

SELECTION GUIDE

Hydraulic Components and Systems



Hydraulic Products Used With Confidence Throughout the World



Dynex manufactures hydraulic components and systems which operate under difficult conditions including high pressure, contamination, dirty environments, fluids with low lubricity, extreme temperature variations and long duty cycles.

High flow piston pumps and control valves operate with extended life at pressures from 6000 to 20 000 psi (420 to 1380 bar).

The company's history dates to 1884. The two divisions, Dynex and Rivett, were reorganized as Dynex/Rivett Inc. in 1977. Today, customers use high-performance Dynex products for stronger, more efficient and reliable designs—for machines that can be used with confidence around the world, without concern for hydraulic problems.

We are committed to responding to customers' special requirements. Our flexible product design and manufacturing can shorten new-product development time, as well as support regular production needs.

BROCHURE NOTES:

Maximum pressures indicated throughout are the maximum intermittent pressures a component can sustain for occasional, short periods of operation without appreciably reducing the life expectancy. Contact the Dynex sales department for a review of any application which requires operating above the rated pressures, flows, speeds or higher than normal operating temperatures.

Specifications shown were in effect when printed. Since errors or omissions are possible, contact your sales representative for the most current specifications before ordering. Dynex reserves the right to discontinue products or change designs at any time without incurring any obligation.

For more information
visit our web site:
www.dynexhydraulics.com

USA Headquarters

Dynex/Rivett Inc.
770 Capitol Drive
Pewaukee, WI 53072
Tel: (262) 691-2222
FAX: 262-691-0312
E-mail:
sales@dynexhydraulics.com

Power Units & Systems

Dynex/Rivett Inc.
54 Nickerson Road
Ashland, MA 01721
Tel: (508) 881-5110
FAX: 508-881-6849
E-mail:
ashland@dynexhydraulics.com

European Sales

Dynex/Rivett Inc.
Unit C5 Steel Close, Little End Road,
Eaton Socon, Huntingdon,
Cambs. PE19 8TT United Kingdom
Tel: +44 (0) 1480 213980
FAX: +44 (0) 1480 405662
E-mail: sales@dynexhydraulics.co.uk

CHECKBALL PUMPS



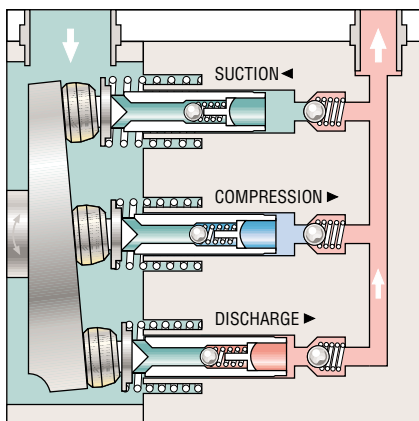
Long Life in Demanding Applications At Pressures to 20 000 psi (1380 bar)

EFFICIENT HIGH PRESSURE OPERATION

High flow checkball pumps operate reliably at pressures from 6000 to 20000 psi (420 to 1380 bar). The positive seating action of the individual piston check valves provides better wear and greater volumetric efficiency, especially at higher pressures.

The check valves take the place of a valveplate, commonly used in other pump designs to direct flow from the pump inlet to the outlet. With no dynamic metal-to-metal surface, checkball pumps are resistant to wear or scoring, providing an advantage with lower lubricity and contaminated fluids.

During operation the checkball rotates, providing a uniform, moving area of wear against the seat. The result is high efficiency even as the checkball wears.



During compression, the inlet checkball (inside the piston) seats. Pressure in the pumping chamber rises until it exceeds load pressure. The outlet checkball then lifts off its seat and fluid is pumped out of the chamber.

CONTAMINATION TOLERANT FOR DIRTY ENVIRONMENTS

The checkball design is exceptionally contamination tolerant because the outlet check valves provide a relatively large flushing path for any system contamination. This makes the pumps ideal for systems where the fluid cannot be totally cleaned by filtration, or where complete filtration is just not economical.

RELIABLE OPERATION WITH A WIDE RANGE OF FLUIDS

Checkball pumps are compatible with standard petroleum-based fluids, lube fluids and low-lubricity fluids including water-glycol, Skydrol, other phosphate ester fluids and various aerospace fluids. This makes these pumps ideal for use on subsea production control systems, metal processing equipment, development or production test-stands, aircraft ground-support equipment and other applications requiring special fluids.

RESISTANT TO DAMAGE FROM CAVITATION

This design is also resistant to cavitation damage, because the outlet check valves do not unseat until pressure in the pumping chambers rises to load pressure. Cavitation is caused by the implosion of fluid filling any vapor bubbles in the pumping chambers. This can occur in other pump designs when fluid under low pressure is suddenly subjected to the higher pressure of the outlet.



The outlet checkball valves provide a large flushing path for any system contamination. During operation the checkball rotates, providing a uniform, moving area of wear against the seat. High volumetric efficiency is maintained even as the checkball wears.

BI-DIRECTIONAL PUMP OUTPUT REDUCES INVENTORY

Fixed displacement and hydraulic variable delivery models are bi-directional. The direction of output flow is constant, regardless of drive shaft rotation. Bi-directional output can be an advantage when using double-ended electric motors, requiring only one model to be stocked and reducing installation errors. When powered by a diesel engine, a reversal in direction will not affect pump output flow.

SMOOTH AND QUIET OPERATION

Checkball pumps provide smooth flow. Output with reduced pressure fluctuations results from combining the individual piston outputs in the pump cover or barrel. Tests have indicated a typical peak to peak pressure ripple as low as ± 100 psi operating at 8000 psi (± 7 bar at 560 bar) for PV4000 Series pumps.

These pumps may be quieter than other pump designs, especially at high speeds and pressures. Tests on some models have shown readings as low as 63 dBA. The sound generated is typically a more comfortable, lower pitch compared to other designs.



Selecting Standard Pressure Pumps For Operation to 8000 psi (560 bar)

OUTPUT FLOWS FROM 0.7 TO 52.5 U.S. GPM (2,6 TO 198,7 L/MIN)

Standard pressure models are available with outputs from 0.7 to 52.5 U.S. gpm (2,6 to 198,7 L/min) at 1800 rpm, with maximum pressures to 6000 psi (420 bar) continuous and 8000 psi (560 bar) intermittent.

The table lists most commonly used models with keyed shafts. PF4000 Series pumps with “10” or “20” design/modification numbers require detailed model codes specifying shaft and seal options. Contact a Dynex sales representative for complete ordering information including spline shaft options, dimensions and performance curves.

All fixed displacement pumps are bi-rotational, providing constant direction of flow regardless of drive shaft rotation.

STANDARD PRESSURE MODELS

Pump Models	Output Flow At 1500 rpm ^①		Output Flow At 1800 rpm ^①		Rated Pressure		Maximum Intermittent Pressure		Rated Speed rpm	Maximum Speed rpm	Port Sizes	
	U.S. gpm	L/min	U.S. gpm	L/min	psi	bar	psi	bar			Inlet	Outlet
PF1001-3141	0.6	2,2	0.7	2,6	5000	350	8000	560	2200	2800		
PF1002-2825	1.2	4,4	1.4	5,3	5000	350	6000	420	2200	3600		
PF1003-2826	1.7	6,6	2.1	7,9	3000	210	4000	280	2200	2800	No. 12 S.A.E.	No. 8 S.A.E.
PF1004-2827	2.2	8,2	2.6	9,8	5000	350	6000	420	2200	3600		
PF1006-2820	3.0	11,4	3.6	13,6	3000	210	4000	280	2200	2800		
PF2007-2190	3.4	12,9	4.1	15,5	5000	350	6000	420	2000	2800		
PF2008-2191	4.8	18,3	5.8	22,0	5000	350	6000	420	2000	2400	No. 16 S.A.E.	No. 8 S.A.E.
PF2009-2184	5.1	19,2	6.1	23,1	3000	210	4000	280	2000	2800		
PF2012-2185	7.1	26,8	8.5	32,2	3000	210	4000	280	2000	2400		
PF2006-1808	3.3	12,6	4.0	15,1	6000	420	8000	560	2000	2400	No. 12 S.A.E. ^②	No. 10 S.A.E. ^②
PF2008-1804	4.7	18,0	5.7	21,6	3000	210	5000	350	2000	2400		
PF3011-2192	6.9	26,2	8.3	31,4	5000	350	6000	420	2000	2800		
PF3015-2193	8.2	30,9	9.8	37,1	5000	350	6000	420	2000	2400	No. 20 S.A.E.	No. 12 S.A.E.
PF3017-2186	9.7	36,9	11.7	44,3	3000	210	5000	350	2000	2800		
PF3021-2187	12.2	46,4	14.7	55,6	3000	210	5000	350	2000	2400		
PF4011-20 ^③	6.0	22,7	7.2	27,2	6000	420	8000	560	2600	3600		
PF4015-20 ^③	8.5	32,2	10.2	38,6	6000	420	8000	560	2600	3600	No. 24 S.A.E. ^④	No. 12 S.A.E. ^④
PF4021-20 ^③	12.5	47,3	15.0	56,8	3000	210	5000	350	2600	3600		
PF4018-10 ^③	10.6	40,1	12.7	48,1	4000	280	6000	420	2000	2400		
PF4026-10 ^③	15.1	57,1	18.1	68,5	4000	280	6000	420	2000	2400	No. 24 S.A.E.	No. 12 S.A.E.
PF4033-10 ^③	18.5	70,0	22.2	84,0	4000	280	6000	420	1800	2100		
PF6054-2946	28.7	108,5	34.4	130,2	6000	420	6000	420	1800	2400		
PF6070-3186	40.2	152,4	48.3	182,8	6000	420	6000	420	1800	2300	2-1/2 inch Flange ^⑤	1 inch Flange ^⑤
PF6080-2989	43.7	165,6	52.5	198,7	5500	380	6000	420	1800	2200		

① Output flow based on typical performance at rated pressure with pressurized inlet where required. Refer to Bulletin PES.

