



Analytical Gas Systems Products for Spectroscopy

Bulletin AGS-Spectroscopy-B

aerospace

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

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Aerospace	Hydraulics
Climate Control	Pneumatics
Electromechanical	Process Control
Filtration	Sealing & Shielding
Fluid & Gas Handling	

Legal Notifications



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FT-IR Purge Gas Generators

The Parker Balston FT-IR Purge Gas Generator is specifically designed for use with FT-IR Spectrometers to provide a purified purge and air bearing gas from compressed air. The generator supplies carbon dioxide-free air at less than -100°F (-73°C) dew point with no suspended impurities larger than $0.01\text{ }\mu\text{m}$. The unit is designed to operate continuously 24 hours/day, 7 days/week. The Parker Balston Purge Gas Generator completely eliminates the inconvenience and the high costs of nitrogen cylinders and dewars, and significantly reduces the costs of operating FT-IR

instrumentation. The Parker Balston unit offers cleaner background spectra in a shorter period of time and more accurate analysis by improving the signal-to-noise ratio. The typical payback period is less than one year. The generator is also ideally suited for use with CO_2 Analyzers and Matrix GC's in addition to supplying gas to other laboratory instruments.

The generators are quiet, reliable, and easy to install - simply attach the inlet and outlet air lines (at least 60 psig and 1/4 inch pipe), plug the power cord into a wall outlet, and enjoy trouble-free operation.



Model 75-52, 75-62, and 75-45



Features and Benefits

- Eliminates the need for costly, dangerous, inconvenient nitrogen cylinders in the laboratory
- Compact design frees up valuable laboratory floor space
- Improves signal-to-noise ratio even on non-purge systems
- Increases FT-IR sample thru-put and maximizes up-time
- Recommended and used by all major FT-IR manufacturers



Here's what your colleagues say:

"A Parker Balston FT-IR Purge Gas Generator and Self Contained Lab Gas Generator were used in conjunction with the Society for Applied Spectroscopy Fourier Transform Infrared Spectrometry Workshop at the University of Georgia, June 2000 (organized by Dr. James A de Haseth and Dr. Peter R. Griffiths). The Self-Contained Lab Gas Generator provided excellent purge for six spectrometers. The organizers were so pleased with the performance of the Parker Balston systems, they have requested that Parker Hannifin Corporation, Inc. participate in future workshops."

*Dr. James A. de Haseth and
Dr. Peter R. Griffiths*

FT-IR Purge Gas Generators

Principal Specifications

Model Number	75-45	75-52	75-62
Flow Rate for Specified Dew Point Inlet Pressure 125 psig Inlet Pressure 60 psig	36 scfh (17 lpm) 18 scfh (9 lpm)	72 scfh (34 lpm) 36 scfh (17 lpm)	216 scfh (102 lpm) 120 scfh (57 lpm)
CO ₂ Concentration	< 1 ppm	< 1 ppm	< 1 ppm
Dew Point	-100°F (-73°C)	-100°F (-73°C)	-100°F (-73°C)
Min/Max Inlet Air Pressure	60 psig/125 psig	60 psig/125 psig	60 psig/125 psig
Max Inlet Air Temperature (1)	78°F (25°C)	78°F (25°C)	78°F (25°C)
Air Consumption for regeneration (2)	30 scfh (14 lpm)	60 scfh (28 lpm)	120 scfh (57 lpm)
Inlet/Outlet Port Size	1/4" NPT (female)	1/4" NPT (female)	1/4" NPT (female)
Electrical Requirements (3)	100-230 VAC, 50/60 Hz	100-230 VAC, 50/60 Hz	100-230 VAC, 50/60 Hz
Dimensions	7"w x 13"h x 6"d (18cm x 33cm x 15cm)	13"w x 28"h x 9"d (32cm x 71cm x 23cm)	13"w x 42"h x 9"d (32cm x 102cm x 23cm)
Shipping Weight	26 lbs (12 kg)	60 lbs (27 kg)	88 lbs (40 kg)

NOTES

- 1 Outlet dew point will increase at higher inlet compressed air temperatures.
- 2 Total air consumption = regeneration flow + flow demand.
- 3 Units provided with universal power supply.

