DYNEX
High Pressure Hydraulics

ENGINEERING SPECIFICATIONS

High Pressure Checkball Piston Pumps

PF1000 SERIES
1.5 to 4.1 gpm (5,7 to 15,5 L/min) at 1800 rpm
6000 to 10000 psi (420 bar to 700 bar)

Fixed displacement, bi-directional PF1000 Series pumps provide reliable high-pressure operation:
Continuous, 6000 psi (420 bar).
Maximum, 10000 psi (700 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 7.

Outlet Port Options

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

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.

Specifications - Keyed Shaft

Pump Models	Output Flow at 1500 rpm①		Output Flow at 1800 rpm①		Rated Pressure		Maximum Pressure②		Speed rpm③	
	U.S. gpm	L/min	U.S. gpm	L/min	psi	bar	psi	bar	Rated	Max.
PF1002-10	1.3	4,9	1.5	5,7	6000	420	8000	560	1800	3600
PF1003-10	1.8	6,8	2.1	7,9	6000	420	8000	560	1800	3600
PF1004-10	2.2	8,3	2.6	9,8	6000	420	8000	560	1800	3600
PF1005-10	2.9	11,0	3.5	13,2	6000	420	8000	560	1800	2800
PF1006-10	3.4	12,9	4.1	15,5	6000	420	8000	560	1800	2800
PF1002H-10	1.3	4,9	1.5	5,7	6000	420	10 000	700	1800	3600
PF1003H-10	1.8	6,6	2.1	7,9	6000	420	10 000	700	1800	3600
PF1004H-10	2.2	8,3	2.6	9,8	6000	420	10 000	700	1800	3600
PF1005H-10	2.9	11,0	3.5	13,2	6000	420	10 000	700	1800	2800
PF1006H-10	3.4	12,9	4.1	15,5	6000	420	10 000	700	1800	2800

① *Output flow based on typical performance at rated pressure (ISO 32 oil at 120° F).*
② *Ratings for keyed shaft only. Refer to "SAE A Spline Shaft" table on page 3 for spline shaft pressure ratings.*
③ *Contact the Sales department for applications requiring operation above rated speed. High speed operation may require a pressurized inlet. Refer to " Minimum Inlet Conditions" table on page 2.*

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

Standard seals are Buna-N (Nitrile). 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 15 psi (1 bar) require a high pressure shaft seal (XE or XV option).

See *Typical Model Code* on page 7 for selecting seal options.

Minimum Inlet Conditions①

Pump Models	Operating Speed							
	1800 rpm		2200 rpm		2800 rpm		3600 rpm	
	psi	bar	psi	bar	psi	bar	psi	bar
PF1002	0	0	0	0	0	0	5	0,4
PF1003 and PF1004	0	0	0	0	5	0,4	10②	0,7②
PF1005 and PF1006	0	0	5	0,4	10②	0,7②	–	–

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 or XV option). Refer to "Typical Model Code" on page 7 for seal options.*

Hydraulic Fluid Viscosity Guidelines①

Operating							
Minimum		Maximum		Start-up②		Optimum Range	
SUS	cSt	SUS	cSt	SUS	cSt	SUS	cSt
59	10	1580	342	1580	342	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.

