

NM32LA

Product Information Package



Introduction

This is the Product Information Package (PIP) for Peak Scientific Instruments' NM32LA Nitrogen Generator specifically designed to provide gas to LCMS Applications as produced by most LCMS Manufacturers.

With this guide to the NM32LA we hope to provide you with a better understanding of this Nitrogen generator model both from a sales and from a technical point of view.

The PIP- NM32LA will provide you with detailed information on:

- Specifications of the product
- Suitable applications
- Installation and Set Up
- Trouble Shooting
- Maintenance Requirements
- Positioning against competing products
- Target customers & Markets
- Qualifying Questions
- Alternative Solutions

Though we anticipate for this PIP to be a full guide on the NM32LA we will appreciate any feedback in terms of inclusion of other items and/ or information that will be useful to any of our representatives in the field.

To submit feedback, please address any comments to your account manager, who will pass the information to Peak Scientific's Marketing Department or contact the Marketing Department directly through marketing@peakscientific.com.

Product Description

The 'NM32LA' Nitrogen Generator has been specifically designed to operate LCMS manufactured by Waters Corporation, Thermo Fisher Scientific, Agilent Technologies, Shimadzu, Bruker and similar, producing the required flow rates, purities and pressures to cater for the requirements of this application.

Extensively tested under supervision of Peak and LCMS Manufacturers, the 'NM32LA' has been approved to supply Nitrogen to their LCMS Applications.

The 'NM32LA' generates Nitrogen through the application of 'Membrane Technology'. Nitrogen membranes separate gases by the principle of selective permeation across the nitrogen membrane wall. "Fast" gases permeate through the nitrogen membrane wall more readily than "slow" gases, thus separating the original gas mixture into 2 streams. The purity of the desired streams can be adjusted depending on operating conditions.

Internal air compressors further make the 'NM32LA' a stand- alone, self- sufficient Nitrogen Generator, independent from external air sources.

Features & Benefits

- **Experience**
Peak Scientific has more than 10 years of experience in the development, production and service of laboratory gas generators
- **Safety**
Products operate within Health & Safety Standards
No requirement to replace dangerous gas cylinders
- **Simple Installation**
Designed as a Plug & Play System
- **Economical**
More cost effective than gas bottles or cylinders
- **Portable**
Easy to fit into your laboratory environment
- **Convenience**
No more worries about running out of gas
- **Reliable**
Extensively tested to ensure reliability and longevity of generator
Every generator is tested to its specifications before despatch from factory
Electronic Control System facilitates compressor cycling, resulting in longer compressor life
Indicators for Preventative Compressor Maintenance ensure maximum uptime
Alarm function aids fault finding and prevents unnecessary downtime
- **Robust**
Manufactured with highest quality components
Produced by trained and skilled staff at UK Head Office
- **Certified**
Conformity with Low Voltage Directive EEC, EMC (EN61326), CAN/CSA and UL approved
WEEE and RoHS compliant
- **Peak or Peak Approved Support**
A variety of preventative maintenance plans are available from Peak Scientific
Easy access to a network of authorized partners and Peak Global Support

Technical Specifications

NM32LA	
Minimum Operating Ambient Temperature	5°C / 41°F
Maximum Operating Ambient Temperature	30°C / 86°F
Maximum relative Humidity	70%
Maximum Altitude	2,000 meters
Outlet Gas - Nitrogen Maximum Flow Rate	32L/min (1.13cfm)
Outlet Gas - Nitrogen Maximum Outlet Pressure	6.90 bar/ 100 psi
Particles	< 0.1 µm
Phthalates	None
Suspended Liquids	None
Outlet 1/4" BSP	1
Pressure Gauges	1
Start Up Time	30 minutes
Noise Level	54 dBA @ 1m
Electrical Requirements	230v ± 10%, 50/ 60 Hz, 7A
Compressors	2-Pole 6A - D curve
Fans & Controls	2- Pole 4A - C curve
Electrical Connection	Single Phase Power Cord
Dimensions WxDxH (cm/ inches)	60 x 75 x 71.2 / 23.6 x 29.5 x 28
Weight	95kg / 209lb
Shipping Weight	120kg / 264lb

Principle of Operation

Being designed to cater for the requirements of typical LCMS applications, the 'NM32LA' was developed to provide a reliable source of nitrogen in the laboratory. The 'NM32LA' is unique in that it features internal air compressors, while offering a low noise, low vibration solution for the laboratory without emitting excess heat.

