

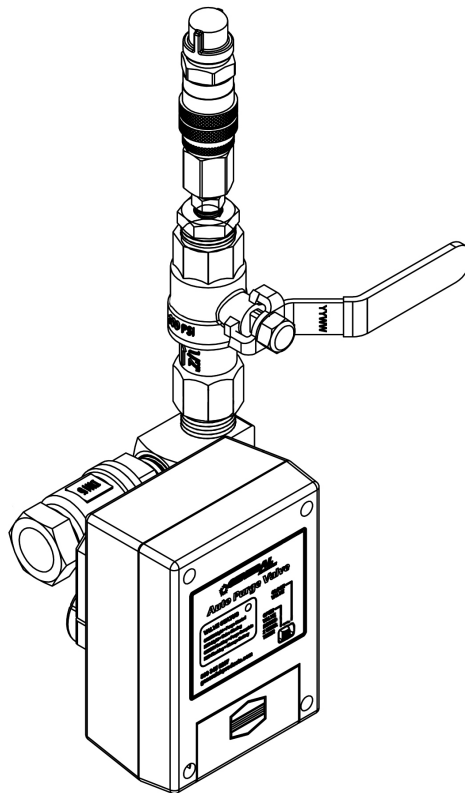


# Purge Vent / Sampling Port

*For use with Fire Protection Nitrogen Generators on Dry Pipe Sprinkler Systems*

**Models: NGP-APV / NGP-PV-1**

## Installation, Operation and Maintenance Manual

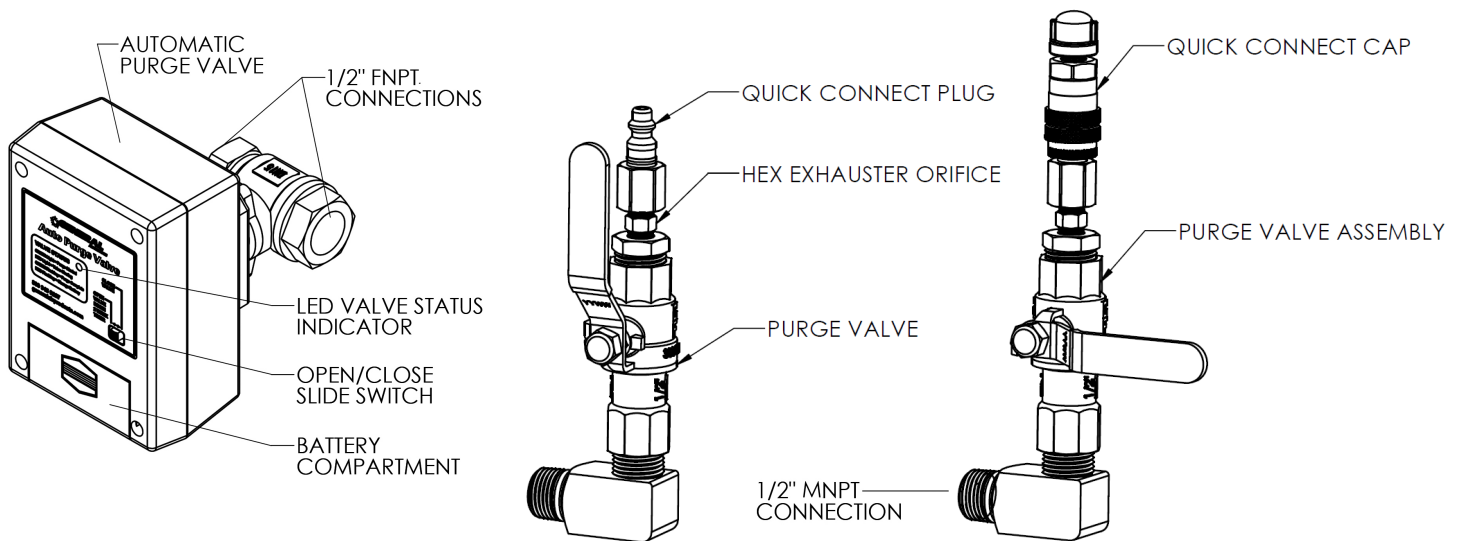


*Purge device and gas monitoring port installed at the end of the piping system to provide a means to bleed oxygen from the sprinkler piping during the nitrogen fill process and analyze the gas purity of the entire piping system. Used in conjunction with the NGP-PSN2 portable gas analyzer (sold with the Nitrogen Generator) at the gas source, the purge valve provides a simple and reliable way to monitor the gas purity throughout the sprinkler system, and purge oxygen from the piping.*

