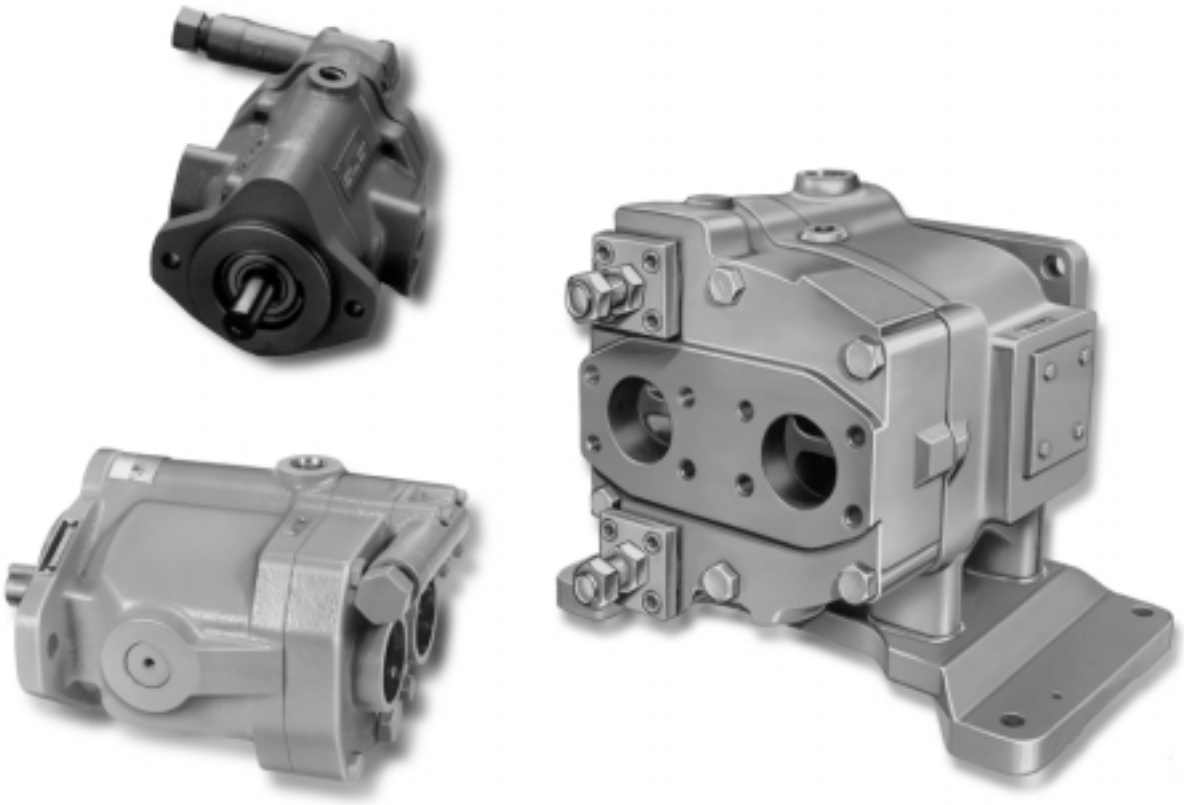
Vickers®

Piston Pumps

Axial Piston Pumps

Fixed and Variable Displacement
PFB 5, PFB 10, PFB 20
PVB 5/6, PVB 10/15, PVB 20/29, PVB 45 and PVB 90 to SAE
PVB 5/6, PVB 10/15, PVB 20/29 to DIN/ISO 3019, Part 2



VICKERS

GB-2379B

Basic Characteristics

Type . . . . . Axial piston pumps
Operating pressure . . . . . up to 210 bar (3000 psi)
Displacement . . . . . 10,5 to 197,5 cm^3/r (0.64 to 12 in^3/r)
Drive speed . . . . . up to 3600 r/min

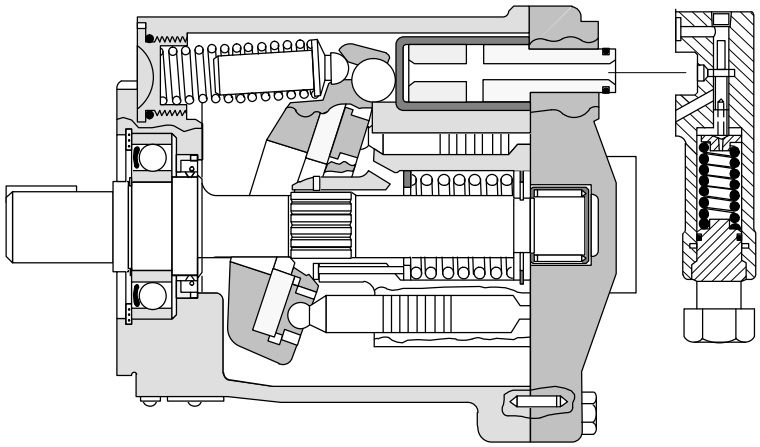
General Description

Both fixed and variable displacement models make up this range of axial piston pumps. Their high performance ratings and efficiencies are achieved with a variety of hydraulic fluids. Fixed displacement models are noted for their volumetric and mechanical efficiencies. Variable displacement models can closely match pressure and/or flow demand with a control selected from:

- Pressure compensator with or without a remote control facility.
- Pressure compensator with adjustable displacement control.
- Load sensing compensator.
- Mechanical (lever) control.
- Handwheel control

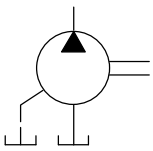
Typical Section

Variable displacement model with compensator control “C” or “CM”



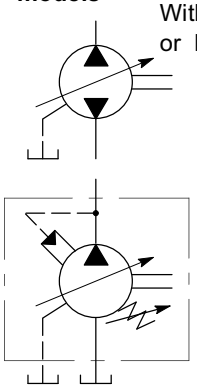
Functional Symbols

PFB
Fixed displacement models

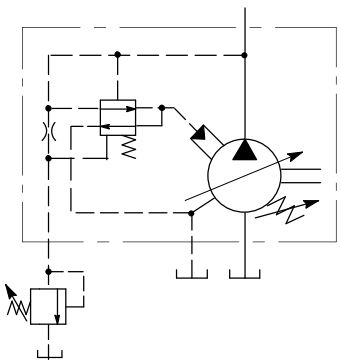


PVB
Variable displacement models

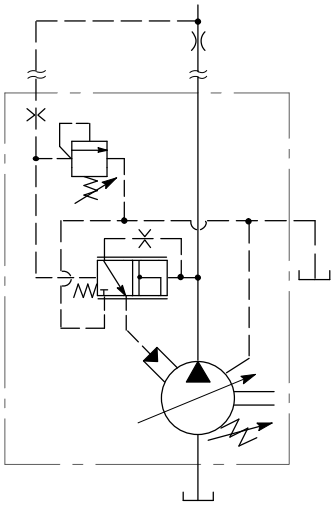
With handwheel, or lever.



With pressure compensator (C or CM) (simplified symbol)



With pressure compensator arranged for remote control C(M)G (detailed symbol)



With CVP load sensing and pressure limiter

Model Codes

P * B ** - (F) - (M) * * (F)(X) (*) - ** - ** - (C) - (G) - (L) - ** - **

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

1 Basic models

F = Fixed displacement type
V = Variable displacement type

2 Displacement

PFB and PVB models:
5 = 10,55 cm^3/r (0.64 in^3/r)
10 = 21,10 cm^3/r (1.29 in^3/r)
20 = 42,80 cm^3/r (2.61 in^3/r)
PVB models only:
6 = 13,81 cm^3/r (0.84 in^3/r)
15 = 33,00 cm^3/r (2.01 in^3/r)
29 = 61,60 cm^3/r (3.76 in^3/r)
45 = 94,50 cm^3/r (5.76 in^3/r)
90 = 197,50 cm^3/r (12.0 in^3/r)

3 Foot mounting option

F = Foot mounting option for PVB45 and PVB90 models.
Omit for flange mounting.
***Note**. For foot mounting brackets. for other models see bottom of page.*

4 Mounting flange

M = Metric, to DIN/ISO 3019, Part 2 and VDMA 24560, Part 1
Omit for SAE mounting flange

5 Shaft rotation

Viewed at shaft end
R = Clockwise
L = Anticlockwise (not avalable for PFB10 and PFB20)

6 Displacement zone

PVB models only.
S = One side of center (pressure compensated models only)
D = Both sides of center (Handwheel and lever controlled models only)
Omit for PFB models.

7 Flanged main ports

F = PVB45 and PVB90 models only.
Omit for P*B5 to 29 inclusive.

8 Thru shaft option

PVB5 to 29 only:
X = Thru shaft (with side entry ports)
Omit for PVB45 and PVB 90, or if not required.

9 Shaft type

N = Metric, to DIN/ISO 3019, Part 2 and VDMA 24560, Part 1
Y = SAE models P*B5 to 15 only.
Omit for 20 thru 90 models

10 Pump design number

10 = PFB20
30 = PFB10
31 = PVB10 and PVB15
20 = all other models

11 Displacement control options

PVB models only.
C = Pressure compensator. Pressure adjustment range:
PVB90: 19 to 210 bar (275 to 3000 psi)
All other models: 17 to 210 bar (250 to 3000 psi)
Also used as prefix for item 12
***Note**. For PVB6, 15 and 29 models, the user must ensure that the max. pressure setting never exceeds 140 or 100 bar (2000 or 1500 psi) dependent on the type of fluid being used.*

CM = Pressure compensator. Option for all sizes except PVB90. Pressure adjustment range:
PVB45: 10 to 100 bar (150 to 1500 psi)
All other sizes: (17 to 100 bar (250 to 1500 psi)
CVP = Load sensing with pressure limiter.

PVB5 to 15 only:
H = Handwheel control
M = Lever control
V = No control (As for "M" type but without lever.)
Omit for PFB models.

12 Maximum displacement adjustment

PVB5 to 29 models only:
C = "C" or "CM"compensator, and with 12
Omit when not required.

13 Pressure compensator variations

PVB5 to 29 models only:
G = Remotely adjustable pressure setting.
Omit when not required.

14 Control location

PVB5 to 15 models with "H", "M" or "V" controls only:
L = Left hand, when viewed at shaft end.
Omit for right hand, or when a pressure compensator is fitted.

15 Control design number

PVB models only.
10 = "H" and "M"controls; also "C" control for PVB90
11 = "C" and "CM" controls.
12 = "CVP" control.
20 = "CG" control.

16 Special design options

For PFB5 and PVB5 to 29 only:.
S.30 = Extra drain port to permit vertical "shaft-up" installation.

For PVB5 to PVB29 pressure compensated models only:
GE1 = 10% minimum displacement. when pressure compensated.

For all models:
GEVS = Pressure setting knob with key lock.

Omit when not required.

Foot bracket mounting kits

Order separately if required. Kits include pump fixing bolts.

Model code	Part number	For pump sizes:
FB-A-10	422582	P*B5/6
FB-B-10	422583	P*B10/15 and PFB20
FB-C-10	422584	PVB20/29

Operating Data

Pressure and Speed Limits

Basic model designation	Geometric dispalcement, cm^3/r (in^3/r)	Maximum shaft speed (r/min)			Maximum outlet pressure, bar (psi)		
		Anti-wear hydraulic oil	Water-in–oil emulsion (40%/60%)	Water-glycol	Anti–wear hydraulic oil	Water glycol	Water-in–oil emulsion (40%/60%)
PFB5	10,55 (0.64)	3600			210 (3000)		
PFB10	21,10 (1.29)	3200	1800	1800	210 (3000)	175 (2500)	175 (2500)
PFB20	42,80 (2.61)	2400			175(2500)		
PVB5	10,55 (0.64)				210 (3000)	140 (2000)	140 (2000)
PVB6	13,81 (0.84)				140 (2000)	100 (1500)	100 (1500)
PVB10	21,10 (1.29)				210 (3000)	140 (2000)	140 (2000)
PVB15	33,00 (2.01)	1800	1800	1800	140 (2000)	100 (1500)	100 (1500)
PVB20	42,80 (2.61)				210 (3000)	140 (2000)	140 (2000)
PVB29	61,60 (3.76)				140 (2000)	100 (1500)	100 (1500)
PVB45	94,50 (5.76)				210 (3000)	140 (2000)	140 (2000)
PVB90	197,50 (12.0)	1800	1200	1200	210 (3000)	140 (2000)	140 (2000)

Maximum Inlet Pressure

All pumps except PVB5/6/10/15 with H, M or V controls . . . . . 1,0 bar (15 psi)
PVB5/6/10/15 with H, M or V controls . . . . . As “Max. outlet pressure” above for appropriate size.

