

Direct Operated 2 Port Solenoid Valve For Heated Water Series VCB

Improved durability (Nearly twice the life of the previous series)

Resistance of moving parts has been reduced through the use of a unique magnetic material. Service life, wear resistance, and corrosion resistance are improved.

Large flow rate: Av factor 3.84 to $50.40 \times 10^{-6} \text{ m}^2$

Compact: Single valve volume reduced by -15% (Class 3)

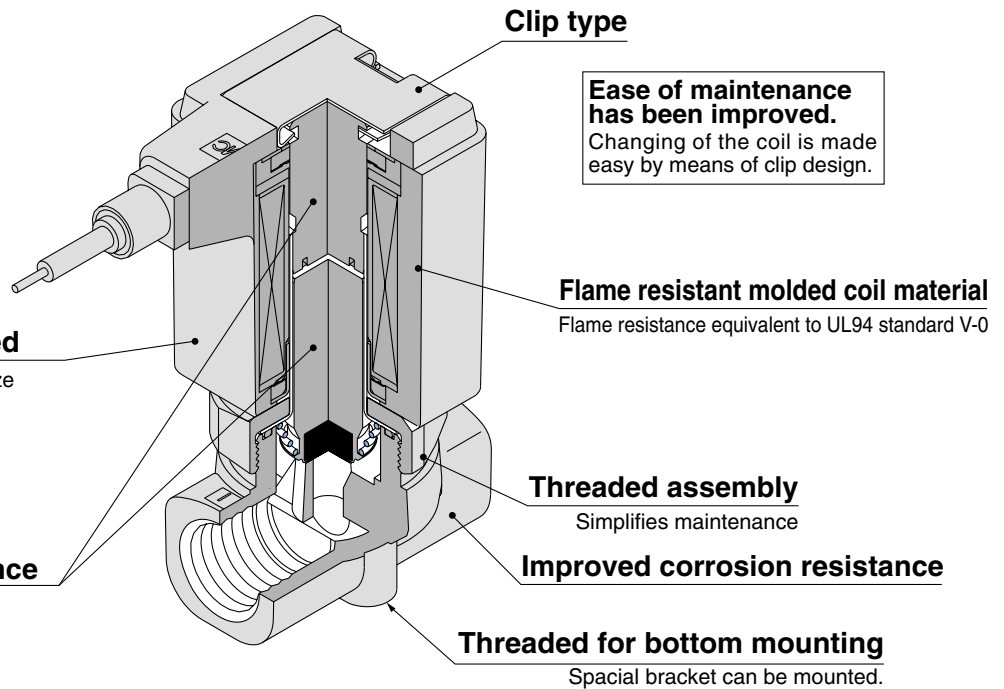
Coil size and weight reduced

New compact coil reduces the overall size and weight of the valve.

Volume: -15% } SMC comparison
Weight: -20% } (Class 3)

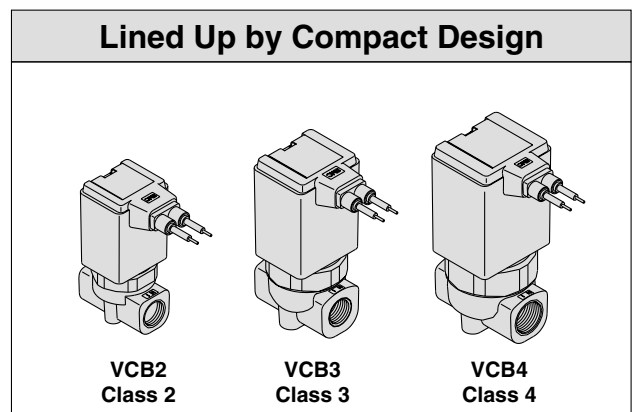
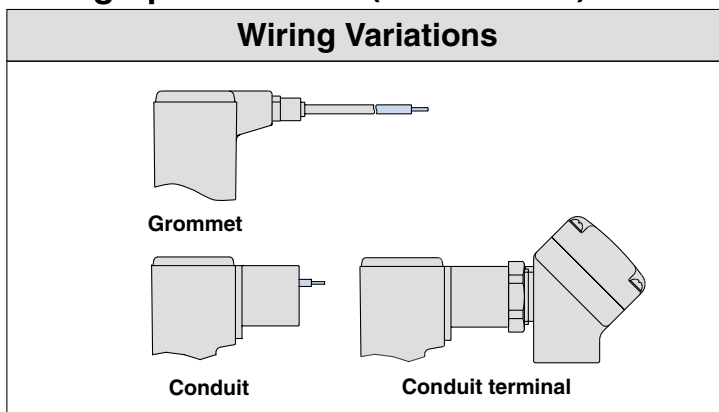
Improved corrosion resistance

Special material introduced.



