




Proserv Pneu Hydro Valves and Accessories

proserv

Proserv supplies an extensive range of precision valve solutions and accessories for extreme conditions inherent in the most challenging drilling and production control systems. Using only the finest materials and most advanced metal to metal, hydro-seal technology, Proserv designs and manufactures valves and regulators to the most exacting standards.

Our innovative range of services are briefly outlined on the following pages, however if you require further information please email us or visit our website for regional contact details: www.proserv.com.

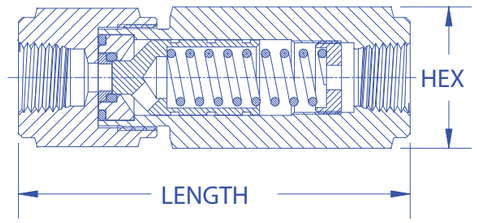
INGENIOUS SIMPLICITY

Inline Relief Valves

Proserv's Pneu Hydro bar stock relief valves remain bubble-tight up to cracking pressure. They reseal at less than 10% drop from cracking pressure in lower ranges, and less than 5% at higher ranges.

Cracking pressure is reliable, repeatable and easily set by an internal adjustment, which is tamper-proof once the valve is installed in the system. An O-ring seals the poppet while a metallic stop bears the spring load. This simple design provides crisp settings and long life. The standard valve is constructed of 316 stainless steel for strength and durability in the most corrosive applications.

Note: See flow data graph on back page.



Specifications

Operating pressure ranges

401 series	3 - 206 bar *(50 - 3,000 psid)*
402 series	206 - 689 bar *(3,000 - 10,000 psid)*

Operating temperature ranges

Buna-N seals	-40 to 121 °C *(-40 to 250 °F)*
Viton seals	-29 to 232 °C *(-20 to 450 °F)*

Ordering Information

Model Number	Pipe Size (in)	Length (in)	Hex (in)	Cv	Pressure Range	Dash #
401F4Q- [1,2]	0.25 NPT Female	3	0.94	0.6	3 - 17 bar *(50 - 250 psi)*	-1
401F6Q- [1,2]	0.375 NPT Female	4.25	1.38	1.3	17 - 41 bar *(250 - 600 psi)*	-2
401F8Q- [1,2]	0.5 NPT Female	4.61	1.38	1.3	34 - 120 bar *(500 - 1,750 psi)*	-3
401M4Q- [1,2]	0.25 NPT Male	3.5	0.94	0.6	103 - 206 bar *(1,500 - 3,000 psi)*	-4
402F4Q- [2]	0.25 NPT Female	4.5	1.38	0.6	206 - 689 bar *(3,000 - 10,000 psi)*	N/A
402F8Q- [2]	0.5 NPT Female	4.67	1.38	0.6	206 - 689 bar *(3,000 - 10,000 psi)*	N/A

[1] Dash number for desired pressure range must be inserted
[2] Buna-N is standard elastomer and requires no code. For Viton, insert 'V'. Consult factory for other materials

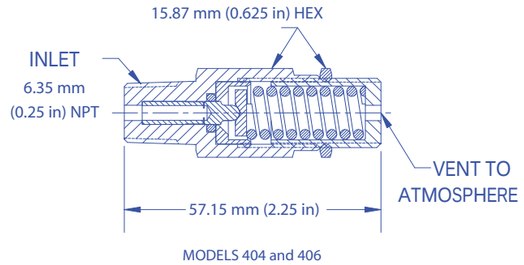
For example: Model No. 401F4Q-2V specifies an inline relief valve with 0.25 NPT femal ports, Viton O-rings and a 250 - 600 psi *(17 - 41 bar)* range.

Miniature Relief Valves

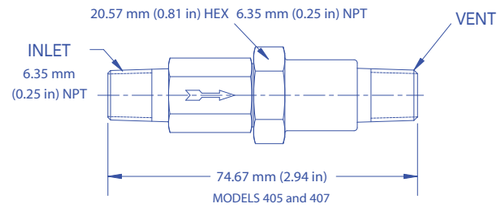
Proserv's Pneu Hydro miniature relief valves provide zero leakage up to cracking pressure. They reseal bubble-tight within 5 - 10% of cracking pressure. Adjustments are insensitive to temperature variations.

These miniature relief valves are made from 316 stainless steel for strength and corrosion resistance. Material options can be provided on request. Buna-N or Viton O-rings are standard but other O-ring materials can be provided. Back-pressure on the 405 and 407 series (with connected vent line) should be limited to 1,000 psi *(69 bar)*.

Note: See flow data graph on back page.



