User Manual

Pro He-O2

Helium & Oxygen Gas Analyzer

Rev. 03.19

If you have any questions on this equipment please contact Technical Support at:

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Oxnard, CA 93033

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Hours: Monday through Friday
8:00 a.m. to 5:00 p.m. PST USA

⚠ Warning

This User Manual contains important safety information and should always be available to those personnel operating this equipment. Read, understand, and retain all instructions before operating this equipment to prevent equipment damage, injury, or death.

Every effort was made to ensure the accuracy of the information contained within this manual; however, we retain the right to modify its contents without notice. **If you have problems or questions after reading this manual, stop and call Nuvair for information.**

Table of Contents

1.0 Introduction

This manual will assist you in the proper set-up, operation and maintenance of the Pro He-O2 Helium & Oxygen Analyzer. Be sure to read the entire manual.

Throughout this manual we will use certain words to call your attention to conditions, practices or techniques that may directly affect your safety. Pay particular attention to information introduced by the following signal words:

⚠ Danger

Indicates an imminently hazardous situation, which if not avoided, will result in serious personal injury or death.

⚠ Warning

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

⚠ Caution

Indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

⚠ Notice

Notifies people of installation, operation or maintenance information which is important but not hazard-related.

Warnings Graphics Defined:

Gas Inhalation

Skin damage

Abbreviations commonly used in this manual:

psi	**Pounds Per Square Inch**	**HP**	**High Pressure**
LP	**Low Pressure**	**PPM**	**Parts Per Million**
O_2	**Oxygen**	**L/min**	**Liters Per Minute**
He	**Helium**	**O_2%**	**Oxygen Percentage of Gas**

2.0 System Description

The Pro He-O2 Helium & Oxygen Analyzer measures Helium (He) and Oxygen (O_2) levels in gasses in the range of 0 to 100% of volume with a .1% resolution. It can be used to measure the He and O_2 content in all breathing gas mixes. The Analyzer is designed to verify Helium & Oxygen concentration in stored gas cylinders, as well as monitor a continuous flow of gas. The Analyzer is compatible with outdoor and marine environments.

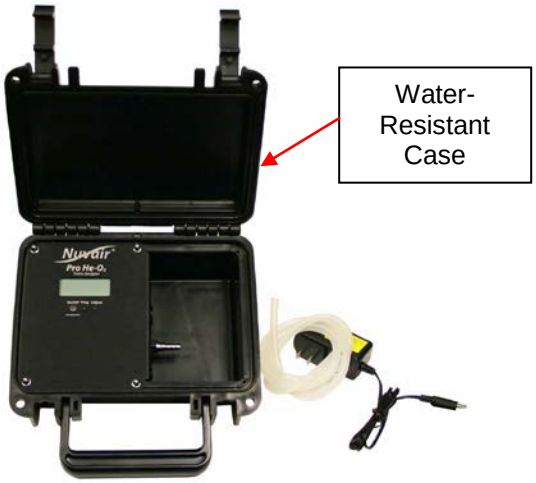
⚠ Danger

Helium is a colorless, odorless, tasteless gas that will not support life. Exposure to Helium can lead to unconsciousness and death.

The Analyzer is powered by a rechargeable Lithium Polymer battery. A 110/230 V charger is supplied with the unit. Also included are two internally mounted sensors.

The Analyzer uses a flexible tubing to deliver sample gas to the Sensors. Pressurized gases must be regulated to .5-1.0 L/min in order to avoid damage to the analyzer. Use of this Analyzer in a hyperbaric chamber will void the owner's warranty.

Certified calibration gas should be used periodically to confirm the accuracy of the analyzer and that the sensor and electronics are working properly.



⚠ Warning

This analyzer is designed for use at atmospheric pressures only. It is not designed for exposure in a hyperbaric chamber. Use of this analyzer in a hyperbaric chamber will result in incorrect readings and may damage the unit.

⚠ Warning

Although the Analyzer has been designed to handle rugged environments, careless handling or abuse may result in damage to the unit and this may result in inaccurate gas analysis. Inaccurate gas analysis can lead to serious personal injury or death.

