



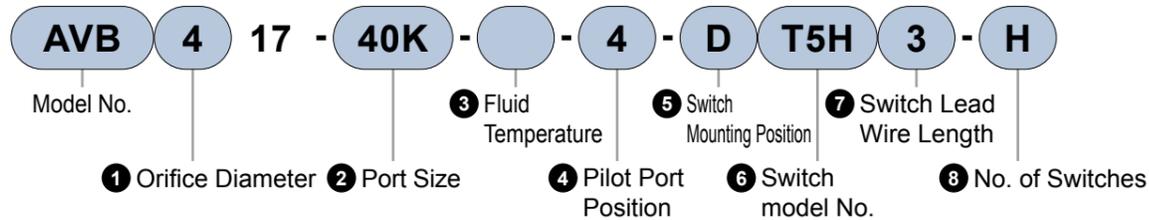
Air Operated Valve for High Vacuum, NC Type

# AVB□17 Series

● Molded bellows used ● Aluminum body



## Model No. Notation Method



### 1 Orifice Diameter

Code	Content
2	ø17
3	ø24
4	ø39
5	ø48
6	ø68
7	ø80

Cannot be selected for high-temperature specification.

### 2 Port Size

Code	Content	
16K	NW16	AVB217 only
25K	NW25	AVB317 only
40K	NW40	AVB417 only
50K	NW50	AVB517 only
63K	NW63	AVB617 only
80K	NW80	AVB717 only

### 3 Fluid Temperature

Code	Content
Blank	5 to 60°C (Built-in magnet)
HO	5 to 150°C (No magnet)
HOM	5 to 150°C (Built-in magnet)

Note) When selecting "HOM" with a switch, choose either "ETOH" or "ETOV" for the switch model No.

### 4 Pilot Port Position

Code	Content
4	<p>The pilot port position is indicated as 4, 1, 2, or 3 relative to the flange direction when viewed from the top of the valve.</p>
1	
2	
3	

### 5 Switch Mounting Position

Code	Content
Blank	No Switch
D	<p>The switch mounting position is indicated as D, A, B, or C relative to the flange direction when viewed from the top of the valve.</p>
A	
B	
C	

Note) 1) For orifice diameter "2" (ø17) only, switches can be mounted on 3 surfaces. Switches can be mounted on any surface except for the pilot port surface. -The following model Nos. cannot be selected.

- AVB217-16K-1-A 67-8
- AVB217-16K-2-B 67-8
- AVB217-16K-3-C 67-8
- AVB217-16K-4-D 67-8

### 6 Switch Model No.

Code	Content		
Blank	No Switch		
T0H	Lead wire straight type	Reed	2-wire
T5H			
T0V			
T5V	Lead wire L-type	Solid State	3-wire
T2H			
T3H			
T2V	Lead wire L-type	Reed	2-wire
T3V			
ETOH	Lead wire straight type	Reed	2-wire
ETOV	Lead wire L-type		

Note) 3) For fluid temperature "HOM," please select either "ETOH" or "ETOV."

### 7 Switch Lead Wire Length

Code	Content
Blank	1 m (Standard)
3	3 m
5	5 m

6) If switch model No. is "ETOH" or "ETOV," this cannot be selected.

### 8 No. of Switches (Detection Position)

Code	Content
H	Valve Open Detection
R	Valve Closed Detection
D	Valve Open/Closed Detection

9) If switch model No. is "ETOH" or "ETOV," this cannot be selected.

## Specifications

Item	AVB217	AVB317	AVB417	AVB517	AVB617	AVB717
Applicable Fluid	Vacuum and inert gas					
Operating Pressure Pa (abs)	1.3x10 <sup>-6</sup> to 1x10 <sup>5</sup>					
Max. Operating Pressure Differential MPa	0.1					
Valve Seat Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-10</sup> or less					
External Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-11</sup> 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 Diameter mm	ø17	ø24	ø39	ø48	ø68	ø80
Conductance *2 L/s	5	13	43	74	166	242
Port Size	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

\*1: The values in ( ) are for high temperature specifications.

\*2: The conductance value is a theoretical calculated value in the molecular flow region and is not an actual measured value.

\*3: Vacuum grease is applied to the O-ring of the external seal part.

## Switch Specifications

Item	Solid State Switch		Reed Switch		
	T2H, T2V	T3H, T3V	T0H, T0V	T5H, T5V	ETOH, ETOV
Application	For Programmable Controller	For Relay, Programmable Controller	For Relay, Programmable Controller	For Programmable Controller, Relay, IC Circuit (No Lamp), Series Connection	For Relay, Programmable Controller
Power Supply Voltage	-	10 to 28 VDC	-	-	-
Load Voltage/Current	10 to 30 VDC, 5 to 20 mA *2	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	-	At 24 VDC (ON): 10 mA or less	-	-	-
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 (Lights up when ON)			-	LED (Lights up when ON)
Leakage Current	1 mA or less	10 µA or less	0 mA	0 mA	0 mA
Lead Wire Length *1	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm <sup>2</sup> )	Standard 1 m (oil resistant vinyl cabtyre cable 3-conductor 0.2 mm <sup>2</sup> )	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm <sup>2</sup> )		Standard 1 m (Heat-resistant fluorine insulated cabtyre cord, 2-core, 0.5 mm <sup>2</sup> )
Max. Impact Resistance	980 m/s <sup>2</sup>		294 m/s <sup>2</sup>		
Insulation Resistance	20 MΩ or more at 500 VDC Megger				100 MΩ or more at 500 VDC Megger
Dielectric Strength	No abnormality when 1000 VAC is applied for 1 minute				
Ambient Temperature	-10 to +60°C				-10 to +150°C
Enclosure	IEC Standard IP67, JIS C0920 (Watertight), Oil-resistant				
Weight	1 m: 18 g 3 m: 49 g 5 m: 80 g				44 g

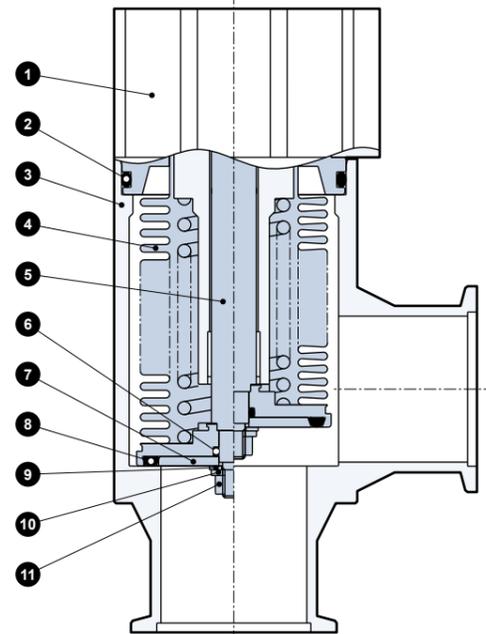
\*1: 3 m and 5 m lead wire lengths are available as options.

\*2: The above maximum load current of 20 mA is at 25°C. If the ambient operating temperature of the switch is higher than 25°C, the current will be lower than 20 mA. (5 to 10 mA at 60°C)

\*3: For precautions on using other switches, refer to P. 139 to 143.

Internal Structure Diagram and Materials

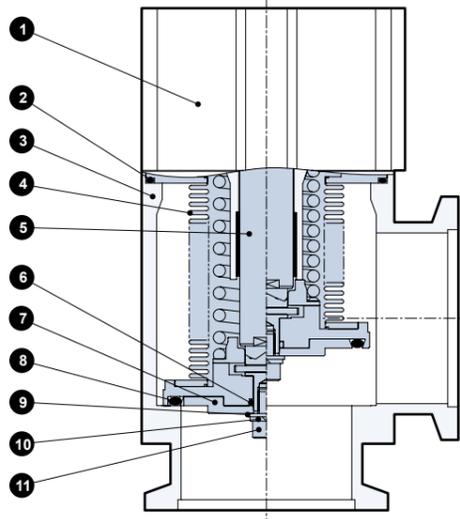
AVB217, AVB317, AVB417, AVB517, AVB617



Part 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	Flat Washer	SUS304
10	Spring Washer	SUS304
11	Hex Nut	SUS304

Note) For information on other available O-ring materials, please inquire.

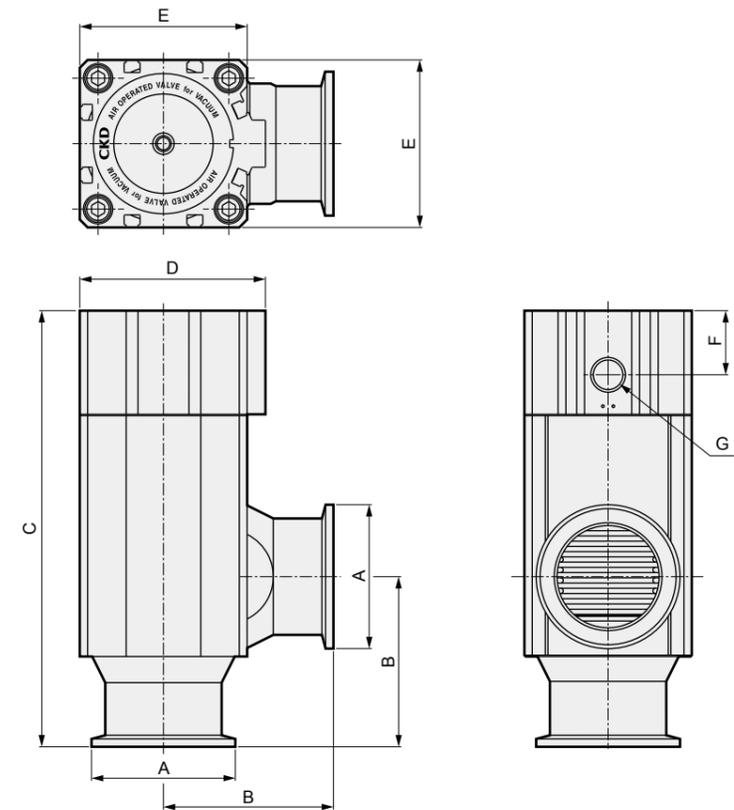
AVB717



Part 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	Flat Washer	SUS304
10	Spring Washer	SUS304
11	Hexagon Socket Head Cap Screw	SUS304

Note) For information on other available O-ring materials, please inquire.

External Dimension Drawings



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



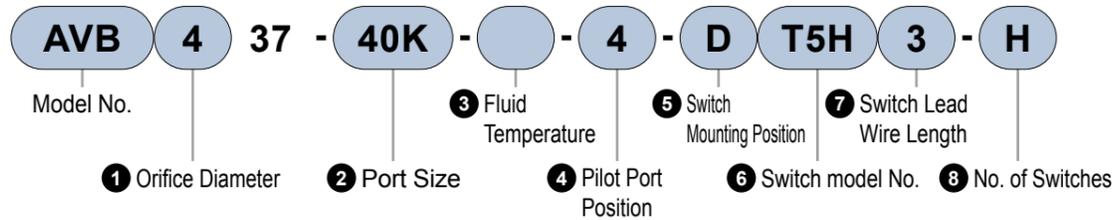
Air Operated Valve for Vacuum, Double Acting Type

# AVB□37 Series

● Molded bellows used ● Aluminum body



## Model No. Notation Method



### 1 Orifice Diameter

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

Cannot be selected for high-temperature specification.

### 2 Port Size

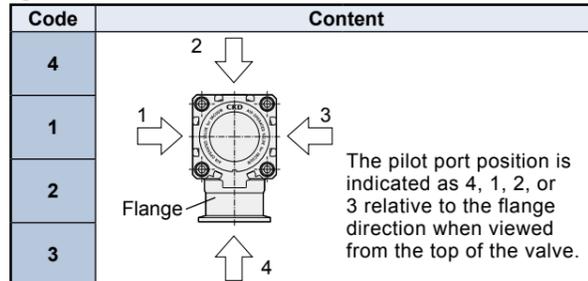
Code	Content	
16K	NW16	AVB237 only
25K	NW25	AVB337 only
40K	NW40	AVB437 only
50K	NW50	AVB537 only
63K	NW63	AVB637 only
80K	NW80	AVB737 only
100K	NW100	AVB837 only

### 3 Fluid Temperature

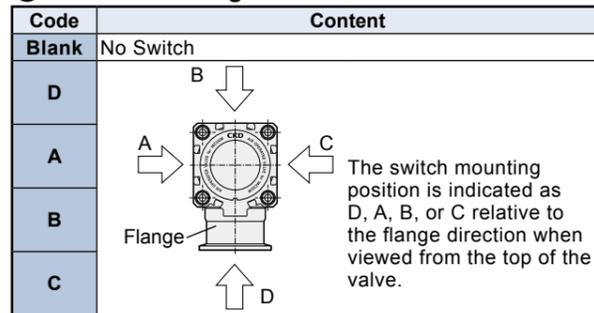
Code	Content
Blank	5 to 60°C (Built-in magnet)
HO	5 to 150°C (No magnet)
HOM	5 to 150°C (Built-in magnet)

Note) When selecting "HOM" with a switch, choose either "ETOH" or "ETOV" for the switch model No.