MODELS 404 and 406



MODELS 405 and 407

Specifications

Operating pressure ranges

404 & 405 series	3 - 344 bar (50 - 5,000 psid)
406 & 407 series	344 - 896 bar (5,000 - 13,000 psid)
Cv	0.035

Operating temperature ranges

Buna-N seals	-40 to 121 °C *(-40 to 250 °F)*
Viton seals	-29 to 232 °C *(-20 to 450 °F)*

Ordering Information

Pressure Range	Vent to Atmosphere		0.25 NPT Vent Connection	
	Buna-N	Viton	Buna-N	Viton
3 - 6 bar *(50 - 100 psi)*	404M4Q-10	404M4Q-10V	405M4Q-10	405M4Q-10V
6 - 10 bar *(100 - 150 psi)*	404M4Q-1	404M4Q-1V	405M4Q-1	405M4Q-1V
10 - 17 bar *(150 - 250 psi)*	404M4Q-2	404M4Q-2V	405M4Q-2	405M4Q-2V
17 - 24 bar *(250 - 350 psi)*	404M4Q-3	404M4Q-3V	405M4Q-3	405M4Q-3V
24 - 41 bar *(350 - 600 psi)*	404M4Q-4	404M4Q-4V	405M4Q-4	405M4Q-4V
41 - 62 bar *(600 - 900 psi)*	404M4Q-5	404M4Q-5V	405M4Q-5	405M4Q-5V
62 - 103 bar *(900 - 1,500 psi)*	404M4Q-6	404M4Q-6V	405M4Q-6	405M4Q-6V
103 - 206 bar *(1,500 - 3,000 psi)*	404M4Q-7	404M4Q-7V	405M4Q-7	405M4Q-7V
206 - 344 bar *(3,000 - 5,000 psi)*	404M4Q-8	404M4Q-8V	405M4Q-8	405M4Q-8V
344 - 896 bar *(5,000 - 13,000 psi)*	406M4Q	406M4Q-V	407M4Q	404M4Q-V

Notes:
Elastomer options are available. Consult factory.

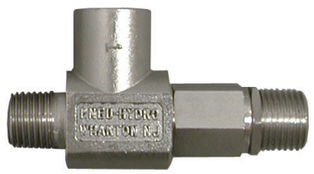
Right Angle Relief Valves

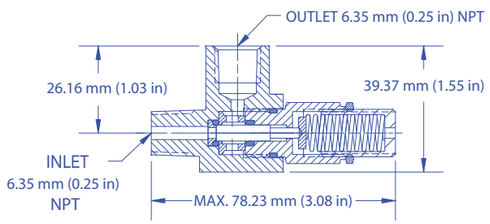
Proserv's Pneu Hydro right angle relief valves are pressure balanced internally and pressure referenced to atmosphere. This yields insensitivity to downstream pressure and permits the valve to be used as a back-pressure regulator. The valve seals against a soft seat and has a metal stop that bears the spring load, prolongs seal life and prevents sticking.

These valves remain bubble-tight up to cracking pressure and reseal bubble-tight at less than 10% drop from cracking pressure (significantly less in the higher pressure ranges). The external setting adjustment is particularly useful in applications where changes are required. The design provides full flow at a very small rise above cracking pressure.

Features include: a wide series of available pressure ranges; smooth, chatter-free performance; reliable and repeatable cracking and reseating pressures and 316 stainless steel construction. Seal material selections are available for compatibility with virtually any fluid chemistry. Standard seal materials are Buna-N and Viton.

Note: See flow data graph on back page.





Specifications

Operating pressure ranges

Proof pressure	1,378 bar *(20,000 psid)*
Burst pressure	2,757 bar *(40,000 psid)*

Operating temperature ranges

Buna-N seals	-40 to 121 °C *(-40 to 250 °F)*
Viton seals	-29 to 232 °C *(-20 to 450 °F)*

