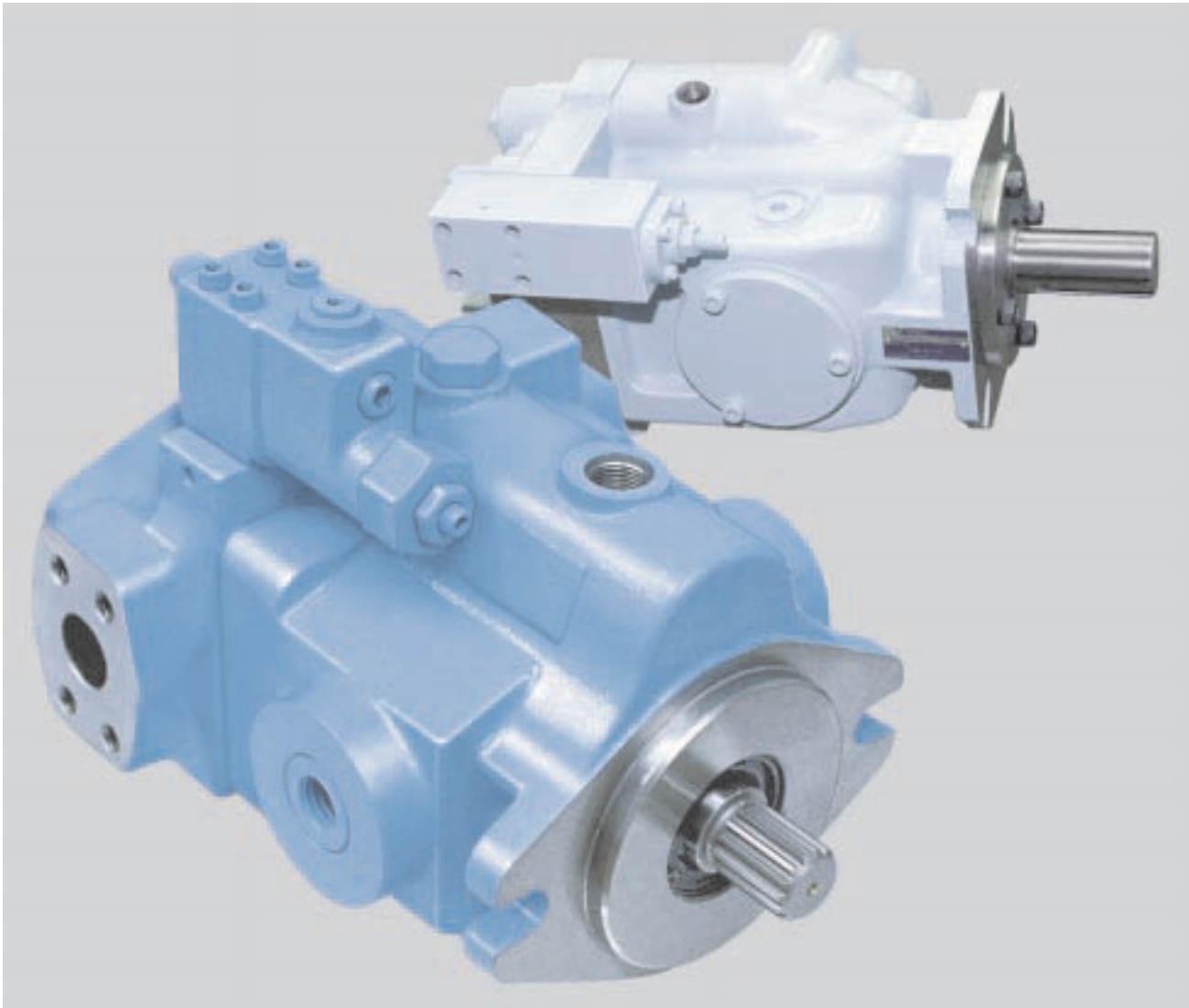
DENISON HYDRAULICS

PV, PVT Series

piston pumps for open circuits



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DENISON Hydraulics

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TYPICAL CHARACTERISTICS

Specification	Term	Series PV6 PVT6	Series PV10 PVT10	Series PV15 PVT15	Series PV20 PVT20	Series PVM20 PVR20	Series PV29 PVT29	Series PVT38	Series PVT47	Series PVT64
•displacement	in^3/rev.	0.88	1.26	2.09	2.62	2.62	3.78	4.88	6.10	7.93
at max angle	cm^3/rev.	14.4	20.6	34.2	42.9	42.9	61.9	80.0	100.0	130.0
•pressure, continuous	psi	3500	3500	3500	3500	3500	3000	4000	4000	4000
	bar	240	240	240	240	240	207	280	280	280
intermittent [1]	psi	4500	4500	4500	4500	4500	4000	4350	4350	4350
	bar	310	310	310	310	310	280	300	300	300
•speed, max. [2]	rpm	3000	3000	2500	2400	2600	2400	1800	1800	1800
•rotating inertia	lb in^2	2.00	3.3	7.87	11.97	11.97	21.84	27.98	44.39	68.22
	kg m^2	.0006	.00099	.00233	.00355	.00355	.00647	.00829	.01315	.02021
•compensator response										
off-stroke	ms	50	50	50	50	50	50	50	50	50
on-stroke	ms	120	120	120	120	120	120	100	100	100
•maximum compensator	psi	4000	4000	4000	4000	4000	3500	4000	4000	4000
setting	bar	276	276	276	276	276	241	280	280	280
•compensator-	psi/turn	650	650	650	650	650	650	650	650	650
adjustment	bar/turn	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8
•max. vol. adjustment										
full to zero- stroke	turns	8.5	8.5	8.5	9.7	9.7	10.5	13.1	14.0	15.3
maximum torque [3]	lb-in	28	25	41	49	49	45			
	Nm	3.2	2.8	4.6	5.5	5.5	5.1			
•minimum inlet-	in-Hg	-6.1	-6.1	-6.1	-6.1	-6.1	-6.1	-4.9	-4.9	-4.9
at 1800 rpm	mm-Hg	-155	-155	-155	-155	-155	-155	-125	-125	-125
•maximum inlet-	psi	50	50	50	50	50	50	50	50	50
pressure	bar	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
•max. case pressure	psi	10	10	10	10	10	10	7	7	7
	bar	0.7	0.7	0.7	0.7	0.7	0.7	0.5	0.5	0.5
•peak case pressure-	psi	15	15	15	15	15	15	7	7	7
over inlet pressure	bar	1	1	1	1	1	1	0.5	0.5	0.5
•input mounting	SAE	82-2 (A)	101-2 (B)	101-2 (B)	127-2 (C)	127-2 (C)	127-2 (C)	127-4 (C)	127-4 (C)	152-4 (D)
•input shaft, keyed	SAE	19-1	22-1	22,25-1[4]	32-1	32-1	32-1	38-1	44-1	44-1
splined		22-4	22-4	22,25-4[4]	32-4	32-4	32-4	38-4	38-4	44-4
		(A)(B)	(B)	(B,BB)	(C)	(C)	(C)	(C,CC)	(C,CC)	(D)
•shaft bearing life at-										
1800 rpm, 2500 psi (*4000 psi)										
front bearing	hrs	3100	4800	3500	4400	4400	2100	8776	13789	24720
rear bearing	hrs	9600	9400	3100	5100	5100	2600	7165	11510	15533
1500 rpm, 172 bar (*280 bar)										
front bearing	hrs	3720	5760	4200	5280	5280	2520	10531	16547	29964
rear bearing	hrs	11520	11280	3720	6120	6120	3120	8598	13812	18640
•weight-approx. -PV, PVM	lb	24	36	43	57	57	73	—	—	—
	Kg	11	16	20	26	26	33	—	—	—
•weight-approx. -PVT, PVR	lb	30	45	55	71	71	93	110	156	211
	Kg	14	20	25	32	32	42	50	71	95

[1] 10% of operation time, not exceeding 6 successive seconds.
[2] for speeds over 1800 rpm see higher speeds guideline chart pg. 5.
[3] this is a maximum torque-actual torque reduces by about 25% at full stroke.
[4] PV15 uses 22-1,22-4 (SAE-B) only
* PVT 38, 47 and 64

FLUID CONNECTIONS

	Term	Series PV6 PVT6	Series PV10 PVT10	Series PV15 PVT15	Series PV20 PVT20	Series PVM20 PVR20	Series PV29 PVT29	Series PVT38	Series PVT47	Series PVT64
•port A PV/PVM (inlet)	SAE St. Thd.	-12	-20	-20	-20	-24	-20	N/A	N/A	N/A
	BSPP	3/4	1-1/4	1-1/4	1-1/4	1-1/2	1-1/4	N/A	N/A	N/A
• port B PV/PVM (outlet)	SAE St. Thd.	-12	-20	-20	-20	-20	-20	N/A	N/A	N/A
	BSPP	3/4	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4	N/A	N/A	N/A
•port A (inlet),PVT/PVR SAE code 61 4 bolt flg.	in.	1”	1.25”	1.5”	1.5”	1.5”	2”	2”	2.5”	2.5”
	mm	25.4	31.75	38.1	38.1	38.1	50.8	50.0	63.5	63.5
•port B (outlet),PVT/PVR SAE code 61 4 bolt flg.	in.	.75”	1”	1”	1”	1”	1”	1.5”	1.5”	1.5”
	mm	19.1	25.4	25.4	25.4	25.4	25.4	38.1	38.1	38.1
•port D	SAE St. Thd.	-8	-10	-10	-12	-12	-12	-12	-12	-12
	BSPP	1/2	3/4	3/4	1	1	1	N/A	N/A	N/A
•port V	SAE St. Thd.	-4	-4	-4	-4	-4	-4	-4	-4	-4
	BSPP	1/4	1/4	1/4	1/4	1/4	1/4	N/A	N/A	N/A

MAXIMUM ALLOWABLE THROUGH DRIVE TORQUE

Max. input torque: max. torque allowed on input shaft from the combined torques of front and rear pumps.
Max. rear drive torque: max. torque allowed from rear pump.

	input shaft	max. input torque lbs-in.(Nm)	rear mounting pad	rear drive coupling (spline)	max. rear drive torque lbs-in.(Nm)
PVT6	SAE-19-1 (A) key SAE-22-4 (B) spline	1125 (127,1) 2025 (228,8)	SAE-82-2 (A)	SAE-16-4 (A) SAE-22-4 (B)	1125 (127,1) 1125 (127,1)
PVT10	SAE-22-1 (B) key SAE-22-4 (B) spline	1680 (189,8) 2550 (288,1)	SAE-82-2,101-2 (A,B)	SAE-16-4 (A) SAE-22-4 (B)	1680 (189,8) 1925 (217,5)
PVT15	SAE-22-1 (B) key SAE-22-4 (B) spline SAE-25-1 (B-B) key SAE-25-4 (B-B) spline	1680 (189,8) 2185 (246,9) 2850 (332) 3825 (432,2)	SAE-82-2,101-2 (A,B)	SAE-16-4 (A) SAE-22-4 (B) SAE-25-4 (B-B)	1680 (189,8) 2000 (226) 2000 (226) 2000 (226)
PVT20 PVR20	SAE-32-1 (C) key SAE-32-4 (C) spline	4675 (528,3) 4675 (528,3)	SAE-82-2,101-2,127-2 (A,B,C)	SAE-16-4 (A) SAE-22-4 (B) SAE-25-4 (B-B) SAE-32-4 (C)	3850 (435) 3850 (435)
PVT29	SAE-32-1 (C) key SAE-32-4 (C) spline	4880 (551,4) 6300 (711,9)	SAE-82-2,101-2,127-2 (A,B,C)	SAE-16-4 (A) SAE-22-4 (B) SAE-25-4 (B-B) SAE-32-4 (C)	3850 (435) 3850 (435)
PVT38	SAE-38-4 (CC) spline SAE-32-1 (C) key	6501 (735) 6501 (735)	SAE -82-2, 101-2,127-2 (A,B,C)	SAE-16-4 (A) SAE-22-4 (B) SAE-25-4 (B-B) SAE-32-4 (C) SAE-38-4 (C-C)	3007 (340)
PVT47	SAE-38-4 (CC) spline SAE-32-1 (C) key	8756 (990) 8756 (990)	SAE-82-2,101-2,127-2 (A,B,C)	SAE-16-4 (A) SAE-22-4 (B) SAE-25-4 (B-B) SAE-32-4 (C) SAE-38-4 (C-C)	5660 (640)
PVT64	SAE-44-4 (D) spline SAE-44-1 (D) key	11365 (1285) 11365 (1285)	SAE-82-2, 101-2, 127-2, 127-4, 152-4 (A,B,C,D)	SAE-16-4 (A) SAE-22-4 (B) SAE-25-4 (B-B) SAE-32-4 (C) SAE-38-4 (C-C) SAE-44-4 (D)	5660 (640)

HIGHER SPEED GUIDES

	Speed	Minimum inlet pressure				maximum case pressure	
		pressure gage		absolute pressure			
	rpm	psi	bar	psi	bar	psi	bar
PV6 PVT6	1800	-3.0	-0,2	11.7	0,8	10	0,7
	2050	-3.0	-0,2	11.7	0,8	7	0,5
	2100	-3.0	-0,2	11.7	0,8	5	0,3
	2750	-2.4	-0,2	12.4	0,9	5	0,3
	2900	-1.0	-0,1	13.7	1,0	5	0,3
	3000	0.0	0,0	14.7	1,0	5	0,3
PV10 PVT10	1800	-3.0	-0,2	11.7	0,8	10	0,7
	2100	-3.0	-0,2	11.7	0,8	7	0,5
	2500	-3.0	-0,2	11.7	0,8	5	0,3
	2550	-2.5	-0,2	12.2	0,8	5	0,3
	2700	-1.0	-0,1	13.7	0,9	5	0,3
	2800	0.0	0,0	14.7	1,0	5	0,3
	3000	2.2	0,2	16.9	1,2	5	0,3
PV15 PVT15	1800	-3.0	-0,2	11.7	0,8	10	0,7
	2100	-3.0	-0,2	11.7	0,8	7	0,5
	2230	-3.0	-0,2	11.7	0,8	5	0,3
	2275	-2.5	-0,2	12.2	0,8	5	0,3
	2350	-1.7	-0,1	13.0	0,9	5	0,3
	2500	0.0	0,0	14.7	1,0	5	0,3
PV20 PVT20	1800	-3.0	-0,2	11.7	0,8	10	0,7
	2050	-3.0	-0,2	11.7	0,8	7	0,5
	2100	-2.5	-0,2	12.3	0,9	5	0,3
	2200	-1.3	-0,1	13.5	0,9	5	0,3
	2300	-0.0	-0,0	14.7	1,0	5	0,3
	2400	1.3	0,1	16.0	1,1	5	0,3
PVM20 PVR20	1800	-3.0	-0,2	11.7	0,8	10	0,7
	2000	-3.0	-0,2	11.7	0,8	7	0,5
	2100	-3.0	-0,2	11.7	0,8	5	0,3
	2200	-2.0	-0,1	12.7	0,9	5	0,3
	2400	-1.0	-0,1	13.7	0,9	5	0,3
	2600	0.0	0,0	14.7	1,0	5	0,3
PV29 PVT29	1800	-3.0	-0,2	11.7	0,8	10	0,7
	2050	-3.0	-0,2	11.7	0,8	7	0,5
	2100	-2.5	-0,2	12.3	0,9	5	0,3
	2200	-1.3	-0,1	13.5	0,9	5	0,3
	2300	-0.0	-0,0	14.7	1,0	5	0,3
	2400	1.3	0,1	16.0	1,1	5	0,3
PVT38	1800	-2.0	-0,15	14.1	0,95	7	0,5
PVT47	1800	-2.0	-0,15	14.1	0,95	7	0,5
PVT64	1800	-2.0	-0,15	14.1	0,95	7	0,5

Note: Watch the case pressures carefully. Rapid compensation at high speeds can cause severe case spikes. If the pump feeds into a blocked center valve that closes quickly, use both case drain ports and direct short case drain lines and a relief valve.

Benefits and features:

For quiet operation and high productivity, specify DENISON'S PV and PVT series pressure compensated, variable volume axial pisto n pumps. Designed right and built tough, they provide reliable fluid power...even under severe conditions!

You gain more efficient machine operation, upgrade equipment performance and reduce maintenance easily with these quiet, efficient pumps. Because they are interchangeable with other popular pumps, you can use the PV pumps to replace existing older pumps which are not functioning to your satisfaction.

Check these benefits:

quiet operation- improves working conditions, low noise levels over entire operating range.

contamination tolerances- improves dependability and reduces maintenance cost.

more power- because of the PV's high pressure ratings. Max. intermittent operating pressures to 4500 psi (310) bar.

system savings- because higher pressure allows use of smaller components...you can "downsize"and gain real savings.

versatility- full power through drive to allow multiple pumps to be driven from one prime mover.

convenience- side or rear port options for ease and convenience of mounting.

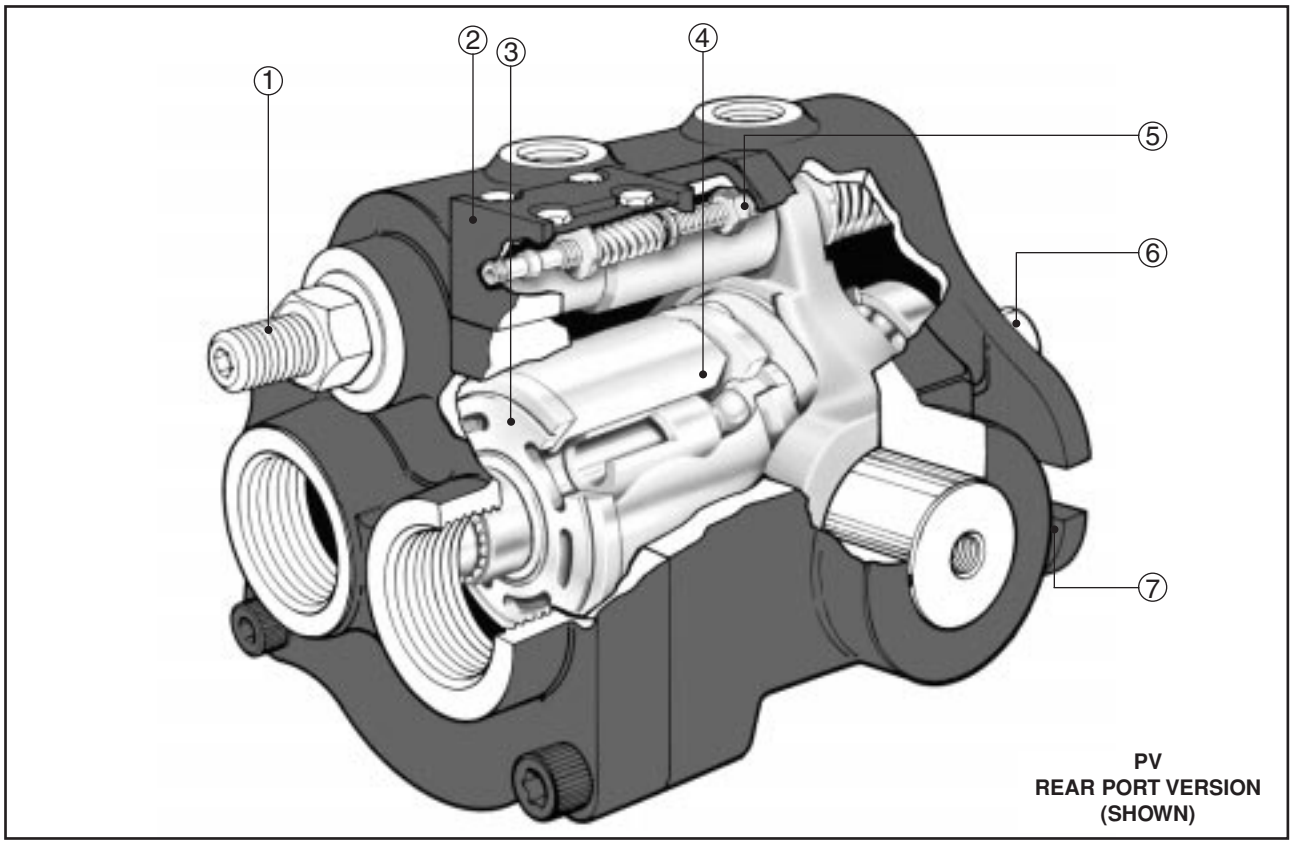
high productivity- because of unique efficiency.

greater safety- you can use fire resistant hydraulic fluids without sacrificing performance.

simple construction- for long, dependable service.

tailor the flow- to your needs with the standard maximum volume adjustment.

interchangeable- with other SAE mounted piston pumps. Conformance to SAE flange mounting and SAE, BSPP or SAE code 61 4-bolt flange.



