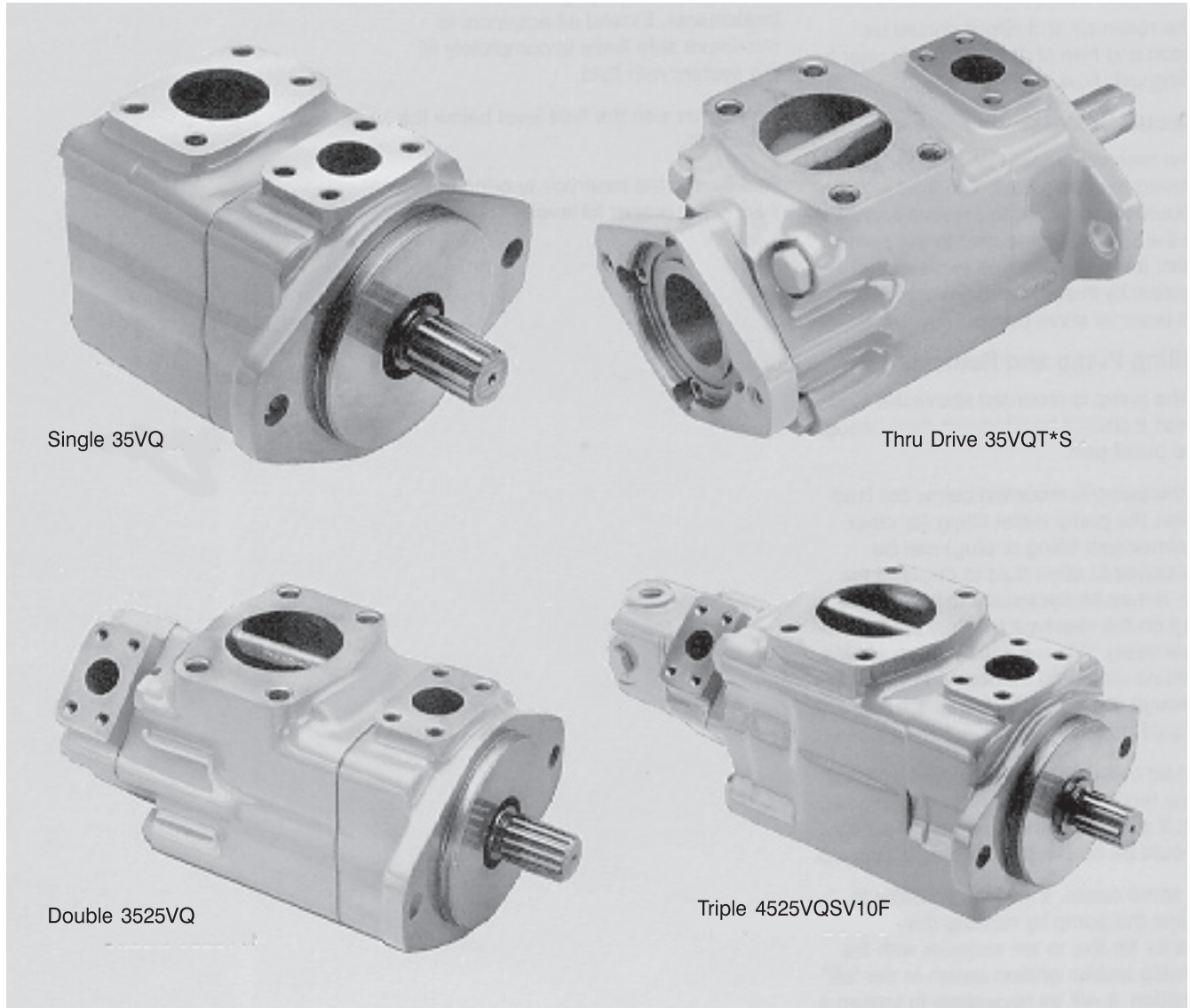


VQ Series High Speed, High Pressure Pumps

www.SaarStore.com



Single 35VQ

Thru Drive 35VQT*S

Double 3525VQ

Triple 4525VQSV10F

Design Features

In all pumps, except the rear pump of triple pumps, fluid flow is developed in a cartridge which consists principally of a cam ring, rotor, ten vanes, and unique side plates and support plates. The bimetallic flexible side plates are located on each side of the rotor with their bronze face toward the rotor and their steel face toward the support plate. Two cavities in each support plate hold high pressure oil against the flexible side plate, thereby hydrostatically balancing the flexible plate and providing optimum clearance with the rotor.

Performance

For a combination of maximum horsepower in a small package, high efficiency, serviceability and economy, Vickers "high output" pumps are unequalled anywhere in industry.

Durability

Vickers high speed-high pressure pumps give more staying power – they last. Their workhorse ruggedness has been proved on the newest types of giant earth-moving equipment.

Reliability & Efficiency

Axial and radial running clearances, along with lubricating oil film on the rotor and vanes, are optimized over the entire operating pressure range. Excellent cold-start capability and superior resistance to seizure make Vickers VQ pumps highly reliable and efficient.

Replaceable Cartridge

The pump cartridge described under design features is easy to service and can normally be replaced in ten minutes or less, without removing the pump from its mounting. A small stock of cartridges can serve many pump models on a variety of vehicles.

Hydraulic Balance

Pump inlet and outlet pressure chambers are diametrically opposed as shown in Figure 2. As a result, the rotor is hydraulically balanced. Bearings thus encounter no hydraulic loads, assuring long life.

Figure 3 shows an insert fitted into a slot in the vane. Outlet pressure is applied continuously only to the space between the vane and insert. Top and bottom areas of the vane are subject to either inlet or outlet pressure, depending upon the vane's location during rotor rotation. See Figure 2. Complete hydraulic balance is effected in the outlet pressure areas. Outward thrust by the vane in the inlet area is equal to the outlet pressure times the projected area of the end of the insert.

Double Pumps

Double pumps provide a single power source capable of serving two separate hydraulic circuits, or of providing greater volume through the combined delivery of both sections. In either type of application, two pumps in a single housing result in a more compact, simple installation and can be driven through a single shaft coupling.

Triple Pumps

Because triple pumps have three pumps in a single housing, they offer even more application versatility than do the double pumps described above.

Thru-Drive Pumps

These versions of single and double pumps have a rear pad for directly mounting and driving an additional pump. Many different multi-pump arrangements are thus possible.

Integral Valve Options

Single, double, and triple pumps are available with flow control and priority valve covers.

The flow control cover limits flow to the operating system to the desired maximum. Excess flow is diverted to tank. On double and triple pumps, the deliveries of the shaft-end and center pumps are proportional to speed.

The flow control cover also includes a relief valve to limit maximum operating pressure. Operating pressures of the shaft-end and center pumps of double and triple pumps must be controlled by separate, external relief valves.

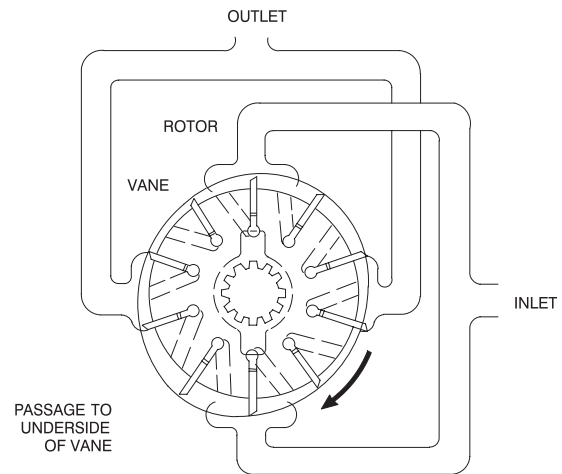


Figure 2

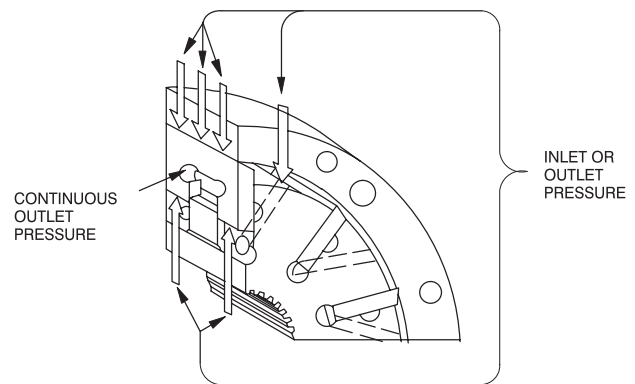


Figure 3

A typical application for the flow control is power steering, where it provides a constant supply of oil throughout the vehicle engine's mid to high speed range.

The priority valve cover maintains a nearly constant flow to a primary circuit and diverts remaining flow to a secondary circuit. The amount of flow going to the secondary circuit is determined by pump delivery. The primary circuit is protected by an integral relief valve, but an external relief valve must be provided for the secondary and any additional circuit.

Single Pump Operating Specifications

www.SaarStore.com

Model Series	Delivery USgpm @ 1200 r/min 7 bar (100 psi)	Displ. cm ³ /r (in ³ /r)	Max. r/min	Max. bar (psi)	Typical del. L/min (USgpm) @ max. speed & pressure	Typical input kW (hp) @ max. speed & pressure	Weight kg (lb)
20VQ	5	18,0 (1.10)	2700	210 (3000)	42,3 (11)	17,9 (24)	11,8 (26)
	8	27,4 (1.67)	2700	210 (3000)	65,4 (17)	26,1 (35)	
	11	36,4 (2.22)	2700	210 (3000)	88,5 (23)	35,4 (47.5)	
	12	39,5 (2.41)	2700	160 (2300)	98,1 (25.5)	28,4 (38)	
	14	45,9 (2.80)	2700	140 (2000)	115,4 (30)	29,1 (39)	
25VQ	12	40,2 (2.45)	2700	210 (3000)	88,5 (23)	41,0 (55)	14,5 (32)
	14	45,4 (2.77)	2700	210 (3000)	103,8 (27)	46,6 (62.5)	
	17	55,2 (3.37)	2500	210 (3000)	119,2 (31)	51,8 (69.5)	
	21	67,5 (4.12)	2500	210 (3000)	146,2 (38)	61,9 (83)	
35VQ	25	81,6 (4.98)	2500	210 (3000)	173,1 (45)	75,3 (101)	22,7 (50)
	30	97,7 (5.96)	2500	210 (3000)	211,5 (55)	87,7 (117.5)	
	35	112,8 (6.88)	2400	210 (3000)	230,8 (60)	98,5 (132)	
	38	121,6 (7.42)	2400	210 (3000)	250,0 (65)	104,4 (140)	
45VQ	42	138,7 (8.46)	2200	175 (2500)	255,8 (66.5)	91,4 (122.5)	34,1 (75)
	50	162,3 (9.90)	2200	175 (2500)	303,8 (79)	105,2 (141)	
	60	193,4 (11.80)	2200	175 (2500)	369,2 (96)	126,8 (170)	

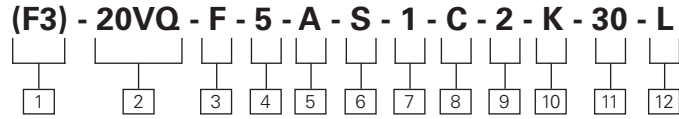
Performance constants: SAE 10W fluid @ 82° C (180° F), and pump inlet @ 0 PSIG (14.7 PSIA)

Note: Outlet pressure must always be higher than inlet pressure.
See page 7 for details.

Model Codes

Single Pump

www.SaarStore.com



1 F3 – Viton seals

Omit if not required.

2 Intravane pump series

3 Integral valve options

Omit if not required

F – Flow control and relief

P – Priority valve and relief

4 Geometric displacement

Code = SAE rating (USgpm) at
1200 r/min, 7 bar (100 psi)

Code	cm ³ /r	in ³ /r
5	18,0	1.10
8	27,4	1.67
11	36,4	2.22
12	39,5	2.41
14	45,9	2.80

5 Port connections

Series	Code	Inlet	Outlets
20VQ	A	SAE 4-bolt flg.	SAE 4-bolt flg.
20VQ	AM*	Metric 4-bolt flg.	Metric 4-bolt flg.
20VQF&P	B	SAE Str. thd.	SAE Str. thd.
20VQF&P	C	SAE 4-bolt flg.	SAE Str. thd.

* Same as code "A" port connections, except metric threads for fastening flanges.

6 Mounting & shaft seal assembly

F – Foot mount with single shaft seal

S – Flange mount and double shaft seal

Omit for flange mount with single shaft seal.

7 Shaft type

1 – Straight keyed

151 – Splined

8 Outlet positions

(Viewed from cover end of pump)

A – Opposite inlet port

B – 90° CCW from inlet

C – In line with inlet

D – 90° CW from inlet

9 Controlled flow rate

(20VQF & 20VQP)

3 – 11 L/min (3 USgpm)

4 – 15 L/min (4 USgpm)

6 – 23 L/min (6 USgpm)

7 – 27 L/min (7 USgpm)

8 – 30 L/min (8 USgpm)

10 – 38 L/min (10 USgpm)

11 – 42 L/min (11 USgpm)

12 – 45 L/min (12 USgpm)

10 Relief valve setting

(20VQF & 20VQP)
bar (psi)

A – 17 (250)

B – 35 (500)

C – 52 (750)

D – 70 (1000)

E – 86 (1250)

F – 100 (1500)

G – 121 (1750)

H – 140 (2000)

J – 155 (2250)

K – 175 (2500)

11 Design

Subject to change. Installation dimensions remain the same for designs –30 through –39.

12 Shaft Rotation

(Viewed from shaft end of pump)

L – Left hand or counterclockwise.

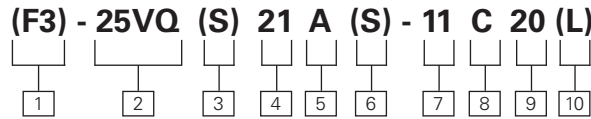
Omit for right hand.

NOTE: For options other than listed above, i.e. shafts, ports, displacements, and mountings, contact your Vickers representative.

Model Codes

Single Pump

www.SaarStore.com



1 F3 - Viton seals

Omit if not required.

2 Intravane pump series

Standard bearing	Heavy duty bearing
25VQ	26VQ
35VQ	36VQ
45VQ	–

3 Pilot designation

S – SAE per ISO 3019/1 (SAE J744)
Omit for standard pilot.

4 Geometric displacement

Code = SAE rating (USgpm) at 1200 r/min and 7 bar (100 psi)

Frame

Size	Code	cm ³ /r	in ³ /r
25V	12	40,2	2.45
	14	45,4	2.77
	17	55,2	3.37
	21	67,5	4.12
35V	25	81,6	4.98
	30	97,7	5.96
	35	112,8	6.88
	38	121,6	7.42
45V	42	138,7	8.46
	50	162,3	9.90
	60	193,4	11.80

5 Port connections

Series	Code	Inlet	Outlets
All	A	SAE 4-bolt flg.	SAE 4-bolt flg.
All	AM*	Metric 4-bolt flg.	Metric 4-bolt flg.
25VQ	B	SAE str. thd.	SAE str. thd.
25VQ	C	SAE 4-bolt flg.	SAE str. thd.
25VQ	D	SAE str. thd.	SAE 4-bolt flg.

