# MHPVB5/6 SERIES
## PISTON PUMPS

GENUINE METARIS
A Hydraulex Brand

## FEATURES

Our MHPVB in-line variable displacement axial piston pumps have excellent operating features and are capable of operating with many types of hydraulic fluid. These units are durable and offer a long service life, which makes them suitable for the industrial market. Available in six displacements to meet the demands of many applications.

- High flow, high performance
- Compact and lightweight
- Highly efficient with a variety of hydraulic fluids
- Engineered for extended life
- Interchangeable with Vickers® PVB series

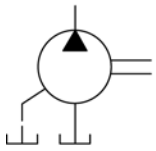
## SPECIFICATIONS

| MODEL | DISPL. IN³/R (CM³/R) | MAXIMUM SHAFT SPEED (RPM) | | | MAXIMUM OUTLET PRESSURE PSI (BAR) | | | FLOW AT 1800 RPM GPM (LPM) |
|---|---|---|---|---|---|---|---|---|
| | | ANTI-WEAR HYD.OIL | WATER-IN-OIL EMULSION (40%/60%) | WATER-GLYCOL | ANTI-WEAR HYD.OIL | WATER-IN-OIL EMULSION (40%/60%) | WATER-GLYCOL | |
| **MHPVB5** | .643(10.5) | 1800 | 1800 | 1800 | 3000 (210) | 2000 (140) | 2000 (140) | 5 (19) |
| **MHPVB6** | .843 (13.8) | 1800 | 1800 | 1800 | 2000 (140) | 1500 (100) | 1500 (100) | 6.5 (24.6) |

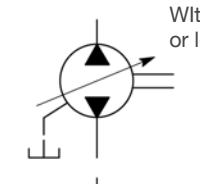
**Maximum Inlet Pressure -** PVB5/6/10/15 with H, M or V controls = As 'Max. Outlet Pressure' above for appropriate size.

## FUNCTIONAL SYMBOLS

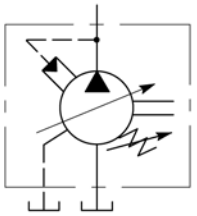
### MHPFB
**Fixed DIsplacement Models**



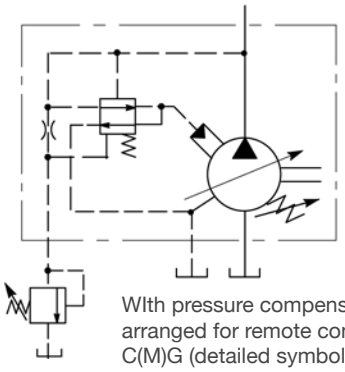
### MHPVB
**Variable DIsplacement Models**



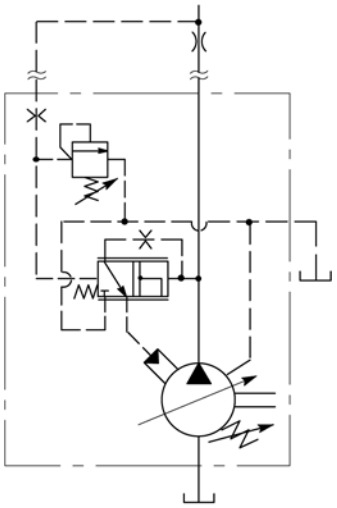
WIth handwheel, or lever



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



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



With CVP load senseing and pressure limiter

# MODEL CODE BREAKDOWN

**MHPVB - ** - R - S - Y - 40 - C - C - 11 - **

### Series
**MHPVB**

### Pump Size
**5** = 10.55 cm³/r (0.64 in³/r)
**6** = 13.81 cm³/r (0.84 in³/r)
**10** = 21.10 cm³/r (1.29 in³/r)
**15** = 33.00 cm³/r (2.01 in³/r)
**20** = 42.80 cm³/r (2.61 in³/r)
**29** = 61.60 cm³/r (3.76 in³/r)

### Rotation
**R** = Right (Clockwise Rotation)
**L** = Left (Counter-Clockwise Rotation)

### Displacement Zone
**S** = One side of center
(Pressure Compensated models only)

### Shaft Type
**Y** = SAE models PVB5 thru 15 only
(Both Keyed and Splined Shafts are available for all models)
**Omit** for Short Shaft

### Special Features
**S124** = Splined Shaft

### Control Design Number
**12** = 'C' and 'CM' controls
**30** = 'CG' control

### Optional Features
**C** = Adjustable Maximum Stop

### Pressure Control Type
**C** = Pressure Compensator, (250-3000 psi on 5, 10, 20 models; 250-2000 psi on 6, 15, 29 models)
**CG** = Remotely Adjustable Pressure Setting
**CM** = Pressure Compensator, 17-100 bar (250-1500 psi)
**CVP** = Pressure Limiter/Load Sensing

### Pump Design Number
**40** = 5 or 6 displacement
**40** = 10 or 15 displacement
**20** = 20 or 29 displacement

# 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.

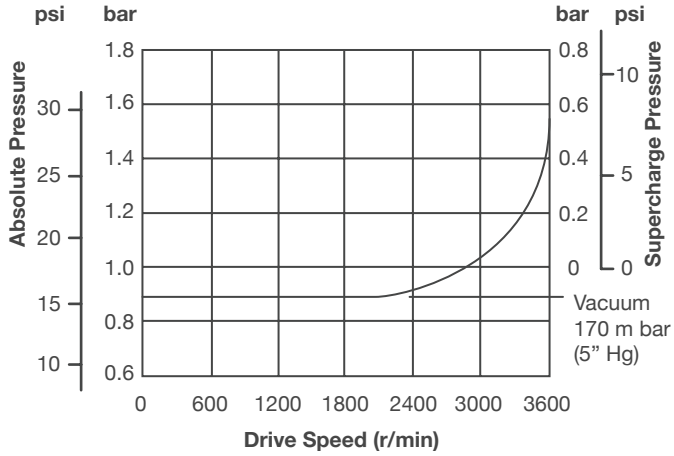
## CASE DRAIN PRESSURE

Caution must be exercised to never exceed the following unit case pressures: 0.35 bar (5 psi) for all models except PFB10.

