

Genuine Metaris Vane Product Technical Catalog

Pumps & Components - V10/V20, VTM, V, VQ, VQH Series



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Cross-referenced parts from the Original Equipment Manufacturer "OEM" are listed for information purposes only. Trademarks identifying these parts for cross-reference are those of each OEM and are the property of their owners and are not used, or authorized for use, by Hydralex or its affiliates. Hydralex is not affiliated with the Original Equipment Manufacturer "OEM" or licensed or authorized to produce unit or parts for the OEM. All units and parts offered in this catalog are manufactured by Hydralex and not by the OEM.

V10/V20 Series

Features

Balanced vane type pumps are excellent for medium- to low-pressure mobile and industrial applications. Available with integrated flow control valves to simplify system design and installation, these pumps are commonly used as pilot and auxiliary pumps for complex systems, and on heavy-duty trucks and interstate buses. Compact size and ease of service allow maximum equipment design flexibility.

- High Performance
- Pressure-balanced
- Low Cost/Economical
- Engineered for Extended Life
- Versatile and Low Noise



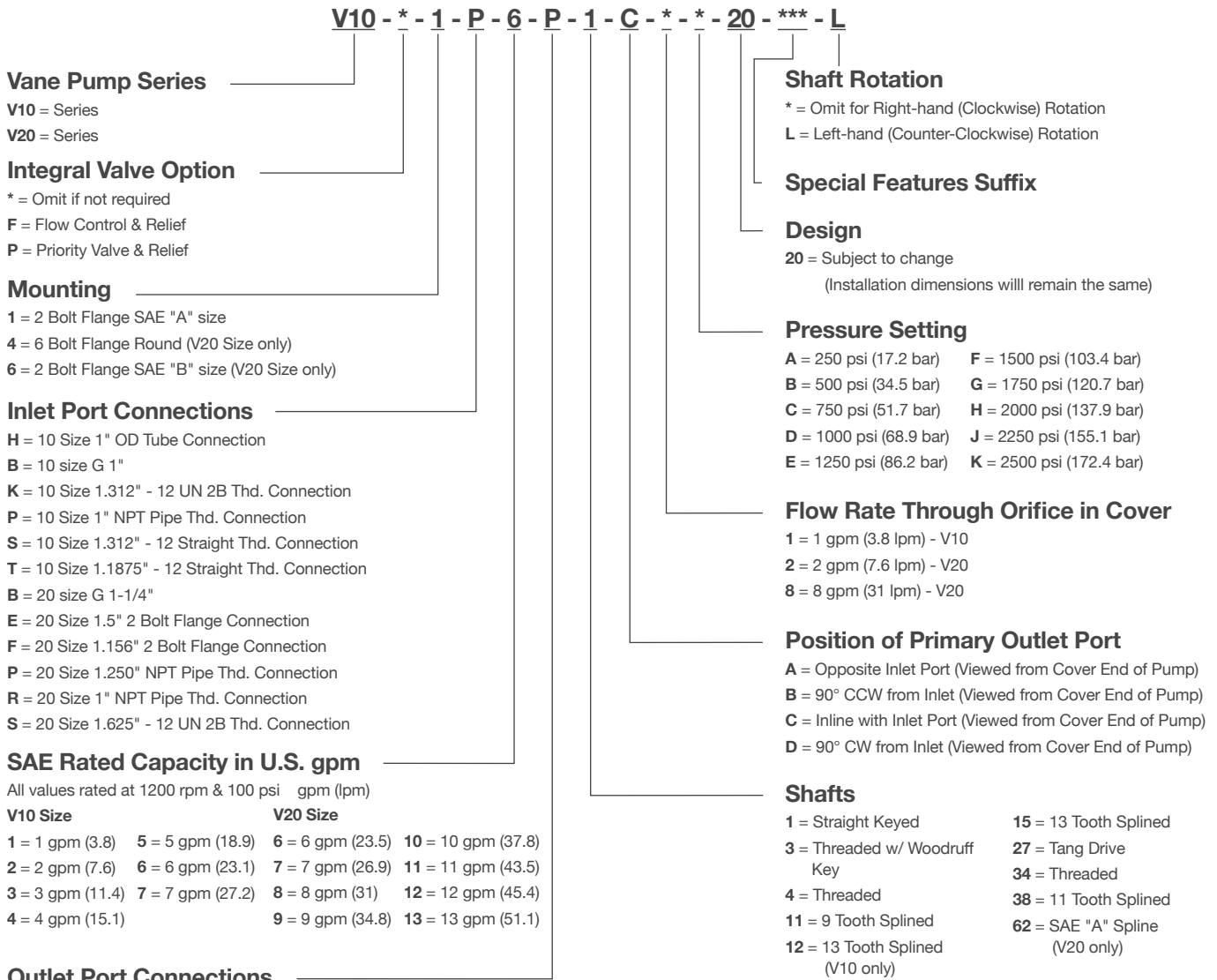
Specifications

PUMP	FLOW IN GPM @ 1200 RPM & 100 PSI (LPM)	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM)	MAX. PRESSURE PSI (BAR)	TYP. DELIVERY GPM @ MAX. SPEED & PRESSURE (LPM)	TYPICAL INPUT POWER HP @ MAX. SPEED & PRESSURE (KW)	WEIGHT LBS (KG)
V10	1 (3.8)	0.20 (3.3)	4800	2500 (172)	3.60 (13.6)	7.00 (5.2)	10-15 (4.5-6.8)
	2 (7.6)	0.40 (6.6)	4500	2500 (172)	7.30 (27.6)	13.6 (10.1)	
	3 (11.4)	0.60 (9.8)	4000	2500 (172)	9.40 (35.6)	17.8 (13.3)	
	4 (15.1)	0.80 (13.1)	3400	2500 (172)	10.9 (41.3)	20.4 (15.2)	
	5 (18.9)	1.00 (16.4)	3200	2500 (172)	12.8 (48.5)	22.8 (17)	
	6 (23.1)	1.19 (19.5)	3000	2200 (152)	14.6 (55.3)	24.5 (18.3)	
	7 (27.2)	1.39 (22.8)	2800	2000 (138)	16.0 (60.6)	24.0 (17.9)	
V20	6 (23.5)	1.19 (19.5)	3400	2500 (172)	16.1 (60.9)	29.0 (21.6)	16-18 (7.3-8.2)
	7 (26.9)	1.39 (22.8)	3000	2500 (172)	16.7 (63.2)	29.5 (22)	
	8 (31)	1.62 (26.5)	2800	2500 (172)	17.7 (67)	32.5 (24.2)	
	9 (34.8)	1.80 (29.7)	2800	2500 (172)	19.8 (75)	35.5 (26.5)	
	11 (43.5)	2.22 (36.4)	2500	2500 (172)	22.9 (86.7)	37.5 (28)	
	12 (45.4)	2.38 (39)	2400	2200 (152)	23.0 (87.1)	36.0 (26.8)	
	13 (51.1)	2.59 (42.4)	2400	2200 (152)	25.9 (98)	39.0 (29.1)	

Values based on using anti-wear type petroleum oil 150 SUS at 100° F (ISO rating of 32 cSt at 38° C) and 0 psi inlet pressure.

V10/V20 Series

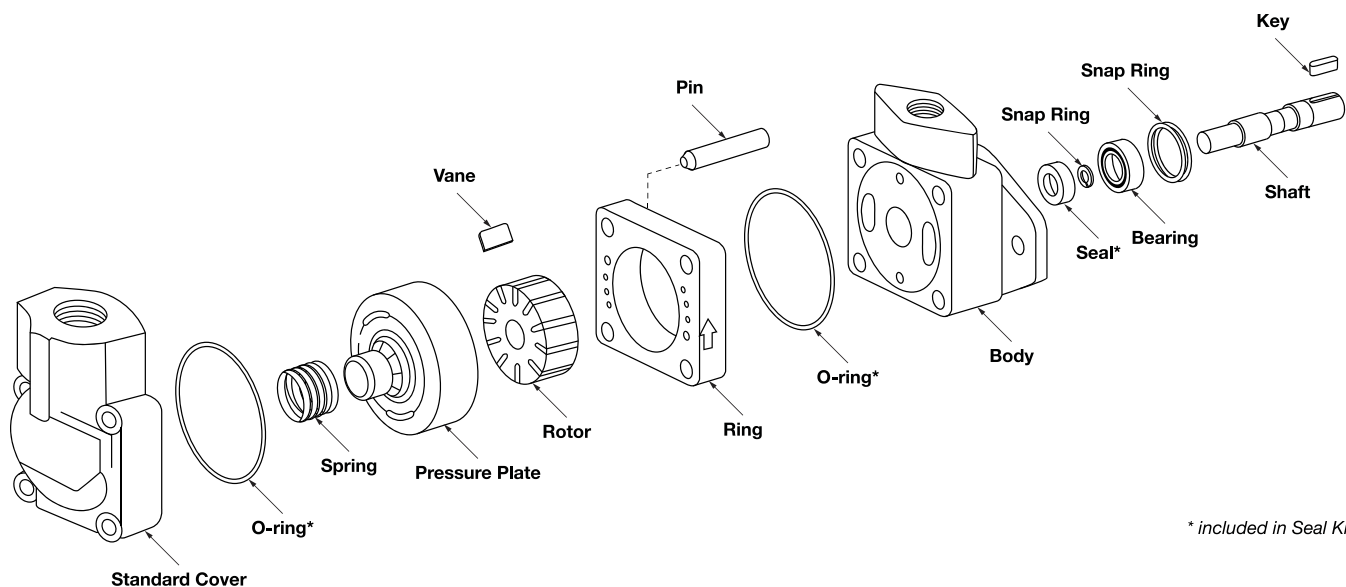
Model Code Breakdown



	Mode	Priority Cover			Flow Control Cover		Standard Cover
		Primary	Secondary	Tank	Pressure	Tank	Pressure
K	V10	9/16-18 Str. Thd.	3/4-16 Str. Thd.	9/16-18 Str. Thd.	-	-	-
B	V10	-	-	-	-	-	G 1/2"
B	V20	-	-	-	-	-	G 3/4"
P	V10	-	-	-	3/4-16 Str. Thd.	1/2-NPT Thd.	1/2-NPT Thd.
P	V20	-	-	-	3/4-16 Str. Thd.	1/2-NPT Thd.	3/4-NPT Thd.
R	V10	-	-	-	-	-	1.062-12 Str. Thd.
S	V20	-	-	-	3/4-16 Str. Thd.	1 1/16-12 Str. Thd.	1.062-12 Str. Thd.
S	V10	-	-	-	-	-	3/4-16 Str. Thd.
T	V10	-	-	-	3/4-16 Str. Thd.	3/4-16 Str. Thd.	-
T	V20	3/4-16 Str. Thd.	7/8-14 Str. Thd.	3/4-16 Str. Thd.	-	-	-
V	V10 & V20	-	-	-	-	-	7/8-14 Str. Thd.

V10/V20 Series

Parts Breakdown



PUMP SERIES	CART KIT	ROTOR	VANES	RING	SEAL	SEAL KIT	BEARING	PR. PL.	SPRING	BODY	COVER	SHAFT NO.	
V10	1	923471	317681	923499	317674	263585	923548	148423	374343	345262	352699	372863	Shaft 1 No. 374338
	2	923470			317675	Viton	Viton						Shaft 3 No. 374340
	3	923496			317676	388205	919772						Shaft 11 No. 374339
	4	923469	351247	923500	317677								Shaft 12 No. 375480
	5	923468			317678								Shaft 38 No. 387481
	6	923497	357268	923501	355641								
	7	923498			331813								
V20	5	924076	358328	923328	388284	229235	922733	098574	359287	28422	280689	313657	Shaft 1 No. 280372
	6	923480			328150	Viton	Viton						Shaft 3 No. 280504
	7	923481	358330	923493	328152	279499	919805						Shaft 6 No. 297330
	8	923483			331791								Shaft 11 No. 280515
	9	923484			331789								Shaft 15 No. 294922
	10	923620	358332	923478	374309								Shaft 38 No. 328096
	11	923482			328156								
	12	923486	358334	923479	331806								
	13	923487			331807								

Changing Cartridge Rotation

Assemble the ring using the location pins for alignment making sure the arrow on the perimeter points in the proper direction for rotation. Install the rotor on the shaft and insert vanes in the rotor slots. Be certain the radius edges of the vanes are towards the cam ring.

Rear Cover Bolt Torque

- V10 - 40 ft/lbs (54.2 Nm)
- V20 - 80 ft/lbs (108.5 Nm)

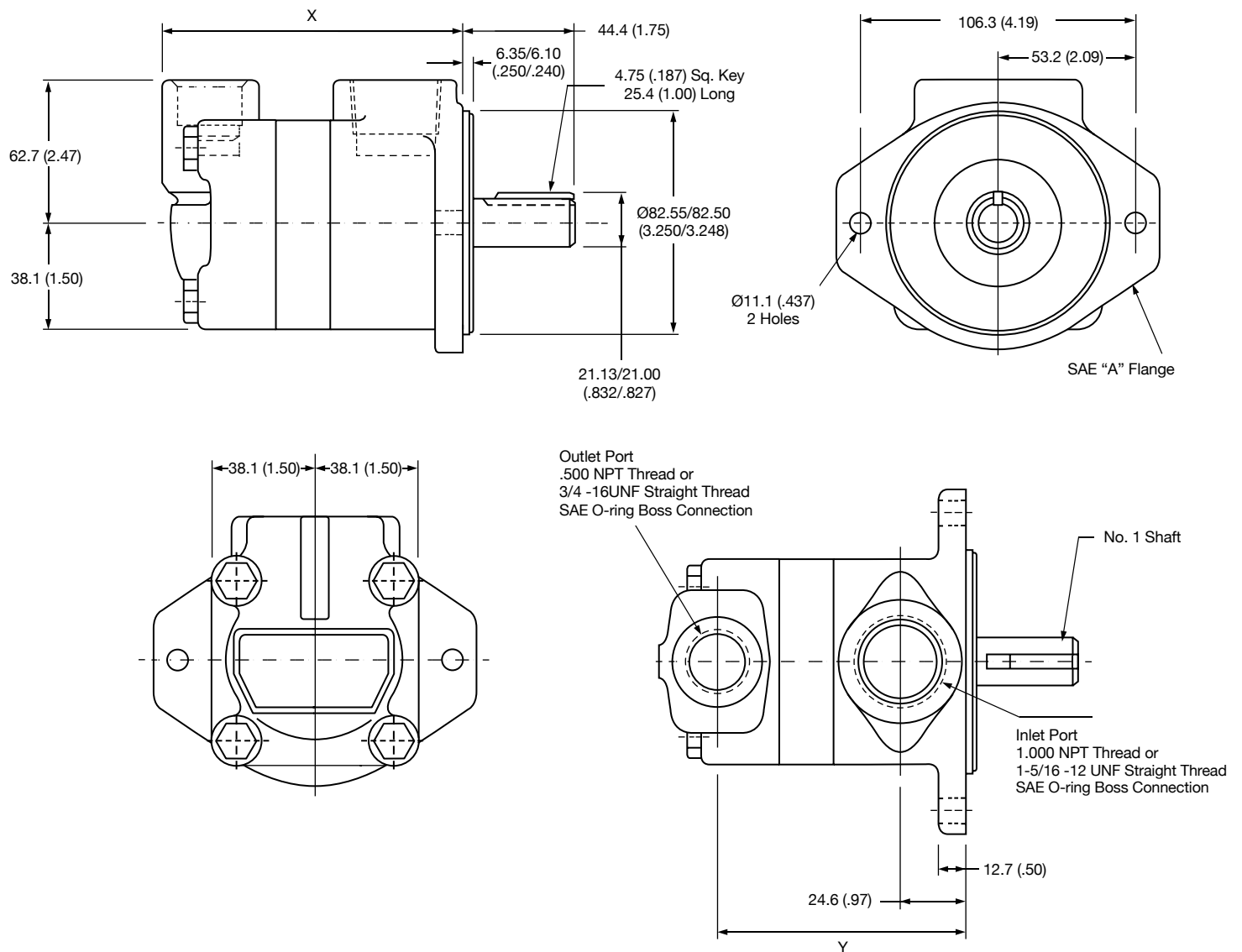
V10 Series

Dimensions

Dimensions are in millimeters (inches).

- Weight: 10 - 15 lbs (4.5 - 6.8 kgs)
- Pressure: 1/2" NPT
- Suction: 1" NPT
- Optional BSPT/SAE Ports Available

DELIVERY AT 1200 RPM & 100 PSI	DIMENSIONS	
	X	Y
1 gpm (3.8 lpm)	115.6 (4.55)	91.9 (3.62)
2 gpm (7.6 lpm)	115.6 (4.55)	91.9 (3.62)
3 gpm (11.4 lpm)	115.6 (4.55)	91.9 (3.62)
4 gpm (15.1 lpm)	121.9 (4.80)	98.3 (3.87)
5 gpm (18.9 lpm)	121.9 (4.80)	98.3 (3.87)
6 gpm (22.7 lpm)	127.0 (5.00)	103.4 (4.07)
7 gpm (26.5 lpm)	127.0 (5.00)	103.4 (4.07)



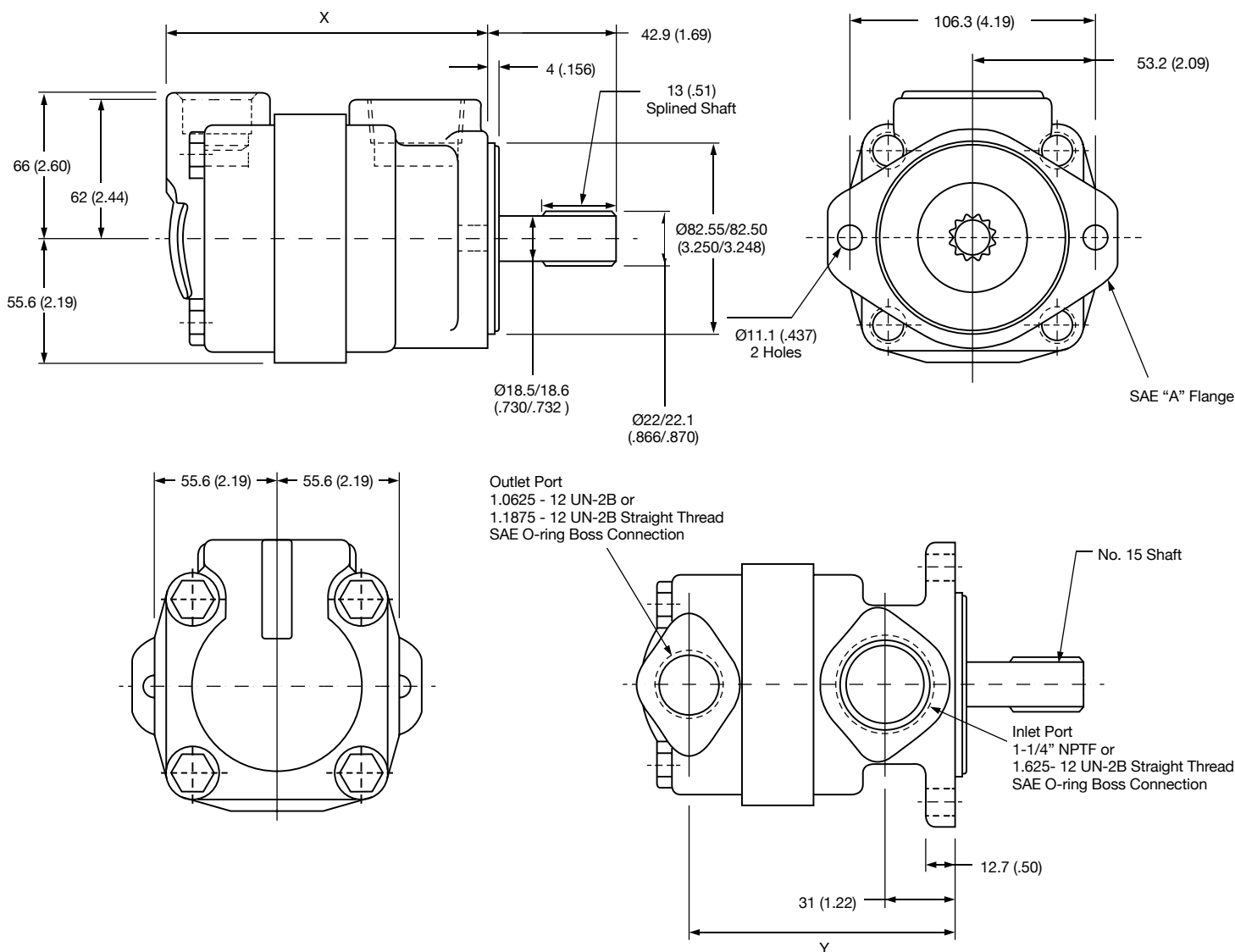
V20 Series

Dimensions

Dimensions are in millimeters (inches).

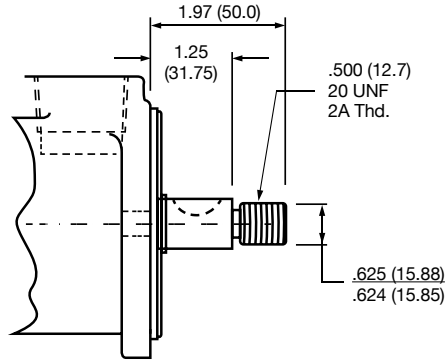
- Weight: 16 - 18 lbs (7.3 - 8.2 kgs)
- Pressure: 3/4" NPT
- Suction: 1-1/4" NPT
- Optional BSPT/SAE Ports Available

DELIVERY AT 1200 RPM & 100 PSI	DIMENSIONS	
	X	Y
6 gpm (22.7 lpm)	125.2 (4.93)	102.1 (4.02)
7 gpm (26.5 lpm)	131.6 (5.18)	108.4 (4.27)
8 gpm (30.3 lpm)	131.6 (5.18)	108.4 (4.27)
9 gpm (34.1 lpm)	131.6 (5.18)	108.4 (4.27)
11 gpm (41.6 lpm)	136.6 (5.38)	113.5 (4.47)
12 gpm (45.4 lpm)	140.2 (5.52)	117.1 (4.61)
13 gpm (49.2 lpm)	140.2 (5.52)	117.1 (4.61)

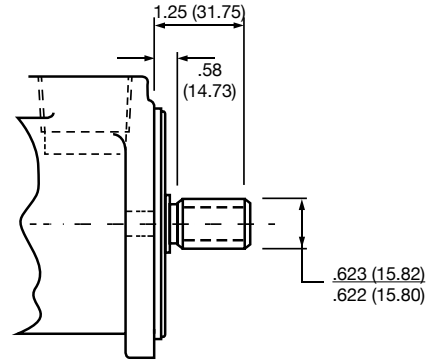


V10 Series

Optional Shaft Dimensions



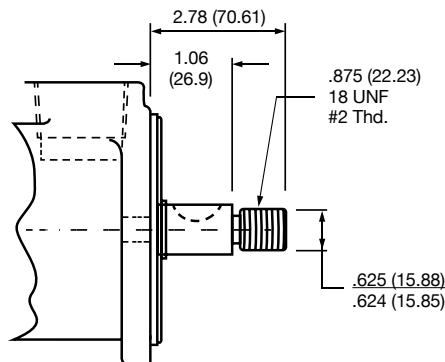
No. 3 Keyed Shaft



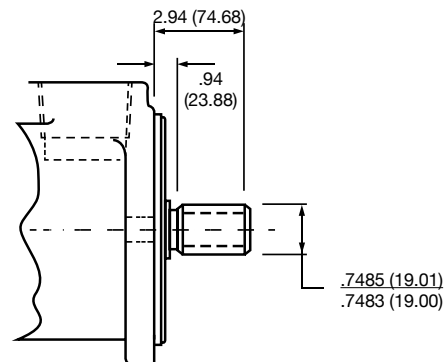
No. 11 Splined Shaft, 9 Tooth

V20 Series

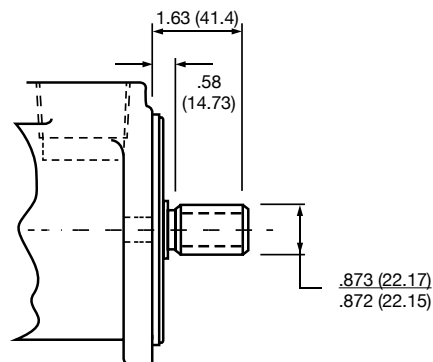
Optional Shaft Dimensions



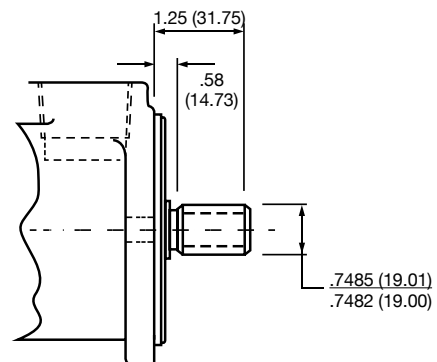
No. 3 Keyed Shaft



No. 11 Splined Shaft, 11 Tooth



No. 12 Splined Shaft, 13 Tooth

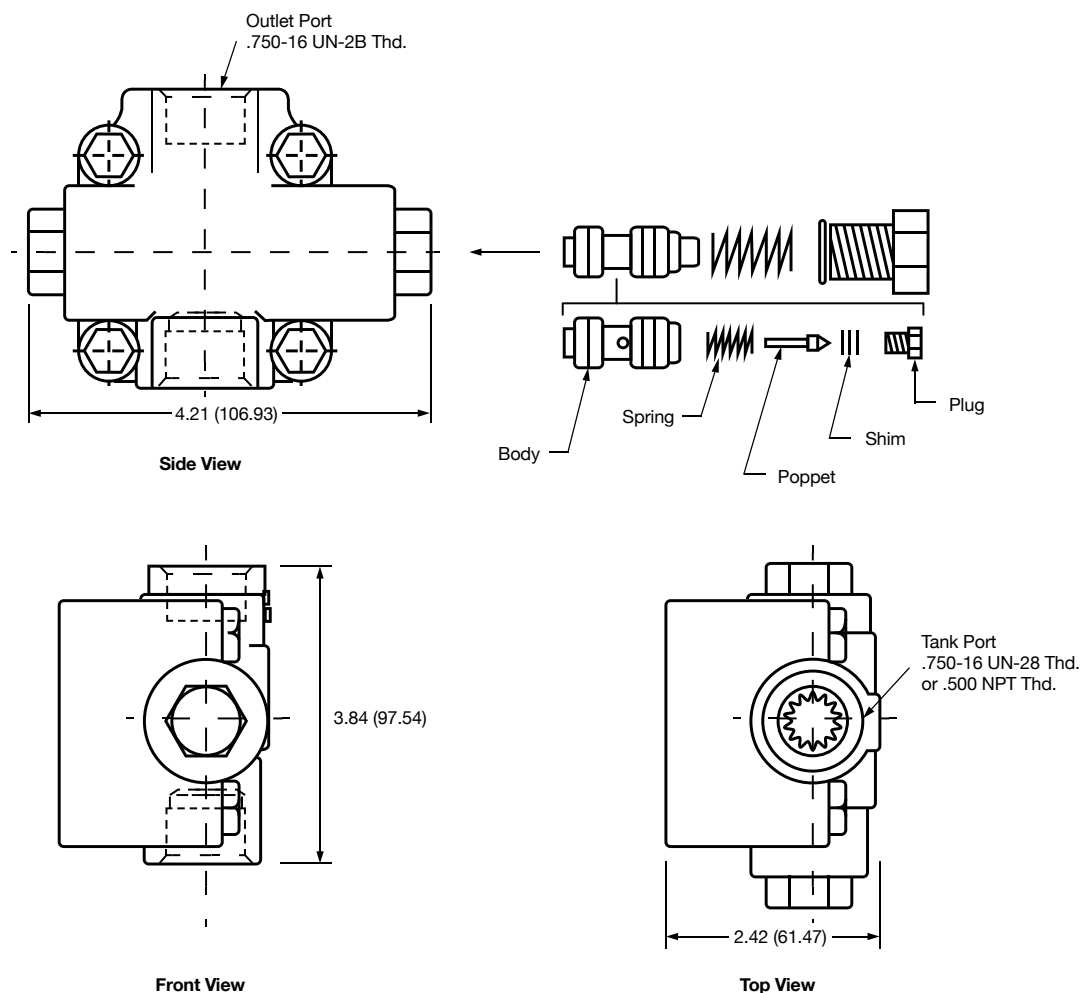


No. 38 Splined Shaft, 11 Tooth

V10F Series

Flow Control Valve Dimensions

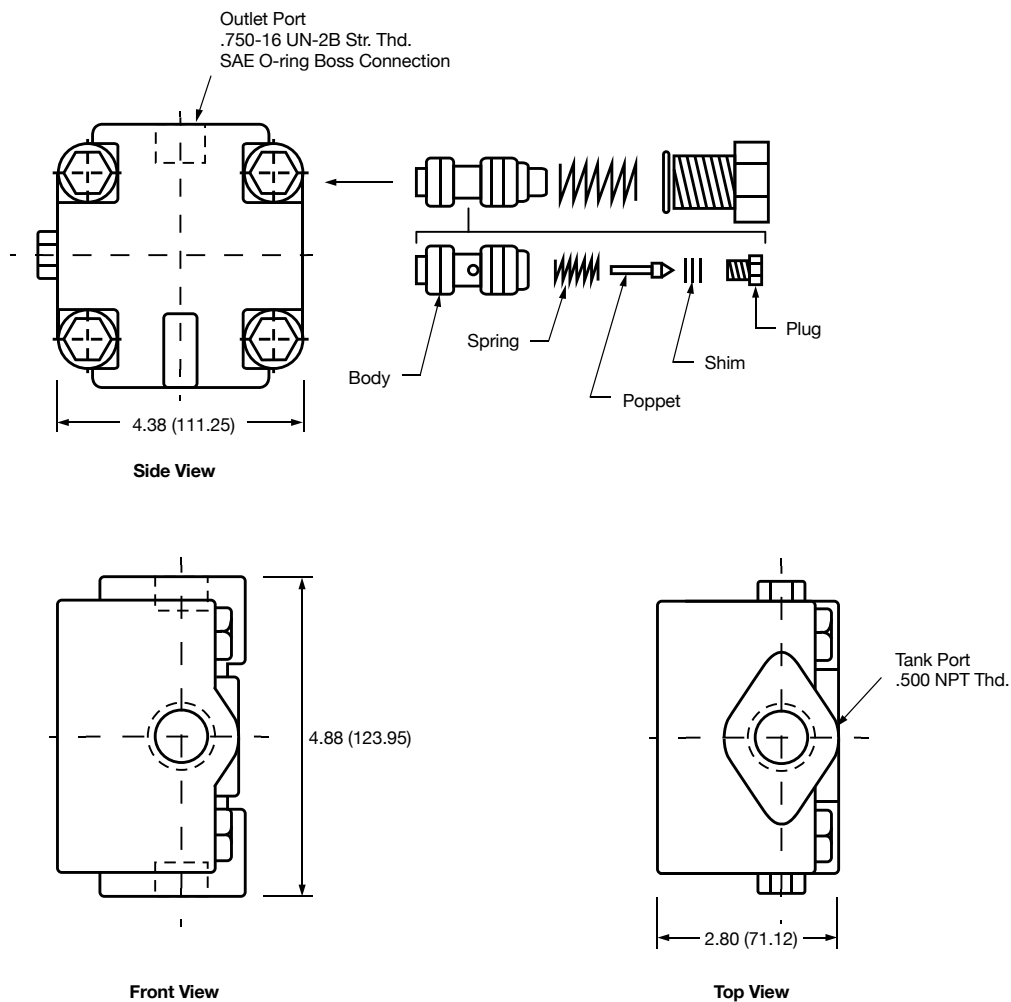
FLOW RATE ORIFICE		RELIEF VALVE NUMBER/PRESSURE SETTING	
2	-2 U.S. gpm (7.6 lpm)	A	250 psi (17.2 bar)
3	-3 U.S. gpm (11.4 lpm)	B	500 psi (34.5 bar)
4	-4 U.S. gpm (15.1 lpm)	C	750 psi (51.7 bar)
5	-5 U.S. gpm (18.9 lpm)	D	1000 psi (68.9 bar)
6	-6 U.S. gpm (22.7 lpm)	E	1250 psi (86.2 bar)
7	-7 U.S. gpm (26.5 lpm)	F	1500 psi (103.4 bar)
8	-8 U.S. gpm (30.3 lpm)	G	1750 psi (120.7 bar)
		H	2000 psi (137.9 bar)
		J	2250 psi (155.1 bar)
		K	2500 psi (172.4 bar)



