



AUTOCLAVE PUMPS

Air Driven, High Pressure Liquid Pumps

Catalog 02-9326BE | September 2026



Autoclave
Engineers®
PARKER BRAND

Parker Autoclave Engineers has always been a large user of Air-over-Liquid pump technology and has a lifetime of experience using all variety of pumps in many different configurations. We have used this experience to develop a best-in-breed line of air-driven, high pressure pumps that are efficient to operate, simple in design, and will stand the test of time. Compared to other types of hydraulic pumps, they provide cost effective and energy saving benefits for many applications in the Oil and Gas, Chemical, Industrial and Research industries.

These pumps convert simple air pressure into high and ultra-high liquid pressures by utilizing a large area piston on the air side to move a small area plunger to compress the liquid into very high hydraulic pressures - as high as 60,000 psi (4137 bar). Some designs are for economy, some for manual use, some for low-flow & high pressure, some for high flow & medium pressure. Pumps like these are perfect for product testing, valve actuation, chemical injection and other applications that require intense pressure. When used in conjunction with a Hydraulic Intensifier (another PAE product) pressures to 150,000 psi (10,000 bar) are normal.

Parker Autoclave Engineers has been making pressure and corrosion test systems as well as high pressure laboratory reaction vessels for over 70 years.

To learn more about our wide range of products visit us online at...

parker.com/ipd or autoclave.com



Table of Contents

Pump Features & Benefits	3
Pump Series Models	4
Drive Types	5
Quick Reference Guide	5
Pump Operation	6
Air Drive Section	6
Typical Pump Cut-Away	7

PUMPS:

ASL Series Pump	8
AHL Series Pump.....	12

Features & Benefits

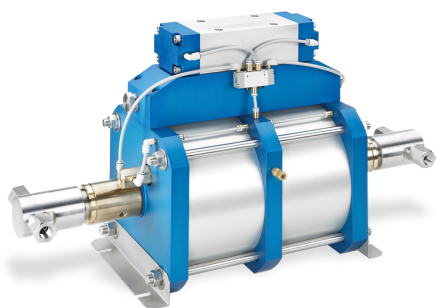
- All Aluminum parts machined from high quality bar stock, not cast aluminum components
- Anodizing with special sealing technique to provide better protection from harsh environments
- Muffler specified to give a great combination of high flow and low noise
- Rubber bumpers in end caps to reduce noise of operation
- Latest lubrication technology provides long seal service life and improves pump efficiency and performance
- No lubricator required for air drive source
- Stainless steel tie-rods and hardware
- Stainless plunger coated with a proprietary multi-layer carbon based coating with diamond like carbon exterior layer:
 - High hardness (3 times harder than Stellite)
 - Inert, it has superior chemical compatibility and corrosion resistance
 - Low friction that limits seal wear and increases efficiency (coefficient of friction equal to or less than PTFE)
 - Tough coating that provides long plunger cycle life.
- Pressure head specially designed and engineered for high cycle life
- Spring energized U-cup seal provides better sealing performance at wide ranges of pressures
- Extended service life check valves with Ceramic balls for high pressure applications

Pump Series Models



ASL Series

- Standard Liquid Pump
- Pressures up to 60,000 psi (4137 bar)
- 6 inches in diameter air piston
- Broad range of ratios
- Single and Double Piston

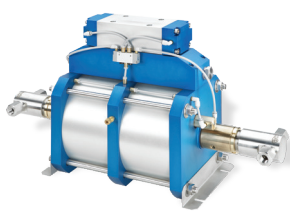


AHL Series

- High Flow up to 7.6 gpm (29 lpm)
- Pressures up to 22,500 psi (917 bar)
- Approximately 10 inch diameter air piston
- Dual Acting



Drive Types

Description	Single Acting, Single Piston	Single Acting, Double Piston	Double Acting, Double Piston
Pump Model			
Catalog Number Suffix	-01	-02	-2D

Catalog Number Example: **ASL25-01**

Quick Reference Guide

Pump Type	Catalog Number	Pressure Ratio	Maximum Rated Outlet Pressure PSI (bar)	Displacement Per Cycle .in ³ (cm ³)	Max. Flow GPM	Liquid Connections	
						Inlet	Outlet

ASL Series - Air Driven Standard Size Liquid Pumps

Low Pressure	ASL25-01	1:28	4,000 (276)	2.10 (34.4)	2.3	1/2" FNPT	1/2" FNPT
Test Pump	ASL60-01	1:70	10,000 (689)	0.84 (13.8)	.79	1/2" FNPT	1/2" FNPT
Test Pump	ASL250-01	1:265	38,400 (2,648)	0.22 (3.6)	.21	1/2" FNPT	1/4" F250C
Test Pump	ASL100-02	1:226	31,000 (2,137)	0.52 (8.5)	.37	1/2" FNPT	1/4" F250C
Test Pump	ASL400-02	1:796	60,000 (4,137)	0.14 (2.3)	.11	1/2" FNPT	1/4" F250C

AHL Series

Chemical Injection	AHL33-2D	1:67	6,700 (462)	15.3 (250.7)	7.6	1" FNPT	1/2" FNPT
Chemical Injection	AHL118-2D	1:239	22,500 (1551)	4.4 (72.1)	2.3	1/2" FNPT	9/16" SF562CX

Pump Operation

Piston to Plunger Ratio

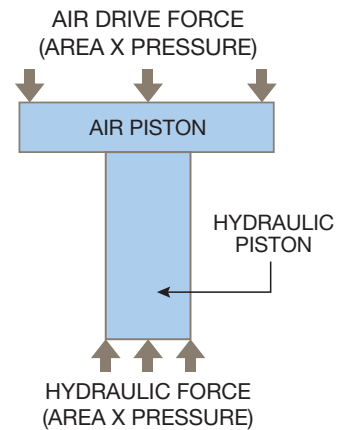
- Compressed air is used to produce hydraulic pressure
- Works on differential surface area between the large air piston and smaller hydraulic plunger
- Differential is represented by the pressure ratio of the pump

Pressure Ratio = Area of Air Piston ÷ Area of Hydraulic Plunger

- The higher the pressure ratio, the higher the output hydraulic pressure

Pressure Output = Pressure Ratio x Air Drive Pressure

- When air is applied to the pump it will cycle until the forces on the air piston equals the forces on the hydraulic plunger. This is the stall pressure.
- Pump will automatically restart if there is a drop in hydraulic pressure or an increase in air drive pressure.
- Double air pistons available which will double the pressure ratio because you have twice the air piston area acting on the same hydraulic plunger area.

