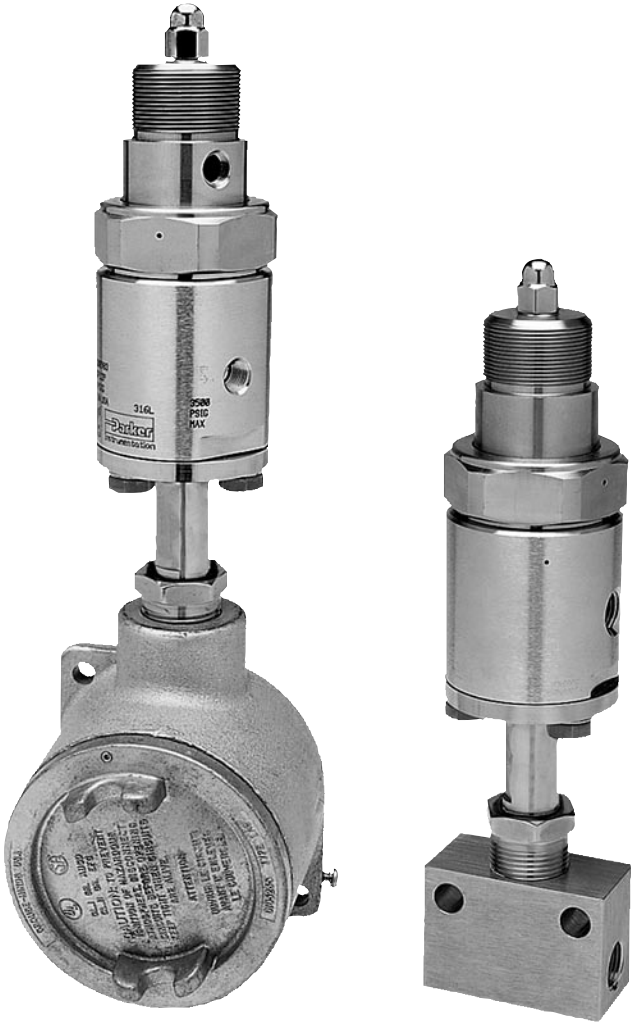


Vaporizing Regulators

Instrument / Analyzer Products

Catalog 4512/USA

December 2007

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

VERIFLO

ENGINEERING YOUR SUCCESS.

Table of Contents

Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Veriflo

A Leading Manufacturer of Precision Valves, Regulators & Surface Mount Components

Veriflo Division, Parker Hannifin Corporation is a leading manufacturer of precision valves, regulators and surface mount components for the control and application of liquids and gases used in the fabrication of semiconductors, as well as in the chemical and petrochemical industries.

Veriflo has maintained industry leadership over the past 95 years through innovative engineering, manufacturing and by placing a premium on quality customer care.

The division maintains two state-of-the-art Class 10 Clean Rooms at its Richmond, CA, facility and has adopted a corporate wide "Lean Manufacturing" philosophy, which is delivering greater value to the customer by eliminating wasteful steps through continuous improvement activities.

Veriflo Division's two manufacturing facilities develop and manufacture applications for the Semiconductor/High Purity and Instrument/Analyzer industries.

WARNING – USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS 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 or system options for further investigation by users having technical expertise.
- The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components 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, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.
- To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

OFFER OF SALE

The items described in this document are hereby offered for sale by Parker-Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the detailed "Offer of Sale" elsewhere in this document or available at www.parker.com.

Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Placing a Premium on Quality Customer Care

With the focus of maintaining the highest industry standards, Veriflo Division has achieved an ISO 9001 registration at its Richmond, CA, manufacturing plant. This certification confirms Veriflo's commitment to quality and excellence as recognized by the international community.

The Instrumentation Group of Parker Hannifin specializes in high quality, critical flow components for world-wide process instrumentation, ultra-high purity, medical, analytical and biopharmaceutical applications.

Parker's Instrumentation Group has ten manufacturing plants and over 300 authorized distributor locations around the world to provide local inventory and technical support. Key markets for the Instrumentation Group include: Chemical Process, Power Generation, Oil and Gas Exploration, Semiconductor Manufacturing, Biomedical, and Analytical Equipment.

VERIFLO

Visit Us on the Web

For further information on Veriflo Division and or its product line visit the division web site at www.parker.com/veriflo. For more information on Parker Hannifin Corporation visit the corporation's web site at www.parker.com.

Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Steam Heated Pressure Reducing Regulator

Parker Hannifin Corporation's Veriflo Division presents the AVR3 Series steam heated pressure reducing vaporizing regulator. The AVR3 is designed to heat and/or vaporize a gas or liquid sample before entering an analyzer system. The design allows easy cleaning of the heating element and screen.

Features

- Ultra low internal volume.
- Hastelloy C-22® diaphragm for superior strength and corrosion resistance.
- Convoluted diaphragm provides outlet pressure stability with changes in flow.
- Integral diaphragm stop provides additional measure of safety.
- Field serviceable heat transfer element.
- Cleaned for oxygen service.

