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

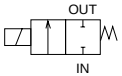
FVB Series

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

Refer to page 17 in the Ending for details.

JIS symbol

- NC (normally closed) type



Common specifications

Item	FVB
Working fluid	Air (medium vacuum)
Withstanding pressure (water) MPa	5.0 (3.0 for orifice ø7)
Fluid temperature MPa	-10 to 40 (no freezing)
Ambient temperature ˚C	-20 to 40
Heat proof class ˚C	B
Atmosphere	Place free of corrosive gas and explosive gas
Valve structure	Direct acting poppet structure
Valve seat leakage Pa·m³/sHe	1.33×10^{-6} or less
Mounting attitude	Free
Protective structure	IP65 or equivalent (Note 1)

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

Individual specifications

Item / Model no.	Port size	Orifice (mm)	Flow characteristics C [dm³/(s·bar)]	Flow characteristics b	Working pressure range Pa (abs)	Rated voltage	Power consumption (W) AC	Power consumption (W) DC	Weight (kg)
NC (normally closed) type									
FVB21-6 -Z	Rc1/8	1	0.14	0.49	1.3×10^{-2} to 1×10^{6}	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}				
FVB31-6/8 -3	Rc1/8 Rc1/4	3	1.2	0.57	1.3×10^{-2} to 0.4×10^{6}		6.5	6	0.29
FVB31-6/8 -5	Rc1/8 Rc1/4	4	2.2	0.50	1.3×10^{-2} to 0.15×10^{6}				
FVB41-8/10 -5	Rc1/4 Rc3/8	4	2.2	0.50	1.3×10^{-2} to 0.3×10^{6}		8.3	8 *3	0.50
FVB41-8/10 -6	Rc1/4 Rc3/8	5	3.2	0.50	1.3×10^{-2} to 0.12×10^{6}				
FVB51-8/10 -5	Rc1/4 Rc3/8	4	2.2	0.50	1.3×10^{-2} to 0.5×10^{6}		11.8	11.5	0.69
FVB51-8/10 -6	Rc1/4 Rc3/8	5	3.2	0.50	1.3×10^{-2} to 0.3×10^{6}				
FVB51-8/10 -7	Rc1/4 Rc3/8	7	5.2	0.38	1.3×10^{-2} to 0.15×10^{6}				

*1: The voltage fluctuation must be within ±10% of the rated voltage.
*2: The leakage current must be less than the values shown below.
*3: 8.6 (W) for 12 VDC.
*4: Effective sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

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 port (2 port valve)
- 2: Ⓐ Size variation
- 1: Ⓑ Actuation
- 6: Ⓒ Port size
- 2: Ⓓ Orifice
- B: Ⓔ Body/sealant combination
- 2CR: Ⓕ Coil option *1 *2
- B: Ⓖ Other options
- 1: Ⓗ Voltage *3

Symbol	Descriptions	Model no. FVB21	FVB31	FVB41	FVB51
Ⓐ Size variation					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Actuation					
1	NC (normally closed) type	●	●	●	●
Ⓒ Port size					
6	Rc1/8	●	●		
8	Rc1/4		●	●	●
10	Rc3/8			●	●
Ⓓ Orifice					
Z	ø1	●			
2	ø2	●			
3	ø3		●		
5	ø4		●	●	●
6	ø5			●	●
7	ø7				●
Ⓔ Body/sealant combination					
	Body / Sealant				
B	Brass / FKM	●	●	●	●
Ⓕ Coil option					
For AC					
2CR	Std. Grommet lead wire with all wave rectifier	●	●	●	●
3TR	Option T type terminal box with all wave rectifier (G1/2)		●	●	●
3RR	Option T type terminal box with light and all wave rectifier (G1/2)		●	●	●
For DC					
2C	Std. Grommet lead wire	●	●	●	●
2CS	Option 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)		●	●	●
Ⓖ Other options					
Blank	Std. None	●	●	●	●
B	Option Mounting plate	●	●	●	●
Ⓗ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
For voltages other than above, directly write in the voltage.					

Select from the combinations indicated with ● above.

<Example of model number>

FVB21-6-Z-B2CRB-1
Model no.: FVB

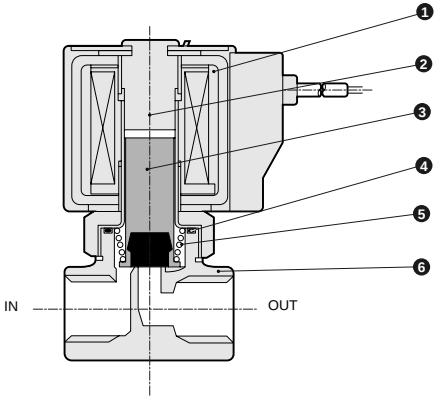
- Ⓐ Size variation: 22 mm
- Ⓑ Actuation: NC (normally closed) type
- Ⓒ Port size: Rc1/8
- Ⓓ Orifice: ø1
- Ⓔ Body/sealant combination: Body - brass, sealant - FKM
- Ⓕ Coil option: Grommet lead wire with all wave rectifier
- Ⓖ Other options: Mounting plate
- Ⓗ Voltage: 100 VAC 50/60Hz

⚠ Note on model no. selection

*1: For Ⓕ 2CR/2CS, the all wave rectifier and surge suppressor are built into the coil, and for 3TR/3RR/3RS, they are built into the terminal box.
*2: With the type with all wave rectifier, the surge suppressor is built in as standard.
*3: Some voltages are not available. Contact CKD for details.

