Direct Operated 2 Port Solenoid Valve For Air

Series VCA

Improved durability (Nearly twice the life of the previous series)
Resistance of moving parts has been reduced.
Service life and wear resistance are improved.

Large flow rate: TV factor 0.33 to 2.11

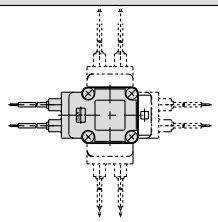
Compact: Single valve volume reduced by –13% (Class 2)
Weight reduced by –25% (Class 2)
Manifold length reduced by –22% (Class 2 : 5 stations) (SMC comparison)

Built-in surge voltage suppressor

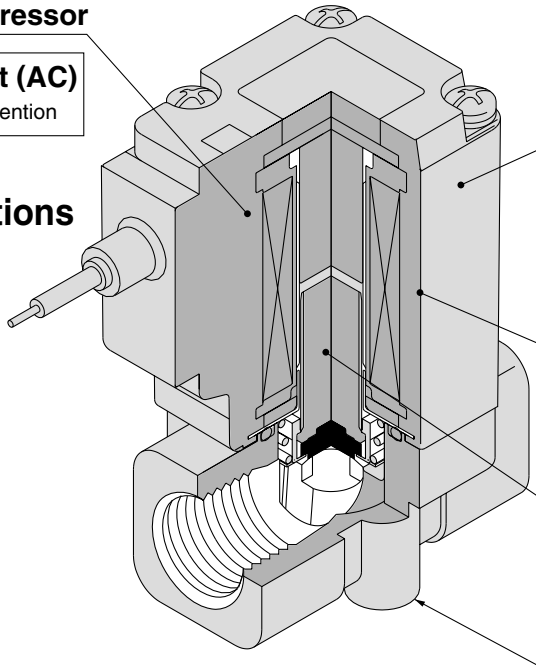
Built-in rectifying circuit (AC)
• Noise prevention • Burn-out prevention

Electrical entry directions

Electrical entry is available from four directions



* When shipped from our factory, the electrical entry is set in the IN port side.



Compact and lightweight
New compact coil reduces the overall size and weight of the valve.
Volume: –13%
Weight: –25%
} SMC comparison (Class 2)

Flame resistant molded coil material
Flame resistance equivalent to UL94 standard V-0

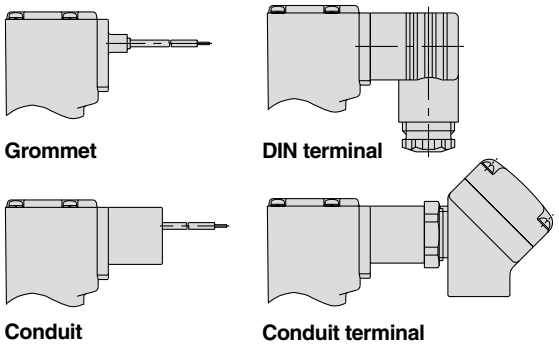
Special construction reduces operating resistance.

Threaded for bottom mounting
Spacial bracket can be mounted.

A variety of wiring options
Grommet, DIN terminal,
Conduit, Conduit terminal

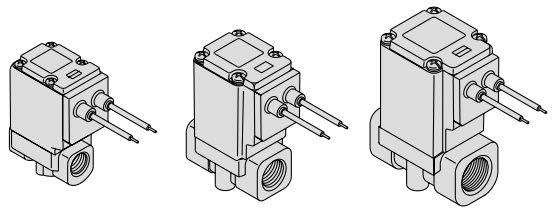
Wiring Specifications (Class B coil)

Wiring Variations



Enclosure: Dusttight
Low jetproof (Equivalent to IP65)

Lined Up by Compact Design



⚠ Precautions

Be sure to read before handling. Refer to page 17-6-3 Safety Instructions and Solenoid Valve Precautions.

Operation by Manual Override

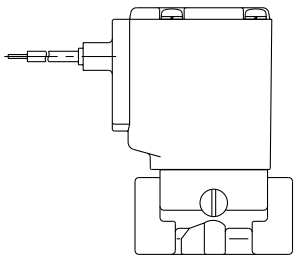
⚠ Warning

Operation

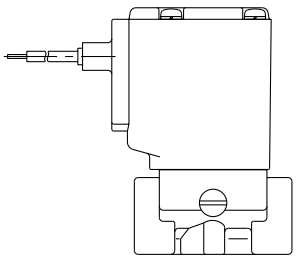
Opening the valve: Turn 90° clockwise by a flat head screwdriver to open the valve. Besides, the valve remains in the open state even when a screwdriver is detached.

Closing the valve: Turn 90° counterclockwise from the open state to the original state to close the valve.

Perform an eletrical operation at the position where the valve is closed.



Closed state (Vertical slot)

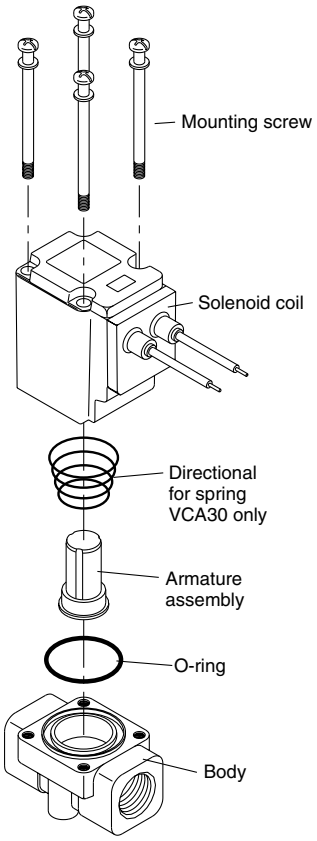


Open state (Horizontal slot)

Disassembly and Reassembly

⚠ Caution

- Cut off the electrical power and pressure supply, and release the residual pressure before dissembling.
- Disassembly procedure
  1. Remove the mounting screws on the top.
  2. Remove the solenoid coil, spring and armature assembly.
  3. If foreign matter is adhering to the parts, perform an appropriate procedure, such as blowing with air or cleaning with neutral detergent.
- Assembly procedure
  Re-assemble by following the disassembly procedure in the reverse order.
  When changing the electrical entry direction, mount it in the direction that solenoid coils will be mounted.