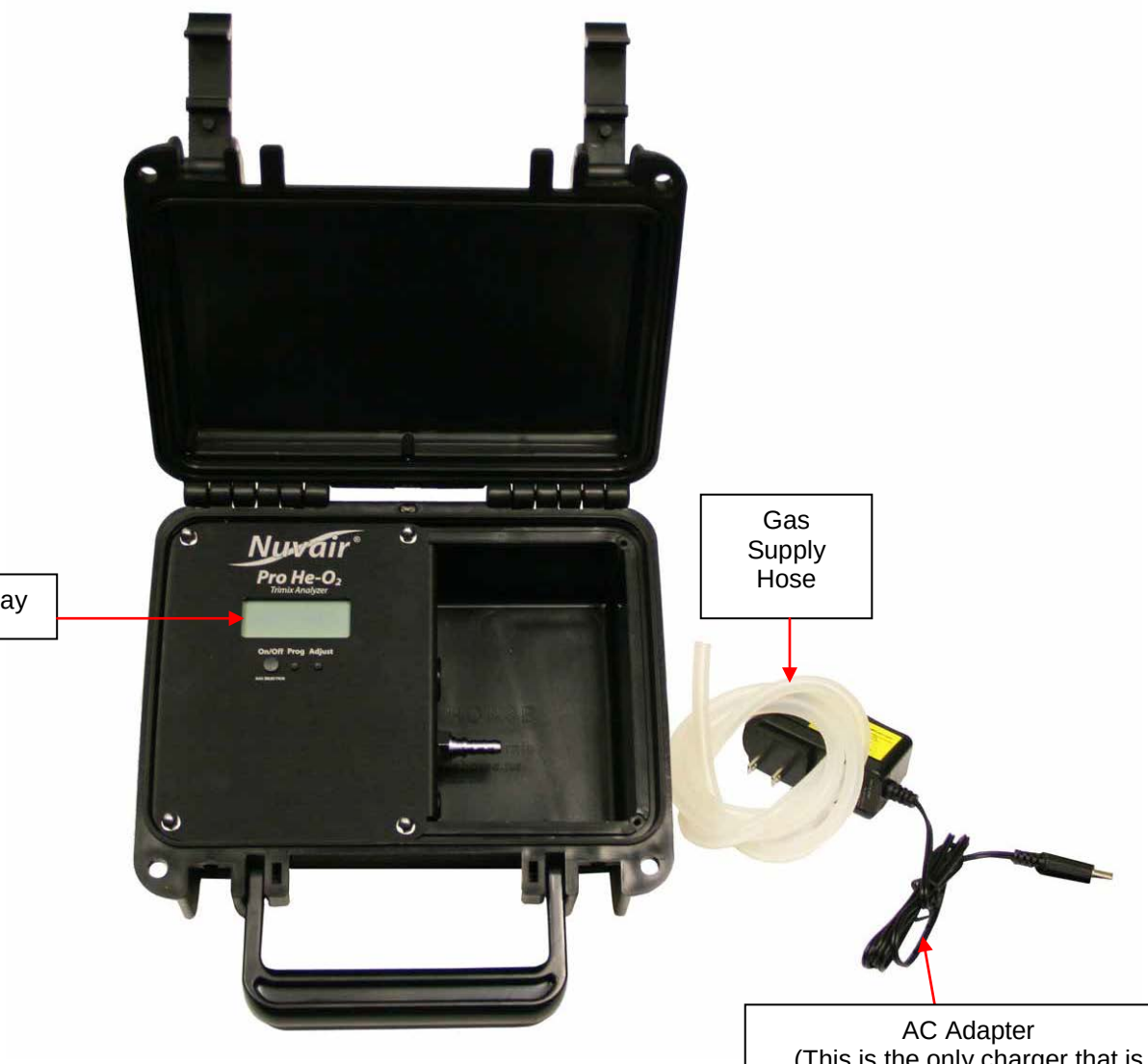
⚠ Notice

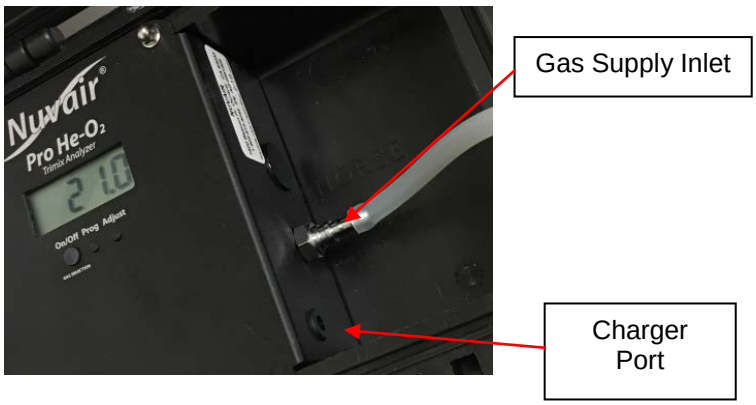
High Pressure Gas directed at the Analyzer may damage the sensors.

⚠ Warning

The Analyzer is provided in a water-resistant case. However, the electronics inside are not water resistant. The Lithium Polymer battery can heat up and cause a fire if exposed to water. Do not allow water to enter the Analyzer case.