Internal structure and parts list

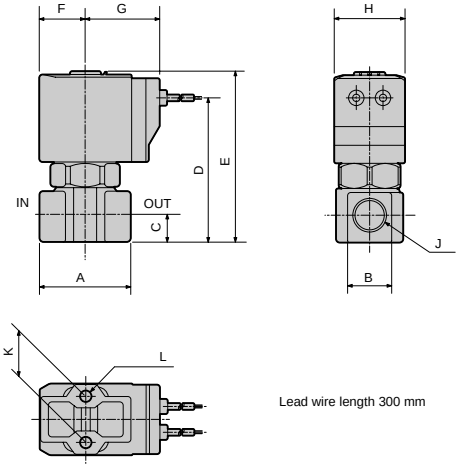
● FVB Series



No.	Parts name	Material		No.	Parts 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	Brass

Dimensions CAD (Page 115)

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



Lead wire length 300 mm

For the DC voltage and lead wire type, use the grommet lead wire (2C) or grommet lead wire with surge suppressor (2CS).

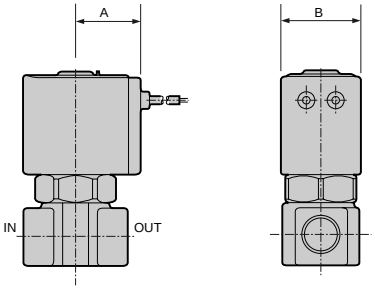
Model no.	A	B	C	D	E	F	G	H	J	K	L
FVB21	32	14	8	45.5	56	15.5	26.5	22	Rc1/8	15	M4 depth 6
FVB31	36	18	11	57.5	68.5	18.5	29.5	28	Rc1/8, Rc1/4	18	M5 depth 6
FVB41	40	21	12	67	81	22.5	34	34	Rc1/4, Rc3/8	18	M5 depth 8
FVB51	40	21	12	73.5	89	26	37.5	40	Rc1/4, Rc3/8	18	M5 depth 8

Optional dimensions

CAD (Page 115)

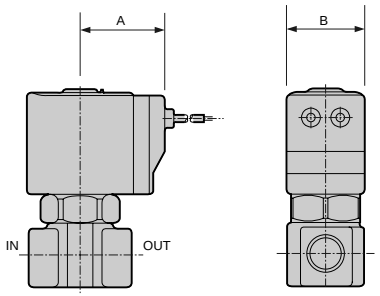
(Refer to the dimensions for grommet lead wire with all wave rectifier on the left page for common dimensions.)

● 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

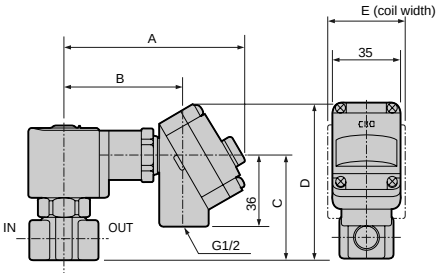
● Grommet lead wire with surge suppressor
FVB*1-*-*-* 2CS



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

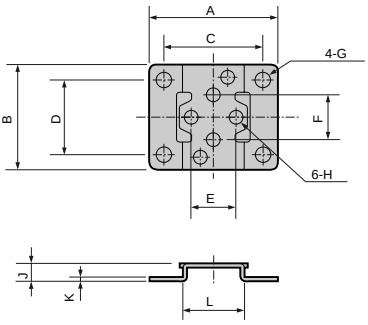
● T type terminal box (with light and surge suppressor) (G1/2)
FVB*1-*-*-* 3T
3RS

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

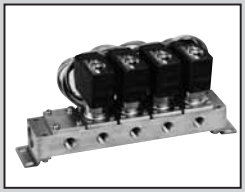


Model no.	A	B	C	D	E
FVB31	92	60.5	53	79	28
FVB41	96	64.5	62.5	88.5	34
FVB51	99.5	68	71	97	40

● Mounting plate
FVB*1-*-*-*** B



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											



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

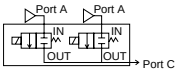
GFVB Series

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

Refer to page 17 in the Ending for details.

JIS symbol

- NC (normally closed) / individual supply type



Common specifications

Item	GFVB
Working fluid	Air (medium vacuum)
Withstanding pressure (water) MPa	5.0 (3.0 for orifice ø7)
Fluid temperature MPa	-10 to 40 (no freezing)
Ambient temperature ˚C	-20 to 40
Heat proof class ˚C	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 attitude	Free
Protective structure	IP65 or equivalent (Note 1)

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

Individual specifications

Item / Model no.	Port size: Individual port (Port A)	Port size: Common port (Port C)	Orifice (mm)	Flow characteristics: C [dm³/(s·bar)]	Flow characteristics: b	Working pressure range Pa (abs)	Rated voltage	Power consumption (W): AC	Power consumption (W): DC
NC (normally closed) type									
GFVB25-Z	Rc1/8	Rc1/4	1	0.13	0.52	1.3 x 10^{-2} to 1 x 10^{6}	100 AC 50/60 Hz 200 AC 50/60 Hz 24 VDC 12 VDC	4.3	4
-2			2	0.58	0.39	1.3 x 10^{-2} to 0.3 x 10^{6}			
GFVB35-3	Rc1/4	Rc3/8	3	1.1	0.35	1.3 x 10^{-2} to 0.4 x 10^{6}		6.5	6
-5			4	1.7	0.30	1.3 x 10^{-2} to 0.15 x 10^{6}			
GFVB45-5	Rc1/4	Rc3/8	4	2.1	0.36	1.3 x 10^{-2} to 0.3 x 10^{6}		8.3	8 *3
-6			5	2.7	0.34	1.3 x 10^{-2} to 0.12 x 10^{6}			
GFVB55-5	Rc1/4	Rc3/8	4	2.1	0.36	1.3 x 10^{-2} to 0.5 x 10^{6}		11.8	11.5
-6			5	2.7	0.34	1.3 x 10^{-2} to 0.3 x 10^{6}			
-7			7	3.8	0.19	1.3 x 10^{-2} to 0.15 x 10^{6}			

*1: The voltage fluctuation must be within ±10% of the rated voltage.
*2: The leakage current must be less than the values shown below.
*3: 8.6 (W) for 12 VDC.
*4: Effective sectional area S and sonic conductance C are converted as S ≈ 5.0 x C.

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

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)

Ⓐ Size variation

Ⓑ Circuit structure

Ⓒ Orifice

Ⓓ Station no. *1 *2

Ⓔ Body/sealant combination

Ⓕ Coil option *3 *4

Ⓖ Voltage *5

Ⓗ No. of solenoid valves

Ⓘ No. of masking plates

Symbol	Descriptions	Model no. GFVB25	GFVB35	GFVB45	GFVB55
Ⓐ Size variation					
2	22 mm	●			
3	28 mm		●		
4	34 mm			●	
5	40 mm				●
Ⓑ Circuit structure					
5	NC (normally closed) / individual supply type	●	●	●	●
Ⓒ Orifice					
Z	ø1	●			
2	ø2	●			
3	ø3		●		
5	ø4		●	●	●
6	ø5			●	●
7	ø7				●
Ⓓ Station no.					
2 to 10	2 stations to 10 stations	●	●	●	●
O	Actuator only	●	●	●	●
X	With masking plate	●	●	●	●
Ⓔ Body/sealant combination					
	Body / Sealant				
B	Brass / FKM	●	●	●	●
Ⓕ Coil option					
For AC					
2CR	Std. Grommet lead wire with all wave rectifier	●	●	●	●
3TR	Option T type terminal box with all wave rectifier		●	●	●
3RR	Option T type terminal box with light and all wave rectifier (G1/2)		●	●	●
For DC					
2C	Std. Grommet lead wire	●	●	●	●
2CS	Option 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)		●	●	●
Ⓖ Voltage					
1	100 VAC 50/60 Hz	●	●	●	●
2	200 VAC 50/60 Hz	●	●	●	●
3	24 VDC	●	●	●	●
4	12 VDC	●	●	●	●
For voltages other than above, directly write in the voltage.					
Ⓗ No. of solenoid valves					
Blank	No masking plate	●	●	●	●
1 to 9	One solenoid valve to Nine solenoid valves	●	●	●	●
Ⓘ No. of masking plates					
Blank	No masking plate	●	●	●	●
1 to 9	One masking plate to Nine masking plates	●	●	●	●

Select from the combinations indicated with ● above.

<Example of model number>

GFVB25-Z-X-B2CR-2-52
Model no.: GFVB

Ⓐ Size variation: 22 mm
Ⓑ Circuit structure: NC (normally closed) / individual supply type
Ⓒ Orifice: ø1
Ⓓ Station no: 7 stations (with masking plate)
Ⓔ Body/sealant combination: Body - brass, sealant - FKM
Ⓕ Coil option: Grommet lead wire with all wave rectifier
Ⓖ Voltage: 200 VAC 50/60Hz
Ⓗ No. of solenoid valves: 5
Ⓘ No. of masking plates: 2

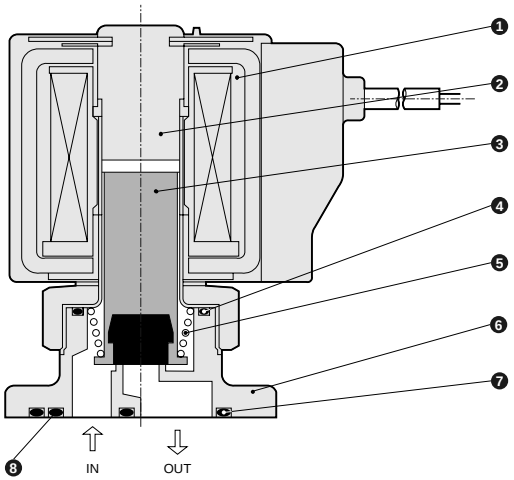
⚠ Note on model no. selection

*1: For station no., select the number of stations from 2 to 10.
*2: For the type with masking plate, designate Ⓓ as X, then designate the numbers of solenoid valves and masking plates.
*3: For Ⓕ 2CR/2CS, the all wave rectifier and surge suppressor are built into the coil, and for 3TR/3RR/3RS, they are built into the terminal box.
*4: With the type with all wave rectifier, the surge suppressor is built in as standard.
*5: Some voltages are not available. Contact CKD for details.
*6: Solenoid valves are arranged from the right side facing the sub-plate (individual) port A.
*7: Orders for only the masking plate and sub-plate are also available. Contact CKD for details.