V20F Series

Flow Control Valve Dimensions

FLOW RATE ORIFICE		RELIEF VALVE NUMBER/PRESSURE SETTING	
2	-2 U.S. gpm (7.6 lpm)	A	250 psi (17.2 bar)
3	-3 U.S. gpm (11.4 lpm)	B	500 psi (34.5 bar)
4	-4 U.S. gpm (15.1 lpm)	C	750 psi (51.7 bar)
5	-5 U.S. gpm (18.9 lpm)	D	1000 psi (68.9 bar)
6	-6 U.S. gpm (22.7 lpm)	E	1250 psi (86.2 bar)
7	-7 U.S. gpm (26.5 lpm)	F	1500 psi (103.4 bar)
8	-8 U.S. gpm (30.3 lpm)	G	1750 psi (120.7 bar)
		H	2000 psi (137.9 bar)
		J	2250 psi (155.1 bar)
		K	2500 psi (172.4 bar)

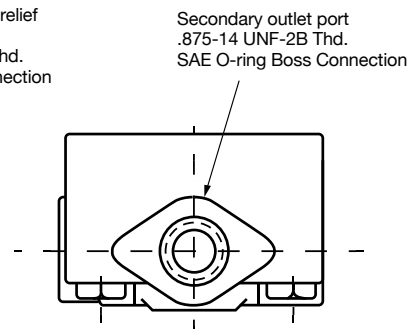
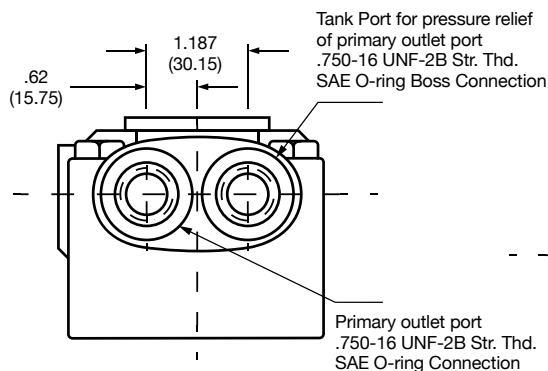
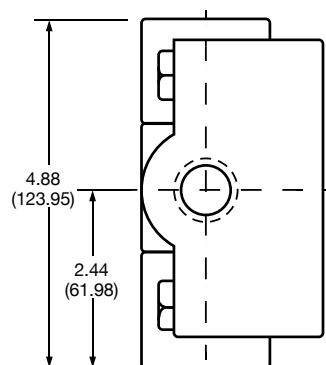
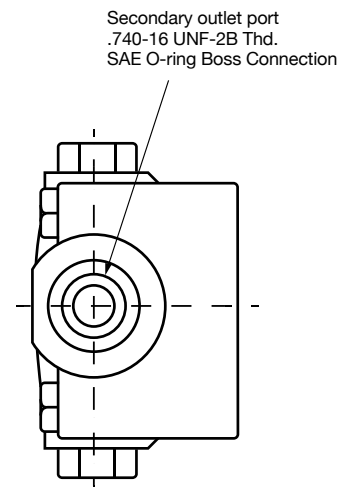
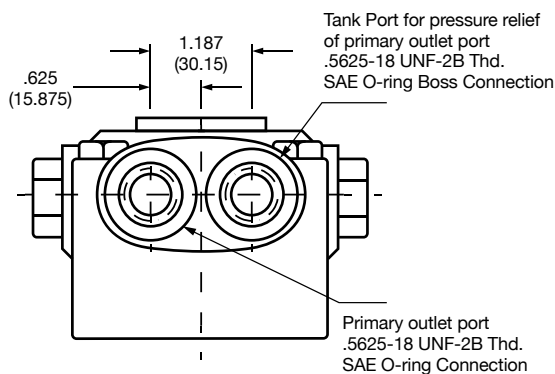
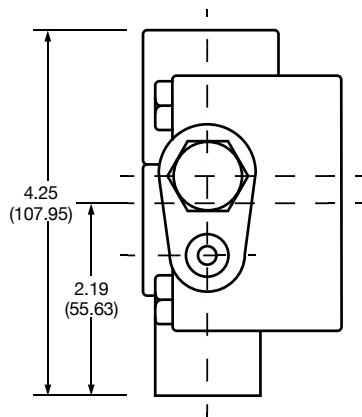


V10/V20 Series

Priority Covers

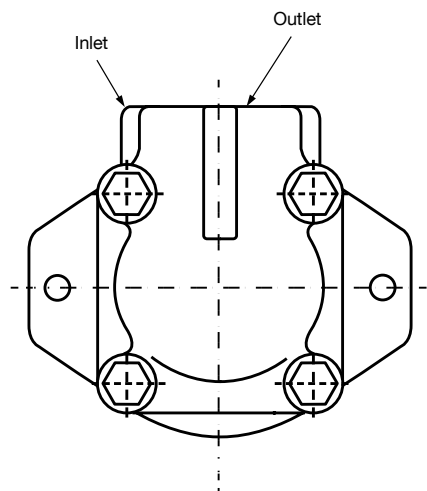
FLOW RATE ORIFICE	
2	-2 U.S. gpm (7.6 lpm)
3	-3 U.S. gpm (11.4 lpm)
4	-4 U.S. gpm (15.1 lpm)
5	-5 U.S. gpm (18.9 lpm)
6	-6 U.S. gpm (22.7 lpm)
7	-7 U.S. gpm (26.5 lpm)
8	-8 U.S. gpm (30.3 lpm)

RELIEF VALVE NUMBER/PRESSURE SETTING	
A	250 psi (17.2 bar)
B	500 psi (34.5 bar)
C	750 psi (51.7 bar)
D	1000 psi (68.9 bar)
E	1250 psi (86.2 bar)
F	1500 psi (103.4 bar)
G	1750 psi (120.7 bar)
H	2000 psi (137.9 bar)
J	2250 psi (155.1 bar)
K	2500 psi (172.4 bar)

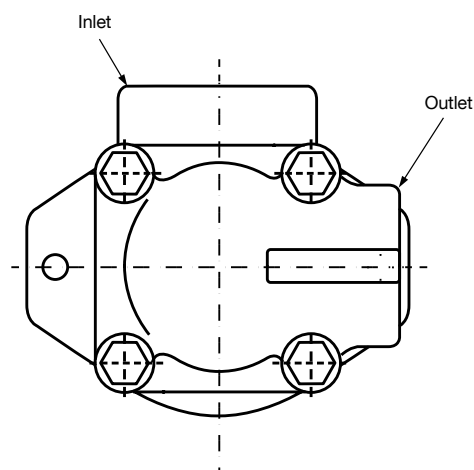


V10/V20 Series

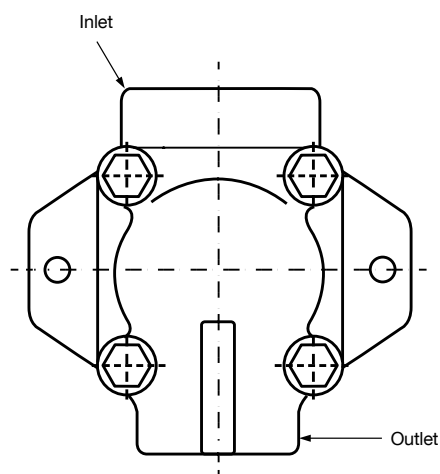
Optional Port Position



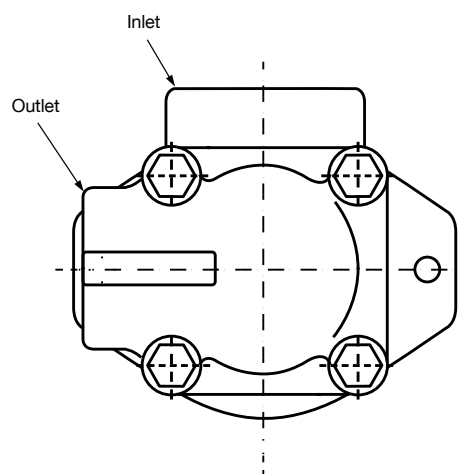
C - Inline with Inlet



D - 90° Clockwise from Inlet



A - Opposite of Inlet



B - 90° Counter-Clockwise from Inlet

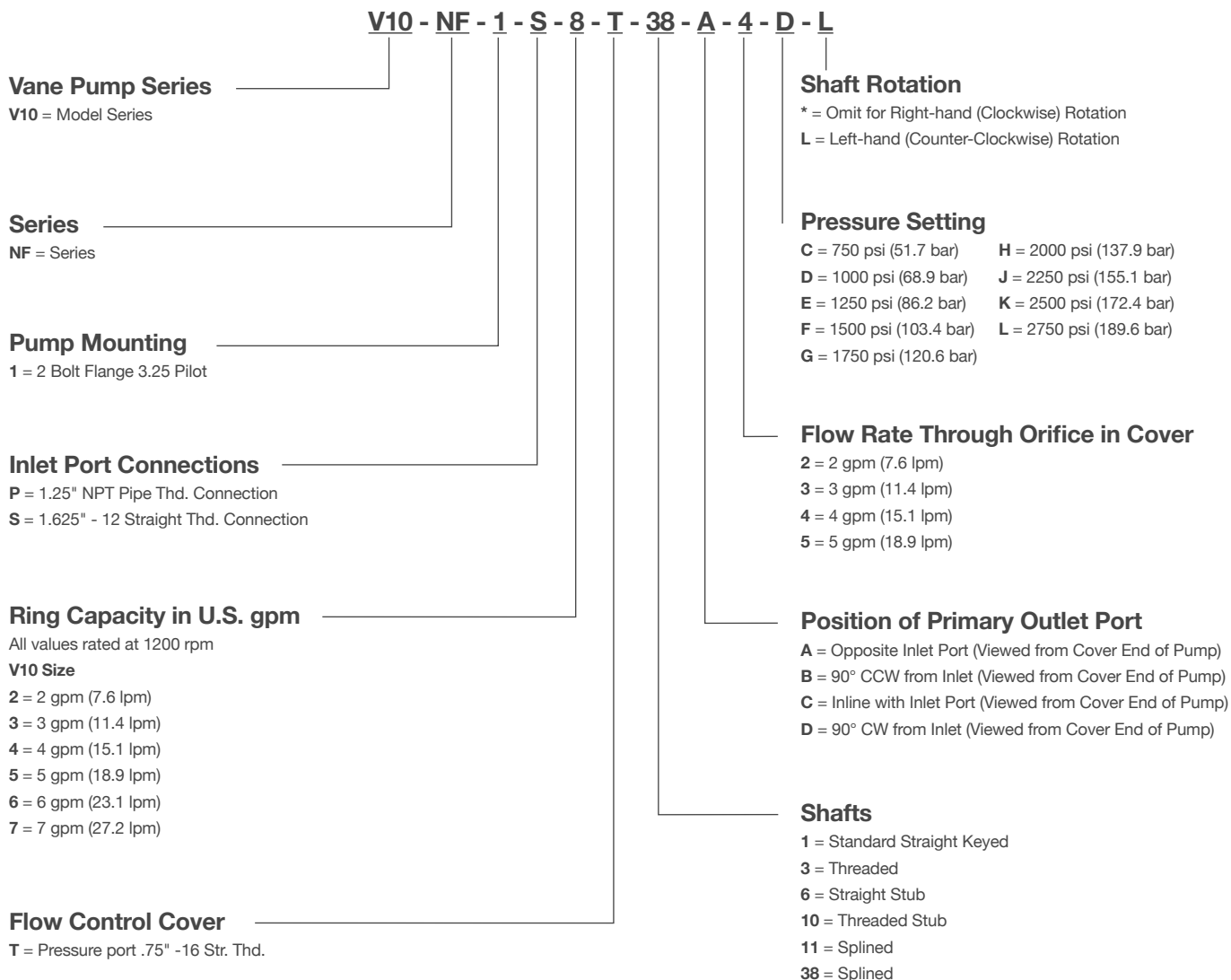
Rear Cover Bolt Torque

- V10 - 40 ft/lbs (54.2 Nm)
- V20 - 80 ft/lbs (108.5 Nm)

Note: Remove rear cover bolts and rotate cover for proper port position.

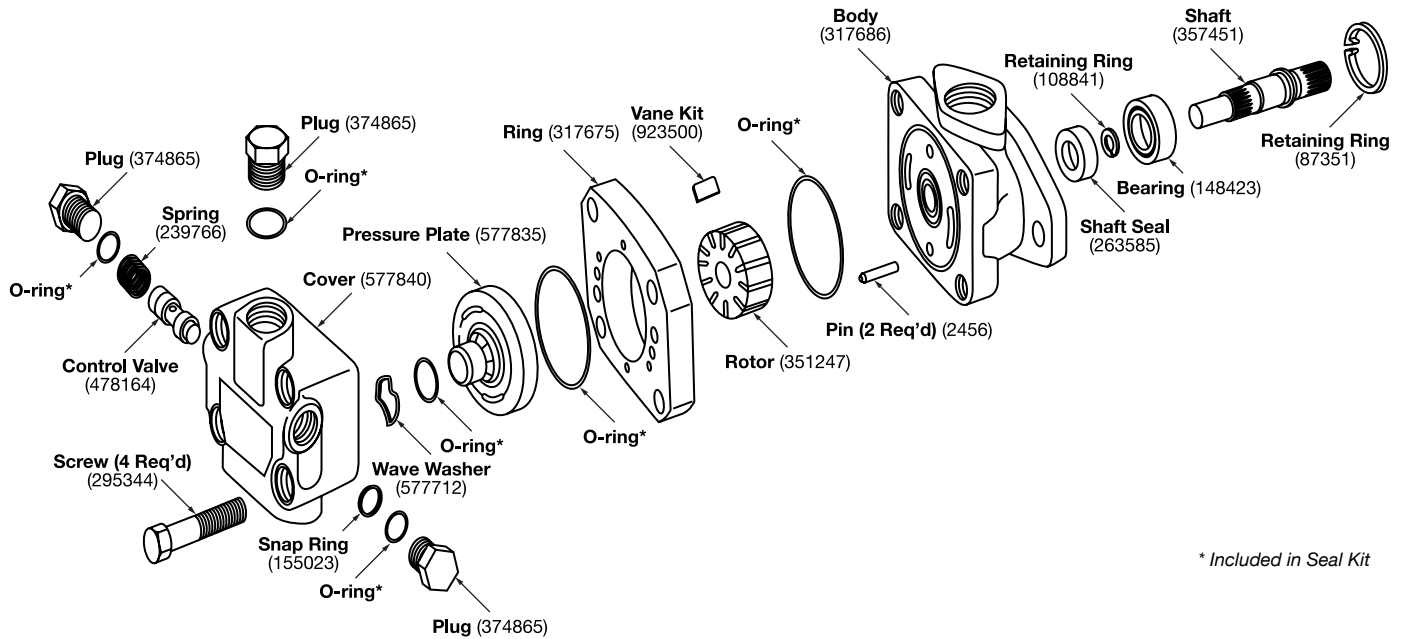
V10NF Series

Model Code Breakdown



V10NF Series

Parts Breakdown



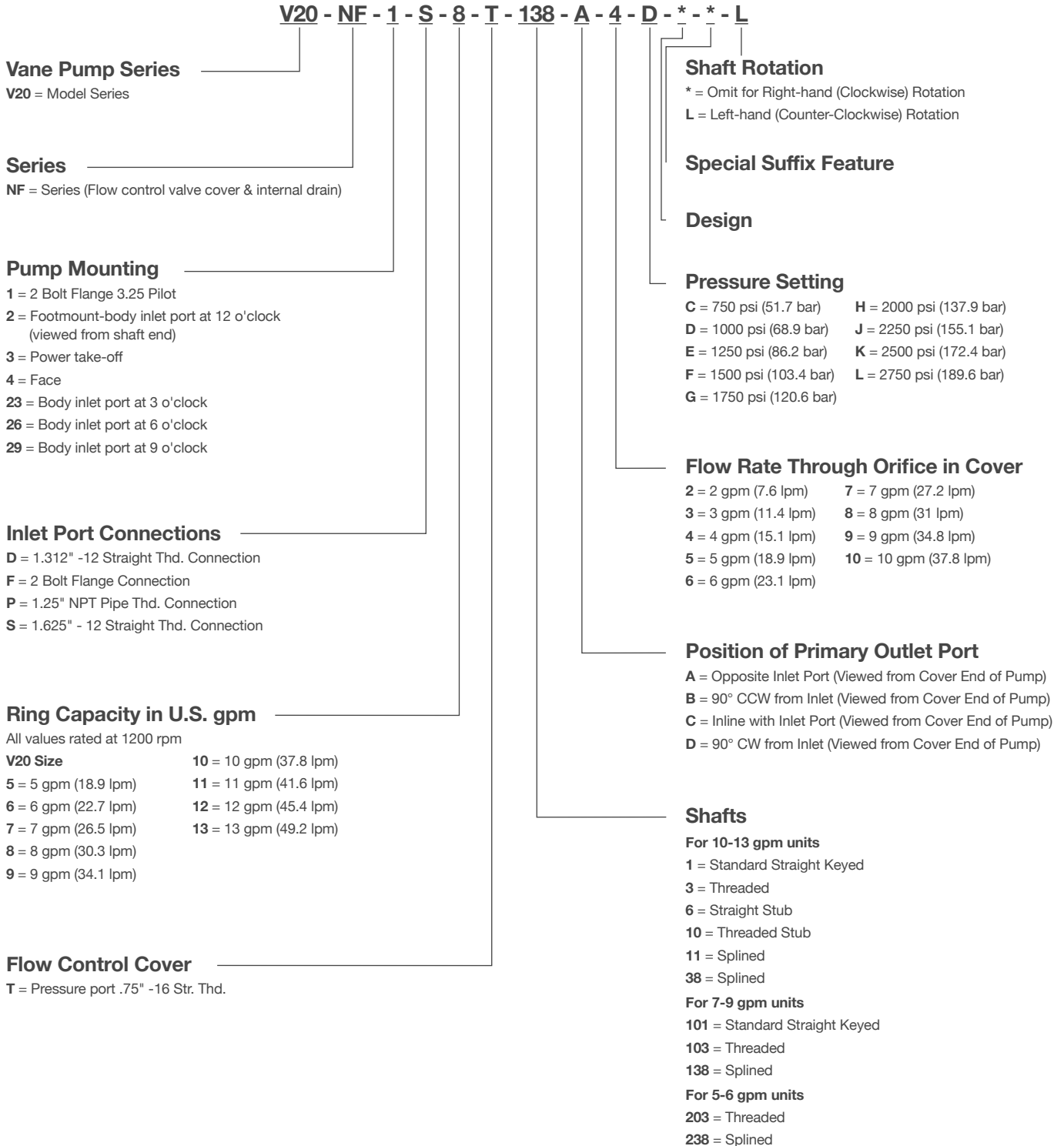
PUMP SERIES	CART KIT	ROTOR	VANES	RING	SEAL	SEAL KIT	BEARING	PR. PL.	SPRING	BODY	COVER	SHAFT NO.	
V10NF	2	923470	351247	923500	317675	263585	920372	148423	577835	239766	317686	577840	Shaft 1 No. 374338
	3	923496			317676	388205	919772						Shaft 3 No. 374340
	4	923469	351247	923500	317677								Shaft 11 No. 374339
	5	923468			317678								Shaft 12 No. 375480
	6	923497	357268	923501	355641								Shaft 38 No. 387481
	7	923498			331813								

Rear Cover Bolt Torque

- V10 - 40 ft/lbs (54.2 Nm)
- V20 - 80 ft/lbs (108.5 Nm)

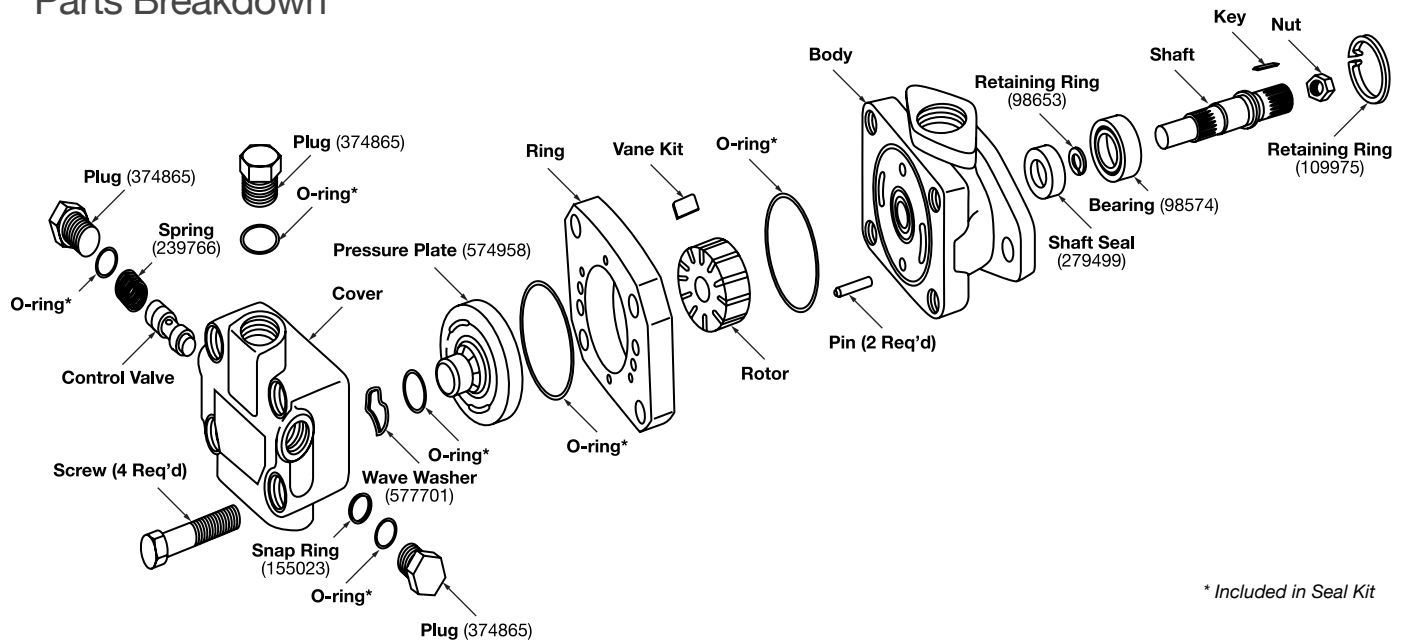
V20NF Series

Model Code Breakdown



V20NF Series

Parts Breakdown



MODEL	BODY
V20NF-***T-***C-22	232794
V20NF-***T-***D-22	232795
V20NF-***T-***E-22	232796
V20NF-***T-***F-22	232797
V20NF-***T-***G-22	232798
V20NF-***T-***H-22	232799
V20NF-***T-***J-22	233019
V20NF-***T-***K-22	233020
V20NF-***T-***L-22	266200

MODEL	BODY
V20NF-1D	583170
V20NF-4D	583172
V20NF-1F	297228
V20NF-1P	280689
V20NF-4P	308628
V20NF-1S	294266

MODEL	BODY
V20NF-***T-***2*-22	452272
V20NF-***T-***3*-22	452240
V20NF-***T-***4*-22	452242
V20NF-***T-***5*-22	452069
V20NF-***T-***6*-22	452244
V20NF-***T-***7*-22	574959
V20NF-***T-***8*-22	452071
V20NF-***T-***9*-22	478133
V20NF-***T-***10*-22	452747

MODEL	SHAFT	KEY	NUT
V20NF-***T-1	280372	5881	-
V20NF-***T-3	280504	1615	132260
V20NF-***T-6	297330	1609	-
V20NF-***T-10	324042	1609	-
V20NF-***T-11	280515	-	-
V20NF-***T-38	328096	-	-
V20NF-***T-101	478142	5881	-
V20NF-***T-103	478136	1615	132260
V20NF-***T-138	478122	-	-
V20NF-***T-203	502682	1615	132260
V20NF-***T-238	502235	-	-

MODEL	PIN	SCREW	VANE KIT	RING & RTR	CART KIT
V20NF-***5T	2161	11165	923651	503157	923656
V20NF-***6T	2161	11165	923651	452235	923657
V20NF-***7T	2478	9431	923652	452261	923658
V20NF-***8T	2478	9431	923652	574954	923659
V20NF-***9T	2478	9431	923652	452264	923660
V20NF-***10T	16662	96168	923653	452267	923661
V20NF-***11T	16662	96168	923653	574945	923662
V20NF-***12T	9603	96168	923654	452270	923663
V20NF-***13T	9603	96168	923654	452245	923664

V2010/V2020 Series

Features

Balanced vane type pumps are excellent for medium- to low-pressure mobile and industrial applications. Available with integrated flow control valves to simplify system design and installation, these pumps are commonly used as pilot and auxiliary pumps for complex systems, and on heavy-duty trucks and interstate buses. Compact size and ease of service allow maximum equipment design flexibility.

