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# OPERATOR'S MANUAL

## ARGO-NAUGHT WELD GAS ANALYZER

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**WARNING!**  
Before operating this product,  
read and understand this  
Operator's Manual.  
Become familiar with the  
potential hazards of this unit.  
Contact SUMNER  
if you have any questions.

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## OWNER'S RESPONSIBILITIES

Throughout this publication, the words WARNING, CAUTION and IMPORTANT will be used to alert the user to special instructions concerning a particular operation that may be hazardous if performed incorrectly or carelessly.

### OBSERVE THEM CAREFULLY !!



#### WARNING

Hazards or unsafe practices which could result in severe personal injury or death.



#### CAUTION

Hazards or unsafe practices which could result in minor personal injury, product or property damage.



#### IMPORTANT

Indicates information or instructions that are necessary for proper operation and/or maintenance.

## General

The Argo-Naught Weld Gas Analyzer uses state of the art technology to reliably and accurately measure the oxygen content in the welding environment, enabling you to closely monitor the quality of your purge. It will tell you as soon as a low enough oxygen content has been reached to start welding, which will save time and argon gas. The Argo-Naught Weld Gas Analyzer can also monitor the purge atmosphere during welding to warn you if any oxygen penetration occurs.

## Before Use

- Carefully read these instructions before using your weld gas analyzer.
- Do not put pressure on the measuring sensor in the Weld Gas Analyzer.
- Always connect the Weld Gas Analyzer to a volume that has an exhaust to avoid pressurizing the sensor.
- Do not use the Weld Gas Analyzer directly connected to a gas bottle.
- Always connect a regulator and flow meter to the gas bottle.

## Unpacking

Your Argo-Naught Weld Gas Analyzer is supplied in a lightweight storage case that is easily portable and will assist in assuring your instrument's safety and longevity.

Your Weld Gas Analyzer was thoroughly tested and calibrated in ISO approved facilities before dispatch and is ready for you to use immediately. However, we recommend checking the instrument for shipment damage before use.

If damaged please do not use and notify Sumner Manufacturing or your distributor.



## The Complete Kit

Your Weld Gas Analyzer kit contains the following:

- Argo-Naught Weld Gas Analyzer
- Oxygen sensor (already fitted)
- Flow adapter (already fitted)
- Metal sampling probe
- 6-1/2' (2 m) rubber hose for connection to the sampling probe
- Rubber aspirator bulb (fitted with 250 mm connection hose)
- Carrying strap
- Operating instructions
- Calibration and test certificate

## Assembling Your Weld Gas Analyzer

1. The on/off switch (yellow) is on the left side of the instrument. The instrument is switched on by pressing the button once and switched off by pressing the button again.
2. The calibration wheel (black) is on the right side of the instrument.



**Left Side**

**Right Side**

3. When you first turn the weld gas analyzer on, adjust the oxygen content displayed to 20.9 % using the calibration wheel.



4. Wait 2 minutes to allow display to stabilize. Re-adjust if necessary.

5. Connect the hose fitted to the aspirator bulb to one port of the flow adapter. The aspirator bulb is used to draw a gas sample to the sensor for measurement.



6. Connect the steel sampling probe to one end of the rubber hose and connect the other end of the hose to the remaining port of the flow adapter.
7. Clip the carrying strap into the loop at the back of the Weld Gas Analyzer.

Your Argon-Naught Weld Gas Analyzer is now ready for use.



### **IMPORTANT**

The Argon-Naught is designed to switch off after 5 minutes of stable readings to increase battery life. If this occurs simply turn the unit back on by pressing the yellow on/off button on the left of the unit.

# Instructions For Use

The Argo-Naught Weld Gas Analyzer can be used for all purge applications where the oxygen content must be monitored. The Argo-Naught Weld Gas Analyzer is hermetically sealed against dust and moisture and is therefore suitable for wet and sandy conditions.

Applications of the Weld Gas Analyzer include purging with purge bladders, purge dams, silicone disc systems, soluble purge films and papers as well as foam dams and welding enclosures and chambers.

