

High Pressure Checkball Piston Pumps

Fixed displacement, bi-directional PF6000 Series pumps provide reliable high-pressure operation: Maximum, 15000 psi (1040 bar).

High Volumetric Efficiency

The positive-seating action of the check valve provides less wear and improved volumetric efficiency at higher pressures.

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.

Contamination Tolerant

Checkball pumps use piston check valves to direct flow from the pump inlet to the outlet.

The outlet check valves provide a relatively large flushing path for system contamination. This makes the pumps ideal for environments in which contamination is always present, such as Steel Mill, Mining, and Aggregate operations.

PUMP SELECTION

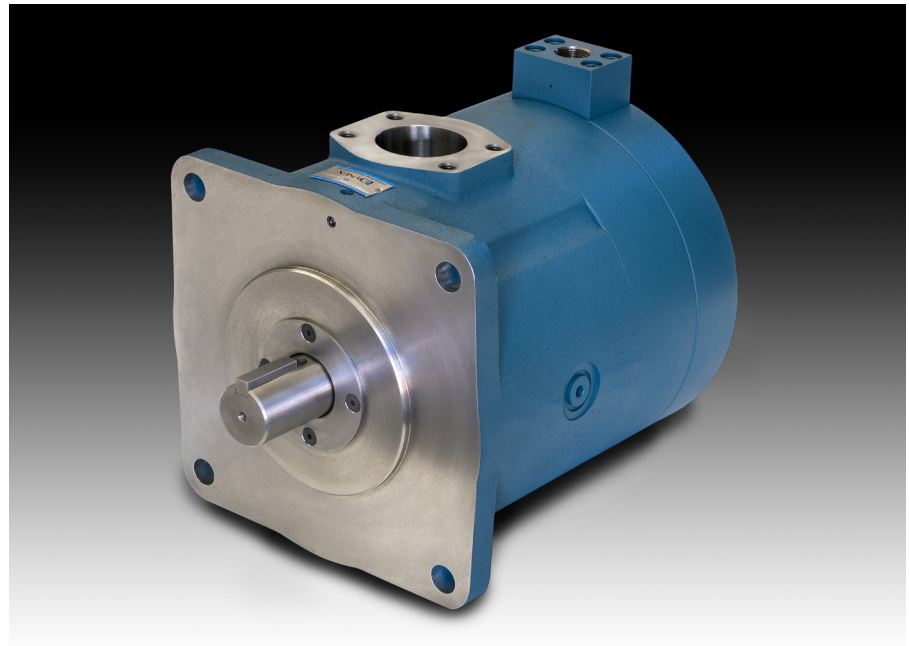
The table shows specifications for standard pressure and high pressure "H" option models.

These pumps require a complete model code specifying shaft, seal and outlet port options. Refer to *Typical Model Code* on page 9.

Multiple Outlet Models

Split-Flow® models provide multiple outputs for synchronized actuator movement or multiple function circuits. Contact the Dynex Sales department for options and availability.

PF6000 SERIES
14.1 to 29.8 gpm (53,4 to 112,8 L/min) at 1800 rpm
6000 to 15000 psi (420 to 1040 bar)



Specifications

Pump Models	Output Flow at 1500 rpm ^①		Output Flow at 1800 rpm ^①		Rated Pressure		Maximum Pressure	
	U.S. gpm	L/min	U.S. gpm	L/min	psi	bar	psi	bar
PF6020-10	11.8	44,5	14.1	53,4	6000	420	8000	560
PF6024-10	13.8	52,3	16.6	62,8	6000	420	8000	560
PF6030-10	18.0	68,2	21.6	81,8	6000	420	8000	560
PF6033-10	19.1	72,3	22.9	86,7	6000	420	8000	560
PF6042-10	24.8	94,0	29.8	112,8	6000	420	8000	560
PF6020H-10	11.2	42,3	13.4	50,7	10 000	700	15 000	1040
PF6024H-10	13.3	50,2	15.9	60,2	10 000	700	15 000	1040
PF6030H-10	17.3	65,3	20.7	78,3	10 000	700	15 000	1040
PF6033H-10	18.8	71,0	22.5	85,2	8000	560	10 000	700
PF6042H-10	24.3	92,1	29.2	110,5	8000	560	10 000	700

① Output flow based on typical performance at rated pressure (ISO 32 oil at 120° F).

INSTALLATION AND OPERATION

Fluid

High-grade premium petroleum-based oil, with a combination of anti-wear, demulsibility, oxidation and foam resistance properties, and rust protection.

Some Dynex pumps are suitable for use with water-glycol, Skydrol and other phosphate ester fluids, and various military fluids. Contact the Dynex Sales department for more information.

If fluid conditions fall outside of the range shown in the *Hydraulic Fluid Viscosity Guidelines* table, or if other operating recommendations are needed, please contact the Dynex Sales department.

