

Vickers®

# Vane Pumps



## Variable Displacement Vane Pumps for Industrial Applications

Model Series VVS and VVP

Maximum Displacements to 100 cm<sup>3</sup>/r (6.1 in<sup>3</sup>/r)

Maximum Pressures to 160 bar (2300 psi)



**VICKERS**

# Contents

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|  |    |
|--|----|
| <b>Introduction</b> .....                  | 3  |
| <b>Series VVS Pumps</b> .....              | 3  |
| Model Code .....                           | 5  |
| Technical Data .....                       | 6  |
| Two-stage Pressure Device .....            | 7  |
| Performance Characteristics                |    |
| VVS0 .....                                 | 8  |
| VVS1 .....                                 | 9  |
| VVS2 .....                                 | 10 |
| VVS3 .....                                 | 11 |
| Dimensions                                 |    |
| VVS0 .....                                 | 12 |
| VVS1 .....                                 | 13 |
| VVS2 & VVS3 .....                          | 14 |
| <b>Series VVP Pumps</b>                    |    |
| Model Code .....                           | 16 |
| Technical Data .....                       | 18 |
| Controls                                   |    |
| Pressure Regulation .....                  | 19 |
| Load sensing and Pressure Regulation ..... | 20 |
| Performance Characteristics                |    |
| VVP1 .....                                 | 21 |
| VVP2 .....                                 | 22 |
| VVP3 .....                                 | 23 |
| Dimensions                                 |    |
| VVP1 .....                                 | 24 |
| VVP2 & VVP3 .....                          | 25 |
| <b>Series VVS and VVP Pumps</b>            |    |
| Dimensions – Base Mounted Pumps .....      | 27 |
| <b>Combined Pumps</b>                      |    |
| Pump Combinations .....                    | 28 |
| Torque Requirements .....                  | 30 |
| Dimensions .....                           | 31 |
| <b>Installation Instructions</b> .....     | 35 |

# Introduction

## Description

Vickers variable displacement vane pumps are available in four nominal sizes (0-1-2-3) and, are divided into three displacements. Each size, while retaining the same pump body, is available in two versions: low pressure VVS (100 bar, 1500 psi) with mechanical pressure regulator and high pressure VVP (160 bar, 2300 psi) with hydraulic pressure regulator.

The rotor shaft of Vickers pumps is pre-arranged for mounting an additional pump. By removing the rear cover, the secondary pump can be easily attached (see items A and B on page 4). Combining standard pumps eliminates the need for many "special application" pumps.

As shown in the cross-sectional views, pumps consist of:

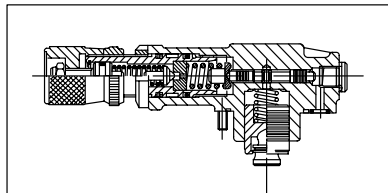
- (1) Body
- (2) One-piece shaft and rotor
- (3) Vanes
- (4) Pressure ring that changes the eccentricity and therefore the displacement of the pump, at hydrostatic axial compensation
- (5) Pressure plate stator to provide the passage of oil from the suction port to the pressure port
- (6) Guide block balancing adjustment screw
- (7) Displacement adjustment piston that regulates the maximum pressure compensated flow
- (8) Maximum volume adjustment screw (optional feature – see model code page 5)
- (9) Pressure regulator
- (10) Pressure regulator adjustment

## Features & Benefits

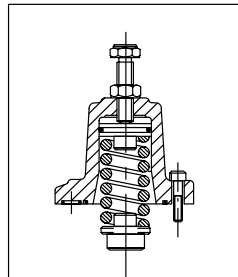
- Long pump life resulting from manufacturing material characteristics, hydrodynamic lubrication of bearings, and hydrostatic balancing of distribution plates
- Quiet pump operation from 66 to 73 dBA
- Simplifies hydraulic circuit by eliminating maximum pressure relief valves and heat exchangers. Pumps can be supplied with various pressure regulators to control the maximum system pressure.
- Standard ISO and SAE mountings
- Combinations of standard pumps provide flexibility and cost effective pump packages.

## Modular Construction

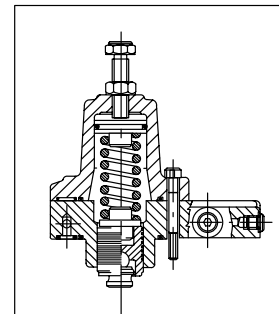
**VVP** hydraulic pressure compensator for pressure and flow controls



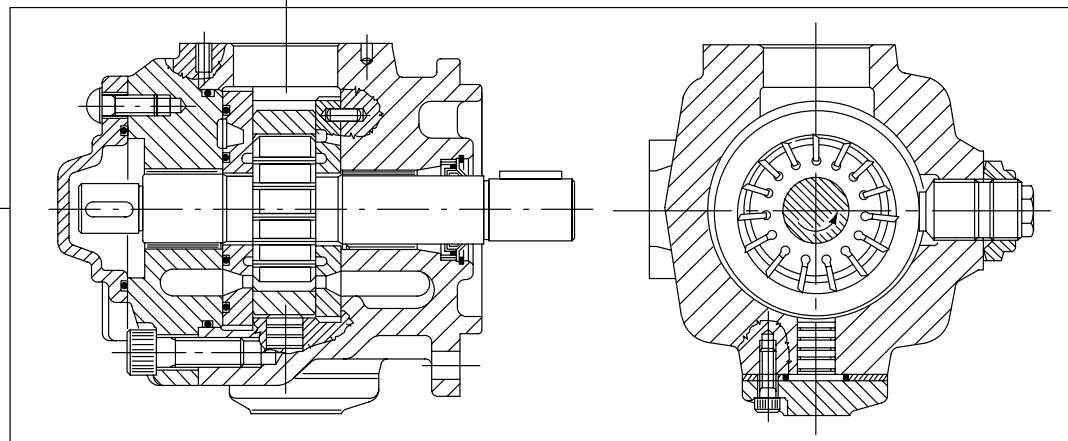
**VVS** mechanical pressure compensator



**VVS** mechanical pressure compensator with two stages of pressure (not available on VVS0)



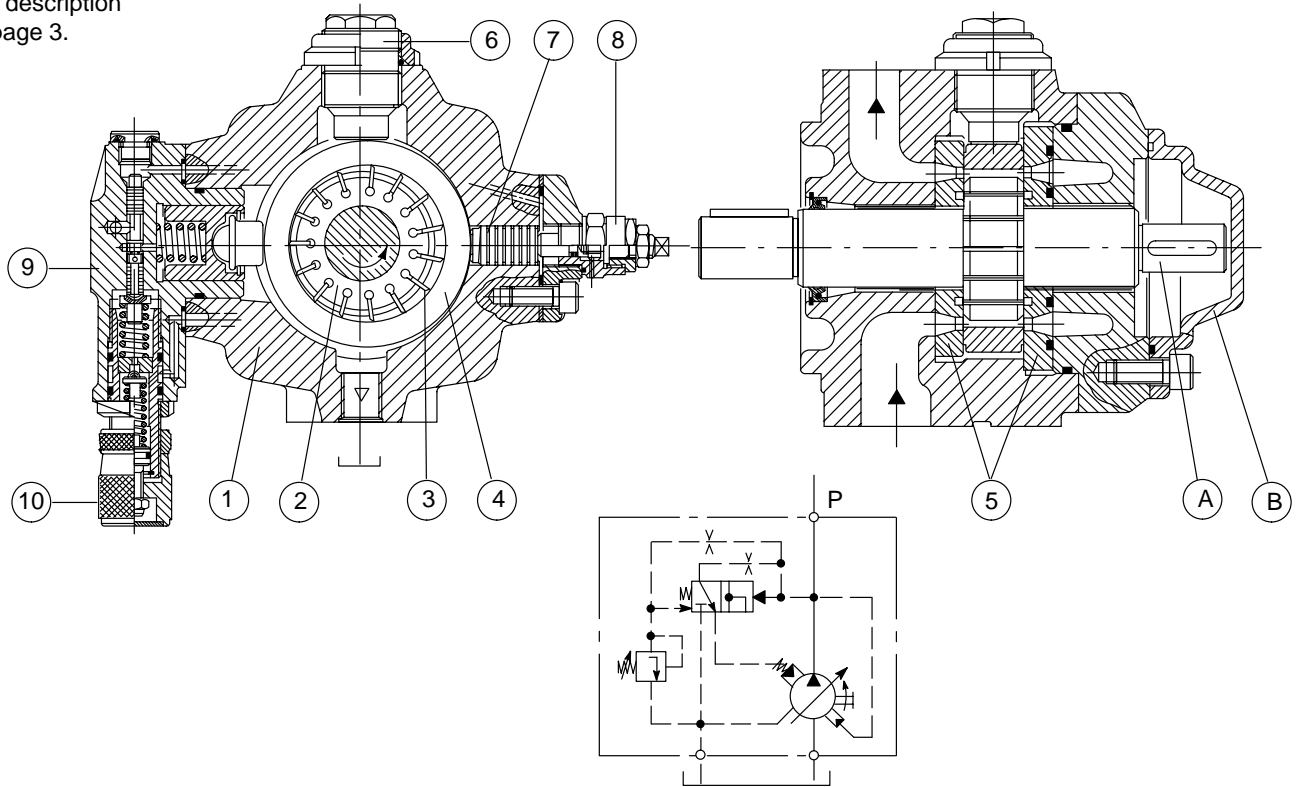
**Basic pump**



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### VVP Pump

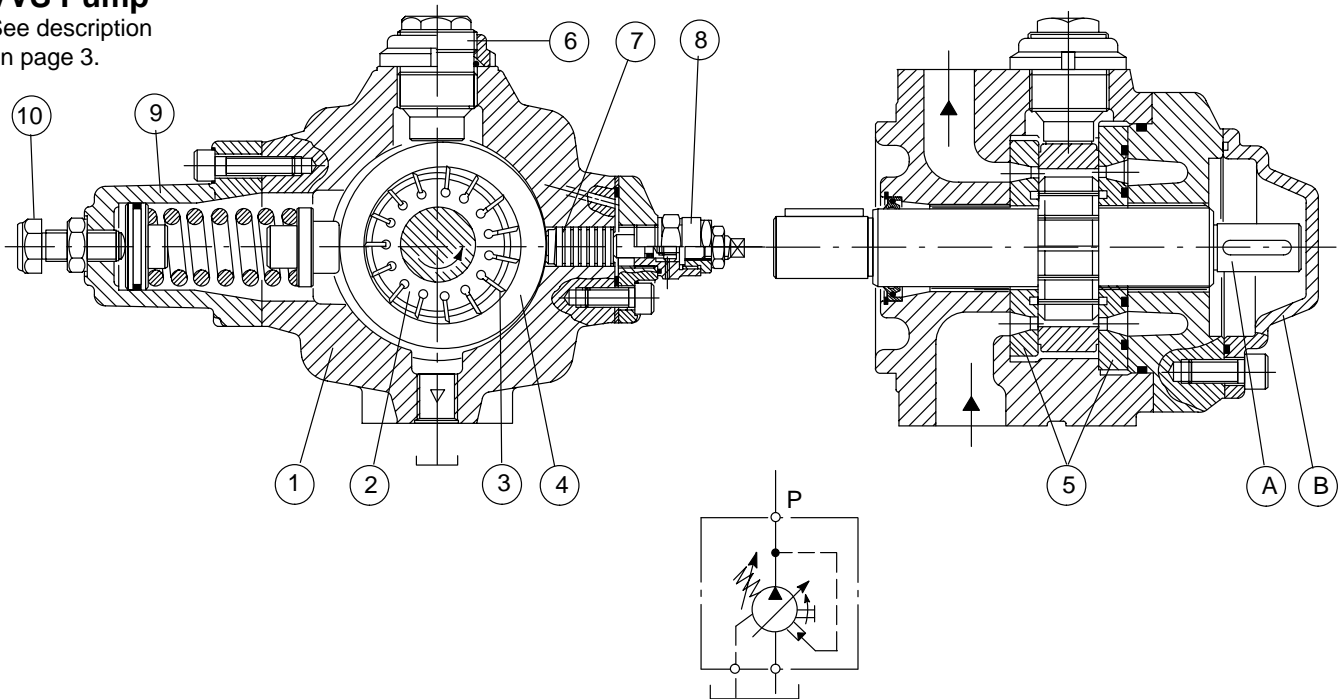
See description on page 3.



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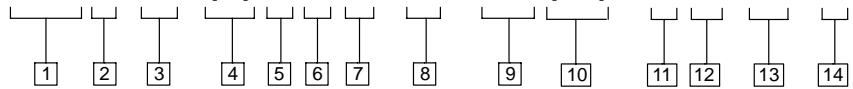
### VVS Pump

See description on page 3.



# Series VVS Model Code

## VVS 1-16-(S) R R M-30-CD (03) - D W-10- \*\*



### 1 Variable vane pump

#### 2 Frame size

- 0 – 6, 10, 12 cm<sup>3</sup>/r
- 1 – 16, 20, 25 cm<sup>3</sup>/r
- 2 – 32, 40, 50 cm<sup>3</sup>/r
- 3 – 63, 80, 100 cm<sup>3</sup>/r

#### 3 Nominal size/geometric displacement, max. pressure

- |                              |                                    |
|------------------------------|------------------------------------|
| 06 – 6 cm <sup>3</sup> /r    | } Maximum<br>150 bar<br>(2200 psi) |
| 10 – 10 cm <sup>3</sup> /r   |                                    |
| 12 – 12 cm <sup>3</sup> /r   |                                    |
| 16 – 16 cm <sup>3</sup> /r   | } Maximum<br>100 bar<br>(1500 psi) |
| 20 – 20 cm <sup>3</sup> /r   |                                    |
| 25 – 25 cm <sup>3</sup> /r   |                                    |
| 32 – 31,5 cm <sup>3</sup> /r |                                    |
| 40 – 40 cm <sup>3</sup> /r   | } Maximum<br>80 bar<br>(1200 psi)  |
| 50 – 50 cm <sup>3</sup> /r   |                                    |
| 63 – 63 cm <sup>3</sup> /r   |                                    |
| 80 – 80 cm <sup>3</sup> /r   |                                    |
| 100 – 100 cm <sup>3</sup> /r |                                    |

#### 4 Adjust. max. displacement stop

S – With stop  
(Omit if not required.)

#### 5 Mounting flange/port conn.

| Code | Mounting flange   | Port connections   |
|------|---|--|
| R    | ISO 3019/2 with straight keyed shaft (size 0 is only available as a single or secondary pump)                         | G (BSPF) thread. (6–25 cm <sup>3</sup> /r pumps)                                 |
| RF   | ISO 3019/2 with straight keyed shaft  | SAE 4-bolt flange with metric mounting bolts (31,5–100 cm <sup>3</sup> /r pumps) |
| PS   | ISO 3019/2 with straight keyed shaft (for size 0 pumps only). Size 0 is only available as a single or secondary pump. | SAE UNF thread. (6–25 cm <sup>3</sup> /r pumps)                                  |
|      | SAE B 4-bolt with straight keyed shaft (for size 1 pumps only)  |  |
| PF   | SAE C 2-bolt with straight keyed shaft (only available on a primary or single pump)                                   | SAE 4-bolt flange with UNC mounting bolts (31,5–100 cm <sup>3</sup> /r pumps)    |
| PX   | ISO 3019/2 with straight keyed shaft (available only on secondary pump)   | SAE 4-bolt flange with UNC mounting bolts (31,5–100 cm <sup>3</sup> /r pumps)    |
| B    | Base plate mounting (available only as single pump)   | O-ring sealed (16–100 cm <sup>3</sup> /r pumps)                                  |

Note: See page 34 for detailed dimensional listing for mounting flanges, shafts and ports.

### 6 Rotation viewed from shaft end

R – Right hand (clockwise) only

#### 7 Fluid compatibility

M – Mineral oil  
E – Phosphate esters

#### 8 Pump design number

Subject to change. Installation dimensions remain unaltered for designs 30–39.

#### 9 Pressure control

C – Standard pressure compensator  
CD – Dual pressure compensator (only available for 16–100 cm<sup>3</sup>/r)

### 10 Electrical rating and wiring connection (for CD pressure control only)

- 01 – 220V AC 50 Hz with DIN 43650 plug connection
- 02 – 115V AC 60 Hz with 1/2" NPT conduit box
- 03 – 24V DC with DIN 43650 plug connection

(Omit if not required.)

#### 11 Control pressure setting

- A – 15–50 bar (215–700 psi)
- B – 30–80 bar (430–1200 psi) (sizes 63–100 cm<sup>3</sup>/r)
- C – 30–100 bar (430–1500 psi) (sizes 6–50 cm<sup>3</sup>/r)
- D – 80–150 bar (1200–2200 psi) (sizes 6–12 cm<sup>3</sup>/r)

#### 12 Control adjustment

W – Screw with locknut  
KL – Screw with key lock

#### 13 Control design number

10 – For all models.  
Subject to change. Installation dimensions remain unaltered for designs 10–19.

