

Discrete direct acting 2 port solenoid valve for medium vacuum (special purpose valve)

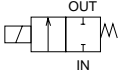
FVB Series

- NC (normally closed) type
- Port size: Rc1/8, Rc1/4, Rc3/8



JIS symbol

- NC (normally closed) type



Common specifications

Descriptions	FVB
Working fluid	Air (medium vacuum)
Withstanding pressure (water pressure) MPa	5.0 (3.0 for orifice ϕ 7 mm)
Fluid temperature °C	-10 to 40 (no freezing)
Ambient temperature °C	-20 to 40
Heat proof class	B
Atmosphere	No corrosive gas and flammable
Valve structure	Direct acting poppet structure
Valve seat leakage Pa·m ³ /sHe	1.33 x 10 ⁻⁶ or less
Installation attitude	Free
Protective structure	IP65 or equivalent (Note 1)

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

Individual specifications

Descriptions Model no.	Port size	Orifice (mm)	Flow characteristics		Working pressure range Pa (abs)	Rated voltage	Power consumption (W)		Weight (kg)	
			C [dm ³ /s·bar]	b			AC	DC		
NC (normally closed) type										
FVB21-6-Z -2	Rc1/8	1	0.14	0.49	1.3 x 10 ⁻² to 1 x 10 ⁶	100 VAC 50/60Hz	4.3	4	0.16	
		2	0.55	0.56	1.3 x 10 ⁻² to 0.3 x 10 ⁶					
FVB31-$\frac{6}{8}$-3 -5	Rc1/8	3	1.2	0.57	1.3 x 10 ⁻² to 0.4 x 10 ⁶		6.5	6		0.29
	Rc1/4	4	2.2	0.50	1.3 x 10 ⁻² to 0.15 x 10 ⁶					
FVB41-$\frac{8}{10}$-5 -6	Rc1/4	4	2.2	0.50	1.3 x 10 ⁻² to 0.3 x 10 ⁶	8.3	8	0.50		
	Rc3/8	5	3.2	0.50	1.3 x 10 ⁻² to 0.12 x 10 ⁶					
FVB51-$\frac{8}{10}$-5 -6 -7	Rc1/4	4	2.2	0.50	1.3 x 10 ⁻² to 0.5 x 10 ⁶	11.8	11.5	0.69		
	Rc3/8	5	3.2	0.50	1.3 x 10 ⁻² to 0.3 x 10 ⁶					
		7	5.2	0.38	1.3 x 10 ⁻² to 0.15 x 10 ⁶					

*1: Use the allowable voltage fluctuation range within $\pm 10\%$ of the rated voltage.

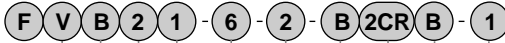
*2: The leakage current must be less than values given below.

*3: 8.6 (W) for 12 VDC.

*4: Effective sectional area S and sonic conductance C are converted as $S \approx 5.0 \times C$.

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

How to order



No. of port
(2 port valve)

Working fluid
(Medium vacuum)

A Size variation

B Actuation

C Port size

D Orifice

E Body, sealant combination

F Coil option

*1

*2

G Other options

H Voltage

*3

<Example of model number>

FVB21-6-Z-B2CRB-1

Model: FVB

- A** Size variation : 22 mm
- B** Actuation : NC (normally closed) type
- C** Port size : Rc 1/8
- D** Orifice : $\phi 1$
- E** Body, sealant combination : Body - brass, sealant - FKM
- F** Coil option : Grommet lead wire with all wave rectified bridge
- G** Other options: Mounting plate
- H** Voltage : 100 VAC 50/60Hz

⚠ Note on model no. selection

- *1: For item (F) 2CR and 2CS, the all wave rectified bridge and surge suppressor are built into the coil, and for 3TR, 3RR, and 3RS, built into the terminal box.
- *2: With the type with an all wave rectified bridge, the surge suppressor is built in as a standard.
- *3: Consult with CKD for other voltages that cannot be manufactured.

