

NM-Argon

Derived Argon Analyser
and
Gas Analyser Pump Box



User Manual

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Precautions

Please read these instructions fully prior to attempting to use the [NM-Argon Analyser](#) and the [Gas Analyser Pump Box](#) to prevent damage to the equipment and/or erroneous readings.

Do not allow the analyser or pump box to become wet.

Do not use the Gas Analyser Pump Box to draw samples of flammable gases or oxygen-enriched gases i.e. gases with an oxygen concentration in excess of 21%.

Always check the calibration prior to use to avoid erroneous readings.

After using the pump box to draw sample of gas, always flush the pump box with ambient air, following the procedure detailed later in this manual, to remove the sample gas from the pump box. If the sensor is left exposed to low-oxygen concentrations for prolonged periods, the performance of the sensor may be adversely affected.

Do not use the pump box to sample gases that may contain dirt, liquids or other particles that may damage the pump. If the pump box is required to sample under such conditions, a disposable filter is available that can be connected between the sampling line and the pump box to protect the pump.

If the analyser or pump box is not to be used for extended periods (i.e. months at a time), remove the batteries from the instruments. It is not necessary to remove the sensor from the pump box.

The analyser features an automatic switch-off function, which returns the unit to stand-by after approximately 3 to 4 minutes of operation to preserve battery life. If the analyser switches off when in use, it can be switched back on without affecting the calibration.

With the exception of battery replacement, there are no user serviceable parts inside. If either instrument is not functioning correctly, please contact Thermoseal Group Ltd. for technical support.

Do not dispose of instruments, batteries or oxygen sensors in domestic waste. If you do not have access to an approved WEEE disposal scheme, Thermoseal Group Ltd. can dispose of equipment via an approved WEEE scheme on your behalf.

Introduction

The **NM-Argon Analyser** (referred to in this manual as the 'analyser') is a derived argon analyser that uses an oxygen sensor to measure the oxygen in a gas sample and calculate the percentage of non-oxygen gases in the sample. Using a look-up table on the front of the instrument, the operator can determine the percentage of argon in the sample.

The NM-Argon Analyser is used in conjunction with the Gas Analyser Pump Box (referred to in this manual as the 'pump box') with the analyser attached to the top of the pump box using heavy-duty hook and loop fastener [fig.1].

The analyser is easy to use with either hand and has large, easily-read digits.

The analyser is powered by 2 x AA / MN1500 / LR6 1.5V alkaline batteries, with an estimated life of 12-18 months with daily usage. The batteries are housed in a separate compartment from the sealed electronics and can be changed without the use of a tool.

The **Gas Analyser Pump Box** uses 3 x AA / MN1500 / LR6 1.5V alkaline batteries, with an estimated life of 30 hours continuous use.

The pump box uses the proven R-17AV oxygen sensor with integral temperature compensation, which is mounted internally. The pump box is connected electronically to the analyser using a short cable with a 3.5 mm jack plug, which can be disconnected to allow them to be separated.

Sampling tubing is connected to the pump box using a Luer-Lok™ connector. A sampling probe is connected to the sampling tubing, which can be inserted into a storage sheath within the pump box when not in use.



Fig.1 - NM-Argon Analyser with Gas Analyser Pump Box

Inserting the batteries

If not already inserted, insert the batteries into the pump box and the analyser prior to use.

To insert the batteries into the analyser, separate the analyser from the pump box and remove the battery door from the rear of the analyser. Insert 2 x AA / MN1500 / LR6 1.5V alkaline batteries, observing the correct polarity [fig.2]. Replace the battery door.



Fig.2 – Battery location in the NM-Argon Analyser

To insert the batteries into the pump box, remove the bottom panel by first removing the 4 screws, then disconnect the jack plug from the sensor to allow access to the batteries. Insert 3 x AA / MN1500 / LR6 1.5V alkaline batteries, observing the correct polarity and reconnect the jack plug to the sensor [fig.3]. Replace the bottom panel.