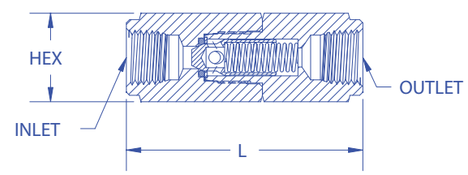
Ordering Information

Pressure Range	Male Inlet, Female Outlet		Male Inlet and Outlet		Cv
	Buna-N	Viton	Buna-N	Viton	
6 - 10 bar *(100 - 150 psi)*	408M4F4Q-1	408M4F4Q-1V	408M4Q-1	408M4Q-1V	0.25
10 - 17 bar *(150 - 250 psi)*	408M4F4Q-2	408M4F4Q-2V	408M4Q-2	408M4Q-2V	
17 - 24 bar *(250 - 350 psi)*	408M4F4Q-3	408M4F4Q-3V	408M4Q-3	408M4Q-3V	
24 - 41 bar *(350 - 600 psi)*	408M4F4Q-4	408M4F4Q-4V	408M4Q-4	408M4Q-4V	
41 - 62 bar *(600 - 900 psi)*	408M4F4Q-5	408M4F4Q-5V	408M4Q-5	408M4Q-5V	
62 - 103 bar *(900 - 1,500 psi)*	408M4F4Q-6	408M4F4Q-6V	408M4Q-6	408M4Q-6V	
103 - 206 bar *(1,500 - 3,000 psi)*	408M4F4Q-7	408M4F4Q-7V	408M4Q-7	408M4Q-7V	
206 - 344 bar *(3,000 - 5,000 psi)*	408M4F4Q-8	408M4F4Q-8V	408M4Q-8	408M4Q-8V	
344 - 689 bar *(5,000 - 10,000 psi)*	409M4F4Q	409M4F4Q-V	409M4Q	409M4Q-V	0.09

Check Valves

Proserv's Pneu Hydro bar stock check valves seal bubble-tight, even without back-pressure. When open, they provide a smooth flow-path with minimum resistance. The poppet is spring loaded for positive operation regardless of orientation. Back pressure and spring loads are borne by a metal stop rather than the soft O-ring seal. This ensures long seal life and minimum maintenance. Operation is smooth and chatter-free.

These check valves are constructed of 316 stainless steel for strength and corrosion resistance and meet the requirements of NACE MR0175. Because of their bar stock design, the valves can be easily made. Buna-N or Viton seals are available from stock and other O-ring materials can be provided.



Specifications

Operating pressure ranges

Maximum	689 bar (10,000 psid)

Operating temperature ranges

Buna-N seals	-40 to 121 °C *(-40 to 250 °F)*
Viton seals	-29 to 232 °C *(-20 to 450 °F)*

Ordering Information

Inlet	Outlet	Dimensions (in)		Cv	Model Number
		L	Hex		
0.25 NPT F	0.25 NPT F	2.28	0.75	0.55	301F4Q
0.25 NPT M	0.25 NPT M	2.34	0.75	0.55	301M4Q
0.25 NPT M	0.25 NPT F	2.28	0.75	0.55	301M4F4Q
0.38 NPT F	0.38 NPT F	3.13	1.06	1.3	301F6Q
0.5 NPT M	0.5 NPT M	3.63	1.06	1.3	301M8Q

Notes:
- Buna-N seals are standard. For optional Viton seals add '-V' to the model number. Contact factory for other seal material options
- 316 stainless steel is standard construction material
- All models are designed for 5 psid cracking pressure. To order valves with the optional pressures shown below, add the indicated suffix number to the basic model number

Crack Pressure/Suffix Number

0.13 bar *(2 psid)*	-1
0.68 bar *(10 psid)*	-2
1.72 bar *(25 psid)*	-3

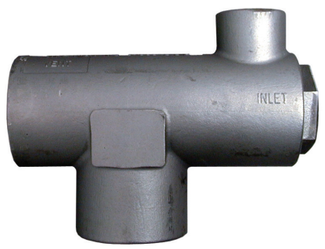
Example Part Numbers:

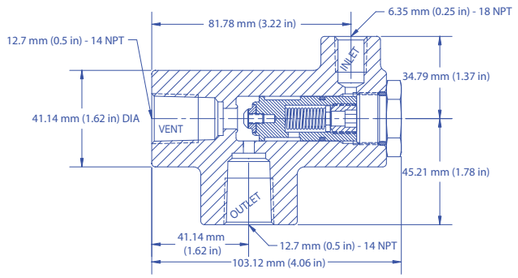
301F4Q	Standard, buna-N O-ring, 0.34 bar *(5 psid)* cracking pressure
301F4Q-V	Viton O-ring, 0.34 bar *(5 psid)* cracking pressure
301F4Q-3	Buns-N O-ring, 1.72 bar *(25 psid)* cracking pressure
301F4Q-3V	Viton O-ring, 1.72 bar *(25 psid)* cracking pressure

Hydraulic Quick-Vent Valves

Proserv's Pneu Hydro hydraulic quick-vent valves are designed to be placed in the line between a control valve and actuator. When control pressure is applied, the internal poppet closes the quick-vent port and directs the flow through the outlet to the actuator. Upon release of pressure, the poppet's internal check closes and the poppet is lifted off the vent seat. The large capacity of the outlet/vent passage permits rapid flow from the actuator.

The valve is constructed of corrosion resistant materials in accordance with NACE MR-01-75.





