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Package Contents

The CO Check+ is supplied with:

1. CO Check+ (Cat. No. CO10)
2. 22 mm plastic mouthpiece adapter (#PSA1800)
3. 22 mm reducing connector for calibration (#MEC1007))
4. 9 Volt Battery
5. 4 Disposable cardboard mouthpieces (#3301)
6. Soft shell carry pouch (# CS101)
7. Operating Manual
**Overview**

The CO Check+ is a hand held portable battery operated device used for measuring the carbon monoxide (CO) concentration on the breath and calculating the percentage of carboxyhemoglobin (%COHb) in the blood.

The CO Check+ is specifically designed as a screening tool for smoking cessation. In smoking cessation clinics, it is used for checking the subject’s progress and compliance.

The CO Check+ is easy to use, very accurate and requires a single breath into the device to display CO results in parts per million (PPM) and the percentage of carboxyhemoglobin (%COHb).

**Operation (with Environment reading enabled)**

Insert the 9 volt battery (#4) supplied by removing the battery cover and clipping the battery in place, replace the battery cover. Insert the plastic mouthpiece adapter (#2) followed by a cardboard mouthpiece (#5).

Turn the CO Check+ ON by pressing power key 🔄. The device will display CO then the version number before starting the countdown timer.

If the environment reading is enabled, the unit will countdown for 10 seconds to ensure that the sensor is stabilized.
When the countdown timer reaches zero it will display the current environment reading.

If the Environmental monitor is disabled, it will zero to ambient air automatically.

Press the Select Function key and the unit will start 'breath hold' countdown timer of 15 seconds (CO Check+). Encourage the subject to hold the breath until the unit beeps to start the test. The display will show the blow icon.

The subject should place their lips around the cardboard mouthpiece and blow gently and continue blowing until their lungs are completely empty. CO is collected in the last portion of the breath (alveolar breath).
Test Reading Display

The CO Check will beep and show the final reading in PPM (parts per million).

By pressing the Select Function key the reading changes to %COHb (carboxyhemoglobin).

Pressing again reverts back to PPM.

⚠️ The maximum reading the CO Check+ can measure is 99 PPM. Any reading above that will be displayed as - - (over range).

After examining the readings, the unit can either be switched off using the ON/OFF Power key or another measurement can be carried out by pressing the Select Function key for at least three seconds.

💡 To save the battery, the unit will switch OFF automatically after three minutes if not used.
Warning/Cautions

⚠️ If higher than expected levels of CO are displayed this could be due to CO poisoning and medical attention should be immediately sort.

⚠️ The CO Check+ has a cross-sensitivity to hydrogen (from some gastro-intestinal disorders) which may affect the reading.

⚠️ Cleaning with products that contain alcohol may result in permanent damage to the sensor. (See page 13 for non-alcohol wipes)

⚠️ The battery should be changed when the word ‘BAT’ appears on the display.

The disposable cardboard mouthpieces are single-use only. Re-use of these single use mouthpieces can increase the risk of cross infection and the mouthpiece should be disposed of after use by the patient.
Calibration

The device should be recalibrated at least once every six months. Calibration gas can be purchased from Micro Direct, Inc., see page 13 for full ordering details.
To calibrate the device, perform the following steps:

1. Connect the control valve (Cat No MC22) to the 20 ppm gas cylinder. (Cat. No. MC10) calibration gas cylinder shown in the diagram above.

2. Connect the short plastic tubing reducing connector (Cat No MEC1007).

3. Switch ON the device with the select key pressed until the device displays ‘Cb’. Release the select key.

4. The device will countdown from 15 to 0 with CAL symbol ON. It will then display the blow icon.

5. Attach the connector and turn the control knob fully counter-clockwise until knob will not turn any further. The supply of gas is .25 L/second.

6. Apply this flow until the device beeps after 20 seconds then turn the gas off. The device will display the gas concentration reading.

7. If the reading is not 20 ppm, press the select key for at least 3 seconds to accept the new calibration value. The device will say ‘dn’ (done) and then will show 20 ppm.
It is advisable to accept the calibration even though it displays 20 ppm. This will reset the calibration due timer.

Switch off the device if the calibration was incorrectly performed. Do not press the select key.

⚠️ To prevent incorrect calibration, only the readings within the range of 16-24 can be calibrated. An ‘Er’ (Error) message will be displayed if the calibration is accepted for reading outside this range.

8. Switch off the device; wait for a minute and it is now ready for use.

If the device is not calibrated for six months, the device will beep three times before countdown starts and will display ‘Cd’ (Calibration due) for 3 seconds. Thereafter the device will operate as normal but the reading will not be guaranteed.
Setting Environment Mode

Environment reading on start-up can be disabled or enabled. Switch ON the unit and wait for the countdown to begin. When the number \( \begin{array}{c}
\text{5}
\end{array} \)

is displayed, press the Select Function key. When the unit beeps at 4, release the Select Function key. At the end of the countdown, the unit will display ‘En’ for 3 seconds followed by either ‘OF’ (Off) or ‘On’ – your current setting.

\[\begin{array}{c}
\text{En} \quad \text{On} \quad \text{OF}
\end{array}\]

Press the Select key momentarily (< 0.5 sec), to change the mode. Press the Select key for more than 3 seconds to accept the mode, either ‘On’ or ‘OF’ (Off). Thereafter the unit will restart with your selected setting.

Battery Life

The 9 volt battery should give at least 30 hours of continuous use. When the battery is low, it will display ‘bL’ (battery low) for three seconds.
The device can still be used, but it is advisable to replace the battery.