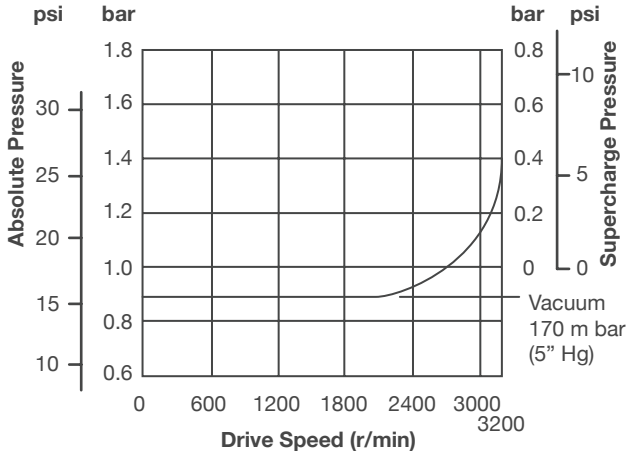
## MINIMUM INLET PRESSURE

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

### MHPVB5

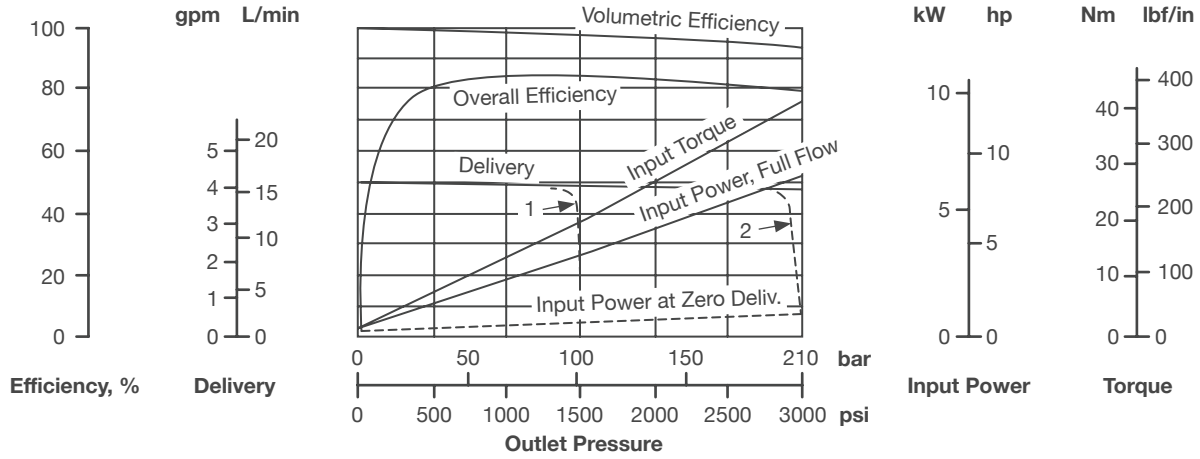



### MHPVB6



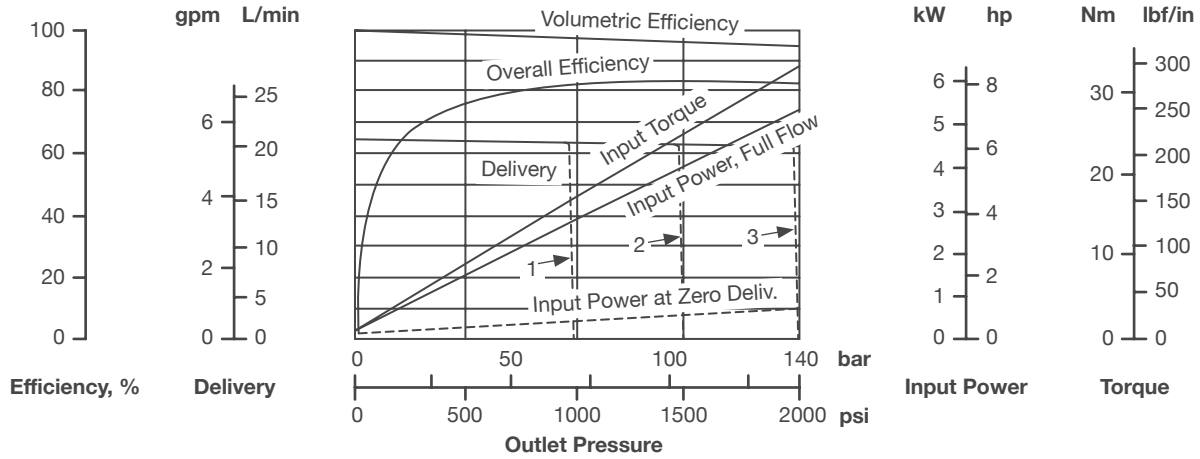
# PERFORMANCE CHARTS AT 1500 R/MIN DRIVE SPEED

## MHPVB5




1 = Delivery with compensator setting of 1500 psi (100 bar)
2 = Delivery with compensator setting of 3000 psi (200 bar)