Ordering Information

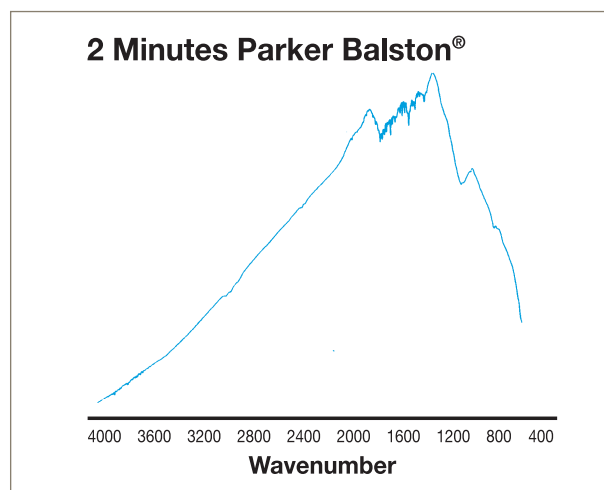
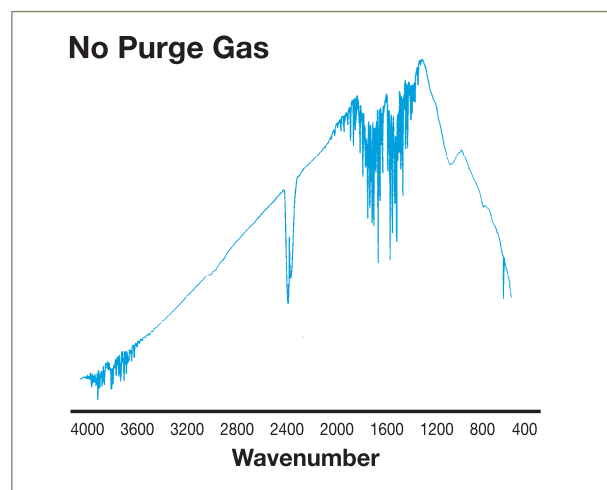
for assistance, call 800-343-4048, 8 to 5 Eastern Time

Model Number	75-45	75-52	75-62
Annual Maintenance Kit	MK7505	MK7552	MK7520
Installation Kit for All Models	IK-0001*	IK-0001*	IK-0002*
Preventive Maintenance Plan	75-45-PM	75-52-PM	75-62-PM
Extended Support with 24 Month Warranty	75-45-DN2	75-52-DN2	75-62-DN2

*Consult factory for tubing needs.

Comparative Spectral Analysis in Purging an FT-IR Sample Chamber

The spectrum collected without purge gas is extremely noisy in several regions. When the sample is purged with nitrogen for two minutes, water vapor and CO₂ are removed and the noise in the spectrum is removed so that important features in the spectrum can be observed.



Self-Contained FT-IR Purge Gas Generator

The Parker Balston Model 74-5041NA FT-IR Purge Gas Generator is specifically designed for use with FT-IR spectrometers to provide a purified purge and air bearing gas supply from compressed air. The Parker Balston model 74-5041NA provides instruments with CO₂-free compressed air at less than -100°F (-73°C) dew point with no suspended impurities larger than 0.01 micron 24 hours/day, 7 days/week. The Parker Balston Self-Contained FT-IR Purge Gas Generator completely eliminates the inconvenience and the high costs of nitrogen

cylinders and Dewars, and significantly reduces the costs of operating FT-IR instruments.

The Parker Balston unit generates cleaner background spectra in a shorter period of time and more accurate analysis by improving the signal-to-noise ratio. The typical payback period is less than one year.

The generator is quiet, very reliable, and easy to install - simply attach the outlet air line, plug the electrical cord into a wall outlet, and the unit is ready for trouble-free operation.



Model 74-5041NA



Features and Benefits

- Less expensive and more convenient than nitrogen cylinders and dewars
- Includes state-of-the-art, oil-less compressor
- Compact, portable design is ideal for mobile labs
- Improves signal-to-noise ratio even on non-purge systems
- Increases FT-IR sample thru-put and maximizes up-time
- Special sound insulation design ensures quiet operation



Self-Contained FT-IR Purge Gas Generator

Principal Specifications

Self-Contained FT-IR Purge Gas Generator	74-5041NA
Maximum Flow Rate (at 80 psig)	60 SCFH (28 lpm)
Maximum Output Pressure	80 psig
CO ₂ Concentration	< 1 ppm
Dew Point	-100°F (-73°C)
Outlet Port Size	1/4" NPT (female)
Min/Max Ambient Temperature	30°F/90°F (-1°C/32°C)
Electrical Requirements (single phase)	120 VAC/60 Hz, 20 amps (1)
Compressor	3/4 hp
Dimensions	18"w x 31"h x 32"d (46 cm x 76 cm x 81 cm)
Shipping Weight	250 lbs. (114 kg)

