

# BACHARACH<sup>®</sup>

## DIOXOR<sup>®</sup> II

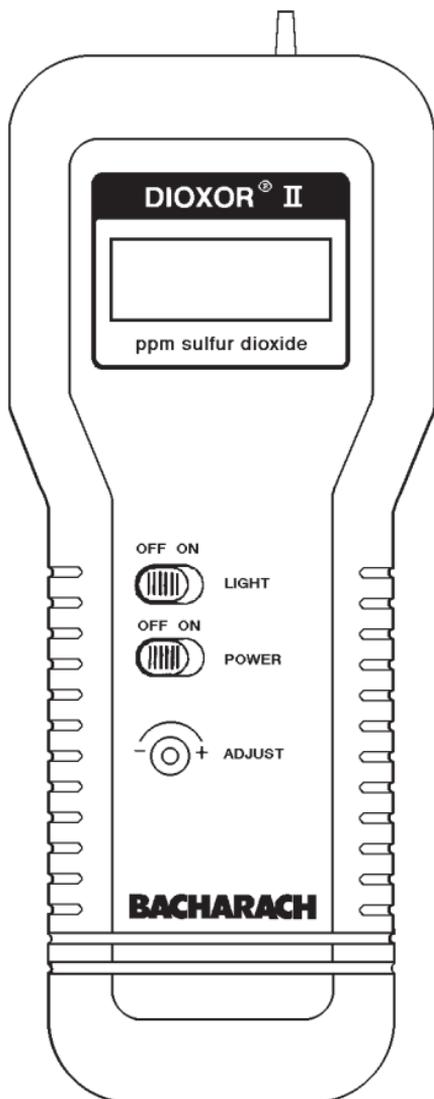
INSTRUCTION 19-9121

Portable SO<sub>2</sub> Analyzer

Part No. 19-7038 & 19-7043



Rev. 6 - April 2007



### Bacharach, Inc.

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# WARRANTY

Bacharach, Inc. warrants to Buyer that at the time of delivery this Product will be free from defects in material and manufacture and will conform substantially to Bacharach Inc.'s applicable specifications. Bacharach's liability and Buyer's remedy under this warranty are limited to the repair or replacement, at Bacharach's option, of this Product or parts thereof returned to Seller at the factory of manufacture and shown to Bacharach Inc.'s reasonable satisfaction to have been defective; provided that written notice of the defect shall have been given by Buyer to Bacharach Inc. within one (1) year after the date of delivery of this Product by Bacharach, Inc.

Bacharach, Inc. warrants to Buyer that it will convey good title to this Product. Bacharach's liability and Buyer's remedy under this warranty of title are limited to the removal of any title defects or, at the election of Bacharach, to the replacement of this Product or parts thereof that are defective in title.

All expendable items, such as electrochemical sensors, are warranted for a period of six months.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND ARE GIVEN AND ACCEPTED IN LIEU OF (I) ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE: AND (II) ANY OBLIGATION, LIABILITY, RIGHT, CLAIM OR REMEDY IN CONTRACT OR TORT, WHETHER OR NOT ARISING FROM BACHARACH'S NEGLIGENCE, ACTUAL OR IMPLIED. The remedies of the Buyer shall be limited to those provided herein to the exclusion of any and all other remedies including, without limitation incidental or consequential damages. No agreement varying or extending the foregoing warranties, remedies or this limitation will be binding upon Bacharach, Inc. unless in writing, signed by a duly authorized officer of Bacharach.

## Declaration of Conformity

Manufacturer's Name:	Bacharach, Inc.
Manufacturer's Address:	621 Hunt Valley Circle New Kensington, PA 15068 USA

Product Name:	DIOXOR II
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### Conforms to the following product specifications

EMC:	European Directive 89/336/EEC EN 500081-1 (Emissions) EN 500082-1 (Immunity)
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## WARNING!

Because this instrument is used to detect and monitor materials and conditions which are listed by OSHA or others as potentially hazardous to personnel and property, the information in this manual must be fully understood and utilized to ensure that the instrument is operating properly and is both used and maintained in the proper manner by qualified personnel. An instrument that is not properly calibrated, operated and maintained by qualified personnel is likely to provide erroneous information, which could prevent user awareness of a potentially hazardous situation for the instrument user, other personnel and property.

If, after reading the information in this manual, the user has questions regarding the operation, application or maintenance of the instrument, supervisory or training assistance should be obtained before use. Assistance is available by calling your nearest Bacharach Service Center.

