



**MATHESON  
TRI•GAS**

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## **Nitrogen generator model N2-Bora**

### **User's manual**

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## **Introduction**

### **Scope of the manual**

This manual provides operation and maintenance instructions for model N2-Bora nitrogen generator.

### **Specifications**

#### ***Specifications of the nitrogen generator***

Nitrogen flow rate	
STP: Standard temperature and pressure (20°C, 1 bar)	0-500 cc/min at STP
Max outlet pressure	5 bar (73 psi)
Purity	99.999%+ (O <sub>2</sub> < 10 ppm)
Weight	18 kg
Input voltage	120 or 240V / 50 or 60Hz
Fuse	4A or 2A
Pressure accuracy	0.1 bar (± 0.5 %)
Microprocessor controlled display	Graphic display, 128 x 64 pixels
Index of protection	IP2x
Operating conditions:	
- Temperature	15°C to +40°C
- Relative humidity	0-80%, non condensing
Over voltage category	II
Pollution degree	2
Sound pressure level	48 dB(A)
Case dimensions	350 x 430 x 230 mm (WxDxH)

### **Notes on FCC compliance**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

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If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**WARNING!**

*Any changes or modifications to this equipment not expressly approved by the manufacturer may void the user's authority to operate the equipment.*

### **Correct use**

Nitrogen generator is designed to produce nitrogen for laboratory use. The unit must only be operated for this purpose, according to the specifications and instructions provided in this manual. In particular, the following warnings must be observed at all times:

- Indoor use only
- Never operate the unit in below-zero temperatures.
- Only operate the unit in a room with sufficient ventilation (see "Placing the unit").
- Always unplug the unit from the mains power supply before accessing the internal components for replacement.
- Only the parts described in the "Spare parts list" can be replaced by the user.

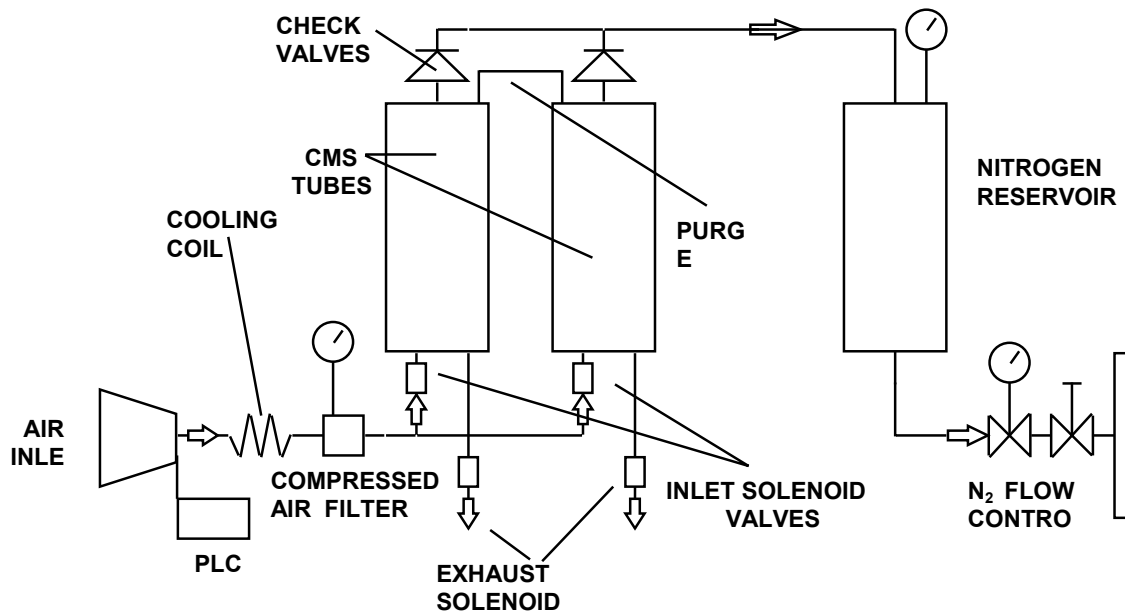
**Packing list*****List of items included in the shipment***

<b>Quantity</b>	<b>Description</b>
1	Nitrogen generator
1	Instruction manual
1	Power cable

## Description

The nitrogen generator produces pure nitrogen through the filtration of compressed air. The key element of the generator is a carbon molecular sieve that is able to separate the nitrogen molecules from the oxygen ones present in the compressed air stream. The two carbon molecular sieve tubes are self regenerating cyclic. The compressor is integral in the generator and its purpose is to compress air up to 5 bar and force it into the tubes containing the carbon molecular sieve.

