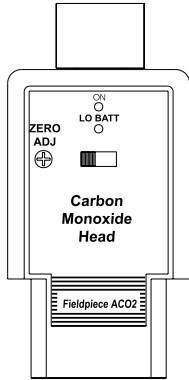




## Model ACO2 CARBON MONOXIDE ACCESSORY HEAD



### OPERATOR'S MANUAL

## DESCRIPTION

The model ACO2 carbon monoxide accessory head enables most digital multimeters to measure low levels of carbon monoxide in parts per million (PPM). It is intended to measure levels of CO in still ambient air. In many cases, it can help pinpoint sources of CO.

It uses a catalytic chemical sensor that consumes no chemicals. Life is primarily determined by the type of exposure.

### WARNING!

1. Do not take measurements directly at a tailpipe, in a furnace flue, or at a register. See precautions.
2. Do not rely solely on a carbon monoxide measurement to determine if a heat exchanger is bad. See heat exchangers.

## HOW TO USE

1. Connect to COM and Volts jacks. Let the head come up to ambient temperature and humidity. For Fieldpiece "stick" meter, slide the head over the meter. For most other meters, use the Fieldpiece deluxe test leads.

2. Select the 2000mVDC range.

3. Turn on and let stabilize for 45 seconds.

4. Expose sensor to a still, stable air sample (see precautions). The display reacts to the presence of CO in seconds. Take final reading when reading stabilizes.

5. For initial tests, walk around the building, watching for the readings to go up to determine where maximum concentrations of CO are. To measure

air from register, use a pump or measure out of the air stream. Hot blowing air can adversely affect the reading. The temperature of the sample must be near ambient.

### ZERO ADJUST

As needed, adjust reading to zero in a known zero CO atmosphere and in temperature similar to the sample air to be tested and when ambient air is within specifications and head is in equilibrium (temperature and relative humidity) with ambient.

### STORAGE

Do not store in areas which contain solvent vapors. This includes aerosols such as air-freshener, wax polish, window cleaner, and all organic solvents.

## CO DETECTORS AND CRACKED HEAT EXCHANGERS.

A CO detector cannot tell you if a heat exchanger is good. A CO detector can indicate a heat exchanger is cracked only if all of the following conditions occur simultaneously:

1. The flame generates enough CO (lack of oxygen, excess fuel, high temp).
2. Enough exhaust gases are emitted from the heat exchanger crack.
3. The exhaust gases from the crack are not diluted too much before coming in contact with the sensor. A cracked heat exchanger may leak CO in a small stream. You may measure high concentrations at one point but low concentrations only an inch away.
4. The heat exchanger is the only possible source for the CO detected.

## PRECAUTIONS

1. Do not measure gas engine exhaust or other high CO or highly contaminated gases. High levels of CO and other contaminants can ruin the sensor.

2. Do not take readings directly in stream of air at register or in a flue.

3. Allow enough time for accessory head to reach ambient temperature and RH%.

Air being measured must be stable and between 32°F and 105°F and 15%RH and 90 %RH. Temperature and humidity changes can cause transient readings. For best results, use a ACOP2 pump to sample the air, cool it to near room temperature, and raise the relative humidity. The ACOP4 pump includes a water trap and an acid filter for light duty flue gas measurements.

## COFFEE CUP TEST

To demonstrate that your CO head works, turn a ceramic coffee cup upside down and slide it over the edge of a counter (or desk) to expose about a third of the mouth of the cup. Burn a cigarette lighter inside the exposed mouth of the cup. Don't burn the counter. When the flame starts to flicker, you've burned up most of the oxygen in the cup creating carbon dioxide and now you're starting to produce CO (carbon monoxide). Bring the flame in and out of the mouth of the coffee cup to just keep the flame alive. The longer you keep the flame flickering, the more CO you produce. After 10 seconds of flickering, extinguish the flame and put the CO head in the mouth of the cup. You should see readings in the 100s. Take it out if it approaches 1000PPM.

## OPTIONAL PUMPS

Use the model ACOP2 pump to extract ambient air samples from hard to reach places or from locations where the air temperature is high. The ACOP2 pump can cool the sample.

ACOP4 pump has a water trap and acid filter for light duty flue gas tests.

For potentially high concentrations of CO, pump slowly and stop if the measurement approaches 2000PPM.

