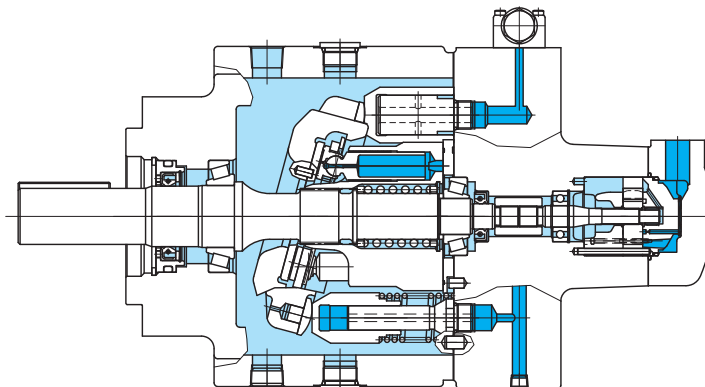
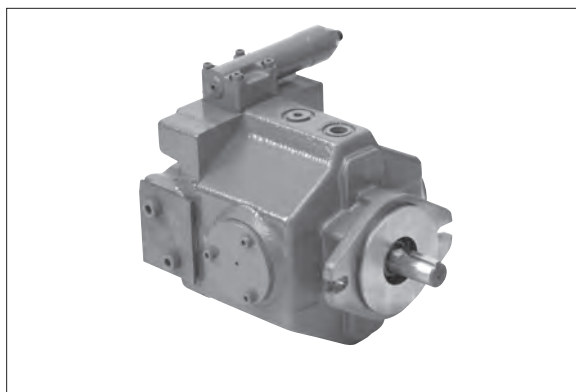


# Low noise variable displacement piston pumps

## P\*\*V(M) series



This pump series offers low noise, high performance, and reliability with various functions for fast response and stability with a variety of controls such as electric direct control, pressure compensator control, and load sensing. Double pump configurations to meet system needs are also available. These pumps are ideal for customer needs for energy saving, high speed, and low noise.

### Model Code

**(F11)-P16V-(F)RS(G)-11-CMC-10-J**

1 2 3 4 5 6 7 8 9

- |   |  |
|---|--|
| <p><b>1</b> Hydraulic fluid<br/>Omit: mineral oil based fluid<br/>F11: water glycol based fluid</p> <p><b>2</b> P16V swash plate type variable displacement piston pump<br/>P16V</p> <p><b>3</b> Pump mounting<br/>Omit: flange mounting<br/>F: foot mounting</p> <p><b>4</b> Rotation (viewed from shaft end)<br/>R: right rotation (clockwise)<br/>L: left rotation (counter-clockwise)</p> | <p><b>5</b> Suction and delivery port piping system<br/>(Tapered threaded pipe for JIS pipes used for drain port)<br/>Omit: SAE O-ring seal coupling connection end port type<br/>G: SAE 4 bolt flange connection end port side<br/>1: SAE 4 bolt flange connection side port type</p> <p><b>6</b> Pump design no.</p> <p><b>7</b> Pump control method<br/>Refer to the pump and control system combination table (on page A4-2).</p> <p><b>8</b> Maximum displacement adjustment function<br/>Omit: not provided<br/>C: w/adjuster</p> <p><b>9</b> Control valve design no.</p> |
|---|--|

### Model Code

**(F11)-P70V(3)(F)R-(2)(C)22-CMC-10-J**

1 2 3 4 5 6 7 8 9 10 11

- |   |   |
|---|---|
| <p><b>1</b> Hydraulic fluid<br/>Omit: mineral oil based fluid<br/>F11: water glycol based fluid</p> <p><b>2</b> P**V swash plate type variable displacement piston pump<br/>P16VM, P21VM, P21V, P31V, P40V<br/>P70V, P100V, P130V</p> <p><b>3</b> Code for double pump<br/>Omit: single pump<br/>3: integrated fixed vane pump (P70V, P100V)</p> <p><b>4</b> Pump mounting<br/>Omit: flange mounting<br/>F: foot mounting</p> <p><b>5</b> Rotation (viewed from shaft end)<br/>R: right rotation (clockwise)<br/>L: left rotation (counter-clockwise)</p> | <p><b>6</b> Integrated vane pump displacement code (input only if <b>3</b> is 3)<br/>Refer to specifications.</p> <p><b>7</b> Integrated vane pump delivery port position (input only if <b>3</b> is 3)<br/>Viewed from cover side with control valve up<br/>A: bottom B: left C: up D: right</p> <p><b>8</b> Pump design no.</p> <p><b>9</b> Pump control method<br/>Refer to the pump and control system combination table (on page A4-2).</p> <p><b>10</b> Maximum displacement adjustment function<br/>Omit: not provided<br/>C: w/adjuster</p> <p><b>11</b> Control valve design no.</p> |
|---|---|

## Model Code

● Pump and control valve combination table (consult Tokyo Keiki for parts not supported)

	Code	Applicable Series									Maximum Displacement Adjustment Function Added ("C" added to code)
		P16VM	P21VM	P16V	P21V	P31V	P40V	P70V	P100V	P130V	
Pressure compensator control	C	○	○	○	○	○	○	○	○	○	○
	CM	○	○	○	○	○	○	○	○	○	○
Remote pressure compensator control	CG	○	○	○	○	○	○	○	○	○	○
Proportional solenoid pressure compensator control	EP	○	○	○	○	○	○	○	○	○	○
Dual pressure, dual flow self-pressurized control	2P	○	○	○	○	○	○	○	○	○	○
Load sensing control	CV	○	○	○	○	○	○	○	○	○	○
	CVF	○	○	○	○	○	○	○	○	○	○
Remote load sensing control w/pressure compensator	CGVF	○	○	○	○	○	○	○	○	○	○
Multi-stage pressure compensator control (1 pressure unload)	MC1U	○	○	○	○	○	○	○	○	○	○
Multi-stage pressure compensator control (2 pressures)	MC2	○	○	○	○	○	○	○	○	○	○
Multi-stage pressure compensator control (2 pressure unload)	MC2U	○	○	○	○	○	○	○	○	○	○
Multi-stage pressure compensator control (3 pressures)	MC3	○	○	○	○	○	○	○	○	○	○
Electric direct control (flow)	EDQS	—	—	—	—	—	○	○	○	○	—
Electric direct control (flow, pressure)	EDS	—	—	—	—	—	○	—	—	—	—

## Specifications

Model Code	Maximum Displacement cm <sup>3</sup> /rev	Maximum Working Pressure MPa	Max. Speed min <sup>-1</sup>	Min. Speed min <sup>-1</sup>	Weight kg
P16VM	16	14	1800	600	16
P21VM	21				17
P16V	16	21			16
P21V	21				22
P31V	31				23
P40V	40				37
P70V	70				63
P100V	100				91
P130V	130				112

- Weights are for pumps with pressure compensator control.
- Consult Tokyo Keiki for specifications of pumps using water glycol fluids.

● Integrated vane pump specifications

6 Displacement Code	Displacement cm <sup>3</sup> /rev	Maximum Working Pressure MPa
2	6.3	16
3	9.4	
4	12.5	
5	15.6	

# Pump control method

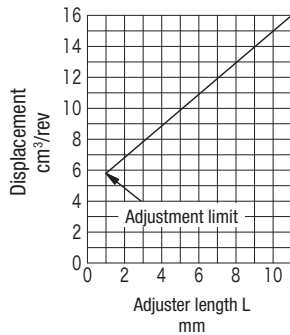
Pump Control Method		Characteristics Curve	Description	Functional Symbol (detailed)
Name	Code			
Pressure compensator control	C		<ul style="list-style-type: none"> <li>When pump delivery pressure approaches the compensator setting, pump delivery is automatically reduced to the minimum flow necessary to maintain the pressure.</li> <li>Pressure setting can be adjusted manually. Pressure adjustment ranges C: ~21MPa CM: ~10.5MPa</li> </ul>	
	CM			
Dual pressure, dual flow self-pressurized control	2P		<ul style="list-style-type: none"> <li>Dual pressure compensation control enables automatic switching from low pressure-high flow to high pressure-low flow modes.</li> </ul>	
	2PU		<ul style="list-style-type: none"> <li>By switching the solenoid valve installed on the pump, low-pressure/high-flow and high-pressure/low-flow control can be exercised thanks to the unload and two pressure settings for compensator control.</li> </ul>	
Remote pressure compensator control	CG		<ul style="list-style-type: none"> <li>Setting pressure of pressure compensator control can be set from a separate location with a remote control valve.</li> </ul>	
Proportional solenoid valve pressure compensator control	EP		<ul style="list-style-type: none"> <li>Setting pressure of pressure compensator control can be set proportionally with proportional solenoid pressure control valve integrated on pump.</li> </ul>	
Load sensing control	CVF (CV)		<ul style="list-style-type: none"> <li>Pump delivery automatically controlled to maintain constant differential pressure across flow control valve located downstream of pump. Energy-saving type pump control which supplies minimum flow and pressure necessary to drive load (actuator).</li> <li>Figure at right is of CVF control.</li> </ul>	
Remote load sensing control w/pressure compensator	CGVF		<ul style="list-style-type: none"> <li>Pump delivery automatically controlled with load sensing control during flow control. Pump control automatically switches as pump delivery pressure approaches pressure compensator control setting (cutoff pressure).</li> </ul>	

# Pump control method

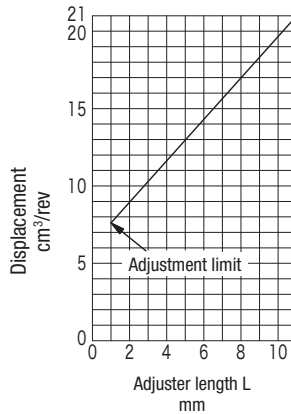
Pump Control Method		Characteristics Curve	Description	Functional Symbol (detailed)
Name	Code			
Multi-stage pressure compensator control	MC1U	<p>Note: Unload when solenoid is OFF.</p>	<ul style="list-style-type: none"> <li>Control of setting pressure for unload and pressure compensator is possible by switching solenoid valve integrated on pump.</li> </ul>	
	MC2		<ul style="list-style-type: none"> <li>2-pressure compensator control setting is possible by switching solenoid valve integrated on pump.</li> </ul>	
	MC2U	<p>Note: Unload when solenoid is OFF.</p>	<ul style="list-style-type: none"> <li>Unload and 2-pressure compensator control setting is possible by solenoid valve integrated on pump.</li> </ul>	
	MC3		<ul style="list-style-type: none"> <li>3-pressure compensator control setting is possible by switching solenoid valve integrated on pump.</li> </ul>	
Electric direct control	EDQS		<ul style="list-style-type: none"> <li>Position sensor mounted on pump detects swash plate angle provides linear control of delivery flow in response to flow control signal.</li> </ul>	
	EDS		<ul style="list-style-type: none"> <li>In flow control mode, pump delivery is controlled by flow control signal and as pump delivery pressure approaches the pressure setting signal, mode automatically switches to pressure control.</li> </ul>	

Pump Control Method		Characteristics Curve	Description	Functional Symbol (detailed)
Name	Code			
Maximum displacement adjustment function	*C **C		<ul style="list-style-type: none"> <li>Maximum displacement adjustment with adjustment screw on pump.</li> <li>Pressure control characteristics dependent on ** section control method.</li> </ul>	<p>Displacement adjustment symbol</p>

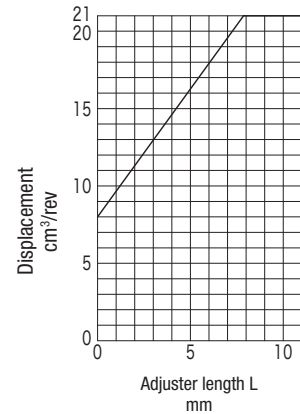
## Max displacement adjuster characteristics



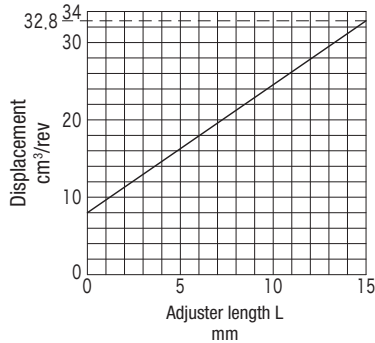
P16V (M)



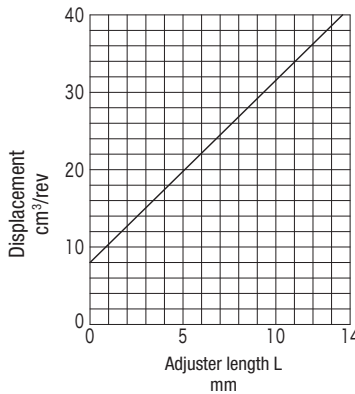
P21VM



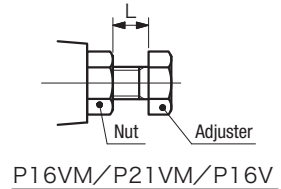
P21V



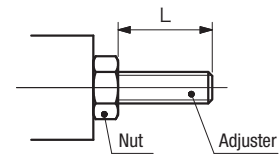
P31V



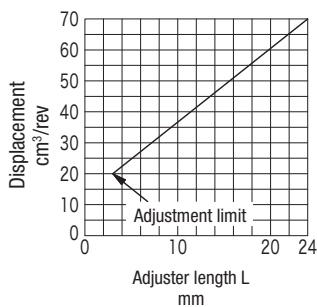
P40V



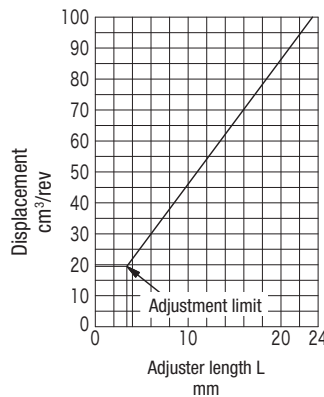
P16VM/P21VM/P16V



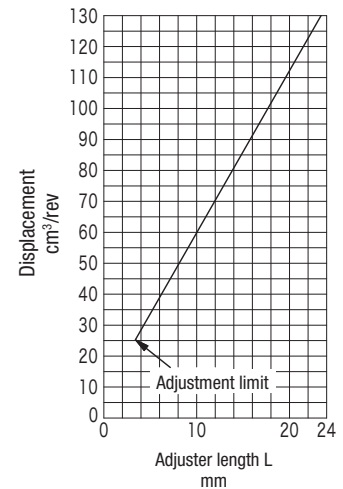
P21V~P130V



P70V



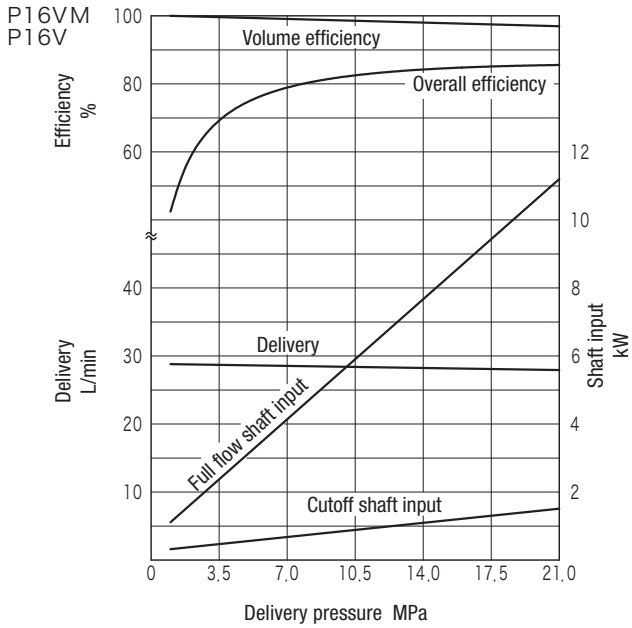
P100V



P130V

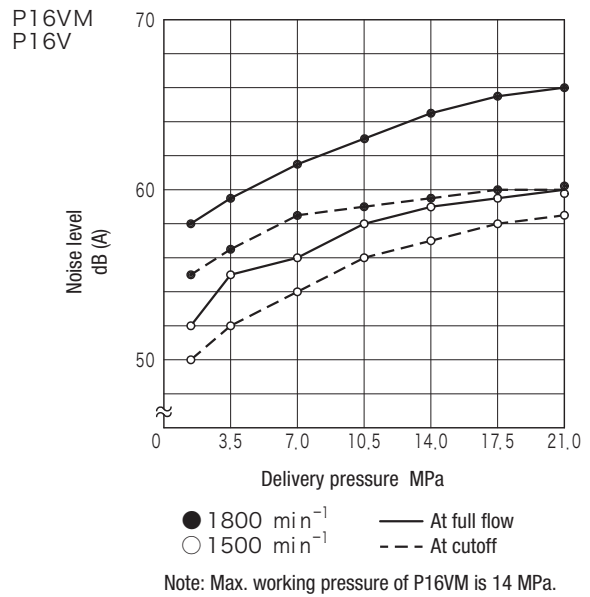
**Characteristics Curve (at 20 mm<sup>2</sup>/s) (typical examples)**

**Pressure, efficiency, delivery, input power (1800 min<sup>-1</sup>)**

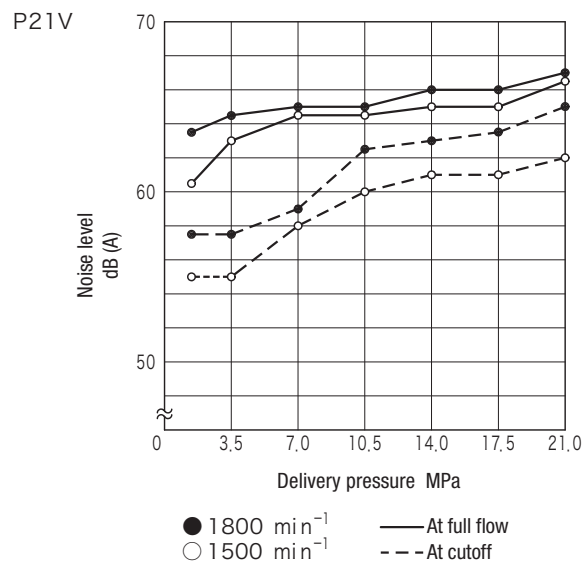
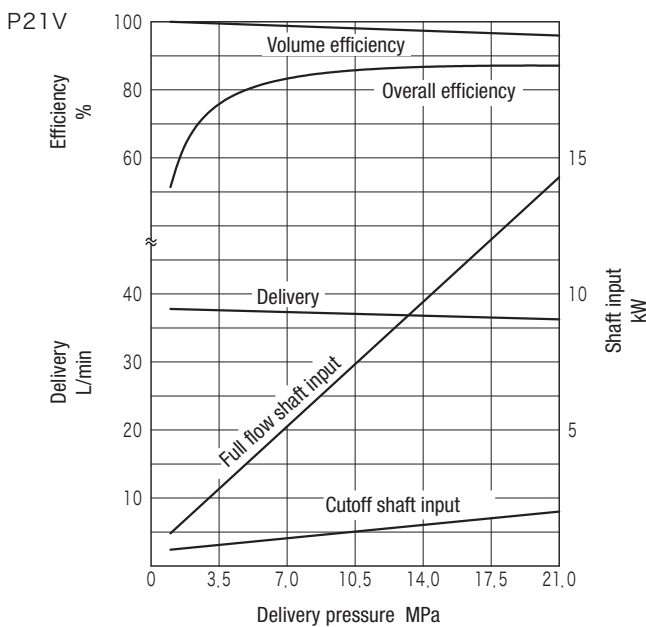
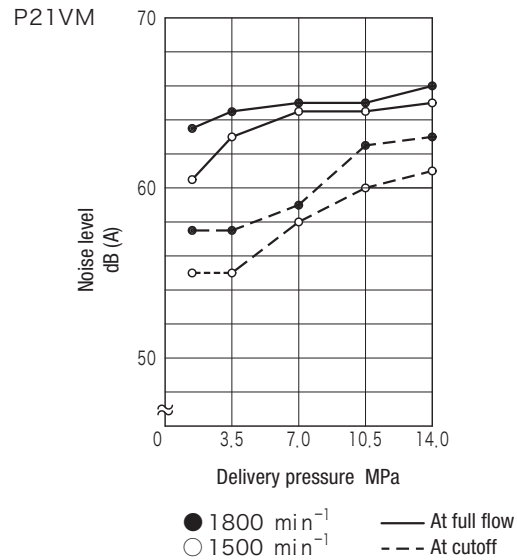
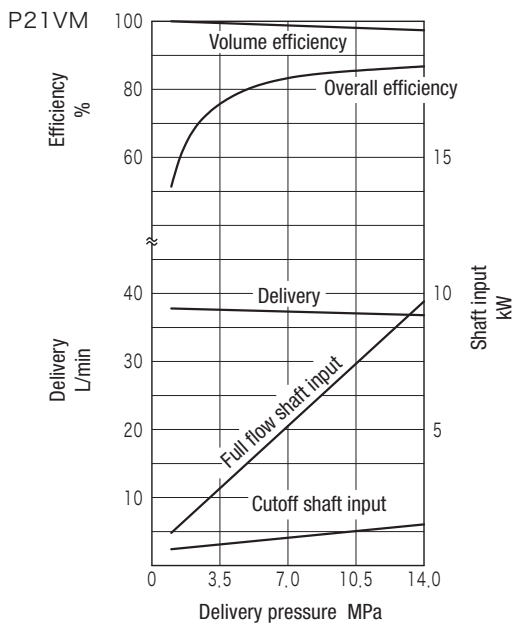


Note: Max. working pressure of P16VM is 14 MPa.

**Pressure, noise characteristics (1 m from pump rear)**



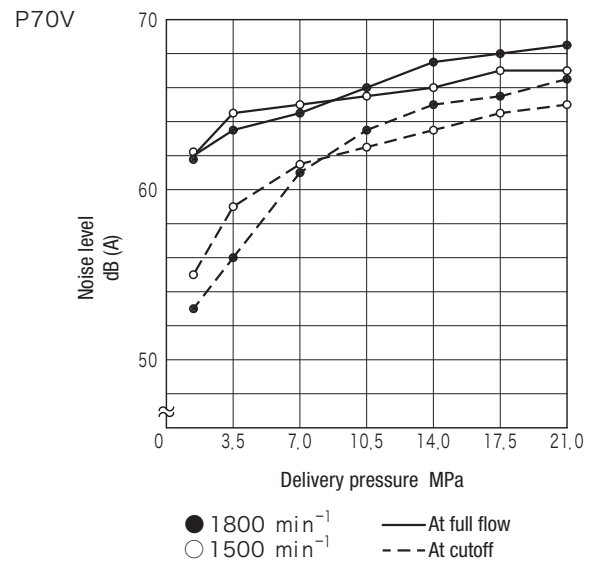
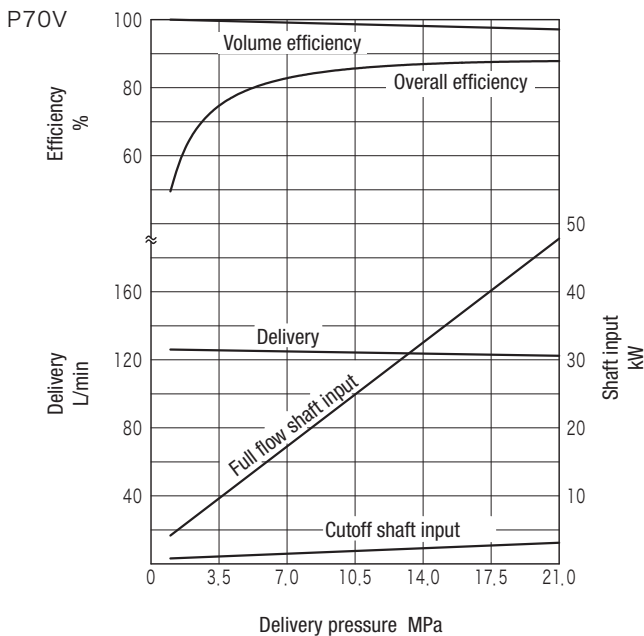
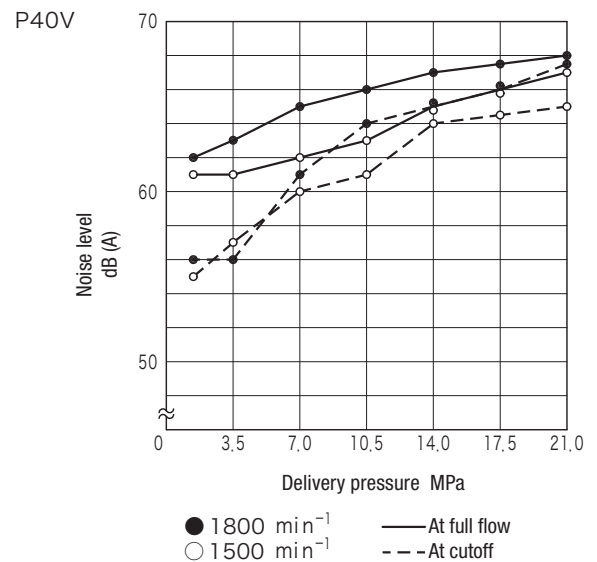
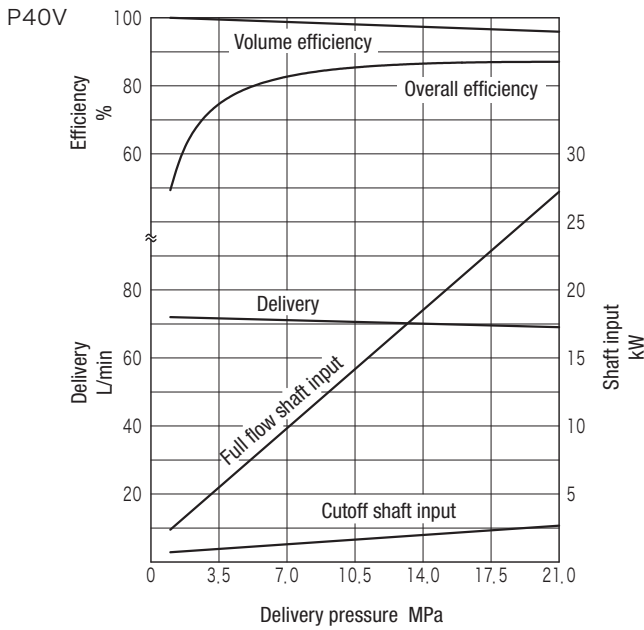
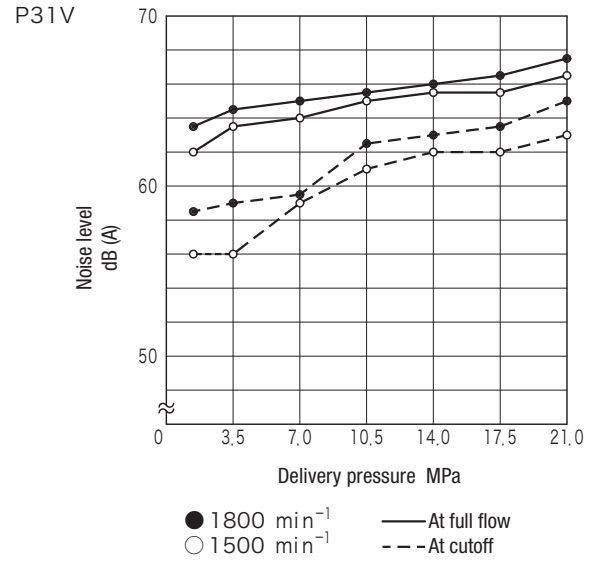
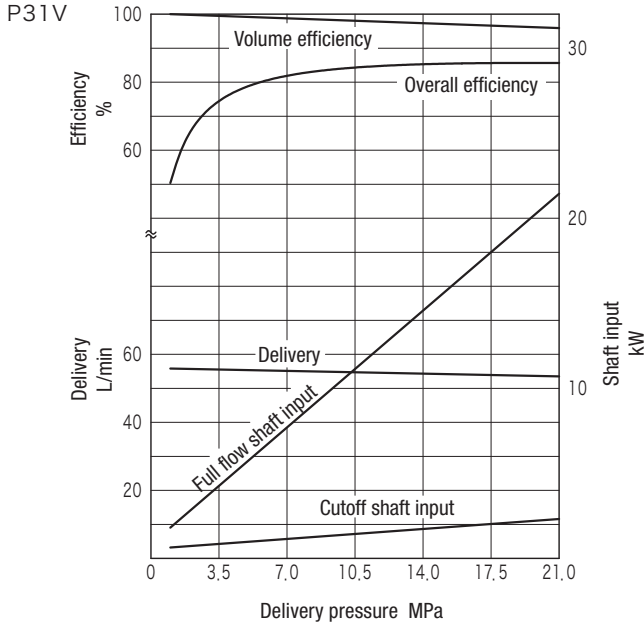
Note: Max. working pressure of P16VM is 14 MPa.



# Characteristics Curve (at 20 mm<sup>2</sup>/s) (typical examples)

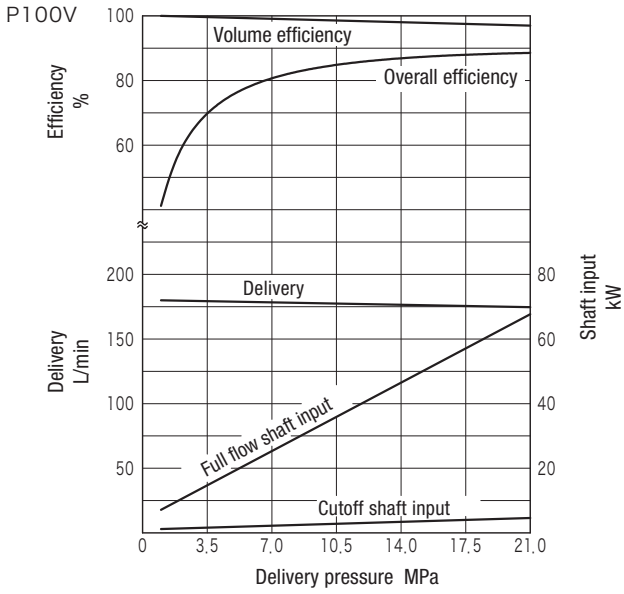
Pressure, efficiency, delivery, input power (1800 min<sup>-1</sup>)

Pressure, noise characteristics (1 m from pump rear)

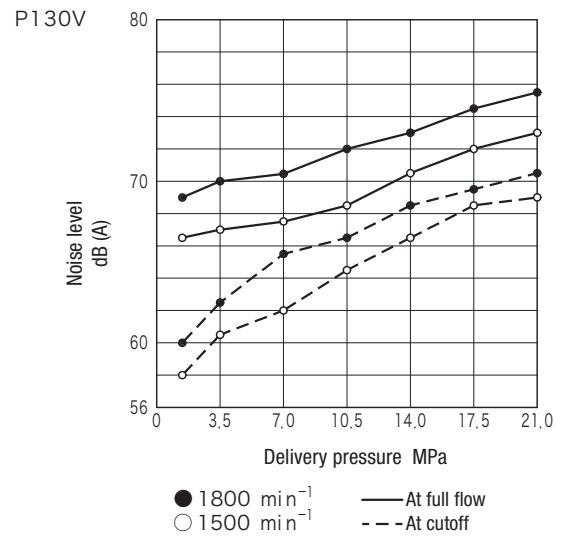
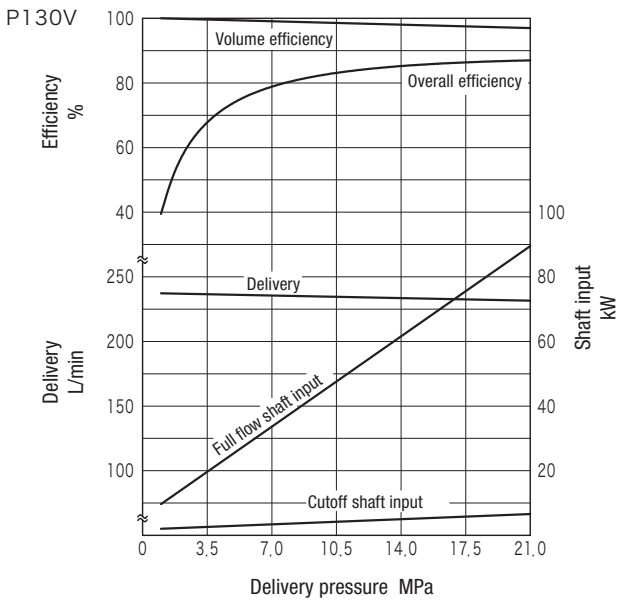
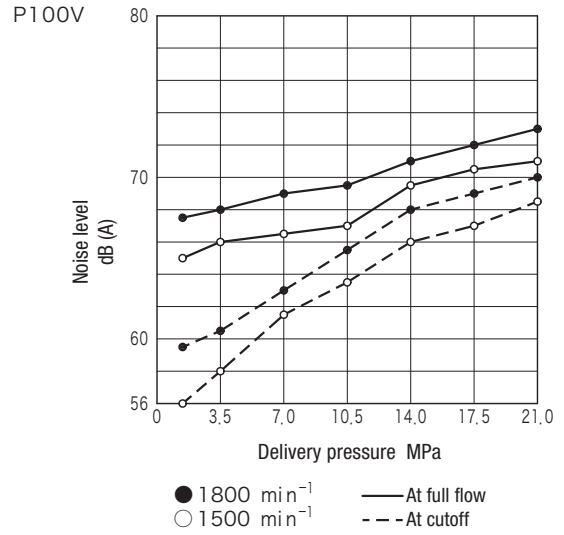


**Characteristics Curve (at 20 mm<sup>2</sup>/s) (typical examples)**

**Pressure, efficiency, delivery, input power (1800 min<sup>-1</sup>)**

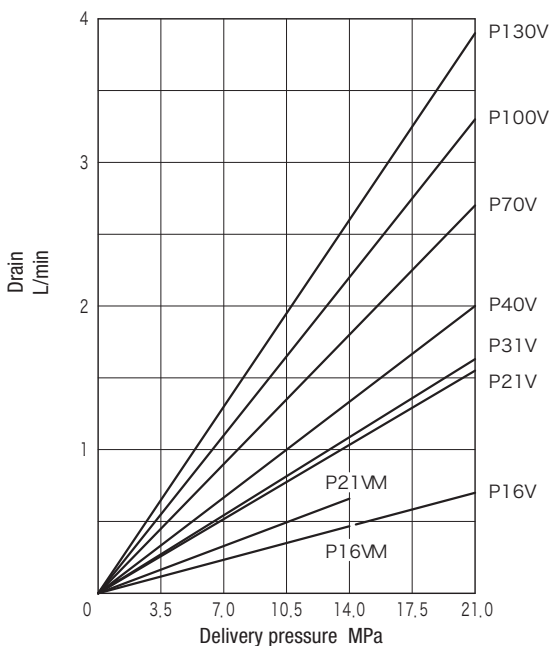


**Pressure, noise characteristics (1 m from pump rear)**

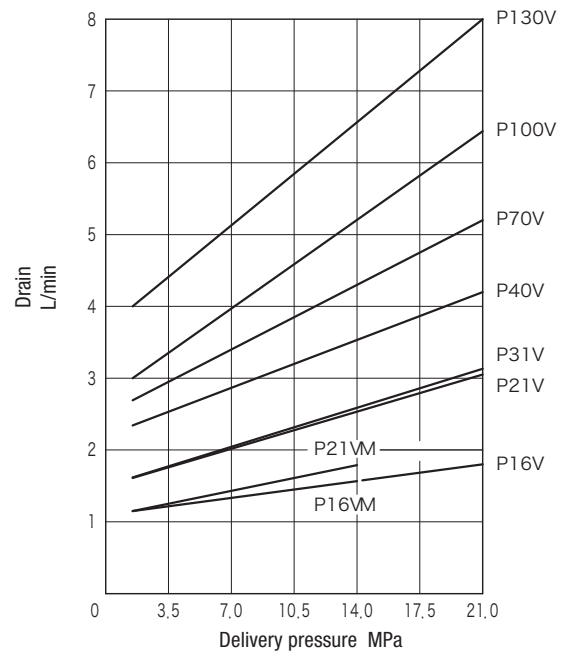


**Pressure, drain flow characteristics (1800 min<sup>-1</sup>, 20 mm<sup>2</sup>/s)**

At full flow



At cutoff (C: Pressure compensator control)





## Notes on Operation

- See piston pump Notes on Operation (page A0-3, A0-4)

## Piping Flanges and Couplings

- Flanges must be ordered separately. See table below for required parts.

### Piping Flanges (conforming to SAE J 518c Standard Pressure)

Pump Model	Threaded		Welded	
	Diameter	Flange Model	Diameter	Flange Model
P16VM, P21VM, P16V	Rc3/4	FL1-6-06P-10-JA-S4-M	20A	FL1-6-06W-10-JA-M
P21V, P31V P40V	Rc1-1/4	FL1-10-10P-10-JA-S4-M	32A	FL1-10-10W-10-JA-M
P70V	Rc1-1/2	FL1-12-12P-10-JA-S4-M	40A	FL1-12-12W-10-JA-M
P70V3	Delivery	FL1-12-12P-10-JA-S4-M	40A	FL1-12-12W-10-JA-M
	Suction	FL1-16-16P-10-JA-S4-M	50A	FL1-16-16W-10-JA-M
P100V (3) P130V (3)	Rc2-1/2	FL1-20-20P-10-JA-S4-M	65A	FL1-20-20W-10-JA-M

- Integrated vane pump delivery port flange

Threaded		Welded	
Diameter	Flange Model	Diameter	Flange Model
Rc3/4	FL1-6-06P-10-JA-S4-J	20A	FL1-6-06W-10-JA

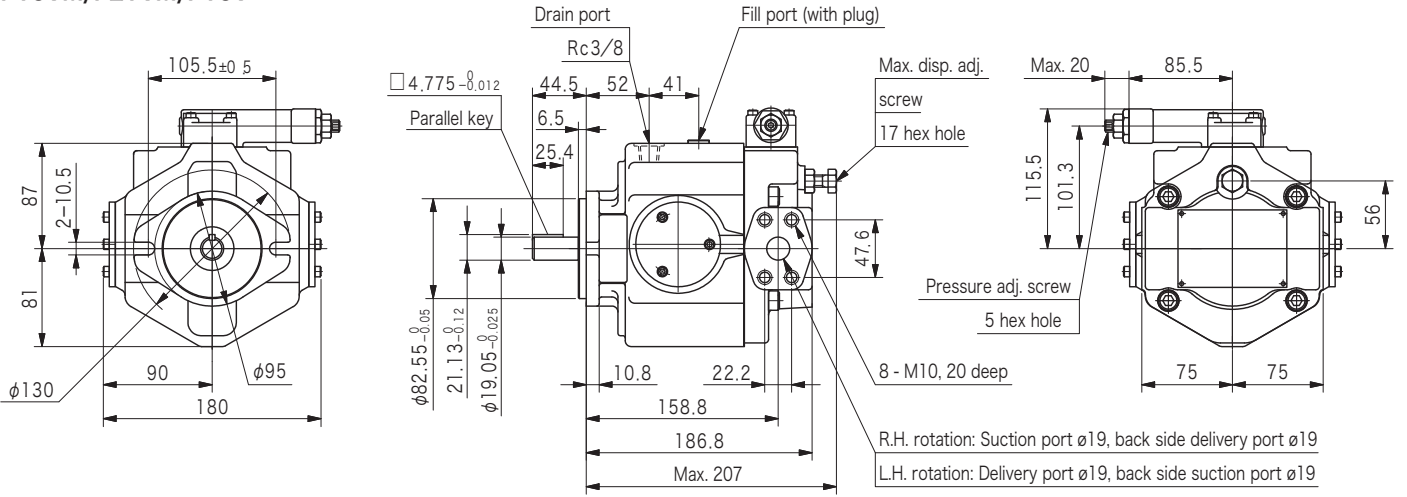
- Flange includes O-rings, mounting bolts, spring washers.

### Pipe Couplings (SAE O-ring seal couplings)

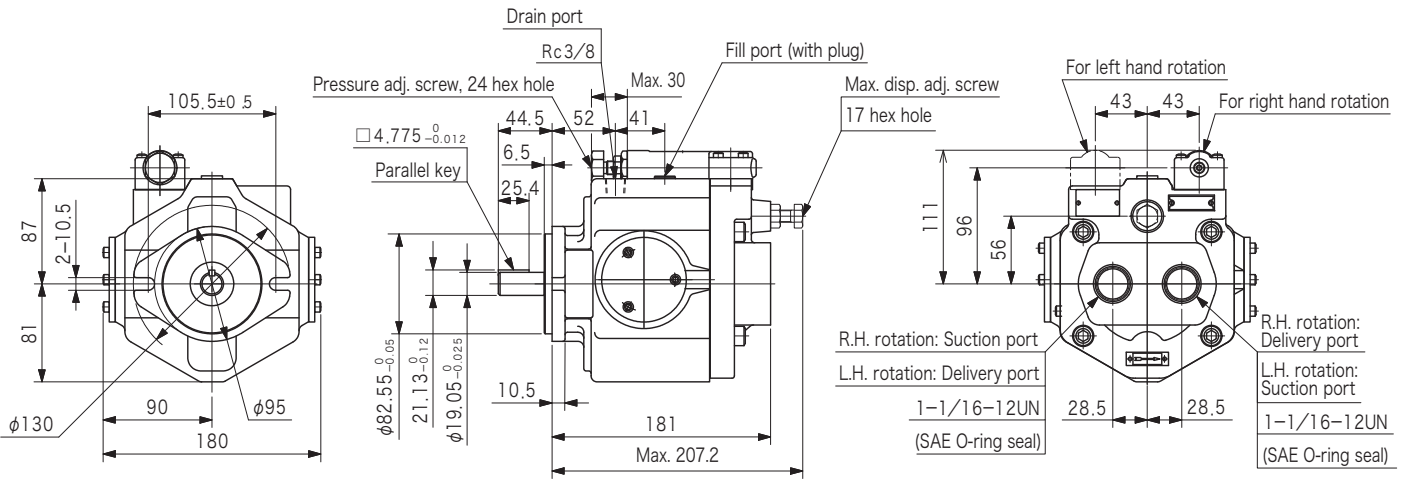
Pump Model	Suction, Delivery Port Couplings		
	Pump Side Thread Size	Piping Side Thread Size	Part No.
P16V	1-1/16-12UN	Rc3/8	VP36051
		Rc1/2	VP36873
		Rc3/4	VP31817
		Rc1	VP39410

**Dimensions**

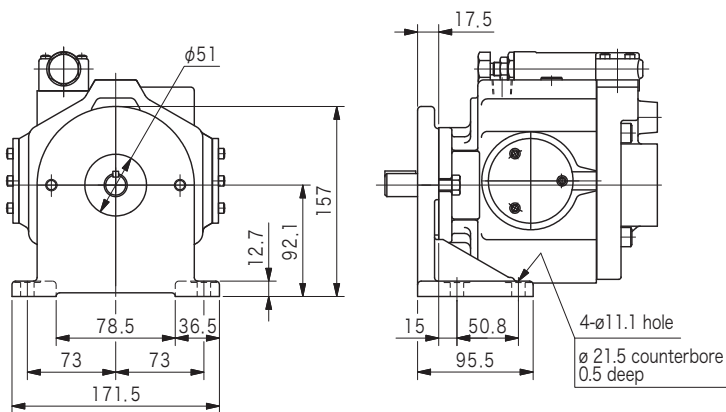
**P16VM/P21VM/P16V**



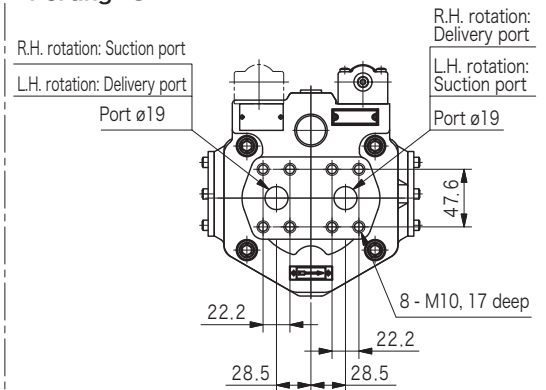
**P16V (end port type)**



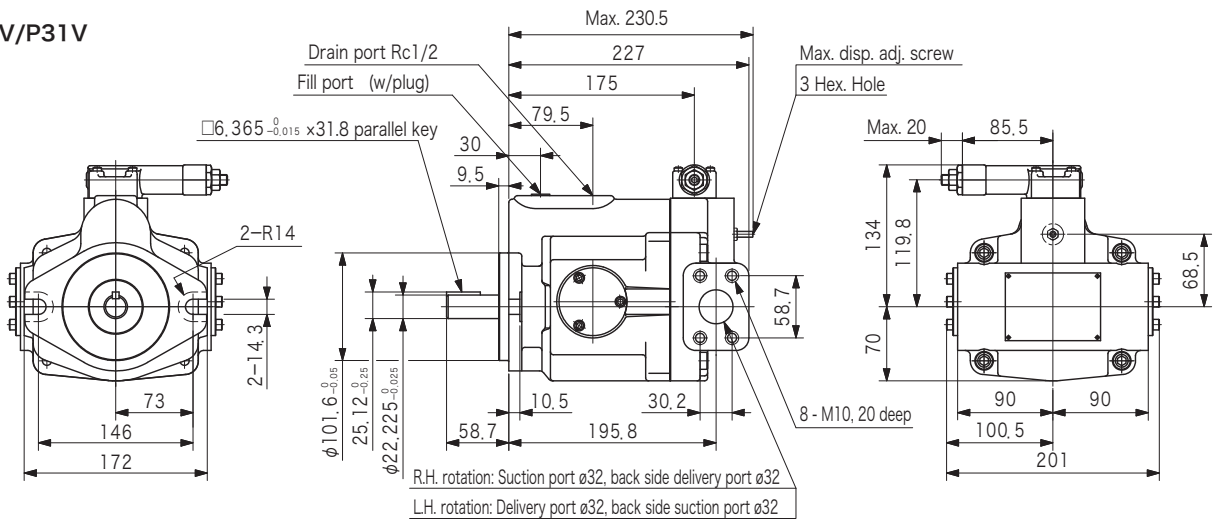
**Foot mounting**



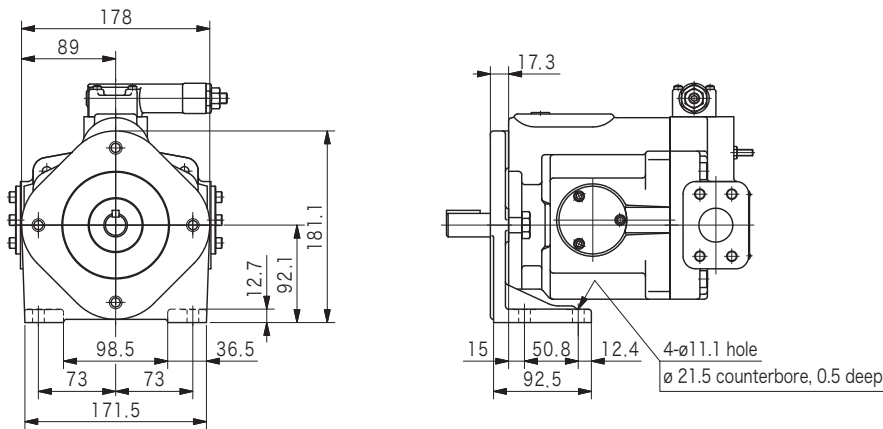
**Porting "G"**



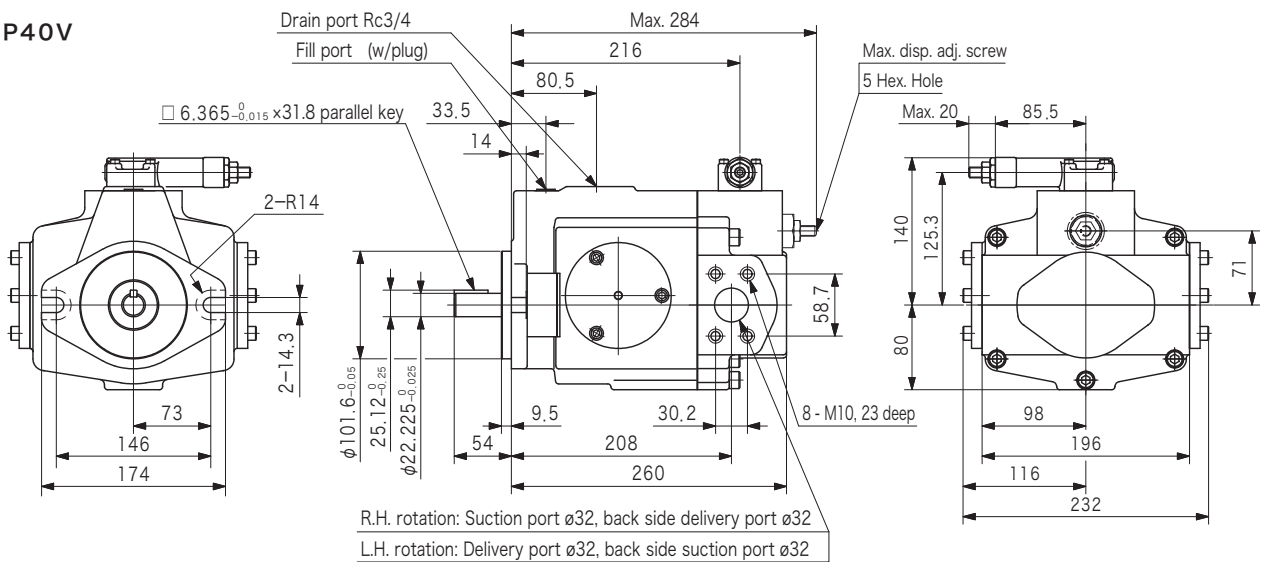
P21V/P31V



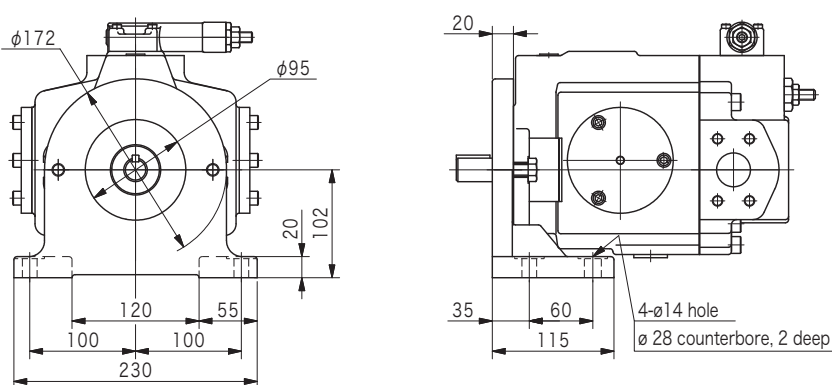
Foot mounting



P40V

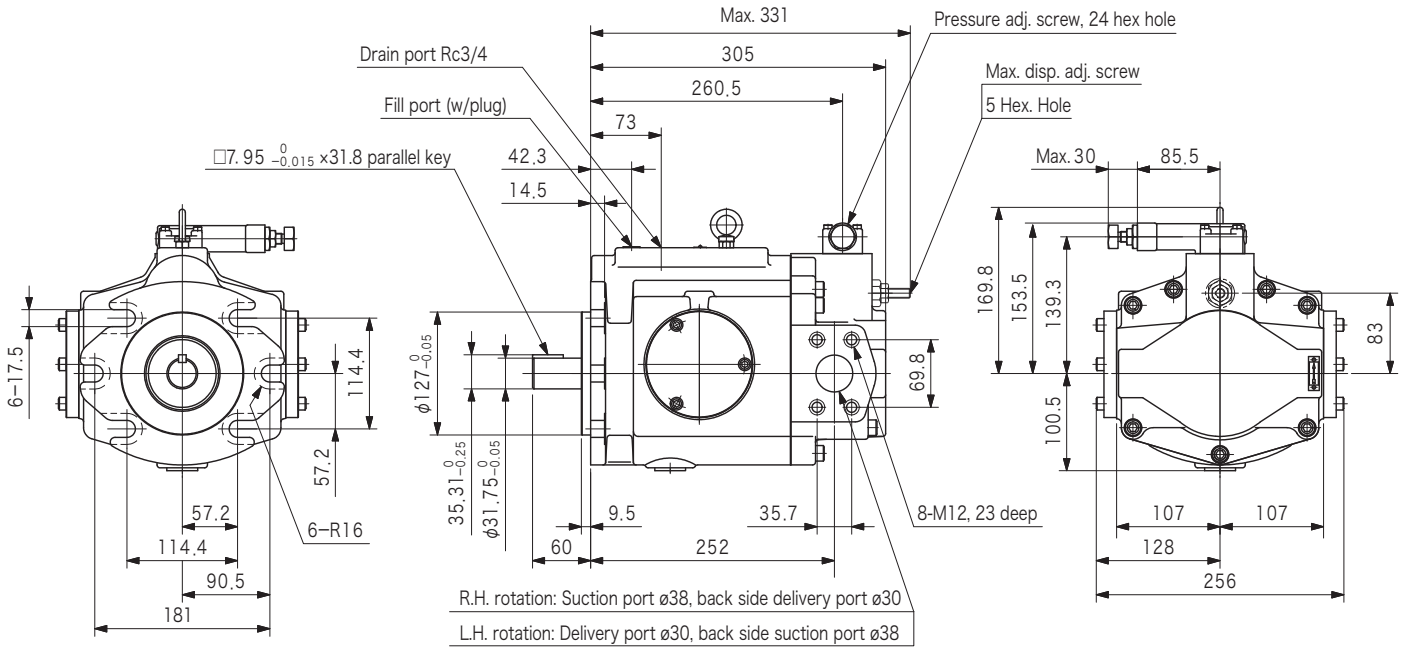


Foot mounting



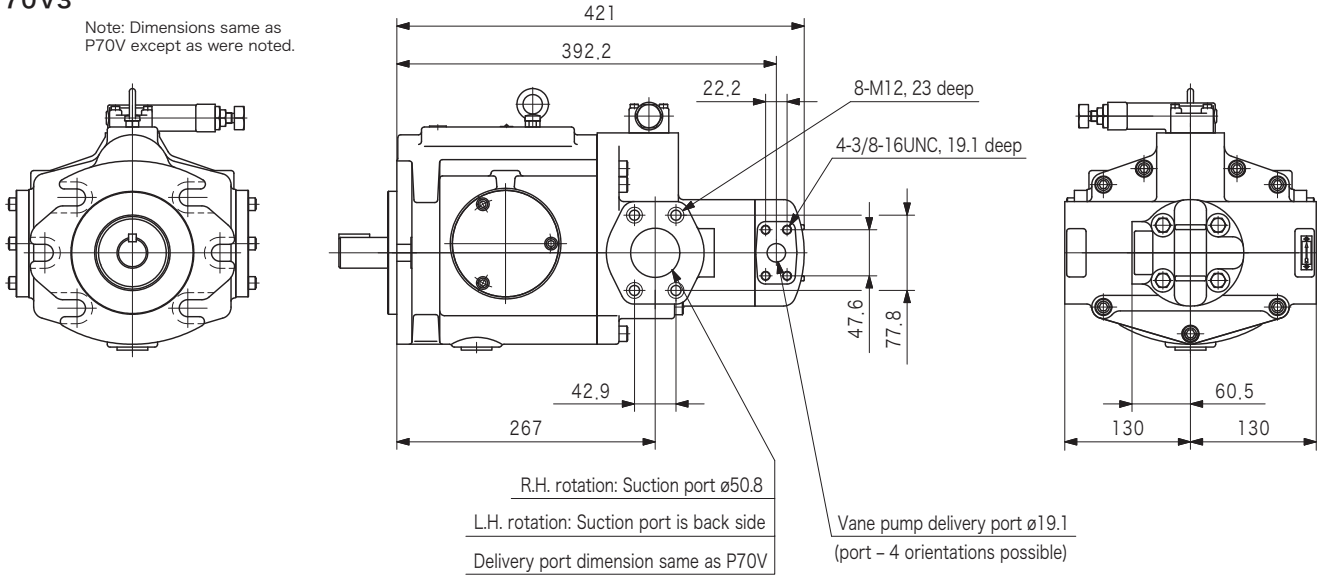
Dimensions

P70V

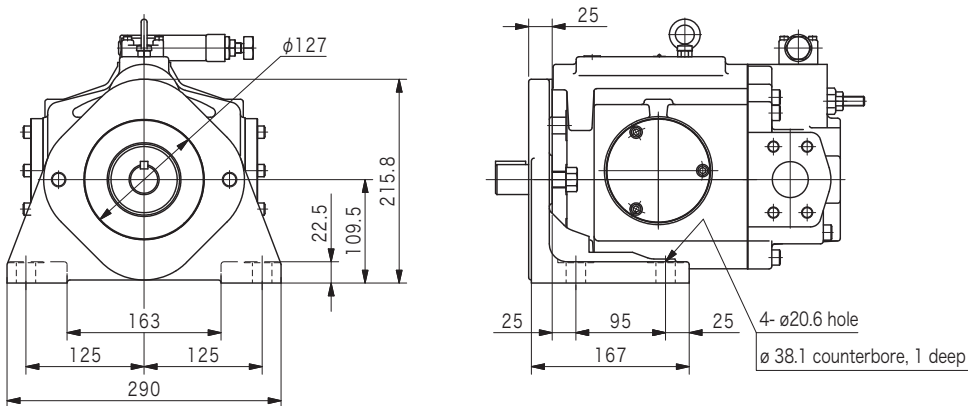


P70V3

Note: Dimensions same as P70V except as were noted.

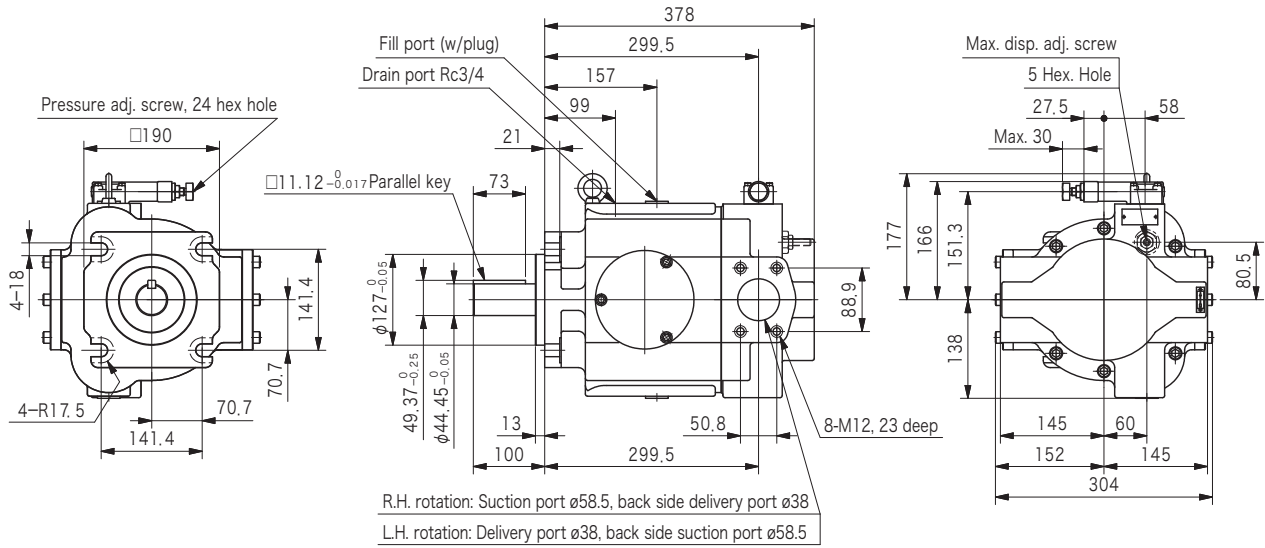


Foot mounting



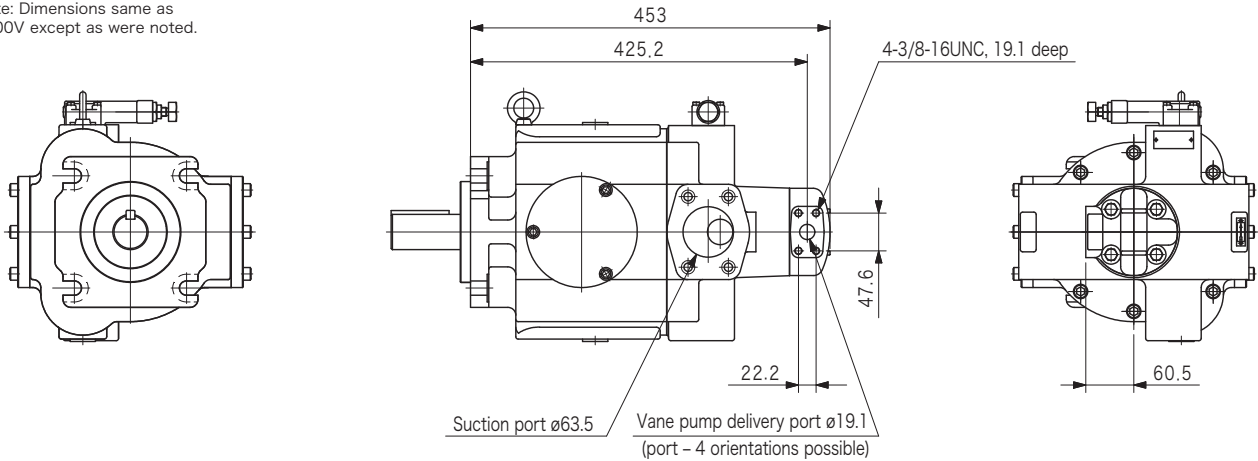
## P100V

Note: Right rotation model is shown.  
For left rotation, control valve shall move to symmetrical position from center line.

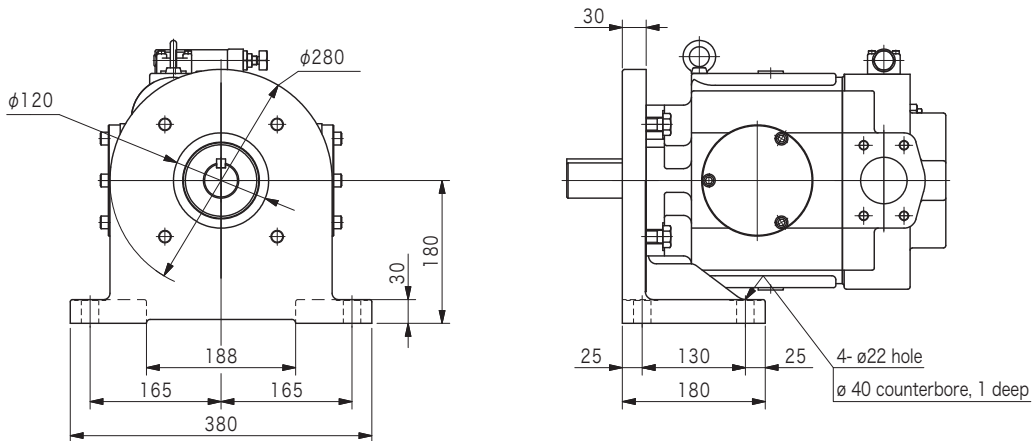


## P100V3

Note: Dimensions same as P100V except as were noted.

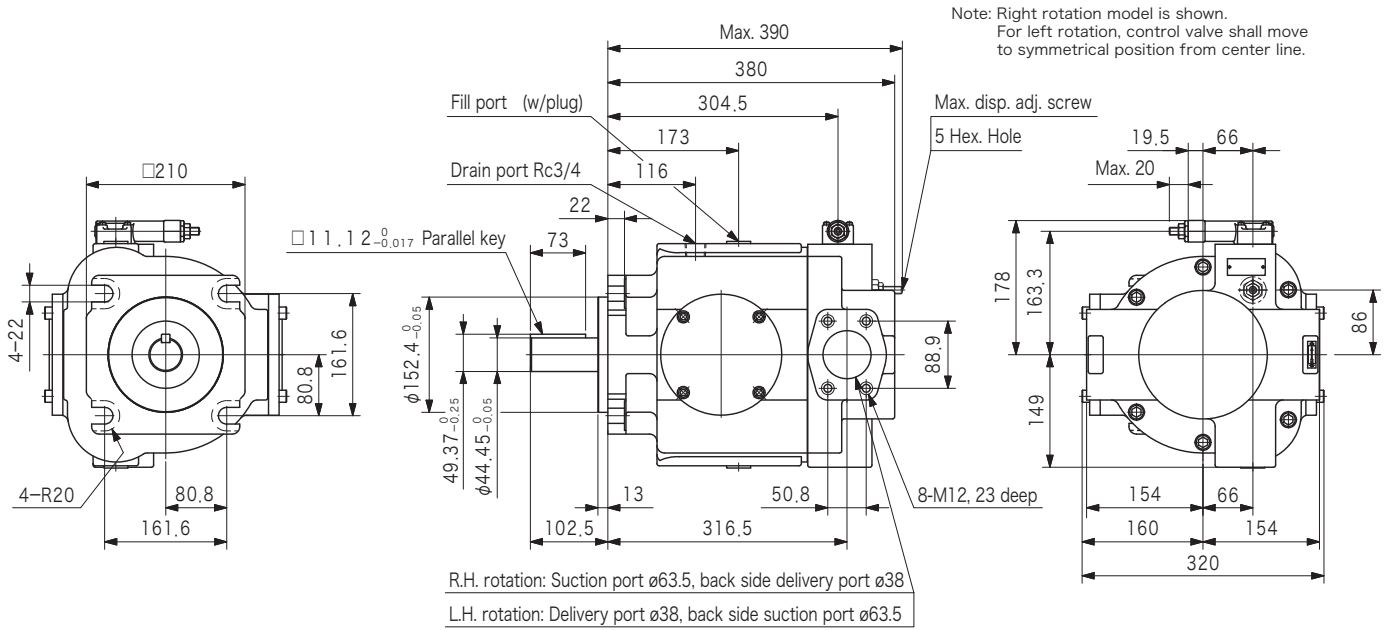


## Foot mounting



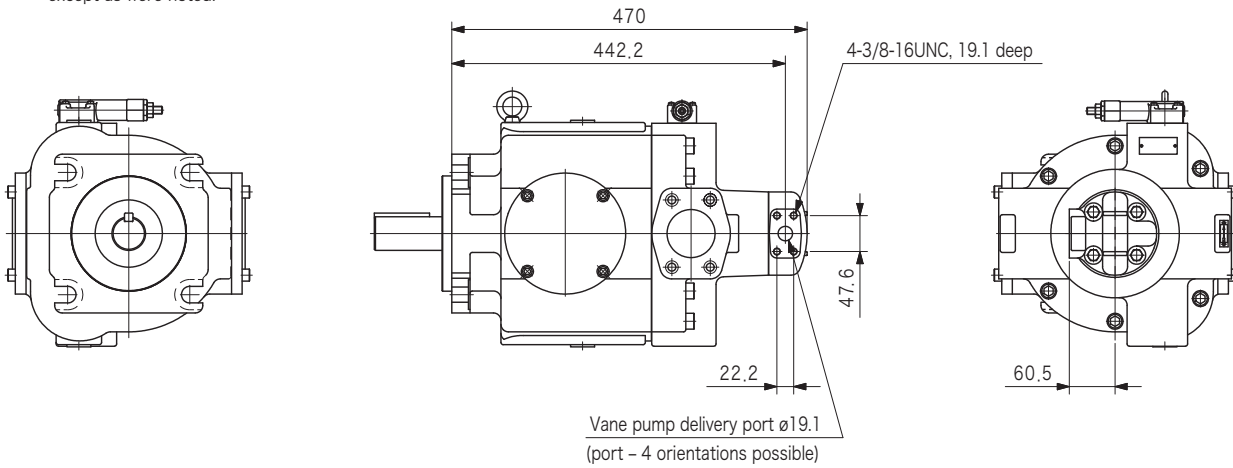
Dimensions

P130V

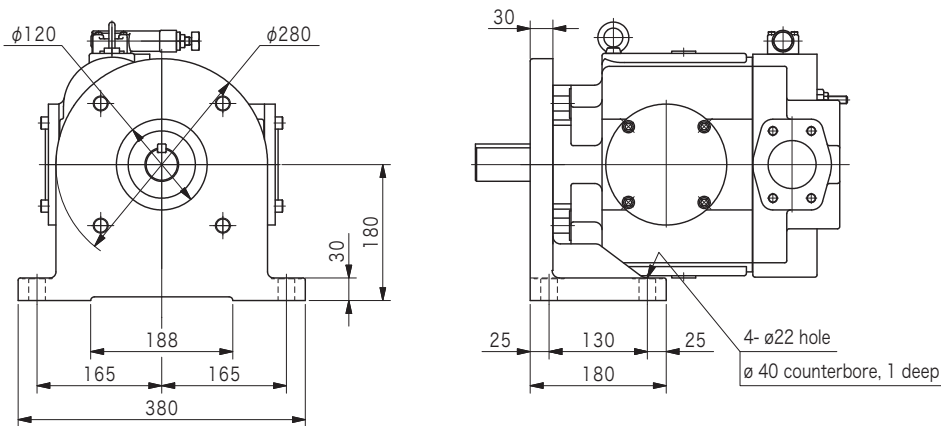


P130V3

Note: Dimensions same as P130V except as were noted.

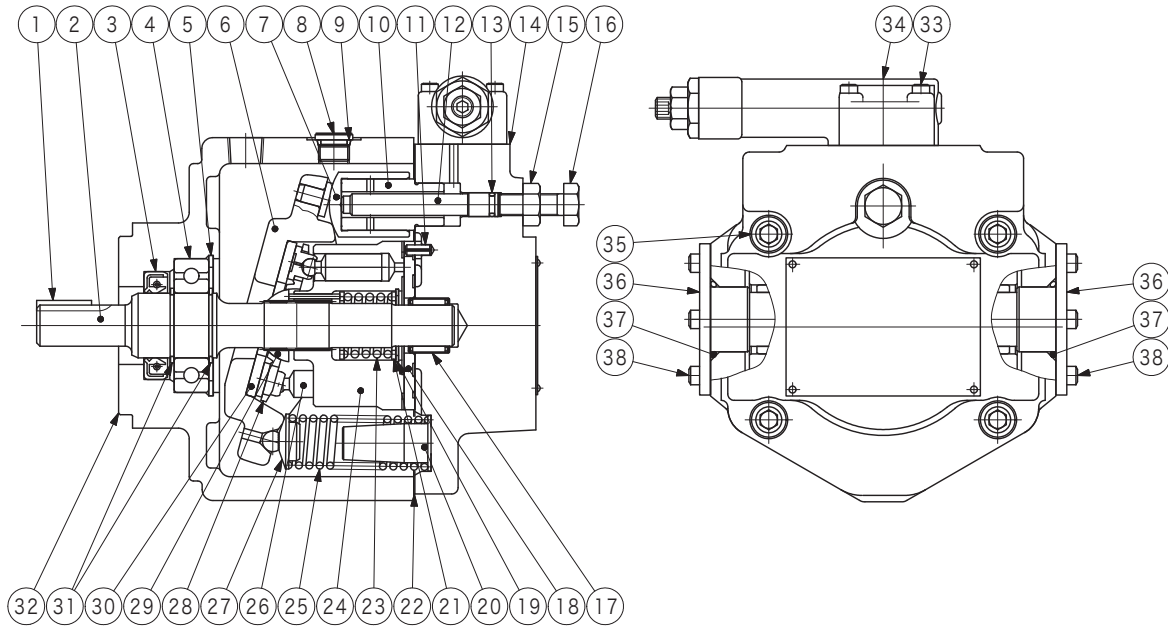


Foot mounting



# Construction

P16VM/P21VM/P16V, P21V/P31V



P16VM/P21VM/P16V

No.	Name	Part No.	Standard	Quantity
3	Shaft seal	VA29405	_____	1
9	O-ring	007990619	AS568-906 (NBR, Hs90)	1
13	O-ring	008000617	JIS B 2401 1A-P8	1
22	Gasket	VA29431	_____	1
37	O-ring	007991619	AS568-916 (NBR, Hs90)	2

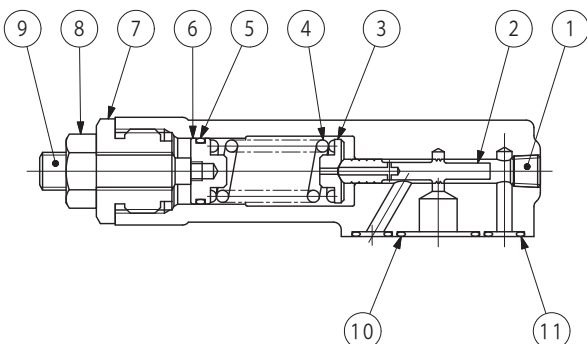
P21V/P31V

No.	Name	Part No.	Standard	Quantity
3	Shaft seal	VA29405	_____	1
9	O-ring	007990619	AS568-906 (NBR, Hs90)	1
13	O-ring	008000417	JIS B 2401 1A-P6	1
22	Gasket	40012493	_____	1
37	O-ring	007912719	AS568-127 (NBR, Hs90)	2

## Rotating Group Kits

Model Code	P16V	P16VM	P21VM	P21V/P31V
Rotating group kit no.	40038012	40038012	40038013	40058739
R rotation No.18 w/wafer plate	40058910	40058910	40058913	40058258
L rotation No.18 w/wafer plate	40058911	40058911	40058914	40058259
Seal kit part no.	VA12268A	40038014	40038014	40088392

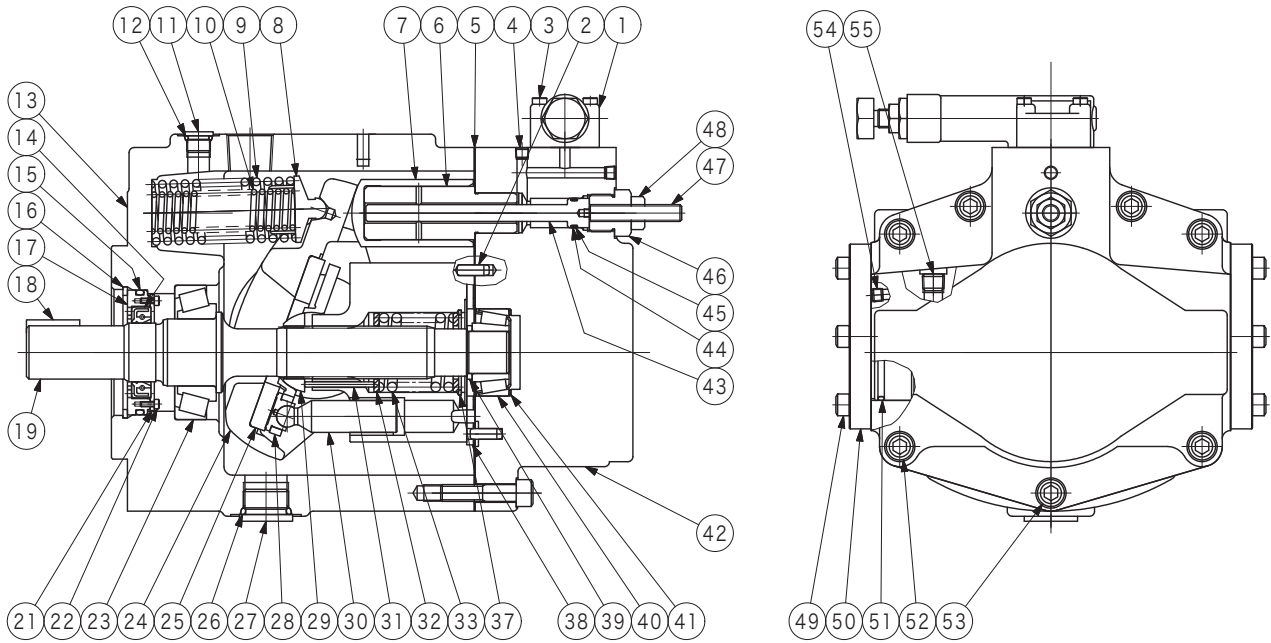
## Pressure compensator mechanism parts



No.	Name	Part No.	Standard	Quantity
5	O-ring	007901517	AS568-015 (NBR, Hs70)	1
10	O-ring	007901819	AS568-018 (NBR, Hs90)	1
11	O-ring	007901119	AS568-011 (NBR, Hs90)	2

Construction

P40V, P70V



P40V

No.	Name	Part No.	Standard	Quantity
5	Gasket	40012857		1
12	O-ring	007990619	AS568-906 (NBR, Hs90)	1
14	Shaft seal	VA29405		1
15	O-ring	007914117	AS568-141 (NBR, Hs70)	1
26				—
44	O-ring	007901517	AS568-015 (NBR, Hs70)	1
45	Backup ring	VP197573	MS28774-015	1
51	O-ring	007914117	AS568-141 (NBR, Hs70)	2

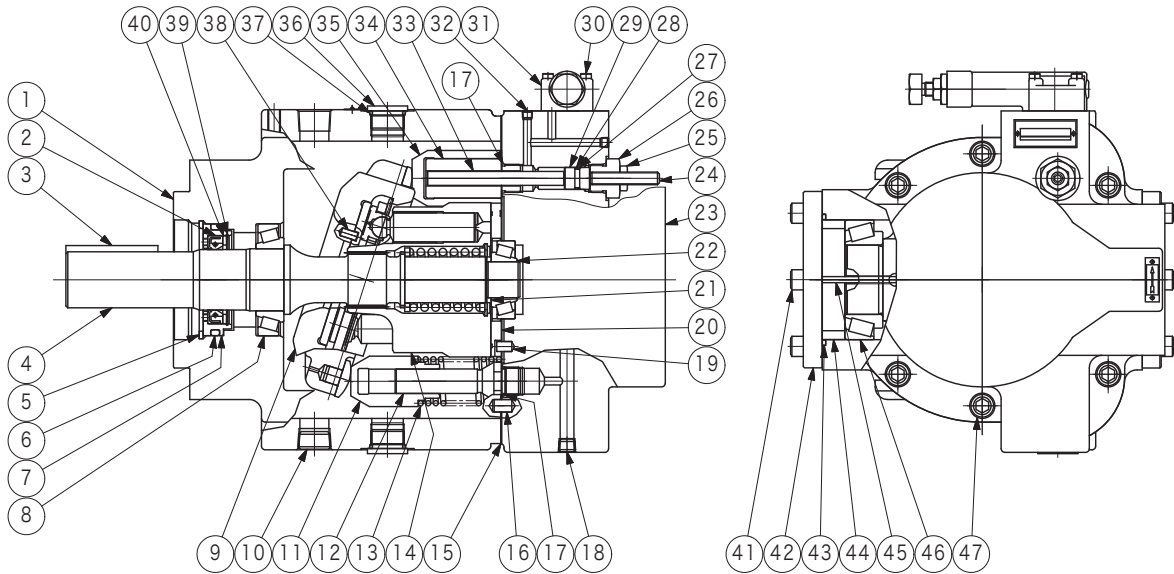
P70V

No.	Name	Part No.	Standard	Quantity
5	Gasket	VA30439		1
12	O-ring	007990619	AS568-906 (NBR, Hs90)	1
14	Shaft seal	40012883		1
15	O-ring	007923119	AS568-231 (NBR, Hs90)	1
26	O-ring	007991219	AS568-912 (NBR, Hs90)	1
44	O-ring	007901517	AS568-015 (NBR, Hs70)	1
45	Backup ring	VP197573	MS28774-015	1
51	O-ring	007914917	AS568-149 (NBR, Hs70)	2

Rotating Group Kits

Model Code	P40V	P70V
Rotating group kit no.	40078101	40048024
R rotation No. 38 w/wafer plate	40078099	40048805
L rotation No. 38 w/wafer plate	40078100	40048806
Seal kit part no.	40088097	40088095





P100V

No.	Name	Part No.	Standard	Quantity
2	Shaft seal	40011048	—————	1
6	O-ring	007933817	AS568-338 (NBR, Hs70)	1
15	Gasket	40011573	—————	1
17	O-ring	007991019	AS568-910 (NBR, Hs90)	2
27	Backup ring	VP197573	MS28774-015	1
28	O-ring	007901517	AS568-015 (NBR, Hs70)	1
37	O-ring	007991219	AS568-912 (NBR, Hs90)	2
43	O-ring	007924119	AS568-241 (NBR, Hs90)	2

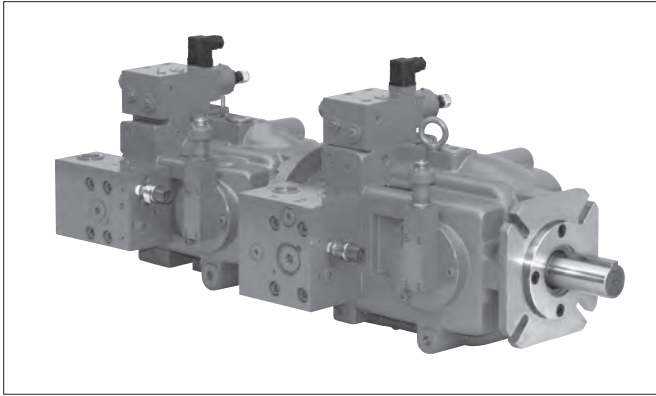
P130V

No.	Name	Part No.	Standard	Quantity
2	Shaft seal	40011048	—————	1
6	O-ring	007933817	AS568-338 (NBR, Hs70)	1
15	Gasket	40011616	—————	1
17	O-ring	007991019	AS568-910 (NBR, Hs90)	2
27	Backup ring	VP197573	MS28774-015	1
28	O-ring	007901517	AS568-015 (NBR, Hs70)	1
37	O-ring	007991219	AS568-912 (NBR, Hs90)	2
43	O-ring	007924719	AS568-247 (NBR, Hs90)	2

Rotating Group Kits

Model Code	P100V	P130V
Rotating group kit no.	40038744	40058363
R rotation No. 20 w/wafer plate	40048836	40058361
L rotation No. 20 w/wafer plate	40048837	40058362
Seal kit part no.	40098065	40088429

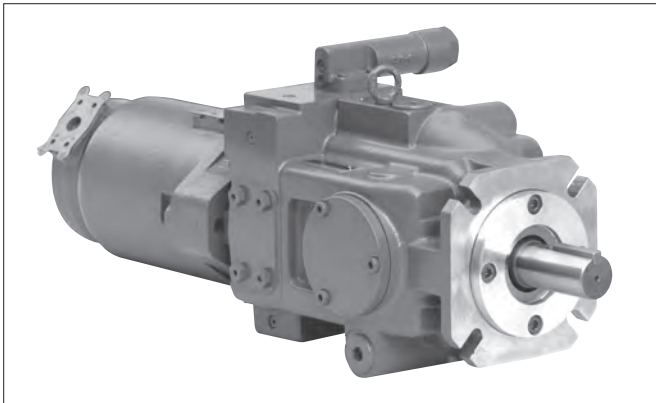
**Double piston pumps**



Two piston pumps can be driven by a single shaft.  
For the restrictions on the shaft torque, consult Tokyo Keiki.

Variable displacement piston pump mounting chart

Front Pump \ Rear Pump	P70V	P100V	P130V	PH56	PH80	PH100	PH130	PH170
P16VM P21VM P16V	○	○	○	○	○	○	○	○
P21V P31V	○	○	○	○	○	○	○	○
P40V	—	—	—	○	○	○	○	○
PH56	—	—	—	○	○	○	○	○
PH80	—	—	—	—	○	○	○	○
PH100	—	—	—	—	—	○	○	○
PH130	—	—	—	—	—	—	○	○
PH170	—	—	—	—	—	—	—	○



It is possible to combine a vane pump with a piston pump so as to drive the pumps using a single shaft.  
For the restrictions on the shaft torque, consult Tokyo Keiki.

Fixed displacement vane pump mounting chart

Front Pump \ Rear Pump	P70V	P100V	P130V	PH56	PH80	PH100	PH130	PH170
SQP1	○	○	○	○	○	○	○	○
SQP2	○	○	○	○	○	○	○	○
SQP3	—	○	○	—	○	○	○	○
SQP21	○	○	○	○	○	○	○	○
SQP31	—	○	○	—	○	○	○	○
SQP32	—	—	—	—	—	○	○	○