#### 14 Special features suffix

# Series VVS Technical Data

| Nominal size  | Size 0   | Size 1                                       | Size 2                                       | Size 3                                      |
|---|--|--|--|---|
| <b>Displacement</b> according to ISO 3662 – cm <sup>3</sup> /r (in <sup>3</sup> /r)                                     | 6 (0.366)<br>10 (0.610)<br>12 (0.732)                    | 16 (0.976)<br>20 (1.220)<br>25 (1.526)       | 31,5 (1.922)<br>40 (2.441)<br>50 (3.051)     | 63 (3.845)<br>80 (4.882)<br>100 (6.102)     |
| <b>Actual displacement</b> – cm <sup>3</sup> /r (in <sup>3</sup> /r)  | 6,9 (0.421)<br>11 (0.671)<br>13,1 (0.799)                | 17,9 (1.092)<br>22,1 (1.349)<br>26,9 (1.642) | 34,5 (2.105)<br>42,8 (2.612)<br>53,1 (3.240) | 69 (4.211)<br>86,2 (5.260)<br>105,5 (6.438) |
| <b>Mounting flange type</b> (See model code, page 5.)   | ISO 3019/2<br>SAE 4-bolt                                 | ISO 3019/2<br>SAE 4-bolt<br>Base plate       | ISO 3019/2<br>SAE C 2-bolt<br>Base plate     | ISO 3019/2<br>SAE C 2-bolt<br>Base plate    |
| <b>Maximum working pressure</b> – bar (psi)   | 150 (2200)   | 100 (1500)                                   | 100 (1500)                                   | 80 (1200)                                   |
| <b>Allowed maximum drain port pressure</b> – bar (psi)  | 1 (15)   |  |  |   |
| <b>Inlet pressure (absolute)</b> – bar (psi)  | 0,5 to 1,5 (7 to 22)                                     |  |  |   |
| <b>Speed range</b> – r/min  | 800 to 1800  |  |  |   |
| <b>Rotation direction</b> (viewed from shaft end)   | Right-hand (clockwise)                                   |  |  |   |
| <b>Loads on drive shaft</b>   | No radial or axial loads allowed                         |  |  |   |
| <b>Maximum torque on primary shaft</b> – Nm (lb-in)<br>(See pages 28 and 30 for torque requirements of combined pumps.) | 110 (974)  | 197 (1744)                                   | 400 (3540)                                   | 740 (6550)                                  |
| <b>Hydraulic fluid</b>  | Mineral oil – HM according to ISO 3498 – Phosphate Ester |  |  |   |
| <b>Viscosity range at working temperature</b> – mm <sup>2</sup> /s (cSt)  | 23 to 45   |  |  |   |
| <b>Recommended viscosity</b> – mm <sup>2</sup> /s (cSt) at 50°C (122°F)   | 32   |  |  |   |
| <b>Viscosity index</b>  | 100 minimum  |  |  |   |
| <b>Fluid temperature range</b> – °C (°F)  | –10 to 70 (14 to 158)                                    |  |  |   |
| <b>Maximum fluid contamination level</b>  | Class 9 per NAS 1638, or class 18/15 per ISO 4406        |  |  |   |
| <b>Weight</b> – kg (lb)   | 6,5 (14.3)   | 12 (26.5)                                    | 32 (70.5)                                    | 44 (97)                                     |

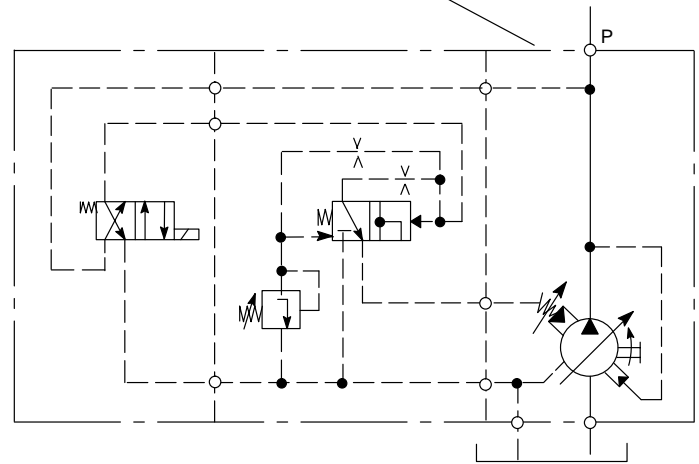
In case of different operating conditions, contact Vickers.

# Two-stage Pressure Device for VVS Pumps

## Advantages of hydraulic circuit with two-stage pressure adjustment:

- Two pressure settings allow pump to reduce power consumption required when working against a closed-center hydraulic valve system
- Pump will compensate at the lower pressure setting with no pilot flow loss.
- Allows the use of hydraulic valves with “all closed” neutral positions
- Allows several different pressure settings to be used
- Pump has a longer effective working life with less downtime

Pump with two-stage pressure device

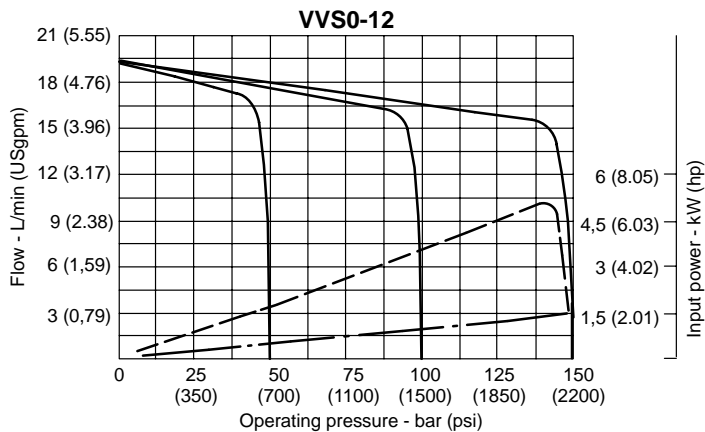
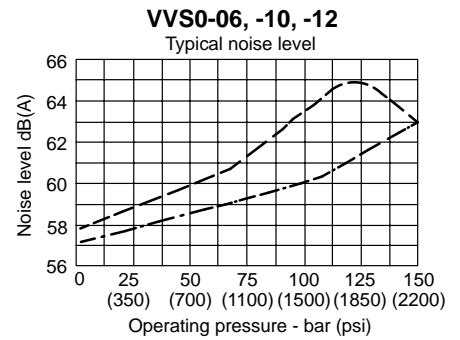
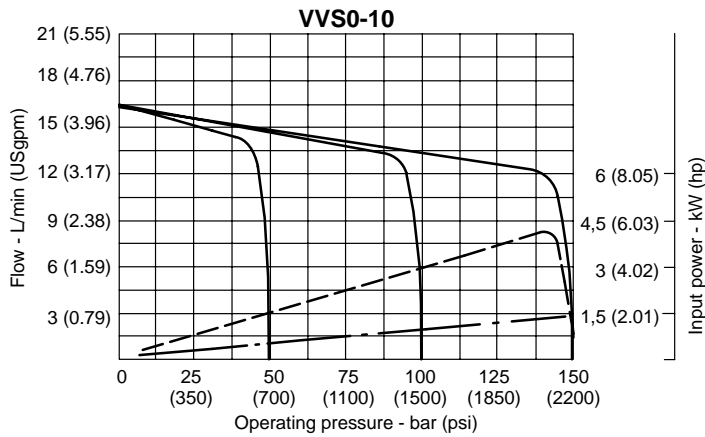
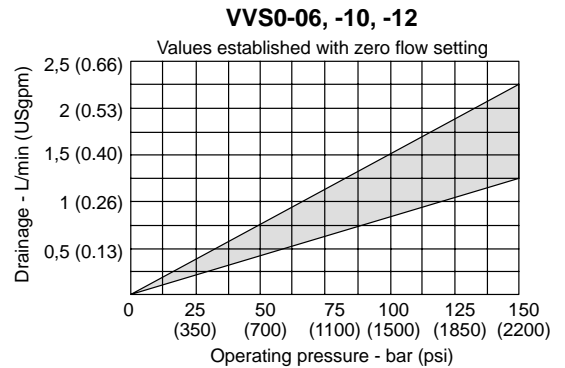
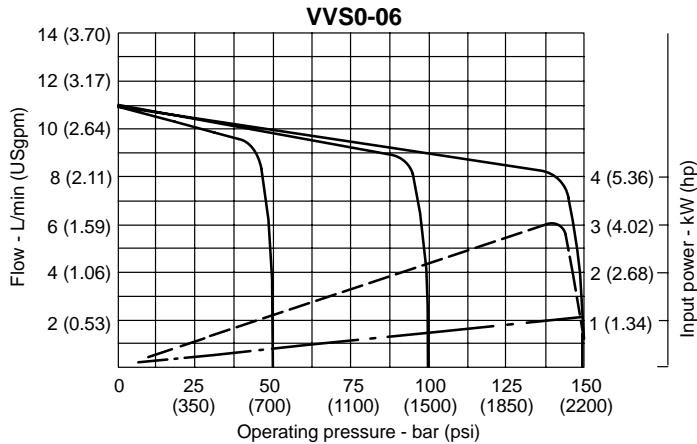


# VVS0 Performance Characteristics

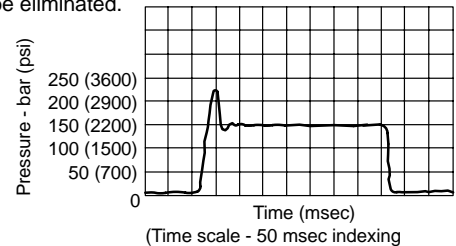
## Performance with:

speed 1450 r/min;  
 oil per ISO 3498;  
 visc. 32 mm<sup>2</sup>/s (cSt);  
 temp. 50°C (122°F)

Power consumption with maximum flow — — — — —  
 Power consumption with zero flow setting — — — — —



**VVS0-06, -10, -12**  
 Response time and pressure peak  
 (Test from Q max Qo - Qo Q max)  
 Pressure peaks are due to test circuit. Peaks exceeding 30% of the max. operating pressure shall be eliminated.



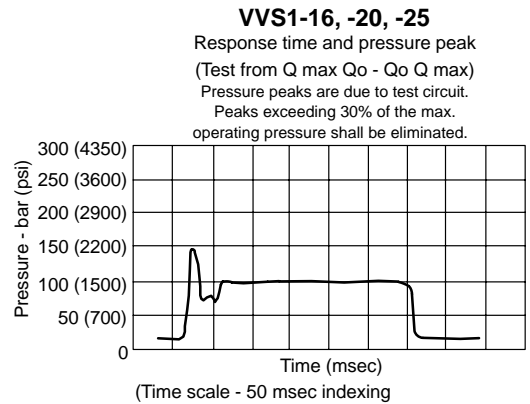
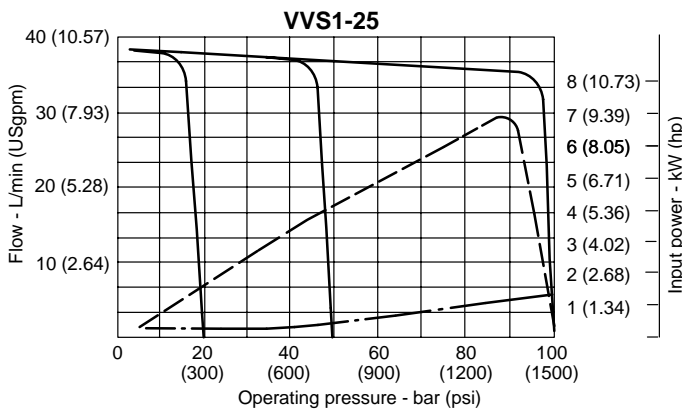
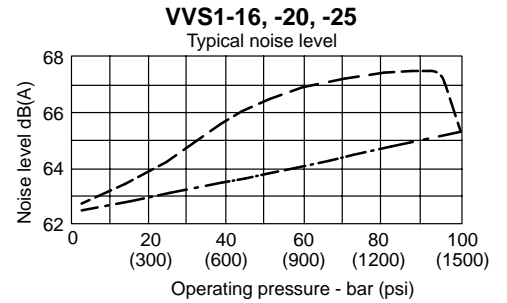
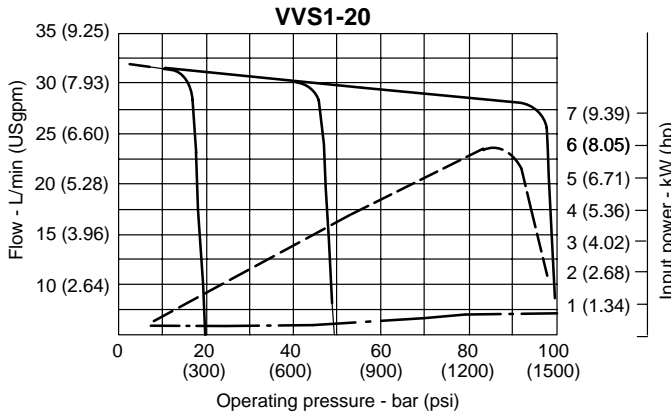
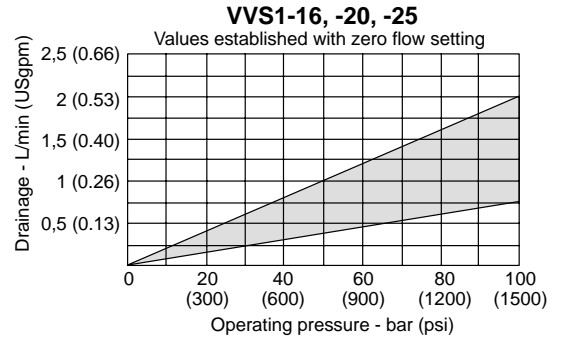
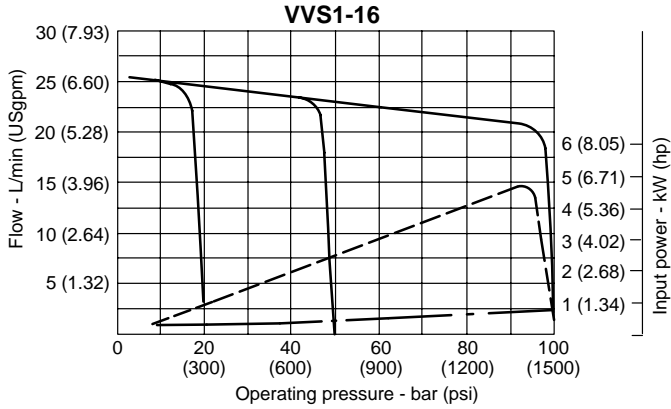


# VVS1 Performance Characteristics

**Performance with:**

Speed 1450 r/min;  
 Oil per ISO 3498;  
 Visc. 32 mm<sup>2</sup>/s (cSt);  
 Temp. 50°C (122°F)

Power consumption with maximum flow — — — — —  
 Power consumption with zero flow setting — — — — —

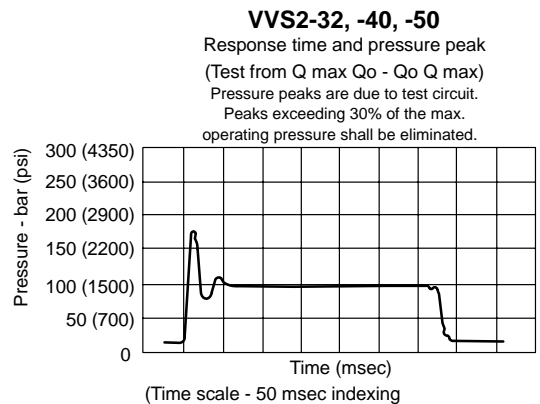
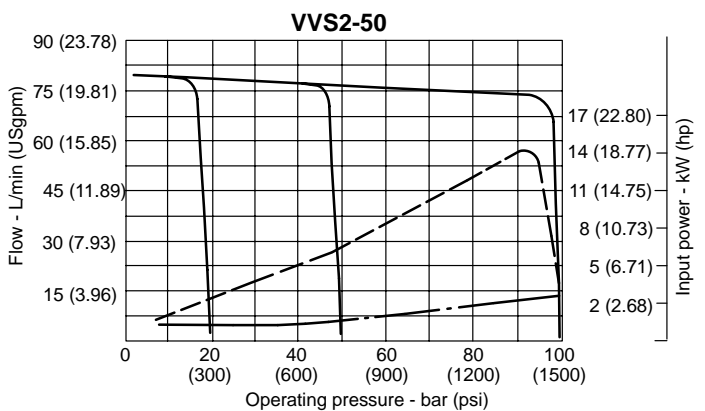
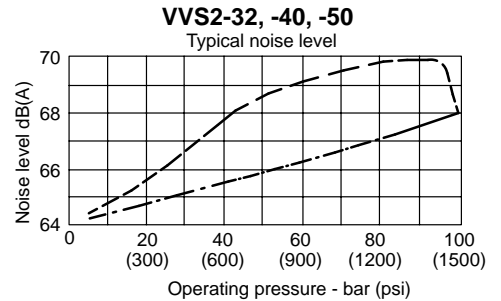
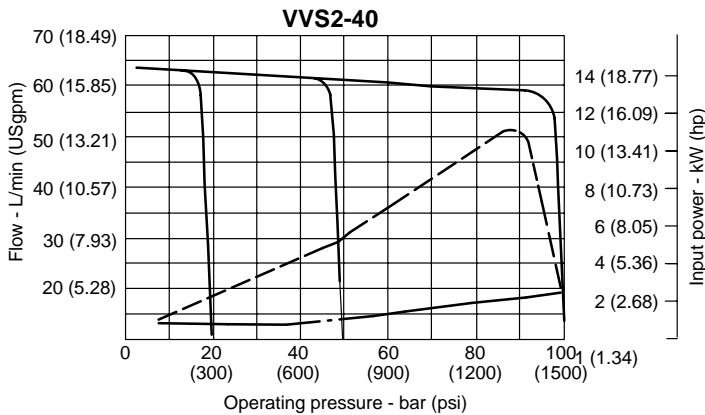
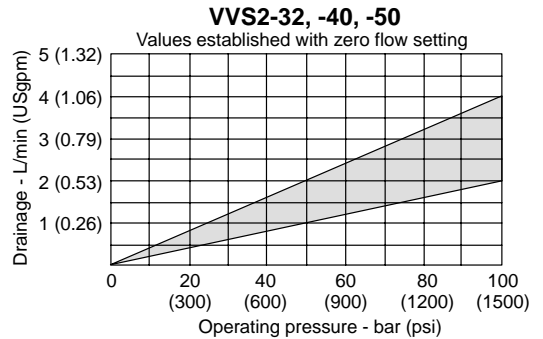
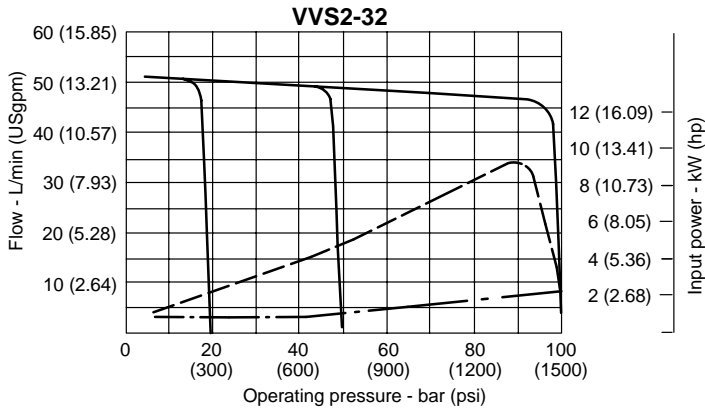


# VVS2 Performance Characteristics

## Performance with:

Speed 1450 r/min;  
 Oil per ISO 3498;  
 Visc. 32 mm<sup>2</sup>/s (cSt);  
 Temp. 50°C (122°F)

