

# Dielectric



A Dielectric Pressurization Systems Company

## Model 9821 Helium Detector



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# 1. INTRODUCTION

## 1.1 PURPOSE OF MODEL 9821

1.1.1 The Mark Products Model 9821 Helium Detector is designed to detect leaks in virtually any type of containment using helium as a tracer gas.

1.1.2 Helium is an ideal tracer gas because it is nontoxic, noncorrosive, nonexplosive, *relatively* inexpensive. The extremely small helium atom penetrates very small leaks, while the low natural background in the atmosphere makes it easily detectable.

## 2. DESCRIPTION OF MODEL 9821

### 2.1 GENERAL DESCRIPTION

2.1.1 The Model 9821 is a microprocessor controlled test instrument that uses a state-of-the-art sensor to detect the presence of helium. Weighing only 6.5 pounds, the Model 9821 is compact and lightweight. The Model 9821 is easy to use eliminating the need for extensive training. Solid-state circuitry and a rechargeable battery make the Model 9821 virtually maintenance free.

2.1.2 The Model 9821 Helium Detector will detect helium in concentrations from as low as 0.01% (100 parts per million [PPM] ) to as high as 100%. The automatic sampling sequence requires only 20 seconds to display the results. The purge cycle varies with the concentration of Helium sampled. The cycle is extended beyond 40 seconds when higher readings, greater than 75%, are detected.

2.1.3 a soft-sided carrying case is provided for the transportation and storage of the Model 9821.

### 2.2 SPECIFICATIONS

***Displayed Operating range:***

0.01 - 0.99% helium

1.0 - 9.9% helium

10 - 100% helium

**Operating Temperature Range:**

14°F (-10°C) to 131°F (55°C)

**Power Source:**

12V rechargeable sealed lead-acid battery

**Operating Cycle:**

20 seconds (in the absence of helium)

40 seconds (small percentages of helium present)

40+ seconds (large percentages of helium present)

**Operating time (without recharge):**

Approximately 8 hours

**Probe:**

3-foot metal, multi-sectional probe

**Filter System:**

1 in-line filter

**Net Weight:**

6.5 pounds (2.95 kg)

**Dimensions:**

4 1/8" high x 8 7/8" deep x 7 1/2" wide

(10.5 cm x 22.5 cm x 19 cm)

2.3 COMPONENTS

2.3.1 Model 9821 Helium Detector comes complete with the following items:

<b>PART #</b>	<b>DESCRIPTION</b>
1820-00266	Battery Charger
1820-00365	Probe Tip
1820-00366	Probe Extensions (3 pieces)
1820-00367	Boot Assembly
1820-00370	Probe Filter/Hose Assembly
1820-00421	Carrying Strap
1820-00435	Carrying Bag

### 2.3.2 Optional accessories for the Model 9821 Helium Detector:

<b>PART #</b>	<b>DESCRIPTION</b>
224	12 Volt, DC Helium Detector Battery Charger (Vehicle)
9801	Portable Flowmeter
9802	Helium Injection Manifold

## 3.0 OPERATIONS

### 3.1 CHARGING THE BATTERY

3.1.1 The Model 9821 Helium Detector is powered by a 12V rechargeable, sealed lead-acid battery. The unit should not be used when either **LO BAT** or **E10** are indicated on the LCD as this may cause battery damage. After receiving the Model 9821 and before operating it for the first time, it is recommended that the unit be charged for 24 hours.

3.1.2 The battery of the Model 9821 should not be serviced by the user. Servicing of the battery must be done by Mark Products, a dielectric Pressurization Systems Company. Call (877) 247-3793 or (207) 647-9495 for an MRA (Material Return Authorization) before returning any product for repair.

3.1.3 Battery recharging is accomplished by using the Model 1820-00266 Battery Charger or the optional Model 224 Battery Charger (Vehicle). The battery charger unit plugs into a standard 115 V /60 cycle electrical outlet and the outlet on the left side of the Model 9821. The Model 224 requires a standard vehicle cigarette lighter receptacle. NOTE: Other types of battery chargers for different electrical systems are available. Please contact Mark for details.