Symbol	Descriptions	Model no.			
		FVB21	FVB31	FVB41	FVB51
A Size variation					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
B Actuation					
1	NC (normally closed) type	●	●	●	●
C Port size					
6	Rc 1 / 8	●	●		
8	Rc 1 / 4		●	●	●
10	Rc 3 / 8			●	●
D Orifice					
Z	$\phi 1$	●			
2	$\phi 2$		●		
3	$\phi 3$			●	
5	$\phi 4$		●	●	●
6	$\phi 5$			●	●
7	$\phi 7$				●
E Body, sealant combination					
	Body	Sealant			
B	Brass	FKM		●	●
F Coil option					
When AC					
2CR	Standard	Grommet lead wire with all wave rectified bridge	●	●	●
3TR	Option	T type terminal box with all wave rectified bridge (G1/2)		●	●
3RR		T type terminal box with light and all wave rectified bridge (G1/2)		●	●
When DC					
2C	Standard	Grommet lead wire	●	●	●
2CS	Option	Grommet lead wire with surge suppressor	●	●	●
3T		T type terminal box (G1/2)		●	●
3RS		T type terminal box with light and surge suppressor (G1/2)		●	●
G Other options					
Blank	Standard	None	●	●	●
B	Option	Mounting plate	●	●	●
H Voltage					
1		100 VAC 50/60Hz	●	●	●
2		200 VAC 50/60Hz	●	●	●
3		24 VDC	●	●	●
4		12 VDC	●	●	●

For voltages other than the above, write in the voltage directly.

Select from the combination of ●marks in the above table.

HNB/G

USB/G

FAB/G

FGB/G

FVB

FWB/G

FHB

FLB

AB

AG

AP/AD

APK/ADK

For dry air

Explosion proof

HVB/HVL

SAB/SVB

NP/NAP/NVP

CHB/G

MXB/G

Other G.P. systems

PD/FAD/PJ

CVE/CVSE

CPE/CPD

Medical analysis

Custom order

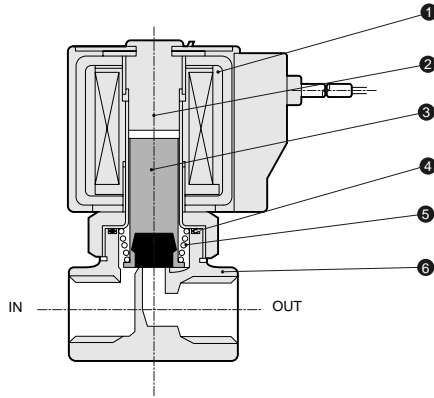
order

Special purpose valve for medium vacuum

Direct acting 2 port solenoid valve

Internal structure and parts list

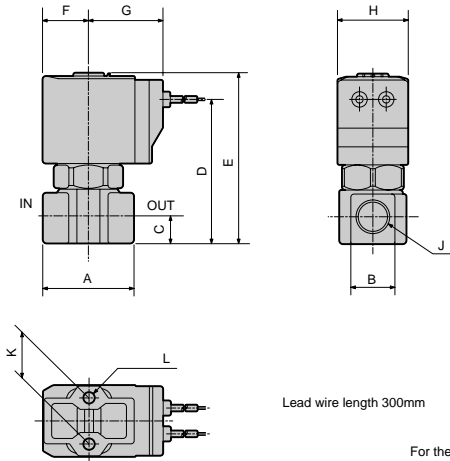
● FVB series



No.	Parts name	Materials	No.	Parts name	Materials
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 Brass

Dimensions (Page 115)

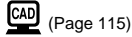
● Grommet lead wire with all wave rectified bridge
FVB*1-*-*2CR



For the DC voltage and lead wire type, use the grommet lead (2C) or grommet lead 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