Note 1) For series VCA30, the end of the spring with the smaller O.D. is fitted over the armature ass'y. Be sure to make this distinction when assembling.

Note 2) Tighten the four mounting screws in a diagonally crossing order, and use the proper tightening torque below.

Proper Tightening Torque (N·m)

VCA20	0.4 to 0.5
VCA30	0.6 to 0.8
VCA40	0.6 to 0.8

⚠ Precautions

Be sure to read before handling. Refer to page 17-6-3 for Safety Instructions and Solenoid Valve Precautions.

Glossary

Pressure

1. Maximum operating pressure differential
This indicates the maximum pressure differential (inlet and outlet pressure differential) which can be allowed for operation with the valve closed or open.

2. Maximum operating pressure
This indicates the limit of pressure that can be applied inside the pipelines. (Line pressure)

3. Withstand pressure
The pressure which must be withstood without a drop in performance after returning to the operating pressure range (The value under the prescribed conditions).

Electricity

1. Surge voltage
A high voltage which is momentarily in the shut-off unit by shutting off the power.

Others

1. Material
HNBR: Nitrile hydride rubber

2. JIS symbol
In the JIS symbol () IN and OUT are in a blocked condition (≒), but actually in the case of reverse pressure (OUT > IN), there is a limit to the blocking capability.
() is used to indicate that blocking of reverse pressure is not possible.

Direct Operated 2 Port Solenoid Valve For Air

Series VCA

How to Order Valves (Single Unit)

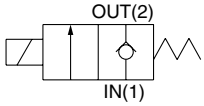
VC A 2 1 □ – 1 G □ – 3 – 02 □ – □

For air

Series

2	Class 2
3	Class 3
4	Class 4

Valve type

1	N.C. OUT(2)  IN(1)

Fluid

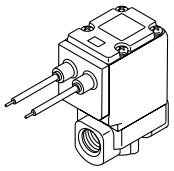
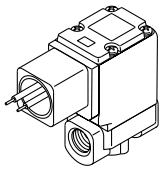
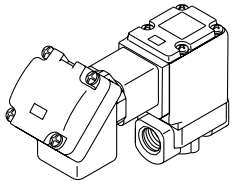
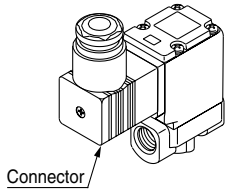
Nil	General air
A	Dry air

Voltage

1	100 VAC
2	200 VAC
3	110 VAC
4	220 VAC
5	24 VDC
6	12 VDC
36	230 VAC

∗ Please consult with SMC regarding other voltages.

Electrical entry

G – Grommet	C – Conduit
	
T – Conduit terminal **TL – Conduit terminal with indicator light**	**D – DIN terminal** **DL – DIN terminal with indecator light** **DO – DIN terminal (without connector)**
	 Connector

∗ All types are equipped with surge voltage suppressor.

Manual override

Nil	None
B	Slotted locking type (Tool required)

Option

Nil	None
F	Foot type bracket

∗ When a bracket is separately required, refer to Table 2 given below.

Thread type (for single unit only)

Nil	Rc
F	G
N	NPT
T	NPTF

Port size

Symbol	Port size	Class 2	Class 3	Class 4
02	1/4 (8A)	○	○	—
03	3/8(10A)	—	○	○
04	1/2(15A)	—	—	○
06	3/4(20A)	—	—	○

Orifice size

Symbol	Orifice size (mmø)	Class 2	Class 3	Class 4
3	3	○	—	—
4	4	—	○	—
5	5	○	—	○
7	7	—	○	○
10	10	—	—	○

∗ Refer to the below table for orifice and port size combinations.

Table (1) Orifice and Port Size Combinations

Class	Port size	Orifice size (mmø)				
		3	**4**	**5**	**7**	**10**
2	1/4 (8A)	●	—	●	—	—
3	1/4 (8A)	—	●	—	●	—
	3/8 (10A)	—	●	—	●	—
4	3/8 (10A)	—	—	●	●	●
	1/2 (15A)	—	—	●	●	●
	3/4 (20A)	—	—	—	—	●

Table (2) Bracket Assembly Part No.

Valve model	Bracket assembly part no.
VCA21	VCA20-12-1A
VCA31	VCA30-12-1A
VCA41	VCA40-12-1A

∗ Mounting screws (2 pcs.)

Standard Specifications

Valve specifications	Valve construction			Direct operated poppet
	Fluid			Air, Inert gas, Low vacuum (133 Pa·abs)
	Withstand pressure (MPa)			2.0
	Body material			Al
	Seal material			HNBR
	Ambient temperature (°C)			–20 to 60
	Fluid temperature (°C)			–10 to 60 (No freezing)
	Enclosure			Dusttight, low jetproof (equivalent to IP65)
	Environment			Location without corrosive or explosive gases
	Valve leakage cm³/min (ANR)			0.2 or less
	Mounting orientation			Unrestricted
	Vibration/Impact resistance (m/s²) (2)			30/150 or less
Coil specifications	Rated voltage			24 VDC, 12 VDC, 100 VAC, 110 VAC, 200 VAC, 220 VAC, 230 VAC (50/60 Hz)
	Allowable voltage fluctuation			±10% of rated voltage
	Coil insulation type			Class B
	Power consumption	DC		VCA 2: 6.5 W, VCA 3: 8 W, VCA 4: 11.5 W
	Apparent power	AC (1)	50 Hz	VCA 2: 7.5 VA, VCA 3: 10 VA, VCA 4: 13 VA
			60 Hz	

Note 1) Since AC coil uses a rectifying circuit, there is no difference in apparent power between inrush and holding.
Note 2) Vibration resistance ···· Conditions when tested with one sweep of 10 to 300 Hz in the axial direction and at a right angle to the armature, in both energized and deenergized states. No malfunction occured when tested. (Value at initial state)
Impact resistance ····· Conditions when tested with a drop tester in the axial direction and at a right angle to the armature, one time each in energized and deenergized states. No malfunction occured when tested. (Value at the initial state).