### 4 Pilot Port Position



### 5 Switch Mounting Position



Note) 1 For orifice diameter "2" (ø17) only, switches can be mounted on 3 surfaces. Switches can be mounted on any surface except for the pilot port surface. The following model Nos. cannot be selected.  
 AVB237-16K-1-A 6 7 8  
 AVB237-16K-2-B 6 7 8  
 AVB237-16K-3-C 6 7 8  
 AVB237-16K-4-D 6 7 8

### 6 Switch Model No.

Code	Content		
Blank	No Switch		
T0H	Lead wire straight type	Reed	2-wire
T5H	Lead wire L-type		
T0V	Lead wire L-type		
T2H	Lead wire straight type	Solid State	3-wire
T3H	Lead wire straight type		
T2V	Lead wire L-type		
T3V	Lead wire L-type	Reed	2-wire
ETOH	Lead wire straight type		
ETOV	Lead wire L-type		

Note) 3 For fluid temperature "HOM," please select either "ETOH" or "ETOV."

### 7 Switch Lead Wire Length

Code	Content	
Blank	1 m (Standard)	
3	3 m	6 If switch model No. is "ETOH" or "ETOV," this cannot be selected.
5	5 m	

### 8 No. of Switches (Detection Position)

Code	Content	
H	Valve Open Detection	
R	Valve Closed Detection	6 If switch model No. is "ETOH" or "ETOV," this cannot be selected.
D	Valve Open/Closed Detection	

## Specifications

Item	AVB237	AVB337	AVB437	AVB537	AVB637	AVB737	AVB837
Applicable Fluid	Vacuum and inert gas						
Operating Pressure Pa (abs)	1.3x10 <sup>-6</sup> to 1x10 <sup>5</sup>						
Max. Operating Pressure Differential MPa	0.1						
Valve Seat Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-10</sup> or less						
External Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-11</sup> 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 Diameter mm	ø17	ø24	ø39	ø48	ø68	ø80	ø100
Conductance *2 L/s	5	13	43	74	166	242	372
Port Size	NW16	NW25	NW40	NW50	NW63	NW80	NW100
Operating Pressure MPa	0.4 to 0.6						
Weight kg	0.5	0.7	1.5	2.5	4.2	5.5	13

\*1: The values in ( ) are for high temperature specifications.

\*2: The conductance value is a theoretical calculated value in the molecular flow region and is not an actual measured value.

\*3: Vacuum grease is applied to the O-ring of the external seal part.

## Switch Specifications

Item	Solid State Switch		Reed Switch		
	T2H, T2V	T3H, T3V	T0H, T0V	T5H, T5V	ETOH, ETOV
Application	For Programmable Controller	For Relay, Programmable Controller	For Relay, Programmable Controller	For Programmable Controller, Relay, IC Circuit (No Lamp), Series Connection	For Relay, Programmable Controller
Power Supply Voltage	-	10 to 28 VDC	-	-	-
Load Voltage/Current	10 to 30 VDC, 5 to 20 mA *2	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	-	At 24 VDC (ON): 10 mA or less	-	-	-
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 (Lights up when ON)			-	LED (Lights up when ON)
Leakage Current	1 mA or less	10 µA or less	0 mA	0 mA	0 mA
Lead Wire Length *1	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm <sup>2</sup> )	Standard 1 m (oil resistant vinyl cabtyre cable 3-conductor 0.2 mm <sup>2</sup> )	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm <sup>2</sup> )		Standard 1 m (Heat-resistant fluorine insulated cabtyre cord, 2-core, 0.5 mm <sup>2</sup> )
Max. Impact Resistance	980m/s <sup>2</sup>		294m/s <sup>2</sup>		
Insulation Resistance	20 MΩ or more at 500 VDC Megger				100 MΩ or more at 500 VDC Megger
Dielectric Strength	No abnormality when 1000 VAC is applied for 1 minute				
Ambient Temperature	-10 to +60°C				-10 to +150°C
Enclosure	IEC Standard IP67, JIS C0920 (Watertight), Oil-resistant				
Weight	1 m: 18 g 3 m: 49 g 5 m: 80 g				44 g

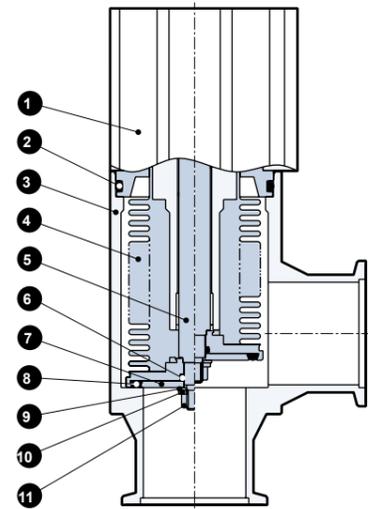
\*1: 3 m and 5 m lead wire lengths are available as options.

\*2: The above maximum load current of 20 mA is at 25°C. If the ambient operating temperature of the switch is higher than 25°C, the current will be lower than 20 mA. (5 to 10 mA at 60°C)

\*3: For precautions on using other switches, refer to P. 139 to 143.

Internal Structure Diagram and Materials

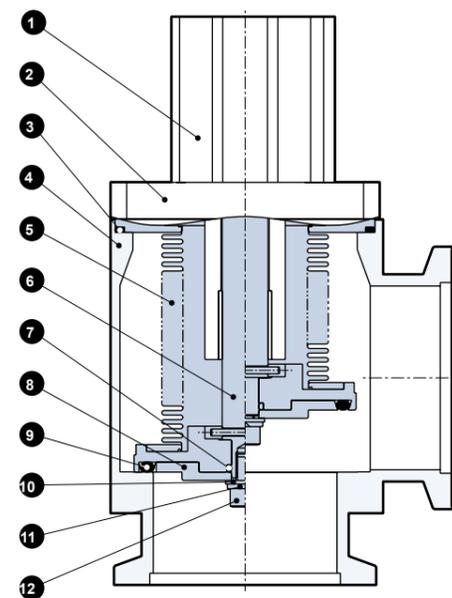
AVB237, AVB337, AVB437, AVB537, AVB637



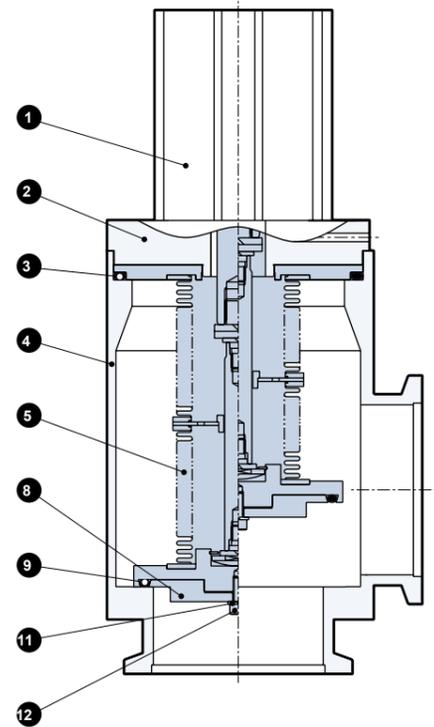
Part No.	Part Name	Material
1	Cylinder (Built-in Magnet)	-
2	O-ring	FKM Note
3	Body	A6063
4	Bellows	SUS316L
5	Rod	SUS304
6	O-ring	FKM Note
7	Valve Disc B	SUS316L
8	O-ring	FKM Note
9	Flat Washer	SUS304
10	Spring Washer	SUS304
11	Hex Nut	SUS304

Note) For information on other available O-ring materials, please inquire.

AVB737



AVB837

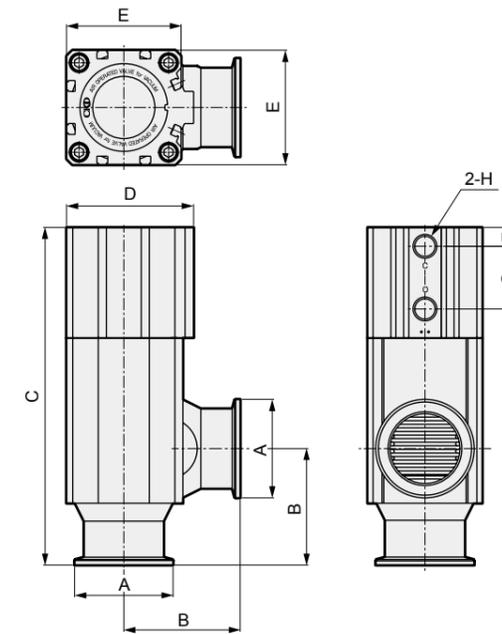


Part No.	Part Name	Material	Part No.	Part Name	Material
1	Cylinder (Built-in Magnet)	-	7	O-ring	FKM Note
2	Cylinder adaptor	AVB737: A5056 AVB837: A5052	8	Valve Disc B	SUS316L
3	O-ring	FKM Note	9	O-ring	FKM Note
4	Body	A6063	10	Flat Washer	SUS304
5	Bellows	ASL350	11	Spring Washer	SUS304
6	Rod	SUS304	12	Hexagon Socket Head Cap Screw	SUS304

Note) For information on other available O-ring materials, please inquire.

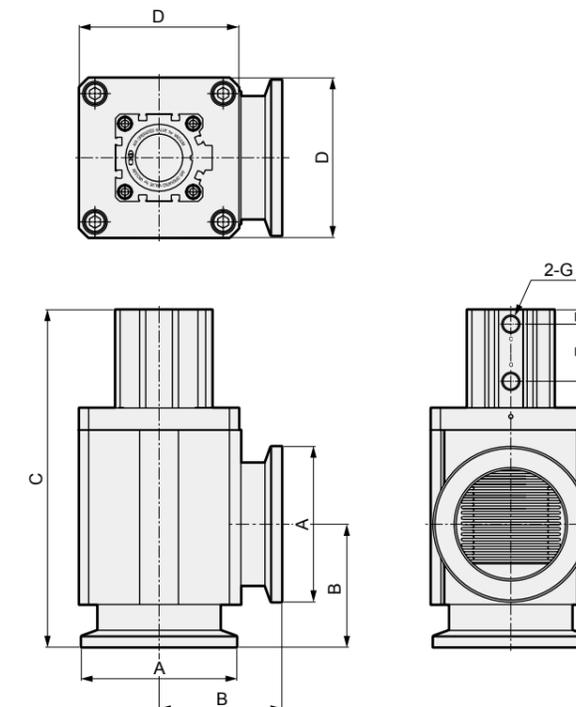
External Dimension Drawings

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



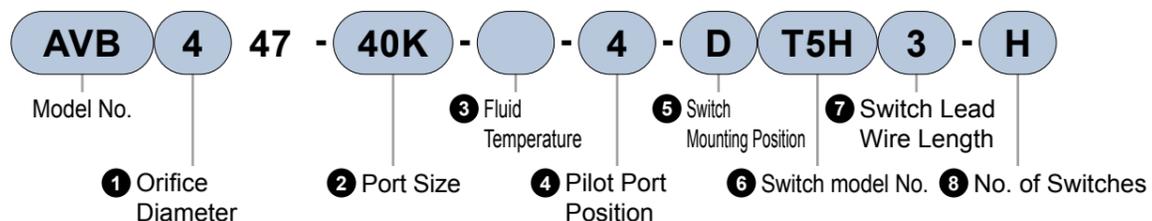
Air Operated Valve for Vacuum, 2-Stage

# AVB□47 Series

● Molded bellows used ● Aluminum body



## Model No. Notation Method



### 1 Orifice Diameter

Code	Content
3	ø24
4	ø39
5	ø48
6	ø68

### 2 Port Size

Code	Content	
25K	NW25	AVB347 only
40K	NW40	AVB447 only
50K	NW50	AVB547 only
63K	NW63	AVB647 only

### 3 Fluid Temperature

Code	Content
Blank	5 to 60°C (Built-in magnet)
HO	5 to 150°C (No magnet)
HOM	5 to 150°C (Built-in magnet)

Note) When selecting "HOM" with a switch, choose either "ETOH" or "ETOV" for the switch model No.

