

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)

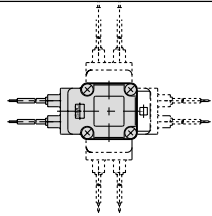
Manifold length reduced by -22% (Class 2 : 5 stations) (SMC comparison)

Built-in surge voltage suppressor

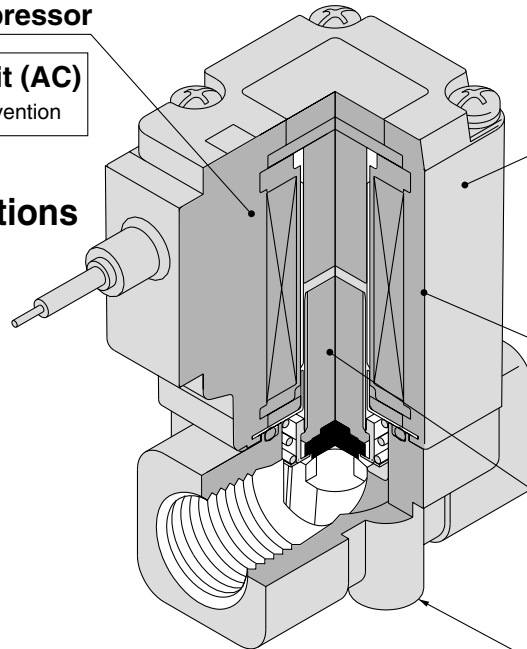
Built-in rectifying circuit (AC)
• Noise prevention • Burn-out prevention

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% } SMC comparison
Weight: -25% } (Class 2)

Flame resistant molded coil material

Flame resistance equivalent to UL94 standard V-0

Special construction reduces operating resistance.

Threaded for bottom mounting

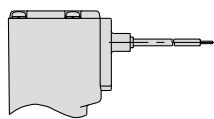
Special bracket can be mounted.

A variety of wiring options

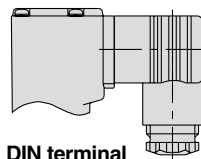
Grommet, DIN terminal,
Conduit, Conduit terminal

Wiring Specifications (Class B coil)

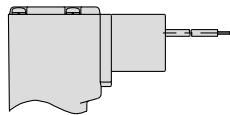
Wiring Variations



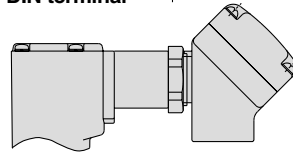
Grommet



DIN terminal



Conduit

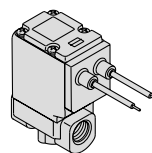


Conduit terminal

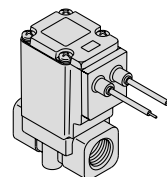
Enclosure: Dusttight

Low jetproof (Equivalent to IP65)

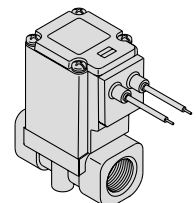
Lined Up by Compact Design



VCA20
Class 2



VCA30
Class 3



VCA40
Class 4

VC□

VDW

VQ

VX2

VX□

VX3

VXA

VN□

LVC

LVA

L VH

LVD

LVQ

LQ

LVN

TI/
TIL

PA

PAX

PB

⚠ Precautions

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

Operation by Manual Override

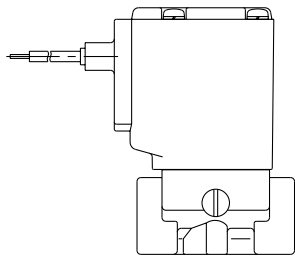
⚠ Warning

Operation

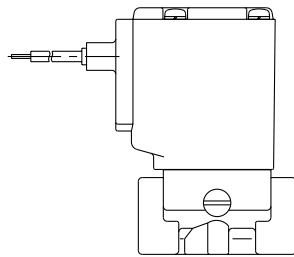
Opening the valve: Turn 90° clockwise by a flat head screwdriver to open the valve. Besides, the valve remains in the open state even when a screwdriver is detached.

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

Perform an electrical 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.

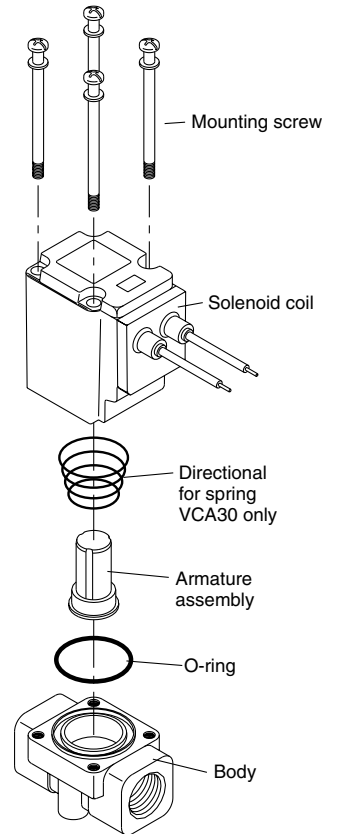
When changing the electrical entry direction, mount it in the direction that solenoid coils will be mounted.