For the best welding results, Sumner Manufacturing recommends the use of inflatable purge dam systems together with your Argo-Naught Weld Gas Analyzer when welding pipe work and tubular vessels.

1. Your Weld Gas Analyzer can be secured on the pipe using the carrying strap.
- 2a. When using a Sumner inflatable purge system together with the Weld Gas Analyzer, the metal sampling probe may be removed from the connection hose. The connection hose can then be directly connected to the exhaust outlet of the purge system. This guarantees reliable continuous measurements of the oxygen content in the purge environment.
- 2b. When using other purge bladders, papers, films etc., the metal sampling probe can be inserted through the weld gap between the two pipes that are being joined (if open root gap welding is applied).
3. Once the Weld Gas Analyzer is connected to the purge volume, a sample of the gas can be drawn by squeezing the aspirator bulb.
4. Once the appropriate oxygen level has been reached (usually around 0.1%) and appears stable, welding can begin.
5. Weld gas samples should be drawn regularly throughout welding since oxygen penetration can damage the weld at any stage of the welding process.



## IMPORTANT

**Sampling with the aspirator bulb will pressurize the sensor and can cause a slight distortion of readings for a few seconds. This does not reflect the actual oxygen level in the purge and will return to normal within seconds.**

If connected directly to a Sumner inflatable purge dam system, gas will flow over the sensor continuously. This allows a constant and close monitoring of the oxygen level throughout the duration of the weld without having to draw samples.

## Instrument Care

The Argo-Naught Weld Gas Analyzer is a very accurate instrument and if looked after properly will give many years of accurate oxygen measurement. There are very few parts that wear out except sensors and batteries. The instrument is robust and designed to be used in the welding environment.

Although it is protected against water it should not be submerged, left in standing water or left outside unprotected against weather.

The instrument should be cleaned with warm soapy water (not immersed). No detergents or solvents should be used on the case or sensor.

Never use the Argo-Naught once the low battery indicator is visible, from this point the electronics quickly become unstable and will produce false readings.

Do not subject the Argo-Naught to mechanical shocks. Although robust, the LCD display is a glass component and can be broken. This is usually apparent by black areas spreading across the LCD screen.

The Argo-Naught should be kept in its case when not in use and should be shielded from high and low temperatures and long exposure to sunlight.

## Regular Calibration

For greatest accuracy the Argo-Naught Weld Gas Analyzer should be re-calibrated in normal air every 8 hours.

1. Switch on instrument
2. Remove flow adapter
3. Move instrument through air slowly
4. Use calibration wheel on right side of instrument to set reading to 20.9



## Replacement of Instrument Parts

The case of the Argo-Naught is hermetically sealed to prevent water damage and contamination. The only parts that can be replaced by the user are the batteries and sensor.

Contact your distributor or Sumner Manufacturing directly for return instructions. When doing so please have serial number and purchasing information handy.

## Sensor Care



### CAUTION

**The sensor may be cleaned with warm water but should never be submerged in water.**



### CAUTION

**Do not use excessive force to rotate the sensor into the inner compartment as this can damage the threads.**

Sensors prefer a cool and damp environment when stored.

Never:

- Store sensors for long periods before use.
- Subject sensors to high temperatures.
- Freeze sensors (e.g. leave on-site overnight).
- Store in a sealed container with limited or no oxygen. When this occurs it can take several hours for the analyzer to stabilize when put back into use.
- Subject sensors to physical shocks.
- Subject sensors to a vacuum.
- Submerge sensors in liquids.
- Attempt to open a sensor.



### IMPORTANT

**Sensors deteriorate very slowly and near the end of their useful life may show a drift up or down soon after calibration. Sensors should be checked periodically in 100% oxygen or pure argon.**

## Sensor Life Expectancy

Sensor life expectancy depends on the amount of oxygen it is exposed to and is not influenced by whether the instrument is switched on or off (this however will affect battery life expectancy). In ambient air sensors will usually work for 24 to 48 months. In an oxygen deprived environment (i.e. when used regularly during purging) the sensor life will normally increase.

