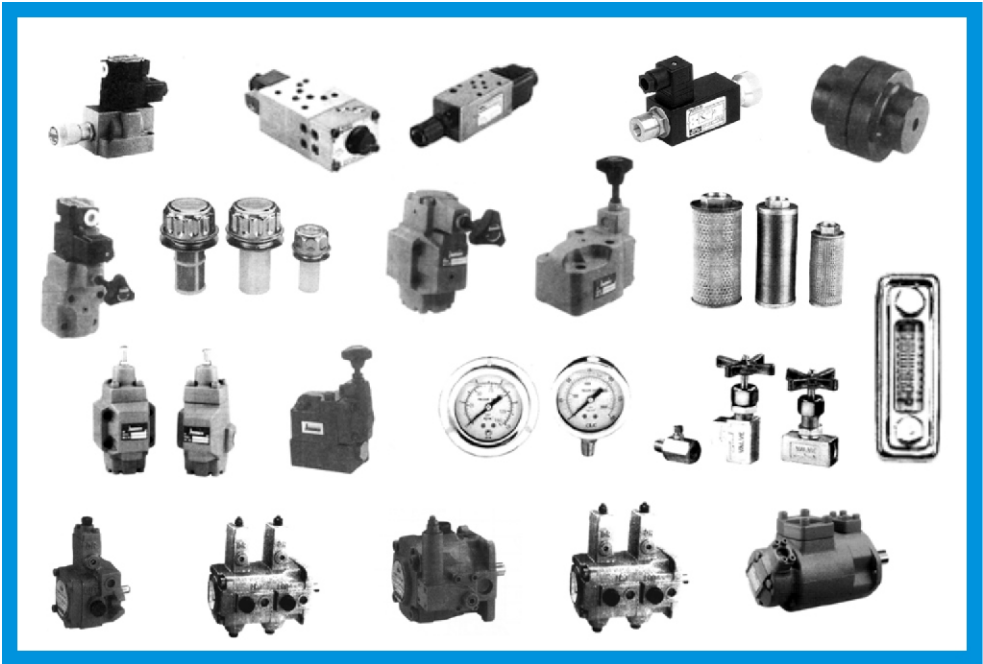


17 : Power units related components

tuv ISO-9001 : 2000 quality certified








■■■ Index ■■■

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Index

■ Hydraulic van pumps

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- HVPD High pressure dual variable pumps.....P17.11
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- FPD(Q) Low pressure dual fixed pumps.....P17.23

VP	VPD	HVP	HVPD	FP(Q) , FPD(Q)
				

Calculations of motor's horse power & pump's volume

$$HP = \frac{P \times Q}{450 \times \eta}$$

HP : horse power

P : pump's output pressure(kgf/cm²)

Q : pump's output volume(ℓ/min)

η : pump's efficiency (1)fixed pump ÷ 80%
(2)variable pump ÷ 60%

e.g. : If a hydraulic cylinder with a bore size 50mm , rod size 30mm , and a stroke 1000mm under a working pressure 70kgf/cm² makes 7 cycles movements per minute , how many of the horse power is needed ?

- ans : 1.needed volume when the cylinder is forwarding = $0.785 \times (5)^2 \times 100 = 1960 \text{cc}$
 2.needed volume when the cylinder is backwarding = $1960 - [0.785 \times (3)^2 \times 100 = 700]$
 = 1260cc
 3.needed volume when the cylinder makes 7 cycles movement per minute = $7 \times (1960 + 1260 = 3220) = 22540 \text{cc} = 22.5 \text{ ℓ/min}$
 4.needed pump's output volume is 22.5 ℓ/min
 based on the working pressure and calculated pump's output volume, we can find a proper fixed pumps from supplier's catalogues .

5.ALSO, because $HP = \frac{70 \times 22.5}{450 \times 0.8} = 4.4 \text{HP}$ (0.8=efficiency)

so, we should select a motor from the market with horse power >4.4HP which is usually about 6HP

6.ALSO, a motor's rotating speed can be found by the formula $f = \frac{P \times N}{120}$ E.g. : f=60 P=4
 f : motor's frequency(HZ)
 N : motor's rotating speed(RPM)
 P : motor's sections(4P.6P)

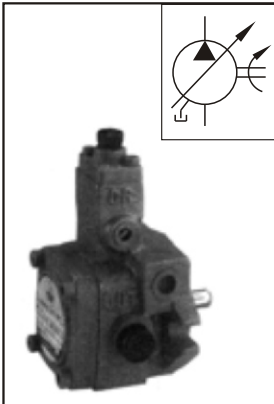
$$N = \frac{f \times 120}{P} = 1800 \text{RPM}$$

P=6
 N=1200RPM

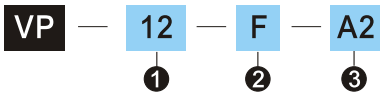
Power units related components

VP Low pressure variable pumps

Specifications

	model	pressure range (bar)	output volume (cc/r)	port(pt)			speed(rpm)		weight(kg)	
				input	outlet	return	min	max	flange	foot
	VP-08	3-20	4.44	3/8	3/8	1/4	800	1800	5	6
	-12		6.67							
	-15		8.3							
	-20	15-35	11.1	1/2						
	-30	30-55	16.7	3/4	1/2	1/4	800	1800	9	12
-40	50-70	22.2								

Order form

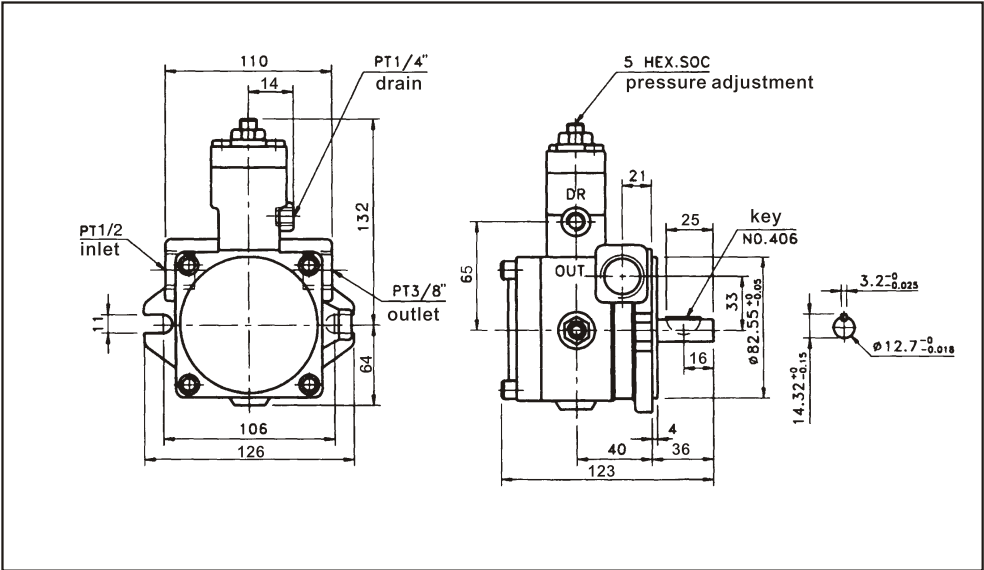


VP : Low pressure variable pumps		
①	model [related volume (cc/rev)]	(1)08 [4.44(cc/rev)] (2)12 [6.67(cc/rev)] (3)15 [8.3(cc/rev)] (4)20 [11.1(cc/rev)] (5)30 [16.7(cc/rev)] (6)40 [22.2(cc/rev)]
②	mounting	(1)F : flange (2)L : foot
③	pressure rang(kgf/cm ²)	(1)A1 : 3~20 (2)A2 : 15~35 (3)A3 : 30~55 (4)A4 : 50~70

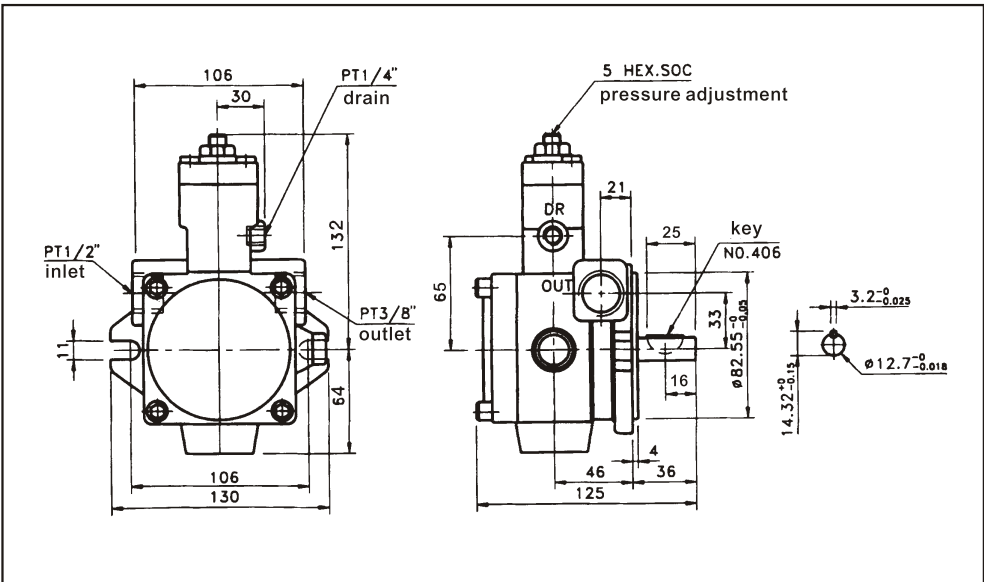
Power units related components

External dimensions

VP-08,12,15-F



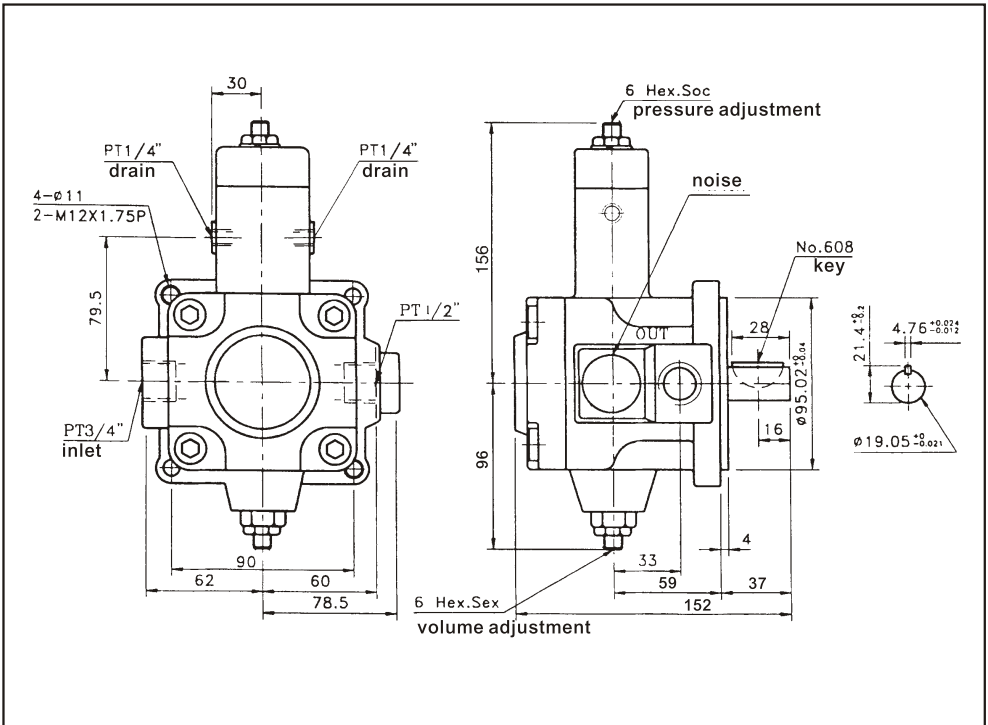
VP-20-F



Power units related components

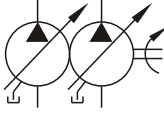
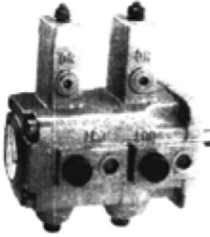
External dimensions

VP-30,40-F



VPD Low pressure dual variable pumps

Specifications

		model	output volume (cc/r)		pressure range (bar)	speed (rpm)		weight (kg)
			front pump	rear pump		min	max	
		VP-20×20	11.1	11.1	A1 : 3~20 A2 : 15~35 A3 : 30~55 A4 : 50~70	800	1800	17
		-30×30	16.7	16.7				
		-40×40	22.2	22.2				

Order form

VPD — 30×30 — F — A1×A1

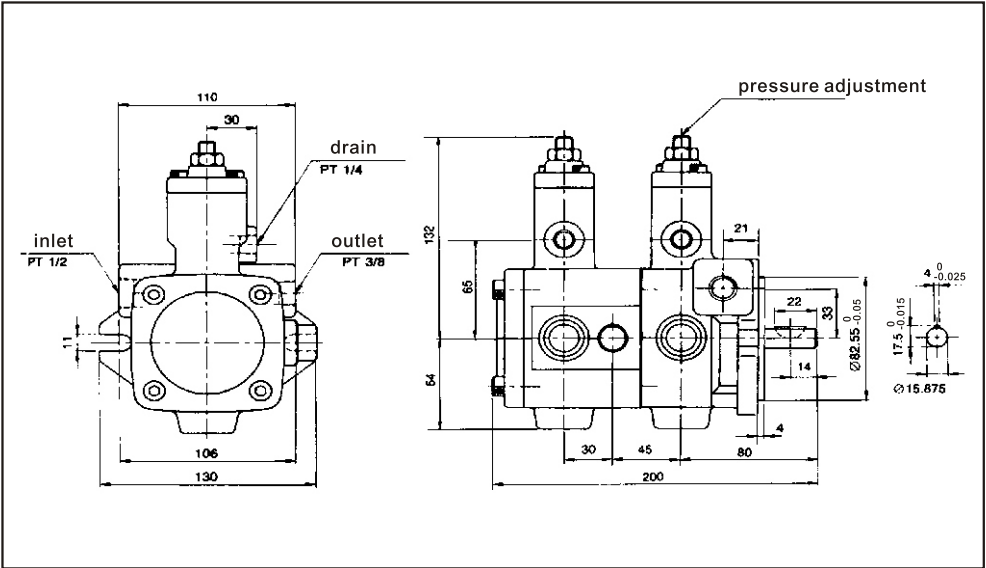
①
②
③

VPD : Low pressure dual variable pumps		
①	model (volume)	(1)20×20 (11.1 , 11.1) (2)30×30 (16.7 , 16.7) (3)40×40 (22.2 , 22.2)
②	mounting	(1)F : flange (2)L : foot
③	pressure rang(bar)	(1)A1 : 3 ~ 20 (2)A2 : 15 ~ 35 (3)A3 : 30 ~ 55 (4)A4 : 50~70
<p>■ note: a motor drives a dual pumps to come out two different pressures and flows.</p>		

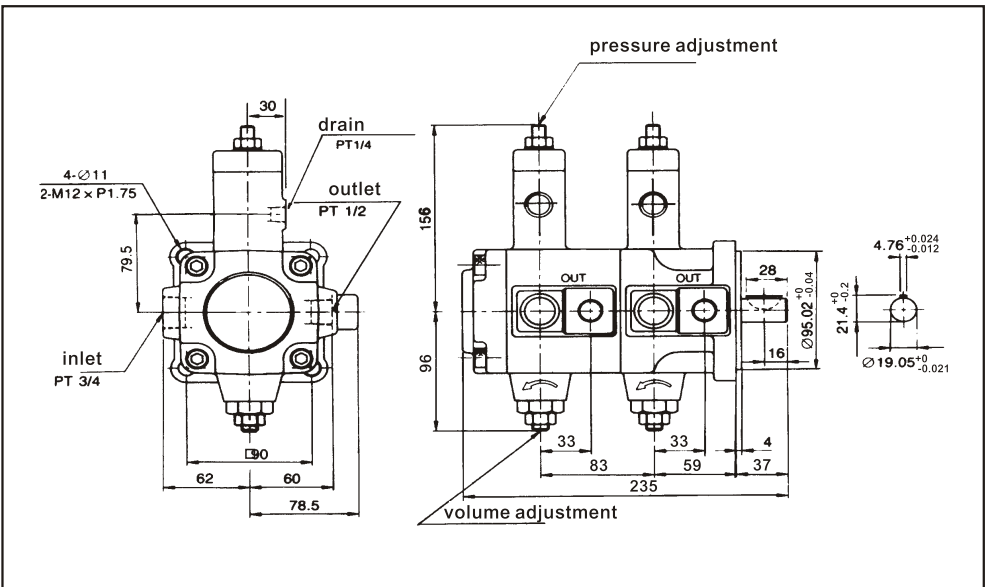
Power units related components

External dimensions

VPD-20×20-F flange

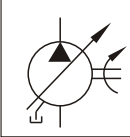



VPD-30×30 or 40×40-F flange



HVP High pressure variable pumps

Specifications

		model	pressure range (bar)	output volume (CC/r)	port(pt)			speed(rpm)		weight(kg)	
					input	outlet	return	min	max	flange	foot
		HVP-30	15~35, 20~70, 50~105, 70~140	16.7	3/4	1/2	1/4	800	1800	9.5	12.5
		HVP-40		22.2							

Order form

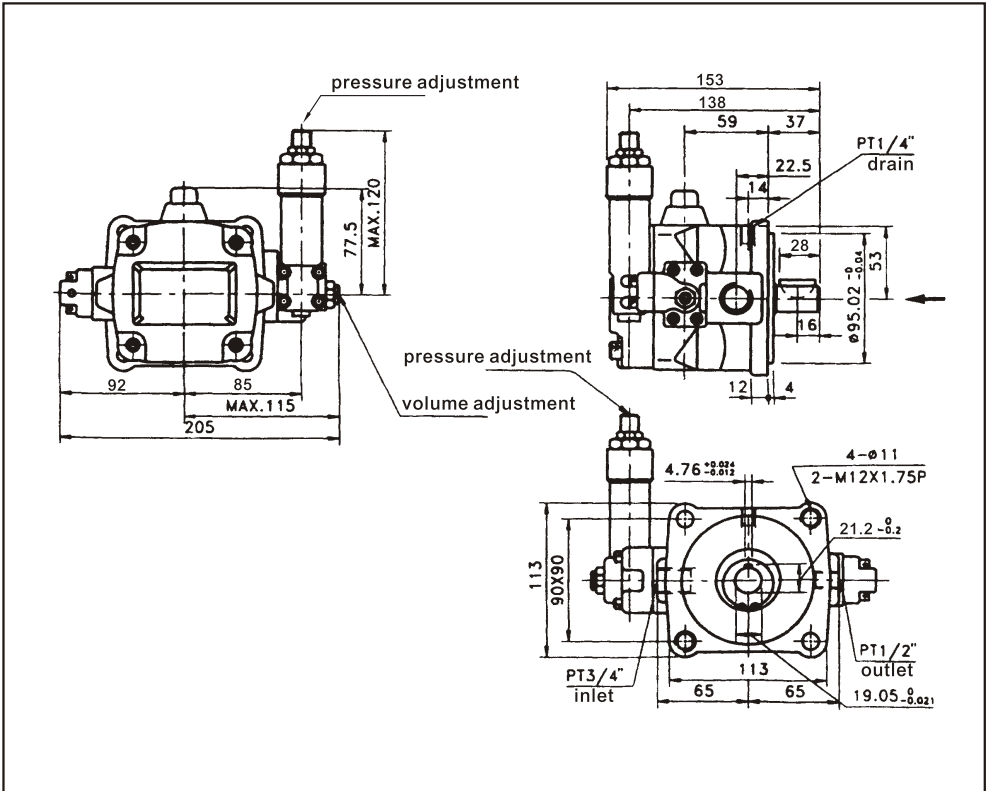
HVP — **30** — **F** — **A3**
 ① ② ③

HVP : High pressure variable pumps		
①	model (related volume (cc/rev))	(1)30 (16.7(cc/rev)) (2)40 (22.2(cc/rev))
②	mounting	(1)F : flange (2)L : foot
③	pressure rang(kgf/cm ²)	(1)A1 : 15~35 (2)A2 : 20~70 (3)A3 : 50~105 (4)A4 : 70~140