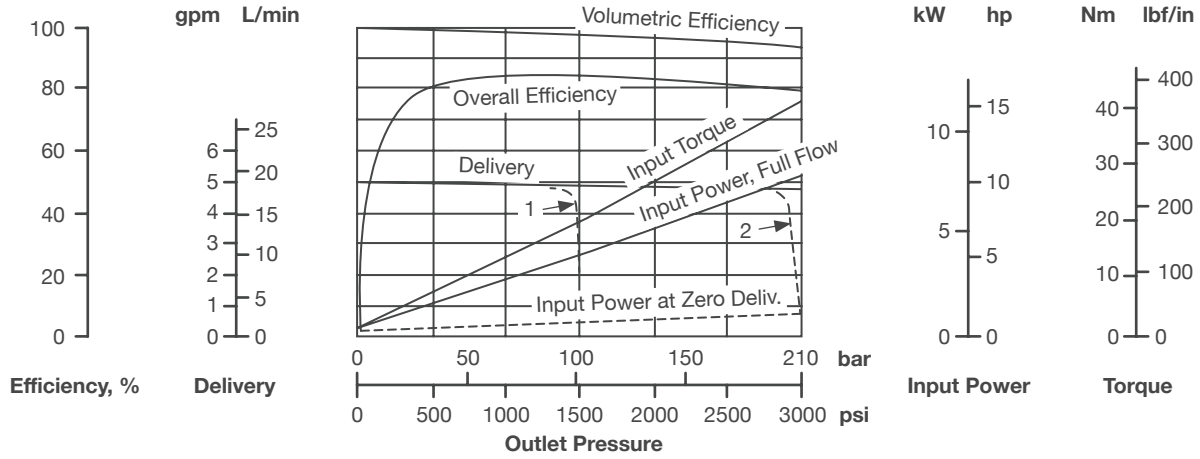
## MHPVB6




1 = Delivery with compensator setting of 750 psi (50 bar)
2 = Delivery with compensator setting of 1500 psi (100 bar)
3 = Delivery with compensator setting of 2000 psi (140 bar)

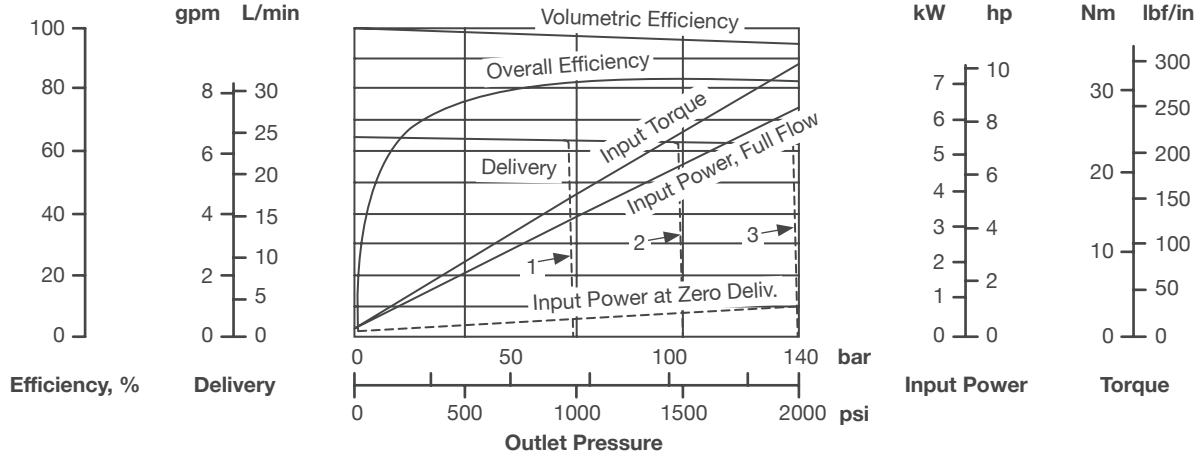
# PERFORMANCE CHARTS AT 1800 R/MIN DRIVE SPEED

## MHPVB5




1 = Delivery with compensator setting of 1500 psi (100 bar)
2 = Delivery with compensator setting of 3000 psi (200 bar)

## MHPVB6




1 = Delivery with compensator setting of 1000 psi (70 bar)
2 = Delivery with compensator setting of 1500 psi (100 bar)
3 = Delivery with compensator setting of 2000 psi (140 bar)

# CONTROL DATA FOR MHPVB PUMPS

**'C' and 'CM' Pressure Compensators**

These automatically adjust pump delivery at pre-adjusted pressure to match system demand. Delivery can decrease rapidly from maximum to zero through a pressure gradient typically 4 to 6 bar (60 to 90 psi) with normal circuit volumes. Please note:

- When using PVB6, 15 or 29 pumps with 'C' type compensators you must ensure that the maximum pressure setting never exceeds 140 or 100 bar (2000 or 1500 psi) dependent on the type of fluid being used.
- ***CAUTION*** *- It is possible to mechanically adjust the compensator up to 3,000 psi (210 bar).*
- It is recommended that a relief valve be fitted externally as protection against overloads. Where a relatively large amount of fluid is directly subject to compensator pressure, it may be possible to omit the relief valve.

**'CC' and 'CMC' Pressure Compensators with Adjustable Max. Displacement Stop**

The pressure compensator section performs as described above. The adjustable stop allows the maximum pump delivery to be adjusted between 25 to 100%. To assist priming, adjust the stop setting to provide at least 40% of the maximum displacement.

**'CG' Pressure Compensator, Remotely Controlled**

Same as the 'C' compensator, but arranged for remote pressure adjustment by appropriate pilot controls. One or more pilot relief valves and/or pilot directional valves, in series or in parallel, can provide many varied remote pilot systems.

**'CV' Load Sensing Compensator, Remotely Controlled**

Automatically matches pump delivery to system demand at a pressure approximately 250 psi (17 bar) above load pressure. This pressure difference can be created by:

- A variable flow restrictor (noncompensated flow control) or the spool opening of a directional control valve.

Both forms can be used with fixed and variable speed pump drives. In the latter case a fixed restrictor can provide preset, near-constant pump flow independent of drive speed, provided that the speed exceeds that which gives the required flow at full displacement. An external pressure limiter must be added to prevent overloading the pump.

The matching of pump pressure and delivery to system demands provides power matching and conservation by minimizing system power wastage.

**'H' Handwheel Control**

Provides manual variation or selection of pump delivery. The control can be operated on both sides of center permitting bi-directional flow characteristics.

Approximate change of displacement per one turn of handwheel is:

- PVB5 ..... 0.16 $in^3$ (2.6 $cm^3$)
- PVB6 ..... 0.21 $in^3$ (3.4 $cm^3$)
- PVB10 ..... 0.32 $in^3$ (5.2 $cm^3$)
- PVB15 ..... 0.50 $in^3$ (8.2 $cm^3$)

**'M' Lever Control**

Provides mechanical or manual variation of pump delivery in approximate proportion to the angluar movement from the center position. This control may be operated on both sides of center permitting bi-directional flow characteristics. The pintle-mounted lever control must be secured by suitable linkage to maintain desired settings; both extremes of pintle travel are limited by internal stops to approx. 17.5° from center.