② These models are also available with N.P.T.F. ports: Models PF2006-1807 and PF2008-1802 (Inlet, 3/4 inch N.P.T.F.; Outlet, 1/2 inch N.P.T.F.).

③ These models are available with various shaft and seal options. Contact a Dynex sales representative for complete model code.

④ These models are also available with N.P.T.F. ports: Models PF4015-P-10 and PF4021-P-10 (Inlet 1-1/4 inch N.P.T.F.; Outlet 3/4 inch N.P.T.F.).

⑤ Pattern for standard S.A.E. 4-bolt flange.



Selecting High Pressure Models For Operation to 20 000 psi (1380 bar)

OUTPUT FLOWS FROM 0.22 TO 31.8 U.S. GPM (0,83 TO 120,4 L/MIN)

The table lists the most commonly used models with keyed shafts. PF500, PF4000 and PF4200 Series pumps with “10” or “20” design/modification numbers require detailed model codes specifying shaft and seal options. Contact a Dynex sales representative for complete ordering information including spline shaft options, dimensions and performance curves.

As shown in the table, high pressure outlet ports are recommended when operating above 8000 psi (560 bar).

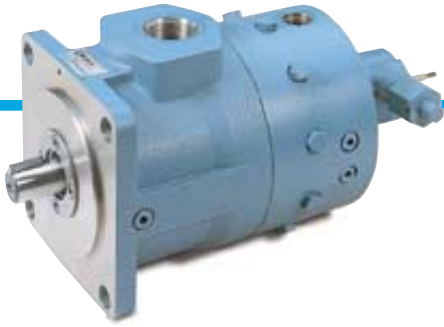
All fixed displacement pumps are bi-rotational, providing constant direction of flow regardless of drive shaft rotation.

HIGH PRESSURE MODELS

Pump Models	Output Flow At 1500 rpm ^①		Output Flow At 1800 rpm ^①		Rated Pressure		Maximum Intermittent Pressure		Rated Speed rpm	Maximum Speed rpm	Port Sizes	
	U.S. gpm	L/min	U.S. gpm	L/min	psi	bar	psi	bar			Inlet	Outlet
PF501H-10 ^②	0.18	0,69	0.22	0,83	8000	560	10 000	700	1800	2800 ^③	No. 12 S.A.E.	3/8 Medium Pressure Coned and Threaded ^④ or G 1/4 (B.S.P.) ^{⑤⑥}
PF504H-10 ^②	0.29	1,10	0.35	1,32								
PF507H-10 ^②	0.40	1,52	0.48	1,82								
PF510H-10 ^②	0.58	2,21	0.70	2,65								
PF1002-2974	1.2	4,4	1.4	5,3	5000	350	10 000	700	1800	2800	No. 12 S.A.E.	9/16 Medium Pressure Coned and Threaded ^④
PF1002-3054	1.2	4,4	1.4	5,3	5000	350	10 000	700	1800	2800	No. 12 S.A.E.	G 3/8 (B.S.P.) ^⑤
PF2007-2973	3.4	12,9	4.1	15,5	6000	420	10 000	700	1800	2800	No. 16 S.A.E.	3/4 Medium Pressure Coned and Threaded ^④
PF2007-3055	3.4	12,9	4.1	15,5	6000	420	10 000	700	1800	2800	No. 16 S.A.E.	G 1/2 (B.S.P.) ^⑤
PF4011H-A-20 ^②	5.7	21,7	6.9	26,1	10 000	700	10 000	700	1800	1800	No. 24 S.A.E.	3/4 Medium Pressure Coned and Threaded ^④
PF4015H-A-20 ^②	8.3	31,5	10.0	37,8	10 000	700	10 000	700	1800	1800		
PF4011H-B-20 ^②	5.7	21,7	6.9	26,1	10 000	700	10 000	700	1800	1800	No. 24 S.A.E.	G 3/4 (B.S.P.) ^⑤
PF4015H-B-20 ^②	8.3	31,5	10.0	37,8	10 000	700	10 000	700	1800	1800		
PF4203H-10 ^②	1.7	6,2	2.0	7,5	15 000	1040	20 000	1380	1800	1800	No. 24 S.A.E.	9/16 Medium Pressure Coned and Threaded ^{④⑦}
PF4205H-10 ^②	2.8	10,7	3.4	12,9	15 000	1040	20 000	1380	1800	1800		
PF4208H-10 ^②	4.2	16,1	5.1	19,3	12 000	830	17 000	1170	1800	1800		
PF4209H-10 ^②	4.7	17,9	5.7	21,5	12 000	830	17 000	1170	1800	1800		
PF4210H-10 ^②	5.6	21,2	6.7	25,4	10 000	700	15 000	1040	1800	1800		
PF6023-3167	11.2	42,2	13.4	50,7	15 000	1040	15 000	1040	1800	1800	2-1/2 inch Flange ^⑧	Outlet Block Required ^⑨
PF6033-3169	18.1	68,4	21.7	82,1	10 000	700	10 000	700	1800	1800	2-1/2 inch Flange ^⑧	Outlet Block Required ^⑩
PF6046-3174	26.5	100,3	31.8	120,4	8000	560	8000	560	1800	1800	2-1/2 inch Flange ^⑧	Outlet Block Required ^⑩

① Output flow based on typical performance at rated pressure with pressurized inlet where required. Refer to Bulletin PES.
 ② These models are available with various shaft, seal and port options. Contact a Dynex sales representative for complete model code.
 ③ Maximum speeds to 3600 rpm may be possible. Contact the Dynex sales department to review applications requiring speed higher than 2800 rpm.
 ④ High pressure outlet port used with Autoclave Medium Pressure, Butech M/P or equivalent fitting.
 ⑤ Outlet fits British Standard Pipe fitting.
 ⑥ Also available with S.A.E. outlet port, not recommended for operation above 8000 psi (560 bar).
 ⑦ Also available with S.A.E. outlet port, not recommended for operation above 8000 psi (560 bar); or B.S.P. outlet port used with British Standard Pipe fitting, not recommended for operation above 10000 psi (700 bar).
 ⑧ Pattern for standard S.A.E. 4-bolt flange.
 ⑨ Requires an outlet block with a port used with Autoclave Medium Pressure, Butech M/P or equivalent fitting. Contact a Dynex sales representative for kit number.
 ⑩ Requires an outlet port block, with a choice of ports: S.A.E.; Autoclave Medium Pressure, Butech M/P or equivalent; or B.S.P. (British Standard Pipe). Contact a Dynex sales representative for kit number.

VARIABLE DELIVERY PUMPS



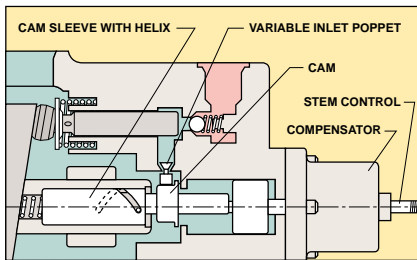
Unique Variable Design Improves System Control and Efficiency

VARIABLE INLET PORTING PROVIDES HIGH EFFICIENCY

Pump output volume can be varied infinitely by changing the active displacement of each piston. Delivery is controlled by variable inlet ports located between the inlet and outlet check valve in each pumping chamber. The opening and closing of these ports, during each piston stroke, determines the amount of fluid compressed in the chamber.

Fluid not needed to meet output requirements flows back to the reservoir at low pressure, typically 100 psi (7 bar) for PV4000 Series pumps.

Delivery is regulated by a spring-biased volume control stem in mechanical delivery models. In hydraulic delivery models, pump output is controlled by a variable low-pressure signal, 0 to 180 psi (0 to 12 bar), supplied to a control port in the pump cover.



Delivery is controlled by variable inlet ports in each piston pumping chamber. Pressure compensated models use a mechanical variable delivery design, with a spring-biased volume control stem. The compensator overrides the setting of the volume control to maintain the required pressure.

