

Variable displacement vane pump (with mechanical pressure compensator)

## PVS-Type

### Key Features:

**Rotation:** Right (viewed from shaft end)  
**Mounting flanges:** 4-hole flange (UNI ISO 3019/2)  
**Connections:** GAS BSP (UNI ISO 228/1) e SAE  
**Mechanical displacement limiter "Q" on request**  
 All pumps are already set up as standard to be coupled to each other and with other types of pump



Series/Name	Rated Displacement (cm <sup>3</sup> /r [in <sup>3</sup> /r])	Maximum Flow Capacity at 1450 rpm (L/min) [US gpm]	Maximum Pressure (bar) [psi]
02-PVS-1-20	20 [1.22]	29 [7.66]	100 [1450]
02-PVS-1-25	25 [1.53]	36 [9.51]	100 [1450]
02-PVS-2-31	31 [1.89]	45 [11.89]	100 [1450]
02-PVS-2-40	40 [2.44]	58 [15.32]	100 [1450]
02-PVS-2-50	50 [3.05]	73 [19.28]	100 [1450]
02-PVS-3-63	63 [3.84]	91 [24.04]	80 [1160]
02-PVS-3-80	80 [4.88]	116 [30.64]	80 [1160]
02-PVS-3-100	100 [6.10]	145 [38.30]	80 [1160]

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### WARNING

All Berarma pumps have been carefully checked during manufacture and subjected to stringent testing cycles before shipment. To achieve optimum performance, avoid problems and maintain the warranty, the installation instructions enclosed with each pump must be strictly observed.

### NOTES

Before selection or use of any Berarma product, it is important that the purchaser analyses all aspects of its application and reviews the information in the current Berarma Technical-Sales catalogues. Due to the many different operating conditions and applications for Berarma products, the purchaser, through their own analysis and testing, is solely responsible for making the final selection of the products and assuring that all performance and safety requirements are met.

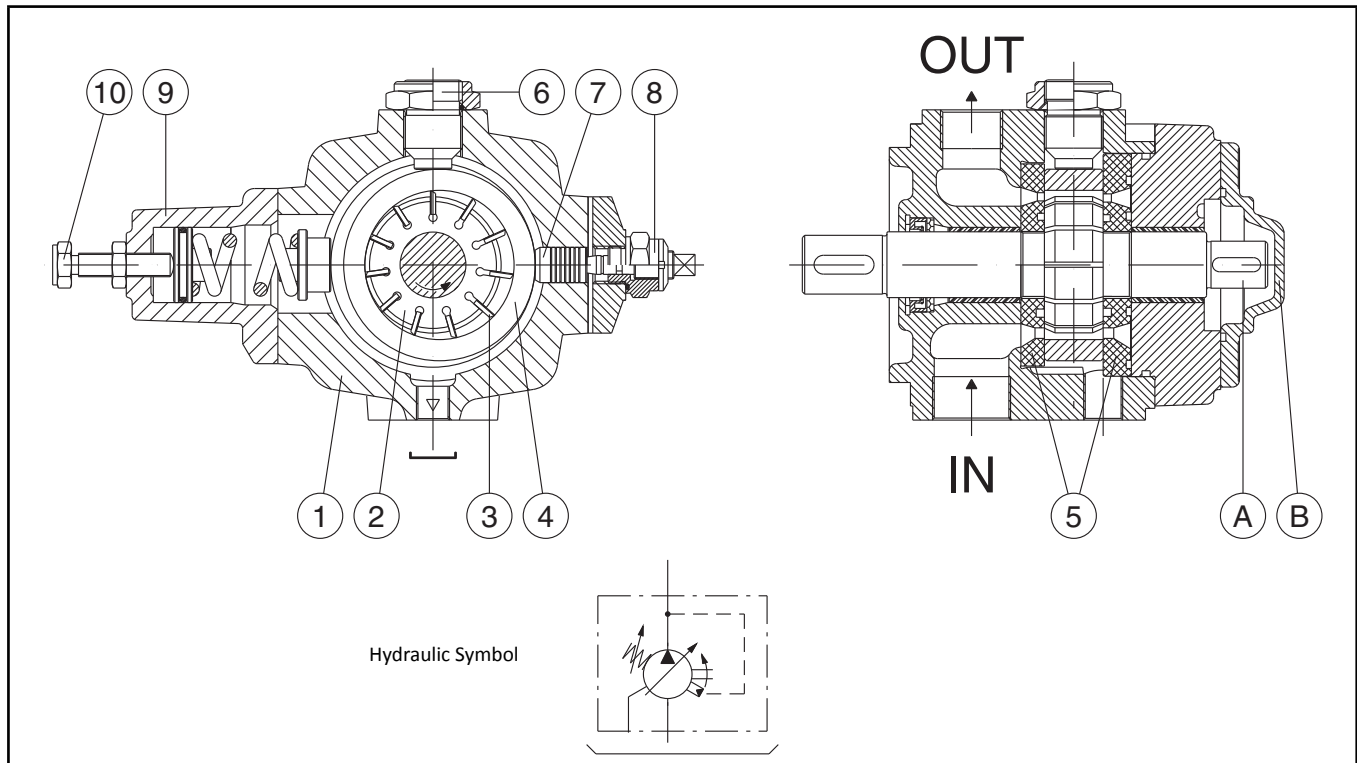
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## GENERAL DESCRIPTION

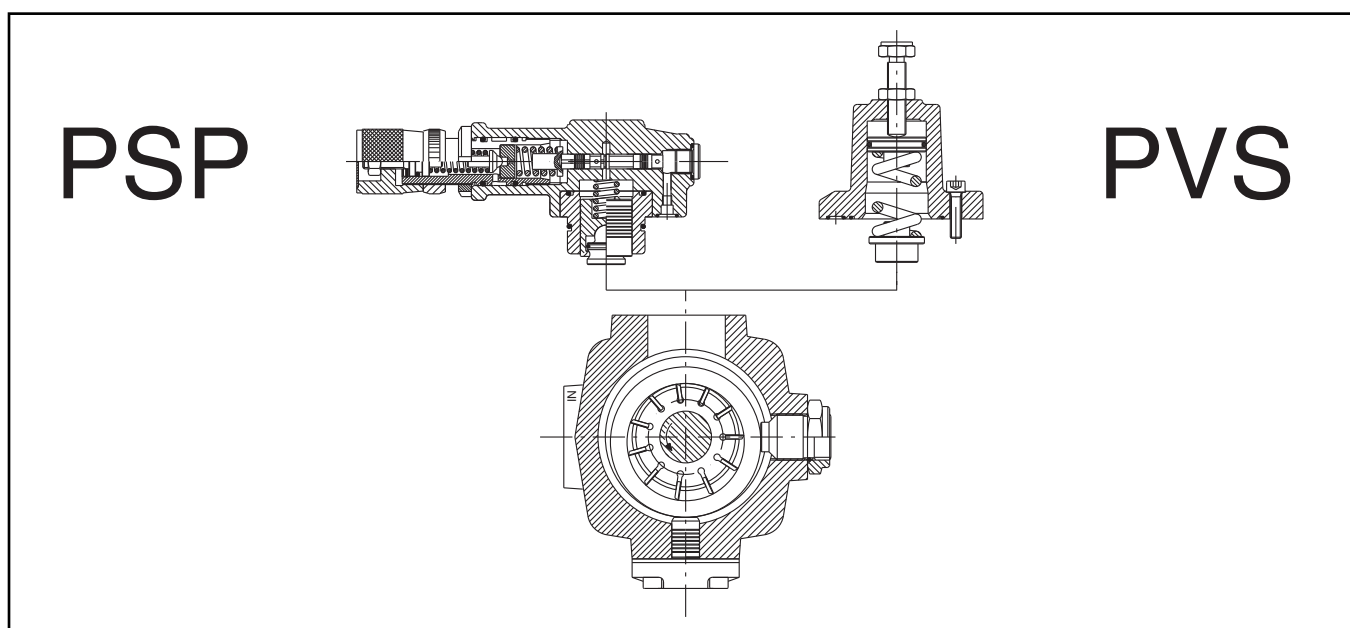
Berarma PVS variable displacement vane pumps come in three nominal sizes: SIZES 1-2-3, each of which is available in three different displacements. The PVS low pressure pumps (100 bar) [1450 psi] are equipped with a MECHANICAL pressure regulating device.

Pump components include: a body 1, a drive rotor 2 which houses the vanes 3, vanes that transport the fluid into the inlet and outlet chambers; a stator 4 (mobile circular ring) for varying eccentricity and consequently displacement; side distribution plates with AXIAL HYDROSTATIC COMPENSATION 5 which delimit the inlet and outlet chambers; a guide block balancing adjustment screw 6 (absolutely must not be tampered with by the user); a displacement adjustment piston 7, a maximum volume adjustment screw 8 (available on request); a pressure control device 9; and a pressure regulator 10.