2.0 Description Continued

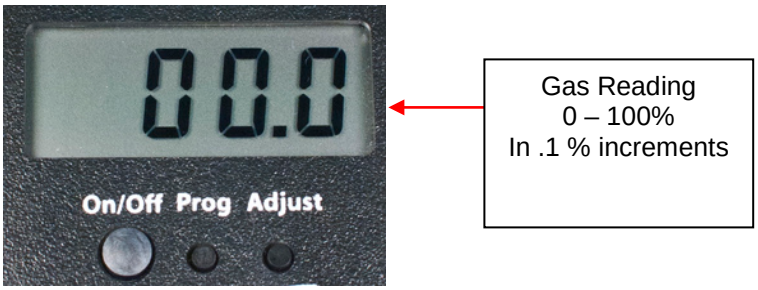




2.1. Controls

The Control buttons are referenced throughout the instructions as “On/Off”, “Prog”, and “Adjust”.

2.2. Display



2.3. Sensors

The Analyzer uses a Thermal Conductive helium sensor to measure He content and an Electrochemical Oxygen Sensor to measure oxygen content. Only the oxygen sensor is disposable and user-replaceable. The life expectancy the helium is 24 months and up to 24 months for the oxygen depending on usage. The sensors are designed for use at atmospheric pressure (0 psi). The gas mixture to be analyzed must be regulated accordingly, and any potential for pressure or vacuum must be avoided.

2.4. Battery

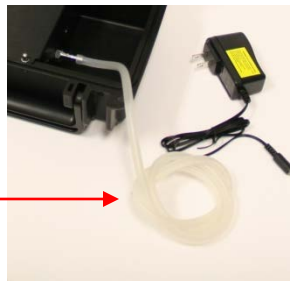
The Pro He-O2 Alarm uses a rechargeable lithium polymer battery. Only use the supplied Nuvair 110/230V charger. A fully charged battery should last up to 24 hours. Recharge takes about 4 hours. See section 15.3 for complete charging instructions.

DO NOT LEAVE UNIT UNATTENDED WHILE CHARGING and UNPLUG ONCE CHARGED.

2.5. Flow Tubing

The Analyzer includes a flexible Flow Tubing. It attaches to the gas supply inlet and is used to direct the gas sample flow to the Sensors.

Sample Flow Method
Flow is delivered from Low Pressure Source via Flexible Tubing



<u>Flow to the sensor must be restricted to 0.5 – 1.0 L/min</u>. Increased flow will create faulty readings. Flow restrictors to accomplish this task may be purchased separately. They are described in the Flow Restrictors and Regulators section.

3.0 Calibration

⚠ Warning

Analyzer calibration must be verified on a weekly basis. Improper calibration may result in an incorrect reading, exposing the user to dangerous levels of Helium or incorrect breathing gas mixtures. Exposure to incorrect breathing gas mixtures can lead to unconsciousness and death.

⚠ Warning

Calibration must be done using a calibration gas. The calibration gas must be regulated and supplied at atmospheric pressure (0 psi). Use of gas at higher pressures may result in incorrect readings and may damage the Analyzer. Incorrect readings may expose the user to high levels of Helium or Oxygen, resulting in personal injury or death.

⚠ Warning

Checking Calibration or use of the Analyzer with a low battery may result in inaccurate readings. Inaccurate gas analysis can lead to serious personal injury or death.

⚠ Notice

If the Analyzer has been exposed to a recent extreme change in ambient temperature, allow it to stabilize for two minutes before checking calibration.

Verify calibration on a weekly basis. Breathing gas applications require the use of a certified He calibration gas and flow rate of 0.5 - 1.0 L/min. Certified test gas may be purchased separately.

To assure the greatest accuracy, the calibration gas concentration should be similar to the expected concentration in the gas being measured.

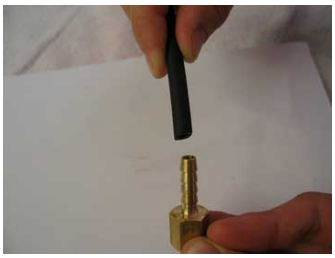
3.1. Sample Flow Method of Checking Calibration (Preferred):

(Ensure that the Sample Flow Tube is disconnected and Analyzer Displays are stabilized before beginning)

1. **Remove the Sample Flow Tubing from the Gas Supply Inlet.**
2. **Program the O2 Calibration Point (cPt) the Oxygen percent of the Calibration Gas, then return to the home screen and select the gas to be checked.**
3. **Attach Sample Flow Tubing to the calibration gas, regulated to 0.5-1.0 L/min. Allow gas to flow until the reading is stable**
4. **To calibrate the O2 analyzer, press the On/Off and Adjust keys until the screen shows "CAL".**
5. **If the Helium analyzer is reading greater than 2% difference from the calibration gas content, contact Nuvair for repair or replacement.**

Step 1: Remove Sample Flow Tube from Gas Supply Inlet.