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.

VC□

VDW

VQ

VX2

VX□

VX3

VXA

VN□

LVC

LVA

LVH

LVD

LVQ

LQ

LVN

T/
TIL

PA

PAX

PB

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

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)

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.

Manual override

Nil	None
B	Slotted locking type (Tool required)

Table (1) Orifice and Port Size Combinations

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

* All types are equipped with surge voltage suppressor.

Direct Operated 2 Port Solenoid Valve For Air Series **VCA**

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 cm ³ /min (ANR)		0.2 or less	
	Mounting orientation		Unrestricted	
	Vibration/Impact resistance (m/s ²) ⁽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 occurred 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 occurred when tested. (Value at the initial state).

VC □

VDW

VQ

VX2

VX □

VX3

VXA

VN □

LVC

LVA

L VH

LVD

LVQ

LQ

LVN

TI/
TIL

PA

PAX

PB

Characteristic Specifications

Model	Class	Port size	Orifice size (mmø)	Max. operating pressure differential (MPa)	Flow characteristics			Max. operating pressure (MPa)	Weight ⁽¹⁾ (kg)
					C [dm ³ /(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		
			5	1.0	3.0	0.35	0.78		
	4	3/8 (10A) 1/2 (15A) 3/4 (20A)	7	0.3	5.4	0.27	1.4	1.0	0.50
			10	0.15	7.7	0.23	1.9		



Note 1) Weight values are for the grommet type.

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



Made to Order Specifications

Oil-free specifications

VCA²₃**1A**-□□□-□-□□-□□-□□-□□**-X15**₄

Normally open (N.O.) specifications

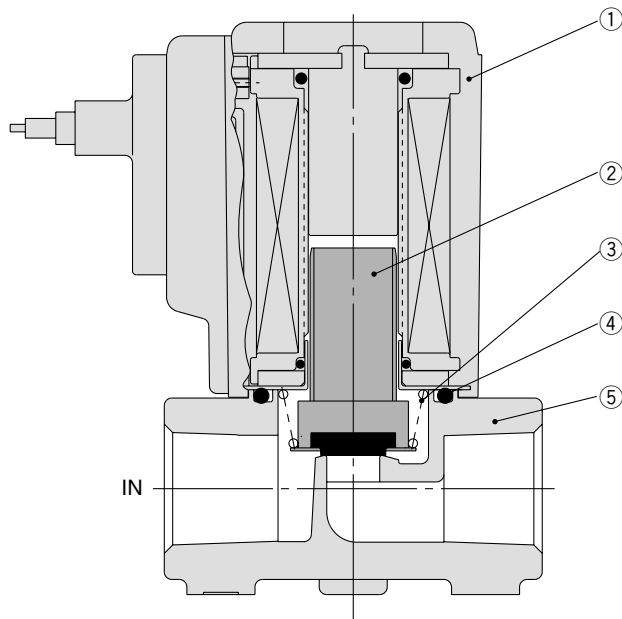
VCW²₃**2**-□□□-□-□□-□□-□□**-X43**₄



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

Series VCA

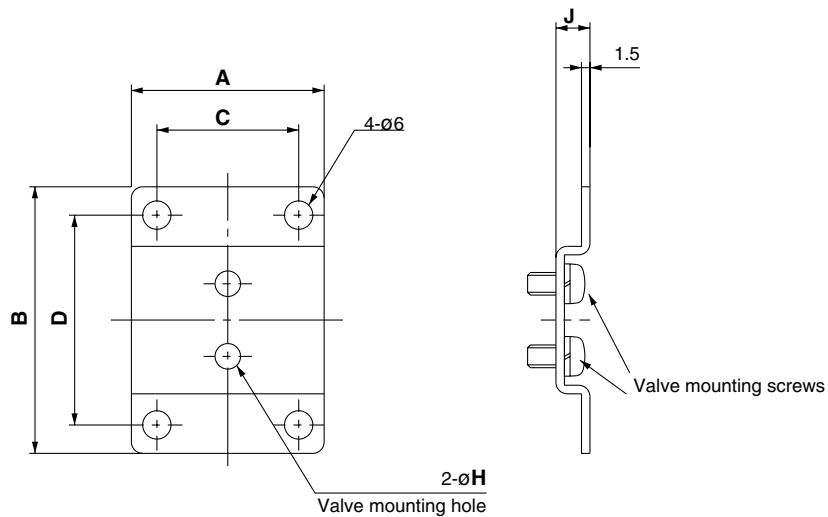
Construction



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)