Licensed for use under U.S. Patents 9,144,700, 9,186,533, and 9,610,466

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or visit our web site for our complete product listing  
**[www.GeneralAirProducts.com](http://www.GeneralAirProducts.com)**

## Basic Components



## Installation and Operation Instructions

### Locations to Install Purge Valve

1. As directed by the system design engineer.
2. On the end of the most distant sprinkler pipe in the upper story.
3. In a location which is readily accessible for manual actuation and future inspection.
4. In a spot where upstream plumbing will not trap water.
5. One purge valve should be installed on the end of each sprinkler system being fed by the nitrogen generator.

### Installing

**The NGP-PV-1 Purge Valve** assembly is comprised of a ½" manual ball valve, hex exhaustor orifice, gas analyzer port, and quick connect cap to close the system. **The NGP-APV Purge Valve** includes these components as well as a battery operated automatic valve with a 2-week timer. Ensure the purge valve is vertical (plumb) when the installation is finished.

1. Apply appropriate pipe sealant and install using a wrench on the flats. The outlet must be pointed to the ceiling
2. Close the manual ball valve until the nitrogen generation system has been integrity tested and is ready to be brought on line.
3. To start initial system commissioning, remove the quick connect cap and open the manual ball valve to begin the purging process.
4. If using the NGP-APV, a new 9-volt battery must be inserted into the battery compartment. Move the slide switch to the "OPEN VALVE" position to begin the purging process and start the 2-week timer. The valve will automatically close after the 2-week timer has elapsed. The LED indicator will reflect the status of the valve. To close the valve at any time, move the slide switch to the "CLOSE VALVE" position.

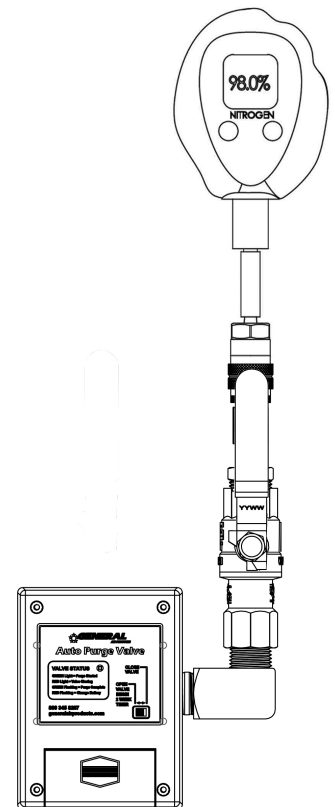
## Operating

### 1. Monitoring

- a. If not already connected, attach the gas analyzer using the quick-disconnect.
- b. Ensure the manual ball valve is open. If using the NGP-APV, insert a new 9-volt battery and move the slide switch to the open position.
- c. Turn the gas analyzer on and wait 30 seconds before reading the concentration.
- d. The gas analyzer should remain in place with the purge valve open until the desired purity level is obtained. Turn the analyzer off.
- e. Weekly readings of the gas analyzer should be made to ensure the piping system has the desired gas purity. When the desired purity is obtained, turn the gas analyzer OFF, close the purge valve and replace the quick connect cap. Follow "Sampling" instruction below for monthly nitrogen purity checks.
- f. The gas analyzer may remain in place indefinitely if there is no threat of freezing conditions; if freezing temperatures are possible the gas analyzer should be stored in a conditioned environment until needed. IF BELOW FREEZING TEMPERATURES ARE A POSSIBILITY, THE GAS ANALYZER MUST BE DISCONNECTED, MOVED TO AND STORED IN A WARMER LOCATION.

### 2. Sampling and Purging

- a. Connect the gas analyzer to the quick-disconnect.
- b. Ensure the manual ball valve is open. If using the NGP-APV, insert a new 9-volt battery and move the slide switch to the open position to allow purging, and sampling.
- c. Follow the instructions of the gas analyzer to take a concentration reading.
- d. Disconnect when finished and store gas analyzer in an area not subject to freezing.
- e. Close purge valve to finish sampling or to stop purging.
- f. To close system when not purging or sampling: Place quick connect cap onto valve by pulling back on cap sleeve and releasing when plug is fully inserted into cap.