NOTES

1 Refer to voltage appendix for electrical and plug configurations for outside North America.

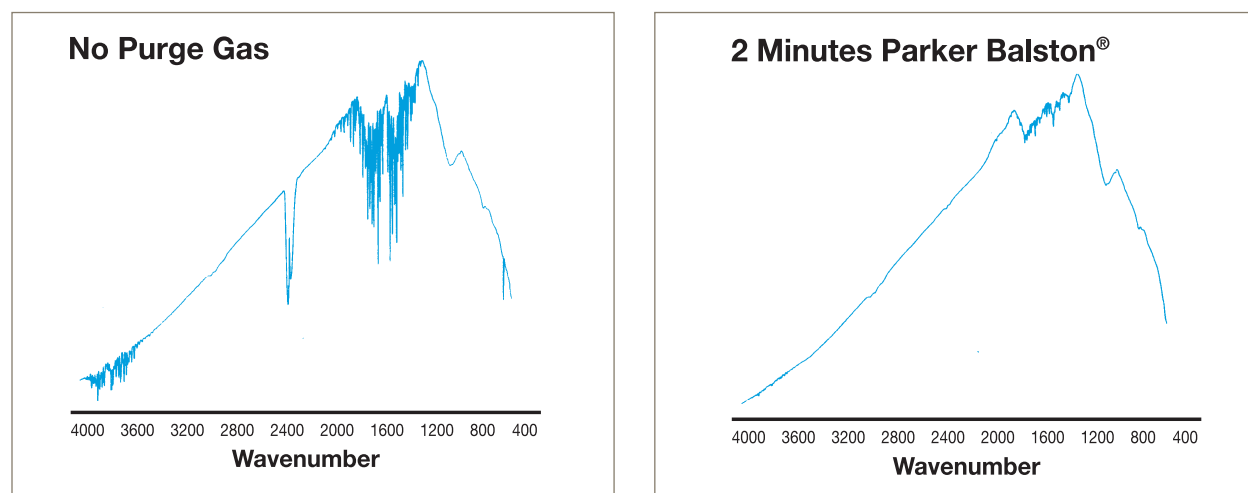
Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Description	Model Number
FT-IR Purge Gas Generator	74-5041NA
Annual Maintenance Kit	74065
Preventive Maintenance Plan	74-5041-PM
Extended Support with 24 Month Warranty	74-5041-DN2

Comparative Spectral Analysis in Purging an FT-IR Sample Chamber

This spectra comparison illustrates that a Parker Balston FT-IR Purge Gas Generator allows an FT-IR to be purged at a much higher flow rate than is practical with nitrogen. The sample chamber purged by the Parker Balston unit is free of CO₂ and water faster than the sample chamber purged by nitrogen.



ICP Spectrometer Nitrogen Generator

The Parker Balston 76-97NA and 76-98NA UHP Nitrogen Generators

can produce 5-12 lpm of ultra high purity nitrogen gas. These systems are completely engineered to transform standard compressed air into 99.995% to 99.9999% of pure nitrogen, exceeding the specification of UHP cylinder gas and dewars. Nitrogen is produced by utilizing a combination of state-of-the-art purification technologies and high efficiency filtration. Pressure swing absorption is utilized for the removal of O_2 , CO_2 , and water vapor. A catalyst module is incorporated in the 76-

98NA to oxidize hydrocarbons from the inlet air supply. The generators also have a combination of high efficiency prefilters and a 0.01 micron (absolute) membrane filter incorporated into their design. The Parker Balston UHP Nitrogen Generators are engineered and packaged in a laboratory cabinet to fit nearly any laboratory. The systems eliminate the needs for costly, inconvenient high pressure nitrogen cylinders or dewars. The 76-97NA and 76-98NA are ideal for ICP Purge gas applications.

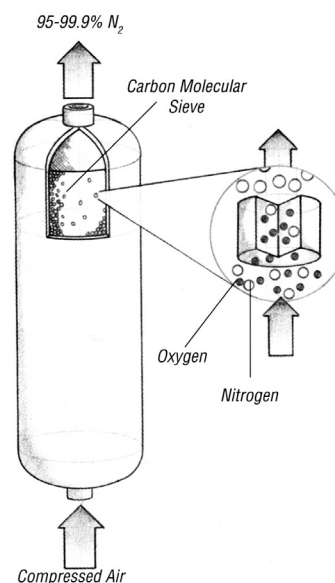


Model 76-98NA Nitrogen Generator



Features and Benefits

- Produces a continuous supply of ultra high purity nitrogen gas from existing compressed air
- Eliminates the need for costly, dangerous, inconvenient nitrogen cylinders or dewars in the laboratory
- Extends ICP Analysis into far-UV range below 170 (nm)
- Compact design frees up valuable laboratory floor space
- Offers long term cost stability - uncontrollable vendor price increases, contract negotiations, long term commitments and tank rentals are no longer a concern



Pressure swing adsorption gas separation process adsorbs oxygen over nitrogen using carbon molecular sieve (CMS).

Applications

Other applications include high flow GC carrier gas needs, DNA Synthesis and Sequencing Equipment, Mocon Moisture Analyzers, Circular Dichroism and Gel Permeation needs.



ICP Spectrometer Nitrogen Generator

Flow Tables - Models 76-97NA and 76-98NA

@ 99.9999% Purity

Inlet Air Pressure (psig)	Max Outlet Flow (lpm)	Max Outlet Pressure (psig)
120	5	83
110	5	73
100	5	63
90	4	62
80	4	51
70	2	50
60	2	42

@ 99.995% Purity

Inlet Air Pressure (psig)	Max Outlet Flow (lpm)	Max Outlet Pressure (psig)
120	12	60
110	12	55
100	12	45
90	10	45
80	8	40
70	8	35
60	6	33