## Correct Sensor Disposal

The sensor contains an electrolyte which is caustic. Leaking or exhausted sensors should be disposed of in accordance to local regulations which are usually similar to the disposal of batteries.

## Battery & Sensor Replacement

Replacement sensors are supplied by Sumner Manufacturing.

Please do not stock replacement sensors. The shelf life and performance will decrease when they are not in use.

To replace battery & sensor:

1. Switch off your Weld Gas Analyzer and remove the flow adapter.
2. Remove the 3 screws at the base of the analyzer and the compartment cover.



### IMPORTANT

**The compartment cover is gasket sealed and after a period of time may need some pressure to remove. Loosen the seal by moving the base from side to side. Do not lever off using tools as this may damage the seal.**



### Battery Replacement

The Argo-Naught Weld Gas Analyzer runs on 2 AA batteries. Be sure to insert new batteries according to label instructions.

### Sensor Replacement

1. Remove the old sensor by unscrewing from the housing.
2. Take new sensor (see below) out of protective bag and inspect for damage or electrolyte leakage. Do not use damaged or leaking sensors!



3. Screw new sensor into place.

Switch on Weld Gas Analyzer to confirm that it is working properly. Allow up to an hour for the sensor to achieve greatest accuracy.

### First Aid Procedures:



#### CAUTION

The electrolyte in the sensor is caustic, very similar to the electrolyte in batteries.

If it gets in contact with eyes or skin it can cause irritation and burning or stinging.

Wash and rinse affected area with plenty of water and seek medical attention if burning persists.

In case of ingestion drink plenty of cold water, do not induce vomiting and seek medical attention immediately.

## Troubleshooting

Problem	Possible reason	Solution
No display	Not switched on	Switch on
	Batteries dead	Replace batteries
	Batteries inserted incorrectly	
Lo symbol appears	Low battery	Replace batteries
Turns off during welding	Turns off automatically after 5 minutes of stable readings	Switch on
Zero reading	Sensor disconnected, deposit in jack plug or sensor jack socket	Rotate sensor whilst in instrument
Not calibrating to 20.9	Sensor exhausted	Replace sensor
Zero reading		
Reading drifts	Sensor nearly exhausted	Replace sensor
	Sensor in flowing gas too long	Remove sensor from gas flow
	Ambient temperature changes	Check ambient temperature
	Strong winds	Shield against winds
Inaccurate reading	Old sensor	Replace sensor
	Too high flow pressurizes sensor	Reduce gas flow if possible
	RF interference	Move away from RF source (e.g. radio)
	Condensation on sensor face	Remove condensate
0.1% oxygen levels cannot be reached	Sensor not calibrated in air	Move calibration wheel in air to display 20.9
	Purge gas is not pure enough	Measure purge gas sample directly
	Leak in gas hose	Check gas hose
	Pipe is contaminated	Clean pipe from dirt, oil or moisture
	Porous purge materials used	Use higher flow rate if purging with foam, paper or soluble films, use pure system



## Oxygen Calibration Table

### The Effects of Pressurizing the Sensor:

Oxygen sensors usually do not measure the percentage of oxygen in a mixture of gas but they measure the partial pressure of oxygen. This is why Weld Gas Analyzers can sometimes give erratic readings when exposed to too high gas flow or strong winds which cause the sensor to be pressurized.

### The Effects of Altitude on the Sensor:

The partial pressure of oxygen in air is 0.209 bar (20.9 %) at sea level. In higher altitudes the air becomes thinner and the partial pressure of oxygen in the air changes. The calibration figure of 20.9 in air can be adapted to the altitude to ensure optimum accuracy. Please see table below for more information.

Feet (above sea level)	Meters (above sea level)	Calibrate Sensor To
0	0	20.9
1,000	305	20.2
2,000	610	19.4
3,000	915	18.7
4,000	1,220	18.1
5,000	1,525	17.4
6,000	1,830	16.8
8,000	2,440	15.5
10,000	3,050	14.4
12,000	3,660	13.3