Specifications

Operating pressure ranges

Maximum	689 bar *(10,000 psig)*

Operating temperature ranges

Buna-N seals	-40 to 121 °C *(-40 to 250 °F)*
Viton seals	-29 to 232 °C *(-20 to 450 °F)*

Ordering Information

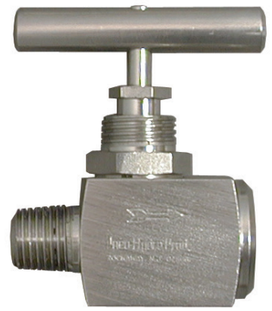
Part Number	Description
433254	Buna-N seals
433254-V	Viton seals

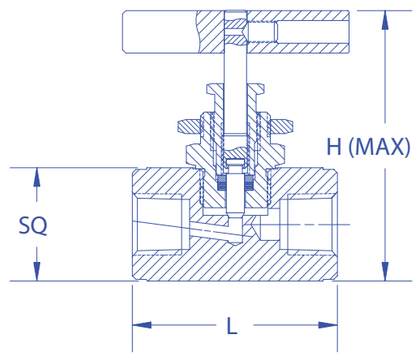
Hand Valves

Proserv's Pneu Hydro hand valves offer design and operating features not typically found on valves of this pressure range. The Teflon stem packing is located below the stem threads and pintle swivel. This helps prevent contamination and lubrication washout by isolating this critical area from the process fluid. This, combined with the very low operating torque (less than 10 lb-inches), provides a precise 'feel' and adjustment sensitivity over the lifetime of the valve.

The valve stem is designed so that it cannot be inadvertently backed out of the valve. The low profile makes this valve ideally suited for panel mounted or other limited space applications.

Standard features include self-aligning swivel pintles to minimize seat scoring, Teflon stem seal and 316 stainless steel construction to provide maximum compatibility with corrosive fluids.





Specifications

Operating pressure ranges

Maximum operating pressure	689 bar *(10,000 psig)*
Maximum proof pressure	1,378 bar *(20,000 psig)*
Maximum burst pressure	2,757 bar *(40,000 psig)*

Operating temperature ranges

Buna-N seals	-53to 232 °C *(-65 to 450 °F)*
Cv	0.26

Ordering Information

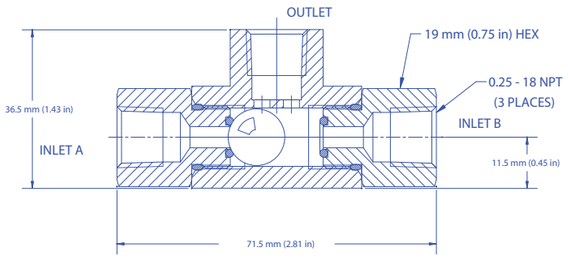
Inlet	Outlet	Dimensions (in)			Orifice	Cv	Model Number
		L	H	Sq			
0.25 NPT F	0.25 NPT F	1.81	2.5	1	0.125	0.26	202F4Q
0.25 NPT M	0.25 NPT F	1.93	2.5	1	0.125	0.26	202M4F4Q
0.25 NPT F	0.25 NPT F	1.81	2.38	0.89	0.125	0.26	206F4Q*

* 413 bar *(6,000 psig)* maximum operating temperature

Shuttle Valves

The heart of Proserv's Pneu Hydro shuttle valve is a stainless steel ball. The slightest pressure blows this ball from the O-ring seat to the other and directs flow to the outlet port. The breakaway friction of sliding seal designs is eliminated by this 'contact seal' principle.

Our Proserv Pneu Hydro shuttle valves are made from 316 stainless steel. Buna-N seals are standard, but Viton or other elastomers are available to meet specific requirements.



Specifications

Operating pressure ranges

Operating pressure	17 bar *(250 psig)* maximum
Proof pressure	25 bar *(375 psig)*
Burst pressure	344 bar *(5,000 psig)*

Operating temperature ranges

Buna-N seals	-40 to 121 °C *(-40 to 250 °F)*
Viton seals	-29 to 232 °C *(-20 to 450 °F)*
Cv	0.40

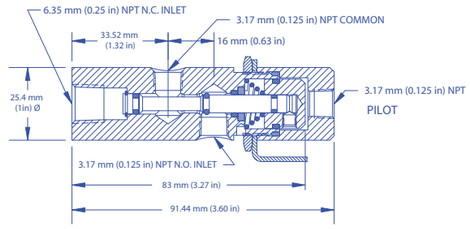
Ordering Information

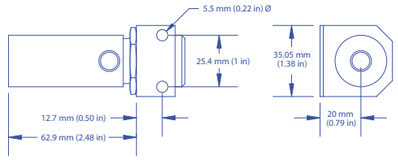
Part Number	Description
801F4Q	Buna-N seals
801F4Q-V	Viton seals

Pneumatic Control Valves

Proserv's Pneu Hydro pneumatic control valves are simple and robust. These smooth acting valves offer bubble-tight sealing and can be line, panel or bracket mounted to comply with your toughest installation problems.

