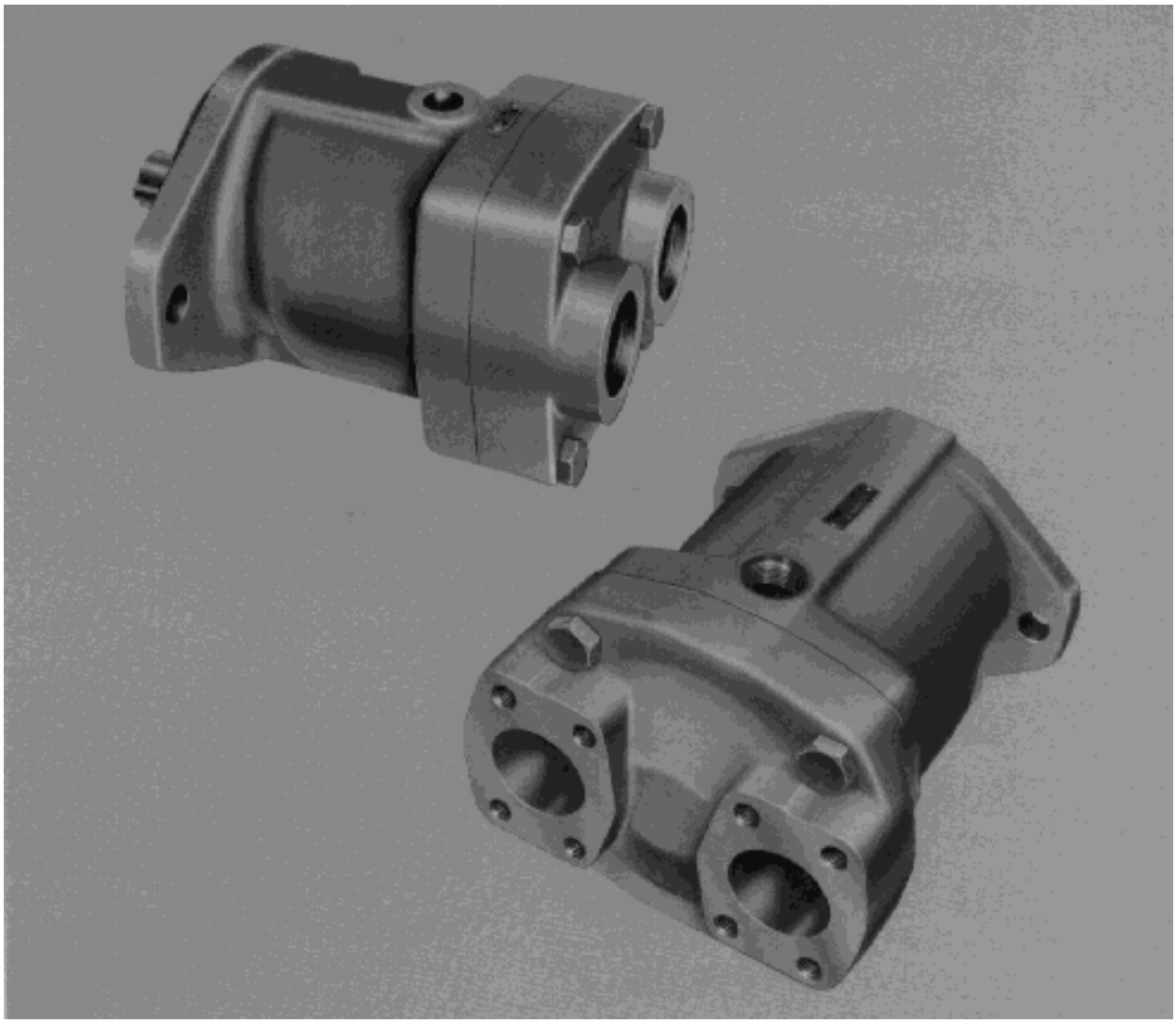
PFB Piston Pumps

Fixed Displacement, Inline Design



Introduction

PFB fixed displacement piston pumps are available in four geometric displacements: 10,5; 21,1; 42,8 and 94,4 cm^3/rev (0.64, 1.29, 2.61 and 5.76 in^3/rev). Depending upon displacement and type of fluid used, maximum speeds are from1200 to 3600 r/min, and maximum operating pressures are from 69 to 210 bar (1000 to 3000 psi). Foot mountings are avaiable for all models.

Features & Benefits

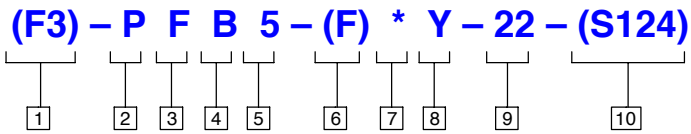
- Advanced design and extensive use of powdered metallurgy permit Vickers to offer inline piston pumps at a substantial weight and cost reduction.
- P FB pumps feature high volumetric and overall efficiencies, and are proven by millions of hours of rugged field service.
- Simplicity of design means fewer parts, which increases reliability and also permits fast, easy field service.
- High speeds, pressures and efficiencies give high power density, resulting in compact pumps that require minimum installed space.
- SAE straight-thread and 4-bolt flange ports use O-ring seals to minimize chance of leakage.

Table of Contents

Model Series	Georetric Displcement cm^3/r (in^3/r)	Maximum Speed r/min	Maximum Pressure bar (psi)	Page
PFB5	10,5 (0.64)	3600	210 (3000)	4
PFB10	21,1 (1.29)	3200	210 (3000)	7
PFB20	42,8 (2.61)	2400	172 (2500)	10
PFB45	94,4 (5.76)	2200	210 (3000)	13
	Foot Bracket			16
	Hydrauic Fluids			17
	Seals			17
	Installation and Startup			17
	Fluid Cleanliness			17
	Applications Guide			17
	Service Information			17

PFB5 Model Series 1

Model Code



1 Special Seals

Omit if not required.

2 Pump

3 Fixed Displacement

4 Inline Design Series

5 Delivery Rating (at 1800 r/min)

5 – 18,9 l/min (5 USgpm)

6 Mounting

Blank – Flange mounting. (Standard)
F – Foot bracket mounting. (Optional)
For separate foot bracket kit, order model FB-A-10.

See page 16 for foot bracket

7 Rotation (viewed from shaft end)

R – Right hand (clockwise)
L – Left hand (counterclockwise)
U – Either direction

8 Shaft

Y – Standard keyed shaft.
Omit for splined shaft. See suffix.

9 Design Number

Subject to change. Installation dimensions are the same for designs 20 through 29.

10 Special Suffix

S30 – Add only for vertical mount with shaft up.
S124– Add only for SAE “A” size shaft with 9 tooth, 16/32 DP spline.

