

Analytical Gas Systems

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ENGINEERING YOUR SUCCESS.

Parker Balston

Technology you can trust

Parker Balston is the leading provider of Gas Systems for the Analytical Instrument market. Generators are specifically designed to meet the stringent gas requirements for all the leading Analytical Instrument manufacturers including Agilent, ThermoFisher, Waters, Shimadzu, AB Sciex, Perkin Elmer and many others.

Utilising Parker's range of patented proprietary technologies, there are 1,000's of systems installed worldwide. These technologies offer some unique performance benefits, including guaranteed ultra high purity gas, silent operation, minimal moving parts and minimal operator attention. It is **technology you can trust.**

Improved instrument performance

Consistent gas quality and pressure improves stability and ensures greater reproducibility of results.

Convenience

No changing of gas cylinders or liquid dewars.

On-demand supply 24/7 - generate gas as and when required.

Safety

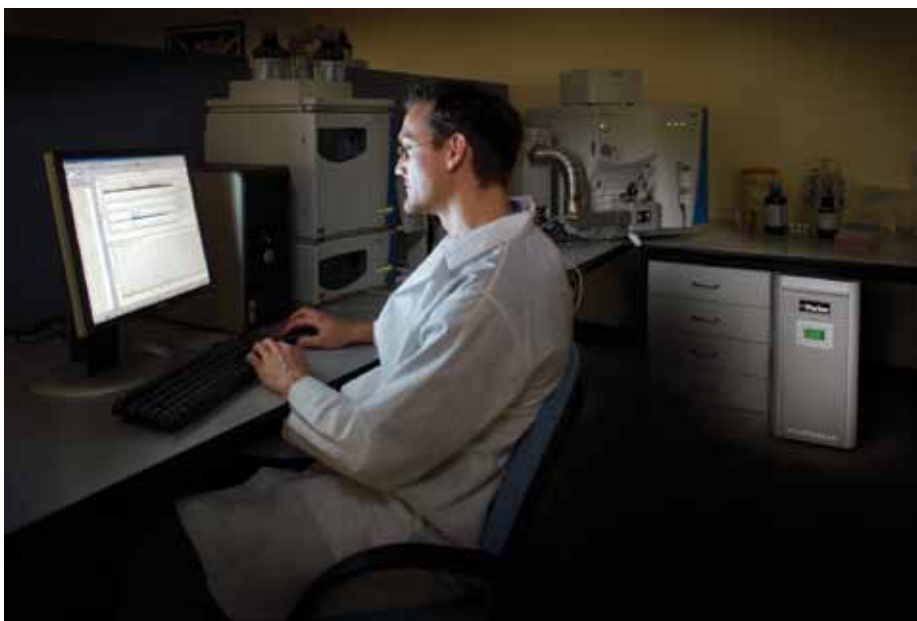
Eliminate high pressure gas cylinders and liquid dewars from your laboratory.

Eliminates manual handling, reducing Health and Safety risks.

Cost

Payback in less than 18 months. Minimal ongoing maintenance costs.

No more gas costs, delivery and rental charges.



The End for High-Pressure Gas Cylinders?



High-pressure gas cylinders are a common sight in many laboratories: a default for supplying analytical instruments with their gas requirements, high-pressure gas cylinders are familiar and provide the gas that's required, so it could be said that the old adage, 'if it isn't broke, don't fix it', could well apply.

Despite this, increasing numbers of analytical instrument users are choosing to supply their GC/FID, LC/MS and other types of instrument with gas via an analytical gas generator. Driving this decision will be a combination of factors broadly grouped into four areas; safety, cost, convenience and purity.

Safety Concerns...

High-pressure gas cylinders can provoke safety concerns in a number of different ways, some with potentially fatal consequences. The presence of high-pressure gas cylinders in the laboratory has been likened to sharing the laboratory with a potential missile. This stems from the behaviour of a cylinder that suddenly de-pressurises. There is enough force released with a European 'L' size cylinder to accelerate the cylinder to something like 66mph or 108km/h in around 1/10 seconds. Cylinders weigh in at 200lb (98kg), so there'll be enough momentum to cause some severe damage.

It's because of this potential 'missile scenario' that cylinders tend to be strapped down to something fixed. Even restrained, should a large cylinder suddenly vent its contents into the laboratory, then there are potentially fatal consequences. For example, if a high-pressure cylinder of nitrogen suddenly vented into the atmosphere of a laboratory, then more than 9,000 litres of un-breathable gas would be released.

This would dramatically reduce the oxygen content of the air – presenting the possibility of asphyxiation. The risk of oxygen displacement from the atmosphere is also associated with liquefied gases whose volume will increase as much as 1,000 fold when in the gas phase. This means liquid nitrogen dewars can also be hazardous.

If the gas suddenly venting was a potentially explosive gas, as in the case of hydrogen, the result could be much more dramatic. Hydrogen will form an explosive mixture at just 4% volume in air.

These possibilities are the life threatening safety concerns associated with high-pressure gas cylinders. However, there is still the potential for other non-fatal injuries. The practice of rolling cylinders on their bottom edge comes with the risk of trapping toes or feet. With the 'smaller' cylinders there is also potential for heavy lifting injuries when being placed on a bench top.

Costs Increase Whilst Convenience and Purity are Reduced...

With high pressure cylinders the storage requirements are dictated by safety concerns, such as separating hydrogen cylinders and cylinders of oxidising gases. These often result in cylinders being some distance from where the gas is used and hence long gas lines. Whilst the longer gas lines result from the positioning of cylinders for safety concerns, the impact will be in the areas of cost, convenience and purity.

With any gas line there is the potential for leaks, and the longer the line the greater the potential. Hence the requirement to regularly leak-check the gas supply line – this both increases costs and decreases convenience - whilst leaks allow gas to escape and also allow impurities to enter the gas supply, which reduces purity and influences the accuracy of any analysis.

A Smarter Choice...

Analytical gas generators can remove the requirement for high-pressure cylinder users. Analytical gas generators are typically placed next to the instrument they're servicing. This removes any need for extended gas lines and with them associated problems impacting on purity, cost and convenience.

There are inherent features both in the design and the way in which generators operate which offer clear compelling reasons to switch from high-pressure gas cylinders. The latest gas generators utilise

new technologies including membranes, adsorbents and catalysts to produce ultra high purity gases. Generators are designed to be used at the point of use, simplifying and minimising the amount of pipe work, and guaranteeing ultra high purity gas reaching the instrument.

The generators are designed to run continuously with minimal annual maintenance and therefore minimal disruption to the gas supply. This all but eliminates the introduction of impurities, which can be reduced further by the installation of in line purifiers.

Increased Safety...

High-pressure gas cylinders will contain gas which is at a pressure of 200 to 300 times atmospheric pressure, and gas which is released to atmospheric pressure would have a volume in the region of 9,000 litres. Analytical gas generators operate at a fraction of this pressure and have very low volumes of stored gas within them. One of Parker Balston's market leading hydrogen generators, for example, will have just 50 ml of stored gas, which will be at a maximum of around 4 times atmospheric pressure. Hence the missile concern is removed with a generator, and there's no large volume of gas to suddenly vent and make the atmosphere potentially explosive or deficient of life-supporting oxygen. Additional safety features are also incorporated in the design; for example, in Parker Balston hydrogen generators there are leak detection auto shut-off devices.

Increased Convenience...

High-pressure gas cylinders will require regular replacement. Gas cylinders running out part way through analysis will result in unplanned downtime, and a replacement cylinder has to be collected and the old one removed which brings manual handling and safety concerns. After the new cylinder has been connected restarting the instrument, and waiting for stable baseline and re-calibration, are required before samples can be run. Life is more convenient with



(continued)



a gas generator as there's no unplanned downtime. Analytical gas generators only require simple quick maintenance which can be planned for – they don't unexpectedly run-out of gas halfway through analysis.

Increased Purity...

Analytical gas generators provide a constant source of gas. This removes the variations in purity between cylinders, helping to improve sensitive analysis. Purity is also preserved because there is no chance for impurities to enter the gas pipes, which may happen as cylinders are switched and regulators changed-over.

Reduced Cost...

High-pressure gas cylinders can also prove to be costly: typical payback periods on analytical gas generators are short – sometimes less than one year. The cost of using high pressure cylinders is not just the cost of the gas itself but other charges, some of which can be seen and others which are hidden. Cylinder rental and delivery charges are readily apparent, however there's also hidden costs. These must also be included to reveal the true cost.

Analytical gas generators do not have the hidden costs of cylinders. There are no recurring costs with generators for activities such as ordering replacement cylinders, there are no storage costs for the spare and empty cylinders, and there is no cost of lost productivity through the need to stop and replace cylinders.

Innovative Technology...

Parker Balston analytical gas generators are world renowned for their reliability, dependability and long life. Since commercializing their first laboratory scale analytical gas generator in the 1980s, Parker Balston now serve an installed customer base of over 40,000 gas generator users globally.

Part of the reason behind this is the unique innovative technology employed in Parker Balston's generators, from proprietary hollow fibre nitrogen generating membranes, to the use of palladium hydrogen purifiers.

A Smarter Choice for LC/MS...

Providing nitrogen for uses such as LC/MS, Parker Balston's hollow fibre membrane nitrogen generators represent state-of-the-art technology. The membrane simply and efficiently separates compressed air into nitrogen and an oxygen rich permeate stream – which contains other unwanted impurities such as water vapour. The membrane achieves this due to its selective permeation rates for different gases – oxygen and other unwanted constituents of the compressed air simply pass through the membrane at a much faster rate than nitrogen, resulting in a stream of very pure nitrogen.

These generators, when connected to an existing compressed air supply, will provide a constant supply of nitrogen with no moving parts inside the generator. This means that the generator is very

quiet whilst operating and there are minimal replacement parts. The only consumable is a pre-filter which protects the membrane, and can be changed in 5 minutes every 6 months.

A Smarter Choice for GC...

Hydrogen offers advantages for GC users when used as a carrier gas. The Van Deemter curves illustrate the wide range over which high efficiency is obtained, making hydrogen the best carrier gas for samples containing compounds which elute over a wide temperature range. The risks associated with high-pressure gas cylinders have already been outlined – hence a gas generator is the smarter choice for hydrogen. The optimised design of Parker Balston hydrogen generators take deionised water and, through electrolysis, separate the hydrogen. This is then purified using desiccants, and on some generators a hydrogen purifier, manufactured from palladium. Palladium has a unique property which permits only hydrogen to diffuse: this ensures the highest possible purity of hydrogen.

An End For Cylinders?

With the improvements that gas generators offer in the areas of safety, purity, convenience and cost there's little reason to use high-pressure gas cylinders with instruments such as GC and LC/MS. The range of Parker Balston analytical gas generators also extends its technologically innovative approach to other techniques such as FT-IR, TOC, ICP, ELSD and Atomic Absorption.

Gas Generators for GC and GC/MS

Hydrogen Generators

for Gas Chromatography
PEM (Proton Exchange Membrane)



Hydrogen on Demand, up to 510 ml/min

Ultra high purity hydrogen generators from Parker Balston are designed as hazard-free alternatives to high-pressure hydrogen cylinders. Deionised water and an electrical supply is all that is required to generate hydrogen for weeks of continuous operation.

Optional automatic water-feed is available for remote installations or where minimal operator attention is required. With an output capacity of up to 510 ml/min, one generator can supply 99.9995% pure fuel gas for up to 12 FID's or several GC's with carrier gas. The compact design allows the generators to be installed directly in the laboratory eliminating the requirement for long hydrogen lines.

Hydrogen generators are available with Remote Networking software. Remote Networking software allows up to 27 hydrogen to be activity controlled from one control PC, and facilitates true cascading capabilities.



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Product Features:

- Produces a continuous supply of 99.9995% pure hydrogen gas at up to 6.9 bar
- Designed to run 24 hours a day
- Compact, reliable and minimal maintenance
- Eliminate dangerous hydrogen cylinders from the laboratory
- 2 years standard cell warranty
- Ideal for GC combustion gas requirements

Certified Safety

Parker Balston hydrogen generators utilise an exclusive Proton Exchange Membrane to produce hydrogen on demand.

A built in sensing circuit shuts the generator down if a hydrogen leak is detected and an eightstage explosion protection system ensures the highest level of operator safety.

A sophisticated control system connected to a liquid crystal display, continuously monitors the vital operating parameters to ensure a safe and consistent performance.

That's why Parker Balston hydrogen generators meet the strict safety guidelines to be certified for CE, CSA and UL approval.

Proven Technology

Parker Balston's exclusive Proton Exchange Membrane is proven in thousands of GC installations worldwide. Maintenance requires only a few moments per year – no inconvenient extended downtime.

Simply change the deioniser cartridge every 6 months and the desiccant cartridge as required.

If contaminated water or low water levels are detected, the system activates a warning light and shuts off the generator. A small pump and environmental filters also ensure that the electrolytic cell is supplied continuously with high quality water - avoiding damage to the electrolytic membrane. Parker Balston's hydrogen generators are the most reliable hydrogen generators on the market today.