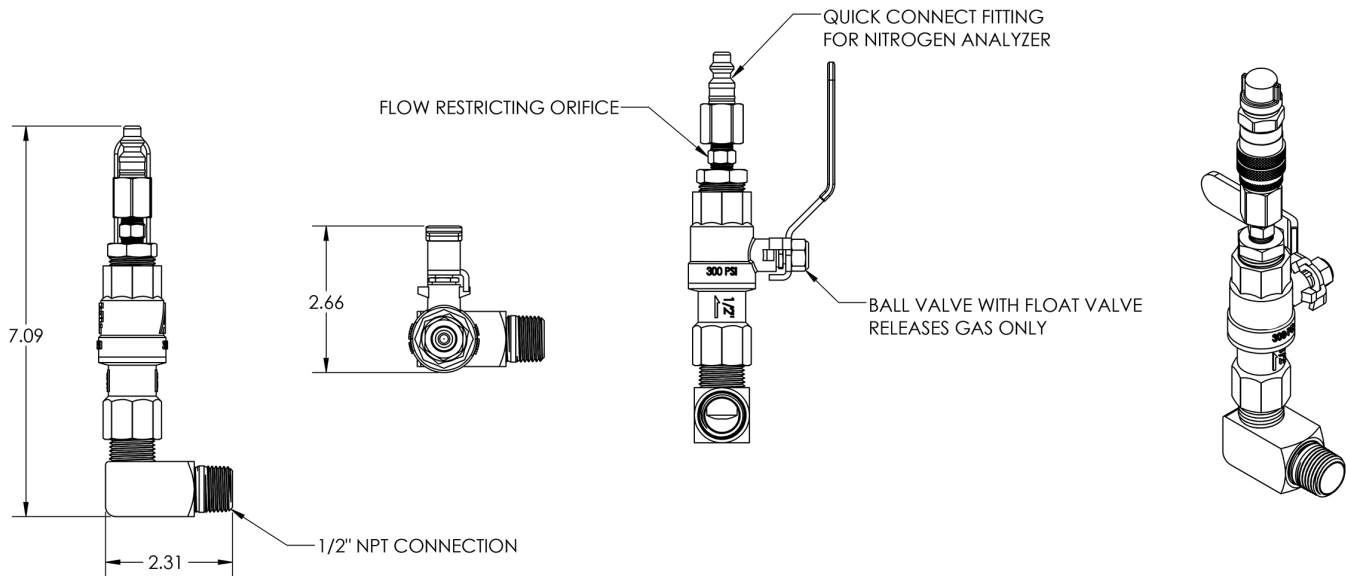
**NGP-APV  
WITH ANALYZER ATTACHED**

## Troubleshooting

If a blockage is suspected in the hex exhaustor orifice, inspect its filter screen and the valve inlet screen during the system trip test or while the system is depressurized.

1. During a system trip test or while the system is depressurized, unthread the NGP-PV-1 valve and the hex exhaustor. DO NOT attempted to inspect these components while the system is operational. Doing so will be hazardous and trip the system.
2. Examine the inlet screen to the NGP-PV-1 valve. Clean as needed by removing its retaining ring with snap ring pliers.
3. Examine the inlet screen to the hex exhaustor. The exhaustor will need to be replaced if it or the screen is blocked.
4. When completed, reconnect all components with appropriate pipe sealant on all joints which were disturbed.