Carbon monoxide concentrations will begin to be shown in two or three squeezes. For final reading, pump until the reading stabilizes--approximately 30 squeezes.

## SPECIFICATIONS

Range: 0 to 1000PPM (2000PPM with 5 minute max exposure time.)  
 Initial accuracy: +/-5% of reading +/-5PPM  
 Response time: <35sec to 90% of reading  
 Operating temperature: 32 to 105 °F  
 Operating relative humidity: 15 to 90%RH, non-condensing  
 Long term drift: <5% / year (depending on use)  
 Battery life: 1000 hours typical. No measurable current draw when in "off" position.  
 Battery: 9V

## CROSS-SENSITIVITY

The sensor has a permanent unreplaceable filter built inside the sensor to filter out trace concentrations of SO<sub>2</sub>, NO<sub>2</sub>, and most hydrocarbons. If exposed to high concentrations of harmful chemicals or dirt, the filter can deteriorate and/or impede diffusion of air to the sensor.


## ONE YEAR LIMITED WARRANTY

This head is warranted to the original purchaser against defects in material and workmanship for a period of one year from the date of purchase. During the warranty period, Fieldpiece will replace or repair the defective unit, subject to verification of the defect.

ANY DAMAGE TO THE SENSOR FROM DIRT, MECHANICAL ABUSE, OR OVEREXPOSURE TO DAMAGING CHEMICALS, INCLUDING OVEREXPOSURE TO CARBON MONOXIDE, ARE NOT COVERED UNDER THIS WARRANTY. ALSO NOT COVERED ARE DEFECTS RESULTING FROM ABUSE, NEGLIGENCE, ACCIDENT, UNAUTHORIZED REPAIR, ALTERATION, OR UNREASONABLE USE.

ANY IMPLIED WARRANTIES

ARISING OUT OF THE SALE OF A FIELDPIECE INSTRUMENT PRODUCT, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE ABOVE. FIELDPIECE SHALL NOT BE LIABLE FOR LOSS OF USE OF THE INSTRUMENT OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, EXPENSES, OR ECONOMIC LOSS, OR FOR ANY CLAIM OR CLAIMS FOR SUCH DAMAGE, EXPENSES, OR ECONOMIC LOSS.

Local laws vary. Above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary by location.

## CO EXPOSURE EFFECTS

CO PPM	Effects
9PPM	Minimal. Max allowable concentration for eight hours (EPA and ASHRAE).
35PPM	Max for continuous exposure for one hour (EPA and ASHRAE).
50PPM	Max for eight hours (OSHA).
100PPM	Trips installed CO detectors. UL2034 specifies a max exposure of 100 min.
200PPM	In two to three hours: slight headache, tiredness, dizziness, nausea. UL2034 specifies a max exposure of 35 min.
400PPM	In one or two hours: frontal headaches. In three hours: life threatening. UL2034 specifies a max exposure of 15 minutes.
800PPM	In forty five minutes: dizziness, nausea, and convulsions.
800PPM	In two to three hours: death.
1600PPM	In one hour: death.
6400PPM	In fifteen minutes: death.
12800 PPM	In three minutes: death.

*Effects can vary significantly depending on age, sex, weight, and overall health.*

## OBTAINING SERVICE

Call Fieldpiece for an RMA# and send freight prepaid to Fieldpiece.

For warranty service, include proof of purchase date. For out of warranty service or to replace sensor and recalibrate, include a check or money order for \$100. We will send you a reconditioned and calibrated accessory head with a new sensor. For calibration, include a check or money order for \$50.

## CALIBRATION

Because the chemical sensor can be degraded by exposure to harmful chemicals, dirt and other contamination, high temperatures, and extremes in humidity, it needs to be calibrated periodically for best accuracy. The life of the sensor and the accuracy of the accessory depend on use and calibration. Drift is expected to be less than 5%/year in most cases but is dependent on use. For calibration, send the meter to Fieldpiece. See "Obtaining Service."

Initially it's recommended to calibrate once a month. Later calibrate as needed, depending on use and exposure, but at least once a year.

## OPTIONAL CALIBRATION KIT MODEL ACO2CAL

The more critical the measurements and the more often they are taken, the stronger Fieldpiece recommends that the user calibrate his own instrument. For this Fieldpiece offers a calibration kit. Call Fieldpiece for model ACO2CAL.



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