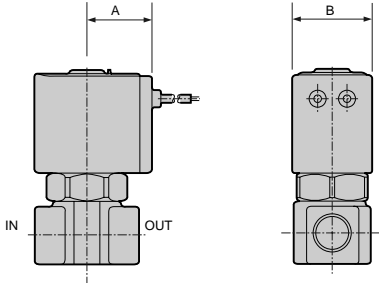
Optional dimensions



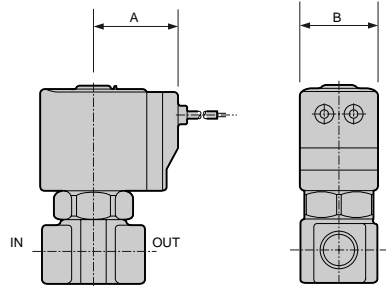
(Page 115)

(For common dimensions, refer to the grommet lead wire with all wave rectified bridge dimensions on the left page.)

- Grommet lead wire
FVB*1-**-**[2C]



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

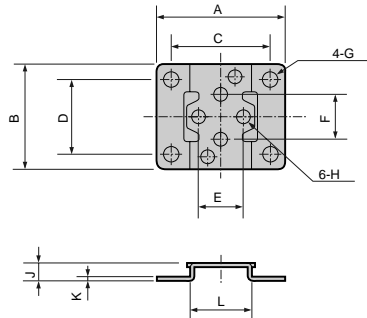
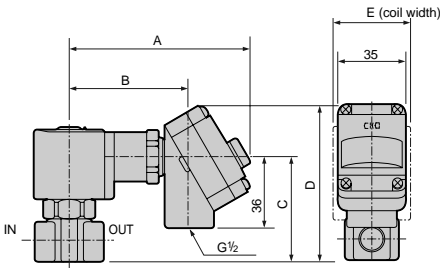


Model no.	A	B
FVB21	19.5	22
FVB31	22.5	28
FVB41	26	34
FVB51	29.5	40

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

- T type terminal box (with light and surge suppressor) (G1/2)
FVB*1-**-**[3T]
[3RS]
- T type terminal box with all wave rectified bridge (with light) (G1/2)
FVB*1-**-**[3TR]
[3RR]

- Mounting plate
FVB*1-**-**[B]

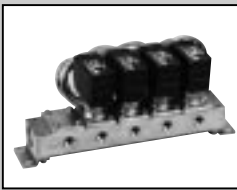


Model no.	A	B	C	D	E
FVB31	92	60.5	53	79	28
FVB41	96	64.5	62.5	88.5	34
FVB51	99.5	68	71	97	40

Model no.	A	B	C	D	E	F	G	H	J	K	L
FVB21	40	34	30	25	15	15	∅5	∅4.5	6	1.2	20
FVB31	52	42	40	30	18	18	∅6	∅5.5	7	1.6	25
FVB41											
FVB51	56	48	44	36	18	18	∅6	∅5.5	7	1.6	30

- HNB/G
- USB/G
- FAB/G
- FGB/G
- FVB**
- FWB/G
- FHB
- FLB
- AB
- AG
- AP/AD
- APK/ADK
- For dry air
- Explosion proof
- HVB/HVL
- SAB/SVB
- NP/NAP/NVP
- CHB/G
- MXB/G
- Other G.P. systems
- PD/FAD/PJ
- CVB/CVSE
- CPE/CPD
- Medical analysis
- Custom order

Special purpose valve for medium vacuum
Direct acting 2 port solenoid valve



Direct acting 2 port solenoid valve for medium vacuum, manifold (special purpose valve)

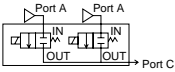
GFVB Series

- NC (normally closed) type
- Port size: Rc1/8, Rc1/4, Rc3/8



JIS symbol

- NC (normally closed) / individual supply type



Common specifications

Descriptions	GFVB
Working fluid	Air (medium vacuum)
Withstanding pressure (water pressure) MPa	5.0 (3.0 for orifice ϕ 7 mm)
Fluid temperature $^{\circ}\text{C}$	-10 to 40 (no freezing)
Ambient temperature $^{\circ}\text{C}$	-20 to 40
Heat proof class	B
Atmosphere	No corrosive gas and flammable
Valve structure	Direct acting poppet structure
Valve seat leakage $\text{Pa}\cdot\text{m}^3/\text{s}\cdot\text{He}$	1.33×10^{-6} or less
Installation attitude	Free
Protective structure	IP65 or equivalent (Note 1)

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

Individual specifications

Descriptions Model no.	Port size		Orifice (mm)	Flow characteristics		Working pressure range Pa (abs)	Rated voltage	Power consumption (W)	
	Individual port (Port A)	Common port (Port C)		C [$\text{dm}^3/(\text{s}\cdot\text{bar})$]	b			AC	DC
NC (normally closed) type									
GFVB25- Z - 2	Rc1/8	Rc1/4	1	0.13	0.52	1.3×10^{-2} to 1×10^6	100 VAC	4.3	4
			2	0.58	0.39	1.3×10^{-2} to 0.3×10^6			
GFVB35- 3 - 5	Rc1/4	Rc3/8	3	1.1	0.35	1.3×10^{-2} to 0.4×10^6	50/60Hz	6.5	6
			4	1.7	0.30	1.3×10^{-2} to 0.15×10^6			
GFVB45- 5 - 6	Rc1/4	Rc3/8	4	2.1	0.36	1.3×10^{-2} to 0.3×10^6	200 VAC 50/60Hz	8.3	*3 8
			5	2.7	0.34	1.3×10^{-2} to 0.12×10^6			
GFVB55- 5 - 6 - 7	Rc1/4	Rc3/8	4	2.1	0.36	1.3×10^{-2} to 0.5×10^6	24 VDC 12 VDC	11.8	11.5
			5	2.7	0.34	1.3×10^{-2} to 0.3×10^6			
			7	3.8	0.19	1.3×10^{-2} to 0.15×10^6			

*1: Use the allowable voltage fluctuation range within $\pm 10\%$ of the rated voltage.

*2: The leakage current must be less than values given below.

*3: 8.6 (W) for 12 VDC.

*4: Effective sectional area S and sonic conductance C are converted as $S \approx 5.0 \times C$.

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

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 port
(2 port valve)

Working fluid
(Medium vacuum)

A Size variation

B Circuit structure

C Orifice

D Station no.

*1

*2

E Body, sealant combination

F Coil option

*3

*4

G Voltage

*5

H Solenoid valve quantity

*6

I Masking plate quantity

<Example of model number>

GFVB25-Z-X-B2CR-2-52

Model: GFVB

- A** Size variation : 22 mm
- B** Circuit structure : NC (normally closed) / individual supply type
- C** Orifice : $\phi 1$
- D** Station no. : 7 stations (with masking plate)
- E** Body, sealant combination
- F** Coil option : Grommet lead wire with all wave rectified bridge
- G** Voltage : 200 VAC 50/60Hz
- H** Solenoid valve quantity: 5 pieces
- I** Masking plate quantity : 2 pieces

⚠ Note on model no. selection

- *1: For the number of manifold stations, select a number of stations from 2 to 10.
- *2: For the type with masking plate, designate the item (D) as "X", then designate the number of (H) solenoid valves and (I) masking plates.
- *3: For item (H) 2CR and 2CS, the all wave rectified bridge and surge suppressor or are built into the coil, and for 3TR, 3RR, and 3RS, built into the terminal box.
- *4: With the type with an all wave rectified bridge, the surge suppressor is built in as a standard.
- *5: Consult with CKD for other voltages that cannot be manufactured.
- *6: Solenoid valves are arranged from the right side facing the sub-plate A (independent) port.
- *7: Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

Symbol	Descriptions	Model no.			
		GFVB25	GFVB35	GFVB45	GFVB55
A Size variation					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
B Circuit structure					
5	NC (normally closed) / individual supply type	●	●	●	●
C Orifice					
Z	$\phi 1$	●			
2	$\phi 2$	●			
3	$\phi 3$		●		
5	$\phi 4$			●	●
6	$\phi 5$			●	●
7	$\phi 7$				●
D Station no.					
2 to 10	2 stations to 10 stations	●	●	●	●
O	Actuator only	●	●	●	●
X	With masking plate	●	●	●	●
E Body, sealant combination					
	Body	Sealant			
B	Brass	FKM			
		●	●	●	●
F Coil option					
When AC					
2CR	Standard	Grommet lead wire with all wave rectified bridge	●	●	●
3TR	Option	T type terminal box with all wave rectified bridge		●	●
3RR	Option	T type terminal box with light and all wave rectified bridge (G1/2)		●	●
When DC					
2C	Standard	Grommet lead wire	●	●	●
2CS	Standard	Grommet lead wire with surge suppressor	●	●	●
3T	Option	T type terminal box (G1/2)		●	●
3RS	Option	T type terminal box with light and surge suppressor (G1/2)		●	●
G Voltage					
1	100 VAC 50/60Hz	●	●	●	●
2	200 VAC 50/60Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
For voltages other than the above, write in the voltage directly.					
H Solenoid valve quantity					
Blank	No masking plate	●	●	●	●
1 to 9	One solenoid valve to Nine solenoid valves	●	●	●	●
I Masking plate quantity					
Blank	No masking plate	●	●	●	●
1 to 9	One masking plate to Nine masking plates	●	●	●	●

Select from the combination of ● marks in the above table.

HNB/G

USB/G

FAB/G

FGB/G

FVB

FWB/G

FHB

FLB

AB

AG

AP/AD

APK/ADK

For dry air

Explosion proof

HVB/HVL

SAB/SVB

NP/NAP/NVP

CHB/G

MXB/G

Other G.P. systems

PDF/FAD/PJ

CVE/CVSE

CPE/CPD

Medical analysis

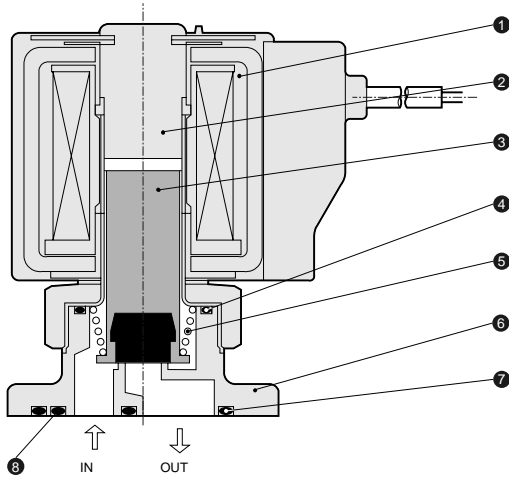
Custom order

Special purpose valve for medium vacuum

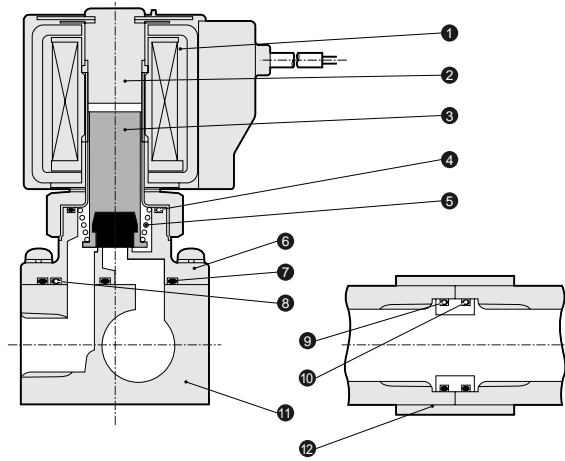
Direct acting 2 port solenoid valve

Internal structure and parts list

● GFVB actuator

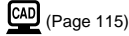


● GFVB manifold

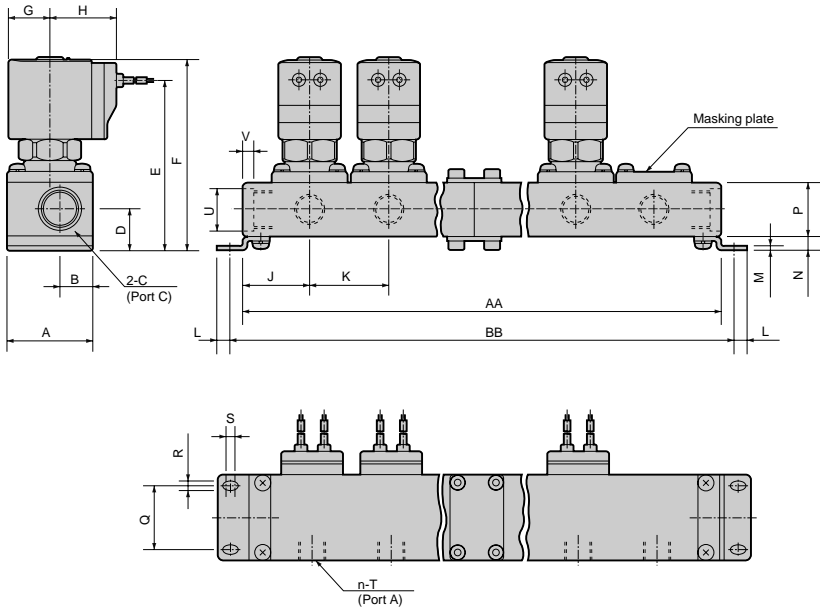


No.	Parts name	Materials	No.	Parts name	Materials
1	Coil assembly	-	7	O ring	FKM Fluoro rubber
2	Core assembly	SUS Stainless steel	8	O ring	FKM Fluoro rubber
3	Plunger assembly	SUS, FKM Stainless steel, fluoro rubber	9	Connector	C3604 Brass
4	O ring	FKM Fluoro rubber	10	O ring	FKM Fluoro rubber
5	Spring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

Dimensions: Manifold



- Grommet lead wire with all wave rectified bridge
GFVB*5-*-*B2CR



Model no.	Sm. no. (Order)	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 structure: 2 stations x 1, 3 stations x 1, 2 stations x 2, 5 stations x 1, 3 stations x 2, 5 stations x 2, 2 stations x 3, 5 stations x 2, 5 stations x 3, 5 stations x 2, 2 stations x 3, 5 stations x 2

Lead wire length 300mm

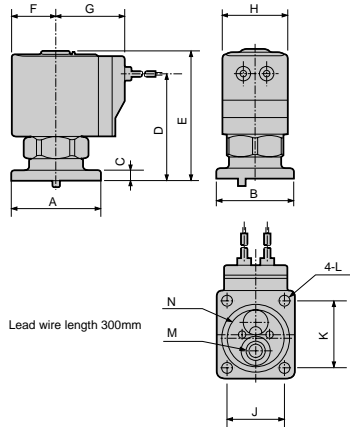
Model no.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
GFVB2	32	13.5	Rc1/4	17.5	66.5	77	15.5	26.5	26	28	6	1.6	6.5	21	22	4.5	2.5	Rc1/8	φ17.3	4
GFVB3	38	14.5	Rc3/8	18.5	75.5	86.5	18.5	29.5	30	36	6	2	6.5	24	28	4.5	2.5	Rc1/4	φ19	4.6
GFVB4	42	16.5	Rc3/8	19.5	84	98	22.5	34	33	39	6.5	2	7.5	24	30	5.5	2.5	Rc1/4	φ19	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	φ19	4.6

- HNB/G
- USB/G
- FAB/G
- FGB/G
- FVB**
- FWB/G
- FHB
- FLB
- AB
- AG
- AP/AD
- APK/ADK
- For dry air
- Explosion proof
- HVB/HVL
- SAB/SVB
- NP/NAP/NVP
- CHB/G
- MXB/G
- Other G.P. systems
- PD/FAD/PJ
- CVE/CVSE
- CPE/CPD
- Medical analysis
- Custom order