COMPENSATION AT PRESSURES TO 8500 PSI (590 BAR)

Pressure compensated models, with mechanical variable delivery, are rated to 8500 psi (590 bar). When compensating, fluid flows back to the reservoir at relatively low pressure. This design provides stabilized temperatures with little heat build-up, even when compensating for long periods.

RPA PROVIDES ELECTROHYDRAULIC PUMP VOLUME CONTROL

A Remote Proportional Actuator (RPA) provides accurate control for mechanical variable delivery models. The RPA strokes the volume control stem, proportional to an electrical input signal. Contact a Dynex sales representative for model numbers or kit numbers for converting manual pumps to electrohydraulic control.

VARIABLE DELIVERY MODELS

Pump Models	Output Flow at 1500 rpm ^①		Output Flow at 1800 rpm ^①		Rated Pressure		Maximum Intermittent Pressure		Rated Speed rpm	Maximum Speed rpm	Port Sizes	
	U.S. gpm	L/min	U.S. gpm	L/min	psi	bar	psi	bar			Inlet	Outlet
Mechanical Variable Delivery: ^②												
PV4018-2928	10.6	40,1	12.7	48,1	4000	280	6000	420	2000	2400		
PV4026-2929	15.1	57,1	18.1	68,5	4000	280	6000	420	2000	2400	No. 24 S.A.E.	No. 12 S.A.E.
PV4033-2117	18.5	70,0	22.2	84,0	4000	280	6000	420	1800	2100		
Pressure Compensated Mechanical Variable Delivery: ^③												
PV4020-3046	10.0	37,8	12.0	45,4	8500	590	8500	590	1800	1800		
PV4026-3126	15.1	57,1	18.1	68,5	4000	280	6000	420	1800	1800	No. 24 S.A.E.	No. 12 S.A.E.
PV4033-3127	18.5	70,0	22.2	84,0	4000	280	6000	420	1800	1800		
PV6046-3177	25.9	98,1	31.1	117,7	8500	590	8500	590	1800	1800	2-1/2 inch Flange ^⑤	No. 16 S.A.E.
PV6054-3183	31.7	119,8	38.0	143,8	8500	590	8500	590	1800	1800		
Hydraulic Variable Delivery: ^④												
PV6054-3065	28.7	108,5	34.4	130,2	6000	420	6000	420	1800	2400		
PV6070-3066	40.2	152,4	48.3	182,8	6000	420	6000	420	1800	2300	2-1/2 inch Flange ^⑤	1 inch Flange ^⑤
PV6080-2923	43.7	165,6	52.5	198,7	5500	380	6000	420	1800	2200		

① Output flow based on typical performance at rated pressure with pressurized inlet where required. Refer to Bulletin PES.

② Models shown for PV4000 Series are for clockwise rotation, with keyed shaft, and deliver zero flow with the volume control stem in the fully extended position.

③ Pressure compensated models shown are for clockwise rotation, with keyed shaft, and deliver full flow with the volume control stem in the fully extended position.

④ Models listed have standard spline shaft. These pumps are bi-directional, providing constant direction of output flow, regardless of drive shaft rotation.

⑤ Pattern for standard S.A.E. 4-bolt flange.



Split-Flow® Simplifies Synchronized And Multiple Function Circuits

UP TO TEN OUTLET FLOWS FROM A SINGLE PUMP

Split-Flow® checkball pumps provide multiple, fixed or variable outputs for synchronized actuator movement or multiple function circuits.

This unique design isolates the pumping chambers, allowing the output of each piston to be used separately. One or more pistons can be isolated from the main outlet using isolator valves which screw into the rear pump barrel.

In *Split-Flow-Cover* models individual outputs are grouped together in the pump cover or barrel, providing smooth multiple flows to meet system requirements.

MULTIPLE FUNCTION SYSTEMS

One pump can simultaneously supply independent, fixed or variable flows to multiple functions in a circuit with separate loads. These pumps can simplify a system and reduce overall costs. A single pump can eliminate separate dedicated pumps or mechanical gear boxes. The result is a circuit with fewer components and less piping.

IMPROVED ACCURACY FOR SYNCHRONIZED ACTUATOR MOVEMENT

Split-Flow® pumps can be used for synchronized movement of cylinders and motors without using flow dividers. They provide unique advantages for lifting, jacking and skidding operations, increasing the flexibility of systems for handling heavy loads.

The pumps provide greater accuracy than flow dividers which operate over a narrow band width and are likely to have flow variations in the secondary branches, especially when cascaded in series circuits.

INCREASED EFFICIENCY IN HI-LO CIRCUITS

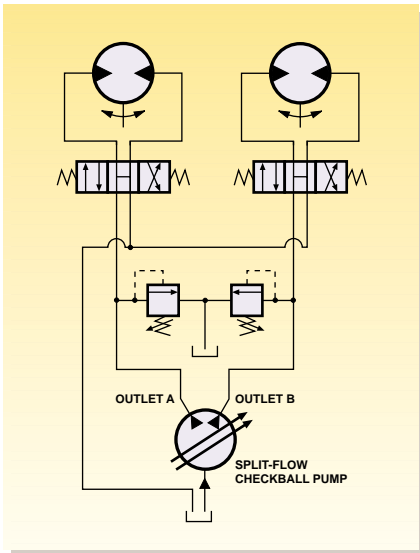
Split-Flow® pumps can efficiently supply flow in a circuit with changing flow and pressure requirements. These pumps are ideal for clamping, pressing and high torque tool applications.

Combined flow from both pump outlets is supplied to the actuator, until load pressure rises to the unloading valve setting, for example, 500 psi (35 bar). As shown at left, the higher output flow, 8 U.S. gpm (30 L/min), is then unloaded to tank. The remaining 2 U.S. gpm (8 L/min) is supplied at high pressure up to the relief valve setting of 10 000 psi (700 bar).

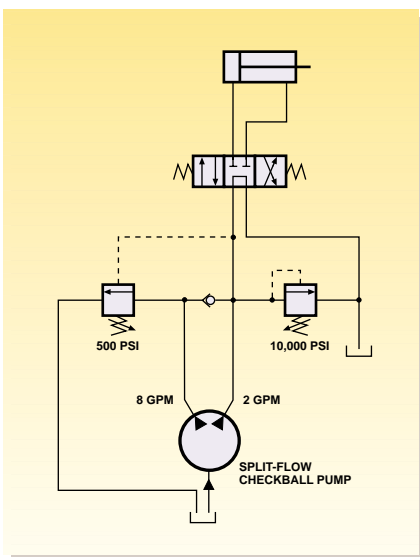
VARIABLE PUMP OUTPUTS IN HYDROSTATIC DRIVE CIRCUITS

A typical open-loop circuit can use a ten piston PV6000 Series hydraulic variable pump with two outlets. Each five piston pump output supplies independent variable flow to a motor.

Dynex DP Series valves in the circuit control the two low pressure signals, directed to the rear pump cover to independently control the hydraulic variable delivery mechanism of each variable output. As a result, the speed of each motor is controlled by its own variable supply.



Variable delivery Split-Flow® pumps provide increased system control and efficiency. Used in multiple function circuits, the flow from multiple outlets can be diverted and combined in the circuit for maximum performance.



Split-Flow® pumps can efficiently supply flow in a circuit with changing flow and pressure requirements. This makes them ideal for clamping, pressing and high torque tool applications.



Select the Piston-Output Splits To Match System Requirements

ISOLATOR VALVE MODELS

The checkball design, with its isolated pumping chambers, allows the output of each piston to be used separately.

One or more individual pistons can be isolated from the main outlet. Up to ten separate outlet flows are possible, for example, from a ten-piston pump.

The table below lists pump series available with isolator valves. Note that high pressure pump models are limited to a maximum pressure of 6000 psi (420 bar) when using isolator valves.

ISOLATOR VALVE



A six piston Split-Flow® pump can provide six independent flows using isolator valves which screw into the piston pumping chambers.

SPLIT-FLOW-COVER MODELS

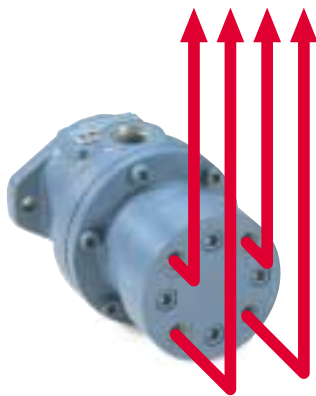
In Split-Flow-Cover models, the individual piston outputs are grouped together in the pump cover or barrel providing smooth, multiple outlet flows. Models are available for various piston-flow splits to match system requirements.

For example, an eight-piston PF3000 Series pump is available as a 4+4 split. The output of the four even-numbered pistons (2 through 8) is combined separately from that of the four odd-numbered pistons (1 through 7). Individual portions of a circuit are supplied by the output from each group of four pistons.

Other splits available for this pump include a 5+3 split, a 6+2 split or a 7+1 split, as well as an eight-way (8x1) split with separate outputs from each of the eight pistons.