- High Performance
- Pressure-balanced
- Low Cost/Economical
- Engineered for Extended Life
- Versatile and Low Noise
- Compact
- Weight: 30-35 lbs (13.6 - 15.9 kgs)

Specifications

PUMP	SHAFT END FLOW IN GPM @ 1200 RPM & 100 PSI	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM)	MAX. PRESSURE PSI (BAR)	TYP. DELIVERY GPM @ MAX. SPEED & PRESSURE (LPM)	TYPICAL INPUT POWER HP @ MAX. SPEED & PRESS. (KW)	COVER END FLOW IN GPM @ 1200 RPM & 100 PSI	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM)	MAX. PRESSURE PSI (BAR)	TYP. DELIVERY GPM @ MAX. SPEED & PRESSURE (LPM)	TYPICAL INPUT POWER HP @ MAX. SPEED & PRESS. (KW)
V2010	6	1.19 (19.5)	3000	2500 (172)	14.5 (54.9)	24.5 (18.3)	1	.20 (3.3)	3000	2500 (172)	2 (7.6)	4.5 (3.4)
	7	1.39 (22.8)	3000	2500 (172)	16.5 (62.5)	30 (22.4)	2	.40 (6.6)	3000	2500 (172)	4.7 (17.8)	9 (6.7)
	8	1.62 (26.5)	2800	2500 (172)	17.5 (66.2)	32.5 (24.2)	3	.60 (9.8)	3000	2500 (172)	7 (26.5)	13.4 (10)
	9	1.81 (29.7)	2800	2500 (172)	20 (75.7)	36 (26.8)	4	.80 (13.1)	3000	2500 (172)	9.5 (36)	18 (13.4)
	11	2.22 (36.4)	2500	2500 (172)	23 (87.1)	37.5 (28)	5	1.00 (16.4)	3000	2500 (172)	12 (45.4)	21.5 (16)
	12	2.38 (39)	2400	2200 (152)	23 (87.1)	36 (26.8)	6	1.19 (19.5)	3000	2200 (152)	14.5 (54.9)	24.5 (18.3)
	13	2.59 (42.4)	2400	2200 (152)	26 (98.4)	39 (29.1)	7	1.39 (22.8)	2800	2000 (138)	16 (60.6)	24 (17.9)
V2020	6	1.19 (19.5)	3000	2500 (172)	14.5 (54.9)	24.5 (18.3)	6	1.19 (19.5)	3000	2500 (172)	14.5 (54.9)	24.5 (18.3)
	7	1.39 (22.8)	3000	2500 (172)	16.5 (62.5)	30 (22.4)	7	1.39 (22.8)	3000	2500 (172)	16.5 (62.5)	30 (22.4)
	8	1.62 (26.5)	2800	2500 (172)	17.5 (66.2)	32.5 (24.2)	8	1.62 (26.5)	2800	2500 (172)	17.5 (66.2)	32.5 (24.2)
	9	1.81 (29.7)	2800	2500 (172)	20 (75.7)	36 (26.8)	9	1.81 (29.7)	2800	2500 (172)	20 (75.7)	36 (26.8)
	11	2.22 (36.4)	2500	2500 (172)	23 (87.1)	37.5 (28)	11	2.22 (36.4)	2500	2500 (172)	23 (87.1)	37.5 (28)
	12	2.38 (39)	2400	2200 (152)	23 (87.1)	36 (26.8)						
	13	2.59 (42.4)	2400	2200 (152)	26 (98.4)	39 (29.1)						

Values based on using anti-wear type petroleum oil 150 SUS at 100° F (ISO rating of 32 cSt at 38° C) and 0 psi inlet pressure.

V2010 Series

Model Code Breakdown

Special Note

Place an **F3** in front of the model code for **Special Seals**.

Example: F3-V-2010-* -1-* -F-8-S-1-P-1-**-12-L

V - 2010 - * - 1 - * - F - 8 - S - 1 - P - 1 - ** - 12 - L

Vane Pump Series

V = Vane Pump Series

Series

2010 = Series Designation

Cover Type

* = Omit for standard cover

F = Flow control cover

P = Priority valve cover

Pump Mounting

1 = 2 Bolt Flange SAE 'B' size

2 = Foot bracket

Foot Bracket

(Mounting position with respect to inlet port position when viewed from the shaft end)

3 = Inlet port position at 3 o'clock

6 = Inlet port position at 6 o'clock

9 = Inlet port position at 9 o'clock

* = Omit for Inlet port position at 12 o'clock

Inlet Port Connections

F = 4 Bolt Flange 1.5" diam. SF

Ring Capacity in U.S. gpm (Shaft end)

All values rated at 1200 rpm & 100 psi

7 = 7 gpm (26.5 lpm) 11 = 11 gpm (41.6 lpm)

8 = 8 gpm (30.3 lpm) 12 = 12 gpm (45.4 lpm)

9 = 9 gpm (34.1 lpm) 13 = 13 gpm (49.2 lpm)

Outlet Port

(Shaft end)

S = 1.062" - 12 UN 2B Thd. Connection

B = G 3/4"

Ring Capacity in U.S. gpm (Cover end)

All values rated at 1200 rpm & 100 psi

1 = 1 gpm (3.8 lpm) 5 = 5 gpm (18.9 lpm)

2 = 2 gpm (7.6 lpm) 6 = 6 gpm (22.7 lpm)

3 = 3 gpm (11.4 lpm) 7 = 7 gpm (26.5 lpm)

4 = 4 gpm (15.1 lpm)

Shaft Rotation

(Viewed from shaft end)

* = Omit for Right-hand (Clockwise) Rotation

L = Left-hand (Counter-Clockwise) Rotation

Design

Outlet Port Position

(Viewed from rear cover end of pump)

With No. 1 Outlet (shaft end) opposite inlet port

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 (shaft end) 90° CCW from inlet port

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 (shaft end) inline with inlet port

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 (shaft end) 90° CW from inlet port

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

Shafts

1 = Straight keyed

3 = Threaded w/ woodruff key

11 = Splined 13 tooth

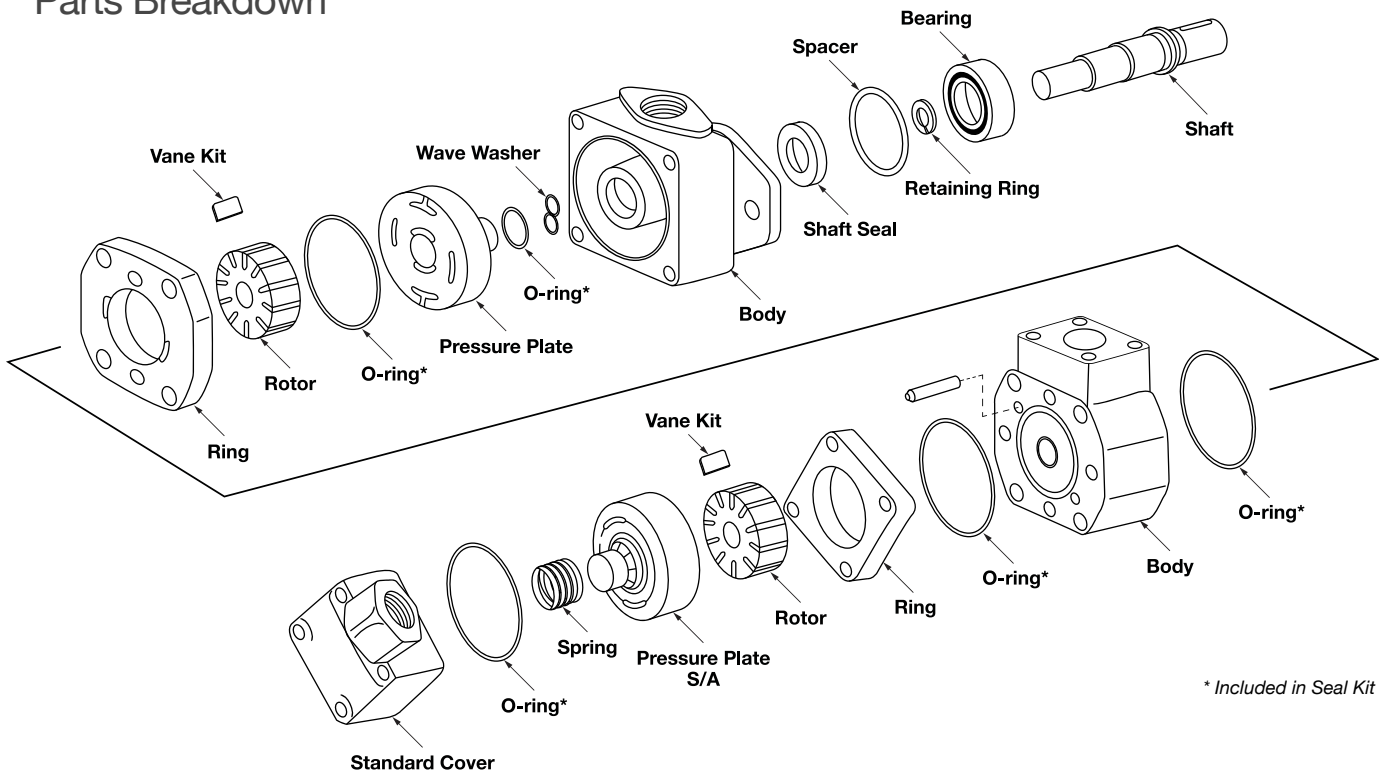
Outlet Port Connections

(Cover end)

Code	Std. Cover	Flow Control Cover	
		Pressure	Tank
B	G 1/2"	-	-
P	1/2" NPT	3/4" St. Thd.	1/2" NPT
R	1.062 - 12 St. Thd.	-	-
S	3/4" St. Thd.	-	-
T	-	3/4" St. Thd.	3/4" St. Thd.

V2010 Series - Double Vane Pump

Parts Breakdown



PUMP	FRONT CART. KIT	FRONT ROTOR	FRONT VANE	FRONT RING	FRONT PRES. PLT.	BACK CART. KIT	BACK ROTOR	BACK VANE	BACK RING	BACK PRES. PLT.
V2010	6	923474	358339	923493	328152	1	923471		317674	
	7	923494			328152	2	923470	317681	923499	317675
	8	923495	358335	923493	331791	3	923496		317676	
	9	923462			331789	4	923469	351247	923500	317677
	11	923475	358336	923478	328156	5	923468		317678	373795
	12	923476			331806	6	923497		355641	
	13	923477	358337	923479	331807	7	923498	357286	923501	331813

PUMP	SEAL KIT	SEAL	BEARING	BODY	SHAFT NO.
V2010	923577	229236	82938	357292	SHAFT 1 - 351249
					SHAFT 11 - 321215

Changing Cartridge Rotation

Assemble the ring using the location pins for alignment making sure the arrow on the perimeter points in the proper direction for rotation. Install the rotor on the shaft and insert vanes in the rotor slots. Be certain the radius edges of the vanes are towards the cam ring.

Front Section Bolt Torque

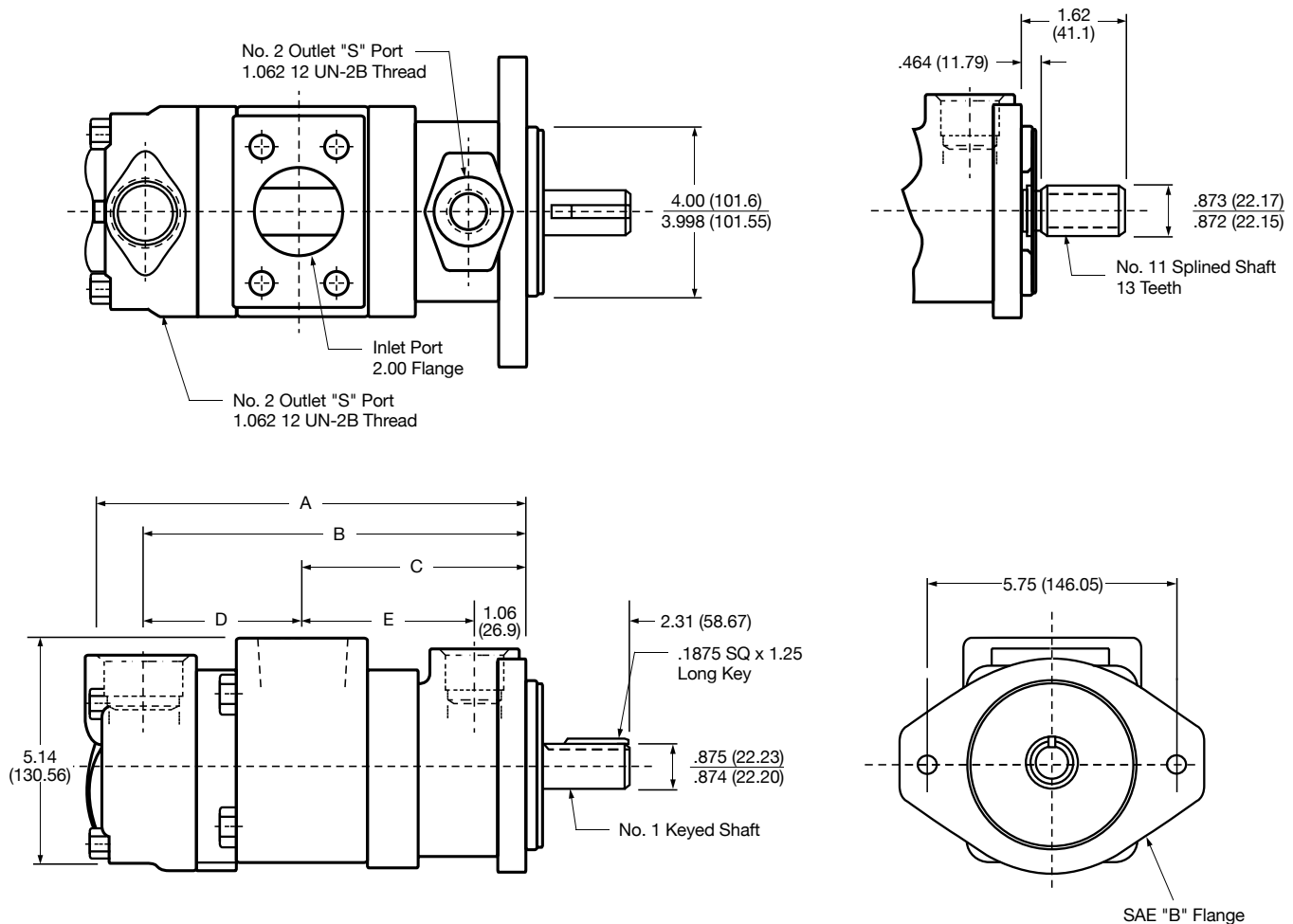
- V2010 - 85 ft/lbs (115.2 Nm)

Back Section Bolt Torque

- V2010 - 45 ft/lbs (61 Nm)

V2010 Series - Double Vane Pump

Dimensions



DELIVERY AT 1200 RPM & 100 PSI (7 BAR)		DIMENSIONS				
SHAFT END	COVER END	A	B	C	D	E
7, 8 or 9	1, 2 or 3	8.39 (213.1)	7.45 (189.2)	4.46 (113.3)	2.99 (75.9)	3.40 (86.4)
7, 8 or 9	4 or 5	8.64 (219.5)	7.70 (195.6)	4.46 (113.3)	3.24 (82.3)	3.40 (86.4)
7, 8 or 9	6 or 7	8.84 (224.5)	7.90 (200.7)	4.46 (113.3)	3.44 (87.4)	3.40 (86.4)
11	1, 2 or 3	8.59 (218.2)	7.65 (194.3)	4.65 (118.1)	2.99 (75.9)	3.59 (91.2)
11	4 or 5	8.84 (224.5)	7.90 (200.7)	4.65 (118.1)	3.24 (82.3)	3.59 (91.2)
11	6 or 7	9.04 (229.6)	8.10 (205.7)	4.65 (118.1)	3.44 (87.4)	3.59 (91.2)
12 or 13	1, 2 or 3	8.73 (221.7)	7.79 (197.9)	4.79 (121.7)	2.99 (75.9)	3.73 (94.7)
12 or 13	4 or 5	8.97 (227.8)	8.03 (204.0)	4.79 (121.7)	3.24 (82.3)	3.73 (94.7)
12 or 13	6 or 7	8.23 (209.0)	8.03 (204.0)	4.79 (121.7)	3.44 (87.4)	3.73 (94.7)

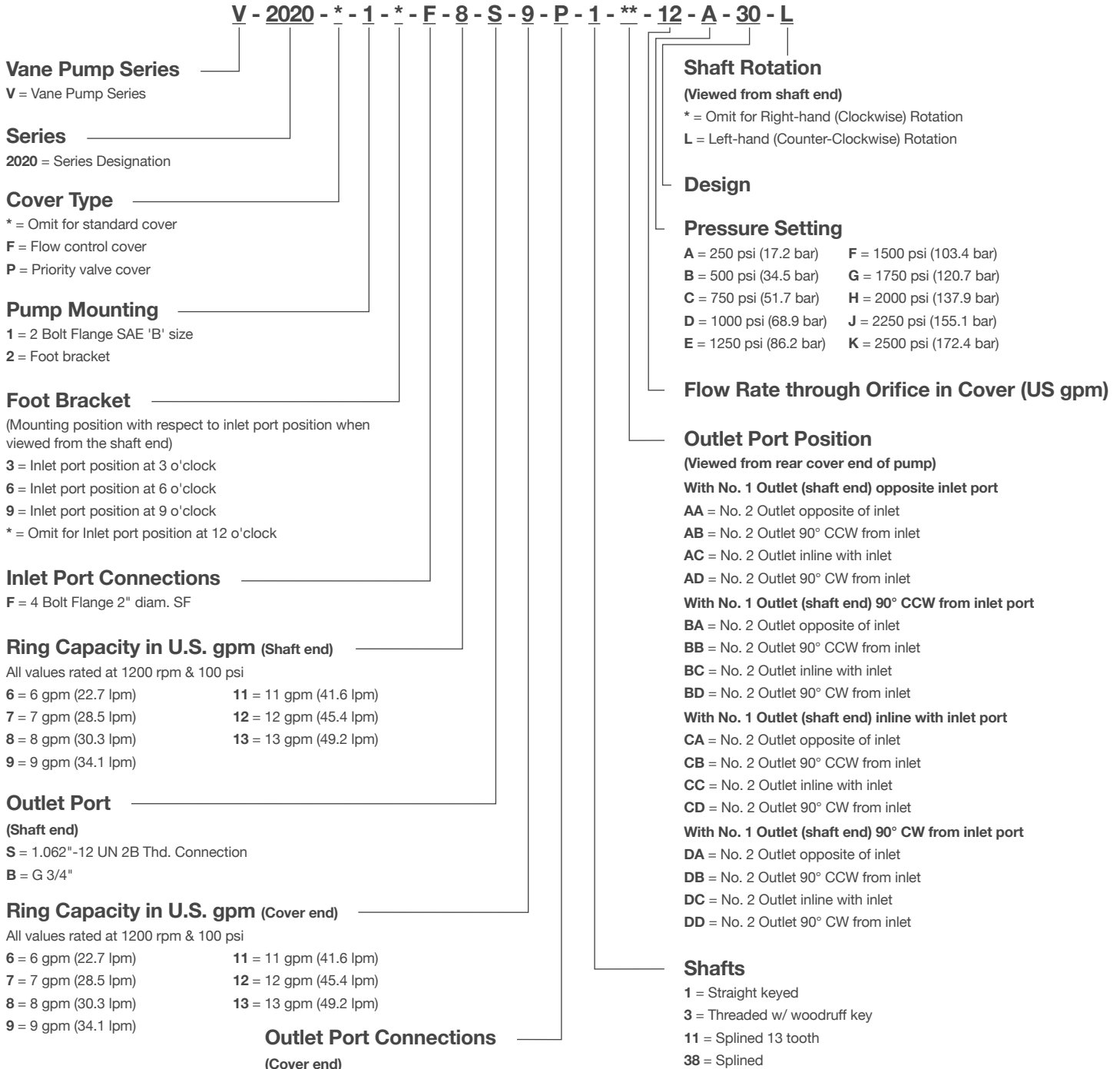
V2020 Series

Model Code Breakdown

Special Note

Place an **F3** in front of the model code for **Special Seals**.

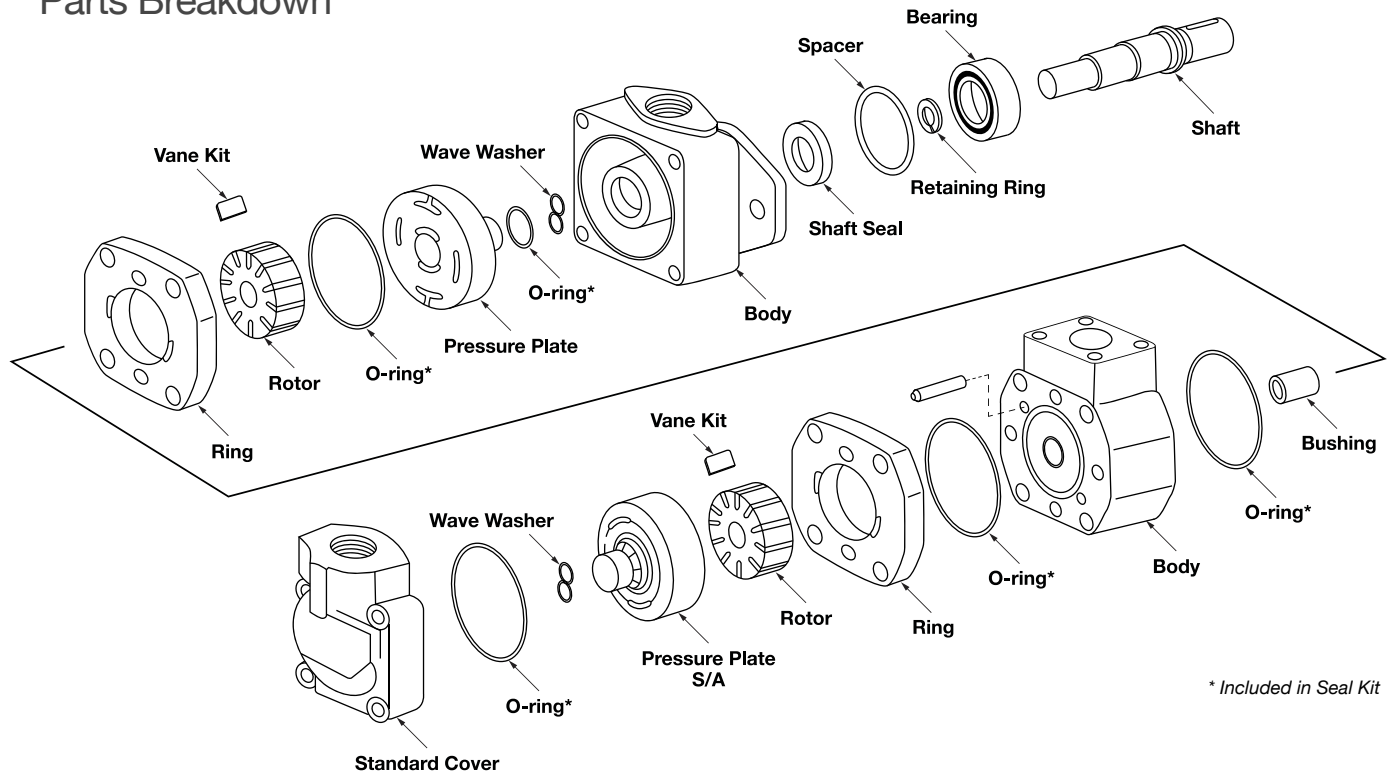
Example: F3-V-2020-*1*-F-8-S-9-P-1-**-12-A-30-L



Code	Std. Cover	Flow Control Cover	
		Pressure	Tank
B	G 3/4"	-	-
P	-	3/4" St. Thd.	1/2" NPT
S	1.062-12 St. Thd.	3/4" NPT	1.062-12 St. Thd.
T	-	3/4" St. Thd.	3/4" St. Thd.

V2020 Series - Double Vane Pump

Parts Breakdown



* Included in Seal Kit

PUMP	FRONT CART. KIT	FRONT ROTOR	FRONT VANE	FRONT RING	FRONT PRES. PLT.	BACK CART. KIT	BACK ROTOR	BACK VANE	BACK RING	BACK PRES. PLT.
V2020	6	923474	358339	923493	328152	6	923480	358328	923485	328150
	7	923494			328152	7	923481			328152
	8	923495	358335	923493	331791	8	923483	358330	923493	331791
	9	923462			331789	9	923484			331789
	11	923475	358336	923478	328156	11	923482	358332	923478	328156
	12	923476			331806					
	13	923477	358337	923479	331807					

PUMP	SEAL KIT	SEAL	BEARING	BODY	SHAFT NO.
V2020	923174	229236	82938	308681	SHAFT 1 - 308686
					SHAFT 11 - 308926

Changing Cartridge Rotation

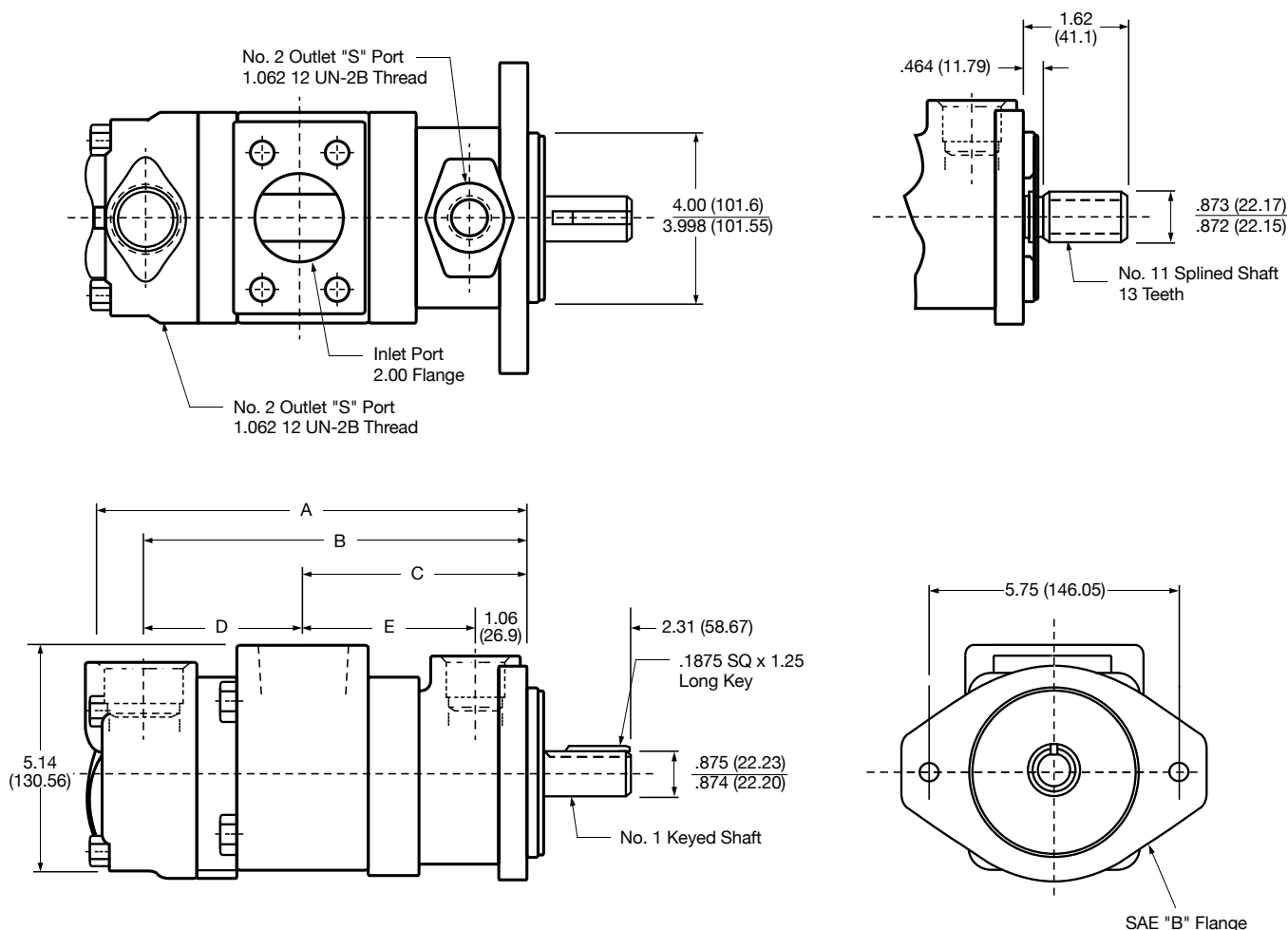
Assemble the ring using the location pins for alignment making sure the arrow on the perimeter points in the proper direction for rotation. Install the rotor on the shaft and insert vanes in the rotor slots. Be certain the radius edges of the vanes are towards the cam ring.

Bolt Torque

- V2020 - 81 ft/lbs (109.8 Nm)

V2020 Series - Double Vane Pump

Dimensions



DELIVERY AT 1200 RPM & 100 PSI (7 BAR)		DIMENSIONS				
SHAFT END	COVER END	A	B	C	D	E
7, 8 or 9	6	8.41 (213.6)	7.39 (187.7)	4.49 (114.0)	2.90 (73.7)	3.43 (87.1)
7, 8 or 9	7, 8 or 9	8.66 (220.0)	7.64 (194.1)	4.49 (114.0)	3.15 (80.0)	3.43 (87.1)
11	6	8.61 (218.7)	7.59 (192.8)	4.69 (119.1)	2.90 (73.7)	3.63 (92.2)
11	7, 8 or 9	8.86 (225.0)	7.84 (199.1)	4.69 (119.1)	3.15 (80.0)	3.63 (92.2)
11	11	9.05 (229.9)	8.03 (204.0)	4.69 (119.1)	3.35 (85.1)	3.63 (92.2)
12 or 13	6	8.75 (222.3)	7.73 (196.3)	4.82 (122.4)	2.90 (73.7)	3.76 (95.5)
12 or 13	7, 8 or 9	8.99 (228.3)	7.97 (202.4)	4.82 (122.4)	3.5 (88.9)	3.76 (95.5)
12 or 13	11	9.19 (233.4)	8.17 (207.5)	4.82 (122.4)	3.35 (85.1)	3.76 (95.5)

VTM42 Series

Features

Balanced vane type pumps are excellent for medium- to low-pressure mobile and industrial applications. Available with integrated flow control valves to simplify system design and installation, these pumps are commonly used as pilot and auxiliary pumps for complex systems, and on heavy-duty trucks and interstate buses. Compact size and ease of service allow maximum equipment design flexibility.

