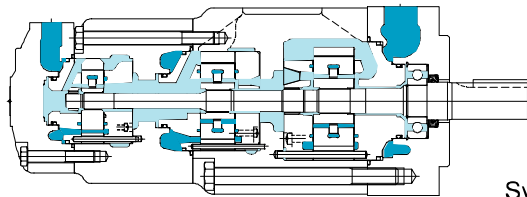


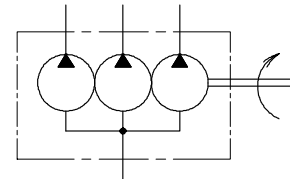
Low noise triple fixed displacement vane pumps SQP series

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VANE PUMPS



Symbol



Model Code

(F3) - SQP432 - 60 -38 -15 -86 C C C (2)-(LH)-18

1 2 3 4 5 6 7 8 9 10 11 12

1 Fluid

Omit for mineral oil
F3: phosphate ester
F11: water glycol

2 Low noise fixed displ. triple vane pump

SQP211 Series
SQP311,321 Series
SQP421,431,432 Series

3 Shaft end pump displacement

Series	Displacement
SQP2**	10, 12, 14, 15, 17, 19, 21
SQP3**	17, 21, 25, 30, 32, 35, 38
SQP4**	30, 35, 38, 42, 50, 60

4 Middle pump displacement

Series	Displacement
SQP*1*	2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 14
SQP*2*	10, 12, 14, 15, 17, 19, 21
SQP*3*	17, 21, 25, 30, 32, 35, 38

5 Cover end pump displacement

Series	Displacement
SQP**1	2, 3, 4, 5, 6, 7, 8, (9), (11), (12), (14)
SQP**2	10, 12, 14, 15, 17, 19

Note: Applicable series with displacements indicated by () are limited.
See page B31.

6 Shaft

86: parallel sq. key

7 Shaft end pump outlet position(viewed from cover end)

A: opposite inlet
B: 90° CCW from inlet
C: inline with inlet
D: 90° CW from inlet

8 Middle pump outlet position(viewed from cover end)

SQP211,311,321,421
A: 135° CCW from inlet
B: 45° CCW from inlet
C: 45° CW from inlet
D: 135° CW from inlet
SQP431,432
A: opposite inlet
B: 90° CCW from inlet
C: inline with inlet
D: 90° CW from inlet

9 Cover end pump outlet position(viewed from cover end)

SQP211,311,431,432
A: 135° CCW from inlet
B: 45° CCW from inlet
C: 45° CW from inlet
D: 135° CW from inlet
SQP321,421
A: opposite inlet
B: 90° CCW from inlet
C: inline with inlet
D: 90° CW from inlet

10 Pump mounting

Omit for flange mounting
2*: foot mounting

Shaft end outlet position to foot mount surface (see page B28)

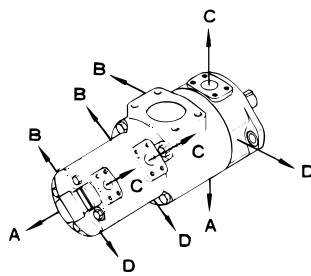
Foot mount. code	Shaft end pump outlet position to foot surface (viewed from shaft end)
2	up (12 o'clock)
23	right (3 o'clock)
26	down (6 o'clock)
29	left (9 o'clock)

11 Rotation (viewed from shaft end)

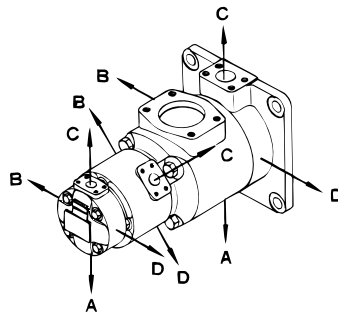
Omit for CW
LH: CCW

12 Design no.

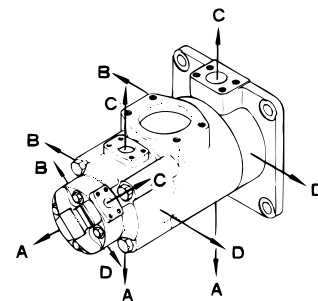
Model Code



● SQP211 Series
● SQP311 Series



● SQP321 Series
● SQP421 Series



● SQP431 Series
● SQP432 Series

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VANE PUMPS

Specifications

Model	Shaft End Pump			Middle Pump			Cover End Pump						Minimum Speed min ⁻¹					
	Displ. Code	Del. at 1000 min ⁻¹ 0.7Mpa L/min	Max.Wkg. Press MPa	Displ. Code	Del. at 1000 min ⁻¹ 0.7Mpa L/min	Max.Wkg. Press MPa	Displ. Code	Del. at 1000 min ⁻¹ 0.7Mpa L/min	Max.Wkg. Press MPa	Max. Speed min ⁻¹								
										Mineral Oil	Water-Glycol	Phosphate Ester						
SQP211	10	32.5	17.5	2	7.5	14	2	7.5	14	1800	1200	1200	600					
	12	38.3		3	10.2		3	10.2										
	14	43.3		4	12.8		4	12.8										
	15	46.7		17.5	5	16.7	17.5	5	16.7					17.5	1500	1000	1000	
	17	52.5			6	19.2		6	19.2									
	19	59.2			7	22.9		7	22.9									
	21	65.0			8	26.2		8	26.2									
SQP311	17	53.3	17.5	8	26.2	16	17.5	17.5	17.5	1200	1000	1000	600					
	21	66.7		9	28.3									7	22.9	1000		
	25	79.2		11	35.0									8	26.2			
	30	95.0		12	37.9									14	44.2			
	32	100.0		14	14	14				14	14	14		14	14	14		
	35	109.0																
	38	118.0																
SQP321	17	53.3	17.5	10	32.5	17.5	2	7.5	14	1800	1200	1200	600					
	21	66.7		12	38.3		3	10.2										
	25	79.2		14	43.3		4	12.8										
	30	95.0		17.5	15		46.7	17.5	5					16.7	17.5	1500	1000	1000
	32	100.0			6		19.2		6					19.2				
	35	109.0			7		22.9		7					22.9				
	38	118.0			8		26.2		8					26.2				
SQP421	30	96.0	17.5	17	52.5	17.5	9	28.3	17.5	1200	1000	1000	600					
	35	109.0		19	59.2		11	35.0										
	38	128.0		21	65.0		12	37.9										
	42	134.0		14	14		14	14						14	14	14	14	14
	50	156.0																
	60	189.0																
SQP431	30	96.0	17.5	17	53.3	17.5	2	7.5	14	1800	1200	1200	600					
	35	109.0		21	66.7		3	10.2										
				25	79.2		4	12.8										
	38	128.0		30	95.0		5	16.7	17.5					1500	1000	1000		
	42	134.0		32	100.0		6	19.2										
	50	156.0		35	109.0		7	22.9										
				38	118.0		8	26.2										
	60	189.0		14	14		14	14									14	14
									12					37.9	14	44.2		
	SQP432	30		96.0	17.5		17	53.3	17.5					10	32.5	17.5	1800	1200
35		109.0	21	66.7		12	38.3	1500										
38		128.0	25	79.2		14	43.3											
42		134.0	30	95.0		15	46.7											
50		156.0	32	100.0		17	52.5	1200		1000	1000							
			35	109.0		19	59.2											
60		189.0	38	118.0		21	65.0											