Seals

Options include Fluorocarbon (Viton® or Fluorel®), Polyurethane (Disogrin®), or EPR (Ethylene-Propylene Rubber).

Inlet Pressure

Pumps may require pressurized inlet at elevated speeds or fluid viscosities outside the optimum range. Failure to meet inlet requirements will result in flow reduction. Refer to the *Minimum Inlet Conditions* table.

Inlet pressures higher than 10 psi (0,7 bar) require a high pressure shaft seal (XE, XV or XD option).

See *Typical Model Code* on page 9 for selecting seal options.

Outlet Port Options

Full flow and Split-Flow® models are available with the following options:

Standard pressure models have SAE ports. High pressure "H" option models require the use of outlet port option "A" (Autoclave Medium Pressure, Butech M/P or equivalent) or outlet port option "B" (British Standard Pipe Parallel).

As shown on page 3, the outlet port is machined in a block integrally mounted to the pump cover. Refer to *Typical Model Code* on page 9 to specify the port.

Minimum Inlet Conditions^①

Pump Models	Operating Speed					
	1200 rpm		1500 rpm		1800 rpm	
	psi	bar	psi	bar	psi	bar
PF6020, PF6024	0	0	5	0,4	5	0,4
PF6030, PF6033	0	0	5	0,4	10	0,7
PF6042	5	0,4	10	0,7	15 ^②	1 ^②

① Values shown are based on fluid viscosity of 100 SUS (20 cSt). Includes Standard and "H" option models.

② Inlet pressures higher than 10 psi (0,7 bar) require a high-pressure shaft seal (XE, XV or XD option). Refer to "Typical Model Code" on page 9 for seal options.

Hydraulic Fluid Viscosity Guidelines^①

Operating				Start-up ^②			
Minimum		Maximum		SUS		Optimum Range	
SUS	cSt	SUS	cSt	SUS	cSt	SUS	cSt
34	2,3	1911	413	1911	413	98 to 324	20 to 70

① If fluid conditions fall outside of the range shown, contact the Dynex Sales department.

② Under load or no-load.

Minimum Filtration Levels

Pump inlet, 150 µ nominal.
Pressure or return line, 25 µ nominal.
Finer filtration levels than these are desirable and will result in longer component life.

Note: Restricting flow to the pump inlet should be avoided to achieve expected output flow.

Orientation

Generally, shaft horizontal with inlet vertically up. Contact the Dynex Sales department for applications requiring vertical shaft-up mounting or inlet orientation other than vertically up.

Bi-Directional Shaft Rotation

With these fixed displacement pumps, the direction of output flow is constant, regardless of drive shaft rotation.

INSTALLATION

All dimensions are shown in inches (millimeters in parentheses) and are nominal. See Typical Model Code on page 9 for selecting port options.

Pilot/Mounting

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

Shaft

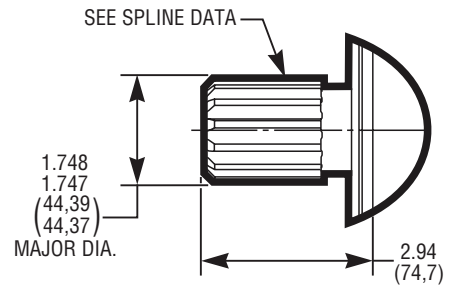
1.75 inch (44,44 mm) diameter keyed shaft.

Optional Spline Shaft

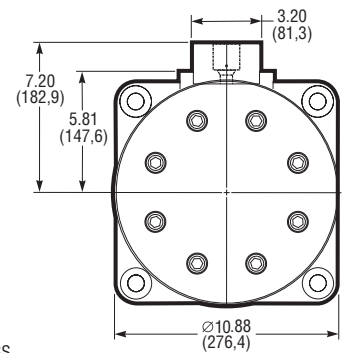
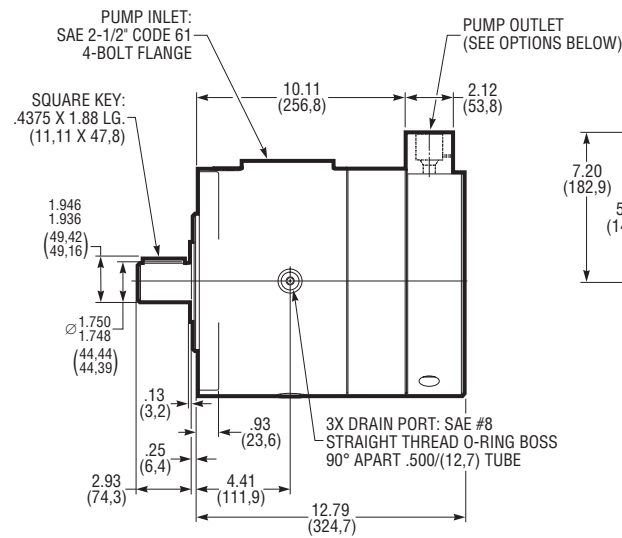
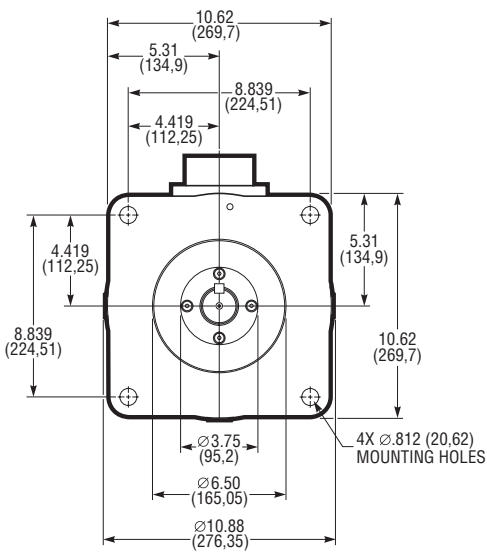
SAE Spline, 1.748/1.747 inch (44,39/44,37mm) diameter standard SAE 13 tooth, 8/16 DP 30° involute spline.