Characteristic Specifications

Model	Class	Port size	Orifice size (mmø)	Max. operating pressure differential(MPa)	Flow characteristics			Max.operating pressure (MPa)	(1) Weight (kg)
					C [dm³/(s<·bar)]	b	Cv		
VCA (for air) 2 port solenoid valve	2	1/4 (8A)	3	1.0	1.1	0.45	0.29	1.0	0.21
			5	0.15	2.9	0.21	0.68		
	3	1/4 (8A) 3/8 (10A)	4	1.0	1.9	0.24	0.45	1.0	0.30
			7	0.15	5.0	0.16	1.2		
	4	3/8 (10A) 1/2 (15A) 3/4 (20A)	5	1.0	3.0	0.35	0.78	1.0	0.50
			7	0.3	5.4	0.27	1.4		
			10	0.15	7.7	0.23	1.9		

Note 1) Weight values are for the grommet type.

Made to Order Specifications

Please contact SMC for detailed specifications, delivery, and price.

Oil-free specifications

VCA$^{2}_{3}$$_{4}$1A–□□□–□–□□–□–□–X15

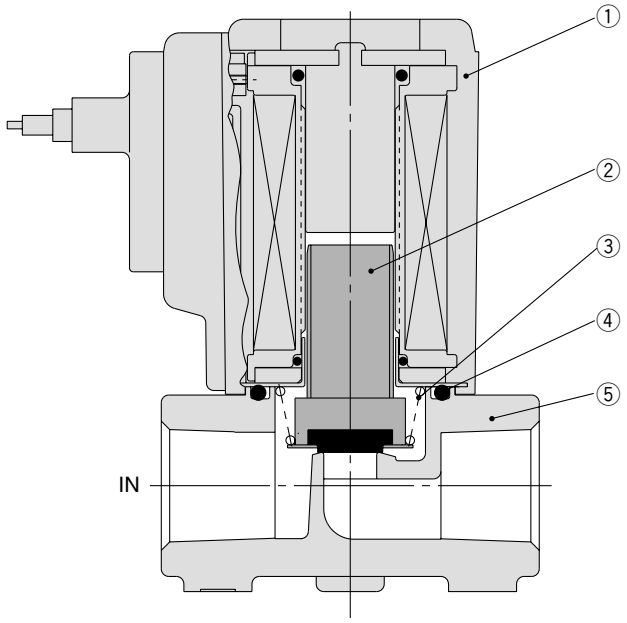
Normally open (N.O.) specifications

VCW$^{2}_{3}$$_{4}$2–□□□–□–□□–□–□–X43

Note) Fluid: Air. Refer to VCW for model numbers and characteristics.

Series VCA

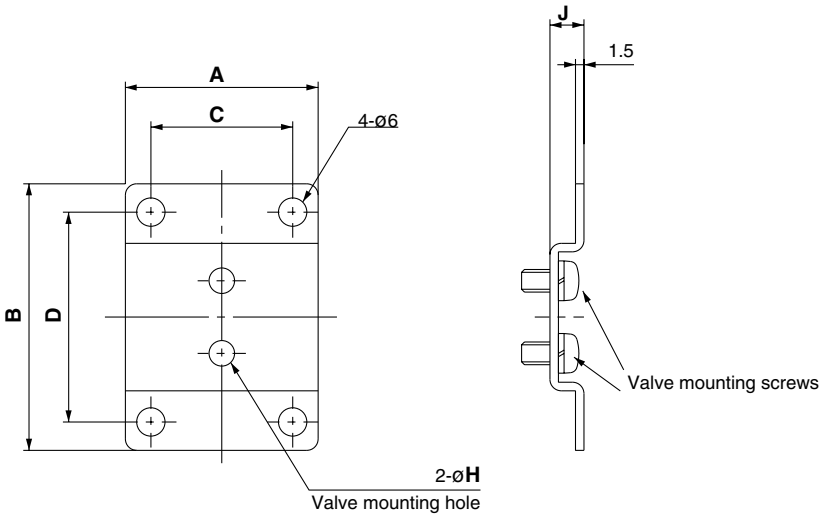
Construction



Component Parts

No.	Description	Material
①	Solenoid coil	—
②	Armature assembly	Stainless steel, HNBR, PPS
③	Return spring	Stainless steel
④	O-ring	HNBR
⑤	Body	Aluminum

Bracket Assembly Dimensions



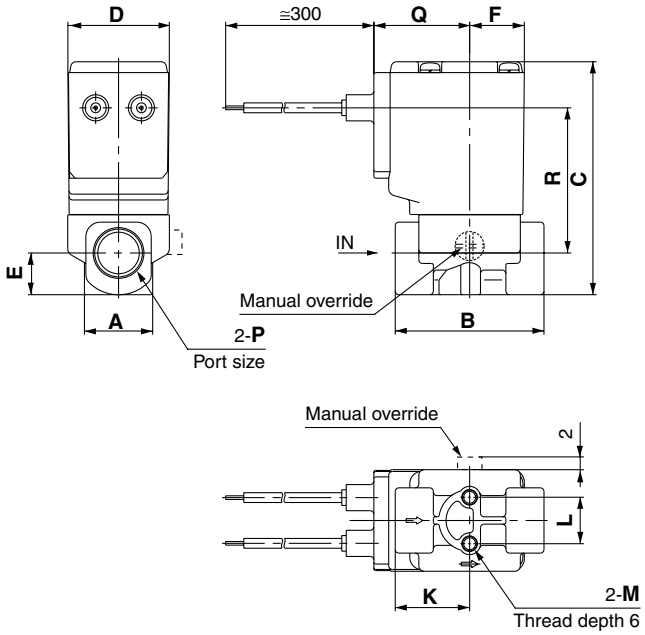
Bracket Mounting Dimensions/Bracket Material: Stainless Steel (mm)

