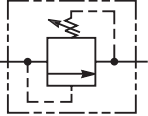
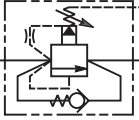
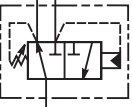
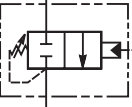
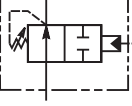
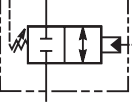
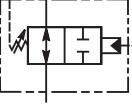
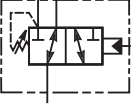
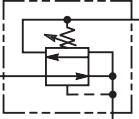
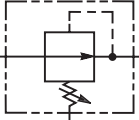
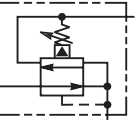


<b>CV</b>	Check Valves
<b>SH</b>	Shuttle Valves
<b>LM</b>	Load/Motor Controls
<b>FC</b>	Flow Controls
<b>PC</b>	Pressure Controls
<b>LE</b>	Logic Elements
<b>DC</b>	Directional Controls
<b>MV</b>	Manual Valves
<b>SV</b>	Solenoid Valves
<b>PV</b>	Proportional Valves
<b>CE</b>	Coils & Electronics
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<b>TD</b>	Technical Data

SERIES	CAVITY	DESCRIPTION	FLOW LPM/GPM	PRESSURE BAR/PSI	PAGE NO.
<b>RELIEF VALVES</b>					
<b>DIRECT ACTING</b>					
					
RDH042	C04-2	Direct Acting Relief, Poppet Type	3.8/1	350/5000	PC7-PC8
★ RDH081	C08-2	Direct Acting Relief, Ball Type	1.9/5	380/5500	PC9-PC10
RDH082	C08-2	Direct Acting Relief, Poppet Type	30/8	380/5500	PC11-PC12
★ RDH101	C10-2	Direct Acting Relief, Ball Type	1.9/5	380/5500	PC13-PC14
A02A2	C08-2	Direct Acting Relief, Ball Type	6/1.6	420/6000	PC15-PC16
A02B2	C08-2	Direct Acting Relief, Poppet Type	8/30	420/6000	PC17-PC18
★ RD102	C10-2	Direct Acting Relief, Poppet Type	38/10	250/3600	PC19-PC20
A04B2	C10-2	Direct Acting Relief, Poppet Type	100/26	420/6000	PC21-PC22
A04B2*CE	C10-2	Direct Acting Relief, Poppet Type*			PC23-PC24
A04C2	C10-2	Direct Acting Relief, Spool Type	200/53	100/1450	PC25-PC26
*CE marked, PED Compliant					
<b>DIFFERENTIAL AREA</b>					
RDH083	C08-2	Direct Acting Differential Area Relief	45/12	350/5000	PC27-PC28
★ RDH103	C10-2	Direct Acting Differential Area Relief	75/20	350/5000	PC29-PC30
★ RDCH103	C10-2	Direct Acting Differential Relief Assembly with Reverse Check	60/16	380/5500	PC31-PC32
RD163	C16-2	Direct Acting Differential Area Relief	151/40	210/3000	PC33-PC34
<b>PILOT OPERATED</b>					
★ RAH081	C08-2	Pilot Operated Spool Type	75.8/20	350/5000	PC35-PC36
