

Cartridge insert CVI



Functional Symbols

Function	Functional Symbol	Area Ratio $A_A : A_{AP}$	Model Code	Remarks
Normally closed		1 : 1	CVI-**-D10	Not applicable to valve sizes 50, 63, 80
Normally closed		1 : 1.1	CVI-**-D11	
		1 : 1.5	CVI-**-D15	
		1 : 2	CVI-**-D20	
Normally open		1 : 1.7	CVI-**-OD17	
Normally closed (with notch)		1 : 2	CVI-**-F	
		1 : 1.5	CVI-**-F15	

Model Code

(F3)-CVI-25-D20-3-L-10-JA

1 2 3 4 5 6

1 Hydraulic fluid

Omit: mineral oil based fluid, water-glycol based fluid
F3: phosphate ester

2 Cartridge valve insert

3 Size

16, 25, 32, 40, 50, 63 and 80

4 Function and area ratio

Code	Function	Area Ratio ($A_A : A_{AP}$)
D10 ^{*1}	Normally closed	1 : 1
D11	Normally closed	1 : 1.1
D15	Normally closed	1 : 1.5
D20	Normally closed	1 : 2
F	Normally closed (with notch)	1 : 2
F15	Normally closed (with notch)	1 : 1.5
OD17	Normally open	1 : 1.7

^{*1}: Not applicable to sizes 50, 63 and 80.

5 Cracking pressure MPa

Code	D10		D11		D15		D20		F		F15	
	A→B	B→A	A→B	B→A	A→B	B→A	A→B	B→A	A→B	B→A	A→B	B→A
L	0.03	—	0.03	0.27	0.04	0.08	0.05	0.05	0.05	0.05	0.04	0.08
M	0.13	—	0.14	1.4	0.19	0.37	0.25	0.25	0.25	0.25	0.19	0.37
H	0.25	—	0.27	2.7	0.37	0.75	0.5	0.5	0.5	0.5	0.37	0.75

6 Design no.

Specifications

Model Code	Size	Max. Working Pressure MPa	Rated Flow ^{*1} L/min	Weight kg
CVI	16	35	200	0.15
	25		450	0.35
	32		650	0.75
	40		1100	1.4
	50		1700	2.2
	63		2800	5.4
	80		4200	9.8

^{*1}: Rated flow at pressure drop 0.5 MPa.

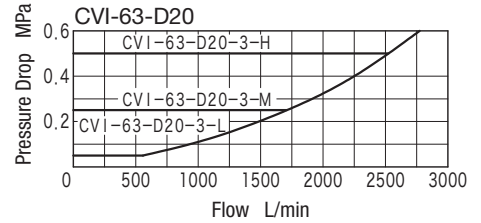
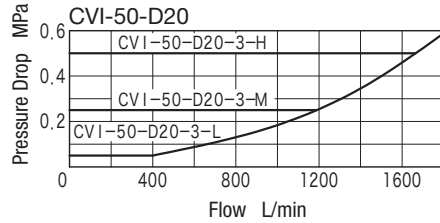
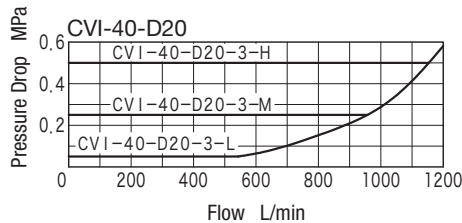
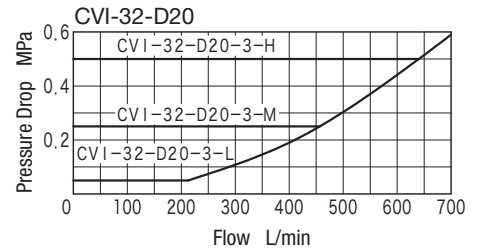
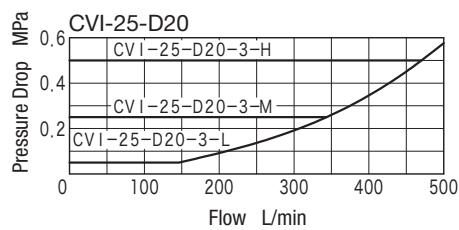
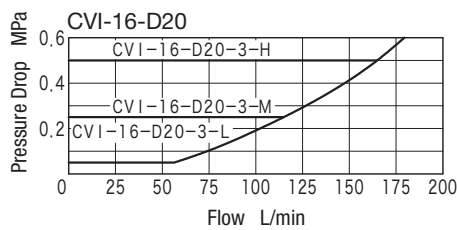
Notes on Operation