Principal Specification

Model	H2PEM-100	H2PEM-165	H2PEM-260	H2PEM-510
Purity*	99.9995%	99.9995%	99.9995%	99.9995%
Flow Rates	100 ml/min	165 ml/min	260 ml/min	510 ml/min
Outlet Connection	1/8" compression	1/8" compression	1/8" compression	1/8" compression
Delivery Pressure (Adjustable)	0.7 to 6.9 bar (+/- 0.07bar)	0.7 to 6.9 bar (+/- 0.07bar)	0.7 to 6.9 bar (+/- 0.07bar)	0.7 to 6.9 bar (+/- 0.07bar)
Remote Monitoring	Yes	Yes	Yes	Yes
Auto Water Fill	Optional	Optional	Optional	Optional
Water Quality Required	> 5 Mohm	> 5 Mohm	> 5 Mohm	> 5 Mohm
Ambient Temperature	10 to 35°C	10 to 35°C	10 to 35°C	10 to 35°C
Electrical Requirements	100-230v - 50/60Hz	100-230v - 50/60Hz	100-230v - 50/60Hz	100-230v - 50/60Hz
Power Consumption	90 Watts	160 Watts	250 Watts	500 Watts
Dimensions (H x W x D)	435 x 342 x 457 mm	435 x 342 x 457 mm	435 x 342 x 457 mm	435 x 342 x 457 mm
Weight (Shipping)	24 Kg (28)	24 Kg (28)	24 Kg (28)	24 Kg (28)

*with respect to Oxygen

Ordering Information

Description	Model Number
100 ml/min Hydrogen Generator	H2PEM-100
165ml/min Hydrogen Generator	H2PEM-165
260 ml/min Hydrogen Generator	H2PEM-260
510 ml/min Hydrogen Generator	H2PEM-510
Auto Water Fill Option	Add suffix AWF i.e. H2PEM-100-AWF
Installation Kit	IK7532
Remote Networking User Software	604971531
Remote Networking Expansion Module	604971541

Maintenance Items	Model Number	Change Frequency
Desiccant Cartridge	MKH2PEM-D	As Required
6 Month Maintenance Kit	MKH2PEM-6M	6 Months
24 Month Maintenance Kit	MKH2PEM-24M	24 Months

Hydrogen Generators

for Gas Chromatography
Palladium



Hydrogen on Demand, up to 300 ml/min

Ultra high purity hydrogen generators from Parker Balston are designed as hazard-free alternatives to high-pressure hydrogen cylinders. Deionised water and an electrical supply is all that is required to generate hydrogen for weeks of continuous operation.

Automatic water-feed is available as standard for remote installations or where minimal operator attention is required. With an output capacity of up to 300 ml/min, one generator can supply 99.99999% pure fuel gas for up to 7 FID's or several GC's with carrier gas or several GC/MS with carrier gas.



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Product Features:

- Produces a continuous supply of 99.99999% pure hydrogen gas at up to 4.1 bar
- Designed to run 24 hours a day
- Ideal for carrier gas requirements for GC/MS
- Eliminate dangerous hydrogen cylinders from the laboratory
- Simple low cost annual maintenance
- Ideal for fuel and carrier gas requirements on GC-FID

Certified Safety

Parker Balston hydrogen generators utilise an exclusive palladium membrane to produce hydrogen on demand. A built in pressure transducer monitors the down stream requirements. This ensures the hydrogen generator produces only enough gas for the application keeping internal storage to an absolute minimum.

A sophisticated control system connected to a liquid crystal display, continuously monitors the vital operating parameters to ensure a safe and consistent performance.

That's why Parker Balston hydrogen generators meet the strict safety guidelines to be certified for CE, CSA and UL approval.

Proven Technology

Parker Balston's exclusive Palladium Membrane is proven in thousands of GC installations worldwide.

Maintenance requires only a few minutes per year - no inconvenient extended downtime. Simply change the electrolyte every 12 months.

Hydrogen gas is produced by electrolytic dissociation of water. The resultant hydrogen stream then passes through a palladium membrane to ensure ultra high purity.

Only hydrogen and its isotopes can penetrate the palladium membrane; therefore, the purity of the output gas is consistently 99.99999+%.

Principal Specification

Model	H2PD-150	H2PD-300
Purity	99.99999+%	99.99999+%
Flow Rates	150 ml/min	300 ml/min
Outlet Connection	1/8" compression	1/8" compression
Delivery Pressure (Adjustable)	0.7 to 4.1 bar	0.7 to 4.1 bar
Auto Water Fill	Yes	Yes
Water Quality Required	> 5 Mohm	> 5 Mohm
Ambient Temperature	10 to 35°C	10 to 35°C
Electrical Requirements	230VAC - 50Hz	230VAC - 50Hz
Power Consumption	200 Watts	200 Watts
Dimensions (H x W x D)	580 x 300 x 300 mm	580 x 300 x 300 mm
Weight (Shipping)	23 Kg (26)	23 Kg (26)

Ordering Information

Description	Model Number
150 ml/min Hydrogen Generator	H2PD-150EU OR H2PD-150UK
300 ml/min Hydrogen Generator	H2PD-300EU OR H2PD-300UK
Installation Kit	IK7532

Maintenance Items	Model Number	Change Frequency
Electrolyte Solution	REAG-920071	12 Months

The Analysis of 16 EPA PAHs by GC/MS using Hydrogen Carrier Gas.

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Parker Hannifin Ltd

AIM

The aim of this technical paper is to optimize and produce a robust and repeatable method for the analysis of 16 EPA PAHs by GC/MS using generated hydrogen carrier gas, over helium. This yields vastly improved analytical performance with shortened run times, whilst eliminating laboratory hazards associated with high pressure vessel usage, storage and handling.

Introduction

Hydrogen is the choice of carrier gas for many applications, due to faster analysis times (compared with nitrogen and helium) with no reduction in resolution. In fact resolution is normally improved. However hydrogen's use as a GC/MS carrier gas has long been avoided. Reactions in the ion source, lack of pumping ability, and high background noise have all been cited as reasons not to use hydrogen as a carrier gas. Modern technology has to some extent allayed these concerns, but still helium continues to be used for many established methods. Generated hydrogen offers an analytically superior, cost effective and safe solution over and above cylinder fed helium.

One of the most common analytical studies performed in many environmental laboratories is the analysis of Polynuclear Aromatic Hydrocarbons (PAHs). PAHs are a group of compounds consisting of more than one benzene ring, found in fossil fuels, tar and various oils, as well as being formed by the incomplete combustion of carbon containing compounds, such as wood, coal and diesel, to name but a few.

The Environment Protection Agency (EPA) has designated 16 PAHs as primary pollutants. The detection and quantification of these compounds, especially in water and soils, is of paramount importance for human health and the environment, due to their toxic and carcinogenic nature.

Parker Balston manufacture a range of hydrogen generators providing ultra high purity hydrogen gas without the safety concerns associated with high pressure cylinders. These generators improve analytical performance, shorten run times and maximise productivity.

Analytical considerations

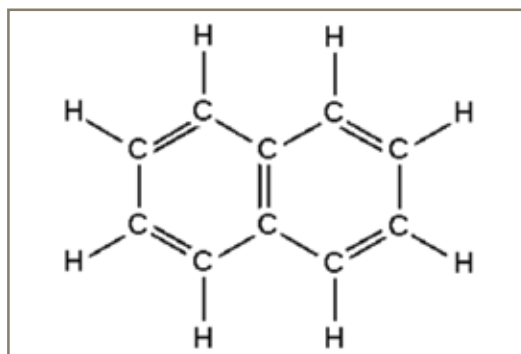
Analysis of the 16 EPA PAHs is normally carried out using GC-FID or GC/MS, with varying detection limits depending upon the medium in question and the analytical technique employed. GC/MS is favourable as it can eliminate non-required peaks, leaving only analytical information of interest, utilizing Single Ion Monitoring (SIM) mode. This is especially important in complex matrices, where peaks of similar composition may lead to false interpretation.

In any modern analytical laboratory, sample throughput and productivity are of utmost importance, where time is money.

Employing hydrogen as a carrier gas is very common in GC-FID workflows, yielding superior chromatography, as well as reduced run times. Whilst its use within GC/MS workflows is less common, with the correct conditions, it has the potential to deliver superior performance benefits over and above helium, with the added incentive of enhanced safety and cost savings.

Typical GC/MS analyses uses helium which, as well as having vagaries in supply, often at elevated cost, also necessitates the use of cumbersome, heavy, high pressure cylinders (up to 200 bar g) which must be changed on a regular basis.

A Parker Balston hydrogen generator produces ultra high purity carrier gas at a constant pressure and flow rate, with minimal stored volume, eliminating laboratory hazards associated with high pressure storage vessels, such as cylinders.



Naphthalene

Experimental

Analysis was performed on a Shimadzu QP2010s using SIM mode and splitless injection (www.shimadzu.com)

Hydrogen was supplied from a Parker Balston generator (www.parker.com/dhFNS))

Column supplied by Phenomenex - Zebron ZB5MS 0.25mm X 0.25µm (www.phenomemex.com)

Injector - 300°C
Interface - 320°C
Ion Source - 250°C
Flow rate - 3ml/min (H2)
Injection volume - 1µl

Oven Programme:-

40°C (hold 1minute)
100 °C @ 15 °C/min (hold 10 minutes)
225 °C @ 5 °C /min (hold 0 minutes)
320 °C @ 15 °C /minute (hold 2 minutes)

Total run time = 48.33 minutes

Sampling time - 1minute

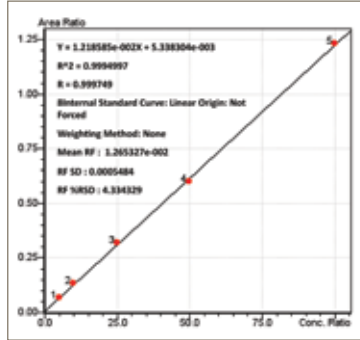
Control mode - Linear velocity

Results

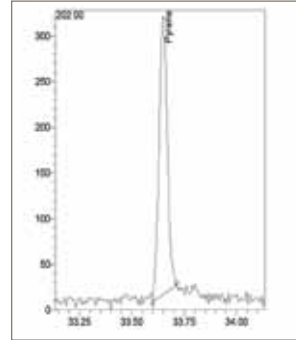
Detection limits of 1ppb were easily achieved, with excellent baseline resolution. 10 replicates were ran at this level, with typical RSD's of <0.1, and signal/noise (s/n) ratios varying between 5 and 20 (typically <10).

Standards were prepared in Dichloromethane over a range of 5 to 100ppb. Calibration over this range showed excellent linearity with all compounds being >0.995.

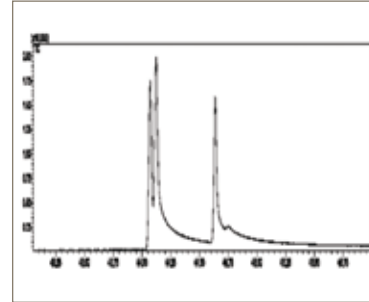
Benzo[ghi]perylene



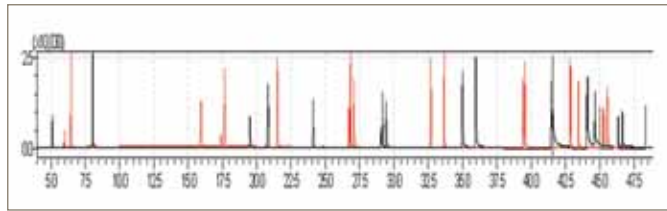
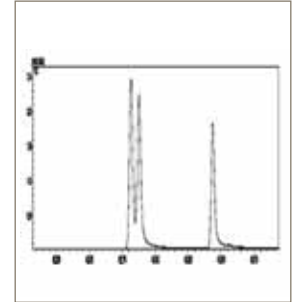
1 ppb Pyrene



Late compound tailing - Helium



Elimination of peak tailing - Hydrogen



Typically, late eluting PAHs tend to tail, sometimes quite badly, making integration difficult, and peak asymmetry poor. In the above example, you can see clearly that the use of hydrogen carrier gas minimizes tailing, making integration easier to perform

As you can see from the comparison of the two chromatograms on the left hand side, hydrogen has many advantages over helium when it comes to chromatographic performance:-

- **Shorter run times, in this case, a saving of over 5 minutes**
- **Increase in sensitivity, which is important for trace level analysis**
- **Less peak tailing of later compounds, which is important for peak integration**
- **Near baseline resolution of later co-eluting peaks**

Conclusion

In conclusion, hydrogen carrier gas, supplied by a Parker Balston generator, provides all the necessary requirements needed to perform the analysis of low level Polynuclear Aromatic Hydrocarbons by GC/MS, with many distinct advantages over helium carrier gas.

As well as the analytical benefits, safety issues are also addressed through the elimination of the containment and handling of heavy, high pressure storage vessels, not to mention the danger of running out of gas unexpectedly. Instrument downtime through loss of gas and further column damage and loss of vacuum within the GC/MS system are extremely undesirable outcomes. Moreover, the volume of stored gas in a hydrogen generator is very small, and has built in safety features in case of a leak, shutting down the flow of hydrogen, thus removing the danger of the lower explosive limit being reached.

