



MiniBump



Calibration Gas Bump Tester

Instruction Manual

Rel.IV

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 2014/30/EU** on Electromagnetic Compatibility (EMC), in accordance with the provisions of Statutory Instrument 2372.

The following standards have been applied EN 61000-6-1:2007-10, EN 61326:1997 +A1:1998 +A22001+A3:2003 Class A, EN61326-1:2013

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Calibration Gas Instrument

Release IV

P/N 910-0550-00

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I. GENERAL DESCRIPTION

The MiniBump is a small battery-powered, portable electrochemical gas generator designed to functionally test and or calibrate toxic gas sensors and alarm systems. The MiniBump is designed to 'bump' a gas detection system into alarm within approximately 30 seconds when used with a MiniBump generating source. When used with a MiniCal generating source, the unit will provide calibration gas of the type and concentration determined by the generating source to calibrate gas detection systems. 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. The Release IV MiniBump instruments are designed to operate at .5 LPM (liters per minute).

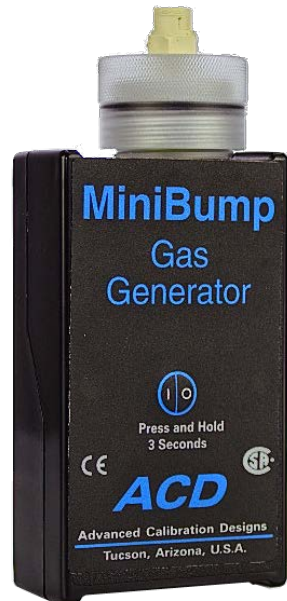
Electrochemical Generating Source

The electrochemical generating source contains an electrolyte solution and either inert or consumable electrodes, depending upon the gas being generated. Gas is generated in the solution and is delivered out of the source by the internal pump, to the detection system.

Alkaline 'A' 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 what type of generating source is inserted, the gas type and concentration as well as if the source is a “bump” type source and the remaining source life. It also monitors battery life and indicates when either a low battery or exhausted source 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.

II. START-UP MINIBUMP SOURCE

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 **3 seconds**. Release the switch immediately thereafter.

The GREEN LED will blink at a rapid rate indicating the number of hours of gas remaining in the source (5 blinks indicates 5 hours of life remaining). It will then blink at a rate of once a second for approximately 20 seconds. Gas will begin to be generated immediately. After 20 seconds, the green light will stay illuminated and the pump will begin running. With a bump source installed, the unit will run for an additional 20 seconds providing a 'bump' of output gas to drive the connected sensor into alarm after which both red and green lights will alternate indicating that the instrument is purging. It will shut off automatically after an additional 25 seconds. Note: Some sensors have faster response times than others. If the system does not respond to the gas within 30 seconds, continue to leave the MiniBump attached to the sensor throughout the purge cycle and if needed, run the bump cycle a second time.

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

III. NORMAL OPERATION MINIBUMP SOURCE

The instrument is designed to generate gas for approximately 36 seconds per bump test. Each source will provide up to 1000 tests. The MiniBump will generate gas until either the battery becomes discharged or the source 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 hose attached to the source manifold cap. The hose is placed over, around or in front of the gas sensor. Alternatively, the detector can be placed directly in front of the outlet fitting allowing the gas to be presented directly to the detector.

IV. START-UP MINICAL SOURCE

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 **3 seconds**. Release the switch immediately thereafter.

The GREEN LED will blink at a rapid rate indicating the number of hours of gas remaining in the source (5 blinks indicate 5 hours of life remaining). It will then blink at a rate of once a second for approximately 20 seconds. Gas will begin to be generated immediately. After 20 seconds, the pump will come on and the unit will continue running with the green light blinking for an additional 20 seconds. After this, the green light will stay illuminated indicating the unit is ready to calibrate. With a MiniCal source installed, the unit will continue to run in this state generating the concentration and type of gas specified by the generating source installed until turned off by pressing the power button for an additional 3 seconds. When the unit is turned off it will enter a purge cycle, both red and green lights will alternate indicating that the instrument is purging. It will shut off automatically after an additional 25 seconds. Note: Some sensors have faster response times than others. Leave the MiniBump calibrator attached to the sensor until the sensor has stabilized and then proceed with the calibration procedure for that sensor.

