

Advanced Calibration Designs, Inc.

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Revision - 040902

MiniBump Gas Generator

Release II

INSTRUCTION MANUAL

WARNING:

This instrument generates test gas for toxic gas detectors. The instruction manual should be read and understood prior to operation of the instrument. Failure to operate the instrument correctly can lead to improper testing of your detection system.

This instrument conforms to the protection requirements of the **EC DIRECTIVE 89/336/EEC** on Electromagnetic Compatibility (EMC), in accordance with the provisions of Statutory Instrument 2372.

The following standards have been applied:

EN 50081-1
Emissions Standard (Residential Commercial and Light Industry)

EN 50082-1
Immunity Standard (Residential Commercial and Light Industry)

Manufactured by:

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Advanced Calibration Designs, Inc.'s obligation under this warranty shall be limited to repairing or replacing, and returning any product which shall be returned to Advanced Calibration Designs, Inc. at its manufacturing facilities, with transportation charges prepaid, and which Advanced Calibration Designs, Inc.'s Material Review Board examination shall disclose to its satisfaction to have been defective.

This warranty is expressed in lieu of any and all other warranties and representations, expressed or implied, and all other obligations or liabilities on the part of Advanced Calibration Designs, Inc. including, but not limited to, the warranty of fitness for a particular purpose. In no event shall Advanced Calibration Designs, Inc. be liable for direct, incidental or consequential loss or damage of any kind connected with the use of its products or failure of its products to function or operate properly.

The following is a listing of the available electrochemical MiniCal cells and their standard warranty when installed in equipment manufactured and supplied by Advanced Calibration Designs, Inc.

Chlorine, Hydrogen, Hydrogen Sulfide, Hydrogen Cyanide

One year or 250 tests.

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Instruction Manual

MiniBump Gas Generator *Release II*

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I. GENERAL DESCRIPTION

The MiniBump is a small battery-powered, portable electrochemical gas generator designed to functionally test toxic gas sensors and alarm systems. The MiniBump is designed to "bump" a gas detection system into alarm within approximately 30 seconds. The MiniBump uses the following components to produce the calibration gas/air mixture:

Internal Micro Pump

A small air pump draws in ambient air to blend with the electrochemically generated gas.

Electrochemical Generating Cell

The electrochemical generating cell contains an electrolyte solution and either inert or consumable electrodes, depending upon the gas being generated. Gas is generated in the solution and readily permeates out of the cell and to the detection system.

IX. Standard Warranty

We warrant gas calibration equipment manufactured and sold by us to be free from defects in materials, workmanship and performance for a period of one year from date of shipment. Any parts found defective within that period will be repaired or replaced, at our option, free of charge, F.O.B. factory. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned, repaired, or replaced on a routine basis.

Such items may include:

- a. Electrochemical type generating cells
- b. Batteries

Warranty is voided by abuse including rough handling, mechanical damage, alteration, or repair procedures not in accordance with the instruction manual. This warranty indicates the full extent of our liability, and we are not responsible for removal or replacement cost, local repair costs, transportation costs or contingent expenses incurred without our prior approval.

Removing or Inserting the MiniBump Unit into the Wall Mount Housing

If the MiniBump unit is ordered with the Bump Station, the instrument is shipped inside the wall mount housing. The instrument may also be used as a portable gas generator, or it may need to be removed from the housing to change the gas cell or the batteries. To remove the MiniBump follow these steps:

- 1 Unscrew the 4 phillips screws that hold the front of the housing to the back. (Note that the screws do not come completely out of the front cover.)
- 2 Remove the front of the housing from the back.
- 3 Remove the one phillips screw that holds the clear plastic retaining plate located over the instrument.
- 4 Pull out the clear retaining plate by lifting up and out
- 5 Remove the instrument from the housing.
- 6 To insert the MiniBump back into the housing, follow the directions in reverse order.