Control torques (approx. at 1500 r/min).

- PVB5 ..... 33 lbf in at 300 psi (3.8 Nm @ 210 bar)
- PVB6 ..... 24 lbf in at 2000 psi (2.7 Nm @ 138 bar)
- PVB10 & PVB15 ..... 66 lbf in at 1000 psi (7.5 Nm @ 70 bar)

***Note:*** *Torque varies with pressure and speed.*

**Hydraulic Fluids**

All pumps can be used with anti-wear hydraulic oils, water glycols and water-in-oil (invert) emulsions. It is possible to use these pumps with high water base fluids (e.g. 5%/95% oil-in-water emulsion) at pressures up to 70 bar (1000 psi).

The extreme operating viscosity range is from 220 to 13 cSt (1020 to 70 SUS) for all pumps (except where 5%/95% emulsions are used). The recommended running range is 54 to 13 cSt (245 to 70 SUS).

The viscosity of 5%/95% emulsion is near-constant at about 1 or 2 cSt (<35 SUS).

# CONTROL DATA FOR MHPVB PUMPS (CONT.)

**Temperature Limits**

Minimum ambient ..... -20°C (-4°F)
Maximum ambient ..... +70°C (+158°F)

**Fluid Temperatures**

| | MINERAL OIL | WATER-CONTAINING |
|---|---|---|
| Minimum | 20°C (-4°F) | +10°C (+50°F) |
| Maximum | +80°C (+176°F) | +54°C (+129°F) |

** To obtain maximum service life from both fluid and hydraulic system, 65° C (150° F) normally is the maximum temperature except for water-containing fluids. Whatever the actual temperature range, ensure that viscosities stay within the limits specified in "Hydraulic Fluids" section.*

**Drive Requirements:**
**- Direction of Rotation**

Clockwise or anti-clockwise (viewed at shaft-end).

**-Drive Methods**

Direct co-axial drive through a suitable flexible coupling is preferred. If an indirect drive is to be used, please consult Hydraulex/Metaris first.

**Filtration Requirements**

20/18/14 or ISO 18/14.