### 4 Pilot Port Position

Code	Content
4	The pilot port position is indicated as 4, 1, 2, or 3 relative to the flange direction when viewed from the top of the valve.
1	
2	
3	

### 5 Switch Mounting Position

Code	Content
Blank	No Switch
D	Only the main exhaust valve can be mounted. 
A	
B	
C	

### 6 Switch Model No.

Code	Content		
Blank	No Switch		
T0H	Lead wire straight type	Reed	2-wire
T5H			
T0V	Lead wire L-type	Solid State	3-wire
T5V			
T2H	Lead wire straight type	Solid State	2-wire
T3H			
T2V	Lead wire L-type	Solid State	3-wire
T3V			
ETOH	Lead wire straight type	Reed	2-wire
ETOV	Lead wire L-type	Reed	2-wire

Note) For fluid temperature "HOM," please select either "ETOH" or "ETOV."

### 7 Switch Lead Wire Length

Code	Content
Blank	1 m (Standard)
3	3 m <sup>⑥</sup> If switch model No. is "ETOH" or "ETOV," this cannot be selected.
5	5 m

### 8 No. of Switches (Detection Position)

Code	Content
H	Valve Open Detection
R	Valve Closed Detection <sup>⑥</sup> If switch model No. is "ETOH" or "ETOV," this cannot be selected.
D	Valve Open/Closed Detection

## Specifications

Item	AVB347	AVB447	AVB547	AVB647
Applicable Fluid	Vacuum and inert gas			
Operating Pressure Pa (abs)	1.3x10 <sup>-6</sup> to 1x10 <sup>5</sup>			
Max. Operating Pressure Differential MPa	0.1			
Valve Seat Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-10</sup> or less			
External Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-11</sup> 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 Diameter mm	ø24	ø39	ø48	ø68
Conductance *2 L/s	13	43	74	166
Port Size	NW25	NW40	NW50	NW63
Main Exhaust Operating Pressure MPa	0.4 to 0.6			
Slow 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 a theoretical calculated value in the molecular flow region and is not an actual measured value.

\*3: Vacuum grease is applied to the O-ring of the external seal part.

## Switch Specifications

Item	Solid State Switch		Reed Switch		
	T2H, T2V	T3H, T3V	T0H, T0V	T5H, T5V	ETOH, ETOV
Application	For Programmable Controller	For Relay, Programmable Controller	For Relay, Programmable Controller	For Programmable Controller, Relay, IC Circuit (No Lamp), Series Connection	For Relay, Programmable Controller
Power Supply Voltage	-	10 to 28 VDC	-	-	-
Load Voltage/Current	10 to 30 VDC, 5 to 20 mA *2	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	-	At 24 VDC (ON): 10 mA or less	-	-	-
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 (Lights up when ON)			-	LED (Lights up when ON)
Leakage Current	1 mA or less	10 µA or less	0 mA	0 mA	0 mA
Lead Wire Length *1	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm <sup>2</sup> )	Standard 1 m (oil resistant vinyl cabtyre cable 3-conductor 0.2 mm <sup>2</sup> )	Standard 1 m (oil resistant vinyl cabtyre cable 2-conductor 0.2 mm <sup>2</sup> )		Standard 1 m (Heat-resistant fluorine insulated cabtyre cord, 2-core, 0.5 mm <sup>2</sup> )
Max. Impact Resistance	980 m/s <sup>2</sup>		294 m/s <sup>2</sup>		
Insulation Resistance	20 MΩ or more at 500 VDC Megger				100 MΩ or more at 500 VDC Megger
Dielectric Strength	No abnormality when 1000 VAC is applied for 1 minute				
Ambient Temperature	-10 to +60°C			-10 to +150°C	
Enclosure	IEC Standard IP67, JIS C0920 (Watertight), Oil-resistant				
Weight	1 m: 18 g 3 m: 49 g 5 m: 80 g			44 g	

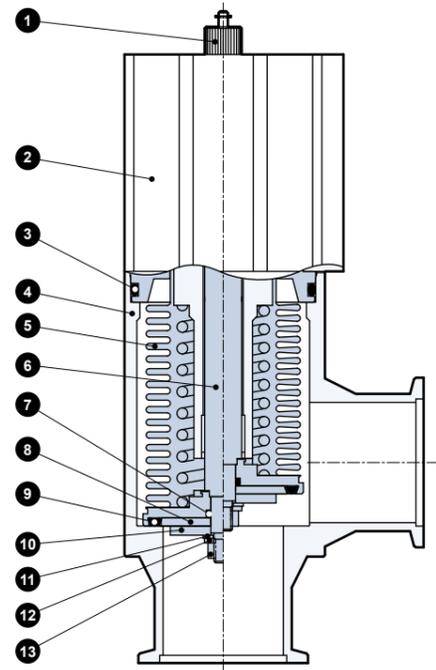
\*1: 3 m and 5 m lead wire lengths are available as options.

\*2: The above maximum load current of 20 mA is at 25°C. If the ambient operating temperature of the switch is higher than 25°C, the current will be lower than 20 mA. (5 to 10 mA at 60°C)

\*3: For precautions on using other switches, refer to P. 139 to 143.

\*4: The switch can only be mounted on the main exhaust valve.

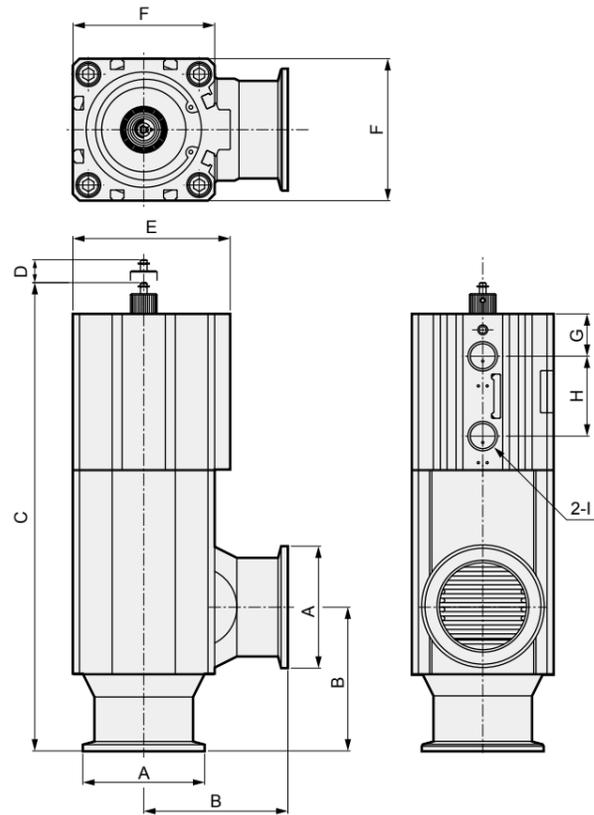
Internal Structure Diagram and Materials



Part 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	Flat Washer	SUS304
12	Spring Washer	SUS304
13	Hex Nut	SUS304

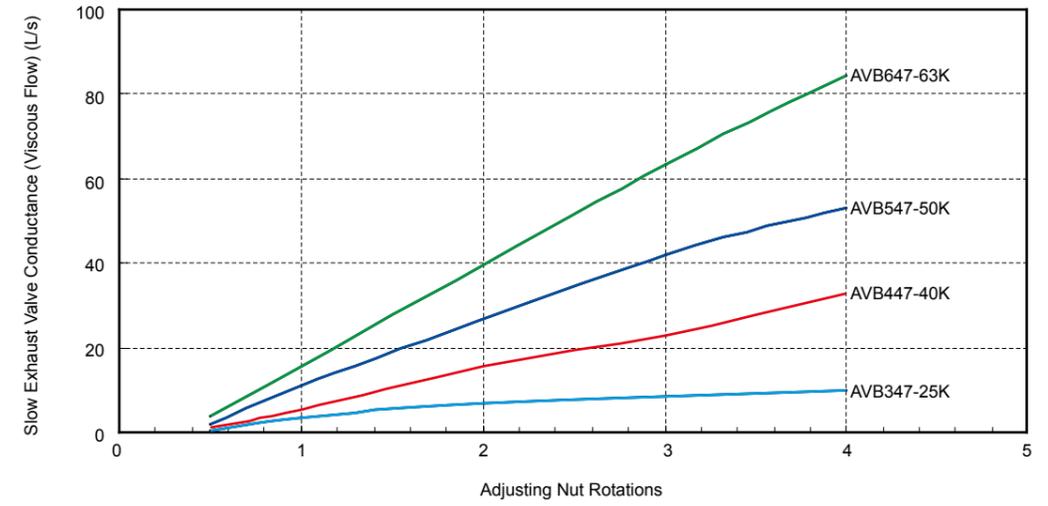
Note) For information on other available O-ring materials, please inquire.

External Dimension Drawings



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 Slow exhaust valve/conductance



Air Operated Valve for High Vacuum

# AVB□□7 Series Special Specification Product

Contact CKD for details.

**RoHS** Special Specifications

**AVB□□7 Series**  
Special Specifications

## Large Bore Type

Model No.	Actuation Method	Port Size
AVB937	Double Acting	NW160

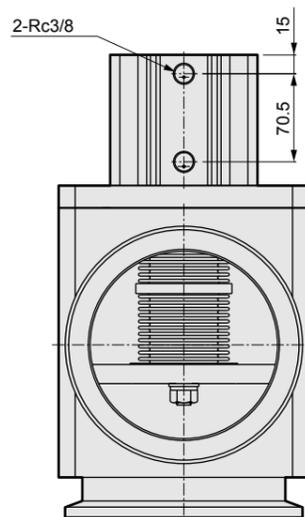
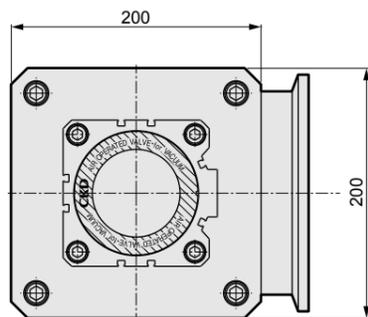


## Reference specifications

Item	AVB937-X□
Applicable Fluid	Vacuum and inert gas
Operating Pressure Pa (abs)	$1.3 \times 10^{-6}$ to $1 \times 10^5$
Max. Operating Pressure Differential MPa	0.1
Valve Seat Leakage Pa·m <sup>3</sup> /s (He)	$1.3 \times 10^{-10}$ or less
External Leakage Pa·m <sup>3</sup> /s (He)	$1.3 \times 10^{-11}$ or less
Proof Pressure MPa	0.3
Fluid Temperature °C	5 to 60
Ambient Temperature °C	0 to 60 (No freezing)
Orifice Diameter mm	∅150
Conductance *1 L/s	1,100
Port Size	NW160
Operating Pressure MPa	0.3 to 0.5
Weight kg	18

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

## Internal Structure Diagram, Materials, and External Dimensions



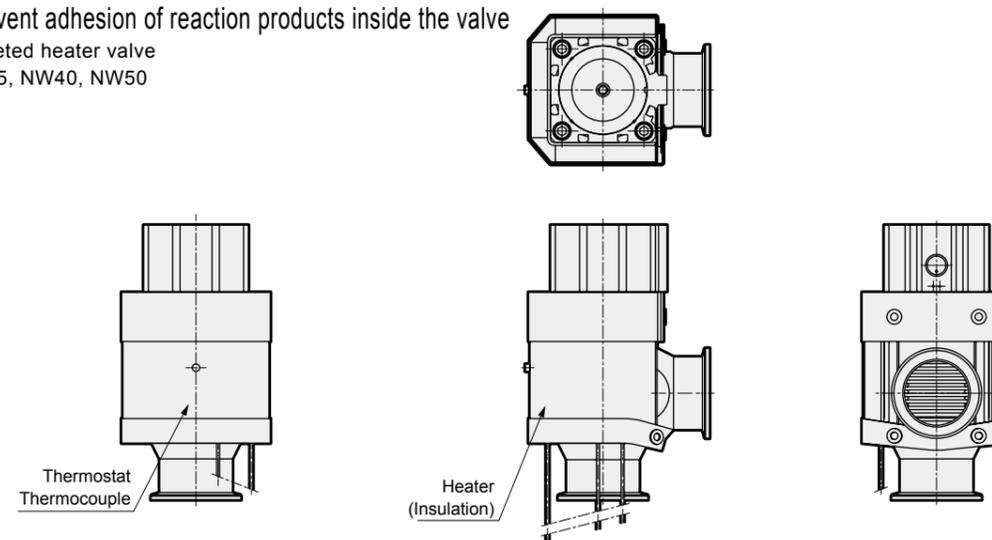
Part No.	Part Name	Material
1	Cylinder (Built-in Magnet)	-
2	Cylinder adaptor	A5056
3	O-ring	FKM <sup>Note)</sup>
4	Body	A5052
5	Bellows	ASL350
6	Rod	SUS304
7	O-ring	FKM <sup>Note)</sup>
8	Valve Disc B	SUS304
9	O-ring	FKM <sup>Note)</sup>
10	Flat Washer	SUS304
11	Spring Washer	SUS304
12	Hex Nut	SUS304

Note) For information on other available O-ring materials, please inquire.