## CHARACTERISTICS

- SILENT RUNNING from 60 to 72 dB(A).
- HIGH EFFICIENCY.
- LONG WORKING LIFE thanks to quality materials and state-of-the-art manufacturing technology: hydrodynamic lubrication of bearings and hydrostatic balancing of distribution plates.
- ECONOMY AND SIMPLIFICATION OF HYDRAULIC SYSTEM.
- The pumps can be supplied with various proportional devices for flow, pressure and power control.
- ISO standard MOUNTING FLANGES.
- GAS (BSP), SAE standard PORT CONNECTIONS.
- MODULAR DESIGN: all Berarma pumps feature modular design for maximum flexibility and adaptability. The pumps comprise a body, common to each size, on which the various types of compensator devices (mechanical and hydraulic for pressure and volume control) can be mounted. The pump can therefore be converted from PVS to PSP and vice versa without any special modification, using the same standard pump body.



## ORDERING CODE

	1	2	3	4	5	6	7	8	9
	SERIES	NAME	SIZE	DISPLACEMENT	FLANGE	PRESSURE SETTING	ROTATION	SEALS	OPTIONS
E.G.	02	PVS	1	20	F	H	R	M	Q-KL

**1** PUMP SERIES = 02

**2** PUMP NAME = PVS

**3** PUMP SIZE = 1, 2, 3

**4** DISPLACEMENT CM<sup>3</sup>/R =  
20 - 25 (SIZE 1)  
31 - 40 - 50 (SIZE 2)  
63 - 80 - 100 (SIZE 3)

**5** FLANGE AND PORT CONNECTIONS =  
F (UNI ISO 3019/2 - GAS BSP UNI ISO 228/1 thread)

**6** PRESSURE L 15-50 bar (218-725 psi)  
SETTING H 30-80 bar (435-1160 psi) for SIZE 3  
CONTROL H 30-100 bar (435-1450 psi) for SIZE 1-2

**7** ROTATION = R (Right hand - clockwise viewed from shaft end)

**8** SEALS = M (NBR)  
E (FPM-Viton)

**9** OPTIONS = KL (Key lock compensator)  
Q (Flow regulation screw)

# ORDERING CODE

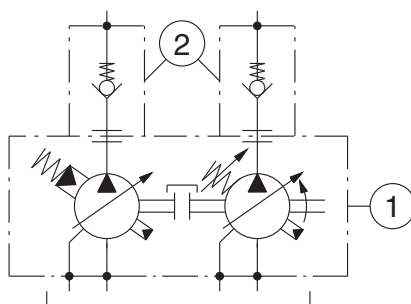
# TECHNICAL DATA

NOMINAL SIZE	SIZE 1	SIZE 2	SIZE 3
Geometric displacement according to UNI-ISO 3662 (cm <sup>3</sup> /r) [in <sup>3</sup> /r]	20-25 [1.220-1.526]	31.5-40-50 [1.922-2.441-3.051]	63-80-100 [3.844-4.882-6.102]
Actual displacement (cm <sup>3</sup> /r) [in <sup>3</sup> /r]	22.1-26.9 [1.349-1.642]	34.5-42.8-53.1 [2.105-2.612-3.240]	69-86.2-105.5 [4.211-5.260-6.438]
Maximum working pressure (bar) [psi]	100 [1450]	100 [1450]	80 [1160]
Pressure setting range	L - 15 / 50 bar [218 / 725 psi]  H - 30 / 100 bar [435 / 1450 psi]	L - 15 / 50 bar [218 / 725 psi]  H - 30 / 100 bar [435 / 1450 psi]	L - 15 / 50 bar [218 / 725 psi]  H - 30 / 80 bar [435 / 1160 psi]
Permitted maximum drain port pressure (bar) [psi]	1 [14.5]		
Inlet pressure (absolute-bar) [absolute-psi]	0.8 - 1.5 [11.6 - 21.8]		
Speed range (r/min)	800 - 1800		
Rotation direction (viewed from shaft end)	Right (clockwise) R		
Loads on drive shaft	NO RADIAL OR AXIAL LOADS ALLOWED		
Maximum torque on primary shaft (Nm) [lb in]	197 [1744]	400 [3540]	740 [6550]
Hydraulic fluid	HM hydraulic oil according to ISO 6743/4; HLP hydraulic oil according to DIN 51524/2 organic ester HFD-U according to ISO 6743/4 (Quintolubric 888) for other fluids contact Berarma Technical-Sales Service		
Viscosity range (cSt, mm <sup>2</sup> /s)	22 - 68		
Starting viscosity under full flow conditions (cSt, mm <sup>2</sup> /s)	400 max		
Viscosity index according to ISO 2909	100 min		
Inlet fluid temperature range (°C) [°F]	-10 / +50 [14 / 122]		
Maximum acceptable fluid contamination level	20/18/15 according to ISO 4406/99, CLASS 9 according to NAS 1638		
Recommended fluid contamination level for a longer pump working life	18/16/13 according to ISO 4406/99, CLASS 7 according to NAS 1638		
Weight (kg) [lb]	12 [26.7]	32 [71.1]	44 [97.8]
For different operating conditions, please contact Berarma Technical Service			

## COMBINED PUMPS

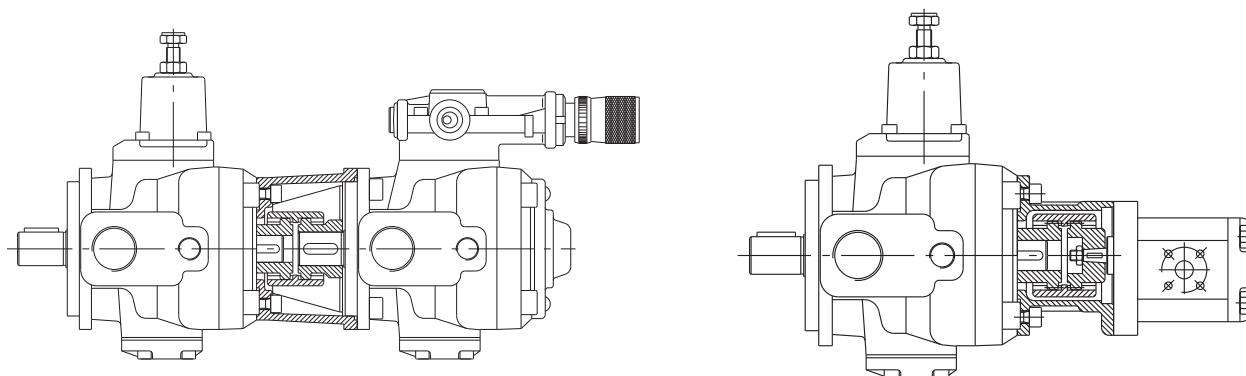
BERARMA pumps are already set-up for coupling to one another or to other types of pump (see table of possible combinations). The standard rotor shaft is set up for coupling (see pump section view, detail "A", on page 3). After removal of cover "B", the pump can be fitted with the different units already set up for coupling.

With this solution BERARMA intends to avoid pumps with non-standard special applications, in order to simplify interchangeability and pump combination. For solutions different to the ones described, please contact Berarma Technical Service.



1) Combined Pumps

2) Non return valve - recommended installation (supplied on request)



The ordering code should be specified according to the coupling sequence

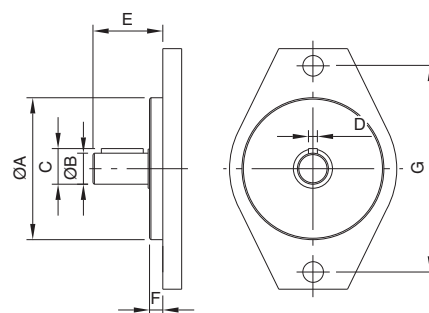
PRIMARY PUMP CODE	+	COUPLING UNIT CODE	+	SECONDARY PUMP CODE
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Combined pumps should be mounted in decreasing order of absorbed power. Depending on the conditions of use of each pump, pump combination should be established after first checking that torque values (Nm) [lb in] never exceed the limits specified in the table below.

Primary pump	Secondary pump	Coupling unit code	Maximum torque for secondary pump
02 PVS-PSP 1	Gear pump 1P	3000011000	55 Nm [487 lb in]
	Gear pump 1M	3000011100	
	Gear pump 2	3000011200	
	01-PLP-PHV-05-F	3000010200	
	01-PLP-PHV-05-FGR2	3000011200	
	02 PVS-PSP 1 F	3000010100	
	SAE "A"	3100000100	
02 PVS-PSP 2-3	Gear pump 1P	3000022000	110 Nm [974 lb in]
	Gear pump 1M	3000022100	
	Gear pump 2	3000022200	
	Gear pump 3	3000022300	
	01-PLP-PHV-05-F	3000020400	
	01-PLP-PHV-05-FGR2	3000022200	
	02 PVS-PSP 1 F	3000020100	
	02 PVS-PSP 2	3000020200	
	SAE "A"	3100000200	
	SAE "B"	3100000300	
02 PVS-PSP 3	02 PVS-PSP 3	3000020300	180 Nm [1593 lb in]

Warning: the sum of the torques of the combined pumps must not exceed the maximum permissible torque on the primary pump (see page 6).

Secondary pump with SAE A or B 2-bolt mounts should conform to the dimensions below.



Primary pump	Secondary pump flange	ØA	ØB	C	D	E min.	E max.	F	G
02 PVS 1	SAE J744 A	82.5 [3.248"]	19.05 [0.750"]	21.1 [0.831"]	4.8 [0.189"]	32 [1.260"]	59 [2.323"]	7 [0.276"]	106.4 [4.189"]
02 PVS 2-3	SAE J744 A	82.5 [3.248"]	19.05 [0.750"]	21.1 [0.831"]	4.8 [0.189"]	32 [1.260"]	59 [2.323"]	7 [0.276"]	106.4 [4.189"]
	SAE J744 B	101.6 [4.000"]	22.2 [0.874"]	25.1 [0.988"] 25.5 [1.000"]	6,375 [0.251"] 4.8 [0.189"]	41 [1.614"]	71 [2.795"]	9.5 [0.374"]	146 [5.748"]

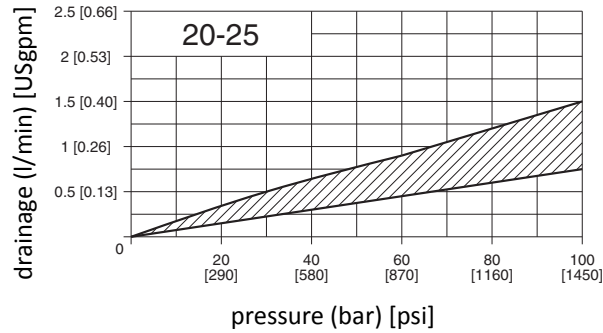


## CHARACTERISTIC CURVES

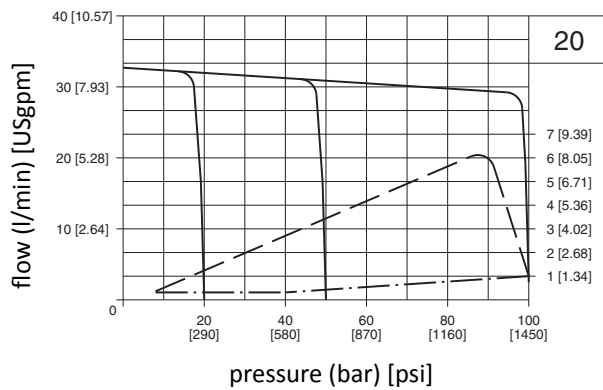
indicative values related to 1450 r/min., HM hydraulic oil according to ISO 6743/4, ISO VG 32 according to ISO 3448, temperature 50°C [122°F]

### 02 PVS 1 20-25

values established under zero flow setting

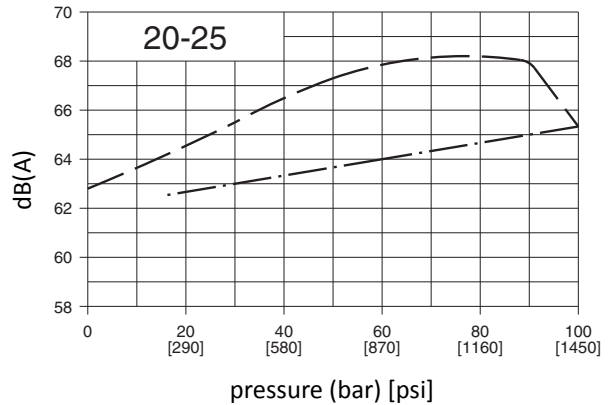


volumetric efficiency - zero flow setting curve

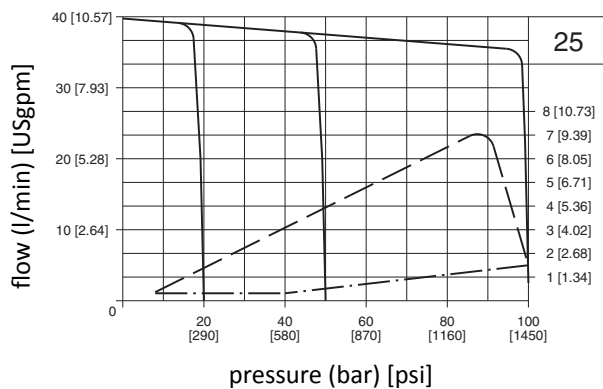


absorbed power (kW) [hp]

Maximum noise level measured on Berarma test bench with sound-level meter placed 1 metre [39.37"] from the pump, with flexible coupling.

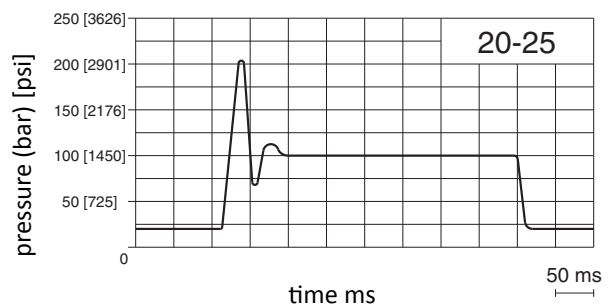


volumetric efficiency - zero flow setting curve



absorbed power (kW) [hp]

Response time and pressure peak



Power consumption with maximum flow

Power consumption with zero flow setting

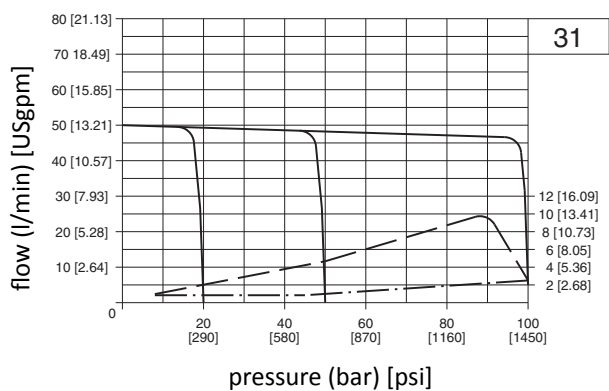
Pressure peaks are due to the test system. Pressure peak exceeding 30% of the maximum operating pressure must be eliminated by adopting the appropriate measures.

indicative values related to 1450 r/min., HM hydraulic oil according to ISO 6743/4, ISO VG 32 according to ISO 3448, temperature 50°C [122°F].

# CHARACTERISTIC CURVES

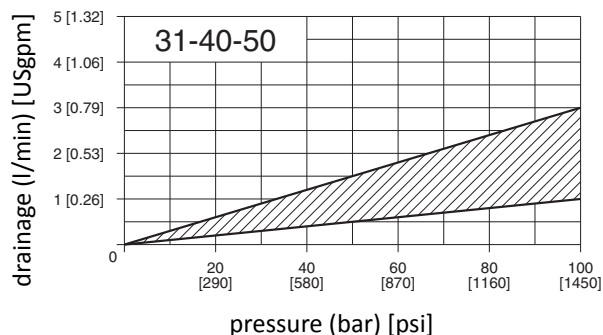
## 02 PVS 2 31-40-50

volumetric efficiency - zero flow setting curve

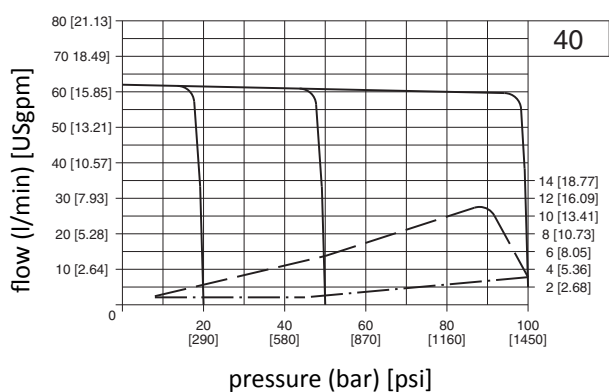


absorbed power (kW) [hp]

values established with zero flow setting

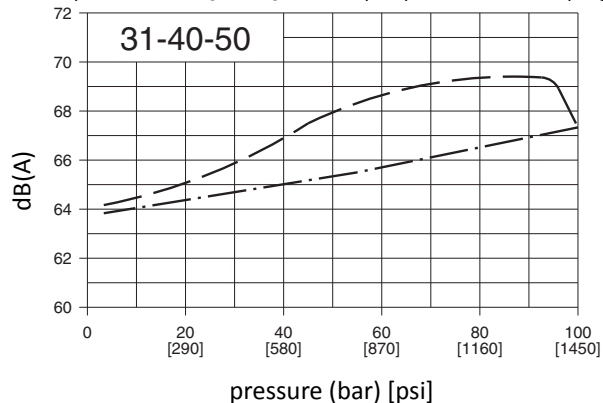


volumetric efficiency - zero flow setting curve

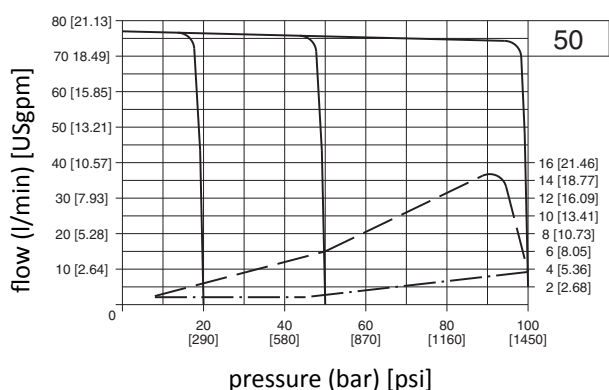


absorbed power (kW) [hp]

Maximum noise level measured on Berarma test bench with sound-level meter placed 1 metre [39.37"] from the pump, with flexible coupling

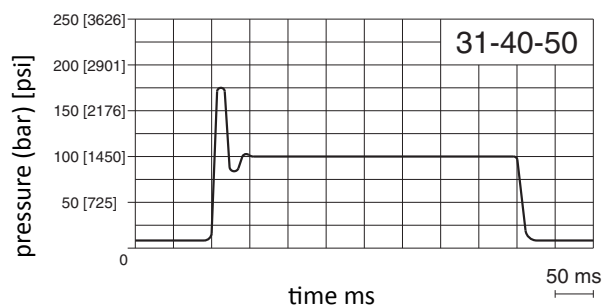


volumetric efficiency - zero flow setting curve



absorbed power kW

Response time and pressure peak



Power consumption with maximum flow

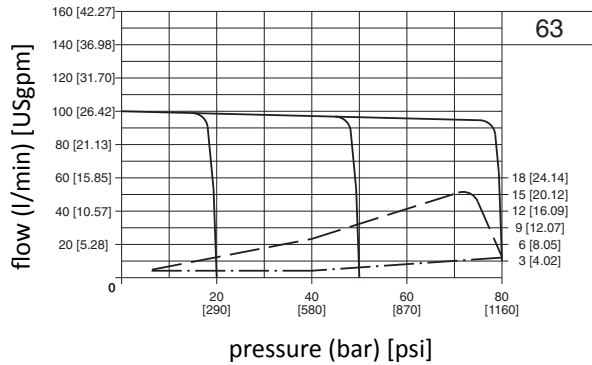
Power consumption with zero flow setting

Pressure peaks are due to the test system. Pressure peak exceeding 30% of the maximum operating pressure must be eliminated by adopting the appropriate measures.

indicative values related to 1450 r/min., HM hydraulic oil according to ISO 6743/4, ISO VG 32 according to ISO 3448, temperature 50°C [122°F]

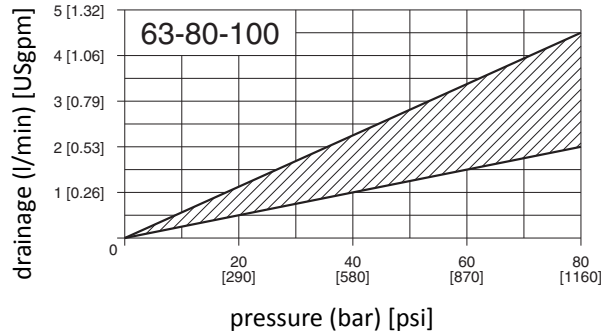
## 02 PVS 3 63-80-100

volumetric efficiency - zero flow setting curve

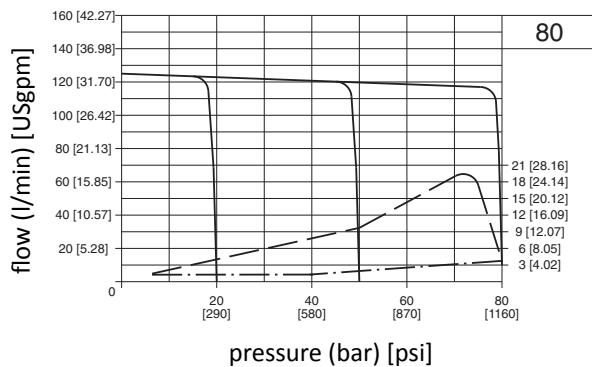


absorbed power (kW) [hp]

values established under zero flow setting

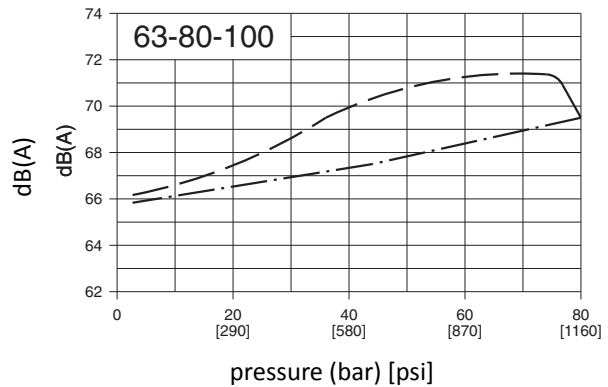


volumetric efficiency - zero flow setting curve

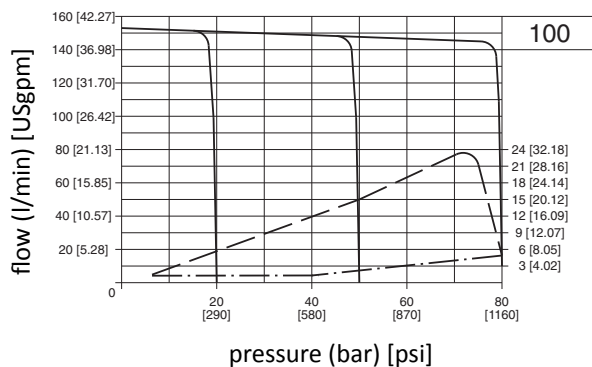


absorbed power (kW) [hp]

Maximum noise level measured on Berarma test bench with sound-level meter placed 1 metre [39.37"] from the pump, with flexible coupling

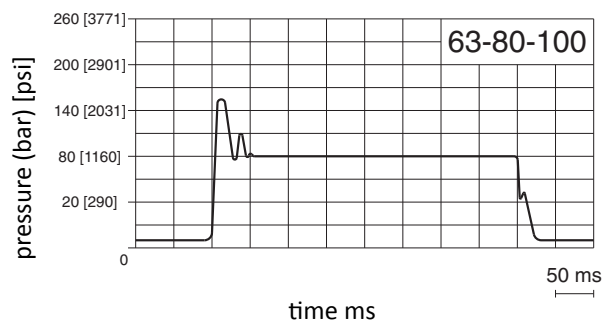


volumetric efficiency - zero flow setting curve



absorbed power (kW) [hp]