- When pilot pressure operates to close valve, pilot pressure P_{AP} may leak to B port via the space between the sleeve and spool.
- In circuit where A port is at high pressure and B port is at low pressure while cartridge valve is closed, and if pilot pressure is not high enough, pilot pressure may fall due to leakage from AP port to B port and may cause instability. For sure valve operation, pilot pressure should be sufficiently high or circuit should be designed so that B port is the high pressure side when the valve is closed.

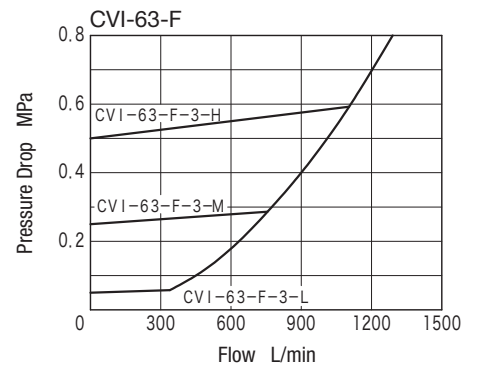
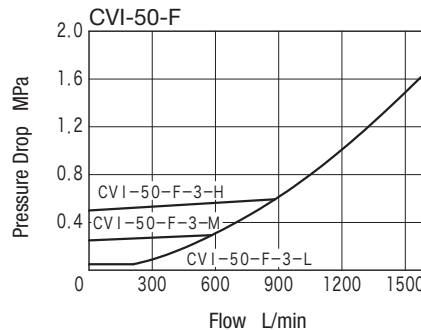
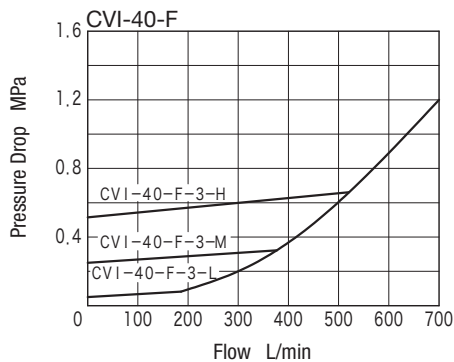
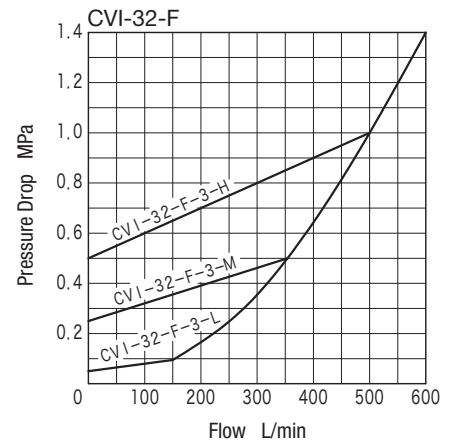
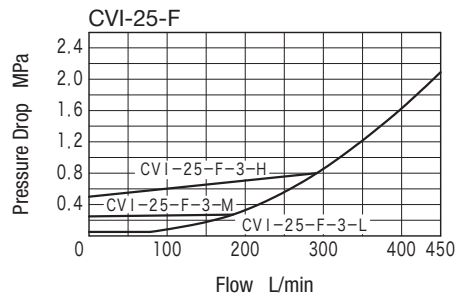
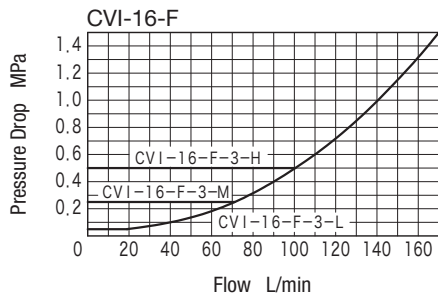
Characteristics Curve (at 20 mm²/s) (typical examples)

