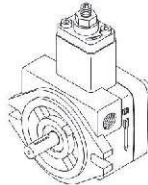
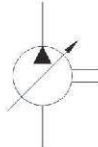
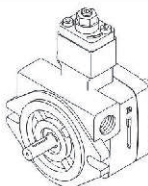
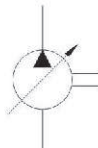
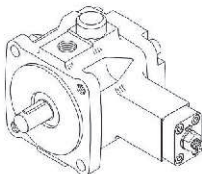
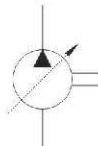
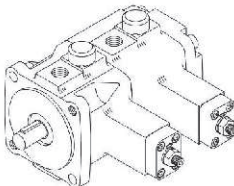
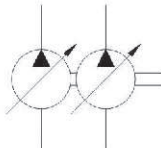
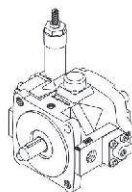
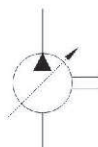
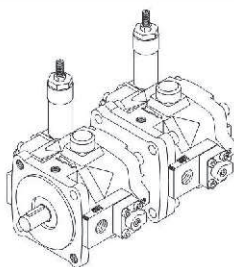
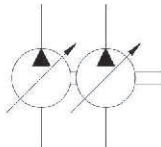
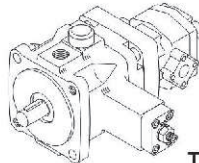
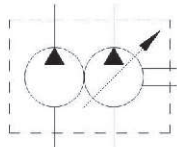
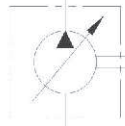
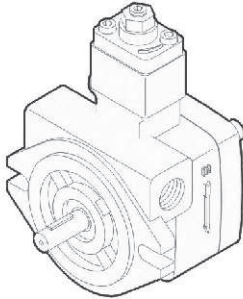


Variable Vane Pumps

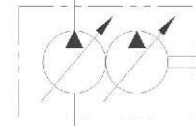
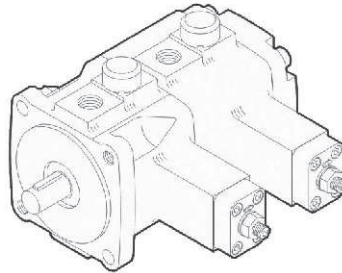


VARIABLE DISPLACEMENT VANE PUMPS		Graphic Symbol	Q max. (At 1800 r.p.m) lpm (USgpm)	P max. bar(PSI)	Speed r.p.m		
	PVF-12-**-11		12(3.17)	 70(1000)	Max.1800 Min.800		
	PVF-20-**-11		20(5.28)				
	PVF-30-**-11		30(7.93)				
	PVF-40-**-11		40(10.57)				
	PVF-50-**-11		50(13.21)				
	PVF-70-**-11		70(18.49)				
	PVDF-2**-2**-11		20+20 (5.28+5.28)				
	PVDF-3**-3**-11		30+30 (7.93+7.93)				
	PVDF-4**-4**-11		40+40 (10.57+10.57)				
	PVDF-5**-5**-11		50+50 (13.21+13.21)				
	PVDF-7**-7**-11		70+70 (18.49+18.49)				
	VP5F-A*-50		30(7.93)	140(2000)			
	VP5F-B*-50		40(10.57)	70(1000)			
	VP6F-C*-50		54(14.27)	140(2000)			
	VP6F-D*-50		70(18.49)	70(1000)			
	VP7F-E*-50		120(31.70)	140(2000)			
	VP5FD-A*-A*-50		30+30 (7.93+7.93)	70(1000)			
	VP5FD-B*-B*-50		40+40 (10.57+10.57)	140(2000)			
	VP6FD-C*-C*-50		54+54 (14.27+14.27)	70(1000)			
	VP6FD-D*-D*-50		70+70 (18.49+18.49)	140(2000)			
	VP7FD-E*-E*-50		120+120 (31.70+31.70)				
Hi-Lo Pump 	TPF-VL-30-GPH*		30(7.93)	LOW 70(1000) + HIGH 210(3000)			
	TPF-VL-40-GPH*		40(10.57)				
	TPF-VL-50-GPH*		50(13.21)				
	TPF-VL-70-GPH*		70(18.49)				

PVF-***



PVDF-**



PVF Ordering Code - Single Pumps

PVF	-12		-70		-11
Series No.	Outlet flow at 3.5bar,1800rpm lpm		Operating pressure range bar		Design No.
PVF Flange mounting	Code	Outlet flow	Code	Pressure range	
	12	12lpm	20	8~20bar	
	20	20lpm	35	15~35bar	
	30	30lpm	55	30~55bar	
	40	40lpm	70	50~70bar	
	Factory setting Qmax.		Factory setting Pmin.		

PVDF Ordering Code - Double Pumps

PVDF	-3		70		-3		70		-11
Series No,	Shaft end pump				Cover end pump				Design No.
	Outlet flow at 3.5bar,1800rpm lpm		Operating pressure range bar		Outlet flow at 3.5bar,1800rpm lpm		Operating pressure range bar		
PVDF Flange mounting	Code	Outlet flow	Code	Pressure range	Code	Outlet flow	Code	Pressure range	11:PT(Rc) 1180:PF(G) 1190:NPT
	3	30lpm	20	8~20bar	3	30lpm	20	8~20bar	
	4	40lpm	35	15~35bar	4	40lpm	35	15~35bar	
	Factory setting Qmax.		55	30~55bar	Factory setting Qmax.		55	30~55bar	
			70	50~70bar			70	50~70bar	
		Factory setting Pmin.				Factory setting Pmin.			

PVF/PVDF Pumps Speed Limits

Minimum speed:800rpm
Maximum speed:1800rpm

PVF/PVDF Pumps Weight

MODEL	Weight kg(ib)
PVF-12-**-11	5(11.01)
PVF-20-**-11	6(13.22)
PVF-30-**-11	9(19.82)
PVF-40-**-11	9(19.82)
PVDF-3***-3**-11	17(37.44)
PVDF-4***-4**-11	17(37.44)

PV(D)F / TPF Operating Data

ROTARY DIRECTION.

Clockwise rotation viewed from shaft end is standard.

FLUIDS PERMISSIBLE.

When working pressure lower than 70 bar , hydraulic oil with a viscosity ranging from 30~50 cSt(ISO VG32).
When working pressure higher than 71bar ,hydraulic oil with a viscosity ranging from 50~70 cSt(ISO VG68)
at 40°C is recommended.(ISO VG32) at 40 °C is recommended.

DRAIN PORT PIPING.

Drain connection must be piped directly to tank and below the oil level with a back pressure not exceed 0.3 bar.

OIL TEMPERATURE RANGE.

Oil temperature range should be between 15~60°C for continuous operation and should be higher than 7°C at starting.

ALIGNMENT AND INSTALLATION OF PUMP.

The shaft alignment for pump and electric motor shall be limited to 0.05mm TIR. and 1 degree angular error.

INLET PORT PRESSURE.

Inlet port pressure should be -0.3 bar to +0.3 bar .

FLOW ADJUSTMENT.

The flow will be reduced when the flow adjusting screw is turned clockwise and increased when anti-clockwise.

PRESSURE ADJUSTMENT.

The pressure will be increased when the pressure adjusting screw is turned clockwise and reduced when anti-clockwise.

P-Q CHARACTERISTICS (EX-WORK SET)

Flow setting:The max. flow as catalogue shown.

Pressure setting:The min. operating pressure range.

SLIDE SCREW.

The slide screw is non-adjustable and set at factory.

Unauthorized persons cannot tamper with the desired setting.

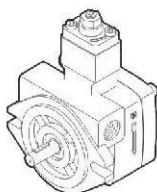
CAUTIONS FOR STARTING.

Start up the pump under No-Load condition and repeat to start and stop the motor several times to extract the air from inside of the pump and piping.Then keep a 10 minutes continuous running for a better de-airing.

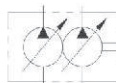
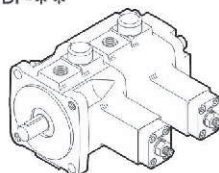
PEAK-PRESSURE.

The peak pressure is 140 bar for code * 2 & * 3,and 210 bar for A4 & A5.

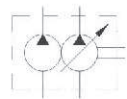
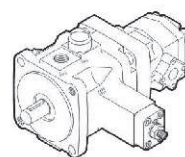
PVF-***



PVDF-***

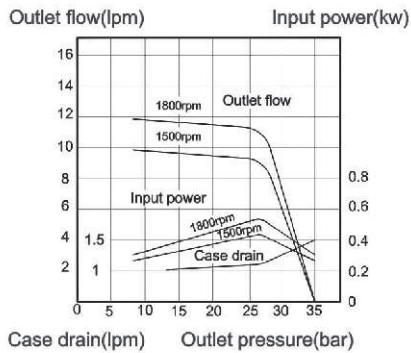


TPF-VL***-GH*

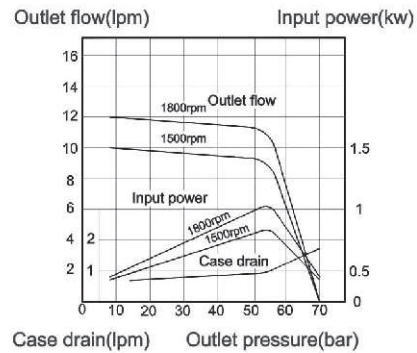


PVF Series Pumps Curve

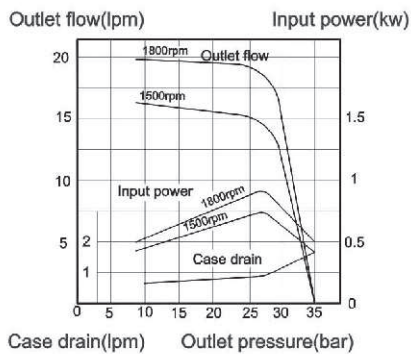
PVF-12-35-11



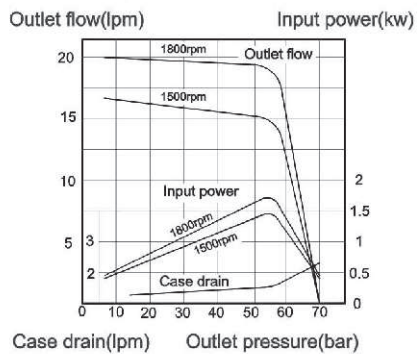
PVF-12-70-11



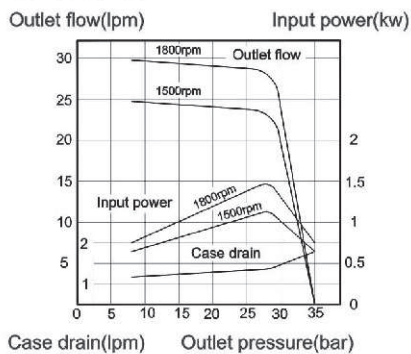
PVF-20-35-11



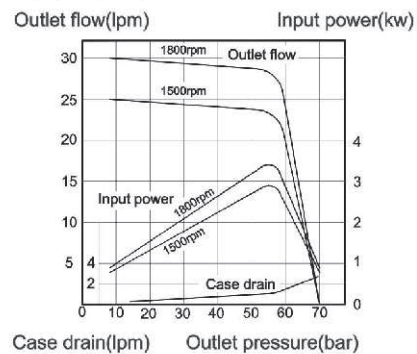
PVF-20-70-11



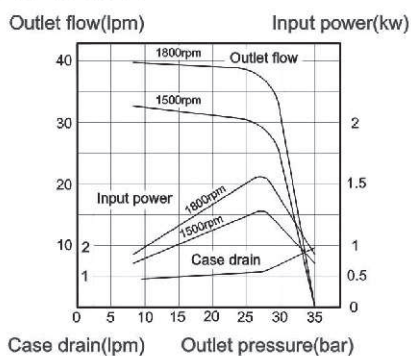
PVF-30-35-11



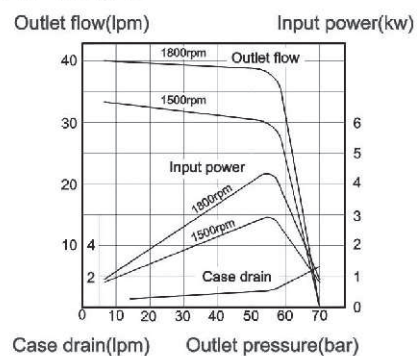
PVF-30-70-11



PVF-40-35-11



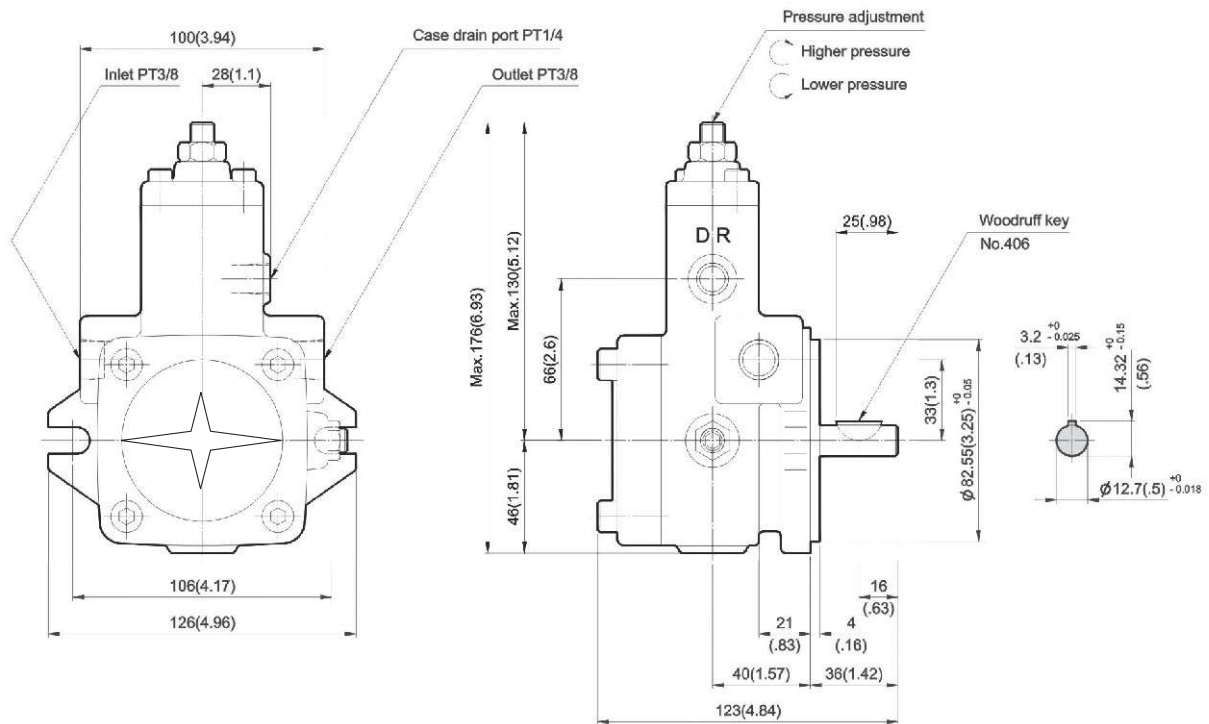
PVF-40-70-11



DIMENSIONS

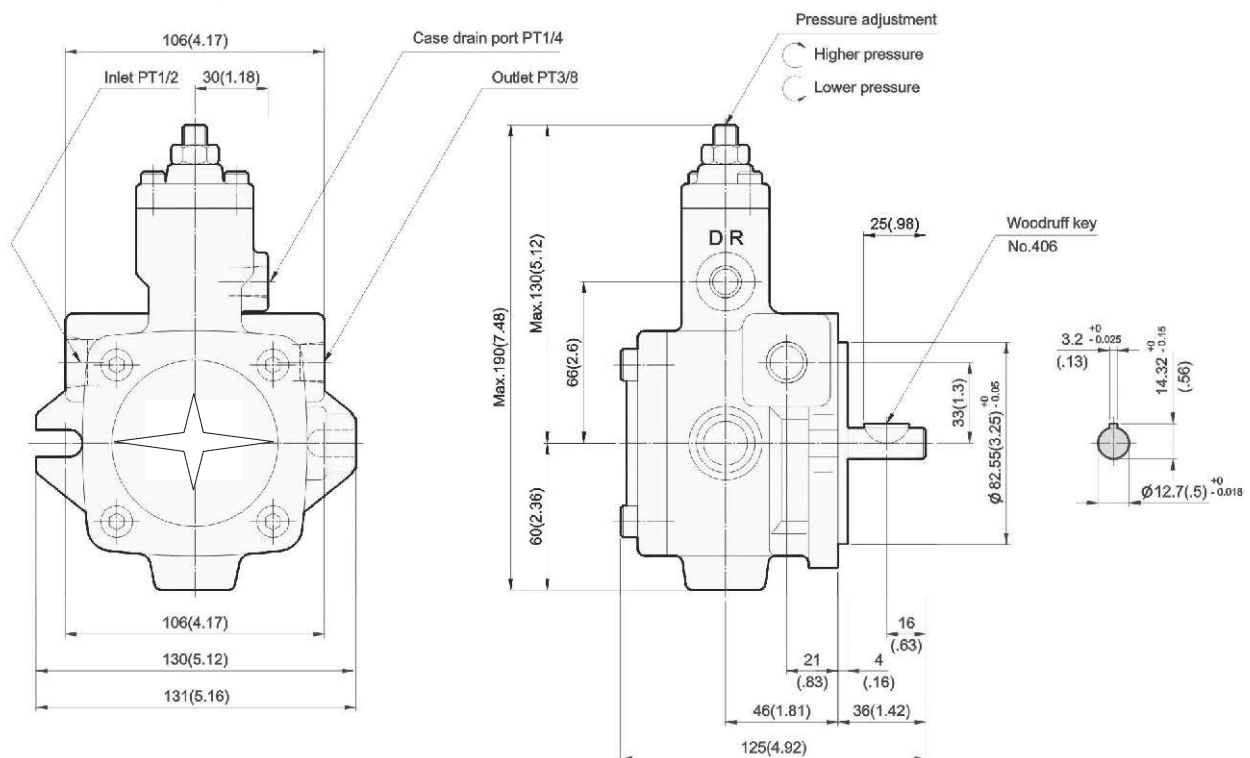
MILLIMETERS(INCHES)

PVF-12- * *-11



Note: Above type, without flow adjustment equipment.

PVF-20- * *-11

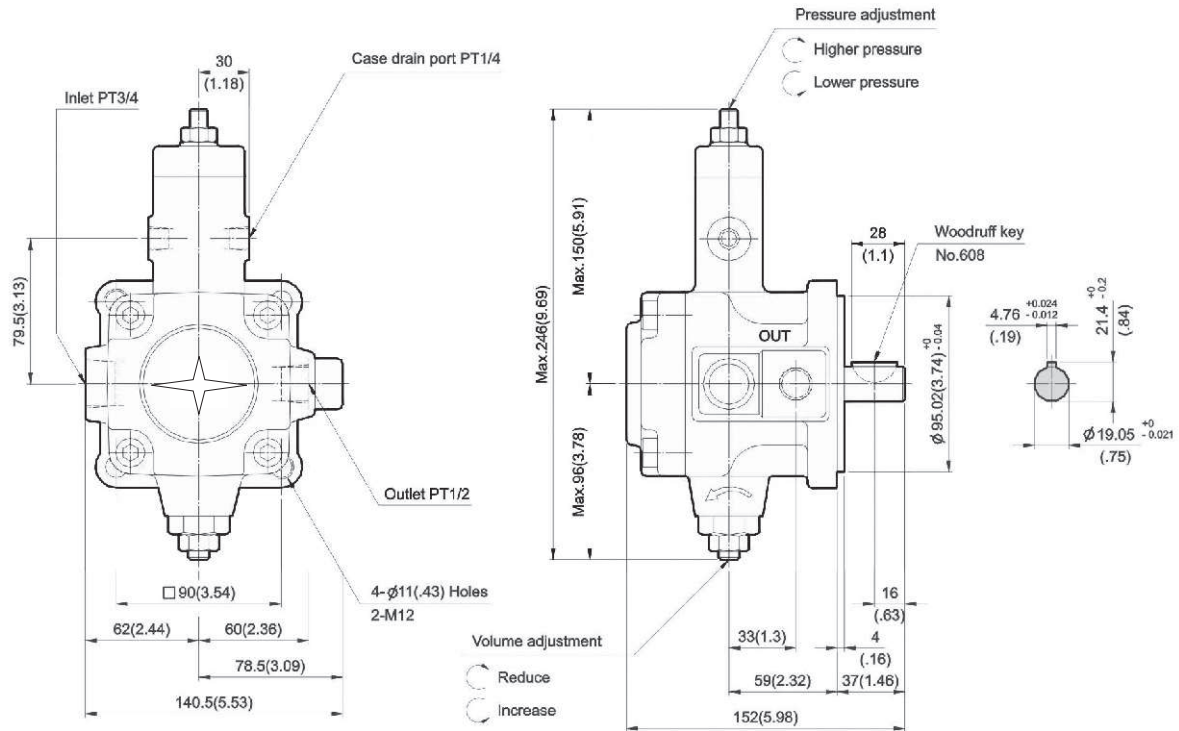


Note: Above type, without flow adjustment equipment.

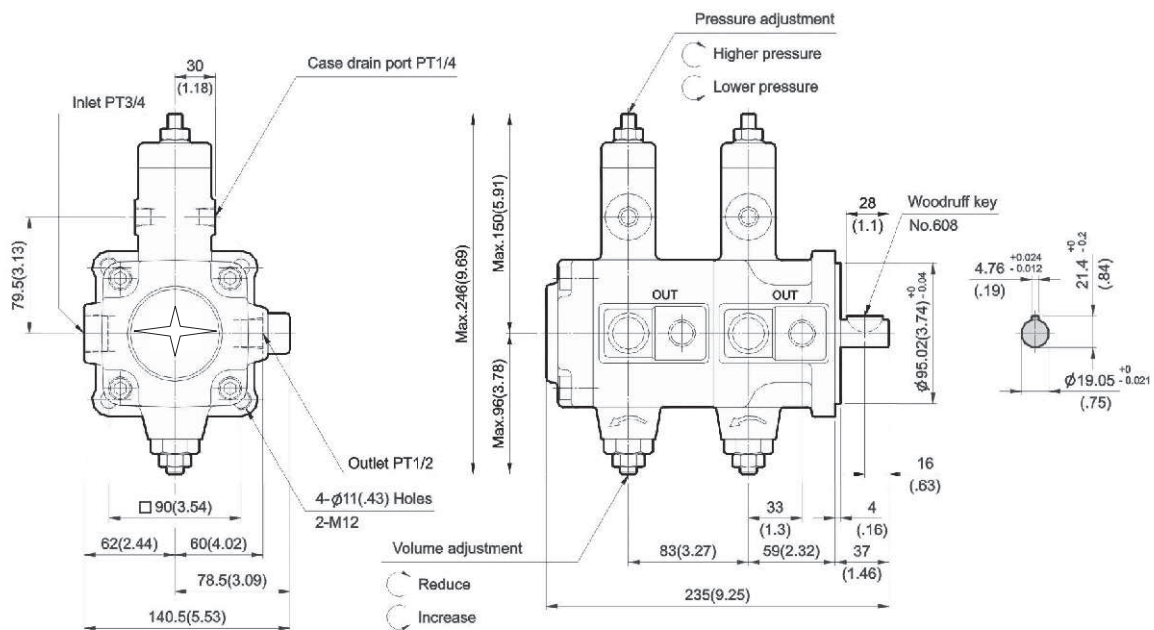
DIMENSIONS

MILLIMETERS(INCHES)

PVF-30(40)-* *-11



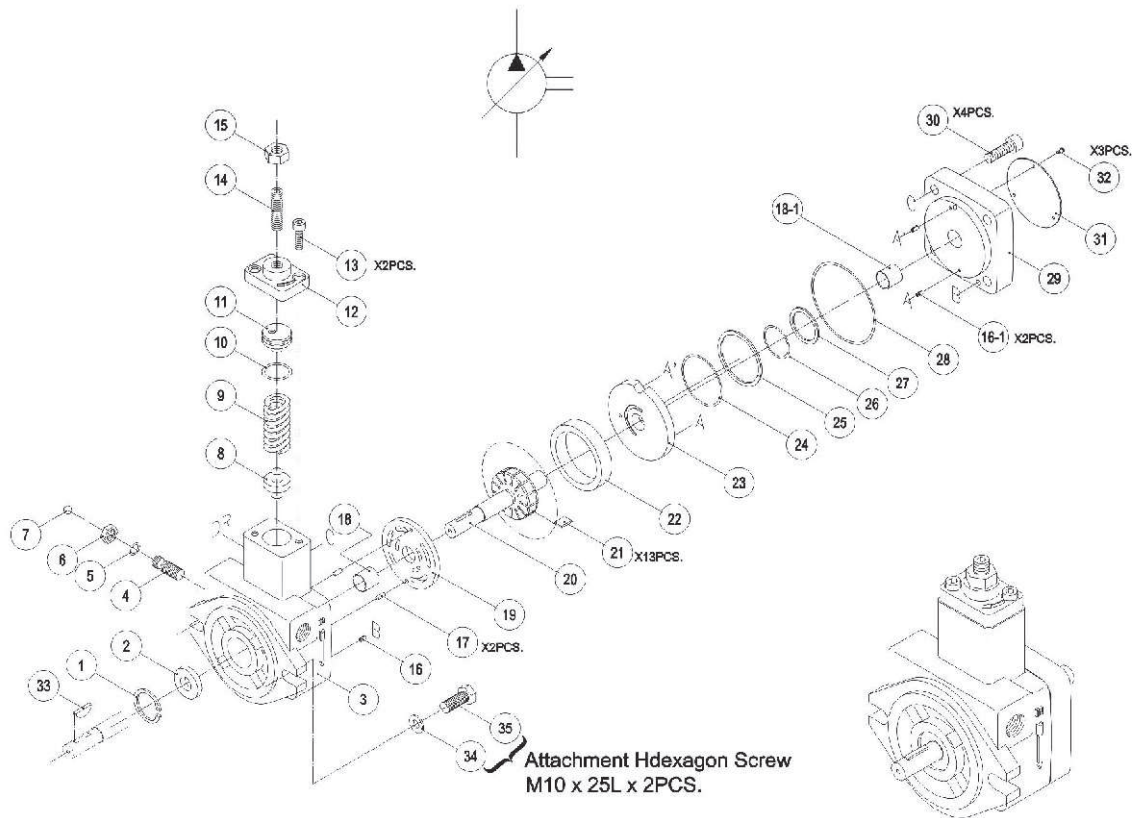
PVDF-* *- *-11



ASSEMBLY AND PARTS LIST

PVF-12-**-**-11

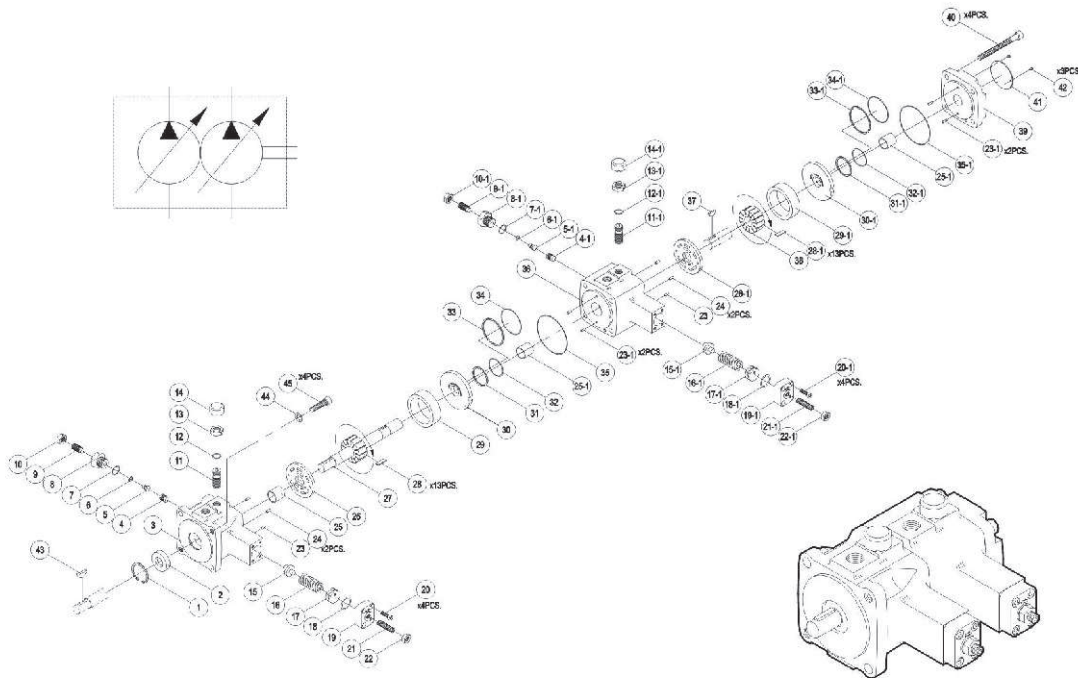
A4



No.	Part Name	Specification	Q'ty	No.	Part Name	Specification	Q'ty
				18-1	Engine Bush	DIADO(JAPAN)DD1415	1
				18	Engine Bush	DIADO(JAPAN)DD1415	1
				17	Straight Pin	φ3x8	2
35	Hexagon Screw	M10xP1.5x25L	2	16-1	Spring Pin	φ3x8	2
34	Washer	M10	2	16	Spring Pin	φ3x8	1
33	Woodruff Key	NO.406	1	15	Hexagon Nut	M10xP1.5	1
32	Fixing Screw		3	14	Socket Set Screw	M10xP1.5x35L	1
31	Name Plate		1	13	Socket Head Cap Screw	M6xP1.0x20L	2
30	Socket Head Cap Screw	M8xP1.25x30L	4	12	Cover		1
29	Cover		1	11	Spring Retainer		1
28	O-Ring	1A-S71	1	10	O-Ring	1A-P20	1
27	Endless Back-up Ring		1	9	Spring		1
26	O-Ring	AS568-023	1	8	Piston		1
25	Endless Back-up Ring		1	7	Plastic Plug		1
24	O-Ring	AS568-031	1	6	Hexagon Nut		1
23	Thrust Plate		1	5	O-Ring	1A-P8	1
22	Cam Ring		1	4	Slide Screw		1
21	Vanes		13	3	Pump Body		1
20	Rotorshaft		1	2	Shaft Seal	TCV 14287	1
19	Port Plate		1	1	Retainer Ring	R28	1

ASSEMBLY AND PARTS LIST

PVDF

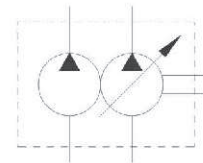
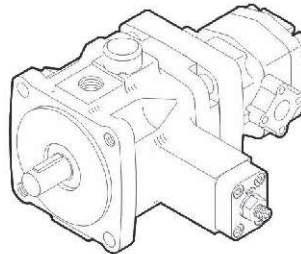
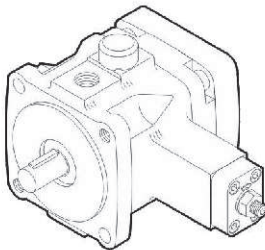


No.	Description	Specification	Q'ty
1	Retainer Ring	R42	1
2	Shaft Seal	TCV 224211	1
3	Pump Body		1
4	Piston		2
5	Piston		2
6	O-Ring	1A-P5	2
7	O-Ring	1A-P22	2
8	Thrust Screw		2
9	Socket Set Screw	M12xP1.75x25L	2
10	Hexagon Nut	M12xP1.75	2
11	Slide Screw		2
12	O-Ring	1A-P14	2
13	Hexagon Nut	M16xP1.0	2
14	Cap		2
15	Piston		2
16	Spring		1
16-1	Spring		1
17	Spring Retainer		2
18	O-Ring	1A-P22A	2
19	Cover		2
20	Skt. HD. Cap Scr.	M6xP1.0x20L	8
21	Socket Set Screw	M10xP1.5x35L	2
22	Hexagon Nut	M10xP1.5	2
23	Spring Pin	φ4x10	2
23-1	Spring Pin	φ4x10	4
24	Straight Pin	φ4x10	4
25	Engine Bush	DIADO(JAPAN)DD2225	1
25-1	Engine Bush	DIADO(JAPAN)DD2225	2

No.	Description	Specification	Q'ty
26	Port Plate		2
27	Rotorshaft		1
28	Van		26
29	Cam Ring		1
29-1	Cam Ring		1
30	Thrust Plate		2
31	O-Ring	AS568-030	2
32	Endless Back-up Ring		2
33	O-Ring	AS568-035	2
34	Endless Back-up Ring		2
35	O-Ring	1A-S85	2
36	Pump Body		1
※ 4 & 4-1; 26 & 26-1 is same kits (Without spring 16-1)			
37	Woodruff Key	NO.406	1
38	Rotor		1
※ 23 & 23-1; 28 & 28-1 is same kits (Without Cam-ring 29-1)			
39	Cover		1
40	Skt. HD. cap Scr.	M10xP1.5x110L	4
41	Name Plate		1
42	Fixing Screw		3
43	Woodruff Key	NO.608	1
44	Spring Washer	M10	4
45	Skt. HD. cap Scr.	M10xP1.5x30L	4
※ 44~45 are Accessories.			

TPF-VL***-G00

TPF-VL***-GH*



TPF Ordering Code - Hi-Lo Pumps

TPF	-VL30		2		-GH		2		-11
Series No.	Shaft end pump		Variable volume pressure compensated vane pump		Cover end pump		Fixed displacement gear pump		Design No.
	Outlet flow at 3.5bar,1800rpm lpm		Operating pressure range bar		Displacement lpm		Operating pressure bar		
TPF Flange mounting	Code	Outlet flow	Code	Pressure range	Code	Outlet flow	Pressure	Peak	11:PT(Rc) 1180:PF(G) 1190:NPT
	VL30	30lpm	1	15~35bar	GH1	1.09	210	250	
	VL40	40lpm	2	30~70bar	GH2	2.07			
	Factory setting Qmax.		Factory setting Pmin.		GH3	3.08			
					GH4	4.06			
					GH5	6.16			
					GH6	7.67			
					GH7	9.24			
					GH8	10.77			
					GH9	12.0			
					G00	G00 Type,is variable vane pump only, no including the gear pump.			

TPF Pumps Speed Limits

Minimum speed:800rpm
Maximum speed:1800rpm

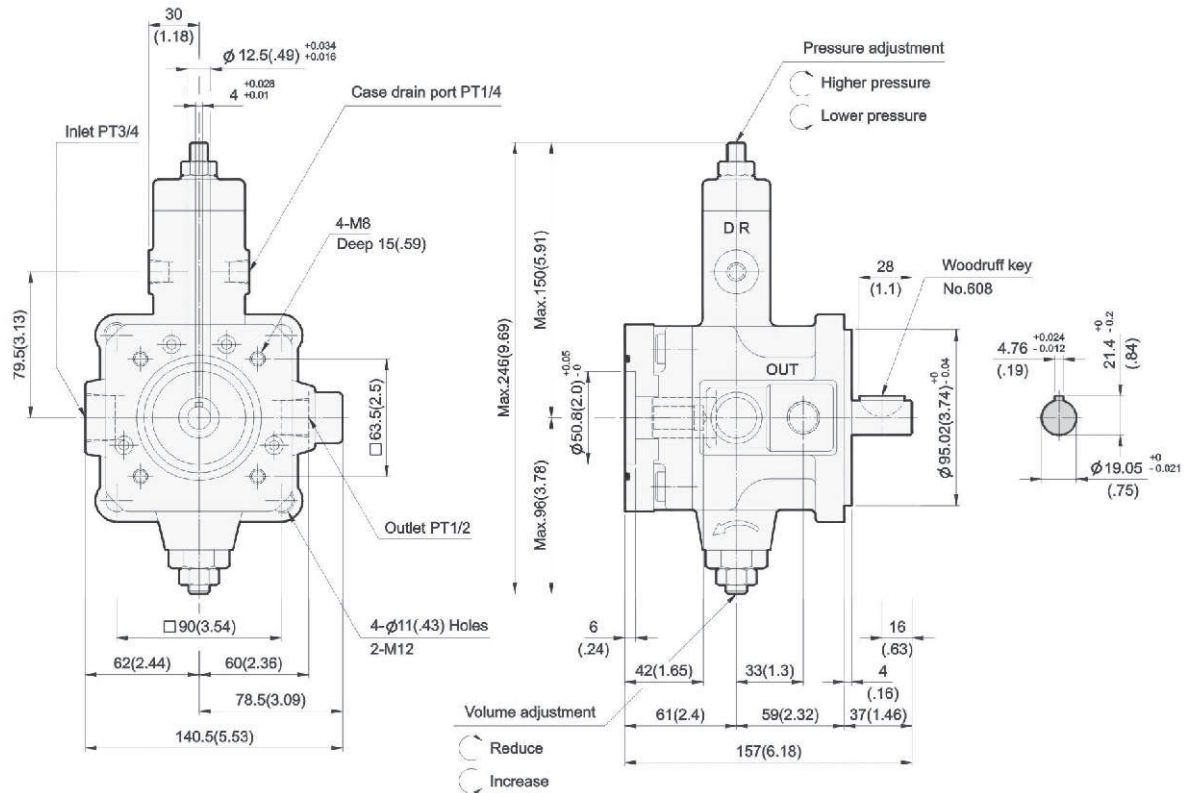
TPF Pumps Weight

MODEL	Weight kg(ib)
TPF-VL***-G00-11	10(22.03)
TPF-VL***-GH*-11	11.7(25.77)

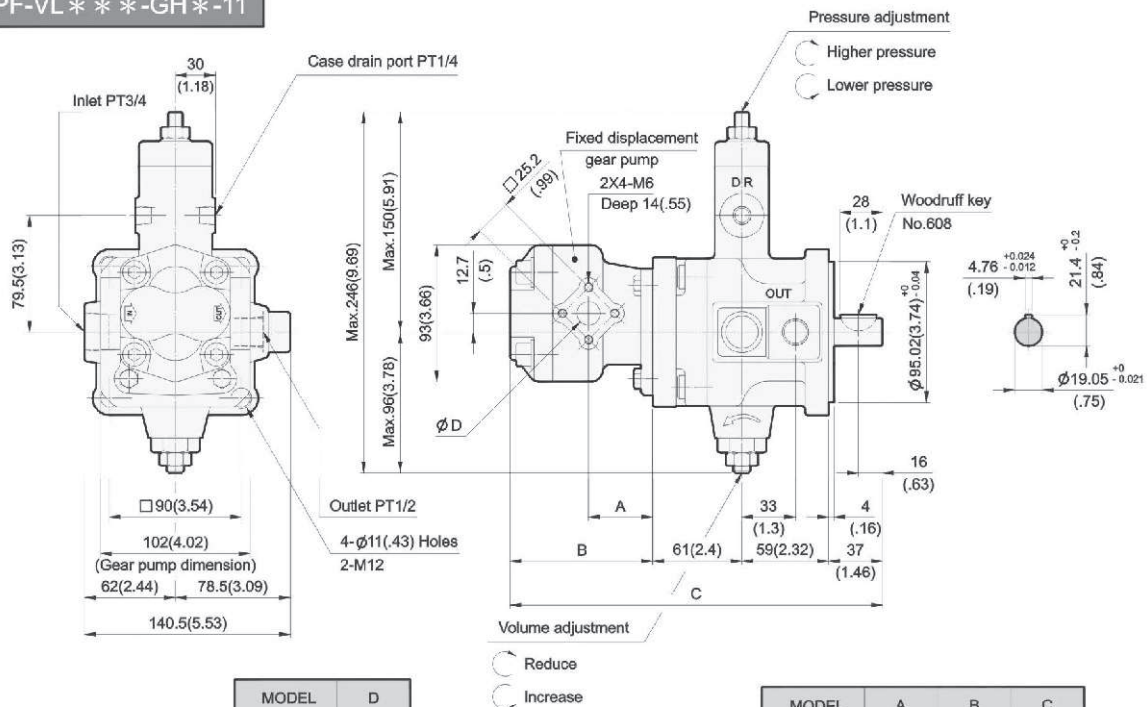
DIMENSIONS

MILLIMETERS(INCHES)

TPF-VL***-G00-11



TPF-VL***-GH*-11

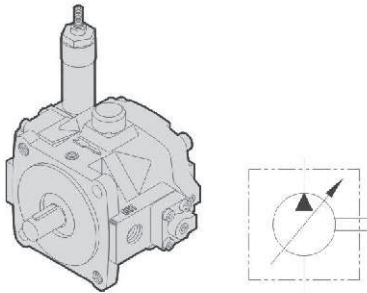


MODEL	D
GH1~GH4	14.8 (.58)
GH5~GH9	17.5 (.69)

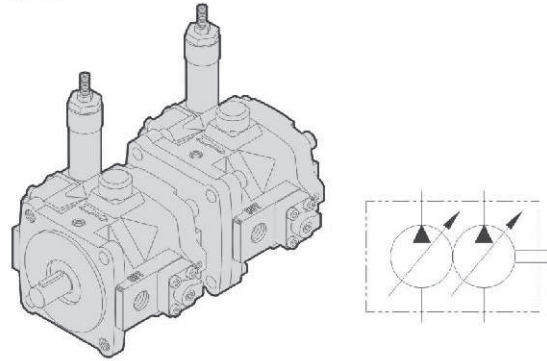
MODEL	A	B	C
GH1~GH6	39.9 (1.57)	91.2 (3.59)	248.2 (9.77)
GH7~GH9	43.7 (1.72)	95 (3.74)	252 (9.92)

VP5F(D) Operating Data

VP5F



VP5FD



High Efficiency Operation With High Pressure.

Under the conditions of pressure 140 bar, the 5 pump is stable and highly efficient. Due to our improvement designs "THREE POINT RING" support systems.

No Vibration And Quiet.

The cam ring is specifically designed to have a special curve so the noise level (dB) is very low, even in the high pressure operations.

Sharp Characteristics And Quick Response.

Quick response displayed in both "ON-OFF" control of operation, due to use special design "BIAS PISTON" stable and accurate operation can be attained in an instant.

Stable Flow.

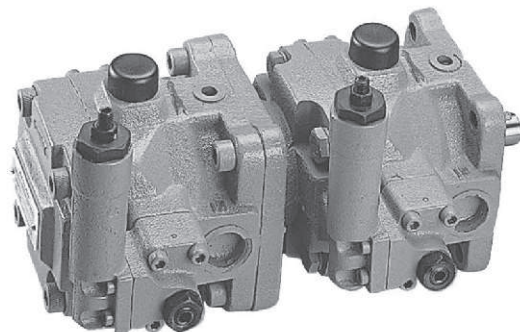
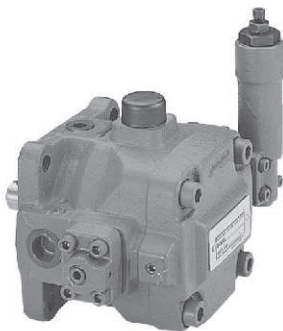
Due to use new design "PRESSURE BALANCE MECHANISM" the output flow pressure control systems, the output flow is very stable even in the high pressure ranges.

Energy Saving Type.

Power loss has been reduced further by application of our highly advanced precision machining technology to assure the same high efficiency performance. As the "VP5" series with many new mechanisms of our improvement designs. And the power loss at the "dead head" has been reduced by a large degree.

Easy Testing And Maintenance.

Pressure adjusting screw, and the volume adjusting screw were located at the same side, and ensure easy testing at a glance.



VP5F Ordering Code - Single Pumps

VP5F	-A		5		-50
Series No.	Outlet flow at 3.5bar,1800rpm lpm		Operating pressure range bar		Design No.
VP5F Flange mounting	Code	Outlet flow	Code	Pressure range	50:PT(Rc) 5080:PF(G) 5090:NPT
	A	30lpm	2	15~35bar	
	★B	40lpm	3	20~70bar	
	Factory setting Qmax.		4	50~105bar	
			5	70~140bar	
			Factory setting Pmin.		

PS: ★ code B(40lpm),maximum pressure 70 bar.

VP5FD Ordering Code - Double Pumps

VP5FD	-A		5		-A		5		-50
Series No.	Shaft end pump				Cover end pump				Design No.
	Outlet flow at 3.5bar,1800rpm lpm		Operating pressure range bar		Outlet flow at 3.5bar,1800rpm lpm		Operating pressure range bar		
VP5FD Flange mounting	Code	Outlet flow	Code	Pressure range	Code	Outlet flow	Code	Pressure range	50:PT(Rc) 5080:PF(G) 5090:NPT
	A	30lpm	2	15~35bar	A	30 lpm	2	15~35bar	
	★B	40lpm	3	20~70bar	★B	40 lpm	3	20~70bar	
	Factory setting Qmax.		4	50~105bar	Factory setting Qmax.		4	50~105bar	
			5	70~140bar			5	70~140bar	
			Factory setting Pmin.				Factory setting Pmin.		

PS: ★ code B(40lpm),maximum pressure 70 bar.

VP5F/VP5FD Pumps Speed Limits

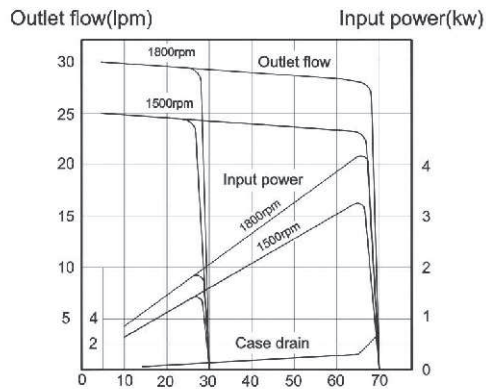
Minimum speed:800rpm
Maximum speed:1800rpm

VP5F/VP5FD Pumps Weight

MODEL	Weight kg(ib)
VP5F- * *-50	9.5(20.93)
VP5FD- * *- * *-50	27(59.47)

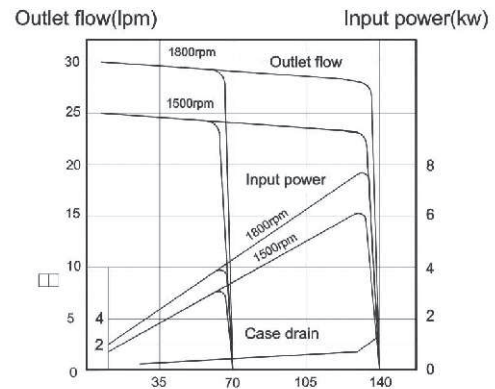
VP5F SERIES PUMPS CURVE

VP5F-A3-50



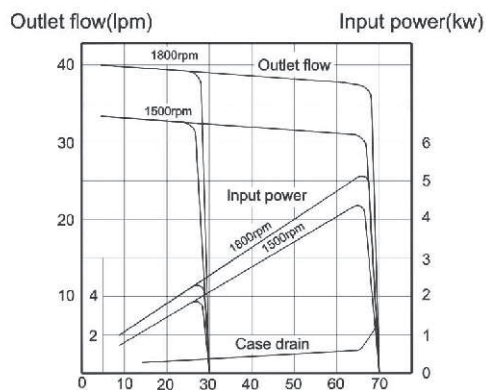
Case drain(lpm) Outlet pressure(bar)

VP5F-A5-50

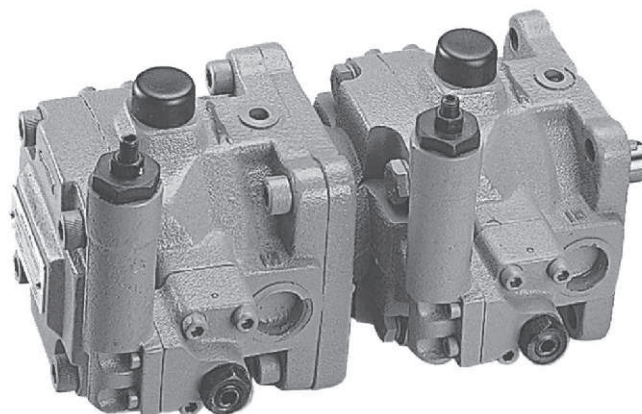
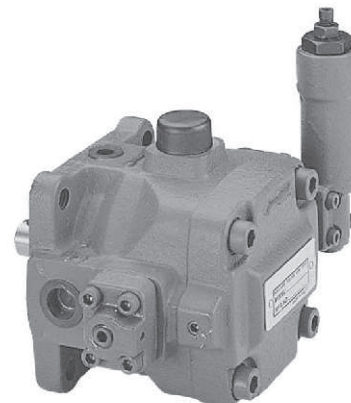


Case drain(lpm) Outlet pressure(bar)

VP5F-B3-50



Case drain(lpm) Outlet pressure(bar)

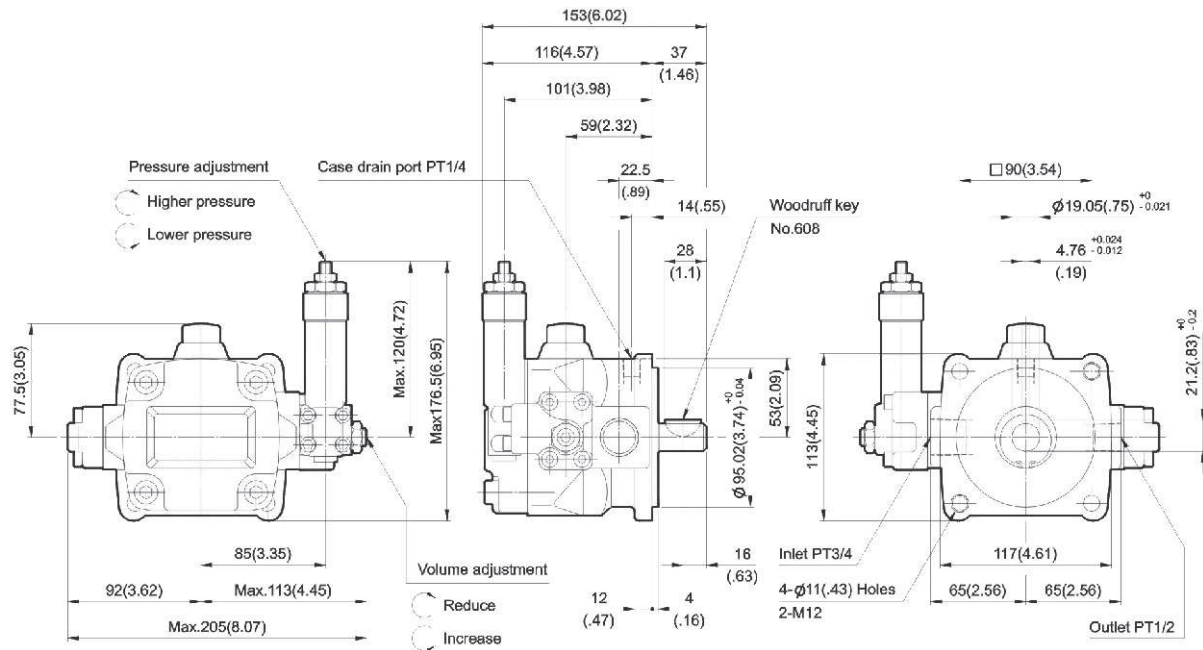


Variable Vane Pumps

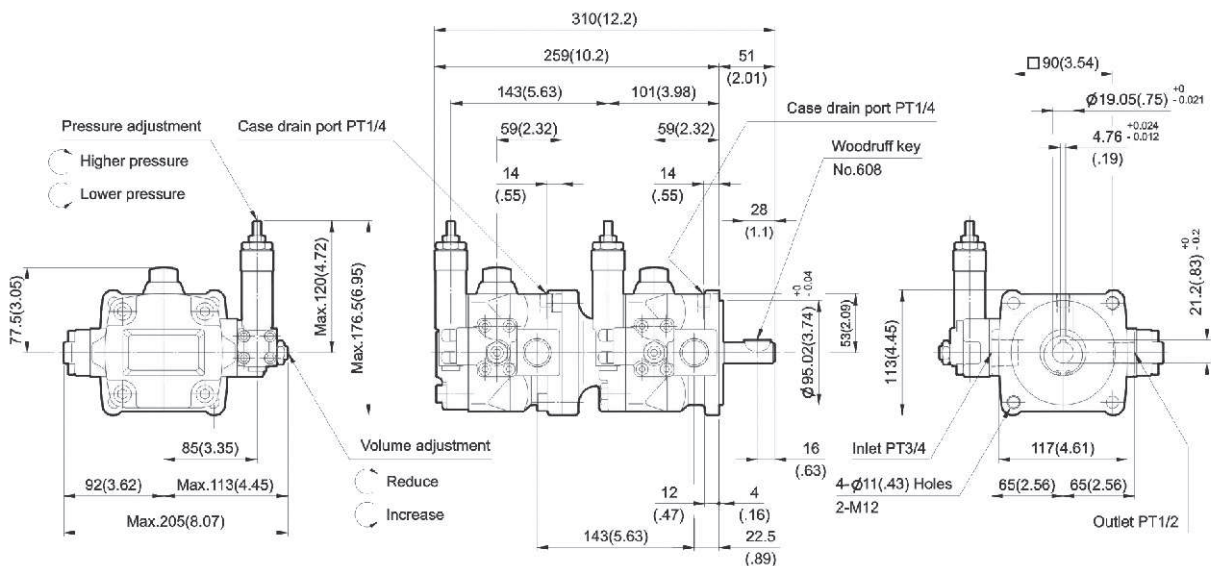
DIMENSIONS

MILLIMETERS(INCHES)

VP5F- * * -50

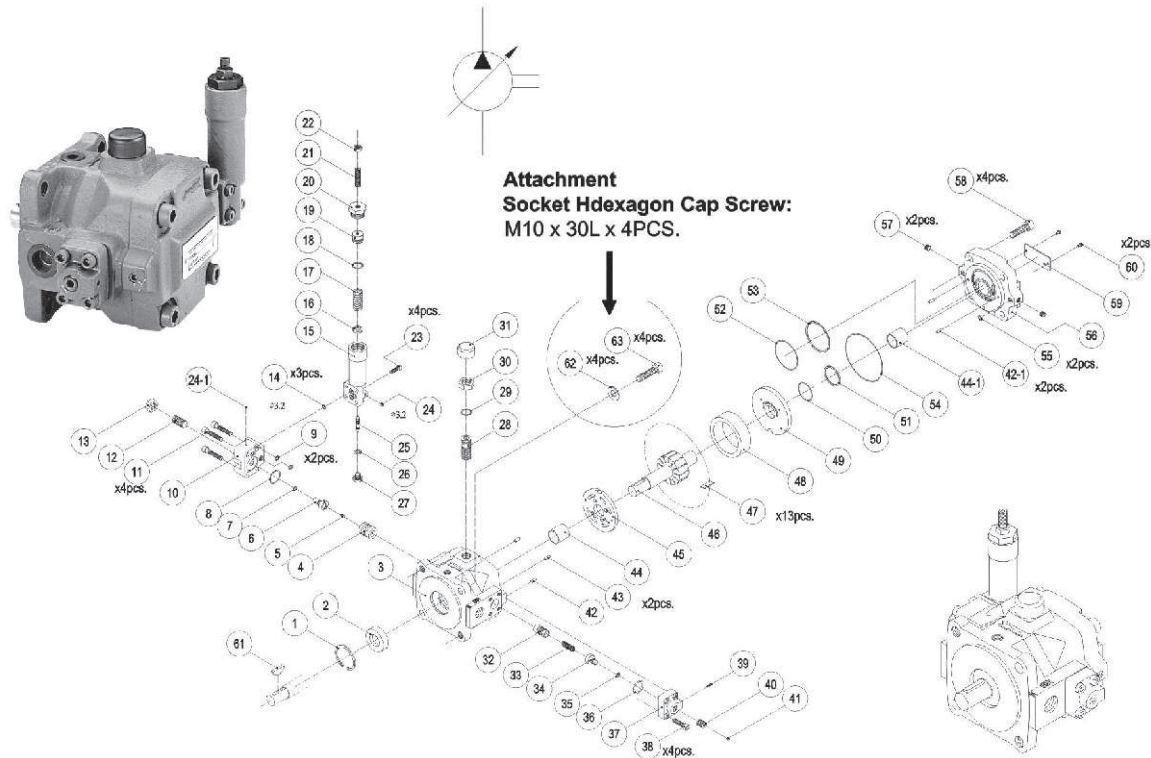


VP5FD- * * - * -50



ASSEMBLY AND PARTS LIST

VP5F-***-50

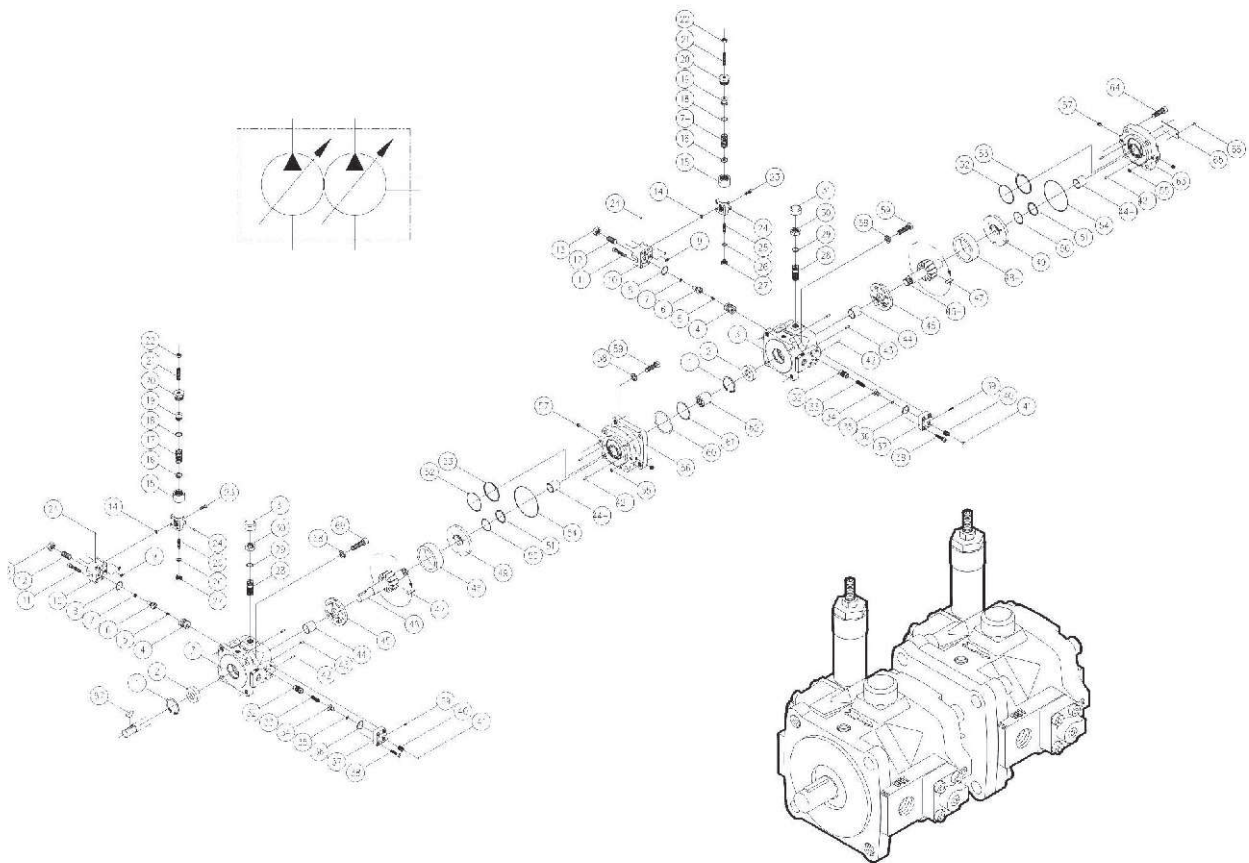


63	Socket Head Cap Screw	M10xP1.5x30L	4	33	Spring		1
62	Spring Washer	M10	4	32	Piston		1
61	Woodruff Key	NO.608	1	31	Cap		1
60	Fixing Screw		2	30	Hexagon Nut	M16xP1.0	1
59	Name Plate		1	29	O-Ring	1A-P14	1
58	Socket Head Cap Screw	M10xP1.5x35L	4	28	Slide Screw		1
57	Plug	1/16"	2	27	Plug		1
56	Cover		1	26	O-Ring	1A-P10	1
55	O-Ring	1A-P6	2	25	Spool		1
54	O-Ring	1A-S85	1	24	Plug		1
53	Endless Back-up Ring		1	23	Socket Set Screw	M5xP0.8x25L	4
52	O-Ring	AS568-034	1	22	Hexagon Nut	M8xP1.25	1
51	Endless Back-up Ring		1	21	Socket Set Screw	M8xP1.25x35L	1
50	O-Ring	AS568-026	1	20	Screw		1
49	Thrust Plate		1	19	Spring Retainer		1
48	Cam Ring		1	18	O-Ring	1A-P14	1
47	Vanes		13	17	Spring		1
46	Rotorshaft		1	16	Hold		1
45	Port Plate		1	15	Body		1
44-1	Engine Bush	DIADO(JAPAN)DD2225	1	14	O-Ring	1A-P6	3
44	Engine Bush	DIADO(JAPAN)DD2225	1	13	Hexagon Nut	M12xP1.75	1
43	Straight Pin	φ4x10	2	12	Socket Set Screw	M12xP1.75x25L	1
42-1	Spring Pin	φ4x10	2	11	Socket Head Cap Screw	M6xP1.0x35L	4
42	Spring Pin	φ4x10	1	10	Cover		1
41	Plug		1	9	O-Ring	1A-P6	2
40	Socket Set Screw	M10xP1.5x12L	1	8	O-Ring	1A-P20	1
39	Socket Set Screw	M5xP0.8x10L	1	7	O-Ring	1A-P5	1
38	Socket Head Cap Screw	M6xP1.0x25L	4	6	Piston		1
37	Cover		1	5	Socket Set Screw	M4xP0.7x5L	1
36	O-Ring	1A-P22	1	4	Piston		1
35	O-Ring	1A-P5	1	3	Pump Body		1
34	Piston		1	2	Shaft Seal	TCV 224211	1
				1	Retainer Ring	R42	1
No.	Part Name	Specification	Q'ty	No.	Part Name	Specification	Q'ty

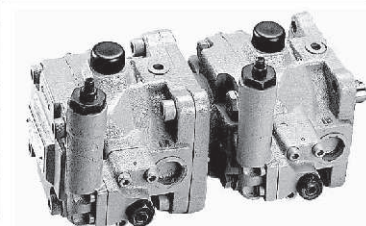
ASSEMBLY AND PARTS LIST

VP5FD

A4



No.	Description	Specification	Q'ty	No.	Description	Specification	Q'ty	No.	Description	Specification	Q'ty
1	Retainer Ring	R42	1+1	30	Hexagon Nut	M16xP1.0	1+1	56	Cover		1
2	Shaft Seal	TCV 224211	1+1	31	Cap		1+1	57	Plug	1/16"	2+2
3	Pump Body		1+1	32	Piston		1+1	58	Spring Washer	M10	4+4
4	Piston		1+1	33	Spring		1+1	59	Hexagon Head Screw	M10xP1.5x30L	4+4
5	Socket Set Screw	M4xP0.7x5L	1+1	34	Piston		1+1	60	O-Ring	1A-G45	1
6	Piston		1+1	35	C-Ring	1A-P5	1+1	61	O-Ring	1A-G60	1
7	O-Ring	1A-P5	1+1	36	C-Ring	1A-P22	1+1	62	Coupling		1
8	O-Ring	1A-P20	1+1	37	Cover		1+1				
9	O-Ring	1A-P6	2+2	38	Skt. HD. Cap Scr.	M6xP1.0x25L	4+4				
10	Cover		1+1	39	Socket Set Screw	M5xP0.8x10L	1+1				
11	Skt. HD. Cap Scr.	M6xP1.0x35L	4+4	40	Socket Set Screw	M10xP1.5x12L	1+1	63	Cover		1
12	Socket Set Screw	M12xP1.75x25L	1+1	41	Plug		1+1	64	Skt. HD. cap Scr.	M10xP1.5x35L	4
13	Hexagon Nut	M12xP1.75	1+1	42	Spring Pin	ø4x10	1+1	65	Name Plate		1
14	O-Ring	1A-P6	3+3	42-1	Spring Pin	ø4x10	2+2	66	Fixing Screw		2
15	Body		1+1	43	Straight Pin	ø4x10	2+2	67	Woodruff Key	NO.608	1
16	Hold		1+1	44	Engine Bush	DIADO(JAPAN)DD2225	1+1	68	Spring Washer	M10	4
17	Spring		1	44-1	Engine Bush	DIADO(JAPAN)DD2225	1+1	69	Skt. HD. cap Scr.	M10xP1.5x30L	4
17-1	Spring		1	45	Port Plate		1+1				
18	O-Ring	1A-P14	1+1	46	Rotorshaft(A)		1				
19	Spring Retainer		1+1	46-1	Rotorshaft(B)		1				
20	Screw		1+1	47	Vanes		13+13				
21	Socket Set Screw	M8xP1.25x35L	1+1	48	Cam Ring		1				
22	Hexagon Nut	M8xP1.25	1+1	48-1	Cam Ring		1				
23	Socket Set Screw	M5xP0.8x25L	4+4	49	Thrust Plate		1+1				
24	Plug		2+2	50	C-Ring	AS588-026	1+1				
25	Spool		1+1	51	Endless Back-up Ring		1+1				
26	O-Ring	1A-P10	1+1	52	C-Ring	AS588-034	1+1				
27	Plug		1+1	53	Endless Back-up Ring		1+1				
28	Slide Screw		1+1	54	O-Ring	1A-S85	1+1				
28	O-Ring	1A-P14	1+1	55	O-Ring	1A-P6	2+2				



※ 62~63 are Accessories.