Assembly part no.	A	B	C	D	H	J
VCA20-12-1A	41	52	30	40	4.5	6
VCA30-12-1A	48	56	36	44	5.5	7
VCA40-12-1A	50	62	38	50	5.5	7

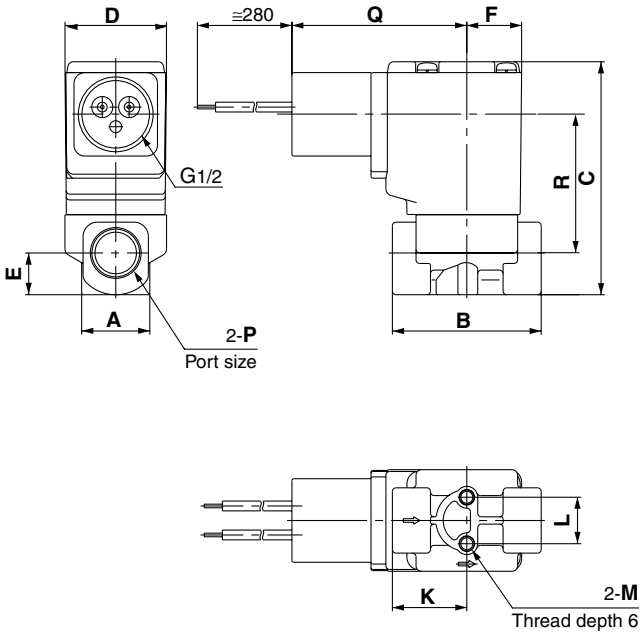
∗ 2 mounting screws (for mounting brackets) are included in bracket part no.

Dimensions

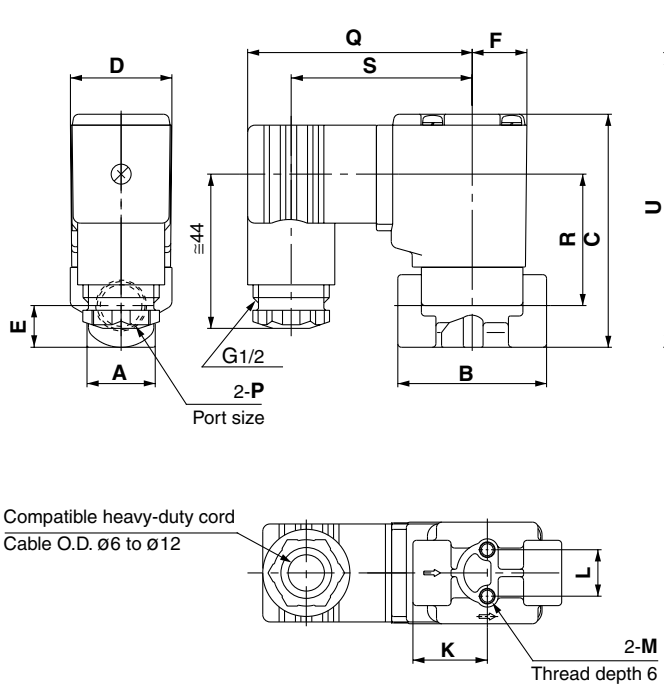
Grommet: G



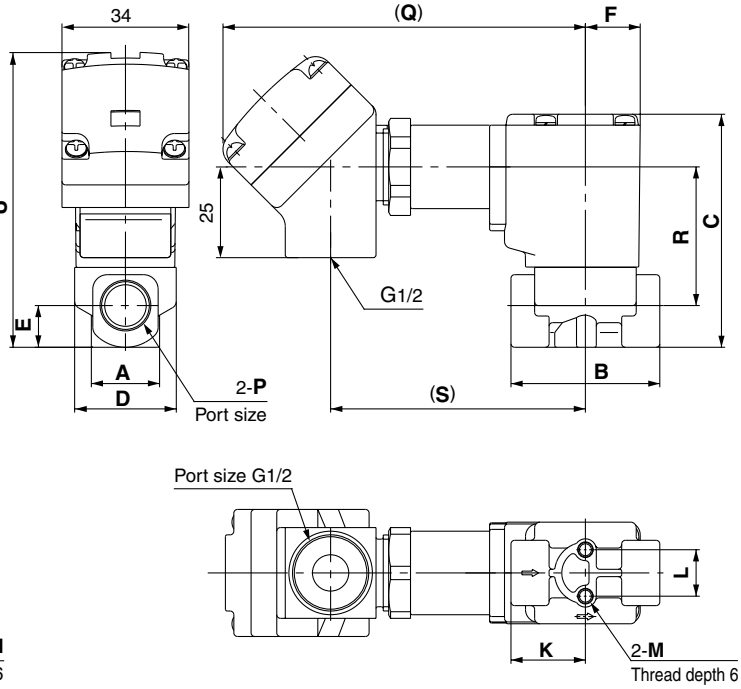
Conduit: C



DIN terminal: D



Conduit terminal: T



(mm)