PV
REAR PORT VERSION
(SHOWN)

1 **maximum volume adjustment**

2 **fast compensator response-** 50 ms. off-stroke, 120 ms on-stroke. Other controls available- ventable compensator, load sensing and power limiter

3 **port plate-** replaceable

4 **smoother power and quieter operation-** with nine-piston rotating group

5 **adjustable compensator**

6 **key and spline conform** to industry standard

7 **SAE mounting-** easily interchangeable with other SAE mounted pumps

- **operates with many hydraulic fluids**

- **also available are side porting and rear drive**

GENERAL

The PV/PVT series pumps are variable displacement open circuit piston pumps with a design emphasis on operation economy. These axial piston pumps for open loop operation are suitable for rear drive in the PVT series configuration.

The PV/PVT pumps have a displacement of 0.88 to 7.93 cu. in/rev. (14,4 to 130,0 cc/rev.) with a continuous working pressure up to 4000 psi (280 bar): The pumps can be equipped with a pressure compensator, ventable compensator, load sensing or power limit control.

MOUNTING

The PV/PVT pumps have been designed to operate in a wide range of applications in industries where high pressure and variable flow are required at competitive cost.

These pumps are designed to operate in any position. The mounting hub and two bolt mounting flange are in conformance with SAE standards. The pump shaft must be in alignment with the shaft of the source driver and should be checked with a dial indicator. The mating pilot bore and coupling must be concentric. This concentricity is particularly important if the shaft is rigidly connected to the driven load without a flexible coupling.

REAR DRIVE:

See installation drawings page 11 thru 23 of this bulletin for mounting and page 24 for **maximum allowable torque** in the data section for torque limits.

SHAFT OPTIONS:

SAE splined and keyed, see installation drawings page 11 thru 23 for details.

INPUT SHAFT INFORMATION:

Splined: The shafts will accept a maximum misalignment of 0.002 in. (0,06mm) total indicator reading when the pump is foot mounted and 0.001 in. (0,03 mm) when flange mounted. Angular misalignment at the male and female spline axis must be less than ±0,002 inch per inch radius (± 0,002 mm/mm). The coupling interface must be lubricated.

DENISON recommends lithium molydisulfide or similar grease. The female coupling should be hardened to 27/34 Rc and must conform to SAE-J498c, class 5 flat root side fit.

Keyed: High strength heat treated keys must be used. Replacement keys must be hardened to 27-34 Rc. The key corners must be chamfered 0.03 - 0.04 in. (0,75-1,0 mm) at 45° to clear radii that exist in the keyway.

SIDE LOAD CAPABILITY:

The PV series is designed for inline-drive and side loading on the shaft is not recommended. If this is unavoidable consult your nearest DENISON HYDRAULICS representative.

SHAFT BEARING LIFE:

See chart in data section of this bulletin.

See installation drawings in the back of this bulletin for port connections.

PIPING

The maximum case pressure is shown on page 3. Case pressure must never exceed inlet pressure by more than 13 psi (0,9 bar). When connecting case drain line make certain that drain plumbing passes above highest point of the pump before passing to the reservoir.

The case leakage line must be of sufficient size to prevent back pressure in excess of the values on page 3 and returned to the reservoir below the surface of the oil as far from the supply suction as possible. All fluid lines, whether pipe, tubing, or hose must be adequate size and strength to assure free flow through the pump. An undersize inlet line will prevent the pump from operating at full rated speed. An undersize outlet line will create back pressure and cause heat generation. Flexible hose lines are recommended. If rigid piping is used, the workmanship must be accurate to eliminate strain on the pump port block or to the fluid connections. Sharp bends in the lines must be eliminated wherever possible. All system piping must be cleaned with solvent or equivalent before installing pump. Make sure the entire hydraulic system is free of dirt, lint, scale, or other foreign material.

Caution: Do not use galvanized pipe. Galvanized coating can flake off with continued use.

SERVICE INFORMATION

These hydraulic products are designed to give long dependable service when properly applied and their systems properly maintained. These general instructions apply to typical systems. Specific instructions for particular equipment can be developed from them.
Refer to bulletin S1-AM009 for service information.

RECOMMENDED FLUIDS

The fluid recommended for use in these pumps has a petroleum base and contains agents which provide oxidation inhibition and anti-rust, anti-foam and de-aerating properties as described in DENISON HYDRAULICS standard HF-1. Where anti-wear additive fluids are specified, see DENISON HYDRAULICS standard HF-0.

VISCOSITY

max. at cold start- 7500 SUS (1600 cSt)
at low pressure, low flow, and if possible, low speed
max. at full power- 750 SUS (160 cSt)
optimum for max. life- 140 SUS (30 cSt)
minimum at full power- 60 SUS (10 cSt)

VISCOSITY INDEX

90 V. I. minimum. Higher values extend the range of operating temperature but may reduce the service life of the fluid.

TEMPERATURE

Determined by the viscosity characteristics of the fluid used. Because high temperatures degrade seals, reduce the service life of the fluid and create hazards, fluid temperature should not exceed 180° F (82° C) at the case drain.

MAINTENANCE

The pump is self-lubricating and preventative maintenance is limited to keeping system fluid clean by changing filters frequently. Keep all fittings and screws tight. Do not operate at pressures and speeds in excess of the recommended limit. If the pump does not operate properly, check the troubleshooting chart before attempting to overhaul the unit. Overhauling may be accomplished by referring to the disassembly, rework limits of wear parts, and assembly procedures. Refer to the service manual for troubleshooting and overhaul information.

FLUID CLEANLINESS

Fluid must be cleaned before and continuously during operation by filters that maintain a cleanliness level of ISO 17/14. This approximately corresponds to NAS 1638 class 8 (class 9 for 15 micron and smaller). This fluid level cleanliness can usually be accomplished by the effective use of 10 micron filters. Better cleanliness levels will significantly extend the life of the components. As contaminant generation may vary with each application, each must be analyzed to determine proper filtration to maintain the required cleanliness level.

COMPARISON OF SOLID CONTAMINATION CLASSIFICATION SYSTEM

NATIONAL AERONAUTICS STANDARD (NAS) 1638

		class													
		00	0	1	2	3	4	5	6	7	8	9	10	11	12
particle size range	5-15µm	125	250	500	1000	2000	4000	8000	16000	32000	64000	128000	256000	512000	1024000
	15-25µm	22	44	89	178	356	712	1425	2850	5700	11400	22800	45600	91200	182400
	25-50µm	4	8	16	32	63	126	253	506	1012	2025	4050	8100	16200	32400
	50-100µm	1	2	3	6	11	22	45	90	180	360	720	1440	2880	5760
	>100µm	0	0	1	1	2	4	8	16	32	64	128	256	512	1024
maximum particles	>5µm	152	304	609	1217	2432	4864	9731	19462	38924	77849	155698	311396	622792	1245584
	>15µm	27	54	109	217	432	864	1731	3462	6924	13849	27698	55396	110792	221584

ISO:DIS 4406; SAE J1165

		iso solid contaminant code													
		8/5	9/6	10/7	11/8	12/9	13/10	14/11	15/12	16/13	17/14	18/15	19/16	20/17	21/18	22/19
maximum	>5µm	250	500	1000	2000	4000	8000	16000	32000	64000	130000	250000	500000	1000000	2000000	4000000
particles	>15µm	32	64	130	250	500	1000	2000	4000	8000	16000	32000	64000	130000	250000	500000

NOTES: All measurements are for a 100 ml sample size.

SYSTEM RELIEF VALVES

Although the PV/PVT series pumps have very fast off-stroke compensator response, system relief valves are recommended in all cases for safety considerations.

COMPENSATOR

The C and F pressure compensator control allows the pump to deliver full volume from the outlet port until the pressure rises to the value set by the control. One turn clockwise of the pressure compensator adjusting screw represents a pressure increase of approximately 650 psi (45 bar).

The control then reduces the pump volume to that required by the system while maintaining the preset pressure at the outlet port. The stroking piston is controlled by a 3-way valve which is shifted by discharge pressure.

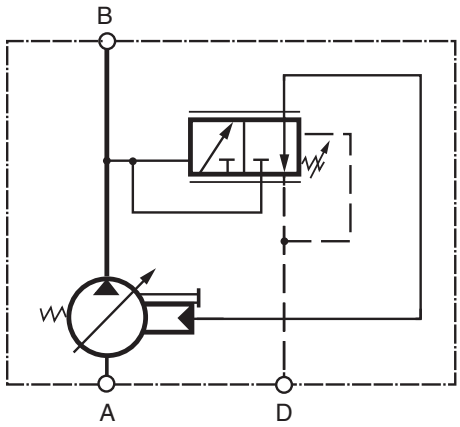
The fast response (typically 50 ms off-stroke and 120 ms on-stroke) and high flow capacity of this valve holds pressure overshoot and undershoot to a minimum.

An adjusting screw complete with locknut allows the pump volume to be set between maximum and zero.

Clockwise rotation pumps have the pressure compensator control located on the left side of the pump body; on counter clockwise rotation pumps the control is on the right side.

Units with C- compensator, a 30-50 psi (2-3 bar) check valve is recommended in the discharge port on all open loop pumps. The check valve must be located approximately 12 in. (0.3 M) from the discharge port. Failure to locate the check valve at this point may result in compensator hunting.

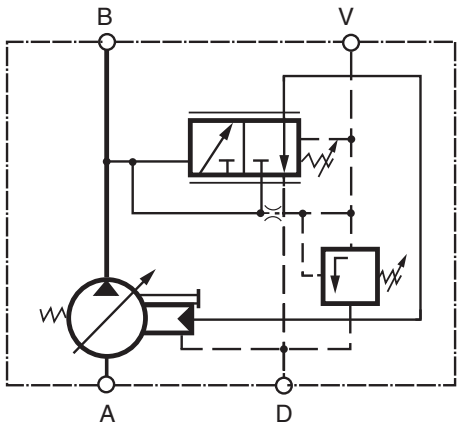
C- COMPENSATOR CIRCUIT



A – Inlet
B – Outlet
D – Case drain

F- VENTABLE COMPENSATOR

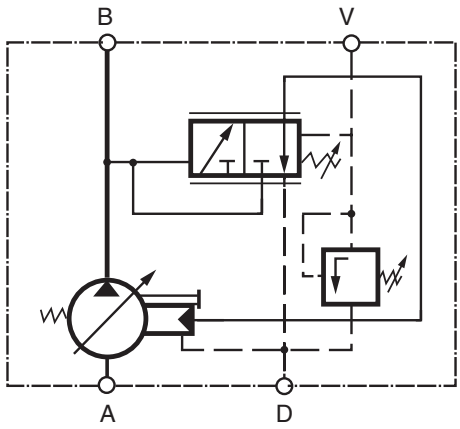
The F- compensator is used in applications requiring remote control pressure. The remote relief is connected to the vent port. The pressure may be controlled at any level below the compensator pressure setting. The vent port may also be used to remotely vent-off the compensator for starting.
Caution: The F- and L- differential spring is the same as the C- compensator spring. Therefore it is possible to set the differential pressure too high.



A – Inlet
B – Outlet
D – Case drain
V – Vent

L- LOAD SENSING COMPENSATOR

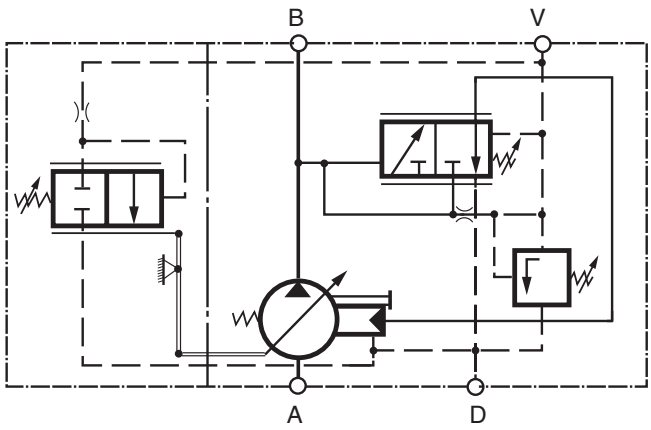
The L- compensator is used for load sensing circuits. The L- compensator prevents pilot flow from entering the circuit which will eliminate creeping of the load. The L-compensator will let the pump deliver a constant flow rate to the circuit by providing an adjustable Δ P across the customers orifice or valve. The pump will operate at 250-400 psi (17-28 bar) above load pressure.



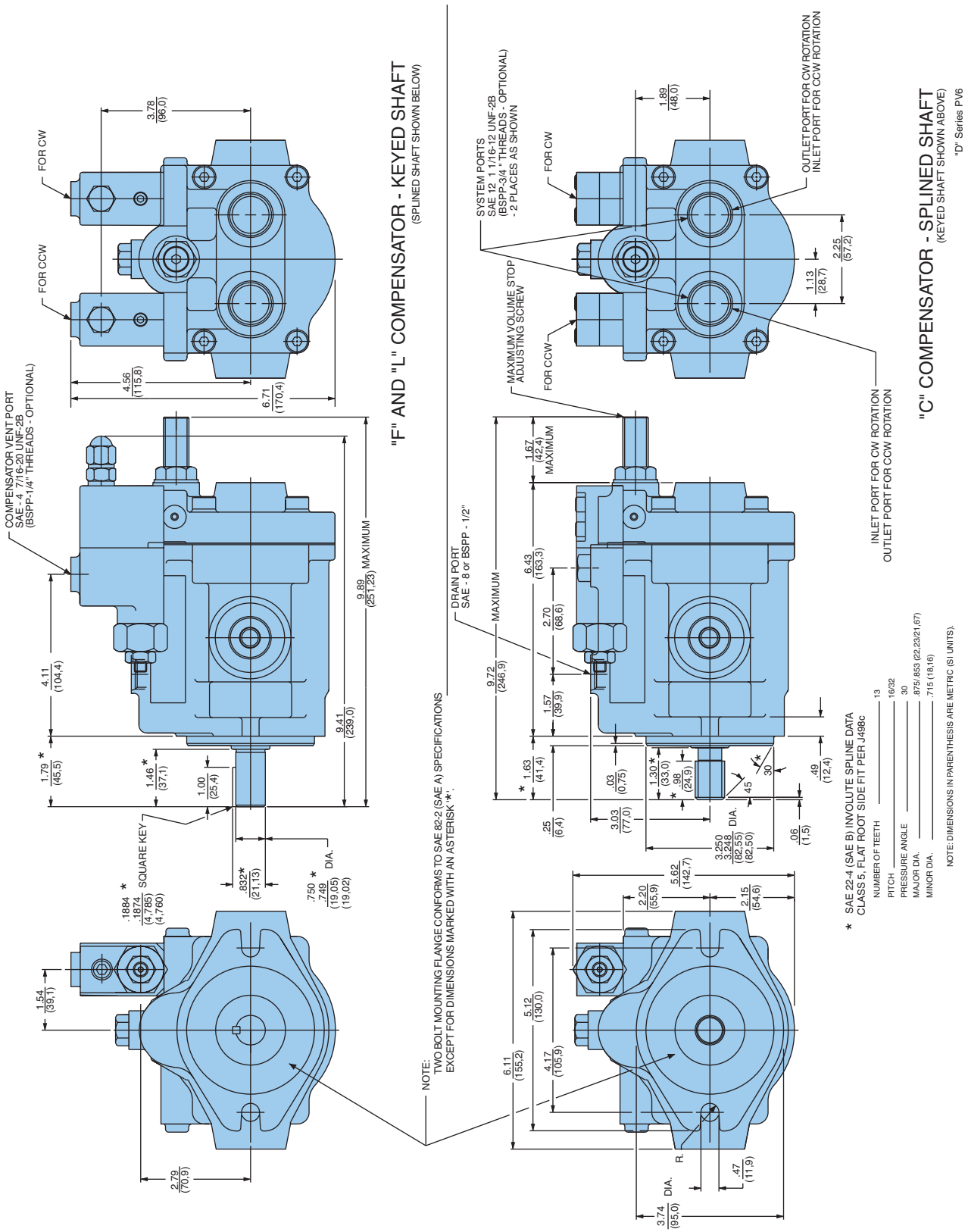
A – Inlet
B – Outlet
D – Case drain
V – Vent

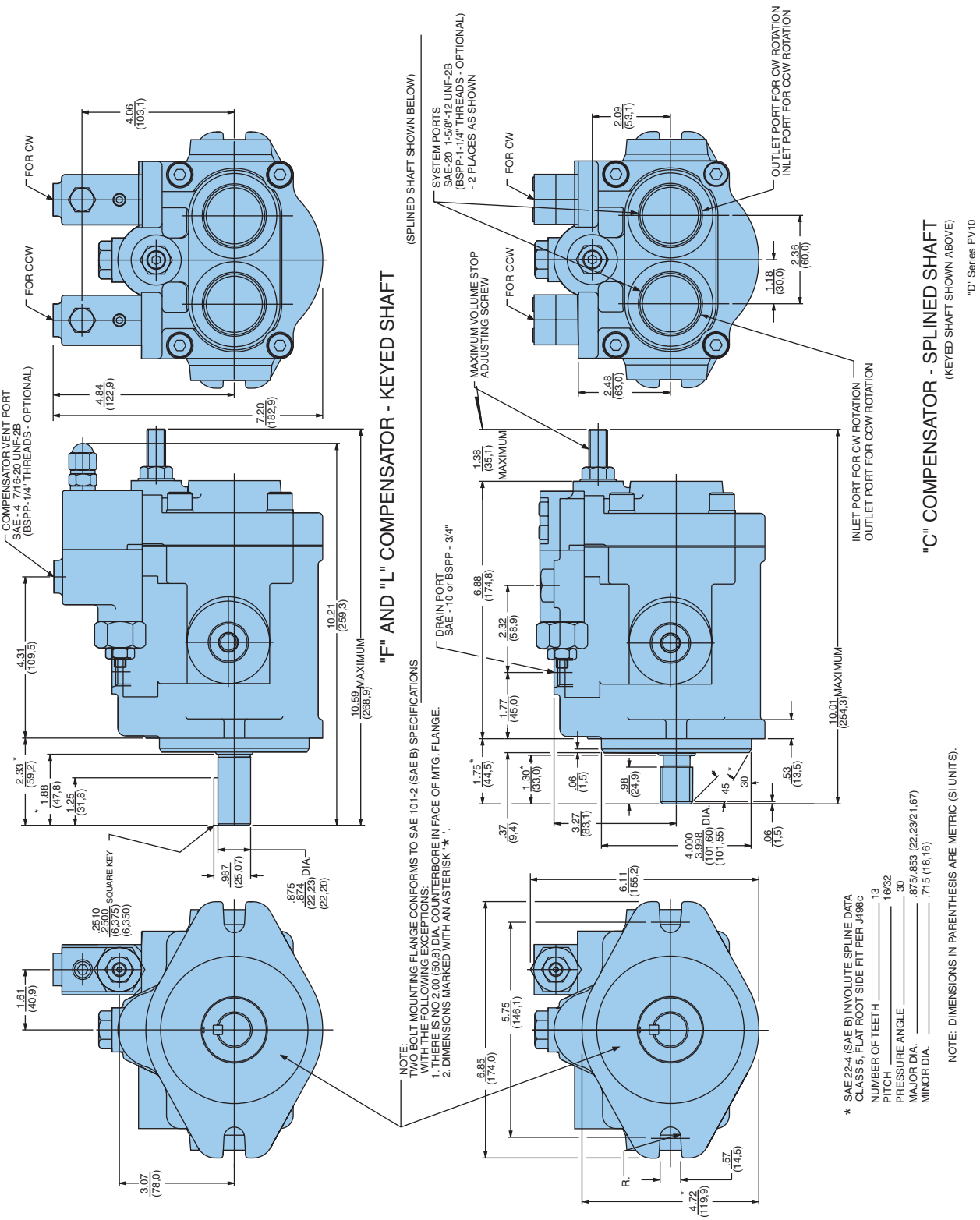
J- TORQUE LIMITER *(low range)*
K- TORQUE LIMITER *(high range)*