Power consumption with maximum flow   
 Power consumption with zero flow setting

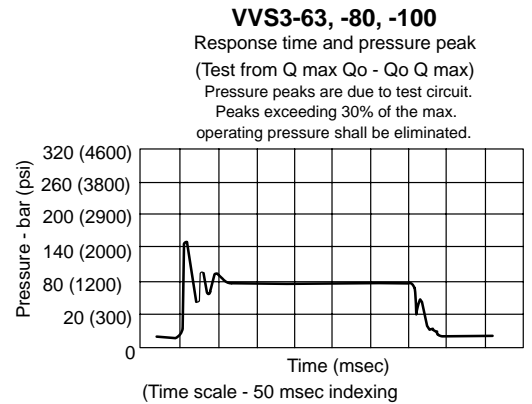
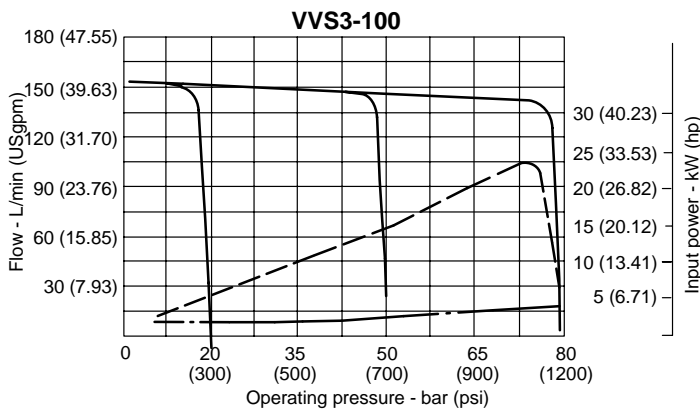
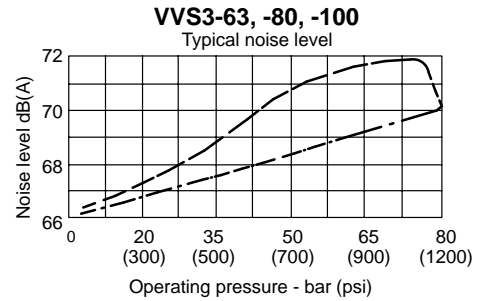
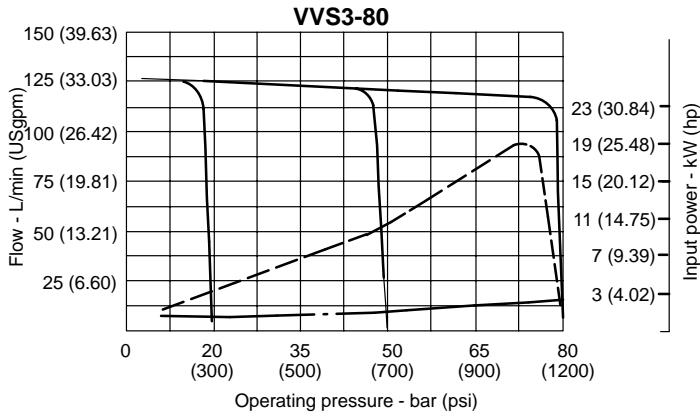
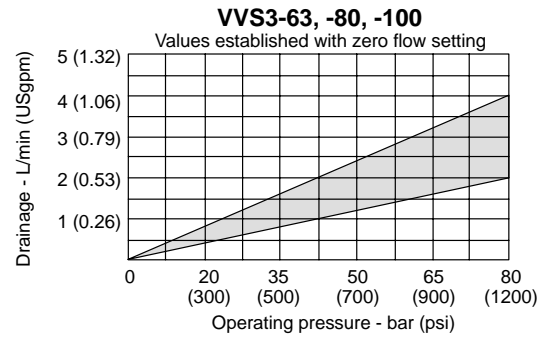
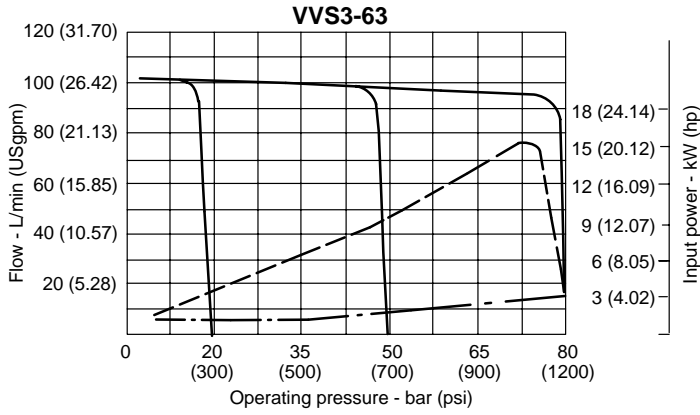


# VVS3 Performance Characteristics

**Performance with:**

Speed 1450 r/min;  
 Oil per ISO 3498;  
 Visc. 32 mm<sup>2</sup>/s (cSt);  
 Temp. 50°C (122°F)

Power consumption with maximum flow ————  
 Power consumption with zero flow setting — — — —

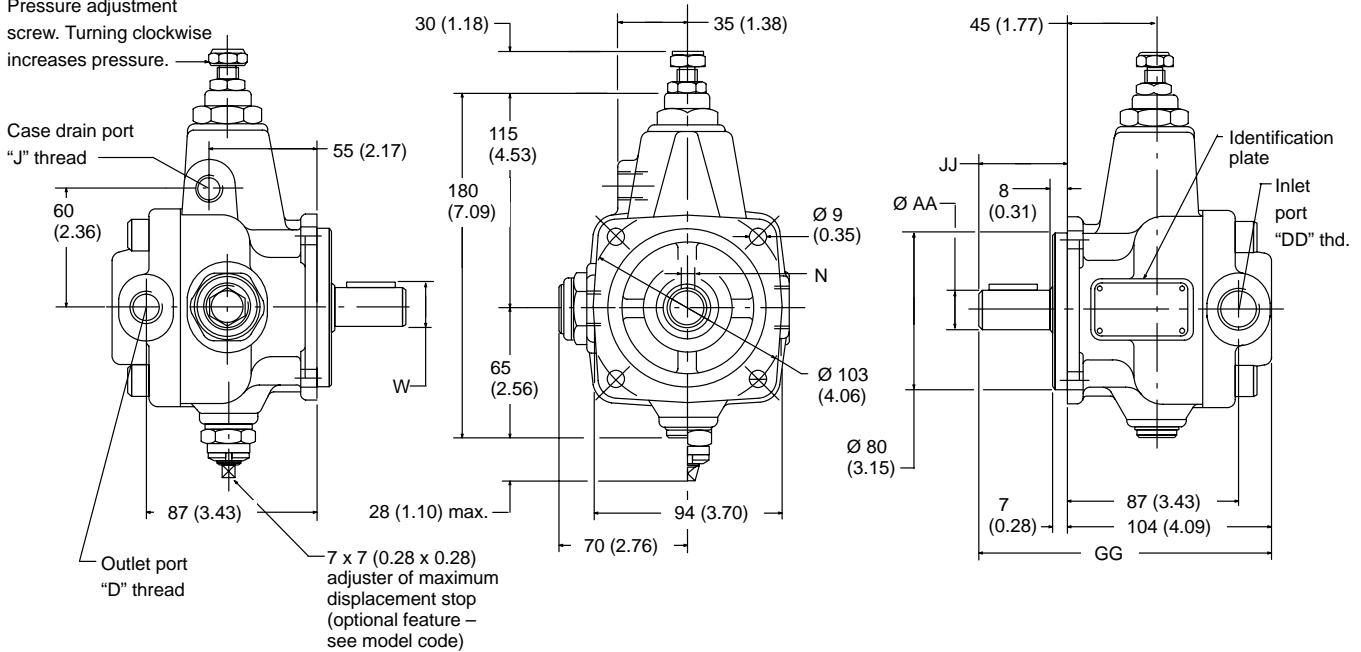


# Dimensions - VVS0 with ISO Mounting Flange

Dimensions in millimeters (inches)

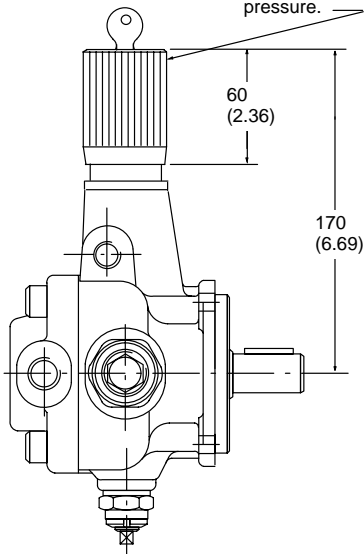
## “C” control with “W” adjustment

Pressure adjustment screw. Turning clockwise increases pressure.



## “C” control with “KL” adjustment

Pressure adjustment knob. Turning clockwise increases pressure.



Note:

1. Dual pressure control “CD” is not available on VVS0 frame size.
2. All mounting flange, port and shaft options are listed on page 34.

| Mounting flange and ports code* | D              | J              | N            | W            | Ø AA          | DD             | GG         | JJ        |
|---------------------------------|----------------|----------------|--------------|--------------|---------------|----------------|------------|-----------|
| R                               | 3/8 BSP        | 1/4 BSP        | 6 (0.236)    | 22,5 (0.886) | 20 (0.787)    | 1/2 BSP        | 148 (5.83) | 44 (1.73) |
| PS                              | .750-16 UNF-2B | .500-20 UNF-2B | 4,76 (0.187) | 17,9 (0.705) | 15,88 (0.625) | .875-14 UNF-2B | 136 (5.35) | 32 (1.25) |

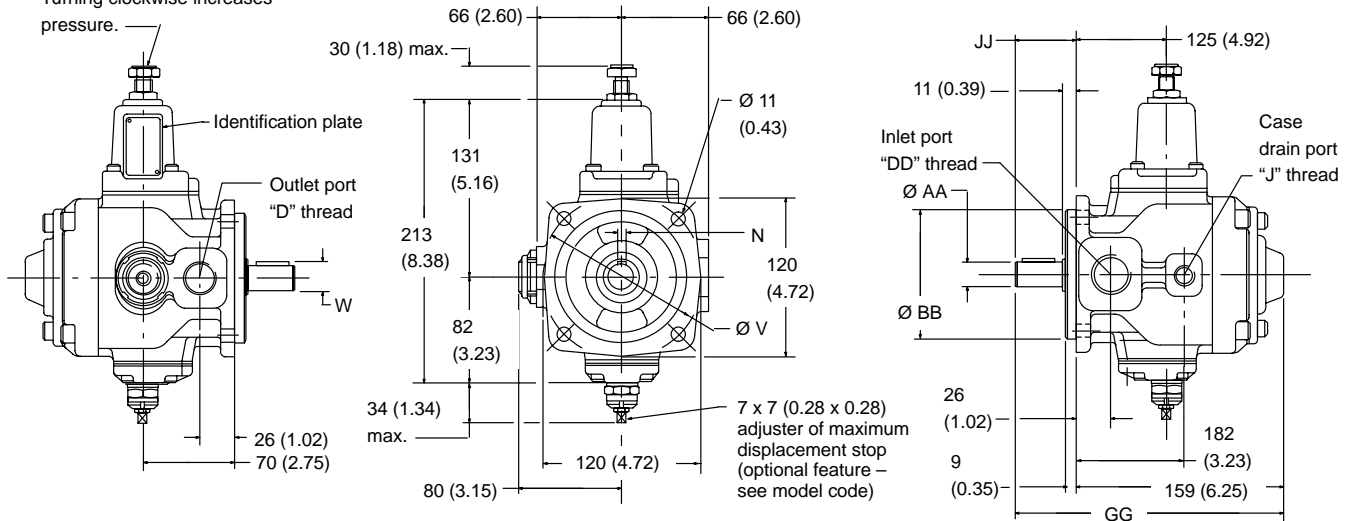
\* See model code, page 5.

# Dimensions - VVS1 with ISO or SAE Mounting Flange

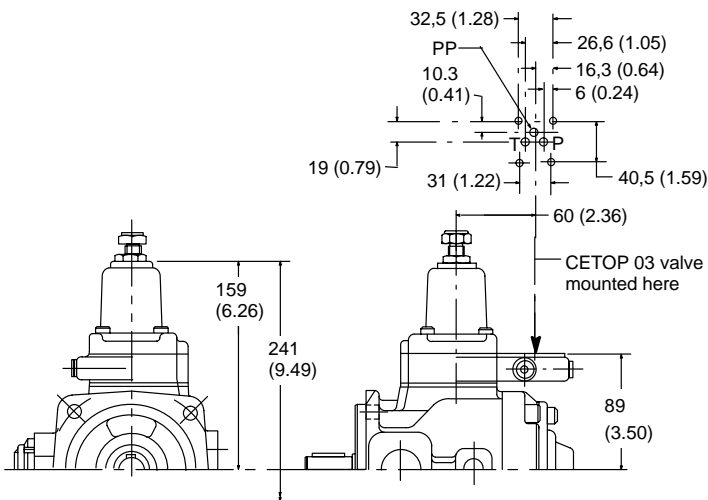
Dimensions in millimeters (inches)

## “C” control with “W” adjustment

Pressure adjustment screw.  
Turning clockwise increases pressure.

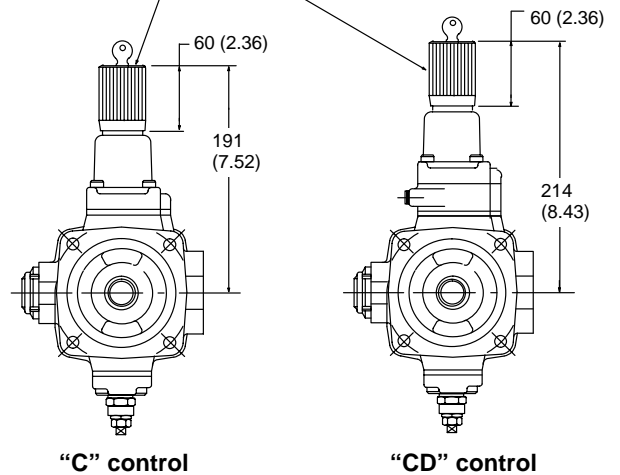


## “CD” control with “W” adjustment



## “KL” adjustment

Pressure adjustment knob.  
Turning clockwise increases pressure.



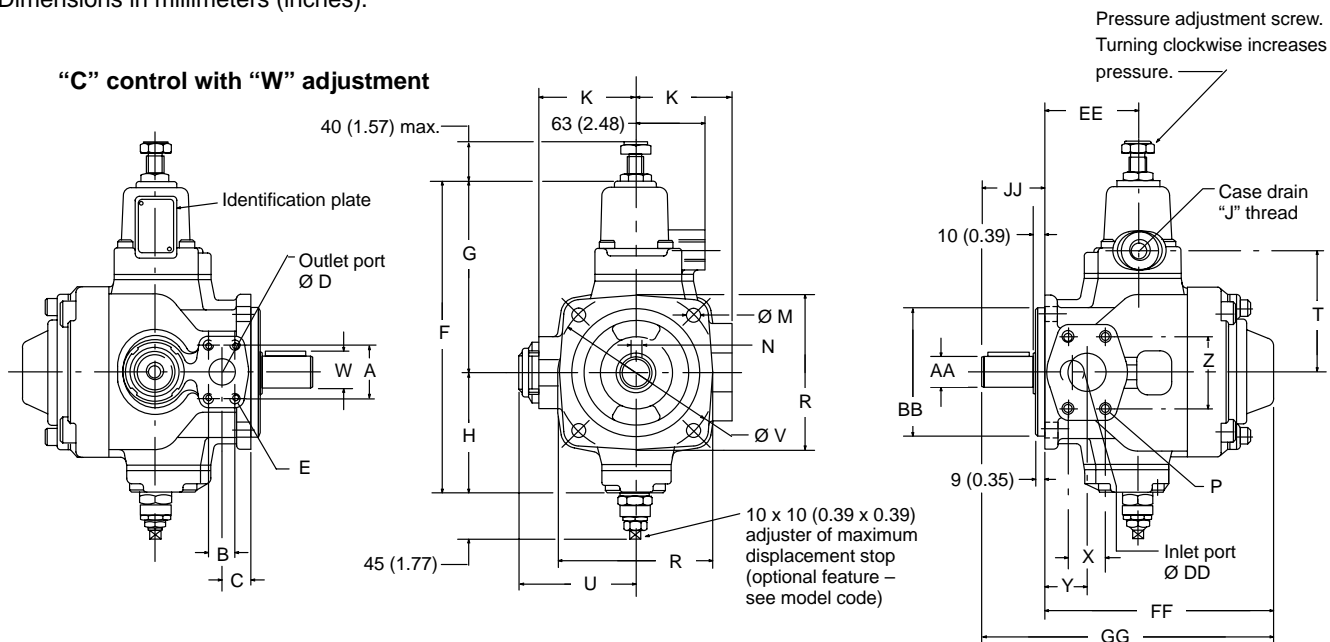
Note: All mounting flange, port and shaft options are listed on page 34.

| Mounting flange and ports code* | D                | J               | N            | ØV          | W             | AA           | ØBB           | DD               | GG         | JJ        |
|---------------------------------|------------------|-----------------|--------------|-------------|---------------|--------------|---------------|------------------|------------|-----------|
| R (ISO)                         | 3/4 BSP          | 3/8 BSP         | 8 (0.315)    | 125 (4.921) | 28 (1.102)    | 25 (0.984)   | 100 (3.937)   | 1 BSP            | 205 (8.07) | 46 (1.81) |
| PS (SAE)                        | 1.0625-12 UNF-2B | .5625-18 UNF-2B | 6,35 (0.250) | 127 (5.000) | 28,17 (1.109) | 25,4 (1.000) | 101,6 (4.000) | 1.3125-12 UNF-2B | 207 (8.15) | 48 (1.89) |

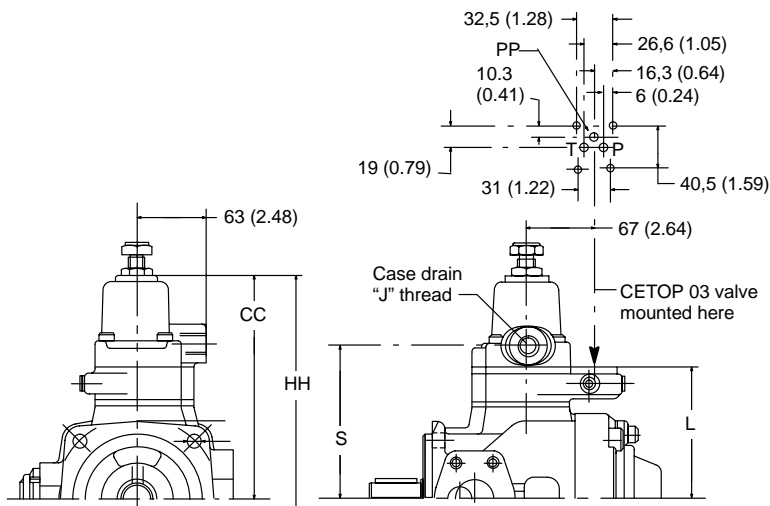
\* See model code, page 5.