The generated nitrogen gas is accumulated in a specific reservoir. The internal pressure is controlled by a pressure transducer. The outlet pressure is controlled by a proportional valve. The nitrogen then passes through outlet port at the rear.



## Installation

### Receiving the generator

All units have been carefully inspected before transport. Visual checks for damage and functional tests should be performed upon receipt. Any damage must be immediately noted and reported. The generator must only be returned according to the shipping instructions provided.

### Placing the generator

The nitrogen generator must be placed on a flat, level, vibration-free, shock-free surface. Do not place the generator over a source of heat, as this may cause the device to overheat. The unit should not be in contact with any other objects on any side, and the air inlet must not be blocked. **Leave at least 30 cm of free space at rear for ventilation.** Do not operate the generator in a sealed or unventilated room. Do not operate the generator at below freezing temperatures. Operation is guaranteed at operating temperatures between +15 and +40°C.

#### **WARNING!**

*Normal precautions for any nitrogen supply should be taken when using the generator. DO NOT use in sealed or unventilated rooms. Nitrogen can cause suffocation.*

### Symbols used on the generator



Earth symbol:  
This symbol marks the earth connections to the chassis of the nitrogen generator.

### Gas connections

Pure nitrogen at regulated pressure is available at the nitrogen outlet port at the rear of the generator. This port must be connected to 1/8" tubing using a stainless-steel or copper Swagelok connector. Teflon connectors are not suitable. The pressure at this port is adjusted and shown on the display.

#### **WARNING!**

*The line from the relief port should never be connected in such a way that back pressure can develop.*

## Initial start-up

### Start N2-Bora

- Switch on the unit.
- Push the START button.
- The unit's compressor will start to run and nitrogen will be produced immediately.
- It will last 30 minutes before the nitrogen produced will reach the stated purity.
- The system is ready for use now.

### Operation

The operating status of the unit is shown on the main screen on the graphic display.

The main screen has three options at the bottom, corresponding to the three buttons on the unit, which are used to run the various functions and access the configuration.



- The button on the left is used to start the unit.
- The button on the right is used to stop the unit.
- The button on the centre is used to set up the alarm.

Pressing it for 20 seconds a 0 digit will appear on the display; then continuing to press the button it will appear a number 1, 2, 3, 4 and 5. Releasing the button you can select the delay (in minutes) of the alarm. If a leak occurs, an internal timer starts and if before the selected time the pressure doesn't return to the initial value, an alarm is activated.

On the graphic display it's possible to see a timer that indicates the working hours of the generator. When 4000 working hours are passed, it's time to replace some consumables, as indicated in the next chapter, "Maintenance".



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## **Maintenance**

With proper care and maintenance, your nitrogen generator should provide you with years of trouble-free operation. There are no adjustments to be made to the generator. The only routine service operations are those described below.

Nonetheless, the generator should be inspected approximately every 3 years. Contact your supplier.

### **Routine maintenance**

The following section describes the maintenance operations required for the correct operation of the nitrogen generator.

### **Cleaning**

The internal components of the nitrogen generator do not need to be cleaned and should not be accessed by the user for cleaning. To clean the outside of the unit, only use a damp cloth (no detergents, acids or aggressive or abrasive substances).

### **Service kits**

- Every 4000 hours the user must replace the filters of the compressor.
- Every 8000 hours the user must replace the filters and the membrane of the compressor.
- Every 24000 hours the user must replace the carbon molecular sieve (CMS).

The specific maintenance kits are available as spare part. These kits include all required parts: they are listed in the "List of spare part".