Enclosure: Dusttight/Low jetproof (Equivalent to IP65)

Wiring Specifications (Class H coil)



VC□

VDW

VQ

VX2

VX□

VX3

VXA

VN□

LVC

LVA

L VH

LVD

L VQ

LQ

L VN

TI/
TIL

PA

PAX

PB

Series VCB

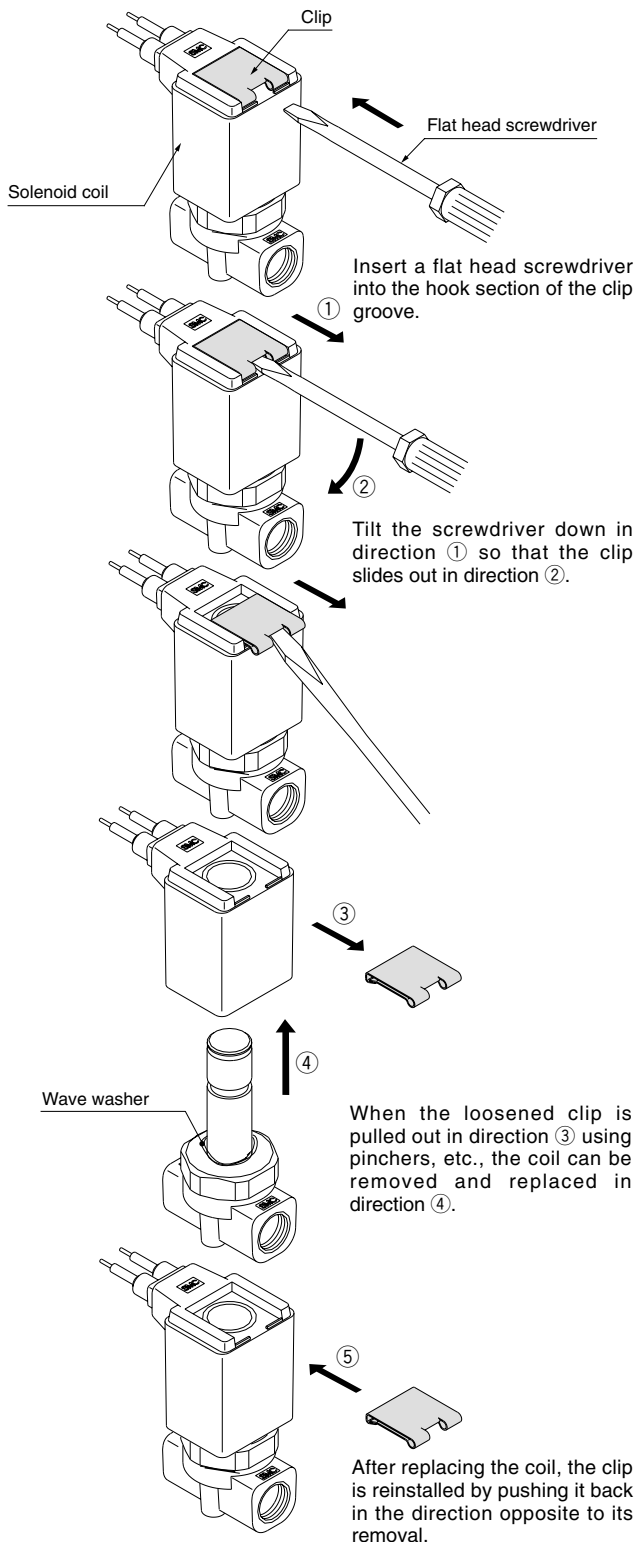
⚠ Precautions

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

Replacing the Solenoid Coils

⚠ Caution

The valve will reach high temperatures from high temperature fluids such as heated water. Confirm that the valve has cooled sufficiently before performing works. If touched inadvertently, there is a danger of being burned.



Replacement Parts

• Solenoid coil part no.

VCS 20 1 G

Series	
20	Class 2
30	Class 3
40	Class 4

• Voltage

1	100 VAC
2	200 VAC
3	110 VAC
4	220 VAC
36	230 VAC

• Lead wire length

Nil	300 mm
L1	600 mm
L2	1000 mm
L3	1500 mm
L4	3000 mm

Note) Grommet type only

• Electrical entry

G	Grommet
C	Conduit
T	Conduit terminal

• Clip part no.

AZ-T-VCB Valve model no. on page 17-2-24

Note) Indicate the valve model no. as a label will be attached to the clip.

• Seal part no.

Valve

For VCB20

OR-1860-120-F

F: FKM
E: EPDM

For VCB30

OR-2380-130-F

F: FKM
E: EPDM

For VCB40

OR-2600-180-F

F: FKM
E: EPDM

When external leakage occurs after disassembling a valve, replace the above seals.

• Wave washer part no.

For VCB20: 41014

For VCB30: 41016

For VCB40: 41018

⚠ 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 (the difference between the inlet and outlet pressure) which can be allowed for operation with the valve closed or open. When the outlet pressure is 0 MPa, this becomes the maximum operating pressure.

2. Maximum operating pressure

This indicates the limit of pressure that can be applied inside the pipelines. (line pressure)
(The pressure differential of the solenoid valve unit must be no more than the maximum operating pressure differential.)

3. Withstand pressure

The pressure which must be withstood without deterioration in performance when the valve returns to the operating pressure range (The value under the specified conditions).

Electricity

1. Surge voltage

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

Others

1. Material

FKM: Fluoro rubber = FPM — Trade names: Viton®, Dai-El®, etc.

EPDM: Ethylene propylene rubber

CAC406: Bronze (BC6)

C37: Brass

SUS: Stainless steel

2. JIS symbol

According to JIS symbol, even though (□□□□) IN and OUT shows the blocked state (⊥), when there is reverse pressure (OUT > IN), there is limited blocking ability. To describe the fact that it cannot be blocked by reverse pressure, (□↑□□) symbol is used here.

VC□

VDW

VQ

VX2

VX□

VX3

VXA

VN□

LVC

LVA

LVH

LVD

LVQ

LQ

LVN

TI/
TIL

PA

PAX

PB

Direct Operated 2 Port Solenoid Valve For Heated Water

Series VCB

How to Order Valves

VC B 2 1 1 G 2 02

For heated water ●
When no symbol is shown for "Material and insulation type"
● Body material: CAC406
● Seal material: FKM
● Coil insulation: Class H

Series ●

2	Class 2
3	Class 3
4	Class 4

Valve type ●

1

Voltage ●

1	100 VAC
2	200 VAC
3	110 VAC
4	220 VAC
36	230 VAC

* Please consult with SMC regarding other voltages.

Electrical entry ●

G - Grommet	C - Conduit
T - Conduit terminal	

* Available types of electrical entry are either G, C and T. (Surge voltage suppressor is not equipped.)

Option

Nil	None
F	Foot type bracket

Material and insulation type

Symbol	Body material	Seal material	Coil insulation type
Nil	CAC406 (BC6)	FKM	Class H
M		EPDM	
N	SUS	FKM	
P		EPDM	

Thread type

Nil	Rc
N	NPT
F	G

Port size

Symbol	Port size	Class 2	Class 3	Class 4
01	1/8 (6A)	○	—	—
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
2	2	○	—	—
3	3	○	○	○
4	4	○	○	○
5	5	○	○	○
7	7	—	○	○
10	10	—	○	○

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

Orifice and Port Size Combinations

Class	Port size	Orifice size (mmø)					
		2	3	4	5	7	10
2	1/8 (6A)	●	●	●	●	—	—
	1/4 (8A)	●	●	●	●	—	—
3	1/4 (8A)	—	●	●	●	●	—
	3/8 (10A)	—	●	●	●	●	●
4	1/2 (15A)	—	—	—	—	—	●
	1/4 (8A)	—	●	●	●	●	—
	3/8 (10A)	—	●	●	●	●	●
	1/2 (15A)	—	—	—	—	—	●
	3/4 (20A)	—	—	—	—	—	●

