



AMC-CD2

Human Occupancy Detector

INSTRUCTION MANUAL

IMPORTANT:

Please read these instructions completely and carefully before starting.

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1 General Information

1.1 Warranty

.This Armstrong equipment is warranted against defects in material and workmanship for a period of one year from date of delivery. Maintenance items are not warranted. During the warranty period, *The Armstrong Monitoring Corporation* will repair or replace components that prove to be defective in the opinion of AMC. Any equipment deemed to be defective by the user should be returned to *The Armstrong Monitoring Corporation* for evaluation (see product return below). **Site visits by Armstrong personnel, to evaluate / repair equipment, are not covered by this warranty.** AMC is not liable for auxiliary interfaced equipment, nor for consequential damage. This warranty shall not apply to any product, which has been modified in any way, which has been repaired by any other party other than a qualified technician or authorized AMC representative, or when failure is due to misuse or conditions of use.

1.2 LIABILITY

All AMC products must be installed and maintained according to instructions. Only qualified personnel should install and maintain the equipment.

AMC shall have no liability arising from auxiliary interfaced equipment, for consequential damage, or the installation and operation of this equipment. AMC shall have no liability for labour or freight costs, or any other costs or charges in excess of the amount of the invoice for the products.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND SPECIFICALLY THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE THEREOF.

1.3 PRODUCT RETURN

All products returned for warranty or service should be shipped by prepaid freight. Please obtain a Return Material Authorization (RMA) number from AMC prior to shipping and ensure this RMA number is clearly visible on the outside of the shipping container. Material shipped without RMA will be rejected and returned. All products returned to the client will be shipped by freight collect.

1.4 CONTACT INFORMATION

For information please call 1-800-465-5777 or through contacts at www.armstrongmonitoring.com or through email directly at support@armstrongmonitoring.com.

1.5 MODIFICATIONS AND SUBSTITUTIONS

Due to an ongoing development program, AMC reserves the right to substitute components and change specifications at any time without incurring any obligations.



2 PRODUCT INFORMATION

2.1 DETECTOR

Detector Serial Number.....	_____
Weight	1.6 kg (3.5 lbs)
Dimensions.....	7.5 x 5.5 x 2.75 in. (19 x 14 x 7 cm)
Material.....	Impact resistant ABS
Display Types.....	Digital LED or LCD
Power Supply.....	Built-in rechargeable battery pack
Battery Life.....	LED Display: 6 hrs LCD Display: 12 hrs
Recharge Time.....	<16 hrs
Sampling Rate.....	500 ml/min nominal
Measurement Range.....	0 to 5000 ppm
Warranty.....	1 year

2.2 ACCESSORIES

AMC-CD2-01.....	Probe assembly complete with handle, filter, hose, lexan wand (12”) and tip adapter
AMC-CD2-126.....	Replacement filter
AMC-CD2-126-10.....	Replacement filters
AMC-CD2-03.....	Leather carry case
AMC-CD2-07.....	Shoulder strap (optional)
AMC-CD2-09.....	AC Charger
AMC-CD2-10.....	Replacement Sampling Needles



3 PRODUCT DESCRIPTION

3.1 GENERAL DESCRIPTION

The AMC-CD2 portable gas detector is designed to provide surveillance of air for concentrations of carbon dioxide gas. Its integral display gives a direct readout in ppm CO₂. This model and its sampling hardware were specifically designed to detect CO₂ exhaled by humans concealed in confined areas thereby permitting their rescue.

The AMC-CD2 unit can be used hand held or worn using the belt clip or shoulder strap. The sampling wand (12") is used to probe areas for elevated levels of carbon dioxide. The system comes complete with the features shown in Figures 3.1.2.1 and 3.1.2.2.