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

V. NORMAL OPERATION MINICAL SOURCE

The instrument is designed to generate calibration gas at .5LPM (liters per minute). Each MiniCal source will provide 5 hours of calibration gas. The MiniBump will generate gas until either the battery becomes discharged or the source 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 hose attached to the source manifold cap. The hose is placed over, around or in front of the gas sensor. Alternatively, the detector can be placed directly in front of the outlet fitting allowing the gas to be presented directly to the detector.

When calibrating sample draw instruments, the output gas may be collected into a gas collection bag. If this method is used, it is recommended that the generated gas be allowed to diffuse into a calibration bag for several minutes to partially fill the bag. Be sure to disconnect the sample draw unit before the bag is completely emptied of calibration gas.

VI. NON-NORMAL OPERATION

If either the batteries or the generating source become depleted, or the generating source 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 source becomes depleted or is removed, the RED LED will light continuously. If the depleted source condition occurs during power up, the RED LED will remain on for approximately 30 seconds and then the instrument will power down. If the depleted source 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 source has been depleted, it should be removed and replaced with a new generating source. Please refer to the section on source life for proper instructions on replacing the generating sources. If the source has not been depleted, there may be a faulty electrical connection between the source and the instrument. Remove the source and inspect the pins protruding from the source and the sockets in the source chamber. Remove any debris and or corrosion that may be present and retest the source. If either the pins or sockets become damaged or non-repairable, replace the source chamber and/or the source.

VII. CELL LIFE

The MiniBump generating source is consumed during normal operation. All sources are rated for up to 1000 test maximum, 250 minimum. Once a source has been depleted, it may be replaced with a new source to provide another 1000 tests. MiniCal sources last for 5 hours of use. Replacement sources may be stored in their containers in a cool, humid area for several years under most conditions.

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

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

VIII. MAINTENANCE

The MiniBump instrument is designed to operate at 0.5 liters per minute flow rate. For most accurate calibration when using a MiniCal source, the flow should be checked and adjusted if necessary. Check the flow using a volumetric flow meter connected directly to the output of the instrument.

If the flow needs to be changed simply adjust the flow control potentiometer until the correct reading is obtained. To access the potentiometer simply remove the top cover of the instrument by pulling up on the sides and the two halves will come apart exposing the internal workings of the product. Replace the top cover and you are ready to calibrate.

Changes in altitude and temperature can cause changes in air density, thus affecting the output of the MiniCal source. The output was calibrated to STP (standard temperature and pressure) of sea level and 20 °C. To compensate for differences in altitude or temperature from STP, the following tables should be utilized:

Note: Altitude and Temperature are cumulative, i.e., you must correct for both factors to obtain the most accurate calibration.

Altitude Correction Table		Temperature Correction Table	
Altitude (in feet)	corrected output (multiply by)	Temperature (° C)	corrected output (multiply by)
0	1.000	-30	0.829
1000	1.038	-20	0.863
2000	1.076	-10	0.898
3000	1.116	0	0.932
4000	1.158	10	0.966
5000	1.202	20	1.000
6000	1.248	30	1.034
40	1.068		
50	1.102		

(5 PPM @ 3000 feet and 0 C = $5 \times 1.116 \times .932 = 5.2$ PPM actual output)

ON/OFF Switch

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

Note: The generating sources 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.

IX. 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 MiniBump source
510-0550-02	Hydrogen Sulfide MiniBump source
510-0570-02	Hydrogen Cyanide MiniBump source
510-0590-02	Hydrogen MiniBump source
510-0401-0x	Chlorine MiniCal source (specify PPM 1 – 25)
510-0405-0x	Hydrogen Sulfide MiniCal source (specify PPM 1 – 25)
510-0407-0x	Hydrogen Cyanide MiniCal source (specify PPM 1 – 25)
510-0409-0x	Hydrogen MiniCal source (specify PPM 1 – 25)
715-0405-0X	Hose with connector, Norprene, 5'
730-0415-00	Hard-body, water resistant, padded accessory case
910-0550-00	Instruction manual, MiniBump

X. 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 sources
- 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.

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 MiniBump sources 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.

The following is a listing of the available electrochemical MiniCal sources 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 5 hours of calibration gas.

Manufactured by:

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