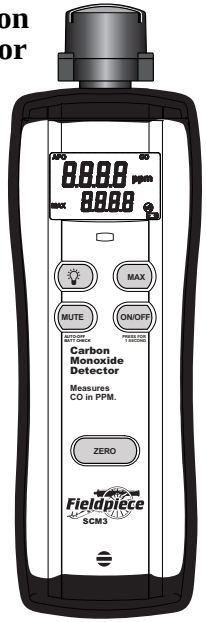
Standalone Carbon Monoxide Detector Model: SCM3



Fieldpiece

OPERATOR'S MANUAL

Specifications

Range: 0 to 1000PPM (2000PPM with 5 minute max exposure time)
Initial accuracy at 73ºF±9ºF, <75%RH**:**
0-15ppm ±5% reading ±1 ppm after zeroing
16-35ppm ±5% reading ±2 ppm after zeroing
36-1000ppm ±5% reading ±5ppm after zeroing
Display: Updates real-time
CO air sample temperature range: 32 to 105°F
Operating environment: 32 to 122ºF (0 to 50°C)
Operating relative humidity: 15 to 90%RH, non-condensing
Storage temperature: -4ºF to 140ºF, 0 to 80% R.H. with battery removed from meter.
Sensor type: Electrochemical (specific to CO)
Sensor calibration: Factory calibrated on 205ppm
Long term drift: <5% / year (depending on use)
Battery: 9V
Battery life: Approx.150 hrs typical (Alkaline)
Auto power off (APO): 15 minutes

Description

The model SCM3 standalone carbon monoxide detector measures 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.

The SCM3 uses a catalytic chemical sensor that does not consume chemicals. Life is primarily determined by the type of exposure.

The most practical application of the SCM3 is to determine if the indoor CO levels are higher than outdoor levels and to determine the source. This instrument reacts quickly to changing CO levels.

"Walk around" test

The SCM3 responds almost instantly to changes in CO levels in the air. If you see a difference in CO levels from outside to inside, you need to find the source of the CO. Walk around and watch the display. By constantly going towards the area of higher concentration, you can determine the source of the CO.

Persistent sources of CO, such as malfunctioning combustion equipment in occupied spaces, must be serviced immediately. These can be life threatening.

In addition to the "walk around" test, the SCM3 can be used for filtered flue testing using the optional AOXP2 hand pump. (See Optional pump section.)

⚠ CAUTION ⚠

Do not take measurements directly at a tailpipe, or at a register. See "Precautions" below.

Make sure O_2 and CO_2 are close to manufacturer's specified levels before testing combustion equipment such as heaters, boilers or stoves.

Do not rely solely on a carbon monoxide measurement to determine if a heat exchanger is bad. See "CO detectors and cracked heat exchangers" to the right.

⚠ WARNING ⚠

Extended exposure to even relatively low carbon monoxide concentrations can be hazardous to human health. Evacuate areas of significant CO concentration immediately. See the CO Exposure Effects on the second page of this manual.

How to use

1. Turn on by holding ON/OFF for 1 second.
2. Let stabilize for 10 seconds in a CO free environment. (There will be a 10 second countdown.)
3. Take the instrument outdoors and set it to zero. Then bring indoors to take measurements.
4. Expose sensor to a still, stable air sample between 32ºF to 105ºF and 15%RH to 90%RH. Temperature and humidity changes will result in unstable readings. The sensor reacts to the presence of CO in instantly. Take the final measurement when reading stabilizes on the display.

Note: If sampling above the indicated temperature range, use an AOXP2 pump. This will allow for more stable readings.

5. For initial tests, walk around the building and monitor the display to determine areas of highest CO concentration. To measure air from a register or a flue, 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.
6. Turn off by holding ON/OFF for 1 second.

Storage

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

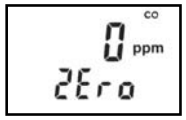
Precautions

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 and be a health hazard.
2. Do not take readings directly in stream of air at register or in a flue. Use AOXP2 pump to measure the gases in a flue.
3. Verify O_2 and CO_2 levels are close to manufacturer's specification before testing combustion equipment such as heaters, boilers or stoves. This helps prevent the SCM3 from being exposed to CO levels that could potentially damage the sensor. If O_2 and CO_2 are within the manufacturer's specs, then the combustion equipment should be producing minimal CO.
4. Allow enough time for SCM3 to reach ambient temperature and %RH.
5. The sensor has a permanent unreplaceable filter built inside the sensor to filter out trace concentrations of SO_2, NO_2, and most hydrocarbons. If exposed to high concentrations of harmful chemicals or dirt, the filter can deteriorate and/or impede diffusion of CO to the sensor.