Specifications

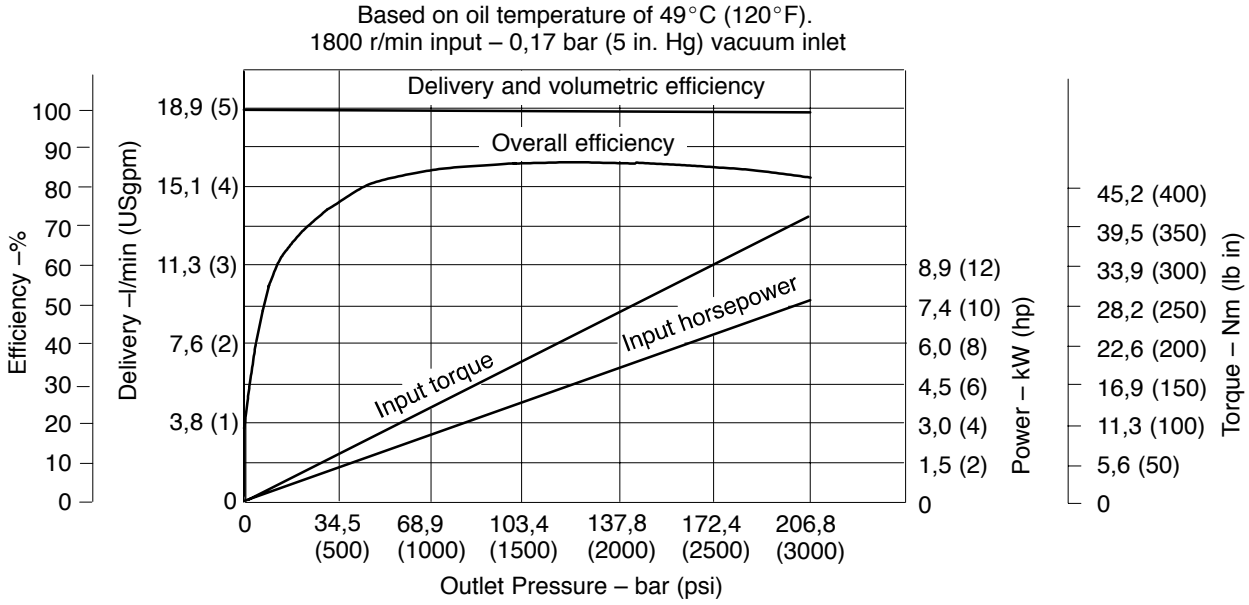
Fluid	Theoretical Delivery at Max. Speed l/min (USGpm)	Max. Speed r/min	Maximum Pressure bar (psi)	Max. Input Power kW (hp)	Minimum Inlet Pressure at 1800 r/min with 21 cSt (100 SUS) fluid †	Maximum Operating Temperature	Percent of expected life (by fluid type)
Petroleum Oil	37,8 (10)	3600	210 (3000)	13,0 (17.5)	0,83 bar (12 psia)	65°C (150°F)	100 %
Synthetic Phosphate Ester ‡	18,9 (5)	1800	172 (2500)	5,4 (7.3)	0,83 bar (12 psia)	54°C (130°F)	75 -100%
Synthetic Polyol Ester	18,9 (5)	1800	172 (2500)	5,4 (7.3)	0,83 bar (12 psia)	54°C (130°F)	75 -100%
Invert Emulsion (water-in-oil)	18,9 (5)	1800	172 (2500)	5,4 (7.3)	0,90 bar (13 psia)	54°C (130°F)	70 - 80%
Water Glycol	18,9 (5)	1800	172 (2500)	5,$ (7.3)	0,90 bar (13 psia)	54°C (130°F)	70 - 80%
High Water Base Fluid (oil-in-water)	15,9 (4.2)	1500	69 (1000)	1,7 (2.5)	0,83 bar (12 psia)	54°C (130°F)	40-60%

† See curve, page 5, and fluid and temperature recommendations sheet 694.
‡ F3 seals required (See model code.)

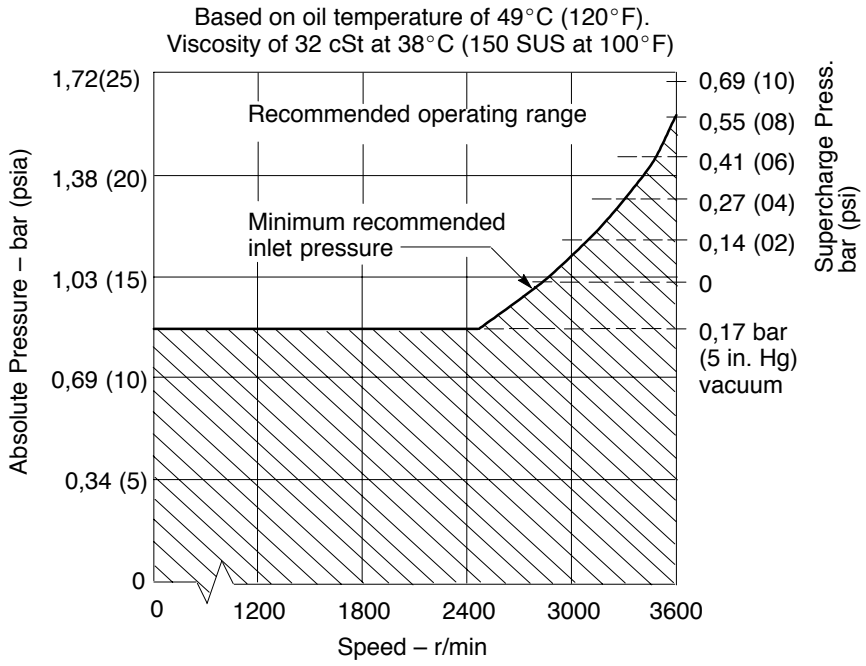
Geometric Displacement:
10,5 cm^3/r (0.64 in^3/r)
Maximum Case Pressure:
0,34 bar (5 psi)
Weight:
Flange mounting – 5,0 kg (11 lb);
Foot mounting – 6,8 kg (15 lb).