Direct Operated 2 Port Solenoid Valve For Heated Water **Series VCB**

Standard Specifications



		Valve construction	Direct operated poppet	
		Fluid	Heated water (99°C or less)	
		Withstand pressure (MPa)	5.0	
Valve specifications		Body material	CAC406 (BC6), Stainless steel	
		Seal material	FKM, EPDM	
		Ambient temperature (°C)	-20 to 100	
		Fluid temperature (°C)	1 to 99	
		Enclosure	Dusttight, low jetproof (equivalent to IP65)	
		Environment	Location without corrosive or explosive gases	
		Valve leakage cm³/min	0 (With water pressure)	
		Mounting orientation	Unrestricted	
		Vibration/Impact resistance (m/s²) ^{Note1)}	30/150 or less	
	Coil specifications		Rated voltage	100 VAC, 110 VAC, 200 VAC, 220 VAC, 230 VAC (50/60 Hz)
			Allowable voltage fluctuation	±10% of rated voltage
		Coil insulation type	Class H	
		Power consumption (W) 50/60 Hz	VCB2: 4.9/4.1, VCB3: 7.7/6.6, VCB4: 10.5/9.3	
		Apparent power (VA) 50/60 Hz	Inrush: VCB2: 22/19, VCB3: 36/30, VCB4: 45/37 Holding: VCB2: 10/8, VCB3: 15/13, VCB4: 19/16	



Note1) Vibration resistance Conditions when tested with one sweep of 10 to 250 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 the 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)

Characteristic Specifications

Model	Class	Port size ⁽¹⁾	Orifice size (mmØ) ⁽¹⁾	Max. operating pressure differential (MPa)	Flow characteristics		Max. operating pressure (MPa)	Weight (kg)
					Av x 10 ⁻⁶ (m²)	Cv converted		
VCB2	2	1/8 (6A) 1/4 (8A)	2	2.0	3.8	0.16	3.0	1/8 : 0.21 1/4 : 0.24
			3	0.8	7.9	0.33		
			4	0.5	12	0.51		
			5	0.3	16	0.65		
VCB3	3	1/4 (8A) 3/8(10A) 1/2(15A)	3	2.0	8.4	0.35	3.0	1/4 : 0.42 3/8 : 0.40 1/2 : 0.49
			4	0.8	13	0.54		
			5	0.5	19	0.80		
			7	0.2	33	1.4		
			10	0.1	50	2.1		
VCB4	4	1/4 (8A) 3/8(10A) 1/2(15A) 3/4(20A)	3	3.0	8.4	0.35	3.0	1/4 : 0.58 3/8 : 0.55 1/2 : 0.62 3/4 : 0.78
			4	1.3	14	0.60		
			5	0.7	20	0.85		
			7	0.3	33	1.4		
			10	0.12	50	2.1		



Note 1) Refer to model selection on page 17-2-24 regarding port size and orifice size combinations.
Note 2) The weight is the value for the grommet type.