## Supports heater for valve heating

To prevent adhesion of reaction products inside the valve

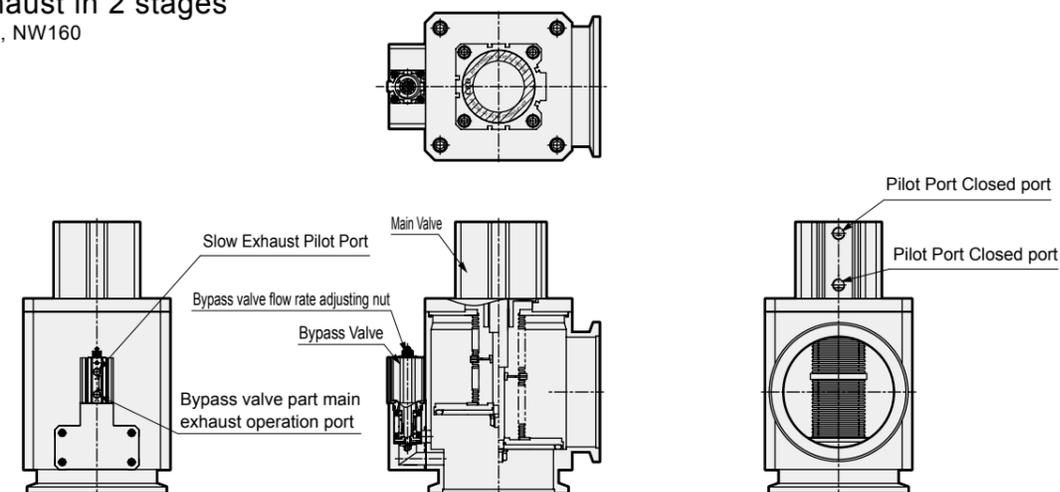
- Jacketed heater valve
- NW25, NW40, NW50



## Slow exhaust (external bypass valve) compatible

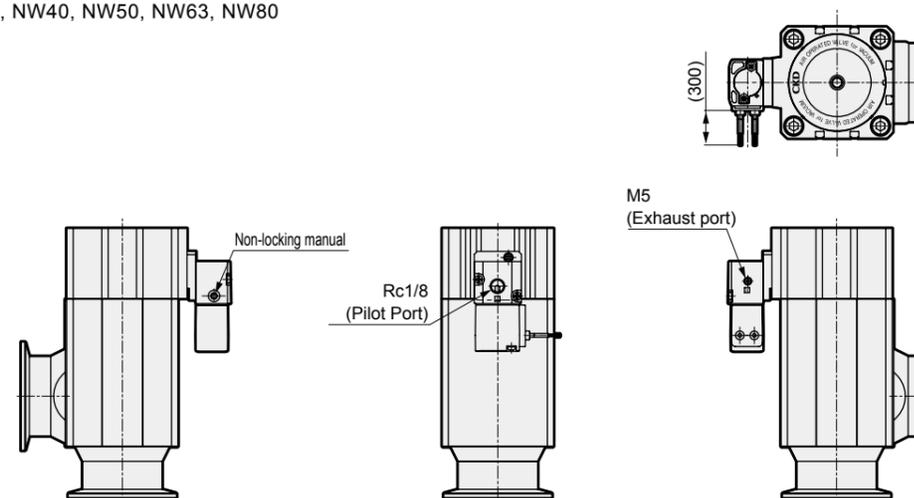
Control exhaust in 2 stages

- NW80, NW100, NW160



## Solenoid Valve

- NW16, NW25, NW40, NW50, NW63, NW80
- NC Type





Air Operated Valve for High Vacuum

# AVB□□3 Series

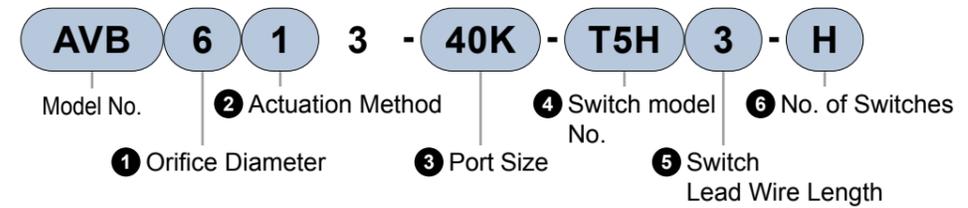
- Molded bellows used
- stainless steel body



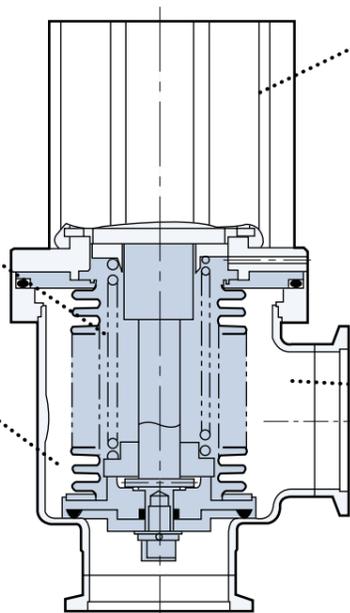
# AVB□□3 Series

Model No. Notation Method

Model No. Notation Method



SUS body has been adopted and improved corrosion resistance, allowing use in various processes.



● Long service life molded bellows  
Special stainless steel material (ASL350) used.  
Proven 3 million cycles (Under our specified conditions)

● No gas accumulation  
Due to the design of the flow path, there is no dead space for gas accumulation.

● Miniature switch can be mounted  
Reed switch for operation check (proximity, reed) can be connected. (Can be retrofitted)

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

## 1 Orifice Diameter

Code	Content
5	ø24
6	ø40
7	ø50
8	ø80

## 3 Port Size

Code	Content	
25K	NW25	AVB6□3 only
40K	NW40	AVB6□3 only
50K	NW50	AVB7□3 only
80K	NW80	AVB8□3 only

## 5 Switch Lead Wire Length

Code	Content
Blank	1 m (Standard)
3	3 m
5	5 m

## 6 No. of Switches (Detection Position)

Code	Content
H	Valve Open Detection
R	Valve Closed Detection
D	Valve Open/Closed Detection

## 2 Actuation method

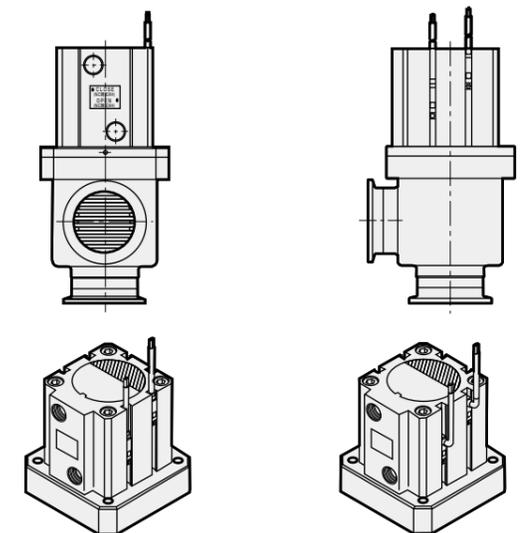
Code	Content
1	NC (Normally Closed)
2	NO (Normally Open)
3	Double Acting

## 4 Switch Model No.

Code	Content		
Blank	No Switch		
T0H	Lead wire straight type	Reed	2-wire
T5H			
T0V			
T2H	Lead wire L-type	Solid State	3-wire
T3H			
T2V			
T3V	Lead wire L-type		3-wire

## External view of switch installation

- T□H type (lead wire straight)
- T□V type (lead wire L-shaped)



## Precautions for Use

To use this product correctly and safely, please be sure to read the following precautions on page 9 of the opening section and on pages 138-143.

- About Applicable Fluids
- Mounting
- Direction when connecting pipes
- Proximity switch, reed switch

Internal Structure Diagram and Materials

Specifications

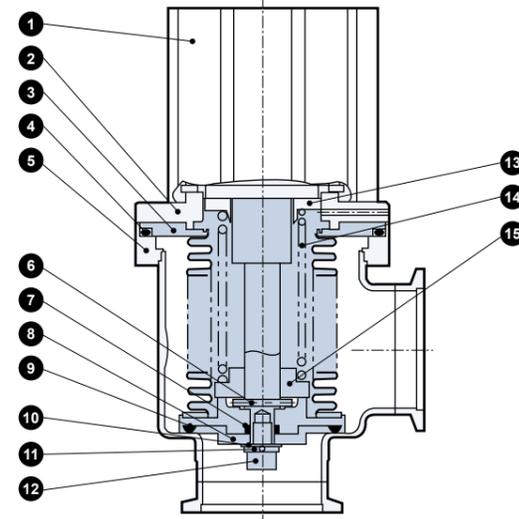
Item	AVB5□3	AVB6□3	AVB7□3	AVB8□3	
Applicable Fluid	Vacuum and inert gas				
Working pressure Pa (abs)	1.3x10 <sup>-6</sup> to 1x10 <sup>5</sup>				
Max. Operating Pressure Differential MPa	0.1				
Valve Seat Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-10</sup> or less				
Valve Seat Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-11</sup> or less				
Proof Pressure MPa	0.3				
Fluid temperature °C	5 to 60				
Ambient Temperature °C	0 to 60 (no freezing)				
Orifice Diameter mm	ø24	ø40	ø50	ø80	
Stroke mm	10	20	22	32	
Conductance *1 L/s	13	52	80	242	
Port Size	NW25	NW40	NW50	NW80	
Operating Pressure MPa	0.4 to 0.6				
Weight kg	NC Type	1.1	1.9	3.6	7.9
	NO Type	1.1	1.9	3.5	7.8
	Double Acting	1.0	1.6	3.2	7.3

\*1: The conductance value is a theoretical calculated value in the molecular flow region and is not an actual measured value.  
 \*2: Vacuum grease is applied to the O-ring of the external seal part.

Switch Specifications

Item	Solid State Switch		Reed Switch	
	T2H, T2V	T3H, T3V	T0H, T0V	T5H, T5V
Application	For Programmable Controller	For Relay, Programmable Controller	For Relay, Programmable Controller	For Programmable Controller, Relay, IC Circuit (No Lamp), Series Connection
Power Supply Voltage	-	10 to 28 VDC	-	-
Load Voltage/Current	10 to 30 VDC, 5 to 20 mA *2	30 VDC or less, 100 mA or less	12/24 VDC 5 to 50 mA, 100 VAC 7 to 20mA	12/24 VDC 50 mA or less, 100 VAC, 20 mA or less
Power Consumption	-	At 24 VDC (ON): 10 mA or less	-	-
Internal Voltage Drop	4 V or less	0.5 V or less	3 V or less	0 V
Lamp	LED (Lights up when ON)			
Leakage Current	1 mA or less	10 µA or less	0 mA	0 mA
Lead Wire Length *1	Standard 1 m (Oil-resistant vinyl cabtyre cord, 2-core, 0.2 mm <sup>2</sup> )	Standard 1 m (Oil-resistant vinyl cabtyre cord, 3-core, 0.2 mm <sup>2</sup> )	Standard 1 m (Oil-resistant vinyl cabtyre cord, 2-core, 0.2 mm <sup>2</sup> )	
Max. Impact Resistance	980 m/s <sup>2</sup>		294 m/s <sup>2</sup>	
Insulation Resistance	20 MΩ or more at 500 VDC Megger			
Dielectric Strength	No abnormality when 1000 VAC is applied for 1 minute			
Ambient Temperature Range	-10 to +60°C			
Enclosure	IEC Standard IP67, JIS C0920 (Watertight), Oil-resistant			
Weight	1 m: 18 g 3 m: 49 g 5 m: 80 g			

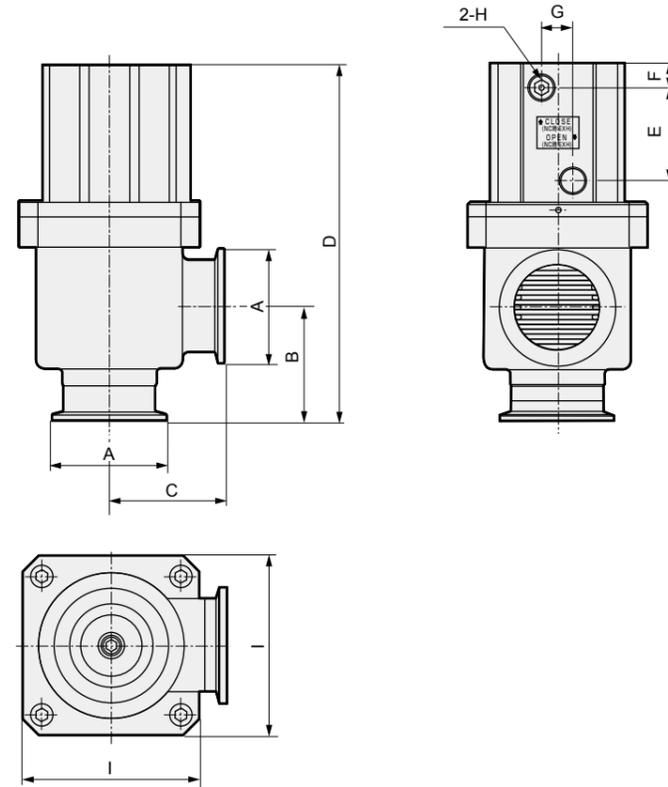
\*1: 3 m and 5 m lead wire lengths are also available as options.  
 \*2: The above maximum load current of 20 mA is at 25°C. If the ambient operating temperature of the switch is higher than 25°C, the current will be lower than 20 mA. (5 to 10 mA at 60°C)  
 \*3: For precautions on using other switches, refer to P. 139 to 143.