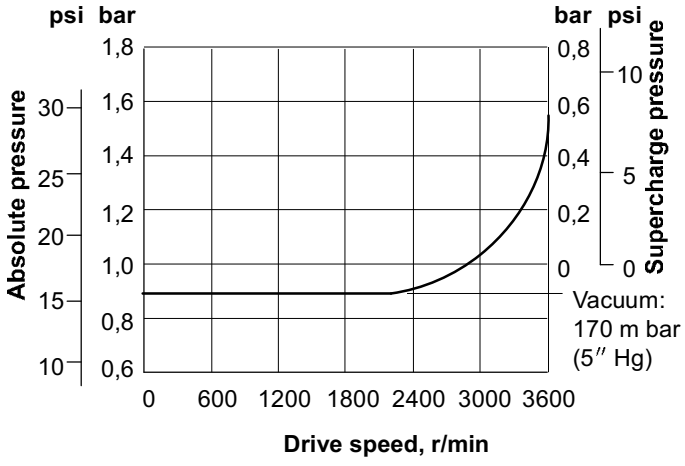
Case Drain Pressure

See “Installation data” section, on page A.33.

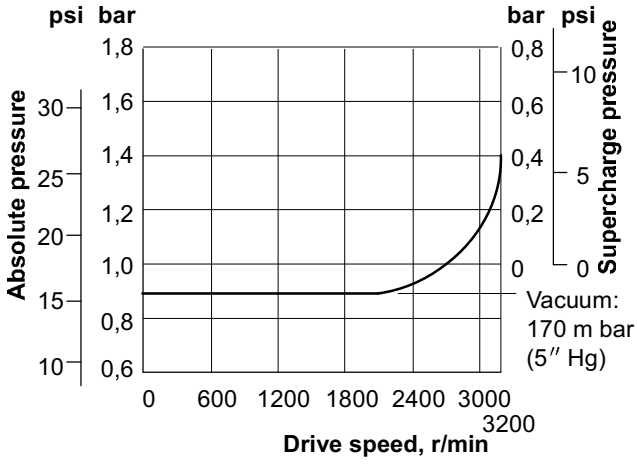
Minimum Inlet Pressure

See following graphs.
Based on oil viscosity of 21 cSt (102 SUS) and at 50°C (120°F).

PFB5 and PVB5



PVB6

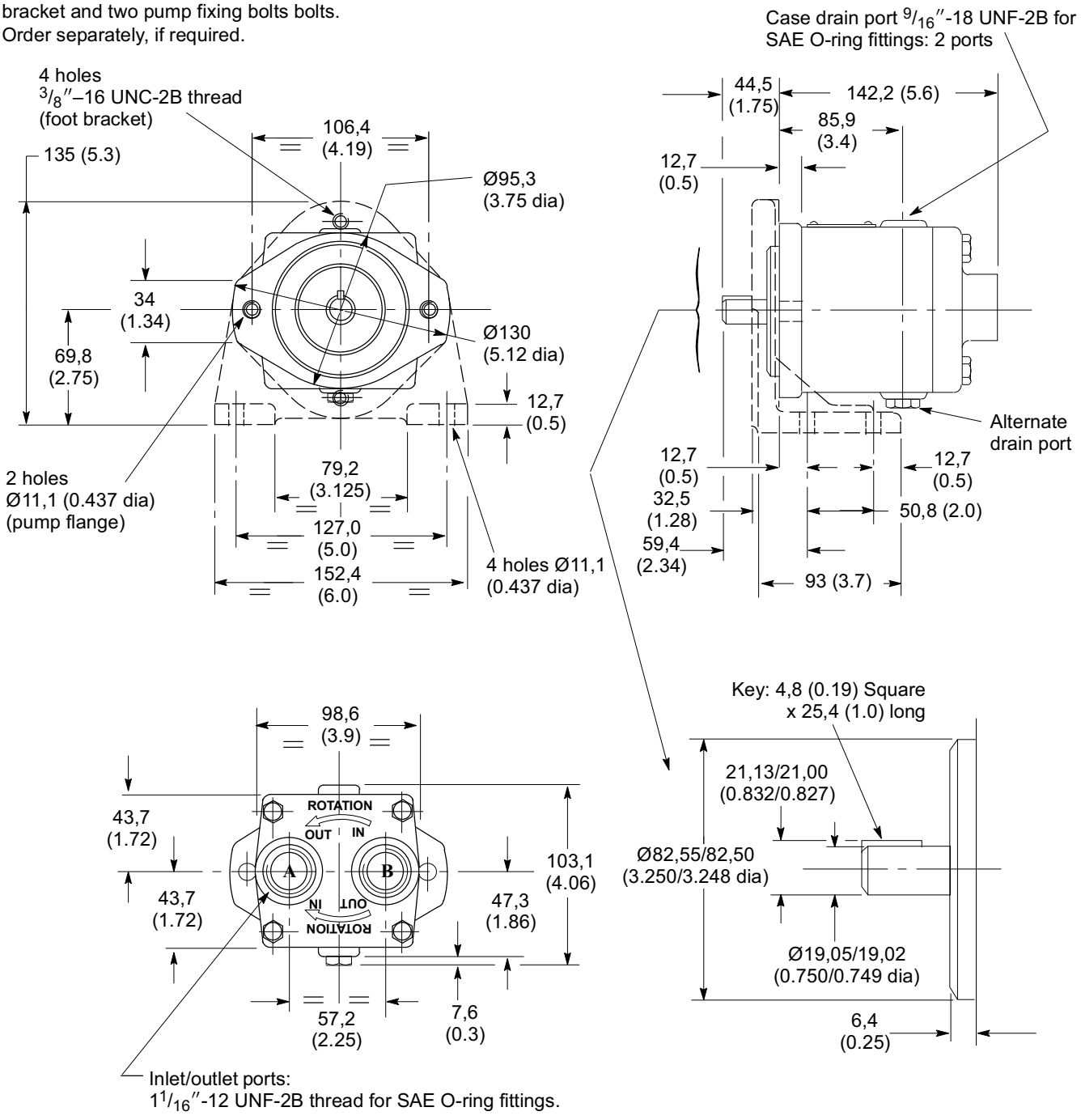


PFB5 SAE Flange Mounting

3rd angle projection

Installation Dimensions in mm (inches)

Optional foot bracket, shown in dashed outline; kit FB-A-10 comprises foot bracket and two pump fixing bolts bolts. Order separately, if required.



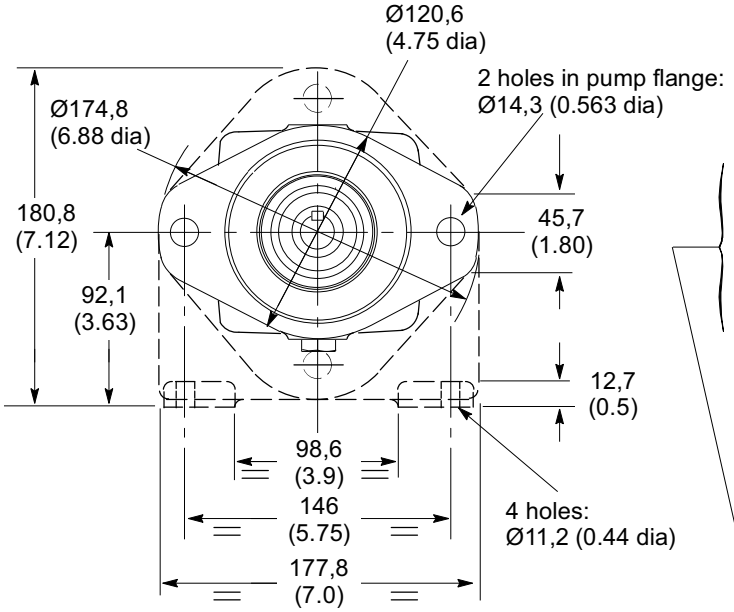
View on rear end of pump

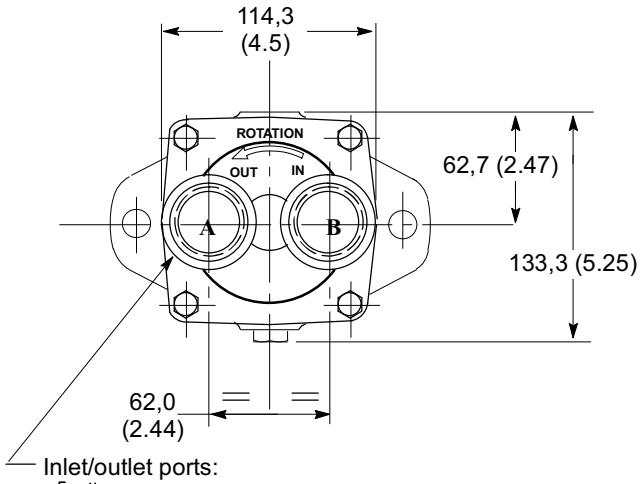
Detail of shaft, key and locating diameter

PFB10 SAE Flange Mounting

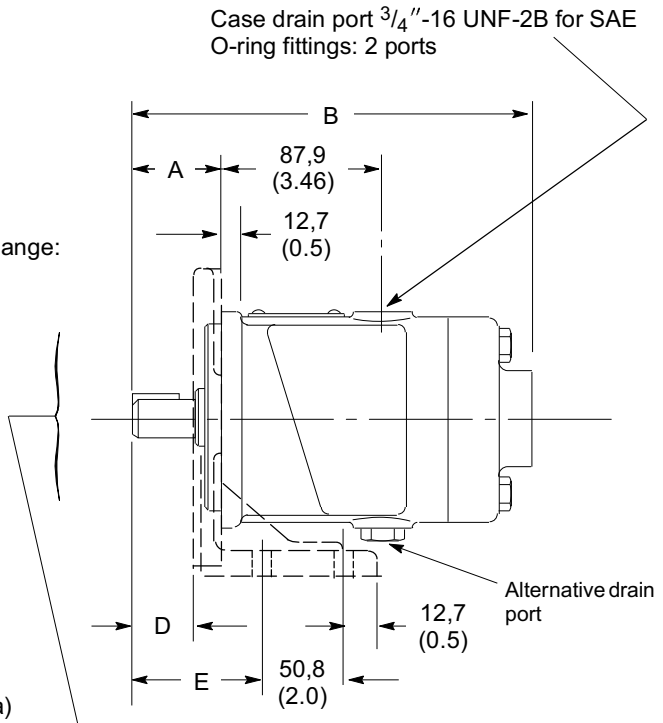
Installation Dimensions in mm (inches)

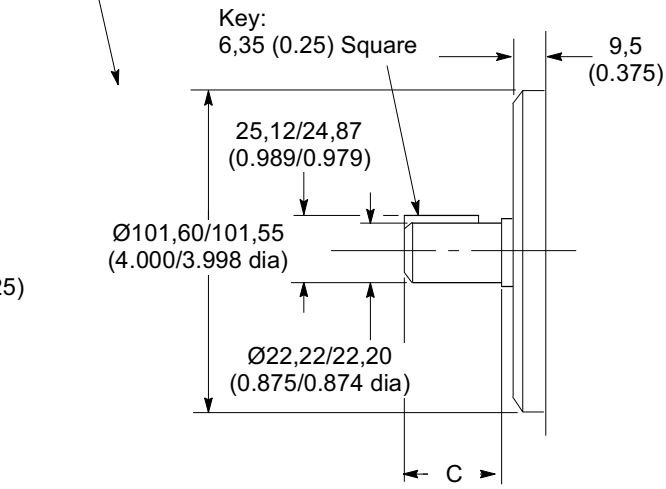
Optional foot bracket, shown in dashed outline; kit FB-B-10 comprises foot bracket and two pump fixing bolts bolts. Order separately, if required.