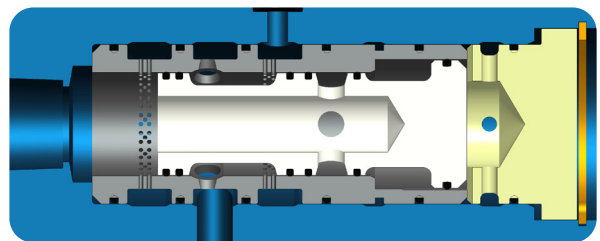


Air Drive Section

- Compressed air is used to produce hydraulic pressure
- Works on differential surface area between the large air piston and smaller hydraulic plunger
- Differential is represented by the pressure ratio of the pump

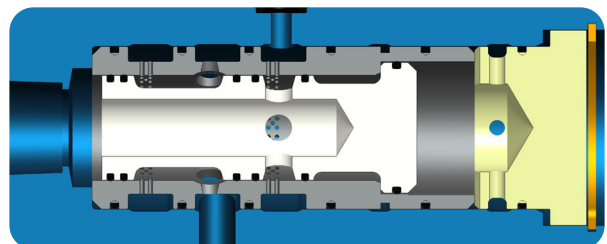
Section 1

- Air pilot operated spool provides automatic cycling of air from one side of the piston to the other
- At the end of each stroke, the air piston activates a pilot valve that will cause the spool to shift

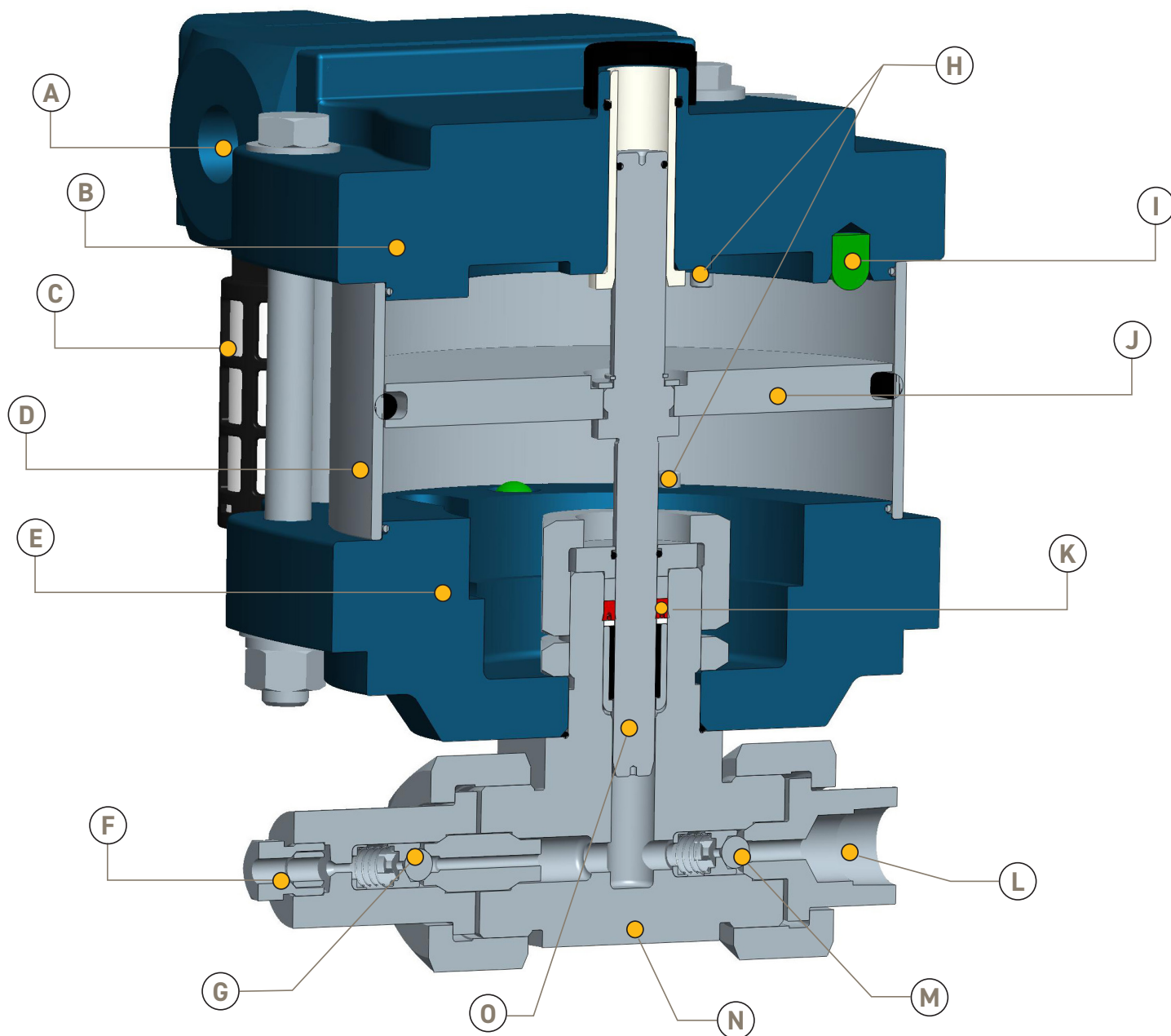


Section 2

- The spool shifting will supply air to one side of the piston while venting the other side of the piston
- This alternating action continues until the pump reaches its stall pressure



Typical Pump Cut-Away



	Description
A	Air Inlet
B	Top End Cap
C	Air Muffler
D	Air Cylinder
E	Bottom End Cap
F	High Pressure Outlet Connection
G	Outlet Check Valve
H	Pilot Valve

	Description
I	Air Piston Bumper
J	Air Piston
K	High Pressure Seal Assembly
L	Liquid Inlet Connection
M	Inlet Check Valve
N	Pump Head Body
O	Hydraulic Plunger

ASL SERIES

Single-Acting, Single or Double Piston Air Drive



Features:

- Pressure Ranges from 4,000 to 60,000 psi (276 to 4100 bar) maximum
- Operating Temperature Range: 0° to 140°F (-18° to 60°C)
- Pressure Head Material: 15-5 PH Stainless Steel
- Plunger: Stainless Steel, coated with proprietary multi-layer carbon for long life
- Liquid Side Material: All Stainless Steel Construction
- Air Side Material: Anodized Aluminum