**Noise Levels**

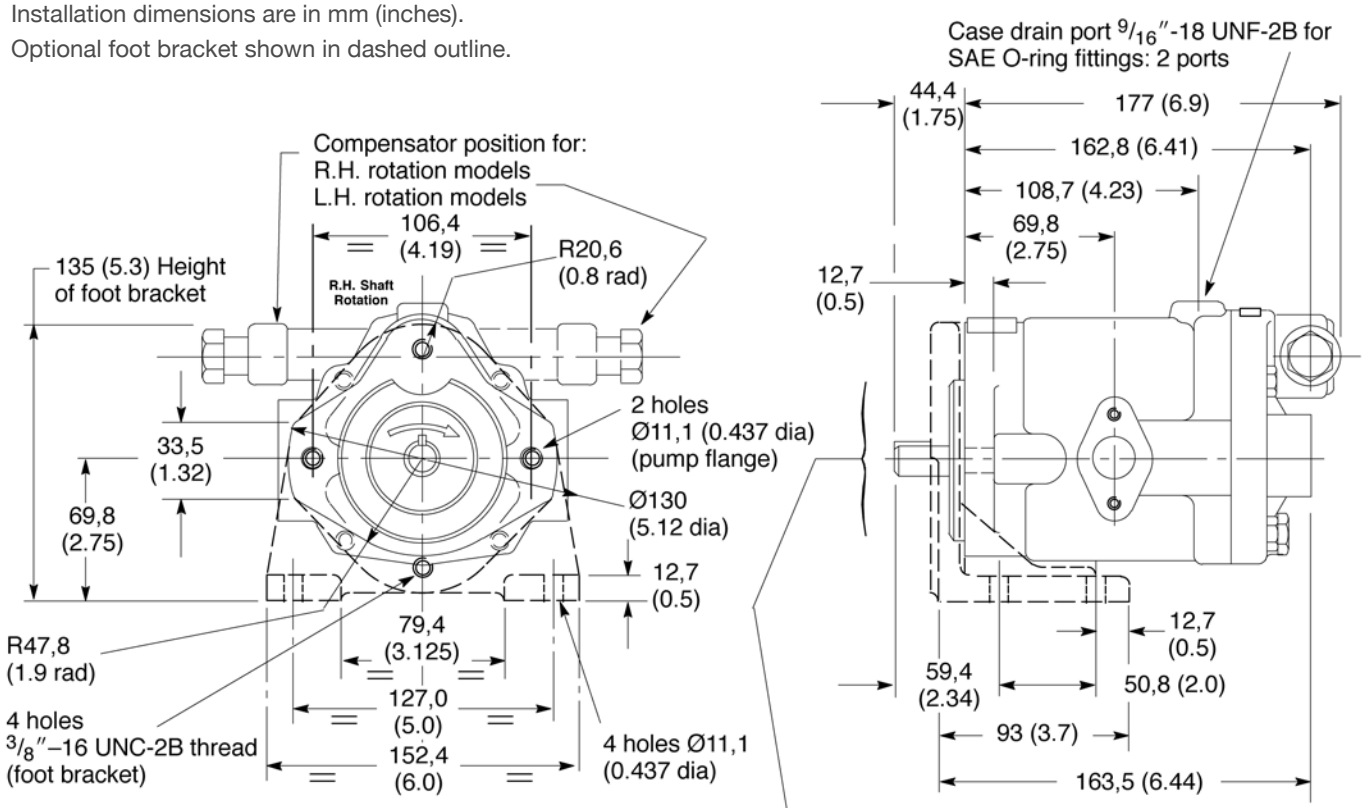
* Typical values equivalent to NFPA

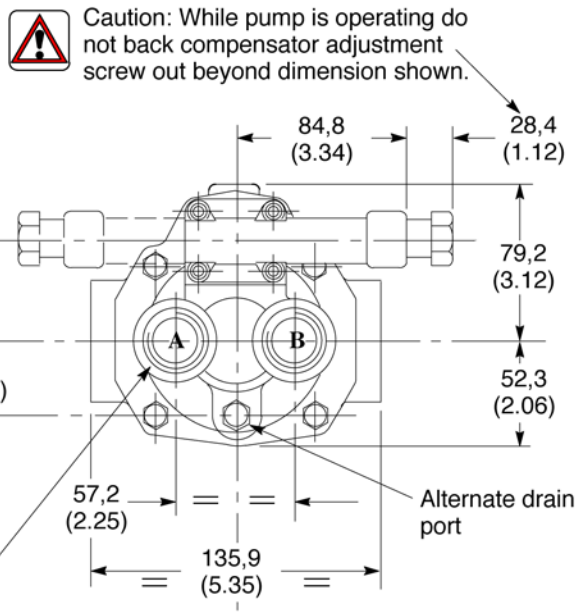
| Speed r/min | Pressure bar (psi) | Stroke | Noise level – dB(A)* | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | PVB5 | PVB6 | PVB10 | PVB15 | PVB20 | PVB29 |
| 1000 | 35 (500) | Full flow | 51 | 52 | 54 | 58 | – | – |
| | | Cutoff | 51 | 51 | 44 | 47 | – | – |
| | 70 (1000) | Full flow | 54 | 55 | 56 | 60 | – | – |
| | | Cutoff | 52 | 54 | 49 | 54 | – | – |
| | 140 (2000) | Full flow | 56 | 57 | 60 | 62 | – | – |
| | | Cutoff | 58 | 56 | 55 | 59 | – | – |
| | 210 (3000) | Full flow | 60 | – | 61 | – | – | – |
| | | Cutoff | 59 | – | 59 | – | – | – |
| 1200 | 35 (500) | Full flow | 50 | 51 | 55 | 60 | – | – |
| | | Cutoff | 52 | 51 | 48 | 51 | – | – |
| | 70 (1000) | Full flow | 54 | 55 | 57 | 61 | 74 | 70 |
| | | Cutoff | 56 | 57 | 51 | 54 | – | – |
| | 140 (2000) | Full flow | 59 | 59 | 60 | 63 | 74 | 73 |
| | | Cutoff | 59 | 60 | 54 | 58 | 69 | 76 |
| | 210 (3000) | Full flow | 60 | – | 62 | – | 78 | – |
| | | Cutoff | 61 | – | 56 | – | – | – |
| 1500 | 35 (500) | Full flow | 54 | 54 | 58 | 63 | – | – |
| | | Cutoff | 52 | 52 | 51 | 52 | – | – |
| | 70 (1000) | Full flow | 58 | 58 | 60 | 64 | – | – |
| | | Cutoff | 57 | 57 | 55 | 55 | – | – |
| | 140 (2000) | Full flow | 61 | 62 | 62 | 66 | – | – |
| | | Cutoff | 62 | 59 | 62 | 59 | – | – |
| | 210 (3000) | Full flow | 64 | – | 65 | — | – | – |
| | | Cutoff | 62 | – | 63 | — | – | – |
| 1800 | 35 (500) | Full flow | 57 | 58 | 61 | 64 | – | – |
| | | Cutoff | 55 | 57 | 55 | 56 | – | – |
| | 70 (1000) | Full flow | 60 | 61 | 63 | 67 | 76 | 77 |
| | | Cutoff | 59 | 58 | 59 | 60 | – | – |
| | 140 (2000) | Full flow | 63 | 66 | 65 | 69 | 81 | 81 |
| | | Cutoff | 62 | 63 | 62 | 64 | 75 | 81 |
| | 210 (3000) | Full flow | 64 | – | 67 | – | 81 | – |
| | | Cutoff | 64 | – | 65 | – | – | – |

# DIMENSIONS

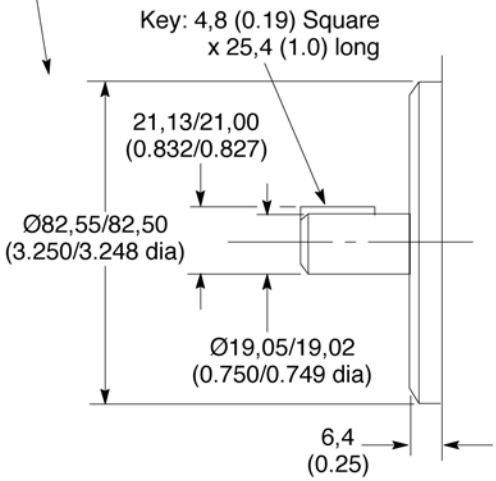
## MHPVB5/6 SAE FLANGE MOUNTING - PRESSURE COMPENSATED CONTROL - 'C' AND 'CM'

Installation dimensions are in mm (inches).
Optional foot bracket shown in dashed outline.