Specifications

Materials of Construction

Wetted

Pressure Control and Heat Exchanger
Bodies..... 316L Stainless Steel, Monel®, Hastelloy C-22®
Seat ..... PCTFE, PEEK™, or Vespel®
Heater Seal..... PEEK™
Back-up O-ring ..... Fluorocarbon
Carrier ..... 316L Stainless Steel, Hastelloy C-22®
Compression Member ..... Inconel®
Diaphragm ..... Hastelloy C-22®
Poppet ..... UNS N10276 (HAST C276)
Poppet Spring..... Inconel®

Nonwetted

Cap ..... 303 Stainless Steel
Cap Nut ..... 316L Stainless Steel

Operating Conditions

Maximum Inlet Pressure..... 3,500 psig (241 barg)
Outlet Pressure..... 0-10 psig (.7 barg), 1-30 psig (2 barg), 2-60 psig (4 barg), 3-100 psig (7 barg), 10-250 psig (17 barg), 20-500 psig (35 barg)
Maximum Steam Supply..... 600 psig, 500°F (41 barg), (260°C)
Temperature of Flow Media ..... -40°F to 500°F (-40°C to 260°C) Seat Material Specific

Functional Performance

Design Proof Pressure ..... 5,250 psig (362 barg)
Design Burst Pressure..... 11,500 psig (793 barg)
Flow Capacity ..... C_v 0.06 Nominal
Supply Pressure Effect ..... 0.6 psig per 100 psig (.04 barg per 7 barg)

Leakage

Internal (seat) ..... Bubble Tight
External ..... Bubble Tight

Internal Volume

High Pressure Inlet 0.57 cc, Overall 4.6 cc

Standard Connections

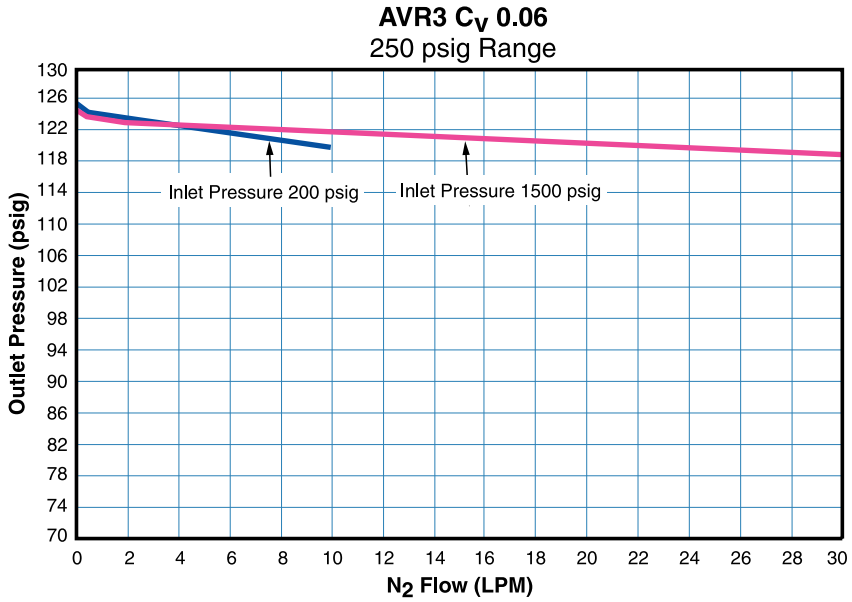
1/4" NPT outlet ports, 1/8" NPT, 3/8" NPT steam supply connections

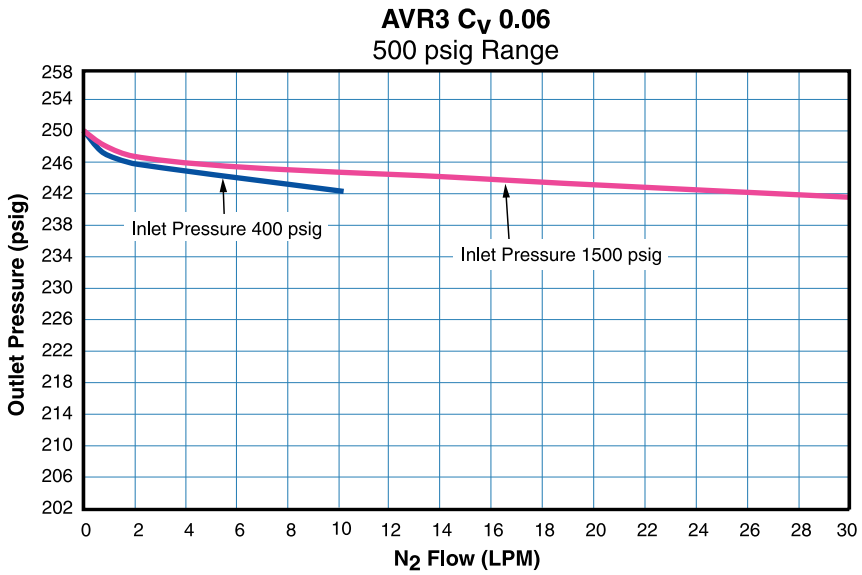
Approximate Weight

..... 8 lbs (2.0 kgm)

Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Flow Curves





Seat Operating Parameters

Seat Material	Temperature		Inlet Pressure	
PCTFE	150°F	(66°C)	3500 psig	(241 barg)
PEEK™	275°F	(135°C)	3500 psig	(241 barg)
Vespel®	500°F	(260°C)	3500 psig	(241 barg)

Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

AVR3 Series Express Service Program

The Express Service Program (ESP) is Parker's next generation of customer service to provide customers with an array of standard products in a 5-day delivery window*. The ESP program offers a standard lead time of 5 working days from receipt of the order to the ship date. Using the Product Data Ordering Information listed below, you can identify the product configurations offered in the program by the **Blue Print**. If the configuration you select is configured from any options in black print, the product will be ready to ship in the standard lead time. Please contact your local Parker Hannifin distributor or the factory for any questions regarding the scope of the Express Service Program.

