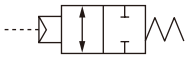
Air operated valve for high vacuum NC

AVB*17 Series

● Molded bellows method Aluminum body

Specifications

Descriptions	AVB217	AVB317	AVB417	AVB517	AVB617	AVB717
Working fluid	Vacuum and inert gas					
Working pressure Pa(abs)	1.3×10^{-6} to 1×10^{5}					
Max. working differential pressure MPa	0.1					
Valve seat leakage Pa·m³/s (He)	1.3×10^{-10} or less					
External leakage Pa·m³/s (He)	1.3×10^{-11} or less					
Proof pressure MPa	0.3					
Fluid temperature °C	5 to 60 (5 to 150) *1					
Ambient temperature °C	0 to 60 (no freezing)					
Orifice size mm	ø17	ø24	ø39	ø48	ø68	ø80
Conductance *2 ℓ/s	5	13	43	74	166	242
Connection	NW16	NW25	NW40	NW50	NW63	NW80
Operating pressure MPa	0.4 to 0.6					
Weight kg	0.4	0.5	1.2	2.0	3.5	6.5
JIS symbol	 NC					

*1: The values in ( ) are for high temperature specifications.
*2: The conductance value is the theoretical calculation value in the molecular region, and not the actual measured value.
*3: Grease for vacuum is applied to the O-rings of outer seal parts.

Switch specifications

Descriptions	Proximity switch		Reed switch		
	T2H/T2V	T3H/T3V	TOH/TOV	T5H/T5V	ETOH/ETOV
Applications	Dedicated for programmable controller	For relay, programmable controller	For relay, programmable controller	For programmable controller, relay, IC circuit (without indicator lamp), serial connection	For relay, programmable controller
Power supply voltage	-	10 to 28 VDC	-	-	-
Load voltage/current	10 to 30 VDC, 5 to 20 mA *4	30 VDC or less, 100 mA or less	12/24 VDC 5 to 50 mA 100 VAC 7 to 20 mA	12/24 VDC 50 mA or less 100 VAC 20 mA or less	12/24 VDC 5 to 50 mA 110 VAC 7 to 20 mA
Power consumption	-	10 mA or less when ON at 24 VDC	-	-	-
Internal voltage drop	4 V or less	0.5 V or less	3 V or less	0 V	2.4 V or less
Lamp	LED (Lit when ON)			-	LED (Lit when ON)
Leakage current	1 mA or less	10 μA or less	0 mA	0 mA	0 mA
Lead wire length *3	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm²)	Standard 1 m (oil resistant vinyl cabtyre cable 3-conductor 0.2 mm²)	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm²)		Standard 1 m (heat-resistant fluorine insulation cabtyre cable 2-conductor 0.5 mm²)
Max. shock	980 m/s²		294 m/s²		
Insulation resistance	20 MΩ and over at 500 VDC megger				100 MΩ and over at 500 VDC megger
Withstand voltage	No failure after 1 minute of 1,000 VAC application.				
Ambient temperature	-10 to +60°C				-10 to +150°C
Degree of protection	IEC Standard IP67, JIS C0920 (water-tight), oil resistance				
Weight	1 m:18 g 3 m:49 g 5 m:80 g				44 g

*3: 3 m and 5 m lead wires are also available as options.
*4: The above max. load current is 20 mA at 25°C.
The current is lower than 20 mA if the operating ambient range around the switch is higher than 25˚C. (5 to 10 mA at 60˚C)
*5: Refer to pages 156 to 160 for precautions on using other switches.

How to order

AVB 4 17 - 40K - ○ - 4 - D T5H 3 - H

Model No.

Ⓐ Series

Actuation
NC

Ⓑ Connection

Ⓒ Fluid temperature

Ⓓ Operating port position

Ⓔ Switch mounting position *1

Ⓕ Switch model No. *2

Ⓖ Switch lead wire length *3

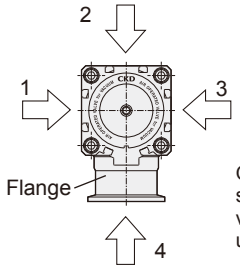
Ⓗ Switch quantity *4

Code	Content
Ⓐ Series	
2	Orifice size ø17
3	Orifice size ø24
4	Orifice size ø39
5	Orifice size ø48
6	Orifice size ø68
7	Orifice size ø80 (setting not valid for high temperature specifications)

Ⓑ Connection		
16K	NW16	Only AVB217 is available
25K	NW25	Only AVB317 is available
40K	NW40	Only AVB417 is available
50K	NW50	Only AVB517 is available
63K	NW63	Only AVB617 is available
80K	NW80	Only AVB717 is available

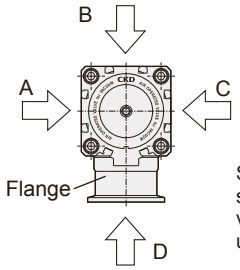
Ⓒ Fluid temperature	
Blank	5 to 60°C (built-in magnet)
HO	5 to 150°C (without magnet)
HOM	5 to 150°C (built-in magnet)

Ⓓ Operating port position

4	
1	
2	
3	

Operating port position is shown as 4, 1, 2, 3 when viewed from the valve upper surface.

Ⓔ Switch mounting position

Blank	Without switch
D	
A	
B	
C	

Switch mounting position is shown as D, A, B, C when viewed from the valve upper surface.

Ⓕ Switch model No.			
Blank	Without switch		
T0H	Axial lead wire	Reed	2-wire
T5H			
T0V	Radial lead wire		
T5V			
T2H	Axial lead wire	Proximity	3-wire
T3H			
T2V	Radial lead wire		2-wire
T3V			3-wire
ETOH	Axial lead wire	Reed	2-wire
ETOV	Radial lead wire		

Ⓖ Switch lead wire length	
Blank	1 m (standard)
3	3 m
5	5 m

Ⓗ Switch quantity	
H	Detection at valve open
R	Detection at valve closed
D	Detection at valve open and closed

Precautions for model No. selection

*1: The switch can be mounted on three sides for series 2 (orifice ø17) only. Switch mounting is possible on all sides except the operating port surface.
The following model No. cannot be selected.
AVB217-16K-1-AⒻⒼ-Ⓗ
AVB217-16K-2-BⒻⒼ-Ⓗ
AVB217-16K-3-CⒻⒼ-Ⓗ
AVB217-16K-4-DⒻⒼ-Ⓗ

*2: For Ⓒ Fluid temperature "HOM", select either ETOH or ETOV.

*3: "3" and "5" cannot be selected for Ⓕ Switch model no. "ETOH" "ETOV".

*4: "R" and "D" cannot be selected for Ⓕ Switch model no. "ETOH" "ETOV".

[Example of model No.]