*Same as code "A" port connections, except metric threads for fastening flanges.

6 Mounting & shaft seal assembly

F – Foot mounting with single shaft seal
S – Flange mount and double shaft seal
Omit for flange mount with single shaft seal.

7 Shaft type

With standard pilot, single shaft seal

- 1** – Straight keyed
- 11** – Splined
- 86** – Straight keyed, heavy duty

With standard pilot, double shaft seal

- 123** – Splined (not available on 45VQ)
- 130** – Splined (for 45VQ only)

With SAE pilot, single or double shaft seal

- 203** – Straight keyed, heavy duty
- 297** – Splined

8 Outlet positions

(Viewed from cover end of pump)

- A** – Opposite inlet
- B** – 90° CCW from inlet
- C** – In line with inlet
- D** – 90° CW from inlet

9 Design

Subject to change. Installation dimensions remain the same for designs –20 through –29

10 Rotation

(Viewed from shaft end of pump)

- L** – Left hand (counterclockwise)
- Omit for right hand.

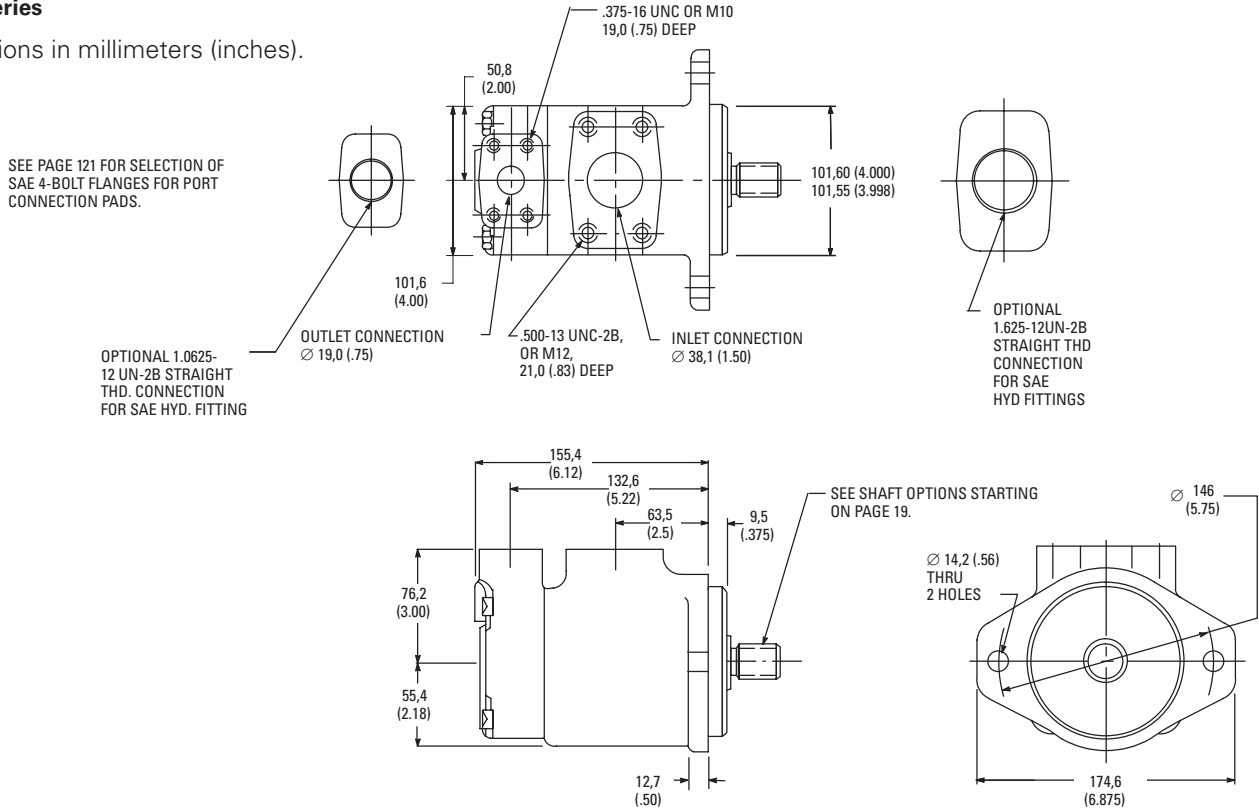
NOTE: For options other than listed in the model code, i.e. shafts, ports, displacements and mountings, contact your Vickers representative.

Installation Dimensions

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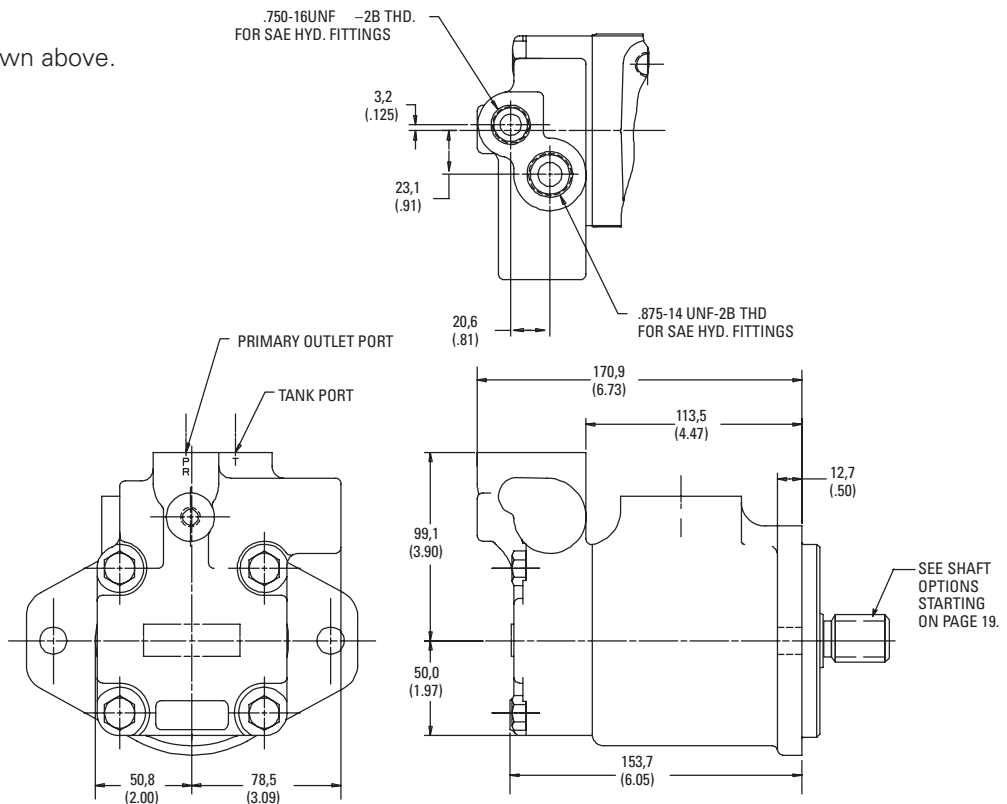
20VQ Series

Dimensions in millimeters (inches).



20VQF Series

Additional dimensions are shown above.

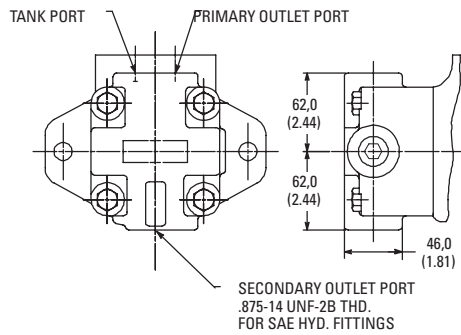
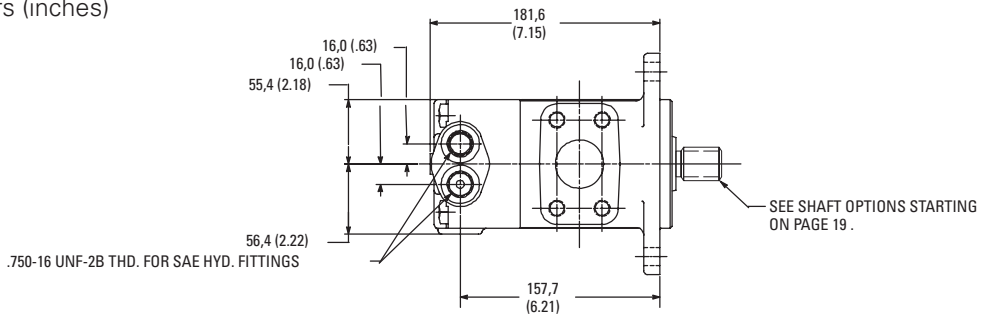


Installation Dimensions

20VQP Series

Dimensions in millimeters (inches)

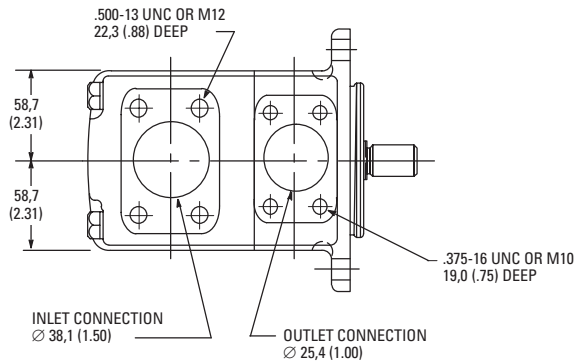
See preceding page for additional dimensions.



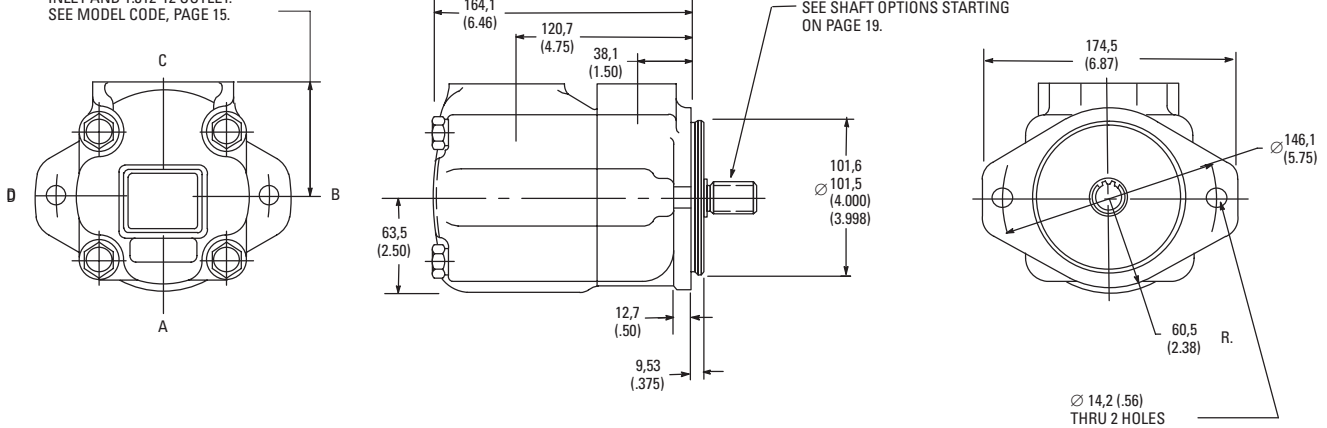
25VQ Series

Dimensions in millimeters (inches)

PORT CONNECTION PADS ARE FOR USE WITH 4-BOLT FLANGES. SEE PAGE 121 FOR SELECTION.



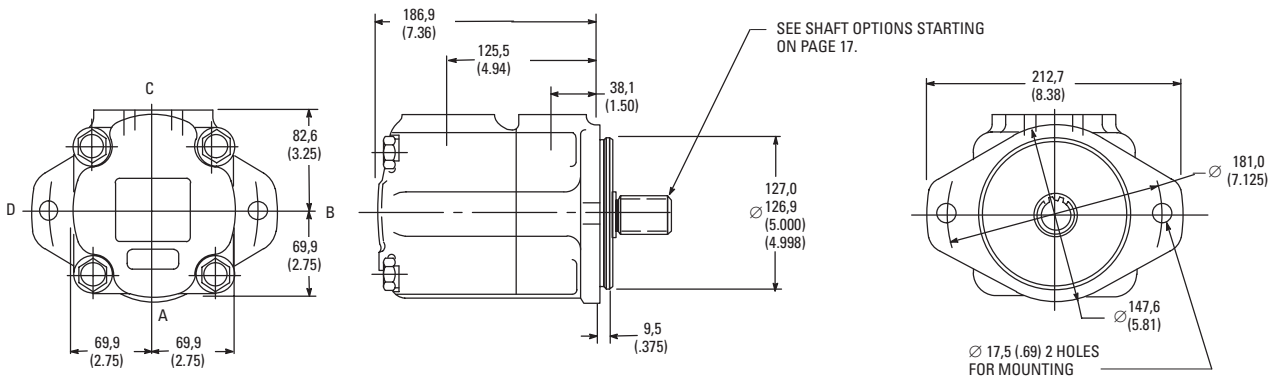
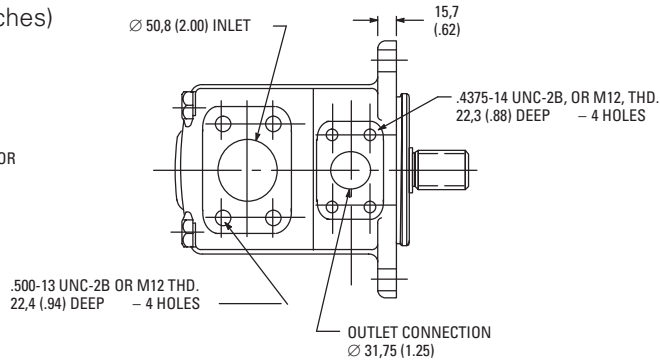
76,2 (3.00) FOR SAE 4-BOLT FLANGE PADS. 85,9 (3.38) FOR 1.875-12 STRAIGHT THREADED INLET AND 1.312-12 OUTLET. SEE MODEL CODE, PAGE 15.