Step 2: Attach Flexible Tubing to Gas Sample Flow of 0.5 – 2.0 L/min.



Step 3: Verify that Gas is flowing through Sample Flow Tube, and then attach hose to Gas Supply Inlet

Step 4: Allow Display Reading to Stabilize

Step 5: Record Reading While Gas is Flowing

Certified test gas (P/N 101618) for confirming calibration can be purchased separately. See Spares and Accessories section.

Testing Gas must contain a known amount of Helium for calibration test to succeed.

Do NOT use a gas mix containing Acetylene, Ammonia, Argon, CO^2, Ethane, Ethylene, Freon, Hydrogen, Methane, Neon, Propane, etc.

Flow Restrictor/ Regulator Assembly

P/N P101618
Nuvair Calibration Gas Specs:
18% O^2
50% He
32 % N (Nitrogen)

4.0 Operation

1) Turn Pro He O2 on by holding the “On/Off” button for more than 3 seconds, until display shows “On”. The unit will then display the current firmware version, and then the current selected analyzer, alternating with the gas level sensed by the analyzer sensor.

2) Cycle through the current settings of the analyzer:

A. Cycle between the O2 and He analyzers by pushing and quickly releasing the On/Off Button
B. Hold down the “Prog” button for 2 seconds then use the “On/Off” button to cycle through the settings.
C. Adjust program values at this time if needed.

3) Confirm calibration of Analyzer using “Calibration Test Gas” once weekly**.**

⚠ Warning

Gas, even under moderate pressures, can cause extreme bodily harm. Never allow any gas stream to be directed at any part of your body.

⚠ Warning

Never expose the sensor to pressures above atmospheric pressure (0 psi) or you may cause damage to the sensor and/or receive false readings. Damaged Sensors will not provide accurate gas analysis. Inaccurate gas analysis can lead to serious personal injury or death.

The Pro He-O2 Alarm can be used to analyze a regulated gas sample flow, the contents of a gas cylinder, or the flow from a regulator:

- When analyzing a gas, the flow rate must equal 0.5 – 1.0 L/min at atmospheric pressure (0 psi). To produce this flow, a flow restrictor and/or regulator may be required. Contact Nuvair if you need assistance.

5.0 Overview of Programming Procedures

To enter the programming page, turn on the unit, then hold the Prog button until the screen shows “Pr”.

Cycle through the programmable features by pressing the On/Off Button. The display will show “End” and return to the analyzer value of the currently analyzed gas after cycling through the programmable features.

- The O2 analyzer Calibration Value (display will show “02c” or “cPt”) is the Oxygen percent of the gas used for calibration.
    - Press the Prog button to increase the value of the selected digit
    - Press the Adj button to change the selected digit

- The Time On (display will show “t0n” or “t00”) setting adjusts how long the analyzer will stay on in seconds before automatically shutting down.
    - Press the Prog button to increase the value of the selected digit
    - Press the Adj button to change the selected digit

6.0 Factory Reset

If it becomes necessary to reset the Pro O_2 Analyzer to the factory settings, first power on the Analyzer the pressing the “On/Off” and “Adjust” buttons at the same time and hold them for a few seconds. On the display will appear “res” and the instrument will go to the reading page.

⚠ Warning

After reset, the instrument will delete all the alarms settings and any customization to the full scale value, and the Oxygen calibration will be lost, as the unit will be reset to factory settings. Before using the instrument, it will be necessary to reprogram the alarm values, the full scale value, and the Oxygen sensor calibration to the desired settings. Proper calibration should be achieved prior to using analyzer. Wrong Oxygen analysis may lead to death.

7.0 Maintenance

⚠ Warning

Analyzers immersed in liquid or stored in wet environments may not operate properly. This may result in incorrect readings. Incorrect gas analysis may result in personal injury or death. The Lithium Polymer battery may present a fire hazard if the battery gets wet.

⚠ Warning

Protect the analyzer from excessive shock and impact. Excessive shock and impact may result in incorrect readings. Incorrect gas analysis may result in personal injury or death.

⚠ Warning

Protect the analyzer from exposure to hyperbaric environments. Exposure to hyperbaric environments may result in incorrect readings. Incorrect gas analysis may result in personal injury or death.