Nitrogen is generated from ambient air. The internal air compressors feed the air through a nitrogen membrane which separates gases by the principle of selective permeation across the nitrogen membranes wall. For nitrogen polymeric membranes, the rate of permeation of each gas is determined by its solubility in the nitrogen membrane material, and the rate of diffusion through the molecular free volume in the nitrogen membrane wall. Gases that exhibit high solubility in the nitrogen membranes, and gases that are small in molecular size, permeate faster than larger, less soluble gases.

'Fast' gases permeate through the membrane wall more readily than 'slow' gases, thus separating the original gas mixture into two streams. With nitrogen being a slow gas, it passes through the membrane, while other gases contained in Air (CO₂ and O₂) permeate through the membrane wall and are vented back to atmosphere.

Installation & Set Up

The 'NM32LA' is designed as a plug & play system and can easily be installed by the end user.

However, Peak Scientific and their local representatives offer installation of their products by Peak Qualified Engineers. Installation by Peak Qualified Representatives is generally recommended and is highly advisable where the generator is not to be installed adjacent to the LCMS Application.

Site Preparation

The 'NM32LA' generator is designed for indoor use only and should only be installed adjacent to the Mass Spectrometer it is supplying. If this is not convenient then the unit can be sited elsewhere, however, consideration should be given to the lengths of pipe runs as pressure drops can result from extended runs of pipe.

Performance of the 'NM32LA' generator, like all sophisticated equipment, is affected by ambient conditions. Continuous operation in ambient temperatures exceeding 30°C will shorten the life of the internal air compressors and affect the generator's performance.

Note should also be taken to the proximity of Air Conditioning outlets. These can sometimes give rise to 'pockets' of air with high relative humidity. Operation of the 'NM32LA' within such pockets could also adversely affect its performance.

Please ensure sufficient air flow around the unit. It is recommended that an air gap of 75mm (3") should be maintained down both sides, at the rear and across the top of the unit.

The unit must always be placed on a level surface. Failure to do so will affect the performance of the generator.

System Start Up

With the 'NM32LA' installed, disconnect the outlet port from the instrument (ensuring that any internal pressure has been safely dissipated) and switch generator on. The initial Purge Run should be conducted for a period of 30 minutes prior to connecting the tubing to the output ports on the rear of the generator.

Once the generator is switched on, the operation of the generator will go through the

following sequence:

1. Fans at the rear of the generator will start after 3 seconds
2. Solenoid valve will energise to vent any residual pressure from the compressor heads after 2 seconds
3. Compressor No 1 will start after 1 second
4. Compressor No 2 will start after a further second

The total time for start up is 7 seconds.

Once the generator has gone through this sequence pressure will start to build in the internal storage tanks. This can be monitored by watching the output pressure gauge on the front panel climb. This will climb to the factory set pressure as noted in the generator specifications.

Once this pressure is reached the compressors will continue to run until the internal tank upper pressure limits is reached and the compressor has run for a period of 3 minutes (or more).

The compressors will then rest until the internal tank lower pressure limit is reached. Once this limit is reached the compressors will switch back on again. This compressor cycling is normal and will continue throughout the operation of the Generator.

When the system has been operated for a period of 30 minutes, all the internal pipe-work and storage tanks will have been purged with clean Nitrogen.

On completion, the generator will be fully operational and should require no further intervention.

Note: Once the tubes are connected to the Mass Spectrometer, ensure that they are thoroughly checked for being leak- tight. Even the slightest leak in the gas supply between the generator and the Mass Spectrometer can lead to a reduction in efficiency.

Start Up Kit

- | | |
|----|-------------------------------|
| 1x | 8mm Hex Key |
| 1x | 6mm Push Fit Tube Fitting |
| 2x | 1/4" Compression Tube Fitting |
| 1x | 2m 6mm Grey Tubing |
| 1x | 4m 1/4" Teflon Tubing |
| 1x | C19 Mains Cable (UK) |
| 1x | C19 Mains Cable (Euro) |
| 1x | C19 Mains Cable (US) |

Operator Training

The 'NM32LA' Laboratory Gas Generator is designed specifically to minimize operator involvement. Given that the system is installed as described in the user manual and is serviced in accordance with the specified maintenance recommendations, then it should simply be a matter of turning the generator on.