35VQ Series

Dimensions in millimeters (inches)

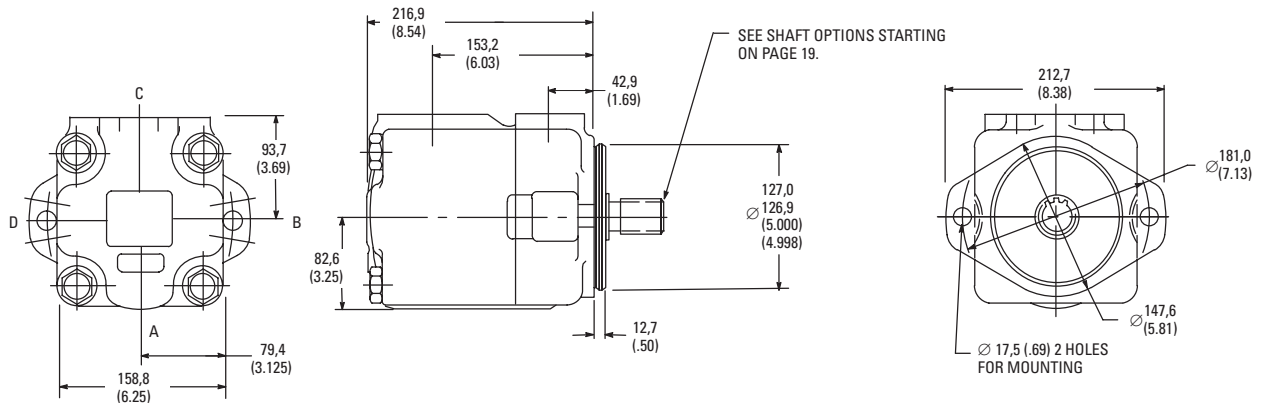
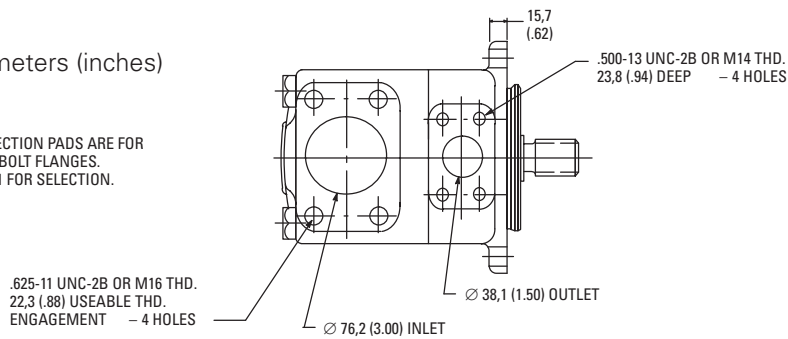
PORT CONNECTION PADS ARE FOR USE WITH 4-BOLT FLANGES. SEE PAGE 119 FOR SELECTION.



45VQ Series

Dimensions in millimeters (inches)

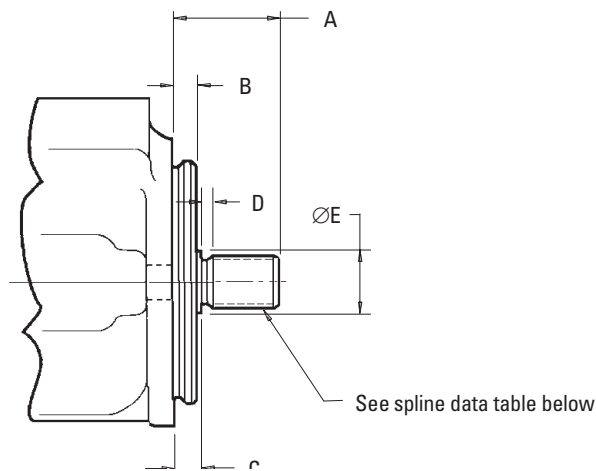
PORT CONNECTION PADS ARE FOR USE WITH 4-BOLT FLANGES. SEE PAGE 121 FOR SELECTION.



Optional Shafts

Splined Shafts

Dimensions in millimeters (inches)



Pump	Shaft Code	A	B	C	D	ØE	Spline Data (See below.)
20VQ, 20VQF, 20VQP	151	44,1 (1.62)	9,53 (.375)	11,9 (.468)	4,1 (.16)	27,8 (1.09)	A
	11	44,5 (1.75)	9,53 (.375)	11,1 (.437)	4,1 (.16)	27,8 (1.09)	A
25VQ	123	44,5 (1.75)	9,53 (.375)	15,7 (.62)	4,1 (.16)	27,8 (1.09)	A
	297	41,1 (1.62)	9,53 (.375)	7,9 (.31)	4,1 (.16)	27,8 (1.09)	C
35VQ	11	58,7 (2.31)	9,53 (.375)	11,1 (.437)	6,4 (.25)	35,1 (1.38)	D
	123	58,7 (2.31)	9,53 (.375)	15,2 (.60)	5,5 (.21)	35,1 (1.38)	D
	297	55,5 (2.19)	12,7 (.500)	7,9 (.31)	6,4 (.25)	35,1 (1.38)	E
45VQ	11	61,9 (2.44)	12,7 (.500)	14,3 (.565)	9,7 (.38)	39,6 (1.56)	D
	130	61,9 (2.44)	12,7 (.500)	15,2 (.60)	9,9 (.39)	40,4 (1.59)	D
	297	55,5 (2.19)	12,7 (.500)	7,9 (.31)	9,7 (.38)	39,6 (1.56)	E

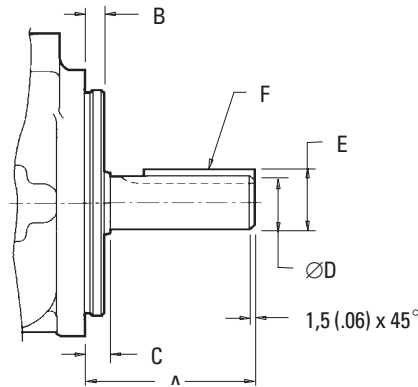
Spline Data Table

(Involute splines from above chart)

Spline Data Reference	Number of Teeth	Pitch	Major Diameter	Form Diameter	Minor Diameter	Minor Diameter
A	13	16/32	22,17 (.873) 22,15 (.872)	19,03 (.749)	18,16 (.715)	Major dia. fit
C	13	16/32	21,8 (.858) 21,6 (.852)	19,03 (.749)	18,16 (.715)	Side fit
D	14	12/24	31,70 (1.248) 31,67 (1.247)	27,4 (1.08)	26,42 (1.040)	Major dia. fit
E	14	12/24	31,2 (1.229) 31,1 (1.223)	27,4 (1.08)	26,42 (1.040)	Side fit

Straight Key Shafts

Dimensions in millimeters (inches)



Pump	Shaft Code	A	B	C	ØD	E	F key width x length
20VQ, 20VQF, 20VQP	1	58,7 (2.31)	9,53 (.375)	11,9 (.468)	22,23 (.875) 22,20 (.874)	24,5 (.966) 24,4 (.961)	4,75 (.187) x 32 (1.25)
	1	58,7 (2.31)	9,53 (.375)	11,1 (.435)	22,23 (.875) 22,20 (.874)	24,5 (.966) 24,4 (.961)	4,75 (.187) x 32 (1.25)
25VQ	86	77,7 (3.06)	9,53 (.375)	11,1 (.435)	25,37 (.999) 25,35 (.998)	28,3 (1.11) 28,1 (1.10)	6,36 (.250) x 50,8 (2.00)
	203	77,7 (3.06)	9,53 (.375)	7,9 (.31) ▲	25,40 (1.00) 25,35 (.998)	28,20 (1.11) 27,94 (1.10)	6,36 (.250) x 49,2 (1.938)
35VQ	1	73,2 (2.88)	9,53 (.375)	11,1 (.435)	31,75 (1.250) 31,70 (1.248)	35,36 (1.39) 34,10 (1.38)	7,94 (.313) x 38,1 (1.50)
	86	85,9 (3.38)	9,53 (.375)	11,1 (.435)	34,90 (1.374) 34,87 (1.373)	38,6 (1.52) 38,3 (1.51)	7,92 (.312) x 54 (2.13)
45VQ	203	84,1 (3.31)	12,7 (.500)	7,9 (.31) ▲	34,90 (1.374) 34,87 (1.373)	38,6 (1.52) 38,3 (1.51)	7,92 (.312) x 54 (2.125)
	1	62,0 (2.44)	12,7 (.500)	14,22 (.560)	31,75 (1.250) 31,70 (1.248)	35,36 (1.39) 34,10 (1.38)	7,92 (.312) x 28,5 (1.12)
45VQ	86	87,4 (3.44)	12,7 (.500)	14,22 (.560)	38,07 (1.499) 38,05 (1.498)	42,4 (1.67) 42,1 (1.66)	9,53 (.375) x 50,8 (2.00)
	203	90,4 (3.56)	12,7 (.500)	7,9 (.31) ▲	38,07 (1.499) 38,05 (1.498)	42,4 (1.67) 42,1 (1.66)	9,53 (.375) x 57,1 (2.25)

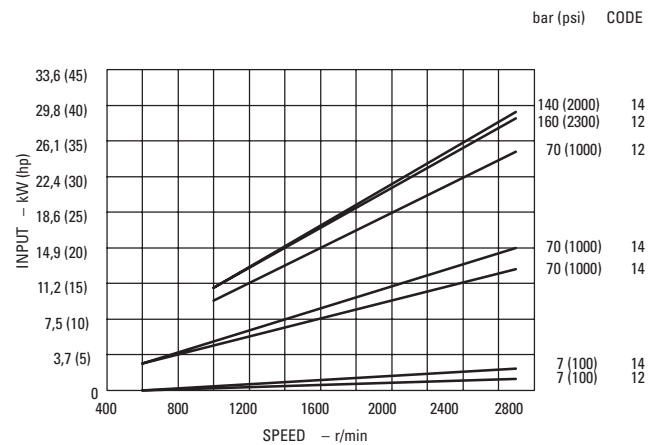
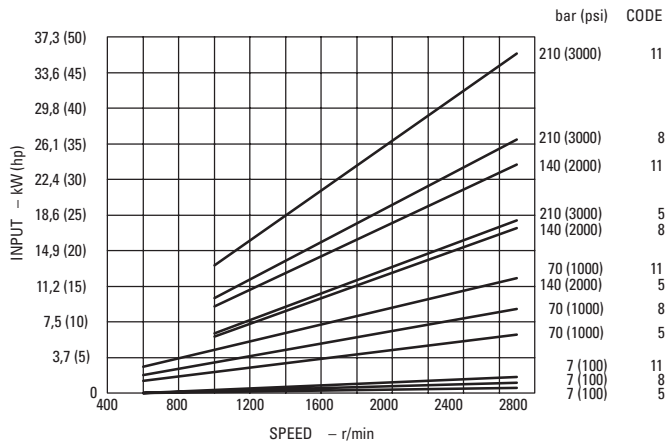
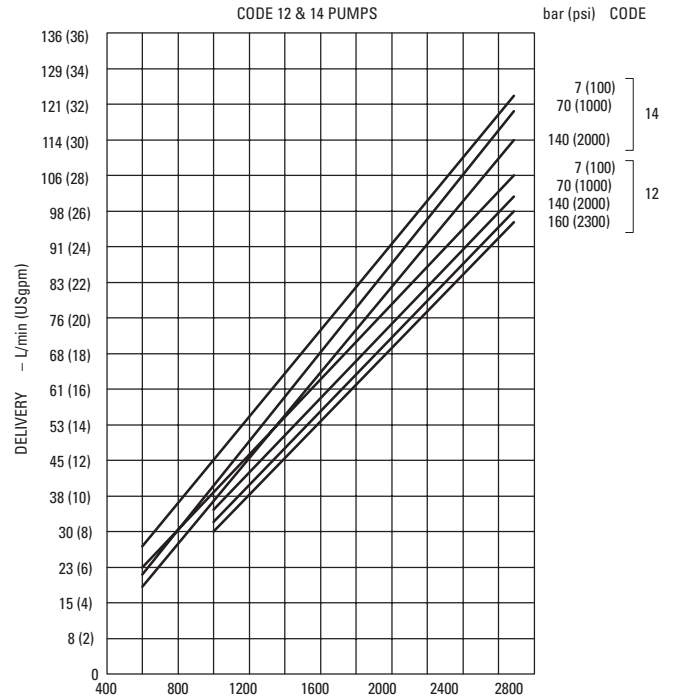
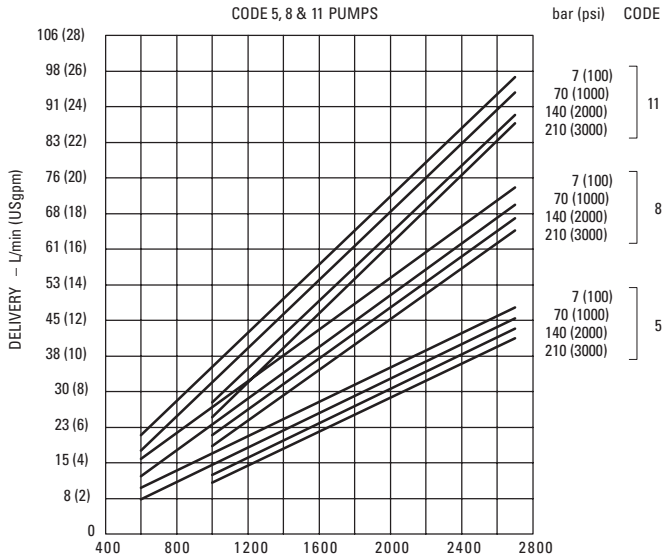
▲ Shaft shoulder inside recess in pilot.

