Installation & User Guide

High Purity Gas Generator

For
API Range

NM20ZL Gas Station
(Wall Mounted System)

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1	Document Created	SK	20/09/07
2	Included new design of cabinet and updated pneumatic diagram	SK	18/06/08

Warranties and Liabilities

1) The Company warrants that it has title to the Goods.

2) Subject to the provisions of this clause the Company warrants that the Goods shall comply in all material respects with any specification referred to in the Order Confirmation (as the same may be amended) and shall, subject thereto, be free from defects in material and workmanship for the lesser of a period of twelve months from the date of delivery or thirteen months from the date of dispatch from the factory.

3) Save as provided in this clause and except where the Goods are sold to a person dealing as a consumer (within the meaning of the Unfair Contract Terms Act 1977) all warranties, conditions or other terms implied by statute or common law are hereby expressly excluded save to the extent they may not be lawfully excluded. When the Goods are sold to a consumer within the meaning of the Unfair Contract Terms Act 1977 their statutory rights are not affected by the provisions of this clause.

4) In the event of the Customer making a claim in respect of any defect in terms of clause 2 hereof the Customer must: -

   4.1) Reasonably satisfy the Company that the Goods have been properly installed, commissioned, stored, serviced and used and without prejudice to the generality of the foregoing that any defect is not the direct or indirect result of lack of repair and/or servicing, incorrect repair and/or servicing, use of wrong materials and/or incorrect spare parts; and
   4.2) Allow the company to inspect the Goods and/or any installation and any relevant packaging as and when reasonably required by the Company.

5) Subject to the Company being notified of any defect as is referred to in sub-clause 2 hereof within a reasonable time of it becoming apparent and subject always to the terms of sub-clause 4 hereof, the Company shall, in its option, replace or repair the defective Goods or refund a proportionate part of the Price. The Company shall have no further liability to the Customer (save as mentioned in sub-clause 6 hereof).

6) The Company shall be liable to indemnify the Customer in respect of any claim for death or personal injury to any person in so far as such is attributable to the negligence or breach of duty of the Company or any failure by the Company to comply with the provisions of sub-clause 2 hereof.

7) Save as provided in sub-clause 2 hereof the Company shall not be liable in respect of any claim by the Customer for costs, damages, loss or expenses (whether direct, indirect, consequential or otherwise) or indemnity in any respect howsoever arising including, but not by way of limitation, liability arising in negligence (other than pursuant to clause 6 above) that may be suffered by the Customer or any third party,

SAFETY NOTICE TO USERS

These instructions must be read thoroughly and understood before installation and operation of your Peak Gas Generator.

When handling, operating or carrying out any maintenance, personnel must employ safe engineering practices and observe all relevant local heath and safety requirements and regulations. The attention of UK users is drawn to the Health and Safety at Work Act 1974.

WARNING: Nitrogen is not a poisonous gas, but if the concentration in the inhaled air becomes too high there will be a risk of asphyxiation.

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1 Introduction

The Peak Scientific Instruments Ltd NM20ZL Gas Station is designed specifically for use with API LC/MS Instruments. The generator is fitted with manual switch which allows the generator to switch source and exhaust as described in photo spray mode.

2 Unpacking and Installation

Although Peak Scientific takes every precaution with safe transit and packaging, it is advisable to fully inspect the unit for any sign of transit damage.

ANY DAMAGE SHOULD BE REPORTED IMMEDIATELY TO THE CARRIER AND PEAK SCIENTIFIC OR THE DISTRIBUTOR FROM WHERE THE UNIT WAS PURCHASED.

Note: - Included with the generator is a pack containing manuals & fittings. Be careful not to discard these with the packing.

Please save the product packaging for storage or future shipment of the generator.

3 Location

The generator in designed to be installed adjacent to the Mass Spectrometer it is supplying. If this is not convenient then the generator can be sited elsewhere however consideration should be made to the lengths of pipe runs as pressure drops can result from extended runs of pipe.

The generator can fit under most workbenches although it has been designed to be wall mounted using the slotted holes to the rear. These are on 100mm centres.

Performance of the generator (like all sophisticated equipment) is affected by ambient conditions. Continuous operation in ambient temperatures exceeding 25°C will lead to a reduction in capacity and prolonged operation in temperatures exceeding 30°C will shorten the life of the unit. Note should also be taken of the proximity of Air Conditioning outlets. These can sometimes give rise to “pockets” of air with high relative humidity. Operation of the generator within such a pocket could adversely affect its performance. Consideration should also be given to the air flow around the unit. It is recommended that an air gap of 75mm (3”) should be maintained down both sides and across the top of the unit.