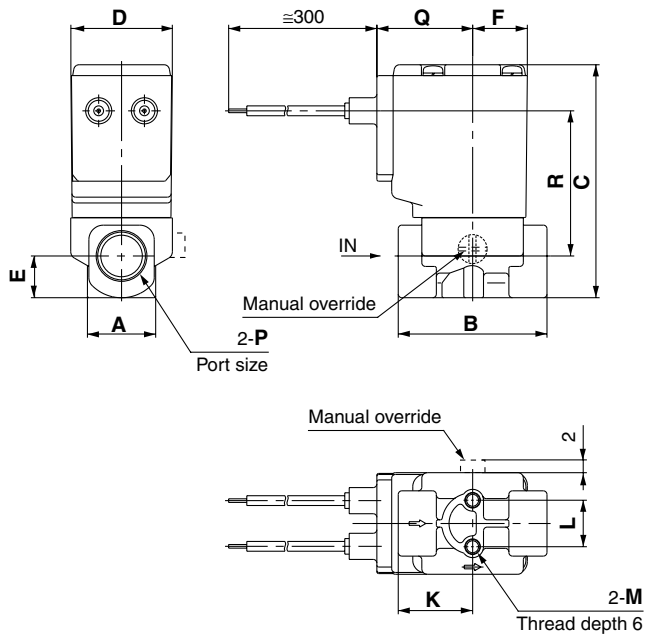
Assembly part no.	A	B	C	D	H	J
VCA20-12-1A	41	52	30	40	4.5	6
VCA30-12-1A	48	56	36	44	5.5	7
VCA40-12-1A	50	62	38	50	5.5	7

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

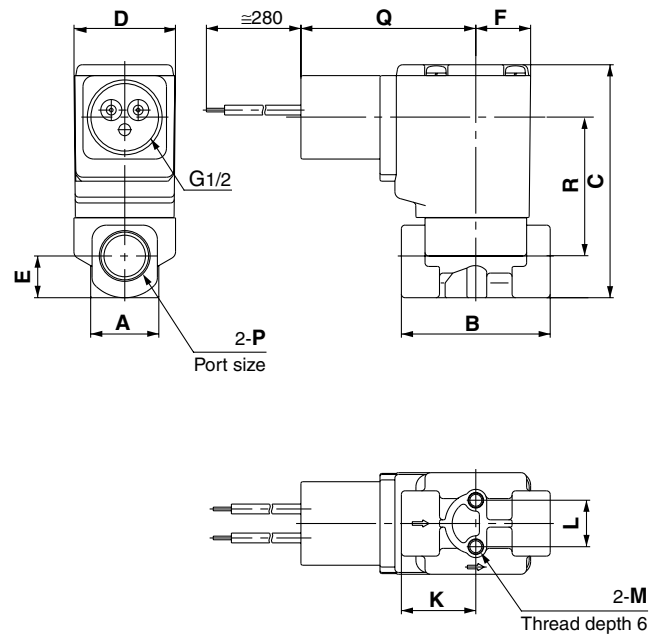
Direct Operated 2 Port Solenoid Valve For Air Series VCA