Typical Performance

www.SaarStore.com

20VQ Single Pumps

Performance Constants:
SAE 10W fluid @ 82° C (180° F)
Pump inlet @ 0 psig (14.7 psia)



25VQ Single & 25VQT*S Thru-drive Pumps

Performance Constants:
 SAE 10W fluid @ 82° C (180° F)
 Pump inlet @ 0 psig (14.7 psia)

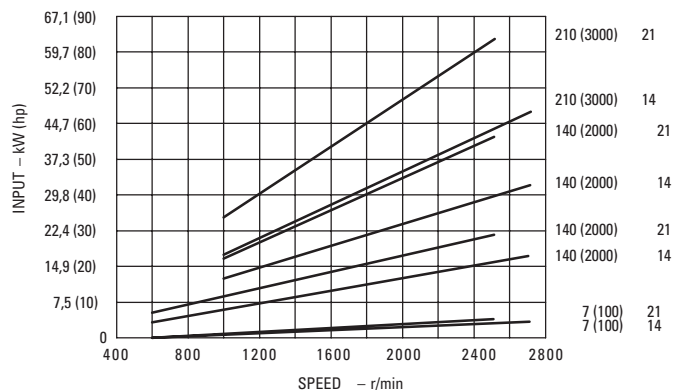
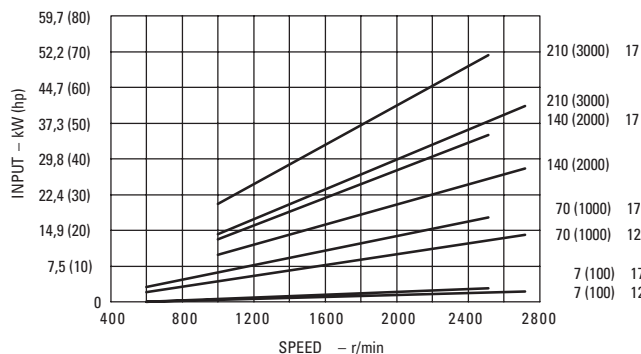
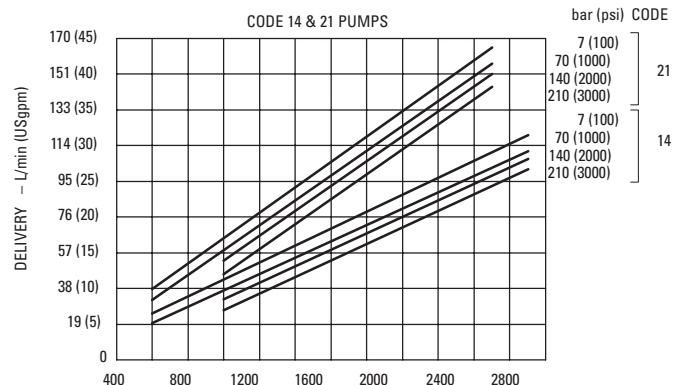
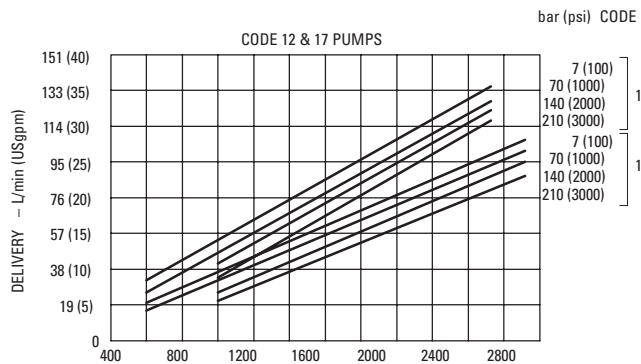
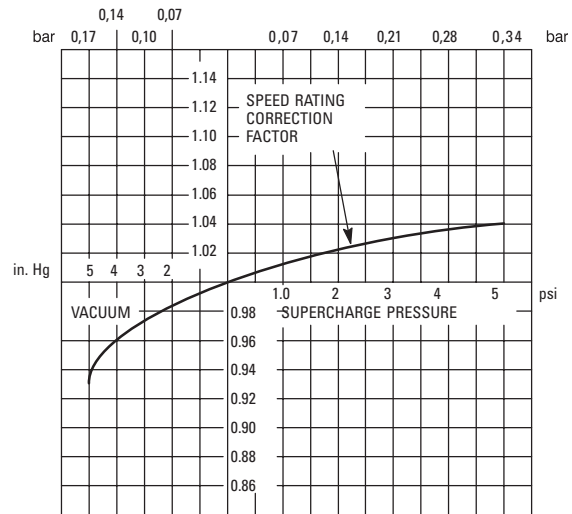
Maximum operating speeds shown on performance curves are for pumps operating at 0 psi inlet condition. To compute maximum operating speeds at other inlet conditions, use appropriate speed rating correction factor.

Example:

Max. speed @ 0 psi inlet 2700 r/min
 Correction factor @ 5 in. Hg $\times .93$
 Max. speed @ 5 in. Hg inlet 2511 r/min

Pump inlet suction should not exceed 5 in. Hg vacuum. Positive pressure on inlet should not exceed 1,4 bar (20 psi).

MAXIMUM OPERATING SPEED CORRECTION FACTORS BASED ON PUMP INLET CONDITIONS



Typical Performance

35VQ Single & 35VQT*S Thru-drive Pumps

Performance Constants:
 SAE 10W fluid @ 82° C (180° F)
 Pump inlet @ 0 psig (14.7 psia)

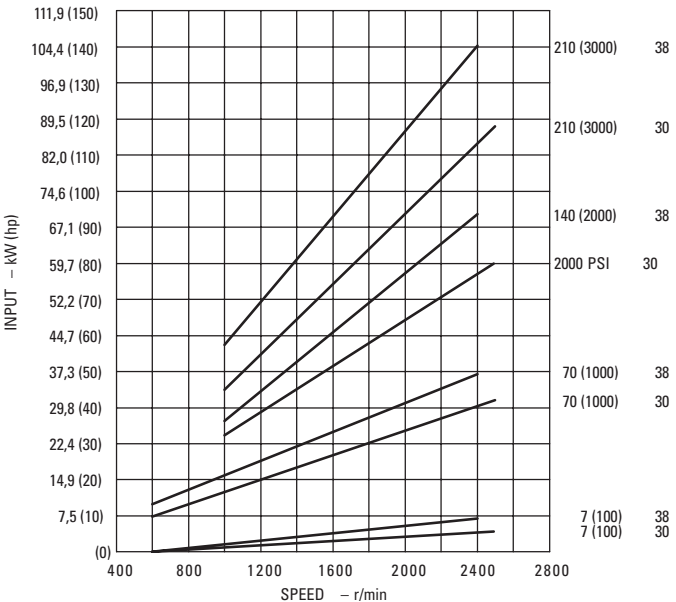
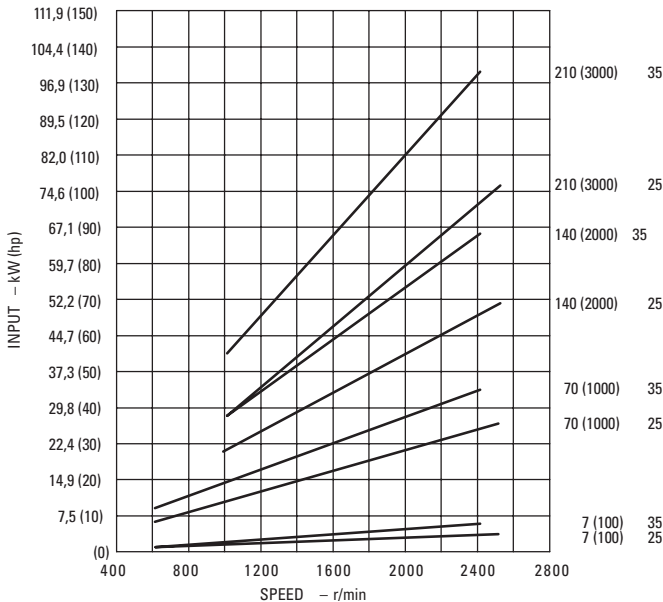
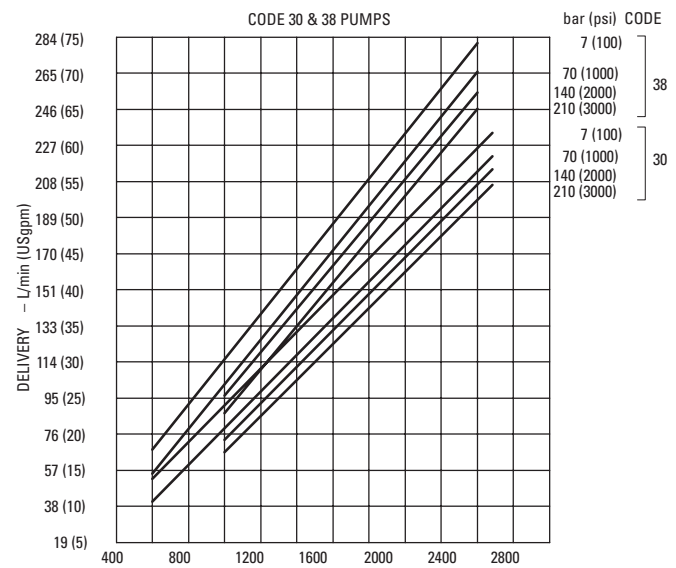
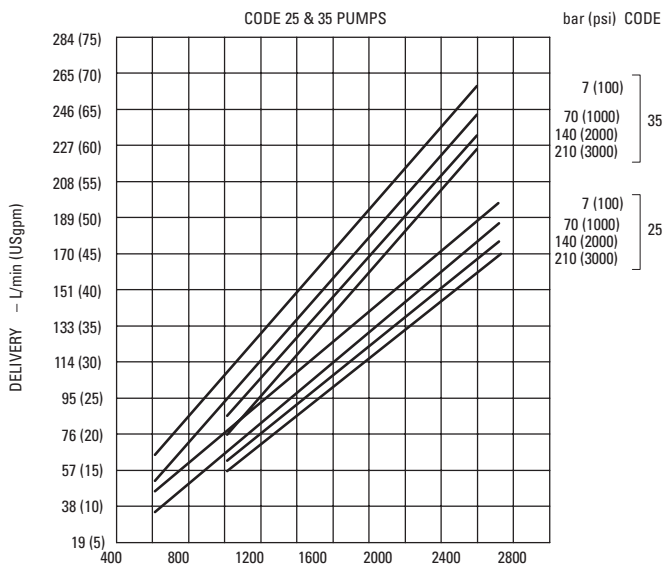
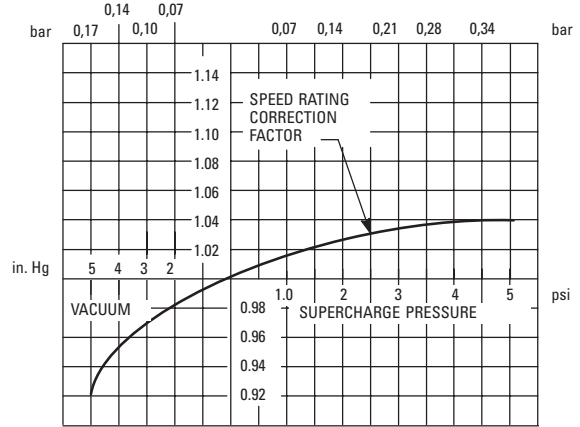
Maximum operating speeds shown on performance curves are for pumps operating at 0 psi inlet condition. To compute maximum operating speeds at other inlet conditions, use appropriate speed rating correction factor.

Example:

Max. speed @ 0 psi inlet 2500 r/min
 Correction factor @ 5 in. Hg $\times .92$
 Max. speed @ 5 in. Hg inlet 2300 r/min

Pump inlet suction should not exceed 5 in. Hg vacuum. Positive pressure on inlet should not exceed 1,4 bar (20 psi).

MAXIMUM OPERATING SPEED CORRECTION FACTORS BASED ON PUMP INLET CONDITIONS



45VQ Single & 45VQT*S Thru-drive Pumps

Performance Constants:
 SAE 10W fluid @ 82° C (180° F)
 Pump inlet @ 0 psig (14.7 psia)

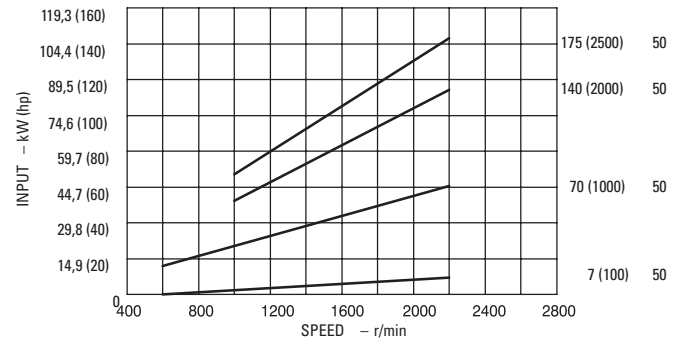
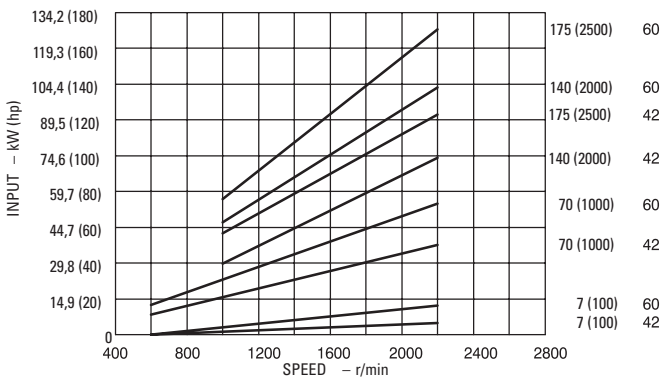
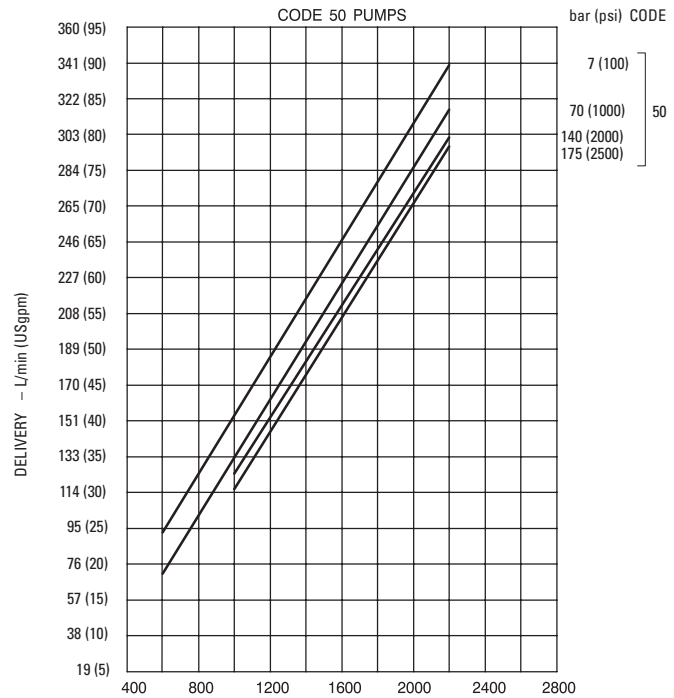
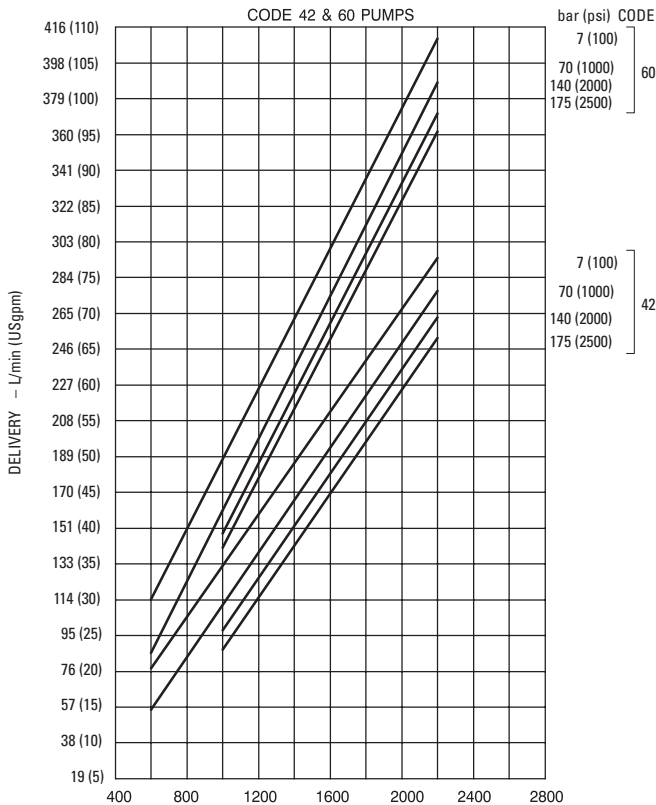
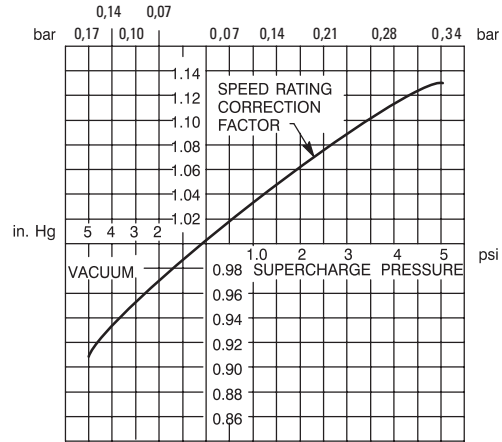
Maximum operating speeds shown on performance curves are for pumps operating at 0 psi inlet condition. To compute maximum operating speeds at other inlet conditions, use appropriate speed rating correction factor.