MAXIMUM AMBIENT CONDITIONS: - 30°C (dry bulb) 70%RH (Max)

Electrical Connection

The NM20ZL does not require any electrical supply.

4 Air Connection

The Nitrogen Generator should be connected to a **clean, dry, OIL - FREE** source of compressed air. A regulated minimum pressure of 120 psig is required. Any doubts as to the suitability of your compressed air supply should be referred to the factory for advice.

The generator has a *Breathing Air Filter* with ¼" BSPT connection to the left side of the unit. The Compressed Air supply should be connected here. This filter will drain moisture and is equipped with an automatic drain. The drain should be led to a convenient place. There are 3-off ¼" BSPT Female bulkhead connections to the right of the unit. Fittings are provided to connect these ports to the gas connections of the Mass Spectrometer.

A kit of fittings for connecting to the Mass Spectrometer is provided with this User Guide.

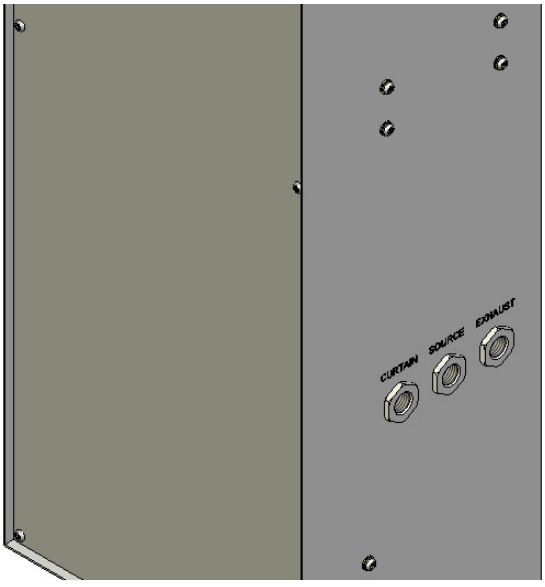
LC/MS with 3-off Connections (e.g. Api2000)

Connect the 3-off gas ports at the right side of the generator to their respective ports on the Mass Spectrometer using the 3-off ¼" BSPT x ¼" Swagelok fittings provided. Use ¼" tubing throughout.

LC/MS with 4-off Connections (e.g. Api3000)

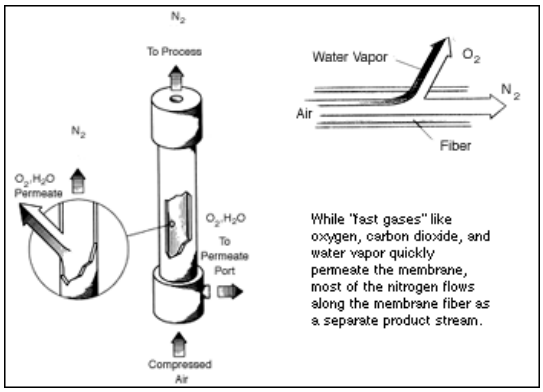
Connect *Curtain Gas* and *Exhaust* to their respective ports using ¼" tubing as per above. The *Source Gas* will have to be split into *Gases 1 & 2* at the Mass Spectrometer. Connect *Gases1 & 2* with 1/8" tubing to the ¼" Tee Piece supplied with the 2-off ¼" BSPT x 1/8" Swagelok fittings. Connect the inlet branch of the tee to the *Source Gas* connection at the rear of the generator using ¼" tubing as above.

