

## PV6000 Variable Delivery Checkball Piston Pump

**PV6000 SERIES (Hydraulically Operated)**  
**35.1 to 53.8 gpm (132,9 to 203,7 L/min) at 1800 rpm**  
**Rated: 5 500 psi (380 bar), Maximum: 6 000 psi (420 bar)**

PV6000 Series checkball pumps supply infinitely variable flow. Output is regulated by an external low-pressure control signal supplied to a control port in the cover.

These pumps, with bi-directional shaft rotation, provide constant direction of output flow regardless of the direction of drive shaft rotation.

### Regulating Pump Output

Pump volume controls, including remote pressure compensators, improve the flexibility of hydraulic circuits. Refer to *Typical Open Loop Circuit* on page 3 and contact the Sales department for ordering information.

### Split-Flow® Provides Multiple Outlets

PV6000 Series models with split-flow covers efficiently supply flows for multiple function circuits. Piston outputs are grouped together in the cover, with this ten-piston pump providing five-piston output from each of two independent ports. See *Split-Flow® Output* on page 4.

### Pump Selection

The *Specifications* table lists the most commonly used standard models with standard spline shafts and high-pressure shaft seals.

Contact the Sales department for model numbers with optional seals and other extraordinary operating requirements.



### Specifications

Pump Models	Output Flow at 1500 rpm <sup>①</sup>		Output Flow at 1800 rpm <sup>①</sup>		Rated Pressure		Max. Intermittent Pressure <sup>②</sup>		Rated Speed	Max. Speed
	U.S. gpm	L/min	U.S. gpm	L/min	psi	bar	psi	bar	rpm	rpm
<i>Standard SAE 4-Bolt Flange Outlet Port:</i>										
PV6054-3065	29.3	110,9	35.1	132,9	6000	420	6000	420	1800	2400
PV6070-3066	38.7	146,5	46.4	175,6	6000	420	6000	420	1800	2300
PV6080-2923	44.8	169,6	53.8	203,7	5500	380	5500	380	1800	2200

<sup>①</sup> Output flow based on typical performance at rated pressure with pressurized inlet where required, as shown in the table on page 2.

<sup>②</sup> Contact the Sales department for applications requiring higher intermittent operating pressures.

## Mounting

SAE E 4-bolt pattern with 0.25 inch (6,4 mm) pilot engagement.

## Standard Spline Shaft

1.748/1.747 inch diameter standard SAE 13 tooth, 8/16 DP 30° involute spline.

## Outlet Port Options

Pattern for standard 1 inch SAE 4-bolt flange. Refer to *Outlet Port Configurations* on page 5.

## Inlet Conditions

Pumps may require pressurized inlet conditions at higher speeds. Failure to meet minimum inlet requirements will result in slight flow reduction. Refer to the table.

## Seal Options

Standard seals are Buna-N (Nitrile). Options include Fluorocarbon (Viton® or Fluorel®) or EPR for use with some phosphate ester fluids.

## Weight (Mass)

330 lb (150 kg)

## Minimum Inlet Pressure<sup>①</sup>

Pump Models	Operating Speed							
	1200 rpm		1500 rpm		1800 rpm		2400 rpm	
	psi	bar	psi	bar	psi	bar	psi	bar
PV6054	0	0	5	0,4	5	0,4	10	0,7
PV6070	0	0	5	0,4	10	0,7	10 <sup>②</sup>	0,7 <sup>②</sup>
PV6080	5	0,4	5	0,4	10	0,7	15 <sup>②</sup>	1,0 <sup>②</sup>

① Values shown are based on fluid viscosity of 100 SUS (20 cSt). All PV6000 Series pumps have a high-pressure shaft seal.

② Refer to maximum speeds indicated in the "Specifications" table.

## Fluid Guidelines

See page 5 for *Fluid Recommendations*.

Some pump models may require reduced operating pressures when using low-lubricity fluids.

Because of the wide range of fluid characteristics, contact the Sales department for a review of any application using non-petroleum based fluids.