Model	P Port size	A	B	C	D	E	F	K	L	M	Electrical entry										
											Grommet: G		Conduit: C		DIN terminal: D			Conduit terminal: T			
											Q	R	Q	R	Q	R	S	Q	R	S	U
VCA21	1/4	18	41	64	28	11.5	15	20.5	12.8	M4	27	40	46	36	63	35	51	98	36	68	81
VCA31	1/4, 3/8	24	50	76	34	14	17	25	19	M5	30	48	50	44	66	42	54	101	44	71	91.5
VCA41	3/8, 1/2	30	60	86	40	15	20	30	23	M5	32	56	52	53	69	51	57	104	53	74	101
	3/4	35	68	91	40	17.5	20	34	23	M5	32	58.5	52	55.5	69	53.5	57	104	55.5	74	103.5

Series VCA

How to Order Manifold (VCA20)

VV2C A 2 – 02 02 □ – □ – □

For air

Series

2	Class 2

Stations

02	2 stations
⋮	⋮
10	10 stations

OUT port size

02	1/4 (8A)

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Electrical entry

Nil	Grommet, Conduit, DIN
T	Conduit terminal

IN port direction

Nil	Side
A	Front

How to Order Manifold Assembly

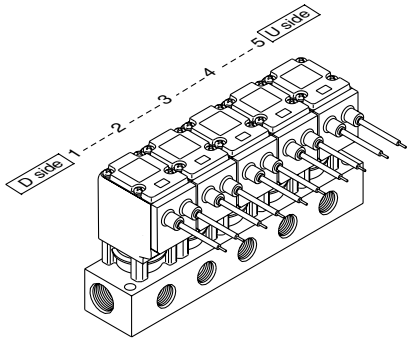
Enter the mounting valve and option part numbers under the manifold base part number.

<Ordering Example>

VV2CA2-0502 ····· 1 set Manifold part no.
∗ VCA23-5G-3 ····· 5 sets Valve part no. (Stations 1 to 5)

"∗" is the symbol for assembly. Add an "∗" in front of the part numbers for solenoid valves, etc., to be mounted.

Enter together in order, counting from station 1 on the D side.



How to Order Valves (VCA20)

VC A 2 3 □ – 1 G □ – 3

For air

Series

2	Class 2

Valve type

3	N.C. for manifold

Fluid

Nil	General air
A	Dry air

Voltage

1	100 VAC
2	200 VAC
3	110 VAC
4	220 VAC
5	24 VDC
6	12 VDC
36	230 VAC

∗ Please consult with SMC regarding other voltages.

Electrical entry

G	Grommet
C	Conduit
T	Conduit terminal
TL	Conduit terminal with indicator light
D	DIN terminal
DL	DIN terminal with indicator light
DO	DIN terminal (without connector)

∗ All types equipped with surge voltage suppressor.

Manual override

Nil	None
B	Slotted locking type (tool required)

Orifice size

Symbol	Orifice size (mmø)
3	3
5	5

How to Order Manifold (VCA30/40)

VV2C A 3 02 □ □

For air

Series

3	Class 3
4	Class 4

Stations

02	2 stations
⋮	⋮
10	10 stations

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

IN port direction

Nil	Side
A	Front

How to Order Manifold Assembly

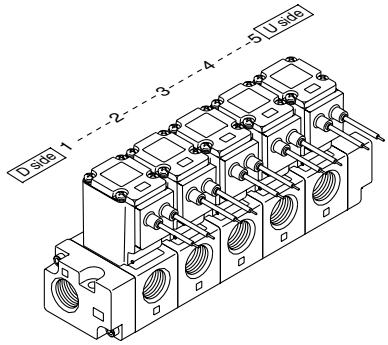
Enter the mounting valve and option part numbers under the manifold base part number.

<Ordering Example>

VV2CA3-05 ····· 1 set Manifold part no.
∗ VCA35-5G-4-03 ····· 5 sets Valve part no. (Stations 1 to 5)

"∗" is the symbol for assembly. Add an "∗" in front of the part numbers for solenoid valves, etc., to be mounted.

Enter together in order, countingfrom station 1 on the D side.



How to Order Valves (VCA30/40)

VC A 3 5 □ 1 G □ 4 03 □

For air

Series

3	Class 3
4	Class 4

Valve type

5	N.C. for manifold

Fluid

Nil	General air
A	Dry air

Voltage

1	100 VAC
2	200 VAC
3	110 VAC
4	220 VAC
5	24 VDC
6	12 VDC
36	230 VAC

∗ Please consult with SMC regarding other voltages.

Electrical entry

G	Grommet
C	Conduit
T	Conduit terminal
TL	Conduit terminal with indicator light
D	DIN terminal
DL	DIN terminal with indicator light
DO	DIN terminal (without connector)

∗ All types equipped with surge voltage suppressor.

Manual override

Nil	None
B	Slotted locking type (Tool required)

Orifice size

Symbol	Orifice size (mmø)	Class 3	Class 4
4	4	○	—
5	5	—	○
7	7	○	○
10	10	—	○

Port size (OUT)