- Compact Power Source for Steering Applications
- Integral Relief and Flow Control
- High Efficiency
- Engineered for Extended Life
- Pressure-balanced

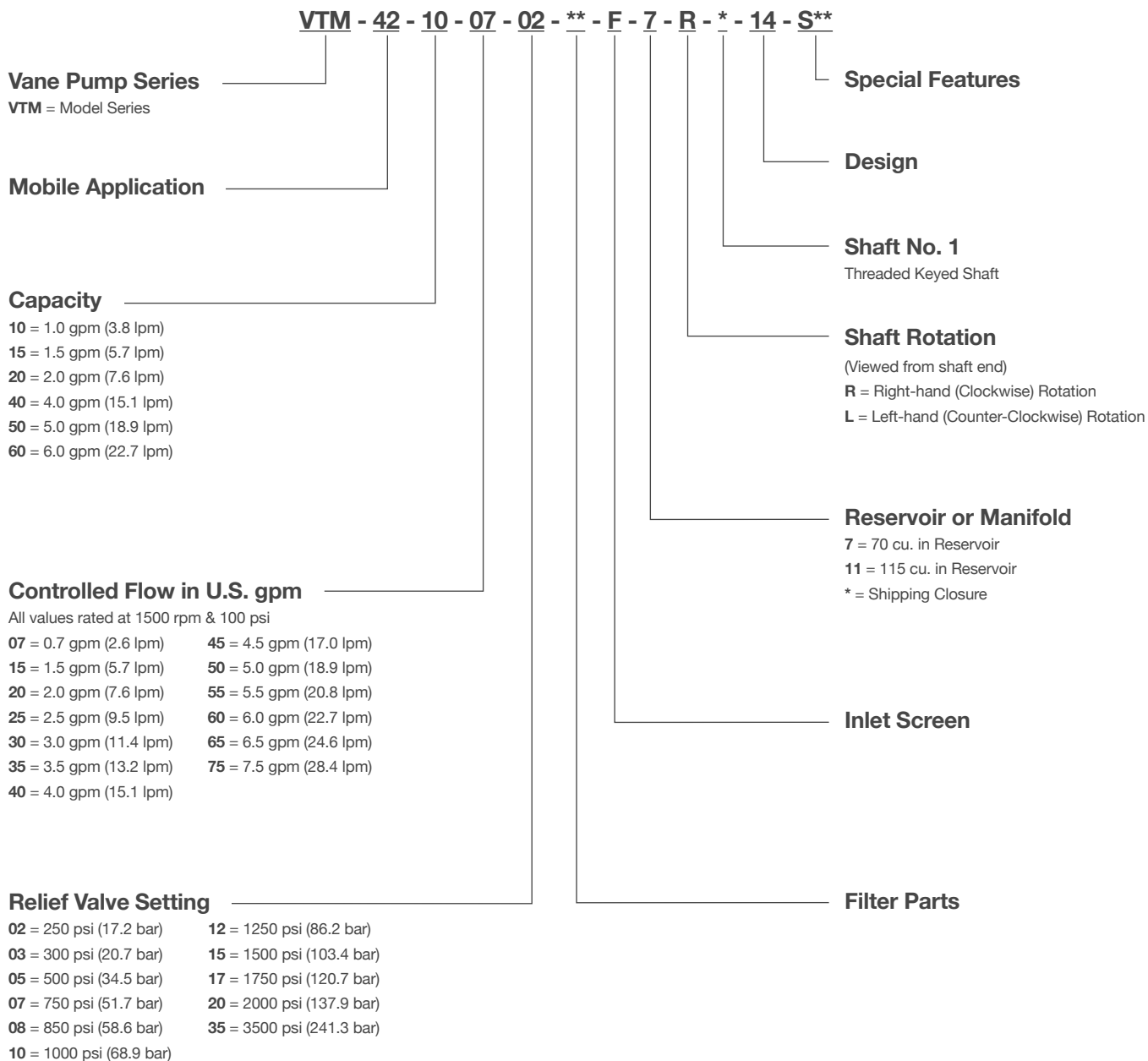
Specifications

PUMP	FLOW IN GPM @ 1200 RPM & 100 PSI (LPM)	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM) @ 100 PSI (7 BAR)	MAX. SPEED (RPM) @ 1500 PSI (103 BAR)	MAX. SPEED (RPM) @ 2000 PSI (138 BAR)	MAX. PRESSURE PSI (BAR)	WEIGHT LBS (KGS)
VTM42	1 (3.8)	0.21 (3.44)	7000	5000	4250	2000 (137.9)	14 (6.35)
	1.5 (5.7)	0.31 (5.08)	7000	4500	4000	2000 (137.9)	
	2 (7.6)	0.38 (6.23)	7000	4200	3800	2000 (137.9)	
	4 (15.1)	0.79 (12.95)	7000	2800	2800	2000 (137.9)	
	5 (18.9)	0.96 (15.73)	6000	2600	2300	2000 (137.9)	
	6 (22.7)	1.18 (19.34)	5000	2500	2000	2000 (137.9)	

Values based on using anti-wear type petroleum oil 150 SUS at 100° F (ISO rating of 32 cSt at 38° C) and 0 psi inlet pressure.

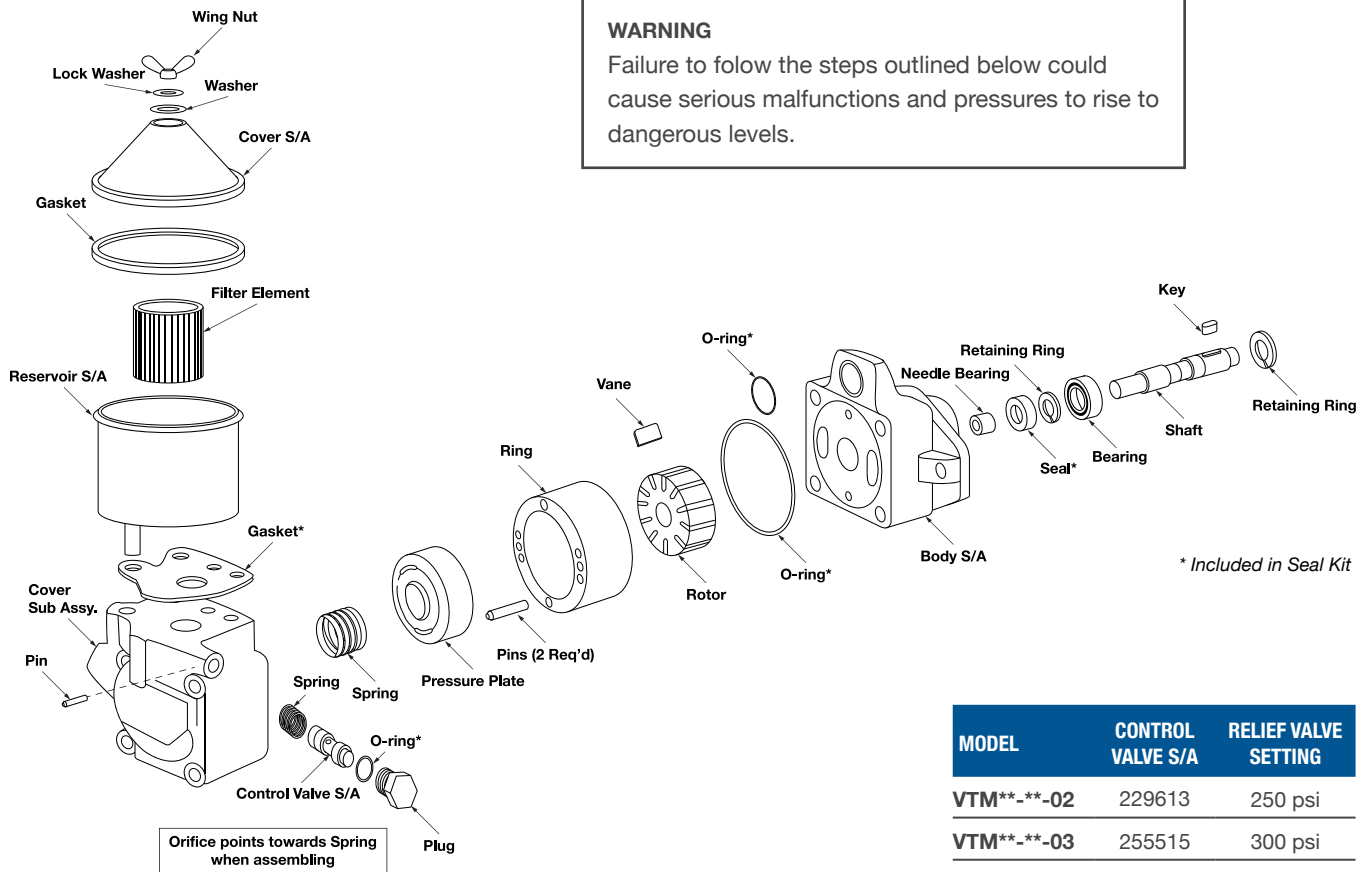
VTM42 Series - Power Steering Pump

Model Code Breakdown



VTM42 Series - Power Steering Pump

Parts Breakdown



MODEL	CARTRIDGE	ROTOR	VANE KIT (10 VANES)	RING	PIN	PRES. PLATE	SPRING
VTM**-10	923087			296594			
VTM**-15	923088	213860	912139	296595	217308		289281
VTM**-20	923089			296596		276396	
VTM**-40	923090			296597			
VTM**-50	923091	213859	922594	296598	154364		245507
VTM**-60	923092			296599			

MODEL	CONTROL VALVE S/A	RELIEF VALVE SETTING
VTM**-**-02	229613	250 psi
VTM**-**-03	255515	300 psi
VTM**-**-05	233018	500 psi
VTM**-**-06	247615	600 psi
VTM**-**-07	232794	750 psi
VTM**-**-08	397339	850 psi
VTM**-**-10	232795	1000 psi
VTM**-**-12	232796	1250 psi
VTM**-**-15	232797	1500 psi
VTM**-**-17	232798	1750 psi
VTM**-**-20	232799	2000 psi

PUMP	RESERVOIR S/A KIT	SEAL KIT	BODY S/A KIT	NEEDLE BEARING	SHAFT SEAL	RETAINING RING	BALL BEARING	#1 SHAFT	KEY	RETAINING RING	FILTER ELEMENT
VTM-42	70 cu. in. 923837	922904	923951	222440	263585	193732	148423	250455	1606	172376	213984
	115 cu. in. 923838										

Changing Cartridge Rotation

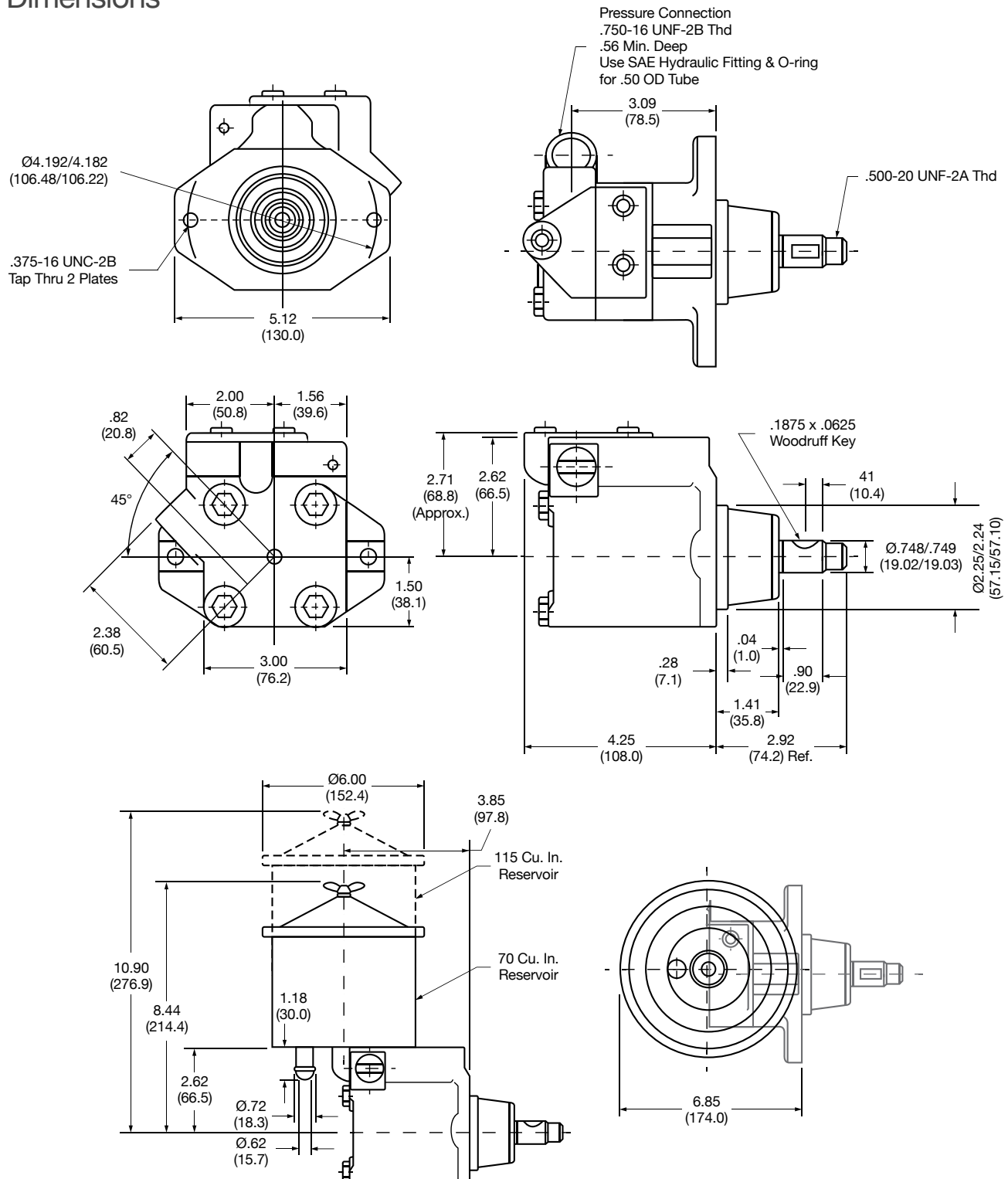
To change the cartridge kit rotation slide cam ring over rotor and vanes, making sure all the radius edges of vanes is toward cam ring. Insert locating pins through cam ring, position cam ring so that the arrow on cam ring is pointing in the proper direction.

Flow Control Relief Valve

When installing the control relief valve, install hex head first into the cover bore seating on the spring. Press plug fully in and insert lock pin.

VTM42 Series - Power Steering Pump

Dimensions



V Series - Single Pump

Features

Intravane design pumps provide longer life and increased productivity. Not to mention, they provide application versatility. These units are also known for extremely low sound levels, making them perfect for industrial applications. Compact size and ease of service allow maximum equipment design flexibility. Pumps are available in single, double and thru-drive configurations.

- High Volumetric Efficiency
- Maximum 3000 psi Operating Pressure
- Twelve Vane Design for Quiet Operation
- Hydraulically Balanced for Extended Life
- Versatile
- Compact



Specifications

PUMP	FLOW IN GPM @ 1200 RPM & 100 PSI (LPM)	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM)	MAX. PRESSURE PSI (BAR)	TYP. DELIVERY GPM @ MAX. SPEED & PRESSURE (LPM)	TYPICAL INPUT POWER (HP) @ MAX. SPEED & PRESSURE (KW)	WEIGHT LBS (KG)
20V	5 (18.9)	1.10 (18.0)	1800	3000 (207)	7.5 (28.4)	15.00 (11.2)	26 (11.8)
	8 (30.3)	1.67 (27.4)	1800	3000 (207)	12 (45.4)	22.78 (17.0)	
	11 (41.6)	2.22 (36.4)	1800	3000 (207)	15 (56.8)	30.28 (22.6)	
	12 (45.4)	2.47 (40.5)	1800	3000 (207)	16.4 (62.1)	33.69 (25.1)	
	14 (53.0)	2.78 (45.6)	1800	3000 (207)	18.4 (69.7)	37.91 (28.3)	
25V	12 (45.4)	2.47 (40.5)	1800	2500 (172)	16.4 (62.1)	30.75 (22.9)	32 (14.5)
	14 (53.0)	2.78 (45.6)	1800	2500 (172)	18.4 (69.7)	34.50 (25.7)	
	17 (64.4)	3.39 (55.6)	1800	2500 (172)	22.8 (86.3)	40.00 (29.8)	
	21 (79.5)	4.13 (67.7)	1800	2500 (172)	28 (106.0)	45.60 (34.0)	
35V	21 (79.5)	4.13 (67.7)	1800	2500 (172)	28 (106.0)	45.60 (34.0)	50 (22.7)
	25 (94.6)	4.94 (81.0)	1800	2500 (172)	33 (125.0)	61.00 (45.5)	
	30 (113.6)	5.91 (96.8)	1800	2500 (172)	40.8 (154.4)	73.00 (54.4)	
	35 (132.5)	6.83 (111.9)	1800	2500 (172)	48 (181.7)	82.40 (61.4)	
	38 (143.8)	7.37 (120.8)	1800	2500 (172)	51.2 (193.8)	88.30 (65.8)	
45V	42 (159.0)	8.41 (137.8)	1800	2500 (172)	55 (208.2)	101.00 (75.3)	75 (34)
	50 (189.3)	9.85 (161.4)	1800	2500 (172)	67 (263.6)	117.00 (87.2)	
	60 (227.1)	11.75 (192.5)	1800	2500 (172)	82 (310.4)	139.00 (103.7)	

Values based on using anti-wear type petroleum oil 150 SUS at 100° F (ISO rating of 32 cSt at 38° C) and 0 psi inlet pressure.

VQ Series - Single Pump

Features

Intravane design pumps provide longer life and increased productivity. Not to mention, they provide application versatility. These units are also known for extremely low sound levels, making them perfect for mobile applications. Compact size and ease of service allow maximum equipment design flexibility. Pumps are available in single, double and thru-drive configurations.

- High Volumetric Efficiency
- Maximum 3000 psi Operating Pressure
- High Operating Speeds
- Pressure Balanced Brass Flex Plates
- Versatile and Compact
- Contaminant Tolerant



Specifications

PUMP	FLOW IN GPM @ 1200 RPM & 100 PSI (LPM)	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM)	MAX. PRESSURE PSI (BAR)	TYP. DELIVERY GPM @ MAX. SPEED & PRESSURE (LPM)	TYPICAL INPUT POWER (HP) @ MAX. SPEED & PRESSURE (KW)	WEIGHT LBS (KG)
20VQ	5 (18.9)	1.10 (18.0)	2700	3000 (207)	11.0 (41.6)	24.0 (17.9)	26 (11.8)
	8 (30.3)	1.67 (27.4)	2700	3000 (207)	17.0 (64.4)	35.0 (26.1)	
	11 (41.6)	2.22 (36.4)	2700	3000 (207)	23.0 (87.1)	47.5 (35.4)	
	12 (45.4)	2.41 (39.5)	2700	2300 (159)	22.5 (85.2)	38.0 (28.3)	
	14 (53.0)	2.80 (45.9)	2700	2000 (138)	30.0 (113.6)	39.0 (29.1)	
25VQ	12 (45.4)	2.45 (40.1)	2700	3000 (207)	23.0 (87.1)	55.0 (41.0)	32 (14.5)
	14 (53.0)	2.77 (45.4)	2700	3000 (207)	27.0 (102.2)	62.5 (46.6)	
	17 (64.4)	3.39 (55.6)	2500	3000 (207)	31.0 (117.3)	69.5 (51.8)	
	19 (71.9)	3.72 (61.0)	2500	3000 (207)	35.0 (132.5)	76.0 (56.7)	
	21 (79.5)	4.12 (67.5)	2500	3000 (207)	38.0 (143.8)	83.0 (61.9)	
35VQ	21 (79.5)	4.12 (67.5)	2500	3000 (207)	38.0 (143.8)	83.0 (61.9)	50 (22.7)
	25 (94.6)	4.98 (81.6)	2500	3000 (207)	45.0 (170.3)	101.0 (75.3)	
	30 (113.6)	5.96 (97.7)	2500	3000 (207)	55.0 (208.2)	117.5 (87.6)	
	35 (132.5)	6.88 (112.7)	2400	3000 (207)	60.0 (227.1)	132.0 (98.4)	
	38 (143.8)	7.42 (121.6)	2400	3000 (207)	65.0 (246.1)	140.0 (104.4)	
45VQ	42 (159.0)	8.46 (138.6)	2200	2500 (172)	66.5 (251.7)	122.5 (91.3)	75 (34.0)
	45 (170.3)	8.95 (146.7)	2200	2500 (172)	71.0 (268.8)	131.0 (97.7)	
	50 (189.3)	9.90 (162.2)	2200	2500 (172)	79.0 (299.0)	141.0 (105.1)	
	60 (227.1)	11.80 (193.4)	2200	2500 (172)	96.0 (363.4)	170.0 (126.8)	

Values based on using anti-wear type petroleum oil 150 SUS at 100° F (ISO rating of 32 cSt at 38° C) and 0 psi inlet pressure.

V/VQ Series - Single Pump

Model Code Breakdown

35 - V - 38 - A - (S) - 11 - C - 22 - R

Model _____

20
25
35
45

Series _____

V = Industrial Series
VQ = Mobile Series

Ring Capacity in U.S. gpm _____

Rated capacity at 1200 rpm & 100 psi

Frame Size	Code (US gpm)	cm ³ /r	in ³ /r
20V/VQ	2	7	0.43
	5	18	1.10
	8	27	1.67
	9	30	1.85
	11	36	2.22
	12	40	2.47
	14	45	2.78
25V/VQ	12	39	2.47
	14	45	2.78
	17	55	3.39
	19	61	3.72
	21	67	4.13
35V/VQ	25	81	4.94
	30	97	5.91
	35	112	6.83
	38	121	7.37
45V/VQ	42	138	8.41
	45	147	8.95
	50	162	9.85
	60	193	11.75

Shaft Rotation
R = Omit for Right-hand (Clockwise) Rotation
L = Left-hand (Counter-Clockwise) Rotation

Design

Outlet Position
(Viewed from cover end of pump)
A = Outlet opposite of inlet
B = Outlet 90° CCW from inlet
C = Outlet inline with inlet
D = Outlet 90° CW from inlet

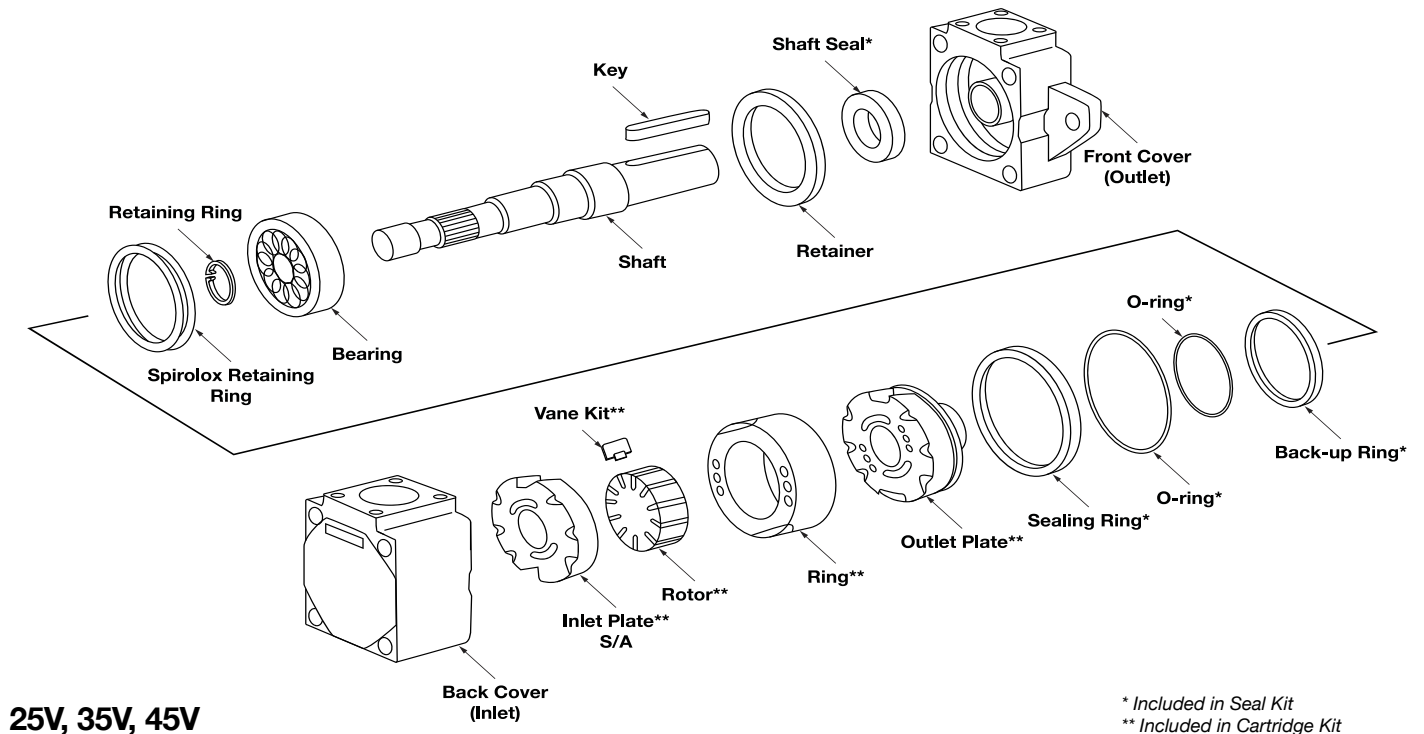
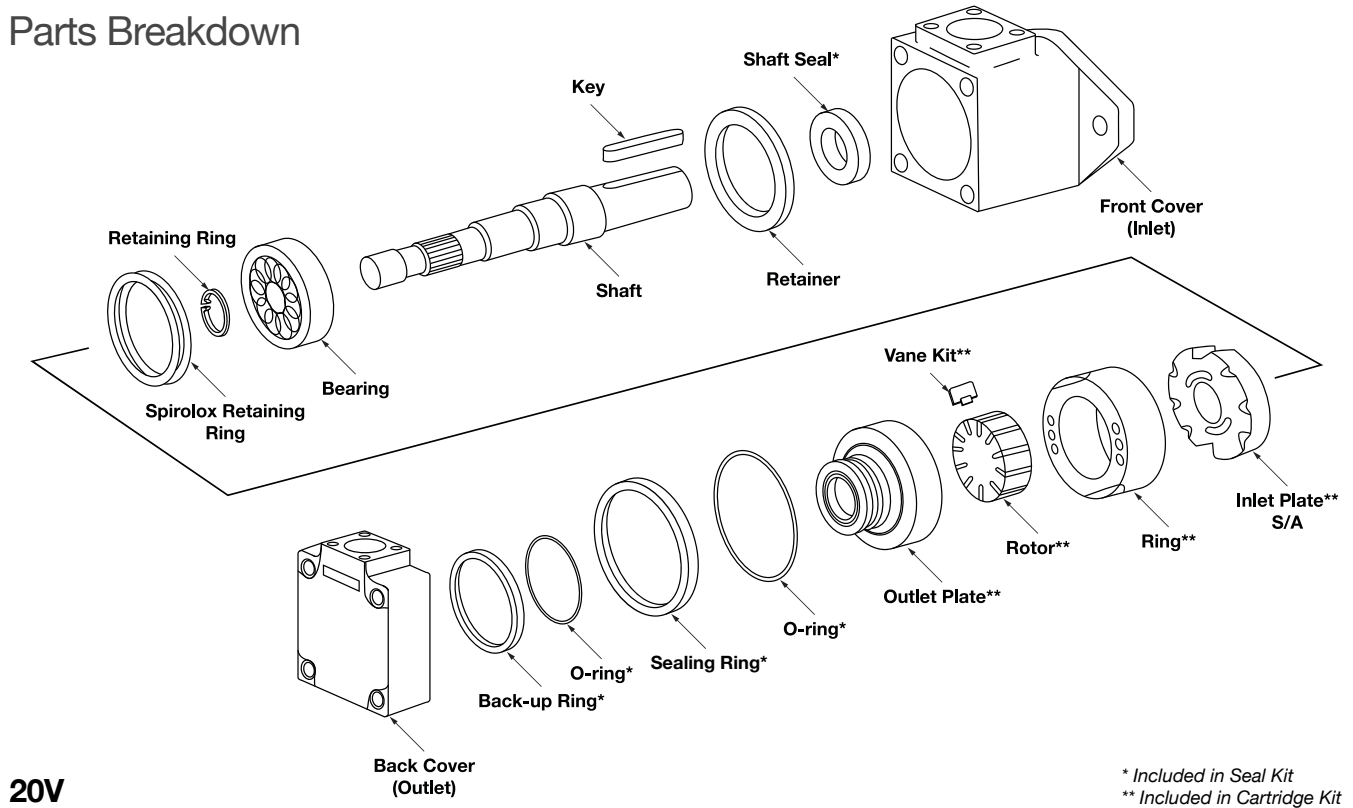
Shaft
1 = Straight Keyed
11 = Splined
86 = Keyed (Heavy-Duty)
151 = Splined (For 20V/VQ only)
(Other Shafts Available)

