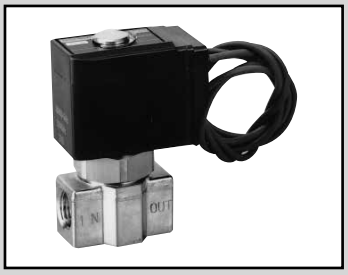
Discontinue



Direct acting 2-port solenoid valve for medium vacuum, single unit
Special purpose

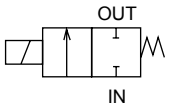
FVB Series

- NC (open when energized)
- Port size: Rc1/8, Rc1/4, Rc3/8

Refer to the Ending for details.

JIS symbol

- NC (open when energized)



Common specifications

Item	FVB
Working fluid	Air (medium vacuum)
Proof pressure (water pressure) MPa	5.0 (≈730 psi, 50 bar) (3.0 (≈440 psi, 30 bar) for ø7 orifice)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage Pa·m³/sHe	1.33 x 10^{-6} or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1 : The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.	Port size	Orifice size (mm)	Flow characteristics C[dm³/(s·bar)]	Flow characteristics b	Working pressure Pa(abs)	Max. working pressure differential (*6)(MPa)	Rated voltage	Power consumption (W) AC	Power consumption (W) DC	Weight (kg)
NC (open when energized)										
FVB21- 6 - Z	Rc1/8	1	0.14	0.49	1.3×10^{-2} to 1×10^{6}	1	100 VAC 50/60 Hz 200 VAC 50/60 Hz 24 VDC 12 VDC	4.3	4	0.16
FVB21- 6 - 2	Rc1/8	2	0.55	0.56	1.3×10^{-2} to 0.3×10^{6}	0.3				
FVB31- 6/8 - 3	Rc1/8	3	1.2	0.57	1.3×10^{-2} to 0.4×10^{6}	0.4		6.5	6	0.29
FVB31- 6/8 - 5	Rc1/4	4	2.2	0.50	1.3×10^{-2} to 0.15×10^{6}	0.15				
FVB41- 8/10 - 5	Rc1/4	4	2.2	0.50	1.3×10^{-2} to 0.3×10^{6}	0.3		8.3	8 *3	0.50
FVB41- 8/10 - 6	Rc3/8	5	3.2	0.50	1.3×10^{-2} to 0.12×10^{6}	0.1				
FVB51- 8/10 - 5	Rc1/4	4	2.2	0.50	1.3×10^{-2} to 0.5×10^{6}	0.5		11.8	11.5	0.69
FVB51- 8/10 - 6	Rc3/8	5	3.2	0.50	1.3×10^{-2} to 0.3×10^{6}	0.3				
FVB51- 8/10 - 7	Rc3/8	7	5.2	0.38	1.3×10^{-2} to 0.15×10^{6}	0.15				

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : 8.6 (W) for 12 VDC.
*4 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*5 : When using in vacuum, vacuum the OUT port side.
*6 : The max. working pressure differential is the pressure difference between IN port (high-pressure side) and OUT port (low-pressure side).
*7 : The working pressure range vacuum does not guarantee the vacuum attainment time or that the vacuum will not change.
*8 : FKM is used for sealant material, so consider the generation of discharge gas during use.

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
FVB	2 mA or less	1 mA or less	1 mA or less	2 mA or less

How to order

F V B 2 1 - 6 - 2 - B 2CR B - 1

- F V: Working fluid (Medium vacuum)
- B: No. of ports (2-port valve)
- 2: Ⓐ Series size
- 1: Ⓑ Actuation
- 6: Ⓒ Port size
- 2: Ⓓ Orifice size
- B: Ⓔ Body/sealant combination
- 2CR: Ⓕ Coil option *1 *2
- B: Ⓖ Other options
- 1: Ⓗ Rated voltage *3

Code	Description	Model No. FVB21	FVB31	FVB41	FVB51
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Actuation					
1	NC (open when energized)	●	●	●	●
Ⓒ Port size					
6	Rc1/8	●	●		
8	Rc1/4		●	●	●
10	Rc3/8			●	●
Ⓓ Orifice size					
Z	ø1	●			
2	ø2	●			
3	ø3		●		
5	ø4		●	●	●
6	ø5			●	●
7	ø7				●
Ⓔ Body/sealant combination					
	Body / Seal				
B	Copper alloy / FKM	●	●	●	●
Ⓕ Coil option					
For AC					
2CR	Std. Grommet lead wire with full-wave rectifier	●	●	●	●
3TR	Option T type term box, full-wave rectifier (G1/2)		●	●	●
3RR	Option T type terminal box with lamp/ full-wave rectifier (G1/2)		●	●	●
For DC					
2C	Std. Grommet lead wire	●	●	●	●
2CS	Option Grommet lead wire with surge suppressor	●	●	●	●
3T	Option With T type terminal box (G1/2)		●	●	●
3RS	Option T type terminal box with lamp/ surge suppressor (G1/2)		●	●	●
Ⓖ Other options					
Blank	Std. None	●	●	●	●
B	Option Mounting plate	●	●	●	●
Ⓗ Rated voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					

Select from the combinations indicated with ● in the table above.