**View on rear end of pump**




**Detail of shaft, key and locating diameter**

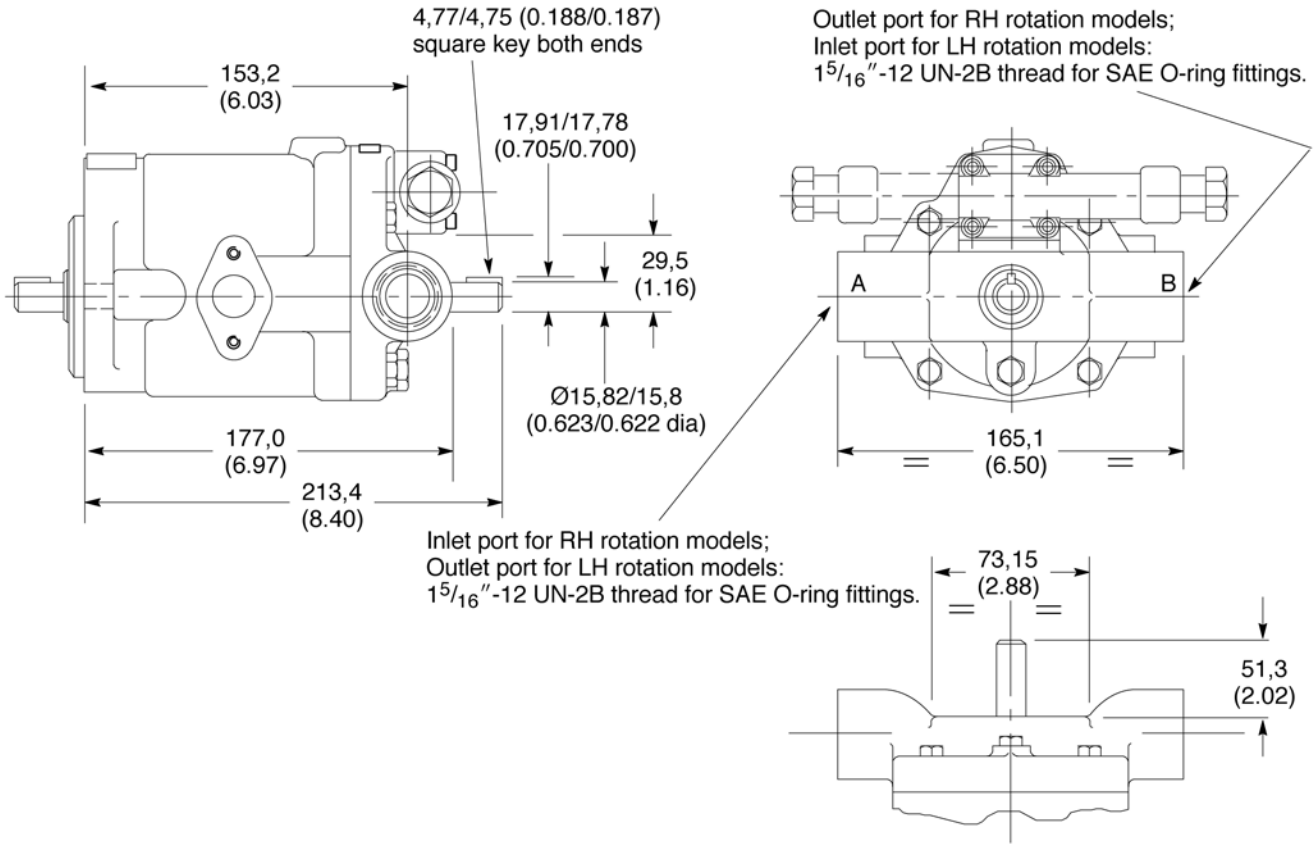
| Shaft rotation | Inlet port | Outlet port |
|---|---|---|
| RH | A | B |
| LH | B | A |

# DIMENSIONS

## MHPVB5/6 THRU-SHAFT MODELS (WITH SIDE PORTS)

Installation dimensions are in mm (inches).
For other dimensional and installation data see previous page.

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.



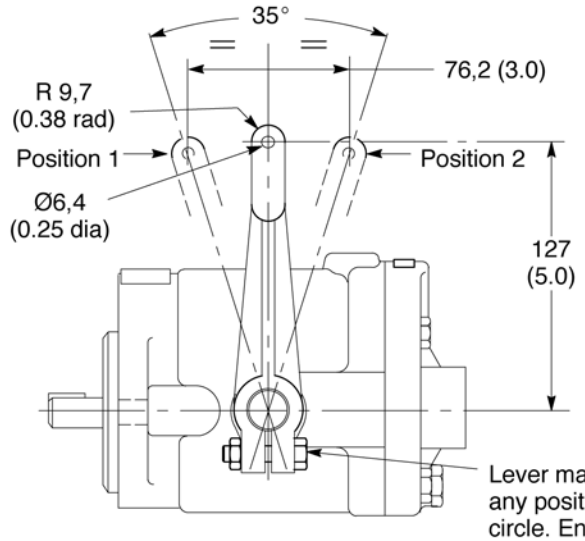
# DIMENSIONS

## MHPVB5/6 MANUAL/MECHANICAL CONTROLS

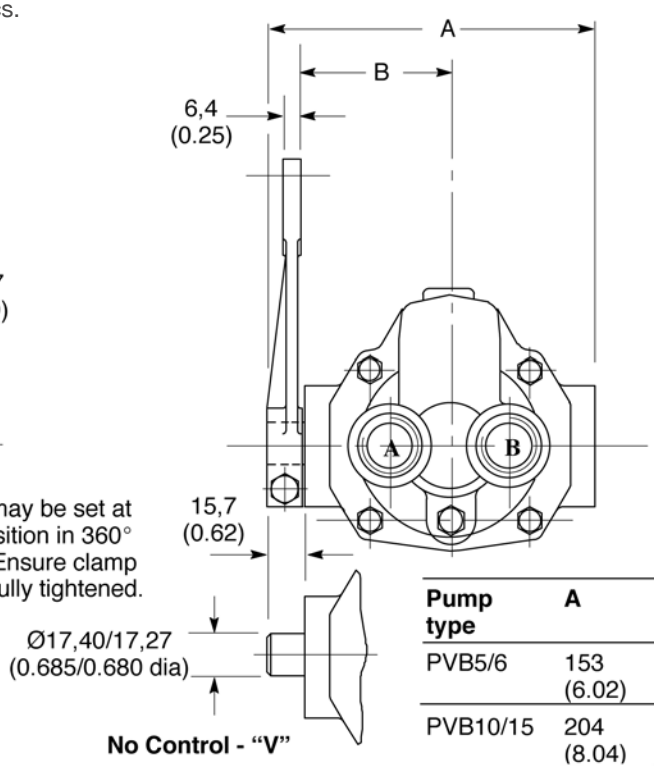
### Lever Control - 'M' and No Control - 'V'

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

Installation dimensions are in mm (inches).