Dimensions

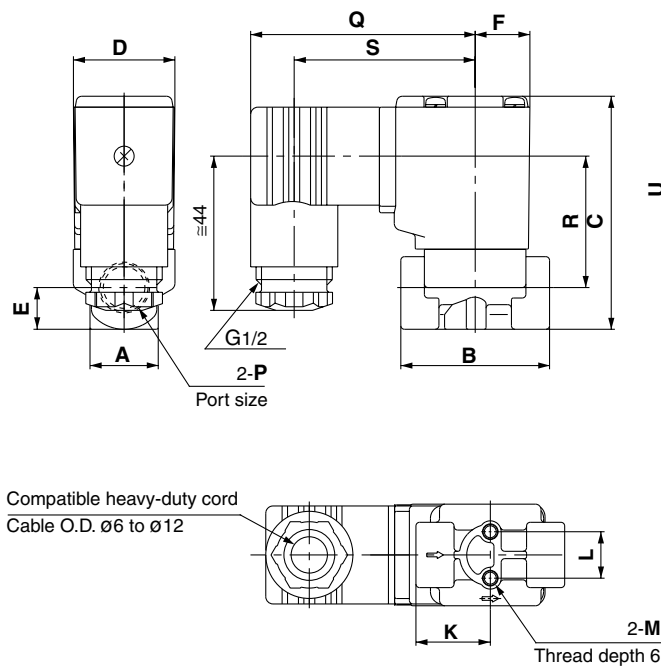
Grommet: G



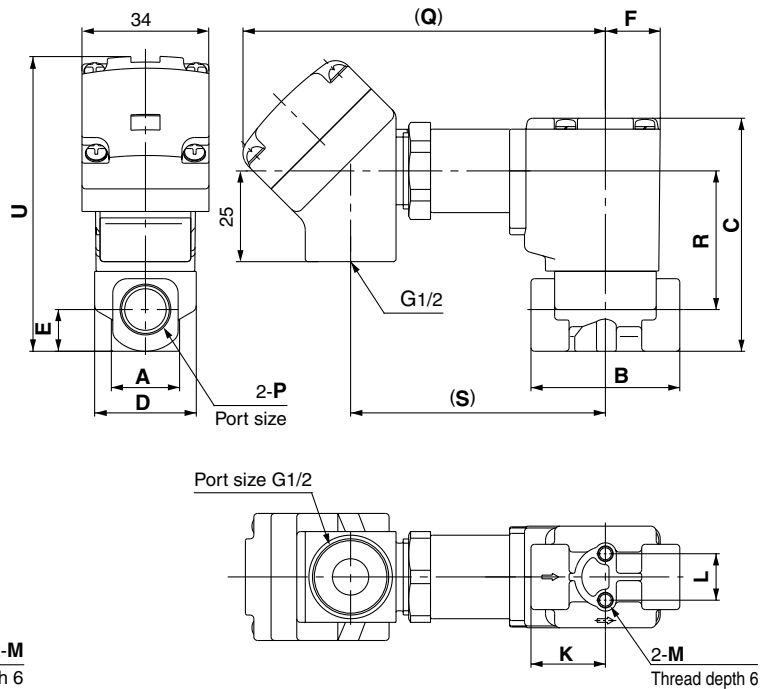
Conduit: C



DIN terminal: D



Conduit terminal: T



- VC□
- VDW
- VQ
- VX2
- VX□
- VX3
- VXA
- VN□
- LVC
- LVA
- L VH
- LVD
- LVQ
- LQ
- LVN
- TI/
TIL
- PA
- PAX
- PB

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

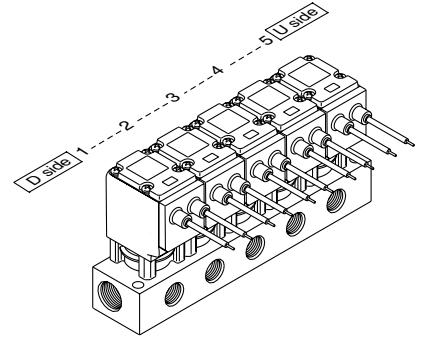
Enter the mounting valve and option part numbers under the manifold base part number.

<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

Orifice size

Symbol	Orifice size (mmØ)
3	3
5	5

Manual override

Nil	None
B	Slotted locking type (tool required)

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)

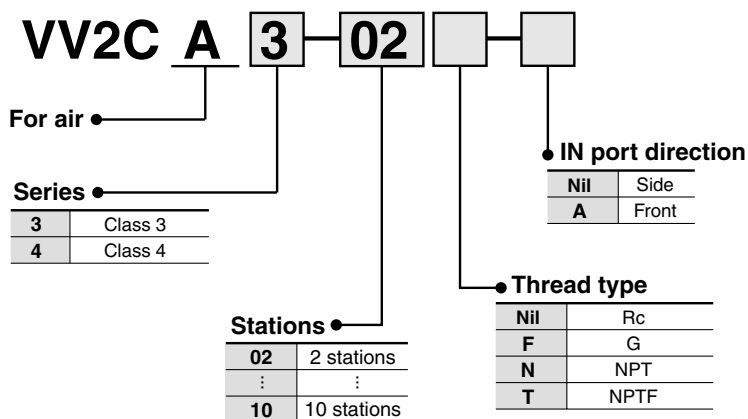
Voltage ●

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.

* All types equipped with surge voltage suppressor.

How to Order Manifold (VCA30/40)



How to Order Manifold Assembly

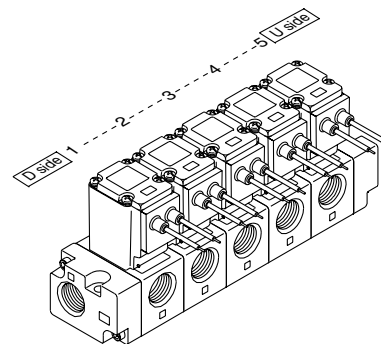
Enter the mounting valve and option part numbers under the manifold base part number.