Note: • Max. working pressure is 14 MPa for phosphate-ester fluid.
• Max. speed may vary depending on displacement of cover side pump.

Weight, Delivery, Shaft Input Power

Model	Delivery, Shaft Input Power			Weight kg	
	Shaft End Pump	Middle Pump	Cover End Pump	Flange Mount	Foot Mount
SQP211	same as SQP2 Series	same as SQP1 Series	same as SQP1 Series	40.0	49.5
SQP311	same as SQP3 Series			60.0	69.5
SQP321	same as SQP3 Series	same as SQP2 Series	same as SQP1 Series	62.0	71.5
SQP421	same as SQP4 Series			88.0	113.0
SQP431	same as SQP4 Series	same as SQP3 Series	same as SQP1 Series	97.0	122.0
SQP432	same as SQP4 Series		same as SQP2 Series	104.0	129.0

See pages B10, 11 for delivery, shaft input power for SQP1 - SQP4 Series

Notes on Use

See page B5 for Notes On Using Vane Pumps

Shaft Input Torque Limitation

Shaft torque limitations of triple pumps are shown in the table. Please insure that the torque limits shown in the table are not exceeded when the total load of the three pumps are at maximum. Please calculate shaft torque from the operating speed and shaft input.

N: operating speed (min^{-1})

L: shaft input sum (kW)

Shaft torque: $T = (60 \times 1000 / 2\pi N) \times L = (9554 / N) \times L (N \cdot \text{Em})$

Model	Shaft Torque Limitation N · m
SQP211	360
SQP311	610
SQP321	610
SQP421	950
SQP431	950
SQP432	950

(Example) SQP432-60-38-14, operating speed 1200 min^{-1} , first pump

14MPa, second pump 14MPa, third pump 17.5MPa under max. load,

First pump shaft input: from table on page B11, SQP4-60 shaft input is 57.1kW

Second pump shaft input: from table on B11, SQP3-38 shaft input is 36.2kW

Third pump shaft input: from table on B10, SQP2-14 shaft input is 18.4kW

Shaft input sum: $L = 57.1 + 36.2 + 18.4 = 111.7 \text{ (kW)}$

Shaft input sum substituted for torque in the table, shaft input torque: $T = 9554$

$\times 111.7 / 1200 = 889.3 \text{ (N·Em)}$

Thus, the shaft torque of the SQP432 should be below the limitation of 820 N·Em.

Please confirm shaft torque using this procedure.

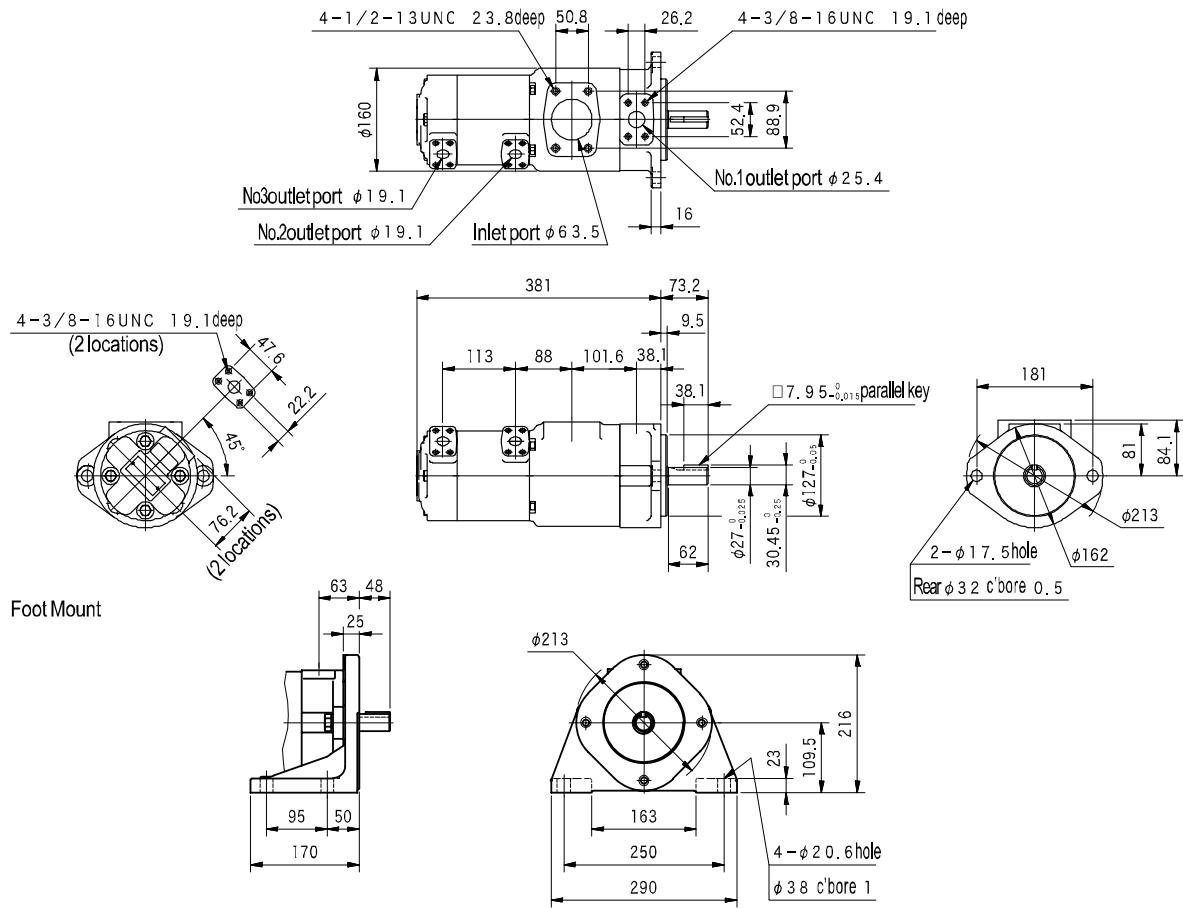
Piping Flange (Conforming to SAE J518c at Standard Pressure)