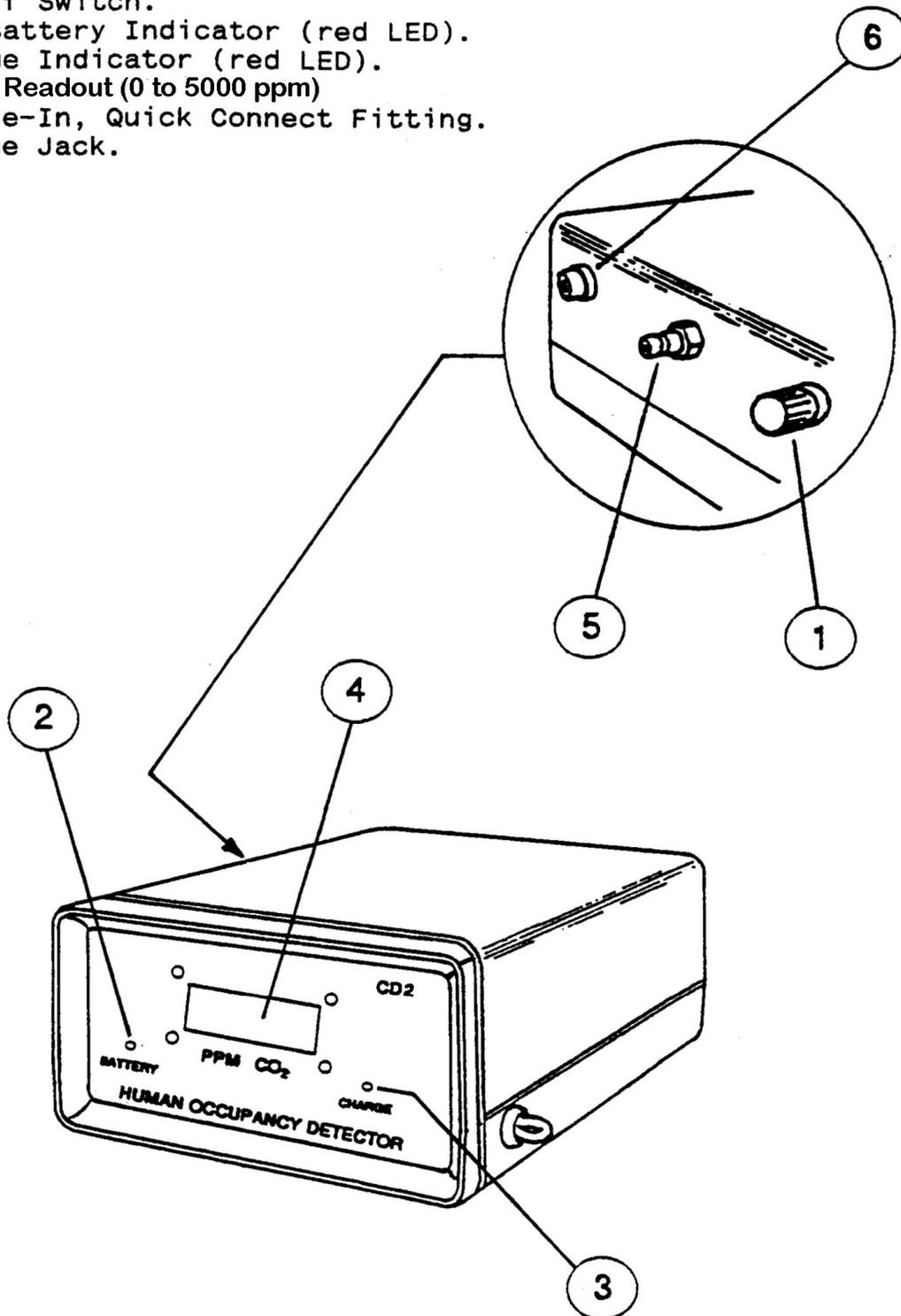
3.1.1 BASIC REQUIREMENTS

OPERATING TEMPERATURE:	0°C to 50 °C 32°F to 122°F
OPERATING PRESSURE:	Ambient atmospheric pressure.
HUMIDITY:	0 to 95% RH, non-condensing.