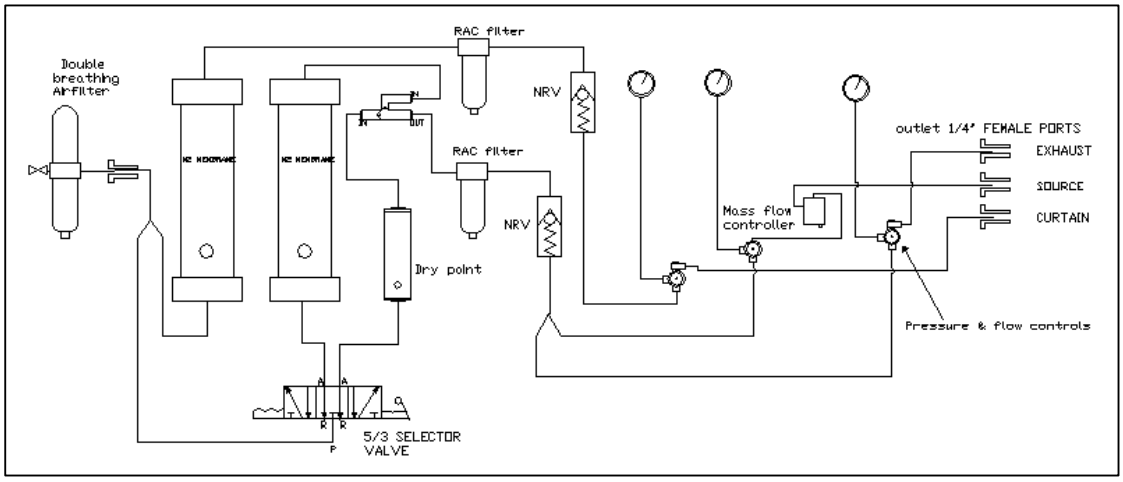
NB: - to minimize pressure losses position the Tee as close to the Mass Spectrometer as possible.



5 Principle of Operation

Peak Scientific Instruments NM20ZL Generators utilize two of air preparation membranes to produce the required Gas outputs. The Nitrogen side of the generator employs "*Hollow Fibre Membrane"* Technology to efficiently separate Nitrogen from other gases present in ambient air. An overview of this process can be seen below.





Air passes into the system through the **Inlet BA Filter** which removes bulk moisture and harmful particles. The air is now divided into 2 streams. The first stream is passed through the **Nitrogen Membrane** to generate a flow of **Nitrogen** for the **Curtain Gas** output. The **Nitrogen** is then filtered through the **RAC Filter** to remove any remaining contaminants. The second stream is passed through hand operated selector valve this allows air through **2nd Nitrogen Membrane** to generate a high flow of **Nitrogen** for the **Source Gas** and **Exhaust Gas** requirements or through the dry point for High flow of dry air for **Source** and **Exhaust** requirements this is selected by the end user via the selector switch at the front of the generator. The **Nitrogen** / **Air** is then filtered through the **RAC** Filter to remove any remaining contaminants.

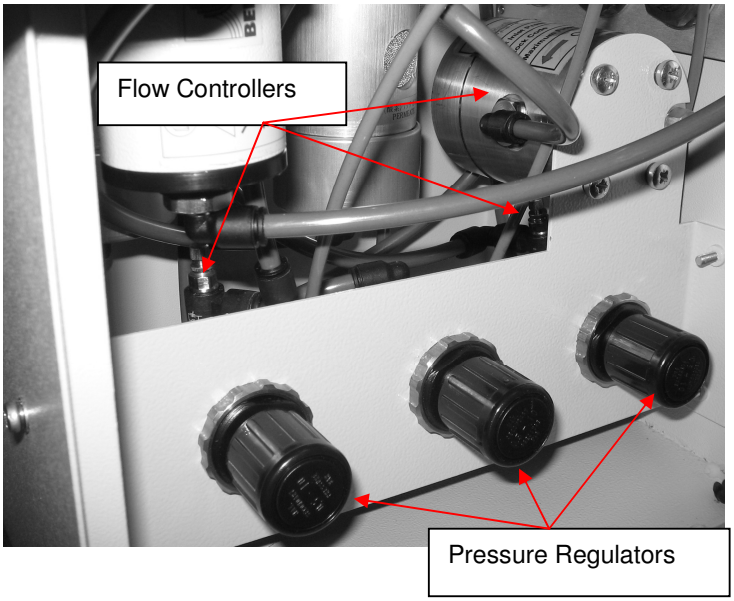
6 Commissioning

With the Generator installed as described earlier connect compressed air to the unit and turn it ON. Select Source N2 or Source Air mode via selector switch. Disconnect the Outlet connections to allow the generator to vent to atmosphere until the unit is stabilised. The Generator has been pre-set in the factory to give the specified output flow-rate and pressure in line with known requirements. Once the Membranes reach the design pressures the Generator will stabilise and produce Nitrogen. Maximum purity will be achieved. The generator can then be re-connected to the application.