* Limited to 5 pieces per order of any ESP combination.

Ordering Information

AVR3	S	K	1	X	3PG	RV

Basic Series
AVR3

Materials
- **S 316L Stainless Steel**
- M Monel®
- H Hastelloy C-22®

Seat Materials
- **K PCTFE**
- **P PEEK™**
- **V Vespel®**

Notes:
High pressure port standard is 1/8" NPT female.
1/4" NPT female on auxillary outlet ports.
ESP porting configuration standard is 3PG. Either an outlet pressure gauge or relief valve is available; not both.

Pressure Range
- 0 0 - 10 psig*
- **1 1 - 30 psig**
- **2 2 - 60 psig**
- **3 3 - 100 psig**
- 4 10 - 250 psig
- 5 20 - 500 psig

* Max inlet 250 psig

Outlet Gauge
- **03 0 - 30 psig**
- **OL 0 - 60 psig**
- **01 0 - 100 psig**
- 4 0 - 400 psig
- 6 0 - 600 psig
- **X No Gauge**

Porting Configuration
- (omit) 2 Port (with plugged port)
- **3PG Relief Valve or Gauge Port**
- 4PV Relief Valve and Gauge Port
- 2PL 2 Port Reverse Entry
- 3PLG Reverse Entry Relief Valve or Gauge Port
- 4PL Reverse Entry Relief Valve and Gauge Port

Note: Some ports may be plugged based on configuration.

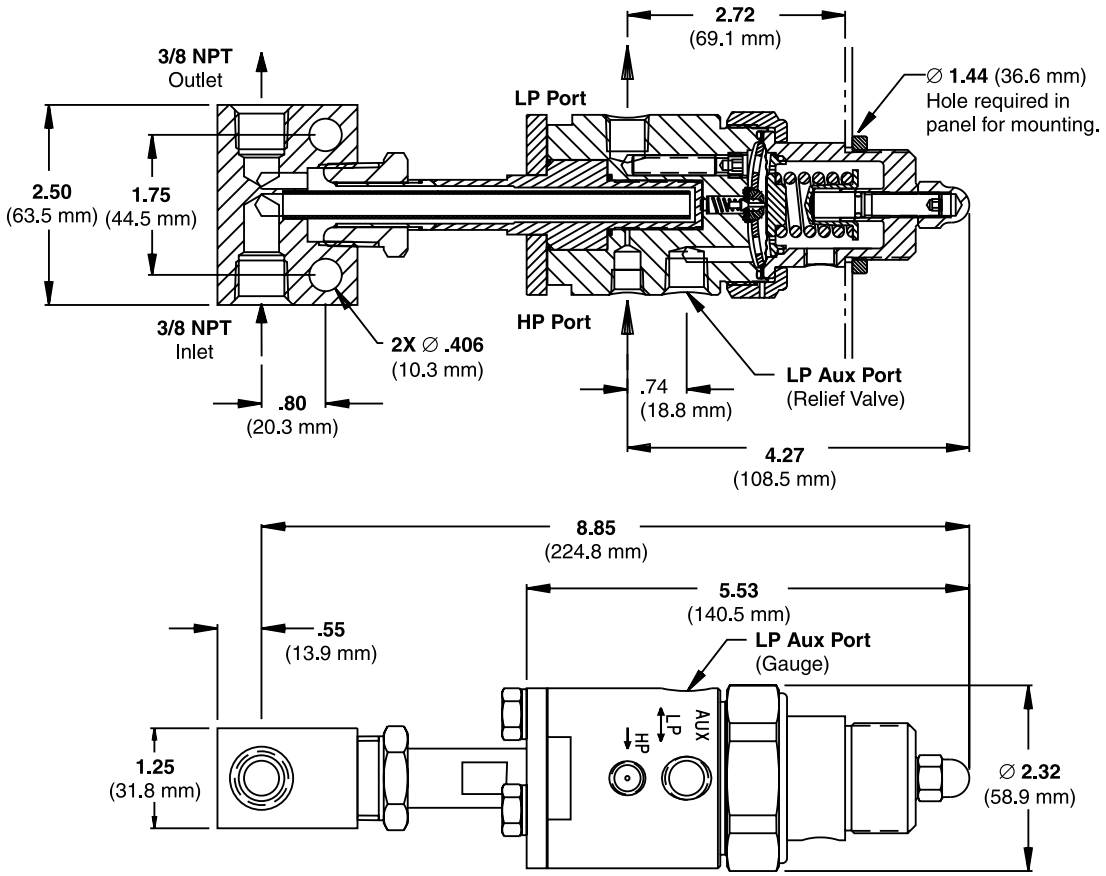
Optional Features
- **RV Relief Valve**

Note: Order Panel Mount Ring P/N **41900363** as a separate line item.