The table on page 9 lists the most common Split-Flow-Cover models. Note that PF1000, PF2000 and PF3000 Series pumps are also available with all pistons isolated.

Contact a Dynex sales representative for complete Split-Flow® model numbers and a review of your application.



Split-Flow® pumps can be used for synchronized movement of cylinders without flow dividers. These pumps can simplify a system and provide greater accuracy.

ISOLATOR VALVE MODELS

Pump Series ^①	Number of Pistons	Rated Flow Per Piston ^②				Isolator Valve Model Number ^④	Port Size
		1200 rpm		1800 rpm			
		U.S. gpm	L/min	U.S. gpm	L/min		
PF2006 [®]	6	0.45	1,70	0.67	2,54	VC2006-1872	1/8 Inch N.P.T.
PF2008 [®]	6	0.64	2,42	0.97	3,67	VC2008-1256	1/4 Inch N.P.T.
PF4011	10	0.50	1,89	0.75	2,84	VC4015-1845	No. 4 S.A.E.
PF4015	10	0.70	2,65	1.05	3,97	VC4015-1845	No. 4 S.A.E.
PF4021	10	1.00	3,78	1.50	5,68	VC4021-1844	No. 4 S.A.E.
PF4018, PV4018	10	0.85	3,22	1.27	4,81	VC6046-1755	No. 6 S.A.E.
PF4026, PV4026	10	1.21	4,58	1.81	6,85	VC6046-1755	No. 6 S.A.E.
PF4033, PV4033	10	1.48	5,60	2.22	8,40	VC6046-1755	No. 6 S.A.E.
PF6033	10	1.61	6,09	2.42	9,16	VC6033-1756	No. 6 S.A.E.
PF6046	10	2.13	8,06	3.20	12,11	VC6046-3205	No. 8 S.A.E.

① Contact your sales representative for complete model numbers and a review of your application.

② Output flow based on typical performance at rated pressure with pressurized inlet where required.

③ These models are special mounting. See installation drawing, page 13.

④ Note that high pressure pump models are limited to a maximum pressure of 6000 psi (420 bar) when using isolator valves.

SPLIT-FLOW PUMPS

SPLIT-FLOW-COVER MODELS^①

Pump Series	Number of Pistons	Number of Pistons per Outlet (Port Size)		Output Flow per Outlet at 1500 rpm ^②				Output Flow per Outlet at 1800 rpm ^①			
				Outlet 1		Outlet 2		Outlet 1		Outlet 2	
				U.S. gpm	L/min	U.S. gpm	L/min	U.S. gpm	L/min	U.S. gpm	L/min
PF1001	4			0.30	1,10	0.30	1,10	0.35	1,32	0.35	1,32
PF1002	4			0.58	2,21	0.58	2,21	0.70	2,65	0.70	2,65
PF1003	4	2 Pistons	+	2 Pistons		0.87	3,31	0.87	3,31	1.05	3,97
PF1004	4	(S.A.E. No. 4)		(S.A.E. No.4)		1.08	4,09	1.08	4,09	1.28	4,84
PF1006	4			1.50	5,68	1.50	5,68	1.80	6,81	1.80	6,81
PF1001	4			0.44	1,66	0.15	0,55	0.53	1,99	0.18	0,66
PF1002	4			0.87	3,31	0.29	1,10	1.05	3,97	0.35	1,32
PF1003	4	3 Pistons	+	1 Piston		1.31	4,98	0.44	1,64	1.58	5,98
PF1004	4	(S.A.E. No. 8)		(S.A.E. No.4)		1.62	6,15	0.54	2,05	1.92	7,27
PF1006	4			2.25	8,52	0.75	2,84	2.70	10,22	0.90	3,41
PF2007	6			1.71	6,47	1.71	6,47	2.05	7,76	2.05	7,76
PF2008	6			2.42	9,15	2.42	9,15	2.90	10,98	2.90	10,98
PF2009	6	3 Pistons	+	3 Pistons		2.54	9,62	2.54	9,62	3.05	11,55
PF2012	6	(S.A.E. No. 8)		(S.A.E. No.8)		3.54	13,41	3.54	13,41	4.25	16,09
PF2007	6			2.28	8,62	1.14	4,31	2.73	10,33	1.37	5,19
PF2008	6			3.22	12,21	1.61	6,09	3.87	14,65	1.93	7,31
PF2009	6	4 Pistons	+	2 Pistons		3.39	12,83	1.69	6,41	4.07	15,39
PF2012	6	(S.A.E. No. 6)		(S.A.E. No.6)		4.72	17,88	2.36	8,94	5.67	21,46
PF2007	6			2.85	10,78	0.57	2,16	3.42	12,94	0.68	2,57
PF2008	6			4.03	15,25	0.81	3,05	4.83	18,28	0.97	3,67
PF2009	6	5 Pistons	+	1 Piston		4.24	16,04	0.85	3,21	5.08	19,24
PF2012	6	(S.A.E. No. 8)		(S.A.E. No.4)		5.90	22,34	1.18	4,47	7.08	26,80
PF3011	8			3.46	13,09	3.46	13,09	4.15	15,71	4.15	15,71
PF3015	8			4.08	15,46	4.08	15,46	4.90	18,55	4.90	18,55
PF3017	8	4 Pistons	+	4 Pistons		4.87	18,45	4.87	18,46	5.85	22,14
PF3021	8	(S.A.E. No. 8)		(S.A.E. No.8)		6.12	23,19	6.12	23,19	7.35	27,82
PF3011	8			4.32	16,36	2.59	9,82	5.19	19,64	3.11	11,77
PF3015	8			5.10	19,32	3.06	11,59	6.12	23,16	3.68	13,93
PF3017	8	5 Pistons	+	3 Pistons		6.09	23,06	3.66	13,85	7.31	27,67
PF3021	8	(S.A.E. No. 12)		(S.A.E. No.8)		7.66	28,98	4.59	17,39	9.19	34,78
PF3011	8			5.19	19,64	1.73	6,55	6.22	23,54	2.08	7,87
PF3015	8			6.12	23,18	2.04	7,72	7.35	27,82	2.45	9,27
PF3017	8	6 Pistons	+	2 Pistons		7.31	27,69	2.44	9,21	8.78	33,23
PF3021	8	(S.A.E. No. 12)		(S.A.E. No.6)		9.19	34,78	3.06	11,59	11.02	41,71
PF3011	8			6.05	22,90	0.86	3,28	7.26	27,48	1.04	3,94
PF3015	8			7.15	27,05	1.02	3,86	8.58	32,48	1.22	4,62
PF3017	8	7 Pistons	+	1 Piston		8.53	32,30	1.22	4,61	10.24	38,76
PF3021	8	(S.A.E. No. 12)		(S.A.E. No.6)		10.72	40,57	1.53	5,80	12.86	48,68
PF4011	10			3.00	11,36	3.00	11,36	3.60	13,63	3.60	13,63
PF4015	10			4.25	16,09	4.25	16,09	5.10	19,31	5.10	19,31
PF4021	10	5 Pistons	+	5 Pistons		6.25	23,66	23.66	23,66	7.50	28,39
PF4011	10			4.20	15,90	1.80	6,81	5.04	19,08	2.16	8,18
PF4015	10	7 Pistons	+	3 Pistons		5.95	22,52	2.55	9,65	7.14	27,03
PF4011	10			5.29	20,02	5.29	20,02	6.35	24,03	6.35	24,03
PF4026, PV4026	10	5 Pistons	+	5 Pistons		7.54	28,54	7.54	28,54	9.05	34,25
PF4033, PV4033	10	(S.A.E. No. 12)		(S.A.E. No.12)		9.25	35,01	9.25	35,01	11.10	42,01
PF6033	10			9.04	34,23	9.04	34,23	10.85	41,07	10.85	41,07
PF6046	10	5 Pistons	+	5 Pistons		13.24	50,16	13.24	50,16	15.90	60,19
		(1 Inch Flange)		(S.A.E.No.12)							
PF6054, PV6054	10			14.33	54,26	14.33	54,26	17.20	65,11	17.20	65,11
PF6070, PV6070	10	5 Pistons	+	5 Pistons		20.12	76,18	20.12	76,18	24.15	91,42
PV6080	10	(1 Inch Flange)		(1 Inch Flange)		21.87	82,81	21.87	82,81	26.25	99,70

① Contact a Dynex sales representative for Split-Flow® model options not shown in the table.

② Output flow based on typical performance at rated pressure with pressurized inlet where required.



Electrohydraulic Control For Accurate, Remote Speed Control

VARIABLE DISPLACEMENT PUMPS FOR RELIABLE OPERATION

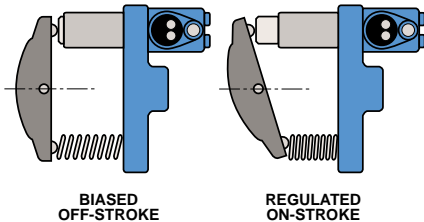
Modulating pumps provide accurate variable-speed control. Output flow is proportional to a variable electrical input signal. Components can be conveniently located, with the hydraulics remotely controlled.