3.1.4 When the charger is connected to the instrument, the **POWER ON** light on the charger displays steadily. If the Model 9821 requires charging, the **FAST CHARGE** light will be lit. The charger may be connected to the Model 9821 indefinitely without damage to the unit or charger.

3.1.5 For normal charging, charge the unit until the **FAST CHARGE** light goes out. The battery should be charged for two hours per every hour of use. A fully charged battery will power the Model 9821 for about 8 hours.

3.1.6 After daily use, recharge the battery as soon as possible. Storage of the Model 9821 with a depleted battery can reduce battery life.

## 3.2 ASSEMBLING THE MODEL 9821

3.2.1 The probe for the Model 9821 is assembled without requiring the use of any tools. All parts are pushed together. Each component is gasketed to ensure a snug fit.

3.2.2 The probe assembly consists of six parts:

*Model 1820-00365 Probe Tip* stainless steel extension to be used in place of the Collection Boot

*Model 1820-00366 Probe Extensions (3 pieces)*

*Model 1 820-00367 Boot Assembly*

*Model 1820-003 70 Probe Filter/Hose Assembly*

3.2.3 The 1820-00370 Probe Filter/Hose Assembly attaches to the Model 9821 by inserting the metal O-ring sealed fitting into the quick disconnect fitting on the side of the instrument. NOTE: If the fitting does not insert easily, push the release tab up until the locking pin pops out. To release the hose assembly, lift the release tab as you pull the fitting outward.

3.2.4 Attach one or more (up to three) of the Probe Extensions to the, Probe Filter/Hose Assembly. Adding any additional length to the probe assembly may cause inaccurate readings. Use the Boot Assembly if you are working on flat surfaces or windy areas. Use the Probe Tip to sniff helium in cracks, holes, duct work, !etc. Take care to ensure moisture, liquid, ) and/or contaminates are not drawn into the Probe Assembly.

### 3.3 STARTING UP THE MODEL 9821

3.3.1 To turn on the Model 9821, press the button marked ON/OFF once. Do not press the **ON/OFF** button again until you wish to turn the power off. Pressing the button more than once will cause the unit to turn off after the countdown sequence.

3.3.2 The LCD will display a rapid countdown from **100** to 0 after the power has been turned on. The unit is warming up and completing a self-diagnostic sequence.

3.3.3 If the display stops before showing 0 press the ON/OFF button and restart by pressing it again. If after three attempts the instrument does not display **00**, refer to the Troubleshooting Guide (last page).

3.3.4 A fifteen minute warm up is recommended for the Model 9821 before taking samples in the field. This allows the sensor to stabilize and will help prevent false readings.

### 3.4 OPERATING THE MODEL 9821

3.4.1 With the proper probe configuration (i.e. probe tip or boot, and up to three extension tubes) position the probe as close as possible to the location to be checked. The boot is a collection device only and does not require a tight seal, but should be positioned **above** the suspected leak location if possible.

3.4.2 **CAUTION: DO NOT** immerse the Probe Tip, Probe Assembly or Probe Extension in water or any other liquid. The helium detector pump will draw liquid into the unit, resulting in damage to the unit and voiding the warranty. Keep the Probe Tip dry.

3.4.3 Initiate the sampling sequence by pressing the RUN button.

3.4.4 During this cycle the Model 9821 is drawing in a sample from the area under the Boot Assembly or around the Probe Tip and the **SAMPLE** LED will be lit for approximately 14 seconds. No reading will be displayed until the **READ** cycle.

3.4.5 The **READ** light will come on when the instrument has completed analyzing the sample. During the **READ** cycle, the Model 9821 is analyzing the sample, which takes 6 seconds.

3.4.6 If helium is not present in the sample, the **PURGE** LED will flash once per second for fifteen seconds. During this time the unit is backflushing itself in case any methane is present which could cause a false reading. Once the **PURGE** LED goes off you can initiate another sampling sequence by pushing the RUN button. If you believe methane may be present where you are sampling, do not interrupt this backflushing sequence. If, however, you have determined that methane is not present in the sampling area, the sequence can be interrupted by pushing the **RUN** button. This will significantly shorten the overall cycle time.

