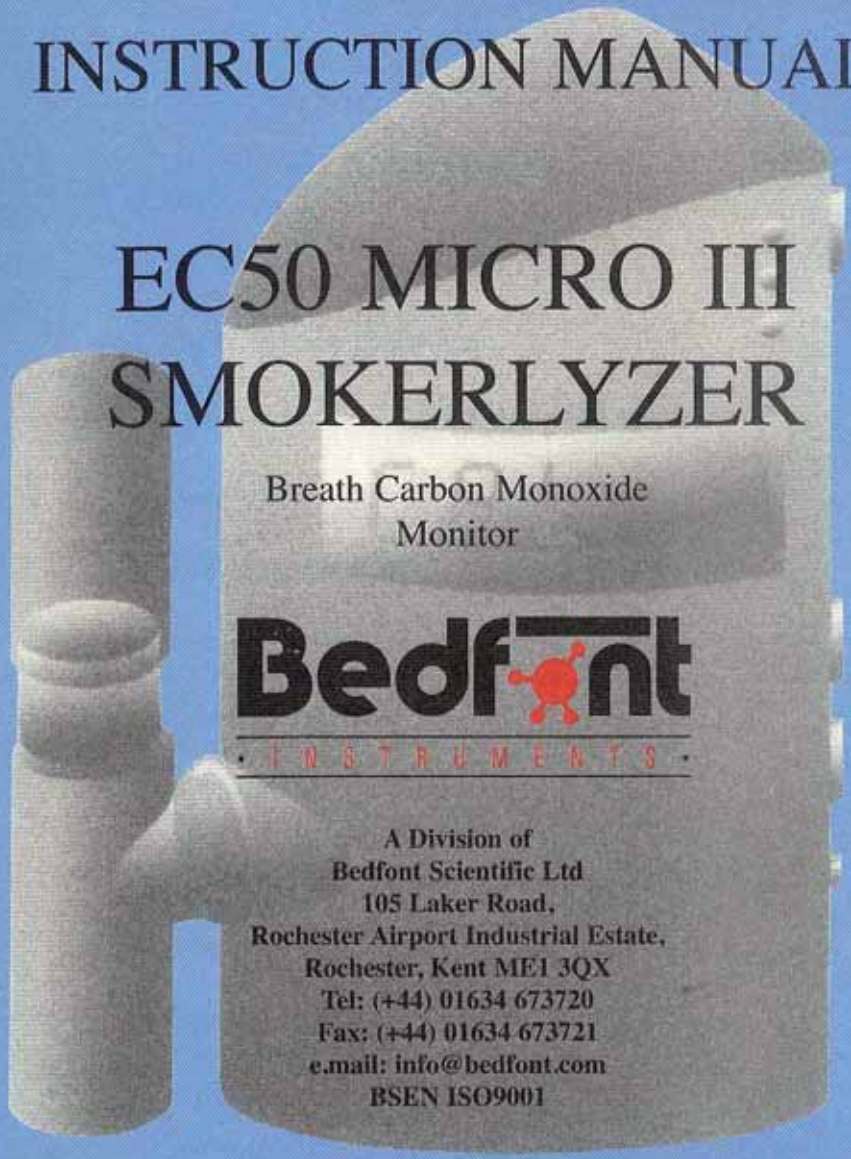
INSTRUCTION MANUAL

EC50 MICRO III SMOKERLYZER

Breath Carbon Monoxide Monitor



Bedfont

INSTRUMENTS

A Division of
Bedfont Scientific Ltd
105 Laker Road,
Rochester Airport Industrial Estate,
Rochester, Kent ME1 3QX
Tel: (+44) 01634 673720
Fax: (+44) 01634 673721
e.mail: info@bedfont.com
BSEN ISO9001

Please read this manual before using the Smokerlyzer

Issue 7

CONTENTS

THE BEDFONT EC50 Micro Smokerlyzer

Breath Carbon Monoxide Monitor

INTRODUCTION

1. THE EC50 Micro Smokerlyzer

Welcome to the EC50 Smokerlyzer. It is probably the most user-friendly, accurate and rapid lung-breath Carbon Monoxide (CO) and bloodstream Carboxyhaemoglobin (COHb) monitoring system yet developed.

Clear, rapid displayed readings give instant feedback of results, to which a diagnosis of possible CO poisoning can be made.