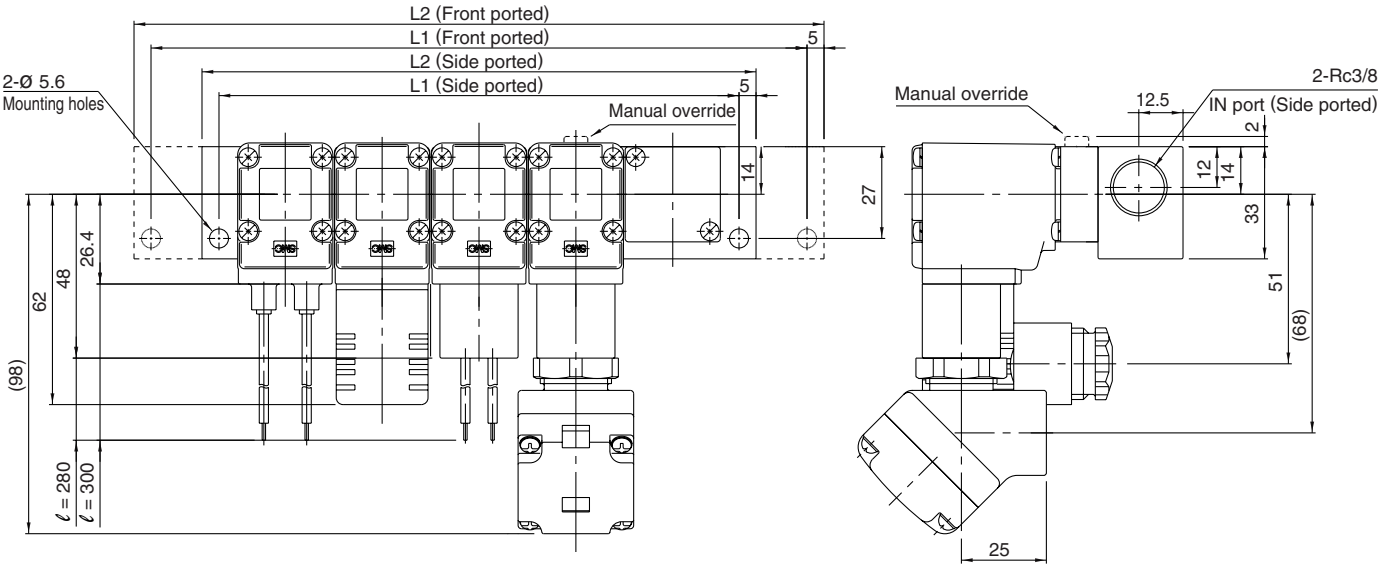
Symbol	Size	Class 3	Class 4
03	3/8 (10A)	○	—
04	1/2 (15A)	○	○
06	3/4 (20A)	—	○

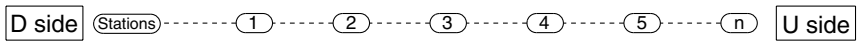
Thread type

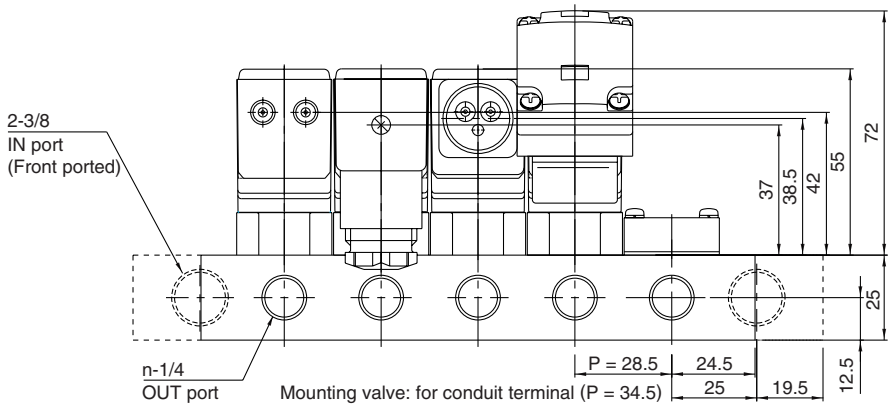
Nil	Rc
F	G
N	NPT
T	NPTF

Series VCA

Dimensions: VCA20 Manifold







Dimensions

Side ported: L1 = n x 28.5 + 10.5 L2 = n x 28.5 + 20.5
Front ported: L1 = n x 28.5 + 50.5 L2 = n x 28.5 + 60.5

(mm)

IN port direction	L \ n	2	3	4	5	6	7	8	9	10
Side ported	L1	67.5	96	124.5	153	181.5	210	238.5	267	295.5
	L2	77.5	106	134.5	163	191.5	220	248.5	277	305.5
Front ported	L1	107.5	136	164.5	193	221.5	250	278.5	307	335.5
	L2	117.5	146	174.5	203	231.5	260	288.5	317	345.5

(When the electrical entry of a valve to be mounted is conduit terminal.)

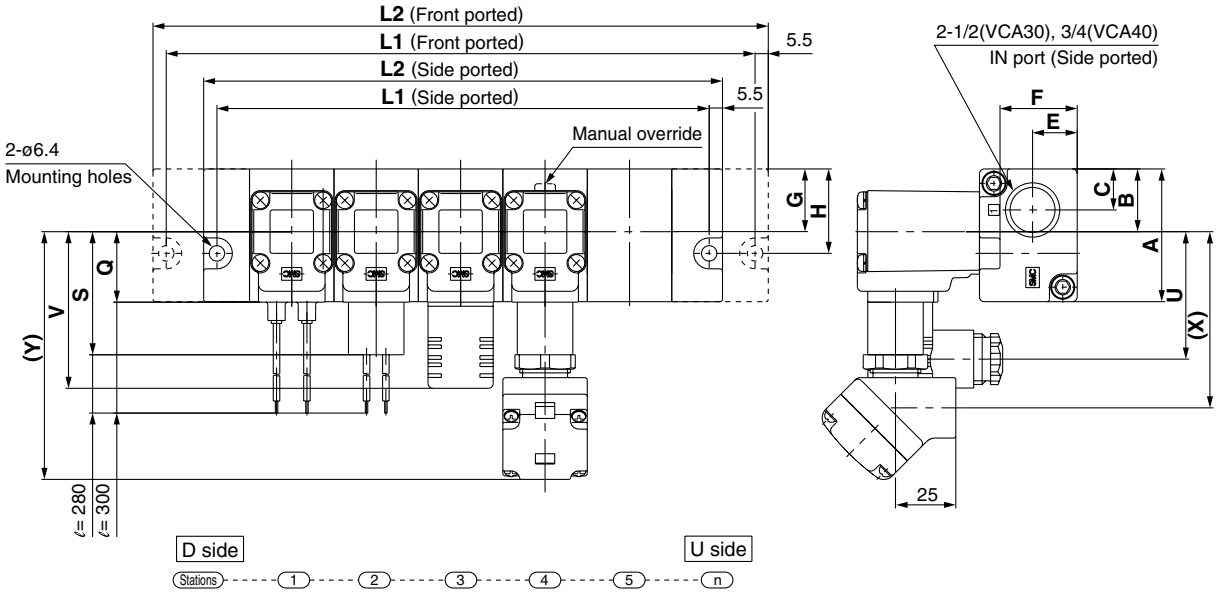
Dimensions

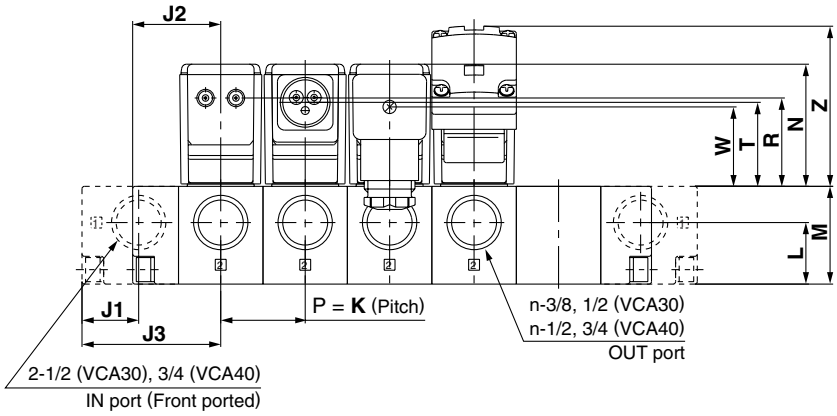
Side ported: L1 = n x 34.5 + 4.5 L2 = n x 34.5 + 14.5
Front ported: L1 = n x 34.5 + 44.5 L2 = n x 34.5 + 54.5

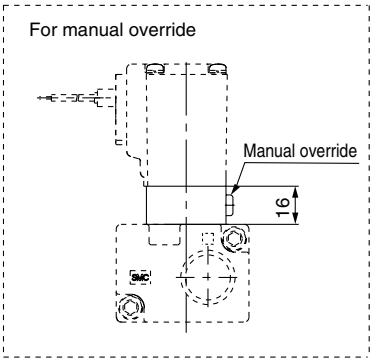
(mm)

IN port direction	L \ n	2	3	4	5	6	7	8	9	10
Side ported	L1	73.5	108	142.5	177	211.5	246	280.5	315	349.5
	L2	83.5	118	152.5	187	221.5	256	290.5	325	359.5
Front ported	L1	113.5	148	182.5	217	251.5	286	320.5	355	389.5
	L2	123.5	158	192.5	227	261.5	296	330.5	365	399.5

Dimensions: VCA30/40 Manifold







L Dimension

(mm)

Model	IN port direction	Dimensions	n (stations)								
			2	3	4	5	6	7	8	9	10
VV2CA3	Side ported	**L1**	103	138	173	208	243	278	313	348	383
		L2	114	149	184	219	254	289	324	359	394
	Front ported	**L1**	139	174	209	244	279	314	349	384	419
		L2	150	185	220	255	290	325	360	395	430
VV2CA4	Side ported	**L1**	117	158	199	240	281	322	363	404	445
		L2	128	169	210	251	292	333	374	415	456
	Front ported	**L1**	161	202	243	284	325	366	407	448	489
		L2	172	213	254	295	336	377	418	459	500

Formulas
VV2CA3
Side ported: L1 = n x 35 + 33, L2 = n x 35 + 44
Front ported: L1 = n x 35 + 69, L2 = n x 35 + 80
VV2CA4
Side ported: L1 = n x 41 + 35, L2 = n x 41 + 46
Front ported: L1 = n x 41 + 79, L2 = n x 41 + 90

Dimensions

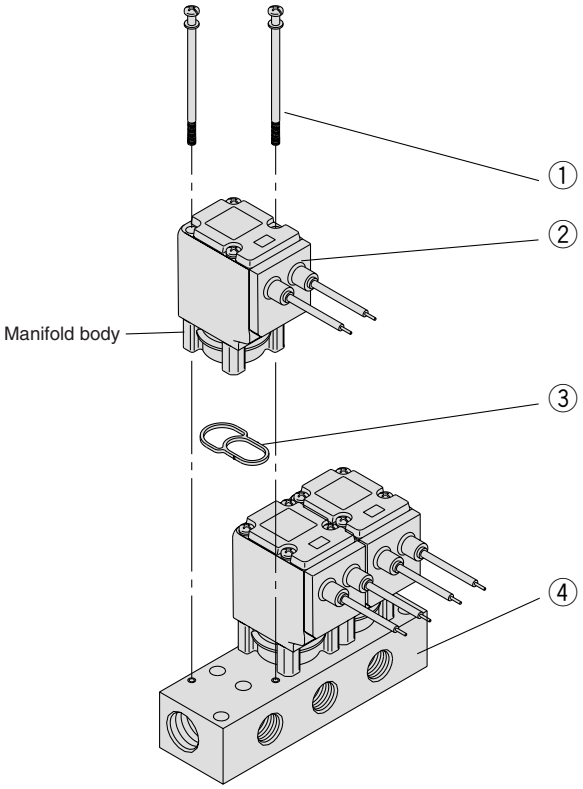
(mm)

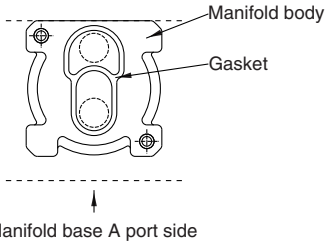
Model	A	B	C	E	F	G	H	J1	J2	J3	K	L	M	N	Electrical entry									
															Grommet: G		Conduit: C		DIN terminal: D			Conduit terminal: T		
															Q	R	S	T	U	V	W	X	Y	Z
VV2CA3	55	26	17	19.5	33	26	35	23.5	39.5	57.5	35	26.5	41.5	50	30	36	50	32	54	66	30	71	101	65.5
VV2CA4	62	31	19	21	39.5	31	43	27	43.5	65.5	41	29	48	55	32	41	52	38	57	69	36	74	104	71