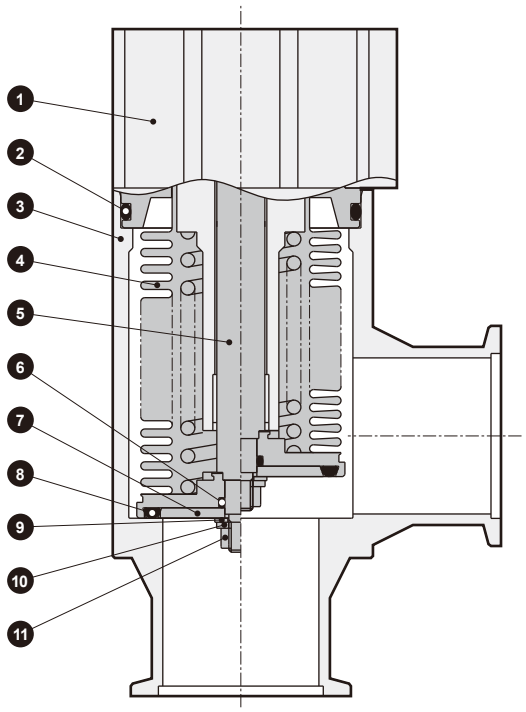
AVB417-40K-4-DT5H3-H

Model: AVB417 Air operated valve for high vacuum (NC)

Ⓐ Series : Orifice size ø39
Ⓑ Connection : NW40
Ⓒ Fluid temperature : 5 to 60°C (built-in magnet)
Ⓓ Operating port position : 4
Ⓔ Switch mounting position : D
Ⓕ Switch model No. : T5H (Axial lead wire)
Ⓖ Lead wire length : 3 m
Ⓗ Switch quantity : Detection at valve open

Internal structure and parts list (NC)

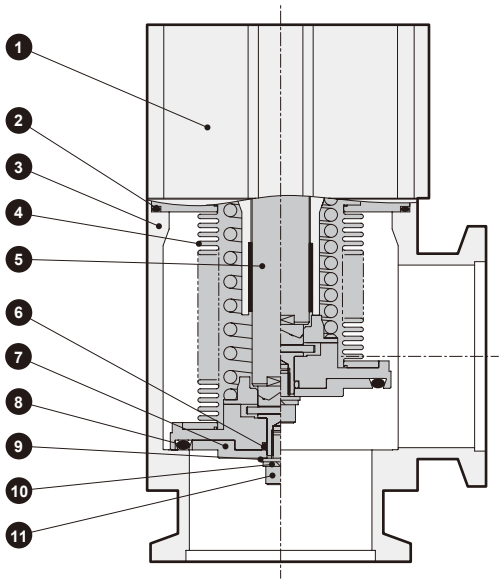
● AVB217/AVB317/AVB417/AVB517/AVB617



No.	Part name	Material	
1	Cylinder (built-in magnet)		
2	O-ring	FKM	Note
3	Body	A6063	
4	Bellows	SUS316L	
5	Rod	SUS316L	
6	O-ring	FKM	Note
7	Valve disc B	SUS316L	
8	O-ring	FKM	Note
9	Plain washer	SUS304	
10	Spring washer	SUS304	
11	Hexagon nut	SUS304	

Note: Contact CKD for other O-ring material compatibility.

● AVB717

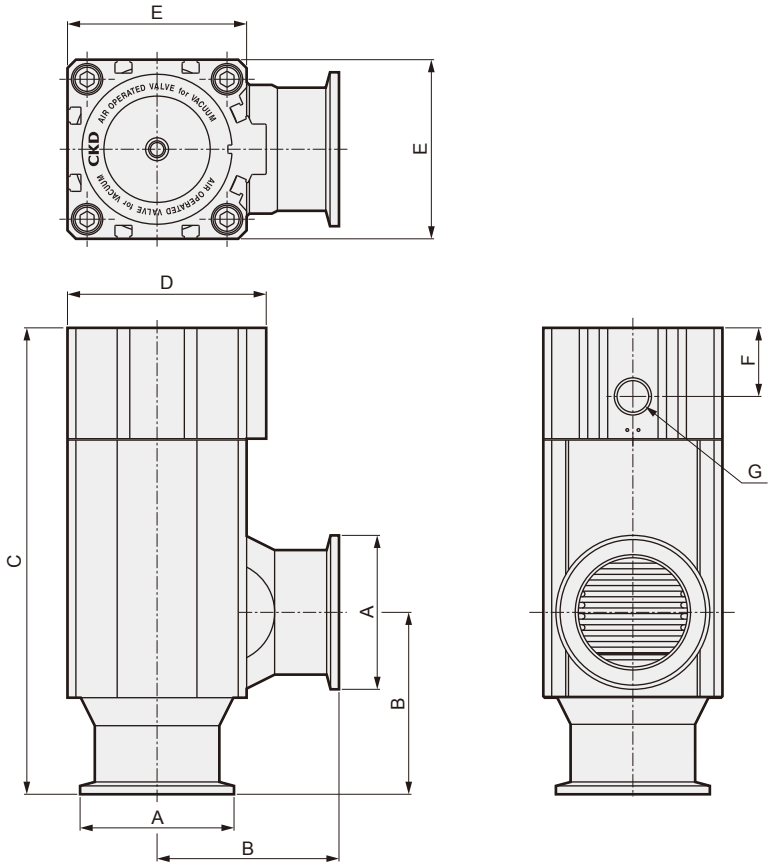


No.	Part name	Material	
1	Cylinder (built-in magnet)		
2	O-ring	FKM	Note
3	Body	A6063	
4	Bellows	ASL350	
5	Rod	SUS304	
6	O-ring	FKM	Note
7	Valve disc B	SUS316L	
8	O-ring	FKM	Note
9	Plain washer	SUS304	
10	Spring washer	SUS304	
11	Hexagon socket head cap screw	SUS304	

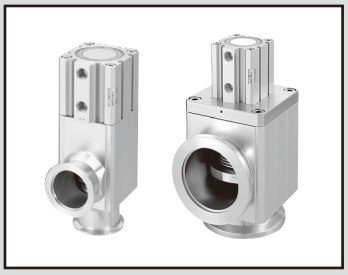
Note: Contact CKD for other O-ring material compatibility.

Dimensions (NC)

● AVB217/AVB317/AVB417/AVB517/AVB617/AVB717



Model No.	A	B	C	D	E	F	G
AVB217	ø30(NW16)	40	114	40	40	20	M5
AVB317	ø40(NW25)	50	127	49.5	45	23	Rc1/8
AVB417	ø55(NW40)	65	168	71	64	24.5	Rc1/4
AVB517	ø75(NW50)	70	186	84	77	31	Rc1/4
AVB617	ø87(NW63)	88	214	104	98	37	Rc1/4
AVB717	ø114(NW80)	90	235	123.5	117	52.5	Rc1/4

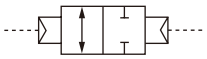


Air operated valve For high vacuum Double acting

AVB*37 Series

● Molded bellows method Aluminum body

Specifications

Descriptions	AVB237	AVB337	AVB437	AVB537	AVB637	AVB737	AVB837
Working fluid	Vacuum and inert gas						
Working pressure Pa (abs)	1.3×10^{-6} to 1×10^{5}						
Max. working differential pressure MPa	0.1						
Valve seat leakage Pa·m³/s (He)	1.3×10^{-10} or less						
External leakage Pa·m³/s (He)	1.3×10^{-11} or less						
Proof pressure MPa	0.3						
Fluid temperature °C	5 to 60						
Ambient temperature °C	0 to 60 (no freezing)						
Orifice size mm	ø17	ø24	ø39	ø48	ø68	ø80	ø100
Conductance *1 ℓ/s	5	13	43	74	166	242	372
Connection	NW16	NW25	NW40	NW50	NW63	NW80	NW100
Operating pressure MPa	0.4 to 0.6						0.3 to 0.5
Weight kg	0.5	0.7	1.5	2.5	4.2	5.5	13
JIS symbol	 Double acting						

*1: The conductance value is the theoretical calculation value in the molecular region, and not the actual measured value.
*2: Grease for vacuum is applied to the O-rings of outer seal parts.