Technical Data:

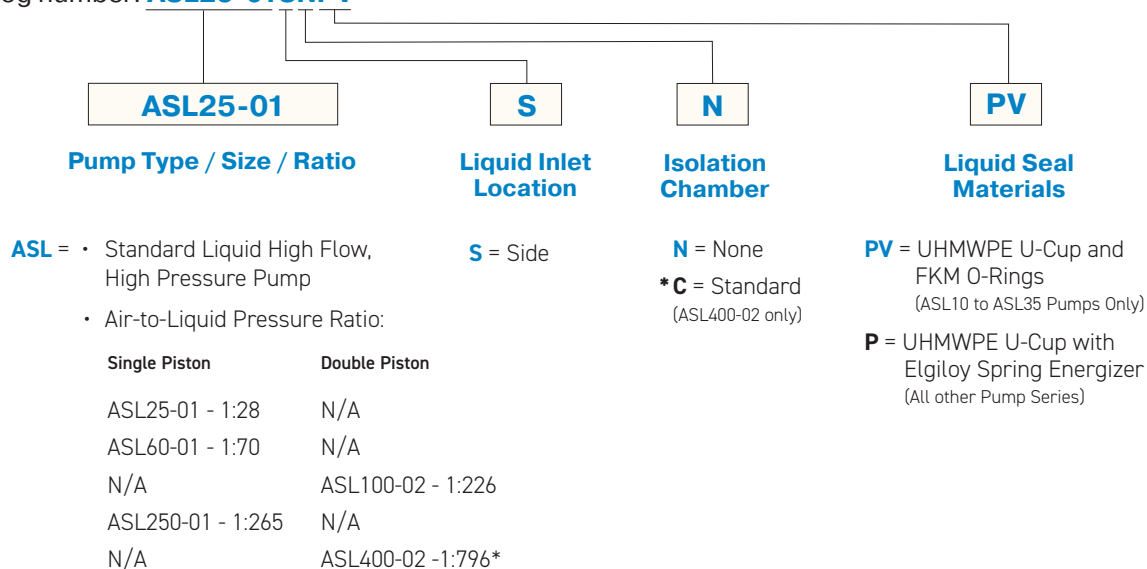
- Liquid Connections: Side Inlet Only – see chart (page 9)
- Isolation Chamber: Only available on ASL400-02 pump
- Displacement per stroke: See chart (page 9)
- Liquid Seals: ASL25 - UHMWPE U-Cup and FKM Orings (PV option)
- Air Drive Pressure Range: 15-150 psi (1-10 bar) * See Note
- Main Air Inlet: 1/2" FNPT (Regulated)
- Pilot Air Inlet: 1/8" FNPT (Unregulated)
- Maximum Air Consumption: 70 SCFM @ 90 psi (no pressure)
- Pre-Lubricated Piston at Factory
- Air Seals: Buna-N

Note: *Maximum air drive pressure is limited by maximum pressure shown in chart on Page 9.

ASL Pump Part Number Matrix

For complete information on available pump options, contact Parker Autoclave Engineers.

Typical catalog number: **ASL25-01SNPV**



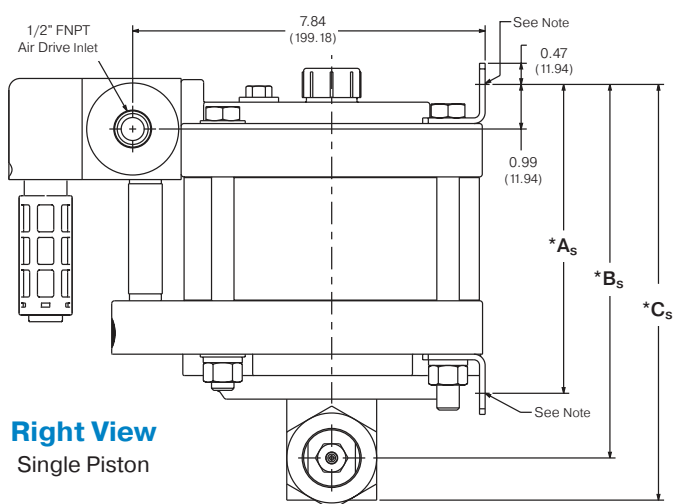
Note: Individual Pump Specifications can be found at www.autoclave.com.

Reference Guide

Catalog Number	Pressure Ratio	Maximum Rated Outlet Pressure PSI (bar)	GPM Displacement Per Cycle .in ³ (cm ³)	Liquid Connections	
				Inlet	Outlet
ASL25-01SNPV	1:28	4,000 (276)	2.10 (34.4)	1/2" FNPT	1/2" FNPT
ASL60-01SNP	1:70	10,000 (689)	0.84 (13.8)	1/2" FNPT	1/2" FNPT
ASL100-02SNP	1:226	31,000 (2,137)	0.52 (8.5)	1/2" FNPT	1/4" F250C
ASL250-01SNP	1:265	38,400 (2,648)	0.22 (3.6)	1/2" FNPT	1/4" F250C
ASL400-02SCP	1:796	60,000 (4,137)	0.14 (2.3)	1/2" FNPT	1/4" F250C

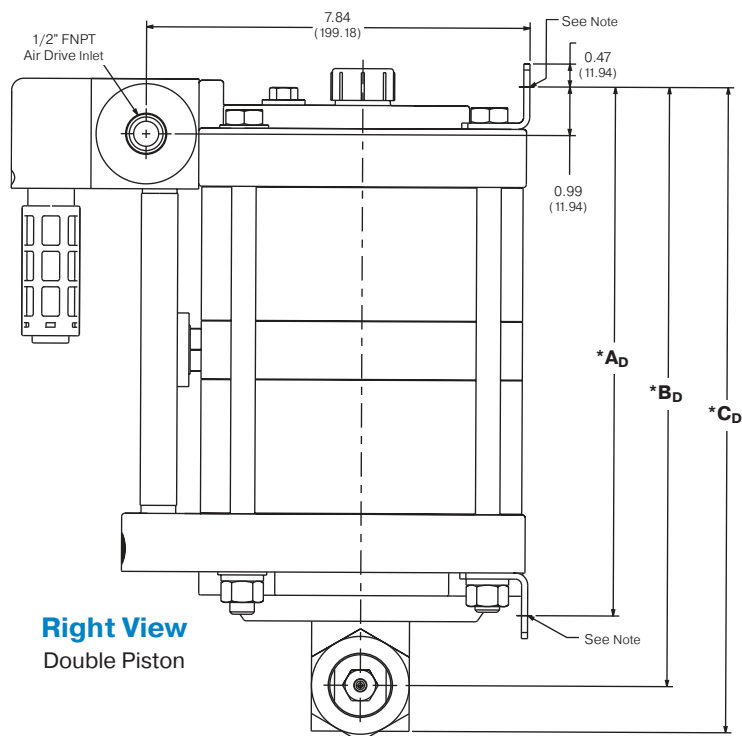
Air Drive Connection

All **ASL Series Pumps** have a 1/2" FNPT regulated main air drive supply connection and utilize a 1/8" FNPT pilot port connection for remote start/stop operation. It is recommended to operate the pilot port at a higher air pressure unregulated than the main air drive supply pressure for proper function.

