



Analytical Gas Systems Products for Ultra Dry Air

Bulletin AGS-UDA

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

Parker Hannifin Corporation

The Global Leader in Motion and Control Technologies

We engineer success of our customers around the world, drawing upon nine core motion and control technologies. These technologies enable virtually every machine and process to operate accurately, efficiently and dependably.

As the global leader in motion and control, we partner with our distributors to increase our customers' productivity and profitability by delivering an unmatched breadth of engineered components and value-added services.

We continue to grow with our customers by creating application-focused products and system solutions. A key to our global expansion has been to follow our customers and establish operations, sales and service wherever they are needed. No single competitor matches Parker's global presence.



Corporate Headquarters
in Cleveland, Ohio.

Parker's Motion and Control Technologies

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

Legal Notifications



WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.







The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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Laboratory Membrane Air Dryers

The Parker Balston® 64-01, 64-02 and 64-10 Membrane Air Dryers will supply oil and particulate free dry compressed air to atmospheric dewpoints as low as -40°F (-40°C), and at flow rates of up to 25 SCFM. Parker Balston Membrane Air Dryers are engineered for easy installation, operation, and long term reliability. The dryers incorporate the highest efficiency membrane available, offering low cost operation and minimal maintenance.

Parker Balston Membrane Air Dryers are designed to operate continuously, 24 hours per day, 7 days per week. The only maintenance required is

changing the prefilter cartridge once each year. This annual maintenance takes approximately 5 minutes.

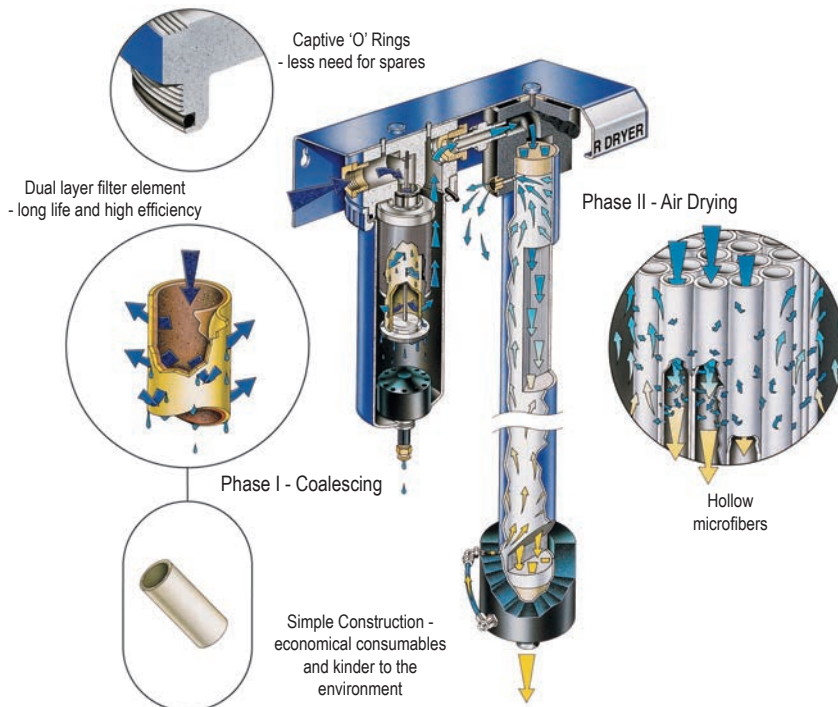
The dryers are lightweight, compact, and can be easily installed on an existing air line. In a vertical or horizontal orientation (depending upon model), a high efficiency coalescing prefilter is installed directly upstream from the dryer module to protect the membrane from potential contamination caused by pipe scale, liquids, or other solids. Parker Balston Membrane Air Dryers require no electrical connections, making them ideal for remote and point-of-use installations or for installation in hazardous areas.



Model 64-02

Features and Benefits

- Low dewpoint instrument air - prevents analytical instrument contamination
- Dry air for hazardous areas
- No electricity required - low operating costs
- No refrigerants or freons - environmentally sound
- Explosion proof
- No moving parts or motors - silent operation



- Phase 1: Coalescing Filtration; oil, water droplets and particulate contamination removed with an efficiency of 99.99% at 0.01 micron. Water-laden air passes through membrane filter.
- Phase 2: Drying - As the compressed air passes through the hollow membrane fibers, water vapor permeates through the fiber walls, and dry air exits the end of the fiber, piping to the application.

Laboratory Membrane Air Dryers

Principal Specifications

Membrane Air Dryer Model	64-01	64-02	64-10
Max. Flow Rate (1) at 40°F (-40°C) at Dewpoints Shown at 32°F (0°C)	28 LPM 71 LPM	57 LPM 142 LPM	283 LPM 708 LPM
Min/Max Inlet Air Temp. (2)	40°F/140°F (4°C/60°C)	40°F/140°F (4°C/60°C)	40°F/140°F (4°C/60°C)
Recommended Operating Temp. Range	60°F-100°F (16°C-38°C)	60°F-100°F (16°C-38°C)	60°F-100°F (16°C-38°C)
Min/Max Inlet Pressure	60 psig/150 psig	60 psig/150 psig	60 psig/150 psig
Maximum Pressure Drop	<4 psig	<4 psig	<4 psig
Wall Mountable	Yes	Yes	Yes
Inlet/Outlet Port Size	1/4" NPT (female)	1/4" NPT (female)	1/2" NPT (female)
Electrical Requirements	None	None	None
Shipping Weight	9 lbs. (4 kg)	10 lbs. (5 kg)	18 lbs. (9 kg)
Dimensions	6" w x 22" h x 5" d (15cm x 57cm x 13cm)	6" w x 23" h x 5" d (15cm x 112cm x 13cm)	6" w x 37" h x 5" d (15cm x 93cm x 13cm)

NOTES

- 1 Dewpoint specified with inlet air at 100°F (38°C) saturated at 100 psig.
- 2 Inlet compressed air dewpoint must not exceed the ambient air temperature.

Ordering Information

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

Description	64-01	64-02	64-10
Annual Maintenance Kit	MK7601	MK7601	MK7610
Installation Kit	IK7572	IK7572	IK75880
Pressure Regulator	72-130-V883	72-130-V883	72-130-V883
Preventive Maintenance Plan	64-01-PM	64-02-PM	64-10-PM
Extended Support with 24 Month Warranty	64-01-DN2	64-02-DN2	64-10-DN2



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

Ultra Dry Gas Generator

Principal Specifications

Model UDA-300 Compressed Air Dryer	
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)	100/120/220 VAC, 50/60 Hz
Dimensions	41"h x 15"w x 8"d (104cm x 38cm x 20cm)
Shipping Weight	50 lbs (23 kg)

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
Annual Preventive Maintenance Plan	UDA-300-PM
Extended Support with 24 Month Warranty	UDA-300-DN2

NOTES

- 1 Outlet dew point will increase at higher inlet compressed air temperatures

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)

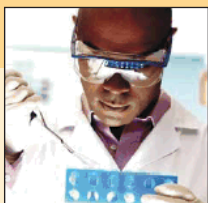
- Hydrogen, Zero Air and UHP Nitrogen Generators for Gas Chromatography
- Combination systems available to provide multiple gasses from one unit
- Highest purities available from any supplier



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-JDA)

- 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

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.

Application Notes

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Offer of Sale

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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 deferral 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 twelve months from the date of delivery to Buyer or 2,000 hours of normal use, whichever occurs first. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, 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.

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.

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) appointments 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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