Switch specifications

Descriptions	Proximity switch		Reed switch	
	T2H/T2V	T3H/T3V	TOH/TOV	T5H/T5V
Applications	Dedicated for programmable controller	For relay, programmable controller	For relay, programmable controller	For programmable controller, relay, IC circuit (without indicator lamp), serial connection
Power supply voltage	-	10 to 28 VDC	-	-
Load voltage/current	10 to 30 VDC, 5 to 20 mA *3	30 VDC or less, 100 mA or less	12/24 VDC 5 to 50 mA 100 VAC 7 to 20 mA	12/24 VDC 50 mA or less 100 VAC 20 mA or less
Power consumption	-	10 mA or less when ON at 24 VDC	-	-
Internal voltage drop	4 V or less	0.5 V or less	3 V or less	0 V
Lamp	LED (Lit when ON)			-
Leakage current	1 mA or less	10 μA or less	0 mA	0 mA
Lead wire length *2	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm²)	Standard 1 m (oil resistant vinyl cabtyre cable 3-conductor 0.2 mm²)	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm²)	
Max. shock	980 m/s²		294 m/s²	
Insulation resistance	20 MΩ and over at 500 VDC megger			
Withstand voltage	No failure after 1 minute of 1,000 VAC application.			
Ambient temperature	-10 to +60°C			
Degree of protection	IEC Standard IP67, JIS C0920 (water-tight), oil resistance			
Weight	1 m:18 g 3 m:49 g 5 m:80 g			

*2: 3 m and 5 m lead wires are also available as options.
*3: The above max. load current is 20 mA at 25°C.
The current is lower than 20 mA if the operating ambient range around the switch is higher than 25˚C. (5 to 10 mA at 60˚C)
*4: Refer to pages 156 to 160 for precautions on using other switches.

How to order

AVB 4 37 - 40K - ○ - 4 - D T5H 3 - H

Model No.

Ⓐ Series

Actuation
Double acting

Ⓑ Connection

Ⓒ Fluid temperature

Ⓓ Operating port position

Ⓔ Switch mounting position *1

Ⓕ Switch model No.

Ⓖ Switch lead wire length

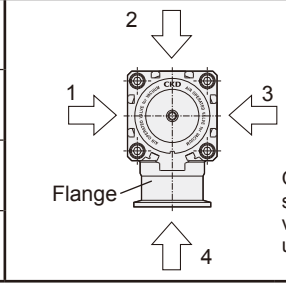
Ⓗ Switch quantity

Code	Content
Ⓐ Series	
2	Orifice size ø17
3	Orifice size ø24
4	Orifice size ø39
5	Orifice size ø48
6	Orifice size ø68
7	Orifice size ø80
8	Orifice size ø100

Ⓑ Connection		
16K	NW16	Only AVB237 is available
25K	NW25	Only AVB337 is available
40K	NW40	Only AVB437 is available
50K	NW50	Only AVB537 is available
63K	NW63	Only AVB637 is available
80K	NW80	Only AVB737 is available
100K	NW100	Only AVB837 is available

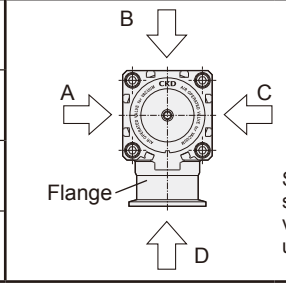
Ⓒ Fluid temperature	
Blank	5 to 60°C (built-in magnet)

Ⓓ Operating port position

4	
1	
2	
3	

Operating port position is shown as 4, 1, 2, 3 when viewed from the valve upper surface.

Ⓔ Switch mounting position

Blank	Without switch
D	
A	
B	
C	

Switch mounting position is shown as D, A, B, C when viewed from the valve upper surface.

Ⓕ Switch model No.

Blank	Without switch		
T0H	Axial lead wire	Reed	2-wire
T5H			
T0V	Radial lead wire		
T5V			
T2H	Axial lead wire	Proximity	3-wire
T3H			
T2V	Radial lead wire		2-wire
T3V			3-wire

Ⓖ Switch lead wire length	
Blank	1 m (standard)
3	3 m
5	5 m

Ⓗ Switch quantity	
H	Detection at valve open
R	Detection at valve closed
D	Detection at valve open and closed

Precautions for model No. selection

*1: The switch can be mounted on three sides for series 2 (orifice ø17) only. Switch mounting is possible on all sides except the operating port surface.
The following model No. cannot be selected.
AVB237-16K-1-AⒻⒼ-Ⓗ
AVB237-16K-2-BⒻⒼ-Ⓗ
AVB237-16K-3-CⒻⒼ-Ⓗ
AVB237-16K-4-DⒻⒼ-Ⓗ

[Example of model No.]

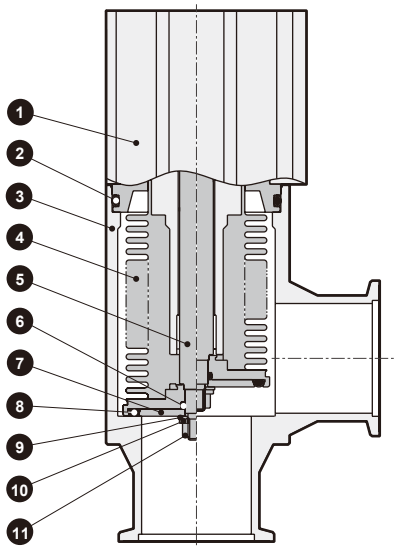
AVB437-40K-4-DT5H3-H

Model: AVB417 Air operated valve for high vacuum (Double acting)

Ⓐ Series : Orifice size ø39
Ⓑ Connection : NW40
Ⓒ Fluid temperature : 5 to 60°C (built-in magnet)
Ⓓ Operating port position : 4
Ⓔ Switch mounting position : D
Ⓕ Switch model No. : T5H (Axial lead wire)
Ⓖ Lead wire length : 3 m
Ⓗ Switch quantity : Detection at valve open

Internal structure and parts list (Double acting)

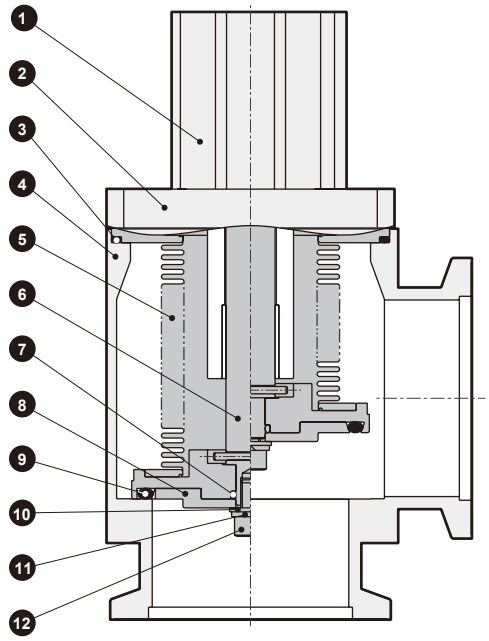
● AVB237/AVB337/AVB437/AVB537/AVB637



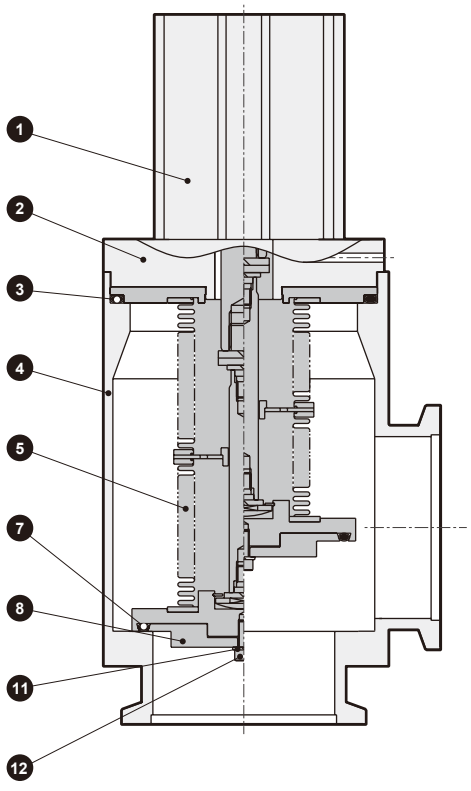
No.	Part name	Material	
1	Cylinder (built-in magnet)		
2	O-ring	FKM	Note
3	Body	A6063	
4	Bellows	SUS316L	
5	Rod	SUS304	
6	O-ring	FKM	Note
7	Valve disc B	SUS316L	
8	O-ring	FKM	Note
9	Plain washer	SUS304	
10	Spring washer	SUS304	
11	Hexagon nut	SUS304	

Note: Contact CKD for other O-ring material compatibility.