Mounting & Shaft Seal Assembly
S = Flange mount and double shaft seal
Omit for flange mount with single shaft seal

Port Connections
A = SAE 4-Bolt Flange

V Series - Industrial Single Pump

Parts Breakdown



V Series - Industrial Single Pump

Parts Breakdown Listing

PUMP	CARTRIDGE KITS		ROTOR	VANE KIT	RING	INLET PLATE	OUTLET PLATE	SHAFTS	
20V	5	02-102518	402690	02-136720	333624	584383	585382	1 151	497109 497113
	8	02-102519			333625				
	11	02-102520			333626				
	12	02-102521	403539	02-136721	353901	584384			
	14	02-102522			353902				
25V	12	02-102532	584618	941214	326984	591016	588690	1 11 86	238755 238929 419882
	14	02-102533			326985				
	17	02-102534			326986				
	21	02-102535			326988				
	25	02-102552			319396				
35V	30	02-102553	575478	941019	319397	576265	575479	1 11 86	233624 242287 392669
	35	02-102554			319398				
	38	02-102555			319399				
	42	02-102572			297510				
45V	50	02-102574	578900	941049	297502	578903	580921	1 11 86	233369 242885 361760
	60	02-102575			297503				

PUMP	BUNA SEAL KIT	VITON SEAL KIT	BUNA SHAFT SEAL	VITON SHAFT SEAL	SECONDARY SHAFT SEAL	BEARING	FRONT COVER	BACK COVER
20V	497125	981322	394976	429286	429283	1704	02-102335	250824
25V	922850	919656	394976	429286	429283	1705	942353	224309
35V	922851	919262	394973	429284	429281	38441	942355	234248
45V	919850	919632	394974	429285	429282	131812	942356	229633

Bolt Torques

PUMP	COVER BOLT - FT. LB.	CARTRIDGE KIT - IN. LB.
20V	50 (67.8 Nm)	30 (3.4 Nm)
25V	50 (67.8 Nm)	40 (4.5 Nm)
35V	100 (135.6 Nm)	90 (10.2 Nm)
45V	100 (135.6 Nm)	100 (11.3 Nm)

Filtration

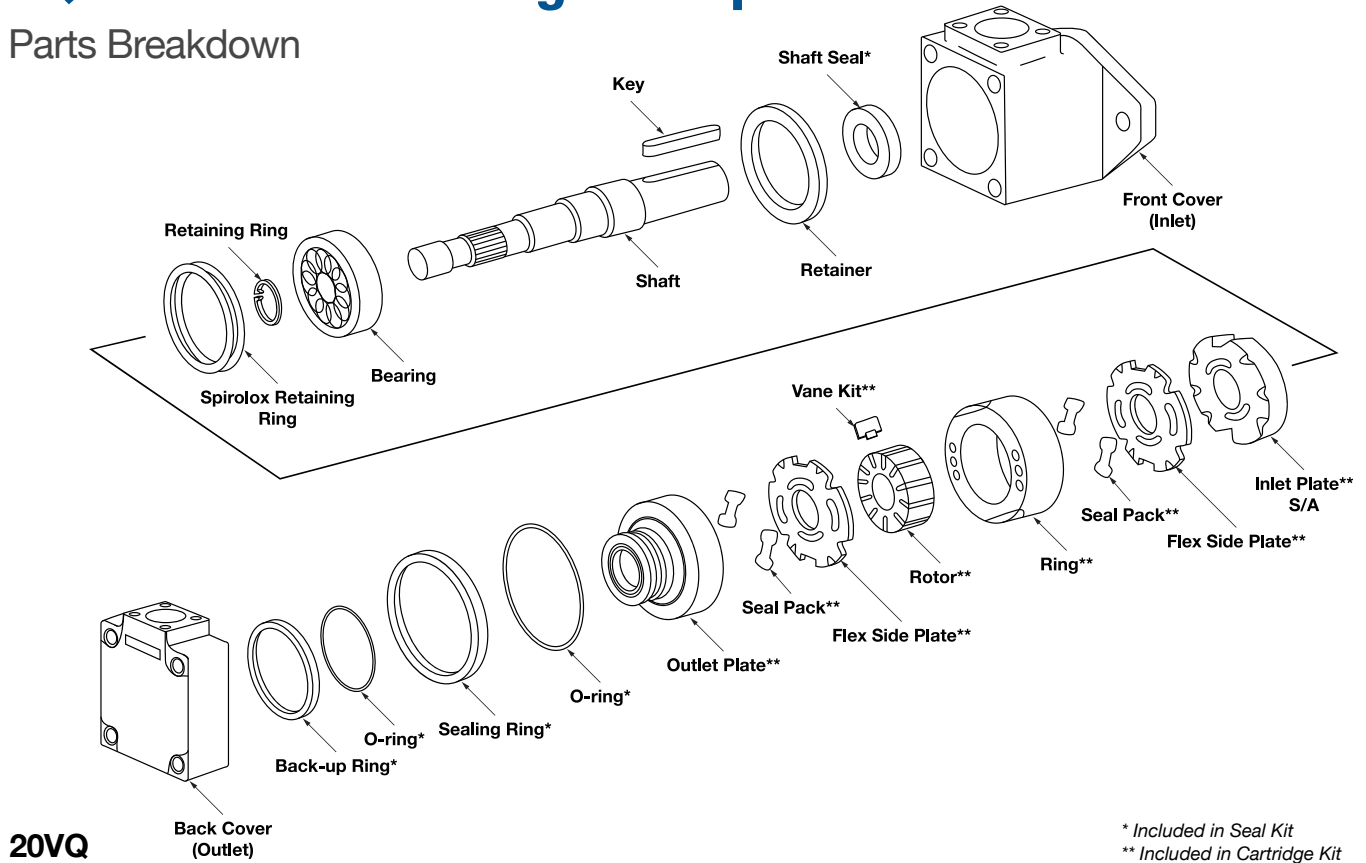
For satisfactory service life, use full flow filtration to provide fluid which meets ISO cleanliness code 19/17 or better.

Changing Cartridge Rotation

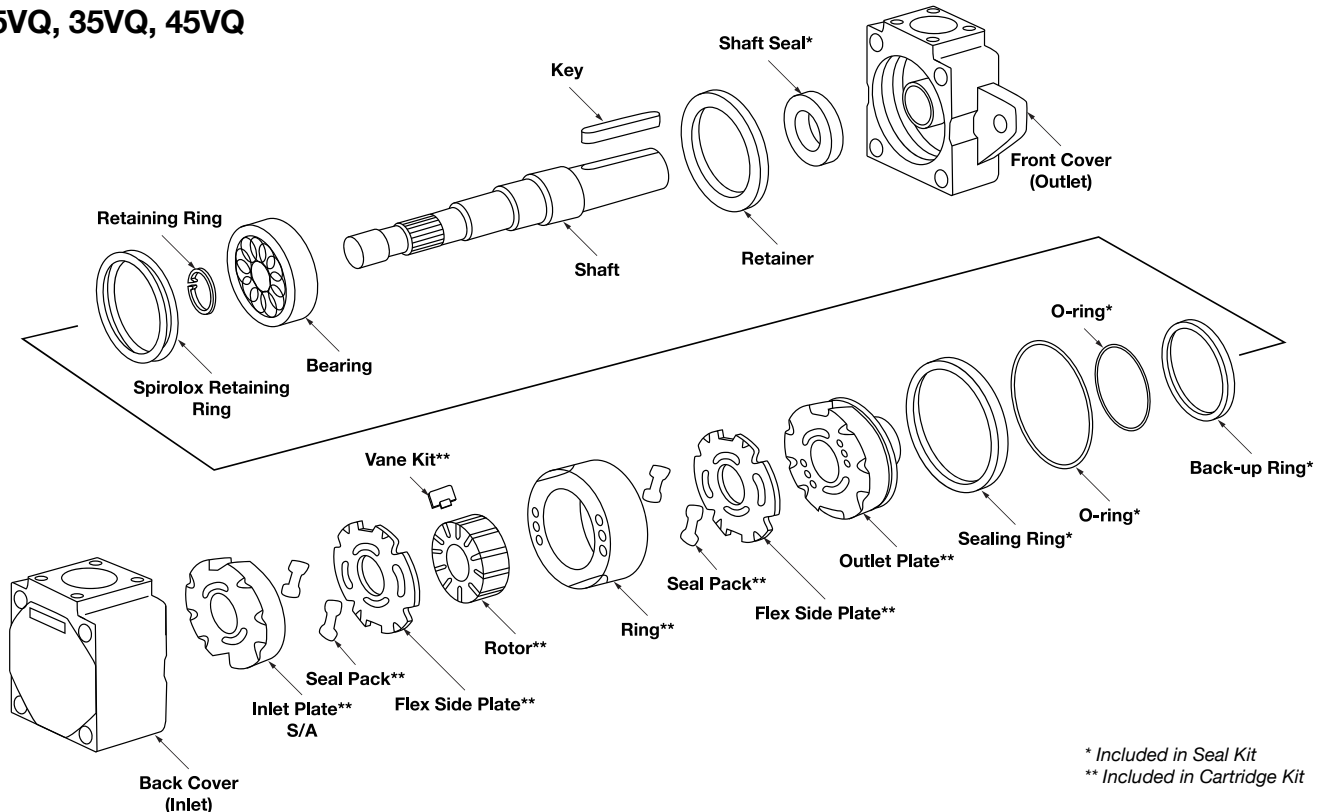
To change Cartridge Kit rotation, reverse the location of the inlet and the outlet support plates. Hand tighten the cartridge screws and use pump cover to align all the parts. Remove the cover and tighten the cartridge screws to the designated value. Sharp edge of vanes must lead in direction of rotation.

VQ Series - Mobile Single Pump

Parts Breakdown



25VQ, 35VQ, 45VQ



VQ Series - Mobile Single Pump

Parts Breakdown Listing

PUMP	CARTRIDGE KITS		ROTOR	VANE KIT	RING	FLEX PLATE	INLET PLATE	OUTLET PLATE	SHAFTS						
20VQ	5	497115	402690	922741	333624	416423	419502	497502	1 151	497109 497113					
	8	497118			333625										
	11	497120			333626										
	12	497121	403539	922743	353901		419501								
	14	497122	353902												
25VQ	12	416439	270597	922710	326984	923956	430805	419079	1 3 11 25 127	238755 242747 238929 270187 424457					
	14	416440			326985										
	17	416441			326986										
	21	416442			326988										
35VQ	21	413420	262154	922700	394961	923953	430806	412003	1 11 19	233624 242287 275270					
	25	413421			319396										
	30	413422			319397										
	35	413418			319398										
	38	413419			319399										
45VQ	42	416435	283271	922701	297510	923954	430807	415382	1 11 19	233369 242885 265575					
	50	416436			297502										
	60	416437			297503										

PUMP	BUNA SEAL KIT	VITON SEAL KIT	BUNA SHAFT SEAL	VITON SHAFT SEAL	SECONDARY SHAFT SEAL	BEARING	FRONT COVER	BACK COVER
20VQ	497123	451471	394976	429286	429283	1704	02-102335	250824
25VQ	920021	920023	394976	429286	429283	1705	942353	224309
35VQ	920015	920029	394973	429284	429281	38441	942355	234248
45VQ	920025	920027	394974	429282	429285	131812	942356	229633

Bolt Torques

PUMP	COVER BOLT - FT. LB.	CARTRIDGE KIT - IN. LB.
20VQ	50 (67.8 Nm)	30 (3.4 Nm)
25VQ	50 (67.8 Nm)	45 (5.1 Nm)
35VQ	100 (135.6 Nm)	100 (11.3 Nm)
45VQ	100 (135.6 Nm)	105 (11.9 Nm)

Filtration

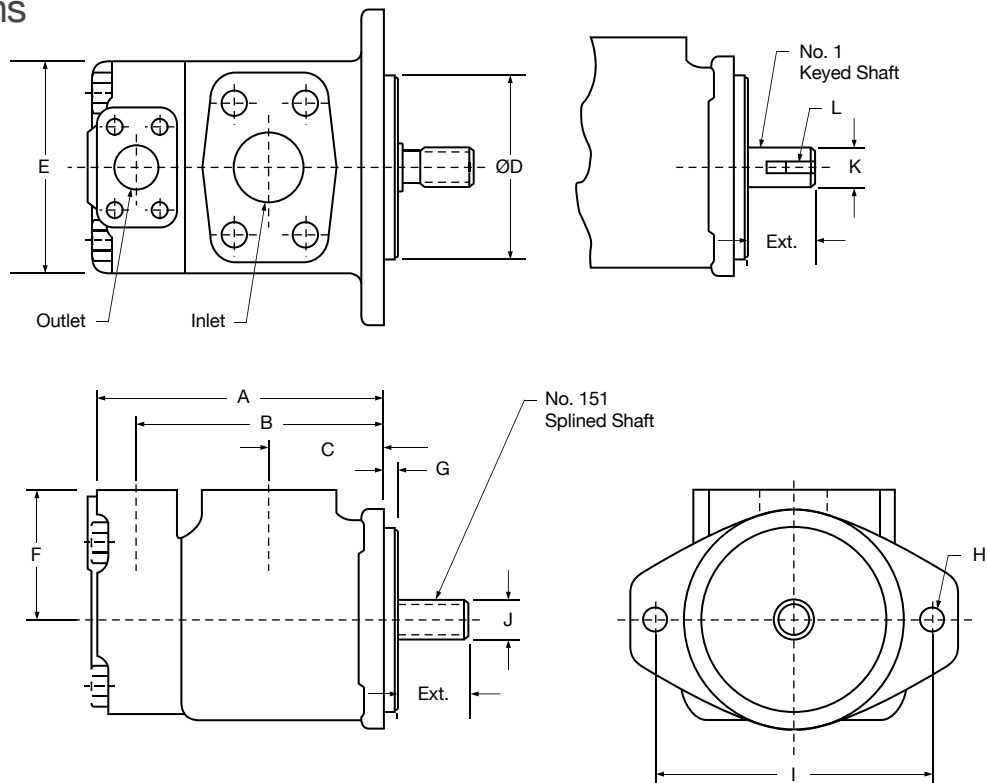
For satisfactory service life, use full flow filtration to provide fluid which meets ISO cleanliness code 19/17 or better.

Changing Cartridge Rotation

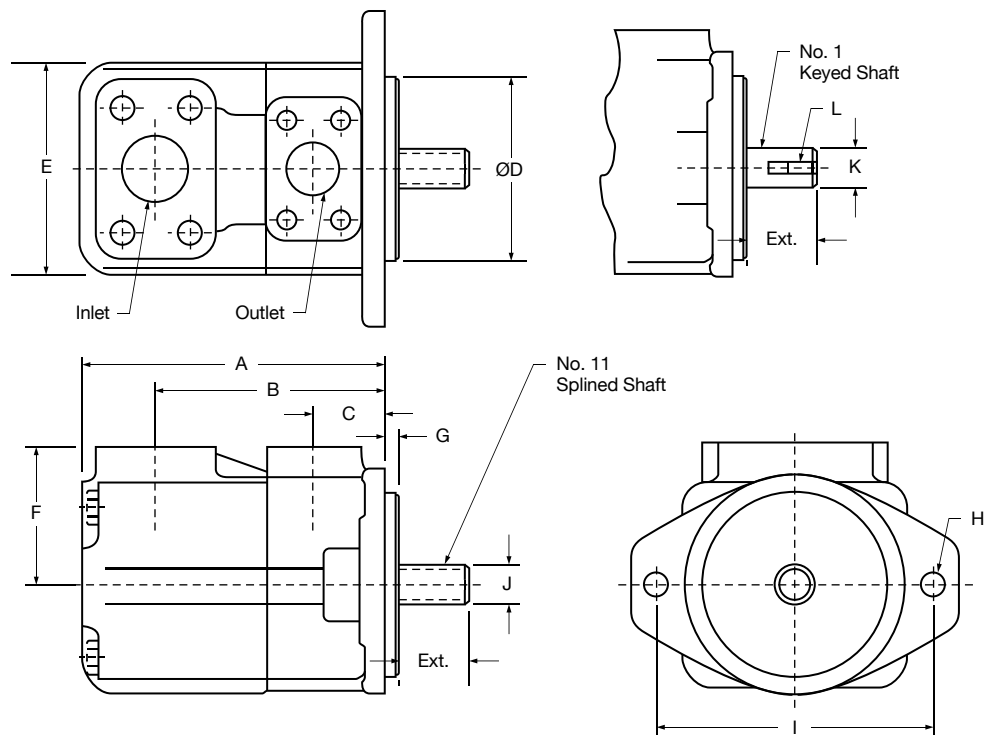
To change Cartridge Kit rotation, reverse the location of the inlet and the outlet support plates. Hand tighten the cartridge screws and use pump cover to align all the parts. Remove the cover and tighten the cartridge screws to the designated value. Sharp edge of vanes must lead in direction of rotation.

V/VQ Series - Single Pump

Dimensions



20V/20VQ



25V/25VQ, 35V/35VQ, 45V/45VQ

V/VQ Series - Single Pump

Dimensions Chart

	20 SERIES	25 SERIES	30 SERIES	35 SERIES	45 SERIES
A	6.12 (155.4)	6.38 (162.1)	6.96 (176.8)	7.28 (185.0)	8.50 (215.9)
B	5.22 (132.6)	4.75 (120.7)	4.85 (123.2)	4.94 (125.4)	6.02 (153.0)
C	2.50 (63.5)	1.50 (38.1)	1.50 (38.1)	1.50 (38.1)	1.69 (43.0)
D	4" Ø SAE 'B'	4" Ø SAE 'B'	4" Ø SAE 'B'	5" Ø SAE 'C'	5" Ø SAE 'C'
E	4.00 (101.6)	4.62 (117.3)	4.62 (117.3)	5.51 (140.0)	6.36 (161.5)
F	3.00 (76.2)	3.00 (76.2)	3.00 (76.2)	3.25 (82.6)	3.69 (93.7)
G	.375 (9.5)	.375 (9.5)	.375 (9.5)	.375 (9.5)	.500 (12.7)
H	.56 (14.2)	.56 (14.2)	.56 (14.2)	.688 (17.5)	.688 (17.5)
I	5.75 (146.1)	5.75 (146.1)	5.75 (146.1)	7.125 (181.0)	7.125 (181.0)
J	.875 Ø 13t 1.75 Ext.	.875 Ø 13t 1.75 Ext.	.875 Ø 13t 1.75 Ext.	1.25 Ø 14t 2.31 Ext.	1.25 Ø 14t 2.44 Ext.
K	.875 Ø 13t 2.13 Ext.	.875 Ø 13t 2.31 Ext.	.875 Ø 13t 2.31 Ext.	1.25 Ø 14t 2.88 Ext.	1.25 Ø 14t 2.44 Ext.
L	Key .187	Key .187	Key .187	Key .3125	Key .3125
Inlet	1-1/2" FL	1-1/2" FL	1-1/2" FL	2" FL	3" FL
Outlet	3/4" FL	1" FL	1-1/4" FL	1-1/4" FL	1-1/2" FL
Weight	32 lbs (14.5 kg)	32 lbs (14.5 kg)	36 lbs (16.3 kg)	50 lbs (22.7 kg)	75 lbs (34.0 kg)

Dimensions are in inches (millimeters).

Shaft Descriptions & Codes

PUMP STYLE	CODE	DESCRIPTION	MAJOR DIAM.	EXT.
20V/20VQ	1	3/16 Square Keyed	0.875 (22.2)	2.310 (58.7)
	151	13T 16/32 Splined	0.875 (22.2)	1.750 (44.5)
25V/25VQ	1	13/16 Square Keyed	0.875 (22.2)	2.312 (58.7)
	3	#15 Woodruff Keu	0.875 (22.2)	2.440 (62.0)
30V/30VQ	11	13T 16/32 Splined	0.875 (22.2)	1.750 (44.5)
	25	14T 12/24 Splined	1.250 (31.8)	1.750 (44.5)
	127	14T 12/24 Splined	1.250 (31.8)	2.310 (58.7)
35V/35VQ	1	5/16 Square Keyed	1.250 (31.8)	2.880 (73.2)
	11	14T 12/24 Splined	1.250 (31.8)	2.310 (58.7)
	19	14T 12/24 Extra Long Splined	1.250 (31.8)	3.050 (77.5)
	86	5/16 Heavy-Duty Square Keyed	1.375 (34.9)	3.380 (85.9)
45V/45VQ	1	5/16 Square Keyed	1.250 (31.8)	2.440 (62.0)
	11	14T 12/24 Splined	1.248 (31.7)	2.440 (62.0)
	19	14T 12/24 Extra Long Splined	1.248 (31.7)	3.060 (77.7)
	86	3/8 Heavy-Duty Square Keyed	1.500 (38.1)	3.440 (87.4)

V Series - Industrial Double Pump

Features & Specifications

Intravane design pumps provide longer life and increased productivity. Not to mention, they provide application versatility. These units are also known for extremely low sound levels, making them perfect for industrial applications. Compact size and ease of service allow maximum equipment design flexibility. Pumps are available in single, double and thru-drive configurations.

- High Volumetric Efficiency
- Maximum 3000 psi Operating Pressure
- Twelve Vane Design for Quiet Operation
- Hydraulically Balanced for Extended Life
- Versatile & Compact



PUMP	SHAFT END FLOW IN GPM @ 1200 RPM & 100 PSI (LPM)	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM)	MAX. PRESS. PSI (BAR)	TYP. DELIVERY GPM @ MAX. SPEED & PRESSURE (LPM)	TYPICAL INPUT POWER (HP) @ MAX. SPEED & PRESSURE (KW)	COVER END FLOW IN GPM @ 1200 RPM & 100 PSI (LPM)	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM)	MAX. PRESS. PSI (BAR)	TYP. DELIVERY GPM @ MAX. SPEED & PRESSURE (LPM)	TYPICAL INPUT POWER (HP) @ MAX. SPEED & PRESSURE (KW)
2520V	12 (45.4)	2.47 (40.5)	1800	2500 (172)	16.4 (62.1)	30.75 (22.9)	5 (18.9)	1.10 (18.0)	1800	3000 (207)	7.2 (27.3)	17.00 (12.7)
	14 (53.0)	2.78 (45.6)	1800	2500 (172)	18.4 (69.7)	34.50 (25.7)	8 (30.3)	1.67 (27.4)	1800	3000 (207)	11.1 (42.0)	25.00 (18.6)
	17 (64.4)	3.39 (55.6)	1800	2500 (172)	22.8 (86.3)	35.80 (26.7)	11 (41.6)	2.22 (36.4)	1800	3000 (207)	13.1 (49.6)	34.00 (25.4)
	21 (79.5)	4.13 (67.7)	1800	2500 (172)	28.8 (109.0)	31.00 (23.1)	12 (45.4)	2.41 (39.5)	1800	2500 (172)	17.4 (65.9)	29.75 (22.2)
							14 (53.0)	2.78 (45.6)	1800	2000 (138)	18.6 (70.4)	34.50 (25.7)
3520V	21 (79.5)	4.13 (67.7)	1800	2500 (172)	28.8 (109.0)	31.00 (23.1)	5 (18.9)	1.10 (18.0)	1800	3000 (207)	7.2 (27.3)	17.00 (12.7)
	25 (94.6)	4.94 (81.0)	1800	2500 (172)	33.9 (128.3)	61.00 (45.5)	8 (30.3)	1.67 (27.4)	1800	3000 (207)	11.1 (42.0)	25.00 (18.6)
	30 (113.6)	5.91 (96.8)	1800	2500 (172)	40.8 (154.4)	73.00 (54.4)	11 (41.6)	2.22 (36.4)	1800	3000 (207)	13.1 (49.6)	34.00 (25.4)
	35 (132.5)	6.83 (111.9)	1800	2500 (172)	48.0 (181.7)	82.40 (61.4)	12 (45.4)	2.41 (39.5)	1800	2500 (172)	17.4 (65.9)	29.75 (22.2)
	38 (143.8)	7.37 (120.8)	1800	2500 (172)	51.2 (193.8)	88.30 (65.8)	14 (53.0)	2.78 (45.6)	1800	2500 (172)	18.6 (70.4)	34.50 (25.7)
3525V	21 (79.5)	4.13 (67.7)	1800	2500 (172)	28.8 (109.0)	31.00 (23.1)						
	25 (94.6)	4.94 (81.0)	1800	2500 (172)	33.9 (128.3)	61.00 (45.5)	12 (45.4)	2.41 (39.5)	1800	2500 (172)	16.0 (60.6)	30.75 (22.9)
	30 (113.6)	5.91 (96.8)	1800	2500 (172)	40.8 (154.4)	73.00 (54.4)	14 (53.0)	2.81 (46.0)	1800	2500 (172)	18.6 (70.4)	34.50 (25.7)
	35 (132.5)	6.83 (111.9)	1800	2500 (172)	48.0 (181.7)	82.40 (61.4)	17 (64.4)	3.39 (55.6)	1800	2500 (172)	22.5 (85.2)	35.80 (26.7)
	38 (143.8)	7.37 (120.8)	1800	2500 (172)	51.2 (193.8)	88.30 (65.8)	21 (79.5)	4.13 (67.7)	1800	2500 (172)	27.5 (104.1)	45.60 (34.0)
4520V	42 (159.0)	8.41 (137.8)	1800	2500 (172)	55.0 (208.2)	101.00 (75.3)	5 (18.9)	1.10 (18.0)	1800	3000 (207)	7.2 (27.3)	17.00 (12.7)
	50 (189.2)	9.85 (161.4)	1800	2500 (172)	57.0 (215.8)	110.00 (82.0)	8 (30.3)	1.67 (27.4)	1800	3000 (207)	11.1 (42.0)	25.00 (18.6)
	60 (227.1)	11.75 (192.5)	1800	2500 (172)	67.0 (253.6)	117.00 (87.2)	11 (41.6)	2.22 (36.4)	1800	3000 (207)	13.1 (49.6)	34.00 (25.4)
							12 (45.4)	2.41 (39.5)	1800	2500 (172)	17.4 (65.9)	29.75 (22.2)
							14 (53.0)	2.78 (45.6)	1800	2500 (172)	18.6 (70.4)	34.50 (25.7)
4525V	42 (159.0)	8.41 (137.8)	1800	2500 (172)	55.0 (208.2)	101.00 (75.3)	12 (45.4)	2.41 (39.5)	1800	2500 (172)	16.0 (60.6)	30.75 (22.9)
	50 (189.2)	9.85 (161.4)	1800	2500 (172)	57.0 (215.8)	110.00 (82.0)	14 (53.0)	2.81 (46.0)	1800	2500 (172)	18.6 (70.4)	34.50 (25.7)
	60 (227.1)	11.75 (192.5)	1800	2500 (172)	67.0 (253.6)	117.00 (87.2)	17 (64.4)	3.39 (55.6)	1800	2500 (172)	22.5 (85.2)	35.80 (26.7)
							21 (79.5)	4.13 (67.7)	1800	2500 (172)	27.5 (104.1)	45.60 (34.0)
4535V	42 (159.0)	8.41 (137.8)	1800	2500 (172)	55.0 (208.2)	101.00 (75.3)	21 (79.5)	4.13 (67.7)	1800	2500 (172)	28.8 (109.0)	31.00 (23.1)
	50 (189.2)	9.85 (161.4)	1800	2500 (172)	57.0 (215.8)	110.00 (82.0)	25 (94.6)	4.94 (81.0)	1800	2500 (172)	33.9 (128.3)	61.00 (45.5)
	60 (227.1)	11.75 (192.5)	1800	2500 (172)	67.0 (253.6)	117.00 (87.2)	30 (113.6)	5.91 (96.8)	1800	2500 (172)	40.8 (154.4)	73.00 (54.4)
							35 (132.5)	6.83 (111.9)	1800	2500 (172)	48.0 (181.7)	82.40 (61.4)
							38 (143.8)	7.37 (120.8)	1800	2500 (172)	51.2 (193.8)	88.30 (65.8)

Values based on using anti-wear type petroleum oil 150 SUS at 100° F (ISO rating of 32 cSt at 38° C) and 0 psi inlet pressure.

VQ Series - Mobile Double Pump

Features & Specifications

Intravane design pumps provide longer life and increased productivity. Not to mention, they provide application versatility. These units are also known for extremely low sound levels, making them perfect for mobile applications. Compact size and ease of service allow maximum equipment design flexibility. Pumps are available in single, double and thru-drive configurations.