Power units related components

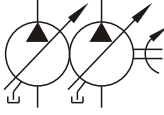
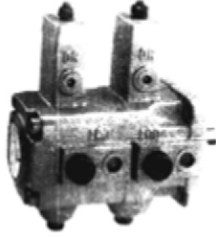
External dimensions

HVP-30,40



HVPD High pressure dual variable pumps

Specifications

	model	output volume (cc/r)		pressure range (bar)	speed (rpm)		weight (kg)
		front pump	real pump		min	max	
	VPD-20×20	11.1	11.1	A1 : 3~20 A2 : 15~35 A3 : 30~55 A4 : 50~70	800	1800	17
	-30×30	16.7	16.7				
	-40×40	22.2	22.2				

Order form

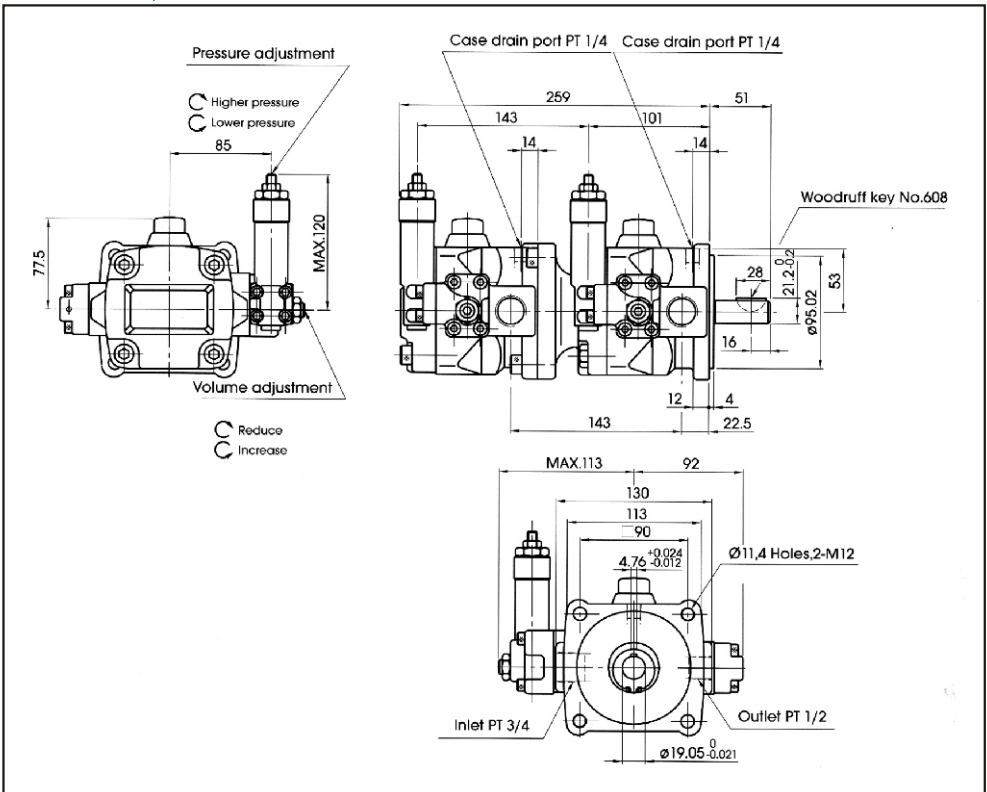
HVPD — **30×30** — **F** — **A1×A1**
① ② ③

HVPD : High pressure dual variable pumps		
①	model (volume)	(1)20.20 (2)30.30 (3)40.40
②	mounting)1(FGflange)2(LGfoot
③	pressure rang)bar))1(A1 : 3 ~ 20)2(A2 : 15 ~ 35)3(A3 : 30 ~ 55)4(A4 : 50~70
<p>■ note:a motor drives a dual pumps to come out two different pressures and flows.</p>		

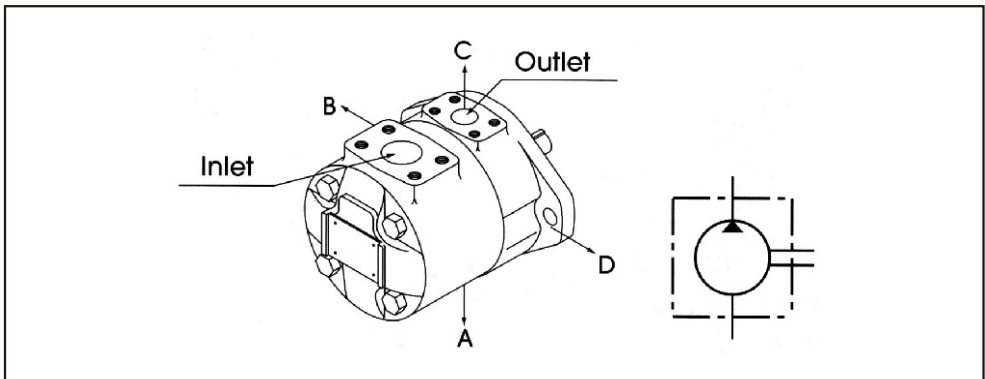
Power units related components

External dimensions

HVPD-30,40



FP(Q)Low pressure fixed vane pumps



■ features

- 1.FP/FP(Q)pumps provide 90% efficiency and 62db noise level under the 210bar working pressure.
- 2.Pumps with 12 pieces of vanes provides low noise ability.
- 3.There are 4 kinds of combinations for inlet and outlet positions that provide the flexibility of systems design.

FP(Q)low pressure fixed vane pumps

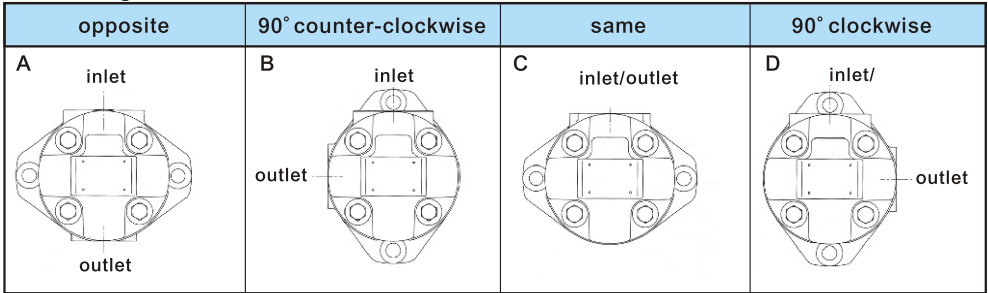
Specifications

body	num	output volume (cc/r)	oil						min rotation (r/min)	weight (kg)	
			mineral oil		phosphated ester		soluble			flange	foot
			max. pressure (bar)	max. rotation (r/min)	max. pressure (bar)	max. rotation (r/min)	max. pressure (bar)	max. rotation (r/min)			
small FP(Q)1	2	7.5	138	1800	138	1500	138	1200	600	16	19
	3	10.2									
	4	12.8									
	5	16.7	207		157						
	6	19.2									
	7	22.9									
	8	26.2									
	9	31.0	157		138						
	10	35.0									
	11	37.9									
12	37.9	157	138								
13	44.2	138									
14	44.2	138									
mid FP(Q)2	10	32.5	172	1800	157	1500	138	1200	600	25	34.5
	12	38.3									
	14	43.3									
	15	46.7									
	16	52.5								29.5 (q type)	39 (q type)
	17	59.2									
	18	65.0									
	19	59.2								138	138
20	78.6										
large FP(Q)3	17	53.3	172	1800	157	1500	138	1200	600	35	44.5
	21	66.7									
	23	79.2									
	24	95.0									
	25	100								43 (q type)	53.5 (q type)
	26	109									
	27	118									
	28	134								138	138
29	134										
extra FP(Q)4	30	96.0	172	1800	157	1500	138	1200	600	59.5	84.5
	31	109									
	32	128									
	33	134									
	34	156								71 (q type)	96 (q type)
	35	189									
	36	210									
	37	210								157	138
38	236	138									

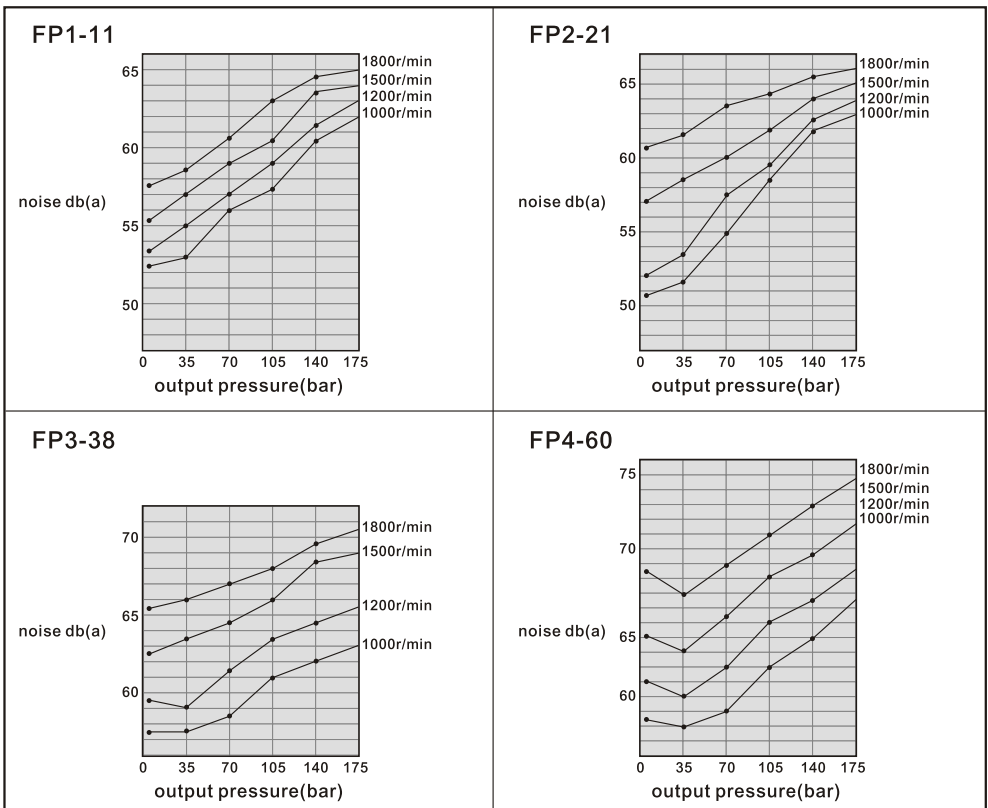
Power units related components

Positions of FP(Q) in let/ outlet ports

■ viewing from rear cover



FP(Q)Noise level



Power units related components

FP Selections of FP fixed vane pumps

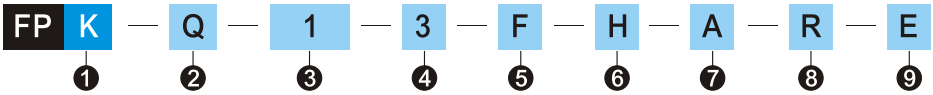
model	rotation (r/min)	output volume(l /min)				needed motor(kw)			
		6.9bar	69bar	138bar	172bar	6.9bar	69bar	138bar	172bar
FP(Q)1-2	1000	7.5	6.0	4.5		0.2	1.2	2.1	
	1200	9.5	8.5	6.5		0.3	1.5	2.5	
	1500	11.2	9.3	7.5		0.3	1.8	3.2	
	1800	13.5	11.2	9.0		0.4	2.2	3.8	
FP(Q)1-3	1000	10.2	8.8	7.4		0.3	1.5	3.1	
	1200	12.5	11.0	9.5		0.4	1.8	3.7	
	1500	15.3	13.7	12.1		0.5	2.3	4.7	
	1800	18.4	16.9	15.3		0.5	2.7	5.6	
FP(Q)1-4	1000	12.8	12.3	10.8	10.0	0.4	1.8	3.7	4.6
	1200	16.0	15.0	13.5	13.0	0.5	2.2	4.4	5.5
	1500	19.2	17.7	16.2	15.7	0.6	2.7	5.6	6.9
	1800	23.1	21.3	19.5	19.0	0.7	3.2	6.7	8.3
FP(Q)1-5	1000	16.7	15.7	14.7	14.2	0.4	2.8	4.8	6.0
	1200	20.0	19.0	18.0	17.5	0.5	3.2	5.8	7.2
	1500	25.0	24.0	23.0	22.5	0.6	3.9	7.3	9.0
	1800	30.0	29.0	28.0	27.5	0.6	4.2	8.6	10.7
FP(Q)1-6	1000	19.2	18.2	17.0	16.2	0.4	3.0	5.5	6.6
	1200	23.0	22.0	20.5	20.0	0.5	3.5	6.5	7.9
	1500	28.5	27.5	26.0	25.0	0.6	4.3	8.1	11.8
	1800	34.5	33.5	32.0	31.0	0.7	5.2	9.7	7.6
FP(Q)1-7	1000	22.9	21.4	19.9	18.9	0.5	3.4	6.2	9.1
	1200	27.5	26.0	24.5	23.5	0.6	4.0	7.4	11.3
	1500	34.4	32.9	31.4	30.4	0.7	5.0	9.2	13.6
	1800	41.3	39.8	38.3	37.3	0.8	5.9	11.0	8.3
FP(Q)1-8	1000	26.2	24.2	22.7	21.2	0.5	3.9	6.7	10.0
	1200	31.5	29.5	28.0	26.5	0.6	4.5	8.0	12.5
	1500	39.4	37.4	35.9	34.4	0.8	5.5	10.0	14.8
	1800	47.2	45.2	43.7	42.2	0.8	6.6	11.8	10.4
FP(Q)1-10	1000	31.0	29.2	26.5	24.8	0.6	4.6	8.4	12.5
	1200	37.2	34.7	32.4	30.9	0.7	5.4	10.0	15.6
	1500	46.5	43.1	41.3	39.4	0.9	6.5	12.5	18.5
	1800	55.8	53.2	50.6	48.5	0.9	7.8	14.7	11.4
FP(Q)1-11	1000	35.0	33.0	30.5	29.5	0.7	4.9	9.2	13.7
	1200	42.0	40.0	37.5	36.5	0.8	5.7	11.0	17.1
	1500	52.5	50.5	48.0	47.0	1.0	6.9	13.8	20.3
	1800	63.2	61.0	58.5	57.5	1.0	8.3	16.2	
FP(Q)1-12	1000	37.9	36.4	34.4		0.7	5.6	10.4	
	1200	45.5	44.0	42.0		0.9	6.5	12.5	
	1500	56.9	55.4	53.4		1.1	7.9	15.6	
	1800	68.2	66.7	64.7		1.1	9.4	18.4	
FP(Q)1-14	1000	44.2	42.7	40.7		1.0	6.6	12.2	
	1200	53.0	51.5	49.5		1.1	7.8	14.6	
	1500	66.0	64.0	62.0		1.3	9.6	18.2	
	1800	79.5	77.5	75.5		1.4	11.5	21.7	
FP(Q)2-10	1000	32.5	29.5	26.0	24.5	0.9	4.9	9.3	11.3
	1200	39.0	36.0	32.5	31.0	1.0	5.8	11.1	13.5
	1500	48.8	45.8	42.3	40.8	1.2	7.2	13.8	16.8
	1800	58.5	55.5	52.0	50.5	1.3	8.5	16.5	20.1
FP(Q)2-12	1000	38.3	35.9	33.3	31.8	1.0	5.7	10.9	13.4
	1200	46.0	43.6	41.0	39.5	1.1	6.5	13.0	16.0
	1500	57.5	55.1	52.5	51.0	1.3	8.3	16.1	19.9
	1800	69.0	66.6	64.0	62.5	1.4	9.8	19.3	23.8
FP(Q)2-14	1000	43.3	40.2	36.8	35.8	1.2	6.4	12.2	15.1
	1200	52.0	48.5	45.5	44.5	1.3	7.5	14.5	18.0
	1500	65.0	61.9	58.5	57.5	1.5	9.4	18.0	22.4
	1800	78.0	74.9	71.5	70.5	1.7	11.1	21.5	26.7
FP(Q)2-15	1000	46.7	43.7	40.7	39.2	1.2	6.8	13.0	15.9
	1200	56.0	53.0	50.0	48.5	1.3	8.0	15.5	19.0
	1500	70.0	67.0	64.0	62.5	1.5	9.9	19.3	23.6
	1800	84.0	81.0	78.0	76.5	1.7	11.8	23.0	28.3
FP(Q)2-17	1000	52.5	49.7	46.5	44.5	1.4	7.4	14.3	17.6
	1200	63.0	60.6	57.0	55.0	1.5	9.0	17.0	21.0
	1500	78.8	76.0	72.8	70.8	1.7	10.8	21.1	26.1
	1800	94.5	91.7	88.5	86.5	1.9	12.9	25.1	31.2
FP(Q)2-19	1000	59.2	56.2	53.2	50.2	1.5	8.5	16.0	20.1
	1200	71.0	68.0	65.0	62.0	1.7	10.0	19.0	24.0
	1500	88.7	85.7	82.7	79.7	1.9	12.3	24.1	29.8
	1800	106.5	103.7	100.7	97.7	2.2	14.7	28.2	35.7
FP(Q)2-21	1000	65.0	62.6	59.0	57.0	1.6	9.2	17.6	21.8
	1200	78.0	75.0	72.0	70.0	1.8	11.0	21.0	26.0
	1500	97.5	94.7	91.5	89.5	2.1	13.4	26.1	32.3
	1800	117	114	111	109	2.3	16.0	31.1	38.6