The design of the generator is such that it can deliver up to 26 Litres / min Nitrogen/ Air at 110 psig with an additional 12 Litres / min of Nitrogen at 80 psig. Should the demand for gases be less than the rated output flow, or indeed should the demand stop the generator will continue to operate without any problems.

Pressure & Flow Settings

Output pressures and flow rates are controlled by pressure regulators located behind the front panel as shown below. The Factory settings for the 3 outputs are as follows: -



Port	Usage / Connection	Pressure / Flow
CURTAIN	Curtain Gas	12 ltr /min - 80 psig
SOURCE	Source Air / Source N2	26 ltr/min - 110 psig
EXHAUST	Exhaust Gas	8 ltr/min - 60 psig

The above settings should allow the NM20ZL to be operated with all standard configurations for the Applied Biosystems Api range of LC/MS/MS instruments. Should the above settings not provide sufficient flow or pressure for your application please contact the factory for assistance.

7 Maintenance Schedule

WARNING: Servicing and/or repair of the Generator should only be undertaken by a TECHNICALLY COMPETENT PERSON with the Generator in a safely isolated condition.

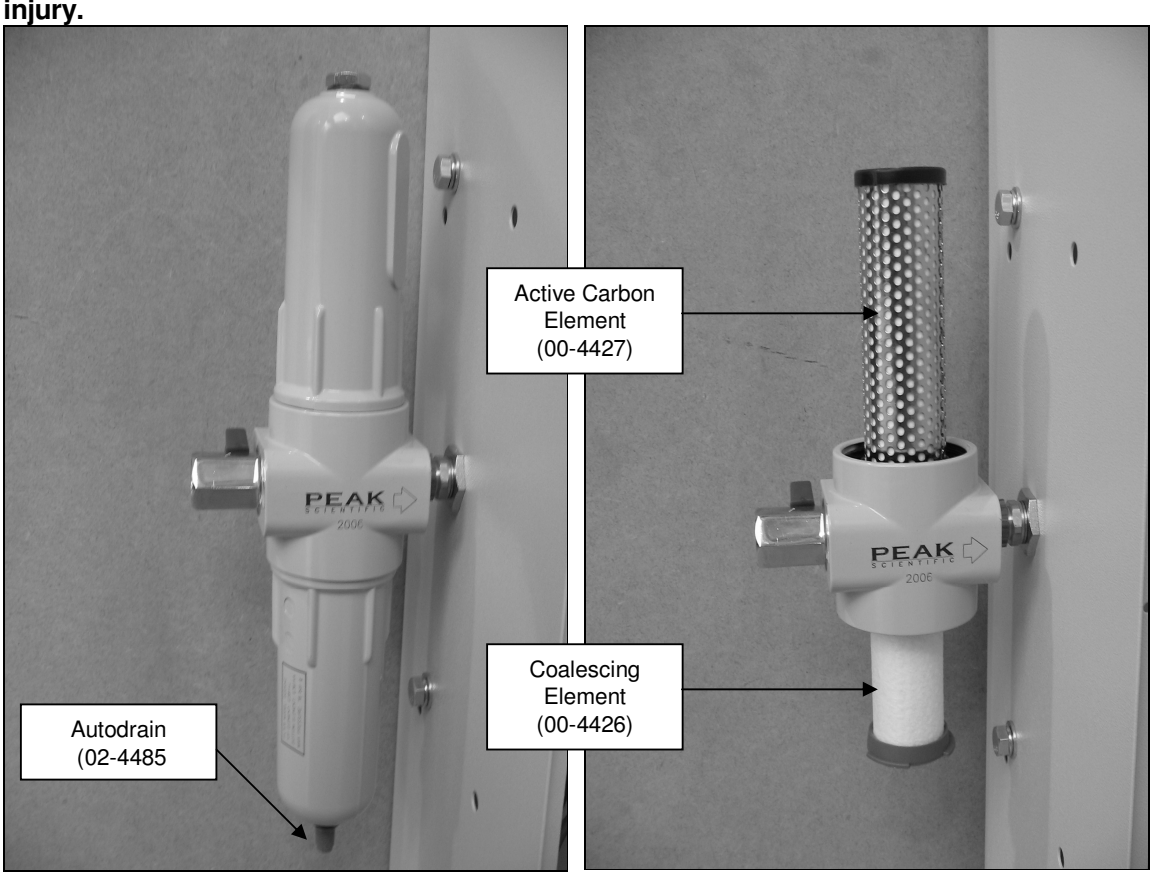
Due to the simplicity of the design and the small number of moving parts the NM Series Nitrogen Generator will have a long and trouble free life. However as with all scientific and technical equipment it should be regularly inspected and serviced as below:

BA Inlet Filters	**Every 12 - months**
RAC Filter Elements	**Every 12 - months**

1. BA inlet Filter Elements

These should be changed at 12 months intervals. In addition filter bowls should be cleaned and, the operation of the auto-drains should be checked.