- Pump flange not included.
- Flanges (incl. hex socket bolts, spring washers, and O-rings) should be ordered separately from the table below.
- See page Q12 for details such as dimensions, etc.

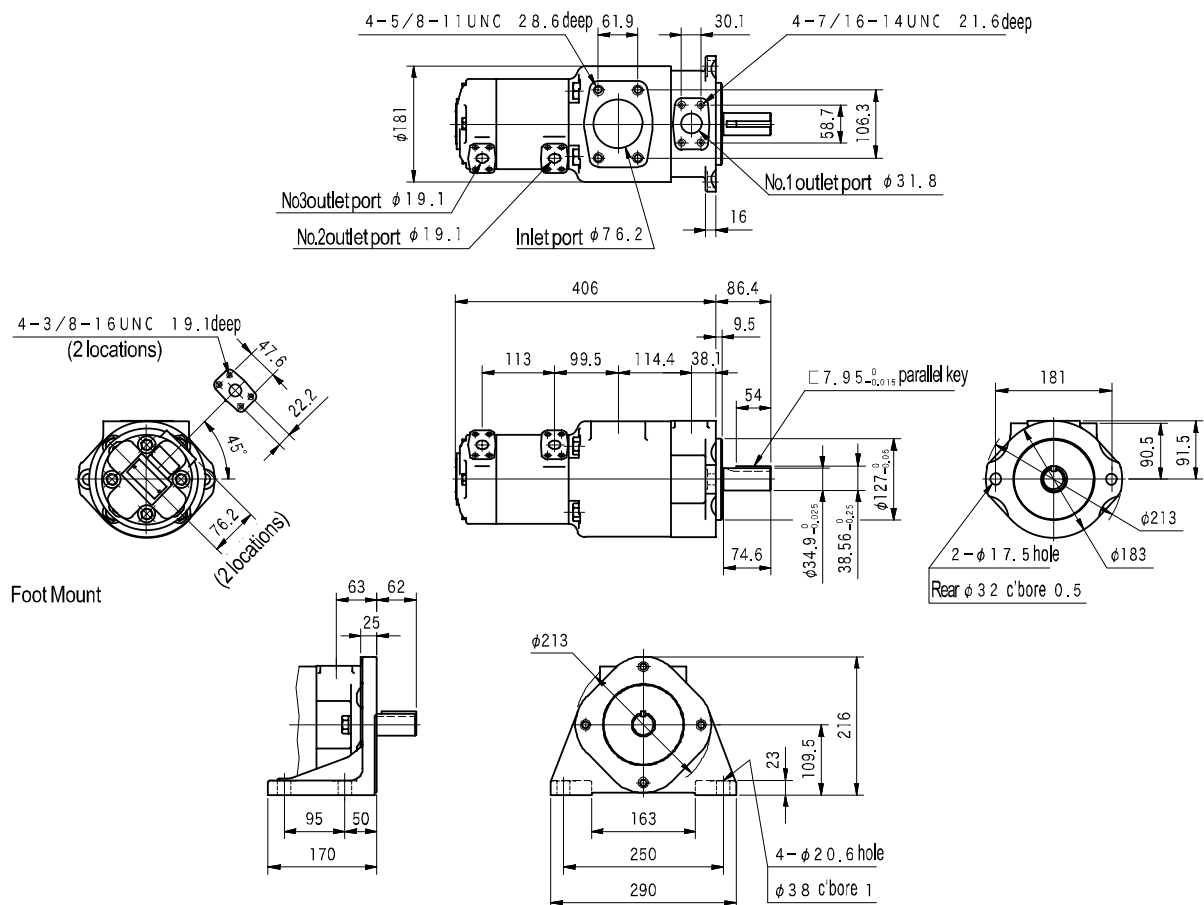
Pump Model	Type	Flange Model							
		Inlet Port		Outlet Port					
		Code		Code	No. 1 Port (Shaft End)	Code	No. 2 Port (Middle)	Code	No.3 Port (Cover End)
SQP211	Thread	2-1/2	FL1-20-20P-10-JA-S4-J	1	FL1-8-08P-10-JA-S4-J	3/4	FL1-6-06P-10-JA-S4-J	3/4	FL1-6-06P-10-JA-S4-J
	Weld		FL1-20-20W-10-JA		FL1-8-08W-10-JA		FL1-6-06W-10-JA		FL1-6-06W-10-JA
SQP311	Thread	3	FL1-24-24P-10-JA-S4-J	1-1/4	FL1-10-10P-10-JA-S4-J	3/4	FL1-6-06P-10-JA-S4-J	3/4	FL1-6-06P-10-JA-S4-J
	Weld		FL1-24-24W-10-JA		FL1-10-10W-10-JA		FL1-6-06W-10-JA		FL1-6-06W-10-JA
SQP321	Thread	3	FL1-24-24P-10-JA-S4-J	1-1/4	FL1-10-10P-10-JA-S4-J	1	FL1-8-08P-10-JA-S4-J	3/4	FL1-6-06P-10-JA-S4-J
	Weld		FL1-24-24W-10-JA		FL1-10-10W-10-JA		FL1-8-08W-10-JA		FL1-6-06W-10-JA
SQP421	Thread	3-1/2	FL1-28-28P-10-JA	1-1/2	FL1-12-12P-10-JA-S4-J	1	FL1-8-08P-10-JA-S4-J	3/4	FL1-6-06P-10-JA-S4-J
	Weld		FL1-28-28W-10-JA		FL1-12-12W-10-JA		FL1-8-08W-10-JA		FL1-6-06W-10-JA
SQP431	Thread	4	FL1-32-32P-10-JA	1-1/2	FL1-12-12P-10-JA-S4-J	1-1/4	FL1-10-10P-10-JA-S4-J	3/4	FL1-6-06P-10-JA-S4-J
	Weld		FL1-32-32W-10-JA		FL1-12-12W-10-JA		FL1-10-10W-10-JA		FL1-6-06W-10-JA
SQP432	Thread	4	FL1-32-32P-10-JA	1-1/2	FL1-12-12P-10-JA-S4-J	1-1/4	FL1-10-10P-10-JA-S4-J	1	FL1-8-08P-10-JA-S4-J
	Weld		FL1-32-32W-10-JA		FL1-12-12W-10-JA		FL1-10-10W-10-JA		FL1-8-08W-10-JA