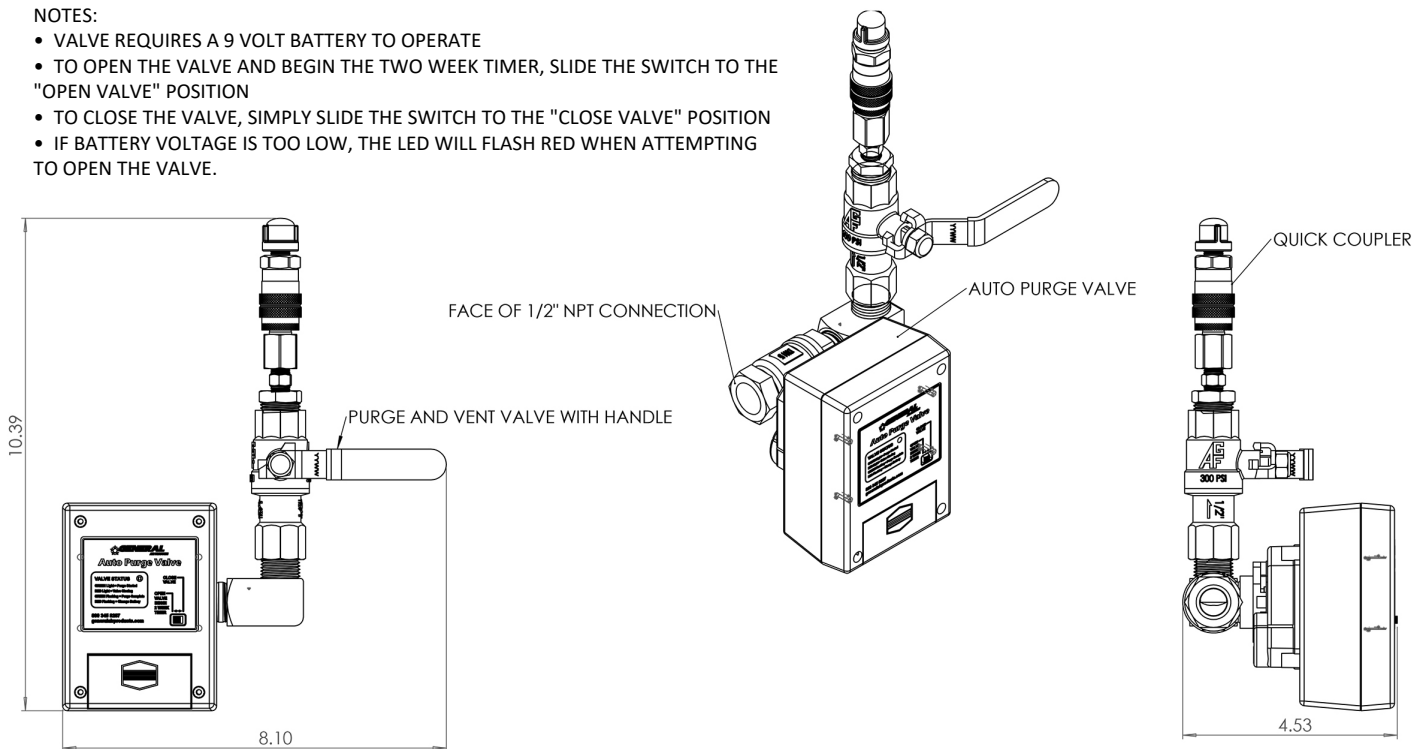
## NGP-PV-1 (Manual Purge Valve) General Arrangement

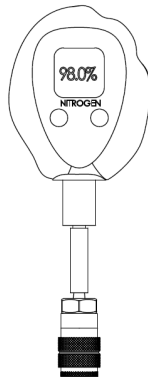


## NGP-APV (Automatic Purge Valve) General Arrangement

### NOTES:

- VALVE REQUIRES A 9 VOLT BATTERY TO OPERATE
- TO OPEN THE VALVE AND BEGIN THE TWO WEEK TIMER, SLIDE THE SWITCH TO THE "OPEN VALVE" POSITION
- TO CLOSE THE VALVE, SIMPLY SLIDE THE SWITCH TO THE "CLOSE VALVE" POSITION
- IF BATTERY VOLTAGE IS TOO LOW, THE LED WILL FLASH RED WHEN ATTEMPTING TO OPEN THE VALVE.





## **NGP-PSN2 Portable Gas Analyzer (sold separately)**

### **Operating Instructions for Use**

#### **CLASSIFICATION**

Protection against electric shock: ..... Internally powered equipment.

Protection against water: ..... IPX1

Mode of Operation: ..... Continuous

Flammable anesthetic mixture: ..... Not suitable for use in presence of a  
flammable anesthetic mixture

#### **Product Disposal Instructions:**



The sensor, batteries, and circuit board are not suitable for regular trash disposal.

Return sensor to General Air Products for proper disposal or dispose according to local guidelines. Follow local guidelines for disposal of other components.

#### **WARRANTY**

The N2 analyzer is designed for oxygen delivery equipment and systems. Under normal operating conditions, we warrant the N2 analyzer to be free from defects of workmanship or materials for a period of 1- year from the date of shipment provided that the unit is properly operated and maintained in accordance with our operating instructions. Based on our product evaluation our sole obligation under the foregoing warranty is limited to making replacements, repairs, or issuing credit for equipment found to be defective. This warranty extends only to the buyer purchasing the equipment directly from us or through our designated distributors and agents as new equipment. Our warranty warrants the oxygen sensor in the N2 analyzer to be free from defects in material and workmanship for a period of 1-year from the date of shipment in a N2 analyzer. Should a sensor fail prematurely, the replacement sensor is warranted for the remainder of the original sensor warranty period. Routine maintenance items, such as batteries, are excluded from warranty. We and any other subsidiaries shall not be liable to the purchaser or other persons for incidental or consequential damages or equipment that has been subject to abuse, misuse, mis-application, alteration, negligence or accident.