On/Off models offer an alternative to the infinitely variable pump. An integral control brings the pump on and off-stroke in response to an electrical signal.

Pressure: Rated, 3000 psi (210 bar); Maximum Intermittent, 4000 psi (280 bar);

Speed: Rated, 2000 rpm; Maximum, 2800 rpm (PV2032 Models, 2600 rpm)

Porting: Inlet, No. 20 S.A.E.; Outlet, No. 16 S.A.E.



The movement of the cradle in proportional pumps is controlled by a variable electrical signal supplied to the pilot-stage force motor.

MOTORS CAN REDUCE HYDROSTATIC DRIVE SYSTEM WEIGHT

Compact motors produce high torque. The largest, for example, weighs only 38 lb (17 kg) and produces torque to 1386 lb•in at 3000 psi (157 N•m at 210 bar). Variable models provide two speeds. A solenoid valve de-strokes the motor to its lower displacement, providing increased speed.

PV2 SERIES PUMPS

Clockwise Rotation			Counter-Clockwise Rotation			Shaft S.A.E. B-B	Pump Control Description
17.7 U.S. gpm (67,0 L/min) at 1800 rpm ^③	21.5 U.S. gpm (81,4 L/min) at 1800 rpm ^③	24.5 U.S. gpm (92,7 L/min) at 1800 rpm ^③	17.7 U.S. gpm (67,0 L/min) at 1800 rpm ^③	21.5 U.S. gpm (81,4 L/min) at 1800 rpm ^③	24.5 U.S. gpm (92,7 L/min) at 1800 rpm ^③		
PV2024-3084 PV2024-3085	PV2029-3024 PV2029-3026	PV2032-3147 PV2032-3149	PV2024-3086 PV2024-3087	PV2029-3025 PV2029-3027	PV2032-3148 PV2032-3150	Keyed Spline	Pressure Compensated ^①
PV2024-3088 PV2024-3067	PV2029-3028 PV2029-3030	PV2032-3151 PV2032-3153	PV2024-3089 PV2024-3090	PV2029-3029 PV2029-3031	PV2032-3152 PV2032-3154	Keyed Spline	Remote Pressure Compensated ^①
PV2024-2950 PV2024-2951	PV2029-3032 PV2029-3034	PV2032-3155 PV2032-3157	PV2024-3082 PV2024-3083	PV2029-3033 PV2029-3035	PV2032-3156 PV2032-3158	Keyed Spline	Load Sensing ^②
PV2024-3095 PV2024-3096	PV2029-3038 PV2029-3099	— —	PV2024-3097 PV2024-3098	PV2029-3039 PV2029-3100	— —	Keyed Spline	On/Off Control ^②
PV2024-3091 PV2024-3073	PV2029-3036 PV2029-3093	— —	PV2024-3092 PV2024-3074	PV2029-3037 PV2029-3094	— —	Keyed Spline	Modulating Control ^②

^① Pressure compensator setting adjustable from 500 to 3000 psi (35 to 210 bar).

^② Models listed here also have pressure compensator override.

^③ Output flow based on typical performance at rated pressure with pressurized inlet where required. Refer to Bulletin PES.

MF2 AND MV2 SERIES MOTORS

Motor Model Number	Input Flow, 1000 rpm		Theoretical Torque		Rated Speed rpm	Rated Pressure		Maximum Pressure		Port Sizes	
	U.S. gpm	L/min	lb-in. per 100 psi	N•m per 10 bar		psi	bar	psi	bar	Inlet/Outlet	Drain
MF2015-3047 ^①	7.0	26,5	23.9	3,9	2800	3000	210	4000	280	No. 12 S.A.E.	No. 8 S.A.E.
MF2020-2924 ^①	9.0	34,1	31.8	5,2							
MF2024-3048 ^①	11.3	42,8	38.5	6,3							
MF2029-3049 ^①	13.2	50,0	46.2	7,6							
MV2024-3050 ^②	7.0 to 11.3	26,5 to 42,8	23.9 to 38.5	3,9 to 6,3	2800	3000	210	4000	280	No. 16 S.A.E.	No. 8 S.A.E.
MV2029-3052 ^②	8.2 to 13.2	31,0 to 50,0	28.6 to 46.2	4,7 to 7,6	2400	3000	210	4000	280		

^① These models are fixed displacement, bi-directional design.

^② These models are variable displacement, clockwise rotation. The cradle is biased to full-stroke. Energizing an integral solenoid valve de-strokes the pump to its lower displacement providing increased speed. Models are also available for counter-clockwise rotation: MV2024-3051 and MV2029-3053.

HEAVY-DUTY PISTON MOTORS



Piston Motors Withstand Pressure Spikes and Tough Duty Cycles

STEADY, RELIABLE POWER WITH SMOOTH SPEED VARIATION

Heavy-duty motors deliver steady power with smooth speed variation. These motors keep operating even when subjected to extreme changes in pressure, severe vibration and tough duty cycles.

They operate well in systems with constant starting and stopping, and sudden direction reversals.

DESIGNED FOR LONG LIFE OPERATION

These motors operate with long life at pressures to 6000 psi; 8000 psi intermittent (420 bar; 560 bar intermittent). Large radial bearings absorb piston reaction forces and provide balanced loading. Forged bronze barrels and hardened-steel pistons provide long life under adverse conditions.

COMPACT HIGH-TORQUE DESIGN REDUCES SYSTEM WEIGHT

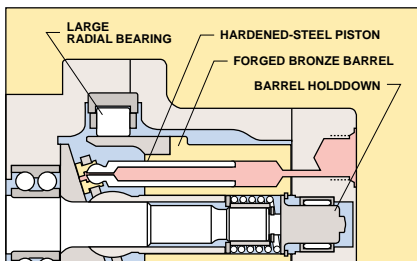
These efficient high-torque motors can reduce the size and weight of system components. Model MF5060, for example, weighs 130 lb (59 kg) and produces torque to 4775 lb•in at 5000 psi (540 N•m at 350 bar).

RESISTANT TO VIBRATION AND OVER-SPEED CONDITIONS

These motors are ideal for machines that experience severe hydraulic shock and vibration. Stalling, caused by barrel lift-off, is prevented by an optional hold-down feature. Barrel lift-off is controlled by limiting the maximum valveplate clearance. This optional feature enables the rotating group to continue turning with full torque.

HYDROSTATIC DRIVE APPLICATIONS

These motors can be used with *Split-Flow*[®] checkball pumps (see page 7) in hydrostatic drive systems. One double-outlet pump can supply two motors, providing equal speed and torque.



Rugged piston motors perform reliably in severe operating conditions, with large radial bearings, forged bronze barrels and hardened steel pistons. Maximum valveplate clearance is controlled by an optional barrel hold-down feature, providing exceptional tolerance to hydraulic shock, vibration and over-speed conditions.

MF5000 SERIES PISTON MOTORS

Motor Model Number	Shaft Type	Input Flow, 1000 rpm		Theoretical Torque		Rated Speed rpm	Rated Pressure		Maximum Intermittent Pressure		Port Sizes	
		U.S. gpm	L/min	lb-in per 100 psi	N-m per 10 bar		psi	bar	psi	bar	Inlet/Outlet	Drain
MF5036-2921 MF5036-2168	Keyed Spline	16.7	63,2	57.3	9,4	2000	6000	420	8000	560		
MF5045-2194 MF5045-2165	Keyed Spline	20.5	77,6	71.1	11,6	2000	6000	420	8000	560	No. 16 S.A.E.	No. 12 S.A.E.
MF5060-2922 MF5060-2925	Keyed Spline	25.7	97,3	95.5	15,6	2000	5000	350	5000	350		



Compact, Direct-Drive Motors Save Space and Reduce Weight

DESIGNED FOR EFFICIENT, LONG-LIFE OPERATION

Low speed, high torque vane motors provide smooth rotary power from stall to maximum speeds. A radially balanced design improves mechanical efficiency and extends operating life. A unique square profile produces extra strength at the corners for extended fatigue life, especially at high pressures.

REDUCE WEIGHT AND SAVE SPACE

The motors transmit torque and motion through a hollow, internal-spline rotor. This direct-drive design eliminates the need for costly gear reductions, simplifying system design and installation. The result is fewer system components and lower cost. Space requirements can be significantly reduced on equipment used in construction, mining, military and other space-restricted applications.

HOLLOW DRIVE SHAFT SIMPLIFIES WIRING AND PIPING

The motor's large diameter shaft opening allows the use of either a solid or hollow output shaft. The convenient passageway through the center of the motor can simplify the design and installation of wiring and piping.