● Pressure Drop

CVI-D20 Insert



CVI-F Insert

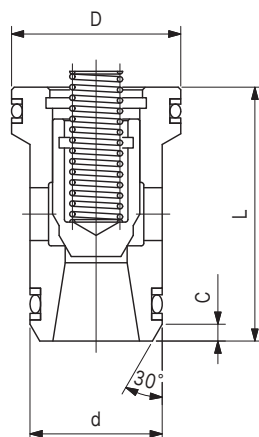


H
1-2

Cartridge Valves

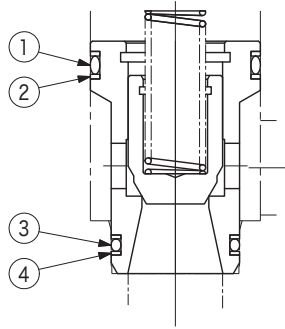
Dimensions

● Insert



Dimensions table

Size mm	D	d	L	C
16	φ 32	φ 25	48	3.2
25	φ 45	φ 34	61.5	2.9
32	φ 60	φ 45	72	3.0
40	φ 75	φ 55	90	4.0
50	φ 90	φ 68	104	4.0
63	φ 120	φ 90	135	4.0



CVI-16

No.	Name	Part No.	Standard	Qty
1	O-ring	VP761409	—	1
2	Backup ring	VP761413	—	2
3	O-ring	008001917	JIS B 2401 1A-P21	1
4	Backup ring	008101902	JIS B 2407 T2-P21	2

CVI-25

No.	Name	Part No.	Standard	Qty
1	O-ring	008050419	JIS B 2401 1B-G40	1
2	Backup ring	008150402	JIS B 2407 T2-G40	2
3	O-ring	VP760187	—	1
4	Backup ring	VP761375	—	2

CVI-32

No.	Name	Part No.	Standard	Qty
1	O-ring	008050717	JIS B 2401 1A-G55	1
2	Backup ring	008150702	JIS B 2407 T2-G55	2
3	O-ring	008050417	JIS B 2401 1A-G40	1
4	Backup ring	008150402	JIS B 2407 T2-G40	2

CVI-40

No.	Name	Part No.	Standard	Qty
1	O-ring	VP761411	—	1
2	Backup ring	VP761415	—	2
3	O-ring	008050617	JIS B 2401 1A-G50	1
4	Backup ring	008150602	JIS B 2407 T2-G50	2

CVI-50

No.	Name	Part No.	Standard	Qty
1	O-ring	008006417	JIS B 2401 1A-P80	1
2	Backup ring	008106402	JIS B 2407 T2-P80	2
3	O-ring	008005517	JIS B 2401 1A-P58	1
4	Backup ring	008105502	JIS B 2407 T2-P58	2