3.1.2 SENSOR DETAILS

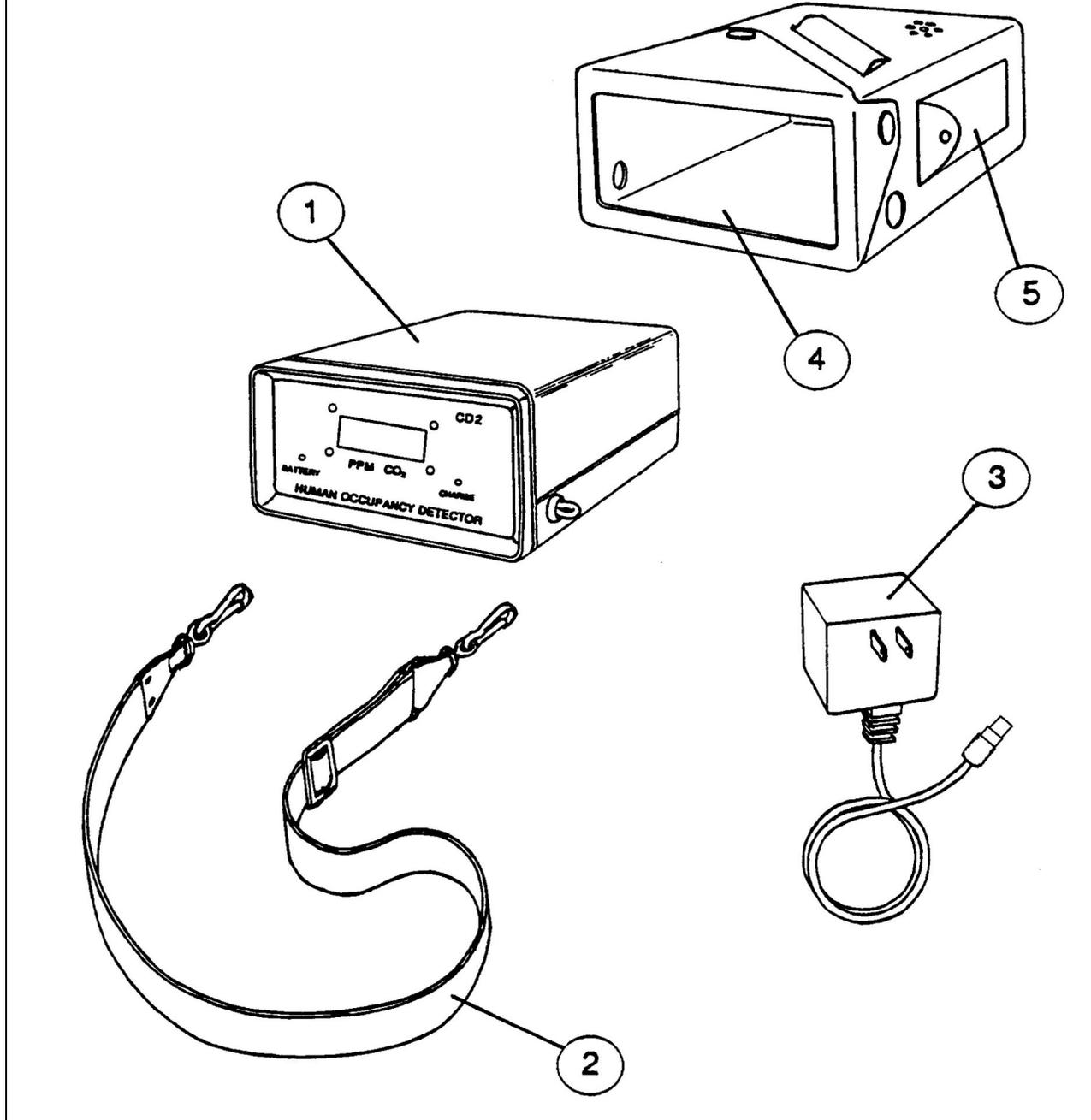
SENSOR TYPE:	N.D.I.R.
ACCURACY:	+/- 5% of reading +/-30ppm
REPEATABILITY:	+/- 1% of reading +/-20ppm
EXPECTED SENSOR LIFE:	5 years
WARM-UP TIME:	< 30 seconds

1. On/Off Switch.
2. Low Battery Indicator (red LED).
3. Charge Indicator (red LED).
4. Digital Readout (0 to 5000 ppm)
5. Sample-In, Quick Connect Fitting.
6. Charge Jack.