● AVB737



● AVB837

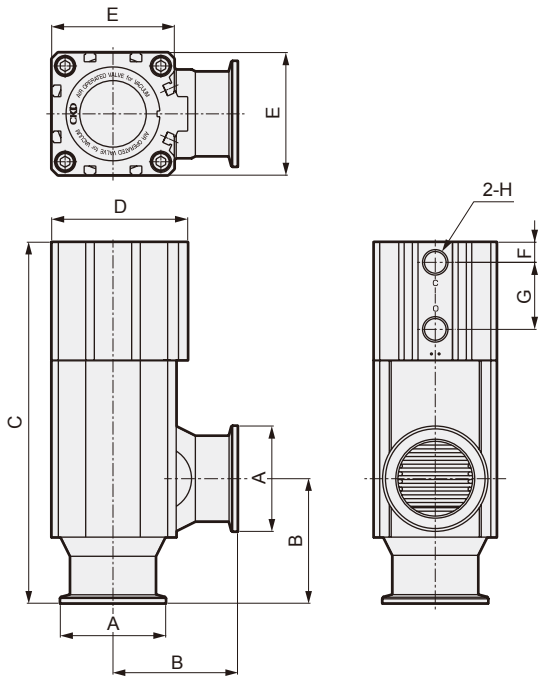


No.	Part name	Material		No.	Part name	Material	
1	Cylinder (built-in magnet)			7	O-ring	FKM	Note
2	Cylinder adaptor	AVB737:A5056 AVB837:A5052		8	Valve disc B	SUS316L	
				9	O-ring	FKM	Note
3	O-ring	FKM	Note	10	Plain washer	SUS304	
4	Body	A6063		11	Spring washer	SUS304	
5	Bellows	ASL350		12	Hexagon socket head cap screw	SUS304	
6	Rod	SUS304					

Note: Contact CKD for other O-ring material compatibility.

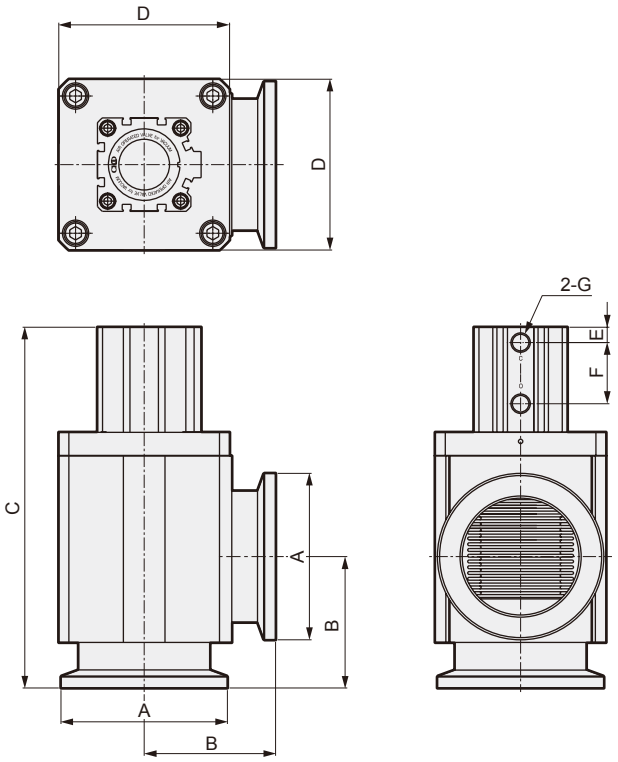
Dimensions (Double acting)

● AVB237/AVB337/AVB437/AVB537/AVB637



Model No.	A	B	C	D	E	F	G	H
AVB237	ø30(NW16)	40	132.5	40	40	6	32.5	M5
AVB337	ø40(NW25)	50	144.5	49.5	45	8	32	Rc1/8
AVB437	ø55(NW40)	65	188	71	64	10.5	35	Rc1/4
AVB537	ø75(NW50)	70	213	84	77	11	47	Rc1/4
AVB637	ø87(NW63)	88	245	104	98	13	55	Rc1/4

● AVB737/AVB837



Model No.	A	B	C	D	E	F	G
AVB737	ø114(NW80)	90	247	117	10.5	42	Rc1/4
AVB837	ø134(NW100)	108	390	154	13	94.5	Rc3/8

Air operated valve for high vacuum Two-stage

AVB*47 Series

● Molded bellows method Aluminum body

Specifications

Descriptions	AVB347	AVB447	AVB547	AVB647
Working fluid	Vacuum and inert gas			
Working pressure Pa(abs)	1.3×10^{-6} to 1×10^{5}			
Max. working differential pressure MPa	0.1			
Valve seat leakage Pa·m³/s (He)	1.3×10^{-10} or less			
External leakage Pa·m³/s (He)	1.3×10^{-11} or less			
Proof pressure MPa	0.3			
Fluid temperature °C	5 to 60 (5 to 150) *1			
Ambient temperature °C	0 to 60 (no freezing)			
Orifice size mm	ø24	ø39	ø48	ø68
Conductance *2 ℓ/s	13	43	74	166
Connection	NW25	NW40	NW50	NW63
Main exhaust operating pressure MPa	0.4 to 0.6			
Soft exhaust operating pressure MPa	0.4 to 0.6			
Weight kg	0.7	1.6	2.6	4.4

*1: The values in ( ) are for high temperature specifications.
*2: The conductance value is the theoretical calculation value in the molecular region, and not the actual measured value.
Note 1: Grease for vacuum is applied to the O-rings of outer seal parts.

Switch specifications

Descriptions	Proximity switch		Reed switch		
	T2H/T2V	T3H/T3V	TOH/TOV	T5H/T5V	ETOH/ETOV
Applications	Dedicated for programmable controller	For relay, programmable controller	For relay, programmable controller	For programmable controller, relay, IC circuit (without indicator lamp), serial connection	For relay, programmable controller
Power supply voltage	-	10 to 28 VDC	-	-	-
Load voltage/current	10 to 30 VDC, 5 to 20 mA *4	30 VDC or less, 100 mA or less	12/24 VDC 5 to 50 mA 100 VAC 7 to 20 mA	12/24 VDC 50 mA or less 100 VAC 20 mA or less	12/24 VDC 5 to 50 mA 110 VAC 7 to 20 mA
Power consumption	-	10 mA or less when ON at 24 VDC	-	-	-
Internal voltage drop	4 V or less	0.5 V or less	3 V or less	0 V	2.4 V or less
Lamp	LED (Lit when ON)			-	LED (Lit when ON)
Leakage current	1 mA or less	10 μA or less	0 mA	0 mA	0 mA
Lead wire length *3	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm²)	Standard 1 m (oil resistant vinyl cabtyre cable 3-conductor 0.2 mm²)	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm²)		Standard 1 m (heat-resistant fluorine insulation cabtyre cable 2-conductor 0.5 mm²)
Max. shock	980 m/s²		294 m/s²		
Insulation resistance	20 MΩ and over at 500 VDC megger				100 MΩ and over at 500 VDC megger
Withstand voltage	No failure after 1 minute of 1,000 VAC application.				
Ambient temperature	-10 to +60°C				-10 to +150°C
Degree of protection	IEC Standard IP67, JIS C0920 (water-tight), oil resistance				
Weight	1 m:18 g 3 m:49 g 5 m:80 g				44 g

*3: 3 m and 5 m lead wires are also available as options.
*4: The above max. load current is 20 mA at 25°C. The current is lower than 20 mA if the operating ambient range around the switch is higher than 25°C. (5 to 10 mA at 60°C)
Note 1: Refer to pages 156 to 160 for precautions on using other switches.
Note 2: Only the main exhaust valve can be mounted on the switch.

How to order

AVB 4 47 - 40K - ○ - 4 - D T5H 3 - H

Model No.