With the price of helium ever increasing, and vagaries in supply, there is a compelling case for ultra high purity generated hydrogen as a GC/MS carrier gas. With maximized instrument uptime of prime importance to many analytical laboratories, the use of hydrogen is a viable and safe alternative over and above helium.

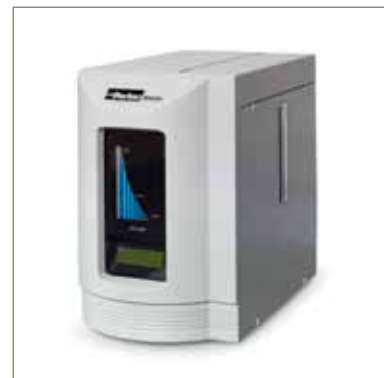
Throughout this paper we have displayed a robust, repeatable and reliable method utilizing hydrogen as a carrier gas to reduce peak tailing, lower limits of detection, provide superior baseline resolution of co-eluting compounds with excellent calibration coefficients, over much reduced analytical run times.

Acknowledgements

The author would like to thank Alan Northage/ Sarah Caldwell at Shimadzu UK (www.shimadzu.com) and Louise Earley at Phenomemex (www.phenomenex.com)

FID Gas Generators

for Gas Chromatography



FID Gas on Demand, up to 250 ml/min H₂ and 2,500 ml/min Air

The Parker Balston FID Gas Station's combines two gas generators in one enclosure to supply all your FID gas requirements from one generator. The generators can produce up to 250 ml/min of high purity hydrogen and 2,500 ml/min of high purity, <0.05ppm THC, air. Each system is capable of supplying up to six FID's.



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Product Features:

- Produces a supply of 99.9995% pure hydrogen and 0.05ppm THC Air
- Eliminate dangerous hydrogen cylinders from the laboratory
- Supplies the gas requirements for up to six FID's
- Designed to run 24 hours a day
- Compact, reliable and minimal maintenance
- Simple annual maintenance

Zero Air on demand, up to 2,500 ml/min

Compressed air is pre filtered down to 0.01 micron and then purified using a state-of-art combined heated catalyst module.

The resultant air is free of total hydrocarbons (THC) to <0.05ppm making it ideal for all FID applications. The low levels guarantee a low signal to noise ratio, ensuring a flat constant base line with no peaks or fluctuations.

There are no moving parts and no noise making the generator extremely reliable and ideal to install in the laboratory. Simple and quick to install the Zero Air Generator requires maintenance just once per year.

Hydrogen on demand, up to 250 ml/min

Deionised water is all that is required to generate hydrogen for weeks of continuous operation. The generators utilises a proprietary Proton Exchange Membrane to produce hydrogen on demand.

A sophisticated control system, connected to a LCD continuously monitors the vital operating parameters to ensure a safe and consistent performance.

Parker Balston Proton Exchange Membrane is proven in 1,000's of GC installations worldwide. Maintenance requires only a few moments per year - no inconvenient extended downtime. Simply change the deioniser cartridge every 6 months and the desiccant as required.

Principal Specification

Model	FID-1000		FID-2500	
	Hydrogen	Zero Air	Hydrogen	Zero Air
Gas	Hydrogen	Zero Air	Hydrogen	Zero Air
Purity	99.9995%	< 0.05ppm THC	99.9995%	< 0.05ppm THC
Flow Rates	90 ml/min	1,000 ml/min	250 ml/min	2,500 ml/min
Outlet Connection	1/8" compression	1/8" compression	1/8" compression	1/8" compression
Delivery Pressure	4.1 bar	2.7 to 8.5 bar	4.1 bar	2.7 to 8.5 bar
Water Quality Required	> 5 Mohm	N/A	> 5 Mohm	N/A
Ambient Temperature	10 to 35°C			
Electrical Requirements	230VAC - 50Hz			
Power Consumption	460 Watts			
Dimensions (H x W x D)	502 x 324 x 575 mm			
Weight (Shipping)	24 Kg (28)			

Ordering Information

Description	Model Number
90 ml/min Hydrogen / 1000 ml/min Zero Air	FID-1000EU OR FID-1000UK
250 ml/min Hydrogen / 2500 ml/min Zero Air	FID-2500EU OR FID-2500UK
Installation Kit	IK7532

Maintenance Items	Model Number	Change Frequency
Resin Bed Cartridge	B02-0323	6 Months
Desiccant Cartridge	1647727	As required
Maintenance Kit Zero Air	MK7583	12 Months
Maintenance Kit FID 1000 and 2500 (Includes 1647727, B02-0323 and MK7583)	MKFID1000	12 Months / As required

Zero Air Generators

for Gas Chromatography



Zero Air on demand, up to 30,000 ml/min

The Parker Balston Zero Air Generator can produce up to 30,000 ml/min of high purity zero grade air. Compressed air is pre filtered down to 0.01 micron and then purified using a state-of-art combined heated catalyst module.

There are no moving parts and no noise, making the generator extremely reliable and ideal to install in the laboratory. Simple and quick to install, the Zero Air Generator requires minimal maintenance just once a year.

The resultant air is free of total hydrocarbons (THC) to < 0.05ppm making it ideal for all FID applications. The low levels guarantee a low signal to noise ratio, ensuring a flat constant base line with no peaks or fluctuations.



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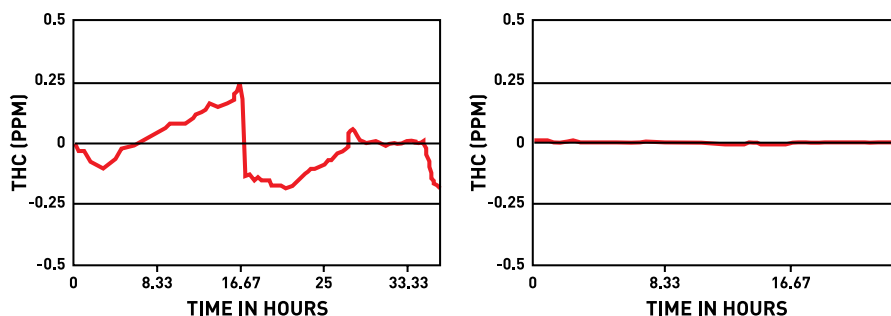
www.parker.com/dhFNS

Product Features:

- Ultra high purity air for GC FID applications
- Payback period typically less than one year
- Silent operation and minimal operator attention required
- Eliminate inconvenient and potentially dangerous air cylinders from the laboratory
- Models available to service up to 75 FID's
- Increases the accuracy and repeatability of analysis

The chromatograms compare baselines produced by a Parker Balston Zero Air Generator and cylinder air.

The baseline produced by the Parker Balston Generator is very flat, with no fluctuations or peaks, in comparison with the chromatogram of the cylinder air supply, which has many peaks ranging from 0.25 ppm to -0.25 ppm.



Principal Specification

Model	75-83	HPZA-3500	HPZA-7000	HPZA-18000	HPZA-30000
Purity	< 0.1ppm THC	< 0.05ppm THC	< 0.05ppm THC	< 0.05ppm THC	< 0.1ppm THC
Flow Rates	1,000 ml/min	3,500 ml/min	7,000 ml/min	18,000 ml/min	30,000 ml/min
Number of FID's*	Up to 2	Up to 8	Up to 17	Up to 45	Up to 75
Inlet Pressure	2 to 8 bar	2 to 8 bar	2 to 8 bar	2 to 8 bar	2 to 8 bar
Drop-Clean Pressure	0.6 bar	0.6 bar	0.6 bar	0.6 bar	0.6 bar
Inlet Connection	1/4" NPT (Female)	1/4" NPT (Female)	1/4" NPT (Female)	1/4" NPT (Female)	1/4" NPT (Female)
Outlet Connection	1/4" NPT (Female)	1/4" NPT (Female)	1/4" NPT (Female)	1/4" NPT (Female)	1/4" NPT (Female)
Ambient Temperature	10 to 35°C	10 to 35°C	10 to 35°C	10 to 35°C	10 to 35°C
Electrical Requirements	230VAC - 50Hz	230VAC - 50Hz	230VAC - 50Hz	230VAC - 50Hz	230VAC - 50Hz
Power Consumption	150 Watts	220 Watts	220 Watts	440 Watts	440 Watts
Dimensions (H x W x D)	250 x 300 x 80 mm	420 x 270 x 340 mm	420 x 270 x 340 mm	420 x 270 x 340 mm	420 x 270 x 340 mm
Weight (Shipping)	2 Kg (3)	16 Kg (19)	16 Kg (19)	16 Kg (19)	16 Kg (19)

*400 ml/min per FID

Ordering Information

Description	Model Number
1,000 ml/min Zero Air Generator	75-83EU or 75-83UK
3,500 ml/min Zero Air Generator	HPZA-3500EU or HPZA-3500UK
7,000 ml/min Zero Air Generator	HPZA-7000EU or HPZA-7000UK
18,000 ml/min Zero Air Generator	HPZA-18000EU or HPZA-1800UK
30,000 ml/min Zero Air Generator	HPZA-30000EU or HPZA-30000UK
Installation Kit	IK76803

Maintenance Items	Model Number	Change Frequency
Maintenance Kit for Model 75-83	MK7583	12 Months
Maintenance Kit for Models HPZA-3500, HPZA-7000, HPZA-18000, HPZA-30000	MK7840	12 Months

Explosion Proof Zero Air Generators

for Process GC-FID



Zero Air on demand, up to 650 ml/min

The Parker Balston explosion proof zero air generators are a complete system with carefully matched components engineered for easy installation, operation and long term reliability. They are designed to transform standard compressed air into a safe supply of hydrocarbon free (< 0.1ppm) zero grade air.

The explosion proof zero air generators are an ideal alternative to high purity air cylinders used on process GC-FID's in explosive environments. Simply connect to the GC-FID to ensure a low baseline signal to noise ratio resulting in consistent, accurate and reliable analysis. Payback periods are typically less than one year.



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Product Features:

- Produces a supply of high purity air for process GC-FID's in explosive environments
- Payback periods typically less than one year
- Compact design mounts directly to Unistrut® framing
- CENELEX Certification LCIE 03 ATEX 6232: Code EEX of 11B and H₂ T6, Category 112G
- CENELEX standard: EN 50014: 1997 +A1, A2, EN 50018: 2000
- Compact, reliable, no moving parts and minimal maintenance

The housing is a standard Crouse-Hinds explosion proof enclosure designed to operate in a Class 1, Division 1, groups B,C and D environments.

The intervals are all stainless steel to resist corrosion in the most hazardous environments.

The Parker Balston explosion proof zero air generators meet and exceed the CENELEX and ATEX requirements. Zero air is produced by utilising heated catalyst technology.

We recommend to pre filter instrument quality air with high efficiency coalescing filters to remove all contaminants down to 0.01 micron.

Compressed air flows across the heated catalyst to remove hydrocarbons to <0.1ppm. Finally the air passes through a combined filter / flame arrestor to ensure that the outlet air is particulate free.

Simply connect the Zero air generator to the process GC-FID for consistent reliable analysis.

Principal Specification

Model	75-82EU-220	75-82EU
Purity	< 0.1 ppm Hydrocarbons	< 0.1 ppm Hydrocarbons
Flow Rates	650 ml/min	650 ml/min
Inlet Pressure	2.8 to 8.6 bar	2.8 to 8.6 bar
IP Rating	IP54	IP54
Internal Components	Stainless Steel	Stainless Steel
Outlet Flame Arrestor	Included	Included
Maximum Hydrocarbon at Inlet	50 ppm	50 ppm
Ambient Temperature	4 to 38°C	4 to 38°C
Electrical Requirements	230VAC - 50Hz	110VAC - 60Hz
Power Consumption	60 Watts	60 Watts
Dimensions (H x W x D)	180 x 340 150 mm	180 x 340 150 mm
Weight (Shipping)	11 Kg (13)	11 Kg (13)

Ordering Information

Description	Model Number
Explosion Proof Zero Air Generator - 220V	75-82EU-220
Explosion Proof Zero Air Generator - 110V	75-82EU

Maintenance Items	Model Number	Change Frequency
Replacement Final Filter 75-82EU-220 and 75-82EU	13299	12 Months
Replacement Catalyst Module for 75-82EU-220	75398-220	12 Months
Replacement Catalyst Module for 75-82EU	75398	12 Months

UHP Zero Nitrogen Generators

for GC carrier gas and make up applications



Nitrogen on demand, up to 3,200 ml/min

The Parker Balston Ultra High Purity (UHP) Zero Nitrogen Generators are engineered to transform standard compressed air in to a safe regulated supply of 99.9995% pure nitrogen, with <0.1ppm of hydrocarbons

Typical applications include GC make up gas and carrier gas, including ECD (Electron Capture Detector), DSC (Differential Scanning Calorimeter) and virtually any analytical instrument that requires a small flow of ultra high purity zero nitrogen.

Innovative design features include integral compressors with economy mode as standard. This extends compressor life and reduces ongoing running costs.



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Product Features:

- Produces a continuous supply of ultra high purity organic free nitrogen at 99.9995% purity
- Ideal for make-up and carrier gas applications including ECD
- Eliminate dangerous nitrogen cylinders from the laboratory
- Integral oil free compressors with noise reduction technology
- Economy mode: increasing compressor life and reducing ongoing running costs
- Designed to run 24 hours a day

Nitrogen is produced by utilising a combination of filtration and pressure swing adsorption (PSA) technology. Standard compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron. For ultra sensitive applications such as ECD, units also include the addition of a heated catalyst module to ensure hydrocarbons are removed to < 0.1ppm.