3.1.2.1 FIGURE: AMC-CD2 portable CO₂ detector.

1. AMC-CD2 Gas Detector.
2. Shoulder Strap
3. Recharger/Adapter.
4. Carry case.
5. Sample Tips.



3.1.2.2 FIGURE: Basic portable gas detection system.



4 OPERATION

4.1 TURNING ON AND STABILIZING THE MONITOR

Turn on the unit with the power switch, as shown in Figure 3.1.2.1. The display will activate. The sensor requires approximately 30 seconds to stabilize. The internal pump will turn on immediately and run continuously.

Operating time with fully recharged batteries is approximately twelve (12) hours for the unit with the LCD display and six (6) hours for the unit with the LED display. Power can be turned off to conserve battery life. Discontinue use when the low battery indicator activates,

4.2 TAKING AN AIR SAMPLE

The internal pump continuously draws air into the sensor chamber. To use the unit as a concealed human occupant detector, connect the sampling hose to the quick connect fitting (see Figure 4.4.1.1) and use the wand fitted with the appropriate tip to obtain a sample. The sampling wand includes a rigid tip with needles, which permit sampling through small orifices and/or rubber seals. Ambient atmospheric CO₂ is within the range of 300 to 400 ppm but may range as high as 650 ppm under certain environmental conditions. Any enclosed space with respiring humans will give an elevated reading.

When sampling, a substantial increase of two to three times clean air is required to indicate human occupancy.

The following two examples will demonstrate this principle:

1. A baseline of 400 parts per million (PPM) is recorded in outside air. After taking a sample from within an enclosed boxcar, the reading increases to 550 PPM. This minimal increase would not indicate a likelihood of human occupation.
2. A baseline of 350 PPM is recorded. A reading from inside a tractor trailer indicates 1100 PPM. This should alert personnel to the likelihood of unauthorized personnel and steps should be taken to investigate further.

Human respiration is not the only process, which will produce carbon dioxide. The following are other possible sources of unusually high readings:

1. Livestock - any animals breathing will produce carbon dioxide.
2. Fermentation - if rotting organic material has begun to ferment, elevated levels will be witnessed.
3. Packaged Carbon Dioxide - products such as soda contain carbon dioxide. Breakage of containers will result in elevated levels.
4. Medical shipments packaged in dry ice. As the dry ice sublimates it can off gas into the container causing higher CO₂ levels.

The CD-2 will be effective only when samples are taken from relatively confined spaces. A railcar with perforated or louvered walls i.e. an automobile carrying car, will not allow carbon dioxide levels to increase to a discernible level before being vented. If however, small vents are present which allow only limited fresh air, an indicative reading can be taken



Warning:

Do NOT immerse the sampling wand in any liquid as it will damage the pump mechanism. Turn the power off immediately if a liquid appears inside the filter.

4.3 Sensor Operation

The CD2 employs non-dispersive infrared technology completely specific to carbon dioxide with no interferences or poisons. Sensing of gas does not result in any wear and tear to the sensing element resulting in very long detector life.