Ⓐ Series

Actuation
Two-stage

Ⓑ Connection

Ⓒ Fluid temperature

Ⓓ Operating port position

Ⓔ Switch mounting position

Ⓕ Switch model No. *1

Ⓖ Switch lead wire length *2

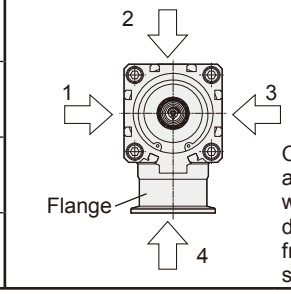
Ⓗ Switch quantity *3

Code	Content
Ⓐ Series	
3	Orifice size ø24
4	Orifice size ø39
5	Orifice size ø48
6	Orifice size ø68

Ⓑ Connection		
25K	NW25	Only AVB347 is available
40K	NW40	Only AVB447 is available
50K	NW50	Only AVB547 is available
63K	NW63	Only AVB647 is available

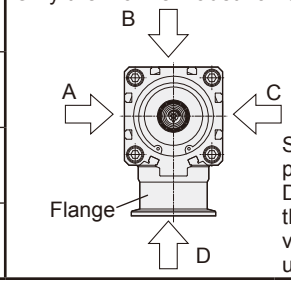
Ⓒ Fluid temperature	
Blank	5 to 60°C (built-in magnet)
HO	5 to 150°C (without magnet)
HOM	5 to 150°C (built-in magnet)

Ⓓ Operating port position

4	
1	
2	
3	

Operating port positions are shown as 4, 1, 2, 3 with respect to the flange direction when viewed from the valve upper surface.

Ⓔ Switch mounting position

Blank	Without switch
D	Only the main exhaust valve can be mounted.
A	
B	
C	

Switch mounting positions are shown as D, A, B, C with respect to the flange direction when viewed from the valve upper surface.

Ⓕ Switch model No.			
Blank	Without switch		
T0H	Axial lead wire	Reed	2-wire
T5H			
T0V	Radial lead wire		
T5V			
T2H	Axial lead wire	Proximity	3-wire
T3H			
T2V	Radial lead wire		2-wire
T3V			3-wire
ETOH	Axial lead wire	Reed	2-wire
ETOV	Radial lead wire		

Ⓖ Switch lead wire length	
Blank	1 m (standard)
3	3 m
5	5 m

Ⓗ Switch quantity	
H	Detection at valve open
R	Detection at valve closed
D	Detection at valve open and closed

Precautions for model No. selection

*1: For Ⓒ Fluid temperature "HOM", select either ETOH or ETOV.
*2: "3" and "5" cannot be selected for Ⓕ Switch model no. "ETOH" "ETOV".
*3: "R" and "D" cannot be selected for Ⓕ Switch model no. "ETOH" "ETOV".

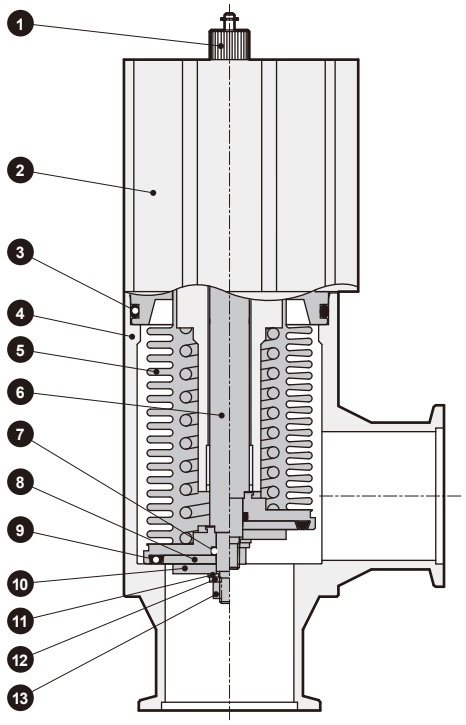
[Example of model No.]

AVB447-40K-4-DT5H3-H

Model: AVB447 Air operated valve for high vacuum (Two-stage)

Ⓐ Series : Orifice size ø39
Ⓑ Connection : NW40
Ⓒ Fluid temperature : 5 to 60°C (built-in magnet)
Ⓓ Operating port position : 4
Ⓔ Switch mounting position : D
Ⓕ Switch model No. : T5H (Axial lead wire)
Ⓖ Lead wire length : 3 m
Ⓗ Switch quantity : Detection at valve open

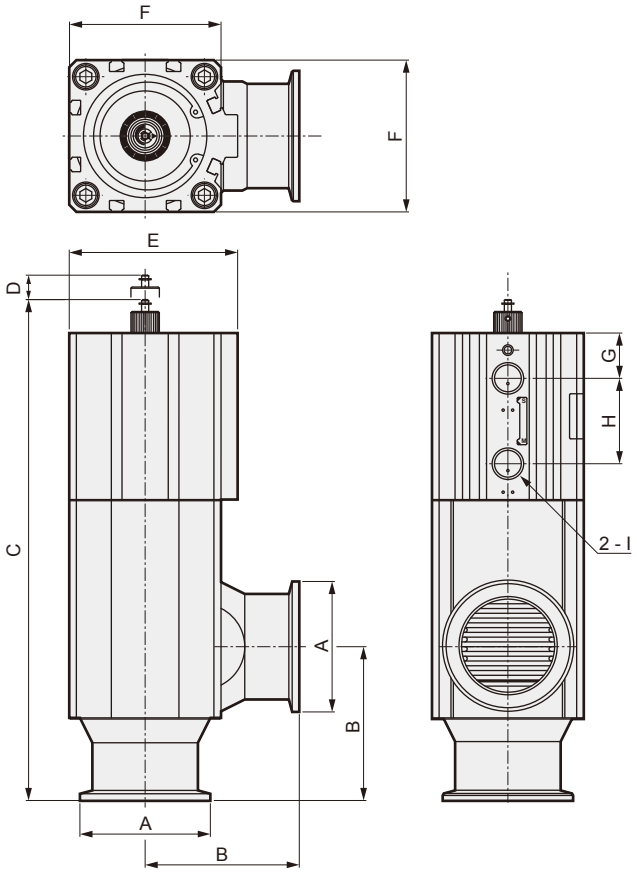
Internal structure and parts list



No.	Part name	Material	
1	Adjusting nut	A5056	
2	Cylinder (built-in magnet)		
3	O-ring	FKM	Note
4	Body	A6063	
5	Bellows	SUS316L	
6	Rod	SUS304	
7	O-ring	FKM	Note
8	Valve disc B	SUS316L	
9	O-ring	FKM	Note
10	Skirt	SUS304	
11	Plain washer	SUS304	
12	Spring washer	SUS304	
13	Hexagon nut	SUS304	

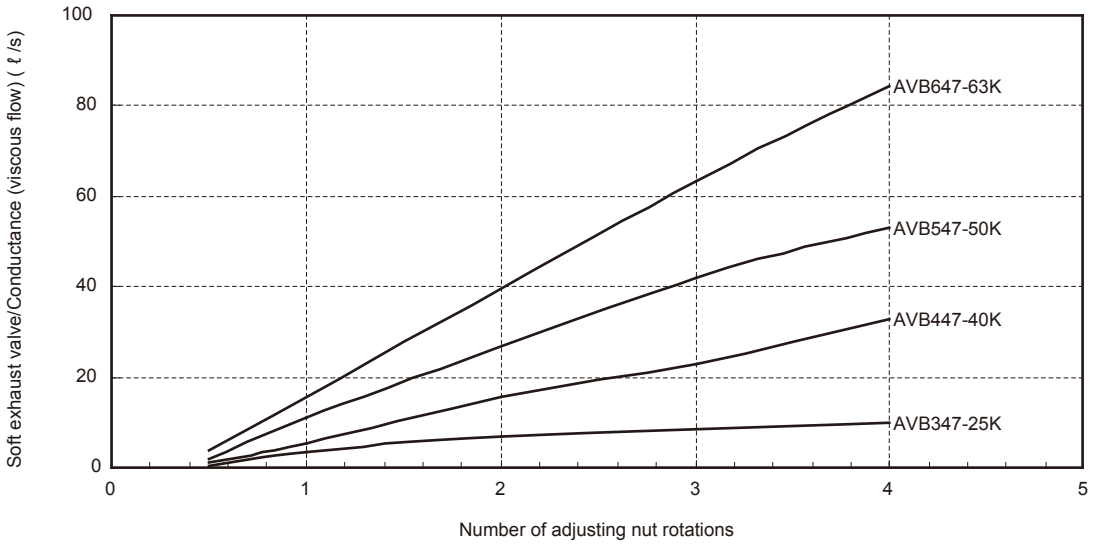
Note: Contact CKD for other O-ring material compatibility.