The air then passes through two columns filled with carbon molecular sieve (CMS) which adsorb O₂, CO₂, moisture and hydrocarbons. These are desorbed to atmosphere during the pressure swing cycle leaving a supply of ultra pure nitrogen.

Principal Specification

Model	UHPZN2-1100	UHPZN2-1100C	UHPZN2-3200	UHPZN2-3200C
Purity	99.9995%	99.9995%	99.9995%	99.9995%
Hydrocarbon concentration	<0.1ppm	<0.1ppm	<0.1ppm	<0.1ppm
CO Concentration	<1ppm	<1ppm	<1ppm	<1ppm
CO2 Concentration	<1ppm	<1ppm	<1ppm	<1ppm
H2O Concentration	<1ppm	<1ppm	<1ppm	<1ppm
Flow rates	1100ml/min	1100ml/min	3200ml/min	3200ml/min
Inlet pressure	8-9.9 bar	N/A	8-9.9 bar	N/A
Integral compressor	No	Yes	No	Yes
Outlet pressure	5 bar	5 bar	5 bar	5 bar
Inlet connection	1/4"	N/A	1/4"	N/A
Outlet connection	1/8" BSPP	1/8" BSPP	1/4" BSPP	1/4" BSPP
Ambient temperature	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C
Electrical requirements	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz
Power Consumption	720 Watts	1250 Watts	720 Watts	1250 Watts
Dimensions (HxWxD)	869x345x667mm	869x345x667mm	869x345x667mm	869x345x667mm
Weight	86	96	86	96

Ordering Information

Description	Model Number
1,100 ml/min Zero UHP Nitrogen Generator	UHPZN2-1100
1,100 ml/min Zero UHP Nitrogen Generator with integral compressor	UHPZN2-1100C
3,200 ml/min Zero UHP Nitrogen Generator	UHPZN2-3200
3,200 ml/min Zero UHP Nitrogen Generator with integral compressor	UHPZN2-3200C
Installation Kit	IK7694

Maintenance Items	Model Number	Change Frequency
Filter Kit - all non compressor models	MKUHPZN2-FK	12 months
Filter Kit - All compressor models	MKUHPZN2CL-FK	12 months
Compressor Kit 230V - All models	MKN2-CK230L	4,000 hours or 12 months (which ever comes sooner)

Ultra High Purity Nitrogen Generators

for GC and other analytical applications



Nitrogen on demand, up to 3,200 ml/min

The Parker Balston Ultra High Purity (UHP) Nitrogen Generators are engineered to transform standard compressed air in to a safe regulated supply of 99.9995% pure nitrogen.

Typical applications include GC make up gas, solvent evaporation, DSC (Differential Scanning Calorimeter) and virtually any analytical instrument that requires a small flow of ultra high purity nitrogen.

Innovative design features include integral compressors with economy mode as standard. This extends compressor life and reduces ongoing running costs.



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Product Features:

- Produces a continuous supply of high purity nitrogen 99.9995% for analytical applications
- Compact, reliable with minimal operator attention and maintenance
- Eliminate dangerous nitrogen cylinders from the laboratory
- Integral oil free compressors with noise reduction technology
- Economy mode: increasing compressor life and reducing ongoing running costs
- Designed to run 24 hours a day

Nitrogen is produced by utilising a combination of filtration and pressure swing adsorption (PSA) technology. Standard compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron.

The air then passes through two columns filled with carbon molecular sieve (CMS) which adsorb O₂, CO₂, moisture and hydrocarbons. These are desorbed to atmosphere during the pressure swing cycle leaving a supply of ultra pure nitrogen.

Principal Specification

Model	UHPN2-600	UHPN2-600C	UHPN2-800	UHPN2-800C	UHPN2-1600	UHPN2-1600C	UHPN2-3200	UHPN2-3200C
Purity	99.9995%	99.9995%	99.9995%	99.9995%	99.9995%	99.9995%	99.9995%	99.9995%
Hydrocarbon concentration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CO Concentration	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm
CO ₂ Concentration	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm
H ₂ O Concentration	<<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm
Flow rates	600ml/min	600ml/min	800ml/min	800ml/min	1600ml/min	1600ml/min	3200ml/min	3200ml/min
Inlet pressure	8-9.9 bar	N/A	8-9.9 bar	N/A	8-9.9 bar	N/A	8-9.9 bar	N/A
Integral compressor	No	Yes	No	Yes	No	Yes	No	Yes
Outlet pressure	5 bar	5 bar	5 bar	5 bar	5 bar	5 bar	5 bar	5 bar
Inlet connection	1/4"	N/A	1/4"	N/A	1/4"	N/A	1/4"	N/A
Outlet connection	1/8" BSPP	1/8" BSPP	1/8" BSPP	1/8" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP
Ambient temperature	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C
Electrical requirements	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz
Power consumption	85 Watts	606 Watts	85 Watts	606 Watts	88 Watts	698 Watts	88 Watts	698 Watts
Dimensions (HxWxD)	869x345x417mm	869x345x417mm	869x345x417mm	869x345x417mm	869x345x667mm	869x345x667mm	869x345x667mm	869x345x667mm
Weight	44Kg	50Kg	44Kg	50Kg	84Kg	93Kg	84Kg	93Kg

Ordering Information

Description	Model Number
600 ml/min UHP Nitrogen Generator	UHPN2-600
600 ml/min UHP Nitrogen Generator with integral compressor	UHPN2-600C
800ml/min UHP Nitrogen Generator	UHPN2-800
800ml/min UHP Nitrogen Generator with integral compressor	UHPN2-800C
1600ml/min UHP Nitrogen Generator	UHPN2-1600
1600ml/min UHP Nitrogen Generator with integral compressor	UHPN2-1600C
3,200 ml/min UHP Nitrogen Generator	UHPN2-3200
3,200ml/min UHP Nitrogen Generator with integral compressor	UHPN2-3200C
Installation Kit	IK7694

Maintenance Items	Model Number	Change Frequency
Filter Kit - all non compressor models	MKUHPN2-FK	12 months
Filter Kit - UHPN2-600C/800C models	MKUHPN2C-FK	12 months
Filter Kit UHPN2-1600C / 3200C models	MKUHPN2CL-FK	12 months
Compressor Kit 230V - UHPN2-600C/800C models	MKN2CK230S	8,000 hours or 24 months (which ever comes first)
Compressor Kit 230V UHPN2-1600C/3200C models	MKN2-CK230L	8,000 hours or 24 months (which ever comes first)

Nitrogen Generators

for Gas Chromatography
FID Make Up Gas



Make up Gas on Demand, up to 400 ml/min Zero Grade N₂ and 2,500 ml/min Zero Air

The Parker Balston Make up Gas Generator is available in two options, Zero Grade Nitrogen or Zero Grade Nitrogen with Zero Grade Air combined in the same enclosure. With flow rates up to 400 ml/min of Zero Nitrogen and 2,500 ml/min of Zero Air each unit can supply up to 6 GC-FID's.

The typical application is make up gas and fuel air for FID and other detectors on GC's. Make up gas efficiently sweeps the sample to the detector which results in improved peak shape and maximum sensitivity. The majority of GC manufactures instruments have the option to add make up gas to the sample flow prior to the detector.



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Product Features:

- Produces make up grade nitrogen with < 0.05ppm THC
- Improves flame shape within the FID detector and maximises sensitivity
- Eliminates dangerous and costly helium or nitrogen cylinders
- Can supply up to 6 GC-FID with FID fuel air and make up nitrogen
- Silent in operation and minimal operator attention required
- Space saving wall mount version available

Zero Grade Air

Zero Air is produced by utilising a combination of filtration and catalyst technologies. Compressed air is pre filtered down to 0.01 micron and then purified using a state-of-art combined heated catalyst module.

The resultant air is free from hydrocarbons (THC) to < 0.05ppm making it ideal for all FID applications.

The low levels guarantee a low signal to noise ratio, ensuring a flat consistent base line.

Zero Grade Nitrogen

A proportion of the Zero Grade Air is further purified by utilising membrane separation technology. The unique proprietary hollow fibre membranes separate the air into a concentrated Zero Nitrogen stream.

At 99.9999% pure with respect to hydrocarbons and 99+% in respect to oxygen, the zero grade nitrogen is ideal as a make up gas.

There are no moving parts and no noise, making the generator extremely reliable and ideal to install in the laboratory. Simple and quick to install, the make up gas generator requires minimal maintenance just once per year.

Principal Specification

Model	MGG-400	MGG-2500	
Gas	Zero Nitrogen	Zero Nitrogen	Zero Air
Purity	99.9999% THC & 99+% O ₂	99.9999% THC & 99+% O ₂	<0.05 ppm THC
Flow Rates	400 ml/min	400 ml/min	2,500 ml/min
Inlet Pressure	4.1 to 8.2 bar		
Outlet Pressure	4.1 to 8.2 bar		
Inlet Connection	1/4" NPT (female)		
Outlet Connection	1/4" NPT (female)		
Ambient Temperature	10 to 35°C		
Electrical Requirements	230VAC - 50Hz		
Power Consumption	580 Watts		
Dimensions (H x W x D)	420 x 180 x 660 mm		
Weight (Shipping)	27 Kg (30)		

Ordering Information

Description	Model Number
Make up Gas Generator - Zero N ₂ only	MGG-400EU OR MGG-400UK
Make up Gas Generator - Zero N ₂ & Zero Air	MGG-2500EU OR MGG-2500UK
Wall mount versions	Add the suffix 'W' i.e. MGGW-400
Installation Kit	IK76803

Maintenance Items	Model Number	Change Frequency
12 Month Maintenance Kit - MGG-400	MKMGG400-12	12 Months
12 Month Maintenance Kit - MGG-2500	MKMGG2500-12	12 Months

HydroGen Mate

for Hydrogen Generators



Deionised water on demand, up to 1 lpm

The Parker Balston HydroGen Mate is a complete system designed with carefully matched components engineered for easy installation, operation and long term reliability. They are engineered to transform standard tap water into a safe regulated supply of deionised water (> 5 megohms/cm), with minimal operator attention.

With flow rates up to 1 lpm they make an ideal solution as a point of use supply, for all Parker Balston hydrogen generators users who do not have access to a suitable deionised water supply.



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Product Features:

- Produces a continuous supply of high purity water for hydrogen generators
- Visual indication for cartridge change
- Compact, reliable and minimal maintenance
- Removal of organics, phosphates, chlorine, and all ionisable constituent
- Quick and easy installation, no electrical requirements
- Easy fill dispensing gun

The system is supplied ready to install complete with pre-filtration, two DI resin exchange cartridges, a final filter and dispensing gun.

Simply change the resin exchange cartridges as required for a continuous supply of ultra pure deionised water. Change times will depend on the quality of inlet water and usage.

Principal Specification

Model	72-230 and 72-231
Purity	>5 Megohm/cm - Final Filter 20 micron
Flow Rates	1 lpm
Maximum Water Inlet Pressure	3.4 bar
Maximum Water Supply Temperature	27°C
Inlet Connection	1/4" OD Tubing (Press Fitting)
Outlet Connection	Dispensing Gun
Ambient Temperature	10 to 35°C
Electrical Requirements	Not Required
Power Consumption	N/A
Dimensions (H x W x D)	460 x 310 x 70 mm
Weight (Shipping)	4.5 Kg (5.5)

Ordering Information

Description	Model Number
Complete DI Water System	72-230 or 72-231**

Maintenance Items	Model Number	Change Frequency
Maintenance Kit*	72236	12 Months

* Includes 2 each resin exchange cartridges, 1 each prefilter and 1 each final filter.

** Model 72-231 does not include dispensing gun and connects directly to generator automatic water feed port.

Gas Generators for LC/MS

NitroFlow Lab

for LC/MS



Nitrogen on demand, up to 32 lpm

The Parker Balston NitroFlow Lab is a self contained generator that produces up to 32 lpm of pure LC/MS grade nitrogen at pressures up to 8 bar. Nitrogen is produced by utilising a combination of compressor and membrane separation technologies. High and low pressure compressors are carefully matched to the hollow fibre membranes to ensure quiet and reliable operation. Oil free compressed air is passed through the unique proprietary hollow fibre membranes which separate the air into a concentrated nitrogen stream.

Typical applications include LC/MS, LC/MS/MS, nebuliser gases for APCI and ESI, ELSD, Turbo Vaps and chemical solvent evaporation. The NitroFlow Lab has been tried and tested by all the major LC/MS manufacturers.



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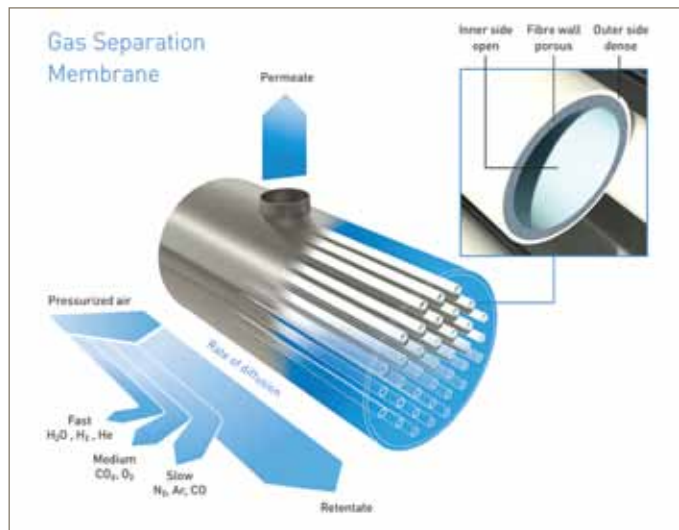
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Product Features:

- Complete “Plug and Play” system recommended by all major LC/MS manufacturers
- Produces a continuous supply of nitrogen for all LC/MS applications
- Phthalate-free, no organic vapours
- Eliminate dangerous nitrogen cylinders from the laboratory
- 8,000 hours compressor warranty
- Internal acoustic dampening ensures quiet operation

The unique combination of the dual compressor technology ensures that the NitroFlow® Lab has several unique technical advantages over all other existing LC/MS Nitrogen Generators.

Nitrogen is produced at low pressure and then compressed to 8 bar. This ensures minimal maintenance of the system with no compressed air filter replacements or waste condensate. The compressor life is guaranteed under the Parker Balston warranty for 8,000 continuous running hours, the longest currently available on the market.



Principal Specification

Model	NitroFlow Lab
Purity	99.5%
Phthalate-free	Yes
Hydrocarbon-free	Yes
Flow Rates	Up to 32 lpm
Delivery Pressure	8 bar
Outlet Connection	1/4" G (optional 6 and 8mm push fit connectors included.)
Ambient Temperature	10 to 35°C
Electrical Requirements	230VAC- 50Hz
Power Consumption	1400 Watts
Noise Level	<58 dB (A)
Dimensions (H x W x D)	700 x 310 x 900 mm
Weight (Shipping)	93 Kg (110)

Ordering Information

Description	Model Number
NitroFlow Lab - UK plug	159.004627
NitroFlow Lab - EU plug	159.003848

Maintenance Items	Model Number	Change Frequency
Maintenance Kit	159.003754	12 Months

Nitrogen Generators

for LC/MS



Nitrogen on demand, up to 228 lpm

The Parker Balston membrane nitrogen generators can produce up to 228 lpm of pure LC/MS grade nitrogen at pressures up to 8 bar. Generators are complete systems engineered to transform standard compressed air into a safe regulated nitrogen supply with minimal operator attention.

Typical applications include LC/MS, LC/MS/MS, nebuliser gases for APCI and ESI, ELSD, Turbo Vaps and chemical solvent evaporation. The membrane nitrogen generators have been tried and tested by all the major LC/MS manufactures.



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Product Features:

- Recommended and used by all major LC/MS manufacturers
- No electrical requirement, no noise, no moving parts
- Can supply up to 6 LC/MS from one generator
- Eliminates inconvenient nitrogen dewars from the laboratory
- Phthalate-free, no organic vapours
- Utilises Parker's proprietary membrane technology

Nitrogen is produced by utilising a combination of filtration and membrane separation technologies.

Unique proprietary hollow fibre membranes then separate the air into a concentrated nitrogen stream.

A house supply of compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron.

Membrane technology offers some unique performance benefits for LC/MS users including phthalate-free nitrogen, silent operation, no moving parts and no electrical requirements. 10,000's of systems are installed worldwide.

Principal Specification

Model	N2-14	N2-22	N2-35	N2-45	N2-80	N2-135
Purity	Up to 99.5 %	Up to 99.5 %	Up to 99.5 %	Up to 99.5 %	Up to 99.5 %	Up to 99.5 %
Phthalate-free	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon-free	Yes	Yes	Yes	Yes	Yes	Yes
Flow Rates	Up to 34 lpm	Up to 50 lpm	Up to 75 lpm	Up to 117 lpm	Up to 175 lpm	Up to 233 lpm
Inlet Pressure	7 to 10 bar	7 to 10 bar	7 to 10 bar	7 to 10 bar	7 to 10 bar	7 to 10 bar
Ambient Temperature	10 to 35°C	10 to 35°C	10 to 35°C	10 to 35 °C	10 to 35°C	10 to 35°C
Inlet Connection	1/4" NPT	1/4" NPT	1/4" NPT	1/2" NPT	1/2" NPT	1/2" NPT
Outlet Connection	1/4" NPT	1/4" NPT	1/4" NPT	1/2" NPT	1/2" NPT	1/2" NPT
Electrical Requirements	None	None	None	None	None	None
Number of LC/MS*	Up to 1	Up to 2	Up to 3	Up to 4	Up to 7	Up to 9
Dimensions (H x W x D)	1270 x 400 x 400 mm	1270 x 400 x 400 mm	1270 x 400 x 400 mm	1700 x 610 x 510 mm	1700 x 610 x 510 mm	1700 x 610 x 510 mm
Weight (Shipping)	30 Kg (34)	42 Kg (46)	48 Kg (52)	104 Kg (114)	104 Kg (114)	104 Kg (114)

*Based on 25 lpm at 7 bar per LC/MS

Ordering Information

Description	Model Number
Nitrogen Generator for up to 1 LC/MS	N2-14
Nitrogen Generator for up to 2 LC/MS	N2-22
Nitrogen Generator for up to 3 LC/MS	N2-35
Nitrogen Generator for up to 4 LC/MS	N2-45
Nitrogen Generator for up to 5 LC/MS	N2-80
Nitrogen Generator for up to 6 LC/MS	N2-135
Installation Kit for N2-14, N2-22, N2-35	IK7572
Installation Kit for N2-45, N2-80, N2-135	IK75880

For versions with oxygen analysers add AEU or AUK ie N2-14AEU

Maintenance Items	Model Number	Change Frequency
Maintenance Kit for N2-14, N2-22, N2-35	MK7572C*	6 Months (Kit contains 1 year supply)
Maintenance Kit for N2-45, N2-80, N2-135	75478	6 Months (Kit contains 1 year supply)
Carbon Tower for N2-45, N2-80, N2-135	75344	6 Months

*Includes Carbon Filters

TriGas Generators

for Applied Biosystems LC/MS/MS



Gas on Demand, up to 10 lpm N₂, 23 lpm Zero Air and 8 lpm Dry Air

The Parker Balston TriGas Generators are complete engineered systems designed to purify compressed air into pure nitrogen, zero grade air (0.1ppm THC) and dry (-40°C dewpoint) air. The gases exceed the purity, flow and pressure requirements for the curtain, source and exhaust gases on all Applied Biosystems LC/MS/MS instruments.

The TriGas Generators can easily be connected to an existing compressed air supply. Alternatively complete 'plug and play' systems including ultra quiet reliable scroll compressors are available.



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www.parker.com/dhFNS

Product Features:

- Specifically designed to supply curtain, source and exhaust gas for LC/MS/MS
- Purity up to 99.999% for organics
- 10,000 hour/3 year compressor warranty
- Special design ensures ultra quiet operation
- Phthalate-free nitrogen
- Complete 'Plug and Play' system approved by AB Sciex

Gas distribution is via independent stainless steel outlets carefully matched to the instrument. Integral flow and pressure control on each outlet eliminate the requirement for additional gas management systems.

The systems consist of 3 main functional technologies: proprietary nitrogen membranes, proprietary air membranes and heated catalyst module. Compressed air is pre-filtered by

high efficiency coalescing and carbon filters to remove all contaminants down to 0.01 micron.

Nitrogen membranes separate the air into a concentrated nitrogen stream, air membranes separate the moisture from the air and the heated catalyst module removes the hydrocarbons. Final absolute membrane filtration ensure optimum gas quality.

Principal Specification

Model	LCMS-5000	LCMS-5001T	LCMS-5001NT
Purity			
Curtain-Gas (Nitrogen)	99.9 %	99.9 %	99.9 %
Source Gas (UHP Zero Grade Air)	<0.1ppm Total Hydrocarbons	<0.1ppm Total Hydrocarbons	<0.1ppm Total Hydrocarbons
Exhaust Gas (Dry Air)	-40°C Dew Point	-40°C Dew Point	-40°C Dew Point
Flow Rates			
Curtain-Gas (Nitrogen)	Up to 10 lpm	Up to 10 lpm	Up to 10 lpm
Source Gas (UHP Zero Grade Air)	Up to 23 lpm	Up to 23 lpm	Up to 23 lpm
Exhaust Gas (Dry Air)	Up to 8 lpm	Up to 8 lpm	Up to 8 lpm
Includes Compressor	Yes	No	No
Delivery Pressure			
Curtain-Gas (Nitrogen)	5.5 bar	5.5 bar	5.5 bar
Source Gas (UHP Zero Grade Air)	7.6 bar	7.6 bar	7.6 bar
Exhaust Gas (Dry Air)	4.1 bar	4.1 bar	4.1 bar
Inlet Connection	Includes Compressor	3/8" Compression Fitting	3/8" Compression Fitting
Outlet Connection	1/4" SS Compression (3 off)	1/4" SS Compression (3 off)	1/4" SS Compression (3 off)
Ambient Temperature	10 to 35°C	10 to 35°C	10 to 35°C
Electrical Requirements	230VAC - 50Hz	230VAC - 50Hz	230VAC - 50Hz
Power Consumption	3000 Watts	360 Watts	360 Watts
Dimensions (H x W x D)	1090 x 1140 x 640 mm	1090 x 510 x 640 mm	1040 x 580 x 410 mm
Weight (Shipping)	256 Kg (350)	102 Kg (150)	50 Kg (94)

Ordering Information

Description	Model Number
Complete Source LC/MS TriGas Generator including compressor	LCMS-5000EU OR LCMS-5000UK
Source LC/MS TriGas Generator including receiver tank	LCMS-5001TEU OR LCMS-5001TUK
Source LC/MS TriGas Generator	LCMS-5001NTEU OR LCMS-54001NTUK
Installation Kit	IKLCMS-5000

Maintenance Items	Model Number	Change Frequency
Maintenance Kit for LCMS 5000 and 5001T	MK5028	12 Months
Maintenance Kit for LCMS 5001NT	MK5029	12 Months

NitroSource Lab

for LC/MS



Nitrogen on demand, up to 500 lpm

The Parker Balston NitroSource Lab nitrogen generator can produce up to 500 lpm of pure LC/MS grade nitrogen at pressures up to 10 bar. The generator is engineered to transform standard compressed air into a safe regulated supply of nitrogen with minimal operator attention. Pressure flow rates and purities are specifically designed to match the stringent requirements of all the latest LC/MS instruments.

Typical applications include LC/MS, LC/MS/MS, nebuliser gases for APCI and ESI, ELSD, Turbo Vaps and chemical solvent evaporation. The Nitrosource Lab technology has been tried and tested by all the major LC/MS manufactures.



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Product Features:

- Recommended and used by all major LC/MS manufacturers
- No noise, no moving parts
- Can supply up to 20 LC/MS from one generator
- Eliminate dangerous nitrogen cylinders or dewars from the laboratory
- Phthalate-Free, no organic vapours
- Utilises Parker's proprietary membrane technology

Nitrogen is produced by utilising a combination of filtration and membrane separation technologies. A supply of compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron.

Patented proprietary hollow fibre membranes then separate the air into a concentrated pure nitrogen stream. Membrane technology offers some unique performance benefits for LC/MS users including phthalate free nitrogen, silent operation, no moving parts. There are 10,000's systems installed worldwide.

Principal Specification

Model	NitroSource Lab
Purity	Up to 99%
Phthalate-Free	Yes
Hydrocarbon-Free	Yes
Flow Rates	Up to 500 lpm
Inlet Pressure	4 to 10 bar
Inlet Connection	G1 - 1 1/2" BSPP (G)
Outlet Connection	G1 - 1" BSPP (G)
Ambient Temperature	10 to 35°C
Electrical Requirements	90-250VAC / 50-60 Hz
Power Consumption	35 Watts
Dimensions (H x W x D)	1928 x 725 x 490 mm
Weight (Shipping)	165 Kg (180)

Ordering Information

Description	Model Number
NitroSource Lab for up to 16 LC/MS	159.003847
Installation Kit	IK7572

Maintenance Items	Model Number	Change Frequency
Maintenance Kit	159.003569	12 Months

Nitrogen Generators

for ELSD



Nitrogen on demand, up to 8 lpm

The Parker Balston ELSD (Evaporative Light Scattering Detector) nitrogen generator can produce up to 8 lpm of nitrogen at pressures up to 8 bar. The generator is engineered to transform standard compressed into a safe, regulated supply of nitrogen with minimal operator attention.

Pressure flow rates and purities are specifically designed to match the stringent requirements of all the ELSD instruments. The ELSD Nitrogen Generators has been tried and tested by all the major ELSD manufactures.



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Product Features:

- Produces a continuous supply of high purity nitrogen as a nebulising gas for ELSD
- No noise, no moving parts, no electrical requirements
- Utilises Parker's proprietary membrane technology
- Eliminate dangerous nitrogen cylinders from the laboratory
- Phthalate-Free, no organic vapours
- Compact design, minimal maintenance

Nitrogen is produced by utilising a combination of filtration and membrane separation technologies. A supply of compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron.

Patented proprietary hollow fibre membranes then separate the air into a concentrated nitrogen stream. Membrane technology offers some unique performance benefits for ELSD users including phthalate free nitrogen, silent operation, no moving parts and no electrical requirements. There are 10,000's of systems using Parker Balston membrane technology installed worldwide.

Principal Specification

Model	N2-04
Purity	99%
Flow Rates	Up to 8 lpm
Inlet/Outlet Connection	1/4" NPT
Inlet Pressure	4.1 to 10 bar
Ambient Temperature	10 to 35°C
Electrical Requirements	Not Required
Power Consumption	N/A
Dimensions (H x W x D)	410 x 270 x 340 mm
Weight (Shipping)	17 Kg (19)

Ordering Information

Description	Model Number
Nitrogen Generator for up to 2 ELSD	N2-04
Installation Kit	IK7572

Maintenance Items	Model Number	Change Frequency
Maintenance Kit	MK7840	12 Months

Gas Generators for Spectroscopy, TOC and evaporation

FT-IR Purge Gas Generators

for Fourier Transform-Infrared



FT-IR Purge Gas on demand, up to 85 lpm

The Parker Balston FT-IR purge gas generator is engineered to transform standard compressed air into a clean supply of dry (-73°C), CO₂ free (<1 ppm) purge gas. The FT-IR gas generators are an ideal alternative to nitrogen, producing cleaner background spectra in a shorter time.

Payback periods are typically less than one year. By removing CO₂ and water vapour the signal to noise ratio allows more accurate analysis, particularly from 1,200-2,000, 2,400 and 3,600-4,000 wave numbers.



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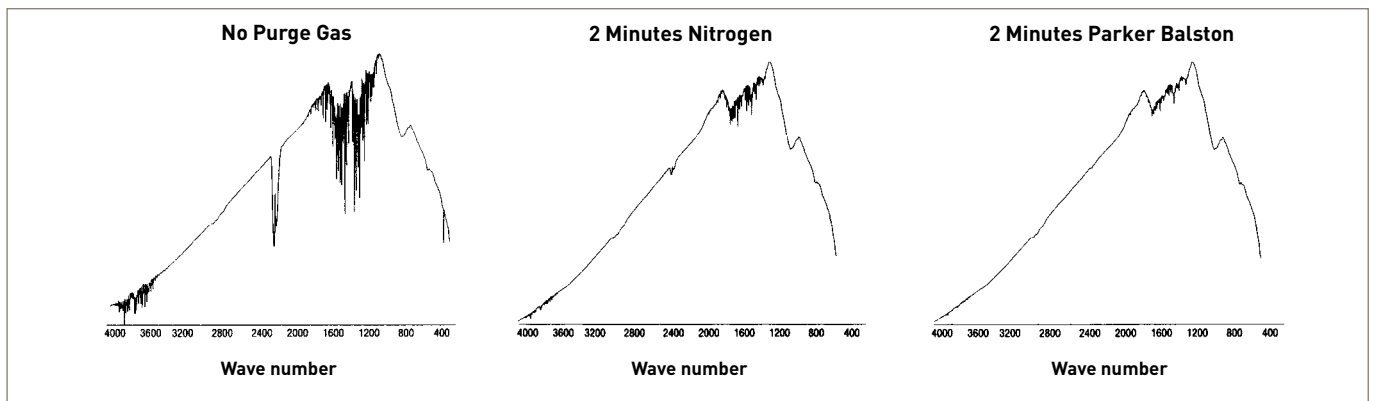
www.parker.com/dhFNS

Product Features:

- Produces a continuous supply of purge gas for FT-IR's at a fraction of the cost of nitrogen
- Can supply FTIR with microscopes and other accessories
- Eliminate costly nitrogen cylinders in the laboratory
- Recommended and used by all leading FT-IR manufacturers
- Improve signal-to-noise ratio even on non-purge systems - cleaner spectra in a shorter time
- Simple, low cost annual maintenance

FT- IR purge gas is produced by utilising a combination of filtration and pressure swing adsorption (PSA) technology. An external supply of compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01

micron. The air then passes through two columns filled with molecular sieve which adsorb moisture and CO₂. These are desorbed to atmosphere during the pressure swing cycle leaving a supply of ultra pure dry air.



Principal Specification

Model	75-45	75-52	75-62
Dewpoint	-73°C	-73°C	-73°C
Carbon Dioxide Concentration	< 1.0 ppm	< 1.0 ppm	< 1.0 ppm
Flow Rates (at 6.9 bar)	14 lpm	28 lpm	85 lpm
Inlet/Outlet Pressure	4.1 to 8.6 bar	4.1 to 8.6 bar	4.1 to 8.6 bar
Inlet Connection	1/4" NPT (Female)	1/4" NPT (Female)	1/4" NPT (Female)
Outlet Connection	1/4" NPT (Female)	1/4" NPT (Female)	1/4" NPT (Female)
Ambient Temperature	10 to 35°C	10 to 35°C	10 to 35°C
Electrical Requirements	230 VAC - 50Hz - 12VDC	230 VAC - 50Hz - 12VDC	230 VAC - 50Hz - 12VDC
Power Consumption	100 Watts	100 Watts	100 Watts
Dimensions (H x W x D)	330 x 320 x 180 mm	710 x 320 x 220 mm	1120 x 320 x 220 mm
Weight (Shipping)	10 Kg (12)	24 Kg (27)	36 Kg (40)

Ordering Information

Description	Model Number
14 lpm FT-IR Purge Gas Generator	75-45EU OR 75-45UK
28 lpm FT-IR Purge Gas Generator	75-52EU OR 75-52UK
85 lpm FT-IR Purge Gas Generator	75-62EU OR 75-62UK
Installation Kit	IK7572

Maintenance Items	Model Number	Change Frequency
Maintenance Kit for 75-45	MK7505	12 Months
Maintenance Kit for 75-52	MK7552	12 Months
Maintenance Kit for 75-62	MK7520	12 Months

FT-IR Purge Gas Generators

for Fourier Transform-Infrared



FT-IR Purge Gas on Demand, up to 28 lpm

The Parker Balston 'plug and play' FT-IR purge gas generator is engineered to transform standard compressed air from an integral state of the art oil-free compressor, into a safe regulated supply of dry (-73°C), CO₂ free (< 1 ppm) purge gas.

The FT-IR gas generators are an ideal alternative to nitrogen producing cleaner background spectra in a shorter time. Payback periods are typically less than one year. By removing CO₂ and water vapour the signal to noise ratio allows more accurate analysis, particularly from 1,200-2,000, 2,400 and 3,600-4,000 wave numbers.



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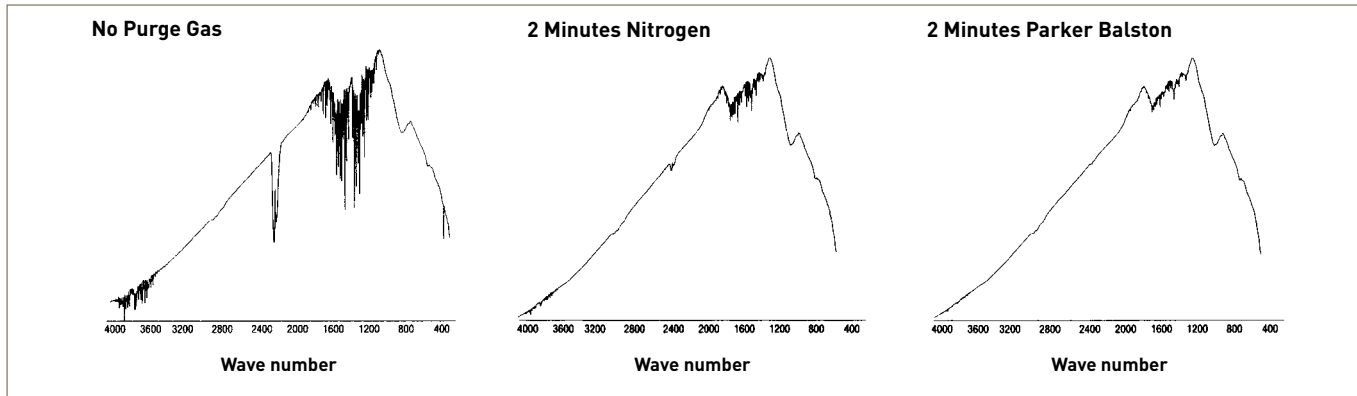
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Product Features:

- Produces a continuous supply of purge gas for FT-IR's at a fraction of the cost of nitrogen
- Complete 'Plug and Play' generator
- Improve signal-to-noise ratio even on non-purge systems - cleaner spectra in a shorter time
- Recommended and used by all leading FT-IR manufacturers
- Eliminate costly nitrogen cylinders from the laboratory
- Internal acoustic dampening ensures quiet operation

FT- IR purge gas is produced by utilising a combination of compressor, filtration and pressure swing adsorption (PSA) technology. Compressed air is produced from an oil free compressor and then filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron. The air then

passes through two columns filled with molecular sieve which adsorb CO₂, moisture and hydrocarbons. These are desorbed to atmosphere during the pressure swing cycle leaving a supply of ultra pure air. Simply connect to the instrument for a continuous supply of FT-IR purge gas.



Principal Specification

Model	74-5041
Dewpoint	-73°C
Carbon Dioxide Concentration	< 1.0 ppm
Delivery Pressure	5.5 bar
Ambient Temperature	10 to 35°C
Electrical Requirements	230VAC- 50Hz
Power Consumption	1.8 kW
Dimensions (H x W x D)	700 x 310 x 900 mm
Weight (Shipping)	93 Kg (114)

Ordering Information

Description	Model Number
28 lpm FT-IR Purge Gas Generator	74-5041EU or 74-5041UK
Installation Kit	IK7572

Maintenance Items	Model Number	Change Frequency
Maintenance Kit	74065	12 Months
Replacement Compressor 220V	74155	18 Months

High Purity Nitrogen Generators

for Analytical Instruments including ICP Spectrometers



Nitrogen on demand, up to 14 lpm

The Parker Balston Ultra High Purity (UHP) Nitrogen Generators are engineered to transform standard compressed air in to a safe supply of 99.999% pure nitrogen.

Innovative design features include integral compressors with economy mode as standard. This extends compressor life and reduces ongoing running costs.

Typical applications include optical purge for ICP-OES (Inductive Coupled Plasma - Optical Emissions) high flow GC make up gas, solvents evaporation, DSC (Differential Scanning Calorimeter) and virtually any analytical instrument that requires a small to medium flow of ultra high purity nitrogen.

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Product Features:

- Produces a continuous supply of high purity nitrogen 99.999% for ICP-OES
- Ideal for Optical Purge, extends analysis into the far UV range below 170 nm
- Designed to run 24 hours a day
- Eliminate dangerous nitrogen cylinders or dewars from the laboratory
- Integral oil free compressors with noise reduction technology
- Economy mode, increasing compressor life and reducing ongoing running costs

Nitrogen is produced by utilising a combination of filtration and pressure swing adsorption (PSA) technology. Standard compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron.

The air then passes through two columns filled with carbon molecular sieve (CMS) which adsorb O₂, CO₂, moisture and hydrocarbons. These are desorbed to atmosphere during the pressure swing cycle leaving a supply of ultra pure nitrogen.

Principal Specification

	HPN2-5200	HPN2-5200C	HPN2-8000	HPN2-8000C	HPN2-10500	HPN2-10500C	HPN2-14000	HPN2-14000C
Purity	99.999%	99.999%	99.9%	99.9%	99.8%	99.8%	99.5%	99.5%
Hydrocarbon concentration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CO concentration	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm
CO2 concentration	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm
H2O concentration	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm	<1ppm
Flow rates	5,200ml/min	5,200ml/min	8,000ml/min	8,000ml/min	10,500ml/min	10,500ml/min	14,000ml/min	14,500ml/min
Inlet pressure	8-9.9 bar	N/A	8-9.9 bar	N/A	8-9.9 bar	N/A	8-9.9 bar	N/A
Integral compressor	No	Yes	No	Yes	No	Yes	No	Yes
Outlet pressure	5 bar	5 bar	5 bar	5 bar	5 bar	5 bar	5 bar	5 bar
Inlet connection	1/4" BSPP	N/A	1/4"	N/A	1/4"	N/A	1/4"	N/A
Outlet connection	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP
Ambient temperature	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C	15 to 25°C
Electrical requirements	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz
Power consumption	89 Watts	580 Watts	89 Watts	580 Watts	89 Watts	580 Watts	89 Watts	580 Watts
Dimensions (HxWxD)	869x345x667mm	869x345x667mm	869x345x667mm	869x345x667mm	869x345x667mm	869x345x667mm	869x345x667mm	869x345x667mm
Weight (shipping)	86Kg	95Kg	86Kg	95Kg	86Kg	95Kg	86Kg	95Kg

Ordering Information

Description	Model Number
5,200ml/min HP Nitrogen Generator	HPN2-5200
5,200ml/min HP Nitrogen Generator with integral compressor	HPN2-5200C
8,000ml/min HP Nitrogen Generator	HPN2-8000
8,000ml/min HP Nitrogen Generator with integral compressor	HPN2-8000C
10,500ml/min HP Nitrogen Generator	HPN2-10500
10,500ml/min HP Nitrogen Generator with integral compressor	HPN2-10500C
14,000ml/min HP Nitrogen Generator	HPN2-14000
14,000ml/min HP Nitrogen Generator with integral compressor	HPN2-14000C
Installation Kit	IK7694

Maintenance Items	Model Number	Change Frequency
Filter Kit - non compressor models	MKH-HPN2-FK	12 months
Filter Kit - compressor models	MKH-HPN2CL-FK	12 months
Compressor Kit 230V all models	MKN2-CK230L	8,000 hours or 24 months (whichever comes first)

Dry Air Generators

for Nuclear Magnetic Resonance

Ultra Dry Air
Gas Generator
Model UDA-300

NMR Gas on demand, up to 340 lpm

The Parker Balston NMR (Nuclear Magnetic Resonance) gas generators are a complete system with carefully matched components engineered for easy installation, operation and long term reliability. They are designed to transform standard compressed air into a safe supply of dry (-73°C) gas ideal for ejecting, spinning and lifting on NMR instruments.