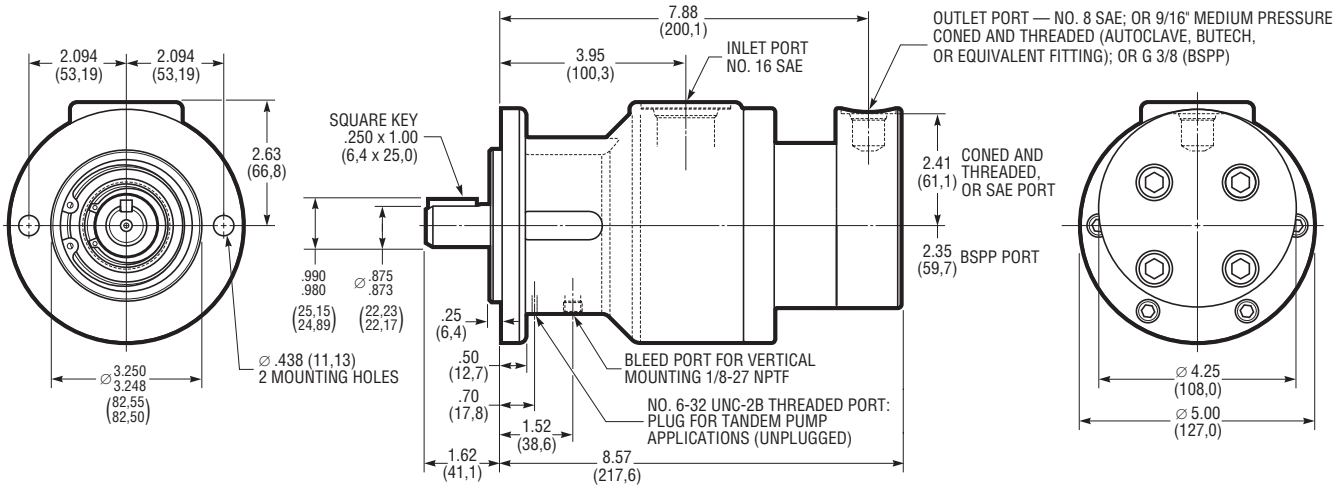
Orientation

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 DRAWING



INSTALLATION

All dimensions are shown in inches (millimeters in parentheses) and are nominal. See *Typical Model Code* on page 7 for selecting port options.

Pilot/Mounting

SAE A 2-bolt pattern with 0.25 inch (6,4 mm) pilot engagement.

Shaft

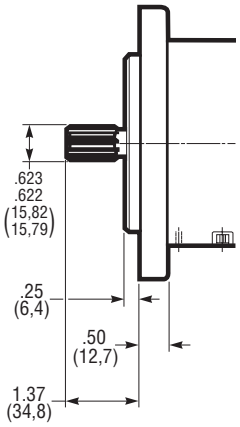
.875 inch (22,2 mm) diameter keyed shaft.

Optional Spline Shaft

.623/.622 inch diameter standard SAE A 9-tooth, 16/32 DP 30° involute spline.

Weight (Mass):

30 lb (13,6 kg).



SAE A Spline Shaft Maximum Pressure

Pump Model	Maximum Pressure	
PF1002-11	10000 psi	700 bar
PF1003-11	10000 psi	700 bar
PF1004-11	8000 psi	560 bar
PF1005-11	6000 psi	420 bar
PF1006-11	5000 psi	350 bar

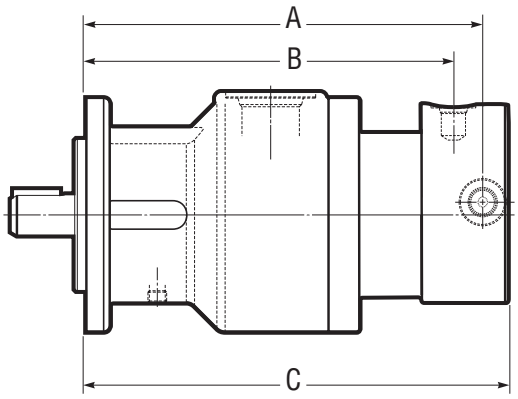
Abbreviations

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

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.



Variable Dimensions and Port Locations

	2+2 SPLIT RADIAL PORTS			3+1 SPLIT RADIAL PORTS			4X SPLIT AXIAL PORTS		
DIM	**SAE**	**C&T**	**BSPP**	**SAE**	**C&T**	**BSPP**	**SAE**	**C&T**	**BSPP**
A	8.50 (216,0)	8.50 (216,0)	8.50 (216,0)	7.88 (200,1)	7.88 (200,1)	7.88 (200,1)	-	-	-
B	7.88 (200,1)	7.88 (200,1)	7.88 (200,1)	7.88 (200,1)	7.88 (200,1)	7.88 (200,1)	-	-	-
C	9.07 (230,3)	9.07 (230,3)	9.07 (230,3)	8.57 (217,6)	8.57 (217,6)	8.57 (217,6)	9.07 (230,3)	9.07 (230,3)	9.07 (230,3)