Dimensions

S Q P 2 1 1 (Flange Mount)

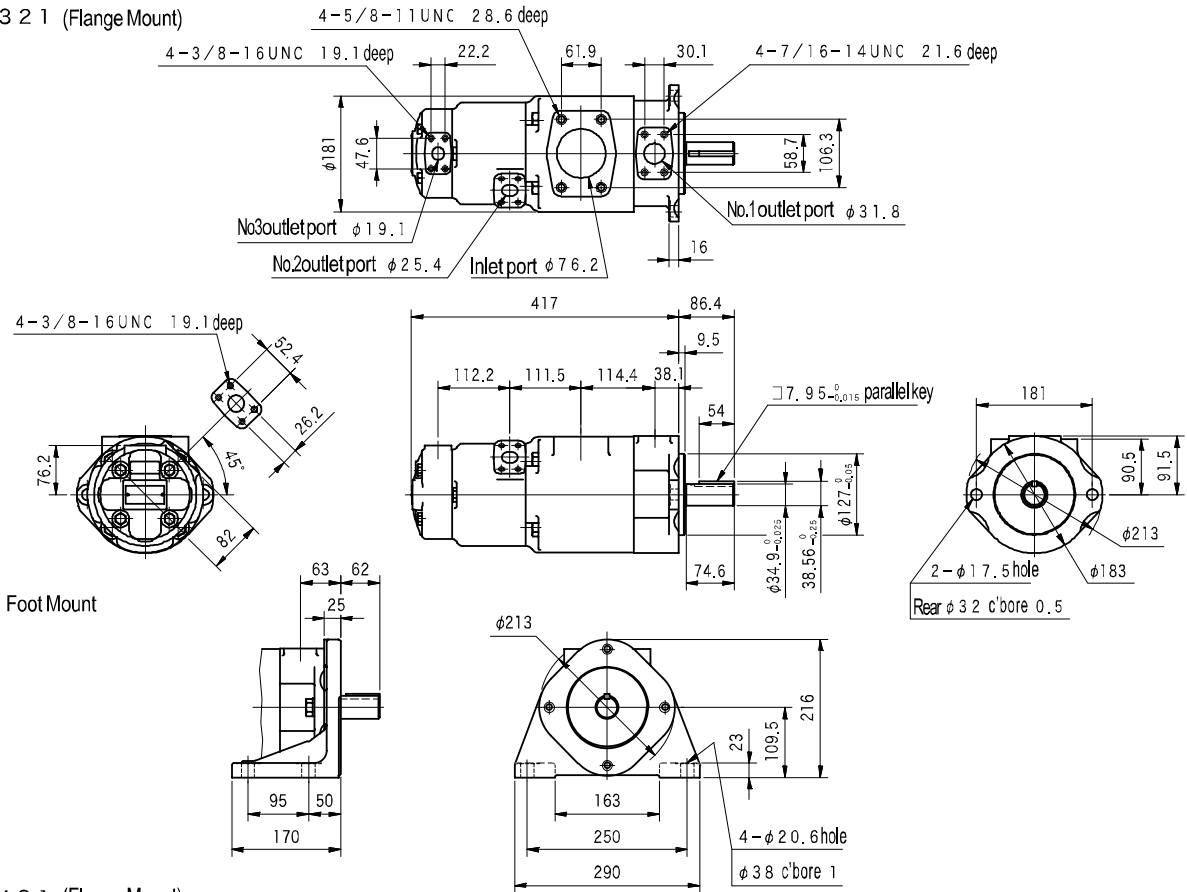


S Q P 3 1 1 (Flange Mount)