FP Selections of FP fixed vane pumps

model	rotation (r/min)	output volume(l/min)				needed motor(kw)			
		6.9bar	69bar	138bar	172bar	6.9bar	69bar	138bar	172bar
FP(Q)2-25	1000	78.8	74.8	71.5		2.0	11.2	21.4	
	1200	94.6	90.3	87.8		2.2	13.4	25.6	
	1500	118.2	113.0	110.0		2.6	16.3	31.8	
	1800	141.0	137.0	134.0		2.8	19.5	32.4	
FP(Q)3-17	1000	53.3	47.3	41.3	38.3	1.4	6.8	12.6	15.5
	1200	64.0	58.0	52.0	49.0	1.5	8.0	15.0	18.5
	1500	80.0	74.0	68.0	65.0	1.7	9.8	18.6	22.9
	1800	96.0	90.0	84.0	81.0	1.9	11.6	22.1	27.4
FP(Q)3-21	1000	66.7	60.7	54.7	51.7	1.6	8.9	16.8	20.6
	1200	80.0	74.0	68.0	65.0	1.8	10.5	20.0	24.5
	1500	100	94.0	88.0	85.0	2.0	12.9	24.8	30.4
	1800	120	114	108.0	105.0	2.3	15.4	30.5	36.4
FP(Q)3-25	1000	79.2	73.5	67.2	64.2	1.8	10.7	20.5	25.1
	1200	95.0	89.0	83.0	80.0	2.0	12.5	24.5	30.0
	1500	119	113	107.0	104.0	2.3	15.7	30.4	37.3
	1800	142	136	130.0	127.0	2.6	18.7	36.4	44.6
FP(Q)3-30	1000	95.0	88.4	81.0	78.0	1.8	12.6	24.7	30.5
	1200	114	107	100	97.0	2.0	15.0	29.5	36.5
	1500	142	136	128	125	2.4	18.6	36.7	45.5
	1800	171	164	157	154	2.7	22.2	44.0	54.5
FP(Q)3-32	1000	100	92.0	85.0	82.0	2.1	13.5	26.0	32.2
	1200	120	112	105	102	2.3	16.0	31.0	38.5
	1500	150	142	135	132	2.7	19.8	38.6	47.9
	1800	180	172	165	162	3.1	23.6	46.1	57.4
FP(Q)3-35	1000	109	103	95.2	92.2	2.2	14.2	27.6	34.3
	1200	131	124	117	114	2.5	17.0	33.0	41.0
	1500	164	157	150	147	2.9	20.9	41.0	51.0
	1800	196	189	182	179	3.3	24.9	50.4	61.1
FP(Q)3-38	1000	118	111	102	99.3	2.7	15.5	29.8	36.9
	1200	142	134	126	123	3.0	18.5	35.5	44.0
	1500	177	170	161	158	3.4	22.7	44.0	54.7
	1800	213	205	197	194	3.9	27.0	52.6	65.4
FP(Q)3-42	1000	134	125	118		4.5	27.1	52.1	
	1200	160	152	144		5.0	32.2	62.2	
	1500	201	193	185		5.8	39.8	77.4	
	1800	241	233	225		6.6	47.5	92.5	
FP(Q)4-30	1000	96.0	87.0	77.0	72.0	1.6	13.4	25.1	30.9
	1200	115	106	96.0	91.0	2.0	15.0	30.0	37.0
	1500	144	135	125	120	2.4	18.6	37.4	46.1
	1800	172.5	163.5	153.5	148.5	2.8	22.3	44.7	55.2
FP(Q)4-35	1000	109	100	90.0	85.0	1.7	14.2	28.4	35.1
	1200	131	122	112	107	2.0	17.0	34.0	42.0
	1500	164	157	145	140	2.4	21.2	42.4	52.4
	1800	196.5	187.5	177.5	172.5	2.9	25.4	50.9	62.9
FP(Q)4-38	1000	128	119	109	104	2.7	16.8	33.5	41.0
	1200	154	145	135	130	3.0	20.0	40.0	49.0
	1500	192.5	183.5	173.5	168.5	3.5	24.8	49.8	61.0
	1800	231	222	212	207	4.0	29.5	59.5	73.0
FP(Q)4-42	1000	134	125	115	110	2.7	17.7	35.2	43.5
	1200	161	152	142	137	3.0	21.0	42.0	52.0
	1500	201	192	182	177	3.5	26.0	52.3	64.7
	1800	241	232	222	217	4.0	31.0	62.5	77.5
FP(Q)4-50	1000	156	147	137	132	3.1	20.2	39.4	49.3
	1200	187	178	168	163	3.5	24.0	47.0	59.0
	1500	234	225	215	210	4.0	29.7	58.5	73.4
	1800	280	271	261	256	4.7	35.4	69.9	87.9
FP(Q)4-60	1000	189	178	166	160	4.0	24.4	46.9	58.6
	1200	227	216	204	198	4.5	29.0	56.0	70.0
	1500	284	273	261	255	5.2	35.8	69.6	87.1
	1800	340	329	317	311	5.9	42.7	83.2	104
FP(Q)4-67	1000	210	199	187		4.5	27.1	52.1	
	1200	252	241	229		5.0	32.2	62.2	
	1500	315	304	292		5.8	39.8	77.4	
	1800	378	366	354		6.6	47.5	92.5	
FP(Q)4-75	1000	236	225	213		5.0	30.5	58.7	
	1200	289	280	269		5.6	36.3	70	
	1500	354	343	331		6.5	44.8	87	
	1800	424	414	401		7.4	53.4	104.0	

Power units related components

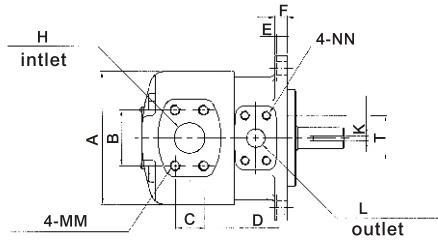
Order form



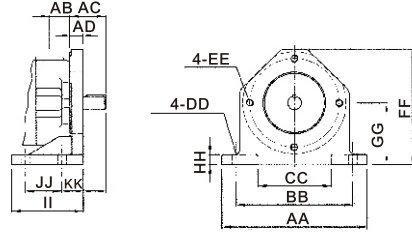
FP : Low pressure fixed vane pumps		
1	demand	(1)space : finished product (2)K : kit sets
2	noise	(1)space : standard (2)Q : low noise
3	body	(1)1 : small (2)2 : middle (3)3 : large (4)4 : extra
4	num.	seeP17.14 FP(Q) table in "num" e.g:2,3,4,5,6,7,8,10,.....
5	mounting	(1)F : flange (2)L : foot
6	rod size	(1)H : heavy duty(bigger) (2)G : standard(smaller) note : (FP1 or FPQ1 uses standard)
7	inlet/outlet position	(1)A : opposite direction (2)B : counter clockwise (3)C : same direction (4)D : clockwise90° (see P17.15)
8	rod rotating	(1)R : clockwise (2)L : counter clockwise (view from rod end)
9	oil	(1)space : mineral oil (2)E : sduble (3)G : Phosphated ester

External dimensions

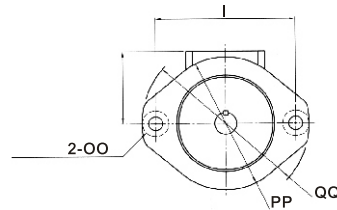
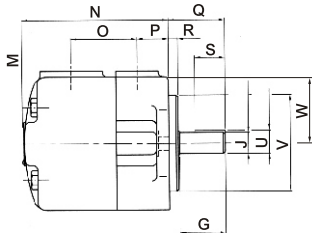
FP1 / 2 / 3 flange



FP1 / 2 / 3 foot



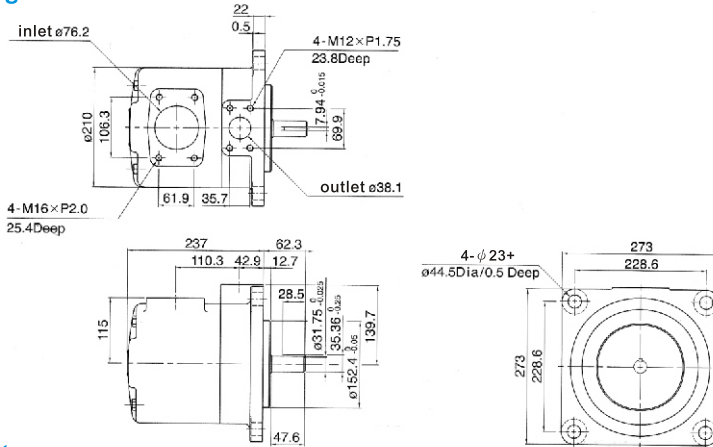
other dimensions refer to left drawings



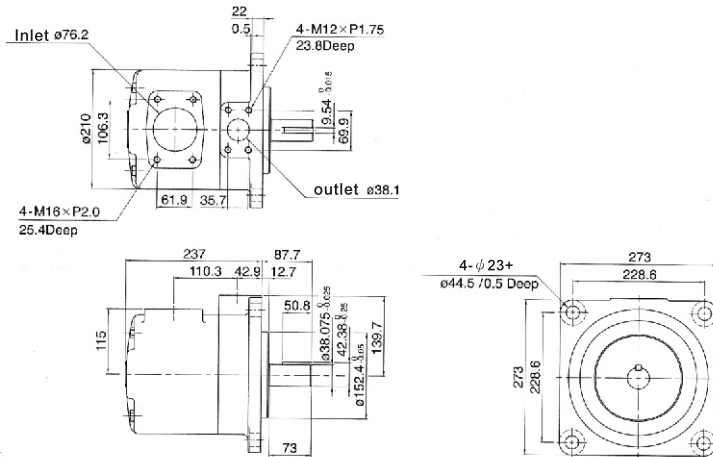
	A	B	C	D	E	F	G	H	I	J		K		L	M			
										small rod	big rod	small rod	big rod					
FP1	φ 140	58.7	30.1	22.2	0.5	13	47.8	φ 31.8	146.1	φ 22.275 ⁰ _{-0.025}	φ 22.225 ⁰ _{-0.025}	4.775 ⁰ _{-0.012}	4.775 ⁰ _{-0.012}	φ 19.1	70			
FP2	φ 160	69.9	35.7	26.2	0.5	16	47.2	φ 38.1	181	φ 22.275 ⁰ _{-0.025}	φ 25.4 ⁰ _{-0.025}	4.775 ⁰ _{-0.012}	6.35 ⁰ _{-0.012}	φ 25.4	80			
FP3	φ 181	77.7	42.8	30.1	0.5	16	61.8	φ 50.8	181	φ 31.75 ⁰ _{-0.025}	φ 34.9 ⁰ _{-0.025}	7.94 ⁰ _{-0.015}	7.95 ⁰ _{-0.015}	φ 31.8	90.5			
	N	O	P	Q	R	S	T	U		V	W	AA	AB	AC		AD	BB	CC
								small rod	big rod					small rod	big rod			
FP1	154	69.2	38.1	58.7	9.5	31.8	47.6	24.465 ⁰ _{-0.13}	24.465 ⁰ _{-0.13}	φ 101.6 ⁰ _{-0.05}	-	237	32.9	58.7	58.7	22	190	120
FP2	182	82.5	38.1	58.7	9.5	31.8	52.4	24.465 ⁰ _{-0.13}	28.3 ⁰ _{-0.13}	φ 127 ⁰ _{-0.05}	81	278	38.1	58.7	78.8	26	235	145
FP3	211	87.4	38.1	73.6	9.5	38.1	58.7	35.36 ⁰ _{-0.025}	38.56 ⁰ _{-0.025}	φ 127 ⁰ _{-0.05}	92	278	38.1	73.6	86.4	26	235	145
	DD		EE	FF	GG	HH	II	JJ	KK	OO	PP	QQ	MM		NN			
	φ 14+φ 28 / 1d												M10×P1.5×21.6d	M10×φ 1.5×19.1d				
FP1	φ 14+φ 28 / 1d		M12	191	102	17	117	60	35	φ 14.3+φ 27 / 0.5d	φ 140	φ 174	M10×P1.5×21.6d	M10×φ 1.5×19.1d				
FP2	φ 17.5+φ 26 / 1d		M16	219	109.5	23	131	76.2	39	φ 22.5+φ 33 / 0.5d	φ 162	φ 213	M12×1.75×23.8d	M10×φ 1.5×19.1d				
FP3	φ 19.5+φ 26 / 1d		M16	219	109.5	23	131	76.2	39	φ 17.5+φ 30 / 0.5d	φ 181	φ 225	M12×1.75×23.9d	M10×φ 1.5×21.6d				

External dimensions

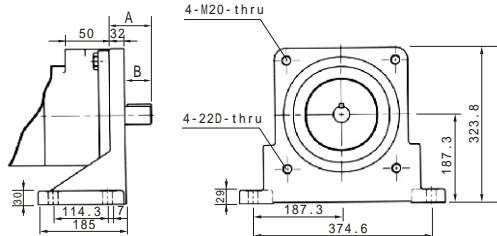
FP4 flange



FP4 foot

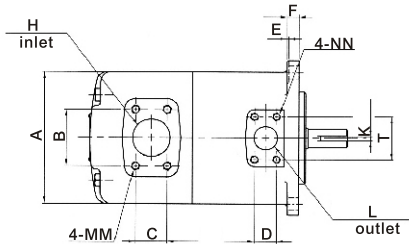


dim.	A	B
rod		
small	62.3	30.3
big	87.7	55.7

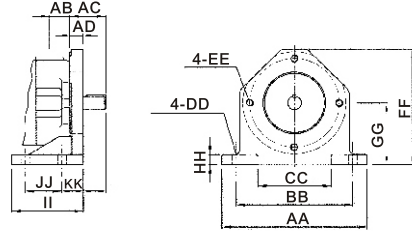


External dimensions

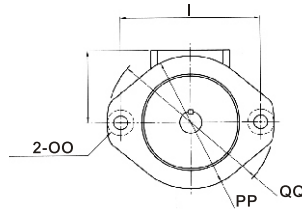
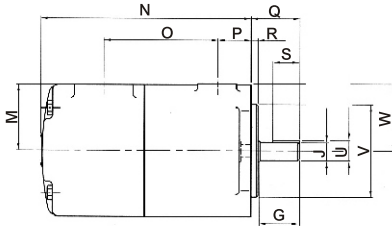
FPQ1 / 2 / 3 flange



FPQ1 / 2 / 3 foot



other dimensions refer to left drawings

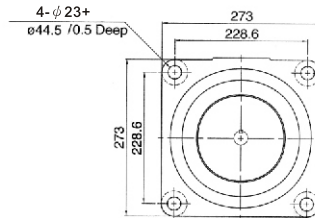
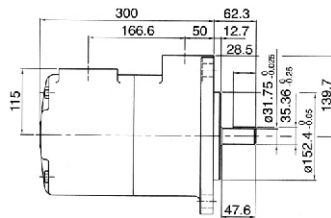
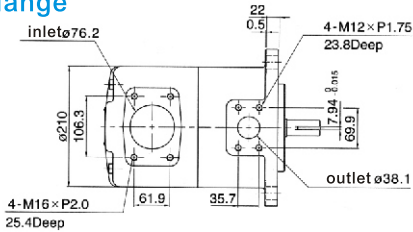


	A	B	C	D	E	F	G	H	I	J		K		L	M			
										small rod	big rod	small rod	big rod					
FP1	φ 140	58.7	30.1	22.2	0.5	13	47.8	φ 31.8	146.1	φ 22.275 ⁰ _{-0.025}	φ 22.225 ⁰ _{-0.025}	4.775 ⁰ _{-0.012}	4.775 ⁰ _{-0.012}	φ 19.1	70			
FP2	φ 160	69.9	35.7	26.2	0.5	16	47.2	φ 38.1	181	φ 22.275 ⁰ _{-0.025}	φ 25.4 ⁰ _{-0.025}	4.775 ⁰ _{-0.012}	6.35 ⁰ _{-0.012}	φ 25.4	80			
FP3	φ 181	77.7	42.8	30.1	0.5	16	61.8	φ 50.8	181	φ 31.75 ⁰ _{-0.025}	φ 34.9 ⁰ _{-0.025}	7.94 ⁰ _{-0.015}	7.95 ⁰ _{-0.015}	φ 31.8	90.5			
	N	O	P	Q	R	S	T	U		V	W	AA	AB	AC		AD	BB	CC
								small rod	big rod					small rod	big rod			
FP1	154	69.2	38.1	58.7	9.5	31.8	47.6	24.465 ⁰ _{-0.13}	24.465 ⁰ _{-0.13}	φ 101.6 ⁰ _{-0.05}	-	237	32.9	58.7	58.7	22	190	120
FP2	182	82.5	38.1	58.7	9.5	31.8	52.4	24.465 ⁰ _{-0.13}	28.3 ⁰ _{-0.13}	φ 127 ⁰ _{-0.05}	81	278	38.1	58.7	78.8	26	235	145
FP3	211	87.4	38.1	73.6	9.5	38.1	58.7	35.36 ⁰ _{-0.025}	38.56 ⁰ _{-0.025}	φ 127 ⁰ _{-0.05}	92	278	38.1	73.6	86.4	26	235	145
	DD		EE	FF	GG	HH	II	JJ	KK	OO	PP	QQ	MM		NN			
	φ 14+	φ 28 / 1d											φ 17.5+	φ 26 / 1d	φ 19.5+	φ 26 / 1d	φ 14.3+	φ 27 / 0.5d
FP1	φ 14+	φ 28 / 1d	M12	191	102	17	117	60	35	φ 14.3+	φ 27 / 0.5d	φ 140	φ 174	M10×P1.5×21.6d	M10×φ 1.5×19.1d			
FP2	φ 17.5+	φ 26 / 1d	M16	219	109.5	23	131	76.2	39	φ 22.5+	φ 33 / 0.5d	φ 162	φ 213	M12×1.75×23.8d	M10×φ 1.5×19.1d			
FP3	φ 19.5+	φ 26 / 1d	M16	219	109.5	23	131	76.2	39	φ 17.5+	φ 30 / 0.5d	φ 181	φ 225	M12×1.75×23.9d	M10×φ 1.5×21.6d			

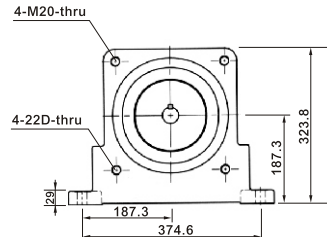
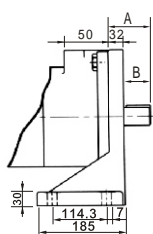
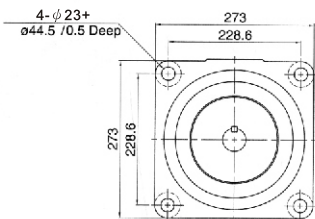
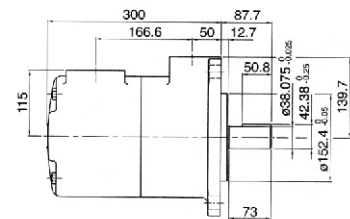
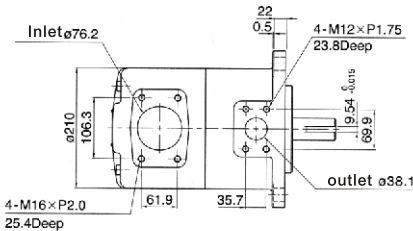
Power units related components

External dimensions

FPQ4 flange



FPQ4 foot



dim.	A	B
rod		
small	62.3	30.3
big	87.7	55.7

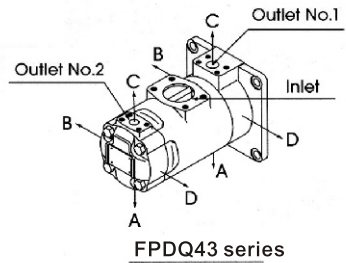
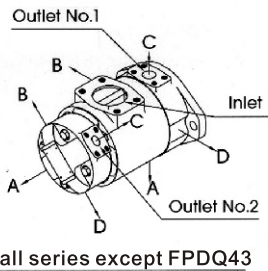
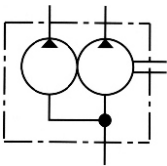
Power units related components

FPD(Q) Low pressure fixed dual vane pumps

FPD



FPDQ



■ features

- 1.FP/FP(Q)pumps provide 90% efficiency and 62db noise level under the 210bar working pressure.
- 2.Pumps with 12 pieces of vanes provides low noise ability.
- 3.There are 4 kinds of combinations for inlet and outlet positions that provide the flexibility of systems design.