Abbreviations

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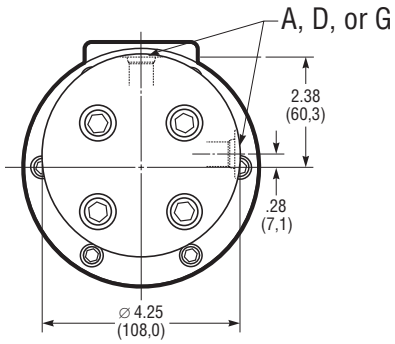
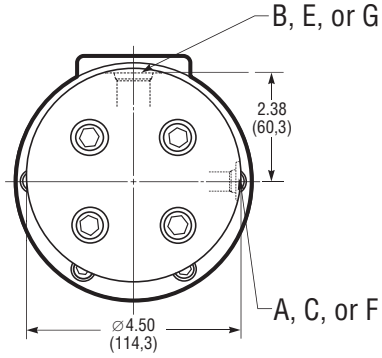
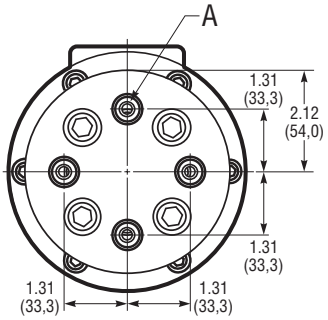


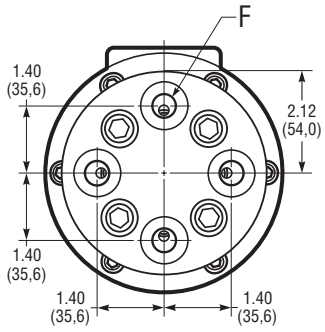
(2+2) Two-pistons output + two-pistons output



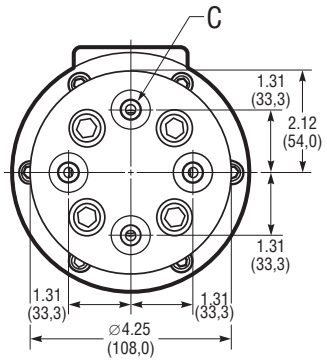
(3+1) Three-pistons output + one-piston output



(4X) Four ports, each with one-piston output C&T Ports



(4X) Four ports, each with one-piston output BSPP Ports



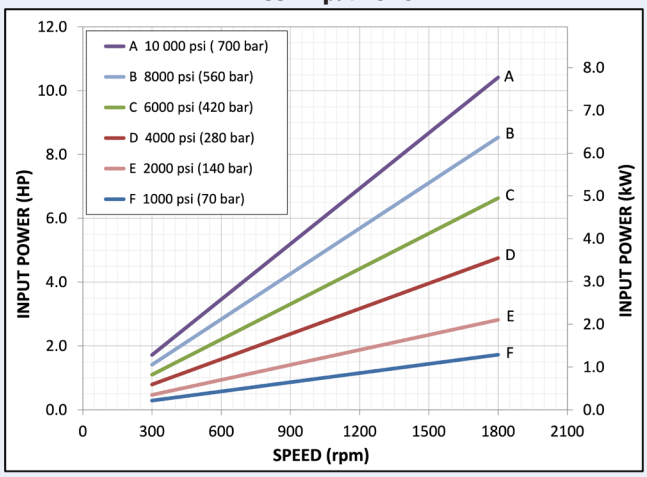
(4X) Four ports, each with one-piston output SAE Ports