View on rear end of pump





Detail of shaft, key and locating diameter

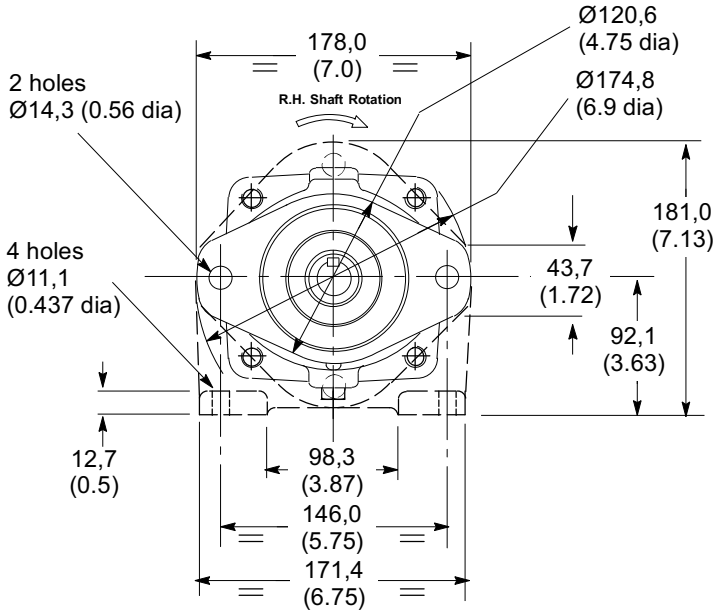
Pump type	A	B	C	D*	E*
PFB10-*-30	44,4 (1.75)	213,9 (8.42)	33,3 (1.31)	26,9 (1.06)	59,4 (2.34)
PFB10-***Y**-30	58,7 (2.31)	228,1 (8.98)	47,6 (1.87)	41,1 (1.62)	73,7 (2.9)

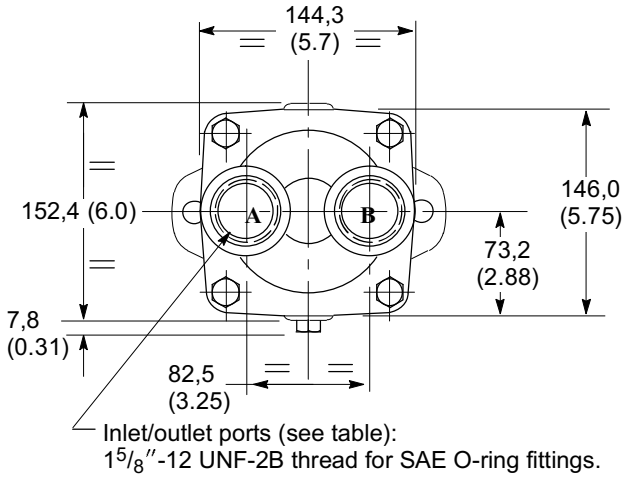
*Omit for foot bracket models)

PFB20 SAE Flange Mounting

Installation Dimensions in mm (inches)

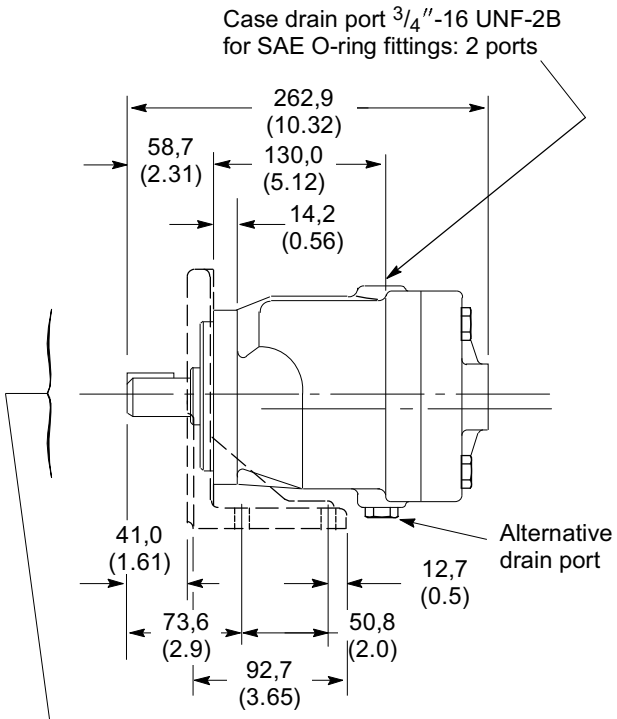
Optional foot bracket, shown in dashed outline; kit FB-B-10 comprises foot bracket and two pump fixing bolts bolts. Order separately, if required.

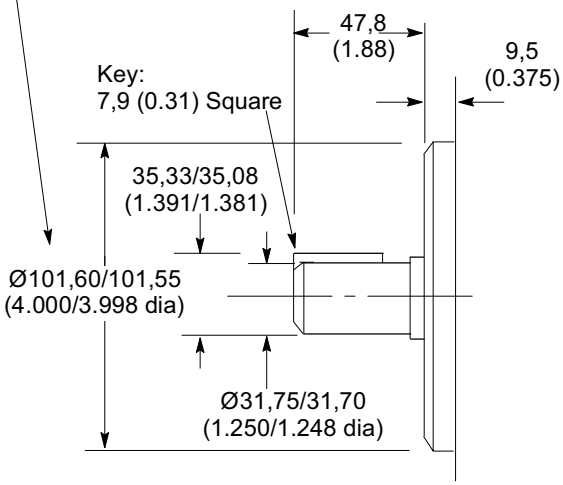




View on rear end of pump

Shaft rotation	Inlet port	Outlet port
RH	B	A
LH	A	B





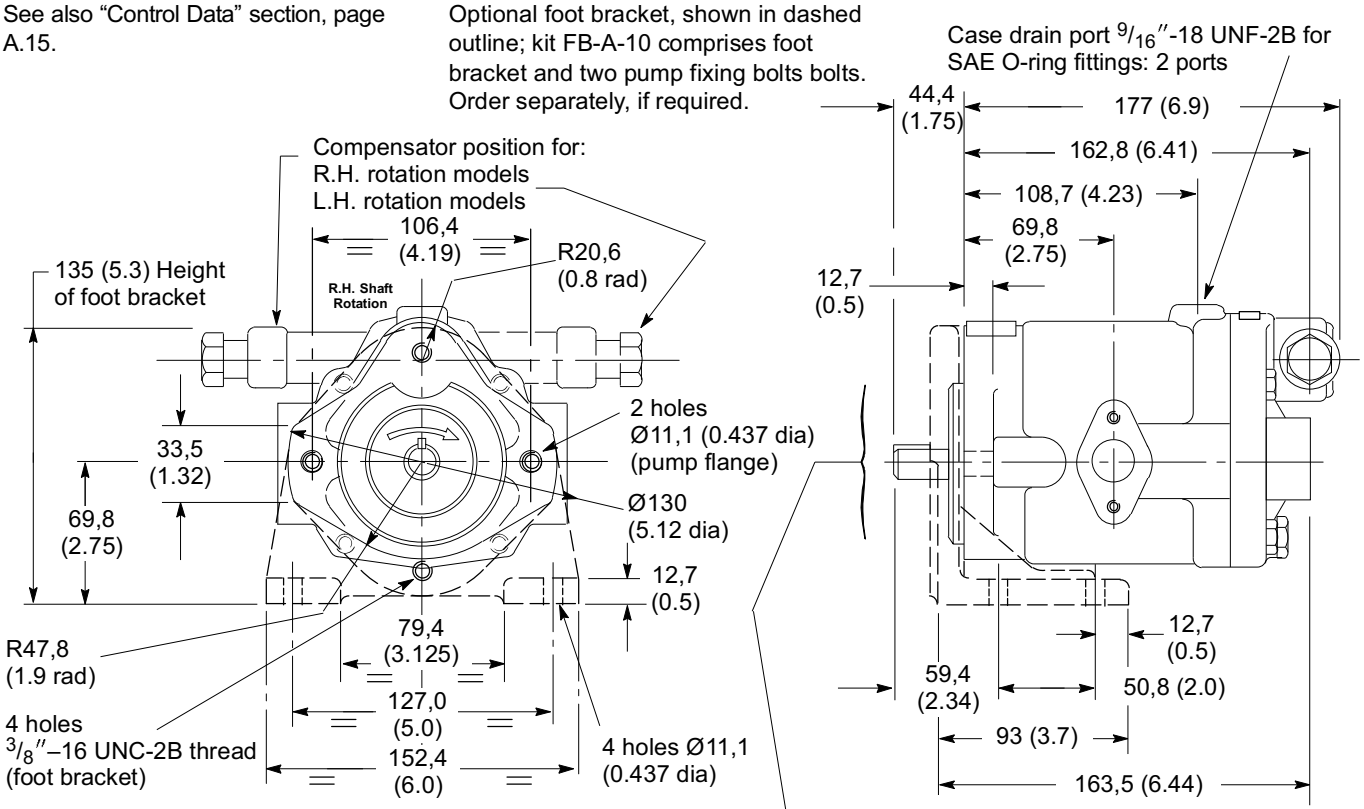
Detail of shaft, key and locating diameter

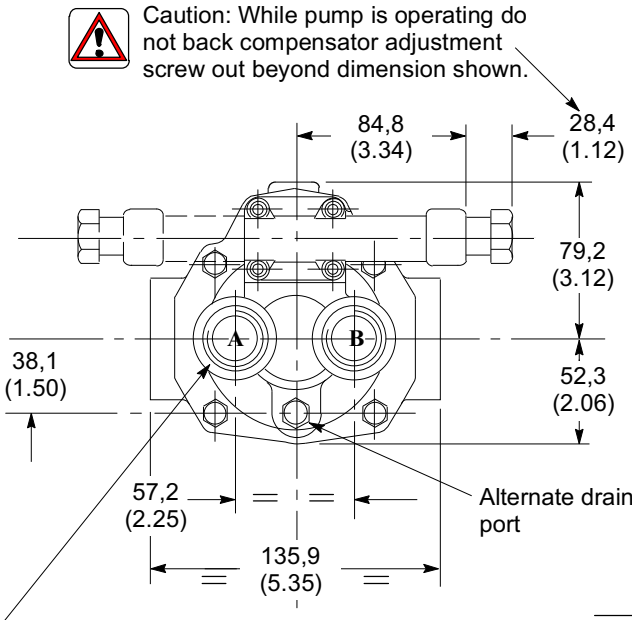
PVB5/6 SAE Flange Mounting:
Pressure Compensator Control - “C” and “CM”

Installation Dimensions in mm (inches)

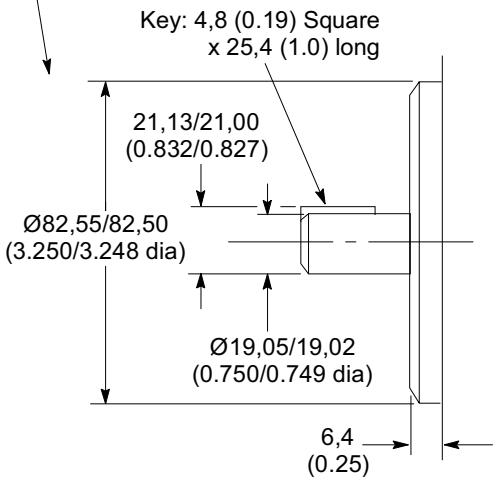
See also “Control Data” section, page A.15.