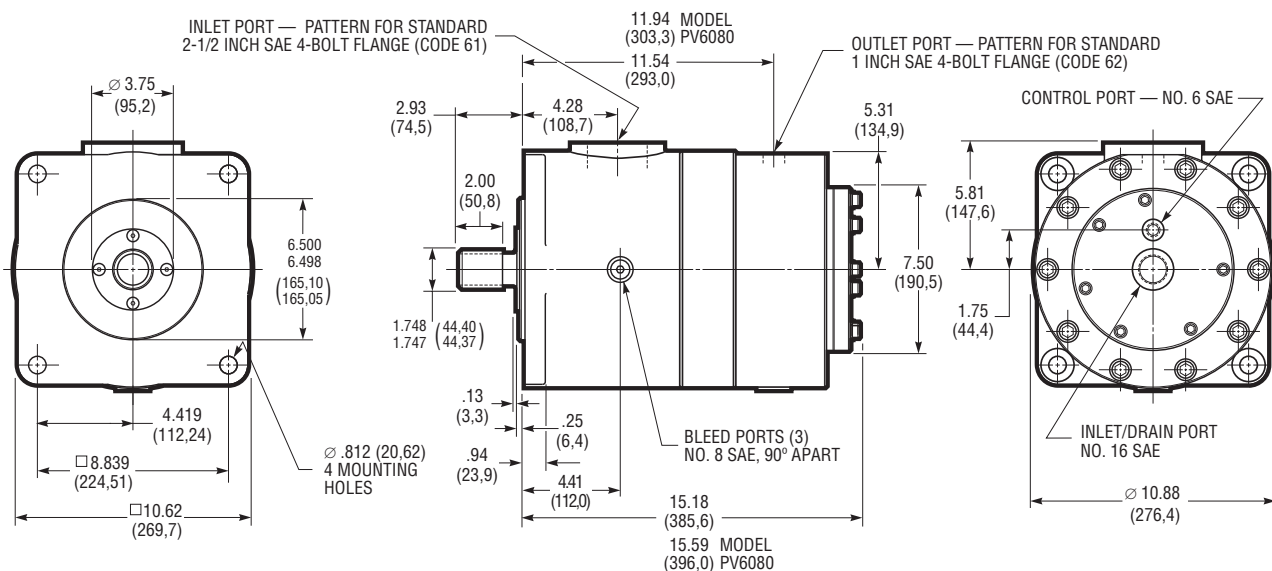
## Pump Inlet/Drain Port

Note the location of the dual purpose inlet/drain port. Acting as an inlet, this port increases volumetric efficiency by improving the filling of the piston chamber.

Acting as a drain, the port diverts unused fluid at low pressure from the chamber, providing improved circulation which dissipates heat.