[Example of model No.]

FVB21-6-Z-B2CRB-1

Model : FVB

- Ⓐ Series size : 22 mm
- Ⓑ Actuation : NC (open when energized)
- Ⓒ Port size : Rc1/8
- Ⓓ Orifice size : ø1
- Ⓔ Body/sealant combination : Body - copper alloy, sealant - FKM
- Ⓕ Coil option : Grommet lead wire with full-wave rectifier
- Ⓖ Other options : Mounting plate
- Ⓗ Rated voltage : 100 VAC 50/60 Hz

⚠ Precautions for model No. selection

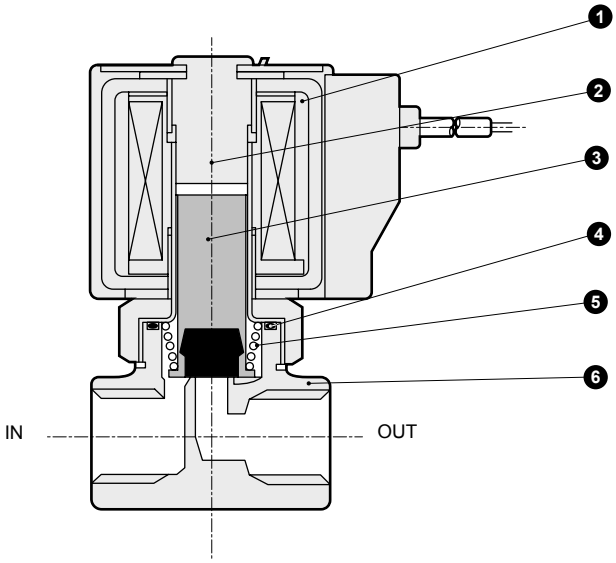
*1 : Full-wave rectifier and surge suppressor are built into the coil for Item Ⓕ 2CR, 2CS and in the terminal box for 3TR, 3RR, 3RS.

*2 : Surge suppressor is included as standard in the models with full-wave rectifier.

*3 : Other voltages may not be available. Contact CKD for details.

Internal structure and parts list

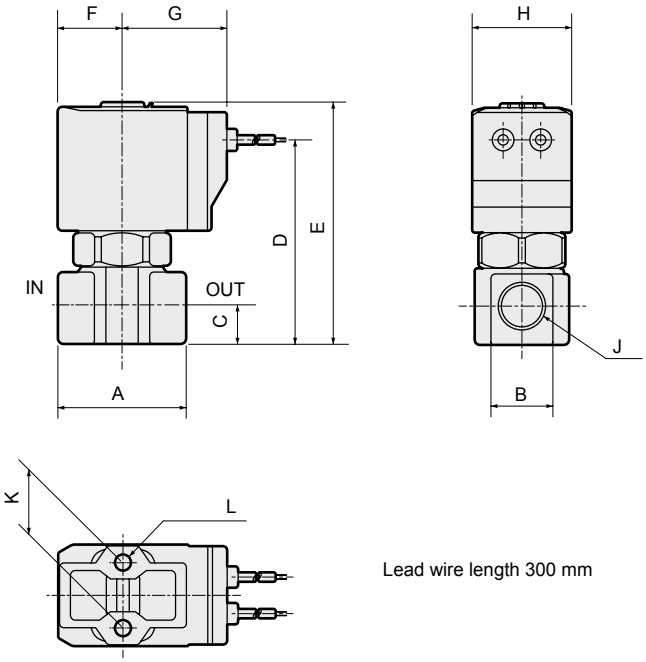
● FVB Series



No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	4	O-ring	FKM	Fluoro rubber
2	Core assembly	SUS	Stainless steel	5	Spring	SUS	Stainless steel
3	Plunger assembly	SUS, FKM	Stainless steel, fluoro rubber	6	Body	C3771	Copper alloy

Dimensions CAD

● Grommet lead wire with full-wave rectifier
FVB*1-*-*-*2CR



Lead wire length 300 mm

When using lead wire with DC voltage, use the grommet lead wire (2C) or grommet lead wire with surge suppressor (2CS).