3.4.7 If helium is present in the sample, the LCD of the Model 9821 will display the percent of helium found during the **READ** cycle. The Model 9821 reads from 0.01% to 100% helium (100 PPM to 1,000,000 PPM).

3.4.8 NOTE: Always verify the presence of helium by taking additional readings.

3.4.9 After the **READ** cycle is complete and helium has been found, the Model 9821 enters the **PURGE** cycle. During this cycle, the **PURGE** light will light continuously and cannot be interrupted. Purge time varies with the amount of helium found.

3.4.10 Once the **PURGE** cycle is completed, the detector will again backflush and the **PURGE** light will flash once every second for 15 seconds. If you are certain methane is not present, the sequence can be interrupted. NOTE: Methane, which is sometimes present in the ground, can give false readings if not purged thoroughly from the unit.

3.4.11 In the event that extremely high concentrations (above 75%) are found, a longer purge cycle will take place. After this cycle is completed, it is recommended that samples of fresh air be taken to ensure that all of the helium has been purged and the sensor has recovered completely.

3.4.12 Do not turn the unit off after every sample. The LCD draws little power during times between samples. Furthermore, the unit will continue to backflush which prevents interference from other gases. The unit will automatically turn off after 15 minutes if no sample has been taken.

3.4.13 If significant temperature changes are experienced during the testing, make certain the unit has time to acclimate in order to respond effectively to the new ambient temperature. Ten to fifteen minutes is all that is required.

## 4. MAINTENANCE

4.1 Be sure to examine the Probe Assembly for contamination from dirt, dust, debris, water or other liquid before packing the parts into the carrying bag. If contamination is found, clean the Probe Assembly with a damp cloth.

4.2 Recharge the battery when **LO BAT** or **E10** appears on the LCD display. Reading in the **LO BAT** condition may be inaccurate

4.3 Always check the O-rings in the extension tubes to make sure they are not dirty or worn out. Keeping the O-rings in good condition ensures that helium does not escape when taking readings.

# APPENDIX

<b>TROUBLESHOOTING GUIDE</b>		
<b>CONDITION</b>	<b>PROBABLE CAUSE</b>	<b>REPAIR PROCEDURE</b>
"LOW BAT" "E" 10 indication on LCD Display	1. Battery discharged	1. Recharge Battery
"E15" indication on LCD Display	1. Clogged system 2. Processor malfunction	1. Inspect and clean probe 2. Contact
Pump Failure	1. Clogged system 2. Battery discharged	1. Inspect and clean probe 2. Recharge battery
Unit will not turn on	1. Battery discharged 2. Processor malfunction	1. Recharge battery 2. Contact Mark Products
Pump running slowly	1. Battery discharged 2. Clogged system	1. Recharge battery 2. Inspect and clean probe
Unit will not turn off or respond to switch commands	1. Processor malfunction	1. Turn off unit by using a small pointed instrument to push the reset button located on the left side of the unit below the strap. Repower unit.

## **WARRANTY**

The Manufacturer warrants that all goods supplied hereunder, whether or not of its own manufacture, will be of the kind described herein or in any specification and drawing approved by the Manufacturer and of merchantable quality and free from defects in material or workmanship under normal use and prescribed maintenance for a period of one (1) year, with the exception of air dryers utilizing water sealed compressors as well as the compressors themselves which shall be for two (2) years. Neither this warranty nor any other, expressed or implied, shall apply to goods delivered hereunder which have been damaged or subjected to alteration or negligence after delivery. The Manufacturer's only obligation for breach of this warranty shall be the repair, without charge, or the furnishing F.O.B. Bridgton, Maine, of a similar part to replace any part which within one (1) year, with the exception as noted above, from date of shipment is proven to have been defective, provided that (i) the Purchaser shall have notified the Manufacturer within ten (10) days of the discovery of such defect and not later than ten (10) days after the last day of this warranty, and (ii) the Manufacturer shall have the option of requiring the return of the defective material (transportation prepaid) to establish the claim. The Manufacturer shall not in any event be liable for the Purchaser's manufacturing costs, loss of profits, good will or any other special, consequential, incidental, or other damages resulting from such defects. THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, WHICH EXTEND BEYOND THE WARRANTY SET FORTH HEREIN.

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