Optional foot bracket, shown in dashed outline; kit FB-A-10 comprises foot bracket and two pump fixing bolts bolts. Order separately, if required.





View on rear end of pump



Detail of shaft, key and locating diameter

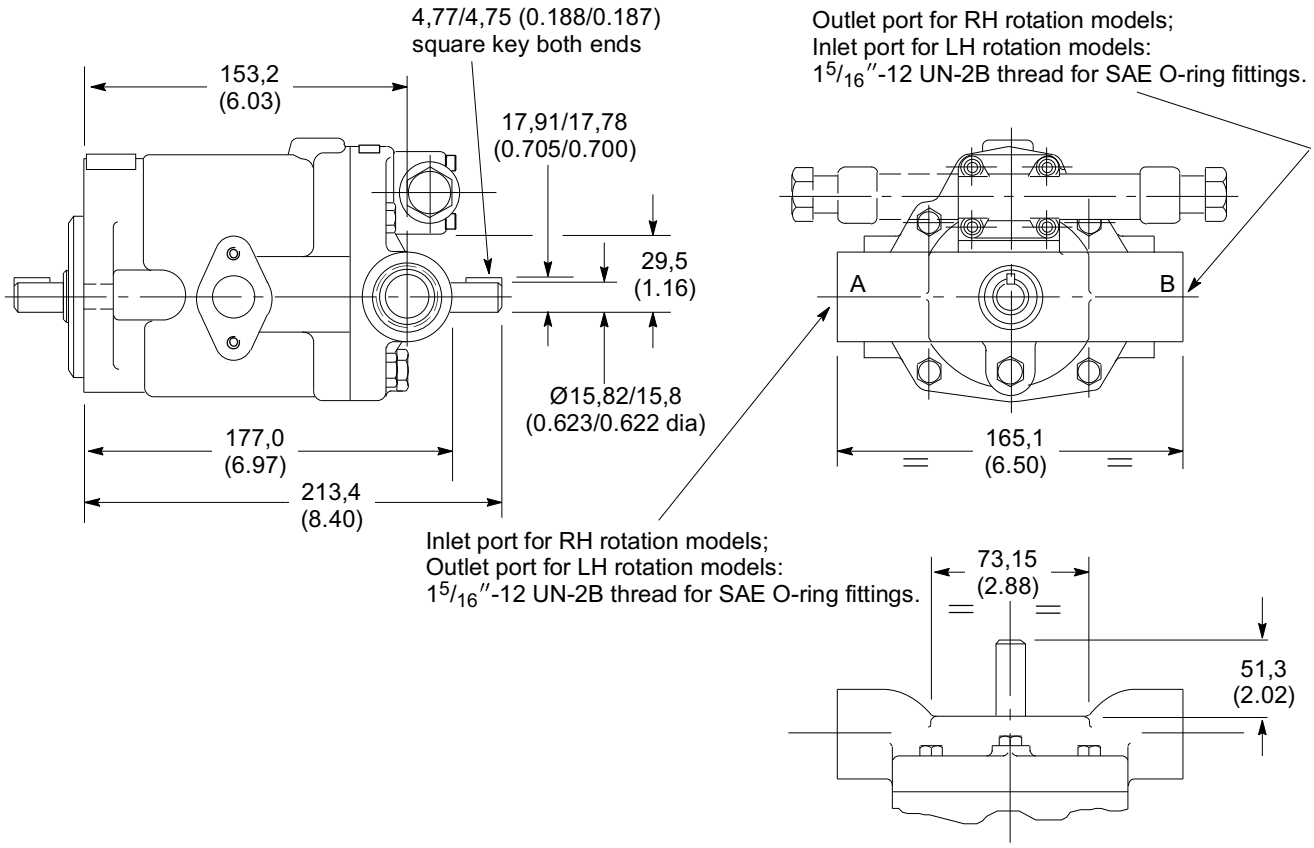
Shaft rotation	Inlet port	Outlet port
RH	A	B
LH	B	A

PVB5/6 Thru-Shaft Models (with Side Ports)

Installation Dimensions in mm (inches)

Maximum output torque is 40 Nm (354 lbf in), less unput torque at system pressure, see performance curves:
At 1500 r/min drive speed, page A.8.
At 1800 r/min drive speed, page A.12.

For other dimensions and installation data see page A.20.

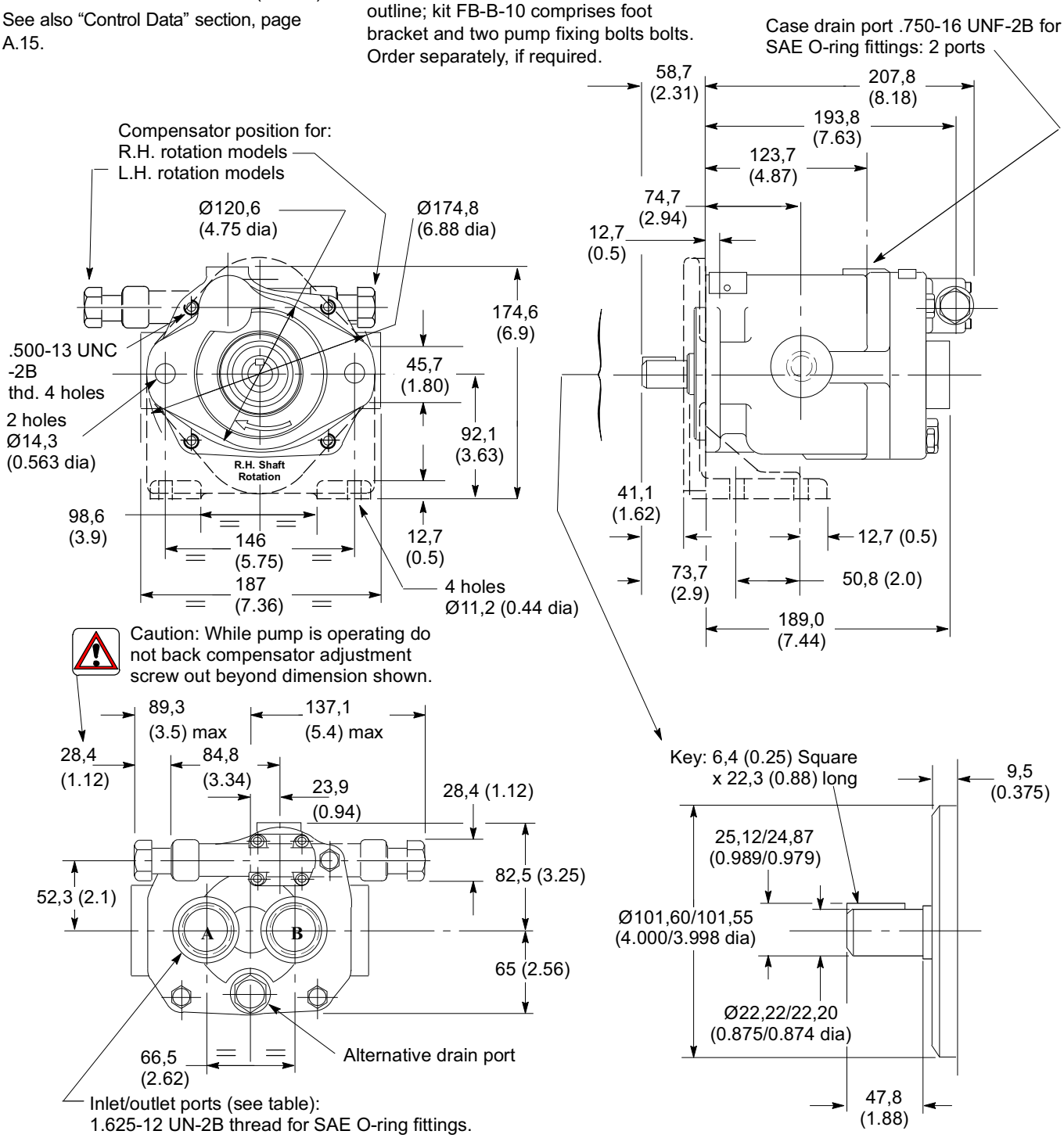


PVB10/15 SAE Flange Mounting
Pressure Compensator Control - “C” and “CM”

Installation Dimensions in mm (inches)

See also “Control Data” section, page A.15.

Optional foot bracket, shown in dashed outline; kit FB-B-10 comprises foot bracket and two pump fixing bolts bolts. Order separately, if required.



View on rear end of pump

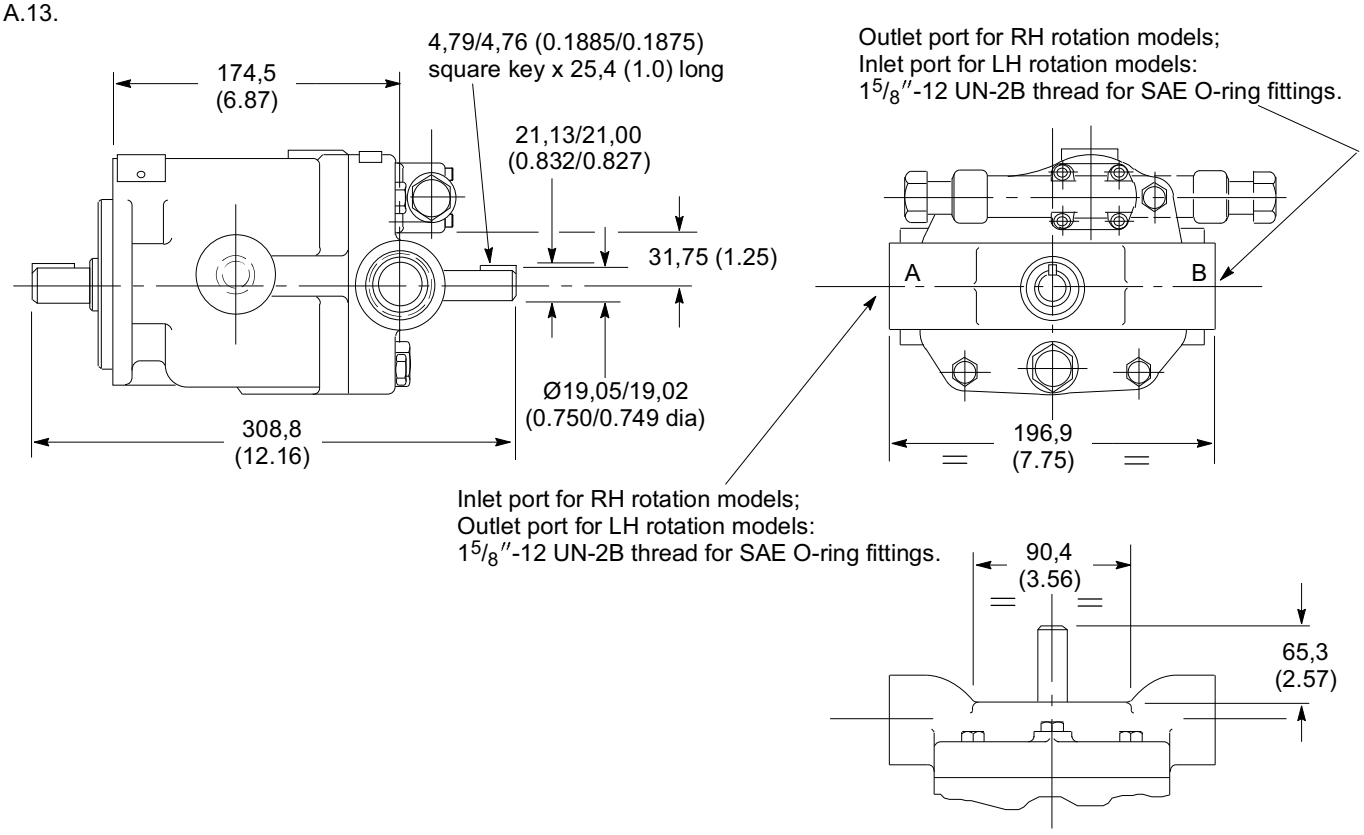
Shaft rotation	Inlet port	Outlet port
RH	A	B
LH	B	A

Detail of shaft, key and locating diameter

PVB10/15 Thru-Shaft Models (with Side Ports)

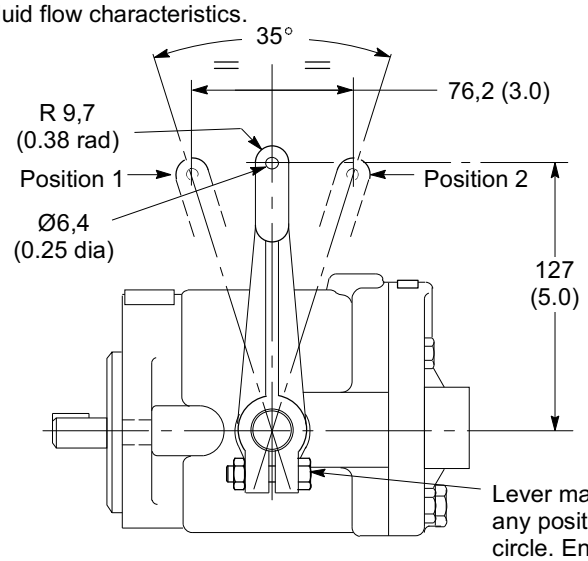
Maximum output torque is 83 Nm (735 lbf in), less unput torque at system pressure, see performance curves:
At 1500 r/min drive speed, pages A.8 & A.9.
At 1800 r/min drive speed, page A.12 & A.13.