PFB5 Model Series 2

Performance Characteristics

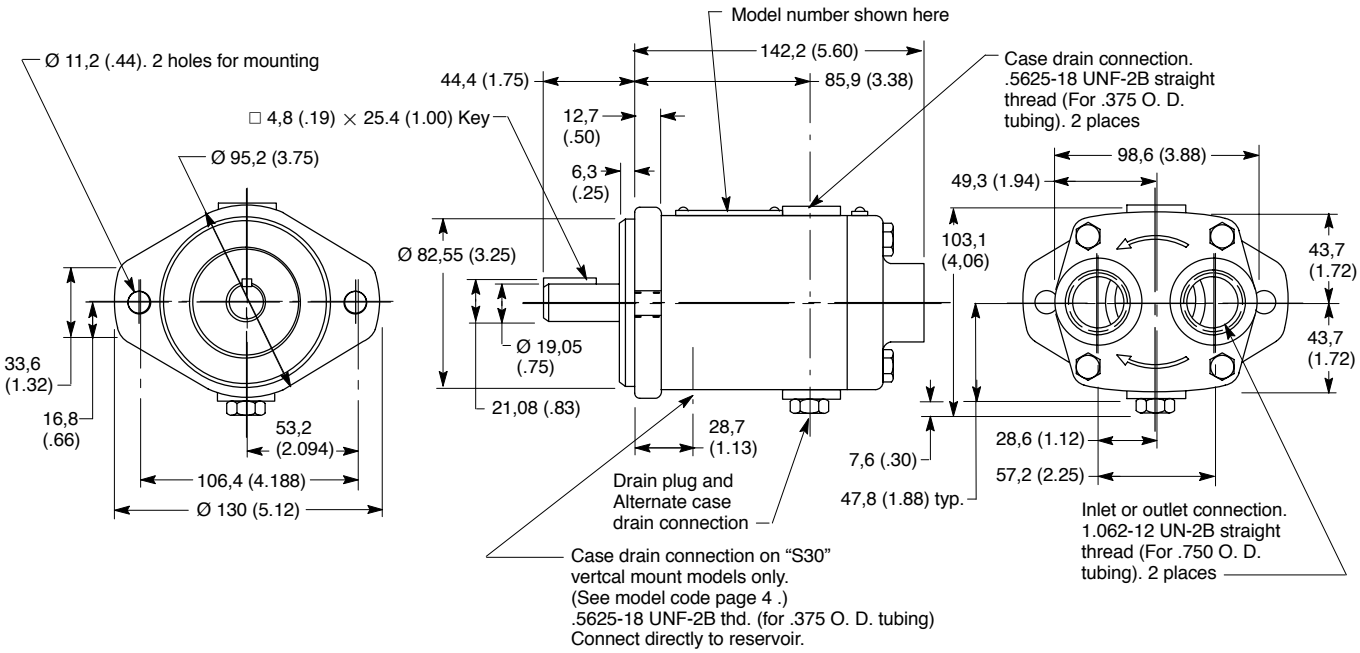


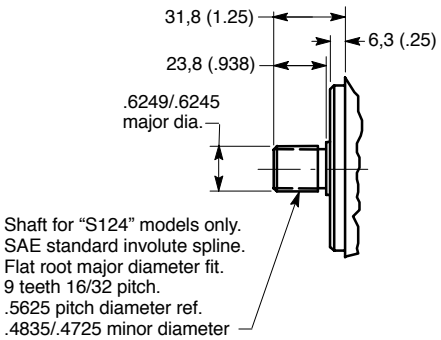
Inlet Pressure Requirements



PFB5 Model Series

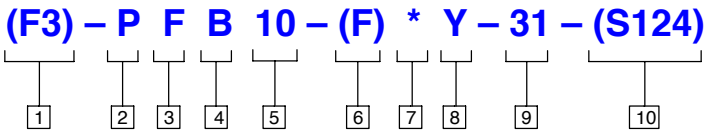
Dimensions
Millimeters (inches)





PFB10 Model Series 3

Model Code



1 Special Seals

Omit if not required.

2 Pump

3 Fixed Displacement

4 Inline Design Series

5 Delivery Rating (at 1800 r/min)

10 – 37,8 l/min (10 USgpm)

6 Mounting

Blank – Flange mounting. (Standard)
F – Foot bracket mounting. (Optional)
(For separate foot bracket kit, order model FB-B-10.

See page 16 for foot bracket

7 Rotation (viewed from shaft end)

R – Right hand (clockwise)
L – Left hand (counterclockwise)

8 Shaft

Y – Standard keyed shaft.
Omit for short shaft with key, or for splined shaft. See model code suffix.

9 Design Number

Subject to change. Installation dimensions are the same for designs 30 through 39.

10 Special Suffix

S30 – Add only for vertical mount with shaft up
S124 – Add only for SAE "B" size shaft with 13 tooth, 16/32 DP spline.

Specifications

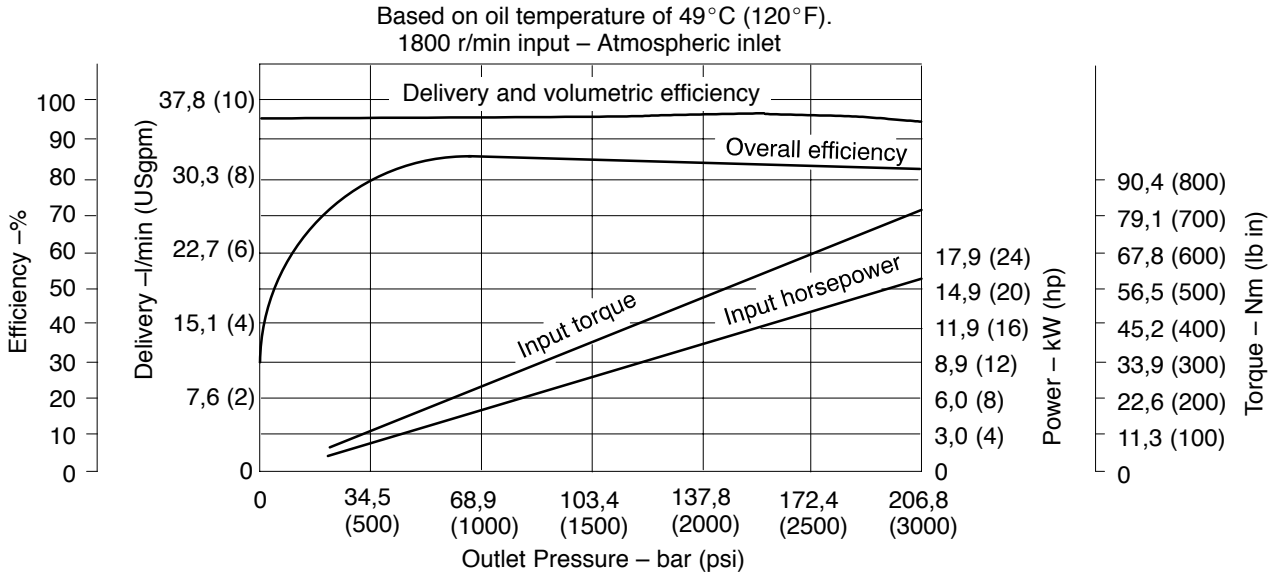
Fluid	Theoretical Delivery at Max. Speed l/min (USgpm)	Maximum Speed r/min	Maximum Pressure bar (psi)	Max. Input Power kW (hp)	Minimum Inlet Pressure	Maximum Operating Temperature	Expected Life (by fluid type)
Petroleum Oil	68,1 (18)	3200	210 (3000)	26,1 (35)	See curve, pg. 6	65°C (150°F)	100 %
Synthetic Phosphate Ester †	37,8 (10)	1800	172 (2500)	12,7 (17)	0,17 bar (5 in. Hg) vac	54°C (130°F)	75 -100%
Synthetic Polyol Ester	37,8 (10)	1800	172 (2500)	12,7 (17)	0,17 bar (5 in. Hg) vac	54°C (130°F)	75 -100%
Invert Emulsion (water-in-oil)	37,8 (10)	1800	172 (2500)	12,7 (17)	0,10 bar (3 in. Hg) vac	54°C (130°F)	70 - 80%
Water Glycol	37,8 (10)	1800	172 (2500)	12,7 (17)	0,10 bar (3 in. Hg) vac	54°C (130°F)	70 - 80%
High Water Base Fluid (oil-in-water)	25,3 (6.7)	1200	69 (1000)	3,3 (4.4)	0 bar (0 psig)	49°C (120°F)	40 - 60%
	37,8 (10)	1800	69 (1000)	5,0 (6.7)	0,55 bar (8 psig)	49°C (120°F)	40 - 60%

† F3 seals required (See model code).