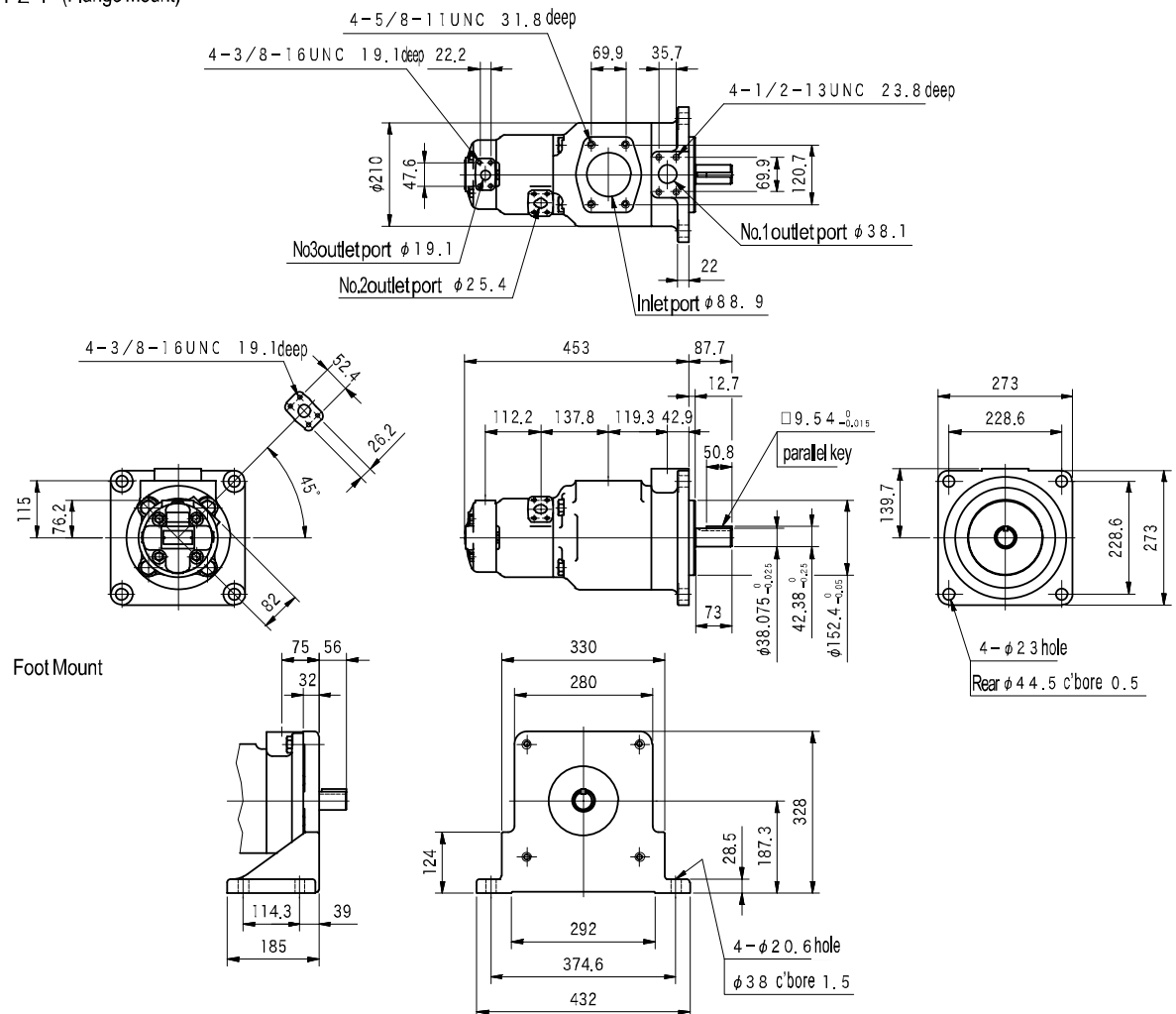


Dimensions

S Q P 3 2 1 (Flange Mount)



S Q P 4 2 1 (Flange Mount)