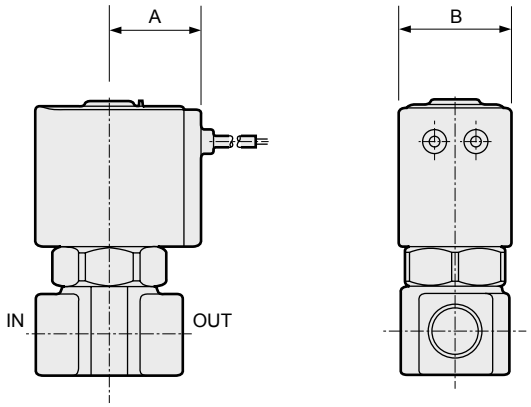
Model No.	A	B	C	D	E	F	G	H	J	K	L
FVB21	32	14	8	45.5	56	15.5	26.5	22	Rc1/8	15	M4 depth 6
FVB31	36	18	11	57.5	68.5	18.5	29.5	28	Rc1/8, Rc1/4	18	M5 depth 6
FVB41	40	21	12	67	81	22.5	34	34	Rc1/4, Rc3/8	18	M5 depth 8
FVB51	40	21	12	73.5	89	26	37.5	40	Rc1/4, Rc3/8	18	M5 depth 8

Optional dimensions

CAD

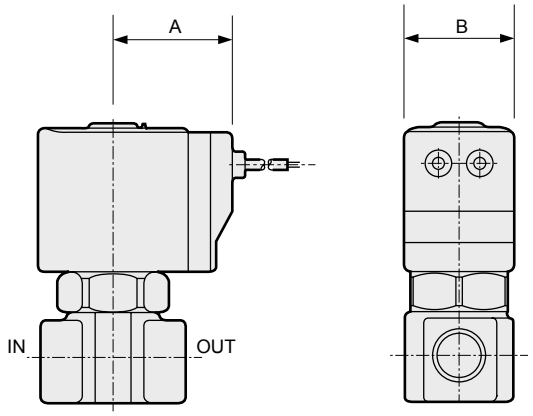
(Refer to the dimensions of grommet lead wire with full-wave rectifier on page 96 for common dimensions.)

● Grommet lead wire
FVB*1-*-*-* 2C



Model No.	A	B
FVB21	19.5	22
FVB31	22.5	28
FVB41	26	34
FVB51	29.5	40

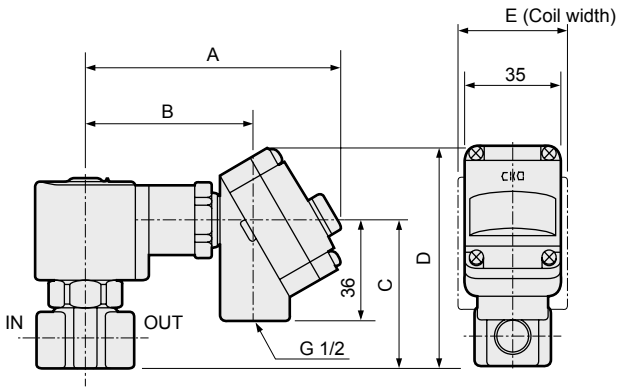
● Grommet lead wire with surge suppressor
FVB*1-*-*-* 2CS



Model No.	A	B
FVB21	26.5	22
FVB31	29.5	28
FVB41	34	34
FVB51	37.5	40

● T type terminal box (with lamp/surge suppressor) (G1/2)
FVB*1-*-*-* 3T
3RS

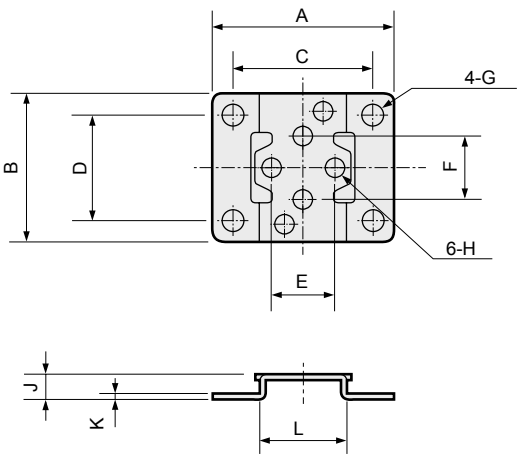
● T type terminal box with full-wave rectifier (with lamp) (G1/2)
FVB*1-*-*-* 3TR
3RR



Model No.	A	B	C	D	E
FVB31	92	60.5	53	79	28
FVB41	96	64.5	62.5	88.5	34
FVB51	99.5	68	71	97	40

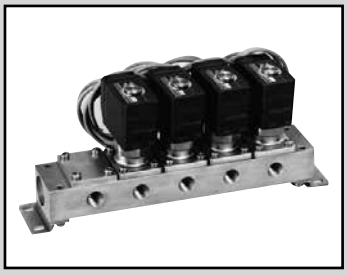
● Mounting plate
FVB*1-*-*-***B

Material : Steel
Zinc plated



Model No.	A	B	C	D	E	F	G	H	J	K	L
FVB21	40	34	30	25	15	15	ø5	ø4.5	6	1.2	20
FVB31	52	42	40	30	18	18	ø6	ø5.5	7	1.6	25
FVB41	56	48	44	36	18	18	ø6	ø5.5	7	1.6	30
FVB51											