Principal Specifications

Model	76-97NA	76-98NA
Nitrogen Purity	99.995% and 99.9999%	99.995% and 99.9999%
Max Nitrogen Output Pressure	See Table (above)	See Table (above)
CO Concentration	< 1 ppm	< 1 ppm
CO ₂ Concentration	< 1 ppm	< 1 ppm
O ₂ Concentration	< 1 ppm	< 1 ppm
H ₂ O Concentration	< 2 ppm	< 2 ppm
Hydrocarbon Concentration (1)	–	< 0.1 ppm
Argon Concentration (2)	0.9%	0.9%
Min/Max Inlet Pressure	60 psig/120 psig	60 psig/120 psig
Recommended Inlet Temperature	78°F (25°C)	78°F (25°C)
Ambient Operating Temperature	60°F-100°F (16°C-38°C)	60°F-100°F (16°C-38°C)
Average Air Consumption	3.0 scfm	3.0 scfm
Inlet Connection	1/4" NPT	1/4" NPT
Outlet Connection	1/8" NPT, convertible to 1/4" NPT	1/8" NPT, convertible to 1/4" NPT
Electrical Requirements (3, 4)	120 VAC/60 Hz	120 VAC/60 Hz
Dimensions	41"h x 25"w x 25"d (104cm x 64cm x 64cm)	41"h x 25"w x 25"d (104cm x 64cm x 64cm)
Shipping Weight	500 lbs (227 kg)	500 lbs (227 kg)

NOTES

- 1 Model 76-97NA does not remove hydrocarbons.
- 2 Purity specification for Nitrogen does not include Argon concentration.
- 3 Power Consumption is as follows:
Model 76-97NA = 10 Watts,
Model 76-98NA = 1 KW
- 4 Refer to voltage appendix for electrical and plug configurations for outside North America.

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Model Numbers	Description
76-97NA and 76-98NA	Ultra High Purity Nitrogen Generator
76-97-PM, 76-98-PM	Preventive Maintenance Plan
76-97-DN2, 76-98-DN2	Extended Support with 24 Month Warranty

High Purity Nitrogen Generators

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.



Model HPN2-5200



Features and Benefits

- 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 utilizing 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

Description	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
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	5,200 ml/min	5,200 ml/min	8,000 ml/min	8,000 ml/min	10,500 ml/min	10,500 ml/min	14,000 ml/min	14,500 ml/min
Inlet pressure	130.5-143.6 psi g (8-9.9 bar)	N/A	130.5-143.6 psi g (8-9.9 bar)	N/A	130.5-143.6 psi g (8-9.9 bar)	N/A	130.5-143.6 psi g (8-9.9 bar)	N/A
Integral compressor	No	Yes	No	Yes	No	Yes	No	Yes
Outlet pressure	72.5 psi g (5 bar)	72.5 psi g (5 bar)	72.5 psi g (5 bar)	72.5 psi g (5 bar)	72.5 psi g (5 bar)	72.5 psi g (5 bar)	72.5 psi g (5 bar)	72.5 psi g (5 bar)
Inlet connection	1/4"	N/A	1/4"	N/A	1/4"	N/A	1/4"	N/A
Outlet connection	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	N/A
Min/Max Inlet Air Temperature	59°F to 77°F (15 to 25°C)	59°F to 77°F (15 to 25°C)	59°F to 77°F (15 to 25°C)	59°F to 77°F (15 to 25°C)	59°F to 77°F (15 to 25°C)	59°F to 77°F (15 to 25°C)	59°F to 77°F (15 to 25°C)	59°F to 77°F (15 to 25°C)
Electrical requirements	120 VAC/60Hz 230VAC-50Hz	120 VAC/60Hz 230VAC-50Hz	120 VAC/60Hz 230VAC-50Hz	120 VAC/60Hz 230VAC-50Hz	120 VAC/60Hz 230VAC-50Hz	120 VAC/60Hz 230VAC-50Hz	120 VAC/60Hz 230VAC-50Hz	120 VAC/60Hz 230VAC-50Hz
Power consumption	89 Watts	580 Watts	89 Watts	580 Watts	89 Watts	580 Watts	89 Watts	580 Watts
Dimensions (HxWxD)	34.2x13.6x26.3in (87x35x67cm)	34.2x13.6x26.3in (87x35x67cm)	34.2x13.6x26.3in (87x35x67cm)	34.2x13.6x26.3in (87x35x67cm)	34.2x13.6x26.3in (87x35x67cm)	34.2x13.6x26.3in (87x35x67cm)	34.2x13.6x26.3in (87x35x67cm)	34.2x13.6x26.3in (87x35x67cm)
Weight (shipping)	189.6 lbs (86Kg)	197.3 lbs (95Kg)	189.6 lbs (86Kg)	197.3 lbs (95Kg)	189.6 lbs (86Kg)	197.3 lbs (95Kg)	189.6 lbs (86Kg)	197.3 lbs (95Kg)

Ordering Information

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

Maintenance Items	Model Number	Change Frequency
Filter Kit - non compressor models	MKHPN2-FK	12 months
Filter Kit - compressor models	MKHPN2CL-FK	12 months
Compressor Kit 230V all models	MKN2-CK230L	8,000 hours or 24 months (whichever comes first)

Ultra Dry Gas Generator

The Parker Balston Model UDA-300 Compressed Air Dryer provides ultra-dry, purified compressed air to analytical instruments. The model UDA-300 reduces the dewpoint to -100°F (-73°C) without operator attention.