Port Options

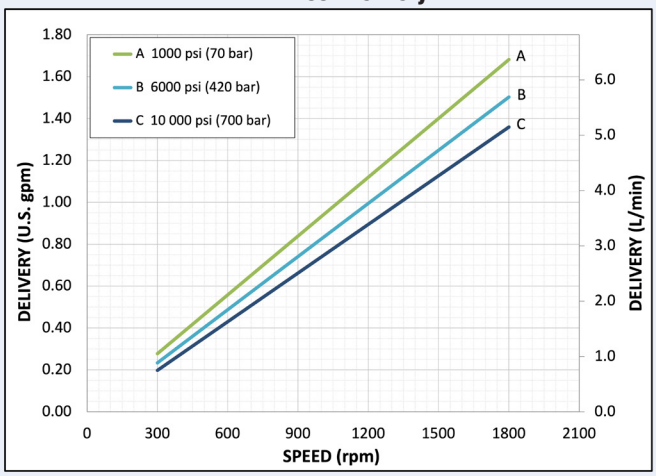
Port	Port Type	Maximum Port Pressure	
A	3/8" Medium Pressure Coned and Threaded (Autoclave, Butech, or equivalent)	10000 psi	700 bar
B	9/16" Medium Pressure Coned and Threaded (Autoclave, Butech, or equivalent)	10000 psi	700 bar
C	SAE No. 4 Straight Thread O-Ring Boss .25 (6) Tube .4375-20 UNF-2B Thread	8000 psi	560 bar
D	SAE No. 6 Straight Thread O-Ring Boss .375 (10) Tube .5625-18 UNF-2B Thread	8000 psi	560 bar
E	SAE No. 8 Straight Thread O-Ring Boss .500 (12) Tube .750-16 UNF-2B Thread	8000 psi	560 bar
F	G 1/4 1/4-19 BSPP Thread	10000 psi	700 bar
G	G 3/8 3/8-19 BSPP Thread	10000 psi	700 bar