Made to Order Specifications

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



Oil-free specifications

VCB-□□-□□-□-□□-□□-□□-□□-**X10**

VC□

VDW

VQ

VX2

VX□

VX3

VXA

VN□

LVC

LVA

LVH

LVD

LVQ

LQ

LVN

TI/
TIL

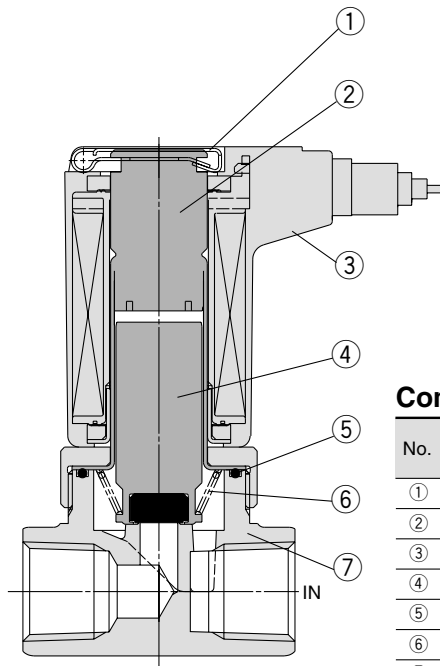
PA

PAX

PB

Series VCB

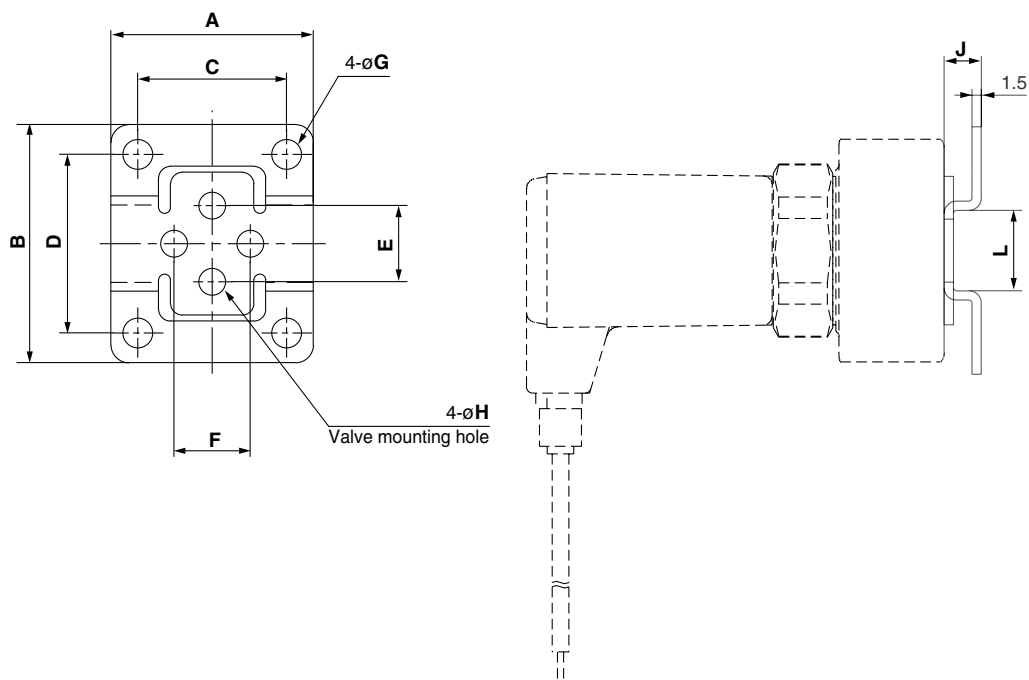
Construction



Component Parts

No.	Description	Material	
		Standard	Option
①	Clip	Stainless steel	—
②	Tube assembly	Stainless steel/Cu	Stainless steel/Ag
③	Coil assembly	Class H	—
④	Armature assembly	Stainless steel/FKM	Stainless steel/EPDM
⑤	Seal	FKM	EPDM
⑥	Return spring	Stainless steel	—
⑦	Body	CAC406	Stainless steel

Dimensions: Bracket



Bracket Mounting Dimensions/Bracket Material: Stainless Steel

Valve model	Port size	Bracket part no.	A	B	C	D	E	F	G	H	J	L
VCB2□	1/8, 1/4	VCW20-12-01A	34	40	25	30	12.8	12.8	5	4.5	6	13
VCB3□	1/4, 3/8	VCW30-12-02A	42	52	30	40	19	19	6	5.5	7	19
	1/2	VCW30-12-04A ^{Note 1)}	48	56	36	44	23	23	6	5.5	7	23
VCB4□	1/4, 3/8	VCW40-12-02A	42	52	30	40	23	23	6	5.5	7	19
	1/2	VCW30-12-04A ^{Note 1)}	48	56	36	44	23	23	6	5.5	7	23
	3/4	VCW40-12-06A	56	65	44	53	28.2	28.2	6	5.5	7	26