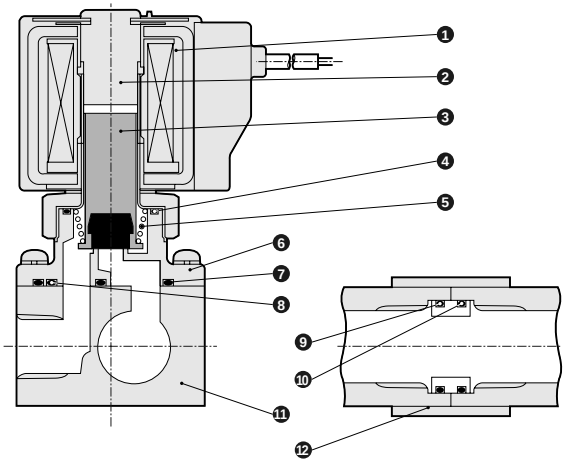
Special purpose valve for medium vacuum
Direct acting 2 port solenoid valve

Internal structure and parts list

● GFVB Actuator



● GFVB Manifold

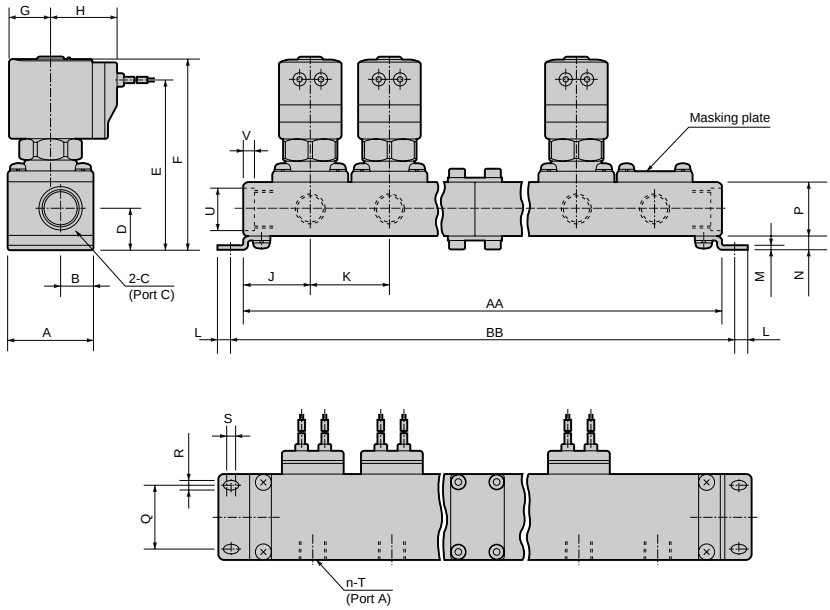


No.	Parts name	Material		No.	Parts name	Material	
1	Coil assembly	-	-	7	O ring	FKM	Fluoro rubber
2	Core assembly	SUS	Stainless steel	8	O ring	FKM	Fluoro rubber
3	Plunger assembly	SUS, FKM	Stainless steel, fluoro rubber	9	Connector	C3604	Brass
4	O ring	FKM	Fluoro rubber	10	O ring	FKM	Fluoro rubber
5	Spring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

Dimensions: Manifold

CAD (Page 115)

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



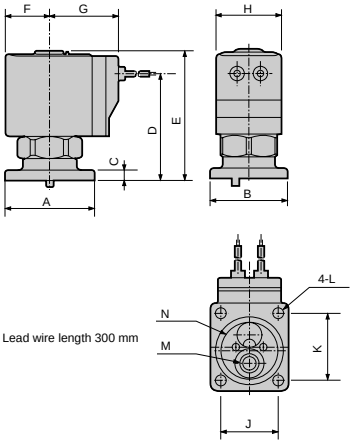
Model no.	Station no. / Symbol	2	3	4	5	6	7	8	9	10
GFVB2	AA	81	109	162	165	218	246	274	327	330
	BB	93	121	174	177	230	258	286	339	342
GFVB3	AA	97	133	194	205	266	302	338	399	410
	BB	109	145	206	217	278	314	350	411	422
GFVB4	AA	106	145	212	223	290	329	368	435	446
	BB	119	158	225	236	303	342	381	448	459
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 + 2 stations	5 stations + 3 stations	3 stations x 3	5 stations 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

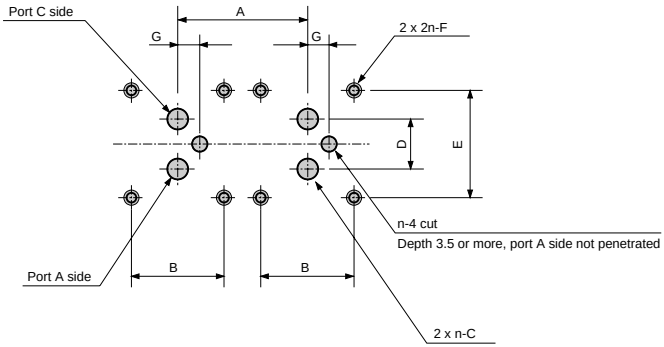
Dimensions: Actuator

● Grommet lead wire with all wave rectifier
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	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

Mounting dimensions of actuator



Machining drawing when using 2 actuators

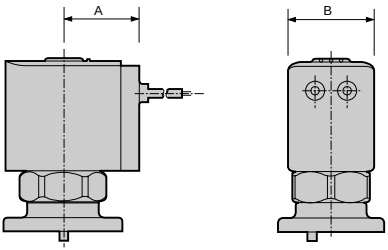
Model no.	A	B	C	D	E	F	G
GFVB2	28 or more	19±0.1	3.5 cut or less	10.6±0.1	24±0.1	M3 effective thread depth 6 or more	6±0.2
GFVB3	35 or more	25±0.1	5.5 cut or less	13.8±0.1	29±0.1	M4 effective thread depth 6 or more	6±0.2
GFVB4	39 or more	28±0.1	7.5 cut or less	17±0.1	32±0.1	M4 effective thread depth 6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

Optional dimensions

CAD (Page 115)

(Refer to the dimensions for grommet lead wire with all wave rectifier on the left page for common dimensions.)

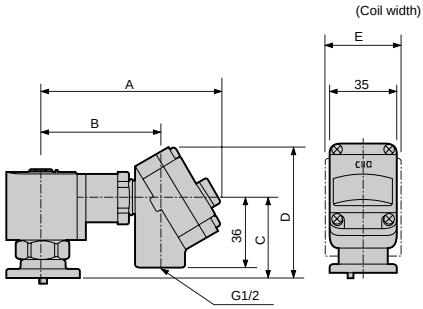
● Grommet lead wire
GFVB*5-*-*-B 2C



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

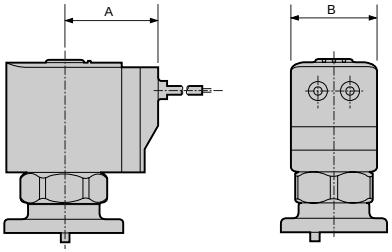
● T type terminal box (with light and surge suppressor) (G1/2)
GFVB*5-*-*-B 3T
3RS

● T type terminal box with all wave rectifier (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

● 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

FA$^{B}_{G}$/FG$^{B}_{G}$/FVB
FW$^{B}_{G}$/FHB/FLB

(Special purpose valve)

Special purpose direct acting 2, 3 port solenoid valve

■ For compressed air, dry air, medium vacuum, water, hot water, oil

Overview

This is a direct acting poppet type solenoid valve. Six series for compressed air, dry air, medium vacuum, water, hot water and oil applications are available to suit the control fluid. Dedicated fluid design is suited for all types of fluids. Select the optimum series based on the fluid.

Features

Dedicated fluid design
Special purpose design to fit the required fluid.

Double life (CKD comparison)
Long life even for dry air and inert gas applications.

26% reduced footprint (CKD comparison)

56% reduced weight (CKD comparison for compressed air)

Surge suppressor integrated coil (with surge suppressor)

Low wattage design

Flame resistant UL94V-0 conformed coil

Easy disassembly and assembly

CONTENTS

⚠ Always read the precautions in the Introduction and page 24 before starting use.

Series variation

Special purpose direct acting 2, 3 port solenoid valve (special purpose valve)

Working fluid	No. of port	Model	Structure	Actuation
Compressed air	2 port 	FAB	Discrete	NC (normally closed) type
				NO (normally open) type
		GFAB	Manifold	Common supply type
				Individual supply type
	3 port 	FAG	Discrete	Universal type
				NC pressurization type
		GFAG	Manifold	Common air supply/ exhaust type
Dry air	2 port 	FGB	Discrete	NC (normally closed) type
		GFGB	Manifold	Common supply type
				Individual supply type
	3 port 	FGG	Discrete	Universal type
				NC pressurization type
		GFGG	Manifold	Common air supply/ exhaust type
Medium vacuum	2 port 	FVB	Discrete	NC (normally closed) type
		GFVB	Manifold	Individual supply type
Water	2 port 	FWB	Discrete	NC (normally closed) type
				NO (normally open) type
		GFWB	Manifold	Common water supply type
	3 port 	FWG	Discrete	Universal type
		GFWG	Manifold	Common water supply/ individual drain type
Hot water	2 port 	FHB	Discrete	NC (normally closed) type
Oil	2 port 	FLB	Discrete	NC (normally closed) type
		GFLB	Manifold	Central lubrication type

	Port size					Page
	M5	Rc1/8	Rc1/4	Rc3/8	Rc1/2	
	●	●	●	●	●	26
		●	●	●		
		●		●		32
	●	●	●			
	●	●	●	●		38
		●	●	●		
	●	●	●			42
		●	●	●	●	48
		●		●		52
		●	●			
		●	●	●		58
		●	●	●		
		●	●			62
		●	●	●		68
		●	●			72
		●	●	●	●	78
		●	●	●		
		●	●	●		84
		●	●	●		90
		●	●	●		94
		●	●	●	●	100
		●	●	●	●	104
		●	●	●		108

* Note: Port size of manifold indicates pressure port.

Safety precautions

Always read this section before starting use.

Special purpose direct acting 2, 3 port solenoid valve (special purpose valve)

Design & Selection

WARNING

1 Working fluid

(1) Active gases cannot be used with the compressed air and dry air types, so consult with CKD when these applications are required.

(2) Dedicated solenoid valve for each fluid. Select the solenoid valve based on the fluid. When using with other fluids, for example, in an air flow in water, specifications may differ, so consult with CKD.

2 Protective structure

The protective structure of the special purpose valve has passed IEC standard compliance tests, but performance greatly differs based on weather resistance and time, so these values are not guaranteed.

Provide means to ensure that water, dust, etc., do not come in direct contact.

CAUTION

1 Continuous energizing

Consult with CKD when the 3 port valve for water (FWG) is to be continuously energized with the NO port pressurized.

2 Fluid viscosity

The fluid viscosity must be 50 mm^2/s or less.

Malfunctions could occur if the viscosity is higher than 50 mm^2/s.

Installation, Piping & Wiring

CAUTION

1 Piping

Always hold the socket with a spanner, etc., when tightening the piping to the FWG Series NO port.

2 Wiring

Refer to the connection methods in Introduction 53 when wring to the small terminal box, DIN terminal box or T type terminal box.

Maintenance

CAUTION

1 For compressed air, dry air, medium vacuum

(1) When disassembling or assembling the FAB/G or FGB/G Series, tighten the coil assembly set screws with the following tightening torques.

Model no.	Coil assembly set screw
FAB/G1	0.3 to 0.7 N·m
FAB/G2/FGB/G2	0.7 to 1.1 N·m
FAB/G3/FGB/G3	1.1 to 1.8 N·m
FAB/G4/FGB/G4	1.1 to 1.8 N·m
FAB/G5/FGB/G5	2.0 to 3.0 N·m

(2) When disassembling or assembling the FAB32/42/52 or FVB Series, tightening the core assembly and body with the following tightening torques.

Model no.	Core assembly set screw
FVB2	12 to 18 N·m
FAB32/FVB3	16 to 24 N·m
FAB42/FVB4	21 to 31 N·m
FAB52/FVB5	21 to 31 N·m

2 For water, hot water, oil

When disassembling or assembling the FWB/G, FHB or FLB Series and tightening the core assembly and body, and core assembly and socket, first temporarily tighten until the core assembly contacts the O ring to prevent entanglement of the spring (outer spring). Then tighten with the following torques.

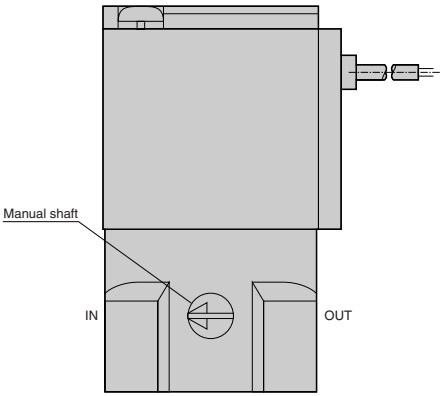
Model no.	Core assembly tightening torque	Socket tightening torque
FWB2/FHB2/FLB2	12 to 18 N·m	———
FWG2		3 to 5 N·m
FWB3/FHB3/FLB3	16 to 24 N·m	———
FWG3		6 to 10 N·m
FWB4/FHB4/FLB4	21 to 31 N·m	———
FWG4		10 to 14 N·m
FWB5/FHB5/FLB5	21 to 31 N·m	———
FWG5		10 to 14 N·m

⚠ How to operate manual override (optional) (FAB/FAG/FGB/FGG/GFAB/GFAG/GFGB/GFGG Series)

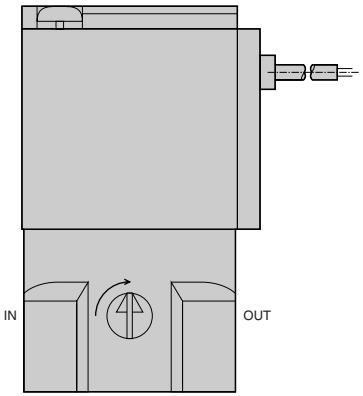
1 Manual locking type (available for FAB/FAG/FGB/FGG Series)

Opening: Insert a flat-tip screwdriver into the slit on the manual shaft, and turn it approx. 90˚ to the right. The plunger will rise up and the valve will open. (For the 3 port valve, the NC side valve seat will open and the NO side valve seat will close.) This opened state will be maintained even if the screwdriver is removed.

Closing: Turn the manual shaft to the left from the open position to the close position. The plunger will lower and the valve will close. (For the 3 port valve, the NC side valve seat will close and the NO side valve seat will open.)



Valve closed
(Slit at horizontal position)

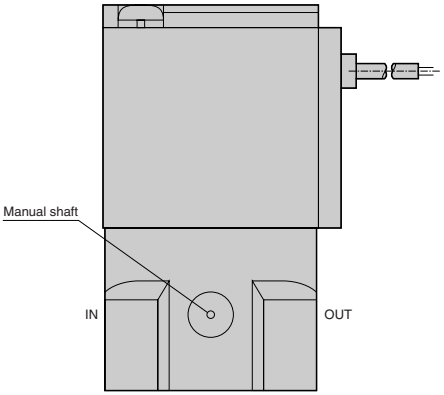


Valve opened
(Slit at vertical position)

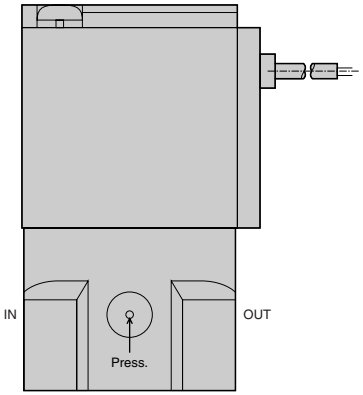
2 Manual non-locking type

Opening: When the concave section at the center of the manual shaft is pressed in with the fine tip of a Phillips screwdriver, the plunger assembly will rise up and the valve will open. (For the 3 port valve, the NC side valve seat will open and the NO side valve seat will close.)

Closing: When the screwdriver is removed from the manual shaft, the manual shaft will return to the front by the force of the inner spring, and the plunger assembly will lower and the valve will close. (For the 3 port valve, the NC side valve seat will close and the NO side valve seat will open.)



Valve closed



Valve opened

Electronic Catalog file list

Special purpose direct acting 2, 3 port solenoid valve (special purpose valve)

Compressed air

Electronic Catalog file list is applied to "CAD DATA 2006".

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
● Discrete 2 port solenoid valve: Pages 28, 30			
FAB11	FAB	fab11	CKD-FAB11
FAB21		fab21	CKD-FAB21
FAB31		fab31	CKD-FAB31
FAB41		fab41	CKD-FAB41
FAB51		fab51	CKD-FAB51
FAB32		fab32	CKD-FAB32
FAB42		fab42	CKD-FAB42
FAB52		fab52	CKD-FAB52
● 2 port solenoid valve, manifold: Page 35			
GFAB11(5)	FAB	gfab11_5_	CKD-GFAB11(5)
GFAB21(5)		gfab21_5_	CKD-GFAB21(5)
GFAB31(5)		gfab31_5_	CKD-GFAB31(5)
GFAB41(5)		gfab41_5_	CKD-GFAB41(5)
GFAB51(5)		gfab51_5_	CKD-GFAB51(5)
● Option			
FAB1 option depth 18 mm	FAB	fab1_opt	CKD-FAB1-OPT
FAB2 option depth 22 mm		fab2_opt	CKD-FAB2-OPT
FAB3 option depth 28 mm		fab3_opt	CKD-FAB3-OPT
FAB4 option depth 34 mm		fab4_opt	CKD-FAB4-OPT
FAB5 option depth 40 mm		fab5_opt	CKD-FAB5-OPT
● Discrete 3 port solenoid valve: Page 40			
FAG11	FAG	fag11	CKD-FAG11
FAG21		fag21	CKD-FAG21
FAG31(3)		fag31_3_	CKD-FAG31(3)
FAG41(3)		fag41_3_	CKD-FAG41(3)
FAG51		fag51	CKD-FAG51
● 3 port solenoid valve, manifold: Page 45			
GFAG11	FAG	gfag11	CKD-GFAG11
GFAG21		gfag21	CKD-GFAG21
GFAG31		gfag31	CKD-GFAG31
GFAG41		gfag41	CKD-GFAG41
GFAG51		gfag51	CKD-GFAG51
● Option			
FAG1 option depth 18 mm	FAG	fag1_opt	CKD-FAG1-OPT
FAG2 option depth 22 mm		fag2_opt	CKD-FAG2-OPT
FAG3 option depth 28 mm		fag3_opt	CKD-FAG3-OPT
FAG4 option depth 34 mm		fag4_opt	CKD-FAG4-OPT
FAG5 option depth 40 mm		fag5_opt	CKD-FAG5-OPT

Dry air

Electronic Catalog file list is applied to "CAD DATA 2006".

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
● Discrete 2 port solenoid valve: Page 50			
FGB21	FGB	fgb21	CKD-FGB21
FGB31		fgb31	CKD-FGB31
FGB41		fgb41	CKD-FGB41
FGB51		fgb51	CKD-FGB51
● 2 port solenoid valve, manifold: Page 55			
GFGB21(5)	FGB	gfgb21_5_	CKD-GFGB21(5)
GFGB31(5)		gfgb31_5_	CKD-GFGB31(5)
GFGB41(5)		gfgb41_5_	CKD-GFGB41(5)
GFGB51(5)		gfgb51_5_	CKD-GFGB51(5)
● Option			
FGB2 option depth 22 mm	FGB	fgb2_opt	CKD-FGB2-OPT
FGB3 option depth 28 mm		fgb3_opt	CKD-FGB3-OPT
FGB4 option depth 34 mm		fgb4_opt	CKD-FGB4-OPT
FGB5 option depth 40 mm		fgb5_opt	CKD-FGB5-OPT
● Discrete 3 port solenoid valve: Page 60			
FGG21	FGG	fgg21	CKD-FGG21
FGG31(3)		fgg31_3_	CKD-FGG31(3)
FGG41(3)		fgg41_3_	CKD-FGG41(3)
FGG51		fgg51	CKD-FGG51
● 3 port solenoid valve, manifold: Page 65			
GFGG21	FGG	gfgg21	CKD-GFGG21
GFGG31		gfgg31	CKD-GFGG31
GFGG41		gfgg41	CKD-GFGG41
GFGG51		gfgg51	CKD-GFGG51
● Option			
FGG2 option depth 22 mm	FGG	fgg2_opt	CKD-FGG2-OPT
FGG3 option depth 28 mm		fgg3_opt	CKD-FGG3-OPT
FGG4 option depth 34 mm		fgg4_opt	CKD-FGG4-OPT
FGG5 option depth 40 mm		fgg5_opt	CKD-FGG5-OPT

Medium vacuum

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
● Discrete 2 port solenoid valve: Page 70			
FVB21	FVB	fvb21	CKD-FVB21
FVB31		fvb31	CKD-FVB31
FVB41		fvb41	CKD-FVB41
FVB51		fvb51	CKD-FVB51
● 2 port solenoid valve, manifold: Page 75			
GFVB25	FVB	gfvb25	CKD-GFVB25
GFVB35		gfvb35	CKD-GFVB35
GFVB45		gfvb45	CKD-GFVB45
GFVB55		gfvb55	CKD-GFVB55
● Option			
FVB2 option depth 22 mm	FVB	fvb2_opt	CKD-FVB2-OPT
FVB3 option depth 28 mm		fvb3_opt	CKD-FVB3-OPT
FVB4 option depth 34 mm		fvb4_opt	CKD-FVB4-OPT
FVB5 option depth 40 mm		fvb5_opt	CKD-FVB5-OPT

Electronic Catalog file list

Water

Electronic Catalog file list is applied to "CAD DATA 2006".

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
● Discrete 2 port solenoid valve: Pages 80, 82			
FWB21	FWB	fw_l_b21	CKD-FW(L)B21
FWB31		fw_l_b31	CKD-FW(L)B31
FWB41		fw_l_b41	CKD-FW(L)B41
FWB41-*-8		fw_l_b41___8	CKD-FW(L)B41-*-8
FWB51		fw_l_b51	CKD-FW(L)B51
FWB51-*-8		fw_l_b51___8	CKD-FW(L)B51-*-8
FWB32		fwb32	CKD-FWB32
FWB42		fwb42	CKD-FWB42
FWB52		fwb52	CKD-FWB52
● 2 port solenoid valve, manifold: Page 87			
GFWB21	FWB	gfw_l_b21	CKD-GFW(L)B21
GFWB31		gfw_l_b31	CKD-GFW(L)B31
GFWB41		gfw_l_b41	CKD-GFW(L)B41
GFWB51		gfw_l_b51	CKD-GFW(L)B51
● Option			
FWB2 option depth 22 mm	FWB	fw_l_b2_opt	CKD-FW(L)B2-OPT
FWB3 option depth 28 mm		fw_l_b3_opt	CKD-FW(L)B3-OPT
FWB4 option depth 34 mm		fw_l_b4_opt	CKD-FW(L)B4-OPT
FWB5 option depth 40 mm		fw_l_b5_opt	CKD-FW(L)B5-OPT
● Discrete 3 port solenoid valve: Page 92			
FWG21	FWG	fwg21	CKD-FWG21
FWG31		fwg31	CKD-FWG31
FWG41		fwg41	CKD-FWG41
FWG51		fwg51	CKD-FWG51
● 3 port solenoid valve, manifold: Pages 97 to 98			
GFWG21	FWG	gfwg21	CKD-GFWG21
GFWG31		gfwg31	CKD-GFWG31
GFWG41		gfwg41	CKD-GFWG41
GFWG51		gfwg51	CKD-GFWG51
● Option			
FWG2 option depth 22 mm	FWG	fwg2_opt	CKD-FWG2-OPT
FWG3 option depth 28 mm		fwg3_opt	CKD-FWG3-OPT
FWG4 option depth 34 mm		fwg4_opt	CKD-FWG4-OPT
FWG5 option depth 40 mm		fwg5_opt	CKD-FWG5-OPT

Hot water

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
● Discrete 2 port solenoid valve: Page 103			
FHB21	FHB	fhb21	CKD-FHB21
FHB31		fhb31	CKD-FHB31
FHB41		fhb41	CKD-FHB41
FHB41-*-8		fhb41___8	CKD-FHB41-*-8
FHB51		fhb51	CKD-FHB51
FHB41-*-8		fhb41___8	CKD-FHB41-*-8

For oil

Model no.	DXF		MICRO CADAM
	Folder name	Filename	Filename (GROUP: CAD, USER: STDLIB)
● Discrete 2 port solenoid valve: Page 106			
FLB21	FLB	fw_l_b21	CKD-FW(L)B21
FLB31		fw_l_b31	CKD-FW(L)B31
FLB41		fw_l_b41	CKD-FW(L)B41
FLB41-*-8		fw_l_b41___8	CKD-FW(L)B41-*-8
FLB51		fw_l_b51	CKD-FW(L)B51
FLB51-*-8		fw_l_b51___8	CKD-FW(L)B51-*-8
● 2 port solenoid valve, manifold: Page 111			
GFLB21	FLB	gfw_l_b21	CKD-GFW(L)B21
GFLB31		gfw_l_b31	CKD-GFW(L)B31
GFLB41		gfw_l_b41	CKD-GFW(L)B41
GFLB51		gfw_l_b51	CKD-GFW(L)B51
● Option			
FLB2 option depth 22 mm	FLB	fw_l_b2_opt	CKD-FW(L)B2-OPT
FLB3 option depth 28 mm		fw_l_b3_opt	CKD-FW(L)B3-OPT
FLB4 option depth 34 mm		fw_l_b4_opt	CKD-FW(L)B4-OPT
FLB5 option depth 40 mm		fw_l_b5_opt	CKD-FW(L)B5-OPT