★ RAH101	C10-2	Pilot Operated Spool Type	113/30	350/5000	PC37-PC38
RAH121	C12-2	Pilot Operated Spool Type	190/50	350/5000	PC39-PC40
RAH161	C16-2	Pilot Operated Spool Type	303/80	380/5500	PC41-PC42
A06G2	C16-2	Pilot Operated Spool Type	400/106	420/6000	PC43-PC44
RAH201	C20-2	Pilot Operated Spool Type	379/100	350/5000	PC45-PC46
A04K2	C10-2	Pilot Operated Spool Type Kick Down	160/42	420/6000	PC47-PC48
<b>SOLENOID OPERATED</b>					
AS04G2	C10-2	Solenoid Operated Unloading Relief	90/24	220/3200	PC49-PC50
*See page PC49 for symbol					
<b>VENTABLE</b>					
★ RAH101V	C10-3	Pilot Operated Vented Relief	68/18	380/5500	PC51-PC52
A04H3	C10-3S	Pilot Operated Vented Relief	190/50	420/6000	PC53-PC54
A06H3	C16-3S	Pilot Operated Vented Relief	400/106	420/6000	PC55-PC56
<b>CROSS-OVER</b>					
XR101	C10-2	Direct Acting Cross-over Relief	61/16	245/3500	PC57-PC58
A04J2	C10-2	Direct Acting Cross-over Relief	120/32	350/5000	PC59-PC60
A04J2*CE	C10-2	Direct Acting Cross-over Relief*	120/32	350/5000	PC61-PC62
★ XRDH101		Direct Acting Cross-over Relief	75/20	380/5500	PC63-PC64
★ XRDH102		Direct Acting Cross-over Relief with Anti-Cav Check	60/16	380/5500	PC65-PC66
★ XRDH103		Direct Acting Cross-over Relief, Motor Mount	75/20	380/5500	PC67-PC68
*CE marked, PED Compliant					
<b>UNLOADING</b>					
RU101	C10-3	Direct Acting Unloading	3.75/1	210/3000	PC69-PC70
*M04A4J	C10-4	Direct Acting Piloting Unloading	2/0.53	420/6000	PC71-PC72
*See page PC71 for symbol					
<b>PILOT OPERATED WITH REVERSE CHECK</b>					
A06P2	C16-2	Pilot Operated Poppet Type	400/106	420/6000	PC73-PC74
<b>SEQUENCE VALVES</b>					
<b>PILOT OPERATED</b>					
★ SVH081	C08-3	Pilot Operated, Int. Pilot, Ext. Drain	45/12	350/5000	PC75-PC76
★ SVH101	C10-3	Pilot Operated, Int. Pilot, Ext. Drain	56.3/15	350/5000	PC77-PC78
SVH161	C16-3	Pilot Operated, Int. Pilot, Ext. Drain	151.6/40	350/5000	PC79-PC80
★ SVH102	C10-3	Pilot Operated, Ext. Pilot, Int. Drain	56.3/15	350/5000	PC81-PC82
SVH162	C16-3	Pilot Operated, Ext. Pilot, Int. Drain	151.6/40	350/5000	PC83-PC84
★ SVCH101		Pilot Operated with Reverse Check Assy	56/15	380/5500	PC85-PC86

★ Denotes New Winner's Circle Product Line.