Weight (Mass):

290 lb (131,54 kg).

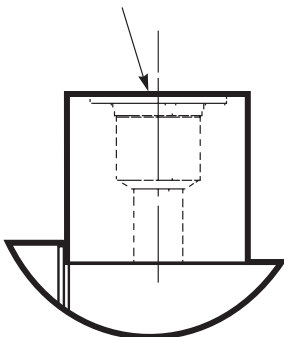


INSTALLATION DRAWING



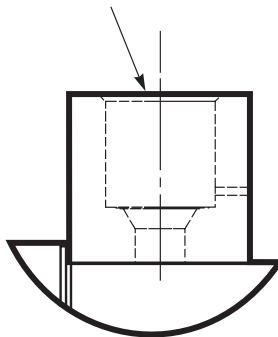
FULL FLOW OUTLET OPTIONS

PUMP OUTLET:
SAE #12 STRAIGHT THREAD
O-RING BOSS
.594/(15,1) TUBE
1.0625-12 UN-2B THREAD



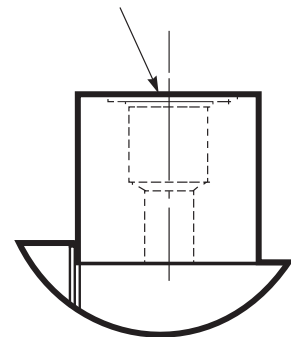
"No Code" Option

PUMP OUTLET:
1 MEDIUM PRESSURE CONED & THREADED
1.00/(25,4) TUBE
1.375-12 UN-2B THREAD
(FITS AUTOCLAVE ENGINEERS SF1000CX,
BUTECH PRESSURE SYSTEMS 1 M/P OR EQUAL)



"A" Option

PUMP OUTLET:
G 3/4
.750-14 BSPP THREAD



"B" Option

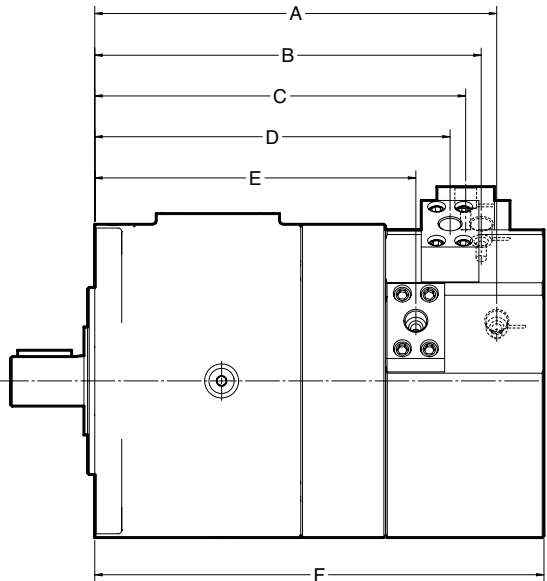
SPLIT-FLOW® MODELS

Split-Flow® provides multiple outlets from a single pump. Models with Split-Flow® covers efficiently supply two or more flows for multiple function circuits. Multiple outlet pumps can be used for synchronized actuator movement.

Piston outputs are grouped together in the cover with various piston flow splits available.