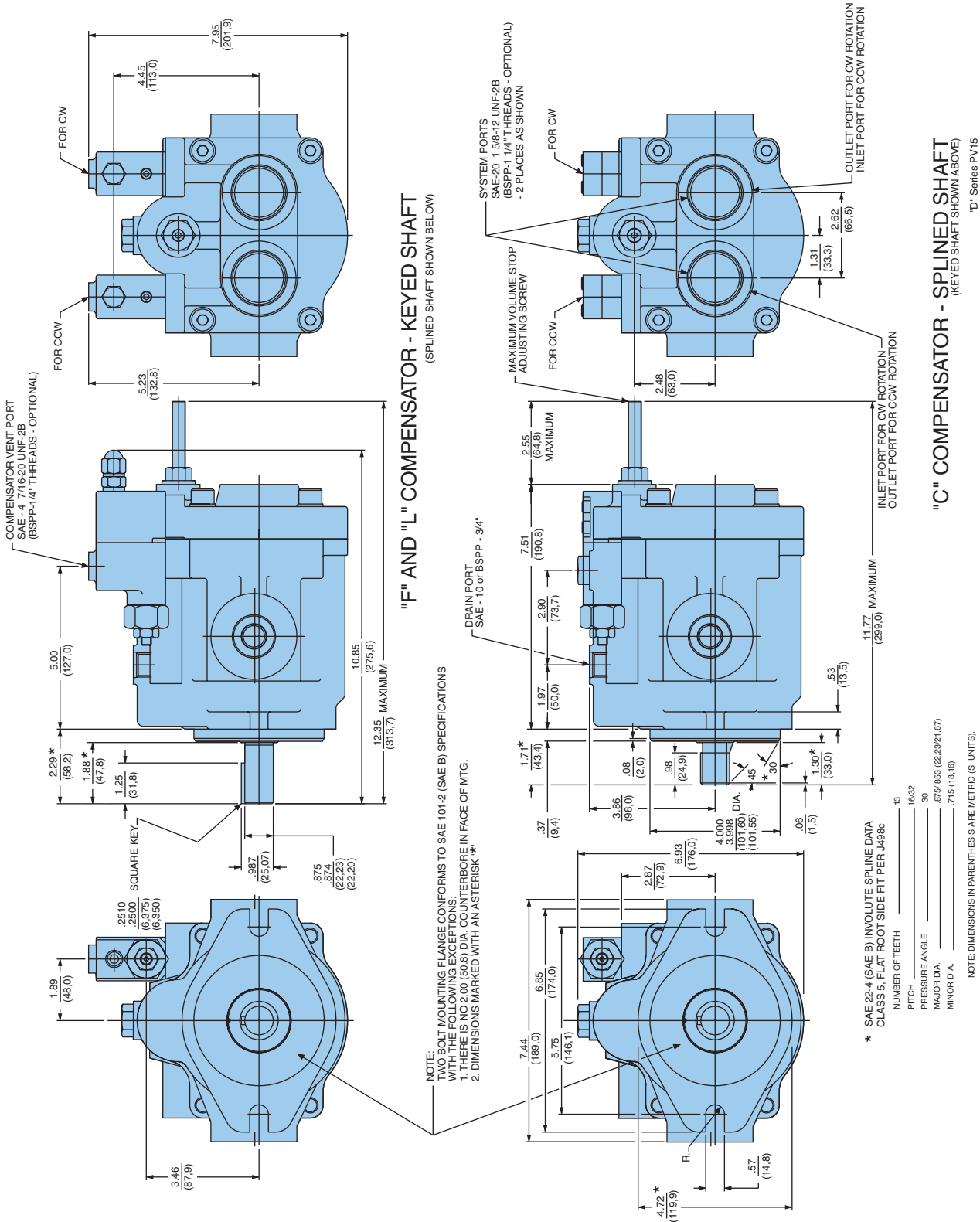
The torque limiter monitors both pressure and displacement (hanger angle). It is a single spring unit which works with the "F" compensator, and can also be connected into a load sensing or remote venting circuit. As pressure rises, flow is reduced according to the zero adjustment and spring rate of the torque limiter. When pressure has risen to its full value, control is assumed by the "F" compensator . The torque limiter functions down to 20% of corner power. Lower adjustment are possible, at the expense of peak pressure.

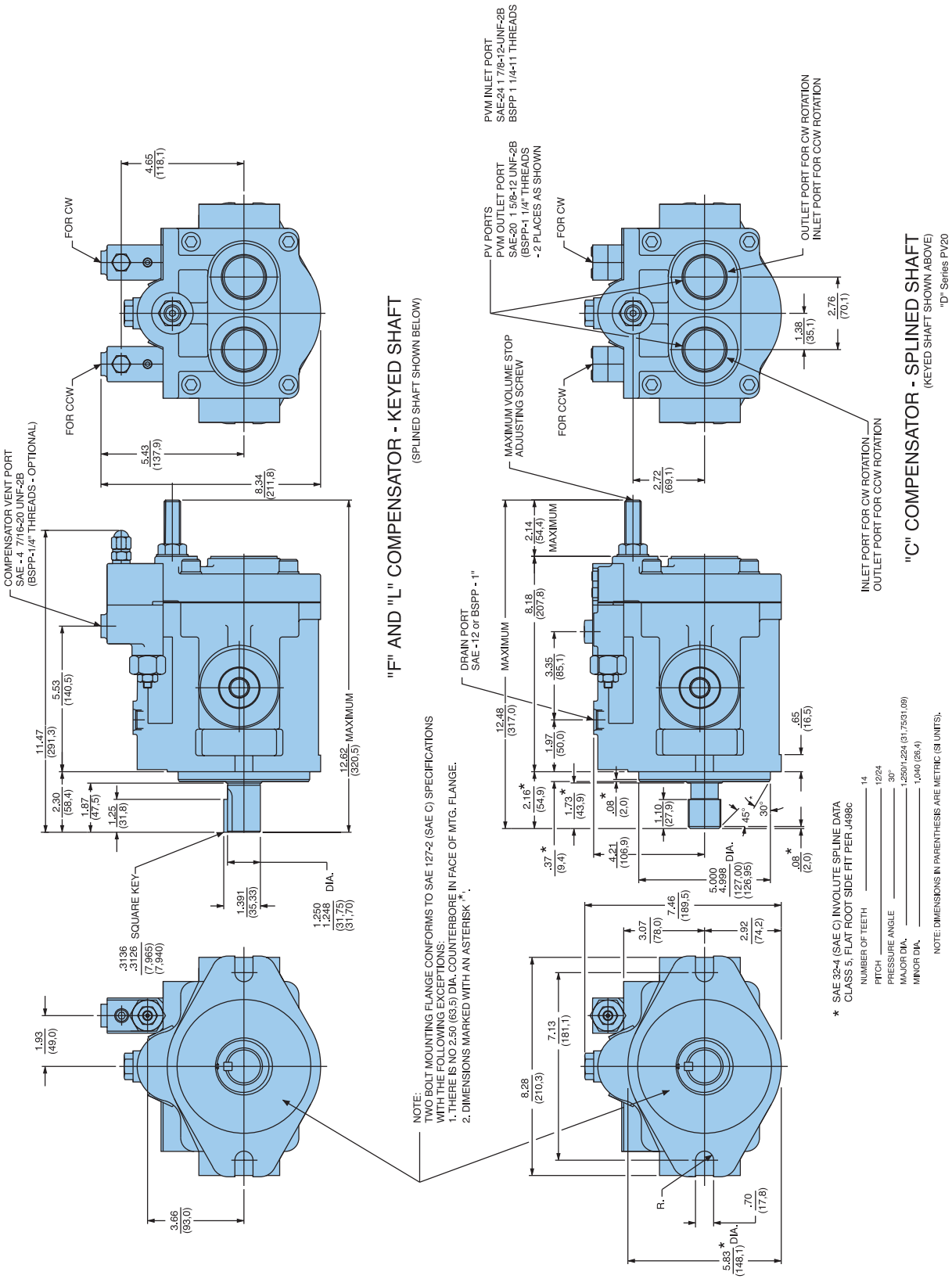


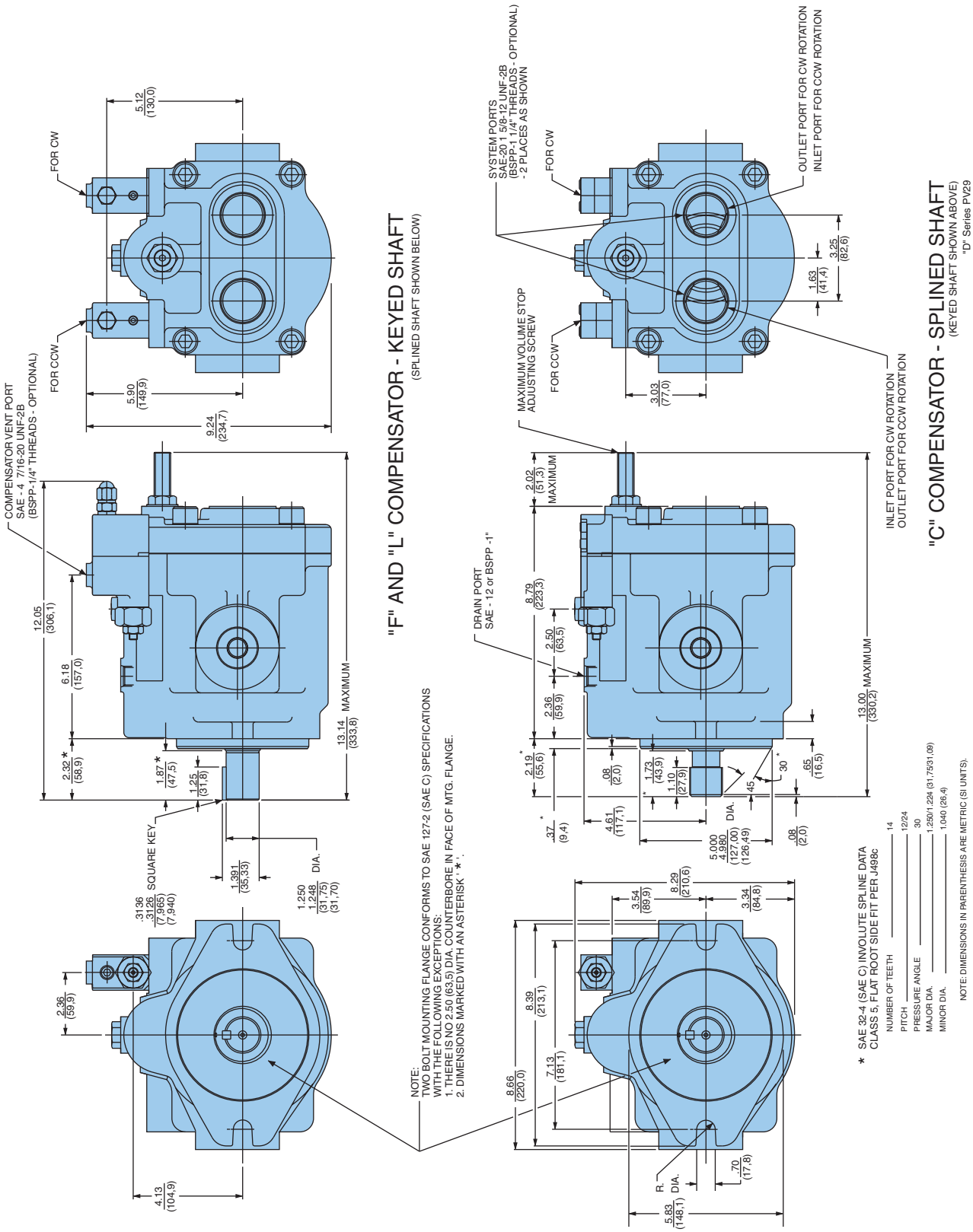
A – Inlet
B – Outlet
D – Case drain
V – Vent

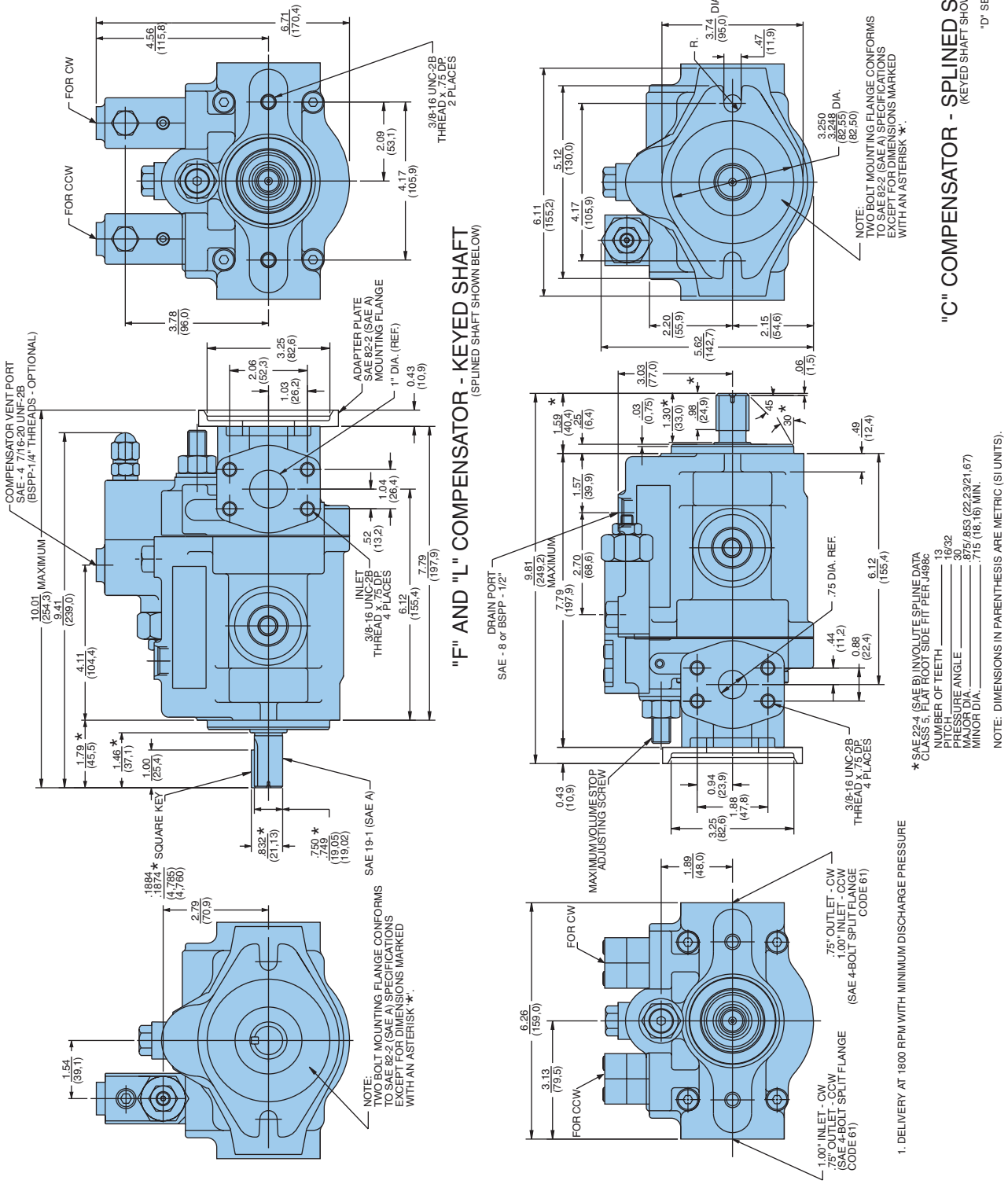

"F" AND "L" COMPENSATOR - KEYED SHAFT
(SPLINED SHAFT SHOWN BELOW)
"C" COMPENSATOR - SPLINED SHAFT
(KEYED SHAFT SHOWN ABOVE)
"D" Series PV6
NOTE:
TWO BOLT MOUNTING FLANGE CONFORMS TO SAE 82-2 (SAE A) SPECIFICATIONS
EXCEPT FOR DIMENSIONS MARKED WITH AN ASTERISK "*".
COMPENSATOR VENT PORT
SAE - 4 7/16-20 UNF-2B
(BSPP-1/4" THREADS - OPTIONAL)
FOR CW
FOR CCW
SQUARE KEY
DRAIN PORT
SAE - 8 or BSPP - 1/2"
SYSTEM PORTS
SAE 12 1 1/16-12 UNF-2B
(BSPP-3/4" THREADS - OPTIONAL)
- 2 PLACES AS SHOWN
MAXIMUM VOLUME STOP
ADJUSTING SCREW
OUTLET PORT FOR CW ROTATION
INLET PORT FOR CCW ROTATION
INLET PORT FOR CW ROTATION
OUTLET PORT FOR CCW ROTATION
MAXIMUM
DIA.
R.
* SAE 22-4 (SAE B) INVOLUTE SPLINE DATA
CLASS 5, FLAT ROOT SIDE FIT PER J498c
NUMBER OF TEETH 13
PITCH 16/32
PRESSURE ANGLE 30
MAJOR DIA. .875/.853 (22,23/21,67)
MINOR DIA. .715 (18,16)
NOTE: DIMENSIONS IN PARENTHESIS ARE METRIC (SI UNITS).

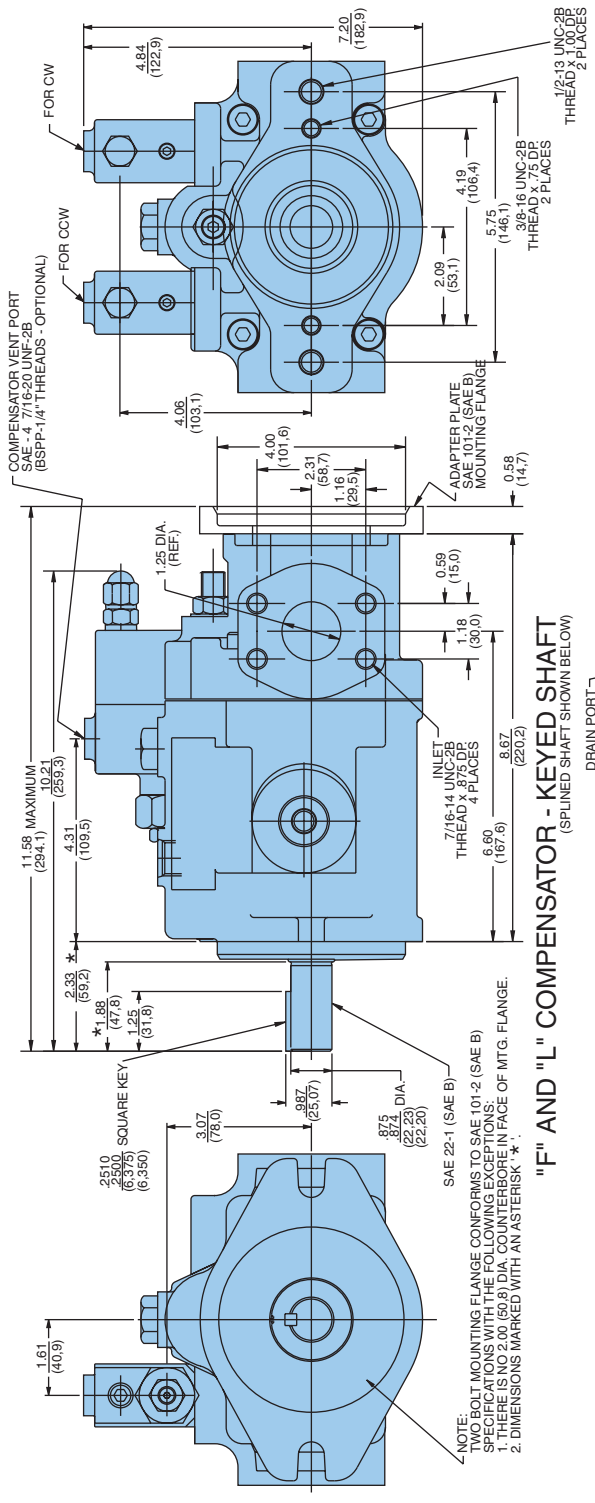

"F" AND "L" COMPENSATOR - KEYED SHAFT
(SPLINED SHAFT SHOWN BELOW)
"C" COMPENSATOR - SPLINED SHAFT
(KEYED SHAFT SHOWN ABOVE)
"D" Series PV10
NOTE:
TWO BOLT MOUNTING FLANGE CONFORMS TO SAE 101-2 (SAE B) SPECIFICATIONS WITH THE FOLLOWING EXCEPTIONS:
1. THERE IS NO 2.00 (50,8) DIA. COUNTERBORE IN FACE OF MTG. FLANGE.
2. DIMENSIONS MARKED WITH AN ASTERISK '*'.
COMPENSATOR VENT PORT SAE - 4 7/16-20 UNF-2B (BSPP-1/4" THREADS - OPTIONAL)
FOR CW
FOR CCW
DRAIN PORT SAE - 10 or BSPP - 3/4"
SYSTEM PORTS SAE-20 1-5/8"-12 UNF-2B (BSPP-1-1/4" THREADS - OPTIONAL) - 2 PLACES AS SHOWN
MAXIMUM VOLUME STOP ADJUSTING SCREW
OUTLET PORT FOR CW ROTATION
INLET PORT FOR CCW ROTATION
INLET PORT FOR CW ROTATION
OUTLET PORT FOR CCW ROTATION
.2510 .2500 (6,375) (6,350) SQUARE KEY
.875 .874 (22,23) (22,20) DIA.
4.000 3.998 (101,60) (101,55) DIA.
* SAE 22-4 (SAE B) INVOLUTE SPLINE DATA
CLASS 5, FLAT ROOT SIDE FIT PER J498c
NUMBER OF TEETH 13
PITCH 16/32
PRESSURE ANGLE 30
MAJOR DIA. .875/.853 (22,23/21,67)
MINOR DIA. .715 (18,16)
NOTE: DIMENSIONS IN PARENTHESIS ARE METRIC (SI UNITS).


"F" AND "L" COMPENSATOR - KEYED SHAFT
(SPLINED SHAFT SHOWN BELOW)
"C" COMPENSATOR - SPLINED SHAFT
(KEYED SHAFT SHOWN ABOVE)
"D" Series PV15
FOR CW
FOR CCW
7.95 (201,9)
4.45 (113,0)
5.23 (132,8)
COMPENSATOR VENT PORT
SAE - 4 7/16-20 UNF-2B
(BSPP-1/4" THREADS - OPTIONAL)
5.00 (127,0)
10.85 (275,6) MAXIMUM
12.35 (313,7)
2.29 * (58,2)
1.88 * (47,8)
1.25 (31,8)
SQUARE KEY
.2510 .2500 (6,375) (6,350)
1.89 (48,0)
3.46 (87,9)
.987 (25,07)
.875 .874 (22,23) (22,20)
NOTE:
TWO BOLT MOUNTING FLANGE CONFORMS TO SAE 101-2 (SAE B) SPECIFICATIONS
WITH THE FOLLOWING EXCEPTIONS:
1. THERE IS NO 2.00 (50.8) DIA. COUNTERBORE IN FACE OF MTG.
2. DIMENSIONS MARKED WITH AN ASTERISK "*"
SYSTEM PORTS
SAE-20 1 5/8-12 UNF-2B
(BSPP-1 1/4" THREADS - OPTIONAL)
- 2 PLACES AS SHOWN
MAXIMUM VOLUME STOP
ADJUSTING SCREW
DRAIN PORT
SAE - 10 or BSPP - 3/4"
2.55 (64,8) MAXIMUM
7.51 (190,8)
2.90 (73,7)
1.97 (50,0)
1.71 * (43,4)
.37 (9,4)
3.86 (98,0)
.08 (2,0)
.98 (24,9)
4.000 3.998 DIA. (101,60) (101,55)
45
* 30
1.30 * (33,0)
.06 (1,5)
.53 (13,5)
11.77 (299,0) MAXIMUM
INLET PORT FOR CW ROTATION
OUTLET PORT FOR CCW ROTATION
OUTLET PORT FOR CW ROTATION
INLET PORT FOR CCW ROTATION
2.48 (63,0)
1.31 (33,3)
2.62 (66,5)
6.93 (176,0)
2.87 (72,9)
6.85 (174,0)
7.44 (189,0)
5.75 (146,1)
R.
.57 (14,8)
4.72 * (119,9)
* SAE 22-4 (SAE B) INVOLUTE SPLINE DATA
CLASS 5, FLAT ROOT SIDE FIT PER J498c
NUMBER OF TEETH 13
PITCH 16/32
PRESSURE ANGLE 30
MAJOR DIA. .875/.853 (22,23/21,67)
MINOR DIA. .715 (18,16)
NOTE: DIMENSIONS IN PARENTHESIS ARE METRIC (SI UNITS).


"F" AND "L" COMPENSATOR - KEYED SHAFT
(SPLINED SHAFT SHOWN BELOW)
"C" COMPENSATOR - SPLINED SHAFT
(KEYED SHAFT SHOWN ABOVE)
"D" Series PV20
NOTE:
TWO BOLT MOUNTING FLANGE CONFORMS TO SAE 127-2 (SAE C) SPECIFICATIONS
WITH THE FOLLOWING EXCEPTIONS:
1. THERE IS NO 2.50 (63.5) DIA. COUNTERBORE IN FACE OF MTG. FLANGE.
2. DIMENSIONS MARKED WITH AN ASTERISK *.
COMPENSATOR VENT PORT
SAE -4 7/16-20 UNF-2B
(BSPP-1/4" THREADS - OPTIONAL)
FOR CW
FOR CCW
SQUARE KEY
DIA.
MAXIMUM
DRAIN PORT
SAE -12 or BSPP - 1"
MAXIMUM VOLUME STOP
ADJUSTING SCREW
PV PORTS
PVM OUTLET PORT
SAE-20 1 5/8-12 UNF-2B
(BSPP-1 1/4" THREADS
- 2 PLACES AS SHOWN
PVM INLET PORT
SAE-24 1 7/8-12-UNF-2B
BSPP 1 1/4-11 THREADS
OUTLET PORT FOR CW ROTATION
INLET PORT FOR CCW ROTATION
INLET PORT FOR CW ROTATION
OUTLET PORT FOR CCW ROTATION
R.
* SAE 32-4 (SAE C) INVOLUTE SPLINE DATA
CLASS 5, FLAT ROOT SIDE FIT PER J498c
NUMBER OF TEETH 14
PITCH 12/24
PRESSURE ANGLE 30°
MAJOR DIA. 1.250/1.224 (31.75/31.09)
MINOR DIA. 1.040 (26.4)
NOTE: DIMENSIONS IN PARENTHESIS ARE METRIC (SI UNITS).


"F" AND "L" COMPENSATOR - KEYED SHAFT
(SPLINED SHAFT SHOWN BELOW)
"C" COMPENSATOR - SPLINED SHAFT
(KEYED SHAFT SHOWN ABOVE)
"D" Series PV29
COMPENSATOR VENT PORT
SAE - 4 7/16-20 UNF-2B
(BSPP-1/4" THREADS - OPTIONAL)
FOR CW
FOR CCW
5.12 (130,0)
5.90 (149,9)
9.24 (234,7)
12.05 (306,1)
6.18 (157,0)
2.32 * (58,9)
1.87 * (47,5)
1.25 (31,8)
13.14 (333,8) MAXIMUM
SQUARE KEY
.3136 .3126 (7,965) (7,940)
1.391 (35,33)
1.250 1.248 (31,75) (31,70) DIA.
2.36 (59,9)
4.13 (104,9)
NOTE:
TWO BOLT MOUNTING FLANGE CONFORMS TO SAE 127-2 (SAE C) SPECIFICATIONS
WITH THE FOLLOWING EXCEPTIONS:
1. THERE IS NO 2.50 (63,5) DIA. COUNTERBORE IN FACE OF MTG. FLANGE.
2. DIMENSIONS MARKED WITH AN ASTERISK " * ".
SYSTEM PORTS
SAE-20 1 5/8-12 UNF-2B
(BSPP-1 1/4" THREADS - OPTIONAL)
- 2 PLACES AS SHOWN
OUTLET PORT FOR CW ROTATION
INLET PORT FOR CCW ROTATION
3.03 (77,0)
1.63 (41,4)
3.25 (82,6)
MAXIMUM VOLUME STOP
ADJUSTING SCREW
DRAIN PORT
SAE - 12 or BSPP -1"
2.02 (51,3) MAXIMUM
8.79 (223,3)
2.50 (63,5)
2.36 (59,9)
2.19 * (55,6)
.37 * (9,4)
4.61 (117,1)
.08 (2,0)
1.73 (43,9)
1.10 (27,9)
30 *
45
.65 (16,5)
13.00 (330,2) MAXIMUM
INLET PORT FOR CW ROTATION
OUTLET PORT FOR CCW ROTATION
5.000 4.980 (127,00) (126,49) DIA.
.08 (2,0)
8.66 (220,0)
8.39 (213,1)
7.13 (181,1)
3.54 (89,9)
8.29 (210,6)
3.34 (84,8)
.70 (17,8)
R.
5.83 (148,1) DIA.
* SAE 32-4 (SAE C) INVOLUTE SPLINE DATA
CLASS 5, FLAT ROOT SIDE FIT PER J498c
NUMBER OF TEETH 14
PITCH 12/24
PRESSURE ANGLE 30
MAJOR DIA. 1.250/1.224 (31,75/31,09)
MINOR DIA. 1.040 (26,4)
NOTE: DIMENSIONS IN PARENTHESIS ARE METRIC (SI UNITS).


"F" AND "L" COMPENSATOR - KEYED SHAFT
(SPLINED SHAFT SHOWN BELOW)
"C" COMPENSATOR - SPLINED SHAFT
(KEYED SHAFT SHOWN ABOVE)
"D" SERIES PVT6
FOR CW
FOR CCW
COMPENSATOR VENT PORT
SAE - 4 7/16-20 UNF-2B
(BSPP-1/4" THREADS - OPTIONAL)
ADAPTER PLATE
SAE 82-2 (SAE A)
MOUNTING FLANGE
1" DIA. (REF.)
INLET
3/8-16 UNC-2B
THREAD X .75 DP.
4 PLACES
SQUARE KEY
SAE 19-1 (SAE A)
DRAIN PORT
SAE - 8 or BSPP - 1/2"
MAXIMUM VOLUME STOP
ADJUSTING SCREW
3/8-16 UNC-2B
THREAD X .75 DP.
2 PLACES
3/8-16 UNC-2B
THREAD X .75 DP.
4 PLACES
.75 DIA. REF.
NOTE:
TWO BOLT MOUNTING FLANGE CONFORMS
TO SAE 82-2 (SAE A) SPECIFICATIONS
EXCEPT FOR DIMENSIONS MARKED
WITH AN ASTERISK *.
1.00" INLET - CW
.75" OUTLET - CCW
(SAE 4-BOLT SPLIT FLANGE
CODE 61)
.75" OUTLET - CW
1.00" INLET - CCW
(SAE 4-BOLT SPLIT FLANGE
CODE 61)
* SAE 22-4 (SAE B) INVOLUTE SPLINE DATA
CLASS 5, FLAT ROOT SIDE FIT PER ANSI B92.1-1996
NUMBER OF TEETH 13
PITCH 16/32
PRESSURE ANGLE 30°
MAJOR DIA. .875/.853 (22.23/21.67)
MINOR DIA. .715 (18.16) MIN.
1. DELIVERY AT 1800 RPM WITH MINIMUM DISCHARGE PRESSURE
NOTE: DIMENSIONS IN PARENTHESIS ARE METRIC (SI UNITS).



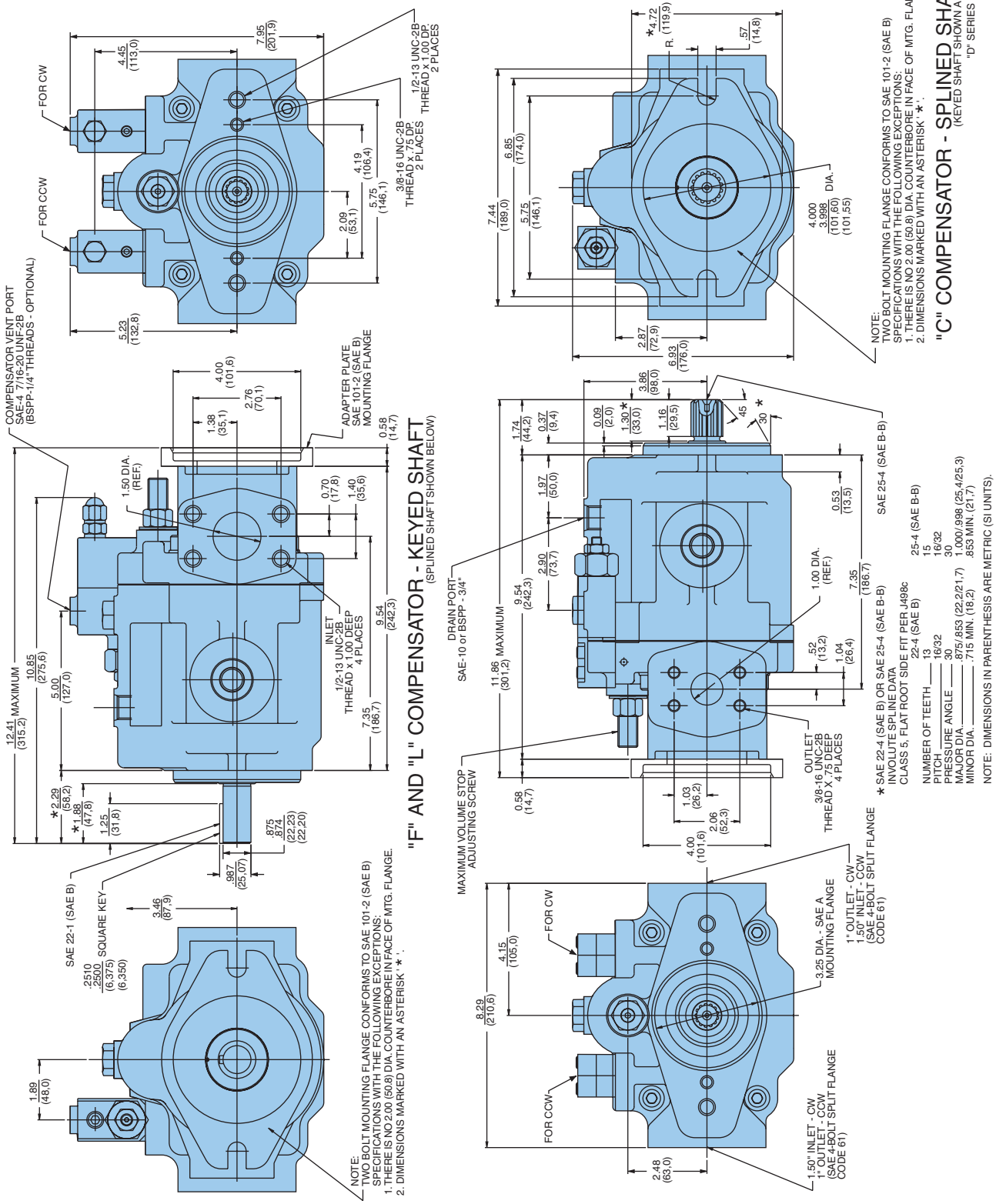
"F" AND "L" COMPENSATOR - KEYED SHAFT
(SPLINED SHAFT SHOWN BELOW)

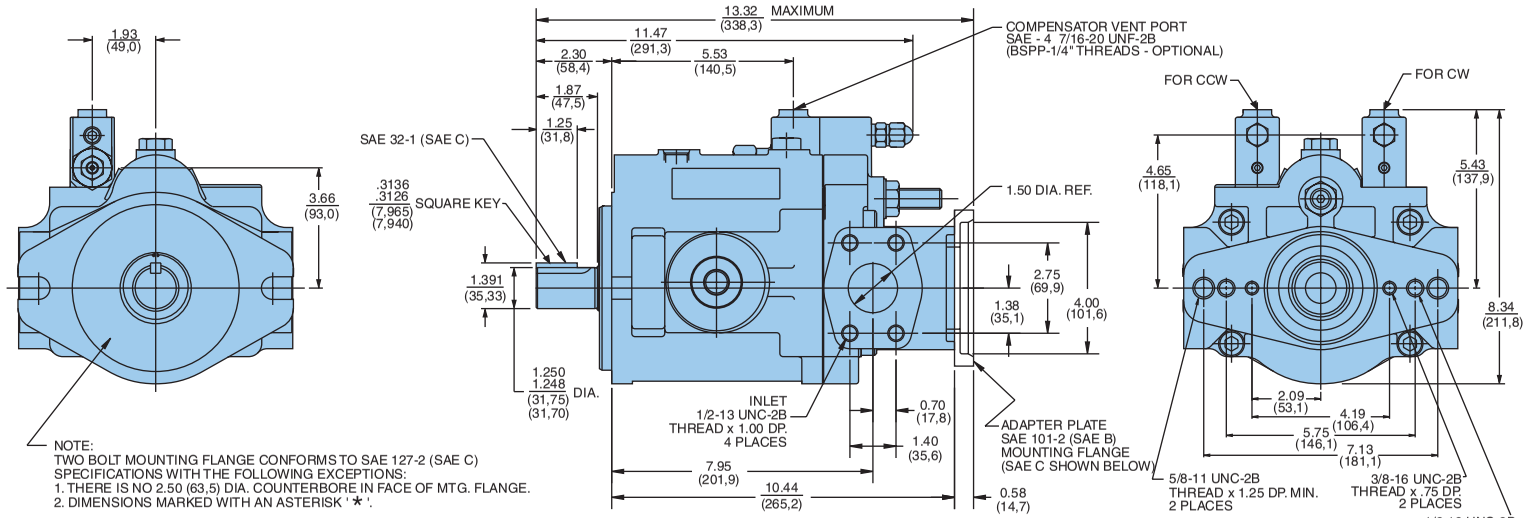
"C" COMPENSATOR - SPLINED SHAFT
(KEYED SHAFT SHOWN ABOVE)
"D" SERIES PVT10

SAE 22-4 (SAE B) INVOLUTE SPLINE DATA
CLASS 5, FLAT ROOT SIDE FIT PER J498c

NUMBER OF TEETH	13
PITCH	16/32
PRESSURE ANGLE	30
MAJOR DIA.	.875/.853 (22.23/21.67)
MINOR DIA.	.715 (18.16)

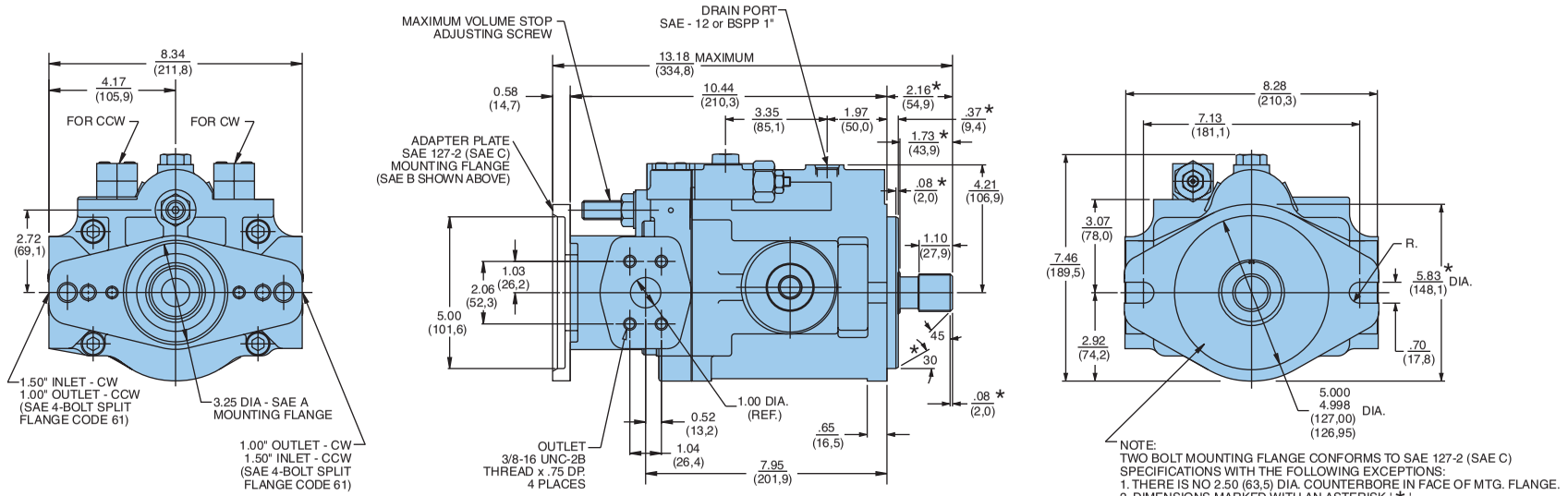
NOTE: DIMENSIONS IN PARENTHESIS ARE METRIC (SI UNITS).


"F" AND "L" COMPENSATOR - KEYED SHAFT
(SPLINED SHAFT SHOWN BELOW)
"C" COMPENSATOR - SPLINED SHAFT
(KEYED SHAFT SHOWN ABOVE)
"D" SERIES PVT15
COMPENSATOR VENT PORT
SAE-4 7/16-20 UNF-2B
(BSPP-1/4" THREADS - OPTIONAL)
ADAPTER PLATE
SAE 101-2 (SAE B)
MOUNTING FLANGE
INLET
1/2-13 UNC-2B
THREAD X 1.00 DEEP
4 PLACES
DRAIN PORT
SAE-10 or BSPP - 3/4"
MAXIMUM VOLUME STOP
ADJUSTING SCREW
OUTLET
3/8-16 UNC-2B
THREAD X .75 DEEP
4 PLACES
SAE 22-1 (SAE B)
SQUARE KEY
SAE 25-4 (SAE B-B)
FOR CW
FOR CCW
3/8-16 UNC-2B
THREAD X .75 DP.
2 PLACES
12-13 UNC-2B
THREAD X 1.00 DP.
2 PLACES
1.50 DIA.
(REF.)
1.00 DIA.
(REF.)
3.25 DIA - SAE A
MOUNTING FLANGE
1" OUTLET - CW
1.50" INLET - CCW
(SAE 4-BOLT SPLIT FLANGE
CODE 61)
1.50" INLET - CW
1" OUTLET - CCW
(SAE 4-BOLT SPLIT FLANGE
CODE 61)
NOTE:
TWO BOLT MOUNTING FLANGE CONFORMS TO SAE 101-2 (SAE B)
SPECIFICATIONS WITH THE FOLLOWING EXCEPTIONS:
1. THERE IS NO 2.00 (50.8) DIA. COUNTERBORE IN FACE OF MTG. FLANGE.
2. DIMENSIONS MARKED WITH AN ASTERISK ' * '.
* SAE 22-4 (SAE B) OR SAE 25-4 (SAE B-B)
INVOLUTE SPLINE DATA
CLASS 5, FLAT ROOT SIDE FIT PER J498c
22-4 (SAE B) 25-4 (SAE B-B)
NUMBER OF TEETH 13 15
PITCH 16/32 16/32
PRESSURE ANGLE 30 30
MAJOR DIA. .875/.853 (22.2/21.7) 1.000/.998 (25.4/25.3)
MINOR DIA. .715 MIN. (21.7) .853 MIN. (21.7)
NOTE: DIMENSIONS IN PARENTHESIS ARE METRIC (SI UNITS).



"F" AND "L" COMPENSATOR - KEYED SHAFT

(SPLINED SHAFT SHOWN BELOW)



SAE 32-4 (SAE C) INVOLUTE SPLINE DATA
CLASS 5, FLAT ROOT SIDE FIT PER J498c

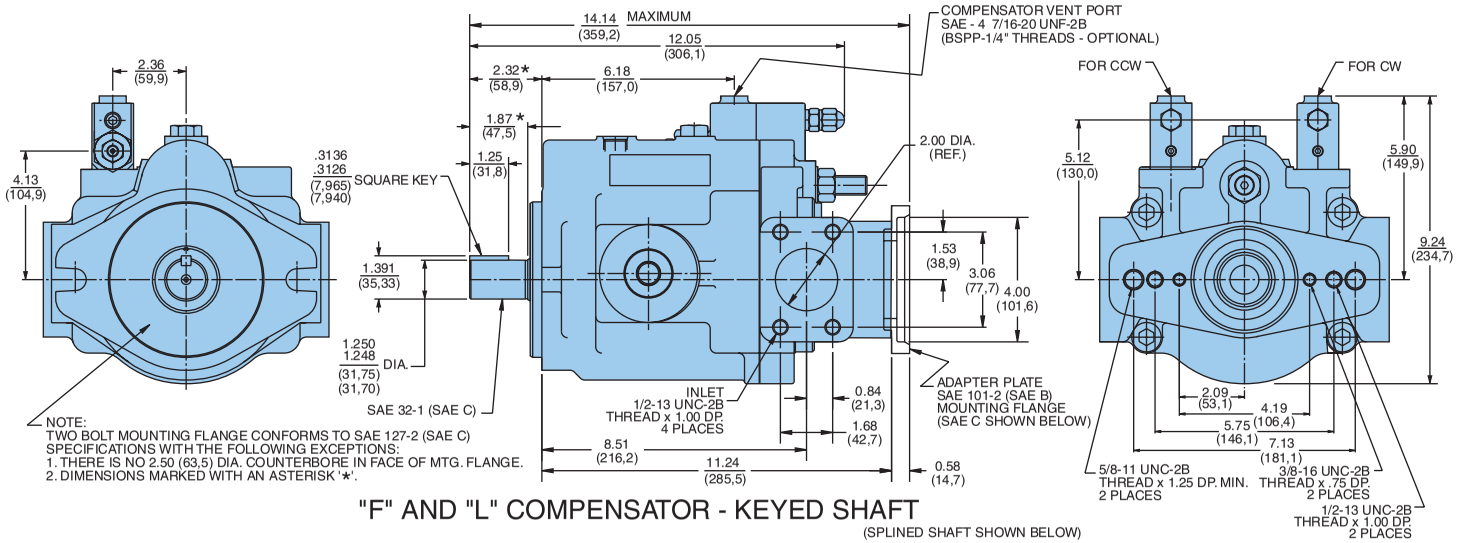
NUMBER OF TEETH	14
PITCH	12/24
PRESSURE ANGLE	30
MAJOR DIA.	1.250/1.224 (31,75/31,09)
MINOR DIA.	1.040 (26,4)

NOTE: DIMENSIONS IN PARENTHESIS ARE METRIC (SI UNITS).

"C" COMPENSATOR - SPLINED SHAFT

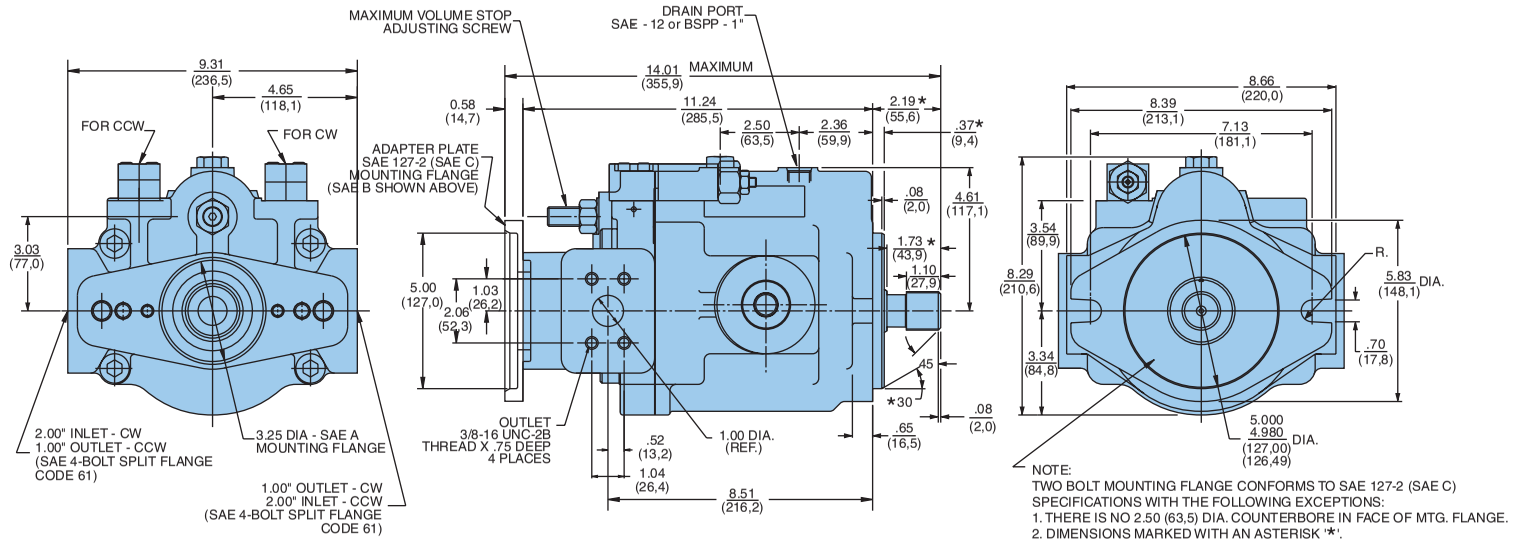
(KEYED SHAFT SHOWN ABOVE)

"D" SERIES PVT20



"F" AND "L" COMPENSATOR - KEYED SHAFT

(SPLINED SHAFT SHOWN BELOW)



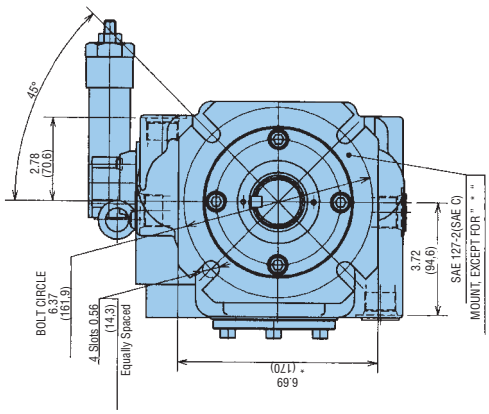
SAE 32-4 (SAE C) INVOLUTE SPLINE DATA
CLASS 5, FLAT ROOT SIDE FIT PER J498c

NUMBER OF TEETH	14
PITCH	12/24
PRESSURE ANGLE	30
MAJOR DIA.	1.250/1.224 (31,75/31,09)
MINOR DIA.	1.040 (26,4)

NOTE: DIMENSIONS IN PARENTHESIS ARE METRIC (SI UNITS).

"C" COMPENSATOR - SPLINED SHAFT

(KEYED SHAFT SHOWN ABOVE)
"D" SERIES PVT29



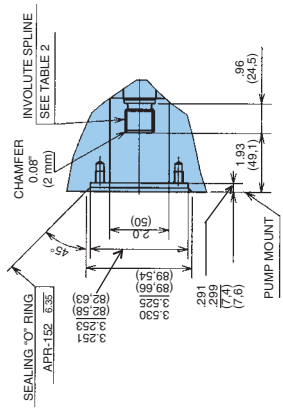


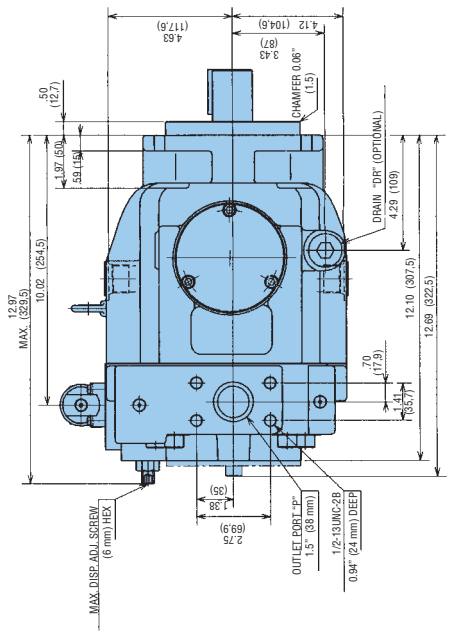
Table 2
SAE 25-4 INVOLUTE SPLINE DATA (REAR DRIVE)

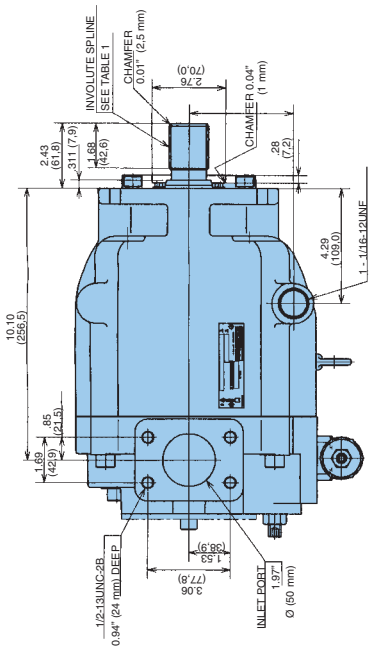
NUMBER OF TEETH	15	16/32
PITCH		
PRESSURE ANGLE	30°	30°
MAJOR DIA.	.983 .978 (24.98)	
MINOR DIA.	.858 .847 (21.80)	

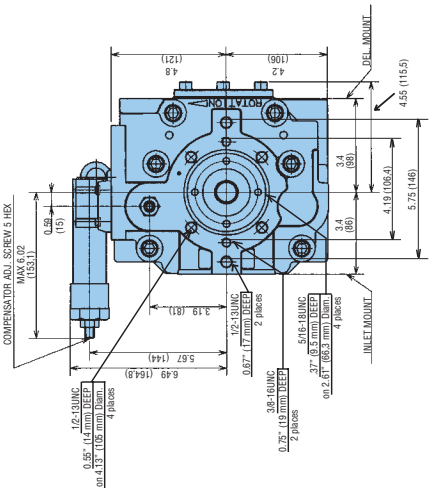
Table 1
SAE 38-4 INVOLUTE SPLINE DATA

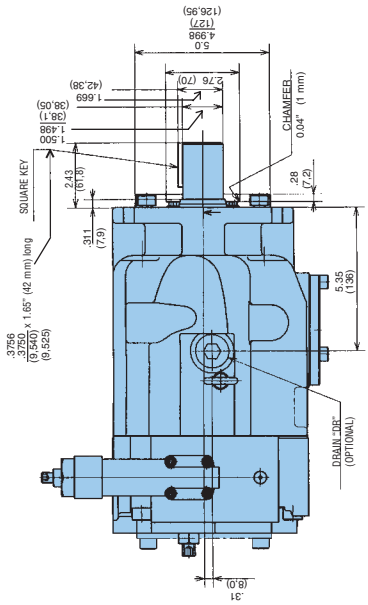
NUMBER OF TEETH	17	
PITCH	12/24	
PRESSURE ANGLE	30°	
MAJOR DIA.	1.479 1.474 (37.57) (37.44)	
MINOR DIA.	1.312 1.299 (33.34) (33.01)	

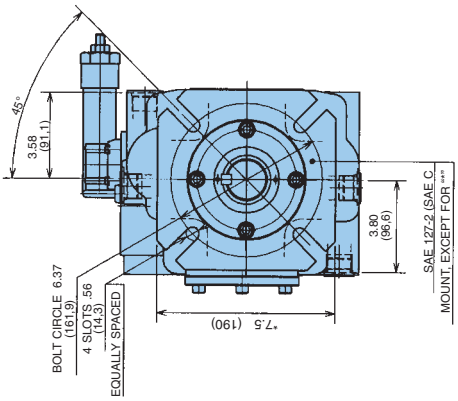
Note: DIMENSIONS IN PARENTHESIS ARE METRIC UNITS











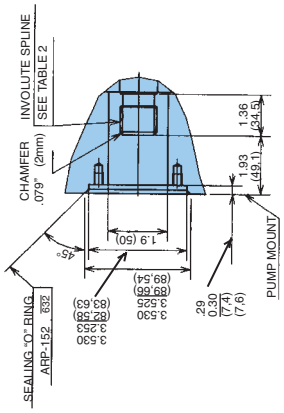
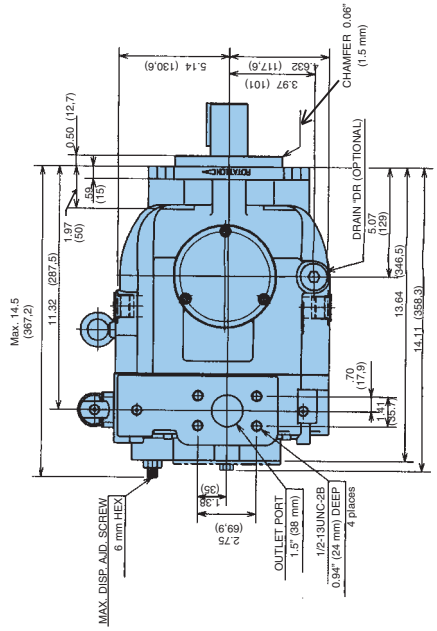


Table 2

SAE 32-4 INVOLUTE SPLINE DATA (REAR DRIVE)		
NUMBER OF TEETH	14	
PITCH	12/24	
PRESSURE ANGLE	30°	
MAJOR DIA.	1.229	
	1.224	
	(31,22)	
	(31,09)	
MINOR DIA.	1.062	
	1.049	
	(26,99)	
	(26,66)	



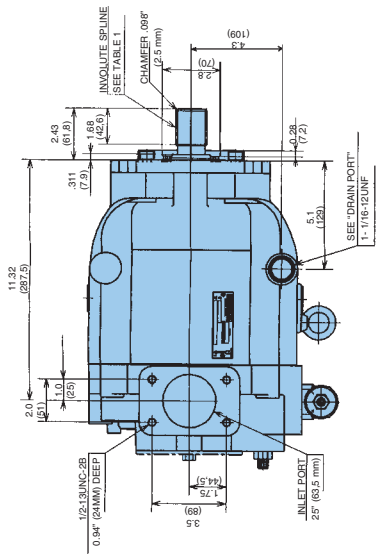
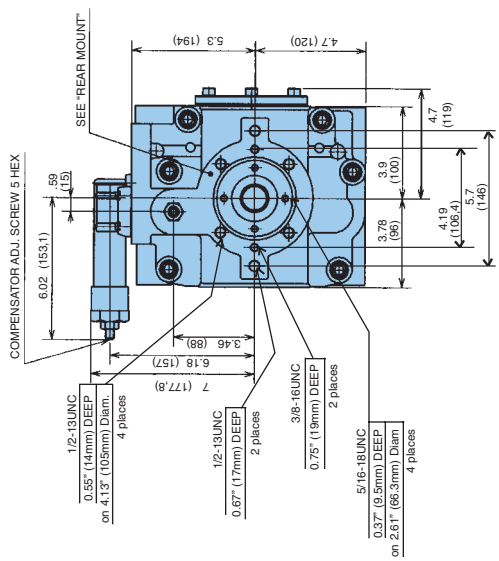
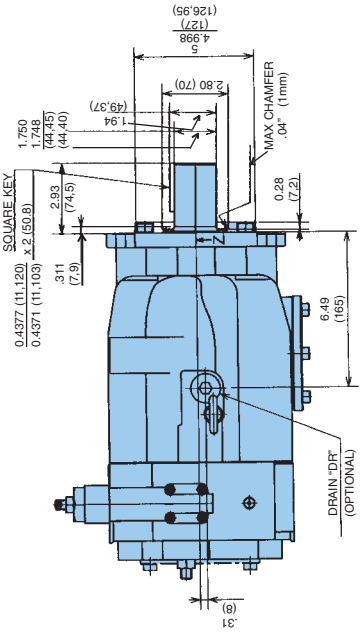


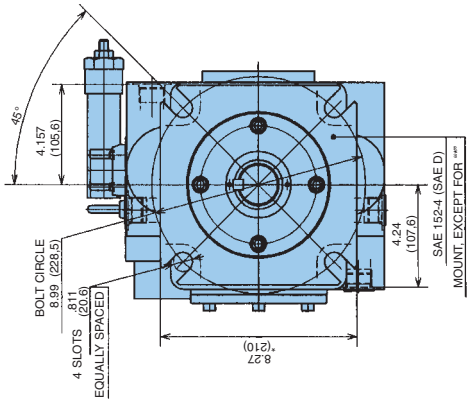
Table 1

SAE 38-4 INVOLUTE SPLINE DATA		
NUMBER OF TEETH	17	
PITCH	12/24	
PRESSURE ANGLE	30°	
MAJOR DIA.	1.497	
	1.474	
	(37,57)	
	(37,44)	
MINOR DIA.	1.312	
	1.299	
	(33,34)	
	(33,01)	

Note: DIMENSIONS IN PARENTHESIS ARE METRIC UNITS







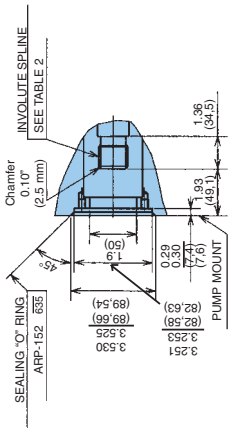
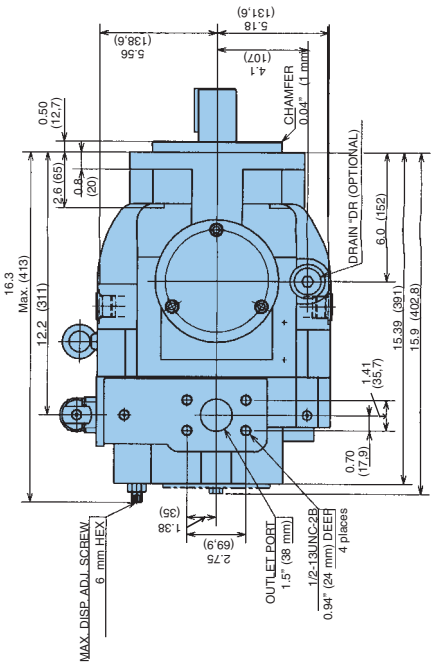


Table 2
SAE 32-4 INVOLUTE SPLINE DATA (REAR DRIVE)

NUMBER OF TEETH	14
PITCH	12/24
PRESSURE ANGLE	30°
MAJOR DIA.	1.229 1.224 (31.22) (31.09)
MINOR DIA.	1.060 1.049 (26.99) (26.66)



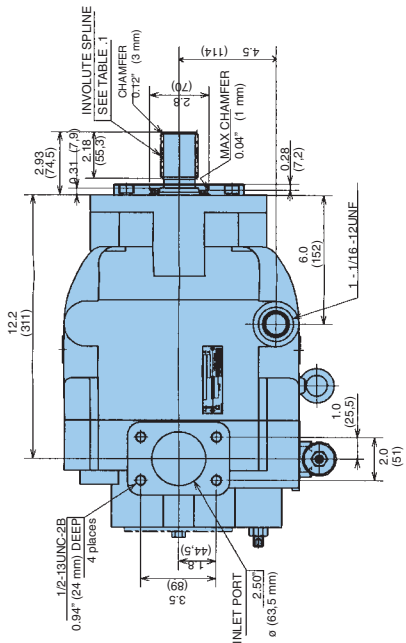
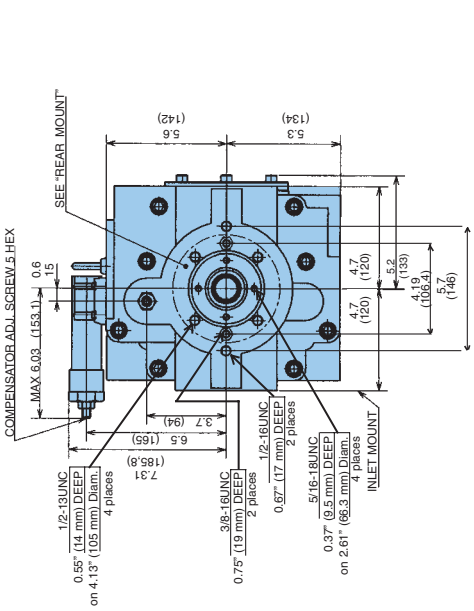
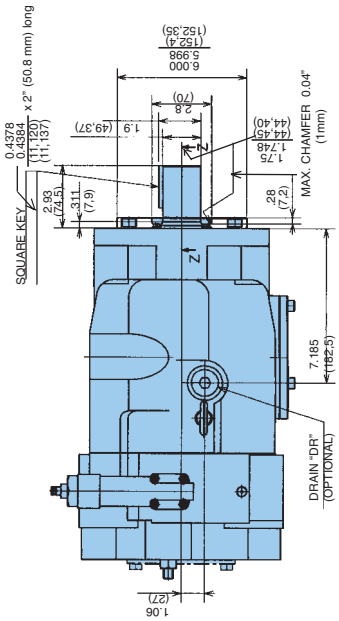


Table 1
SAE 44-4 INVOLUTE SPLINE DATA

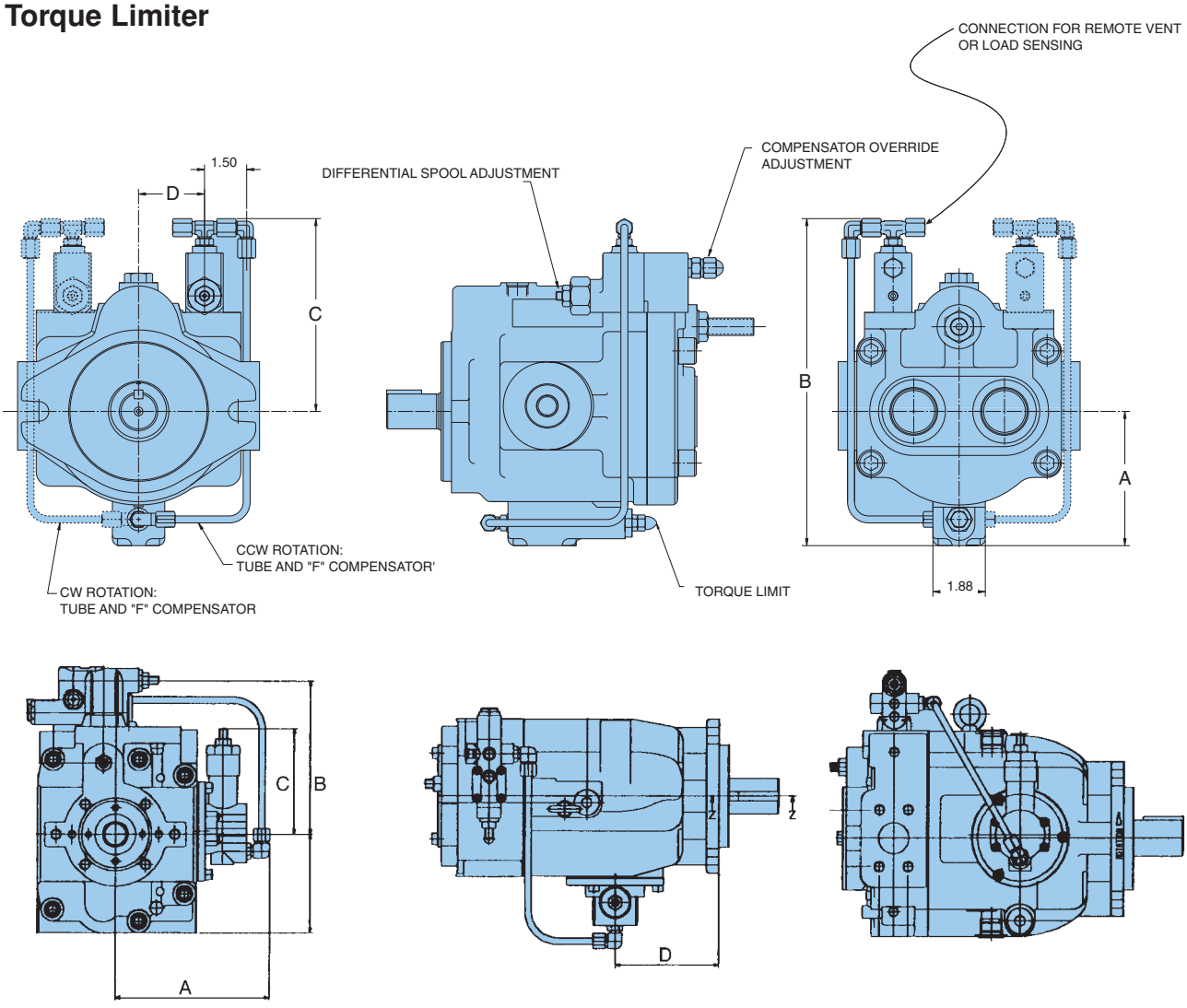
NUMBER OF TEETH	13
PITCH	8/16
PRESSURE ANGLE	30°
MAJOR DIA.	1.721 1.715 (43.71) (43.58)
MINOR DIA.	1.471 1.453 (37.36) (36.90)

Note: DIMENSIONS IN PARENTHESIS ARE METRIC UNITS





Torque Limiter



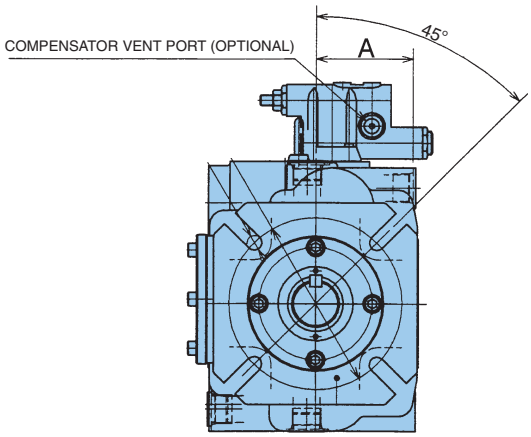
Torque Values

	Max. Pressure psi	Max. Pressure bar	Max. Torque in-lb	Max. Torque Nm	J* torque range in-lb min	K* torque range in-lb min.	J* torque range Nm min.	K* torque range Nm min.
PV6/PVT6	4500	310	685	77	88	274	10	31
PV10/PVT10	4500	310	981	111	257	407	29	46
PV15/PVT15	4500	310	1627	184	407	619	46	70
PV20/PVT20	4500	310	2040	231	531	725	60	82
PV29/PVT29	4000	275	2616	296	681	1044	77	118
PVT38	4350	300	3672	415	946	1318	107	149
PVT47	4350	300	4590	519	1185	1645	134	186
PVT64	4350	300	5968	675	1512	2087	171	236

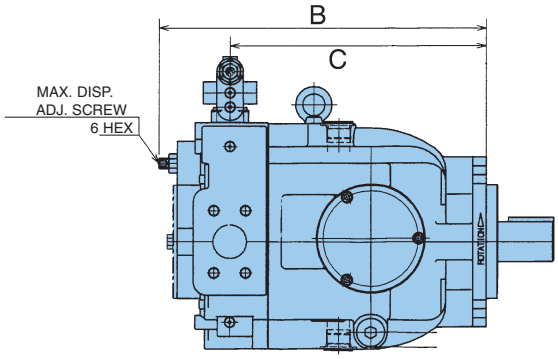
* Use J limiter from listed minimum to K value
* Use K limiter from listed minimum to Maximum Torque value value

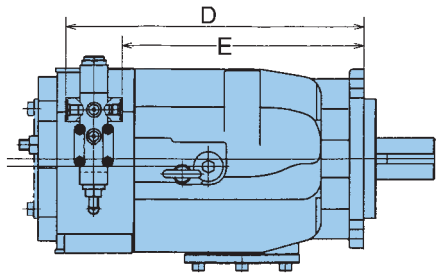
PV PVT	A	B	C	D
6	3.50 (88.9)	9.06 (230.1)	5.56 (141.2)	1.54 (39.1)
10	4.00 (101.6)	9.84 (249.9)	5.84 (148.3)	1.61 (40.9)
15	4.38 (111.3)	10.61 (269.5)	6.23 (158.2)	1.89 (48.0)
20	4.63 (117.6)	11.06 (280.9)	6.43 (163.3)	1.93 (49.0)
29	5.00 (127.0)	11.90 (302.3)	6.90 (175.3)	2.36 (59.9)
38	7.10 (180.3)	7.02 (178.3)	5.12 (131.0)	4.57 (116.0)
47	7.46 (189.6)	7.53 (191.3)	5.20 (132.0)	5.08 (129.0)
64	8.02 (203.8)	7.85 (199.3)	4.92 (125.0)	5.98 (152.0)

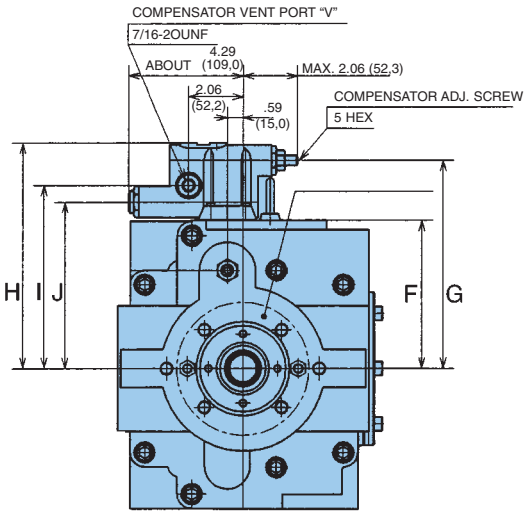
F and L Compensators

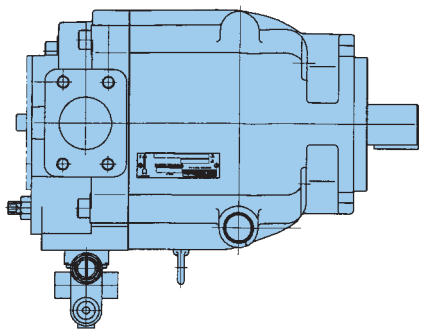


	PVT 38	PVT47	PVT64
A	2.78 (70.6)	3.59 (91.1)	4.16 (105.6)
B	12.97 (329.5)	14.46 (367.2)	16.26 (413.0)
C	10.02 (254.5)	11.32 (287.5)	12.24 (311.0)
D	11.20 (284.5)	12.50 (317.5)	13.43 (341.0)
E	8.84 (224.5)	10.14 (257.5)	11.06 (281.0)
F	4.76 (121.0)	5.28 (134.0)	5.59 (142.0)
G	7.02 (178.3)	7.53 (191.3)	7.85 (199.3)
H	7.69 (195.3)	8.20 (208.3)	8.52 (216.3)
I	6.07 (154.3)	6.59 (167.3)	6.90 (175.3)
J	5.44 (138.3)	5.96 (151.3)	6.27 (159.3)

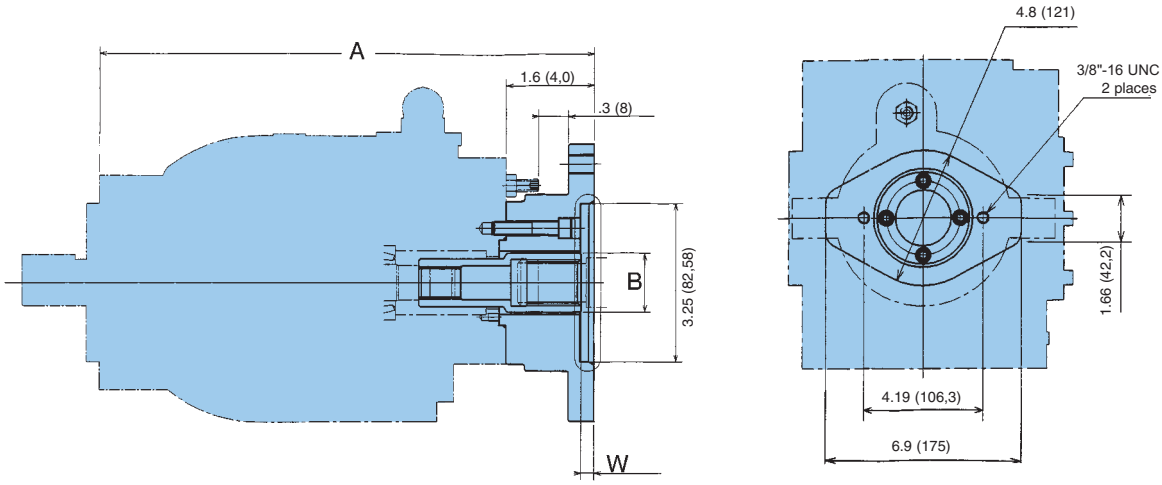






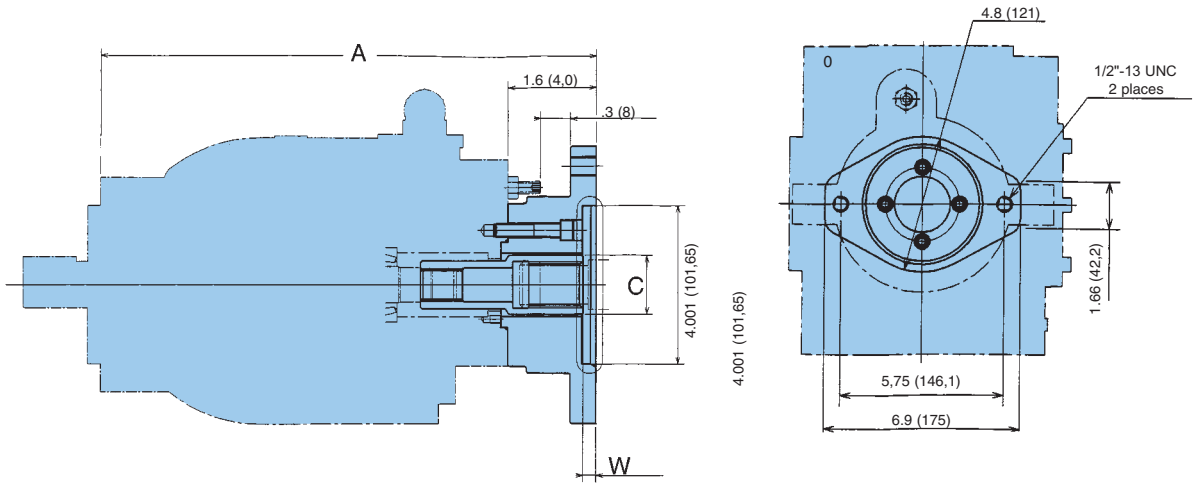


SAE - A REAR DRIVE



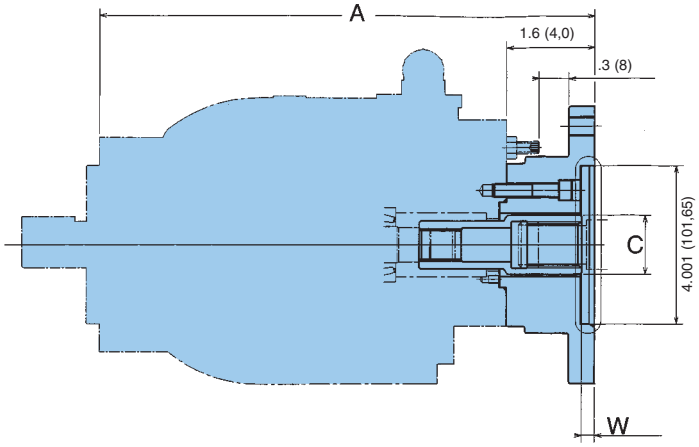
	A	B	W
PVT38	13.68 (347,5)	1.5 (38)	.492 (12,50)
PVT47	15.21 (386,4)	1.7 (44)	.531 (13,51)
PVT64	16.97 (431,0)	1.7 (44)	.496 (12,60)

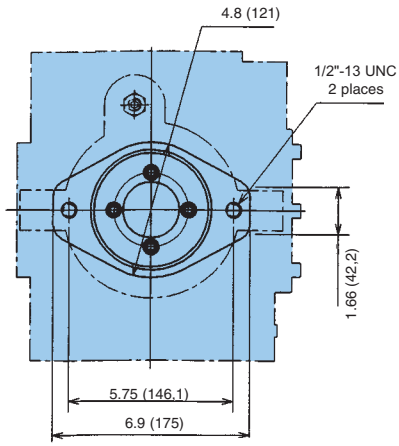
SAE - B REAR DRIVE



	A	C	W
PVT38	13.68 (347,5)	1.5 (38)	.492 (12,50)
PVT47	15.21 (386,4)	1.7 (44)	.531 (13,51)
PVT64	16.97 (431,0)	1.7 (44)	.496 (12,60)

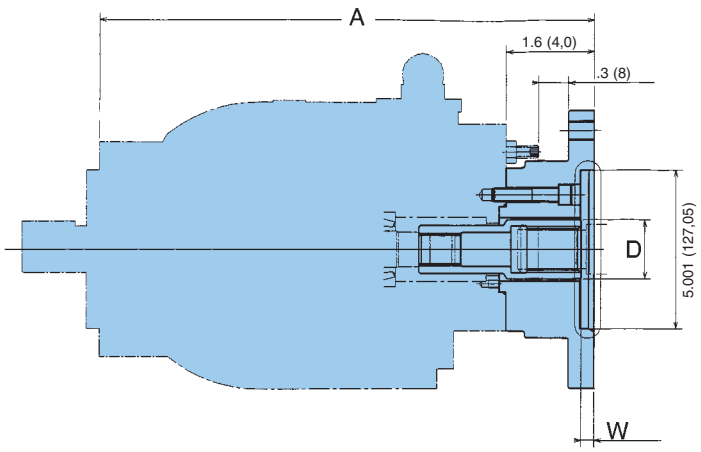
SAE - BB REAR DRIVE

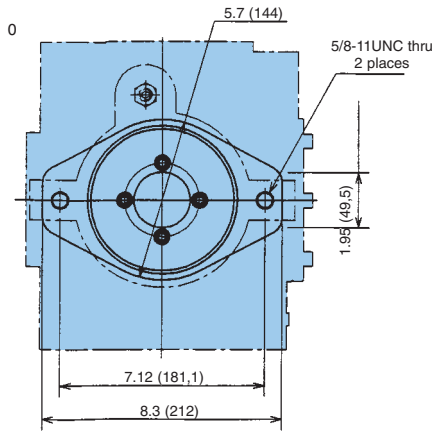




	A	C	W
PVT38	13.68 (347,5)	1.5 (38)	.492 (12,50)
PVT47	15.21 (386,4)	1.7 (44)	.531 (13,51)
PVT64	16.97 (431,0)	1.7 (44)	.496 (12,60)

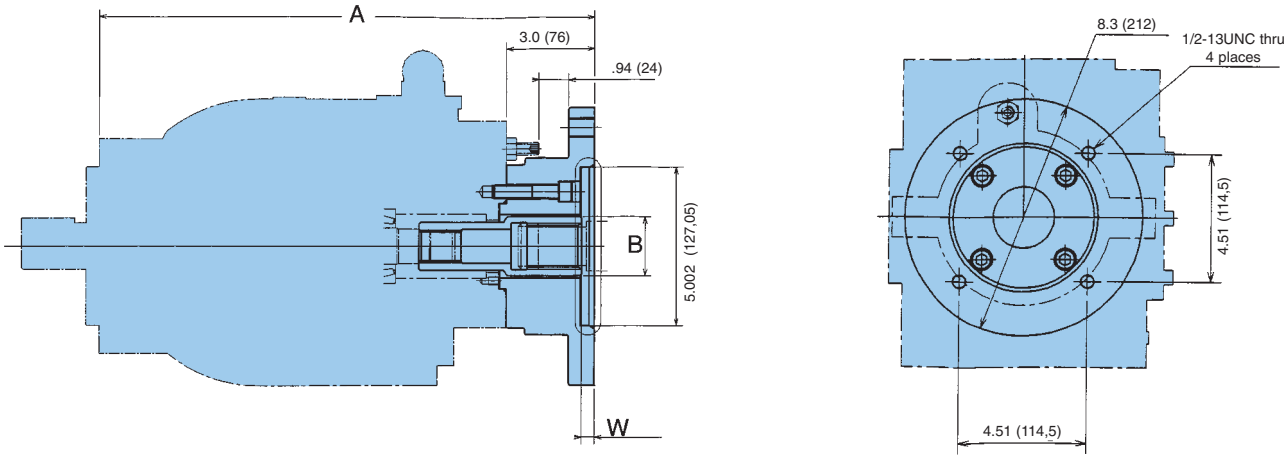
SAE - C REAR DRIVE





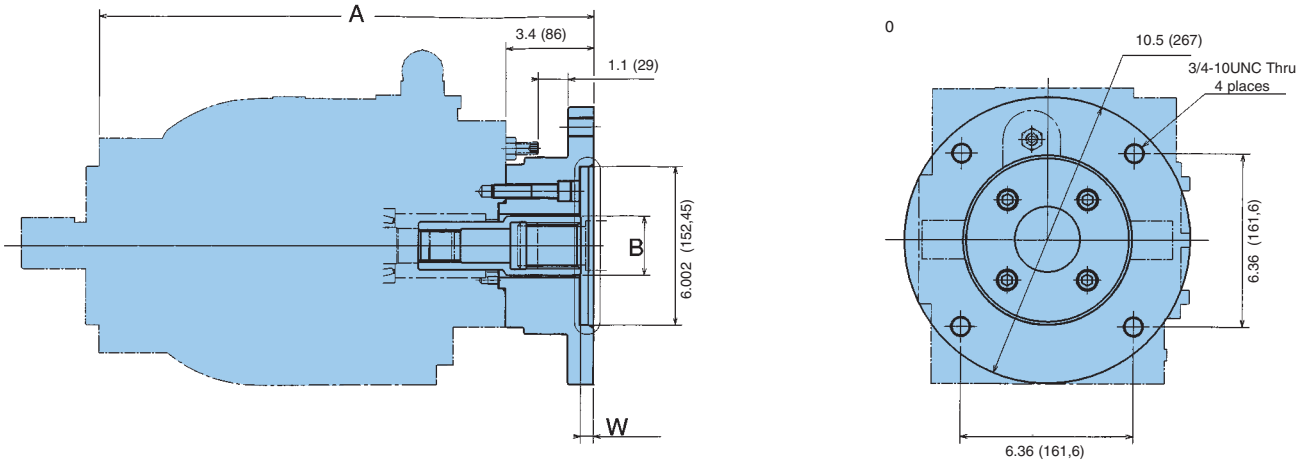
	A	D	W
PVT38	13.68 (347,5)	1.7 (44)	.492 (12,50)
PVT47	15.21 (386,4)	1.7 (44)	.531 (13,51)
PVT64	16.97 (431,0)	1.7 (44)	.496 (12,60)

SAE - CC REAR DRIVE



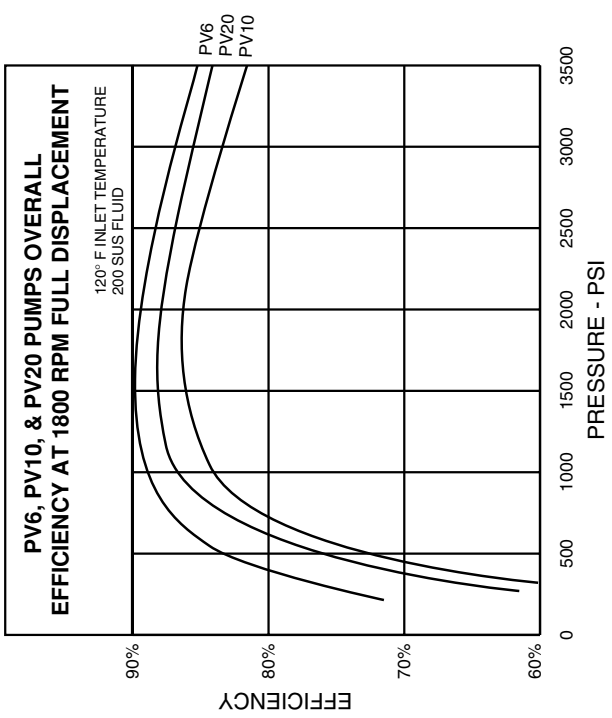
	A	B	W
PVT38	15.10 (383,5)	2.0 (51)	.492 (12,50)
PVT47	16.62 (422,4)	2.0 (51)	.531 (13,51)
PVT64	18.39 (467,0)	2.0 (51)	.496 (12,60)

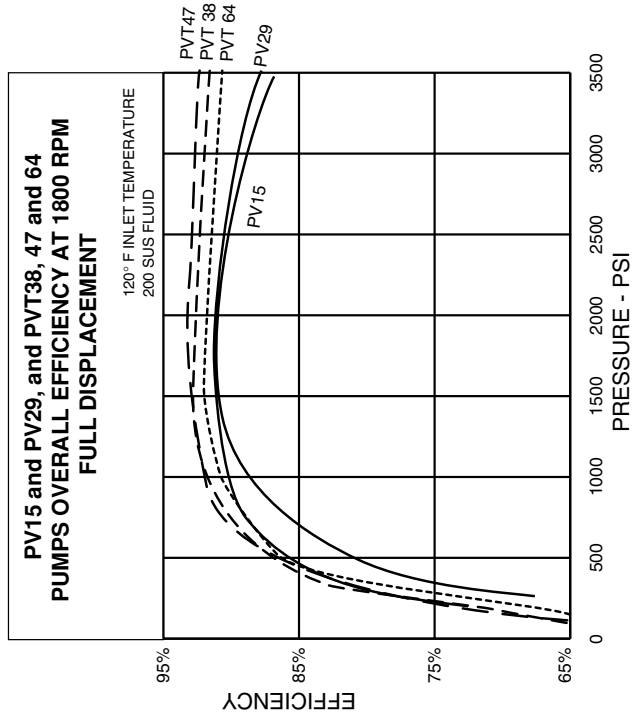
SAE - D REAR DRIVE

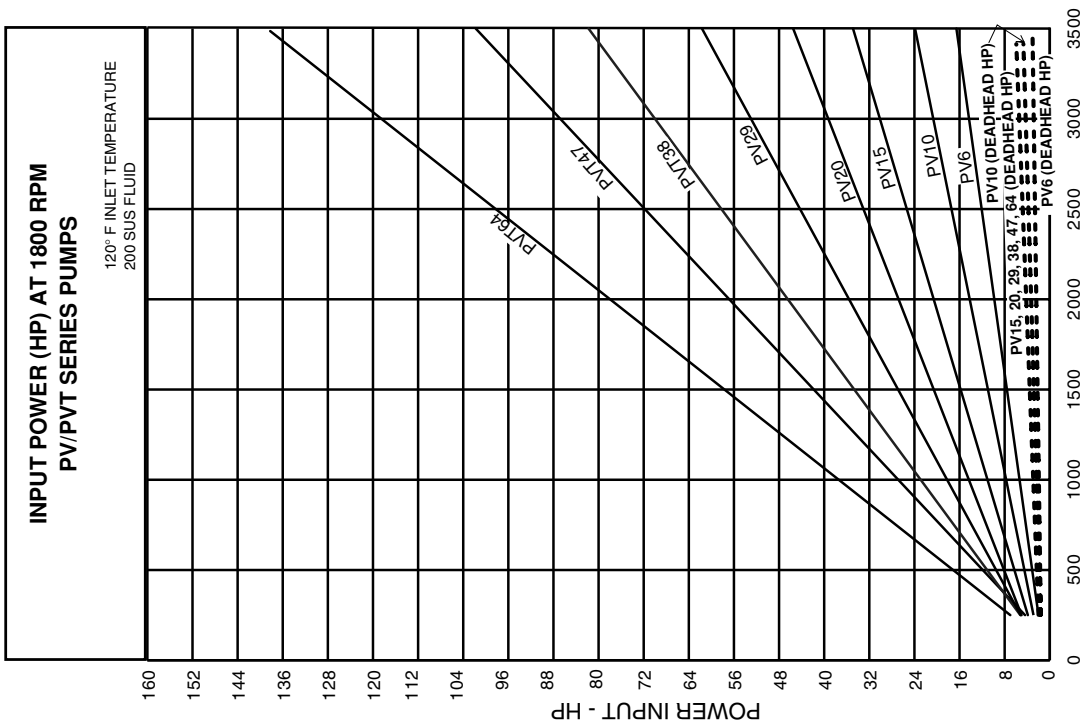


	A	B	W
PVT64	18.8 (477)	2.2 (57)	.496 (12,60)

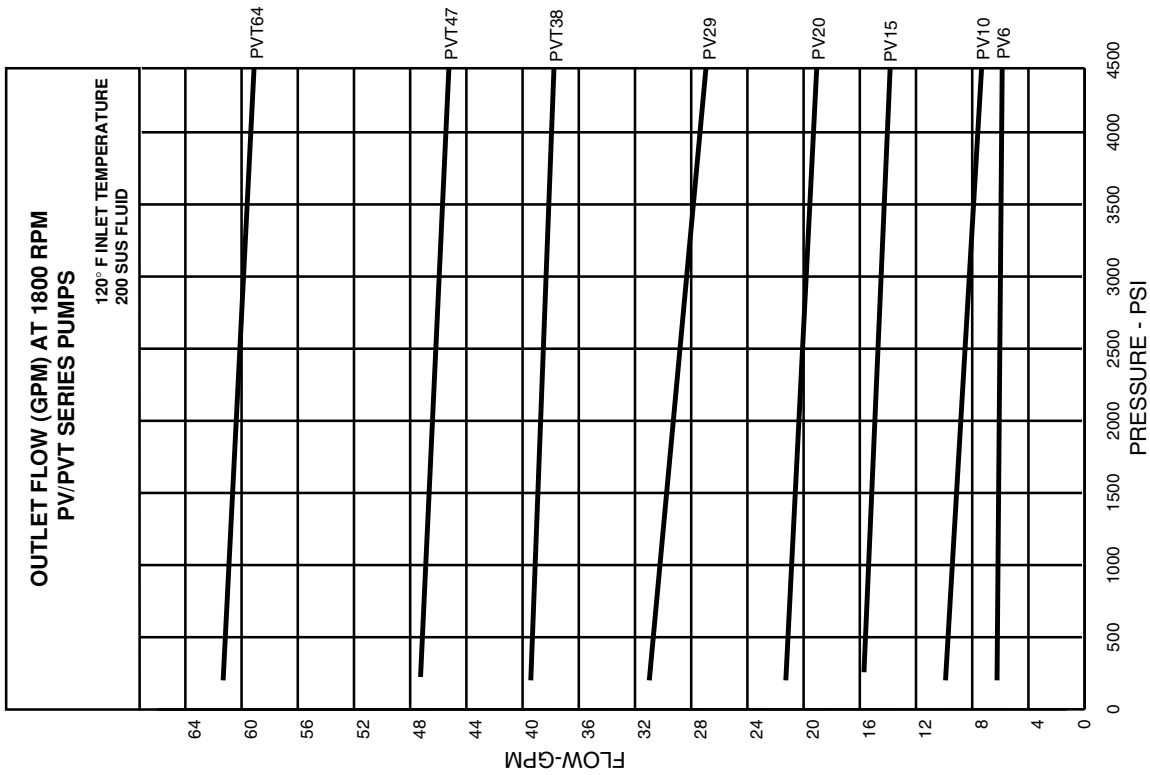
@ 1800 RPM

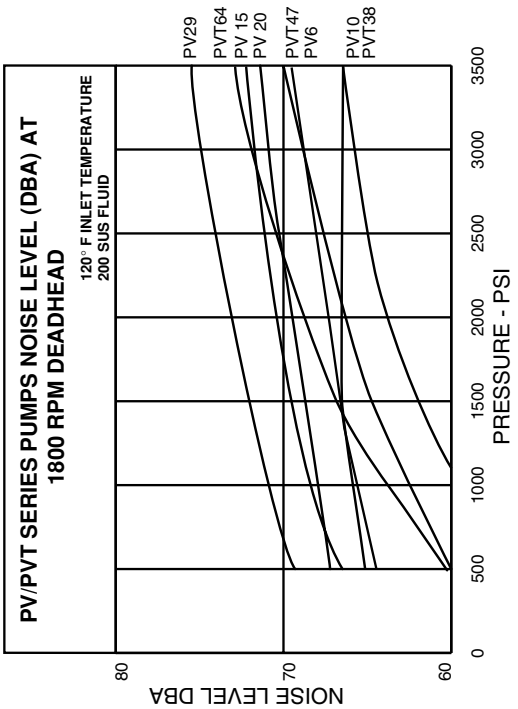

PV6, PV10, & PV20 PUMPS OVERALL
EFFICIENCY AT 1800 RPM FULL DISPLACEMENT
120° F INLET TEMPERATURE
200 SUS FLUID
PV6
PV20
PV10
90%
80%
70%
60%
EFFICIENCY
0
500
1000
1500
2000
2500
3000
3500
PRESSURE - PSI

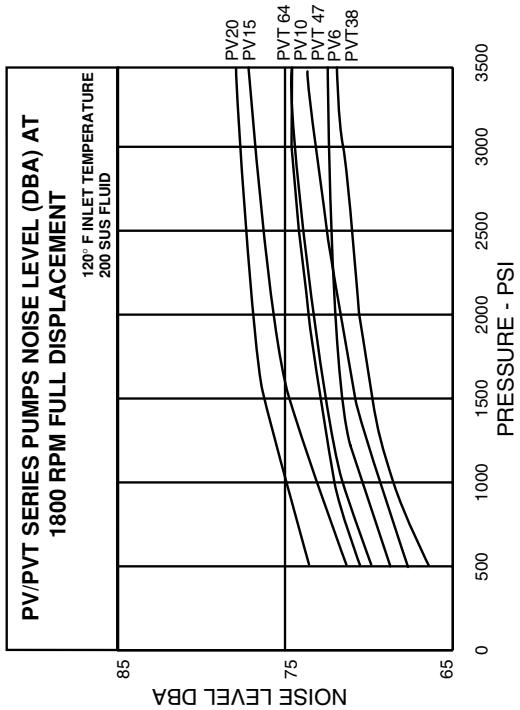

PV15 and PV29, and PVT38, 47 and 64
PUMPS OVERALL EFFICIENCY AT 1800 RPM
FULL DISPLACEMENT
120° F INLET TEMPERATURE
200 SUS FLUID
PVT47
PVT 38
PVT 64
PV29
PV15
95%
85%
75%
65%
EFFICIENCY
0
500
1000
1500
2000
2500
3000
3500
PRESSURE - PSI


INPUT POWER (HP) AT 1800 RPM
PV/PVT SERIES PUMPS
120° F INLET TEMPERATURE
200 SUS FLUID
PVT64
PVT47
PVT38
PV29
PV20
PV15
PV10
PV6
PV10 (DEADHEAD HP)
PV15, 20, 29, 38, 47, 64 (DEADHEAD HP)
PV6 (DEADHEAD HP)
160
152
144
136
128
120
112
104
96
88
80
72
64
56
48
40
32
24
16
8
0
POWER INPUT - HP
0
500
1000
1500
2000
2500
3000
3500
PRESSURE - PSI

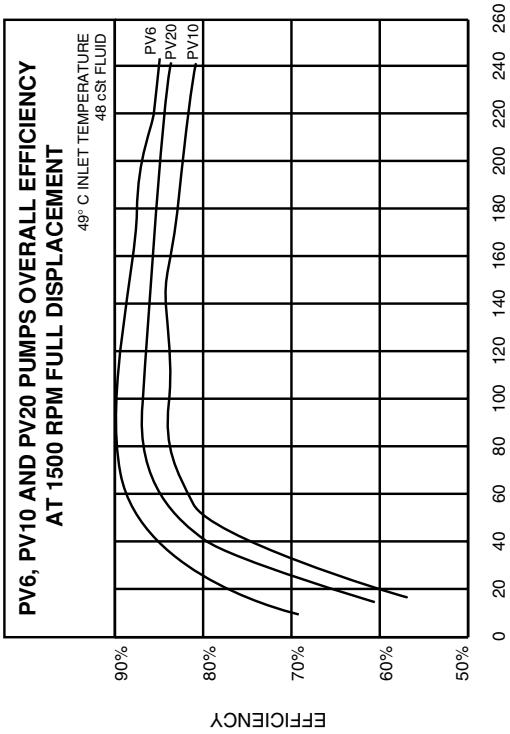
@ 1800 RPM

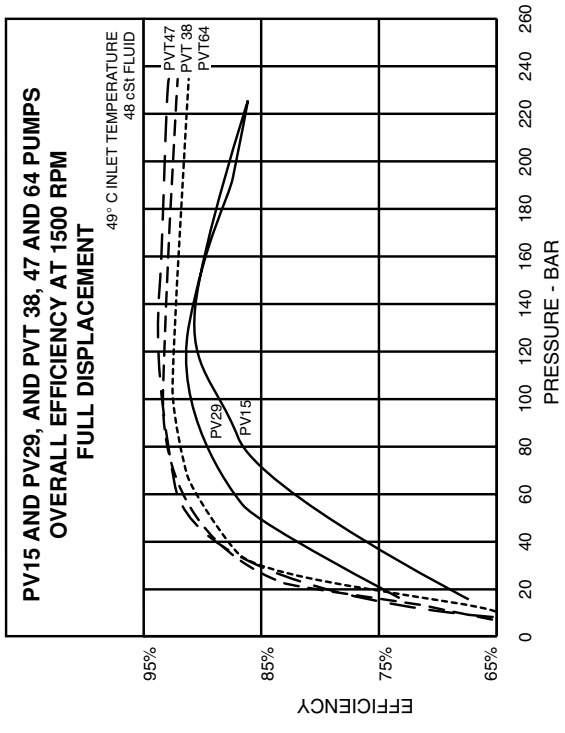

OUTLET FLOW (GPM) AT 1800 RPM
PV/PVT SERIES PUMPS
120° F INLET TEMPERATURE
200 SUS FLUID
PVT64
PVT47
PVT38
PV29
PV20
PV15
PV10
PV6
FLOW-GPM
64 60 56 52 48 44 40 36 32 28 24 20 16 12 8 4 0
0 500 1000 1500 2000 2500 3000 3500 4000 4500
PRESSURE - PSI

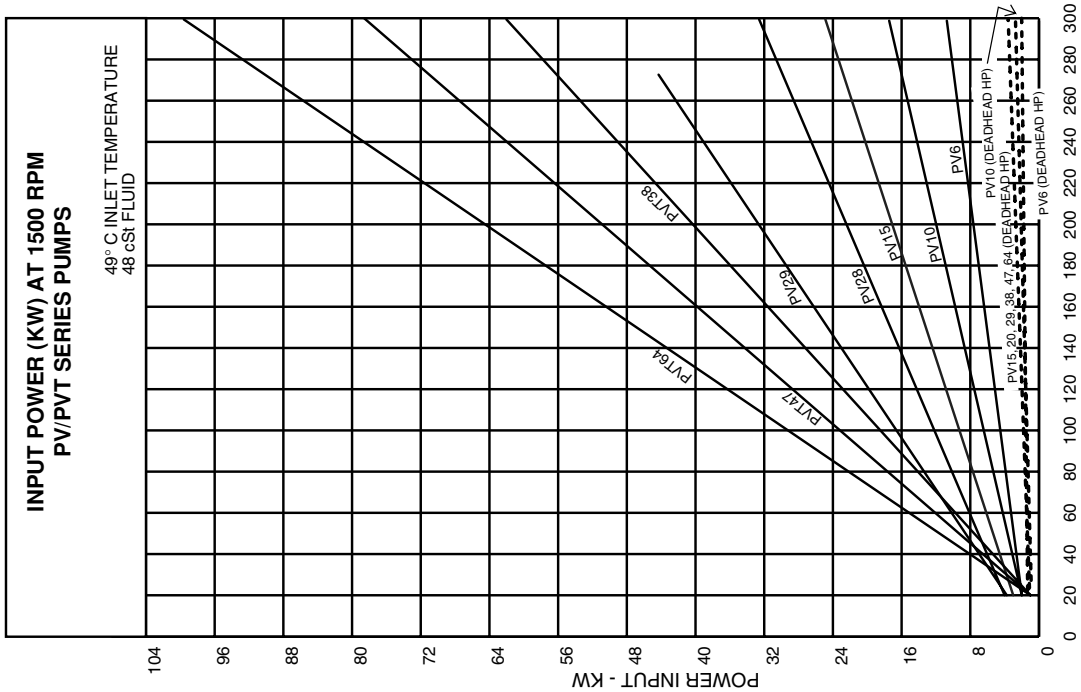

PV/PVT SERIES PUMPS NOISE LEVEL (DBA) AT
1800 RPM DEADHEAD
120° F INLET TEMPERATURE
200 SUS FLUID
PV29
PVT64
PV 15
PV 20
PVT47
PV6
PV10
PVT38
NOISE LEVEL DBA
80 70 60
0 500 1000 1500 2000 2500 3000 3500
PRESSURE - PSI


PV/PVT SERIES PUMPS NOISE LEVEL (DBA) AT
1800 RPM FULL DISPLACEMENT
120° F INLET TEMPERATURE
200 SUS FLUID
PV20
PV15
PVT 64
PV10
PVT 47
PV6
PVT38
NOISE LEVEL DBA
85 75 65
0 500 1000 1500 2000 2500 3000 3500
PRESSURE - PSI

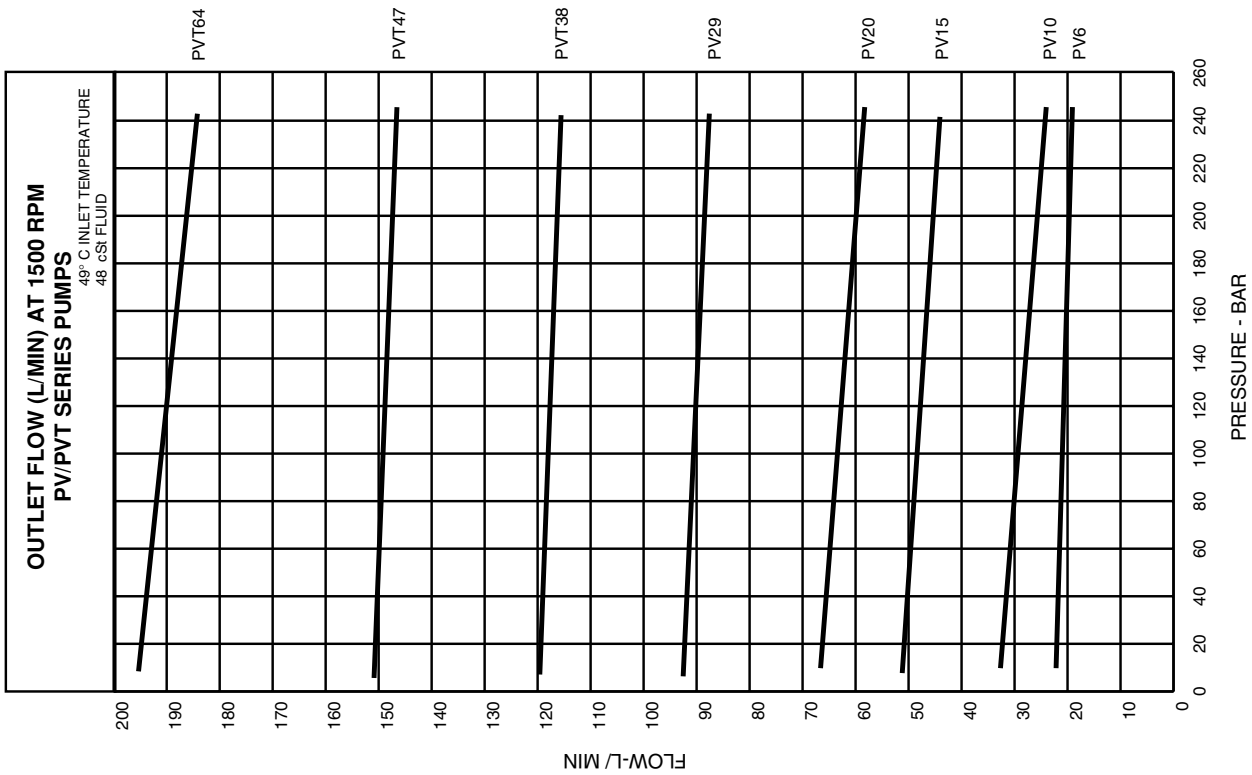
@ 1500 RPM

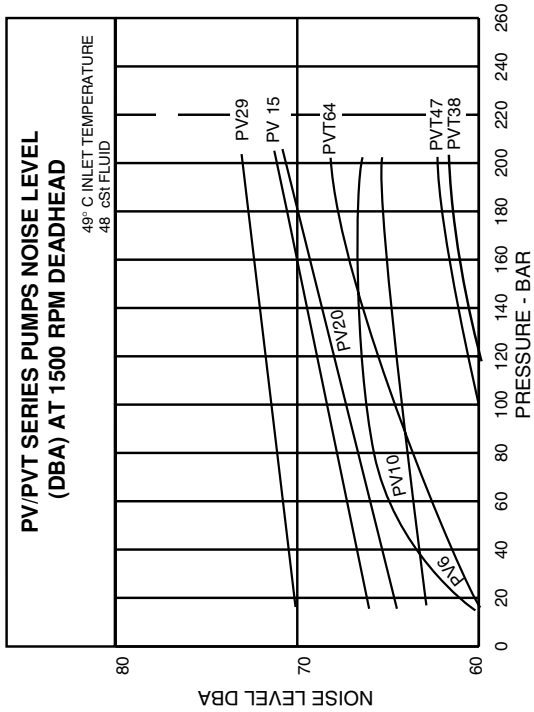

PV6, PV10 AND PV20 PUMPS OVERALL EFFICIENCY
AT 1500 RPM FULL DISPLACEMENT
49° C INLET TEMPERATURE
48 cSt FLUID
PV6
PV20
PV10
EFFICIENCY
90%
80%
70%
60%
50%
0 20 40 60 80 100 120 140 160 180 200 220 240 260
PRESSURE - BAR

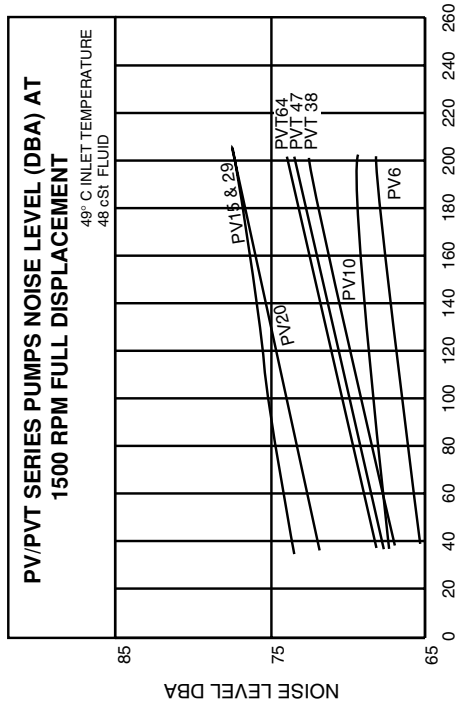

PV15 AND PV29, AND PVT 38, 47 AND 64 PUMPS
OVERALL EFFICIENCY AT 1500 RPM
FULL DISPLACEMENT
49° C INLET TEMPERATURE
48 cSt FLUID
PVT47
PVT 38
PVT64
PV29
PV15
EFFICIENCY
95%
85%
75%
65%
0 20 40 60 80 100 120 140 160 180 200 220 240 260
PRESSURE - BAR


INPUT POWER (KW) AT 1500 RPM
PV/PVT SERIES PUMPS
49° C INLET TEMPERATURE
48 cSt FLUID
PVT64
PVT47
PVT38
PV29
PV28
PV15
PV10
PV6
PV10 (DEADHEAD HP)
PV15, 20, 29, 38, 47, 64 (DEADHEAD HP)
PV6 (DEADHEAD HP)
POWER INPUT - KW
104 96 88 80 72 64 56 48 40 32 24 16 8 0
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300
PRESSURE - BAR

@ 1500 RPM







NOISE LEVEL MEASUREMENT

MEASUREMENTS OF PUMP ACOUSTICAL DATA WERE MADE IN ACCORDANCE WITH ANSI B93.71M-1986. HYDRAULIC FLUID POWER-PUMPS-TEST CODE FOR THE DETERMINATION OF AIRBORNE NOISE LEVELS. (TECHNICALLY SIMILAR TO ISO 4412-1)

THE MEASUREMENTS WERE MADE IN A SPECIAL REVERBERANT TEST ROOM IN THE DENISON HYDRAULICS MARYSVILLE FACULTY WHICH WAS QUALIFIED TO ANSI S12.23-1990, (REVISION OF ANSI S1.33-1982). ENGINEERING METHODS FOR THE DETERMINATION OF SOUND POWER LEVELS OF NOISE SOURCES IN A SPECIAL REVERBERATION TEST ROOM.

PV pumps

Model number sheet

Revised 6/24/02

Example model code:

	PV	6	-2	R	1	*	-C	0	2	-0	0	0	
Type													
No rear drive, rear ports (sizes 6 through 29 only)	PV												
No rear drive, rear ports, mobile version (size 20 only)	PVM												
Rear drive, side ports, mobile version (size 20 only)	PVR												
Rear drive, side ports (all sizes)	PVT												
No rear drive, rear ports, for use on water glycol only (sizes 6 through 29 only)	PVW												
No rear drive, rear ports, mobile version, for use on water glycol only (size 20	PVX												
Rear drive, side ports, mobile version, for use on water glycol only (size 20 on	PVY												
Rear drive, side ports, for use on water glycol only (sizes 6 through 29 only)	PVZ												
Flow (at 1800 RPM)													
6.8 GPM (26.0 lpm)		6											
10.0 GPM (37.2 lpm)		10											
16.3 GPM (61.6 lpm)		15											
20.4 GPM (77.3 lpm)		20											
29.5 GPM (111.5 lpm)		29											
38.0 GPM (144.0 lpm)		38											
47.6 GPM (180.0 lpm)		47											
61.8 GPM (234.0 lpm)		64											
Shaft													
Splined			-1										
Keyed			-2										
Rotation													
Clockwise				R									
Counter-clockwise				L									
Seals													
Nitrile (Buna N)					1								
EPR (sizes 6 through 29 only)(pump will be unpainted unless otherwise specified)					4								
Flourocarbon (Viton)					5								
Design letter (assigned by manufacturer)						*							
Controls													
Compensator							-C						
Compensator - pilot operated with vent port							-F						
Load sensing compensator							-L						
Low torque limiter							-J						
High torque limiter							-K						
Load sensing compensator (L) + low torque limiter (J)							-V						
Load sensing compensator (L) + high torque limiter (K)							-W						
Control type													
Max. volume adjustment screw								0					
Fluid connections													
SAE threaded ports (PV & PVM units only)									0				
BSPP threaded ports (PV & PVM units only)									2				
SAE 4-bolt flange ports with SAE case drain ports (PVR & PVT units only)									3				
SAE 4-bolt flange ports with BSPP case drain ports (size 6 through 29 PVR & PVT units only)									4				
External drive													
None (PV & PVM units only)										-0			
Blanking plug (PVR & PVT units only)										-S			
SAE-A (SAE 82-2)(PVR & PVT units only)										-A			
SAE-B (SAE 101-2)(size 10 through 64 PVR & PVT units only)										-B			
SAE-C (SAE 127-2)(SAE 127-4 for PVT38/47/64 with SAE-CC coupling)(size 10 through 64 PVR & PVT units only)										-C			
SAE-D (SAE 152-4)(PVT64 only)										-D			
Coupling													
None											0		
SAE-A (SAE 16-4)(PVR & PVT units only)											A		
SAE-B (SAE 22-4)(size 10 through 64 PVR & PVT units only)											B		
SAE-BB (SAE 25-4)(size 10 through 64 PVR & PVT units only)											Q		
SAE-C (SAE 32-4)(size 10 through 64 PVR & PVT units only)											C		
SAE-CC (SAE 38-4)(size 38 through 64 PVT units only)											R		
SAE-D (SAE 44-4)(PVT64 only)											D		
External mounting													
No external pump mounted												0	
External pump mounted (requires special modification "-M2")(must be separately specified)												1	
Special modification													
None													omit
No paint													-NP
Other special modification (example: tandem pumps)													-M2

Allowable controls

C00, C02, C03, C04, F00, F02, F03, F04
L00, L02, L03, L04, J00, J02, J03, J04, K00, K02, K03, K04
V00, V02, V03, V04, W00, W02, W03, W04

DEFINITION & UNIT

displacement	in^3/rev x 16.387 = cm^3/rev	cm^3/rev x 0.06102 = in^3/rev
flow	gpm x 3.78 = L/min	L/min x 0.2642 = gpm
power	hp x 0.7457 = kW	kW x 1.341 = hp
torque	lb-ft x 1.3567 = Nm	Nm x 0.7376 = lb-ft
pressure	lbs/in^2 (psi) x 0.06895 = bar lbs/in^2 (psi) x 6.895 = kPa	bar x 14.50 = lbs/in^2 (psi) kPa x 0.1450 = lbs/in^2 (psi)
weight	lb x 0.4536 = kg	kg x 2.205 = lbs
force	lb x 4.448 = N	N x 0.2248 = lbs
volume	in^3 x 16.387 = cm^3	cm^3 x 0.06102 = in^3
area	in^2 x 6.452 = cm^2	cm^2 x 0.1550 = in^2
length	in x 25.4= mm	mm x 0.03937 = in
temperature	$\frac{\text{degree F-32}}{1.8}$ = ° C	1.8 x ° C+32 = ° F
viscosity	*c*St x 1.0 = mm^2/sec	mm^2/sec x 1.0 = *c*St

FLUID POWER FORMULAS

Pump input torque	*lbs. in.*	$\frac{\text{pressure(psi) x displacement } (in^3/rev)}{2\pi \text{ x mech. eff.}}$
Pump input power	*hp*	$\frac{\text{rpm x } (in^3/rev) \text{ x (psi)}}{395934 \text{ x overall eff.}}$
Pump output flow	*U.S. gpm*	$\frac{\text{rpm x } (in^3/rev) \text{ x volumetric eff.}}{231}$
Fluid motor speed	*rpm*	$\frac{231 \text{ x flow rate(U.S. gpm) x volumetric eff.}}{\text{displacement } (in^3/rev)}$
Fluid motor torque	*lbs. in.*	$\frac{\text{pressure(psi) x displacement } (in^3/rev) \text{ x mech. eff.}}{2\pi}$
Fluid motor power	*hp*	$\frac{\text{rpm x } (in^3/rev) \text{ x (psi) x overall eff.}}{395934}$
(metric)		
Pump input torque	*Nm*	$\frac{\text{pressure(bar) x displacement } (cm^3/rev}{20\pi \text{ x mech. eff.}}$
Pump input power	*kW*	$\frac{\text{rpm x } (cm^3/rev) \text{ x (bar)}}{600000 \text{ x overall eff.}}$
Pump output flow	*Lpm*	$\frac{\text{rpm x } (cm^3/rev) \text{ x volumetric eff.}}{1000}$
Fluid motor speed	*rpm(min^{-1}) (tr/mn)*	$\frac{1000 \text{ x flow rate (Lpm) x volumetric eff.}}{\text{displacement } (cm^3/rev)}$
Fluid motor torque	*Nm*	$\frac{\text{pressure(bar) x displacement } (cm^3/rev) \text{ x mech. eff.}}{20\pi}$
Fluid motor power	*kW*	$\frac{\text{rpm x } (cm^3/rev) \text{ x (bar) x overall eff.}}{600000}$

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