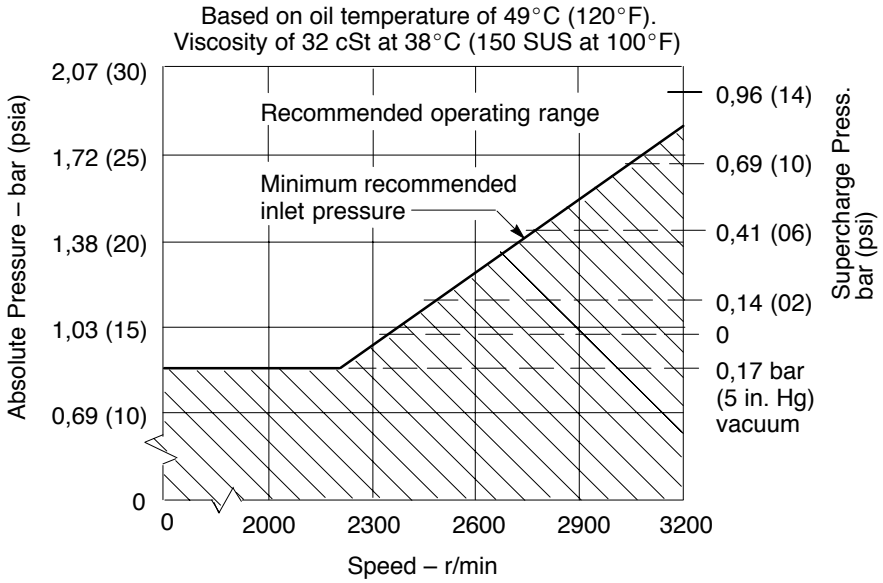
Geometric Displacement:
21,1 cm^3/r (1.29 in^3/r)
Maximum Case Pressure:
0,69 bar (10 psi)
Weight:
Flange mounting – 9,5 kg (21lb)
Foot mounting –11,8 kg (26 lb).

PFB10 Model Series

Performance Characteristics

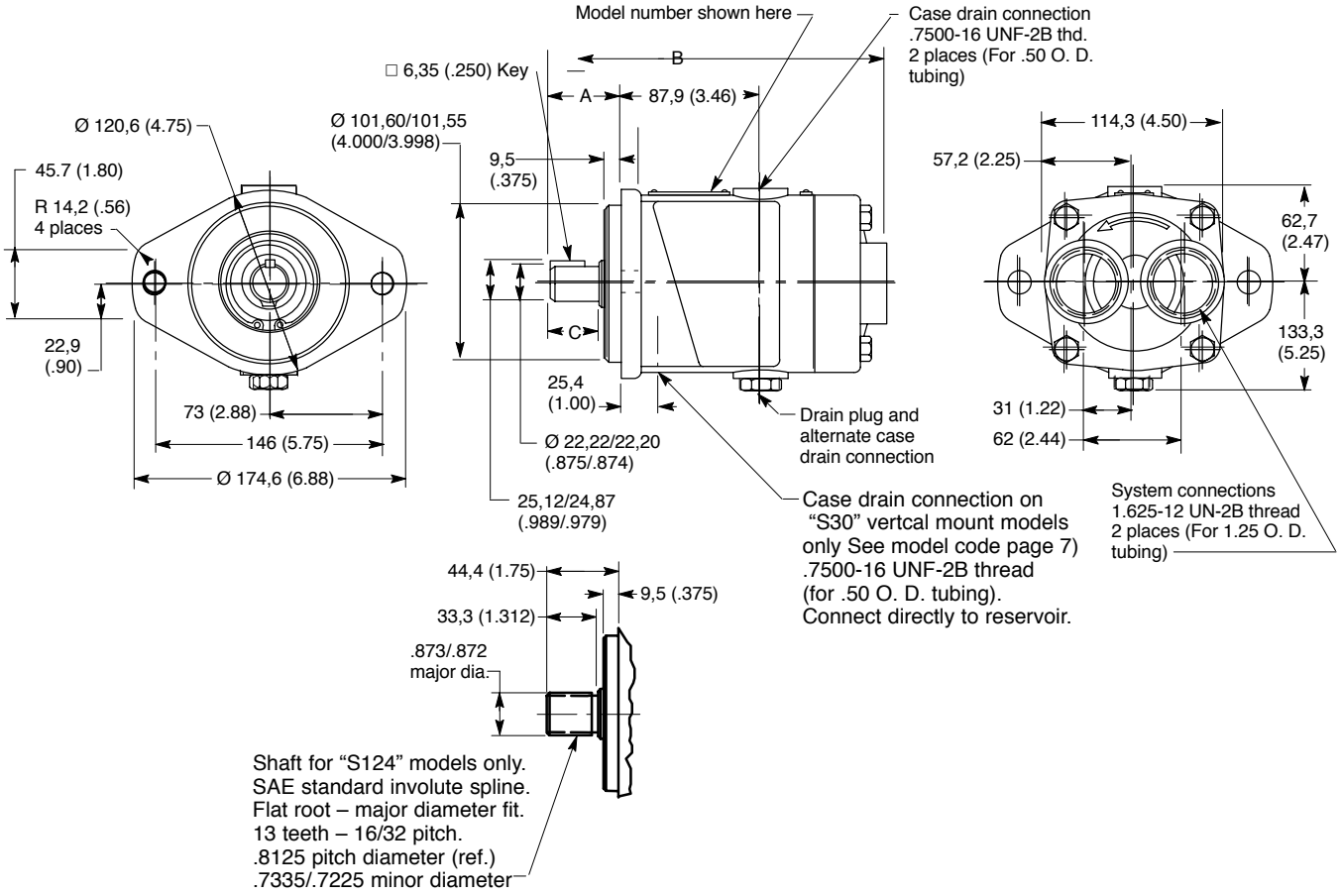


Inlet Pressure Requirements



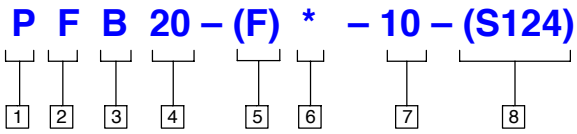
Dimensions
Millimeters (inches)

Shaft Type	A	B	C
Std. (Code Y)	58,7 (2.31)	228,1 (8.98)	47,6 (1.874)
Short	44,4 (1.75)	213,9 (8.42)	33,3 (1.312)



PFB20 Model Series 4

Model Code



1 Pump

2 Fixed Displacement

3 Inline Design Series

4 Delivery Rating (at 1800 r/min)

20 – 75,7 l/min (20 USgpm)

5 Mounting

Blank – Flange mounting. (Standard)
F – Foot bracket mounting. (Optional)
(For separate foot bracket kit, order model FB-B-10.)