The generator will automatically produce the factory default flow and pressure:

NITROGEN 32 litres per min (ATP) 100 psig

These flows and pressures are greater than the stated requirements of your instrument and been set to allow for pressure drops between the generator and the instrument, ensuring the Mass Spectrometer is supplied with the required pressures and flows. These settings have been approved by LCMS Manufacturers.

The 'NM32LA' produces gas on demand. If the Mass Spectrometer is operating and requires gas flow, the generator will supply this to suit the requirements of the Mass

Spectrometer.

If the Mass Specs' requirement for gas stops, the generator will also stop. If the demand from the Mass Spec starts again, the generator will detect the demand for gas and will automatically start again to suit the demand.

The 'NM32LA' is designed for the internal compressors to cycle. This cycling reduces the duty (run time) on the compressors. The rate at which they cycle will be dependent on the gas required to satisfy the demand of the Mass Spec. If the Mass Spec demands the maximum gas flow of the 'NM32LA', the compressor duty will be higher. If the Mass Spec demand is lower than the maximum gas flow, then the duty on the compressors will decrease. If the generator is installed in an extreme environment or is subjected to low supply voltage or high altitude the compressors may undergo periods where they do not cycle.

The only additional tasks required are:

Unusual Operation

If at any time the generator begins to emit excessive noise or vibration, then it should be switched off and you should contact your authorised service provider or Peak Scientific as soon as possible.

System Drain

Please ensure that the drain port at the rear of the compressor is led to a suitable connection or container. It should be noted that the generator will expel considerable amounts of water from this port. If a container is used it should be emptied at regular intervals.

Note: The container must not have an airtight seal.

Service

Ensure that the generator is serviced in accordance with the maintenance recommendations. The information is also made available as a download from the Peak Scientific Website on:

www.peakscientific.com

Maintenance

Due to the simplicity of the design and the small number of moving parts in the 'NM32LA', the generator will have a long and trouble free life. However, the components mentioned below should be replaced to maintain optimum performance levels and maximum runtime.

Failure to follow the prescribed maintenance will invalidate the product warranty.

Schedule & Parts

Servicing and/ or repair of the generator should only be undertaken by a TECHNICALLY COMPETENT PERSON with the generator safely isolated.

Service Interval	Component	Part No
12 months	2x Coalescer Filter Element	00-4499
	1x Compressor Inlet Filter Element	02-4640
	1x Reverse Active Carbon Filter Element	00-4425

The above service parts are available as a Peak Scientific Annual Service Kit, offering a single part number containing all maintenance parts required for this gas generator, whilst giving the added benefit of cost saving over buying the parts separately.

Purchase Interval	Component	Part No
12 months	Annual Service Kit NM32LA	08-4780

In addition to regular filter changes, the 'NM32LA' requires service/ replacement of the internal compressor. To aid the identification of the compressor service requirements, Peak Scientific has programmed their generators to indicate the Compressor Service Stages.

Compressor Service Indication

The NM32LA Gas Generator monitors and counts the accumulative run- time (in hours) for the internal compressors and Peak Scientific has programmed the generator to go through the following Service Indication Stages:

Compressor Service Stage 1

Once the compressors reach a total of 3,000 hours the service LED indicator (yellow) in the front of the generator will light.

This is to make the user aware that a service of the generator is due and should be planned at the earliest convenience. The generator will continue to operate as normal with the LED on.

Compressor Service Stage 2

If the service is not completed the Generator will continue to run. Once the compressors reach a total of 4,000 hours, the service LED indicator (yellow) will start to flash.

This is to make the user aware that the service of the generator is now overdue and must be completed immediately to ensure the continuous operation of the generator.

Service Interval	Component	Part No
every 4,000 hours or 12 months	Compressor Service Kit	06-5529
	Compressor Replacement Assembly	08-8141

Please note that this service/ replacement interval may be shortened by extreme ambient conditions, such as heat, high relative humidity, altitude and excessive use of the generator, being the most prominent examples.