## 1 INTRODUCTION

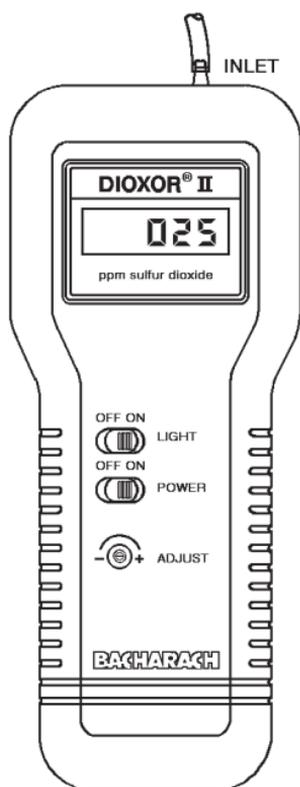


Figure 1. Dioxor II

The Dioxor<sup>®</sup> II is a commercial-grade portable instrument designed to display concentrations of sulfur dioxide (SO<sub>2</sub>) gas between 0 and 2000 ppm. This instrument shows the presence of SO<sub>2</sub> in a gas sample by drawing the sample into its sensor chamber by a built-in motorized pump. Part #19-7038 comes with a probe. Part #19-7043 comes without a probe (All non-probe related functions remain the same in this instruction).

Other features and accessories of the Dioxor II include: A large, back-lit Liquid Crystal Display (LCD), which allows the display to be read in any lighting condition from direct sun-light to total darkness; a semi-detachable elastic strap that permits the instrument to be either hand held, or hung on nearby objects; a rigid stainless steel probe with handle, connected to a flexible hose with sample filter that allows gas samples to be taken from cramped and confined areas (alternate probes and condensate traps may be used).

## 2 TECHNICAL CHARACTERISTICS

SO <sub>2</sub> Display Range.....	0–1999 ppm SO <sub>2</sub>
Accuracy .....	±10 ppm or ±5% of reading whichever is greater
Response Time.....	90% of final value within 40 sec.
Battery Requirements.....	1.5 V, “C” cells, Qty. 4
Operating Time* .....	14–16 hours, alkaline cells
Operating Temp. Range .....	23 to 104°F (–5 to 40°C)
Relative Humidity .....	10–85% non-condensing
Weight (w/o batteries).....	12 ozs. (341 grams)
Dimensions.....	8.6 x 3.5 x 2.9 inches (218 x 89 x 74 mm)

\* *Times are with the backlight turned off. Continuous use of the backlight will decrease battery life.*

## 3 PREPARING THE DIOXOR II FOR OPERATION

To prepare the instrument for operation, you must install four “C” size batteries, and (if desired) install the hose and probe as described in the following paragraphs.

For your convenience, and to ensure that the instrument will provide reliable SO<sub>2</sub> indications, the SO<sub>2</sub> sensor is installed and the instrument calibrated on a known SO<sub>2</sub> concentration at the factory.

### 3.1 Battery Installation

Detach the elastic strap’s metal clip at the bottom of the instrument, and slide off the battery cover as shown in Figure 2. Then while observing proper battery polarity, install four “C” size batteries into the instrument’s battery compartment. (Recommended battery types: Duracell Alkaline or equivalent). After the batteries are installed, replace the battery cover and the elastic-strap clip.

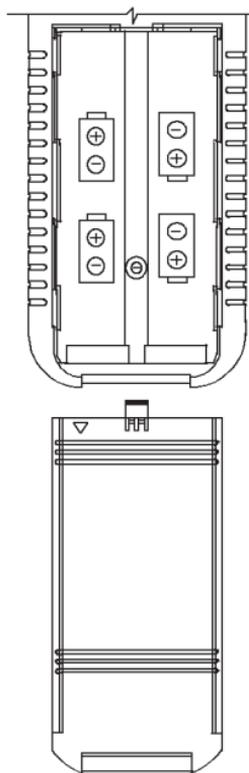


Figure 2. Battery Installation

If batteries are accidentally installed in the wrong polarity, a positive temperature coefficient (PTC) thermistor will protect the instrument's electronic circuitry. The instrument will operate once batteries are properly installed and the PTC thermistor is allowed to cool.

## 3.2 Probe Installation

Install the probe by sliding the end of its tubing over the gas inlet port on the top right side of the instrument as shown in Figure 3. The tubing may be difficult to slide over the gas inlet port of the unit for the first time. This was done intentionally to allow for a snug fit. Use a little dish washing liquid diluted in water or heat the end of the tube in hot tap water to help it slide onto the port.