The Air supply to Generator MUST be turned OFF and the Generator MUST be de-pressurised prior to attempting to remove ANY filter bowl. Failure to do this may cause injury.

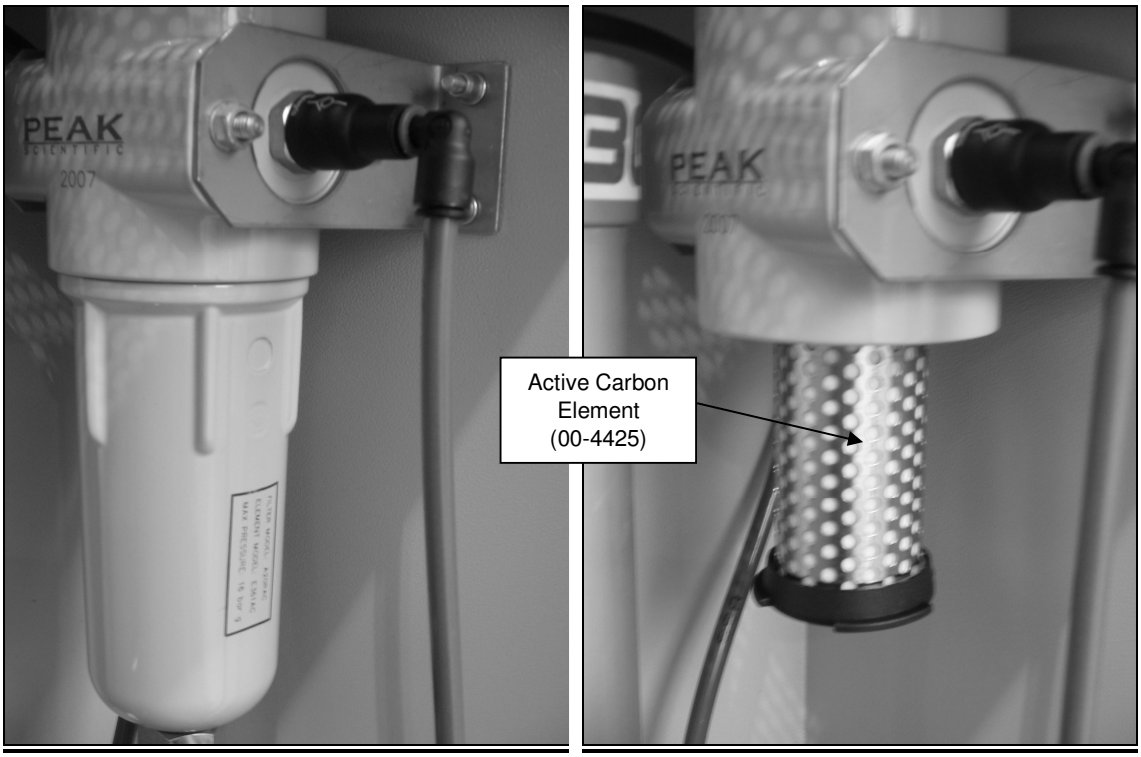


The filter housing is removed by un-screwing in a counter clockwise direction.

2. RAC Filter

The Element is as shown, and should be changed at 12-month intervals.

The Air supply to Generator MUST be turned OFF and the Generator MUST be de-pressurised prior to attempting to remove ANY filter bowl. Failure to do this may cause injury.