Constructed of 316 stainless steel with a broad selection of available O-ring materials, they can be used in your toughest applications.





Specifications

Operating pressure ranges

Operating pressure	17 bar *(250 psig)* maximum
Proof pressure	25 bar *(375 psig)*
Burst pressure	344 bar *(5,000 psig)*

Operating temperature ranges

Viton seals	-29 to 232 °C *(-20 to 450 °F)*
Cv	0.40

Ordering Information

Part Number	Description
183552	Panel mounted, pushbutton
183554	Bracket mounted, pushbutton
183612	Line mounted, pushbutton
433553	Bracket mounted, pilot operated
433555	Line mounted, pilot operated

Hydraulic-Pneumatic InterfaceValves

Occupying about a third of the space required by conventional diaphragm interface valves, this three-way, two position, normally closed valve permits a low pressure signal from an internal pneumatic pilot to control a high pressure hydraulic power system. The pilot section handles pressures of up to 1,000 psi and the hydraulic section accommodates pressures of up to 10,000 psi.

In the unique spool valve design, the usual pilot diaphragm is replaced by a piston. The use of a stainless steel piston and compatible seal eliminates failures due to diaphragm leakage and incompatibility of diaphragm with process fluid.

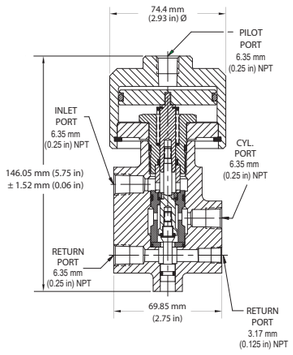
A high ratio of hydraulic power pressure to pilot control pressure insures safe operation and positive control under all conditions. A pilot pressure of 50 psi controls 5,000 psi hydraulic power, and 80 psi pilot pressure controls 10,000 psi hydraulic power pressure.

A soft seal design insures zero leakage in the hydraulic power section. Metal-to-metal seating insures against leakage in emergency situations.

Failsafe closure is insured, as both the internal spring and hydraulic pressure acting on the differential spool area provide sufficient force to effect closure should one or the other fail. Normally both act to close the valve. A positive indicator of operation is provided in the spool extension, which shifts to show position.

Excellent flow capacity is provided with a value of Cv = 0.5 or the equivalent of an orifice of 0.224 inch diameter. A normally open version of this valve is also available under product number 433242-P.

With minor differences the dimensions and operating parameters are the same for this version. The manual override version has a turning handle located at the top center of the piston housing.



Specifications

Complete assembly

Weight	2.6 kg *(5.8 lb)*

Pilot section

Fluid	Air or hydraulic
Operating pressure	3.45 bar *(50 psi)* air pressure for 345 bar *(5,000 psi)* hydraulic pressure 5.5 bar *(80 psi)* air pressure for 698 bar *(10,000 psi)* hydraulic pressure
Working pressure	68.9 bar *(1,000 psi)* maximum
Proof pressure	103.4 bar *(1,500 psi)*
Burst pressure	137.9 bar *(2,000 psi)*

Valve section

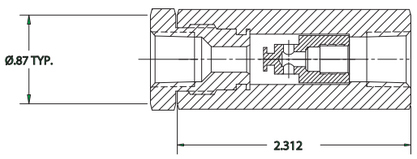
Fluid	Hydraulic fluid or diesel
Working pressure	689 bar *(10,000 psi)* maximum
Proof pressure	1,034 bar*(15,000 psi)*
Burst pressure	1,379 bar *(20,000 psi)*
Temperature range	-53 to 232 °C *(-65 to 450°F)*
Flow capacity	Cv 0.5
Flow	147 L/min @ 345 bar *(39 Gal US/min @ 5,000 psi)*
Internal-External leakage	Zero

Ordering Information

Part Number	Description
183834-P	Valve, hydraulic interface 3-wnc 6k psi manual override
433174-P	Valve, hydraulic interface 3-wnc 6k psi
433174-PA	Valve, hydraulic interface 3-wnc 6k psi arctic
433174-PH	Valve, hydraulic interface 3-wnc 8k psi hydraulic pilot
433174-PHA	Valve, hydraulic interface 3-wnc 8k psi hydraulic pilot arc
433242-P	Valve, hydraulic interface 3-wno 6k psi
433242-PH	Valve, hydraulic interface 3-wno 6k psi hydraulic pilot
433242-PHA	Valve, hydraulic interface 3-wno 6k psi hydraulic pilot arctic
433707-P	Valve, hydraulic interface 3-wnc 6k psi dual inlet
433707-PH	Valve, hydraulic interface 3-wnc 6k psi dual inlet arctic
434189	Valve, hydraulic interface 3-wnc 10k psi
434189-A	Valve, hydraulic interface 3-wnc 10k psi arctic