Compressors can be re- fitted as an alternative to replacements up to a maximum of 3 times, this is a more cost effective solution however a degree of technical expertise is required.

Recommended Spare Parts

Though Peak Scientific anticipates that the Spare Parts used to fulfil the generators maintenance requirements should be all parts required throughout the lifetime of the 'NM32LA', it may be advisable for any authorized service staff to have the following parts available.

Part Description	P/N	Part Description	P/N
Compressor Inlet Filter Element	02-4640	Silencer	02-1016
Coalescer Filter Element	00-4499	Power Supply, 24 VDC 211A	04-4543
Reverse Active Carbon Filter Element	00-4425	Pressure Relief Valve	02-1220
Annual Service Kit (contains items	08-4779	3-2 Solenoid Valve, universal, 24	02-5494
Large THI Compressor Service Kit	06-5529	2-2 Solenoid Valve, 24 VDC	02-5504
Large THI Replacement Compressor	06-5522	Non Return Valve	02-5473
Large Compressor Anti- Vib Mounts	06-6173	Nitrogen Membrane	06-4418
Replacement Compressor Assembly	08-8141	Non Return Valve	02-4546
Elbow 1/4 BSP	02-4402	Filter, Carbon	02-4552
Capacitor	04-4472	Filter, Coalescing	02-5432
Elbow 10MM	02-5451	Pressure Regulator	02-1110
Compressor Braided Hose	02-1105	Pressure Release Valve, 11 bar	02-4544
Reducing Bush	02-1051	Flow Controller Valve	02-4207
Pressure Switch, 24V	04-4526	Indicator LED (red)	04-4550
Pressure Gauge (0-200psi)	02-4598	Indicator LED (yellow)	04-4551
PLC, 24 VDC	04-4557	120mm Fan	04-1021
PLC Display	04-4558	Compressor Socket	04-4449
Relay Base	04-4533	Exhaust Silencer	02-4287
Connector Triple Deck	04-1010	Compressor Inlet Filter	02-4639
10A Relay	04-4534	Circuit Breaker 4A	04-4559
Timer Relay	04-1071	Earth Connector	04-4415
Buzzer 24 VDC	04-4562	Motor Contactor	04-4544
Circuit Breaker 6A	04-4560	Elbow 1/4 BSP M-M	02-4403
Compressor Plug	04-4450		

High Duty Indication

The 'NM32LA' has a 'HIGH DUTY' indicator in the front panel. This indicator monitors the running condition of the internal compressors and illuminates when they have been operating continually for a period of 8 hours.

There are a number of extreme conditions that can affect the duty cycling of the compressors inside the 'NM32LA'. These extremes include very high ambient temperatures, low supply voltages, very high flow requirements and locations of high altitude. Any of these or a combination of a number of these extremes can be evident in a customer site. While the 'NM32LA' generator is designed to operate fully in these conditions it should be noted that the effect of these extremes can force the compressors to run continually. The compressors are fully capable of running continually with no detrimental effect. However, it should be noted that if this is the case it will increase their duty and they will reach the 3000 hour recommended service interval quicker.

HIGH DUTY INDICATION RESET

If the compressors have been operating continually for a period of 8 hours the indicator light will be illuminated. Once the compressors return to a cycling mode the indicator light will automatically switch off. There is no manual intervention required.

INDICATION OF FAULT

In most installations the 'HIGH DUTY' indicator will never be illuminated. If your 'NM32LA' generator has been operating for a significant period of time, then suddenly develops a 'HIGH DUTY' indication with no apparent change in environmental conditions or flow requirements, it may be indicative of a problem with the system such as an external leak of imminent compressor failure.

You should contact Peak Scientific or any of our authorized service providers.

It should be noted that the generator will continue to operate so long as it can maintain pressure during this indication.

Technical Support

With a proven track record of quick response times and excellent problem solving skills Peak Scientific has been rewarded with a good reputation as a first class provider of sales and after- sales to our partners and customers world- wide.

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Training

Peak Scientific offers Product Training for a variety of gas generators, including the 'NM32LA'.

Since adopting the training program for Peak Scientific, we have certified over 300 Field Service Engineers as "Peak Authorized Service Engineer".

Where the Peak branded technician training program comes into its own, it provides an in- depth understanding of the gas generator and all its individual components. As a result, all students are fully conversant with the servicing protocols, spare parts and anything else from unpacking the generator, to installation, maintenance and fault finding.