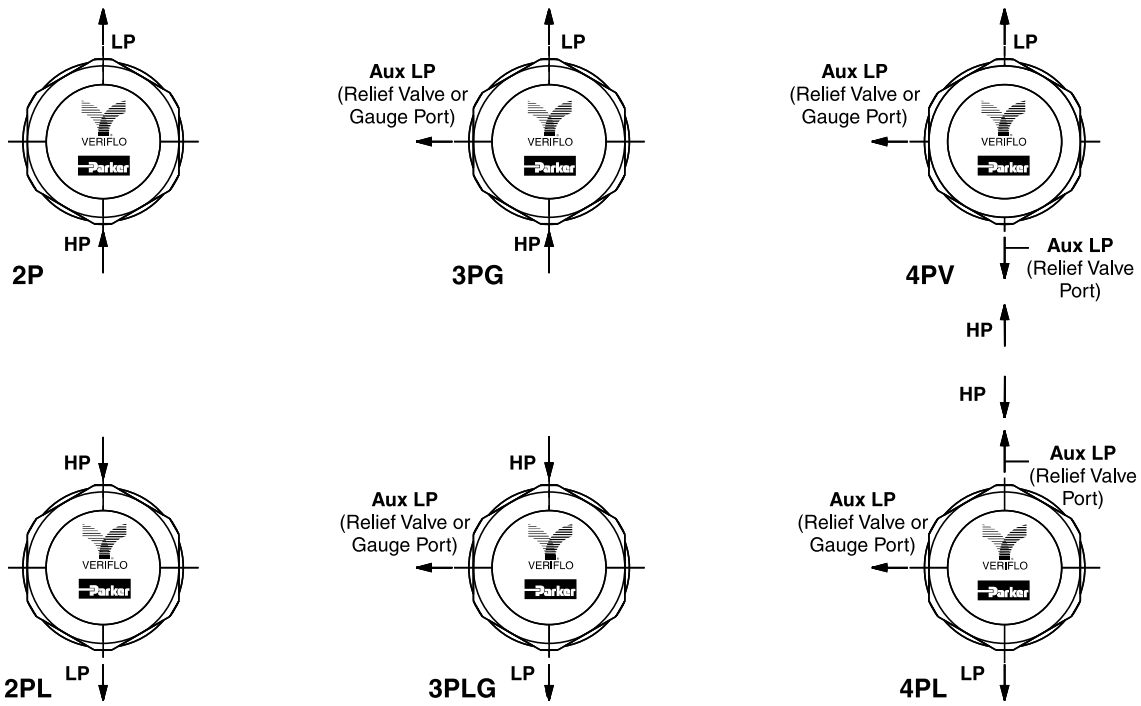
Safety Guide and Installation and Operating Instructions available at www.parker.com/veriflomanuals

Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Cross Sectional View and Installation Dimensions



Porting Configurations



Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Electrically Heated Pressure Reducing Regulator

Parker Hannifin Corporation's Veriflo Division presents the AVR4 Series electronically heated vaporizing pressure reducing regulator. The AVR4 Series is for use in potentially explosive atmospheres.

The AVR4 is designed to heat and/or vaporize a gas or liquid sample before entering an analyzer system. The design allows easy cleaning of the heating element and screen, reducing expensive replacement costs.

Features

- Ultra low internal volume.
- Hastelloy C-22® diaphragm for superior strength and corrosion resistance.
- Convoluted diaphragm provides outlet pressure stability with changes in flow.
- Integral diaphragm stop provides additional safety measure.
- CSA, CE-ATEX certified.
- Field serviceable heat transfer element.
- Cleaned for oxygen service.

ATEX Related Drawing:
Revision Control Per 54099313
Reference: ATEX Schedule Drawing 54013150
Reference: CSA File # LR99181

Specifications

Materials of Construction

Wetted

Pressure control and heat exchanger
Bodies..... 316L Stainless Steel, Monel®, Hastelloy C-22®
Seat ..... PCTFE, PEEK™, or Vespel®
Heater Seal..... PEEK™
Back-up O-ring ..... Fluorocarbon
Carrier ..... 316L Stainless Steel, Hastelloy C-22®
Compression Member ..... Inconel®
Diaphragm ..... Hastelloy C-22®
Poppet ..... UNS N10276 (HAST C276)
Poppet Spring..... Inconel®

Nonwetted

Cap ..... 303 Stainless Steel
Cap Nut ..... 316L Stainless Steel
Condulet ..... Cast iron and aluminum

Electrical Specifications

Power Requirements ..... 120V or 240V, 50/60 Hz
Heater Wattage..... 40, 100, 150, 200 watt
Temperature Controller..... Proportional, 75°F to 220°F or 215°F to 380°F (24°C to 105°C or 102°C to 194°C) Ranges Approximate
Condulet .....Crouse Hinds, UL and CSA listed Class 1, Groups A, B, C, D; Class 2, Groups E, F, G

Operating Conditions

Maximum Inlet Pressure..... 3500 psig (241 barg)
Outlet Pressure..... 0-10 psig (.7 barg), 1-30 psig (2 barg), 2-60 psig (4 barg), 3-100 psig (7 barg), 10-250 psig (17 barg), 20-500 psig (35 barg)
Temperature of Flow Media .....-40°F to 500°F (-40°C to 260°C) Seat Material Specific

Functional Performance

Design Proof Pressure ..... 5,250 psig (362 barg)
Design Burst Pressure..... 11,500 psig (793 barg)
Flow Capacity ..... C_v 0.06 Nominal
Supply Pressure Effect ..... 0.6 psig per 100 psig (.04 barg per 7 barg)