Part No.	Part Name	Material
1	Super Compact Cylinder	-
2	Cylinder adaptor	A5056
3	Bellows assembly	ASL350/SUS316L
4	O-ring	FKM *
5	Body Assembly	SUS316L
6	Parallel Pin	SUS301
7	O-ring	FKM *
8	Valve Disc B	SUS316L
9	O-ring	FKM *
10	Flat Washer	SUS304
11	Spring Washer	SUS304
12	Hexagon Socket Head Cap Screw	SUS304
13	Spring Retainer B	A5056
14	Spring	SWOSC-V (Electrodeposition)
15	Spring Retainer A	A5056

\*For information on other available O-ring materials, please inquire.

External Dimension Drawings



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

Model No.	A	B	C	D	E	F	G	H	I
AVB5□3	ø40 (NW25)	50	50	151.5 (162.5)	37	8	10	Rc1/8	77
AVB6□3	ø55 (NW40)	55	55	170.5 (181.5)	44.5	10.5	15	Rc1/4	86
AVB7□3	ø75 (NW50)	70	70	208	52	11	15	Rc1/4	112
AVB8□3	ø114 (NW80)	90	105	258	64.5	13	15	Rc3/8	137

Air Operated Valve for High Vacuum

# AVB□□3 Series Special Specification Product

Contact CKD for details.



## Slow Exhaust (Built-in Bypass Valve) Compatible

### Control exhaust in 2 stages

- 1 actuator slow exhaust valve
- NW25, NW40, NW50

### Specifications

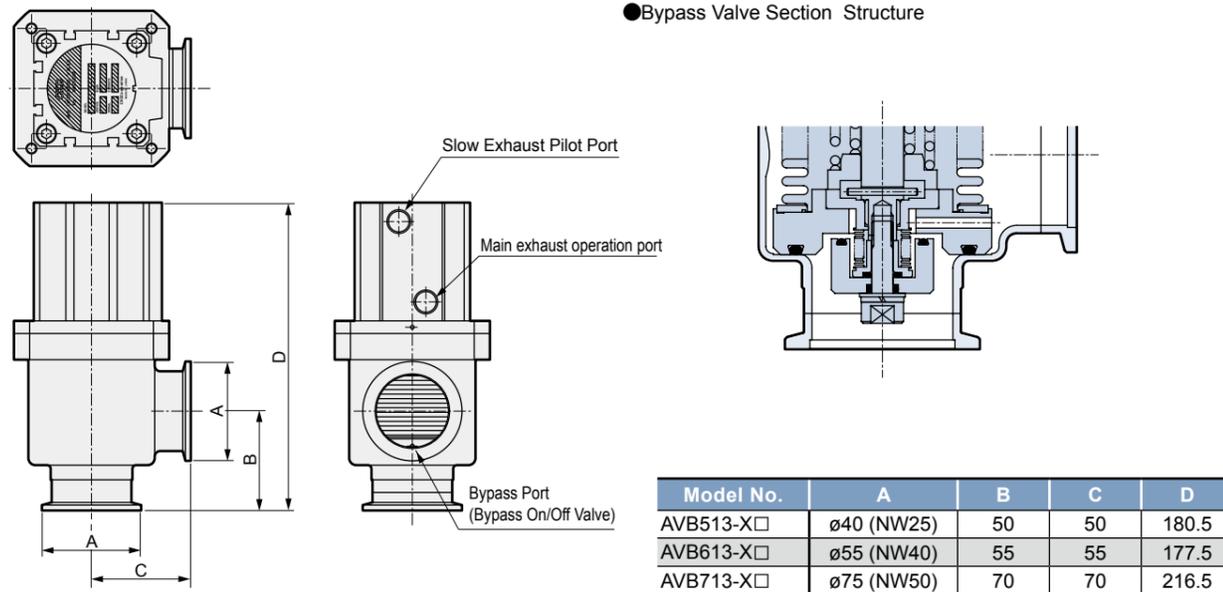
Item	AVB513-X□	AVB613-X□	AVB713-X□
Applicable Fluid	Vacuum and inert gas		
Operating Pressure Pa (abs)	1.3x10 <sup>-6</sup> to 1x10 <sup>5</sup>		
Max. Operating Pressure Differential MPa	0.1		
Valve Seat Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-10</sup> or less		
External Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-11</sup> or less		
Proof Pressure MPa	0.3		
Fluid temperature °C	5 to 60		
Ambient Temperature °C	0 to 60 (no freezing)		
Orifice Diameter mm	ø24	ø40	ø50
Small Flow Orifice Diameter *1 mm	ø1 to 3	ø1 to 3	ø1 to 4
Main Valve Stroke mm	10	20	22
Small Flow Valve Stroke mm	2	2	2
Conductance (main valve) *2 L/s	13	52	80
Port Size	NW25	NW40	NW50
Operating Pressure MPa	0.4 to 0.6		

\*1: Please consult with us separately regarding the small flow orifice diameter.

\*2: The conductance value is a theoretical calculated value in the molecular flow region and is not an actual measured value.

## External Dimension Drawings

●Bypass Valve Section Structure



Slow exhaust (external bypass valve) compatible

### Control exhaust in 2 stages

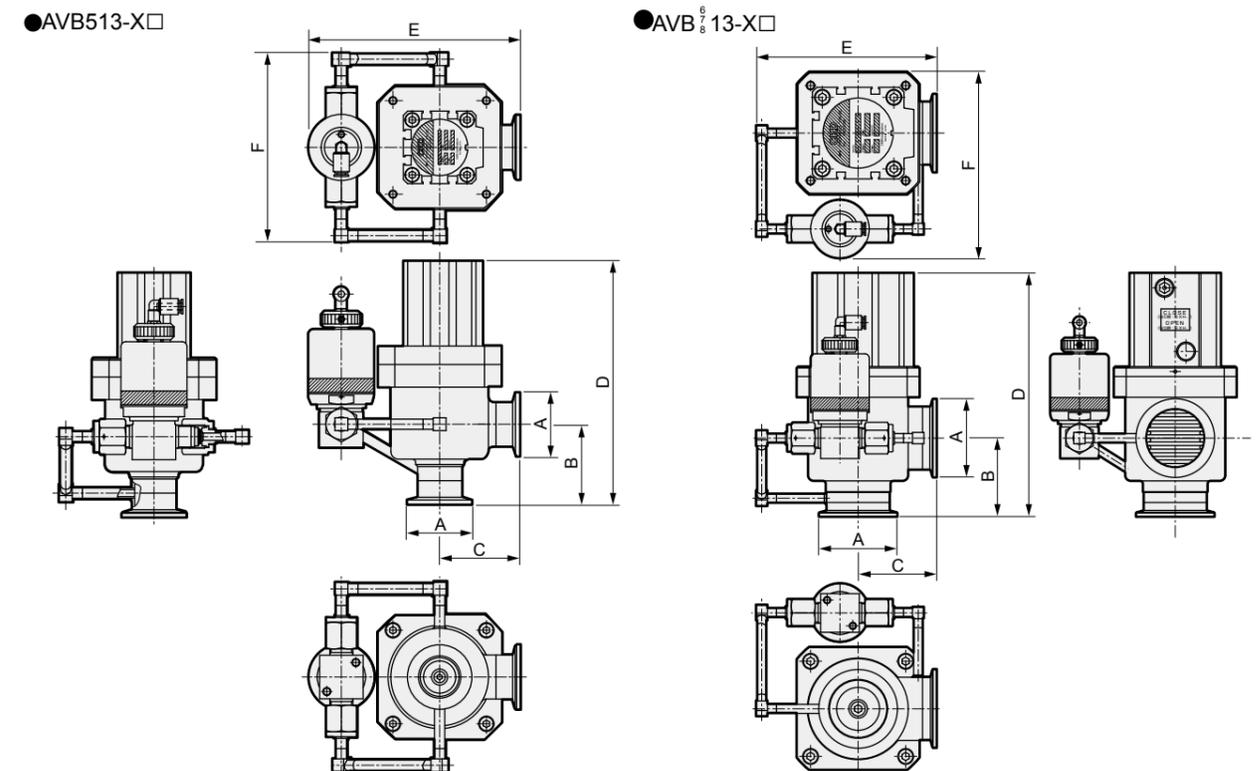
- 2 actuator (bypass) slow exhaust valve
- NW25, NW40, NW50, NW80

### Specifications

Item	AVB513-X□	AVB613-X□	AVB713-X□	AVB813-X□
Applicable Fluid	Vacuum and inert gas			
Operating Pressure Pa (abs)	1.3x10 <sup>-6</sup> to 1x10 <sup>5</sup>			
Max. Operating Pressure Differential MPa	0.1			
Valve Seat Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-10</sup> or less			
External Leakage Pa·m <sup>3</sup> /s (He)	1.3x10 <sup>-11</sup> or less			
Proof Pressure MPa	0.3			
Fluid temperature °C	5 to 60			
Ambient Temperature °C	0 to 60 (no freezing)			
Orifice Diameter (Main Flow Path) mm	ø24	ø40	ø50	ø80
Stroke (Main Valve) mm	10	20	22	32
Conductance (main valve) *1 L/s	13	52	80	242
Port Size	NW25	NW40	NW50	NW80
Operating Pressure MPa	0.4 to 0.6			

\*1: The conductance value is a theoretical calculated value in the molecular flow region and is not an actual measured value.

## External Dimension Drawings



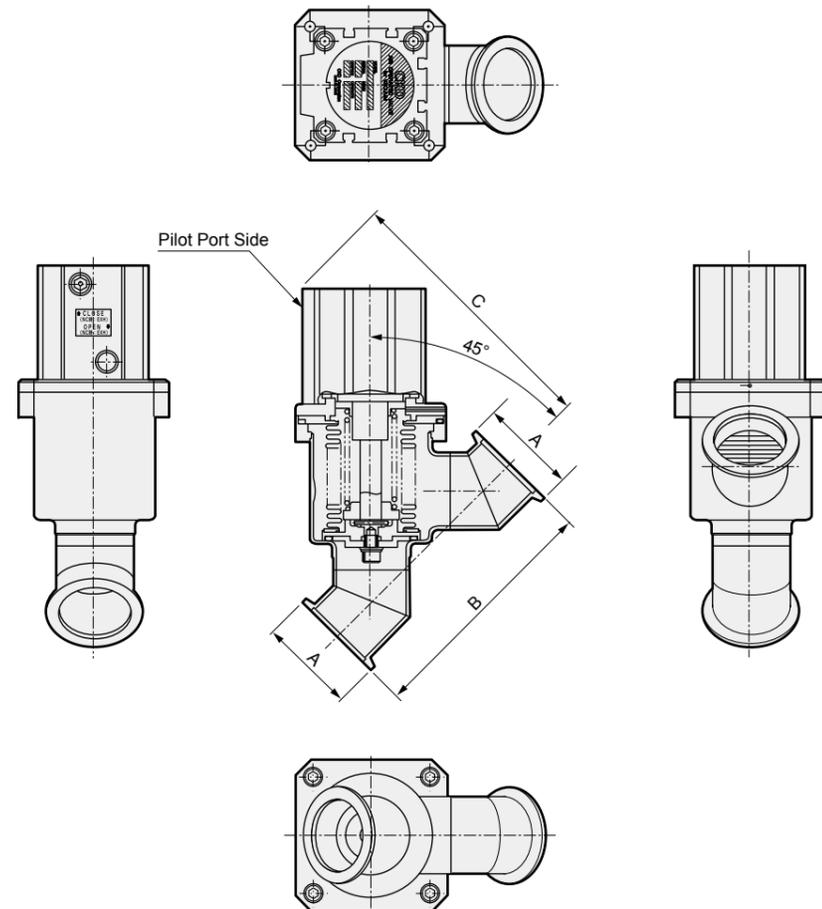
Model No.	A	B	C	D	E	F	Bypass Valve	Bypass Piping
AVB513-X□	ø40 (NW25)	50	50	151.5	131.5	117.5	AGD11V-□	1/4"
AVB613-X□	ø55 (NW40)	55	55	170.5	127	130.5		
AVB713-X□	ø75 (NW50)	70	70	208	165.5	175.5		
AVB813-X□	ø114 (NW80)	90	105	258	191.5	202	AGD21V-□	3/8"