**These warranties are exclusive and in lieu of all other warranties, expressed or implied, including warranty of merchantability and fitness for a particular purpose.**

## ⚠️ WARNINGS

Indicates a potentially hazardous situation, if not avoided, could result in death or serious injury.

- » Never allow an excess length of tubing, or any accessory near a person's head or neck, which may result in strangulation.
- » Before use, all individuals who will be using the N2 Analyzer must become thoroughly familiar with the information contained in this Operation Guide.
- » Strict adherence to the operating instructions is necessary for safe, effective product performance. This product will perform only as designed if installed and operated in accordance with the manufacturer's operating instructions.
- » Use only genuine accessories and replacement parts. Failure to do so may seriously impair the analyzer's performance.
- » Repair or alteration of the N2 Analyzer beyond the scope of the maintenance instructions, or by anyone other than an authorized service person, could cause the product to fail to perform as designed.
- » Calibrate the N2 analyzer weekly when in operation, or if environmental conditions change significantly. (ie, Elevation, Temperature, Pressure, Humidity — refer to "Factors Influencing Accurate Readings").
- » Use of the N2 analyzer near devices that generate electrical fields may cause erratic readings
- » Ensure proper tire inflation pressure after use, if required.
- » The oxygen sensor is a sealed device containing a mild acid electrolyte, lead (Pb), and lead acetate. Lead and lead acetate are hazardous waste constituents and should be disposed of properly, or returned for proper disposal or recovery.
- » Dropping the device can adversely affect its performance.

❌ **Do not immerse the device in any cleaning solution, autoclave or expose the sensor to high temperatures (> 70°C).**

❌ **Do not over pressurize the sensor. Doing so may destroy the sensor and void the warranty. To avoid over pressurization only allow 3 psi (or 2 liters per minute) of gas to come in contact with the sensor membrane.**

## CAUTION:

Indicates a potentially hazardous situation, if not avoided, could result in minor or moderate injury and property damage.

- » Read the manual in its entirety before attempting use.
  - » Always use protective eyewear and observe proper safety procedures when working with pressurized gases.
  - » Dispose of the N2 properly when it has expired.
  - » Ensure the protective freshness seal has been removed from the sensing port before use.
  - » Ensure the N2 has been properly calibrated before use.
  - » If the N2 display goes blank immediately after the on button is pushed, or the N2 will not properly calibrate, the unit has expired.
- ❌ **Do not use, dispose of properly.**
- » The display is not valid when in Over Range Mode. Recalibrate the N2 and observe the proper operating procedure.
  - » Never immerse the N2 or expose it to high humidity or moisture. It is not watertight.
  - » Never expose the N2 to high temperatures.

## **INTRODUCTION**

The following instructions describe the function; operation and maintenance of the N2 Analyzer. The N2 analyzer is engineered for long life, maximum reliability and stable performance.

**NOTE:** In order to obtain optimum performance from your analyzer, all operation and maintenance must be performed in accordance with these instructions. Please read these instructions thoroughly before using the analyzer and do not attempt any repair or procedure that is not described herein. We cannot warranty any damage resulting from misuse, unauthorized repair or improper maintenance of the instrument.

### **N2 ANALYZER FEATURES AND FUNCTIONS**

**LCD Display:** A 3-digit display provides a direct readout of nitrogen concentration in the range of 0 - 99.9%.

**ON Button/Auto OFF:** Use this button to turn the N2 Analyzer on or off.

**Over Range Indicator:** The appearance of a decimal point after the first digit means that the N2 Analyzer is reading in excess of 99.9%. Recalibrate analyzer when over range is indicated.

Example: 0.0.0 = 100% 0.0.1 = 101%

0.0.2 = 102% (etc).



**Calibration Key:** This key is used to calibrate the device. Holding the key for more than three seconds will force the device to enter a calibration mode.