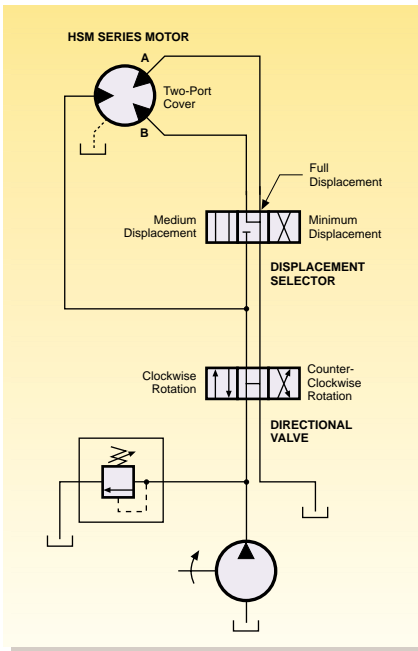
A hollow shaft is an advantage on augers and drilling equipment. Air or water can be pumped through the center of the motor to remove chips or debris from the drill hole.

IDEAL FOR VERTICAL MOUNTING AND COLD WEATHER APPLICATIONS

The rotor design makes the motors ideal for machines requiring vertical shaft mounting. Models with optional vertical-mounting covers supply increased lubrication between the rotor and running surface providing increased service life.

Warm-up ports are beneficial for mobile equipment used in cold weather. This option reduces the potential for motor seizure caused by thermal shock. The ports allow fluid to be circulated through the motor without rotor rotation, equalizing fluid and motor temperatures.

For more information about these options, contact the Dynex sales department.

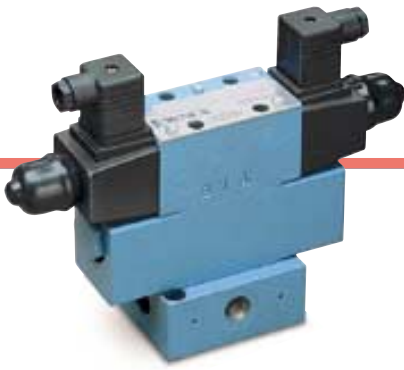


HSM motors can reduce power usage in systems with fixed pumps. A typical three-speed circuit uses a motor providing two unequal torque splits. The machine operator controls actuator speed using the selector valve. This valve combines the displacements to provide minimum, medium or maximum speeds.

HSM SERIES VANE MOTORS

Single Displacement Model Number	Theoretical Torque		Multiple Displacement Model Number	Multiple Displacement Torque Splits ^①				Input Flow, 100 rpm		Maximum Speed at 2000 psi (140 bar) rpm	Maximum Pressure at Stall	
	lb-ft per 100 psi	N·m per 10 bar		lb-ft per 100 psi		N·m per 10 bar		U.S. gpm	L/min		psi	bar
				Port A	Port B	Port A	Port B					
HSM100-2493	70	138	HSM100-2522	35	35	69	69	28.0	106.0	300	4000	280
HSM100-2454	90	177	HSM100-2455	45	45	88	88	38.0	143.8	300	4000	280
HSM200-2696	130	256	HSM200-2700	75	55	148	108	48.0	181.7	250	3000	210
HSM200-2695	150	295	HSM200-2699	75	75	147	147	55.0	208.2	250	3000	210
HSM300-2598	190	374	HSM300-2590	95	95	187	187	70.0	265.0	200	2750	190
HSM300-2601	220	433	HSM300-2591	125	95	246	187	80.0	302.8	150	2750	190
HSM300-2521	250	492	HSM300-2579	125	125	246	246	91.0	344.4	150	2750	190
HSM300-2592	380	747	HSM300-2594	190	190	374	374	140.0	529.9	200	2750	190
HSM300-2602	440	865	HSM300-2595	250	190	492	374	158.0	598.0	150	2750	190
HSM300-2551	500	983	HSM300-2597	250	250	492	492	184.0	696.4	150	2750	190

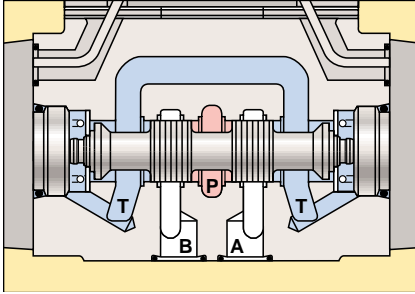
^① Multiple displacement models use a two-port cover (Port A and Port B). Models with equal torque splits provide two speed/torque selection. Models with unequal torque splits provide three speed/torque selection when used in a typical circuit as shown above.



Subplate Mounted Valves Operate Reliably at Pressures to 15 000 psi

SELECT FROM STANDARD OR HIGH PRESSURE MODELS

Dynex offers standard pressure valves rated for 5000 psi (350 bar) which mount on standard NFPA (CETOP) patterns. Dynex HP pattern valves, shown on page 15, operate reliably at pressures to 15 000 psi (1040 bar).



Dynex directional valves, with a second tank port into a common tank passageway, provide low pressure drop. Spool travel is exceptionally smooth because of a four-land spool design. Additional outboard lands provide greater support than two-land designs.

STANDARD PATTERN VALVES RATED TO 5000 PSI (350 BAR)

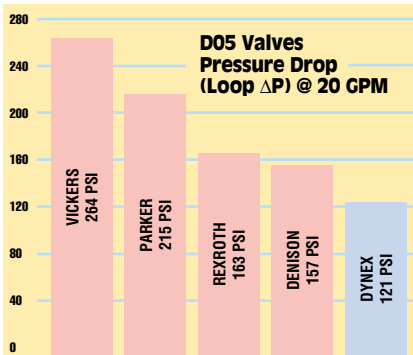
Sliding-spool directional valves operate with smooth, responsive control. High-force springs and solenoids, and tank return hydraulic boost passageways assure reliable shifting. Tapered o-ring counterbores improve sealing at the valve mounting surface. Standard fluorocarbon (Viton® or Fluorel®) seals provide greater fluid compatibility and wider temperature range performance.

Large internal flow passages, with uniform flow areas throughout the body coring, provide exceptionally low pressure drop.

D05 VALVES PROVIDE EXCEPTIONAL FLOW CHARACTERISTICS

Dynex D05 valves are one of the most efficient 20 U.S. gpm (76 L/min) subplate mounted valves available. Low pressure drop is enhanced with the use of our standard subplate, which takes advantage of the valve's double tank port design.

Typical loop pressure-drop is a low 102 psi (7 bar) for open-center spools and 121 psi (8 bar) for closed-center spools at a rated flow of 20 U.S. gpm (76 L/min). These valves can handle maximum flows to 40 U.S. gpm and are rated for 5000 psi (151 L/min at 350 bar).



Excellent flow characteristics make directional valves from Dynex exceptionally efficient. Pressure drop comparisons, above, are for NFPA D05 (CETOP 5) pattern valves with closed-center spools (based on competitive published data).

TWO-WAY CHECK VALVES (8640 SERIES)

These check valves are available in simple check or pilot-operated models. Select from line-connected or subplate mounted (size 06 only) configurations.

Rated Flow: Size 06, 40 U.S. gpm (151 L/min);
Size 10 and 16, 120 U.S. gpm (454 L/min)

Rated Pressure: 3000 psi (210 bar)

Porting: Size 06, 3/4 inch or 1 inch N.P.T.F.
Size 10, 1-1/4 inch N.P.T.F.; or 1-1/2 inch N.P.T.F., or
S.A.E. 1.500 inch flange;
Size 16, S.A.E. 2.000 inch flange

SANDWICH ACCESSORY VALVES SAVE SPACE AND ASSEMBLY TIME

Sandwich valves save space and reduce weight. Controlling components can be placed right at the directional valve, providing a neat and compact assembly. This modular design requires less piping and fittings, reducing machine costs and assembly time.

Models are available to mount on standard NFPA (CETOP) D03, D05 and D05H (D05 high flow) patterns. Select from flow control, check, relief, counterbalance and pressure reducing functions. Standard pressure models are available rated to 3000 psi (210 bar).

High pressure VSW Series valves, which mount on the Dynex HP pattern, are available rated to 10000 psi (700 bar). See page 15.

DIRECTIONAL CONTROL VALVES



Select Standard Pattern Valves for Operation to 5000 psi (350 bar)

MODELS AVAILABLE WITH FLOWS TO 165 U.S. GPM (625 L/MIN)

Subplate mounted sliding spool valves are available in five sizes which mount on standard NFPA (CETOP) patterns. Models are available with maximum flows to 165 U.S. gpm (625 L/min) rated for 5000 psi (350 bar) operation.

Select from manual, solenoid, hydraulic pilot or air pilot actuators, with a choice of various spool options.

Solenoid models include a range of electrical voltages, including explosion proof models with special enclosures approved by "UL" and "CSA" for use in hazardous locations. Other options include plug-in terminal solenoids (Hirschmann GDM 209), quick connect 3 or 5-pin receptacles, cable grips and signal lights. A manual solenoid override option provides convenient hand actuated override without the use of tools.