Example:

Max. speed @ 0 psi inlet 2200 r/min
 Correction factor @ 5 in. Hg $\times .91$
 Max. speed @ 5 in. Hg inlet 2002 r/min

Pump inlet suction should not exceed 5 in. Hg vacuum. Positive pressure on inlet should not exceed 1,4 bar (20 psi).

MAXIMUM OPERATING SPEED CORRECTION FACTORS BASED ON PUMP INLET CONDITIONS



Double Pump Operating Specifications

www.SaarStore.com

Model Series	Shaft End Pump						Cover End Pump						Wt. kg (lb.)
	Delivery USgpm @ 1200 r/min 7 bar (100 psi)	Displ. cm ³ /r (in ³ /r)	Max. r/min	Max. bar (psi)	Typical del. L/min (USgpm) @ max. speed & pressure	Typical input kW (hp) @ max. speed & pressure	Delivery USgpm @ 1200 r/min 7 bar (100 psi)	Displ. cm ³ /r (in ³ /r)	Max. r/min	Max. bar (psi)	Typical del. L/min (USgpm) @ max. speed & pressure	Typical input kW (hp) @ max. speed & pressure	
2520VQ	12	40,2 (2.45)	2700	210 (3000)	88,5 (23)	41,0 (55)	5	18,0 (1.10)	2700	210 (3000)	42,3 (11)	17,9 (24)	20,5 (45)
	14	45,4 (2.77)	2700	210 (3000)	103,8 (27)	46,6 (62.5)	8	27,4 (1.67)	2700	210 (3000)	65,4 (17)	26,1 (35)	
	17	55,2 (3.37)	2500	210 (3000)	119,2 (31)	51,8 (69.5)	11	36,4 (2.22)	2700	210 (3000)	88,5 (23)	35,4 (47.5)	
	21	67,7 (4.12)	2500	210 (3000)	146,2 (38)	61,9 (83)	12	39,5 (2.41)	2700	160 (2300)	98,1 (25.5)	28,4 (38)	
3520VQ	25	81,6 (4.98)	2500	210 (3000)	173,1 (45)	75,3 (101)	5	18,0 (1.10)	2500	210 (3000)	38,5 (10)	16,5 (22)	34,0 (75)
	30	97,7 (5.96)	2500	210 (3000)	211,5 (55)	87,7 (117.5)	8	27,4 (1.67)	2500	210 (3000)	61,5 (16)	24,0 (32.5)	
	35	112,8 (6.88)	2400	210 (3000)	230,8 (60)	98,5 (132)	11	36,4 (2.22)	2500	210 (3000)	80,8 (21)	33,0 (44)	
	38	121,6 (7.42)	2400	210 (3000)	250,0 (65)	104,4 (140)	12	39,5 (2.41)	2500	160 (2300)	90,4 (23.5)	26,1 (35)	
3525VQ	25	81,6 (4.98)	2500	210 (3000)	173,1 (45)	75,3 (101)	12	40,2 (2.45)	2500	210 (3000)	79,5 (21)	38,0 (51)	34,5 (76)
	30	97,7 (5.96)	2500	210 (3000)	211,5 (55)	87,7 (117.5)	14	45,4 (2.77)	2500	210 (3000)	91,0 (24)	43,0 (58)	
	35	112,8 (6.88)	2400	210 (3000)	230,8 (60)	98,5 (132)	17	55,2 (3.37)	2500	210 (3000)	119,2 (31)	51,5 (69)	
	38	121,6 (7.42)	2400	210 (3000)	250,0 (65)	104,4 (140)	21	67,5 (4.12)	2500	210 (3000)	146,2 (38)	61,9 (83)	
4520VQ	42	138,7 (8.46)	2200	175 (2500)	255,8 (66.5)	91,4 (122.5)	5	18,0 (1.10)	2200	210 (3000)	32,0 (8.5)	14,5 (19.5)	43,0 (94)
	50	162,3 (9.90)	2200	175 (2500)	303,8 (79)	105,2 (141)	8	27,4 (1.67)	2200	210 (3000)	51,0 (13.5)	21,0 (28.5)	
	60	193,4 (11.80)	2200	175 (2500)	369,2 (96)	126,8 (170)	11	36,4 (2.22)	2200	210 (3000)	68,0 (18)	28,5 (38.5)	
							12	39,5 (2.41)	2200	160 (2300)	77,5 (20.5)	23,0 (31)	
4525VQ	42	138,7 (8.46)	2200	175 (2500)	255,8 (66.5)	91,4 (122.5)	12	40,2 (2.45)	2200	210 (3000)	68,0 (18)	33,0 (44)	46,0 (101)
	50	162,3 (9.90)	2200	175 (2500)	303,8 (79)	105,2 (141)	14	45,4 (2.77)	2200	210 (3000)	79,5 (21)	38,0 (51)	
	60	193,4 (11.80)	2200	175 (2500)	369,2 (96)	126,8 (170)	17	55,2 (3.37)	2200	210 (3000)	100,0 (26.5)	45,5 (61)	
							21	67,5 (4.12)	2200	210 (3000)	125,0 (33)	54,5 (73)	
4535VQ	42	138,7 (8.46)	2200	175 (2500)	255,8 (66.5)	91,4 (122.5)	25	81,6 (4.98)	2200	210 (3000)	145,5 (38.5)	66,5 (89)	53,6 (118)
	50	162,3 (9.90)	2200	175 (2500)	303,8 (79)	105,2 (141)	30	97,7 (5.96)	2200	210 (3000)	178,0 (47)	77,5 (104)	
	60	193,4 (11.80)	2200	175 (2500)	369,2 (96)	126,8 (170)	35	112,8 (6.88)	2200	210 (3000)	211,5 (55)	89,5 (120)	
							38	121,6 (7.42)	2200	210 (3000)	223,0 (59)	97,0 (130)	

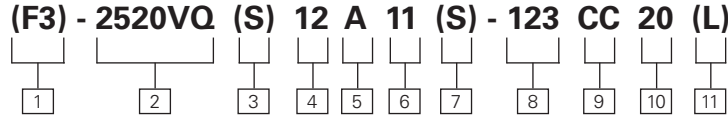
Performance constants: SAE 10W fluid @ 82°C (180° F); pump inlet @ 0 PSIG (14.7 PSIA)

Note: Outlet pressure must always be higher than inlet pressure. See page 7 for details.

Model Codes

Double Pump (without integral valves)

www.SaarStore.com



1 F3 - Viton seals

Omit if not required.

2 Intravane pump series

2520VQ	3525VQ	4525VQ
3520VQ	4520VQ	4535VQ

3 Pilot designation

S – SAE per ISO 3019/1 (SAE J744)

Omit for standard pilot.

4 Geometric displacement shaft end pump

Code = SAE rating (USgpm) at 1200 r/min and 7 bar (100 psi)

Frame Size	Code (USgpm)	cm ³ /r	in ³ /r
2520VQ	12	40,2	2.45
	14	45,4	2.77
	17	55,2	3.37
	21	67,5	4.12

35**VQ	25	81,6	4.98
	30	97,7	5.96
	35	112,8	6.88
	38	121,6	7.42

45**VQ	42	138,7	8.46
	50	162,3	9.90
	60	193,4	11.80

Note: For options other than listed in the model code, i.e. shafts, ports, displacements and mountings, contact your Vickers representative.

6 Geometric displacement - cover end pump

Code = SAE rating (USgpm) at 1200 r/min and 7 bar (100 psi)

Frame Size	Code (USgpm)	cm ³ /r	in ³ /r
**20VQ	5	18,0	1.10
	8	27,4	1.67
	11	36,4	2.22
	12	39,5	2.41
	14	45,9	2.80

**25VQ	12	40,2	2.45
	14	45,4	2.77
	17	55,2	3.37
	21	67,5	4.12

4535VQ	25	81,6	4.98
	30	97,7	5.96
	35	112,8	6.88
	38	121,6	7.42

7 Mounting & shaft seal assembly

S – Flange mount and double shaft seal

Omit for flange mount with single shaft seal.

8 Shaft type

With standard pilot, single shaft seal

- 1** – Straight keyed
- 11** – Splined
- 86** – Straight keyed, heavy duty

With standard pilot, double shaft seal

- 123** – Splined (not available on 45**VQ)
- 130** – Splined (for 45**VQ only)

With SAE pilot, single or double shaft seal

- 203** – Straight keyed, heavy duty
- 297** – Splined

9 Port orientation

(Viewed from cover end of pump)

All series except 4535VQ

With No.1 outlet opposite inlet:

AA - No. 2 outlet 135° CCW from inlet

AB - No. 2 outlet 45° CCW from inlet

AC - No. 2 outlet 45° CW from inlet

AD - No. 2 outlet 135° CW from inlet

With No.1 outlet 90° CCW from inlet:

BA - No. 2 outlet 135° CCW from inlet

BB - No. 2 outlet 45° CCW from inlet

BC - No. 2 outlet 45° CW from inlet

BD - No. 2 outlet 135° CW from inlet

With No.1 outlet inline with inlet:

CA - No. 2 outlet 135° CCW from inlet

CB - No. 2 outlet 45° CCW from inlet

CC - No. 2 outlet 45° CW from inlet

CD - No. 2 outlet 135° CW from inlet

With No.1 outlet 90° CW from inlet:

DA - No. 2 outlet 135° CCW from inlet

DB - No. 2 outlet 45° CCW from inlet

DC - No. 2 outlet 45° CW from inlet

DD - No. 2 outlet 135° CW from inlet

Series 4535VQ

With No.1 outlet opposite inlet:

AA - No. 2 outlet opposite inlet

AB - No. 2 outlet 90° CCW from inlet

AC - No. 2 outlet inline with inlet

AD - No. 2 outlet 90° CW from inlet

With No.1 outlet 90° CW from inlet:

BA - No. 2 outlet opposite inlet

BB - No. 2 outlet 90° CCW from inlet

BC - No. 2 outlet inline with inlet

BD - No. 2 outlet 90° CW from inlet

With No.1 outlet inline with inlet:

CA - No. 2 outlet opposite inlet

CB - No. 2 outlet 90° CCW from inlet

CC - No. 2 outlet inline inlet

CD - No. 2 outlet 90° CW from inlet

With No.1 outlet 90° CW from inlet:

DA - No. 2 outlet opposite inlet

DB - No. 2 outlet 90° CCW from inlet

DC - No. 2 outlet inline with inlet

DD - No. 2 outlet 90° CW from inlet

5 Port connections

Pump series	Code	Inlet	Outlet no.1	Outlet no. 2
All	A	SAE 4-bolt flg	SAE 4-bolt flg.	SAE 4-bolt flg.
All	AM*	Metric 4-bolt flg.	Metric 4-bolt flg.	Metric 4-bolt flg.
2520VQ	C	SAE 4-bolt flg.	SAE str. thd.	SAE str. thd.
All but 4535VQ	E	SAE 4-bolt flg.	SAE 4-bolt flg.	SAE str. thd.
2520VQ	F	SAE 4-bolt flg.	SAE str. thd.	SAE 4-bolt flg.

*Same as code "A" port connections, except metric threads for fastening flanges.

10 Design

11 Shaft Rotation

(Viewed from shaft end of pump)

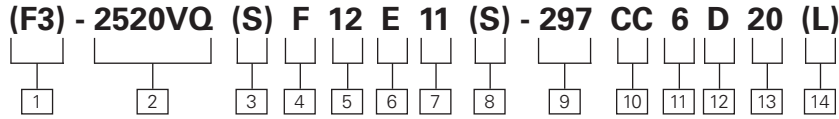
L – Left hand (counterclockwise)

Omit for right hand.

Model Codes

Double Pump (without integral valves)

www.SaarStore.com



1 F3 - Viton seals
Omit if not required.

2 Intravane pump series

2520VQ	3525VQ	4525VQ
--------	--------	--------

3 Pilot designation
S – SAE per ISO 3019/1 (SAE J744)
Omit for standard pilot.

4 Integral valve options
F – Flow control and relief
P – Priority valve and relief

5 Geometric displacement shaft end pump
Code = SAE rating (USgpm) at 1200 r/min and 7 bar (100 psi)

Frame	Code		
Size	(USgpm)	cm ³ /r	in ³ /r
2520VQ	12	40,2	2.45
	14	45,4	2.77
	17	55,2	3.37
	21	67,5	4.12
3520VQ	25	81,6	4.98
	30	97,7	5.96
	35	112,8	6.88
	38	121,6	7.42
4520VQ	42	138,7	8.46
	50	162,3	9.90
	60	193,4	11.80

6 Port connections

Pump series	Code	Inlet	Outlet no. 1	Outlet(s) no. 2	Tank
2520VQ only	C	SAE 4-bolt flg.	SAE str. thd.	SAE str. thd.	SAE str. thd.
All pumps	E	SAE 4-bolt flg.	SAE 4-bolt flg.	SAE str. thd.	SAE str. thd.