Leakage

Internal (seat) ..... Bubble Tight
External ..... Bubble Tight

Internal Volume

High Pressure Inlet .....0.57 cc, Overall 4.6 cc

Standard Connections

1/4" NPT outlet ports, 1/8" NPT inlet port

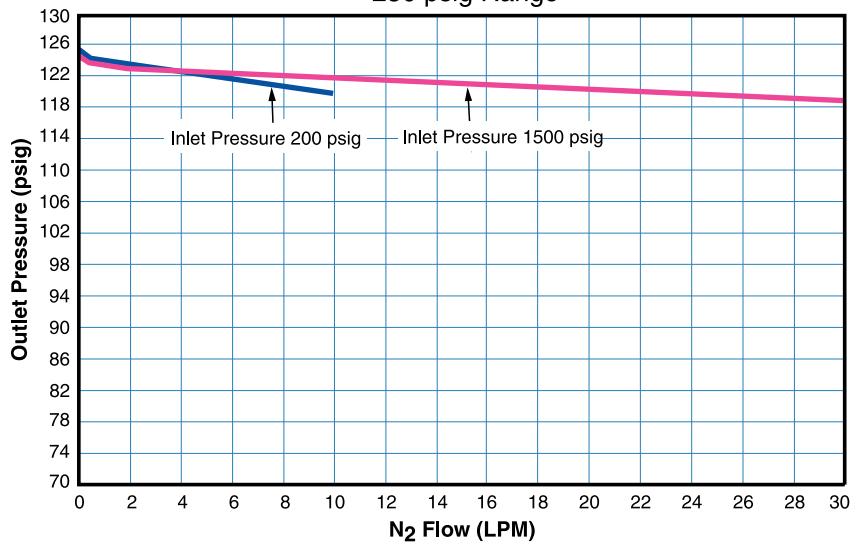
Approximate Weight

..... 8 lbs (2.0 kgm)

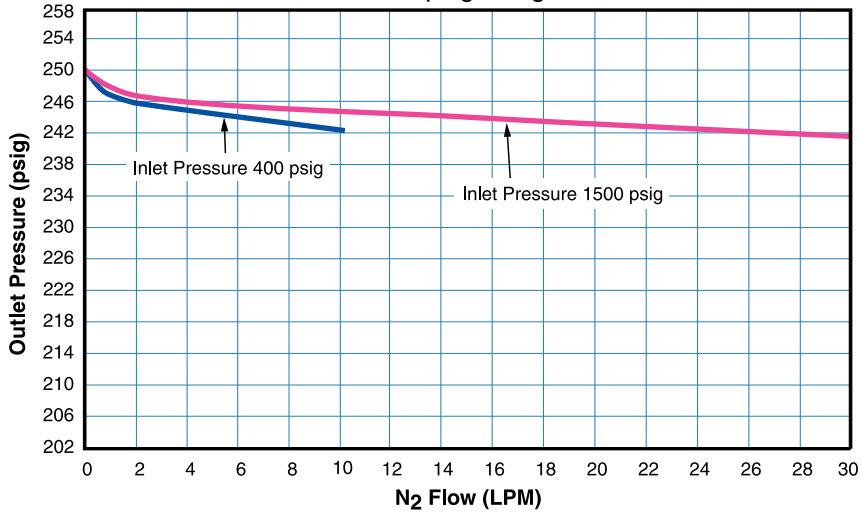
Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Flow Curves

AVR4 C_V 0.06
250 psig Range



AVR4 C_V 0.06
500 psig Range



Seat Operating Parameters

Seat Material	Temperature		Inlet Pressure	
PCTFE	150°F	(66°C)	3500 psig	(241 barg)
PEEK™	275°F	(135°C)	3500 psig	(241 barg)
Vespel®	500°F	(260°C)	3500 psig	(241 barg)

Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

AVR4 Series Express Service Program

The Express Service Program (ESP) is Parker's next generation of customer service to provide customers with an array of standard products in a 5-day delivery window*. The ESP program offers a standard lead time of 5 working days from receipt of the order to the ship date. Using the Product Data Ordering Information listed below, you can identify the product configurations offered in the program by the **Blue Print**. If the configuration you select is configured from any options in black print, the product will be ready to ship in the standard lead time. Please contact your local Parker Hannifin distributor or the factory for any questions regarding the scope of the Express Service Program.

* Limited to 5 pieces per order of any ESP combination.

Ordering Information

AVR4	S	K	1	120	D	L	X	3PG	RV

Basic Series
- **AVR4**

Materials
- **S 316L Stainless Steel**
- M Monel®
- H Hastelloy C-22®

Seat Materials
- **K PCTFE**
- **P PEEK™**
- **V Vespel®**

Pressure Range
- 0 0 - 10 psig*
- **1 1 - 30 psig**
- **2 2 - 60 psig**
- **3 3 - 100 psig**
- 4 10 - 250 psig
- 5 20 - 500 psig

* Max inlet 250 psig

Voltage
- **120 120V**
- **240 240V**

Heater Wattage
- A 40
- C 100
- **D 150**
- **E 200**

Temperature Controller
- **L 75°F to 220°F (24°C to 104°C)**
- **H 220°F to 380°F (104°C to 193°C)**

Outlet Gauge
- **03 0 - 30 psig**
- **OL 0 - 60 psig**
- **01 0 - 100 psig**
- 4 0 - 400 psig
- 6 0 - 600 psig
- **X No Gauge**

Optional Features
- **RV Relief Valve**

Note: Panel Mount Ring – Order Panel Mount Ring P/N **41900363** as a separate line item.

Porting Configuration
- (omit) 2 Port (with plugged port)
- **3PG Relief Valve or Gauge Port**
- 4PV Relief Valve and Gauge Port
- 2PL 2 Port Reverse Entry
- 3PLG Reverse Entry Relief Valve or Gauge Port
- 4PL Reverse Entry Relief Valve and Gauge Port

Note: Some ports may be plugged based on configuration.

Notes:
High pressure port standard is 1/8" NPT female.
1/4" NPT female on auxillary outlet ports.
ESP porting configuration standard is 3PG.
Either an outlet pressure gauge or relief valve is available; not both.