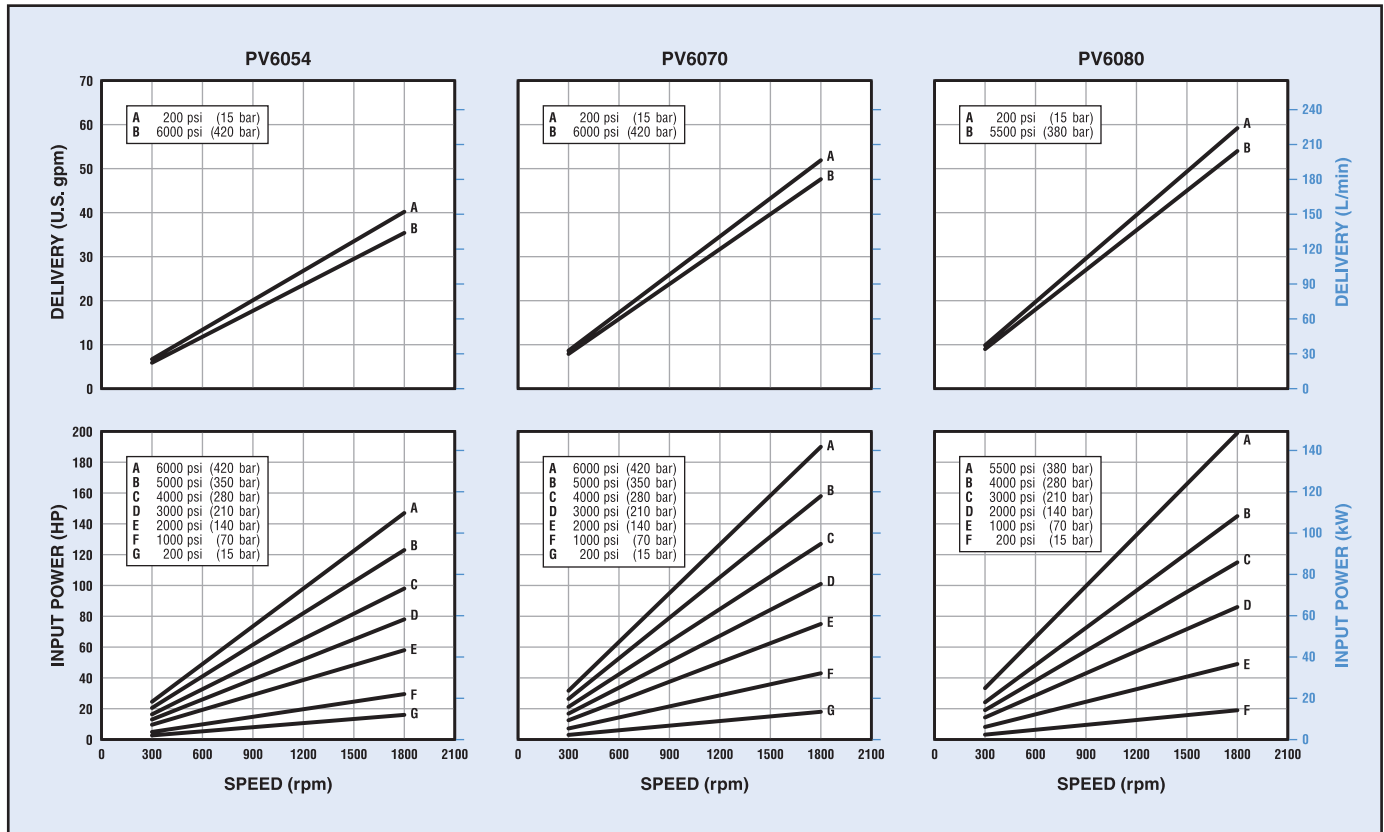
## INSTALLATION

All dimensions are shown in inches (millimeters in parentheses) and are nominal.



PV6000 Series Standard Full-Flow Configuration

## Typical Performance Curves



Typical performance curves are based on 100 SUS (20 cSt) mineral oil with pressurized inlet where required. Refer to the "Minimum Inlet Pressure" table on page 2.

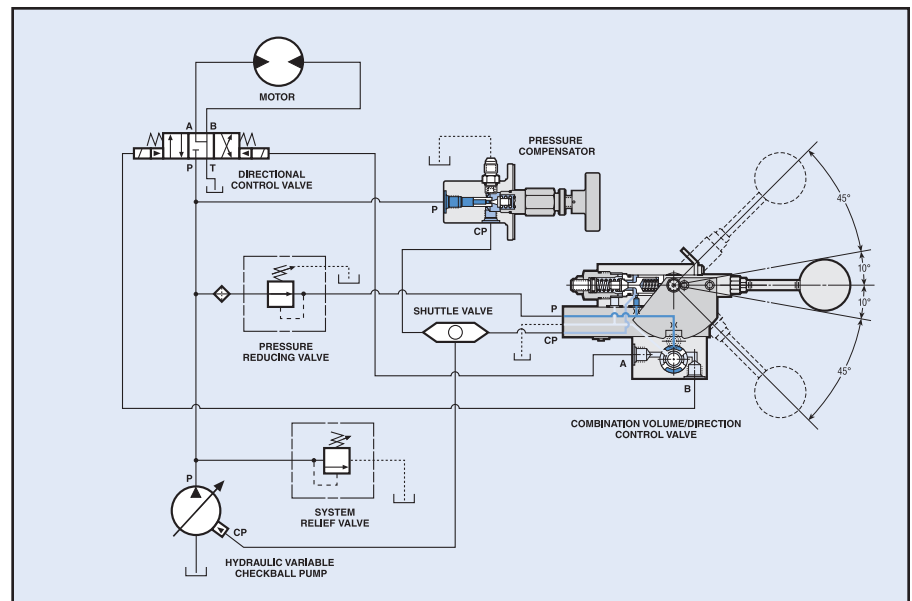
## Pump Volume Controls

Pump volume controls for PV6000 Series pumps, including a remote pressure compensator, improve the control and design flexibility of hydraulic circuits.

## Typical Motor Circuit

A typical open loop circuit uses a combination volume/direction control valve to regulate the control signal. As the valve lever is moved to either side of center, the output pressure from the "CP" port decreases, which is sensed at the pump control port "CP". This results in an increase in pump output. Simultaneously, flow from the "A" or "B" port travels to the directional valve controlling the motor. This pilot supply hydraulically controls actuator direction, providing an over-center function at the motor.

