INSTALLATION

and

INSTRUCTION

MANUAL

for

QUALITY

AIR

BREATHING

SYSTEMS

Model ABM - 700
# ABM - 700 CARBON MONOXIDE MONITOR

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ABM - 700

This manual will cover the set-up, operation, maintenance, troubleshooting, and replacement parts listing for the ABM-700 carbon monoxide monitor.

The ABM - 700 monitor is provided by Martech Services Company, as a stand alone monitor, or as a component of a complete Quality Air Breathing System. This monitor is to be operated as a life saving device. Such a unit requires proper care, testing, calibration, and maintenance. Please read this manual prior to operating and using this instrument. It could save a life!

GENERAL:

The instrument is housed in a NEMA IV non-metallic case. The case is corrosion resistant, positively pressured by the compressor supply line, and sealed except for a bleed hole to exhaust the compressor's air. The instrument is powered by a standard 110 volt electric source. The instrument comes complete with a case mounted electronic horn assembly.

The monitor continuously samples the breathing air from the breathing air source. During use, the monitor takes a continuous sample of the filtered air, which is monitored by the chemical cell sensor. If the sample air supply fails for any reason such as air blockage, loss of pressure, or excessive high pressure, an intermittent alarm horn will sound and a yellow lamp will illuminate.

In the event carbon monoxide is detected in levels of 10 ppm or above, a continuous alarm horn will sound and the 'ALARM" red lamp will illuminate.
Indicator Lamps and Audible Alarm Horn  (see figure #1)

The panel has three lamps that provide the following information to the user of this monitor;

Safe Air lamp indicates the following of two possible situations;

- Green colored lamp marked, "Safe Air" and no audible horn, indicates the sample air is within the OSHA levels for Grade "D" Breathable Air standards.
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- Red colored lamp marked, "Safe Air" and a continuous audible horn, indicates that the carbon monoxide levels are at or above the OSHA standards for Grade "D" Breathable Air. Please note, that it is not unusual for the Red lamp to illuminate briefly during the Yellow standby mode, when first put into operation.

*Alarm lamp indicates the following of three possible situations;*

- Green colored lamp marked, "Alarm". This lamp, when illuminated green and no audible horn, indicates that there is the correct air flow and pressure to the sensor, itself. The correct air flow will be maintained by keeping the ball within the flow range indicated on the ball flow meter.

- Yellow colored lamp marked, "Alarm". This lamp, when illuminated yellow and no audible horn, indicates the monitor is in the standby mode, otherwise called the warm-up mode. During the first two minutes of operation, the monitor goes through a warm up period to help stabilize the sensor. After the warm up period, the lamp will return to Green or stay in Yellow depending on the condition of the monitored air sample.

- Yellow colored lamp marked, "Alarm". This lamp, when illuminated yellow and sounds an intermittent alarm horn, indicates either low flow, or excessive high flow in the sensor area. Check the flow range indicated on the ball flow meter, and adjust to keep ball within the indicate range.

*Armed lamp indicates one of two possible conditions;*

- Green colored lamp indicates the audible alarm horn is active and will allow the horn to sound in the event of an alarm situation.
- Clear colored lamp indicated the audible alarm horn is inactive.

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Digital Display (see figure #1)

- The digital display shows the level of Carbon Monoxide (CO) in parts per million (ppm). It is not unusual for the display to be slightly high for a brief period while the sensor stabilizes after the warm up mode.

Run/Calibration Switch; (see figure #1)

- Position the toggle switch in the "RUN" position for all functions other than the actual calibration process. If the switch is not in the "RUN" position, the monitor will indicate a yellow, "Alarm" lamp, with an intermittent horn sound, indicating that a test sample is not reaching the sensor. By correctly positioning the switch, to "RUN", the alarm condition will terminate, after one minute.

Armed/Disarm Switch; (see figure #1)

- The switch arms and disarms the audible alarm horn. The switch is tripped by inserting a small probe, such as a straightened paper clip, through the small access opening in the faceplate. A small hole will be found in the center of the box marked "ARM". It may take one or two pushes to trip the switch. The audible horn is enabled when the "Armed" lamp is illuminated green. The audible horn is disabled when the "Armed" lamp is unlit. It is recommended that the audible horn be enabled at all times, other than during a recalibration procedure.

Electrical Requirements

- **120 Volt AC power**
  The monitor is supplied with a 120 volt AC power cord, and can be plugged into a 120 volt grounded electrical outlet.
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- *12 Volt DC power*
  It is possible to convert the monitor to operate on 12 volt DC. Please contact Martech Services Company for assistance and instructions that will explain this conversion.

- *External Alarms*
  In addition to the existing case mounted horn, an external alarm may also be added. If for any reason, you wish to add additional, external audible or visual alarms, please contact Martech Services Company for assistance and instructions that will explain this conversion.

OPERATION:

⚠️ **WARNING**

Do not use the monitor if it has not be calibrated and tested, as outlined in the calibration section of this manual. Using a monitor that has not been calibrated and tested could result in levels of carbon monoxide to pass above the permitted standards.