Each system is delivered complete, and ready for easy installation. A high efficiency prefiltration system, automatic drains, a 0.01µm final filter, a moisture indicator, and pretested controls are integral to the design of each dryer.

To install, simply connect your house compressed air supply (at least 60

psig and 1/4 inch pipe) to the dryer inlet port, and connect the dryer outlet port to your instruments. Plug the electrical cord into a wall outlet - no electrician required - and the unit is ready for trouble-free operation.

Designed specifically for NMR instrumentation, the generator is completely automatic, and virtually maintenance free. It is ideal for injecting, spinning, and lifting operations. It is recommended by major NMR instrument manufacturers and is currently installed in several thousand locations.



Model UDA-300

Features and Benefits

- Supplies ultra-dry, purified compressed air to NMR Spectrometers and other analytical instruments
- Ideal gas supply for spindle and automatic sample changer
- Completely eliminates costly, inconvenient nitrogen dewars - never pay for or change out another dewar
- Compact design frees up valuable laboratory floor space
- Completely automatic - plug it in and forget about it

Principal Specifications

Description	Specifications
Dew Point	-100°F (-73°C)
Flow Rate at 60 psig	390 scfh (184 lpm)
Flow Rate at 125 psig	720 scfh (340 lpm)
Min/Max Inlet Air Pressure	60 psig/125 psig
Max Inlet Air Temperature (1)	78°F (25°C)
Inlet/Outlet Port Size	1/4" NPT (female)
Electrical Requirements (2)	120 VAC/60 Hz, 10 Watts
Dimensions	41"h x 15"w x 8"d (104cm x 38cm x 20cm)
Shipping Weight	50 lbs (23 kg)

NOTES

- 1 Outlet dew point will increase at higher inlet compresses air temperatures
- 2 Refer to voltage appendix for electrical and plug configurations for outside North America.

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Description	Model Number
Compressed Air Dryer	UDA-300
Inlet Pressure Regulator	72-130-V883
Annual Maintenance Kit	MK7525
Preventive Maintenance Plan	UDA-300-PM
Extended Support with 24 Month Warranty	UDA-300-DN2

Atomic Absorption Gas Purifier

The Parker Balston AA Gas Purifier is a completely engineered, wall mountable system designed to purify gases commonly used with Atomic Absorption Spectrophotometers. The Purifier consists of two independent filtration systems. The first system is designed to purify the compressed air (oxidant) with two stages of high efficiency coalescing filtration. These filters will remove all oil, water, and particulate matter down to 0.01 micron.

The second filtration system is designed to purify the acetylene gas. This system removes liquid acetone and solid particulate from the gas. The 73-100 protects the microcomputer gas controls and AA burner assembly from contamination and corrosion. In addition, the acetylene filter has an integral flashback arrester, meeting all OSHA requirements, to enhance the safe operation of the spectrophotometer.



Features and Benefits

- Designed specifically for AA Instrumentation
- Protects microcomputer gas controls and burner system
- Ensures a clean, contaminant-free atomic cloud
- Ensures consistent quality of compressed air oxidant and fuel gas
- Convenient, turnkey system
- Services a single AA

Principal Specifications

Description	Specifications
Compressed Air Inlet/Outlet	1/4" NPT (female)
Recommended Inlet Air Temperature	< 78°F (26°C)
Min/Max Inlet Pressure (compressed air)	15 psig/125 psig
Acetylene Inlet/Outlet	9/16 - 18 LH ("B" size)
Max Inlet Pressure (acetylene)	15 psig max. working pressure
Ambient Operating Temperature	40°F - 100°F (4°C - 38°C)
Dimensions	11" w x 8" d x 10" h (28cm x 20cm x 25cm)
Shipping Weight	10 lbs (4.5 kg)

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Description	Model Number
Atomic Absorption Gas Purifier	73-100
73-100 Service Kit (contains one year supply of all replacement filter cartridges)	73065
Acetylene Hose Assembly (6 feet in length)	19257