The NMR gas generators are an ideal alternative to nitrogen cylinders or dewars. Payback periods are typically less than one year.



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Product Features:

- **Produces a continuous supply of ultra dry (-73°C) air for NMR spectrometers and other analytical instruments**
- **Low cost alternative to nitrogen - pay back periods typically less than one year**
- **Ideal gas supply for ejecting, spinning and lifting operations**
- **Eliminate dangerous nitrogen cylinders or dewars from the laboratory**
- **Compact, reliable and minimal maintenance**
- **Designed to run 24 hours a day**

NMR gas is produced by utilising a combination of filtration and pressure swing adsorption (PSA) technologies. Standard compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron. The air then passes through two columns filled with molecular sieve which

adsorbs moisture. This is desorbed to atmosphere during the pressure swing cycle leaving a supply of ultra dry NMR grade air. The PSA columns require no operator attention or maintenance. Simply connect the generator to the NMR instrument for consistent reliable analysis.

Principal Specification

Model	UDA-300
Dew Point	-73°C
Flow Rates	Up to 340 lpm
Inlet Pressure	4.1 to 8.6 bar
Inlet Connection	1/4" NPT (Female)
Outlet Connection	1/4" NPT (Female)
Ambient Temperature	10 to 35°C
Electrical Requirements	230VAC- 50Hz - 12VDC (to the UDA-300)
Power Consumption	10 Watts
Dimensions (H x W x D)	700 x 310 x 900 mm
Weight (Shipping)	23 Kg (26)

Ordering Information

Description	Model Number
NMR Gas Generator	UDA - 300EU OR UDA-300UK
Installation Kit	IK7572

Maintenance Items	Model Number	Change Frequency
Maintenance Kit	MK7525	12 Months

Gas Purifier

for AA Spectrophotometers



AA Gas Purifier

The Parker Balston AA (Atomic Absorption) purifiers are a complete wall mount system with carefully matched components engineered for easy installation, operation and long term reliability. They are engineered to purify standard compressed air (oxidant) into a safe supply of clean dry air. They also remove liquid acetone from the acetylene which increases in quantity as the cylinder volume is reduced during use.

Ideal for all AA installations the purifier protects the microcomputer gas controls and AA burner assembly from contamination and corrosion.



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Product Features:

- **Designed specifically for AA Instrumentation**
- **Protects microcomputer gas controls**
- **Ensures a clean, contaminant-free flame**
- **Ensures a consistent quality of compressed air (oxidant) and fuel gas**
- **Convenient wall mountable system with flash back arrestor**
- **Minimal maintenance**

The purifier consists of two independent filtration systems. The first is designed to purify the compressed air with two stages of high efficiency coalescing filters to remove all contaminants to < 0.01ppm.

The second system then purifies the acetylene by removing liquid acetone and solids from the gas. Finally the gas passes through an integral flash back arrestor to enhance the safe operation of the Atomic Absorption.

Principal Specification

Model	73-100	
	Compressed Air	Acetylene
Purity	< 0.01 µm	< 0.01 µm
Inlet Pressure	1 to 17 bar	0.5 to 1 bar
Inlet Connection	1/4" (Female)	3/4 -24 LH (A Size)
Outlet Connection	1/4" (Female)	9/16 -18 LH (B Size)
Ambient Temperature	10 to 35°C	
Electrical Requirements	Not Required	
Power Consumption	N/A	
Dimensions (H x W x D)	250 x 270 x 200 mm	
Weight (Shipping)	4 Kg (5)	

Ordering Information

Description	Model Number
Atomic Absorption Gas Purifier	73-100

Maintenance Items	Model Number	Change Frequency
Maintenance Kit	73065	12 Months
Acetylene Hose Assembly (1.8m in length)	19257 (connection thread: POL/CGA 501)	As required

Membrane Air Dryers

for Analytical Instruments



Dry Air on demand, up to 1,203 lpm

The Parker Balston membrane air dryers are a complete system with carefully matched components engineered for easy installation, operation and long term reliability. They are engineered to transform standard compressed air into a safe supply of dry (up to -40°C) air with minimal operator attention.

With flow rates up to 1,203 lpm and pressure up to 9.6 bar, they make an ideal alternative to cylinders for any analytical instruments or laboratory house supply.

With no electrical requirements and no moving parts they are also designed for installation in explosive environments and for process analysers.

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Water vapour quickly permeates the membrane and is released harmlessly to atmosphere. Air flows along the membrane fibre as a separate product stream.

Product Features:

- Produces a continuous supply of ultra dry -40°C dewpoint instrument air
- Designed to run 24 hours a day
- Compact, reliable and minimal maintenance
- Intrinsically safe for hazardous explosive environments
- No noise, no moving parts, no electrical requirements
- No refrigerants or Freons - environmentally friendly

Dry air is produced by utilising a combination of filtration and membrane separation technologies.

A supply of compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron.

Patented proprietary hollow fibre membranes then separate the moisture to leave ultra dry air.

Membrane technology offers some unique performance benefits including silent operation, no moving parts and no electrical requirements.

There are 1000's systems using Parker Balston membrane technology installed worldwide.

Principal Specification

Model	64-01	64-02	64-10
Dew Point	Up to -40°C	Up to -40°C	Up to -40°C
Flow Rates	See Table	See Table	See Table
Inlet Pressure	4.1 to 10.3 bar	4.1 to 10.3 bar	4.1 to 10.3 bar
Inlet/Outlet Connection	1/4" NPT (Female)	1/4" NPT (Female)	1/2" NPT (Female)
Ambient Temperature	10 to 35°C	10 to 35°C	10 to 35°C
Electrical Requirements	Not Required	Not Required	Not Required
Power Consumption	N/A	N/A	N/A
Dimensions (H x W x D)	570 x 150 x 130 mm	570 x 150 x 130 mm	930 x 150 x 130 mm
Weight (Shipping)	3 Kg (4)	4 Kg (5)	7 Kg (9)

Flow Rates lpm

Pressure	4 bar		5.5 bar		7 bar		8.3 bar		9.6 bar	
	-40°C	0°C	-40°C	0°C	-40°C	0°C	-40°C	0°C	-40°C	0°C
Model 64-01	9	24	16	35	28	71	35	83	47	113
Model 64-02	13	52	30	80	57	142	80	193	125	307
Model 64-10	54	321	142	425	283	708	403	1014	517	1203

Ordering Information

Description	Model Number
Membrane Air Dryer up to 113 lpm	64-01
Membrane Air Dryer up to 307 lpm	64-02
Membrane Air Dryer up to 1,203 lpm	64-10
Installation Kit for 64-01 and 64-02	IK7572
Installation Kit for 64-10	IK75880

Maintenance Items	Model Number	Change Frequency
Annual Maintenance Kit for 64-01 and 64-02	MK7601	12 Months
Annual Maintenance Kit for 64-10	MK7610	12 Months

NitroVap Generator

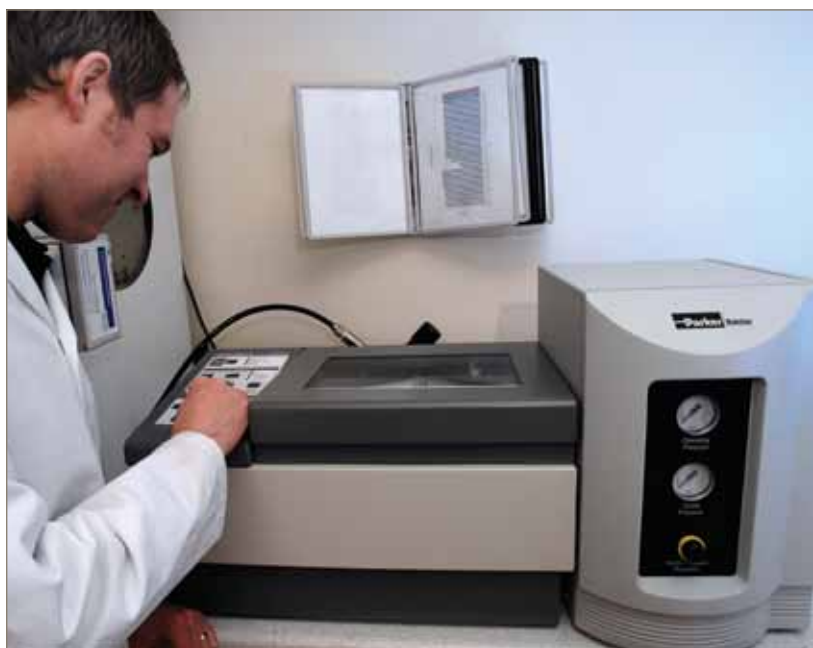
for Turbo Vaps



Nitrogen on demand, up to 350 lpm

The Parker Balston NitroVap nitrogen generator can produce up to 350 lpm of pure nitrogen at pressures up to 8 bar. The generator is engineered to transform standard compressed air into a safe supply of nitrogen with minimal operator attention.

With a 'sleep' economy mode, high volumes of nitrogen are available as required making this an ideal generator for Turbo Vaps, sample concentrators and solvent evaporator applications.



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Product Features:

- Pay back periods typically less than one year
- Designed to run 24 hours a day
- Flow rates up to 350 lpm
- Requires minimal installation and operator attention
- Sleep economy mode
- Compact design

Nitrogen is produced by utilising a combination of filtration and membrane separation technologies. A supply of compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron.

Patented proprietary hollow fibre membranes then separate the air into a concentrated pure nitrogen stream. Membrane technology offers some unique performance benefits including phthalate free nitrogen, silent operation, no moving parts and no electrical requirements. There are 10,000's of systems using Parker Balston membrane technology installed worldwide.

Principal Specification

Model	NitroVap-1LV	NitroVap-2LV
Purity	Up to 95%	Up to 95%
Flow Rates	200 lpm	350 lpm
Inlet Pressure	4.1 bar to 10 bar (7 bar recommended)	4.1 bar to 10 bar (7 bar recommended)
Inlet Connection	1/4" NPT (Female)	1/4" NPT (Female)
Outlet Connection	1/4" NPT (Female)	1/4" NPT (Female)
Ambient Temperature	10 to 35°C	10 to 35°C
Electrical Requirements	Not Required	Not Required
Power Consumption	N/A	N/A
Dimensions (H x W x D)	410 x 270 x 340 mm	410 x 270 x 340 mm
Weight (Shipping)	22 Kg (24)	22 Kg (24)

Ordering Information

Description	Model Number
200 lpm NitroVap Nitrogen Generators	NitroVap-1LV
350 lpm NitroVap Nitrogen Generators	NitroVap-2LV
Installation Kit	IK76803

Maintenance Items	Model Number	Change Frequency
Maintenance Kit 1LV and 2LV	MKNITROVAP	12 Months

TOC Gas Generators

for Total Organic Carbon Analysers



TOC carrier gas on demand, up to 1,250 ml/min

The Parker Balston TOC (Total Organic Carbon) gas generators are a complete system with carefully matched components engineered for easy installation, operation and long term reliability.

They are designed to transform standard compressed air into safe supply of hydrocarbon free (<0.05ppm), dry (-73°C), CO₂ free (<1ppm) carrier gas. The TOC gas generators are an ideal alternative as a carrier / combustion gas to nitrogen, oxygen and air cylinders. Payback periods are typically less than one year.