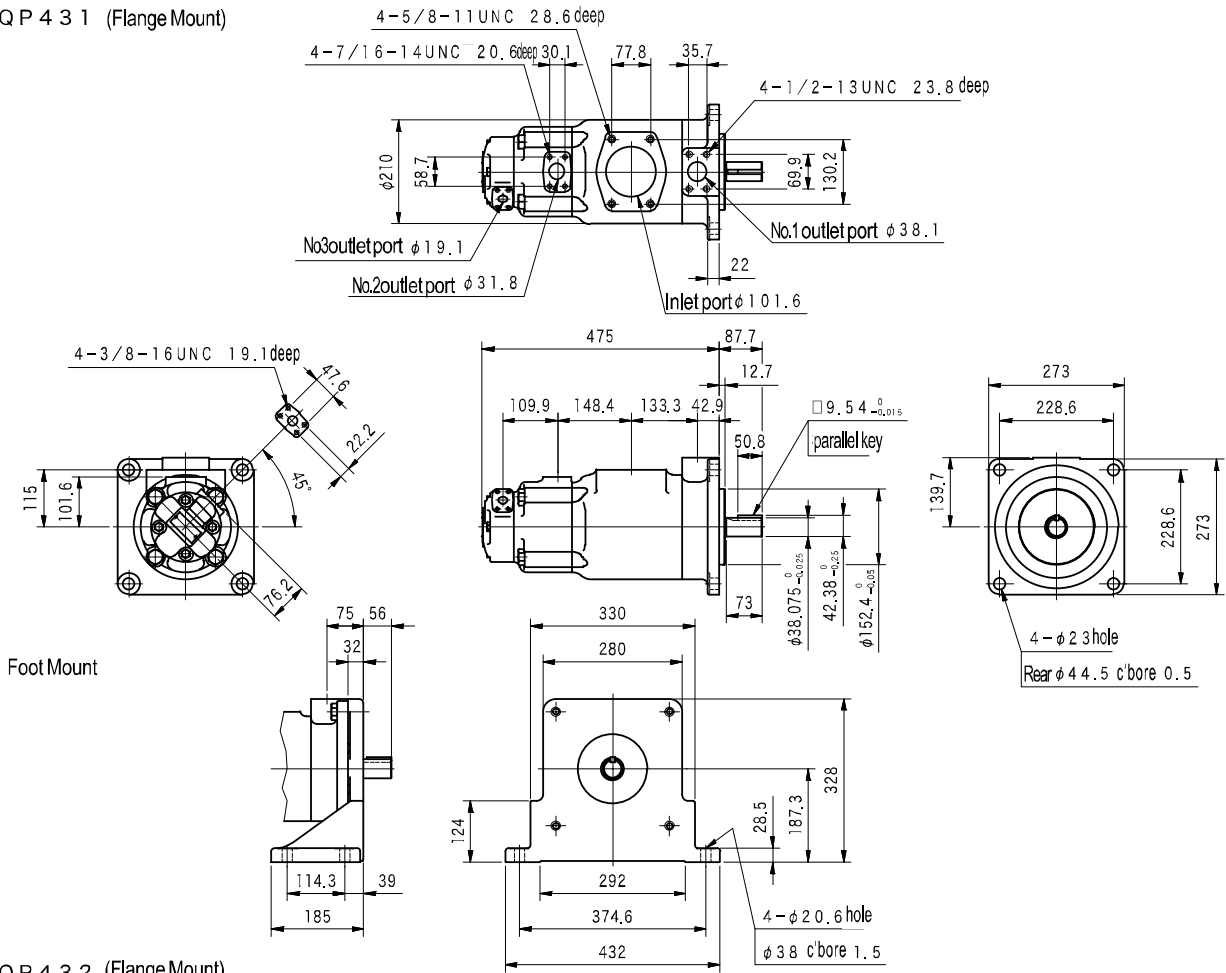


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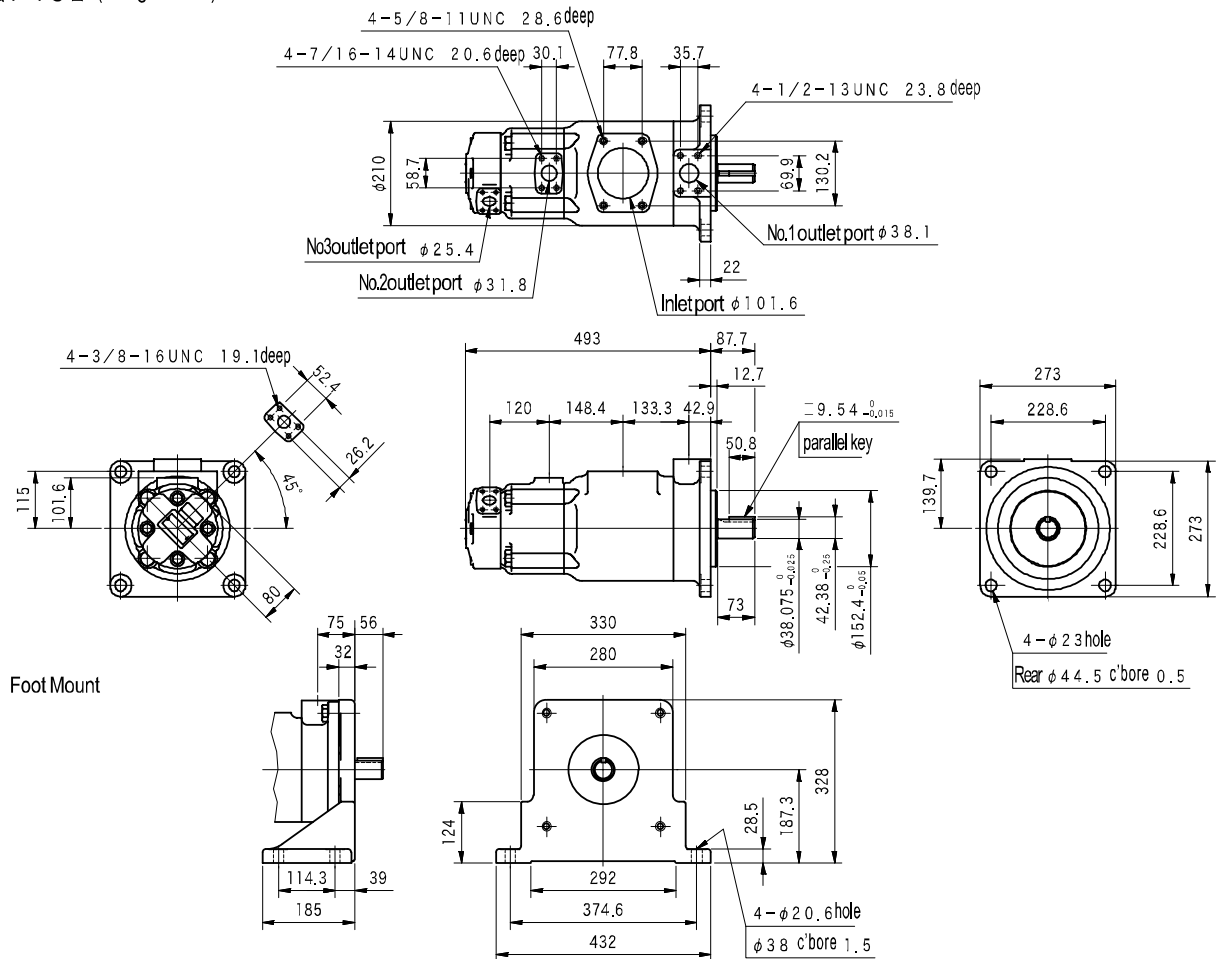
VANE PUMPS

Dimensions

S Q P 4 3 1 (Flange Mount)



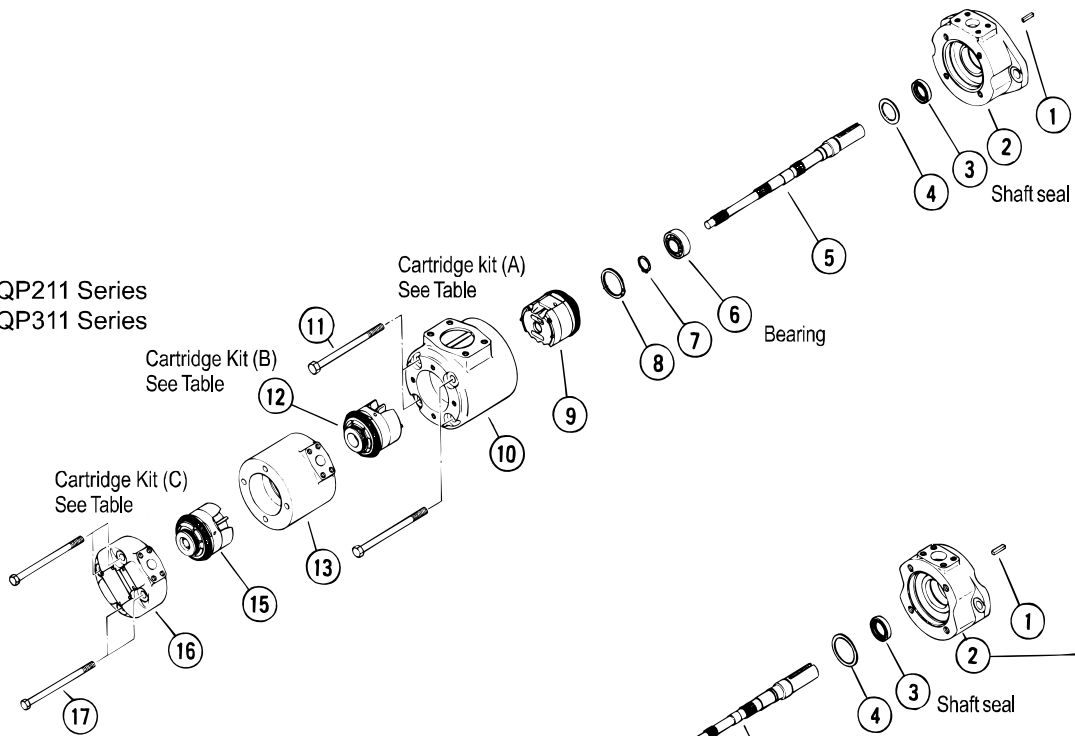
S Q P 4 3 2 (Flange Mount)