	SERIES	CAVITY	DESCRIPTION	FLOW LPM/GPM	PRESSURE BAR/PSI	PAGE NO.	
<b>SEQUENCE VALVES</b>							
	<b>Pilot Operated (Continued)</b>						
	B04D3	C10-3S	Pilot Operated, Reverse Check, Ext. Drain	120/32	420/6000	PC87-PC88	
	B04C3	C10-3S	Pilot Operated, Kick Down	160/42	420/6000	PC89-PC90	
<hr/>							
	<b>DIRECT ACTING</b>						
	B02E3F	C08-3	Direct Acting, 2P-3W, Int. Pilot, Int. Drain	30/8	420/6000	PC91-PC92	
	B04E3	C10-3	Direct Acting, 2P-3W, Int. Pilot, Int. Drain	50/13	420/6000	PC93-PC94	
☆	SV103	C10-3	Direct Acting, 2P-3W, Int. Pilot, Ext. Drain	56/15	250/3600	PC95-PC96	
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	☆	SV105	Direct Acting, 2P-2W, NC, Ext. Pilot, Int. Drain	38/10	250/3600	PC97-PC98	
	B04F3	C10-3	Direct Acting, 2P-2W, NC, Ext. Pilot, Int. Drain	34/9	420/6000	PC99-PC100	
	B04G3	C10-3	Direct Acting, 2P-2W, NO, Ext. Pilot, Int. Drain	40/10.6	420/6000	PC101-PC102	
	<hr/>						
	B04H4	C10-4	Direct Acting, 2P-2W, NC, Ext. Pilot, Ext. Drain	47/12	420/6000	PC103-PC104	
	☆	SV104	Direct Acting, 2P-2W, NO, Ext. Pilot, Ext. Drain	30/8	250/3600	PC105-PC106	
	B04J4	C10-4	Direct Acting, 2P-2W, NO, Ext. Pilot, Ext. Drain	47/12	420/6000	PC107-PC108	
	<hr/>						
	B04K4	C10-4	Direct Acting, 2P-3W, NO, Ext. Pilot, Int. Drain	42/11	420/6000	PC109-PC110	
	<hr/>						
<b>REDUCING VALVES</b>							
	<b>DIRECT ACTING</b>						
	C02A3	C08-3	Direct Acting Reducing/Relieving	20/5	420/6000	PC111-PC112	
☆	PR103	C10-3	Direct Acting Reducing/Relieving	56/13	210/3000	PC113-PC114	
<hr/>							
	<b>PILOT OPERATED</b>						
	☆	PRH082	C08-3	Pilot Operated Reducing	30/8	350/5000	PC115-PC116
☆	PRH102	C10-3	Pilot Operated Reducing	56.3/15	350/5000	PC117-PC118	
	PRH122	C12-3	Pilot Operated Reducing	113.7/30	350/5000	PC119-PC120	
	PRH162	C16-3	Pilot Operated Reducing	150/40	350/5000	PC121-PC122	
<hr/>							
	☆	PRH081	C08-3	Pilot Operated Reducing/Relieving	30/8	350/5000	PC123-PC124
	☆	PRH101	C10-3	Pilot Operated Reducing/Relieving	56.3/15	350/5000	PC125-PC126
	PRH121	C12-3	Pilot Operated Reducing/Relieving	113.7/30	350/5000	PC127-PC128	
	PRH161	C16-3	Pilot Operated Reducing/Relieving	150/40	350/5000	PC129-PC130	
☆	PRCH101		Pilot Operated Reducing/Relieving with Reverse Check	56/15	380/5500	PC131-PC132	

☆ Denotes New Winner's Circle Product Line.



CV

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Directional Controls

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SV

Solenoid Valves

PV

Proportional Valves

CE

Coils & Electronics

BC

Bodies & Cavities

TD

Technical Data

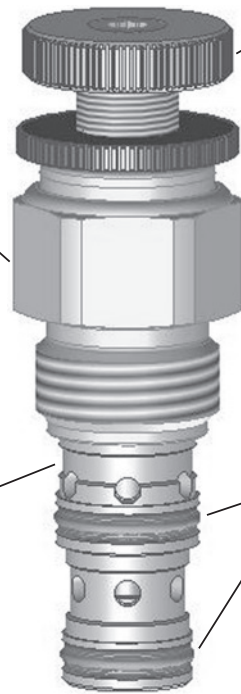
**INTRODUCTION**

This technical tips section is designed to help familiarize you with the Parker line of Pressure Controls. In this section we highlight new products to this catalog as well as some design features of our pressure control line. In addition we present common options available to help you in selecting products for your application. Finally we give a brief synopsis of the operation and applications of the various product offered in this section.

**NEW PRODUCTS**

There are several new additions and product improvements to our Pressure Controls product line.

*Here are just some of the design features and advantages to the "Winner's Circle" product line.*



**Variety of Adjustments**  
Pressure controls are offered in screw adjust, knob adjust, fixed and tamper resistant configurations.