Dimensions



Model No.	A	B	C	D (max.)	E	F	G	H	I
AVB347	ø40(NW25)	50	168	7.5	49.5	45	19	31	Rc1/8
AVB447	ø55(NW40)	65	211	12	71	64	19	35	Rc1/4
AVB547	ø75(NW50)	70	234	15	84	77	21.5	42.5	Rc1/4
AVB647	ø87(NW63)	88	263	17	104	98	23.5	49	Rc1/4

Number of adjusting nut rotations x Soft exhaust valve/Conductance



MEMO

Air operated valve for high vacuum

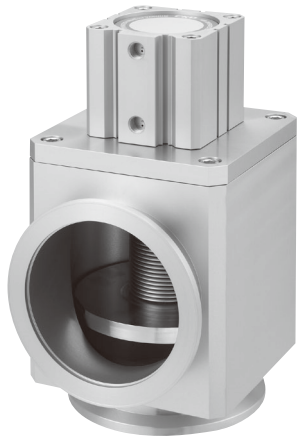
AVB**7 Series Made to Order

Contact CKD for details.

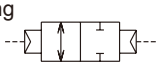
RoHS **Made to Order**

Large bore size

Model No.	Actuation	Connection
AVB937	Double acting	NW160

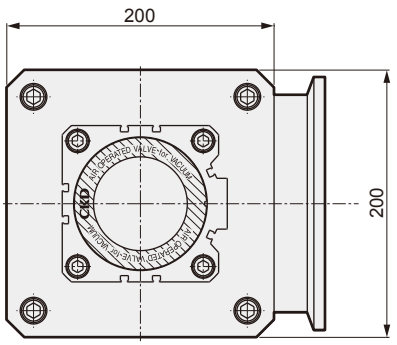


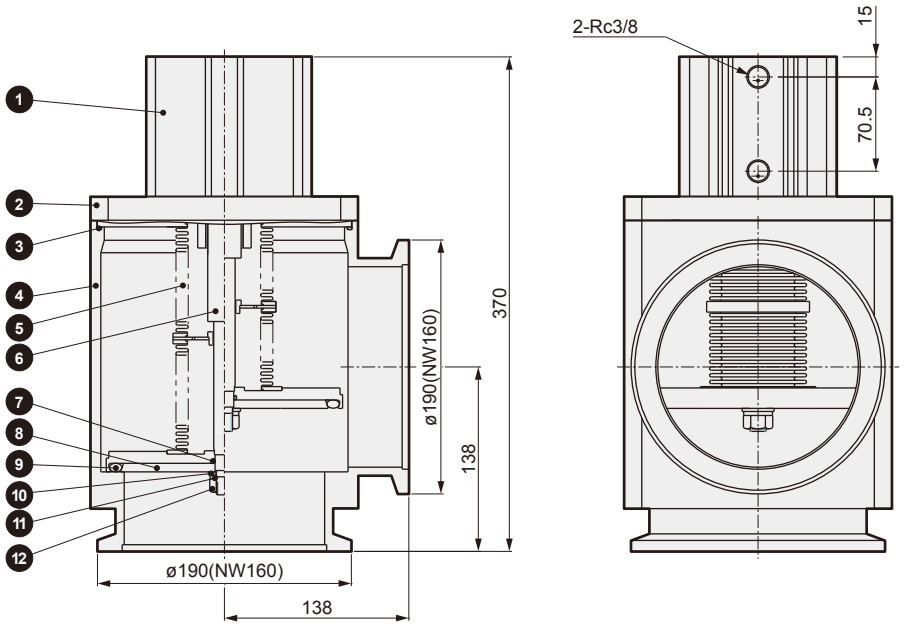
Reference specifications

Descriptions		AVB937-X*
Working fluid		Vacuum and inert gas
Working pressure	Pa(abs)	1.3×10^{-6} to 1×10^{5}
Max. working differential pressure	MPa	0.1
Valve seat leakage	$Pa \cdot m^3/s$ (He)	1.3×10^{-10} or less
External leakage	$Pa \cdot m^3/s$ (He)	1.3×10^{-11} or less
Proof pressure	MPa	0.3
Fluid temperature	°C	5 to 60
Ambient temperature	°C	0 to 60 (no freezing)
Orifice size	mm	ø150
Conductance*1	L/s	1,100
Connection		NW160
Operating pressure	MPa	0.3 to 0.5
Weight	kg	18
JIS symbol		● Double acting 

*1: The conductance value is the theoretical calculation value in the molecular region, and not the actual measured value.

Internal structure and parts list/Dimensions





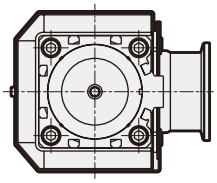
No.	Part name	Material
1	Cylinder (built-in magnet)	
2	Cylinder adaptor	A5056
3	O-ring	FKM
4	Body	A5052
5	Bellows	ASL350
6	Rod	SUS304
7	O-ring	FKM
8	Valve disc B	SUS304
9	O-ring	FKM
10	Plain washer	SUS304
11	Spring washer	SUS304
12	Hexagon nut	SUS304

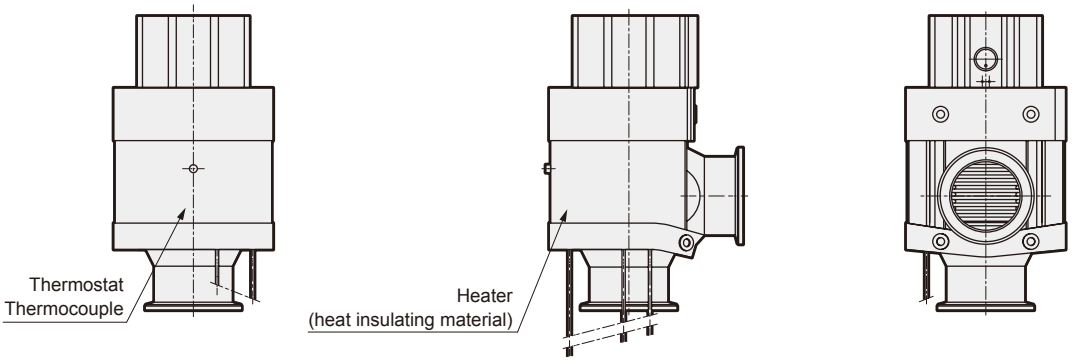
*2: Contact CKD for other O-ring material compatibility.

