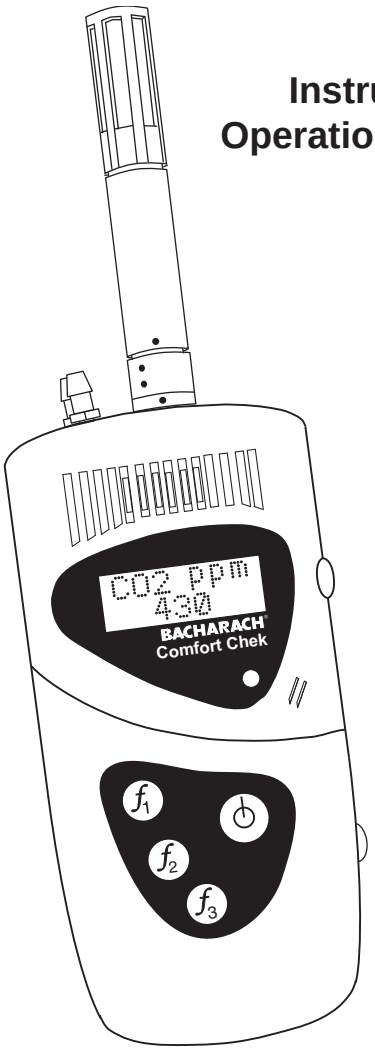
BACHARACH®
The Measurable Difference

# Comfort Chek
## 100 / 200

### Instruction 0019-9321
### Operation & Maintenance

**Rev. 4 – May 2010**

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# Contents

# 1.0 INTRODUCTION

## 1.1 General

Bacharach's line of $CO_2$ Analyzers are easy to use, but it is essential that these Operating Instructions be read and understood by all operators and maintenance personnel prior to using or servicing the instrument.

The Bacharach Comfort Chek is a versatile handheld instrument that is ideal for verifying indoor air comfort and quality, environmental health and general safety monitoring, controlled atmosphere monitoring, and trend analysis using data-logging.

Available in two models:
- *Model 100* – measures $CO_2$, barometric pressure, temperature and humidity (features diffusion gas sampling)
- *Model 200* – measures $CO_2$, barometric pressure, temperature, humidity and CO (features an internal pump for remote gas sampling)

Each reading is displayed separately on an LCD display, with an operator being able to quickly scroll through the readings by pressing the $f_3$ button. A peak-gas-reading mode provides the ability to view the highest gas readings that were detected since the instrument was switched ON.

Both models feature data-logging, run-and-charge capability, and a user-zero function for all gases.

Power is provided by a long-life NiMH battery, which is capable of providing up to 10 hours of continuous operation from one charge.

Built-in memory allows the storage of up to 200 sets of readings, which can later be downloaded to a personal computer for analysis via its integral IrDA communications link and the optional BACH-COM software.

## 1.2 Features

- Normal and peak reading modes
- Up to 10 hours of operation on one charge
- Convenient zero function for all gas sensors
- Integral pump for remote gas sampling
- Long-life sensors ($CO_2$ - 10 years; CO - 2 years)
- Infrared $CO_2$ sensor and electrochemical CO sensor
- Battery capacity display
- Manual (snapshot) and continuous data logging of readings
- Memory capacity for storing up to 200 sets of data
- IrDA link for downloading stored data to a personal computer
- Charge-and-run capability for long-term monitoring
- Weight: 12 oz
- Dimensions: 5.5"H x 2.5"W x 1.4"D

## 1.3 Applications

- IAQ – Indoor Air Quality Checks
- Environmental Health and General Safety
- CAP – Controlled Atmosphere Monitoring
- Trend Analysis using Data-Logging

## 1.4 Measuring Ranges

| **Measurement** | **Range / Resolution** |
|---|---|
| $CO_2$ | 0 to 10,000 ppm / 10 ppm |
| CO (Model 200) | 0 to 500 ppm / 1 ppm |
| Barometric Pressure | 21 to 36" Hg / 0.01" Hg |
| Temperature | 0 to 104°F / 0.1°F |
| Relative Humidity | 0 to 99.9% / 1% |

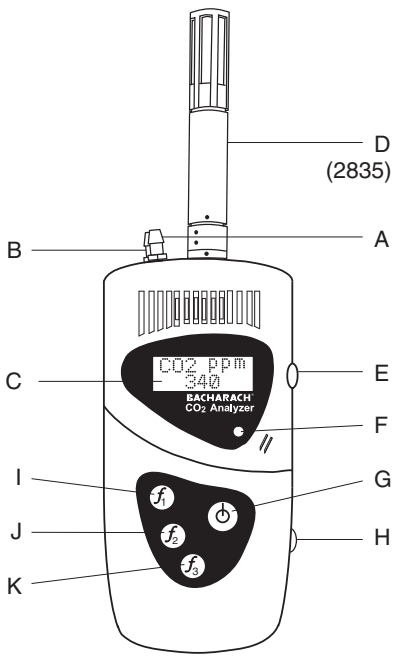
# 2.0 OPERATION

## 2.1 Important Note

Always ensure that the instrument's gas inlet (Figure 1, Item A) and gas outlet (Figure 1, Item B) are unobstructed and open to the atmosphere. Be careful not to breath directly on the instrument while taking a measurement; otherwise, inaccurate readings will result.