Typical Performance Curves①

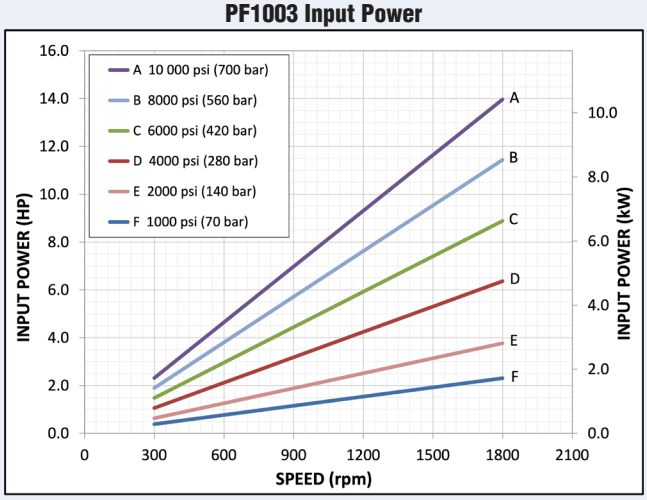
PF1002 Input Power



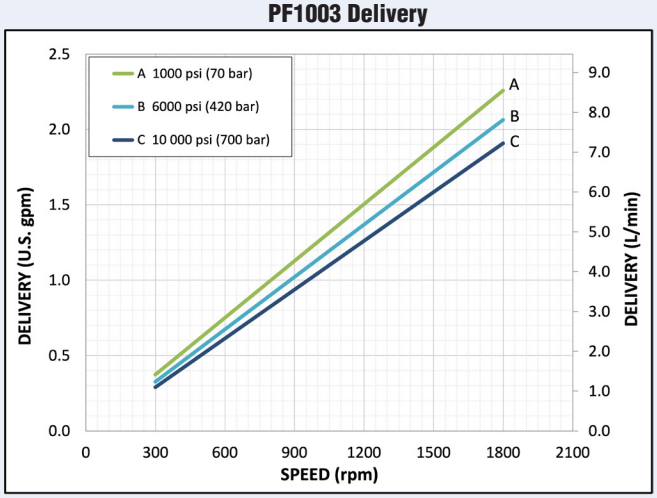
PF1002 Delivery



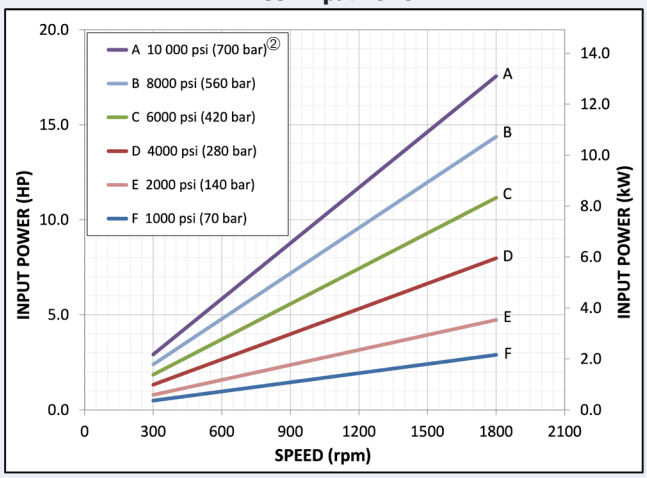
PF1003 Input Power



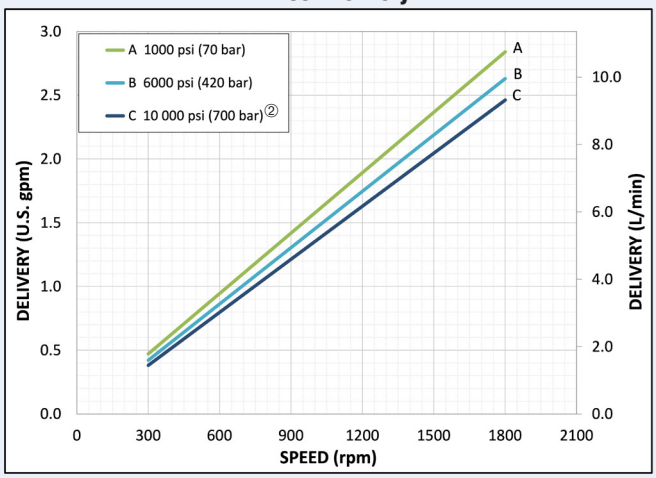
PF1003 Delivery



PF1004 Input Power



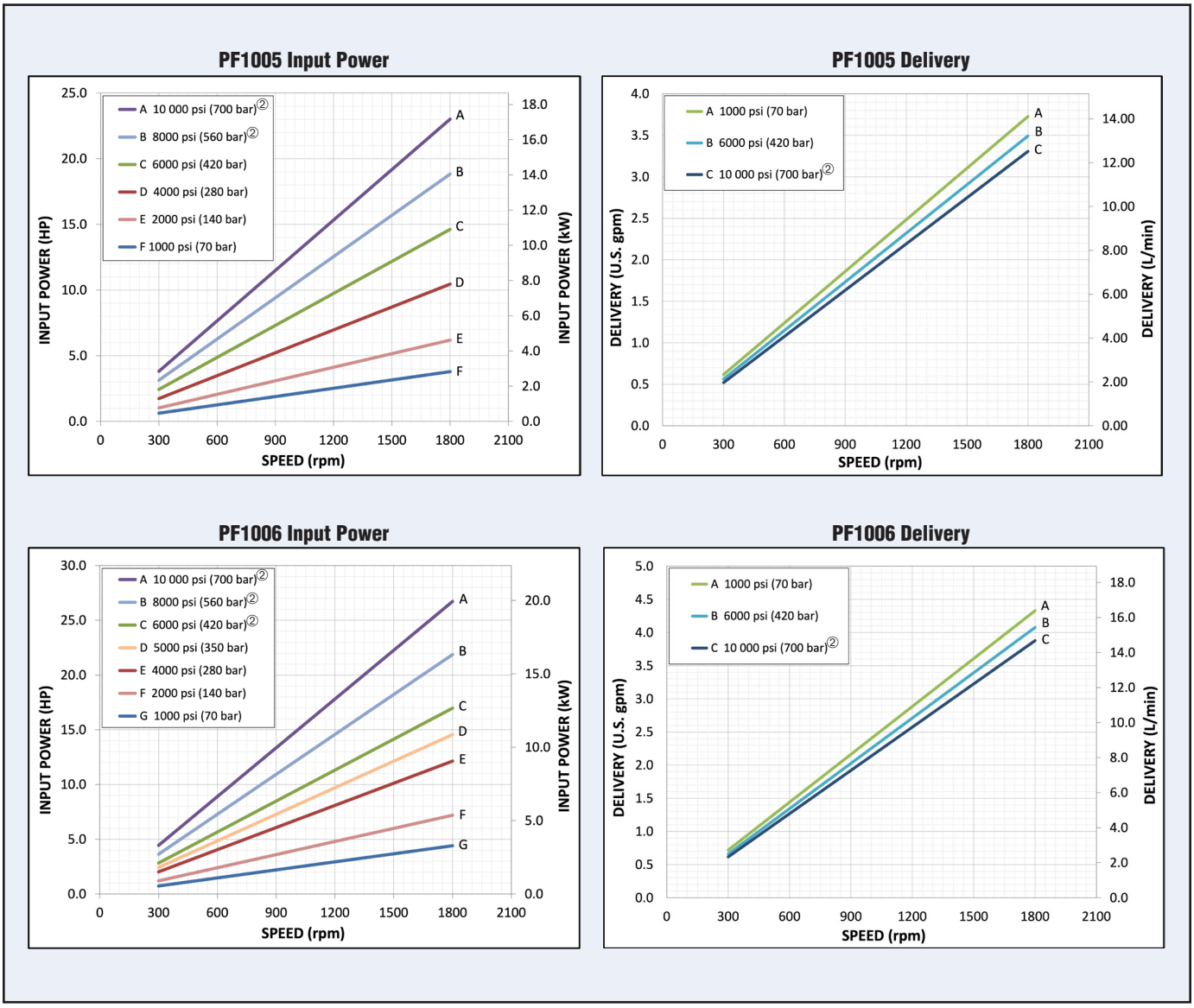
PF1004 Delivery



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.*

② *Keyed shaft option only. Refer to "SAE A Spline Shaft" table on page 3 for spline shaft pressure ratings.*

Typical Performance Curves①



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.*
② *Keyed shaft option only. Refer to "SAE A Spline Shaft" table on page 3 for spline shaft pressure ratings.*

TYPICAL MODEL CODE

PF10 02 H – S XV A – 22 – 1 0

Pump Type	
PF10	Fixed Displacement Checkball Pump

Output Flow (At 1800 rpm, at Rated Pressure)①	
02	1.5 gpm (5,7 L/min)
03	2.1 gpm (7,9 L/min)
04	2.6 gpm (9,8 L/min)
05	3.5 gpm (13,2 L/min)
06	4.1 gpm (15,5 L/min)

① *Output flows based on typical performance at rated pressure. Refer to performance curves for flows at lower pressures.*

Operating Pressure	
No Code	Standard Pressure
H	High Pressure①

① *Requires "A" or "B" port option.*

Drive Shaft	
No Code	Keyed, 0.875 inch (22,20 mm) diameter
S	SAE A 9-Tooth Spline, .623 inch (15,8 mm) diameter

SAE A Spline Shaft Information