2. CARBON MONOXIDE (ppm)/CARBOXYHAEMOGLOBIN (%COHb) CORRELATION:

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 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, sex and inhalation intensity. The half life is about 5 hours.

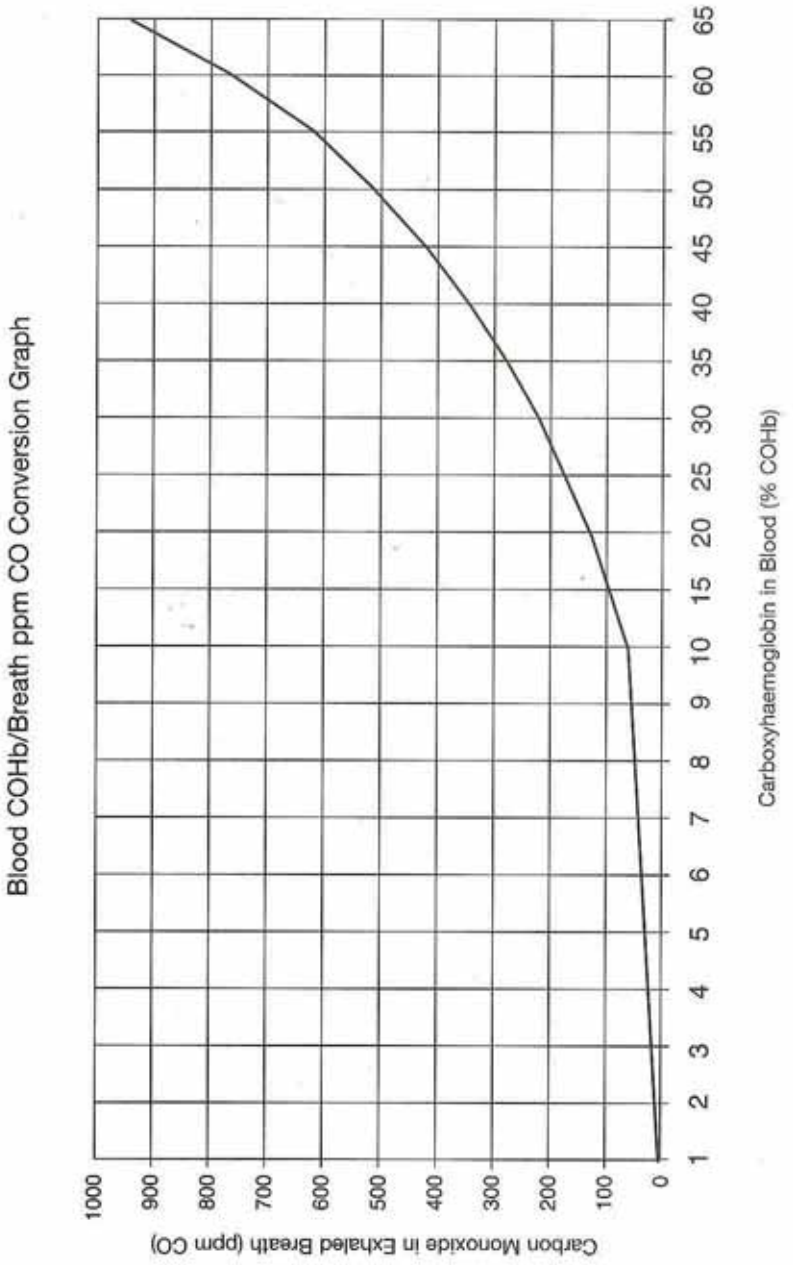
Breath Carbon Monoxide is measured in parts per million (ppmCO) and blood Carboxyhaemoglobin in percentages (%COHb). But the two are compatible and convertible, CO relating lung/breath and COHb to blood gas. The Smokerlyzer usually displays COppm, but can be automatically converted to COHb.

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 50ppm CO for no more than eight hours time-weighted average.

PAULCOHB.XLC Chart 1



3. PACKING LIST

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

4. DISPLAY AND FUNCTIONS

The LCD gives a three digit display, low battery symbol, ppmCO, and %COHb indicators. In addition, the LCD shows a 15 second countdown during which the patient holds a lung-ful of breath before providing the end-tidal breath sample. The instrument also has LED's which give an immediate indication of the patient's smoking habit where:

0-10ppm CO (Non Smoker) – Green LED flashes

11-20ppm CO (Light Smoker) – Amber LED flashes

21+ppm CO (Heavy Smoker) – Red LED flashes

The Auto Zero enables the operator to zero the instrument before use, ensuring accurate readings every time.