Discontinue



Direct acting 2-port solenoid valve for medium vacuum, manifold
Special purpose

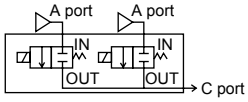
GFVB Series

- NC (open when energized)
- Port size: Rc1/8, Rc1/4, Rc3/8

CE Refer to the Ending for details. RoHS CAD

JIS symbol

- NC (open when energized)/ individual supply



Common specifications

Item	GFVB
Working fluid	Air (medium vacuum)
Proof pressure (water pressure) MPa	5.0 (≈730 psi, 50 bar) (3.0 (≈440 psi, 30 bar) for ø7 orifice)
Fluid temperature °C	-10 (14°F) to 40 (104°F) (no freezing)
Ambient temperature °C	-20 (-4°F) to 40 (104°F)
Thermal class	Class 130 (B)
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage Pa·m³/sHe	1.33 x 10^{-6} or less
Mounting orientation	Unrestricted
Degree of protection	IP65 or equivalent (*1)

*1: The T type terminal box is IP61 or equivalent.

Individual specifications

1 MPa ≈ 145.0 psi, 1 MPa = 10 bar

Item / Model No.		Port size: Individual port (port A)	Port size: Common port (port C)	Orifice size (mm)	Flow characteristics: C[dm³/(s·bar)]	Flow characteristics: b	Working pressure Pa(abs)	Max. working pressure differential (*6)(MPa)	Rated voltage	Power consumption (W): AC	Power consumption (W): DC
NC (open when energized)											
GFVB25	- Z	Rc1/8	Rc1/4	1	0.13	0.52	1.3×10^{-2} to 1×10^{6}	1	AC100 50/60 Hz AC200 50/60 Hz 24 VDC 12 VDC	4.3	4
	- 2			2	0.58	0.39	1.3×10^{-2} to 0.3×10^{6}	0.3			
GFVB35	- 3	Rc1/4	Rc3/8	3	1.1	0.35	1.3×10^{-2} to 0.4×10^{6}	0.4		6.5	6
	- 5			4	1.7	0.30	1.3×10^{-2} to 0.15×10^{6}	0.15			
GFVB45	- 5	Rc1/4	Rc3/8	4	2.1	0.36	1.3×10^{-2} to 0.3×10^{6}	0.3		8.3	8 *3
	- 6			5	2.7	0.34	1.3×10^{-2} to 0.12×10^{6}	0.1			
GFVB55	- 5	Rc1/4	Rc3/8	4	2.1	0.36	1.3×10^{-2} to 0.5×10^{6}	0.5		11.8	11.5
	- 6			5	2.7	0.34	1.3×10^{-2} to 0.3×10^{6}	0.3			
	- 7			7	3.8	0.19	1.3×10^{-2} to 0.15×10^{6}	0.15			

*1 : The voltage fluctuation range must be within ±10% of the rated voltage.
*2 : The leakage current must be less than or equal to the values shown below.
*3 : 8.6 (W) for 12 VDC.
*4 : Effective cross-sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.
*5 : When using in vacuum, vacuum the OUT port side.
*6 : The max. working pressure differential is the pressure difference between IN port (high-pressure side) and OUT port (low-pressure side).
*7 : The working pressure vacuum does not guarantee the vacuum attainment time or that the vacuum will not change.
*8 : FKM is used for sealant material, so consider the generation of discharge gas during use.

Leakage current: Voltage / Model No.	100 VAC	200 VAC	24 VDC	12 VDC
GFVB	2 mA or less	1 mA or less	1 mA or less	2 mA or less

Weight

Model No.	Actuator weight (kg)	Masking weight (kg)	Sub-plate weight (g) (sub-plate, connection part and mounting plate) 2 stns.	3 stns.	4 stns.	5 stns.	6 stns.	7 stns.	8 stns.	9 stns.	10 stns.	Formula for product weight
GFVB25	0.14	0.03	0.40	0.51	0.77	0.77	1.03	1.16	1.30	1.60	1.55	(product weight (kg)) = 0.14 x (actuator quantity) + 0.03 x (masking quantity) + sub-plate weight
GFVB35	0.27	0.05	0.60	0.80	1.20	1.22	1.60	1.81	2.02	2.40	2.44	(product weight (kg)) = 0.27 x (actuator quantity) + 0.05 x (masking quantity) + sub-plate weight
GFVB45	0.45	0.06	0.73	1.00	1.47	1.50	2.00	2.23	2.50	3.00	3.00	(product weight (kg)) = 0.45 x (actuator quantity) + 0.06 x (masking quantity) + sub-plate weight
GFVB55	0.64	0.09	0.83	1.11	1.67	1.70	2.24	2.52	2.81	3.36	3.40	(product weight (kg)) = 0.64 x (actuator quantity) + 0.09 x (masking quantity) + sub-plate weight

How to order

● Manifold

G F V B 3 5 - 2 - 7 - B 3RR - 1

● Manifold with masking plate

G F V B 2 5 - Z - X - B 2CR - 2 - 5 2

No. of ports (2-port valve)

Working fluid (medium vacuum)

Model No.