- High Volumetric Efficiency
- Maximum 3000 psi Operating Pressure
- High Operating Speeds
- Pressure Balanced Brass Flex Plates
- Contaminant Tolerant



PUMP	SHAFT END FLOW IN GPM @ 1200 RPM & 100 PSI (LPM)	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM)	MAX. PRESS. PSI (BAR)	TYP. DELIVERY GPM @ MAX. SPEED & PRESSURE (LPM)	TYPICAL INPUT POWER (HP) @ MAX. SPEED & PRESSURE (KW)	COVER END FLOW IN GPM @ 1200 RPM & 100 PSI (LPM)	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM)	MAX. PRESS. PSI (BAR)	TYP. DELIVERY GPM @ MAX. SPEED & PRESSURE (LPM)	TYPICAL INPUT POWER (HP) @ MAX. SPEED & PRESSURE (KW)
2520VQ	12 (45.4)	2.47 (40.5)	2700	3000 (207)	23.0 (87.1)	55.0 (41.0)	5 (18.9)	1.10 (18.0)	2700	3000 (207)	11.0 (41.6)	24.0 (17.9)
	14 (53.0)	2.78 (45.6)	2700	3000 (207)	27.0 (102.2)	62.5 (46.6)	8 (30.3)	1.67 (27.4)	2700	3000 (207)	17.0 (64.4)	35.0 (26.1)
	17 (64.4)	3.39 (55.6)	2700	3000 (207)	31.0 (117.3)	69.5 (51.8)	11 (41.6)	2.22 (36.4)	2700	3000 (207)	23.0 (87.1)	47.5 (35.4)
	21 (79.5)	4.13 (67.7)	2700	3000 (207)	38.0 (143.8)	76.0 (56.7)	12 (45.4)	2.41 (39.5)	2700	2300 (159)	25.5 (96.5)	38.0 (28.3)
							14 (53.0)	2.78 (45.6)	2700	2000 (138)	30.0 (113.6)	39.0 (29.1)
3520VQ	21 (79.5)	4.13 (67.7)	2500	3000 (207)	38.0 (143.8)	83.0 (61.9)	5 (18.9)	1.10 (18.0)	2500	3000 (207)	11.0 (41.6)	24.0 (17.9)
	25 (94.6)	4.94 (81.0)	2500	3000 (207)	45.0 (170.3)	101.0 (75.3)	8 (30.3)	1.67 (27.4)	2500	3000 (207)	17.0 (64.4)	35.0 (26.1)
	30 (113.6)	5.91 (96.8)	2500	3000 (207)	55.0 (208.2)	117.5 (87.6)	11 (41.6)	2.22 (36.4)	2500	3000 (207)	23.0 (87.1)	47.5 (35.4)
	35 (132.5)	6.83 (111.9)	2400	3000 (207)	60.0 (227.1)	132.0 (98.4)	12 (45.4)	2.41 (39.5)	2500	2300 (159)	25.5 (96.5)	38.0 (28.3)
	38 (143.8)	7.37 (120.8)	2400	3000 (207)	65.0 (246.1)	140.0 (104.4)	14 (53.0)	2.78 (45.6)	2500	2000 (138)	30.0 (113.6)	39.0 (29.1)
3525VQ	21 (79.5)	4.13 (67.7)	2500	3000 (207)	38.0 (143.8)	83.0 (61.9)						
	25 (94.6)	4.94 (81.0)	2500	3000 (207)	45.0 (170.3)	101.0 (75.3)	12 (45.4)	2.41 (39.5)	2500	3000 (207)	21.0 (79.5)	51.0 (38.0)
	30 (113.6)	5.91 (96.8)	2500	3000 (207)	55.0 (208.2)	117.5 (87.6)	14 (53.0)	2.81 (46.0)	2500	3000 (207)	24.0 (90.8)	58.0 (43.3)
	35 (132.5)	6.83 (111.9)	2400	3000 (207)	60.0 (227.1)	132.0 (98.4)	17 (64.4)	3.39 (55.6)	2500	3000 (207)	31.0 (117.3)	69.0 (51.5)
	38 (143.8)	7.37 (120.8)	2400	3000 (207)	65.0 (246.1)	140.0 (104.4)	21 (79.5)	4.13 (67.7)	2500	3000 (207)	38.0 (143.8)	83.0 (61.9)
4520VQ	42 (159.0)	8.41 (137.8)	2200	2500 (172)	66.5 (251.7)	122.5 (91.3)	5 (18.9)	1.10 (18.0)	2200	3000 (207)	11.0 (41.6)	24.0 (17.9)
	50 (189.2)	9.85 (161.4)	2200	2500 (172)	79.0 (299.0)	141.0 (105.1)	8 (30.3)	1.67 (27.4)	2200	3000 (207)	17.0 (64.4)	35.0 (26.1)
	60 (227.1)	11.75 (192.5)	2200	2500 (172)	96.0 (363.4)	170.0 (126.8)	11 (41.6)	2.22 (36.4)	2200	3000 (207)	23.0 (87.1)	47.5 (35.4)
							12 (45.4)	2.41 (39.5)	2200	2300 (159)	25.5 (96.5)	38.0 (28.3)
							14 (53.0)	2.78 (45.6)	2200	2000 (138)	30.0 (113.6)	39.0 (29.1)
4525VQ	42 (159.0)	8.41 (137.8)	2200	2500 (172)	66.5 (251.7)	122.5 (91.3)	12 (45.4)	2.41 (39.5)	2200	3000 (207)	21.0 (79.5)	51.0 (38.0)
	50 (189.2)	9.85 (161.4)	2200	2500 (172)	79.0 (299.0)	141.0 (105.1)	14 (53.0)	2.81 (46.0)	2200	3000 (207)	24.0 (90.8)	58.0 (43.3)
	60 (227.1)	11.75 (192.5)	2200	2500 (172)	96.0 (363.4)	170.0 (126.8)	17 (64.4)	3.39 (55.6)	2200	3000 (207)	31.0 (117.3)	69.0 (51.5)
							21 (79.5)	4.13 (67.7)	2200	3000 (207)	38.0 (143.8)	83.0 (61.9)
4535VQ	42 (159.0)	8.41 (137.8)	2200	2500 (172)	66.5 (251.7)	122.5 (91.3)	21 (79.5)	4.13 (67.7)	2200	3000 (207)	38.0 (143.8)	83.0 (61.9)
	50 (189.2)	9.85 (161.4)	2200	2500 (172)	79.0 (299.0)	141.0 (105.1)	25 (94.6)	4.94 (81.0)	2200	3000 (207)	45.0 (170.3)	101.0 (75.3)
	60 (227.1)	11.75 (192.5)	2200	2500 (172)	96.0 (363.4)	170.0 (126.8)	30 (113.6)	5.91 (96.8)	2200	3000 (207)	55.0 (208.2)	117.5 (87.6)
							35 (132.5)	6.83 (111.9)	2200	3000 (207)	60.0 (227.1)	132.0 (98.4)
							38 (143.8)	7.37 (120.8)	2200	3000 (207)	65.0 (246.1)	140.0 (104.4)

Values based on using anti-wear type petroleum oil 150 SUS at 100° F (ISO rating of 32 cSt at 38° C) and 0 psi inlet pressure.

V/VQ Series - Double Pump

Model Code Breakdown

2520 - V - 12 - A - 14 - (S) - 1 - CC - 22 - R

Model

2520	4520
3520	4525
3525	4535

Series

V = Industrial Series
VQ = Mobile Series

Shaft End Ring Capacity in U.S. gpm

Rated capacity at 1200 rpm & 100 psi

Frame Size	Code (US gpm)	cm ³ /r	in ³ /r
25V/VQ	10	33	2.01
	12	39	2.47
	14	45	2.78
	17	55	3.39
	21	67	4.13
35V/VQ	25	81	4.94
	30	97	5.91
	35	112	6.83
	38	121	7.37
45V/VQ	42	138	8.41
	45	147	8.95
	50	162	9.85
	60	193	11.75

Port Connections

Code	Inlet	Outlet #1 Shaft End	Outlet #2 Cover End	Pump Series
A	4 Bolt Flg.	4 Bolt Flg.	4 Bolt Flg.	All
C	4 Bolt Flg.	SAE St. Thd.	SAE St. Thd.	2520
E	4 Bolt Flg.	4 Bolt Flg.	SAE St. Thd.	All except 4535

Cover End Ring Capacity in U.S. gpm

Rated capacity at 1200 rpm & 100 psi

Frame Size	Code (US gpm)	cm ³ /r	in ³ /r
**20V/VQ	2	7	0.43
	5	18	1.10
	8	27	1.67
	9	30	1.85
	11	36	2.22
	12	40	2.47
	14	45	2.78
**25V/VQ	10	33	2.01
	12	39	2.47
	14	45	2.78
	17	55	3.39
	21	67	4.13
**35V/VQ	25	81	4.94
	30	97	5.91
	35	112	6.83
	38	121	7.37

Shaft Rotation

R = Omit for Right-hand (Clockwise) Rotation
L = Left-hand (Counter-Clockwise) Rotation

Design

Outlet Port Position

(Viewed from cover end of pump)

All Series except 4535V/VQ

With No. 1 Outlet (shaft end) opposite inlet port

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 (shaft end) 90° CCW from inlet port

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 (shaft end) inline with inlet port

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 (shaft end) 90° CW from inlet port

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 4535V/VQ

With No. 1 Outlet (shaft end) opposite inlet port

AA = No. 2 Outlet opposite of 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 (shaft end) 90° CCW from inlet port

BA = No. 2 Outlet opposite of 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 (shaft end) inline with inlet port

CA = No. 2 Outlet opposite of inlet
CB = No. 2 Outlet 90° CCW from inlet
CC = No. 2 Outlet inline with inlet
CD = No. 2 Outlet 90° CW from inlet

With No. 1 Outlet (shaft end) 90° CW from inlet port

DA = No. 2 Outlet opposite of inlet
DB = No. 2 Outlet 90° CCW from inlet
DC = No. 2 Outlet inline with inlet
DD = No. 2 Outlet 90° CW from inlet

Mounting & Shaft Seal Assembly

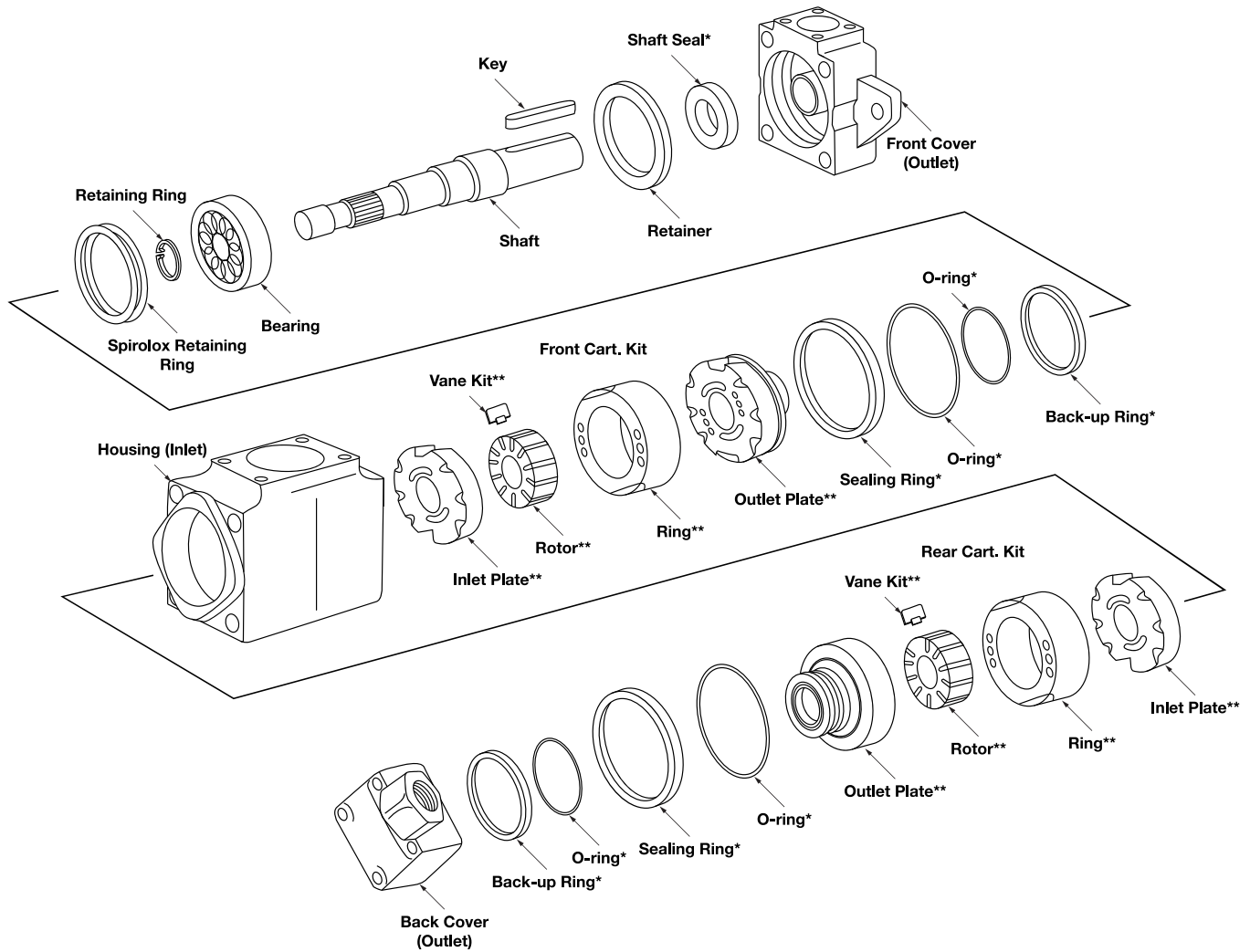
S = Flange mount and double shaft seal
Omit for flange mount with single shaft seal

Shaft

1 = Straight Keyed
11 = Splined
86 = Keyed (Heavy-Duty)
(Other Shafts Available)

V Series - Industrial Double Pump

Parts Breakdown

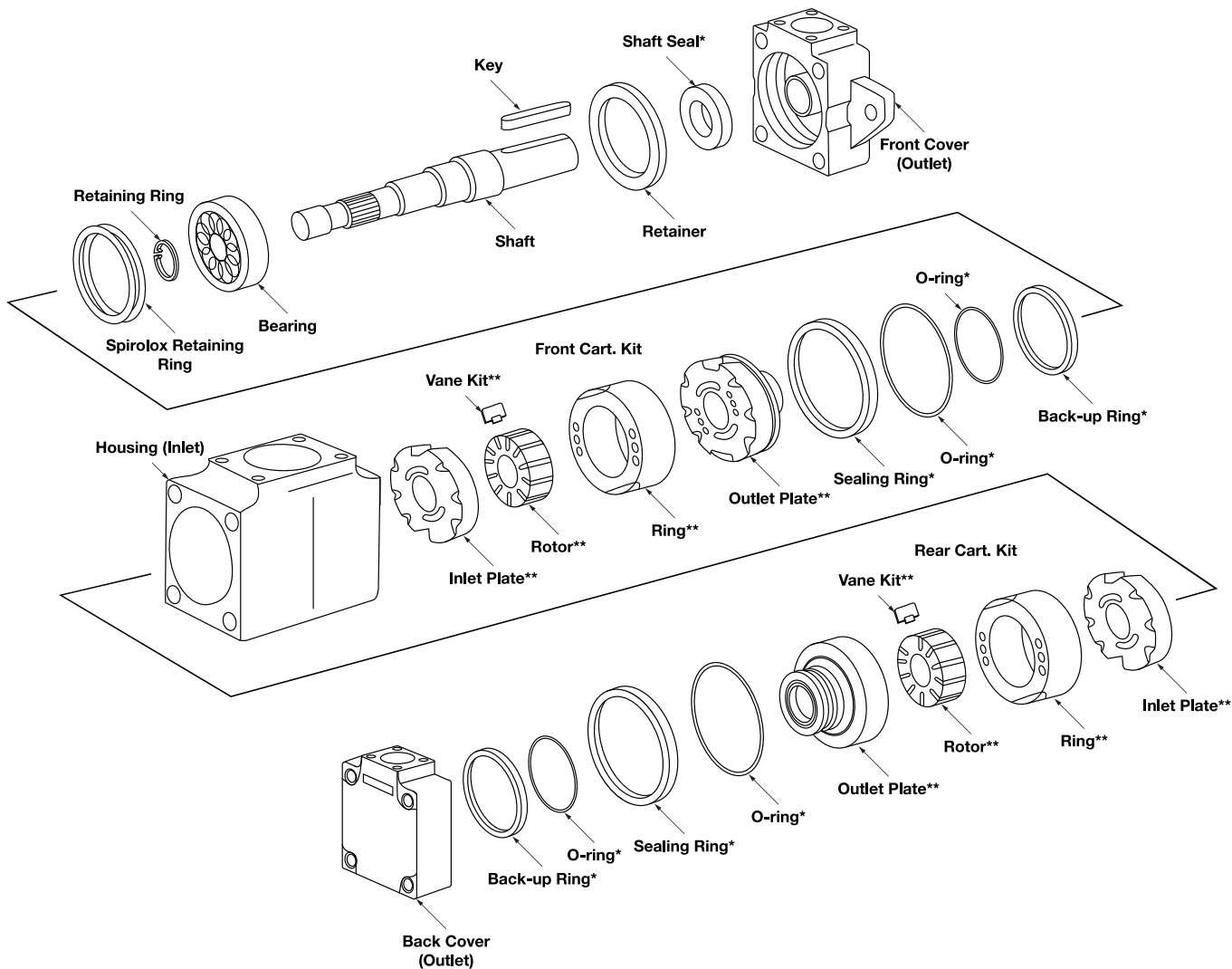


**2520V, 3520V, 4520V,
3525V, 4525V**

* Included in Seal Kit
** Included in Cartridge Kit

V Series - Industrial Double Pump

Parts Breakdown



4535V

* Included in Seal Kit
** Included in Cartridge Kit

V Series - Industrial Double Pump

Parts Breakdown Listing

PUMP	FRONT CART. KIT	ROTOR	VANE KIT	RING	REAR CART. KIT	ROTOR	VANE KIT	RING	SHAFTS
2520V	12 02-102532	584618	941214	326984	2 02-102506	402690	922741	388693	1 254964 11 254848
	14 02-102533			326985	5 02-102507			333624	
	17 02-102534			326986	8 02-102508			333625	
	21 02-102535			326988	11 02-102509			333626	
					12 02-102510			353901	
3520V	21 02-102551	575478	94019	394961	14 02-102511	403539	922743	353902	1 258249 11 258250 86 394517
	25 02-102552			319396	2 02-102506			388693	
	30 02-102553			319397	5 02-102507			333624	
	35 02-102554			319398	8 02-102508			333625	
	38 02-102555			319399	11 02-102509			333626	
3525V	21 02-102551	575478	941019	394961	12 02-102510	403539	922743	353901	1 243448 11 243449 86 394036
	25 02-102552			319396	14 02-102511			353902	
	30 02-102553			319397	12 02-102536			326984	
	35 02-102554			319398	14 02-102537			326985	
	38 02-102555			319399	17 02-102538			326986	
4520V	42 02-102572	578900	941049	297510	21 02-102539	584618	941214	326988	1 255533 11 255536 86 361761
	50 02-102574			297502	2 02-102506			388693	
	60 02-102575			297503	5 02-102507			333624	
					8 02-102508			333625	
					11 02-102509			333626	
4525V	42 02-102572	283871	922701	297510	12 02-102510	403539	922743	353901	1 233524 11 233527 86 361762
	50 02-102574			297502	14 02-102511			353902	
	60 02-102575			297503	12 02-102536			326984	
					14 02-102537			326985	
					17 02-102538			326986	
4535V	42 02-102572	283871	922701	297510	21 02-102539	575478	941019	319396	1 289083 11 289084 86 361763
	50 02-102574			297502	25 02-102556			319397	
	60 02-102575			297503	30 02-102557			319398	
					35 02-102558			319399	
					38 02-102559				

PUMP	BUNA SEAL KIT	VITON SEAL KIT	BUNA SHAFT SEAL	VITON SHAFT SEAL	SECONDARY SHAFT SEAL	BEARING	FRONT COVER	MIDDLE COVER	BACK COVER
2520V	922856	919303	394976	429286	429283	001705	942353	251263	250824
3520V	922859	919304	394973	429284	429281	038441	942355	250818	250824
3525V	922862	919305	394973	429284	429281	038441	942355	230189	231532
4520V	922863	919616	394974	429285	429282	131812	942356	252283	250824
4525V	922865	919345	394974	429285	429282	131812	942356	370071	231532
4535V	922866	919346	394974	429285	429282	131812	942356	270640	270679

V Series - Industrial Double Pump

Bolt Torques

PUMP	FRONT HOUSING - FT. LB.	REAR COVER - FT. LB.	FRONT CART. KIT - IN. LB.	REAR CART. KIT - IN. LB.
2520V	75 (101.7 Nm)	50 (67.8 Nm)	40 (4.5 Nm)	25 (2.8 Nm)
3520V	150 (203.4 Nm)	50 (67.8 Nm)	90 (10.2 Nm)	25 (2.8 Nm)
3525V	150 (203.4 Nm)	75 (101.7 Nm)	90 (10.2 Nm)	40 (4.5 Nm)
4520V	275 (372.8 Nm)	50 (67.8 Nm)	100 (11.3 Nm)	25 (2.8 Nm)
4525V	275 (372.8 Nm)	75 (101.7 Nm)	100 (11.3 Nm)	20 (2.3 Nm)
4535V	275 (372.8 Nm)	75 (101.7 Nm)	100 (11.3 Nm)	90 (10.2 Nm)

Changing Cartridge Rotation

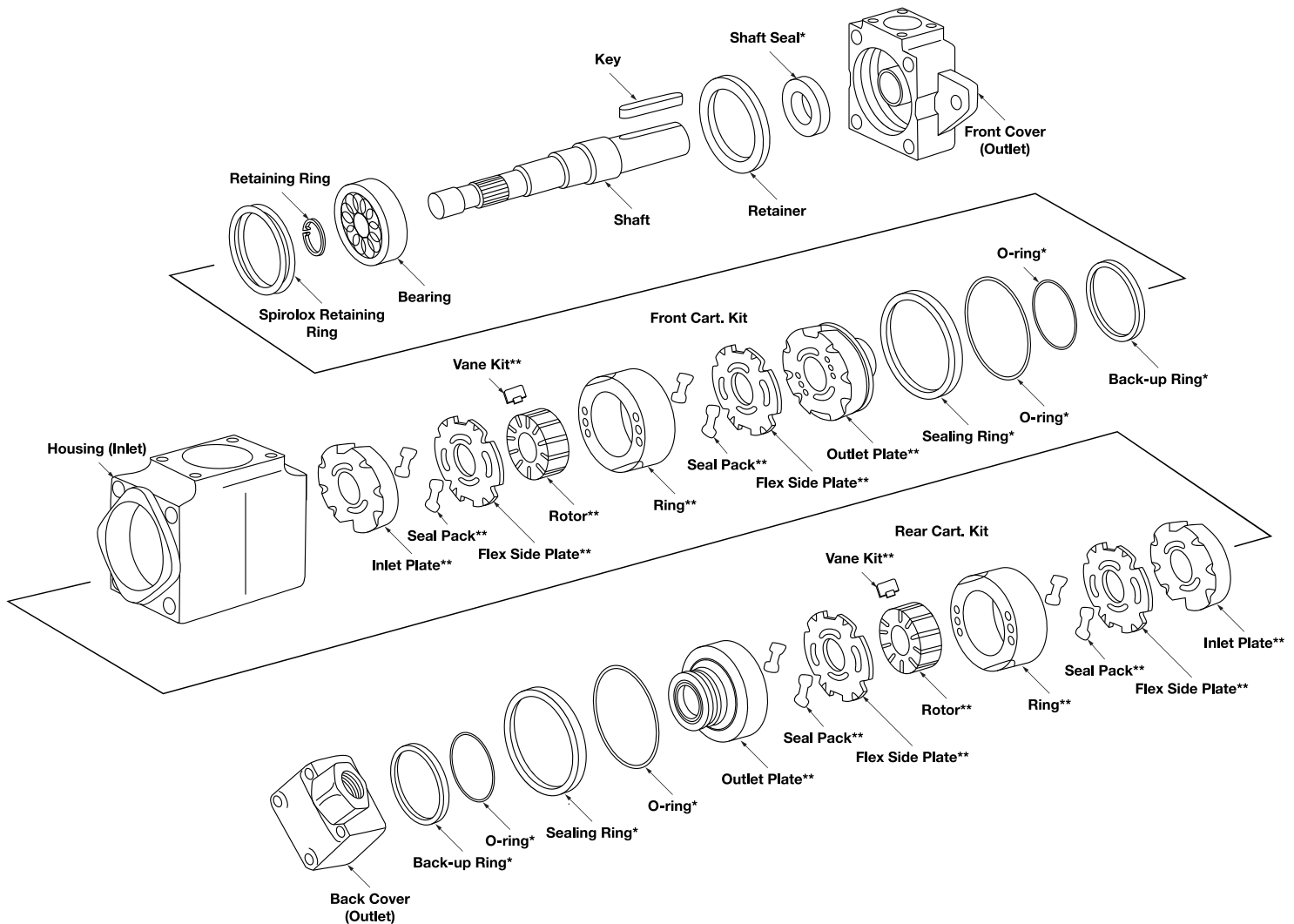
To change Cartridge Kit rotation, reverse the location of the inlet and the outlet support plates. Hand tighten the cartridge screws and use pump cover to align all the parts. Remove the cover and tighten the cartridge screws to the designated value. Sharp edge of vanes must lead in direction of rotation.

Filtration

For satisfactory service life, use full flow filtration to provide fluid which meets ISO cleanliness code 19/17 or better.

VQ Series - Mobile Double Pump

Parts Breakdown

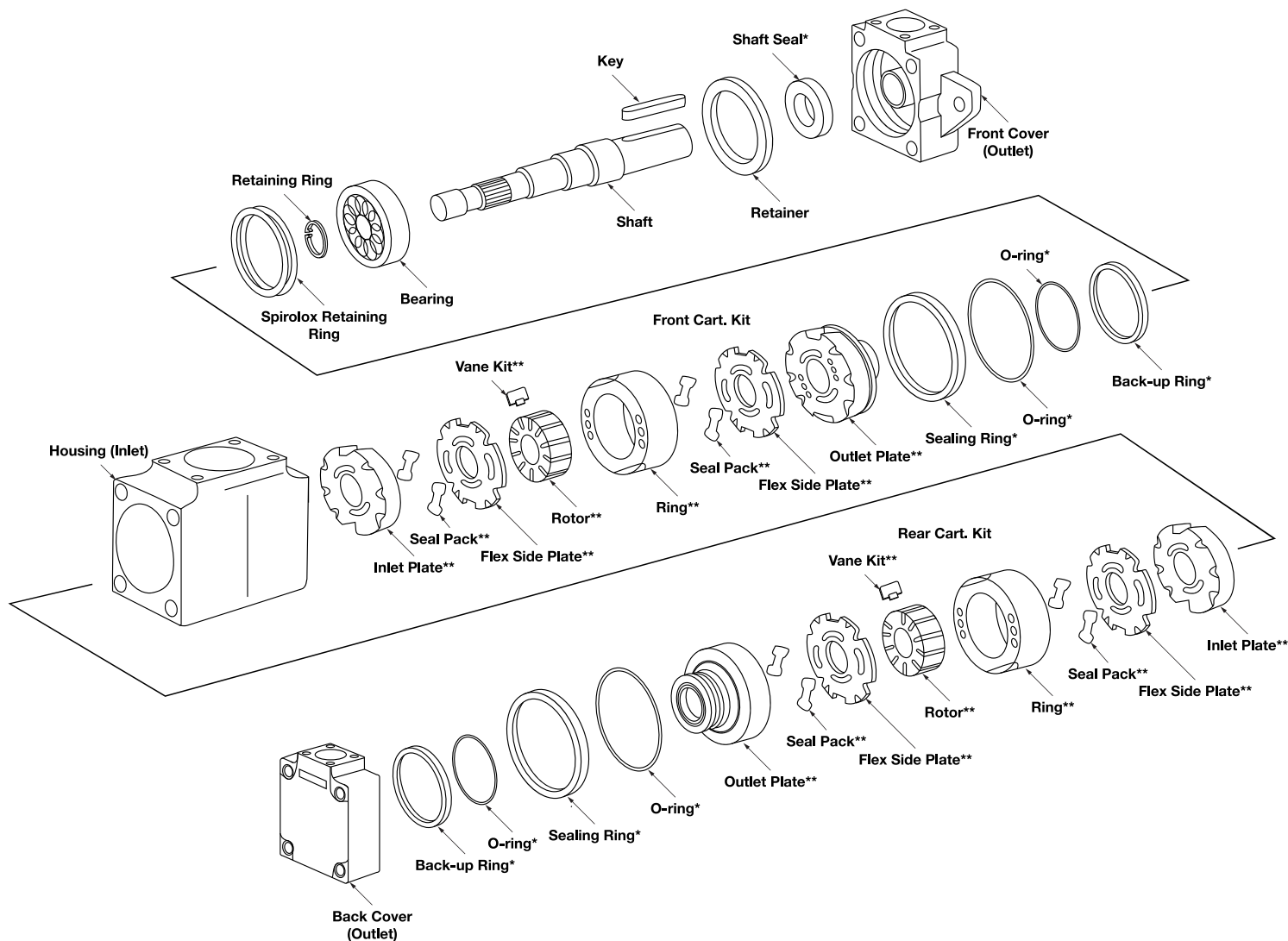


**2520VQ, 3520VQ, 4520VQ,
3525VQ, 4525VQ**

* Included in Seal Kit
** Included in Cartridge Kit

VQ Series - Mobile Double Pump

Parts Breakdown



4535VQ

* Included in Seal Kit

** Included in Cartridge Kit

VQ Series - Mobile Double Pump

Parts Breakdown Listing

PUMP	FRONT CART. KIT	ROTOR	VANE KIT	RING	FLEX PLT.	REAR CART. KIT	ROTOR	VANE KIT	RING	FLEX PLT.	SHAFTS
2520VQ	12 416439	270597	922710	326984	923956	2 417052	402690	922741	388693	923955	1 254964 11 254848 25 293360
	14 416440			326985		5 417053			333624		
	17 416441			326986		8 417054			333625		
	21 416442			326988		11 416427			333626		
3520VQ	21 413420	262154	922700	394961	923953	12 416428	403539	922743	353901	923955	1 258249 11 254848 86 394517 113 413022 114 413434
	25 413421			319396		14 416429			353902		
	30 413422			319397		2 417052			388693		
	35 413418			319398		5 417053			333624		
	38 413419			319399		8 417054			333625		
3525VQ	21 413420	262154	922700	394961	923953	11 416427	403539	922743	333626	923955	1 243448 11 243449 19 247019 111 413023
	25 413421			319396		12 416428			353901		
	30 413422			319397		14 416429			353902		
	35 413418			319398		2 417052			388693		
	38 413419			319399		5 417053			333624		
4520VQ	42 416435	283871	922701	297510	923954	8 417054	403539	922743	333625	923955	1 255533 11 255536 86 361761 114 413436
	50 416436			297502		11 416427			333626		
	60 416437			297503		12 416428			353901		
						14 416429			353902		
4525VQ	42 416435	283871	922701	297510	923954	12 421244	270597	922710	326984	923956	1 233524 11 233527 86 361762 114 413024
	50 416436			297502		14 421235			326985		
	60 416437			297503		17 421236			326986		
4535VQ	42 416435	283871	922701	297510	923954	21 421238	262154	922700	326988	923953	1 289083 11 289084 86 361763 114 413027
	50 416436			297502		25 421239			319396		
	60 416437			297503		30 421240			319397		
						35 421242			319398		
						38 421243			319399		