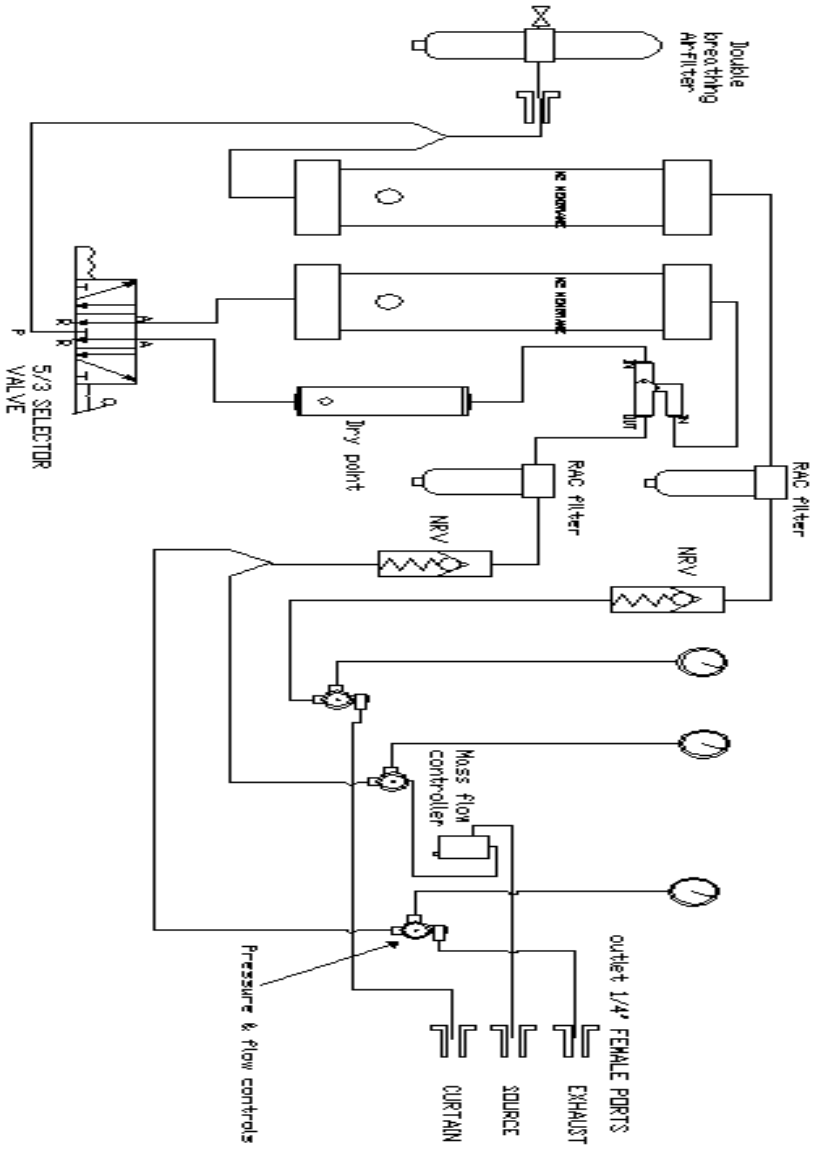
The filter housing is removed by un-screwing in a counter clockwise direction.

8 Technical Specifications

General Details

Minimum Operating Ambient Temperature	5 °C (41 °F)
Maximum Operating Ambient Conditions	30 °C (86 °F) 70% RH(max)
Inlet Conditions (Free of oil and bulk moisture)	
Minimum Air Inlet Pressure	120 psig (8.27 Barg)
Maximum Air Inlet Pressure	145 psig (10.0 Barg)
Minimum Air Inlet Flow Rate	90 l/min (ATP)
Outlet Gas	
Maximum Pressure Drop (Outlet-Inlet) δP	8 psig
Maximum Gas Outlet Pressure	110 psig
Maximum Source Gas Outlet Flow (Nitrogen / Air)	26 Litres/min (ATP)
Maximum Exhaust Gas Outlet Flow (Nitrogen / Air)	8 Litres/min (ATP)
Maximum Curtain Gas Outlet Flow (High Purity Nitrogen)	12 Litres/min (ATP)
Start up time for Purity	60 minutes
Particles	0.01um
Serviceable Parts List	
Breathing Air Inlet Filter Elements	00-4426 00-4427
Active Carbon Filter Element	00-4425
Auto drain	02-4485
General	
Dimensions W x D x H cm (inches)	27 x 20 x 76 (10 x 8 x 30)
Shipping Weight Kg (lbs)	25 (55)

9 Pneumatic Diagram



Maintenance Log

Model- NM20ZL. **Serial number**

Work Done	Remarks	Date	Name

Notes: