

Analytical Gas Systems

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



ENGINEERING YOUR SUCCESS.

Parker domnick hunter

Technology you can trust

Parker domnick hunter 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, Thermo Fisher, 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 gases for many analytical instrument 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

adsorbents, catalysts, and specialist micro dryers, 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 domnick hunter's market leading hydrogen generators, for example, will have just 50 ml of stored gas, which will be at a maximum of around 5 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 domnick hunter 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



(continued)



re-calibration, are required before samples can be run. Life is more convenient with 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 analyses. 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 for 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.

Unlike cylinders, Analytical Gas Systems have no hidden costs. 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 domnick hunter 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 domnick hunter 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 domnick hunter generators, from carbon molecular sieve, to the use of robust hydrogen membranes.

A Smarter Choice for LC/MS...

Providing nitrogen for uses such as LC/MS, Parker domnick hunter's pressure swing adsorption nitrogen generators represent state-of-the-art technology. The carbon molecular bed simply and efficiently separates compressed air into nitrogen. The carbon molecular bed achieves this due to its selective adsorption capabilities for different gases – oxygen and other unwanted constituents of the compressed air are simply removed by desorption – the complete process is monitored by a sophisticated control system.

These generators, when connected to an existing compressed air supply, will provide a constant supply of nitrogen with limited moving parts inside the generator. This means that the generator is very quiet whilst operating and there are minimal replacement parts.

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 domnick hunter hydrogen generators take deionised water and, through electrolysis, separate the hydrogen. This is then purified using desiccants, and specialist micro dryers.

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 domnick hunter 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 GC combustion detector applications

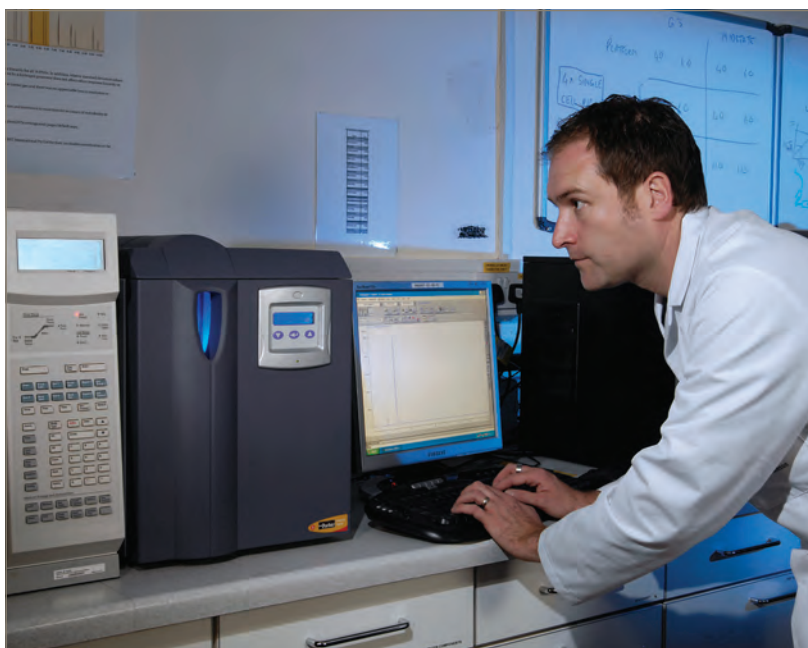


The Parker domnick hunter H high purity hydrogen gas generators offer the optimum combination of safe operation, reliability and performance.

Utilising field proven PEM cell technology, hydrogen is produced on demand from deionised water and electricity, at low pressure and with minimal stored volume. Innovative control software allows unrivalled operational safety and reliability.

The H generators ideally supply fuel gas to all known GC combustion detectors used in today's laboratory workflows. Three models operate at flow rates; 160 ml/min, 250 ml/min and 500 ml/min.

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



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Fax: +44 (0)191 482 6296

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www.parker.com/dhfn

Product Features:

- **Eliminate dangerous hydrogen cylinders from the work place**
- **Simple to install and operate**
- **Compact, reliable with minimal maintenance**
- **Produces a continuous supply of 99.9995% pure hydrogen at up to 6.9 bar**
- **2 year standard cell warranty**
- **Optional automatic water fill and remote networking capability**

Product Selection

Model	Flow Rate		Purity*	Water Consumption (24/7, full flow)	Delivery Pressure		Optional Auto Water Fill (AWF)
	ml/min				bar g	psi g	
20H	160		>99.9995	1.25	0.3-6.89	5-100	YES
40H	250		>99.9995	2	0.3-6.89	5-100	YES
60H	500		>99.9995	4	0.3-6.89	5-100	YES

*With respect to oxygen

Note: For auto water fill option add suffix AWF ie 20H-AWF

Technical Data

Ambient Temperature Range	5 - 40°C 41 - 104°F
Water Supply Pressure*	0.1 bar g 1.45 psi g
Water Supply Flow Rate*	1 L/min
Water Quality	Deionised. ASTM II, >1MΩ, <1µs, filtered to <100µm
Supply Voltage Range	90 - 264V 50/60Hz
Port Connections	Hydrogen Outlet Water Drain Water Fill*
	1/8" Compression Fitting Quick Release Push in Fitting Quick Release Push in Fitting

*With optional AWF

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight (Empty)		Weight (Full of Water)	
	mm	in	mm	in	mm	in	kg	lb	kg	lb
20H	456	17.9	342	13.5	437	17.2	19	41.9	23	50.7
40H	456	17.9	342	13.5	437	17.2	19	41.9	23	50.7
60H	456	17.9	342	13.5	437	17.2	19	41.9	23	50.7

Preventative Maintenance

Preventative Maintenance Kit	Part Number	Change Frequency
Replacement desiccant cartridge	604970412	As required*
6 month kit	604970600	6 months
24 month kit	604970532	24 Months

* 20H Continuous operation approx 6 to 7 months

* 40H Continuous operation approx 4 to 5 months

* 60H Continuous operation approx 2 to 3 months

Optional Extra's

Description	Part Number	Required for
Remote Networking Module	H2-REMOTE-NET-DH 604971530	Allows cascading of two generators
Remote Networking Expansion Module	H2-REMOTE-EXP-DH 6049711540	Required to cascade each additional generator
Remote Monitoring Module	H2-REMOTE-MON-DH 604971532	Allows the remote monitoring of one generator
Installation kit	IK7532	Suitable for all hydrogen generators

Hydrogen Generators

for GC and GC/MS carrier gas applications



The Parker domnick hunter H-MD ultra high purity hydrogen gas generators offer the optimum combination of safe operation, reliability, performance and low cost of ownership.

Utilising field proven PEM cell technology, hydrogen is produced on demand from deionised water and electricity, at low pressure and with minimal stored volume. Innovative control software allows unrivalled operational safety and reliability.

The H-MD generators ideally supply GC and GC/MS carrier gas, in addition to all known combustion detectors that are routinely used in today's laboratory workflows. Four models operate at flow rates; 160 ml/min, 250 ml/min, 500 ml/min and 1100 ml/min.

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



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Email: gasgen@parker.com

www.parker.com/dhfn

Product Features:

- **Eliminate dangerous hydrogen cylinders from the work place**
- **Simple to install and operate**
- **Compact, reliable with minimal maintenance**
- **Produces a continuous supply of 99.99995% pure hydrogen up to 1,100ml/min and 6.9 bar**
- **2 year standard cell warranty**
- **Optional automatic water fill and remote networking capability**

Product Selection

Model	Flow Rate	Purity*	Water Consumption (24/7, full flow)	Delivery Pressure		Optional Auto Water Fill (AWF)
	ml/min	%	L/week	bar g	psi g	
20H-MD	160	>99.99995	1.69	0.69-6.89	10-100	YES
40H-MD	250	>99.99995	2.41	0.69-6.89	10-100	YES
60H-MD	500	>99.99995	4.82	0.69-6.89	10-100	YES
110H-MD	1100	>99.99995	10.60	0.69-6.89	10-100	Standard

*With respect to oxygen

Note: For auto water fill option add suffix AWF ie 20H-MD-AWF

Technical Data

Ambient Temperature Range	5 - 40°C 41 - 104°F
Water Supply Pressure*	0.1 bar g 1.45 psi g
Water Supply Flow Rate*	1 L/min
Water Quality	Deionised. ASTM II, >1MΩ, <1µs, filtered to <100µm
Supply Voltage Range	90V - 264V 50/60Hz
Port Connections	Hydrogen Outlet Water Drain Water Fill*
	¹ / ₈ " Compression Fitting Quick Release Push in Fitting Quick Release Push in Fitting

*With optional AWF

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight (Empty)		Weight (Full of Water)	
	mm	in	mm	in	mm	in	kg	lb	kg	lb
20H-MD	456	17.9	342	13.5	470	18.5	20.5	45.2	25	55.1
40H-MD	456	17.9	342	13.5	470	18.5	20.5	45.2	25	55.1
60H-MD	456	17.9	342	13.5	470	18.5	20.5	45.2	25	55.1
110H-MD	456	17.9	342	13.5	470	18.5	23.6	51.8	28	61.7

Preventative Maintenance

Preventative Maintenance Kit	Parker number	Change frequency
6 month kit	M06.HMD.0001	6 months
24 month kit	M24.HMD.0001	24 months
60 month kit	M60.HMD.0001	60 months

Optional Extra's

Description	Part Number	Required for
Remote Networking Module	H2-REMOTE-NET-DH 604971530	Allows cascading of two generators
Remote Networking Expansion Module	H2-REMOTE-EXP-DH 6049711540	Required to cascade each additional generator
Remote Monitoring Module	H2-REMOTE-MON-DH 604971532	Allows the remote monitoring of one generator
Installation kit	IK7532	Suitable for all hydrogen generators

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

Mark Wilkinson (mark.wilkinson@parker.com), James Heseltine (james.heseltine@parker.com)

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 domnick hunter 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

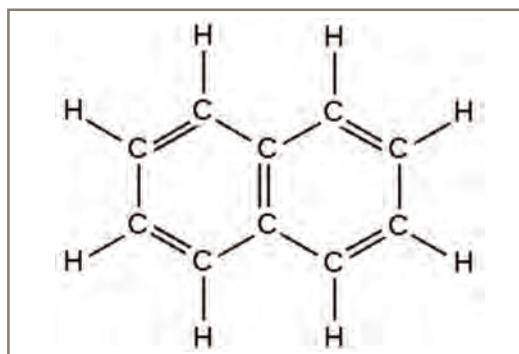
Analysis of the 16 EPA PAHs is normally carried out using GC-FID or GC/MS, with varying detection limits depending upon the medium in question and the analytical technique employed. GC/MS is favourable as it can eliminate non-required peaks, leaving only analytical information of interest, utilizing 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 use 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 domnick hunter 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 domnick hunter 110H-MD generator (www.domnickhunter.com)

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

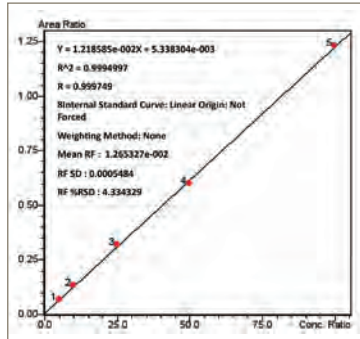
Control mode - Linear velocity

Results

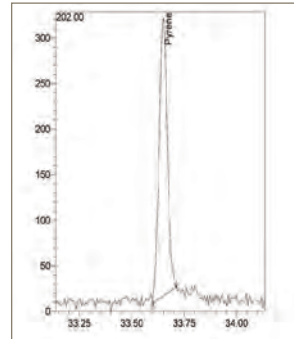
Detection limits of 1ppb were easily achieved, with excellent baseline resolution. 10 replicates were ran at this level, with typical RSD's of <0.1, and signal/noise (s/n) ratios varying between 5 and 20 (typically <10).

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.

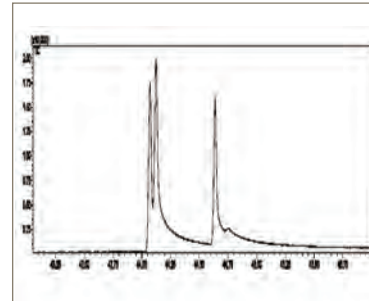
Benzo[ghi]perylene



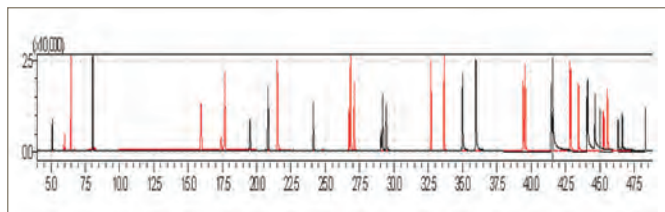
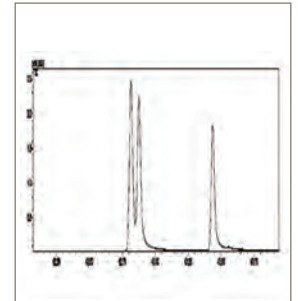
1 ppb Pyrene



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 domnick hunter 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 Phenomenex (www.phenomenex.com)

Hydrogen Generators

for ICP-MS instruments



The Parker domnick hunter 40H-ICP hydrogen gas generator, developed in collaboration with major instrument vendors, meets the initial purge and reaction gas requirements of the Collision Reaction Interface, providing simple routine removal of troublesome spectroscopic interferences.

Utilising field proven PEM cell technology, hydrogen is produced on demand from deionised water and electricity, at low pressure and with minimal stored volume. Innovative control software allows unrivalled operational safety and reliability.

The 40H-ICP hydrogen generator employs a fully approved low-pressure buffer arrangement, to cater for elevated hydrogen flows required during the purge cycle of ICP-MS Instrumentation.

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



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www.parker.com/dhfns

Product Features:

- **Designed specifically for ICP-MS**
- **Simple to install and operate**
- **Compact, reliable with minimal maintenance**
- **Eliminate dangerous hydrogen cylinders from the work place**
- **2 year standard cell warranty**
- **Optional automatic water refill and remote networking capability'**

Product Selection

Note: For auto water fill option add suffix AWF ie 20H-AWF

Model	Flow Rate	Purity	Water Consumption (24/7, full flow)	Delivery Pressure		Optional Auto Water Fill (AWF)
	ml/min	%	L/week	bar g	psi g	
40H-ICP	250	>99.9995	2	0.3-6.89	5-100	YES

*With respect to oxygen

Note: For auto water fill option add suffix AWF ie 40H-ICP-AWF

Technical Data

Ambient Temperature Range	5 - 40°C 41 - 104°F
Water Supply Pressure*	0.1 bar g 1.45 psi g
Water Supply Flow Rate*	1 L/min
Water Quality	Deionised. ASTM II, >1MΩ, <1µs, filtered to <100µm
Supply Voltage Range	90V - 264V 50/60Hz
Port Connections	Hydrogen Outlet Water Drain Water Fill*
	1/8" Compression Fitting Quick Release Push in Fitting Quick Release Push in Fitting

*With optional AWF

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight (Empty)		Weight (Full of Water)	
	mm	in	mm	in	mm	in	kg	lb	kg	lb
40H-ICP	577	22.7	342	13.5	602	23.7	27.5	60.6	31.5	69.5

Preventative Maintenance

Preventative Maintenance Kit	Part Number	Change Frequency
Replacement desiccant cartridge	604970412	As required*
6 month kit	604970600	6 months
24 month kit	604970532	24 months

* 40H Continuous operation approx 4 to 5 months

Optional Extra's

Description	Part Number	Required for
Remote Networking Module	H2-REMOTE-NET-DH 604971530	Allows cascading of two generators
Remote Networking Expansion Module	H2-REMOTE-EXP-DH 6049711540	Required to cascade each additional generator
Remote Monitoring Module	H2-REMOTE-MON-DH 604971532	Allows the remote monitoring of one generator
Installation kit	IK7532	Suitable for all hydrogen generators

Zero Air Generators

for GC combustion detector applications



The Parker domnick hunter UHP-ZA zero air generators produce a continuous stream of organic impurity free air from an external dry compressed air source and offer superior limits of detection over and above other modes of supply. Flow rates range from 1 L/min to 30 L/min.

The UHP-ZA generators feature an interchangeable top panel facilitating the direct mounting of any Parker domnick hunter hydrogen generator. The stackable system forms an innovative, modular FID gas station suitable for all known GC combustion detectors such as FID, FPD and NPD.

UHP-ZA generators may also be used in many other chemical analysis and life science applications, including LC/MS source gas, zero and combustion gas for total hydrocarbon analysers and as a gas sensing calibration and dilution gas.



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Email: gasgen@parker.com
www.parker.com/dhfn

Product Features:

- **Ultra high purity, organic free, air for GC combustion detectors**
- **Increase resolution and detection limits of analysis**
- **Compact, reliable with minimal operator attention and maintenance**
- **Eliminate inconvenient and potentially dangerous air cylinders**
- **Payback period typically less than 24 months**
- **Models available to supply up to 75 FID's**

Product Selection

Model	Flow Rate	Organic Impurity	Air Inlet @ 4 -10 bar g (58-145 psi g)	Delivery Pressure		Integral Compressor
	L/min	ppm	L/min	bar g	psi g	
UHP-10ZA-S	1	<0.1	1.2	4-10	58-145	NO
UHP-35ZA-S	3.5	<0.1	4.2	4-10	58-145	NO
UHP-50ZA-S	5.0	<0.1	6.0	4-10	58-145	NO
UHP-75ZA-S	7.5	<0.1	9.0	4-10	58-145	NO
UHP-150ZA-S	15	<0.1	18	4-10	58-145	NO
UHP-200ZA-S	20	<0.1	24	4-10	58-145	NO
UHP-300ZA-S	30	<0.1	35	4-10	58-145	NO

Note: Add suffix 'E' for 207-253V 50/60Hz ie. UHP-10ZA-S-E
Add suffix 'W' for 103 -126V 60Hz ie. UHP-10ZA-S-W

Technical Data

Ambient Temperature Range	5 - 40°C 41 - 104°F
Inlet Air Quality	Clean dry compressed air ISO8573-1:2010 Class 3.2.1
Supply Voltage Range	103 - 126V 60Hz 207 - 253V 50/60Hz
Port Connections	Outlet (UHP-10ZA-S & UHP-35ZA-S) Inlet (UHP-10ZA-S & UHP-35ZA-S) Outlet (UHP-50ZA-S - UHP-300ZA-S) Inlet (UHP-50ZA-S - UHP-300ZA-S)
	1/8" Compression Fitting 1/8" Compression Fitting 1/4" Compression Fitting 1/4" Compression Fitting

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	in	mm	in	mm	in	kg	lb
UHP-10ZA-S	325	12.8	340	13.4	425	16.7	10.2	22.5
UHP-35ZA-S	455	17.9	340	13.4	425	16.7	14.2	31.3
UHP-50ZA-S	455	17.9	340	13.4	425	16.7	14.2	31.3
UHP-75ZA-S	455	17.9	340	13.4	425	16.7	14.2	31.3
UHP-150ZA-S	455	17.9	340	13.4	425	16.7	15.2	33.5
UHP-200ZA-S	455	17.9	340	13.4	425	16.7	15.2	33.5
UHP-300ZA-S	455	17.9	340	13.4	425	16.7	15.2	33.5

Preventative Maintenance

Preventative Maintenance Kit	Part Number	Change Frequency
Inlet Filter PM Kit - all models	005A0	12 Months
Outlet Filter PM Kit - all models	005AA	12 Months
Fan PM Kit, 230V - all models	606272525	24 Months
Fan PM Kit, 120V - all models	606272526	24 Months

Optional Extra's

Description	Part Number	Required for
Installation kit	IK76803	Suitable for all zero air generators

Ultra High Purity Zero Nitrogen Generators

for GC makeup gas and carrier gas applications



The Parker domnick hunter zero nitrogen generators employ robust, field proven technology to produce ultra high purity nitrogen for GC makeup and carrier gas applications. An integral heated platinum catalyst ensures carrier grade nitrogen free from organic impurities to <math><0.1\text{ppm}</math>.

The generators provide a continuous stream of ultra high purity nitrogen from a single 'plug & play' unit. Models are available with and without an integral oil free compressor, are extremely quiet in operation and are fully approved for use by major instrumentation manufacturers.

Innovative design features include economy mode as standard which extends compressor life and significantly reduces on going running costs.



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Product Features:

- **Ultra high purity, organic free, nitrogen**
- **Economy mode as standard, increases compressor life**
- **Ideal for GC make-up and carrier gas applications including ECD**
- **Integral oil free compressor, with advanced noise reduction technology**
- **Eliminate inconvenient and potentially dangerous nitrogen cylinders**
- **Compact, reliable with minimal operator attention and maintenance**

Product Selection

Model	Flow Rate	Purity*		Inlet Air @ 9 to 9.9 bar (131 to 143 psi)	Delivery Pressure		Integral Compressor
	L/min	ppm organic impurity	%	L/min	bar g	psi g	
UHPZN2-1000	1	<0.1 Total Hydrocarbons	>99.9995%	42	5	72.5	NO
UHPZN2-1000C	1	<0.1 Total Hydrocarbons	>99.9995%	n/a	5	72.5	YES
UHPZN2-3000	3	<0.1 Total Hydrocarbons	>99.9995%	52	5	72.5	NO
UHPZN2-3000C	3	<0.1 Total Hydrocarbons	>99.9995%	n/a	5	72.5	YES

*Purity with respect to oxygen

Note: Add suffix 'E' for 207-253V 50/60Hz ie. UHPZN2-1000-E
Add suffix 'W' for 103 -126V 60Hz ie. UHPZN2-1000-W

Technical Data

Ambient Temperature Range	15 - 25°C 59 - 77°F
Inlet Air Quality†	Clean dry compressed air ISO8573-1:2010 Class 2.-.1
Supply Voltage Range	103 - 126V 60Hz 207 - 253V 50/60Hz
Port Connections	Inlet† Outlet
	1/4" Compression Fitting 1/8" Compression Fitting

†Non compressor models only

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight (with compressor)		Weight (without compressor)	
	mm	in	mm	in	mm	in	kg	lb	kg	lb
UHPZN2 range	869	34.2	345	13.6	667	26.3	96	211.6	86	189.5

Preventative Maintenance

Preventative Maintenance Kit	Part Number	Change Frequency
Filter Kit - non compressor option	606272561	12 months
Filter Kit - compressor option	606272563	12 months
Compressor Kit 230V	606272581	4,000 hours or 12 months (which ever comes first)
Compressor Kit 120V	606272583	4,000 hours or 12 months (which ever comes first)

Optional Extra's

Description	Part Number	Required for
Installation kit	IK7694	Suitable for all zero nitrogen generators

Ultra High Purity Nitrogen Generators

for GC and other critical analytical applications



The Parker domnick hunter nitrogen gas generators employ robust, field proven technology to produce ultra high purity nitrogen for critical life science, chemical analysis and spectroscopy applications. Flow rates range from 0.55 L/min to 3 L/min, with purities >99.9995%.

The generators provide a continuous stream of ultra high purity nitrogen from a single 'plug & play' unit. Models are available with and without an integral oil free compressor, are extremely quiet in operation and are fully approved for use by major instrumentation manufacturers.

Innovative design features include economy mode as standard which extends compressor life and significantly reduces on going running costs.



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Product Features:

- **Complete 'Plug and Play' system specifically designed for critical analytical applications**
- **Produces a continuous supply of 99.999% purity nitrogen 24 hours a day**
- **Integral oil free compressor, with advanced noise reduction technology**
- **Eliminate inconvenient and potentially dangerous nitrogen cylinders**
- **Compact, reliable with minimal operator attention and maintenance**
- **Economy mode as standard; increases compressor life**

Product Selection

Model	Flow Rate	Purity*	Inlet Air 8 to 9.9 bar (116 to 143 psi)	Outlet Pressure		Integral Compressor
	L/min	%	L/min	bar g	psi g	
UHPN2-550	0.55	>99.9995	33	5	72.5	NO
UHPN2-550C	0.55	>99.9995	n/a	5	72.5	YES
UHPN2-750	0.75	>99.9995	33	5	72.5	NO
UHPN2-750C	0.75	>99.9995	n/a	5	72.5	YES
UHPN2-1500	1.5	>99.9995	117	5	72.5	NO
UHPN2-1500C	1.5	>99.9995	n/a	5	72.5	YES
UHPN2-3000	3.0	>99.9995	117	5	72.5	NO
UHPN2-3000C	3.0	>99.9995	n/a	5	72.5	YES

*Purity with respect to oxygen

Note: Add suffix 'E' for 207-253V 50/60Hz ie. UHPN2-750-E
Add suffix 'W' for 103 -126V 60Hz ie. UHPN2-750-W

Technical Data

Ambient Temperature Range	15 - 25°C / 59 - 77°F
Inlet Air Quality†	Clean dry compressed air ISO8573-1:2010 Class 3.2.1
Supply Voltage Range	103 - 126V 60Hz / 207 - 253V 50/60Hz
Port Connections	Inlet† Outlet UHPN2 550 & 750 Outlet UHPN2 1500 & 3000
	1/4" Compression Fitting 1/8" Compression Fitting 1/4" Compression Fitting

†Non compressor models only

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight (with compressor)		Weight (without compressor)	
	mm	in	mm	in	mm	in	kg	lb	kg	lb
UHPN2-550, 550C, 750, 750C	869	34.2	345	13.6	417	16.4	50	110	44	97
UHPN2-1500, 1500C, 3000, 3000C	869	34.2	345	13.6	667	667	93	205	84	185

Preventative Maintenance

Preventative Maintenance Kit UHPN2-550, 550C, 750, 750C	Part Number	Change Frequency
Filter kit non compressor models	606272551	12 Months
Filter kit - compressor models	606272553	12 Months
Compressor kit 230V	606272577	8,000 hours or 24 months (which ever comes first)
Compressor kit 120V	606272579	8,000 hours or 24 months (which ever comes first)

Preventative Maintenance Kit UHPN2-1500, 1500C, 3000, 3000C	Part Number	Change Frequency
Filter Kit non compressor option	606272551	12 Months
Filter Kit compressor option	606272555	12 Months
Compressor Kit 230V	606272581	8,000 hours or 24 months (which ever comes first)
Compressor Kit 120V	606272583	8,000 hours or 24 months (which ever comes first)

Optional Extra's

Description	606272551	Required for
Installation kit	IK7694	Suitable for all UHP nitrogen generators

High Purity Nitrogen and Dry Air Generators

Analytical instrumentation



The Parker domnick hunter G6 and G7 nitrogen and dry air generators employ robust, field proven technology to produce ultra high purity nitrogen and dry air suitable for chemical analysis applications.

The G6 and G7 generators provide a continuous stream of nitrogen and dry air from a single 'plug & play' unit, are extremely quiet in operation and are fully approved for use by major instrumentation manufacturers.

Innovative technology, design and function combine to completely eliminate all other modes of supply, facilitating maximum instrument uptime, attractive return on investment and proven analytical performance.



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Product Features:

- Ideal for analytical instruments that require high purity nitrogen and air
- Produces a continuous supply of high purity nitrogen 99.999% and dry air
- Integral oil free compressor, with noise reduction technology
- Eliminate inconvenient and potentially dangerous nitrogen cylinders
- Compact, reliable with minimal operator attention and maintenance
- Improve analysis and reproducibility with guaranteed high purity gas

Product Selection

Model	Flow Rate		Purity*		Delivery Pressure		Integral Compressor
	Nitrogen	Dry Air	Nitrogen	Dry Air	bar g	psi g	
	L/min	L/min	%	°C (dew point)			
G6010	0.60	1.5	>99.999	-40	5	72.5	YES
G7010	3	3	>99.999	-40	5	72.5	YES

*Purity with respect to oxygen

Note: Add suffix 'E' for 207-253V 50/60Hz ie G6010-E
Add suffix 'W' for 103 -126V 60Hz ie G6010-W

Technical Data

Ambient Temperature Range	5 - 45°C 41 - 113°F
Supply Voltage Range	103 - 126V 60Hz 207 - 253V 50/60Hz
Port Connections	Outlet (G6010) Outlet (G7010)
	1/8" Compression Fitting 1/4" Compression Fitting

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	in	mm	in	mm	in	kg	lb
G6010	842	33.1	345	13.6	413	16.3	58	127.9
G7010	874	34.4	345	13.6	663	26.1	93	205

Preventative Maintenance

Preventative Maintenance Kit G6	Part Number	Change Frequency
Filter Kit - G6 option 1 (compressor)	606272351	12 Months
Compressor Kit 230V - G6 option 1	606272336	12 Months
Compressor Kit 120V - G6 option 1	606272337	12 Months

Preventative Maintenance Kit G7	606272337	12 Months
Filter Kit - G7 option 1 (compressor)	606272352	12 Months
Compressor Kit 230V - G7 option 1	606272334	12 Months
Compressor Kit 120V - G7 option 1	606272335	12 Months

Optional Extra's

Description	Part Number	Required for
Installation kit	IK7694	Suitable for all HP nitrogen/air generators

Gas Generators for LC/MS

Nitrogen Generators

for LC/MS applications - with optional economy mode



The Parker domnick hunter LCMS nitrogen gas generators employ robust, field proven technology to meet the drying, sheath and nebulisation gas requirements of today's latest LC/MS instrumentation. Five models operate at flow rates from 15 L/min to 50 L/min.

The LCMS generators provide a continuous stream of high purity nitrogen from a single 'plug & play' unit. Models are available with and without an integral oil free compressor, are extremely quiet in operation and are fully approved for use by major instrumentation manufacturers.

Innovative design and technology facilitate maximum instrument uptime, attractive return on investment and proven analytical performance, eliminating the need for other modes of supply.



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Product Features:

- Ultra high purity, organic free, nitrogen
- Produces a continuous supply of LC/MS grade nitrogen 24 hours a day
- Integral oil free compressor, with noise reduction technology
- Optional ECOMax economy module to increase compressor life
- Compact, reliable with minimal operator attention and maintenance
- Phthalate-free componentry

Product Selection

Model	Flow Rate	Purity*	Air Inlet @ 8.5 bar g (123.3 psi g)	Delivery Pressure		Integral Compressor
	L/min	%	L/min	bar g	psi g	
LCMS15-0	15	>99	70	7	101.5	NO
LCMS15-1	15	>99	n/a	7	101.5	YES
LCMS20-0	20	>99	70	7	101.5	NO
LCMS20-1	20	>99	n/a	7	101.5	YES
LCMS30-0	30	>98	130	7	101.5	NO
LCMS30-1	30	>98	n/a	7	101.5	YES
LCMS40-0	40	>99	130	7	101.5	NO
LCMS50-0	50	>98	130	7	101.5	NO

*Purity with respect to oxygen

Note: Add suffix 'E' for 207-253V 50/60Hz ie LCMS15-0-E Add suffix 'W' for 103 -126V 60Hz ie LCMS15-0-W

Technical Data

Ambient Temperature Range	5 - 40°C 41 - 104°F
Inlet Air Quality †	Clean dry compressed air ISO8573-1:2010 Class 3.2.1
Supply Voltage Range	103 - 126V 60Hz 207 - 253V 50/60Hz
Port Connections Nitrogen Outlet / Air Inlet †	1/4" Compression Fitting

†Non compressor models only

LCMS-ECOMax Add-on-Module (Optional Extra)

Product	Description	Compatibility	Installation	Height (H)		Width (W)		Depth (D)		Weight	
				mm	in	mm	in	mm	in	Kg	lb
LCMS-ECOMax-230V	Enables economy mode cycle supplying nitrogen gas only when required, whilst maintaining constant purity	LCMS15-50 models with and without integral compressor	All required fittings supplied with ECOMax module	103	4.06	303	11.93	408	16.06	7.8	17.2

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight (with compressor)	
	mm	in	mm	in	mm	in	kg	lb
LCMS 15-1	705	27.8	510	20.1	826	32.5	129	284
LCMS 20-1	705	27.8	510	20.1	826	32.5	129	284
LCMS 30-1	705	27.8	510	20.1	826	32.5	129	284

Model	Height (H)		Width (W)		Depth (D)		Weight (without compressor)	
	mm	in	mm	in	mm	in	kg	lb
LCMS 15-0	705	27.8	510	20.1	559	22.0	89	196
LCMS 20-0	705	27.8	510	20.1	559	22.0	89	196
LCMS 30-0	705	27.8	510	20.1	760	22.9	135	298
LCMS 40-0	705	27.8	510	20.1	760	22.9	135	298
LCMS 50-0	705	27.8	510	20.1	760	22.9	135	298

Preventative Maintenance

Preventative Maintenance Kit	Part Number	Change Frequency
Filter Kit - all models	606272251	12 Months
Compressor Kit 230V - Option 1 models	606272253	12 Months
Compressor Kit 120V - Option 1 models	606272261	12 Months

Optional Extra's

Description	Part Number	Required for
Installation kit	IK7572	Suitable for all LCMS nitrogen generators

Nitrogen Generators

for Agilent 6400 & 6500 LC/MS instruments



The Parker domnick hunter LCMS64/65 dual flow nitrogen gas generators employ robust, field proven technology to meet the drying, sheath, nebulisation and collision gas requirements of the Agilent Technologies QQQ & Q-TOF instrumentation portfolio.

The LCMS64/65 generators provide two continuous streams of high purity nitrogen from a single 'plug & play' unit. Models are available both with and without an integral oil free compressor, are extremely quiet in operation, and fully approved for use by major instrumentation manufacturers.

Innovative design and technology facilitate maximum instrument uptime, attractive return on investment and proven analytical performance, eliminating the need for other modes of supply.



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Product Features:

- **Complete 'Plug and Play' system specifically designed for the Agilent 6400 & 6500**
- **Produces a continuous supply of LC/MS grade nitrogen 24 hours a day**
- **Integral oil free compressor, with noise reduction technology**
- **Eliminate inconvenient and potentially dangerous nitrogen cylinders**
- **Compact, reliable with minimal operator attention and maintenance**
- **Phthalate-free componentry**

Product Selection

Model	Flow Rate		Purity*		Air Inlet @ 8.5 bar g (123.3 psi g)	Delivery Pressure		Integral Compressor
	Drying, sheath & Nebulisation Nitrogen	Collision cell Nitrogen	Drying, sheath & Nebulisation Nitrogen	Collision cell Nitrogen		bar g	psi g	
	L/min	ml/min	%	%	L/min			
LCMS64-0	18	200	>98	>99.999	90	6.8	98.6	NO
LCMS64-1	18	200	>98	>99.999	n/a	6.8	98.6	YES
LCMS65-0	30	200	>98	>99.999	90	6.8	98.6	NO
LCMS65-1	30	200	>98	>99.999	n/a	6.8	98.6	YES

*Purity with respect to oxygen

Note: Add suffix 'E' for 207-253V 50/60Hz ie LCMS64-0-E
Add suffix 'W' for 103 -126V 60Hz ie LCMS64-0-W

Technical Data

Ambient Temperature Range	5 - 40°C 41 - 104°F
Inlet Air Quality †	Clean dry compressed air ISO8573-1:2010 Class 3.2.1
Supply Voltage Range	103 - 126V 60Hz 207 - 253V 50/60Hz
Port Connections Nitrogen Outlet Air Inlet †	1/4" Compression Fitting 1/4" Compression Fitting

†Non compressor models only

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	in	mm	in	mm	in	kg	lb
LCMS64-0	705	27.8	510	20.1	559	22	103	227
LCMS64-1	705	27.8	510	20.1	826	32.5	143	315
LCMS65-0	705	27.8	510	20.1	559	22	103	227
LCMS65-1	705	27.8	510	20.1	826	32.5	143	315

Preventative Maintenance

Preventative Maintenance Kit	Part Number	Change Frequency
Filter Kit	606272251	12 Months
Compressor Kit 230V - Option 1 models	606272253	12 Months
Compressor Kit 120V - Option 1 models	606272261	12 Months

Optional Extra's

Description	Part Number	Required for
Installation kit	IK7572	Suitable for all LCMS nitrogen generators

Nitrogen and Dry Air Generators

for LC/MS instruments



The Parker domnick hunter LCMS20/3 dual flow nitrogen and dry air generators employ robust, field proven technology to meet the nebulisation requirements of LC/MS instruments, both in positive and negative ionisation mode.

The LCMS20/3 generators provide two continuous streams of high purity nitrogen and dry air from a single 'plug & play' unit. Models are available with and without an integral oil free compressor, are extremely quiet in operation and are fully approved for use by major instrumentation manufacturers.

Innovative design and technology facilitate maximum instrument uptime, attractive return on investment and proven analytical performance, eliminating the need for other modes of supply.



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Product Features:

- **Complete 'Plug and Play' system specifically designed for LC/MS**
- **Produces a continuous supply of LC/MS grade nitrogen 24 hours a day**
- **Integral oil free compressor, with noise reduction technology**
- **Eliminate inconvenient and potentially dangerous nitrogen cylinders**
- **Compact, reliable with minimal operator attention and maintenance**
- **Phthalate-free componentry**

Product Selection

Model	Flow Rate		Purity*		Air Inlet @ 8.5 bar g (123.3 psi g)	Delivery Pressure		Integral Compressor
	Nebulisation Nitrogen (positive ionisation mode)	Nebulisation Dry Air (negative ionisation mode)	Nebulisation Nitrogen (positive ionisation mode)	Nebulisation Dry Air (negative ionisation mode)		bar g	psi g	
	L/min	L/min	%	°C (dew point)				
LCMS20/3-0	20	3	>99	-40	85	7	101.5	NO
LCMS20/3-1	20	3	>99	-40	n/a	7	101.5	YES

*Purity with respect to oxygen

Note: Add suffix 'E' for 207-253V 50/60Hz ie. LCMS20/3-0-E
Add suffix 'W' for 103 -126V 60Hz ie. LCMS20/3-0-W

Technical Data

Ambient Temperature Range	5 - 40°C 41 - 104°F
Inlet Air Quality †	Clean dry compressed air ISO8573-1:2010 Class 3.2.1
Supply Voltage Range	103 - 126V 60Hz 207 - 253V 50/60Hz
Port Connections Outlet Inlet †	1/4" Compression Fitting 1/4" Compression Fitting

†Non compressor models only

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	in	mm	in	mm	in	kg	lb
LCMS20/3-0	705	27.8	510	20.1	559	22	103	227
LCMS20/3-1	705	27.8	510	20.1	826	32.5	143	315

Preventative Maintenance

Preventative Maintenance Kit	Part Number	Change Frequency
Filter Kit	606272251	12 Months
Compressor Kit 230V - Option 1 models	606272253	12 Months
Compressor Kit 120V - Option 1 models	606272261	12 Months

Optional Extra's

Description	Part Number	Required for
Installation kit	IK7572	Suitable for all LCMS nitrogen generators

MIDIGAS LAB

for multiple LC/MS and centralised laboratory supply applications



The Parker domnick hunter MIDIGAS LAB nitrogen gas generators employ robust, field proven technology to produce high purity nitrogen for a number of medium flow, high demand analytical applications, such as multiple LC/MS installations. Flow rates range from 9 L/min to 408 L/min, with purities from >95% to >99.999%.

The MIDIGAS LAB generators provide a continuous stream of high purity nitrogen from a innovative modular unit. Models are available with or without an external compressed air system, and offer a compelling alternative to other modes of supply such as cylinders or liquid.

Innovative design and technology facilitate maximum instrument uptime, attractive return on investment and proven analytical performance.



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Product Features:

- **Innovative modular system specifically for multiple LC/MS and centralised supply applications**
- **Produces a continuous stream of high purity analytical grade nitrogen 24 hours a day**
- **Integral automatic economy mode and continuous purity monitoring**
- **Digital and analogue outputs of remote monitoring and alarm capabilities**
- **Eliminate inconvenient and potentially dangerous nitrogen cylinders and dewars**
- **Robust, reliable with minimal operator attention and maintenance**

Product Selection

Performance data is based on 7 bar g (100 psi g) air inlet pressure and 20° - 25°C (66° - 77°F) ambient temperature. Consult Parker for performance under other specific conditions.

Nitrogen flow rate m ³ /hr vs Purity (Oxygen Content)												
Model	Unit	10ppm	100ppm	250ppm	500ppm	0.1%	0.5%	1.0%	2.0%	3.0%	4.0%	5.0%
MIDIGAS2 LAB	m ³ /hr	0.55	1.2	1.5	1.9	2.4	3.4	4.3	5.8	7.2	8.4	9.4
	cfm	0.3	0.7	0.9	1.1	1.4	2.0	2.5	3.5	4.2	4.9	5.5
MIDIGAS4 LAB	m ³ /hr	1.2	2.4	3.2	3.9	4.7	6.9	8.5	11.6	14.3	16.7	18.8
	cfm	0.7	1.4	1.9	2.3	2.8	4.1	5.0	6.8	8.4	9.8	11.1
MIDIGAS6 LAB	m ³ /hr	1.5	3.2	4.2	5.3	6.5	9.5	11.5	15.2	18.7	21.7	24.5
	cfm	0.9	1.9	2.5	3.1	3.8	5.6	6.8	8.9	11.0	12.8	14.4

m³ reference standard = 20°C, 1013 millibar(a), 0% relative water vapour pressure.

Technical Data

Ambient temperature range	5 - 50°C	
Nitrogen outlet pressure	up to 11 bar g	
Air inlet pressure	6 to 13 bar g	
Air Inlet Quality	Pressure Dewpoint	-40°C
	Particulate	<0.1 micron
	Oil	<0.01 mg/m ³
Supply Voltage Range	103 - 126V 60Hz 207 - 253V 50/60Hz	
Inlet/outlet connections	G ¹ / ₂	

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight (with compressor)	
	mm	in	mm	in	mm	in	kg	lb
MIDIGAS2 LAB	1034	41	450	18	471	19	98	216
MIDIGAS4 LAB	1034	41	450	18	640	26	145	320
MIDIGAS6 LAB	1034	41	450	18	809	33	196	432

NITROSource

Part of the MAXIGAS Range

Advanced technology nitrogen gas generator for industry leading performance; a source of increased productivity, sustainability and profitability.



With unique design and advanced energy saving technology at its core the market leading NITROSource nitrogen gas generator requires less compressed air to generate more nitrogen.

Together with substantially lower servicing costs, reduced downtime and a longer working life, it adds up to the most cost-efficient nitrogen supply available; significantly more affordable than traditional sources, and delivering huge savings over the lifetime of the generator.

With over 20 years experience in the market, and over 50,000 units installed globally, Parker domnick hunter is first choice for innovative and reliable gas generation technology.



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Features and Benefits:

- **Energy saving technology**
Matches compressed air flow to the nitrogen outlet flow and purity, reducing compressed air use, and saving energy and money.
- **Lower cost maintenance, extensive working life**
The Carbon Molecular Sieve, the 'engine' of the generator delivers nitrogen more efficiently, leading to a very long working life – and major savings on maintenance.
- **Five year warranty**
Free through Parker extended warranty, offering the assurance of no unexpected maintenance costs and maximised factory up-time.*
- **Industry compliance**
Food and pharmaceutical safe, in line with European statute (EIGA) and the USA Food & Drugs Administration (FDA Article 21) and Pharmacopeia compliance.
- **Gas quality control**
 - **Mass Flow Controller** - ensuring correct set pressure and flow
 - **Integral Oxygen Analyser** - constantly measures gas purity
 - **Off-Gas-By-Pass** - automatically vents off out-of-specification gas ensuring product quality by ensuring gas quality
 - **Inlet and Outlet Pressure Regulation** - preventing damage to the generator or application
 - **Electronic Control System** – 100% management of all critical generator functions
- **Remote monitoring**
Enabling connection to proprietary remote management and the generator control systems to control and track gas parameters from a central location
- **Easily upgradable supply**
Simply add extra generators as the application requirement grows.

*Subject to terms and conditions. Please contact your local authorised Parker distributor.

Product Selection

Performance data is based on 7 bar g air inlet pressure and 20°C - 25°C ambient temperature. Consult Parker for performance under specific conditions.

Model	Nitrogen flow rates m ³ /hr vs Purity (oxygen content)													
	5 ppm	10ppm	50ppm	100ppm	250ppm	500ppm	0.10%	0.40%	0.50%	1%	2%	3%	4%	5%
N2-20P	3.5	4.5	6.7	8.0	9.7	11.1	12.4	16.7	17.7	21.3	25.3	29.8	30.9	33.7
N2-25P	5.3	6.8	10.1	12.0	14.6	16.7	18.6	25.1	26.6	32.0	38.0	44.7	46.4	50.6
N2-35P	7.0	9.0	13.4	16.0	19.4	22.2	24.8	33.4	35.4	42.6	50.6	59.6	61.8	67.4
N2-45P	8.8	11.3	16.8	20.0	24.3	27.8	31.0	41.8	44.3	53.3	63.3	74.5	77.3	84.3
N2-55P	10.5	13.5	20.1	24.0	29.1	33.3	37.2	50.1	53.1	63.9	75.9	89.4	92.7	101.1
N2-60P	11.6	15.0	22.3	26.6	32.3	36.9	41.2	55.5	58.9	70.8	84.1	99.1	102.7	112.1
N2-65P	13.3	17.1	25.5	30.4	36.9	42.2	47.1	63.5	67.3	80.9	96.1	113.2	117.4	128.1
N2-75P	14.5	18.6	27.7	33.1	40.2	46.0	51.3	69.1	73.3	88.2	104.7	123.4	127.9	139.5
N2-80P	16.1	20.7	30.8	36.8	44.6	51.1	57.0	76.8	81.4	98.0	116.4	137.1	142.1	155.0

m³ reference standard 20°C, 1013 millibar(a), 0% relative water vapour pressure.

Inlet Parameters

Inlet Air Quality	ISO 8573-1: 2010 Class 2.2.2 (2.2.1 with high oil vapour content)
Inlet Air Pressure Range	5-13 bar g

Environmental Parameters

Ambient Temperature	5-50°C
Humidity	50% @ 40°C (80% @ MAX @ 31°C)
IP Rating	IP20 / NEMA 1
Pollution Degree	2
Installation Category	II
Altitude	< 2000 m
Noise	<80 dB (A)

Electrical Parameters

Generator Supply	100 - 240 +/- 10% Vac 50/60Hz
Generator Power	55 W
Fuse	3.15 A (Anti Surge (T), 250v, 5 x 20mm HBC, Breaking Capacity 1500A @ 250v, IEC 60127, UL R/C Fuse)

Port Connections

Air Inlet	G1
N2 Outlet to Buffer	G1
N2 Inlet from Buffer	G1 1/2
N2 Outlet	G1 1/2

Weights and Dimensions

Model	Height (mm)	Width (mm)	Depth (mm)	Weight (Kg)
N2-20P	1894	550	881	299
N2-25P			1050	384
N2-35P			1219	469
N2-45P			1388	553
N2-55P			1557	638
N2-60P			1726	722
N2-65P			1895	807
N2-75P			2064	892
N2-80P			2233	976

Packed Weights and Dimensions

Model	Height (mm)	Width (mm)	Depth (mm)	Weight (Kg)
N2-20P	729		1090	398.4
N2-25P			1260	495.4
N2-35P			1430	580.4
N2-45P			1600	686.4
N2-55P	832		1770	782.4
N2-60P			1935	897.4
N2-65P			2100	997.4
N2-75P			2275	1093.4
N2-80P			2445	1186.4

For more information please contact your local sales office or visit www.parker.com

Parker has a continuous policy of product development and although the company reserves the right to changes specifications, it attempts to keep customers informed of any alterations.

**Gas Generators for
Spectroscopy, TOC,
Circular Dichroism,
Digital Radiography
and evaporation**

High Purity Nitrogen Generators

For Analytical Instruments Including ICP



The Parker domnick hunter nitrogen gas generators employ robust, field proven technology to produce high purity nitrogen for life science, chemical analysis and spectroscopy applications. Flow rates range from 5 to 12.5 lpm, with purities from 99.8 to 99.999%.

The generators provide a continuous stream of high purity nitrogen from a single 'plug & play' unit. Models are available with and without an integral oil free compressor, are extremely quiet in operation and are fully approved for use by major instrumentation manufacturers.

Innovative design features include economy mode as standard which extends compressor life and significantly reduces on going running costs.



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Product Features:

- **Complete 'Plug and Play' system for laboratory applications**
- **Produces a continuous supply of nitrogen from 99.8% to 99.999% purity**
- **Integral oil free compressor, with advanced noise reduction technology**
- **Eliminate inconvenient and potentially dangerous nitrogen cylinders**
- **Compact, reliable with minimal operator attention and maintenance**
- **Economy mode as standard, increases compressor life**

Product Selection

Model	Flow Rate		Purity*	Inlet air @ 8 to 9.9 bar (116 to 143 psi) **	Outlet Pressure		Integral Compressor
	L/min				bar g	psi g	
HPN2-5000	5	>99.999	110	5	72.5	No	
HPN2-5000C	5	>99.999	n/a	5	72.5	Yes	
HPN2-7000	7	>99.9	110	5	72.5	No	
HPN2-7000C	7	>99.9	n/a	5	72.5	Yes	
HPN2-10000	10	>99.8	110	5	72.5	No	
HPN2-10000C	10	>99.8	n/a	5	72.5	Yes	
HPN2-12500	12.5	>99.5%	129	5	72.5	No	
HPN2-12500C	12.5	>99.5%	n/a	5	72.5	Yes	

*Purity with respect to oxygen

** Model HPN2-12500 min inlet 9 bar (130 psi)

Note: Add suffix 'E' for 207-253V 50/60Hz ie. HPN2-7000-E

Add suffix 'W' for 103 -126V 60Hz ie. HPN2-7000-W

Technical Data

Ambient Temperature Range	15 - 25°C / 55 - 77°F
Inlet Air Quality †	Clean dry compressed air / ISO8573-1:2010 Class 3.2.1
Supply Voltage Range	103 - 126V 60Hz / 207 - 253V 50/60Hz
Port Connections Outlet Inlet †	1/4" Compression Fitting 1/4" Compression Fitting

†Non compressor models only

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight (with compressor)		Weight (without compressor)	
	mm	in	mm	in	mm	in	kg	lb	kg	lb
HPN2 range	869	34.2	345	13.6	667	26.3	95	189.6	86	209.4

Preventative Maintenance

Preventative Maintenance Kit - all models	Part Number	Change Frequency
Filter kit - non compressor models	606272557	12 Months
Filter kits - compressor models	606272559	12 Months
Compressor Kit 230V models	606272581	8,000 hours or 24 months (which ever comes first)
Compressor Kit 120V models	606272583	8,000 hours or 24 months (which ever comes first)

Optional Extra's

Description	Part Number	Required for
Installation kit	IK7694	Suitable for all HP nitrogen generators

Nitrogen Generators

for Circular Dichroism and ICP purge applications



The Parker domnick hunter CD10 nitrogen gas generator employs robust, field proven technology to meet the complete purge gas requirements of today's latest Circular Dichroism and ICP instrumentation.

The CD10 generator provides a continuous stream of ultra high purity nitrogen suitable for optic, source and plasma torch purge applications, maximising instrument uptime, productivity and enhancing spectroscopic resolution. The CD10 is extremely quiet in operation and fully approved for use by major instrumentation manufacturers.

Innovative design and technology facilitate maximum instrument uptime, attractive return on investment and proven analytical performance, eliminating the need for other modes of supply.



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Product Features:

- **Specifically designed for Circular Dichroism and ICP applications**
- **Produces a continuous supply of high purity 99.9965% nitrogen 24 hours a day**
- **Simple to install and operate**
- **Eliminate inconvenient and potentially dangerous nitrogen cylinders**
- **Compact, reliable with minimal operator attention and maintenance**
- **Phthalate-free componentry**

Product Selection

Model	Flow Rate	Purity*	Air Inlet @ 8.5 bar g (123.3 psi g)	Delivery Pressure		Integral Compressor
	L/min	%	L/min	bar g	psi g	
CD10-0	10	>99.9965	130	7	101.5	NO

*Purity with respect to oxygen

Note: Add suffix 'E' for 207-253V 50/60Hz ie CD10-0-E
Add suffix 'W' for 103 -126V 60Hz ieCD10-0-W

Technical Data

Ambient Temperature Range	5 - 40°C 41 - 104°F
Inlet Air Quality	Clean dry compressed air ISO8573-1:2010 Class 3.2.1
Supply Voltage Range	103 - 126V 60Hz 207 - 253V 50/60Hz
Port Connections	Outlet Inlet
	1/4" Compression Fitting 1/4" Compression Fitting

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	in	mm	in	mm	in	kg	lb
CD10-0	705	27.8	510	20.1	760	29.9	135	298

Preventative Maintenance

Preventative Maintenance Kit	Part Number	Change Frequency
Filter Kit	606272251	12 Months

Optional Extra's

Description	Part Number	Required for
Installation kit	IK7698	Suitable for all ICP/CD nitrogen generators

Nitrogen Generators

for Edge Medical Devices



The Parker domnick hunter G1-LN-800 nitrogen gas generator employs robust, field proven technology to produce ultra high purity nitrogen for critical life science applications.

The G1-LN-800 generator provides a continuous stream of ultra high purity nitrogen from a single 'plug & play' unit. This system is available with an integral oil free compressor, and is extremely quiet in operation.

Innovative design and technology facilitate maximum instrument uptime, attractive return on investment and proven analytical performance, eliminating the need for other modes of supply.



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Product Features:

- **Complete 'Plug and Play' system specifically designed for Edge Medical**
- **Produces a continuous supply of high purity 99.999% nitrogen 24 hours a day**
- **Integral oil free compressor, with noise reduction technology**
- **Eliminate inconvenient and potentially dangerous nitrogen cylinders**
- **Compact, reliable with minimal operator attention and maintenance**
- **Phthalate-free componentry**

Product Selection

Model	Flow Rate	Purity*	Outlet Pressure		Integral Compressor
	ml/min	%	mbar g	psi g	
G1-LN-800	800	>99.999	17	0.25	YES

*Purity with respect to oxygen

Note: Add suffix 'E' for 207-253V 50/60Hz ie G1-LN-800-E
Add suffix 'W' for 103 -126V 60Hz ie G1-LN-800-W

Technical Data

Ambient Temperature Range	5 - 45°C 41 - 113°F
Supply Voltage Range	103 - 126V 60Hz 207 - 253V 50/60Hz
Port Connections Outlet	1/4" Compression Fitting

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	in	mm	in	mm	in	kg	lb
G1-LN-800	567	22.3	400	15.7	700	27.5	82	181

Preventative Maintenance

Preventative Maintenance Kit	Part Number	Change Frequency
Filter and Compressor Kit 230V	606272440	12 Months
Filter and Compressor Service Kit 120V	606272442	12 Months

Optional Extra's

Description	Part Number	Required for
Installation kit	IK7694	Suitable for Edge nitrogen generators

Dry Air Generators

for spectroscopy applications



The Parker domnick hunter G8 and G9 dry air generators employ robust, field proven technology to produce high purity dry air suitable for spectroscopy applications.

The G8 and G9 generators provide a continuous stream of dry air from a single 'plug & play' unit, are extremely quiet in operation and are fully approved for use by major instrumentation manufacturers.

Innovative design and technology facilitate maximum instrument uptime, attractive return on investment and proven analytical performance, eliminating the need for other modes of supply.



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Product Features:

- Ideal for analytical instruments that require ultra dry air
- Eliminate inconvenient and potentially dangerous nitrogen cylinders
- Integral oil free compressor, with noise reduction technology
- Produces a continuous supply of clean dry air 24 hours a day
- Compact, reliable with minimal operator attention and maintenance
- Phthalate-free componentry

Product Selection

	Flow Rate	Purity	Delivery Pressure		Integral Compressor
	L/min	°C (dew point)	bar g	psi g	
G8010	3	-40	5	72.5	YES
G9010	6	-40	5	72.5	YES

Note: Add suffix 'E' for 207-253V 50/60Hz ie G8010-E
Add suffix 'W' for 103 -126V 60Hz ie G8010-W

Technical Data

Ambient Temperature Range	5 - 45°C 41 - 113°F
Supply Voltage Range	103 - 126V 60Hz 207 - 253V 50/60Hz
Port Connections Outlet	1/8" Compression Fitting

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	in	mm	in	mm	in	kg	lb
G8010	842	33.1	345	13.6	413	16.3	54	119
G9010	842	33.1	345	13.6	413	16.3	54	119

Preventative Maintenance

Preventative Maintenance Kit G8	Part Number	Change Frequency
Filter Kit - G8 option 1 (compressor)	606272351	12 Months
Compressor Kit 230V - G8 option 1	606272336	12 Months
Compressor Kit 120V - G8 option 1	606272337	12 Months

Preventative Maintenance Kit G9	Part Number	Change Frequency
Filter Kit - G9 option 1 (compressor)	606272351	12 Months
Compressor Kit 230V - G9 option 1	606272336	12 Months
Compressor Kit 120V - G9 option 1	606272337	12 Months

Optional Extra's

Description	Part Number	Required for
Installation kit	IK7694	Suitable for all dry air generators

CO₂ Free Air Generators

for FT-IR & TOC Applications



The Parker Zander K-MT-LAB CO₂ removal purifier employs, robust, field proven technology to produce ultra high purity CO₂ free air for critical FT-IR and TOC purge applications. Flow rates range from 1.5 L/min to 100 L/min, with purities <1 ppm residual CO₂ and <0.003 ppm residual hydrocarbons.

The K-MT-LAB CO₂ removal purifiers provide a continuous stream of ultra high purity CO₂ free air from a single compact system. K-MT-LAB systems employ both upstream and downstream filtration to safeguard your analytical workflow.

Innovative design and technology facilitate maximum instrument uptime, attractive return on investment and proven analytical performance eliminating the need for other modes of supply.



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Product Features:

- Complete compact and modular design for critical applications
- Produces a continuous supply CO₂ free air 24 hours a day
- Ultra high purity reduces signal/noise ratio, improving analytical performance
- Protects delicate optic surfaces and air bearings against moisture
- Eliminate inconvenient and potentially dangerous synthetic air cylinders
- Compact, reliable with minimal operator attention and maintenance

Technical Data

Cleanroom air generator K-MT-LAB	K-MTLAB 1	K-MTLAB 3	K-MTLAB 6
Outlet flow rate	1.5 NI/min	20 NI/min	100 NI/min
Regeneration gas volume	10 NI/min	36 NI/min	75 NI/min
Inlet flow rate	11.5 NI/min	56 NI/min	175 NI/min
Inlet temperature	+ 5°C to + 30°C		
CO ₂ outlet concentration	< 1 ppm at max. 380 ppm at the inlet		
Residual hydrocarbons	< 0.003 ppm		
Particle separation	0.01 µm		
Pressure dewpoint	up to - 70°C		
Operating pressure	5 barü		
Initial differential pressure incl. filtration	300 mbar		
Connections	G 1/4"	G 1/4"	G 3/8"

Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	in	mm	in	mm	in	kg	lb
K-MTLAB1	401	15.8	372	14.6	210	8.2	14	30.8
K-MTLAB3	827	32.5	429	16.8	210	8.2	20	44
K-MTLAB6	1185	46.6	580	22.8	300	11.8	54	119

Preventative Maintenance

Preventative Maintenance Kit	Part Number	Change Frequency
Filter cartridges, condensate drain, silencer, reset module	KM 18 LAB 1-3	18 months
	KM 18 LAB 6	
Filter cartridges, condensate drain, silencer, main valves, seal set, reset module	KM 36 LAB 1-3	36 months
	KM 36 LAB 6	
Desiccant pack, 2.0 kg of molecular filter granulate *	DESPAC 2 LAB	

Optional Extra's

Description	Part Number	Required for
Installation kit	IK7572	Suitable for all FT-IR generators

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 'H' or 'H-MD'	PEM + Desiccant or PEM + Micro dryer		
	H2 as carrier gas (displacing Helium)	UHP	up to 200 ml/min	Hydrogen, 'H-MD'	PEM + Micro Dryer		
	Zero Air as flame support gas	Zero Grade	300-500 ml/min	Zero Air UHP-ZA-S	Catalytic Module		
	N2 for packed carrier gas	Zero Grade	20-50 ml/min	Zero Nitrogen, G5	N2 PSA + Catalytic Module		
	N2 as detector make-up gas	Zero Grade	30-50 ml/min	Zero Nitrogen, G5	N2 PSA + Catalytic Module		
GC - Flame Photometric Detector (FPD)	Hydrogen as fuel gas	UHP	60-90 ml/min	Hydrogen 'H' or 'H-MD'	PEM + Desiccant or PEM + Micro dryer		
	Zero Air as flame support gas	Zero Grade	90-120 ml/min	Zero Air UHP-ZA-S	Catalytic Module		
GC - Nitrogen Phosphorous Detector (NPD)	Hydrogen as carrier gas (displacing Helium)	UHP	up to 50 ml/min	Hydrogen, 'H-MD'	PEM + Micro Dryer		
	Nitrogen as detector make-up gas	Zero Grade	up to 30 ml/min	Zero Nitrogen, G5	N2 PSA + Catalytic Module		
GC - Electron Capture Detector (ECD)	Nitrogen as carrier gas	Zero Grade	up to 60 ml/min	Zero Nitrogen, G5	N2 PSA + Catalytic Module		
	Nitrogen as detector make-up gas	Zero Grade	up to 100 ml/min	Zero Nitrogen, G5	N2 PSA + Catalytic Module		
GC - Thermal Conductivity Detector (TCD)	Hydrogen as carrier gas	UHP	up to 50 ml/min	Hydrogen 'H' or 'H-MD'	PEM + Desiccant or PEM + Micro dryer		
GC - Automatic Thermal Desorption (ATD)	Nitrogen as purge gas	UHP	up to 150 ml/min	UHP Nitrogen, G1 or G2	N2 PSA		
GC - Atomic Emission Detector (AED)	Nitrogen as carrier gas	Zero Grade	up to 1 ml/min	Zero Nitrogen, G5	N2 PSA + Catalytic Module		
GC - Electrolytic Conductivity Detector (ELCD & Hall ELCD)	Hydrogen as reaction gas	UHP	70 to 200 ml/min	Hydrogen 'H' or 'H-MD'	PEM + Desiccant or PEM + Micro dryer		
GC/MS - Carrier Gas	Hydrogen as carrier gas (displacing Helium)	UHP	up to 50 ml/min	Hydrogen, 'H-MD'	PEM + Micro Dryer		
Products for LC/MS Instruments							
LC/MS - Nebulisation Gas	Nitrogen used to nebulise liquid into aerosol	HP	up to 32 L/min	Nitrogen, LCMS-15 to 50	N2 PSA		
			34 - 228 L/min	Nitrogen, Midi Gas Lab	N2 PSA		
			up to 567 L/min	Nitrogen, Maxi Gas Lab	N2 PSA		
LC/MS - Source Gas	Nitrogen used as a source gas	HP	up to 17 L/min	TriGas, LCMS-5000 series	N2 Membrane		
			Zero Air as source gas to remove hydrocarbons	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		
			Clean Dry Air for exhaust gas purge	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, LCMS-15 to 50	N2 PSA		
			34 - 228 L/min	Nitrogen, Midi Gas Lab	N2 PSA		
			up to 567 L/min	Nitrogen, Maxi Gas Lab	N2 PSA		
LC/MS - Collision Cell Gas	Nitrogen used as collision gas	UHP	up to 25 ml/min	Nitrogen, G5	N2 PSA		
LC/MS - Matrix Assisted Laser Desorption Ionisation	Nitrogen as laser purge guide	UHP	up to 5 L/min	Nitrogen, G4	N2 PSA		
LC/MS - Multiple Instrument Supply	Nitrogen as nebulisation/sheath/exhaust gas	HP	Various	Nitrogen, Midi Gas Lab	N2 PSA		
				Maxi Gas Lab	N2 PSA		
FT/MS - Fourier Transform Mass Spectrometry	Nitrogen as laser flush/purge gas	HP	up to 100 L/min	Nitrogen, Midi Gas Lab	N2 PSA		
				Maxi Gas Lab	N2 PSA		

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 generators	PSA - Desiccant
Nuclear Magnetic Resonance (NMR)	Air for lifting, spinning & ejecting, <400MHz	CDA	60-100 L/min	CDA, Mida	CDA PSA - Desiccant
	Nitrogen for lifting, spinning & ejecting, >400MHz	HP		Midi Gas Lab	N2 PSA
				Maxi Gas Lab	N2 PSA
Inductively Coupled Plasma - Mass Spectrometry (ICP-MS)	Hydrogen as collision cell reaction gas	UHP	up to 250 ml/min	Hydrogen, 'H-MD'	PEM + Micro Dryer
Inductively Coupled Plasma Optical Emission Spectrometers (ICP-OES)	Nitrogen as purge gas for plasma torch	UHP	up to 9 L/min	Nitrogen, G4	N2 PSA
Atomic Emission Spectrometers (AA - Flame)	Air for flame support gas	CDA	28-200 L/min	CDA, Midas	PSA - Desiccant
Particle Sizing Instruments	Air to purge and drying gas	CDA	up to 100 L/min	CDA, Midas	PSA - Desiccant
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	PSA - Desiccant
		Zero Grade		Zero Air, UHP-ZA-S	Catalytic Module
	Nitrogen for carrier gas	UHP	50-700 ml/min	Nitrogen, G2	N2 PSA
Total Hydrocarbon Analyser (THA)	Hydrogen as fuel gas	UHP	5-50 ml/min	Hydrogen 'H' or 'H-MD'	PEM + Desiccant or PEM + Micro dryer
	Zero Air as flame support gas	Zero Grade	50-500 ml/min	Zero Air, UHP-ZA-S	Catalytic Module
Differential Scanning Calorimetry (DSC)	Nitrogen as shield/sheath gas	UHP	100 ml/min	Nitrogen, G1	N2 PSA
Thermal Gravimetric Analyser (TGA)	Nitrogen as inerting/blanket furnace gas	UHP	300 ml/min	Nitrogen, G1	N2 PSA
CO2 Analyser	CO2 free air as calibration gas	CO2 free air	550-1000 ml/min	CO2 free air	PSA - Desiccant
Chemisorption/Physisorption	Hydrogen as measurement gas	UHP	up to 250 ml/min	Hydrogen, 'H-MD'	PEM + Micro Dryer
	Nitrogen as measurement gas	UHP	up to 250 ml/min	Nitrogen, G1	N2 PSA
Other Laboratory Applications					
Sample Preparation/Solvent Evaporators (TurboVap)	Nitrogen as inert evaporation gas	HP	6-50 L/min	Nitrogen, G4 or LCMS-50	N2 PSA
Circular Dichroism (CD)	Nitrogen as source and optics purge	UHP	up to 10 L/min	Nitrogen, CD-10	N2 PSA
Evaporative Light Scattering Detector (ELSD)	Nitrogen as nebulisation gas	HP	up to 8 L/min	Nitrogen, G4	N2 PSA
Corona Charged Aerosol Detector (CAD)	Nitrogen as nebulisation gas	HP	up to 8 L/min	Nitrogen, G4	N2 PSA
Condensation Nucleation Light Scattering Detector (CNLSD)	Nitrogen as nebulisation gas	HP	up to 8 L/min	Nitrogen, G4	N2 PSA
CO2 Incubators (IVF, Stem Cell & Regenerative Medicine)	Nitrogen to create oxygen deficient atmosphere	HP	up to 12 L/min	Nitrogen, G4	N2 PSA
Chemical Vapour Deposition Instrumentation (CVD)	Hydrogen to aid deposition process	UHP	up to 1L/min	Hydrogen, 'H-MD'	PEM + Micro Dryer
	Nitrogen to aid deposition process	UHP	up to 1L/min	Nitrogen, G1 & G2	N2 PSA
Plasma Cleaning Instrumentation (UCP)	Hydrogen as a high efficiency process gas	UHP	up to 1000 ml/min	Hydrogen, 'H-MD'	PEM + Micro Dryer
Digital Radiography (Edge, General Electric, Varian Medical)	Nitrogen to inert/purge diode array	UHP	up to 550 ml/min	Nitrogen, G1	N2 PSA
Hydrogenation (Organic Chemistry)	Hydrogen as reaction gas	UHP	up to 250 ml/min	Hydrogen, 'H' range	PEM + Desiccant

Notes

(This area contains horizontal lines for writing notes.)



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