Response time and pressure peak



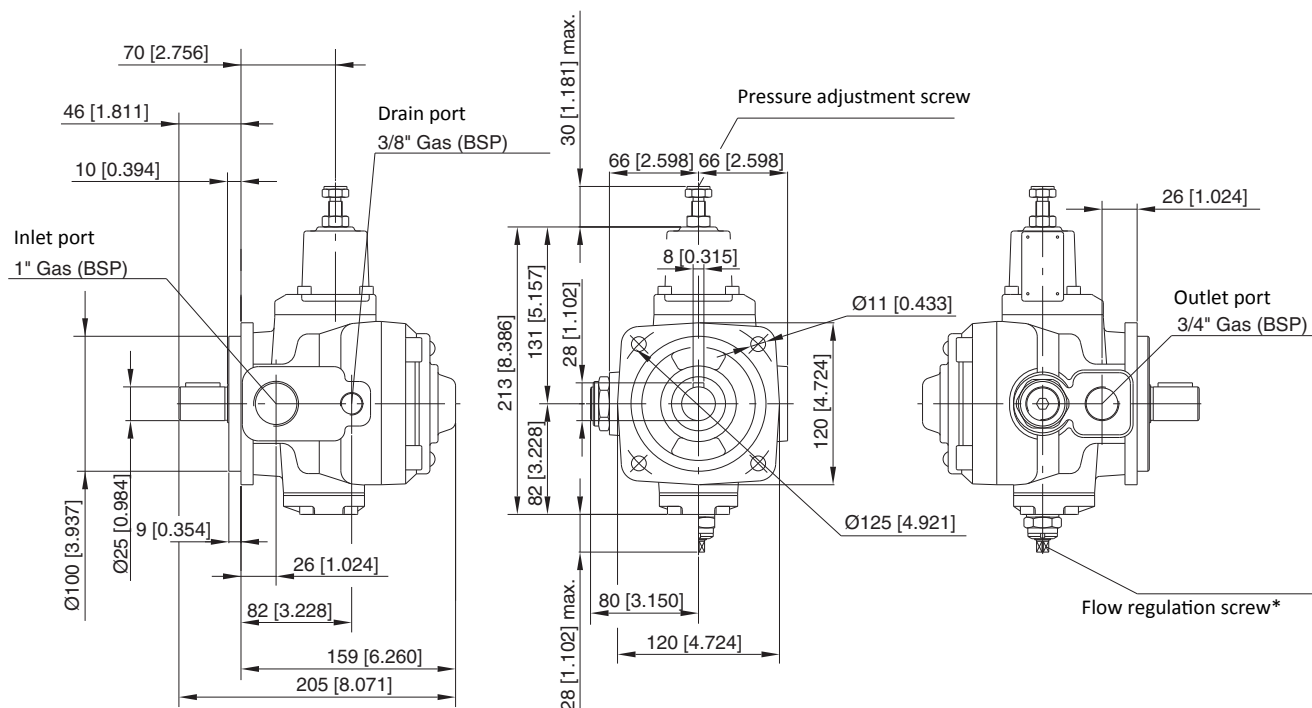
Power consumption with maximum flow

Power consumption with zero flow setting

Pressure peaks are due to the test system. Pressure peaks exceeding 30% of the maximum operating pressure must be eliminated by adopting the appropriate measures.

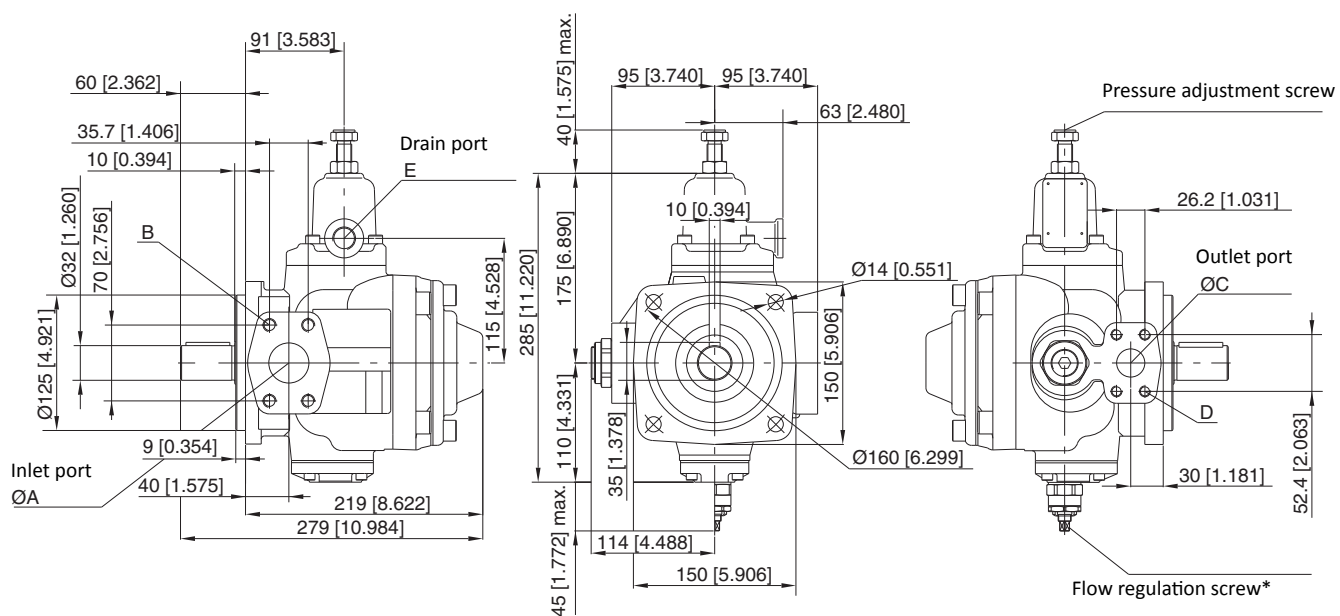
## DIMENSIONS

### 02 PVS 1 20-25 (F)



\* - Supplied on request (see page 18)

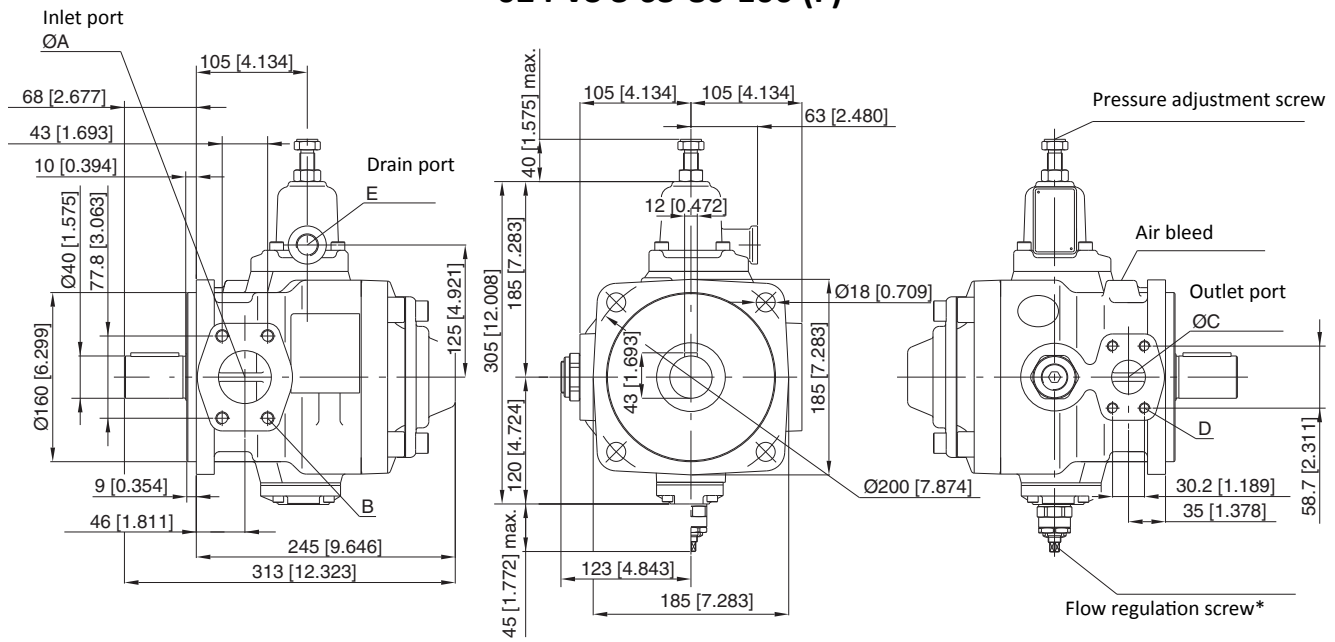
### 02 PVS 2 31-40-50 (F)



\* - Supplied on request (see page 18)

Flange	ØA	B	ØC	D	E
<b>F (ISO)</b>	38 [1,496]	SAE (3000) 1 1/2 M12 x 45 [0.472x1.772]	25 [0,984]	SAE (3000) 1" M10 x 35 [0.394x1.378]	1/2" Gas (BSP)

Note: dimensions inside [ ] are in inches

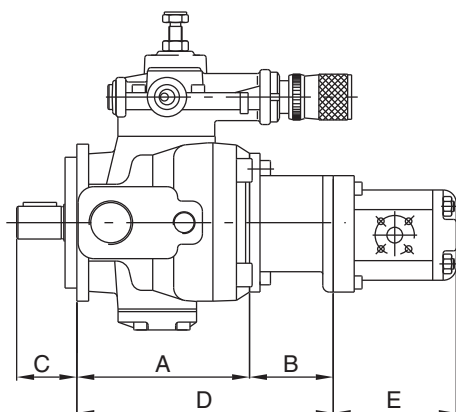
**02 PVS 3 63-80-100 (F)**


\* - Supplied on request (see page 18)

Flange	ØA	B	ØC	D	E
<b>F (ISO)</b>	51 [2,008]	SAE (3000) 2" M12 x 45 [0.472x1.772]	32 [1,260]	SAE (3000) 1"1/4 M10 x 40 [0.394x1.575]	1/2" Gas (BSP)

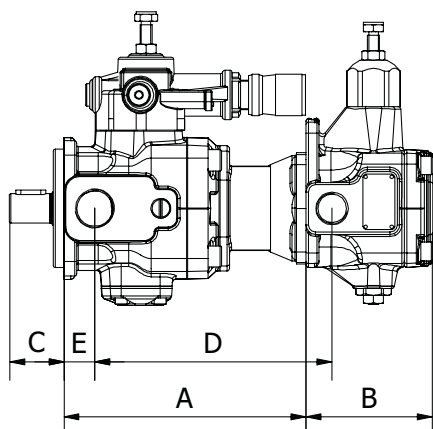
Note: dimensions inside [ ] are in inches

# DIMENSIONS



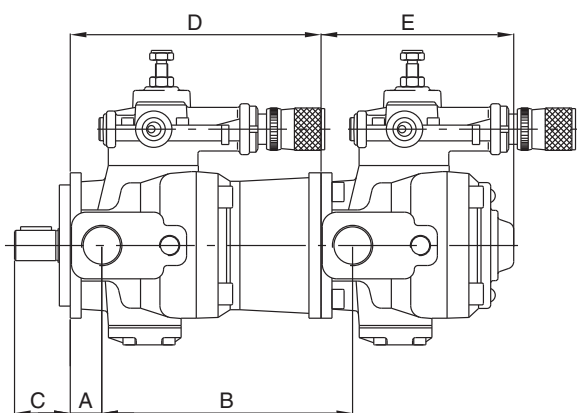
**Primary pump 02 PVS PSP 1 F**

Secondary pump	A	B	C	D	E
1P gear pump	132 [5.197]	64 [2.520]	46 [1.811]	196 [7.717]	please consult gear pump catalogue
1M gear pump	132 [5.197]	64 [2.520]	46 [1.811]	196 [7.717]	
2 gear pump	132 [5.197]	72 [2.835]	46 [1.811]	204 [8.031]	



**Primary pump 02 PVS 1 F**

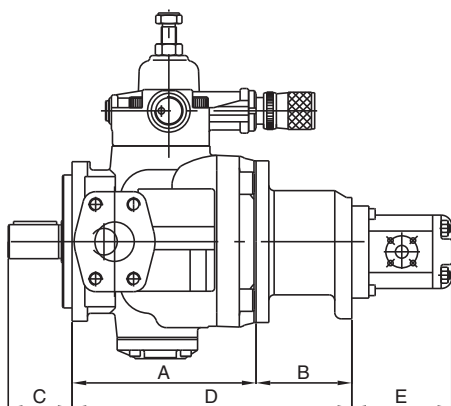
Secondary pump	A	B	C	D	E
01-PLP-F	205 [8.071]	107 [4.213]	46 [1.811]	201 [7.913]	26 [1.024]
01-PLP-FGR2	204 [8.031]	107 [4.213]	46 [1.811]	201 [7.913]	26 [1.024]



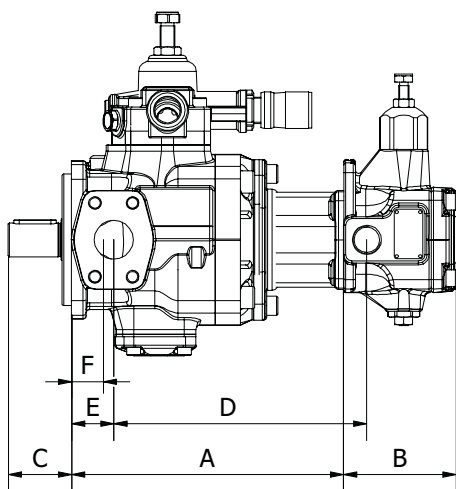
**Primary pump 02 PVS PSP 1 F**

Secondary pump	A	B	C	D	E
02 PVS PSP 1	26 [1.024]	207 [8.150]	46 [1.811]	207 [8.150]	159 [6.260]

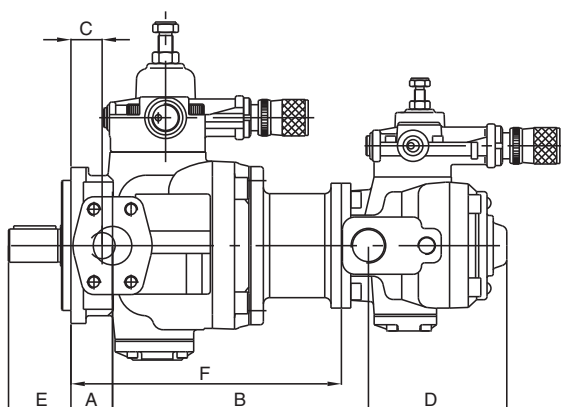
Note: dimensions inside [ ] are in inches


**Primary pump 02 PVS PSP 2 F**

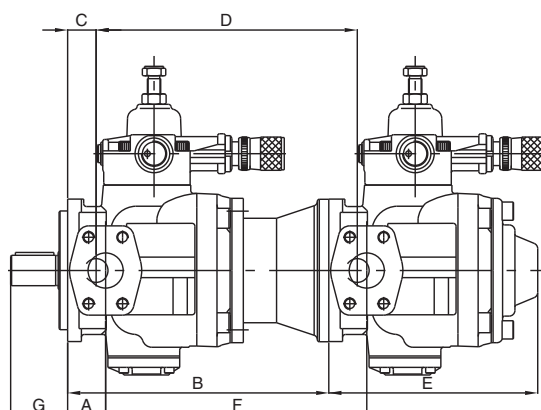
Secondary pump	A	B	C	D	E
1P gear pump	173 [6.811]	90 [3.543]	60 [2.362]	263 [10.354]	please consult gear pump catalogue
1M gear pump	173 [6.811]	90 [3.543]	60 [2.362]	263 [10.354]	
2 gear pump	173 [6.811]	90 [3.543]	60 [2.362]	263 [10.354]	
3 gear pump	173 [6.811]	90 [3.543]	60 [2.362]	263 [10.354]	


**Primary pump 02 PVS PSP 2 F**

Secondary pump	A	B	C	D	E	F
01-PLP 05 F	258 [10.157]	107 [4.213]	60 [2.362]	240 [9.449]	40 [1.575]	30 [1.181]
01-PLP 05 FGR2	263 [10.354]	107 [4.213]	60 [2.362]	245 [9.646]	40 [1.575]	30 [1.181]

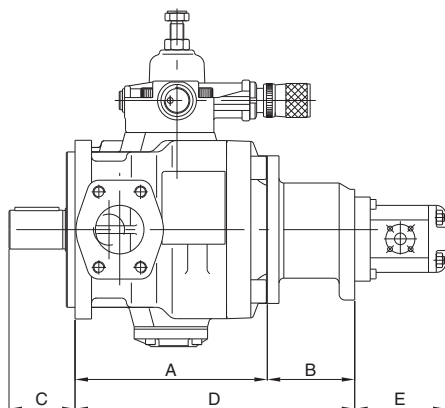

**Primary pump 02 PVS PSP 2 F**

Secondary pump	A	B	C	D	E	F
02 PVS PSP 1 F	40 [1.575]	246 [9.685]	30 [1.181]	159 [6.260]	60 [2.362]	260 [10.236]


**Primary pump 02 PVS PSP 2 F**

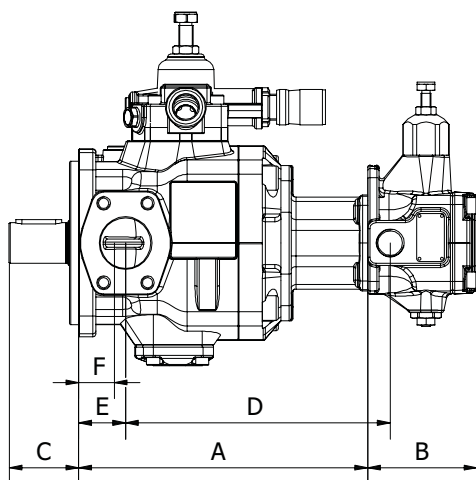
Secondary pump	A	B	C	D	E	F	G
02 PVS PSP 2 F	40 [1.575]	275 [10.827]	30 [1.181]	275 [10.827]	220 [8.661]	275 [10.827]	60 [2.362]

Note: dimensions inside [ ] are in inches



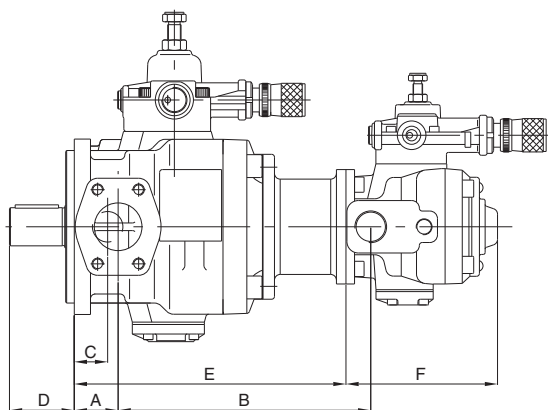
**Primary pump 02 PVS PSP 3 F**

Secondary pump	A	B	C	D	E
1P gear pump	198 [7.795]	90 [3.543]	68 [2.677]	288 [11.339]	please consult gear pump catalogue
1M gear pump	198 [7.795]	90 [3.543]	68 [2.677]	288 [11.339]	
2 gear pump	198 [7.795]	90 [3.543]	68 [2.677]	288 [11.339]	
3 gear pump	198 [7.795]	90 [3.543]	68 [2.677]	288 [11.339]	



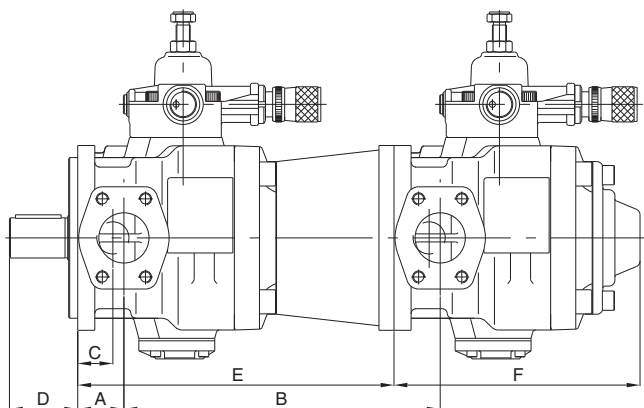
**Primary pump 02 PVS PSP 3 F**

Secondary pump	A	B	C	D	E	F
01 PLP 05 F	283 [11.142]	107 [4.213]	68 [2.677]	259 [10.197]	46 [1.811]	35 [1.378]
01 PLP 05 FGR2	288 [11.339]	107 [4.213]	68 [2.677]	264 [10.394]	46 [1.811]	35 [1.378]



**Primary pump 02 PVS PSP 3 F**

Secondary pump	A	B	C	D	E	F
02 PVS PSP 1 F	46 [1.811]	265 [10.433]	35 [1.378]	68 [2.677]	285 [11.220]	159 [6.260]



**Primary pump 02 PVS PSP 3 F**

Secondary pump	A	B	C	D	E	F
02 PVS PSP 2 F	46 [1.811]	295 [11.614]	35 [1.378]	68 [2.677]	300 [11.811]	220 [8.661]
02 PVS PSP 3 F	46 [1.811]	315 [12.402]	35 [1.378]	68 [2.677]	315 [12.402]	245 [9.646]

Note: dimensions inside [ ] are in inches

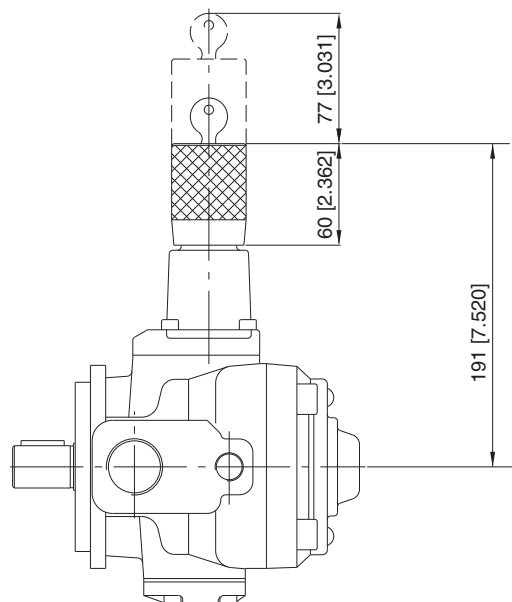
For the dimensions of the other solutions described on page 8, please contact Berarma Technical Service.



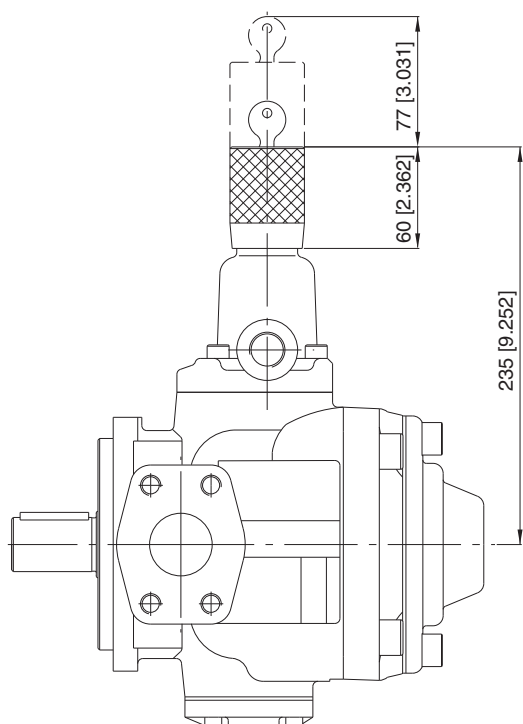
# ACCESSORIES

## KEY-LOCK SETTING PRESSURE DEVICE

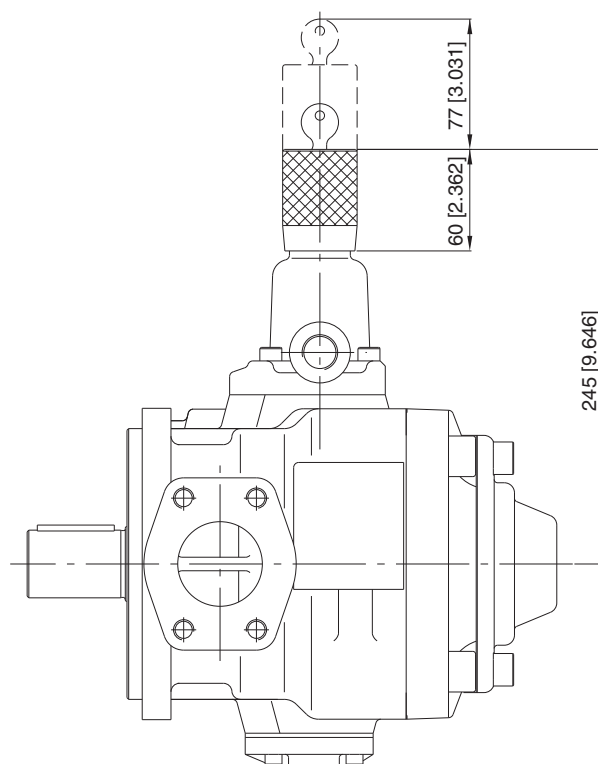
02 PVS 1 ....-KL



02 PVS 2 ....-KL

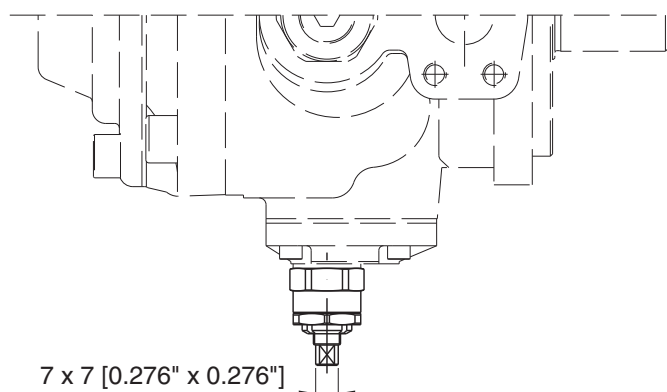


02 PVS 3 ....-KL



Note: dimensions inside [ ] are in inches

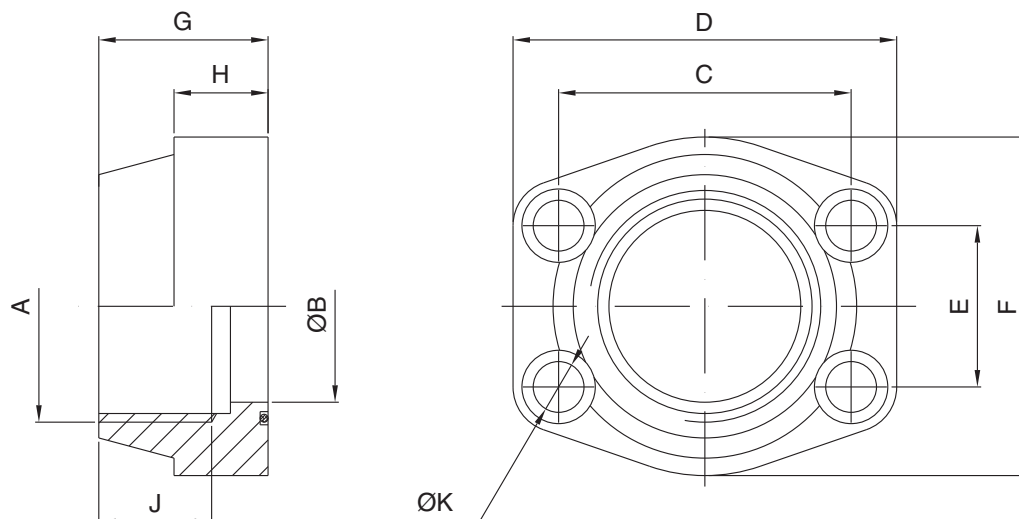
## FLOW REGULATION SCREW



If the pump is supplied with flow regulation screw "Q" set to less than 50% of the nominal flow, the pump can only start on condition that the system and pump are completely filled with fluid.

Pump type	02 PVS 1-20	02 PVS 1-25	02 PVS 2-31	02 PVS 2-40	02 PVS 2-50	02 PVS 3-63	02 PVS 3-80	02 PVS 3-100
Indicative data that can change from pump to pump								
MAX flow at 1450 r/min (l/min) [USgpm]	33 {8.72}	39 {10.30}	50 {13.21}	62 {16.38}	78 {20.61}	100 {26.42}	125 {33.02}	152 {40.15}
MIN flow at 1450 r/min (l/min) [USgpm]	11 {2.91}	17 {4.49}	2.3 {0.61}	14.3 {3.78}	30.3 {8.00}	14 {3.70}	39 {10.30}	66 {17.44}
Reduced flow by screw turn (l/min) [USgpm]	14 {3.70}	14 {3.70}	23.8 {6.29}	23.8 {6.29}	23.8 {6.29}	34.5 {9.11}	34.5 {9.11}	34.5 {9.11}

## FLANGES SAE J518 (3000 SERIES) SUPPLIED WITH SCREWS AND O-RING

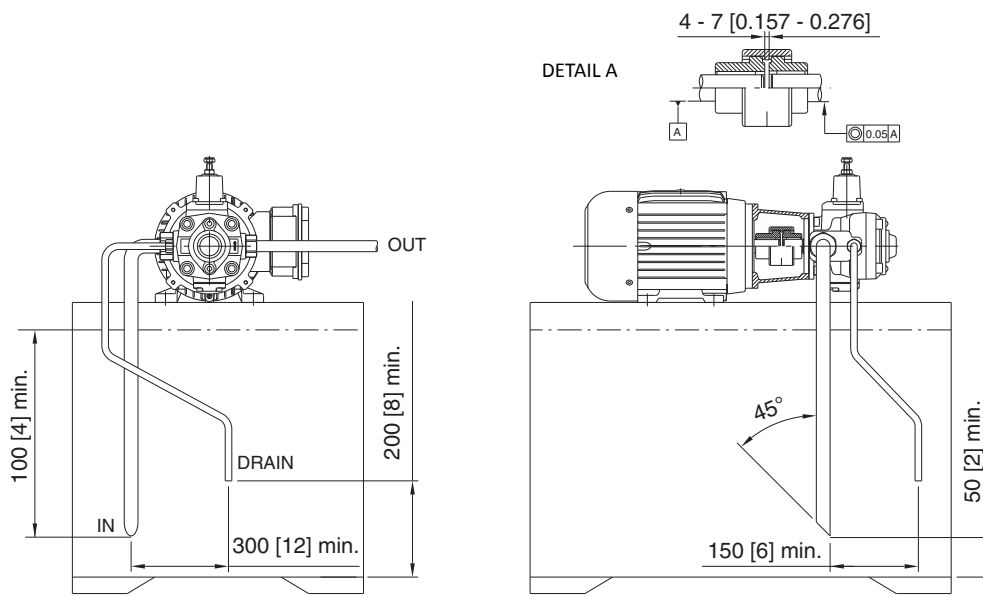


Pump type	ORDERING CODE	Nominal size	A	ØB	C	D	E	F	G	H	J	ØK	Screws	O-Ring
02 PVS PSP 2	5540000102	1"	1" Gas (BSP)	25 [0.984]	52.4 [2.063]	70 [2.756]	26.2 [1.031]	52 [2.047]	38 [1.496]	18 [0.709]	19 [0.748]	11 [0.433]	M10 [0.394]	OR 4131 NBR
	5540000106	1" 1/2	1"½ Gas (BSP)	38 [1.496]	70 [2.756]	93 [3.661]	35.7 [1.406]	78 [3.071]	44 [1.732]	25 [0.984]	24 [0.945]	13.5 [0.531]	M12 [0.472]	OR 4187 NBR
02 PVS PSP 3	5540000104	1" 1/4	1"¼ Gas (BSP)	32 [1.260]	58.7 [2.311]	79 [3.110]	30.2 [1.189]	68 [2.677]	41 [1.614]	21 [0.827]	22 [0.866]	11.5 [0.453]	M10 [0.394]	OR 4150 NBR
	5540000108	2"	2" Gas (BSP)	51 [2.008]	77.8 [3.063]	102 [4.016]	42.9 [1.689]	90 [3.543]	45 [1.772]	25 [0.984]	30 [1.181]	13.5 [0.531]	M12 [0.472]	OR 4225 NBR

Note: dimensions inside [ ] are in inches

## INSTRUCTIONS FOR INSTALLATION AND USE

- 1) Size 1 PVS pumps can be mounted in any position.  
 Sizes 2 and 3 PVS pumps must be mounted with the shaft along a horizontal axis and with the compensator device facing upward (see figure).  
 When the pump is installed above the tank oil level, pay attention to the inlet pressure (see page 6).  
 The minimum section of the inlet pipe must be equal to the section of the thread of the pump inlet port. The inlet pipes should be as short as possible, with a small number of bends and without internal section changes.
- 2) All return and drain pipes must be positioned so that the oil cannot be sucked back directly by the pump (see figure).  
 The oil tank must be suitably sized in order to exchange the thermal power generated by the various system components and to provide a low recycle rate.  
 To ensure the maximum pump working life, the inlet oil temperature must never be above 50°C (122°F).  
 In systems where the pump runs for a long time under zero flow setting conditions, the installation of a heat exchanger in the drain line is recommended. The pressure on the drain port must never exceed the specified value (page 6). The drain pipe must always be independent from the other return lines, connected directly to the tank, and extended sufficiently inside the tank so as to be below the minimum oil level to avoid generating foam. Moreover, the drain pipe must be free of restrictions and as far as possible from the inlet pipe.
- 3) Motor-pump coupling must be made with a self-aligning flexible coupling with convex teeth and a polyamide cam.  
 When assembling, maximum attention must be given to the distance between the two half-couplings which must strictly fall within the values specified in the diagram below (detail "A").  
 Other types of motor-pump couplings are not permitted.  
 No induced RADIAL or AXIAL LOADS are allowed on the pump shaft.
- 4) During initial installation, the pump must be run under maximum flow conditions (P connected to T), with the oil flowing directly into the tank, in order to induce air bleeding.  
 This phase must run for several minutes.  
 Pump priming (delivery of oil to the outlet) must occur within a few seconds, otherwise the pump must be turned off and the operation repeated.  
 Subsequent start-ups under zero flow setting conditions are admissible only with pressure not exceeding 30 bar (435 psi), and with the system and pump completely filled with oil.  
 During the initial and subsequent starting operations, the difference between the oil temperature and the ambient temperature (body pump temperature) must not exceed 20°C (68°F).



Note: dimensions inside [ ] are in inches

For further information, please consult the leaflet "Installation and start-up instructions for variable displacement vane combined pumps".

