](http://www.covita.net)