FPD(Q) Low pressure fixed dual vane pumps

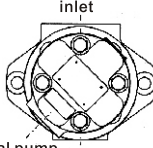
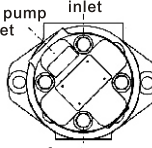
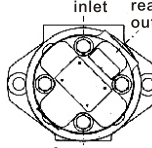
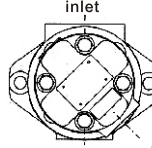
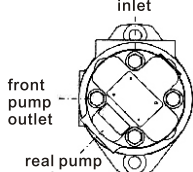
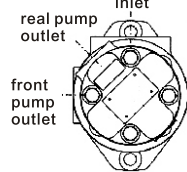
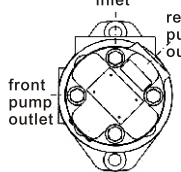
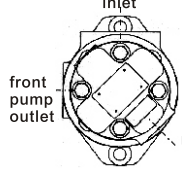
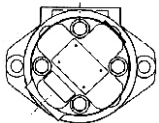
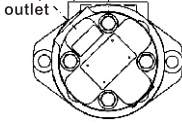
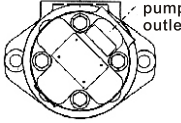
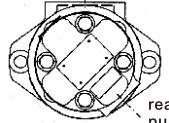
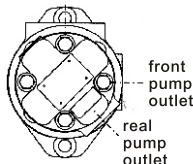
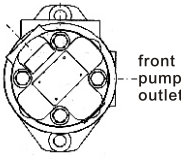
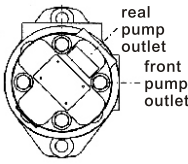
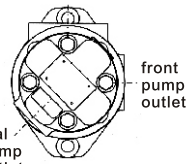
Specifications

body	front pump(rod end)		real pump(real cover)		max. rotation (r/min)	min. rotation (r/min)
	num.	max.pressure (bar)	num.	max.pressure (bar)		
FPD(Q)21 (front 2 real 1)	10	32.5	2	7.5	mineal oil = 138 soluble = 69 phosphated ester= 138	mineal oil =1800 soluble = 1200 phosphated ester = 1500
	12	38.3				
	14	43.3	3	10.2		
	15	46.7				
	17	52.5	4	12.8		
	19	59.2				
21	65.0	5	16.7			
25	78.6					
17	53.3			6	19.2	
21	66.7					
25	79.2					
30	95.0					
32	100	8	26.2			
35	109					
38	118	10	31.0			
42	134					
FPD(Q)31 (front 3 real 1)	30	96.0	11	35.0	mineal oil = 207 soluble = 69 phosphated ester = 157	
	35	109				
	38	128	12	37.9		
	42	134				
	50	156	14	44.2		
	60	189				
67	210	10	32.5			
75	236					
17	53.3			12	38.3	
21	66.7					
25	79.2			14	43.3	
30	95.0					
32	100	15	46.7			
35	109					
38	118	17	52.5			
42	134					
FPD(Q)32 (front 3 real 2)	30	96.0	19	59.2	mineal oil = 172 soluble = 69 phosphated ester = 157	
	35	109				
	38	128	21	65.0		
	42	134				
	50	156	25	78.6		
	60	189				
67	210	17	53.3			
75	236					
35	109			21	66.7	
38	128					
42	134			25	79.2	
50	156					
60	189	30	95.0			
67	210					
75	236	32	100			
35	109					
FPD(Q)41 (front 4 real 1)	38	118	35	109	mineal oil = 172 soluble = 69 phosphated ester = 157	
	42	134				
	30	96.0	38	118		
	35	109				
	38	128	42	134		
	42	134				
FPD(Q)42 (front 4 real 2)	30	96.0	42	134	mineal oil = 172 soluble = 69 phosphated ester = 157	
	35	109				
	38	128	42	134		
	42	134				
	50	156	42	134		
	60	189				
67	210	17	53.3			
75	236					
35	109			21	66.7	
38	128					
42	134			25	79.2	
50	156					
60	189	30	95.0			
67	210					
75	236	32	100			
35	109					
FPD(Q)43 (front 4 real 3)	38	118	35	109	mineal oil = 172 soluble = 69 phosphated ester = 157	
	42	134				
	30	96.0	38	118		
	35	109				
	38	128	42	134		
	42	134				

Power units related components

FPD Positions of inlet / outlet ports

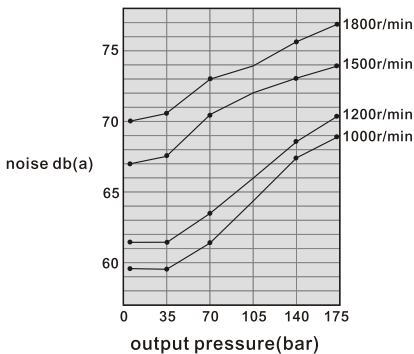
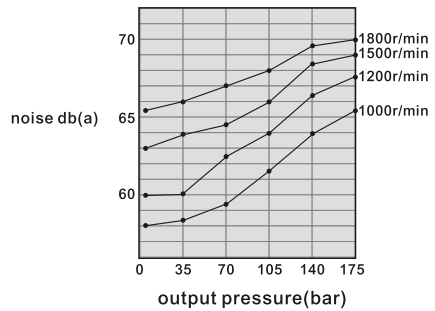
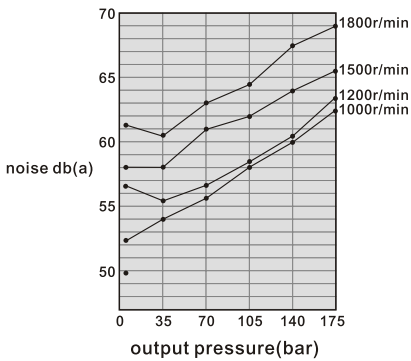
(view from real cover)

	AA	AB	AC	AD
opposite	 <p>real pump outlet has 135° counter clockwise different with inlet</p>	 <p>real pump outlet has 45° counter clockwise different with inlet</p>	 <p>real pump outlet has 45° clockwise different with inlet</p>	 <p>real pump outlet has 135° clockwise different with inlet</p>
counter clockwise 90°	 <p>real pump outlet has 135° counter clockwise different with inlet</p>	 <p>real pump outlet has 45° counter clockwise different with inlet</p>	 <p>real pump outlet has 45° clockwise different with inlet</p>	 <p>real pump outlet has 135° clockwise different with inlet</p>
same	 <p>real pump outlet has 135° counter clockwise different with inlet</p>	 <p>real pump outlet has 45° counter clockwise different with inlet</p>	 <p>real pump outlet has 45° clockwise different with inlet</p>	 <p>real pump outlet has 135° clockwise different with inlet</p>
clockwise 90°	 <p>real pump outlet has 135° counter clockwise different with inlet</p>	 <p>real pump outlet has 45° counter clockwise different with inlet</p>	 <p>real pump outlet has 45° clockwise different with inlet</p>	 <p>real pump outlet has 135° clockwise different with inlet</p>

FPD Weight table

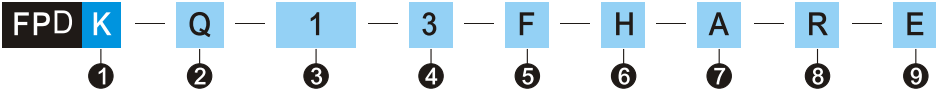
model	flange	foot	model	flange	foot
FPD21	31.5kg	41kg	FPDQ21	41kg	50.5kg
FPD31	46kg	55.5kg	FPDQ31	56kg	65.5kg
FPD32	48kg	57.5kg	FPDQ32	62kg	71.5kg
FPD41	74kg	99kg	FPDQ41	83kg	108kg
FPD42	80kg	105kg	FPDQ42	88kg	113kg
FPD43	88.5kg	113kg	FPDQ43	99kg	123kg

FDP Noise level



Power units related components

Order form



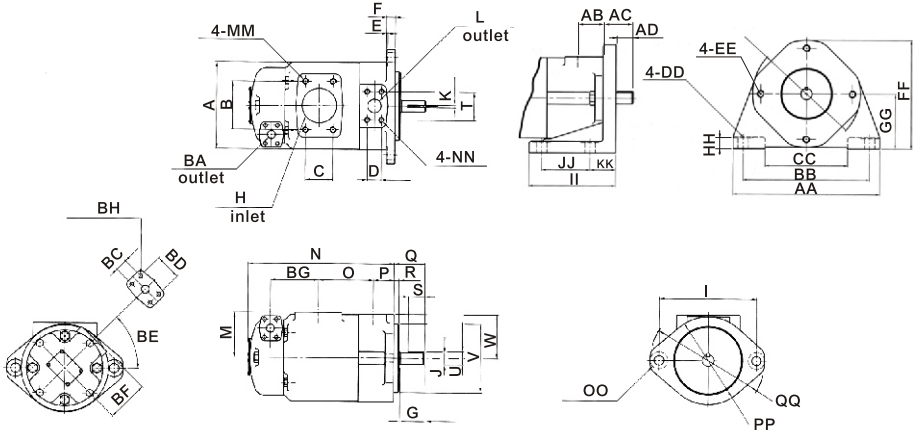
FPD : Low pressure fixed dual vane pumps		
①	demand	(1)space : finished product (2)K : kite sets
②	noise	(1)space : standard (2)Q : low noise
③	body	(1)1 : small (2)2 : middle (3)3 : large (4)4 : extra
④	front pump num.	seeP17.14 FP(Q) table in "num" e.g:2,3,4.....
⑤	realpump num.	seeP17.14 FP(Q) table in "num" e.g:2,3,4.....
⑥	mounting	(1)F : flange (2)L : foot
⑦	rod size	(1)H : heavy duty(bigger) (2)G : standard(smaller) note : (FP1 or FPQ1 uses standard)
⑧	inlet/outlet position	(1)A : opposite direction (2)B : 90°counter clockwise (3)C : same direction (4)D : clockwise(see P17.24)
⑨	rod rotating	(1)R : clockwise (2)L : counter clockwise (view from rod end)
⑩	oil	(1)space : mineral oil (2)E : soluble (3)G : phosphated ester

Power units related components

External dimensions

FPD21 / 31 / 32 flange

FPD21 / 31 / 32 foot



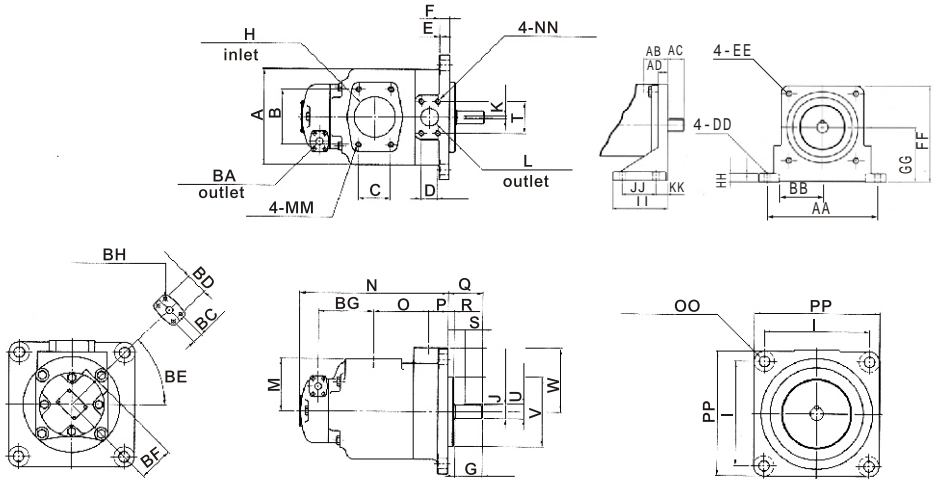
	A	B	C	D	E	F	G	H	I	J		K		L		
										small rod	big rod	small rod	big rod			
FPD21	φ 160	88.9	50.8	26.2	0.5	16	47.2	φ 63.5	181	φ 22.225 ⁰ _{-0.025}	φ 27 ⁰ _{-0.025}	4.775 ⁰ _{-0.012}	7.95 ⁰ _{-0.012}	φ 25.4		
FPD31	φ 181	106.3	61.9	30.1	0.5	16	61.8	φ 76.2	181	φ 31.75 ⁰ _{-0.025}	φ 34.9 ⁰ _{-0.025}	7.94 ⁰ _{-0.015}	7.94 ⁰ _{-0.012}	φ 31.8		
FPD32	φ 181	106.3	61.9	30.1	0.5	16	61.8	φ 76.2	181	φ 31.75 ⁰ _{-0.025}	φ 34.9 ⁰ _{-0.025}	7.94 ⁰ _{-0.015}	7.95 ⁰ _{-0.015}	φ 31.8		
	M	N	O	P	Q	R	S	T	U		V	W	AA	AB	AC	
									small rod	big rod					small rod	big rod
FPD21	70	269	101.6	38.1	58.7	9.5	31.8	52.4	24.465 ⁰ _{-0.13}	30.45 ⁰ _{-0.13}	φ 127.6 ⁰ _{-0.05}	81	278	38.1	58.7	73.2
FPD31	80	293	114.4	38.1	73.6	9.5	38.1	58.7	35.36 ⁰ _{-0.25}	38.56 ⁰ _{-0.25}	φ 127 ⁰ _{-0.05}	91.5	278	38.1	73.6	86.4
FPD32	90.5	310	114.4	38.1	73.6	9.5	38.1	58.7	35.36 ⁰ _{-0.025}	38.56 ⁰ _{-0.025}	φ 127 ⁰ _{-0.05}	91.5	278	38.1	73.6	86.4
	AD	BA	BB	BC	BD	BE	BF	BG	BH	CC	DD	EE	FF			
FPD21	26	φ 19.1	235	22.2	47.6	45°	76.2	88	M10×1.5×19.1	145	φ 17.5+φ 26 / 1d	M16	219			
FPD31	26	φ 19.1	235	22.2	47.6	45°	76.2	99.5	M10×1.5×19.1	145	φ 17.5+φ 26 / 1d	M16	219			
FPD32	26	φ 25.4	235	26.2	52.4	45°	80	109.5	M10×1.5×19.1	145	φ 17+φ 26 / 1d	M16	219			
	GG	HH	II	JJ	KK	OO	PP	QQ	MM	NN						
FPD21	109.5	23	131	76.2	39	φ 17.5+φ 32 / 0.5d	φ 162	φ 213	M12×P1.75×23.8d	M10×φ 1.5×19.1d						
FPD31	109.5	23	131	76.2	39	φ 17.5+φ 32 / 0.5d	φ 183	φ 213	M16×2.0×28.6d	M10×φ 1.5×21.6d						
FPD32	109.5	23	131	76.2	39	φ 17.5+φ 32 / 0.5d	φ 183	φ 213	M16×2.0×28.6d	M10×φ 1.5×21.6d						

Power units related components

External dimensions

FPD41 / 42 flange

FPD41 / 42 foot

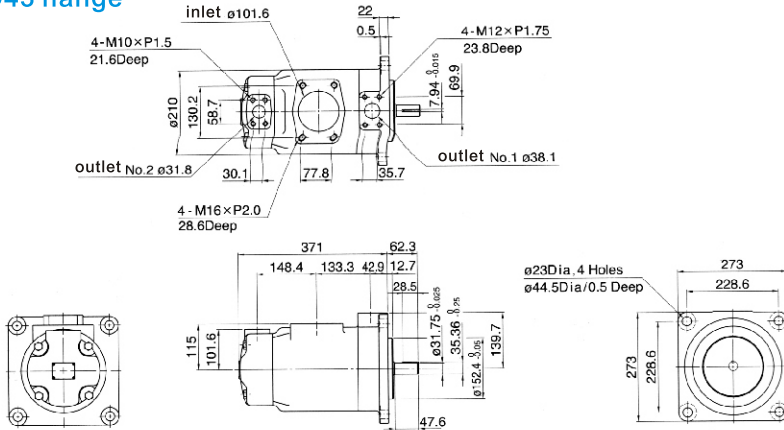


	A	B	C	D	E	F	G	H	I	J		K		L		
										small rod	big rod	small rod	big rod			
FPD41	ψ 210	120.7	69.9	35.7	0.5	22	73	ψ 88.9	228.6	ψ 31.75 ⁰ _{-0.025}	ψ 38.095 ⁰ _{-0.025}	7.94 ⁰ _{-0.015}	9.54 ⁰ _{-0.012}	ψ 38.1		
FPD42	ψ 210	120.7	69.9	35.7	0.5	22	73	ψ 88.9	228.6	ψ 31.75 ⁰ _{-0.025}	ψ 38.095 ⁰ _{-0.025}	7.94 ⁰ _{-0.015}	9.54 ⁰ _{-0.015}	ψ 31.8		
	M	N	O	P	Q	R	S	T	U		V	W	AA	AB	AC	
									small rod	big rod					small rod	big rod
FPD41	115	323	119.3	42.9	87.7	12.7	50.8	69.9	35.36 ⁰ _{-0.25}	42.38 ⁰ _{-0.25}	ψ 152.4 ⁰ _{-0.05}	139.7	374.6	42.9	62.3	87.7
FPD42	115	346	119.3	42.9	87.7	12.7	50.8	69.9	35.36 ⁰ _{-0.025}	42.38 ⁰ _{-0.025}	ψ 152.4 ⁰ _{-0.05}	139.7	374.6	42.9	62.3	87.7
	AD	BA	BB	BC	BD	BE	BF	BG	BH	DD	EE	FF				
FPD41	32	ψ 19.1	187.3	22.2	47.6	45°	76.2	119.9	M10×1.5×19.1	ψ 22 thru	M20	323.8				
FPD42	32	ψ 19.1	187.3	26.2	52.4	45°	80	135.8	M10×1.5×19.1	ψ 22 thru	M20	323.8				
	GG	HH	II	JJ	KK	OO	PP	MM	NN							
FPD41	187.3	30	185	114.3	7	ψ 23+44.5 / 0.5d	ψ 273	M16×2.0×31.8d	M12×1.75×23.8d							
FPD42	187.3	30	185	114.3	7	ψ 23+44.5 / 0.5d	ψ 273	M16×2.0×31.8d	M12×1.75×23.8d							