## Typical Open Loop Circuit



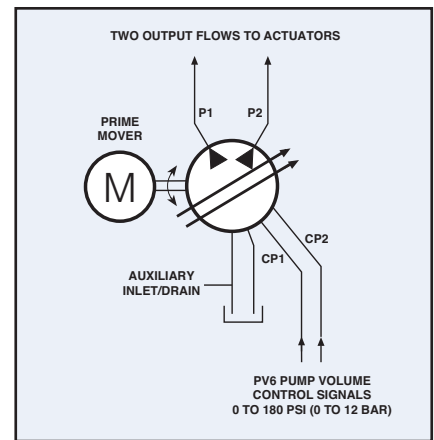
## Split-Flow® Output

Split-Flow® models can supply multiple, independent flows from one pump!

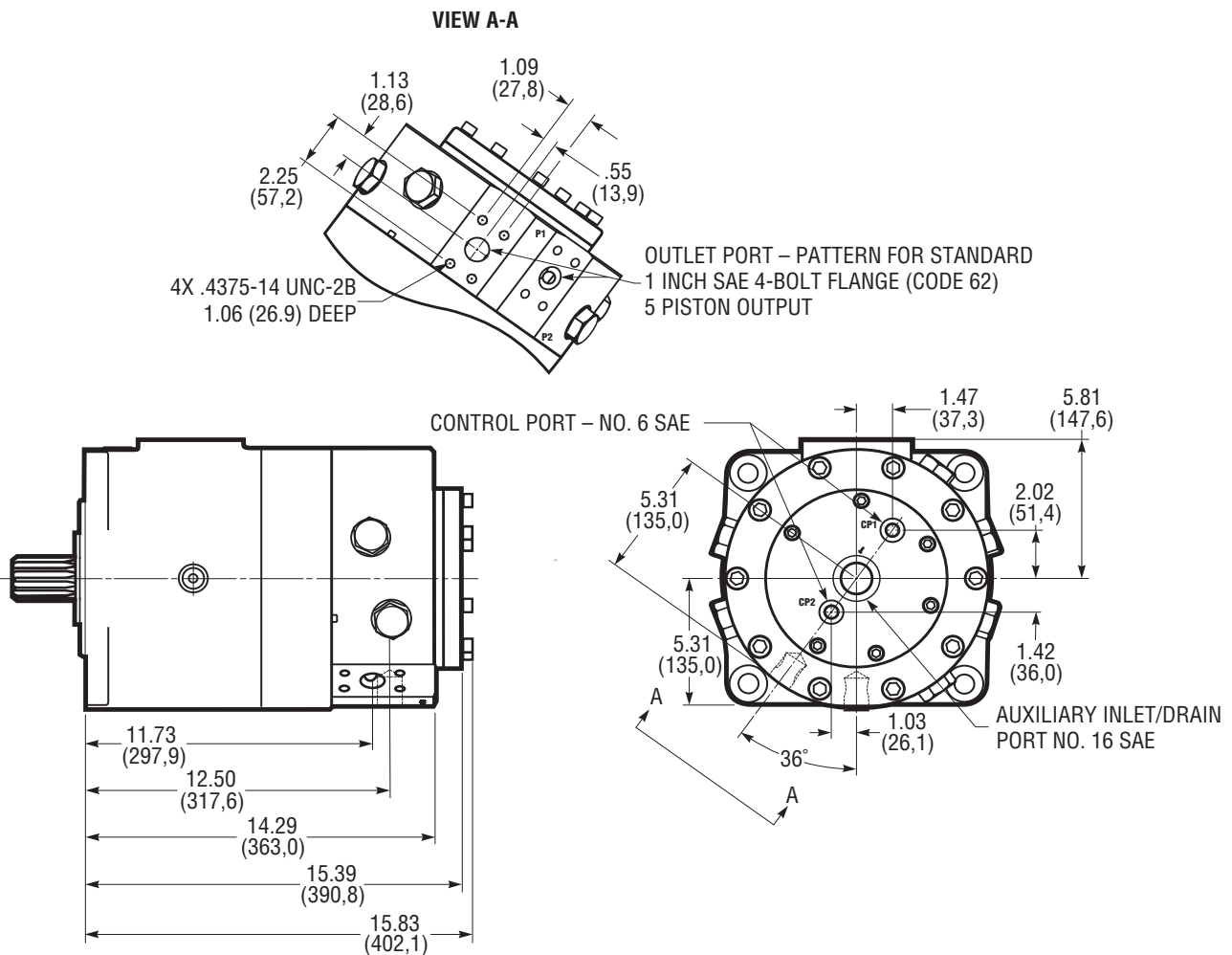
This ten-piston pump is available with a cover which provides five-piston output from each of two outlet ports. Output is regulated by the variable pressure signal supplied to its corresponding control port.