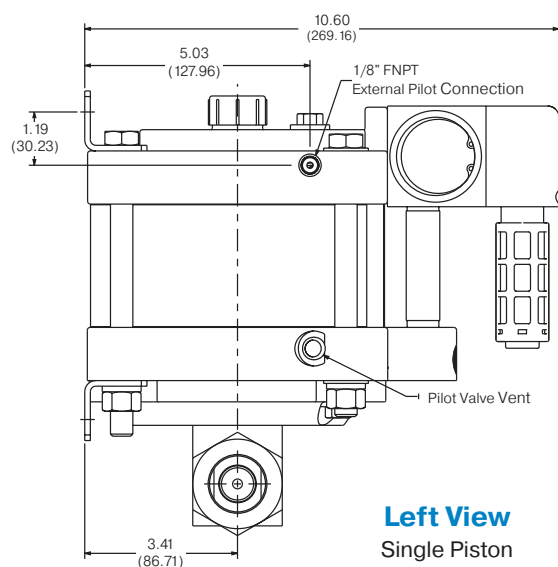


Right View
Single Piston

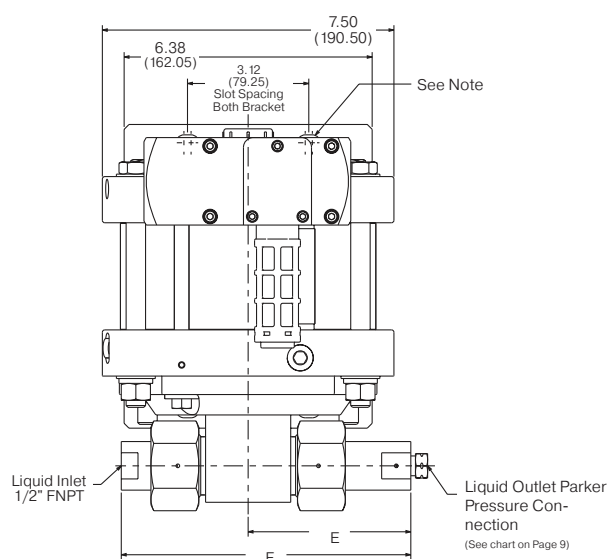
*See following page for product dimensions.



Right View
Double Piston



Left View
Single Piston



Front View
Single Piston

Note:

- Each mounting bracket includes (2) x 11/32" (8.73) slots for 5/16" bolts.
- All dimensions are for reference only and are subject to change without notice.
- Primary dimensions: Inches, Secondary Dimensions: (Millimeters)

ASL Series: Dimensions

Catalog Number	A _S	B _S	C _S
Single Piston Air Drive			
ASL25-01	6.87 (175)	8.25 (210)	9.83 (250)
ASL60-01	6.87 (175)	8.31 (211)	9.25 (235)
ASL250-01	6.87 (175)	8.31 (211)	9.25 (235)

Catalog Number	A _D	B _D	C _D
Double Piston Air Drive			
ASL100-02	10.81 (275)	12.25 (311)	13.19 (335)
ASL400-02	10.81 (275)	12.30 (312)	13.32 (338)

Note:

Each mounting bracket includes two (2) x 13/32" (10.32) slots for 3/8" bolts. Bottom inlet pump head and side inlet pump head are mutually exclusive. All dimensions are for reference only and are subject to change without notice.

Primary Dimensions: Inches

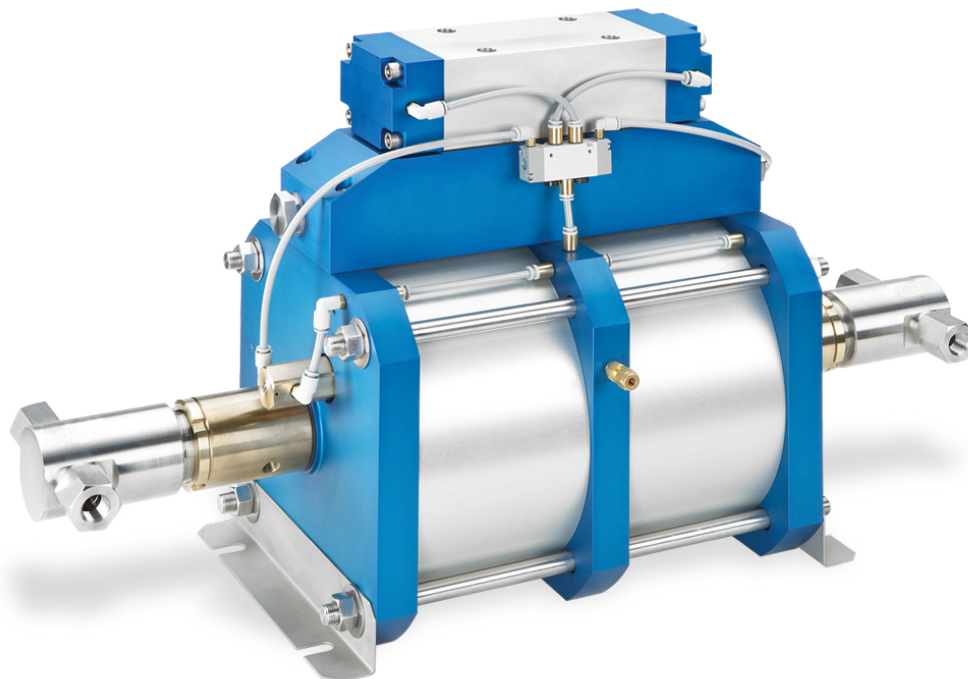
Secondary Dimensions: (Millimeters)