CVI-63

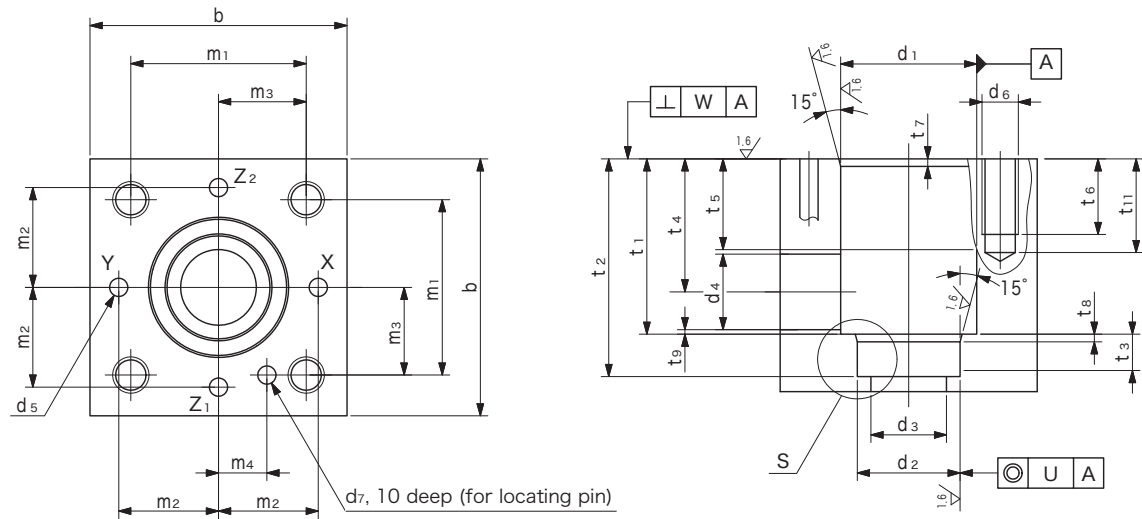
No.	Name	Part No.	Standard	Qty
1	O-ring	008007117	JIS B 2401 1A-P110	1
2	Backup ring	008107102	JIS B 2407 T2-P110	2
3	O-ring	008006417	JIS B 2401 1A-P80	1
4	Backup ring	008106402	JIS B 2407 T2-P80	2

CVI-80

No.	Name	Part No.	Standard	Qty
1	O-ring	008007817	JIS B 2401 1A-P135	1
2	Backup ring	008107802	JIS B 2407 T2-P135	2
3	O-ring	008006817	JIS B 2401 1A-P100	1
4	Backup ring	008106802	JIS B 2407 T2-P100	2

Dimensions

● Cavity Dimensions (ISO 7368)



Size	16	25	32	40	50	63
b	65	85	102	125	140	180
d ₁ min.	32.000	45.000	60.000	75.000	90.000	120.000
max.	32.025	45.025	60.030	75.030	90.035	120.035
d ₂ min.	25.000	34.000	45.000	55.000	68.000	90.000
max.	25.021	34.025	45.025	55.030	68.030	90.035
d ₃ max.	16	25	32	40	50	63
d ₄ min.	16	25	32	40	50	63
max.	25	32	40	50	63	80
d ₅ max.	4	6	8	10	10	12
d ₆	M8	M12	M16	M20	M20	M30
d ₇	4	6	6	6	8	8
m ₁ ^{+0.2} ₀	46	58	70	85	100	125
m ₂ ^{+0.2} ₀	25	33	41	50	58	75
m ₃ ^{+0.2} ₀	23	29	35	42.5	50	62.5
m ₄ ^{+0.2} ₀	10.5	16	17	23	30	38
t ₁ ^{+0.1} ₀	43	58	70	87	100	130
t ₂ ^{+0.1} ₀	56	72	85	105	122	155
t ₃ ^{*1}	11	12	13	15	19	22
t ₄	34	44	52	64	72	95
t ₄ ^{*2}	29.5	40.5	48	59	65.5	86.5
t ₅ ^{*1}	28	30	30	30	35	45
t ₆	20	25	35	35	40	55
t ₇	2	2.5	2.5	3	4	4
t ₈	2	2.5	2.5	3	3	4
t ₉ min.	1.0	1.0	1.5	2.5	2.5	3
t ₁₁ max.	25	31	42	53	53	75
U	0.03	0.03	0.03	0.05	0.05	0.05
W	0.05	0.05	0.1	0.1	0.1	0.2

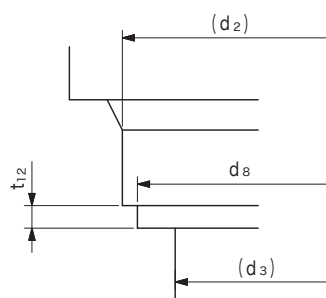
*1: range $\sqrt[1.6]{}$

d₂ bottom hole diameter should be of dimensions which does not interfere with chamfer C of insert (see bottom of H1-2).

d₂ bottom hole dimensional examples shown in schematic below.