# Dimensions - VVS2 & VVS3 with ISO Mounting Flange

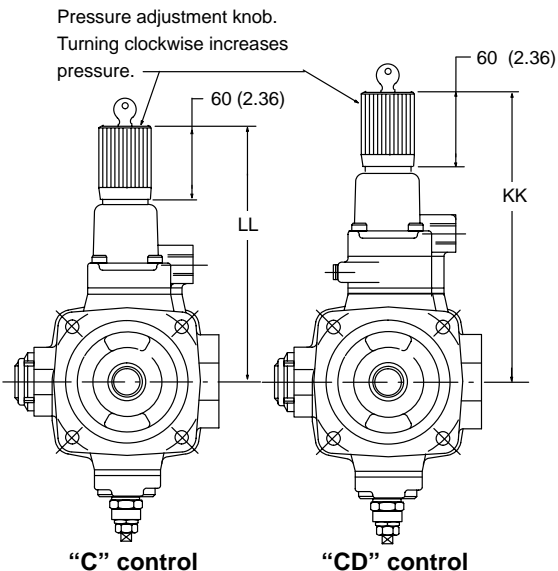
Dimensions in millimeters (inches).



## “CD” control with “W” adjustment



## “KL” control adjustment



Note: All mounting flange, port and shaft options are listed on page 34.

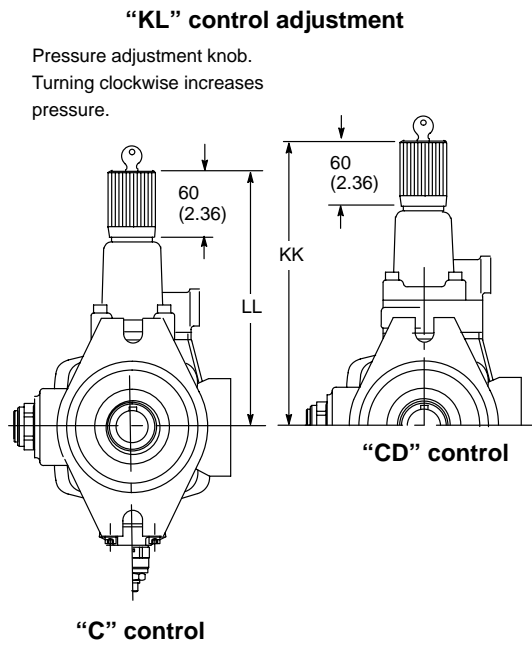
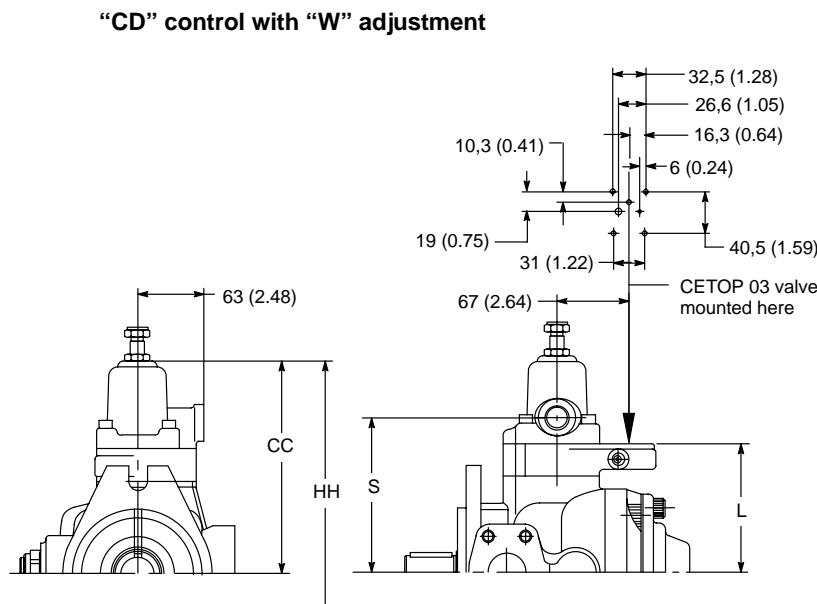
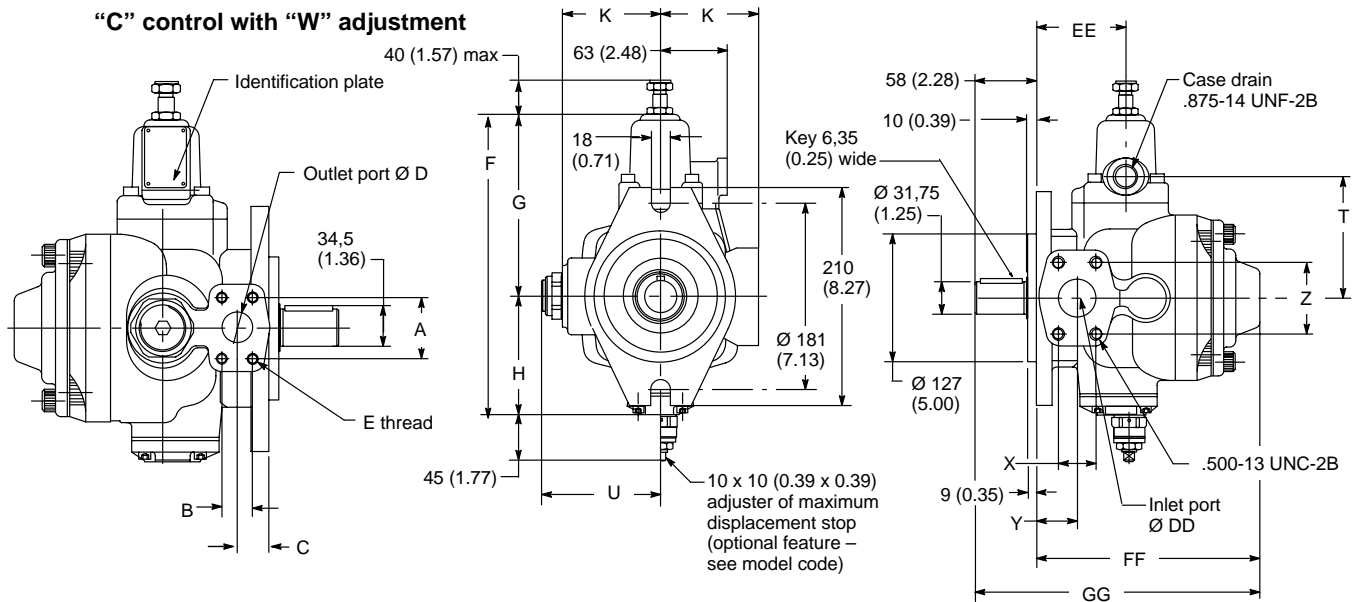
| Model | A              | B              | C            | Ø D          | E                             | F              | G             | H             | J                                | K             | L             | Ø M          | N            | P                            | R             | S             |
|-------|----------------|----------------|--------------|--------------|-------------------------------|----------------|---------------|---------------|----------------------------------|---------------|---------------|--------------|--------------|------------------------------|---------------|---------------|
| VVS2  | 52,4<br>(2.06) | 26,2<br>(1.03) | 30<br>(1.18) | 25<br>(0.98) | M10 or<br>.375-16<br>UNC-2B*  | 285<br>(11.22) | 175<br>(6.89) | 110<br>(4.33) | 1/2 BSP or<br>.875-14<br>UNF-2B* | 95<br>(3.74)  | 122<br>(4.80) | 14<br>(0.55) | 10<br>(0.39) | M12 or<br>.500-13<br>UNC-2B* | 150<br>(5.91) | 147<br>(5.79) |
| VVS3  | 58,7<br>(2.31) | 30,2<br>(1.19) | 36<br>(1.42) | 32<br>(1.26) | M10 or<br>.4375-14<br>UNC-2B* | 305<br>(12.01) | 185<br>(7.28) | 120<br>(4.72) | 1/2 BSP or<br>.875-14<br>UNF-2B* | 105<br>(4.13) | 132<br>(5.20) | 18<br>(0.71) | 12<br>(0.47) | M12 or<br>.500-13<br>UNC-2B* | 185<br>(7.28) | 157<br>(6.18) |

\* See mounting flange/port connections codes RF and PX, page 5.

| Model | T             | U             | Ø V           | W            | X              | Y            | Z              | Ø AA         | Ø BB          | CC            | Ø DD         | EE            | FF            | GG             | HH             | JJ           | KK             | LL            |
|-------|---------------|---------------|---------------|--------------|----------------|--------------|----------------|--------------|---------------|---------------|--------------|---------------|---------------|----------------|----------------|--------------|----------------|---------------|
| VVS2  | 115<br>(4.53) | 113<br>(4.45) | 160<br>(6.30) | 35<br>(1.38) | 35,7<br>(1.41) | 40<br>(1.51) | 70<br>(2.76)   | 32<br>(1.26) | 125<br>(4.92) | 207<br>(8.15) | 38<br>(1.50) | 91<br>(3.58)  | 220<br>(8.66) | 280<br>(11.02) | 317<br>(12.48) | 60<br>(2.36) | 267<br>(10.51) | 235<br>(9.25) |
| VVS3  | 125<br>(4.92) | 123<br>(4.84) | 200<br>(7.87) | 43<br>(1.69) | 43<br>(1.69)   | 46<br>(1.81) | 77,8<br>(3.06) | 40<br>(1.57) | 160<br>(6.30) | 217<br>(8.54) | 51<br>(2.01) | 105<br>(4.13) | 245<br>(9.65) | 313<br>(12.32) | 337<br>(13.27) | 68<br>(2.68) | 277<br>(10.91) | 245<br>(9.65) |

# Dimensions - VVS2 & VVS3 with SAE Mounting Flange

Dimensions in millimeters (inches).



Note: All mounting flange, port and shaft options are listed on page 34.

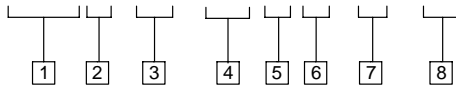
| Model | A              | B              | C            | Ø D          | E         | F              | G             | H             | K             | L             | S             | T             |
|-------|----------------|----------------|--------------|--------------|-----------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|
| VVS2  | 52,4<br>(2.06) | 26,2<br>(1.03) | 27<br>(1.06) | 25<br>(0.98) | .375 UNC  | 285<br>(11.22) | 175<br>(6.89) | 110<br>(4.33) | 95<br>(3.74)  | 122<br>(4.80) | 147<br>(5.79) | 115<br>(4.53) |
| VVS3  | 58,7<br>(2.31) | 30,2<br>(1.19) | 35<br>(1.38) | 32<br>(1.26) | .4375 UNC | 305<br>(12.01) | 185<br>(7.28) | 120<br>(4.72) | 105<br>(4.13) | 132<br>(5.20) | 157<br>(6.18) | 125<br>(4.92) |

| Model | U             | X              | Y            | Z              | CC            | Ø DD         | EE            | FF            | GG             | HH             | KK             | LL            |
|-------|---------------|----------------|--------------|----------------|---------------|--------------|---------------|---------------|----------------|----------------|----------------|---------------|
| VVS2  | 113<br>(4.45) | 35,7<br>(1.41) | 40<br>(1.51) | 70<br>(2.76)   | 207<br>(8.15) | 38<br>(1.50) | 91<br>(3.58)  | 220<br>(8.66) | 280<br>(11.02) | 317<br>(12.48) | 267<br>(10.51) | 235<br>(9.25) |
| VVS3  | 123<br>(4.84) | 43<br>(1.69)   | 46<br>(1.81) | 77,8<br>(3.06) | 217<br>(8.54) | 51<br>(2.01) | 105<br>(4.13) | 245<br>(9.65) | 313<br>(12.32) | 337<br>(13.27) | 277<br>(10.91) | 245<br>(9.65) |

# Series VVP Model Code

VVP 1 - 20 - (S) R R - M - 30 - CVTCE (03) B \* - 04 - 15 - 10 - \*\*



**1 Variable vane pump**

**2 Frame size**

- 1 – 16, 20, 25 cm<sup>3</sup>/r
- 2 – 32, 40, 50 cm<sup>3</sup>/r
- 3 – 63, 80, 100 cm<sup>3</sup>/r

**3 Nominal size/geometric displacement, maximum**

- |                              |                                    |
|------------------------------|------------------------------------|
| 16 – 16 cm <sup>3</sup> /r   | } Maximum<br>160 bar<br>(2300 psi) |
| 20 – 20 cm <sup>3</sup> /r   |                                    |
| 25 – 25 cm <sup>3</sup> /r   |                                    |
| 32 – 31,5 cm <sup>3</sup> /r |                                    |
| 40 – 40 cm <sup>3</sup> /r   | } Maximum<br>150 bar<br>(2200 psi) |
| 50 – 50 cm <sup>3</sup> /r   |                                    |
| 63 – 63 cm <sup>3</sup> /r   |                                    |
| 80 – 80 cm <sup>3</sup> /r   |                                    |
| 100 – 100 cm <sup>3</sup> /r |                                    |

**4 Adjust. max. displacement stop**

S – With stop  
(Omit if not required.)

**6 Rotation viewed from shaft end**

R – Right hand (clockwise) only

**7 Fluid compatibility**

M – Mineral oil  
E – Phosphate esters

**8 Pump design number**

Subject to change. Installation dimensions remain unaltered for designs 30–39.

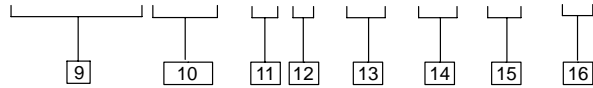
**5 Mounting flange/port conn.**

| Code | Mounting flange   | Port connections   |
|------|---|--|
| R    | ISO 3019/2 with straight keyed shaft  | G (BSPF) thread. (16–25 cm <sup>3</sup> /r pumps)                                |
| RF   | ISO 3019/2 with straight keyed shaft  | SAE 4-bolt flange with metric mounting bolts (31,5–100 cm <sup>3</sup> /r pumps) |
| PS   | SAE B 4-bolt with straight keyed shaft  | SAE UNF thread. (16–25 cm <sup>3</sup> /r pumps)                                 |
| PF   | SAE C 2-bolt with straight keyed shaft (available only on primary or single pump) | SAE 4-bolt flange with UNC mounting bolts (31,5–100 cm <sup>3</sup> /r pumps)    |
| PX   | ISO 3019/2 with straight keyed shaft (available only on secondary pump)           | SAE 4-bolt flange with UNC mounting bolts (31,5–100 cm <sup>3</sup> /r pumps)    |
| B    | Base plate mounting (available only as single pump)                               | O-ring sealed (16–100 cm <sup>3</sup> /r pumps)                                  |

Note: See page 34 for detailed dimensional listing for mounting flanges, shafts and ports.



# VVP 1 - 20 - (S) R R - M - 30 - CVTCE (03) - B \* - 04 - 15 - 10 - \*\*



## 9 Pump controls

- C – Standard pressure compensator
- CR – Remote controlled pressure control
- CD1 – Dual pressure control with non-adjustable min. pressure
- CD2 – Dual adjustable pressure control
- CE – Proportional pressure control
- CVP – Load sensing compensator
- CVPR – Remote controlled load sensing control
- CVPD1 – Load sensing control with dual pressure with fixed minimum pressure
- CVPD2 – Load sensing control with dual adjustable pressure control
- CVPCE – Load sensing control with proportional pressure control
- CVT – Torque limiter
- CVTR – Remote controlled torque limiter
- CVTD – Torque control with dual adjustable pressure control
- CVTCE – Torque control with proportional pressure control

## 10 Electrical rating and wiring connection

For CD\*, CVPD\*, CVTD pump controls, three options below apply; for CE, CVPCE, CVTCE, only option 03 applies.

- 01 – 220V AC 50 Hz with DIN 43650 plug connection
- 02 – 115V AC 60 Hz with 1/2" NPT conduit box
- 03 – 24V DC with DIN 43650 plug connection

(Omit if not required.)

## 11 Control pressure setting

- B – 30–160 bar (430–2300 psi)  
(sizes 16–50 cm<sup>3</sup>/r)
- C – 30–150 bar (430–2200 psi)  
(sizes 63–100 cm<sup>3</sup>/r)

## 12 Control adjustment

- Omit for CR, CE, CVPR, CVTD, CVPCE and CVTCE pump controls.
- K – Micrometer knob (standard)
- KL – Micrometer knob with key lock

## 13 Maximum power setting in kW

- Applies to CVT pump control only.
- \*\* – Factory setting of power limit in kilowatt; for example 04=4 kW

## 14 Maximum pressure setting

- Applies to CVT pump control only.
- \*\* – Factory setting of pressure for zero flow in 10-bar increments; for example 15=150 bar

## 15 Control design number

- 10 – For all models. Subject to change. Installation dimensions remain unaltered for designs 10–19.

## 16 Special features suffix

# Series VVP Technical Data

| Nominal size  | Size 1   | Size 2                                       | Size 3                                      |
|---|--|--|---|
| <b>Displacement</b> according to ISO 3662 – cm <sup>3</sup> /r (in <sup>3</sup> /r)                                     | 16 (0.976)<br>20 (1.220)<br>25 (1.526)                   | 31,5 (1.922)<br>40 (2.441)<br>50 (3.051)     | 63 (3.845)<br>80 (4.882)<br>100 (6.102)     |
| <b>Actual displacement</b> – cm <sup>3</sup> /r (in <sup>3</sup> /r)  | 17,9 (1.092)<br>22,1 (1.349)<br>26,9 (1.642)             | 34,5 (2.105)<br>42,8 (2.612)<br>53,1 (3.240) | 69 (4.211)<br>86,2 (5.260)<br>105,5 (6.438) |
| <b>Mounting flange type</b> (See model code, page 16.)  | ISO 3019/2<br>SAE 4-bolt<br>Base plate                   | ISO 3019/2<br>SAE C 2-bolt<br>Base plate     | ISO 3019/2<br>SAE C 2-bolt<br>Base plate    |
| <b>Maximum working pressure</b> – bar (psi)   | 160 (2300)   | 160 (2300)                                   | 150 (2200)                                  |
| <b>Allowed maximum drain port pressure</b> – bar (psi)  | 1 (15)   |  |   |
| <b>Inlet pressure (absolute)</b> – bar (psi)  | 0,5 to 1,5 (7 to 22)                                     |  |   |
| <b>Speed range</b> – r/min  | 800 to 1800  |  |   |
| <b>Rotation direction</b> (viewed from shaft end)   | Right-hand (clockwise)                                   |  |   |
| <b>Loads on drive shaft</b>   | No radial or axial loads allowed                         |  |   |
| <b>Maximum torque on primary shaft</b> – Nm (lb-in)<br>(See pages 28 and 30 for torque requirements of combined pumps.) | 197 (1744)   | 400 (3540)                                   | 740 (6550)                                  |
| <b>Hydraulic fluid</b>  | Mineral oil – HM according to ISO 3498 – Phosphate Ester |  |   |
| <b>Viscosity range at working pressure</b> – mm <sup>2</sup> /s (cSt)   | 23 to 45   |  |   |
| <b>Recommended viscosity</b> – mm <sup>2</sup> /s (cSt) at 50°C (122°F)   | 32   |  |   |
| <b>Viscosity index</b>  | 100 minimum  |  |   |
| <b>Fluid temperature range</b> – °C (°F)  | –10 to 70 (14 to 158)                                    |  |   |
| <b>Maximum fluid contamination level</b>  | Class 9 per NAS 1638, or class 18/15 per ISO 4406        |  |   |
| <b>Weight</b> – kg (lb)   | 13 (28.7)  | 33 (72.8)                                    | 45 (99.2)                                   |

In case of different operating conditions, contact Vickers.

# Controls for VVP Pumps

VVP pumps offer a wide selection of electrohydraulic controls for the regulation of pressure and volume.

In addition to the various pressure regulating controls, a hydraulic load-sensing control is available to provide pumps with maximum flexibility for use in energy saving systems.

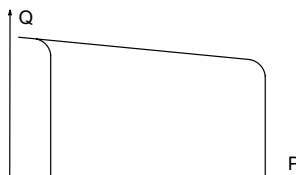
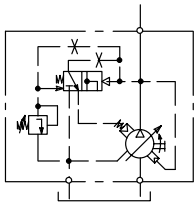
The load sensing compensator control receives a signal pressure directly after an external throttle and before an actuator. When a variation in pressure is sensed (with a fixed fall in pressure  $\Delta P=20$  bar (300 psi), the control will automatically change the pump's displacement independent of pressure variations that occur in the circuit.

The load sensing control produces a notable reduction in displaced power and is recommended for use in applications where there are notable variations in torque (or force) and speed.

## Diagrams and Characteristic Curves for Pressure Regulation

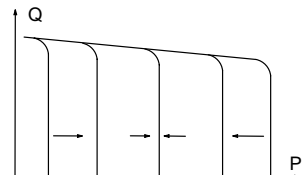
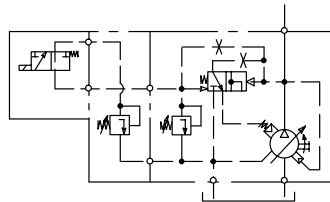
**Pump with standard pressure compensator**

Model code C



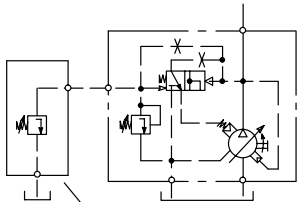
**Pump with two adjustable stages of pressure**

Model code CD2



**Pump with remote pressure control**

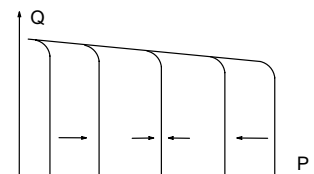
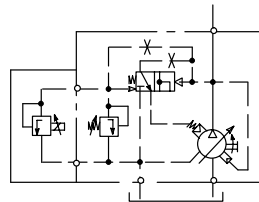
Model code CR



Remote max. pressure relief valve from 0 to 5 L/min (0 to 1.3 USgpm) not supplied. Length of pilot line between compensator and relief valve should not exceed 5 m (16 ft).

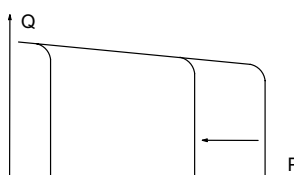
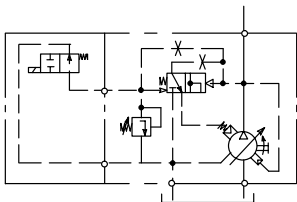
**Pump with proportional pressure control**

Model code CE



**Pump with two stages of pressure of which one with fixed setting (at minimum pressure level of pump)**

Model code CD1

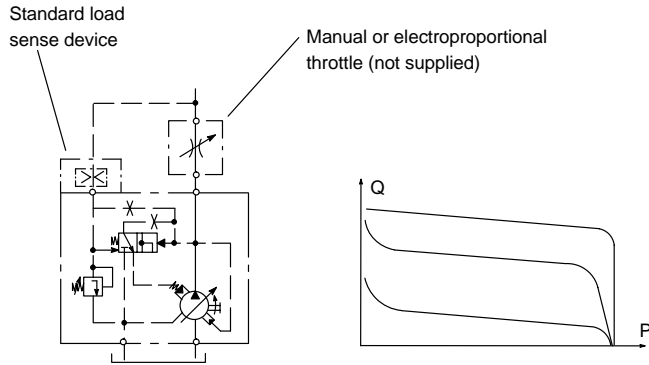


# Controls for VVP Pumps

## Diagrams and Characteristic Curves for Load Sensing and Pressure Regulation

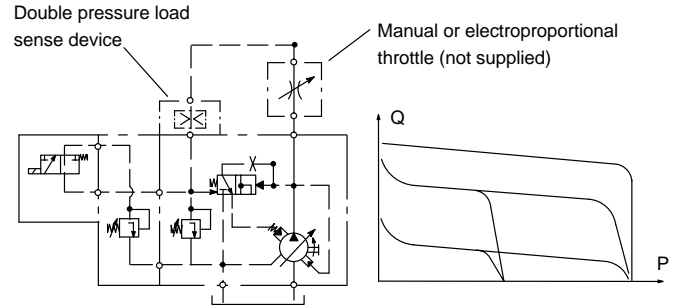
**Load sensing pump for standard flow control**

Model code CVP



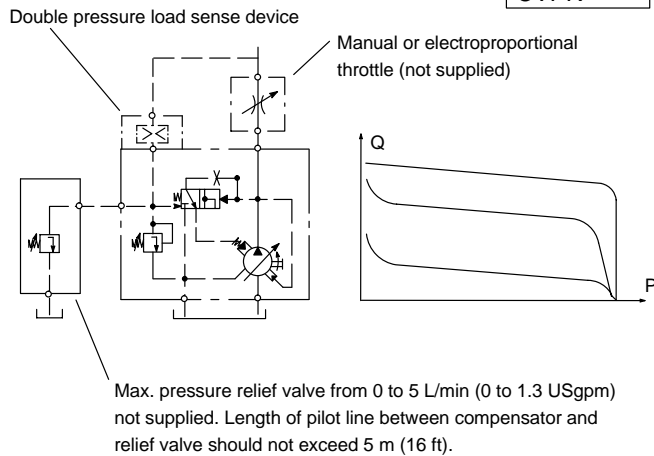
**Load sensing pump with two adjustable stages of pressure**

Model code CVPD2



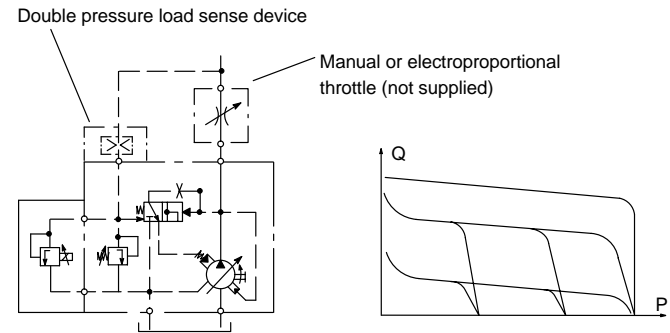
**Load sensing pump with remote pressure control**

Model code CVPR



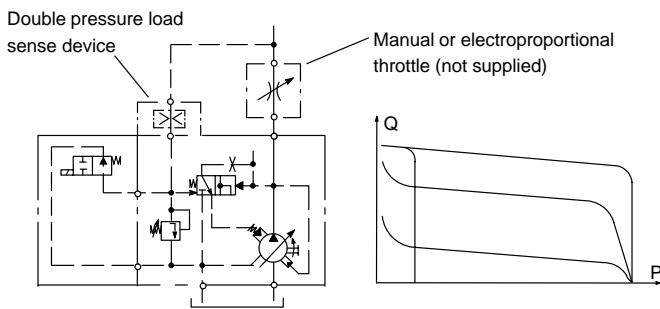
**Load sensing pump with proportional pressure control**

Model code CVPCE



**Load sensing pump with two stages of pressure of which one with fixed setting (at min. pressure level of pump)**

Model code CVPD1

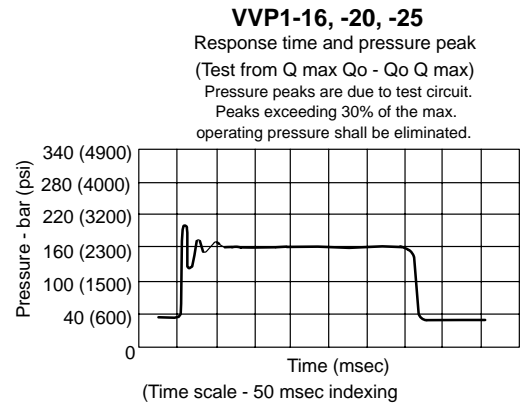
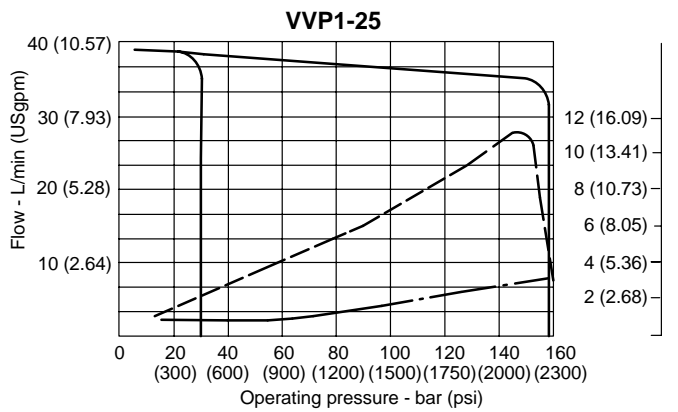
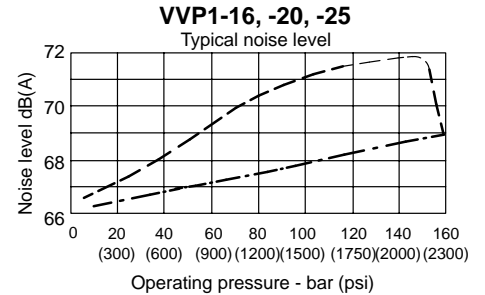
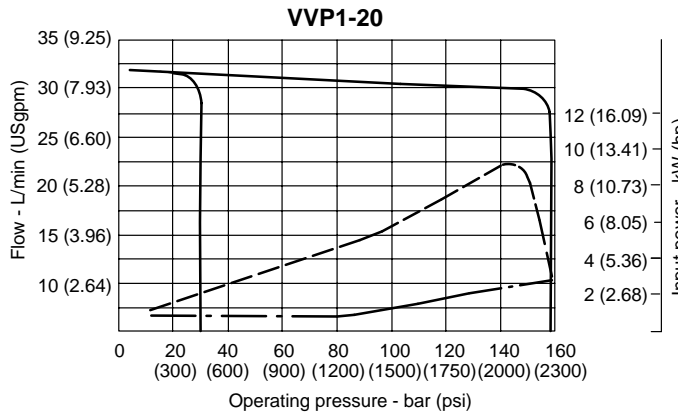
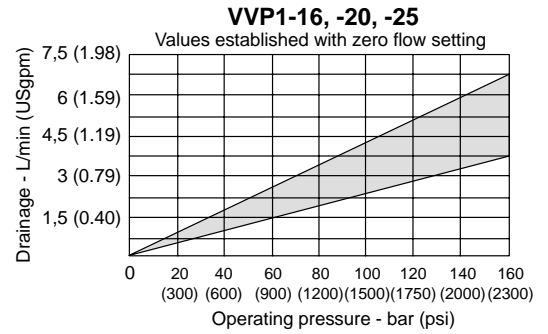
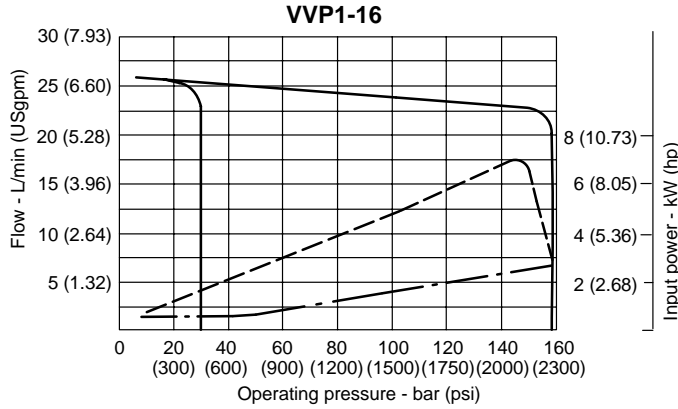


# VVP1 Performance Characteristics

**Performance with:**

Speed 1450 r/min;  
 Oil per ISO 3498;  
 Visc. 32 mm<sup>2</sup>/s (cSt);  
 Temp. 50°C (122°F)

Power consumption with maximum flow — — — — —  
 Power consumption with zero flow setting — — — — —

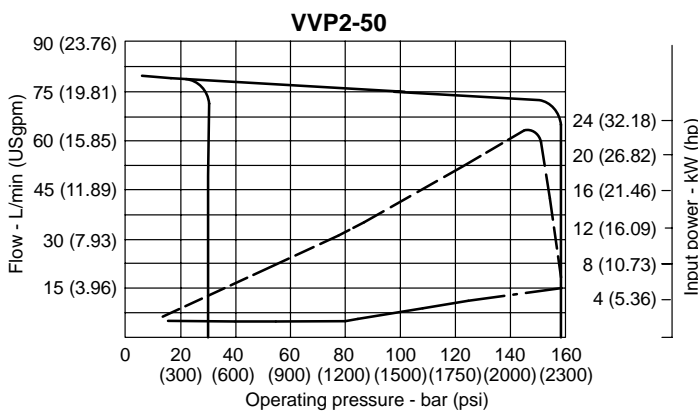
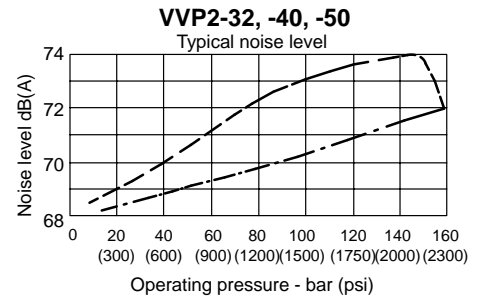
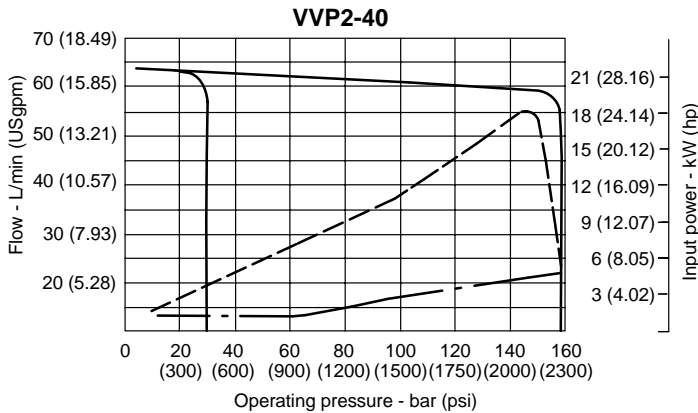
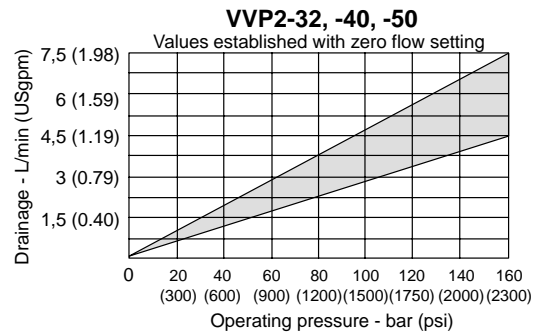
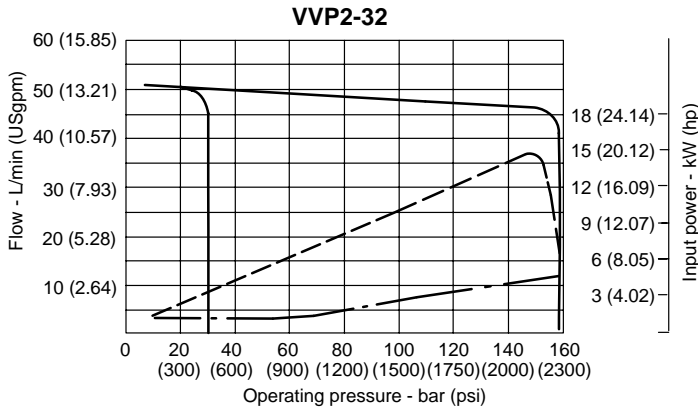


# VVP2 Performance Characteristics

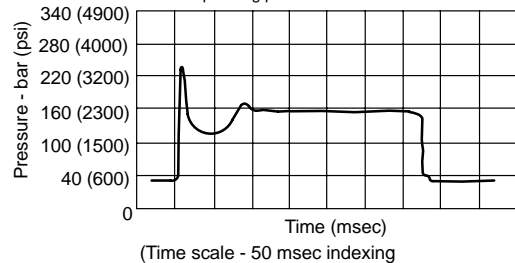
## Performance with:

Speed 1450 r/min;  
 Oil per ISO 3498;  
 Visc. 32 mm<sup>2</sup>/s (cSt);  
 Temp. 50°C (122°F)

Power consumption with maximum flow — — — — —  
 Power consumption with zero flow setting — — — — —



**VVP2-32, -40, -50**  
 Response time and pressure peak  
 (Test from Q max Qo - Qo Q max)  
 Pressure peaks are due to test circuit.  
 Peaks exceeding 30% of the max.  
 operating pressure shall be eliminated.