Series VCA

Manifold Exploded View

Series VCA20



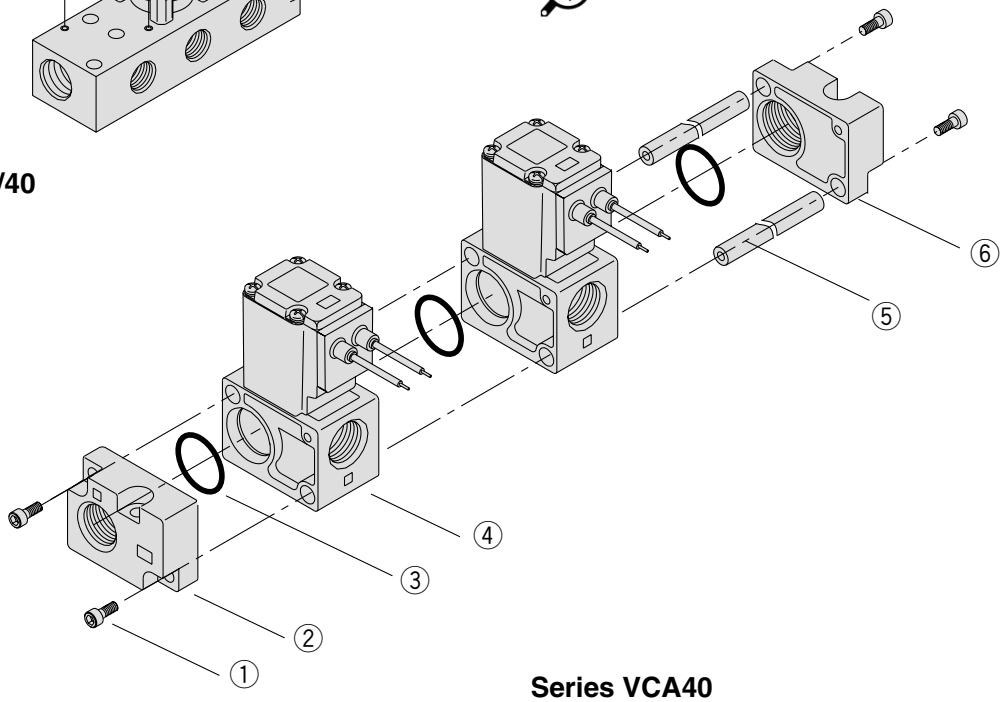


Mounting orientation exists when mounting valves onto manifold base. Mount it as shown above.

No.	Part no.	Description	Material
①	**M3 x 57**	Cross-recessed head machine screw	Steel
②	**VCA23□-□□□-□**	Valve for manifold (1)	
③	**VVCA20-3-1**	Gasket	HNBR
④	**VV2CA2-□□□-□**	Manifold base	Aluminum

Note 1) Gasket ③ is included with manifold valve ②.

Series VCA30/40



Series VCA30

No.	Part no.	Description	Material
①	**AXT632-69-1**	Mounting screw (side port)	Steel
	AXT632-69-2	Mounting screw (front port)	
②	**VVCA30-3A-04-2**	End plate assembly (D side, side port)	Aluminum
	VVCA30-3A-04-1	End plate assembly (D side, front port)	
③	**OR-2200-200-H**	O-ring (for VCA30)	HNBR
④	**VCA35□-□□-□-□□**	Manifold valve (2)	
⑤	**VVCA30-6-n**	Tie-rod	Steel
⑥	**VVCA30-4A-04-2**	End plate assembly (U side, side port)	Aluminum
	VVCA30-4A-04-1	End plate assembly (U side, front port)	

Note 2) O-ring ③ is included with manifold valve ④.

Series VCA40

No.	Part no.	Description	Material
①	**AXT632-69-1**	Mounting screw (side port)	Steel
	AXT632-69-2	Mounting screw (front port)	
②	**VVCA40-3A-06-2**	End plate assembly (D side, side port)	Aluminum
	VVCA40-3A-06-1	End plate assembly (D side, front port)	
③	**OR-3200-200-H**	O-ring (for VCA40)	HNBR
④	**VCA45□-□□-□-□□**	Manifold valve (2)	
⑤	**VVCA40-6-n**	Tie-rod	Steel
⑥	**VVCA40-4A-06-2**	End plate assembly (U side, side port)	Aluminum
	VVCA40-4A-06-1	End plate assembly (U side, front port)	

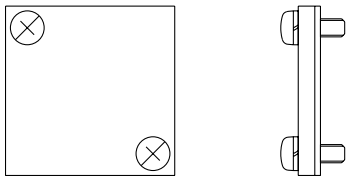
Note 2) O-ring ③ is included with manifold valve ④.

Manifold Option Parts

Blanking plate assembly (VCA20)

VVCA20 − 4A

This is used when a blanking plate is mounted on a manifold as preparation for a planned valve installation. (With gasket, 2 mounting screws)

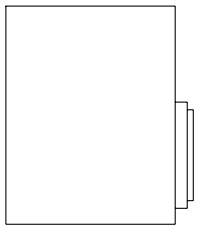


Blanking block assembly (VCA30, 40)

VVCA 3 0 − 2A − 00

3	Series VCA30
4	Series VCA40

This is used when a blanking plate is mounted on a manifold as preparation for a planned valve installation. (With O-ring)



Tie-rod for additional stations (Set of 2 pcs for 1 station) (VCA30, 40)

VVCA 3 0 −6 −1A

3	Series VCA30
4	Series VCA40

Mounted on the tie-rod when adding one station.