Flow Rate Table: Air Drive Pressure (psi) vs. Outlet Pressure (psi)

Catalog Number	Air Drive Pressure (psi)	Outlet Pressure (psi)											
		0	500	1,500	3,000	5,000	7,500	10,000	15,000	25,000	40,000	55,000	in ³ /min.
ASL25-01	60	508	342	127									
	90	520	387	303									
	120	543	427	360	202								
ASL60-01	60	168	155	125	79								
	90	175	161	134	106	63							
	120	182	167	140	118	94	45						
ASL250-01	60	46	45	44	42	37	26	20	2				
	90	47	46	45	44	43	40	36	26				
	120	48	47	47	46	45	43	41	34	17			
ASL100-02	60	86	84	82	77	72	53	30					
	90	87	86	84	82	82	70	61	36				
	120	89	88	86	84	84	77	72	57	13			
ASL400-02	60	31	31	30	30	29	29	28	26	16			
	90	31	31	31	30	30	30	29	27	23	14	2	
	120	31	31	31	31	30	30	30	29	27	21	14	

AHL SERIES

Double-Acting, Double Piston Air Drive



Features:

- Pressure Ranges from 6,700 to 22,500 psi (460 to 1550 bar) max
- Operating Temperature Range: 0° to 140°F (-18° to 60°C)
- Pressure Head Material: 15-5 PH Stainless Steel
- Plunger: Stainless Steel, coated with proprietary multi-layer carbon for long life
- Liquid Side Material: All Stainless-Steel Construction
- Air Side Material: Anodized Aluminum

Technical Data:

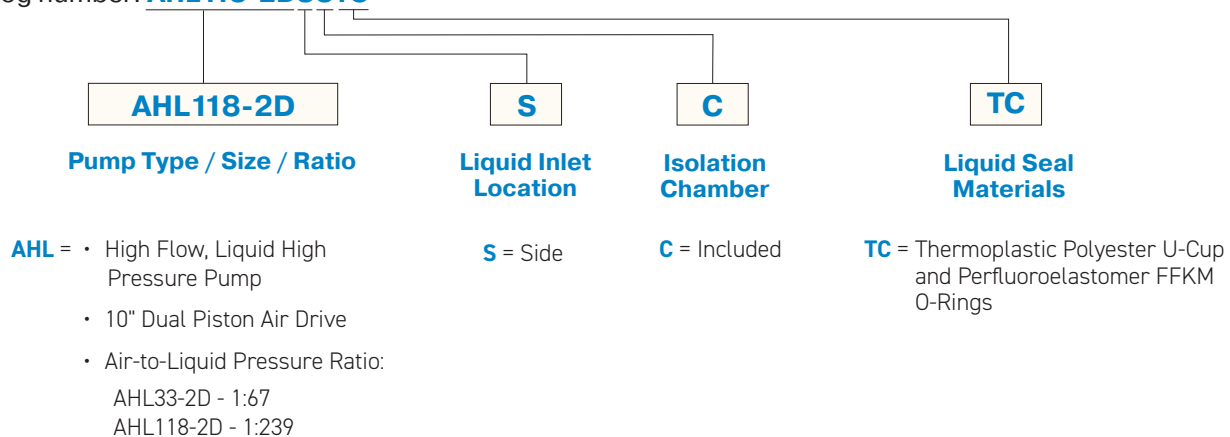
- Liquid Connections: Dual Side Inlet Only – see chart (page 13)
- Isolation Chamber: Standard on all sizes
- Displacement per stroke: See chart (page 13)
- Liquid Seals: Thermoplastic Polyester U-Cup with optional o-rings (see P/N matrix)
- Air Drive Pressure Range: 20-100 psi (1.5-7 bar) * [See Note](#)
- Main Air Inlet: 1" FNPT (Regulated)
- Pilot Air Inlet: 1/8" FNPT (unregulated)
- Exhaust Port (muffler removed) 1" BSP
- Max Air Consumption: 290 SCFM @ 50 psi (no pressure)
- Pre-Lubricated Piston at Factory
- Air Seals: Buna-N

Note: *Maximum air drive pressure is limited by maximum pressure

AHL Pump Part Number Matrix

For complete information on available pump options, contact Parker Autoclave Engineers.

Typical catalog number: **AHL118-2DSCTC**



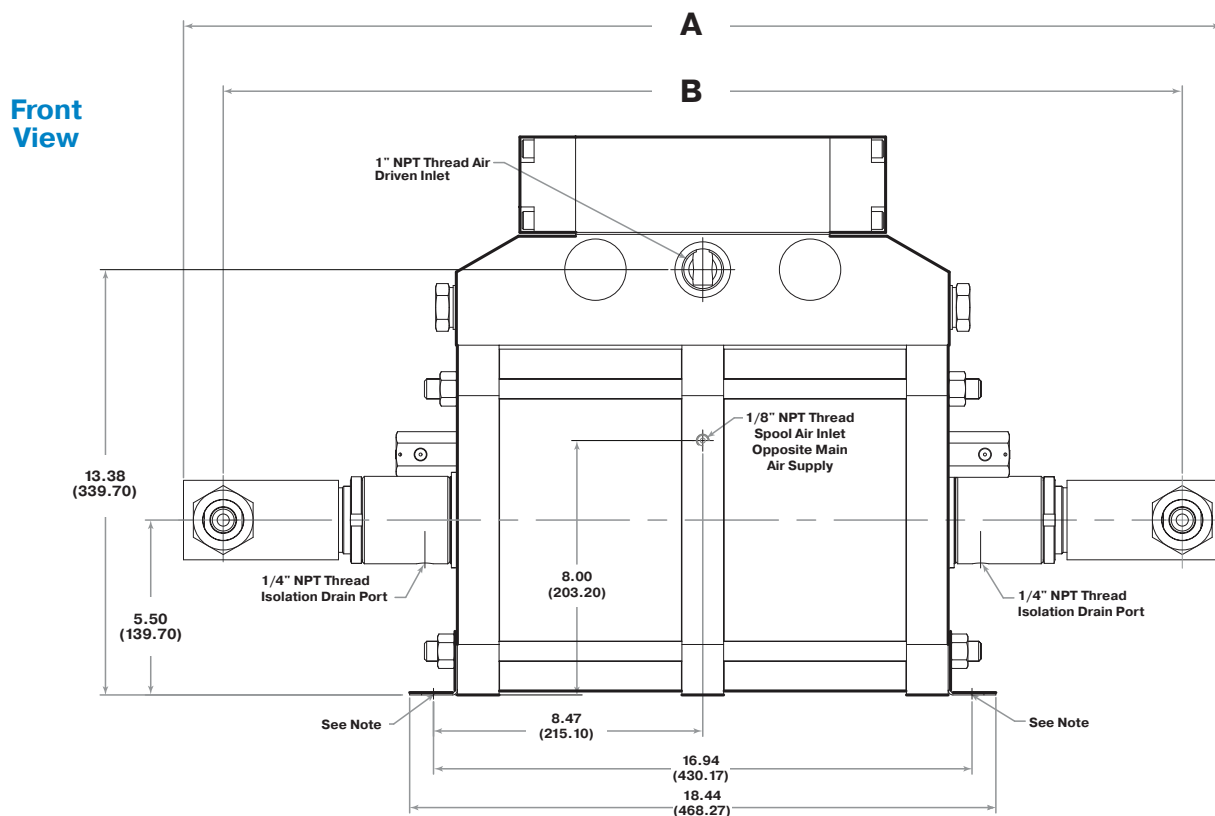
Note: Individual Pump Specifications can be found at www.autoclave.com.