Once the end-tidal breath sample has been obtained the ppmCO reading is shown on the LCD, with the highest value remaining on the LCD. The user can, by pressing the black % button, show the patient's breath blood %COHb level. Thus, in a single operation, COHb and CO levels are demonstrated effectively and accurately.

5. OPERATING INSTRUCTIONS

Step 1

Ensure battery is located in battery compartment. If an audible alarm is required, switch alarm switch on side panel to ♫. or else switch to ♫. Switch ON/OFF switch to ON position. If low battery symbol is displayed, **switch instrument off** and replace 9 volt alkaline battery which is located in the battery compartment. Then repeat from step 1.

Step 2

Display will show *888* followed by a ppm value.

Step 3

Wait for display value to become stable. After warm up period, press and hold the red ZERO button. The display will show *SET*, followed by *CAL*, and finally *GO* (approximately 3 seconds). Release red ZERO button.

Step 4

Connect T-piece sampling system with the cardboard disposable mouthpiece inserted, into instrument. Ensure all connections are pushed firmly together.

Step 5

Press the blue GO button within 2½ minutes and ask the patient to hold his/her breath during the 15 second countdown period. (If the blue GO button is not pressed within 2½ minutes, the display will show *ERR* followed by real time monitoring. To get back to the *GO* message, the red ZERO button should be pressed and held, until the display shows *SET*, followed by *CAL* and finally *GO* (approximately 3 seconds) then repeat from step 5. The patient should then exhale slowly and gently, emptying the lungs as far as possible. A powerful exhalation may dislodge the valve and will not necessarily provide the desired end-tidal air sample.

NOTE: People with lung diseases or chest ailments may not be able to achieve the 15 second breath-hold. In such cases, initiate the 15 second countdown, wait for 0ppm to show on the LCD, and then instruct the patient to inhale. Hold breath as long as possible, and exhale through the sampling system mouthpiece. If people with contagious diseases are being analysed, Bedfont recommend the sampling system be replaced after use. Please note the sampling system should **not** be immersed in water

Step 6

The display will then flash while the ppm value is rising and become constant once the maximum value is reached. Pressing the black % button will show the corresponding %COHb value, and on release will revert back to display the ppm value. The maximum value will then be stored on the display until step 7 or switch off.

Step 7

If any further readings are required, remove T-piece and press and release the blue GO button, which reverts back to real time monitoring. Allow the display to fall **to 0ppm.** Press the red ZERO button to allow the display to show *GO*. Repeat from step 5.

Note:– Always allow display to fall to 0ppm.
In addition this applies when no further readings are to be taken, and the unit is to be switched off.

6. CALIBRATION PROCEDURE

For continued accurate use, calibration on a six monthly basis is recommended.

Step 1

Ensure battery is located in battery compartment. If an audible alarm is required switch alarm switch on side panel to ♫, or else switch to ♫. Switch ON/OFF switch to ON position. If low battery symbol is displayed, **switch instrument off** and replace 9 volt alkaline battery which is located in the battery compartment. Then repeat from step 1.

Step 2

Display will show *888* followed by a ppm value.

Step 3

Wait for display to fall and become stable. After warm up period press and hold red ZERO button. The display will show *SET*, followed by *CAL* and finally *GO* (approximately 3 seconds). Release red ZERO button.

Step 4

Ensuring that the value is in the OFF position, screw the Fine Control Valve (FCV) and Flow Indicator (FI) assembly to the gas can. This is best done by screwing the gas can into the valve.

Step 5

With the tubing, connect the Calibration Adaptor and the Flow Indicator. (Warming the end of the tubing will assist connection).

Step 6

Insert the Calibration Adaptor into the clear section of the T-piece sampling system.

Step 7

Press the blue GO button until 0:15 appears on the LCD, indicating initiation of the 15 second countdown.

Step 8

At the end of the countdown, 0ppm should appear on the LCD. If it does not, repeat the sequence from step 1. When 0ppm shows on the LCD, calibration may proceed.

Step 9

Insert the T-piece sampling system into the Smokerlyzer sensor housing, ensuring that all connections are pushed firmly into place.