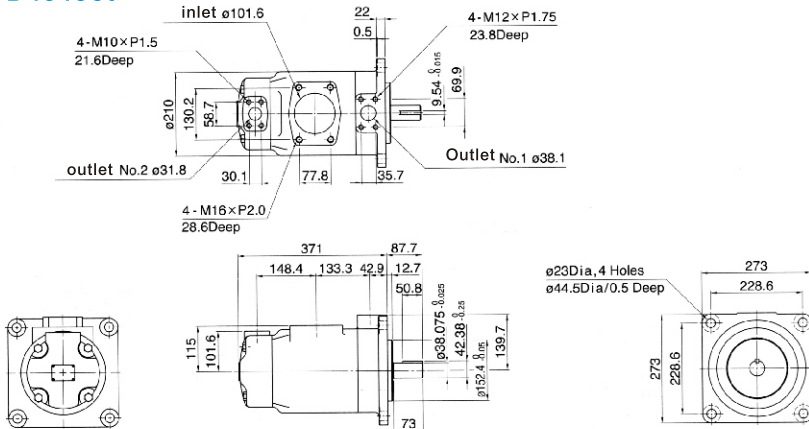
Power units related components

External dimensions

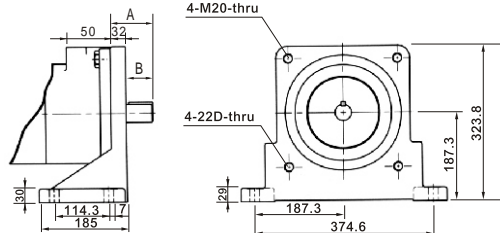
FPD43 flange



FPD43 foot



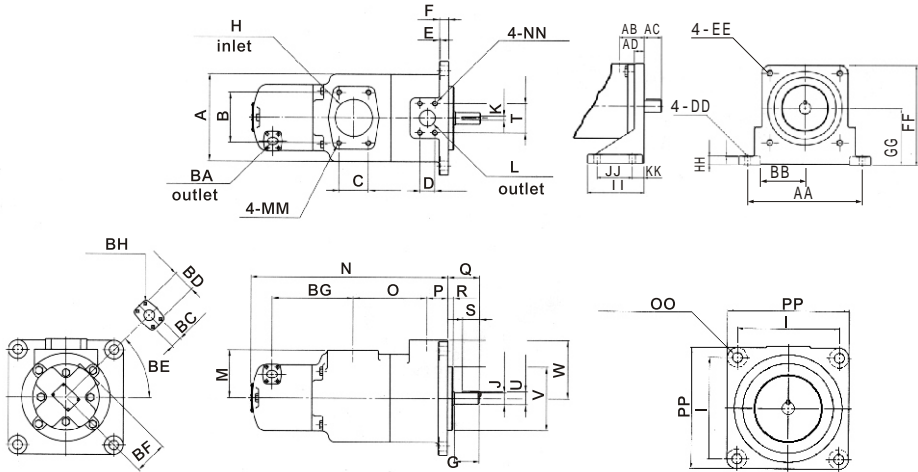
dim.	A	B
rod		
small	62.3	30.3
big	87.7	55.7



External dimensions

FPDQ41 / 42 flange

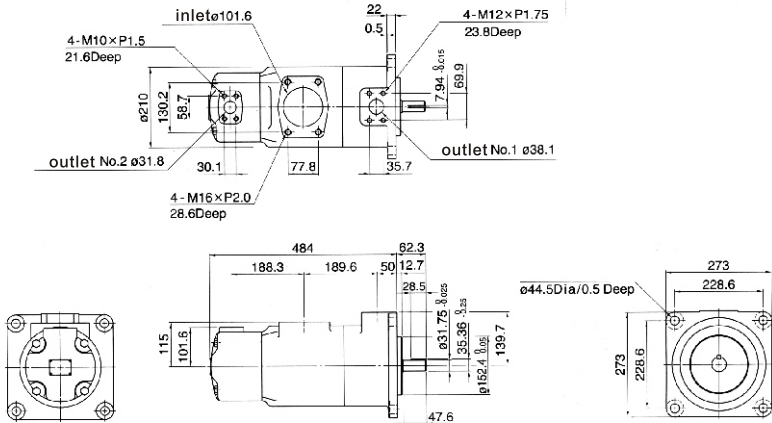
FPDQ41 / 42 foot



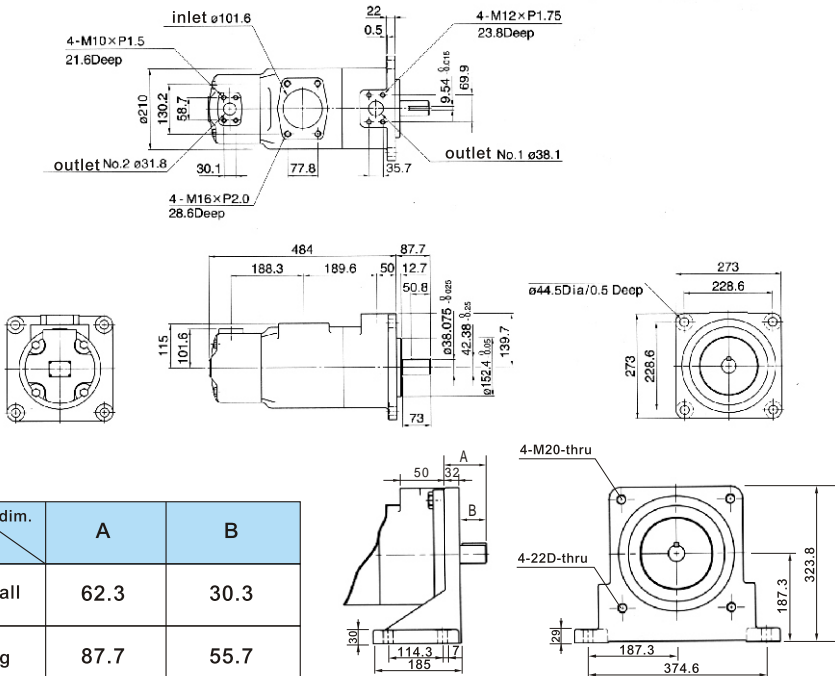
	A	B	C	D	E	F	G	H	I	J		K		L		
										small rod	big rod	small rod	big rod			
FPDQ41	φ210	120.7	69.9	35.7	0.5	22	73	φ88.9	228.6	φ31.75 ⁰ _{-0.025}	φ38.095 ⁰ _{-0.025}	7.94 ⁰ _{-0.015}	9.54 ⁰ _{-0.012}	φ38.1		
FPDQ42	φ210	120.7	69.9	35.7	0.5	22	73	φ88.9	228.6	φ31.75 ⁰ _{-0.025}	φ38.095 ⁰ _{-0.025}	7.94 ⁰ _{-0.015}	9.54 ⁰ _{-0.015}	φ31.8		
	M	N	O	P	Q	R	S	T	U		V	W	AA	AB	AC	
									small rod	big rod					small rod	big rod
FPDQ41	115	444	175.6	50	87.7	12.7	50.8	69.9	35.36 ⁰ _{-0.25}	42.38 ⁰ _{-0.25}	φ152.4 ⁰ _{-0.05}	139.7	374.6	42.9	62.3	87.7
FPDQ42	115	469	175.6	50	87.7	12.7	50.8	69.9	35.36 ⁰ _{-0.025}	42.38 ⁰ _{-0.025}	φ152.4 ⁰ _{-0.05}	139.7	374.6	42.9	62.3	87.7
	AD	BA	BB	BC	BD	BE	BF	BG	BH		DD		EE	FF		
FPDQ41	32	φ19.1	187.3	22.2	47.6	45°	76.2	137.7	M10×1.5×19.1		φ22 thru		M20	323.8		
FPDQ42	32	φ19.1	187.3	26.2	52.4	45°	80	190.8	M10×1.5×19.1		φ22 thru		M20	323.8		
	GG	HH	II	JJ	KK	OO		PP	MM		NN					
FPDQ41	187.3	30	185	114.3	7	φ23+44.5 / 0.5d		φ273	M16×2.0×31.8d		M12×1.75×23.8d					
FPDQ42	187.3	30	185	114.3	7	φ23+44.5 / 0.5d		φ273	M16×2.0×31.8d		M12×1.75×23.8d					

External dimensions

FPDQ43 flange



FPDQ43 foot



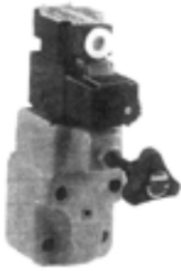






dim.	A	B
rod		
small	62.3	30.3
big	87.7	55.7

Index

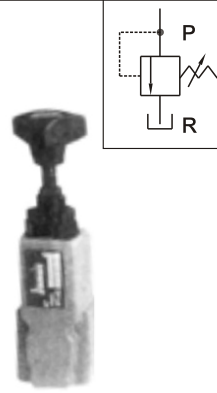
■ Pressure control valve

- DG / DT Direct relief valves.....P17.34
- BG / BT Pilot operated relief valves..... P17.35
- BSG / BST Solenoid operated relief valves.....P17.36
- R Pressure reducing valves / RC One way pressure reducing valves..... P17.38
- H Sequence valves / HC One way sequence valves..... P17.39
- PS Pressure switch..... P17.40
- BR Unloading valves..... P17.41

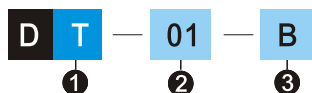
DG / DT	BG / BT	BSG / BST	R / RC
			
H / HC	PS	BR	
			

DG / DT Direct relief valves

Specifications

	mounting		pressure range (kgf/cm ²)	fixed volume (ℓ/min)	weight (kg)
	pipe	direct			
	DT-01	DG-01	(1)C : 10~70 (2)B : 35~140	2	1.0
DT-02	DG-02	(3)A : 70~210	16	1.6	


Order form



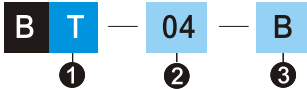
1	mounting	(1)DT : Pipe (2)DG : Direct
2	port	(1)01 : 1/8 (2)02 : 1/4
3	pressure range (kgf/cm ²)	(1)C : 10~70 (2)B : 35~140 (3)A : 70~210

BG / BT Pilot operated relief valves.

Specifications

	mounting		pressure range (kgf/cm ²)	fixed volume (ℓ/min)	weight (kg)
	pipe	direct			
	BT-04	—	(1)C : 10~70	100	2.4
	BT-06	—		200	4
	BT-10	—	(2)B : 35~140	400	7
	—	BG-03	(3)A : 70~250	100	—
	—	BG-06		200	7.6
—	BG-10	400		8.7	

Order form




1	mounting	(1)BT : Pipe (2)BG : Direct
2	port	(1)03 : 3/8 (2)04 : 1/2 (3)06 : 3/4 (4)10 : 1
3	pressure range (kgf/cm ²)	(1)C : 10~70 (2)B : 35~140 (3)A : 70~250

Power units related components

BSG / BST Solenoid operated relief valves

Specifications

	mounting		pressure range (kgf/cm ²)	fixed volume (ℓ/min)	weight(kg)	
	pipe	direct			one coil	two coils
	BST-03	BSG-03	(1)C : 7~70 (2)B : 35~140 (3)A : 70~250	100	7.5	—
	BST-06	BSG-06		200	8	10
BST-10	BSG-10	400		25	27	

Order form

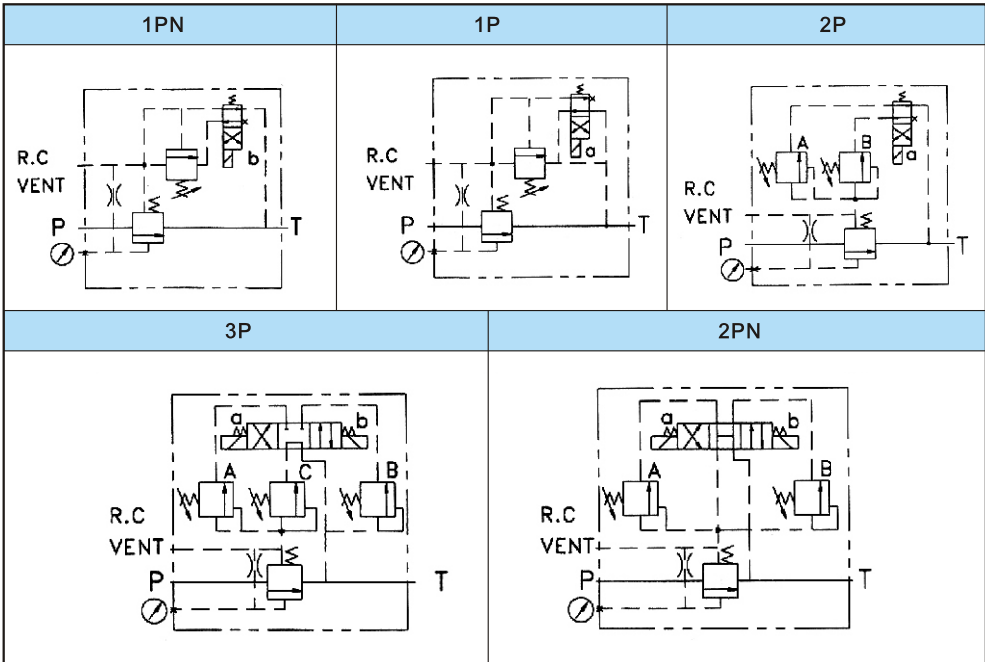
BS
T
—
06
—
1P
—
B
—
A1

1
2
3
4
5

BS : Solenoid operated relief valves

1	mounting	(1)BST : Pipe (2)BSG : Direct
2	port	(1)04 : 1/2 (2)06 : 3/4 (3)10 : 1
3	control	(1)1PN (2)1P (3)2P (4)2PN (5)3P (please see P17.37 circuits)
4	pressure range (kgf/cm ²)	(1)C : 7-70 (2)B : 35-140 (3)A : 70-250
5	voltage	(1)A1 : AC110V (2)A2 : AC220V (3)A3 : AC380V (4)D1 : DC12V (5)D2 : DC24V

Hydraulic control circuits




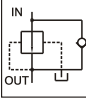


model	input signals		drain to	control	matched solenoid valve(see P17.43)
	magnet a	magnet b			
1PN	—	off	tank(no load)	N.O.	SVD-02-2B2
		on	prefill set pressure		
1P	off	—	prefill set pressure	N.C.	SVD-02-2B2 SVD-02-2B2B
	on		tank(no load)		
2P	off	—	to "A" port	2 steps	SVD-02-2B2
	on		to "B" port		
2PN	off	off	tank(no load)	2 steps+N.O.	SVD-02-3C3
	on	off	to "A" port		
	off	on	to "B" port		
3P	off	off	to "C" port	3 steps	SVD-02-3C6
	on	off	to "A" port		
	off	on	to "B" port		

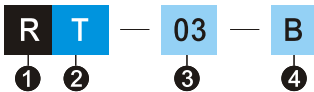
Power units related components

R Pressure reducing valves / RC One way pressure reducing valves

Specifications

R Pressure reducing valves 	IN OUT 	mounting		pressure range (kgf/cm ²)	fixed volume (ℓ/min)	drained volume (ℓ/min)	weight(kg)	
		pipe	direct				pipe	direct
		RT-03	RG-03	(1)B:7~70	50	0.8	4.3	4.5
		RCT-03	RCG-03				4.8	4.8
RC One way pressure reducing valves 	IN OUT 	RT-06	RG-06	(2)C:35~140	125	1.0	6.0	6.8
		RCT-06	RCG-06				7.8	7.8
		RT-10	RG-10	(3)H:70~210	250	1.2	12	16
		RCT-10	RCG-10				14.4	18.5

Order form

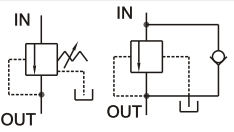



R Pressure reducing valves / RC One way pressure reducing valves

①	kind	(1)R : Pressure reducing valves(no check valve attached) (2)RC : One way pressure reducing valves(check valve attached)
②	mounting	(1)T : pipe (2)G : direct
③	port	(1)03 : 3/8 (2)06 : 3/4 (3)10 : 1
④	pressure range (kgf/cm ²)	(1)C : 7~70 (2)B : 35~140 (3)A : 70~210

H Sequence valves / HC One way sequence valves

Specifications

 H Sequence valves HC One way sequence valves	mounting		pressure range (kgf/cm ²)	fixed volume (l/min)	weight(kg)	
	pipe	direct			pipe	direct
	HT-03	HG-03	L : 3~5	50	3.7	4.0
	HCT-03	HCG-03	M : 5~9		4.1	4.8
	HT-06	HG-06	N : 9~18	125	6.2	6.1
	HCT-06	HCG-06	A : 18~35		7.1	7.4
	HT-10	HG-10	B : 35~70	250	12	11
	HCT-10	HCG-10	C : 70~140		13.8	13.8

Order form

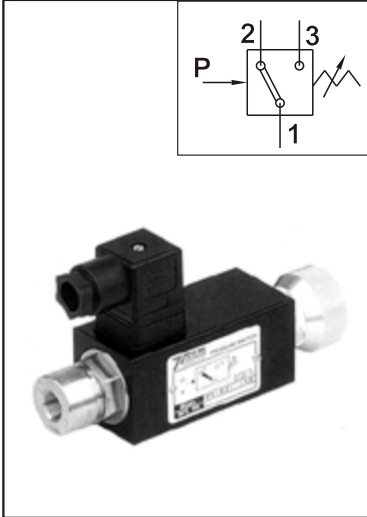


H Sequence valves / HC One way sequence valves		
1	kinds	(1)H : Sequence valves (no check valve attached) (2)HC : One way sequence valves(check valve attached)
2	mounting	(1)T : pipe (2)G : direct
3	port	(1)03 : 3/8 (2)06 : 3/4 (3)10 : 1
4	pressure range (kgf/cm ²)	(1)L : 3~5 (2)M : 5~9 (3)N : 9~18 (4)A : 18~35 (5)B : 35~70 (6)C : 70~140

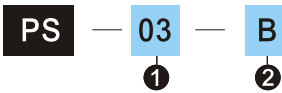
Power units related components

PS Pressure switch

Specifications

	port	pressure range (kgf/cm ²)	fixed volume (l/min)	weight (kg)
	PS-02	(1)C : 5~70	300	1
		(2)B : 20~150		
	PS-03	(3)A : 40~230		