Code	Description	GFVB25	GFVB35	GFVB45	GFVB55
Ⓐ Series size					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Circuit configuration					
5	NC (open when energized)/individual supply	●	●	●	●
Ⓒ Orifice size					
Z	ø1	●			
2	ø2	●			
3	ø3		●		
5	ø4		●	●	●
6	ø5			●	●
7	ø7				●
Ⓓ Manifold station No.					
2 to 10	2 stations to 10 stations	●	●	●	●
0	Actuator only	●	●	●	●
X	With masking plate	●	●	●	●
Ⓔ Body/sealant combination					
	Body / Seal				
B	Copper alloy / FKM	●	●	●	●
Ⓕ Coil option					
For AC					
2CR	Standard: Grommet lead wire With full-wave rectifier	●	●	●	●
3TR	Option: T type terminal box with full-wave rectifier		●	●	●
3RR	Option: T type terminal box with lamp full-wave rectifier (G1/2)		●	●	●
For DC					
2C	Std. Grommet lead wire	●	●	●	●
2CS	Option: Grommet lead wire with surge suppressor	●	●	●	●
3T	Option: With T type terminal box (G1/2)		●	●	●
3RS	Option: T type terminal box with lamp/ surge suppressor (G1/2)		●	●	●
Ⓖ Rated voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
Specify the desired voltage if it is not listed above.					
Ⓗ No. of solenoid valves					
Blank	No masking plate	●	●	●	●
1 to 9	1 solenoid valve to 9 solenoid valves	●	●	●	●
Ⓘ Masking plate quantity					
Blank	No masking plate	●	●	●	●
1 to 9	1 masking plate to 9 masking plates	●	●	●	●

Select from the combinations indicated with ● in the table above.

Ⓐ Series size

Ⓑ Circuit configuration

Ⓒ Orifice size

Ⓓ Manifold station No. *1 *2

Ⓔ Body/sealant combination

Ⓕ Coil option *3 *4

Ⓖ Rated voltage *5

Ⓗ No. of solenoid valves *6

Ⓘ Masking plate quantity

[Example of model No.]

GFVB25-Z-X-B2CR-2-52

Model: GFVB

- Ⓐ Series size : 22 mm
- Ⓑ Circuit configuration : NC (open when energized)/individual supply
- Ⓒ Orifice size : ø1
- Ⓓ Manifold station No. : 7 stations (with masking plate)
- Ⓔ Body/sealant combination : Body - copper alloy/sealant - FKM
- Ⓕ Coil option : Grommet lead wire with full-wave rectifier
- Ⓖ Rated voltage : 200 VAC 50/60 Hz
- Ⓗ No. of solenoid valves : 5
- Ⓘ Masking plate quantity : 2

⚠ Precautions for model No. selection

*1 : Select a desired manifold station No. from 2 to 10.

*2 : For the type with masking plate, designate Item Ⓓ as X, then designate the quantities of Ⓗ solenoid valves and Ⓘ masking plates.

*3 : Full-wave rectifier and surge suppressor are built into the coil for Item Ⓕ 2CR/2CS and in the terminal box for 3TR/3RR/3RS.

*4 : Surge suppressor is included as standard in the models with full-wave rectifier.

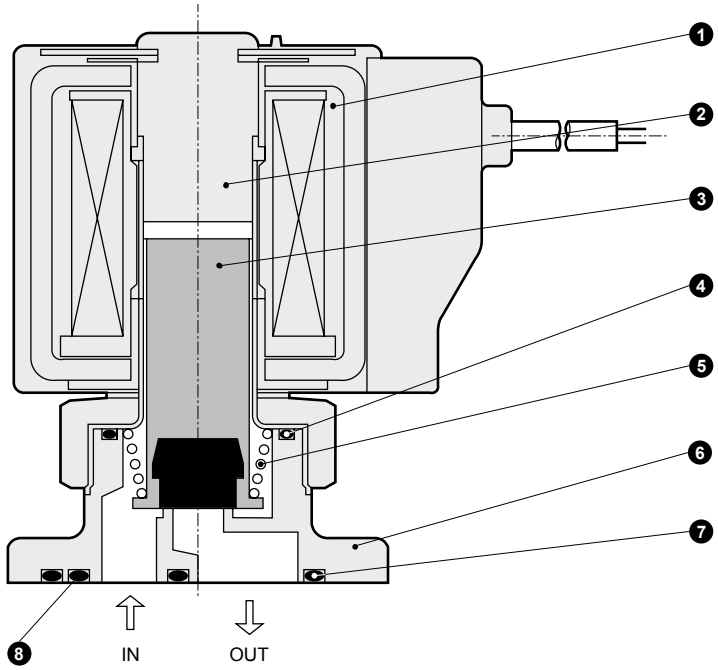
*5 : Other voltages may not be available. Contact CKD for details.