Recommended Gas Generators for Analytical Instruments

Instrument	Gas Requirements	Gas Purity Requirements	Flow Rates	Generator Recommendation/Model
Atomic Absorption (AA) with Flame	Air for Oxidant Gas	Clean, Dry	1-7 SCFM	AA Gas Purifier (Model 73-100)
Atomic Thermal Desorber	Zero Air	Clean, Dry, Hydrocarbon-free	Up to 1600 ml/min.	Zero Air or TOC Gas Generator (HPZA-3500 or TOC-1250)
	Hydrogen for FID Fuel	Clean, Dry, High Purity	Up to 40 ml/min. per FID	Hydrogen Generator (H2PEM-100, H2PEM-165) (H2PEM-260, H2PEM-510)
Atmospheric Pressure Ionization (API-MS)	Air for Nebulizer Gas	Clean, Dry, Hydrocarbon-free	< 30 LPM	Zero Air Generator (HPZA-30000)
	Nitrogen for Curtain, Sheath, and Shield gas	99% or higher	< 20 LPM	Nitrogen Generator (N2-14, N2-22, N2-35, NitroFlowLab)
Autosamplers for Various Instruments	Air for Pneumatic Controls	Clean, Dry	< 1 SCFM	Membrane Air Dryer (64-02)
	Nitrogen for Sample Injector	Ultra High Purity	< 550 cc/min	UHP Nitrogen Generator (HPN2-1100) (UHPN2-1100)
CO ₂ Analyzers	Calibration Air	CO ₂ -free	0.5-1.0 SLPM	FT-IR Purge Gas Generator (75-45, 75-52)
Continuous Emissions Monitoring (CEM)	Calibration Air Dilution Air	Dry, CO ₂ , SO ₂ , NO _x , Hydrocarbon-free	10-15 SLPM	CEM Zero Air Generator (75-45-M744)
Emissions Analyzers	Zero Air	Hydrocarbon-free	2-15 SLPM	Zero Air Generator (HPZA-18000)
Fourier Transform Infrared Spectrometer (FT-IR)	Air for Sample Compartment, Optics, and/or Air-Bearing Components	Clean, Dry, CO ₂ -free	0.5-3 SCFM	FT-IR Purge Gas Generator (75-62, 75-52, 75-45) Lab Gas Generator (74-5041NA)
Gas Chromatograph (GC) GC-FID	Zero Air as Flame Support Air	Clean, Hydrocarbon-free	150-600 cc/min.	Zero Air Generator (HPZA-3500)
	Hydrogen as Flame Fuel Gas	Ultra High Purity	30-40 cc/min.	Hydrogen Generator (H2PEM-260)
	Hydrogen as Capillary Carrier Gas	Ultra High Purity	Varies	Hydrogen Generator (H2PD-300)
	Nitrogen as Packed Carrier Gas	Ultra High Purity, Zero Grade	Varies	UHP Nitrogen Generator (UHPN2-1100)
	Nitrogen as Make up Gas	Ultra High Purity, Zero Grade	<100 cc/min	UHP Nitrogen Generator (UHPN2-1100)
GC-FPD	Zero Air as Flame Support Air	Clean, Hydrocarbon-free	<200 cc/min	Zero Air Generator (HPZA-3500)
	Hydrogen as Flame Fuel Gas	Ultra High Purity	50-70 cc/min	Hydrogen Generator (H2PEM-260)
	Hydrogen as Capillary Carrier Gas	Ultra High Purity	Varies	Hydrogen Generator (H2-1200)
	Nitrogen as Packed Carrier Gas	Ultra High Purity	Varies	UHP Nitrogen Generator (UHPN2-1100)
GC-NPD	Zero Air to Rubidium/Thermonic Bead	Dry, Clean, Hydrocarbon-Free	60-200 cc/min.	Zero Air Generator (HPZA-3500)
	Hydrogen as Detector Support Gas	Ultra High Purity	<10 cc/min	Hydrogen Generator (H2PEM-100)
	Hydrogen as Capillary Carrier Gas	Ultra High Purity	Varies	Hydrogen Generator (Palladium) (H2PD-300)
	Nitrogen as Packed Carrier Gas	Ultra High Purity	Varies	UHP Nitrogen Generator (UHPN2-1100)
GC-ECD	Nitrogen as Carrier Gas	Ultra High Purity, Zero Grade	Varies	UHP Nitrogen Generator (UHPN2-1100)
	Nitrogen as Make up Gas	Ultra High Purity, Zero Grade	<100 cc/min	UHP Nitrogen Generator (UHPN2-1100)
GC-ELCD, HALL	Hydrogen as Reaction Gas	Ultra High Purity	70-200 cc/min	Hydrogen Generator (H2PD-300)

Recommended Gas Generators for Analytical Instruments

Instrument	Gas Requirements	Gas Purity Requirements	Flow Rates	Generator Recommendation/Model
GC-TCD	Hydrogen as Carrier & Reference Gas	Ultra High Purity	Varies	Hydrogen Generator (H2PD-300)
LC/MS	Nitrogen as a Curtain Gas	LC/MS Grade	3-30 lpm	Nitrogen Generator (N2-14, N2-14ANA, NitroFlowLab) (NitroFlow60, N2-35, N2-35ANA)
ICP Spectrometer	Nitrogen as Optic/Camera Purge	Ultra High Purity	<1-5 lpm	Nitrogen Generator (76-97NA, 76-98NA)
Nuclear Magnetic Resonance (NMR)	Air for Lifting, Spinning	Clean, Dry	<10 SCFM	Air Dryer (UDA-300NA) Lab Gas Generator (74-5041NA)
Ozone Generator	Supply Air	Clean, Dry	.3-20 SCFM	Air Dryer (64-01, 64-02, 64-10, UDA-300NA)
Protein Analyzer	Dry Air, Nitrogen	Clean, Dry	40 psig	Nitrogen Generator (N2-14, N2-22, NitroFlowLab, N2-35)
Solvent Evaporators (Sample Concentrators)	Nitrogen	Clean, Dry Nitrogen	Up to 5 SCFM	Nitrogen Generator (Nitrovap-1LV, Nitrovap-2LV)
Stack Gas Sampler	Dilution Air	Clean, Dry	<1.0 SCFM	CEM Zero Air Generator (75-45-M744)
Total Oxygen Demand (TOD)	Nitrogen Carrier Gas	Ultra High Purity	300 cc/min	Nitrogen Generator (UHPN2-1100)
Thermal Gravimetric Analyzer (TGA)	Nitrogen as Furnace Purge	Clean, Dry, Inert	<100 cc/min	Nitrogen Generator (UHPN2-1100)
Differential Scanning Calorimeter (DSC)	Air for Air Shield	Clean, Dry	<100 cc/min	Dry Air Generator (64-01, UDA-300)
Total Hydrocarbon Analyzer (THA)	Zero Air for FID	Clean, Hydrocarbon-Free	50-500 cc/min	Zero Air Generator (75-82S, 75-83NA)
	Hydrogen as Flame Fuel Gas	Ultra High Purity	5-50 cc/min	Hydrogen Generator (H2PEM-100)
Total Organic Carbon Analyzer (TOC)	Dry Air or Nitrogen for Carrier Gas or Combustion Gas	Clean, Dry, Hydrocarbon-Free	100-500 SLPM	TOC Gas Generator (TOC-625, TOC-1250)
		CO ₂ -Free Ultra High Purity	50-700 cc/min	UHP Nitrogen Generator (UHPN2-1100)