7 Geometric displacement - cover end pump
Code = SAE rating (USgpm) at 1200 r/min and 7 bar (100 psi)

Frame	Code		
Size	(USgpm)	cm ³ /r	in ³ /r
**20VQ	5	18,0	1.10
	8	27,4	1.67
	11	36,4	2.22
	12	39,5	2.41
	14	45,9	2.80

8 Mounting & shaft seal assembly
S – Flange mount and double shaft seal
Omit for flange mount with single shaft seal.

9 Shaft type
With standard pilot, single shaft seal
1 – Straight keyed
11 – Splined
86 – Straight keyed, heavy duty
With standard pilot, double shaft seal
123 – Splined (not available on 4520VQ)
130 – Splined (for 4520VQ only)

With SAE pilot, single or double shaft seal
203 – Straight keyed, heavy duty
297 – Splined

10 Port orientation
(Viewed from cover end of pump)
With No.1 outlet opposite inlet:
AA - No. 2 outlet 135° CCW from inlet
AB - No. 2 outlet 45° CCW from inlet
AC - No. 2 outlet 45° CW from inlet
AD - No. 2 outlet 135° CW from inlet
With No.1 outlet 90° CCW from inlet:
BA - No. 2 outlet 135° CCW from inlet
BB - No. 2 outlet 45° CCW from inlet
BC - No. 2 outlet 45° CW from inlet
BD - No. 2 outlet 135° CW from inlet
With No.1 outlet inline with inlet:
CA - No. 2 outlet 135° CCW from inlet
CB - No. 2 outlet 45° CCW from inlet
CC - No. 2 outlet 45° CW from inlet
CD - No. 2 outlet 135° CW from inlet
With No.1 outlet 90° CW from inlet:
DA - No. 2 outlet 135° CCW from inlet
DB - No. 2 outlet 45° CCW from inlet
DC - No. 2 outlet 45° CW from inlet
DD - No. 2 outlet 135° CW from inlet

11 Controlled flow rate – USgpm
2, 4, 6, 7, 8, 10 or 12 USgpm

12 Relief valve setting – bar (psi)

C – 52 (750)	G – 121 (1750)
D – 70 (1000)	H – 140 (2000)
E – 86 (1250)	J – 155 (2250)
F – 100 (1500)	K – 175 (2500)

13 Design
(Viewed from shaft end of pump)
L - Left hand (counterclockwise)
Omit for right hand.

14 Shaft Rotation
(Viewed from shaft end of pump)
L – Left hand (counterclockwise)
Omit for right hand.

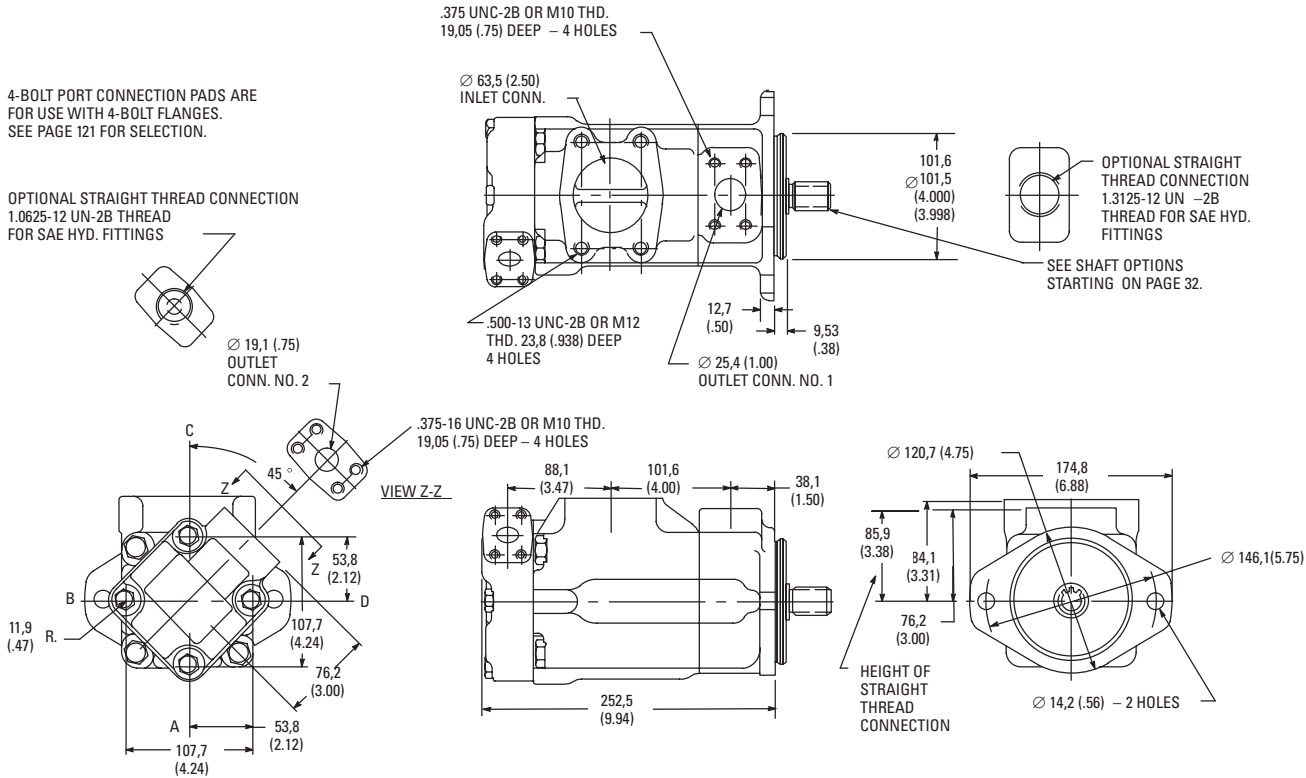
Note: For options other than listed in the model code, i.e. shafts, ports, displacements and mountings, contact your Vickers representative.

Installation Dimensions

www.SaarStore.com

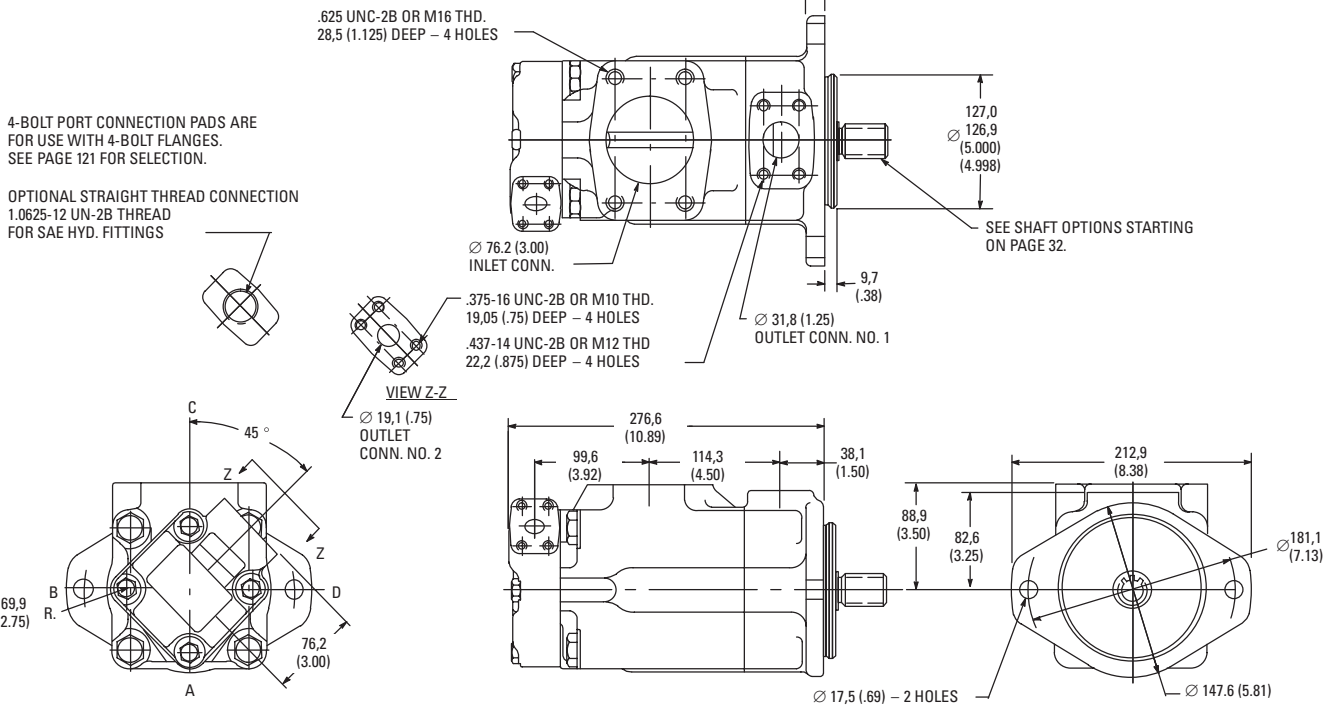
2520VQ Series

Dimensions in millimeters (inches)



3520VQ Series

Dimensions in millimeters (inches)

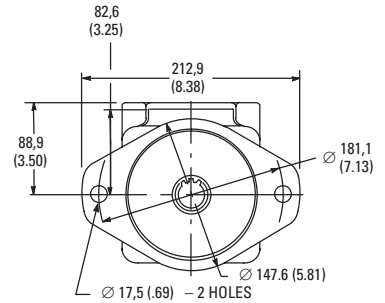
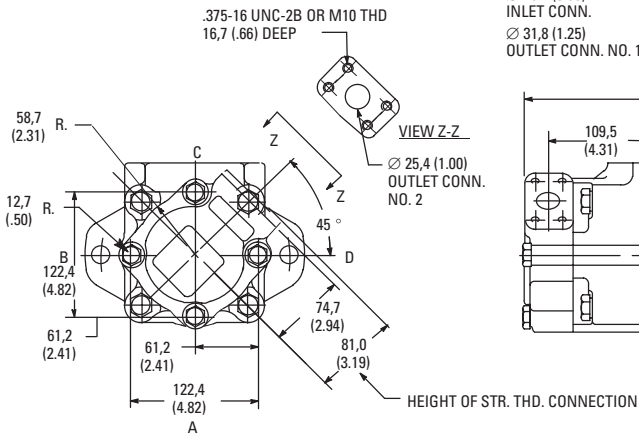
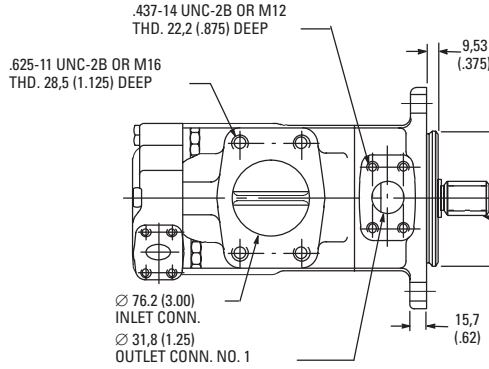
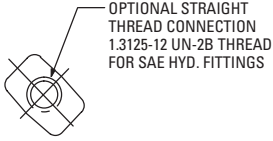


Installation Dimensions

3525VQ Series

Dimensions in millimeters (inches)

4-BOLT PORT CONNECTION PADS ARE FOR USE WITH 4-BOLT FLANGES. SEE PAGE 121 FOR SELECTION.

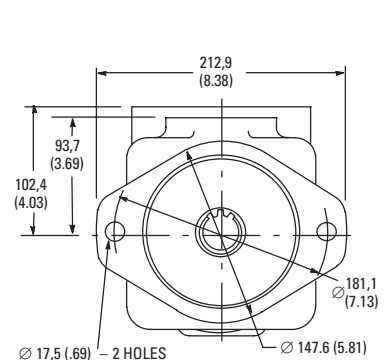
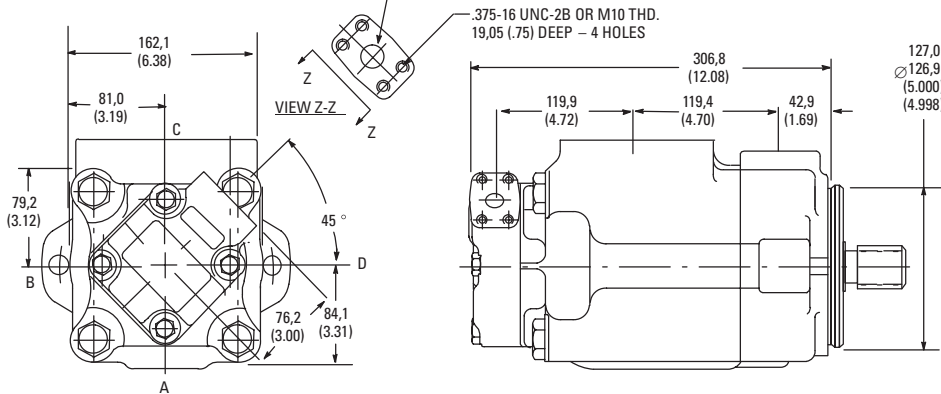
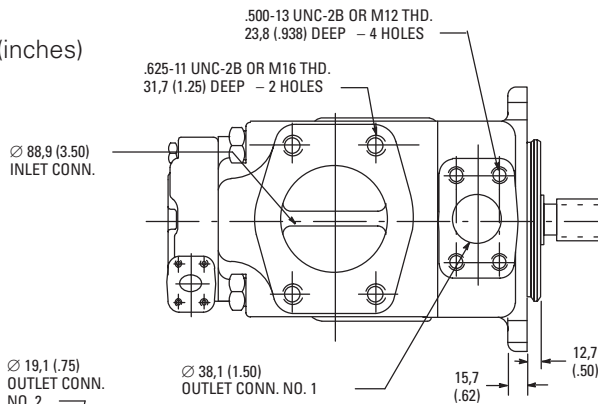


4520VQ Series

Dimensions in millimeters (inches)

4-BOLT PORT CONNECTION PADS ARE FOR USE WITH 4-BOLT FLANGES. SEE PAGE 121 FOR SELECTION.