## 2.2 Switching the Instrument ON/OFF

Switch ON the instrument by momentarily pressing the ⏻ button. Switch the instrument OFF by pressing the ⏻ button for at least 3 seconds, or until the display goes blank. When first switched ON, there is a warm-up period of approximately 1 minute before the $CO_2$ level begins to be displayed. Note that a normal fresh-air-background reading of $CO_2$ is approximately 340 ppm.




A - Gas inlet fitting

B - Gas outlet fitting (Model 200)

C - LCD display

D - Temperature and humidity sensor probe

E - IrDA link

F - Pump ON light (Model 200)

G - Press once to switch ON instrument; press once to start and stop pump (Model 200); hold 3 seconds to switch OFF instrument (⏻)

H - Battery charging socket

I - Press once to store data; hold to start and stop data-logging ($f_1$)

J - Press once for battery level; hold to start Air Calibration ($f_2$)

K - Press once to scroll through measurement channels; hold for peak gas reading ($f_3$)

*Figure 1. Components of the Comfort Chek*

## 2.3 Pump Operation (Model 200)

With the instrument already switched ON, momentarily pressing the ⏻ button will start and stop the internal pump. The optional Extended Probe Assembly with in-line filter (P/N 0019-3310) can be connected to the gas inlet fitting (Figure 1, Item A) on the top of the instrument for drawing in gas samples from hard-to-reach areas. If desired, a section of $^{1}/_{8}$" I.D. tubing can be connected to the gas outlet fitting (Figure 1, Item B) to exhaust the gas being sampled to an outside area.

Note that the combined sampling hose and probe length should not exceed 6 feet (1.8 m). Also note that the internal pump is intended for use only at normal atmospheric pressure, and is not designed to draw in gas samples against a vacuum or an obstruction such as a kink in the sampling hose. If an obstruction or negative-pressure gradient is present, then gas *will not* be drawn into the instrument. Please consult the factory for applications where longer sampling lengths are required, or where it is necessary to draw against a vacuum.

## 2.4 Pump Contamination (Model 200)

Over time the pump can become contaminated, leading to a slower response time and lower readings. To check for pump contamination, turn ON the pump and hold your index finger over the inlet fitting. The pump should normally stall. If the pump, however, continues to run, then the pump is contaminated and the instrument needs to be returned to Bacharach for repair.

## 2.5 Selecting the Measurement to be Displayed

Depending upon which model of the Comfort Chek was purchased, several different gases and environmental measurements can be taken as described in Section *1.1 General*.

> **Important!** *The temperature and humidity sensor probe (Figure 1, Item D) must be installed for the instrument to operate properly. If this probe is removed, inaccurate temperature and humidity readings will be displayed.*

Each measurement is displayed separately on the instrument's LCD (Figure 1, Item C). The measurement displayed is selected by pressing the $f_3$ button.

Each time the $f_3$ button is pressed, the display scrolls through the following measurements:

| | |
|---|---|
| CO2 ppm<br>340 | Carbon Dioxide<br>(Models 100 & 200) |
| CO ppm<br>0 | Carbon Monoxide<br>(Model 200) |
| Temp F<br>72.4 | Temperature<br>(Models 100 & 200) |
| Baro"Hg<br>28.79 | Barometeric Pressure<br>(Models 100 & 200) |
| RH %<br>45 | Relative Humidity<br>(Models 100 & 200) |

## 2.6 Current / Peak Reading Mode

The instrument can display either the current readings of all measurements, or peak gas readings. While displaying a "gas" reading, pressing and holding the $f_3$ button for 3 seconds switches the instrument to its peak-reading mode. Note that a peak reading is the highest reading taken since the instrument was switched ON.

| | |
|---|---|
| CO2 ppm<br>340 | peakCO2<br>1,530 |

When using the Model 200 in its peak-reading mode, pressing the $f_3$ button toggles the display between 'peak CO2' and 'peak CO'.

To return the instrument to its current-reading mode, again press and hold the $f_3$ button for 3 seconds.

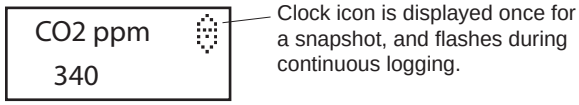
To reset the peak gas readings back to the current readings, switch the instrument OFF and then back ON.