Reference Guide

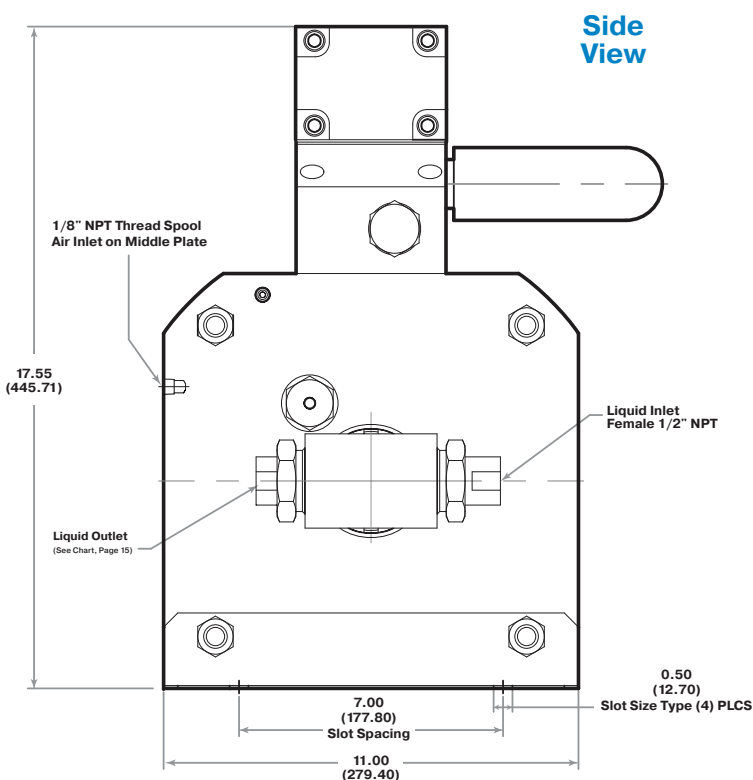
Catalog Number	Pressure Ratio	Maximum Rated Outlet Pressure PSI (bar)	GPM Displacement Per Cycle .in ³ (cm ³)	Liquid Connections	
				Inlet	Outlet
AHL33-2DSCXX	1:67	6,700 (462)	15.3 (250.7)	1" FNPT	1/2" FNPT
AHL118-2DSCXX	1:239	22,500 (1551)	4.4 (72.1)	1/2" FNPT	SF562CX

Air Drive Connection

All AHL series pumps have a 1" FNPT regulated main air drive supply connection and utilize a 1/8" FNPT unregulated pilot port connection for remote start/stop operation. It is recommended to operate the pilot port at a higher air pressure than the main air drive supply pressure for proper function.



Model	A	B
AHL33	32.41 (823.21)	30.42 (772.41)
AHL118	32.66 (829.61)	30.16 (766.11)



Note:

- Each Mounting Bracket includes (2) 9/16" (14.29) holes for 1/2" Bolts.
- All dimensions are for reference only and are subject to change without notice.
- Primary Dimensions: Inches
- Secondary Dimensions: (Millimeters)

Liquid Flow Rate vs. Outlet Pressure: AHL33-2DSC Series

Approximate Air Drive Pressure: 100 psi			
Pressure (PSI)	Pressure (bar)	Flow (gpm)	Flow (liter/min)
0	0	7.6* (see note 2)	28.8* (see note 2)
1000	69	6.1	23.0
2000	138	5.7	21.5
3000	207	4.9	18.4
4000	276	4.0	15.2
5000	345	3.2	12.3
6000	414	1.8	6.9

Nominal Liquid Pressure (Stalled)			
Air Drive Pressure		Liquid Pressure	
PSI	bar	PSI	bar
20	1.4	1340	92.4
30	2.1	2010	138.6
40	2.8	2680	184.8
50	3.4	3350	231.0
60	4.1	4020	277.2
70	4.8	4690	323.4
80	5.5	5360	369.6
90	6.2	6030	415.8
100	6.9	6700	461.9

Note:

1. Actual flow rates will vary depending on air flow capacity, downstream flow restrictions, and fluid type.
2. Flow valve at approximately 50 psi air drive pressure.

Liquid Flow Rate vs. Outlet Pressure: AHL118-2DSC Series

Approximate Air Drive Pressure: 100 psi			
Pressure (PSI)	Pressure (bar)	Flow (gpm)	Flow (liter/min)
0	0	2.0	7.7
2000	138	1.8	6.9
4000	276	2.0	6.3
6000	414	1.5	5.8
8000	552	1.4	5.4
10000	689	1.3	5.1
12000	827	1.2	4.7
14000	965	1.1	4.3
16000	1103	1.0	3.8
18000	1241	0.8	3.1
20000	1379	0.6	2.3
22500	1551	0.2	0.8

Nominal Liquid Pressure (Stalled)			
Air Drive Pressure		Liquid Pressure	
PSI	bar	PSI	bar
20	1.4	4780	329.6
30	2.1	7170	494.4
40	2.8	9560	659.1
50	3.4	11950	823.9
60	4.1	14340	988.7
70	4.8	16730	1153.5
80	5.5	19120	1318.3
90	6.2	21510	1483.1
95	6.6	22500	1551.3

Note:

1. Actual flow rates will vary depending on air flow capacity, downstream flow restrictions, and fluid type.
2. Flow valve at approximately 50 psi air drive pressure.