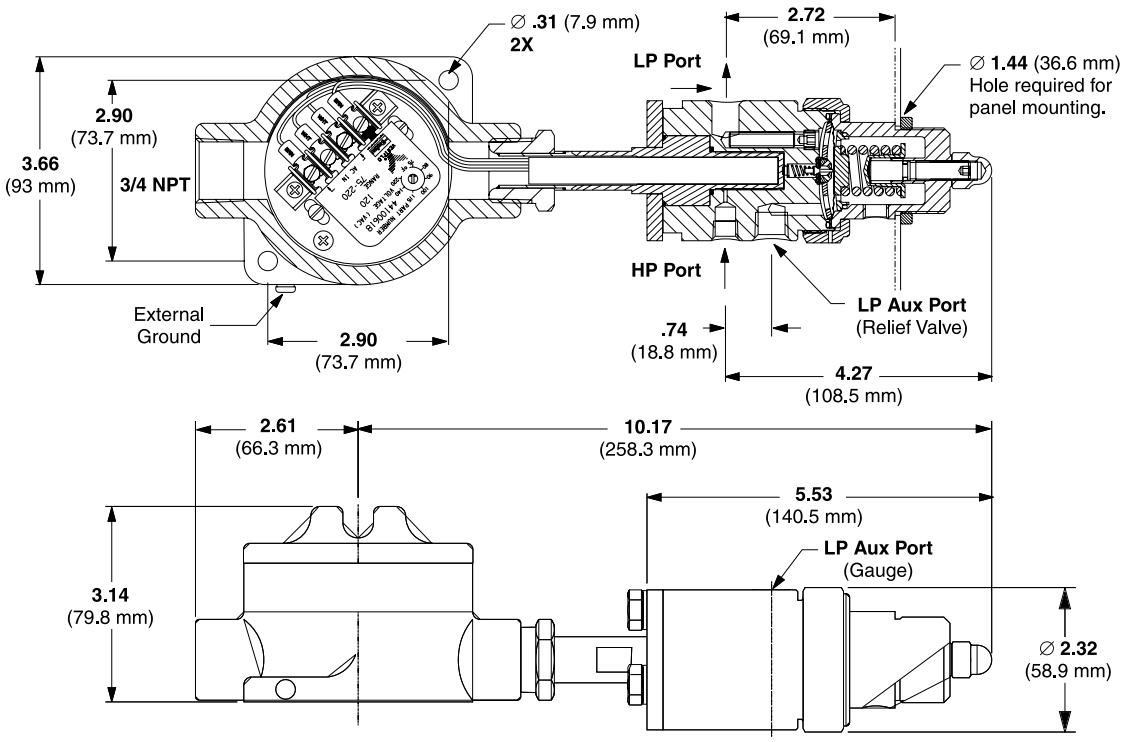
Product Certifications

North American Certification	CLASS I GROUPS A,B,C & D LR99181
European Union Certification	0344 II 2 G EExdIIC T3 KEMA 03ATEX2359

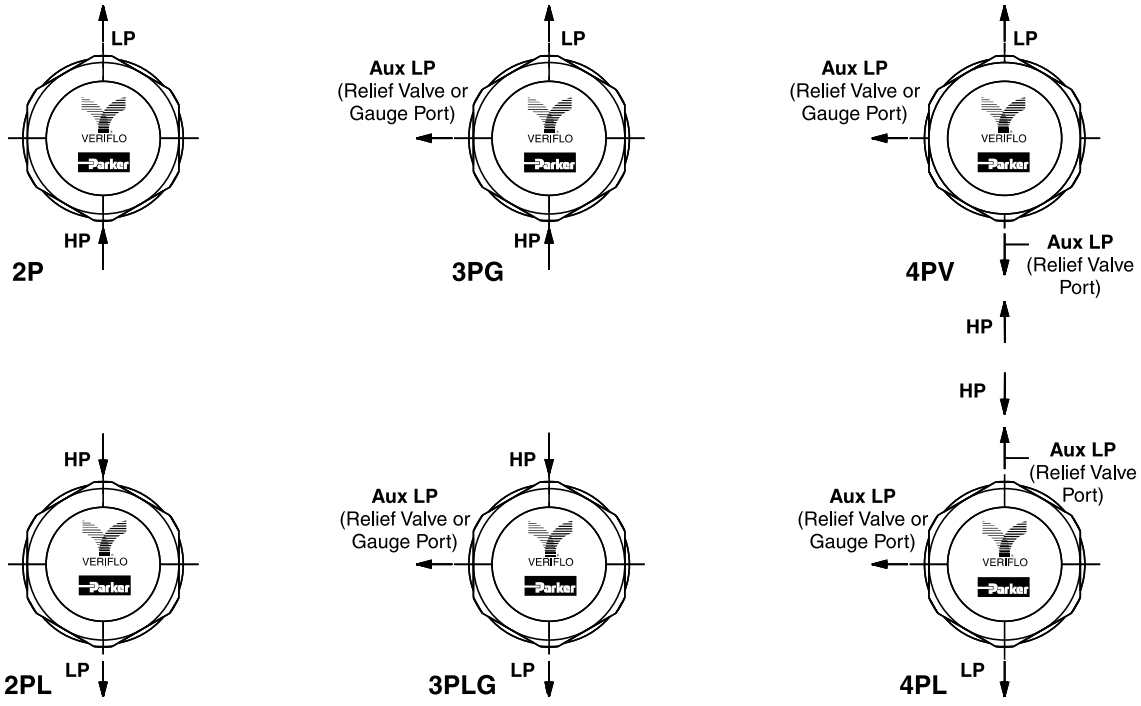
Safety Guide and Installation and Operating Instructions available at www.parker.com/veriflomanuals

Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Cross Sectional View and Installation Dimensions



Porting Configurations



Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Parker Hannifin Corporation
Veriflo Division
250 Canal Boulevard
Richmond, CA 94804-0034
phone 510 235 9590
fax 510 232 7396
www.parker.com/veriflo

Parker Hannifin Corporation
Veriflo Division
Partek Operations
7075 East Southpoint Road
Tucson, AZ 85706
phone 520 574 2600
fax 520 574 2700
www.parker.com/partek

Safety Guide
PN: 25000194
Revision: –
Date: 09.01.07

Safety Guide For Selecting and Using Veriflo Division Products and Related Accessories

⚠ WARNING: FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF VERIFLO DIVISION VALVES, PRESSURE REGULATORS, FLOW CONTROLLERS, AND RELATED ACCESSORIES ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- **Release of toxic, or otherwise injurious, liquids, gases, and chemicals ("fluids").**
- **Injection, inhalation, or exposure to fluids.**
- **Contact with, or injection by, high-pressure fluid discharge.**
- **Rupture of the product or other system components.**
- **Products, components, parts, or other items thrown at high speeds.**
- **Explosion or fire.**
- **Improper and unsafe function of the devices or systems using the product.**

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

1.1. Scope: This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Veriflo Division valve, pressure regulator, and flow control products and related accessories ("products").

1.2. Fail-Safe: Veriflo products can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of Veriflo products will not endanger persons or property.

1.3. Relevant International Standards: For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules relating to systems. See www.iso.org for ordering information.

1.4. Distribution: Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Veriflo products. Do not select or use Veriflo products without thoroughly reading and understanding this safety guide as well as the specific Veriflo publications for the products considered or selected.

1.5. User Responsibility: Due to the wide variety of operating conditions and applications for Veriflo products, Parker and its distributors do not represent or warrant that any particular Veriflo product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a Veriflo product. The user, through its own analysis and testing, is solely responsible for:

- Making the final selection of the appropriate Veriflo product;
- Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards;
- Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the Veriflo products are used; and
- Assuring compliance with all applicable government and industry standards.

1.6. Safety Devices: Safety devices should not be removed, or defeated.

1.7. Warning Labels: Warning labels should not be removed, painted over or otherwise obscured.

1.8. Additional Questions: Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department and Veriflo catalogs and publications.

2. PRODUCT SELECTION INSTRUCTIONS

2.1. Operating Pressure: The user must assure that the pressures applied to the product will never exceed the maximum operating pressure of the product, the maximum operating pressure of any options and accessories connected to the product, and the maximum operating pressure of any other system component. Consult product labeling and Veriflo Division catalogs for maximum operating pressures. Additional operating pressure considerations:

- Pressure regulators have an outlet operating pressure range that is less than the maximum operating inlet pressure. Never exceed the maximum operating inlet pressure. Never exceed the maximum operating outlet pressure.
- Pressure gauges should be selected such that the pressure to be measured is no more than 75% of the full scale range of the gauge. For additional information refer to ASME standard B40.1, Pressure Gauges and Gauge Attachments. See www.asme.org for ordering information.
- Products may be fitted with special connections and adaptors to connect the product to a pressure cylinder. The maximum operating pressure of the product, its options, and accessories must equal or exceed the maximum pressure of the cylinder. For more information regarding the selection and safe use of pressure cylinders and cylinder connections, contact the Compressed Gas Association (CGA), 4221 Walney Road, Chantilly, VA, 20151, Phone: 703-788-2700, Fax: 703-961-1831, or visit the CGA web page at www.cganet.com.

2.2. Temperature Rating: Never exceed the temperature ratings of a product. Excessive heat or cold can shorten the life expectancy of a product, cause improper function, and product rupture. Consult Veriflo Division catalogs for maximum and minimum temperature ratings.

2.3. Leakage: Most products experience small amounts of leakage. Product leakage must be suitable for the application, environment, and the process fluid. Good system design and product selection require consideration of both internal and external leakage. Leakage can create hazardous situations due to exposure to the process fluid, unintended chemical reactions, loss of system pressure, or unexpected transfer of fluids and pressures within the system. Consult Veriflo Division catalogs for product leakage rates.

2.4. Severe Leakage: The user must address in their system design and product selection any hazards that may result from severe leakage due to product or system failure. Good system design requires consideration of the possibility of severe internal and external leakage and may require safety pressure relief devices and secondary fluid containment. Severe leakage can create hazardous situations due to exposure to the process fluid, unintended chemical reactions, loss of system pressure, or unexpected transfer of fluids and pressures within the system.

2.5. Flow Rate: The flow rate requirements of a system are an important consideration when selecting a product. Products need to be able to provide adequate flow and pressure for the desired application.

2.6. Environment: Many environmental conditions can affect the integrity and suitability of a product for a given application. Veriflo

Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct exposure to sunlight, weather, and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.

2.7. Fluid Compatibility: Veriflo products are constructed from a variety of materials. The user is solely responsible for selecting and assuring that the product and materials of construction are compatible with the process fluid. The user must take extreme caution when selecting products and materials for use with corrosive and hazardous fluids. The user should contact their fluid supplier for additional safety and product selection guidance.