See page 16 for foot bracket

6 Rotation (viewed from shaft end)

R – Right hand (clockwise)
L – Left hand (counterclockwise)

7 Design Number

Subject to change. Installation dimensions are the same for designs 10 through 19.

8 Special Suffix

S124 – Add only for SAE “C” size shaft with 14 tooth, 12/24 DP spline.

Specifications

Fluid	Theoretical Delivery at Max. Speed l/min (USgpm)	Max. Speed r/min	Maximum Pressure bar (psi)	Maximum Input Power kW (hp)	Minimum Inlet Pressure	Maximum Operating Temperature	Percent of expected life (by fluid type)
Petroleum Oil	102 (27)	2400	172 (2500)	29.4 (39.5)	0,48 bar (7 psi)	65° C (150° F)	100%
Invert Emulsion (water-in-oil)	75,7 (20)	1800	172 (2500)	22,1 (29.6)	0,10 bar (3 in. Hg)	54° C (130° F)	70 - 80%
Water Glycol	75,7 (20)	1800	172 (2500)	22,1 (29.6)	0,10 bar (3 in. Hg)	54° C (130° F)	70 - 80%
High Water Base Fluid (oil-in-water)	64,0 (17)	1500	69 (1000)	7,4 (9.9)	0,69 bar (10 psig)	49° C (120° F)	40 - 60%

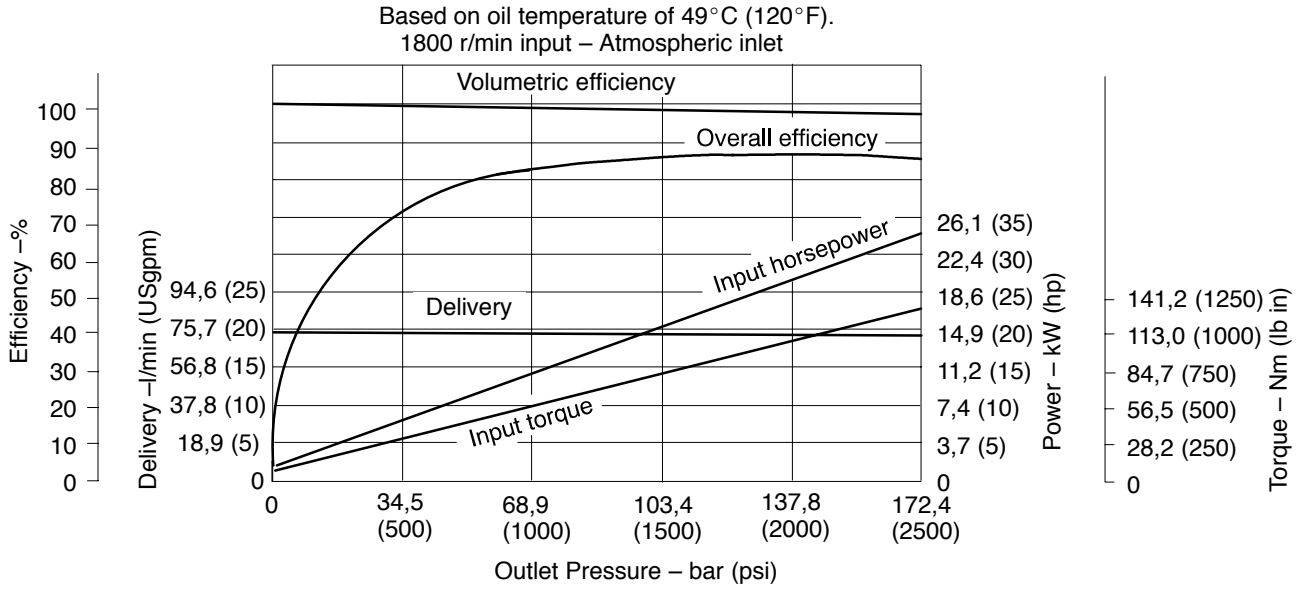
Geometric Displacement:
42,8 cm^3/r (2.61 in^3/r)

Maximum Case Pressure:
0,34 bar (5 psi)

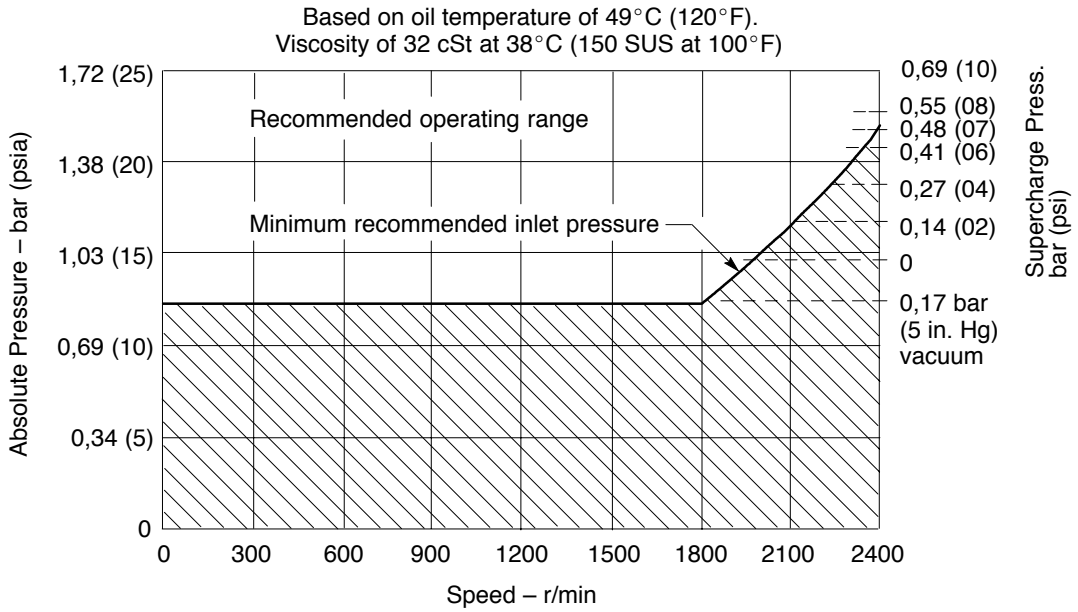
Weight:
Flange mounting –18,6 kg (41lb)
Foot mounting – 20,9 kg (46 lb).