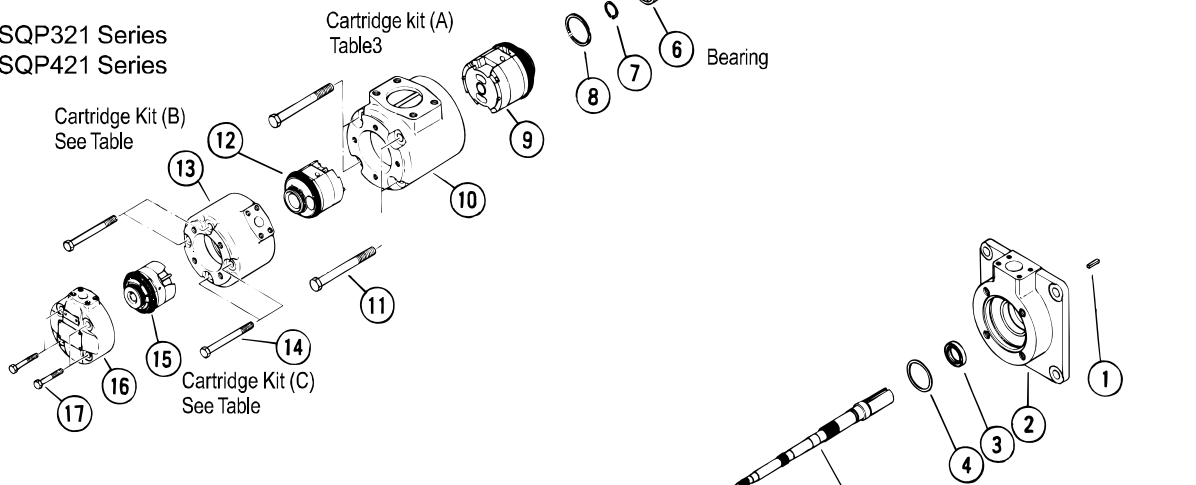
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VANE PUMPS

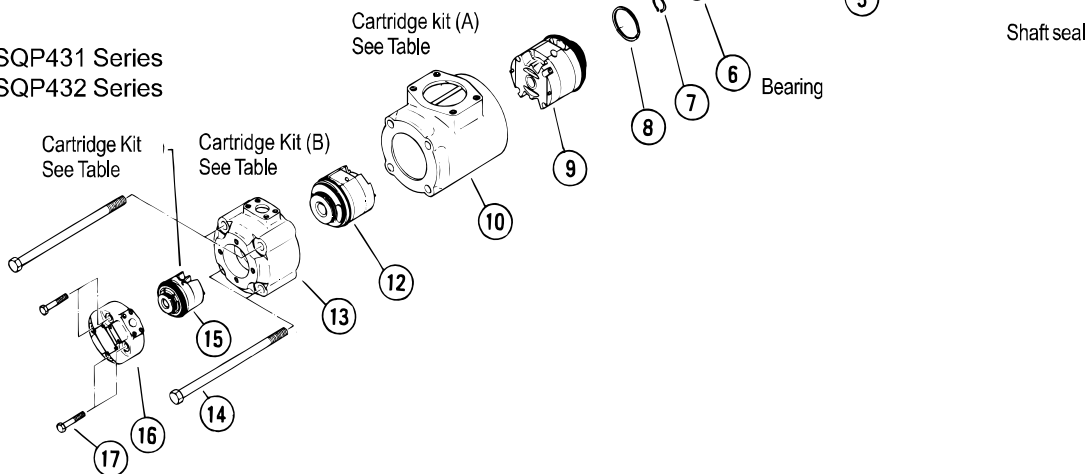
SQP211 Series
SQP311 Series



SQP321 Series
SQP421 Series



SQP431 Series
SQP432 Series



Construction

• Seal, Bearing Table

Series	Seal Kit P/N	Shaft Seal P/N	Bearing P/N
(F11) –SQP211	VA10885A (40028865)	VP191668 (40015857)	0070 62051
(F11) –SQP311	VA10757A (40028502)	VP193428 (40015856)	0070 63061
(F11) –SQP321	VA10756A (40028503)	VP193428 (40015856)	0070 63061
(F11) –SQP421	VA11703A (40028869)	VP195287 (40015858)	0070 63071
(F11) –SQP431	VA11133A (40028870)	VP195287 (40015858)	0070 63071
(F11) –SQP432	VA11450A (40028871)	VP195287 (40015858)	0070 63071

Note: • Shaft seal included in seal kit.

- Bearing P/N - bold characters refer to JIS B 1521 nomenclature, 0070 indicates no shield.
- Seal kit P/N and shaft seal P/N - () refers to F11.