*Set Up for Operation*

Position the Run/Calibration toggle switch to the "RUN" position. Adjust the sample regulator to allow the flowmeter ball to remain within the flow range indicated on the panel front.

Plug the monitor into a grounded 120 Volt AC power supply. If the monitor has been converted to operate on 12 Volt DC, connect carefully to be certain the positive and negative leads are correctly attached. The instrument is not fitted with a on/off switch. Plugging into the proper power supply will begin the warm up process.
Warm Up Period

With electrical power applied and the sample air flow set as indicated on the flow range (approximate .5 to .8 scfh) the monitor will go through a warm-up period of approximately two minutes.

During the warm up period the audible horn is disabled and the "ALARM" lamp will illuminate yellow.

At the end of the warm up period the audible horn is activated, and all of the indicator lamps will illuminate green in color. These three green lamps indicate;

"SAFE AIR": The test sample reaching the sensor is within the permissible OSHA standards for carbon monoxide levels.

"ALARM": There is correct test sample flow to the sensor.

"ARMED": The audible horn is armed, to provide an audible alarm if the carbon monoxide reaches 10 ppm or higher.

⚠️WARNING

DO NOT use the air to the hood or mask during the warm up period. During the warm up period the alarms are disabled.

OPERATING MODE

Following the warm up period, with the toggle switch in the "RUN" position, and the test sample flowing to the instrument in the flow range, the monitor is in full operating mode.
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Always be certain that all three alarm lamps are in illuminated "Green", and no audible horn, before using the air to supply a hood or mask.

SHUT DOWN

If the monitor is attached to a compressed air system that is shut down on a regular basis, then the power to the monitor should be removed also. However, if the monitor is attached to a compressed air system that is powered 24 hours per day, there is no need to shut the monitor off.

CAUTION

If the compressed air source is shut down without removing the power supply to the monitor, the monitor will go into a low flow alarm, sounding an intermittent alarm horn, and displaying a yellow "ALARM" lamp.

MAINTENANCE

Cleaning of monitor case and faceplate

- Due to the occasional opening of the case cover to periodically calibrate the monitor, this will allow external contaminates to come in contact with the faceplate. Care should be given to prevent contaminants from getting into the instrument itself.

- Clean the exterior of the case and the faceplate, with a cloth soaked in a solution of warm water and a mild detergent. Do not clean with solvent of other harsh cleaners.
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CALIBRATION and TESTING

⚠️ WARNING

Be certain you are using the correct calibration test gas for this monitor when performing the calibration procedure. Using the wrong test gas, may cause the monitor to be out of calibration.

Calibration;

The monitor must be in operation for at least 30 minutes before performing a calibration. DO NOT calibrate the monitor until it has gone through the warm up period and has been in operation with the sample air flowing through it for at least 30 minutes.

Set up of calibration equipment; (see figure #2)

- Confirm that the calibration connector valve is closed. The valve is closed when turned fully clockwise. Use only slight pressure on this valve.
- Thread the calibration connector onto the top of the test gas cylinder.
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Prepare the monitor; (see figure #3)

- Open the case cover to access the faceplate by loosing the two screws.

- Connect the calibration connector to the "Test Gas port", by aligning the tabs and inserting the tube end connector into the port and turning slightly clockwise to lock into position.

- Place the RUN/CAL switch towards "CAL". The "ALARM" light will immediately turn yellow, and within a few seconds the intermittent audible horn will sound. You can disarm the audible horn as outlined previously in this manual. This will silence the audible horn during the calibration process.

![Figure 7: Diagram of ABM-700 Carbon Monoxide Monitor](image-url)
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CALIBRATION PROCEDURE

- Slowly open the calibration connector valve to introduce the test gas. The test gas is entering the unit when the flow meter ball rises. If the flow meter ball does not rise with the calibration valve fully open, then the test gas cylinder is empty.

- Adjust the calibration connector valve until the flow meter ball floats between .5 and .8 scfm. The valve is sensitive, and you may need to make several small adjustments to keep the ball in the proper range.

- Allow the test gas to flow through the monitor until the digital readout stabilizes. (This will take about one minute)

- If the display stabilizes at 10 ppm, the calibration process is complete. You may return the monitor to the normal operating mode as outlined previously in this manual

- If the display stabilizes at any value other than 10 ppm, you will need to make a calibration adjustment, as outlined in the next section of this manual.

CALIBRATION ADJUSTMENT PROCEDURE

** DO NOT CALIBRATE THE MONITOR UNLESS IT HAS GONE THOUGH A STABILIZING PERIOD  **

With the test gas flowing, make up or down adjustments to the digital display by pushing on the appropriate switch. The up triangle will increase the displayed value, and the down triangle will decrease the displayed value. To make value adjustments, use a straightened paper clip and through the small hole in the triangle,
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gently push against the switch. Each push will change the value by one unit. Repeat the process until the value displayed is 10 ppm. The monitor is now calibrated.