Supports heater for valve heating

To prevent adhesion of reaction products to the valve interior

- Jacketed heater valve
- NW25/NW40/NW50

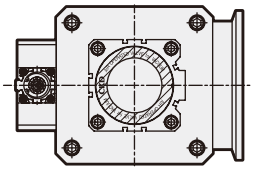


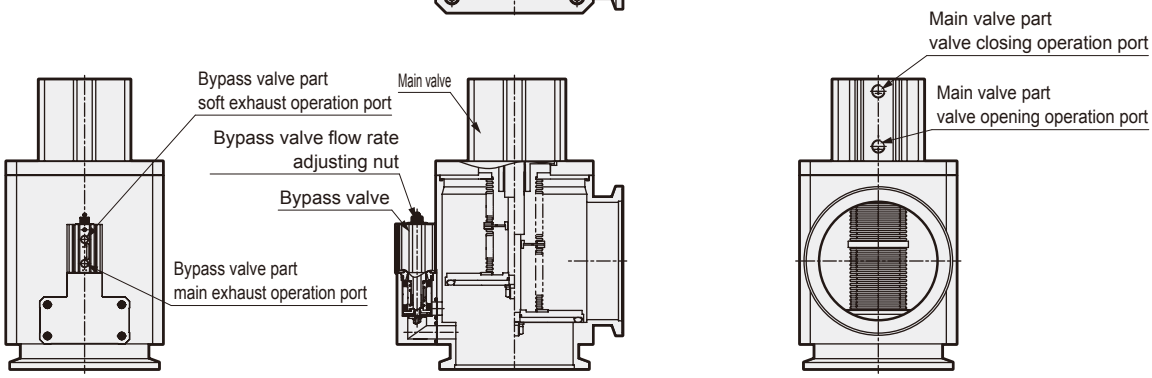


Soft exhaust (external bypass valve) compatible

Controls discharge rate in 2 stages

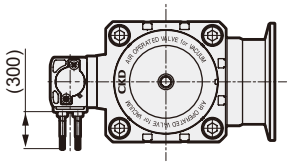
- NW80/NW100/NW160

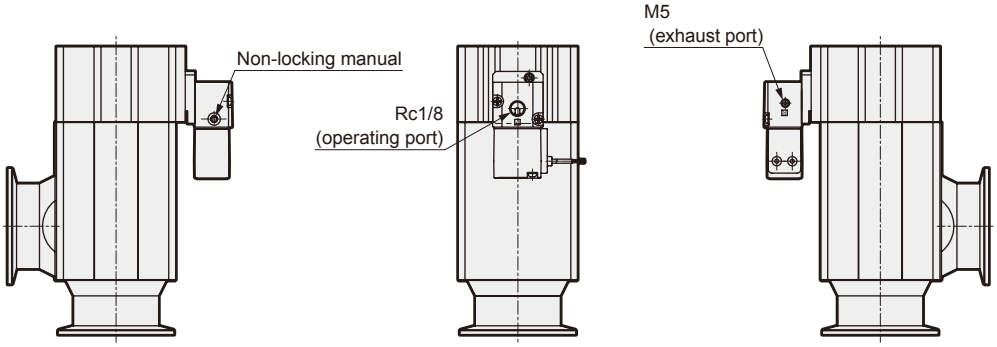


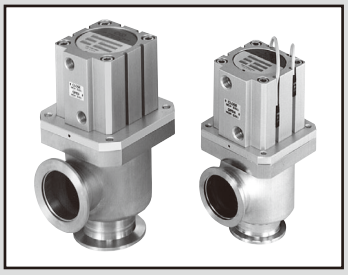


With solenoid valve

- AVB217/317/417/517/617/717
- NC







Air operated valve for high vacuum

AVB$^{5}_{6}_{7}_{8}$*3 Series

● Molded bellows method ● Stainless steel body compact

Model No.	Actuation	Connection
AVB513	NC	NW25
AVB613	NC	NW40
AVB713	NC	NW50
AVB813	NC	NW80

Model No.	Actuation	Connection
AVB523	NO	NW25
AVB623	NO	NW40
AVB723	NO	NW50
AVB823	NO	NW80

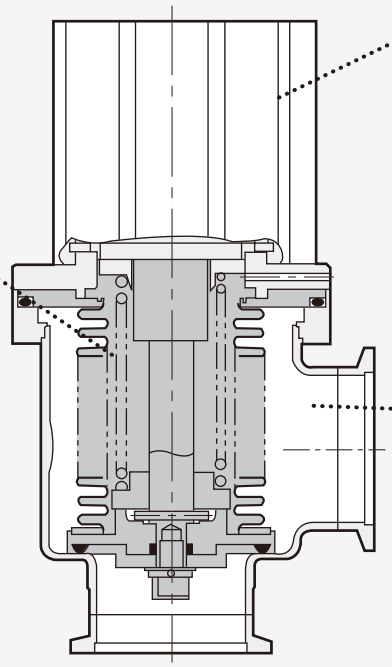
Model No.	Actuation	Connection
AVB533	Double acting	NW25
AVB633	Double acting	NW40
AVB733	Double acting	NW50
AVB833	Double acting	NW80

Smaller and with improved maintainability.

● Long service life molded bellows
Special stainless steel material (ASL350) used.
Durability: 1 million cycles (*1)

*1 Service life when the working fluid is inert gas within the specified range and does not contain solids such as reaction products.

● Reverse pressure can be used (free exhaust direction)
Vacuum pump connection is possible on either port.



● Miniature switch can be mounted
Reed switch for operation check (proximity, reed) can be connected. (Retrofitting is also possible)

● No gas accumulation
The bulge-integrated molding method creates a streamlined flow path and smooth surfaces. There is no dead space for gas accumulation.

● Low dust generation
There are no sliding parts to cause particle generation in the gas contact parts (flow path).

Safety precautions

Read the following Safety Precautions on Intro Page 9 and pages 163 to 170 to ensure correct and safe use of the product.

● Working fluids
● Mounting
● Direction when connecting pipes
● Proximity switch, reed switch

Contact CKD for these custom orders.

1. Change in length between flanges
2. Change in flange type
3. Heating of valving element
4. Change in gas contact part O-ring material
5. Slow exhaust
6. Straight piping

Specifications

Descriptions		AVB5 1 2 3 3	AVB6 1 2 3 3	AVB7 1 2 3 3	AVB8 1 2 3 3
Working fluid		Vacuum and inert gas			
Working pressure Pa(abs)		1.3×10^{-6} to 1×10^{5}			
Max. working differential pressure MPa		0.1			
Valve seat leakage Pa·m³/s (He)		1.3×10^{-10} or less			
External leakage Pa·m³/s (He)		1.3×10^{-11} or less			
Proof pressure MPa		0.3			
Fluid temperature °C		5 to 60			
Ambient temperature °C		0 to 60 (no freezing)			
Orifice size mm		ø24	ø40	ø50	ø80
Stroke length mm		10	20	22	32
Conductance *1 ℓ/s		13	52	80	242
Connection		NW25	NW40	NW50	NW80
Operating pressure MPa		0.4 to 0.6			
Weight kg	NC	1.1	1.9	3.6	7.9
	NO	1.1	1.9	3.5	7.8
	Double acting	1.0	1.6	3.2	7.3
JIS symbol		● NC	● NO	● Double acting	

*1: The conductance value is the theoretical calculation value in the molecular region, and not the actual measured value.
Note 1: Grease for vacuum is applied to the O-rings of outer seal parts.

Switch specifications

Descriptions	Proximity switch		Reed switch	
	T2H/T2V	T3H/T3V	TOH/TOV	T5H/T5V
Applications	Dedicated for programmable controller	For relay, programmable controller	For relay, programmable controller	For programmable controller, relay, IC circuit (without indicator lamp), serial connection
Power supply voltage	–	10 to 28 VDC	–	–
Load voltage/current	10 to 30 VDC, 5 to 20mA *3	30 VDC or less, 100 mA or less	12/24 VDC 5 to 50 mA 100 VAC 7 to 20 mA	12/24 VDC 50 mA or less 100 VAC 20 mA or less
Power consumption	–	10 mA or less when ON at 24 VDC	–	–
Internal voltage drop	4 V or less	0.5 V or less	3 V or less	0 V
Lamp	LED (Lit when ON)			–
Leakage current	1 mA or less	10 μA or less	0 mA	0 mA
Lead wire length *2	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm²)	Standard 1 m (oil resistant vinyl cabtyre cable 3-conductor 0.2 mm²)	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm²)	
Max. shock	980 m/s²		294 m/s²	
Insulation resistance	20 MΩ and over at 500 VDC megger			
Withstand voltage	No failure after 1 minute of 1,000 VAC application.			
Ambient temperature	-10 to +60°C			
Degree of protection	IEC Standard IP67, JIS C0920 (water-tight), oil resistance			
Weight	1 m:18 g 3 m:49 g 5 m:80 g			

*2: In addition, 3 m and 5 m lead wires are available as options.
*3: The above max. load current is 20 mA at 25°C.
The current is lower than 20 mA if the operating ambient range around the switch is higher than 25˚C.
(5 to 10 mA at 60˚C)
Note 1: Refer to pages 156 to 160 for precautions on using other switches.