Alkaline "AA" Batteries

A set of two fully charged alkaline "AA" batteries provides approximately 10-12 hours of operation. To replace the batteries, open the battery cover with either a fingernail or small flat object. It is important that when changing the batteries in the instrument, to not use a metal object, such as a screw driver. Using a metal object to remove the batteries will frequently blow the pico fuse in the unit, preventing the unit from powering up.

NOTE: Rechargeable batteries will provide substantially fewer hours of operation and will self discharge while the instrument is in storage. Users should also be aware that use of rechargeable batteries will void the CSA approval of the MiniBump for intrinsic safety.

Microprocessor-Based Circuitry

When powered-up, the microprocessor checks for remaining cell life. It also monitors battery life and indicates when either a low battery or exhausted cell condition occurs. The circuit board is attached directly to the bottom case via solder joints to the battery terminals. If damaged or inoperable, it should be replaced as part of the case rather than removed from these terminals.

Delivery cup

The instrument comes standard with a small flexible rubber cup designed for delivering the gas to the sensor head. The distance between the generator and the sensing electrodes should be kept to a minimum for fast response.

VIII. Optional Bump Station Accessory

The MiniBump can also be used in the optional wall mount "Bump Station." This weather and corrosion resistant housing is designed to place the MiniBump unit in an easily accessible area for frequent functional testing of a variety of gas detection units.

When the MiniBump unit is ordered with the Bump Station, the instrument is shipped with the rubber cal cup adapter installed on the instrument. In addition, a 3' polyurethane hose with a quick connect is also included. The MiniBump can also be removed from the Bump Station and used as a portable gas generator.

Mounting the Bump Station Housing

To mount the case, remove the four mounting screws from inside the unit. Drill four mounting holes in the wall as per the location of the mounting brackets, and mount the case with the gas outlet pointing toward the ground. The front of the case has been labeled "This Side Down". Mounting in this configuration helps prevent dust, dirt, and water from entering the instrument through the gas outlet port.

VII. Accessory Items / Parts List

The following items and spare parts are available for the MiniBump:

P/N	Description
115-0400-00	Screw Cap with hose fitting
210-0400-00	Wall mount case for MiniBump
250-0401-00	Battery Cover, MiniGen
400-0500-00	MiniBump main board
510-0500-01	Chlorine generation cell
510-0550-02	Hydrogen sulfide generation cell
510-0570-02	Hydrogen cyanide generation cell
510-0590-02	Hydrogen generation cell
715-0100-00	Rubber cal cup adapter
730-0400-00	Nylon carrying case
730-0415-00	Hard-body, water resistant, padded accessory case
910-0550-00	Instruction manual, MiniBump

II. Start-Up

To start the generator, **press and hold** the ON/OFF Switch, located in the middle front of the instrument, until the GREEN LED turns on, approximately **0.3 seconds**. Release the switch immediately thereafter. Please note that the label on the front of the MiniBump instrument says to press and hold for 3 seconds. This is no longer necessary, but holding the button down for 3 seconds will still turn on the unit with no adverse effects.

The GREEN LED will remain lit for approximately 120 seconds. Gas will begin to be generated immediately and should reach the sensor within a few seconds. Gas will continue to be generated for 30 seconds, followed by a 90 second purge of air through the sensor. Note: Some sensors have faster response times than others. If the system does not respond to the gas within 30 seconds, continue to hold the MiniBump test cap on the sensor as some gas is still being released during the purge cycle.

If the RED LED begins flashing or remains lit continuously it indicates the instrument is in either low battery condition or cell failure mode. Please refer to the section on Non-Normal Operation.

The instrument will shut off automatically after the 120 seconds expires and the GREEN LED turns off. The instrument may be turned on again immediately after the GREEN LED turns off.

III. Normal Operation

The instrument is designed to generate gas for approximately 120 seconds per bump test. Each cell will provide up to 1000 tests. The MiniBump will generate gas until either the battery becomes discharged or the cell is consumed. If either condition occurs, a RED LED will light, indicating a non-normal condition (refer to the Non-Normal Operation section that follows.)