STANDARD PRESSURE DIRECTIONAL VALVES

Dynex Nominal Size	Standard Mounting Pattern	Operator or Function	Dynex Series Designation	Nominal Flow		Maximum Flow		Maximum Pressure	
				US gpm	L/min	US gpm	L/min	psi	bar
D03	N.F.P.A. D03 (CETOP 3)	Manual Lever	6100	8	30	15	57	5000	350
		Solenoid Direct	6500	8	30	15	57	5000	350
		External Hydraulic Pilot	6800	8	30	15	57	5000	350
		External Air Pilot	6900	8	30	15	57	5000	350
D05	N.F.P.A. D05 ^② (CETOP 5)	Manual Lever	6100	20	76	20	76	5000	350
		Solenoid Direct	6500	20	76	40 ^①	151 ^①	5000	350
		External Hydraulic Pilot	6800	20	76	20	76	5000	350
		External Air Pilot	6900	20	76	20	76	5000	350
D05H	N.F.P.A. D05 ^③ (CETOP 5)	Solenoid Pilot	6600	20	76	30	114	5000	350
		External Hydraulic Pilot	6800	20	76	30	114	5000	350
		External Air Pilot	6900	20	76	30	114	5000	350
D08	N.F.P.A. D08 (CETOP 8)	Mechanical	6000	40	151	90	341	5000	350
		Solenoid Pilot	6600	40	151	90	341	5000	350
		External Hydraulic Pilot	6800	40	151	90	341	5000	350
		External Air Pilot	6900	40	151	90	341	5000	350
D08H	N.F.P.A. D08 (CETOP8)	Solenoid Pilot	6600	80	303	165	625	5000	350
		External Hydraulic Pilot	6800	80	303	165	625	5000	350
		External Air Pilot	6900	80	303	165	625	5000	350
03	P06 ^④	External Hydraulic Pilot	4800	15	57	20	76	5000	350
06	P08 ^④			40	151	60	227	5000	350
10	P10 ^④			90	341	150	568	5000	350
Sandwich Valves	D03	Various Functions ^⑤	—	6	23	6	23	3000	210
	D05		—	12	45	12	45	3000	210
	D05H ^③		—	20	76	20	76	3000	210

① Maximum flow capacity is determined by internal operator, spool type and operating pressure. Consult your Dynex sales representative for complete specifications.

② D05 valves have the standard D05 pattern plus a second "T" port into a common tank passageway, providing lower pressure drop and increased efficiency.

③ D05H valves have the standard D05 pattern plus a second "T" port into a common tank passageway, and auxiliary "X" and "Y" ports for external pilot and drain.

④ P4800 Series subplate valves mount on these standard N.F.P.A. patterns, which more commonly are found on pressure control valves. These valves are two-position, two-way configuration. They are also available in flange mounted and line connected models. For installation details, refer to Bulletin VES.

⑤ For complete sandwich valve function descriptions and model numbers, contact the Dynex sales department.

DIRECTIONAL CONTROL VALVES



High Pressure HP Pattern Valves Rated to 15 000 psi (1040 bar)

HP SPOOL VALVES OPERATE RELIABLY TO 10 000 PSI (700 BAR)

HP03 and HP05 valves, with a simple sliding-spool design, operate at pressures up to twice that of conventional subplate mounted valves. These reliable controls provide true four-way control in a compact package.

Select from manual, solenoid, hydraulic or air-pilot operation with a range of spools and other options.

Spool travel is exceptionally smooth because of a four-land spool design. Additional outboard lands provide greater support than two-land designs. Spool balancing grooves assure precise centering and reduced silt build-up.

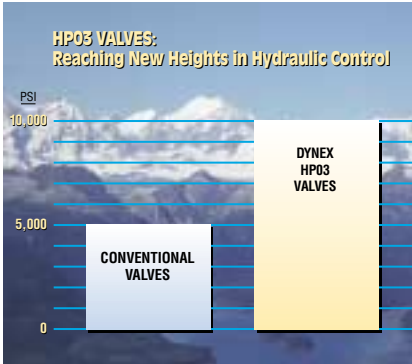
POSITIVE SEALING VST SEATED VALVES RATED TO 15 000 PSI (1040 BAR)

VST Series valves, with a ball-on-seat design, provide distinct advantages. First, silting cannot occur, assuring reliable shifting even when the valve remains unactuated for long periods at high pressure. Second, these are positive sealing valves, which make them ideal for circuits requiring load holding functions.

These valves mount on the high pressure HP03 pattern. Two position, two-way models are available for venting, unloading or similar on/off functions. Three-way controls are ideal for circuits which require locking of actuators used in clamping systems, presses and load holding applications.

HIGH PRESSURE SANDWICH ACCESSORY VALVES

VSW Series high pressure valves are used with Dynex high pressure sliding spool and seated control valves which mount on the HP pattern. HP03 pattern sandwich valves are rated for 10000 psi (700 bar) and HP05 pattern valves are rated to 8500 psi (590 bar).



High pressure HP sliding-spool valves provide true four-way control in a simple compact package. HP03 valves are rated for 10 000 psi (700 bar), double that of conventional subplate mounted valves.

HIGH PRESSURE DIRECTIONAL VALVES

Dynex Nominal Size	Mounting Pattern	Operator or Function	Dynex Series Designation	Nominal Flow		Maximum Flow ^①		Maximum Pressure	
				US gpm	L/min	US gpm	L/min	psi	bar
HP03	Special HP03 Pattern	Manual Lever	6100	5	19	15	57	10 000	700
		Solenoid Direct	6500	5	19	15	57	10 000	700
		External Hydraulic Pilot	6800	5	19	8	30	10 000	700
		External Air Pilot	6900	5	19	8	30	10 000	700
HP05	Special HP05 Pattern	Solenoid Direct	6500	5	19	25	95	8000	560
		External Hydraulic Pilot	6800	5	19	10	38	8000	560
		External Air Pilot	6900	5	19	10	38	8000	560
HP03 Seated Valves	Special HP03 Pattern	Vent Function	VSTV	1	3,8	2	7,6	15 000	1040
		Two Position, Two-Way	VST22	5	19	10	38	10 000	700
		Two Position, Three-Way	VST23	5	19	10	38	10 000	700
Sandwich Valves	Special HP Pattern	Various Functions ^②	VSW-HP03	5	19	10	38	10 000	700
			VSW-HP05	15	57	25	95	8500	590

① Maximum flow capacity is determined by internal operator, spool type and operating pressure. Consult your Dynex sales representative for complete specifications.

② For complete sandwich valve function descriptions and model numbers, contact the Dynex sales department.

PRESSURE CONTROL VALVES



High Pressure Control Valves Provide Reliable Pressure Regulation

FAST RESPONSE AT PRESSURES TO 15 000 PSI (1040 BAR)

VH Series relief and decompression valves are ideal for high pressure and high shock systems. These pilot-operated valves provide fast response at pressures to 15 000 psi (1040 bar) with flow ratings to 30 U.S. gpm (114 L/min).

H8819 Series proportional relief valves are rated to 50 U.S. gpm at 15 000 psi (190 L/min at 1040 bar), or 75 U.S. gpm at 9000 psi (284 L/min at 620 bar). Electrohydraulic models provide accurate remote control of the relief pressure setting, proportional to a variable electrical input signal.

SELECT FROM THREE TYPES OF STANDARD PRESSURE CONTROLS

Balanced spool valves provide consistent control of pressure, regardless of flow variations. These valves have a narrow differential between cracking and full flow, making them ideal for systems requiring constant actuator force. Poppet style valves provide fast response and are ideal for systems with extreme changes in pressure. Direct-spring valves provide inexpensive low flow relief protection.

PRESSURE CONTROL VALVES

Dynex Series	Valve Type	Mounting	Nominal Size	Port Size	Rated Flow		Maximum Flow		Rated Pressure	
					U.S. gpm	L/min	U.S. gpm	L/min	psi	bar
8800 Series	Pilot Operated Balanced Spool	Line Connected or Subplate Mounted	03	1/2 inch N.P.T.F.	15	57	20	76	40 to 3000	3 to 210
			06	1 inch N.P.T.F.	40	151	60	227	40 to 5000	3 to 350
			10	1-1/2 inch N.P.T.F.	90	341	150	568	40 to 3000	3 to 210
8800 Series	Pilot Operated Poppet Style	Line Connected	03	1/2 inch N.P.T.F.	15	57	25	95	50 to 5000	4 to 350
		Subplate Mounted	06	3/4 or 1 inch N.P.T.F.	40	151	60	227	50 to 5000	4 to 350
H8819 Series	Proportional Relief Valves ①	Line Connected	—	No. 16 S.A.E. ② 1.375-12 U.N.F. Threaded ③	75	284	75	284	9000	620
			—	④	50	190	50	190	15 000	1040
		Manifold Mounted	—	④	75	284	75	284	9000	620
8820 Series	Direct-Spring (Panel Mounted)	Remote Control	01	1/4 inch N.P.T.F.	0.8	3	1	4	50 to 5000	4 to 350
		Safety Relief	02	1/4 inch N.P.T.F.	1	4	3	11	50 to 5000	4 to 350
VR Series	Direct-Spring Relief Valves	Line Connected	—	3/8 inch N.P.T.F. inlet with 3/4 inch N.P.T.F. outlet; or both No. 8 S.A.E.	2	8	8	30	500 to 10 000	35 to 700
VA Series	Poppet Style Relief Valves	Line Connected	—	3/8 inch, 1/2 inch, or 3/4 inch N.P.T.F.; No. 8, No. 10, or No. 12 S.A.E.	20	76	30	114	250 to 10 000	17 to 700
VH Series High Pressure	Poppet Style Relief and Decompression Valves	Line Connected	—	.750-14 N.P.S.M. pressure ⑤ or G 3/4 (B.S.P.) ⑥	14	53	14	53	3000 to 15 000	210 to 1040
		Subplate Mounted	—	—	22	83	22	83	3000 to 15 000	210 to 1040

① Models available with manual control, electric vent or electro-hydraulic control. Refer to Bulletin VES.H88 for complete specifications.