<Ordering Example>

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

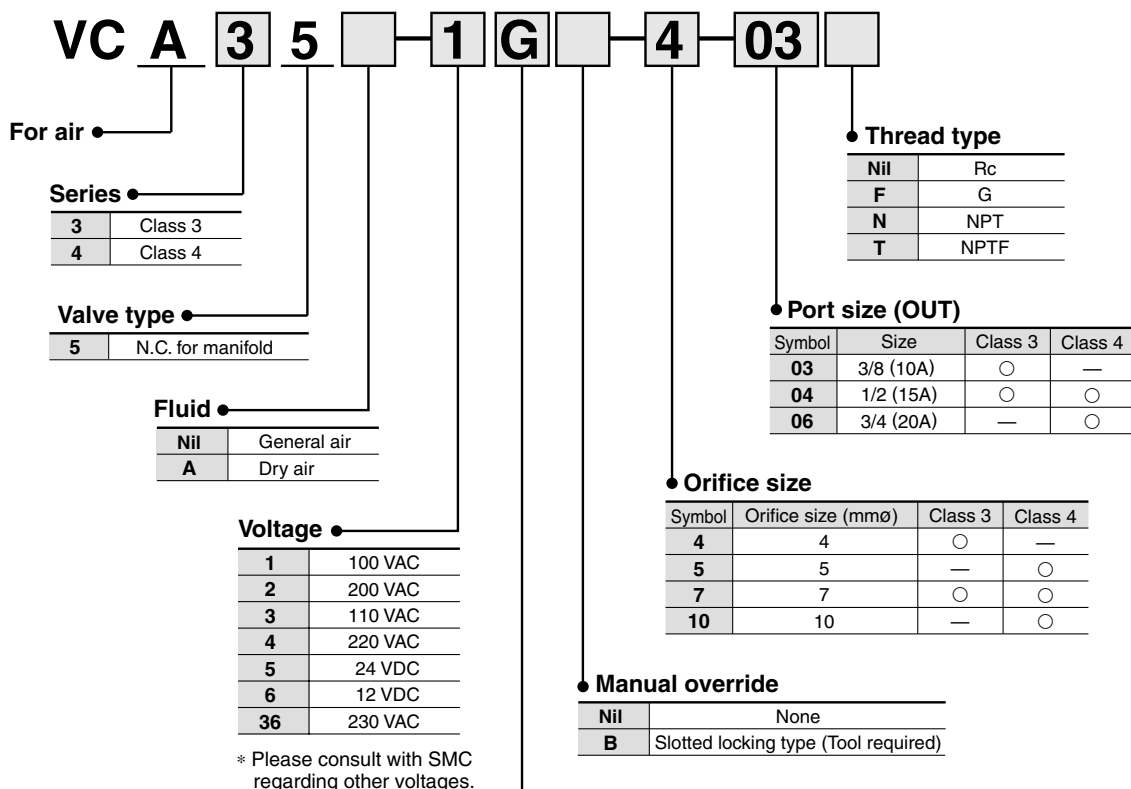
"*" is the symbol for assembly. Add an "*" in front of the part numbers for solenoid valves, etc., to be mounted.

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



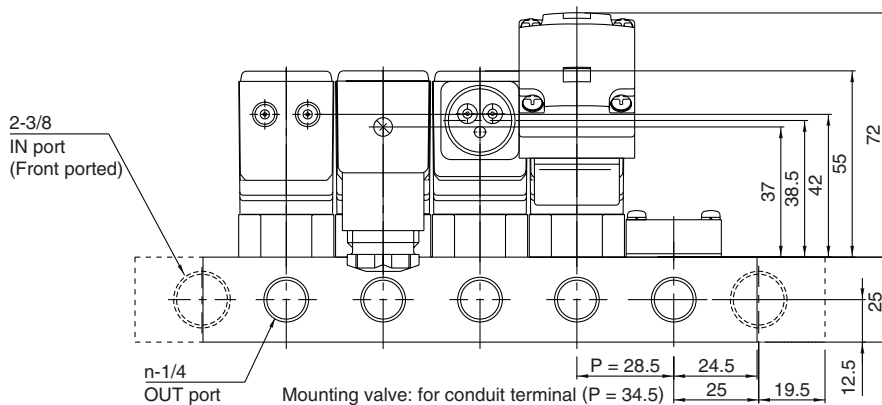
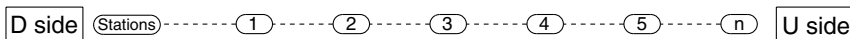
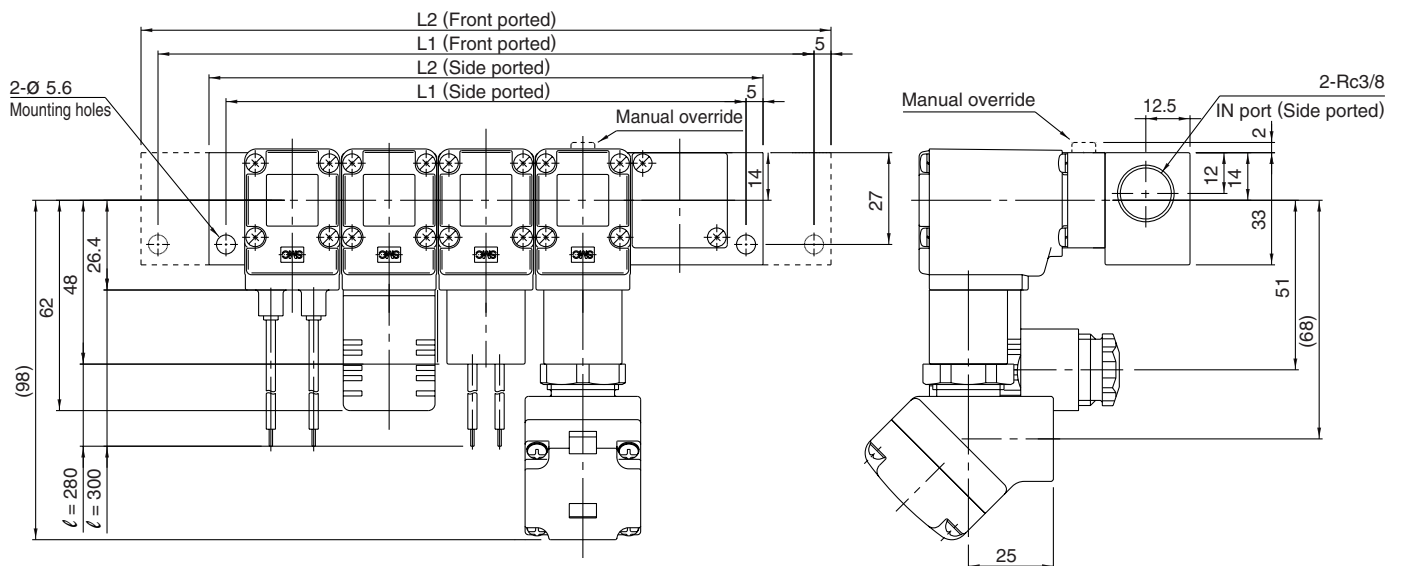
- VC
- VDW
- VQ
- VX2
- VX
- VX3
- VXA
- VN
- LVC
- LVA
- LVH
- LVD
- LVQ
- LQ
- LVN
- TI/TIL
- PA
- PAX
- PB

How to Order Valves (VCA30/40)



Series VCA

Dimensions: VCA20 Manifold



Side ported: L1 = $n \times 28.5 + 10.5$ L2 = $n \times 28.5 + 20.5$
 Front ported: L1 = $n \times 28.5 + 50.5$ L2 = $n \times 28.5 + 60.5$ (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