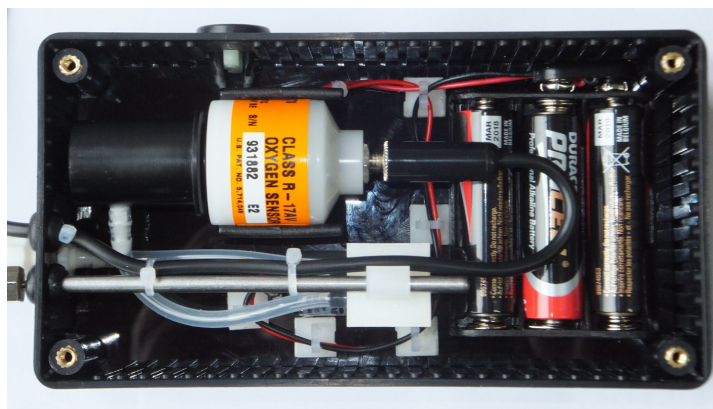


Fig.3 – Battery location in the Gas Analyser Pump Box

Re-attach the analyser to the pump box using the hook and loop fastener.



Caution: incorrectly inserted batteries may cause damage to the equipment.

Preparing the instruments for use

With the analyser mounted on the top of the pump box, connect the 3.5 mm jack plug that exits the pump box into the jack socket on the analyser [fig.4].



Fig.4 – Connecting the pump box to the analyser

Ensure that the sampling tubing has a Luer-Lok™ connector attached to one end and a sampling probe connected to the other [fig.5 & 6], connect the Luer-Lok™ connector to the pump box [fig.4].

The sampling probe can be inserted into the storage sheath in the pump box when not in use, as shown in fig.4.



Fig.5 – Luer-Lok™ connector



Fig.6 – Sampling probe

Test the pump box by removing the sampling probe from the storage sheath and pressing the pump activation button, which is the grey button located on the left-hand side of the pump box. The pump should be heard to activate and a gentle suction should be felt at the tip of the sampling probe.

If the pump fails to activate, check that the batteries are correctly inserted.

If the pump activates but fails to generate suction, check the connections between the tubing, the Luer-Lok™ and the sampling probe. If neither appears to be the cause, check the pump box internally for disconnected tubing. Internal tubing should be connected to the Luer-Lok™ connector inside the pump box and runs to the sampling chamber as can be seen in fig.3. Ensure the tubing is not kinked.

Calibrating the analyser prior to use

Turn the analyser on by pressing the grey ON/OFF button on the front of the instrument.

The LCD display will briefly display a software revision number, before displaying a reading.

If the displayed reading is 100.0, check that the analyser is connected to the pump box by way of the 3.5 mm jack plug on the end of the cable that exits the pump box.

If the reading still reads 100.0, open the pump box and check that the sensor is connected to the internal 3.5 mm jack plug: if it is connected, the sensor may have expired, in which case, contact Thermoseal Group Limited for technical support.

With the sampling probe exposed to ambient air, activate the pump for at least 5 seconds to draw air into the sampling chamber inside the pump box.

The reading on the display may initially change but should settle to a steady reading within approximately 10 seconds.

Release the pump activation button to deactivate the pump.

Once the reading is stable, calibrate the analyser using the CALIBRATION knob on the front of the analyser, turning it clockwise or anti-clockwise as required until a reading of **79.1% ($\pm 0.1\%$)** is obtained [fig.7].

Note: as the analyser is measuring the absence of oxygen, turning the calibration knob clockwise will *decrease* the % NON-OXYGEN GASES reading on the display.



Fig.7 – Analyser display after calibration

Note: the analyser is measuring the percentage of **NON-OXYGEN GASES** in the sample i.e. all gases contained in the sample that are not oxygen. Oxygen accounts for approximately 20.9% of air, so the percentage of non-oxygen gases is 79.1%.

As a final check, briefly activate the pump to ensure that the reading does not change, if it does, then adjust the calibration accordingly back to 79.1%.

Taking a sample from an Insulated Glass (IG) Unit

The NM-Argon Analyser and Pump Box can be used to take and analyse gas samples from a recently-filled IG unit post-fill and prior to closing the filling hole, or from a fully sealed unit in a destructive test for quality assurance purposes.

To take a sample post-fill - first allow a few moments for the filling turbulence to settle with the probes still in place so as to not allow air to enter the IG.

With the sampling probe exposed to ambient air, activate the pump briefly and check the calibration of the analyser still reads **79.1% ($\pm 0.1\%$)**. Recalibrate the analyser if required.

Remove the filling probe and immediately replace with the sampling probe, inserting the sampling probe as far as the knurled nut with the aim of sealing the hole and preventing air from entering.

Activate the pump to start drawing the sample, a response should be seen on the analyser display in under 1 second if using 60 cm of tubing.