7.1. Analyzer Care

- Do not clean Analyzer with anything other than a damp soft cloth.
- Do not immerse in liquid, leave unprotected outside, or store in a wet environment.
- Protect Analyzer from excessive shock and impact.
- Protect Analyzer from excessive exposure to sunlight and extreme temperatures.
- Do not use the Analyzer in a hyperbaric environment.

7.2. Battery Replacement

⚠ Notice

Be sure to dispose of spent or damaged Battery properly and according to local regulations.

The following instructions show the steps necessary to replace the Lithium Polymer battery used to power the Pro He-O2 Alarm analyzer:

Step 1: Remove four Nuts and washers

Step 2: Rotate Analyzer Cover upside down with hand on panel

Step 3: Remove & Replace Old Battery

Step 4: Replace Analyzer Cover - Do Not Pinch Wires

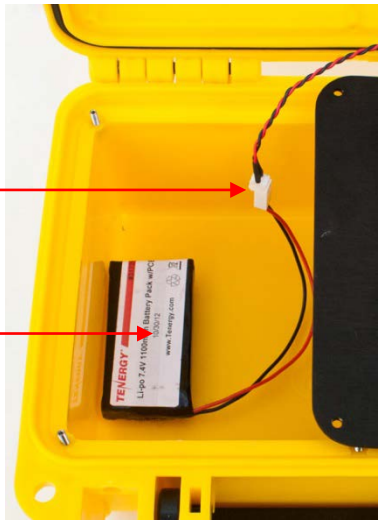
Step 5: Reinstall Nuts and washers

Step 6: Charge battery

Step 7: Turn Analyzer On

Step 8: Perform Calibration Test

Remove four nuts and pull out aluminum panel. The Lithium Polymer battery is under this panel. Contact Nuvair for a replacement battery.



Disconnect Battery

Battery is held in place by Velcro

⚠ Warning

Replace sensor when either the Helium or Oxygen analyzer is unable to correctly analyze Supply gas. The use of an exhausted sensor may cause incorrect gas analysis. Incorrect gas analysis may lead to death. Contact NUVAIR for sensor replacement parts. Do not use any other sensor brands for replacement. Unauthorized sensors may not work properly in this analyzer and use of them will void all warranties.

7.3. Sensor Replacement

Take care not to damage the Oxygen sensor when replacing. Unplug and unscrew the sensor from the threaded port the sensor is mounted in.

The Helium sensor is not user replaceable.

Oxygen Sensor
P/N 9507

⚠ Caution

Be sure to dispose of spent or damaged Sensors properly, according to local regulations for solid state electronics.

7.4. Handling Sensors

Replacement Sensors are supplied in sealed bags. Normally Sensors do not present a health hazard. Dispose of Sensor properly or return for replacement. Sensors are made using Solid State technology and should be handled like similar electronics according to local regulations.

Electrolyte First Aid Procedures

- Ingestion - Drink a large volume of fresh water. Do not induce vomiting. Get immediate medical attention.
- Eye Contact - Flush eyes with clean, fresh water for at least 15 minutes and get medical help immediately.
- Skin Contact - Flush the affected area with clean, fresh water for at least 15 minutes and removed contaminated clothing. If stinging persists get medical attention.

⚠ Warning

Do not try to disassemble the sensor. Sealed unit contains caustic liquid (KOH) which may cause severe burns to skin and eyes. In case of contact, flush 15 minutes with water. For contact to eyes flush immediately with water and seek medical attention. If not properly treated, the eyes may have permanent damage.

8.0 Spares and Accessories

8.1. Sensors

The replacement O2 sensor is P/N 9507.

Contact Nuvair for replacement of the He sensor

Oxygen Sensor
P/N 9507

8.2. Calibration Equipment

Calibration check requires certified He calibration gas to be delivered at a specific flow rate and pressure.

A variety of calibration gas canisters are available from Nuvair, with compatible Flow Restrictor/ Regulator assemblies to regulate the gas.

Do NOT use a gas mix containing Acetylene, Ammonia, Argon, CO^2, Ethane, Ethylene, Freon, Hydrogen, Methane, Neon, Propane, etc.

Flow Restrictor/ Regulator Assembly

P/N P101618
Nuvair Calibration Gas Specs:
18% O^2
50% He
32 % N (Nitrogen)

8.3. Authorized 110/230V Charger

VERY IMPORTANT: USE ONLY NUVAIR SUPPLIED MODEL: H00740003-XX-W1. USE Of ANY OTHER CHARGER COULD CAUSE A FIRE AND VOIDS WARRANTY.