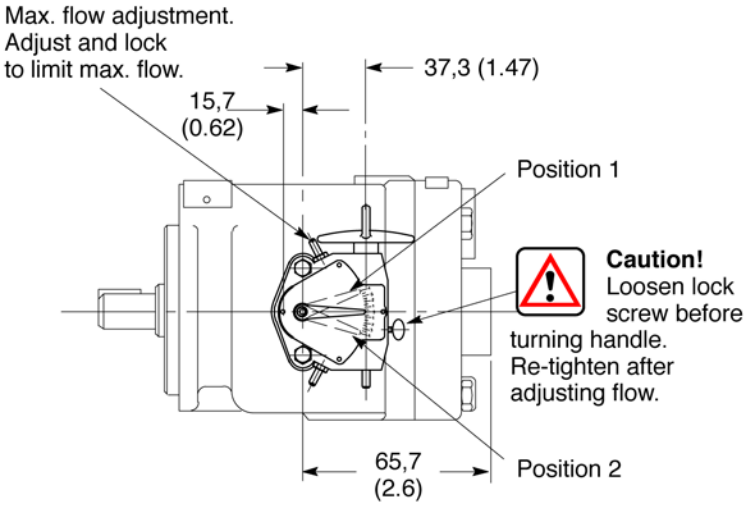

| Shaft rotation | Lever position | Outlet port |
|---|---|---|
| RH | 1 | A |
| | 2 | B |
| LH | 1 | B |
| | 2 | A |



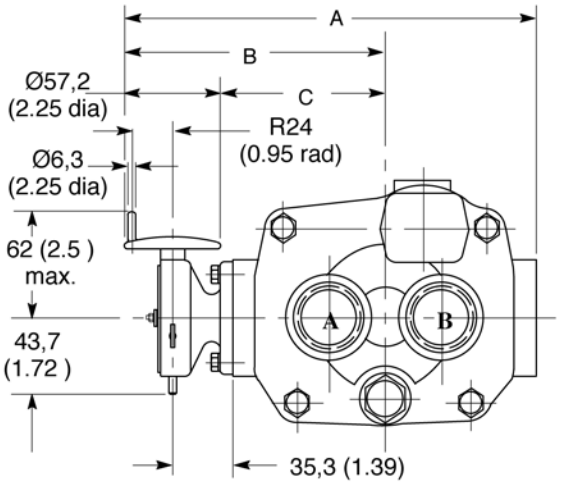

| Pump type | A | B |
|---|---|---|
| PVB5/6 | 153 (6.02) | 68,9 (2.7) |
| PVB10/15 | 204 (8.04) | 99,9 (3.93) |

### 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 |



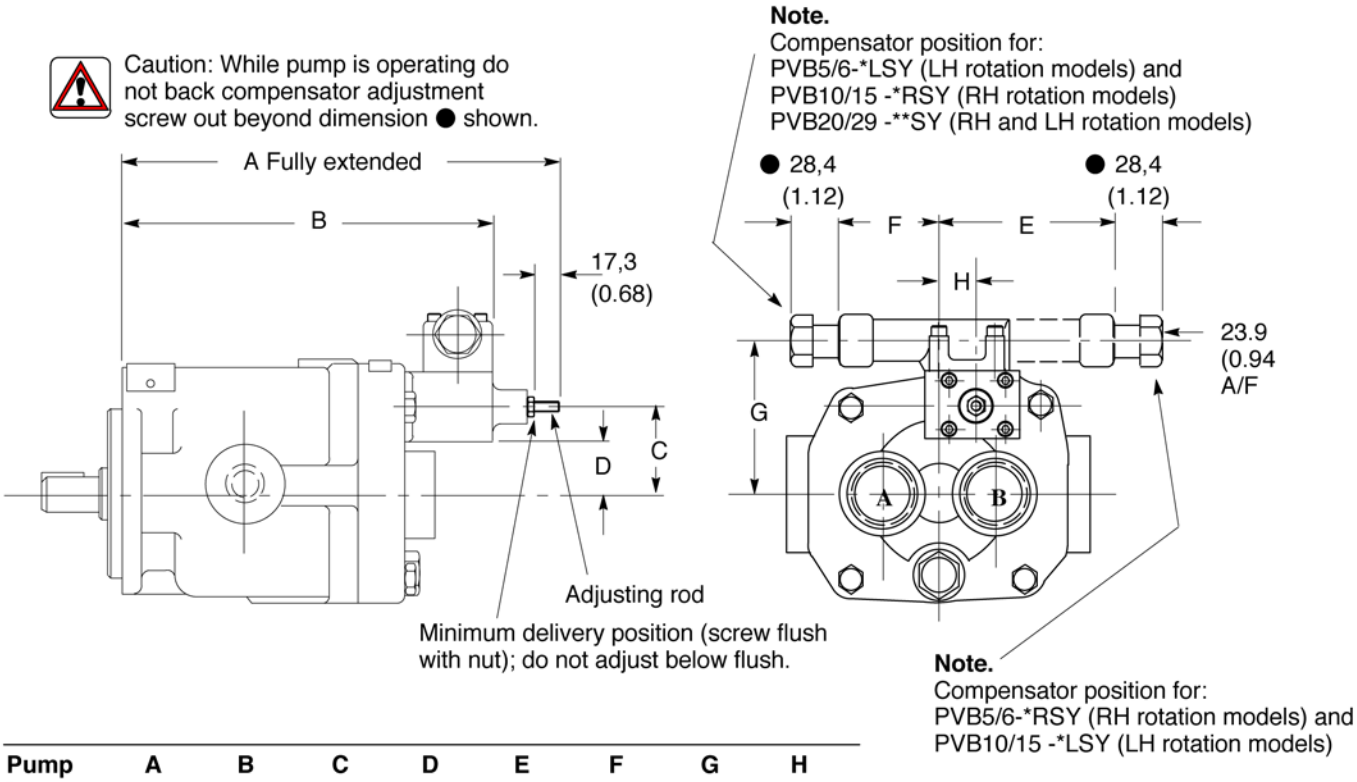

| Pump type | A | B | C |
|---|---|---|---|
| PVB5/6 | 200 (7.87) | 129 (5.08) | 70,6 (2.78) |
| PVB10/15 | 250 (9.84) | 140 (5.51) | 93,5 (3.68) |

# DIMENSIONS

## MHPVB5/6, 10/15 AND 20/29 WITH PRESSURE COMPENSATOR AND ADJUSTABLE MAXIMUM DISPLACEMENT STOP: CONTROL TYPES 'CC' AND 'CMC'

Installation dimensions are in mm (inches).

For other dimensional and installation data see previous pages.