**Yellow Zinc Coating**  
Steel adapters are coated with yellow zinc di-chromate for protection from salt spray.

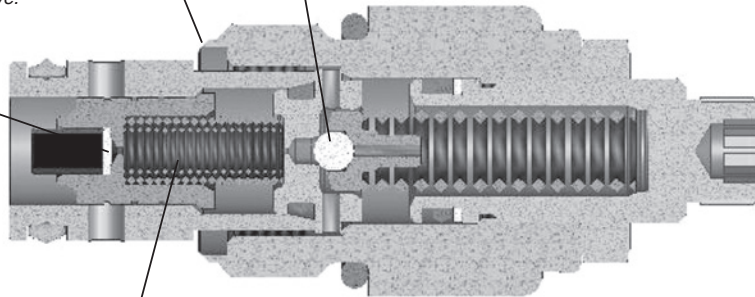
**High Pressure Design**  
Pilot operated valves are rated to 350 Bar (5000 PSI) for use at elevated pressure.

**"D"-Ring**  
Standard 4301 Polyurethane Seal eliminates the need for backup rings providing easier manifold installation. (For more information on "D"-Ring see Technical Data Section)

**Crimp Design**  
Fold over crimp provides secure holding and eliminates the need for adhesive.

**Guided Pilot**  
Pilot is fully guided providing a more consistent reseat.

**Internal Screen**  
A small internal screen protects the pilot orifice and spring chamber from debris.



**High Rate Bias Spring**  
Pilot operated reducing and sequence valves are designed with a high rate bias spring pressure, enhancing stability.

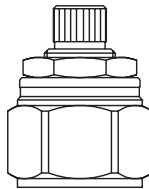
**Low Profile Adapter**  
The low profile shape of the pilot operated pressure controls reduces the manifold clearance required.

**COMMON OPTIONS**

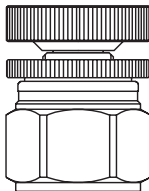
As you will see, Parker offers a variety of Pressure Control products. As such, some of the options mentioned below may not be available on all valves. Consult the model coding and dimensions for each valve for specifics. Here are some of the common options available.

**Adjustment Types:** Parker offers four primary types of adjustments for most of the pressure control products. Samples of these types are shown below. Please note all options may not be available for all valves. Consult the individual catalog pages for more details.

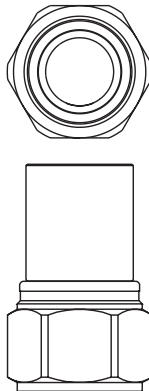
**Screw Adjustment** - Valve can be adjusted with an allen wrench. Lock nut included to maintain desired setting after adjustment. This is the most common adjustment option available on most Parker products.



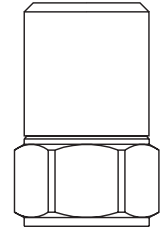
**Knob Adjustment** - An aluminum knob is added to the standard screw adjustment. A lock knob is provided to help maintain the desired setting after adjustment. Parker offers knob conversion kits for most pressure control valves. For kit numbers consult individual valve pages.



**Fixed Style** - In most cases, the Fixed Style product is a screw adjustable product with a steel collet threaded over the screw adjustment. These valves are preset at the factory.



**Tamper Resistant** - The tamper resistant option is a screw adjustable valve with a steel cap installed to conceal the adjustment. The cap is designed so that the internal edges clamp into the groove of the valve adapter. Once the cap is installed, it cannot be removed without damaging the cap and the valve. When a valve is ordered with the tamper resistant option, it will be preset at the factory, and the cap will be included in a separate plastic bag to allow for fine tuning at the customer site. Parker offers tamper resistant cap conversion kits for most pressure control valves. For kit numbers consult individual valve pages.



**Seals:** The Winner's Circle products feature a standard 4301 Polyurethane "D"-Ring. The "D"-Ring eliminates the need for backup rings. The majority of the products are available in Nitrile or Fluorocarbon Seals. You should match the seal compatibility to the temperature and fluid being used in your application.