Features:

- 110V-240V AC input for worldwide power support
- Constant charging current for faster charging
- Stabilized output, low ripple
- Safety Protection:
  - Over Voltage Protection
  - Short Circuit Protection
  - Output reverse input protection

- The charger will cut off automatically if battery is fully charged (1/10C) and indicated by LED

  In charging mode **RED** LED
  Battery Full **GREEN** LED

Specifications:
Input: AC 100-240V 50-60Hz
Output: DC 8.1V
Charging Current: 300mA

WARNING:

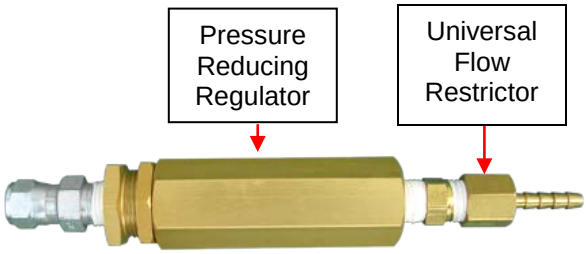
- Charge only Nuvair 7.4V Li-ion rechargeable battery pack with this charger
- Don't expose the product to rain or humidity to prevent from electric shock
- It is normal for the product to get slightly warm when in use
- Keep out of reach of children
- Don't touch any part of the product during charging to prevent electric shock.

8.4. Flow Restrictors and Regulators

A variety of Flow Restrictors and Pressure Regulators for the Sample Flow Method are available from Nuvair, all calibrated to produce a flow rate of 0.5 – 2.0 L/min with a Regulator output of 100 – 160 psi.

Universal Flow Restrictors are used for most applications and are typically provided complete with Regulator.

When analyzing Scuba Cylinder gases, special Flow Restrictors can be used to obtain the sample gas directly from the BC inflator hose. A variety of BC Flow Restrictors are available to fit the different types of inflator hose QD fittings used.



Part No. 9519

¼" FNPT Flow Restrictor
Part - 9518

ScubaPro™ Flow Restrictor
Part – 9518-SCUBAPRO

Mares™ Flow Restrictor
Part – 9518-MARES

Standard Flow Restrictor
Part - 9518-STD

HP Regulated Flow Restrictor
Part No. 9520-Int

HP Regulated Flow Restrictor
Part No. 9520-DIN

9.0 Troubleshooting

SYMPTOM	REASON	SOLUTION
Battery symbol	Low Battery	Charge the battery
No display	Switched off Bad connection Low Battery	Switch on Check display/ battery connection Charge the battery
Reading erratic	Pressure on sensor Radio transmission Sensor old or faulty Condensation on sensor.	Check flow Move unit away Change sensor Dry in air
Display segments missing	Display faulty	Return to dealer
Reading drifts	Rapid temperature change	Stabilize temperature & recalibrate

Appendix

Analyzer Specifications Helium Sensor (P/N 9511)

Resolution:	0 – 100% Helium in air or nitrogen or oxygen
Display Accuracy:	+/- 2%
Sensor Type:	Thermal Conductive Technology
Expected Sensor Life, Room Air:	5+ Years
Power:	Rechargeable Lithium Ion Battery 110/230v electric
Response Time:	Less than 10 Seconds to 90% of Final Value
Stabilization Time:	10 Minutes Max Accuracy
Operating Temperature:	41 to 86°F (5 to 30°C). Will work outside this range with decreased accuracy.
Storage Temperature:	5 to 104°F (-15 to 40°C)
Operating Pressure:	Not to Exceed 1 Atmosphere Absolute (0 psi)
Humidity:	0-95% Non-Condensing. Don't allow moisture to build up on the sensing surface.
Warranty:	12 Months

Note: All specifications are at ambient / sea level, 77°F / 25°C and subject to change without notice

Analyzer Specifications Oxygen Sensor (P/N 9507)

Sensor Type:	Electrochemical (Galvanic)
Electrical Connector:	3.5 mm Molex Jack
Range:	0-100.0% Oxygen (0-1 ATA PPO_2)
Display Accuracy:	+/- 0.1%
Expected Sensor Life, Room Air:	0-24 Months @ ambient air
Output Signal:	11+- 3 milliVolt @ dry ambient air 74°F (23°c)
Power:	Rechargeable Lithium Ion Battery 110/230v electric
Response Time:	Less Than 12 Seconds
Drift:	< 1% volume O_2 / month @ air
Operating Temperature:	41-104°F (5-40°C)
Storage Temperature:	recommended: 41to 86°F (5 to 30°C) maximum: -4 to122°F (-20 to 50°C)
Pressure:	750 to 1250 hPa
Linearity Error:	= 2% @ 100% O_2 applied for 5 min.
Zero Offset Voltage:	= 200 uV in 100% N2, applied for 5 min.
Influence of Humidity:	-0.03% rel. O_2 reading /%RH
Humidity:	up to 100% RH
Temperature Compensation:	NTC
Interferences:	according to DIN EN 12598 and ISO 7767
Material in contact media:	PA, PPS, PTFE, stainless steel
Warranty:	24 Months Prorated

In the interest of product improvement these design specifications may change without notice.