*2: d₄ dimension is max.

S Sectional Detail



d₂ Bottom Hole Dimensions (Reference)

Size	d ₈ min.	t ₁₂ ±0.2
16	24.6	2
25	33.6	2
32	44.6	2
40	54.6	3
50	67.6	3
63	89.6	3

Cartridge cover CVC



Functional Symbols

Function and Model Code	Symbol	Remarks
CVC-**-N Basic Cover		All Sizes
CVC-**-A With Adjustable Valve Opening		All Sizes
CVC-**-PC With Pilot Operated Check Valve		16, 25, 32, 40
CVC-**-D3 Directional with ISO4401-03 Interface		25, 32, 40
CVC-**-D5 Directional with ISO4401-05 Interface		50, 63, 80
CVC-**-W With Shuttle Valve		16, 25, 32, 40

Function and Model Code	Symbol	Remarks
CVC-**-W13 Directional with ISO4401-03 Interface and Shuttle Valve (Type 1)		25, 32, 40
CVC-**-W23 Directional with ISO4401-03 Interface and Shuttle Valve (Type 2)		Same as above
CVC-**-W33 Directional with ISO4401-03 Interface and Shuttle Valve (Type 3)		Same as above
CVC-**-W43 Directional with ISO4401-03 Interface and Shuttle Valve (Type 4)		Same as above

Note: Under graphical symbol, [Φ] denotes inserted orifice, and [Φ] denotes position of insertable optional orifice.

Model Code

(F3)-CVC-25-A-T39-(W)-10-JA-(X10)

1	2	3	4	5	6	7	8
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1 Hydraulic fluid

Omit: mineral oil based fluid, water-glycol based fluid

F3: phosphate ester

2 Cartridge valve cover

3 Size

16, 25, 32, 40, 50, 63 and 80

4 Functions (see symbols for details)

Code	Function	Orifice	
		Standard	Option
N	Basic type	X	—
A	With Adjustable Valve Opening	X	—
PC	With Pilot Operated Check Valve	AP	—
D3	Directional with ISO4401-03 Interface	AP	X, Z1, Z2
D5	Directional with ISO4401-05 Interface	AP	X, Z1, Z2
W	With Shuttle Valve	AP	Z2
W13	Directional with ISO4401-03 Interface and Shuttle Valve (Type 1)	AP	Z2
W23	Same as above (Type 2)	AP	Z2
W33	Same as above (Type 3)	AP	X, Y, Z2
W43	Same as above (Type 4)	AP	X, Y, Z1

5 Control code T39: for 16, 25, 32 and 40

JT39: for 50, 63 and 80

6 Valve opening adjuster (for code type 'A' under 4)

W: Adjustment screw (standard)

M: Micrometer knob (option for sizes 16, 25 only)

K: Micrometer knob w/key (option for sizes 16, 25 only)

7 Design no.

8 Orifice (option)

For orifices other than standard, indicate port code and orifice diameter (2 digit, no decimal).

Notes:

- Standard port for the orifice is as shown in table under 4. Orifice diameters as follows.

Size	16	25	32	40	50	63	80
Orifice Diameter	φ 1.0	φ 1.2	φ 1.2	φ 1.4	φ 1.6	φ 1.8	φ 3.0

- Ports to which the orifice can be incorporated are shown in the (Option) column of table under 4. (See Symbol)
- Plug with no hole is indicated by "00".
- No orifice in standard orifice port is indicated by "99".
- Example: function D3 standard orifice port (AP) orifice not necessary, ø1.0 orifice in X and Z1 port with holeless plug in Z2 port - AP99X10Z110Z200