### **WARNING!**

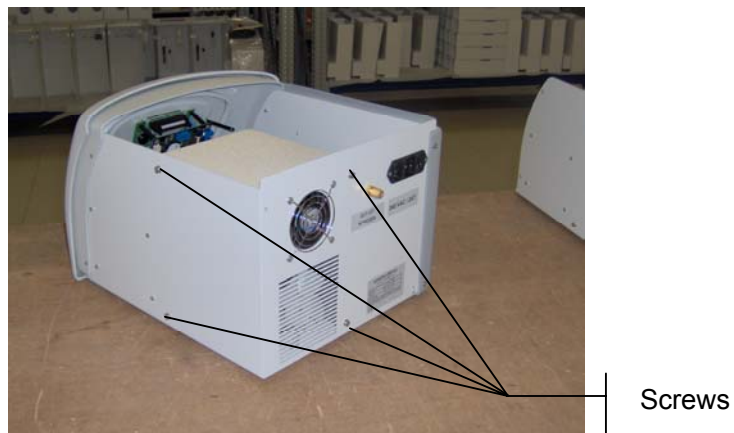
*Only qualified personnel should perform service on this product. Any damage done to this product as a result of improper maintenance procedure will void the warranty.*

**4000 h service kit***a) Exchange of the compressor's inlet filter*

- Switch off the instrument and disconnect from the power line
- Open the hood
  - Unscrew the 2 screws on rear of the unit



- Unscrew the 4 screws on right side and on rear of the unit



- Exchange the filtering media



Filtering Media

- Reassemble

b) *Exchange of the automatic purge filtering media*

- Switch off the instrument and disconnect from the power line
- Open the hood
- Disconnect the 2 tubes fixed at the top of the automatic purge (quick connect fittings)



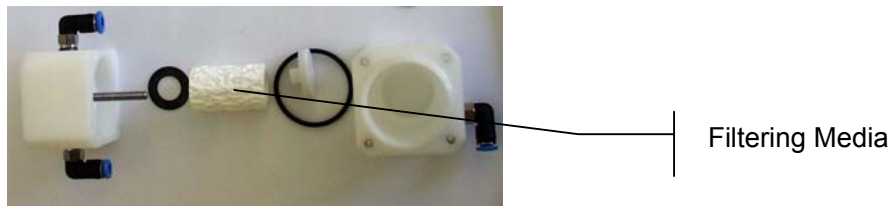
Automatic Purge

- Unscrew the 4 screws on top of the automatic purge



Screws

- Exchange the filtering media (white cylinder)



- Reassemble

### 8000 h service kit

#### a) *Exchange of the compressor's inlet filter*

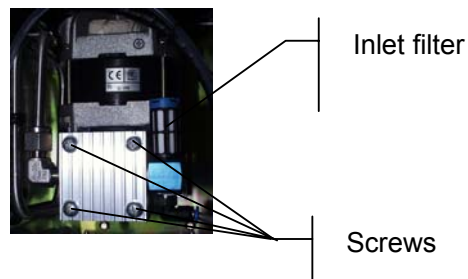
See 4000 h service kit

#### b) *Exchange of the automatic purge filtering media*

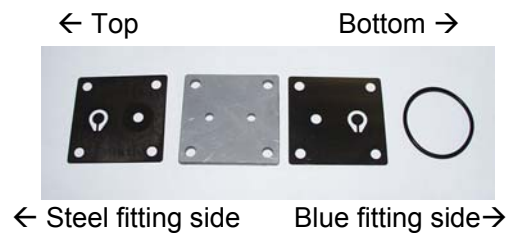
See 4000 h service kit

#### c) *Exchange of the membrane in the inside compressor*

- Switch off the instrument and disconnect from the power line
- Open the hood
- Unscrew the 4 screws on top of the pump



- Replace the seals and membranes



- Reassemble

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**Returning the unit**

In the event of any faults or damage, first notify the agent or distributor who supplied the unit. Please also provide full details of the problem, including the model and serial number. Instructions will then be provided for the service or the return of the unit. If the one year warranty has expired, or the fault is due to misuse of the unit, all repair and shipping costs are to be paid by the customer. All other costs are borne by the customer, except as otherwise expressly agreed upon.

**WARNING!**

*If the unit has to be transported, make sure to use suitable packaging.  
The unit should be transported in an upright position; this warning should be reported on  
the outside of the packaging.*

## Spare parts list

The table below provides a list and description of the spare parts of the nitrogen generator.

### *List of spare parts – N2-Bora*

<b>p/n</b>	<b>DESCRIPTION</b>
NB-404	4000 h service kit for N2-BORA (filters)
NB-401	8000 h service kit for N2-BORA (filters + compressor kit)
NB-408	24000 h CMS tubing kit complete

**IMPORTANT!**

*The manufacturer reserves the right to change or modify its products without prior notice.*