Order form




Power units related components

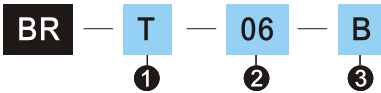
PS :Pressure switch		
①	port	(1)02 : 1/4 (2)03 : 3/8
②	pressure range (kgf/cm ²)	(1)C : 5~70 (2)B : 20~150 (3)A : 40~230

BR Unloading valves

Specifications

	mounting		pressure range (kgf/cm ²)	fixed volume (l/min)	weight (kg)
	pipe	direct			
	BRT-06	BRG-06	(1)C : 7~70	125	3.5
			(2)B : 35 ~ 140		
BRT-10	BRG-10	(3)A : 70 ~ 210	250		

Order form









BR : Unloading valves		
①	mounting	(1)BRT : Pipe (2)BRG : Direct
②	port	(1)06 : 3/4 (2)10 : 1
③	pressure range (kgf/cm ²)	(1)C : 7 ~ 70 (2)B : 35 ~ 140 (3)A : 70 ~ 210

Power units related components

Index

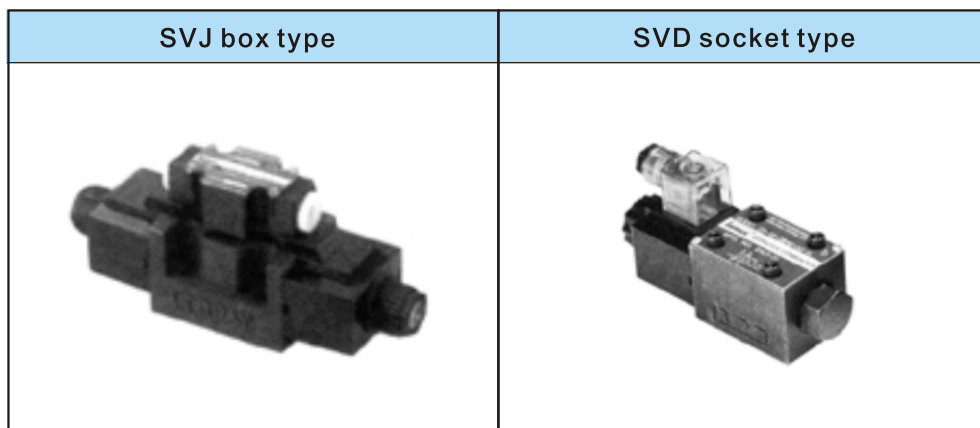
■ Directional control valves

- SVJ / SVD Solenoid valves(port 02 , 03)..... P17.43
- SPVJ / SPVD Pilot operated solenoid valves (port 04 , 06 ,10)..... P17.49
- DM / DR Manual valves..... P17.52
- CIT / CRG / CRNG Check valves..... P17.54
- CPD Pilot operated check valves..... P17.55
- SG Prefill valves..... P17.56

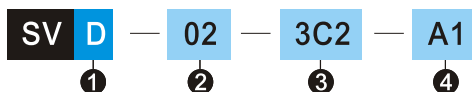
SVJ / SVD	SPVJ / SPVD	DR / DM	CIT / CRG
			
CPD	SG		
			

SVJ / SVD Solenoid valves(port 02 , 03).

port : 02 , 03



Order form



SVJ / SVD : Solenoid valves				
①	kind	(1)J : box type(JIS spec.) (2)D : socket type (DIN spec.)		
②	port(pt)	(1)02 : NG6 (2)03 : 1NG10		
③	spool position	(see P17.42"SV spool positions")		
④	voltage	A.C. (1)A1 : AC110V (2)A2 : AC220V (3)A3 : AC380V	D.C. (4)D1 : DC12V (5)D2 : DC24V	R.F. (6)R1 : RF110V (7)R2 : RF220V

Power units related components

SV Spool positions

SPRING OFFSET 2 POSITION	GRAPHIC SYMBOLS	SPRING OFFSET 3 POSITION	GRAPHIC SYMBOLS	SPRING OFFSET 2 POSITION	GRAPHIC SYMBOLS
	STANDARD		STANDARD		STANDARD
2A2		3C2		2D2	
2A3		3C3		2D3	
2A14		3C4		2D4	
2A2L		3C40		2D40	
2A3L		3C5		2D7	
2A14L		3C6		2D2A	
2B2		3C60		2D3A	
2B3		3C7		2D4A	
2B8		3C8		2D40A	
2B29		3C9		2D5A	
2B2L		3C10		2D6A	
2B3L		3C11		2D60A	
2B8L		3C12		2D7A	
2B29L		3C25		2D9A	
		3C29		2D10A	
		3C48		2D11A	
		3C94		2D12A	

SV Pool positions

SPRING OFFSET 2 POSITION	GRAPHIC SYMBOLS		SPRING OFFSET 2 POSITION	GRAPHIC SYMBOLS	
	STANDARD	ALXTERNATED		STANDARD	ALXTERNATED
2B2A			2B2B		
2B3A			2B3B		
2B4A			2B4B		
2B40A			2B40B		
2B5A			2B5B		
2B6A			2B6B		
2B60A			2B60B		
2B7A			2B7B		
2B8A			2B8B		
2B9A			2B9B		
2B10A			2B10B		
2B11A			2B11B		
2B12A			2B12B		
2B25A			2B25B		
2B29A			2B29B		
2B48A			2B48B		

Power units related components

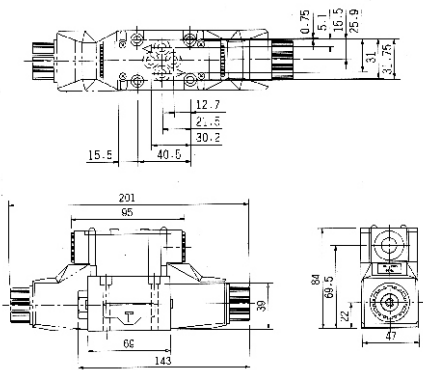
Coil specifications

spec.	current	model	frequency (hz)	voltage(V)		current & power			
				fixed voltage	range	start current	holding current	power (W)	
02 (NG6)	A.C.	A110	50	100	90-110	4.79	0.86	32	
			60	100	90-115	3.71	0.62		
				110	99-126	4.20	0.74		
		A120	50	110	99-121	4.29	0.78		
			60	120	108-138	3.99	0.70		
		A220	50	200	180-220	2.31	0.42		
			60	200	180-220	1.87	0.31		
				220	198-253	2.05	0.36		
		A240	50	220	198-242	2.04	0.37		
			60	240	216-274	1.88	0.33		
		R.F.	R110	50	100	90-115	0.47		0.47
				60	110	99-126	0.47		0.47
	R220		50	200	180-220	0.24	0.24		
			60	220	198-253	0.24	0.24		
D.C.	D12	12		10.8-13.2	2.58	2.58			
	D24	24		21.6-26.4	1.33	1.33			
03 (NG10)	A.C.	A110	50	100	90-110	1.60	0.46	26	
			60	100	90-115	1.40	0.32		
				110	99-126	1.50	0.39		
		A120	50	110	99-121	1.30	0.38		
			60	120	108-138	1.20	0.27		
		A220	50	200	180-220	0.80	0.23		
			60	200	180-220	0.70	0.16		
				220	198-242	0.75	0.19		
		A240	50	220	198-242	0.67	0.19		
			60	240	216-274	0.59	0.13		
		R.F.	R110	50	100	98-115	0.30		0.44
				60	110	99-126	0.30		0.30
	R220		50	200	180-220	0.15	0.19		
			60	220	198-253	0.15	0.13		
	D.C.	D12	12		10.8-13.2	2.20	2.20		
		D24	24		21.6-26.4	1.10	1.10		

Power units related components

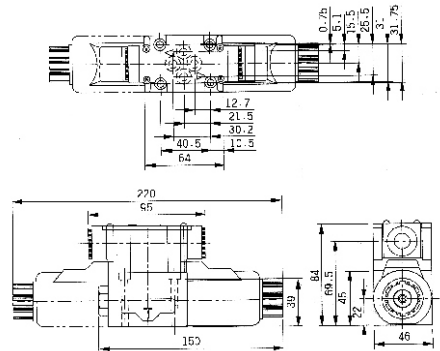
External dimensions

SVJ-02(A.C.)



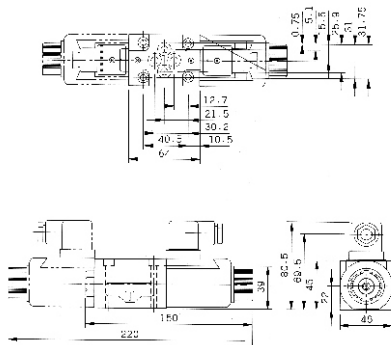
weight single 1.38kg / dual 1.8kg

SVJ-02(D.C.)



weight single 1.45kg / dual 2.01kg

SVD-02(R.F.)



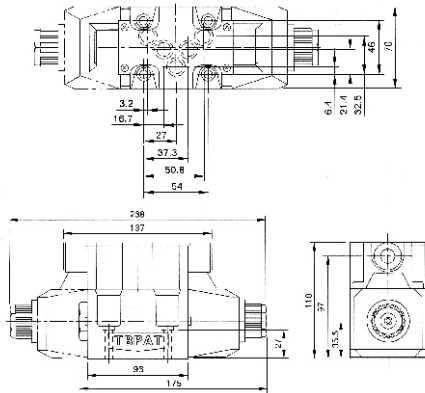
weight single 1.37kg / dual 1.88kg

note :

1. Valves are better mounted in horizontal position.
2. Mounting surfaces should keep 3.2Z smoothness.
3. R port should not be blocked to reduce the efficiency.
4. A COM wire is attached for box type coils. No wire is needed again to be attached onto the box.

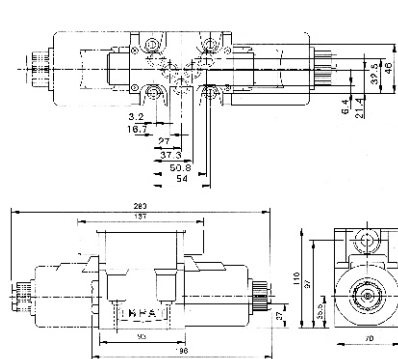
External dimensions

SVJ-03(A.C.)



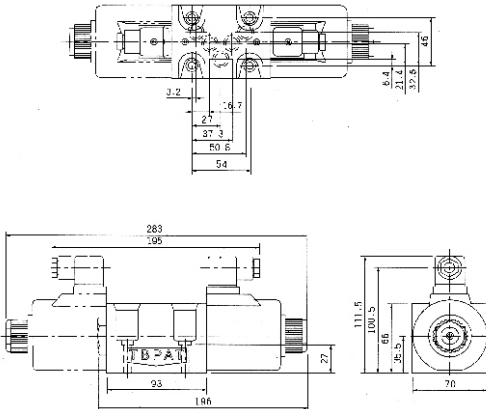
weight single 3.4kg / dual 4.2kg

SVJ-03(D.C.)



weight single 4kg / dual 5.4kg

SVD-03(R.F.)



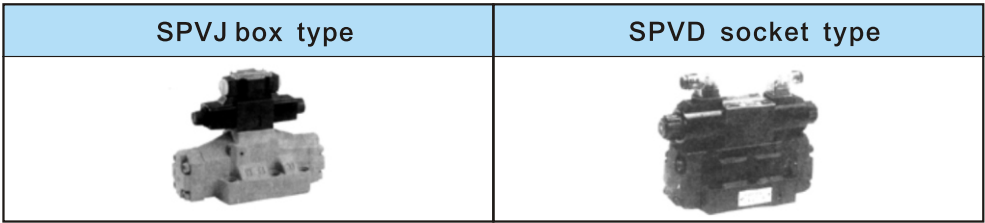
weight single 3.87kg / dual 5.19kg

note :

1. Valves are better mounted in horizontal position.
2. Mounting surfaces should keep 3.2Z smoothness.
3. R port should not be blocked to reduce the efficiency.
4. A COM wire is attached for box type coils. No wire is needed again to be attached onto the box.

PVJ / SPVD Pilot operated solenoid valves

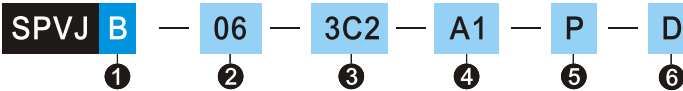
ports : 04 , 06 , 10 , 16



Specifications

model	max.pressure (kgf/cm ²)	max.volume (ℓ/min)	fixed volume (ℓ/min)	allowed back pressure (kgf/cm ²)	max. on / off times	weight(kg)
SPVJ-04	250	200	120	140	120	8.2
-06		300	180			13.7
-10		500	300			39.7

Order form



SPVJ / SPVD : Pilot operated solenoid valve																																																																																						
①	kind (1)SPVJ : Box type(JIS spec.) (2)SPVD : Socket type(DIN spec.)																																																																																					
②	<table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="2">04</td> <td colspan="2">06</td> <td colspan="2">10</td> </tr> <tr> <td colspan="2">16mm bore</td> <td colspan="2">20mm bore</td> <td colspan="2">32mm bore</td> </tr> </table>	04		06		10		16mm bore		20mm bore		32mm bore																																																																										
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③	<table border="1" style="width: 100%; text-align: center;"> <tr> <td rowspan="3" style="vertical-align: middle;">spool position (see P17.45 & P17.46 table)</td> <td colspan="6">dual coils</td> <td colspan="4">single coils</td> </tr> <tr> <td colspan="3">3 position</td> <td colspan="3">2 position</td> <td colspan="2">3 position</td> <td colspan="2">2 position</td> </tr> <tr> <td>3C2</td><td>3C5</td><td>3C9</td> <td>2D2</td><td>2D2A</td><td>2D5A</td> <td>2B2A</td><td>2B7A</td><td colspan="2">2B2B</td> </tr> <tr> <td></td><td>3C60</td><td>3C10</td> <td>2D3</td><td>2D3A</td><td>2D7A</td> <td>2B3A</td><td>2B8A</td><td colspan="2">2B3B</td> </tr> <tr> <td></td><td>3C3</td><td>3C7</td><td>3C11</td> <td>2D7</td><td>2D4A</td><td>2D9A</td> <td>2B4A</td><td>2B9A</td><td colspan="2">2B4B</td> </tr> <tr> <td></td><td>3C4</td><td>3C8</td><td>3C12</td> <td>2D8</td><td>2D40A</td><td>2D10A</td> <td>2B40A</td><td>2B10A</td><td colspan="2">2B40B</td> </tr> <tr> <td></td><td>3C40</td><td></td><td></td> <td></td><td>2D11A</td><td>2D12A</td> <td>2B5A</td><td>2B11A</td><td colspan="2"></td> </tr> <tr> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td> <td>2B60A</td><td>2B12A</td><td colspan="2"></td> </tr> </table>	spool position (see P17.45 & P17.46 table)	dual coils						single coils				3 position			2 position			3 position		2 position		3C2	3C5	3C9	2D2	2D2A	2D5A	2B2A	2B7A	2B2B			3C60	3C10	2D3	2D3A	2D7A	2B3A	2B8A	2B3B			3C3	3C7	3C11	2D7	2D4A	2D9A	2B4A	2B9A	2B4B			3C4	3C8	3C12	2D8	2D40A	2D10A	2B40A	2B10A	2B40B			3C40				2D11A	2D12A	2B5A	2B11A										2B60A	2B12A		
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	3 position			2 position			3 position		2 position																																																																													
	3C2	3C5	3C9	2D2	2D2A	2D5A	2B2A	2B7A	2B2B																																																																													
	3C60	3C10	2D3	2D3A	2D7A	2B3A	2B8A	2B3B																																																																														
	3C3	3C7	3C11	2D7	2D4A	2D9A	2B4A	2B9A	2B4B																																																																													
	3C4	3C8	3C12	2D8	2D40A	2D10A	2B40A	2B10A	2B40B																																																																													
	3C40				2D11A	2D12A	2B5A	2B11A																																																																														
							2B60A	2B12A																																																																														
④	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;">D.C. (1)A1 : AC110V (2)A2 : AC220V (3)A3 : AC380V</td> <td style="width: 50%;">A.C. (4)D1 : DC12V (5)D2 : DC24V</td> </tr> </table>	D.C. (1)A1 : AC110V (2)A2 : AC220V (3)A3 : AC380V	A.C. (4)D1 : DC12V (5)D2 : DC24V																																																																																			
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⑤	(1)P : external (2)space : no																																																																																					
⑥	(1)D : external (2)space : no																																																																																					

Power units related components

Spool positions

dual & 3 position	symbol	dual & 2 position	symbol	dual & 2 position	symbol
	spool position		spool position		spool position
3C2		2D2		2D2A	
3C3		2D3		2D3A	
3C4		2D7		2D4A	
3C40		2D8		2D40A	
3C5		single & 2 position	symbol	2D5A	
3C60				2D7A	
3C7				2D9A	
3C8		2B2		2D10A	
3C9		2B3		2D11A	
3C10		2B8		2D12A	
3C11					
3C12					


Spool positions

single & 2 position	symbol		single & 2 position	symbol	
	spool position			spool position	
	standard	alternated		standard	alternated
2B2A			2B2B		
2B3A			2B3B		
2B4A			2B4B		
2B40A			2B40B		
2B5A			2B5B		
2B60A			2B60B		
2B7A			2B7B		
2B8A			2B8B		
2B9A			2B9B		
2B10A			2B10B		
2B11A			2B11B		
2B12A			2B12B		

DM / DR Manual valves



Specifications

model	port(PT)	max.volume (ℓ/min)	max.pressure (kgf/cm ²)	allowed back pressure (kgf/cm ²)	weight (kg)	symbol
DM-03	3/8	50	fixed volume (ℓ/min) 250	100	4.0	
-04	1/2	100		140	7.6	
-06	3/4	180			22	13
-10	1	300		20		3.4
DR-03	3/8	50	70	20	3.4	


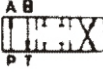











Order form

DM **T** — **03** — **3C2** — **W**

① ② ③ ④ ⑤

①	kind	(1)DM : front / real (2)DR : left / right
②	mounting	(1)T : pipe (2)G : direct
③	port(PT)	(1)03 : 3/8" (2)04 : 1/2" (3)06 : 3/4" (4)10 : 1"
④	spool position	see P17.50
⑤	return	(1)W : spring(2 pos.) (2)O : steel ball(3 pos.)


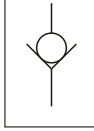
Spool positions

kind	model	symbol	kind	model	symbol
3 position	3C2		2 position	2B2	
	3C3				
	3C4				
	3C40			2B3	
	3C5				
	3C6				
	3C60				
	3C9				
	3C12				
3C11		2B8			

Power units related components

CIT / CRG / CRNG Check valves

Specifications

		type		fixed volume (l/min)	max. pressure (kgf/cm ²)	cracking pressure (kgf/cm ²)	weight(kg)		
		JIS mount	ISO mount						
		CRG-03	CRNG-03	40	250	(1)A1 : 0.5 (2)A2 : 4.5 (3)A3 : 8	2	2.4	
		CRG-06	CRNG-06	125			4.4	4.2	
		CRG-10	CRNG-10	250			8.5	7.8	
		direct							
		CIT-03		40	350			0.31	
		-04		60			0.48		
		-06		100			1.07		
		-08		150			1.75		
		-10		200			1.75		
				-12	250			2.6	
				-16			3.35		


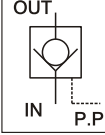
Order form

CIT — **03** — **A1**
 ① — ② — ③

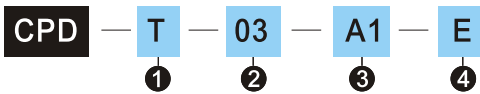
①	kind	(1)CIT : Direct (2)CRG : JIS mount (3)CRNG : ISO mount
②	port(pt)	(1)03 : 3/8PT (2)04 : 1/2PT (3)06 : 3/4PT (4)08 : 1PT (5)10 : 1 1/4PT (6)12 : 1 1/2PT (7)16 : 2PT
③	cracking pressure (kgf/cm ²)	(1)A1 : 0.5 (2)A2 : 4.5 (3)A3 : 8

CPD Pilot operated check valves

Specifications

		type	fixed volume (ℓ/min)	max. pressure (kgf/cm ²)	cracking pressure (kgf/cm ²)	weight(kg)			
						pipe(T)	direct(G.F)		
		CPD-03	50			250	(1)A1 : 0.5	3.4	4.5
		-04	75			(2)A2 : 4.5	3.4	—	
		-06	125			(3)A3 : 0.35	5.2	7	
		-10	320			11.6	12		
-10A	400	24.2	—						

Order form



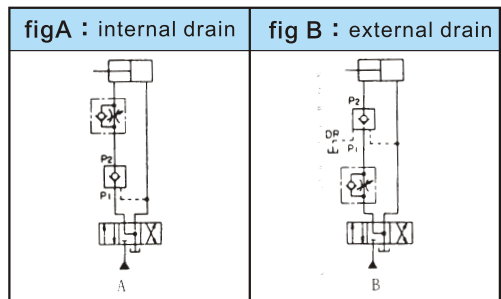
CPD : Pilot operated check valves		
①	mounting	(1)T : Pipe (2)G : Direct (3)F : Flange
②	port(pt)	(1)03 : 3/8PT (2)04 : 1/2PT (3)06 : 3/4PT (4)10 : 1 1/4PT
③	cracking pressure (kgf/cm ²)	(1)A1 : 0.5 (2)A2 : 4.5 (3)A3 : 0.35
④	drain control	(1)E : internal drain (2)ET : external drain

Use of drain control

.Internal drain is used when the P1 port has a flow directly back to the tank.

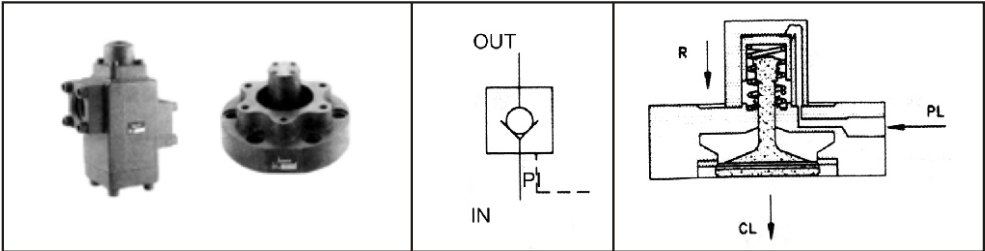
(fig.A)

.external drain is used when a back pressure occurred at P1 port(fig.B)



Power units related components

SGPrefill valves



Specifications

model	max. volume (ℓ/min)	max. pressure (kgf/cm ²)	cracking pressure (kgf/cm ²)	fixed volume (ℓ/min)		used volume (ℓ/min)		weight (kg)
				vacuum	PL	vacuum	PL	
SGN-24	400	250	0.12	—	—	—	—	2.8
-28	630							3.8
-32	1000							6
-40	1600							10.8
-48	2500		0.13	23.5				
SG/SLG-16	—	250	0.12	260	400	260±100M	400±100M	31.2
-24			0.14	600	900	600±150M	900±150M	55
-32			0.16	1100	1600	1100±300M	1600±300M	100
-48				2200	3200	2200±600M	3200±600M	240

Order form



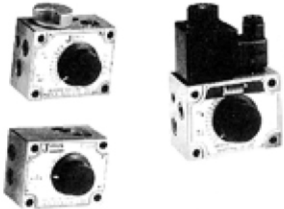
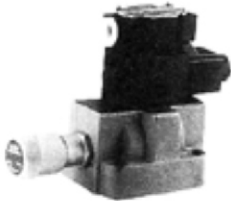

SG — **24**
 ① ②

SG : Prefill valve		
①	type	(1)SGN : direct (2)SG : inlet / outlet180° (3)SLG : inlet / outlet 90°
②	port	(1)16 : 2" (3)28 : 3 1/2" (5)40 : 5" (2)24 : 3" (4)32 : 4" (6)48 : 6"

Index

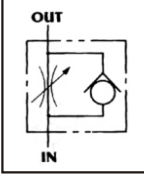

■ Flow control valves

- K / KC Throttle check valves.....P17.58
- SR / SRC Throttle valves.....P17.59
- FC Speed regulators..... P17.60
- SF Solenoid speed regulators.....P17.61
- MFSC Modular flow solenoid valves.....P17.62

K / KC	SR / SRC	FC
		
SF	MFSC	
		

K / KC Throttle check valves

Specifications

 	type		max. pressure (kgf/cm ²)	fixed volume (ℓ/min)	weight (kg)
	dual ways	one way			
	K-02	KC-02	K / KC : 350 KCF : 250	20	0.26
	-03	-03		30	0.34
	-04	-04		40	0.55
-06	-06	60		0.79	


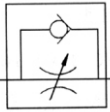

Order form

K — **F** — **02**
 ① ② ③

①	kind	(1)K : dual ways (2)KC : one way
②	body material	(1)space : Steel (2)F : Brone
③	port(PT)	(1)02 : 1/4 (2)03 : 3/8 (3)04 : 1/2 (4)06 : 3/4

SR / SRC Throttle valves

Specifications

 	type		max. pressure (kgf/cm ²)	fixed volume (ℓ/min)	weight (kg)	
	pipe(T)	direct(G)			pipe(T)	direct(G)
	SR T-03	SR G-03	250	30	1.4	1.5
	-06	-06		85	1.5	2
	-10	-10		230	2.6	2.7
	SRCT-03	SRCG-03		30	3.5	4.4
	-06	-06		85	6.1	5.2
	-10	-10		230	7.4	8.1

Order form

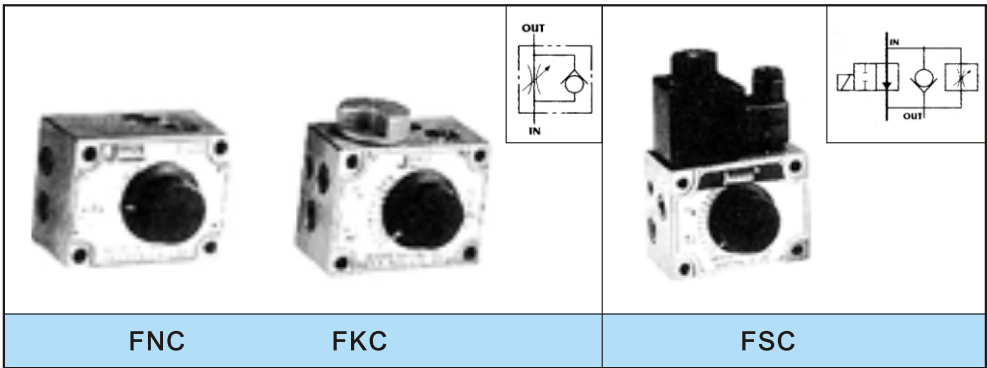
SR
T
—
03

1
2
3

1	kind	(1)SR : dual ways (2)SRC : one way
2	mounting	(1)T : pipe (2)G : direct
3	port(PT)	(1)03 : 3/8 (2)06 : 3/4 (3)10 : 1

Power units related components

FC Speed regulators



Specifications

type			max. pressure (kgf/cm ²)	max. volume (ℓ/min)	volume range (ℓ/min)	weight(kg)		
stick	flat	solenoid				stick	flat	solenoid
FKC-02	FNC-02	FSC-02	70	20	(1)2 : 0.05~2	1.2	1.2	1.2
-03	-03	-03		30	(2)4 : 0.05~4	2	2	2.6


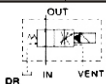
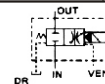
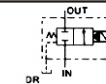
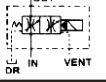
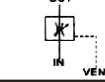
Order form

FC — **02**
 ① ②

①	kind	(1)FKC : stick (2)FNC : flat (3)FSC : solenoid
②	port(PT)	(1)02:1/4 (2)03 : 3/8

SF Solenoid speed regulators

Specifications

	type	max.pressure (kgf/cm ²)	max.volume (ℓ/min)	weight (kg)	solenoid
	SF-06	210	120	6.4	SVD-02-2B2
	SDF-06			6.4	SVD-02-2B2
	SFD-06			5	—
	SD-06			6.1	SVD-02-2B2
	SKF-06			7.7	—
	SF-10	210	240	9.9	SVD-02-3C4
	SDF-10			9.9	SVD-02-2B2
	SFD-10			8.4	SVD-02-2B2
	SD-10			9.4	SVD-02-2B2
SF		SDF		SD	
SKF		SFD			

Order form

SF — 06 — A1
1 2 3

1	kind	(1)S F : normal open until solenoid is activated to control flow from slow to high speed. (2)SDF : normal close until solenoid is activated to control flow from slow to high speed. (3)SKF : 3 stage control for slow→high→quick speed application (4)SFD : 2 stage control for slow→high speed application. (5)S D : normal close until solenoid is activated to cause flow normally open.		
2	port(PT)	(1)06 :3/4	(2)10 : 1	
3	voltage	A.C. (1)A1 : AC110V (2)A2 : AC220V	D.C. (3)D1 : DC12V (4)D2 : DC24V	R.F. (5)R1 : RF110V (6)R2 : RF220V

Power units related components

MFSC Modular flow solenoid valves



Specifications

type	max.pressure (kgf/cm ²)	max.volume (ℓ/min)	volume vange (ℓ/min)	weight (kg)
MFSC-02	70	0.01-6	30	2
-03		0.01-8	60	4.4

Order form

MFSC — 02 — A1
 ① ②









Power units related components

MFSC : Modular flow solenoid valves		
①	port(PT)	(1)02 : 1/4 (2)03 : 3/8
②	voltage	A.D. (1)A1 : AC110V (2)A2 : AC220V (3)A3 : AC380V D.C. (1)D1 : DC110V (2)D2 : DC220V

Index


■ Modual valves

- CV Modular check valves..... P17.64
- PCV Modular pilot operated check valves.....P17.65
- RV Modular prefill valves.....P17.66
- BRV Modular reducing valves.....P17.67
- SVC Modular sequence valves.....P17.68
- SHV Modular balance valves.....P17.69
- TV Modular throttle valves.....P17.70
- TVC Modular throttle check valves.....P17.71

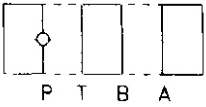
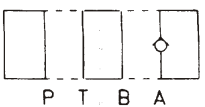
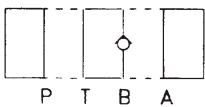
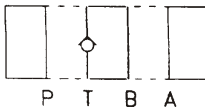

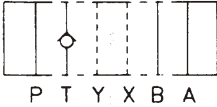
CV	PCV	RV	BRV
			
SVC	SHV	TV	TVC
			

Power units related components

CV : Modular check valves

	type	control	max.pressure (kgf/cm ²)	fixed volume (l/min)	cracking pressure (kgf/cm ²)
	CV-P	P port	250	02 : 40	A : 0.5
	-A	A port		03 : 80	B : 3.5
	-B	B port		06 : 190	C : 4.6
-T	T port				

Symbol

CVP-02/03	CVA-02/03	CVB-02/03	CVT-02/03
			
CVP-06	CVT-06		
			

Order form




Power units related components

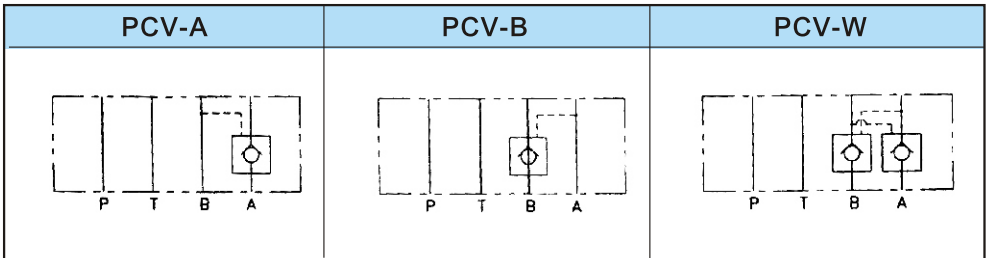
CV : Modular check valves				
①	control	(1) P : P (2) A : A	(3) B : B (4) T : outlet	
②	port(PT)	(1)02 : 1/4	(2)03 : 3/8	(3)06 : 3/4
③	cracking pressure (kgf/cm ²)	(1)A : 0.5	(2)B : 3.5	(3)C : 4.6

PCV Modular pilot operated check valves

Specifications

	type	control	max.pressure (kgf/cm ²)	fixed volume (ℓ/min)	cracking pressure (kgf/cm ²)
	PCV-W	A / B port	250	02 : 40	A : 0.5
	-A	A port		03 : 80	B : 3.5
	-B	B port		06 : 190	C : 4.6

Symbol



Order form




PCV : Modular pilot operated check valves		
①	control	(1)W : A / B (2)A : A (3)B : B
②	port(PT)	(1)02 : 1/4 (2)03 : 3/8 (3)06 : 3/4
③	cracking pressure (kgf/cm ²)	(1)A : 0.5 (2)B : 3.5 (3)C : 4.6

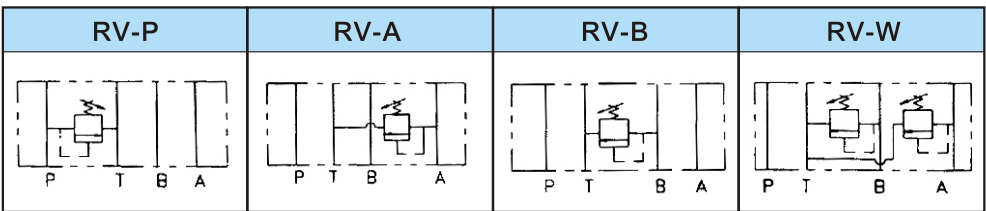
Power units related components

RV Modular prefill valves

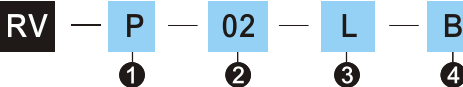
Specifications

	type	control	max.pressure (kgf/cm ²)	fixed volume (ℓ/min)	pressure rounge (kgf/cm ²)
	RV-W	A / B port	210	02 : 40 03 : 80 06 : 190	B : 8-70 C : 35-140 H : 70-210
	-A	A port			
	-B	B port			
	-P	P port			

Symbol



Order form

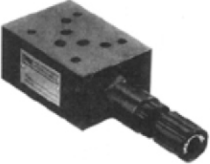


PCV : Modular prefill valves

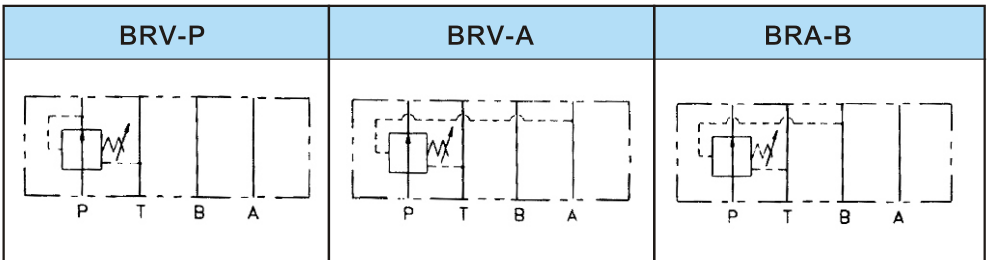
①	control	(1)W : A / B (2)A : A (3)B : B (4)P : P
②	port(pt)	(1)02 : 1/4 (2)03 : 3/8 (3)06 : 3/4
③	turning	(1)space : no tunning knob (2)L : with tunning knob
④	pressure range	(1)B : 8-70 (2)C : 35-140 (3)H : 70-210

BRV Modular reducing valves

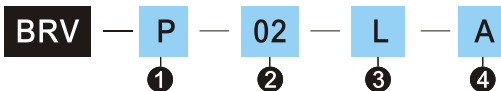
Specifications

	type	control	max.pressure (kgf/cm ²)	fixed volume (l/min)	pressure range (kgf/cm ²)
	BRV-P	P	210	02 : 40 03 : 80 06 : 190	A : 3-35 B : 8-70 C : 35-140 H : 105-210
	-A	A			
-B	B				

Symbol



Order form




BRV : Modular reducing valves		
①	control	(1)P : P (2)A : A (3)B : B
②	port(pt)	(1)02 : 1/4 (2)03 : 3/8 (3)06 : 3/4
③	tunning	(1)space : no tunning knob (2)L : with tunning knob
④	pressure range	(1)A : 3-35 (2)B : 8-70 (3)C : 35-140 (4)H : 105-210

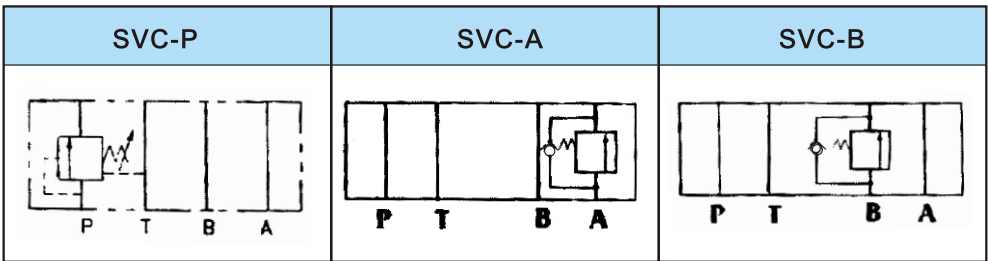
Power units related components

SVC Modular sequence valves

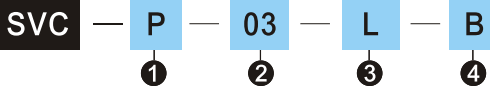
Specifications

	type	control	max.pressure (kgf/cm ²)	fixed volume (l/min)	pressure range (kgf/cm ²)
	SVC-P	P	210	02 : 40 03 : 80	B : 8-70 C : 35-140 H : 105-210
	-A	A			
-B	B				