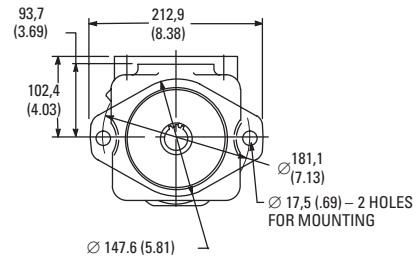
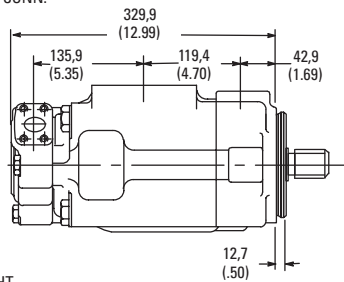
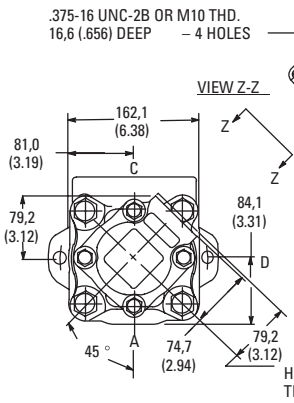
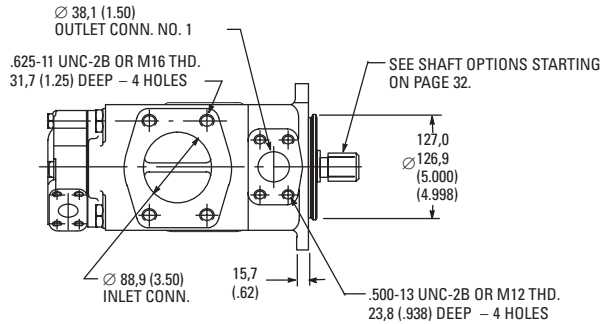
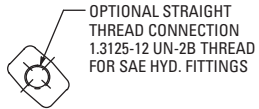
OPTIONAL STRAIGHT THREAD CONNECTION
1.0625-12 UN-2B THREAD
FOR SAE HYD. FITTINGS



4525VQ Series

Dimensions in millimeters (inches)

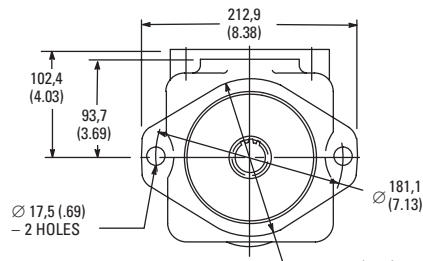
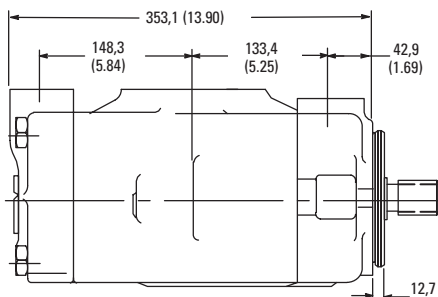
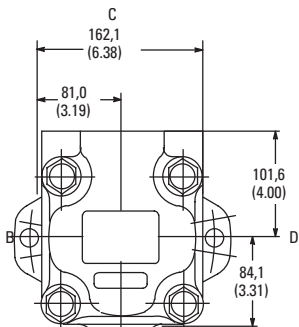
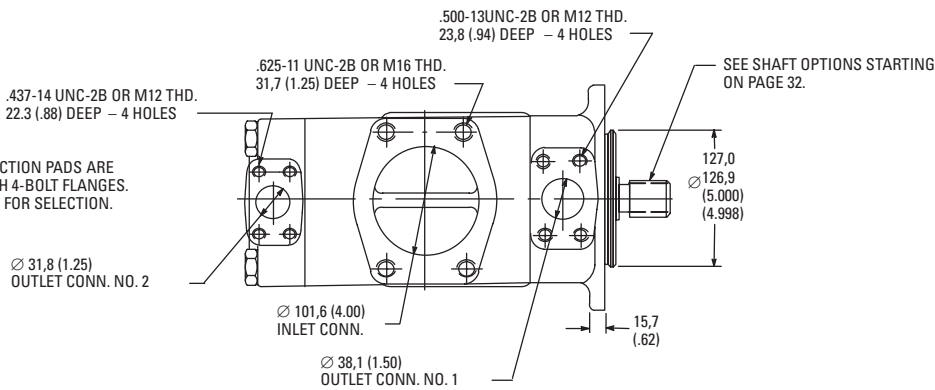
4-BOLT PORT CONNECTION PADS ARE FOR USE WITH 4-BOLT FLANGES. SEE PAGE 121 FOR SELECTION.



4535VQ Series

Dimensions in millimeters (inches)

PORT CONNECTION PADS ARE FOR USE WITH 4-BOLT FLANGES. SEE PAGE 121 FOR SELECTION.



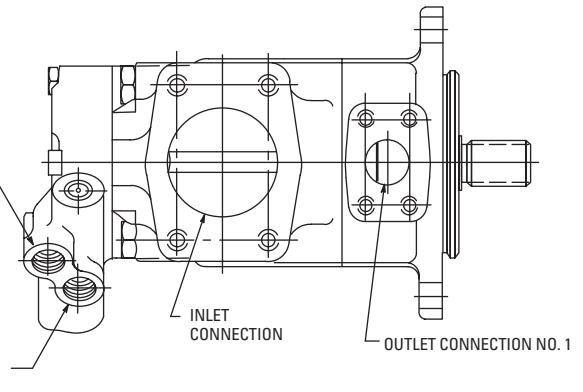
Installation Dimensions

Pumps with flow control cover

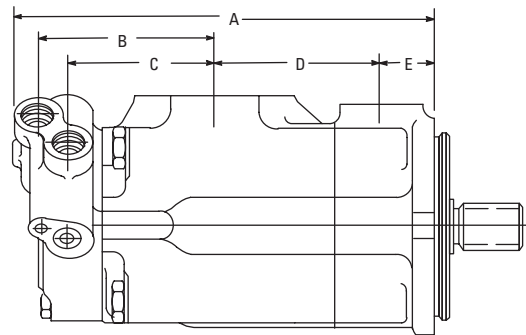
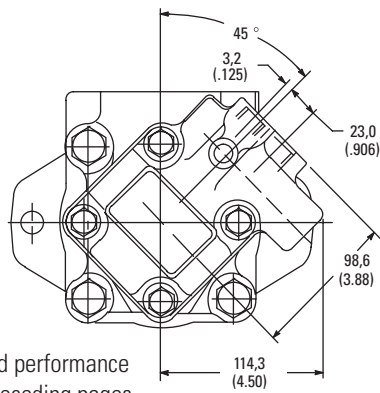
Dimensions in millimeters (inches)

Model series	A	B	Dimensions C	D	E
2520VQF	265,9 (10.47)	108,7 (4.28)	88,1 (3.47)	101,6 (4.00)	38,1 (1.50)
3520VQF	289,8 (11.41)	120,1 (4.73)	99,6 (3.92)	114,3 (4.50)	38,1 (1.50)
4520VQF	320,3 (12.61)	140,5 (5.53)	119,9 (4.72)	119,4 (4.70)	42,9 (1.69)

OUTLET CONNECTION NO. 2
.750-16 UNF-2B THD.



TANK CONNECTION
.875-14 UNF-2B THD.



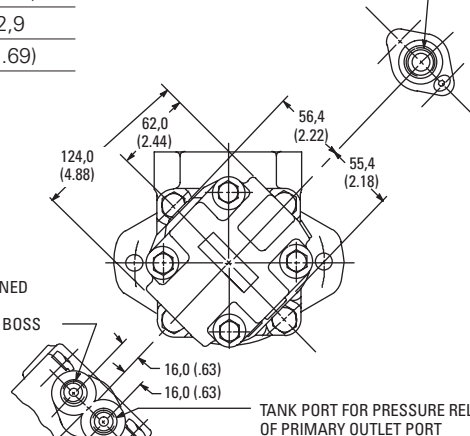
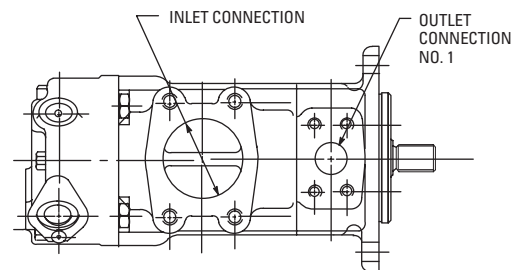
Note: For installation dimensions and performance data of basic pump series, refer to preceding pages.

Pumps with priority valve cover

Dimensions in millimeters (inches)

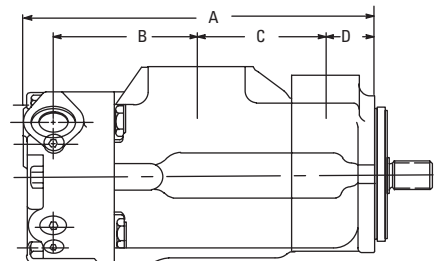
Model series	A	Dimensions B	C	D
2520VQP	276,6 (10.89)	113,0 (4.45)	101,6 (4.00)	38,1 (1.50)
3520VQP	300,7 (11.84)	124,5 (4.90)	114,3 (4.50)	38,1 (1.50)
4520VQP	331,0 (13.03)	144,8 (5.70)	119,4 (4.70)	42,9 (1.69)

SECONDARY OUTLET PORT
.875-14 UNF-2B THD PORT
MACHINED TO .62 TUBE SIZE
PER SAE SPEC FOR STRAIGHT
THD "O" RING BOSS.



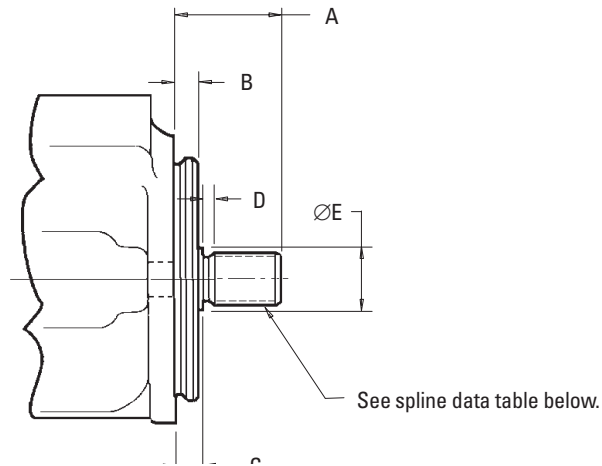
#2 PRIMARY OUTLET PORT
.750-16 UNF-2B THD. PORT MACHINED
TO .50 TUBE SIZE PER SAE SPEC.
FOR STRAIGHT THREAD "O" RING BOSS

TANK PORT FOR PRESSURE RELIEF
OF PRIMARY OUTLET PORT



Splined Shafts

Dimensions in millimeters (inches)



Pump	Shaft Code	A	B	C	D	ØE	Spline Data (See below.)
2520VQ	11	44,5 (1.75)	9,53 (.375)	11,1 (.437)	4,1 (.16)	27,8 (1.09)	A
2520VQF,	123	44,5 (1.75)	9,53 (.375)	15,7 (.62)	4,1 (.16)	27,8 (1.09)	A
2520VQP	297	41,1 (1.62)	9,53 (.375)	7,9 (.31)	6,4 (.25)	27,8 (1.09)	C
3520VQ,							
3520VQF,	11	58,7 (2.31)	9,53 (.375)	11,1 (.437)	6,4 (.25)	35,1 (1.38)	D
3520VQP,	123	58,7 (2.31)	9,53 (.375)	15,2 (.60)	5,5 (.21)	35,1 (1.38)	D
3525VQ	297	55,5 (2.19)	12,7 (.500)	7,9 (.31)	5,5 (.21)	35,1 (1.38)	E
4520VQ,							
4520VQF,							
4520VQP,	11	61,9 (2.44)	12,7 (.500)	14,3 (.565)	9,7 (.38)	39,6 (1.56)	D
4525VQ,	130	61,9 (2.44)	12,7 (.500)	15,2 (.60)	9,9 (.39)	40,4 (1.59)	D
4535VQ	297	55,5 (2.19)	12,7 (.500)	7,9 (.31)	6,4 (.25)	39,6 (1.56)	E

Spline Data Table

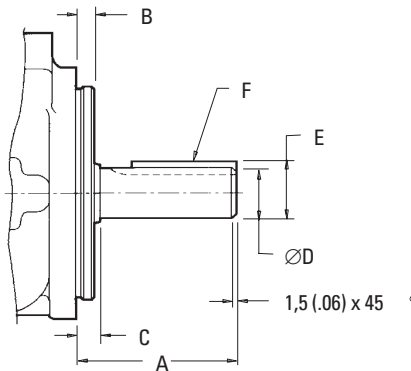
(Involute splines from above chart)

Spline Data Reference	Number of Teeth	Pitch	Major Diameter	Form Diameter	Minor Diameter	Minor Diameter
A	13	16/32	22,17 (.873) 22,15 (.872)	19,03 (.749)	18,16 (.715)	Major dia. fit
C	13	16/32	21,8 (.858) 21,6 (.852)	19,03 (.749)	18,16 (.715)	Side fit
D	14	12/24	31,70 (1.248) 31,67 (1.247)	27,4 (1.08)	26,42 (1.040)	Major dia. fit
E	14	12/24	31,2 (1.229) 31,1 (1.223)	27,4 (1.08)	26,42 (1.040)	Side fit

Optional Shafts

Straight Key Shafts

Dimensions in millimeters (inches)



Pump	Shaft Code	A	B	C	ØD	E	F key width x length
2520VQ,	1	58,7 (2.31)	9,53 (.375)	11,1 (.435)	22,23 (.875) 22,20 (.874)	24,5 (.966) 24,4 (.961)	4,75 (.187) x 32 (1.25)
2520VQF,	86	77,7 (3.06)	9,53 (.375)	11,1 (.435)	25,37 (.999) 25,35 (.998)	28,3 (1.11) 28,1 (1.10)	6,35 (.250) x 50,8 (2.00)
2520VQP	203	77,7 (3.06)	9,53 (.375)	7,9 (.31)▲	25,40 (1.00) 25,35 (.998)	28,20 (1.11) 27,94 (1.10)	6,35 (.250) x 49,2 (1.938)
3520VQ,	1	73,2 (2.88)	9,53 (.375)	11,1 (.435)	31,75 (1.250) 31,70 (1.248)	35,36 (1.39) 34,10 (1.38)	7,94 (.313) x 38,1 (1.50)
3520VQF, 3520VQP,	86	85,9(3.38)	9,53 (.375)	11,1 (.435)	34,90 (1.374) 34,87 (1.373)	38,6 (1.52) 38,3 (1.51)	7,92 (.312) x 54 (2.13)
3525VQ	203	84,1 (3.31)	12,7 (.500)	7,9 (.31)▲	34,90 (1.374) 34,87 (1.373)	38,6 (1.52) 38,3 (1.51)	7,92 (.312) x 54 (2.125)
4520VQ, 4520VQF,	1	62,0 (2.44)	12,7 (.500)	14,22 (.560)	31,75 (1.250) 31,70 (1.248)	35,36 (1.39) 34,10 (1.38)	7,92 (.312) x 28,5 (1.12)
4520VQP, 4525VQ,	86	87,4 (3.44)	12,7 (.500)	14,22 (.560)	38,07 (1.499) 38,05 (1.498)	42,4 (1.67) 42,1 (1.66)	9,53 (.375) x 50,8 (2.00)
4535VQ	203	90,4 (3.56)	12,7 (.500)	7,9 (.31)▲	38,07 (1.499) 38,05 (1.498)	42,4 (1.67) 42,1 (1.66)	9,53 (.375) x 57,1 (2.25)

▲ Shaft shoulder inside recess in pilot.