## 2.7 Storing Readings

There are two storage modes available:

- Snapshot
- Continuous Data Logging

Pressing the $f_1$ button once stores (takes a snapshot of) the reading shown on the display.



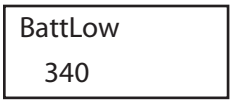

Pressing and holding down the $f_1$ button for at least 3 seconds starts the continuous data logging of the readings at a preset interval (factory set at 15 minutes).

The instrument can store from 100 to 200 readings based on the instrument's configuration. Logging will stop once the instrument's storage capacity has been reached.

The stored data can be downloaded to a personal computer using the instrument's IrDA link and the optional BACH-COM software. This software can also be used to alter the data-logging interval; produce tables and plots of time-based $CO_2$ readings; and clear all logged data from memory.

## 2.8 Battery Low Display

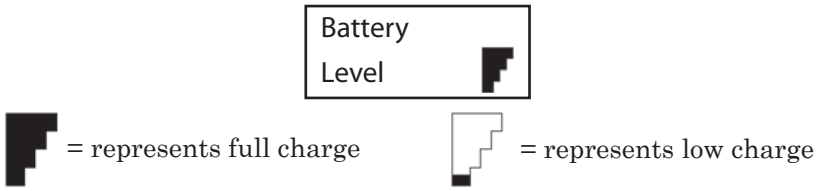
When the battery voltage falls below a pre-determined level, the display will alternate between its current or peak display and




In addition, the beeper will emit three rapid notes every 30 seconds. At this time the instrument should be given a full charge per Section 3.6 as soon as possible.

## 2.9 Battery Charge Display

An indication of the battery's charge level is obtained by pressing the $f_2$ button once. A bar graph in the lower part of this screen shows an approximation of the battery's remaining charge. As the charge reduces, the bar graph decreases in size. Typical operating time from a full charge is approximately 10 hours.




## 2.10 Fault Condition Warning

The instrument is capable of alerting the operator of an internal fault condition (i.e., a sensor failure or blockage in the infrared path). If a fault occurs, the instrument's beeper will sound continuously, and the following message is displayed until the instrument is switched OFF.


If the fault warning is displayed at any time, then the instrument must be returned to Bacharach for servicing.

## 2.11 Powering Instrument from Charger

The instrument can be continuously powered by its charger by connecting the charger to the instrument in the following sequence:

1. Switch ON the instrument *without* the charger attached.

   **Note:** *Connecting a charger to an instrument that is switched OFF causes the instrument to enter its charging mode, which in turn prevents the instrument from being switched ON.*

2. Plug the charger into the appropriate AC wall socket (or 12 VDC when using the optional cigarette lighter adapter). Then plug the charger's output connector into the instrument's charging socket (Figure 1, Item H).

The instrument will now continuously run until it is switched OFF.

# 3.0 MAINTENANCE

## 3.1 Cleaning

Keep the instrument clean by wiping it with a soft cloth dampened with a mild detergent solution.

## 3.2 Sunlight

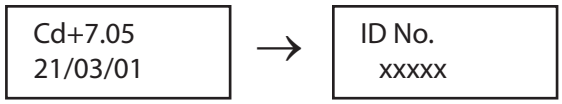
The unit should not be left out in direct sunlight, or in other areas where excessive heat exists, for long periods since component damage due to overheating may result.

## 3.3 Servicing

There are no user-serviceable parts inside the instrument. Unauthorized disassembly of the unit will invalidate the warranty.

## 3.4 Software Version / ID Number

With the instrument switched OFF, and while holding down the $f_1$ button, switch ON the instrument to display its software version and issue date. Releasing the $f_1$ button displays the instrument's ID number for 5 seconds.




## 3.5 Factory Settings

**Important!** *The instrument should only be returned to its factory settings when advised by a Bacharach Service Representative.*

With the instrument switched OFF, and while holding down the $f_2$ button, switch ON the instrument. The display will show:


Keep the $f_2$ button depressed until the display shows:

Release the $f_2$ button and perform an Air Calibration as described in Section 3.7

> **WARNING!** *Failure to perform an Air Calibration after resetting the instrument to its factory settings may cause incorrect gas readings to be displayed.*

## 3.6 Battery Charging

When the 'BattLow' message is displayed (refer to Section 2.8), the instrument must be recharged using the supplied battery charger.

> **Important!** *The battery has a long shelf life, but it is recommended that the battery be* ***recharged once a month*** *if left unused. Batteries that have not been charged for several months should be given at least two charge/discharge cycles before using the instrument.*

As with all rechargeable batteries, there are guidelines that should be observed: The battery should normally be charged at room temperature. Charging at temperatures below 54 °F (12 °C) should be avoided since this may cause a false indication of when the battery is charged, and could also damage the battery.