**Pressure Range:** Parker offers a range of spring settings for the Pressure Control product line. You want to choose the setting that best meets the operating range. The model callout is equivalent to the maximum setting (in psi) of the spring divided by 100 (i.e. 50 = 5000 psi).

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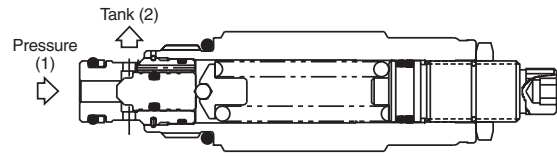
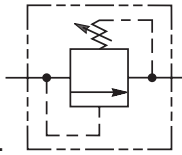
TD

Technical Data

PRODUCT TYPES / APPLICATIONS

**Direct Acting Relief Valves**

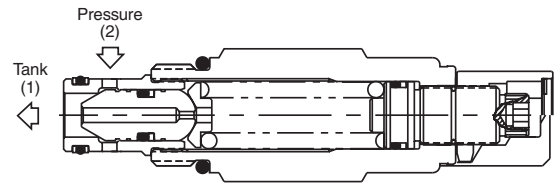
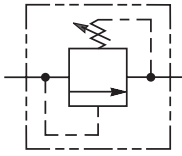
Direct acting relief valves are designed for fast response in intermittent duty applications. They are often used as an economical solution to clip pressure spikes. The poppet design allows for low leakage.



**OPERATION** - The valve poppet is held against the seat by the spring force. Inlet pressure on the nose (port 1) of the poppet acts against the spring force to unseat the poppet at the valve setting and allow flow to pass to tank. Since the pressure is working directly on the spring, this valve is very fast responding. It is not the best choice for system pressure regulation as it is slightly noisier than pilot operated relief valves and has higher pressure rise. *Note:* Any backpressure on port 2 would be additive to the spring setting.

**Differential Area Relief Valves**

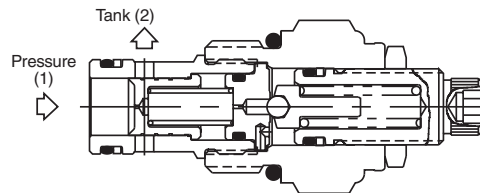
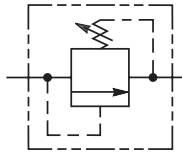
Differential area relief valves also are also best suited for intermittent applications where fast response is critical. These valves are often used as cross-over relief valves to chop pressure spikes. Due to their design, they generally can handle a larger flow rate and have a lower pressure rise than the standard directing acting relief. The poppet design allows for low leakage.



**OPERATION** - Pressure on the inlet (port 2) of the valve acts on the differential area of the poppet (difference between the O.D. of the poppet and the seat diameter) to produce a force which is opposed by the spring force. When pressure reaches the valve setting, the poppet is pushed off its seat, permitting flow to tank. *Note:* Any backpressure on port 1 would be additive to the spring setting.

**Pilot Operated Relief**

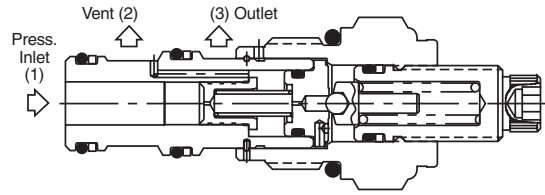
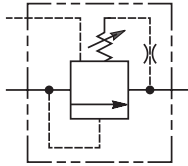
Pilot operated relief valves are designed for continuous duty applications. Due to their stability and low pressure rise, the pilot operated relief is the best option for setting the pressure of a hydraulic system.



**OPERATION** - When inlet pressure at the nose (port 1) exceeds the valve setting, the pilot ball unseats. The pilot flow creates a pressure imbalance across the main spool causing the spool to move and allowing flow from inlet (port 1) to tank (port 2.) *Note:* Any backpressure on port 2 would be additive to the spring setting.