PFB20 Model Series

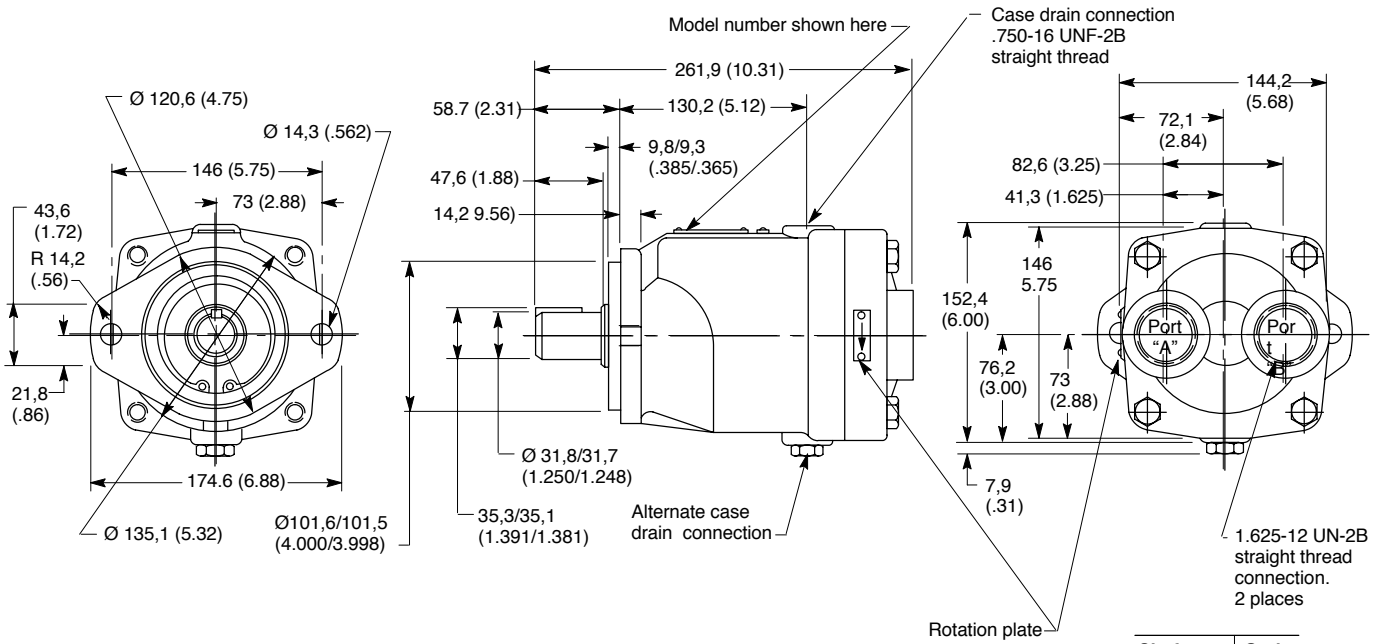
Performance Characteristics



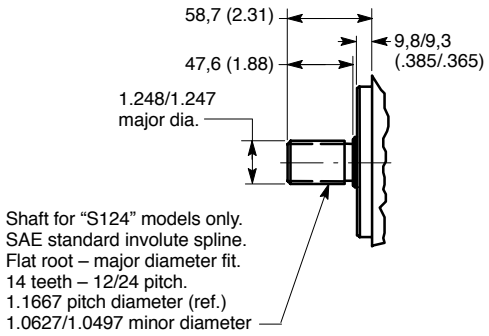
Inlet Pressure Requirements



Dimensions
Millimeters (inches)

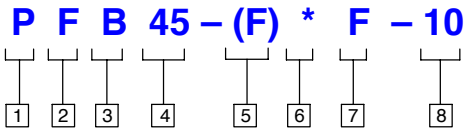


Shaft Rotation	Outlet Port
Right hand	"A"
Left hand	"B"



PFB45 Model Series 5

Model Code



1 Pump

2 Fixed Displacement

3 Inline Design Series

4 Delivery Rating (at 1800 r/min)

45 – 170 l/min (45 USgpm)

5 Mounting

Blank – Flange mounting. (Standard)
F – Foot bracket mounting. (Optioal)
(For separate foot bracket kit, order model FB-C-10.)

See page 16 for foot bracket

6 Rotation (viewed from shaft end)

R – Right hand (clockwise)
L – Left hand (counterclockwise)

7 Port Connections

F – SAE 4-bolt flange

8 Design Number

Subject to change. Installation dimensions are the same for designs 10 through 19.

Specifications

Fluid	Theoretical Delivery at Max. Speed l/min (USgpm)	Max. Speed r/min	Maximum Pressure bar (psi)	Max. Input Power kW (hp)	Minimum Inlet Pressure	Maximum Operating Temperature	Percent of expected life (by fluid type)
Petroleum Oil	208 (55)	2200	210 (3000)	71,7 (96.1)	0,48 bar (7 psi)	65° C (150° F)	100%
Invert Emulsion (water-in-oil)	170 (45)	1800	172 (2500)	48,8 (65.5)	0,10 bar (3 in. Hg)	54° C (130° F)	70 - 80%
Water Glycol	170 (45)	1800	172 (2500)	48,8 (65.5)	0,10 bar (3 In. Hg)	54° C (130° F)	70 - 80%

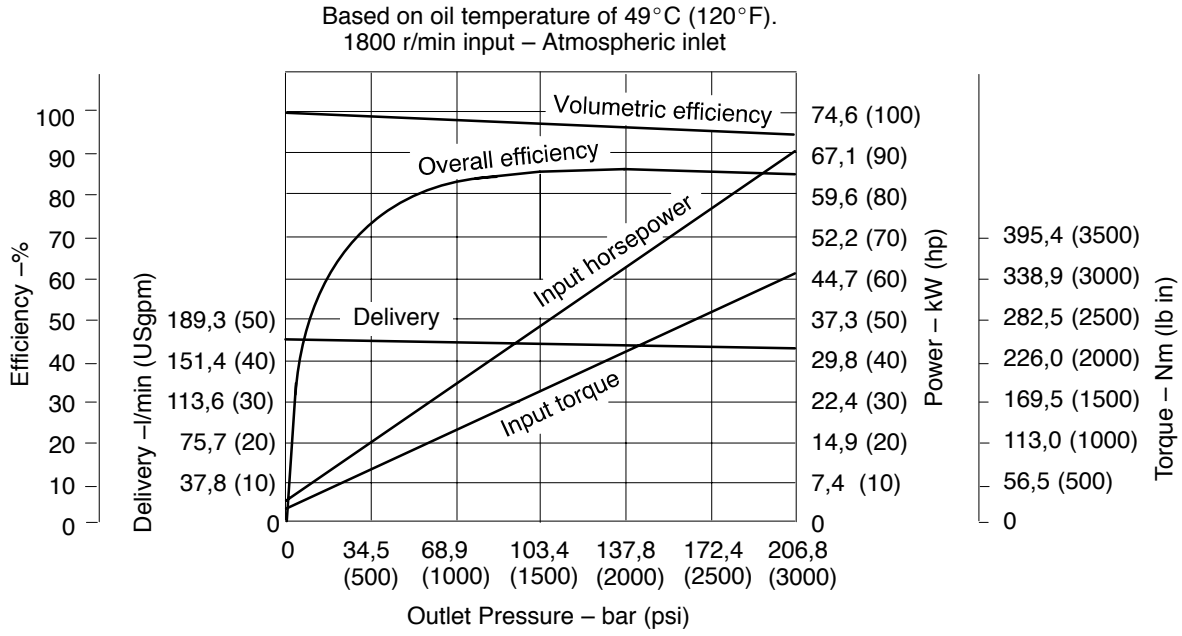
Geometric Displacement:
94,4 cm^3/r (5.76 in^3/r)