Abbreviations

C&T	Medium Pressure Coned and Threaded (Autoclave, Butech, or equivalent)
SAE	O-Ring Boss (ORB)
BSPP	British Standard Pipe Parallel



VARIABLE DIMENSIONS AND PORT LOCATIONS^①

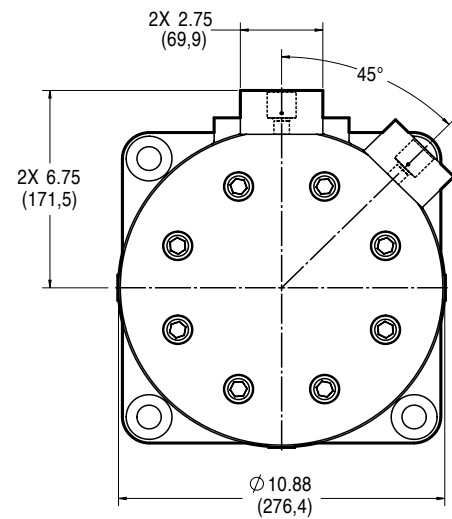
DIMENSIONS	Split-Flow Options					
	4+4 Split Radial Ports	5+5 Split Radial Ports	4X2 Split Radial Ports	5X2 Split Radial Ports	8X Split Axial Ports	10X Split Axial Ports
A	—	—	—	13.96 (354,7)	—	—
B	12.34 (313,4)	12.38 (314,5)	11.11 (282,2)	13.42 (340,9)	—	—
C	11.11 (282,2)	11.15 (283,3)	11.84 (300,8)	12.88 (327,2)	—	—
D	—	—	12.84 (326,2)	12.34 (313,5)	—	—
E	—	—	13.38 (339,9)	11.15 (283,3)	—	—
F	13.56 (344,4)	13.60 (345,5)	14.56 (369,8)	15.60 (396,3)	13.06 (331,7)	13.10 (332,8)

^① Dimensions shown are for port location reference only. See “Typical Model Code” on page 5 for available port type and size information.

Port Options 4+4 Split Flow "44"

2 outlet ports with 4 active pistons per port.

Port	Port Type	Maximum Port Pressure	
No Code	SAE No. 10 Straight Thread O-Ring Boss .625 (16) Tube .875-14 UNF-2B Thread	8000 psi	560 bar
A	3/4" Medium Pressure Coned and Threaded (Autoclave, Butech, or equivalent)	15 000 psi	1040 bar
B	G 5/8 5/8-14 BSPP Thread	10 000 psi	700 bar

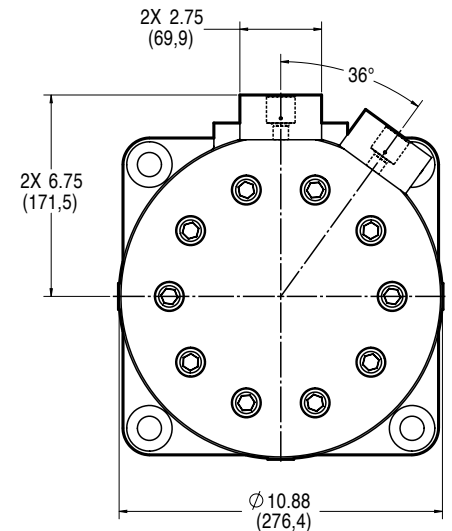


(4+4) Four-pistons output
+ four-pistons output

Port Options 5+5 Split Flow "55"

2 outlet ports with 5 active pistons per port.

Port	Port Type	Maximum Port Pressure	
No Code	SAE No. 10 Straight Thread O-Ring Boss .625 (16) Tube .875-14 UNF-2B Thread	8000 psi	560 bar
A	3/4" Medium Pressure Coned and Threaded (Autoclave, Butech, or equivalent)	15000 psi	1040 bar
B	G 5/8 5/8-14 BSPP Thread	10000 psi	700 bar

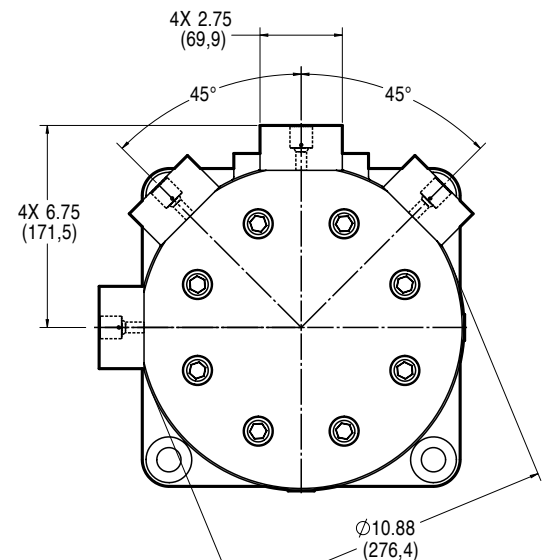


(5+5) Five-pistons output
+ five-pistons output

Port Options 4X2 Split Flow "4X2"

4 outlet ports with 2 active pistons per port.

Port	Port Type	Maximum Port Pressure	
No Code	.375 (10) SAE No. 6 Straight Thread O-Ring Boss Tube .5625-18 UNF-2B Thread	8000 psi	560 bar
A	9/16" Medium Pressure Coned and Threaded (Autoclave, Butech, or equivalent)	15 000 psi	1040 bar
B	G 3/8 3/8-19 BSPP Thread	10000 psi	700 bar

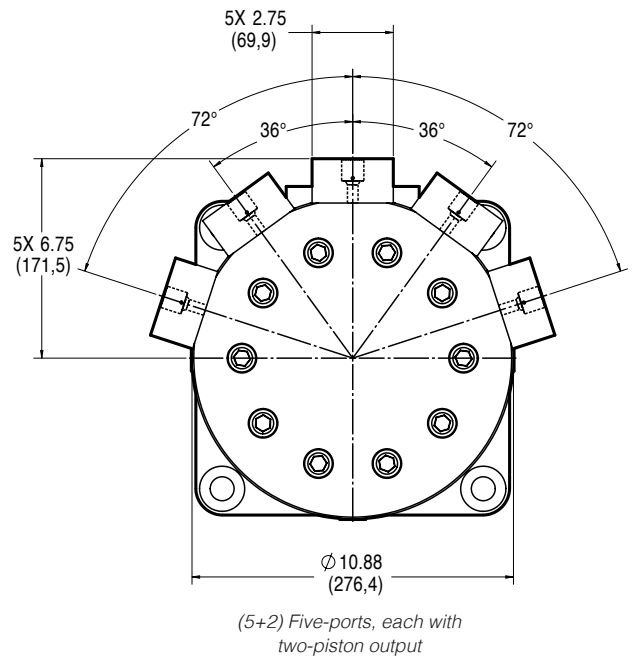


(4+2) Four-ports, each with
two-piston output

Port Options 5X2 Split Flow "5X2"

5 outlet ports with 2 active pistons per port.

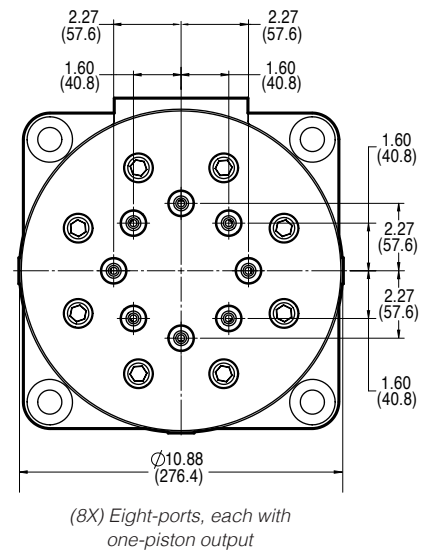
Port	Port Type	Maximum Port Pressure	
No Code	.375 (10) SAE No. 6 Straight Thread O-Ring Boss Tube .5625-18 UNF-2B Thread	8000 psi	560 bar
A	9/16" Medium Pressure Coned and Threaded (Autoclave, Butech, or equivalent)	15 000 psi	1040 bar
B	G 3/8 3/8-19 BSPP Thread	10 000 psi	700 bar



Port Options 8X Split Flow "8X"

8 independent outlets with 1 active piston per port.

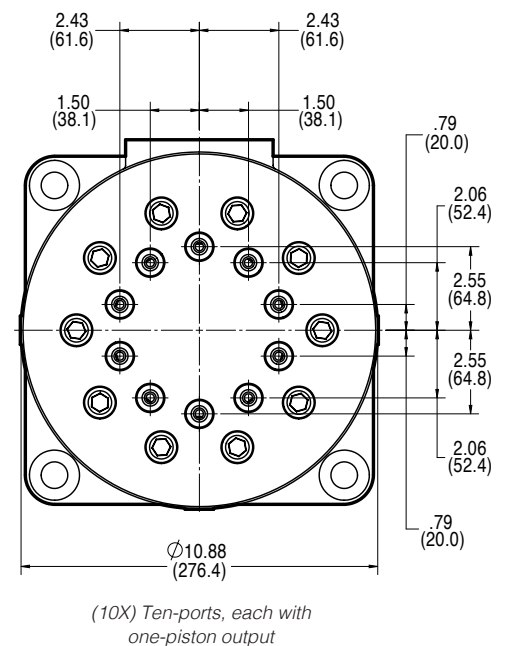
Port	Port Type	Maximum Port Pressure	
No Code	SAE No. 6 Straight Thread O-Ring Boss .375 (10) Tube .5625-18 UNF-2B Thread	8000 psi	560 bar
A	9/16" Medium Pressure Coned and Threaded (Autoclave, Butech, or equivalent)	15 000 psi	1040 bar
B	G 3/8 3/8-19 BSPP Thread	10 000 psi	700 bar



Port Options 10X Split Flow "10X"

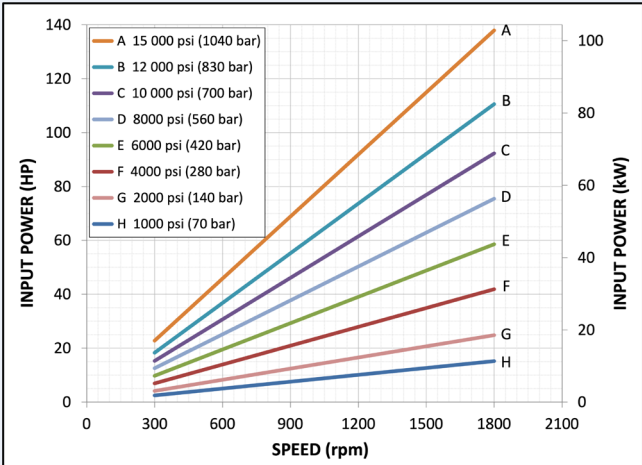
10 independent outlets with 1 piston per port.

Port	Port Type	Maximum Port Pressure	
No Code	SAE No. 6 Straight Thread O-Ring Boss .375 (10) Tube .5625-18 UNF-2B Thread	8000 psi	560 bar
A	9/16" Medium Pressure Coned and Threaded (Autoclave, Butech, or equivalent)	15 000 psi	1040 bar
B	G 3/8 3/8-19 BSPP Thread	10 000 psi	700 bar

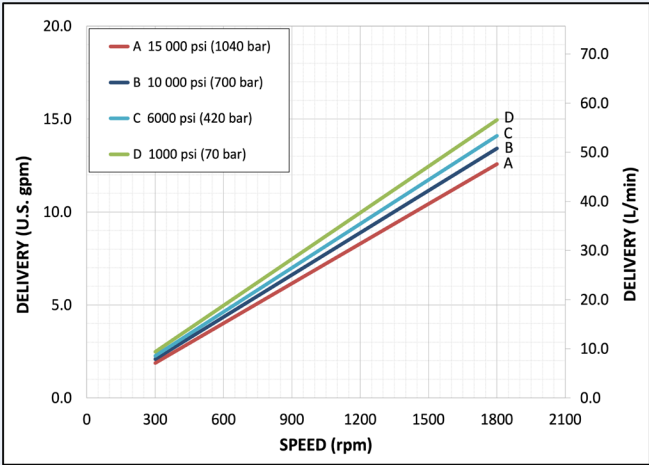


Typical Performance Curves^①

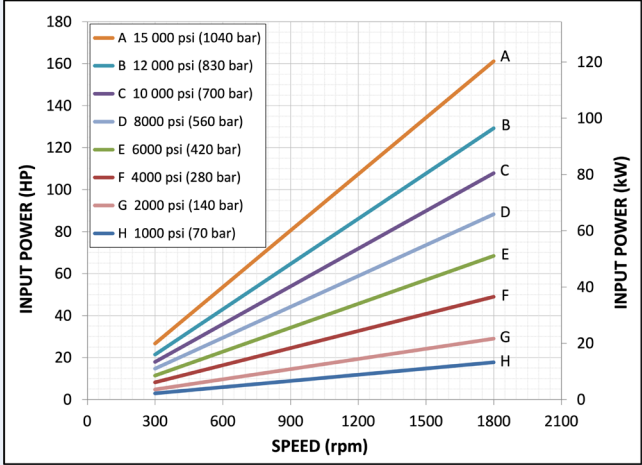
PF6020 Input Power



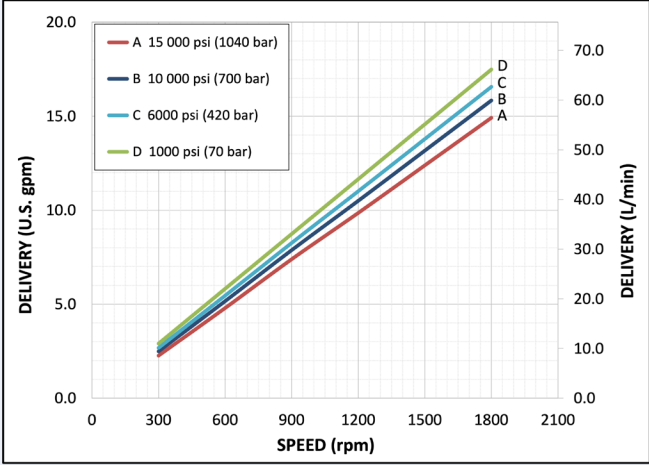
PF6020 Delivery



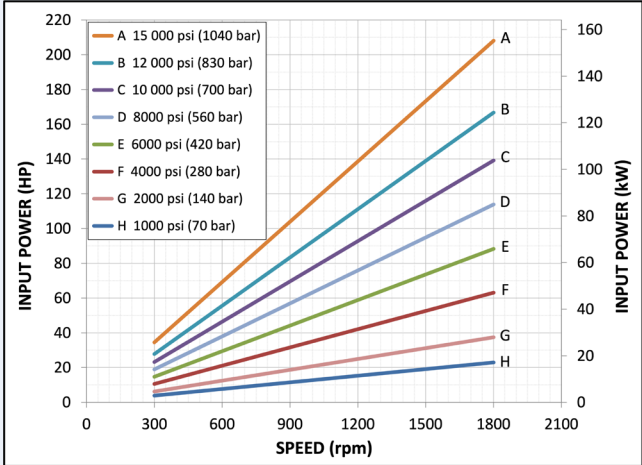
PF6024 Input Power



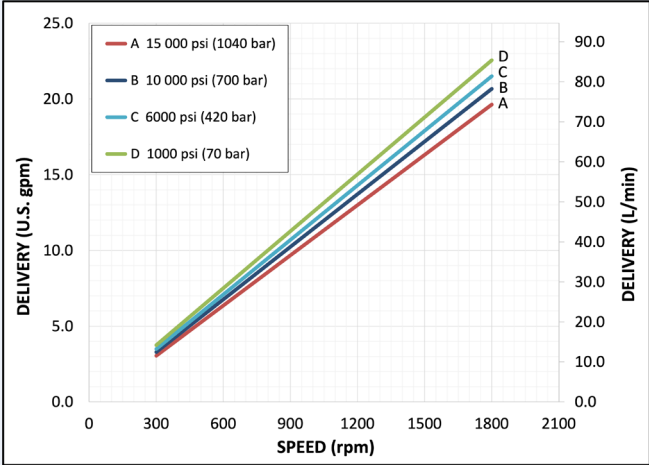
PF6024 Delivery



PF6030 Input Power



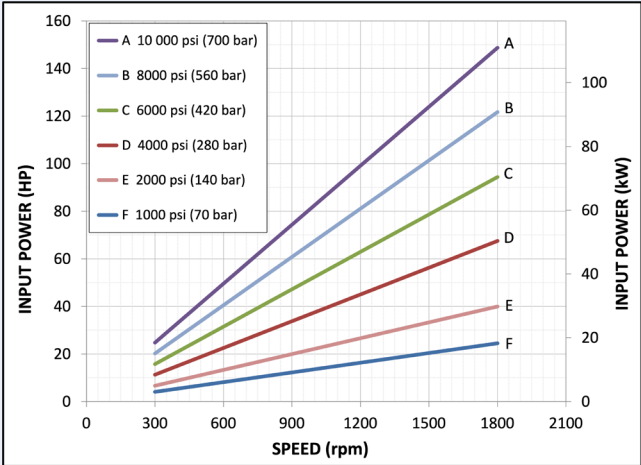
PF6030 Delivery



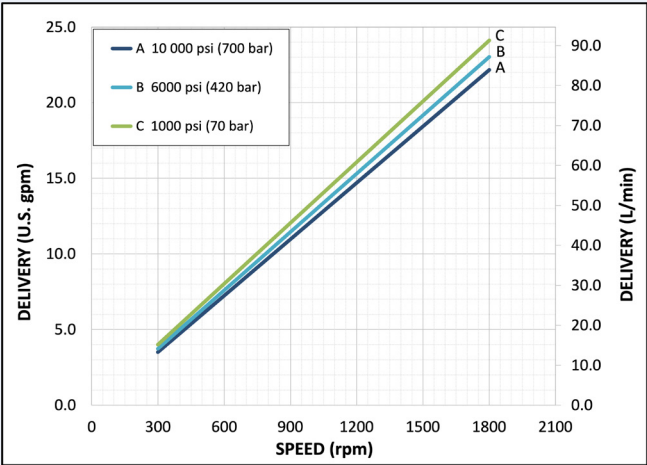
① Curves valid only when minimum inlet condition is met, and for most fluids at 100 SUS (20 cSt). Refer to "Minimum Inlet Conditions" table on page 2.