**Ventable Pilot Operated Relief**

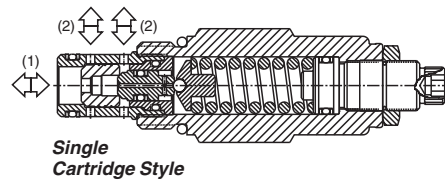
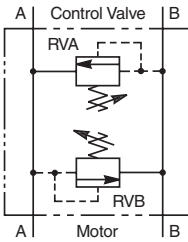
Ventable relief valves are a unique type of pilot operated relief. With this valve, you can control the pressure setting with the internal adjustment as well as via remote circuit. These valves are ideal in circuits where multiple pressures are needed.



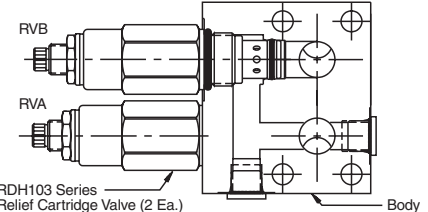
**OPERATION** - This valve can be controlled by the adjustment setting on the valve, or a remote circuit via the vent line. When the vent line is used, the smaller of the two pressure settings will determine the valve setting. In other words, if the pressure setting of the remote circuit is less than the adjusted setting, then the valve will relieve at the remote setting. If the pressure setting of the remote circuit is greater than the adjusted setting, then the valve will relieve at the adjusted setting. With the vent port (port 2) blocked, the valve operates like a standard pilot operated relief valve. Thus, a solenoid valve could be used on the vent port to select control between this valve another remote valve.

**Dual Crossover Relief Valves**

Dual crossover relief valves provide pressure surge protection for double acting hydraulic actuators. For best results, you always want to install the valve as close to the actuator as possible. The dual crossover feature can be achieved in two different methods. One way is to manifold two Differential Area Relief Valves into a single body. Parker offers three versions of this two cartridge arrangement. The advantage gained is higher flows can be pushed through this arrangement. The second method is to combine this dual function into a single cartridge. The single cartridge arrangement reduces cost considerably of the total package. In addition, a standard common cavity line body can be used instead of a special two body arrangement. The operation for the single cartridge style is shown below.



Single Cartridge Style

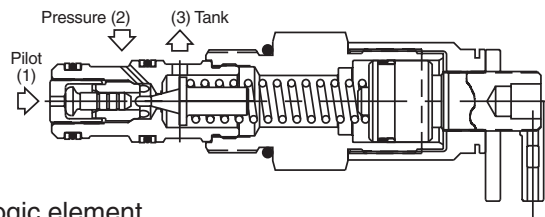
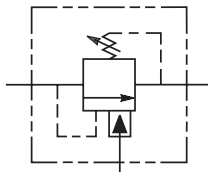


Two Cartridge Style

**OPERATION** - Pressure at port 1 acts on the spool to produce a force which is opposed by the spring setting. When pressure reaches the valve setting, the spool and poppet move relieving flow from port 1 to port 2. When port 2 is pressurized, the pressure acts on the differential area poppet to produce a force which is opposed by the spring force. When the pressure reaches the valve setting, the poppet is pushed off of its seat, relieving flow from port 2 to port 1. *Note:* Due to the construction and flow paths through the valve, the relief pressure settings may vary by approximately 300 psi from one direction to the other.

**Differential Area Unloading Relief Valve**

Unloading valves are differential area relief valves that can also be fully dumped or unloaded via a remote signal. They are best suited for low flow accumulator unloading circuits. They provide a fixed percentage between load and unload pressures. This pilot valve would generally be used in conjunction with a logic element.



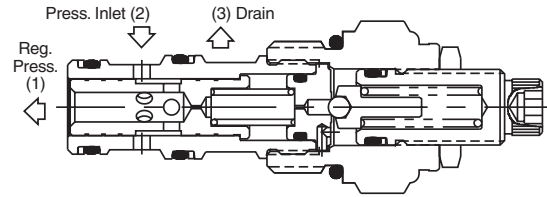
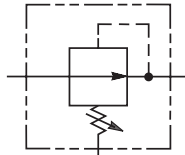
**OPERATION** - The fixed differential is provided by the pilot piston which has greater area than the dart seat. With its greater area, the piston is able to hold the dart off its seat, permitting flow from pressure to tank, until pressure on the pilot piston falls below the fixed percentage of the valve settings.