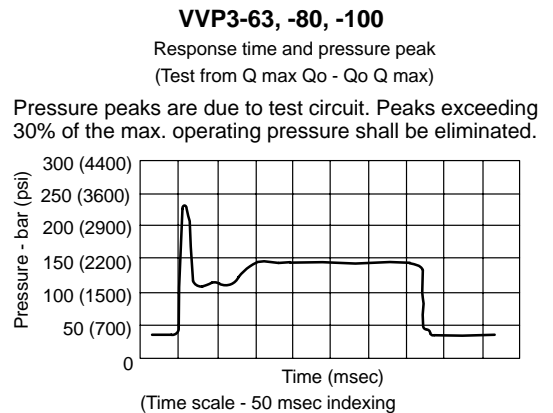
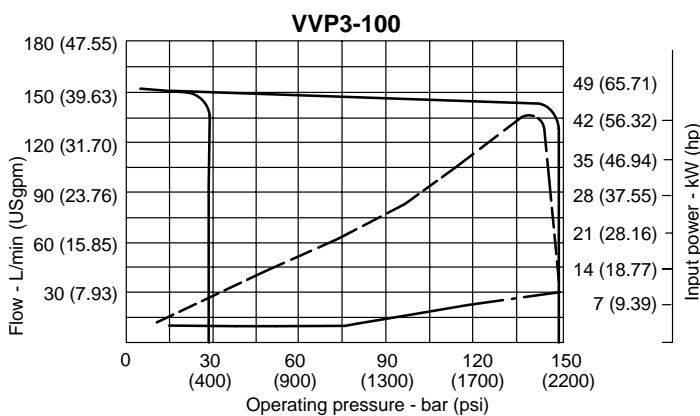
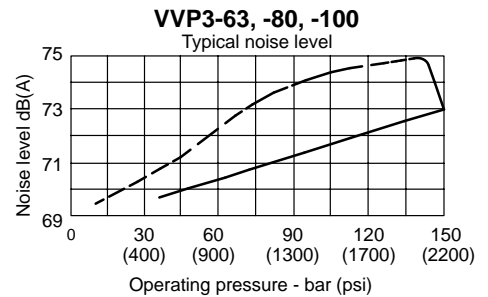
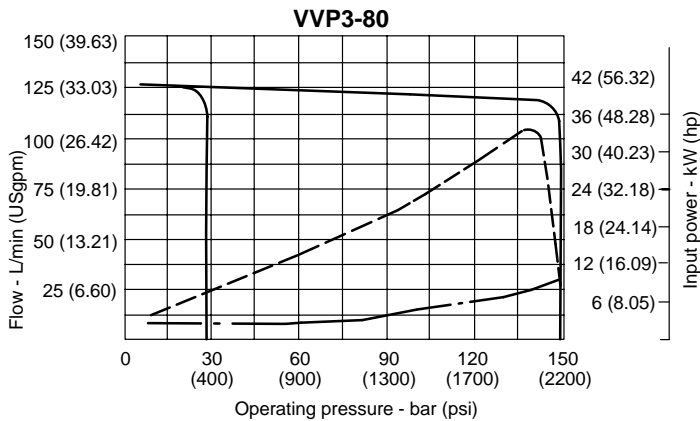
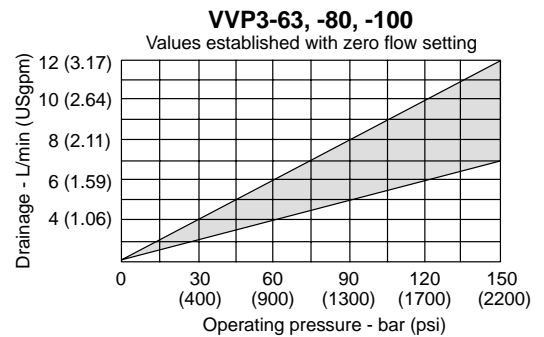
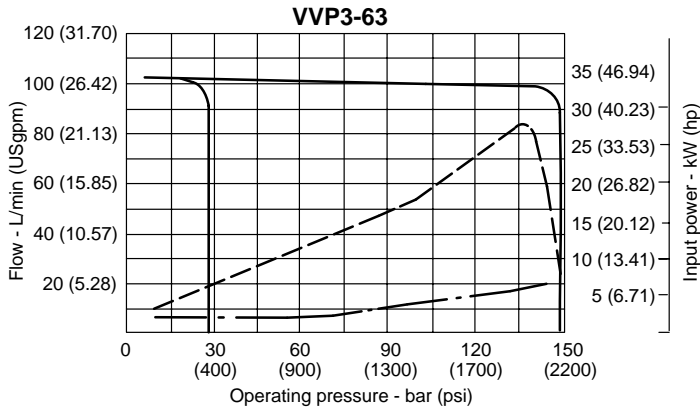


# VVP3 Performance Characteristics

## Performance with:

Speed 1450 r/min;  
 Oil per ISO 3498;  
 Visc. 32 mm<sup>2</sup>/s (cSt);  
 Temp. 50°C (122°F)

Power consumption with maximum flow — — — — —  
 Power consumption with zero flow setting — - - - -

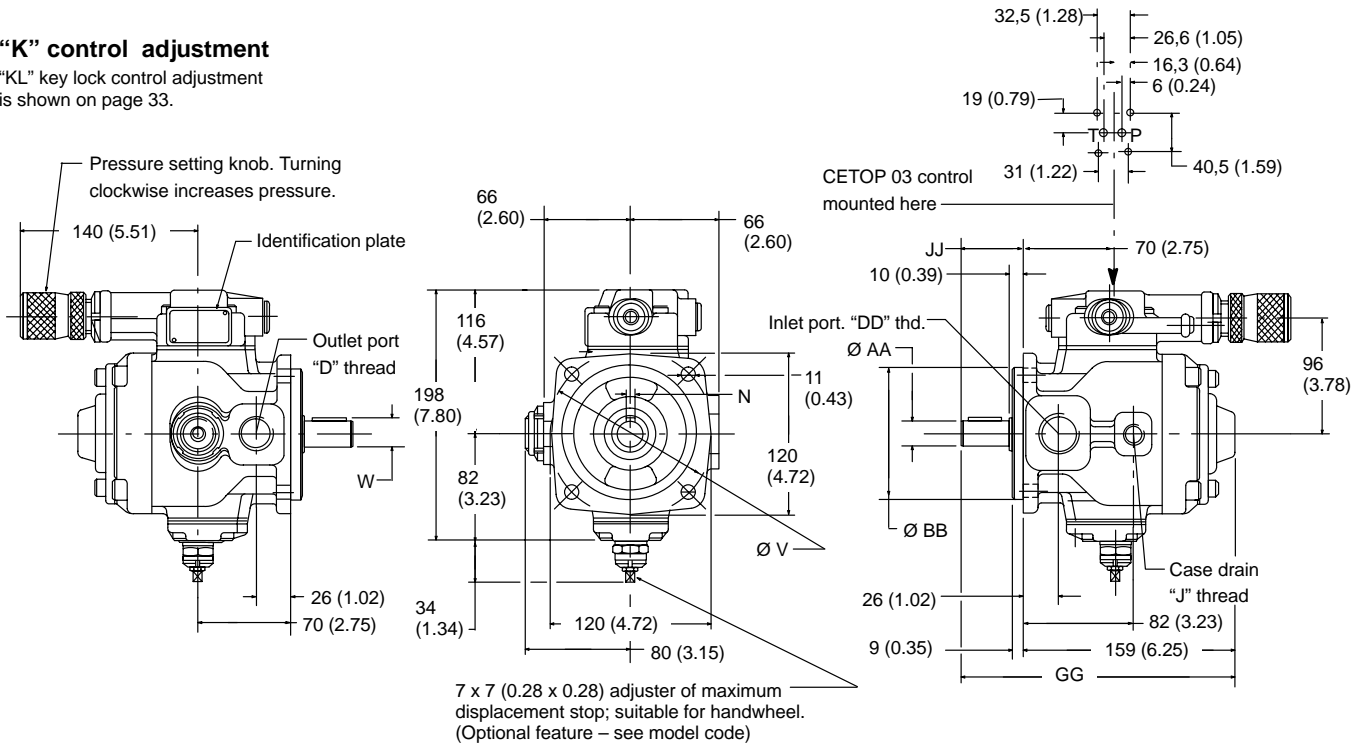


# Dimensions - VVP1 with ISO or SAE Mounting Flange

Dimensions in millimeters (inches)

## “K” control adjustment

“KL” key lock control adjustment is shown on page 33.



Note: All mounting flange, port and shaft options are listed on page 34.

| Mounting flange and ports code* | D                   | J                  | N               | Ø V            | W                | Ø AA            | Ø BB             | DD                  | GG            | JJ           |
|---------------------------------|---------------------|--------------------|-----------------|----------------|------------------|-----------------|------------------|---------------------|---------------|--------------|
| R (ISO)                         | 3/4 BSP             | 3/8 BSP            | 8<br>(0.315)    | 125<br>(4.921) | 28<br>(1.102)    | 25<br>(0.984)   | 100<br>(3.937)   | 1 BSP               | 205<br>(8.07) | 46<br>(1.81) |
| PS (SAE)                        | 1.0625-12<br>UNF-2B | .5625-18<br>UNF-2B | 6,35<br>(0.250) | 127<br>(5.000) | 28,17<br>(1.109) | 25,4<br>(1.000) | 101,6<br>(4.000) | 1.3125-12<br>UNF-2B | 207<br>(8.15) | 48<br>(1.89) |

\* See model code, page 16.

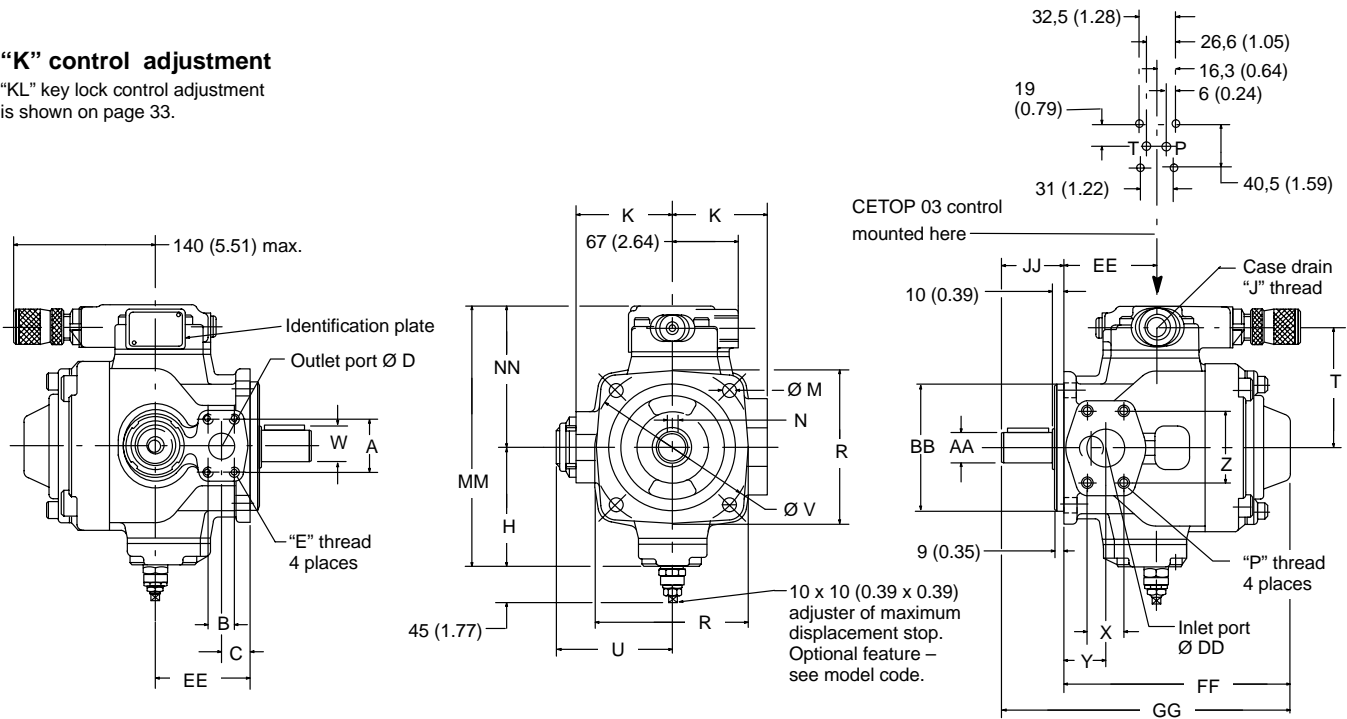


# Dimensions - VVP2 & VVP3 with ISO Mounting Flange

Dimensions in millimeters (inches)

## "K" control adjustment

"KL" key lock control adjustment is shown on page 33.



Note: All mounting flange, port and shaft options are listed on page 34.

| Model | A              | B              | C            | D            | E                             | H             | J                                  | K             | Ø M          | N            | P                            | R             | T             |
|-------|----------------|----------------|--------------|--------------|-------------------------------|---------------|------------------------------------|---------------|--------------|--------------|------------------------------|---------------|---------------|
| VVP2  | 52,4<br>(2.06) | 26,2<br>(1.03) | 30<br>(1.18) | 25<br>(0.98) | M10 or<br>.375-16<br>UNC-2B*  | 110<br>(4.33) | 3/4 BSP or<br>1.0625-12<br>UNF-2B* | 95<br>(3.74)  | 14<br>(0.55) | 10<br>(0.39) | M12 or<br>.500-13<br>UNC-2B* | 150<br>(5.91) | 123<br>(4.84) |
| VVP3  | 58,7<br>(2.31) | 30,2<br>(1.19) | 36<br>(1.42) | 32<br>(1.26) | M10 or<br>.4375-14<br>UNC-2B* | 120<br>(4.72) | 3/4 BSP or<br>1.0625-12<br>UNF-2B* | 105<br>(4.13) | 18<br>(0.71) | 12<br>(0.47) | M12 or<br>.500-13<br>UNC-2B* | 185<br>(7.28) | 133<br>(5.24) |

\* See mounting flange/port connections codes RF and PX, page 16.

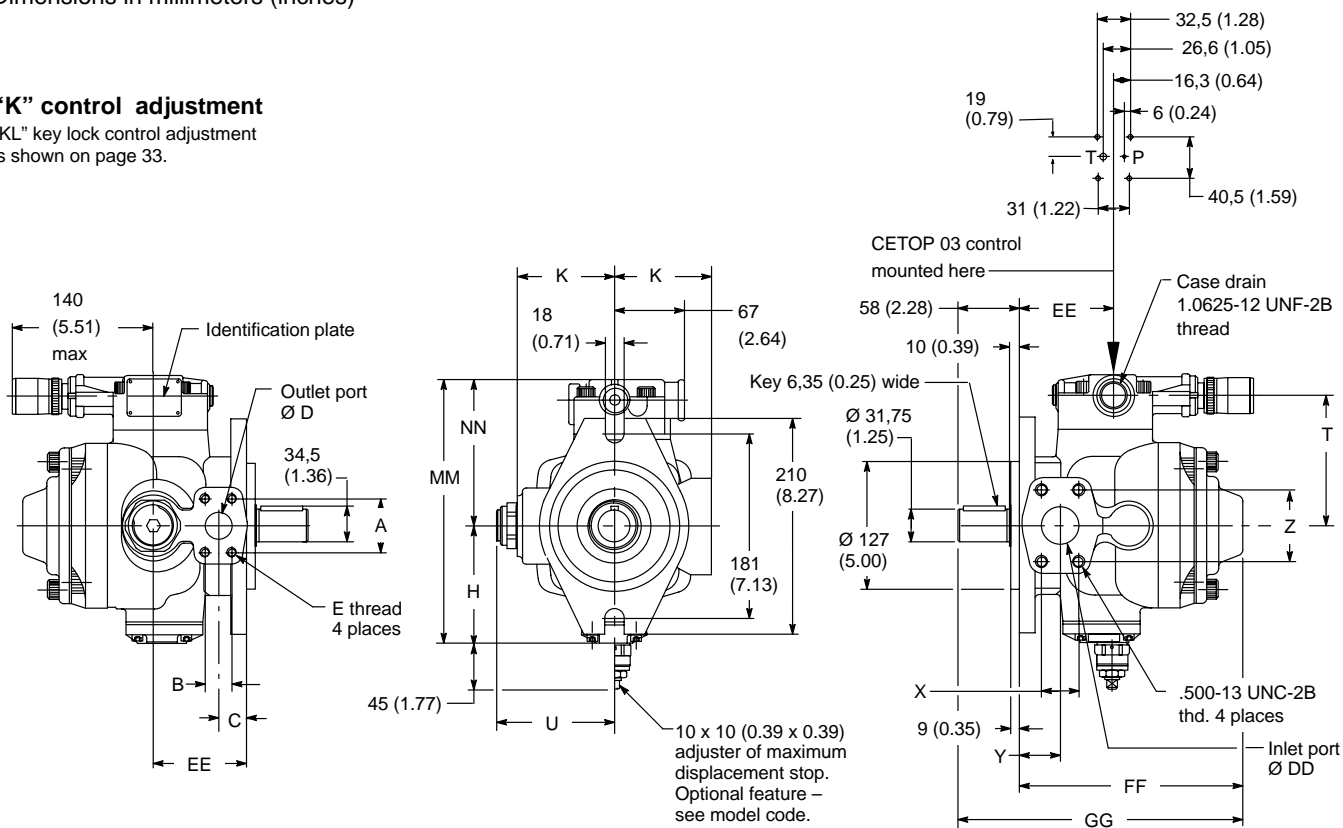
| Model | U             | Ø V           | W            | X              | Y            | Z              | Ø AA         | Ø BB          | Ø DD         | EE            | FF            | GG             | JJ           | MM             | NN            |
|-------|---------------|---------------|--------------|----------------|--------------|----------------|--------------|---------------|--------------|---------------|---------------|----------------|--------------|----------------|---------------|
| VVP2  | 113<br>(4.45) | 160<br>(6.30) | 35<br>(1.38) | 35,7<br>(1.41) | 40<br>(1.51) | 70<br>(2.76)   | 32<br>(1.26) | 125<br>(4.92) | 38<br>(1.50) | 91<br>(3.58)  | 220<br>(8.66) | 280<br>(11.02) | 60<br>(2.36) | 253<br>(9.96)  | 143<br>(5.63) |
| VVP3  | 123<br>(4.84) | 200<br>(7.87) | 43<br>(1.69) | 43<br>(1.69)   | 46<br>(1.81) | 77,8<br>(3.06) | 40<br>(1.57) | 160<br>(6.30) | 51<br>(2.01) | 105<br>(4.13) | 245<br>(9.65) | 313<br>(12.32) | 68<br>(2.68) | 273<br>(10.75) | 153<br>(6.02) |

# Dimensions - VVP2 & VVP3 with SAE Mounting Flange

Dimensions in millimeters (inches)

## “K” control adjustment

“KL” key lock control adjustment is shown on page 33.