Specifications

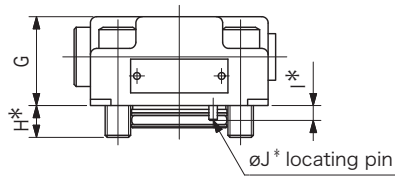
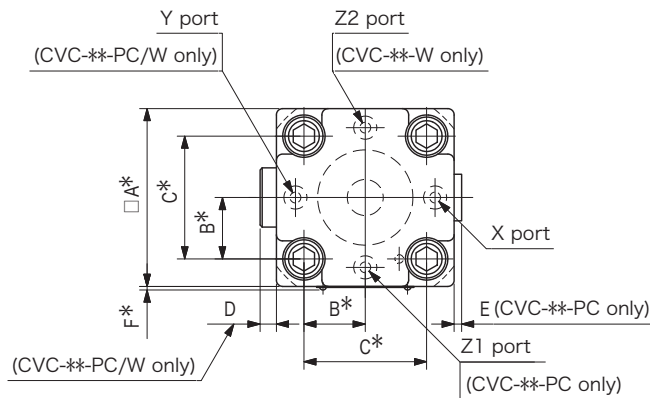
Model Code	Size	Max. Working Pressure MPa	Weight kg
CVC	16	21 (*35)	0.8
	25		1.8 (2.5)
	32		3.8 (4.5)
	40		6.0
	50		9.7
	63		20
	80		24

Size	A*	B*	C*	D	E	F*	G	H*	I*	J*	K	L	M	N	P	Mounting Bolts (Included)	Tightening Torque N•m
16	65	23	46	13	4	3	35	14	7	3	87	10	22	—	—	M 8×40	31.5~38.5
25	85	29	58	8	4	3	42	15	7	4	95	10	22	39	57	M12×40	99~121
32	102	35	70	—	4	3	51	25	7	4	87	10	22	49	60	M16×55	153~187
40	125	42.5	85	—	4	3	61	25	7	4	107	10	22	58	58	M20×60	450~550
50	140	50	100	—	—	3	70	35	8	6	128	15	36	68	—	M20×80	522~638
63	180	62.5	125	—	—	3	86	42	8	6	151	17	41	83	—	M30×90	1080~1320

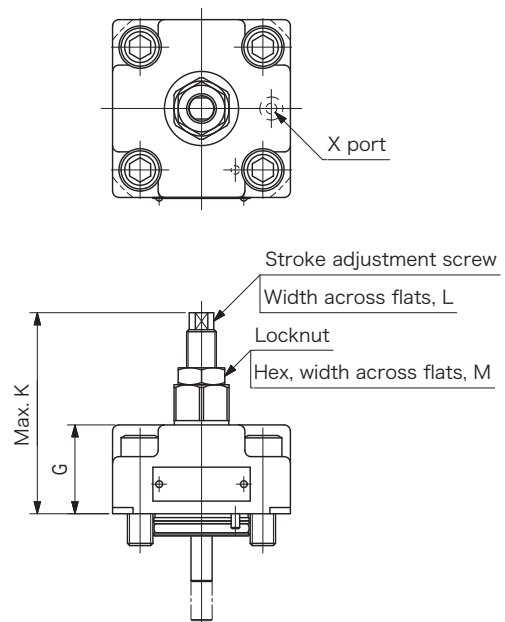
Note: * denotes common dimensions.

* Consult Tokyo Keiki in case specifications call for 35 MPa maximum working pressure.
* Weight in () for W13 through W43.

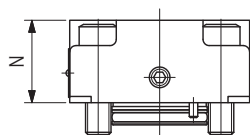
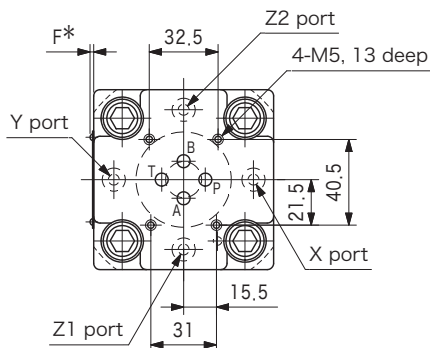
Dimensions