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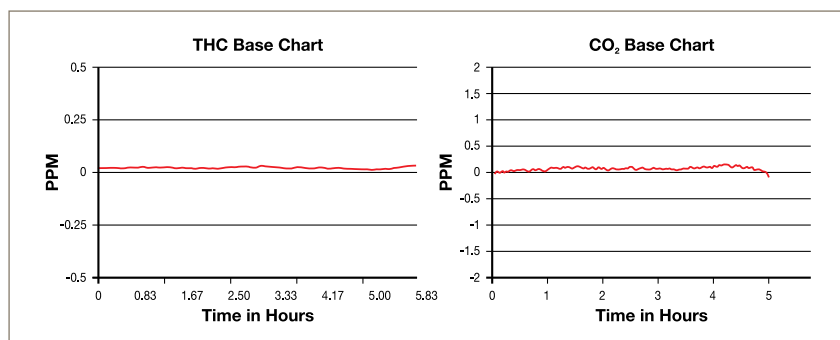
Product Features:

- Produces a continuous supply of gas for TOC's
- Designed to run continuously 24 hours/day
- Purity meets or exceeds all TOC manufacturer's gas purity requirements
- Compact design and minimal maintenance
- Ensures consistent, reliable TOC analysis
- Eliminate dangerous high pressure oxygen and nitrogen gas cylinders from the laboratory

TOC carrier gas is produced by utilising a combination of filtration, heated catalyst and pressure swing adsorption (PSA) technologies. Standard compressed air is filtered by high efficiency coalescing filters to remove all contaminants down to 0.01 micron.

The air is then purified using a state-of-art combined heated catalyst module to remove hydrocarbons. Finally the air then passes through two columns filled with molecular sieve which adsorb CO₂ and moisture.

These are desorbed to atmosphere during the pressure swing cycle leaving a supply of ultra pure TOC grade air. Simply connect to the TOC instrument for consistent reliable analysis.



Principal Specification

Model	TOC-625	TOC-1250
Hydrocarbon Concentration	< 0.05 ppm	< 0.05 ppm
Carbon Dioxide Concentration	<1.0 ppm	< 1.0 ppm
Dew Point	-73°C	-73°C
Flow Rates	625 ml/min	1250 ml/min
Inlet Pressure	4.5 bar to 8.6 bar	4.5 bar to 8.6 bar
Ambient Temperature	10 to 35°C	10 to 35°C
Electrical Requirements	230VAC - 50Hz	230VAC - 50Hz
Power Consumption	80 Watts	170 Watts
Dimensions (H x W x D)	318 x 229 x 406 mm	430 x 280 x 430 mm
Weight (Shipping)	13 Kg (15)	20 Kg (22)

Ordering Information

Description	Model Number
625 ml/min TOC Gas Generator	TOC-625EU OR TOC-625UK
1,250 ml/min TOC Gas Generator	TOC-1250EU OR TOC-1250UK
Receiver Tank - 3 litres at atmospheric pressure	72-007 (required to prevent pressure fluctuations)
Installation Kit	IK76803

Maintenance Items	Model Number	Change Frequency
Maintenance Kit for TOC-1250	MK7840	12 Months
Replacement catalyst module	76810 - 220	36 Months
Maintenance Kit for TOC-625	MKTOC625-12	12 Months
Maintenance Kit for TOC-625	MKTOC625-36*	36 Months

* Includes catalyst module

Applications Guide

Key

UHP = Ultra High Purity, >99.99 - >99.9999% with respect to oxygen

Zero Grade = Free from residual hydrocarbons

HP = High Purity, >98 >99.9% with respect to oxygen

CDA = Clean Dry Air

Instrument	Gas Requirement	Purity	Flow rate	Generator	Technology
Product for Gas Chromatography (GC)					
GC - Flame Ionisation Detector (FID)	H2 as fuel gas	UHP	30-50 ml/min	Hydrogen 'H2PEM/PD' or 'H2PD'	PEM + Palladium or Palladium Cell (PD)
	H2 as carrier gas (displacing Helium)	UHP	up to 200 ml/min	Hydrogen, 'H2PD'	Palladium Cell (PD)
	Zero Air as flame support gas	Zero Grade	300-500 ml/min	Zero Air HP-ZA	Catalytic Module
	N2 for packed carrier gas	Zero Grade	20-50 ml/min	Zero Nitrogen, UHPN2-1100	N2 PSA + Catalytic Module
	N2 as detector make-up gas	Zero Grade	30-50 ml/min	Zero Nitrogen, UHPN2-1100	N2 PSA + Catalytic Module
GC - Flame Photometric Detector (FPD)	Hydrogen as fuel gas	UHP	60-90 ml/min	Hydrogen, 'H2PEM' or 'H2PD'	PEM + Desiccant or Palladium Cell (PD)
	Zero Air as flame support gas	Zero Grade	90-120 ml/min	Zero Air HP-ZA	Catalytic Module
GC - Nitrogen Phosphorous Detector (NPD)	Hydrogen as carrier gas (displacing Helium)	UHP	up to 50 ml/min	Hydrogen, 'H2PEM' or 'H2PD'	PEM + Desiccant or Palladium Cell (PD)
	Nitrogen as detector make-up gas	Zero Grade	up to 30 ml/min	Zero Nitrogen, UHPN2- 1100	N2 PSA + Catalytic Module
GC - Electron Capture Detector (ECD)	Nitrogen as carrier gas	Zero Grade	up to 60 ml/min	Zero Nitrogen, UHPN2- 1100	N2 PSA + Catalytic Module
	Nitrogen as detector make-up gas	Zero Grade	up to 100 ml/min	Zero Nitrogen, UHPN2- 1100	N2 PSA + Catalytic Module
GC - Thermal Conductivity Detector (TCD)	Hydrogen as carrier gas	UHP	up to 50 ml/min	Hydrogen, 'H2PEM' or 'H2PD'	PEM + Desiccant or Palladium Cell (PD)
GC - Automatic Thermal Desorption (ATD)	Nitrogen as purge gas	UHP	up to 150 ml/min	UHP Nitrogen, UHPN2- 1100	N2 PSA
GC - Atomic Emission Detector (AED)	Nitrogen as carrier gas	Zero Grade	up to 1 ml/min	Zero Nitrogen, UHPN2- 1100	N2 PSA + Catalytic Module
GC - Electrolytic Conductivity Detector (ELCD & Hall ELCD)	Hydrogen as reaction gas	UHP	70 to 200 ml/min	Hydrogen, 'H2PEM' or 'H2PD'	PEM + Desiccant or Palladium Cell (PD)
GC/MS - Carrier Gas	Hydrogen as carrier gas (displacing Helium)	UHP	up to 50 ml/min	Hydrogen, 'H2PD'	Palladium Cell (PD)
Products for LC/MS Instruments					
LC/MS - Nebulisation Gas	Nitrogen used to nebulise liquid into aerosol	HP	up to 32 L/min	Nitrogen, NitroFlow Lab	N2 Membrane
			34 - 228 L/min	Nitrogen, N2-14 to 135	N2 Membrane
			up to 567 L/min	Nitrogen, NitroSource	N2 Membrane
LC/MS - Source Gas	Nitrogen used as a source gas	HP	up to 17 L/min	TriGas, LCMS-5000 series	N2 Membrane
		Zero Grade	up to 17 L/min	TriGas, LCMS-5000 series	Catalytic Module
		Zero Grade	up to 17 L/min	Zero Air HP-ZA	Catalytic Module
LC/MS - Exhaust Gas	Nitrogen for exhaust gas purge	HP	up to 8 L/min	TriGas, LCMS-5000 series	N2 Membrane
		CDA	up to 8 L/min	TriGas, LCMS-5000 series	CDA Membrane
LC/MS - Sheath Gas	Nitrogen used as inerting/blanket gas	HP	up to 32 L/min	Nitrogen, NitroFlow Lab	N2 Membrane
			34 - 228 L/min	Nitrogen, N2-14 to 135	N2 Membrane
			up to 567 L/min	Nitrogen, NitroSource	N2 Membrane
LC/MS - Collision Cell Gas	Nitrogen used as collision gas	UHP	up to 25 ml/min	Nitrogen, UHPN2-1100	N2 PSA
LC/MS - Matrix Assisted Laser Desorption Ionisation	Nitrogen as laser purge guide	UHP	up to 5 L/min	Nitrogen, N2-04	N2 Membrane
LC/MS - Multiple Instrument Supply	Nitrogen as nebulisation/sheath/exhaust gas	HP	Various	Nitrogen, N2-14 to 135	N2 Membrane
				Nitrogen, NitroSource	N2 Membrane
FT/MS - Fourier Transform Mass Spectrometry	Nitrogen as laser flush/purge gas	HP	up to 100 L/min	Nitrogen, N2-14 to 135	N2 Membrane
				Nitrogen, NitroSource	N2 Membrane

Instrument	Gas Requirement	Purity	Flow rate	Generator	Technology
Products for Spectroscopy					
Fourier-Transform Infra Red Spectrometer (FT-IR)	CO2 free air for sample compartment, optics air bearing and microscope purge gas	CO2 free air	up to 28 L/min	CO2 free air, 75-5041 75-45/75-52/75-62	CO2 RP PSA - Desiccant
Nuclear Magnetic Resonance (NMR)	Air for lifting, spinning & ejecting, <400MHz	CDA	60-100 L/min	CDA, UDA-300	CDA PSA - Desiccant
	Nitrogen for lifting, spinning & ejecting, >400MHz	HP		Nitrogen, N2-14 to 135 Nitrogen, NitroSource	N2 Membrane N2 Membrane
Inductively Coupled Plasma - Mass Spectrometry (ICP-MS)	Hydrogen as collision cell reaction gas	UHP	up to 250 ml/min	Hydrogen, 'H2PD'	Palladium Cell (PD)
Inductively Coupled Plasma Optical Emission Spectrometers (ICP-OES)	Nitrogen as purge gas for plasma torch	UHP	up to 9 L/min	Nitrogen, 76-97 & 76-98	N2 PSA
Atomic Emission Spectrometers (AA - Flame)	Air for flame support gas	CDA	28-200 L/min	CDA, 73-100	Filtration
Particle Sizing Instruments	Air to purge and drying gas	CDA	up to 100 L/min	CDA, 64-01/64-02/64-10	CDA Membrane
Products for Analysers					
Total Organic Carbon Analyser (TOC)	CO2 free & Zero Grade air for carrier gas	CO2 free air	100-500 ml/min	CO2 Free Air Zero Grade	PSA - Desiccant & Catalytic Module
		Zero Grade		TOC-625 / 1250	
	Nitrogen for carrier gas	UHP	50-700 ml/min	Nitrogen, UHPN2-1100	N2 PSA + Catalytic Module
Total Hydrocarbon Analyser (THA)	Hydrogen as fuel gas	UHP	5-50 ml/min	Hydrogen, 'H2PEM' or 'H2PD'	PEM + Desiccant or Palladium Cell (PD)
	Zero Air as flame support gas	Zero Grade	50-500 ml/min	Zero Air, HP-ZA	Catalytic Module
Differential Scanning Calorimetry (DSC)	Nitrogen as shield/sheath gas	UHP	100 ml/min	Nitrogen, UHPN2-1100	N2 PSA
Thermal Gravimetric Analyser (TGA)	Nitrogen as inerting/blanket furnace gas	UHP	300 ml/min	Nitrogen, UHPN2-1100	N2 PSA
CO2 Analyser	CO2 free air as calibration gas	CO2 free air	550-1000 ml/min	CO2 free air, 75-5041 75-45/75-52/75-62	CO2 RP PSA - Desiccant
Chemisorption/Physisorption	Hydrogen as measurement gas	UHP	up to 250 ml/min	Hydrogen, 'H2PD'	Palladium Cell (PD)
	Nitrogen as measurement gas	UHP	up to 250 ml/min	Nitrogen, UHPN2-1100	N2 PSA
Other Laboratory Applications					
Sample Preparation/Solvent Evaporators (TurboVap)	Nitrogen as inert evaporation gas	HP	6-50 L/min	Nitrogen, NitroVap-1LV NitroVap-2LV	N2 Membrane
Circular Dichroism (CD)	Nitrogen as source and optics purge	UHP	up to 10 L/min	Nitrogen, 76-97 & 76-98	N2 PSA
Evaporative Light Scattering Detector (ELSD)	Nitrogen as nebulisation gas	HP	up to 8 L/min	Nitrogen, N2-04	N2 Membrane
Corona Charged Aerosol Detector (CAD)	Nitrogen as nebulisation gas	HP	up to 8 L/min	Nitrogen, N2-04	N2 Membrane
Condensation Nucleation Light Scattering Detector (CNLS)	Nitrogen as nebulisation gas	HP	up to 8 L/min	Nitrogen, N2-04	N2 Membrane
CO2 Incubators (IVF, Stem Cell & Regenerative Medicine)	Nitrogen to create oxygen deficient atmosphere	HP	up to 12 L/min	Nitrogen, NitroFlow Lab	N2 Membrane
Chemical Vapour Deposition Instrumentation (CVD)	Hydrogen to aid deposition process	UHP	up to 1L/min	Hydrogen, 'H2PD'	Palladium Cell (PD)
	Nitrogen to aid deposition process	UHP	up to 1L/min	Nitrogen, UHPN2-1100	N2 PSA
Plasma Cleaning Instrumentation (UCP)	Hydrogen as a high efficiency process gas	UHP	up to 1000 ml/min	Hydrogen, 'H2PD'	Palladium Cell (PD)
Digital Radiography (Edge, General Electric, Varian Medical)	Nitrogen to inert/purge diode array	UHP	up to 550 ml/min	Nitrogen, UHPN2-1100	N2 PSA
Hydrogenation (Organic Chemistry)	Hydrogen as reaction gas	UHP	up to 250 ml/min	Hydrogen, 'H2PEM'	PEM + Desiccant



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