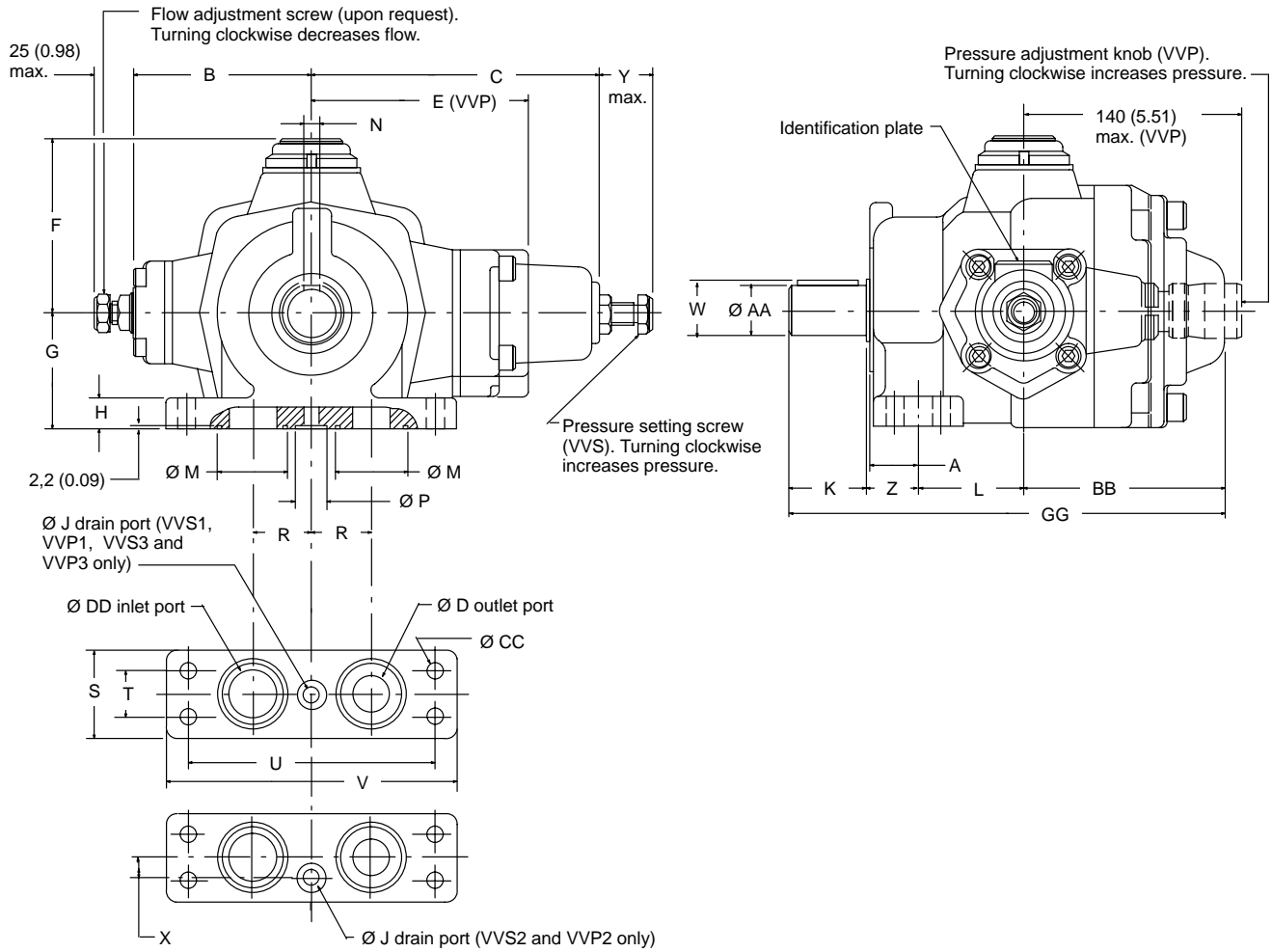
Note: All mounting flange, port and shaft options are listed on page 34.

| Model | A           | B           | C         | D         | E               | H          | K          | T          | U          |
|-------|-------------|-------------|-----------|-----------|-----------------|------------|------------|------------|------------|
| VVP2  | 52,4 (2.06) | 26,2 (1.03) | 27 (1.06) | 25 (0.98) | .375-16 UNC-2B  | 110 (4.33) | 95 (3.74)  | 123 (4.84) | 113 (4.45) |
| VVP3  | 58,7 (2.31) | 30,2 (1.19) | 35 (1.38) | 32 (1.26) | .4375-14 UNC-2B | 120 (4.72) | 105 (4.13) | 133 (5.24) | 123 (4.84) |

| Model | X           | Y         | Z           | $\varnothing DD$ | EE         | FF         | GG          | MM          | NN         |
|-------|-------------|-----------|-------------|------------------|------------|------------|-------------|-------------|------------|
| VVP2  | 35,7 (1.41) | 40 (1.51) | 70 (2.76)   | 38 (1.50)        | 91 (3.58)  | 220 (8.66) | 280 (11.02) | 253 (9.96)  | 143 (5.63) |
| VVP3  | 43 (1.69)   | 46 (1.81) | 77,8 (3.06) | 51 (2.00)        | 105 (4.13) | 245 (9.65) | 313 (12.32) | 273 (10.75) | 153 (6.02) |

# Dimensions - VVS and VVP Base Mounted

Dimensions in millimeters (inches)



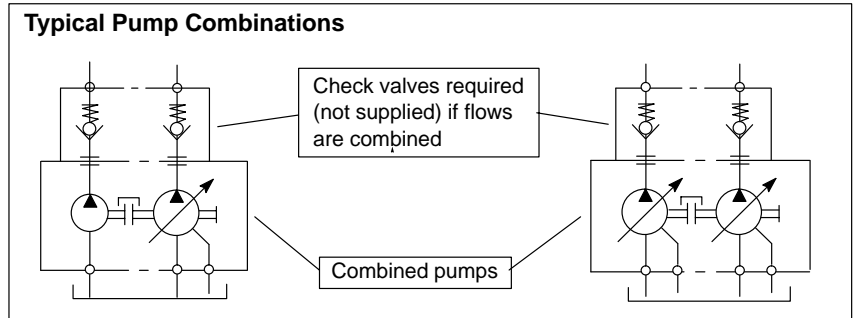
| Model | A      | B      | C      | Ø D    | E      | F      | G      | H      | Ø J    | K      | L      | Ø M    | N      | Ø P    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| VVS1  | 25     | 82     | 131    | 14     | 117    | 80     | 54     | 13     | 6      | 32     | 52.5   | 32     | 5      | 14     |
| VVP1  | (0.98) | (3.23) | (5.16) | (0.55) | (4.61) | (3.15) | (2.13) | (0.51) | (0.24) | (1.26) | (2.07) | (1.26) | (0.20) | (0.55) |
| VVS2  | 31     | 110    | 175    | 24     | 143    | 113    | 75     | 20     | 10     | 50     | 68     | 45     | 10     | 20     |
| VVP2  | (1.22) | (4.33) | (6.89) | (0.94) | (5.63) | (4.45) | (2.95) | (0.79) | (0.39) | (1.97) | (2.68) | (1.77) | (0.39) | (0.79) |
| VVS3  | 53,5   | 125    | 185    | 28     | 153    | 123    | 114    | 21     | 13     | 47     | 57,5   | 49     | 6,35   | 29     |
| VVP3  | (2.11) | (4.92) | (7.28) | (1.10) | (6.02) | (4.84) | (4.49) | (0.83) | (0.51) | (1.85) | (2.26) | (1.93) | (0.25) | (1.14) |

| Model | R      | S      | T      | U      | V       | W      | X      | Y      | Z      | AA     | BB     | Ø CC   | Ø DD   | GG      |
|-------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| VVS1  | 25,5   | 46     | 25,5   | 121    | 140     | 21     | -      | 30     | 27     | 19     | 89.5   | 11     | 21     | 201     |
| VVP1  | (1.00) | (1.81) | (1.00) | (4.76) | (5.51)  | (0.83) |        | (1.18) | (1.06) | (0.75) | (3.52) | (0.43) | (0.83) | (7.91)  |
| VVS2  | 38     | 57     | 30     | 159    | 188     | 35     | 12,5   | 40     | 33     | 32     | 129    | 11     | 32     | 280     |
| VVP2  | (1.50) | (2.24) | (1.18) | (6.26) | (7.40)  | (1.38) | (0.49) | (1.57) | (1.30) | (1.26) | (5.08) | (0.43) | (1.26) | (11.02) |
| VVS3  | 57     | 76     | 51     | 247,5  | 273     | 27,5   | -      | 40     | 55,5   | 25,35  | 140    | 13,5   | 35     | 300     |
| VVP3  | (2.24) | (2.99) | (2.01) | (9.74) | (10.75) | (1.08) |        | (1.57) | (2.19) | (1.00) | (5.51) | (0.53) | (1.38) | (11.81) |

# Combined Pumps

The rotor shaft of Vickers variable vane pumps is pre-arranged for mounting an additional pump. Simply take off the rear cover to easily attach the secondary pump. (See items A and B on sectional view, page 4.)

Vickers combined standard pumps (see table below) eliminate the need for many “special application” pumps. For solutions other than those shown in the table, contact your Vickers representative.



## Components for Combining Pumps

| Primary pump  | Secondary pump | Adapter kit             | Max. torque on drive shaft for secondary pump |
|---------------|----------------|-------------------------|---|
| VV*1-***-R/PS | VVS0-R         | AK-VVS/VVP1-0-R         | 55 Nm (487 lb-in)                             |
|               | VVS0-PS        | AK-VVS/VVP1-0-PS        |   |
|               | VV*1-R         | AK-VVS/VVP1-1-R         |   |
|               | VV*1-PS        | AK-VVS/VVP1-1-PS        |   |
|               | SAE A 2-bolt † | AK-VVS/VVP1-SAE-A       |   |
| VV*2/3-RF/PF  | VVS0-R         | AK-VVS/VVP2/3-0-R ‡     | 110 Nm (974 lb-in)                            |
|               | VVS0-PS        | AK-VVS/VVP2/3-0-PS ‡    |   |
|               | VV*1-R         | AK-VVS/VVP2/3-1-R ‡     |   |
|               | VV*1-PS        | AK-VVS/VVP2/3-1-PS ‡    |   |
|               | VV*2-RF/PX     | AK-VVS/VVP2/3-2-RF/PX ‡ |   |
|               | SAE A 2-bolt † | AK-VVS/VVP2/3-SAE-A ‡   |   |
|               | SAE B 2-bolt † | AK-VVS/VVP2/3-SAE-B ‡   |   |
| VV*3-RF/PF    | VV*3-RF/PX     | AK-VVS/VVP3-3-RF/PX     | 200 Nm (1770 lb-in)                           |

†SAE A and B 2-bolt are generic interfaces. Secondary pump with SAE A or B mount should conform to dimensions on the following page.

‡Adapter kits for same displacements within frame sizes 2 and 3 primary pumps are identical.

## Ordering Combined Pumps

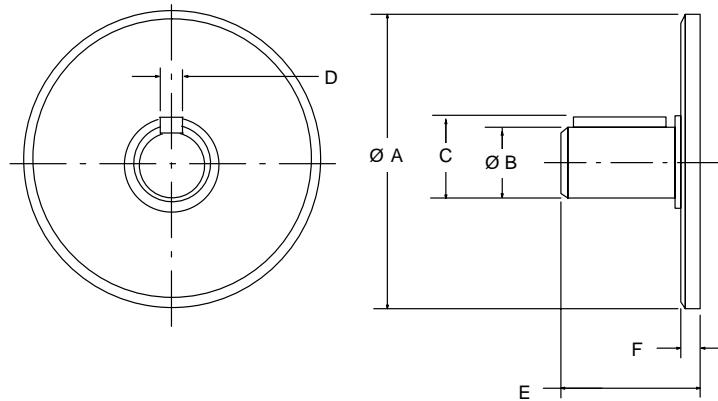
Order pumps and coupling unit in progressive order of coupling.

Example: One (1) VVP1-20-RR-M-30-CVTCE03B-15-10 Primary Pump

One (1) AK-VVS/VVP1-0-R Adapter Kit

One (1) VVS0-10-RR-M-30-CDD03W-10 Secondary Pump

Secondary pumps with SAE A or B  
 2-bolt mounts should conform to the  
 dimensions below. Dimensions in  
 millimeters (inches)



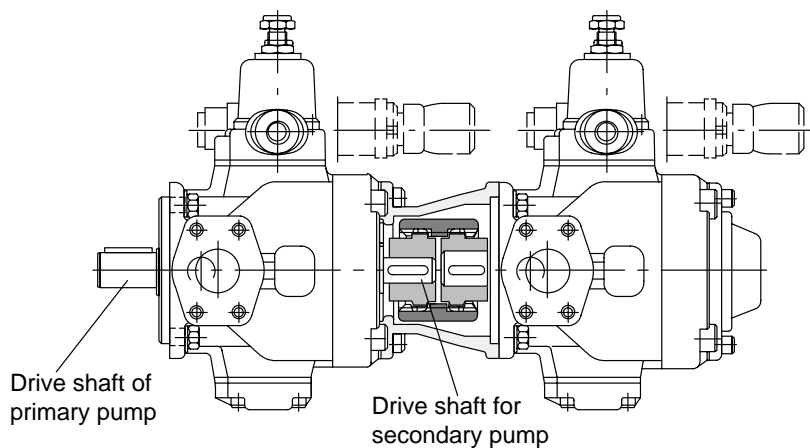
| Primary pump                 | 2-bolt flange of secondary pump † | Adapter kit         | Ø A             | Ø B             | C                                    | D                                    | E max.       | F             |
|------------------------------|-----------------------------------|---------------------|-----------------|-----------------|--------------------------------------|--------------------------------------|--------------|---------------|
| VVS1<br>VVP1                 | SAE A                             | AK-VVS/VVP1-SAE-A   | 82,5<br>(3.25)  | 19,05<br>(0.75) | 21,1<br>(0.83)                       | 4,8<br>(0.19)                        | 50<br>(1.97) | 7<br>(0.28)   |
| VVS2<br>VVP2<br>VVS3<br>VVP3 | SAE A                             | AK-VVS/VVP2/3-SAE-A | 82,5<br>(3.25)  | 19,05<br>(0.75) | 21,1<br>(0.83)                       | 4,8<br>(0.19)                        | 60<br>(2.36) | 7<br>(0.28)   |
|                              | SAE B                             | AK-VVS/VVP2/3-SAE-B | 101,6<br>(4.00) | 22,2<br>(0.87)  | 25,1<br>(0.99) ‡<br>25,5<br>(1.00) ‡ | 6,375<br>(0.25) ‡<br>4,8<br>(0.19) ‡ |              | 9,5<br>(0.37) |

† Secondary pumps with ISO mounting flange are listed on page 28.

‡ Both shafts are accommodated within same coupling.

# Torque Requirements - Combined Pumps

Combined pumps must be installed in decreasing order of displacement. Torque requirements and limitations of single and combined pumps must not exceed the values shown in the tables below.



## Pump Frame Size 1

| Pump type | Required torque for primary pump – Nm (lb in) | Maximum torque on the drive shaft for secondary pump – Nm (lb in) |
|-----------|---|---|
| VVS1-16   | 30 (266)                                      | 55 (487)  |
| VVS1-20   | 37 (327)                                      |   |
| VVS1-25   | 46 (407)                                      |   |
| VVP1-16   | 47 (416)                                      |   |
| VVP1-20   | 58 (513)                                      |   |
| VVP1-25   | 73 (646)                                      |   |

## Pump Frame Size 2

| Pump type | Required torque for primary pump – Nm (lb in) | Maximum torque on the drive shaft for secondary pump – Nm (lb in) |
|-----------|---|---|
| VVS2-32   | 57 (504)                                      | 110 (974)   |
| VVS2-40   | 73 (646)                                      |   |
| VVS2-50   | 91 (805)                                      |   |
| VVP2-32   | 92 (814)                                      |   |
| VVP2-40   | 117 (1036)                                    |   |
| VVP2-50   | 146 (1292)                                    |   |

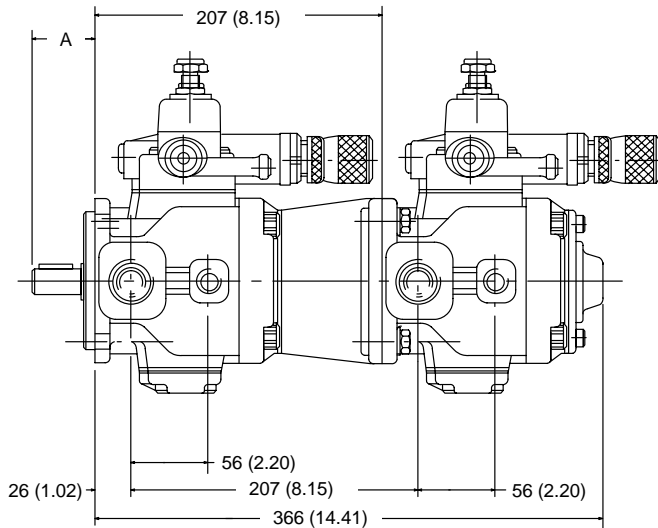
## Pump Frame Size 3

| Pump type | Required torque for primary pump – Nm (lb in) | Maximum torque on the drive shaft for secondary pump – Nm (lb in) |
|-----------|---|---|
| VVS3-63   | 92 (814)                                      | Dependent on secondary pump; see page 28.                         |
| VVS3-80   | 117 (1036)                                    |   |
| VVS3-100  | 146 (1292)                                    |   |
| VVP3-63   | 172 (1522)                                    |   |
| VVP3-80   | 219 (1938)                                    |   |
| VVP3-100  | 273 (2416)                                    |   |

# Dimensions - Combined Pumps

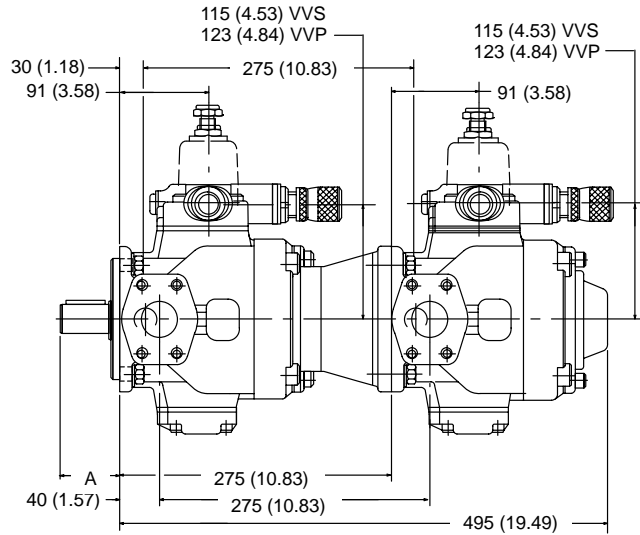
## VVS1 or VVP1 primary pump with VVS1 or VVP1 secondary pump

Dimensions in millimeters (inches)



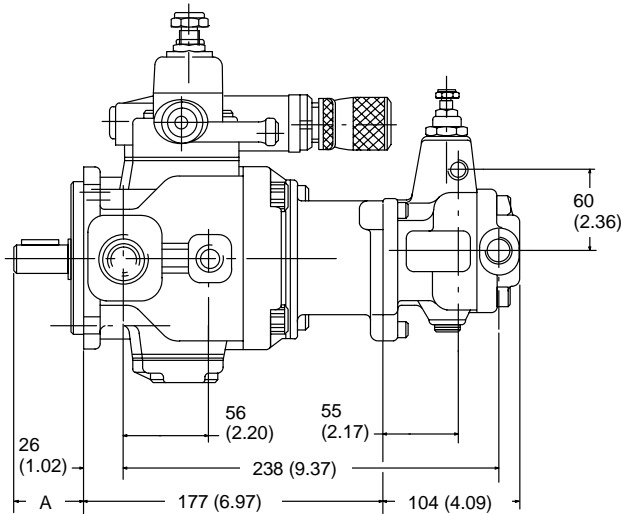
| Mtg. flange & port code | A         |
|-------------------------|-----------|
| R                       | 46 (1.81) |
| PS                      | 48 (1.89) |