*6 : Solenoid valves are arranged from the right side with the sub-plate (individual) port A facing front.

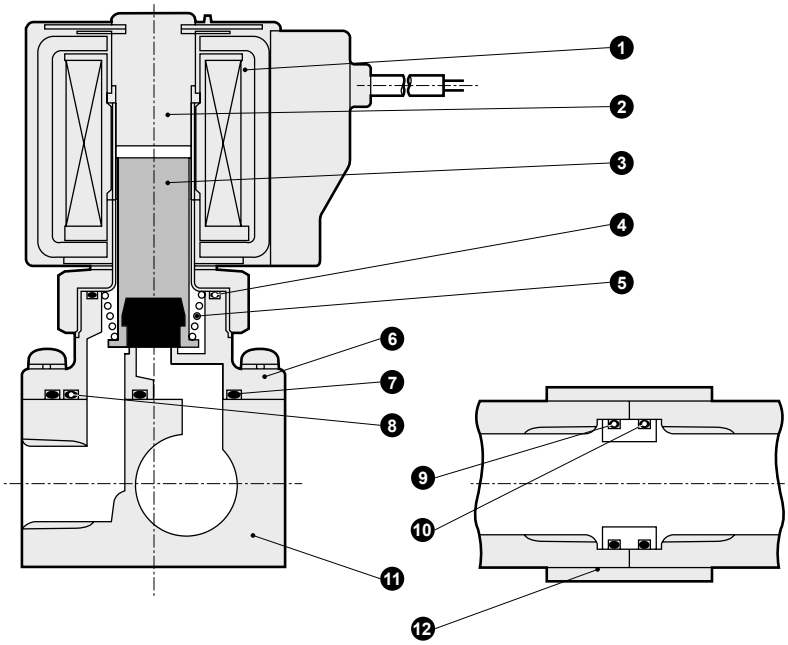
*7 : Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Internal structure and parts list