For other dimensions and installation data see page A.22.

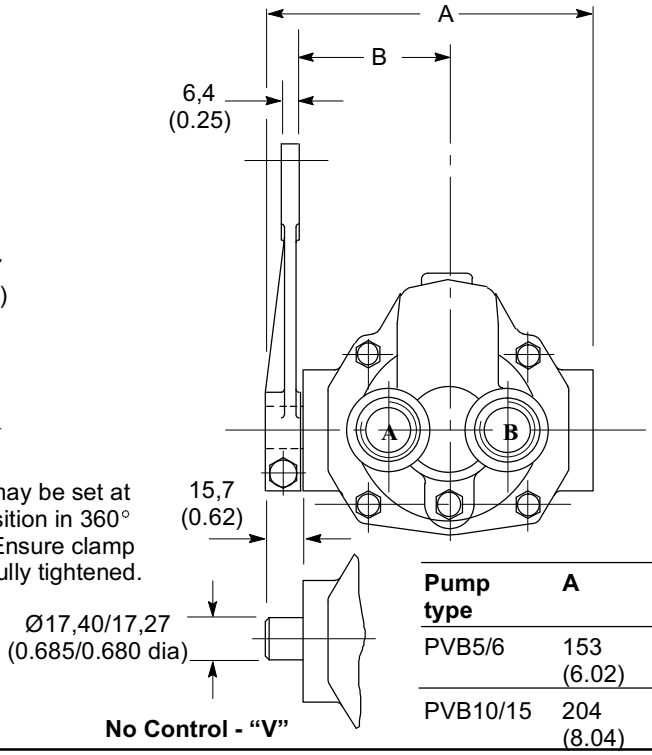


Lever Control - “M” and No Control - “V”

Units with this control may be operated on both sides of center permitting bi-directional fluid flow characteristics.



Shaft rotation	Lever position	Outlet port
RH	1	A
	2	B
LH	1	B
	2	A

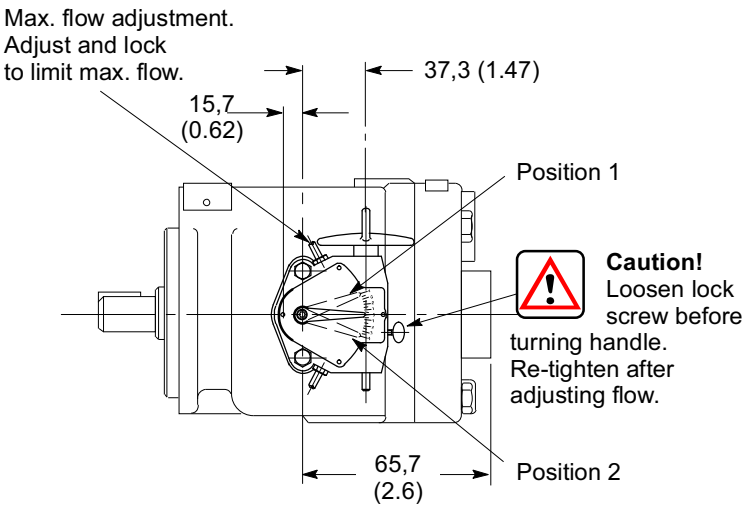


No Control - “V”

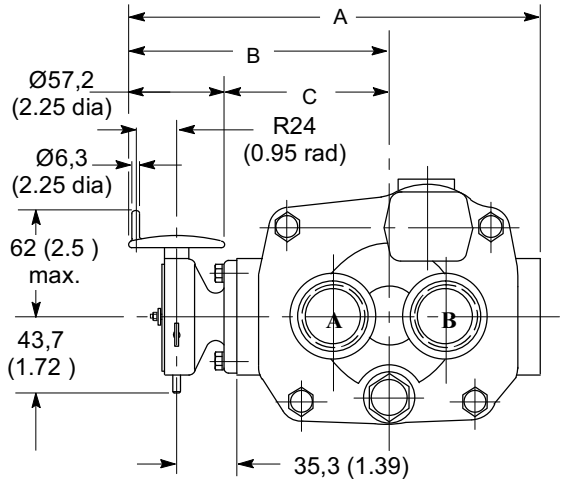
Pump type	A	B
PVB5/6	153 (6.02)	68,9 (2.7)
PVB10/15	204 (8.04)	99,9 (3.93)

Handwheel Control - “H”

Units with this control may be operated on both sides of center permitting bi-directional fluid flow characteristics.



Shaft rotation	Pointer position	Handwheel rotation from zero	Outlet port
RH	1	Clockwise	A
	2	Counter-clockwise	B
LH	1	Clockwise	B
	2	Counter-clockwise	A



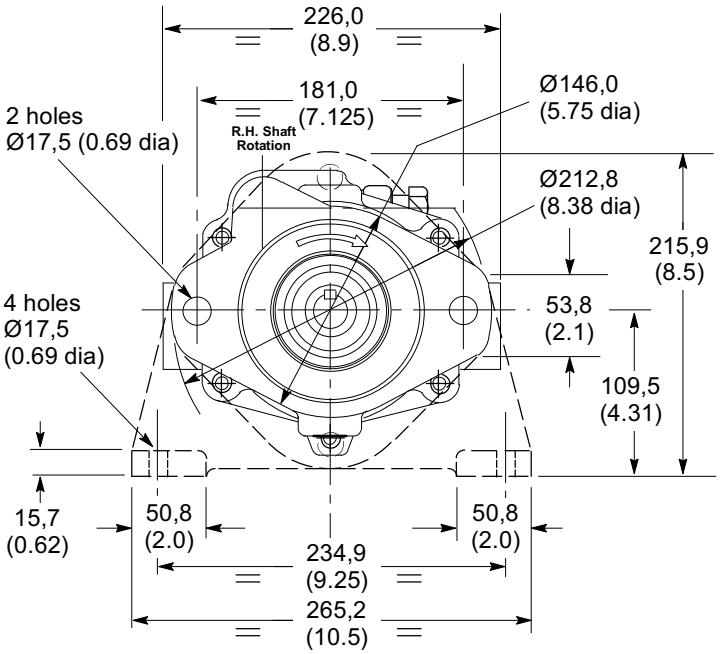
Pump type	A	B	C
PVB5/6	200 (7.87)	129 (5.08)	70,6 (2.78)
PVB10/15	250 (9.84)	140 (5.51)	93,5 (3.68)

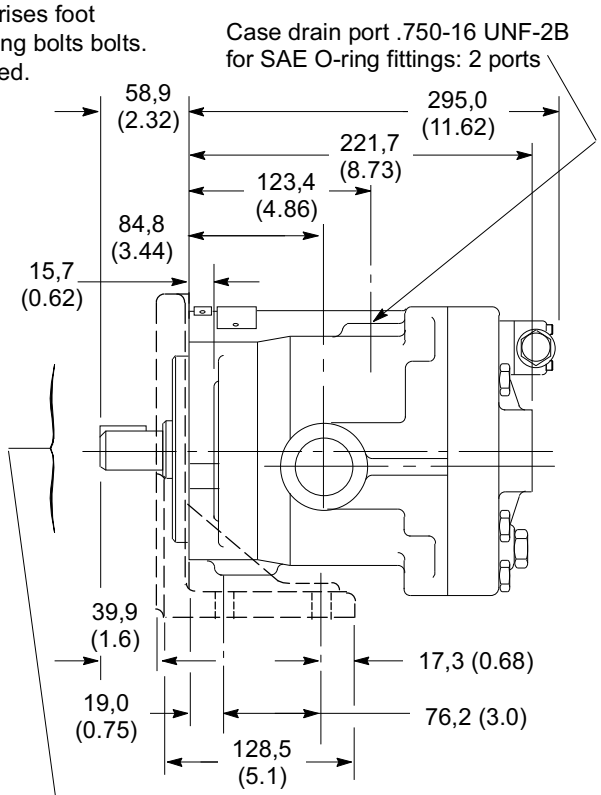
PVB20/29 SAE Flange Mounting
Pressure Compensator Control - “C” and “CM”

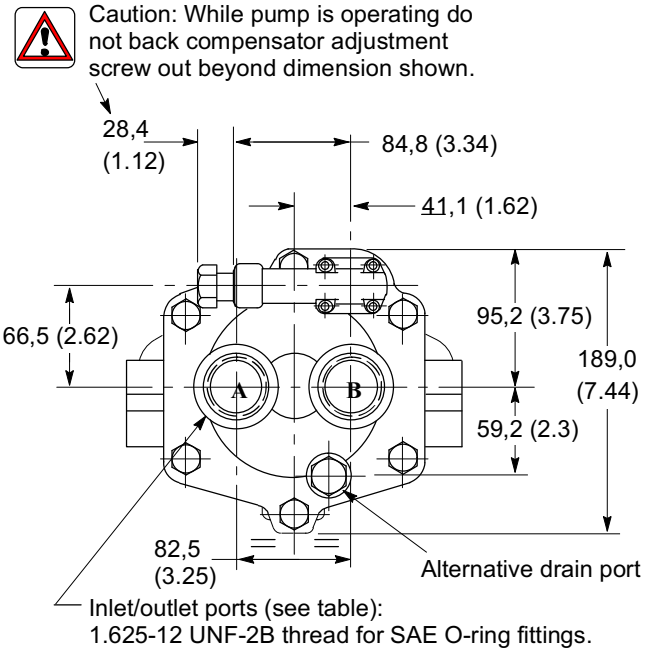
Installation Dimensions in mm (inches)

See also “Control Data” section, page A.15.

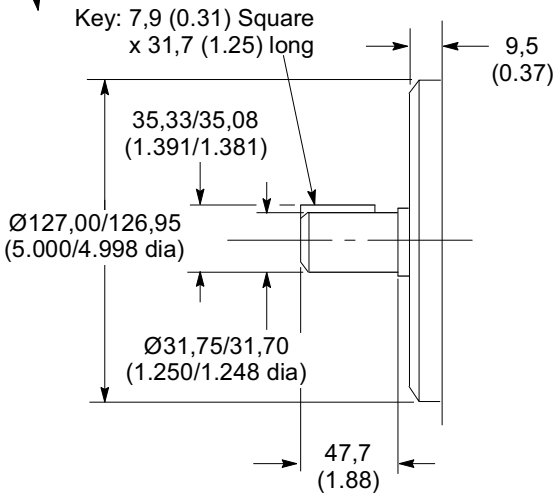
Optional foot bracket, shown in dashed outline; kit FB-C-10 comprises foot bracket and two pump fixing bolts bolts. Order separately, if required.