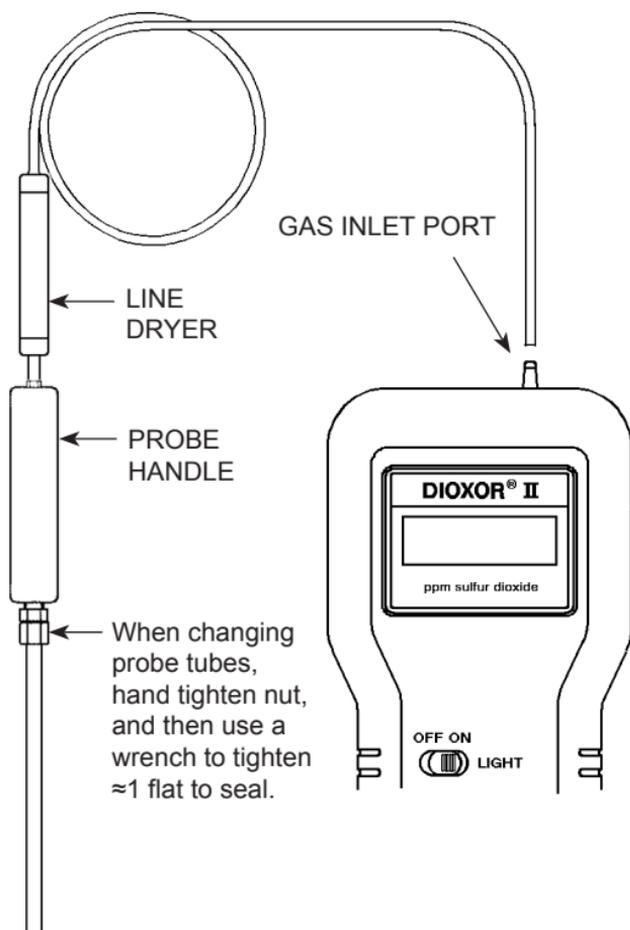


Figure 3. Probe Installation

## 4 OPERATION

To operate the Dioxor II, you simply . . .

- Set its POWER switch to ON,
- Wait for the instrument to warm up (approx. 1 minute),
- Zero the display (if necessary),
- Take a gas sample.

Detailed operating procedures are presented below:

### 4.1 Power ON/OFF

Turn on the instrument by sliding its POWER switch to ON. Observe that when power is first applied, all numerical LCD segments are tested for 5-15 seconds; after which, the LCD shows the detected SO<sub>2</sub> level. (A minus sign may appear during power up as the sensor stabilizes.) Turn off the instrument by sliding the POWER switch to OFF.



**Important!** *When storing the instrument for extended periods of time, remove the batteries and ensure that the POWER switch is OFF. The OFF position places a short across the SO<sub>2</sub> sensor, thus keeping the sensor from being destabilized while not in use.*

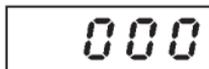
### 4.2 Zeroing the Instrument

After being turned on and warmed up for at least 1 minute, the instrument should indicate 000 ±5 ppm in fresh air. If the instrument needs to be zeroed, proceed as follows:

1. Ensure that the instrument is sampling air that is free of sulfur dioxide.

**NOTE:** *An indication that the instrument was not zeroed in fresh air is when a large negative SO<sub>2</sub> display appears when the instrument is moved into another area.*

2. Using a 1/8" flat-blade screwdriver, turn the ADJUST potentiometer until the LCD shows 0 ppm. The display shows negative numbers for zeroing purposes. *An instrument can be considered zeroed with a display bounce of up to ±3 ppm.*



## 4.3 Backlight ON/OFF

The LCD can be read in low-light areas by setting the front panel LIGHT switch to ON. The backlight stays on until turned off, or until the POWER switch is set to OFF.

## 4.4 Using the Strap

The instrument's elastic strap allows the unit to be either hand-held, or hung on nearby objects.

By sliding your hand between the instrument and its elastic strap, you can hold onto the Dioxor II with a minimum of effort. The instrument's front panel slide switches can then be actuated by your thumb for one-handed operation. Or, by releasing the metal clip at the bottom of the instrument's case, you can hang the instrument by its strap on nearby objects such as nails, sheet metal, or valve handles.