● GFVB actuator



● GFVB manifold

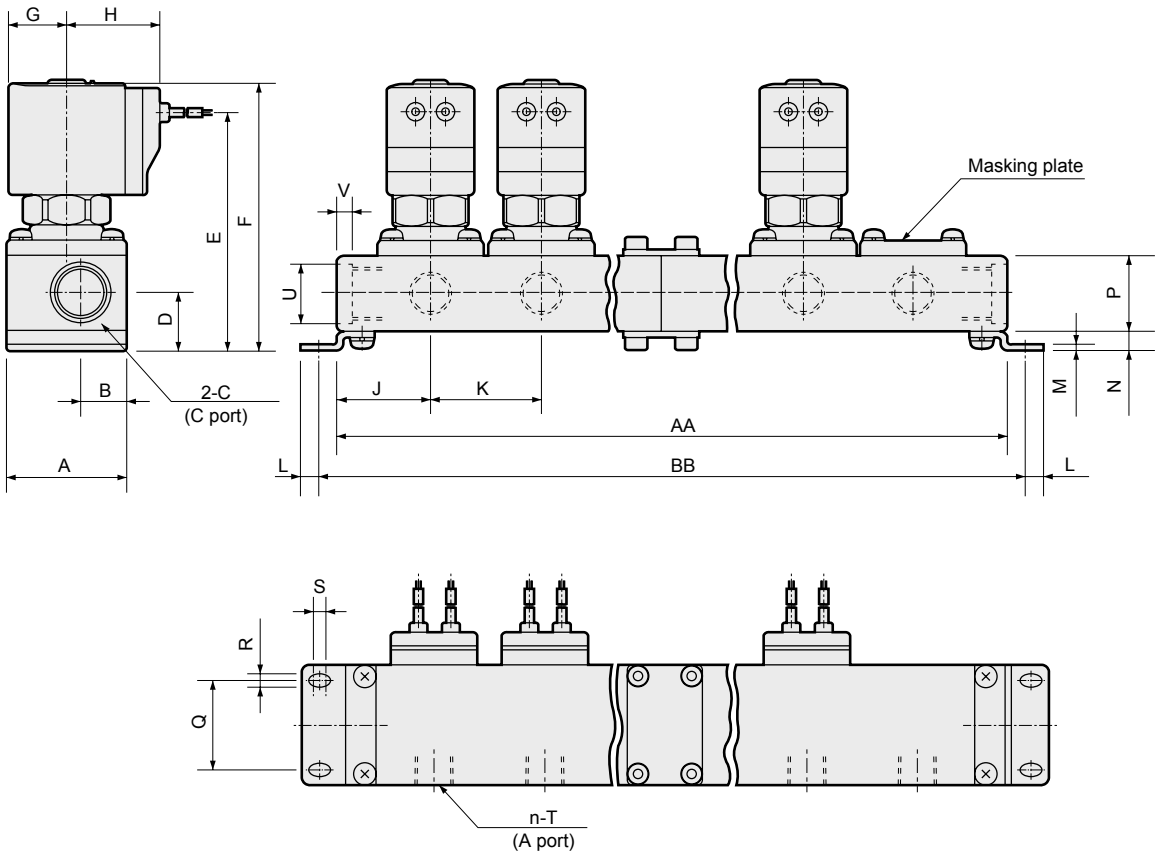


No.	Part name	Material		No.	Part name	Material	
1	Coil assembly	-	-	7	O-ring	FKM	Fluoro rubber
2	Core assembly	SUS	Stainless steel	8	O-ring	FKM	Fluoro rubber
3	Plunger assembly	SUS, FKM	Stainless steel, fluoro rubber	9	Connector	C3604	Copper alloy
4	O-ring	FKM	Fluoro rubber	10	O-ring	FKM	Fluoro rubber
5	Spring	SUS	Stainless steel	11	Sub-plate	C3604	Copper alloy
6	Body	C3771	Copper alloy	12	Connecting plate	SPC	Steel

*4 body mounting screws and 2 O-rings are attached to the actuator only.

Dimensions: Manifold

● Grommet lead wire with full-wave rectifier
GFVB*5-*-*-B2CR



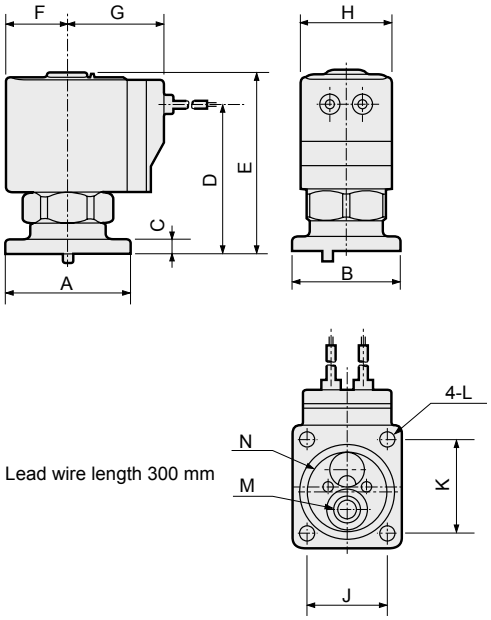
Model No.	Station No. / Code	2	3	4	5	6	7	8	9	10
GFVB2	AA	81	109	162	165	218	246	274	327	330
	BB	93	121	174	177	230	258	286	339	342
GFVB3	AA	97	133	194	205	266	302	338	399	410
	BB	109	145	206	217	278	314	350	411	422
GFVB4	AA	106	145	212	223	290	329	368	435	446
	BB	119	158	225	236	303	342	381	448	459
GFVB5	AA	118	163	236	253	326	371	416	489	506
	BB	131	176	249	266	339	384	429	502	519
Manifold configuration		2 stns. x 1	3 stns. x 1	2 stns. x 2	5 stns. x 1	3 stns. x 2	5 stns. + 2 stns.	5 stns. + 3 stns.	3 stns. x 3	5 stns. x 2

Lead wire length 300 mm

Model No.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
GFVB2	32	13.5	Rc1/4	17.5	66.5	77	15.5	26.5	26	28	6	1.6	6.5	21	22	4.5	2.5	Rc1/8	ø17.3	4
GFVB3	38	14.5	Rc3/8	18.5	75.5	86.5	18.5	29.5	30	36	6	2	6.5	24	28	4.5	2.5	Rc1/4	ø19	4.6
GFVB4	42	16.5	Rc3/8	19.5	84	98	22.5	34	33	39	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	ø19	4.6
GFVB5	42	16.5	Rc3/8	19.5	90	105	26	37.5	36	45	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	ø19	4.6

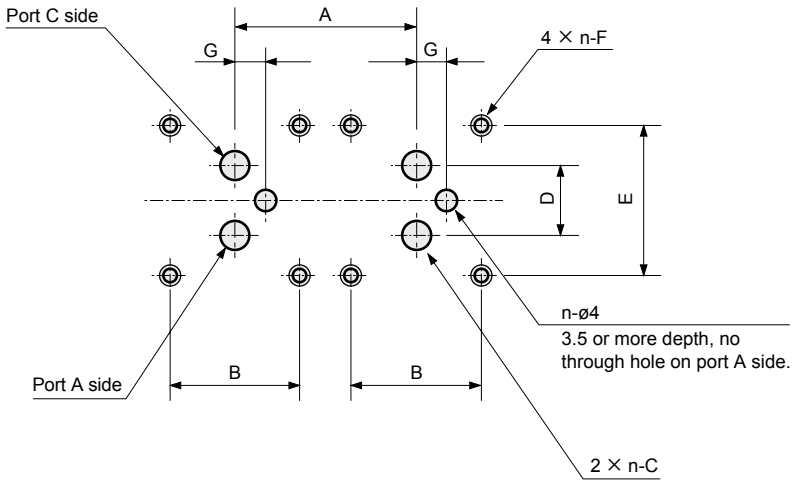
Dimensions: Actuator

● Grommet lead wire with full-wave rectifier
GFVB*5-*-0-B2CR



Model No.	A	B	C	D	E	F	G	H	J	K	L	Applicable O-ring	
												M	N
GFVB2	32	27	4	39	49.5	15.5	26.5	22	19	24	ø3.5	AS568-009	AS568-018
GFVB3	38	34	4.5	45	56	18.5	29.5	28	25	29	ø4.5	AS568-011	AS568-022
GFVB4	42	38	4.5	52.5	66.5	22.5	34	34	28	32	ø4.5	AS568-012	AS568-025
GFVB5	42	44	5.5	58.5	73.5	26	37.5	40	34	32	ø4.5	AS568-012	AS568-025

Actuator installation dimensions



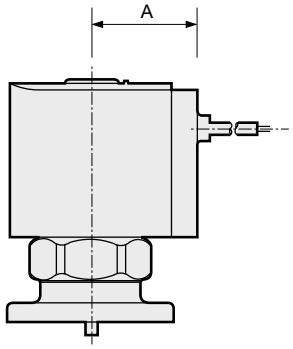
Machining drawing when using 2 actuators (n: number of stations)

Model No.	A	B	C	D	E	F	G
GFVB2	28 or more	19±0.1	ø3.5	10.6±0.1	24±0.1	M3 effective thread depth 6 or more	6±0.2
GFVB3	35 or more	25±0.1	ø5.5	13.8±0.1	29±0.1	M4 effective thread depth 6 or more	6±0.2
GFVB4	39 or more	28±0.1	ø7.5	17±0.1	32±0.1	M4 effective thread depth 6 or more	7±0.2
GFVB5	45 or more	34±0.1	ø7.5	17±0.1	32±0.1	M4 effective thread depth 6 or more	7±0.2

Optional dimensions

(Refer to the dimensions of grommet lead wire actuator with full-wave rectifier on page 102 for common dimensions.)

● Grommet lead wire
GFVB*5-*-*-B 2C

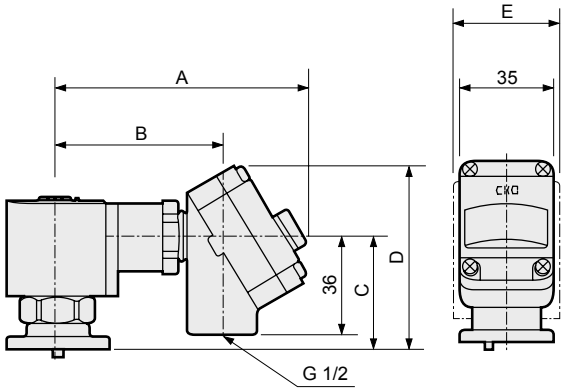


Model No.	A	B
GFVB2	19.5	22
GFVB3	22.5	28
GFVB4	26	34
GFVB5	29.5	40

● T type terminal box (with lamp/surge suppressor) (G1/2)
GFVB*5-*-*-B 3T
3RS

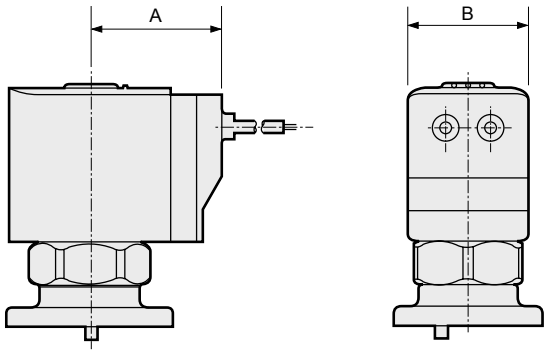
● T type terminal box with full-wave rectifier (with lamp) (G1/2)
GFVB*5-*-*-B 3TR
3RR

(Coil width)



Model No.	A	B	C	D	E
GFVB3	92	60.5	40.5	66.5	28
GFVB4	96	64.5	48	74	34
GFVB5	99.5	68	55.5	81.5	40

● Grommet lead wire with surge suppressor
GFVB*5-*-*-B 2CS



Model No.	A	B
GFVB2	26.5	22
GFVB3	29.5	28
GFVB4	34	34
GFVB5	37.5	40