As shown in the circuit, the Split-Flow® PV6000 Series pump can supply two variable flows, or one fixed and one variable flow.

Each output (P1 and P2) is independently controlled by its own external control pressure signal (CP1 and CP2).



*This 10-piston Split-Flow® pump provides two 5-piston outputs.*



*PV6000 Series Split-Flow® Configuration*

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## FLUID RECOMMENDATIONS (All Checkball Pumps)

### Mineral Oil

A high-grade premium petroleum-based fluid should be used to assure long component and system life. The fluid should have a combination of anti-wear, demulsibility, rust protection, oxidation-resistant and foam-resistant properties.

### Special Fluids

Various pump models are available for use with water-based fluids, diesel calibration fluids, phosphate ester fluids, machining coolant, brake fluid, various military fluids and other special fluids.

PF1300 & PF4300 Series pumps are compatible with a variety of water-based fluids. Refer to specific product documentation for specifications for these models, which are specifically rated for use with low-lubricity fluids.

Some pump models may require reduced operating pressures when using low-lubricity fluids.

Refer to separate bulletin: [Water-Based Fluid and Port Specifications](#) for use with water-based fluids.

Because of the wide range of fluid characteristics, contact the Sales department for a review of any application using non-petroleum based fluids.

### Viscosity Specifications

Using fluid with the correct viscosity range is critical to achieving long component life.

Fluid conditions outside the "Optimum" range shown in the table may result in reduced pump output, requiring pressurized inlet conditions. For more information, contact the Sales department.

## Hydraulic Fluid Viscosity<sup>①</sup>

Pump Models	Operating				Start-up		Optimum	
	Minimum		Maximum		SUS	cSt	SUS	cSt
	SUS	cSt	SUS	cSt				
<i>Fixed Displacement Pumps:</i>								
PF500-20	52	8	1911	413	3706	800	98 to 324	20 to 70
PF1000-10	59	10	1911	413	3706	800	98 to 324	20 to 70
PF1300-11 <sup>②</sup>	–	–	–	–	–	–	–	–
PF2000-10	59	10	1911	413	1911	413	98 to 324	20 to 70
PF2000 <sup>③</sup>	34	2,3	1911	413	1911	413	98 to 324	20 to 70
PF3000-10	59	10	1911	413	3706	800	98 to 342	20 to 70
PF4000-30	34	2,3	1911	413	1911	413	98 to 324	20 to 70
PF4200-10	34	2,3	1911	413	1911	413	98 to 324	20 to 70
PF4300-22 <sup>②</sup>	–	–	–	–	–	–	–	–
PF6000	34	2,3	1911	413	1911	413	98 to 324	20 to 70
<i>Mechanical Variable Delivery Pumps:</i>								
PV4000-11	34	2,3	1911	413	1911	413	98 to 324	20 to 70
PV6000	34	2,3	1911	413	1911	413	98 to 324	20 to 70
<i>Hydraulic Variable Delivery Pumps:</i>								
PV6000	34	2,3	1911	413	1911	413	98 to 324	20 to 70

① Fluid conditions outside the "Optimum" range may result in reduced output, requiring pressurized inlet conditions. Contact the Sales department.

② Refer to separate bulletin "Water-Based Fluid and Port Specifications" for use with water-based fluids.

③ Models with special mounting.

## MINIMUM FILTRATION LEVELS

Pump inlet: 150 μ nominal;

Pressure or return line: 25 μ nominal.

While finer filtration levels than these are desirable and will result in longer component life, restricting flow to the pump inlet should be avoided. Minimum recommended inlet conditions must be maintained.

If a system component fails resulting in fluid contamination, it is important to drain and clean the reservoir, all lines, filter screens and all components. Refill with new fluid.

## INSTALLATION AND OPERATION

Refer to [Checkball Pumps Service, Installation and Operating Instructions](#) for general installation and operating recommendations.

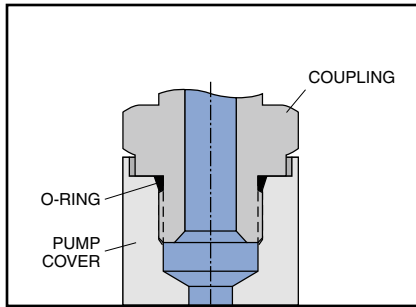
That brochure includes information on mounting, shaft loading, sizing inlet pipe and hose, air bleed procedures and initial start-up. Guidelines for maintenance, repair and trouble-shooting are also included.