Excess-Flow Check Valves

Proserv's Pneu Hydro excess-flow check valve has been designed to contain pressurised fluids in the event of catastrophic downstream failure. Its poppet is normally held open by a spring and flow is permitted in both directions through the valve. In the event of down-stream failure (line-rupture, seal-failure and gauge over-pressurisation) the resultant pressure drop across the poppet orifice creates an imbalance which closes the poppet. The poppet remains closed, preventing further escape of fluid until the system is repaired. Removal of supply pressure for system maintenance allows the spring to reset the poppet to its open position.



Specifications

Operating pressure ranges

Service	Standard, H2S-CO2
Design specification	NACE MR-01-75
Fluid	Liquid or gas
Operating pressure	3.45 bar *(50 psi)*
Working pressure	517 bar *(7,500 psi)*
Proof pressure	689 bar *(10,000 psi)*
Burst pressure	1,034 bar *(15,000 psi)*

Operating temperature ranges

Viton temperature range	-29 to 232 °C *(-20 to 450 °F)*
Flow capacity	Cv .45
Flow	Valve shuts pneumatically at 1.0 psid
Internal-External leakage	Zero
Weight	0.17 kg *(0.375 lb)*

Ordering Information

Part Number	Description
213677	Viton seals

Sand Probe Valves

Continuous monitoring of the side effects of an abrasive product on flowline and valves is possible with the use of the Proserv sand probe.

A sensing probe of a predetermined thickness extends through the pipe wall into the flow path of the abrasive product. When the probe is cut, indicating a known degree of erosions to lines, valves and fittings, pressure from the flowline enters the sand probe valve body, shifting the spool valve and vents off a control pressure. This signal may be used to either close a valve or trigger an alarm.

The device is suitable for use with pneumatic control systems. Select the probe length and thickness from the probe kit chart on this page.

The sensing pilot is designed with a 1/2 NPT male thread for attachment to the pipe. this surrounds a 1/4 NPT female connection. With this configuration, probes can be readily fabricated in the field from standard fittings and tubing.

Features and Advantages

Wide pressure range: This device may be safely operated in flowlines containing pressures in the range of 1.72 - 689.47 bar *(25 - 10,000 psi)*

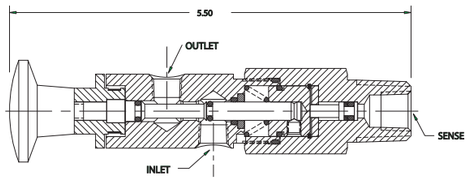
Control pressure range: The pilot handles a control system pressure of 1.37 - 17.23 bar (20 - 250 psi)

Visual indicator: When the probe has been cut and the pilot spool shifts, the palm button and red band on the main spool indicate that the pilot has been activated

Manual Control: The palm button on the pilot may be used at any time to cycle the valve and test the system

Simplicity: When the probe has been cut by abrasive action of the flowing product, the pressure in the pipeline shifts the pilot spool

Choice of probes: Standard wall probes are available in thicknesses of 0.028; 0.035; 0.049 and 0.065 inches. Standard length probes are 6, 10 and 14 inches.



Selection Procedures

The sand probe gives an accurate indication of the erosion on the flowline and its components. In the following procedure, the use of probes of different wall thicknesses is demonstrated:

Pipe: 2 in. schedule 80 - normal thickness 0.218 in

Minimum wall thickness for 1200 psi operation: 0.15 in

Maximum allowable erosion: 0.068 in (0.218 in. minus 0.15 in.)

Specifications

Operating pressure ranges

Sensing pressure	689 bar *(10,000 psi)* maximum
Control pressure	17 bar *(250 psi)* maximum

Operating temperature ranges

Temperature range	-29 to 232 °C *(-20 to 450 °F)*
Product weight	0.68 kg *(1.5 lb)*

Ordering Information

Basic valve body and repair kit

Part Number	Description
434051	2.06 - 17.23 bar (30 - 250 psi) working pressure, valve assembly (less probe)
434052	17.23 - 689.47 bar (250 - 10,000 psi) working pressure, valve assembly (less probe)
434062	17.23 - 689.47 bar (250 - 10,000 psi) working pressure, panel mount valve assembly (less probe)
614051	Repair kit for valve assembly 434051 (does not contain probe)
614052	Repair kit for valve assembly 434052 (does not contain probe)
614062	Repair kit for valve assembly 434062 (does not contain probe)

For example: one Proserv sand probe assembly for standard and H2S-CO2 service, part number 434052.