Maximum Case Pressure:
0,34 bar (5 psi)

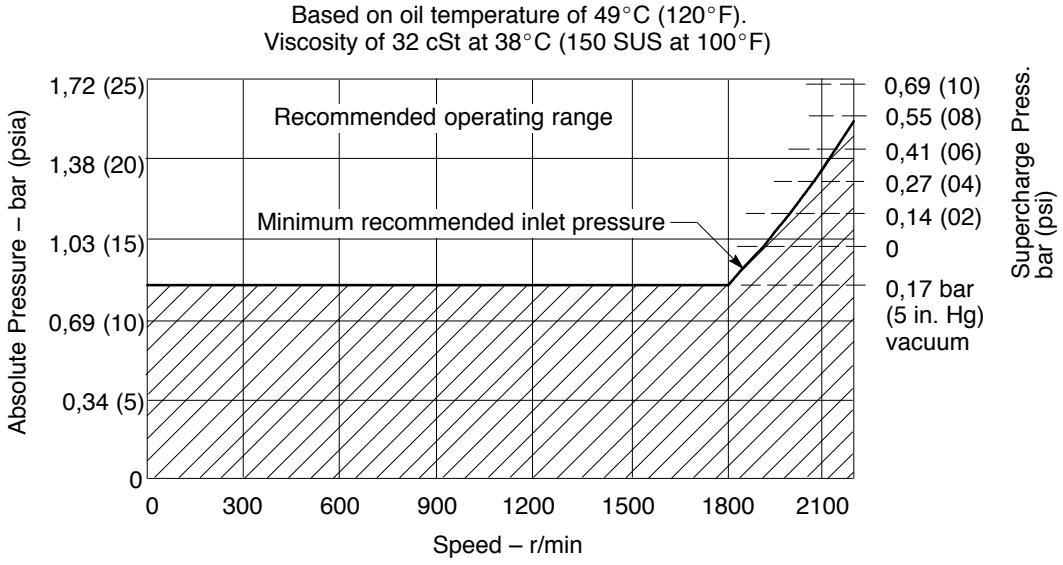
Weight:
Flange mounting – 33,1 kg (73 lb);
Foot mounting – 39,5 kg (87 lb).

PFB45 Model Series

Performance Characteristics

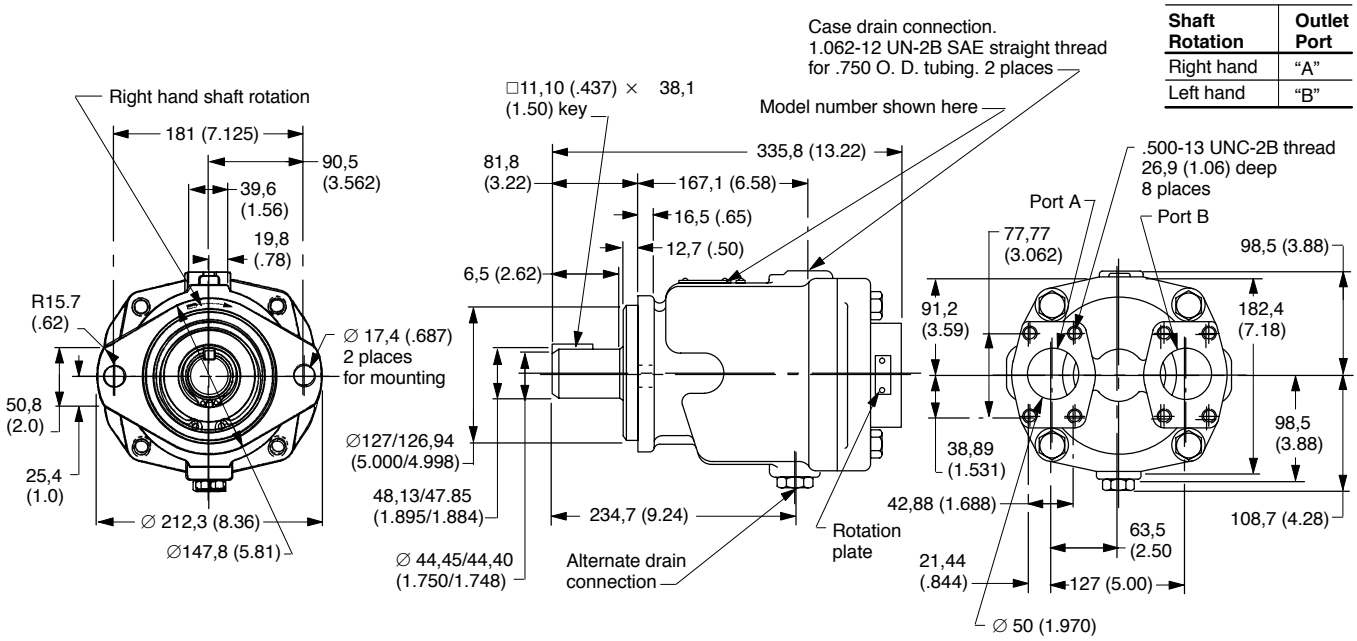


Inlet Pressure Requirements



PFB45 Model Series

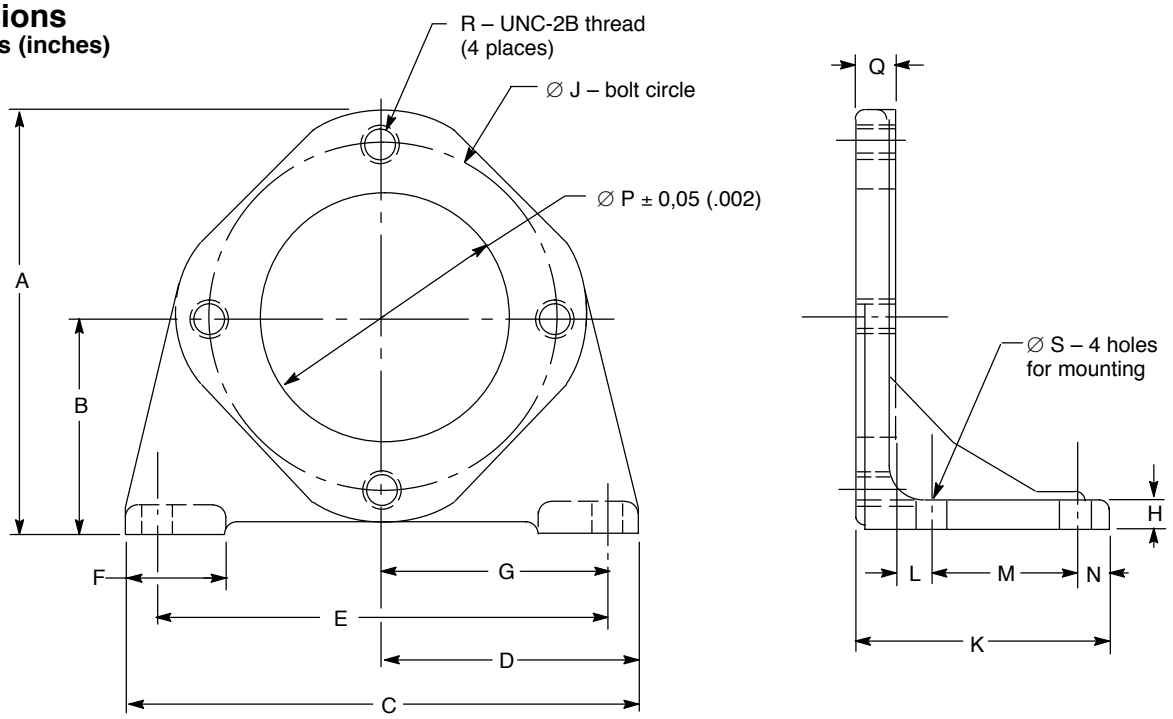
Dimensions
Millimeters (inches)