**Oxygen Sensor:** This is used to measure oxygen concentration in sample gas.

**Sample Inlet Connection:** This is the port at which the device is connected to determine nitrogen concentration.

### **PRE-USE CHECKOUT/CALIBRATION**

Follow these steps before using the N2 Analyzer:

1. Remove N2 Analyzer from box.
2. Unscrew the N2 Analyzer from the black connector body.
3. Using the "ON/OFF" key , make sure the unit is in the power "ON" mode.
4. Press and hold the Calibration Key , for 3 seconds until the display reads "CAL". This will calibrate the N2 Analyzer to room air. The display will read 79.1%. Thereafter, we recommend calibration on a weekly basis.
5. Thread the oxygen sensor back onto the black connector body.
6. N2 Analyzer is ready for use.

A new calibration is required when:

- The measured N2 percentage in 79.1% N2 is above 80.1% N2
- The measured N2 percentage in 79.1% N2 is below 78.1% N2
- If you are unsure about the displayed N2 percentage. (see Factors influencing accurate readings.)

## **OPERATION PRINCIPALS**

The instrument display corresponds directly to the oxygen sensor. The oxygen diffuses through the membrane and an electrical current is generated that is proportional to the partial pressure of oxygen in the gas sample. The oxygen percentage is subtracted from 100, with the remainder being displayed as percent nitrogen. The sensor has a minimal response to gases other than oxygen.

## **FACTORS INFLUENCING ACCURATE READINGS**

### **Elevation Changes**

- Changes in elevation result in a reading error of approximately 1% increase of reading per 250 feet increase in elevation.
- In general, calibration of the instrument should be performed when elevation at which the product is being used changes by more than 500 feet.

### **Temperature Effects**

The N2 analyzer will hold calibration and read correctly within  $\pm 3\%$  when in thermal equilibrium within the operating temperature range. The device must be thermally stable when calibrated and allowed to thermally stabilize after experiencing temperature changes before readings are accurate.

- For best results, perform the calibration procedure at a temperature close to the temperature where analysis will occur.
- Allow adequate time for the sensor to equilibrate to a new ambient temperature.

**CAUTION:** "CAL Err St" may result from a sensor that has not reached thermal equilibrium.

### **Pressure Effects**

Readings from the N2 analyzer are proportional to the partial pressure of oxygen. The partial pressure is equal to the concentration times the absolute pressure. Thus, the readings are proportional to the concentration if the pressure is held constant. Therefore, the following are recommended:

- Calibrate the N2 analyzer at atmospheric pressure.
- Do not block holes in barbed fitting, or pressurize sensor over two atmospheres.

### **Humidity Effects**

Humidity (non-condensing) has no effect on the performance of the N2 analyzer other than diluting the gas, as long as there is no condensation. Depending on the humidity, the gas may be diluted by as much as 4%, which proportionally reduces the oxygen concentration. The device responds to the actual oxygen concentration rather than the dry concentration. Environments where condensation may occur are to be avoided since moisture may obstruct passage of gas to the sensing surface, resulting in erroneous readings and slower response time. For this reason, the following is recommended:


- Avoid usage in environments greater than 95% relative humidity.



## CALIBRATION ERRORS AND ERROR CODES

The N2 analyzers have a self-test feature built into the software to detect faulty calibrations, oxygen sensor failures, and low operating voltage. These are listed below, and include possible actions to take, if an error code occurs.

### **E03: No valid calibration data available**

Make sure unit has reached thermal equilibrium. Press and hold the Calibration Button  for three seconds to manually force a new calibration.


### **E04: Battery below minimum operating voltage**

Change batteries.


### **CAL Err St: O2 Sensor reading not stable**

Wait for displayed oxygen reading to stabilize when calibrating the device at 100% oxygen. Wait for unit to reach thermal equilibrium (Please note that this can take up to one half hour, if the device is stored in temperatures outside the specified operating temperature range).

### **CAL Err lo: Sensor voltage too low**

Press and hold the Calibration Button  for three seconds to manually force a new calibration. If unit repeats this error more than three times, contact General Air Products Customer Service for possible sensor replacement.

### **CAL Err hi: Sensor voltage too high**

Press and hold the Calibration Button  for three seconds to manually force a new calibration. If unit repeats this error more than three times, contact General Air Products Customer Service for possible sensor replacement.

### **CAL Err Bat: Battery voltage too low to recalibrate**

Change batteries.