A wide-angle photograph of a large industrial facility, likely a power plant or refinery. The image shows a complex network of silver-colored pipes and ducts running across the ceiling and through the space. The structural steel framework is prominent, with large white columns supporting the roof. In the foreground, there's a grey concrete floor with white dashed lines and a white arrow pointing right. A yellow safety railing is visible on the right side. In the background, various pieces of industrial machinery, including what looks like a large fan or turbine at the top left, are visible. The lighting is bright, coming from overhead fixtures and natural light from skylights in the roof.

**Air-Driven Power for
Demanding Liquid Applications.**

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PARKER-HANNIFIN CORPORATION OFFER OF SALE

1. Definitions. As used herein, the following terms have the meanings indicated. "Buyer" means any customer receiving a Quote for Products. "Buyer's Property" means any tools, patterns, plans, drawings, designs, specifications materials, equipment, or information furnished by Buyer, or which are or become Buyer's property. "Confidential Information" means any technical, commercial, or other proprietary information of Seller, including, without limitation, pricing, technical drawings or prints and/or part lists, which has been or will be disclosed, delivered, or made available, whether directly or indirectly, to Buyer. "Goods" means any tangible part, system or component to be supplied by Seller. "Intellectual Property Rights" means any patents, trademarks, copyrights, trade dress, trade secrets or similar rights. "Products" means the Goods, Services and/or Software as described in a Quote. "Quote" means the offer or proposal made by Seller to Buyer for the supply of Products. "Seller" means Parker-Hannifin Corporation, including all divisions, subsidiaries and businesses selling Products under these Terms. "Seller's IP" means patents, trademarks, copyrights, or other intellectual property rights relating to the Products, including without limitation, names, designs, images, drawings, models, software, templates, information, any improvements or creations or other intellectual property developed prior to or during the relationship contemplated herein. "Services" means any services to be provided by Seller. "Software" means any software related to the Goods, whether embedded or separately downloaded. "Special Tooling" means equipment acquired by Seller or otherwise owned by Seller necessary to manufacture Goods, including but not limited to tools, jigs, and fixtures. "Terms" means the terms and conditions of this Offer of Sale.

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3. Price; Payment. The Products set forth in the Quote are offered for sale at the prices indicated in the Quote. Unless otherwise specifically stated in the Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices for any reason and at any time by giving ten (10) days prior written notice. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2020). All sales are contingent upon credit approval and full payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Under any circumstances, Buyer as a deduction, set-off or recoupment of any amount, claim or dispute with Seller. Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law. Seller reserves the right to require advance payment or provision of securities for first and subsequent deliveries if there is any doubt, in Seller's sole determination, regarding the Buyer's creditworthiness or for other business reasons. If the requested advance payment or securities are not provided to Seller's satisfaction, Seller reserves the right to suspend performance

or reject the purchase order, in whole or in part, without prejudice to Seller's other rights or remedies, including the right to full compensation. Seller may revoke or shorten any payment periods previously granted in Seller's sole determination. The rights and remedies herein reserved to Seller are cumulative and in addition to any other or further rights and remedies available at law or in equity. No waiver by Seller of any breach by Buyer of any provision of these terms will constitute a waiver by Seller of any other breach of such provision.

4. Shipment; Delivery; Title and Risk of Loss. All delivery dates are approximate, and Seller is not responsible for damages or additional costs resulting from any delay. All deliveries are subject to our ability to procure materials from our suppliers. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the carrier at Seller's facility. Unless otherwise agreed prior to shipment and for domestic delivery locations only, Seller will select and arrange, at Buyer's sole expense, the carrier and means of delivery. When Seller selects and arranges the carrier and means of delivery, freight and insurance costs for shipment to the designated delivery location will be prepaid by Seller and added as a separate line item to the invoice. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions. Buyer shall not return or repackage any Products without the prior written authorization from Seller, and any return shall be at the sole cost and expense of Buyer.

5. Warranty. The warranty for the Products is as follows: (i) Goods are warranted against defects in material or workmanship for a period of twelve (12) months from the date of delivery or 2,000 hours of use, whichever occurs first; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the date of completion of the Services; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end-user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer: EXEMPTION CLAUSE; DISCLAIMER OF WARRANTY, CONDITIONS, REPRESENTATIONS: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY, CONDITION, AND REPRESENTATION, PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, CONDITIONS, AND REPRESENTATIONS, WHETHER STATUTORY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THOSE RELATING TO DESIGN, NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE SOFTWARE IS ERROR-FREE OR FAULTTOLERANT, OR THAT BUYER'S USE THEREOF WILL BE SECURE OR UNINTERRUPTED, UNLESS OTHERWISE AUTHORIZED IN WRITING BY SELLER, THE SOFTWARE SHALL NOT BE USED IN CONNECTION WITH HAZARDOUS OR HIGH-RISK ACTIVITIES OR ENVIRONMENTS. EXCEPT AS EXPRESSLY STATED HEREIN, ALL PRODUCTS ARE PROVIDED "AS IS".

6. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the nonconformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCTS, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING ANY LOSS OF REVENUE OR PROFITS, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.

8. Confidential Information. Buyer acknowledges and agrees that Confidential Information has been and will be received in confidence and will remain the property of Seller. Buyer further agrees that it will not use Seller's Confidential Information for any purpose other than for the benefit of Seller and shall return all such Confidential Information to Seller within thirty (30) days upon request.

9. Loss to Buyer's Property. Buyer's Property will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using Buyer's Property. Also, Seller shall not be responsible for any loss or damage to Buyer's Property while it is in Seller's possession or control. **10. Special Tooling.** Seller may impose a tooling charge for any Special Tooling. Special Tooling shall be and remain Seller's property. In no event will Buyer acquire any interest in the Special Tooling, even if such Special Tooling has been specially converted or adapted for manufacture of Goods for Buyer and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property owned by Seller in its sole determination at any time.

11. Security Interest. To secure payment of all sums due from Buyer, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be 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 Seller's security interest.