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<b>SV</b>
Solenoid Valves
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Technical Data

- CV** Check Valves
- SH** Shuttle Valves
- LM** Load/Motor Controls
- FC** Flow Controls
- PC** Pressure Controls
- LE** Logic Elements
- DC** Directional Controls
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**Pilot Operated Reducing Valve**

Pilot operated pressure reducing valves can be used to reduce the pressure in a leg of the circuit lower than system pressure. Thus, they can be used to provide protection to downstream components from higher pressures.



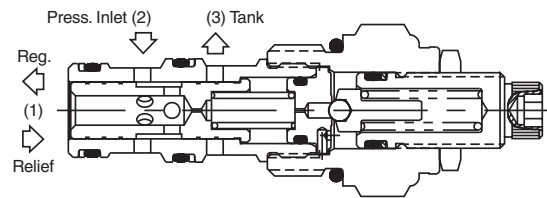
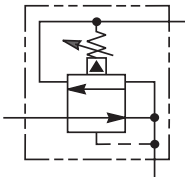
**OPERATION** - The pilot section controls the valve setting when reducing. As pressure at the regulated port exceeds the valve setting, the pilot ball is unseated. The pilot flow creates a pressure imbalance across the main spool causing the spool to throttle in order to maintain constant downstream pressure. The normally open design will allow flow to pass from inlet to reduced port with the only restriction being the pressure drop.

**Pressure Reducing / Relieving Valves**

Pressure reducing / relieving valves can be used to reduce the pressure in a leg of the circuit lower than system pressure. The valve also acts as a relief valve, relieving any shocks or surges that occur between the regulated port and the actuator. When the valve is in the relieving mode, the inlet port is blocked. Parker offers pressure reducing/relieving valves in both pilot operated and directing acting styles. The direct acting version is generally used in static applications where response is critical, or leakage is a concern.

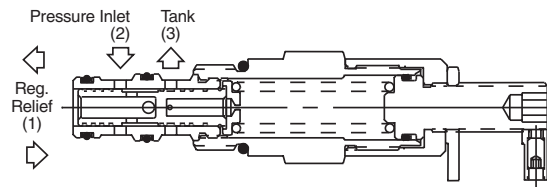
**Pilot Operated**

**OPERATION** - The pilot section controls the valve setting when reducing. As pressure at the regulated port exceeds the valve setting, the pilot ball is unseated. The pilot flow creates a pressure imbalance across the main spool causing the spool to throttle in order to maintain constant downstream pressure. A shock or surge at the regulated port shifts the spool, relieving flow to tank.



**Direct Acting**

**OPERATION** - As pressure at the regulated port exceeds the valve setting, the valve throttles or closes in order to maintain constant downstream pressure. A shock or surge at the regulated port further shifts the spool, relieving flow to tank. This valve is not intended for rapidly changing flows which could lead to instability.

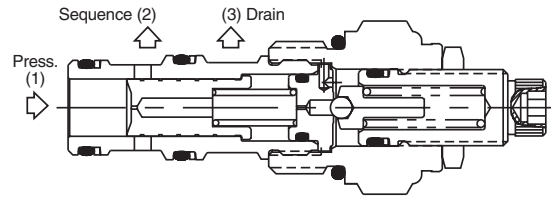


**Pilot Operated Sequence Valves**

Sequence valves are used to control the sequence of operation of two or more hydraulic actuators. The sequence valve pressure is set higher than the first actuator operation pressure. Once the first actuator has completed its cycle, the sequence valve opens allowing the second actuator to move. Parker's line of pilot operated sequence valves include a series of internally piloted, externally drained valves and a series of externally piloted, internally vented valves. Parker also offers a line of direct acting sequence valves which are ideal for piloting logic elements in steady state applications.