Straight Flange Compatible

Ideal for installing in straight piping sections

- Straight flange valve
- NW25, NW40, NW50, NW80

External Dimension Drawings



Model No.	A	B	C
AVB5□3-X□	ø40 (NW25)	130	130 (138)
AVB6□3-X□	ø55 (NW40)	140	155 (163)
AVB7□3-X□	ø75 (NW50)	210	191
AVB8□3-X□	ø114 (NW80)	250	241

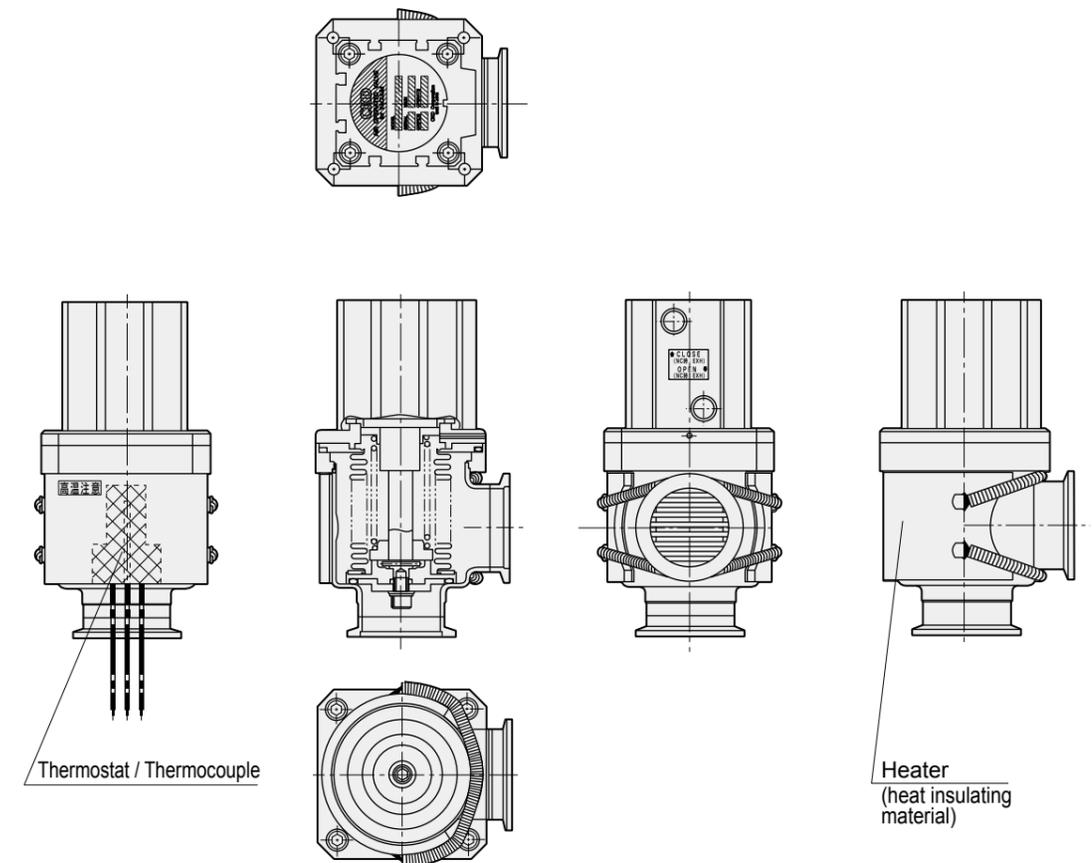
\*1: The dimension in ( ) within code C is for the NO type.  
\*2: The value of C2 changes depending on the orientation of the pilot port.

Supports heater for valve heating

To prevent adhesion of reaction products inside the valve

- The integrated insulation cover prevents burns on contact.
- The thermostat (manual return) prevents abnormal temperature rise.
- The thermocouple enables temperature monitoring and control.
- The heater can be easily attached and detached.

- Jacketed heater valve
- NW25, NW40, NW50, NW80





Air Operated Valve for High Vacuum, NC Type

# AVB21-8T Series

- Molded bellows used
- stainless steel body
- 1/4" Tube



## AVB21 Series

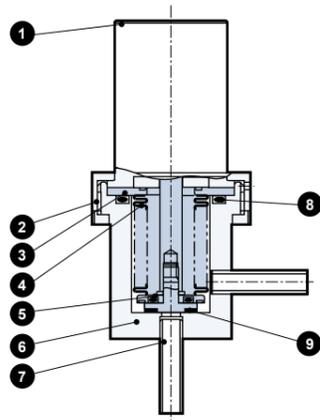
External Dimension Drawings

### Specifications

Item	AVB21-8T
Applicable Fluid	Vacuum and inert gas
Working pressure Pa (abs)	$1.3 \times 10^{-6}$ to $2.5 \times 10^5$
Max. Operating Pressure Differential MPa	0.25
Valve Seat Leakage Pa·m <sup>3</sup> /s (He)	$1.3 \times 10^{-9}$ or less
External Leakage Pa·m <sup>3</sup> /s (He)	$1.3 \times 10^{-9}$ or less
Proof Pressure MPa	0.3
Fluid temperature °C	5 to 60
Ambient Temperature °C	0 to 60 (no freezing)
Orifice Diameter mm	5
Stroke mm	3
Conductance *1 L/s	-
Connection Method	1/4" Tube
Operating Pressure MPa	0.3 to 0.5
Weight kg	0.25

\*1: The conductance value is a theoretical calculated value in the molecular flow region and is not an actual measured value.

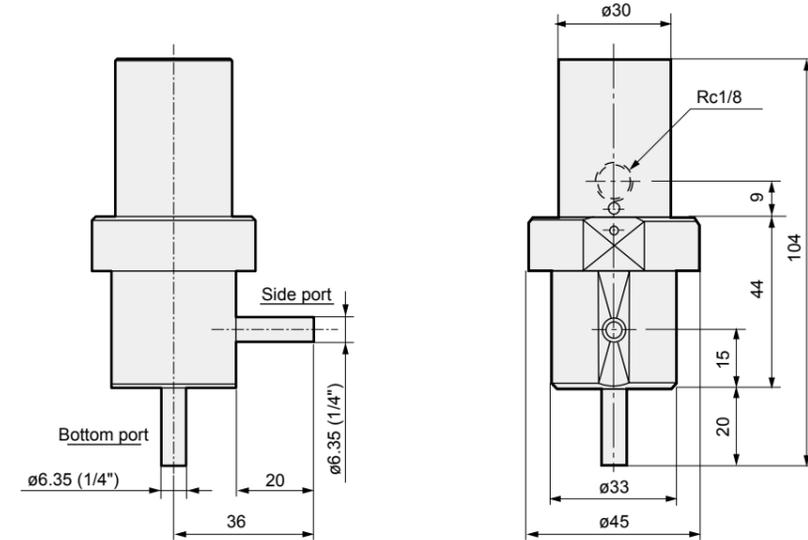
### Internal Structure Diagram and Materials



Part No.	Part Name	Material
1	Cylinder	-
2	Ring	C3604
3	Bellows ring	SUS304
4	Bellows	SUS316L
5	Valve Disc B	SUS304
6	Body	SUS304
7	Pipe	SUS304
8	O-ring	FKM Note
9	Valve Disc A	FKM, SUS304

Note) For information on other available O-ring materials, please inquire.

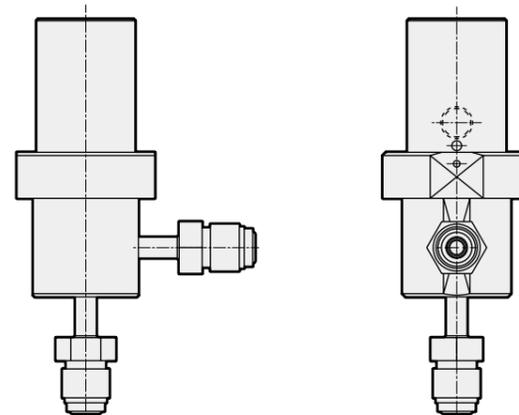
### External Dimension Drawings



■ Flange compatible

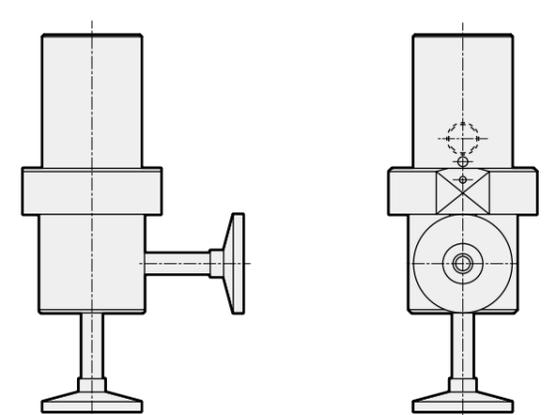
● With fitting

#### Special Specifications



● NW flange

#### Special Specifications



Air operated valve For high vacuum Large bore size

# AVB932 series Special Specification Product

- Uses double acting
- Molded bellows
- Stainless steel body
- Port size: NW100

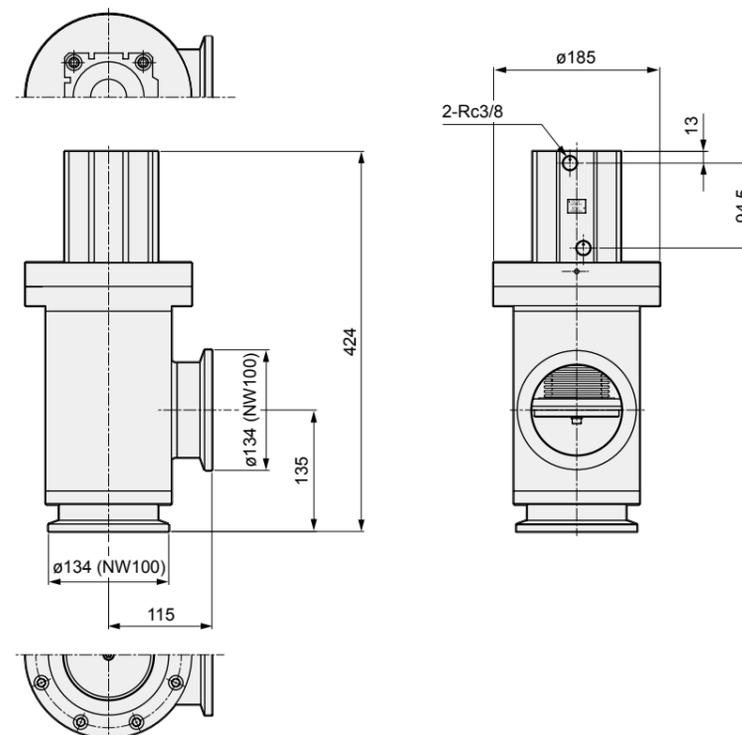
## Special Specifications

### Specifications

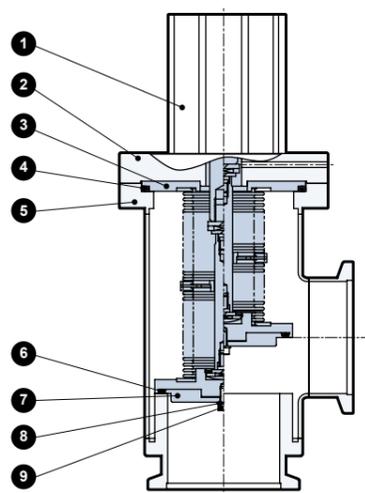
Item	AVB932-X□
Applicable Fluid	Vacuum and inert gas
Working pressure Pa (abs)	$1.3 \times 10^{-6}$ to $1 \times 10^5$
Max. Operating Pressure Differential MPa	0.1
Valve Seat Leakage Pa·m <sup>3</sup> /s (He)	$1.3 \times 10^{-9}$ or less
External Leakage Pa·m <sup>3</sup> /s (He)	$1.3 \times 10^{-9}$ or less
Proof Pressure MPa	0.3
Fluid temperature °C	5 to 60
Ambient Temperature °C	0 to 60 (no freezing)
Orifice Diameter mm	100
Stroke mm	50
Conductance *1 L/s	372
Port Size	NW100
Operating Pressure MPa	0.3 to 0.5
Weight kg	18

\*1: The conductance value is a theoretical calculated value in the molecular flow region and is not an actual measured value.