The calibration gas is delivered through a small flexible rubber cup attached to the cell manifold cap. The rubber cup is placed over, around or in front of the gas sensor. Be sure to make a tight seal to the sensor face to prevent the generated gas from escaping prior to reacting on the sensor. This method is primarily used for calibrating diffusion type sensors.

Alternatively, the output gas may be collected into a gas collection bag for calibrating sample draw instruments. If this method is used, it is recommended that the generated gas is allowed to diffuse into a calibration bag for several minutes (several consecutive tests) to partially fill the bag with generated gas. If the flow rate of sample draw instrument is high, the MiniBump may need to operate several times to provide a sufficient gas sample. Be sure to disconnect the sample draw unit before the bag is completely emptied of gas.

VI. Maintenance

ON/OFF Switch

The ON/OFF Switch is identified by the universal symbols of 1 and 0 and is activated through the front membrane panel. It is a physical switch mounted on the circuit board. If the membrane area gets damaged, it is replaced as part of the entire front label. If the switch becomes nonfunctional, it must be repaired or replaced as part of the circuit board.

Caution

Both the electrochemical cell and the alkaline batteries used in the MiniBump instrument contain corrosive chemicals. While it is not expected that the chemicals in the cell or alkaline batteries will leak during normal operation, it is recommended that both the cell and the batteries be removed from the instrument if it is being stored for periods longer than one week between use.

Note: The generating cells contain very small amounts of acidic solution and should be disposed of as per local or federal regulations. For more information, please contact the factory.

V. Cell Life

The generating cell is consumed during normal operation. All cells are rated for up to 1000 test maximum, 250 minimum. Once a cell has been depleted, it may be replaced with a new cell to provide another 1000 tests. Replacement cells may be stored in their containers in a cool, humid area for several years under most conditions.

Different types of generating cells can be used with each instrument. The microprocessor in the MiniBump reads the type of gas of the cell from a memory chip embedded in the cell body. It then adjusts itself for each type of gas output. For a complete list of correct cell part numbers, please refer to the parts list to follow.

To replace the generating cell in the instrument, first remove the instrument cap located on the top of the instrument. The generating cell pulls directly up out of the cell chamber. **Do not twist or rotate the generating cell while removing it from the cell chamber or damage may occur to either the cell pins or the cell chamber sockets.** The replacement cell is replaced in reverse fashion. Care must be taken when replacing the cell to correctly line up the electrode pins with the corresponding sockets. Do not force the cell into the cell chamber if it is not properly aligned, otherwise the pins may become damaged rendering the cell and/or instrument useless.

NOTE: Never attach a sample draw instrument directly to the end of the MiniBump delivery cup with no "Y" or "T" connector in between the two instruments. This may cause damage to both the MiniBump and/or sample draw instrument.

IV. Non-Normal Operation

If either the batteries or the generating cell become depleted, or the generating cell is removed from the MiniBump, the instrument enters a non-normal operating condition and the RED LED will turn on.

Under a low battery condition, the RED LED will begin to flash. If the low battery condition occurs during power up, the RED LED will flash for approximately 30 seconds and then the instrument will power down. If the low battery condition occurs after start up, the RED LED will begin flashing and the instrument will continue to run for approximately 30 seconds before power down. It is recommended to replace depleted batteries with two "AA" heavy duty Alkaline batteries for maximum operating life.

If the cell becomes depleted or is removed, the RED LED will light continuously. If the depleted cell condition occurs during power up, the RED LED will flash for approximately 30 seconds and then the instrument will power down. If the depleted cell condition occurs after start up, the RED LED will light and the instrument will continue to run for approximately 30 seconds before power down.

If the cell has been depleted, it should be removed and replaced with a new generating cell. Please refer to the section on cell life for proper instructions on replacing the generating cells. If the cell has not been depleted, there may be a faulty electrical connection between the cell and the instrument. Remove the cell and inspect the pins protruding from the cell and the sockets in the cell chamber. Remove any debris and or corrosion that may be present and retest the cell. If either the pins or sockets become damaged or non-repairable, replace the cell chamber and/or the cell.