## VVS2 or VVP2 primary pump with VVS2 or VVP2 secondary pump



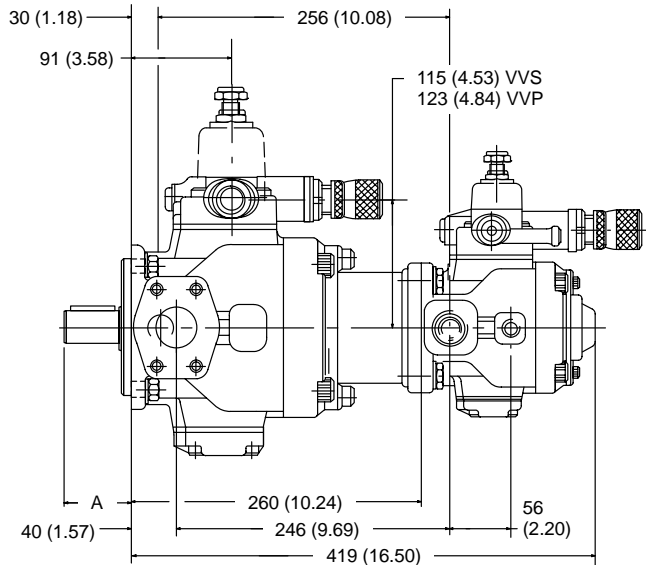
| Mtg. flange & port code | A         |
|-------------------------|-----------|
| RF                      | 60 (2.36) |
| PF                      | 58 (2.28) |

## VVS1 or VVP1 primary pump with VVS0 secondary pump



| Mtg. flange & port code | A         |
|-------------------------|-----------|
| R                       | 46 (1.81) |
| PS                      | 48 (1.89) |

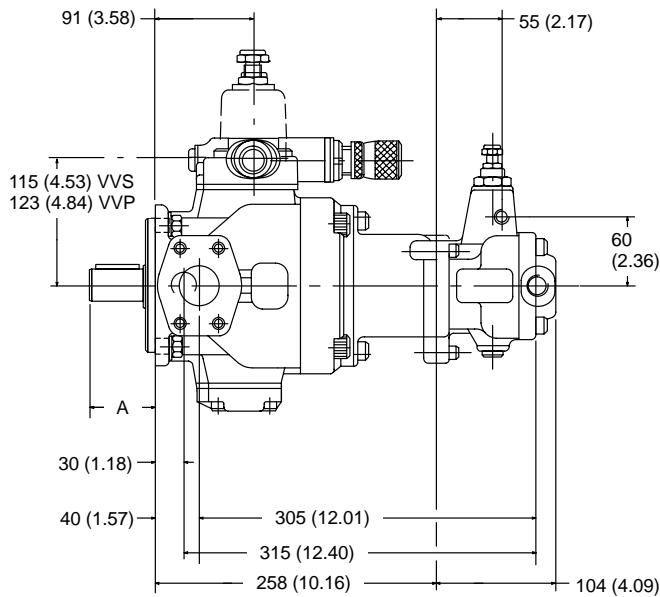
## VVS2 or VVP2 primary pump with VVS1 or VVP1 secondary pump



| Mtg. flange & port code | A         |
|-------------------------|-----------|
| RF                      | 60 (2.36) |
| PF                      | 58 (2.28) |

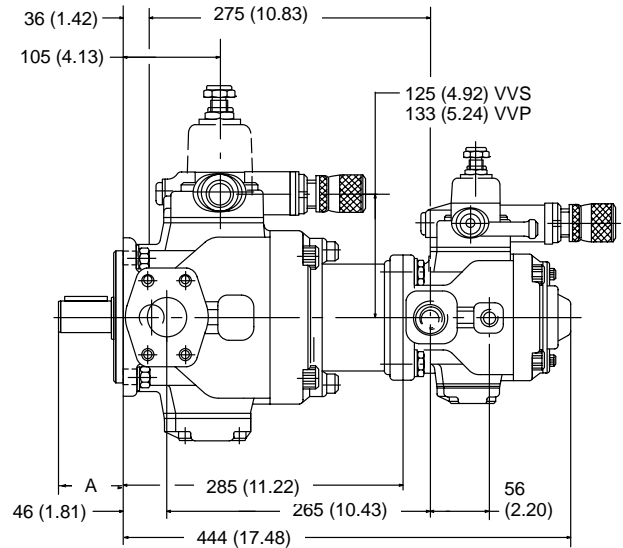
# Dimensions - Combined Pumps

**VVS2 or VVP2 primary pump with VVS0 secondary pump**  
Dimensions in millimeters (inches)



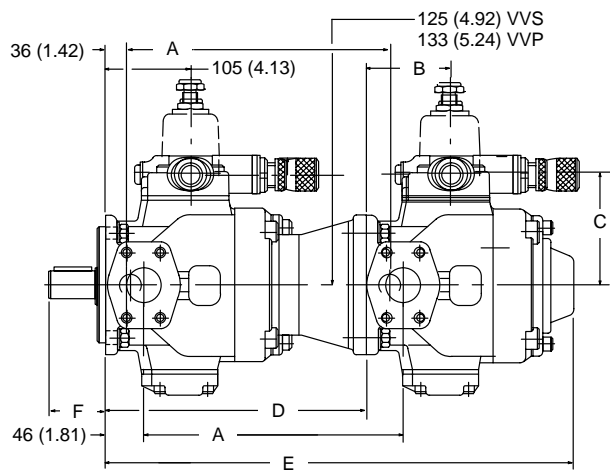
| Mtg. flange & port code | A         |
|-------------------------|-----------|
| RF                      | 60 (2.36) |
| PF                      | 58 (2.28) |

**VVS3 or VVP3 primary pump with VVS1 or VVP1 secondary pump**



| Mtg. flange & port code | A         |
|-------------------------|-----------|
| RF                      | 68 (2.68) |
| PF                      | 58 (2.28) |

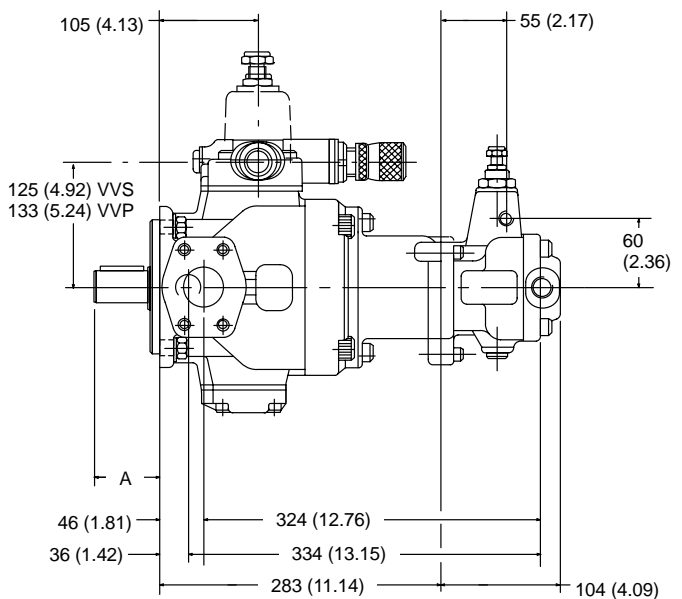
**VVS3 or VVP3 primary pump with VVS3, VVP3, VVS2 or VVP2 secondary pump**



| Secondary pump | A           | B          | C                                  | D           | E           |
|----------------|-------------|------------|------------------------------------|-------------|-------------|
| VVS3, VVP3     | 315 (12.40) | 105 (4.13) | 125 (4.92) VVS3<br>133 (5.24) VVP3 | 315 (12.40) | 560 (22.05) |
| VVS2, VVP2     | 294 (11.57) | 91 (3.58)  | 115 (4.53) VVS2<br>123 (4.84) VVP2 | 300 (11.81) | 520 (20.47) |

| Mtg. flange & port code | F         |
|-------------------------|-----------|
| RF                      | 68 (2.68) |
| PF                      | 58 (2.28) |

**VVS3 or VVP3 primary pump with VVS0 secondary pump**

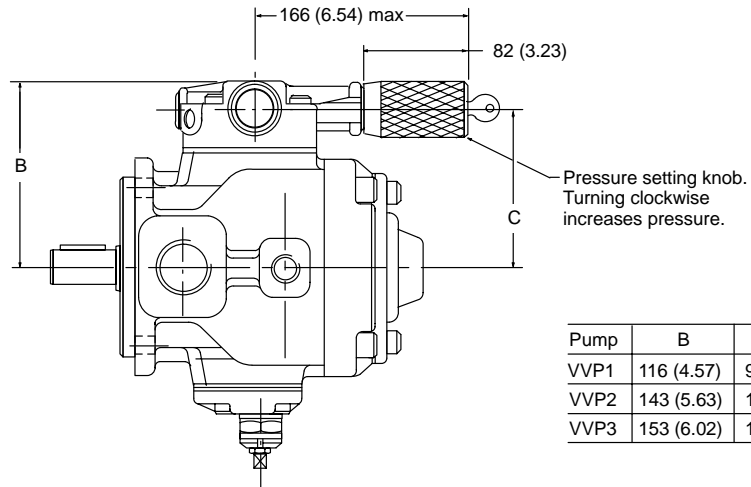


| Mtg. flange & port code | A         |
|-------------------------|-----------|
| RF                      | 68 (2.68) |
| PF                      | 58 (2.28) |



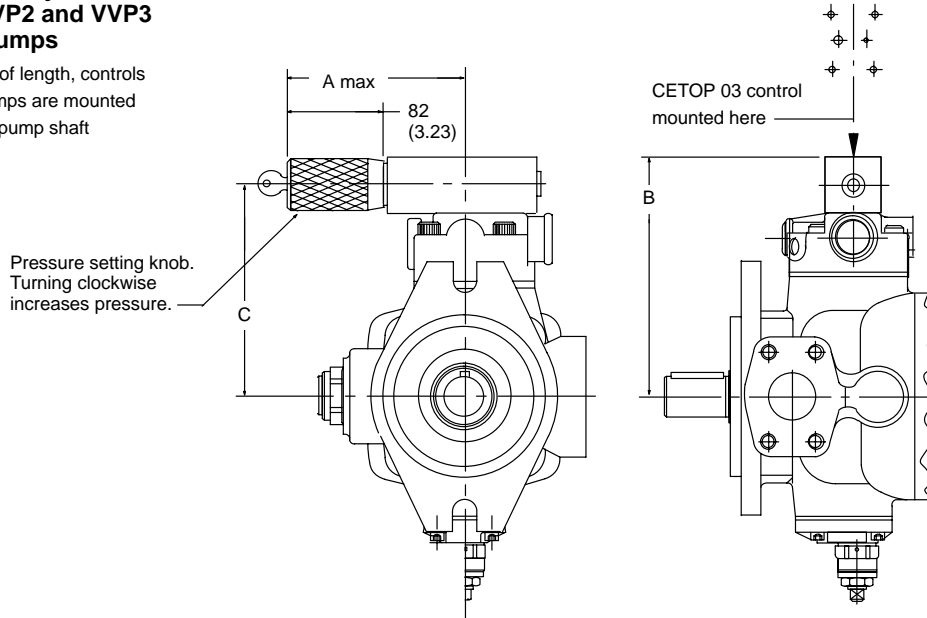
# Key Lock Adjustment for VVP Pumps

## “KL” control adjustment for VVP1, VVP2 and VVP3 single pumps



## “KL” control adjustment for VVP1, VVP2 and VVP3 combined pumps

NOTE: Because of length, controls on combined pumps are mounted perpendicular to pump shaft



| Pump | A          | B          | C          |
|------|------------|------------|------------|
| VVP1 | 162 (6.38) | 162 (6.38) | 139 (5.47) |
| VVP2 | 155 (6.10) | 189 (7.44) | 166 (6.54) |
| VVP3 | 155 (6.10) | 199 (7.83) | 176 (6.93) |

# Dimensions - Mounting, Shaft and Port Options

## Mountings and Shafts

| Frame size | Mtg. flange & ports code | ISO mounting flange |                  | SAE mounting flange |                  | Front end shaft |            | Rear end shaft |           |
|------------|--------------------------|---------------------|------------------|---------------------|------------------|-----------------|------------|----------------|-----------|
|            |                          | Pilot dia.          | Bolt circle dia. | Pilot dia.          | Bolt circle dia. | Diameter        | Length     | Diameter       | Length    |
| 0          | R                        | 80 (3.15)           | 103 (4.06)       | –                   | –                | 20 (0.79)       | 36 (1.42)  | –              | –         |
|            | PS                       | 80 (3.15)           | 103 (4.06)       | –                   | –                | 15,88 (0.625)   | 24 (0.938) | –              | –         |
| 1          | B                        | –                   | –                | –                   | –                | 19 (0.75)       | 32 (1.26)  | –              | –         |
|            | R                        | 100 (3.94)          | 125 (4.92)       | –                   | –                | 25 (0.98)       | 36 (1.42)  | 20 (0.79)      | 26 (1.02) |
|            | PS                       | –                   | –                | 101,6 (4.000)       | 127 (5.000)      | 25,4 (1.00)     | 38 (1.50)  | 20 (0.79)      | 26 (1.02) |
| 2          | B                        | –                   | –                | –                   | –                | 25,37 (1.00)    | 50 (1.97)  | –              | –         |
|            | RF                       | 125 (4.92)          | 160 (6.30)       | –                   | –                | 32 (1.26)       | 50 (1.97)  | 28 (1.10)      | 45 (1.77) |
|            | PF                       | –                   | –                | 127 (5.000)         | 181 (7.125)      | 31,75 (1.25)    | 48 (1.88)  | 28 (1.10)      | 45 (1.77) |
|            | PX                       | 125 (4.92)          | 160 (6.30)       | –                   | –                | 32 (1.26)       | 50 (1.97)  | 28 (1.10)      | 45 (1.77) |
| 3          | B                        | –                   | –                | –                   | –                | 25,37 (1.00)    | 47 (1.85)  | –              | –         |
|            | RF                       | 160 (6.30)          | 200 (7.87)       | –                   | –                | 40 (1.57)       | 58 (2.28)  | 28 (1.10)      | 45 (1.77) |
|            | PF                       | –                   | –                | 127 (5.000)         | 181 (7.125)      | 31,75 (1.25)    | 48 (1.88)  | 28 (1.10)      | 45 (1.77) |
|            | PX                       | 160 (6.30)          | 200 (7.87)       | –                   | –                | 40 (1.57)       | 58 (2.28)  | 28 (1.10)      | 45 (1.77) |

## Ports

| Frame size | Mtg. flange & ports code | Inlet port  | Outlet port  | Drain port      |                  | Remote pressure control, load sensing and dual-pressure load sensing ports |
|------------|--------------------------|---|--|-----------------|------------------|--|
|            |                          |   |  | VVS pumps       | VVP pumps        |  |
| 0          | R                        | G 1/2" BSP  | G 3/8" BSP   | G 1/4" BSP      | –                | –  |
|            | PS                       | .875-14 UNF-2B  | .750-16 UNF-2B   | .500-20 UNF-2B  | –                | –  |
| 1          | B                        | 21 (0.83)   | 14 (0.55)  | 6 (0.24)        | 6 (0.24)         | –  |
|            | R                        | G 1" BSP  | G 3/4" BSP   | G 3/8" BSP      | G 3/8" BSP       | G 1/4" BSP   |
|            | PS                       | 1.3125-12 UNF-2B  | 1.0625-12 UNF-2B   | .5625-18 UNF-2B | .5625-18 UNF-2B  | .500-20 UNF-2B   |
| 2          | B                        | 32 (1.26)   | 24 (0.94)  | 10 (0.39)       | 10 (0.39)        | –  |
|            | RF                       | 1.50 SAE 4-blt. flange with M12 x 45 deep mounting holes    | 1.00 SAE 4-blt. flange with M10 x 35 deep mounting holes     | G 1/2" BSP      | G 3/4" BSP       | G 1/4" BSP   |
|            | PF                       | 1.50 SAE 4-blt. flg. w/ .500 UNC x 1.75 deep mounting holes | 1.00 SAE 4-blt. flg. w/ .4375 UNC x 1.50 deep mounting holes | .875-14 UNF-2B  | 1.0625-12 UNF-2B | .500-20 UNF-2B   |
|            | PX                       |   |  |                 |                  |  |
| 3          | B                        | 35 (1.38)   | 28 (1.10)  | 13 (0.51)       | 13 (0.51)        | –  |
|            | RF                       | 2.00 SAE 4-blt. flange with M12 x 45 deep mounting holes    | 1.25 SAE 4-blt. flange with M10 x 40 deep mounting holes     | G 1/2" BSP      | G 3/4" BSP       | G 1/4" BSP   |
|            | PF                       | 2.00 SAE 4-blt. flg. w/ .500 UNC x 1.75 deep mounting holes | 1.25 SAE 4-blt. flg. w/ .4375 UNC x 1.75 deep mounting holes | .875-14 UNF-2B  | 1.0625-12 UNF-2B | .500-20 UNF-2B   |
|            | PX                       |   |  |                 |                  |  |

# Installation Instructions

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**The following notes will assist in the correct installation of your pumps.**

1. Pump frame sizes 0 & 1 can be mounted in any position. Pump sizes 2 & 3 **must** be mounted with the shaft horizontal. In all cases, the casing/compensator drain connection must be at the highest possible position. In applications where high flow rates and pressures are required, it is recommended that pumps be installed below the reservoir oil level, external of the reservoir.

2. The oil reservoir should have a capacity of at least 3–4 times the pump flow rate per minute. In case of continuous operation at high pressure and flow rate, it is advisable to use heat exchangers. In any case, oil temperature should never exceed 60°C (140°F). Pumps are designed to operate at optimum working temperatures of 40 to 50°C (104 to 122°F).

3. The inlet line should never be reduced from the port size. Excessive restrictions and length will degrade pump performance.

4. The drain line should be separate and directly piped to the reservoir and terminated below the minimum oil level, as far as possible from the pump inlet.

5. When operating pumps using phosphate ester or water-oil emulsion, contact Vickers regarding maximum operating pressure.

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**Eaton Hydraulics**

15151 Highway 5  
Eden Prairie, MN 55344  
Telephone: 612 937-7254  
Fax: 612 937-7130  
[www.eatonhydraulics.com](http://www.eatonhydraulics.com)

46 New Lane, Havant  
Hampshire PO9 2NB  
England  
Telephone: (44) 170-548-6451  
Fax: (44) 170-548-7110