RETURNING TO OPERATION MODE AFTER CALIBRATION

- Close the calibration connector valve.
- Remove the calibration tube end connector from the monitor, by turning the connector counterclockwise and then pulling straight out from the faceplate.
- Place the calibration toggle switch to the "RUN" position.

The flow meter ball should rise to .5 to .8 scfh. If not, adjust the sample air regulator to keep the ball in the flow range. The "ALARM" lamp should change from yellow to green after approximately one minute.
- Make certain the "ARMED" lamp is illuminated green, by activating this feature, as previously outlined in this manual.
- Close the monitor case cover and tighten the two screws
- Remove the calibration connector from the test gas cylinder.

NOTE: The test gas cylinder has a positive seal, and the calibration connector does not. Therefore, the test gas cylinder will leak if the calibration connector is left attached to the cylinder over time.

CALIBRATION TEST

This procedure may be used, to confirm that the monitor is properly calibrated and responding properly. This test does not include any adjustments of the monitor.

- To perform this test, follow the procedure for calibration of this monitor, without making any adjustments to the digital display values.
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TROUBLESHOOTING

⚠️ WARNING

Shorting electrical components could result in serious electrical shocks, or could damage the monitor.

Intermittent Alarm:
- A pressure switch mounted on the circuit board monitors pressure of the test sample delivered to the sensor. If pressure at the switch (which is monitored by flow through the flow meter) drops below minimum requirement, or rises above maximum, the monitor will initiate with an intermittent audible alarm.
- Before doing pressure tests make sure the RUN/CAL toggle switch is in the "RUN" position.
- Make sure the test sample air is between 55 psi and 145 psi. If the test sample is higher than 55 psi, the restriction is internal. Proceed as follows;
  - Check the flow meter ball to be certain it is within the range as indicated on the faceplate. In some cases the range may be slightly higher or lower than the indicated range. Slowly increase and decrease pressure on the sample air regulator. If the regulator pressure was outside the normal limits, the audible alarm will turn off as soon as the correct pressure is reached.
  - If conditions continue, check the internal monitor air lines for breaks, kinks, or disconnection. If a line has come loose, reconnecting it will re-establish function and the monitor will then operate properly.
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No illumination at the lamps or audible alarms;
 - This condition indicates a loss of electrical power to the monitor. Make certain the power cord is connected to the appropriate power source.
   - Make certain the fuse, located on the outside, left of the case is in good condition
   - Make certain the power supply is in fact, on.

Instrument will not calibrate;
 - If the display does not stabilize, or respond to calibration adjustments, then the
   RUN/CAL toggle switch is not set to "CAL"
   - Check flow meter. Calibration connector valve may be off, or calibration bottle may be empty.
   - Sensor has failed. Replace with new sensor.
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REPLACEMENT PARTS

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<td>74700</td>
<td>ABM-700 Monitor - complete</td>
</tr>
<tr>
<td>2</td>
<td>74710</td>
<td>Calibration connector</td>
</tr>
<tr>
<td>3</td>
<td>85910</td>
<td>Test gas - 10 ppm CO</td>
</tr>
<tr>
<td>4</td>
<td>74714</td>
<td>Sample air regulator - complete</td>
</tr>
<tr>
<td>5</td>
<td>74716</td>
<td>Flow meter</td>
</tr>
<tr>
<td>6</td>
<td>74718</td>
<td>Sensor - Chemical cell</td>
</tr>
<tr>
<td></td>
<td>85975</td>
<td>Calibration Kit, includes test gas</td>
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WARRANTY STATEMENT:
Martech Services Company, warrant each new ABM-700 offered by them, to be free from defective material and workmanship as to its merchantability and fitness for the purpose intended, for a period of one (1) year, from the date of sale to the original purchaser, and agrees to remedy any such defect or to furnish a new part (at the company's option) in exchange for any part of any unit of its manufacture which under normal use, and service disclosed such defect; provided the product is delivered by the purchaser to Martech Services Company's factory, intact, for our examination, provided that such examination discloses, in our judgment, that it is thus defective.

The warranty does not extend to any systems which have been subjected to misuse, neglect, accident, unauthorized modification, or to use in violation of instructions furnished by us, nor does it extend to systems which have been repaired or altered outside of our factory.

THIS WARRANTY IS IN LIEU OF ALL WARRANTIES EXPRESSED OR IMPLIED AND NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO ASSUME FOR US ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF OUR SYSTEMS. ALL IMPLIED WARRANTIES ARE LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. IN NO EVENT IS MARTECH SERVICES COMPANY, LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING FROM ANY BREACH OF WARRANTY OR THE ABM - 700 MONITOR.
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RECORDS:

Date of Purchase:_______________________________________

Purchased from:_________________________________________

Serial Number:__________________________________________

CONTACT INFORMATION:

Dealer Name: ___________________________________________

Dealer Address:_________________________________________

Dealer Phone:___________________________________________

MANUFACTURER INFORMATION:

Martech Services Company
P.O. Box 7079
Mazeppa, MN 55956
U.S.A.

Office: 507-843-4700
Toll Free: 800-831-1525
Fax: 507-843-4953
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NOTES: