

FIXED DISPLACEMENT VANE PUMP

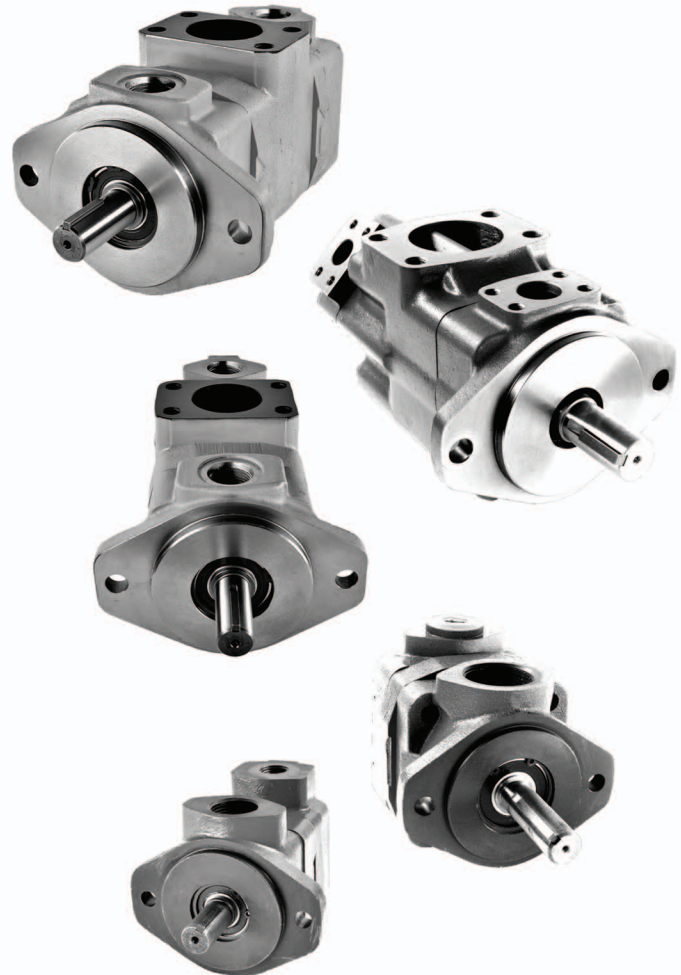
E 10 AND E V20 SERIES



Features:

E V10/V20

- V10 and V20 Series are fixed displacement and balanced type vane pumps. With compact sizes, they are available in single pumps and double pumps for both industrial and mobile application.
- The vane design with self compensation for wear and clearances makes volumetric efficiency of pump nearly constant over the service life. (the vanes always adjust its orbit to contact with the cam ring, even though wear occurs between the cam ring and vane tips)
- The vane pump is not damaged at low speed and high pressure operation because pumping action does not start until the speed is high enough for the vane to throw out. With hydraulically balanced design, the bearing is externally loaded only. Therefore, the pump requires minimized maintenance with long service life.
- The inlet or outlet ports can be rotated through increments of 90° in relation to each other, providing application flexibility and easy installation.
- With optional flow control and priority valve covers, the pump can be used in more applications. The flow control cover can limit the flow to the primary circuit at the required flow rate, while diverts remaining flow to the tank. The priority valve cover maintains a constant flow to the primary circuit, while diverts remaining flow to the secondary circuit. Each cover comes with a relief valve to limits the maximum pressure of the primary circuit.



E V10/V20

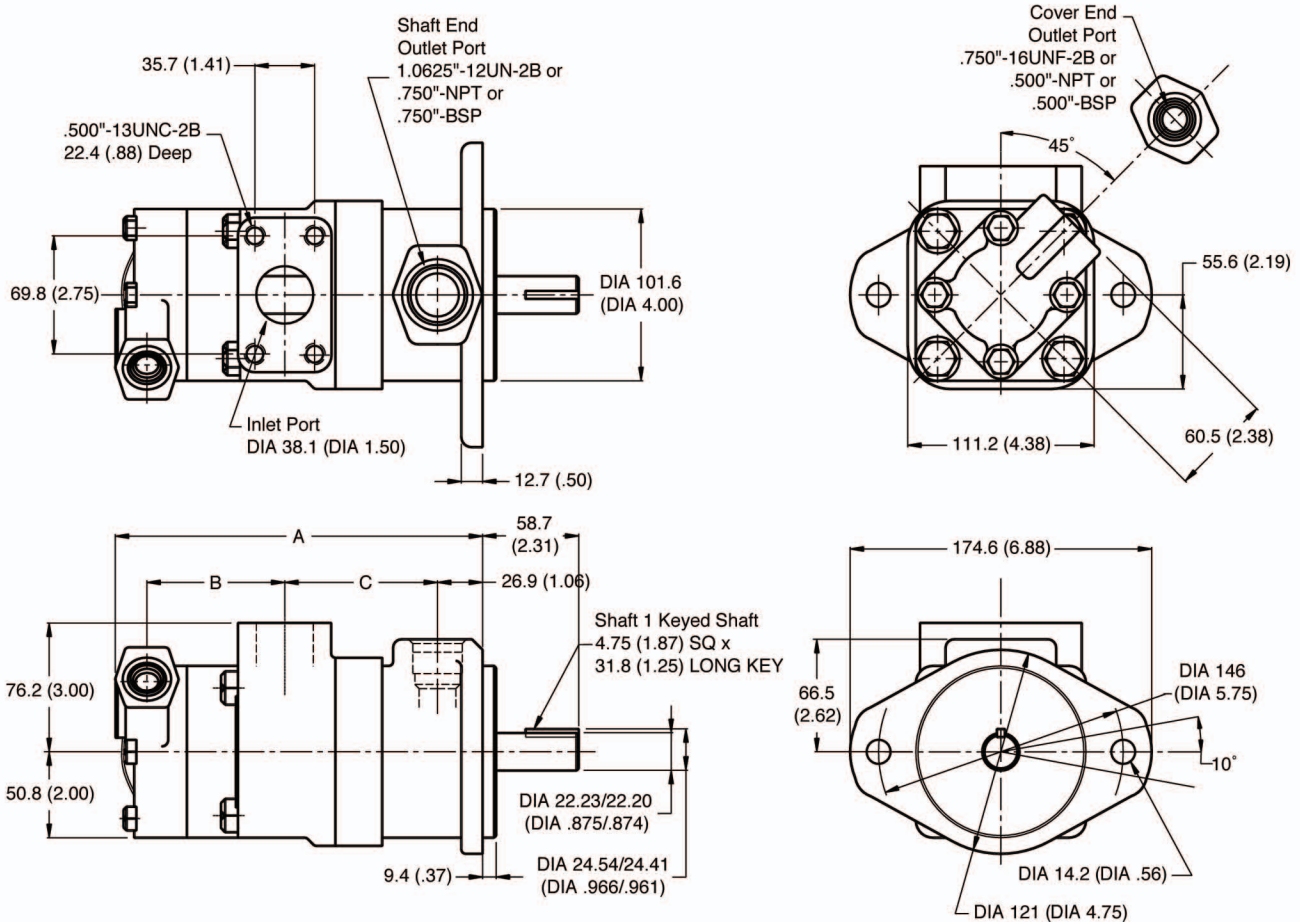
Handling:

- For maximum service life, the pump should be protected from contamination. Filtering fluid before filling and during operation to maintain or exceed ISO cleanliness code 17/14. Replaceable elements should be changed as filter supplier instructions
- The drive shaft must align with the power source shaft. Avoiding shaft end thrust and applications that impose radial loading.
- The start-up procedures should be as follows:
 - Check the rotation of power source to match the rotation of pump.
 - Check inlet and outlet ports to assure all connections are properly installed and check all mounting bolts and flanges to assure all are tight and properly aligned.
- Fill pump with fluid through the outlet port if the pump is mounted above the fluid level. The spline shaft models also need to be lubricated with an anti-fretting grease or similar lubricant.
- Place all controls in the neutral position so the pump is unloaded during initial start-up.
- Prime the pump within a few second when the pump is started.
- Bleed off entrapped air from outlet circuit until a steady output flow is observed.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change at any time without notice.

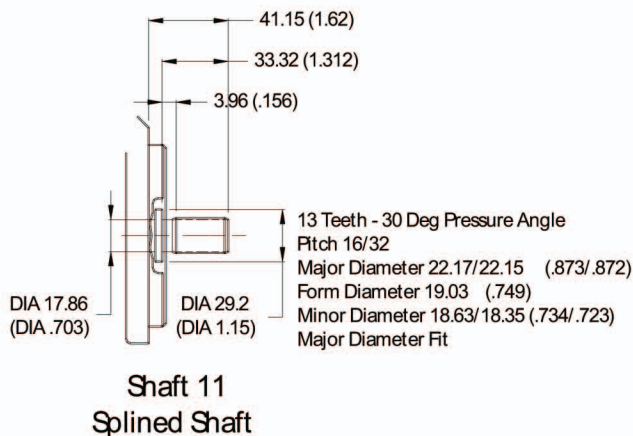
Installation Dimentions:

E V2010



Delivery @ 1200 rpm & 7 bar (100 psi)		Dimension		
Shaft End	Cover End	A	B	C
7, 8, 9	1, 2, 3	213.1 (8.39)	75.9 (2.99)	86.4 (3.40)
7, 8, 9	4, 5	219.5 (8.64)	82.3 (3.24)	86.4 (3.40)
7, 8, 9	6, 7	224.5 (8.84)	87.4 (3.44)	86.4 (3.40)
11	1, 2, 3	218.2 (8.59)	75.9 (2.99)	91.2 (3.59)
11	4, 5	224.5 (8.84)	82.3 (3.24)	91.2 (3.59)
11	6, 7	229.6 (9.04)	87.4 (3.44)	91.2 (3.59)
12, 13	1, 2, 3	221.7 (8.73)	75.9 (2.99)	94.7 (3.73)
12, 13	4, 5	227.8 (8.97)	82.3 (3.24)	94.7 (3.73)
12, 13	6, 7	232.9 (9.17)	87.4 (3.44)	94.7 (3.73)

Other Shaft Options For Double Pump E V2010,V2020:

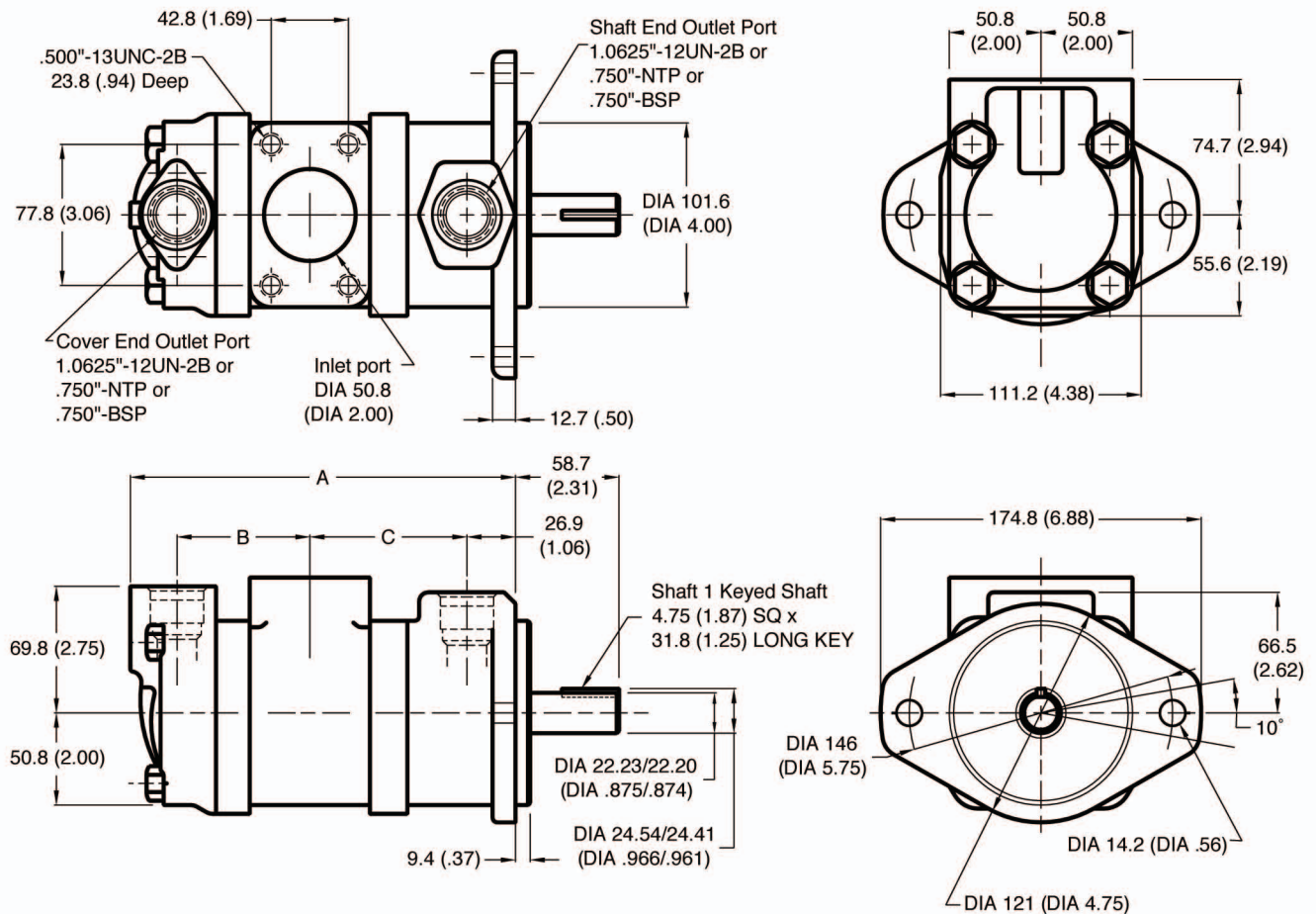


FIXED DISPLACEMENT VANE PUMP DOUBLE PUMP V2020



Installation Dimensions:

E V2020



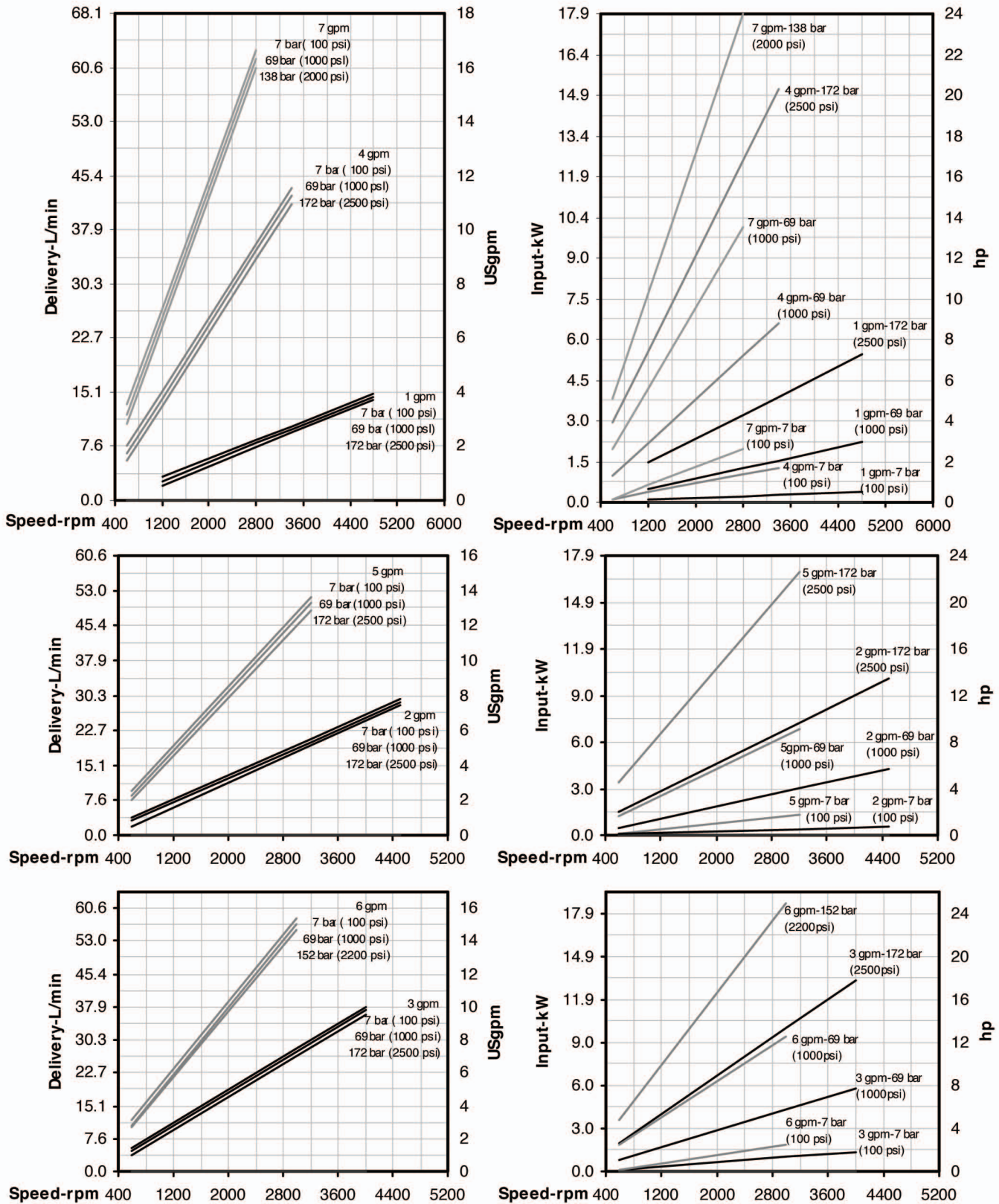
Delivery @ 1200 rpm & 7 bar (100 psi)		Dimension		
Shaft End	Cover End	A	B	C
7, 8, 9	6	213.6 (8.41)	73.7 (2.90)	87.1 (3.43)
7, 8, 9	7, 8, 9	220.0 (8.66)	80.0 (3.15)	87.1 (3.43)
11	6	218.7 (8.61)	73.7 (2.90)	92.2 (3.63)
11	7, 8, 9	225.0 (8.86)	80.0 (3.15)	92.2 (3.63)
11	11	229.9 (9.05)	85.1 (3.35)	92.2 (3.63)
12, 13	6	222.3 (8.75)	73.7 (2.90)	95.5 (3.76)
12, 13	7, 8, 9	228.3 (8.99)	80.0 (3.15)	95.5 (3.76)
12, 13	11	233.4 (9.19)	85.1 (3.35)	95.5 (3.76)

E V2020

Performance Characteristics:

E V10

Based on viscosity 32 cSt (150 SSU) oil at 49 °C (120 °F) and pump inlet at 0 PSIG (14.7 PSIA)



For the Cover End Cartridge, the speed could not exceed the maximum speed of the Shaft End Cartridge.

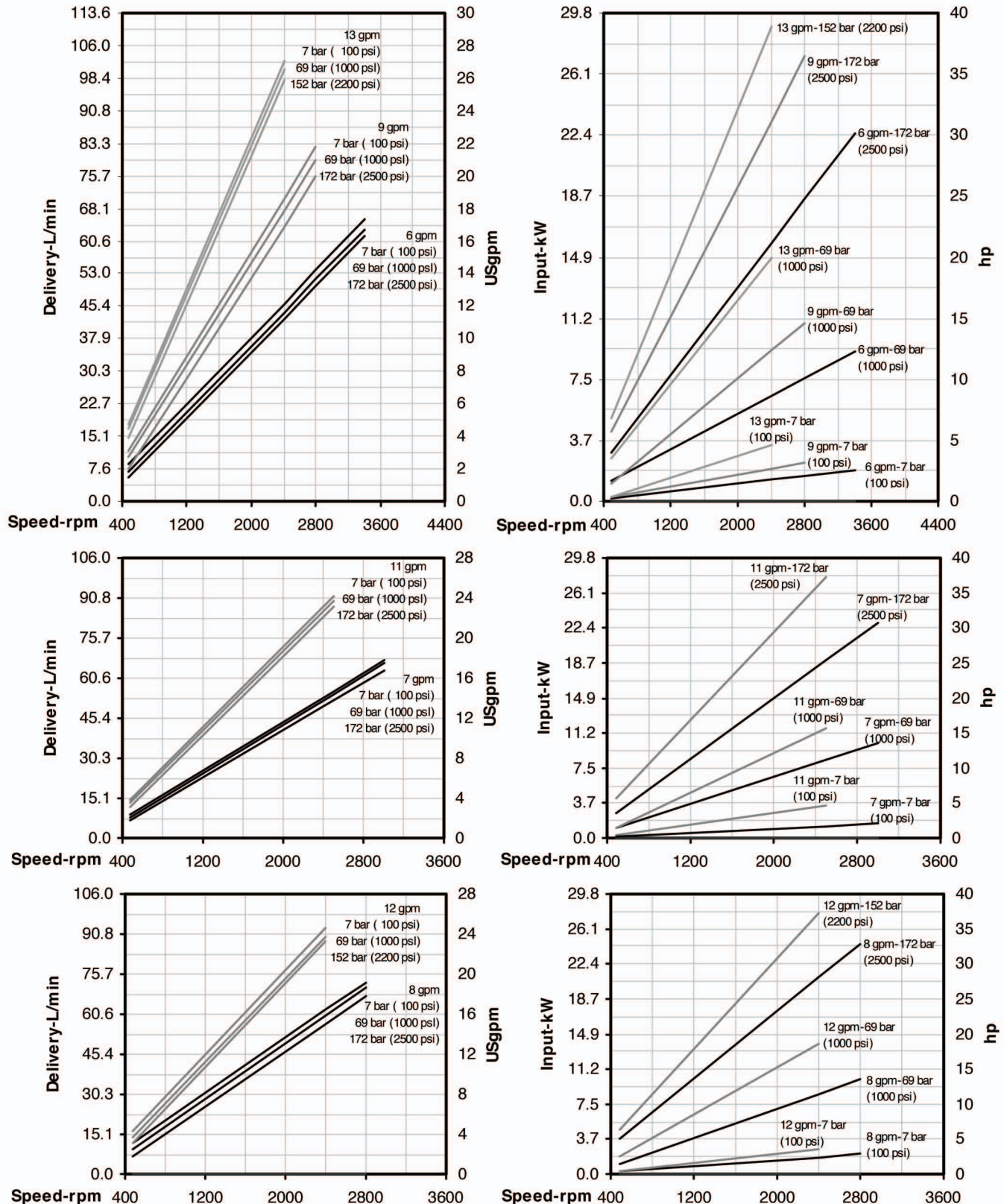
FIXED DISPLACEMENT VANE PUMP E V20, COVER END OF E V2020



Performance Characteristics:

E V20

Based on viscosity 32 cSt (150 SSU) oil at 49 °C (120 °F) and pump inlet at 0 PSIG (14.7 PSIA)



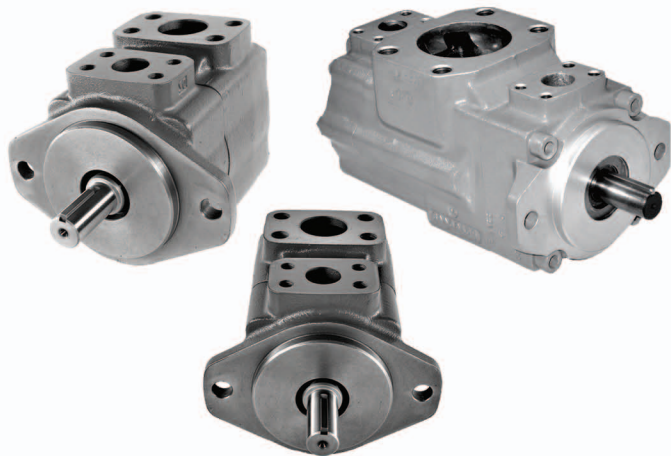
For the Cover End Cartridge, the speed could not exceed the maximum speed of the Shaft End Cartridge.

E V20

Features:

E V/VQ

- V and VQ Series are fixed displacement and balanced type vane pumps. Available in both 12 vanes design for industrial application with quiet operating and 10 vanes design for mobile application with higher pressure and wider range of speed.
- The vane design with self compensation for wear and clearances makes volumetric efficiency of pump nearly constant over the service life. (the vane always adjust its orbit to contact with the cam ring, even though wear occurs between the cam ring and vane tip)
- With a balanced intra-vane design, outlet pressure is continuously applied only to the area between the vane and insert. This area is small and thrust is correspondingly light. Top and bottom areas of the vane are subject to either inlet or outlet pressure, depending on the vane's location during rotor rotation. The valving of pressure to and from the bottom area of the vane is through holes drilled in the rotor. This varying pressure under the vane reduces wear and increases pump efficiency.
- The vane pump is not damaged at low speed and high pressure operation because pumping action does not start until the speed is high enough for the vane to throw out.
- The inlet or outlet ports can be rotated through increments



of 90° in relation to each other, providing application flexibility and easy installation.

- With the cartridge independent of the shaft, allowing for easy change of flow capacity and field servicing without removing the pump from its mounting.
- For the cartridge kit of VQ Series, the flexible plates are inserted between the support plates and the rotor. The flexible plates are assembled with the bronze facing towards the rotor to improve cold start capability and compensate thermal expansion in the rotor. This makes VQ Series particularly suited for mobile application.

Handling:

- For maximum service life, the pump should be protected from contamination. Filtering fluid before filling and during operation to maintain or exceed ISO cleanliness code 16/13. Appropriately size suction filter, with cold start bypass, of 149 micron absolute (100 mesh) and 10 micron absolute return line filter is recommended. Replaceable elements should be changed as filter supplier instructions
- The drive shaft must align with the power source shaft. Avoiding shaft end thrust and applications that impose radial loading.
- The start-up procedures should be as follows:
 - Check the rotation of power source to match with rotation

of pump.

- Check inlet and outlet ports to assure all connections are properly installed and check all mounting bolts and flanges to assure all are tight and properly aligned.
- Fill pump with fluid through the outlet port if the pump is mounted above the fluid level. The spline shaft models also need to be lubricate with an anti-fretting grease or similar lubricant.
- Place all controls in the neutral position so the pump is unloaded during initial start-up.
- Prime the pump within a few second when the pump is started.
- Bleed off entrapped air from outlet circuit until a steady output flow is observed.

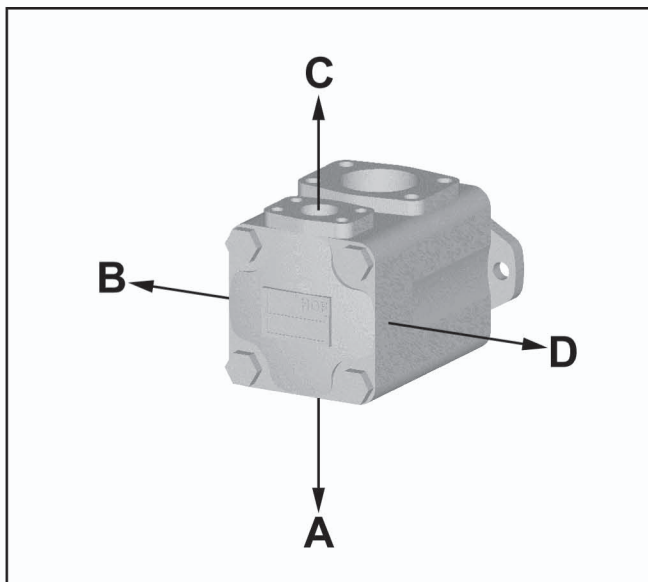
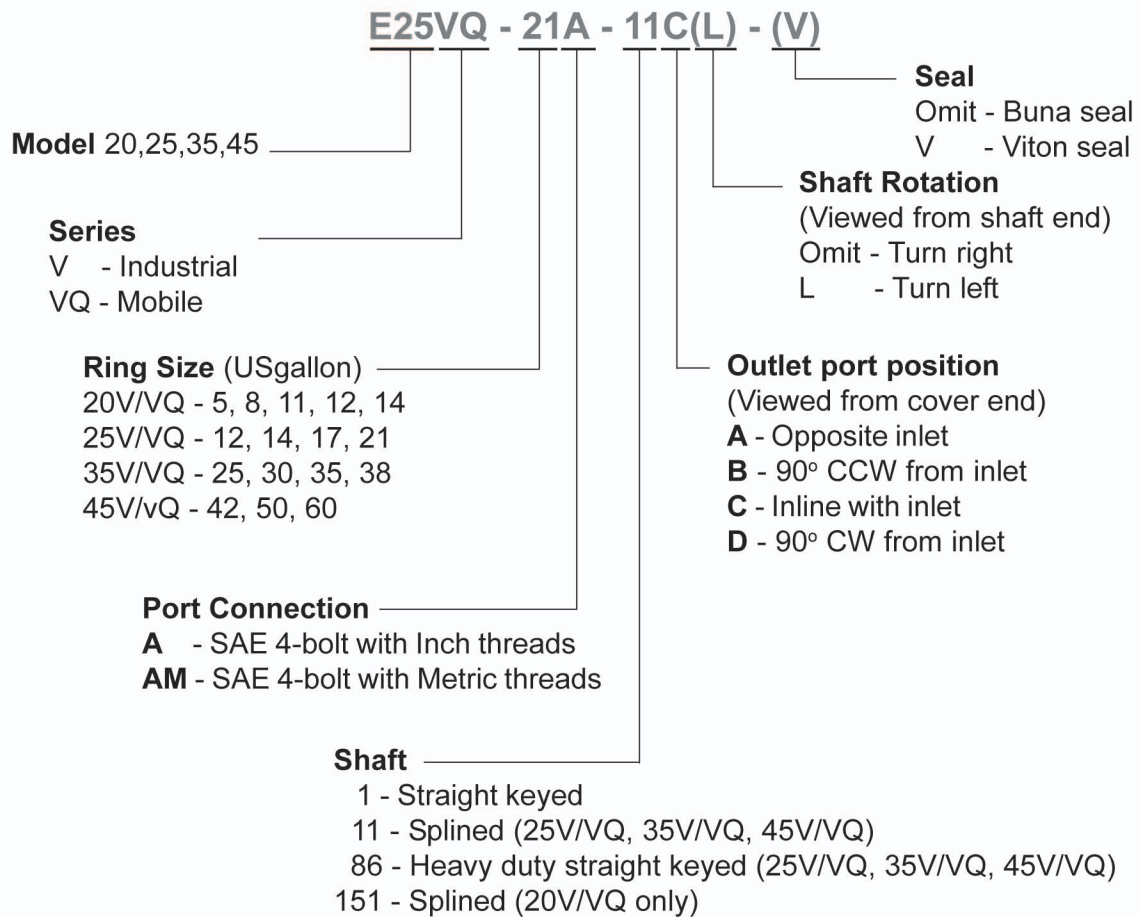
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FIXED DISPLACEMENT VANE PUMP SINGLE PUMP

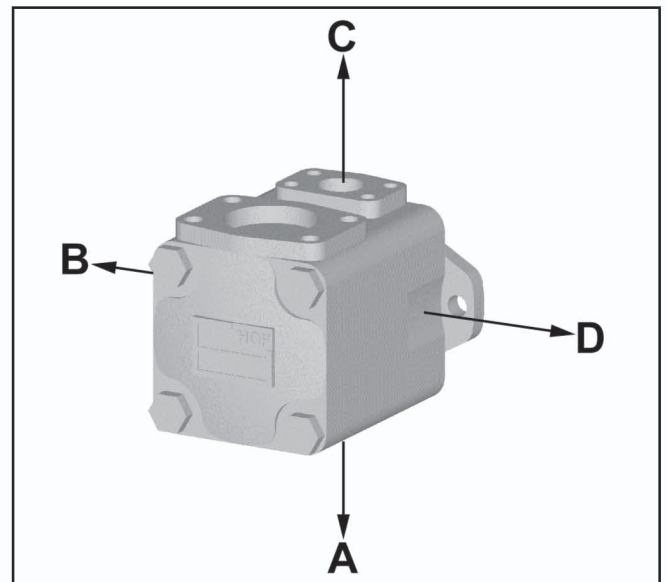


Ordering Code:

E 20V/45VQ



Port Positions for 20V/VQ



Port Positions for 25V/VQ, 35V/VQ, 45V/VQ

E 20V/45VQ

Specifications:

E V/VQ

E V/VQ

Model	Delivery at 1200 rpm & 7 bar (100 psi)	Displacement	Maximum Speed	Maximum Pressure	Typical Delivery at max speed & pressure	Typical Input Power at max speed & pressure	Weight
	USgpm	cm ³ /r (in ³ /r)	rpm	bar (psi)	L/min (USgpm)	kW (hp)	kg (lb)
20V	5	18 (1.10)	1800	206 (3000)	28.4 (7.5)	11.2 (15.0)	11.8 (26)
	8	27 (1.67)		206 (3000)	45.4 (12.0)	17.0 (22.8)	
	11	36 (2.22)		206 (3000)	56.8 (15.0)	22.6 (30.3)	
	12	40 (2.47)		158 (2300)	62.1 (16.4)	25.1 (33.7)	
	14	45 (2.78)		138 (2000)	69.6 (18.4)	28.3 (37.9)	
25V	12	39 (2.47)	1800	172 (2500)	62.1 (16.4)	22.9 (30.8)	14.5 (32)
	14	45 (2.78)			69.6 (18.4)	25.7 (34.5)	
	17	55 (3.39)			86.3 (22.8)	29.8 (40.0)	
	21	67 (4.13)			106.0 (28.0)	34.0 (45.6)	
35V	25	81 (4.94)	1800	172 (2500)	124.9 (33.0)	45.5 (61.0)	22.7 (50)
	30	97 (5.91)			154.4 (40.8)	54.5 (73.0)	
	35	112 (6.83)			181.7 (48.0)	61.5 (82.4)	
	38	121 (7.37)			193.8 (51.2)	65.9 (88.3)	
45V	42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	34.0 (75)
	50	162 (9.85)			253.6 (67.0)	87.3 (117.0)	
	60	193 (11.75)			310.4 (82.0)	103.7 (139.0)	

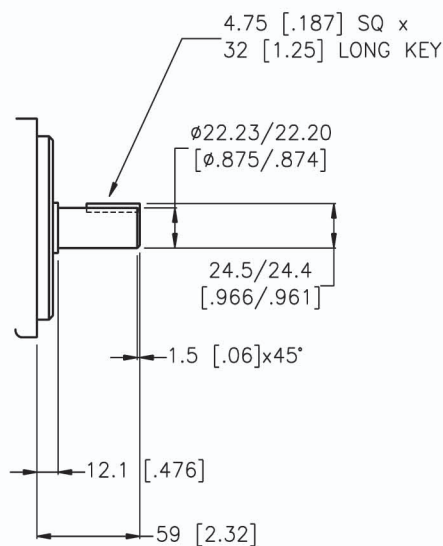
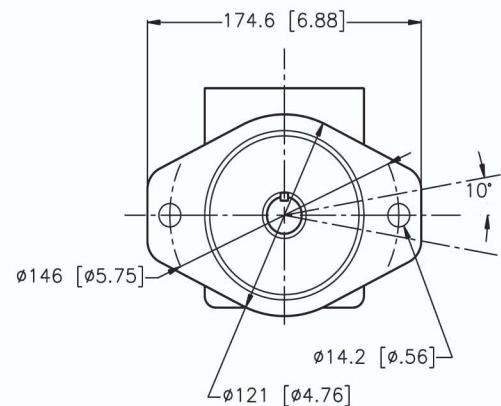
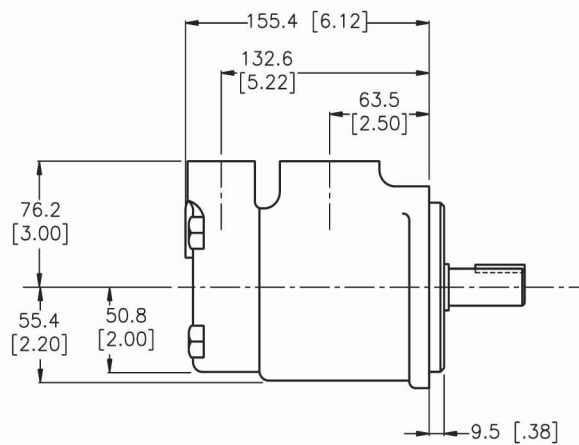
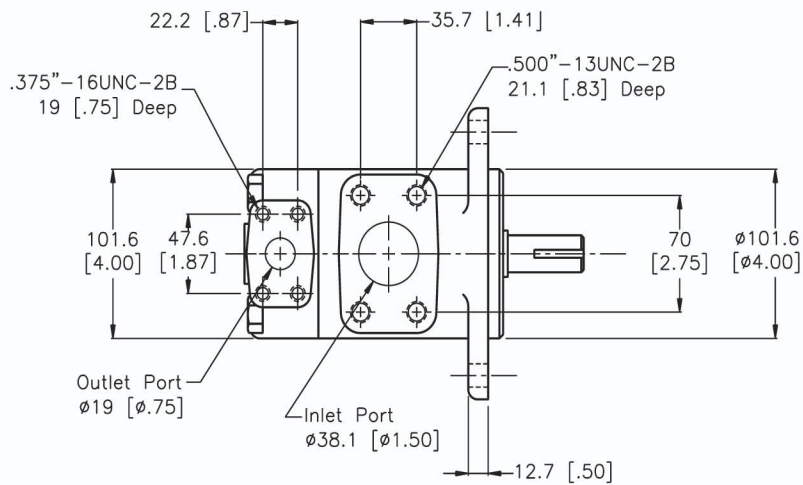
Model	Delivery at 1200 rpm & 7 bar (100 psi)	Displacement	Maximum Speed	Maximum Pressure	Typical Delivery at max speed & pressure	Typical Input Power at max speed & pressure	Weight
	USgpm	cm ³ /r (in ³ /r)	rpm	bar (psi)	L/min (USgpm)	kW (hp)	kg (lb)
20VQ	5	18 (1.10)	2700	206 (3000)	41.6 (11.0)	17.9 (24.0)	11.8 (26)
	8	27 (1.67)		206 (3000)	64.3 (17.0)	26.1 (35.0)	
	11	36 (2.22)		206 (3000)	87.1 (23.0)	35.4 (47.5)	
	12	39 (2.41)		158 (2300)	96.5 (25.5)	28.3 (38.0)	
	14	45 (2.80)		138 (2000)	113.6 (30.0)	29.1 (39.0)	
25VQ	12	40 (2.45)	2700	206 (3000)	87.1 (23.0)	41.0 (55.0)	14.5 (32)
	14	45 (2.77)	2700		102.2 (27.0)	46.6 (62.5)	
	17	55 (3.37)	2500		117.3 (31.0)	51.8 (69.5)	
	21	67 (4.12)	2500		143.8 (38.0)	61.9 (83.0)	
35VQ	25	81 (4.98)	2500	206 (3000)	170.3 (45.0)	75.3 (101.0)	22.7 (50)
	30	97 (5.96)	2500		208.2 (55.0)	87.7 (117.5)	
	35	112 (6.88)	2400		227.1 (60.0)	98.5 (132.0)	
	38	121 (7.42)	2400		246.0 (65.0)	104.4 (140.0)	
45VQ	42	138 (8.46)	2200	172 (2500)	251.7 (66.5)	91.4 (122.5)	34.0 (75)
	50	162 (9.90)			299.0 (79.0)	105.2 (141.0)	
	60	193 (11.80)			363.4 (96.0)	126.8 (170.0)	

FIXED DISPLACEMENT VANE PUMP SINGLE PUMP E 20V/VQ

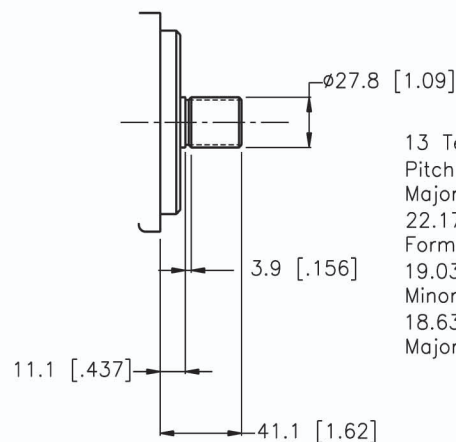


Installation Dimensions mm (inch):

E 20V/VQ



Shaft 1
Keyed Shaft



Shaft 151
Splined Shaft

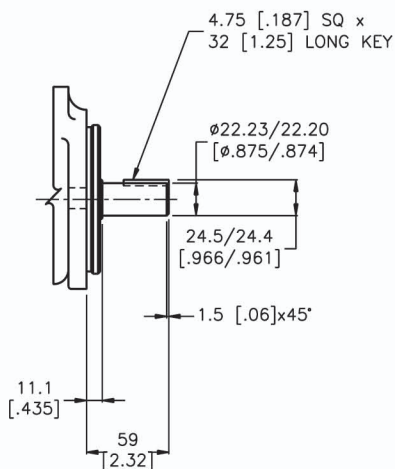
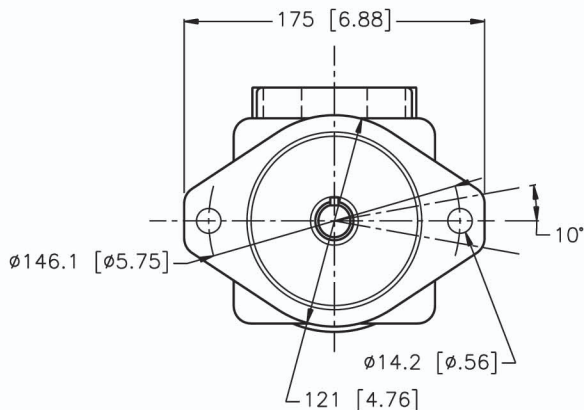
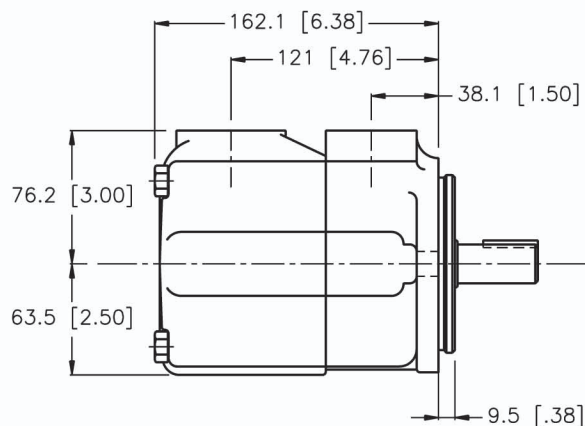
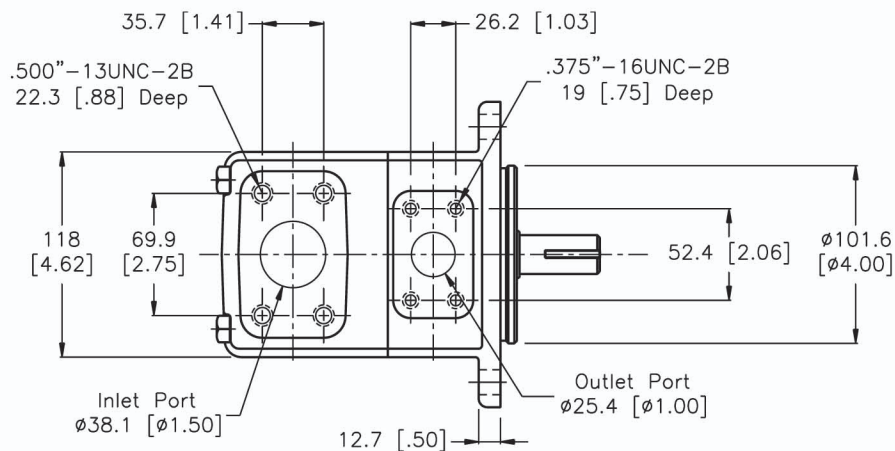
13 Teeth - 30° Press. Angle
Pitch 16/32
Major Diameter 22.17/22.15 [.873/.872]
Form Diameter 19.03 [.749]
Minor Diameter 18.63/18.35 [.734/.723]
Major Diameter Fit

E 20V/VQ

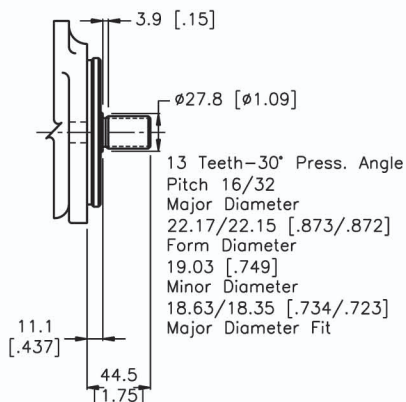
Installation Dimensions mm (inch):

E 25V/VQ

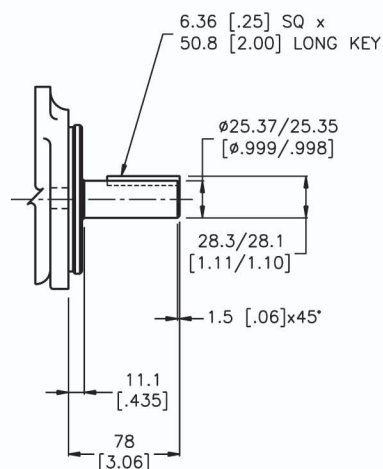
E 25V/VQ



Shaft 1
Keyed Shaft



Shaft 11
Splined Shaft



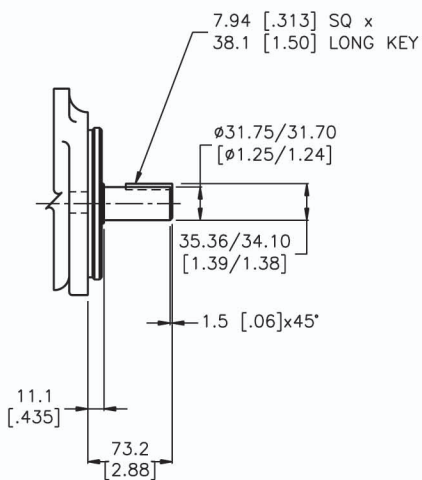
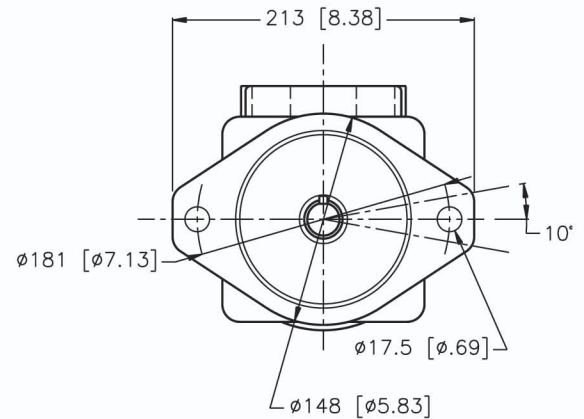
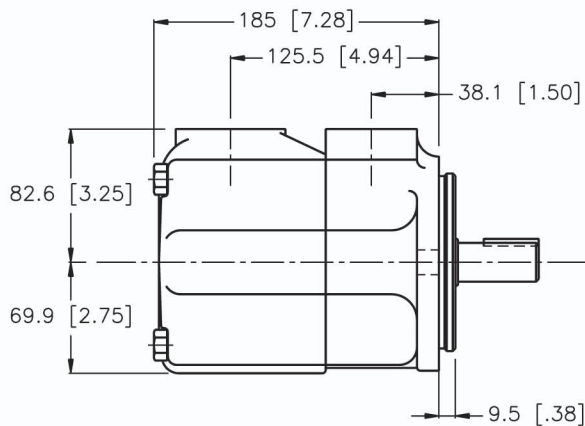
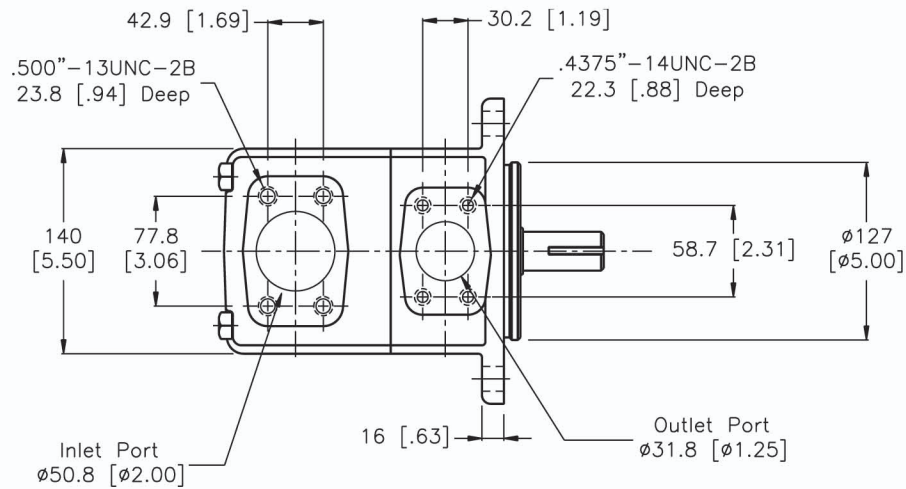
Shaft 86
Keyed Shaft

FIXED DISPLACEMENT VANE PUMP SINGLE PUMP E 35V/VQ

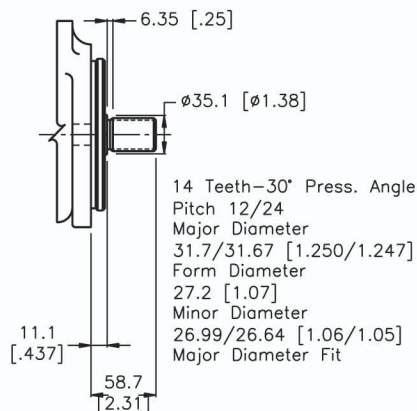


Installation Dimensions mm (inch):

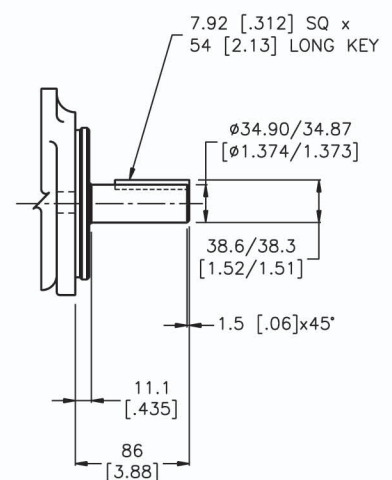
E 35V/VQ



Shaft 1
Keyed Shaft



Shaft 11
Splined Shaft



Shaft 86
Keyed Shaft

E 35V/VQ

Ordering Code:

E V10/V20

E V10/V20

EV20(F) - 1P11S - 1C(8)-(H)-(L)

Model V10, V20

Cover

Omit - Standard Cover
F - Flow Control Cover
P - Priority Valve Cover

Mounting

1 - 2-Bolt Flange

Inlet Port Connection

S - 1.3125"-12 Str. thd. (V10)
- 1.625"-12 Str. thd. (V20)
P - 1.00" NPT (V10)
- 1.25" NPT (V20)
B - 1.00" BSP (V10)
- 1.25" BSP (V20)
T - 1.1875"-12 Str. thd. (V10)

Delivery (USgpm at 1200 rpm)

V10 - 1, 2, 3, 4, 5, 6, 7
V20 - 6, 7, 8, 9, 11, 12, 13

Outlet Port Connection

V10 and V20

S - .750"-16 Str. thd. (V10)
- 1.0625"-12 Str. thd. (V20)
P - .500" NPT (V10)
- .750" NPT (V20)
B - .500" BSP (V10)
- .750" BSP (V20)

V10F, V10P, V20F, and V20P

S - .750"-16 Str. thd. for outlet and 1.0625"-12 Str. thd. for tank port (V20F)
P - .750"-16 Str. thd. for outlet and .500" NPT for tank port (V10F and V20F)
T - .750"-16 Str. thd. for outlet and tank port (V10F)
- .750"-16 Str. thd. for primary outlet and tank port and .875"-14 Str. thd. for secondary outlet (V20P)
K - .5625"-18 Str. thd. for primary outlet and tank port and .750"-16 Str. thd. for secondary outlet (V10P)

Shaft Rotation

(Viewed from shaft end)

Omit - Turn right
L - Turn left

Pressurer Setting for Flow control and Priority Valve Cover bar (psi)

A - 17 (250)	F - 103 (1500)
B - 34 (500)	G - 121 (1750)
C - 52 (750)	H - 138 (2000)
D - 69 (1000)	J - 155 (2250)
E - 86 (1250)	K - 172 (2500)

Flow rate Setting for Flow control and Priority Valve Cover L/min (USgpm)

2 - 7.6 (2)	6 - 22.7 (6)
3 - 11.4 (3)	7 - 26.5 (7)
4 - 15.2 (4)	8 - 30.3 (8)
5 - 19.0 (5)	

Outlet Port Position

(Viewed from cover end)

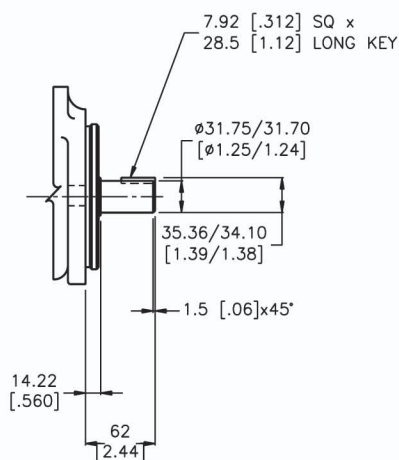
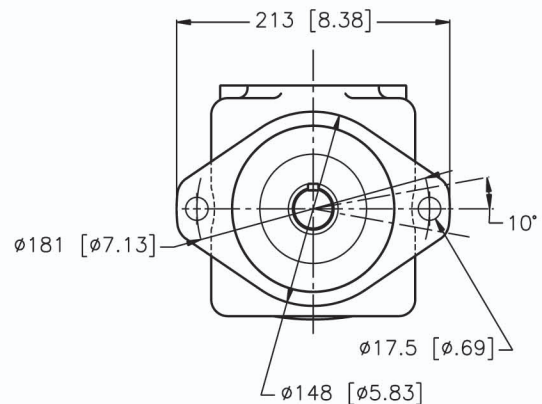
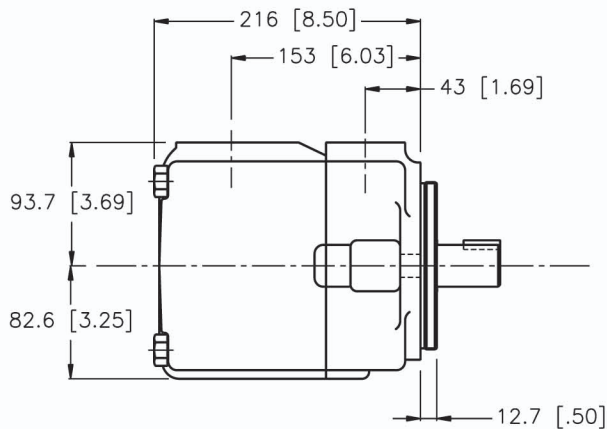
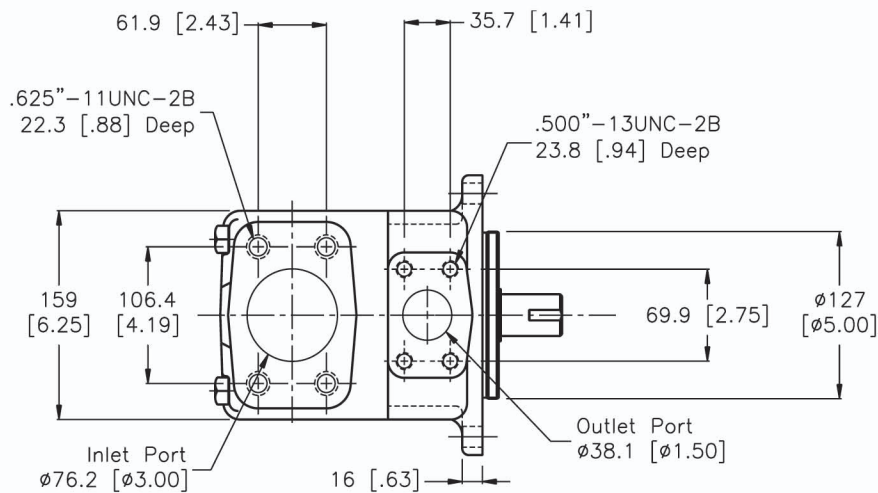
A - Opposite inlet
B - 90° CCW from inlet
C - Inline with inlet
D - 90° CW from inlet

Shaft

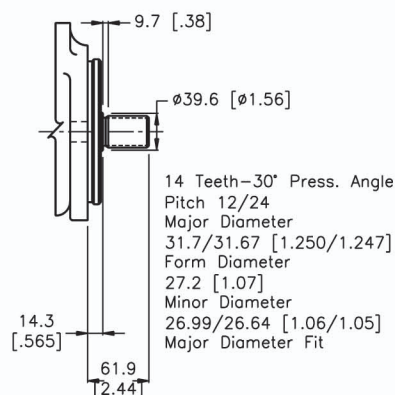
1 - Straight keyed
3 - Threaded with woodruff key
6 - Woodruff key stub (V20 only)
11 - Splined
12 - Splined (V10 only)
15 - Splined (V20 only)
38 - Splined

Installation Dimensions mm (inch):

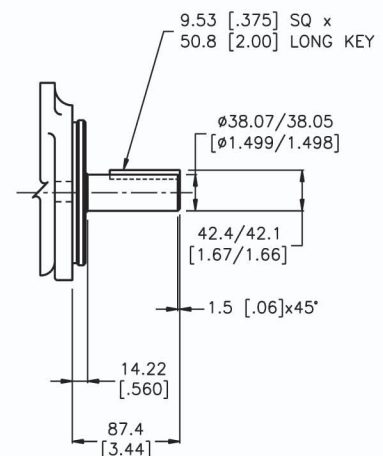
E 45V/VQ



Shaft 1
Keyed Shaft



Shaft 11
Splined Shaft



Shaft 86
Keyed Shaft

FIXED DISPLACEMENT VANE PUMP

DOUBLE PUMP



Ordering Code:

E 2520V/4535VQ

E2520VQ - 21 A 11 - 1 C B (L) - (V)

Model

2520, 3520, 4520
3525, 4525, 4535

Series

V - Industrial
VQ - Mobile

Shaft End Pump

Ring Size (USgallon)
25**V/VQ - 12, 14, 17, 21
35**V/VQ - 25, 30, 35, 38
45**V/VQ - 42, 50, 60

Port Connection

A - SAE 4-bolt with Inch threads
AM - SAE 4-bolt with Metric threads

Cover End Pump

Ring Size (USgallon)
**20V/VQ - 5, 8, 11, 12, 14
**25V/VQ - 12, 14, 17, 21
**35V/VQ - 25, 30, 35, 38

Shaft

1 - Straight keyed
11 - Splined
86 - Heavy duty straight keyed

Seal

Omit - Buna seal
V - Viton seal

Shaft Rotation

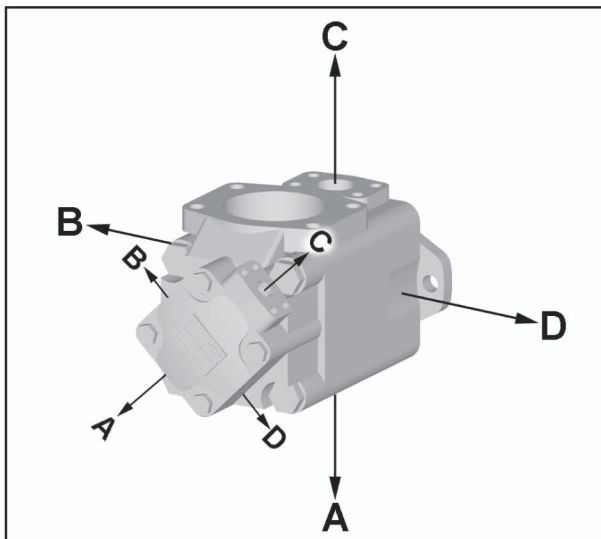
(Viewed from shaft end)
Omit - Turn right
L - Turn left

Cover End Outlet port position

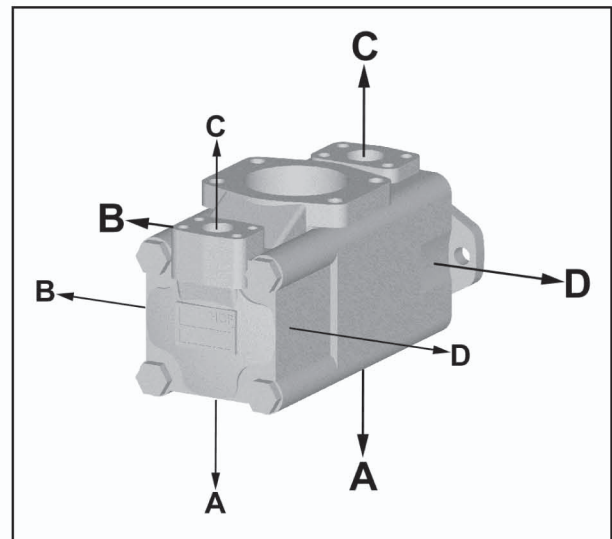
(Viewed from cover end)
For all models except 4535V/VQ
A - 135° CCW from inlet
B - 45° CCW from inlet
C - 45° CW from inlet
D - 135° CW from inlet
For 4535V/VQ
A - Opposite inlet
B - 90° CCW from inlet
C - Inline with inlet
D - 90° CW from inlet

Shaft End Outlet port position

(Viewed from cover end)
A - Opposite inlet
B - 90° CCW from inlet
C - Inline with inlet
D - 90° CW from inlet



Port Positions for 2520V/VQ, 3520V/VQ
4520V/VQ, 3525V/VQ, 4525V/VQ



Port Positions for 4535V/VQ

E 2520V/4535VQ

Specifications:

E 2520V/4535V

Model	Cartridge Position	Delivery at 1200 rpm & 7 bar (100 psi)	Displacement	Maximum Speed	Maximum Pressure	Typical Delivery at max speed & pressure	Typical Input Power at max speed & pressure	Weight
		USgpm	cm ³ /r (in ³ /r)	rpm	bar (psi)	L/min (USgpm)	kW (hp)	kg (lb)
2520V	Shaft End	12	39 (2.47)	1800	172 (2500)	62.1 (16.4)	22.9 (30.8)	20 (45)
		14	45 (2.78)			69.6 (18.4)	25.7 (34.5)	
		17	55 (3.39)			86.3 (22.8)	29.8 (40.0)	
		21	67 (4.13)			106.0 (28.0)	34.0 (45.6)	
	Cover End	5	18 (1.10)	1800	206 (3000)	28.4 (7.5)	11.2 (15.0)	
		8	27 (1.67)		206 (3000)	45.4 (12.0)	17.0 (22.8)	
		11	36 (2.22)		206 (3000)	56.8 (15.0)	22.6 (30.3)	
		12	40 (2.47)		158 (2300)	62.1 (16.4)	25.1 (33.7)	
		14	45 (2.78)		138 (2000)	69.6 (18.4)	28.3 (37.9)	
3520V	Shaft End	25	81 (4.94)	1800	172 (2500)	124.9 (33.0)	45.5 (61.0)	34 (75)
		30	97 (5.91)			154.4 (40.8)	54.5 (73.0)	
		35	112 (6.83)			181.7 (48.0)	61.5 (82.4)	
		38	121 (7.37)			193.8 (51.2)	65.9 (88.3)	
	Cover End	5	18 (1.10)	1800	206 (3000)	28.4 (7.5)	11.2 (15.0)	
		8	27 (1.67)		206 (3000)	45.4 (12.0)	17.0 (22.8)	
		11	36 (2.22)		206 (3000)	56.8 (15.0)	22.6 (30.3)	
		12	40 (2.47)		158 (2300)	62.1 (16.4)	25.1 (33.7)	
		14	45 (2.78)		138 (2000)	69.6 (18.4)	28.3 (37.9)	
3525V	Shaft End	25	81 (4.94)	1800	172 (2500)	124.9 (33.0)	45.5 (61.0)	34.5 (76)
		30	97 (5.91)			154.4 (40.8)	54.5 (73.0)	
		35	112 (6.83)			181.7 (48.0)	61.5 (82.4)	
		38	121 (7.37)			193.8 (51.2)	65.9 (88.3)	
	Cover End	12	39 (2.47)	1800	172 (2500)	62.1 (16.4)	22.9 (30.8)	
		14	45 (2.78)			69.6 (18.4)	25.7 (34.5)	
		17	55 (3.39)			86.3 (22.8)	29.8 (40.0)	
		21	67 (4.13)			106.0 (28.0)	34.0 (45.6)	
4520V	Shaft End	42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	43 (94)
		50	162 (9.85)			253.6 (67.0)	87.3 (117.0)	
		60	193 (11.75)			310.4 (82.0)	103.7 (139.0)	
	Cover End	5	18 (1.10)	1800	206 (3000)	28.4 (7.5)	11.2 (15.0)	
		8	27 (1.67)		206 (3000)	45.4 (12.0)	17.0 (22.8)	
		11	36 (2.22)		206 (3000)	56.8 (15.0)	22.6 (30.3)	
		12	40 (2.47)		158 (2300)	62.1 (16.4)	25.1 (33.7)	
		14	45 (2.78)		138 (2000)	69.6 (18.4)	28.3 (37.9)	
4525V	Shaft End	42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	46 (101)
		50	162 (9.85)			253.6 (67.0)	87.3 (117.0)	
		60	193 (11.75)			310.4 (82.0)	103.7 (139.0)	
	Cover End	12	39 (2.47)	1800	172 (2500)	62.1 (16.4)	22.9 (30.8)	
		14	45 (2.78)			69.6 (18.4)	25.7 (34.5)	
		17	55 (3.39)			86.3 (22.8)	29.8 (40.0)	
		21	67 (4.13)			106.0 (28.0)	34.0 (45.6)	
4535V	Shaft End	42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	54 (118)
		50	162 (9.85)			253.6 (67.0)	87.3 (117.0)	
		60	193 (11.75)			310.4 (82.0)	103.7 (139.0)	
	Cover End	25	81 (4.94)	1800	172 (2500)	124.9 (33.0)	45.5 (61.0)	
		30	97 (5.91)			154.4 (40.8)	54.5 (73.0)	
		35	112 (6.83)			181.7 (48.0)	61.5 (82.4)	
		38	121 (7.37)			193.8 (51.2)	65.9 (88.3)	

FIXED DISPLACEMENT VANE PUMP

DOUBLE PUMP E VQ SERIES



Specifications:

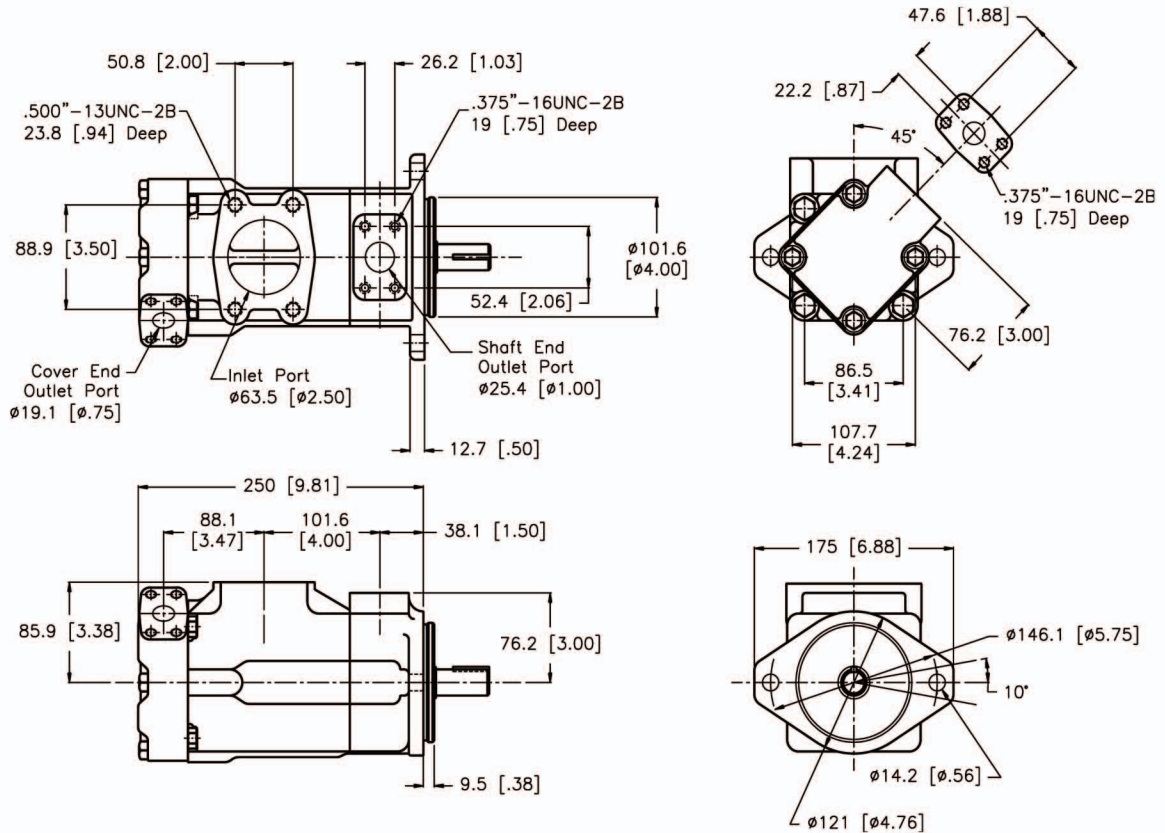
E 2520VQ/4535VQ

Model	Cartridge Position	Delivery at 1200 rpm & 7 bar (100 psi)	Displacement	Maximum Speed	Maximum Pressure	Typical Delivery at max speed & pressure	Typical Input Power at max speed & pressure	Weight
		USgpm	cm ³ /r (in ³ /r)	rpm	bar (psi)	L/min (USgpm)	kW (hp)	kg (lb)
2520VQ	Shaft End	12	40 (2.45)	2700	206 (3000)	87.1 (23.0)	41.0 (55.0)	20 (45)
		14	45 (2.77)	2700		102.2 (27.0)	46.6 (62.5)	
		17	55 (3.37)	2500		117.3 (31.0)	51.8 (69.5)	
		21	67 (4.12)	2500		143.8 (38.0)	61.9 (83.0)	
	Cover End	5	18 (1.10)	2700	206 (3000)	41.6 (11.0)	17.9 (24.0)	
		8	27 (1.67)		206 (3000)	64.3 (17.0)	26.1 (35.0)	
		11	36 (2.22)		206 (3000)	87.1 (23.0)	35.4 (47.5)	
		12	39 (2.41)		158 (2300)	96.5 (25.5)	28.3 (38.0)	
3520VQ	Shaft End	25	81 (4.98)	2500	206 (3000)	170.3 (45.0)	75.3 (101.0)	34 (75)
		30	97 (5.96)	2500		208.2 (55.0)	87.7 (117.5)	
		35	112 (6.88)	2400		227.1 (60.0)	98.5 (132.0)	
		38	121 (7.42)	2400		246.0 (65.0)	104.4 (140.0)	
	Cover End	5	18 (1.10)	2500	206 (3000)	37.9 (10.0)	16.4 (22.0)	
		8	27 (1.67)		206 (3000)	60.6 (16.0)	24.2 (32.5)	
		11	36 (2.22)		206 (3000)	79.5 (21.0)	32.8 (44.0)	
		12	39 (2.41)		158 (2300)	88.9 (23.5)	26.1 (35.0)	
3525VQ	Shaft End	25	81 (4.98)	2500	206 (3000)	170.3 (45.0)	75.3 (101.0)	34.5 (76)
		30	97 (5.96)	2500		208.2 (55.0)	87.7 (117.5)	
		35	112 (6.88)	2400		227.1 (60.0)	98.5 (132.0)	
		38	121 (7.42)	2400		246.0 (65.0)	104.4 (140.0)	
	Cover End	12	40 (2.45)	2500	206 (3000)	79.5 (21.0)	38.0 (51.0)	
		14	45 (2.77)			90.8 (24.0)	43.3 (58.0)	
		17	55 (3.37)			117.3 (31.0)	51.5 (69.0)	
		21	67 (4.12)			143.8 (38.0)	61.9 (83.0)	
4520VQ	Shaft End	42	138 (8.46)	2200	172 (2500)	251.7 (66.5)	91.4 (122.5)	43 (94)
		50	162 (9.90)			299.0 (79.0)	105.2 (141.0)	
		60	193 (11.80)			363.4 (96.0)	126.8 (170.0)	
	Cover End	5	18 (1.10)	2200	206 (3000)	32.2 (8.5)	14.5 (19.5)	
		8	27 (1.67)		206 (3000)	51.1 (13.5)	21.3 (28.5)	
		11	36 (2.22)		206 (3000)	68.1 (18.0)	28.7 (38.5)	
		12	39 (2.41)		158 (2300)	77.6 (20.5)	23.1 (31.0)	
		14	45 (2.80)		138 (2000)	90.8 (24.0)	23.9 (32.0)	
4525VQ	Shaft End	42	138 (8.46)	2200	172 (2500)	251.7 (66.5)	91.4 (122.5)	46 (101)
		50	162 (9.90)			299.0 (79.0)	105.2 (141.0)	
		60	193 (11.80)			363.4 (96.0)	126.8 (170.0)	
	Cover End	12	40 (2.45)	2200	206 (3000)	68.1 (18.0)	32.8 (44.0)	
		14	45 (2.77)			79.5 (21.0)	38.0 (51.0)	
		17	55 (3.37)			100.3 (26.5)	45.5 (61.0)	
		21	67 (4.12)			124.9 (33.0)	54.5 (73.0)	
4535VQ	Shaft End	42	138 (8.46)	2200	172 (2500)	251.7 (66.5)	91.4 (122.5)	54 (118)
		50	162 (9.90)			299.0 (79.0)	105.2 (141.0)	
		60	193 (11.80)			363.4 (96.0)	126.8 (170.0)	
	Cover End	25	81 (4.98)	2200	206 (3000)	145.7 (38.5)	66.4 (89.0)	
		30	97 (5.96)			177.9 (47.0)	77.6 (104.0)	
		35	112 (6.88)			208.2 (55.0)	89.5 (120.0)	
		38	121 (7.42)			223.3 (59.0)	97.0 (130.0)	

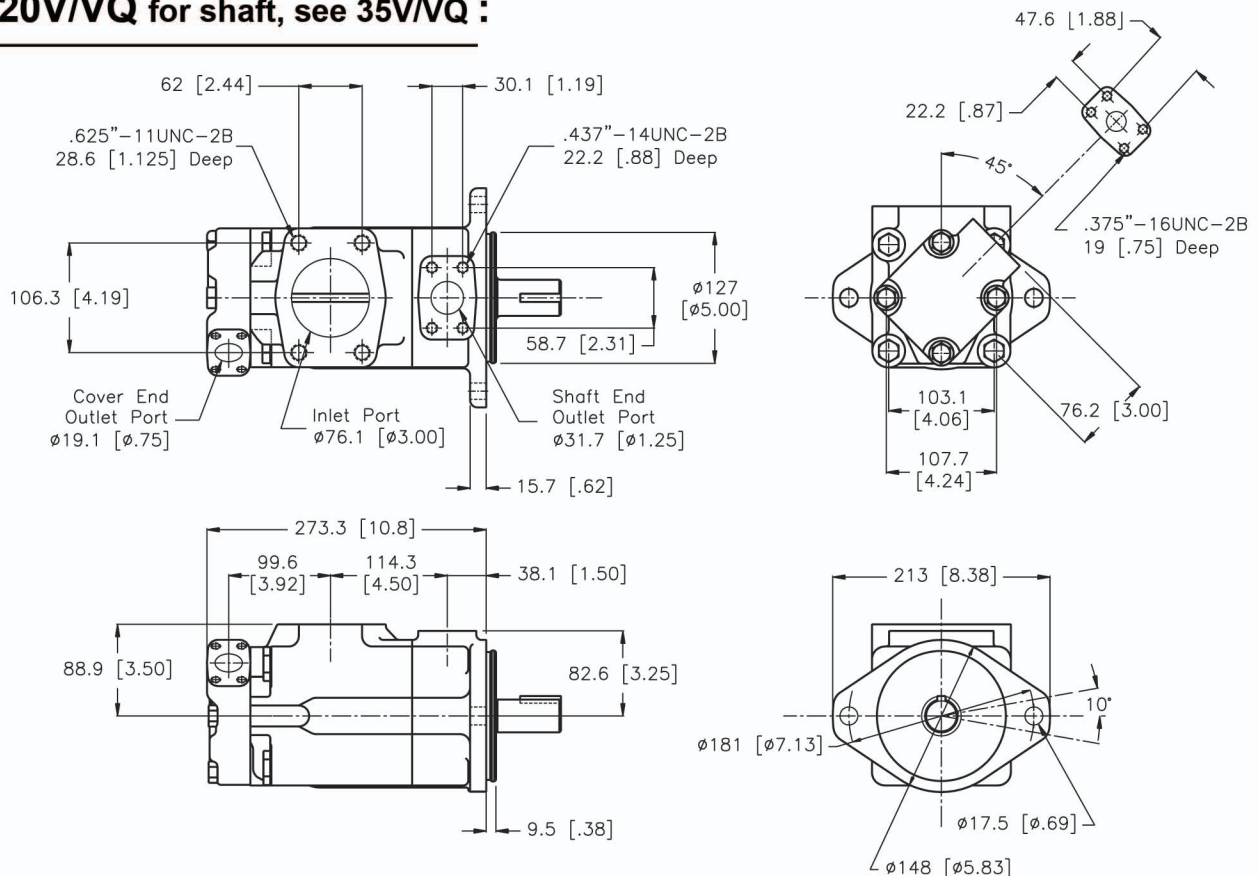
E 2520VQ/4535VQ

Installation Dimensions mm (inch) for shaft, see E 25V/VQ: E 2520V/VQ

E2520,3520V/VQ



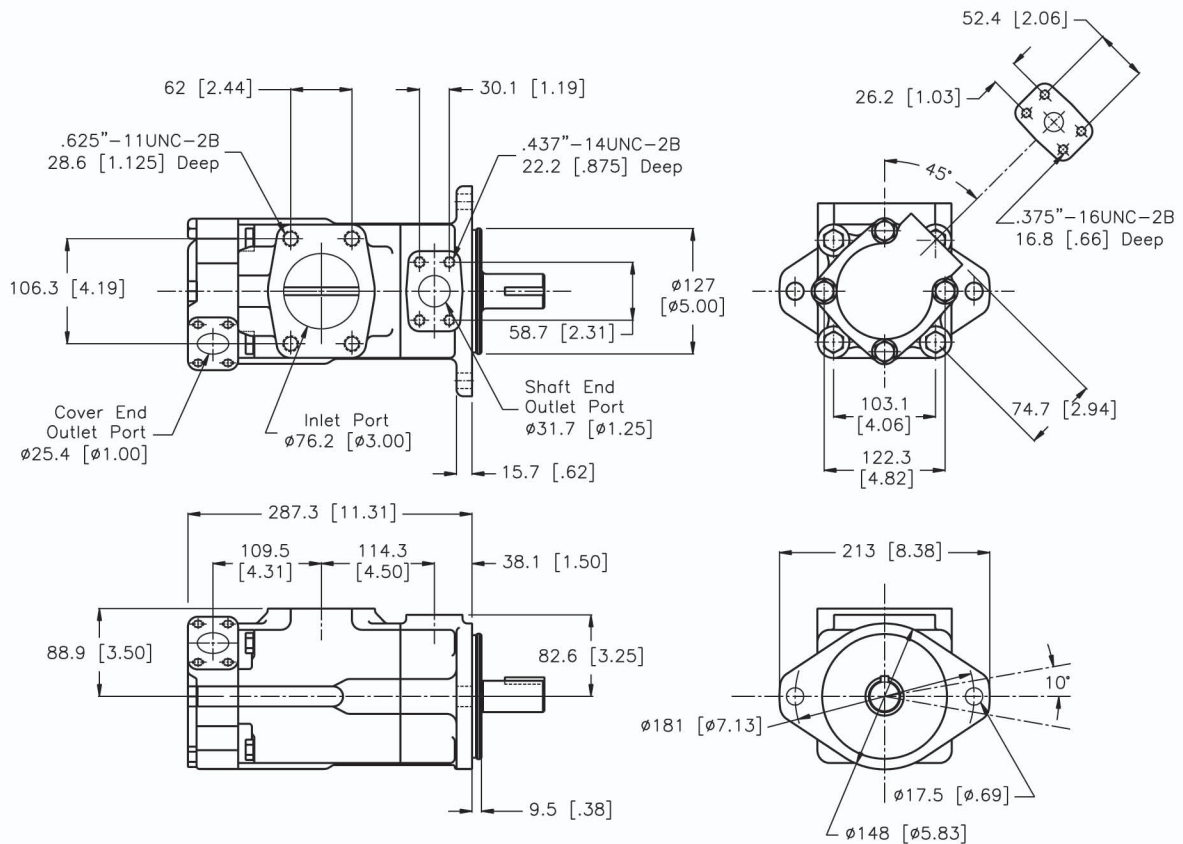
E 3520V/VQ for shaft, see 35V/VQ :



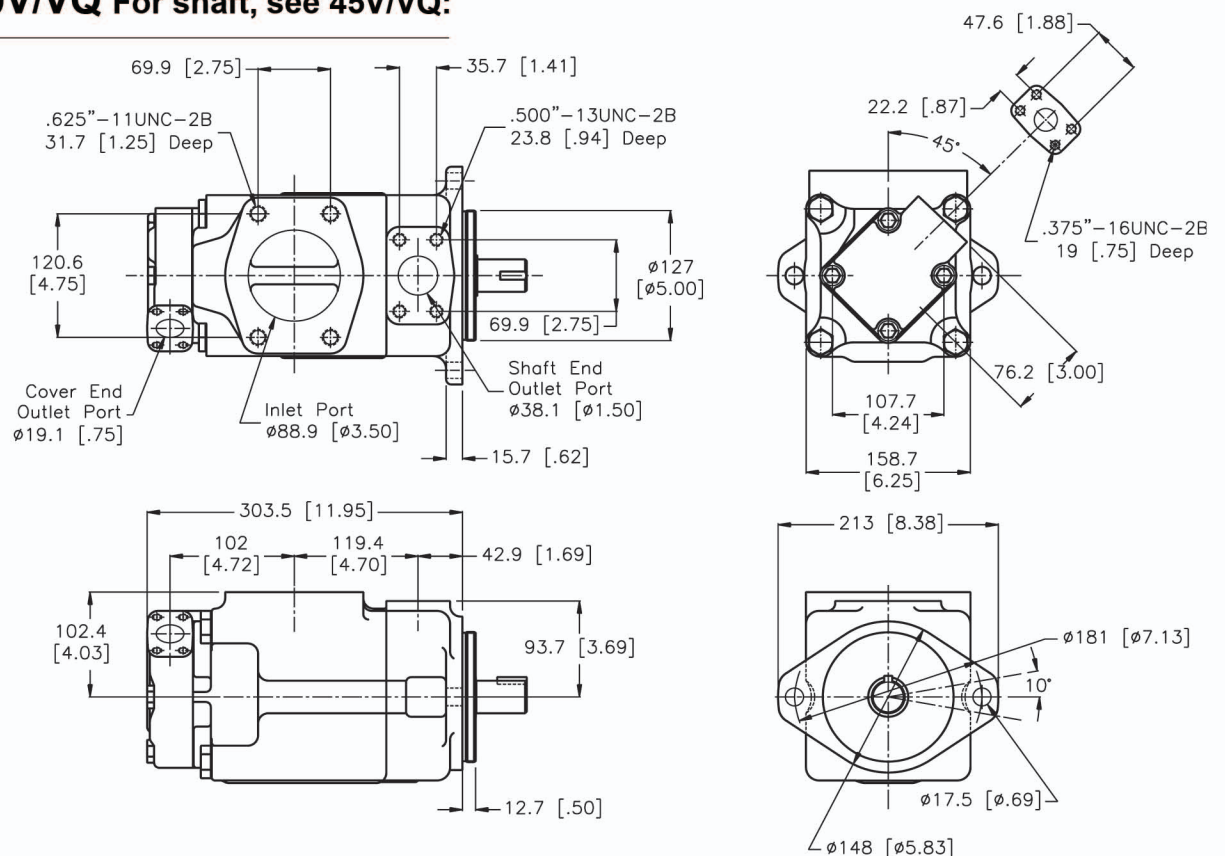
FIXED DISPLACEMENT VANE PUMP DOUBLE PUMP

EQUUS

Installation Dimensions mm (inch) for shaft, see E 35V/VQ: E 3525V/VQ

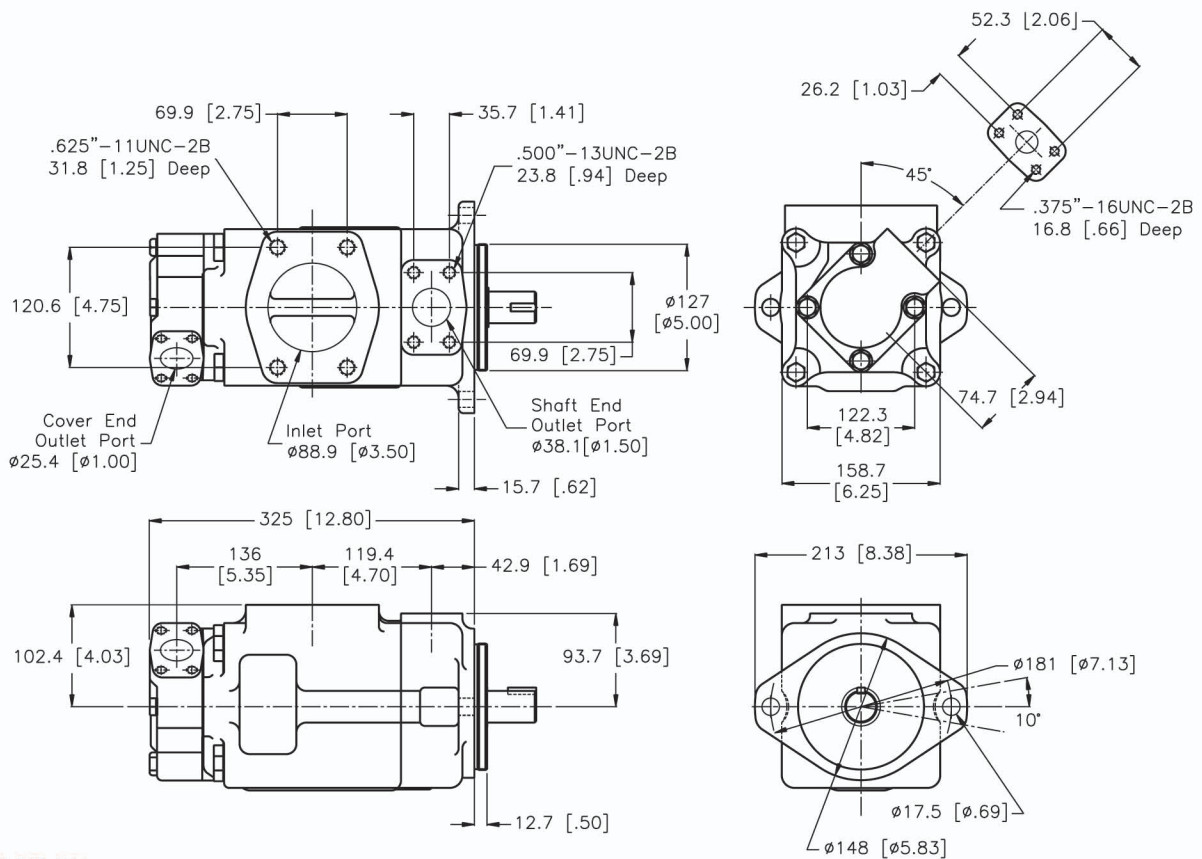


E 4520V/VQ For shaft, see 45V/VQ:

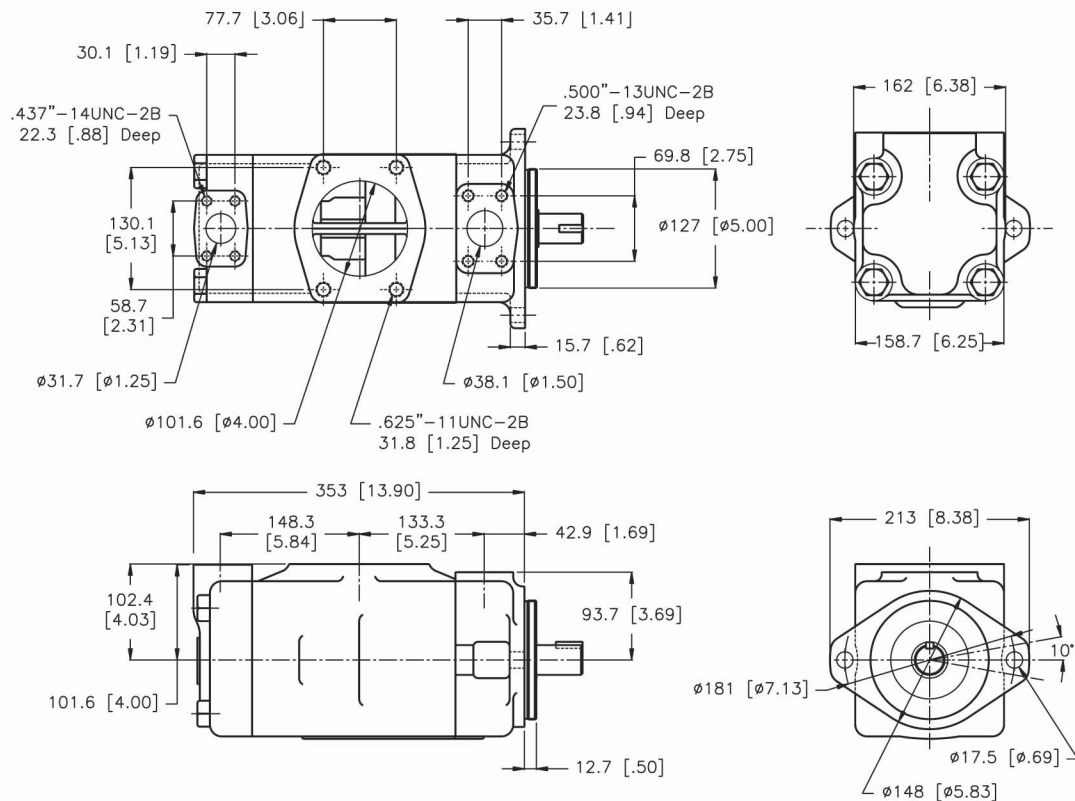


E 3525, 4520V/VQ

Installation Dimensions mm (inch) for shaft, see E 45V/VQ: E 4525V/VQ



E 4535V/VQ for shaft, see 45V/VQ :



FIXED DISPLACEMENT VANE PUMP E 20V, COVER END OF E 20V

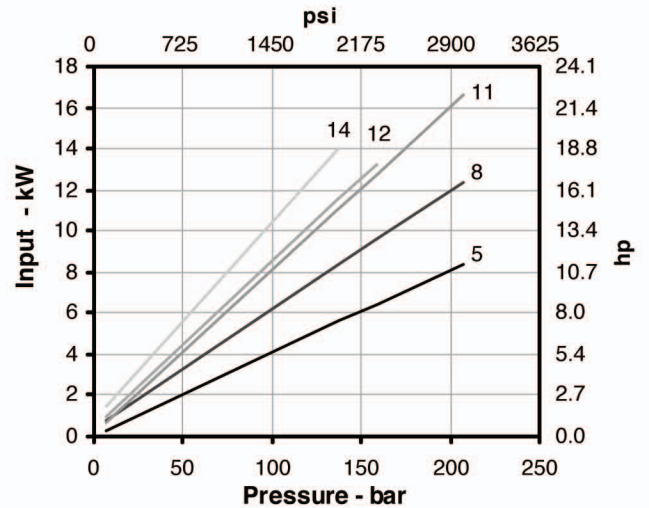
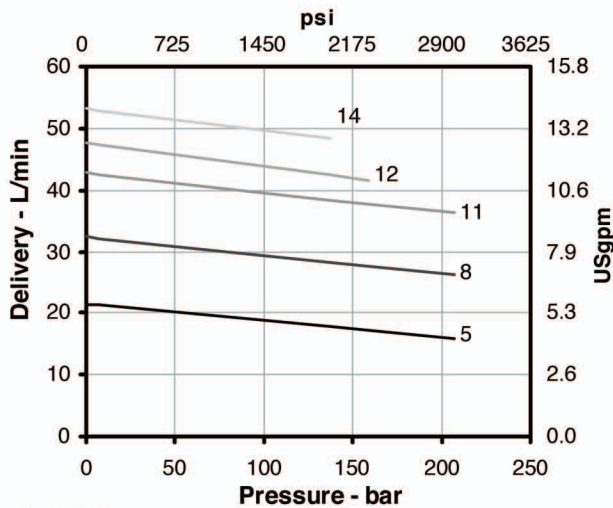


Performance Characteristics:

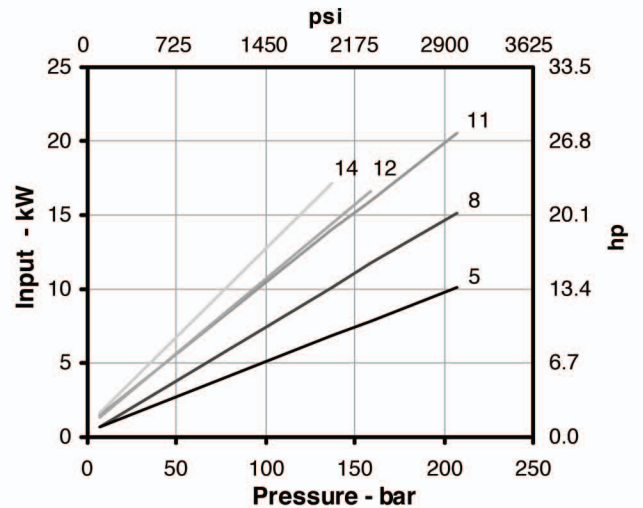
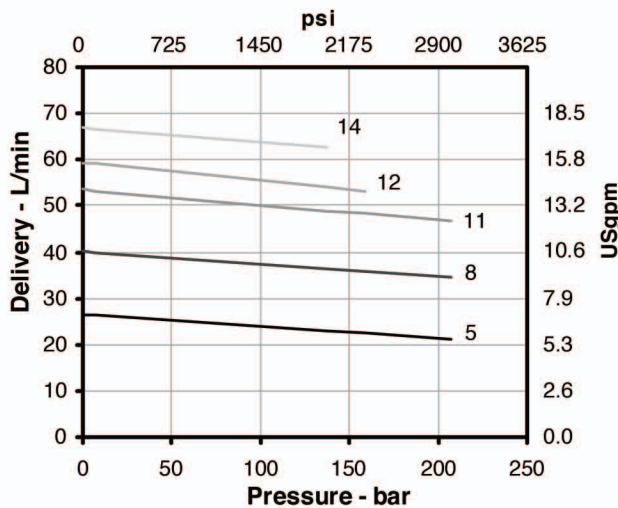
E 20V

Based on SAE 10W Fluid at 50 °C (120 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

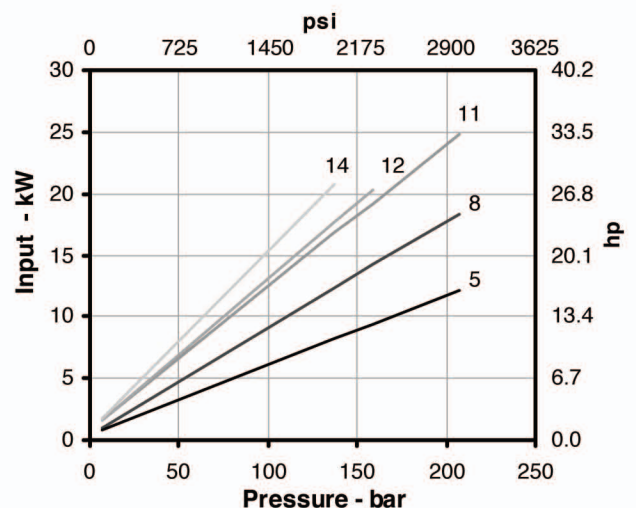
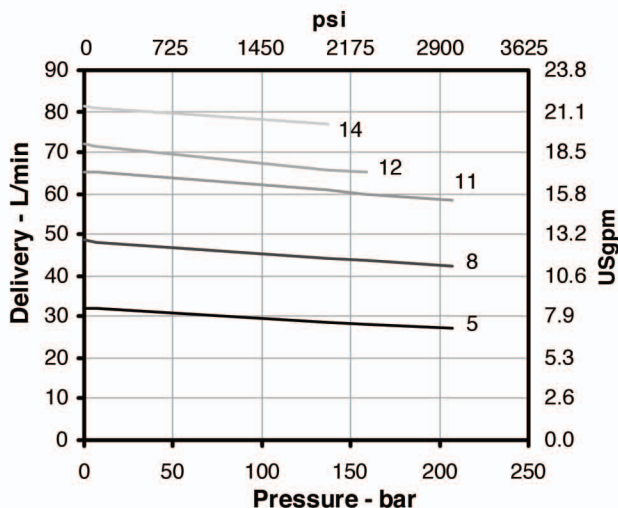
At 1200 rpm



At 1500 rpm



At 1800 rpm



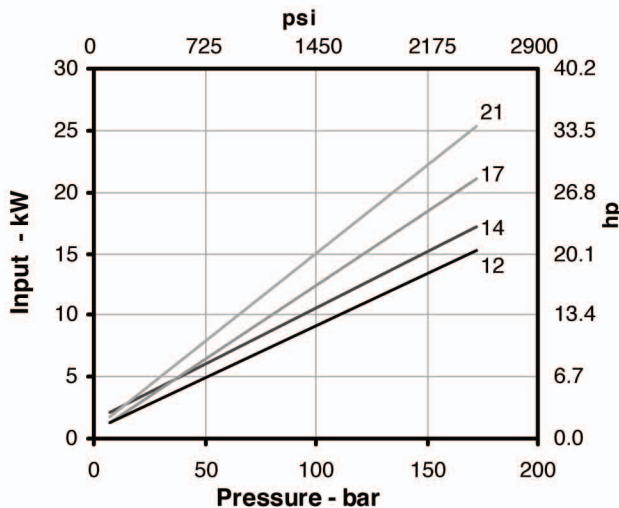
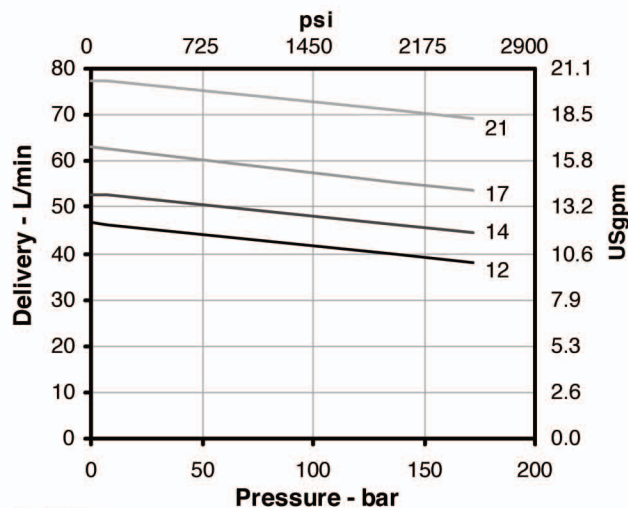
E 20V

Performance Characteristics:

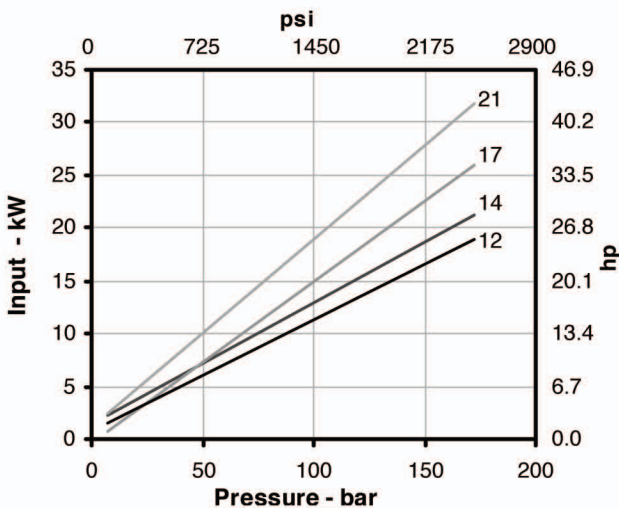
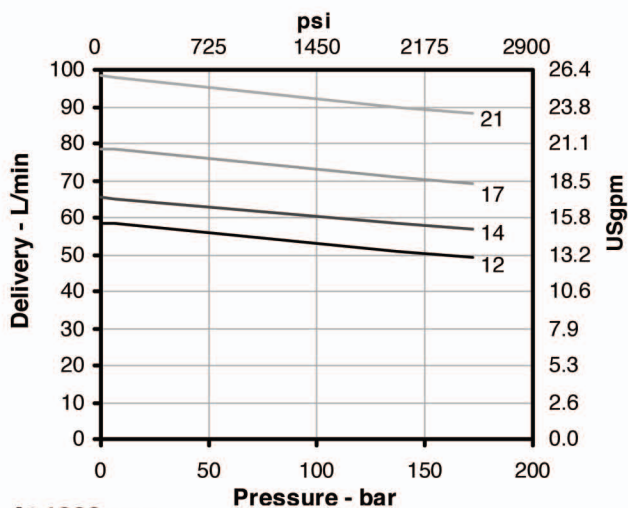
E 25V

Based on SAE 10W Fluid at 50 °C (120 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

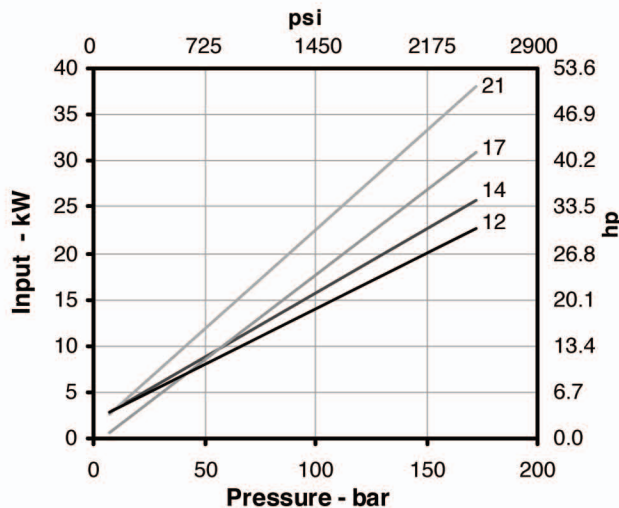
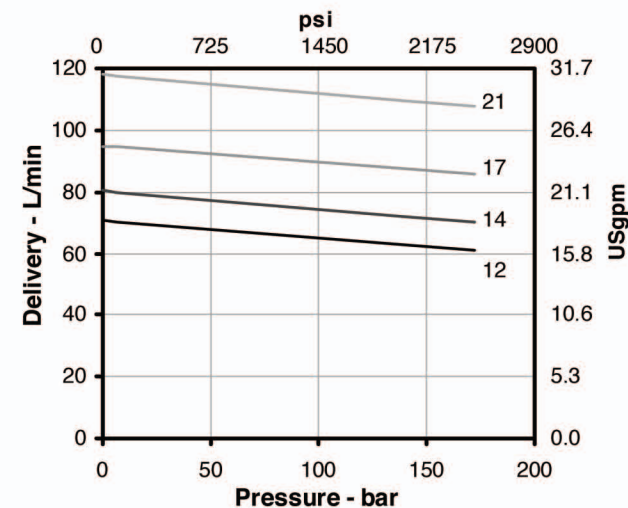
At 1200 rpm



At 1500 rpm



At 1800 rpm



FIXED DISPLACEMENT VANE PUMP

E 35V, SHAFT END OF E 35V, COVER END OF E 35V

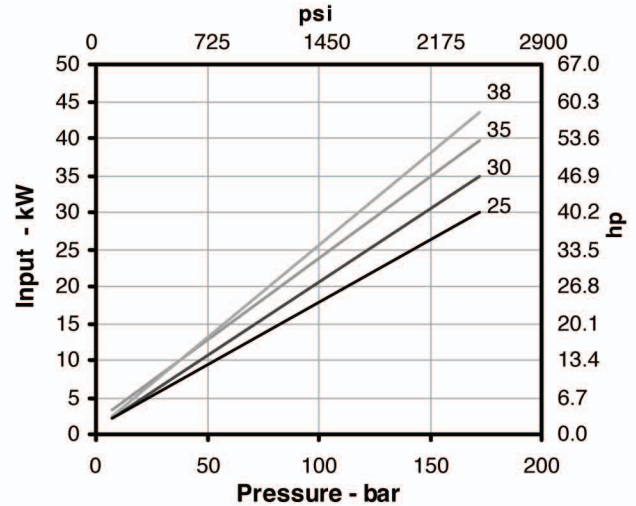
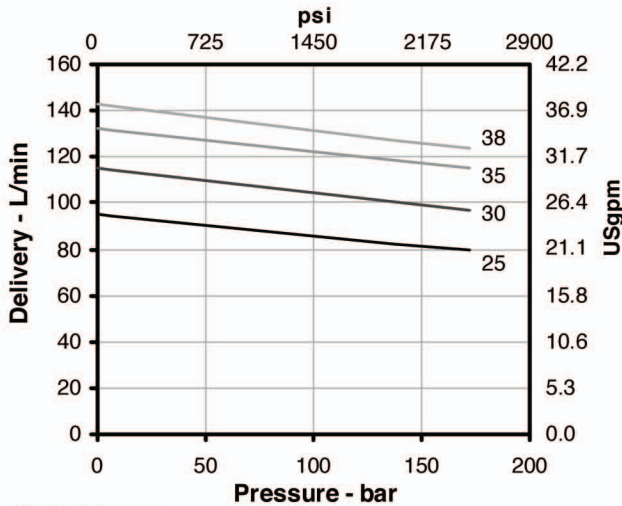


Performance Characteristics:

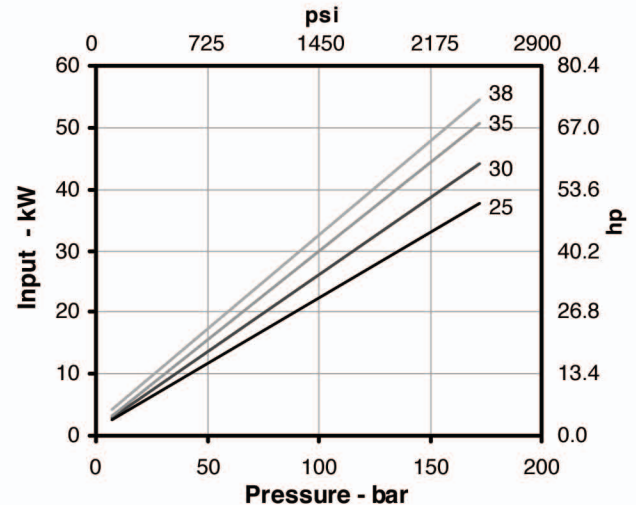
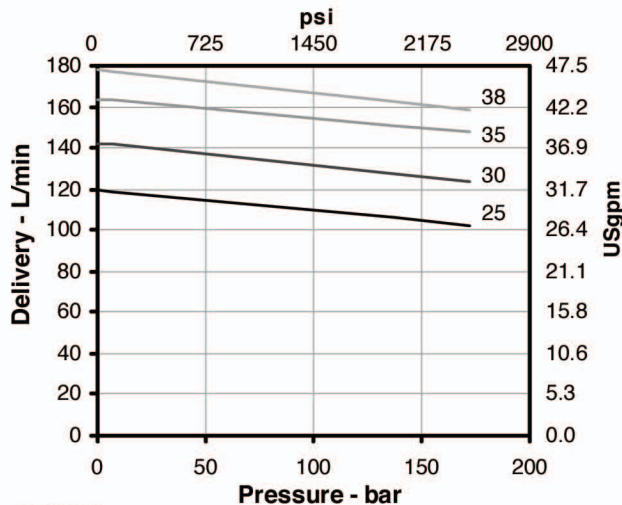
E 35V

Based on SAE 10W Fluid at 50 °C (120 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

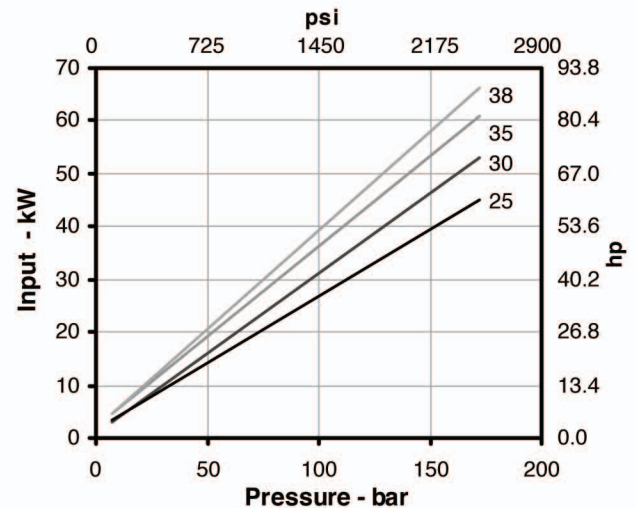
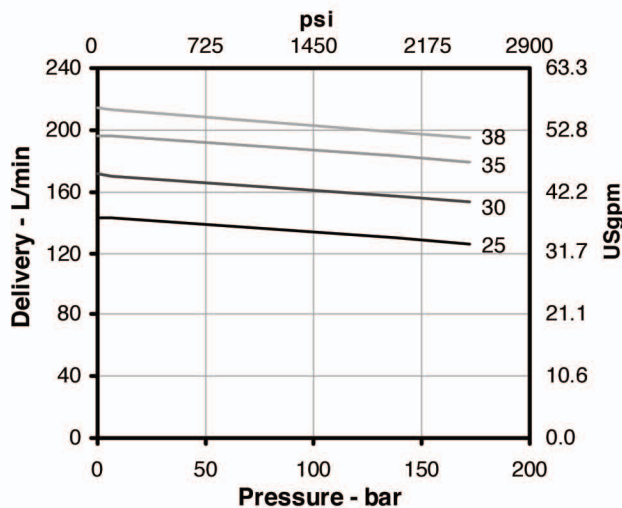
At 1200 rpm



At 1500 rpm



At 1800 rpm



E 35V

FIXED DISPLACEMENT VANE PUMP

SINGLE PUMP



Specifications :

E V10,V10F,V10P,V20,V20F,V20P

Model Series	Ring Size Delivery at 1200 r/min & 7 bar (100 psi) USgpm	Geometric Displacement cm ³ /r (in ³ /r)	Delivery at 1500 r/min & 7 bar (100 psi) L/min (USgpm)	Maximum Pressure bar (psi)	Maximum Speed rpm	Minimum Speed rpm	Weight kg (lb)
V10 V10F V10P	1	3.3 (0.20)	4.70 (1.25)	172 (2500)	4800	650	4.5 - 6.8 (10 - 15)
	2	6.6 (0.40)	9.40 (2.50)	172 (2500)	4500	650	
	3	9.8 (0.60)	14.20 (3.75)	172 (2500)	4000	650	
	4	13.1 (0.80)	18.90 (5.00)	172 (2500)	3400	650	
	5	16.4 (1.00)	23.60 (6.25)	172 (2500)	3200	650	
	6	19.5 (1.19)	28.40 (7.50)	152 (2200)	3000	650	
	7	22.8 (1.39)	33.10 (8.75)	138 (2000)	2800	650	
V20 V20F V20P	6	19.5 (1.19)	28.39 (7.50)	172 (2500)	3400	650	7.3 - 8.2 (16 - 18)
	7	22.8 (1.39)	33.11 (8.75)	172 (2500)	3000	650	
	8	26.5 (1.62)	37.85 (10.00)	172 (2500)	2800	650	
	9	29.7 (1.81)	42.57 (11.25)	172 (2500)	2800	650	
	11	36.4 (2.22)	52.04 (13.75)	172 (2500)	2500	650	
	12	39.0 (2.38)	56.77 (15.00)	152 (2200)	2400	650	
	13	42.4 (2.59)	61.50 (16.25)	152 (2200)	2400	650	

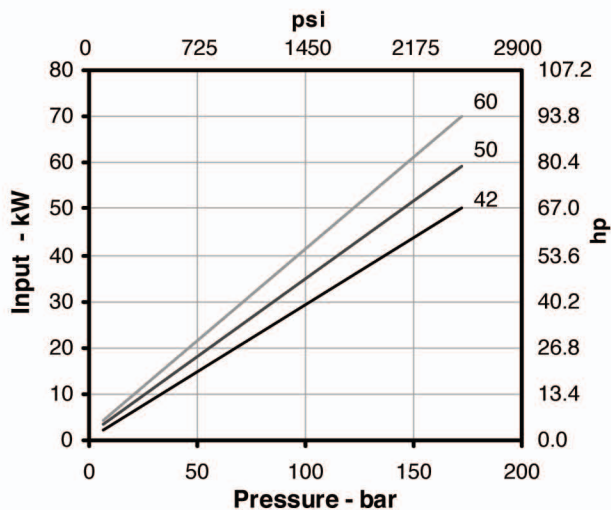
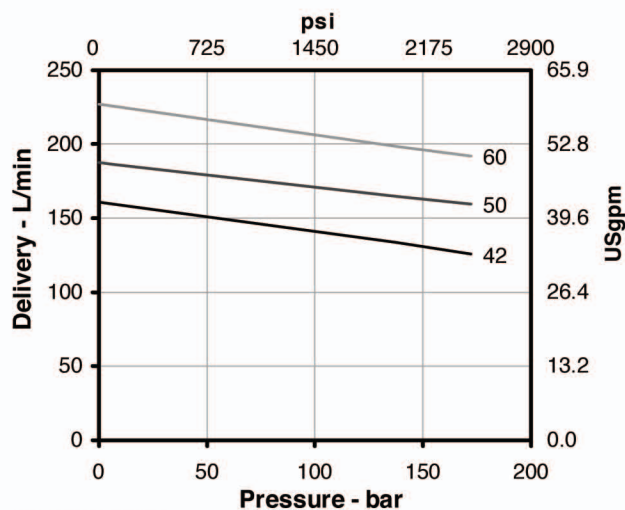
E V10/V20

Performance Characteristics:

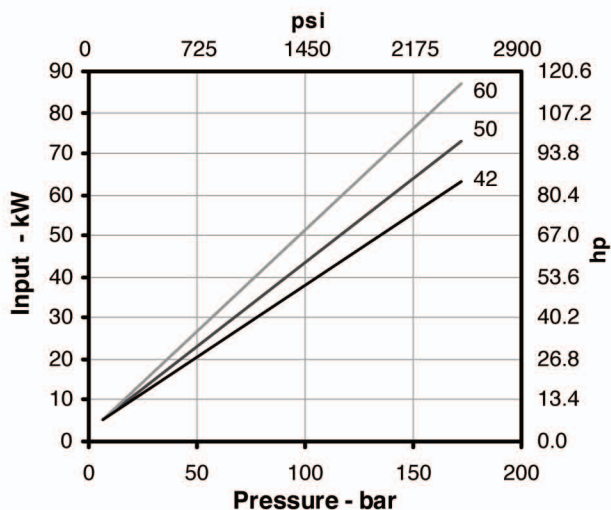
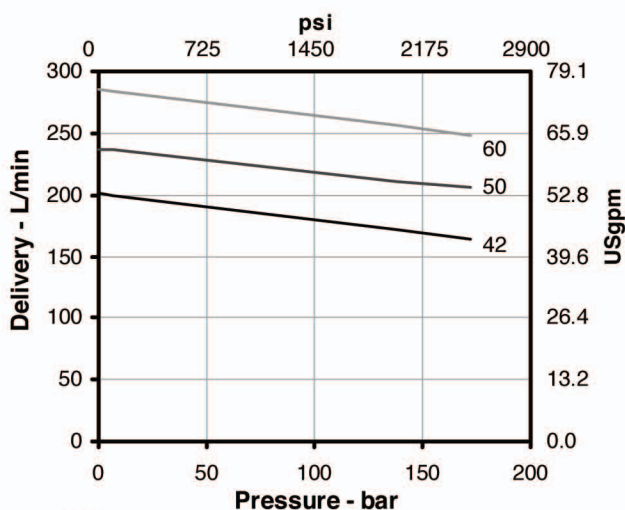
E 45V

Based on SAE 10W Fluid at 50 °C (120 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

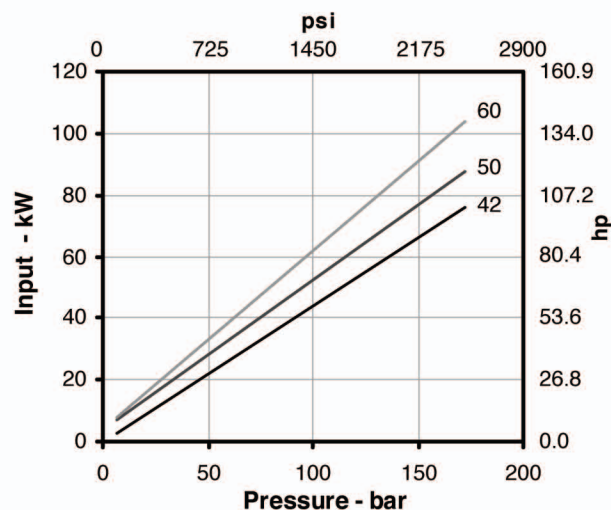
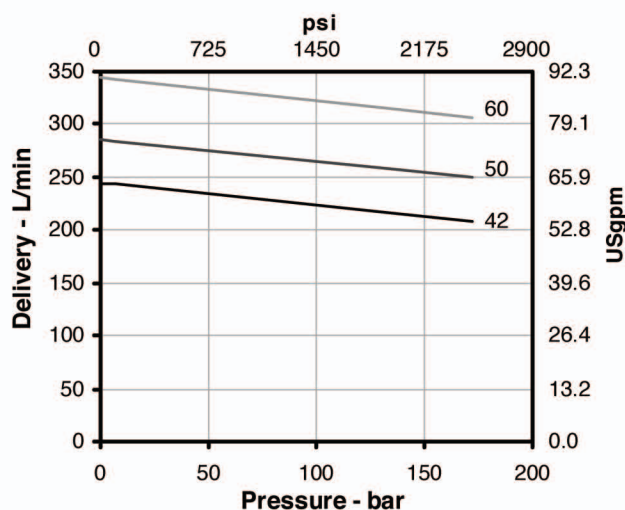
At 1200 rpm



At 1500 rpm



At 1800 rpm



FIXED DISPLACEMENT VANE PUMP E 20VQ, COVER END OF E 20VQ

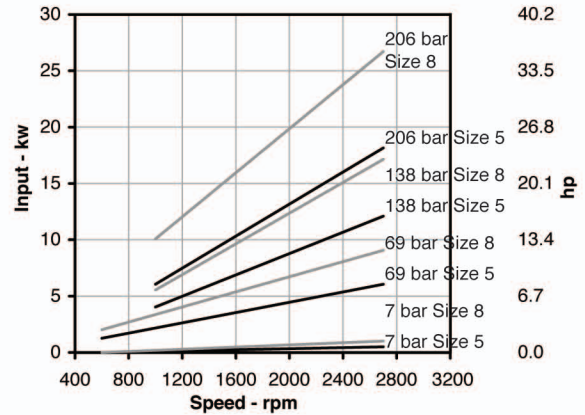
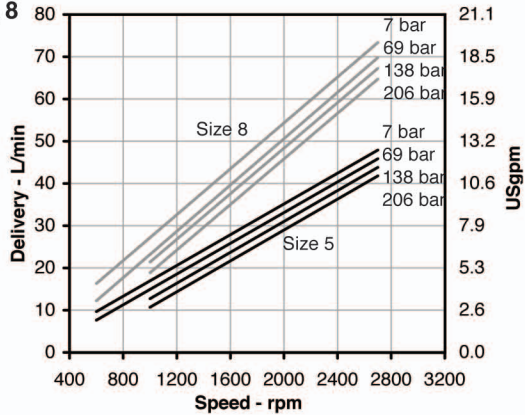


Performance Characteristics:

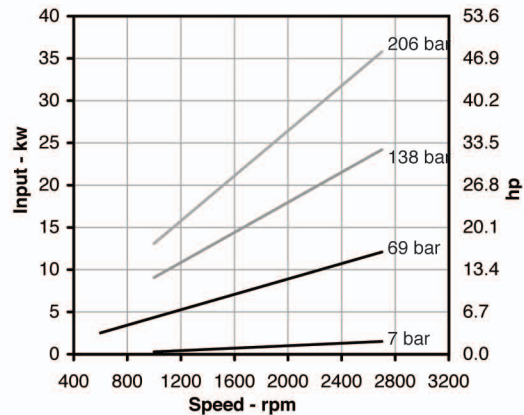
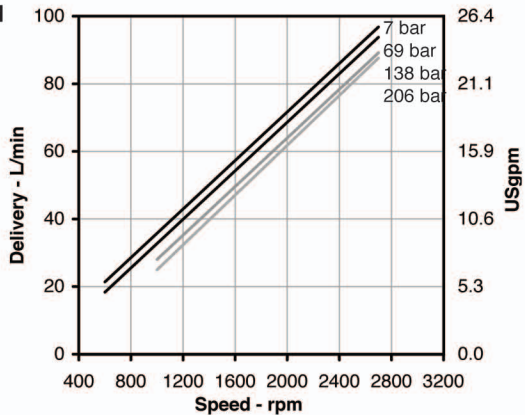
E 20VQ

Based on SAE 10W Fluid at 82 °C (180 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

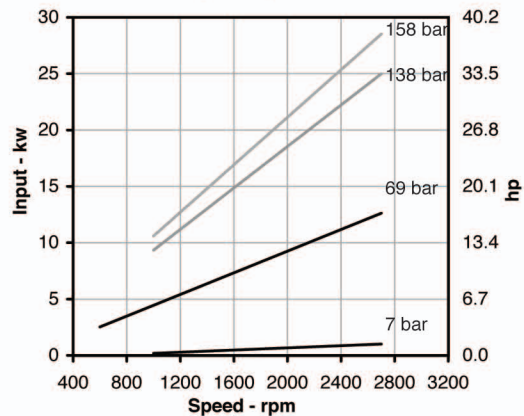
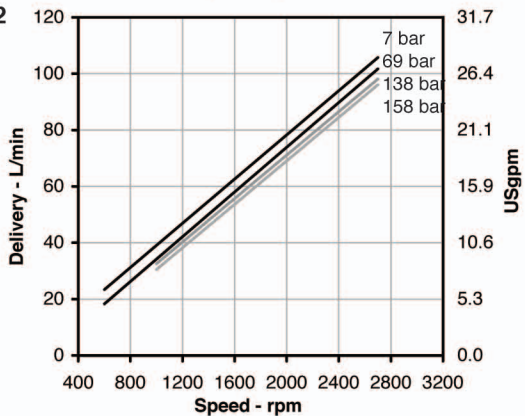
Size 5, 8



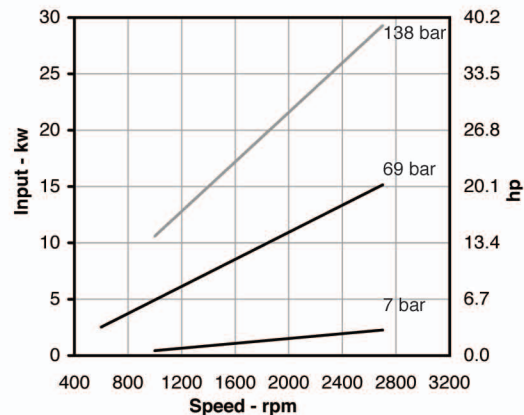
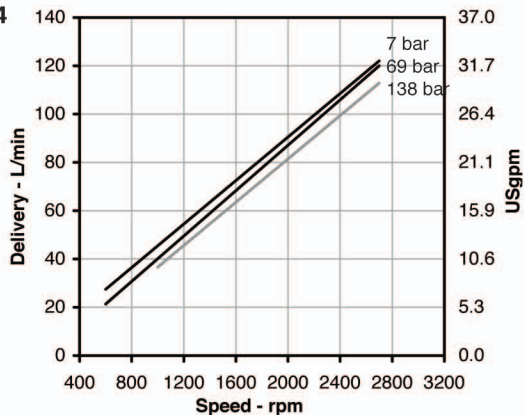
Size 11



Size 12



Size 14



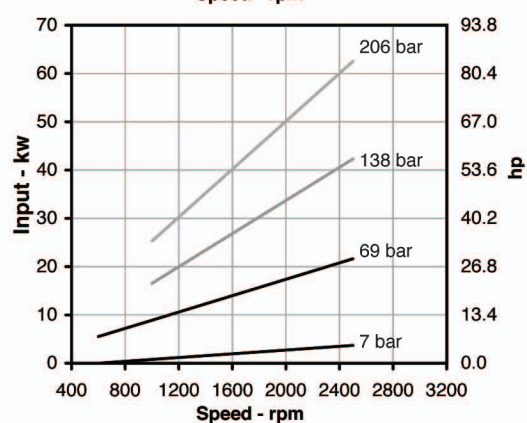
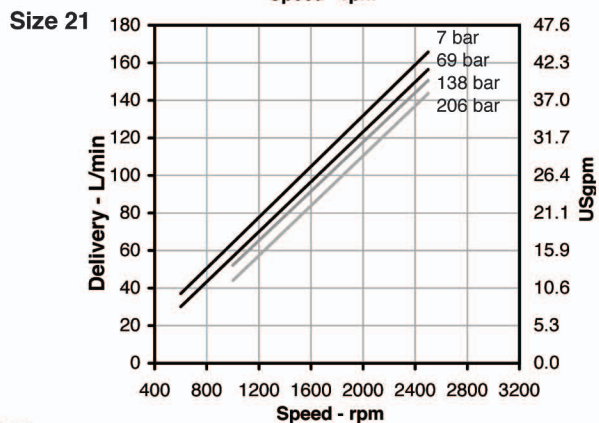
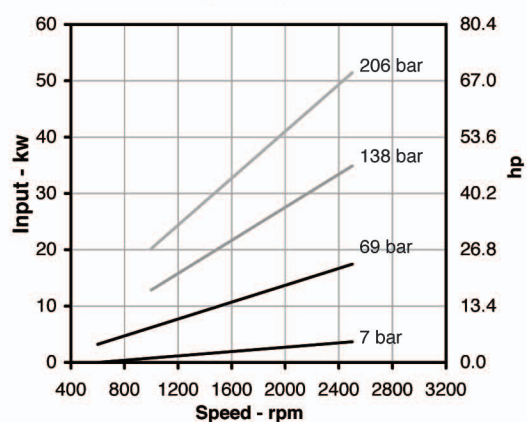
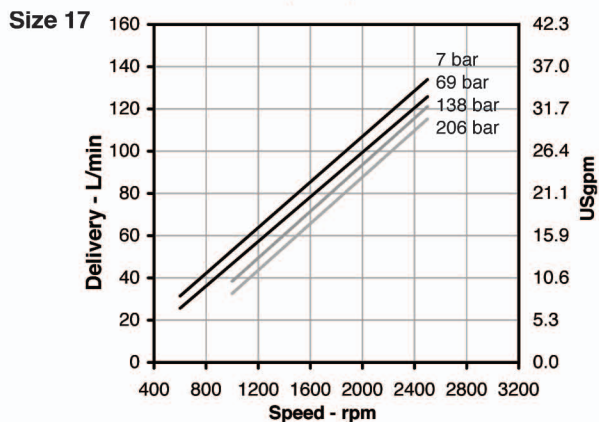
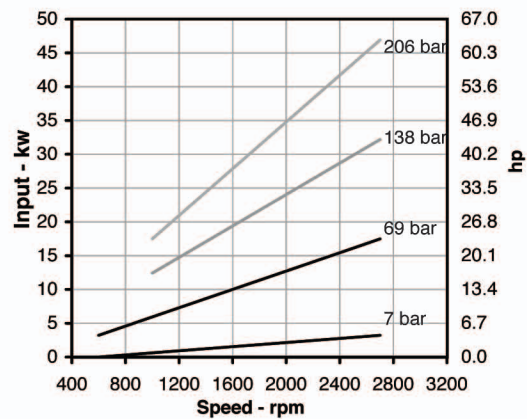
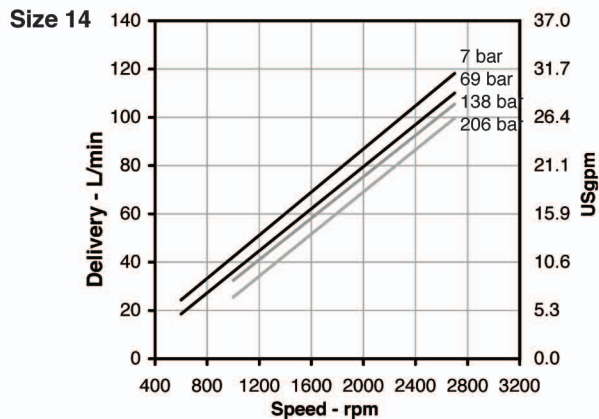
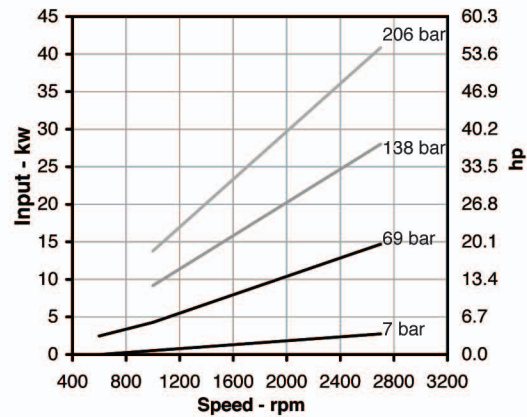
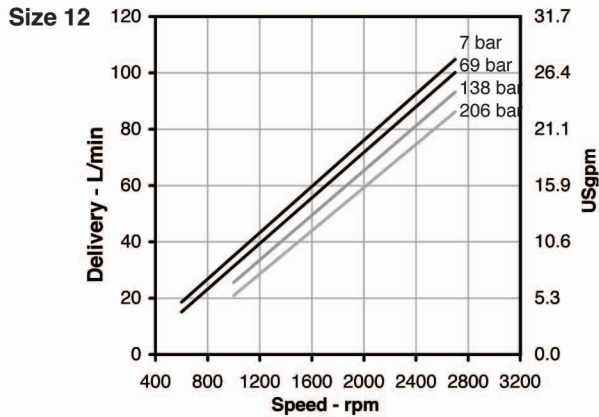
E 20VQ

Performance Characteristics:

E 25VQ

Based on SAE 10W Fluid at 82 °C (180 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

For the Cover End Cartridge, the speed could not exceed the maximum speed of the Shaft End Cartridge.



FIXED DISPLACEMENT VANE PUMP

E 35VQ, SHAFT END OF E 35VQ, COVER END OF E 35VQ

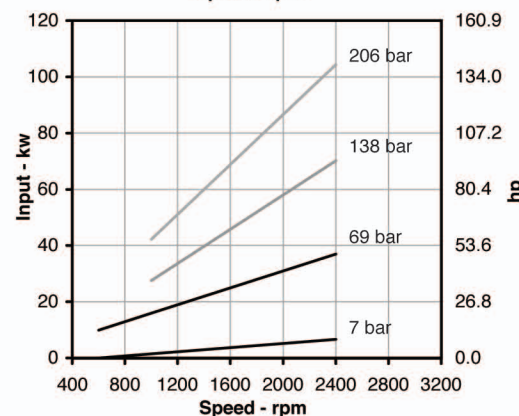
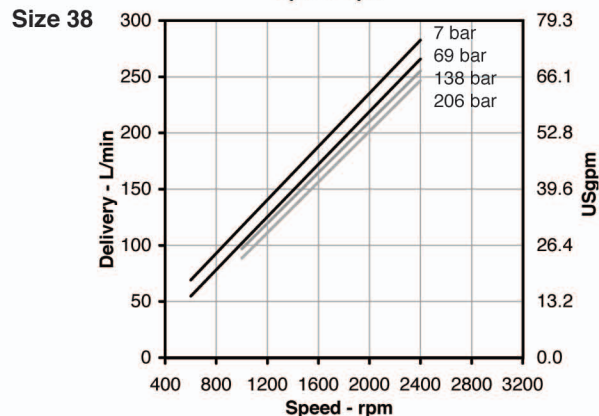
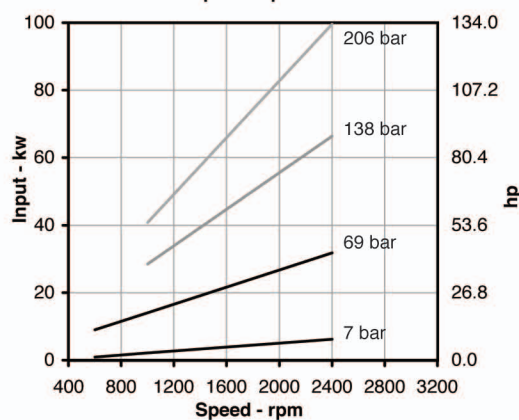
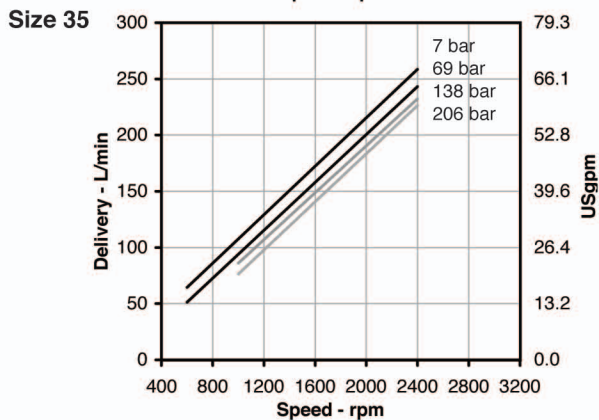
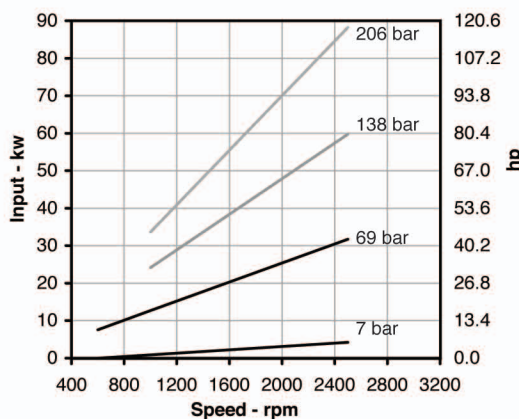
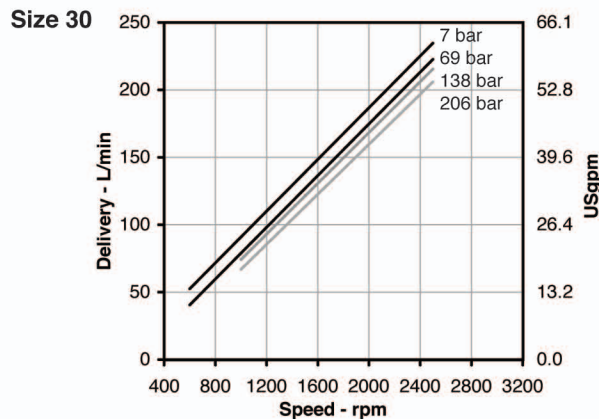
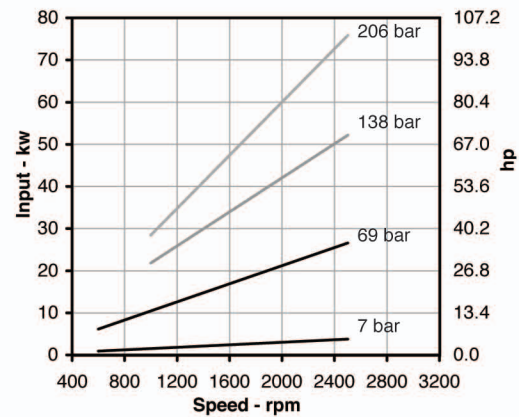
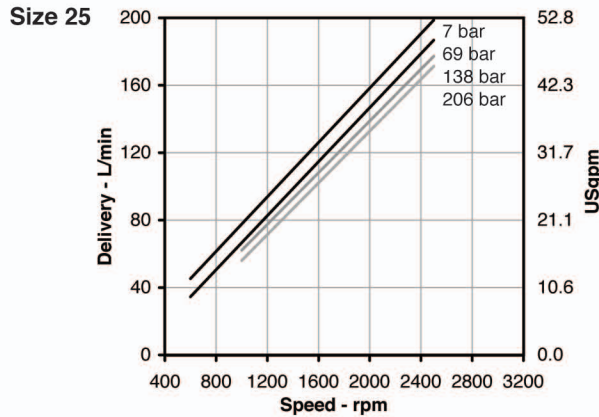


Performance Characteristics:

E 35VQ

Based on SAE 10W Fluid at 82 °C (180 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

For the Cover End Cartridge, the speed could not exceed the maximum speed of the Shaft End Cartridge.



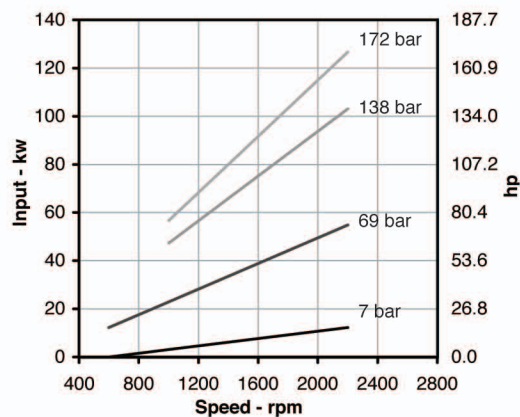
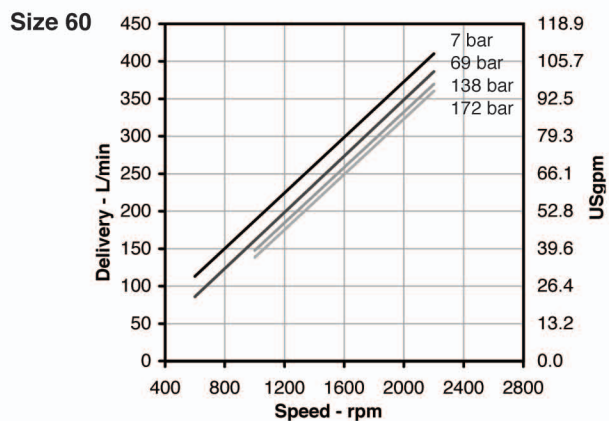
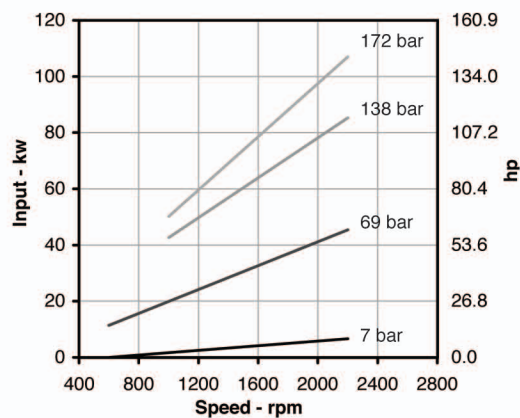
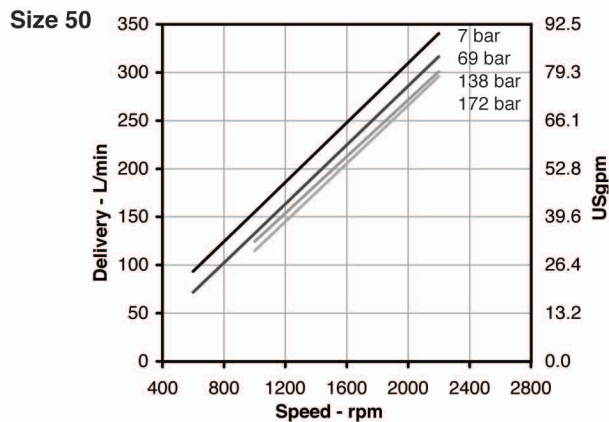
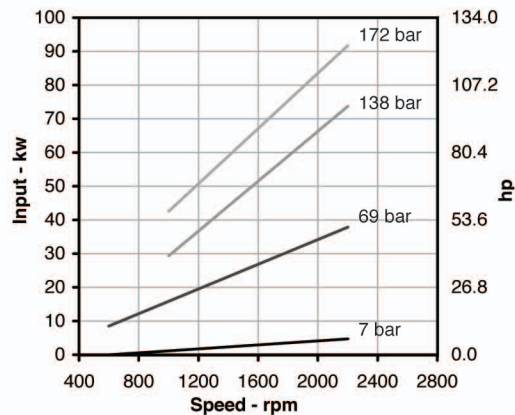
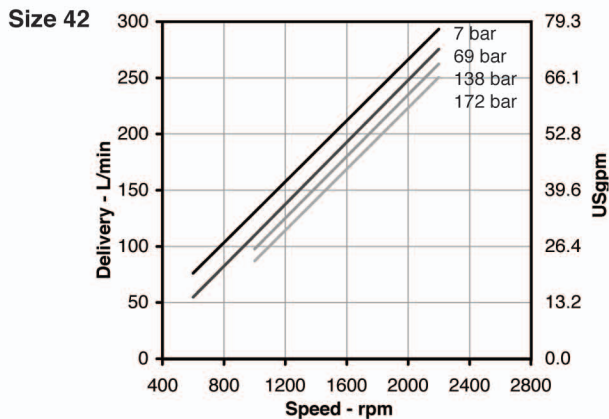
E 35VQ

Performance Characteristics:

E 45VQ

Based on SAE 10W Fluid at 82 °C (180 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

E 45VQ



HIGH PRESSURE SINGLE VANE PUMP

E T6C AND E T6D SERIES



Features:

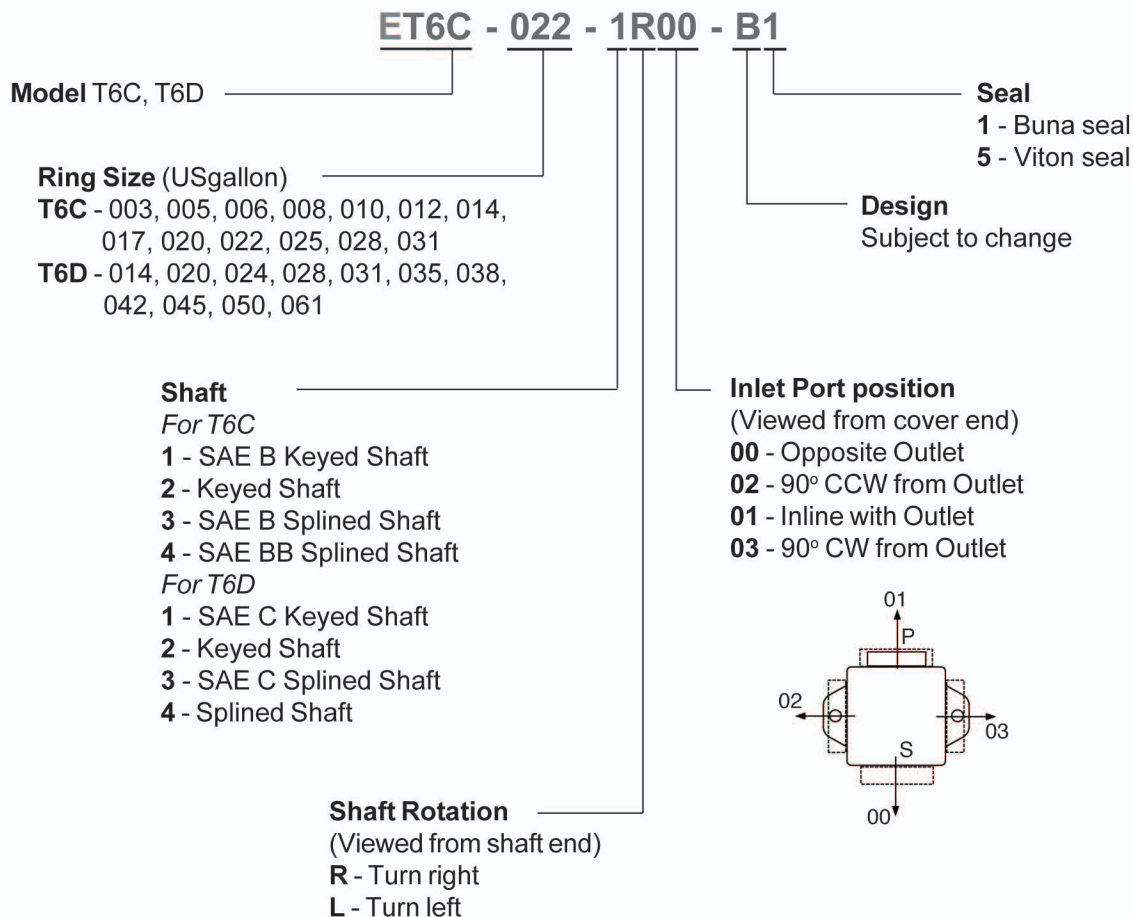
E T6C/T6D

- T6C and T6D Series are fixed displacement and balanced type single vane pumps. The pump is designed for higher operating pressure and greater flow at the same housing size.
- With a balanced pin-vane design, outlet pressure is continuously applied only to the pin. The pin provides the steady light force against the vane. Top and bottom areas of the vane are subject to the same pressure, either inlet or outlet pressure, depending on the vane's location during rotor rotation. This pin-vane design minimizes noise level and improves volumetric efficiency.
- With the cartridge independent of the shaft, allowing for



easy change of flow capacity and field servicing without removing the pump from its mounting.

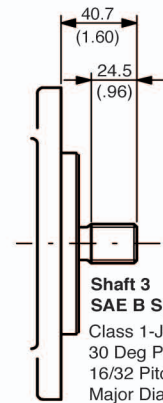
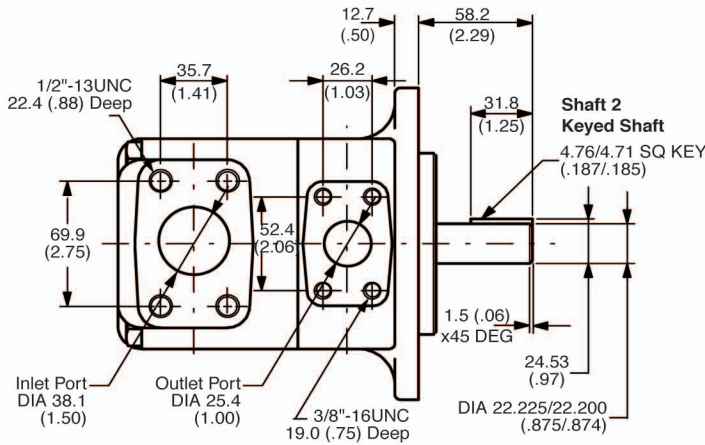
Ordering Code:



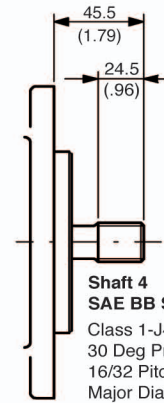
E T6C/T6D

Installation Dimensions mm (inch):

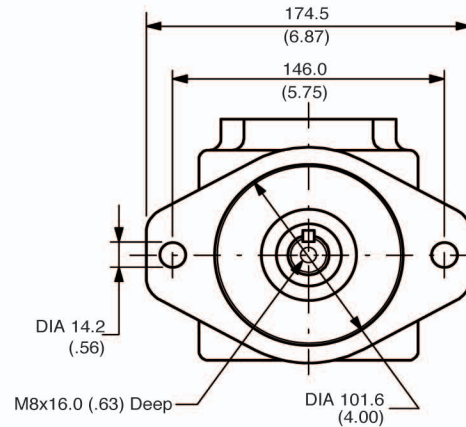
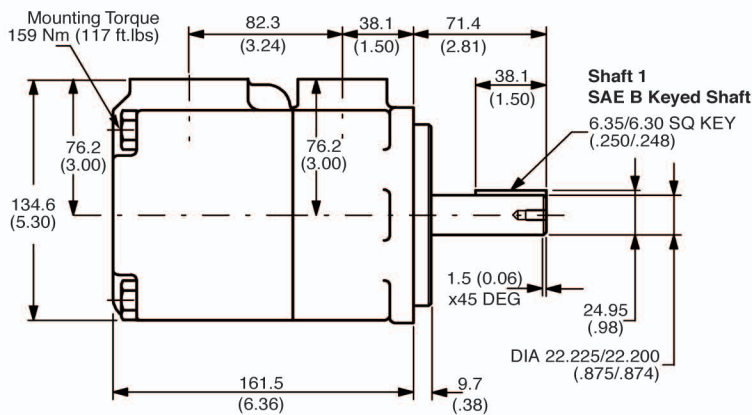
E T6C



**Shaft 3
SAE B Splined Shaft**
Class 1-J498b 13 Teeth
30 Deg Pressure Angle
16/32 Pitch
Major Dia
21.79/21.54 (.858/.848)
Minor Dia
18.62/18.34 (.733/.722)
Flat root side fit



**Shaft 4
SAE BB Splined Shaft**
Class 1-J498b 15 Teeth
30 Deg Pressure Angle
16/32 Pitch
Major Dia
24.98/24.71 (.983/.973)
Minor Dia
21.80/21.53 (.858/.848)
Flat root side fit



Specifications :

Size	Displacement	Max Speed	Min Speed	Max Intermittent Pressure	Max Continuous Pressure	Weight
	cm ³ /r (in ³ /r)	rpm	rpm	bar (psi)	bar (psi)	kg (lb)
003	10.8 (0.66)	2800	600	280 (4000)	240 (3500)	15 (34)
005	17.2 (1.05)					
006	21.3 (1.30)					
008	26.4 (1.61)					
010	34.1 (2.08)					
012	37.1 (2.26)					
014	46.0 (2.81)					
017	58.3 (3.56)					
020	63.8 (3.89)					
022	70.3 (4.29)	2500	600	210 (3000)	160 (2300)	
025	79.3 (4.84)					
028	88.8 (5.42)					
031	100.0 (6.10)					

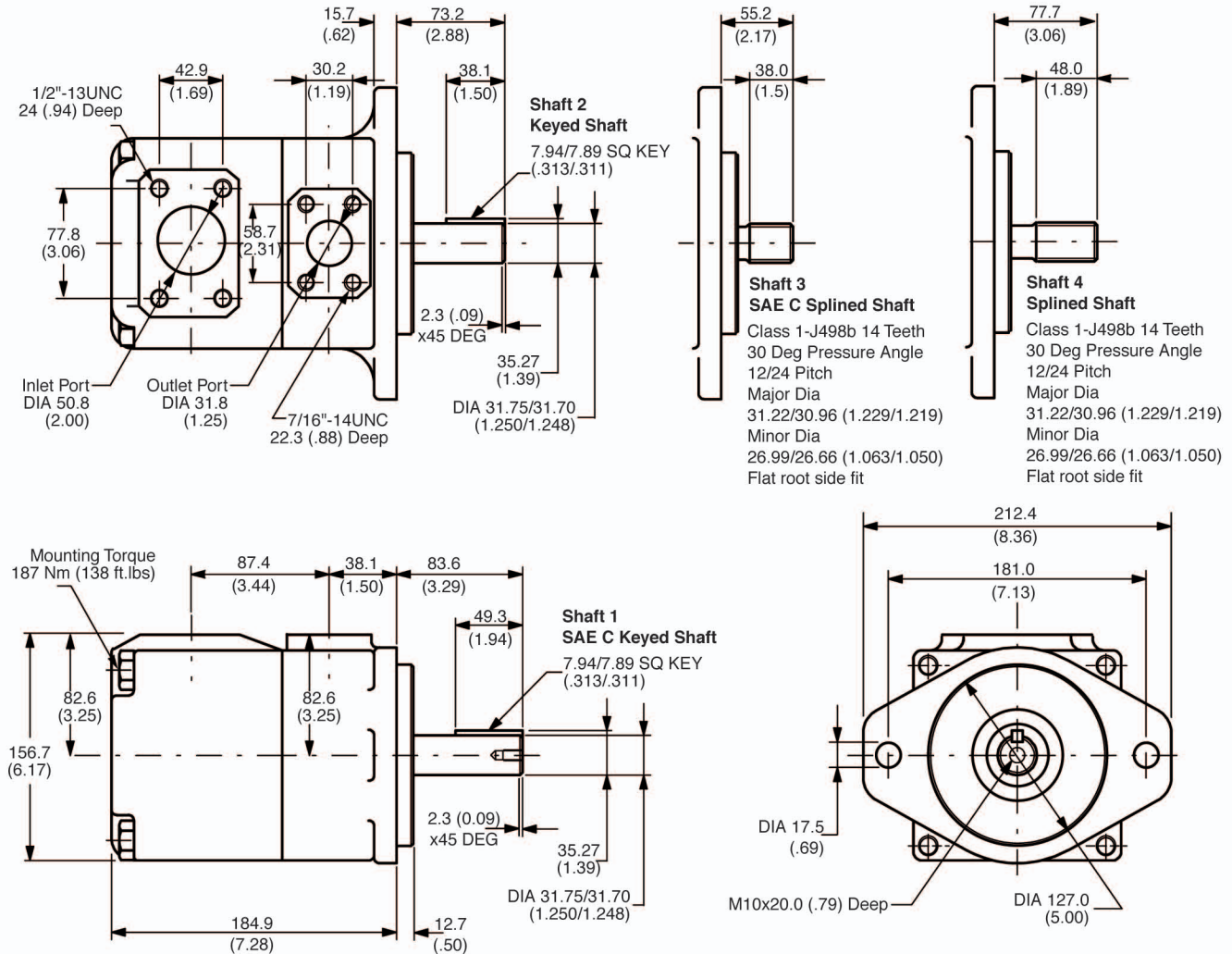
HIGH PRESSURE SINGLE VANE PUMP

E T6D



Installation Dimensions:

E T6D



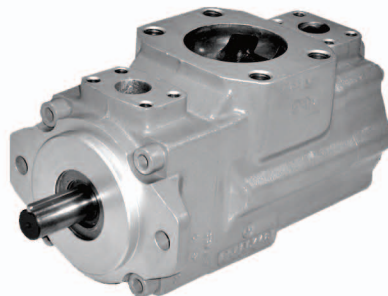
Specifications:

Size	Displacement	Max Speed	Min Speed	Max Intermittent Pressure	Max Continuous Pressure	Weight	
	cm ³ /r (in ³ /r)	rpm	rpm	bar (psi)	bar (psi)	kg (lb)	
014	47.6 (2.90)	2500	600	240 (3500)	210 (3000)	24 (53)	
020	66.0 (4.03)						
024	79.5 (4.85)						
028	89.7 (5.47)						
031	98.3 (6.00)						
035	111.0 (6.77)						
038	120.3 (7.34)						
042	136.0 (8.30)	2200	600	210 (3000)	160 (2320)		
045	145.7 (8.89)						
050	158.0 (9.64)						
061	190.5 (11.63)	1800		120 (1700)	80 (1160)		

Features:

E T6CC/T6DC

- T6CC and T6DC Series are fixed displacement and balanced type double vane pumps. The pump is designed for higher operating pressure and greater flow at the same housing size.
- With a balanced pin-vane design, outlet pressure is continuously applied only to the pin. The pin provides the steady light force against the vane. Top and bottom areas of the vane are subject to the same pressure, either inlet or outlet pressure, depending on the vane's location during rotor rotation. This pin-vane design minimizes noise level and improves volumetric efficiency.
- With the cartridge independent of the shaft, allowing for



easy change of flow capacity and field servicing without removing the pump from its mounting.

Ordering Code :

ET6CC - 031 - 005 - 1R00 - C100

Model T6CC, T6DC ————

Shaft End Pump ————
Ring Size (USgallon)
T6CC - 003, 005, 006, 008, 010, 012, 014, 017, 020, 022, 025, 028, 031
T6DC - 014, 020, 024, 028, 031, 035, 038, 042, 045, 050, 061

Cover End Pump ————
Ring Size (USgallon)
003, 005, 006, 008, 010, 012, 014, 017, 020, 022, 025, 028, 031

Shaft ————
For T6CC
1 - Keyed Shaft
3 - SAE BB Splined Shaft
5 - SAE B Splined Shaft
For T6DC
1 - SAE C Keyed Shaft
2 - Keyed Shaft
3 - SAE C Splined Shaft
4 - Splined Shaft

Shaft Rotation ————
(Viewed from shaft end)
R - Turn right
L - Turn left

Cover End Outlet Port Size
For T6CC only
0 - 1" **1** - 3/4"

Inlet Port Size
For T6CC only
0 - 3" **1** - 2 1/2"

Seal
1 - Buna seal
5 - Viton seal

Design
Subject to change

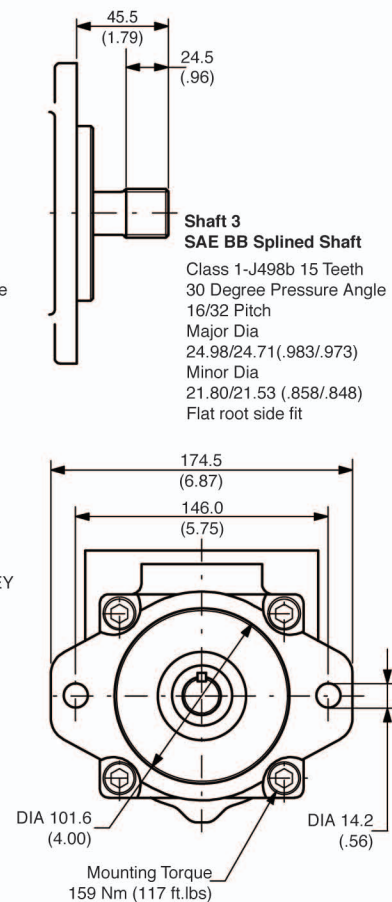
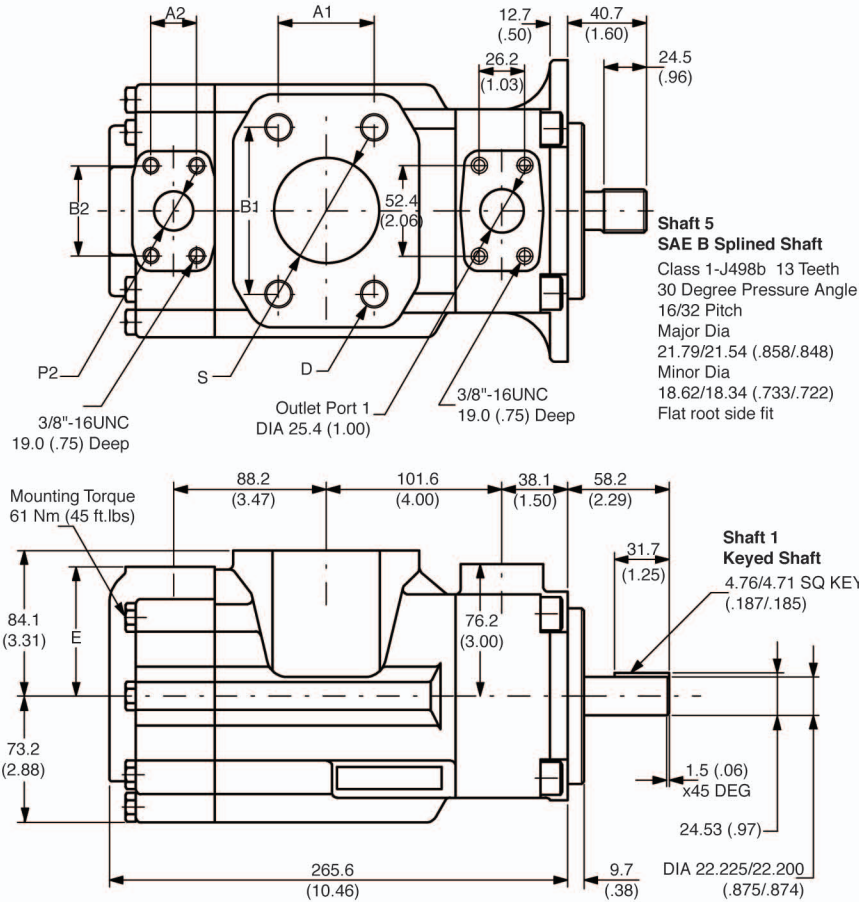
Port position
(Viewed from cover end)
2 digits code presents the position of cover end outlet (P2) at various positions of shaft end outlet (P1) and Inlet (S)

HIGH PRESSURE DOUBLE VANE PUMP E T6CC



Specifications and Installation Dimensions mm (inch):

E T6CC



Inlet Port Size	S	A1	B1	D
3"	76.2 (3.00)	61.9 (2.44)	106.4 (4.19)	5/8"-11UNC 28.4 (1.12) Deep
2 1/2"	63.5 (2.50)	50.8 (2.00)	88.9 (3.50)	1/2"-13UNC 23.9 (.94) Deep

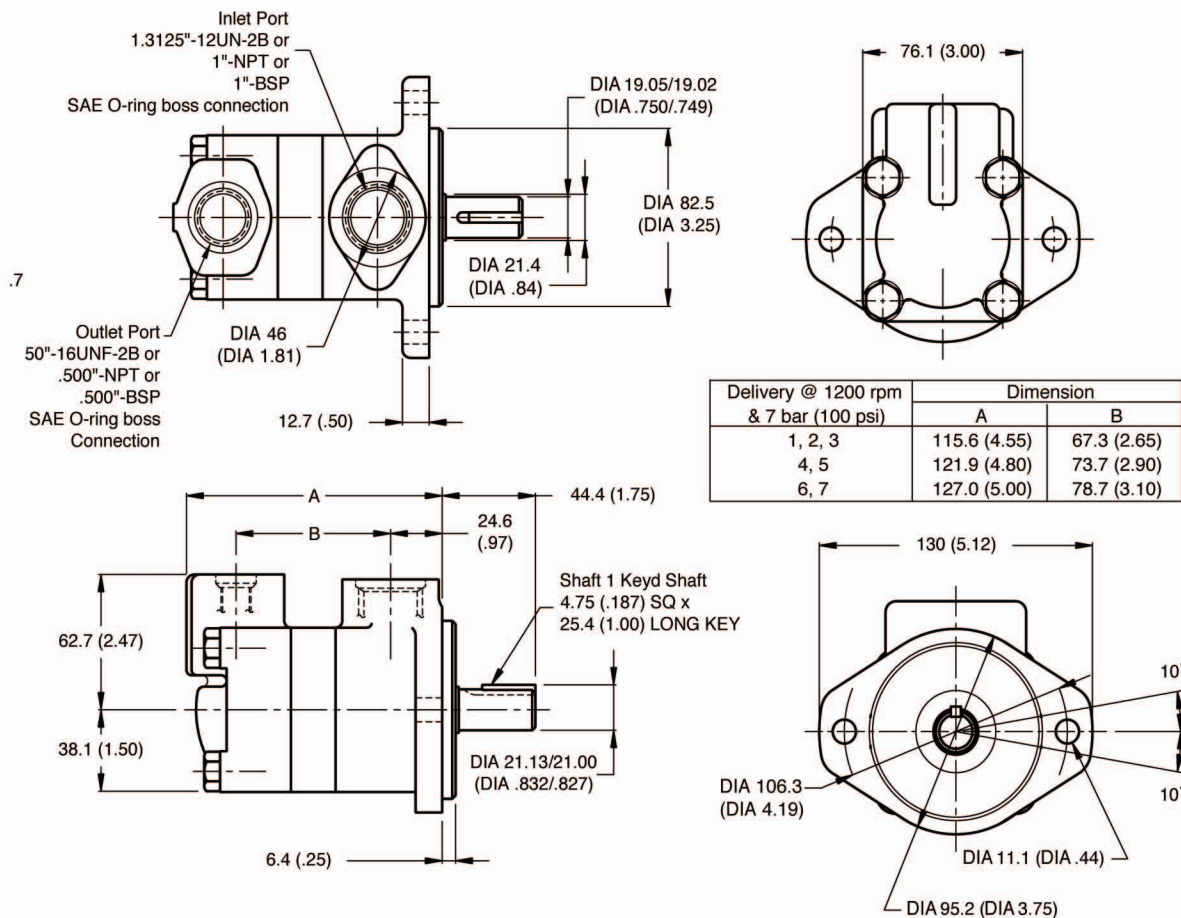
Cover End Outlet Port Size	P2	A2	B2	E
1"	25.4 (1.00)	26.2 (1.03)	52.4 (2.06)	74.7 (2.94)
3/4"	19.0 (.75)	22.4 (.88)	47.7 (1.88)	76.2 (3.00)

Shaft End Pump				Cover End Pump				Max Speed	Weight
	cm ³ /r (in ³ /r)	Max Intermittent Pressure bar (psi)	Max Continuous Pressure bar (psi)	Size	Displacement cm ³ /r (in ³ /r)	Max Intermittent Pressure bar (psi)	Max Continuous Pressure bar (psi)		
003	10.8 (0.66)	280 (4000)	240 (3500)	003	10.8 (0.66)	280 (4000)	240 (3500)	2800	26 (57)
005	17.2 (1.05)			005	17.2 (1.05)				
006	21.3 (1.30)			006	21.3 (1.30)				
008	26.4 (1.61)			008	26.4 (1.61)				
010	34.1 (2.08)			010	34.1 (2.08)				
012	37.1 (2.26)			012	37.1 (2.26)				
014	46.0 (2.81)			014	46.0 (2.81)				
017	58.3 (3.56)			017	58.3 (3.56)				
020	63.8 (3.89)			020	63.8 (3.89)				
022	70.3 (4.29)			022	70.3 (4.29)				
025	79.3 (4.84)	210 (3000)	160 (2300)	025	79.3 (4.84)	210 (3000)	160 (2300)		
028	88.8 (5.42)			028	88.8 (5.42)				
031	100.0 (6.10)			031	100.0 (6.10)				

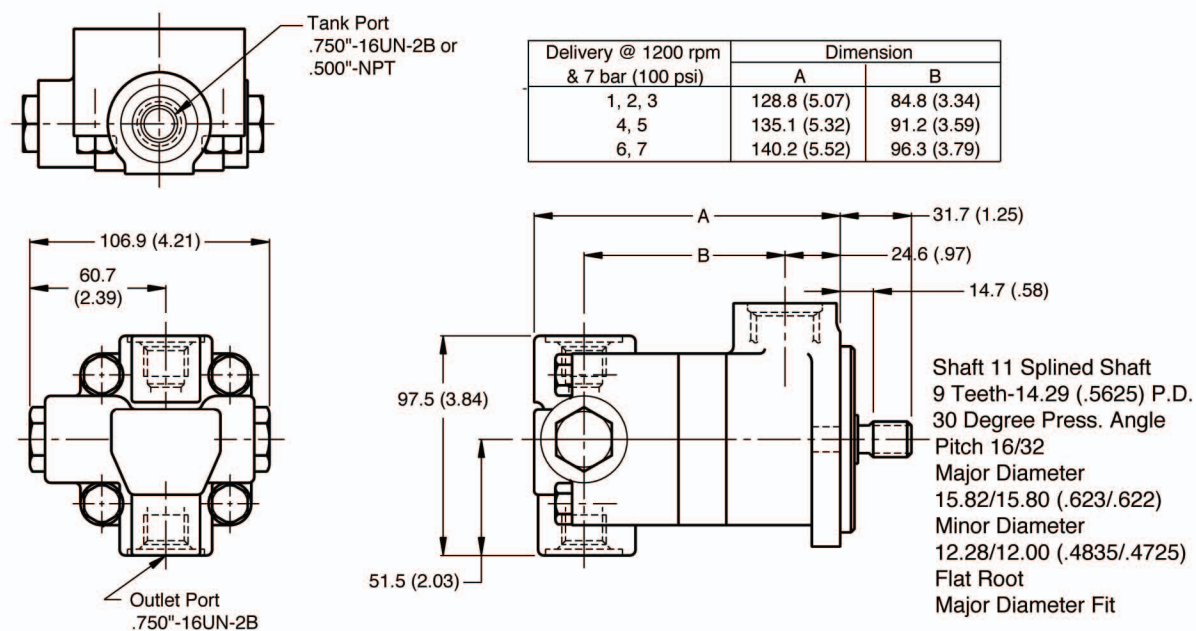
E T6CC

Installation Dimensions mm (inch):

E V10, V10F

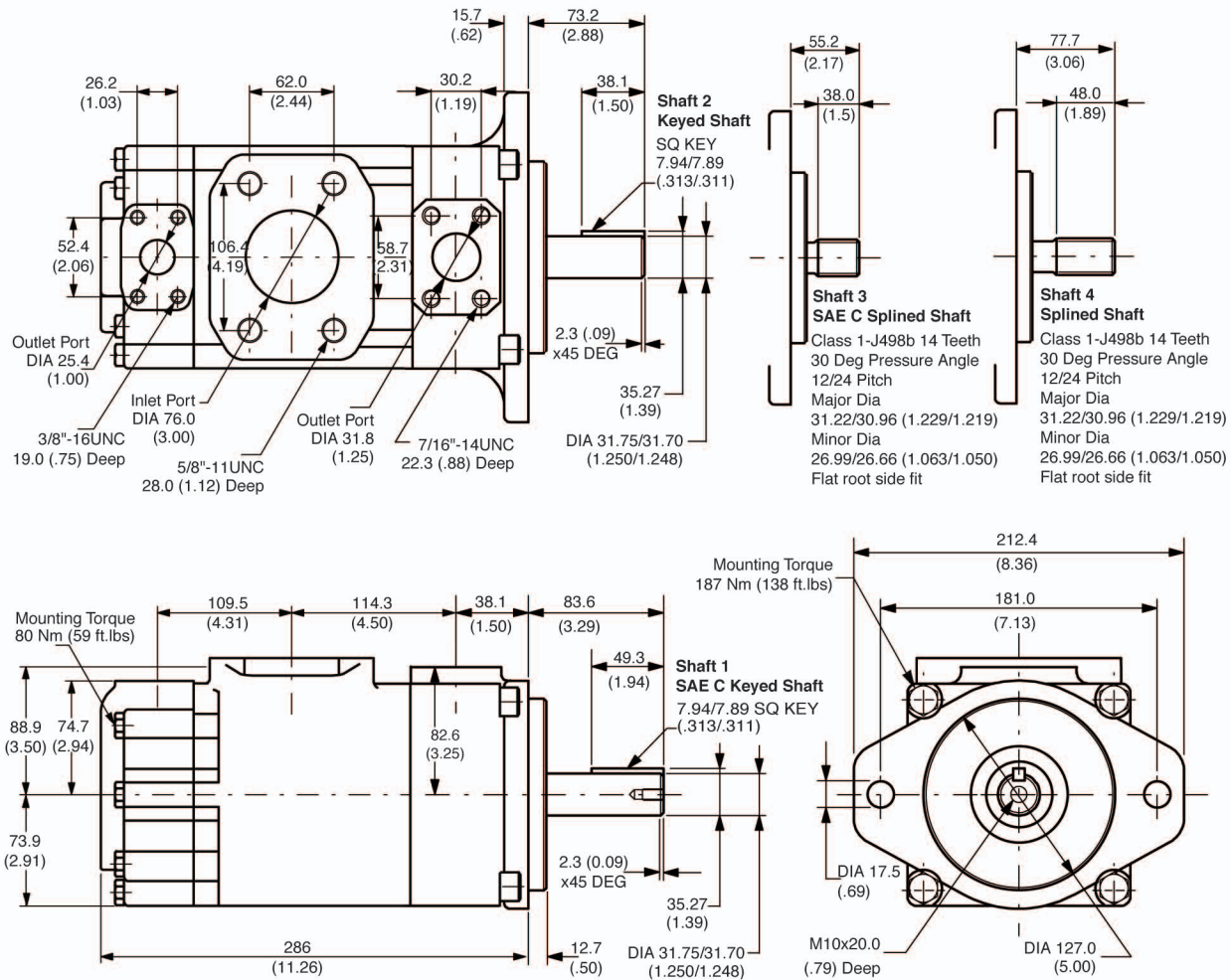


E V10F:



Features:

E T6DC



Shaft End Pump				Cover End Pump				Max Speed	Weight
Size	Displacement cm ³ /r (in ³ /r)	Max Intermittent Pressure bar (psi)	Max Continuous Pressure bar (psi)	Size	Displacement cm ³ /r (in ³ /r)	Max Intermittent Pressure bar (psi)	Max Continuous Pressure bar (psi)	rpm	kg (lb)
014	47.6 (2.90)	240 (3500)	210 (3000)	003	10.8 (0.66)	280 (4000)	240 (3500)	2500	37 (82)
020	66.0 (4.03)			005	17.2 (1.05)				
024	79.5 (4.85)			006	21.3 (1.30)				
028	89.7 (5.47)			008	26.4 (1.61)				
031	98.3 (6.00)			010	34.1 (2.08)				
035	111.0 (6.77)			012	37.1 (2.26)				
038	120.3 (7.34)			014	46.0 (2.81)				
042	136.0 (8.30)			017	58.3 (3.56)				
045	145.7 (8.89)			020	63.8 (3.89)				
050	158.0 (9.64)	210 (3000)	160 (2320)	022	70.3 (4.29)				
061	190.5 (11.63)	120 (1700)	80 (1160)	025	79.3 (4.84)				
				028	88.8 (5.42)	210 (3000)	160 (2300)		
				031	100.0 (6.10)				

HIGH PRESSURE DOUBLE VANE PUMP

E T6C, E T6CC, COVER END OF E T6DC



Performance Characteristics:

E T6C/T6CC

Size	Displacement cm ³ /r (in ³ /r)	Speed rpm	Output Flow L/min (USgpm)			Input Power kW (hp)		
			at 0 bar (0 psi)	at 140 bar (2000 psi)	at 240 bar (3500 psi)	at 7 bar (100 psi)	at 140 bar (2000 psi)	at 240 bar (3500 psi)
003	10.8 (0.66)	1000	10.8 (2.9)	5.8 (1.5)	-	0.9 (1.2)	3.7 (5.0)	-
		1200	13.0 (3.4)	8.0 (2.1)	-	1.1 (1.5)	4.4 (5.9)	-
		1500	16.2 (4.3)	11.2 (3.0)	8.2 (2.2)	1.3 (1.7)	5.4 (7.2)	8.5 (11.4)
		1800	19.4 (5.1)	14.4 (3.8)	11.4 (3.0)	1.7 (2.3)	6.4 (8.6)	10.0 (13.4)
005	17.2 (1.05)	1000	17.2 (4.5)	12.2 (3.2)	9.2 (2.4)	1.0 (1.3)	5.2 (7.0)	8.4 (11.3)
		1200	20.6 (5.4)	15.6 (4.1)	12.6 (3.3)	1.1 (1.5)	6.2 (8.3)	10.0 (13.4)
		1500	25.8 (6.8)	20.8 (5.5)	17.8 (4.7)	1.4 (1.9)	7.7 (10.3)	12.3 (16.5)
		1800	31.0 (8.2)	26.0 (6.9)	23.0 (6.1)	1.9 (2.5)	9.1 (12.2)	14.6 (19.6)
006	21.3 (1.30)	1000	21.3 (5.6)	16.3 (4.3)	13.3 (3.5)	1.0 (1.3)	6.1 (8.2)	10.0 (13.4)
		1200	25.6 (6.8)	20.6 (5.4)	17.6 (4.6)	1.2 (1.6)	7.3 (9.8)	11.9 (16.0)
		1500	32.0 (8.5)	27.0 (7.1)	24.0 (6.3)	1.5 (2.0)	9.1 (12.2)	14.8 (19.8)
		1800	38.3 (10.1)	33.3 (8.8)	30.3 (8.0)	1.9 (2.5)	10.8 (14.5)	17.6 (23.6)
008	26.4 (1.61)	1000	26.4 (7.0)	21.4 (5.7)	18.4 (4.9)	1.1 (1.5)	7.3 (9.8)	12.0 (16.1)
		1200	31.7 (8.4)	26.7 (7.1)	23.7 (6.3)	1.3 (1.7)	8.7 (11.7)	14.4 (19.3)
		1500	39.6 (10.5)	34.6 (9.1)	31.6 (8.3)	1.6 (2.1)	10.9 (14.6)	17.8 (23.9)
		1800	47.5 (12.5)	42.5 (11.2)	39.5 (10.4)	2.1 (2.8)	13.0 (17.4)	21.3 (28.6)
010	34.1 (2.08)	1000	34.1 (9.0)	29.1 (7.7)	26.1 (6.9)	1.2 (1.6)	9.1 (12.2)	15.1 (20.2)
		1200	40.9 (10.8)	35.9 (9.5)	32.9 (8.7)	1.4 (1.9)	10.9 (14.6)	18.1 (24.3)
		1500	51.2 (13.5)	46.2 (12.2)	43.2 (11.4)	1.7 (2.3)	13.6 (18.2)	22.5 (30.2)
		1800	61.4 (16.2)	56.4 (14.9)	53.4 (14.1)	2.2 (2.9)	16.2 (21.7)	26.8 (35.9)
012	37.1 (2.26)	1000	37.1 (9.8)	32.1 (8.5)	29.1 (7.7)	1.2 (1.6)	9.8 (13.1)	16.3 (21.8)
		1200	44.5 (11.8)	39.5 (10.4)	36.5 (9.6)	1.4 (1.9)	11.7 (15.7)	19.5 (26.1)
		1500	55.7 (14.7)	50.7 (13.4)	47.7 (12.6)	1.7 (2.3)	14.6 (19.6)	24.3 (32.6)
		1800	66.8 (17.6)	61.8 (16.3)	58.8 (15.5)	2.3 (3.1)	17.5 (23.5)	29.0 (38.9)
014	46.0 (2.81)	1000	46.0 (12.2)	41.0 (10.8)	38.0 (10.0)	1.3 (1.7)	11.9 (16.0)	19.9 (26.7)
		1200	55.2 (14.6)	50.2 (13.3)	47.2 (12.5)	1.5 (2.0)	14.2 (19.0)	23.8 (31.9)
		1500	69.0 (18.2)	64.0 (16.9)	61.0 (16.1)	1.9 (2.5)	17.7 (23.7)	29.6 (39.7)
		1800	82.8 (21.9)	77.8 (20.6)	74.8 (19.8)	2.5 (3.4)	21.2 (28.4)	35.4 (47.5)
017	58.3 (3.56)	1000	58.3 (15.4)	53.3 (14.1)	50.3 (13.3)	1.5 (2.0)	14.8 (19.8)	24.8 (33.2)
		1200	70.0 (18.5)	65.0 (17.2)	62.0 (16.4)	1.7 (2.3)	17.7 (23.7)	29.7 (39.8)
		1500	87.5 (23.1)	82.5 (21.8)	79.5 (21.0)	2.1 (2.8)	22.0 (29.5)	37.0 (49.6)
		1800	104.9 (27.7)	99.9 (26.4)	96.9 (25.6)	2.7 (3.6)	26.4 (35.4)	44.2 (59.2)
020	63.8 (3.89)	1000	63.8 (16.9)	58.8 (15.5)	55.8 (14.7)	1.5 (2.0)	16.0 (21.4)	27.0 (36.2)
		1200	76.6 (20.2)	71.6 (18.9)	68.6 (18.1)	1.8 (2.4)	19.2 (25.7)	32.3 (43.3)
		1500	95.7 (25.3)	90.7 (24.0)	87.7 (23.2)	2.2 (2.9)	24.0 (32.2)	40.3 (54.0)
		1800	114.8 (30.3)	109.8 (29.0)	106.8 (28.2)	2.8 (3.8)	28.7 (38.5)	48.2 (64.6)
022	70.3 (4.29)	1000	70.3 (18.6)	65.3 (17.3)	62.3 (16.5)	1.6 (2.1)	17.6 (23.6)	29.6 (39.7)
		1200	84.4 (22.3)	79.4 (21.0)	76.4 (20.2)	1.9 (2.5)	21.0 (28.2)	35.5 (47.6)
		1500	105.5 (27.9)	100.5 (26.6)	97.5 (25.8)	2.3 (3.1)	26.2 (35.1)	44.2 (59.2)
		1800	126.5 (33.4)	121.5 (32.1)	118.5 (31.3)	3.0 (4.0)	31.4 (42.1)	52.9 (70.9)
025	79.3 (4.84)	1000	79.3 (21.0)	74.3 (19.6)	71.3 (18.8)	1.7 (2.3)	19.7 (26.4)	33.2 (44.5)
		1200	95.2 (25.2)	90.2 (23.8)	87.2 (23.0)	2.0 (2.7)	23.6 (31.6)	39.8 (53.4)
		1500	119.0 (31.4)	114.0 (30.1)	111.0 (29.3)	2.5 (3.4)	29.4 (39.4)	49.6 (66.5)
		1800	142.7 (37.7)	137.7 (36.4)	134.7 (35.6)	3.2 (4.3)	35.2 (47.2)	59.3 (79.5)
028	88.8 (5.42)	1000	88.8 (23.5)	83.8 (22.1)	81.3 (21.5)*	1.8 (2.4)	21.9 (29.4)	32.5 (43.6)*
		1200	106.6 (28.2)	101.6 (26.8)	99.1 (26.2)*	2.1 (2.8)	26.2 (35.1)	38.9 (52.1)*
		1500	133.2 (35.2)	128.2 (33.9)	125.7 (33.2)*	2.7 (3.6)	32.7 (43.8)	48.5 (65.0)*
		1800	159.8 (42.2)	154.8 (40.9)	152.3 (40.2)*	3.4 (4.6)	39.2 (52.5)	58.1 (77.9)*
031	100.0 (6.10)	1000	100.0 (26.4)	95.0 (25.1)	92.5 (24.4)*	2.0 (2.7)	24.5 (32.8)	36.4 (48.8)*
		1200	120.0 (31.7)	115.0 (30.4)	112.5 (29.7)*	2.3 (3.1)	29.4 (39.4)	43.6 (58.4)*
		1500	150.0 (39.6)	145.0 (38.3)	142.5 (37.6)*	2.9 (3.9)	36.6 (49.1)	54.4 (72.9)*
		1800	180.0 (47.6)	175.0 (46.2)	172.5 (45.6)*	3.6 (4.8)	43.9 (58.8)	65.1 (87.3)*

*Size 28 and 31, at max pressure 210 bar (3000 psi)

E T6C/T6CC

Performance Characteristics:

E T6D/T6DC

E T6D/T6DC

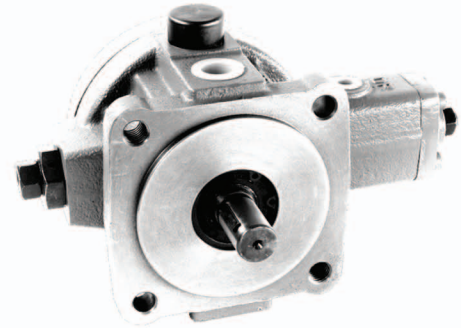
Size	Displacement cm ³ /r (in ³ /r)	Speed rpm	Output Flow L/min (USgpm)			Input Power kW (hp)		
			at 0 bar (0 psi)	at 140 bar (2000 psi)	at 240 bar (3500 psi)	at 7 bar (100 psi)	at 140 bar (2000 psi)	at 240 bar (3500 psi)
014	47.6 (2.90)	1000	47.6 (12.6)	38.6 (10.2)	32.6 (8.6)	1.6 (2.1)	12.5 (16.8)	20.7 (27.7)
		1200	57.1 (15.1)	48.1 (12.7)	42.1 (11.1)	1.8 (2.4)	14.9 (20.0)	24.8 (33.2)
		1500	71.4 (18.9)	62.4 (16.5)	56.4 (14.9)	2.3 (3.1)	18.5 (24.8)	30.7 (41.2)
		1800	85.7 (22.6)	76.7 (20.3)	70.7 (18.7)	2.9 (3.9)	22.3 (29.9)	36.9 (49.5)
020	66.0 (4.03)	1000	66.0 (17.4)	57.0 (15.1)	51.0 (13.5)	1.8 (2.4)	16.8 (22.5)	28.1 (37.7)
		1200	79.2 (20.9)	70.2 (18.5)	64.2 (17.0)	2.1 (2.8)	20.1 (26.9)	33.6 (45.0)
		1500	99.0 (26.2)	90.0 (23.8)	84.0 (22.2)	2.7 (3.6)	24.9 (33.4)	41.7 (55.9)
		1800	118.8 (31.4)	109.8 (29.0)	103.8 (27.4)	3.3 (4.4)	30.1 (40.3)	50.1 (67.2)
024	79.5 (4.85)	1000	79.5 (21.0)	70.5 (18.6)	64.5 (17.0)	1.9 (2.5)	20.0 (26.8)	33.5 (44.9)
		1200	95.4 (25.2)	86.4 (22.8)	80.4 (21.2)	2.2 (2.9)	23.9 (32.0)	40.1 (53.8)
		1500	119.3 (31.5)	110.3 (29.1)	104.3 (27.6)	2.9 (3.9)	29.7 (39.8)	49.8 (66.8)
		1800	143.1 (37.8)	134.1 (35.4)	128.1 (33.8)	3.6 (4.8)	35.7 (47.9)	59.9 (80.3)
028	89.7 (5.47)	1000	89.7 (23.7)	80.7 (21.3)	74.7 (19.7)	2.0 (2.7)	22.3 (29.9)	37.5 (50.3)
		1200	107.6 (28.4)	98.6 (26.1)	92.6 (24.5)	2.4 (3.2)	26.7 (35.8)	45.0 (60.3)
		1500	134.6 (35.6)	125.6 (33.2)	119.6 (31.6)	3.1 (4.2)	33.2 (44.5)	55.9 (74.9)
		1800	161.5 (42.7)	152.5 (40.3)	146.5 (38.7)	3.8 (5.1)	40.0 (53.6)	67.2 (90.1)
031	98.3 (6.00)	1000	98.3 (26.0)	89.3 (23.6)	83.3 (22.0)	2.1 (2.8)	24.3 (32.6)	41.0 (55.0)
		1200	118.0 (31.2)	109.0 (28.8)	103.0 (27.2)	2.5 (3.4)	29.1 (39.0)	49.1 (65.8)
		1500	147.5 (39.0)	138.5 (36.6)	132.5 (35.0)	3.2 (4.3)	36.2 (48.5)	61.1 (81.9)
		1800	176.9 (46.7)	167.9 (44.4)	161.9 (42.8)	4.0 (5.4)	43.6 (58.4)	73.4 (98.4)
035	111.0 (6.77)	1000	111.0 (29.3)	102.0 (26.9)	96.0 (25.4)	2.3 (3.1)	27.3 (36.6)	46.1 (61.8)
		1200	133.2 (35.2)	124.2 (32.8)	118.2 (31.2)	2.7 (3.6)	32.7 (43.8)	55.2 (74.0)
		1500	166.5 (44.0)	157.5 (41.6)	151.5 (40.0)	3.4 (4.6)	40.7 (54.6)	68.7 (92.1)
		1800	199.8 (52.8)	190.8 (50.4)	184.8 (48.8)	4.2 (5.6)	49.0 (65.7)	82.5 (110.6)
038	120.3 (7.34)	1000	120.3 (31.8)	111.3 (29.4)	105.3 (27.8)	2.4 (3.2)	29.5 (39.5)	49.8 (66.8)
		1200	144.4 (38.2)	135.4 (35.8)	129.4 (34.2)	2.8 (3.8)	35.3 (47.3)	59.7 (80.0)
		1500	180.5 (47.7)	171.5 (45.3)	165.5 (43.7)	3.6 (4.8)	43.9 (58.8)	74.3 (99.6)
		1800	216.5 (57.2)	207.5 (54.8)	201.5 (53.2)	4.4 (5.9)	52.9 (70.9)	89.2 (119.6)
042	136.0 (8.30)	1000	136.0 (35.9)	127.0 (33.6)	121.0 (32.0)	2.6 (3.5)	33.1 (44.4)	56.1 (75.2)
		1200	163.2 (43.1)	154.2 (40.7)	148.2 (39.2)	3.0 (4.0)	39.7 (53.2)	67.2 (90.1)
		1500	204.0 (53.9)	195.0 (51.5)	189.0 (49.9)	3.9 (5.2)	49.4 (66.2)	83.7 (112.2)
		1800	244.8 (64.7)	235.8 (62.3)	229.8 (60.7)	4.8 (6.4)	59.5 (79.8)	100.5 (134.7)
045	145.7 (8.89)	1000	145.7 (38.5)	136.7 (36.1)	130.7 (34.5)	2.7 (3.6)	35.4 (47.5)	59.9 (80.3)
		1200	174.8 (46.2)	165.8 (43.8)	159.8 (42.2)	3.2 (4.3)	42.4 (56.8)	71.9 (96.4)
		1500	218.6 (57.8)	209.6 (55.4)	203.6 (53.8)	4.0 (5.4)	52.8 (70.8)	89.5 (120.0)
		1800	262.3 (69.3)	253.3 (66.9)	247.3 (65.3)	5.0 (6.7)	63.5 (85.1)	107.5 (144.1)
050	158.0 (9.64)	1000	158.0 (41.7)	149.0 (39.4)	145.0 (38.3)*	2.8 (3.8)	38.3 (51.3)	56.9 (76.3)*
		1200	189.6 (50.1)	180.6 (47.7)	176.6 (46.7)*	3.3 (4.4)	45.8 (61.4)	68.2 (91.4)*
		1500	237.0 (62.6)	228.0 (60.2)	224.0 (59.2)*	4.3 (5.8)	57.1 (76.5)	85.0 (113.9)*
		1800	284.4 (75.1)	275.4 (72.8)	271.4 (71.7)*	5.2 (7.0)	68.7 (92.1)	102.1 (136.9)*
061	190.5 (11.63)	1000	190.5 (50.3)	186.5 (49.3)*	-	3.2 (4.3)	23.4 (31.4)*	-
		1200	228.6 (60.4)	224.6 (59.3)*	-	3.8 (5.1)	28.0 (37.5)*	-
		1500	285.8 (75.5)	281.8 (74.5)*	-	4.8 (6.4)	35.0 (46.9)*	-
		1800	342.9 (90.6)	338.9 (89.5)*	-	5.9 (7.9)	42.1 (56.4)*	-

*Size 050, at max pressure 210 bar (3000 psi) *Size 061, at pressure 70 bar (1000 psi)

Features:

E VHR

- VHR is a variable vane pump. It is designed for high and adjustable pressure operation with stable performance up to 30 MPa. Special bias piston mechanism ensures an instantaneous, stable, high-precision operation. Together with quiet journal bearings and suction-discharge port design to help minimize operation noise. Silent, vibration-free operation is guaranteed, even in the high pressure range.



E VHR

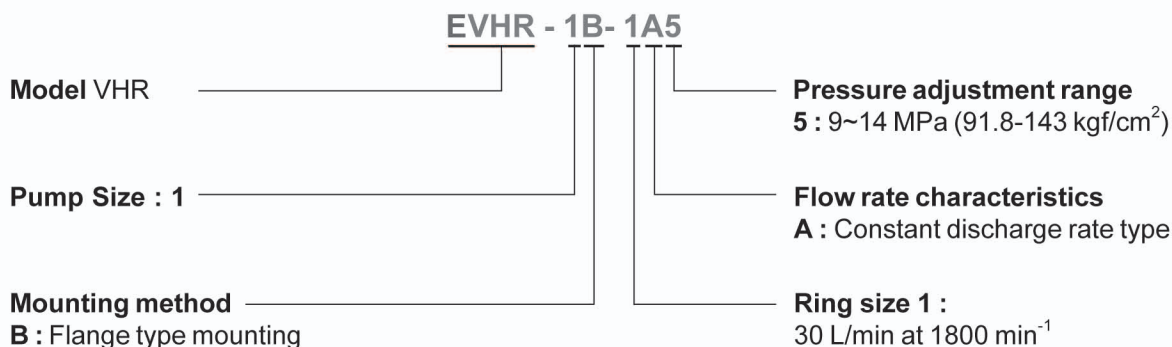
Handling:

- For maximum service life, the pump should be protected from contamination. Filtering fluid before filling and during operation to maintain or exceed ISO cleanliness code 16/13. Appropriately size suction filter, with cold start bypass, of 149 micron absolute (100 mesh) and 10 micron absolute return line filter is recommended. Replaceable elements should be changed as filter supplier instructions.
- The drive shaft must align with the power source shaft. Avoiding shaft end thrust and applications that impose radial loading.
- The direction of rotation is always clockwise (rightward) when viewed from the shaft end.
- Pressure is decreased by clockwise rotation of the discharge rate adjusting screw and increase by counterclockwise (leftward) rotation.
- The start-up procedures should be as follows:
 - Check the rotation of power source to match with rotation of pump.
 - Check inlet and outlet ports to assure all connections are properly installed and check all mounting bolts and flanges to assure all are tight and properly aligned.
 - Fill pump with fluid through the outlet port if the pump is mounted above the fluid level. The spline shaft models also need to be lubricate with an anti-fretting grease or similar lubricant.
 - Place all controls in the neutral position so the pump is unloaded during initial start-up.
 - Prime the pump within a few second when the pump is started.
 - Bleed off entrapped air from outlet circuit until a steady output flow is observed.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change at any time without notice.

Ordering Code and Specifications:

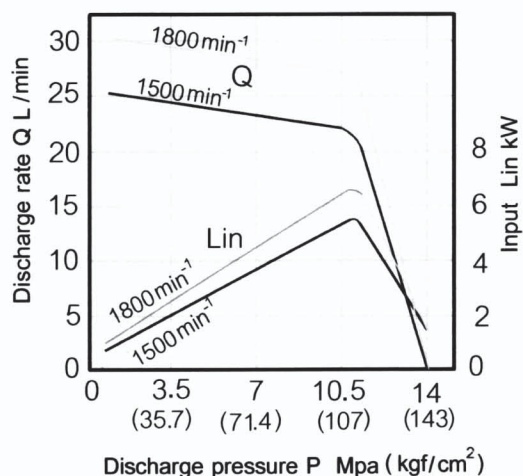
E VHR



Model No.	Capacity cm ³ /rev	No -load Discharge Rate (L/min)				Pressure Adjustment Range Mpa (kgf/cm ²)	Allowable Peak Pressure Mpa (kgf/cm ²)	Revolution Speed min ⁻¹		Weight kg
		1000min ⁻¹	1200min ⁻¹	1500min ⁻¹	1800min ⁻¹			Min.	Max.	
VHR -1B-1A5	16.7	16.7	20	25	30	9~14 (91.8~143)	21 (214)	800	1800	9

Performance Characteristics:

Based on viscosity 32 cSt (150 SSU) oil at 49°C (120°F) and pump inlet at 0 PSIG (14.7 PSIA)

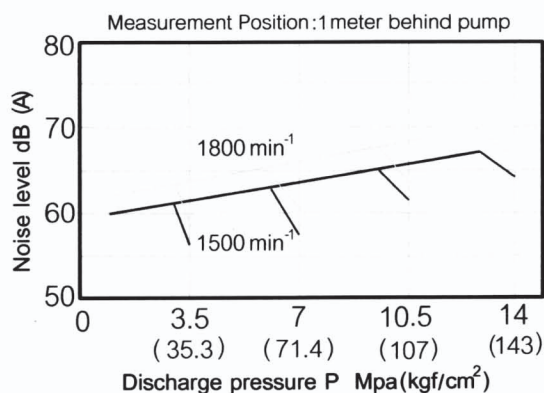


Use the formula below to calculate a pump's required drive force.

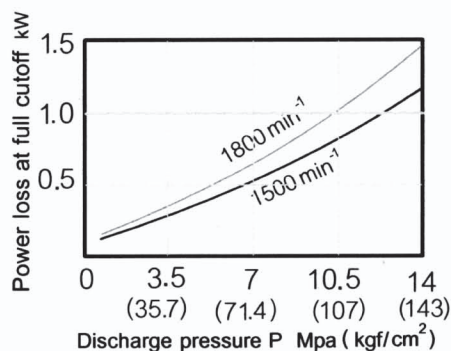
$$H = \frac{PQ}{60} + L$$

H : Input (kW)
P : Pressure Mpa
Q : Flow rate L/min
L : Power loss kW

Noise Characteristics



Power Loss Curve

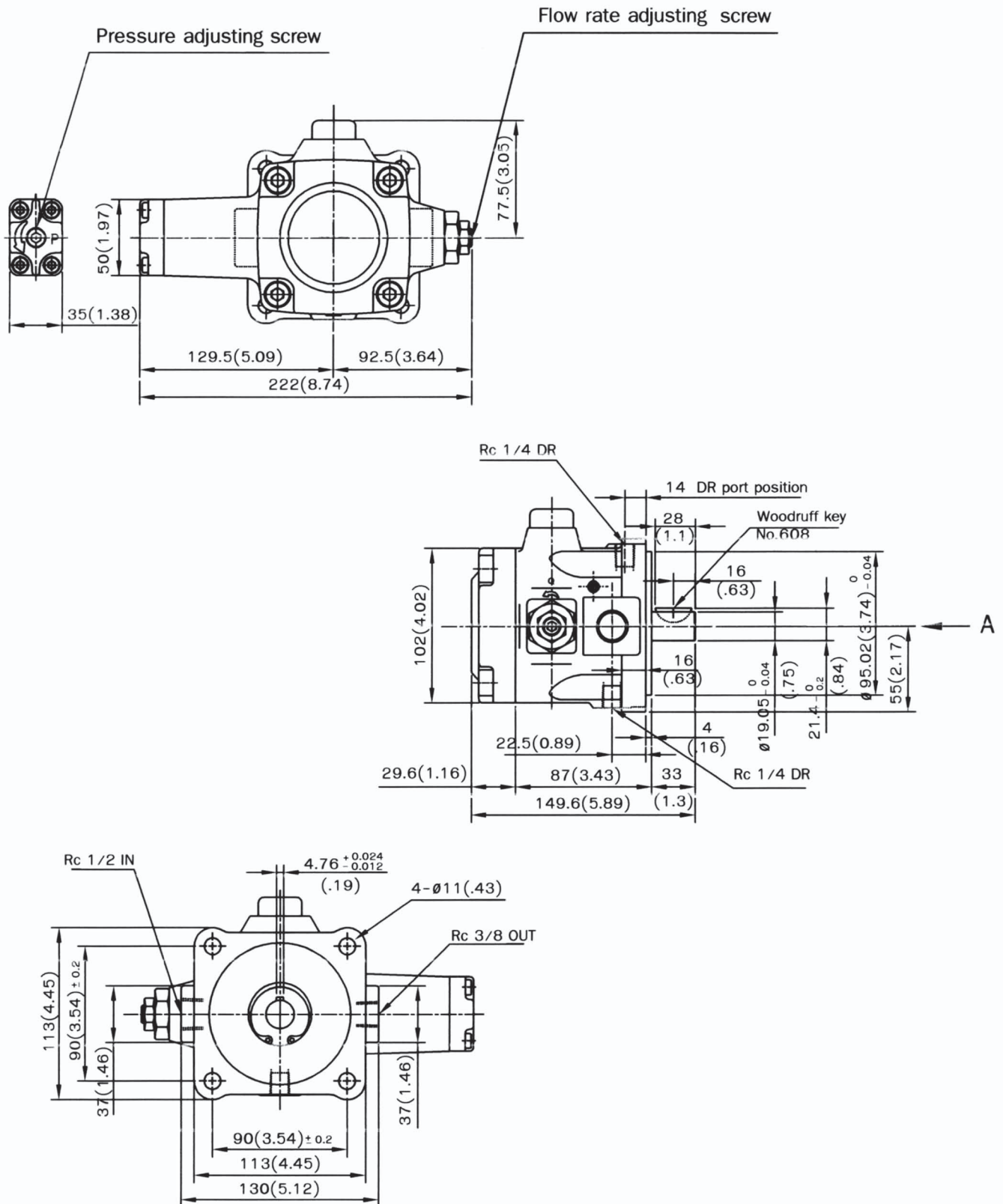


VARIABLE VANE PUMP VARIABLE SINGLE PUMP E VHR



Installation Dimensions mm (inch):

E VHR



Auxiliary View A

E VHR

Features:

E VTM42

- VTM42 Series are fixed displacement and balanced type vane pumps for mobile and marine power steering application. With flow control and relief valves, the pump does not need separate valves. The pump also can be combined with tank or manifold assembly to be piped to an external tank. With threaded shaft and heavy duty bearing, the pump can be used with gear and pulley drive.



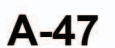
Ordering Code and Specifications:

Model VTM42		EVTM42 - 20- 15 - 20 - F11 - R1		Shaft	
				1 - Threaded	
Delivery (USgpm at 1200 rpm & 7 bar)				Shaft Rotation	
10 - 1.0 USgpm	40 - 4.0 USgpm			(Viewed from shaft end)	
15 - 1.5 USgpm	50 - 5.0 USgpm			no code - Turn right	
20 - 2.0 USgpm	60 - 6.0 USgpm			L - Turn left	
Controlled Flow rate (at 1500 rpm & 7 bar)				Tank or Manifold	
USgpm (L/min)				NO - Without Tank	
15 - 1.5 (6.0)	50 - 5.0 (19.0)			11 - With 115 cu. in. (1884 cc.) Tank	
20 - 2.0 (8.0)	55 - 5.5 (21.0)			07 - With 70 cu. in. (1147 cc.) Tank	
25 - 2.5 (9.5)	60 - 6.0 (23.0)			MA - Manifold without bypass tube	
30 - 3.5 (13.0)	65 - 6.5 (25.0)			MF - Cast iron manifold with bypass tube	
40 - 4.0 (15.0)	70 - 7.0 (26.5)				
45 - 4.5 (17.0)	75 - 7.5 (28.0)				
Relief Valve Cracking Pressure Setting				Filter for Tank	
psi (bar)				no code - Standard baffle without filter	
05 - 500 (35)	15 - 1500 (100)			F - With filter	
07 - 750 (52)	17 - 1700 (120)				
10 - 1000 (70)	20 - 2000 (140)				
12 - 1250 (86)					

Model Series	Ring Size Delivery at 1200 r/min & 7 bar (100 psi) USgpm	Geometric Displacement cm ³ /r (in ³ /r)	Maximum Speed			Maximum Pressure bar (psi)	Weight kg (lb)
			at 7 bar (100 psi) rpm	at 100 bar (1500 psi) rpm	at 140 bar (2000 psi) rpm		
VTM42	1	3.4 (0.21)	7000	5000	4250	140 (2000)	6.4 (14)
	1.5	5.0 (0.31)	7000	4500	4000		
	2	6.2 (0.38)	7000	4200	3800		
	4	12.9 (0.79)	7000	2800	2800		
	5	15.7 (0.96)	6000	2600	2300		
	6	19.3 (1.18)	5000	2500	2000		

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E VTM42

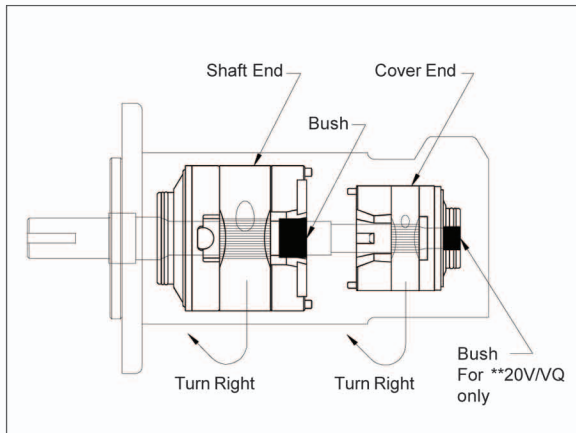


CARTRIDGE KIT FOR VANE PUMP E V AND E VQ SERIES

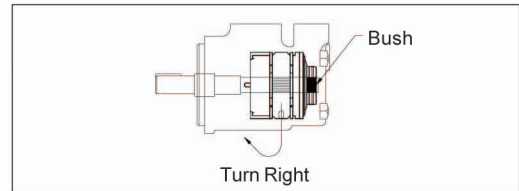


Cartridge Kit Position and Rotation:

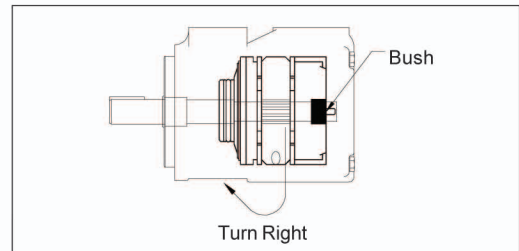
E V/VQ



Double Pump

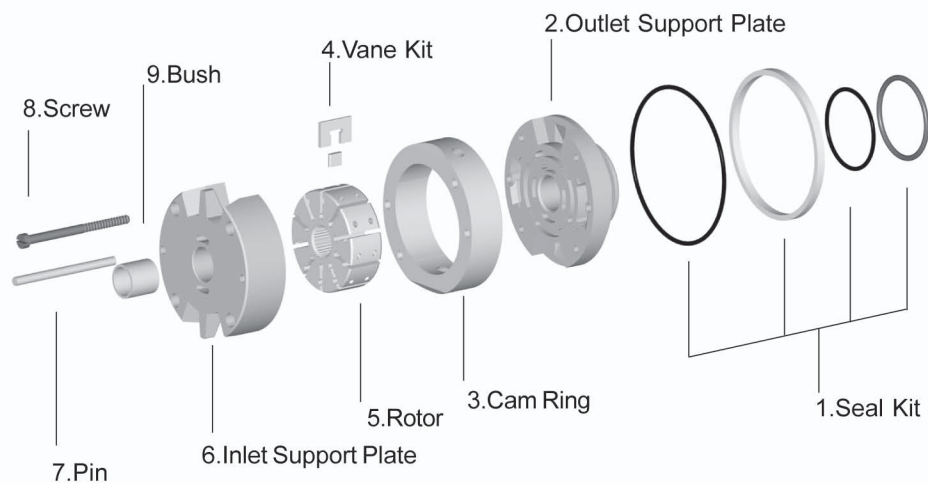


Single Pump, 20V/VQ

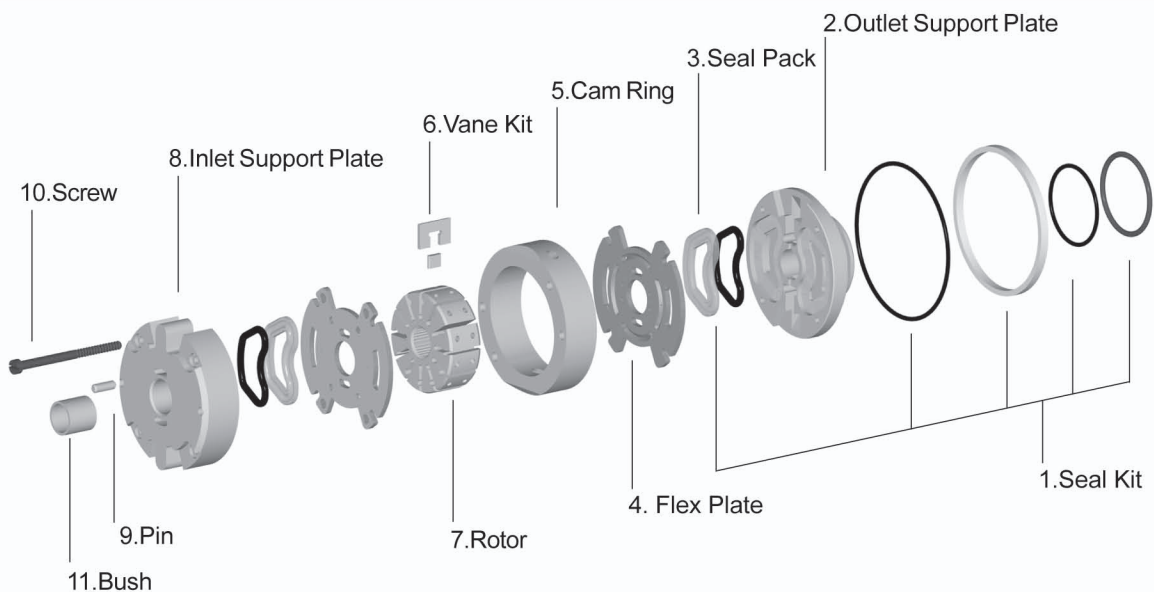


Single Pump, 25V/VQ, 35V/VQ, 45V/VQ

Cartridge Kit Components (E V Series):



Cartridge Kit Components (E VQ Series):



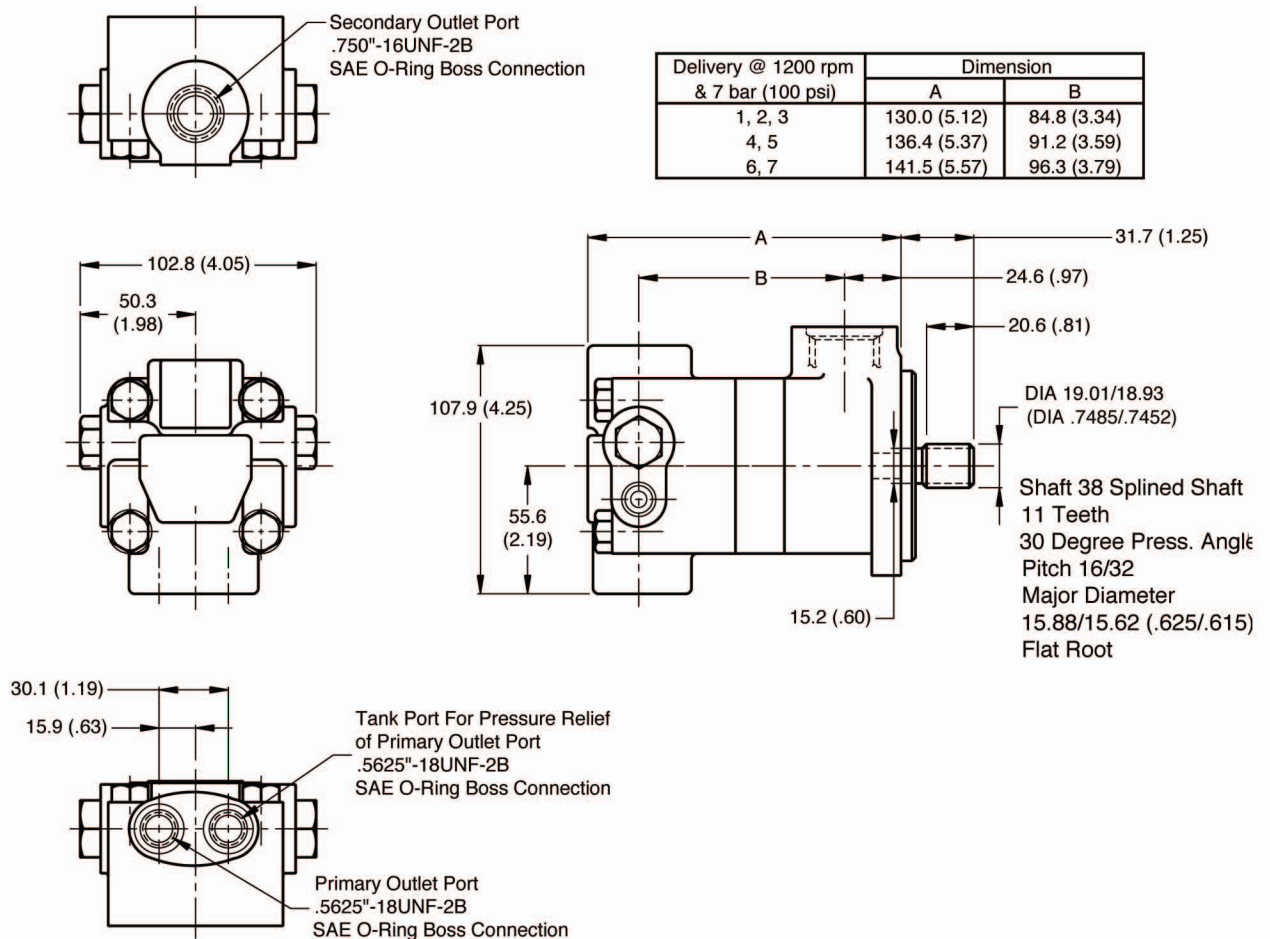
E V/VQ

FIXED DISPLACEMENT VANE PUMP SINGLE PUMP E V10

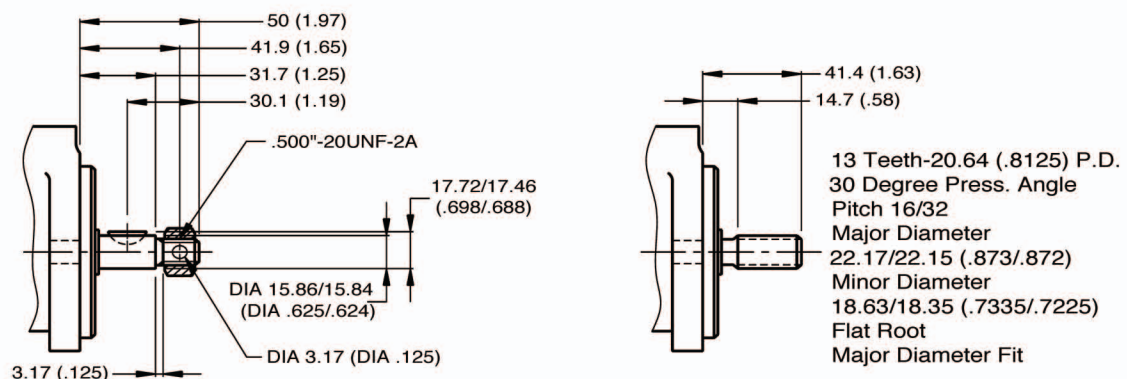


Installation Dimensions mm (inch):

E V10P



Other Shaft Options For E V10 Series:



Shaft 3 Threaded with #6 Woodruff Key

Shaft 12 Splined Shaft 13 Teeth

Instruction for Cartridge Replacement in Single Pump:

E V/VQ

1. Remove the four cover screws and lift the outlet cover. Pull out the old Cartridge. Discard the old large square cut seal and large O ring of the cartridge.

2. Check the wear surfaces of old cartridge. If the wear is normal just change oil in tank circuit and change or clean filters. If there is seizure or heavy wear in rotor, support plates (for V Series), and flex plates (for VQ Series), disassemble the pump completely. Check the shaft alignment and make sure that it is not twisted or crooked. The shaft may need to be changed and also check shaft seal and shaft bearing (remove the large lock ring to remove shaft seal and remove snap ring to remove bearing). Change them if neccessary. If these parts are defective or the oil is dirty, the new cartridge's service life will be shorter than normal.

3. Install square cut seal into the body. Install small O ring and back-up ring on the cartridge outlet support plate hub. Carefully install the cartridge into the body. Install the cover to the body with large O ring in the groove of the body. Install the cover in position; move back and forth until the cartridge pins drop into the alignment holes located within the cover. Install four screws and torque tighten to the values indicated.

Model	Torque Specification	
	N.m	lb.ft.
20V/VQ	48-55	65-75
25V/VQ	48-55	65-75
35V/VQ	102-118	140-160
45V/VQ	188-203	255-275

4. Turn the pump shaft to verify freedom of the cartridge.

Instruction for Cartridge Replacement in Double Pump:

1. Remove the four cover screws and lift the outlet cover. Pull out the old Cover End Cartridge (Pry with screw-driver if necessary). Remove four screws from the inlet housing. Lift inlet housing from the outlet body. Rotate shaft to loosen Shaft End Cartridge and remove the cartridge from outlet body. Discard the old large square cut seals and large O rings of both cartridges.

2. Check the wear surfaces of old cartridges. If the wear is normal just change oil in tank circuit and change or clean filters. If there is seizure or heavy wear in rotors, support plates (for V Series), and flex plates (for VQ Series), disassemble the pump completely. Check the shaft alignment and make sure that it is not twisted or crooked. The shaft may need to be changed and also check shaft seal and shaft bearing (remove the large lock ring to remove shaft seal and remove snap ring to remove bearing). Change them if neccessary. If these parts are defective or the oil is dirty, the new cartridges' service life will be shorter than normal.

3. For new Shaft End Cartridge, install square cut seal into the body. Install small O ring and back-up ring on the cartridge outlet support plate hub. Carefully install the cartridge into the body. Install the inlet housing to the body with large O ring in the groove of the body. Install inlet housing in position; move back and forth until the cartridge pins drop into the alignment holes located within the housing. Install four screws and torque tighten to the values indicated.

4. For new Cover End Cartridge, install a square cut seal into the cover. Install O ring and back-up ring on the cartridge outlet support plate hub. Carefully install cartridge over shaft and into the inlet housing. Turn cartridge slightly to bring into alignment the pin holes and cartridge alignment pins. Install the cover to inlet housing with O ring seal over the cartridge and up against the inlet housing. Make sure square cut seal is in place within the cover. Orient the cover to agree with the alignment. Install the cover with four screws and torque the screws to the value indicated.

Model	N.m	lb.ft.
2520V/VQ	54-68	40-50
3520V/VQ	54-68	40-50
3525V/VQ	88-102	65-75
4520V/VQ	54-68	40-50
4525V/VQ	88-102	65-75
4535V/VQ	188-203	255-275

5. Turn the pump shaft to verify freedom of both cartridges.

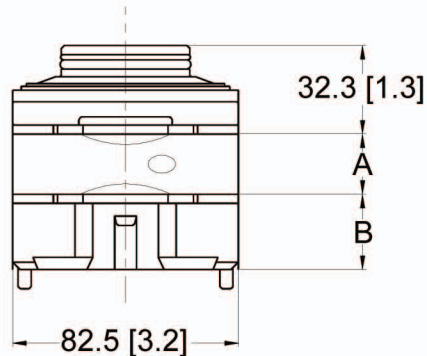
Model	N.m	lb.ft.
2520V/VQ	48-55	65-75
3520V/VQ	102-118	140-160
3525V/VQ	102-118	140-160
4520V/VQ	188-203	255-275
4525V/VQ	188-203	255-275

CARTRIDGE KIT FOR VANE PUMP E 20V AND FOR E 25V



Cartridge Kit 20V Installation Dimensions mm (inch):

E 20V/25V

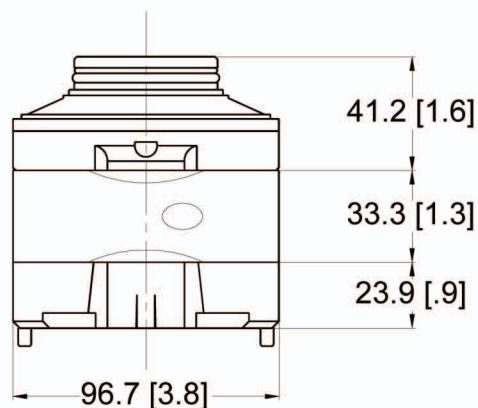


Delivery	A	B
5,8	21.95 [.86]	27.70 [1.09]
11,12,14	30.47 [1.20]	19.10 [0.75]

Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
5	18 (1.10)	1800	206 (3000)	28.4 (7.5)	11.2 (15.0)	2.4 (5.3)
8	27 (1.67)	1800	206 (3000)	45.4 (12.0)	17.0 (22.8)	2.4 (5.3)
11	36 (2.22)	1800	206 (3000)	56.8 (15.0)	22.6 (30.3)	2.3 (5.1)
12	40 (2.47)	1800	158 (2300)	62.1 (16.4)	25.1 (33.7)	2.3 (5.1)
14	45 (2.78)	1800	138 (2000)	69.6 (18.4)	28.3 (37.9)	2.3 (5.1)

Cartridge Kit 25V Installation Dimensions mm (inch):



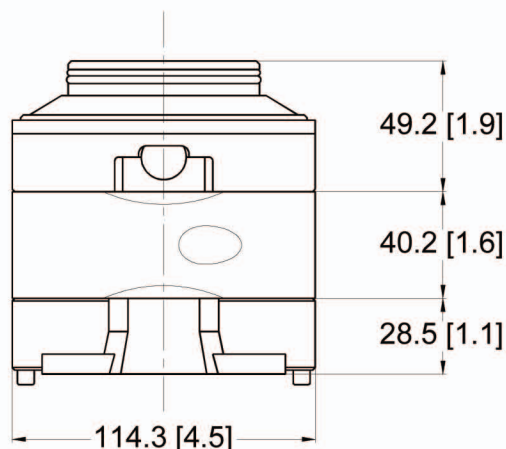
Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
12	39 (2.47)	1800	172 (2500)	62.1 (16.4)	22.9 (30.8)	3.6 (7.9)
14	45 (2.78)	1800	172 (2500)	69.6 (18.4)	25.7 (34.5)	3.6 (7.9)
17	55 (3.39)	1800	172 (2500)	86.3 (22.8)	29.8 (40.0)	3.6 (7.9)
21	67 (4.13)	1800	172 (2500)	106.0 (28.0)	34.0 (45.6)	3.6 (7.9)

E 20V/25V

Cartridge Kit 35V Installation Dimensions mm (inch):

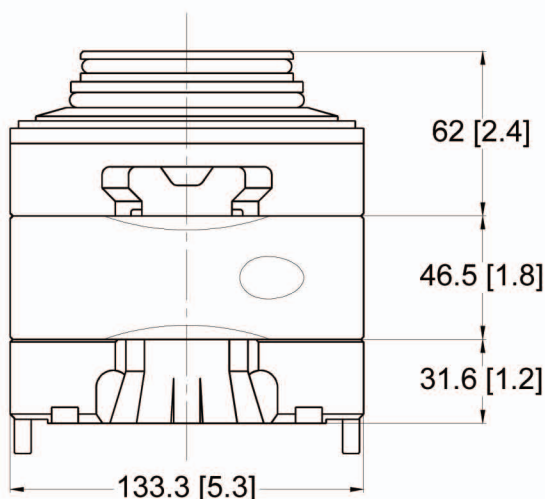
E 35V/45V



Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
25	81 (4.94)	1800	172 (2500)	124.9 (33.0)	45.5 (61.0)	6.5 (14.3)
30	97 (5.91)	1800	172 (2500)	154.4 (40.8)	54.5 (73.0)	6.5 (14.3)
35	112 (6.83)	1800	172 (2500)	181.7 (48.0)	61.5 (82.4)	6.5 (14.3)
38	121 (7.37)	1800	172 (2500)	193.8 (51.2)	65.9 (88.3)	6.5 (14.3)

Cartridge Kit 45V Installation Dimensions mm (inch):



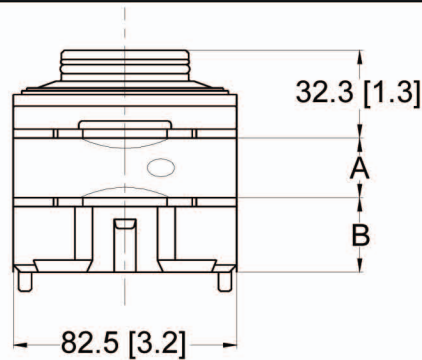
Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	10.1 (22.3)
50	162 (9.85)	1800	172 (2500)	253.6 (67.0)	87.3 (117.0)	10.1 (22.3)
60	193 (11.75)	1800	172 (2500)	310.4 (82.0)	103.7 (139.0)	10.1 (22.3)

CARTRIDGE KIT FOR VANE PUMP E 20VQ AND FOR E 25VQ



Cartridge Kit 20VQ Installation Dimensions mm (inch): E 20VQ/25VQ

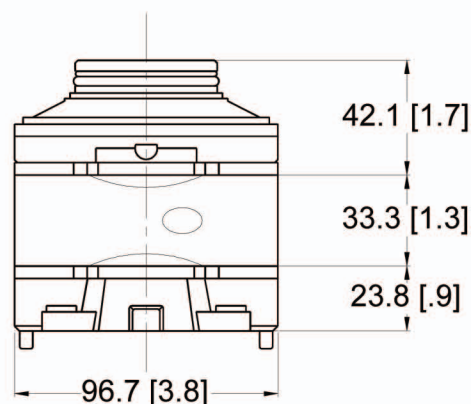


Delivery	A	B
5,8	21.95 [.86]	27.70 [1.09]
11,12,14	30.47 [1.20]	19.10 [0.75]

Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
5	18 (1.10)	2700	206 (3000)	41.6 (11.0)	17.9 (24.0)	2.4 (5.3)
8	27 (1.67)	2700	206 (3000)	64.3 (17.0)	26.1 (35.0)	2.4 (5.3)
11	36 (2.22)	2700	206 (3000)	87.1 (23.0)	35.4 (47.5)	2.3 (5.1)
12	39 (2.41)	2700	158 (2300)	96.5 (25.5)	28.3 (38.0)	2.3 (5.1)
14	45 (2.80)	2700	138 (2000)	113.6 (30.0)	29.1 (39.0)	2.3 (5.1)

Cartridge Kit 25VQ Installation Dimensions mm (inch):

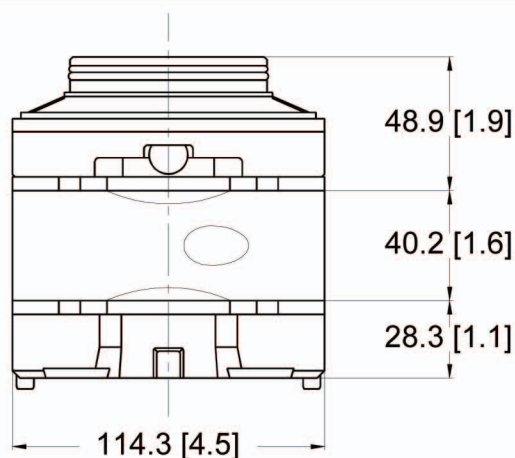


Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
12	40 (2.45)	2700	206 (3000)	87.1 (23.0)	41.0 (55.0)	3.6 (7.9)
14	45 (2.77)	2700	206 (3000)	102.2 (27.0)	46.6 (62.5)	3.6 (7.9)
17	55 (3.37)	2500	206 (3000)	117.3 (31.0)	51.8 (69.5)	3.6 (7.9)
21	67 (4.12)	2500	206 (3000)	143.8 (38.0)	61.9 (83.0)	3.6 (7.9)

E 20VQ/25VQ

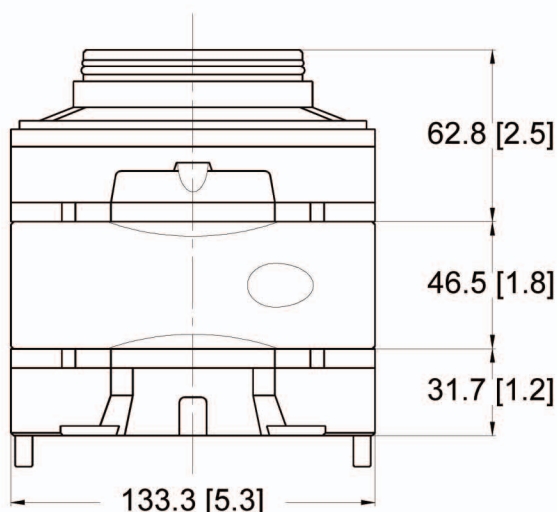
Cartridge Kit 35VQ Installation Dimensions mm (inch): E 35VQ/45VQ



Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
25	81 (4.98)	2500	206 (3000)	170.3 (45.0)	75.3 (101.0)	6.5 (14.3)
30	97 (5.96)	2500	206 (3000)	208.2 (55.0)	87.7 (117.5)	6.5 (14.3)
35	112 (6.88)	2400	206 (3000)	227.1 (60.0)	98.5 (132.0)	6.5 (14.3)
38	121 (7.42)	2400	206 (3000)	246.0 (65.0)	104.4 (140.0)	6.5 (14.3)

Cartridge Kit 45VQ Installation Dimensions mm (inch):



Specifications

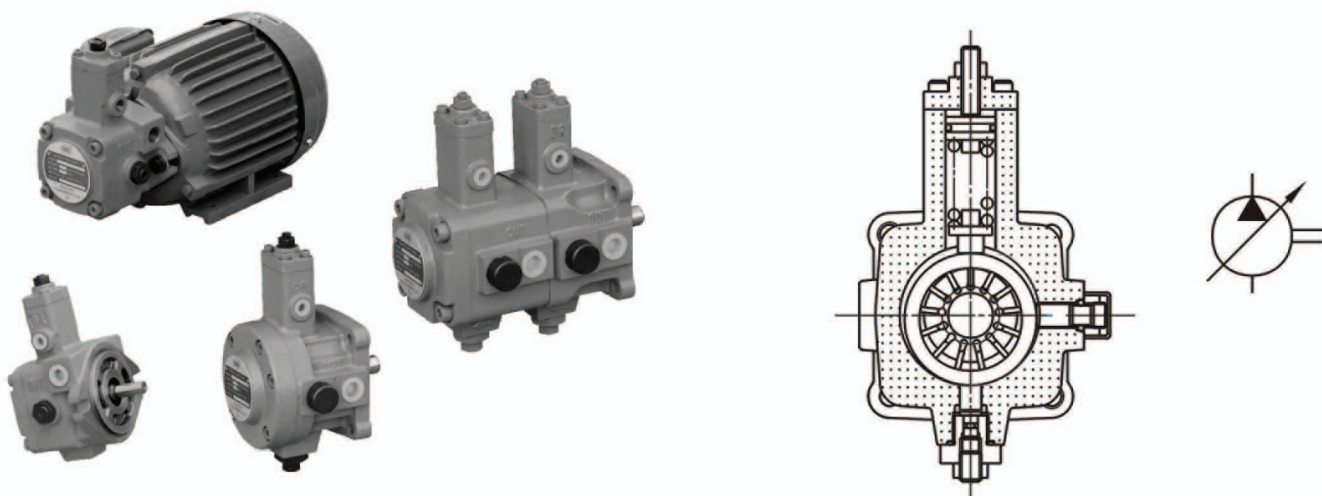
Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	10.1 (22.3)
50	162 (9.85)	1800	172 (2500)	253.6 (67.0)	87.3 (117.0)	10.1 (22.3)
60	193 (11.75)	1800	172 (2500)	310.4 (82.0)	103.7 (139.0)	10.1 (22.3)

VARIABLE DISPLACEMENT VANE PUMPS

EVPV SERIES



Single Pumps model Code:



EVPV1/NPV2

M-	EVPV1	-12	-55	-1.5	-10
Prefix, fluid compatibility	Series	outlet flow(L/min)	operating pressure range(MPa)	Input power(kW)	Design
M: With motor Omit: Without motor	EVPV1	8	2.0 3.5 5.5 7.0	0.75 1.5 2.25 3.75	-10
		12			
		15			
		20			
	EVPV2	30			-20
		40			

Double Pumps model Code:

EVPV22	-30	-70	/-30	-55	-20
Series	Outlet Flow L/min (shaft end pump)	Operating pressure range MPa (shaft end pump)	Outlet Flow L/min (cover end pump)	Operating pressure range MPa (cover end pump)	Design
EVPV11	8	2.0 3.5 5.5 7.0	8	2.0 3.5 5.5 7.0	-20
	12		12		
	15		15		
	20		20		
EVPV22	30		30		-20
	40		40		

Specification:

EVPV1/VPV2

Model	Max. Displacement mL/r	Flow (0MPa 1800r/min) L/min	Operating pressure range MPa	Speed range r/min	Rotation (viewed from shaft end)	Input power kW(HP)	
						1800r/min	1500r/min
E VPV1-8-20	5.3	9.5	0.8-2.0	800-1800	Right hand (for clockwise)	0.29(0.5)	0.29(0.5)
E VPV1-8-35			1.5-3.5			0.59(1)	0.44(0.5)
E VPV1-8-55			3.0-5.5			0.87(1)	0.59(1)
E VPV1-8-70			5.0-7.0			1.19(1.5)	1.19(1.5)
EVPV1-12-20	6.7	12	0.8-2.0			0.37(0.5)	0.37(0.5)
EVPV1-12-35			1.5-3.5			0.75(1)	0.55(1)
EVPV1-12-55			3.0-5.5			1.1(1.5)	0.75(1.0)
EVPV1-12-70			5.0-7.0			1.5(2)	1.5(2.0)
EVPV1-15-20	8.3	15	0.8-2.0			0.5(1)	0.55(1)
EVPV1-15-35			1.5-3.5			1.1(1.5)	0.75(1.0)
EVPV1-15-55			3.0-5.5			1.5(2)	1.1(2)
EVPV1-15-70			5.0-7.0			1.5(2)	1.5(2)
EVPV1-20-20	11.1	20	0.8-2.0			0.75(1)	0.55(1)
EVPV1-20-35			1.5-3.5			1.1(2)	1.1(2)
EVPV1-20-55			3.0-5.5			1.5(2)	1.5(2)
EVPV1-20-70			5.0-7.0			2.2(3)	2.2(3)
EVPV2-30-20	16.7	30	0.8-2.0			1.1(2)	0.75(1)
EVPV2-30-35			1.5-3.5			1.5(2)	1.5(2)
EVPV2-30-55			3.0-5.5			2.2(3)	2.2(3)
EVPV2-30-70			5.0-7.0			3.75(5)	3.0(5)
EVPV2-40-20	22.2	40	0.8-2.0			1.5(2)	1.1(2)
EVPV2-40-35			1.5-3.5			2.2(3)	2.0(3)
EVPV2-40-55			3.0-5.5			3.75(5)	3.0(5)
EVPV2-40-70			5.0-7.0			5.5(7.5)	4.0(5)

VARIABLE DISPLACEMENT VANE PUMPS

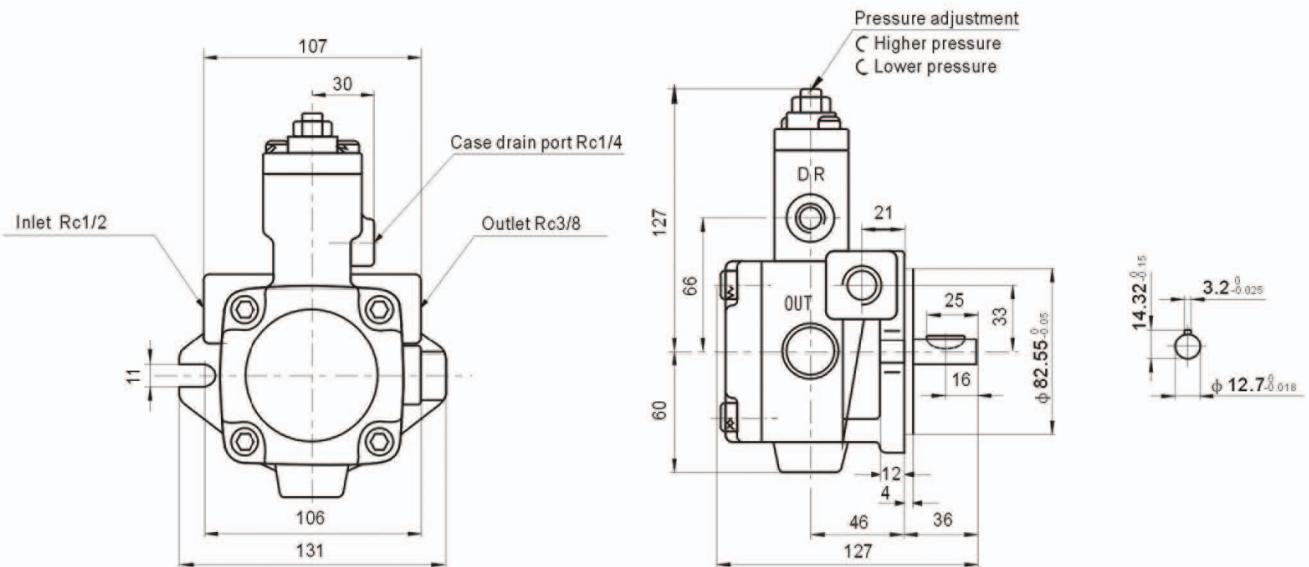
VPV SERIES



Intallation Dimensions:

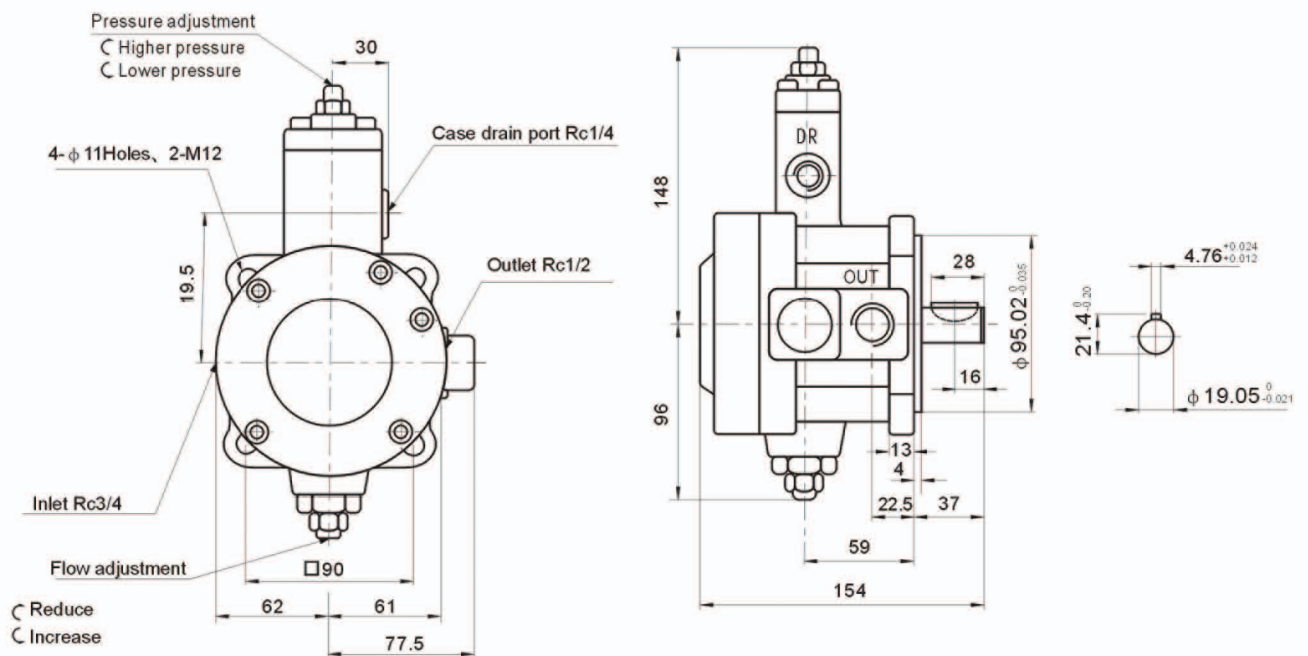
EVPV1/VPV2

EVPV1-※-※-10



Note: No flow adjustment

EVPV2-※-※-20

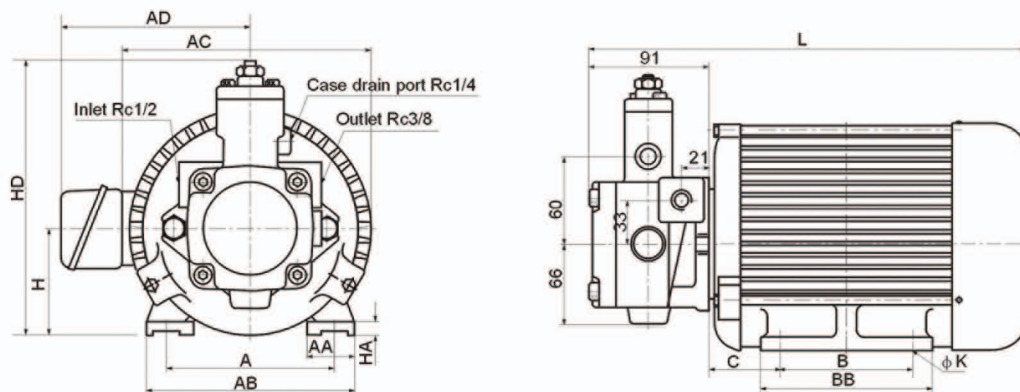


EVPV1/VPV2

Intallation Dimensions:

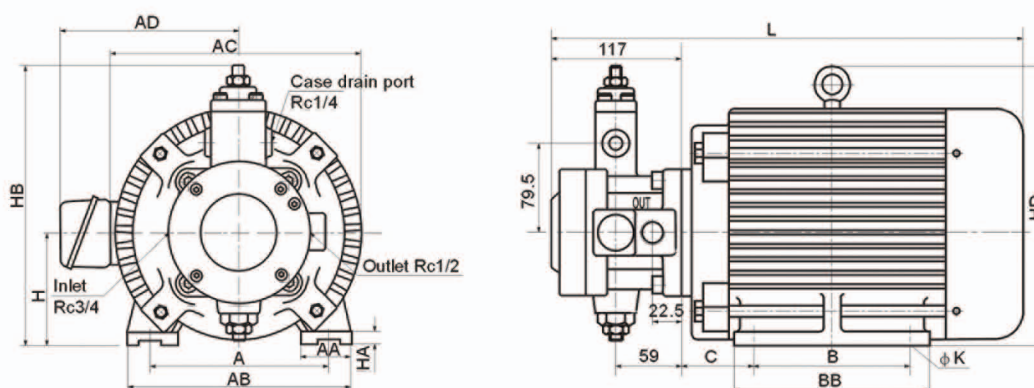
EM-VPV1/VPV2

EM-VPV1-※



Outlet flow L/min	Pressure MPa	Input power KW	A	AA	AB	AC	AD	B	BB	C	H	HA	HD	K	L
12	3.5	0.75	125	35	155	177	140	100	130	53.5	80	10	207	10	331
	5.5	0.75	125	35	155	177	140	100	130	53.5	80	10	207	10	331
	7.0	1.50	140	35	170	196	160	125	150	57	90	10	227	10	369
15	3.5	0.75	125	35	155	177	140	100	130	53.5	80	10	207	10	331
	5.5	1.50	140	35	170	196	160	125	150	57	90	10	227	10	369
	7.0	1.50	140	35	170	196	160	125	150	57	90	10	227	10	369
20	3.5	0.75	125	35	155	177	140	100	130	53.5	80	10	207	10	331
	5.5	1.50	140	35	170	196	160	125	150	57	90	10	227	10	369
	7.0	1.50	140	35	170	196	160	125	150	57	90	10	227	10	369

EM-VPV2-※



Outlet flow L/min	Pressure MPa	Input power KW	A	AA	AB	AC	AD	B	BB	C	H	HA	HB	HD	K	L
30	3.5	1.5	140	35	170	196	160	125	150	57	90	10	238	-	12	395
	5.5	2.25	160	45	200	225	160	140	175	65	100	12	248	247	12	424
	7.0	3.75	190	45	228	245	180	140	175	73.5	112	12	260	265	12	447
40	3.5	1.5	140	35	170	196	160	125	150	57	90	10	238	-	12	395
	5.5	3.75	190	45	228	245	180	140	175	73.5	112	12	260	265	12	447
	7.0	5.5	216	45	250	270	190	140	175	77	132	16	280	310	12	452

VARIABLE DISPLACEMENT VANE PUMPS

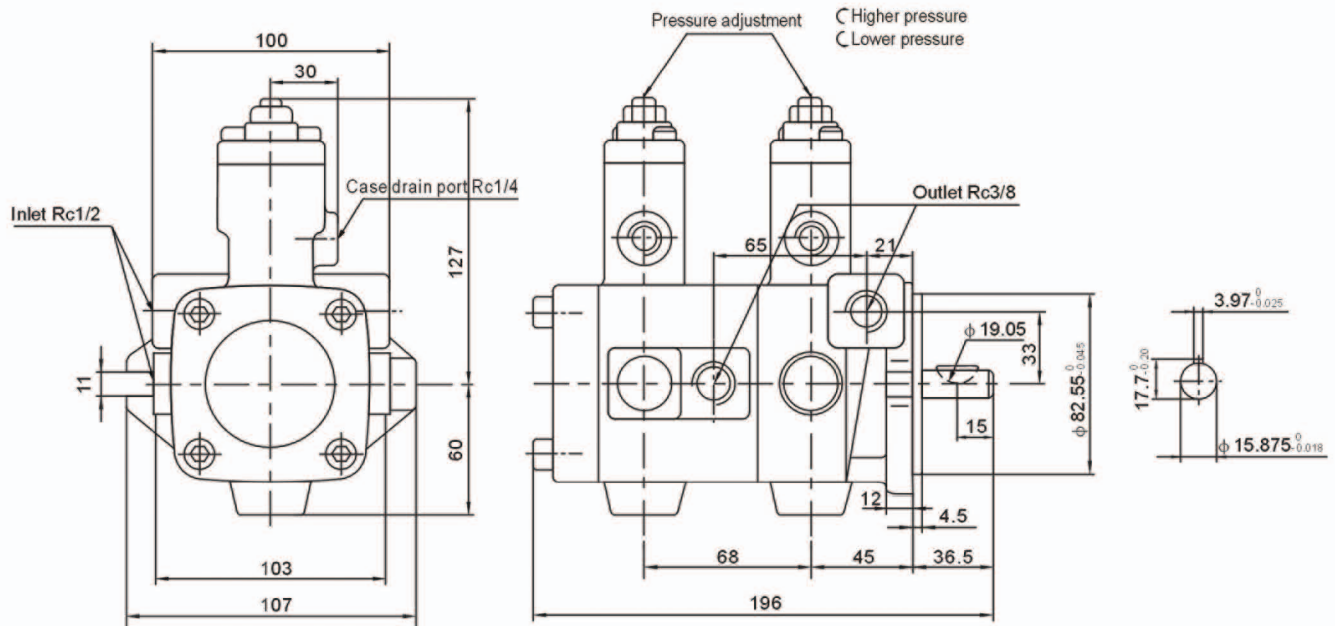
VPV SERIES



Intallation Dimensions:

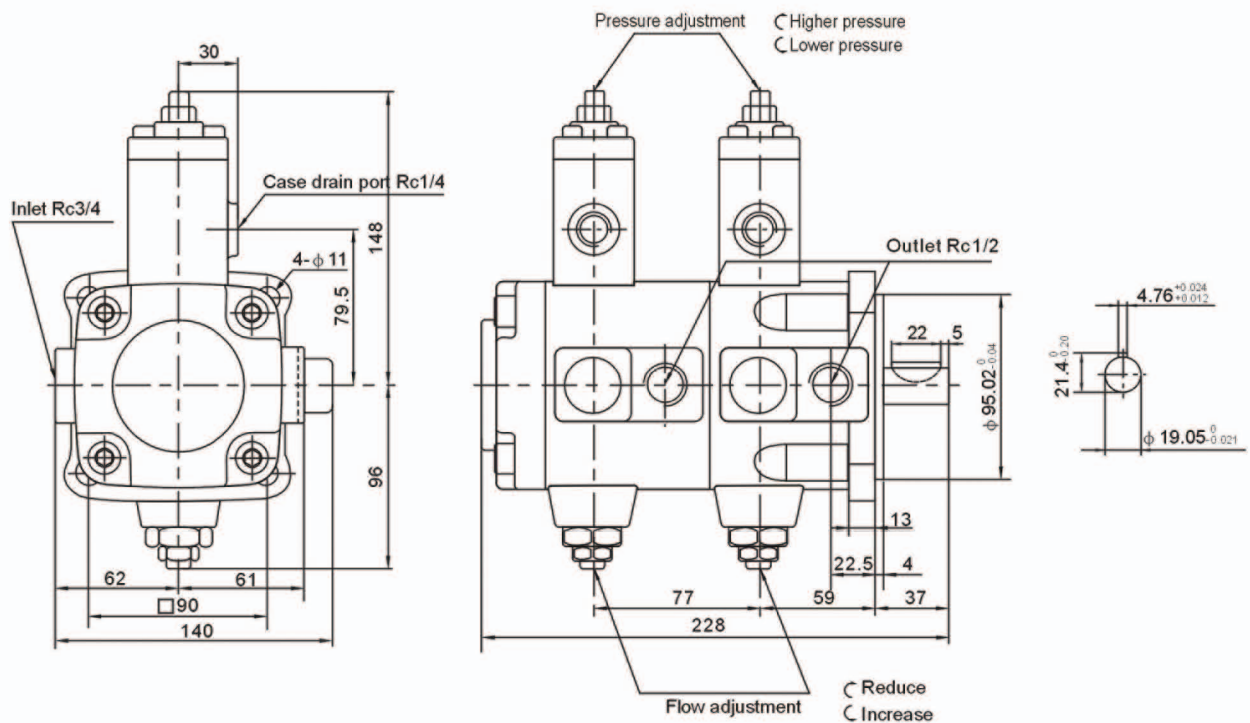
EVPV11/VPV22

EVPV11



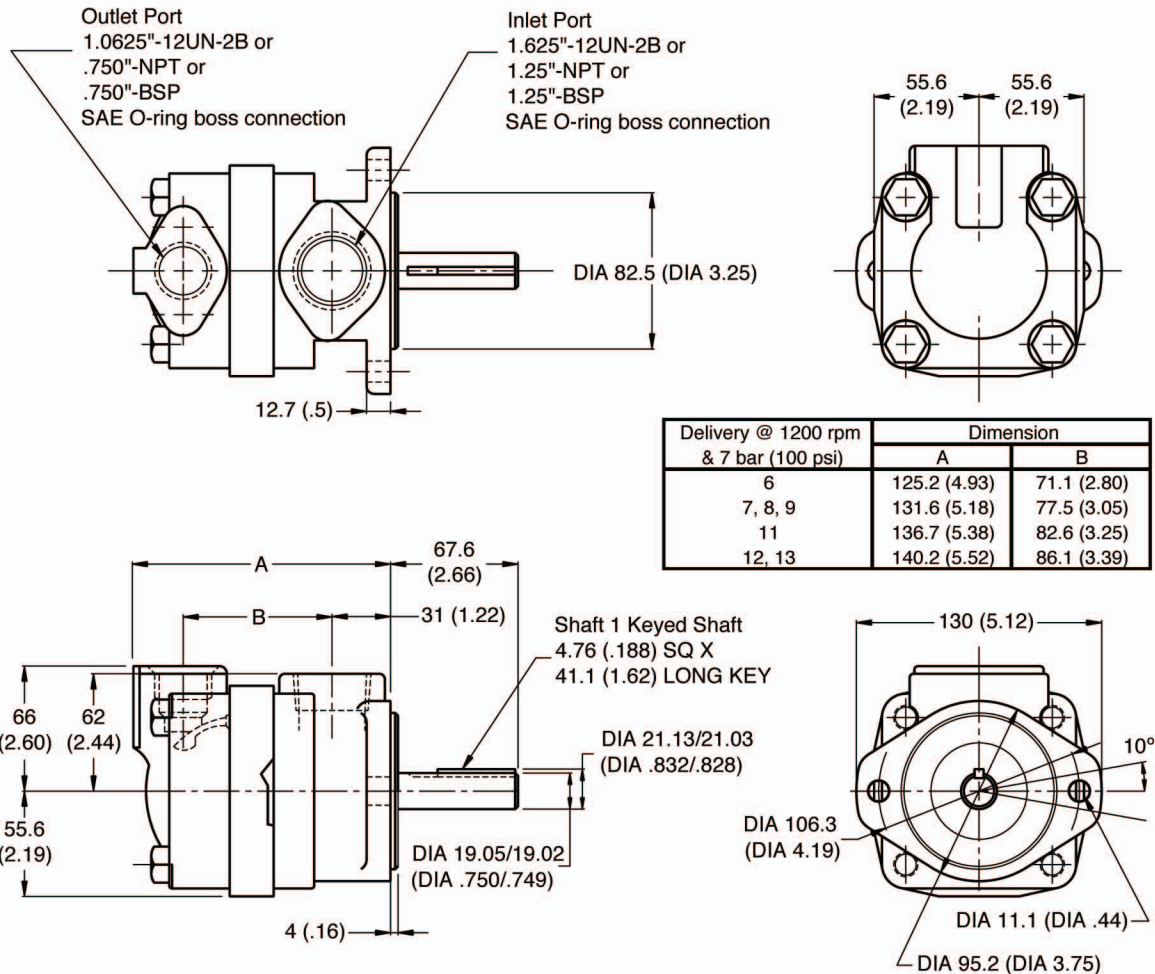
Note: No flow adjustment

EVPV22

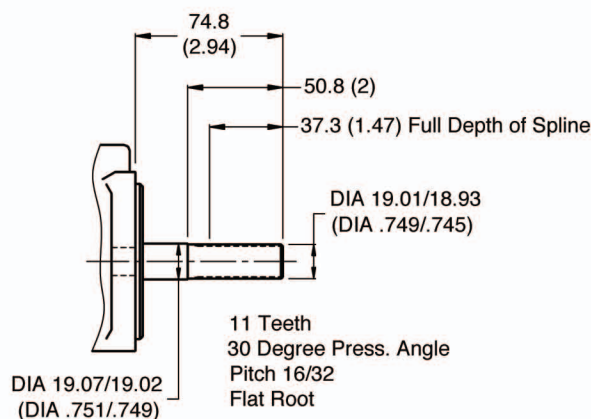


Installation Dimensions mm (inch):

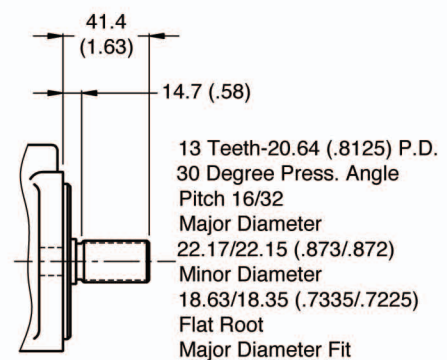
E V20



Other Shaft Options For E V20 Series:



Shaft 11 Splined Shaft 11 Teeth

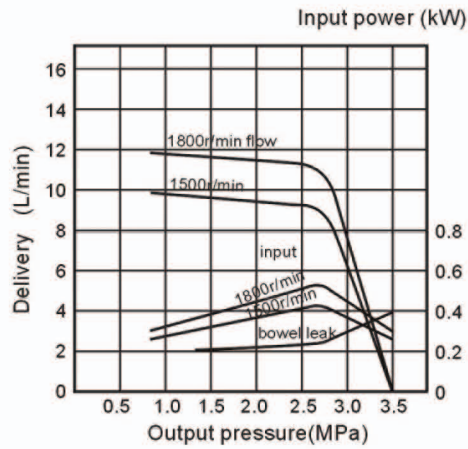


Shaft 15 Splined Shaft 13 Teeth

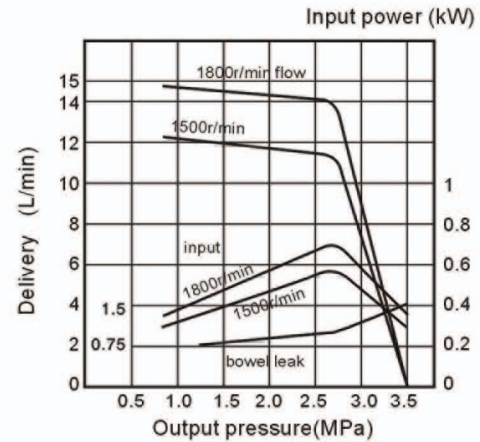
Curves:

EVPV1

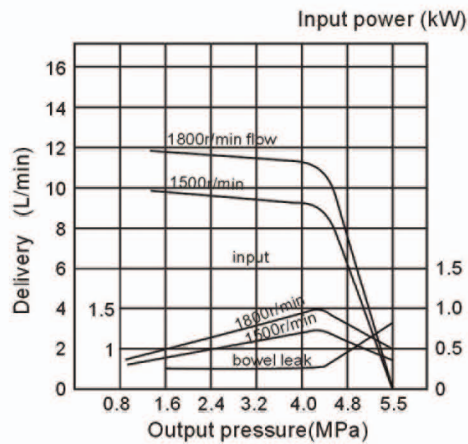
EVPV1-12-35



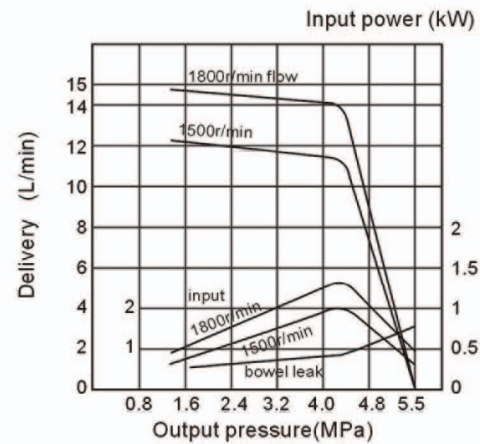
EVPV1-15-35



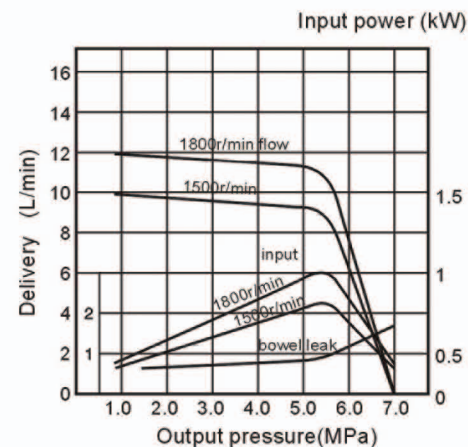
EVPV1-12-55



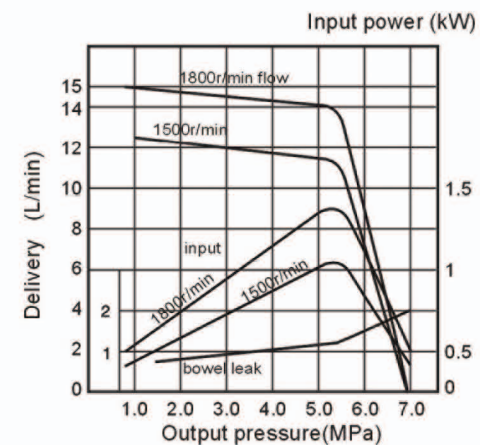
EVPV1-15-55



EVPV1-12-70



EVPV1-15-70



VARIABLE DISPLACEMENT VANE PUMPS

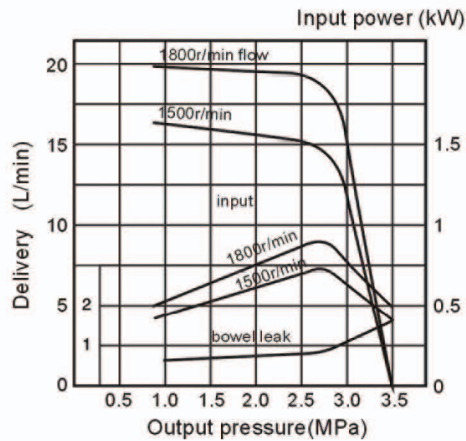
VPV SERIES



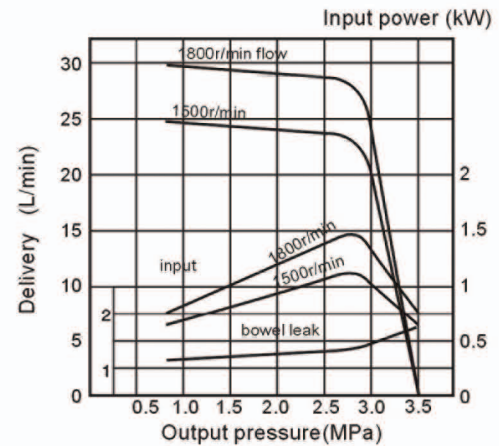
Curves:

EVPV1/VPV2

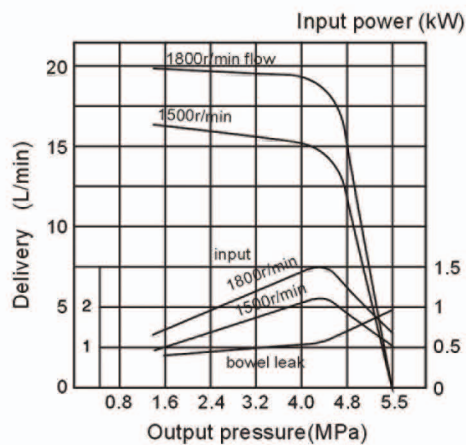
EVPV1-20-35



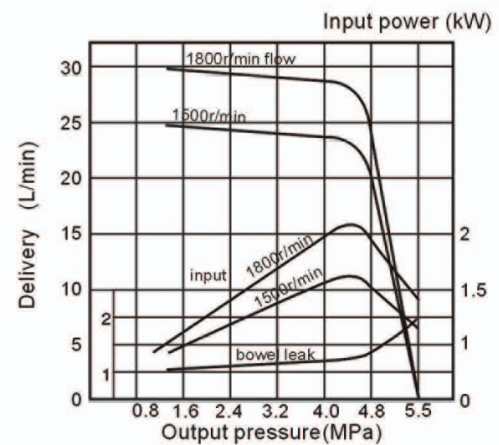
EVPV2-30-35



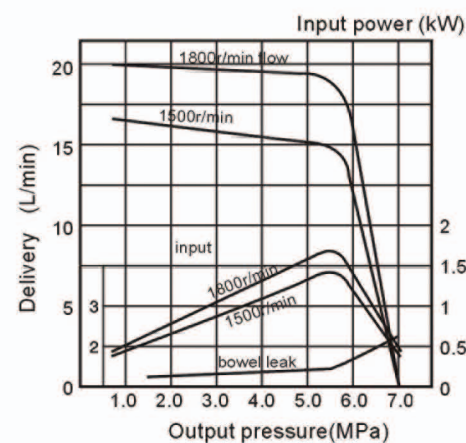
EVPV1-20-55



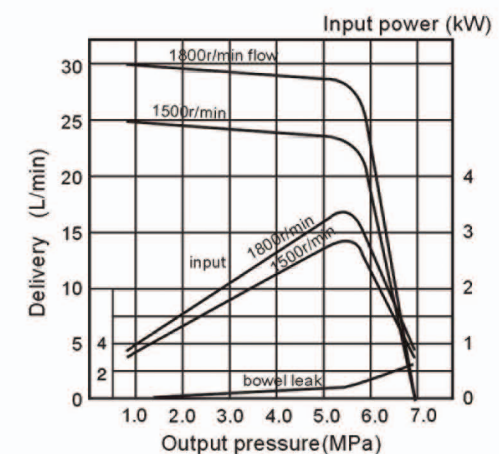
EVPV2-30-55



EVPV1-20-70



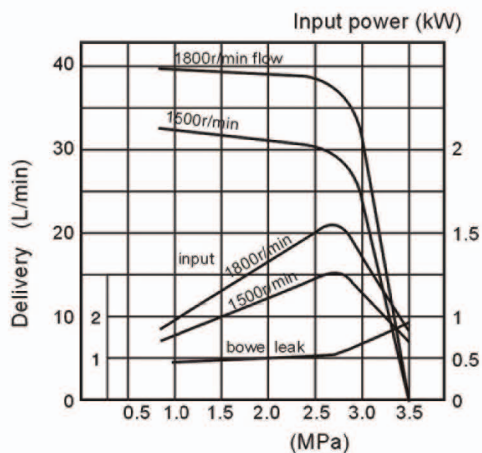
EVPV2-30-70



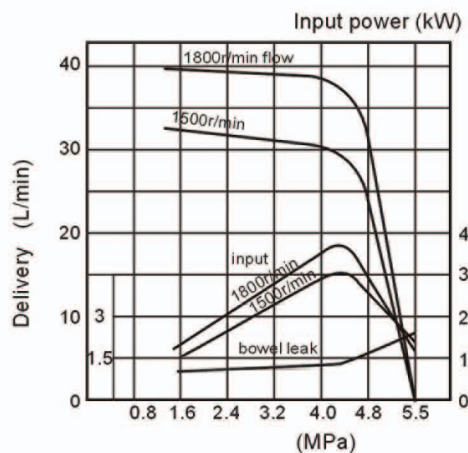
Curves:

EVPV2

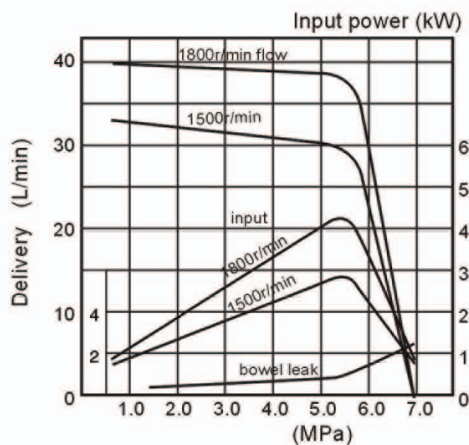
EVPV2-40-35



EVPV2-40-55

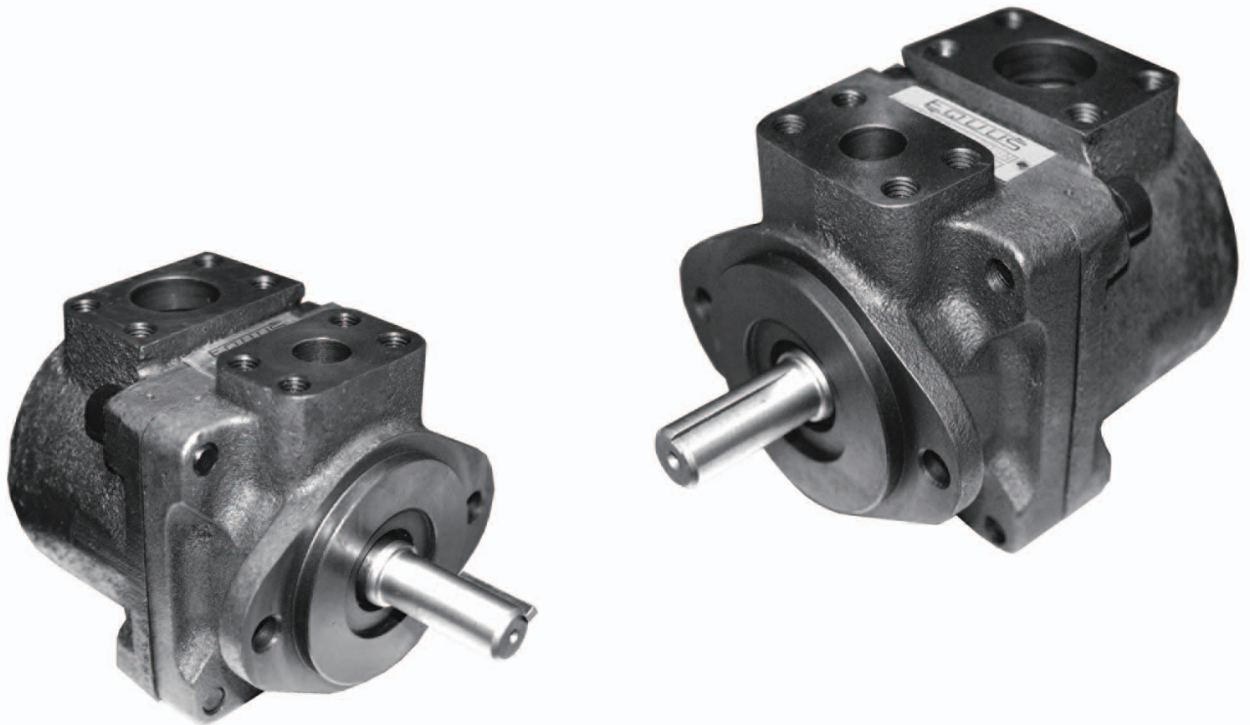


EVPV2-40-70



Features:

EPFE



▲ General Description

PFE series are fixed displacement and twelve vane pumps featuring cartridge design with integral hydraulic balancing for high pressure operation and long service life at low noise level. These pumps are available as single and multiple configurations.

Mounting according to SAE and ISO 3019 standards. Easy installation as inlet and outlet ports can be oriented in any of four relative positions.

Easy maintenance as the pumping cartridge can be replaced in a few minutes.

Wide variety of displacement is up to 150mL/r.

There are 8 series and 75 sizes of PFE pump including single ones (PEE – 31/41/51/32/42/52) and double ones (PFE – 4131/5141).

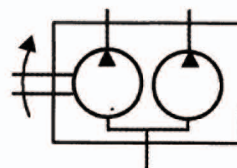
Displacement range: 16.5 ~ 150mL/r, (new PFE – 21/61,5 ~ 250mL/r)

Rated operating pressure: 21 ~ 30MPa

Speed: 600 ~ 2800rpm

Ordering Code:

EPFE/PFED



EPFED—	4131	045/	022/	1	D	TO	/PF
EPFE series fixed displacement vane pump	Series number	Single pump or double pump larger displacement volume side geometric displacement (ml/r)	Double pump smaller displacement volume side geometric displacement (ml/r)	★ ¹ Shaft extension	Direction of rotation (viewed from shaft end)	Port orientation	Suitable fluids
EPFE: single pump series	21	5,6,8,10,12,16	—	1—	D: CW S: CCW	See port orientation table [inlet and outlet ports can be oriented in any of four relative positions: T, V, U, W]	None: petroleum base fluid water glycol fluid /PF: phosphoric ester
	31	16,22,28,36,44	—	Cylindrical type (standard)			
	41	29,37,45,56,70,85	—	2— (ISO/DIS3019) Cylindrical type(ISO/DI S3019)			
	51	90,110,129,150	—				
	61	160,180,200,224,250	—				
	22	8,10,12	—	3— Cylindrical type(high torque)			
	32	22,28,36	—				
	42	45,56,70	—	5— Splined type			
	52	90,110,129	—				

PIN TYPE VANE PUMPS

EPFE SERIES



Ordering Code:

EPFE/PFED

EPFED—	4131	045/	022/	1	D	TO	/PF
EPFE series fixed displacement vane pump	Series number	Single pump or double pump larger displacement volume side geometric displacement (ml/r)	Double pump smaller displacement volume side geometric displacement (ml/r)	Shaft extension	Direction of rotation (viewed from shaft end)	Port orientation	Suitable fluids
EPFED double pump series	4131	29,37,45,56,70,85	16,22,28,36,44	1— Cylindrical type (standard) 2— (ISO/DIS3019) Cylindrical type(ISO/DIS 3019)	D: CW S: CCW	See port orientation table [inlet and two outlet ports can be oriented in any of thirty two relative positions]	
	5141	90,110,129,150	29,37,45,56,70,85	3— Cylindrical type (high torque) 5— Splined type 6— Splined type			

If other shaft extension type or displacement is needed, contact with us.

If other combination of displacement and pressure is needed, contact with us.

Cartridge model code:

SC	EPFE—31036/D
Cartridge	Single pump model including series number, geometric displacement and rotation

EPFE/PFED

Ordering Code:

EPFE

(Using anti-wear hydraulic oil, 24cSt at 50℃)

Model	Displacement (ml/r)	Rated pressure (MPa)	Output flow (L/min)	Driving power (kW)	Speed range (r/min)	Weight (kg)	Port size	
							Inlet	Outlet
EPFE—21005	5.0	21	4.8	3.5	900 ~ 3000	6	$\frac{3}{4}$ "	$\frac{1}{2}$ "
EPFE—21006	6.3		5.8	4.0				
EPFE—21008	8.0		7.8	5.5				
EPFE—21010	10.0		9.7	6.5				
EPFE—21012	12.5		12.2	8				
EPFE—21016	16.0		15.6	10				
EPFE—31016	16.5	21	16	6.5	800 ~ 2800	9	$1\frac{1}{4}$ "	$\frac{3}{4}$ "
EPFE—31022	21.6		23	10				
EPFE—31028	28.1		33	14				
EPFE—31036	35.6		43	18				
EPFE—31044	43.7		55	23				
EPFE—41029	29.3	21	34	14	700 ~ 2500	14	$1\frac{1}{2}$ "	1"
EPFE—41037	36.6		45	18				
EPFE—41045	45.0		57	23				
EPFE—41056	55.8		72	30				
EPFE—41070	69.9		91	37				
EPFE—41085	85.3		114	47	700 ~ 2000			
EPFE—51090	90.0	21	114	47	600 ~ 2200	25.5	2"	$1\frac{1}{4}$ "
EPFE—51110	109.6		141	58				
EPFE—51129	129.2		168	69				
EPFE—51150	150.2		197	80	600 ~ 1800			
E※PFE—61160	160	21	211	94	600 ~ 1800	$2\frac{1}{2}$ "	$1\frac{1}{2}$ "	
E※PFE—61180	180		237	106				
E※PFE—61200	200		264	117				
E※PFE—61224	224		295	131				

Ordering Code:

EPFED

Model	Displacement (ml/r)	Rated pressure (MPa)	Output flow (L/min)	Driving power (kW)	Speed range (r/min)	Weight (kg)	Port size	
							Inlet	Outlet
EPFE—32022	21.6	30	20	15	1200 ~ 2500	9	1 $\frac{1}{4}$ "	$\frac{3}{4}$ "
EPFE—32028	28.1		30	21				
EPFE—32036	35.6		40	27				
EPFE—42045	45.0	28	56	31	1000 ~ 2200	14	1 $\frac{1}{2}$ "	1"
EPFE—42056	55.8		70	40				
EPFE—42070	69.9	25	90	47				
EPFE—52090	90.0	25	111	57	1000 ~ 2000	25.5	2"	1 $\frac{1}{4}$ "
EPFE—52110	109.6		138	69				
EPFE—52129	129.2		163	81				

EPFE series double pump

Model	Displacement (ml/r)	Rated pressure (MPa)	Output flow (L/min)	Driving power (kW)	Speed range (r/min)	Weight (kg)	Port size		
							Inlet	First outlet	Second outlet
EPFED—4131※/※	EPFE-41 + PFE-31 Composed by: cartridge of PFE-41 plus cartridge of PFE-31				800 ~ 2500 (800 ~ 2000) the first element speed at the largest displacement	24.5	2 $\frac{1}{2}$ "	1"	$\frac{3}{4}$ "
EPFED—5141※/※	EPFE-51 + PFE-41 Composed by: cartridge of PFE-51 plus cartridge of PFE-41				700 ~ 2000 (700 ~ 1800) the first element speed at the largest displacement	36	3"	1 $\frac{1}{4}$ "	1"

Note: 1. Output flow and driving power in the table are the values guaranteed at rated working condition; $n = 1500$ rpm and $p = p_n$ (rated pressure)

2. First element is the shaft end (larger volume) pump, second element is the head end (smaller volume) pump.

Ordering Code:

EPFED

Model	Theoretical displacement (ml/r)		Rated pressure (MPa)		Output flow (L/min)		Driving Poven (kW)		Speed range (r/min)	Weight (kg)	Port size		
	Frist element	Second element	Frist element	Second element	First element	Second element	First element	Second element			Inlet	First outlet	Second outlet
EPFED—4131029/016	29.3	16.5	21	21	34	16	14	6.5	800 ~ 2500	24.5	2 $\frac{1}{2}$ "	1"	$\frac{3}{4}$ "
EPFED—4131029/022		21.6				23		10					
EPFED—4131029/028		28.1				33		14					
EPFED—4131037/016	36.6	16.5			45	16	18	6.5					
EPFED—4131037/022		21.6				23		10					
EPFED—4131037/028		28.1				33		14					
EPFED—4131037/036		35.6				43		18					
EPFED—4131045/016	45.0	16.5			57	16	24	6.5					
EPFED—4131045/022		21.6				23		10					
EPFED—4131045/028		28.1				33		14					
EPFED—4131045/036		35.6				43		18					
EPFED—4131045/044		43.7				55		23					
EPFED—4131056/016	55.8	16.5			72	16	30	6.5					
EPFED—4131056/022		21.6				23		10					
EPFED—4131056/028		28.1				33		14					
EPFED—4131056/036		35.6				43		18					
EPFED—4131056/044		43.7				55		23					
EPFED—4131070/016	69.9	16.5			91	16	37	6.5					
EPFED—4131070/022		21.6				23		10					
EPFED—4131070/028		28.1				33		14					
EPFED—4131070/036		35.6				43		18					
EPFED—4131070/044		43.7				55		23					
EPFED—4131085/016	85.3	16.5			114	16	46	6.5					
EPFED—4131085/022		21.6				23		10					
EPFED—4131085/028		28.1				33		14					
EPFED—4131085/036		35.6				43		18					
EPFED—4131085/044		43.7				55		23					

PIN TYPE VANE PUMPS

EPFED SERIES



Ordering Code:

EPFED

Model	Theoretical displacement (ml/r)		Rated pressure (MPa)		Output flow (L/min)		Driving Power (kW)		Speed range (r/min)	Weight (kg)	Port size													
	First element	Second element	First element	Second element	First element	Second element	First element	Second element			Inlet	First outlet	Second outlet											
E PFED—5141090/029	90.0	29.3	21	21	114	48	14	700 ~ 2000	36	3"	1 $\frac{1}{4}$ "	1"												
E PFED—5141090/037		36.6											45	18										
E PFED—5141090/045		45.0													57	24								
E PFED—5141090/056		55.8															72	30						
E PFED—5141090/070		69.9																	91	37				
E PFED—5141090/085		85.3																			114	46		
E PFED—5141110/029	109.6	29.3			141	58	14																	
E PFED—5141110/037													36.6	45									18	
E PFED—5141110/045															45.0	57								24
E PFED—5141110/056																	55.8	72						
E PFED—5141110/070																			69.9	91				
E PFED—5141110/085																					85.3	114		
E PFED—5141129/029	129.2	29.3			168	69	14																	
E PFED—5141129/037													36.6	45									18	
E PFED—5141129/045															45.0	57								24
E PFED—5141129/056																	55.8	72						
E PFED—5141129/070																			69.9	91				
E PFED—5141129/085																					85.3	114		
E PFED—5141150/029	150.2	29.3			197	80	14																	
E PFED—5141150/037								36.6					45	18										
E PFED—5141150/045															45.0	57							24	
E PFED—5141150/056																	55.8	72						30
E PFED—5141150/070																			69.9	91				
E PFED—5141150/085																					85.3	114		

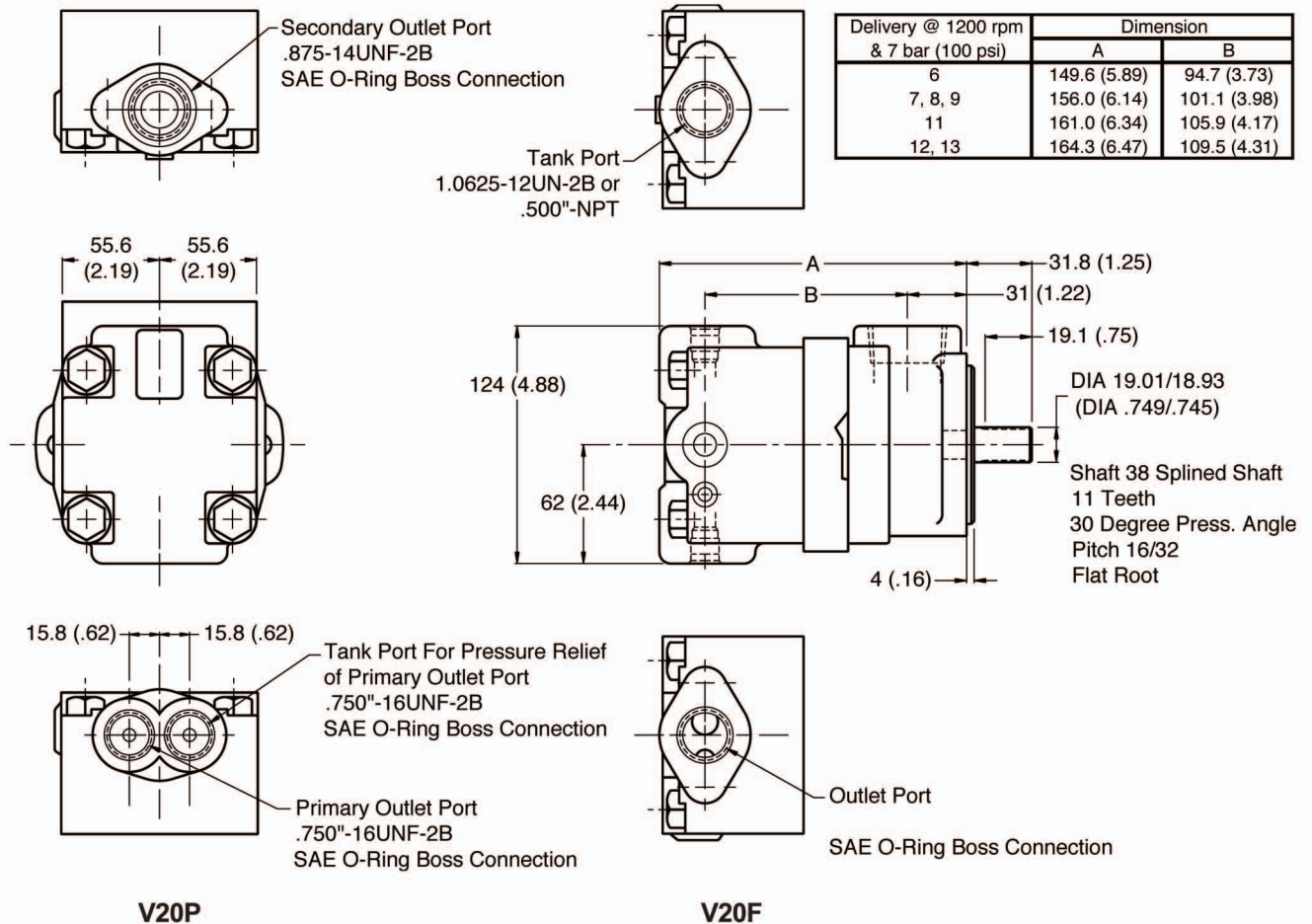
EPFED

FIXED DISPLACEMENT VANE PUMP SINGLE PUMP E V20

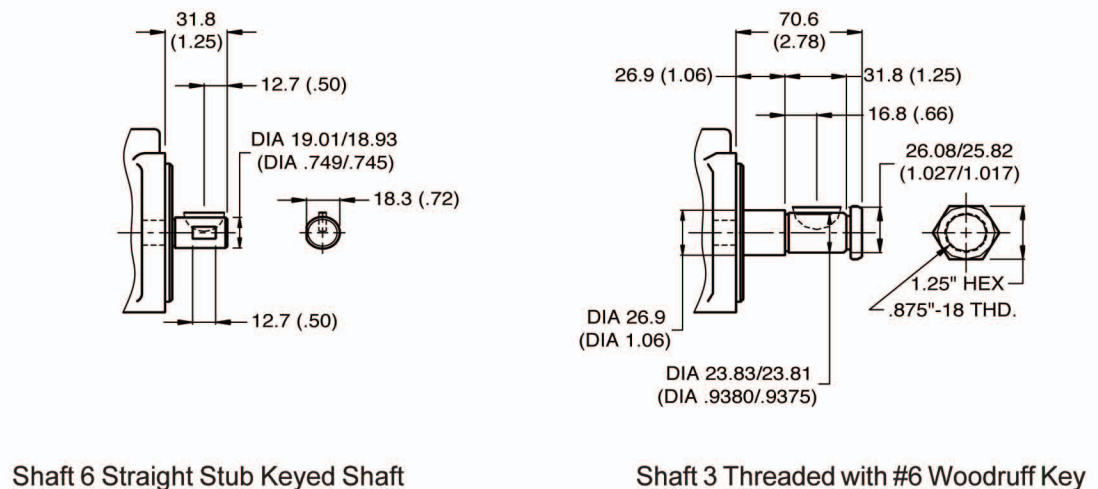


Installation Dimensions mm(inch):

E V20F,V20P



Other Shaft Options For V20 Series:



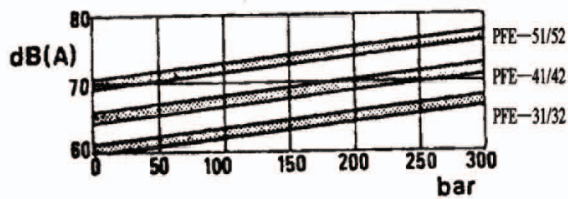
E V20F, V20P

Curves:

EPFE

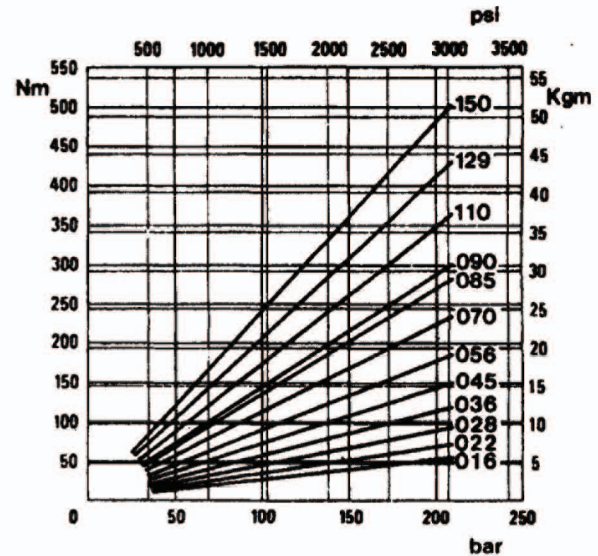
Noise

[Testing conditions: $n = 1500 \text{ r/min}$, oil viscosity $24 \text{ cSt}(3.5^\circ\text{E})$, ambient conditions in accordance with ISO4412 standard]



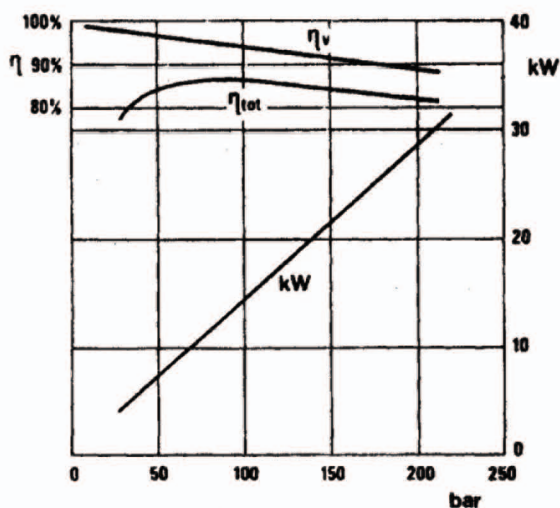
Driving torque versus output pressure diagram

EPFE - 31/41/51

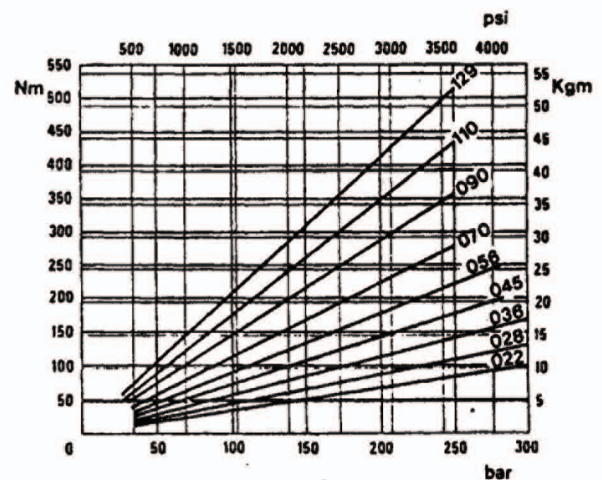


EPFE - 41056 pump typical diagram

($n = 1500 \text{ r/min}$)



EPFE-32/42/52



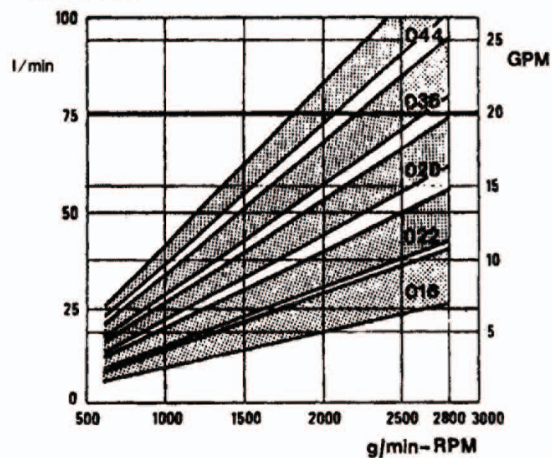
Curves:

EPFE

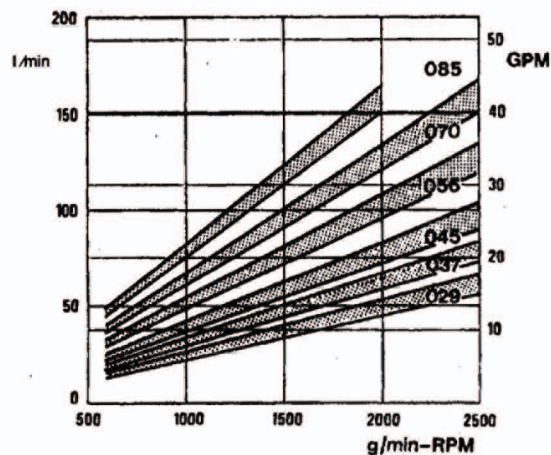
Flow versus rotation speed diagram

[Working condition: pressure - 0.7 ~ 21 MPa, viscosity - 24cSt(3.5°E)]

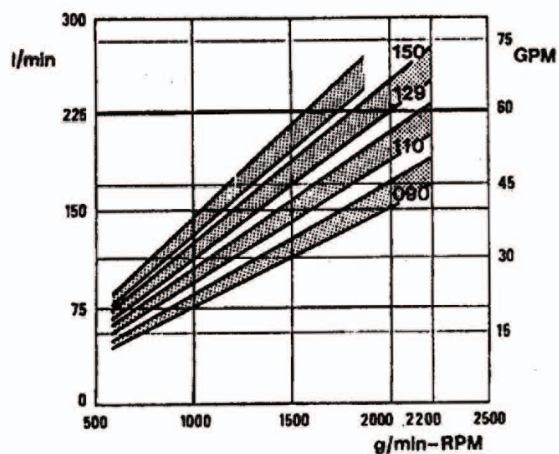
EPFE—31:



EPFE—41:



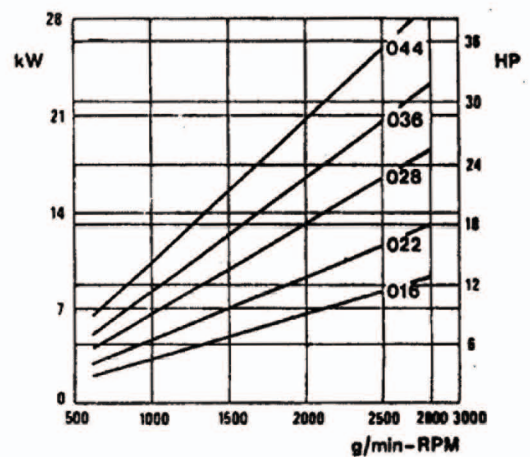
EPFE—51:



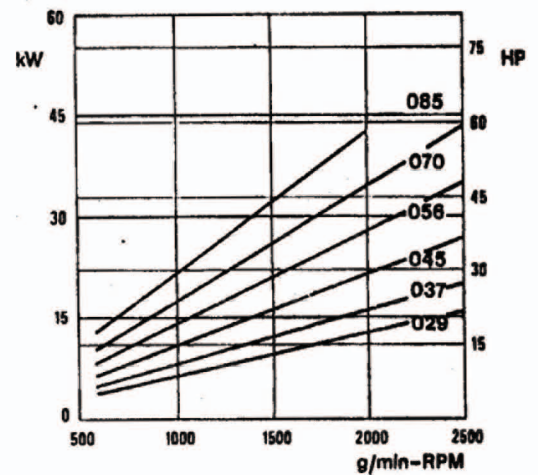
Power consumption versus rotation speed diagram

[Working condition: pressure - 14 MPa]

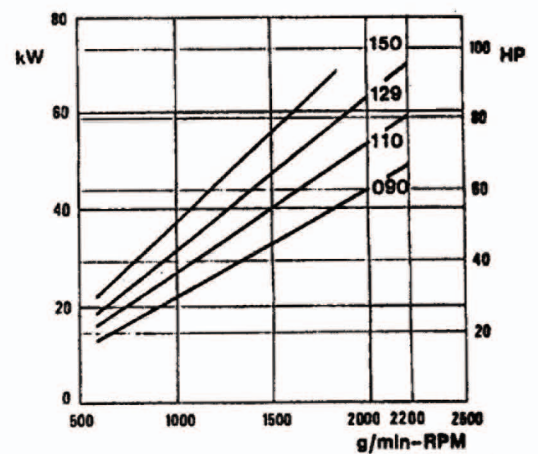
EPFE—31:



EPFE—41:



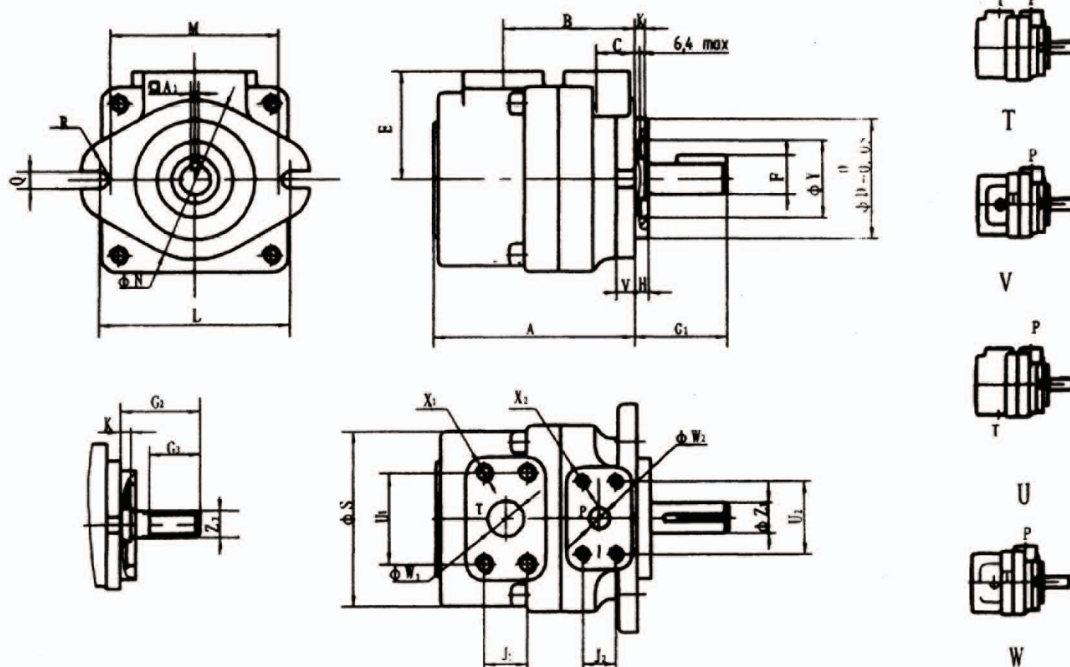
EPFE—51:



Installation Dimensions:

EPFE

EPFE—21,31,41,51



Configuration and Installation Dimensions(mm)

T = inlet port P = outlet port

Model	A	B	C	ØD	E	H	L	M	ØN	Q	R
EPFE—21	105	69	20	63	57	7	100	—	84	9	—
EPFE—31/32	135	98.5	27.5	82.5	70	6.4	106	73	95	11.1	28.5
EPFE—41/42	159.5	121	38	101.6	76.2	9.7	146	107	120	14.3	34
EPFE—51/52	181	125	38	127	82.6	12.7	181	143.5	148	17.5	35
EPFE—61	200	144	40	152.4	98	12.7	229	—	188	22	—

Model	ØS	U ₁	U ₂	V	ØW ₁	ØW ₂	J ₁	J ₂	X ₁	X ₂	ØY
EPFE—21	92	47.6	38.1	10	19	11	22.2	17.5	M10 × 17	M8 × 15	40
EPFE—31/32	114	58.7	47.6	10	32	19	30.2	22.2	M10 × 20	M10 × 17	47
EPFE—41/42	134	70	52.4	13	38	25	35.7	26.2	M12 × 20	M10 × 17	76
EPFE—51/52	158	77.8	58.7	15	51	32	42.9	30.2	M12 × 20	M10 × 20	76
EPFE—61	185	89	70	18	63.5	38	50.8	35.7	M12 × 22	M12 × 22	100

Model	Shaft type 1 (standard)					Shaft type 2					Shaft type 3					Shaft type 5			
	ØZ ₁	G ₁	A ₁	F	K	ØZ ₁	G ₁	A ₁	F	K	ØZ ₁	G ₁	A ₁	F	K	Z ₂	G ₂	G ₃	K
EPFE—21	15.88 15.85	48	4.00 3.98	17.37 17.27	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPFE—31/32	19.05 19.00	55.6	4.76 4.75	21.11 20.94	8	—	—	—	—	—	22.22 22.20	55.6	4.76 4.75	24.54 24.41	8	9T 16/32 DP	32	19.5	8
EPFE—41/42	22.22 22.20	59	4.76 4.75	24.54 24.41	11.4	22.22 22.20	71	6.36 6.35	25.07 25.03	8	25.38 25.36	78	6.36 6.35	28.30 28.10	11.4	13T 16/32 DP	41	28	8
EPFE—51/52	31.75 31.70	73	7.95 7.94	35.33 35.07	13.9	31.75 31.70	84	7.95 7.94	35.33 35.07	8	34.90 34.88	84	7.95 7.94	38.58 38.46	13.9	14T 12/24 DP	56	42	8
EPFE—61	38.10 38.05	91	9.56 9.53	42.40 42.14	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—

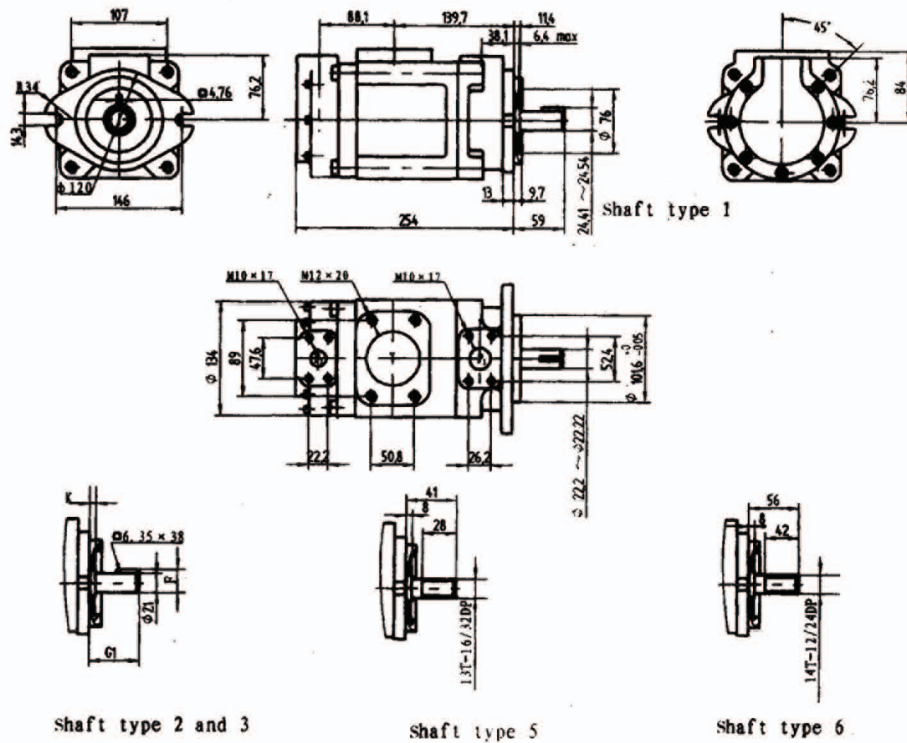
PIN TYPE VANE PUMPS EPFED SERIES



Installation Dimensions:

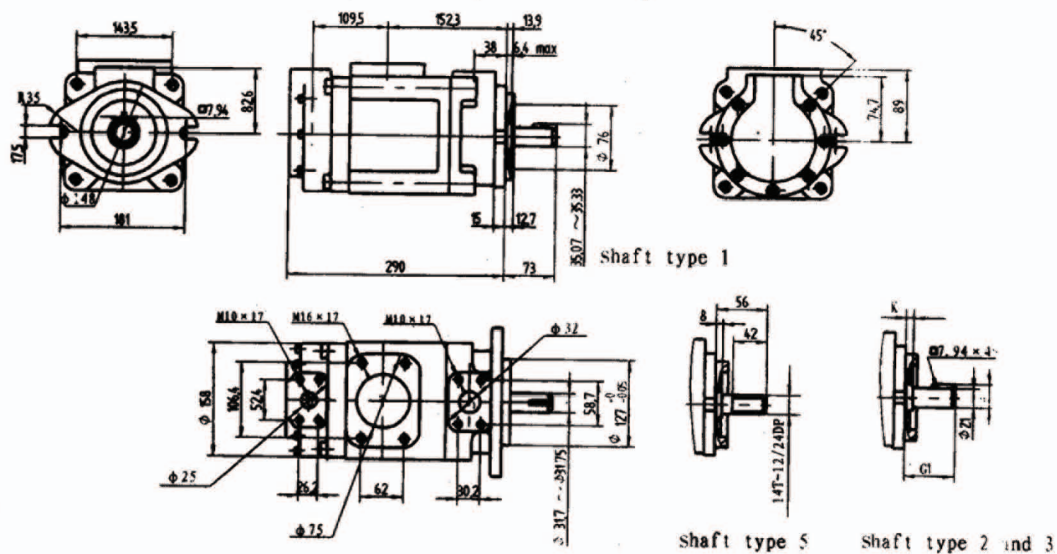
EPFED

Double pump EPFED—41/31



EPFED—51/41

	ØZ1	G1	F	K
Shaft type 2	22.22	71	25.07	8
	22.20		25.03	
Shaft type 3	25.38	78	28.30	11.4
	25.35		28.10	



	ØZ1	G1	F	K
Shaft type 2	31.75	84	35.07	8
	31.70		35.03	
Shaft type 3	34.90	84	38.58	13.9
	34.88		38.46	

EPFED

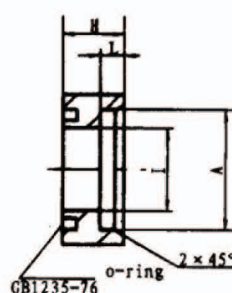
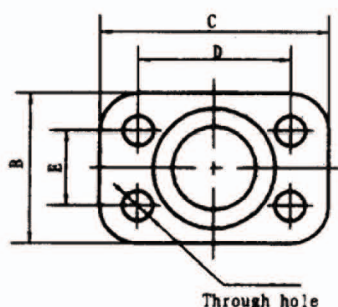
Flange Connection Dimensions:

EWF

Port orientation (as viewed from the shaft end) (Note: T = inlet, P₁ = outlet of the first pump, P₂ = outlet of the second pump)

TO P1-T P2	TA P1-T P2	TB P1-T P2	TC P1-T P2	TD P1-T P2	TE P1-T P2	TF P1-T P2	TG P1-T P2
WO P1-P2 T	WA P1-P2 T	WB P1-P2 T	WC P1-P2 T	WD P1-P2 T	WE P1-P2 T	WF P1-P2 T	WG P1-P2 T
UO P1-P2 T	UA P1-P2 T	UB P1-P2 T	UC P1-P2 T	UD P1-P2 T	UE P1-P2 T	UF P1-P2 T	UG P1-P2 T
VO P1-P2 T	VA P1-P2 T	VB P1-P2 T	VC P1-P2 T	VD P1-P2 T	VE P1-P2 T	VF P1-P2 T	VG P1-P2 T

Flange Connection Dimensions of Port (mm)



Flange specification

EWF	—40
Flange	Nominal diameter

Model	A	B	C	D	E	F	H	I	L	O ring	Screw	Pump port corresponding to flange
EWF—12	18	34	54	38.1	17.5	9	18	11	10	25 × 2.4	M8 × 30	PFE - 21 outlet
EWF—20	28.2	42	65	47.6	22.2	11	18	19	10	35 × 3.1	M10 × 30	PFE - 21 inlet, PFE - 31/21 outlet
EWF—25	35	50	70	52.4	26.2	11	18	25	10	40 × 3.1	M10 × 30	PFE - 41/42 outlet
EWF—32	43	53	79	58.7	30.2	11	21	32	12	45 × 3.1	M10 × 35	PFE - 31/32 inlet, PFE - 51/52 outlet
EWF—40	52	65	87	70	35.7	13.5	25	38	15	55 × 3.1	M12 × 40	PFE - 41/42 inlet PFE - 61 outlet
EWF—50	65.5	73	102	77.8	42.9	13.5	25	51	15	65 × 3.1	M12 × 40	PFE - 51/52 inlet
EWF—65	78	87	110	89	50.8	13.5	25	63	15	75 × 3.1	M12 × 40	PFE - 61 inlet, PFED - 41/31 inlet
EWF—75	93	107	132	106.4	62	17.5	30	75	18	95 × 3.1	M16 × 45	PFED - 51/42 inlet

Note: Size of the diagrammatic representation A and I are reference, correspondent hole and chamfer aren't machined before ex-factory.

Installation and Application:

EPFE

1. Hydraulic oil

- Anti-wear hydraulic oil is recommended in order to increase the performance and service life of the pump

Viscosity range of the oil: 10 ~ 100cSt (1.8 ~ 13°E), recommended viscosity: 24cSt at 50°C

- Filtration

Filtration rating of the system should not be lower than 25μm and a filter with filtration of 70 ~ 150μm fitted at the inlet of the pump (the rated flow of the filter should not be smaller than twice of the pump flow).

- Ambient temperature range: -20 ~ +70°C

Temperature of operating oil: +10 ~ +60°C

- Fire-resistance fluids

When fire-resistance fluid is used, special seal must be adopted and at the same time, the rated pressure and the max. speed of the pump should be in accordance with that specified in the following table:

Operating fluid	Sealing	Rated press.	Max. speed	Max. oil temperature
Phosphate ester	Fluor-elastomer	16MPa	1800r/min	60°C
Water glycol	Standard	16MPa	1500r/min	50°C

2. Installation

- Pump must be firmly mounted on a rigid support bracket which is capable of fully absorbing vibration.
- Horizontal mounting is recommended to maintain necessary fluid level. Shaft of pump should be align with that of motor and co-axiality within Ø0.1mm. Any radial or axial load on shaft of the pump is not permitted and a flexible coupling must be used as linkage between pump and motor.
- All connections at flanges, fittings and suction line of the system must be strictly sealed to prevent air leakage causing noise or vibration and bubble occurrence in oil tank which can reduce service life of the pump.
- Inlet and outlet of pump must be correctly connected to respective pipeline and rotation of the pump be in line with the arrow on the label plate. When firstly starts or hasn't be operated for a longer time, it is necessary to bleed air from pump outlet to permit priming and reduce noise through loosening outlet flange or using air bleed valve. After pump started, it should be jogged repeatedly without any load until it can run smoothly.

- Suction head of pump should not be over 500mm and pressure at suction port of pump is as the following:

Operating oil	At $n \leq 1800\text{r/min}$	At $n > 1800\text{r/min}$
Anti-wear hydraulic oil	-0.015 ~ +0.15MPa	0 ~ +0.15MPa
Fire-resistant fluid	-0.01 ~ +0.15MPa	

3. Drive torque

- For drive torque value required by pump, see drive torque/output pressure diagram; for double pump, the value is the sum of those required by two single pumps, which should not exceed the max. torque in the following table:

Model	Max. drive torque(N·m)				Max. permitted drive torque at shaft end of through-shaft pump
	Shaft 1-2	Shaft 3	Shaft 5	Shaft 6	
EPFE—31/32	160	220	110	220	110
EPFE—41/42	250	320	200	320	200
EPFE—51/52	500	700	450	—	320

4. Replacing pump cartridge

- If pump failed to work, it is only necessary to replace the pump cartridge with new one. When replacing, be careful to keep seals in position so as to avoid edge cutting. Fixing screws for pump housing should be gradually tightened in diagonal line direction and with an even force.

▲ Ordering procedure

- Order pump by full model designation devised from the previous code table.

example:

Single pump EPEF—41045/1DT/PF

Double pump EPEFD—4131045/0.6/1DT0/PF

- This product is in conformity with the following standards:

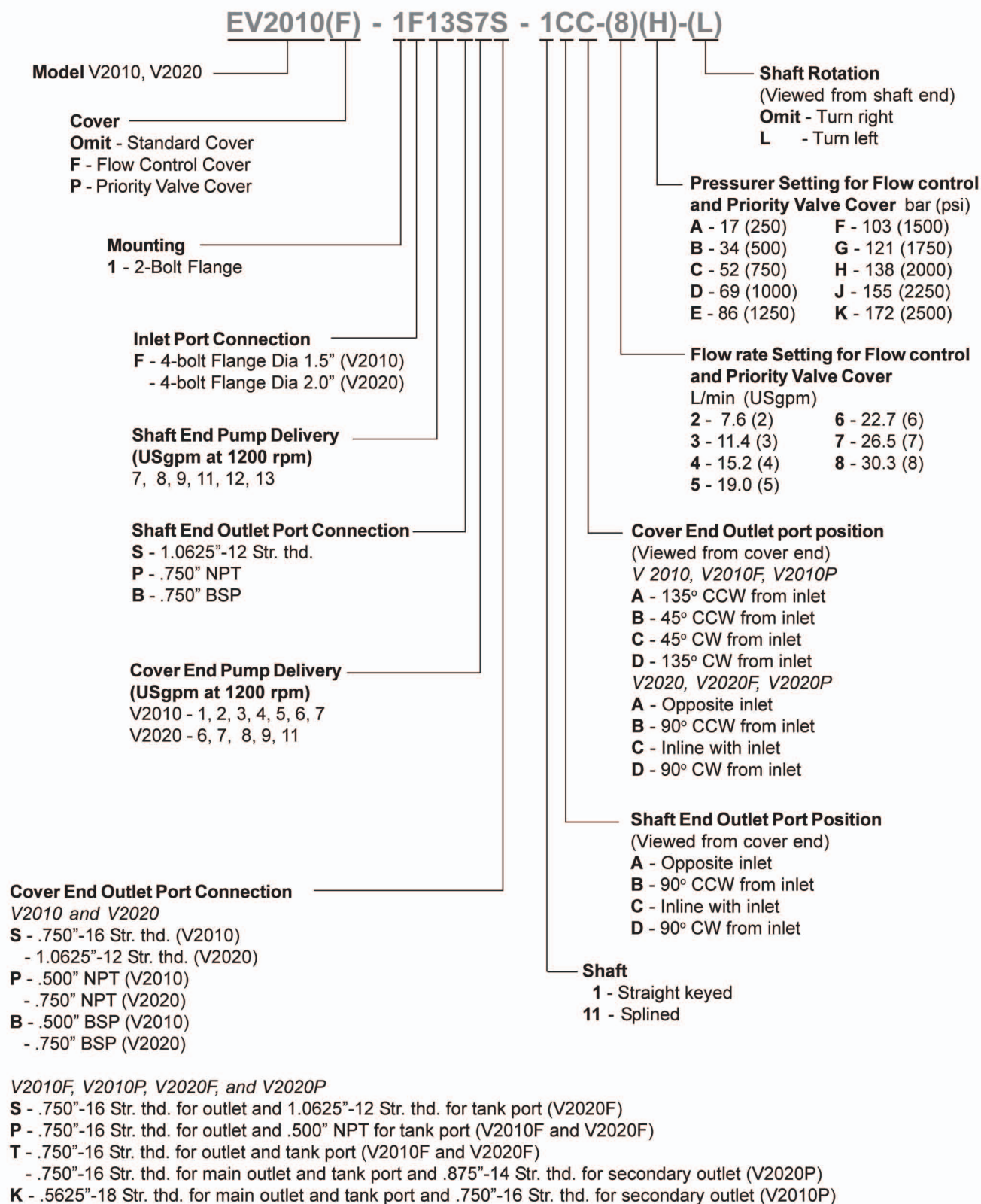
JB/T5001 - 1994

JB/T5002 - 1994

Ordering Code:

E V2010,V2020

E V2010,V2020



FIXED DISPLACEMENT VANE PUMP

DOUBLE PUMP



Specifications :

E V2010,V2020

Model Series	Cartridge Position	Ring Size Delivery at 1200 r/min & 7 bar (100 psi) USgpm	Geometric Displacement cm ³ /r (in ³ /r)	Delivery at 1500 r/min & 7 bar (100 psi) L/min (USgpm)	Maximum Pressure bar (psi)	Maximum Speed rpm	Weight kg (lb)
V2010	Shaft End	7	22.8 (1.39)	33.11 (8.75)	172 (2500)	3000	13.6 (30)
		8	26.5 (1.62)	37.85 (10.00)	172 (2500)	2800	
		9	29.7 (1.81)	42.57 (11.25)	172 (2500)	2800	
		11	36.4 (2.22)	52.04 (13.75)	172 (2500)	2500	
		12	39.0 (2.38)	56.77 (15.00)	152 (2200)	2400	
		13	42.4 (2.59)	61.50 (16.25)	152 (2200)	2400	
	Cover End	1	3.3 (0.20)	4.70 (1.25)	172 (2500)	3000	
		2	6.6 (0.40)	9.40 (2.50)	172 (2500)	3000	
		3	9.8 (0.60)	14.20 (3.75)	172 (2500)	3000	
		4	13.1 (0.80)	18.90 (5.00)	172 (2500)	3000	
		5	16.4 (1.00)	23.60 (6.25)	172 (2500)	3000	
		6	19.5 (1.19)	28.40 (7.50)	152 (2200)	3000	
		7	22.8 (1.39)	33.10 (8.75)	138 (2000)	2800	
V2020	Shaft End	7	22.8 (1.39)	33.11 (8.75)	172 (2500)	3000	15.9 (35)
		8	26.5 (1.62)	37.85 (10.00)	172 (2500)	2800	
		9	29.7 (1.81)	42.57 (11.25)	172 (2500)	2800	
		11	36.4 (2.22)	52.04 (13.75)	172 (2500)	2500	
		12	39.0 (2.38)	56.77 (15.00)	152 (2200)	2400	
		13	42.4 (2.59)	61.50 (16.25)	152 (2200)	2400	
	Cover End	6	19.5 (1.19)	28.39 (7.50)	172 (2500)	3000	
		7	22.8 (1.39)	33.11 (8.75)		3000	
		8	26.5 (1.62)	37.85 (10.00)		2800	
		9	29.7 (1.81)	42.57 (11.25)		2800	
		11	36.4 (2.22)	52.04 (13.75)		2500	

E V2010,V2020

Ordering Code:

E V10/V20

E V10/V20

EV20(F) - 1P11S - 1C(8)-(H)-(L)

Model V10, V20

Cover

Omit - Standard Cover
F - Flow Control Cover
P - Priority Valve Cover

Mounting

1 - 2-Bolt Flange

Inlet Port Connection

S - 1.3125"-12 Str. thd. (V10)
- 1.625"-12 Str. thd. (V20)
P - 1.00" NPT (V10)
- 1.25" NPT (V20)
B - 1.00" BSP (V10)
- 1.25" BSP (V20)
T - 1.1875"-12 Str. thd. (V10)

Delivery (USgpm at 1200 rpm)

V10 - 1, 2, 3, 4, 5, 6, 7
V20 - 6, 7, 8, 9, 11, 12, 13

Outlet Port Connection

V10 and V20

S - .750"-16 Str. thd. (V10)
- 1.0625"-12 Str. thd. (V20)
P - .500" NPT (V10)
- .750" NPT (V20)
B - .500" BSP (V10)
- .750" BSP (V20)

V10F, V10P, V20F, and V20P

S - .750"-16 Str. thd. for outlet and 1.0625"-12 Str. thd. for tank port (V20F)
P - .750"-16 Str. thd. for outlet and .500" NPT for tank port (V10F and V20F)
T - .750"-16 Str. thd. for outlet and tank port (V10F)
- .750"-16 Str. thd. for primary outlet and tank port and .875"-14 Str. thd. for secondary outlet (V20P)
K - .5625"-18 Str. thd. for primary outlet and tank port and .750"-16 Str. thd. for secondary outlet (V10P)

Shaft Rotation

(Viewed from shaft end)

Omit - Turn right
L - Turn left

Pressurer Setting for Flow control and Priority Valve Cover bar (psi)

A - 17 (250)	F - 103 (1500)
B - 34 (500)	G - 121 (1750)
C - 52 (750)	H - 138 (2000)
D - 69 (1000)	J - 155 (2250)
E - 86 (1250)	K - 172 (2500)

Flow rate Setting for Flow control and Priority Valve Cover L/min (USgpm)

2 - 7.6 (2)	6 - 22.7 (6)
3 - 11.4 (3)	7 - 26.5 (7)
4 - 15.2 (4)	8 - 30.3 (8)
5 - 19.0 (5)	

Outlet Port Position

(Viewed from cover end)

A - Opposite inlet
B - 90° CCW from inlet
C - Inline with inlet
D - 90° CW from inlet

Shaft

1 - Straight keyed
3 - Threaded with woodruff key
6 - Woodruff key stub (V20 only)
11 - Splined
12 - Splined (V10 only)
15 - Splined (V20 only)
38 - Splined

FIXED DISPLACEMENT VANE PUMP

SINGLE PUMP



Specifications :

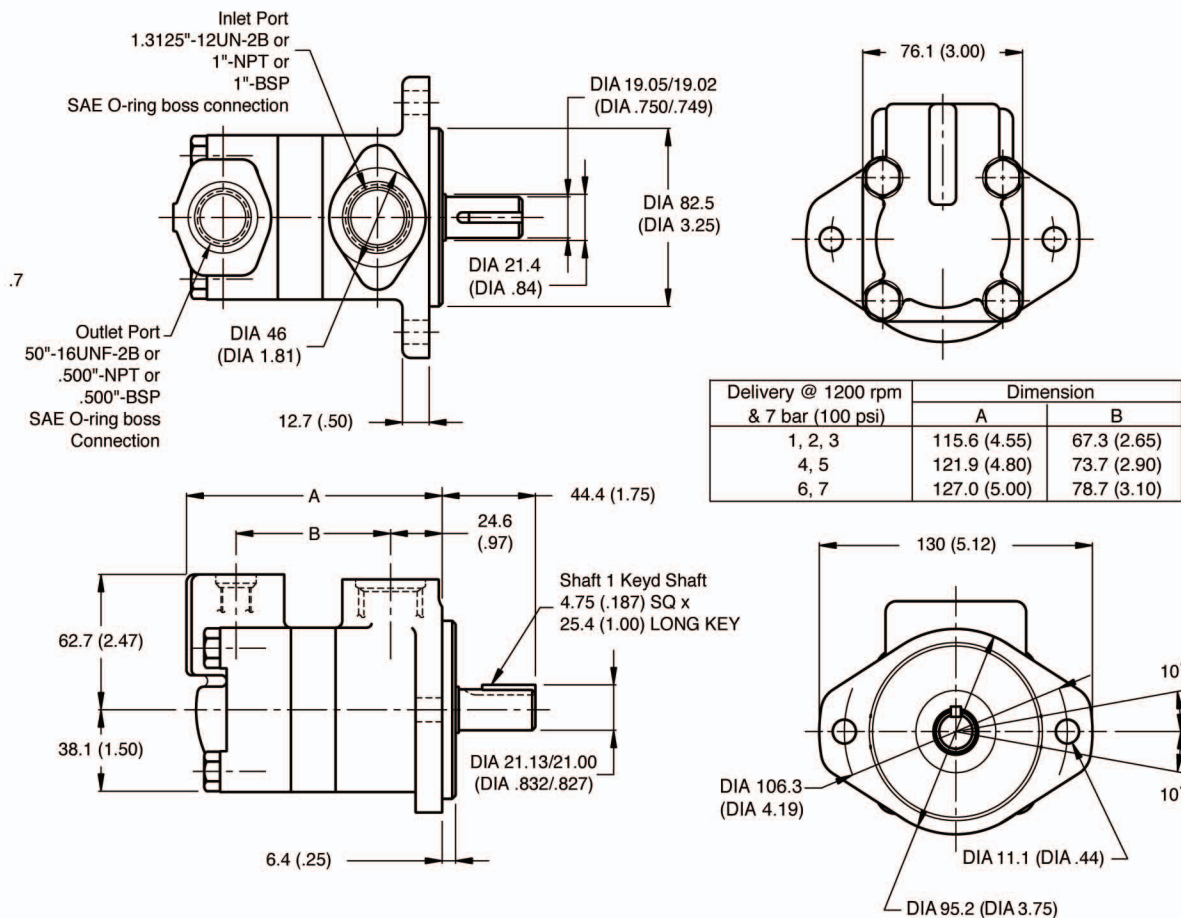
E V10,V10F,V10P,V20,V20F,V20P

Model Series	Ring Size Delivery at 1200 r/min & 7 bar (100 psi) USgpm	Geometric Displacement cm ³ /r (in ³ /r)	Delivery at 1500 r/min & 7 bar (100 psi) L/min (USgpm)	Maximum Pressure bar (psi)	Maximum Speed rpm	Minimum Speed rpm	Weight kg (lb)
V10 V10F V10P	1	3.3 (0.20)	4.70 (1.25)	172 (2500)	4800	650	4.5 - 6.8 (10 - 15)
	2	6.6 (0.40)	9.40 (2.50)	172 (2500)	4500	650	
	3	9.8 (0.60)	14.20 (3.75)	172 (2500)	4000	650	
	4	13.1 (0.80)	18.90 (5.00)	172 (2500)	3400	650	
	5	16.4 (1.00)	23.60 (6.25)	172 (2500)	3200	650	
	6	19.5 (1.19)	28.40 (7.50)	152 (2200)	3000	650	
	7	22.8 (1.39)	33.10 (8.75)	138 (2000)	2800	650	
V20 V20F V20P	6	19.5 (1.19)	28.39 (7.50)	172 (2500)	3400	650	7.3 - 8.2 (16 - 18)
	7	22.8 (1.39)	33.11 (8.75)	172 (2500)	3000	650	
	8	26.5 (1.62)	37.85 (10.00)	172 (2500)	2800	650	
	9	29.7 (1.81)	42.57 (11.25)	172 (2500)	2800	650	
	11	36.4 (2.22)	52.04 (13.75)	172 (2500)	2500	650	
	12	39.0 (2.38)	56.77 (15.00)	152 (2200)	2400	650	
	13	42.4 (2.59)	61.50 (16.25)	152 (2200)	2400	650	

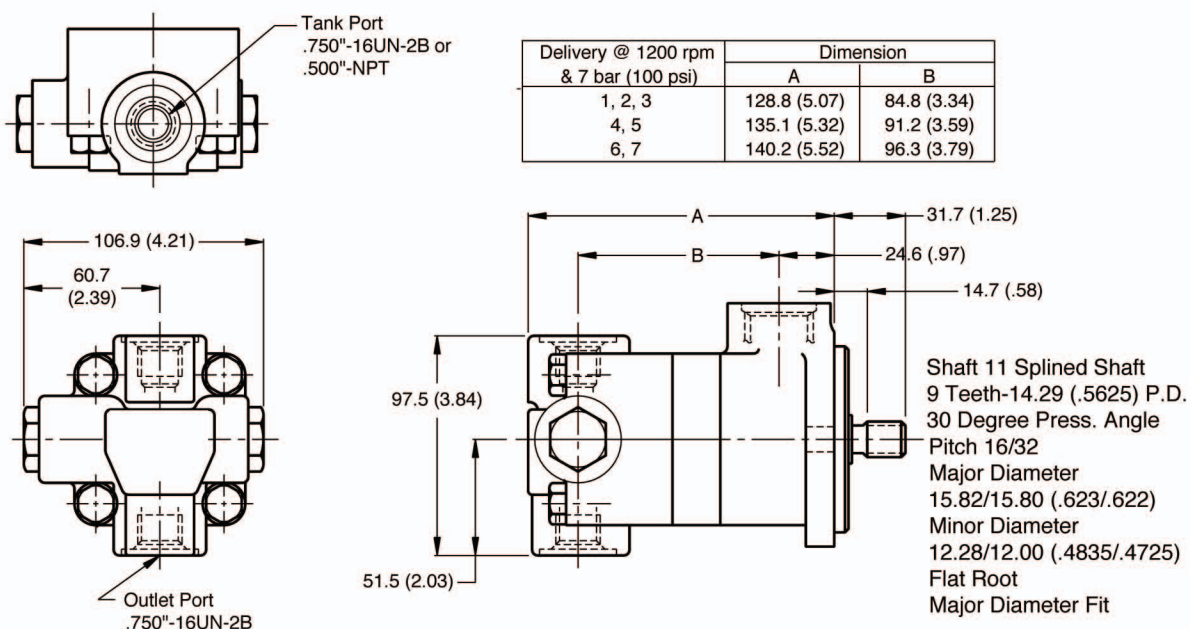
E V10/V20

Installation Dimensions mm (inch):

E V10, V10F

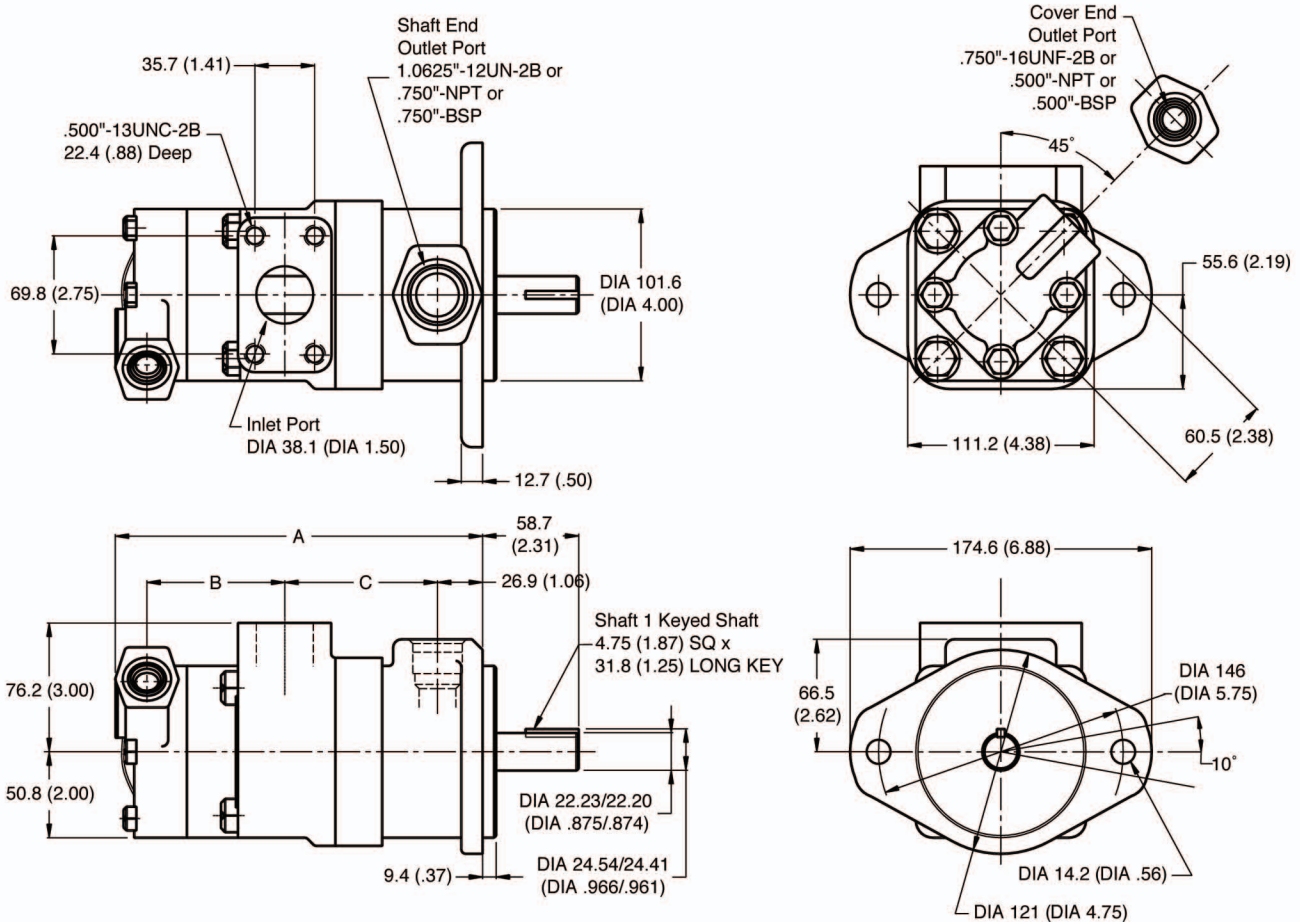


E V10F:



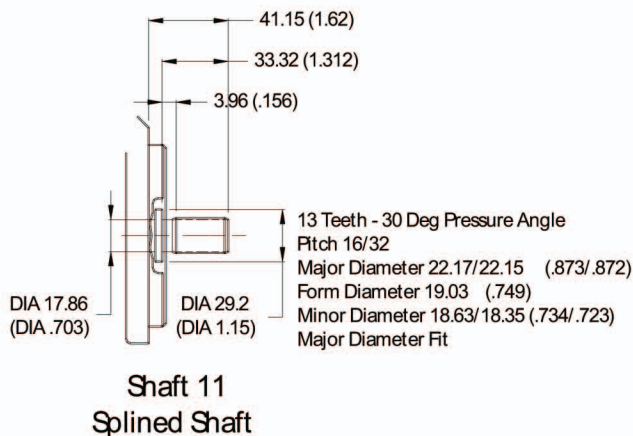
Installation Dimensions:

E V2010



Delivery @ 1200 rpm & 7 bar (100 psi)		Dimension		
Shaft End	Cover End	A	B	C
7, 8, 9	1, 2, 3	213.1 (8.39)	75.9 (2.99)	86.4 (3.40)
7, 8, 9	4, 5	219.5 (8.64)	82.3 (3.24)	86.4 (3.40)
7, 8, 9	6, 7	224.5 (8.84)	87.4 (3.44)	86.4 (3.40)
11	1, 2, 3	218.2 (8.59)	75.9 (2.99)	91.2 (3.59)
11	4, 5	224.5 (8.84)	82.3 (3.24)	91.2 (3.59)
11	6, 7	229.6 (9.04)	87.4 (3.44)	91.2 (3.59)
12, 13	1, 2, 3	221.7 (8.73)	75.9 (2.99)	94.7 (3.73)
12, 13	4, 5	227.8 (8.97)	82.3 (3.24)	94.7 (3.73)
12, 13	6, 7	232.9 (9.17)	87.4 (3.44)	94.7 (3.73)

Other Shaft Options For Double Pump E V2010,V2020:

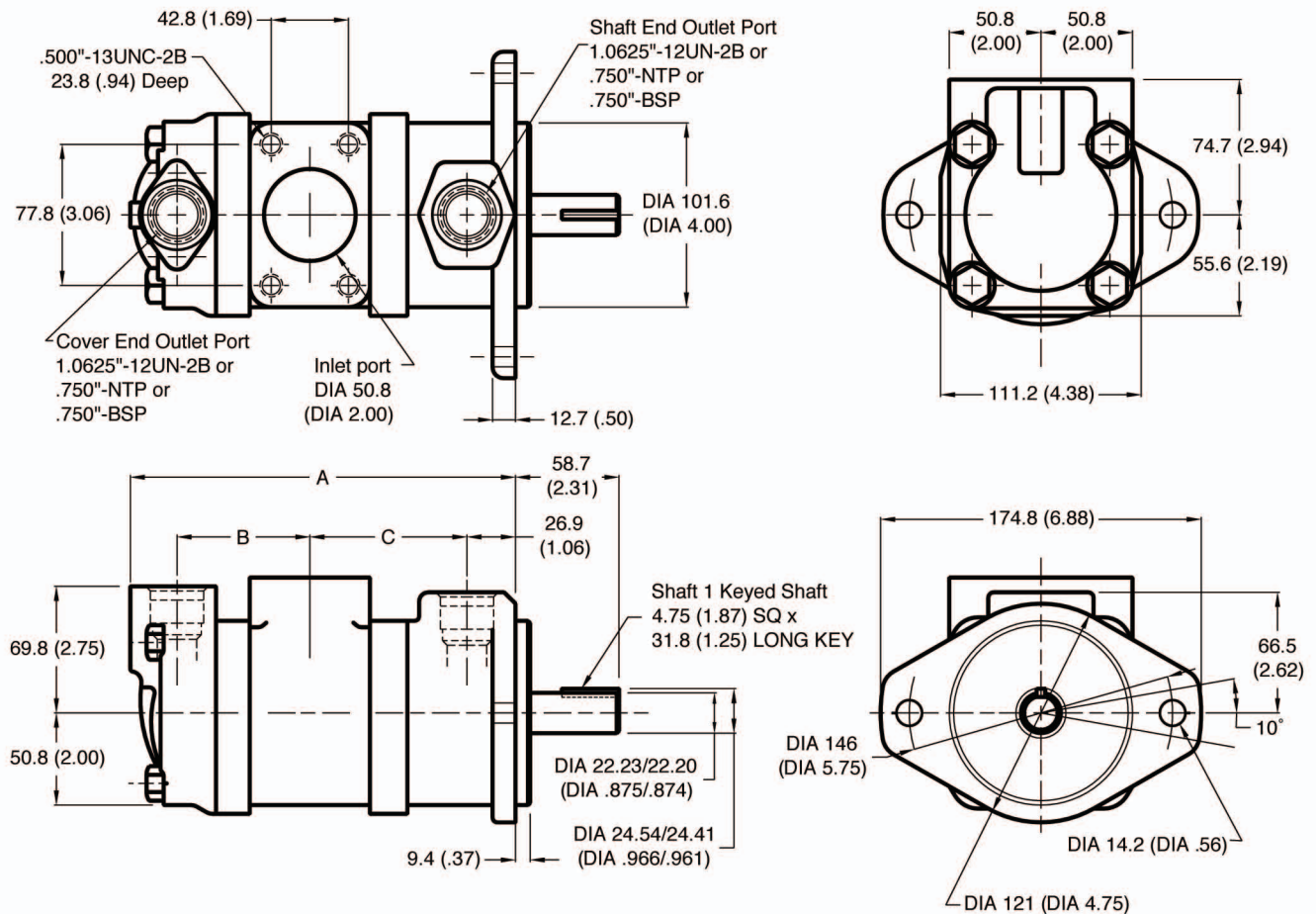


FIXED DISPLACEMENT VANE PUMP DOUBLE PUMP V2020



Installation Dimensions:

E V2020



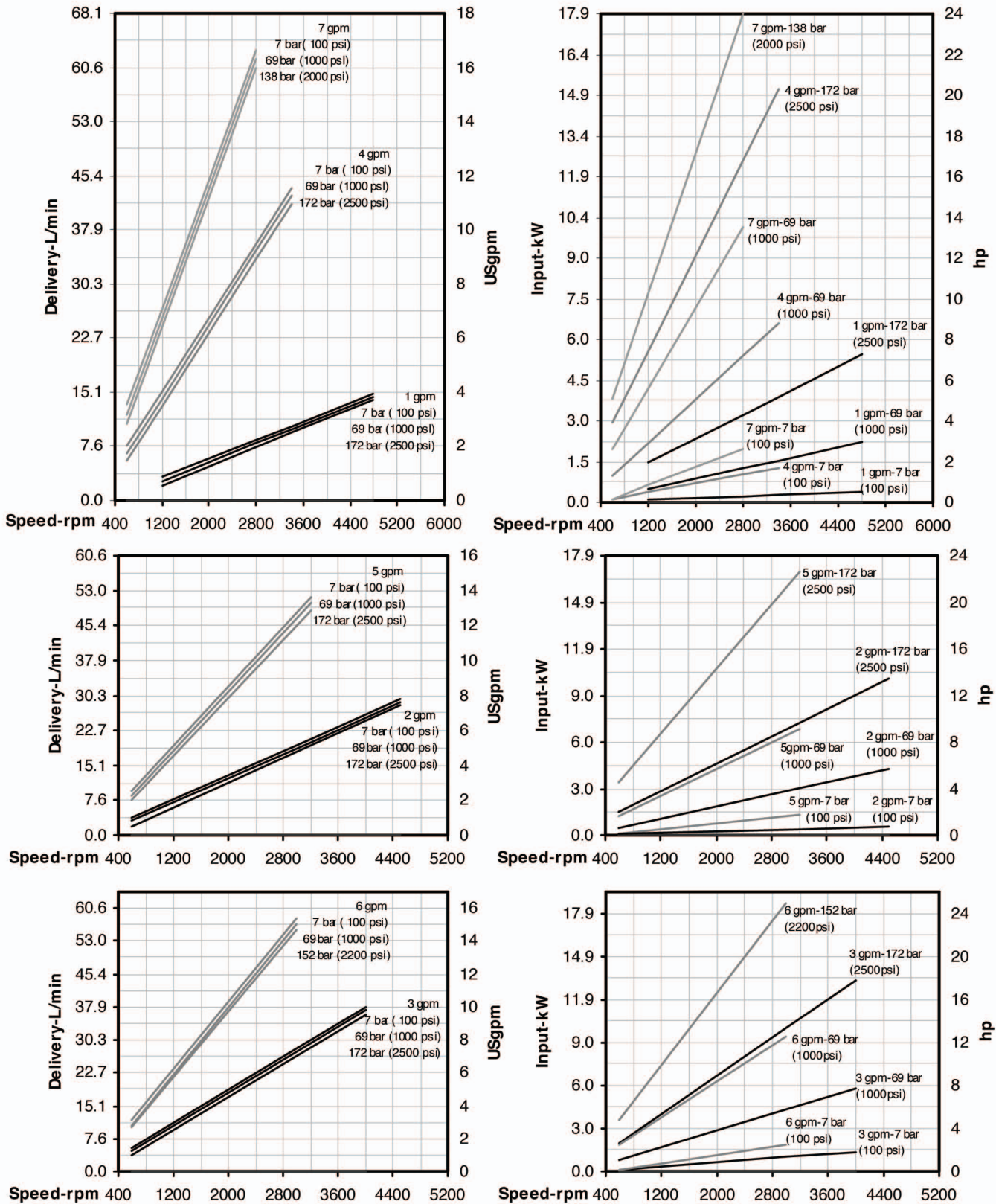
Delivery @ 1200 rpm & 7 bar (100 psi)		Dimension		
Shaft End	Cover End	A	B	C
7, 8, 9	6	213.6 (8.41)	73.7 (2.90)	87.1 (3.43)
7, 8, 9	7, 8, 9	220.0 (8.66)	80.0 (3.15)	87.1 (3.43)
11	6	218.7 (8.61)	73.7 (2.90)	92.2 (3.63)
11	7, 8, 9	225.0 (8.86)	80.0 (3.15)	92.2 (3.63)
11	11	229.9 (9.05)	85.1 (3.35)	92.2 (3.63)
12, 13	6	222.3 (8.75)	73.7 (2.90)	95.5 (3.76)
12, 13	7, 8, 9	228.3 (8.99)	80.0 (3.15)	95.5 (3.76)
12, 13	11	233.4 (9.19)	85.1 (3.35)	95.5 (3.76)

E V2020

Performance Characteristics:

E V10

Based on viscosity 32 cSt (150 SSU) oil at 49 °C (120 °F) and pump inlet at 0 PSIG (14.7 PSIA)



For the Cover End Cartridge, the speed could not exceed the maximum speed of the Shaft End Cartridge.

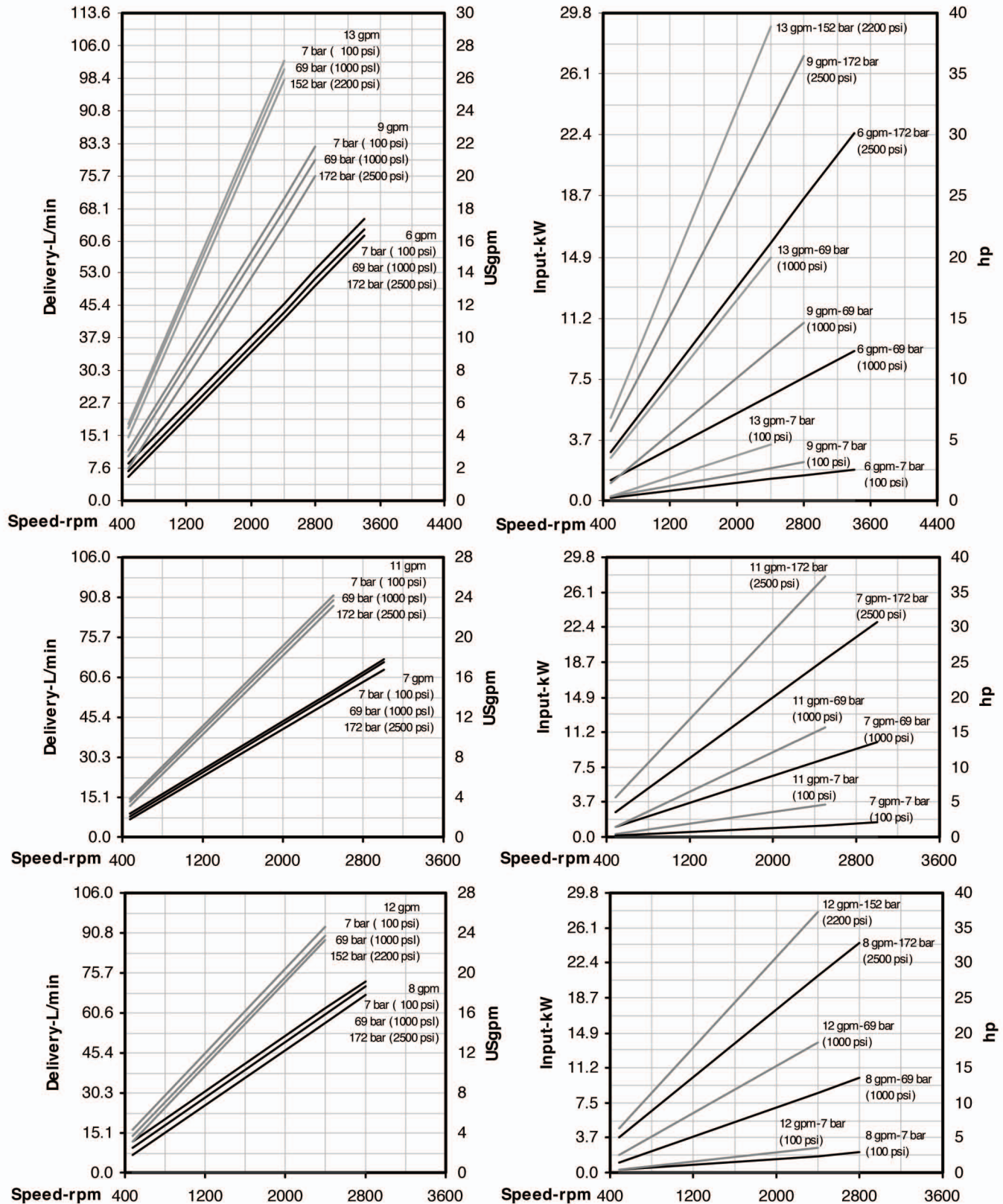
FIXED DISPLACEMENT VANE PUMP E V20, COVER END OF E V2020



Performance Characteristics:

E V20

Based on viscosity 32 cSt (150 SSU) oil at 49 °C (120 °F) and pump inlet at 0 PSIG (14.7 PSIA)



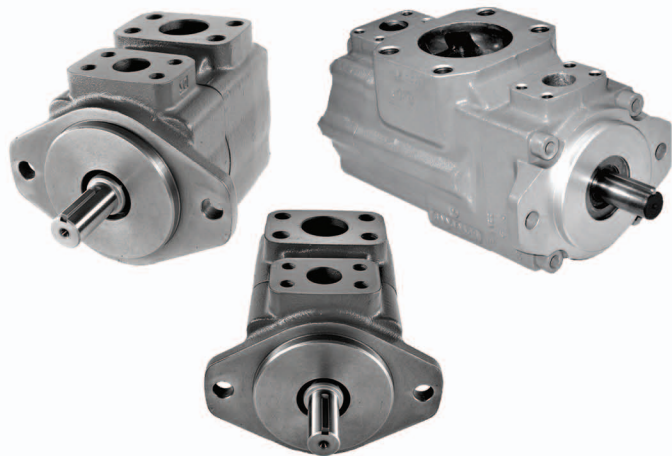
For the Cover End Cartridge, the speed could not exceed the maximum speed of the Shaft End Cartridge.

E V20

Features:

E V/VQ

- V and VQ Series are fixed displacement and balanced type vane pumps. Available in both 12 vanes design for industrial application with quiet operating and 10 vanes design for mobile application with higher pressure and wider range of speed.
- The vane design with self compensation for wear and clearances makes volumetric efficiency of pump nearly constant over the service life. (the vane always adjust its orbit to contact with the cam ring, even though wear occurs between the cam ring and vane tip)
- With a balanced intra-vane design, outlet pressure is continuously applied only to the area between the vane and insert. This area is small and thrust is correspondingly light. Top and bottom areas of the vane are subject to either inlet or outlet pressure, depending on the vane's location during rotor rotation. The valving of pressure to and from the bottom area of the vane is through holes drilled in the rotor. This varying pressure under the vane reduces wear and increases pump efficiency.
- The vane pump is not damaged at low speed and high pressure operation because pumping action does not start until the speed is high enough for the vane to throw out.
- The inlet or outlet ports can be rotated through increments



of 90° in relation to each other, providing application flexibility and easy installation.

- With the cartridge independent of the shaft, allowing for easy change of flow capacity and field servicing without removing the pump from its mounting.
- For the cartridge kit of VQ Series, the flexible plates are inserted between the support plates and the rotor. The flexible plates are assembled with the bronze facing towards the rotor to improve cold start capability and compensate thermal expansion in the rotor. This makes VQ Series particularly suited for mobile application.

Handling:

- For maximum service life, the pump should be protected from contamination. Filtering fluid before filling and during operation to maintain or exceed ISO cleanliness code 16/13. Appropriately size suction filter, with cold start bypass, of 149 micron absolute (100 mesh) and 10 micron absolute return line filter is recommended. Replaceable elements should be changed as filter supplier instructions
- The drive shaft must align with the power source shaft. Avoiding shaft end thrust and applications that impose radial loading.
- The start-up procedures should be as follows:
 - Check the rotation of power source to match with rotation

of pump.

- Check inlet and outlet ports to assure all connections are properly installed and check all mounting bolts and flanges to assure all are tight and properly aligned.
- Fill pump with fluid through the outlet port if the pump is mounted above the fluid level. The spline shaft models also need to be lubricate with an anti-fretting grease or similar lubricant.
- Place all controls in the neutral position so the pump is unloaded during initial start-up.
- Prime the pump within a few second when the pump is started.
- Bleed off entrapped air from outlet circuit until a steady output flow is observed.

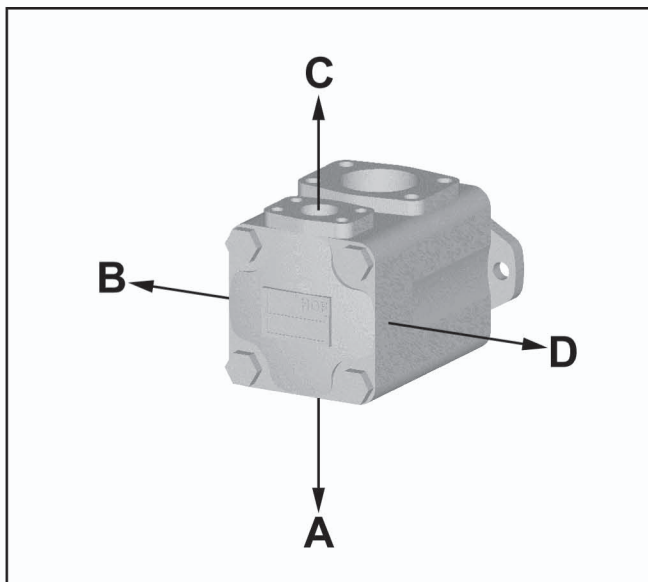
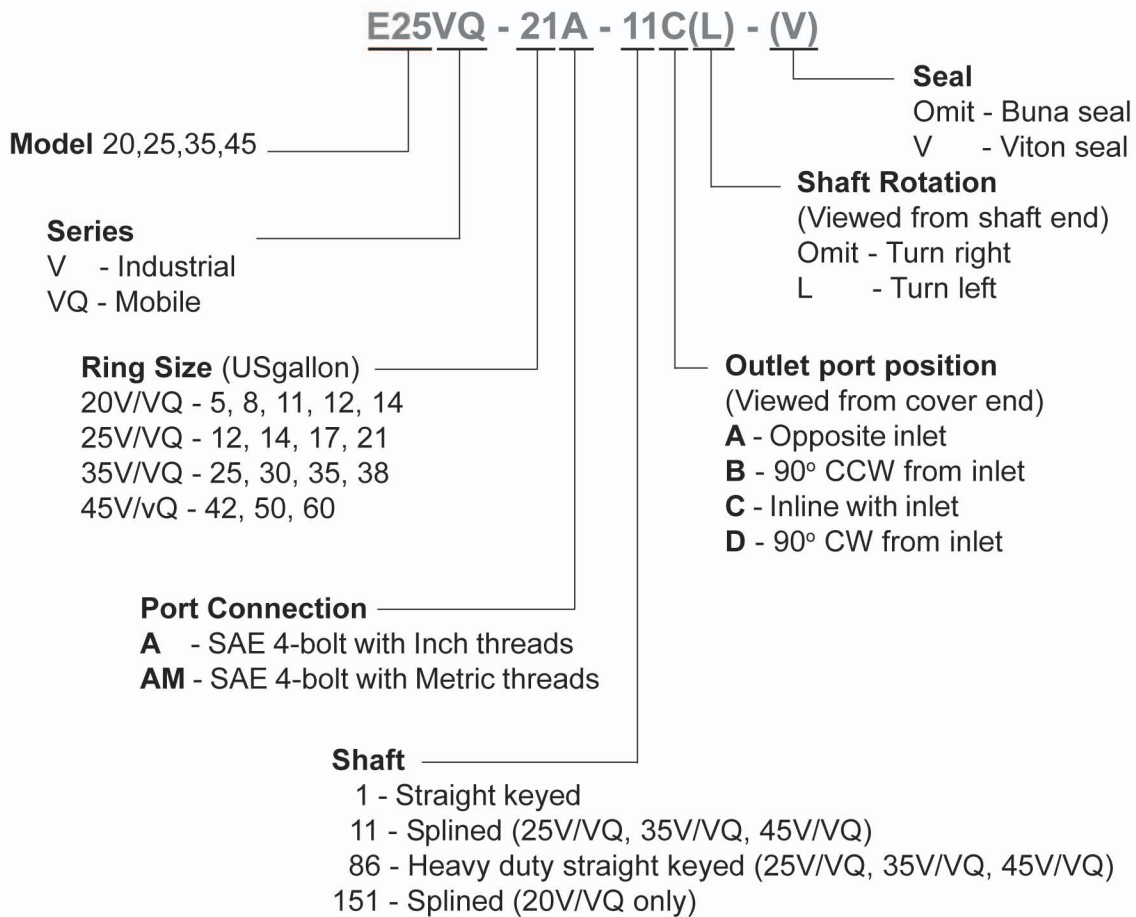
The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change at any time without notice.

FIXED DISPLACEMENT VANE PUMP SINGLE PUMP

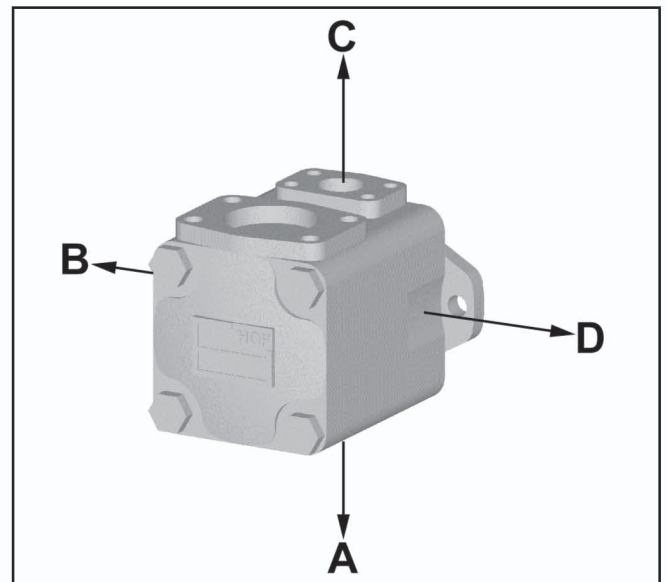


Ordering Code:

E 20V/45VQ



Port Positions for 20V/VQ



Port Positions for 25V/VQ, 35V/VQ, 45V/VQ

E 20V/45VQ

Specifications:

E V/VQ

Model	Delivery at 1200 rpm & 7 bar (100 psi)	Displacement	Maximum Speed	Maximum Pressure	Typical Delivery at max speed & pressure	Typical Input Power at max speed & pressure	Weight
	USgpm	cm ³ /r (in ³ /r)	rpm	bar (psi)	L/min (USgpm)	kW (hp)	kg (lb)
20V	5	18 (1.10)	1800	206 (3000)	28.4 (7.5)	11.2 (15.0)	11.8 (26)
	8	27 (1.67)		206 (3000)	45.4 (12.0)	17.0 (22.8)	
	11	36 (2.22)		206 (3000)	56.8 (15.0)	22.6 (30.3)	
	12	40 (2.47)		158 (2300)	62.1 (16.4)	25.1 (33.7)	
	14	45 (2.78)		138 (2000)	69.6 (18.4)	28.3 (37.9)	
25V	12	39 (2.47)	1800	172 (2500)	62.1 (16.4)	22.9 (30.8)	14.5 (32)
	14	45 (2.78)			69.6 (18.4)	25.7 (34.5)	
	17	55 (3.39)			86.3 (22.8)	29.8 (40.0)	
	21	67 (4.13)			106.0 (28.0)	34.0 (45.6)	
35V	25	81 (4.94)	1800	172 (2500)	124.9 (33.0)	45.5 (61.0)	22.7 (50)
	30	97 (5.91)			154.4 (40.8)	54.5 (73.0)	
	35	112 (6.83)			181.7 (48.0)	61.5 (82.4)	
	38	121 (7.37)			193.8 (51.2)	65.9 (88.3)	
45V	42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	34.0 (75)
	50	162 (9.85)			253.6 (67.0)	87.3 (117.0)	
	60	193 (11.75)			310.4 (82.0)	103.7 (139.0)	

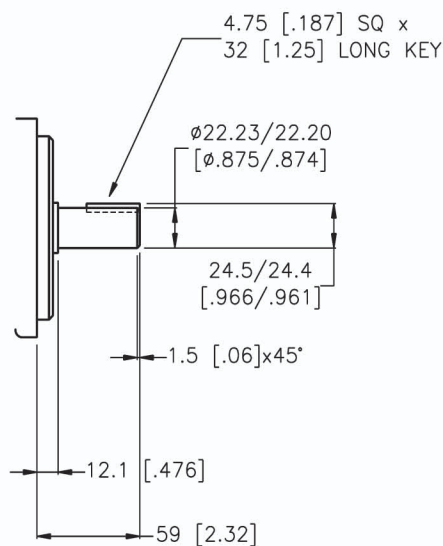
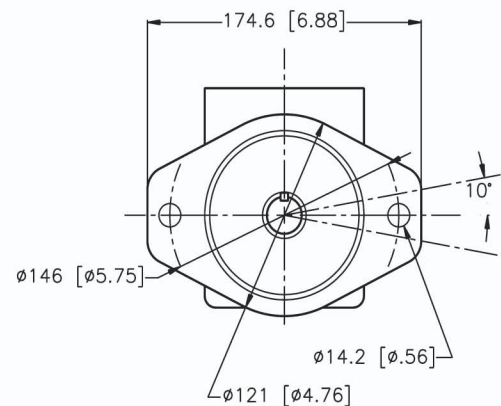
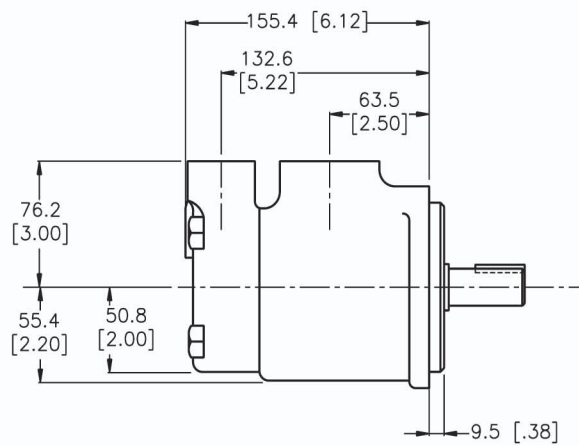
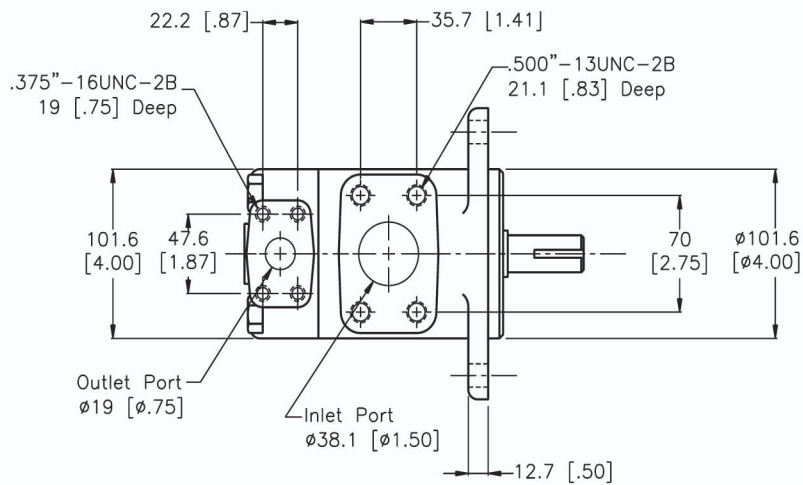
Model	Delivery at 1200 rpm & 7 bar (100 psi)	Displacement	Maximum Speed	Maximum Pressure	Typical Delivery at max speed & pressure	Typical Input Power at max speed & pressure	Weight
	USgpm	cm ³ /r (in ³ /r)	rpm	bar (psi)	L/min (USgpm)	kW (hp)	kg (lb)
20VQ	5	18 (1.10)	2700	206 (3000)	41.6 (11.0)	17.9 (24.0)	11.8 (26)
	8	27 (1.67)		206 (3000)	64.3 (17.0)	26.1 (35.0)	
	11	36 (2.22)		206 (3000)	87.1 (23.0)	35.4 (47.5)	
	12	39 (2.41)		158 (2300)	96.5 (25.5)	28.3 (38.0)	
	14	45 (2.80)		138 (2000)	113.6 (30.0)	29.1 (39.0)	
25VQ	12	40 (2.45)	2700	206 (3000)	87.1 (23.0)	41.0 (55.0)	14.5 (32)
	14	45 (2.77)	2700		102.2 (27.0)	46.6 (62.5)	
	17	55 (3.37)	2500		117.3 (31.0)	51.8 (69.5)	
	21	67 (4.12)	2500		143.8 (38.0)	61.9 (83.0)	
35VQ	25	81 (4.98)	2500	206 (3000)	170.3 (45.0)	75.3 (101.0)	22.7 (50)
	30	97 (5.96)	2500		208.2 (55.0)	87.7 (117.5)	
	35	112 (6.88)	2400		227.1 (60.0)	98.5 (132.0)	
	38	121 (7.42)	2400		246.0 (65.0)	104.4 (140.0)	
45VQ	42	138 (8.46)	2200	172 (2500)	251.7 (66.5)	91.4 (122.5)	34.0 (75)
	50	162 (9.90)			299.0 (79.0)	105.2 (141.0)	
	60	193 (11.80)			363.4 (96.0)	126.8 (170.0)	

FIXED DISPLACEMENT VANE PUMP SINGLE PUMP E 20V/VQ

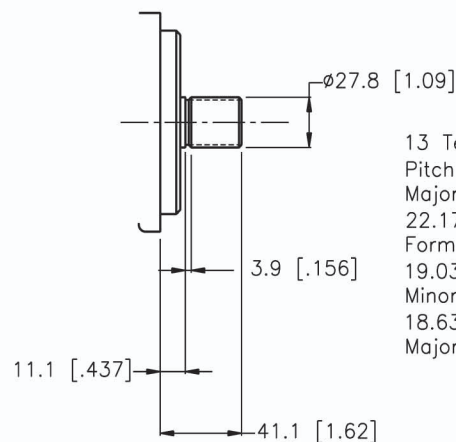


Installation Dimensions mm (inch):

E 20V/VQ



Shaft 1
Keyed Shaft



Shaft 151
Splined Shaft

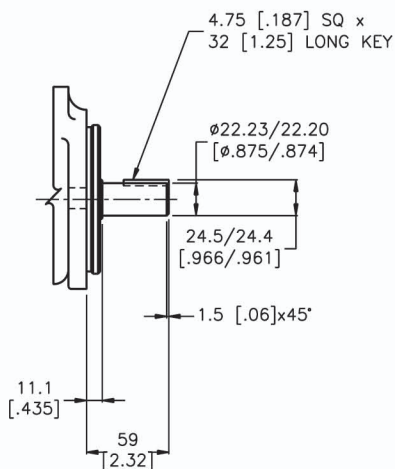
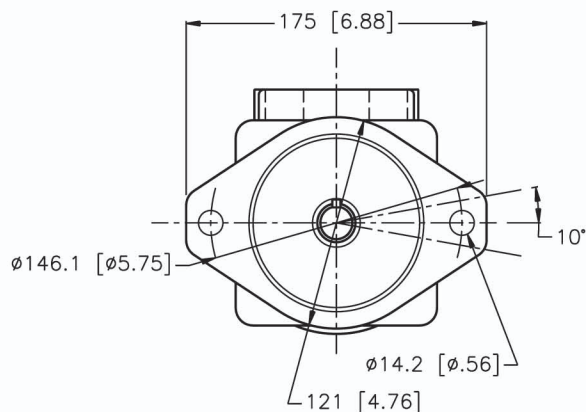
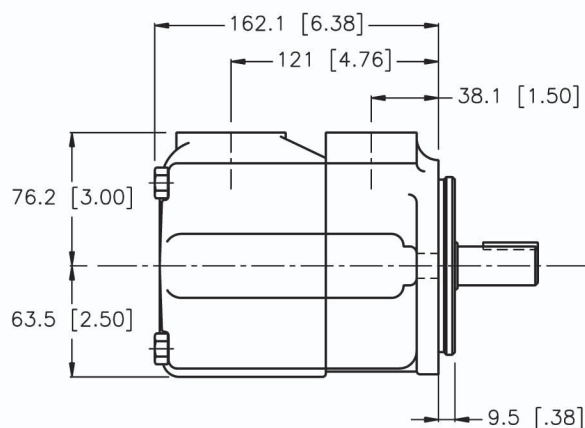
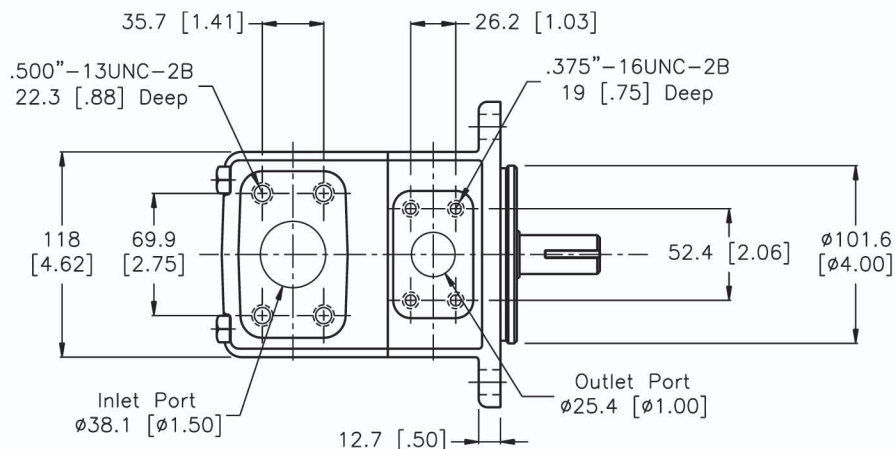
13 Teeth — 30° Press. Angle
Pitch 16/32
Major Diameter
22.17/22.15 [.873/.872]
Form Diameter
19.03 [.749]
Minor Diameter
18.63/18.35 [.734/.723]
Major Diameter Fit

E 20V/VQ

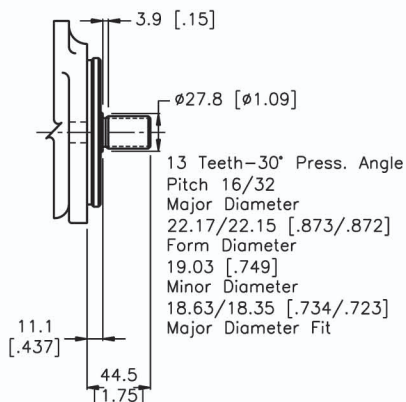
Installation Dimensions mm (inch):

E 25V/VQ

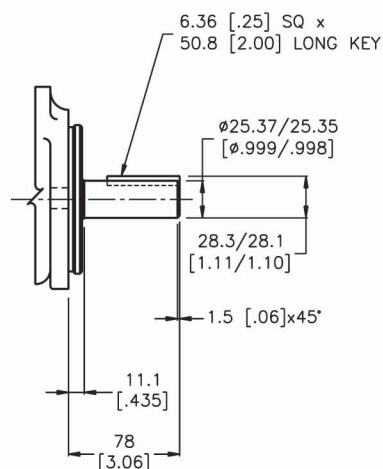
E 25V/VQ



Shaft 1
Keyed Shaft



Shaft 11
Splined Shaft



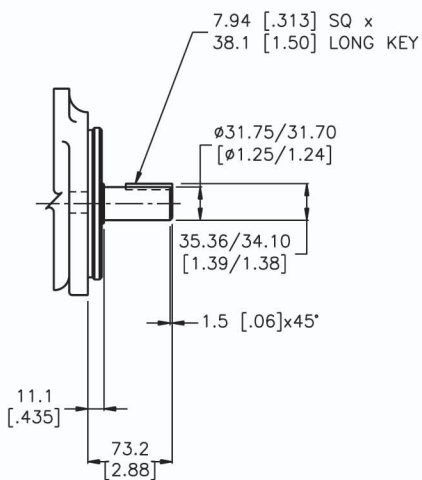
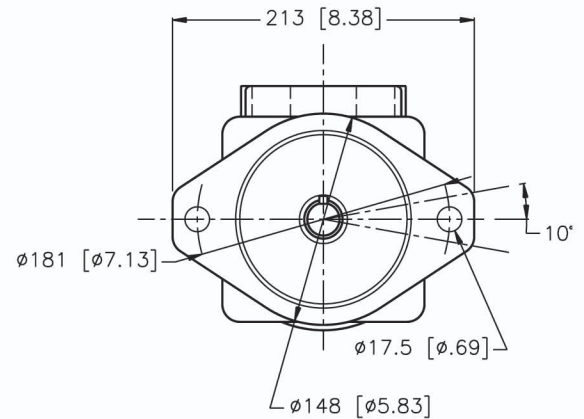
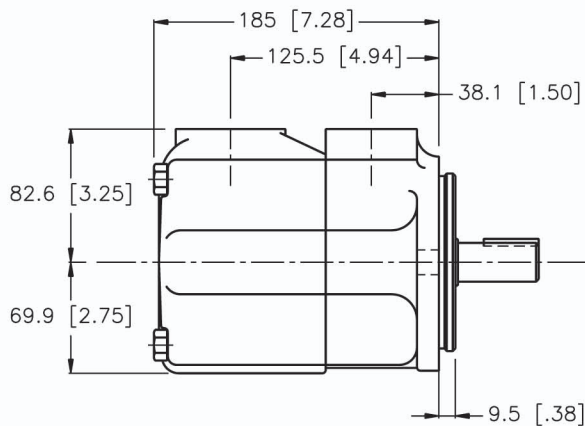
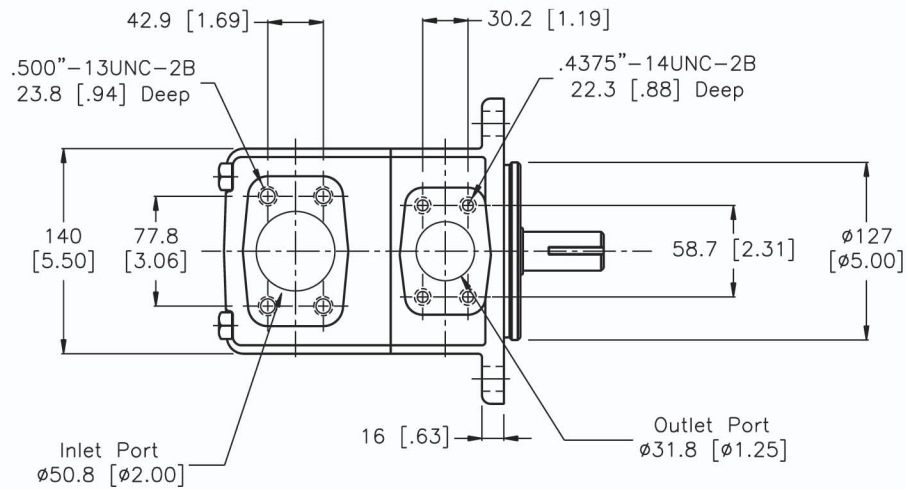
Shaft 86
Keyed Shaft

FIXED DISPLACEMENT VANE PUMP SINGLE PUMP E 35V/VQ

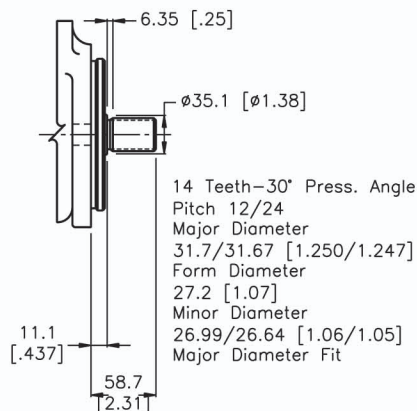


Installation Dimensions mm (inch):

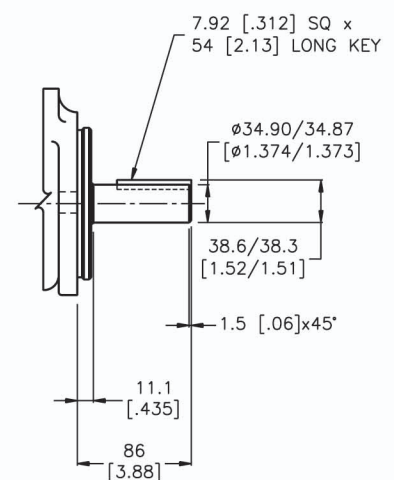
E 35V/VQ



Shaft 1
Keyed Shaft



Shaft 11
Splined Shaft

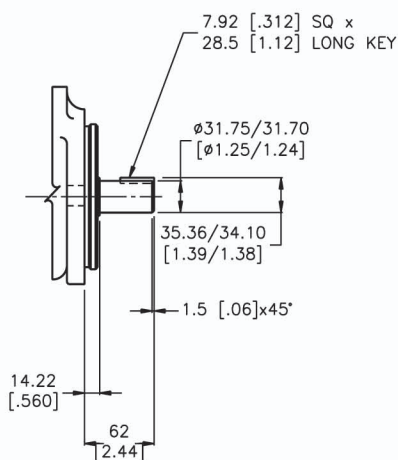
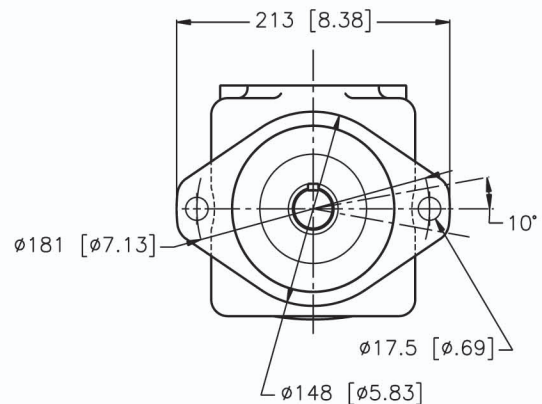
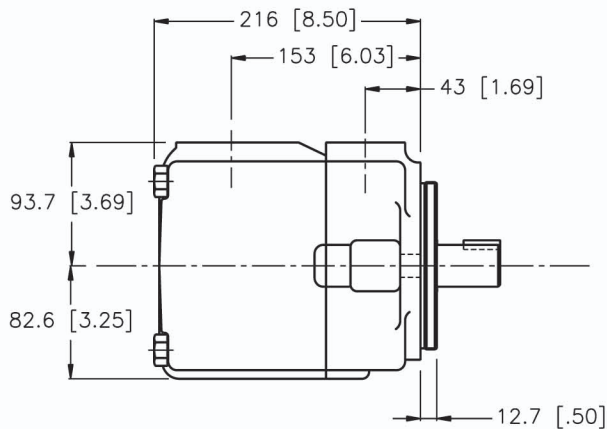
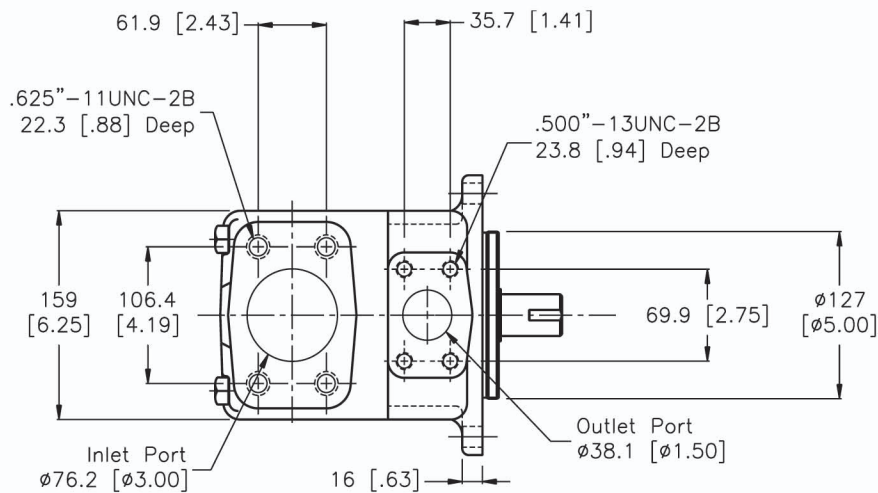


Shaft 86
Keyed Shaft

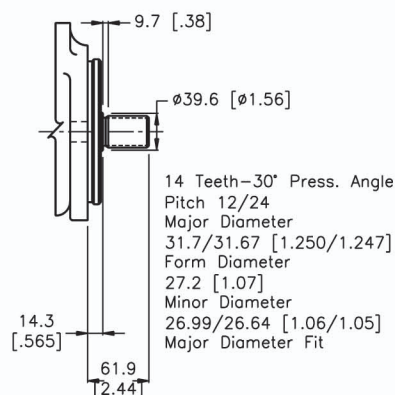
E 35V/VQ

Installation Dimensions mm (inch):

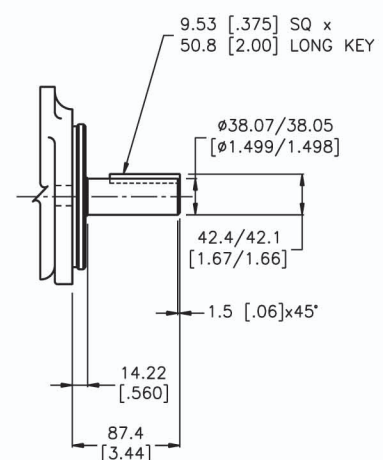
E 45V/VQ



Shaft 1
Keyed Shaft



Shaft 11
Splined Shaft



Shaft 86
Keyed Shaft

FIXED DISPLACEMENT VANE PUMP

DOUBLE PUMP



Ordering Code:

E 2520V/4535VQ

E2520VQ - 21 A 11 - 1 C B (L) - (V)

Model

2520, 3520, 4520
3525, 4525, 4535

Series

V - Industrial
VQ - Mobile

Shaft End Pump

Ring Size (USgallon)
25**V/VQ - 12, 14, 17, 21
35**V/VQ - 25, 30, 35, 38
45**V/VQ - 42, 50, 60

Port Connection

A - SAE 4-bolt with Inch threads
AM - SAE 4-bolt with Metric threads

Cover End Pump

Ring Size (USgallon)
**20V/VQ - 5, 8, 11, 12, 14
**25V/VQ - 12, 14, 17, 21
**35V/VQ - 25, 30, 35, 38

Shaft

1 - Straight keyed
11 - Splined
86 - Heavy duty straight keyed

Seal

Omit - Buna seal
V - Viton seal

Shaft Rotation

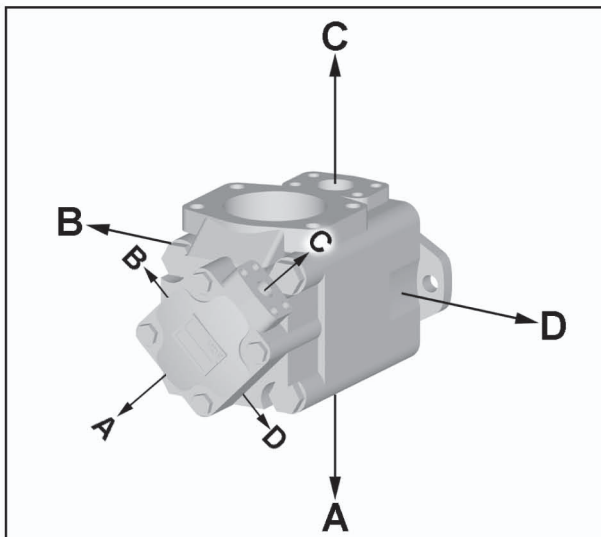
(Viewed from shaft end)
Omit - Turn right
L - Turn left

Cover End Outlet port position

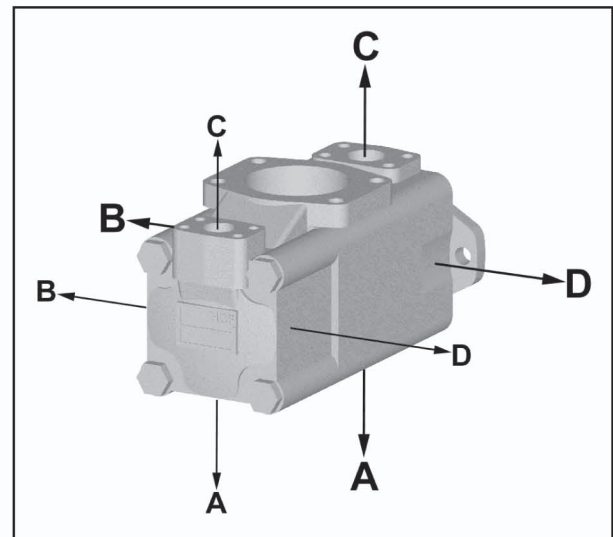
(Viewed from cover end)
For all models except 4535V/VQ
A - 135° CCW from inlet
B - 45° CCW from inlet
C - 45° CW from inlet
D - 135° CW from inlet
For 4535V/VQ
A - Opposite inlet
B - 90° CCW from inlet
C - Inline with inlet
D - 90° CW from inlet

Shaft End Outlet port position

(Viewed from cover end)
A - Opposite inlet
B - 90° CCW from inlet
C - Inline with inlet
D - 90° CW from inlet



Port Positions for 2520V/VQ, 3520V/VQ
4520V/VQ, 3525V/VQ, 4525V/VQ



Port Positions for 4535V/VQ

E 2520V/4535VQ

Specifications:

E 2520V/4535V

Model	Cartridge Position	Delivery at 1200 rpm & 7 bar (100 psi)	Displacement	Maximum Speed	Maximum Pressure	Typical Delivery at max speed & pressure	Typical Input Power at max speed & pressure	Weight
		USgpm	cm ³ /r (in ³ /r)	rpm	bar (psi)	L/min (USgpm)	kW (hp)	kg (lb)
2520V	Shaft End	12	39 (2.47)	1800	172 (2500)	62.1 (16.4)	22.9 (30.8)	20 (45)
		14	45 (2.78)			69.6 (18.4)	25.7 (34.5)	
		17	55 (3.39)			86.3 (22.8)	29.8 (40.0)	
		21	67 (4.13)			106.0 (28.0)	34.0 (45.6)	
	Cover End	5	18 (1.10)	1800	206 (3000)	28.4 (7.5)	11.2 (15.0)	
		8	27 (1.67)		206 (3000)	45.4 (12.0)	17.0 (22.8)	
		11	36 (2.22)		206 (3000)	56.8 (15.0)	22.6 (30.3)	
		12	40 (2.47)		158 (2300)	62.1 (16.4)	25.1 (33.7)	
		14	45 (2.78)		138 (2000)	69.6 (18.4)	28.3 (37.9)	
3520V	Shaft End	25	81 (4.94)	1800	172 (2500)	124.9 (33.0)	45.5 (61.0)	34 (75)
		30	97 (5.91)			154.4 (40.8)	54.5 (73.0)	
		35	112 (6.83)			181.7 (48.0)	61.5 (82.4)	
		38	121 (7.37)			193.8 (51.2)	65.9 (88.3)	
	Cover End	5	18 (1.10)	1800	206 (3000)	28.4 (7.5)	11.2 (15.0)	
		8	27 (1.67)		206 (3000)	45.4 (12.0)	17.0 (22.8)	
		11	36 (2.22)		206 (3000)	56.8 (15.0)	22.6 (30.3)	
		12	40 (2.47)		158 (2300)	62.1 (16.4)	25.1 (33.7)	
		14	45 (2.78)		138 (2000)	69.6 (18.4)	28.3 (37.9)	
3525V	Shaft End	25	81 (4.94)	1800	172 (2500)	124.9 (33.0)	45.5 (61.0)	34.5 (76)
		30	97 (5.91)			154.4 (40.8)	54.5 (73.0)	
		35	112 (6.83)			181.7 (48.0)	61.5 (82.4)	
		38	121 (7.37)			193.8 (51.2)	65.9 (88.3)	
	Cover End	12	39 (2.47)	1800	172 (2500)	62.1 (16.4)	22.9 (30.8)	
		14	45 (2.78)			69.6 (18.4)	25.7 (34.5)	
		17	55 (3.39)			86.3 (22.8)	29.8 (40.0)	
		21	67 (4.13)			106.0 (28.0)	34.0 (45.6)	
4520V	Shaft End	42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	43 (94)
		50	162 (9.85)			253.6 (67.0)	87.3 (117.0)	
		60	193 (11.75)			310.4 (82.0)	103.7 (139.0)	
	Cover End	5	18 (1.10)	1800	206 (3000)	28.4 (7.5)	11.2 (15.0)	
		8	27 (1.67)		206 (3000)	45.4 (12.0)	17.0 (22.8)	
		11	36 (2.22)		206 (3000)	56.8 (15.0)	22.6 (30.3)	
		12	40 (2.47)		158 (2300)	62.1 (16.4)	25.1 (33.7)	
		14	45 (2.78)		138 (2000)	69.6 (18.4)	28.3 (37.9)	
4525V	Shaft End	42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	46 (101)
		50	162 (9.85)			253.6 (67.0)	87.3 (117.0)	
		60	193 (11.75)			310.4 (82.0)	103.7 (139.0)	
	Cover End	12	39 (2.47)	1800	172 (2500)	62.1 (16.4)	22.9 (30.8)	
		14	45 (2.78)			69.6 (18.4)	25.7 (34.5)	
		17	55 (3.39)			86.3 (22.8)	29.8 (40.0)	
		21	67 (4.13)			106.0 (28.0)	34.0 (45.6)	
4535V	Shaft End	42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	54 (118)
		50	162 (9.85)			253.6 (67.0)	87.3 (117.0)	
		60	193 (11.75)			310.4 (82.0)	103.7 (139.0)	
	Cover End	25	81 (4.94)	1800	172 (2500)	124.9 (33.0)	45.5 (61.0)	
		30	97 (5.91)			154.4 (40.8)	54.5 (73.0)	
		35	112 (6.83)			181.7 (48.0)	61.5 (82.4)	
		38	121 (7.37)			193.8 (51.2)	65.9 (88.3)	

FIXED DISPLACEMENT VANE PUMP DOUBLE PUMP E VQ SERIES



Specifications:

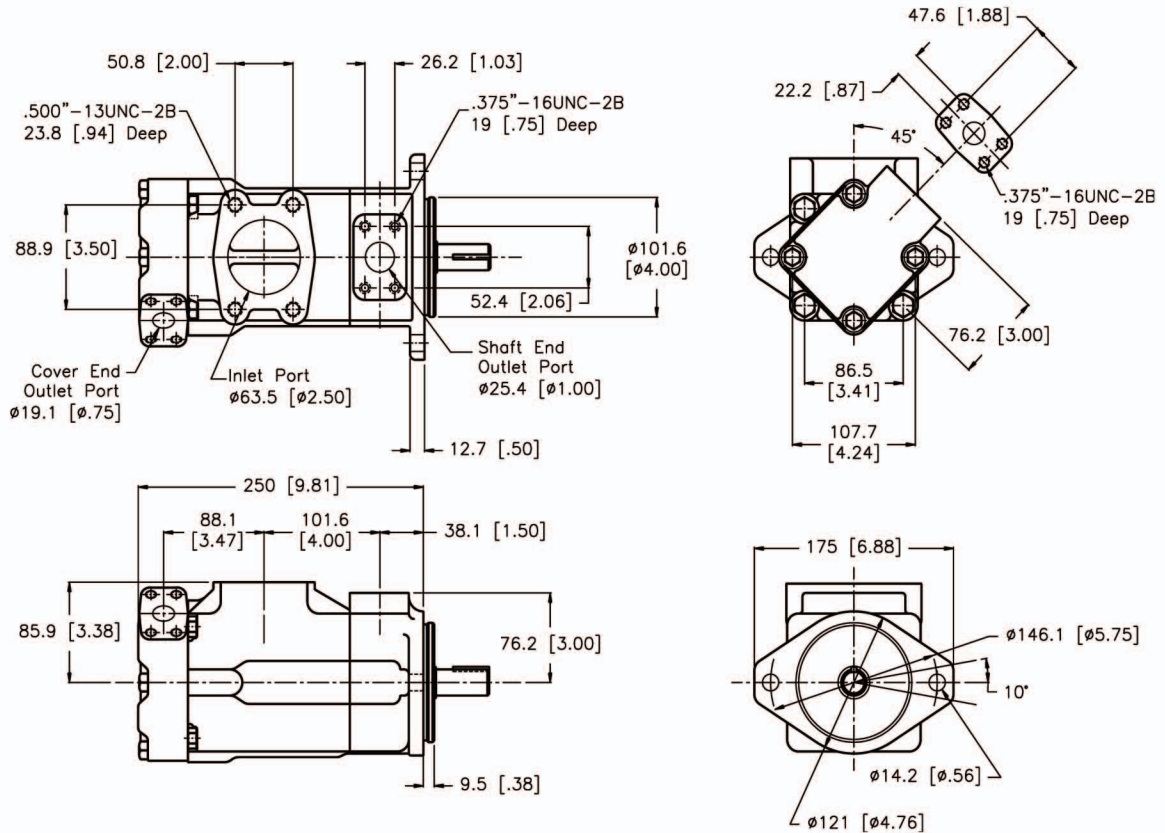
E 2520VQ/4535VQ

Model	Cartridge Position	Delivery at 1200 rpm & 7 bar (100 psi)	Displacement	Maximum Speed	Maximum Pressure	Typical Delivery at max speed & pressure	Typical Input Power at max speed & pressure	Weight
		USgpm	cm ³ /r (in ³ /r)	rpm	bar (psi)	L/min (USgpm)	kW (hp)	kg (lb)
2520VQ	Shaft End	12	40 (2.45)	2700	206 (3000)	87.1 (23.0)	41.0 (55.0)	20 (45)
		14	45 (2.77)	2700		102.2 (27.0)	46.6 (62.5)	
		17	55 (3.37)	2500		117.3 (31.0)	51.8 (69.5)	
		21	67 (4.12)	2500		143.8 (38.0)	61.9 (83.0)	
	Cover End	5	18 (1.10)	2700	206 (3000)	41.6 (11.0)	17.9 (24.0)	
		8	27 (1.67)		206 (3000)	64.3 (17.0)	26.1 (35.0)	
		11	36 (2.22)		206 (3000)	87.1 (23.0)	35.4 (47.5)	
		12	39 (2.41)		158 (2300)	96.5 (25.5)	28.3 (38.0)	
3520VQ	Shaft End	25	81 (4.98)	2500	206 (3000)	170.3 (45.0)	75.3 (101.0)	34 (75)
		30	97 (5.96)	2500		208.2 (55.0)	87.7 (117.5)	
		35	112 (6.88)	2400		227.1 (60.0)	98.5 (132.0)	
		38	121 (7.42)	2400		246.0 (65.0)	104.4 (140.0)	
	Cover End	5	18 (1.10)	2500	206 (3000)	37.9 (10.0)	16.4 (22.0)	
		8	27 (1.67)		206 (3000)	60.6 (16.0)	24.2 (32.5)	
		11	36 (2.22)		206 (3000)	79.5 (21.0)	32.8 (44.0)	
		12	39 (2.41)		158 (2300)	88.9 (23.5)	26.1 (35.0)	
3525VQ	Shaft End	25	81 (4.98)	2500	206 (3000)	170.3 (45.0)	75.3 (101.0)	34.5 (76)
		30	97 (5.96)	2500		208.2 (55.0)	87.7 (117.5)	
		35	112 (6.88)	2400		227.1 (60.0)	98.5 (132.0)	
		38	121 (7.42)	2400		246.0 (65.0)	104.4 (140.0)	
	Cover End	12	40 (2.45)	2500	206 (3000)	79.5 (21.0)	38.0 (51.0)	
		14	45 (2.77)			90.8 (24.0)	43.3 (58.0)	
		17	55 (3.37)			117.3 (31.0)	51.5 (69.0)	
		21	67 (4.12)			143.8 (38.0)	61.9 (83.0)	
4520VQ	Shaft End	42	138 (8.46)	2200	172 (2500)	251.7 (66.5)	91.4 (122.5)	43 (94)
		50	162 (9.90)			299.0 (79.0)	105.2 (141.0)	
		60	193 (11.80)			363.4 (96.0)	126.8 (170.0)	
	Cover End	5	18 (1.10)	2200	206 (3000)	32.2 (8.5)	14.5 (19.5)	
		8	27 (1.67)		206 (3000)	51.1 (13.5)	21.3 (28.5)	
		11	36 (2.22)		206 (3000)	68.1 (18.0)	28.7 (38.5)	
		12	39 (2.41)		158 (2300)	77.6 (20.5)	23.1 (31.0)	
		14	45 (2.80)		138 (2000)	90.8 (24.0)	23.9 (32.0)	
4525VQ	Shaft End	42	138 (8.46)	2200	172 (2500)	251.7 (66.5)	91.4 (122.5)	46 (101)
		50	162 (9.90)			299.0 (79.0)	105.2 (141.0)	
		60	193 (11.80)			363.4 (96.0)	126.8 (170.0)	
	Cover End	12	40 (2.45)	2200	206 (3000)	68.1 (18.0)	32.8 (44.0)	
		14	45 (2.77)			79.5 (21.0)	38.0 (51.0)	
		17	55 (3.37)			100.3 (26.5)	45.5 (61.0)	
		21	67 (4.12)			124.9 (33.0)	54.5 (73.0)	
4535VQ	Shaft End	42	138 (8.46)	2200	172 (2500)	251.7 (66.5)	91.4 (122.5)	54 (118)
		50	162 (9.90)			299.0 (79.0)	105.2 (141.0)	
		60	193 (11.80)			363.4 (96.0)	126.8 (170.0)	
	Cover End	25	81 (4.98)	2200	206 (3000)	145.7 (38.5)	66.4 (89.0)	
		30	97 (5.96)			177.9 (47.0)	77.6 (104.0)	
		35	112 (6.88)			208.2 (55.0)	89.5 (120.0)	
		38	121 (7.42)			223.3 (59.0)	97.0 (130.0)	

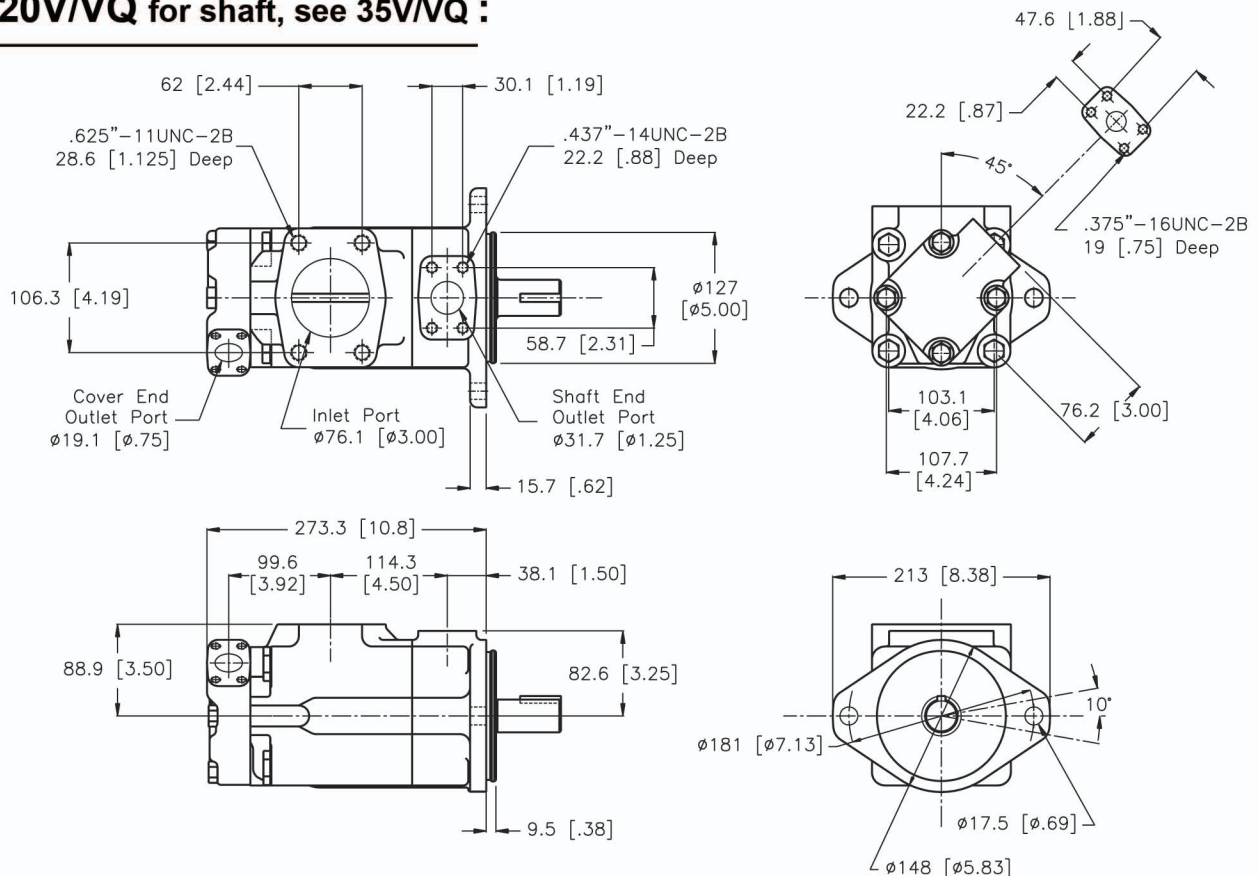
E 2520VQ/4535VQ

Installation Dimensions mm (inch) for shaft, see E 25V/VQ: E 2520V/VQ

E2520,3520V/VQ



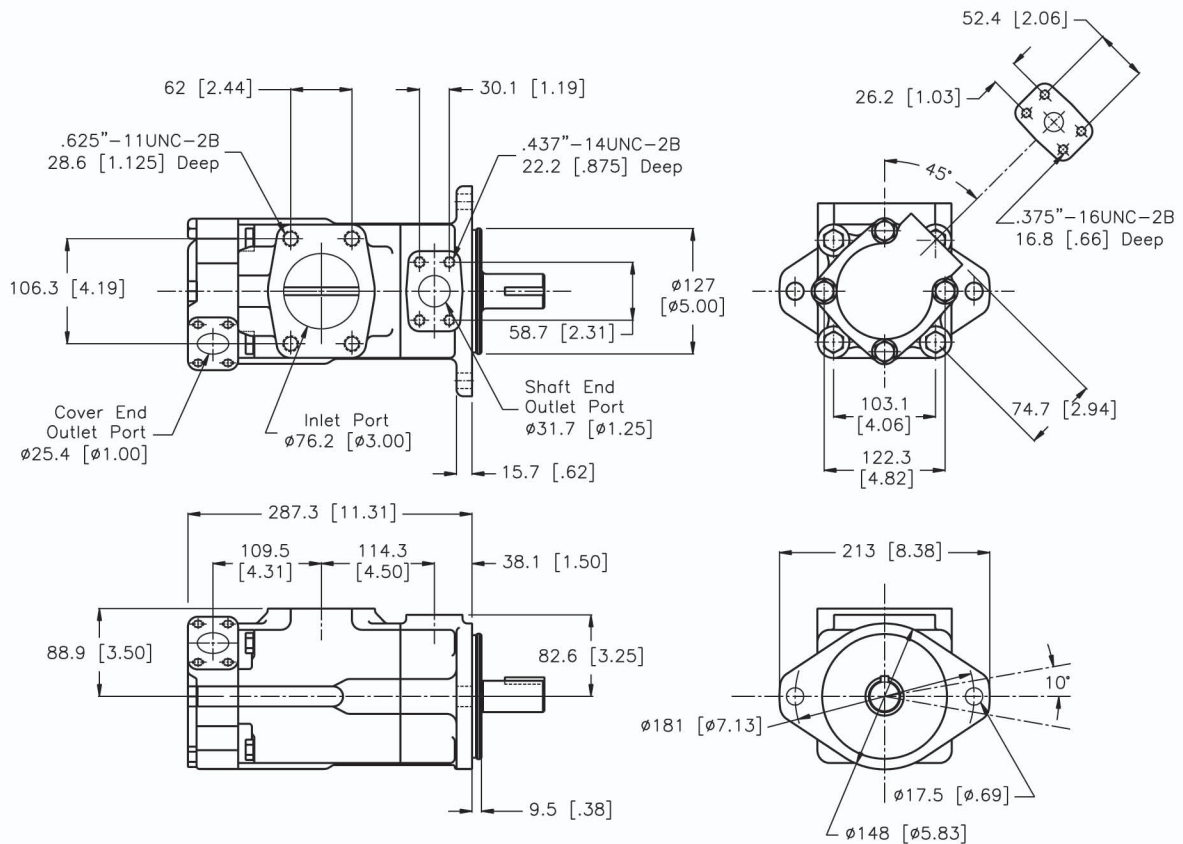
E 3520V/VQ for shaft, see 35V/VQ :



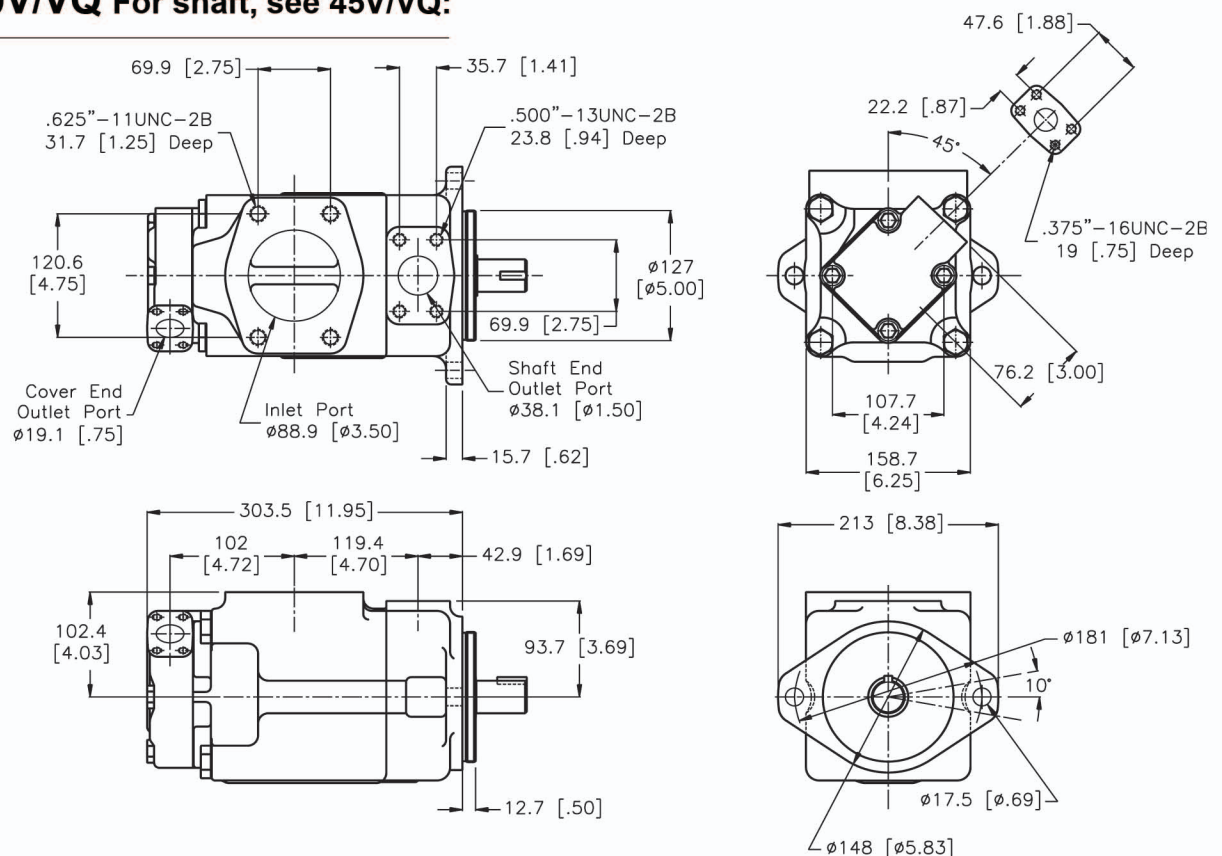
FIXED DISPLACEMENT VANE PUMP DOUBLE PUMP



Installation Dimensions mm (inch) for shaft, see E 35V/VQ: E 3525V/VQ



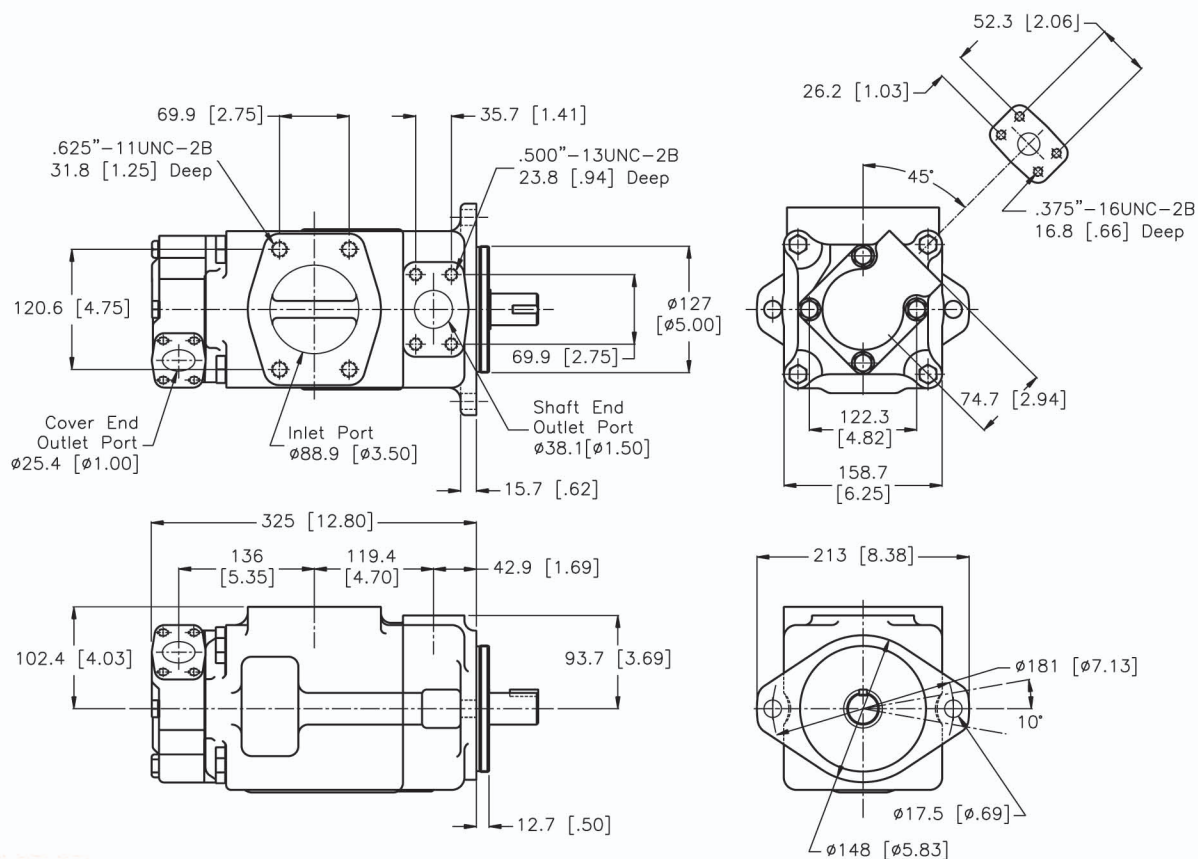
E 4520V/VQ For shaft, see 45V/VQ:



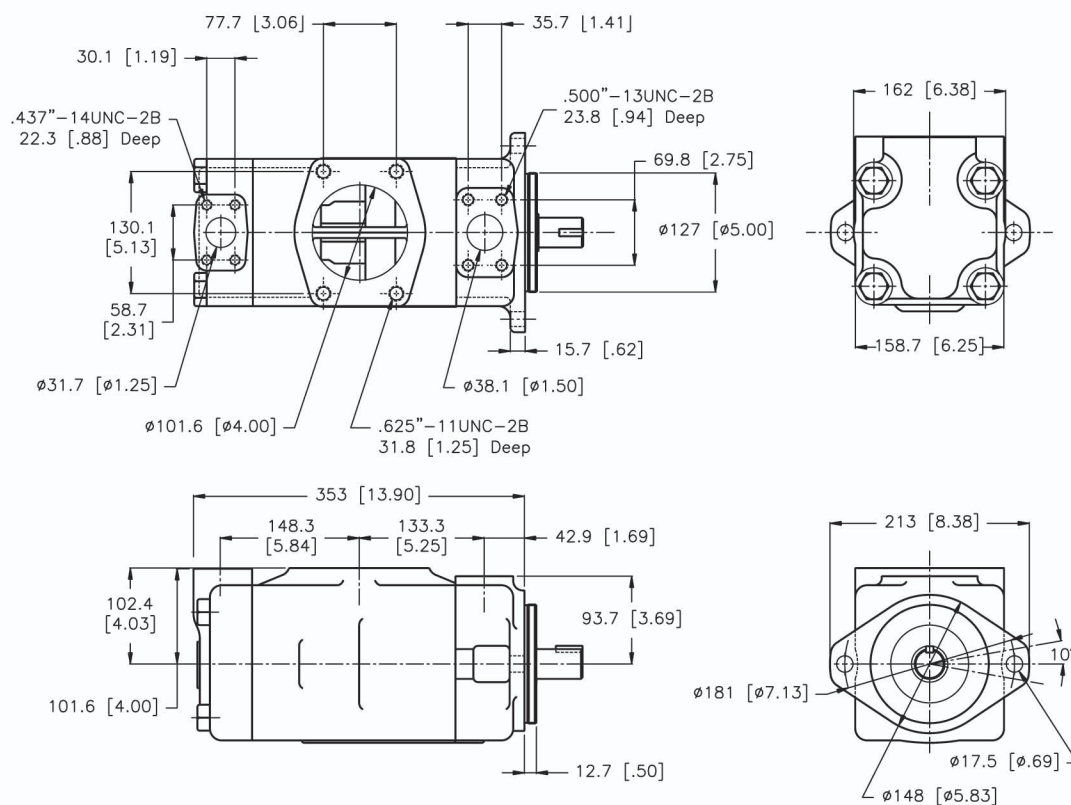
E 3525, 4520V/VQ

Installation Dimensions mm (inch) for shaft, see E 45V/VQ: E 4525V/VQ

E 4525,4535V/QV



E 4535V/VQ for shaft, see 45V/VQ :



FIXED DISPLACEMENT VANE PUMP E 20V, COVER END OF E 20V

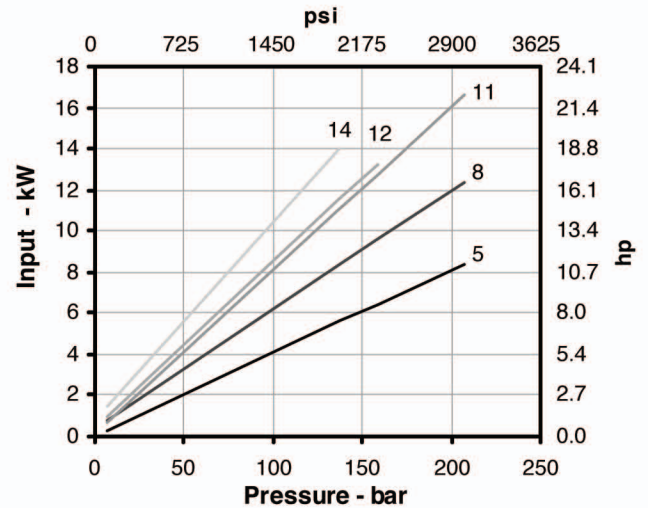
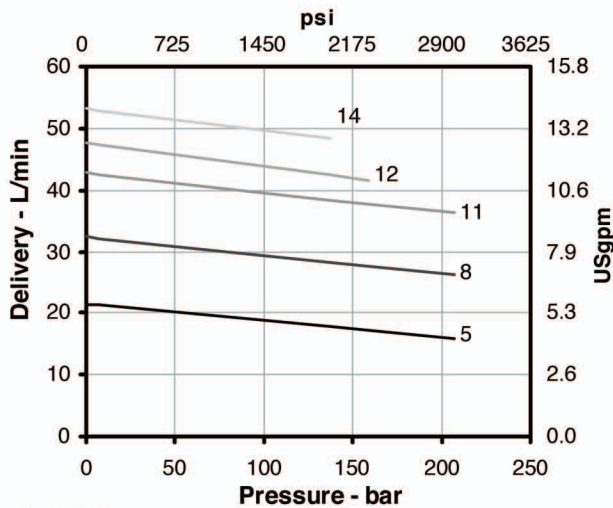


Performance Characteristics:

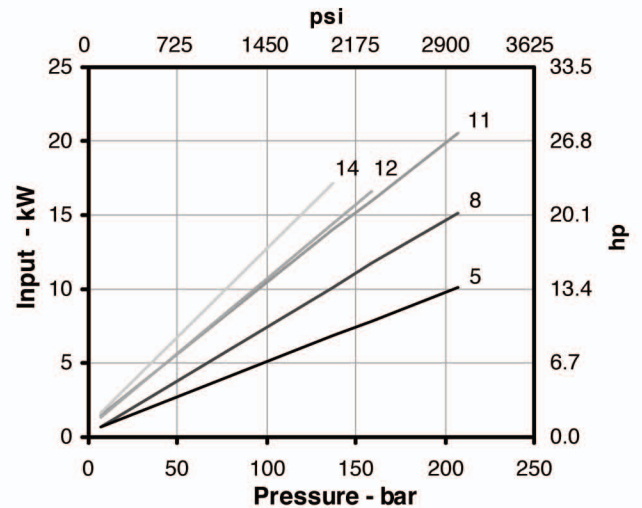
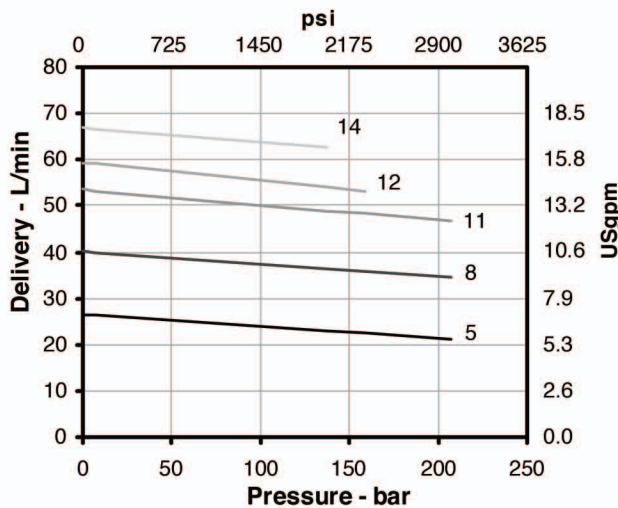
E 20V

Based on SAE 10W Fluid at 50 °C (120 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

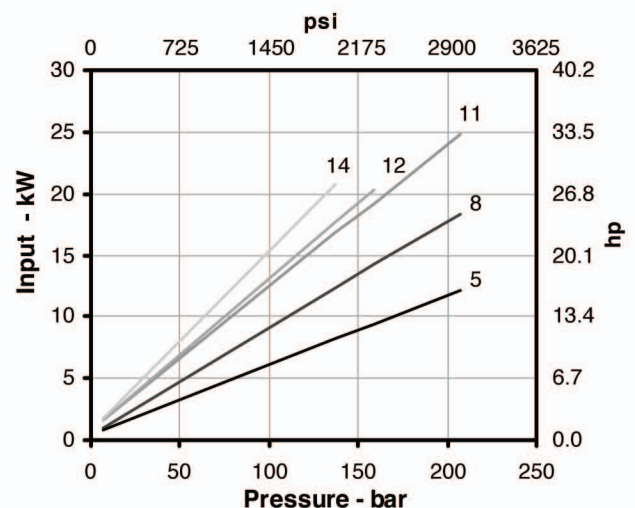
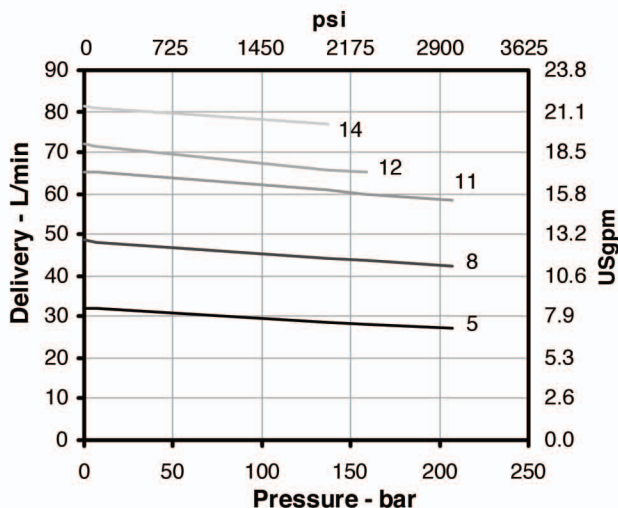
At 1200 rpm



At 1500 rpm



At 1800 rpm



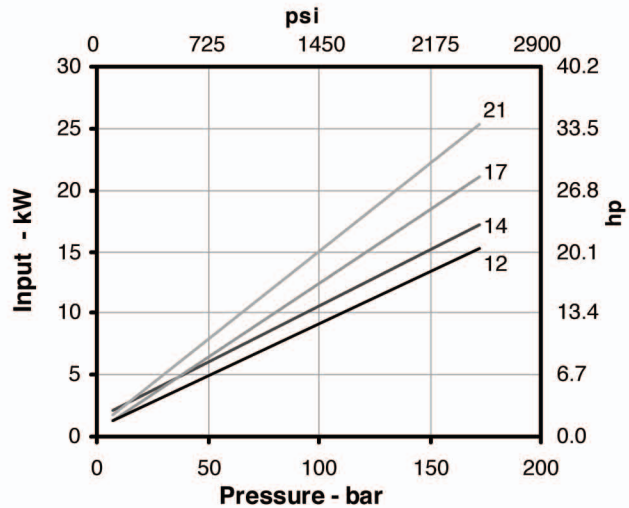
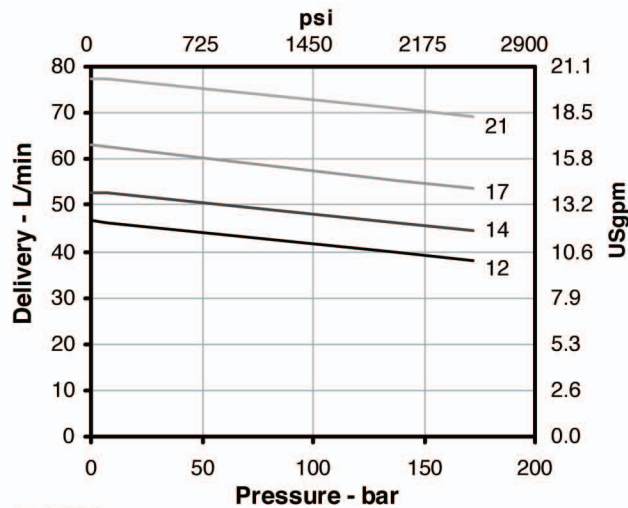
E 20V

Performance Characteristics:

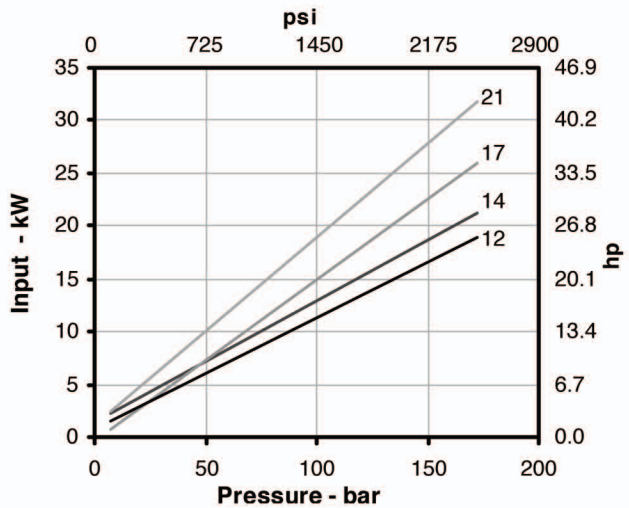
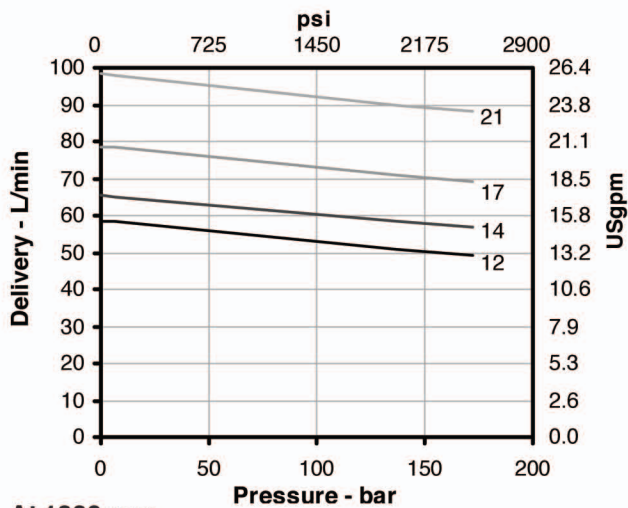
E 25V

Based on SAE 10W Fluid at 50 °C (120 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

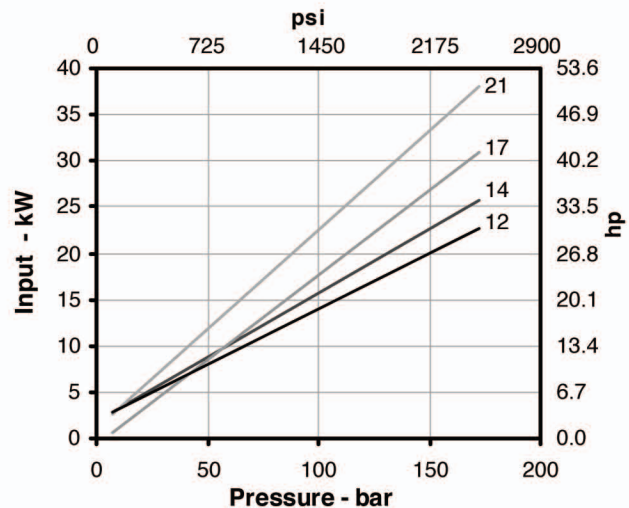
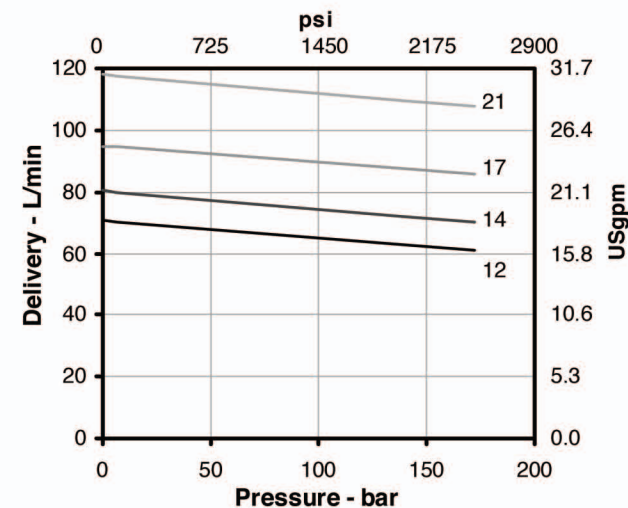
At 1200 rpm



At 1500 rpm



At 1800 rpm



FIXED DISPLACEMENT VANE PUMP

E 35V, SHAFT END OF E 35V, COVER END OF E 35V

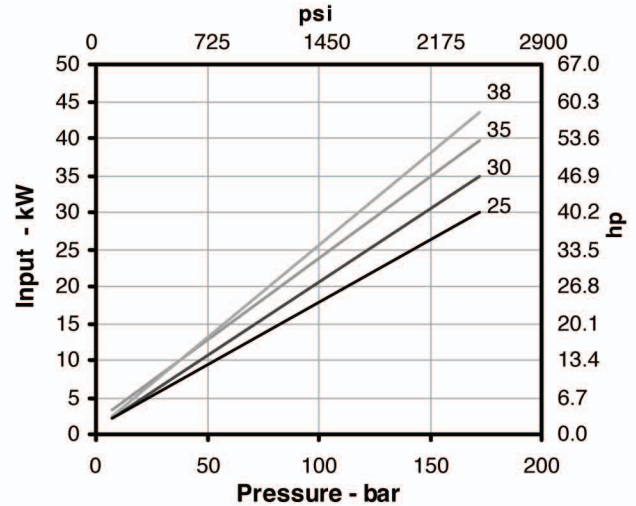
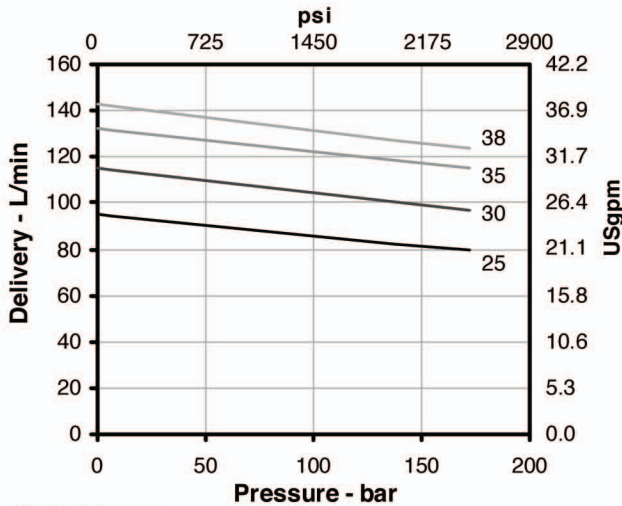


Performance Characteristics:

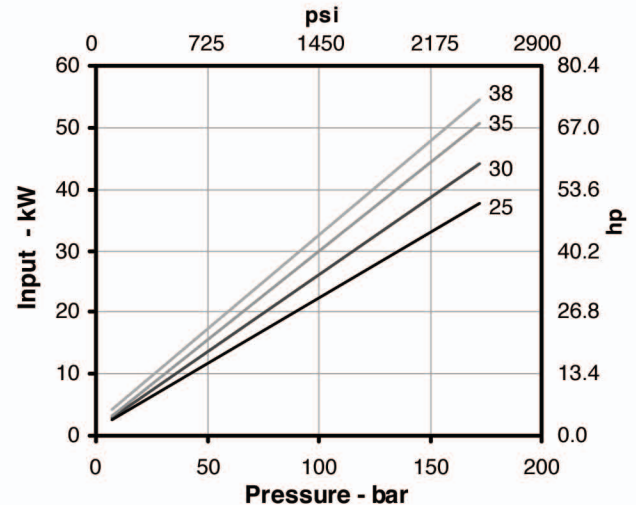
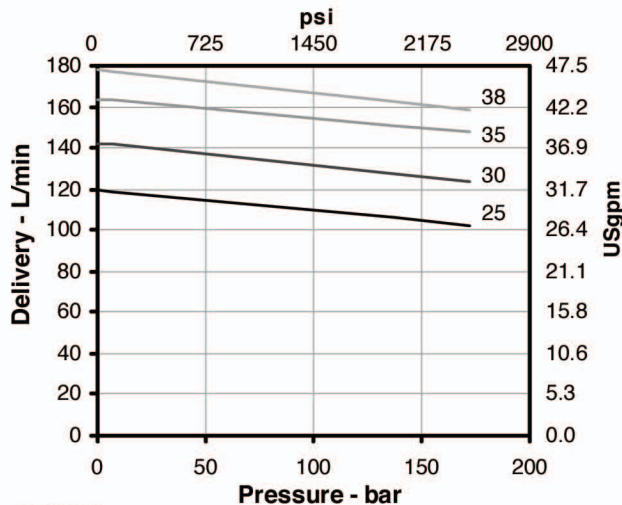
E 35V

Based on SAE 10W Fluid at 50 °C (120 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

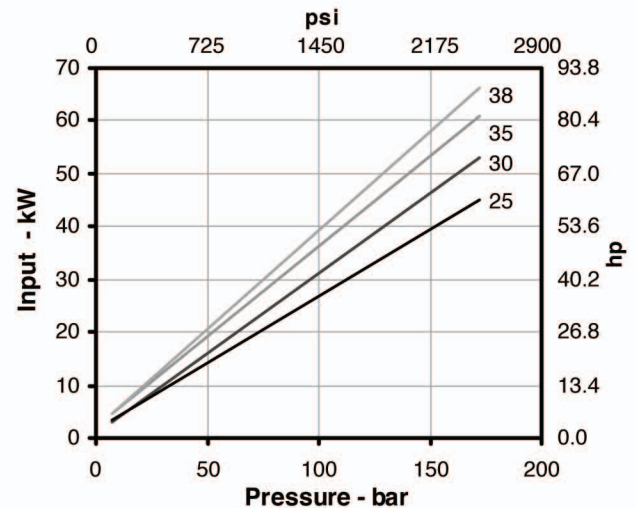
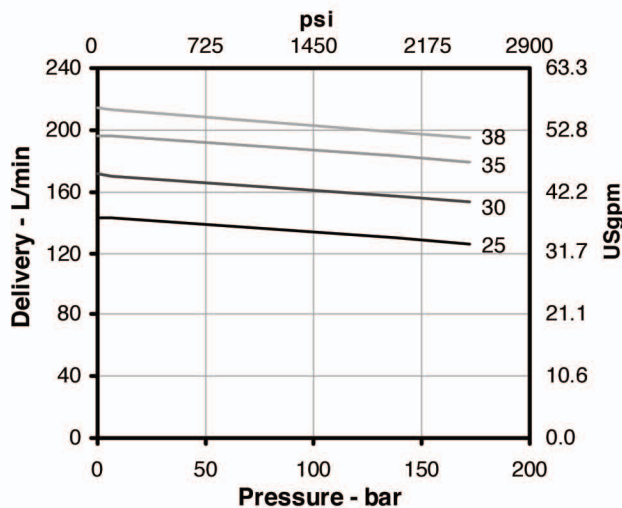
At 1200 rpm



At 1500 rpm



At 1800 rpm



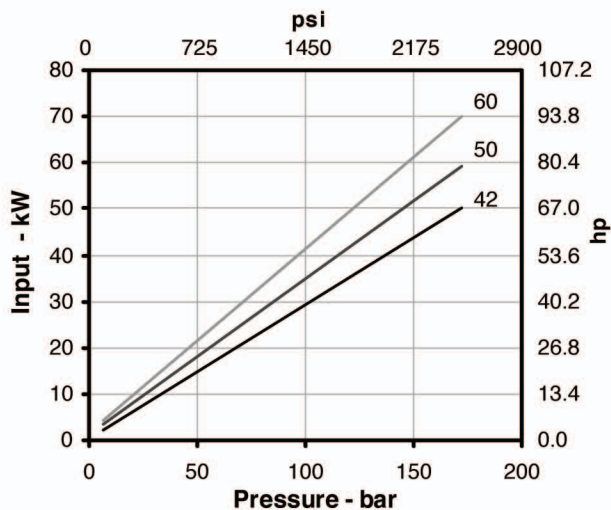
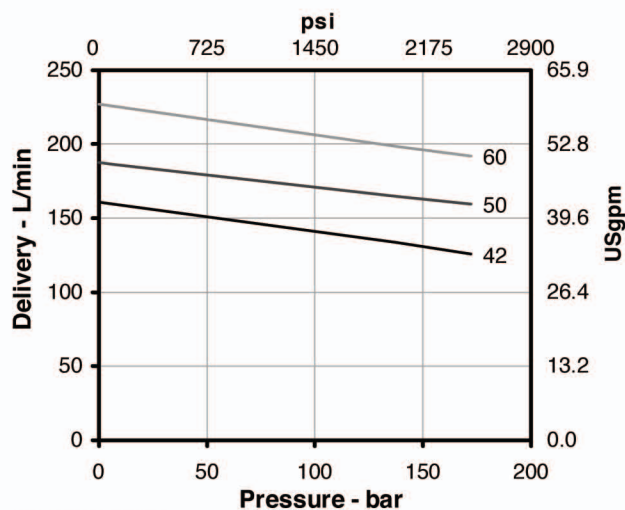
E 35V

Performance Characteristics:

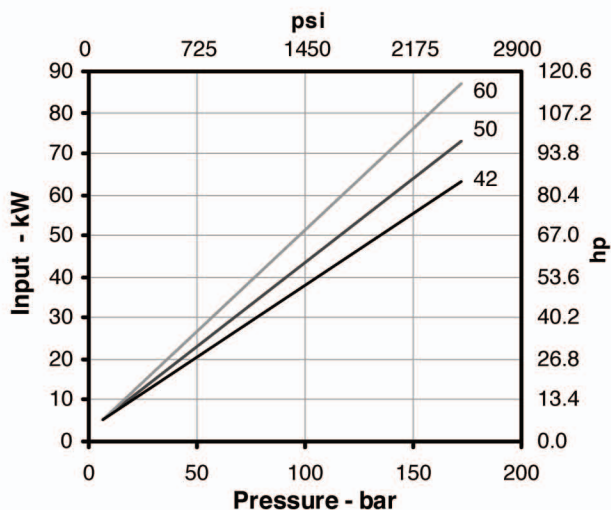
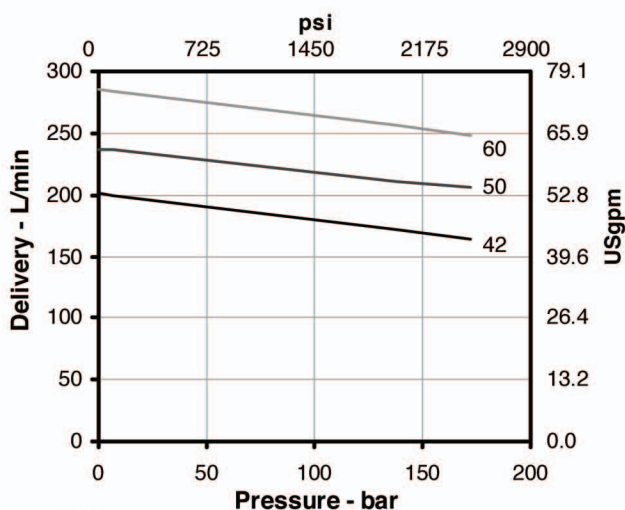
E 45V

Based on SAE 10W Fluid at 50 °C (120 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

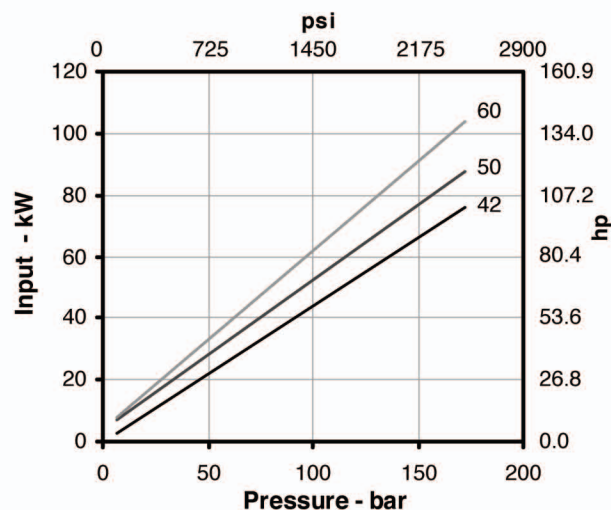
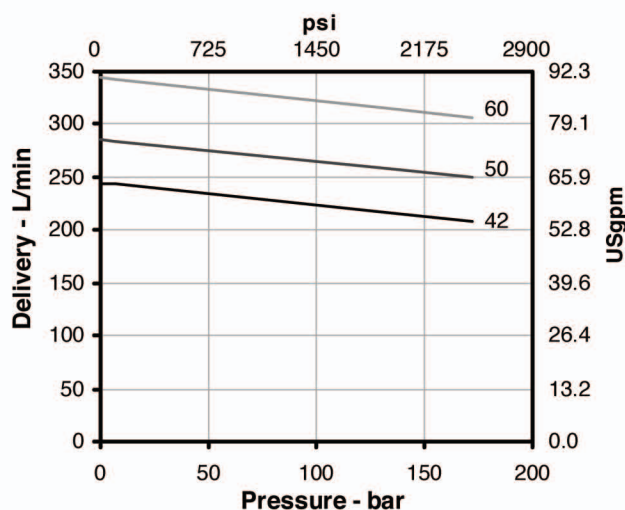
At 1200 rpm



At 1500 rpm



At 1800 rpm



FIXED DISPLACEMENT VANE PUMP E 20VQ, COVER END OF E 20VQ

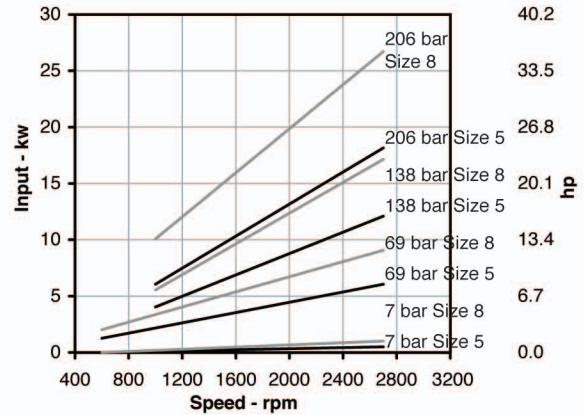
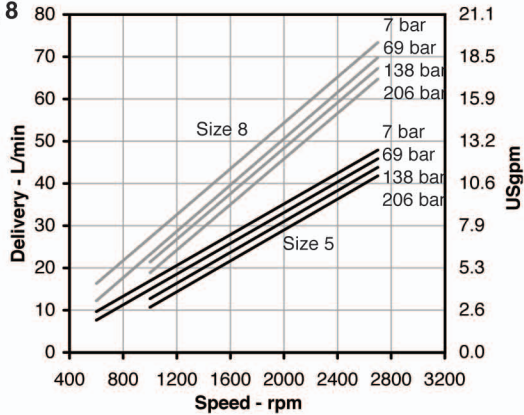


Performance Characteristics:

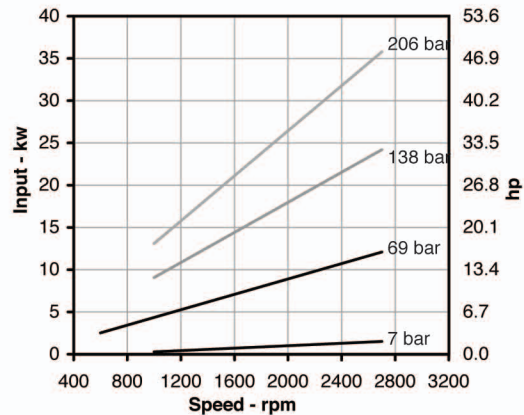
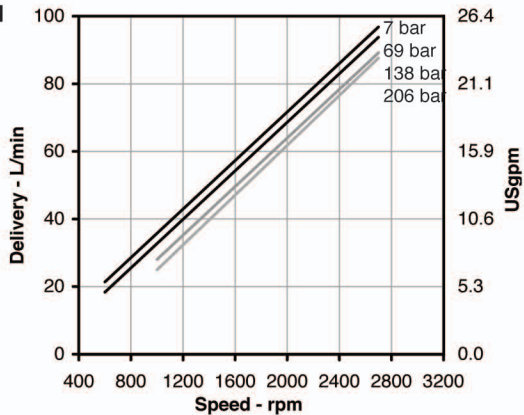
E 20VQ

Based on SAE 10W Fluid at 82 °C (180 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

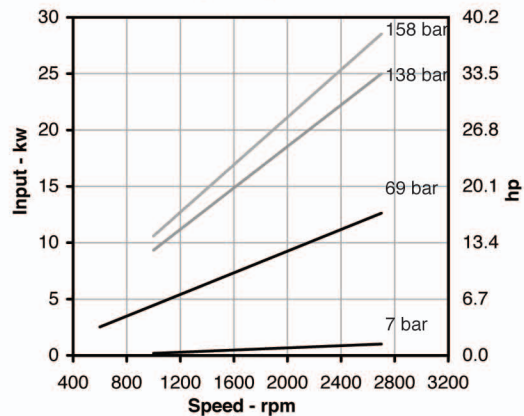
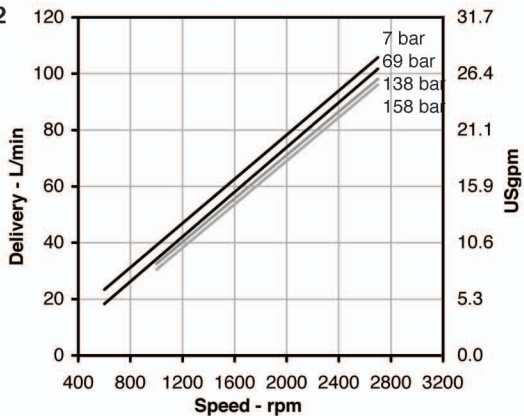
Size 5, 8



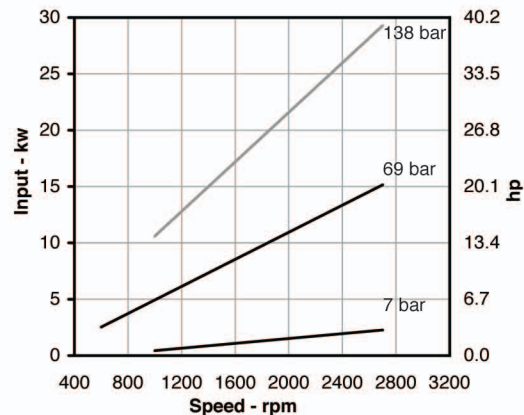
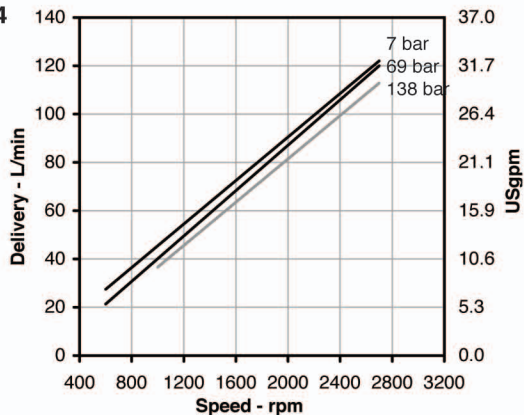
Size 11



Size 12



Size 14



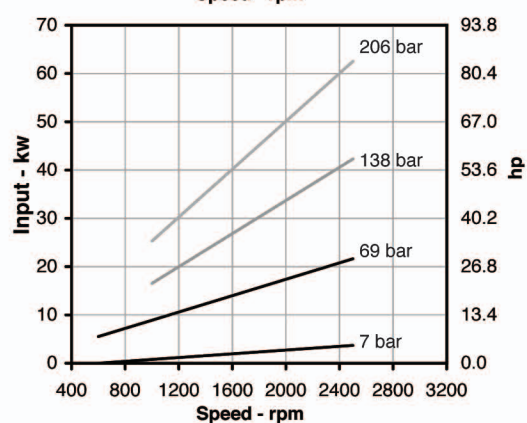
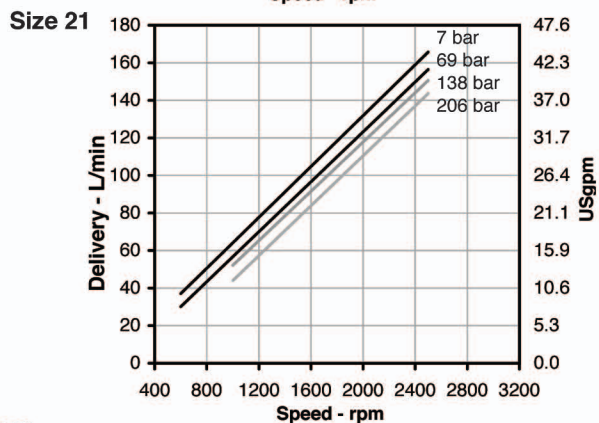
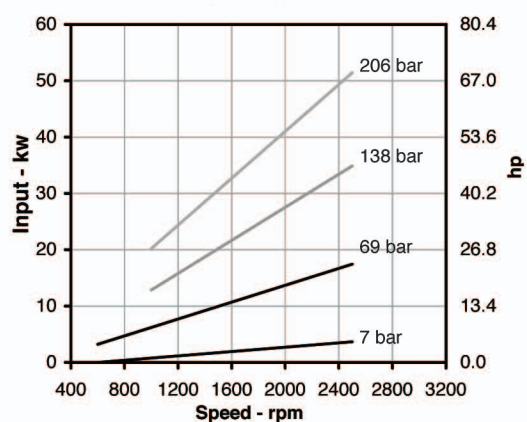
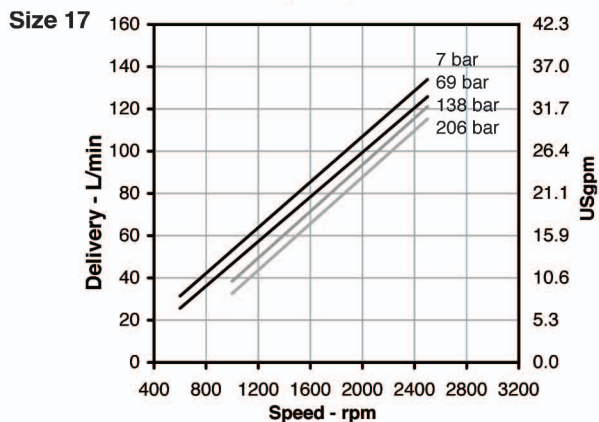
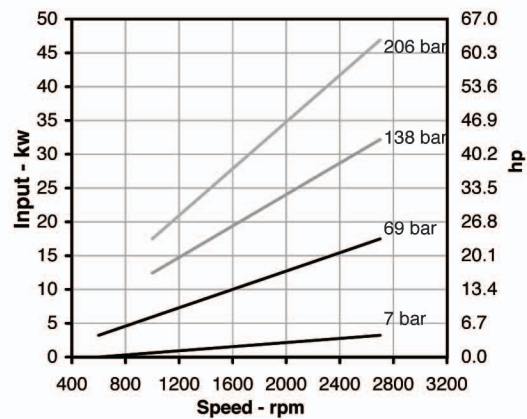
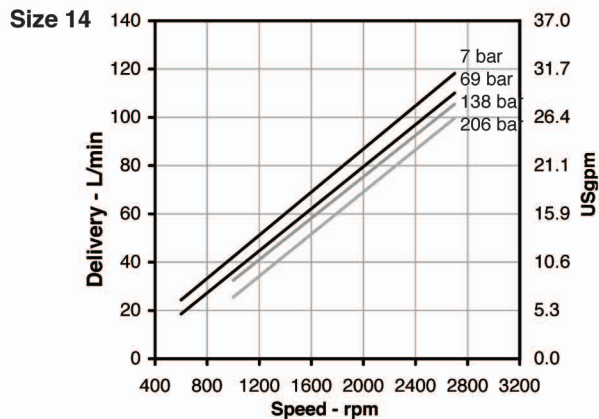
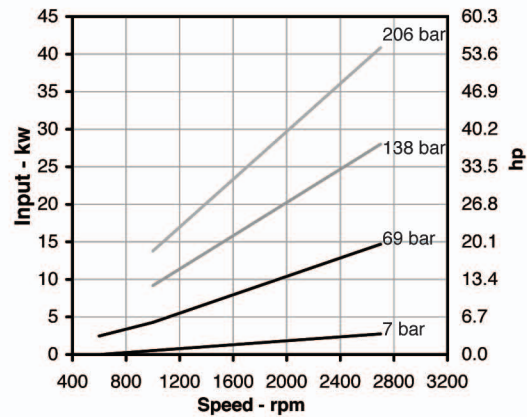
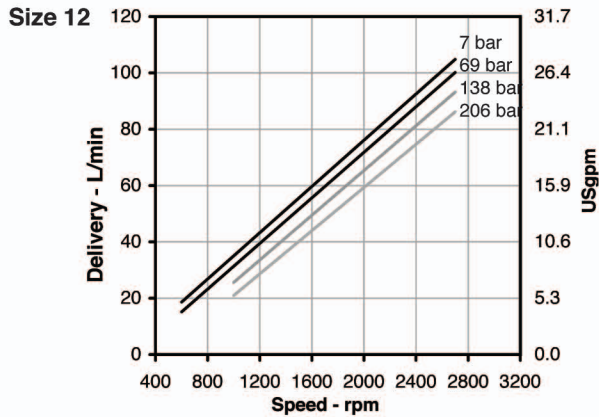
E 20VQ

Performance Characteristics:

E 25VQ

Based on SAE 10W Fluid at 82 °C (180 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

For the Cover End Cartridge, the speed could not exceed the maximum speed of the Shaft End Cartridge.



FIXED DISPLACEMENT VANE PUMP

E 35VQ, SHAFT END OF E 35VQ, COVER END OF E 35VQ

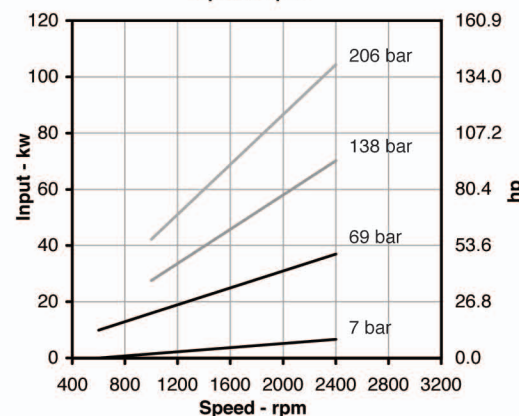
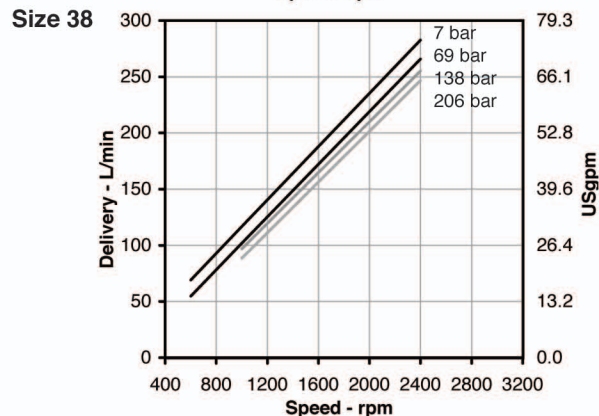
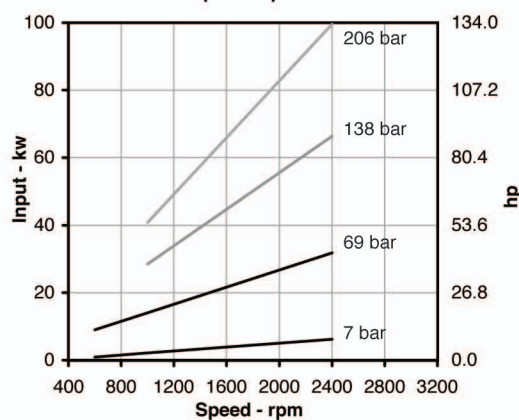
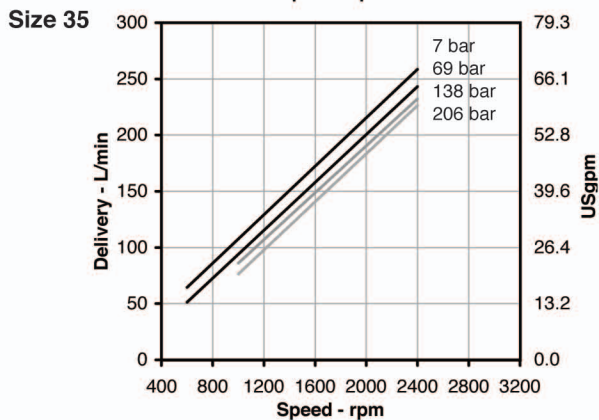
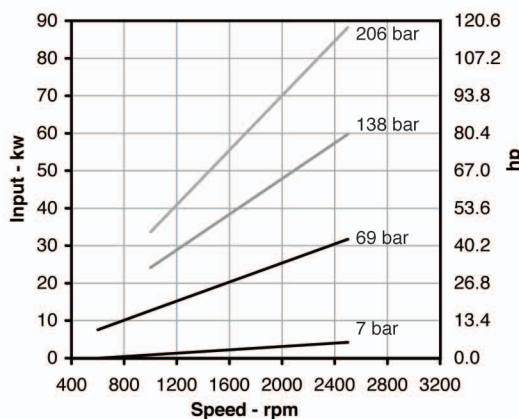
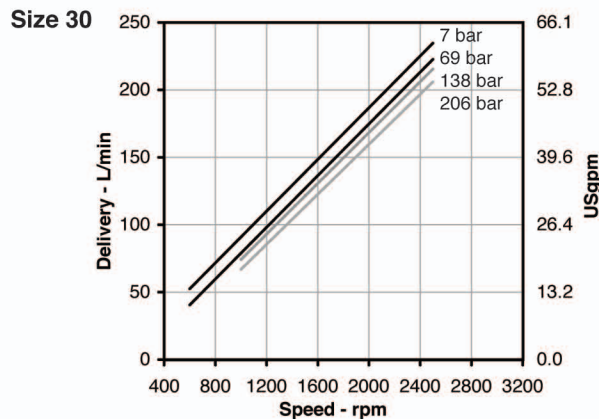
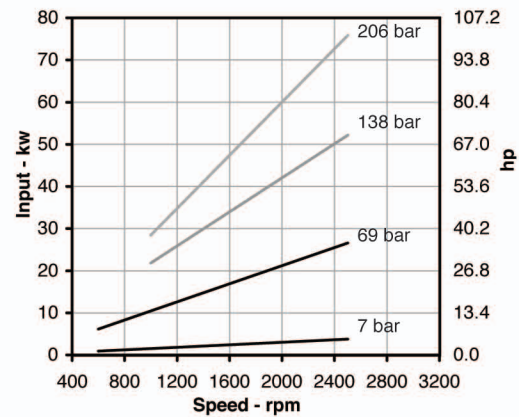
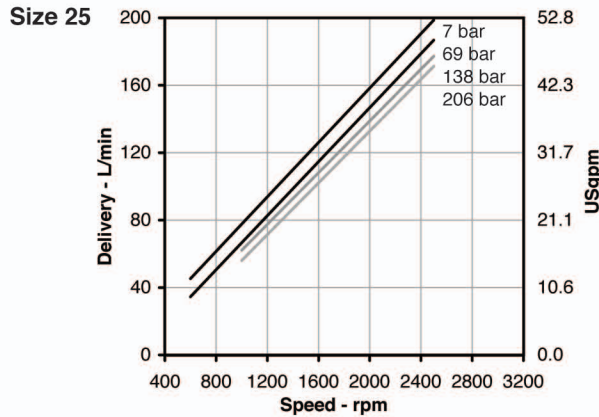


Performance Characteristics:

E 35VQ

Based on SAE 10W Fluid at 82 °C (180 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

For the Cover End Cartridge, the speed could not exceed the maximum speed of the Shaft End Cartridge.



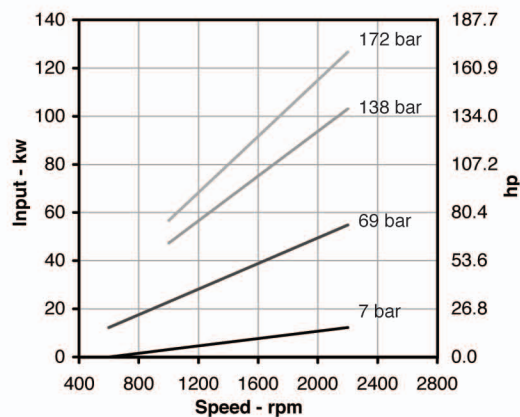
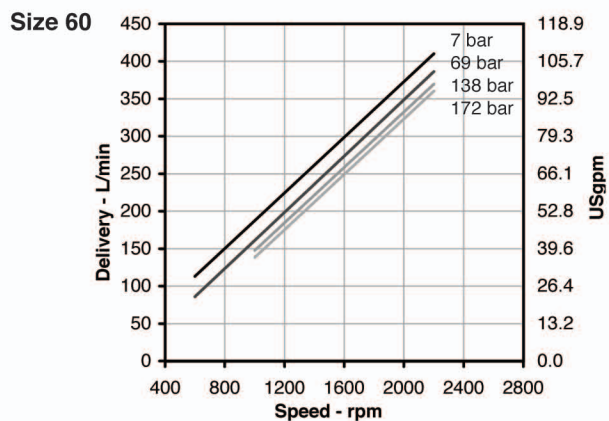
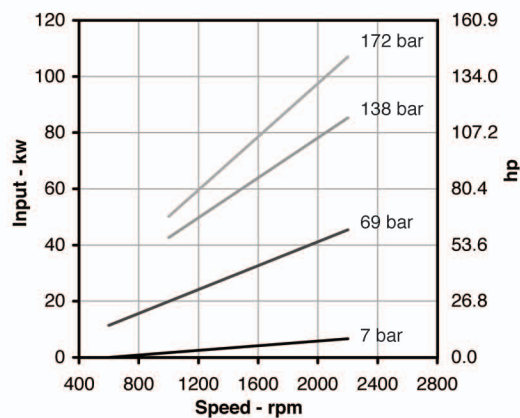
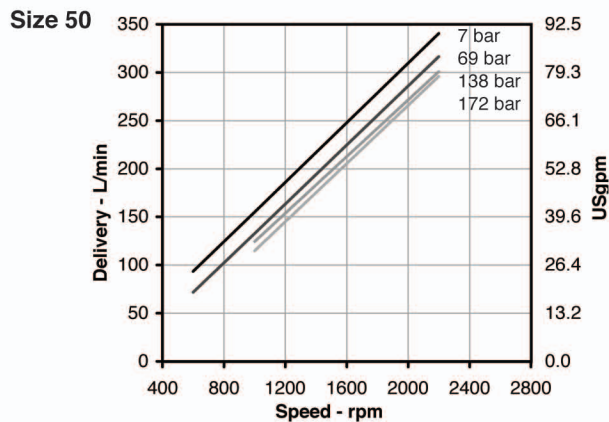
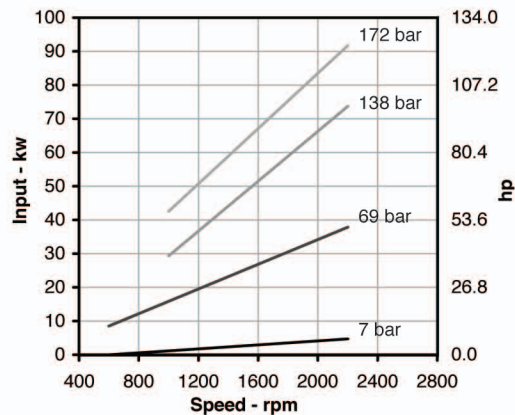
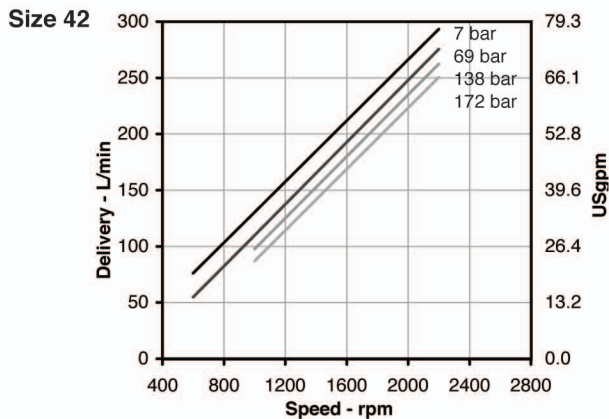
E 35VQ

Performance Characteristics:

E 45VQ

Based on SAE 10W Fluid at 82 °C (180 °F) and Pump inlet at 0 PSIG (14.7 PSIA)

E 45VQ



HIGH PRESSURE SINGLE VANE PUMP

E T6C AND E T6D SERIES



Features:

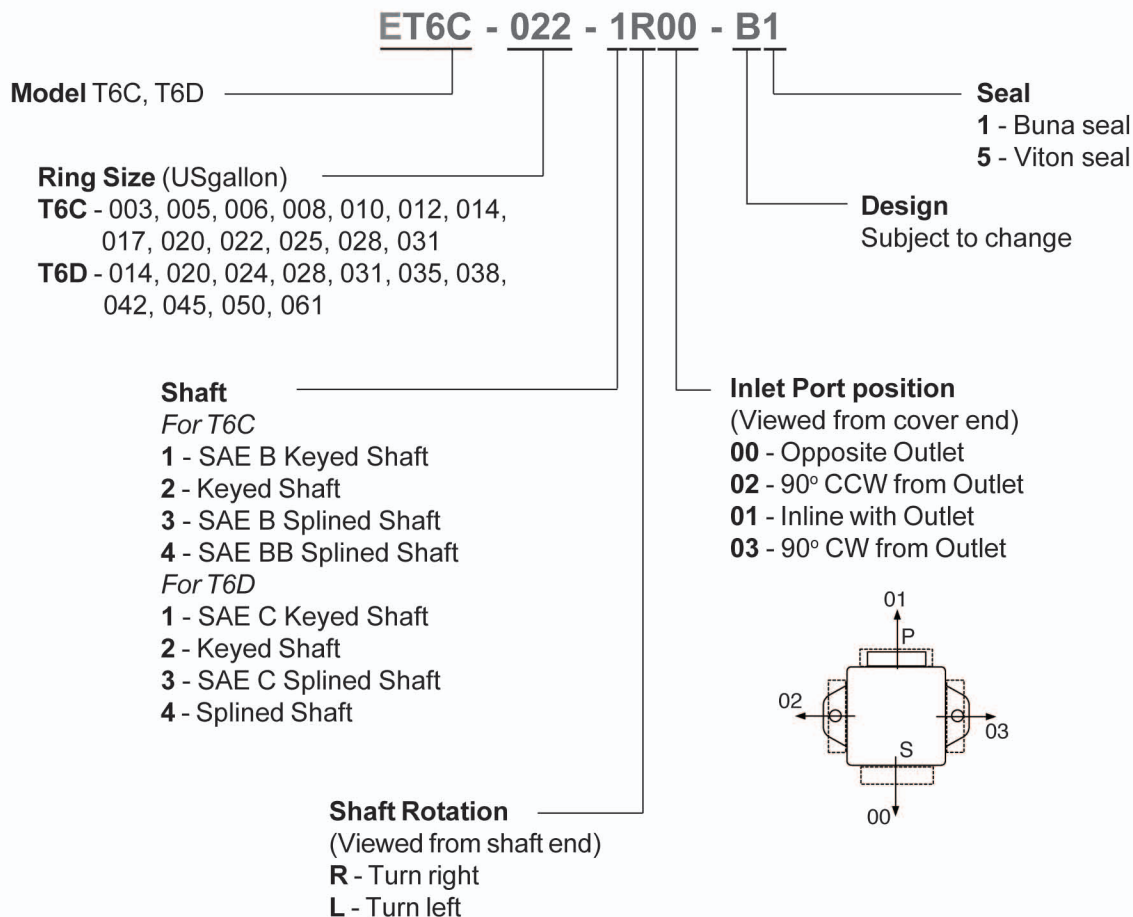
E T6C/T6D

- T6C and T6D Series are fixed displacement and balanced type single vane pumps. The pump is designed for higher operating pressure and greater flow at the same housing size.
- With a balanced pin-vane design, outlet pressure is continuously applied only to the pin. The pin provides the steady light force against the vane. Top and bottom areas of the vane are subject to the same pressure, either inlet or outlet pressure, depending on the vane's location during rotor rotation. This pin-vane design minimizes noise level and improves volumetric efficiency.
- With the cartridge independent of the shaft, allowing for



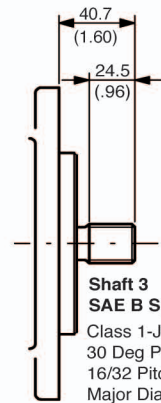
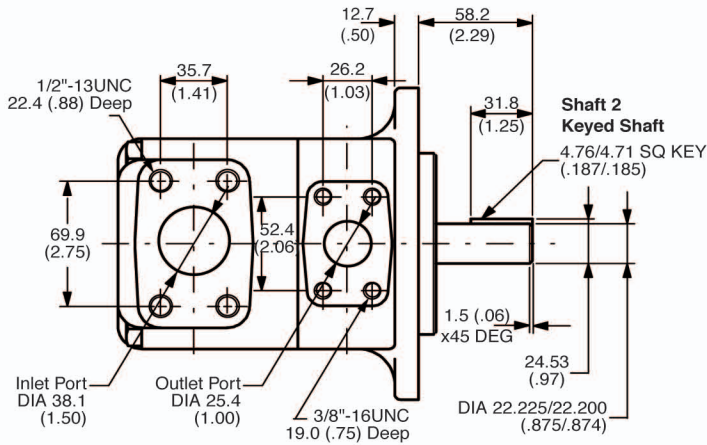
easy change of flow capacity and field servicing without removing the pump from its mounting.

Ordering Code:

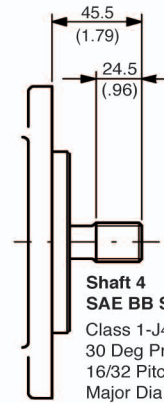


Installation Dimensions mm (inch):

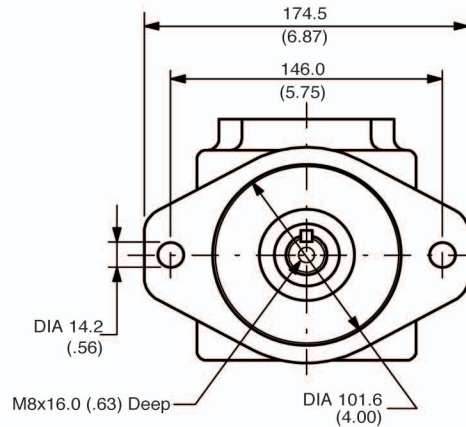
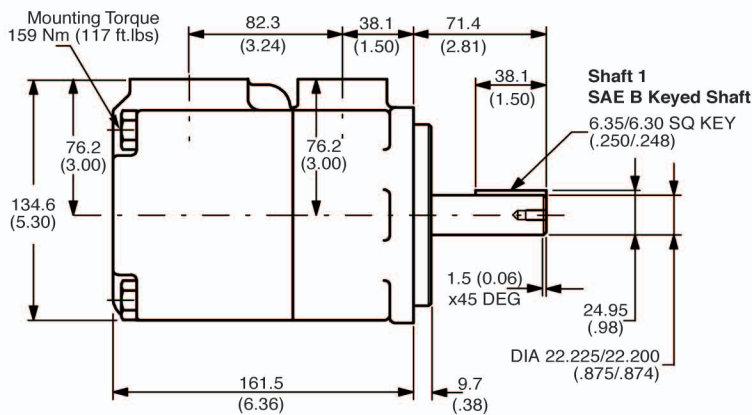
E T6C



**Shaft 3
SAE B Splined Shaft**
Class 1-J498b 13 Teeth
30 Deg Pressure Angle
16/32 Pitch
Major Dia
21.79/21.54 (.858/.848)
Minor Dia
18.62/18.34 (.733/.722)
Flat root side fit



**Shaft 4
SAE BB Splined Shaft**
Class 1-J498b 15 Teeth
30 Deg Pressure Angle
16/32 Pitch
Major Dia
24.98/24.71 (.983/.973)
Minor Dia
21.80/21.53 (.858/.848)
Flat root side fit



Specifications :

Size	Displacement	Max Speed	Min Speed	Max Intermittent Pressure	Max Continuous Pressure	Weight
	cm ³ /r (in ³ /r)	rpm	rpm	bar (psi)	bar (psi)	kg (lb)
003	10.8 (0.66)	2800	600	280 (4000)	240 (3500)	15 (34)
005	17.2 (1.05)					
006	21.3 (1.30)					
008	26.4 (1.61)					
010	34.1 (2.08)					
012	37.1 (2.26)					
014	46.0 (2.81)					
017	58.3 (3.56)					
020	63.8 (3.89)					
022	70.3 (4.29)					
025	79.3 (4.84)	2500	600	210 (3000)	160 (2300)	
028	88.8 (5.42)					
031	100.0 (6.10)					

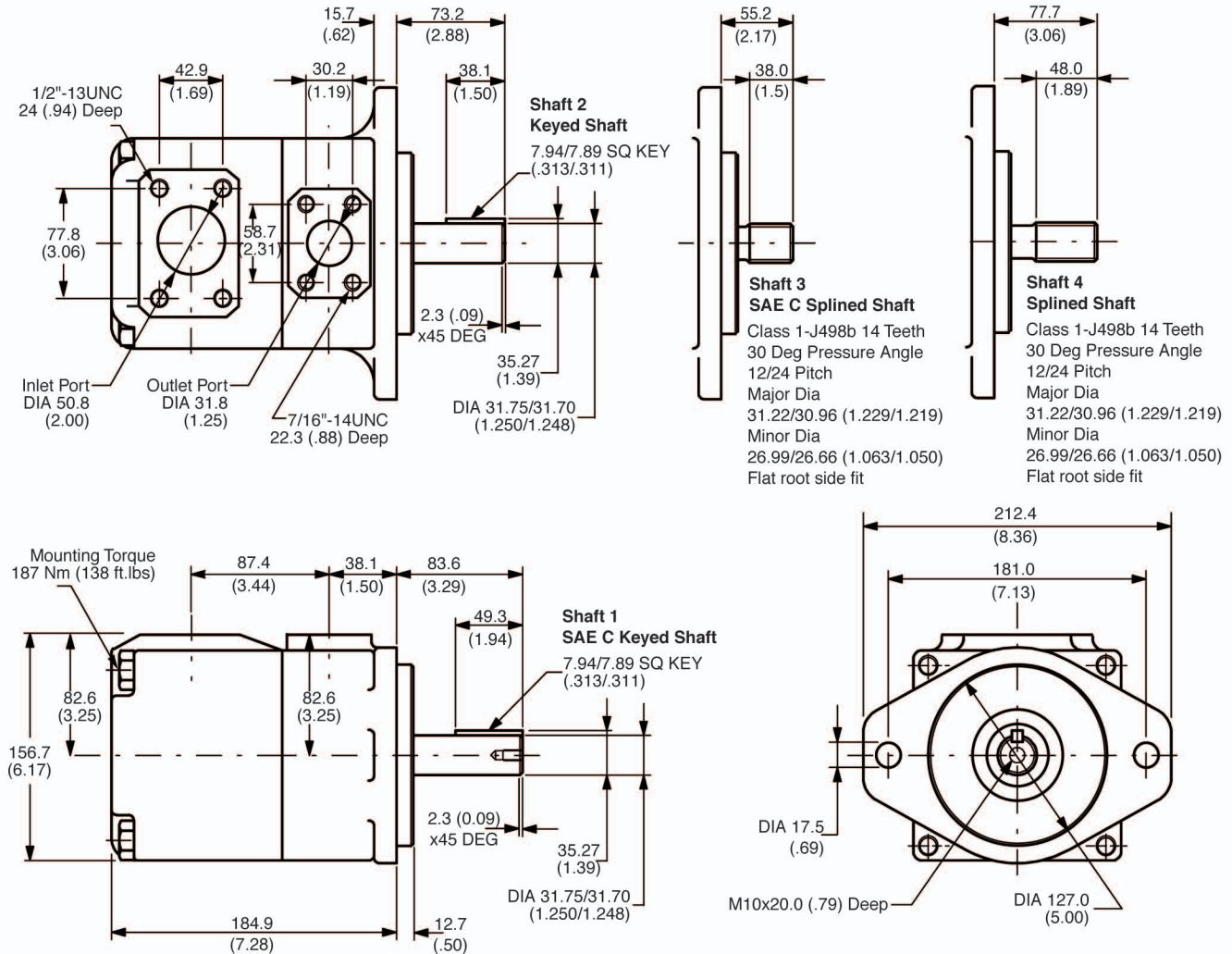
HIGH PRESSURE SINGLE VANE PUMP

E T6D



Installation Dimensions:

E T6D



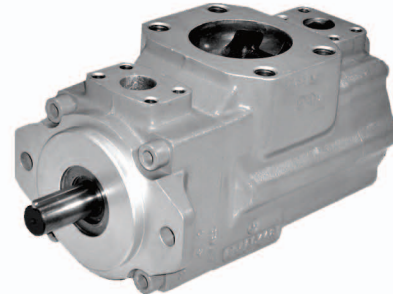
Specifications:

Size	Displacement	Max Speed	Min Speed	Max Intermittent Pressure	Max Continuous Pressure	Weight	
	cm ³ /r (in ³ /r)	rpm	rpm	bar (psi)	bar (psi)	kg (lb)	
014	47.6 (2.90)	2500	600	240 (3500)	210 (3000)	24 (53)	
020	66.0 (4.03)						
024	79.5 (4.85)						
028	89.7 (5.47)						
031	98.3 (6.00)						
035	111.0 (6.77)						
038	120.3 (7.34)						
042	136.0 (8.30)	2200	600	210 (3000)	160 (2320)		
045	145.7 (8.89)						
050	158.0 (9.64)						
061	190.5 (11.63)	1800		120 (1700)	80 (1160)		

Features:

E T6CC/T6DC

- T6CC and T6DC Series are fixed displacement and balanced type double vane pumps. The pump is designed for higher operating pressure and greater flow at the same housing size.
- With a balanced pin-vane design, outlet pressure is continuously applied only to the pin. The pin provides the steady light force against the vane. Top and bottom areas of the vane are subject to the same pressure, either inlet or outlet pressure, depending on the vane's location during rotor rotation. This pin-vane design minimizes noise level and improves volumetric efficiency.
- With the cartridge independent of the shaft, allowing for



easy change of flow capacity and field servicing without removing the pump from its mounting.

Ordering Code :

ET6CC - 031 - 005 - 1R00 - C100

Model T6CC, T6DC Shaft End Pump Ring Size (USgallon) T6CC - 003, 005, 006, 008, 010, 012, 014, 017, 020, 022, 025, 028, 031 T6DC - 014, 020, 024, 028, 031, 035, 038, 042, 045, 050, 061 Cover End Pump Ring Size (USgallon) 003, 005, 006, 008, 010, 012, 014, 017, 020, 022, 025, 028, 031	Shaft <i>For T6CC</i> 1 - Keyed Shaft 3 - SAE BB Splined Shaft 5 - SAE B Splined Shaft <i>For T6DC</i> 1 - SAE C Keyed Shaft 2 - Keyed Shaft 3 - SAE C Splined Shaft 4 - Splined Shaft	Port position (Viewed from cover end) 2 digits code presents the position of cover end outlet (P2) at various positions of shaft end outlet (P1) and Inlet (S)
--	--	--

Shaft Rotation
(Viewed from shaft end)
R - Turn right
L - Turn left

Cover End Outlet Port Size
For T6CC only
0 - 1" **1** - 3/4"

Inlet Port Size
For T6CC only
0 - 3" **1** - 2 1/2"

Seal
1 - Buna seal
5 - Viton seal

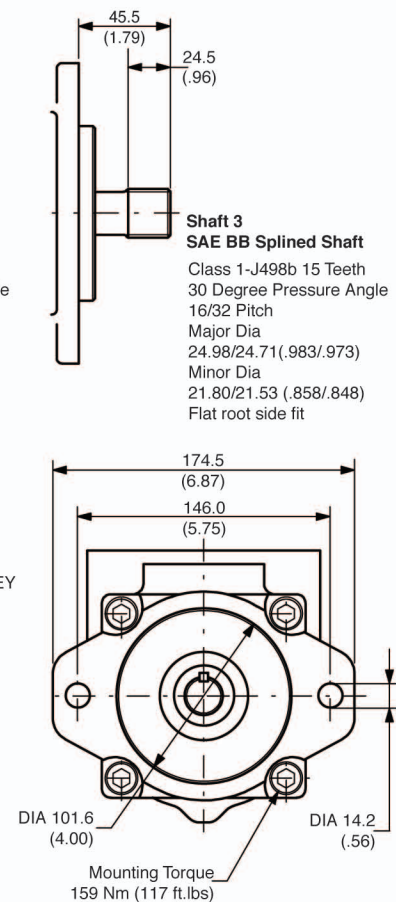
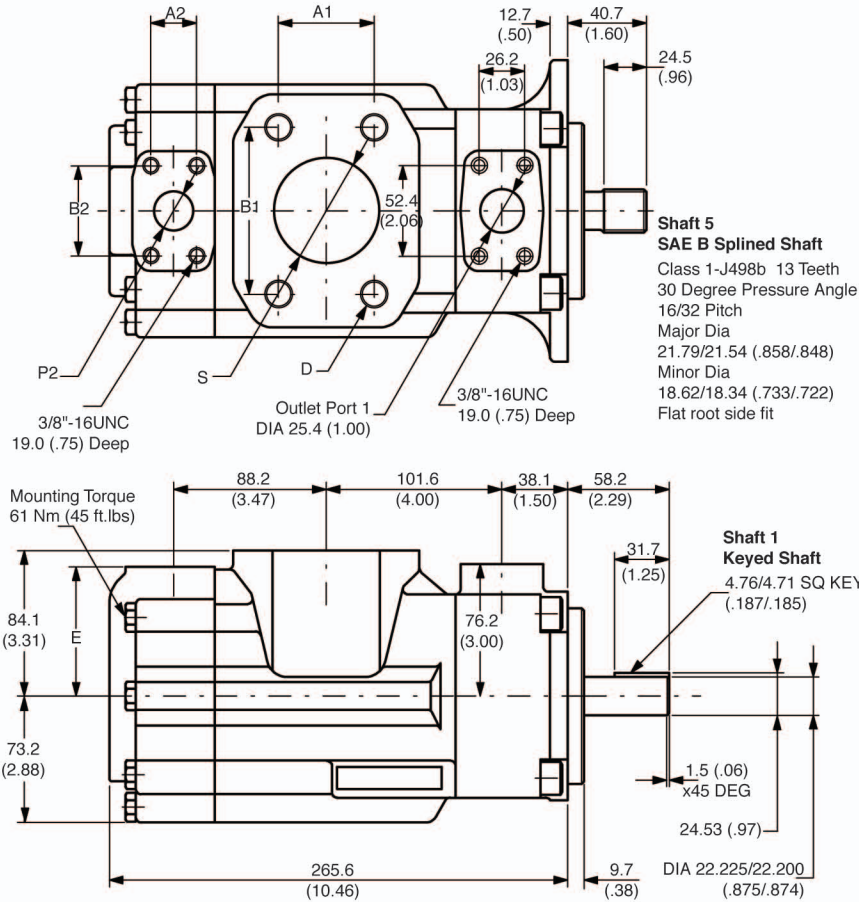
Design
Subject to change

HIGH PRESSURE DOUBLE VANE PUMP E T6CC



Specifications and Installation Dimensions mm (inch):

E T6CC



Inlet Port Size	S	A1	B1	D
3"	76.2 (3.00)	61.9 (2.44)	106.4 (4.19)	5/8"-11UNC 28.4 (1.12) Deep
2 1/2"	63.5 (2.50)	50.8 (2.00)	88.9 (3.50)	1/2"-13UNC 23.9 (.94) Deep

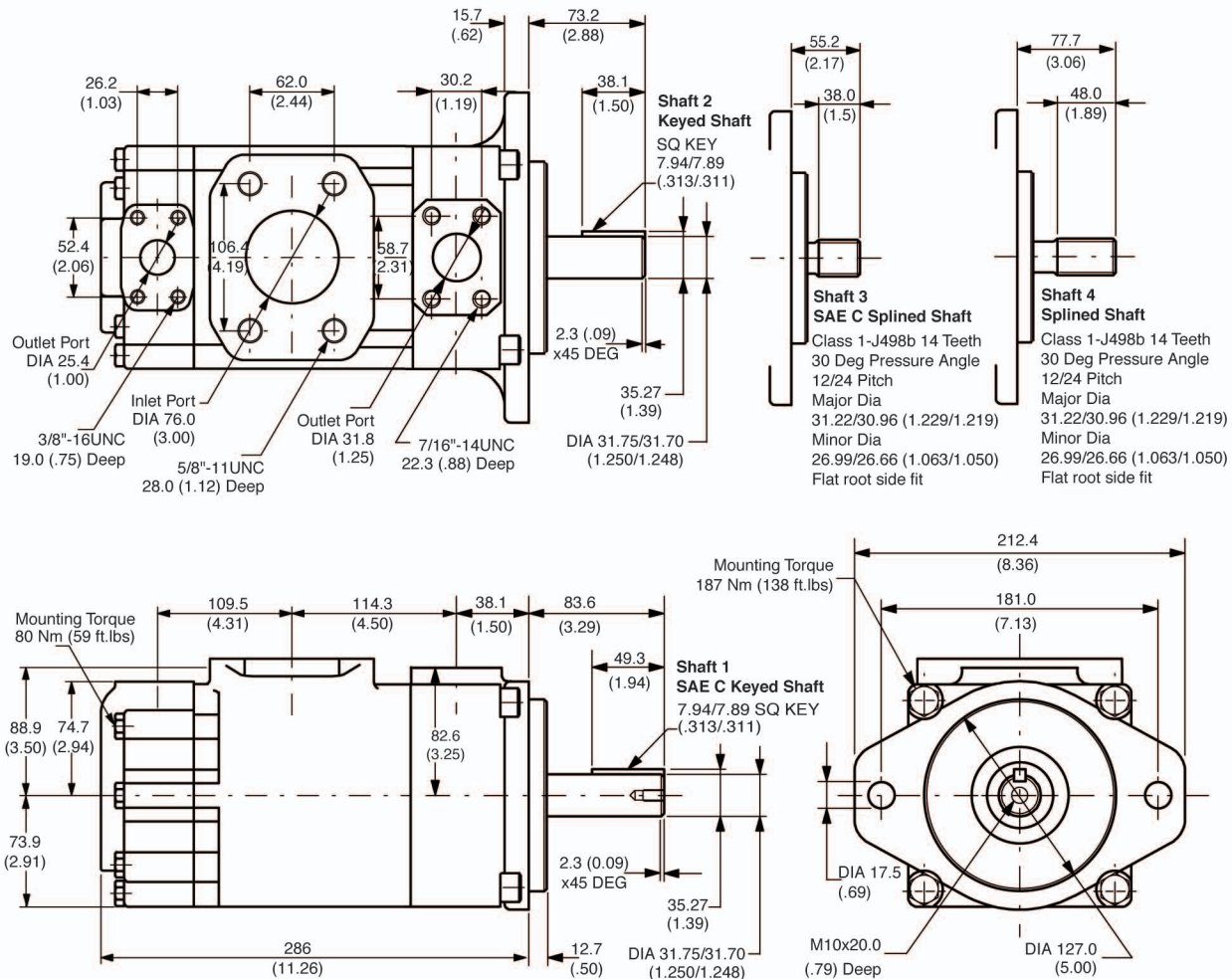
Cover End Outlet Port Size	P2	A2	B2	E
1"	25.4 (1.00)	26.2 (1.03)	52.4 (2.06)	74.7 (2.94)
3/4"	19.0 (.75)	22.4 (.88)	47.7 (1.88)	76.2 (3.00)

Shaft End Pump				Cover End Pump				Max Speed	Weight
	cm ³ /r (in ³ /r)	Max Intermittent Pressure bar (psi)	Max Continuous Pressure bar (psi)	Size	Displacement cm ³ /r (in ³ /r)	Max Intermittent Pressure bar (psi)	Max Continuous Pressure bar (psi)		
003	10.8 (0.66)	280 (4000)	240 (3500)	003	10.8 (0.66)	280 (4000)	240 (3500)	2800	26 (57)
005	17.2 (1.05)			005	17.2 (1.05)				
006	21.3 (1.30)			006	21.3 (1.30)				
008	26.4 (1.61)			008	26.4 (1.61)				
010	34.1 (2.08)			010	34.1 (2.08)				
012	37.1 (2.26)			012	37.1 (2.26)				
014	46.0 (2.81)			014	46.0 (2.81)				
017	58.3 (3.56)			017	58.3 (3.56)				
020	63.8 (3.89)			020	63.8 (3.89)				
022	70.3 (4.29)			022	70.3 (4.29)				
025	79.3 (4.84)	210 (3000)	160 (2300)	025	79.3 (4.84)	210 (3000)	160 (2300)		
028	88.8 (5.42)			028	88.8 (5.42)				
031	100.0 (6.10)			031	100.0 (6.10)				

E T6CC

Features:

E T6DC



Shaft End Pump				Cover End Pump				Max Speed	Weight
Size	Displacement cm ³ /r (in ³ /r)	Max Intermittent Pressure bar (psi)	Max Continuous Pressure bar (psi)	Size	Displacement cm ³ /r (in ³ /r)	Max Intermittent Pressure bar (psi)	Max Continuous Pressure bar (psi)	rpm	kg (lb)
014	47.6 (2.90)	240 (3500)	210 (3000)	003	10.8 (0.66)	280 (4000)	240 (3500)	2500	37 (82)
020	66.0 (4.03)			005	17.2 (1.05)				
024	79.5 (4.85)			006	21.3 (1.30)				
028	89.7 (5.47)			008	26.4 (1.61)				
031	98.3 (6.00)			010	34.1 (2.08)				
035	111.0 (6.77)			012	37.1 (2.26)				
038	120.3 (7.34)			014	46.0 (2.81)				
042	136.0 (8.30)			017	58.3 (3.56)				
045	145.7 (8.89)			020	63.8 (3.89)				
050	158.0 (9.64)	210 (3000)	160 (2320)	022	70.3 (4.29)				
061	190.5 (11.63)	120 (1700)	80 (1160)	025	79.3 (4.84)				
				028	88.8 (5.42)	210 (3000)	160 (2300)		
				031	100.0 (6.10)				

HIGH PRESSURE DOUBLE VANE PUMP

E T6C, E T6CC, COVER END OF E T6DC



Performance Characteristics:

E T6C/T6CC

Size	Displacement cm ³ /r (in ³ /r)	Speed rpm	Output Flow L/min (USgpm)			Input Power kW (hp)		
			at 0 bar (0 psi)	at 140 bar (2000 psi)	at 240 bar (3500 psi)	at 7 bar (100 psi)	at 140 bar (2000 psi)	at 240 bar (3500 psi)
003	10.8 (0.66)	1000	10.8 (2.9)	5.8 (1.5)	-	0.9 (1.2)	3.7 (5.0)	-
		1200	13.0 (3.4)	8.0 (2.1)	-	1.1 (1.5)	4.4 (5.9)	-
		1500	16.2 (4.3)	11.2 (3.0)	8.2 (2.2)	1.3 (1.7)	5.4 (7.2)	8.5 (11.4)
		1800	19.4 (5.1)	14.4 (3.8)	11.4 (3.0)	1.7 (2.3)	6.4 (8.6)	10.0 (13.4)
005	17.2 (1.05)	1000	17.2 (4.5)	12.2 (3.2)	9.2 (2.4)	1.0 (1.3)	5.2 (7.0)	8.4 (11.3)
		1200	20.6 (5.4)	15.6 (4.1)	12.6 (3.3)	1.1 (1.5)	6.2 (8.3)	10.0 (13.4)
		1500	25.8 (6.8)	20.8 (5.5)	17.8 (4.7)	1.4 (1.9)	7.7 (10.3)	12.3 (16.5)
		1800	31.0 (8.2)	26.0 (6.9)	23.0 (6.1)	1.9 (2.5)	9.1 (12.2)	14.6 (19.6)
006	21.3 (1.30)	1000	21.3 (5.6)	16.3 (4.3)	13.3 (3.5)	1.0 (1.3)	6.1 (8.2)	10.0 (13.4)
		1200	25.6 (6.8)	20.6 (5.4)	17.6 (4.6)	1.2 (1.6)	7.3 (9.8)	11.9 (16.0)
		1500	32.0 (8.5)	27.0 (7.1)	24.0 (6.3)	1.5 (2.0)	9.1 (12.2)	14.8 (19.8)
		1800	38.3 (10.1)	33.3 (8.8)	30.3 (8.0)	1.9 (2.5)	10.8 (14.5)	17.6 (23.6)
008	26.4 (1.61)	1000	26.4 (7.0)	21.4 (5.7)	18.4 (4.9)	1.1 (1.5)	7.3 (9.8)	12.0 (16.1)
		1200	31.7 (8.4)	26.7 (7.1)	23.7 (6.3)	1.3 (1.7)	8.7 (11.7)	14.4 (19.3)
		1500	39.6 (10.5)	34.6 (9.1)	31.6 (8.3)	1.6 (2.1)	10.9 (14.6)	17.8 (23.9)
		1800	47.5 (12.5)	42.5 (11.2)	39.5 (10.4)	2.1 (2.8)	13.0 (17.4)	21.3 (28.6)
010	34.1 (2.08)	1000	34.1 (9.0)	29.1 (7.7)	26.1 (6.9)	1.2 (1.6)	9.1 (12.2)	15.1 (20.2)
		1200	40.9 (10.8)	35.9 (9.5)	32.9 (8.7)	1.4 (1.9)	10.9 (14.6)	18.1 (24.3)
		1500	51.2 (13.5)	46.2 (12.2)	43.2 (11.4)	1.7 (2.3)	13.6 (18.2)	22.5 (30.2)
		1800	61.4 (16.2)	56.4 (14.9)	53.4 (14.1)	2.2 (2.9)	16.2 (21.7)	26.8 (35.9)
012	37.1 (2.26)	1000	37.1 (9.8)	32.1 (8.5)	29.1 (7.7)	1.2 (1.6)	9.8 (13.1)	16.3 (21.8)
		1200	44.5 (11.8)	39.5 (10.4)	36.5 (9.6)	1.4 (1.9)	11.7 (15.7)	19.5 (26.1)
		1500	55.7 (14.7)	50.7 (13.4)	47.7 (12.6)	1.7 (2.3)	14.6 (19.6)	24.3 (32.6)
		1800	66.8 (17.6)	61.8 (16.3)	58.8 (15.5)	2.3 (3.1)	17.5 (23.5)	29.0 (38.9)
014	46.0 (2.81)	1000	46.0 (12.2)	41.0 (10.8)	38.0 (10.0)	1.3 (1.7)	11.9 (16.0)	19.9 (26.7)
		1200	55.2 (14.6)	50.2 (13.3)	47.2 (12.5)	1.5 (2.0)	14.2 (19.0)	23.8 (31.9)
		1500	69.0 (18.2)	64.0 (16.9)	61.0 (16.1)	1.9 (2.5)	17.7 (23.7)	29.6 (39.7)
		1800	82.8 (21.9)	77.8 (20.6)	74.8 (19.8)	2.5 (3.4)	21.2 (28.4)	35.4 (47.5)
017	58.3 (3.56)	1000	58.3 (15.4)	53.3 (14.1)	50.3 (13.3)	1.5 (2.0)	14.8 (19.8)	24.8 (33.2)
		1200	70.0 (18.5)	65.0 (17.2)	62.0 (16.4)	1.7 (2.3)	17.7 (23.7)	29.7 (39.8)
		1500	87.5 (23.1)	82.5 (21.8)	79.5 (21.0)	2.1 (2.8)	22.0 (29.5)	37.0 (49.6)
		1800	104.9 (27.7)	99.9 (26.4)	96.9 (25.6)	2.7 (3.6)	26.4 (35.4)	44.2 (59.2)
020	63.8 (3.89)	1000	63.8 (16.9)	58.8 (15.5)	55.8 (14.7)	1.5 (2.0)	16.0 (21.4)	27.0 (36.2)
		1200	76.6 (20.2)	71.6 (18.9)	68.6 (18.1)	1.8 (2.4)	19.2 (25.7)	32.3 (43.3)
		1500	95.7 (25.3)	90.7 (24.0)	87.7 (23.2)	2.2 (2.9)	24.0 (32.2)	40.3 (54.0)
		1800	114.8 (30.3)	109.8 (29.0)	106.8 (28.2)	2.8 (3.8)	28.7 (38.5)	48.2 (64.6)
022	70.3 (4.29)	1000	70.3 (18.6)	65.3 (17.3)	62.3 (16.5)	1.6 (2.1)	17.6 (23.6)	29.6 (39.7)
		1200	84.4 (22.3)	79.4 (21.0)	76.4 (20.2)	1.9 (2.5)	21.0 (28.2)	35.5 (47.6)
		1500	105.5 (27.9)	100.5 (26.6)	97.5 (25.8)	2.3 (3.1)	26.2 (35.1)	44.2 (59.2)
		1800	126.5 (33.4)	121.5 (32.1)	118.5 (31.3)	3.0 (4.0)	31.4 (42.1)	52.9 (70.9)
025	79.3 (4.84)	1000	79.3 (21.0)	74.3 (19.6)	71.3 (18.8)	1.7 (2.3)	19.7 (26.4)	33.2 (44.5)
		1200	95.2 (25.2)	90.2 (23.8)	87.2 (23.0)	2.0 (2.7)	23.6 (31.6)	39.8 (53.4)
		1500	119.0 (31.4)	114.0 (30.1)	111.0 (29.3)	2.5 (3.4)	29.4 (39.4)	49.6 (66.5)
		1800	142.7 (37.7)	137.7 (36.4)	134.7 (35.6)	3.2 (4.3)	35.2 (47.2)	59.3 (79.5)
028	88.8 (5.42)	1000	88.8 (23.5)	83.8 (22.1)	81.3 (21.5)*	1.8 (2.4)	21.9 (29.4)	32.5 (43.6)*
		1200	106.6 (28.2)	101.6 (26.8)	99.1 (26.2)*	2.1 (2.8)	26.2 (35.1)	38.9 (52.1)*
		1500	133.2 (35.2)	128.2 (33.9)	125.7 (33.2)*	2.7 (3.6)	32.7 (43.8)	48.5 (65.0)*
		1800	159.8 (42.2)	154.8 (40.9)	152.3 (40.2)*	3.4 (4.6)	39.2 (52.5)	58.1 (77.9)*
031	100.0 (6.10)	1000	100.0 (26.4)	95.0 (25.1)	92.5 (24.4)*	2.0 (2.7)	24.5 (32.8)	36.4 (48.8)*
		1200	120.0 (31.7)	115.0 (30.4)	112.5 (29.7)*	2.3 (3.1)	29.4 (39.4)	43.6 (58.4)*
		1500	150.0 (39.6)	145.0 (38.3)	142.5 (37.6)*	2.9 (3.9)	36.6 (49.1)	54.4 (72.9)*
		1800	180.0 (47.6)	175.0 (46.2)	172.5 (45.6)*	3.6 (4.8)	43.9 (58.8)	65.1 (87.3)*

*Size 28 and 31, at max pressure 210 bar (3000 psi)

E T6C/T6CC

Performance Characteristics:

E T6D/T6DC

E T6D/T6DC

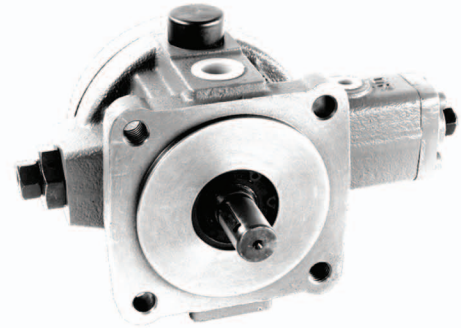
Size	Displacement cm ³ /r (in ³ /r)	Speed rpm	Output Flow L/min (USgpm)			Input Power kW (hp)		
			at 0 bar (0 psi)	at 140 bar (2000 psi)	at 240 bar (3500 psi)	at 7 bar (100 psi)	at 140 bar (2000 psi)	at 240 bar (3500 psi)
014	47.6 (2.90)	1000	47.6 (12.6)	38.6 (10.2)	32.6 (8.6)	1.6 (2.1)	12.5 (16.8)	20.7 (27.7)
		1200	57.1 (15.1)	48.1 (12.7)	42.1 (11.1)	1.8 (2.4)	14.9 (20.0)	24.8 (33.2)
		1500	71.4 (18.9)	62.4 (16.5)	56.4 (14.9)	2.3 (3.1)	18.5 (24.8)	30.7 (41.2)
		1800	85.7 (22.6)	76.7 (20.3)	70.7 (18.7)	2.9 (3.9)	22.3 (29.9)	36.9 (49.5)
020	66.0 (4.03)	1000	66.0 (17.4)	57.0 (15.1)	51.0 (13.5)	1.8 (2.4)	16.8 (22.5)	28.1 (37.7)
		1200	79.2 (20.9)	70.2 (18.5)	64.2 (17.0)	2.1 (2.8)	20.1 (26.9)	33.6 (45.0)
		1500	99.0 (26.2)	90.0 (23.8)	84.0 (22.2)	2.7 (3.6)	24.9 (33.4)	41.7 (55.9)
		1800	118.8 (31.4)	109.8 (29.0)	103.8 (27.4)	3.3 (4.4)	30.1 (40.3)	50.1 (67.2)
024	79.5 (4.85)	1000	79.5 (21.0)	70.5 (18.6)	64.5 (17.0)	1.9 (2.5)	20.0 (26.8)	33.5 (44.9)
		1200	95.4 (25.2)	86.4 (22.8)	80.4 (21.2)	2.2 (2.9)	23.9 (32.0)	40.1 (53.8)
		1500	119.3 (31.5)	110.3 (29.1)	104.3 (27.6)	2.9 (3.9)	29.7 (39.8)	49.8 (66.8)
		1800	143.1 (37.8)	134.1 (35.4)	128.1 (33.8)	3.6 (4.8)	35.7 (47.9)	59.9 (80.3)
028	89.7 (5.47)	1000	89.7 (23.7)	80.7 (21.3)	74.7 (19.7)	2.0 (2.7)	22.3 (29.9)	37.5 (50.3)
		1200	107.6 (28.4)	98.6 (26.1)	92.6 (24.5)	2.4 (3.2)	26.7 (35.8)	45.0 (60.3)
		1500	134.6 (35.6)	125.6 (33.2)	119.6 (31.6)	3.1 (4.2)	33.2 (44.5)	55.9 (74.9)
		1800	161.5 (42.7)	152.5 (40.3)	146.5 (38.7)	3.8 (5.1)	40.0 (53.6)	67.2 (90.1)
031	98.3 (6.00)	1000	98.3 (26.0)	89.3 (23.6)	83.3 (22.0)	2.1 (2.8)	24.3 (32.6)	41.0 (55.0)
		1200	118.0 (31.2)	109.0 (28.8)	103.0 (27.2)	2.5 (3.4)	29.1 (39.0)	49.1 (65.8)
		1500	147.5 (39.0)	138.5 (36.6)	132.5 (35.0)	3.2 (4.3)	36.2 (48.5)	61.1 (81.9)
		1800	176.9 (46.7)	167.9 (44.4)	161.9 (42.8)	4.0 (5.4)	43.6 (58.4)	73.4 (98.4)
035	111.0 (6.77)	1000	111.0 (29.3)	102.0 (26.9)	96.0 (25.4)	2.3 (3.1)	27.3 (36.6)	46.1 (61.8)
		1200	133.2 (35.2)	124.2 (32.8)	118.2 (31.2)	2.7 (3.6)	32.7 (43.8)	55.2 (74.0)
		1500	166.5 (44.0)	157.5 (41.6)	151.5 (40.0)	3.4 (4.6)	40.7 (54.6)	68.7 (92.1)
		1800	199.8 (52.8)	190.8 (50.4)	184.8 (48.8)	4.2 (5.6)	49.0 (65.7)	82.5 (110.6)
038	120.3 (7.34)	1000	120.3 (31.8)	111.3 (29.4)	105.3 (27.8)	2.4 (3.2)	29.5 (39.5)	49.8 (66.8)
		1200	144.4 (38.2)	135.4 (35.8)	129.4 (34.2)	2.8 (3.8)	35.3 (47.3)	59.7 (80.0)
		1500	180.5 (47.7)	171.5 (45.3)	165.5 (43.7)	3.6 (4.8)	43.9 (58.8)	74.3 (99.6)
		1800	216.5 (57.2)	207.5 (54.8)	201.5 (53.2)	4.4 (5.9)	52.9 (70.9)	89.2 (119.6)
042	136.0 (8.30)	1000	136.0 (35.9)	127.0 (33.6)	121.0 (32.0)	2.6 (3.5)	33.1 (44.4)	56.1 (75.2)
		1200	163.2 (43.1)	154.2 (40.7)	148.2 (39.2)	3.0 (4.0)	39.7 (53.2)	67.2 (90.1)
		1500	204.0 (53.9)	195.0 (51.5)	189.0 (49.9)	3.9 (5.2)	49.4 (66.2)	83.7 (112.2)
		1800	244.8 (64.7)	235.8 (62.3)	229.8 (60.7)	4.8 (6.4)	59.5 (79.8)	100.5 (134.7)
045	145.7 (8.89)	1000	145.7 (38.5)	136.7 (36.1)	130.7 (34.5)	2.7 (3.6)	35.4 (47.5)	59.9 (80.3)
		1200	174.8 (46.2)	165.8 (43.8)	159.8 (42.2)	3.2 (4.3)	42.4 (56.8)	71.9 (96.4)
		1500	218.6 (57.8)	209.6 (55.4)	203.6 (53.8)	4.0 (5.4)	52.8 (70.8)	89.5 (120.0)
		1800	262.3 (69.3)	253.3 (66.9)	247.3 (65.3)	5.0 (6.7)	63.5 (85.1)	107.5 (144.1)
050	158.0 (9.64)	1000	158.0 (41.7)	149.0 (39.4)	145.0 (38.3)*	2.8 (3.8)	38.3 (51.3)	56.9 (76.3)*
		1200	189.6 (50.1)	180.6 (47.7)	176.6 (46.7)*	3.3 (4.4)	45.8 (61.4)	68.2 (91.4)*
		1500	237.0 (62.6)	228.0 (60.2)	224.0 (59.2)*	4.3 (5.8)	57.1 (76.5)	85.0 (113.9)*
		1800	284.4 (75.1)	275.4 (72.8)	271.4 (71.7)*	5.2 (7.0)	68.7 (92.1)	102.1 (136.9)*
061	190.5 (11.63)	1000	190.5 (50.3)	186.5 (49.3)*	-	3.2 (4.3)	23.4 (31.4)*	-
		1200	228.6 (60.4)	224.6 (59.3)*	-	3.8 (5.1)	28.0 (37.5)*	-
		1500	285.8 (75.5)	281.8 (74.5)*	-	4.8 (6.4)	35.0 (46.9)*	-
		1800	342.9 (90.6)	338.9 (89.5)*	-	5.9 (7.9)	42.1 (56.4)*	-

*Size 050, at max pressure 210 bar (3000 psi) *Size 061, at pressure 70 bar (1000 psi)

Features:

E VHR

- VHR is a variable vane pump. It is designed for high and adjustable pressure operation with stable performance up to 30 MPa. Special bias piston mechanism ensures an instantaneous, stable, high-precision operation. Together with quiet journal bearings and suction-discharge port design to help minimize operation noise. Silent, vibration-free operation is guaranteed, even in the high pressure range.



E VHR

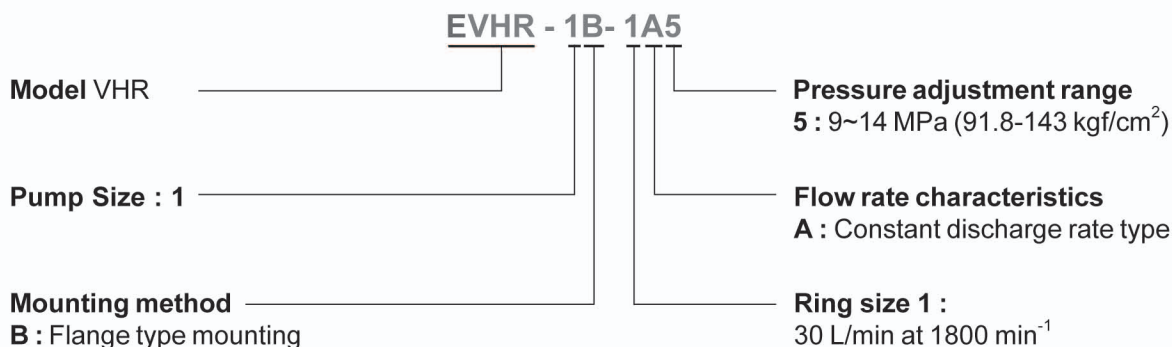
Handling:

- For maximum service life, the pump should be protected from contamination. Filtering fluid before filling and during operation to maintain or exceed ISO cleanliness code 16/13. Appropriately size suction filter, with cold start bypass, of 149 micron absolute (100 mesh) and 10 micron absolute return line filter is recommended. Replaceable elements should be changed as filter supplier instructions.
- The drive shaft must align with the power source shaft. Avoiding shaft end thrust and applications that impose radial loading.
- The direction of rotation is always clockwise (rightward) when viewed from the shaft end.
- Pressure is decreased by clockwise rotation of the discharge rate adjusting screw and increase by counterclockwise (leftward) rotation.
- The start-up procedures should be as follows:
 - Check the rotation of power source to match with rotation of pump.
 - Check inlet and outlet ports to assure all connections are properly installed and check all mounting bolts and flanges to assure all are tight and properly aligned.
 - Fill pump with fluid through the outlet port if the pump is mounted above the fluid level. The spline shaft models also need to be lubricate with an anti-fretting grease or similar lubricant.
 - Place all controls in the neutral position so the pump is unloaded during initial start-up.
 - Prime the pump within a few second when the pump is started.
 - Bleed off entrapped air from outlet circuit until a steady output flow is observed.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change at any time without notice.

Ordering Code and Specifications:

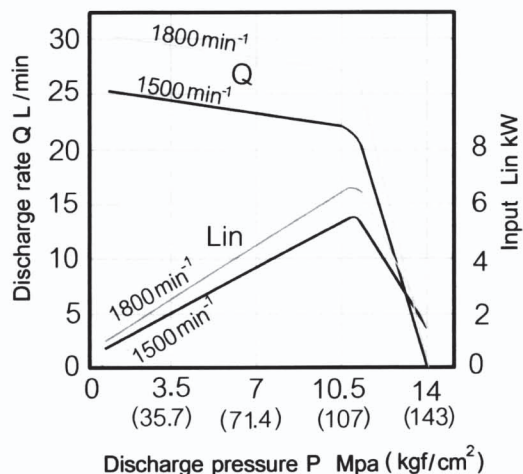
E VHR



Model No.	Capacity cm ³ /rev	No -load Discharge Rate (L/min)				Pressure Adjustment Range Mpa (kgf/cm ²)	Allowable Peak Pressure Mpa (kgf/cm ²)	Revolution Speed min ⁻¹		Weight kg
		1000min ⁻¹	1200min ⁻¹	1500min ⁻¹	1800min ⁻¹			Min.	Max.	
VHR -1B -1A5	16.7	16.7	20	25	30	9~14 (91.8~143)	21 (214)	800	1800	9

Performance Characteristics:

Based on viscosity 32 cSt (150 SSU) oil at 49°C (120°F) and pump inlet at 0 PSIG (14.7 PSIA)

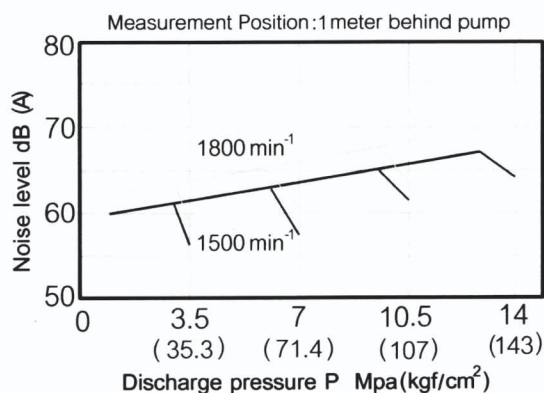


Use the formula below to calculate a pump's required drive force.

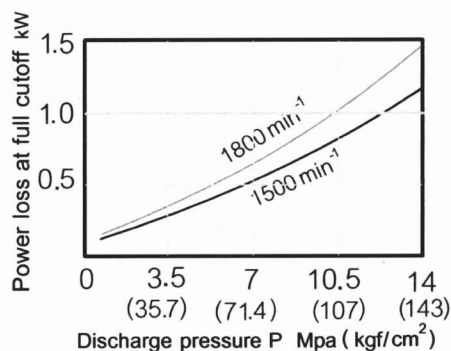
$$H = \frac{PQ}{60} + L$$

H : Input (kW)
P : Pressure Mpa
Q : Flow rate L/min
L : Power loss kW

Noise Characteristics



Power Loss Curve

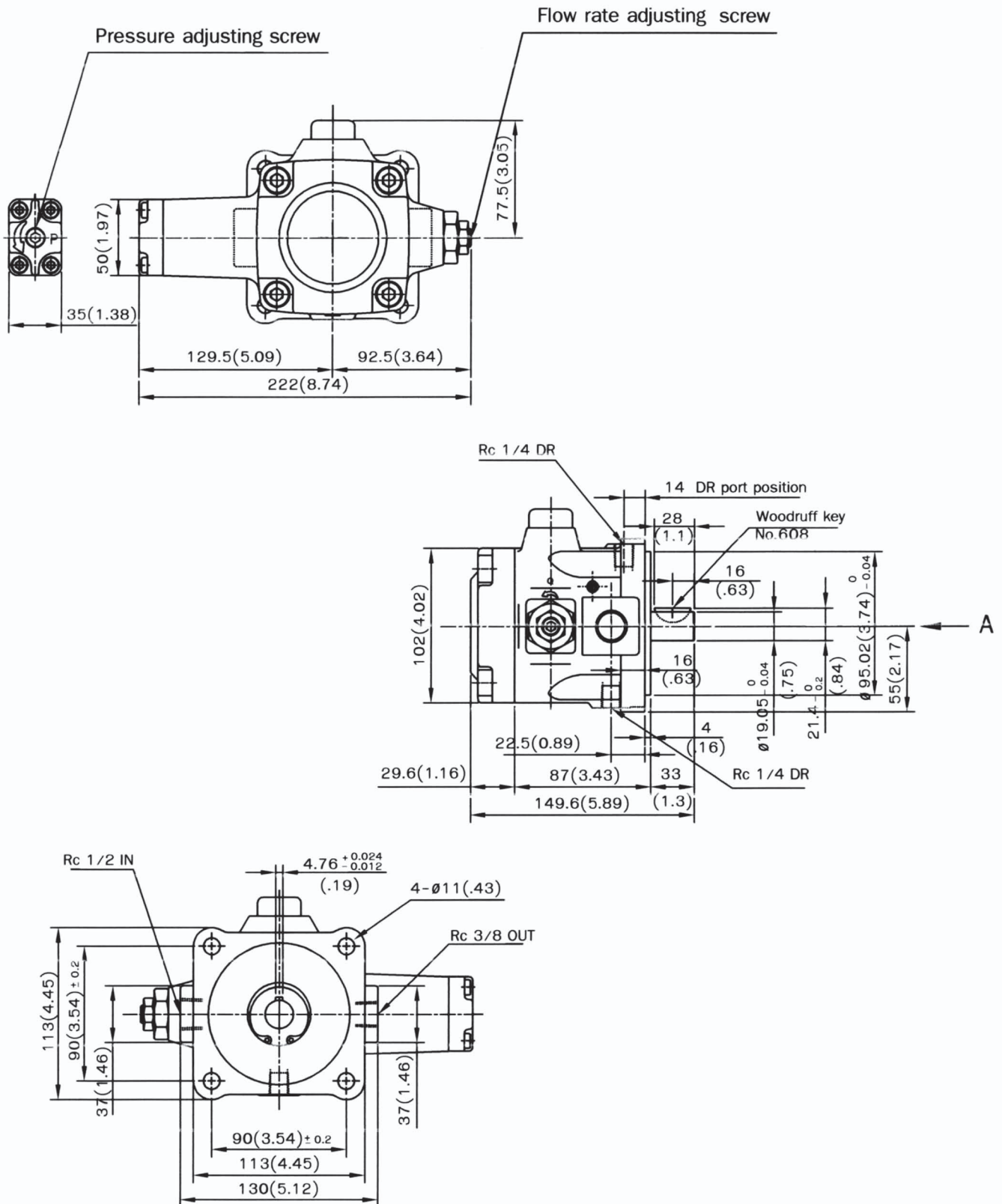


VARIABLE VANE PUMP VARIABLE SINGLE PUMP E VHR



Installation Dimensions mm (inch):

E VHR



Auxiliary View A

E VHR

Features:

E VTM42

- VTM42 Series are fixed displacement and balanced type vane pumps for mobile and marine power steering application. With flow control and relief valves, the pump does not need separate valves. The pump also can be combined with tank or manifold assembly to be piped to an external tank. With threaded shaft and heavy duty bearing, the pump can be used with gear and pulley drive.



Ordering Code and Specifications:

EVTM42 - 20- 15 - 20 - F11 - R1

Model VTM42**Delivery (USgpm at 1200 rpm & 7 bar)**

10 - 1.0 USgpm **40** - 4.0 USgpm

15 - 1.5 USgpm **50** - 5.0 USgpm

20 - 2.0 USgpm **60** - 6.0 USgpm

Controlled Flow rate (at 1500 rpm & 7 bar)

USgpm (L/min)

15 - 1.5 (6.0) 50 - 5.0 (19.0)

20 - 2.0 (8.0) **55 - 5.5 (21.0)**

25 - 2.5 (9.5) **60 - 6.0 (23.0)**

30 - 3.5 (13.0) 65 - 6.5 (25.0)

40 - 4.0 (15.0) 70 - 7.0 (26.5)

45 - 4.5 (17.0) 75 - 7.5 (28.0)

Relief Valve Cracking Pressure Setting

psi (bar)

05 - 500 (35) 15 - 1500 (100)

07 - 750 (52) **17 - 1700 (120)**

10 - 1000 (70) **20** - 2000 (140)

12 - 1250 (86)

- **Shaft**

1 - Threaded

- **Shaft Rotation**

(Viewed from shaft end)

no code - Turn right

L - Turn left

- Tank or Manifold

NO - Without Tank

11 - With 115 cu. in. (1884 cc.) Tank

07 - With 70 cu. in. (1147 cc.) Tank

MA - Manifold without bypass tube

MF - Cast iron manifold with bypass

Filter for Tank

no code - Standard baffle without filter

F - With filter

Model Series	Ring Size Delivery at 1200 r/min & 7 bar (100 psi) USgpm	Geometric Displacement cm ³ /r (in ³ /r)	Maximum Speed			Maximum Pressure bar (psi)	Weight kg (lb)
			at 7 bar (100 psi) rpm	at 100 bar (1500 psi) rpm	at 140 bar (2000 psi) rpm		
VTM42	1	3.4 (0.21)	7000	5000	4250	140 (2000)	6.4 (14)
	1.5	5.0 (0.31)	7000	4500	4000		
	2	6.2 (0.38)	7000	4200	3800		
	4	12.9 (0.79)	7000	2800	2800		
	5	15.7 (0.96)	6000	2600	2300		
	6	19.3 (1.18)	5000	2500	2000		

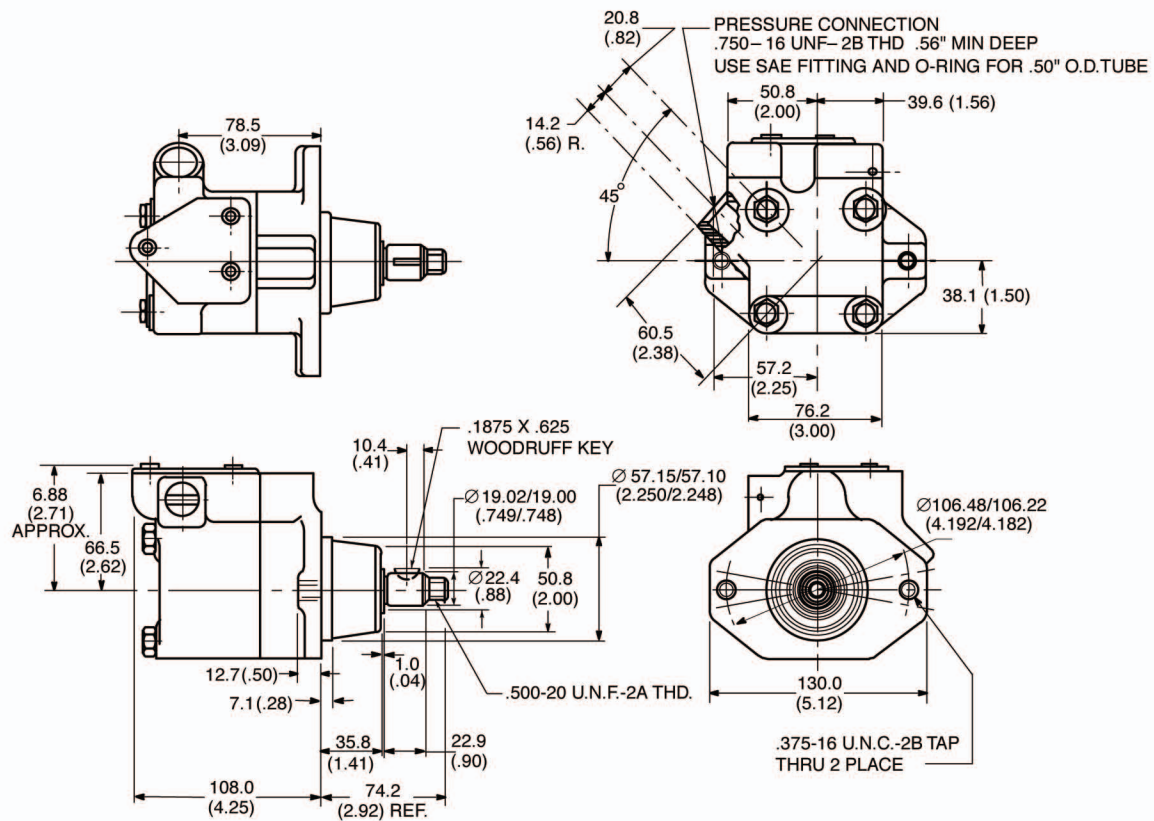
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POWER STEERING VANE PUMP E VTM42

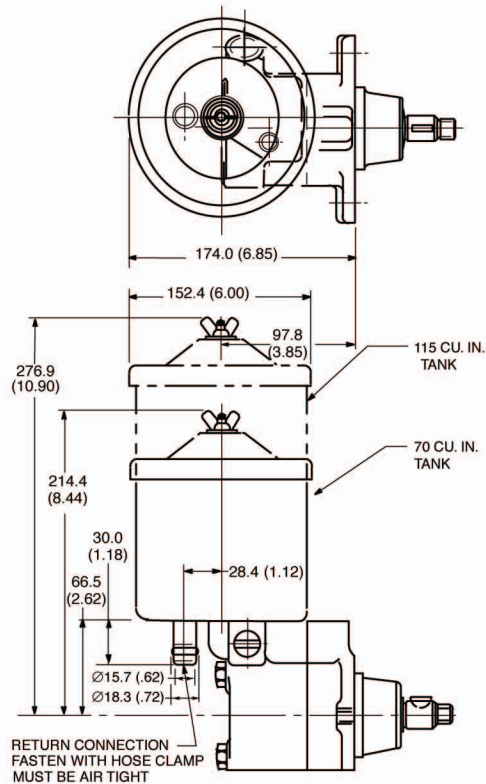


Installation Dimensions mm (inch):

E VTM42



Tank Dimensions:



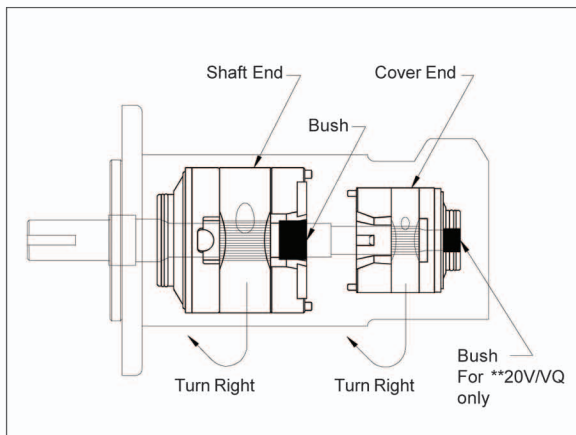
E VTM42

CARTRIDGE KIT FOR VANE PUMP E V AND E VQ SERIES

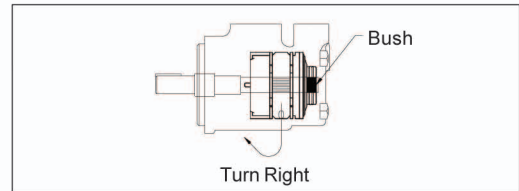


Cartridge Kit Position and Rotation:

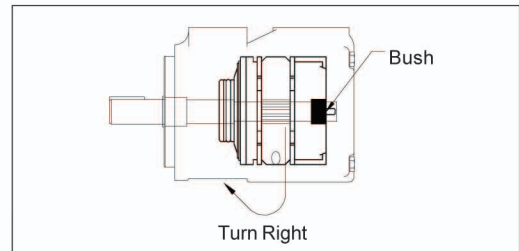
E V/VQ



Double Pump

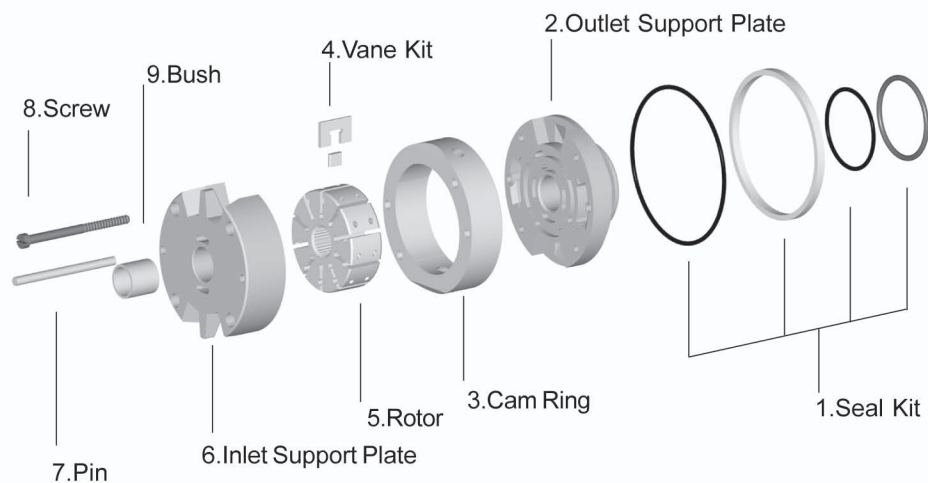


Single Pump, 20V/VQ

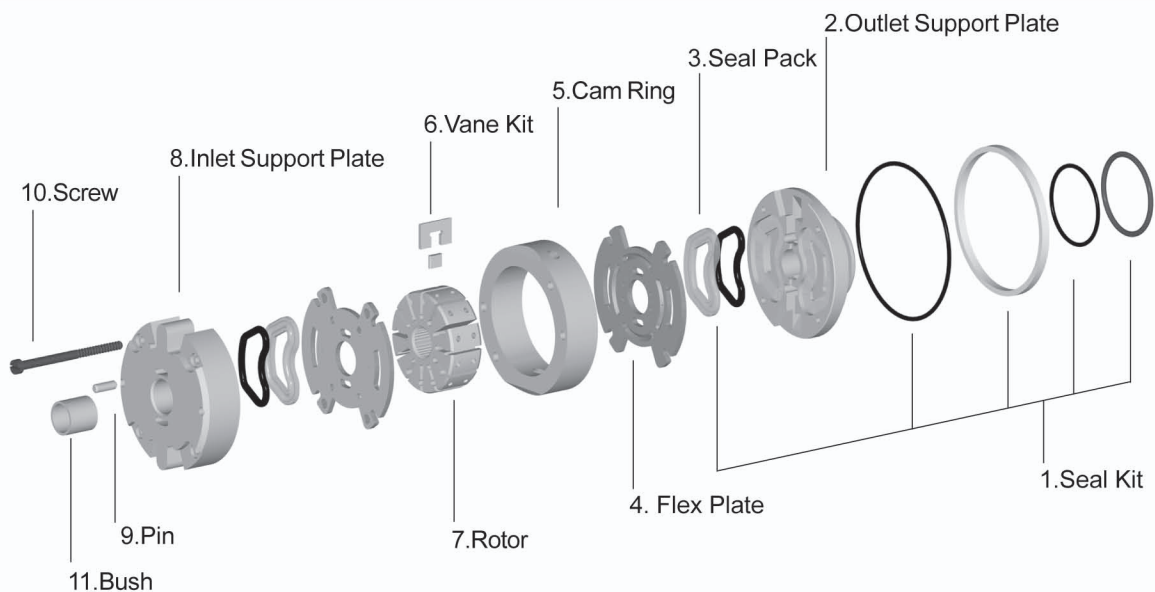


Single Pump, 25V/VQ, 35V/VQ, 45V/VQ

Cartridge Kit Components (E V Series):



Cartridge Kit Components (E VQ Series):



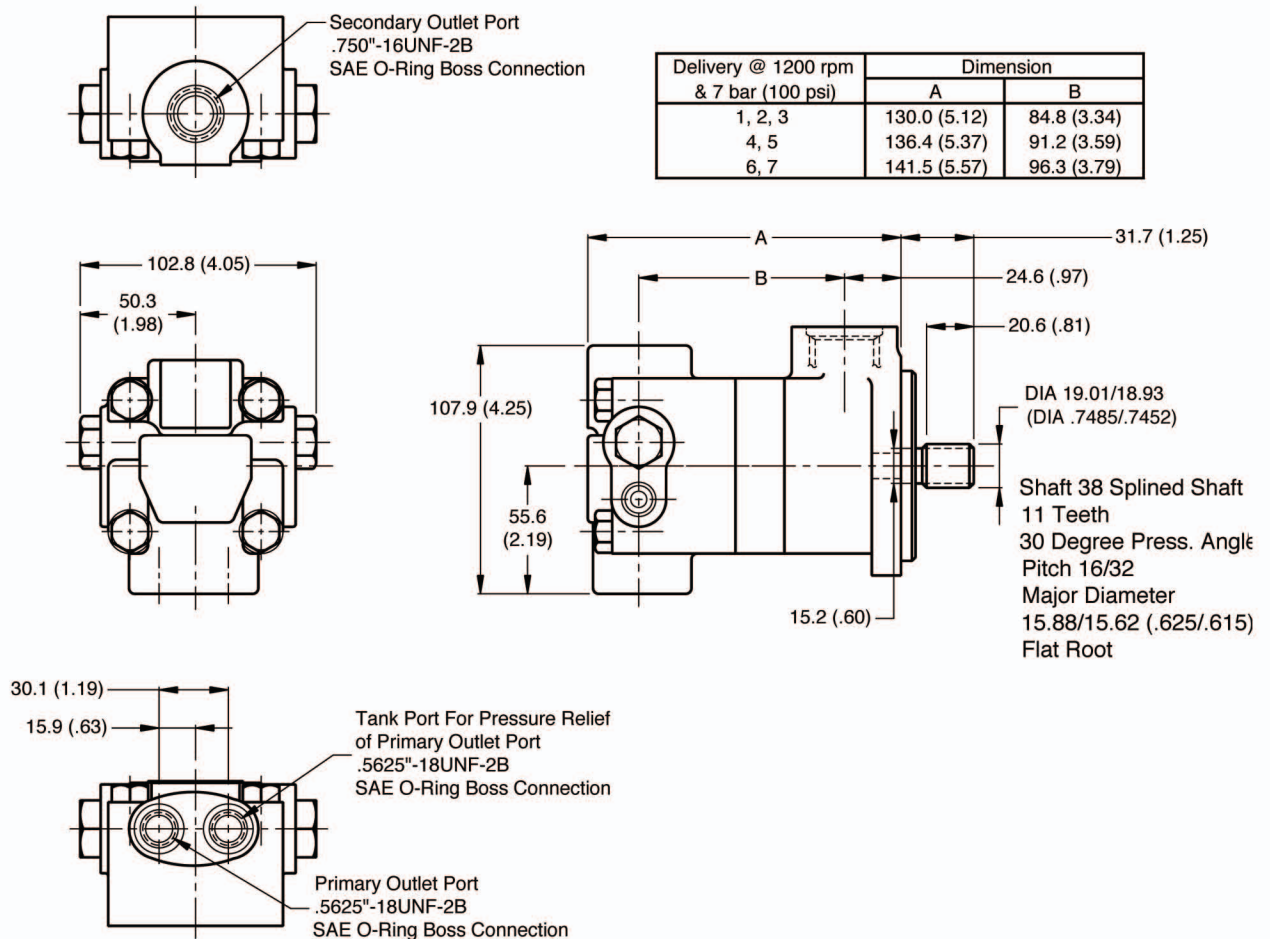
E V/VQ

FIXED DISPLACEMENT VANE PUMP SINGLE PUMP E V10

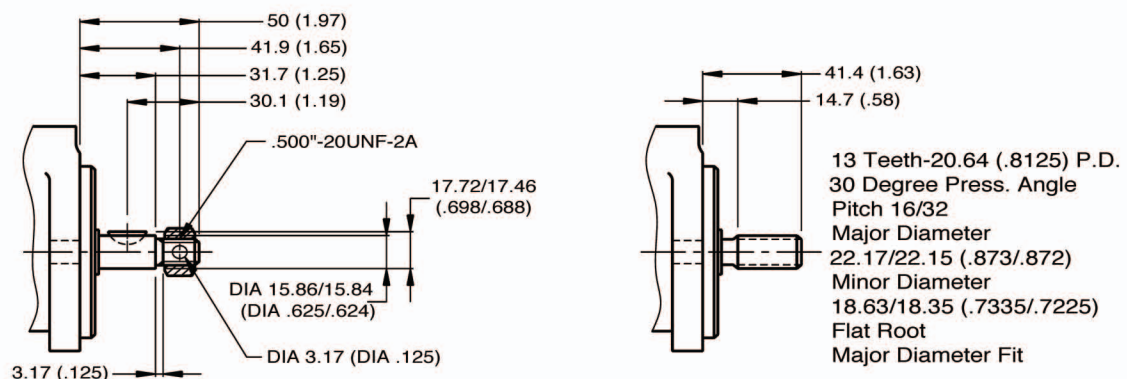


Installation Dimensions mm (inch):

E V10P



Other Shaft Options For E V10 Series:



Shaft 3 Threaded with #6 Woodruff Key

Shaft 12 Splined Shaft 13 Teeth

Instruction for Cartridge Replacement in Single Pump:

E V/VQ

1. Remove the four cover screws and lift the outlet cover. Pull out the old Cartridge. Discard the old large square cut seal and large O ring of the cartridge.

2. Check the wear surfaces of old cartridge. If the wear is normal just change oil in tank circuit and change or clean filters. If there is seizure or heavy wear in rotor, support plates (for V Series), and flex plates (for VQ Series), disassemble the pump completely. Check the shaft alignment and make sure that it is not twisted or crooked. The shaft may need to be changed and also check shaft seal and shaft bearing (remove the large lock ring to remove shaft seal and remove snap ring to remove bearing). Change them if neccessary. If these parts are defective or the oil is dirty, the new cartridge's service life will be shorter than normal.

3. Install square cut seal into the body. Install small O ring and back-up ring on the cartridge outlet support plate hub. Carefully install the cartridge into the body. Install the cover to the body with large O ring in the groove of the body. Install the cover in position; move back and forth until the cartridge pins drop into the alignment holes located within the cover. Install four screws and torque tighten to the values indicated.

Model	Torque Specification	
	N.m	lb.ft.
20V/VQ	48-55	65-75
25V/VQ	48-55	65-75
35V/VQ	102-118	140-160
45V/VQ	188-203	255-275

4. Turn the pump shaft to verify freedom of the cartridge.

Instruction for Cartridge Replacement in Double Pump:

1. Remove the four cover screws and lift the outlet cover. Pull out the old Cover End Cartridge (Pry with screw-driver if necessary). Remove four screws from the inlet housing. Lift inlet housing from the outlet body. Rotate shaft to loosen Shaft End Cartridge and remove the cartridge from outlet body. Discard the old large square cut seals and large O rings of both cartridges.

2. Check the wear surfaces of old cartridges. If the wear is normal just change oil in tank circuit and change or clean filters. If there is seizure or heavy wear in rotors, support plates (for V Series), and flex plates (for VQ Series), disassemble the pump completely. Check the shaft alignment and make sure that it is not twisted or crooked. The shaft may need to be changed and also check shaft seal and shaft bearing (remove the large lock ring to remove shaft seal and remove snap ring to remove bearing). Change them if neccessary. If these parts are defective or the oil is dirty, the new cartridges' service life will be shorter than normal.

3. For new Shaft End Cartridge, install square cut seal into the body. Install small O ring and back-up ring on the cartridge outlet support plate hub. Carefully install the cartridge into the body. Install the inlet housing to the body with large O ring in the groove of the body. Install inlet housing in position; move back and forth until the cartridge pins drop into the alignment holes located within the housing. Install four screws and torque tighten to the values indicated.

4. For new Cover End Cartridge, install a square cut seal into the cover. Install O ring and back-up ring on the cartridge outlet support plate hub. Carefully install cartridge over shaft and into the inlet housing. Turn cartridge slightly to bring into alignment the pin holes and cartridge alignment pins. Install the cover to inlet housing with O ring seal over the cartridge and up against the inlet housing. Make sure square cut seal is in place within the cover. Orient the cover to agree with the alignment. Install the cover with four screws and torque the screws to the value indicated.

Model	N.m	lb.ft.
2520V/VQ	54-68	40-50
3520V/VQ	54-68	40-50
3525V/VQ	88-102	65-75
4520V/VQ	54-68	40-50
4525V/VQ	88-102	65-75
4535V/VQ	188-203	255-275

5. Turn the pump shaft to verify freedom of both cartridges.

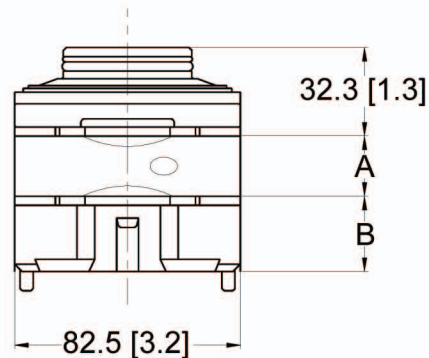
Model	N.m	lb.ft.
2520V/VQ	48-55	65-75
3520V/VQ	102-118	140-160
3525V/VQ	102-118	140-160
4520V/VQ	188-203	255-275
4525V/VQ	188-203	255-275

CARTRIDGE KIT FOR VANE PUMP E 20V AND FOR E 25V



Cartridge Kit 20V Installation Dimensions mm (inch):

E 20V/25V

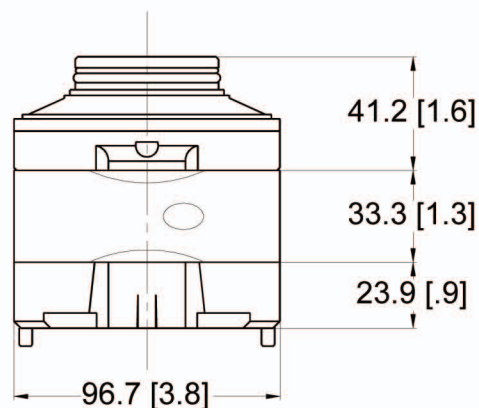


Delivery	A	B
5,8	21.95 [.86]	27.70 [1.09]
11,12,14	30.47 [1.20]	19.10 [0.75]

Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
5	18 (1.10)	1800	206 (3000)	28.4 (7.5)	11.2 (15.0)	2.4 (5.3)
8	27 (1.67)	1800	206 (3000)	45.4 (12.0)	17.0 (22.8)	2.4 (5.3)
11	36 (2.22)	1800	206 (3000)	56.8 (15.0)	22.6 (30.3)	2.3 (5.1)
12	40 (2.47)	1800	158 (2300)	62.1 (16.4)	25.1 (33.7)	2.3 (5.1)
14	45 (2.78)	1800	138 (2000)	69.6 (18.4)	28.3 (37.9)	2.3 (5.1)

Cartridge Kit 25V Installation Dimensions mm (inch):



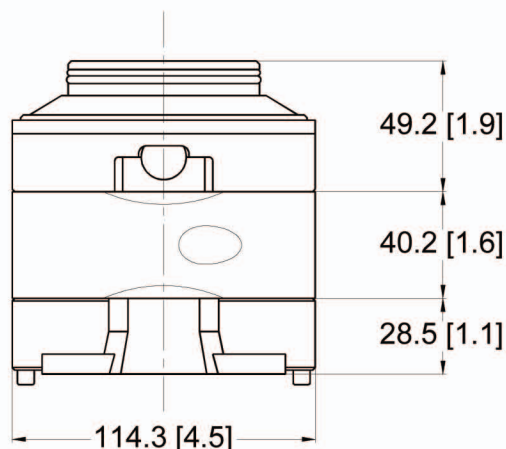
Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
12	39 (2.47)	1800	172 (2500)	62.1 (16.4)	22.9 (30.8)	3.6 (7.9)
14	45 (2.78)	1800	172 (2500)	69.6 (18.4)	25.7 (34.5)	3.6 (7.9)
17	55 (3.39)	1800	172 (2500)	86.3 (22.8)	29.8 (40.0)	3.6 (7.9)
21	67 (4.13)	1800	172 (2500)	106.0 (28.0)	34.0 (45.6)	3.6 (7.9)

E 20V/25V

Cartridge Kit 35V Installation Dimensions mm (inch):

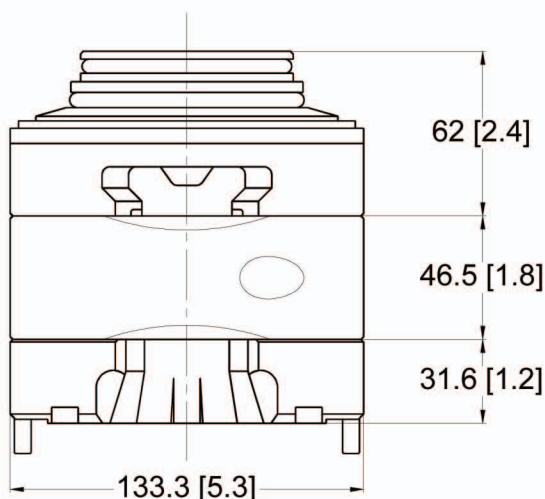
E 35V/45V



Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
25	81 (4.94)	1800	172 (2500)	124.9 (33.0)	45.5 (61.0)	6.5 (14.3)
30	97 (5.91)	1800	172 (2500)	154.4 (40.8)	54.5 (73.0)	6.5 (14.3)
35	112 (6.83)	1800	172 (2500)	181.7 (48.0)	61.5 (82.4)	6.5 (14.3)
38	121 (7.37)	1800	172 (2500)	193.8 (51.2)	65.9 (88.3)	6.5 (14.3)

Cartridge Kit 45V Installation Dimensions mm (inch):



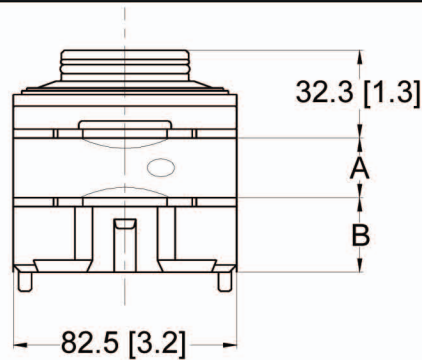
Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	10.1 (22.3)
50	162 (9.85)	1800	172 (2500)	253.6 (67.0)	87.3 (117.0)	10.1 (22.3)
60	193 (11.75)	1800	172 (2500)	310.4 (82.0)	103.7 (139.0)	10.1 (22.3)

CARTRIDGE KIT FOR VANE PUMP E 20VQ AND FOR E 25VQ



Cartridge Kit 20VQ Installation Dimensions mm (inch): E 20VQ/25VQ

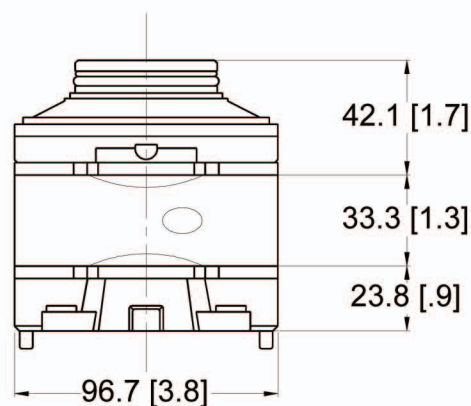


Delivery	A	B
5,8	21.95 [.86]	27.70 [1.09]
11,12,14	30.47 [1.20]	19.10 [0.75]

Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
5	18 (1.10)	2700	206 (3000)	41.6 (11.0)	17.9 (24.0)	2.4 (5.3)
8	27 (1.67)	2700	206 (3000)	64.3 (17.0)	26.1 (35.0)	2.4 (5.3)
11	36 (2.22)	2700	206 (3000)	87.1 (23.0)	35.4 (47.5)	2.3 (5.1)
12	39 (2.41)	2700	158 (2300)	96.5 (25.5)	28.3 (38.0)	2.3 (5.1)
14	45 (2.80)	2700	138 (2000)	113.6 (30.0)	29.1 (39.0)	2.3 (5.1)

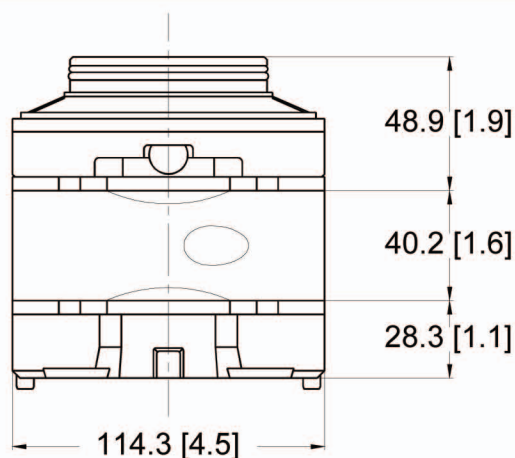
Cartridge Kit 25VQ Installation Dimensions mm (inch):



Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
12	40 (2.45)	2700	206 (3000)	87.1 (23.0)	41.0 (55.0)	3.6 (7.9)
14	45 (2.77)	2700	206 (3000)	102.2 (27.0)	46.6 (62.5)	3.6 (7.9)
17	55 (3.37)	2500	206 (3000)	117.3 (31.0)	51.8 (69.5)	3.6 (7.9)
21	67 (4.12)	2500	206 (3000)	143.8 (38.0)	61.9 (83.0)	3.6 (7.9)

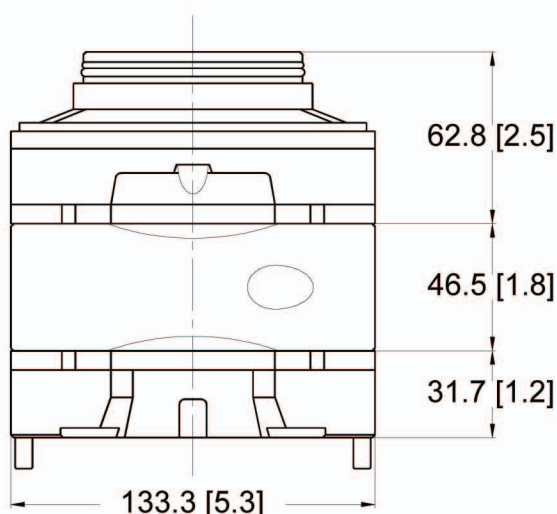
Cartridge Kit 35VQ Installation Dimensions mm (inch): E 35VQ/45VQ



Specifications

Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
25	81 (4.98)	2500	206 (3000)	170.3 (45.0)	75.3 (101.0)	6.5 (14.3)
30	97 (5.96)	2500	206 (3000)	208.2 (55.0)	87.7 (117.5)	6.5 (14.3)
35	112 (6.88)	2400	206 (3000)	227.1 (60.0)	98.5 (132.0)	6.5 (14.3)
38	121 (7.42)	2400	206 (3000)	246.0 (65.0)	104.4 (140.0)	6.5 (14.3)

Cartridge Kit 45VQ Installation Dimensions mm (inch):



Specifications

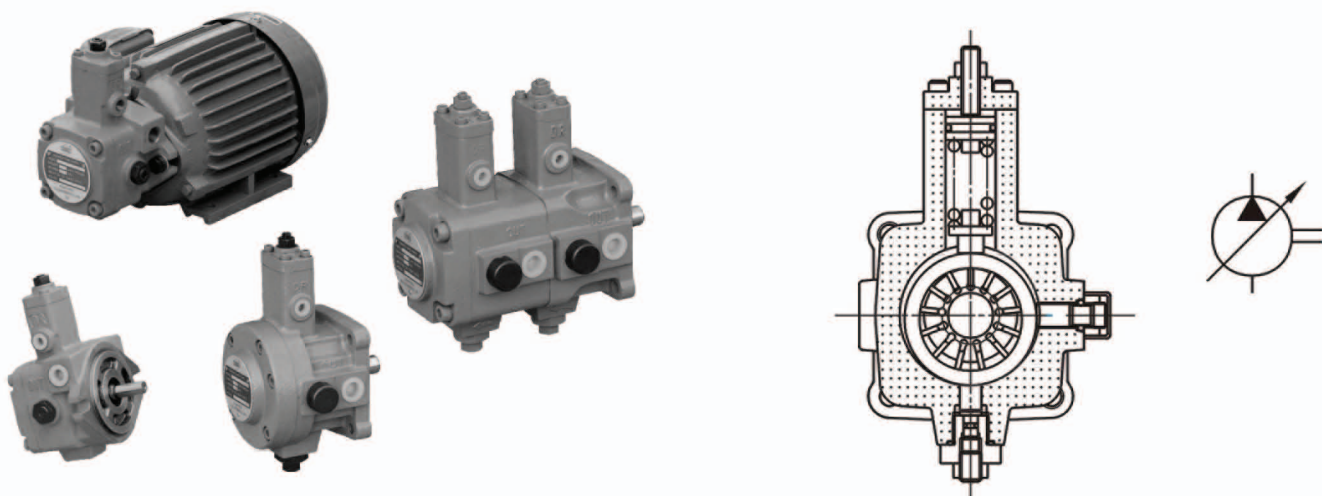
Delivery at 1200 rpm & 7 bar (100 psi) <i>USgpm</i>	Displacement <i>cm³/r (in³/r)</i>	Maximum Speed <i>rpm</i>	Maximum Pressure <i>bar (psi)</i>	Typical Delivery at max speed & pressure <i>L/min (USgpm)</i>	Typical Input Power at max speed & pressure <i>kW (hp)</i>	Weight <i>kg (lb)</i>
42	138 (8.41)	1800	172 (2500)	208.2 (55.0)	75.3 (101.0)	10.1 (22.3)
50	162 (9.85)	1800	172 (2500)	253.6 (67.0)	87.3 (117.0)	10.1 (22.3)
60	193 (11.75)	1800	172 (2500)	310.4 (82.0)	103.7 (139.0)	10.1 (22.3)

VARIABLE DISPLACEMENT VANE PUMPS

EVPV SERIES



Single Pumps model Code:



EVPV1/NPV2

M-	EVPV1	-12	-55	-1.5	-10
Prefix, fluid compatibility	Series	outlet flow(L/min)	operating pressure range(MPa)	Input power(kW)	Design
M: With motor Omit: Without motor	EVPV1	8	2.0 3.5 5.5 7.0	0.75 1.5 2.25 3.75	-10
		12			
		15			
		20			
	EVPV2	30			-20
		40			

Double Pumps model Code:

EVPV22	-30	-70	/-30	-55	-20
Series	Outlet Flow L/min (shaft end pump)	Operating pressure range MPa (shaft end pump)	Outlet Flow L/min (cover end pump)	Operating pressure range MPa (cover end pump)	Design
EVPV11	8	2.0 3.5 5.5 7.0	8	2.0 3.5 5.5 7.0	-20
	12		12		
	15		15		
	20		20		
EVPV22	30		30		-20
	40		40		

Specification:

EVPV1/VPV2

Model	Max. Displacement mL/r	Flow (0MPa 1800r/min) L/min	Operating pressure range MPa	Speed range r/min	Rotation (viewed from shaft end)	Input power kW(HP)	
						1800r/min	1500r/min
E VPV1-8-20	5.3	9.5	0.8-2.0	800-1800	Right hand (for clockwise)	0.29(0.5)	0.29(0.5)
E VPV1-8-35			1.5-3.5			0.59(1)	0.44(0.5)
E VPV1-8-55			3.0-5.5			0.87(1)	0.59(1)
E VPV1-8-70			5.0-7.0			1.19(1.5)	1.19(1.5)
EVPV1-12-20	6.7	12	0.8-2.0			0.37(0.5)	0.37(0.5)
EVPV1-12-35			1.5-3.5			0.75(1)	0.55(1)
EVPV1-12-55			3.0-5.5			1.1(1.5)	0.75(1.0)
EVPV1-12-70			5.0-7.0			1.5(2)	1.5(2.0)
EVPV1-15-20	8.3	15	0.8-2.0			0.5(1)	0.55(1)
EVPV1-15-35			1.5-3.5			1.1(1.5)	0.75(1.0)
EVPV1-15-55			3.0-5.5			1.5(2)	1.1(2)
EVPV1-15-70			5.0-7.0			1.5(2)	1.5(2)
EVPV1-20-20	11.1	20	0.8-2.0			0.75(1)	0.55(1)
EVPV1-20-35			1.5-3.5			1.1(2)	1.1(2)
EVPV1-20-55			3.0-5.5			1.5(2)	1.5(2)
EVPV1-20-70			5.0-7.0			2.2(3)	2.2(3)
EVPV2-30-20	16.7	30	0.8-2.0			1.1(2)	0.75(1)
EVPV2-30-35			1.5-3.5			1.5(2)	1.5(2)
EVPV2-30-55			3.0-5.5			2.2(3)	2.2(3)
EVPV2-30-70			5.0-7.0			3.75(5)	3.0(5)
EVPV2-40-20	22.2	40	0.8-2.0			1.5(2)	1.1(2)
EVPV2-40-35			1.5-3.5			2.2(3)	2.0(3)
EVPV2-40-55			3.0-5.5			3.75(5)	3.0(5)
EVPV2-40-70			5.0-7.0			5.5(7.5)	4.0(5)