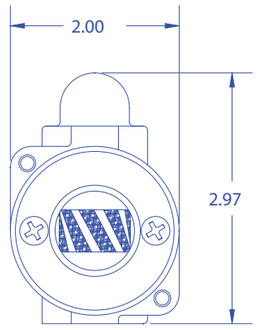
Parts request (for valve only), one repair kit for a Proserv sand probe assemble for standard and HS2-CO2 services, part number 614052.

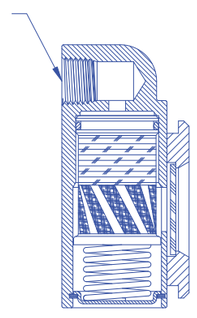
Pressure Indicators

Proserv's Pneu Hydro pressure indicator offers easy to read evidence of the presence or absence of pneumatic pressure in a control circuit. When pressure rises to approximately 1 bar *(14 psi)*, a solid green band shows through the window. If the pressure drops below 0.5 bar *(8 psi)*, a red and white striped band appears. The colours are reflective for visibility in lighted surroundings. The striped section provides added recognition of system status under dimly lit conditions or for colour blind personnel.

The unit mounts through a 1.75 in. diameter hole and in panels from 17 gauge to 0.18 in. thick.

The indicator is constructed of 316 stainless steel and satisfies NACE MR0175 standard.





Specifications

Operating pressure ranges

Working pressure	17.23 bar *(250 psig)*
Proof pressure	34.47 bar *(500 psig)*

Operating temperature ranges

Ethylene Propylene seal	-53 to 148 °C *(-65 to 300 °F)*
Buna-N seals	-40 to 121 °C *(-40 to 250 °F)*
Viton seals	-29 to 232 °C *(-20 to 450 °F)*

Ordering Information

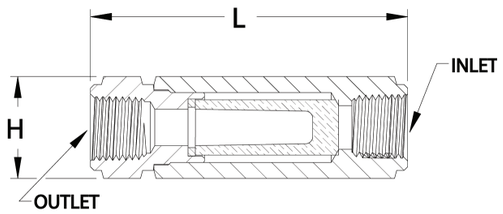
0.125 NPT Connection			0.25 NPT Connection		
Viton	Buna-N	Ethylene Propylene	Viton	Buna-N	Ethylene Propylene
433774	433774-A	433774-EPDM	433775	433775-A	433775-EPDM

Inline Filters

Proserv's Pneu Hydro bar stock component filter uses a minimum number of parts for economy and reliability. It has a strong, durable element, with a large surface area that reduces the need for frequent cleaning or replacement.

A unique assembly retains the filter element solidly, preventing flutter; yet it is easily removed for cleaning or replacement. It will not contribute to system pulsation. A variety of filtration ranges are available.

The 316 stainless steel filter element and Teflon gasket permit use with a wide variety of corrosive fluids.



Specifications

Operating pressure ranges

System pressure	
Stainless steel	6,000 psid *(413.68 bar)* maximum
Maximum psid	1000 across filter element (psid increases as filter collects contaminants)

Operating temperature ranges

Temperature range	-53 to 148 °C *(-65 to 450 °F)*

Ordering Information

Inlet & Outlet Connections	Dimensions (inches)		Filtration Area (inches)	Model Numbers
	L	H (across Hex flats)		316 stainless steel
0.25 NPT Female	2.68	0.25	1.5	501F4Q
0.5 NPT Female	3.03	0.50	2.7	501F8Q

Filter Elements

The filters listed above are supplied with the proper elements for use at specific ranges of filtration. To order a desired range, add the indicated suffix number to the basic model number. To order replacement elements, use the element part number. (Filter elements are 316 stainless steel).