## Changing the Batteries

**When the batteries need to be changed, the device will indicate this in one of two ways:**

1. The battery icon on the bottom of the display will begin to flash. This icon will continue to flash until the batteries are changed. The unit will continue to function normally for approx. 200 hours.
2. If the device detects a very low battery level, an error code of "E04" will be present on the display, and the unit will not function until the batteries are changed. To change the batteries, begin by removing the three screws from the back of the device. A #1 phillips screwdriver is required to remove these screws. Once the screws are removed, gently separate the two halves of the device. The batteries can now be replaced from the back half of the case. Be sure to orient the new batteries as indicated in the embossed polarity on the back case. NOTE: If the batteries are installed incorrectly the batteries will not make contact and the device will not operate. Carefully, bring the two halves of the case together while positioning the wires so they are not pinched between the two case halves. The gasket separating the halves will be captured on the back case half. Reinsert the three screws and tighten until the screws are snug. The device will automatically perform a calibration and begin displaying % of nitrogen.

HELPFUL HINT: If unit does not function, verify that the screws are tight to allow proper electrical connection.

## Changing the Oxygen Sensor

Should the oxygen sensor require changing, the device will indicate this by presenting “Cal Err lo” on the display after initiating a calibration.

To change the oxygen sensor, begin by removing the three screws from the back of the device. A #1 Phillips screwdriver is required to remove these screws. Once the screws are removed, gently separate the two halves of the device. Disconnect the oxygen sensor from the printed circuit board by pressing the unlock lever first and then pull the connector out of the receptacle. The oxygen sensor can now be replaced in the back half of the case.


HELPFUL HINT: Be sure to orient the new sensor by aligning the red arrow on the sensor with the arrow in the back case. A small tab is located on the back case that is designed to engage the sensor and prevent it from rotating within the case.

NOTE: If the oxygen sensor is installed incorrectly, the case will not come back together and the unit may be damaged when the screws are reinstalled. Reconnect the oxygen sensor to the connector on the printed circuit board. Carefully bring the two halves of the case together while positioning the wires to ensure they are not pinched between the two case halves. Make sure the sensor is fully inserted and in the proper orientation. Reinsert the three screws and tighten until the screws are snug. Verify the unit operates properly. The device will automatically perform a calibration and begin displaying % of nitrogen.




## CLEANING, MAINTENANCE, AND DISPOSAL

Store the N2 analyzer in a temperature similar to its ambient environment of daily use. The instructions given below describes the methods to clean the instrument, sensor and its accessories

### Instrument

- When cleaning or disinfecting the exterior of the N2 analyzer, take appropriate care to prevent any solution from entering the instrument.  **Do not immerse unit in fluids.**

### Oxygen Sensor

-  • Clean the sensor with a cloth moistened with a 65% alcohol / water solution.
-  • We do not recommend use of spray disinfectants because they can contain salt, which can accumulate in the sensor membrane and impair readings.
-  **Do not throw away. Dispose of properly in accordance with local regulations.**

### Accessory

- The threaded black body adapter may be cleaned by washing it with a 65% alcohol / water solution. The part must be thoroughly dry before it is re-used.

## SPECIFICATIONS

### Analyzer Specifications

Sensor Type: ..... Galvanic fuel cell  
Measurement Range: ..... 0-99.9% Nitrogen  
Resolution/Display: ..... 0.1%

The three digit LCD indicates values between 0.0 - 99.9% oxygen.  
Over range indicated by one decimal point on display located after the first digit.

Accuracy and Linearity: .....  $\pm 1\%$  of full scale at constant temperature, R.H.  
and @ 15°C - 40°C pressure when calibrated at full scale.  
 $\pm 3\%$  actual oxygen level over full operating temperature.

Response Time: ..... < 15 seconds for 90% step change. (at 25°C)

Warm-up Time: ..... None required Operating

Temperature: ..... 15°C - 40°C (59°F - 104°F)

Storage Temperature: ..... -15°C - 50°C (5°F - 122°F)

Operating Pressure: ..... Atmospheric pressure to 3psig.

Environmental: ..... General purpose housing equivalent to NEMA 1.

The N2 Analyzer is not waterproof. 0-95% RH, non-condensing.

Warranty: ..... Twelve months in normal operating conditions.

Power Requirements: ..... Powered by one internal, non-replaceable

Electronics rated general purpose;  
not for use in hazardous areas or for  
use with flammable gases.

Weight: ..... Approx. 3 Ounces

Battery Life: ..... Approx. 5000 hours continuous use

Sample Port: ..... M16 x1 Thread with barbed tubing adapter.