2.8. Oxygen Service: Extreme caution must be taken when using oxygen. A serious risk of ignition, fire, and explosion exists. The user is solely responsible for selecting the product and specifying materials to be used in oxygen service.

- Do not use a product or operate a system if there is evidence of contamination (e.g. debris, particles, oils, lubricants, grease, etc.);
- Do not interchange products, components, or accessories with those that have been used in other types of gas service;
- Do not operate a pressure regulator without a proper filter;
- Always apply pressure to the regulator slowly to avoid heating from adiabatic compression. Fast opening valves should not be used.

3. PRODUCT INSTALLATION AND OPERATING INSTRUCTIONS

3.1. Product Inspection: Prior to assembly or installation a careful examination of the product must be performed. All products must be checked for correct style, size, and model number. DO NOT use any product that displays any signs of nonconformance.

3.2. Installation and Operating Instructions: Parker published Installation and Operating Instructions must be followed. These instructions are available by calling 1-800-CPARKER, or at www.parker.com. Important installation and operating considerations:

- Installation, operation, removal and servicing of these products must be performed by knowledgeable personnel who understand how the products are to be applied and have been trained and equipped for the handling, use and servicing of pressurized fluids and systems.
- The user must identify the product inlet and outlet ports by the markings on the product to ensure proper connection to the system. DO NOT use any product with unclear or missing inlet and outlet port markings.
- After installation and servicing the product must be tested for proper function and leakage. Leak test methods should be appropriate for the system leak integrity requirements.
- Do not use a product or operate a system if there is evidence of contamination (e.g. debris, particles, oils, lubricants, grease, etc.).
- Do not interchange products, components, and accessories with those that have been used in other types of gas service.
- Process gases must be clean and free of moisture.
- Do not operate a pressure regulator without a proper inlet filter.
- Prior to installation, follow lockout and tagout procedures for the system and equipment. Follow all government, state and local safety and servicing practices including, but not limited, to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
- Always wear appropriate personal protection equipment such as approved safety glasses, face shield, apron, gloves, etc.

4. MAINTENANCE, REMOVAL, AND SERVICING INSTRUCTIONS

4.1. Maintenance: Even with proper selection and installation, product service life may be significantly reduced without a continuing maintenance program. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.6. Maintenance, inspection, service, and replacement intervals need to be established so that products are replaced before any failure occurs. Important considerations when establishing the frequency of maintenance, inspection, service, and replacement of Veriflo Division products:

- Previous performance experiences including known failures in the application or similar applications.
- Government and/or industrial standards.
- When failures could result in unacceptable down time, equipment damage or personal injury risk.

4.2. Inspection: Any of the following conditions requires immediate system shut down and replacement of worn or damaged components. Never approach a product or system exhibiting these or other abnormal conditions until the system has been shut down and depressurized.

- Escaping fluid and abnormal pressure readings: Escaping fluid and abnormal pressure readings may indicate severe leakage or product or system failure.
- Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
- Kinked, crushed, or damaged hoses and plumbing: Kinked plumbing can result in restricted fluid flow and lead to unpredictable system behavior.
- Any observed improper system or component function: Immediately shut down the system and correct the malfunction.
- Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

4.3. Routine Maintenance Issues:

- Remove excessive dirt, grime and clutter from work areas.
- Make sure all required guards and shields are in place.
- Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.

4.4. Removal: Before attempting to remove a product from service, review the product operating instructions. These instructions are available by calling 1-800-CPARKER, or by accessing the Parker WEB site at www.parker.com. Other important product removal considerations:

- Installation, operation, removal and servicing of these products must be performed by knowledgeable personnel who understand how the products are to be applied and have been trained and equipped for the handling, use and servicing of pressurized fluids and systems.
- Follow lockout and tagout procedures for the system and equipment as stated in section 3.2 above.
- Isolate the product from all pressure sources upstream and downstream of the product by closing and locking out the appropriate valves.
- Safely depressurize the product and system.
- Properly purge hazardous fluids from the product and system.
- Always wear appropriate personal protection equipment such as approved safety glasses, face shield, apron, gloves, etc.

4.5. Servicing (conversion or replacing of any worn or damaged parts): Remove the product from the equipment or system prior to servicing. Follow guidelines above for removal instructions. Parker published Service Instructions must be followed. These instructions are available by calling 1-800-CPARKER, or at www.parker.com. To avoid unpredictable system behavior that can cause death, personal injury and property damage:

- Installation, operation, removal and servicing of these products must be performed by knowledgeable personnel who understand how the products are to be applied and have be trained and equipped for the handling, use and servicing of pressurized fluids and systems.
- After installation and servicing the product must be tested for proper function and leakage. Leak test methods should be appropriate for the system leak integrity requirements.
- Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.

4.6. Putting Serviced Product Back into Operation: Follow the guidelines above for product installation and operating instructions, section 3 above.

Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Offer Of Sale

The items described in this document are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. 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 Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer, Acceptance of Seller's products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from Parker Hannifin Corporation. THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED.
NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.

5. Limitation Of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INC.
LUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. 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 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.

8. 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, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are 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. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. 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 Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter '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 an item sold pursuant to this contract 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 an item sold hereunder 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 said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item 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 items 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 item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.
If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of 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, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

9/91-P

Parker Hannifin Corporation
Veriflo Division
Richmond, CA, USA
http://www.parker.com/veriflo

Catalog 4512 12/07

Parker Hannifin Corporation
Veriflo Division
250 Canal Boulevard
Richmond, CA 94804-0034
phone 510 235 9590
fax 510 232 7396
www.parker.com

Your Local Authorized Parker Distributor