View on rear end of pump



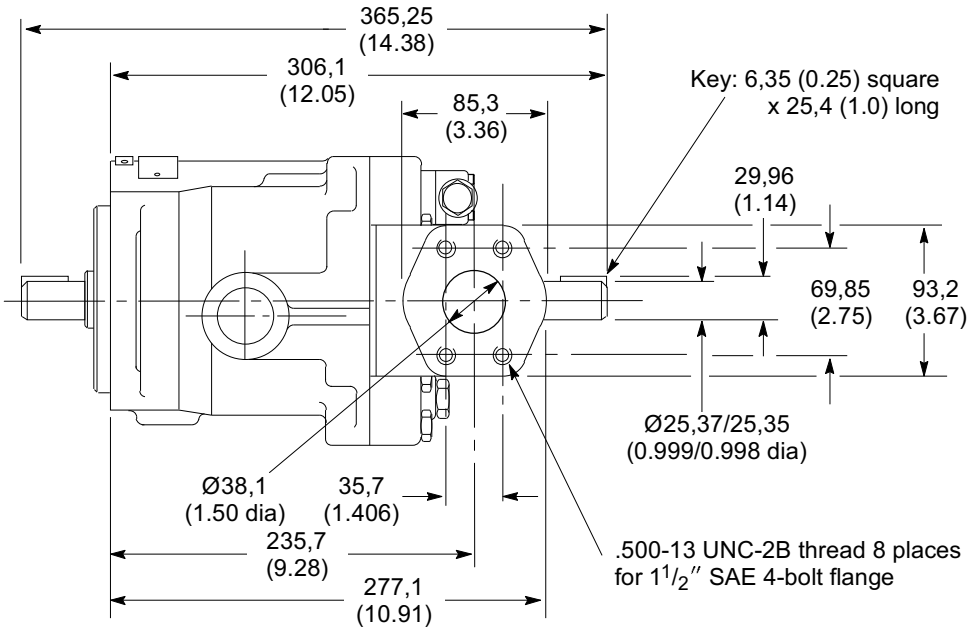
Detail of shaft, key and locating diameter

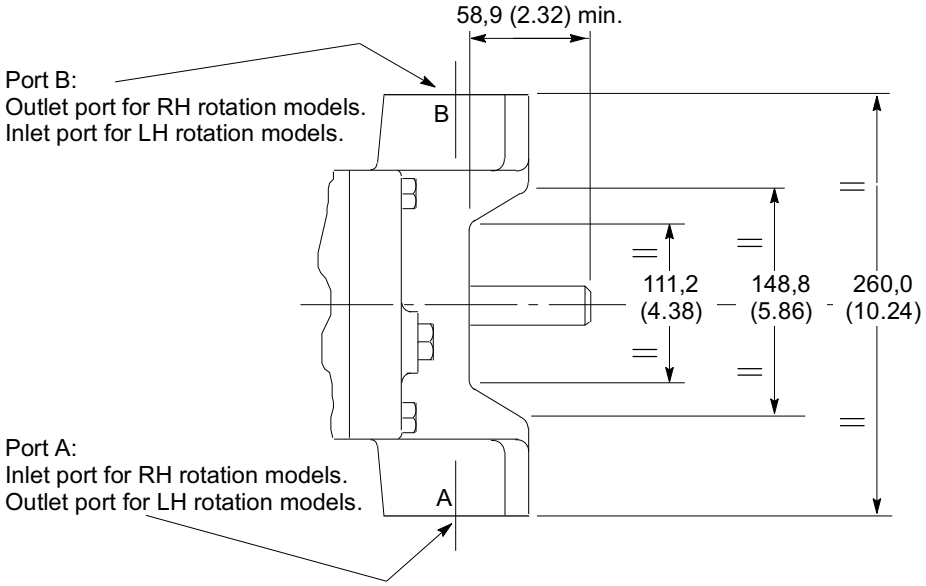
Shaft rotation	Inlet port	Outlet port
RH	A	B
LH	B	A

PVB20/29 Thru-Shaft Models (with Side Ports)

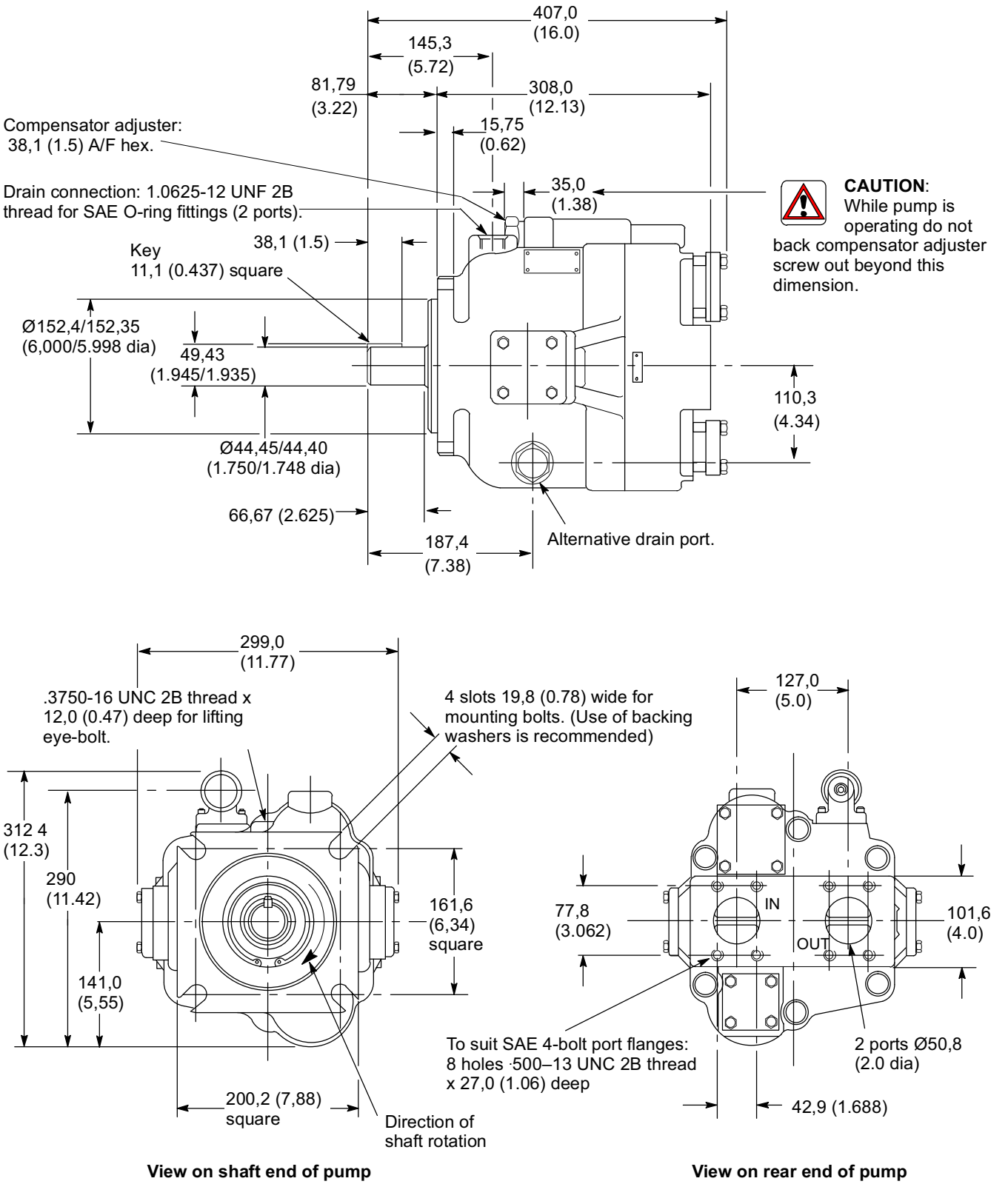
Maximum output torque is 159 Nm (1408 lbf in), less unput torque at system pressure, see performance curves:
At 1500 r/min drive speed, page A.9
At 1800 r/min drive speed, page A.13

For other dimensions and installation data see page A.25.