## OUTLET PORT CONFIGURATIONS

Dynex pumps are available with outlet ports suitable for use at various pressure ranges. Refer to the appropriate *Specification Table* or *Typical Model Code* to specify the required port.

Contact the fitting manufacturer to ensure the selected fittings are rated for the maximum pump operating pressure.

### SAE Straight Thread Ports



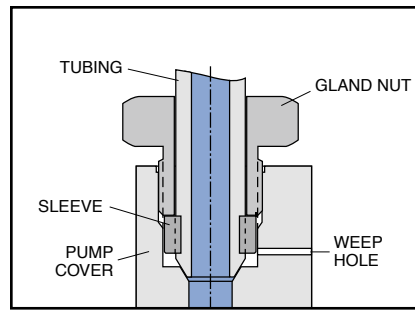
*Typical SAE Straight Thread port connection*

The Straight Thread connection (SAE J1926/1) is sometimes referred to as an SAE O-ring Boss, or ORB. The port consists of a machined spotface surface, a tapered seal cavity and a straight thread port.

The fitting forms a seal by compressing the o-ring in the seal cavity with the underside of the flanged wrench flat. Some adjustable fittings, such as elbows and tees, use a locknut with a captive backup washer for compression.

SAE Straight Thread ports are not recommended for operation above 8000 psi (560 bar). Also, the maximum pressure of pumps with No. 12 SAE outlet ports may be limited by the pressure rating of the available fitting. Contact the fitting manufacturer for ratings.

### Coned and Threaded Ports



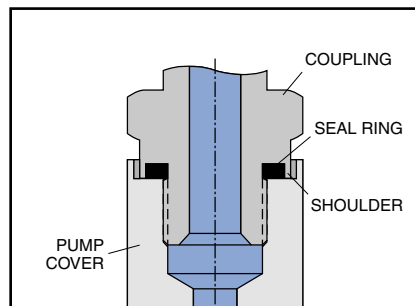
*Typical Coned and Threaded port connection*

High-pressure pumps are available with coned and threaded outlet ports, which use Autoclave Medium Pressure, Butech M/P, or equivalent fittings.

These fittings provide a metal-to-metal seal with an interference fit, not requiring an o-ring. The gland nut holds the sleeve and tubing against the cone surface.

A weep hole, visible on the outside of the pump cover, acts as an indicator of any abnormal leakage caused by system conditions (i.e., excessive pressure).

### British Standard Pipe Parallel Ports



*Typical British Standard Pipe (Parallel) port connection*

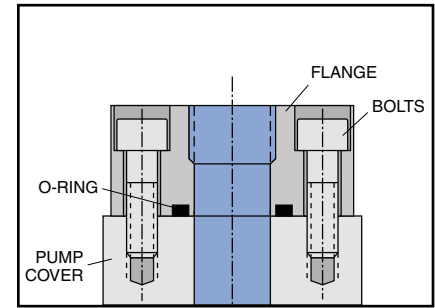
High-pressure pumps are available with flat face ports with British Standard Pipe Parallel (BSPP) threads (BS 2779 or ISO 228), ideal for use on some European applications.

The fitting forms a seal by compressing a flat elastomer ring on a machined spotface surface. There are several sealing methods for these ports.

The recommended fitting has a recessed seal cavity formed by a shoulder on the underside of the flanged wrench flat (Voss "Peflex", Form B Shoulder Seal; or Parker Type E, "EOlastic" Seal; or equivalent).

BSPP ports are not recommended for operation above 10 000 psi (700 bar). Contact the fitting manufacturer to ensure the selected fittings are rated for the maximum pump operating pressure.

### SAE 4-Bolt Flange Ports



*Typical SAE 4-Bolt Flange port connection*

Flange connections are often used for higher flows requiring larger diameter tubing. The port consists of an unthreaded port with four bolt holes in a rectangular pattern on a machined face around the port (SAE J518).

A typical fitting consists of a flanged block with a welded tube and a captive flange with bolt holes. A seal is formed by an o-ring in the groove on the underside mounting surface of the flange head. As the flange bolts are alternately tightened, the o-ring is compressed between the flange head and the machined face on the pump.

To make mounting easier in tight spaces a two-piece split-flange is often used.