### External Dimension Drawings



### Internal Structure Diagram and Materials



Part No.	Part Name	Material
1	Super Compact Cylinder	-
2	Cylinder adaptor	A5056
3	Bellows assembly	-
4	O-ring	FKM Note
5	Body Assembly	SUS316
6	O-ring	FKM Note
7	Valve Disc B	SUS316
8	Spring Washer	SUS304
9	Hexagon Socket Head Cap Screw	SUSXM7

Note) For information on other available O-ring materials, please inquire.

AGD  
 OGD  
 MGD  
 LGD  
 High Durability  
 Other Gas Components  
 PGM  
 IAGD  
 AVB  
 MVB  
 IAVB  
 Process Gas Valve  
 High Vacuum Valve  
 Vacu Press Control Sys

Ending



Components for High Vacuum

# To Use This Product Safely

Be sure to read this before use.  
For General Precautions refer to Into 9.

Individual Precautions: Air Operated Valve for High Vacuum, AVB Series

## Design / Selection

### 1. Confirmation of Specifications

#### Warning

- Incorrect equipment selection and handling can cause problems not only in this product, but also to your system. Please be sure to confirm the specifications of this product and its compatibility with your system before use.
- Check the compatibility between the gas contact part materials and working fluid before use.
- Use within the specified fluid temperature and pressure range.

### 2. Working fluids

#### Caution

- This product is designed for controlling vacuum or inert gas. If other fluids (active gas, liquids, solids, etc.) pass through, the product may fail to operate normally or may display decreased performance. Check the compatibility between the gas contact part materials and working fluid before use. If there is a risk of the applicable fluid solidifying, please confirm that there are no issues with its use before using.
- Avoid using fluids that build up crystallization in the piping.

### 3. Selection

#### Caution

- When managing valve responsiveness, pay attention to piping size and length and the flow characteristics of the operation solenoid valve.
- The cylinder and bellows interior are directly connected to atmosphere. Do not block the connecting hole between the bellows interior and the atmosphere (2 holes just under the operation port) in use.
- Fittings Select air piping and piping that match the working temperature.

### 4. Mounting

#### Caution

- Perform piping so no excessive force is applied to the flange. If heavy objects and mounted components vibrate, fix so that torque is not applied directly to the flange.
- High-Temperature Specification
  - When insulating the valve, insulate only the body. Please note that insulating the cylinder may prevent the maintenance of normal operation.

### 5. Securing Space

#### Caution

- Secure sufficient space for maintenance and inspection.

### 6. Piping

#### Caution

- When piping, do not apply tension, compression, bending or other forces to the valve body from the piping.
- Durability may decrease due to exhaust flow, so we recommend use of the bellows side as the exhaust side except for models with limited vacuum pump connection ports. In addition, since durability varies depending on the operating conditions, please confirm sufficiently.

### 7. During Use

#### Caution

- Do not use valves as a footing or place any heavy objects on top of the valves.



Cylinder Switch

# To Use This Product Safely

Read the precautions listed in the latest "Pneumatic cylinders" (No.RJ-002AA to 006AA) before use.

## Design / Selection

### Solid State Switch T2H, T2V, T3H, T3V

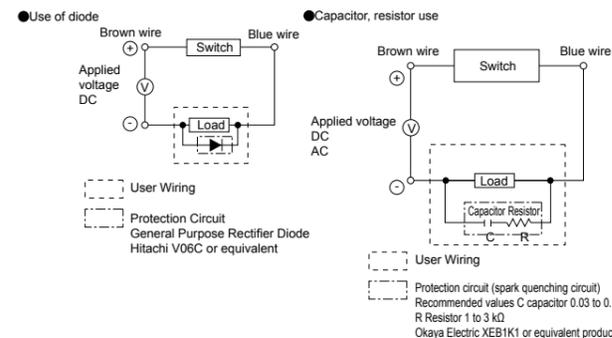
### Reed Switch T0H, T5H, T0V, T5V

#### Warning

- Using outside the specified range of application, load current, voltage, temperature, impact, environment, etc. may cause damage or malfunction. Therefore, use correctly within the specified range.
- Never use in an explosive gas atmosphere. The switch does not have an explosive-proof structure. If used in an explosive gas atmosphere, it may cause an explosion disaster, so never use it.
- The lamps used are LEDs. If used continuously at high temperatures, visibility will gradually decrease. As the LED lamp circuit is separated from the switch output circuit, the switch output works normally even if the LED lamp goes out.
- Do not flow overcurrent.
  - If overcurrent flows to the switch due to a load short-circuit, etc., the switch will be damaged with a risk of ignition. If necessary, please provide an overcurrent protection circuit such as a fuse on the output line and power supply line.

#### Caution

- Please be careful when using in an interlock circuit.
  - When using the switch for an interlock signal requiring high reliability, provide a double interlock by installing a mechanical protection function or a sensor other than a switch as a safeguard against failure. In addition, please perform regular inspections and confirm that it operates normally.
- Please pay attention to the contact capacity.
  - Do not use a load that exceeds the maximum contact capacity of the switch. It will cause failure. The lamp may not come on if the current is less than the rated current.
- Please pay attention to the contact protection circuit. (Reed switch)
  - When an inductive load (relay or solenoid valve) is connected, a surge voltage is generated when the switch is turned OFF. Provide a contact protection circuit.

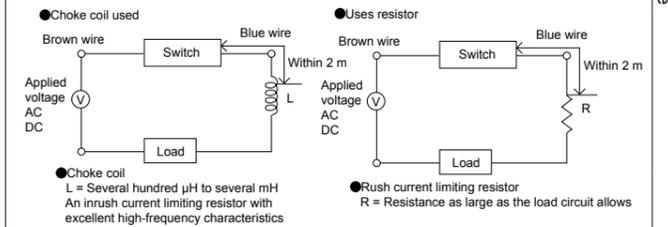


- When connecting and using capacitive loads (capacitors), inrush current will occur when the switch is ON, so always install a contact protection circuit.

- If the wiring increases, the wiring capacity will be reached and a rush current will occur, damaging the switch or shortening the service life. Provide a contact protection circuit if the wiring length exceeds Table 1.

Switch	Voltage	Wiring length
T	DC	50 m
T	AC	10m

Table 1

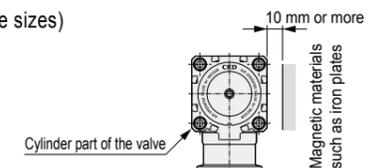


For specifications of contact protection circuits, refer to pneumatic cylinders (Catalog No. RJ-002AA to 006AA).

- Avoid using in environments where water is constantly splashing.
  - It may cause malfunction due to insulation failure, etc.
- Avoid using in oily or chemical environments.
  - The switch may be adversely affected (insulation failure, malfunction caused by swelling of the filled resin, hardening of lead wire sheath, etc.) if used in an environment containing oil, coolant, cleaning fluid, or chemicals. Consult with CKD.
- Do not use in environments with large impacts.
  - For reed switch, if a strong impact (294 m/s<sup>2</sup> or more) is applied while in use, a signal may appear momentarily (1 ms or less) or malfunction. It may also be necessary to use a solid state switch depending on the operating environment, so please consult us.
- Do not use in locations where surge sources exist.
  - If there are device components (solenoid lifters, high frequency induction furnace, motors, etc.) around the valve with proximity switch that generate a large surge, consider surge protection of the source as it may lead to deterioration or damage of the switch internal circuit element.
- Be careful about the accumulation of iron powder and close proximity to magnetic materials.
  - If a large amount of iron chips such as cutting chips or welding spatter accumulate or if magnetic objects (material attracted to magnets) contact the valve with a valve switch, the valve will be demagnetized and valve switch operations may be inhibited.
  - Pay attention to the proximity of valves, etc. When installing more than one valve with switches in parallel, maintain sufficient distance according to the value shown.
  - The switches may malfunction due to mutual magnetic interference.

#### Caution

- The switch may malfunction if there is a magnetic substance such as a metal plate installed adjacently. Confirm that a distance of at least 10mm is allocated from the surface of the valves. (Common to all bore sizes)



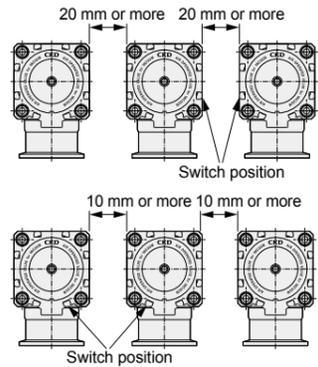
AGD  
OGD  
MGD Process Gas Valve  
LGD  
High Durability  
Other Gas Components  
PGM Regulator  
IAGD Integrated System  
AVB High Vacuum Valve  
MVB High Vacuum Valve  
IAYB Vacu Press Control Sys

AGD  
OGD  
MGD Process Gas Valve  
LGD  
High Durability  
Other Gas Components  
PGM Regulator  
IAGD Integrated System  
AVB High Vacuum Valve  
MVB High Vacuum Valve  
IAYB Vacu Press Control Sys

Ending

Ending

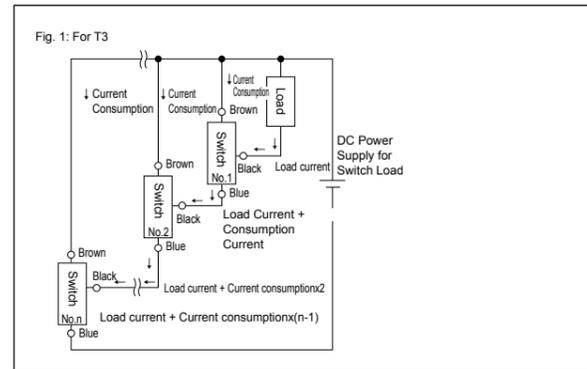
- The switch may malfunction if valves are installed adjacently. Check that the following distance is allocated from the surface. (Common to all bore sizes)



- Pay attention to the magnetic environment.
  - When installing valves with switch nearby in parallel, or if a magnetic object is very close to the valve with switch, mutual interference may occur and adversely affect detection accuracy.

- Be careful of the internal voltage drop caused by serial connection.

- When connecting multiple 2-wire switches in series, the voltage drop across the switches is the sum of the voltage drops of all connected switches. The voltage applied to the load side will be the power supply voltage minus the voltage drop across the switches. Check the load specifications before deciding on the number of units to connect.
- When connecting multiple 3-wire solid-state switches in series, the voltage drop across the switches is the sum of the voltage drops of all connected switches, similar to the 2-wire type. In addition, the current flowing to the switch is the sum of current consumption and load current of the switches connected as in the figure below. Check load specifications and determine the number of connections so as not to exceed the maximum load current of the switch.
- The lamp turns ON only when all switches are ON.

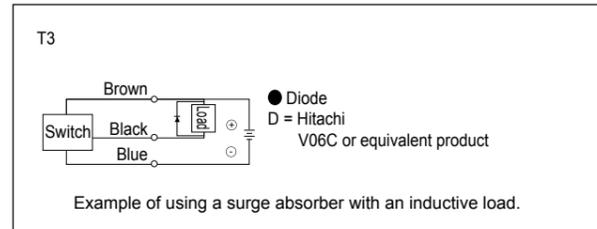


- Pay attention to the leakage current caused by the parallel connection.

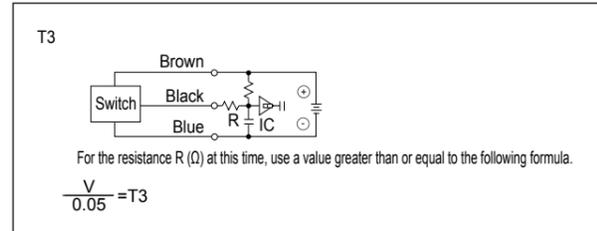
- When connecting multiple 2-wire switches in parallel, the leakage current increases by the number of connected units. Therefore, confirm the load specifications and decide the number of connected units. The indicator lamp of the switch may become dim or not light up.
- For 2-wire solid state switches, from when one switch turns ON until it turns OFF, the voltage across the parallel-connected switches drops to the internal voltage drop value when the switch is ON, falling below the load voltage range, so other switches will no longer turn ON. Therefore, check the input specifications of the connected load, such as a programmable controller, before use.
- For 3-wire solid-state switches, the leakage current is very small (10μA or less), so there is no problem in normal use.