12. User Responsibility. Buyer, through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and any technical information provided with the Quote or the Products, such as Seller's instructions, guides and specifications. If Seller provides options of or for Products based upon data or specifications provided by Buyer, Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event Buyer is not the end-user of the Products, Buyer will ensure such end-user complies with this paragraph.

13. Use of Products, Indemnity by Buyer. Buyer shall comply with all instructions, guides and specifications provided by Seller with the Quote or the Products. If Buyer uses or resells the Products in any way prohibited by Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Further, Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, arising out of or in connection with: (a) improper selection, design, specification, application, or any misuse of Products; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of Buyer's Property; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing, tampering with or repackaging the Products; or (e) Buyer's failure to comply with these Terms, including any legal or

administrative proceedings, collection efforts, or other actions arising from or relating to such failure to comply. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

14. Cancellations and Changes. Buyer may not cancel or modify, including but not limited to movement of delivery dates for the Products, any order 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 and any additional expense. Seller, at any time, may change features, specifications, designs and availability of Products.

15. Assignment. Buyer may not assign its rights or obligations without the prior written consent of Seller.

16. Force Majeure. Seller is not liable for delay or failure to perform any of its obligations by reason of any events or circumstances beyond its reasonable control. Such circumstances include without limitation: accidents, labor disputes or stoppages, government acts or orders, acts of nature, pandemics, epidemics, other widespread illness, or public health emergency, cyber related disruptions, cyber-attacks, ransomware sabotage, delays or failures in delivery from carriers or suppliers, shortages of materials, sudden increases in the price of raw material or components, shutdowns or slowdowns affecting the supply of raw materials or components, or the transportation thereof, oil shortages or oil price increases, energy crisis, energy or fuel interruption, war (whether declared or not) or the serious threat of same, riots, rebellions, acts of terrorism, embargoes, fire or any reason whether similar to the foregoing or otherwise. Seller will resume performance as soon as practicable after the event of force majeure has been removed. All delivery dates affected by an event of force majeure shall be tolled for the duration of such event of force majeure and rescheduled for mutually agreed dates as soon as practicable after the event of force majeure ceases to exist. The right to allocate capacity is in the Seller's sole discretion. An event of force majeure shall not include financial distress, insolvency, bankruptcy, or other similar conditions affecting one of the parties, affiliates and/or subcontractors. An event of force majeure in the meaning of these Terms means any circumstances beyond Seller's control that permanently or temporarily hinders performance, even where that circumstance was already foreseen. Buyer shall not be entitled to cancel any orders following its claim of an event of force majeure.

17. Waiver and Severability. Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice either party's right to enforce that provision in the future. Invalidation of any provision of these Terms shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

18. Duration. Unless otherwise stated in the Quote, any agreement governed by or arising from these Terms shall: (a) be for an initial duration of one (1) year; and (b) shall automatically renew for successive one-year terms unless terminated by Buyer with at least 180-days written notice to Seller or if Seller terminates the agreement pursuant to Section 19 of these Terms.

19. Termination. Seller may, without liability to Buyer, terminate any agreement governed by or arising from these Terms for any reason and at anytime by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms, (b) becomes or is deemed insolvent, (c) appoints or has appointed a trustee, receiver or custodian for all or any part of Buyer's property, (d) files a petition for relief in bankruptcy on its own behalf, or one is filed against Buyer by a third party, (e) makes an assignment for the benefit of creditors; or (f) dissolves its business or liquidates all or a majority of its assets.

20. Ownership of Rights. Buyer agrees that (a) Seller (and/or its affiliates) owns or is the valid licensee of Seller's IP and (b) the furnishing of information, related documents or other materials by Seller to Buyer does not grant or transfer any ownership interest or license in or to Seller's IP to Buyer, unless expressly agreed in writing. Without limiting the foregoing, Seller retains ownership of all Software supplied to Buyer. In no event shall Buyer obtain any greater right in and to the Software than a right in a license limited to the use thereof and subject to compliance with any other terms provided with the Software. Buyer further agrees that it will not, directly or through intermediaries, reverse engineer, decompile, or disassemble any Software (including firmware) comprising or contained within a Product, except and only to the extent that such activity may be expressly permitted, either by applicable law or, in the case of open source software, the applicable open source license.

21. Indemnity for Infringement of Intellectual Property Rights.

Seller is not liable for infringement of any Intellectual Property Rights except as provided in this Section. 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 a third-party claim that one or more of the Products infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by Seller to Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer (including Seller's use of Buyer's Property); or (ii) directed to any Products for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for claims of infringement of Intellectual Property Rights.

22. Governing Law. These Terms, the terms of any Quote, and the sale and delivery of all Products are 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 the sale and delivery of the Products.

23. Entire Agreement. These Terms, along with the terms set forth in the Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale and purchase. In the event of a conflict between any term set forth in the Quote and these Terms, the terms set forth in the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. No modification to these Terms will be binding on Seller unless agreed to in a writing that is signed by an authorized representative of Seller, excluding email correspondence, 'clickwrap' or other purported electronic assent to different or additional terms. Sections 2-25 of these Terms shall survive termination or cancellation of any agreement governed by or arising from these Terms.

24. No 'Wrap' Agreements/No Authority to Bind. Seller's clicking any buttons or any similar action, such as clicking "I Agree" or "Confirm," to utilize Buyer's software or webpage for the placement of orders, is NOT an agreement to Buyer's Terms and Conditions. NO EMPLOYEE, AGENT OR REPRESENTATIVE OF SELLER HAS THE AUTHORITY TO BIND SELLER BY THE ACT OF CLICKING ANY BUTTON OR SIMILAR ACTION ON BUYER'S WEBSITE OR PORTAL.

25. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer represents that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Products from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws. Buyer agrees to promptly and reliably provide Seller all requested information or documents, including end-user statements and other written assurances, concerning Buyer's ongoing compliance with Export Law.

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If you have questions about the products contained in this catalog, or their applications, please contact:

Instrumentation Products Division

1005 A Cleaner Way

Huntsville, AL 35805

Ph: **+1 (256) 881-2040**

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The products described in this catalog can expose you to chemicals, including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.p65warnings.ca.gov.



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Instrumentation Products Division
1005 A Cleaner Way
Huntsville, AL 35805 USA
phone 256 881 2040
fax 256 881 5083
parker.com/ipd | autoclave.com

Parker Hannifin Corporation
Instrumentation Products Division
Autoclave Engineers Operation
8325 Hessinger Drive
Erie, PA 16409 USA
phone 814 860 5700
fax 814 866 7748

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