Pump Model	Maximum Pressure	
PF1002-11	10000 psi	700 bar
PF1003-11	10000 psi	700 bar
PF1004-11	8000 psi	560 bar
PF1005-11	6000 psi	420 bar
PF1006-11	5000 psi	350 bar

Split-Flow® Options (4 Piston Pump)①	
No Code	Full flow from single outlet
Split-Flow® Cover Models:	
22	Two-piston output + two-piston output
31	Three-piston output + one-piston output
4X	Four ports, each with one-piston output
2	Half flow (two-piston output)

① *For outlet port sizes, locations and pump cover dimensions, refer to page 4.*

Ports	
No Code	Inlet No.16 SAE; Outlet No. 8 SAE①
A	Inlet No.16 SAE; Outlet 9/16" Medium Pressure Coned and Threaded②
B	Inlet No.16 SAE; Outlet G 3/8 (BSPP)

① *Not recommended for operation above 8000 psi (560 bar). Contact the fitting manufacturer for the pressure rating of the fitting.*
② *High pressure port uses medium pressure coned and threaded (Autoclave, Butech, or equivalent).*

Seals	
No Code	All Buna-N (Nitrile)
D	Standard: Buna-N (Nitrile) with Disogrin® (Polyurethane) o-rings in the cover①
XE	All EPR (Ethylene-Propylene Rubber) with High Pressure Shaft Seal
XV	All Fluorocarbon (Viton® or Fluorel®) with High Pressure Shaft Seal

① *Recommended in high pressure applications above 8000 psi (560 bar).*

Design Number

Modification Number	
0	Keyed
1	SAE A 9-Tooth Spline

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