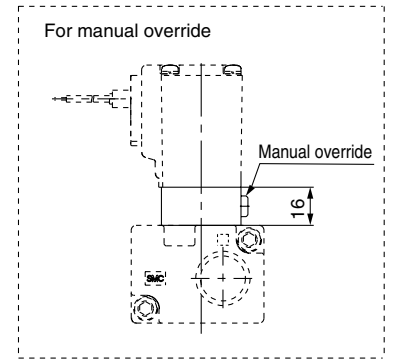
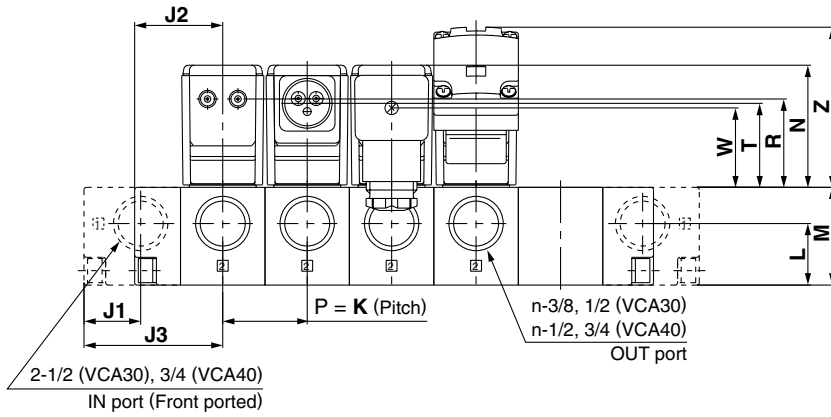
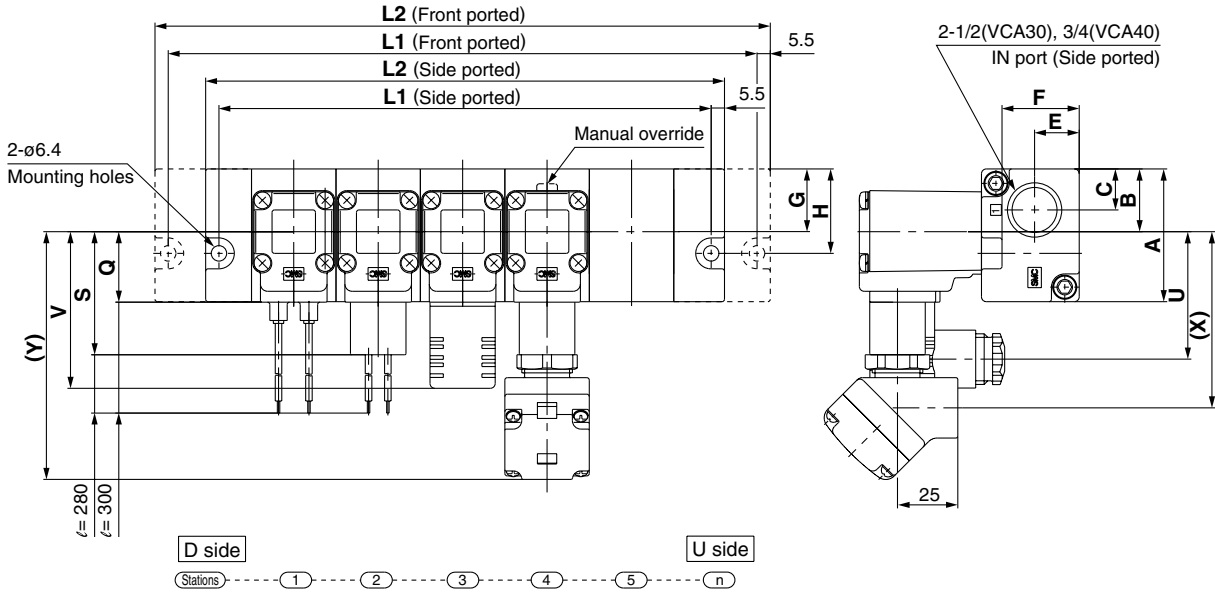
(When the electrical entry of a valve to be mounted is conduit terminal.)

Side ported: L1 = $n \times 34.5 + 4.5$ L2 = $n \times 34.5 + 14.5$
 Front ported: L1 = $n \times 34.5 + 44.5$ L2 = $n \times 34.5 + 54.5$ (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

Direct Operated 2 Port Solenoid Valve For Air Series VCA

Dimensions: VCA30/40 Manifold



L Dimension

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: $L1 = n \times 35 + 33$, $L2 = n \times 35 + 44$
 Front ported: $L1 = n \times 35 + 69$, $L2 = n \times 35 + 80$
 VV2CA4
 Side ported: $L1 = n \times 41 + 35$, $L2 = n \times 41 + 46$
 Front ported: $L1 = n \times 41 + 79$, $L2 = n \times 41 + 90$

Dimensions

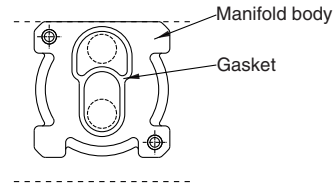
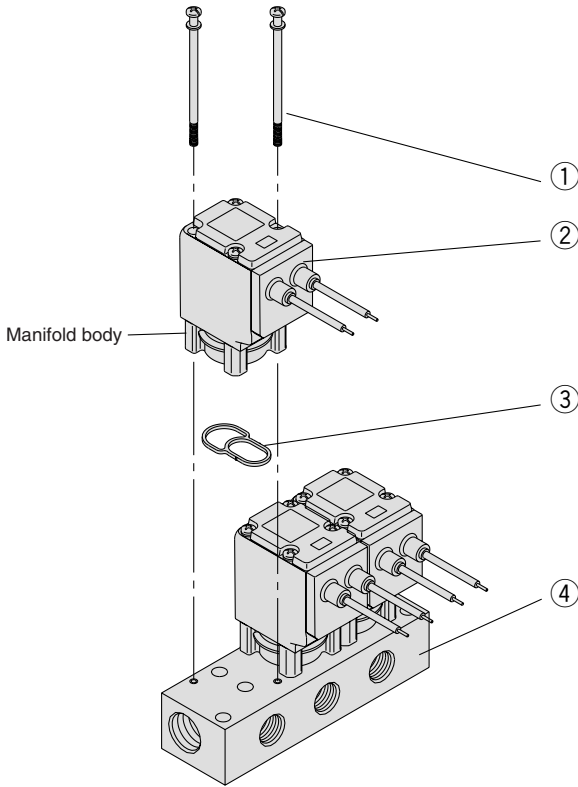
Model	A	B	C	E	F	G	H	J1	J2	J3	K	L	M	N	Electrical entry									
															Grommet: G		Conduit: C		DIN terminal: D		Conduit terminal: T			
															Q	R	S	T	U	V	W	X	Y	Z
VV2CA3	55	26	17	19.5	33	26	35	23.5	39.5	57.5	35	26.5	41.5	50	30	36	50	32	54	66	30	71	101	65.5
VV2CA4	62	31	19	21	39.5	31	43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