Parker Balston also offers Gas Generators for these Applications



Products for LC/MS & Evaporation

(Request Bulletin AGS-LCMS)

- High purity nitrogen for LCMS instruments and solvent evaporation
- Tri-gas units available for instruments that require nitrogen, dry air and zero grade air
- Produce a continuous supply of high purity nitrogen from an existing compressed air supply
- Integrated compressor systems eliminate the need for house air
- Systems available to support one or dozens



Products for Chromatography

(Request Bulletin AGS-Chromatography)

- Hydrogen, Zero Air and UHP Nitrogen Generators for Gas Chromatography
- Combination systems available to provide multiple gasses from one unit
- Highest purities available from any supplier



Products for Spectroscopy

(Request Bulletin AGS-Spectroscopy)

- Remove water and CO₂ from compressed air
- Protect expensive optics from damage from water vapor
- Increase Signal to Noise Ratio and maximize instrument sensitivity
- Ultra dry air for NMR injecting, spinning and ejecting samples



Products for TOC Analysis

(Request Bulletin AGS-TOC)

- Generate gasses for all combustion, UV persulfate and wet oxidation techniques
- Ensures consistent, reliable, instrument operation and reduces instrument service and maintenance costs



Products for Ultra Dry Air

(Request Bulletin AGS-UDA)

- Gas generators for dilution and calibration of Emissions Analyzers
- Exceed instrument manufacturer specifications
- Nitrogen and specialty blend gasses available



Analytical Gas Supplies

(Request Bulletin AGS SUPCAT)

- Installation kits, compressors, purifiers, flow-meters, regulators and all the materials needed to equip your lab
- High quality components, designed specifically for use with Parker gas generators, to deliver high purity gas to your instruments

Voltage Appendix

220vac / 50hz configuration for locations where final plug configuration is unknown



Order Part Number

FID-1000-220, FID-2500-220, FID-3500-220, GCGS-7890-220, H2PD-150-220, H2PD-300-220, 75-83-220, HPZA-3500-220, HPZA-7000-220, HPZA-18000-220, HPZA-30000-220, HPN2-1100-220, HPN2-2000-220, UHPN2-1100-220, 76-97-220, 76-98-220, 74-5041-220, UDA-300-220, LCMS-5000-220, LCMS-5001T-220, LCMS-5001NT-220, N2-14A, N2-22A, N2-35A, N2-45A, N2-80A, N2-135A, MGG-400-220, MGG-2500-220, TOC-625-220, TOC-1250-220

* Units will be supplied only with IEC connector as depicted, power cord to be customer supplied

220vac / 50hz plug configuration for Australia



Order Part Number

FID-1000AU, FID-2500AU, FID-3500AU, GCGS-7890AU, H2PD-150AU, H2PD-300AU, 75-83AU, HPZA-3500AU, HPZA-7000AU, HPZA-18000AU, HPZA-30000AU, HPN2-1100AU, HPN2-2000AU, UHPN2-1100AU, 76-97AU, 76-98AU, 74-5041AU, UDA-300AU, LCMS-5000AU, LCMS-5001TAU, LCMS-5001NTAU, N2-14AAU, N2-22AAU, N2-35AAU, N2-45AAU, N2-80AAU, N2-135AAU, MGG-400AU, MGG-2500AU, TOC-625AU, TOC-1250AU

* Models 75-45AU, 75-52AU and 75-62AU will include universal fit plug and transformer kit.