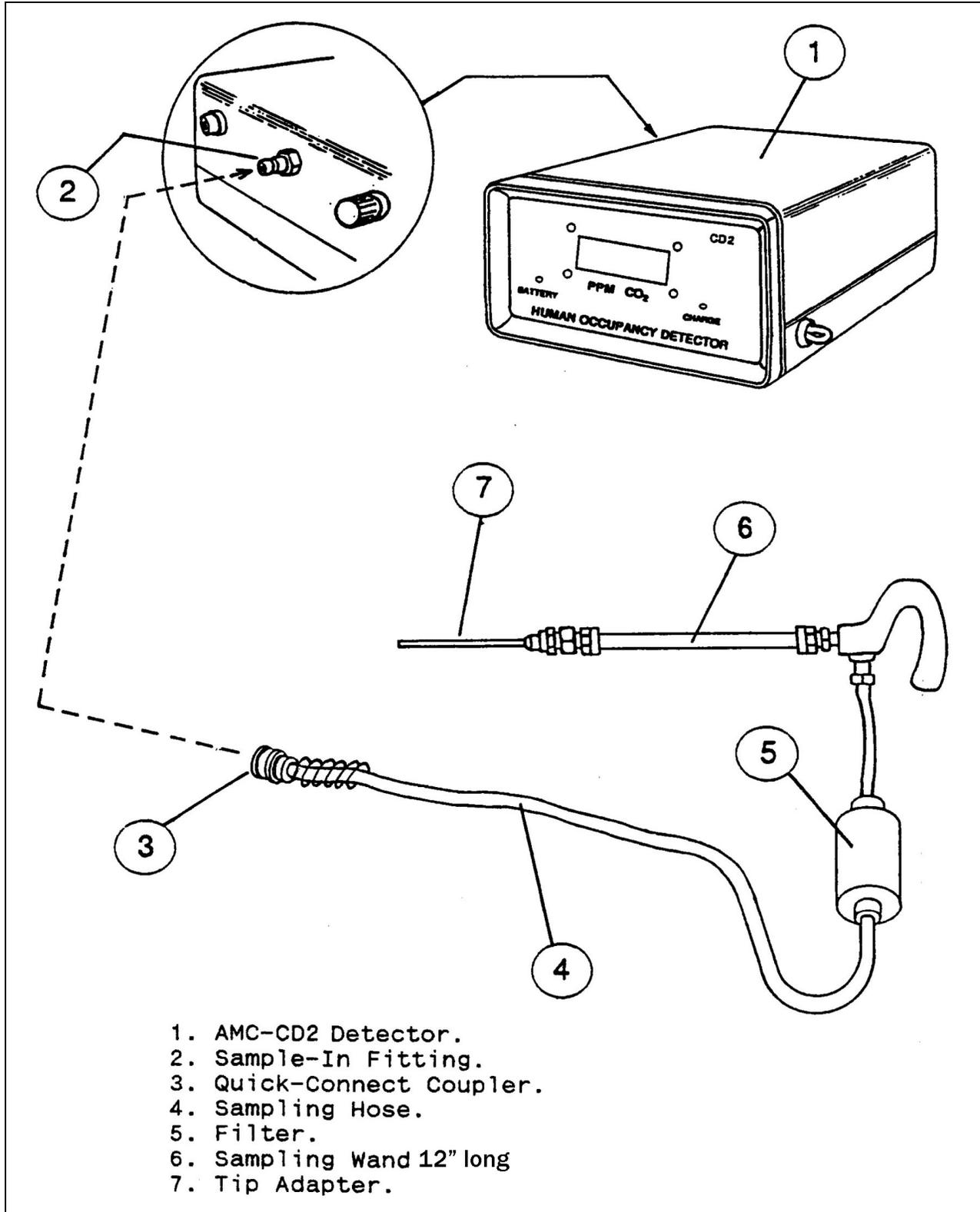
4.4 CHARGING THE MONITOR

The AMC-CD2 is powered with a sealed lead acid battery. The unit may be recharged at the end of each operating session. The AC recharger / adapter plugs into the jack on the side panel of the detector. (see Figure 3.1.2.1)

Full recharge is reached in approximately 12 to 16 hours maximum with the unit powered OFF.

The battery will increase to its full capacity after 25 charge / discharge cycles.

It is possible to power the unit directly from the AC recharger / adapter. The batteries will not be charging while the unit is switched ON.



4.4.1.1 FIGURE: Sampling Handle Wand.



5 PREVENTIVE MAINTENANCE

5.1 GENERAL

The enclosure should be brushed or wiped clean once a year or more, depending on the accumulation rate of dust or dirt.

To avoid sensor damage, the unit **MUST NOT** be submerged in any liquids. Hosing or splashing the unit with any liquids must also be avoided.

5.2 VERIFICATION OF OPERATION

The operation and response of the CD2 may be verified by exhaling near the sample inlet. The display should show an elevated reading. This test should be performed as required to confirm the CO₂ sensitivity. Verification of operation should be done at least once every 6 months. For highly demanding applications more frequent verification is recommended.

5.3 USER MAINTENANCE

The inline transparent filter should be replaced when the sample flow is impeded or when the filter element appears dirty. The replacement filter part number is AMC-CD2-126. A variety of sample tips are available the sampling needle kit AMC-CD-10.