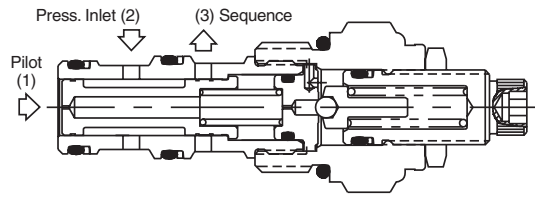
**P.O. Sequence (Internally Piloted, Externally Drained)**

**OPERATION** - For this valve, the pilot pressure is sensed from the inlet of the valve (port 1). When the pilot pressure exceeds the valve setting, the pilot section opens creating a pressure imbalance across the main spool. This causes the spool to move allowing the flow to pass from the nose of the cartridge (port 1) to the actuator port (port 2). By externally draining the pilot flow directly to tank (port 3), the valve is insensitive to back pressure at the sequence port.



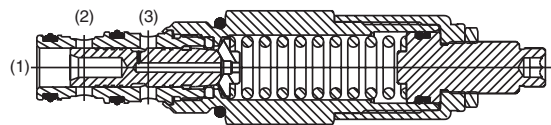
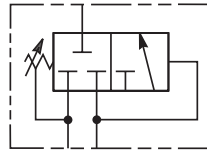
**P.O. Sequence (Externally Piloted, Internally Vented)**

**OPERATION** - For this valve, the pilot pressure is obtained from an external source and not from the pressure port. When the external pilot pressure (port 1) exceeds the valve setting, the pilot section opens creating a pressure imbalance across the main spool. This causes the spool to move allowing the flow to pass from the side of the cartridge (port 2) to the actuator port (port 3). Any pressure at port 3 is additive to the pressure setting. It is most common for port 3 to be connected to tank.



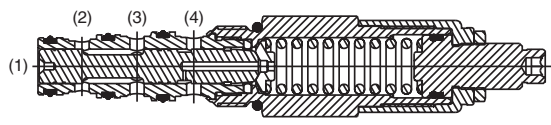
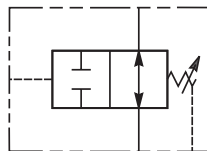
**D.A. Sequence (Internally Piloted, Externally Drained)**

**OPERATION** - In the steady state condition, all three ports are blocked with the spring chamber drained to port 3. When the pressure at port 1 exceeds the valve setting, the spool moves allowing flow from the nose of the cartridge (port 1) to the actuator port (port 2). By externally draining the spring chamber directly to tank (port 3), the valve is insensitive to back pressure at the sequence port.



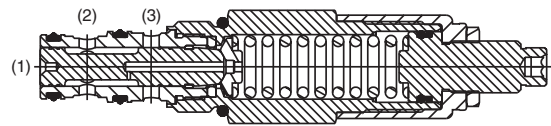
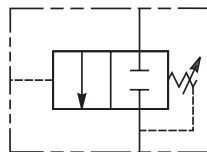
**D.A. Sequence, N.O. (Externally Piloted, Externally Drained)**

**OPERATION** - With no pressure at the pilot port (port 1), bi-directional flow is allowed between port 3 and port 2. When the pilot pressure at port 1 exceeds the valve setting the spool moves blocking both port 3 and port 2. By externally draining the spring chamber to tank (port 4), the valve is insensitive to back pressure at the sequencing ports.



**D.A. Sequence, N.C. (Externally Piloted)**

**OPERATION** - With no pressure at the pilot port (port 1), both port 3 and port 2 are blocked. When the pilot pressure at port 1 exceeds the valve setting, the spool moves opening a path and allowing flow from port 3 to port 2. This valve internally drains the spring chamber to tank via the sequencing port, thus any backpressure on port 2 would be additive to the spring setting.



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