💡 It is recommended to use an alkaline battery.

⚠️ The device will need recalibration after the replacement of the battery. *Duracell notification* - *alkaline batteries can be safely disposed of with normal household waste. Never dispose of batteries in fire because they could explode.*

If the battery is very low such that the reading is not reliable, it will display ‘bd’ (battery dead) and will not operate any more.

![bd]

**Power Saving**

To save battery power, the device will automatically turn itself off after three minutes of the last key press. Do not remove the battery unless the device is not going to be used for a very long time. Remember, calibration will be required when the battery is reconnected.

💡 To prevent the device from switching off, press the select key within three minutes of last press or when the reading is first displayed.
Cleaning

The plastic mouthpiece adapter is recommended to be replaced after approximately 250 tests. It can be cleaned in mild detergent sterilization solution then rinsed with water after use and left to dry thoroughly.

The device can be cleaned using non-alcohol wipes (see page 13). Please be certain not to touch the surface of the sensor or allow moisture to do the same.

Cleaning with products that contain alcohol may result in permanent contamination of the sensor.

Servicing

If your unit requires servicing or repair, please contact Micro Direct, Inc.

The CO Sensor should be replaced every two years.

If the device starts with ‘Er’ (Error) message, it should be returned for service.

service@mdspiro.com
Tel: 800-588-3381 or 207-786-7808
**Consumables**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC15</td>
<td>CO Calibration Kit</td>
</tr>
<tr>
<td>MC10</td>
<td>CO Replacement Tank (17 Liters)</td>
</tr>
<tr>
<td>MC22</td>
<td>Control Valve for Calibration</td>
</tr>
<tr>
<td>3301</td>
<td>Mouthpieces 100 per bag</td>
</tr>
<tr>
<td>PSA1800</td>
<td>Intermediate plastic adaptors 10 per pack</td>
</tr>
<tr>
<td>CS100</td>
<td>Replacement of fuel cell, calibration, battery and service</td>
</tr>
<tr>
<td>GC01</td>
<td>CO Guide chart</td>
</tr>
<tr>
<td>CS101</td>
<td>Soft shell carry pouch</td>
</tr>
<tr>
<td>46-70</td>
<td>Protex Disinfectant Wipe (120/canister)</td>
</tr>
<tr>
<td>FC50</td>
<td>Fuel cell for CO Check+</td>
</tr>
</tbody>
</table>
## Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Detected</td>
<td>Carbon Monoxide</td>
</tr>
<tr>
<td>Concentration Range</td>
<td>0 – 99 PPM</td>
</tr>
<tr>
<td>Detection Sensor Used</td>
<td>Electrochemical fuel cell</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>0.1 PPM (0-10 PPM range); 1 PPM (10-99 PPM range)</td>
</tr>
<tr>
<td>Accuracy (repeatability)</td>
<td>±2%</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>41 - 95 degrees F</td>
</tr>
<tr>
<td>Operating Pressure</td>
<td>Atmospheric 10%</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>30% to 90% RH</td>
</tr>
<tr>
<td>Operating Altitude</td>
<td>Sea level to 6000 ft</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>68 - 158 degrees F</td>
</tr>
<tr>
<td>Storage Humidity</td>
<td>10% to 90% RH</td>
</tr>
<tr>
<td>Hydrogen Cross-Sensitivity</td>
<td>&lt;12% at 68 degrees F</td>
</tr>
<tr>
<td>Sensor Life</td>
<td>2 years</td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
</tr>
<tr>
<td>Sensor Drift</td>
<td>&lt;2% per month</td>
</tr>
<tr>
<td>Display</td>
<td>Custom LCD</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Single 9 volt battery</td>
</tr>
<tr>
<td>Weight</td>
<td>Approximately 5 ounces</td>
</tr>
<tr>
<td>Dimensions</td>
<td>5” x 2.5” x 1.25”</td>
</tr>
</tbody>
</table>
Symbols

In accordance with Directive 93/42/EEC

0120

Type B Device

Environment

This instrument complies with directive EEC89/336 electromagnetic compatibility but may be affected by cellular phones and by electromagnetic interference exceeding levels specified in EN 50082-1:1992
Appendix A – CO Check+ and Smoking Cessation

The CO Check+ (#CO10) is an innovative Carbon Monoxide monitor designed specifically for use in smoking cessation programs and clinics.

All patients attending a smoking cessation program should have their smoking habits established and checked with the CO Check+ at every visit. The results of an initial test may sound alarming to many smokers but within a few days of stopping, CO levels can drop to normal and it is very encouraging for a smoker to see this. CO monitoring is an extremely powerful tool for a smoking cessation counselor, physician or respiratory therapist.

Taking a test before a COPD patient stops smoking will help you gauge their level of nicotine dependence, and taking it after they have stopped will give them real proof that what they are doing is working.

The best time to do a test is in the afternoon as CO levels fall over-night and morning readings can sometimes give misleading low results. High reading in the morning, on the other hand, would be strong evidence of heavy inhalation and high nicotine dependence.

One single breath of expiration into the CO Check+ will give instant results in PPM and %COHb.
Appendix B – CO Check+ and Environmental Capture

When the Environmental reading is enabled, background CO levels are taken into account when carrying out a breath test. If the background levels are 10ppm for example, then when the person is taking a breath test this background reading of 10ppm will be taken into account.

For example, if the Environmental monitor is ON and a reading of 10ppm is detected and the patient records 3ppm for example, then the measurement displayed will be the higher value i.e. 10ppm.

Conversely, if the Environmental monitor is OFF, then the measurement displayed will be value recorded by the patient i.e. 3ppm.