Symbol



Order form




SVC : Modular sequence valves

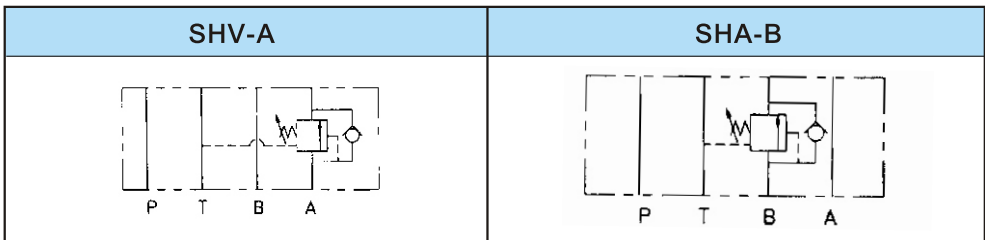
①	control	(1)P : P (2)A : A (3)B : B
②	port(pt)	(1)02 : 1/4 (2)03 : 3/8
③	tunning	(1)space : no tunning knob (2)L : with tunning knob
④	pressure range	(1)B : 8-70 (2)C : 35-140 (3)H : 105-210

SHV Modular balance valves

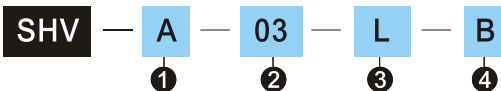
Specifications

	type	control	max.pressure (kgf/cm ²)	fixed volume (l/min)	pressure range (kgf/cm ²)
	SHV-A	A	210	02:40 03:80	B:8-70 C:35-140 H:105-210
	-B	B			

Symbol



Order form




SVC : Modular balance valves		
1	control	(1)A : A (2)B : B
2	port(pt)	(1)02 : 1/4 (2)03 : 3/8
3	tunning	(1)space : no tunning knob (2)L : with tunning knob
4	pressure range	(1)B : 8-70 (2)C : 35-140 (3)H : 105-210

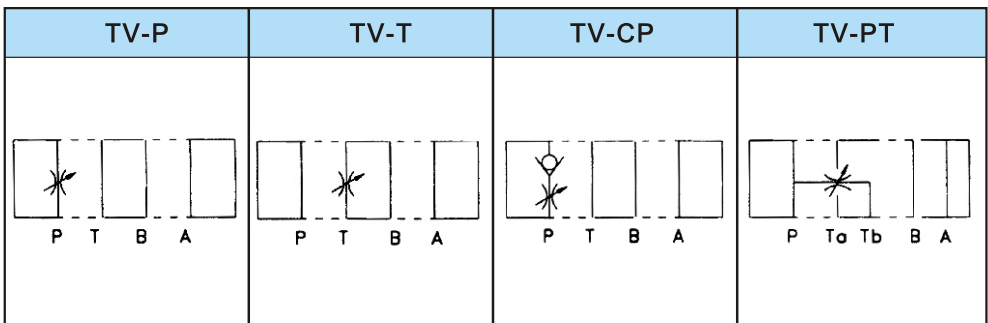
Power units related components

TV Modular throttle valves

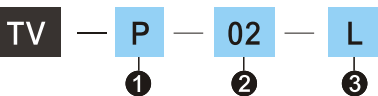
Specifications

	type	control	max.pressure (kgf/cm ²)	fixed volume (ℓ/min)
	TV-P	P	250	02 : 40
	-T	T		03 : 80
-PT	P→T	06 : 190		

Symbol



Order form




TV : Modular throttle valves

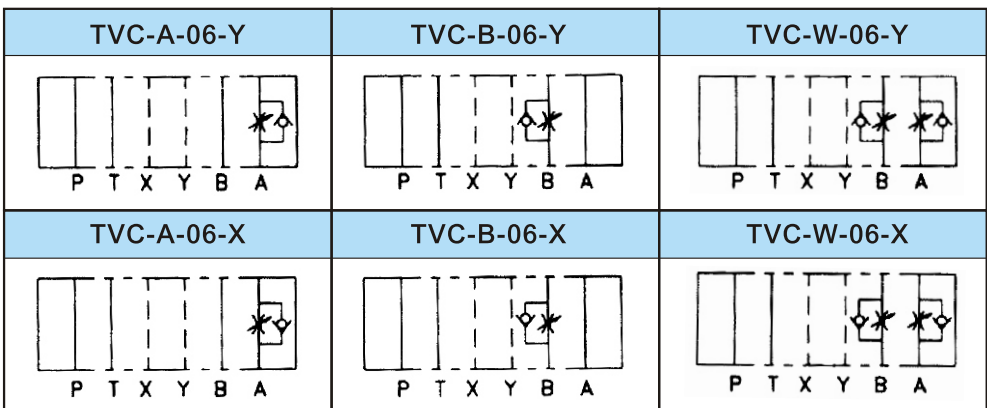
1	control	(1)P : P	(2)T : T	(3)PT : P→T
2	port(pt)	(1)02 : 1/4	(2)03 : 3/8	(3)06 : 3/4
3	tunning	(1)space : no tunning knob		(2)L : with tunning knob

TVC Modular throttle check valves

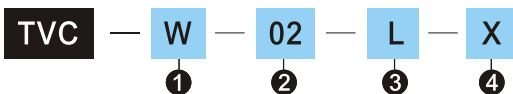
Specifications

	type	control	max. pressure (kgf/cm ²)	fixed volume (l/min)	cracking pressure (kgf/cm ²)
	TVC-A	A	250	02 : 40	02 : 0.3-40
	-B	B		03 : 80	03 : 0.5-80
	-W	A / B		06 : 190	06 : 1-190

Symbol



Order form







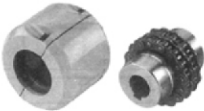



TVC : Modular throttle check valves					
①	control	(1)A : A	(2)B : B	(3)W : A / B	
②	port(pt)	(1)02 : 1/4	(2)03 : 3/8	(3)06 : 3/4	
③	tunning	(1)space : no tunning knob		(2)L : with tunning knob	
④	direction	(1)X : outlet control	(2)Y : inlet control		

Power units related components

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■ Accessories

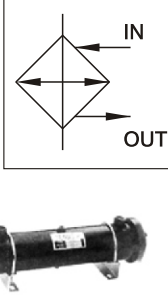
- OC Coolers.....P17.73
- OI Inlet caps..... P17.74
- ST / SF Filters..... P17.75
- TI Temperature guages..... P17.76
- CO / NM Couplings.....P17.77
- PG Pressure guages..... P17.78
- GUA / GUB Guages cocks.....P17.79

OC	OI	ST	SF	TI	
					
CO	NM	PG	PT	GUA	GUB
					

OC Coolers

Specifications

unit : mm

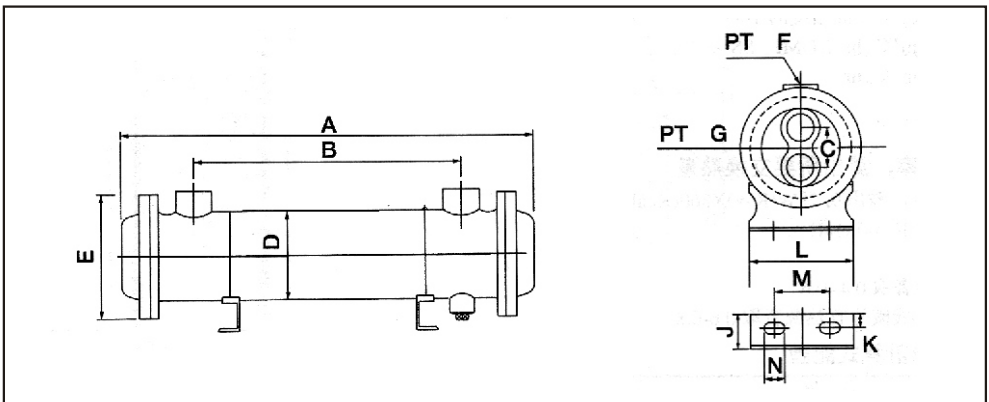
	model	volume (l/min)	A	B	C	D	E	F G		J	K	L	M	N	Cooler	wgt. (kg)
								(PT)								
	OC-60	60	450	305	46	89.1	121	3/4	3/4	23	11	115.5	95	7×10	22	8.5
	OC-100	100	555	403	57	101.6	134	3/4	3/4	33	12.5	145.5	106.5	10×20	26	11.1
	OC-150	150	575	385	76	139.8	175	1 1/4	1	30	12.5	175	130	13×16	42	19
	OC-250	250	780	585											58	24
	OC-350	350	1180	990	87	165.2	207	2	1 1/4	34	12.5	205	161	13×16	58	32.5
	OC-600	600	1175	950											40	
	OC-800	800	1700	1490											54	

Order form

OC — 60
①

OC : Coolers		
①	volume (l/min)	60 , 100 , 150 , 250 , 350 , 600 , 800

External dimensions

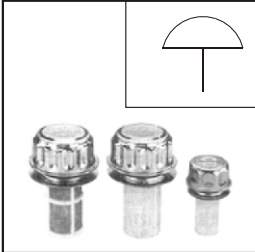


Power units related components

OI Inlet caps

Specifications

unit : mm

	model	bore	A	B	C	D	E	F	G	d × holes	filter	wgt. (kg)
	OI-01	32	53	31	65	34	99	45.5	53	$\phi 6 \times 3$	400	0.07
-02	50	75	48	88	49	137	71	88	$\phi 6 \times 6$	0.19		

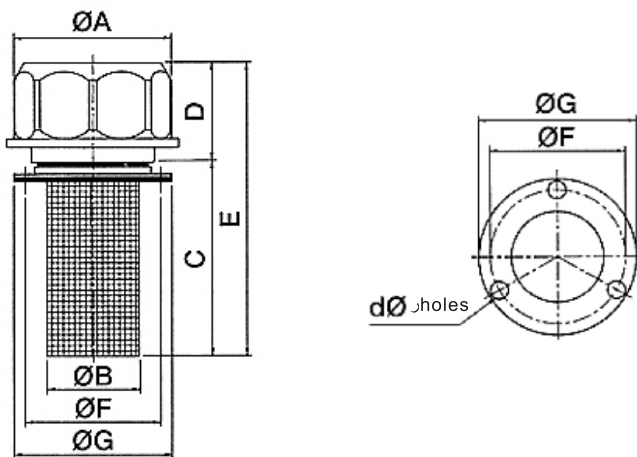
Order form

OI — 01
①

OI : Inlet caps

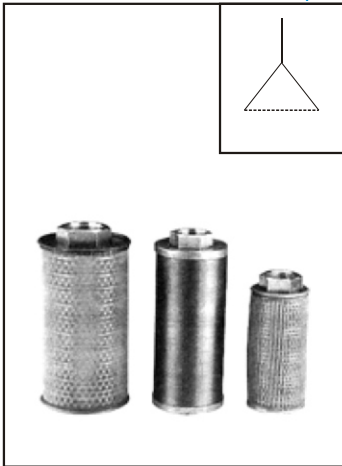
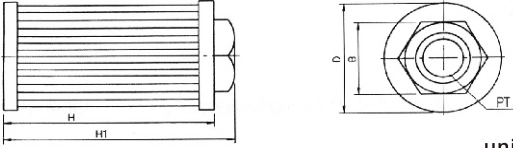
① model (1)01 (2)02

External dimensions



ST / SF Filters

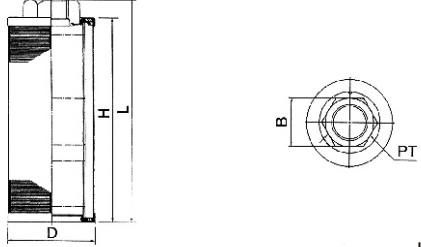
External dimensions(ST)

unit : mm

model	bore (PT)	D	H	H1	B	filter	volume (l/min)	wgt. (kg)	
ST-02	1/4"	58	60	52	22	100	15	0.09	
-02A			96	90			20	0.10	
-03	3/8"		60	52	22		17	0.09	
-03A			96	90			24	0.10	
-04	1/2"		100	90	30		32	0.14	
-06	3/4"		137	124	34		56	0.18	
-08	1"	170	155	42	110		0.20		
-10	1 1/4"	71	186	170	54		210	0.35	
-12	1 1/2"	85	196	182	65		285	0.49	
-16	2"	103	215	202	75		395	1.65	
-20	2 1/2"	148	274	252	110		97	750	1.2
-24	3"						800	1.21	
-32	4"					208	380	357	142

External dimensions



unit : mm

model	bore (PT)	A	B	H1	H2	filter	volume (l/min)	wgt. (kg)
SF-04	1/2"	64	27	153	160	150	35	0.27
-06	3/4"	64	34	153	166		46	0.28
-08	1"	83	42	198	210		90	0.48
-10	1 1/4"	103	53	215	231		150	0.77
-12	1 1/2"	122	61	232	246		205	0.96
-16	2"	122	74	317	332		320	1.27
-20	2 1/2"	148	105	419	434		550	2
-24	3"						600	2.68

Order form

ST — **02**
 ① ②

①	kind	(1)ST : 100 filtering (2)SF : 150 filtering
②	model	see"right"table

Power units related components

TI Temperature gauges

Order form

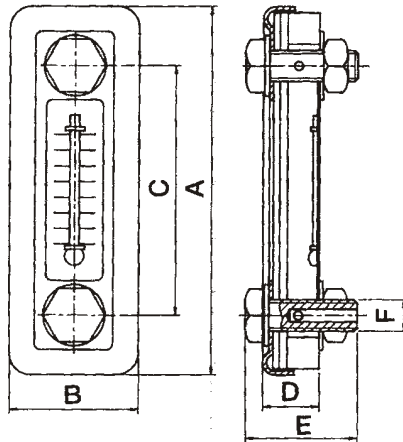


TI — 3"
①

TI : Temperature gauges		
①	model	(1)3" (2)5"

External dimensions

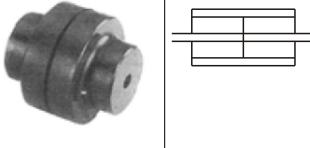
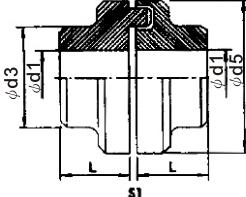

unit : mm



model	A	B	C	D	E	F	wgt.(kg)
TI-3"	118	41	80	18	37	M10	0.18
-5"	180	52	127	19.5	46	M12	0.33

CO / NM Coupling

External dimensions(NM)

<p>NM</p> 		 <p style="text-align: right;">unit : mm</p>																																																																																	
<p>CO</p> 	<table border="1"> <thead> <tr> <th rowspan="2">model</th> <th rowspan="2">torque (kg-m)</th> <th rowspan="2">max. rotating (r.p.m)</th> <th colspan="2">rod hole</th> <th rowspan="2">d3</th> <th rowspan="2">d5</th> <th rowspan="2">L</th> <th rowspan="2">S1</th> <th rowspan="2">wgt. (kg)</th> </tr> <tr> <th>min.</th> <th>max.</th> </tr> </thead> <tbody> <tr> <td>NM-67</td> <td>2.2</td> <td>10000</td> <td>9</td> <td>28</td> <td>46</td> <td>67</td> <td>30</td> <td>2.5±0.5</td> <td>0.93</td> </tr> <tr> <td>-82</td> <td>5</td> <td>8000</td> <td>10</td> <td>32</td> <td>53</td> <td>82</td> <td>40</td> <td>3±1</td> <td>1.78</td> </tr> <tr> <td>-97</td> <td>10.5</td> <td>7000</td> <td>12</td> <td>42</td> <td>69</td> <td>97</td> <td>50</td> <td>3±1</td> <td>3.46</td> </tr> <tr> <td>-112</td> <td>16.7</td> <td>6000</td> <td>14</td> <td>48</td> <td>79</td> <td>112</td> <td>60</td> <td>3.5±1</td> <td>5</td> </tr> <tr> <td>-128</td> <td>26.7</td> <td>5000</td> <td>18</td> <td>55</td> <td>112</td> <td>128</td> <td>70</td> <td>3.5±1</td> <td>7.9</td> </tr> <tr> <td>-148</td> <td>41.7</td> <td>4500</td> <td>22</td> <td>65</td> <td>128</td> <td>148</td> <td>80</td> <td>3.5±1</td> <td>12.3</td> </tr> <tr> <td>-168</td> <td>69.5</td> <td>7000</td> <td>28</td> <td>75</td> <td>148</td> <td>168</td> <td>90</td> <td>3.5±1.5</td> <td>18.4</td> </tr> </tbody> </table>	model	torque (kg-m)	max. rotating (r.p.m)	rod hole		d3	d5	L	S1	wgt. (kg)	min.	max.	NM-67	2.2	10000	9	28	46	67	30	2.5±0.5	0.93	-82	5	8000	10	32	53	82	40	3±1	1.78	-97	10.5	7000	12	42	69	97	50	3±1	3.46	-112	16.7	6000	14	48	79	112	60	3.5±1	5	-128	26.7	5000	18	55	112	128	70	3.5±1	7.9	-148	41.7	4500	22	65	128	148	80	3.5±1	12.3	-168	69.5	7000	28	75	148	168	90	3.5±1.5	18.4
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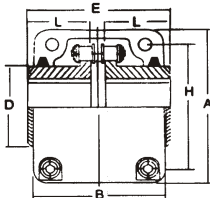
External dimensions(CR)

Order form

CO — **4016**

① ②


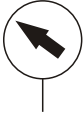
①	kind	(1)CR : chain (2)NM : rubber
②	model	see "right" table

 <p style="text-align: right;">unit : mm</p>																																																																																																																												
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Power units related components

PG Pressure guages

Specifications

 <p>PGG PGT</p>		type	bore (mm)	pressure range (kgf/cm ²)
		G : connect	(1)63(2 1/2")	35 : 0-35 50 : 0-50 70 : 0-70 100 : 0-100 150 : 0-150 250 : 0-250 350 : 0-350 500 : 0-500
		T : direct	(2)100(4")	


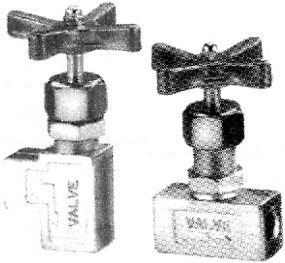
Order form

PGT — **63** — **100**
 ① ② ③

①	kind	(1) G : connect (2) T : direct
②	bore (mm)	(1)63(2 1/2") (2)100(4")
③	pressure range (kgf/cm ²)	35 , 50 , 70 , 100 150 , 250 , 350 , 500

GUA / GUB Guages cocks

Specifications

	type	port(PT)	fixed volume (l/min)	max. pressure (kgf/cm ²)	weight (kg)
	GUA-02	1/4"	2	350	0.28
	-03	3/8"	21		
	GUB-02	1/4"	2		0.32
	-03	3/8"	21		

Order form

GUA — **02**
 ① ②

①	kind	(1)GUB : direct (in/out 180°) (2)GUA : elbow (in/out 90°)
②	port(PT)	(1)02 : 1/4" (2)03 : 3/8"

Power units related components