Peak Scientific branded product training is available in- house in our facilities in Scotland and takes place 6 times a year.

Though in- house training is always the preferred option, allowing trainees to gain valuable hands- on experience on units, we appreciate that the busy schedule of our partners does not always allow for additional travels to the UK. As such we also offer training courses to take place at the site of our partners, covering all aspects of generator sales & service tailored to the requirements of our partner.

To compete and meet your business objectives and achieve a healthy bottom line, its critical to maximize uptime. The training we offer will help you achieve your performance goals.

After the training your engineers will be certified to service Peak products and will receive a certificate acknowledging their achievement.

For more information or to arrange free of charge training, please contact Peak Scientific at training@peakscientific.com.

Service Plans

Peak Scientific offers two service plan options for the 'NM32LA' Generator: 'Standard' & 'Complete'.

The 'Complete' Service Plan is an all- inclusive package which ensures your customer will receive complete care throughout the duration of their service plan with no unexpected additional cost. During the course of the year a Peak Engineer or an authorized representative will carry out preventative maintenance visits and all call- out charges, labour charges and parts are included in the initial Service Plan price. In the 'Complete' Service Plan breakdown charges are also included (call- out, labour & parts) and your customer will further benefit from a priority response time.

The 'Standard' Service Plan offered by Peak Scientific is a more basic package. The Peak Engineer, or authorized representative, will carry out a service visit, when they will change consumable parts. Any other spare parts and breakdowns are, however, not included in this plan, though a discount may be applied to any charges. The response time will only be prioritised over non- plan customers.

If you require any further information or would like to purchase one of the above plans for the NM32LA, please contact Peak Scientific.

NM32LA PIP

Product Family

The 'NM32LA' is part of a product family suitable for most LC/MS Applications and as such forms part of a sell- up strategy. Depending on application and number of systems, the NM32L, N110DR and larger systems, such as the NM60L, can provide suitable alternative solutions to the 'NM32LA' for the customer.

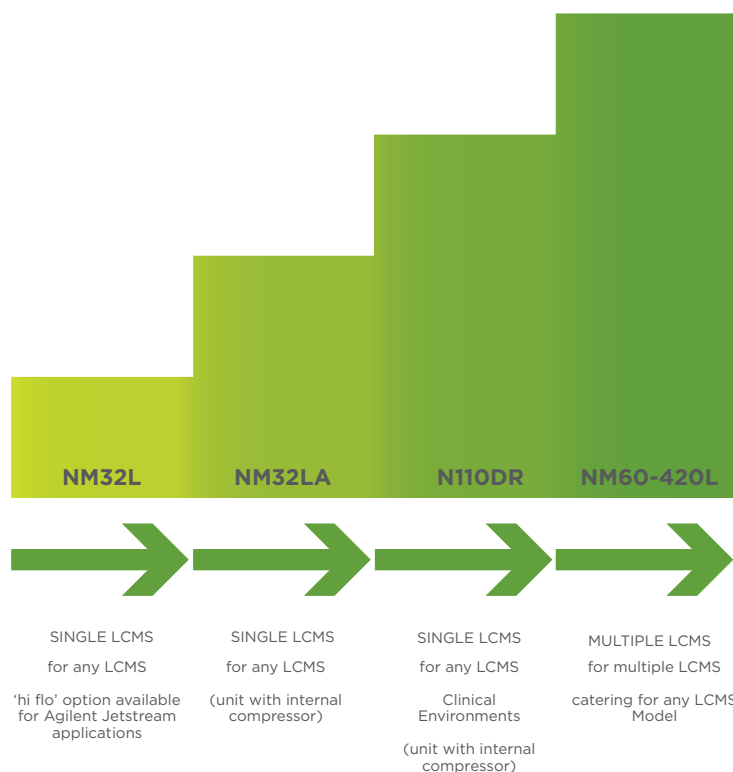


NM32L

NM32LA

N110DR

NM60-420L



Typically, the recommendation of any generator model is dependent on the following:

- Model of LCMS instrument
- Any additional applications (i.e. H-ESI attachment, Jetstream)
- Number of LCMS instruments requiring supply
- Availability of suitable in- house air supply

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