## 4.5 Using the Probe

A rigid stainless steel probe with handle is used to draw a gas sample from the room, boilers, and other combustible furnaces through a line dryer and flexible hose into the instrument. A flexible probe option (see Section 6) is also available.

The probe tube is detachable from the handle when sampling with a different probe is desired. See Figure 3.

**Important!** *The line-dryer will remove moisture from the gas sample. If the line-dryer becomes saturated, however, condensation may be observed within the hose. If this occurs, stop sampling and replace the line-dryer's filter-packing material.*

## 4.6 Interpreting the Display

### Gas Display

The LCD shows SO<sub>2</sub> levels in the range from 0 to 9999 ppm. The display on the right indicates an SO<sub>2</sub> level of 25 ppm.



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## Overrange

When the gas sample exceeds 1999 ppm, a “1” is displayed on the LCD. To clear an overrange condition, leave the instrument turned on and sample fresh air until the LCD returns to displaying SO<sub>2</sub>.



## Low Battery Indications

When the battery voltage becomes low, the “LO BAT” indicator appears. Although the instrument will continue to operate and give SO<sub>2</sub> readings under these conditions, the batteries should be replaced as soon as possible.



When the battery voltage becomes too low for the instrument to operate, a “-1” is displayed on the LCD. No SO<sub>2</sub> readings are provided under these conditions.



## **4.7 Long-Term Storage**

When storing the Dioxor II for extended periods of time, set its POWER switch to OFF and remove the batteries. The POWER OFF position places a short across the SO<sub>2</sub> sensor, thus keeping it from being destabilized while not in use.

## **5 MAINTENANCE**

The Dioxor II needs to be calibrated at regular intervals to ascertain that it still meets its accuracy specification. A regular calibration schedule should be established between you and your nearest Bacharach Service Center, unless your facility has the necessary calibration equipment and personnel trained in the maintenance of gas-detection equipment. Detailed calibration procedures are provided upon request from the factory. Detailed maintenance procedures and parts lists are provided in the Service Manual (19-9166).

## 6 PARTS / SERVICE

### 6.1 Parts List

<b>Item</b>	<b>Part No.</b>
Battery Cover	19-3029
Probe/Hose/Line Dryer Assy.	19-3084
Flexible Probe Tube (optional)	19-3104
Line Dryer Filter Packing	11-0122

### 6.2 Bacharach Sales / Service Centers

#### **United States**

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Bacharach, Inc.  
621 Hunt Valley Circle  
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## 7 HAZARDS OF SULFUR DIOXIDE

### Properties:

Sulfur dioxide (SO<sub>2</sub>) is a colorless, nonflammable gas that has a strong pungent odor, is twice as heavy as air, and is highly corrosive to ordinary metals when mixed with water vapor.

### Physiological Effects:

Exposure to sulfur dioxide gas in low concentrations produces an irritating affect on the mucous membranes of the eyes, nose, throat, and lungs due to the formation of sulfurous acid as the gas comes in contact with the moisture on these surfaces.

Acute exposure through inhalation may result in dryness and irritation of the nose and throat, choking, sneezing, coughing, and broncho-spasm. Severe overexposure may cause death through pulmonary edema (abnormal fluid buildup in the lungs), or from respiratory arrest. Prolonged or repeated exposure may cause impaired lung function, bronchitis, hacking cough, nasal irritation and discharge, increased fatigue, alteration in the senses of taste and smell, and longer duration of common colds.

### PPM Level Attributes:

- |                       |  |
|-----------------------|--|
| <b>1 ppm</b>          | Injurious to plant foliage.  |
| <b>2 ppm</b>          | Eight-hour time-weighted average (TWA) exposure limit set by the U.S. Occupational Safety and Health Administration (OSHA) <sup>[1][2]</sup> . |
| <b>3 ppm</b>          | Noticeable odor.   |
| <b>6 to 300 ppm</b>   | Immediate irritation of the nose and throat.   |
| <b>300 to 500 ppm</b> | Immediately dangerous to life.   |

**First Aid:**

Move victims to fresh air. If breathing has ceased, begin artificial respiration immediately. Administer oxygen if exposure has been severe and breathing is difficult. Seek medical attention immediately.

**References:**

[1] *Code of Federal Regulations*, Title 29 CFR Parts 1900-1910 (Labor), Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

[2] *Threshold Limit Values and Biological Exposure Indices*, 1989-90 ed., American Conference of Governmental Industrial Hygienists (ACGIH), 6500 Glenway Ave., Bldg. D-7, Cincinnati, OH 45211.