Special purpose valve for medium vacuum
Direct acting 2 port solenoid valve

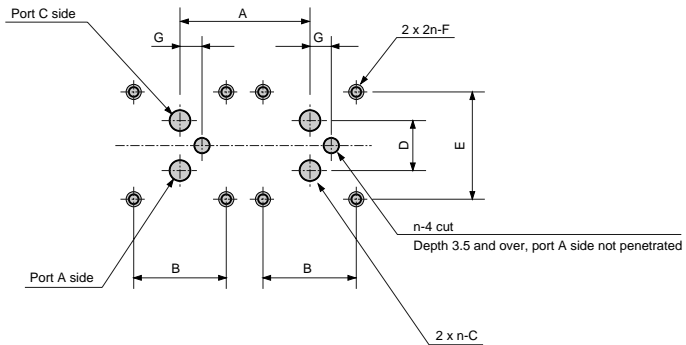
Dimensions: Actuator

- Grommet lead wire with all wave rectified bridge
GFVB*5-*O-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	φ 3.5	AS568-009	AS568-018
GFVB3	38	34	4.5	45	56	18.5	29.5	28	25	29	φ 4.5	AS568-011	AS568-022
GFVB4	42	38	4.5	52.5	66.5	22.5	34	34	28	32	φ 4.5	AS568-012	AS568-025
GFVB5	42	44	5.5	58.5	73.5	26	37.5	40	34	32	φ 4.5	AS568-012	AS568-025

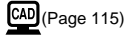
Actuator installation dimension drawing



Machining drawing, when 2 actuators are used.

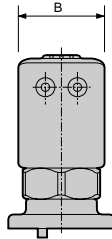
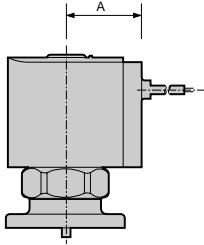
Model no.	A	B	C	D	E	F	G
GFVB2	28 and over	19±0.1	3.5 cut or less	10.6±0.1	24±0.1	M3 effective thread depth 6 and over	6±0.2
GFVB3	35 and over	25±0.1	5.5 cut or less	13.8±0.1	29±0.1	M4 effective thread depth 6 and over	6±0.2
GFVB4	39 and over	28±0.1	7.5 cut or less	17±0.1	32±0.1	M4 effective thread depth 6 and over	7±0.2
GFVB5	45 and over	34±0.1	7.5 cut or less	17±0.1	32±0.1	M4 effective thread depth 6 and over	7±0.2

Optional dimensions



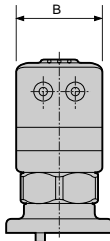
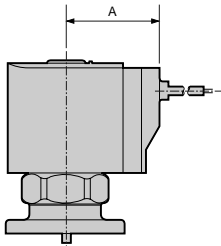
(For common dimensions, refer to the grommet lead wire actuator with all wave rectified bridge dimensions on the left page.)

- 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

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



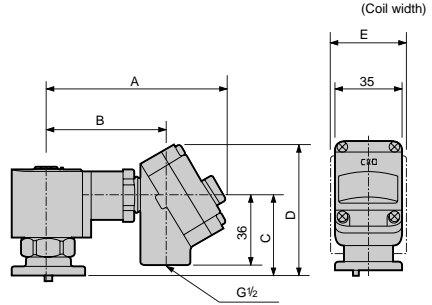
Model no.	A	B
GFVB2	26.5	22
GFVB3	29.5	28
GFVB4	34	34
GFVB5	37.5	40

- T type terminal box (with light and surge suppressor) (G1/2)

GFVB*5-*-*B[3T]
[3RS]

- T type terminal box with all wave rectified bridge (with light) (G1/2)

GFVB*5-*-*B[3TR]
[3RR]



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

HNB/G

USB/G

FAB/G

FGB/G

FVB

FWB/G

FHB

FLB

AB

AG

AP/AD

APK/
ADK

For
dry air

Explosion
proof

HVB/
HVL

SAB/
SVB

NP/NAP/
NVP

CHB/G

MXB/G

Other G.P.
systems

PD/FAD/
PJ

CVE/
CVSE

CPE/
CPD

Medical
analysis

Custom
order

Special
purpose valve for medium vacuum

Direct acting 2 port solenoid valve