How to order

AVB 6 1 3 - 40K - T5H 3 - H

Model No.

Ⓐ Series

Ⓑ Actuation

Ⓒ Connection

Ⓓ Switch model No

Ⓔ Switch lead wire length

Ⓕ Switch quantity (detecting position)

Code	Content		
Ⓐ Series			
5	Orifice size ø24		
6	Orifice size ø40		
7	Orifice size ø50		
8	Orifice size ø80		
Ⓑ Actuation			
1	NC (normally closed)		
2	NO (normally open)		
3	Double acting		
Ⓒ Connection			
25K	NW25	Only AVB5*3 is available	
40K	NW40	Only AVB6*3 is available	
50K	NW50	Only AVB7*3 is available	
80K	NW80	Only AVB8*3 is available	
Ⓓ Switch model No.			
Blank	Without switch		
T0H	Axial lead wire	Reed	2-wire
T5H			
T0V	Radial lead wire		
T5V			
T2H	Axial lead wire	Proximity	3-wire
T3H			
T2V	Radial lead wire		2-wire
T3V			3-wire
Ⓔ Switch lead wire length			
Blank	1 m (standard)		
3	3 m		
5	5 m		
Ⓕ Switch quantity			
H	Detection at valve open		
R	Detection at valve closed		
D	Detection at valve open and closed		

[Example of model No.]

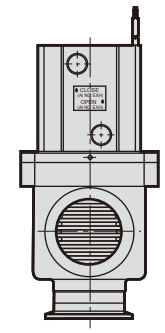
AVB613-40K-T5H3-H

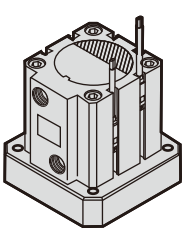
Model: AVB613 Air operated valve for high vacuum

Ⓐ Series : Orifice ø40
Ⓑ Actuation : NC (normally closed)
Ⓒ Connection : NW40
Ⓓ Switch model No. : T5H (axial lead wire)
Ⓔ Lead wire length : 3 m
Ⓕ Switch quantity : Detection at valve open

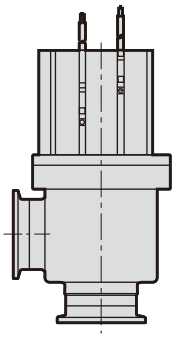
Appearance with switch mounted

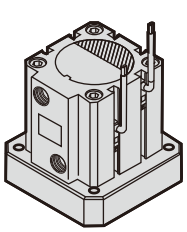
● T*H type (axial lead wire)



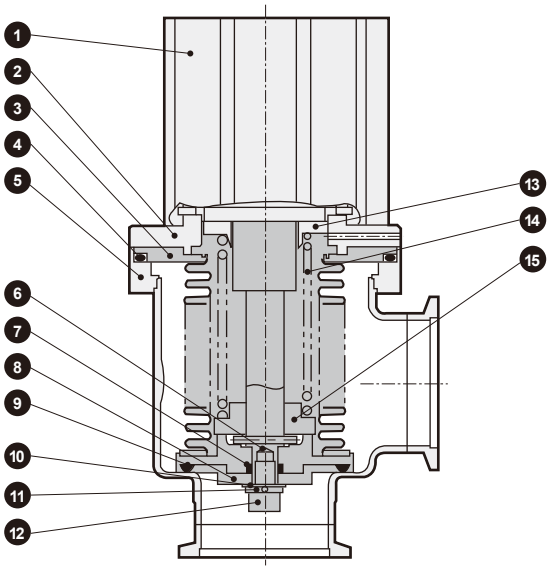


● T*V type (radial lead wire)





Internal structure and parts list



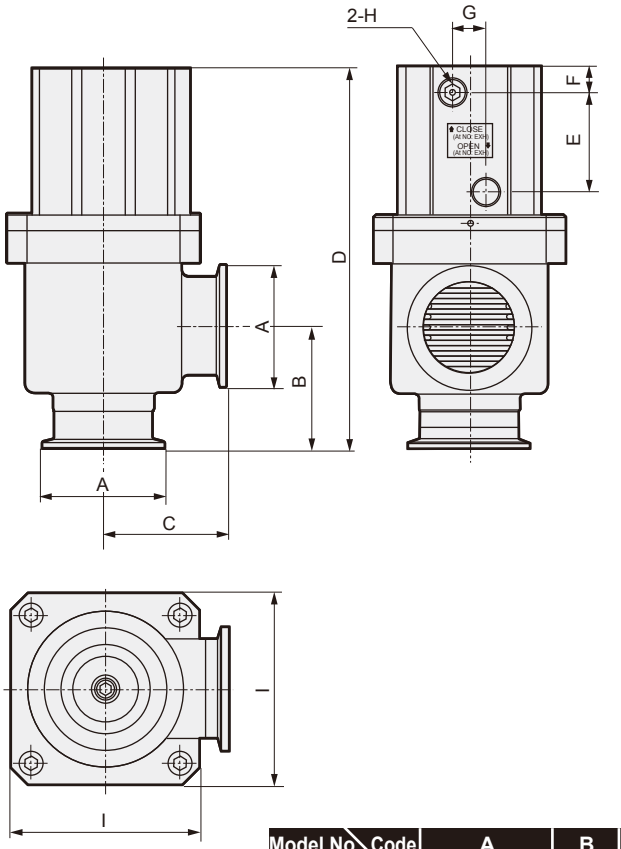
(cross-section view of NC)

No.	Part name	Material
1	Compact cylinder	
2	Cylinder adaptor	A5056
3	Bellows assembly	ASL350/SUS316L
4	O-ring	FKM Note
5	Body assembly	SUS316L
6	Parallel pin	SUS301
7	O-ring	FKM Note
8	Valve disc B	SUS316L
9	O-ring	FKM Note
10	Plain washer	SUS304
11	Spring washer	SUS304
12	Hexagon socket head cap screw	SUS304
13	Spring holder B	A5056
14	Spring	SWOSC-V (Electrodeposition)
15	Spring holder A	A5056

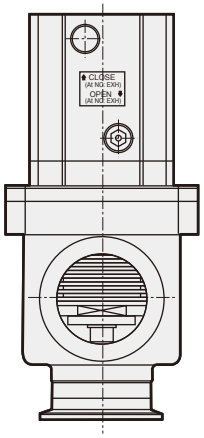
Note: Contact CKD for other O-ring material compatibility.

Dimensions

● AVB*13 (NC)/AVB*33 (Double acting)



● AVB*23 (NO)



The dimensions in ( ) within code D are for NO type.

Model No. \ Code	A	B	C	D	E	F	G	H	I
AVB5*3	ø 40(NW25)	50	50	151.5(162.5)	37	8	10	Rc1/8	77
AVB6*3	ø 55(NW40)	55	55	170.5(181.5)	44.5	10.5	15	Rc1/4	86
AVB7*3	ø 75(NW50)	70	70	208	52	11	15	Rc1/4	112
AVB8*3	ø114(NW80)	90	105	258	64.5	13	15	Rc3/8	137