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

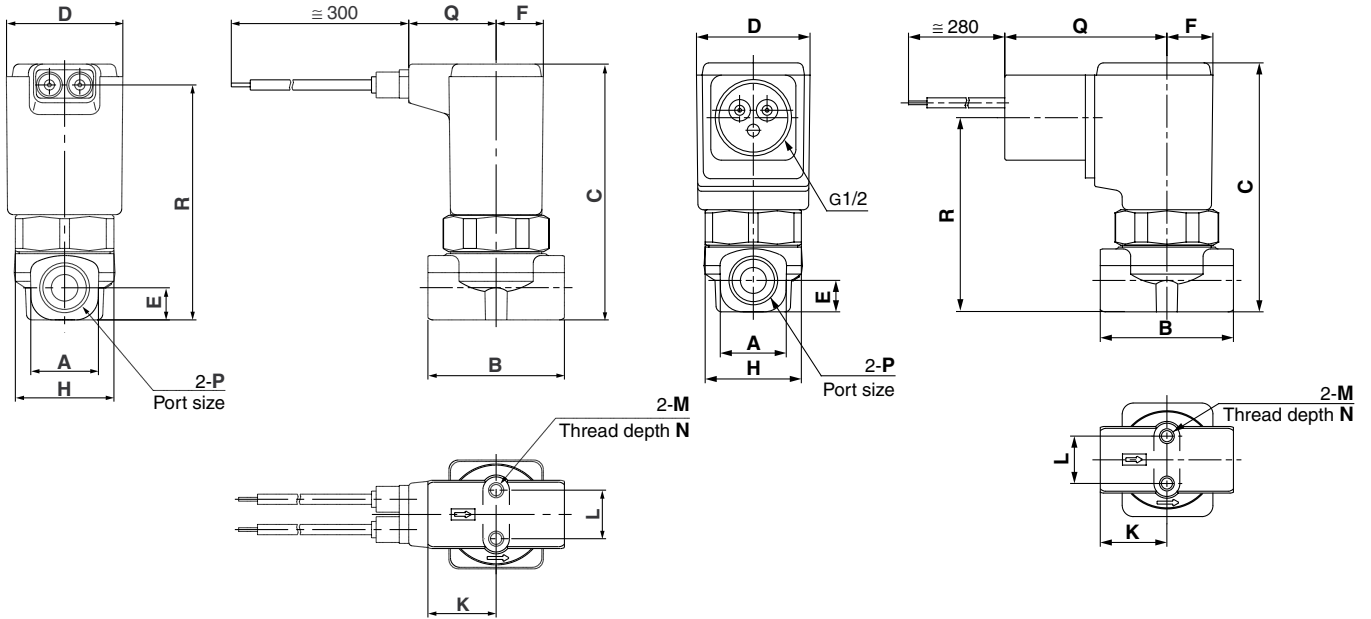
Note 1) The same bracket is used for VCB3□ and VCB4□ (port size 1/2).

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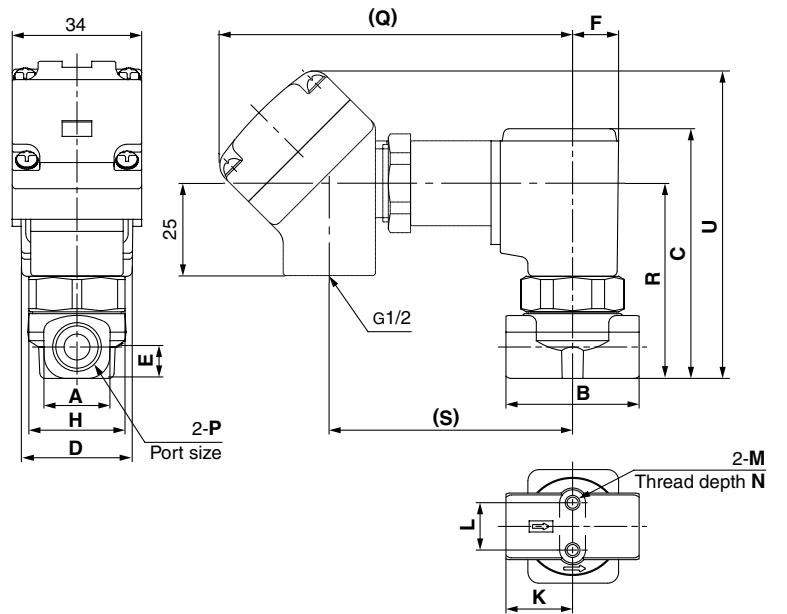
Dimensions

Grommet : G

Conduit: C



Conduit terminal: T



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

(mm)

Model	P Port size	A	B	C	D	E	F	H	K	L	M	N	Electrical entry							
													Grommet:G		Conduit:C		Conduit terminal:T			
													Q	R	Q	R	Q	R	S	U
VCB21	1/8	13.5	28	64	31	6.5	12.5	28	14	12.8	M4	4.5	22	59	44	50	99	50	66	83
	1/4	18	36	67.5	31	8.5	12.5	28	18	12.8	M4	6	22	62	44	53	99	53	66	86
VCB31	1/4, 3/8	22	40	81.5	36.5	11	15	32	20	19	M5	8	24	76	46	66.5	101	66.5	68	99
	1/2	30	50	86	36.5	13.5	15	32	25	23	M5	8	24	80	46	71	101	71	68	104
VCB41	1/4, 3/8	22	45	90	41	11	17	36	22.5	23	M5	8	26	84	48	74.5	103	74.5	70	107
	1/2	30	50	94	41	13.5	17	36	25	23	M5	8	26	88	48	78.5	103	78.5	70	111.5
	3/4	35	60	102	41	17.5	17	36	30	28.2	M5	8	26	96	48	86.5	103	86.5	70	119