Operating Pressure: ..... Atmospheric pressure to 3 psig

Expected Storage Life: ..... Two months with freshness seal on sensor.

# Warranty Policy

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## GENERAL PROVISIONS & LIMITATIONS

General Air Products, Inc. (the "Company") warrants to each original purchaser ("Purchaser") of its new products from the Company or its Authorized Distributor that such products are, at the time of delivery to the Purchaser, made with good materials and workmanship. No warranty is made with respect to:

1. Any product, which has been repaired or altered in such a way, in the Companies judgment, as to affect the product adversely.
2. Any product, which has, in the Companies judgment been subjected to negligence, accident, improper storage, improper installation or application.
3. Any product, which has not been operated or maintained in accordance with the recommendations of the Company.
4. Components or accessories manufactured, warranted and serviced by others.
5. Any reconditioned or prior owned product.

Claims for items described in 4. above should be submitted directly to the manufacturer of the component or accessory.

## WARRANTY PERIOD

The Company's obligation under this Warranty is limited to repair or, at its option, replacing during normal business hours at the designated facility of the Company, any part that in its sole judgment proved not to be as warranted within the applicable Warranty Period as follows.

## COMPONENTS

All non-consumable components are warranted for 12 months from the date of purchase or 18 months from date of manufacture, which ever occurs first. Consumables are not covered under warranty. The unit must have been installed by either a factory authorized distributor or agent in accordance with the factory recommendations taking into account all other local site conditions not originally noted to the factory. The unit must be operated and maintained in accordance with the Factory recommendations and original design conditions. Failure to provide such proof of the above may void warranty.

## LABOR TRANSPORTATION & INSPECTION

The Company will repair or replace any product or part thereof which in the Company's sole judgement is defective in material or workmanship. Labor costs are not covered under warranty.

All costs of transportation of product, labor or parts claimed not to be as warranted and, of repaired or replaced parts to or from factory shall be borne by purchaser. The Company may require the return of any part claimed not to be as warranted to one of its facilities as designated by the Company, transportation prepaid by Purchaser, to establish a claim under this warranty.

Replacement parts provided under the terms of the warranty are warranted for the remainder of the Warranty Period of the product upon which installed to the same extent as if such parts were original components, or for 90 days whichever is longer.

## DISCLAIMER

THE FOREGOING WARRANTY IS EXCLUSIVE AND IT IS EXPRESSLY AGREED THAT, EXCEPT AS TO TITLE, THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED OR STATUTORY, INCLUDING ANY IMPLIED WARRANTY OR MERCHANTABILITY.

THE REMEDY PROVIDED UNDER THIS WARRANTY SHALL BE THE SOLE, EXCLUSIVE AND ONLY REMEDY AVAILABLE TO THE PURCHASER AND IN NO CASE SHALL THE COMPANY BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES. UNDER NO CIRCUMSTANCES SHALL THE COMPANY BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, EXPENSES, LOSSES OR DELAYS HOWSOEVER CAUSED.

No statement, representation, agreement, or understanding, oral or written, made by any agent, distributor, representative or employee of the Company which is not contained in this Warranty will be binding upon the company unless made in writing and executed by an officer of the Company.

This warranty shall not be effective as to any claim which is not presented within 30 days after the date upon which the product is claimed not to have been as warranted. Any action for breach of this warranty must be commenced within one year after the date upon which the cause of action occurred.

Any adjustment made pursuant to this warranty shall not be construed as an admission by the Company that any product was not as warranted.

## PROMPT DISPOSITION & RETURNS POLICY

The Company will make a good faith effort for prompt correction or other adjustment with respect to any product, which proves to be defective within the warranty period. Before returning any product, write or call the distributor, agent or authorized company from which the product was purchased, describing defect and giving date and number of original invoice, a well as proof of Factory supplied consumables and proof of scheduled maintenance. No products will be accepted for return without the Company issuing a "Returned Goods Authorization" (RGA) to the Purchaser and unless accompanied by a properly authorized RGA request form initiated by the Purchaser. Return freight must be prepaid and each returned product must have the RGA number clearly marked on the product. Title and risk of loss pass to buyer upon delivery to the common carrier.

## PRODUCT SUITABILITY

Many States, Localities and Countries have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While General Air Products, Inc. attempts to assure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, please review the product application, and national and local codes and regulations, and be sure that the product, installation, and use will comply with them.

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