PUMP	BUNA SEAL KIT	VITON SEAL KIT	BUNA SHAFT SEAL	VITON SHAFT SEAL	SECONDARY SHAFT SEAL	BEARING	FRONT COVER	MIDDLE COVER	BACK COVER
2520VQ	920040	920042	394976	429286	429283	001705	942353	251263	250824
3520VQ	920048	920050	394973	429284	429281	038441	942355	250818	250824
3525VQ	920056	920058	394973	429284	429281	038441	942355	230189	231532
4520VQ	920060	920062	394974	429285	429282	131812	942356	252283	250824
4525VQ	920068	920070	394974	429285	429282	131812	942356	370071	231532
4535VQ	920072	920074	394974	429285	429282	131812	942356	270640	270679

VQ Series - Mobile Double Pump

Bolt Torques

PUMP	FRONT HOUSING - FT. LB.	REAR COVER - FT. LB.	FRONT CART. KIT - IN. LB.	REAR CART. KIT - IN. LB.
2520VQ	75 (101.7 Nm)	50 (67.8 Nm)	45 (5.1 Nm)	30 (3.4 Nm)
3520VQ	150 (203.4 Nm)	50 (67.8 Nm)	100 (11.3 Nm)	30 (3.4 Nm)
3525VQ	150 (203.4 Nm)	75 (101.7 Nm)	100 (11.3 Nm)	45 (5.1 Nm)
4520VQ	275 (372.8 Nm)	50 (67.8 Nm)	105 (11.8 Nm)	30 (3.4 Nm)
4525VQ	275 (372.8 Nm)	75 (101.7 Nm)	105 (11.8 Nm)	45 (5.1 Nm)
4535VQ	275 (372.8 Nm)	na	105 (11.8 Nm)	100 (11.3 Nm)

Changing Cartridge Rotation

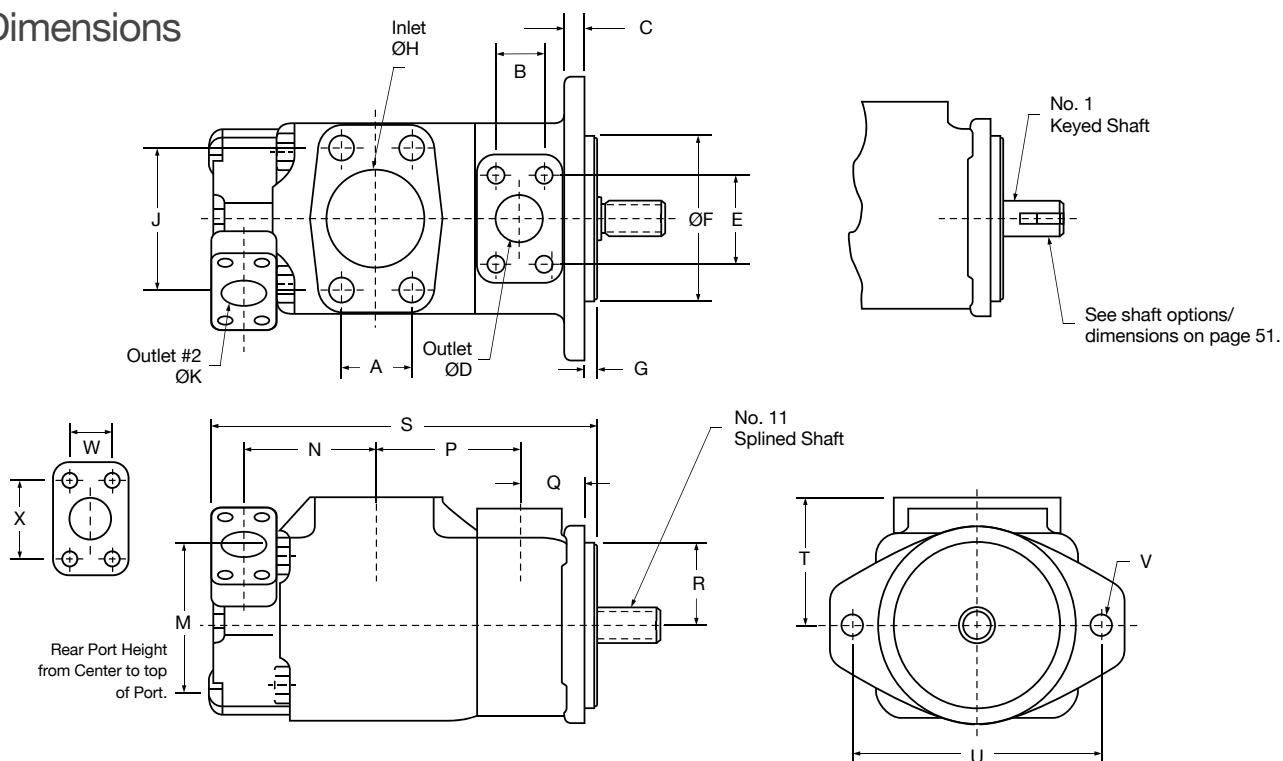
To change Cartridge Kit rotation, reverse the location of the inlet and the outlet support plates. Hand tighten the cartridge screws and use pump cover to align all the parts. Remove the cover and tighten the cartridge screws to the designated value. Sharp edge of vanes must lead in direction of rotation.

Filtration

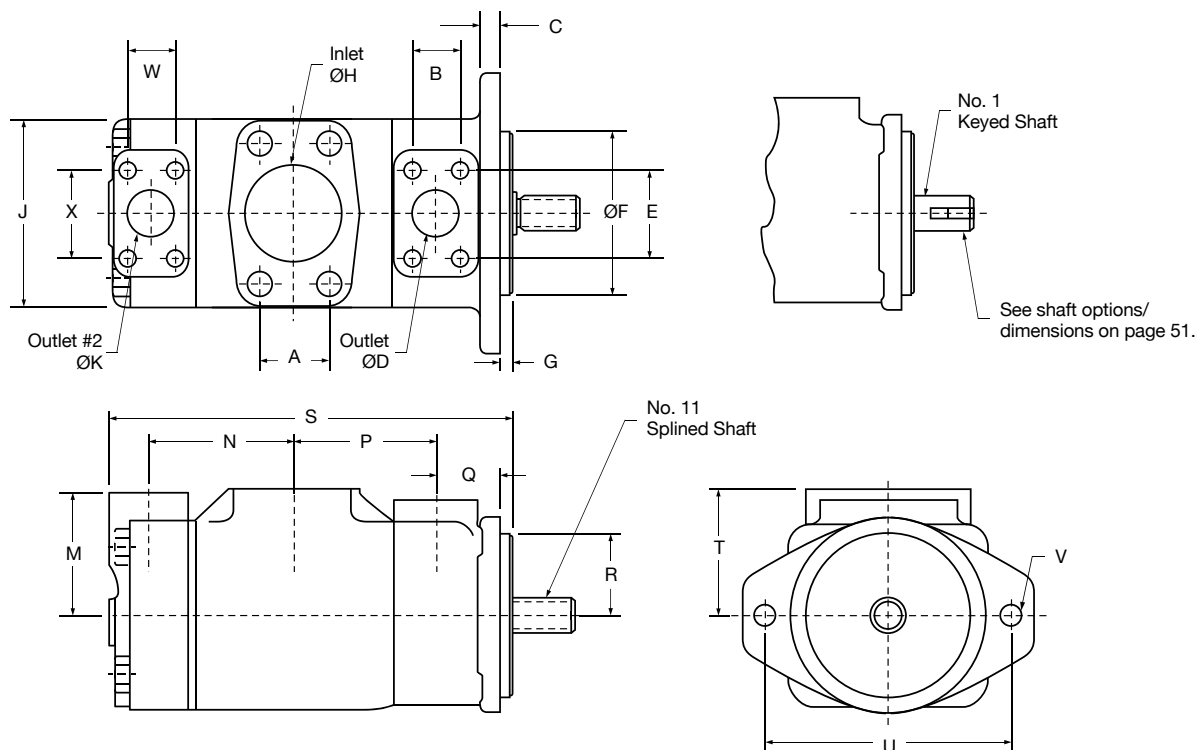
For satisfactory service life, use full flow filtration to provide fluid which meets ISO cleanliness code 19/17 or better.

V/VQ Series - Double Pump

Dimensions



**2520V/2520VQ, 3520V/3520VQ, 3525V/3525VQ
4520V/4520VQ, 4525V/4525VQ**



4535V/4535VQ

V/VQ Series - Double Pump

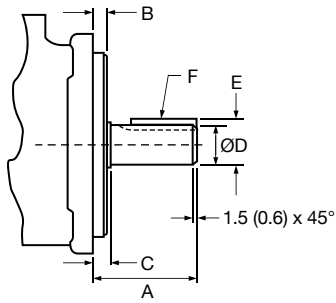
Dimensions Chart

	2520	3520	3525	4520	4525	4535
A	2.00 (50.8)	2.44 (62.0)	2.44 (62.0)	2.75 (69.9)	2.75 (69.9)	3.06 (77.7)
B	1.03 (26.2)	1.19 (30.2)	1.19 (30.2)	1.41 (35.8)	1.41 (35.8)	1.41 (35.8)
C	0.50 (12.7)	0.62 (15.7)	0.62 (15.7)	0.62 (15.7)	0.62 (15.7)	0.62 (15.7)
D	1.00 (25.4)	1.25 (31.8)	1.25 (31.8)	1.50 (38.1)	1.50 (38.1)	1.50 (38.1)
E	2.06 (52.3)	2.31 (58.7)	2.31 (58.7)	2.75 (69.9)	2.75 (69.9)	2.75 (69.9)
F	4.0-3.9 (101.6-99.1)	5.0-4.9 (127-124.5)	5.0-4.9 (127-124.5)	5.0-4.9 (127-124.5)	5.0-4.9 (127-124.5)	5.0-4.9 (127-124.5)
G	0.38 (9.65)	0.38 (9.65)	0.38 (9.65)	0.50 (12.7)	0.50 (12.7)	0.50 (12.7)
H	2.50 (63.5)	3.00 (76.2)	3.00 (76.2)	3.50 (88.9)	3.50 (88.9)	4.00 (101.6)
J	3.50 (88.9)	4.19 (106.4)	4.19 (106.4)	4.75 (120.7)	4.75 (120.7)	5.13 (130.3)
K	0.75 (19.1)	0.75 (19.1)	1.00 (25.4)	0.75 (19.1)	1.00 (25.4)	1.25 (31.8)
M	3.00 (76.2)	3.00 (76.2)	2.94 (74.7)	3.00 (76.2)	2.94 (74.7)	4.00 (101.6)
N	3.47 (88.1)	3.92 (99.6)	4.31 (109.5)	4.72 (119.9)	5.35 (135.9)	5.84 (148.3)
P	4.00 (101.6)	4.50 (114.3)	4.50 (114.3)	4.70 (119.4)	4.70 (119.4)	5.25 (133.4)
Q	1.50 (38.1)	1.50 (38.1)	1.50 (38.1)	1.69 (43.0)	1.69 (43.0)	1.69 (43.0)
R	3.00 (76.2)	3.25 (82.6)	3.25 (82.6)	3.69 (93.7)	3.69 (93.7)	3.69 (93.7)
S	9.81 (249.2)	10.8 (274.3)	9.81 (249.2)	11.95 (303.5)	12.8 (325.1)	13.9 (353.1)
T	3.38 (85.9)	3.50 (88.9)	3.50 (88.9)	4.03 (102.4)	4.03 (102.4)	4.03 (102.4)
U	5.75 (146.1)	7.13 (181.1)	7.13 (181.1)	7.13 (181.1)	7.13 (181.1)	7.13 (181.1)
V	0.56 (14.2)	0.69 (17.5)	0.69 (17.5)	0.69 (17.5)	0.69 (17.5)	0.69 (17.5)
W	0.88 (22.4)	0.88 (22.4)	1.03 (26.2)	0.88 (22.4)	1.03 (26.2)	1.19 (30.2)
X	1.88 (47.8)	1.88 (47.8)	2.06 (52.3)	1.88 (47.8)	2.06 (52.3)	2.31 (58.7)

Dimensions are in inches (millimeters).

V/VQ Series - Double Pump

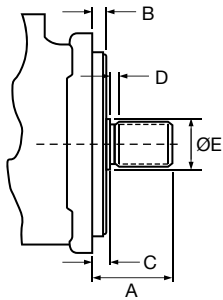
Straight Key Shaft Dimensions Chart



PUMP	SHAFT CODE	A	B	C	ØD	E	F (KEY WIDTH X LENGTH)
25V 2520V/VQ	1	2.32 (59)	.375 (9.53)	.435 (11.1)	.875 (22.23) .874 (22.20)	.966 (24.5) .961 (24.4)	.817 (4.75) x 1.25 (32)
25V 252*V/VQ	86	3.06 (78)	.375 (9.53)	.435 (11.1)	.999 (25.37) .998 (25.35)	1.11 (28.3) 1.10 (28.1)	.250 (6.36) x 2.00 (50.8)
35V 352*V/VQ	1	2.88 (73.2)	.375 (9.53)	.435 (11.1)	1.25 (31.75) 1.24 (31.70)	1.39 (35.36) 1.38 (34.10)	.313 (7.94) x 1.50 (38.1)
	86	3.88 (86)	.375 (9.53)	.435 (11.1)	1.374 (34.90) 1.373 (34.87)	1.52 (38.6) 1.51 (38.3)	.312 (7.92) x 2.13 (54)
45V 45**V/VQ	1	2.44 (62)	.500 (12.7)	.560 (14.22)	1.25 (31.75) 1.24 (31.70)	1.39 (35.36) 1.38 (34.10)	.312 (7.92) x 1.12 (28.5)
	86	3.44 (87.4)	.500 (12.7)	.560 (14.22)	1.499 (38.07) 1.498 (38.05)	1.67 (42.4) 1.66 (42.1)	.375 (9.53) x 2.00 (50.8)

Dimensions are in inches (millimeters).

Splined Shaft Dimensions Chart



PUMP	SHAFT CODE	A	B	C	D	ØE	# OF TEETH	PITCH	MAJOR DIAM.	MINOR DIAM.
25V 2520V/VQ	11	1.75 (44.5)	.375 (9.53)	.437 (11.1)	.156 (3.9)	1.09 (27.8)	13	16/32	.873 (22.17) .872 (22.15)	.734 (18.63) .723 (18.35)
35V 352*V/VQ	11	2.31 (58.7)	.375 (9.53)	.437 (11.1)	.25 (6.35)	1.38 (35.1)	14	12/24	1.25 (31.7) 1.247 (31.67)	1.06 (26.99) 1.05 (26.64)
45V 45**V/VQ	11	2.44 (61.9)	.500 (12.7)	.565 (14.3)	.38 (9.7)	1.56 (39.6)	14	12/24	1.25 (31.7) 1.247 (31.67)	1.06 (26.99) 1.05 (26.64)

Dimensions are in inches (millimeters).

V/VQ Series - Thru-drive Single Pump

Features

Intravane design pumps provide longer life and increased productivity. Not to mention, they provide application versatility. These units are also known for extremely low sound levels, making them perfect for mobile applications. Compact size and ease of service allow maximum equipment design flexibility. Pumps are available in single, double and thru-drive configurations.

- High Volumetric Efficiency
- Maximum 3000 psi (207 bar) Operating Pressure
- High Operating Speeds
- Versatile and Compact



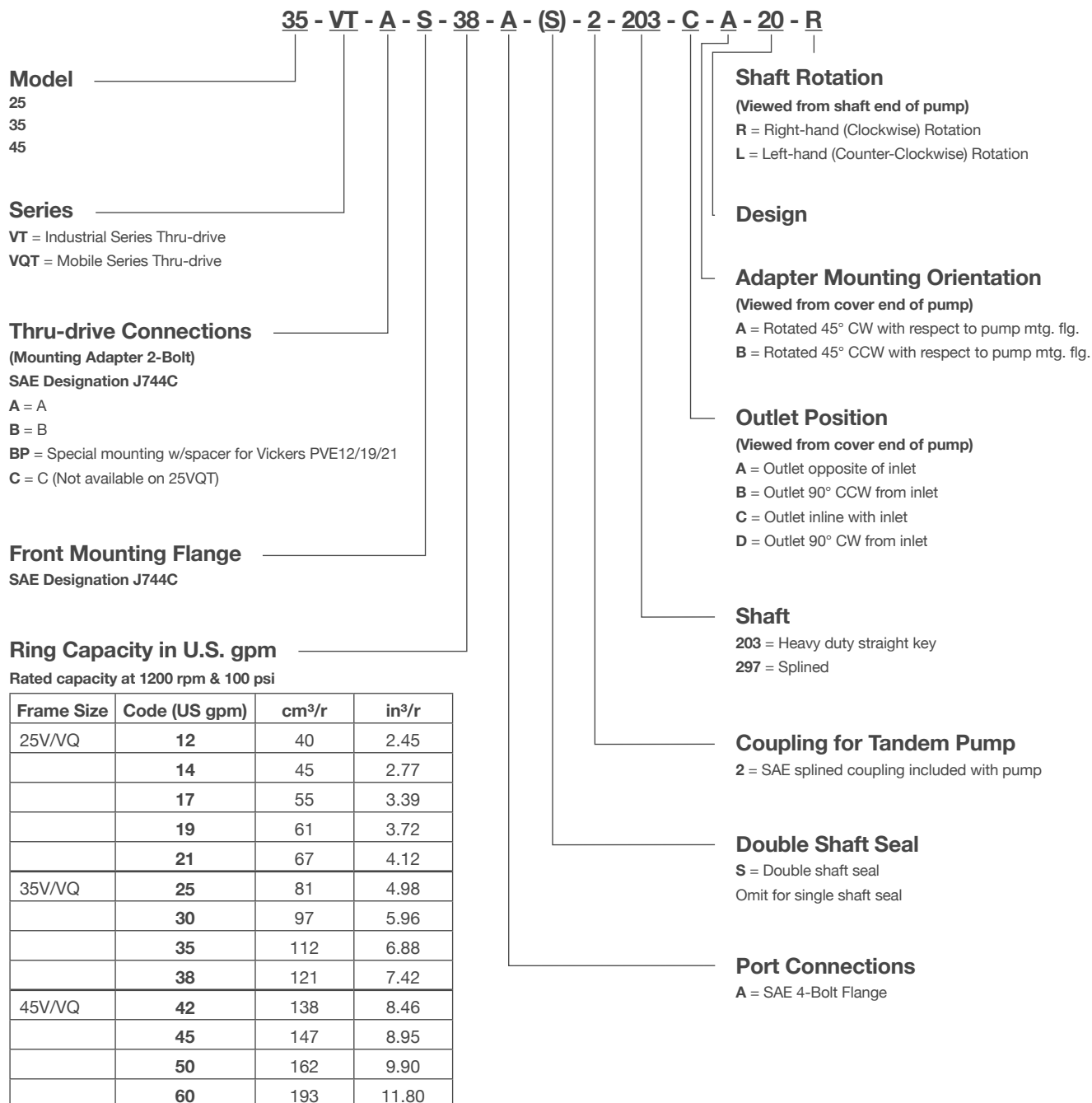
Specifications

PUMP	FLOW IN GPM @ 1200 RPM & 100 PSI (LPM)	DISPL. IN ³ /R (CM ³ /R)	MAX. SPEED (RPM)	MAX. PRESSURE PSI (BAR)	TYP. DELIVERY GPM @ MAX. SPEED & PRESSURE (LPM)	TYPICAL INPUT POWER (HP) @ MAX. SPEED & PRESSURE (KW)	WEIGHT LBS (KGS)
25VT* 25VQT*	12 (45.4)	2.45 (40.1)	2700	3000 (207)	23.0 (87.1)	55.0 (41.0)	43 (19.5)
	14 (53.0)	2.77 (45.4)	2700	3000 (207)	27.0 (102.2)	62.5 (46.6)	
	17 (64.4)	3.39 (55.6)	2500	3000 (207)	31.0 (117.3)	69.5 (51.8)	
	19 (71.9)	3.72 (61.0)	2500	3000 (207)	35.0 (132.5)	76.0 (56.7)	
	21 (79.5)	4.12 (67.5)	2500	3000 (207)	38.0 (143.8)	83.0 (61.9)	
35VT* 35VQT*	21 (79.5)	4.12 (67.5)	2500	3000 (207)	38.0 (143.8)	83.0 (61.9)	63 (28.6)
	25 (94.6)	4.98 (81.6)	2500	3000 (207)	45.0 (170.3)	101.0 (75.3)	
	30 (113.6)	5.96 (97.7)	2500	3000 (207)	55.0 (208.2)	117.5 (87.6)	
	35 (132.5)	6.88 (112.7)	2400	3000 (207)	60.0 (227.1)	132.0 (98.4)	
	38 (143.8)	7.42 (121.6)	2400	3000 (207)	65.0 (246.1)	140.0 (104.4)	
45VT* 45VQT*	42 (159.0)	8.46 (138.6)	2200	2500 (172)	66.5 (251.7)	122.5 (91.3)	84 (38.1)
	45 (170.3)	8.95 (146.7)	2200	2500 (172)	71.0 (268.8)	131.0 (97.7)	
	50 (189.3)	9.90 (162.2)	2200	2500 (172)	79.0 (299.0)	141.0 (105.1)	
	60 (227.1)	11.80 (193.4)	2200	2500 (172)	96.0 (363.4)	170.0 (126.8)	

Values based on using anti-wear type petroleum oil 150 SUS at 100° F (ISO rating of 32 cSt at 38° C) and 0 psi inlet pressure.

V/VQ Series - Thru-drive Single Pump

Model Code Breakdown



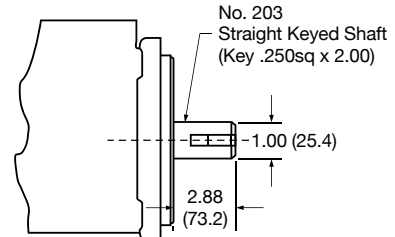
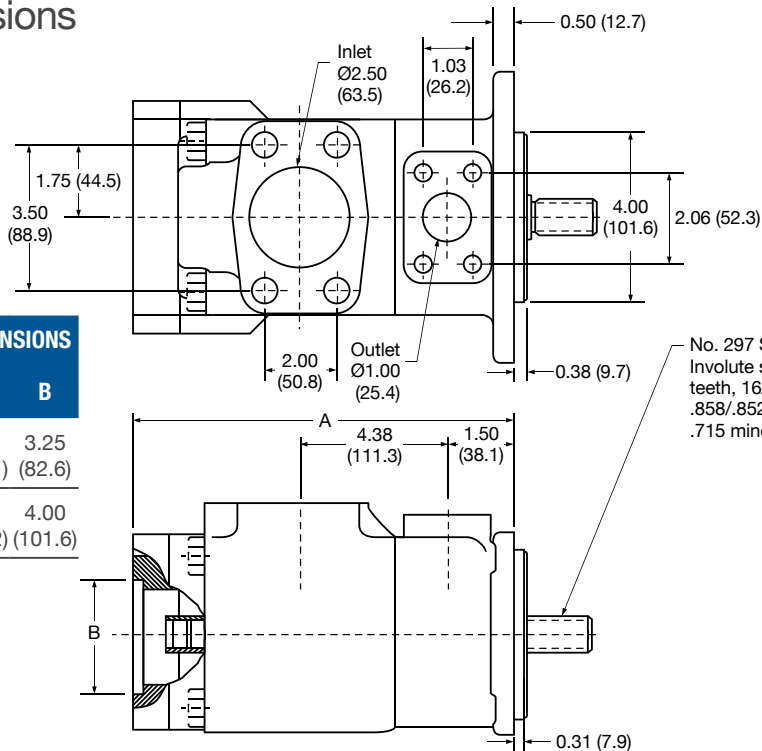
V/VQ Series - Thru-drive Single Pump

Dimensions

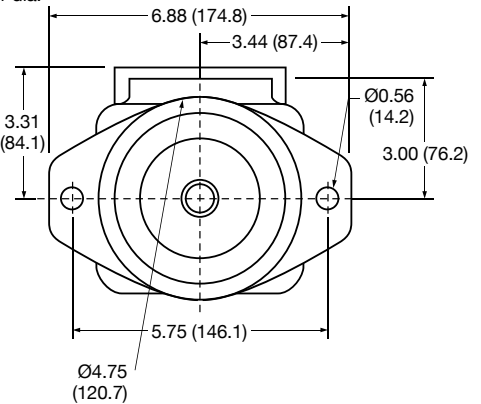
SERIES	DIMENSIONS	
	A	B

25VTA	8.94 (227.1)	3.25 (82.6)
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25VTB	9.30 (236.2)	4.00 (101.6)
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No. 297 Shaft
Involute spline. Flat root, side fit. 13
teeth, 16/32 pitch. 30° pressure angle.
.858/.852 major dia.
.715 minor dia.