PVB45 Flange-Mounted Model

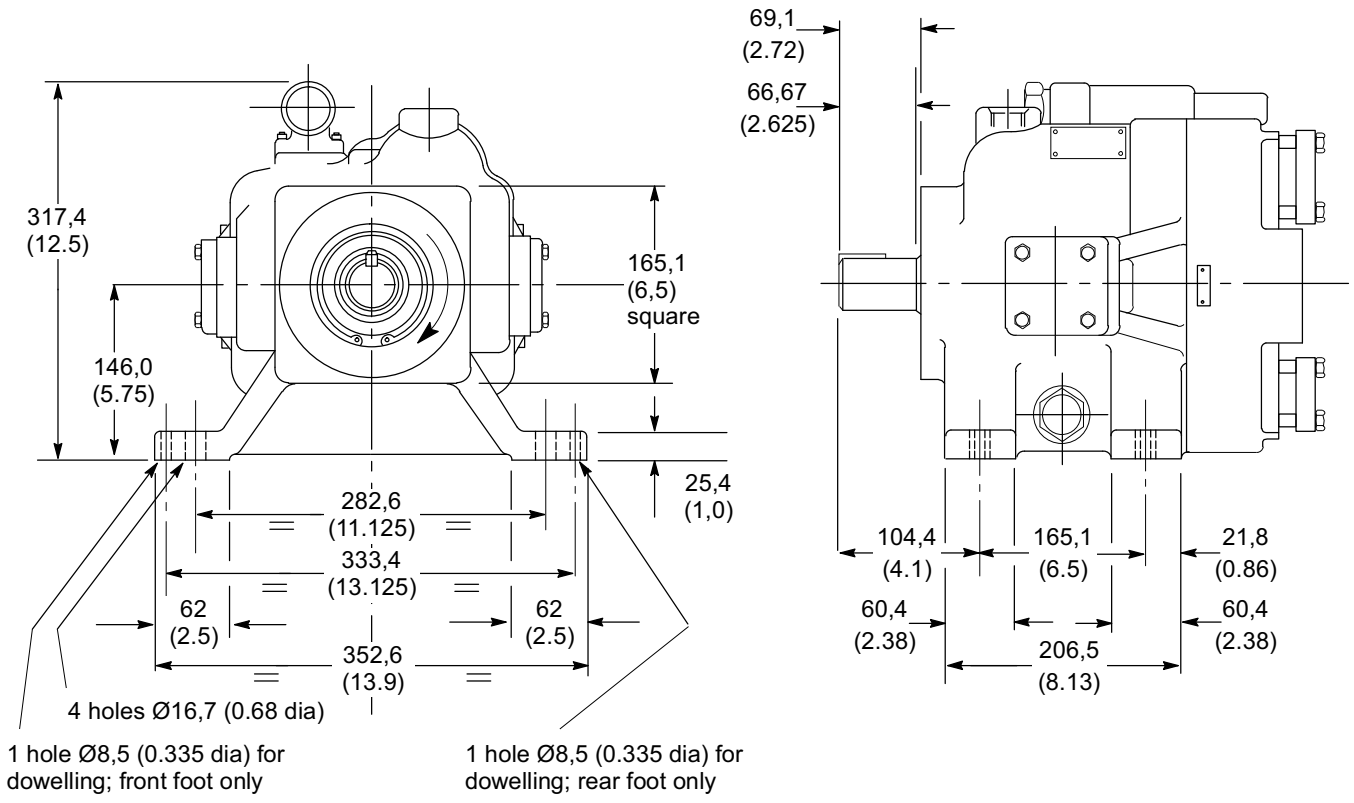


View on shaft end of pump

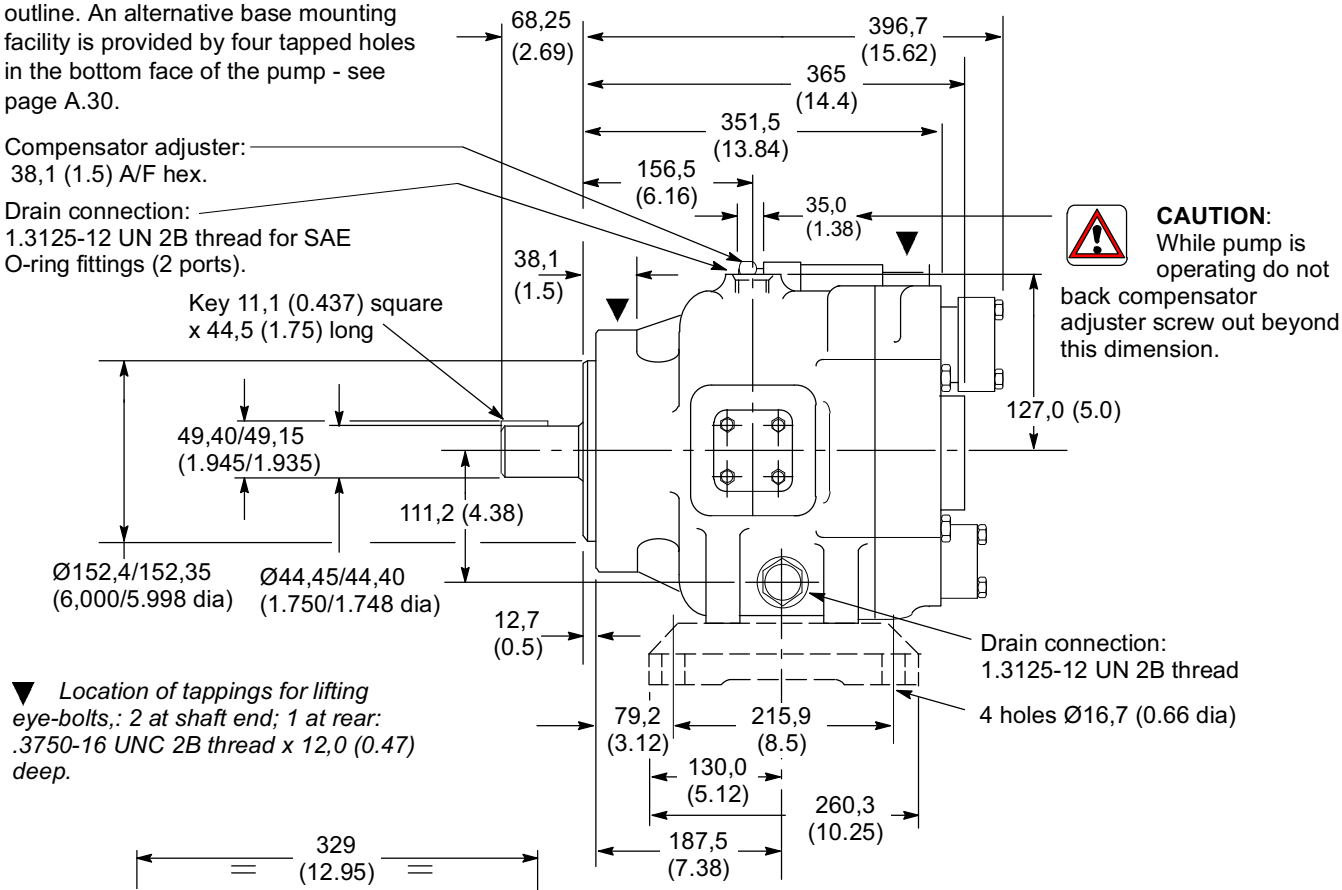
View on rear end of pump

PVB45 Foot-Mounted Model

For other dimensions and installation
data see page A.27 .

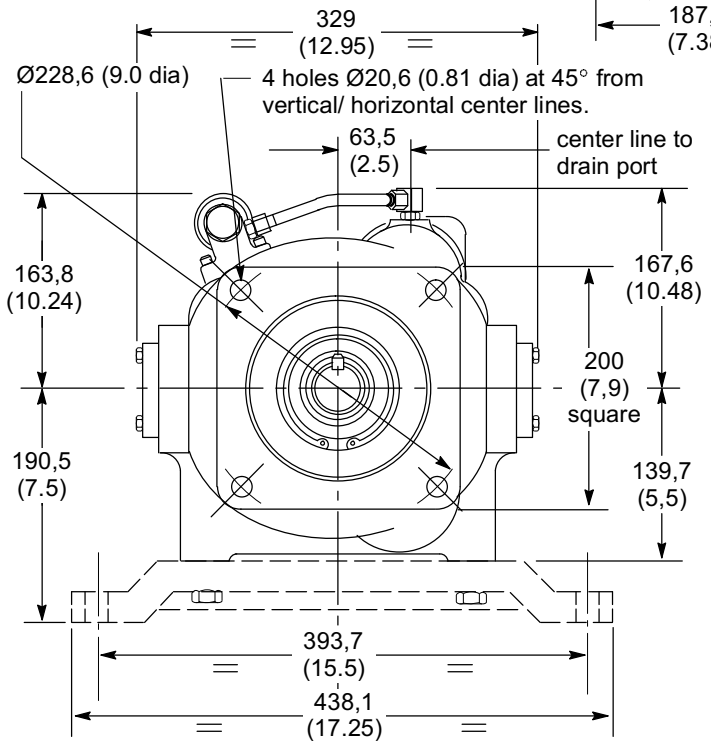


Foot mounting option (designated by Model Code [3]= “F”) is shown in dotted outline. An alternative base mounting facility is provided by four tapped holes in the bottom face of the pump - see page A.30.

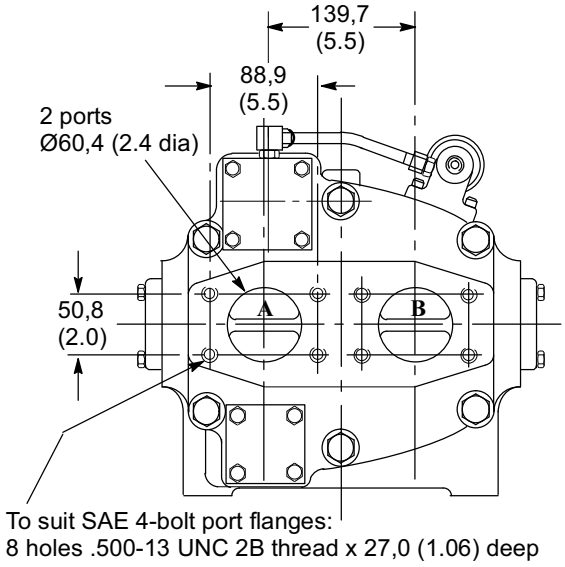


CAUTION: While pump is operating do not back compensator adjuster screw out beyond this dimension.

▼ *Location of tappings for lifting eye-bolts,: 2 at shaft end; 1 at rear: .3750-16 UNC 2B thread x 12,0 (0.47) deep.*



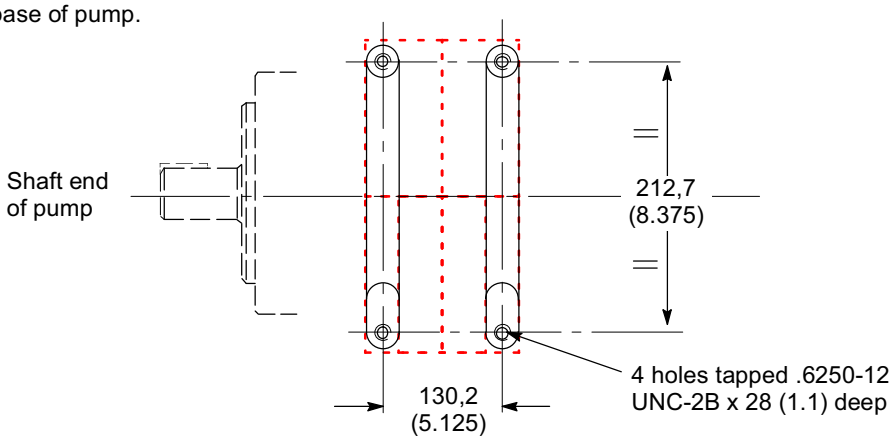
View on shaft end of pump



View on rear end of pump

Shaft rotation	Inlet port	Outlet port
RH	A	B
LH	B	A

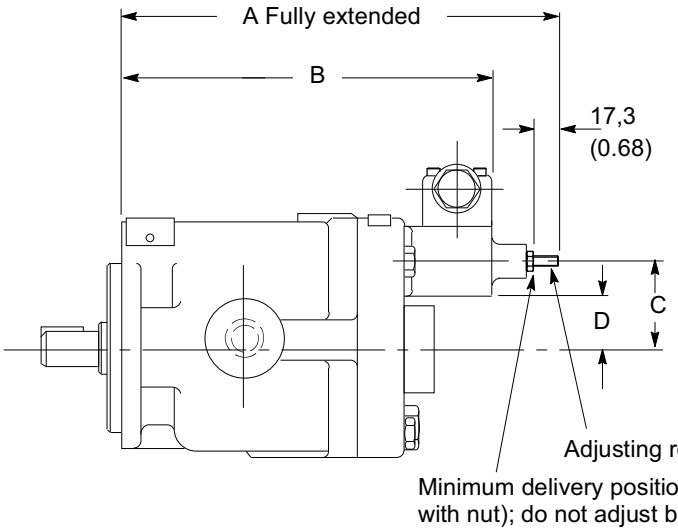
Detail of tappings in base of pump.



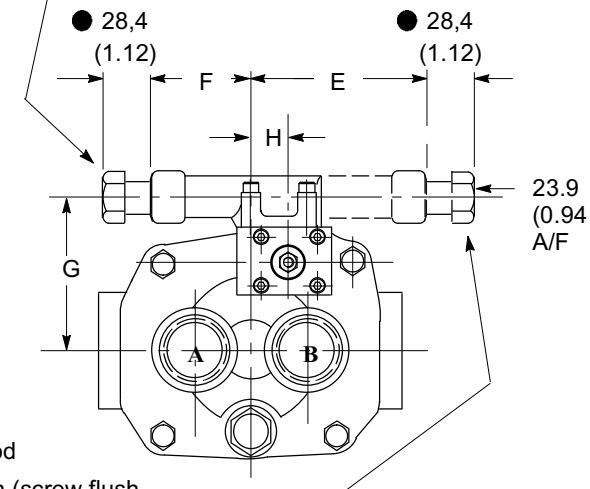
PVB5/6, PVB 10/15 and PVB20/29 with Pressure Compensator and Adjustable Maximum Displacement Stop: Control Types "CC" and "CMC"

For general dimensions and installation data of these pumps, see pages A.20, A.22 and A.25

Caution: While pump is operating do not back compensator adjustment screw out beyond dimension ● shown.