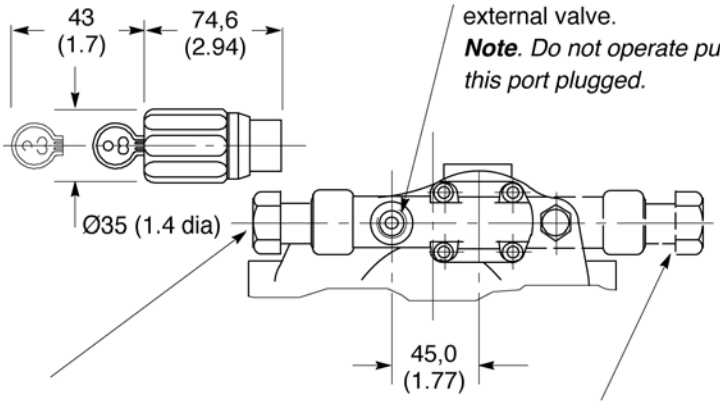

| Pump type | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| PVB5/6 | 233 (9.17) | 195 (7.68) | 50 (1.97) | 22,9 (0.9) | 76,2 (3.0) | 94,4 (3.72) | 94,4 (3.72) | _ |
| PVB10/15 | 266 (10.47) | 226 (8.9) | 52,3 (2.06) | 25,1 (0.99) | 118 (4.65) | 70,8 (2.79) | 90,2 (3.55) | 23,8 (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) |

# DIMENSIONS

## MHPVB5/6, 10/15 AND 20/29 WITH 'CG' REMOTE CONTROL OF COMPENSATOR

Installation dimensions are in mm (inches).

### 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.

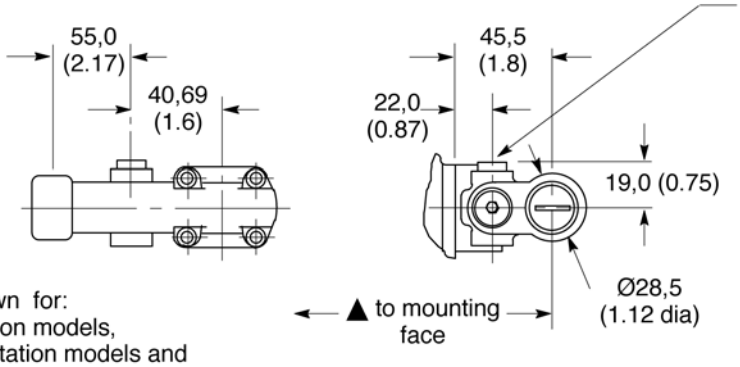
Location as shown in dotted outline for:
PVB5/6 RH rotation models and
PVB10/15 LH rotation models.

**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.

### TYPE 'CVP' LOAD SENSING WITH PRESSURE LIMITER

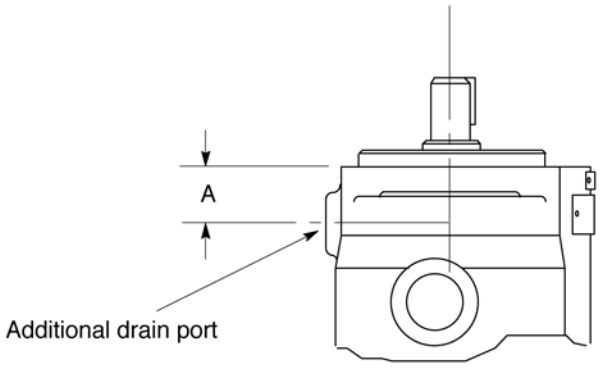



Load sensing control port:
.4375-20 UNF-2B thread
for SAE O-ring fittings.

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 MHPVB5 TO 29



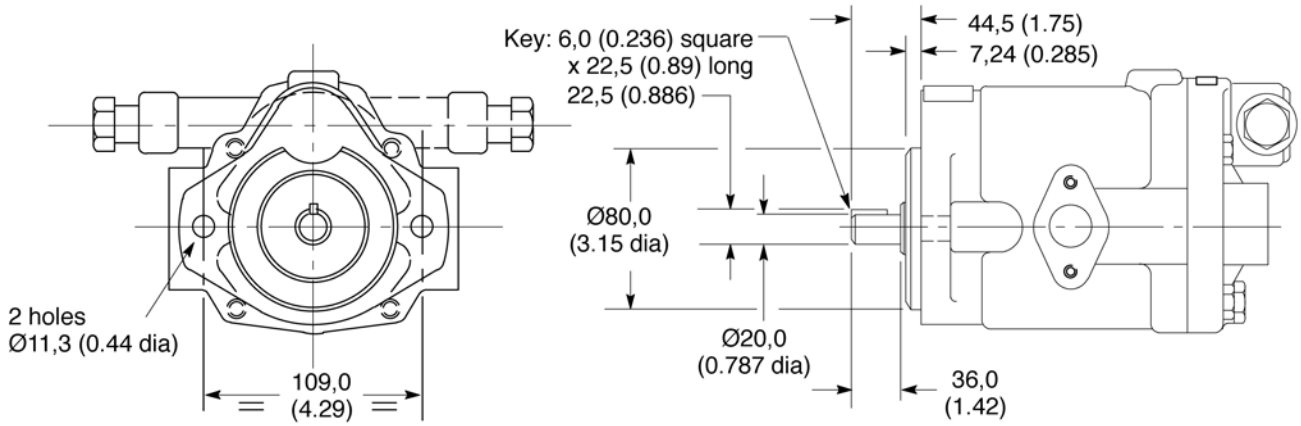

| Pump type | Port tapping | A |
|---|---|---|
| PFB5 | .562518UNF-2B | 28,7 (3.85) |
| PVB5/6 | .5625 18UNF-2B | 19 (0.75) |
| PVB10/15 | .7500 16UNF-2B | 29,3 (1.15) |
| PVB20/29 | .7500 16UNF-2B | 38,9 (1.53) |

# DIMENSIONS

## MHPVB5/6 - DIN/ISO MODELS

Installation dimensions are in mm (inches).
For dimensions/data not shown refer to the corresponding SAE models.

## PRESSURE COMPENSATED CONTROL - 'C' AND 'CM'



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