② Tank Port, No. 24 S.A.E. ; Drain Port, No. 6 S.A.E.

③ Pressure port used with Autoclave Medium Pressure, Butech M/P or equivalent fitting; Tank Port, No. 24 S.A.E.; Drain Port, No. 6 S.A.E.

④ Refer to Bulletin VES.H88 for details on manifold mounting; Tank Port, No. 24 S.A.E.; Drain Port, No. 6 S.A.E.; Pilot Port, No. 6 S.A.E.

⑤ Pressure port used with Autoclave Medium Pressure, Butech M/P or equivalent fitting; Tank port, No. 12 S.A.E.

⑥ Pressure and Tank port fits British Standard Pipe fitting.



Proportional Actuators and Valves For Accurate, Consistent Control

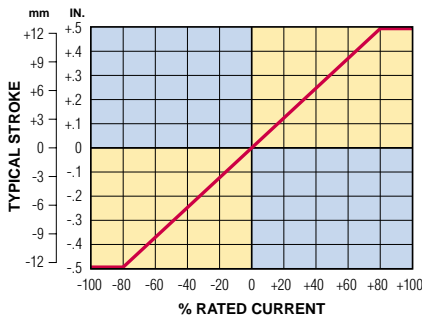
OUTPUT PROPORTIONAL TO AN ELECTRICAL INPUT SIGNAL

Proportional controls provide accurate control without additional electronic feedback. Output is proportional to an electrical input signal.

Both the Remote Proportional Actuator (RPA) and the electro-hydraulic proportional stack valve utilize a force motor in the pilot stage. An electrical signal supplied to the force motor controls the movement of a pilot spool, which ports pilot flow to shift the output rod in the RPA, or the main spool in the proportional valve.

This simple design allows complex tasks to be performed with high speed and accuracy, using position sensors or microprocessor input.

These controls feature *Mechanical Position Feedback*. This patented design monitors and controls main component performance. A mechanical follower, riding on an inclined feedback surface, nulls the pilot stage when the output rod in the RPA, or main spool in the proportional valve, is in its proper position.



Electro-hydraulic controls provide output proportional to an electrical input signal. Patented "Mechanical Position Feedback" provides accurate control without additional electronic feedback.

COMPACT DIRECT-MOUNTING ACTUATORS FOR REMOTE CONTROL

The RPA produces output rod displacement proportional to an electrical input signal. The actuator can be used to stroke variable displacement pumps and motors, spools of large valves, throttle controls, clutches or brakes.

This actuator is ideal where machine size or component location make it impossible to operate a component directly. Compact size and direct mounting makes it easy to convert existing components for remote electro-hydraulic control.

The actuator provides accurate control without additional electronic feedback. Patented *Mechanical Position Feedback* monitors and controls the position of the output rod.

Maximum Stroke: Extend or retract 0.5 inch (12,7 mm), with polarity change; or extend 1.0 inch (25,4 mm), or retract 1.0 inch (25,4 mm), with current increase.

Output Force: 60 lb at 200 psi (0,27 kN at 15 bar) to 1200 lb at 3000 psi (5.34 kN at 210 bar).

RPA PROVIDES ELECTRO-HYDRAULIC PUMP VOLUME CONTROL

The Remote Proportional Actuator (RPA) can be used to control the output of Dynex mechanical variable delivery checkball pumps. Output flow is controlled by stroking the spring-biased linear stem actuator at the back of the pump. Refer to page 5 for information on these pumps.

Kits are available to mount the actuator to the pump. These kits include a bracket and necessary hardware. For complete information, contact the Dynex sales department.

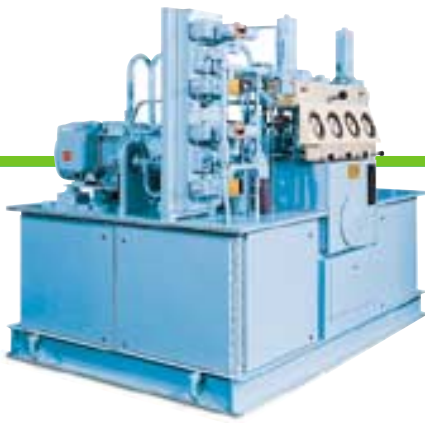
STACKABLE PROPORTIONAL VALVES FOR ACCURATE POSITIONING

Proportional valves accurately control actuator speeds with flow proportional to an electrical input signal. These four-way stack valves feature pilot stages that provide rapid spool movement.

Other control options include electro-hydraulic on/off, remote hydraulic piloted, or manual operation. Up to six segments, with a choice of different controls, can be combined in one stack valve assembly. Inlet options include pressure compensation, load sensing or power beyond capability.



Remote Proportional Actuators (RPA) can control the output of Dynex variable delivery checkball pumps. The electro-hydraulic actuator, with output rod proportional to a variable input signal, strokes the linear stem volume control at the back of the pump.



Power Unit Facility Builds Standard And Custom Designed Systems

EXPERIENCE AND EXPERTISE TO SATISFY YOUR REQUIREMENTS

The Dynex power unit facility builds hydraulic systems used throughout the world. Select from a complete line of standard power units or specialized systems to meet your specific requirements. Our expert system designers and craftsmen can meet all your power unit requirements.

A WIDE RANGE OF STANDARD POWER UNITS

Standard power units include nine basic reservoir styles with sizes to 440 gallons (1665 L). Select from a range of flow and pressure capability, with various prime movers sized from 0.5 to 700 hp (0.4 to 522 kW)).

SELECT FROM MANY COMPONENTS, OPTIONS FOR CUSTOM SYSTEMS

Custom power units are fabricated to your exact specifications. Working with your experienced Dynex distributor, we can design and build a system providing high efficiency and reliable, long life operation.

Choose from a large selection of pumps, valves, electric motors, filters, coolers, controls and other accessories. Options include stainless steel construction and high pressure capability. Custom systems can incorporate customer- or distributor-supplied components.



Power units are functionally tested prior to shipment. Standard tests include checks for proper flow, pressure and valve function. Socket welds can be helium tested for leaks before introducing hydraulic fluid. Other special tests for noise levels, power input and other functions are also available.



The modern facility employs the latest in fabrication processes. Custom tube-bending equipment can handle 1½ inch (38,1 mm) stainless steel.



Power units are designed and built to operate reliably in difficult environments. The units used on this rock crushing equipment are finished with durable, environmentally-safe water-based enamel. The system's hi-lo power circuit efficiently supplies flow in response to changing flow/pressure requirements.



Meet Your Toughest Requirements With Assured On-time Delivery

FLEXIBLE ASSEMBLY AND SCHEDULING FOR FAST TURN-AROUND

Our years of experience, together with our flexible assembly and scheduling, means we can satisfy your toughest requirements. You can depend on prompt, on-time delivery with even the shortest lead times.

MODERN FACILITY AND SKILLED CRAFTSMEN

No power unit is too big or too small for our modern facility. Every unit is built by skilled workers with years of experience in power unit assembly. These craftsmen use the latest in fabrication processes to assure efficient, trouble-free operation.

THOROUGH TESTING AND QUALITY FINISHING

Prior to shipment, standard functional tests assure proper operation. Special tests for noise levels, power input and other functions are also available.

Units are coated with a durable primer and finished with lacquer, enamel, water-based or single-part epoxy. Our fully-enclosed spray booth accommodates even the largest units. For extra protection, units can be completely shrink-wrapped for safe shipping.



Designing your power unit includes a thorough review of functional and physical parameters, to ensure a reliable, energy-efficient system that will exactly meet your requirements.



State-of-the-art TIG welding and plasma metal cutting assure quality fabrication for trouble-free power unit operation.



Reliability and serviceability are important factors in the design of high pressure systems. In this steel mill application, pump/motor sets (photo, top left) supply the lube system on the finishing stands of the strip mill. Rugged checkball pumps perform reliably even when subjected to extreme heat and contamination.

Photo courtesy of Weirton Steel Corporation