- Output circuit protection

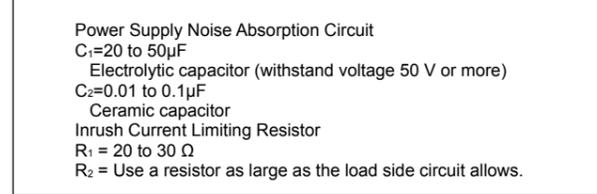
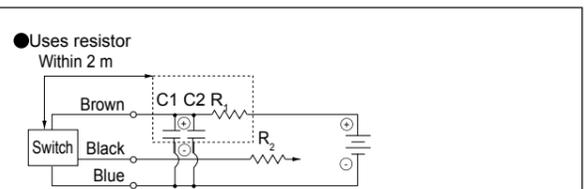
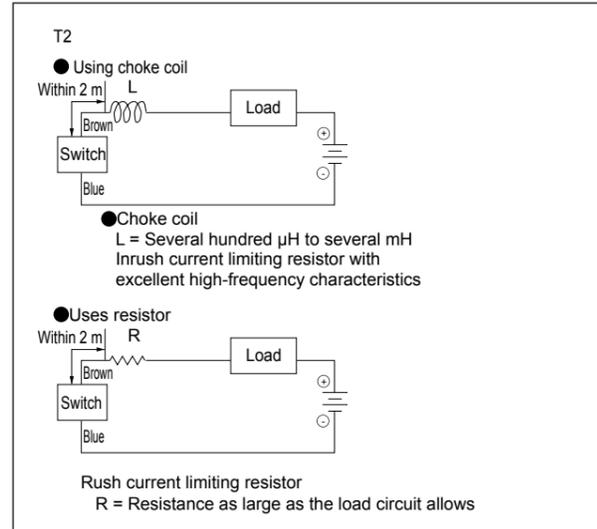
- When an inductive load (relay or solenoid valve) is connected, surge voltage is generated when the switch is turned OFF. Provide the following protection circuit.



- When connecting and using capacitive loads (capacitors), inrush current will occur when the switch is ON, so always install a protection circuit as shown in the figure below.



- If the lead wire length exceeds 10 m, always install a protection circuit as shown in the figure below.



- If special quality and reliability are required, such as when using with a customer-dedicated circuit board, a proximity switch is recommended. In addition, please be sure to thoroughly check the compatibility judgment by yourself.

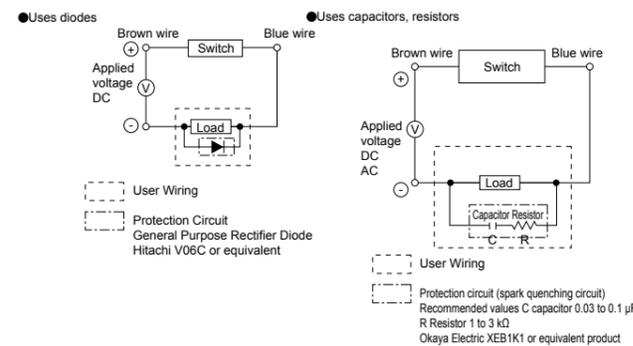
Reed switch ET0H/ET0V

Warning

- Using outside the specified range of application, load current, voltage, temperature, impact, environment, etc. may cause damage or malfunction. Therefore, use correctly within the specified range.
- Never use in an explosive gas atmosphere. The switch does not have an explosive-proof structure. If used in an explosive gas atmosphere, it may cause an explosion disaster, so never use it.
- The lamps used are LEDs. If used continuously at high temperatures, visibility will gradually decrease. As the LED lamp circuit is separated from the switch output circuit, the switch output works normally even if the LED lamp goes out.
- Do not flow overcurrent. If overcurrent flows to the switch due to a load short-circuit, etc., the switch will be damaged with a risk of ignition. If necessary, please provide an overcurrent protection circuit such as a fuse on the output line and power supply line.

Caution

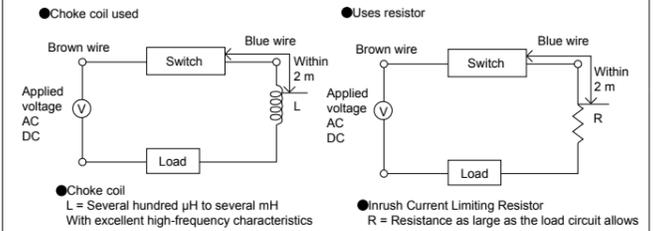
- Please be careful when using in an interlock circuit. When using the switch for an interlock signal requiring high reliability, provide a double interlock by installing a mechanical protection function or a sensor other than a switch as a safeguard against failure. In addition, please perform regular inspections and confirm that it operates normally.
- Please pay attention to the contact capacity. Do not use a load that exceeds the maximum contact capacity of the switch. It will cause failure. The lamp may not come on if the current is less than the rated current.
- Please pay attention to the contact protection circuit. When an inductive load (relay or solenoid valve) is connected, a surge voltage is generated when the switch is turned OFF. Provide a contact protection circuit.



- When connecting and using capacitive loads (capacitors), inrush current will occur when the switch is ON, so always install a contact protection circuit.
- If the wiring increases, the wiring capacity will be reached and a rush current will occur, damaging the switch or shortening the service life. Provide a contact protection circuit if the wiring length exceeds Table 1.

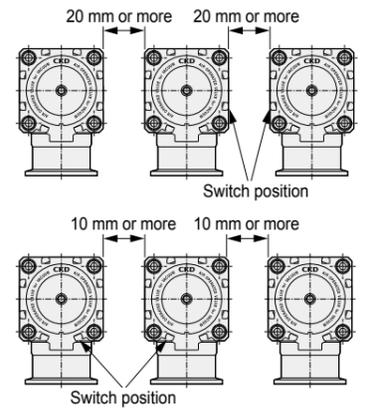
Switch	Voltage	Wiring length
ET0	DC	50 m
ET0	AC	10m

Table 1



For specifications of contact protection circuits, refer to pneumatic cylinders (Catalog No. RJ-002AA to 006AA).

- Pay attention to the magnetic environment.
  - When installing valves with switch nearby in parallel, or if a magnetic object is very close to the valve with switch, mutual interference may occur and adversely affect detection accuracy.
  - If adjacent to a switch other than ET0, it may malfunction at the following distance. Therefore, check the operation before use. (Common to all bore sizes)



- Be careful of the internal voltage drop caused by serial connection.

- When connecting multiple 2-wire switches in series, the voltage drop across the switches is the sum of the voltage drops of all connected switches. The voltage applied to the load side will be the power supply voltage minus the voltage drop across the switches. Check the load specifications before deciding on the number of units to connect.

- Pay attention to the leakage current caused by the parallel connection.

- When connecting multiple 2-wire switches in parallel, the leakage current increases by the number of connected units. Therefore, confirm the load specifications and decide the number of connected units. The indicator lamp of the switch may become dim or not light up.

**During Use**

- Do not use the same wiring as power lines or high-voltage lines.

Avoid parallel wiring or using the same conduit as power lines/high-voltage lines; use separate wiring. The control circuit containing the switch could malfunction due to noise.

- Do not short-circuit the load.

If turned ON in a load short-circuited state, overcurrent will flow and the switch will be instantaneously damaged.

- Be careful when connecting lead wires.

Turn off the power to the equipment on the connected electrical circuit side before performing wiring work. Working with the power on can cause electric shock or accidents due to unexpected operation.

● Reed Switch

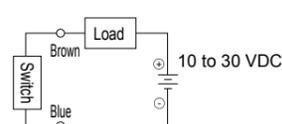
Do not connect the switch lead wires directly to the power supply; always connect a load in series. Pay attention to the following (1), (2) for TO.

- When used for DC, connect the brown wire on the plus (+) side and the blue wire on the negative (-) side. The switch will function when connected in reverse, but the lamp will not turn ON.
- When connected to an AC relay or programmable controller input, conducting half wave rectification with that circuit may prevent the switch lamp from turning ON. The lamp will come ON when the switch lead's polarity is reversed.

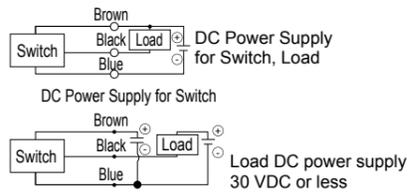
● Solid State Switch

Correctly connect the lead wires based on the color coding in the figure below. Incorrect wiring may cause damage. Please be careful.

● T2



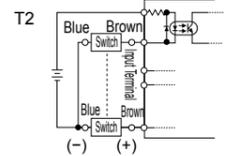
● T3



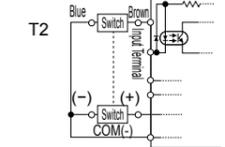
(Connection to Programmable Logic Controller (PLC))

- Connection method varies depending on the type of programmable controller. Connect according to the input specifications.

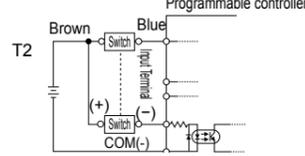
● Connection to source input (external power supply) type



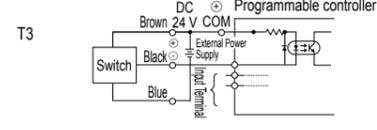
● Connection to source input (built-in power supply) type



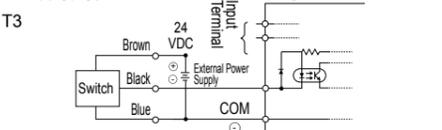
● Connection to sink input type



● Connection to source input (external power supply) type



● Connection to source input (built-in power supply) type



■ Lead wire protection

The lead wire's min. bending radius is 9 mm and over (when fixed). Pay attention to wiring so repeated bending and tensile strain are not applied to the lead wire.

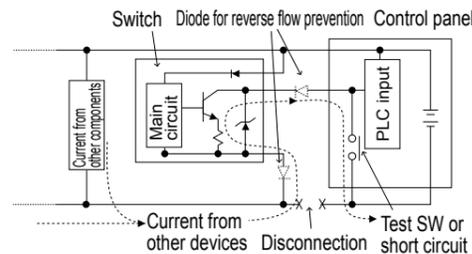
■ Relay

Use the following equivalent relays.

- Omron . . . . . MY type
- Fuji Electric . . . . . HH5 type
- Panasonic . . . . . HC type

- Be careful about reverse current due to wire breakage or wiring resistance.

When other components, including switches, are connected to the same power supply as the switch, and the output cable and power cable's minus side are short-circuited or the power supply's minus side is disconnected to check operation of the input unit from the control panel, reverse current could flow to the switch's output circuit and cause damage.

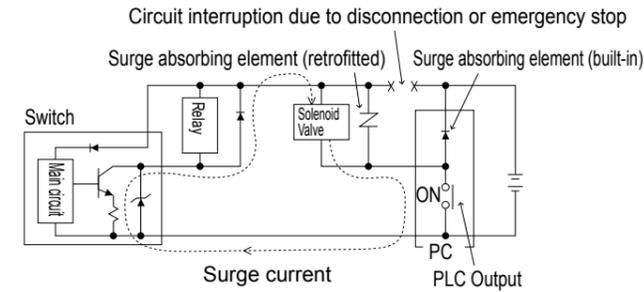


- To prevent damage due to reverse current, take the following measures.

- Avoid centralizing current at the power cable, especially a negative power cable, and use a wire as thick as possible.
- Limit the number of components connected to the same power supply as the switch.
- Insert a diode in serial with the switch's output cable to prevent reversal of current.
- Insert a diode in serial with the switch's power cable minus side to prevent reversal of current.

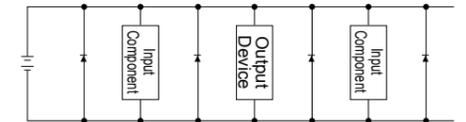
- Be careful about surge current bypass.

- When switch power is shared with an inductive load that generates surges, such as a solenoid valve or relay, if the circuit is cut off while the inductive load is functioning, surge current could enter the output circuit and cause damage depending on where the surge absorber is installed.



- To prevent damage due to surge current sneak paths, take the following measures.

- Separate the power supply for the output system comprising the inductive load, such as the solenoid valve and relay, and the input system, such as the switch.
- If a separate power supply cannot be used, directly install a surge absorption element for all inductive loads. Consider surge absorbing elements connected to PLCs, etc., as protecting only that equipment.
- Connect a surge absorber to places on the power wiring shown in the figure below, as a measure against disconnections in unspecified areas.



Furthermore, if equipment is connected with connectors, disconnecting the connector while power is on may cause the output circuit to be damaged due to the above phenomenon. Always turn off the power before connecting or disconnecting connectors.

For cautions about mounting, installation, adjustment, use, and maintenance, refer to CKD components Product Site (<https://www.ckd.co.jp/kiki/jp/>) → "Model No." Instruction Manuals