• Cartridge Kit Table

Model Displ. Code	Mineral Oil			Water-Glycol		
		Cartridge Kit B (Middle Pump)	Cartridge Kit C (Cover End Pump)		Cartridge Kit B (Middle Pump)	Cartridge Kit C (Cover End Pump)
		SQP211 SQP311	SQP211 SQP311 SQP321 SQP421 SQP431		F11–SQP211 F11–SQP311	F11–SQP211 F11–SQP311 F11–SQP321 F11–SQP421 F11–SQP431
2		VA10889A	VA10243A		VA12597A	VA12621A
3		VA10890A	VA10244A		VA12598A	VA12622A
4		VA10891A	VA10245A		VA12599A	VA12623A
5		VA10892A	VA10246A		VA12600A	VA12624A
6		VA11074A	VA11072A		VA12601A	VA12625A
7		VA11075A	VA11073A		VA12602A	VA12626A
8		VA10893A	VA10247A		VA12603A	VA12627A
9		40018788	(40018789)		40018792	(40018793)
11		VA10894A	(VA10248A)		VA12604A	(VA12628A)
12		VA10895A	(VA10249A)		VA12605A	(VA12629A)
14		VA11455A	(VA11411A)		VA12606A	(VA12630A)
	Cartridge Kit A (Shaft End Pump)	Cartridge Kit B (Middle Pump)	Cartridge Kit C (Cover End Pump)	Cartridge Kit A (Shaft End Pump)	Cartridge Kit B (Middle Pump)	Cartridge Kit C (Cover End Pump)
	SQP211	SQP321 SQP421	SQP432	F11–SQP211	F11–SQP321 F11–SQP421	F11–SQP432
10	VA12087A	VA12100A	VA12106A	VA12553A	VA12607A	VA12631A
12	VA12088A	VA12101A	VA12107A	VA12554A	VA12608A	VA12632A
14	VA12089A	VA12102A	VA12108A	VA12555A	VA12609A	VA12633A
15	VA12090A	VA12103A	VA12109A	VA12556A	VA12610A	VA12634A
17	VA12091A	VA12104A	VA12110A	VA12557A	VA12611A	VA12635A
19	VA12273A	VA12314A	VA12315A	VA12558A	VA12612A	VA12636A
21	VA12092A	VA12105A	40078070	VA12559A	VA12613A	VA12637A
	Cartridge Kit A (Shaft End Pump)	Cartridge Kit B (Middle Pump)		Cartridge Kit A (Shaft End Pump)	Cartridge Kit B (Middle Pump)	
	SQP311	SQP431		F11–SQP311	F11–SQP431	
	SQP321	SQP432		F11–SQP321	F11–SQP432	
17	VA12260A	VA12316A		VA12560A	VA12614A	
21	VA12118A	VA12317A		VA12561A	VA12615A	
25	VA12058A	VA12318A		VA12562A	VA12616A	
30	VA12059A	VA12319A		VA12563A	VA12617A	
32	VA12119A	VA12320A		VA12564A	VA12618A	
35	VA12060A	VA12321A		VA12565A	VA12619A	
38	VA12061A	VA12322A		VA12566A	VA12620A	
	Cartridge Kit A (Shaft End Pump)			Cartridge Kit A (Shaft End Pump)		
	SQP421			F11–SQP421		
	SQP431			F11–SQP431		
	SQP432			F11–SQP432		
30	VA11211A			VA12567A		
35	VA11212A			VA12568A		
38	VA11212A			VA12569A		
42	VA11213A			VA12570A		
50	VA11214A			VA12571A		
60	VA11215A			VA12572A		

Note: • Care should be taken as construction of shaft end, middle, and cover end pump differ.

- Cartridge kit includes seals excluding shaft seal.
 - Suffix "L" added to end of cartridge kit P/N indicates left hand rotation model.
 - Some series of cartridge kit P/N's indicated by () may not be applicable.
- Confirm displacement codes on page B31.

High Performance Pump for Mobile Applications - VQ Series

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VANE PUMPS

The VQ Series intravane pump is designed for high performance mobile applications. The pump's flexible side plate mechanism provides higher volumetric efficiency compared to conventional vane pumps and provides high resistance to seizure during hot and cold startups.

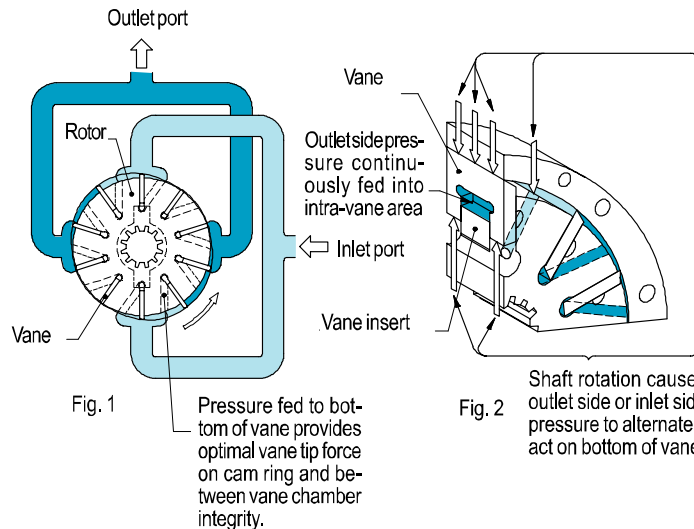
1. Stable operation at high pressures of 21MPa and high speeds of 2700 min⁻¹.
2. Employs pressure balanced flexible side plates. Automatically maintains clearance between rotor

and side plates providing high (83•85%) volumetric efficiency at 82°C.

Side plates act to offset overload spike at startup and swelling caused by heat and improves on seizure characteristics during low temperature starts.

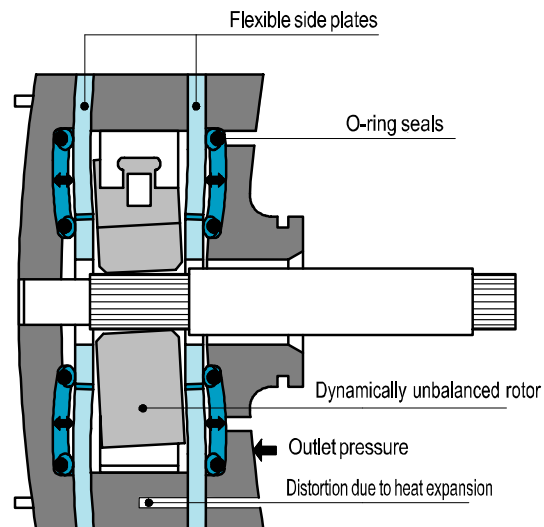
3. Cartridge kit configuration of main rotating elements for ease in maintenance.
4. Single pump, 3 series, 11 types and double pump, 6 series, 99 types configurations allow selection of optimum model to meet the application.

Intravane Mechanism



Flexible Side Plate Mechanism

The flexible sides plates consist of thin bronze and steel plates. Seals located between both support plates and flexible side plates create pressure chambers. Pump delivery pressure fills these chambers and act to provide uniform force on the flexible sides plates toward the rotor. Rotation causes generation of countering flow pressure between the rotor and flexible sides plates pushing the flexible sides plates outward. These two forces are automatically balanced to maintain optimal clearance.



Adjusts for unequal balance between flexible side plates and rotor and heat-caused swelling.

Chambers pressurized by pump delivery to balance rotor and plates for optimal clearance.