Keep the pump running for around 5 seconds to flush out the sampling chamber within the pump box and observe the % NON-OXYGEN GASES reading, which should be steadily rising.

Stop the pump and wait a further 5 seconds for the reading to stabilise, then reactivate the pump for a further 5 seconds to ensure that a steady reading is obtained.

Refer to the conversion label on the front of the instrument to determine an approximate percentage of argon contained within the sample. For greater accuracy, refer to the conversion table detailed below [fig.8].

% NON-OXYGEN GASES	% ARGON
99.5	97.6
99.0	95.3
98.5	92.9
98.0	90.5
97.5	88.2
97.0	85.8
96.83*	85.0
96.5	83.4
96.0	81.1

Fig.8 – Conversion table

For reference, EN1279 Part 3 states that the required gas fill should be 90% (+10%, -5%).

By those criteria:

> 97% NON-OXYGEN GAS INDICATES > 85% ARGON	PASS
< 97% NON-OXYGEN GAS INDICATES < 85% ARGON	FAIL

IMPORTANT: Refer to your organisation's quality assurance procedures to determine whether the measured fill percentage is adequate.

*Note: the actual percentage of non-oxygen gases relating to 85% argon is 96.83%, however, due to tolerance within the stated accuracy of the analyser, a value of 97.0% should be used to compensate.

If the IG needs to be topped up, remove the sampling probe, replace the filling probe and fill as required, then follow the analysing procedure again.

Once the sampling procedure has been completed, remove the sampling probe and expose to ambient air, activate the pump for 5 to 10 seconds to flush out the sampling chamber with air. Observe the % NON-OXYGEN GASES reading, which will steadily return to approximately 79.1%

Switch the analyser off after use. Note: if the analyser automatically switches off when in use, it can be switched back on without affecting the calibration.

To take a sample using a destructive test – the sample unit for testing should be held upright in a safe manner and then, using the hammer and punch provided, small holes should be made through the edge sealant and spacer bar. As the unit is upright, the gas cannot leak out.

The sample is then taken as per non-destructive testing.

Technical information

NM-Argon Analyser Specification

Measurement Range	0% to 100% non-oxygen gases
Measurement Resolution	0.1%
Response Time	90% step change < 10 s
Battery Type	2 x AA / MN1500 / LR6 1.5V
Battery Life	12 – 18 months (with typical usage)
Sensor Type	R-17AV (Galvanic)
Sensor Lifespan	Expected 36 - 48 months (with typical usage)
Sensor Output	9.0 mV - 13.0 mV in air at 25 °C at sea level
Sensor Accuracy	± 1% of full scale at constant temperature and pressure
Dimensions	59 mm x 142 mm x 26 mm
Weight	105 g excluding batteries
Storage Temperature	0 °C to 50 °C (10 °C to 50 °C recommended)
Operating Temperature	0 °C to 40 °C
Ingress Protection Rating	IP65 NEMA 4
ISO Standards	ISO EN 9001:2008
EMC CE	ISO EN 60601-1-2
RoHS	Complies with RoHS
WEEE	Complies with WEEE (registration no. WEE/DJ1953ZR)

Specifications subject to change

Gas Analyser Pump Box Specification

Response Time (60cm x 2.4mm tubing)	< 0.5 s
Gas Flow Rate (60cm x 2.4mm tubing)	2 m/s
Battery Type	3 x AA / MN1500 / LR6 1.5V
Battery Life	> 30 hours continuous run time
Battery Life (as number of samples)	> 10,000 samples of 10 seconds each
Sensor Type	R-17AV (Galvanic)
Sensor Lifespan	Expected 36 - 48 months (with typical usage)
Sensor Output	9.0 mV - 13.0 mV in air at 25 °C at sea level
Sensor Accuracy	± 1% of full scale at constant temperature and pressure
Dimensions	150 mm x 80 mm x 50 mm
Weight	250 g excluding batteries, sensor and sampling probe
Storage Temperature	0 °C to 50 °C (10 °C to 50 °C recommended)
Operating Temperature	0 °C to 40 °C
Ingress Protection Rating	IP20
RoHS	Complies with RoHS
WEEE	Complies with WEEE (registration no. WEE/DJ1953ZR)

Specifications subject to change

Contact details

For technical support, sales and service, please contact Thermoseal Group Ltd. using the contact details below:



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The **NM-Argon Analyser** and **Gas Analyser Pump Box** are manufactured in the UK by Vandagraph Ltd. on behalf of