VARIABLE DISPLACEMENT VANE PUMPS

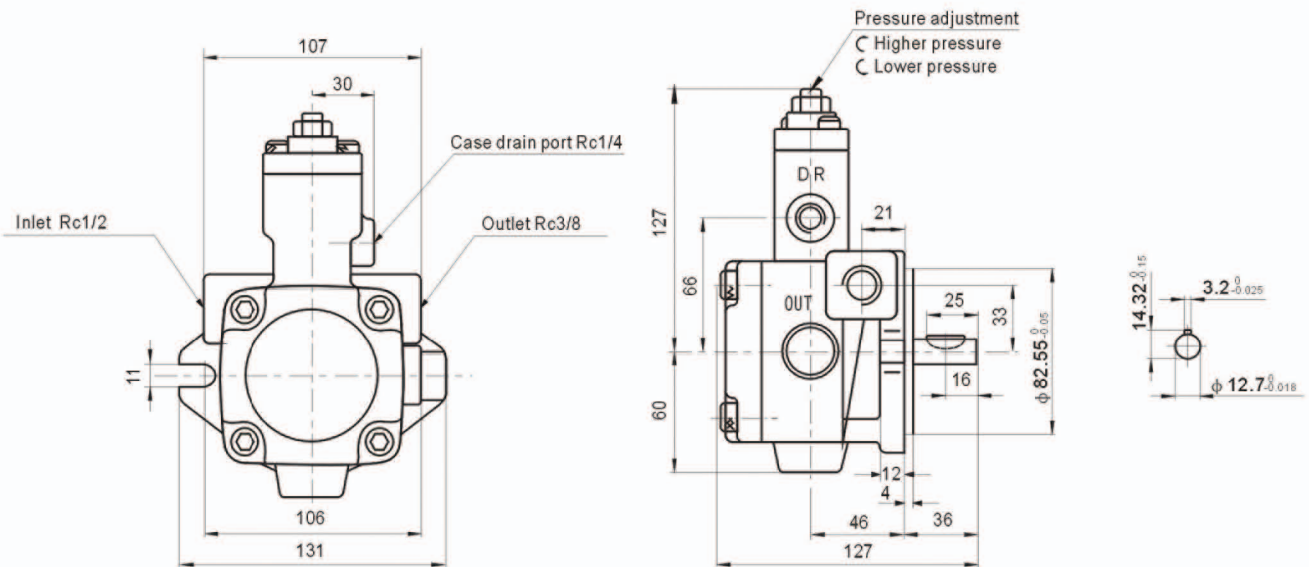
VPV SERIES



Intallation Dimensions:

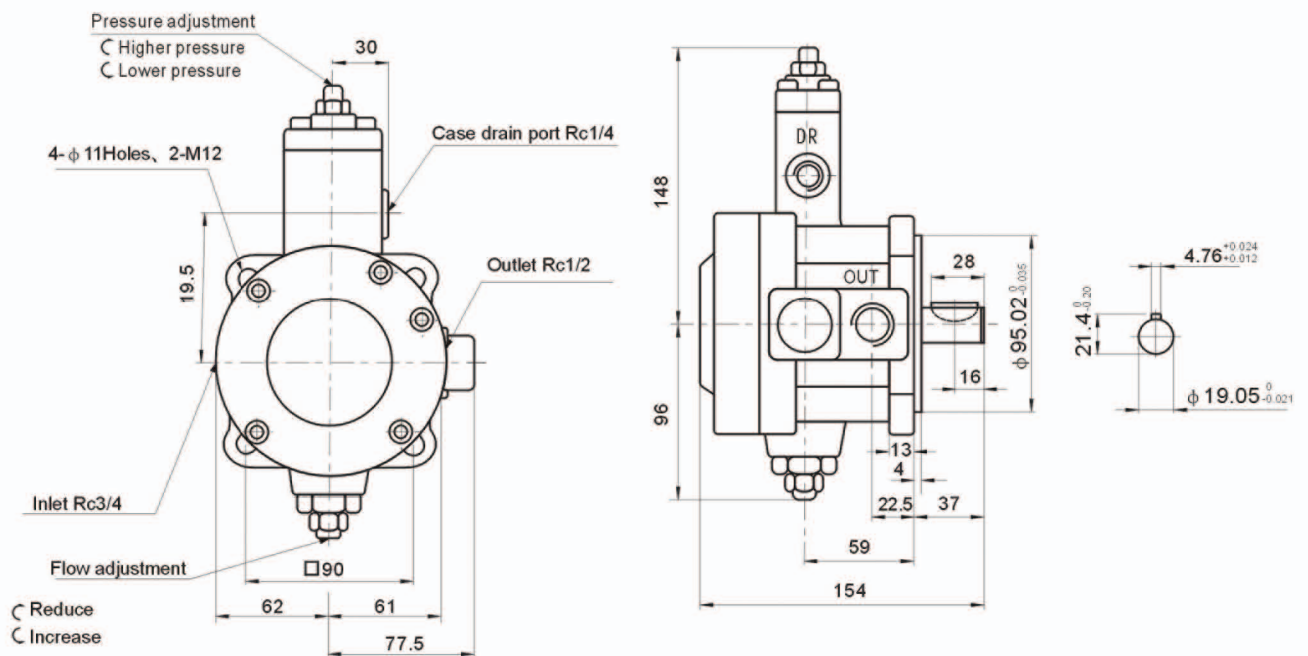
EVPV1/VPV2

EVPV1-※-※-10



Note: No flow adjustment

EVPV2-※-※-20

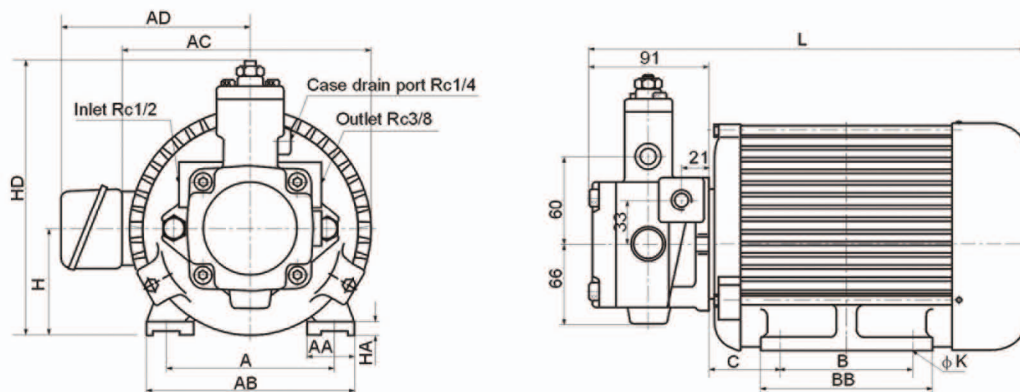


EVPV1/VPV2

Intallation Dimensions:

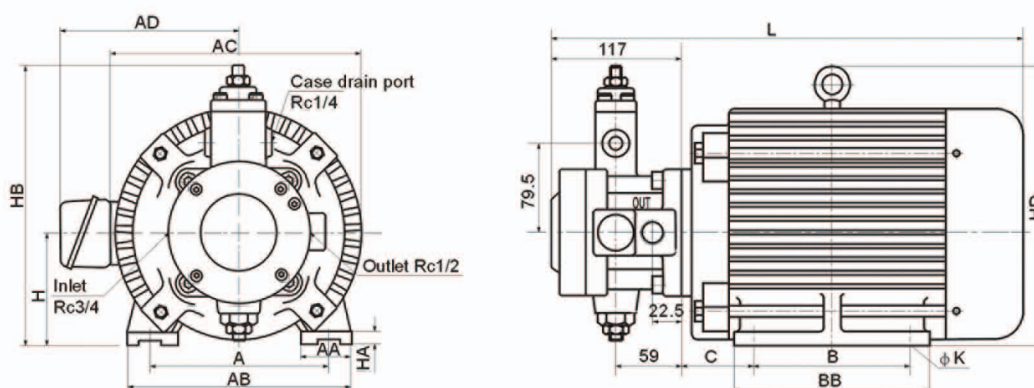
EM-VPV1/VPV2

EM-VPV1-※



Outlet flow L/min	Pressure MPa	Input power KW	A	AA	AB	AC	AD	B	BB	C	H	HA	HD	K	L
12	3.5	0.75	125	35	155	177	140	100	130	53.5	80	10	207	10	331
	5.5	0.75	125	35	155	177	140	100	130	53.5	80	10	207	10	331
	7.0	1.50	140	35	170	196	160	125	150	57	90	10	227	10	369
15	3.5	0.75	125	35	155	177	140	100	130	53.5	80	10	207	10	331
	5.5	1.50	140	35	170	196	160	125	150	57	90	10	227	10	369
	7.0	1.50	140	35	170	196	160	125	150	57	90	10	227	10	369
20	3.5	0.75	125	35	155	177	140	100	130	53.5	80	10	207	10	331
	5.5	1.50	140	35	170	196	160	125	150	57	90	10	227	10	369
	7.0	1.50	140	35	170	196	160	125	150	57	90	10	227	10	369

EM-VPV2-※



Outlet flow L/min	Pressure MPa	Input power KW	A	AA	AB	AC	AD	B	BB	C	H	HA	HB	HD	K	L
30	3.5	1.5	140	35	170	196	160	125	150	57	90	10	238	-	12	395
	5.5	2.25	160	45	200	225	160	140	175	65	100	12	248	247	12	424
	7.0	3.75	190	45	228	245	180	140	175	73.5	112	12	260	265	12	447
40	3.5	1.5	140	35	170	196	160	125	150	57	90	10	238	-	12	395
	5.5	3.75	190	45	228	245	180	140	175	73.5	112	12	260	265	12	447
	7.0	5.5	216	45	250	270	190	140	175	77	132	16	280	310	12	452

VARIABLE DISPLACEMENT VANE PUMPS

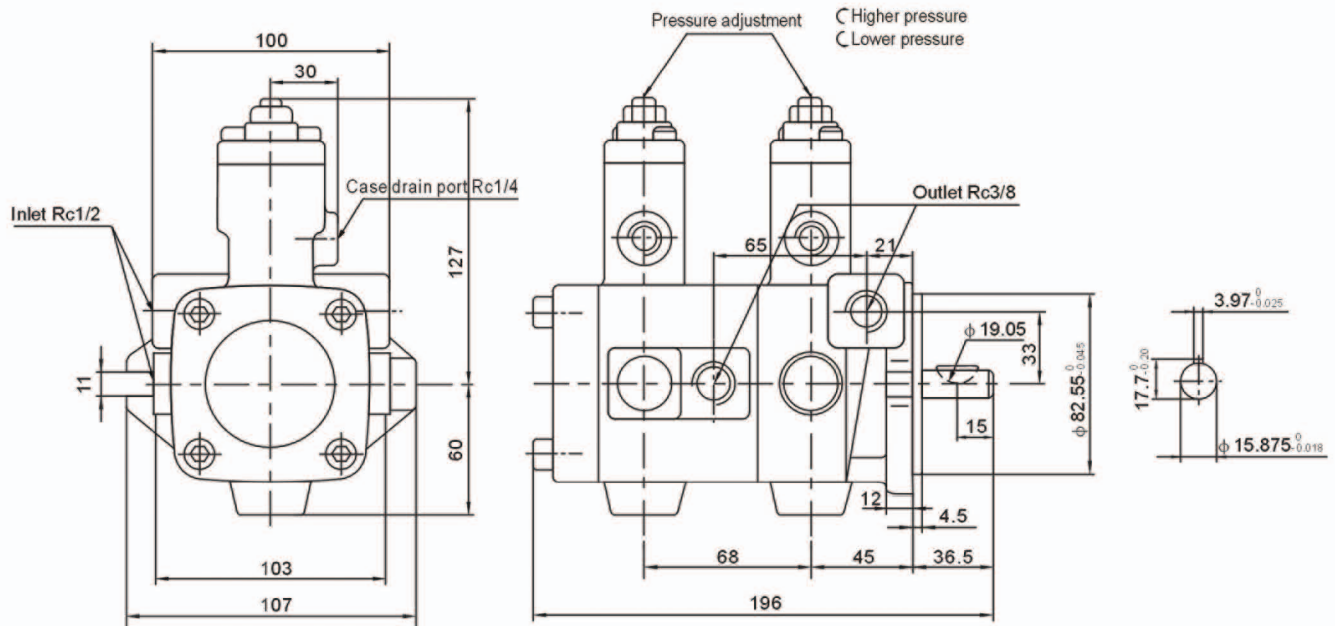
VPV SERIES



Intallation Dimensions:

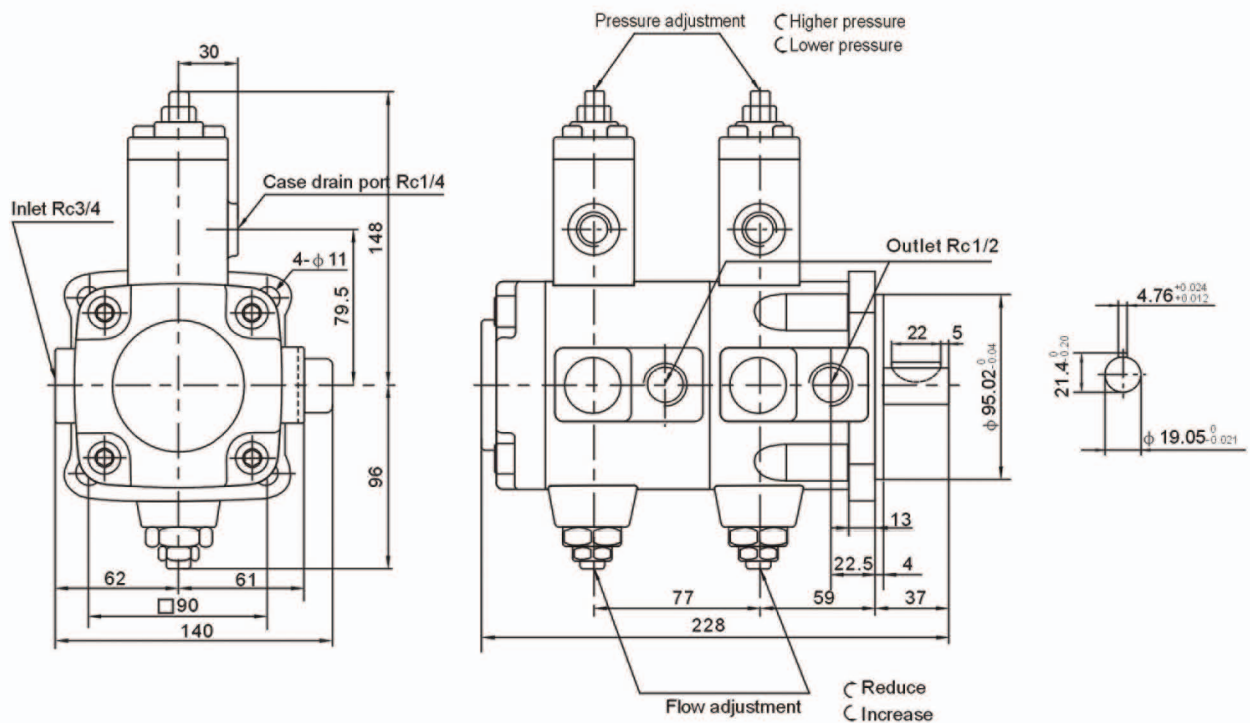
EVPV11/VPV22

EVPV11



Note: No flow adjustment

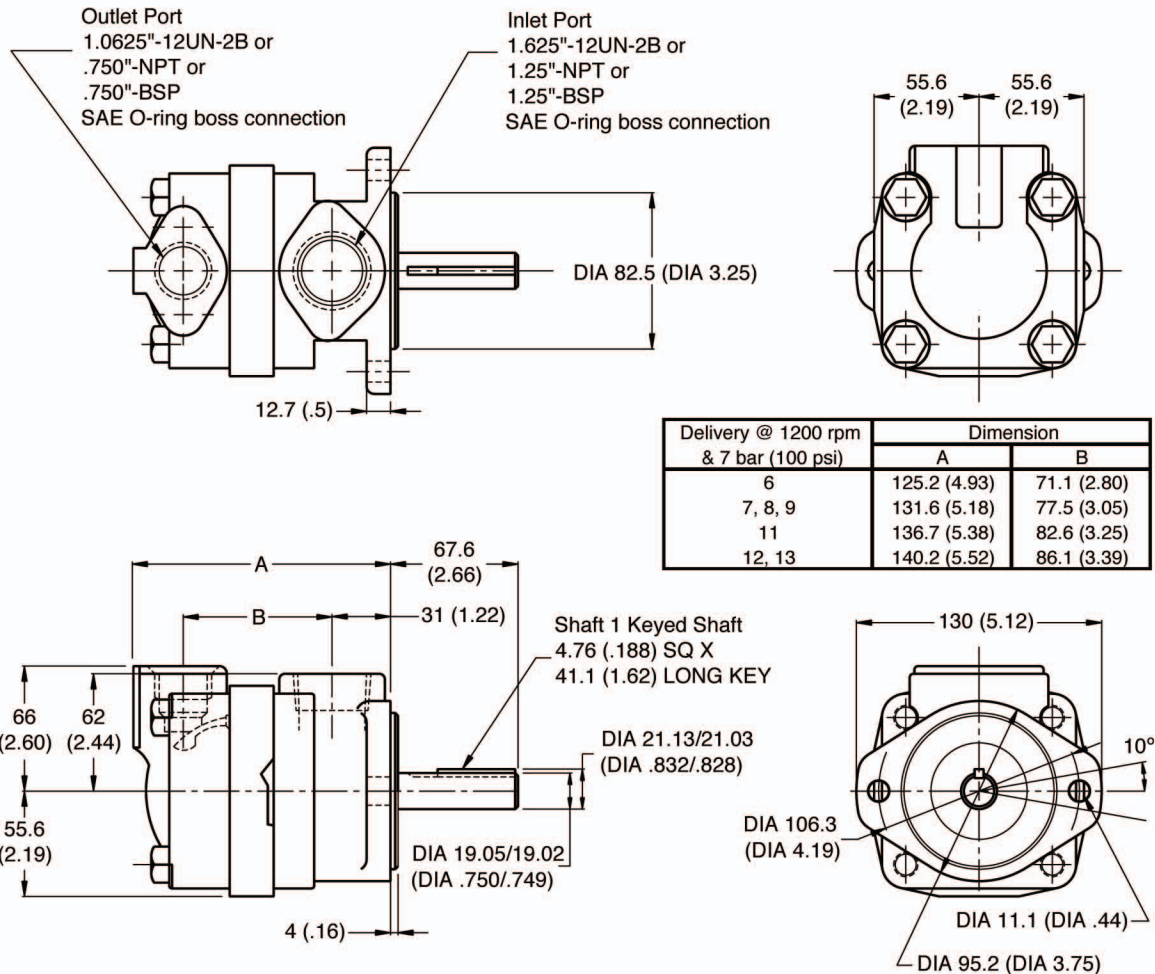
EVPV22



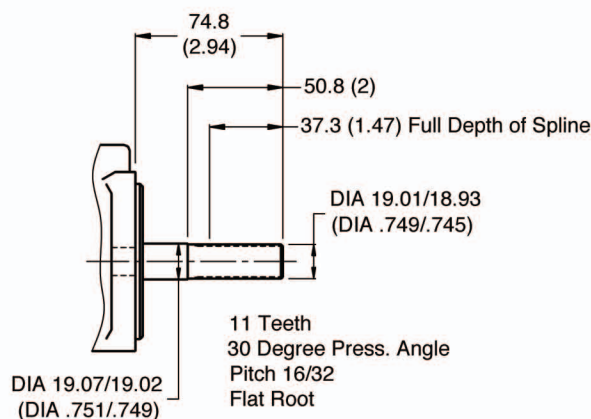
E VPV11/VPV22

Installation Dimensions mm (inch):

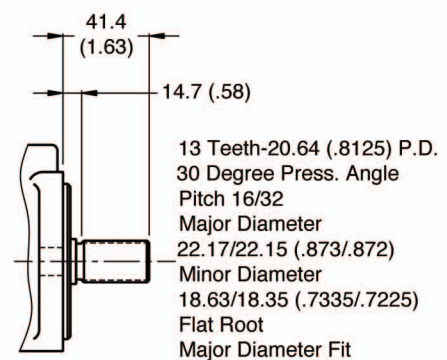
E V20



Other Shaft Options For E V20 Series:



Shaft 11 Splined Shaft 11 Teeth

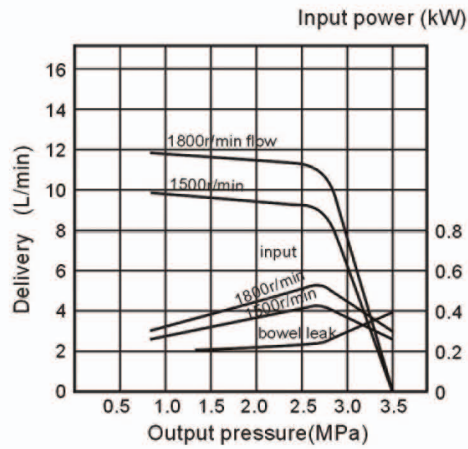


Shaft 15 Splined Shaft 13 Teeth

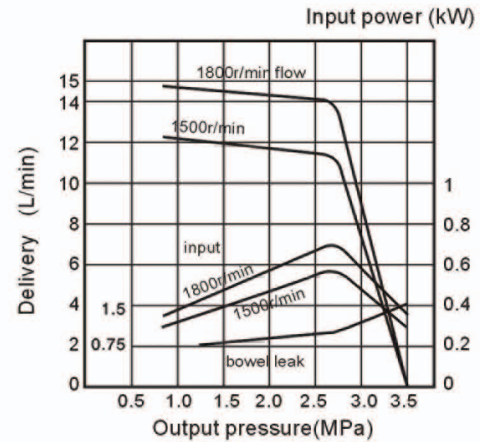
Curves:

EVPV1

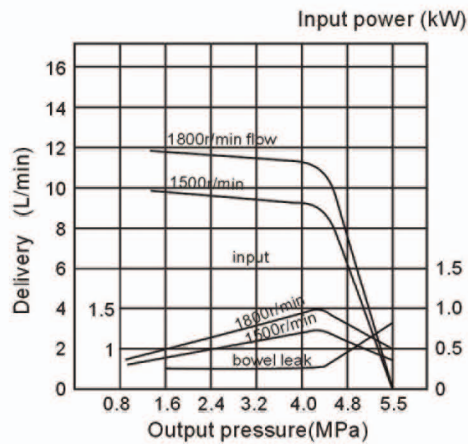
EVPV1-12-35



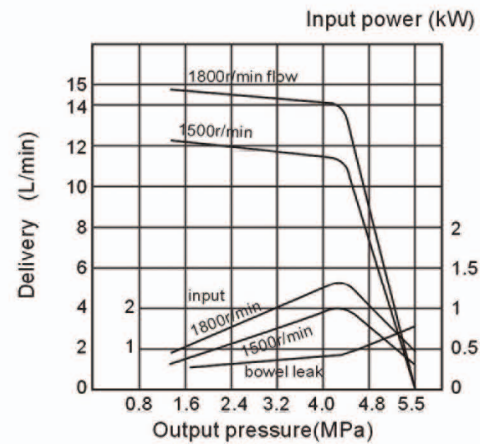
EVPV1-15-35



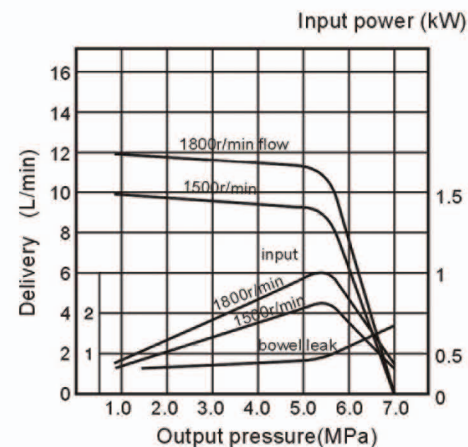
EVPV1-12-55



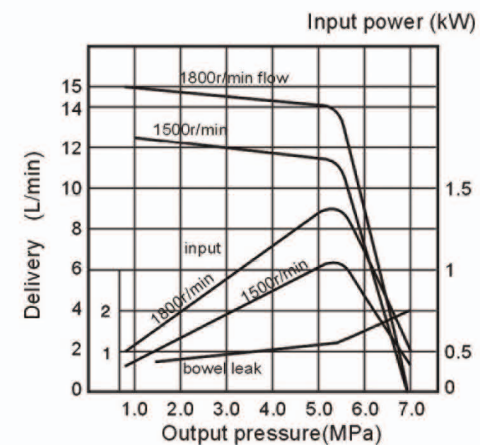
EVPV1-15-55



EVPV1-12-70



EVPV1-15-70



VARIABLE DISPLACEMENT VANE PUMPS

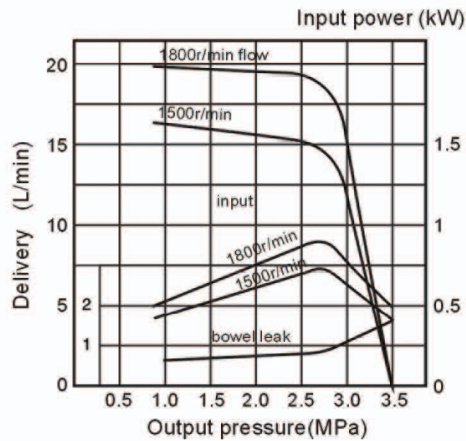
VPV SERIES



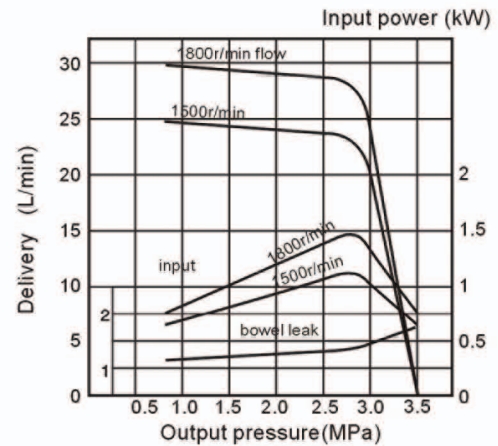
Curves:

EVPV1/VPV2

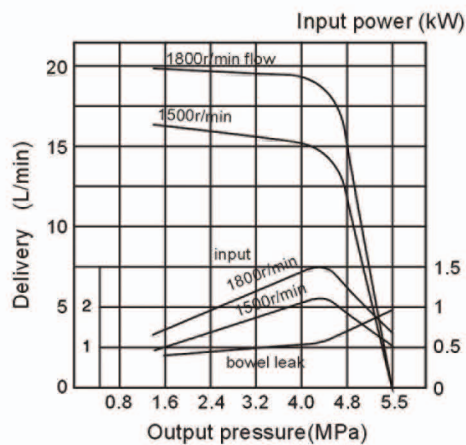
EVPV1-20-35



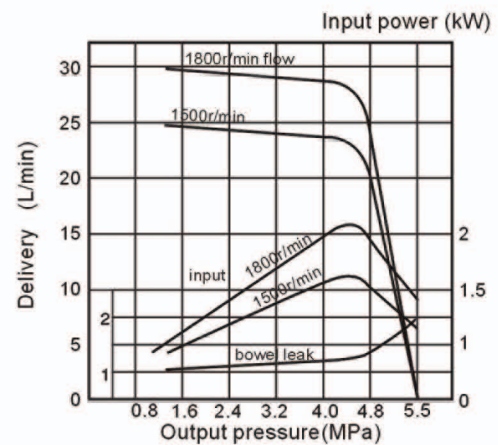
EVPV2-30-35



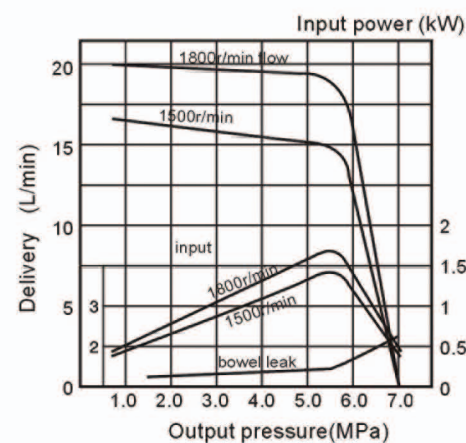
EVPV1-20-55



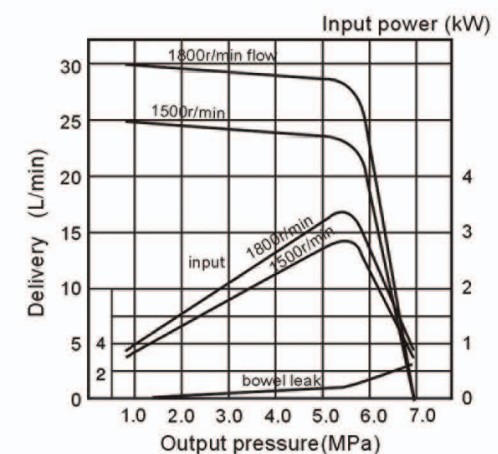
EVPV2-30-55



EVPV1-20-70



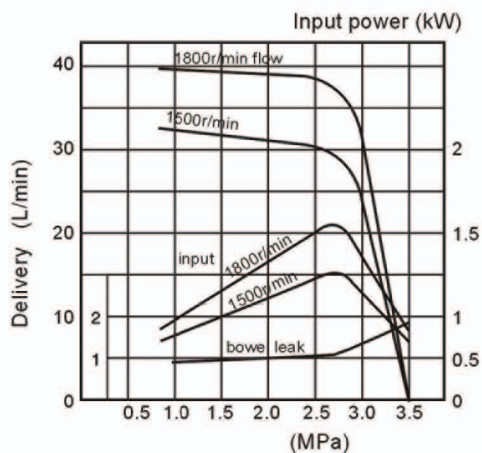
EVPV2-30-70



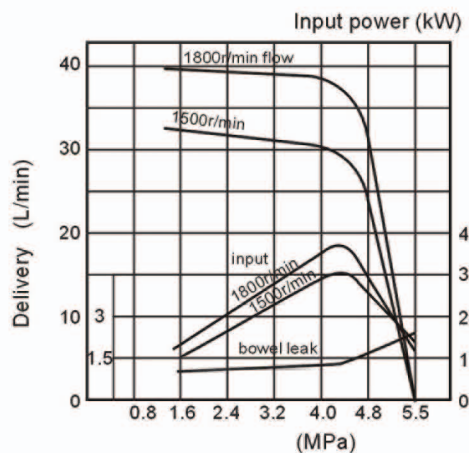
Curves:

EVPV2

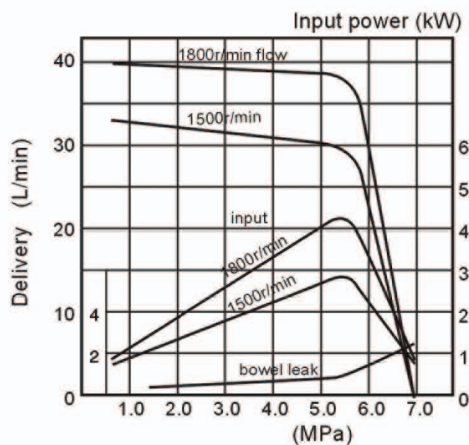
EVPV2-40-35



EVPV2-40-55

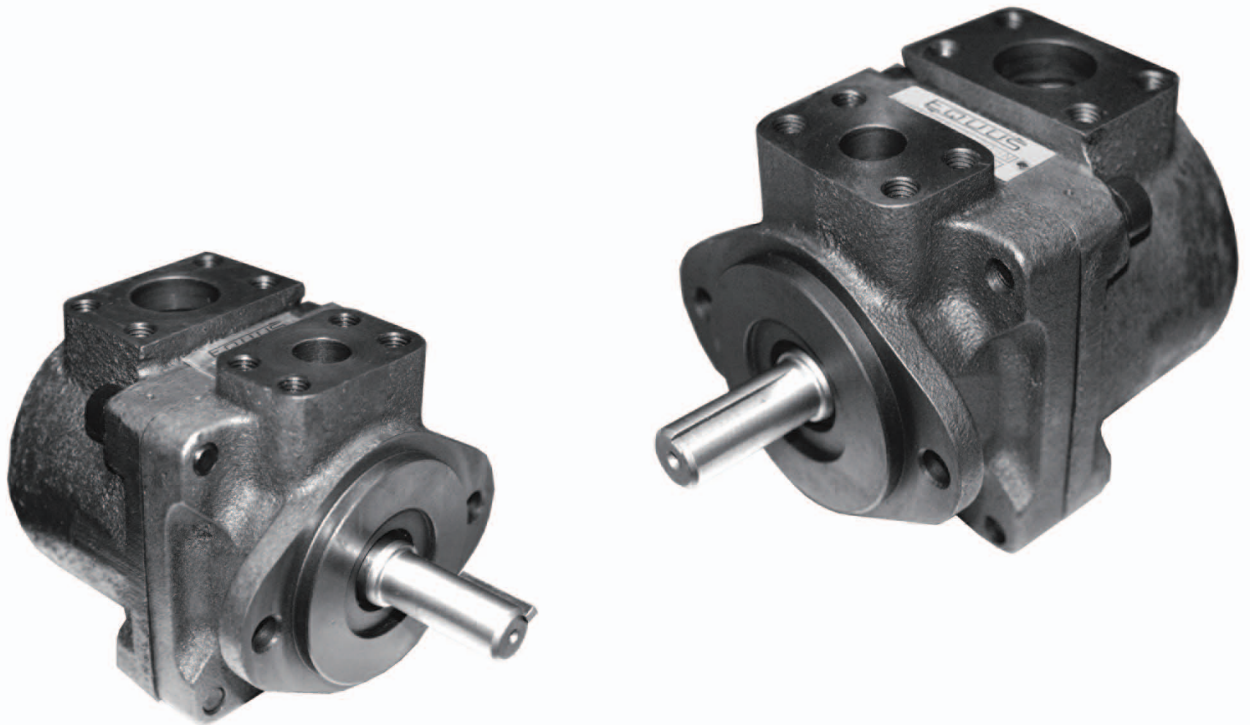


EVPV2-40-70



Features:

EPFE



EPFE

▲ General Description

PFE series are fixed displacement and twelve vane pumps featuring cartridge design with integral hydraulic balancing for high pressure operation and long service life at low noise level. These pumps are available as single and multiple configurations.

Mounting according to SAE and ISO 3019 standards. Easy installation as inlet and outlet ports can be oriented in any of four relative positions.

Easy maintenance as the pumping cartridge can be replaced in a few minutes.

Wide variety of displacement is up to 150mL/r.

There are 8 series and 75 sizes of PFE pump including single ones (PEE – 31/41/51/32/42/52) and double ones (PFE – 4131/5141).

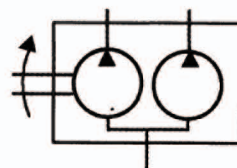
Displacement range: 16.5 ~ 150mL/r, (new PFE – 21/61,5 ~ 250mL/r)

Rated operating pressure: 21 ~ 30MPa

Speed: 600 ~ 2800rpm

Ordering Code:

EPFE/PFED



EPFED—	4131	045/	022/	1	D	TO	/PF
EPFE series fixed displacement vane pump	Series number	Single pump or double pump larger displacement volume side geometric displacement (ml/r)	Double pump smaller displacement volume side geometric displacement (ml/r)	★ ¹ Shaft extension	Direction of rotation (viewed from shaft end)	Port orientation	Suitable fluids
EPFE: single pump series	21	5,6,8,10,12,16	—	1—	D: CW S: CCW	See port orientation table [inlet and outlet ports can be oriented in any of four relative positions: T, V, U, W]	None: petroleum base fluid water glycol fluid /PF: phosphoric ester
	31	16,22,28,36,44	—	Cylindrical type (standard)			
	41	29,37,45,56,70,85	—	2— (ISO/DIS3019) Cylindrical type(ISO/DI S3019)			
	51	90,110,129,150	—				
	61	160,180,200,224,250	—				
	22	8,10,12	—	3— Cylindrical type(high torque)			
	32	22,28,36	—				
	42	45,56,70	—	5— Splined type			
	52	90,110,129	—				

PIN TYPE VANE PUMPS

EPFE SERIES



Ordering Code:

EPFE/PFED

EPFED—	4131	045/	022/	1	D	TO	/PF
EPFE series fixed displacement vane pump	Series number	Single pump or double pump larger displacement volume side geometric displacement (ml/r)	Double pump smaller displacement volume side geometric displacement (ml/r)	Shaft extension	Direction of rotation (viewed from shaft end)	Port orientation	Suitable fluids
EPFED double pump series	4131	29,37,45,56,70,85	16,22,28,36,44	1— Cylindrical type (standard) 2— (ISO/DIS3019) Cylindrical type(ISO/DIS 3019)	D: CW S: CCW	See port orientation table [inlet and two outlet ports can be oriented in any of thirty two relative positions]	
	5141	90,110,129,150	29,37,45,56,70,85	3— Cylindrical type(high torque) 5— Splined type 6— Splined type			

If other shaft extension type or displacement is needed ,contact with us .

If other combination of displacement and pressure is needed ,contact with us .

Cartridge model code:

SC	EPFE—31036/D
Cartridge	Single pump model including series number,geometric displacement and rotation

EPFE/PFED

Ordering Code:

EPFE

(Using anti-wear hydraulic oil, 24cSt at 50℃)

Model	Displacement (ml/r)	Rated pressure (MPa)	Output flow (L/min)	Driving power (kW)	Speed range (r/min)	Weight (kg)	Port size	
							Inlet	Outlet
EPFE—21005	5.0	21	4.8	3.5	900 ~ 3000	6	$\frac{3}{4}$ "	$\frac{1}{2}$ "
EPFE—21006	6.3		5.8	4.0				
EPFE—21008	8.0		7.8	5.5				
EPFE—21010	10.0		9.7	6.5				
EPFE—21012	12.5		12.2	8				
EPFE—21016	16.0		15.6	10				
EPFE—31016	16.5	21	16	6.5	800 ~ 2800	9	$1\frac{1}{4}$ "	$\frac{3}{4}$ "
EPFE—31022	21.6		23	10				
EPFE—31028	28.1		33	14				
EPFE—31036	35.6		43	18				
EPFE—31044	43.7		55	23				
EPFE—41029	29.3	21	34	14	700 ~ 2500	14	$1\frac{1}{2}$ "	1"
EPFE—41037	36.6		45	18				
EPFE—41045	45.0		57	23				
EPFE—41056	55.8		72	30				
EPFE—41070	69.9		91	37				
EPFE—41085	85.3		114	47	700 ~ 2000			
EPFE—51090	90.0	21	114	47	600 ~ 2200	25.5	2"	$1\frac{1}{4}$ "
EPFE—51110	109.6		141	58				
EPFE—51129	129.2		168	69				
EPFE—51150	150.2		197	80	600 ~ 1800			
E※PFE—61160	160	21	211	94	600 ~ 1800	$2\frac{1}{2}$ "	$1\frac{1}{2}$ "	
E※PFE—61180	180		237	106				
E※PFE—61200	200		264	117				
E※PFE—61224	224		295	131				

Ordering Code:

EPFED

Model	Displacement (ml/r)	Rated pressure (MPa)	Output flow (L/min)	Driving power (kW)	Speed range (r/min)	Weight (kg)	Port size	
							Inlet	Outlet
EPFE—32022	21.6	30	20	15	1200 ~ 2500	9	1 $\frac{1}{4}$ "	3 $\frac{3}{4}$ "
EPFE—32028	28.1		30	21				
EPFE—32036	35.6		40	27				
EPFE—42045	45.0	28	56	31	1000 ~ 2200	14	1 $\frac{1}{2}$ "	1"
EPFE—42056	55.8		70	40				
EPFE—42070	69.9	25	90	47				
EPFE—52090	90.0	25	111	57	1000 ~ 2000	25.5	2"	1 $\frac{1}{4}$ "
EPFE—52110	109.6		138	69				
EPFE—52129	129.2		163	81				

EPFE series double pump

Model	Displacement (ml/r)	Rated pressure (MPa)	Output flow (L/min)	Driving power (kW)	Speed range (r/min)	Weight (kg)	Port size		
							Inlet	First outlet	Second outlet
EPFED—4131※/※	EPFE-41 + PFE-31 Composed by: cartridge of PFE-41 plus cartridge of PFE-31				800 ~ 2500 (800 ~ 2000) the first element speed at the largest displacement	24.5	2 $\frac{1}{2}$ "	1"	$\frac{3}{4}$ "
EPFED—5141※/※	EPFE-51 + PFE-41 Composed by: cartridge of PFE-51 plus cartridge of PFE-41				700 ~ 2000 (700 ~ 1800) the first element speed at the largest displacement	36	3"	1 $\frac{1}{4}$ "	1"

Note: 1. Output flow and driving power in the table are the values guaranteed at rated working condition; $n = 1500$ rpm and $p = p_n$ (rated pressure)

2. First element is the shaft end (larger volume) pump, second element is the head end (smaller volume) pump.

Ordering Code:

EPFED

Model	Theoretical displacement (ml/r)		Rated pressure (MPa)		Output flow (L/min)		Driving Poven (kW)		Speed range (r/min)	Weight (kg)	Port size		
	Frist element	Second element	Frist element	Second element	First element	Second element	First element	Second element			Inlet	First outlet	Second outlet
EPFED—4131029/016	29.3	16.5	21	21	34	16	14	6.5	800 ~ 2500	24.5	2 $\frac{1}{2}$ "	1"	$\frac{3}{4}$ "
EPFED—4131029/022		21.6				23		10					
EPFED—4131029/028		28.1				33		14					
EPFED—4131037/016	36.6	16.5			45	16	18	6.5					
EPFED—4131037/022		21.6				23		10					
EPFED—4131037/028		28.1				33		14					
EPFED—4131037/036		35.6				43		18					
EPFED—4131045/016	45.0	16.5			57	16	24	6.5					
EPFED—4131045/022		21.6				23		10					
EPFED—4131045/028		28.1				33		14					
EPFED—4131045/036		35.6				43		18					
EPFED—4131045/044		43.7				55		23					
EPFED—4131056/016	55.8	16.5			72	16	30	6.5					
EPFED—4131056/022		21.6				23		10					
EPFED—4131056/028		28.1				33		14					
EPFED—4131056/036		35.6				43		18					
EPFED—4131056/044		43.7				55		23					
EPFED—4131070/016	69.9	16.5			91	16	37	6.5					
EPFED—4131070/022		21.6				23		10					
EPFED—4131070/028		28.1				33		14					
EPFED—4131070/036		35.6				43		18					
EPFED—4131070/044		43.7				55		23					
EPFED—4131085/016	85.3	16.5			114	16	46	6.5	800 ~ 2000				
EPFED—4131085/022		21.6				23		10					
EPFED—4131085/028		28.1				33		14					
EPFED—4131085/036		35.6				43		18					
EPFED—4131085/044		43.7				55		23					

PIN TYPE VANE PUMPS

EPFED SERIES



Ordering Code:

EPFED

Model	Theoretical displacement (ml/r)		Rated pressure (MPa)		Output flow (L/min)		Driving Power (kW)		Speed range (r/min)	Weight (kg)	Port size						
	Frist element	Second element	Frist element	Second element	First element	Second element	First element	Second element			Inlet	First outlet	Second outlet				
E PFED—5141090/029	90.0	29.3	21	21	114	34	48	14	700 ~ 2000	36	3"	1 $\frac{1}{4}$ "	1"				
E PFED—5141090/037		36.6				45		18									
E PFED—5141090/045		45.0				57		24									
E PFED—5141090/056		55.8				72		30									
E PFED—5141090/070		69.9				91		37									
E PFED—5141090/085		85.3				114		46									
E PFED—5141110/029	109.6	29.3			141	34	58	14									
E PFED—5141110/037		36.6				45		18									
E PFED—5141110/045		45.0				57		24									
E PFED—5141110/056		55.8				72		30									
E PFED—5141110/070		69.9				91		37									
E PFED—5141110/085		85.3				114		46									
E PFED—5141129/029	129.2	29.3			168	34	69	14	700 ~ 1800								
E PFED—5141129/037		36.6				45		18									
E PFED—5141129/045		45.0				57		24									
E PFED—5141129/056		55.8				72		30									
E PFED—5141129/070		69.9				91		37									
E PFED—5141129/085		85.3				114		46									
E PFED—5141150/029	150.2	29.3			197	34	80	14									
E PFED—5141150/037		36.6				45		18									
E PFED—5141150/045		45.0				57		24									
E PFED—5141150/056		55.8				72		30									
E PFED—5141150/070		69.9				91		37									
E PFED—5141150/085		85.3				114		46									

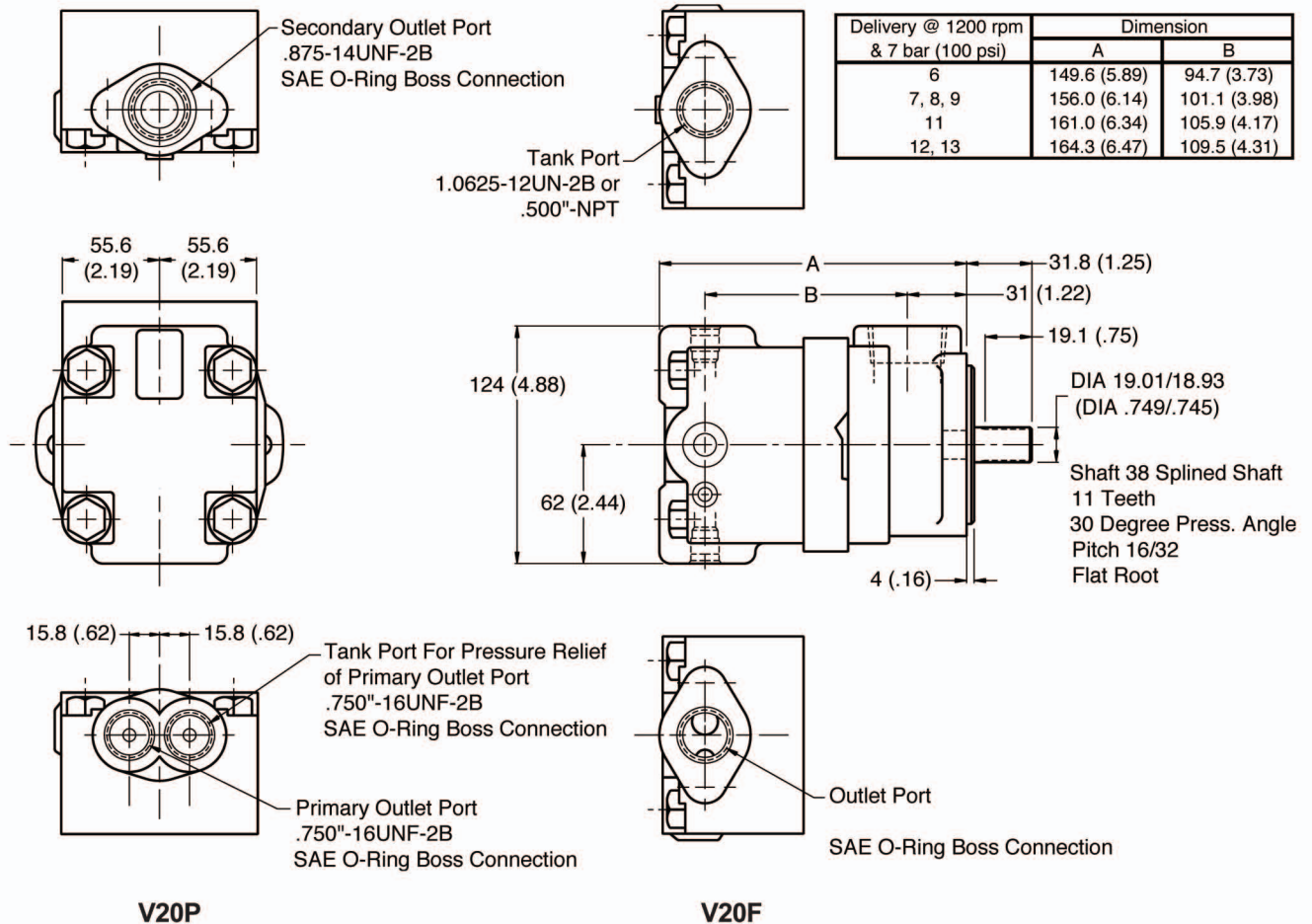
EPFED

FIXED DISPLACEMENT VANE PUMP SINGLE PUMP E V20

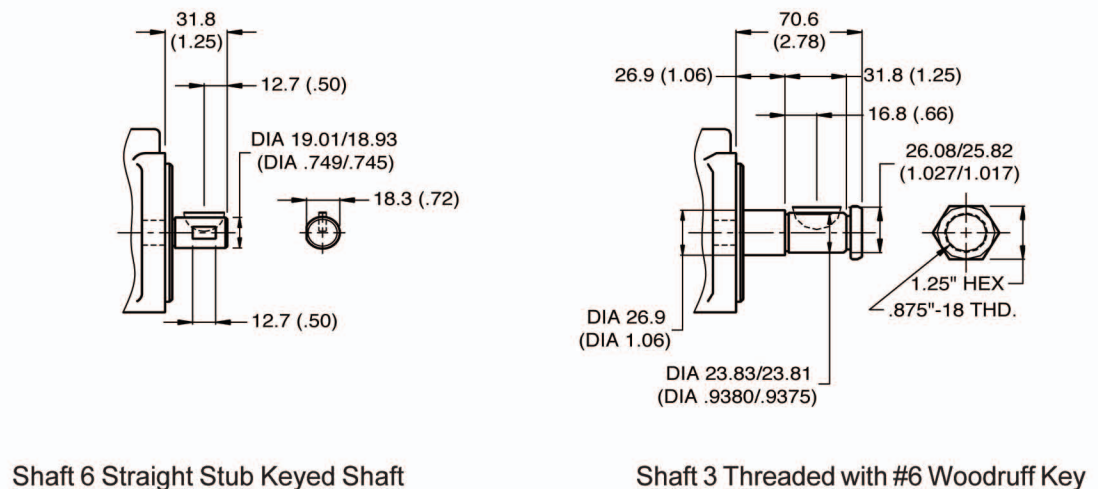


Installation Dimensions mm(inch):

E V20F,V20P



Other Shaft Options For V20 Series:



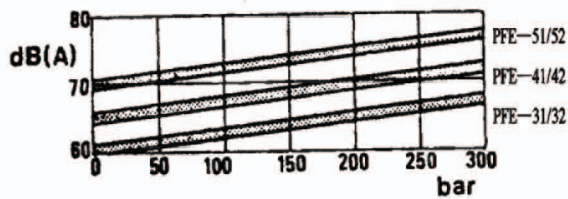
E V20F, V20P

Curves:

EPFE

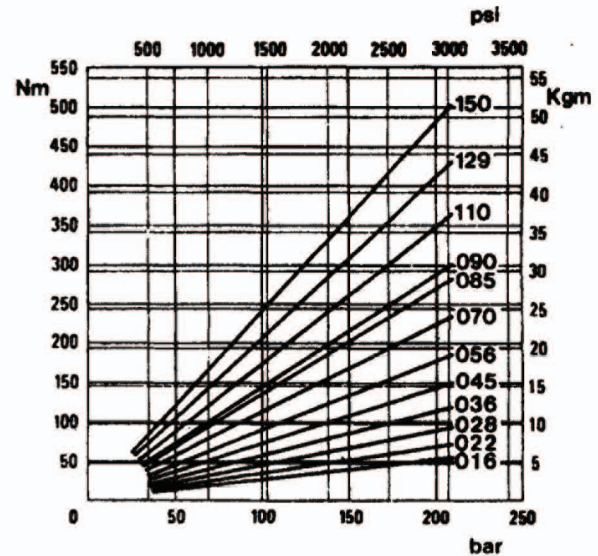
Noise

[Testing conditions: $n = 1500 \text{ r/min}$, oil viscosity $24 \text{ cSt}(3.5^\circ\text{E})$, ambient conditions in accordance with ISO4412 standard]



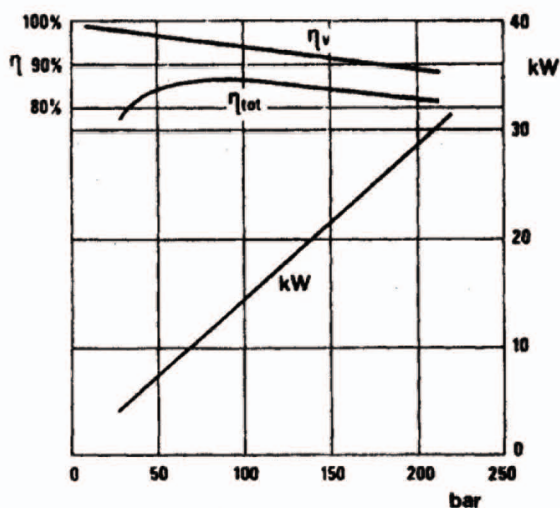
Driving torque versus output pressure diagram

EPFE - 31/41/51

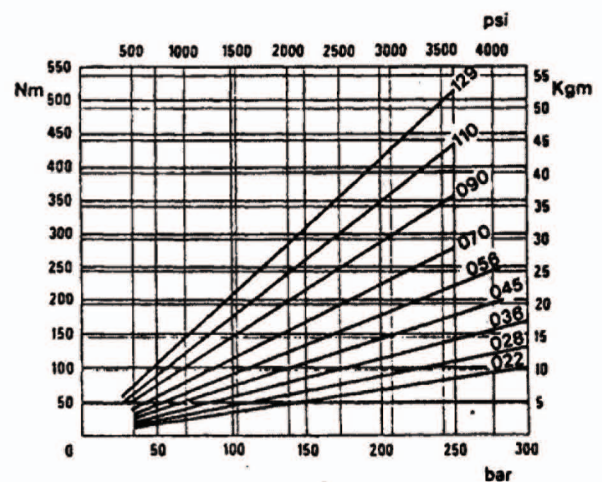


EPFE - 41056 pump typical diagram

($n = 1500 \text{ r/min}$)



EPFE-32/42/52



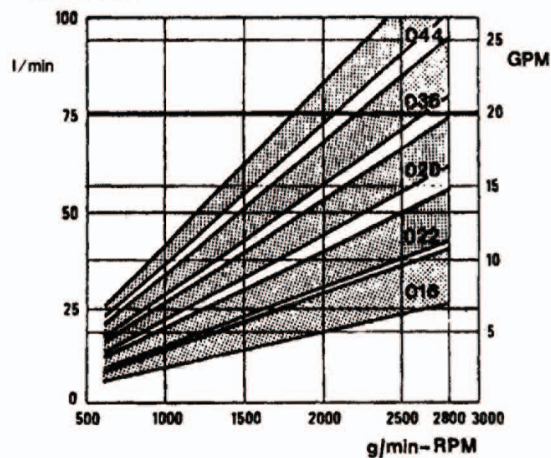
Curves:

EPFE

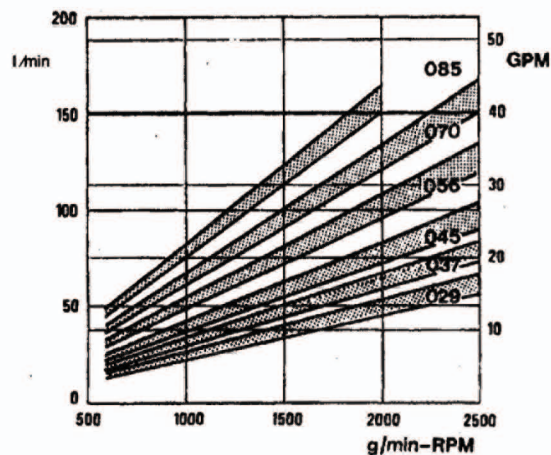
Flow versus rotation speed diagram

[Working condition: pressure - 0.7 ~ 21 MPa, viscosity - 24cSt(3.5°E)]

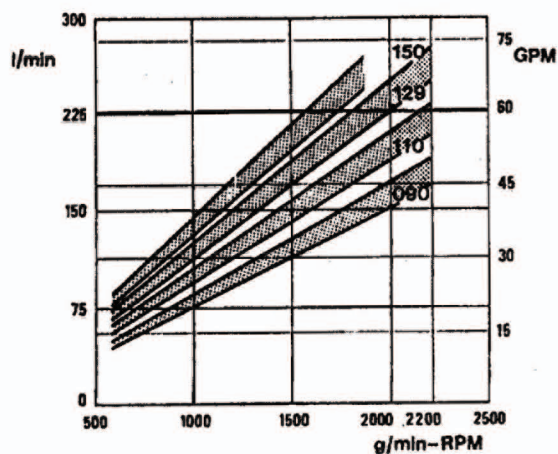
EPFE—31:



EPFE—41:



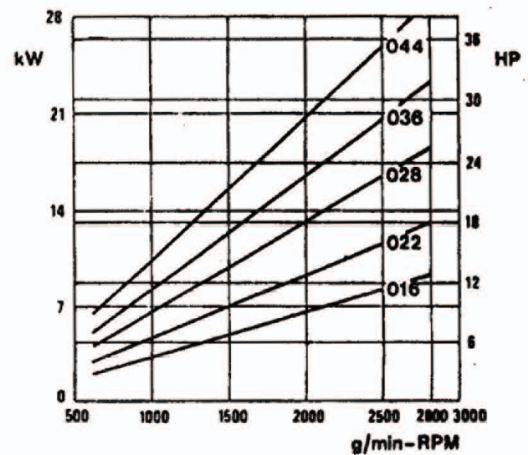
EPFE—51:



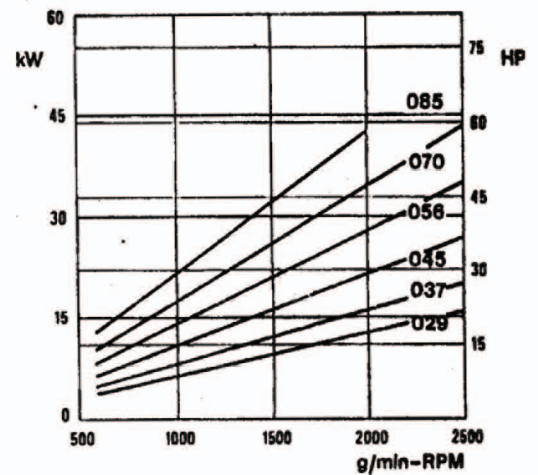
Power consumption versus rotation speed diagram

[Working condition: pressure - 14 MPa]

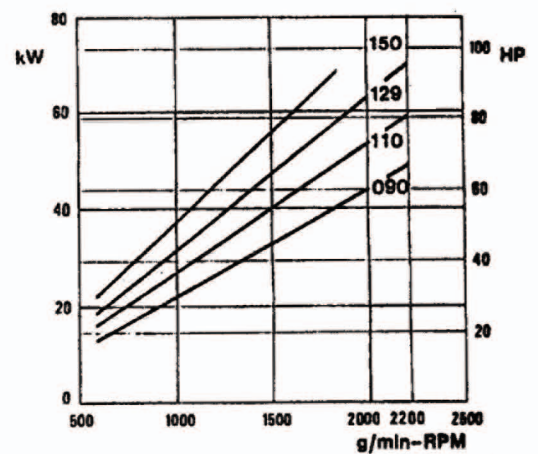
EPFE—31:



EPFE—41:



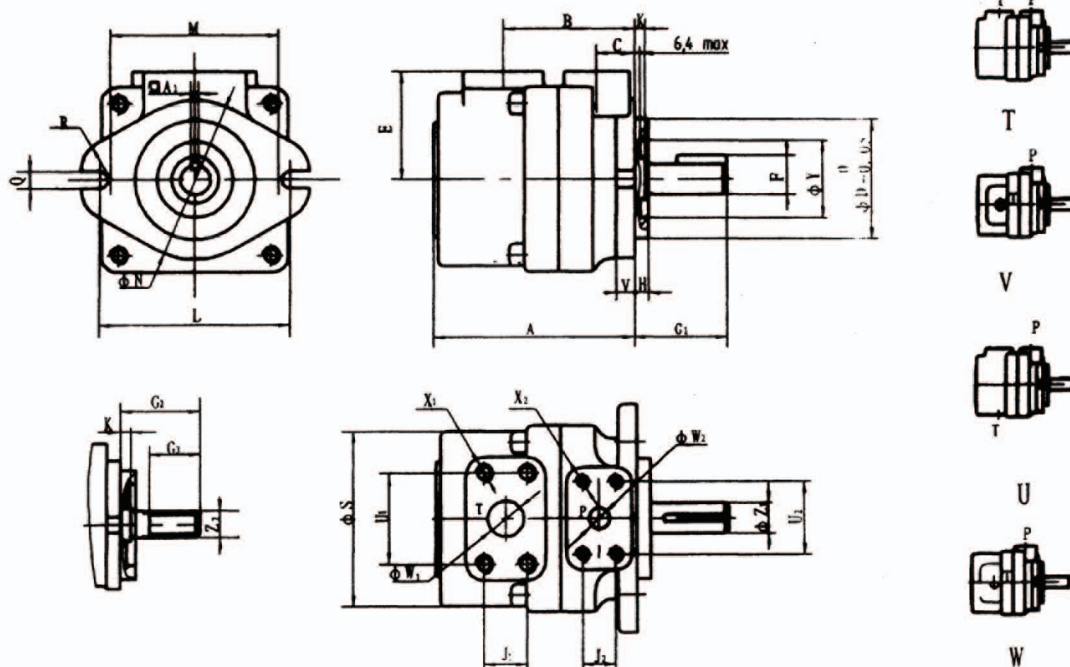
EPFE—51:



Installation Dimensions:

EPFE

EPFE—21,31,41,51



Configuration and Installation Dimensions(mm)

T = inlet port P = outlet port

Model	A	B	C	ØD	E	H	L	M	ØN	Q	R
EPFE—21	105	69	20	63	57	7	100	—	84	9	—
EPFE—31/32	135	98.5	27.5	82.5	70	6.4	106	73	95	11.1	28.5
EPFE—41/42	159.5	121	38	101.6	76.2	9.7	146	107	120	14.3	34
EPFE—51/52	181	125	38	127	82.6	12.7	181	143.5	148	17.5	35
EPFE—61	200	144	40	152.4	98	12.7	229	—	188	22	—

Model	ØS	U ₁	U ₂	V	ØW ₁	ØW ₂	J ₁	J ₂	X ₁	X ₂	ØY
EPFE—21	92	47.6	38.1	10	19	11	22.2	17.5	M10 × 17	M8 × 15	40
EPFE—31/32	114	58.7	47.6	10	32	19	30.2	22.2	M10 × 20	M10 × 17	47
EPFE—41/42	134	70	52.4	13	38	25	35.7	26.2	M12 × 20	M10 × 17	76
EPFE—51/52	158	77.8	58.7	15	51	32	42.9	30.2	M12 × 20	M10 × 20	76
EPFE—61	185	89	70	18	63.5	38	50.8	35.7	M12 × 22	M12 × 22	100

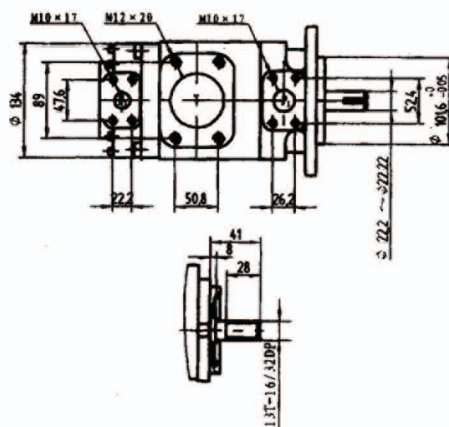
Model	Shaft type 1 (standard)					Shaft type 2					Shaft type 3					Shaft type 5			
	ØZ ₁	G ₁	A ₁	F	K	ØZ ₁	G ₁	A ₁	F	K	ØZ ₁	G ₁	A ₁	F	K	Z ₂	G ₂	G ₃	K
EPFE—21	15.88 15.85	48	4.00 3.98	17.37 17.27	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EPFE—31/32	19.05 19.00	55.6	4.76 4.75	21.11 20.94	8	—	—	—	—	—	22.22 22.20	55.6	4.76 4.75	24.54 24.41	8	9T 16/32 DP	32	19.5	8
EPFE—41/42	22.22 22.20	59	4.76 4.75	24.54 24.41	11.4	22.22 22.20	71	6.36 6.35	25.07 25.03	8	25.38 25.36	78	6.36 6.35	28.30 28.10	11.4	13T 16/32 DP	41	28	8
EPFE—51/52	31.75 31.70	73	7.95 7.94	35.33 35.07	13.9	31.75 31.70	84	7.95 7.94	35.33 35.07	8	34.90 34.88	84	7.95 7.94	38.58 38.46	13.9	14T 12/24 DP	56	42	8
EPFE—61	38.10 38.05	91	9.56 9.53	42.40 42.14	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—

EQUUS

EPFED

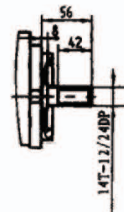
Technical drawing of a shaft assembly, labeled "Shaft type 1". The drawing includes three views: a front view, a side view, and a top view. Dimensions are provided in millimeters (mm). The front view shows a shaft with a diameter of $\phi 47.6$ and a length of 197 mm. The side view shows a shaft with a diameter of $\phi 76$ and a length of 254 mm. The top view shows a shaft with a diameter of $\phi 76$ and a length of 197 mm. The shaft is supported by bearings, and the dimensions indicate the positions of the bearings and the shaft segments.

Shaft type 1



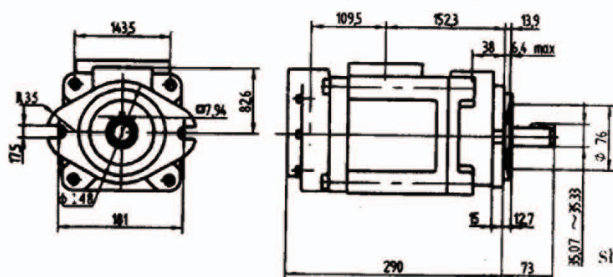
Shaft type 2 and 3

Shaft type 5

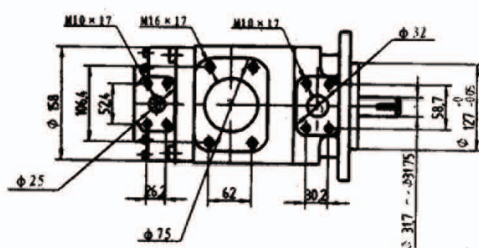
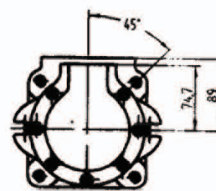


Shaft type 6

	ØZ1	G1	F	K
Shaft type 2	22.22	71	25.07	8
	22.20		25.03	
Shaft type 3	25.38	78	28.30	11.4
	25.35		28.10	



Shaft type 1



Shaft type 5

Shaft type 2 and 3

	ØZ1	G1	F	K
Shaft type 2	31.75	84	35.07	8
	31.70		35.03	
Shaft type 3	34.90	84	38.58	13.9
	34.88		38.46	

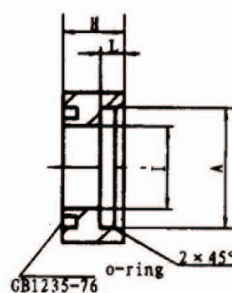
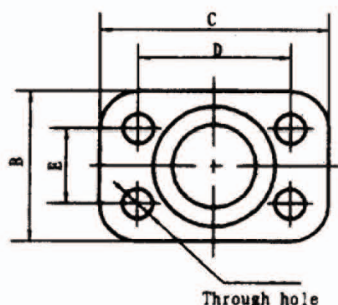
Flange Connection Dimensions:

EWF

Port orientation (as viewed from the shaft end) (Note: T = inlet, P₁ = outlet of the first pump, P₂ = outlet of the second pump)

TO P1-T P2	TA P1-T P2	TB P1-T P2	TC P1-T P2	TD P1-T P2	TE P1-T P2	TF P1-T P2	TG P1-T P2
WO P1-P2 T	WA P1-P2 T	WB P1-P2 T	WC P1-P2 T	WD P1-P2 T	WE P1-P2 T	WF P1-P2 T	WG P1-P2 T
UO P1-P2 T	UA P1-P2 T	UB P1-P2 T	UC P1-P2 T	UD P1-P2 T	UE P1-P2 T	UF P1-P2 T	UG P1-P2 T
VO P1-P2 T	VA P1-P2 T	VB P1-P2 T	VC P1-P2 T	VD P1-P2 T	VE P1-P2 T	VF P1-P2 T	VG P1-P2 T

Flange Connection Dimensions of Port (mm)



Flange specification

EWF	—40
Flange	Nominal diameter

Model	A	B	C	D	E	F	H	I	L	O ring	Screw	Pump port corresponding to flange
EWF—12	18	34	54	38.1	17.5	9	18	11	10	25 × 2.4	M8 × 30	PFE - 21 outlet
EWF—20	28.2	42	65	47.6	22.2	11	18	19	10	35 × 3.1	M10 × 30	PFE - 21 inlet, PFE - 31/21 outlet
EWF—25	35	50	70	52.4	26.2	11	18	25	10	40 × 3.1	M10 × 30	PFE - 41/42 outlet
EWF—32	43	53	79	58.7	30.2	11	21	32	12	45 × 3.1	M10 × 35	PFE - 31/32 inlet, PFE - 51/52 outlet
EWF—40	52	65	87	70	35.7	13.5	25	38	15	55 × 3.1	M12 × 40	PFE - 41/42 inlet PFE - 61 outlet
EWF—50	65.5	73	102	77.8	42.9	13.5	25	51	15	65 × 3.1	M12 × 40	PFE - 51/52 inlet
EWF—65	78	87	110	89	50.8	13.5	25	63	15	75 × 3.1	M12 × 40	PFE - 61 inlet, PFED - 41/31 inlet
EWF—75	93	107	132	106.4	62	17.5	30	75	18	95 × 3.1	M16 × 45	PFED - 51/42 inlet

Note: Size of the diagrammatic representation A and I are reference, correspondent hole and chamfer aren't machined before ex-factory.

Installation and Application:

EPFE

1. Hydraulic oil

- Anti-wear hydraulic oil is recommended in order to increase the performance and service life of the pump

Viscosity range of the oil: 10 ~ 100cSt (1.8 ~ 13°E), recommended viscosity: 24cSt at 50°C

- Filtration

Filtration rating of the system should not be lower than 25μm and a filter with filtration of 70 ~ 150μm fitted at the inlet of the pump (the rated flow of the filter should not be smaller than twice of the pump flow).

- Ambient temperature range: -20 ~ +70°C

Temperature of operating oil: +10 ~ +60°C

- Fire-resistance fluids

When fire-resistance fluid is used, special seal must be adopted and at the same time, the rated pressure and the max. speed of the pump should be in accordance with that specified in the following table:

Operating fluid	Sealing	Rated press.	Max. speed	Max. oil temperature
Phosphate ester	Fluor-elastomer	16MPa	1800r/min	60°C
Water glycol	Standard	16MPa	1500r/min	50°C

2. Installation

- Pump must be firmly mounted on a rigid support bracket which is capable of fully absorbing vibration.
- Horizontal mounting is recommended to maintain necessary fluid level. Shaft of pump should be align with that of motor and co-axiality within Ø0.1mm. Any radial or axial load on shaft of the pump is not permitted and a flexible coupling must be used as linkage between pump and motor.
- All connections at flanges, fittings and suction line of the system must be strictly sealed to prevent air leakage causing noise or vibration and bubble occurrence in oil tank which can reduce service life of the pump.
- Inlet and outlet of pump must be correctly connected to respective pipeline and rotation of the pump be in line with the arrow on the label plate. When firstly starts or hasn't be operated for a longer time, it is necessary to bleed air from pump outlet to permit priming and reduce noise through loosening outlet flange or using air bleed valve. After pump started, it should be jogged repeatedly without any load until it can run smoothly.

- Suction head of pump should not be over 500mm and pressure at suction port of pump is as the following:

Operating oil	At $n \leq 1800\text{r/min}$	At $n > 1800\text{r/min}$
Anti-wear hydraulic oil	-0.015 ~ +0.15MPa	0 ~ +0.15MPa
Fire-resistant fluid	-0.01 ~ +0.15MPa	

3. Drive torque

- For drive torque value required by pump, see drive torque/output pressure diagram; for double pump, the value is the sum of those required by two single pumps, which should not exceed the max. torque in the following table:

Model	Max. drive torque(N·m)				Max. permitted drive torque at shaft end of through-shaft pump
	Shaft 1-2	Shaft 3	Shaft 5	Shaft 6	
EPFE—31/32	160	220	110	220	110
EPFE—41/42	250	320	200	320	200
EPFE—51/52	500	700	450	—	320

4. Replacing pump cartridge

- If pump failed to work, it is only necessary to replace the pump cartridge with new one. When replacing, be careful to keep seals in position so as to avoid edge cutting. Fixing screws for pump housing should be gradually tightened in diagonal line direction and with an even force.

▲ Ordering procedure

- Order pump by full model designation devised from the previous code table.

example:

Single pump EPEF—41045/1DT/PF

Double pump EPEFD—4131045/0.6/1DT0/PF

- This product is in conformity with the following standards:

JB/T5001 - 1994

JB/T5002 - 1994

Ordering Code:

E V2010,V2020

E V2010,V2020

EV2010(F) - 1F13S7S - 1CC-(8)(H)-(L)

Model V2010, V2020

Cover

Omit - Standard Cover
F - Flow Control Cover
P - Priority Valve Cover

Mounting

1 - 2-Bolt Flange

Inlet Port Connection

F - 4-bolt Flange Dia 1.5" (V2010)
- 4-bolt Flange Dia 2.0" (V2020)

Shaft End Pump Delivery (USgpm at 1200 rpm)

7, 8, 9, 11, 12, 13

Shaft End Outlet Port Connection

S - 1.0625"-12 Str. thd.
P - .750" NPT
B - .750" BSP

Cover End Pump Delivery (USgpm at 1200 rpm)

V2010 - 1, 2, 3, 4, 5, 6, 7
V2020 - 6, 7, 8, 9, 11

Cover End Outlet Port Connection

V2010 and V2020

S - .750"-16 Str. thd. (V2010)
- 1.0625"-12 Str. thd. (V2020)
P - .500" NPT (V2010)
- .750" NPT (V2020)
B - .500" BSP (V2010)
- .750" BSP (V2020)

V2010F, V2010P, V2020F, and V2020P

S - .750"-16 Str. thd. for outlet and 1.0625"-12 Str. thd. for tank port (V2020F)
P - .750"-16 Str. thd. for outlet and .500" NPT for tank port (V2010F and V2020F)
T - .750"-16 Str. thd. for outlet and tank port (V2010F and V2020F)
- .750"-16 Str. thd. for main outlet and tank port and .875"-14 Str. thd. for secondary outlet (V2020P)
K - .5625"-18 Str. thd. for main outlet and tank port and .750"-16 Str. thd. for secondary outlet (V2010P)

Shaft Rotation

(Viewed from shaft end)

Omit - Turn right
L - Turn left

Pressurer Setting for Flow control and Priority Valve Cover bar (psi)

A - 17 (250)	F - 103 (1500)
B - 34 (500)	G - 121 (1750)
C - 52 (750)	H - 138 (2000)
D - 69 (1000)	J - 155 (2250)
E - 86 (1250)	K - 172 (2500)

Flow rate Setting for Flow control and Priority Valve Cover

L/min (USgpm)

2 - 7.6 (2)	6 - 22.7 (6)
3 - 11.4 (3)	7 - 26.5 (7)
4 - 15.2 (4)	8 - 30.3 (8)
5 - 19.0 (5)	

Cover End Outlet port position

(Viewed from cover end)

V 2010, V2010F, V2010P

A - 135° CCW from inlet
B - 45° CCW from inlet
C - 45° CW from inlet
D - 135° CW from inlet
V2020, V2020F, V2020P
A - Opposite inlet
B - 90° CCW from inlet
C - Inline with inlet
D - 90° CW from inlet

Shaft End Outlet Port Position

(Viewed from cover end)

A - Opposite inlet
B - 90° CCW from inlet
C - Inline with inlet
D - 90° CW from inlet

Shaft

1 - Straight keyed
11 - Splined

FIXED DISPLACEMENT VANE PUMP

DOUBLE PUMP



Specifications :

E V2010,V2020

Model Series	Cartridge Position	Ring Size Delivery at 1200 r/min & 7 bar (100 psi) USgpm	Geometric Displacement cm ³ /r (in ³ /r)	Delivery at 1500 r/min & 7 bar (100 psi) L/min (USgpm)	Maximum Pressure bar (psi)	Maximum Speed rpm	Weight kg (lb)
V2010	Shaft End	7	22.8 (1.39)	33.11 (8.75)	172 (2500)	3000	13.6 (30)
		8	26.5 (1.62)	37.85 (10.00)	172 (2500)	2800	
		9	29.7 (1.81)	42.57 (11.25)	172 (2500)	2800	
		11	36.4 (2.22)	52.04 (13.75)	172 (2500)	2500	
		12	39.0 (2.38)	56.77 (15.00)	152 (2200)	2400	
		13	42.4 (2.59)	61.50 (16.25)	152 (2200)	2400	
	Cover End	1	3.3 (0.20)	4.70 (1.25)	172 (2500)	3000	
		2	6.6 (0.40)	9.40 (2.50)	172 (2500)	3000	
		3	9.8 (0.60)	14.20 (3.75)	172 (2500)	3000	
		4	13.1 (0.80)	18.90 (5.00)	172 (2500)	3000	
		5	16.4 (1.00)	23.60 (6.25)	172 (2500)	3000	
		6	19.5 (1.19)	28.40 (7.50)	152 (2200)	3000	
		7	22.8 (1.39)	33.10 (8.75)	138 (2000)	2800	
V2020	Shaft End	7	22.8 (1.39)	33.11 (8.75)	172 (2500)	3000	15.9 (35)
		8	26.5 (1.62)	37.85 (10.00)	172 (2500)	2800	
		9	29.7 (1.81)	42.57 (11.25)	172 (2500)	2800	
		11	36.4 (2.22)	52.04 (13.75)	172 (2500)	2500	
		12	39.0 (2.38)	56.77 (15.00)	152 (2200)	2400	
		13	42.4 (2.59)	61.50 (16.25)	152 (2200)	2400	
	Cover End	6	19.5 (1.19)	28.39 (7.50)	172 (2500)	3000	
		7	22.8 (1.39)	33.11 (8.75)		3000	
		8	26.5 (1.62)	37.85 (10.00)		2800	
		9	29.7 (1.81)	42.57 (11.25)		2800	
		11	36.4 (2.22)	52.04 (13.75)		2500	

E V2010,V2020