Typical Performance Curves^①

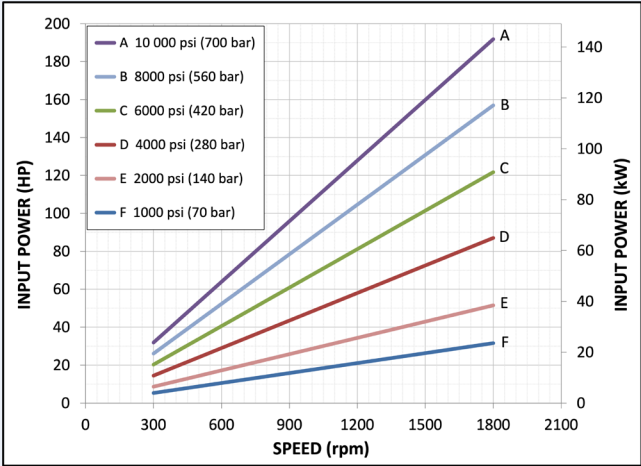
PF6033 Input Power



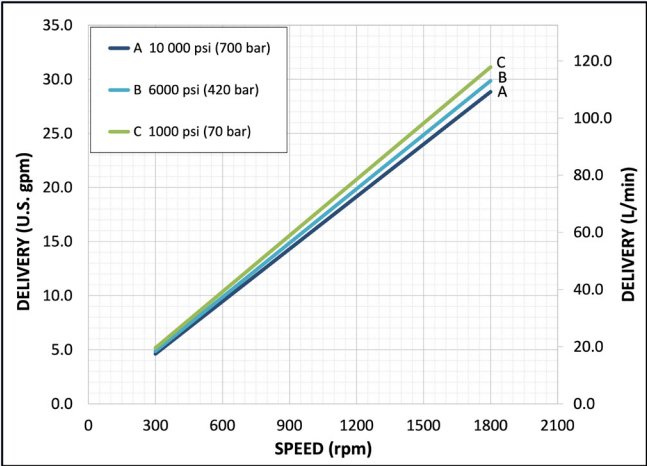
PF6033 Delivery



PF6042 Input Power



PF6042 Delivery



① Curves valid only when minimum inlet condition is met, and for most fluids at 100 SUS (20 cSt). Refer to "Minimum Inlet Conditions" table on page 2.

TYPICAL MODEL CODE

PF60

20

H – S

XV

A

–

44

–

10

Pump Type	
PF60	Fixed Displacement Checkball Pump

Output Flow (At 1800 rpm, at Rated Pressure) ^①	
20	Standard: 14.1 gpm (53,4 L/min) "H" option: 13.4 gpm (50,7 L/min)
24	Standard: 16.6 gpm (62,8 L/min) "H" option: 15.9 gpm (60,2 L/min)
30	Standard: 21.6 gpm (81,8 L/min) "H" option: 20.7 gpm (78,3 L/min)
33	Standard: 22.9 gpm (86,7 L/min) "H" option: 22.5 gpm (85,2 L/min)
42	Standard: 29.8 gpm (112,8 L/min) "H" option: 29.2 gpm (110,5 L/min)
^① Refer to performance curves for flows at other pressures and speeds.	

Operating Pressure	
No Code	Standard Pressure
H	High Pressure ^①
^① Requires "A" or "B" port option.	

Drive Shaft	
No Code	Keyed, 1.75 inch (44,44 mm) diameter
S	SAE Spline, 1.748/1.747 inch (44,39/44,37mm) diameter standard SAE 13-Tooth, 8/16 DP 30° involute Spline.

Seals	
XV	All Fluorocarbon (Viton® or Fluorel®) with High Pressure Shaft Seal
XD	Fluorocarbon (Viton® or Fluorel®) with Polyurethane (Disogrin®) o-rings in the cover and High Pressure Shaft Seal
XE	All EPR (Ethylene Propylene Rubber) with High Pressure Shaft Seal

Design Number

Split-Flow® Options PF6020, 24, 30	
No Code	Full flow from single outlet, eight-piston output
Reduced Flow Models:	
4	Four-piston output + four inactive pistons
Split-Flow® Cover Models:	
44	Four-piston output + four-piston output
4X2	Four ports, each with two-piston output
8X	Eight axial ports, each with one-piston output

Split-Flow® Options PF6033, 42	
No Code	Full flow from single outlet, ten-piston output
Reduced Flow Models:	
5	Five-piston output + five inactive pistons
Split-Flow® Cover Models:	
55	Five-piston output + five-piston output
5X2	Five ports, each with two-piston output
10X	Ten axial ports, each with one-piston output

Ports ^①	
No Code	Inlet SAE 2-1/2" Code 61 4-Bolt Flange; Outlet No. 12 SAE ^②
A	Inlet SAE 2-1/2" Code 61 4-Bolt Flange; Outlet 1 Medium Pressure Coned and Threaded ^③
B	Inlet SAE 2-1/2" Code 61 4-Bolt Flange; Outlet G 3/4 (BSPP) ^④
^① Full/Half-Flow outlet port sizes shown, see table below for Split-Flow® outlet port sizes.	
^② Not recommended for operation above 8000 psi (560 bar). Contact the fitting manufacturer for the pressure rating of the fitting.	
^③ High pressure port uses medium pressure coned and threaded (Autoclave, Butech, or equivalent).	
^④ Outlet port uses British Standard Pipe Parallel fitting. Not recommended for operation above 10 000 psi (700 bar).	

Split-Flow® Outlet Port Sizes			
No Code	44, 55	4X2, 5X2	8X, 10X
	No. 10 SAE ^②	No. 6 SAE ^②	No. 6 SAE (Axial) ^②
A	3/4 Medium Pressure Coned and Threaded ^③	9/16 Medium ^③	9/16 Medium (Axial) ^③
B	G 5/8 (BSPP) ^④	G 3/8 (BSPP) ^④	G 3/8 (BSPP) (Axial) ^④



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