Typical Performance

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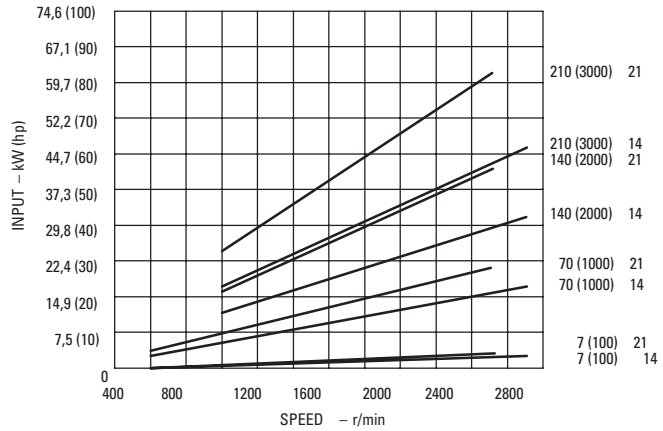
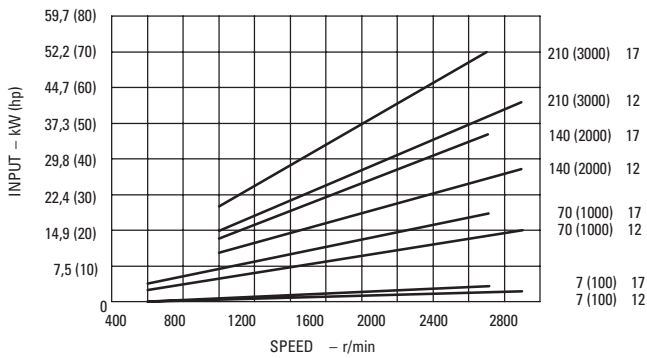
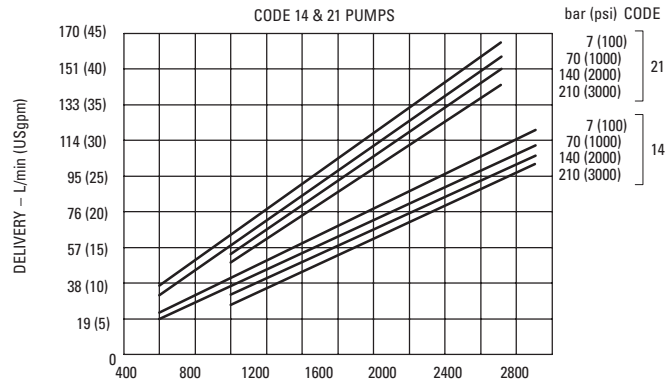
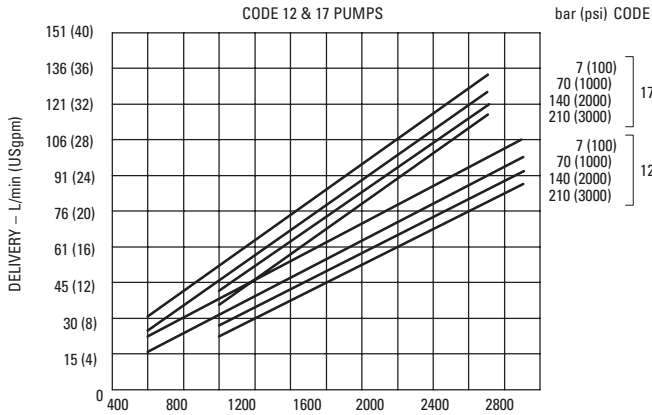
Shaft End Pumps

2520VQ Double Pumps & 2520VQV10 Triple Pumps

Performance Constants:

SAE 10W fluid @ 82°C (180°F)

Pump inlet @ 0 psig (14.7 psia)

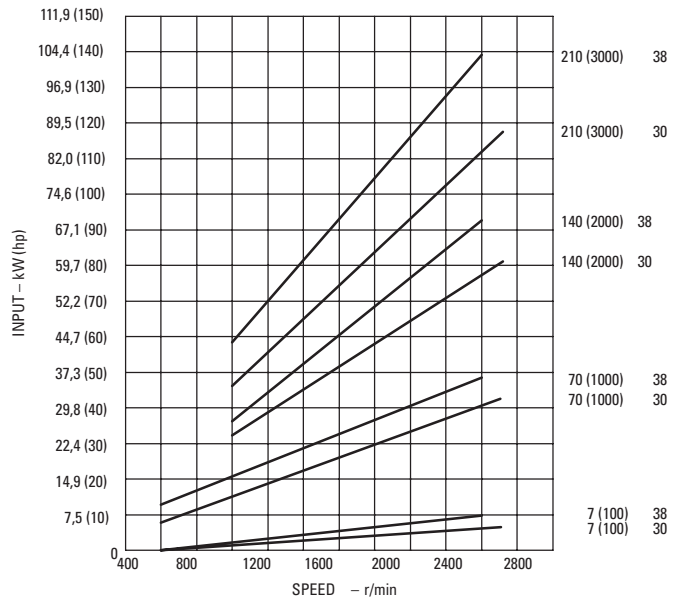
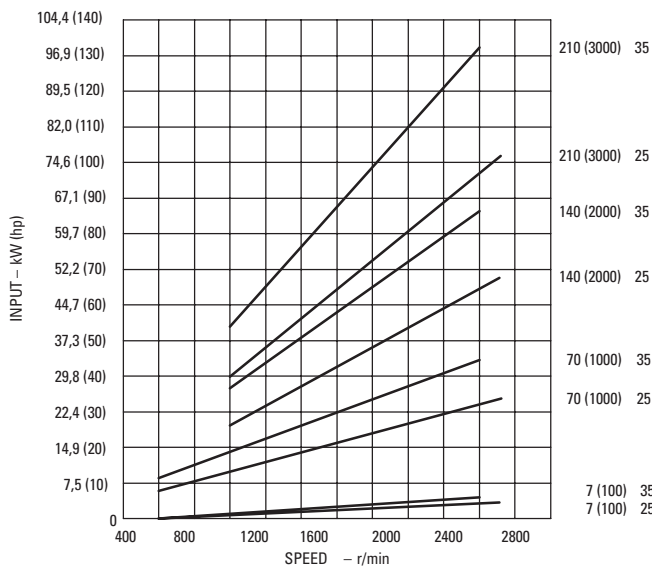
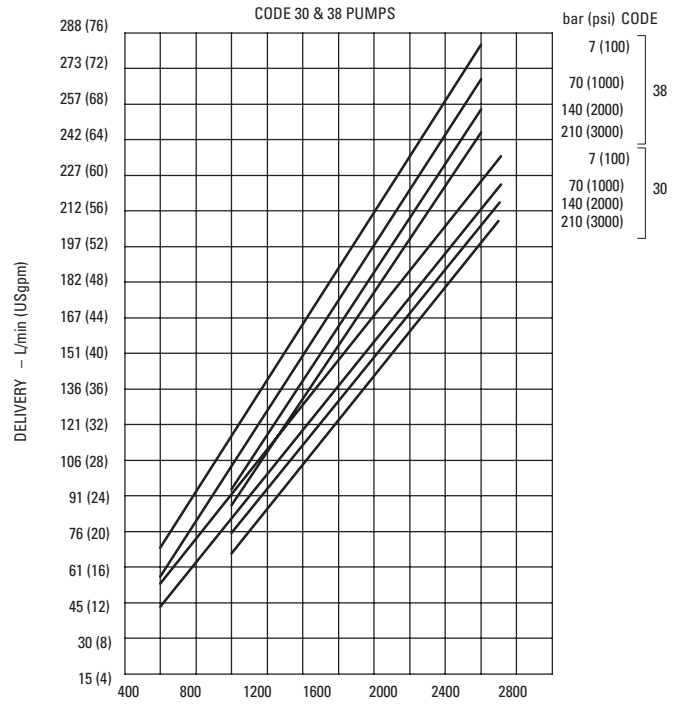
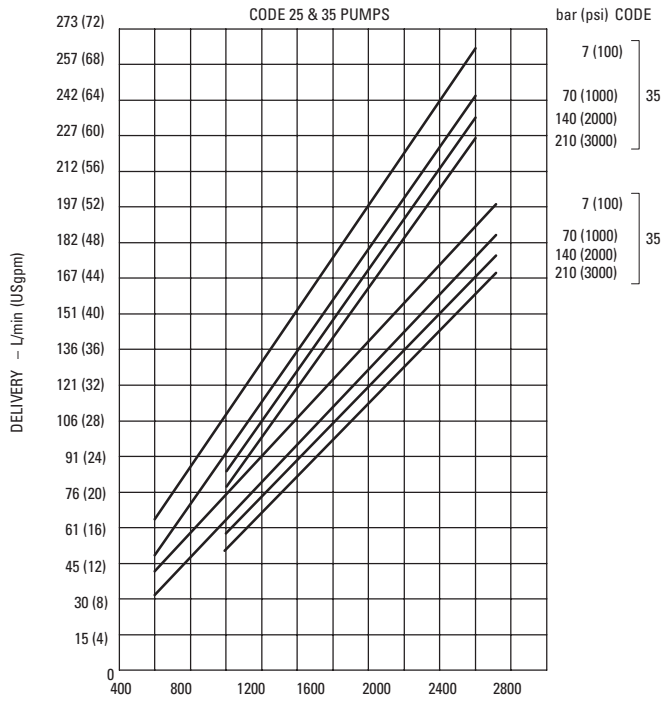


Typical Performance

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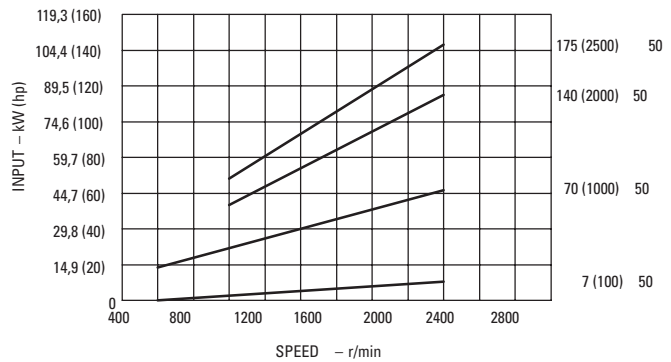
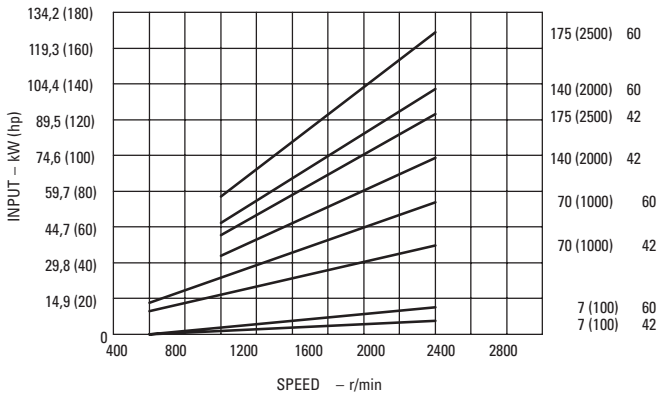
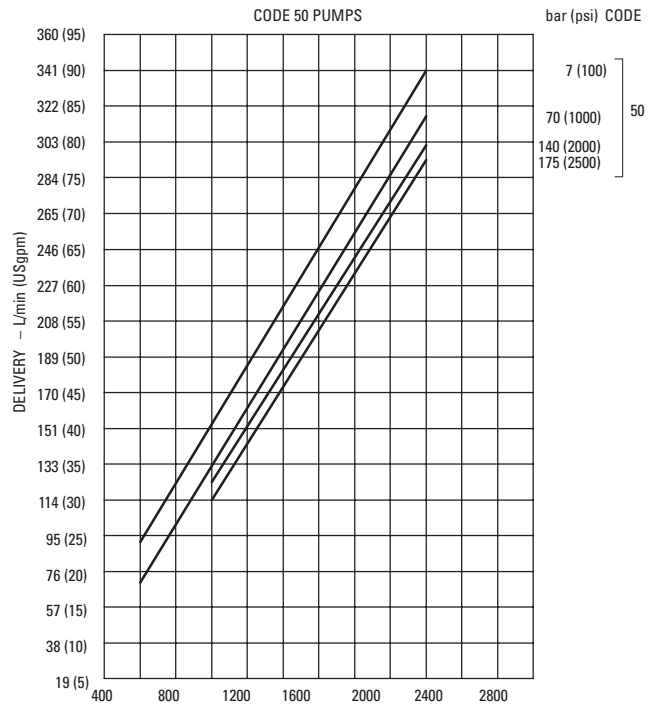
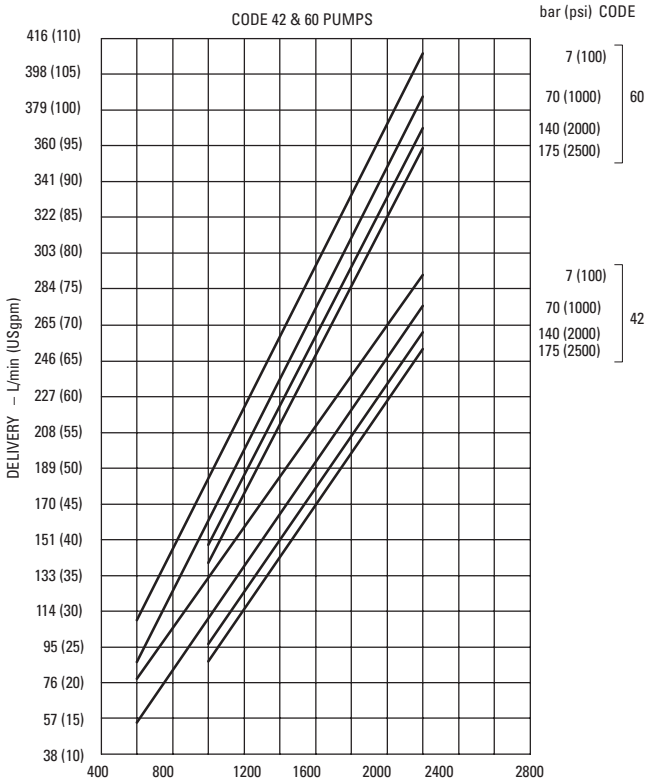
Shaft End Pumps 3520VQ & 3525VQ Double Pumps, 352*VQV10 Triple Pumps, 3525VQT Double Thru-drive Pumps

Performance Constants:
SAE 10W fluid @ 82°C (180°F)
Pump inlet @ 0 psig (14.7 psia)



**Shaft End Pumps 4520VQ, 4525VQ & 4535VQ Double Pumps,
45*5VQV10 Triple Pumps, 4525VQT Double Thru-drive Pumps**

Performance Constants:
SAE 10W fluid @ 82°C (180°F)
Pump inlet @ 0 psig (14.7 psia)



Typical Performance

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Cover-end Pumps of 2520VQ Double Pumps & Center Pumps of 2520VQV10 Triple Pumps

Performance Constants:
 SAE 10W fluid @ 82°C (180°F)
 Pump inlet @ 0 psig (14.7 psia)