Zero set

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

To zero, hold the ZERO button for one second or until "ZEro" is displayed. **(Note: For safety reasons the SCM3 will not zero if reading is above 5ppm.)**



Backlight

Press the backlight button (☼) to toggle the backlight of the display.

MAX button

Press the MAX button to hold the maximum measurement from that point until the meter is turned off or MAX is pressed again.

MUTE button and Battery Check

Press the MUTE button to silence the meter beep. The MUTE button when held for one second or more will show the remaining percentage of battery charge on the main display.

Auto power off (APO)

Hold the MUTE button down while turning on the SCM3 to disable APO.

CO detectors and cracked heat exchangers

A CO detector cannot tell you if a heat exchanger is good. A CO detector can indicate that a heat exchanger may be cracked <u>only if all of the following conditions occur simultaneously</u>:

1. The flame must generate high concentrations of CO (lack of oxygen, excess fuel, high temp).
2. Enough exhaust gases must be emitted from the heat exchanger crack.
3. The exhaust gases from the crack must not be 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 must be the only possible source for the CO detected.

CO exposure effects

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

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

Coffee cup test

To demonstrate that your CO sensor 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 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.

Limited warranty

This meter is warranted against defects in material or workmanship for one year from date of purchase. Fieldpiece will replace or repair the defective unit, at its option, subject to verification of the defect.

This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the instrument.

Any implied warranties arising from the sale of a Fieldpiece 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 of such damage, expenses, or economic loss.

State laws vary. The above limitations or exclusions may not apply to you.

Obtaining service

Contact Fieldpiece Instruments for one-price-fix-all warranty service pricing. Send check or money order for the amount quoted. Send the meter freight prepaid to Fieldpiece Instruments. Send proof of date and location of purchase for in-warranty service. The meter will be repaired or replaced, at the option of Fieldpiece, and returned via least cost transportation.

Optional pump

Use the model AOXP2 pump to extract samples from hard to reach places or from locations where the temperature is high (such as a flue).

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

Carbon monoxide concentrations will begin to show in two or three squeezes. For final reading, pump until the reading stabilizes, about 30 squeezes.

Press MAX on SCM3 to hold highest reading.

Fieldpiece Instruments, Inc.
California, USA
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More Products From Fieldpiece Modular Expandability

Modular expandability is the ability for accessory heads and meters to change configurations to match the various needs of an HVAC/R technician.

Accessory heads (the sensors) send out a mV signal, which represents the value of the measurement, an attached meter. Heads can attach directly to the top of a Stick meter, DL3 data logger, or EHDL1. They can also plug into any meter with mV ranges using ADLS2 leads.

Stick Meter

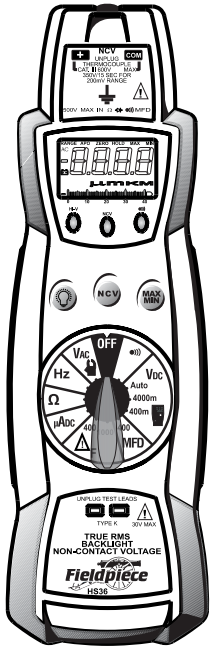
This is the heart of modular expandability. In addition to being a full functioning multimeter, any accessory head can be used with it.

Model HS36

Non contact voltage
Magnetic hanger
Autoranging
Backlight

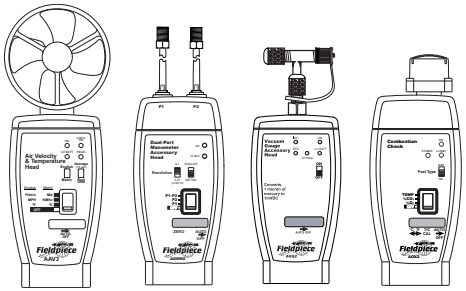
Temperature
Volts, amps, ohms
Frequency
Microfarads

Includes:
HS36 Meter
ACH4 Current Clamp
ATB1 K-type T/C
ADLS2 Deluxe Leads
ANC1 Case



Accessory Heads

Accessory heads are the sensors of multiple parameters measured by technicians every day. They send a mV signal to an attached multimeter. The multimeter will display whatever the head is measuring. Instead of having to purchase and carry a separate instrument for each parameter, a technician can use multiple heads and a single multimeter to do the job.



Here are four of the many heads available:

AAV3 Air Velocity and Temperature
ADMN2 Dual-Port Manometer
AVG2 Digital Vacuum Gauge
AOX2 Combustion Check

Standalone Combustion Check

The SOX2 allows you to easily calibrate combustion equipment such as boilers or furnaces to the manufacturer's specified Excess Air %, CO_2%, or O_2%.

Tuning the Excess Air, CO_2, O_2 stack temperature and temperature rise to match the appliance manufacturer's specifications will increase efficiency and help maximize performance and life expectancy of the equipment. Tuning typically involves adjusting the air/fuel ratio.