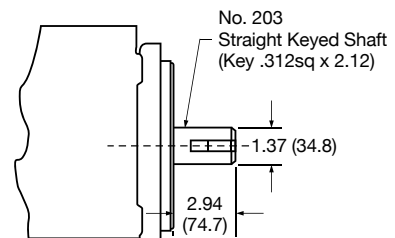
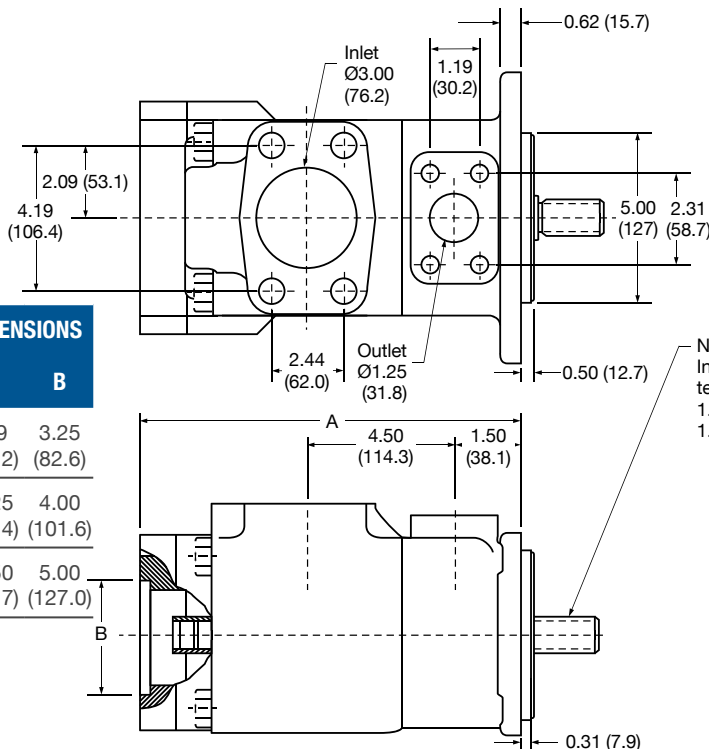
25VT/25VQT

SERIES	DIMENSIONS	
	A	B

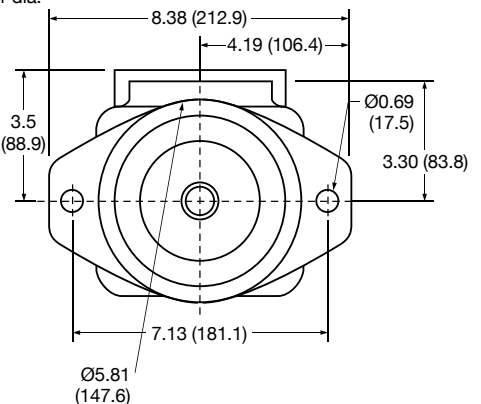
35VTA	9.89 (251.2)	3.25 (82.6)
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35VTB	10.25 (260.4)	4.00 (101.6)
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35VTC	10.50 (266.7)	5.00 (127.0)
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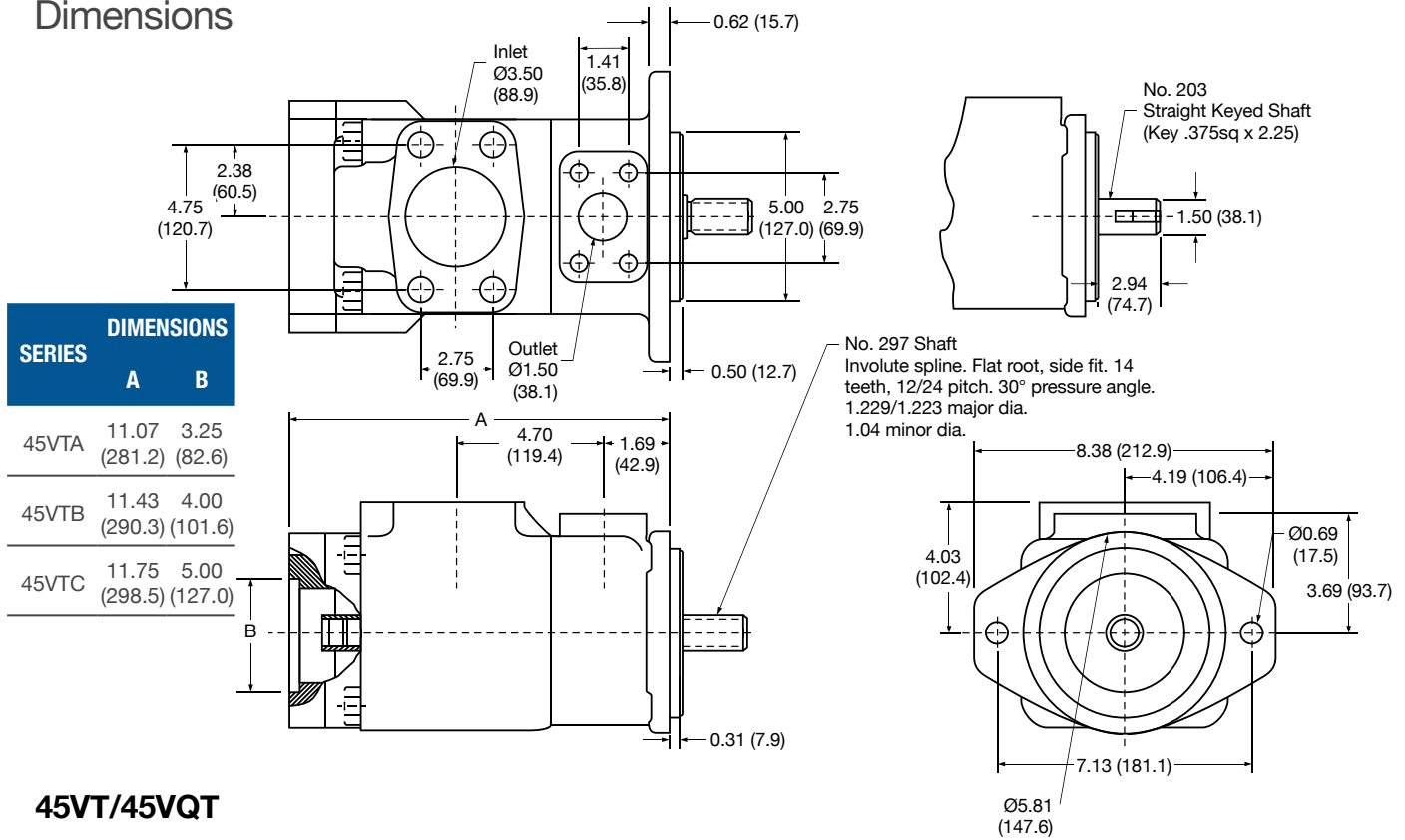
No. 297 Shaft
Involute spline. Flat root, side fit. 14
teeth, 16/32 pitch. 30° pressure angle.
1.25/1.22 major dia.
1.05 minor dia.



35VT/35VQT

V/VQ Series - Thru-drive Single Pump

Dimensions

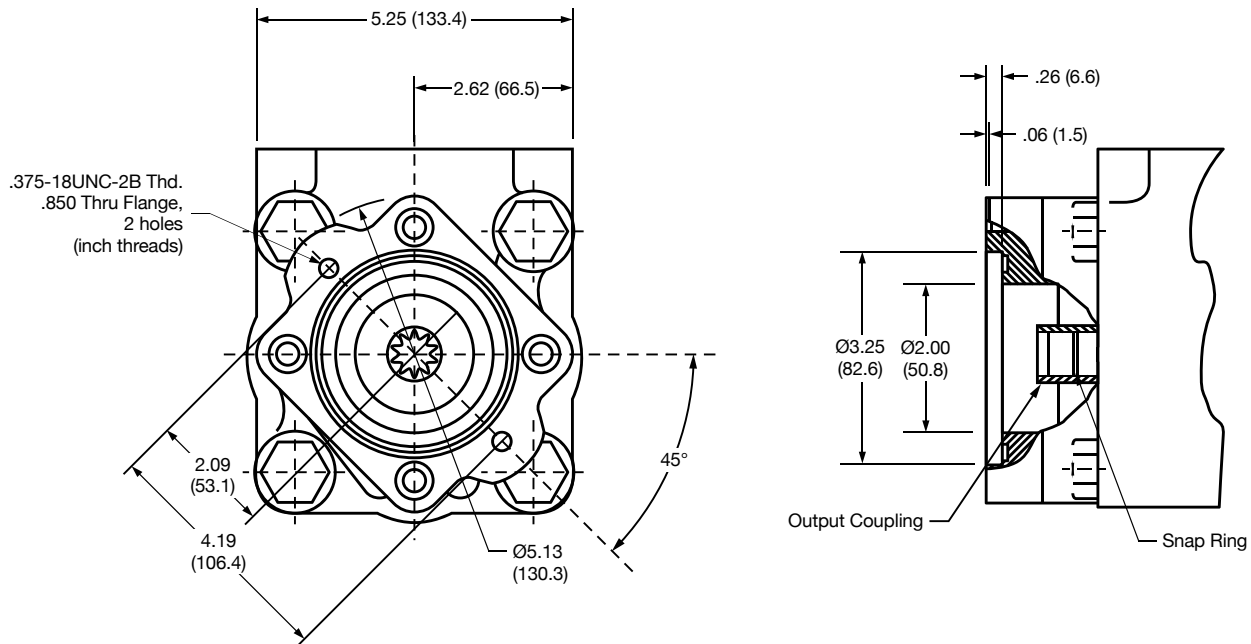


45VT/45VQT

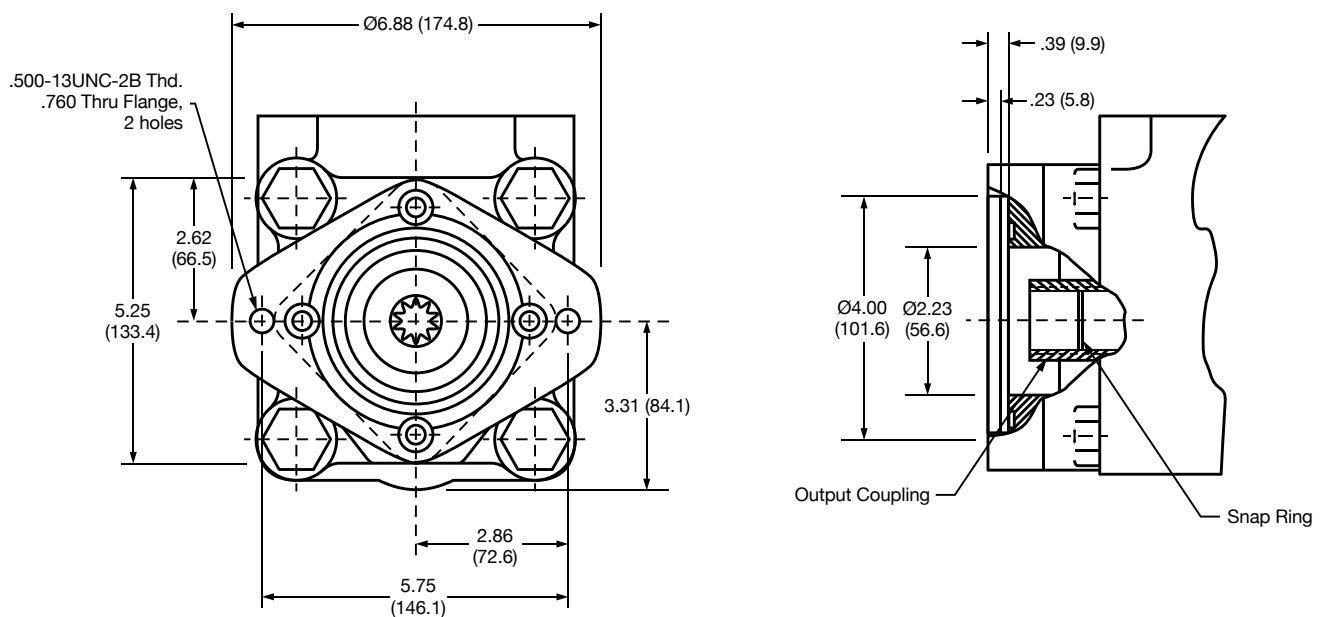
V/VQ Series - Thru-drive Single Pump Rear Mountings

Dimensions

'A' Rear Mount



'B' Rear Mount

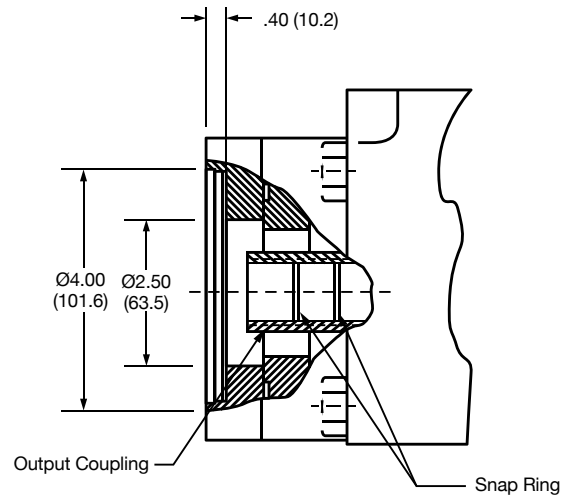
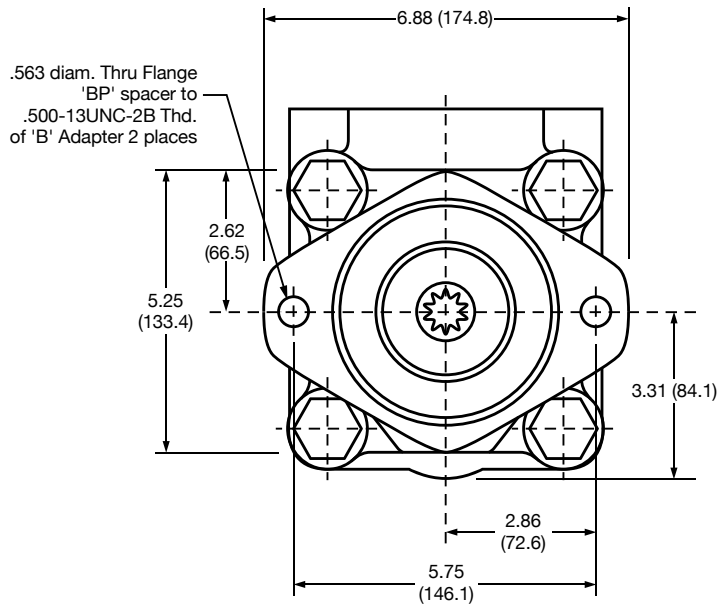


V/VQ Series - Thru-drive Single Pump Rear Mountings

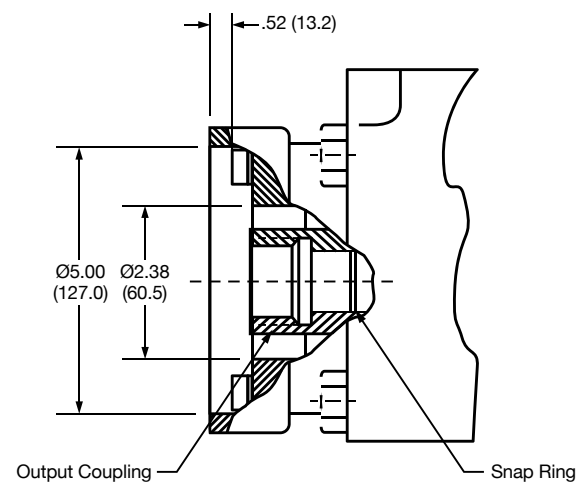
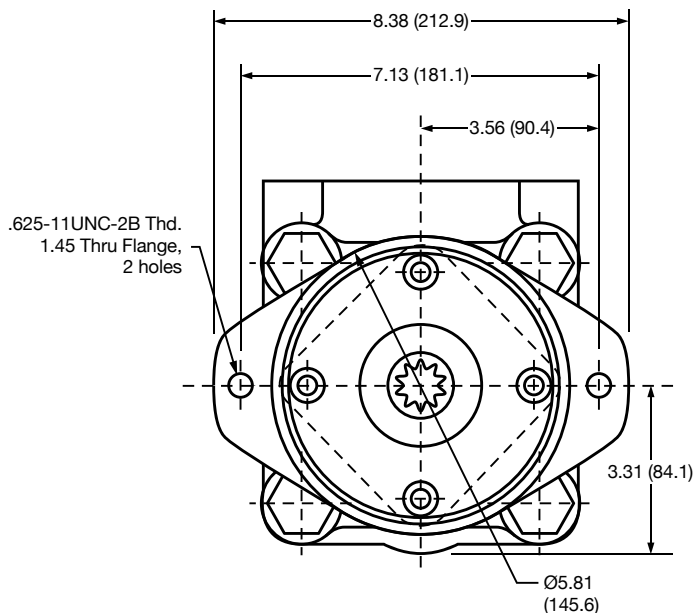
Dimensions

'BP' Rear Mount

This SAE "B" size unit with spacer accepts a Vickers PVE12/19/21 pump.
The output coupling is for a pump shaft of SAE "B" size.



'C' Rear Mount



V/VQ Series

Maximum Torque Loading

Single Pumps

All listed shafts are satisfactory up to maximum pressures in listed in the corresponding pump/series' operating data.

Double Pumps

Where both cartridges are to be on-load together, check that the sum of their separate torques do not exceed the torque limit of the desired shaft.

Single Thru-drive Pumps

Where both the thru-drive pump and its rear-mounted pump are to be on-load together, check that the sum of the torques generated will never exceed the torque limit in shaft torque tables below. Also check that the torque required on the rear-mounted pump never exceeds the thru-drive torque limit in tables below.

Shaft Torque Ratings

PUMP	SHAFT NUMBER	MAXIMUM INPUT TORQUE NM (LB. IN.)
25VQ or 25**VQ	1	316 (2800)
	86	402 (3560)
	11	316 (2800)
	123	316 (2800)
	203	402 (3560)
	297	344 (3040)
35VQ or 35**VQ	1	402 (3560)
	11	791 (7000)
	86	659 (5830)
	123	791 (7000)
	203	659 (5830)
	297	791 (7000)
45VQ or 45**VQ	1	402 (3560)
	11	1017 (9000)
	86	982 (8690)
	130	1017 (9000)
	203	982 (8690)
	297	1017 (9000)

PUMP	SHAFT NUMBER	MAXIMUM INPUT TORQUE NM (LB. IN.)	THRU-DRIVE CONNECTION	MAX. THRU-DRIVE TORQUE NM (LB. IN.)
25VQT	203	402 (3560)	A	131 (1160)
			B	316 (2800)
25VQT	297	344 (3040)	A	131 (1160)
			B	316 (2800)
35VQT	203	6589 (5830)	A	131 (1160)
			B	348 (3080)
			C	437 (3870)
35VQT	297	791 (7000)	A	131 (1160)
			B	348 (3080)
			C	437 (3870)
45VQT	203	982 (8690)	A	131 (1160)
			B	384 (3400)
			C	702 (6210)
45VQT	297	1017 (9000)	A	131 (1160)
			B	384 (3400)
			C	702 (6210)

Example: A 3525VQ38A17 pump operating at 175 bar (2500 psi) front section and 140 bar (2000 psi) rear section will require over 452 Nm (4000 lb. in.) input torque. Therefore, all listed shafts are acceptable except No. 1.

VQH 32 Series

High Pressure Pumps & Cartridge Kits

PUMP	GPM @ 1200 RPM & 100 PSI (LPM)	DISPLACEMENT CM ³ /R (IN ³ /R)	MAX RPM	MAX CONTINUOUS BAR (PSI)	MAX PEAK BAR (PSI)
35VQH	30 (113.6)	97.7 (5.96)	2500	228 (3300)	248 (3600)
	35 (132.5)	112.8 (6.88)	2400	228 (3300)	248 (3600)
	38 (143.8)	121.6 (7.42)	2400	228 (3300)	248 (3600)
45VQH	50 (189.3)	162.3 (9.90)	2200	228 (3300)	248 (3600)
	57 (215.8)	190.2 (11.61)	2200	228 (3300)	248 (3600)
	60 (227.1)	193.4 (11.80)	2200	207 (3000)	248 (3600)

Pump Models

- 35VQH
- 3520VQH
- 3520VQH
- 3525VQH
- 4520VQH
- 4525VQH
- 4535VQH
- 3520VQHV10
- 3525VQHVQH10/V20
- 4520VQHVQH10/V20
- 4525VQHVQH10/V20
- 4535VQHVQH10/V20

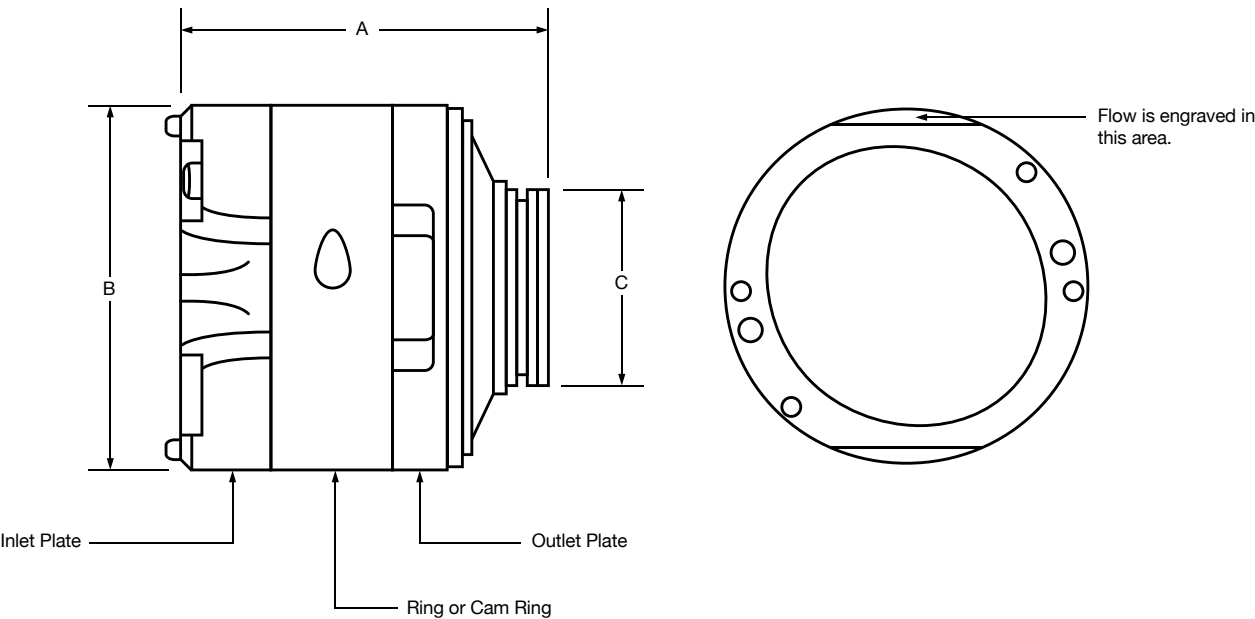
Cartridge Kits

Metaris VQH cartridge kits employ a new 2-piece rotor design as well as hardened Cam Ring and Vanes that improve efficiency and pressure capability.

- 35VQH - 30, 35, 38 gpm (113.6, 132.5, 143.8 lpm)
- 45VQH - 50, 57, 60 gpm (189.3, 215.8, 227.1 lpm)

Pump & Cartridge Identification

Cartridge Kit Dimensions and Flow



DIMS.	20V SERIES	25V SERIES	30V SERIES	35V SERIES	45V SERIES
A	3.22 (81.8)	3.92 (99.6)	4.35 (110.5)	4.66 (118.4)	5.53 (140.5)
B	3.25 (82.6)	3.81 (96.8)	3.81 (96.8)	4.50 (114.3)	5.25 (133.4)
C	1.86 (47.2)	2.05 (52.1)	2.05 (52.1)	2.84 (72.1)	3.16 (80.3)
Weight	5.07 lbs (2.3 kgs)	8.34 lbs (3.8 kgs)	9.04 lbs (4.1 kgs)	14.11 lbs (6.4 kgs)	22.49 lbs (10.2 kgs)
Flow (in gal. at 1200 rpm) (lpm)	2 (7.6)	8 (30.3)	24 (90.8)	21 (79.5)	42 (159.0)
	5 (18.9)	12 (45.4)	28 (106.0)	25 (94.6)	47 (177.9)
	8 (30.3)	14 (53.0)		30 (113.6)	50 (189.2)
	9 (34.1)	17 (64.4)		35 (132.4)	57 (215.8)
	11 (41.6)	19 (72.0)		38 (143.8)	60 (227.1)
	12 (45.4)	21 (79.5)			
	14 (53.0)				

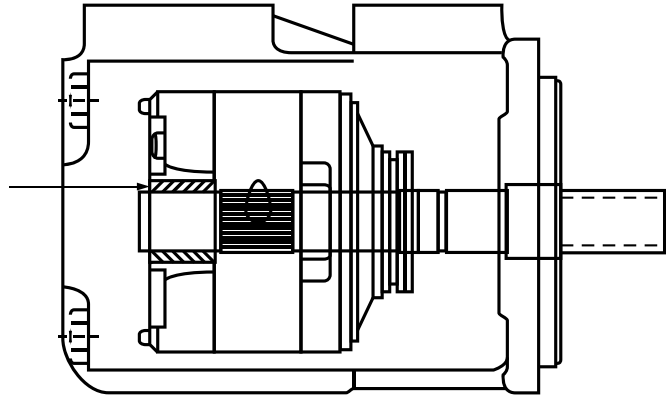
Pump & Cartridge Identification

Pump Rotation

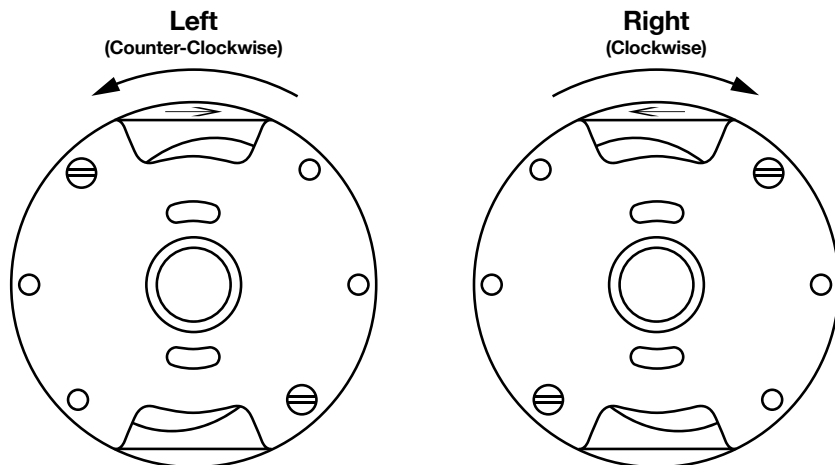
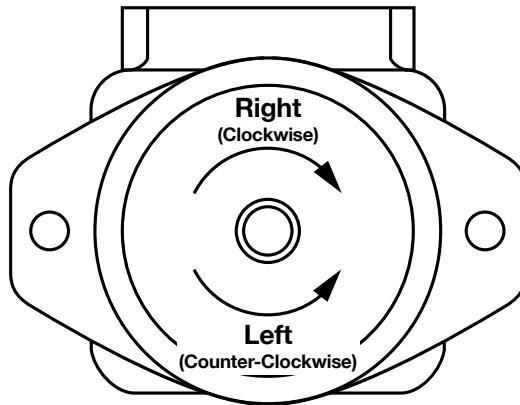
To determine pump rotation look at it from the shaft end side. So, if clockwise, it is right hand rotation, if counter-clockwise, it is left hand rotation.

When taking out the cartridge and putting it on to the outlet plate, take into account that rotation is seen the other way round; an arrow engraved in the ring or cam ring shows the real turning sense/direction.

Support Bushing
Always mounted on the inlet plate.
All single pumps have it.



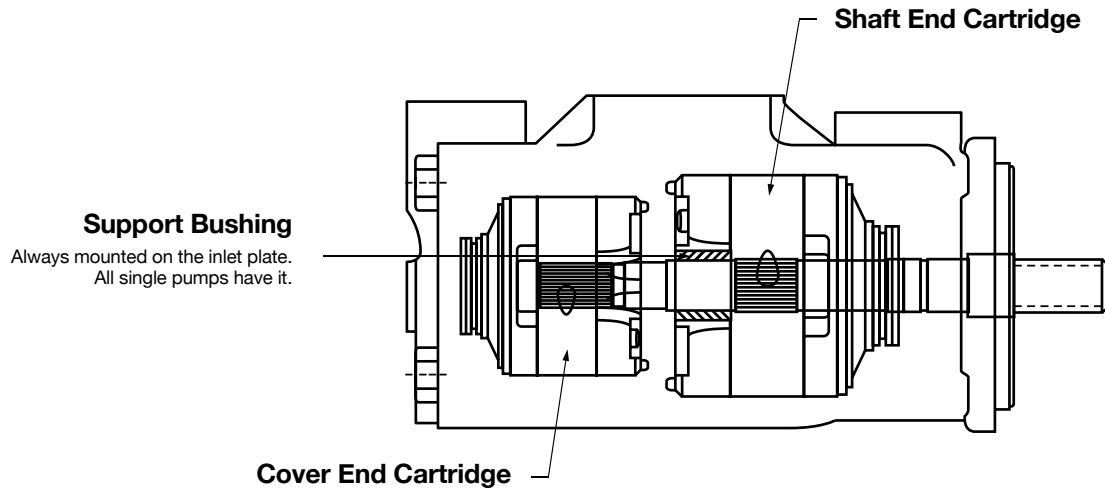
Pump Rotation
Always viewed from the
shaft end side.



Pump & Cartridge Identification

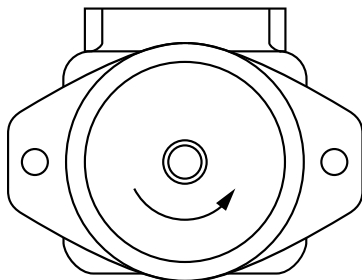
Pump Rotation

A double pump is setup so that the 2 cartridges are opposite to each other, therefore when putting them on the outlet plate, they will apparently have opposite turning sense. The arrow in the ring shows the correct rotation. (Pump and cover end cartridge rotation always coincide.) See diagrams below.

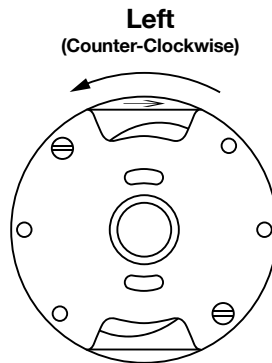


Pump Rotation

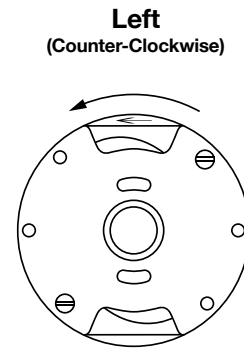
Always viewed from the shaft end side.



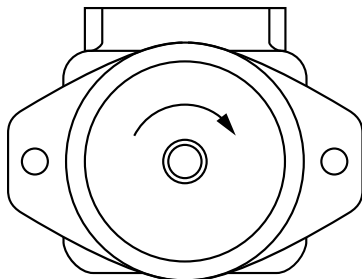
Left
(Counter-Clockwise)



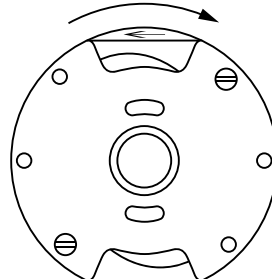
Shaft End Cartridge



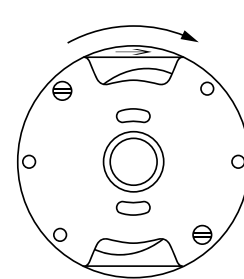
Cover End Cartridge



Right
(Clockwise)



Right
(Clockwise)



Right
(Clockwise)

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Hydraulex Corporate
48175 Gratiot Ave
Chesterfield, MI 48051
Toll Free: 800.422.4279
Tel: 586.949.4240
www.hydraulex.com

Hydraulex Detroit
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Tel: 586.949.4240
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sales@hydraulex.com
sales@metarisusa.com
sales@metaris.com
hrdsales@hydraulex.com
fhisales@hydraulex.com



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