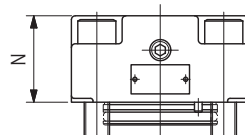
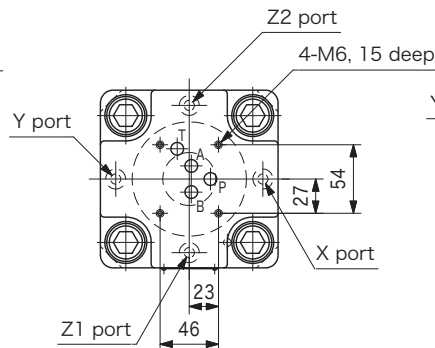
CVC-**-N/PC/W



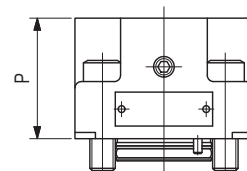
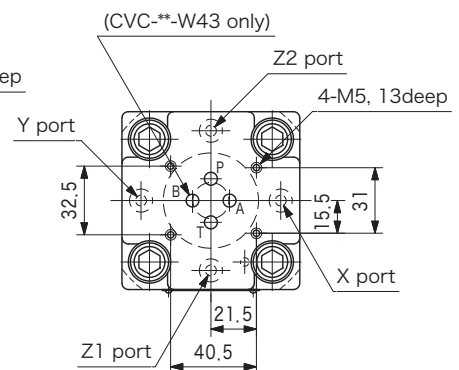
CVC-**-A



CVC-**-D3



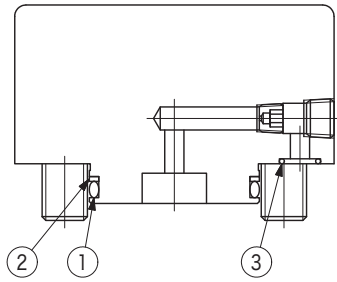
CVC-**-D5



CVC-**-W13/W23/W33/W43

H
2-2

Cartridge Valves



CVC-16

No.	Name	Part No.	Standard	Qty	
				N, A	PC, W
1	O-ring	VP761409	—	1	1
2	Backup ring	VP761413	—	1	1
3	O-ring	007901019	AS568-010 (NBR, Hs90)	1	3

CVC-25

No.	Name	Part No.	Standard	Qty		
				N, A	PC, W	D3, W13, W23, W33, W43
1	O-ring	008050419	JIS B 2401 1B-G40	1	1	1
2	Backup ring	008150402	JIS B 2407 T2-G40	1	1	1
3	O-ring	007901119	AS568-011 (NBR, Hs90)	1	3	4

CVC-32

No.	Name	Part No.	Standard	Qty		
				N, A	PC, W	D3, W13, W23, W33, W43
1	O-ring	008050719	JIS B 2401 1B-G55	1	1	1
2	Backup ring	008150702	JIS B 2407 T2-G55	1	1	1
3	O-ring	007901219	AS568-012 (NBR, Hs90)	1	3	4

CVC-40

No.	Name	Part No.	Standard	Qty		
				N, A	PC, W	D3, W13, W23, W33, W43
1	O-ring	VP761411	—	1	1	1
2	Backup ring	VP761415	—	1	1	1
3	O-ring	007901419	AS568-014 (NBR, Hs90)	1	3	4

CVC-50

No.	Name	Part No.	Standard	Qty	
				N, A	D5
1	O-ring	008006417	JIS B 2401 1A-P80	1	1
2	Backup ring	008106402	JIS B 2407 T2-P80	1	1
3	O-ring	007901419	AS568-014 (NBR, Hs90)	1	4

CVC-63

No.	Name	Part No.	Standard	Qty	
				N, A	D5
1	O-ring	008007117	JIS B 2401 1A-P110	1	1
2	Backup ring	008107102	JIS B 2407 T2-P110	1	1
3	O-ring	007911519	AS568-115 (NBR, Hs90)	1	4

CVC-80

No.	Name	Part No.	Standard	Qty	
				N, A	D5
1	O-ring	008007817	JIS B 2401 1A-P135	1	1
2	Backup ring	008107802	JIS B 2407 T2-P135	1	1
3	O-ring	008002719	JIS B 2401 1B-P28	1	4