- VC□
- VDW
- VQ
- VX2
- VX□
- VX3
- VXA
- VN□
- LVC
- LVA
- LVH
- LVD
- LVQ
- LQ
- LVN
- TI/TIL
- PA
- PAX
- PB

Series VCA

Manifold Exploded View

Series VCA20



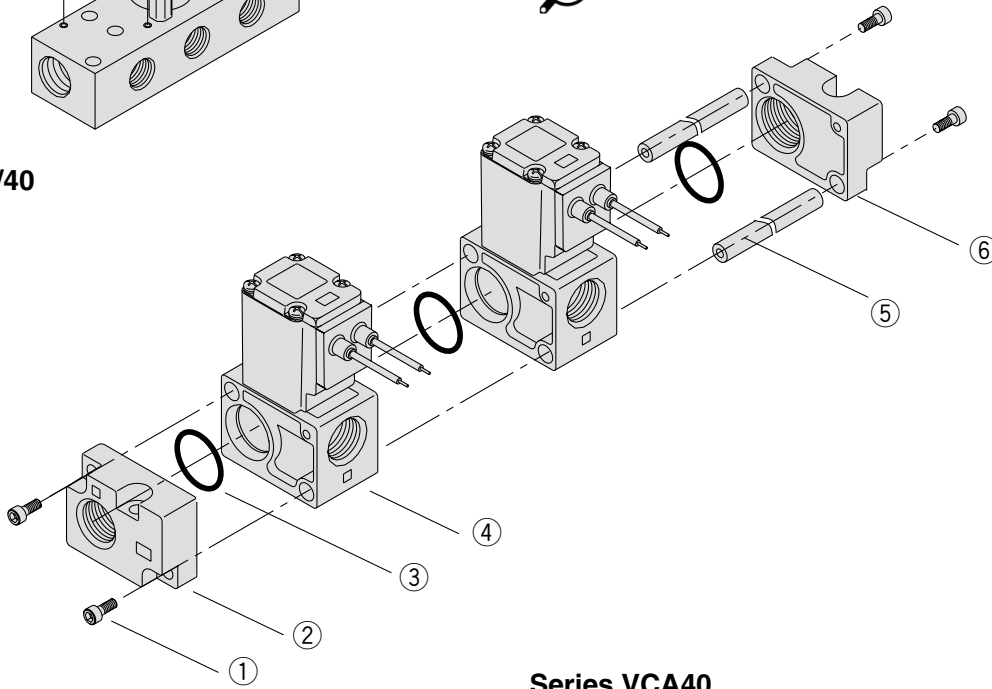
Manifold base A port side

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)	

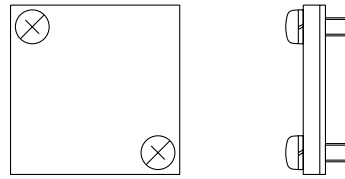
Note 2) O-ring ③ is included with manifold valve ④.

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)

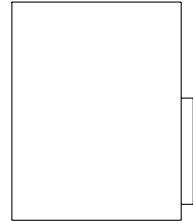


Blanking block assembly (VCA30, 40)

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)

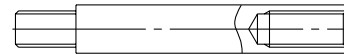


Tie-rod for additional stations (Set of 2 pcs for 1 station) (VCA30, 40)

VVCA 3 0 - 6 - 1A

3	Series VCA30
4	Series VCA40

Mounted on the tie-rod when adding one station.



VC□

VDW

VQ

VX2

VX□

VX3

VXA

VN□

LVC

LVA

LVH

LVD

LVQ

LQ

LVN

TI/
TIL

PA

PAX

PB