Note.
Compensator position for:
PVB5/6-*LSY (LH rotation models) and
PVB10/15 -*RSY (RH rotation models)
PVB20/29 -**SY (RH and LH rotation models)

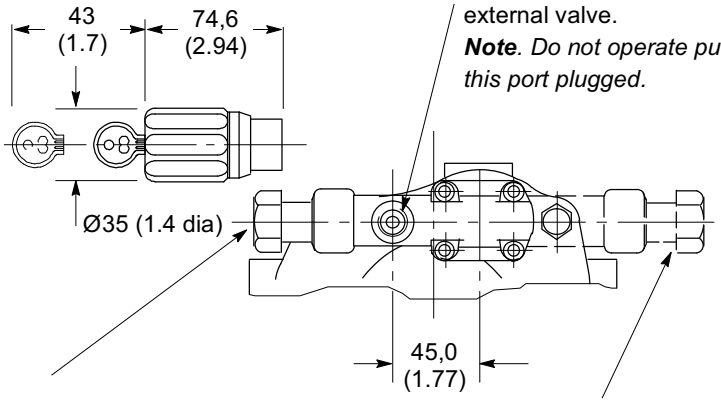


Note.
Compensator position for:
PVB5/6-*RSY (RH rotation models) and
PVB10/15 -*LSY (LH rotation models)

Pump type	A	B	C	D	E	F	G	H
PVB5/6	233 (9.17)	195 (7.68)	50 (1.97)	22,9 (0.9)	76,2 (3.0)	94,4 (3.72)	94,4 (3.72)	_
PVB10/15	266 (10.47)	226 (8.9)	52,3 (2.06)	25,1 (0.99)	118 (4.65)	70,8 (2.79)	90,2 (3.55)	23,8 (0.94)
PVB20/29	294 (11.56)	254 (10.0)	66,5 (2.62)	41,9 (1.65)	_	53,3 (2.1)	104,4 (4.11)	41,1 (1.62)

PVB5 to 29 with “CG” Remote Control of Compensator

Type “GEVS”



.4375-20UNF-2B thread for SAE “CG” control models, connect to external valve.
***Note**. Do not operate pump with this port plugged.*

Location as shown for:
PVB5/6 LH rotation models,
PVB10/15 RH rotation models and
PVB20/29 LH and RH rotation models.

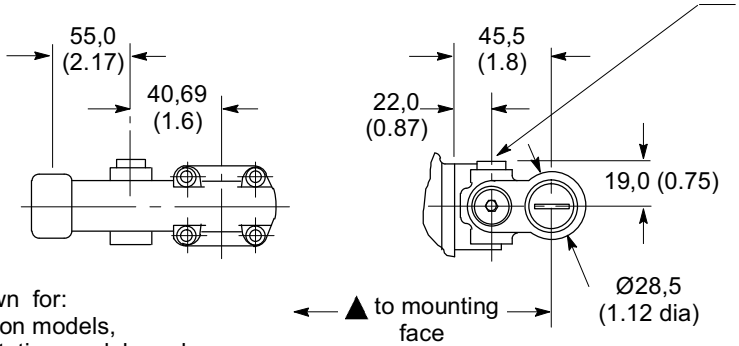
Location as shown in dotted outline for:
PVB5/6 RH rotation models and
PVB10/15 LH rotation models.

Caution: Effective compensator setting will be compensator control setting **plus** remote relief valve setting.

Adjustment procedure

1. Turn remote pressure control (such as C-175) anti-clockwise to minimum setting.
2. Turn compensator adjustment plug to desired minimum pressure - 17 bar (250 psi) or higher.
3. Full pressure range can now be obtained with remote pressure control.

“CVP” Load Sensing with Pressure Limiter

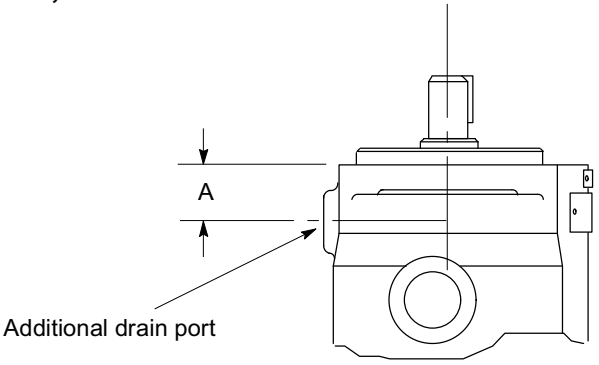


Load sensing control port:
.4375-20 UNF-2B thread
for SAE O-ring fittings.

Location as shown for:
PVB5/6 LH rotation models,
PVB10/15 RH rotation models and
PVB20/29 LH and RH rotation models.

▲ PVB5/6 . . . . . 191 (7.51)
PVB10/15 . . . . . 222 (8.75)
PVB20/29 . . . . . 250 (9.84)

Vertical “Shaft-up” Installation - “S30” Drain Port Option, for PVB5 to 29

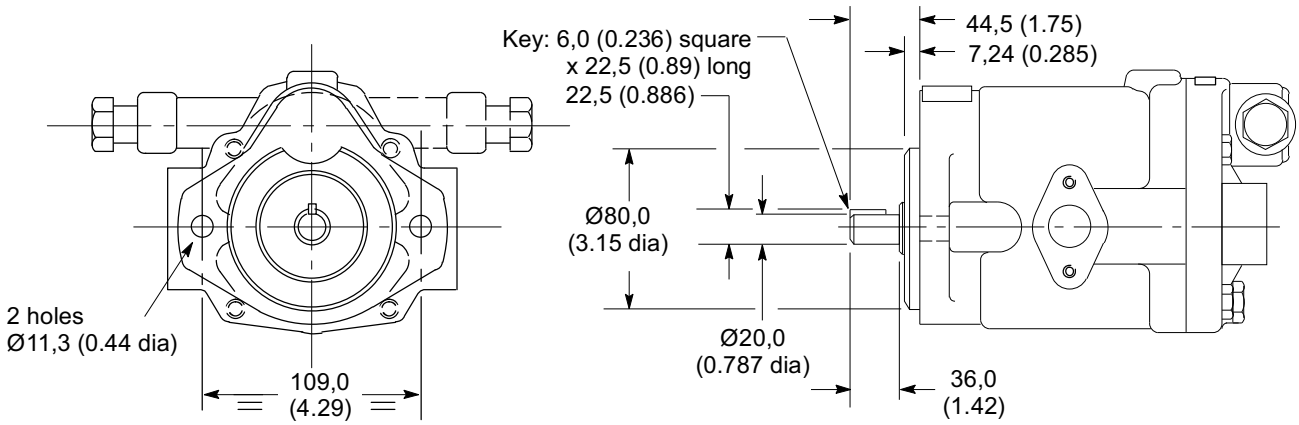


Pump type	Port tapping	A
PFB5	.562518UNF-2B	28,7 (3.85)
PVB5/6	.5625 18UNF-2B	19 (0.75)
PVB10/15	.7500 16UNF-2B	29,3 (1.15)
PVB20/29	.7500 16UNF-2B	38,9 (1.53)

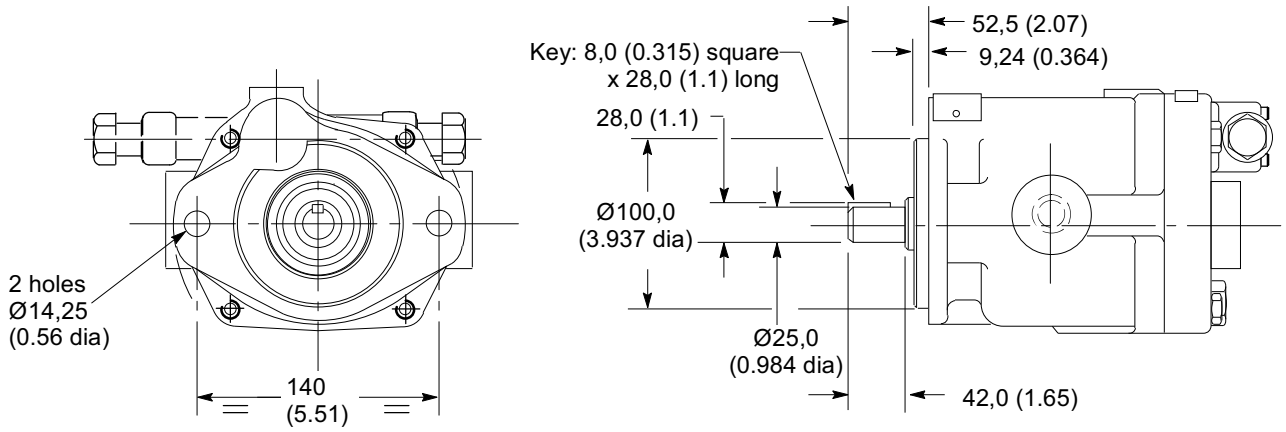
PVB5/6; PVB10/15; PVB20/29 – DIN/ISO Models

For dimensions/data not shown refer to corresponding SAE models.

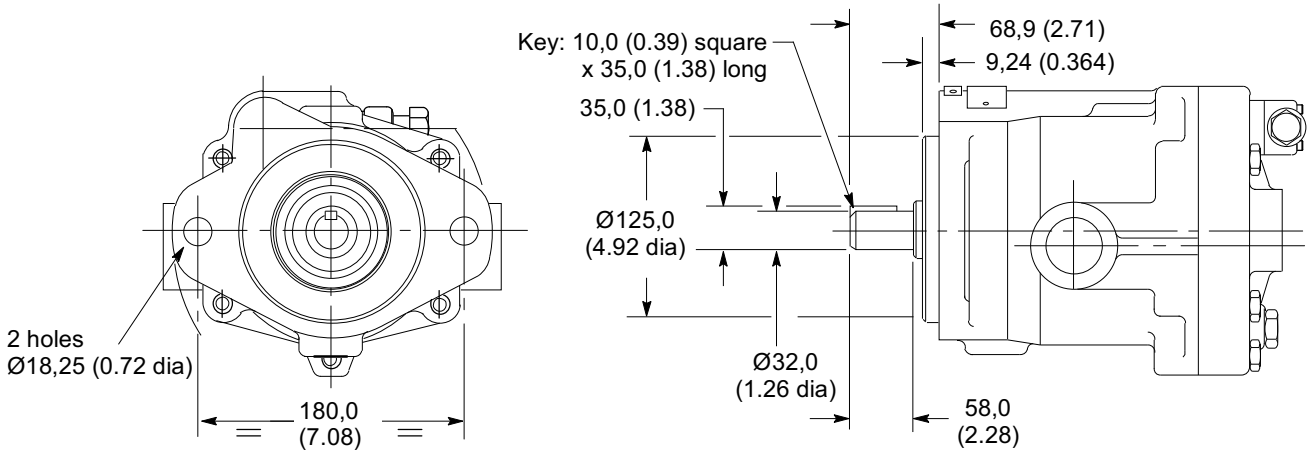
PVB5/6 – Pressure Compensated Control – “C” and “CM”



PVB10/15 – Pressure Compensated Control – “C” and “CM”



PVB20/29 – Pressure Compensated Control – “C” and “CM”



Mass, approx.

Flange Mounting Models

PFB5 . . . . . 5 kg (11 lb)
PFB10 . . . . . 10 kg (22 lb)
PFB20 . . . . . 19 kg (42 lb)
PVB5/6 . . . . . 8 kg (18 lb)
PVB10/15 . . . . . 15 kg (33 lb)
PVB20/29 . . . . . 26 kg (57 lb)
PVB45 . . . . . 96 kg* (211 lb)
PVB90S . . . . . 104 kg (230 lb)

** Also foot mounting models.*

▲ *Combined foot/flange mounting models.*

Foot Bracket Kits

FB-A-10 . . . . . 1,8 kg (4 lb)
FB-B-10 . . . . . 2,3 kg (5 lb)
FB-C-10 . . . . . 5,5 kg (12 lb)

Installation Data

Horizontal mounting is resommended to maintain necessary case fluid level. Vertical “shaft-up” installation is possible with pumps ordered to include the extra drain port denoted by the “S30” feature; see “Model Code”. In all cases the drain line must be full size, unrestricted and connected from the uppermost drain port directly to the reservoir in such a manner that the housing remains filled with fluid.

Piping of drain line must prevent siphoning. Pipe drain line so that it terminates below fluid level. No other lines are to be connected to this drain line.

Caution must be exercised to never exceed the following unit case pressures:

0,7 bar (10 psi) for PFB10 only.
0,35 bar (5psi) for all other models.

Starting

Before starting, fill case with system fluid through the uppermost drain port. Housing must be kept full at all times to provide internal lubrication.When first starting it may be necessary to bleed air from pump outlet to permit priming and to reduce noise. Bleed by loosening an outlet connection until a clear stream of fluid appears. An air bleed valve, ABS-03, is available for this purpose.

Ordering Procedure

Before ordering, check availability with your Vickers reprecentative.