220vac / 50hz plug configuration for Europe



Order Part Number

FID-1000EU, FID-2500EU, FID-3500EU, GCGS-7890EU, H2PD-150EU, H2PD-300EU, 75-83EU, HPZA-3500EU, HPZA-7000EU, HPZA-18000EU, HPZA-30000EU, HPN2-1100EU, HPN2-2000EU, UHPN2-1100EU, 76-97EU, 76-98EU, 74-5041EU, UDA-300EU, LCMS-5000EU, LCMS-5001TEU, LCMS-5001NTEU, N2-14AEU, N2-22AEU, N2-35AEU, N2-45AEU, N2-80AEU, N2-135AEU, MGG-400EU, MGG-2500EU, TOC-625EU, TOC-1250EU

* Models 75-45EU, 75-52EU and 75-62EU will include universal fit plug and transformer kit.

100vac / 60hz plug configuration for Japan



Order Part Number

FID-1000JA-100, FID-2500JA-100, FID-3500JA-100, GCGS-7890JA-100, H2PD-150JA-100, H2PD-300JA-100, 75-83JA-100, HPZA-3500JA-100, HPZA-7000JA-100, HPZA-18000JA-100, HPZA-30000JA-100, HPN2-1100JA-100, HPN2-2000JA-100, UHPN2-1100JA-100, 76-97JA-100, 76-98JA-100, 74-5041JA-100, UDA-300JA-100, LCMS-5000JA-100, LCMS-5001TJA-100, LCMS-5001NTJA-100, N2-14AJA-100, N2-22AJA-100, N2-35AJA-100, N2-45AJA-100, N2-80AJA-100, N2-135AJA-100, MGG-400JA-100, MGG-2500JA-100, TOC-625JA-100, TOC-1250JA-100

* Models 75-45JA-100, 75-52JA-100 and 75-62JA-100 will include universal fit plug and transformer kit.

220vac / 50hz plug configuration for United Kingdom (some Asia)



Order Part Number

FID-1000UK, FID-2500UK, FID-3500UK, GCGS-7890UK, H2PD-150UK, H2PD-300UK, 75-83UK, HPZA-3500UK, HPZA-7000UK, HPZA-18000UK, HPZA-30000UK, HPN2-1100UK, HPN2-2000UK, UHPN2-1100UK, 76-97UK, 76-98UK, 74-5041UK, UDA-300UK, LCMS-5000UK, LCMS-5001TUK, LCMS-5001NTUK, N2-14AUK, N2-22AUK, N2-35AUK, N2-45AUK, N2-80AUK, N2-135AUK, MGG-400UK, MGG-2500UK, TOC-625UK, TOC-1250UK

* Models 75-45UK, 75-52UK and 75-62UK will include universal fit plug and transformer kit.

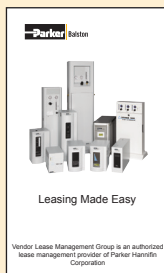
Gas Generator Services



Parker Balston Extended Support Services extend the warranty term of gas generators to 24-months. There are two choices available for level of service: Depot and Express. All parts and labor are included, with “next business morning” delivery available.



Parker Balston “Balston Bucks” Loyalty Programs are offered to every customer who purchases gas generators. Services include special discounts and incentives on gas generator spare parts and consumables as well as special deals on buying your next gas generator. Customers can easily “opt-in” and opt-out” of our special e-mail alerts system which features newsletters, new product announcements and product reminders.



Parker Balston Leasing and Rental Services can provide simple cost effective ways to acquire your next gas generator. Our competitive rates typically provide a monthly payment less than current monthly cylinder gas expenditures. Leasing and rental programs help the customer avoid the need to use capital budget money.



Parker Balston Preventative Maintenance Contracts provide convenient direct in-lab maintenance service for your gas generator. A factory trained technician will service your gas generator, in your lab, with original Parker parts. Preventative maintenance saves time, money and will reduce the total cost of ownership of your gas generator.

Offer of Sale

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, FNS Division, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods, services or work described will be referred to as "Products".

1. Terms and Conditions. Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is subject to these Terms and Conditions or any newer version of the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document issued by Buyer.

2. Price Adjustments; Payments. Prices stated on Seller's quote or other documentation offered by Seller are valid for 30 days, and do not include any sales, use, or other taxes unless specifically stated. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and is due 30 days from the date of invoice or such other term as required by Seller's Credit Department, after which Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Delivery Dates; Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon placement of the products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

4. Warranty. Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of 12 months from the date of shipment and covers in-factory repair and parts only. Warranty does not include on site labor, travel expenses, or other expense associated with field repair. Purchaser shall notify Seller of any breach of warranty within 30 days. Upon notification, Seller will, at its option, repair or replace the defective product, or refund its purchase price. Any action for breach of warranty or for failure to deliver must be commenced within 13 months of its accrual. **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered. **If product is returned for refund, a 20% restock fee may apply.**

6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.

7. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

8. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, will be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer ordering the items manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

10. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. Improper use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees),

whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

12. Cancellations and Changes. Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer. Order cancellation fee of 15% may apply.

13. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

14. Force Majeure. Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

15. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

16. Termination. Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

17. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

18. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

19. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

20. Compliance with Law. U.K. Bribery Act and U.S. Foreign Corrupt Practices Act. Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase products or otherwise benefit the business of Seller.

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Bulletin AGS-Spectroscopy-B 09/14



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