Nominal Filltration Range (µ)	For 0.75 Hex Housing		For 1.13 Hex Housing		Suffix Number
	Element Part Number	Cv	Element Part Number	Cv	
5 - 10	592947-2	0.25	592946-2	0.40	2
10 - 20	592947-3	0.50	592946-3	0.80	3
50 - 75	592947-6	0.90	592946-5	1.15	5
			592946-6	1.50	6

Example: Model number 501F4-2 designates a 1/4 NPT female thread 316SS housing with element for 5 - 10 micron filtration

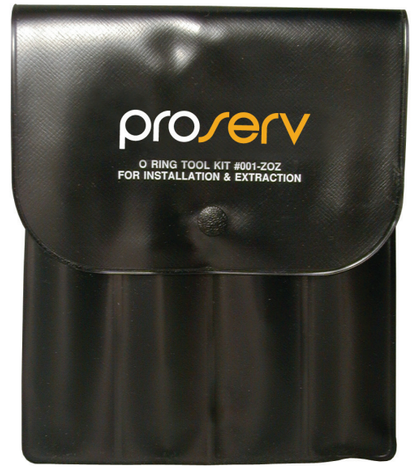
O-ring Tool Kit

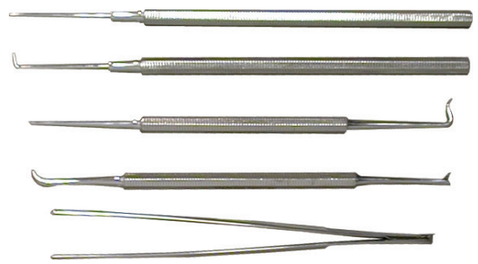
This kit of specifically designed tools for installing and extracting O-rings consists of:

- Jogging and installation tool
- Jogging and removal tool
- Flat face prying tool
- Pointed prying tool
- Piercing tool
- Prodding tool
- Tweezers

The items are invaluable to engineers, technicians and assembly personnel working on pneumatic, hydraulic and other fluid devices. They are fabricated from corrosion resistant materials for compatibility with most fluids and may be used in clean-room applications.

Tools are packaged in an attractive plastic pouch with pockets to separate the various items.





Ordering Information

Part Number	Description
001-ZOZ	316 stainless steel tools

Definitions & Formulae

Proserv has been a long-standing manufacturer of pneumatic and hydraulic valves and systems for the aircraft and missile industry. More recently, Proserv has also pioneered in the design and fabrication of a rapidly growing line of industrial valves for hydraulic, pneumatic and specialised fuel applications.

Our typical product range includes control valves, regulators, check valves, relief valves, filters and actuators.

Based at our state-of-the-art engineering, testing and manufacturing facilities, Proserv can meet your most exacting specifications. In many cases existing designs can be applied quickly to your requirements with a speed that rivals off-the-shelf delivery. All our facilities and experience are at your disposal. Feel free to call us on **+713 468 8778** to discuss your requirements.

Definitions & Formulae

Cv factor is a flow co-efficient based upon 15.5 °C *(60 °F)* water flow (in L/min *[gal US/min]*) at a **Δ**P of 0.06 bar *(1 psi)*.

Cv capacity of valves and approximate flows are based upon the following equations.

For liquids:

$$Cv = L/min\ (gal\ US/min) / \sqrt{\frac{\Delta P}{S}}$$

For gasses (air [at 21.1 °C *(70 °F)* and 1.01 bar *(14.7 psia)*]):

$$Cv = SCFM / 22.67 \sqrt{\frac{(\Delta P)\,(P1)}{(460 + T)\,(S)}}$$

P1 = Inlet pressure (psia)
P2 = Outlet pressure (psia)
P = P1 - P2 (psia) (maximum P for gas = 0.53 x P1)
L/min = Litres per minute
gal US/min = Gallons US per minute
kg/h = kilograms per hour
lb/h = pounds per hour
T = °C *(°F)*
S = Specific gravity of gas or liquid relative to air or water = 1.0

To convert L/min *(gal US/min)* to kg/h *(lb/h)*:

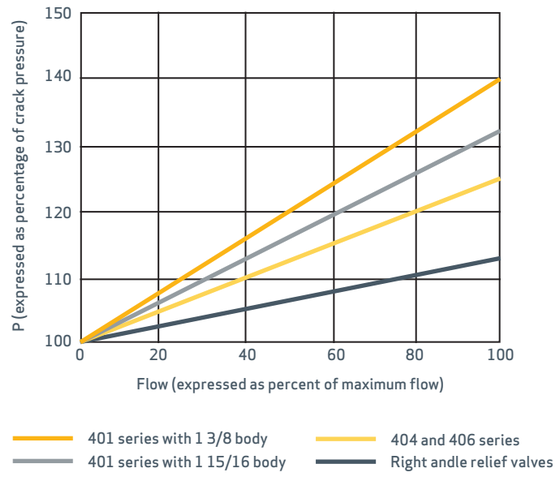
kg/h *(lb/h)* = 500 x L/min *(gal US/min)* x S

To convert SCFM (air) to kg/s *(lb/s)*:

kg/s *(lb/s)* = SCFM / 785

Flow Data

The graph below will assist you in selecting the proper Proserv relief valve for your application. Additional information on the standard valves shown in this brochure as well as special purpose variants is available on request.



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