Step 10

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.

Step 11

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

Step 12

If after 1½ minutes, the LCD does not show 50ppm, press and release the blue GO button and using the screwdriver, adjust the SPAN control on the underside of the instrument, until display shows 50ppm. Turning anti-clockwise will increase the reading and turning clockwise will decrease the reading.

Step 13

Turn off the gas flow, remove T-piece sampling system and disconnect the Calibration Adaptor from the T-piece sampling system.

Step 14

Unscrew the Fine Control Valve and Flow Indicator from the gas can and store safely. If valve is left in can, the gas could escape.

Step 15

If further readings are required repeat from step 7 of operating instructions, otherwise switch 'ON/OFF' switch to 'OFF' position.

7. What to do IF . . .

There is no LCD or panel response under gas when sampling with new batteries?
Return the equipment immediately to Bedfont Scientific Ltd or the local representative. Under no circumstances attempt to locate and correct the fault yourself.

LCD readings are erratic and unsteady?
Check battery strength by switching the unit off and then back on again. If the LOW BATTERY warning appears, **switch instrument off** and change the battery.

The Smokerlyzer returns consistently low readings or none at all?
Check the condition of the Flutter Valves inside the sampling system. Under frequent use, saliva deposits can cause valves to stick. DO NOT attempt to clean, but replace the complete sampling system immediately.

If, after replacement, there is no improvement in performance, return the Smokerlyzer to Bedfont Scientific Ltd or the local representative.

The LOW BATTERY warning shows on the LCD?
Switch instrument off and change battery immediately. Replacement battery should be good quality.

Your Smokerlyzer is dropped or immersed in liquid?
Return the instrument to Bedfont Scientific Ltd or the local representative for checking.

NEVER, UNDER ANY CIRCUMSTANCES, ATTEMPT TO IMMERSE THE SENSOR IN ANY FLUID. THE SENSOR IS A SEALED UNIT WHICH DOES NOT NEED STERILISING. DO NOT ATTEMPT TO REPLACE OR MODIFY THE SENSOR YOURSELF.

ALL ACCESSORIES ARE DISPOSABLE. REPLACEMENT PARTS CAN BE PURCHASED FROM BEDFONT SCIENTIFIC LTD.

8. TECHNICAL SPECIFICATION

Gas Detected:	Carbon Monoxide (CO)
Concentration Range:	0-500ppm
Calibration Flowrate:	0.5 litres/minute
Detection Principle:	Electrochemical sensor
Accuracy:	+/-2% of reading
Hydrogen Cross Interference:	<7.5% @20°C
Alcohol Cross Interference:	Negligible
Display:	Liquid Crystal Display
Power Input:	PP3 alkaline battery (9v ⎓ 6LF22/Equiv)
Note:	To avoid long start up times, ensure Smokerlyzer is switched OFF if battery is removed.
Warm up Time:	Typically less than 30 seconds
Response Time:	Under 30 seconds to 90% FSD
Drift:	Typically less than 10% signal loss/year

Operating Temperature Range:	0-40°C
Operating Humidity Range:	0-100%
Sensor Operating Life:	2-3 years. 6 months warranty
Sensor Sensitivity:	1ppm
Dimensions:	63 (D) x 85 (W) x 144 (H) mm
Weight Including Battery:	Approx. 225 grammes
Construction:	Plastic
Recommended Storage Temperature:	0-30°C

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

9. REFERENCES

The following clinical and research references are available from Bedfont.

Low Cost Carbon Monoxide Monitors in Smoking Assessment; Jarvis, Belcher, Vesey, Hutchinson, (Thorax 1986; 41; 886-887)
Evaluation of a Portable Measure of Carbon Monoxide; Irving, Phil, Clark, Crombie, Smith, (Preventive Medicine 1988; 17; 109-115)

Bedfont
SCIENTIFIC LTD

10. GUARANTEE AND CUSTOMER SERVICE

INSTRUMENT GUARANTEE

BEDFONT INSTRUMENTS WARRANTS PORTABLE INSTRUMENTS OF ITS OWN MANUFACTURE (BATTERIES, FUSES, LAMPS, TUBING, FITTINGS AND FILTERS 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 ITEM IS RETURNED INTACT, PREPAID, TO BEDFONT SCIENTIFIC LTD 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.