Note: All specifications are at ambient / sea level, 77°F / 25°C.

NUVAIR Pro He-O2 Oxygen Sensor Warranty

Nuvair extends a limited warranty, which warrants the Pro He-O2 to be free from defects in materials and workmanship under normal use and service for a one year with the exception of the Oxygen Sensor. The Pro He-02 Oxygen Sensor is under warranty according to the pro-rated terms as set forth below. This warranty is non-transferable.

Nuvair will, at its discretion and according to the terms as set forth within, replace or repair any materials which fail under normal use and service and do not exhibit any signs of improper maintenance, misuse, accident, alteration, weather damage, tampering, or use for any other than the intended purpose. Determination of failure is the responsibility of Nuvair, which will work together with the customer to adequately address warranty issues. When any materials are repaired or replaced during the warranty period, they are warranted only for the remainder of the original warranty period. This warranty shall be void and Nuvair shall have no responsibility to repair or replace damaged materials resulting directly or indirectly from the use of repair or replacement parts not approved by Nuvair.

Pro-Rated Terms:
NUVAIR warrants the O_2 sensor to be free from defects in material and workmanship for a period of twenty-four (24) months from date of purchase. The warranty covers parts and labor and is prorated as follows:

- 0 – 12 Months — Free Replacement
- 13 – 18 Months — 50% Off Replacement
- 19 – 24 Months — 25% Off Replacement

A warranty registration card, supplied with system documentation, must be filled out and submitted to Nuvair for the warranty to be registered. If the warranty registration card is not received within ten (10) days of purchase, the warranty will begin with the date of manufacture by Nuvair.

Maintenance Items:
Any materials which are consumed, or otherwise rendered not warrantable due to processes applied to them, are considered expendable and are not covered under the terms of this policy.

Return Policy:
Application for warranty service can be made by contacting Nuvair during regular business hours and requesting a Return Material Authorization number. Materials that are found to be defective must be shipped, freight pre-paid, to the Nuvair office in Oxnard, California. Upon inspection and determination of failure, Nuvair shall exercise its options under the terms of this policy. Warranty serviced materials will be returned to the customer via Nuvair's preferred shipping method, at Nuvair's expense. Any expedited return shipping arrangements to be made at customer's expense must be specified in advance.

Limitation of Warranty and Liability:
Repair, replacement or refund in the manner and within the time provided shall constitute Nuvair's sole liability and the Purchaser's exclusive remedy resulting from any nonconformity or defect. Nuvair shall not in any event be liable for any damages, whether based on contract, warranty, negligence, strict liability or otherwise, including without limitation any consequential, incidental or special damages, arising with respect to the equipment or its failure to operate, even if Nuvair has been advised of the possibility thereof. Nuvair makes no other warranty or representation of any kind, except that of title, and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, are hereby expressly disclaimed. No salesman or other representative of Nuvair has authority to make any warranties.

Nuvair Pro HE-O2 Helium Sensor Warranty

Nuvair extends a limited warranty, which warrants the Pro HE to be free from defects in materials and workmanship under normal use and service for a limited period. The Pro He is warranted according to the terms as set forth below. This warranty is not transferable.

Nuvair will, at its discretion and according to the terms as set forth within, replace or repair any materials which fail under normal use and service and do not exhibit any signs of improper maintenance, misuse, accident, alteration, weather damage, tampering, or use for any other than the intended purpose. Determination of failure is the responsibility of Nuvair, which will work together with the customer to adequately address warranty issues. When any materials are repaired or replaced during the warranty period, they are warranted only for the remainder of the original warranty period. This warranty shall be void and Nuvair shall have no responsibility to repair or replace damaged materials resulting directly or indirectly from the use of repair or replacement parts not approved by Nuvair.

Terms:
Nuvair warrants the Pro He to be free from defects in material and workmanship for a period of twelve (12) months from date of purchase. The warranty covers parts and labor.

A warranty registration card, supplied with system documentation, must be filled out and submitted to Nuvair for the warranty to be registered. If the warranty registration card is not received within ten (10) days of purchase, the warranty will begin with the date of manufacture by Nuvair.
Maintenance Items:

Any materials which are consumed, or otherwise rendered not warrantable due to processes applied to them, are considered expendable and are not covered under the terms of this policy. This includes batteries.