Before beginning the charging process, first ensure that the instrument is switched OFF. Next, plug the supplied charger into the appropriate AC wall socket (an optional 12 VDC charger with cigarette lighter adapter is also available). Then plug the charger's output connector into the instrument's charging socket (Figure 1, Item H).

The word 'CHARGING' appears while the battery is being charged. Charging time is approximately 2 hours.

> **Note:** *If the battery is deeply discharged, the display will remain blank for a few minutes before the battery begins charging.*

Once the battery is fully recharged, the instrument will emit a beeping tone for 30 seconds and display the word 'CHARGED'. At this time unplug the charger and remove its output connector from the instrument.

## 3.7 Zeroing the Gas Sensor(s)

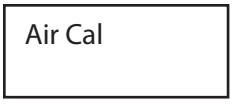
Zeroing the gas sensor(s) consists of performing an Air Calibration in fresh outside air, which sets the $CO_2$ sensor to read 340 ppm (Models 100 and 200) and the CO sensor to 0 ppm (Model 200 only).

> **Important!** *It is essential to ensure that the instrument is in fresh air before attempting an Air Calibration. If this condition is not ensured, incorrect gas readings will occur. Also be careful that your breath does not affect this procedure by keeping your exhaled breath away from the instrument's gas inlet.*

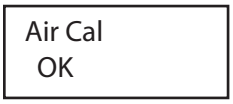
1. Switch ON the instrument, and then allow it to sample fresh outside air for at least 5 minutes.

   When calibrating a Model 200 and after the instrument has warmed up, turn ON its pump for 30 seconds to purge the sensor area, and then turn the pump OFF before proceeding to Step 2.

2. Press and hold down the $f_2$ button until the 'Air Cal' screen is displayed. Note that battery status is first displayed for approximately 2 seconds.

3. Keep the $f_2$ button depressed until the display shows:

   If the procedure was unsuccessful, or if the $f_2$ button released prematurely, then the message

   will be displayed. If this happens, retry the Air Calibration procedure, ensuring that the instrument is only exposed to fresh air. If the procedure is still unsuccessful, then the instrument must be returned to a Bacharach Service Center for evaluation.

4. This completes the Air Calibration procedure.

## 3.8 Removing the Temperature & Humidity Sensor Probe

If desired, the Temperature & Humidity Sensor Probe (Figure 1, Item D) can be removed and the instrument used to primarily measure just gas.

> **Important!** *With the probe removed, the temperature and humidity readings should be disregarded. All other readings are valid.*

> **Note:** *If the probe is reinstalled with the instrument switched ON, observe that 'BattLow' may briefly appear even with a fully charged battery. This is normal and does not indicate that the battery needs recharging.*

Remove the probe as follows:

1. Switch OFF the instrument.
2. Unlock the probe by aligning the dots on the probe's locking collar as shown in Figure 3.
3. Remove the probe by pulling it straight up.

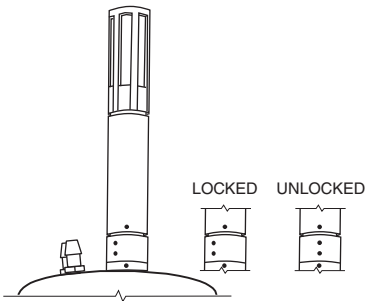



*Figure 3. Unlocking and Locking the Probe*

Install the probe as follows:

1. Switch OFF the instrument.
2. If not already done, turn the probe's locking collar so that all the dots line up.
3. Align the dot on the probe with the dots on the instrument; then push the probe into its socket until it bottoms out.
4. Lock the probe into place by turning the locking collar to its locked position.

# 4.0 PARTS & SERVICE

## 4.1 Replacement Parts and Accessories

**Complete Kits**

**Comfort Check 100** – Includes instrument capable of measuring $CO_2$, barometric pressure, humidity, and temperature with R.H./temperature probe and charger .....0019-8048
**Comfort Check 200** – Includes instrument capable of measuring $CO_2$, CO, barometric pressure, humidity, and temperature with R.H./temperature probe and charger .....0019-8049

**Replacement Parts**

110/240 VAC USA & European Plug Charger .....0019-3312
R.H. / Temperature Probe .....0019-3338

**Accessories**

Carrying Case, Large (13 $^{1}/_{2}$"L x 10 $^{13}/_{16}$"W x 4"H) .....0019-3311
Carrying Case, Small (10 $^{5}/_{8}$"L x 8 $^{1}/_{2}$"W x 3 $^{3}/_{16}$"H) .....0019-3337
Rigid Probe Assembly, 43".....0019-3310
In-Car Charger.....0019-3302
IrDA Interface Kit & BACH-COM Software .....0019-3301
Table Top Stand.....0019-3307

## 4.2 Bacharach Service Centers

### United States

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