Shaft Rotation	Outlet Port
Right hand	"A"
Left hand	"B"

Foot Bracket Kit 6

Dimensions
Millimeters (inches)



Note: Each kit includes screws
for mounting pump to bracket.

Model	A	B	C	D	E	F	G	H
FB-A-10	134,9 (5.31)	69,8 (2.75)	152,4 (6.00)	76,2 (3.00)	127,0 (5.00) A	36,6 (1.44)	63,5 (2.50)	12,7 (.50)
FB-B-10	180,8 (7.12)	92,2 (3.63)	171,4 (6.75)	85,7 (3.38)	146,0 5.75)	36,6 (1.44)	73,1 (2.88)	12,7 (.50)
FB-C-10	215,9 (8.50)	109,5 (4.31)	265,2 (10.44)	132,6 (5.22)	234,9 (9.25)	50,8 (2.00)	117,6 (4.63)	15,8 (.62)

Model	∅ J	K	L	M	N	∅ P	Q	R	∅ S
FB-A-10	106,37 (4.188)	96,0 (3.78)	15,0 (.59)	50,8 (2.00)	12,7 (.50)	82,63 (3.253)	17,5 (.69)	.375-16	11,2 (.44)
FB-B-10	146,0 (5.75)	95,7 (3.77)	15,0 (.59)	50,8 (2.00)	12,7 (.50)	101,68 (4.003)	17,3 (.68)	.500-13	11,2 (.44)
FB-C-10	181,1 (7.13)	131,6 (5.18)	19,0 (.75)	76,2 (3.00)	17,3 (.68)	127,1 (5.003)	19,0 (.75)	.625-11	17,3 (.68)

Application and Service Information

Hydraulic fluids

Pumps can be used with anti-wear hydraulic oil, or automotive type crankcase oil (designations SC, SD, SE, SF, or SG) per SAE J183 JUN89. Fire-resistant fluids can also be used, but may require the use of special seals as explained in the following "Seals" section.

The fluid viscosity range with the pump running should be 13-54 cSt (70-250 SUS). An operating temperature of 49°C (120°F) is recommended. For additional fluid and temperature information, refer to Vickers data sheet 694.

Seals

Nitrile seals are standard in Vickers inline pumps. These seals are suitable for use with petroleum, water-glycol, water-in-oil emulsion, polyol ester, and high-water-base fluids. Phosphate ester fluids require the use of fluorocarbon seals, which are identified in applicable model codes by an "F3" prefix.

Installation and Startup

Horizontal mounting is recommended to maintain the necessary case fluid level

Before starting, fill the case with system fluid through the uppermost drain port. The housing must be kept full at all times to provide internal lubrication.

The case drain line must be full size, unrestricted, and connected from the uppermost drain port directly to the reservoir so the housing remains filled with fluid. The line must be piped to prevent siphoning and must terminate below the reservoir fluid level. No other lines are to be connected to this drain line.

At initial startup, it may be necessary to bleed air from the pump outlet to permit priming and reduce noise. Bleed by loosening an outlet connection until a solid stream of fluid appears. An air bleed valve for this purpose is available through your Vickers representative.

Fluid cleanliness

Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of cleanliness, materials and additives for protection against wear of components, elevated viscosity and inclusion of air.

Essential information on the correct methods for treating hydraulic fluid is included in Vickers publication 561; "Vickers Guide to Systemic Contamination Control," available from your local Vickers distributor or by contacting Vickers, Incorporated. Recommendations on filtration and the selection of products to control fluid condition are included in 561.

Recommended cleanliness levels, using petroleum oil under common conditions, are based on the highest fluid pressure levels in the system and are coded in the chart below. Fluids other than petroleum, severe service cycles, or personnel safety considerations are cause for adjustment of these cleanliness codes. See Vickers publication 561 for exact details.

Vickers products, as any components, will operate with apparent satisfaction in fluids with higher cleanliness codes than those described. Other manufacturers will often recommend levels above those specified. Experience has shown, however, that life of any hydraulic components is shortened in fluids with higher cleanliness codes than those listed below. These codes have been proven to provide a long trouble-free service life for the products shown, regardless of the manufacturer.

Application Guidance

To ensure optimum pump performance in conjunction with your specific application, consult your Vickers representative if your:

- Application requires an indirect drive
- Fluid does not meet specifications on data sheet I-286-S
- Mounting attitude is other than horizontal
- Oil viscosity at operating temperature is not within 13-54cSt (70-250 SUS)
- Oil viscosity at startup is in excess of 220 cSt (1000 SUS)
- Needs require application assistance

Service information

Refer to the following drawings for service parts information:

Model Series	Drawing
PFB5	I–3238–S
PFB10	I–3244–S
PFB20	I–3247–S
PFB45	I–3250–S
Overhaul manual	I–3230–S

Cleanliness codes for petroleum oil usage

Product	System Pressure Level		
	< 2000 psi	2000-3000 psi	3000+ psi
Vane pumps, fixed	20/18/15	19/17/14	18/16/13
Vane pumps, variable	18/16/14	17/15/13	
Piston pumps, fixed	19/17/15	18/16/14	17/15/13
Piston pumps, variable	18/16/14	17/15/13	16/14/12
Directional valves	20/18/15	20/18/15	19/17/14
Check valves	20/18/15	20/18/15	20/18/15
Proportional valves	17/15/12	17/15/12	15/13/11
Servo valves	16/14/11	16/14/11	15/13/10
Pressure / Flow controls	19/17/14	19/17/14	19/17/14
Cylinders	20/18/15	20/18/15	20/18/15
Vane motors	20/18/15	19/17/14	18/16/13
Axial piston motors	19/17/14	18/16/13	17/15/12
Radial piston motors	20/18/14	19/17/13	18/16/13