Return Policy:
Application for warranty service can be made by contacting Nuvair during regular business hours and requesting a Return Material Authorization number. Materials that are found to be defective must be shipped, freight pre-paid, to the Nuvair office in Oxnard, California. Upon inspection and determination of failure, Nuvair shall exercise its options under the terms of this policy. Warranty serviced materials will be returned to the customer via Nuvair's preferred shipping method, at Nuvair's expense. Any expedited return shipping arrangements to be made at customer's expense must be specified in advance.

Limitation of Warranty and Liability:
Repair, replacement or refund in the manner and within the time provided shall constitute Nuvair's sole liability and the Purchaser's exclusive remedy resulting from any nonconformity or defect. Nuvair shall not in any event be liable for any damages, whether based on contract, warranty, negligence, strict liability or otherwise, including without limitation any consequential, incidental or special damages, arising with respect to the equipment or its failure to operate, even if Nuvair has been advised of the possibility thereof. Nuvair makes no other warranty or representation of any kind, except that of title, and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, are hereby expressly disclaimed. No salesman or other representative of Nuvair has authority to make any warranties.

Helium and Oxygen Sample Test Chart

The Helium and Air chart contains a set of numbers for validating that Pro He-O2 Alarm analyzer is working properly. The concept behind using the chart is that the user has a high and low Helium test gas available. We recommend: 90% Helium (balance Nitrogen), 10% Helium (balance Nitrogen), and certified breathing air 20.9% Oxygen. These gases should be contained in portable storage bottles with regulators and flow restrictors for delivery to the Analyzer. Gas delivery needs to be regulated down to 0.5 -2.0 liters per minute using flow restrictors.

In this procedure the Oxygen Analyzer is first calibrated with breathing air gas flowing to the Analyzer.

The second step is to connect the 10% Helium Gas to the Analyzer. Open the gas and allow the Analyzer to stabilize.

Note the Oxygen and Helium readings at this time. Using the chart look up the Helium Gas being used and confirm the Oxygen reading matches within 1 to 2% of the number stated on the chart.

Repeat the process with the 90% Helium gas and confirm the Oxygen percentage is within 1 to 2% of the Chart reading.

We recommend a High and Low Helium mix for doing this test and have provided this chart so that you can confirm proper analysis is being recorded by the analyzer.
It is very important that the Oxygen Analyzer is turned on and calibrated first to verify the analyzer is reading the correct content of Oxygen. This will help ensure the Helium test is accurate.

The Helium test gas should only contain Helium and Nitrogen. No other gases should be present in the mix.

If the Analyzer does not measure the Helium and Oxygen properly, we recommend you recalibrate the Oxygen Analyzer and do the test over again. If the Analyzer fails the test again, Contact Nuvair customer service to discuss the return of the Analyzer for testing and possible repair.

Helium & Air Chart

Percent Helium	Percent Oxygen
100	0.00
99	0.21
98	0.42
97	0.63
96	0.84
95	1.05
94	1.25
93	1.46
92	1.67
91	1.88
90	2.09
89	2.30
88	2.51
87	2.72
86	2.93
85	3.14
84	3.34
83	3.55
82	3.76
81	3.97
80	4.18
79	4.39
78	4.60
77	4.81
76	5.02
75	5.23
74	5.43

Percent Helium	Percent Oxygen
73	5.64
72	5.85
71	6.06
70	6.27
69	6.48
68	6.69
67	6.90
66	7.11
65	7.32
64	7.52
63	7.73
62	7.94
61	8.15
60	8.36
59	8.57
58	8.78
57	8.99
56	9.20
55	9.41
54	9.61
53	9.82
52	10.03
51	10.24
50	10.45
49	10.66
48	10.87
47	11.08

Percent Helium	Percent Oxygen
46	11.29
45	11.50
44	11.70
43	11.91
42	12.12
41	12.33
40	12.54
39	12.75
38	12.96
37	13.17
36	13.38
35	13.59
34	13.79
33	14.00
32	14.21
31	14.42
30	14.63
29	14.84
28	15.05
27	15.26
26	15.47
25	15.68
24	15.88
23	16.09
22	16.30
21	16.51
20	16.72

Percent Helium	Percent Oxygen
19	16.93
18	17.14
17	17.35
16	17.56
15	17.77
14	17.97
13	18.18
12	18.39
11	18.60
10	18.81
9	19.02
8	19.23
7	19.44
6	19.65
5	19.86
4	20.06
3	20.27
2	20.48
1	20.69

Notes

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